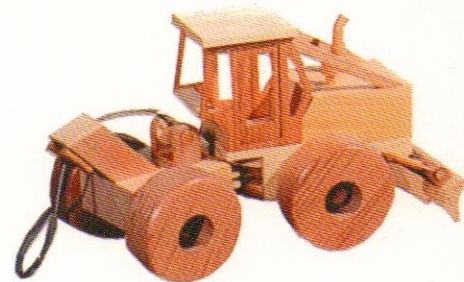
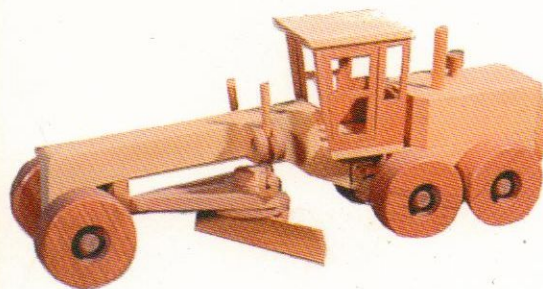
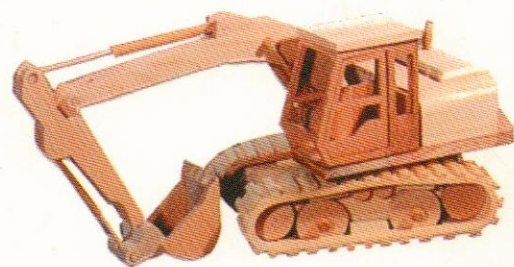
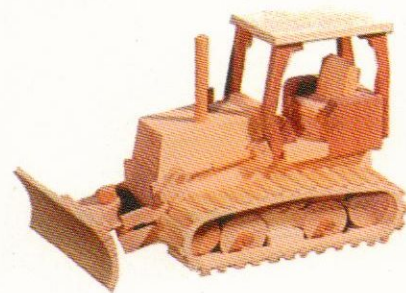


# **REALISTIC CONSTRUCTION MODELS YOU CAN MAKE**

**8 MODELS**

**FULL-SIZED  
PATTERNS**

**EASY TO  
FOLLOW  
ASSEMBLY  
DRAWINGS**



**BY  
LUC ST-AMOUR**



# Realistic Construction Models You Can Make

By Luc St-Amour



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## **IMPORTANT**

### **Notice to parents and readers**

The models in this book are designed as display models only, not toys.

There are many small parts that can break easily and be swallowed by a young child!

If you wish to make this collection for children 5 years of age and up, you may purchase the book called *Making Construction Vehicles For Kids* by the same author.



For my wonderful wife and children

who are always there to give me

love, support and inspiration.



## Acknowledgments

I wish to thank all the people who have contributed to this project, especially my family and friends.

I would also like to thank the "Autodesk" company, who supplied me with the "Autocad" computer software.

I dedicate this book to all the people who are young at heart - people who still believe that dreams can come true and that everyday life is full of little joys.

I hope that these models give you as much pleasure (making them or giving them) as I had creating them for you.

Luc St-Amour



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# Introduction

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This book is for all those who enjoy building wooden models. In this edition you will learn to build fascinating construction vehicles. Our main objective in creating this book was to help you attain the best possible results in reproducing these vehicles as easily and simply as possible. Building them will require patience, know-how and, most importantly, the proper tools.

So, for those who enjoy detail and precision, you'll love building these models using the easy and accurate methods suggested in this book.

You will note that special care has been taken to provide you with as many explanations and instructions as possible. All patterns are full size and easily transferred onto wood. Easy-to-follow assembly drawings are also included for each model.

Please keep in mind the most important aspect of woodworking - safety! And don't forget to read all instructions before you begin.

I wish you the best of luck with your projects.

**Please note:** The models you can build with this book are not toys. (There are many small parts that can easily break and may be swallowed by young children.) They have been specifically designed as display models only. If you wish to make this line of construction vehicles for a child, you can buy the book entitled *Making Construction Vehicles For Kids* by the same author.



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# How to use this book

---

1. Start by reading through the book to get familiar with its contents.
2. Make the two jigs shown on page 4 and 5.
3. Use the materials list to cut all the parts required for a particular model. Label the parts with a pencil using their corresponding number (e.g. L1, L2)
4. You have been supplied with two sets of patterns for each model. The first set is found with the instructions and includes all parts. The second set can be found in the appendix and includes only those parts complicated enough to require a pattern. Using scissors, cut out the second set of patterns needed to make the model you have chosen to build.
5. Attach the pattern to the proper piece of stock.
6. Cut and sand the finished parts.
7. Mark drill holes, if required, and remove the pattern.
8. When all the parts are completed, follow the step-by-step assembly drawings to complete your model.



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# Tools and Techniques

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Because of the complexity of the models, the use of power tools is a must. They will not only give you the precision needed but will also save you an enormous amount of time.

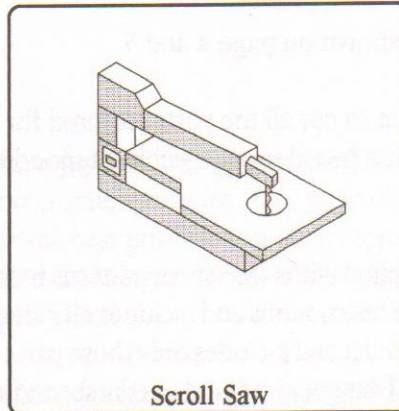
To make some parts you will be required to make intricate inside cuts. The best tool for this task is the scroll saw. A drill press must also be used to drill holes in the centre of the dowel. (A hand drill is not suitable for this task.)

For sanding purposes, you will need power sanders to save you time and give better results.

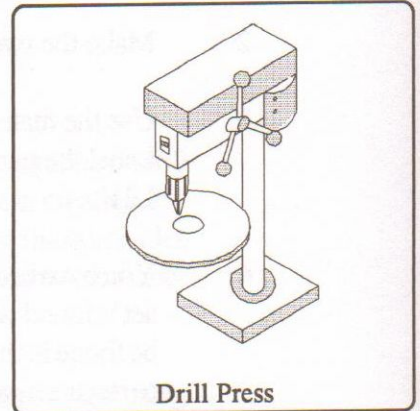
The wood needed to make these projects varies in thicknesses which are not standard. This means you will need to use a thickness planner and a bandsaw to re-saw and bring the wood to the specified thickness. (Some of you may have access to these tools at school, from friends or at a store.)

## Accessories Needed

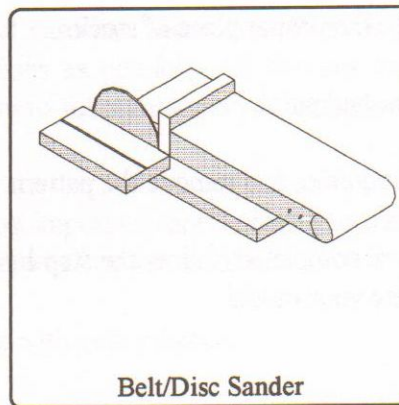
- Drill bit set (1/16" to 1/2")
- Brad point bits (1/8" and 1/4")
- Flat drill bit set (3/8" to 1")
- Measuring tape
- Combination square
- Sanding drum set
- Wood vice
- Assorted c-clamps
- Scriber
- Wood glue
- Wood file
- Pencil and eraser
- 12" ruler (clear recommended)
- 1/2" wide masking tape
- Compass
- Circle template



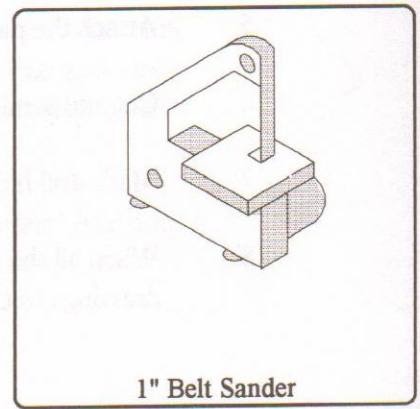
Scroll Saw



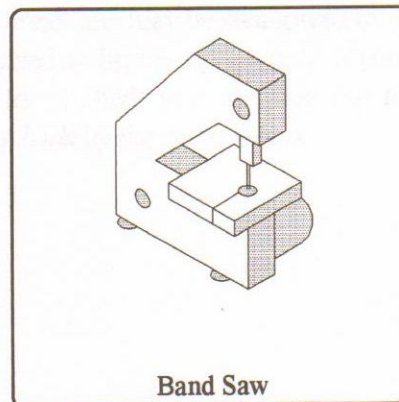
Drill Press



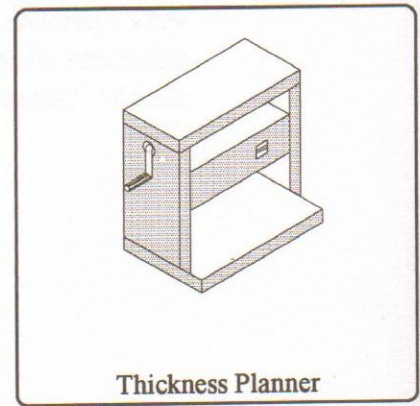
Belt/Disc Sander



1" Belt Sander



Band Saw



Thickness Planner



# Helpful Hints

## HINT #1 MAKING A CHANFER ON THE WHEELS

Make a jig to round the edges of your wheels by cutting a bolt (removing the hexagon) and assembling it, as shown. Use this jig with your drill press.

Please note: Drill a 1/4" diameter hole in your wheels to install on this jig. When you finish sanding the wheels, re-drill the 1/4" diameter holes, this time using a 17/64" drill bit as specified in your plans.

### Materials needed to make this jig

- (1) 1/4" diameter bolt, 1 3/4" long
- (2) 1/4" int.diameter flat washers
- (1) 1/4" diameter nut

### Illustration 1

View of parts necessary to make the sanding jig.

### Illustration 2

Insert unthreaded end of bolt into drill press. Tighten chuck and slide on washer, wheel and 2nd washer. Secure everything using the nut.

### Illustration 3

You are now ready to make the chanfer on the wheel. Start your drill press at low to medium r.p.m.s. Then, use a wood file to round the edges of your wheel. Use sandpaper to get a smooth finish.

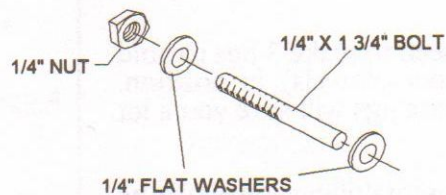


Illustration 1

DRILL CHUCK

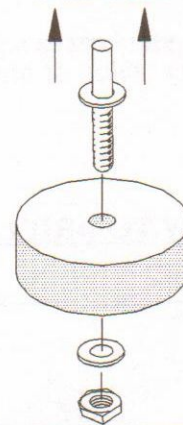


Illustration 2

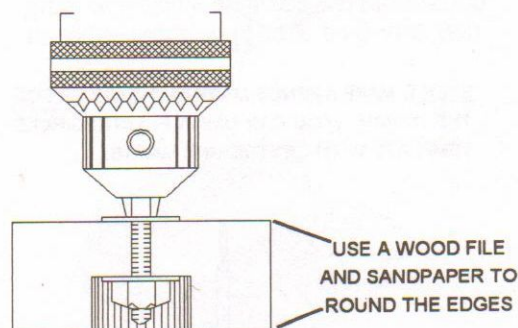


Illustration 3

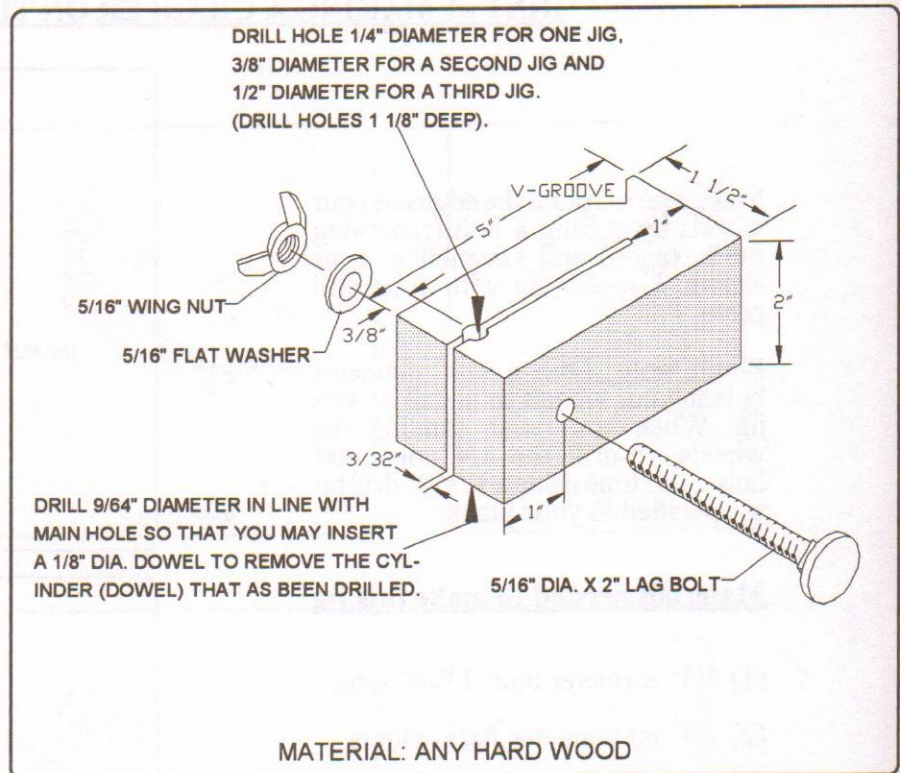


## **HINT #2 MAKE YOUR OWN SPECIAL DRILLING JIGS**

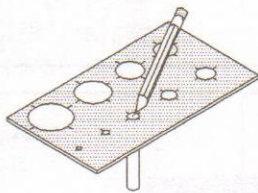
To make the models shown in this book you must be able to drill a hole perfectly in the centre of a dowel. You can do this using your drill press and the special homemade jig shown here.

You will need to make 3 jigs to hold the cylinders (dowels) in position. Making these jigs will save you a lot of time!

Instructions for drilling dowels can be found below.



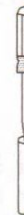
## **HINT #3 HOW TO DRILL A HOLE PERFECTLY IN THE CENTRE OF A DOWEL**



**STEP 1:** MAKE A PENCIL MARK IN THE CENTRE OF THE DOWEL. (YOU CAN USE A PLASTIC CIRCLE TEMPLATE WITH CENTRE LINE MARKS.)



**STEP 3:** USE A BRAD POINT BIT TO DRILL THE HOLE. (IMPORTANT: YOU CANNOT USE A REGULAR BIT FOR THIS OPERATION.)



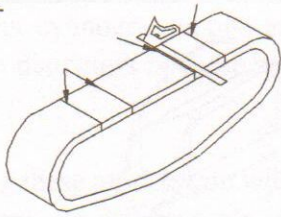
**STEP 2:** USE A SCRIBER TO MARK THE CENTRE.

**STEP 4:** DRILL THE HOLE TO THE SPECIFIED DEPTH USING A PIECE OF 1/2" MASKING TAPE WRAPPED AROUND THE BIT. (SEE PAGE 7 FOR TIPS ON USING THIS METHOD.)



## HINT # 4 HOW TO MAKE A TRACK ASSEMBLY

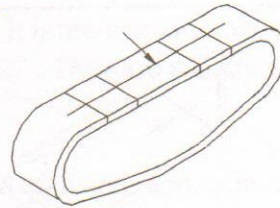
### Step 1



Trace four lines across surface, as shown.

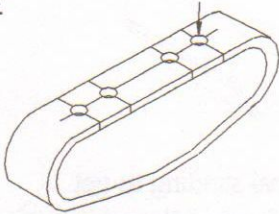
(Note: See patterns for guide lines.)

### Step 2



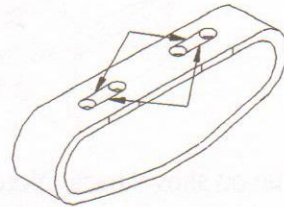
Trace a line down the centre, as shown.

### Step 3



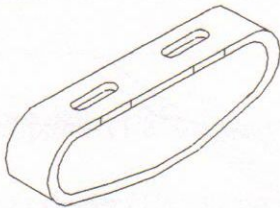
Drill four 3/8" holes on centre marks through first surface only.

### Step 4



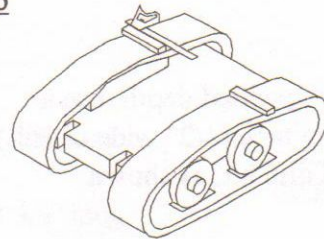
Using a sharp knife, cut lines tangent to holes, as shown.

### Step 5



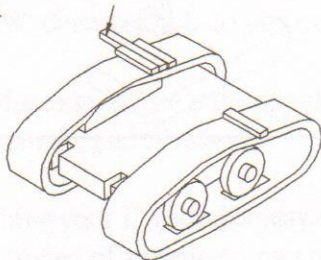
Opening properly cut.

### Step 6



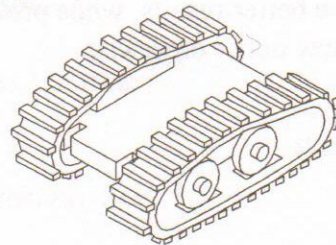
Assemble track assembly, then glue two track threads perpendicular to sides using a square to guide you.

### Step 7



Glue the rest of the track threads using a spacer that is the same width as track threads.  
(Note: Do not glue this spacer.)

### Step 8

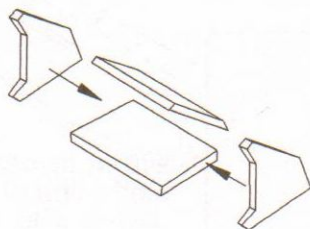


When you are done glueing all the threads, wait for them to dry before doing a final sanding.



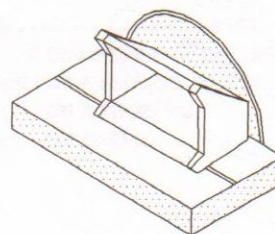
### HINT # 5 MAKING A SHOVEL THE EASY WAY

#### Step 1



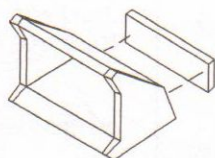
Glue shovel sides to shovel, top and bottom, as shown.

#### Step 2



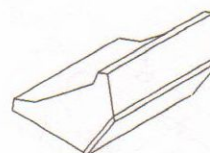
Sand the back surface to get a straight face.

#### Step 3



Glue on shovel back. Note: Shovel top, bottom and back are cut oversized to allow sanding.

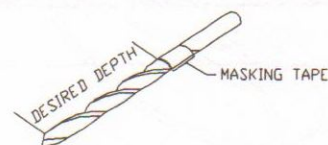
#### Step 4



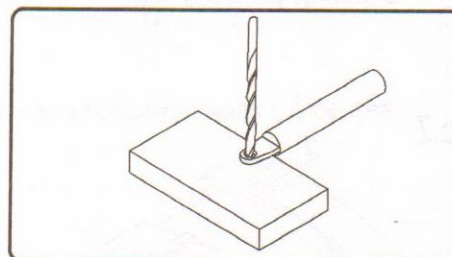
Do a final sanding to get your finished shovel.

### HINT # 6 HOW TO DRILL HOLES TO THE SPECIFIED DEPTH

To get holes to specified depth, use a piece of masking tape (1/2" wide or less). Wrap it around drill bit, as shown.



Also, always use a piece of scrap wood (e.g. plywood) under the part that you are drilling. You will achieve better results, while preventing breakage that may occur otherwise.



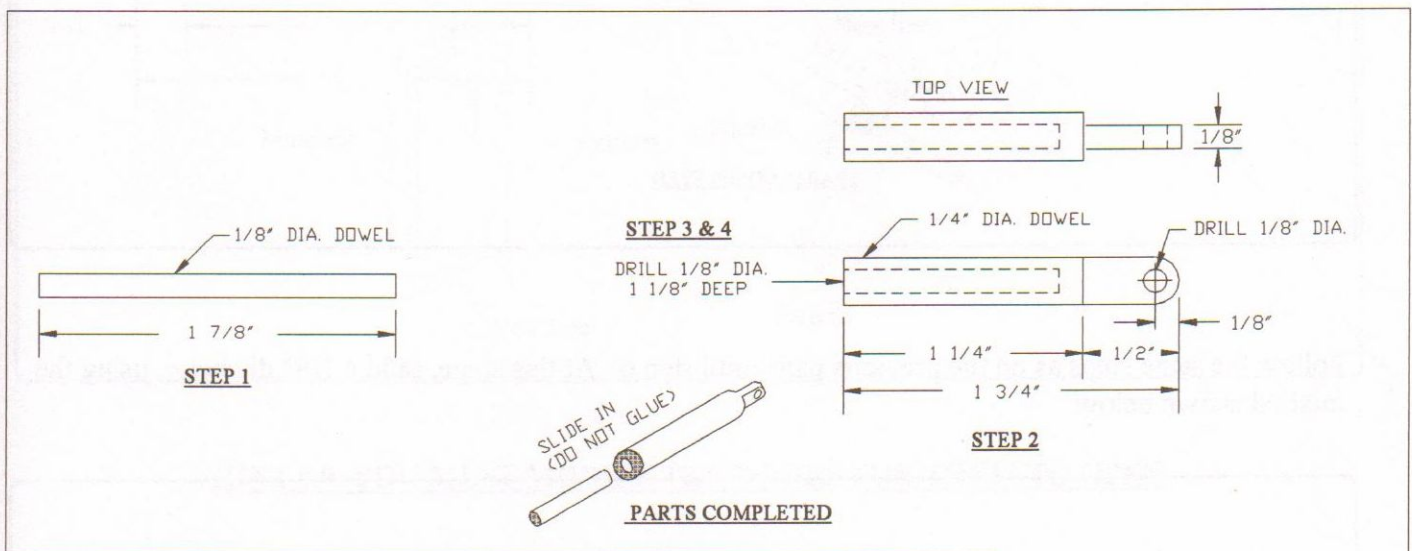


## HINT #7 HOW TO MAKE THE DIFFERENT PISTONS AND CYLINDERS REQUIRED

All the pistons, cylinders and pins are made by using maple dowels. It is recommend that you purchase a few of each. The diameters of these dowels are 1/8", 1/4", 3/8" and 1/2". They are usually sold in 3- or 4- foot lengths.

When making these models you will need to make two different types of pistons and cylinders. Each requiring just a few steps. In a short time, you should be able to make them quickly and easily.

The following is the first type of piston and cylinder you will need to make.



Step 1 Cut piston (1/8" diameter dowel) to length. In this case 1 7/8" long.

Step 2 Cut cylinder (1/4" diameter dowel) to length. In this case 1 3/4" long.

Step 3 Trace and mark the centre of the cylinder (1/4" diameter dowel) using the method shown on page 5.

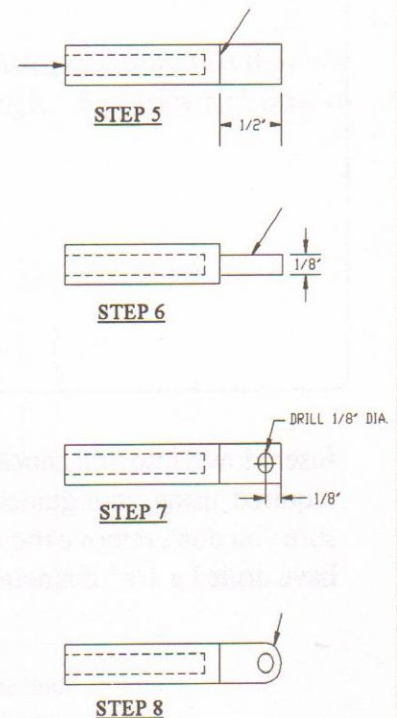
Step 4 Using the jig shown on page 5, hold the cylinder in position and drill the 1/8" diameter hole to proper depth- in this case 1 1/8" deep.

Step 5 Make a guideline at the opposite end of cylinder. In this case, 1/2" away from the end of dowel.

Step 6 Using your 1" wide disc sander, sand this end flat to 1/8" thickness. See drawing of completed part above.

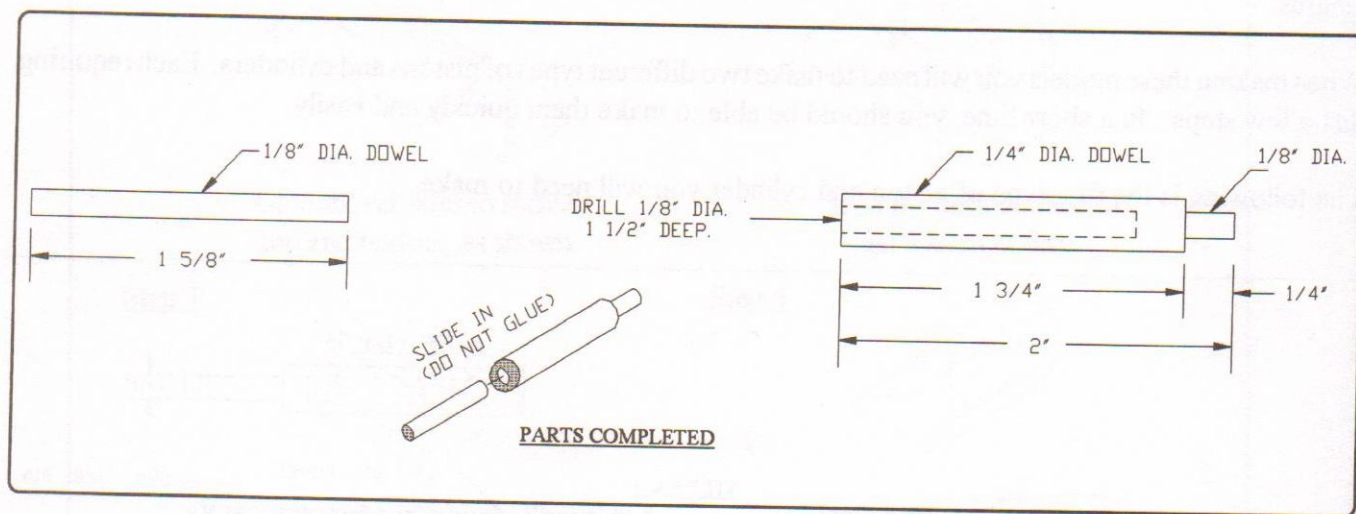
Step 7 Drill the 1/8" diameter hole.

Step 8 Round off the corners to complete the piston and cylinder assembly.

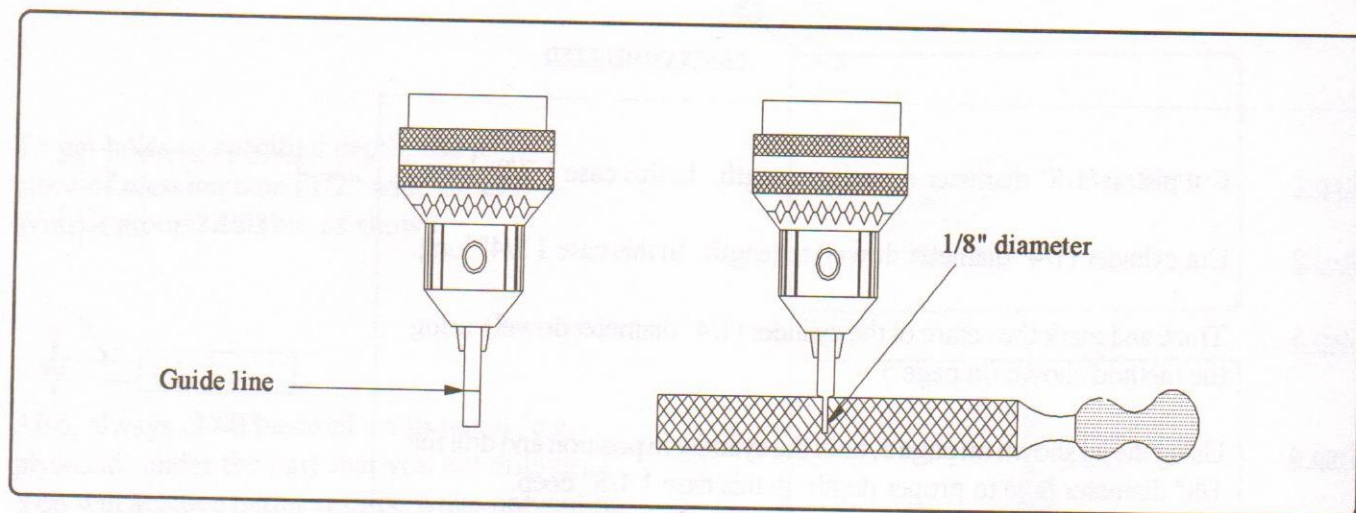




The following is an example of the second type of piston and cylinder you will need to make. The only difference between the two types, is that the first has a 1/8" flat end, and this one has a 1/8" diameter end.



Follow the same steps as on the previous page until step 6. At this stage, sand a 1/8" diameter, using the method shown below.



Insert dowel into drill chuck, as shown above. Using a wood file, sand dowel until you get the 1/8" diameter required, using your guideline to help you. It is recommended that you check your diameter often to make sure you don't remove too much material. To test your diameter, use a piece of scrap wood in which you have drilled a 1/8" diameter hole, then check for proper fit.



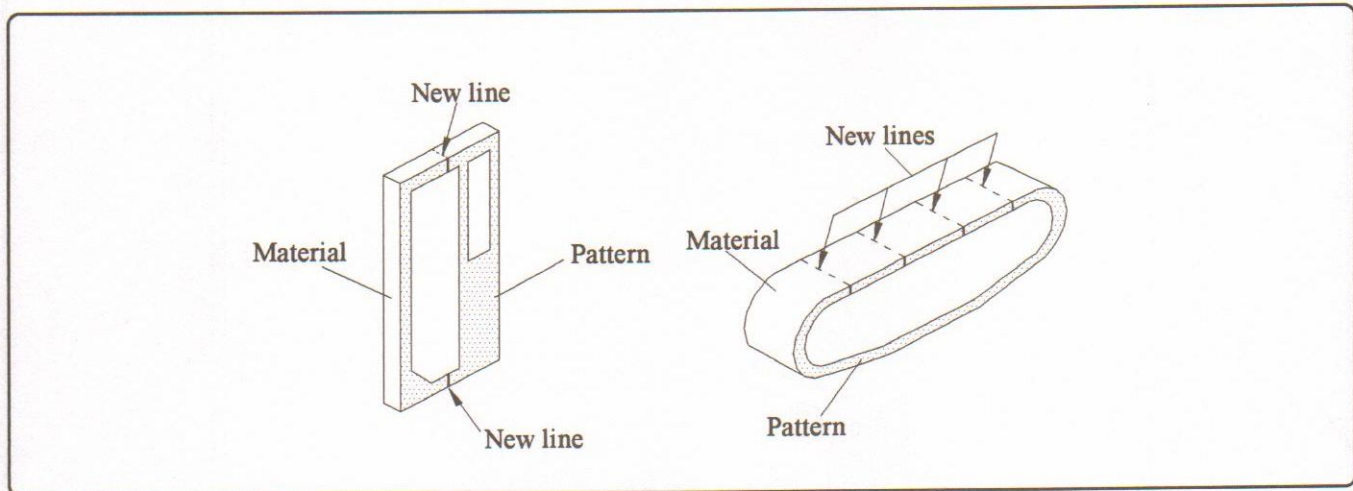
## **HINT #8 TRANSFERING THE GUIDELINES FROM PATTERNS**

### **IMPORTANT:**

This section applies to these parts only:

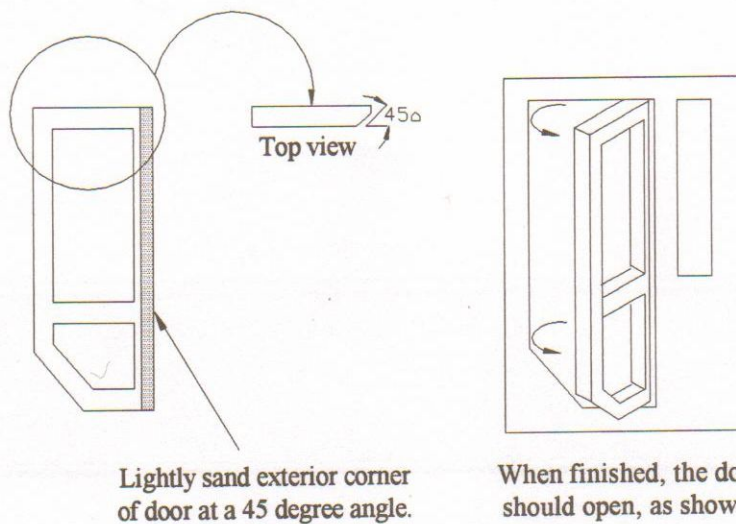
- The cabin sides
- The tracks

Transfer guidelines, as shown below.



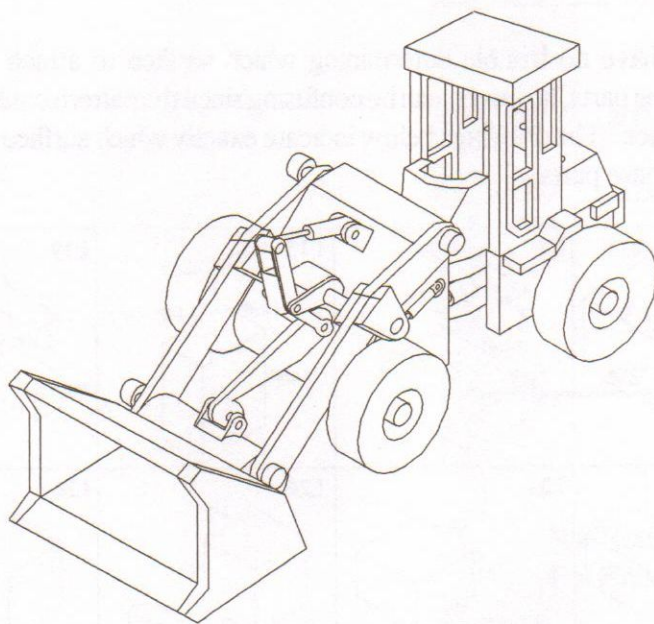
## **HINT #9 YOU MUST MODIFY THE DOORS FOR THEM TO OPEN**

When doors and cabin sides are cut, there must be a small gap between them. Also, to ensure that they will open and close properly, a section of the door must be sanded to a 45 degree angle. See drawing below to see how this is done.





# LOADER





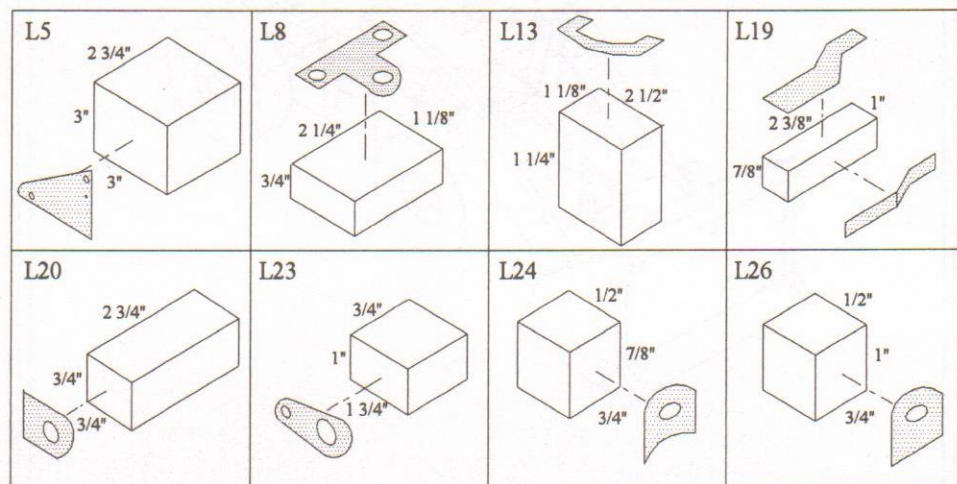
# General Instructions - Loader

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately  $\frac{1}{16}$ " all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts L16, L20 and L27.
- 4- Parts L8, L16, L19, L23, L24, L25 and L26 will need additional cuts and details. Please refer to the Additional Information pages to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Loader

Part	T	W	L	Material	Qty.	*
L1	1/4"	2 1/4"	3 1/4"	oak	1	R
L2	1/4"	2 1/4"	3 1/4"	oak	1	R
L3	1/4"	1 1/4"	2 7/8"	oak	1	R
L4	1/4"	2 1/2"	3 1/4"	oak	1	R
L5	3"	2 3/4"	3"	pine	1	F
L6	1/2"	2 1/2"	6 1/8"	pine	2	R
L7	3/4"	2 1/2"	5"	pine	1	R
L8	3/4"	1 1/8"	2 1/4"	maple	1	R
L9	1/4"	2"	5"	pine	2	R
L10	1/4"	1 7/8"	4 1/2"	pine	1	F
L11	1/8"	1 1/2"	5"	pine	1	F
L12	1/4"	2 3/4"	4 1/2"	pine	1	F
L13	1 1/4"	1 1/8"	2 1/2"	pine	1	R
L14	1/4"	2 3/4"	3"	pine	2	R
L15	1/4"	2 7/8"	2 1/8"	pine	1	F
L16	1 1/4"	2 3/4"	2 3/4"	pine	1	F
L17	1/4"	1/2"	1"	oak	2	F
L18	1/2"	1 1/2"	3 1/2"	oak	1	R
L19	7/8"	1"	2 3/8"	pine	2	R
L20	3/4"	3/4"	2 3/4"	maple	1	F
L21	1/8"	1 1/4"	1 1/8"	maple	4	R
L22	1/4"	1 5/8"	5 3/4"	maple	2	R
L23	3/4"	1"	1 3/4"	maple	1	R
L24	1/2"	3/4"	7/8"	maple	1	R
L25	1/2"	1"	2 7/8"	maple	1	R
L26	1/2"	3/4"	1"	maple	1	R
L27	1"	2 1/2" DIA.		oak	4	F
L28	1/4"	5/8"	2 1/2"	maple	1	R

T = Thickness

W = Width

L = Length

R = Rough size

F = Finished size

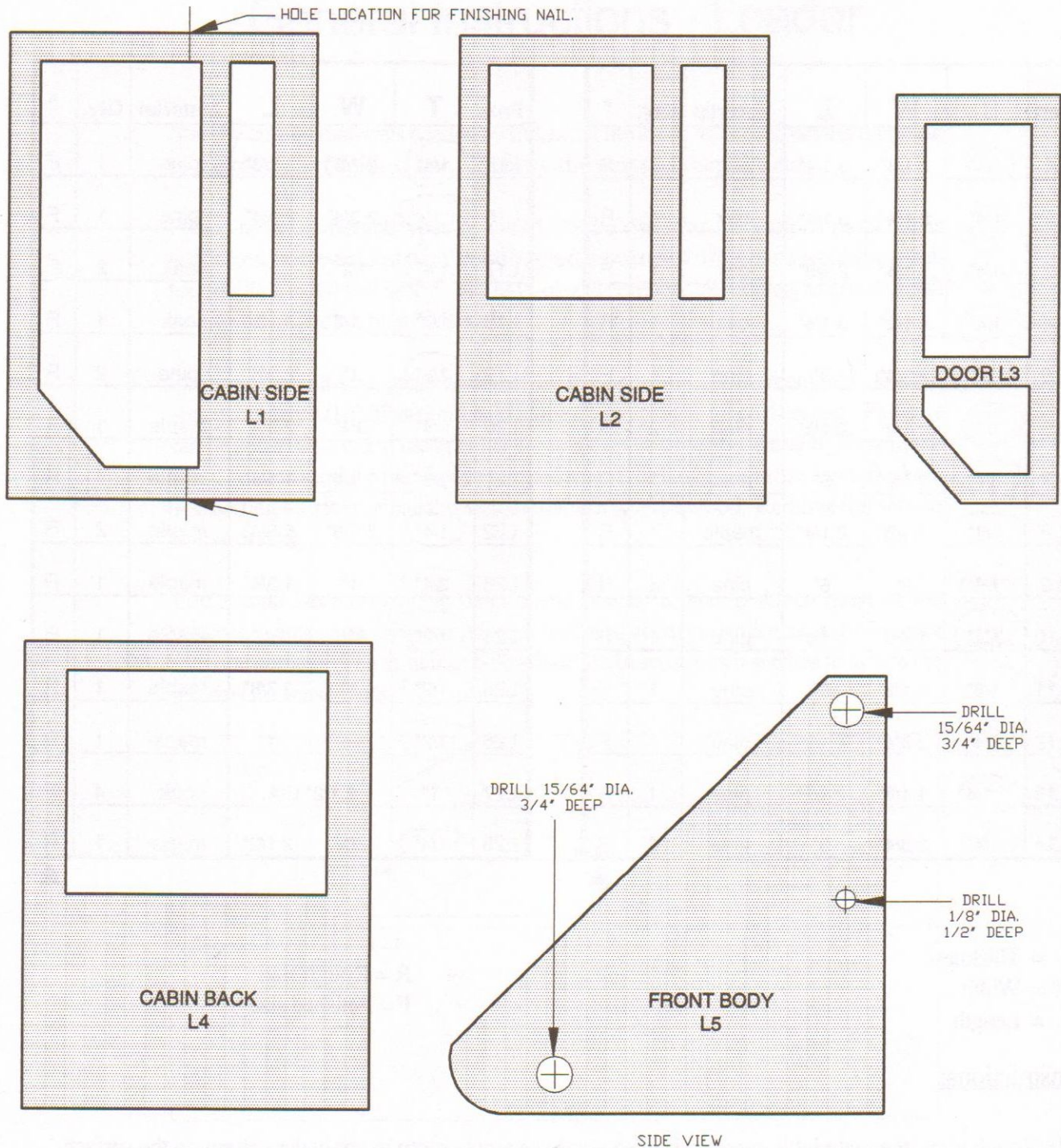
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

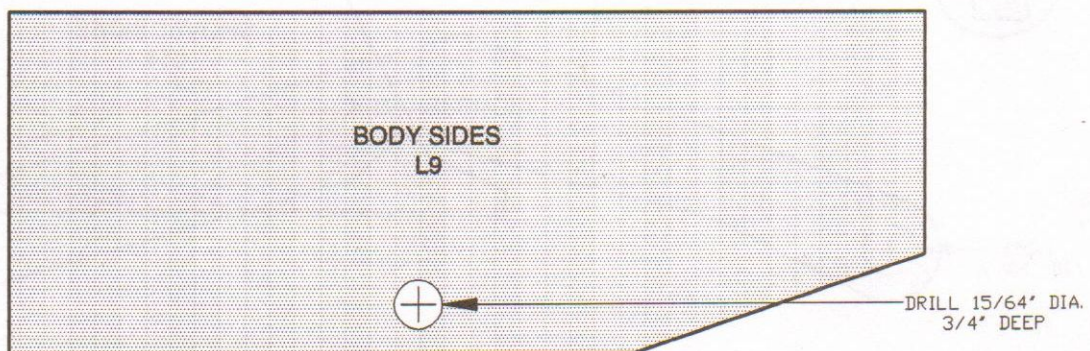
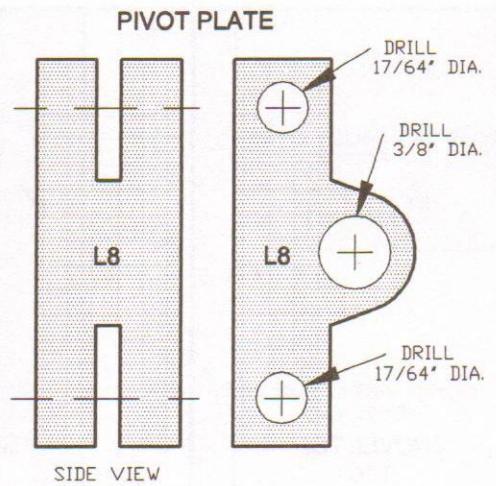
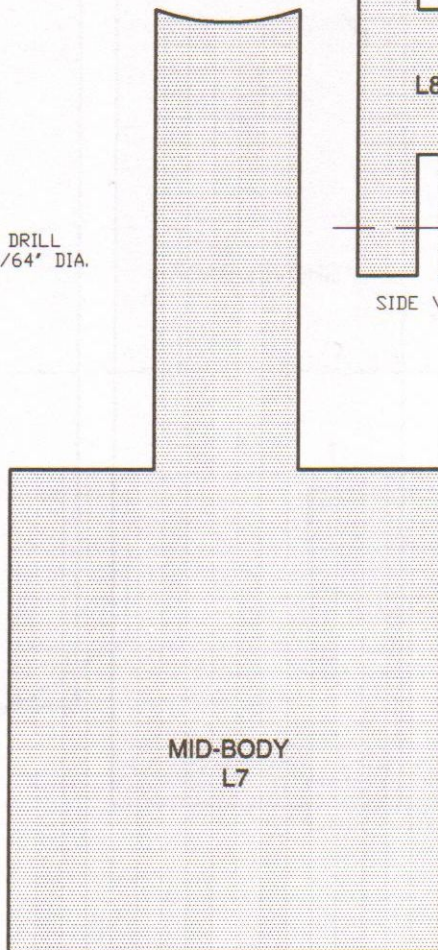
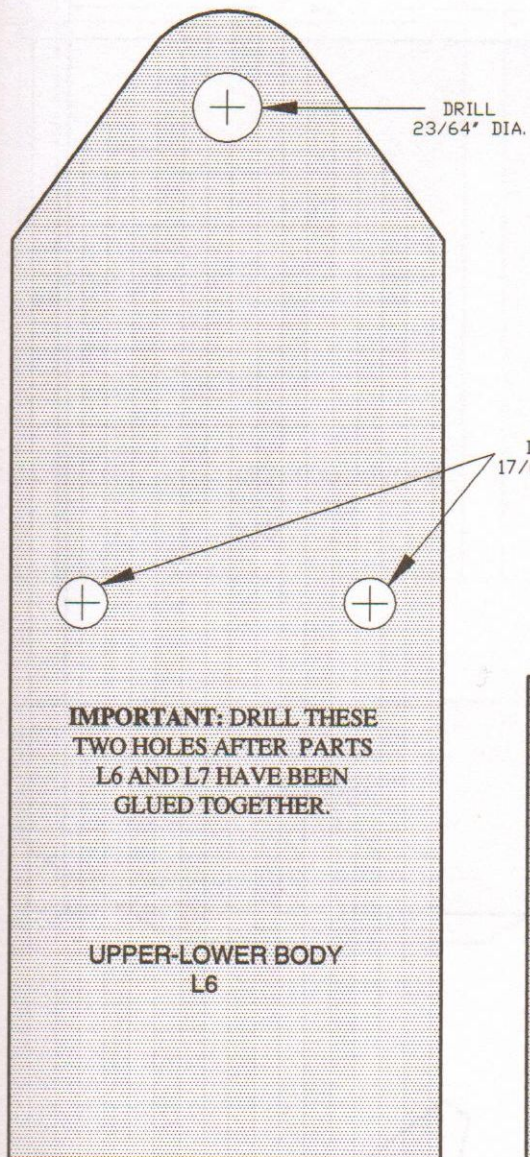
F = Finished Size: Cut and sand parts to finished size.



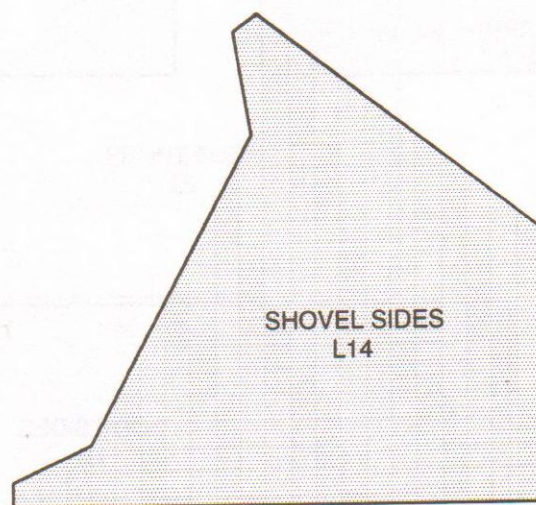
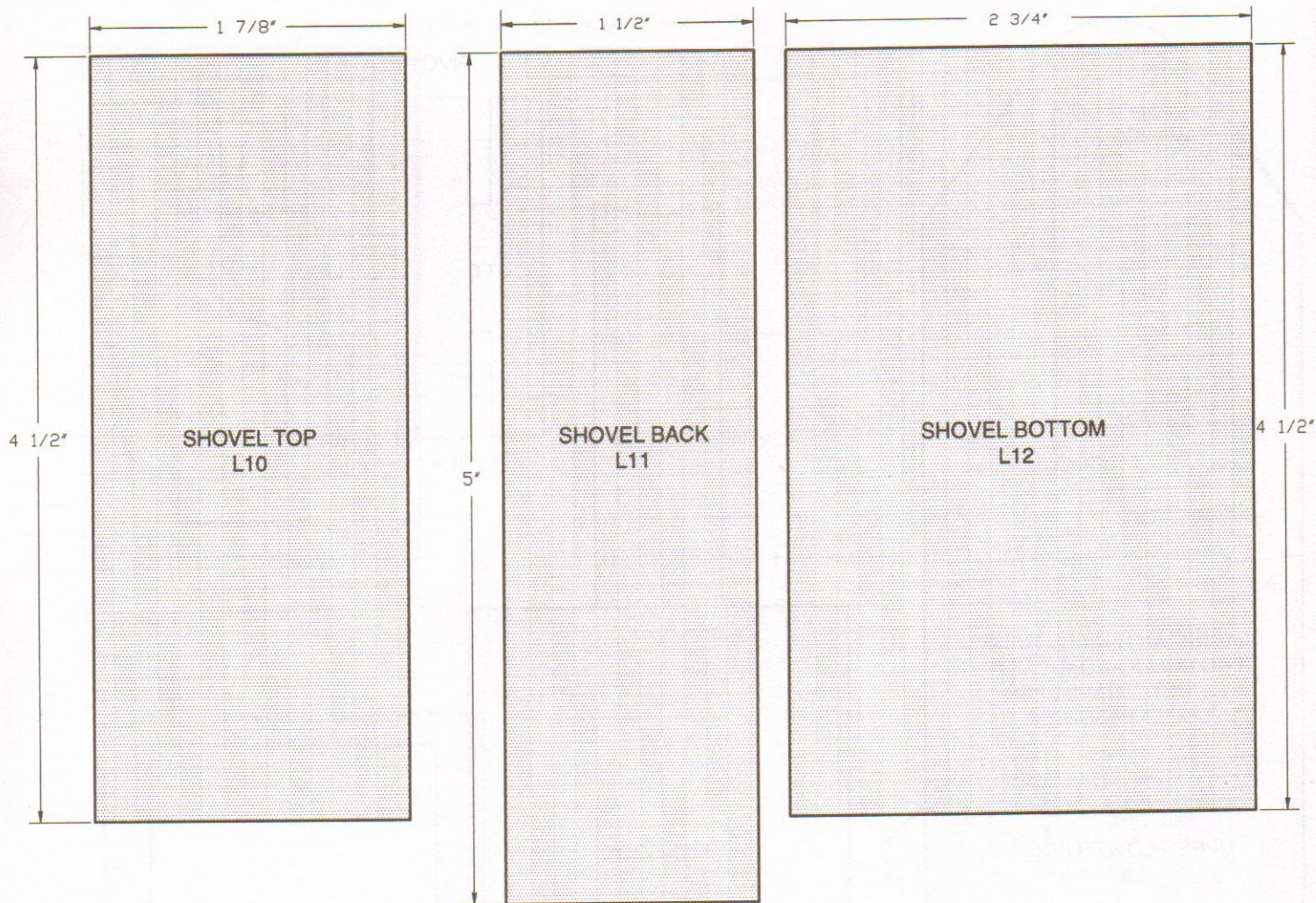
# Full-Sized Patterns: Set One



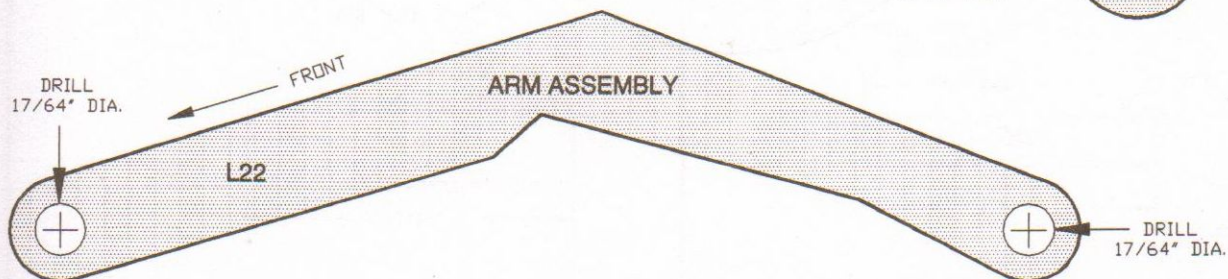
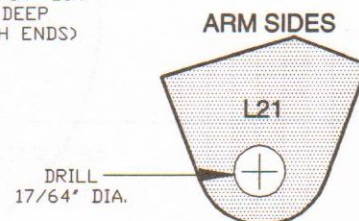
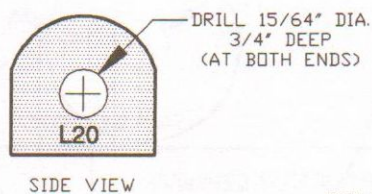
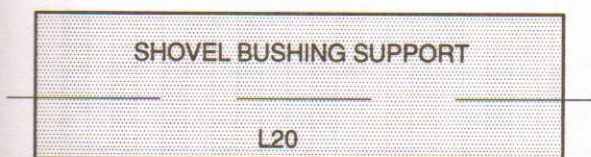
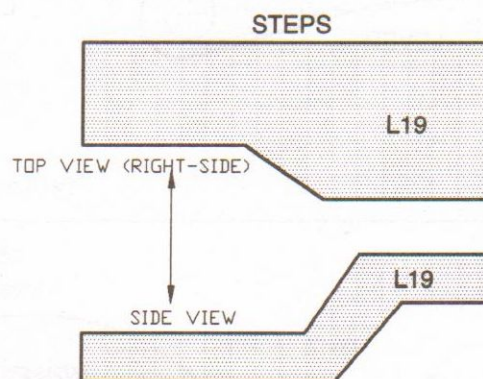
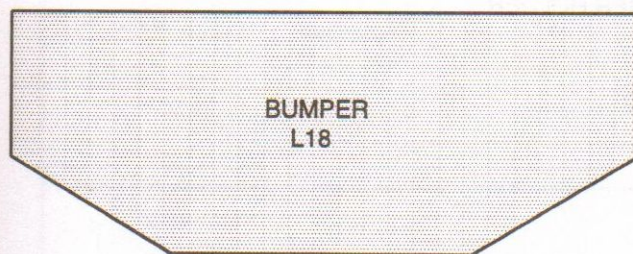
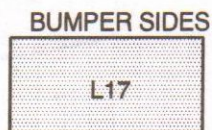
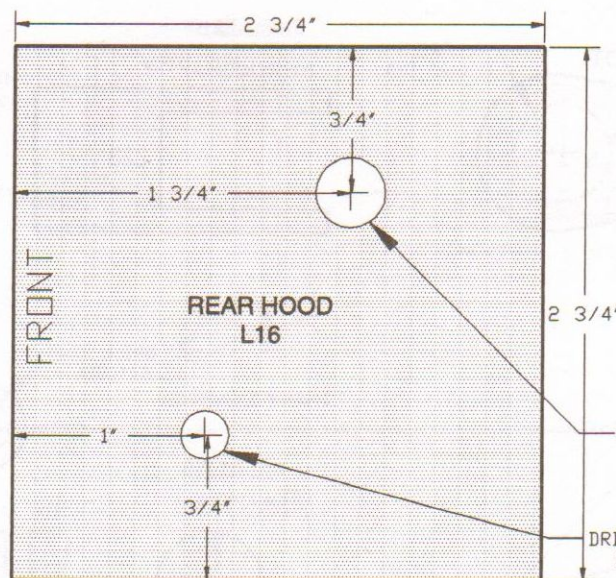
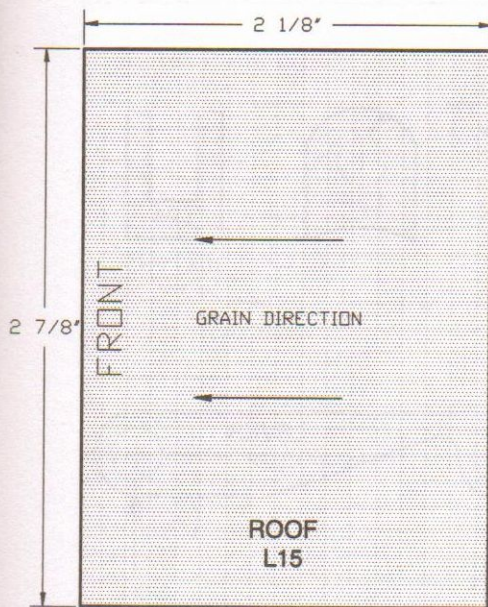




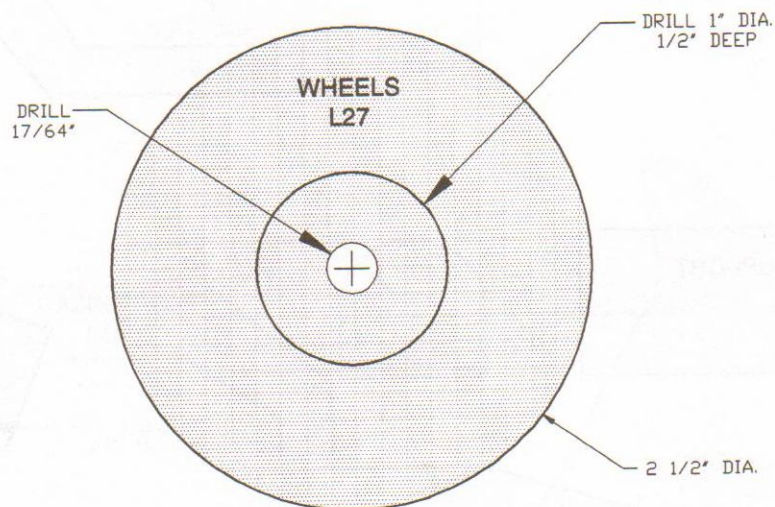
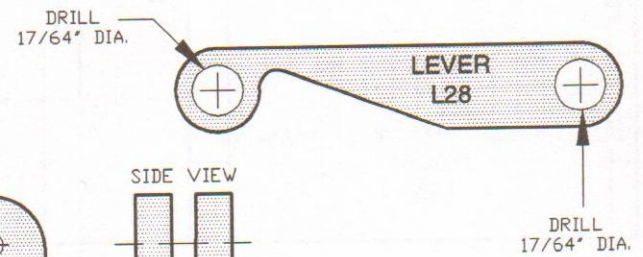
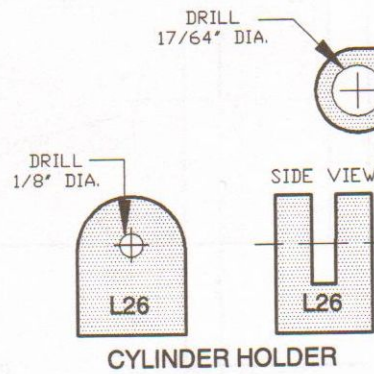
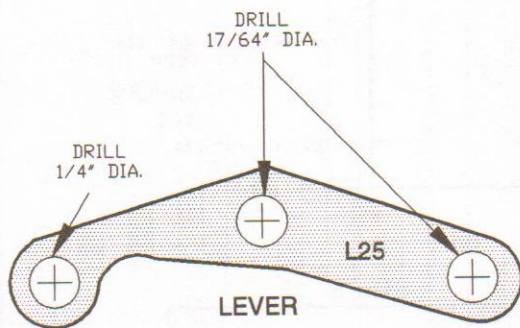
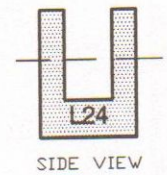
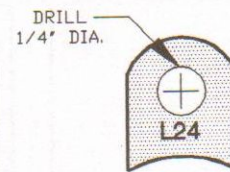
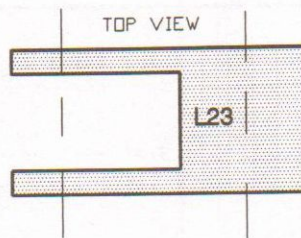
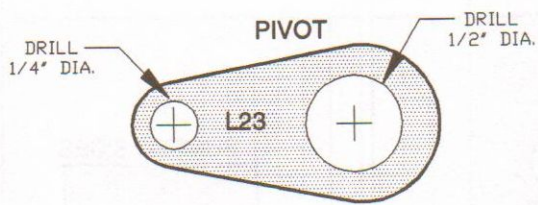










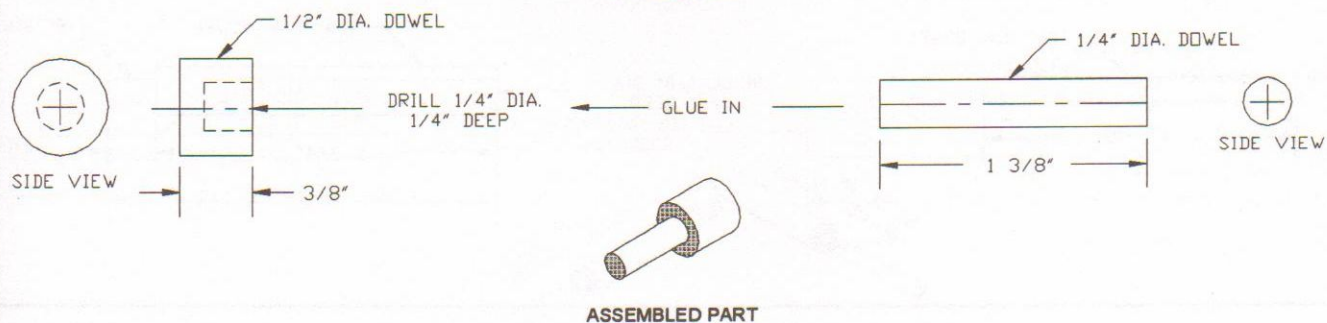




L29

WHEEL PINS

(4 REQUIRED)

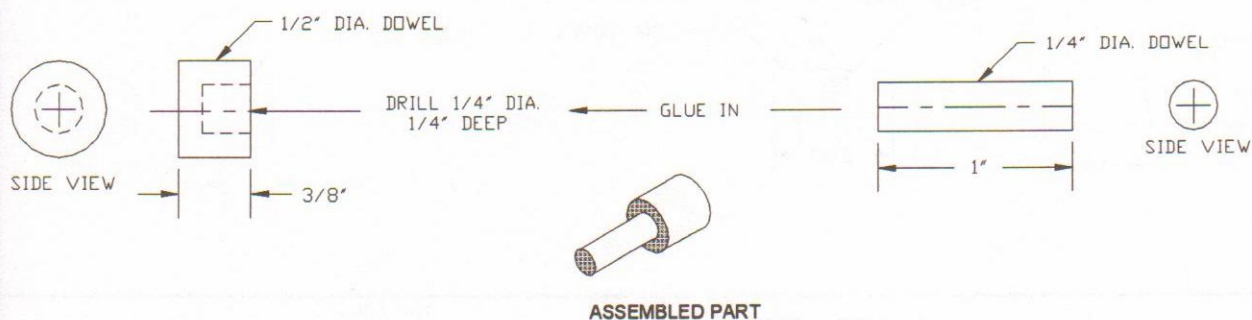


ASSEMBLED PART

L30

AIR FILTER

(1 REQUIRED)

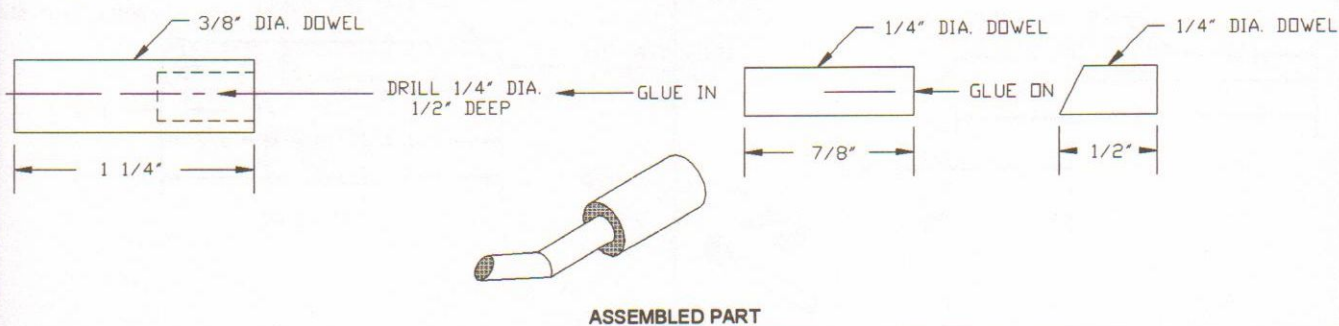


ASSEMBLED PART

L31

MUFFLER

(1 REQUIRED)

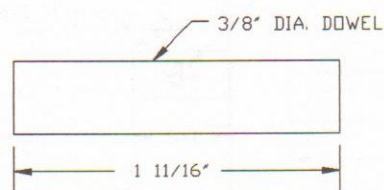


ASSEMBLED PART

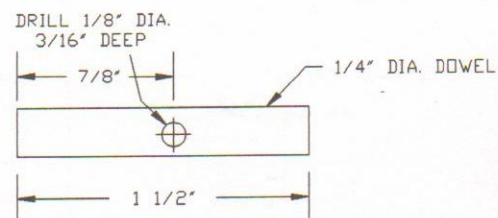
MAIN PIVOT PIN

(1 REQUIRED)

L32

BUSHINGS (2 REQUIRED)

L33

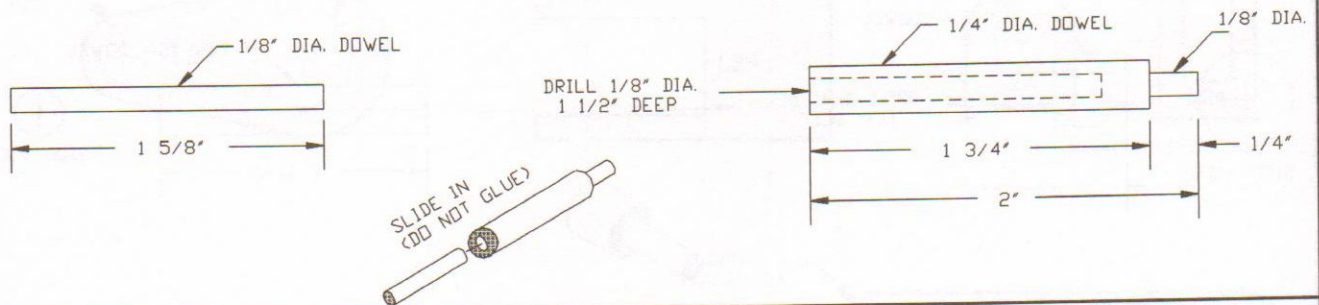




L34

**CYLINDERS & PISTONS FOR BODY ASSEMBLY**

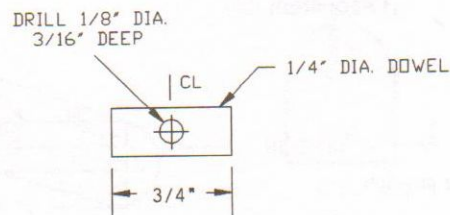
(2 REQUIRED)



L35

**PISTON BUSHINGS**

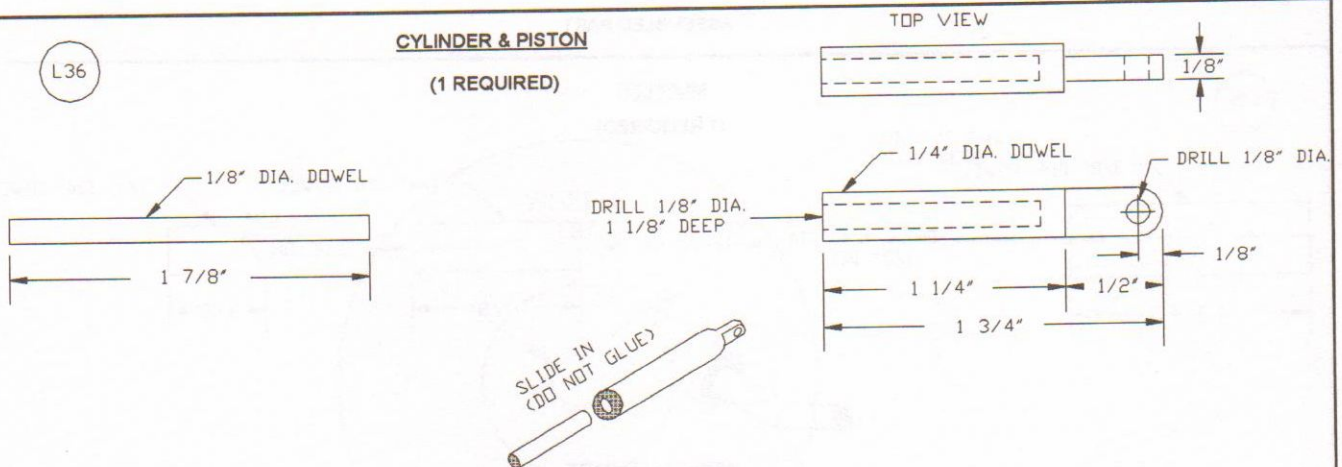
(2 REQUIRED)



L36

**CYLINDER & PISTON**

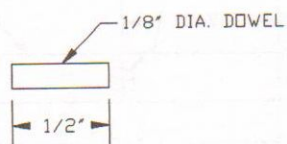
(1 REQUIRED)



L37

**CYLINDER LOCKING PIN**

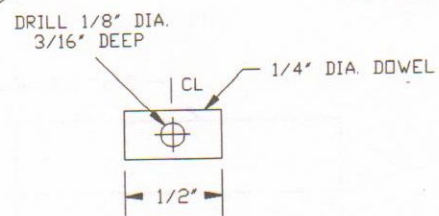
(1 REQUIRED)



L38

**PISTON BUSHING**

(1 REQUIRED)

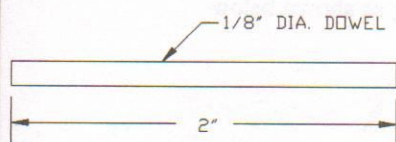




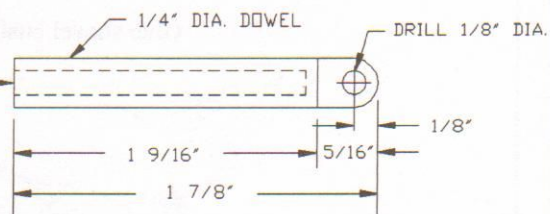
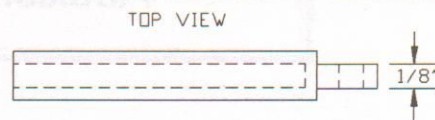
# CYLINDERS AND PISTONS FOR ARM ASSEMBLY

(2 REQUIRED)

L39



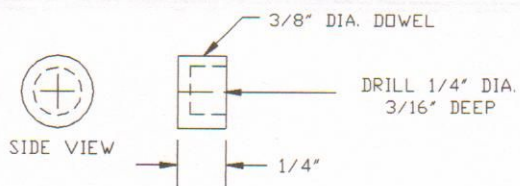
DRILL 1/8" DIA.  
1 1/2" DEEP



## ARM ASSEMBLY LOCKING PINS

(4 REQUIRED)

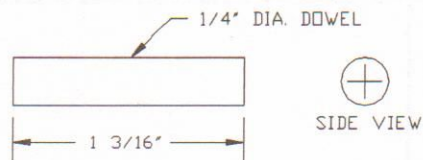
L40



GLUE IN



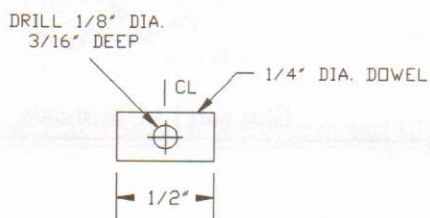
ASSEMBLED PART



## PISTON BUSHINGS

(2 REQUIRED)

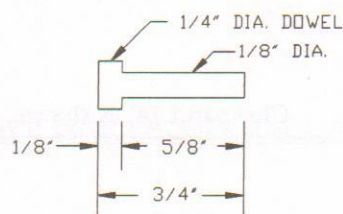
L41



## CYLINDER LOCKING PINS

(2 REQUIRED)

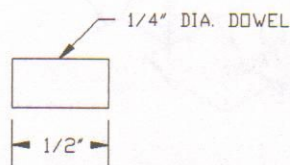
L42



## LEVER LOCKING PINS

(2 REQUIRED)

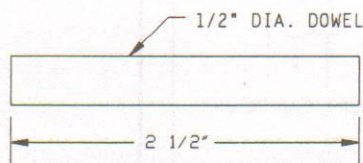
L43



## PIVOT PIN

(1 REQUIRED)

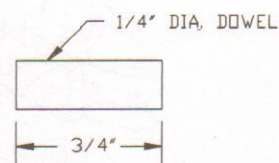
L44



## PIN

(1 REQUIRED)

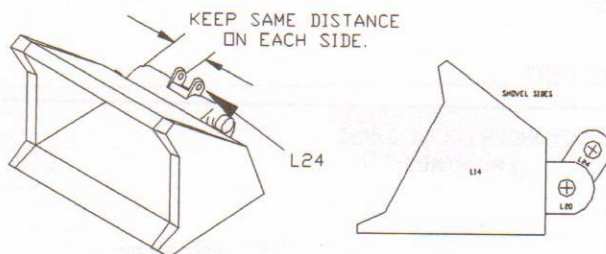
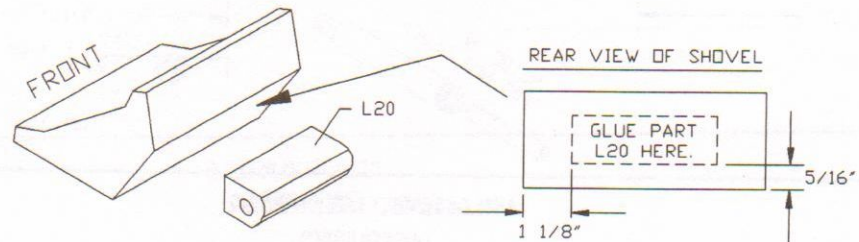
L45



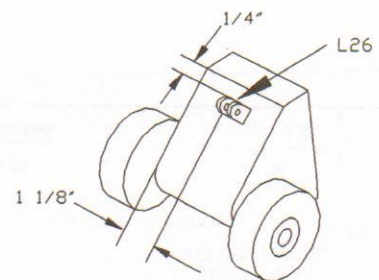


## Additional Information - Loader

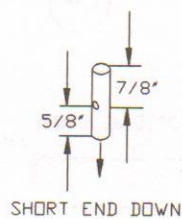
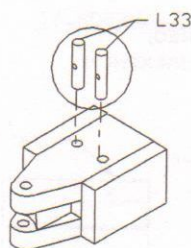
Glue shovel bushing support L20 to shovel assembly, as shown below.



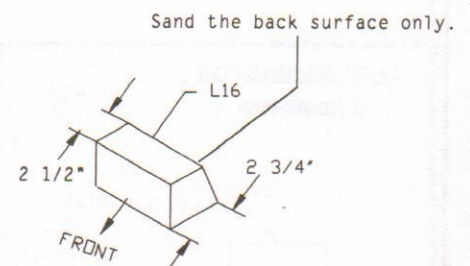
Glue part L24, as shown.



Glue part L26, as shown.

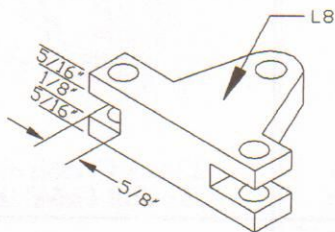


Insert bushings L33, as shown above. Make sure to insert them with the short end going in first. Do not glue.

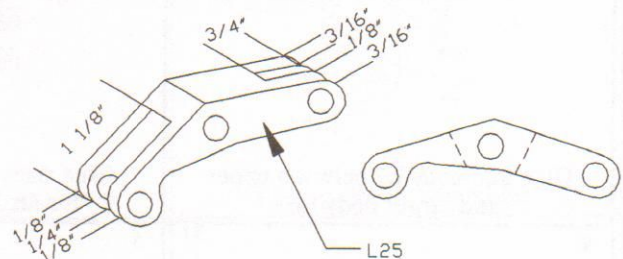


Sand an angle on the back of part L16, as shown.

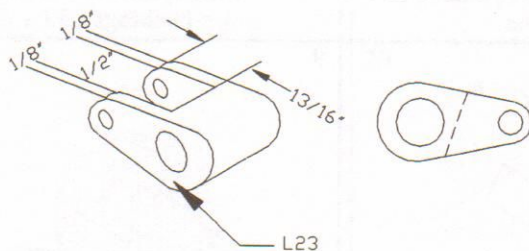




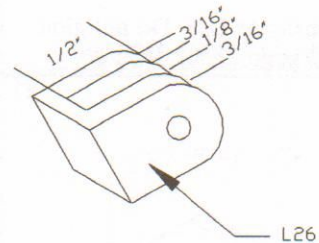
Using your Scroll Saw, cut a groove on each side of part L8.



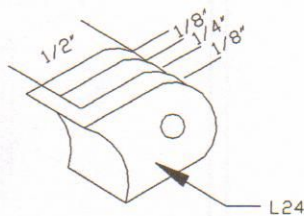
Using your Scroll Saw, cut a groove on each side of part L25.



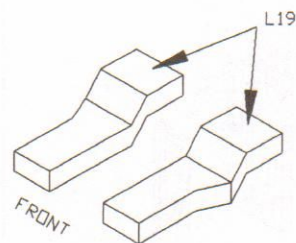
Using your Scroll Saw, cut a groove in part L23.



Using your Scroll saw, cut a groove in part L26.



Using your Scroll Saw, cut a groove in part L24.



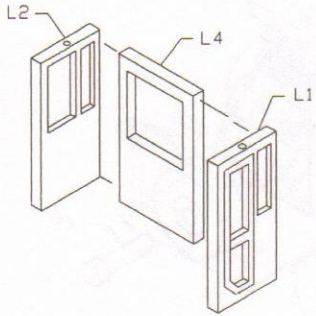
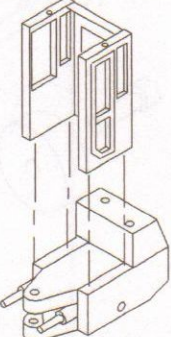
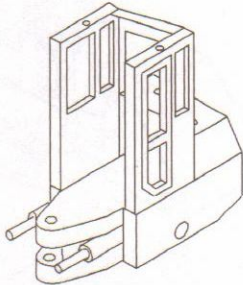
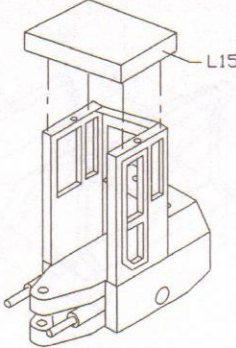
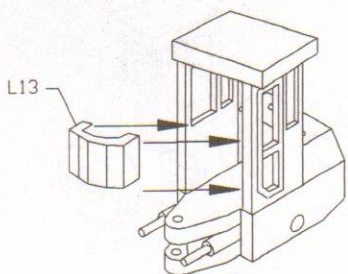
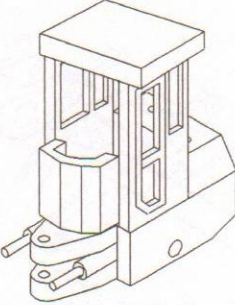
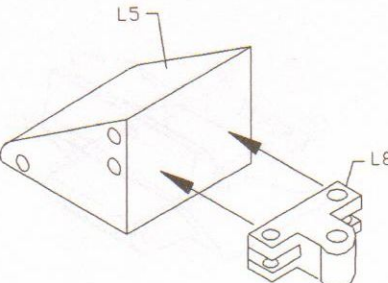
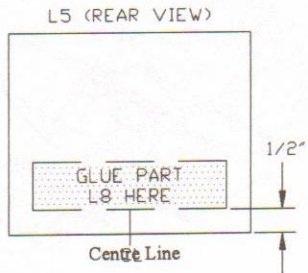
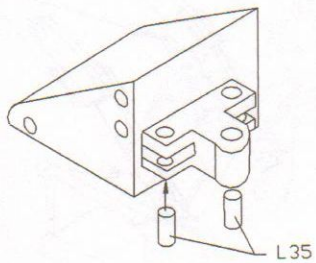
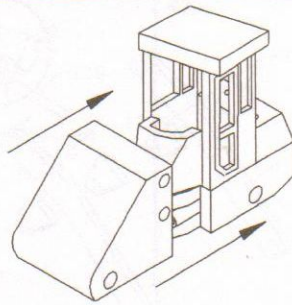
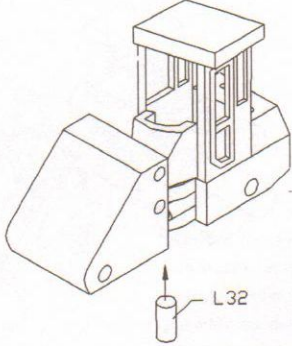
Cut and sand parts L19, as shown, so they fit on both sides of the model. See part drawing-page 18.



# Loader - Assembly Drawings

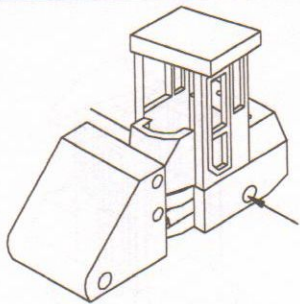
<p>1</p> <p>Glue mid-body L7 between upper and lower body L6.</p>	<p>2</p> <p>RE-DRILL THIS HOLE THROUGH TOP AND BOTTOM PIECES.</p> <p>Glue sides L9 to body assembly. Re-drill 23/64" Dia. hole.</p>	<p>3</p> <p>RE-DRILL THESE TWO HOLES TO 1 5/8" DEEP.</p> <p>Re-drill 17/64" Dia. holes.</p>
<p>4</p> <p>Insert bushings L33. Do not glue. See page 23 for details.</p>	<p>5</p> <p>Slide pistons L34 into cylinders L34. Do not glue.</p>	<p>6</p> <p>Glue cylinders L34 into bushings L33.</p>
<p>7</p> <p>Parts properly assembled.</p>	<p>8</p> <p>Glue rear hood L16 onto body assembly.</p>	<p>9</p> <p>Sand angle from side to side.</p>
<p>10</p> <p>Make a chamfer on door using method shown on page 10, then insert door L3 into door frame L1.</p>	<p>11</p> <p>Drill two holes for hinges using 1/2" finishing nail.</p>	<p>12</p> <p>Insert 1/2" finishing nails.</p>



<p>13</p>  <p>Glue cabin sides L1 and L2 to cabin back L4.</p>	<p>14</p>  <p>Glue cabin onto body, as shown.</p>	<p>15</p>  <p>Parts properly assembled.</p>
<p>16</p>  <p>Glue roof L15 onto cabin.</p>	<p>17</p> <p><b>IMPORTANT</b></p> <p>Cabin must be completely assembled before glue dries so that you may make corrections for proper fit, if necessary</p>	<p>18</p>  <p>Glue cabin front L13, as shown.</p>
<p>19</p>  <p>Start front assembly.</p>	<p>20</p>  <p>Glue pivot plate L8 to body L5. See next frame for exact location.</p>	<p>21</p>  <p>Where to glue L8.</p>
<p>22</p>  <p>Insert bushings L35. Do not glue.</p>	<p>23</p>  <p>Slide front body into rear body making sure that pistons are glued into front bushings L35.</p>	<p>24</p>  <p>Insert main pivot pin L32.</p>

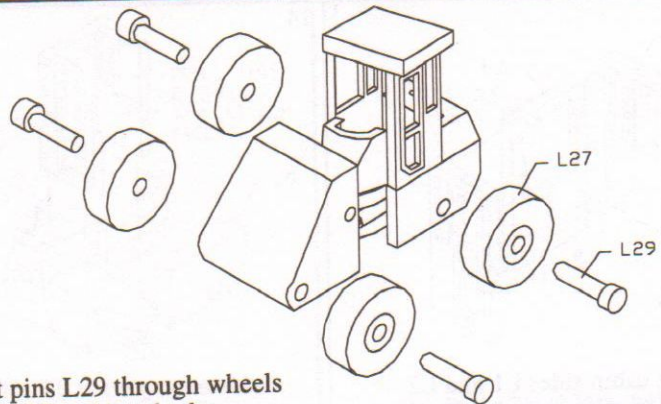


25



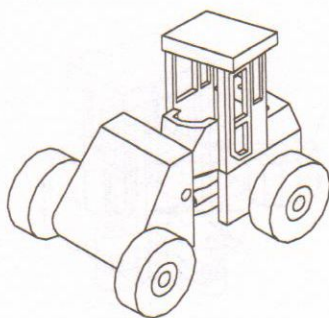
Re-drill 15/64" Dia. holes to 3/4" deep, as shown. (both sides)

26



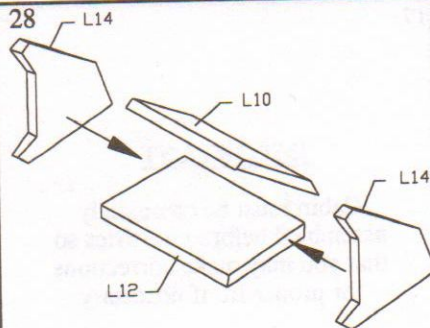
Insert pins L29 through wheels L27 and into body.

27



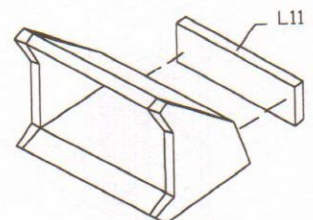
Start shovel assembly.

28



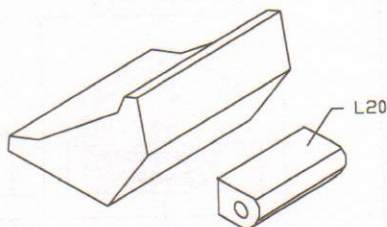
Glue shovel sides L14 to shovel top L10 and shovel bottom L12.

29



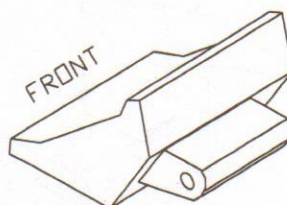
Glue shovel back L11, as shown. See page 7 for hints on making shovel.

30



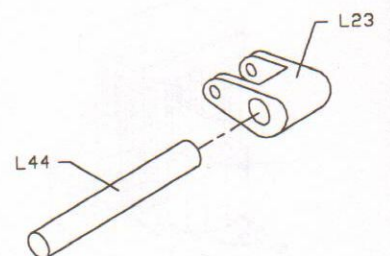
Glue shovel bushing support L20 to shovel. See page 23 for exact location.

31



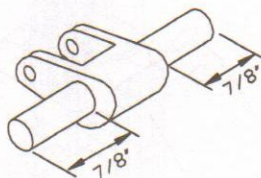
Start lever assembly.

32



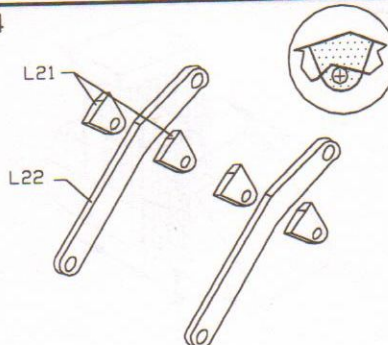
Glue cylinder L44 into pivot L23 being careful to have the same distance on each side. See next step.

33



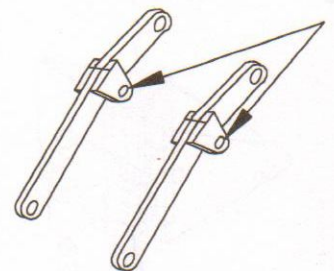
Parts L23 and L44 should be assembled as above (centered).

34



Glue arm sides L21 to arms L22.

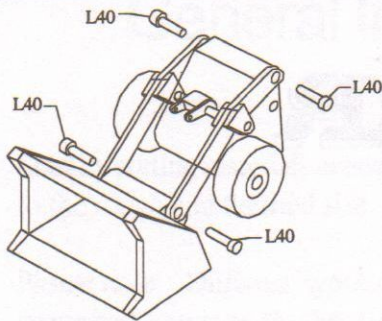
35



Re-drill 17/64" Dia. holes if necessary.

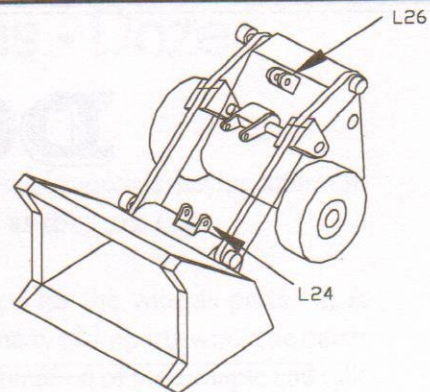


36



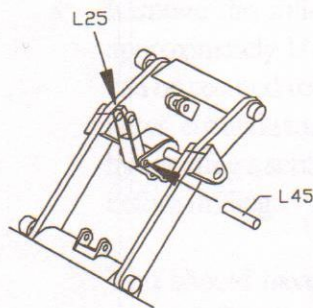
Insert pins L40 and glue pivot assembly L44 and L23, as shown.

37



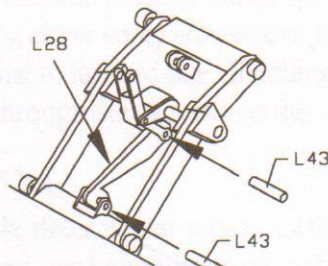
Glue parts L26 and L24. See page 23 for exact location.

38



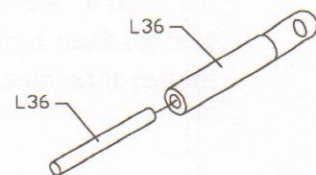
Slide lever L25 between pivot assembly. Hold in place with pin L45.

39



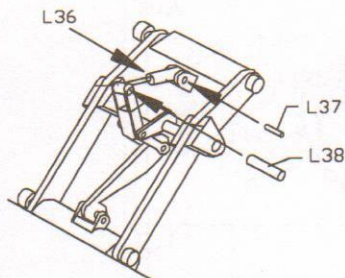
Install lever L28 and hold in place with pins L43.

40



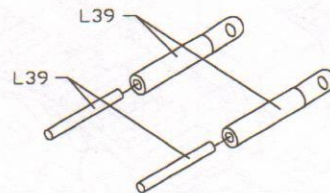
Slide piston L36 into cylinder L36. Do not glue.

41



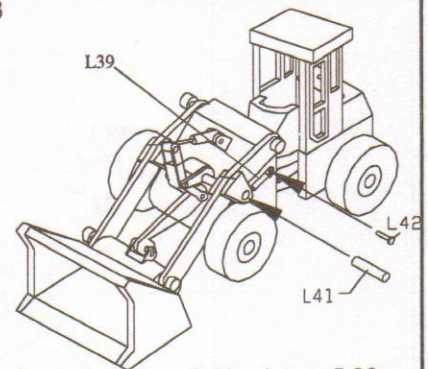
Install piston L36. Insert bushings L38 and pin L37.

42



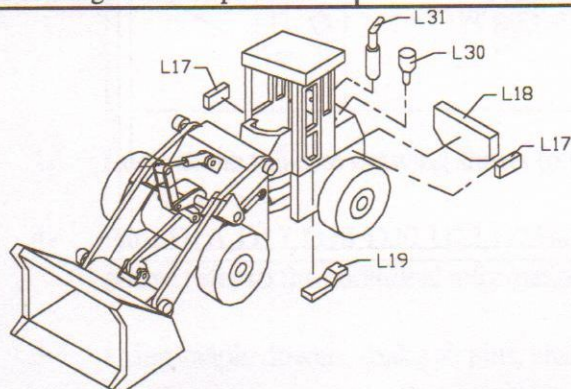
Slide pistons L39 into cylinder L39. Do not glue.

43



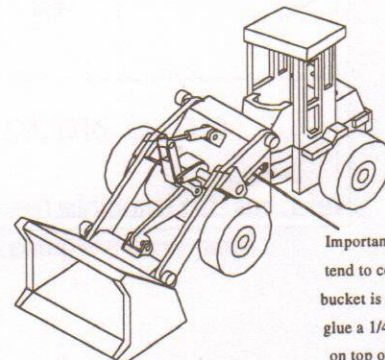
Insert bushings L41, pistons L39 and cylinder pins L42, as shown.

44



Glue parts, as shown.

45

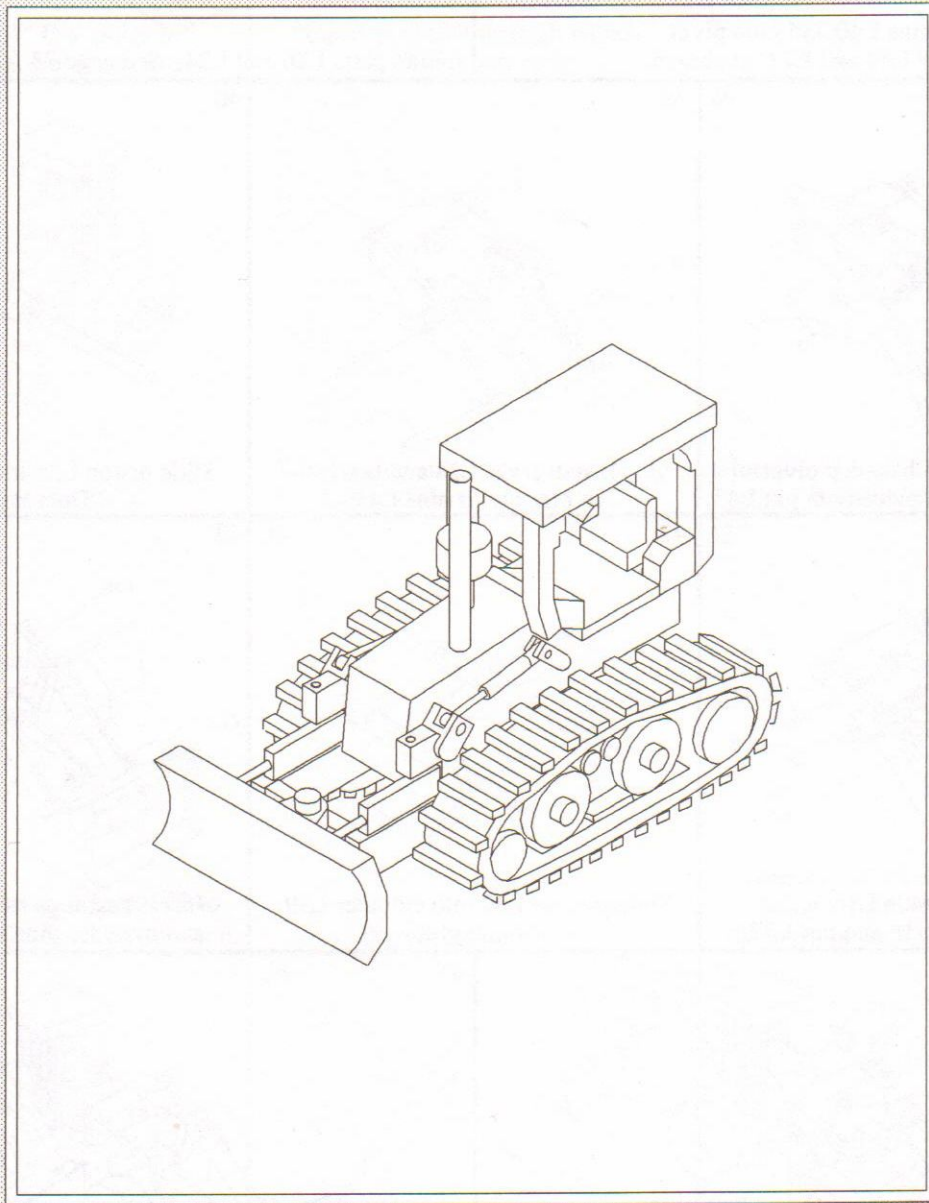


Important: If you see that pistons tend to come out cylinders (when bucket is raised to its maximum), glue a 1/4" dia. dowel - 3/4" long on top of this existing cylinder.

Your model should now be complete.



# DOZER





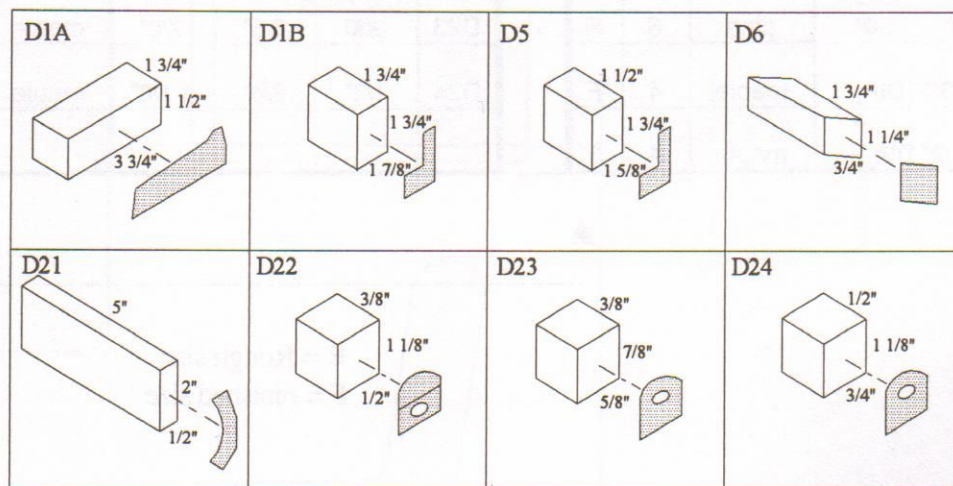
# General Instructions - Dozer

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately 1/16" all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts D3, D16, and D19.
- 4- Parts D1A, D17, D18, D20, D22, D23 and D24 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Dozer

Part	T	W	L	Material	Qty.	*	Part	T	W	L	Material	Qty.	*
D1	1"	1 3/4"	6 13/16"	pine	1	F	D13	1/4"	1 1/4" DIA.		maple	4	F
D1A	1 1/2"	1 3/4"	3 3/4"	pine	1	F	D14	1 1/4"	2"	7"	pine	2	F
D1B	1 3/4"	1 3/4"	1 7/8"	pine	1	F	D15	1/4"	1/2"	3 3/4"	pine	2	F
D2	3/8"	2 3/4"	1 7/16"	pine	1	F	D15A	1/4"	1/2"	3 3/4"	pine	2	F
D3	1/2"	1 1/2"	1 3/4"	oak	2	F	D16	3/4"	3 1/4"	5 3/4"	pine	1	F
D4	1/4"	2 3/4"	3 3/4"	pine	1	F	D17	1/4"	2"	2 1/2"	maple	2	R
D5	1 1/2"	1 3/4"	1 5/8"	pine	1	R	D18	1/4"	3/8"	1 3/8"	maple	2	F
D6	3/4"	1 3/4"	1 1/4"	oak	1	F	D19	5/8"	1/2"	1 3/4"	maple	1	F
D7	3/8"	1 1/4"	3 1/2"	oak	2	R	D20	1/2"	1 5/8"	2 3/4"	maple	1	R
D8	3/8"	1 1/4"	3 1/2"	oak	2	R	D21	1/2"	2"	5"	pine	1	F
D9	1/8"	1/4"	1 3/8"	pine	72	F	D22	3/8"	1/2"	1 1/8"	maple	2	R
D10	1/4"	3/8"	1"	pine	6	F	D23	3/8"	5/8"	7/8"	maple	2	R
D11	1/4"	1 3/8" DIA.		maple	4	F	D24	1/2"	3/4"	1 1/8"	maple	1	R
D12	1/4"	1/2" DIA.		maple	4	F							

T = Thickness

W = Width

L = Length

## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

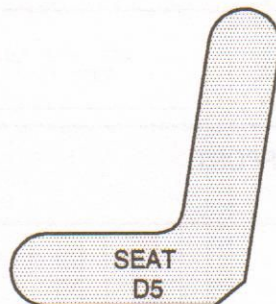
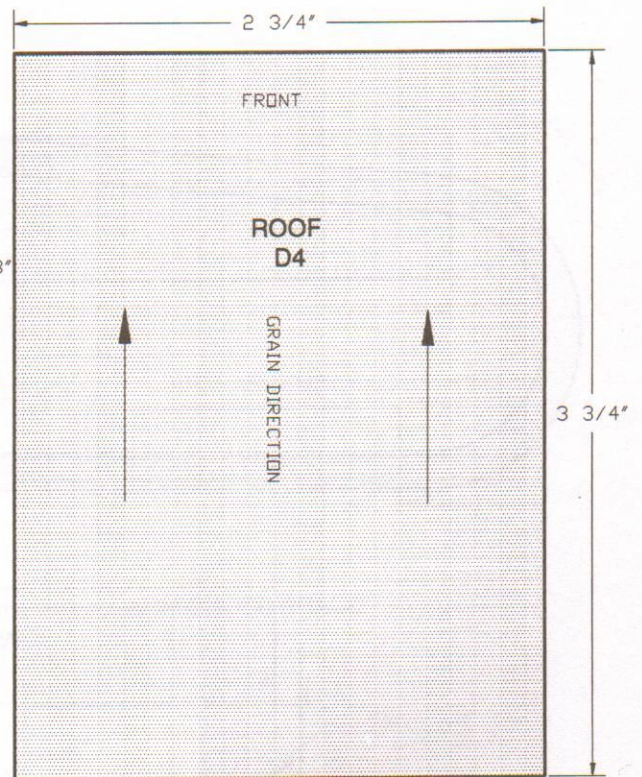
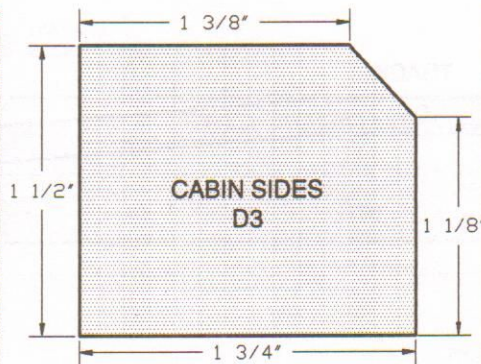
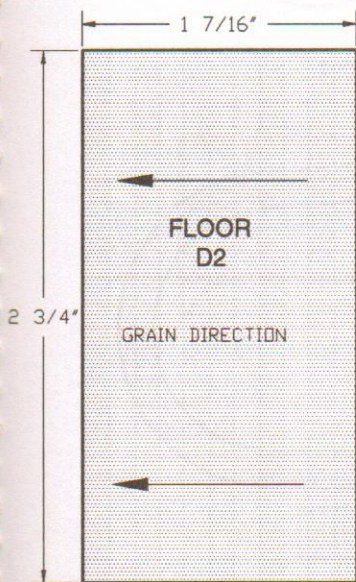
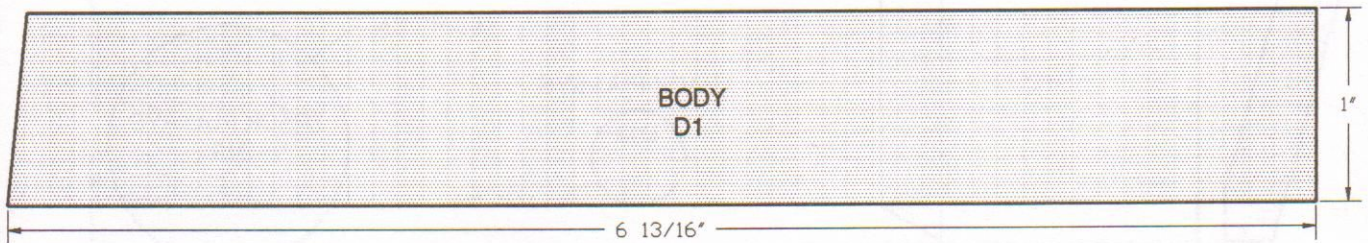
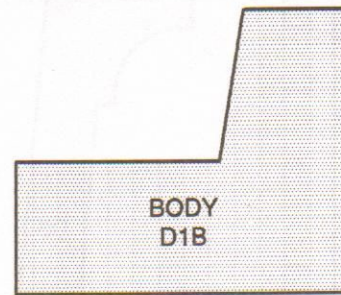
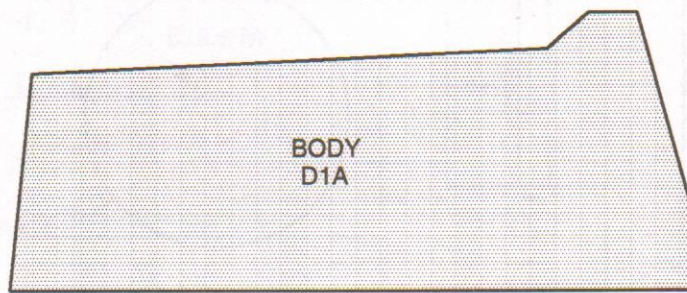
F = Finished Size: Cut and sand parts to finished size.

R = Rough size

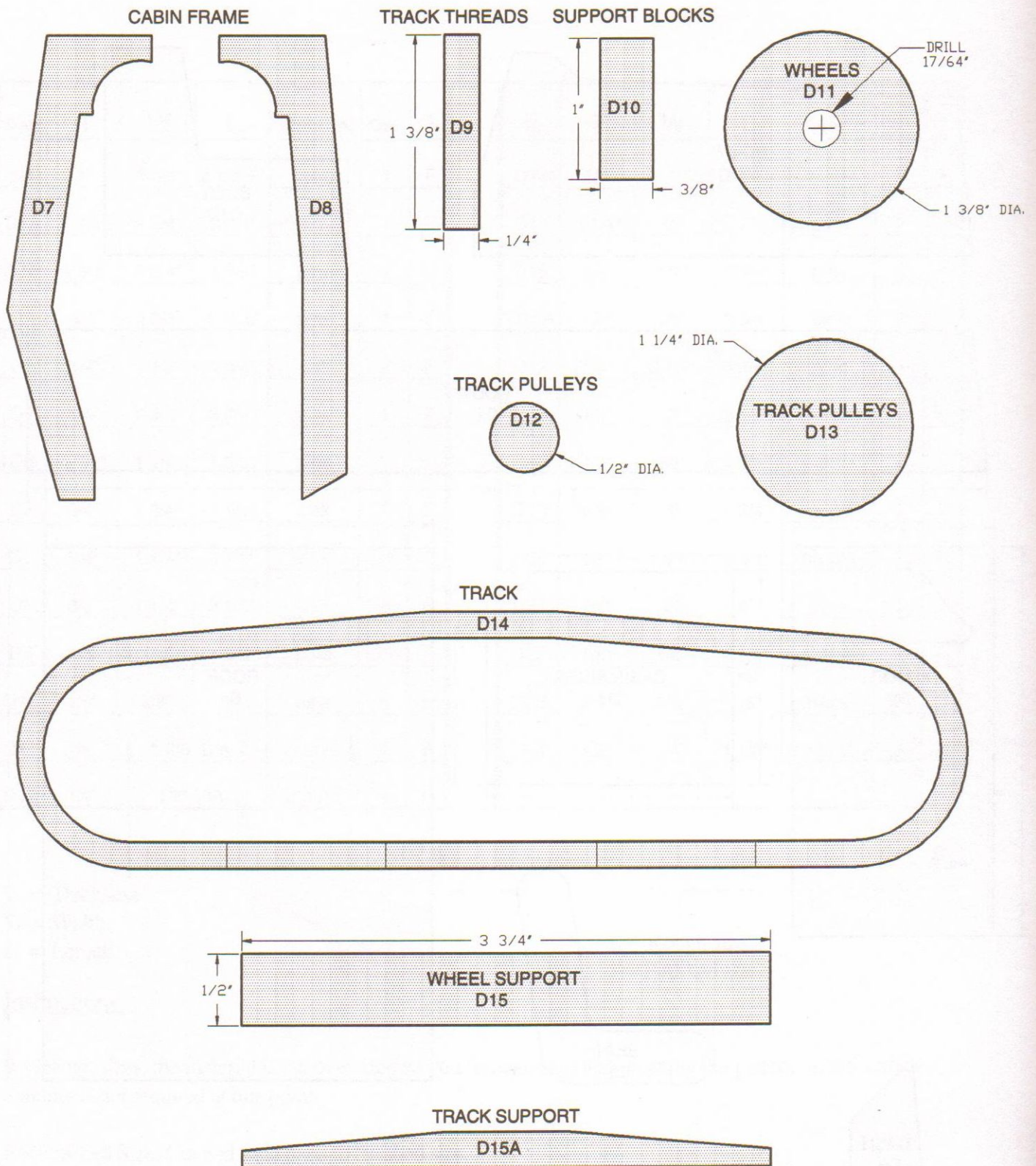
F = Finished size



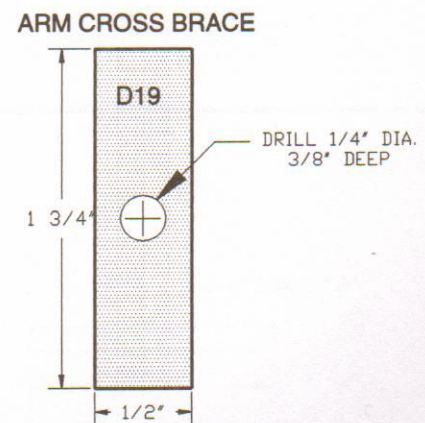
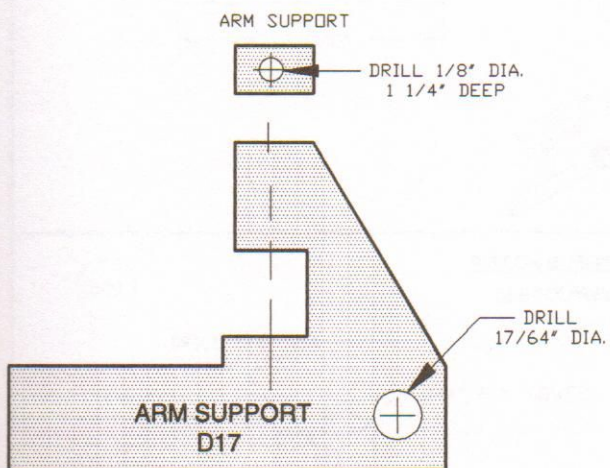
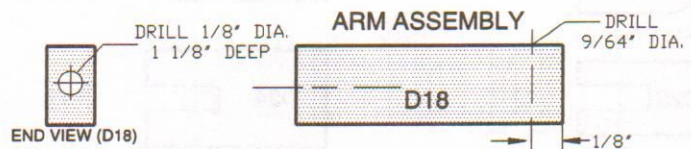
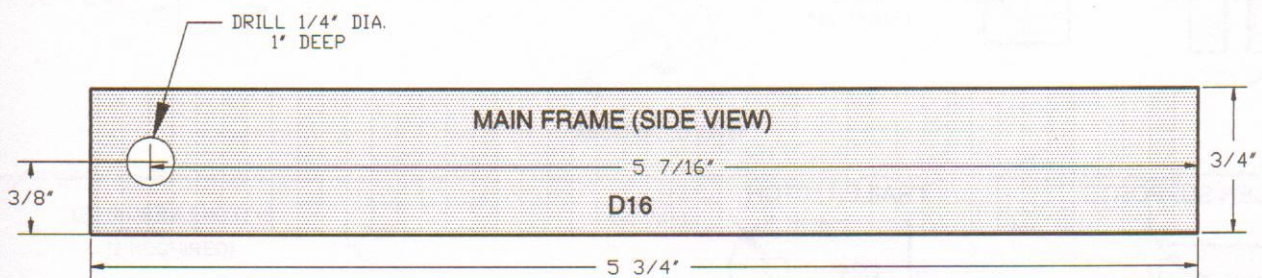
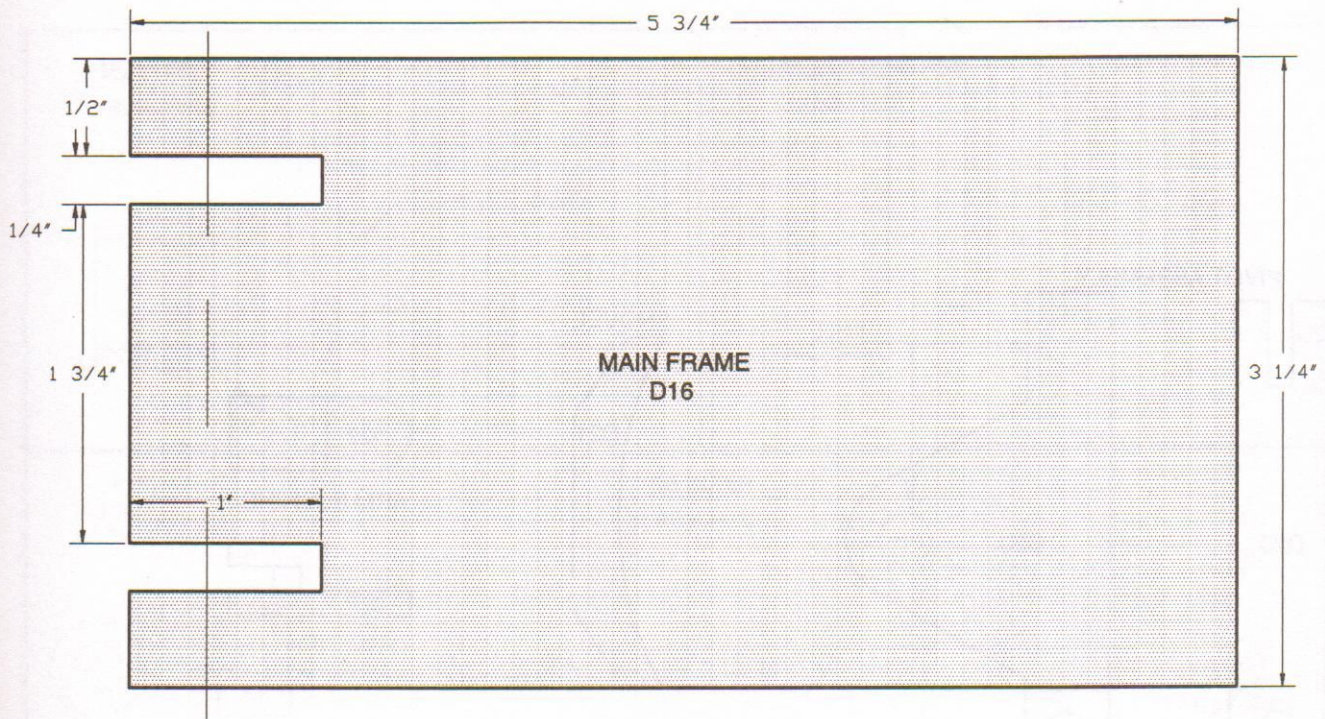
# Full-Sized Patterns: Set One



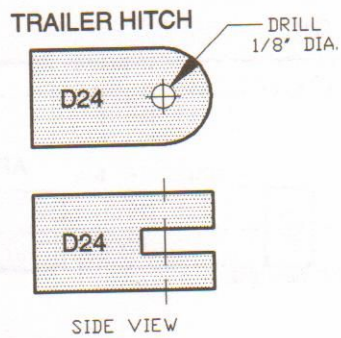
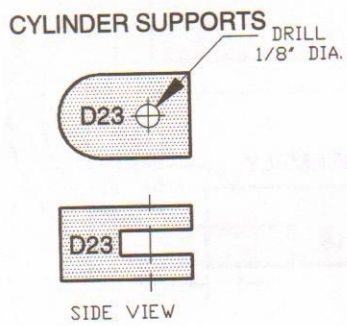
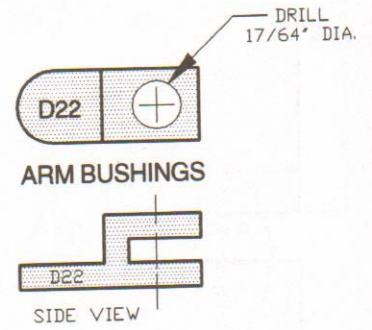
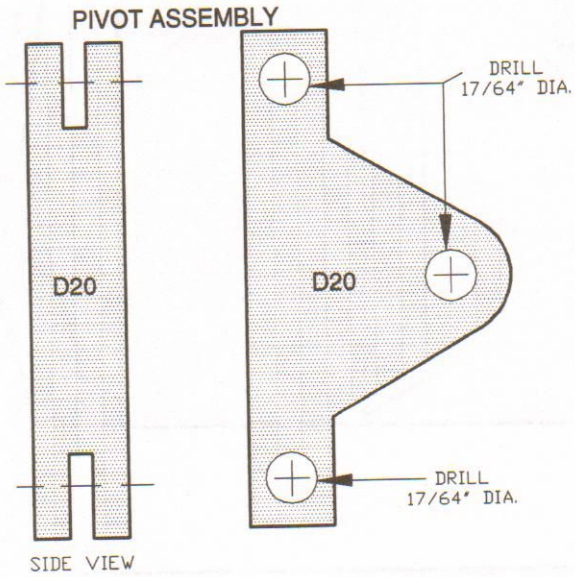








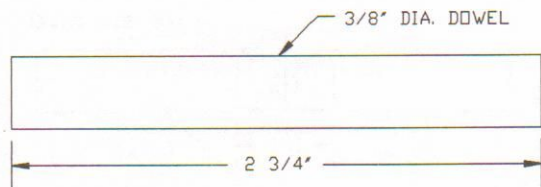






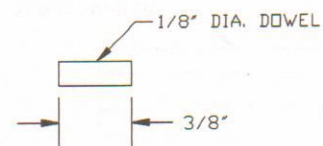
**MUFFLER**  
(1 REQUIRED)

D25



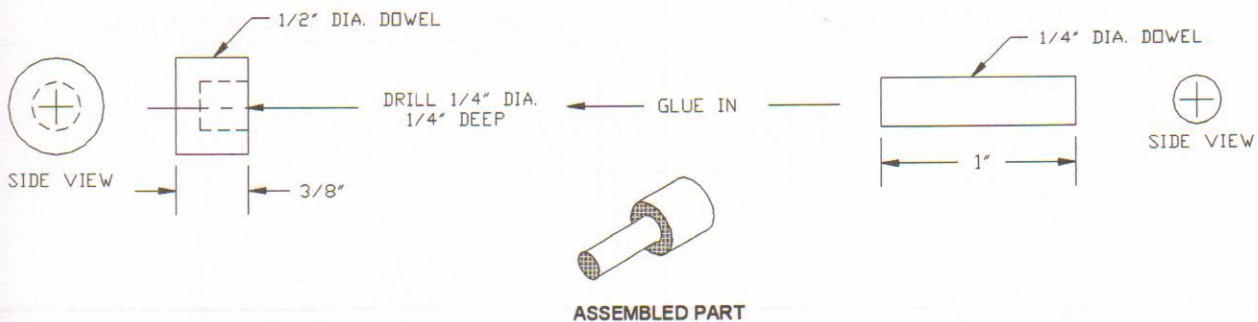
**CYLINDER LOCKING PINS**  
(2 REQUIRED)

D26



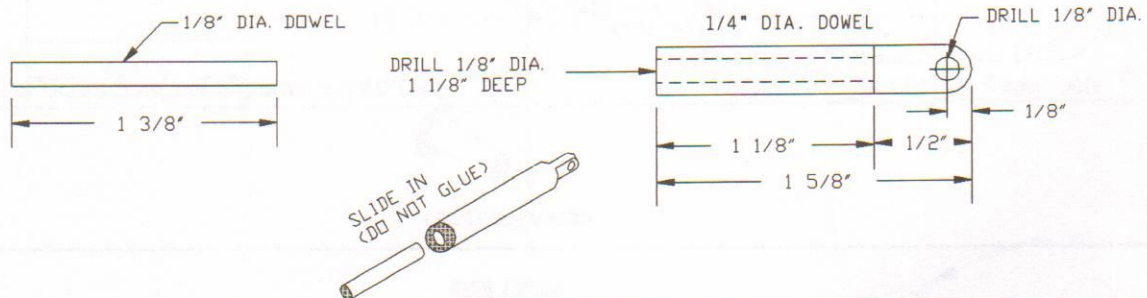
D27

**AIR FILTER**  
(1 REQUIRED)



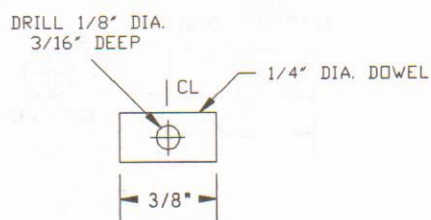
**CYLINDER & PISTONS**  
(2 REQUIRED)

D28



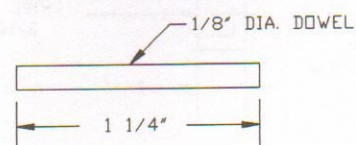
D29

**PISTON BUSHINGS**  
(2 REQUIRED)



**PIVOT PINS**  
(2 REQUIRED)

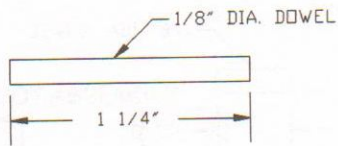
D30





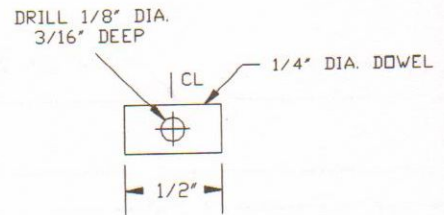
D31

**PIVOT ARM-PISTONS**  
(2 REQUIRED)



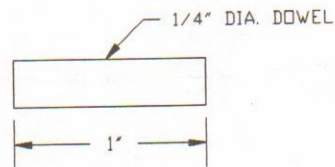
D32

**PISTON BUSHINGS**  
(2 REQUIRED)



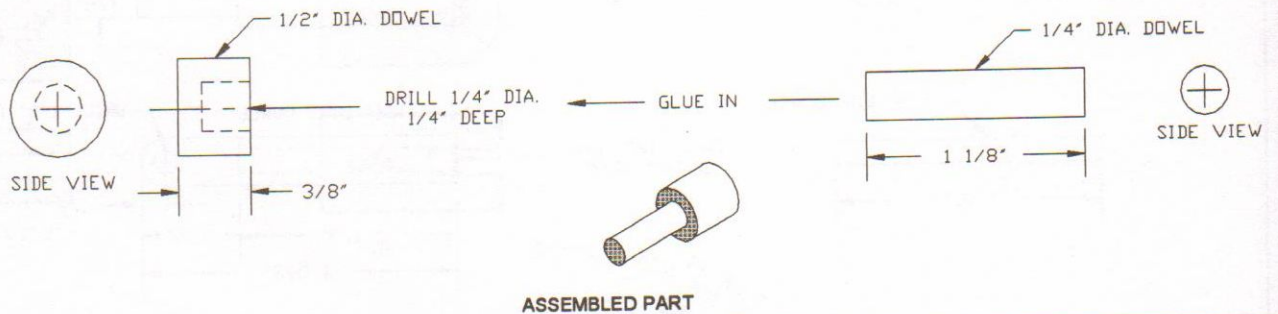
**ARM ASSEMBLY LOCKING PINS**  
(2 REQUIRED)

D33



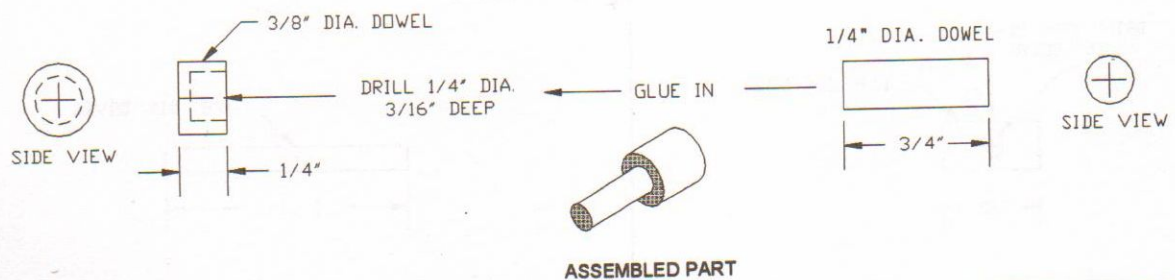
D34

**PIVOT PIN**  
(1 REQUIRED)



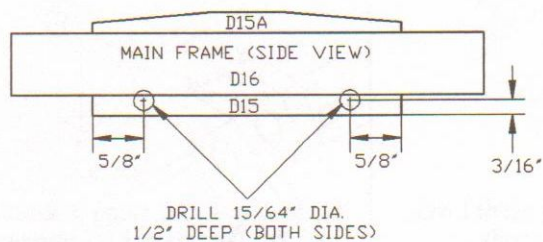
D35

**WHEEL PINS**  
(4 REQUIRED)

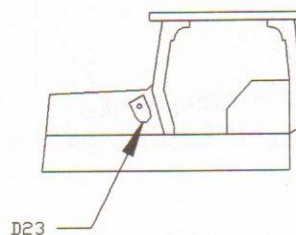




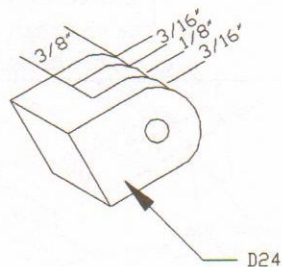
## Additional Information - Dozer



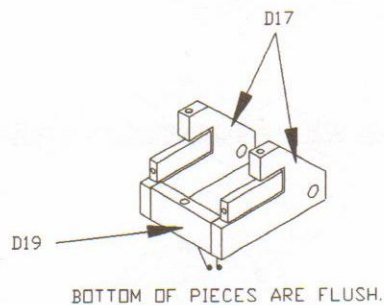
Drill holes into frame assembly, as shown.



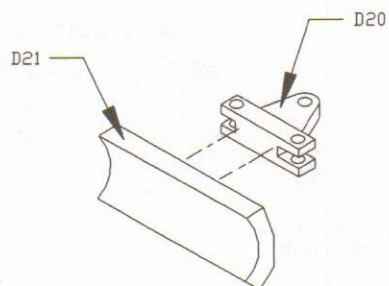
Glue parts D23 on each side of model.



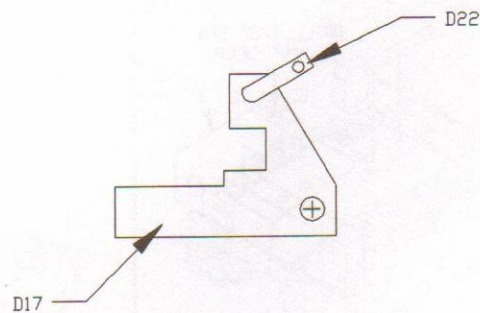
Using your Scroll Saw, cut a groove in part D24.



Glue part D19 between parts D17  
keeping bottom of parts flush.

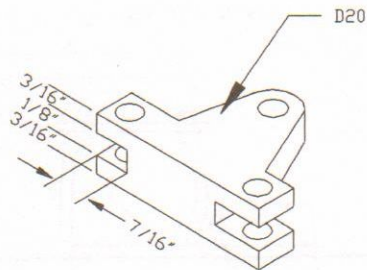


Glue part D20 in the middle (centered) of part D21.

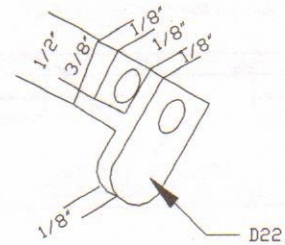


Glue parts D22 onto D17, as shown.

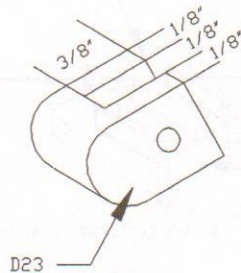




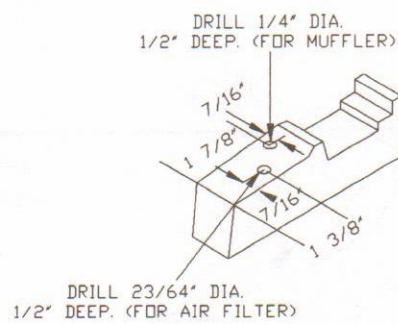
Using your Scroll Saw, cut a groove on each side of part D20, as shown.



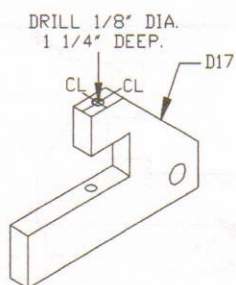
Using your Scroll Saw, cut a groove and shape parts D22.



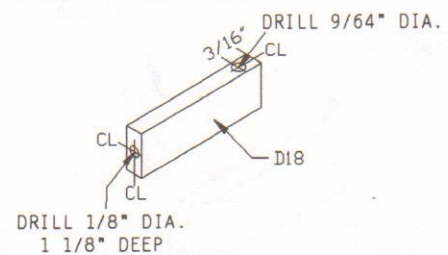
Using your Scroll Saw, cut a groove in parts D23.



Drill these holes in part D1A, as shown.



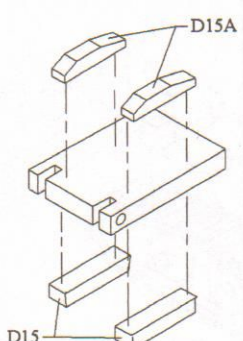
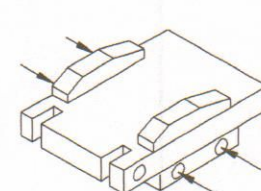
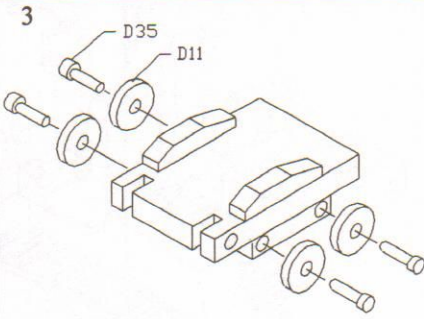
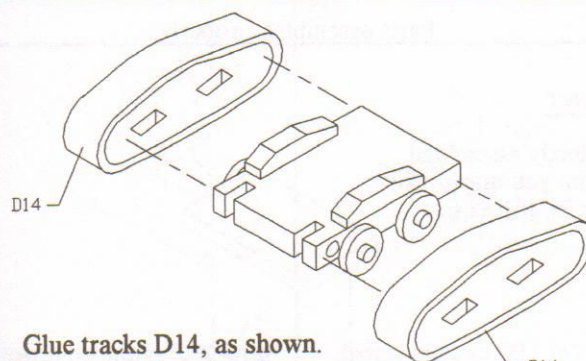
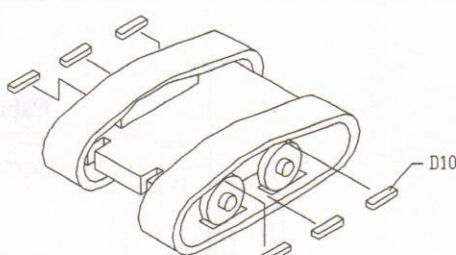
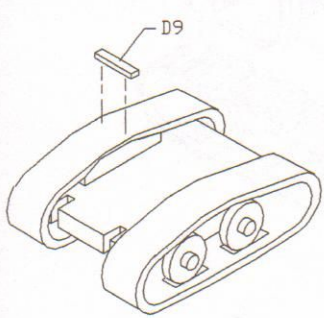
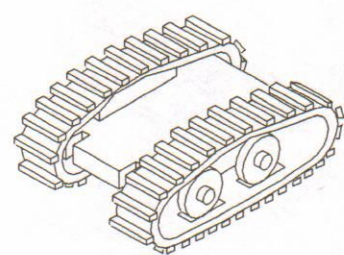
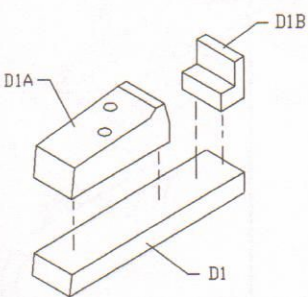
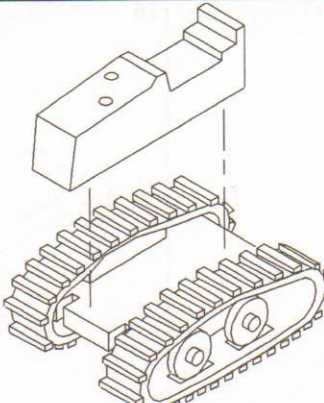
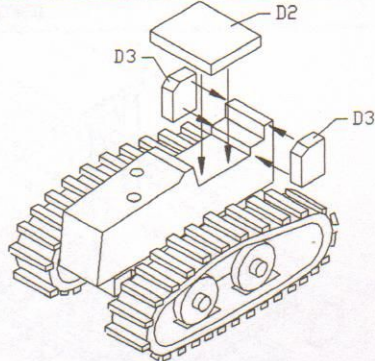
Drill hole in parts D17, as shown.



Drill holes in parts D18, as shown.

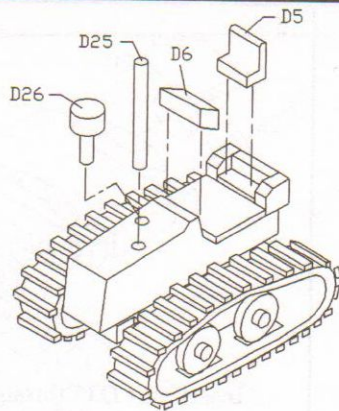


# Dozer - Assembly Drawings

<p>1</p>  <p>Glue track support D15A and wheel support D15 to frame D16.</p>	<p>2</p>  <p>Drill these 4 holes using method shown on page 38.</p>	<p>3</p>  <p>Insert pins D35 through wheels D11 and into body.</p>
<p>4</p>  <p>Glue tracks D14, as shown. Please note: See page 6 to see how track openings are made.</p>	<p>5</p>  <p>Glue track support blocks D10, as shown.</p>	
<p>6</p>  <p>Install track threads D9 using method shown on page 6</p>	<p>7</p>  <p>Track threads installed.</p>	
<p>8</p>  <p>Assemble main body, as shown.</p>	<p>9</p>  <p>Glue body to track assembly.</p>	<p>10</p>  <p>Glue floor D2 and sides D3.</p>

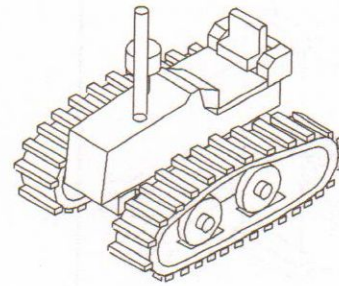


11



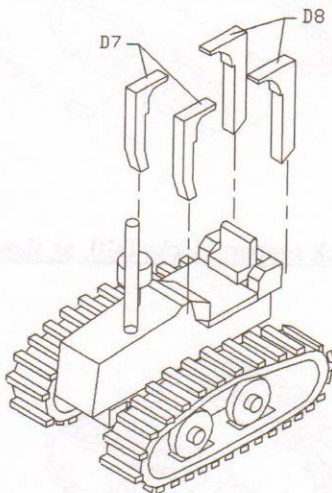
Glue parts, as shown.

12



Parts assembled properly.

13

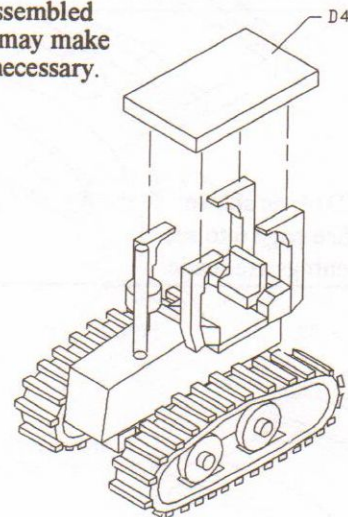


Glue cabin frame D7 and D8.

14

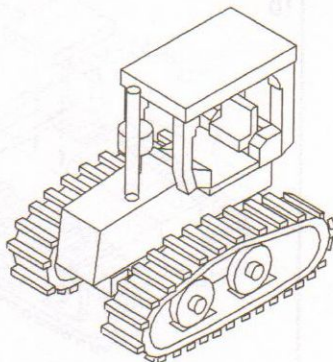
**IMPORTANT**

Cabin must be completely assembled before glue dries so that you may make corrections for proper fit, if necessary.



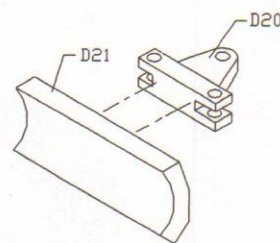
Glue roof assembly D4.

15



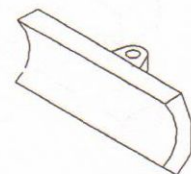
Start working on shovel assembly.

16



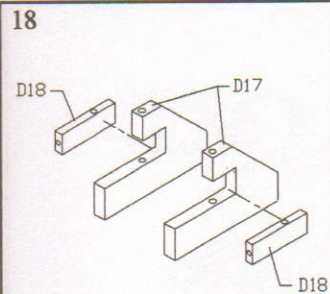
Glue part D20 to D21. See page 38 for exact location.

17

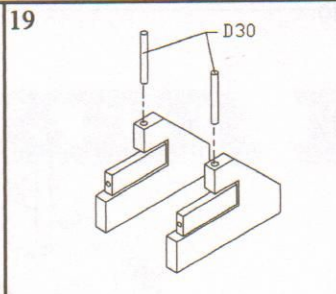


Next, you can start assembling the arms.

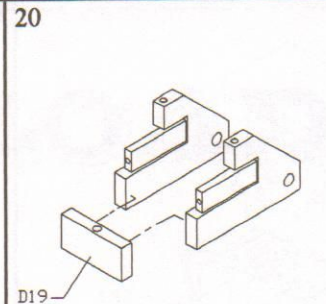




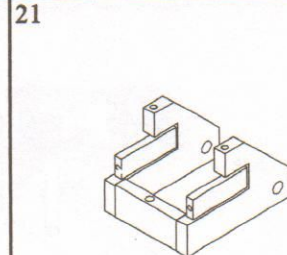
Glue arms D18 into arm support D17.  
Do not glue.



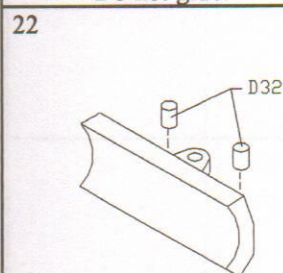
Insert pins D30 through arms D18 and arm supports D17.



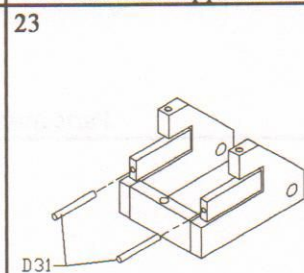
Glue arm cross brace D19, as shown in right diagram.



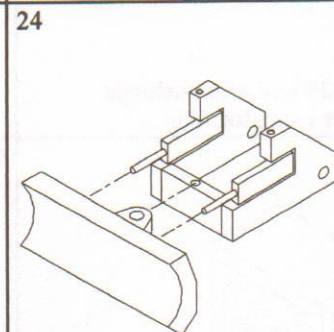
See page 38 for more details.



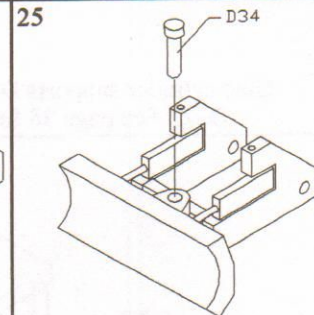
Insert bushings D32 into pivot assembly D20.  
Do not glue.



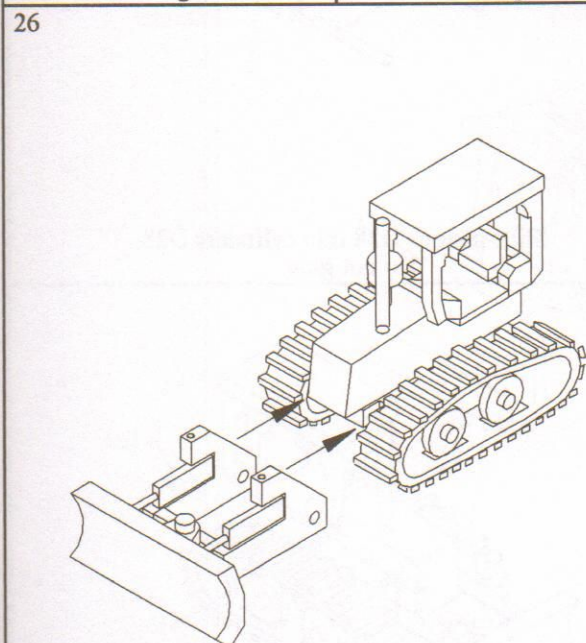
Insert pistons D31 into arm assembly D18.  
Do not glue.



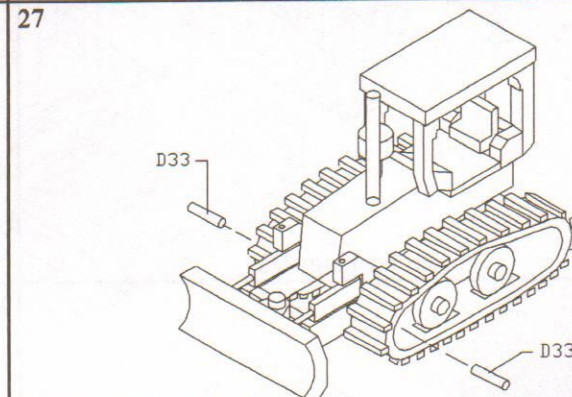
Glue pistons into bushings D32 (not shown).



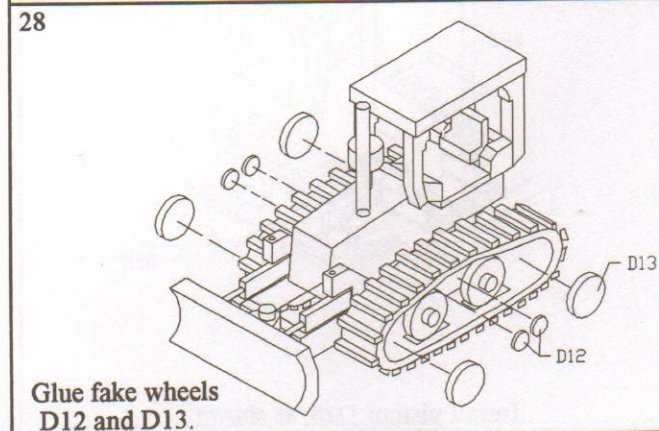
Insert pin D34.



Slide shovel assembly into frame grooves.



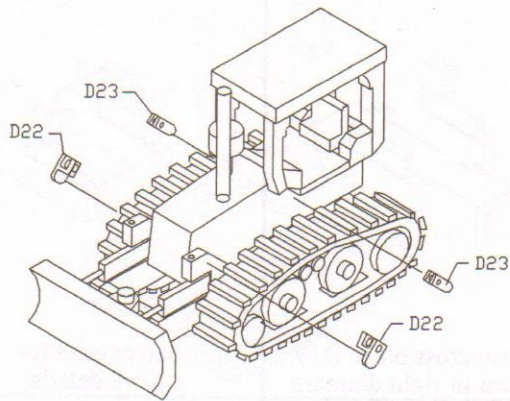
Insert pins D33, as shown.



Glue fake wheels D12 and D13.

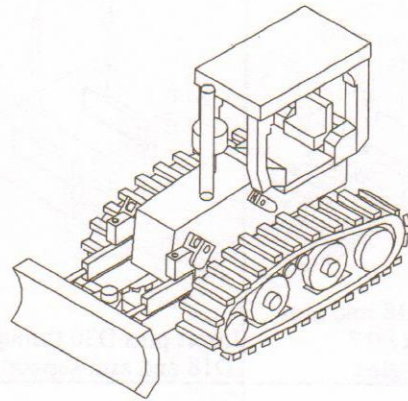


29



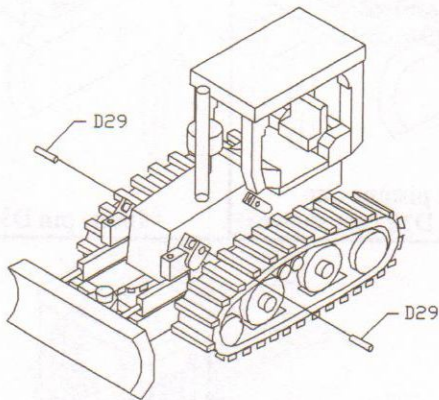
Glue cylinder supports D23 and arm bushings D22. See page 38 for exact location.

30



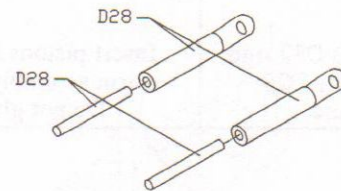
Parts installed.

31



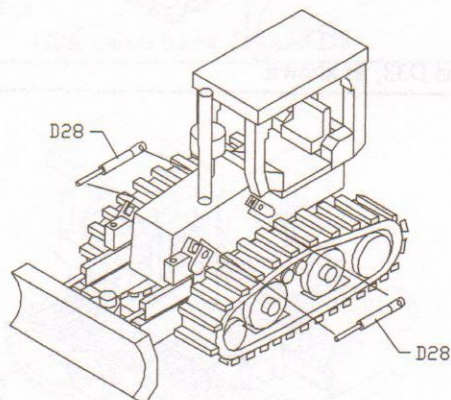
Insert bushings D29.

32



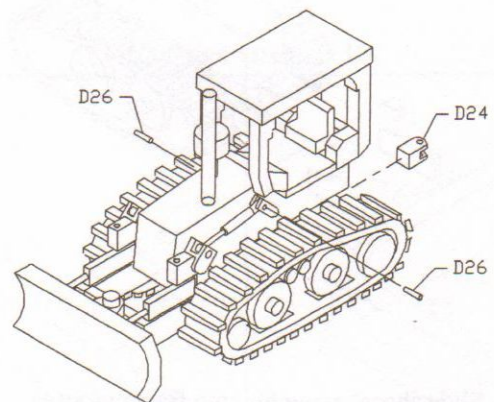
Slide pistons D28 into cylinders D28.  
Do not glue.

33



Install pistons D28, as shown.

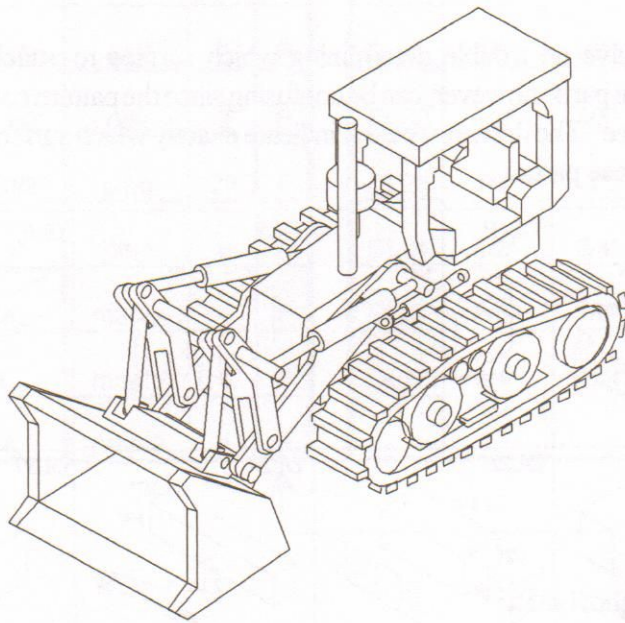
34



Install pins D26 and glue trailer hitch D24.  
Your model should now be complete.



# DOZER LOADER





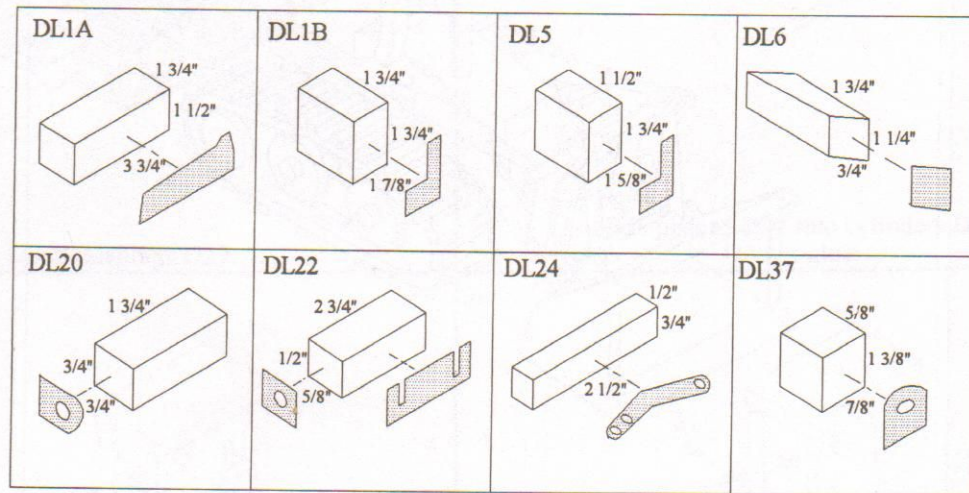
# General Instructions - Dozer Loader

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately  $1/16"$  all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts DL1, and DL3.
- 4- Parts DL1A, DL21, DL22, DL24, and DL37 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Dozer Loader

Part	T	W	L	Material	Qty.	*	Part	T	W	L	Material	Qty.	*
DL1	1"	1 3/4"	6 13/16"	pine	1	F	DL14	1 1/4"	2"	7"	pine	2	R
DL1A	1 1/2"	1 3/4"	3 3/4"	pine	1	R	DL15	1/4"	1/2"	3 3/4"	pine	2	F
DL1B	1 3/4"	1 3/4"	1 7/8"	pine	1	F	DL15a	1/4"	1/2"	3 3/4"	pine	2	F
DL2	3/8"	2 3/4"	1 7/16"	pine	1	F	DL16	1/4"	2 3/4"	4 1/2"	pine	1	F
DL3	1/2"	1 1/2"	1 3/4"	oak	2	F	DL17	1/8"	1 5/8"	5"	pine	1	F
DL4	1/4"	2 3/4"	3 3/4"	pine	1	F	DL18	1/4"	1 7/8"	4 1/2"	pine	1	F
DL5	1 1/2"	1 3/4"	1 5/8"	pine	1	R	DL19	1/4"	2 7/8"	2 7/8"	pine	2	R
DL6	3/4"	1 3/4"	1 1/4"	oak	1	R	DL20	3/4"	3/4"	1 3/4"	maple	1	F
DL7	3/8"	1 1/4"	3 1/2"	oak	2	R	DL21	3/8"	3/4"	1 1/4"	maple	2	R
DL8	3/8"	1 1/4"	3 1/2"	oak	2	R	DL22	1/2"	5/8"	2 1/2"	maple	1	F
DL9	1/8"	1/4"	1 3/8"	pine	72	F	DL23	1/4"	1"	4 3/4"	maple	2	R
DL10	1/4"	3/8"	1"	pine	6	F	DL24	1/2"	3/4"	2 1/2"	maple	2	R
DL11	1/4"	1 3/8" DIA.		maple	4	F	DL37	5/8"	7/8"	1 3/8"	Maple	1	R
DL12	1/4"	1/2" DIA.		maple	4	F	DL38	3/4"	3 1/4"	5 3/4"	pine	1	F
DL13	1/4"	1 1/4" DIA.		maple	4	F							

T = Thickness

W = Width

L = Length

## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

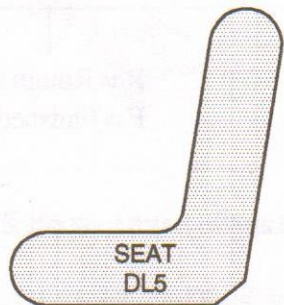
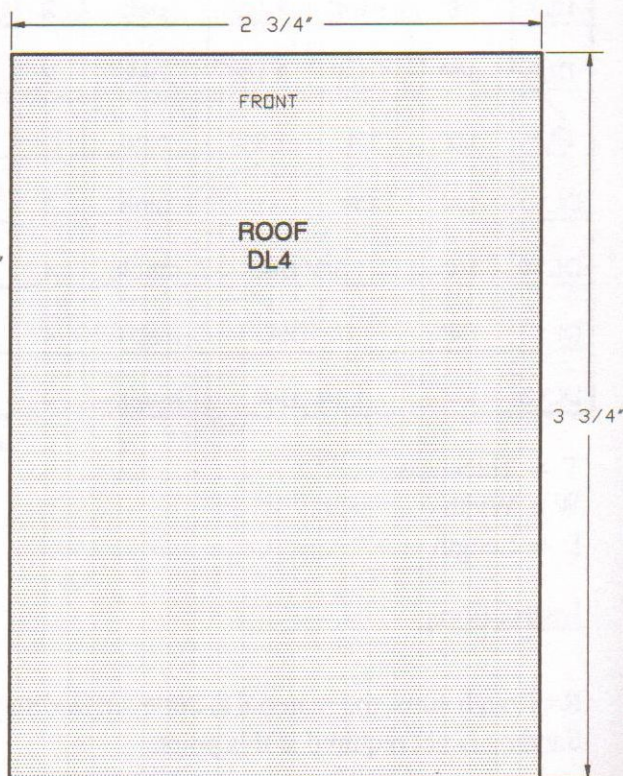
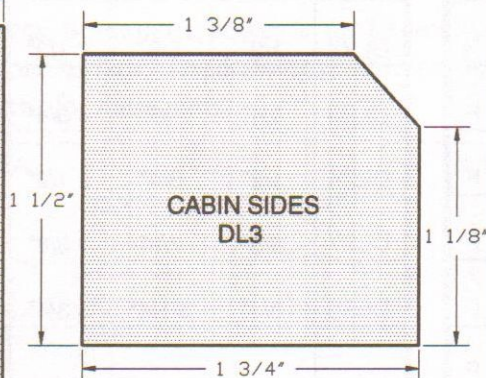
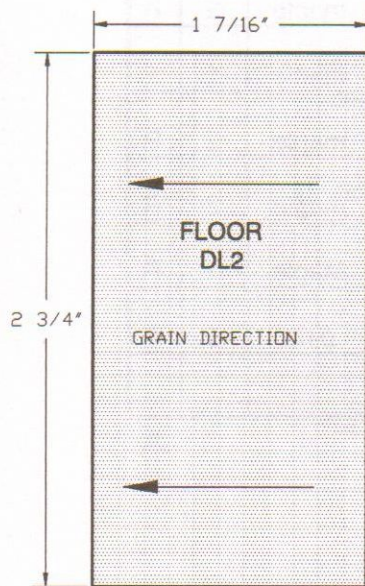
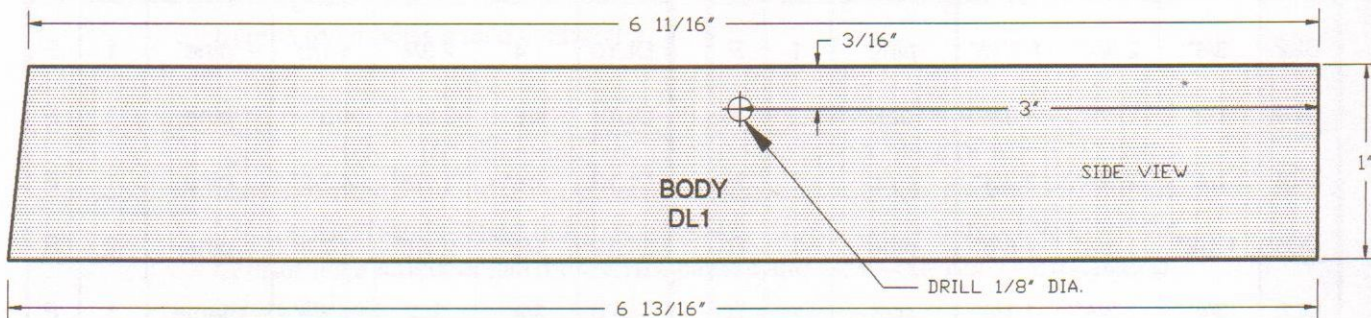
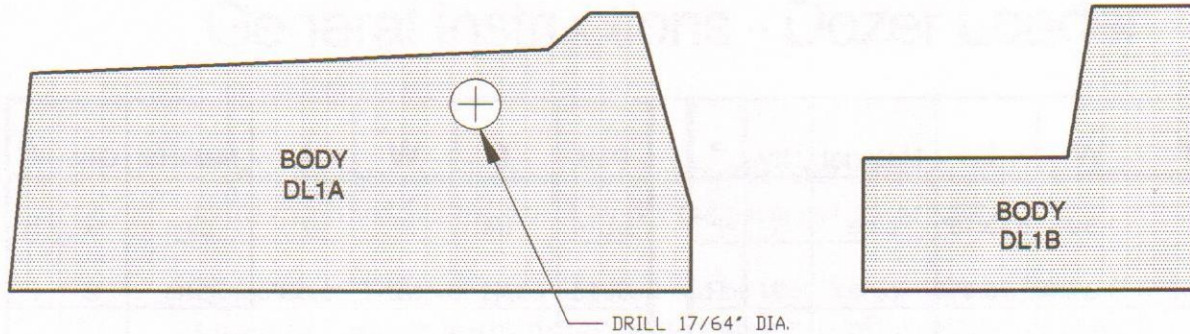
F = Finished Size: Cut and sand parts to finished size.

R = Rough size

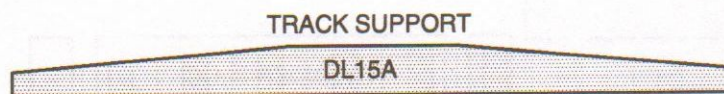
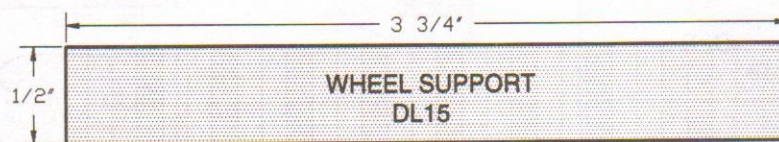
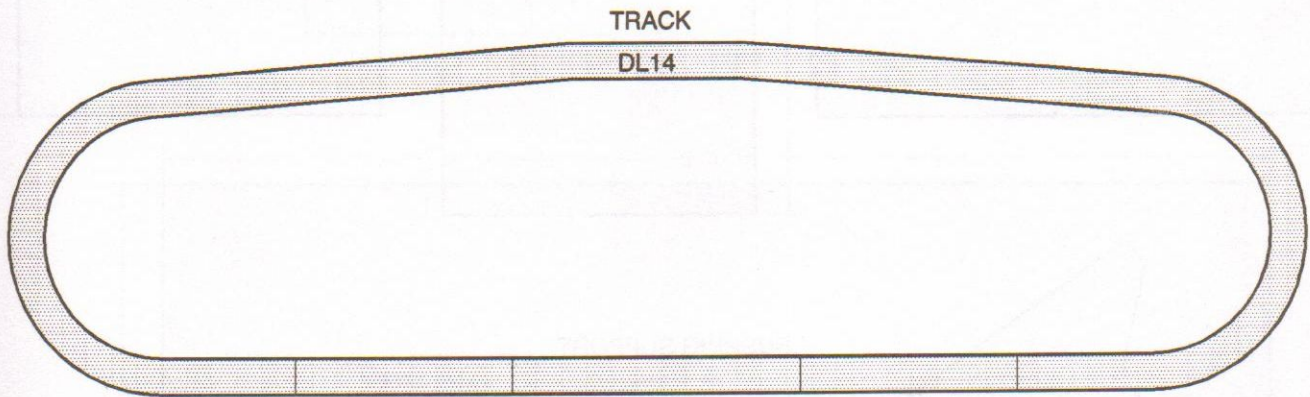
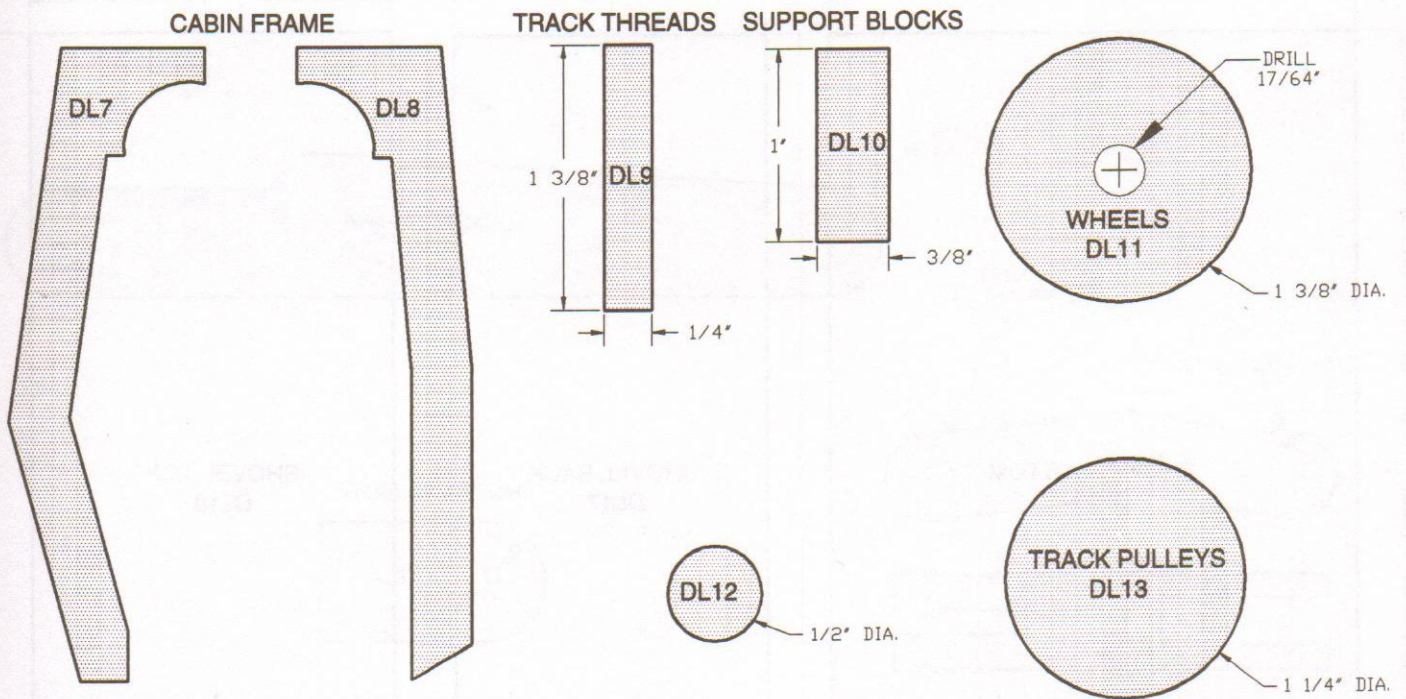
F = Finished size



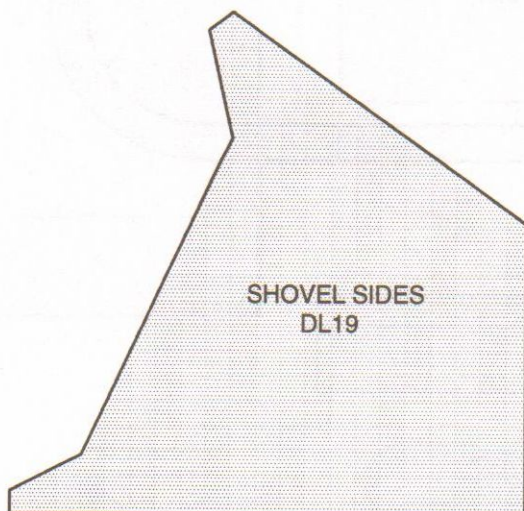
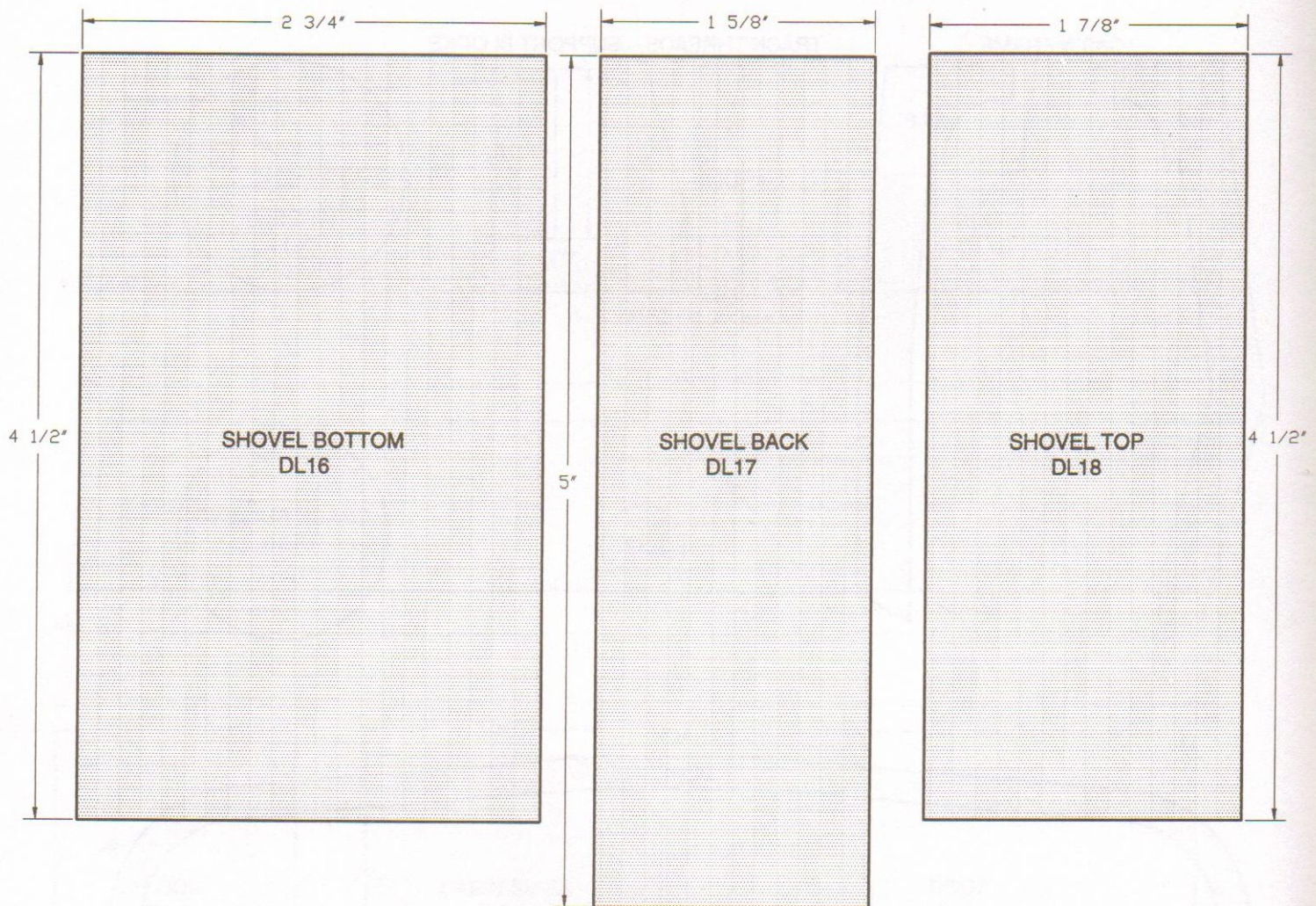
# Full-Sized Patterns: Set One



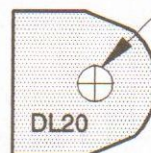




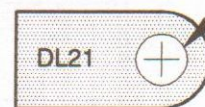
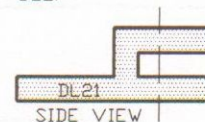




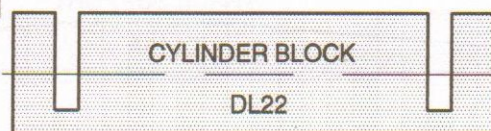
## BUSHING SUPPORT



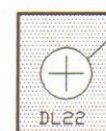
DRILL  $\frac{15}{64}"$  DIA.  
 $\frac{3}{4}"$  DEEP



DRILL  
 $\frac{17}{64}"$  DIA.



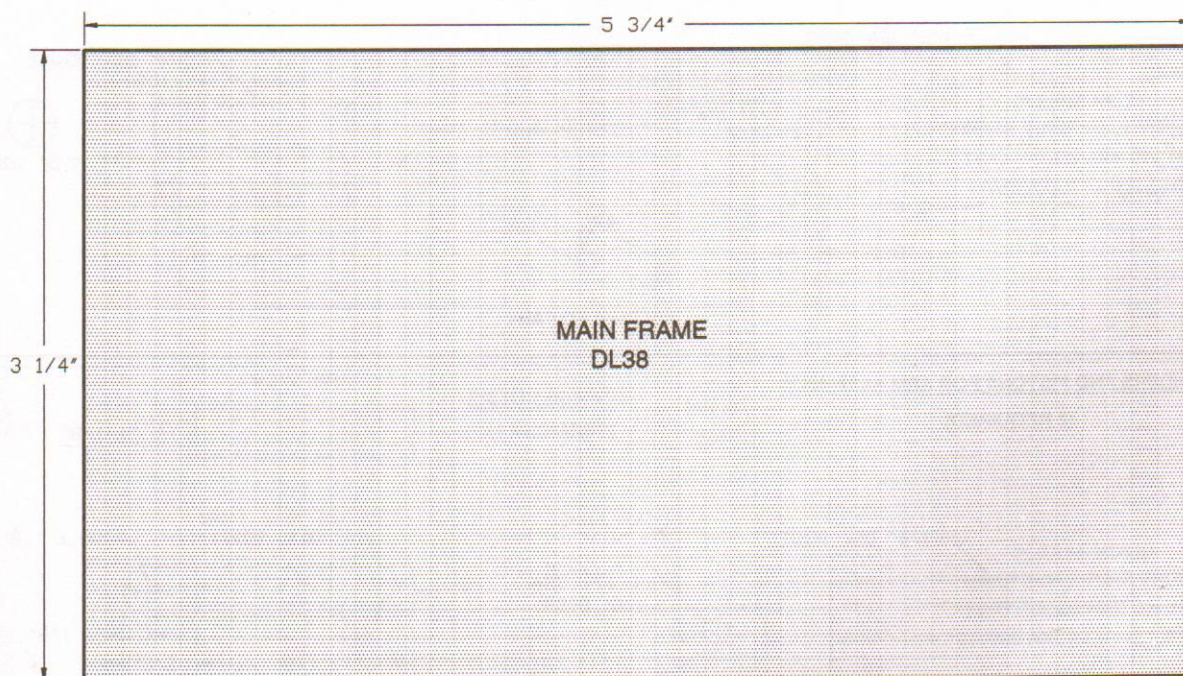
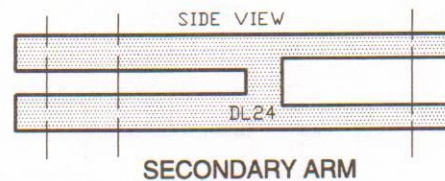
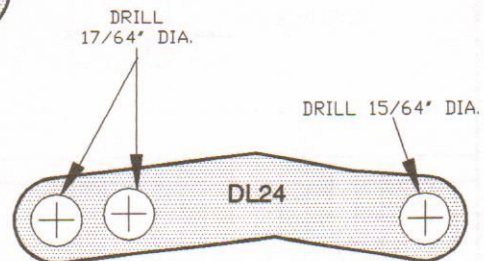
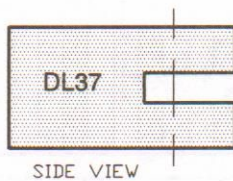
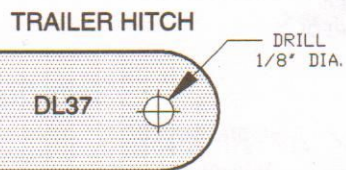
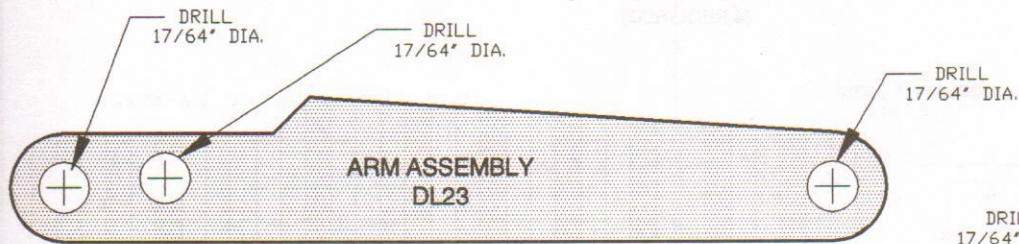
SIDE VIEW



DRILL  
 $\frac{17}{64}"$  DIA.

(END VIEW-DL22)

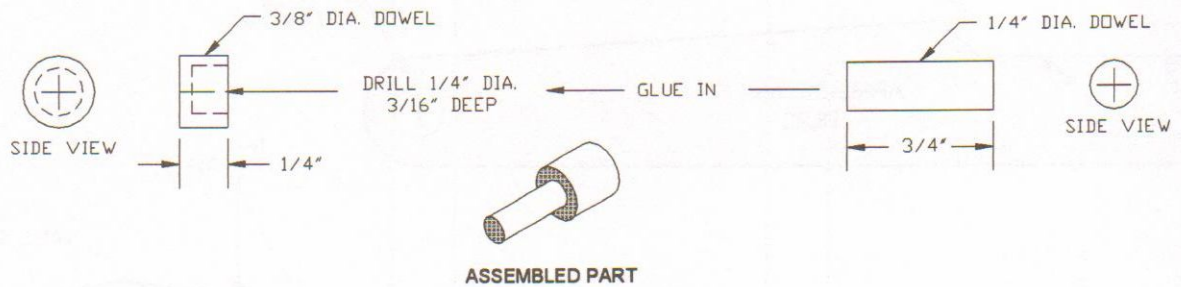






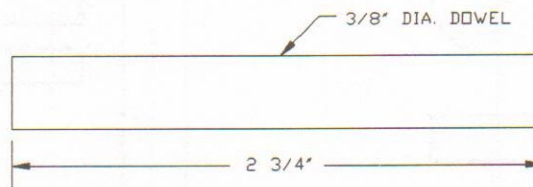
DL25

### WHEEL PINS (4 REQUIRED)



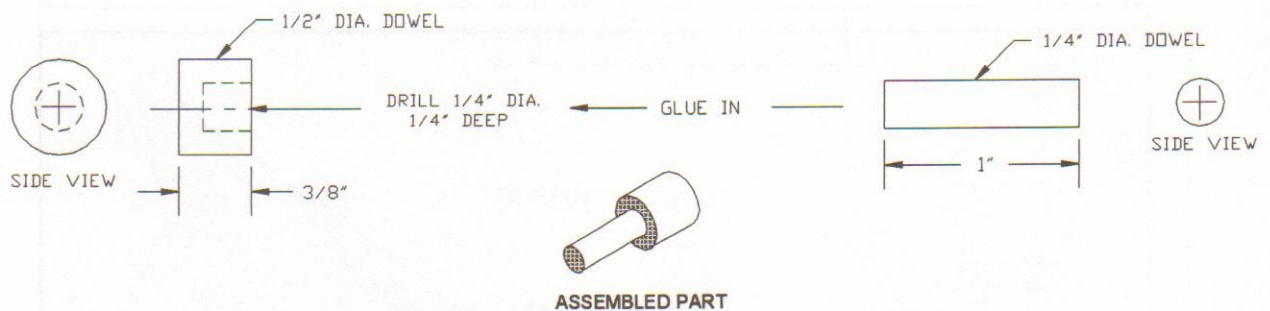
DL26

### MUFFLER (1 REQUIRED)



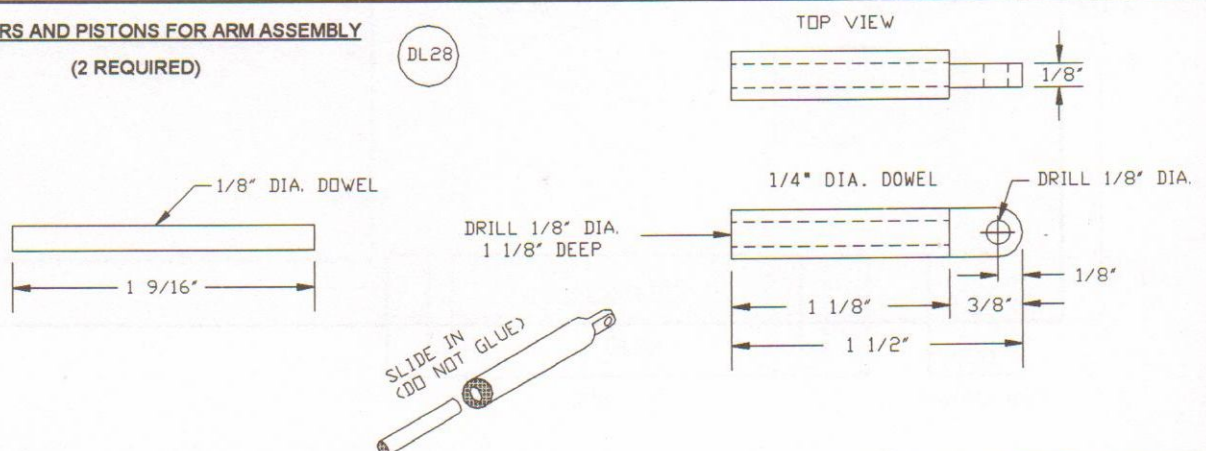
DL27

### AIR FILTER (1 REQUIRED)



### CYLINDERS AND PISTONS FOR ARM ASSEMBLY (2 REQUIRED)

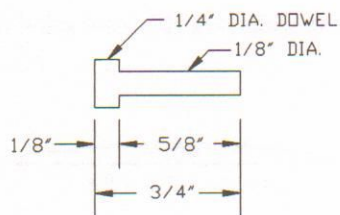
DL28





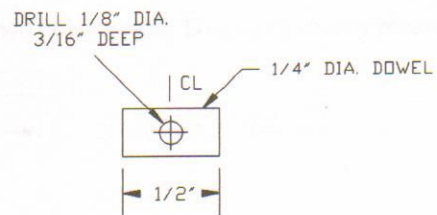
DL29

### CYLINDER LOCKING PINS (2 REQUIRED)



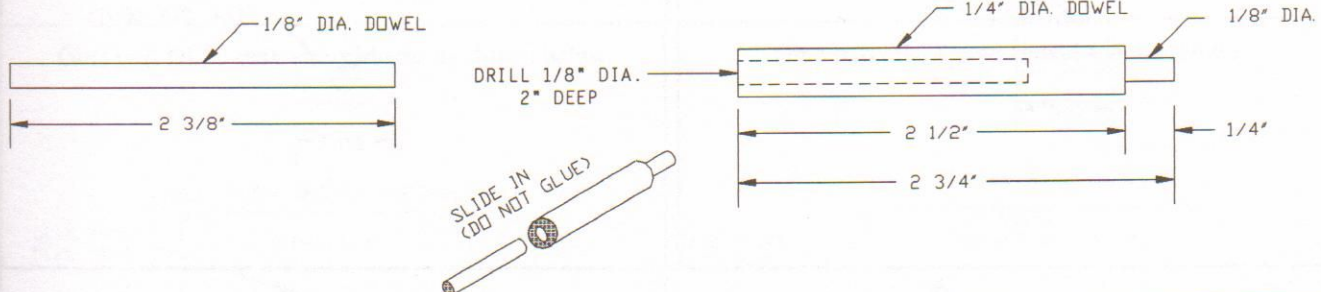
DL30

### PISTON BUSHINGS (2 REQUIRED)



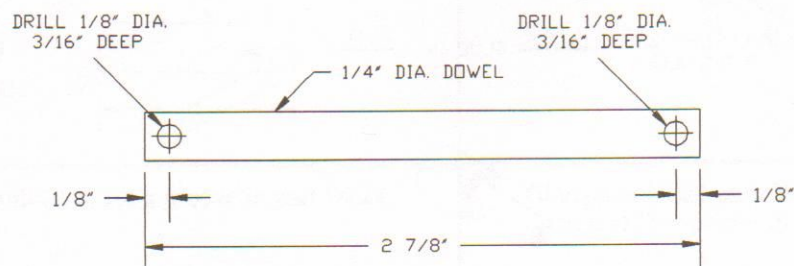
DL31

### CYLINDER & PISTONS FOR ARM ASSEMBLY (2 REQUIRED)



DL32

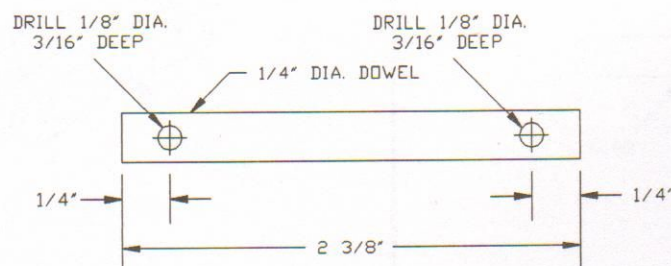
### PIVOT PINS (2 REQUIRED)



PLEASE NOTE:  
MAKE SURE THAT THESE  
TWO HOLES ARE ON THE  
SAME AXES (SAME LINE)

DL33

### PISTON BUSHING (1 REQUIRED)

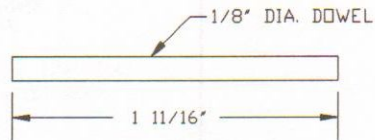


PLEASE NOTE:  
MAKE SURE THAT THESE  
TWO HOLES ARE ON THE  
SAME AXES (SAME LINE)



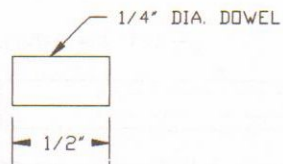
**SHOVEL PISTONS**  
(2 REQUIRED)

DL 34



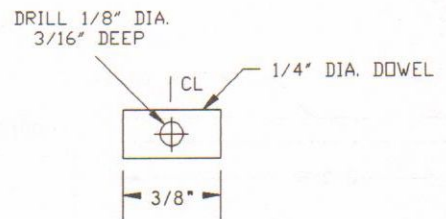
**ARM ASSEMBLY LOCKING PINS**  
(2 REQUIRED)

DL 35



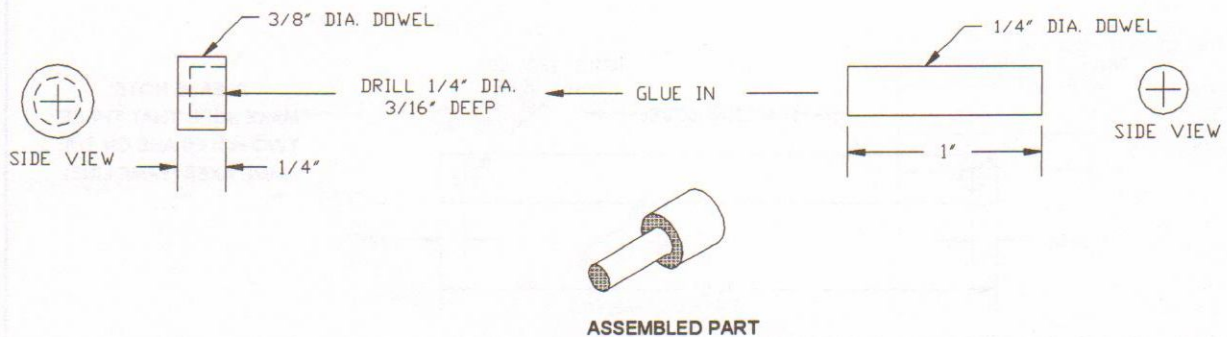
DL 36

**PISTON BUSHINGS**  
(2 REQUIRED)



DL 37

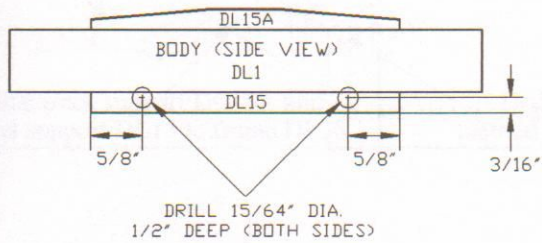
**SHOVEL LOCKING PINS**  
(2 REQUIRED)



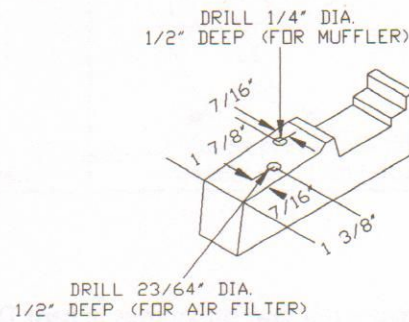


## Additional Information - Dozer Loader

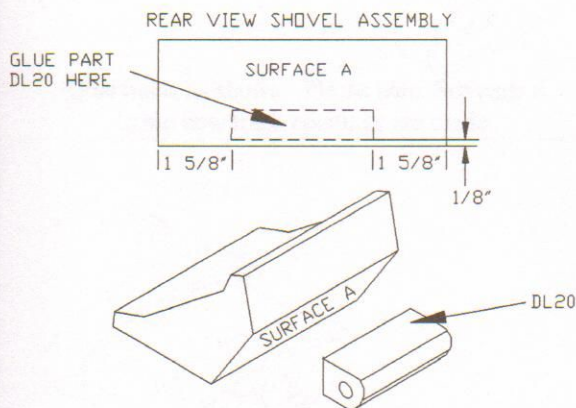
Drill holes into body assembly, as shown.



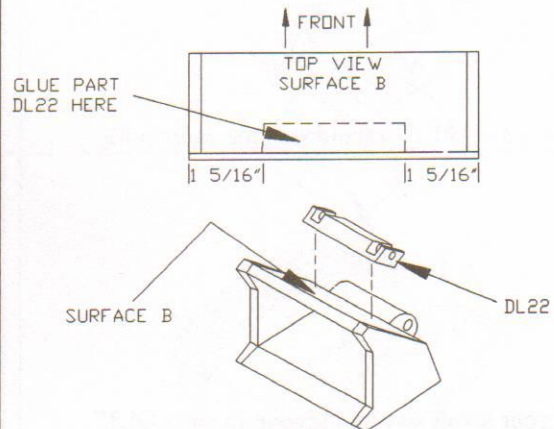
Drill two holes in part DL1A, as shown below.



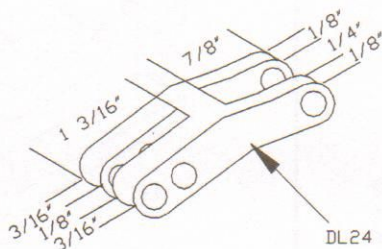
Glue part DL20 onto shovel back, as shown below.



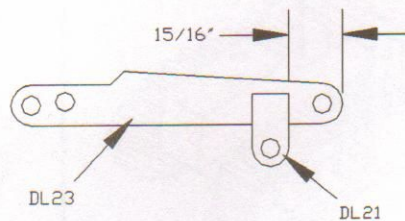
Glue part DL22 onto shovel top, as shown.



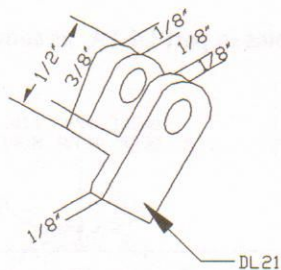
Using your Scroll Saw, cut a groove in part DL24.



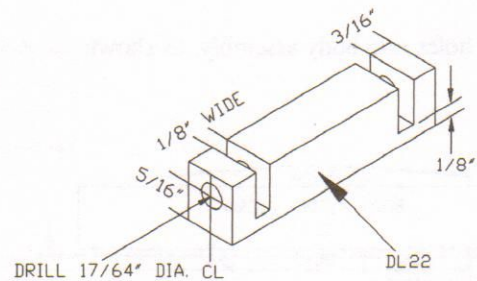
Glue parts DL21 onto DL23. Glue parts DL21 so that they are on the outside of each arm.



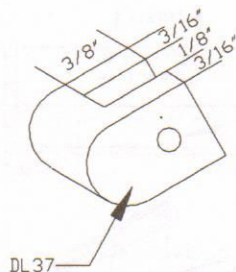




Using your scroll saw, cut grooves in parts DL21.



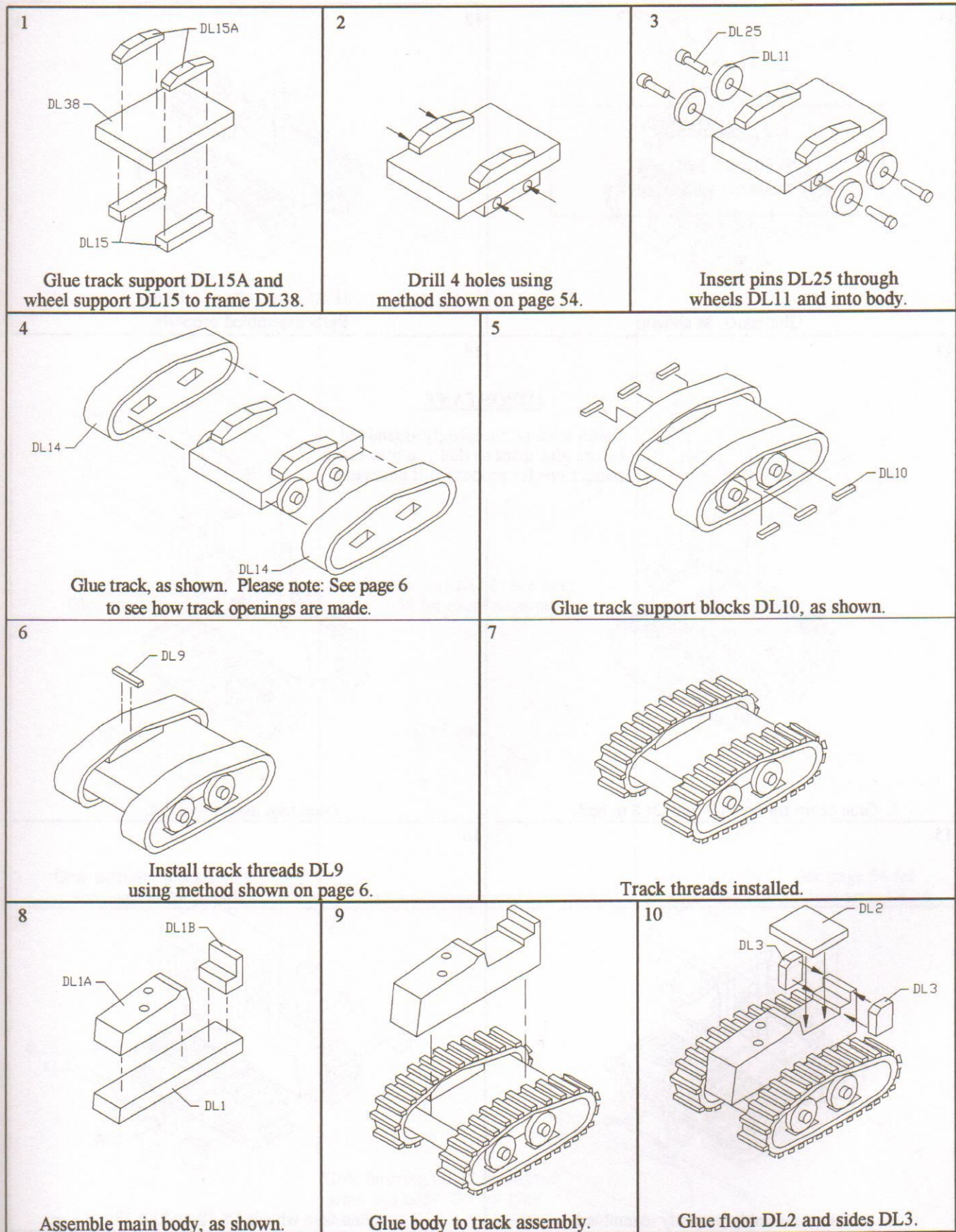
Using your scroll saw, cut grooves in part DL22, as shown.



Using your scroll saw, cut groove in parts DL37.

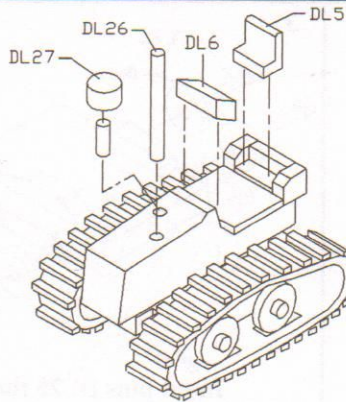


# Dozer Loader - Assembly Drawings



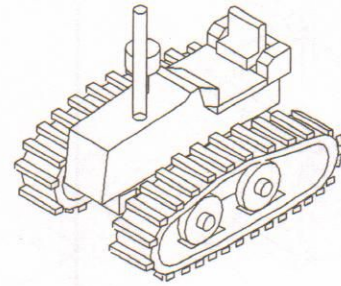


11



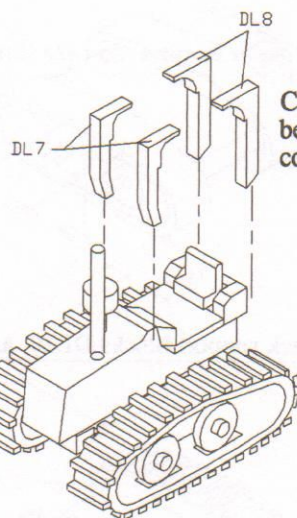
Glue parts, as shown.

12



Parts assembled properly.

13

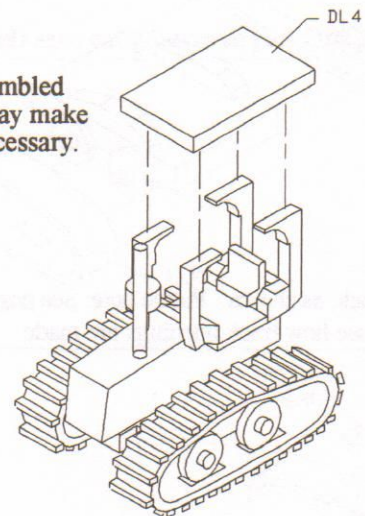


Glue cabin frame DL7 and DL8 to body.

14

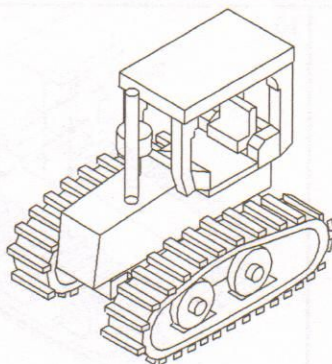
**IMPORTANT**

Cabin must be completely assembled before glue dries so that you may make corrections for proper fit, if necessary.



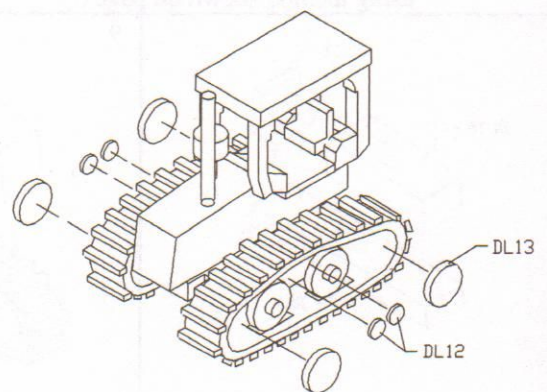
Glue roof assembly DL4.

15



Cabin assembly properly assembled.

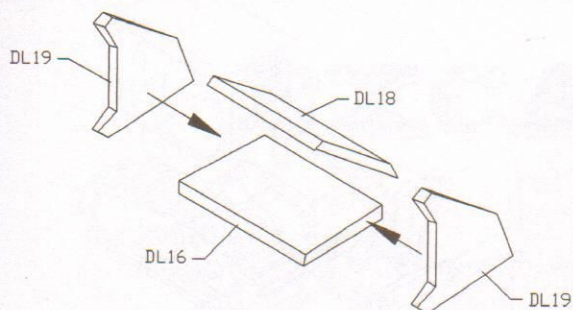
16



Glue fake wheels DL12 and DL13.



17

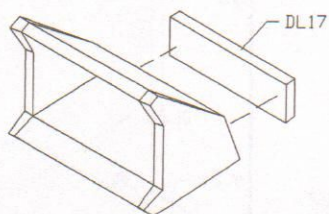


Glue shovel sides DL19 to top DL18 and bottom DL16.

### **IMPORTANT**

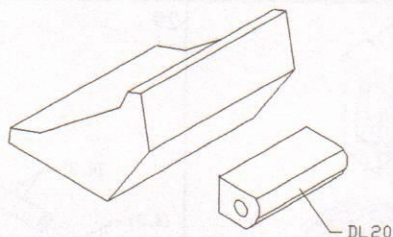
See page 7 for tricks on making the shovel.

18



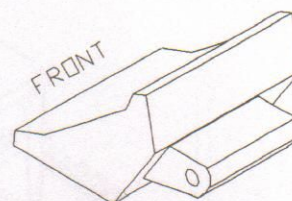
Glue shovel back DL17.

19



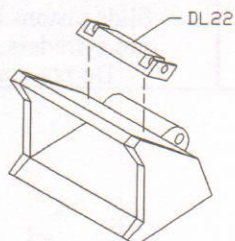
Glue part DL20. See page 54 for exact location.

20



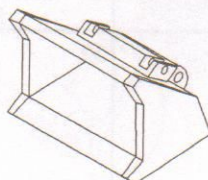
Parts properly installed.

21



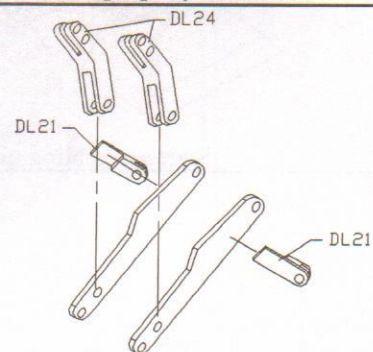
Glue cylinder block DL22. see page 54 for details.

22



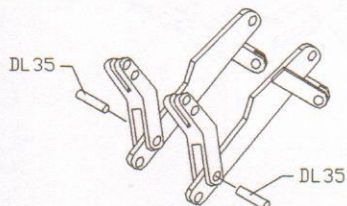
Start working on arm assembly.

23



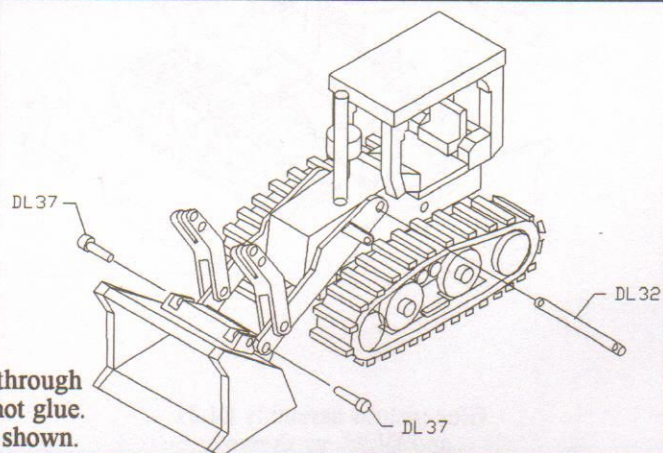
Glue parts DL21. See page 54 for location. Slide secondary arms DL24.

24



Insert pins DL35, as shown.

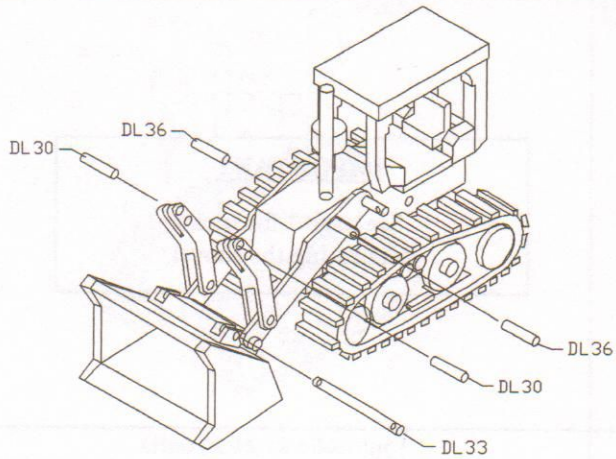
25



Slide bushing DL32 through arms and body. Do not glue. Insert pins DL37, as shown.

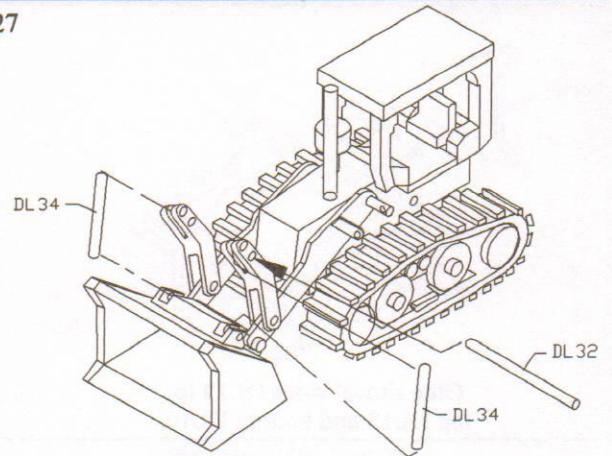


26



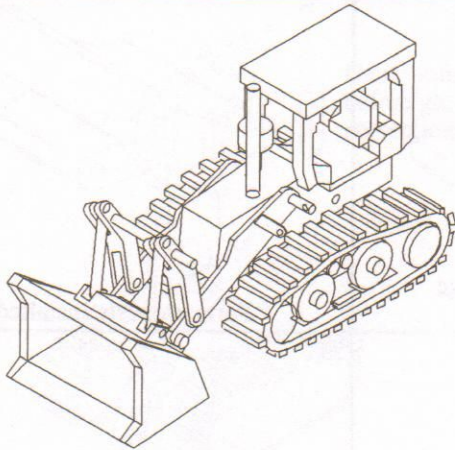
Insert bushings DL33, DL30 and DL36.

27



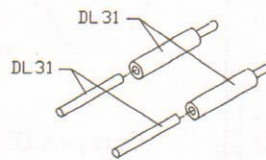
Insert pivot pin DL32. Do not glue.  
Glue in shovel pistons DL34.

28



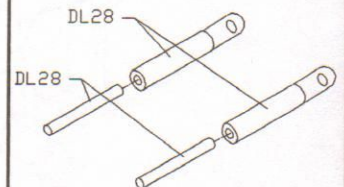
Start assembling pistons.

29



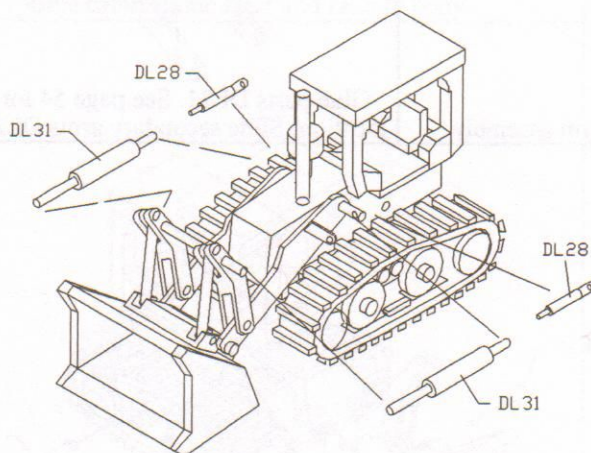
Slide pistons DL31  
into cylinders DL31.  
Do not glue.

30



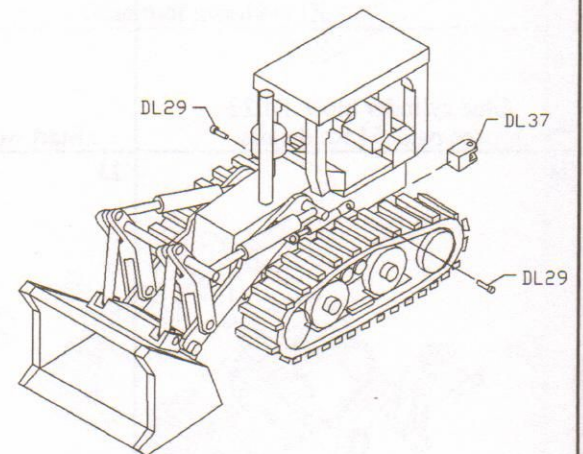
Slide pistons DL28  
into cylinders DL28.  
Do not glue.

31



Glue pistons assembly DL31  
and DL28, as shown.

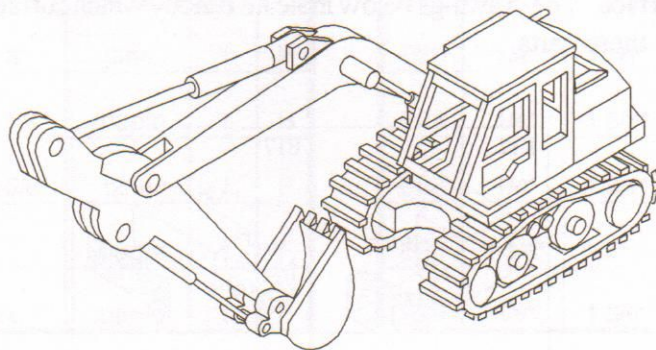
32



Hold pistons DL28 in position using pins DL29. Glue  
trailer hitch DL37. Your model should now be complete.



# EXCAVATOR





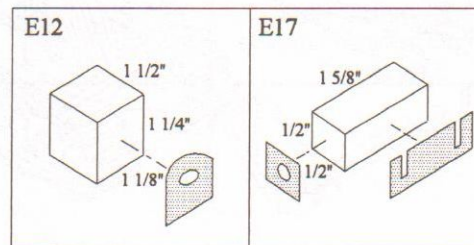
# General Instructions - Excavator

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately 1/16" all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts E9, E10, and E13.
- 4- Parts E12, E17, E18 and E28 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Excavator

Part	T	W	L	Material	Qty.	*	Part	T	W	L	Material	Qty.	*
E1	1/4"	3 1/4"	3 1/4"	oak	1	R	E16	1/2"	5/8"	1 11/16"	oak	1	F
E2	1/4"	3 1/4"	3 1/4"	oak	1	R	E17	1/2"	1/2"	1 5/8"	maple	1	F
E3	1/4"	1 7/8"	3 1/4"	oak	1	R	E18	3/4"	2 7/8"	8 5/8"	maple	1	R
E4	1/4"	2 1/8"	2 7/8"	oak	1	R	E19	1/4"	5/8"	1 1/2"	maple	2	R
E5	1/4"	2 3/16"	2 1/2"	pine	1	F	E20	1/8"	1/4"	1 3/8"	pine	72	F
E6	1/4"	1/4"	1 1/2"	oak	2	F	E21	1/4"	1/2"	3 3/4"	pine	2	F
E7	1/4"	1 3/8" DIA.		maple	4	F	E21A	1/4"	1/2"	3 3/4"	pine	2	R
E8	1/4"	3/8"	1"	pine	6	F	E22	1/4"	1/2" DIA.		maple	4	F
E9	3/8"	4 3/8"	5 1/4"	pine	1	F	E23	1/4"	1 1/4" DIA.		maple	4	F
E10	1/4"	1 1/2"	2 3/4"	pine	1	F	E24	1 1/4"	2"	7"	pine	2	R
E11	1 1/2"	4 3/8"	3"	pine	1	F	E25	1/4"	1 1/2"	5 5/8"	maple	2	R
E12	1 1/8"	1 1/4"	1 1/4"	maple	1	R	E26	1/4"	1 5/8"	5 7/8"	maple	1	R
E13	3/4"	3 1/8"	5 5/8"	pine	1	F	E27	1/4"	1 3/4"	2 1/2"	maple	2	R
E14	1/4"	2" DIA.		maple	1	F	E28	1 3/8"	2"	3 1/2"	maple	1	R
E15	1/2"	1 3/4" DIA.		maple	1	F	E29	3/8"	1 3/8"	4 5/8"	oak	1	R

T = Thickness

W = Width

L = Length

## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

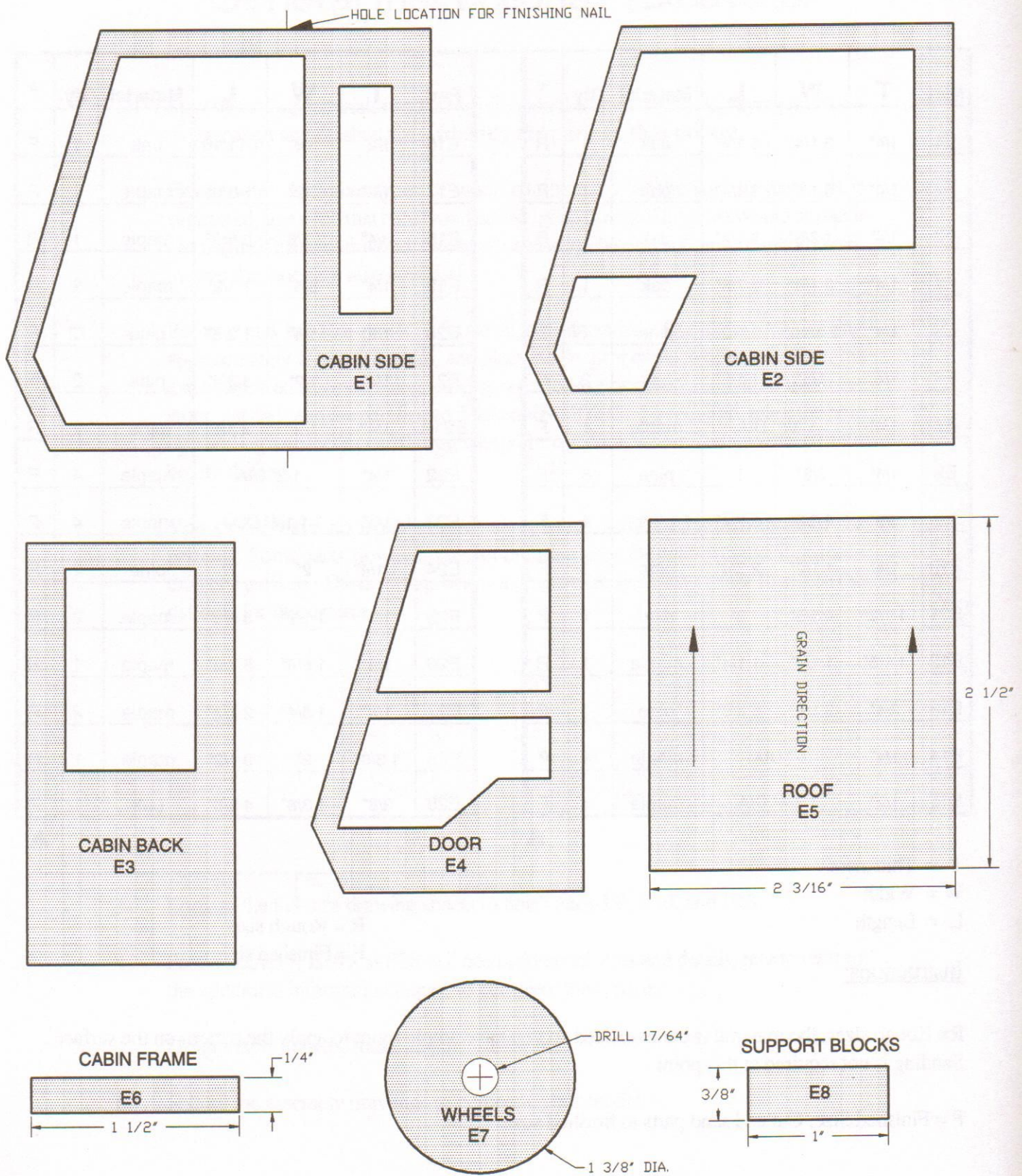
F = Finished Size: Cut and sand parts to finished size.

R = Rough size

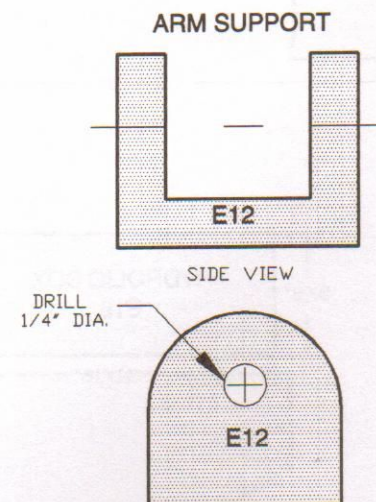
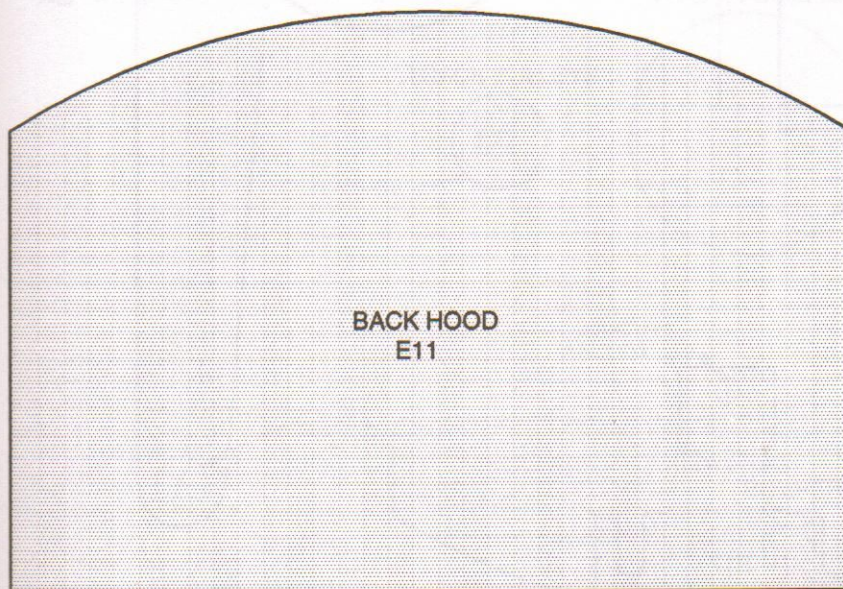
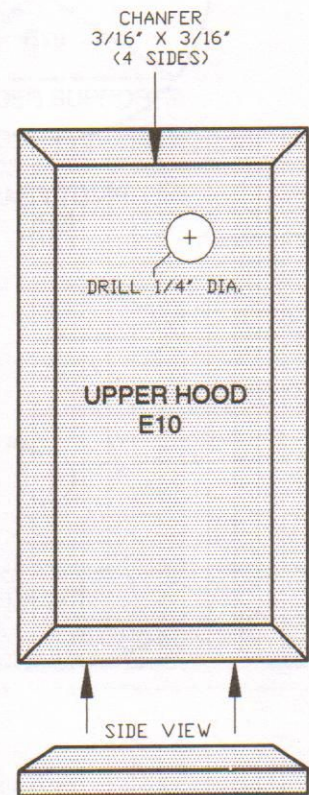
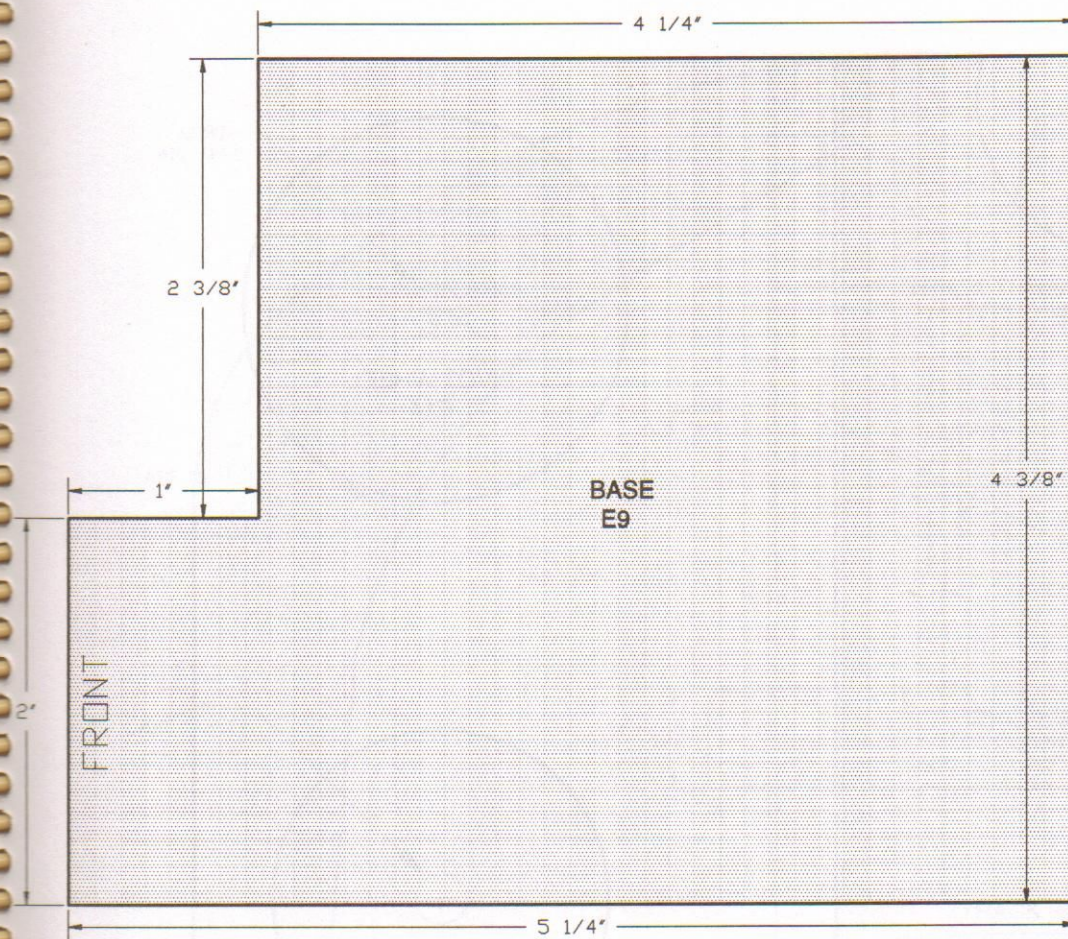
F = Finished size



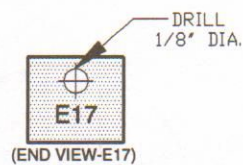
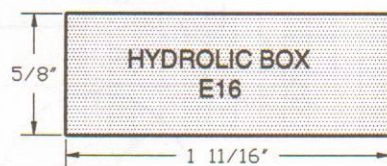
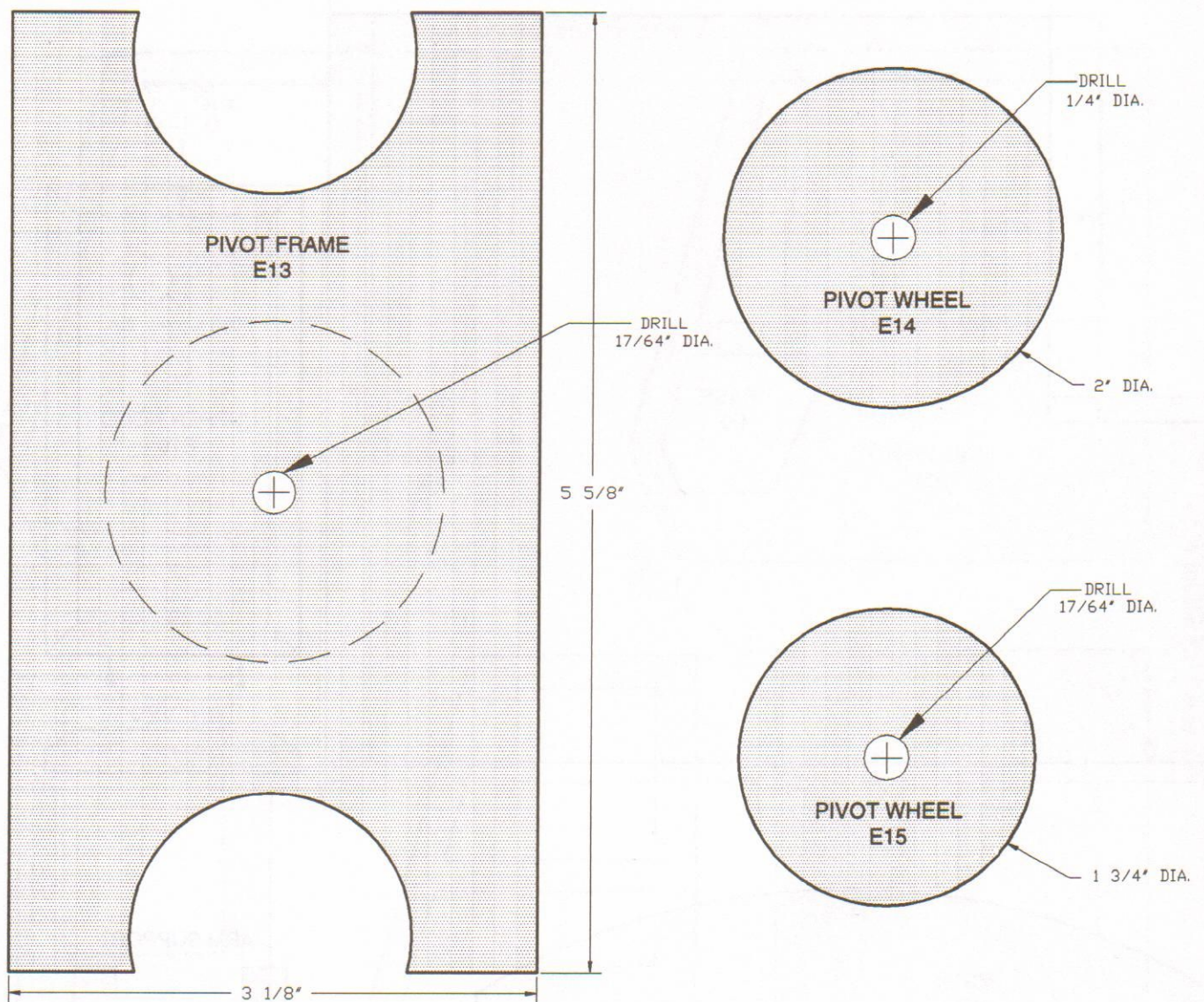
# Full-Sized Patterns: Set One



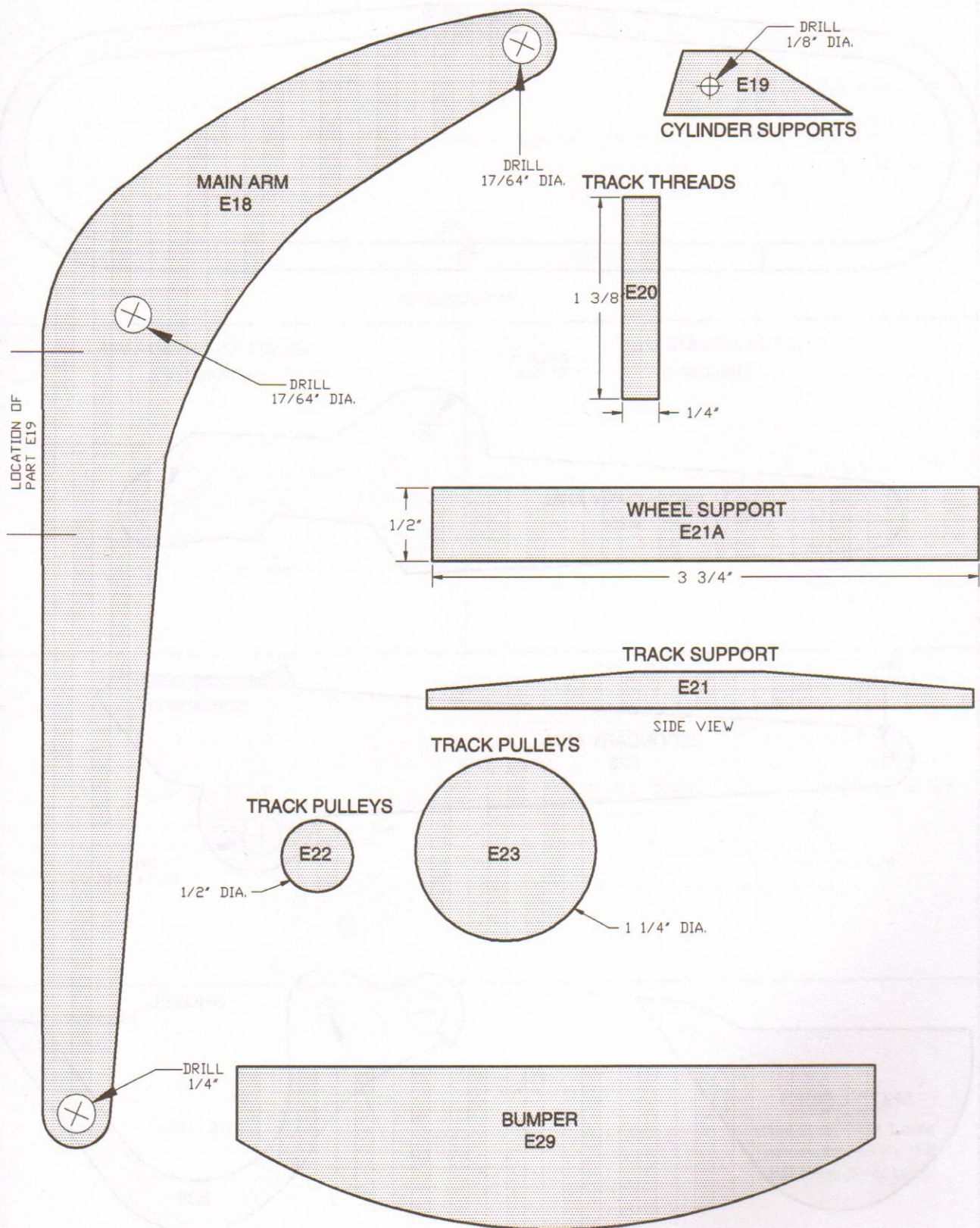




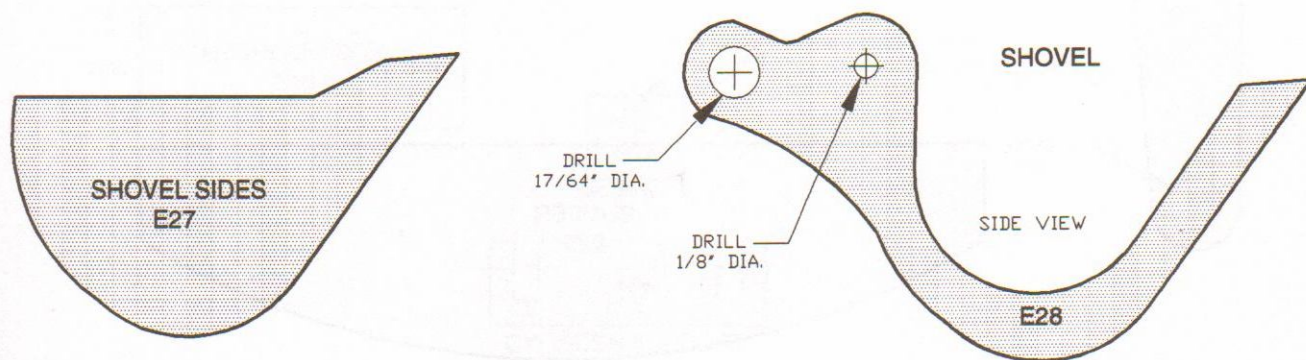
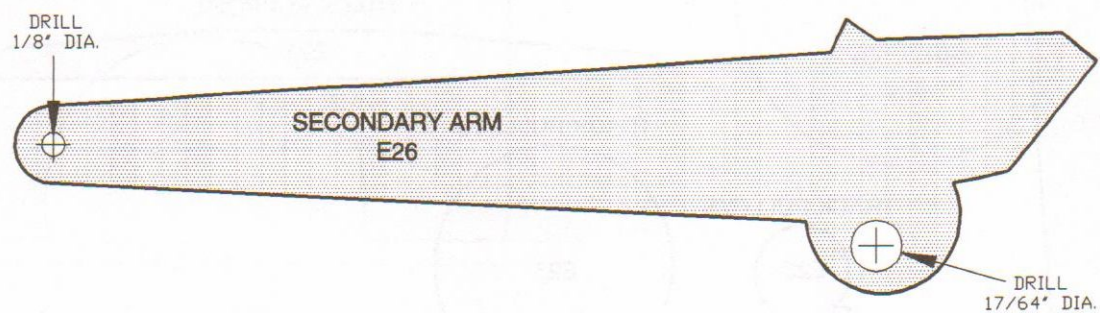
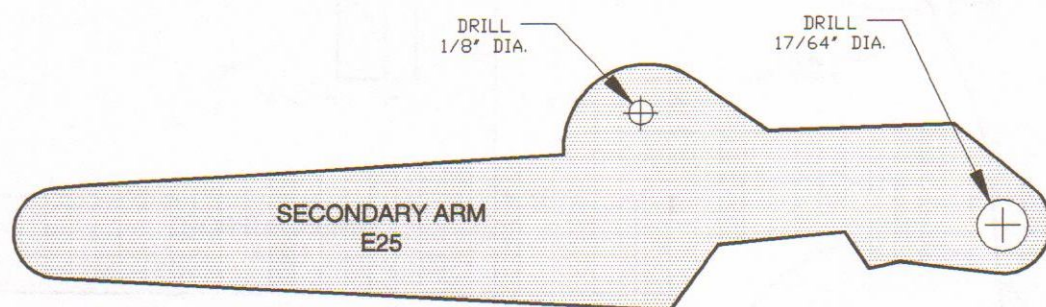
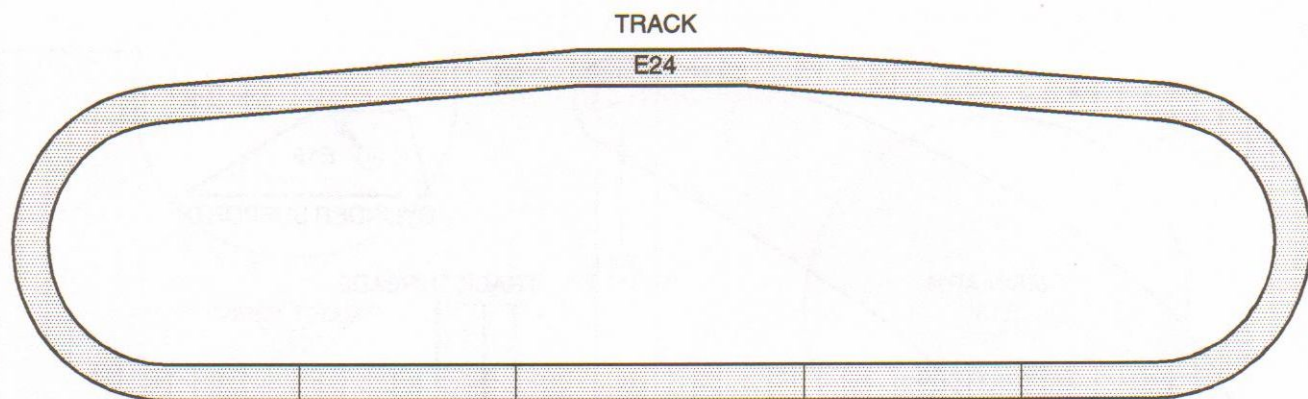












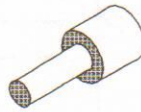


E30

### WHEEL PINS (4 REQUIRED)

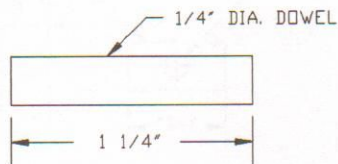


ASSEMBLED PART



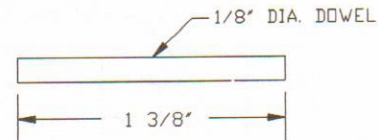
E31

### ARM ASSEMBLY LOCKING PIN (1 REQUIRED)



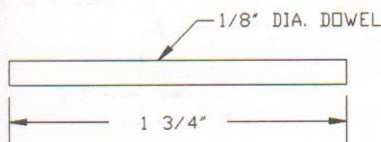
E32

### CYLINDER LOCKING PIN (1 REQUIRED)



E33

### CYLINDERS AND PISTONS (2 REQUIRED)



DRILL 1/8" DIA.  
1 1/2" DEEP

SLIDE IN  
(DO NOT GLUE)

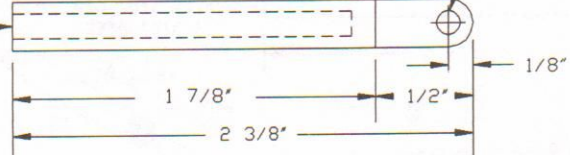


TOP VIEW



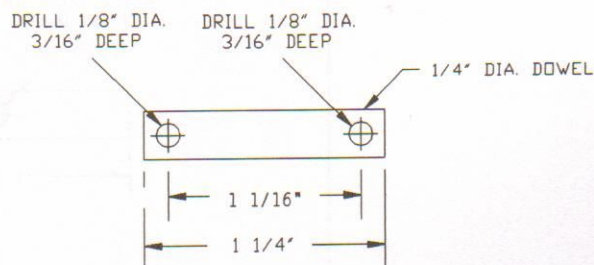
1/4" DIA. DOWEL

DRILL 1/8" DIA.



### PISTON BUSHINGS (1 REQUIRED)

E34

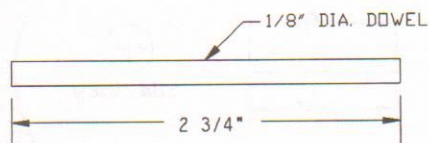


PLEASE NOTE:  
MAKE SURE THAT THESE  
TWO HOLES ARE ON THE  
SAME AXES (SAME LINE).

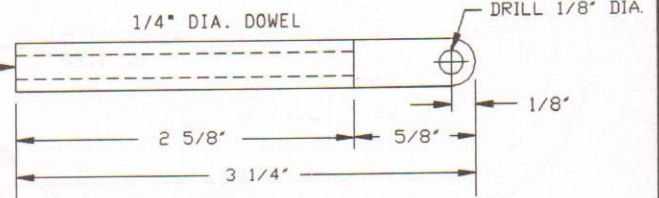
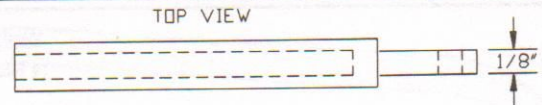


**CYLINDER & PISTON**  
(1 REQUIRED)

E35

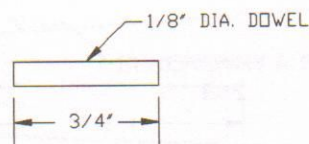


DRILL 1/8" DIA.  
2 1/4" DEEP



E36

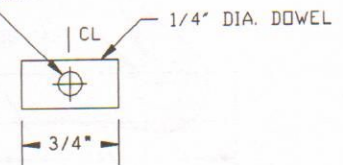
**CYLINDER LOCKING PIN**  
(2 REQUIRED)



E37

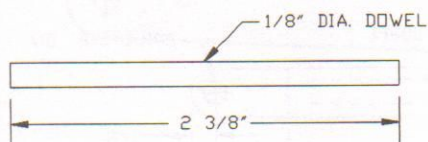
**PISTON BUSHING**  
(1 REQUIRED)

DRILL 1/8" DIA.  
3/16" DEEP

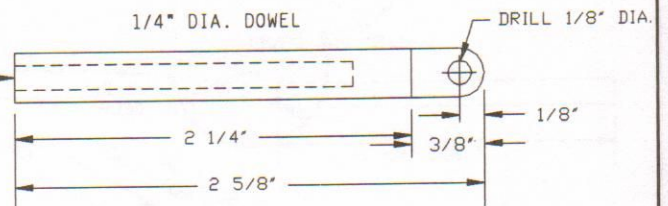
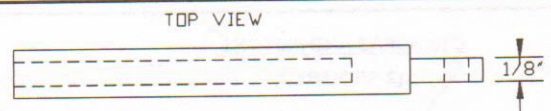
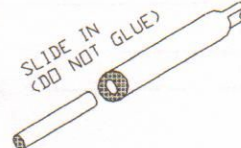


E38

**SHOVEL PISTON AND CYLINDER**  
(1 REQUIRED)

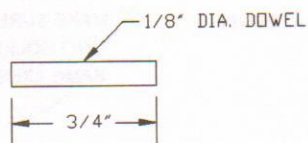


DRILL 1/8" DIA.  
1 3/4" DEEP



E39

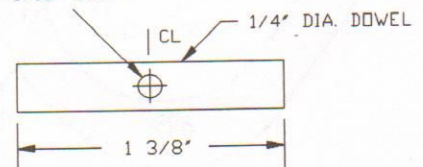
**CYLINDER LOCKING PIN**  
(1 REQUIRED)



E40

**PISTON BUSHING**  
(1 REQUIRED)

DRILL 1/8" DIA.  
3/16" DEEP

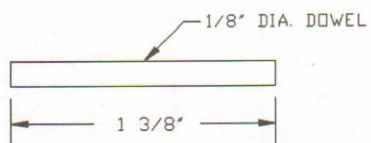




E41

**SHOVEL LOCKING PIN**

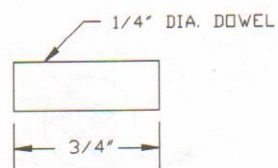
(1 REQUIRED)



E42

**ARM ASSEMBLY LOCKING PIN**

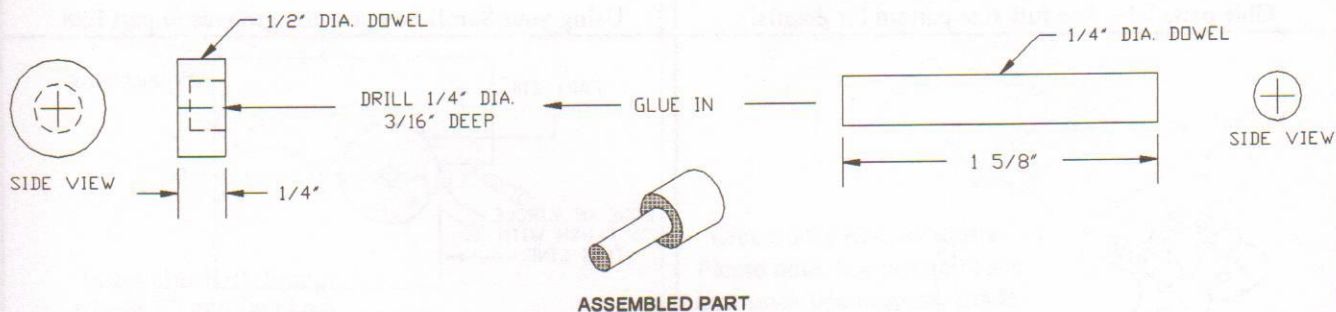
(1 REQUIRED)



E43

**MAIN PIVOT PIN**

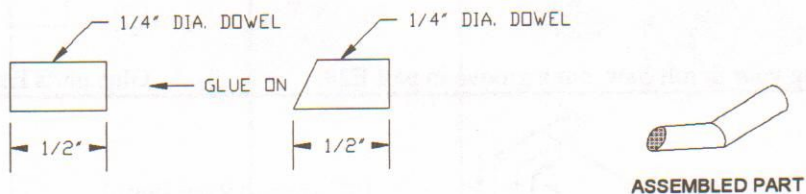
(1 REQUIRED)



E44

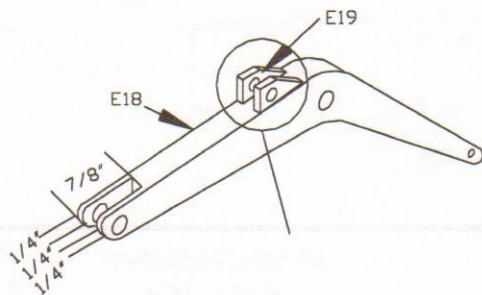
**MUFFLER**

(1 REQUIRED)

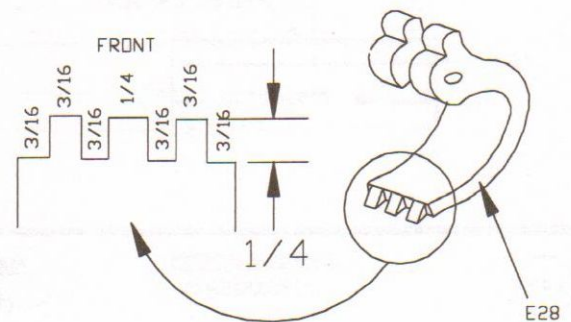




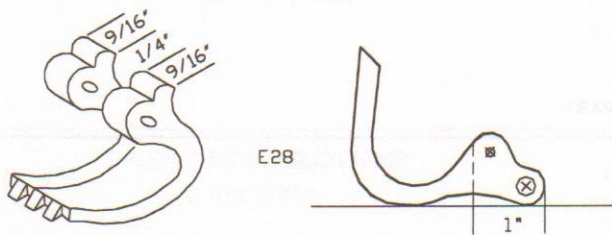
## Additional Information - Excavator



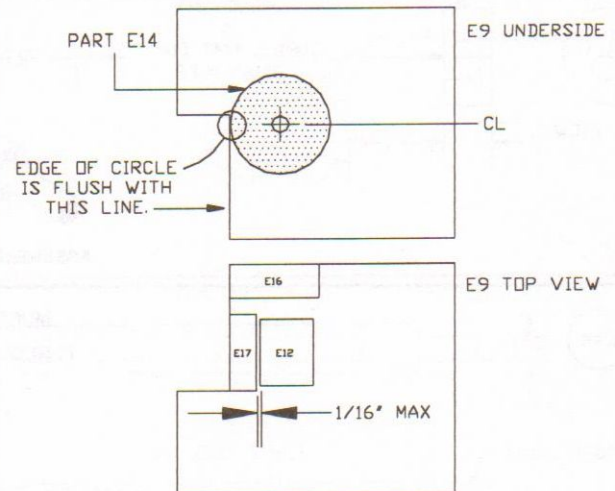
Using your Scroll Saw, cut a groove in part E18.  
Glue parts E19. See full-size pattern for details.



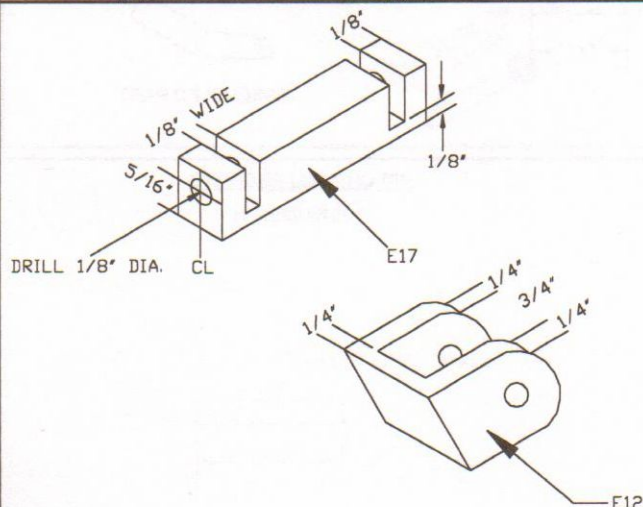
Using your Scroll Saw, cut the grooves in part E28.



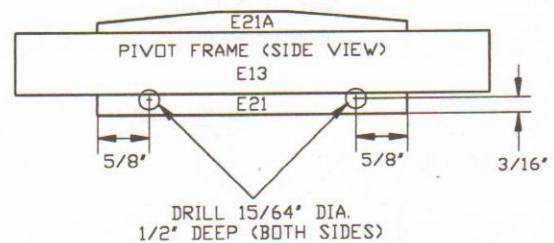
Using your Scroll Saw, cut a groove in part E28.



Glue parts E16, E17 and E12 onto base E9.



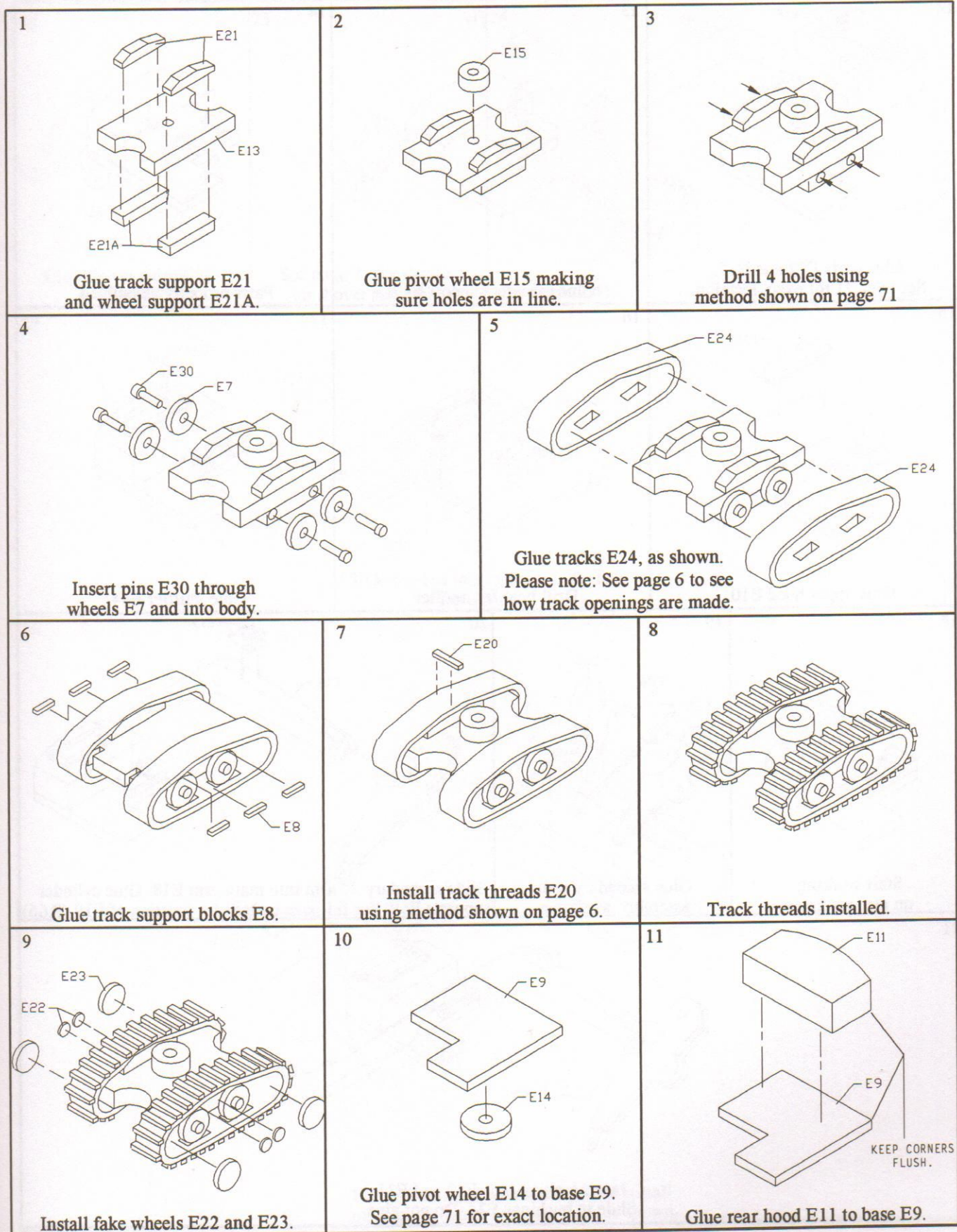
Using your Scroll Saw, cut a groove in parts, as shown.



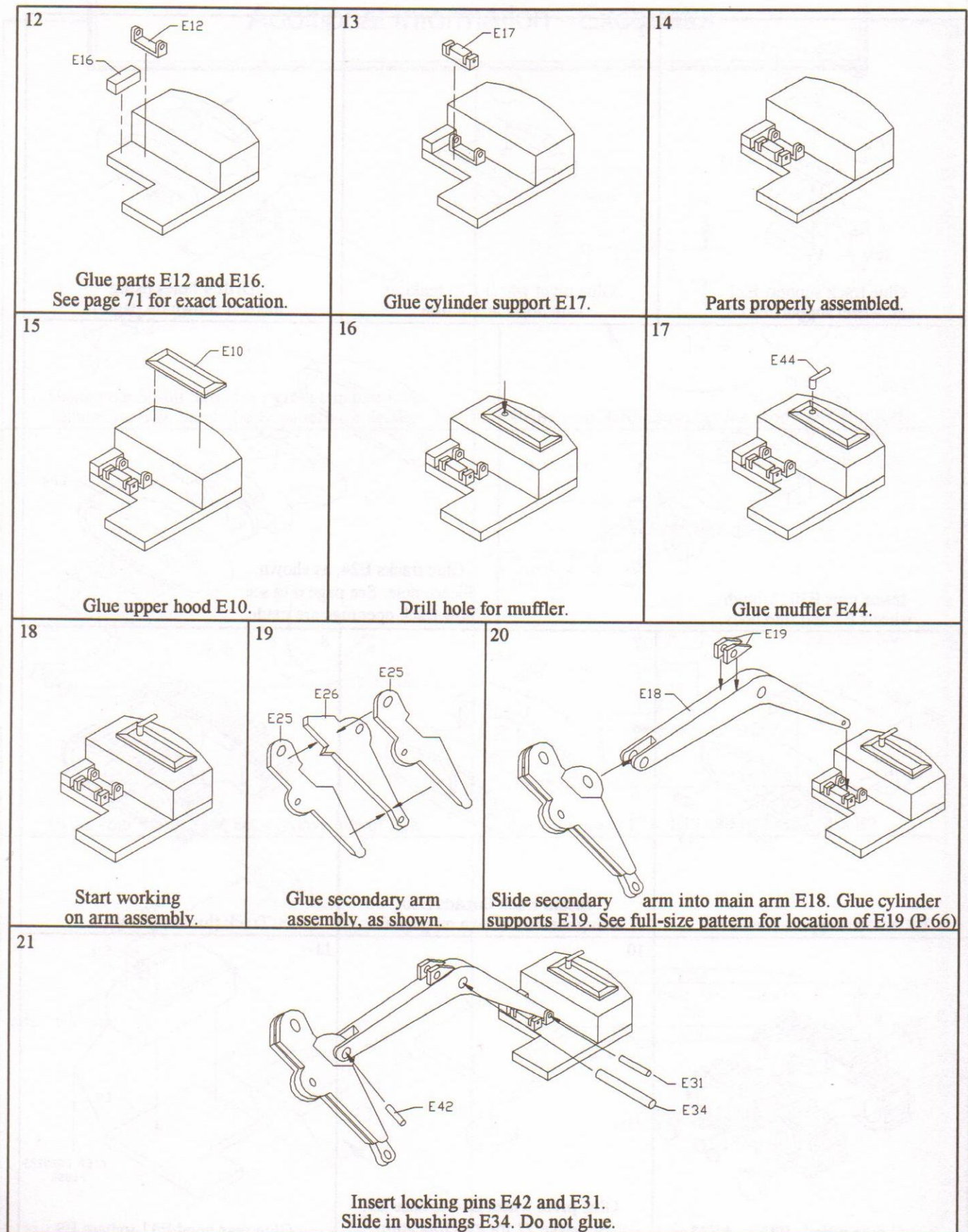
Drill holes in body assembly, as shown.



# Excavator - Assembly Drawings

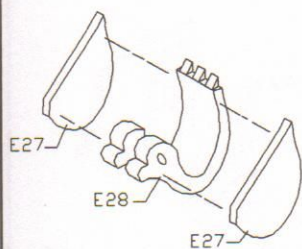






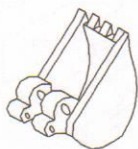


22



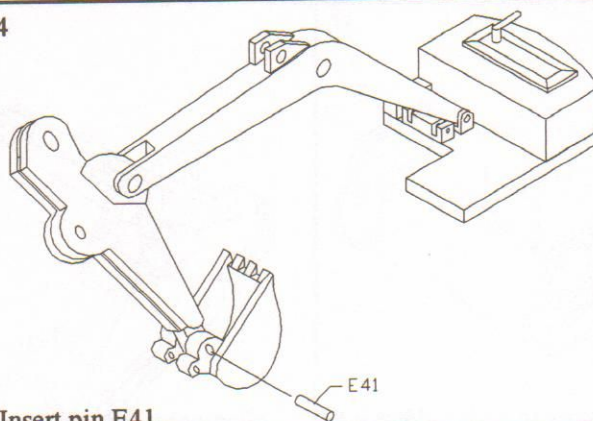
Glue shovel sides E27  
to shovel E28.

23



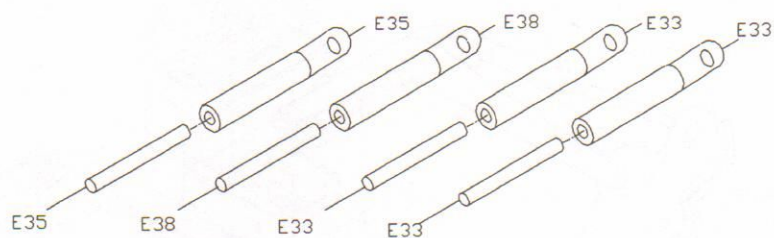
See page 71 for details  
on shovel assembly.

24



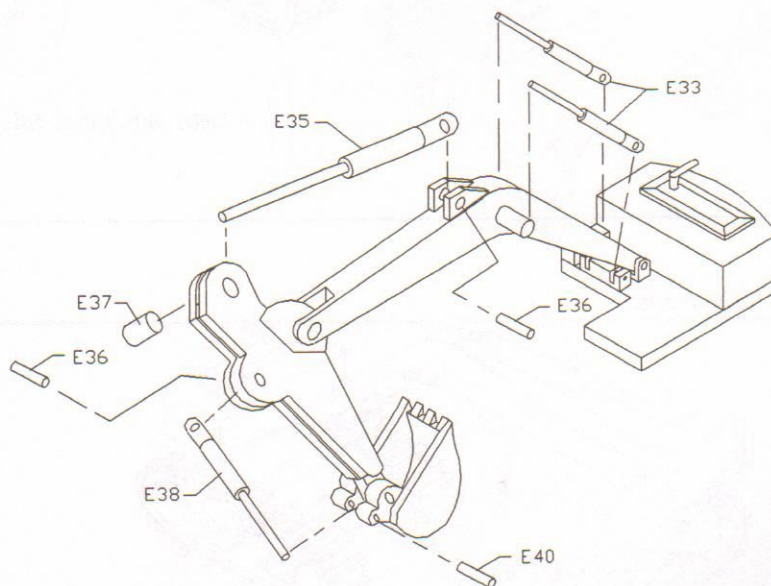
Insert pin E41.

25



Slide pistons into cylinders, as shown.  
Do not glue.

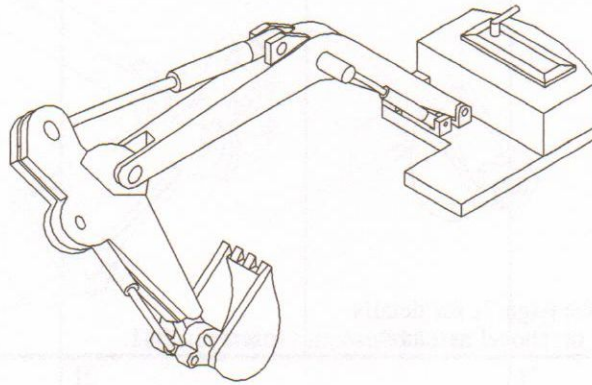
26



Insert bushings E40 and E37, then install  
pistons, cylinders and pins E36, as shown.

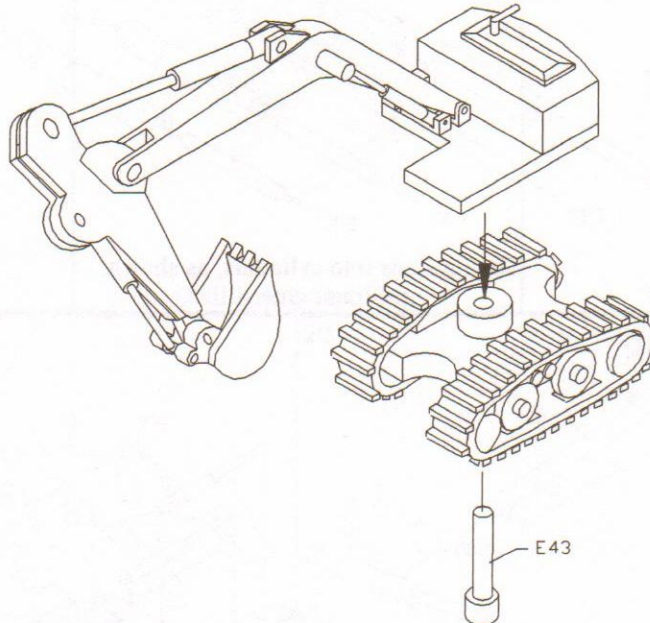


27



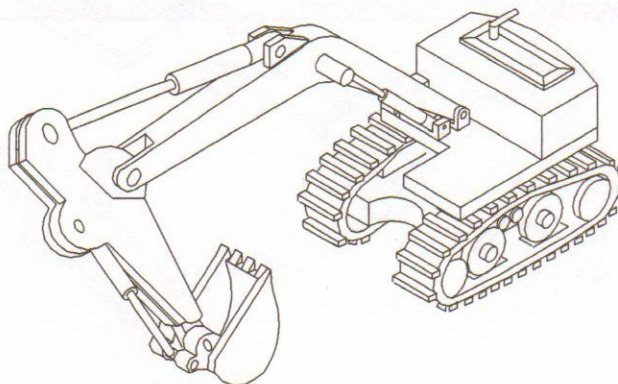
Completed shovel assembly shown.

28



Insert main pin E43 making  
sure that vehicle swivels freely.

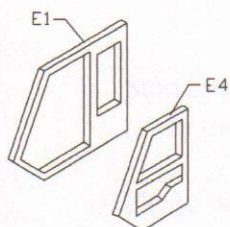
29



Start working on cabin assembly.



30



Make a chamfer on door using method on page 10.  
Slide door E4 into cab side E1.

31



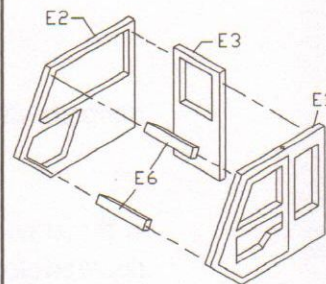
Drill holes using  
1/2" finishing nail.

32



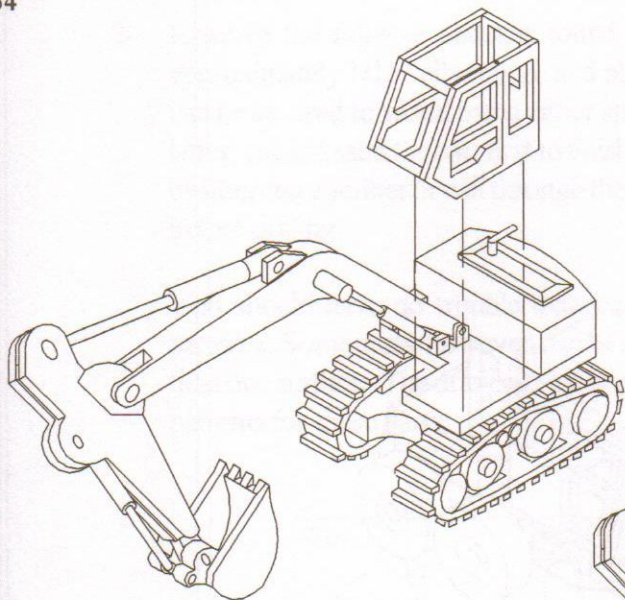
Insert finishing nails.

33



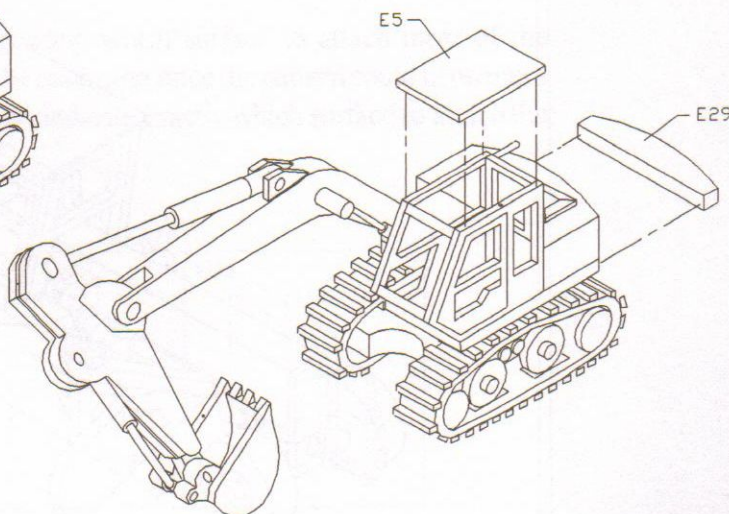
Assemble cabin, as shown.

34



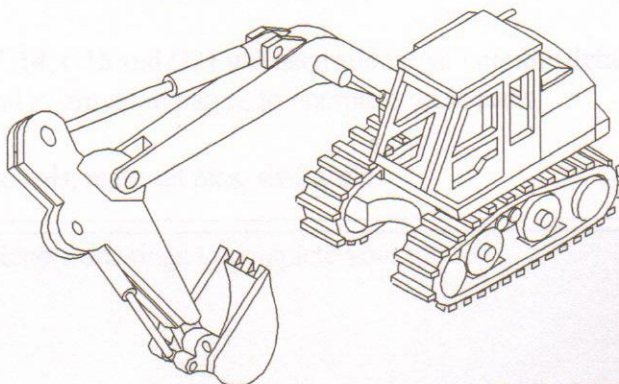
Glue cabin onto base.

35



Glue roof E5 and bumper E29.

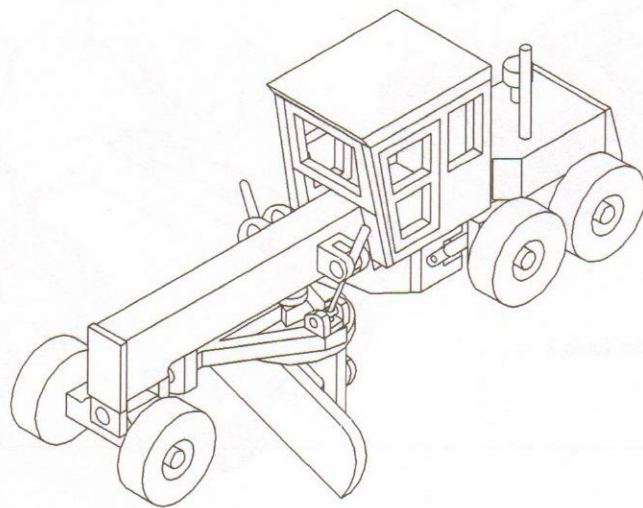
36



Your model should now be complete.



# GRADER





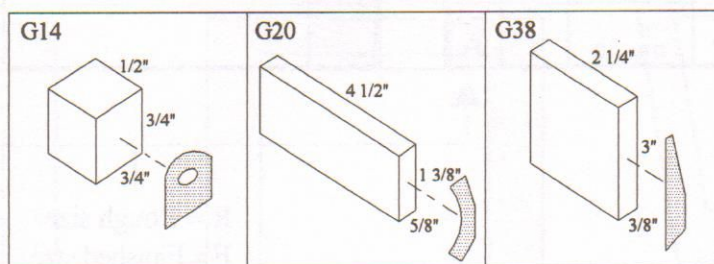
# General Instructions - Grader

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately  $\frac{1}{16}$ " all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts G2, G13, G17, G19 and G40.
- 4- Parts G7, G9, G14, G15 and G21 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Grader

Part	T	W	L	Material	Qty.	*	Part	T	W	L	Material	Qty.	*
G1	1/4"	3"	3 1/4"	oak	2	R	G13	1 1/2"	2 1/4"	3 7/8"	pine	1	F
G2	1/4"	2 3/8"	3 1/8"	pine	1	F	G14	1/2"	3/4"	3/4"	maple	2	R
G3	1/4"	2"	3 1/4"	oak	1	R	G15	3/4"	1 1/8"	1 3/8"	maple	2	R
G4	1/4"	2"	2 1/2"	oak	1	R	G16	3/8"	1 3/8"	4 5/8"	pine	2	F
G5	1/4"	1 7/8"	2 7/8"	oak	2	R	G17	1/2"	1 1/2"	3 7/8"	pine	2	F
G6	1/4"	2 1/4"	2 1/4"	pine	1	F	G18	3/8"	3/4"	3 7/8"	pine	1	F
G7	1/2"	1"	2 1/2"	maple	1	R	G19	1"	2 1/2" DIA.		oak	6	F
G7A	3/8"	7/8" DIA.		maple	1	F	G20	5/8"	1 3/8"	4 1/2"	pine	1	R
G8	3/8"	1 1/4"	1 3/8"	maple	1	R	G21	1"	3 1/8"	10 1/8"	pine	1	R
G9	3/8"	2 1/2"	4 1/8"	maple	1	R	G38	3/8"	2 1/4"	3"	pine	1	F
G10	1/4"	1 1/8"	2 1/2"	maple	1	R	G39	7/8"	1"	1"	maple	1	R
G11	5/16"	1/2"	1"	maple	1	R	G40	1/4"	2 1/4" DIA.		maple	1	F
G12	1/8"	5/8"	1 1/4"	maple	1	R							

T = Thickness  
W = Width  
L = Length

R = Rough size  
F = Finished size

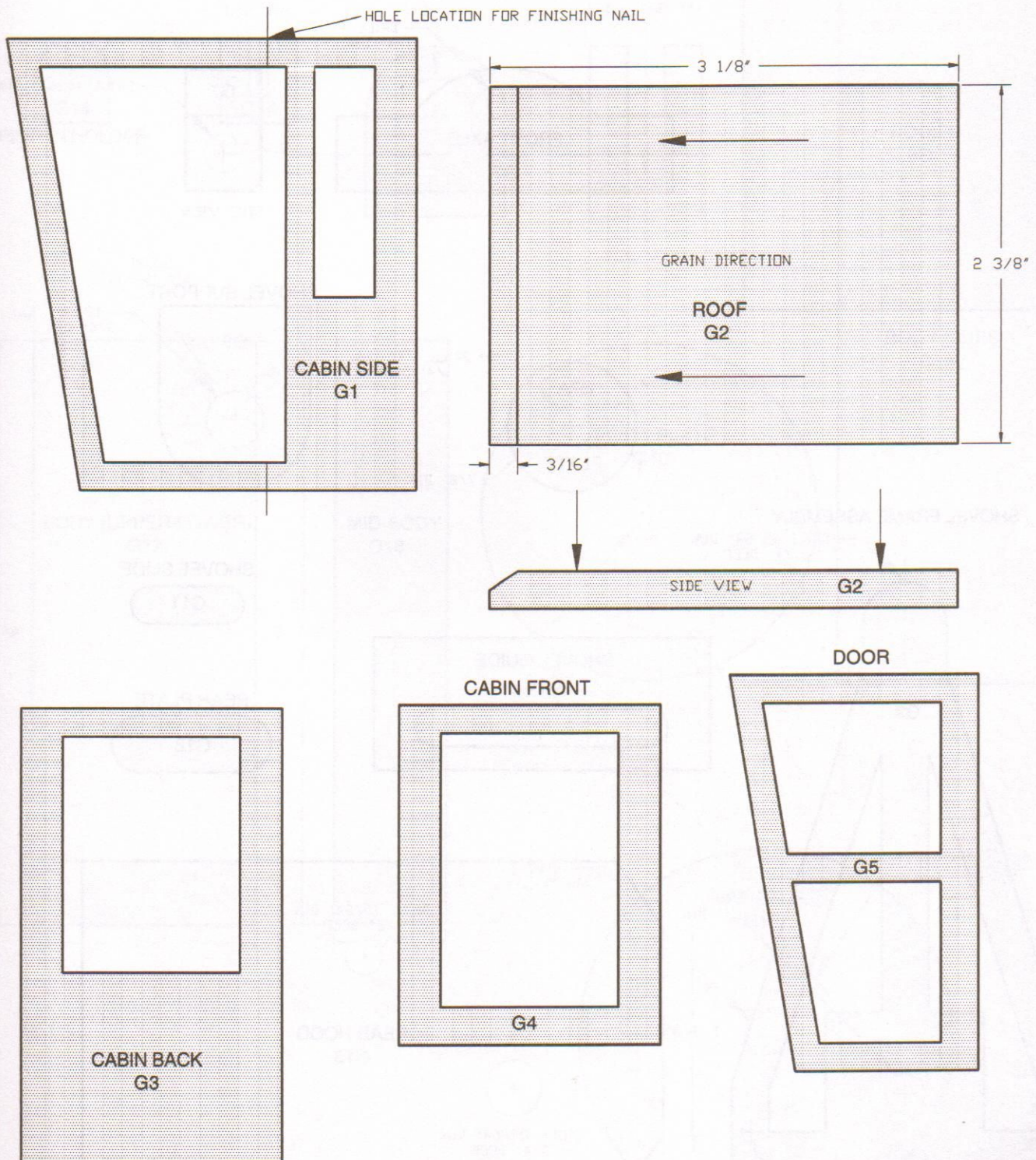
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

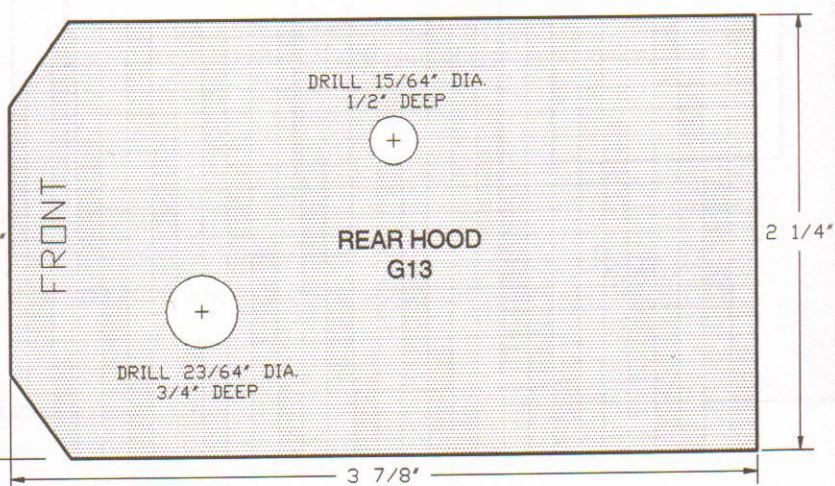
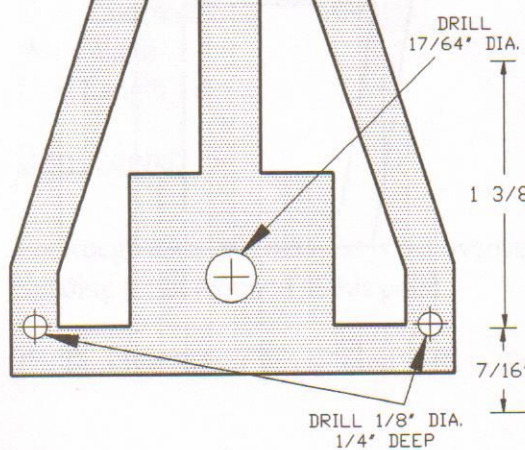
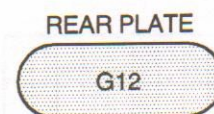
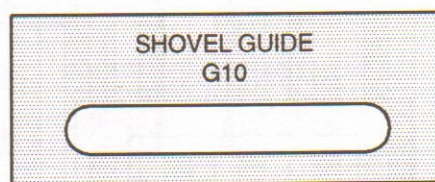
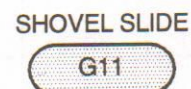
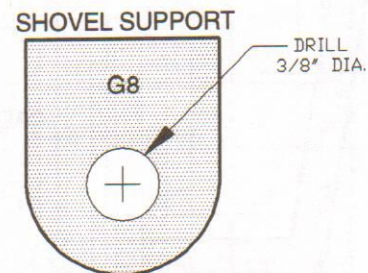
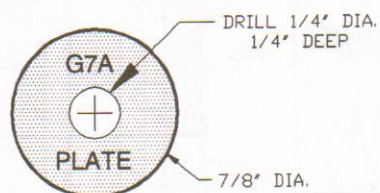
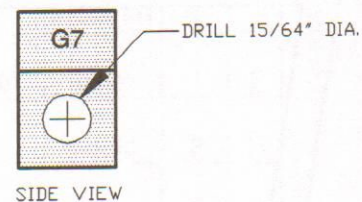
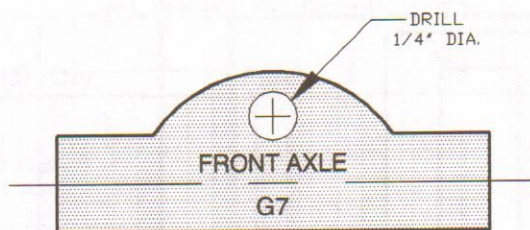
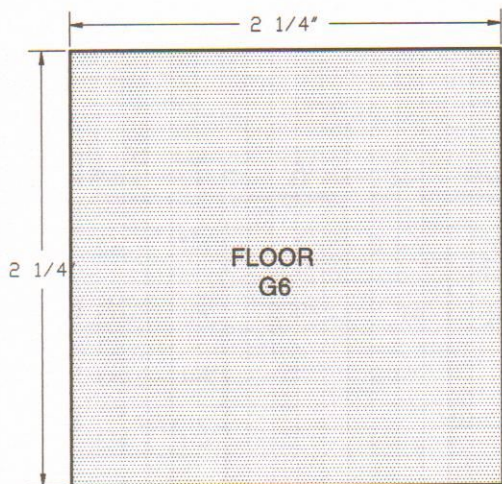
F = Finished Size: Cut and sand parts to finished size.



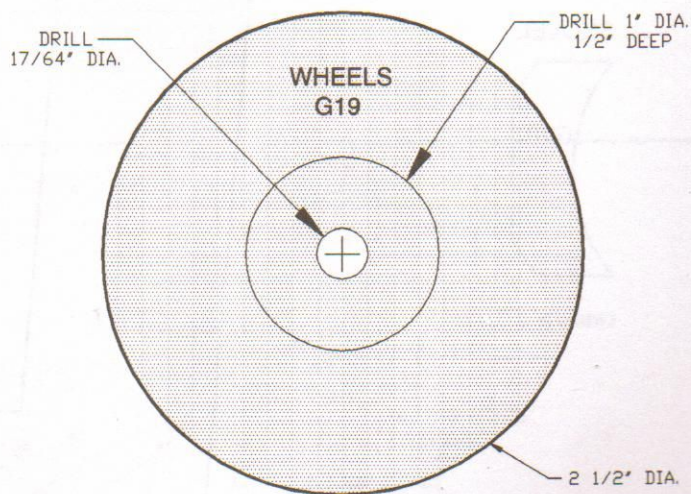
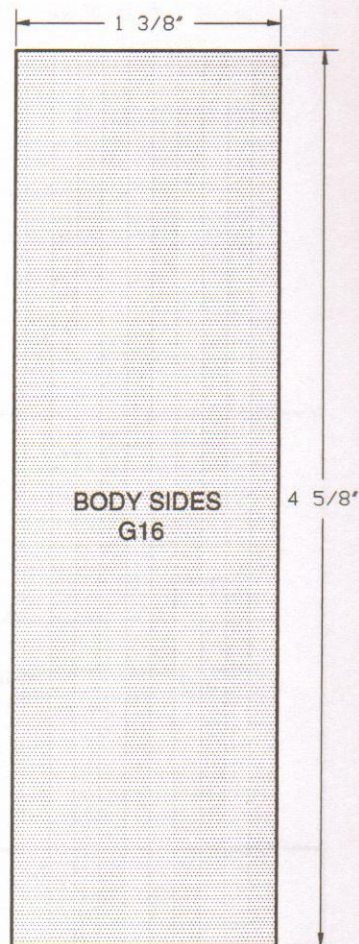
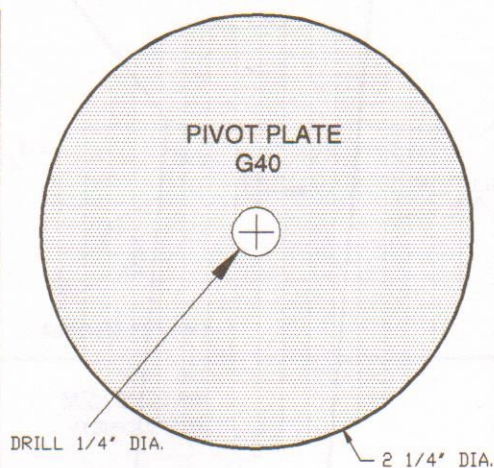
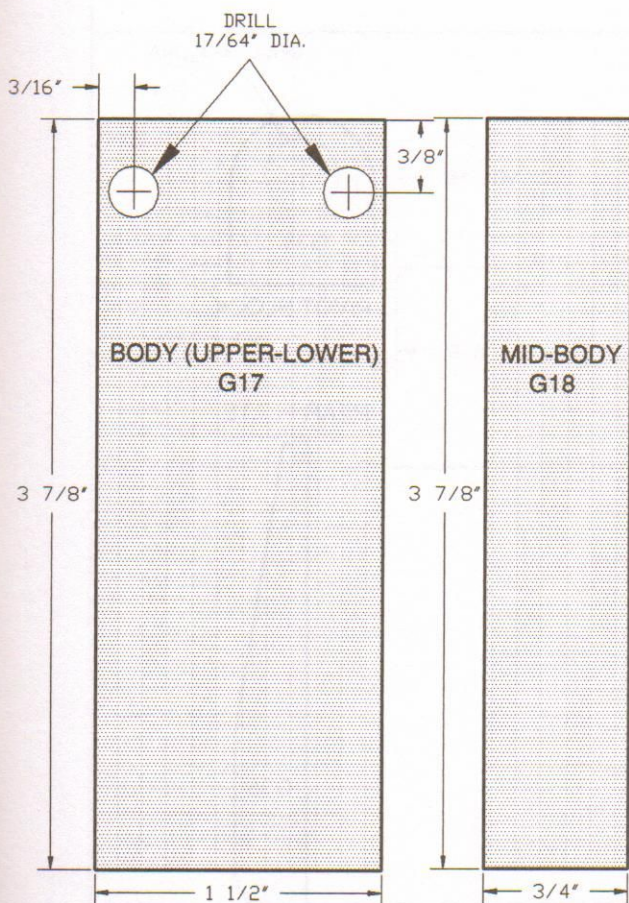
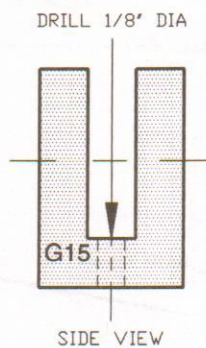
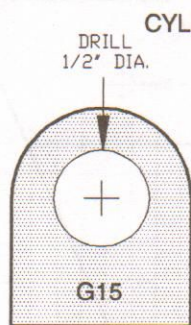
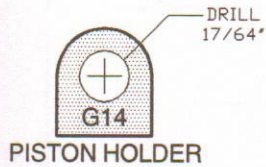
# Full-Sized Patterns: Set One



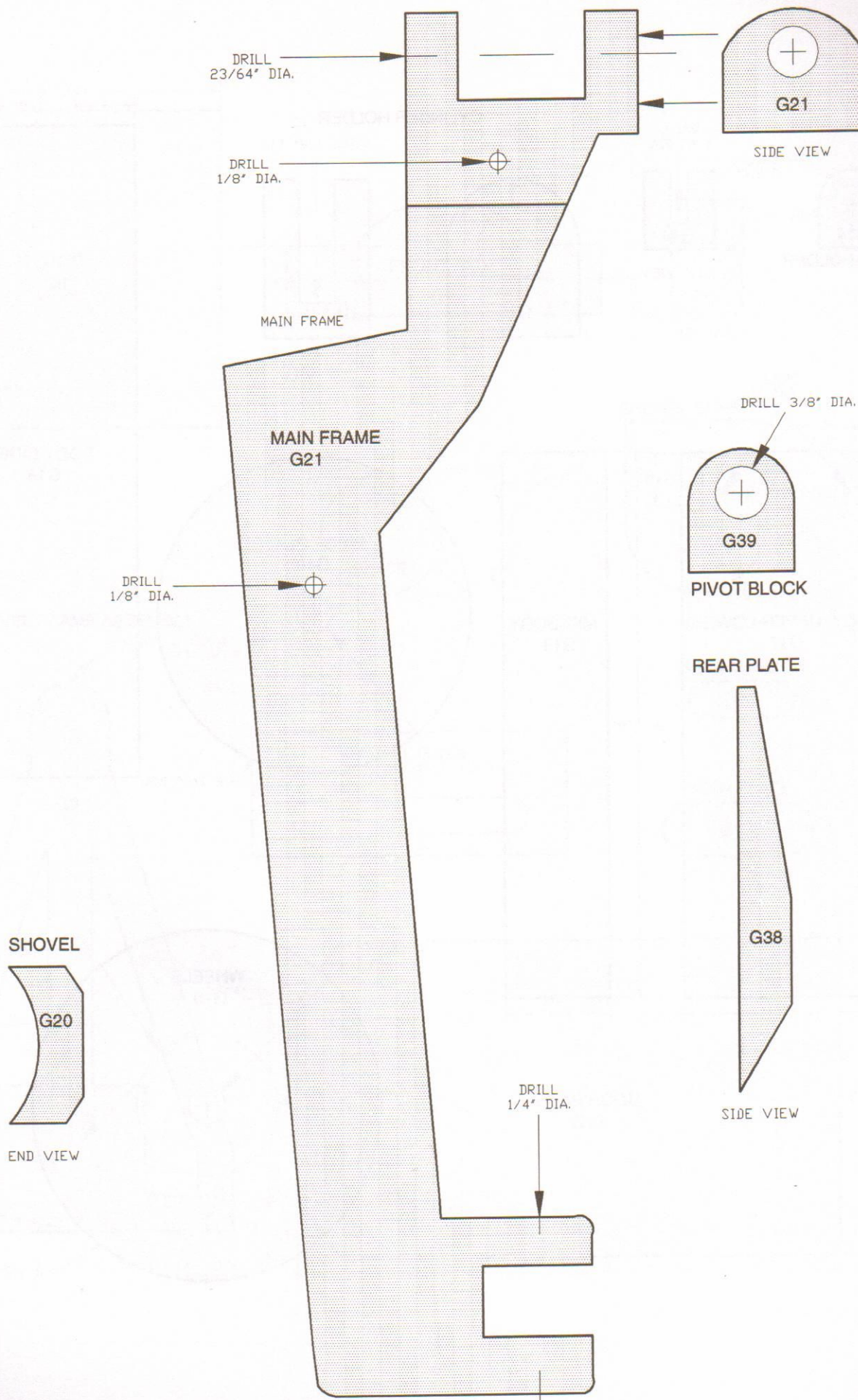














Technical drawing of a rectangular plate. The plate is shown in a perspective view. A dimension line below the plate indicates a length of  $2 \frac{1}{4}"$ . A callout line points to the top edge of the plate, labeled  $3/8" \text{ DIA. DOWEL}$ .

1/2" DIA. DOWEL

DRILL 1/4" DIA.  
1/4" DEEP

3/8"

SIDE VIEW

1/4" DIA. DOWEL

1"

SIDE

SIDE VIEW

ASSEMBLED PART

Technical drawing of a rectangular plate. The plate has a width of  $1 \frac{11}{16}''$  and a height of  $1 \frac{1}{2}''$ . A hole with a diameter of  $\frac{3}{8}''$  is located in the upper right corner. The hole is positioned  $\frac{1}{4}''$  from the right edge and  $\frac{1}{2}''$  from the top edge. The drawing includes dimension lines and arrows indicating the measurements.

TOP VIEW

1/8" DIA. DOWEL

1 3/8"

1/4"  
DRILL 1/8" DIA.  
1 1/2" DEEP

SLIDE IN  
DO NOT GLUE

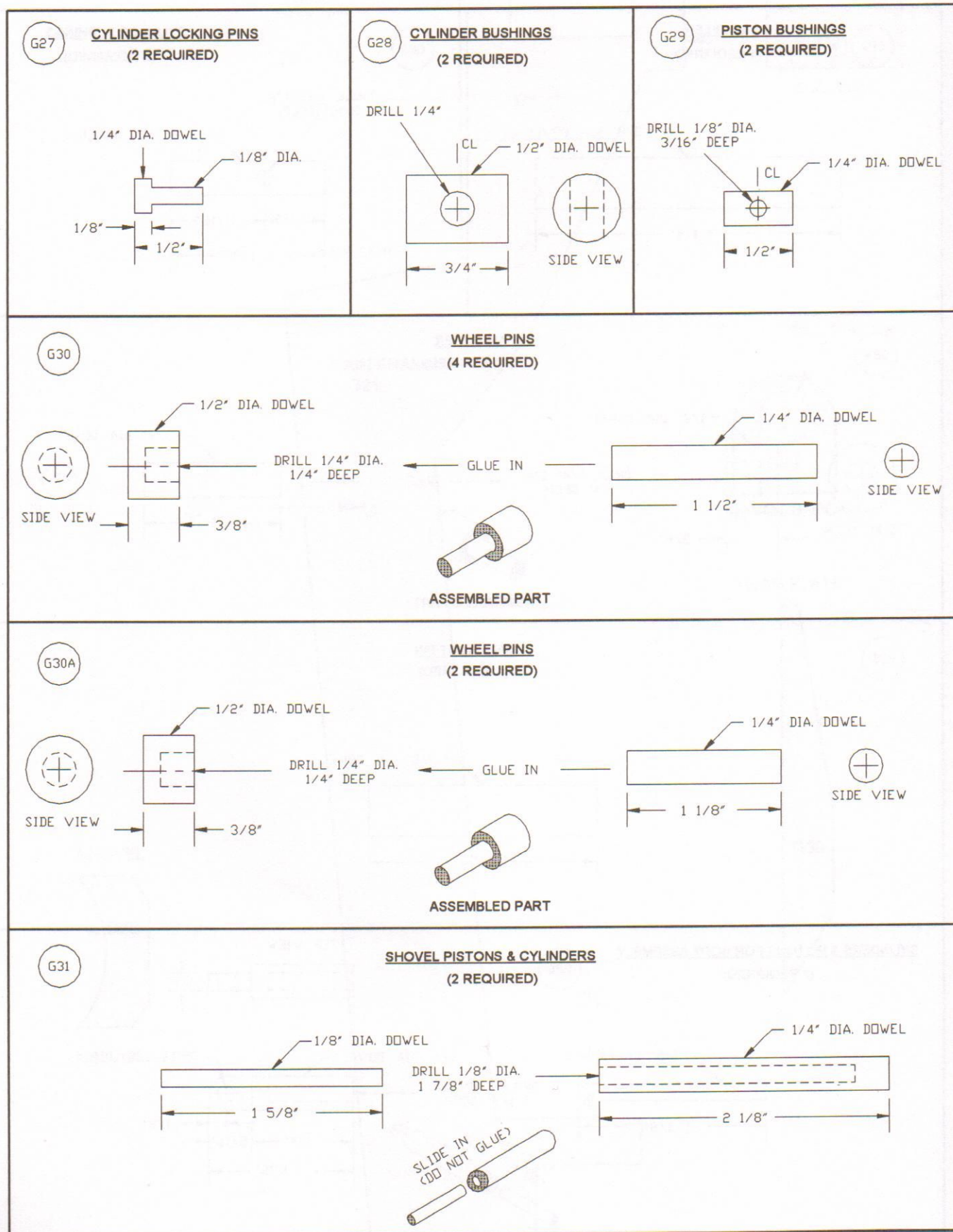
1/4" DIA. DOWEL

- DRILL 1/8" DIA.

Technical drawing of a shaft with a hole and a keyway. The hole has a diameter of  $\frac{1}{8}$  inch.

Dimensioned drawing of a T-joint showing a 1/8 inch gap and offsets of 3/4 inch and 1 1/16 inch.

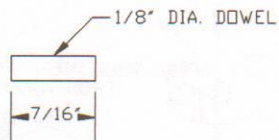






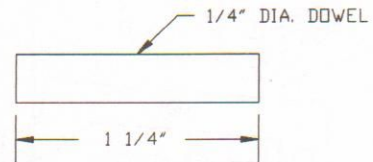
G32

**PINS**  
(2 REQUIRED)



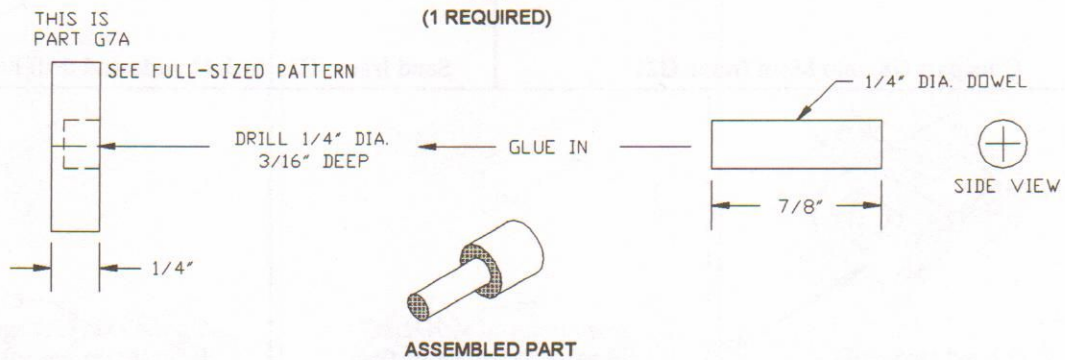
G33

**PIN**  
(1 REQUIRED)



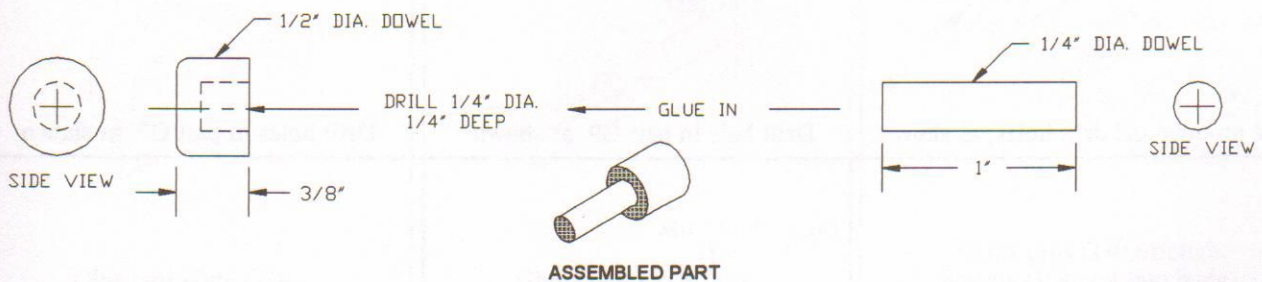
G34

**PIN**  
(1 REQUIRED)



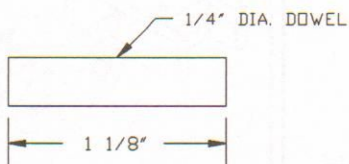
G35

**SHOVEL LOCKING PIN**  
(1 REQUIRED)



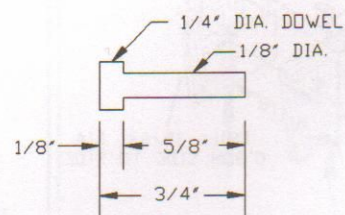
G36

**PIN**  
(1 REQUIRED)



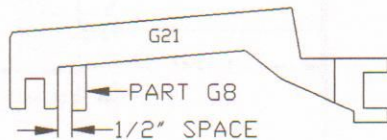
G37

**PINS**  
(2 REQUIRED)

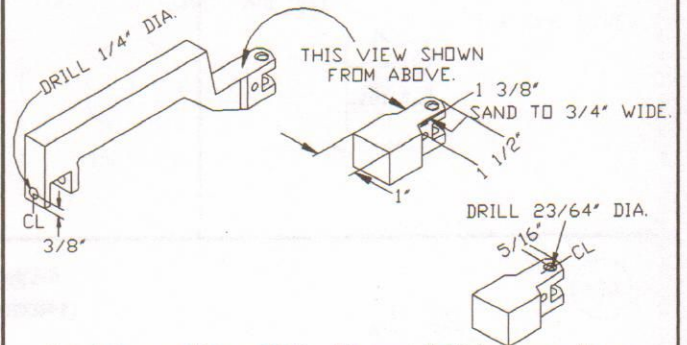




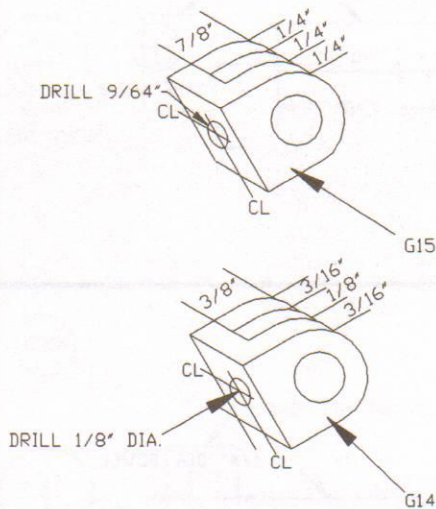
## Additional Information - Grader



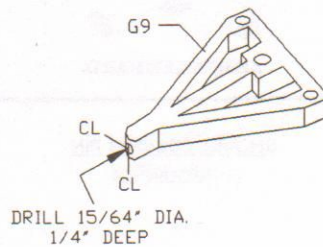
Glue part G8 onto Main frame G21.



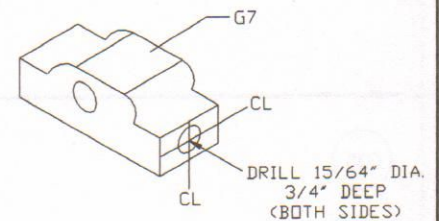
Sand frame G21 to  $3/4"$  wide and drill hole, as shown.



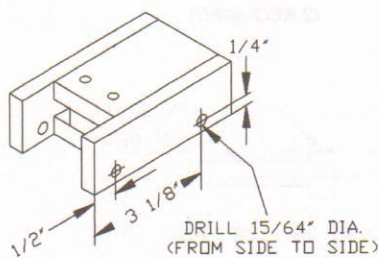
Cut grooves and drill holes, as shown.



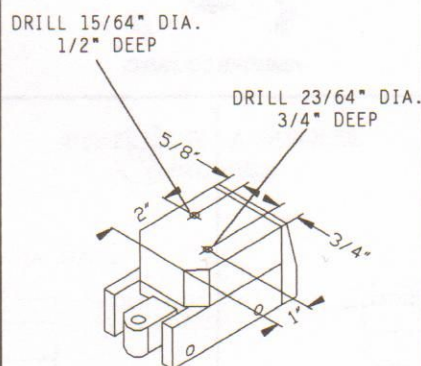
Drill hole in part G9, as shown.



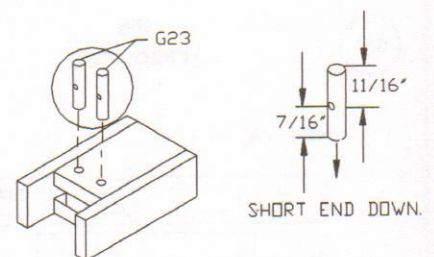
Drill holes in part G7, as shown.



Drill holes in body sides G16.



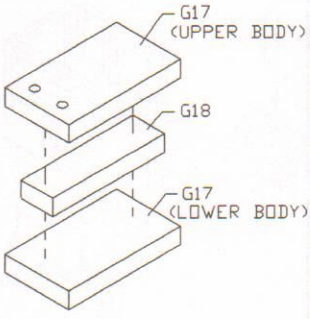
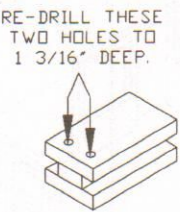
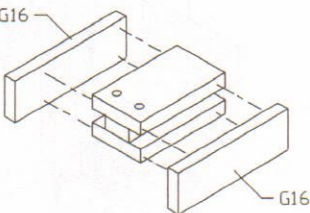
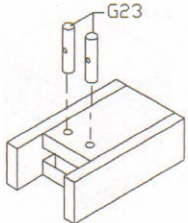
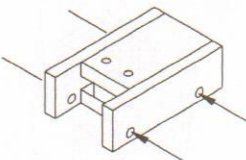
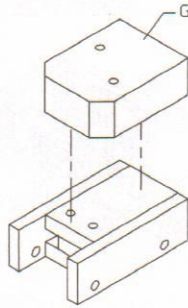
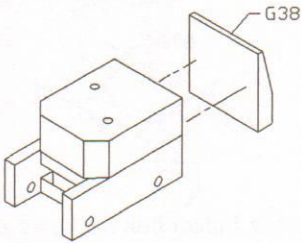
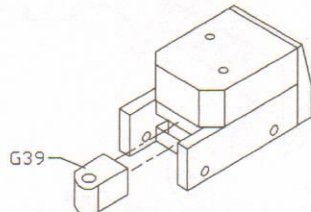
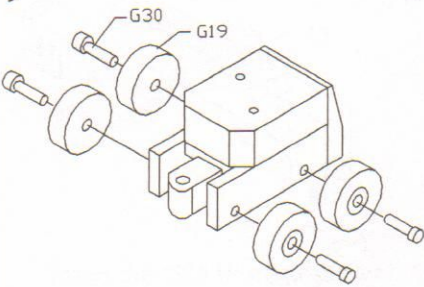
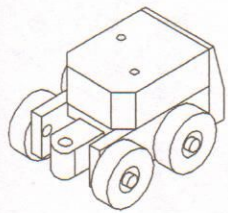
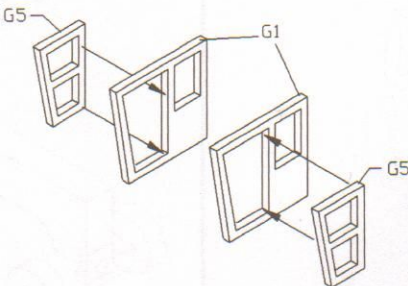
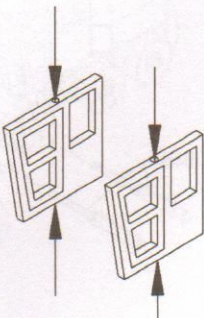
Drill holes in rear hood G13.



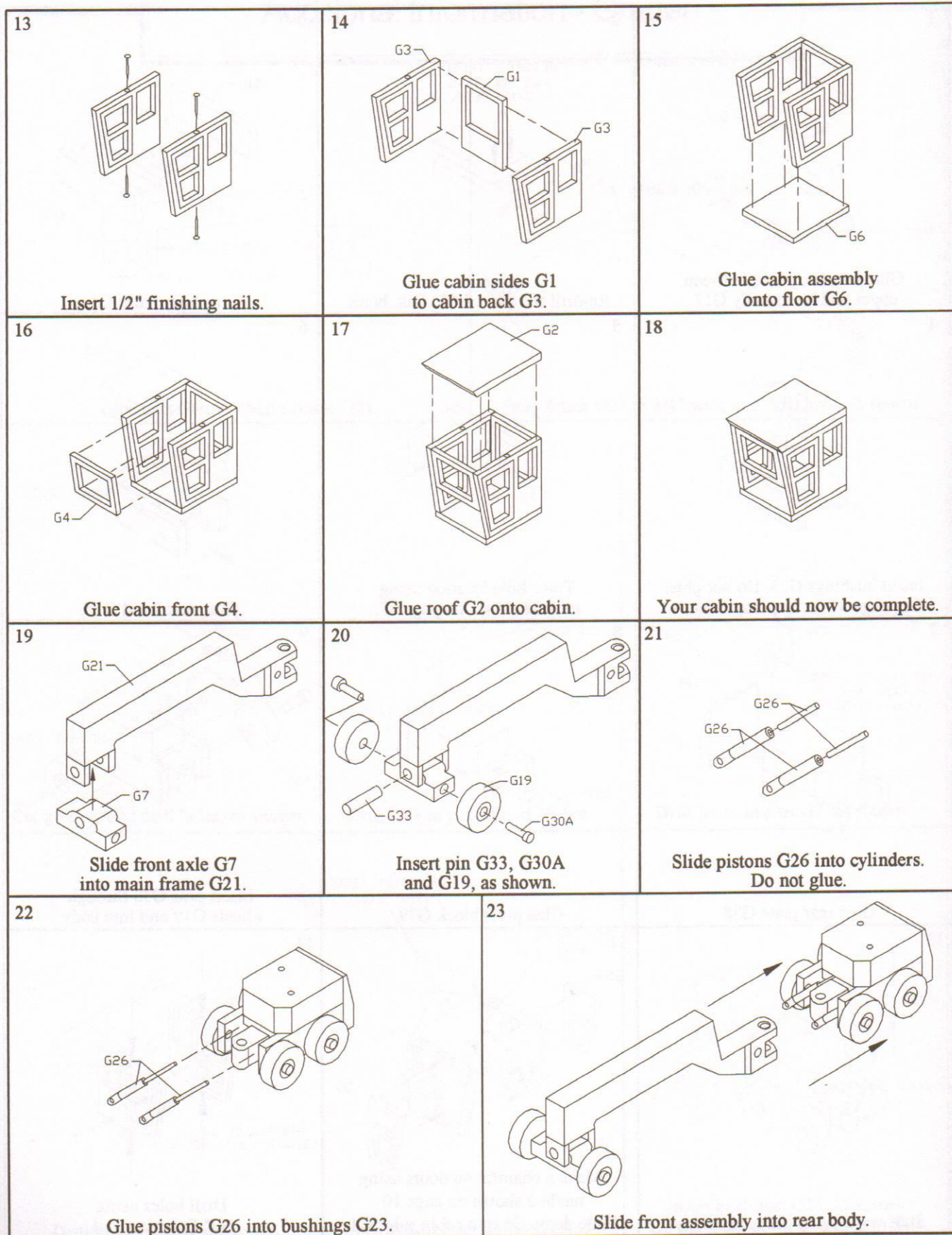
Insert bushings G23, as shown. Do not glue. Short end goes in first.



# Grader - Assembly Drawings

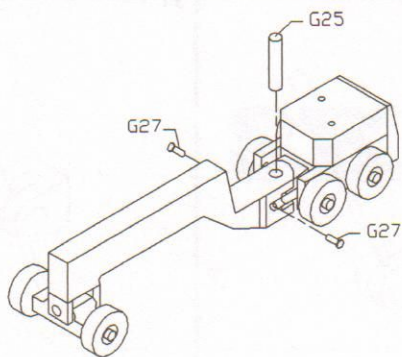
<p>1</p>  <p>Glue mid-body G18 between upper and lower body G17.</p>	<p>2</p>  <p>RE-DRILL THESE TWO HOLES TO 1 3/16" DEEP.</p> <p>Re-drill the two 17/64" Dia. holes.</p>	<p>3</p>  <p>Glue body sides G16.</p>
<p>4</p>  <p>Insert bushings G23. Do not glue. See page 87 for important detail.</p>	<p>5</p>  <p>Trace hole location using method shown on page 87.</p>	<p>6</p>  <p>Glue rear hood G13.</p>
<p>7</p>  <p>Glue rear plate G38.</p>	<p>8</p>  <p>Glue pivot block G39.</p>	<p>9</p>  <p>Insert pins G30 through wheels G19 and into body.</p>
<p>10</p>  <p>Start working on cabin assembly.</p>	<p>11</p>  <p>Make a chamfer on doors using method shown on page 10. Slide doors G5 into cabin sides G1.</p>	<p>12</p>  <p>Drill holes using 1/2" finishing nail.</p>





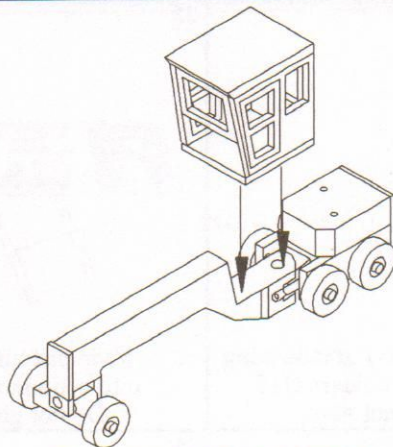


24



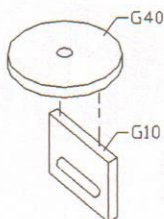
Insert main pin G25 and pins G27, as shown.

25



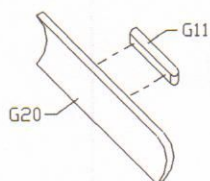
Glue cabin onto main frame.

26



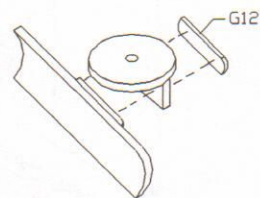
Glue shovel guide G10 onto pivot plate G40.

27



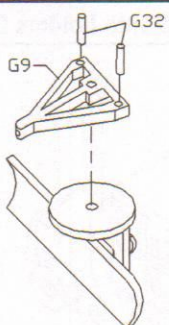
Glue shovel slide G11 onto shovel G20.

28



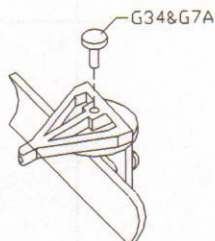
Glue shovel assembly, as shown.

29



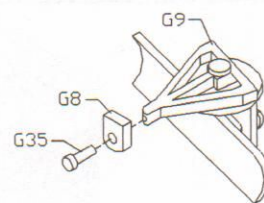
Insert pins G32 and install shovel frame above shovel assembly.

30



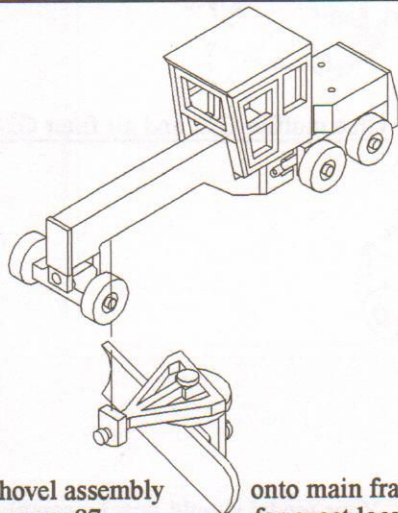
Insert locking pin G34, making sure shovel is free to rotate.

31



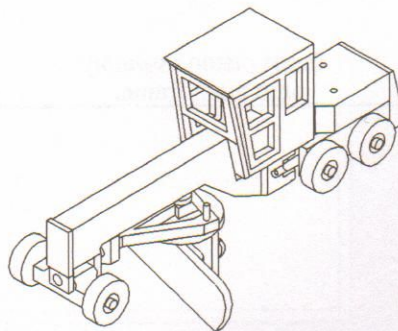
Insert pin G35 through shovel support G8 and into frame G9.

32



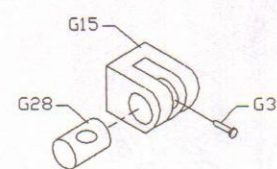
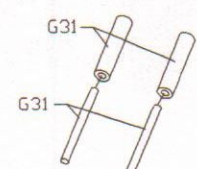
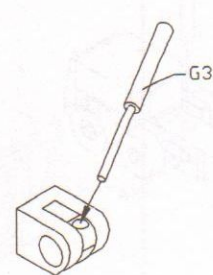

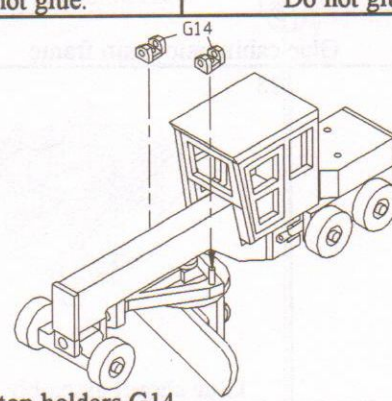
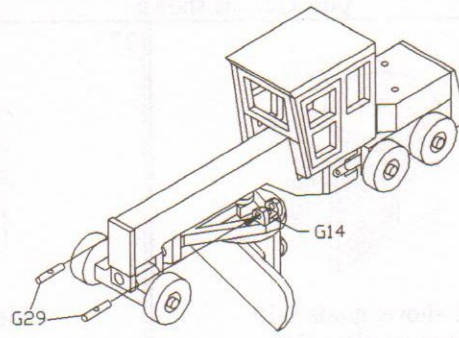
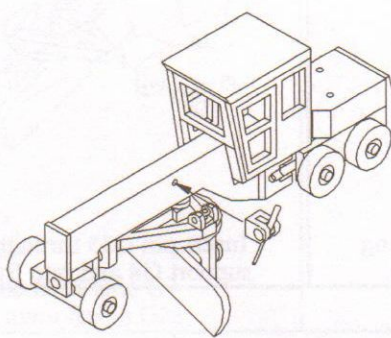
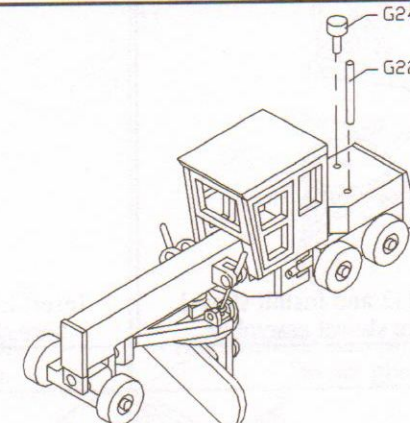
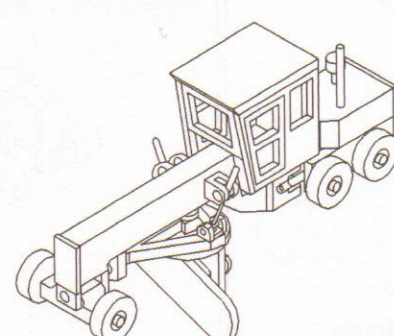
Glue shovel assembly onto main frame. See page 87 for exact location.

33



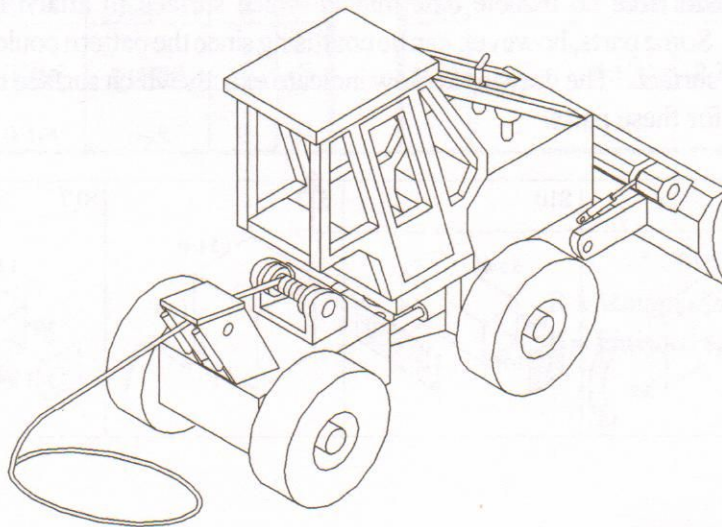
Shovel assembly shown installed.



<p>34</p>  <p>Insert pin G37 and bushing G28 into holders G15. Do not glue.</p>	<p>35</p>  <p>Slide pistons G31 into cylinders G31. Do not glue.</p>	<p>36</p>  <p>Slide cylinders G31 into bushings G28.</p>	<p>37</p>  <p>Parts properly assembled.</p>
<p>38</p>  <p>Install piston holders G14 onto pins. Do not glue.</p>	<p>39</p>  <p>Insert bushings G29 into holders G14.</p>		
<p>40</p>  <p>Insert piston assembly onto main frame.</p>	<p>41</p>  <p>Glue muffler G22 and air filter G24.</p>		
<p>42</p>  <p>Your model should now be complete.</p>			



# SKIDDER





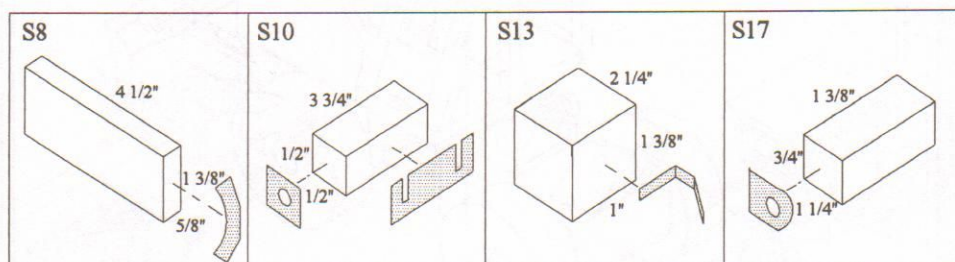
# General Instructions - Skidder

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately 1/16" all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts S2, S6 and S16.
- 4- Parts S10, S15 and S17 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Skidder

Part	T	W	L	Material	Qty.	*	Part	T	W	L	Material	Qty.	*
S1	3/8"	2 1/2"	5 1/2"	pine	2	R	S12	1/4"	1 3/8"	2 3/4"	oak	2	R
S2	1/2"	2 1/4"	4 1/2"	pine	1	F	S13	1"	1 3/8"	2 1/4"	pine	1	R
S3	1/4"	1 1/4"	4 1/4"	pine	2	F	S14	1/4"	3/8"	3 3/4"	oak	2	R
S4	1/4"	2 3/4"	2"	pine	1	F	S15	1/2"	1 1/8"	2 1/4"	maple	1	R
S5	1 1/4"	2 3/4"	3"	pine	1	F	S16	1 1/4"	3" DIA.		oak	4	F
S6	1 1/2"	2 3/4"	3 1/8"	pine	1	F	S17	3/4"	1 1/4"	1 3/8"	maple	1	F
S7	1/4"	3"	2 1/2"	pine	1	F	S18	1/8"	1"	1 1/8"	maple	1	F
S8	5/8"	1 3/8"	4 1/2"	pine	1	F	S19	1/8"	1/2" DIA.		maple	2	F
S9	1/4"	3/4"	2 1/4"	maple	2	F	S20	1/8"	3/4" DIA.		maple	2	F
S10	1/2"	1/2"	3 3/4"	maple	1	F	S35	1"	1 1/4"	2 7/8"	maple	1	R
S11	1/4"	3 1/4"	3 1/4"	oak	2	R							

R = Rough size  
F = Finished size

T = Thickness  
W = Width  
L = Length

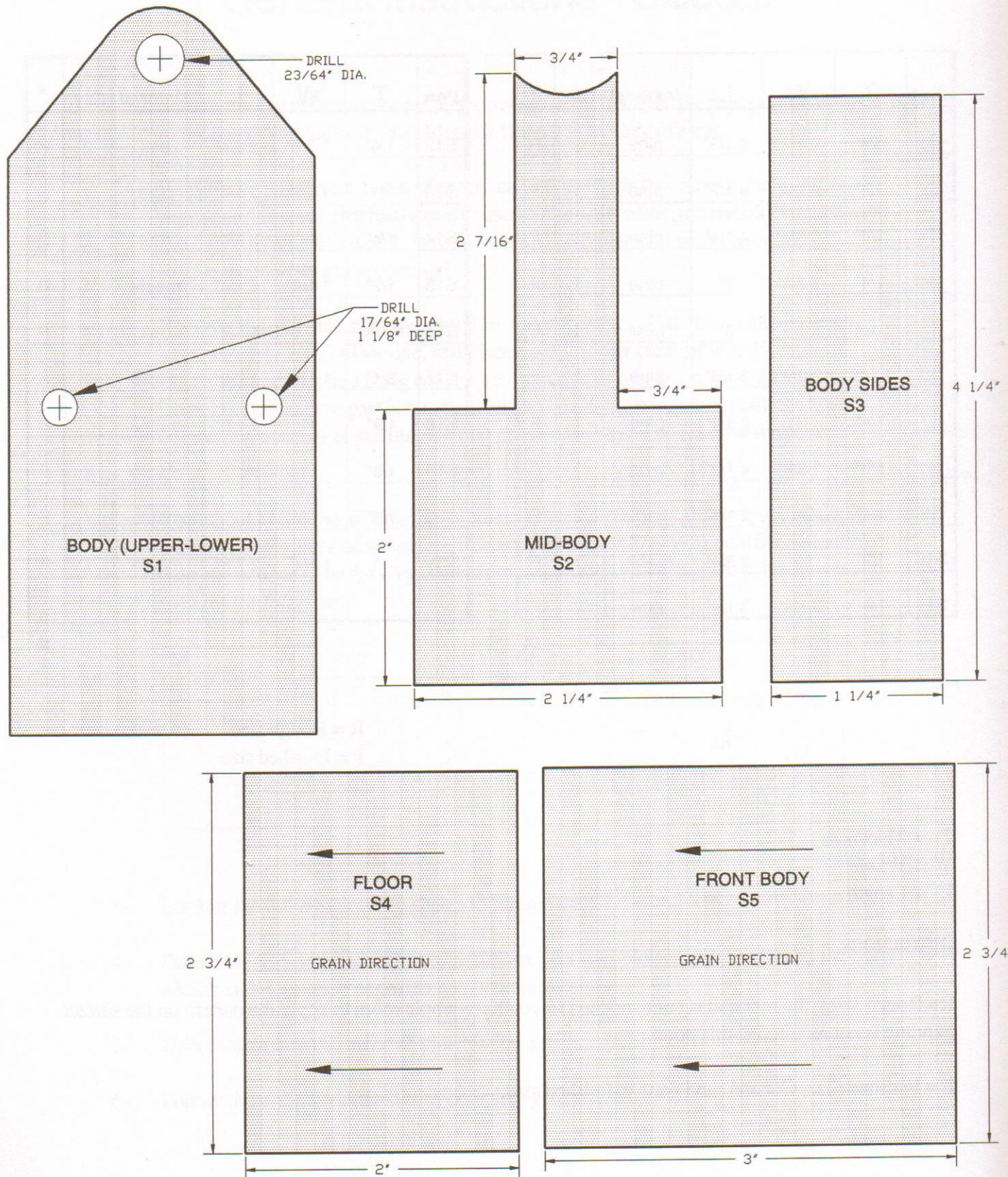
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

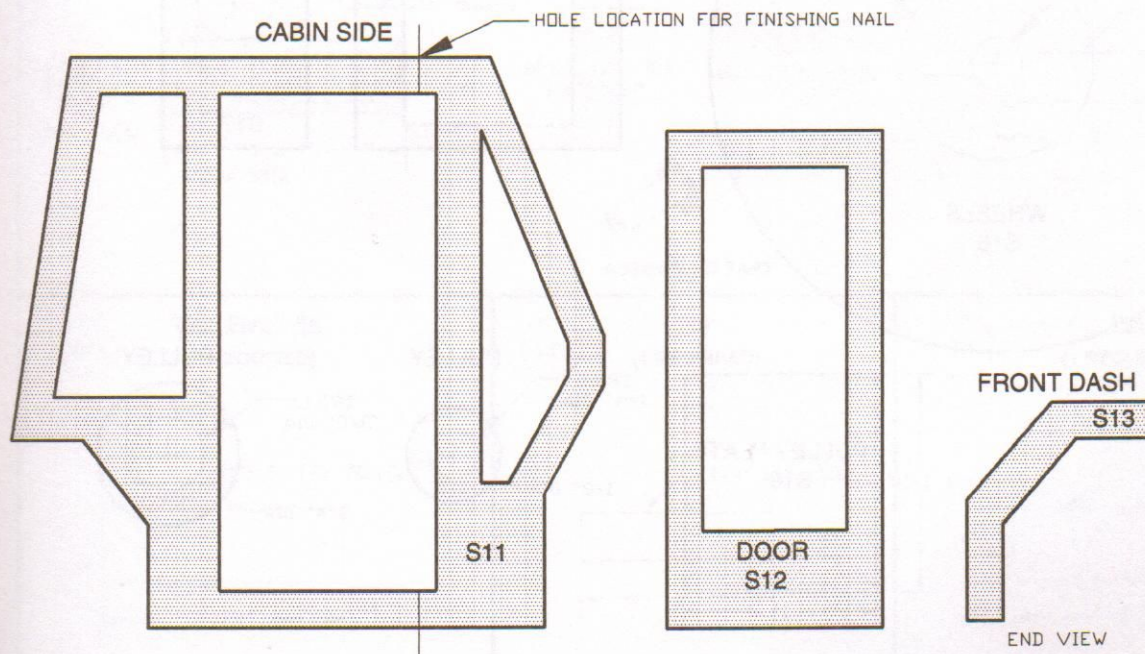
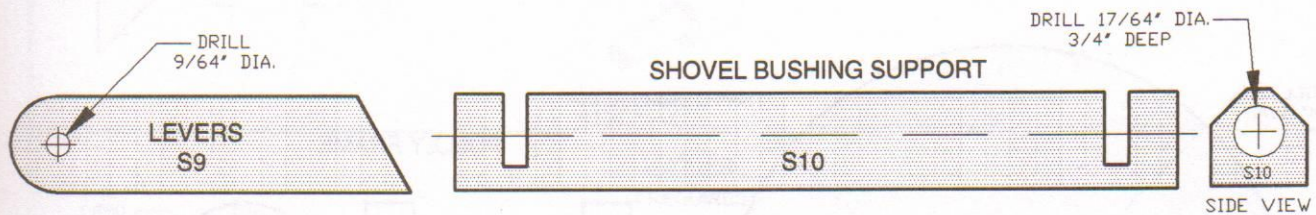
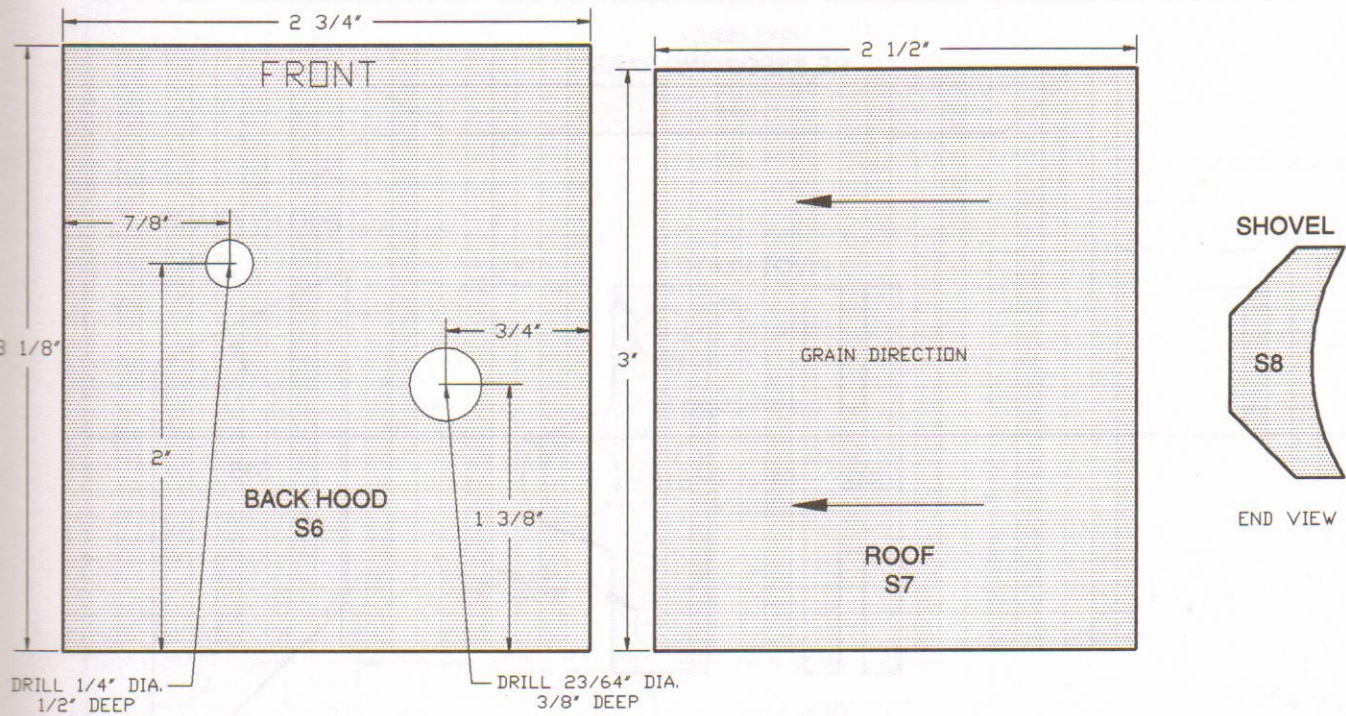
F = Finished Size: Cut and sand parts to finished size.



# Full-Sized Patterns: Set One





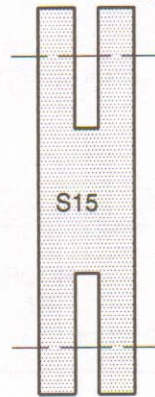




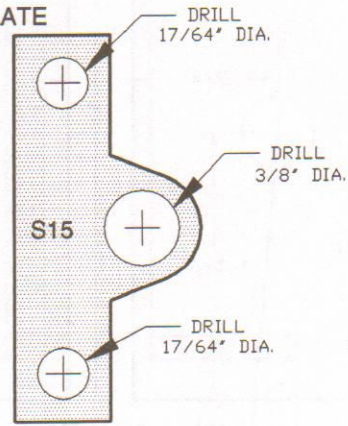
## RE-ENFORCING BARS



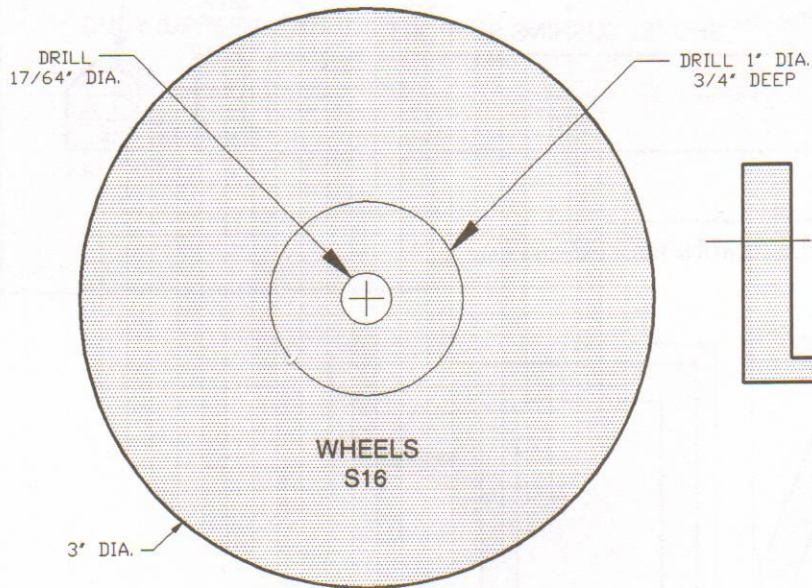
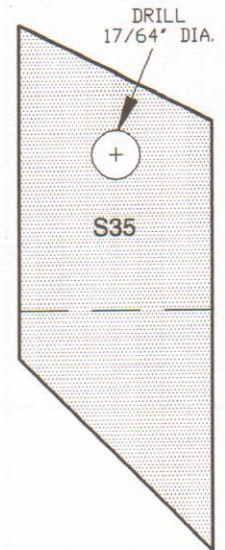
## PIVOT PLATE



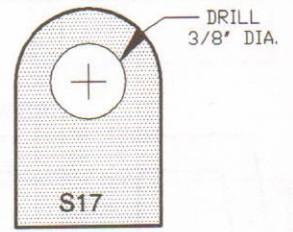
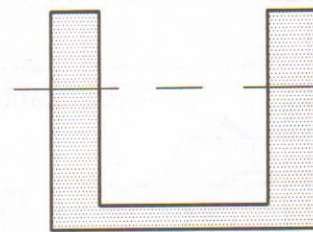
SIDE VIEW



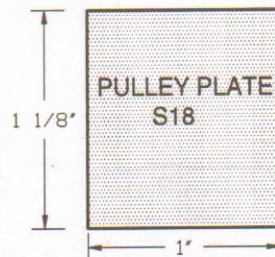
## PULLEY FRAME



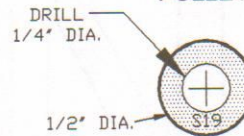
## PULLEY FRAME



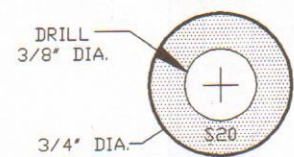
SIDE VIEW



## PULLEY



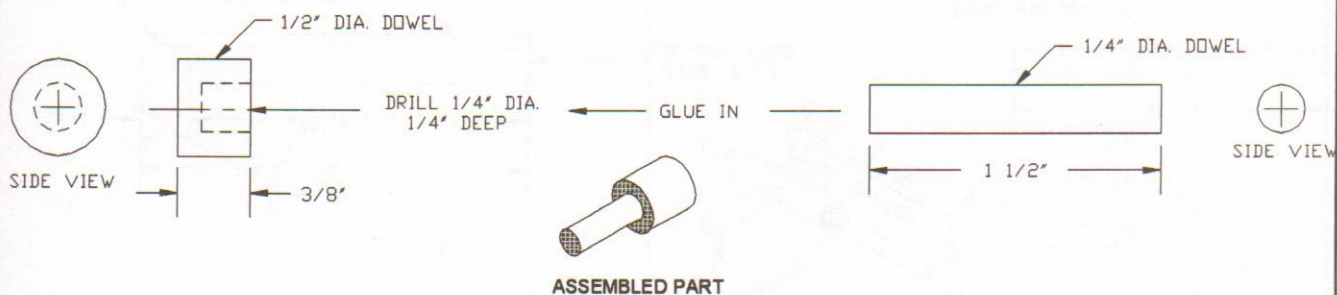
## PULLEY





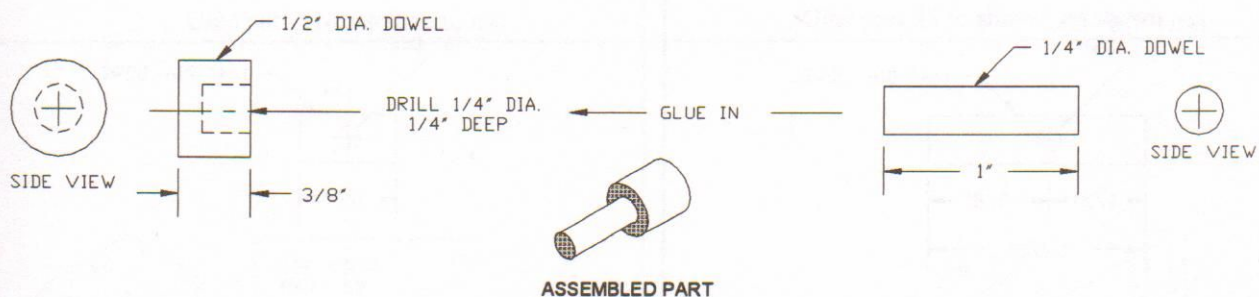
S21

### WHEEL PINS (4 REQUIRED)



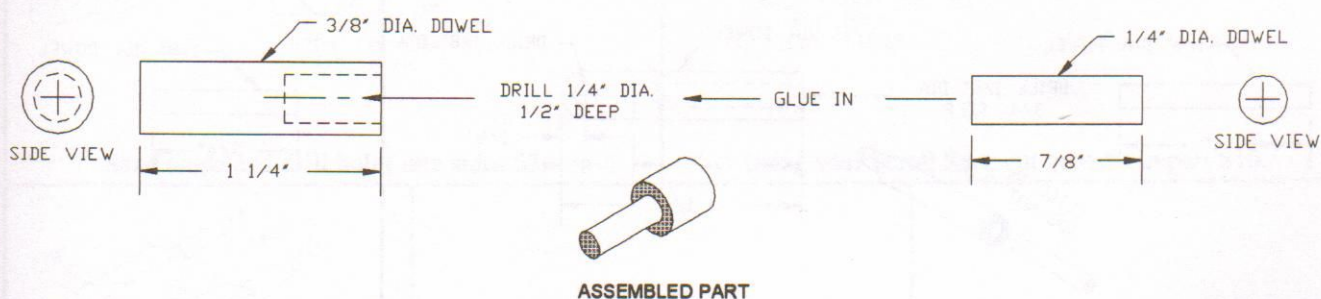
S22

### AIR FILTER (1 REQUIRED)



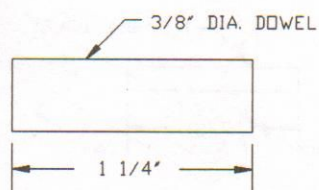
S23

### MUFFLER (1 REQUIRED)



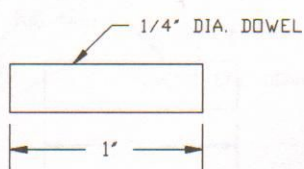
S24

### MAIN PIVOT PIN (1 REQUIRED)



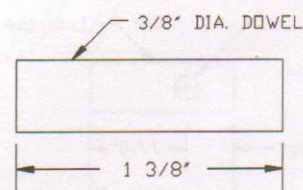
S25

### PIN (1 REQUIRED)



S26

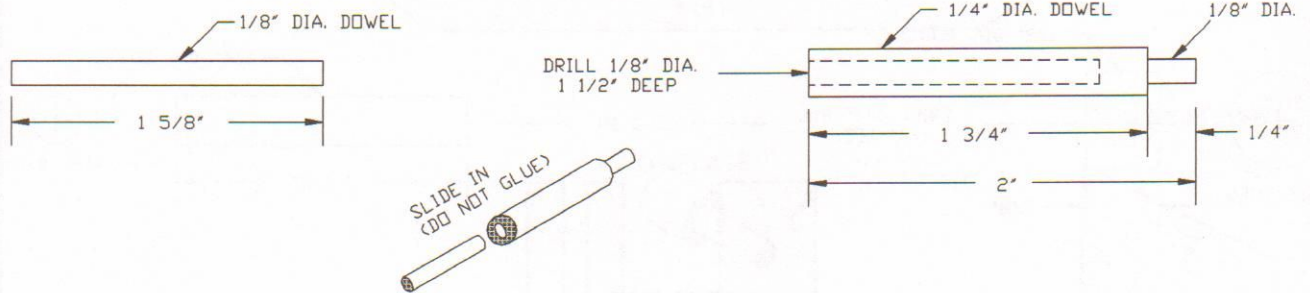
### PIN (1 REQUIRED)





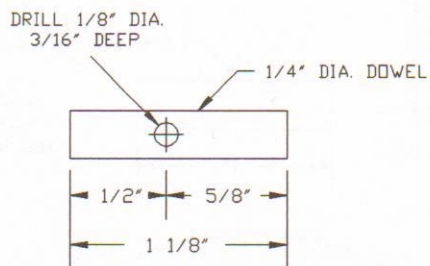
S27

### CYLINDERS & PISTONS FOR BODY ASSEMBLY (2 REQUIRED)



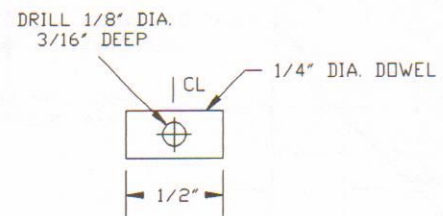
S28

### PISTON BUSHINGS (2 REQUIRED)



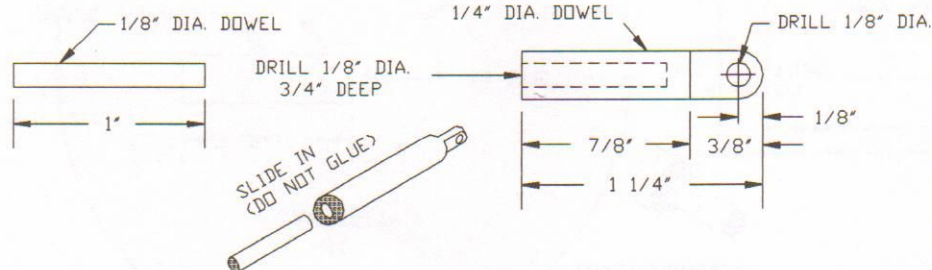
S29

### PIVOT BUSHINGS (2 REQUIRED)



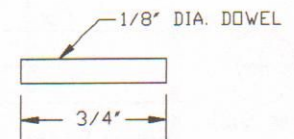
### SHOVEL PISTONS & CYLINDERS (2 REQUIRED)

S30



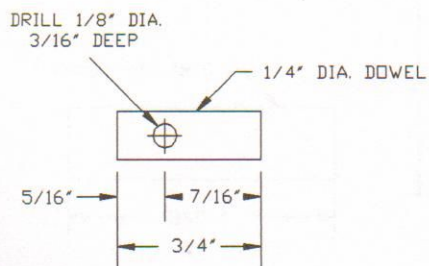
### LEVER LOCKING PINS (2 REQUIRED)

S31



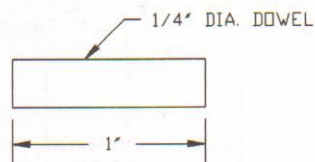
S32

### PISTON BUSHINGS (2 REQUIRED)



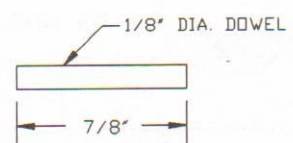
S33

### WIRE GUIDES (2 REQUIRED)



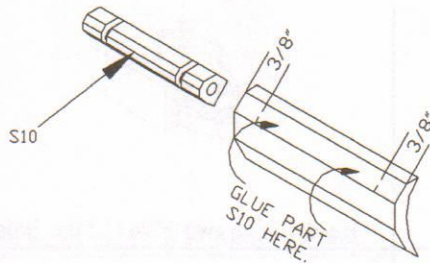
S34

### CYLINDER LOCKING PINS (2 REQUIRED)

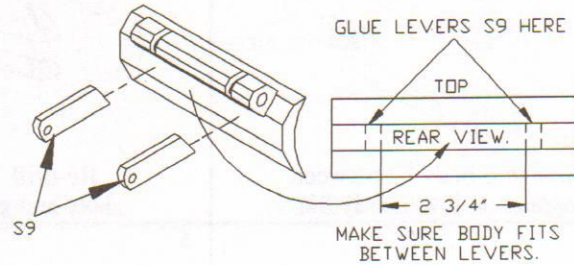




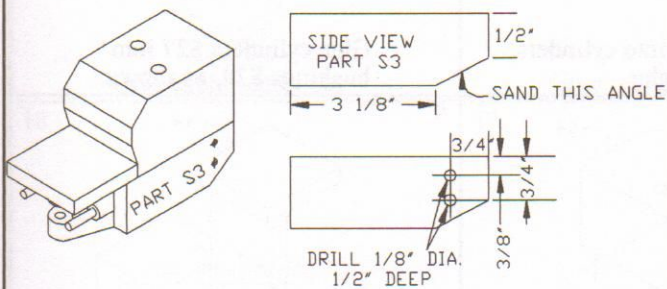
## Additional Information - Skidder



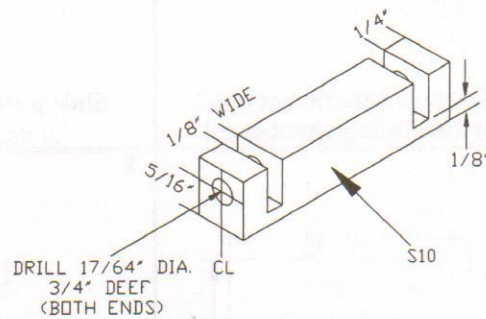
Glue part S10, as shown.



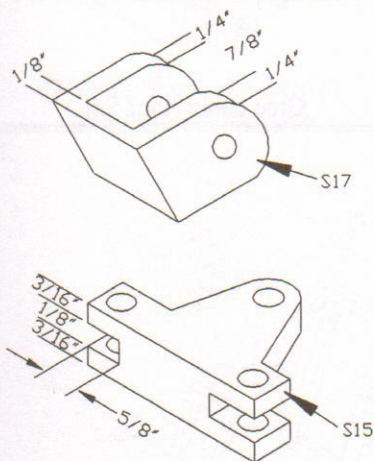
Glue part S9 to shovel, as shown.



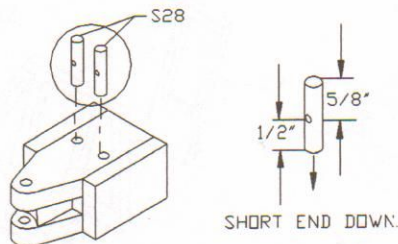
Sand angle and drill holes into sides S3.



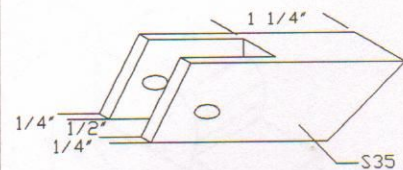
Using your Scroll Saw, cut grooves in part S10.



Using your Scroll Saw, cut grooves in part S15 and S17.



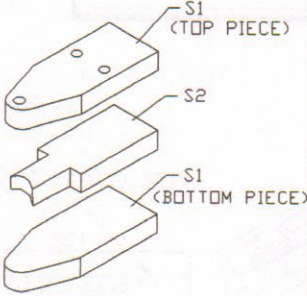
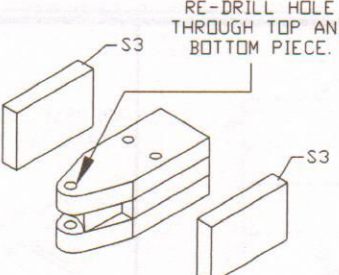
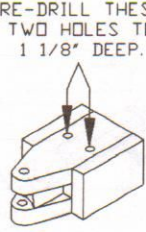
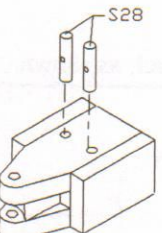
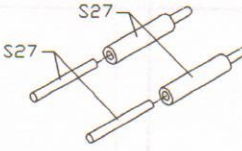
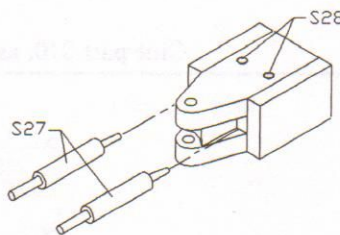
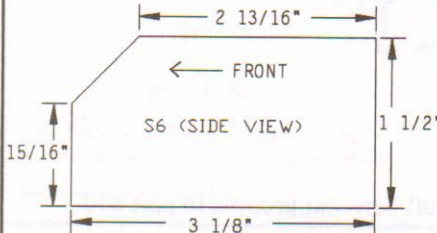
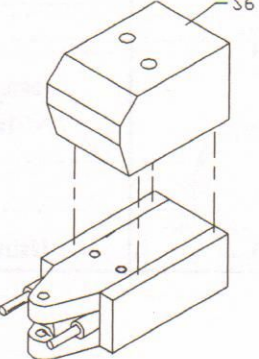
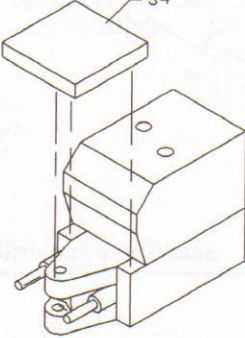
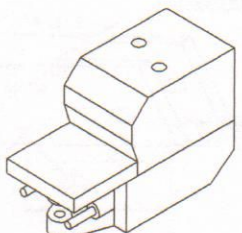
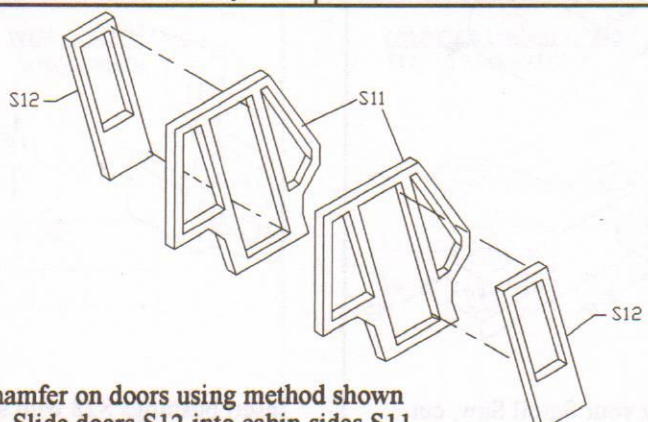
Insert bushings S28 with short end going in first. Do not glue.



Using your Scroll Saw, cut a groove in part S35, as shown.

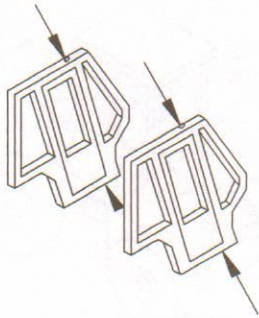


# Skidder - Assembly Drawings

<p>1</p>  <p>S1 (TOP PIECE) S2 S1 (BOTTOM PIECE)</p> <p>Glue mid-body S2 between upper and lower body S1.</p>	<p>2</p>  <p>RE-DRILL HOLE THROUGH TOP AND BOTTOM PIECE.</p> <p>S3</p> <p>Re-drill <math>23/64</math>" Dia. hole and glue sides S3.</p>	<p>3</p>  <p>RE-DRILL THESE TWO HOLES TO <math>1\ 1/8</math>" DEEP.</p> <p>Re-drill the two <math>17/64</math>" Dia. holes.</p>
<p>4</p>  <p>S28</p> <p>Insert bushings S28. Do not glue. See page 100 for important detail.</p>	<p>5</p>  <p>S27</p> <p>Slide pistons S27 into cylinders. Do not glue.</p>	<p>6</p>  <p>S28</p> <p>S27</p> <p>Glue cylinders S27 into bushings S28, as shown.</p>
<p>7</p>  <p>2 <math>13/16</math>"</p> <p>← FRONT</p> <p>S6 (SIDE VIEW)</p> <p>1 <math>1/2</math>"</p> <p>3 <math>1/8</math>"</p> <p>15/16"</p> <p>Sand angle on rear hood, as shown.</p>	<p>8</p>  <p>S6</p> <p>Glue rear hood S6 onto body.</p>	<p>9</p>  <p>S4</p> <p>Glue cabin floor S4.</p>
<p>10</p>  <p>Start working on cabin assembly.</p>	<p>11</p>  <p>S12</p> <p>S11</p> <p>S12</p> <p>Make a chamfer on doors using method shown on page 10. Slide doors S12 into cabin sides S11.</p>	

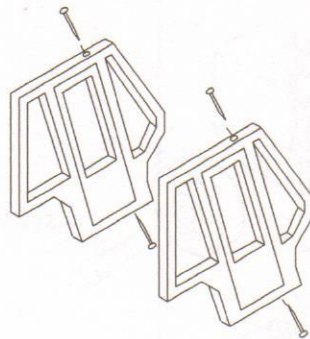


12



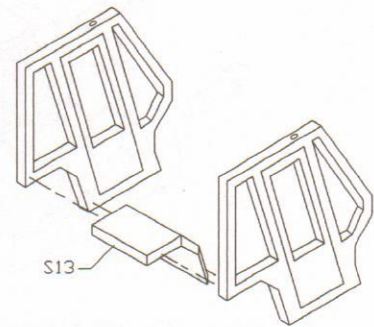
Drill holes using 1/2" finishing nail.

13



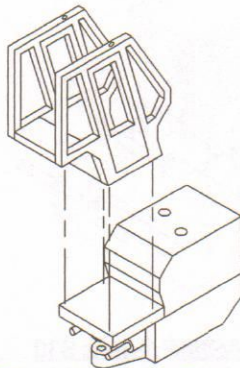
Insert 1/2" finishing nails.

14



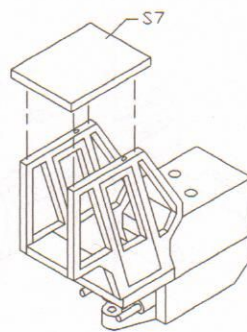
Glue front dash S13, as shown.

15



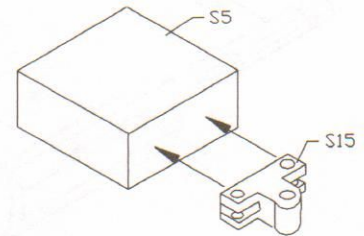
Glue cabin onto floor.

16



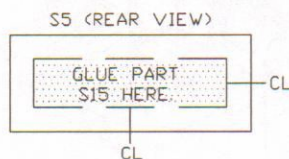
Glue roof S7 onto cabin.

17



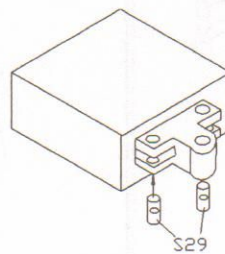
Glue pivot plate S15 onto body S5.  
See next frame for exact location.

18



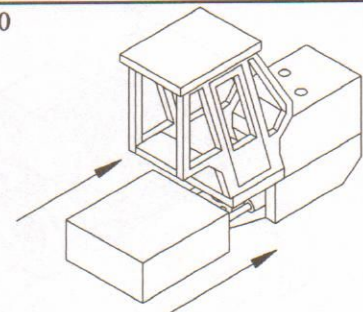
Drawing showing where to  
glue part S15 onto S5.

19



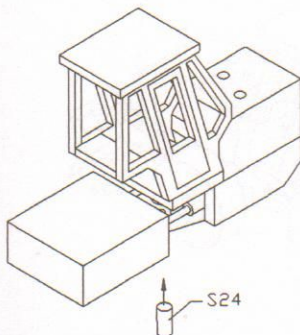
Insert bushings S29 into plate S15.  
Do not glue.

20



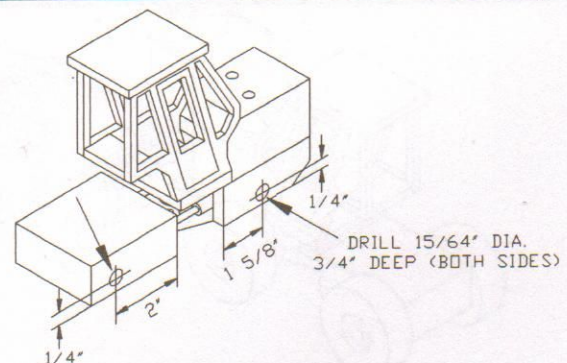
Slide front assembly into rear body  
making sure that you install pistons  
into bushings.

21



Insert main pin S24.

22

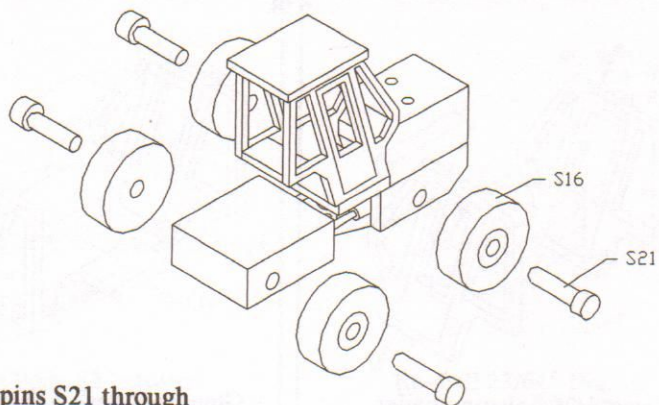


Drill the four 15/64" Dia. holes, as shown



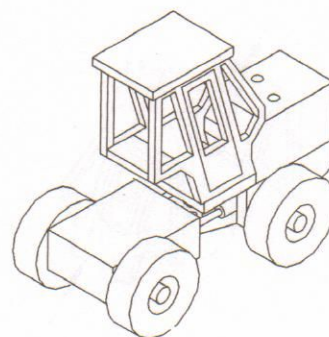
# Skidder - Assembly Drawings

23



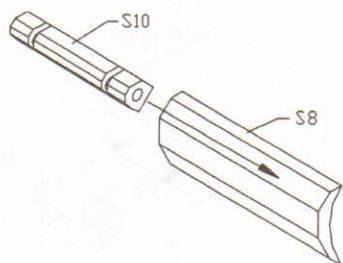
Insert pins S21 through wheels S16 and into body.

24



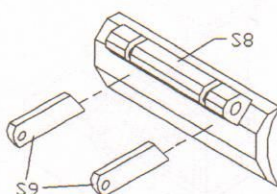
Start shovel assembly.

25



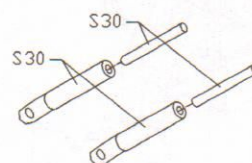
Glue parts, as shown.  
See page 100 for details.

26



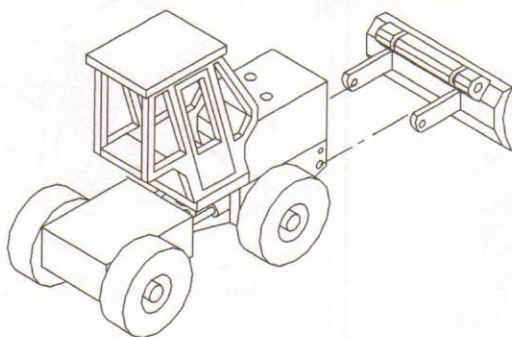
Glue levers S9.  
See page 100 for details.

27



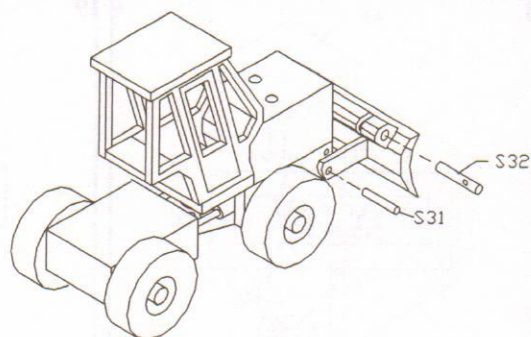
Slide pistons S30  
into cylinders S30.

28



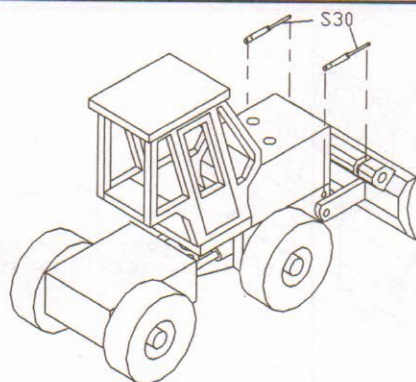
Slide shovel assembly, as shown.

29



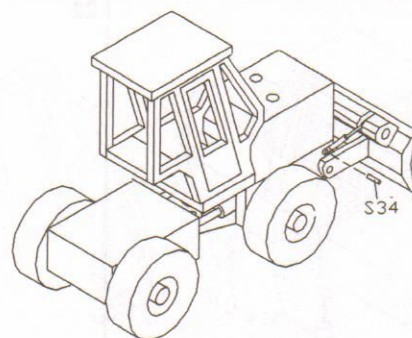
Insert pins S31 and bushings S32 (on each side).  
Do not glue bushings S32.

30



Install pistons S30, as shown.

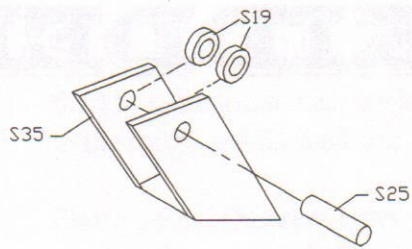
31



Insert cylinder pins S34.

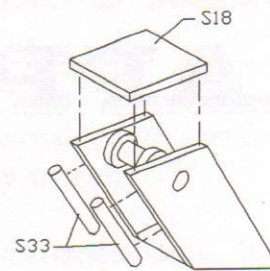


32



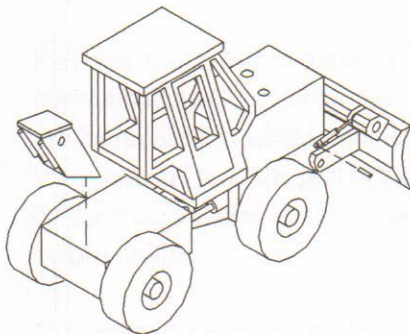
Assemble parts, as shown.

33



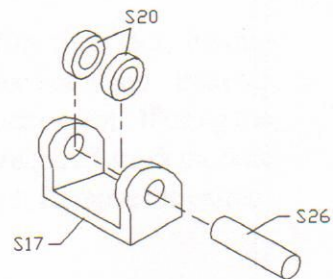
Glue pulley plate S18 and wire guides S33.

34



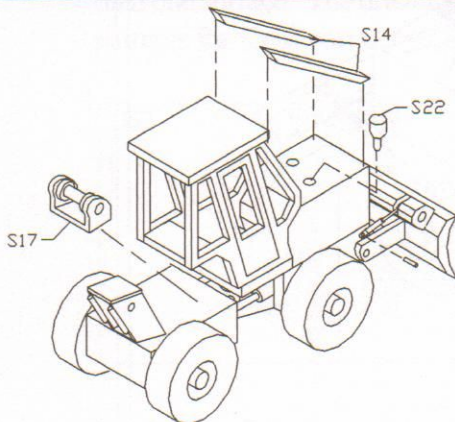
Glue front pulley assembly.

35



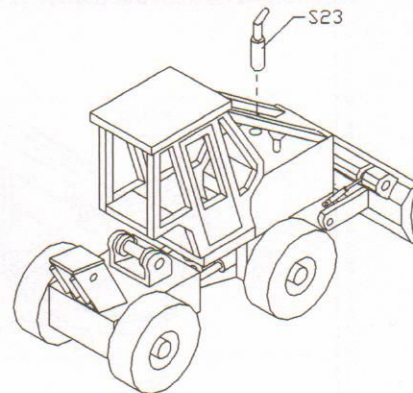
Assemble parts, as shown.

36



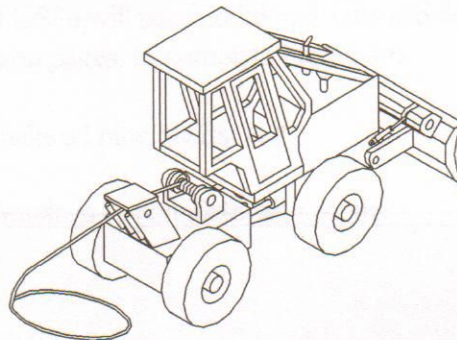
Glue parts S17, S14 and S22.

37



Glue muffler S23.

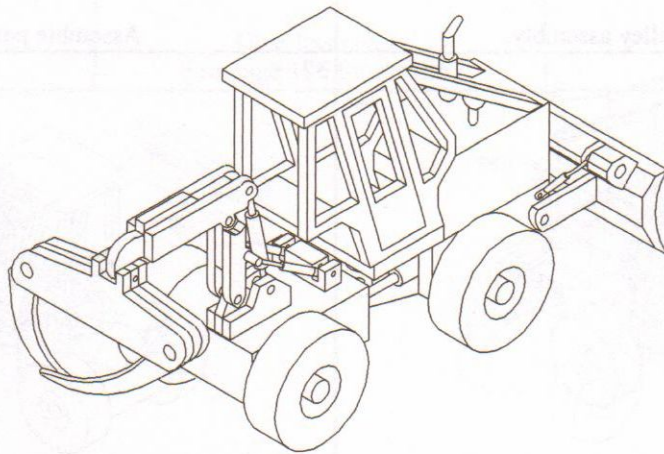
38



Install cable (string).  
Your model should now be complete.



# GRAPPLE SKIDDER





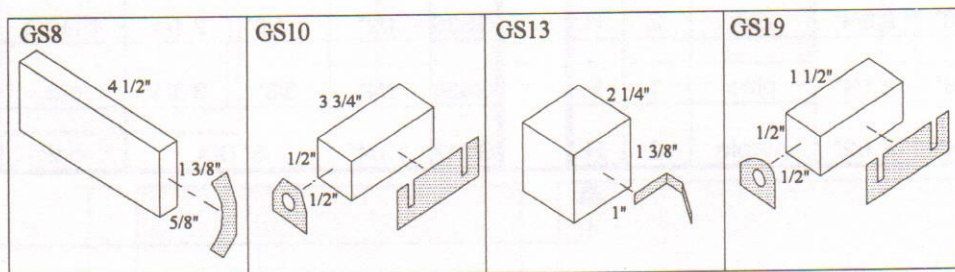
# General Instructions - Grapple Skidder

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately  $\frac{1}{16}$ " all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts GS2, GS6 and GS47.
- 4- Parts GS10, GS19 and GS36 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Grapple Skidder

Part	T	W	L	Material	Qty.	*
GS1	3/8"	2 1/2"	5 1/2"	pine	2	R
GS2	1/2"	2 1/4"	4 1/2"	pine	1	F
GS3	1/4"	1 1/4"	4 1/4"	pine	2	F
GS4	1/4"	2 3/4"	2"	pine	1	F
GS5	1 1/4"	2 3/4"	3"	pine	1	F
GS6	1 1/2"	2 3/4"	3 1/8"	pine	1	F
GS7	1/4"	3"	2 1/2"	pine	1	F
GS8	5/8"	1 3/8"	4 1/2"	pine	1	R
GS9	1/4"	3/4"	2 1/4"	maple	2	R
GS10	1/2"	1/2"	3 3/4"	maple	1	F
GS11	1/4"	3 1/4"	3 1/4"	oak	2	R
GS12	1/4"	1 3/8"	2 3/4"	oak	2	R
GS13	1"	1 3/8"	2 1/4"	pine	1	F
GS14	1/4"	2 1/4"	3 1/2"	maple	2	R

Part	T	W	L	Material	Qty.	*
GS15	3/8"	2 1/4"	3 1/2"	maple	1	R
GS16	1/8"	1 5/8"	4"	maple	2	R
GS17	3/16"	1 3/8"	1 3/8"	maple	1	R
GS18	3/16"	1 3/8"	1 3/8"	maple	1	R
GS19	1/2"	1/2"	1 1/2"	maple	1	F
GS20	1/4"	1 3/8"	3 5/8"	maple	2	R
GS21	1/4"	1 3/4"	3 7/8"	maple	1	R
GS22	1/4"	1 1/8"	2 1/8"	maple	2	R
GS23	1/4"	7/8"	2"	maple	1	R
GS24	1/4"	1 1/8"	2"	maple	2	R
GS25	1/4"	1 1/8"	2"	maple	1	R
GS36	1/2"	1 1/8"	2 1/4"	maple	1	R
GS38	1/4"	3/8"	3 3/4"	oak	2	R
GS47	1 1/4"	3" DIA.		oak	4	F

T = Thickness

W = Width

L = Length

R = Rough size

F = Finished size

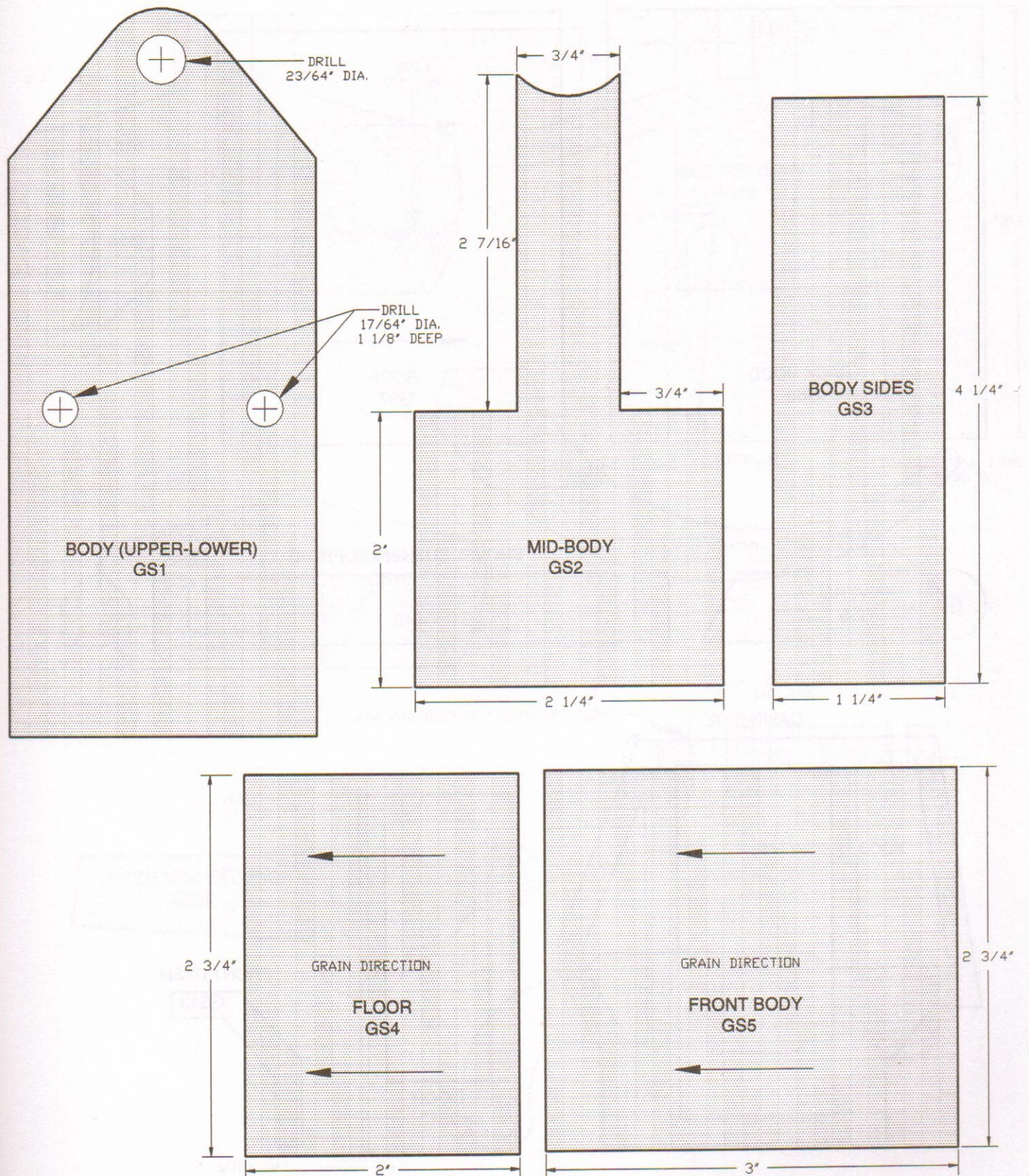
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

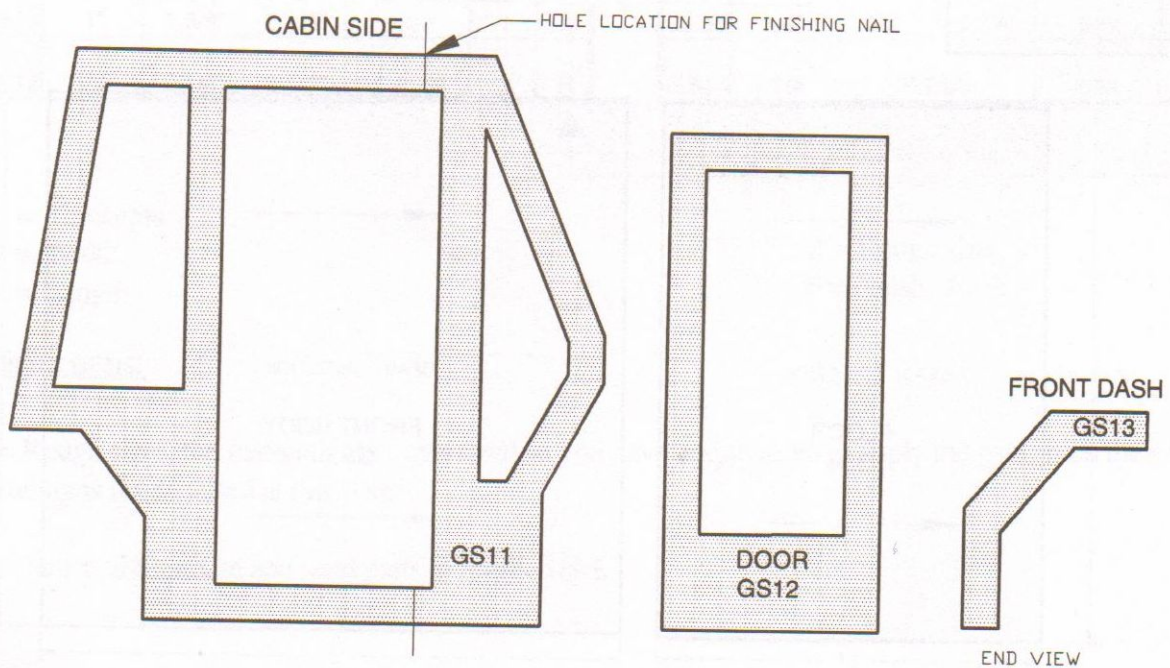
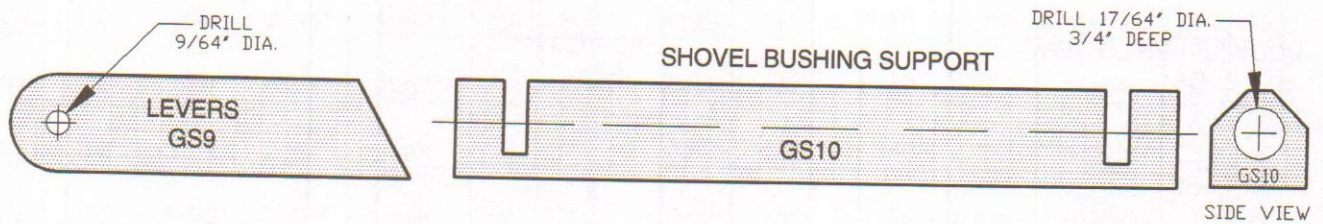
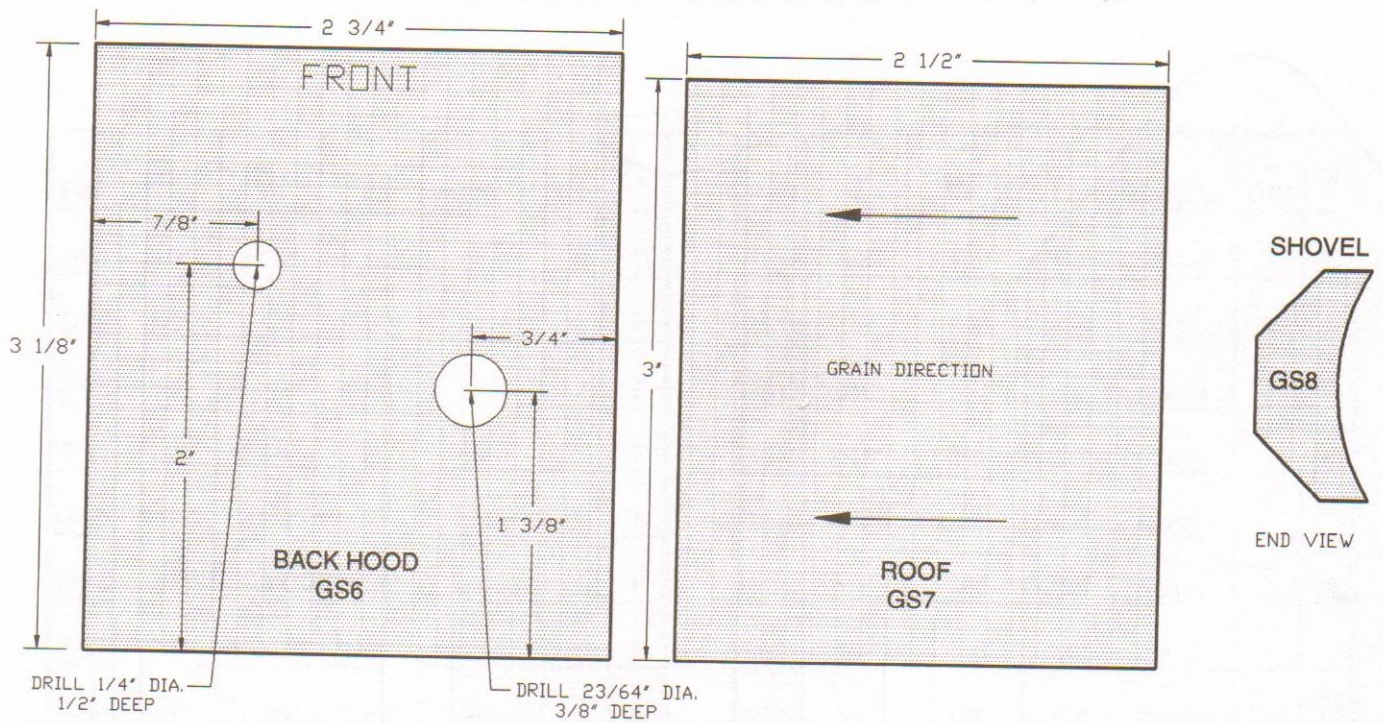
F = Finished Size: Cut and sand parts to finished size.



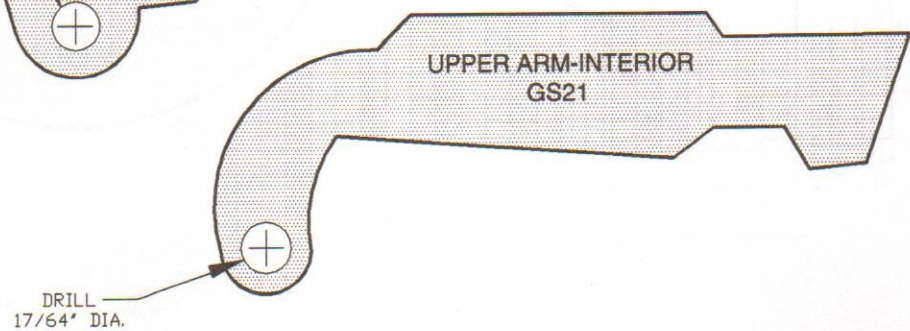
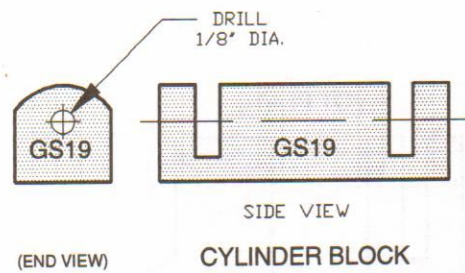
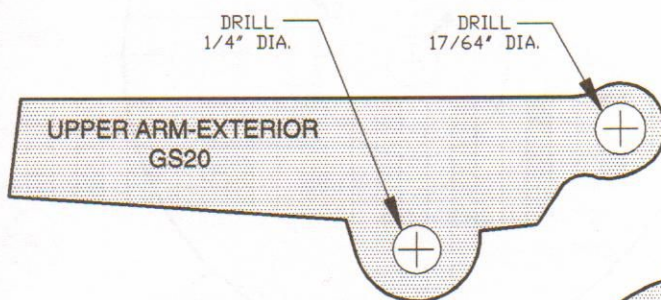
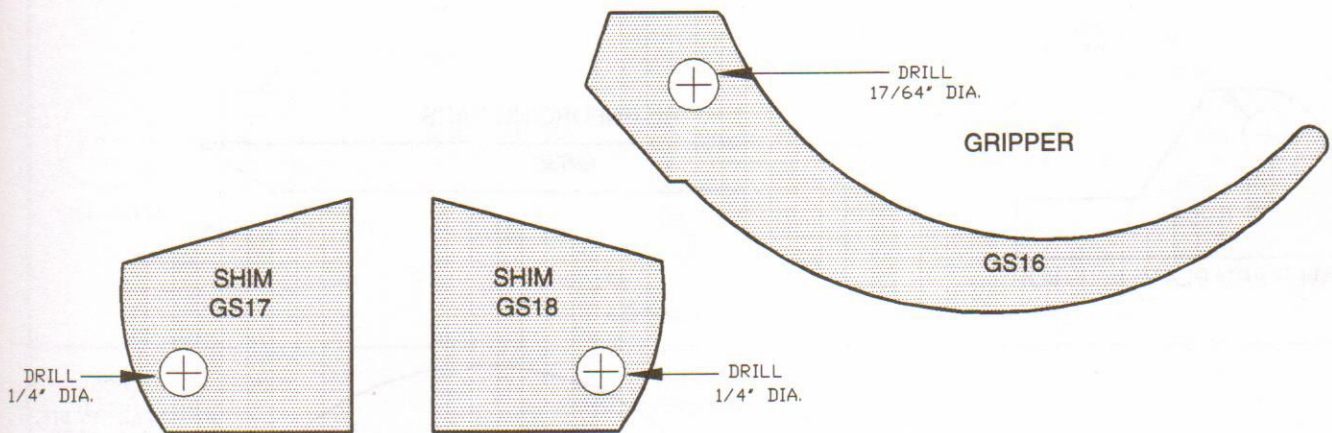
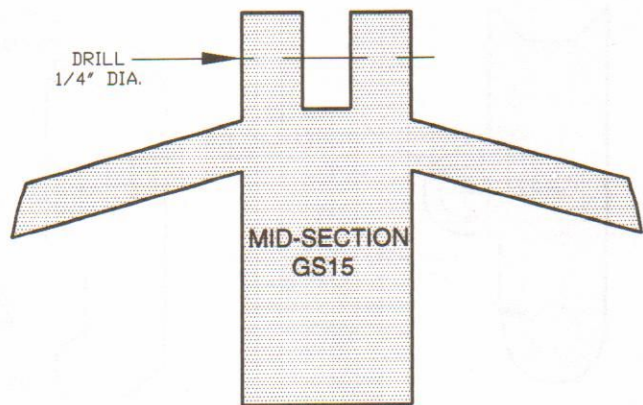
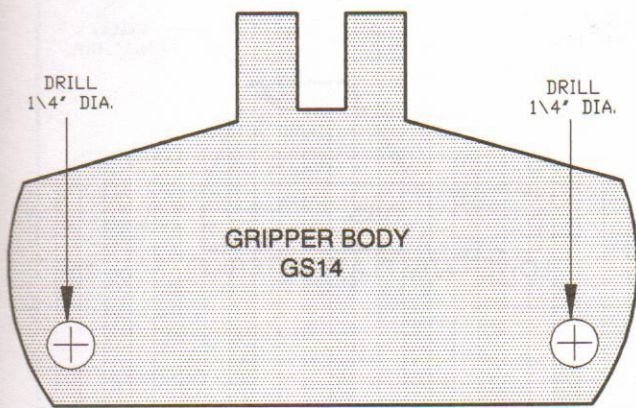
# Full-Sized Patterns: Set One





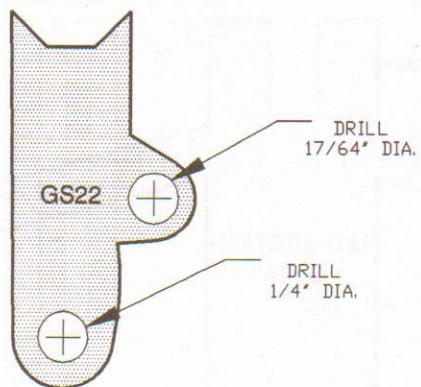




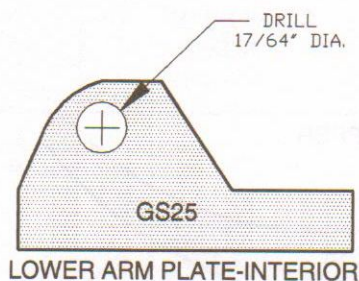
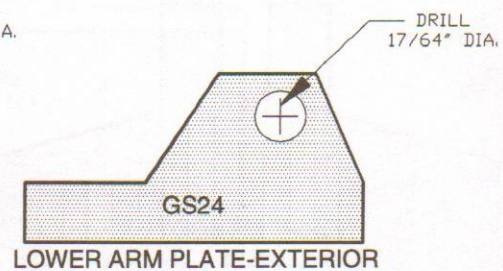
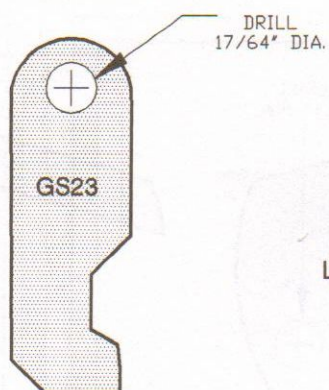




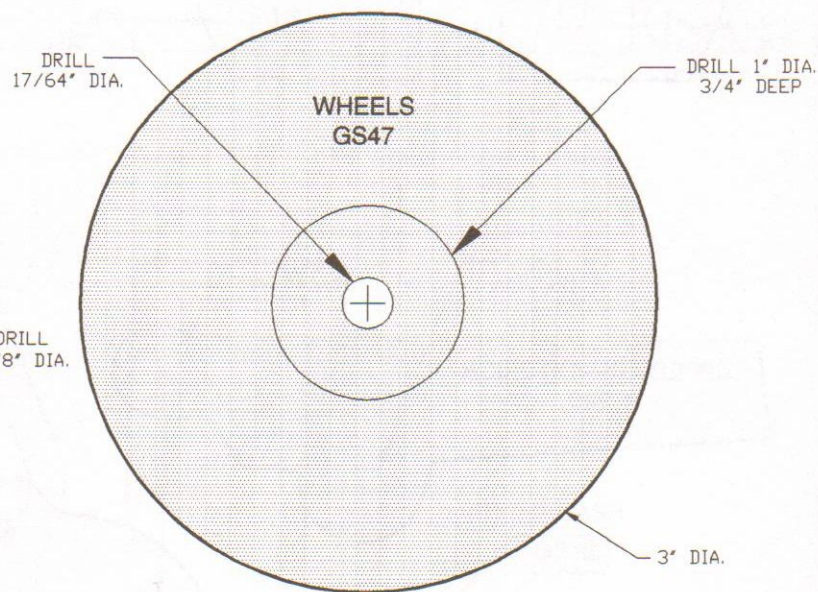
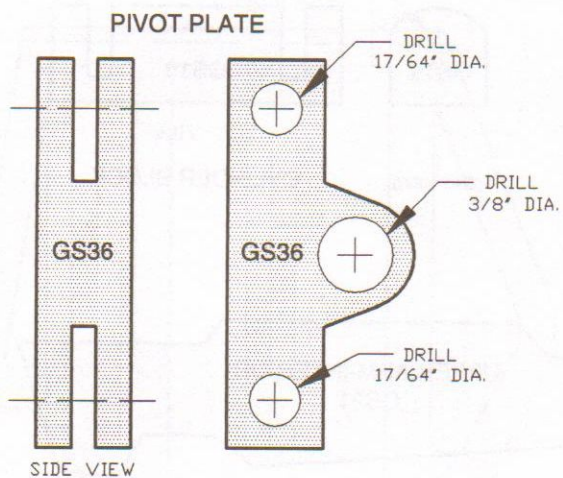
LOWER ARM-EXTERIOR



LOWER ARM-INTERIOR



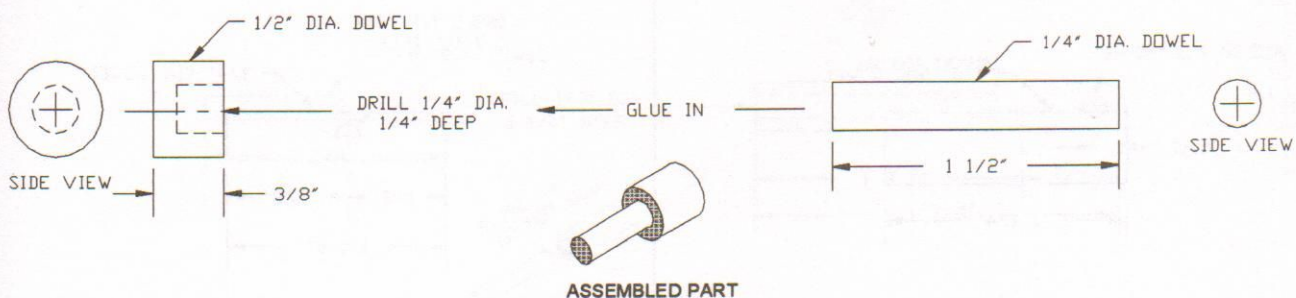
RE-ENFORCING BARS





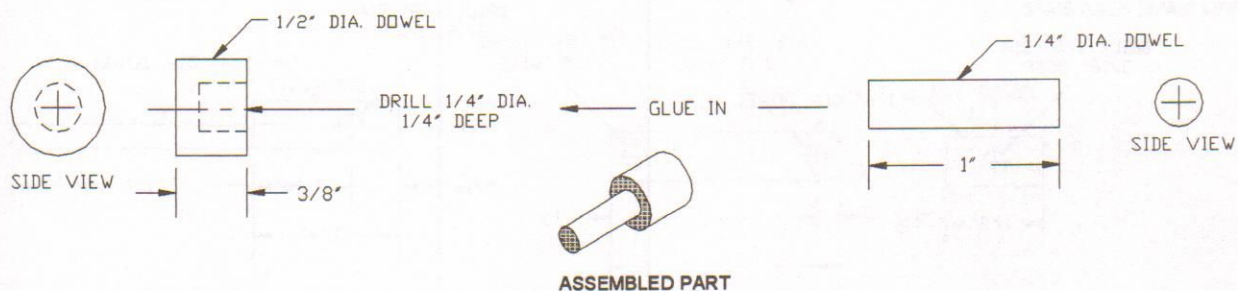
GS26

### WHEEL PINS (4 REQUIRED)



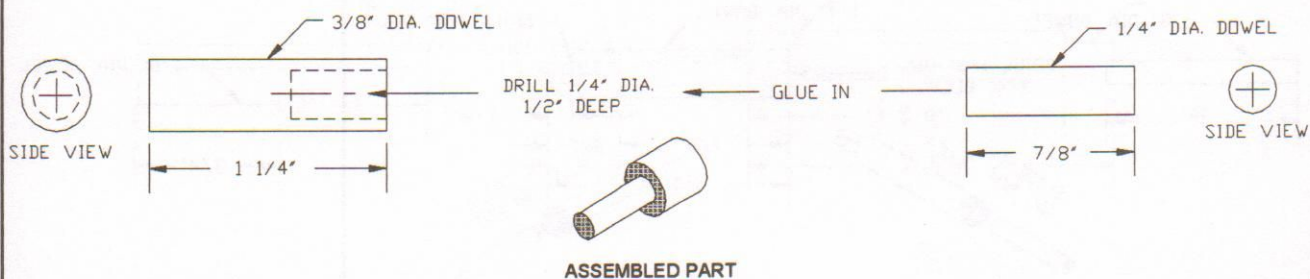
GS27

### AIR FILTER (1 REQUIRED)



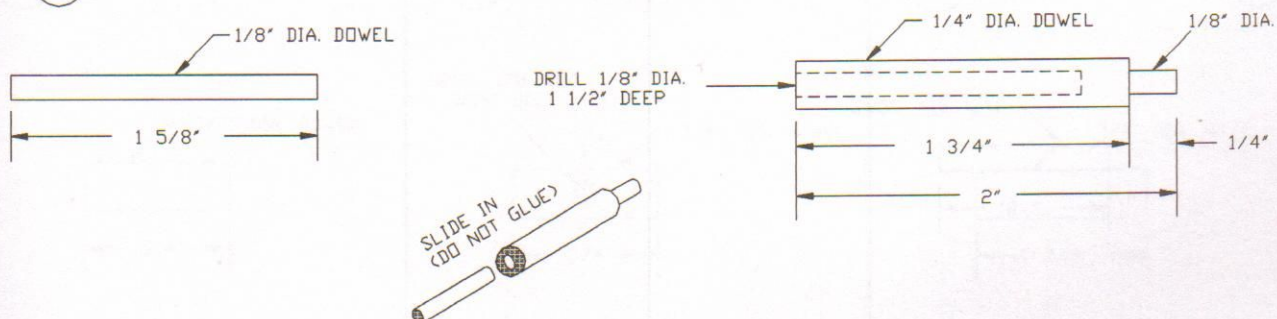
GS28

### MUFFLER (1 REQUIRED)

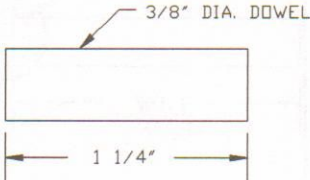
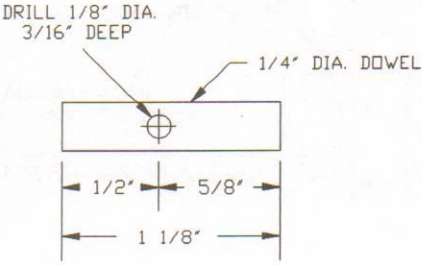
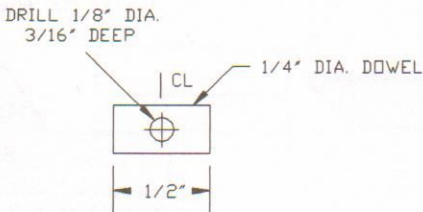
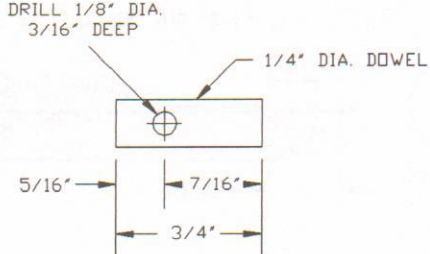
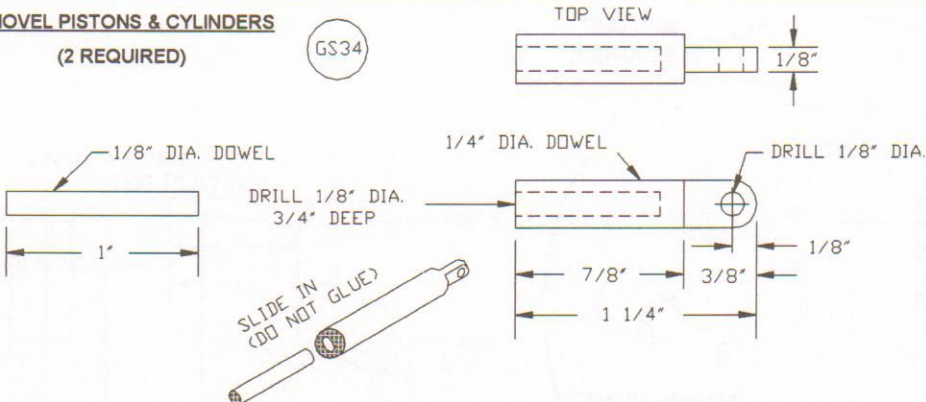
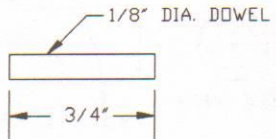
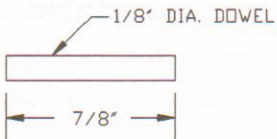


GS29

### CYLINDERS AND PISTONS FOR BODY ASSEMBLY (2 REQUIRED)



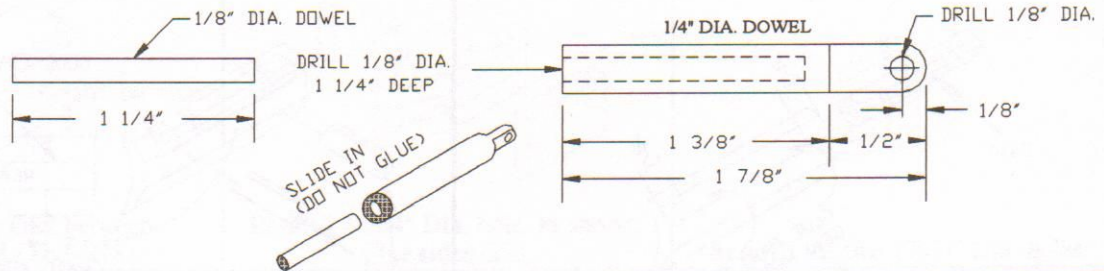


<p>GS30</p> <p><b>MAIN PIVOT PIN</b> (1 REQUIRED)</p>  <p>3/8" DIA. DOWEL</p> <p>1 1/4"</p>	<p>GS31</p> <p><b>PISTON BUSHINGS</b> (2 REQUIRED)</p>  <p>DRILL 1/8" DIA. 3/16" DEEP</p> <p>1/4" DIA. DOWEL</p> <p>1/2" 5/8"</p> <p>1 1/8"</p>
<p>GS32</p> <p><b>PIVOT BUSHINGS</b> (2 REQUIRED)</p>  <p>DRILL 1/8" DIA. 3/16" DEEP</p> <p>CL 1/4" DIA. DOWEL</p> <p>1/2"</p>	<p>GS33</p> <p><b>PISTON BUSHINGS</b> (2 REQUIRED)</p>  <p>DRILL 1/8" DIA. 3/16" DEEP</p> <p>1/4" DIA. DOWEL</p> <p>5/16" 7/16"</p> <p>3/4"</p>
<p><b>SHOVEL PISTONS &amp; CYLINDERS</b> (2 REQUIRED)</p> <p>GS34</p>  <p>1/8" DIA. DOWEL</p> <p>1"</p> <p>DRILL 1/8" DIA. 3/4" DEEP</p> <p>1/4" DIA. DOWEL</p> <p>DRILL 1/8" DIA.</p> <p>7/8" 3/8" 1/8"</p> <p>1 1/4"</p> <p>SLIDE IN (DO NOT GLUE)</p> <p>TOP VIEW</p> <p>1/8"</p>	<p><b>LEVER LOCKING PINS</b> (2 REQUIRED)</p> <p>GS35</p>  <p>1/8" DIA. DOWEL</p> <p>3/4"</p>
<p>GS37</p> <p><b>CYLINDER LOCKING PINS</b> (2 REQUIRED)</p>  <p>1/8" DIA. DOWEL</p> <p>7/8"</p>	



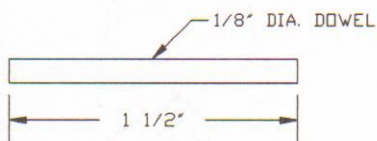
**CYLINDERS AND PISTONS FOR ARM ASSEMBLY**  
(2 REQUIRED)

GS39



GS40

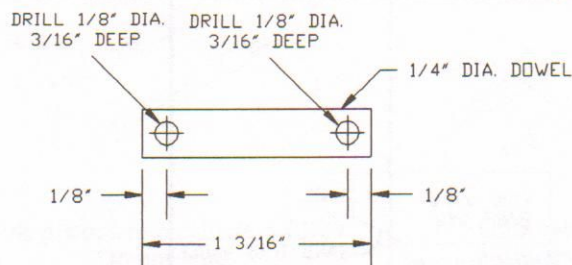
**CYLINDER LOCKING PIN**  
(1 REQUIRED)



GS41

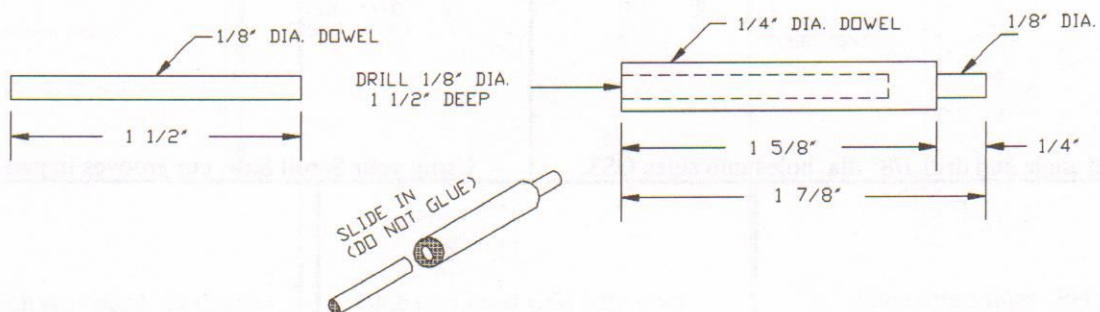
**PISTON BUSHING**  
(1 REQUIRED)

**PLEASE NOTE:**  
MAKE SURE THAT THESE  
TWO HOLES ARE ON THE  
SAME AXES (SAME LINE)



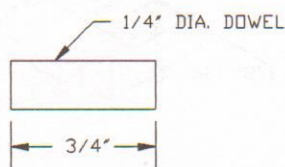
GS42

**CYLINDER AND PISTON**  
(1 REQUIRED)



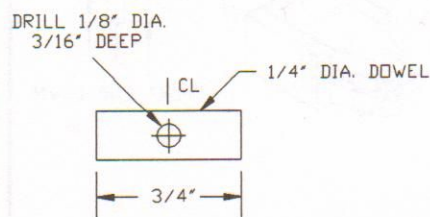
GS43

**PINS**  
(2 REQUIRED)



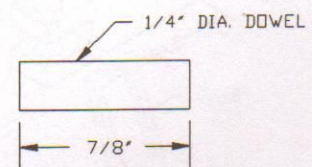
GS44

**BUSHINGS**  
(2 REQUIRED)



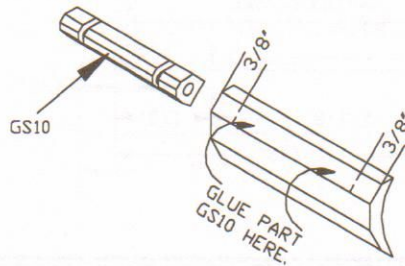
GS45

**PINS**  
(3 REQUIRED)

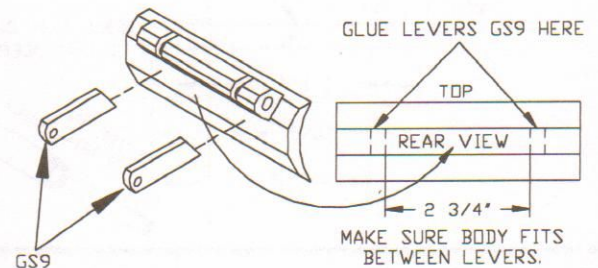




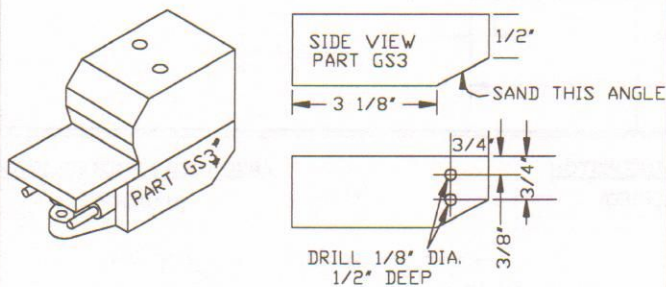
## Additional Information - Grapple Skidder



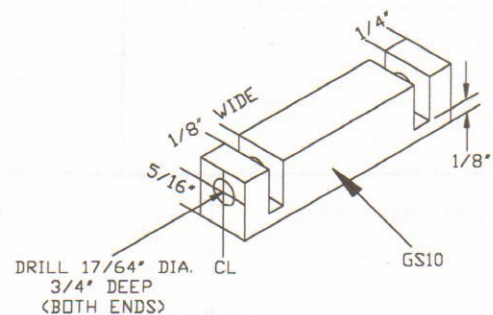
Glue part GS10, as shown.



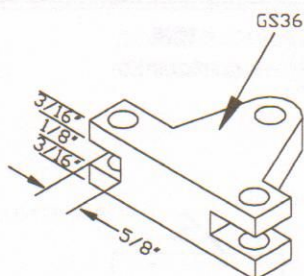
Glue parts GS9 to shovel, as shown.



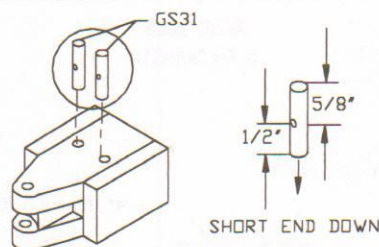
Sand angle and drill 1/8" dia. holes into sides GS3.



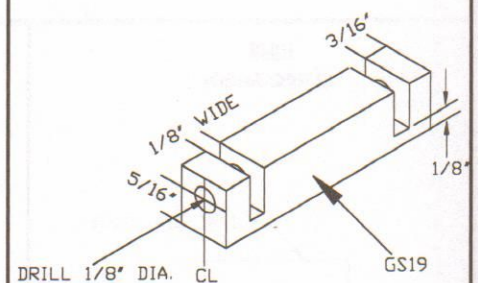
Using your Scroll Saw, cut grooves in part GS10.



Using your Scroll Saw, cut grooves in part GS36.



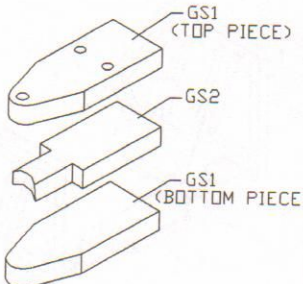
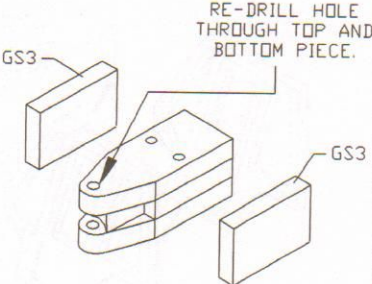
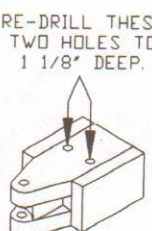
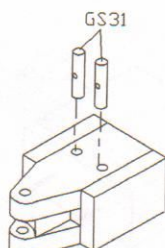
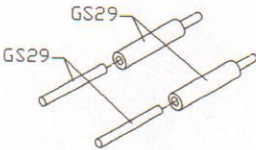
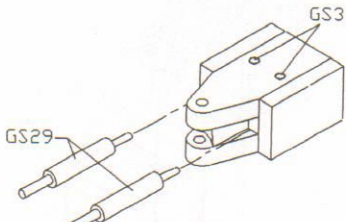
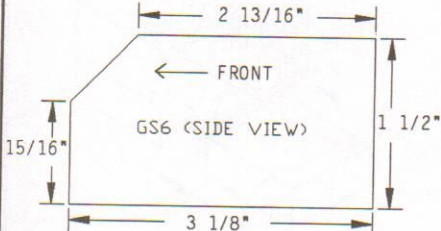
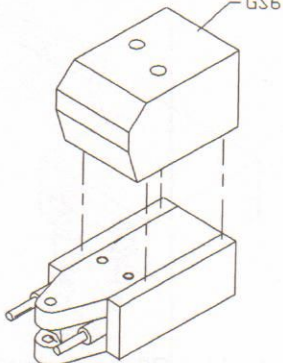
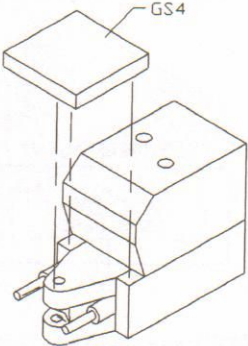
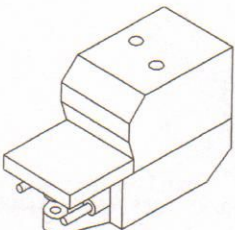
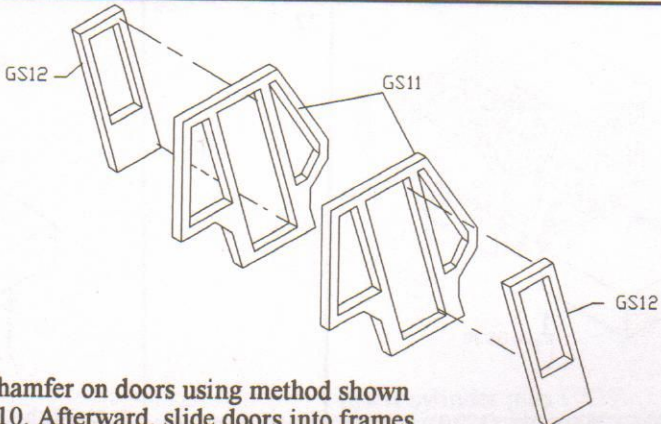
Insert bushings GS31 with short end going in first. Do not glue.



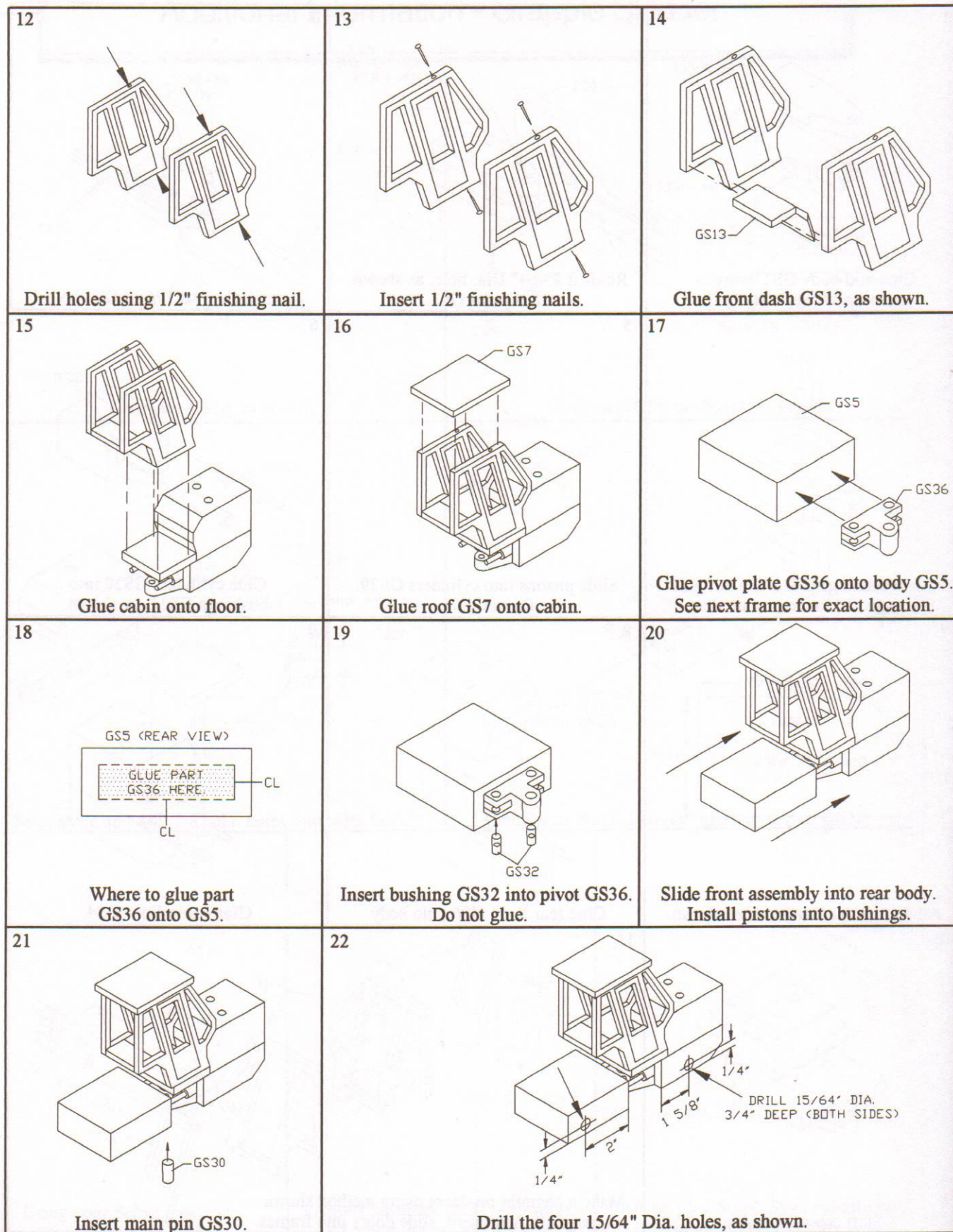
Using your Scroll Saw, cut grooves in part GS19, as shown.



# Grapple Skidder - Assembly Drawings

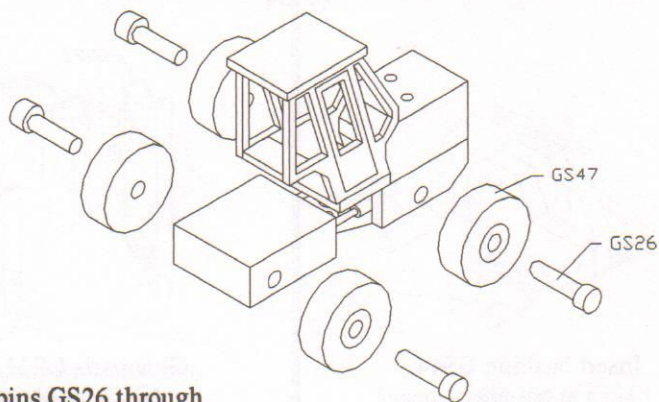
<p>1</p>  <p>GS1 (TOP PIECE) GS2 GS1 (BOTTOM PIECE)</p> <p>Glue mid-body GS2 between upper and lower body GS1.</p>	<p>2</p>  <p>RE-DRILL HOLE THROUGH TOP AND BOTTOM PIECE.</p> <p>GS3</p> <p>Re-drill <math>23/64</math>" Dia. hole, as shown. Glue sides GS3.</p>	<p>3</p>  <p>RE-DRILL THESE TWO HOLES TO <math>1\ 1/8</math>" DEEP.</p> <p>Re-drill the two <math>17/64</math>" Dia. holes.</p>
<p>4</p>  <p>GS31</p> <p>Insert bushings GS31. Do not glue See page 115 for important detail.</p>	<p>5</p>  <p>GS29</p> <p>Slide pistons into cylinders GS29. Do not glue.</p>	<p>6</p>  <p>GS31</p> <p>GS29</p> <p>Glue cylinders GS29 into bushings GS31, as shown.</p>
<p>7</p>  <p><math>2\ 13/16</math>"</p> <p>FRONT</p> <p>GS6 (SIDE VIEW)</p> <p><math>15/16</math>"</p> <p><math>3\ 1/8</math>"</p> <p><math>1\ 1/2</math>"</p> <p>Sand angle on rear hood, as shown.</p>	<p>8</p>  <p>GS6</p> <p>Glue rear hood GS6 onto body.</p>	<p>9</p>  <p>GS4</p> <p>Glue cabin floor GS4.</p>
<p>10</p>  <p>Start cabin assembly.</p>	<p>11</p>  <p>GS12</p> <p>GS11</p> <p>GS12</p> <p>Make a chamfer on doors using method shown on page 10. Afterward, slide doors into frames.</p>	





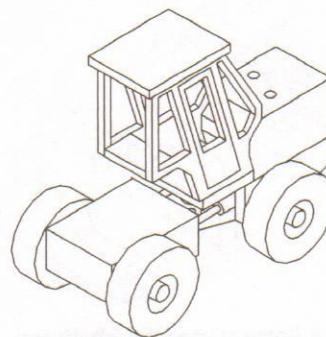


23



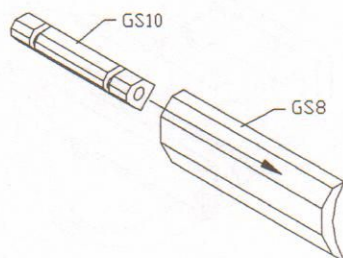
Insert pins GS26 through wheels GS47 and into body.

24



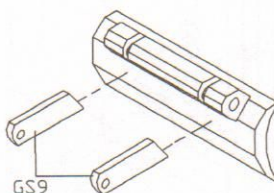
Start shovel assembly.

25



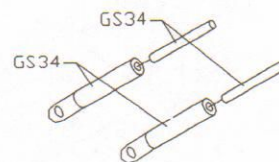
Glue parts, as shown.  
See page 115 for exact location.

26



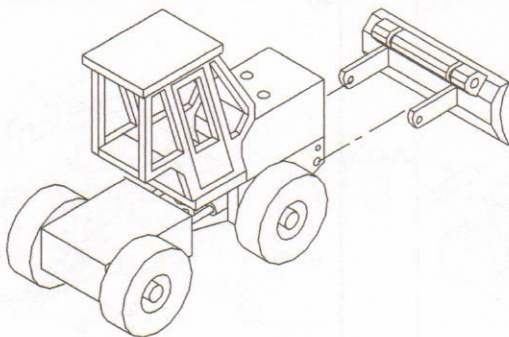
Glue levers GS9.  
See page 115 for exact location.

27



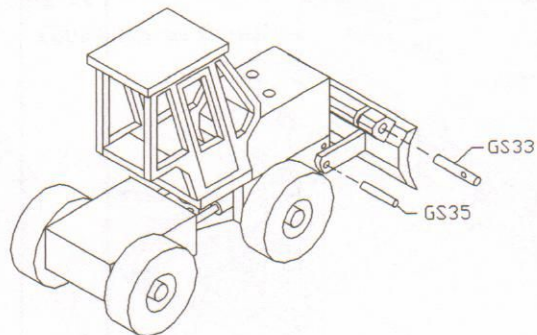
Slide pistons GS34 into cylinders.  
Do not glue.

28



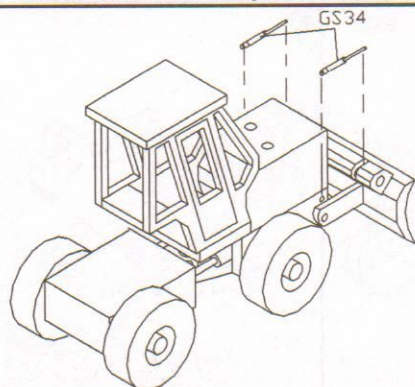
Slide shovel assembly, as shown.

29



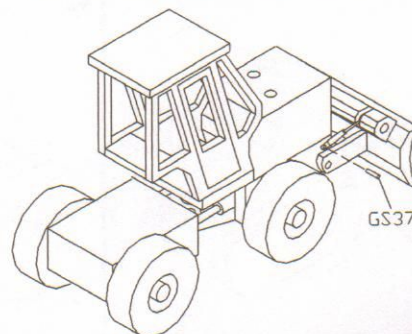
Insert pins GS35 and bushings GS33.  
Do not glue.

30



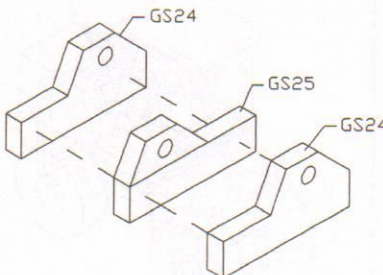
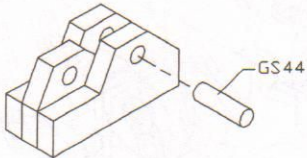
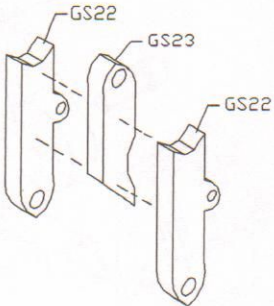
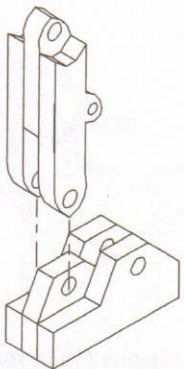
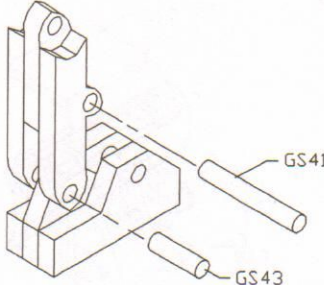
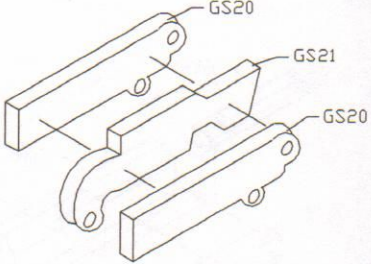
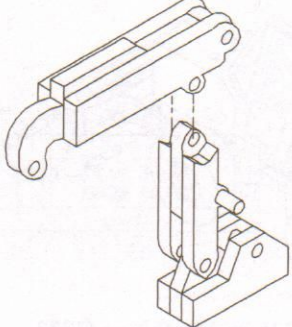
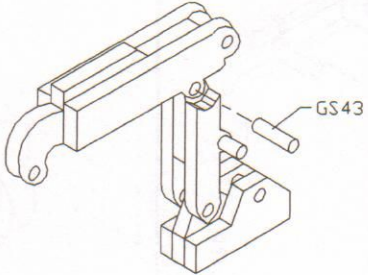
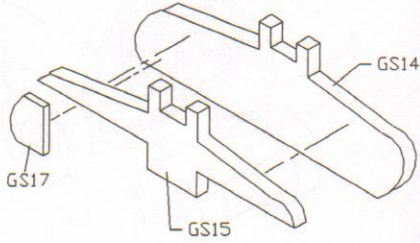
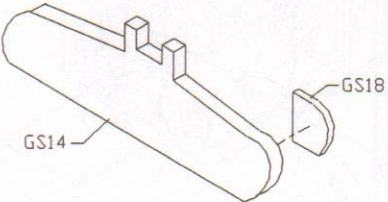
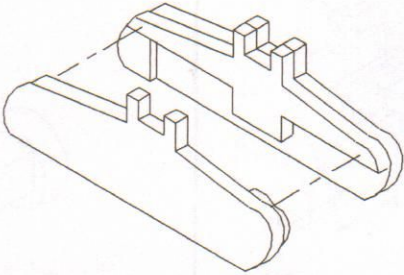
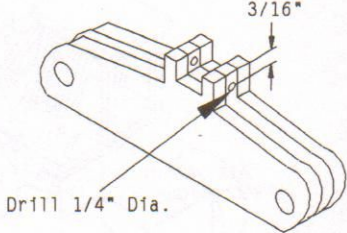
Install pistons GS34, as shown.

31



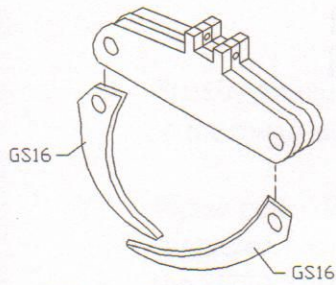
Insert cylinder pins GS37.



<p>32</p>  <p>Glue lower plate GS25 between lower-plate exterior GS24.</p>	<p>33</p>  <p>Insert bushing GS44. Do not glue.</p>	<p>34</p>  <p>Glue parts GS22 and GS23, as shown.</p>
<p>35</p>  <p>Slide lower arm, as shown.</p>	<p>36</p>  <p>Insert pin GS43 and bushing GS41. Do not glue.</p>	<p>37</p>  <p>Glue parts GS20 and GS21, as shown.</p>
<p>38</p>  <p>Slide in parts, as shown.</p>	<p>39</p>  <p>Insert locking pin GS43.</p>	<p>40</p>  <p>Glue parts, as shown.</p>
<p>41</p>  <p>Glue parts, as shown.</p>	<p>42</p>  <p>Glue both assemblies together.</p>	<p>43</p>  <p>Drill 1/4" Dia. hole, as shown.</p>

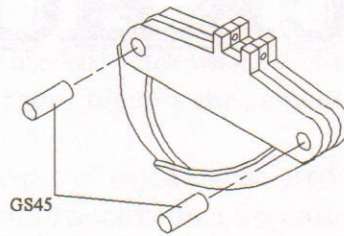


44



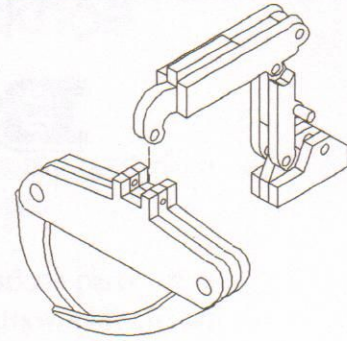
Slide grippers GS16 into gripper body assembly.

45



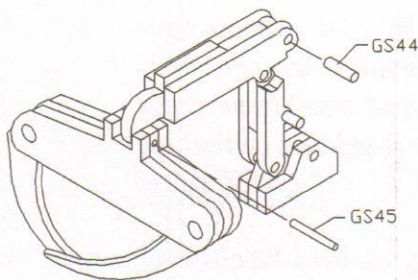
Insert locking pins GS45.

46



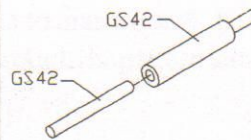
Slide gripper assembly onto upper arm.

47



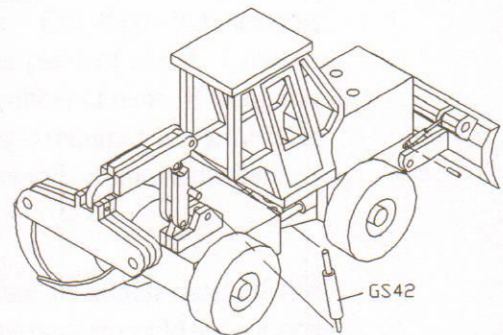
Insert locking pin GS45 and bushing GS44.

48



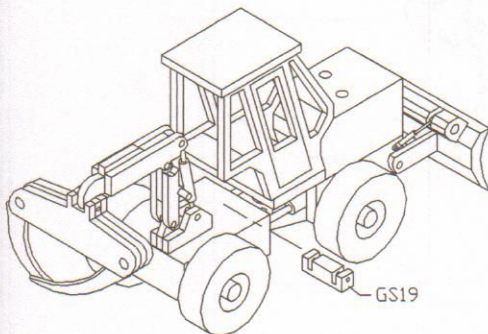
Slide piston GS42 into cylinder. Do not glue.

49



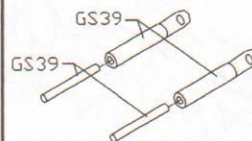
Install piston GS42, as shown.

50



Glue cylinder block GS19.

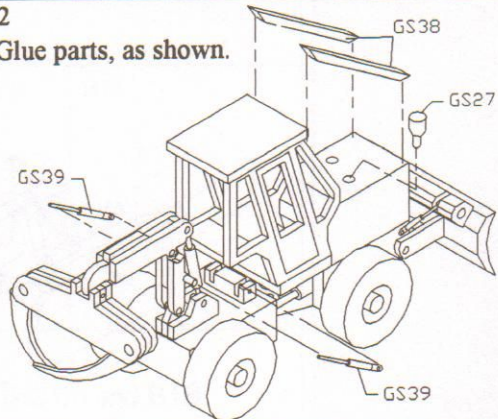
51



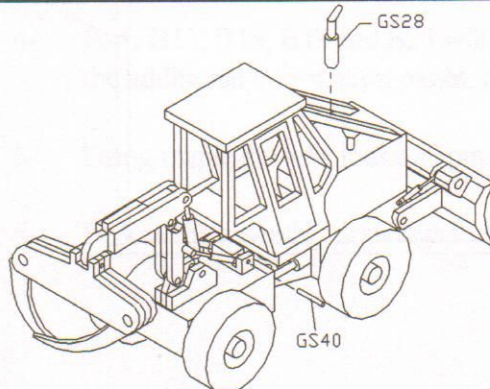
Slide pistons GS39 into cylinders. Do not glue.

52

Glue parts, as shown.

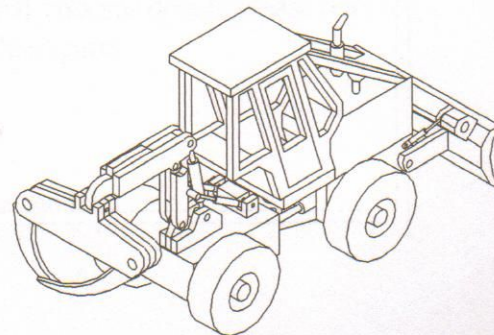


53



Insert cylinder pin GS40 and muffler GS28.

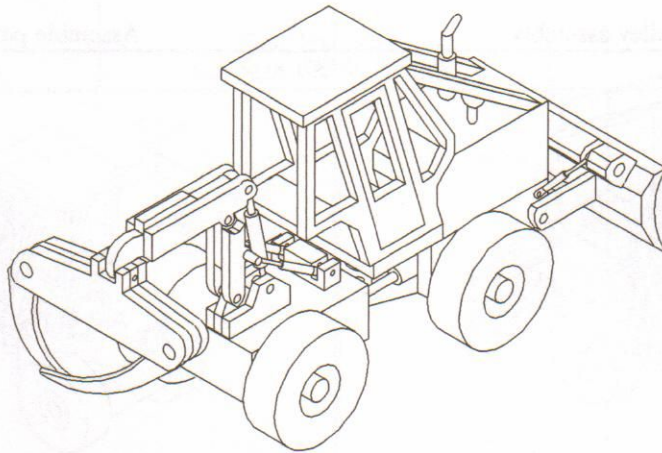
54



Your model should now be complete.



# GRAPPLE SKIDDER





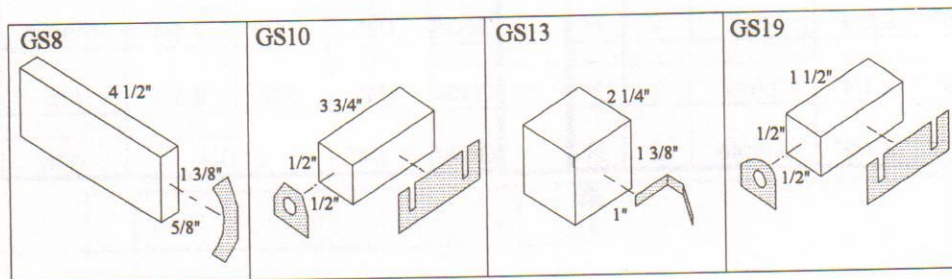
# General Instructions - Grapple Skidder

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately 1/16" all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts GS2, GS6 and GS47.
- 4- Parts GS10, GS19 and GS36 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Grapple Skidder

Part	T	W	L	Material	Qty.	*
GS1	3/8"	2 1/2"	5 1/2"	pine	2	R
GS2	1/2"	2 1/4"	4 1/2"	pine	1	F
GS3	1/4"	1 1/4"	4 1/4"	pine	2	F
GS4	1/4"	2 3/4"	2"	pine	1	F
GS5	1 1/4"	2 3/4"	3"	pine	1	F
GS6	1 1/2"	2 3/4"	3 1/8"	pine	1	F
GS7	1/4"	3"	2 1/2"	pine	1	F
GS8	5/8"	1 3/8"	4 1/2"	pine	1	R
GS9	1/4"	3/4"	2 1/4"	maple	2	R
GS10	1/2"	1/2"	3 3/4"	maple	1	F
GS11	1/4"	3 1/4"	3 1/4"	oak	2	R
GS12	1/4"	1 3/8"	2 3/4"	oak	2	R
GS13	1"	1 3/8"	2 1/4"	pine	1	F
GS14	1/4"	2 1/4"	3 1/2"	maple	2	R
GS15	3/8"	2 1/4"	3 1/2"	maple	1	R
GS16	1/8"	1 5/8"	4"	maple	2	R
GS17	3/16"	1 3/8"	1 3/8"	maple	1	R
GS18	3/16"	1 3/8"	1 3/8"	maple	1	R
GS19	1/2"	1/2"	1 1/2"	maple	1	F
GS20	1/4"	1 3/8"	3 5/8"	maple	2	R
GS21	1/4"	1 3/4"	3 7/8"	maple	1	R
GS22	1/4"	1 1/8"	2 1/8"	maple	2	R
GS23	1/4"	7/8"	2"	maple	1	R
GS24	1/4"	1 1/8"	2"	maple	2	R
GS25	1/4"	1 1/8"	2"	maple	1	R
GS36	1/2"	1 1/8"	2 1/4"	maple	1	R
GS38	1/4"	3/8"	3 3/4"	oak	2	R
GS47	1 1/4"	3" DIA.		oak	4	F

T = Thickness

W = Width

L = Length

R = Rough size

F = Finished size

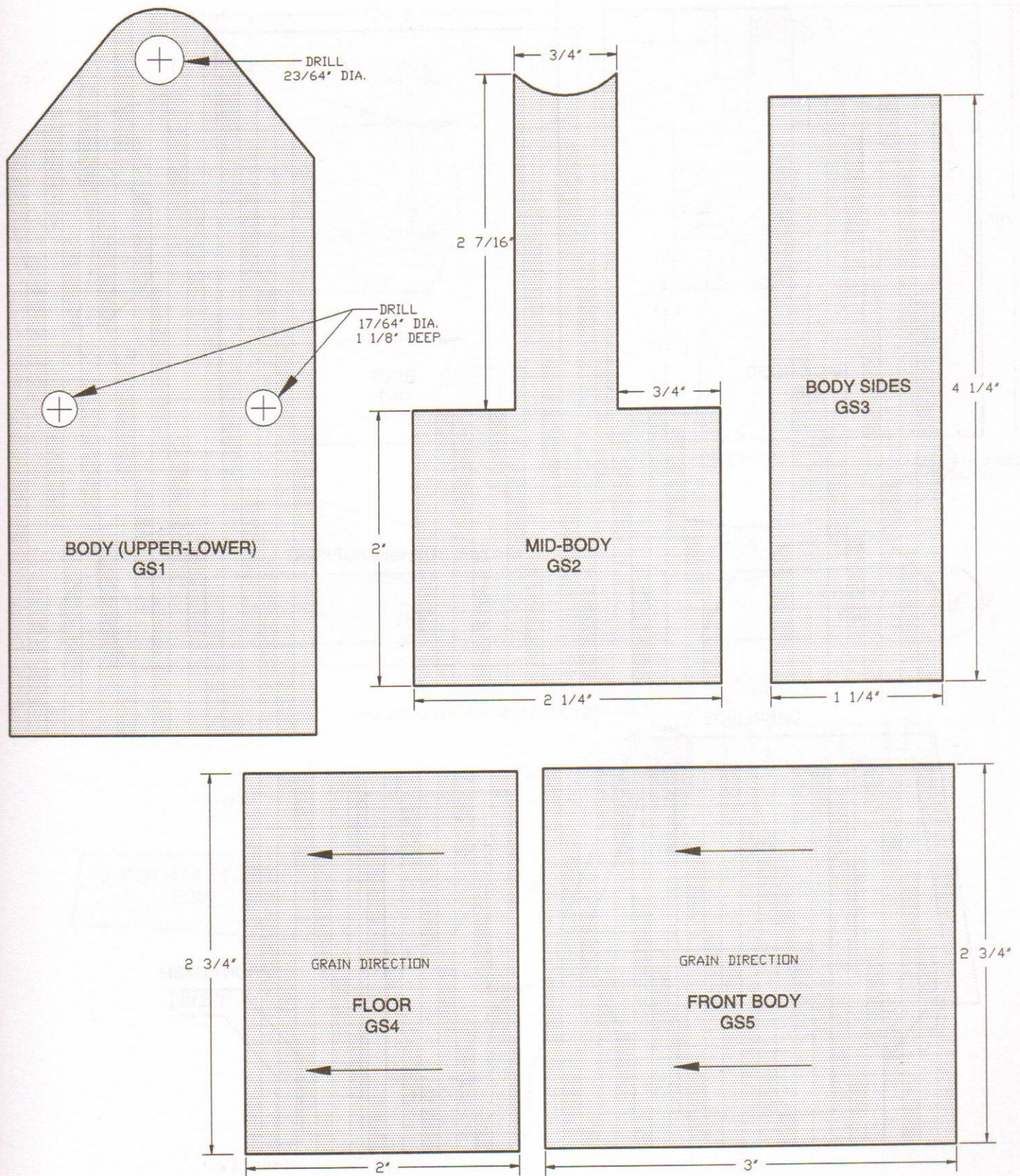
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

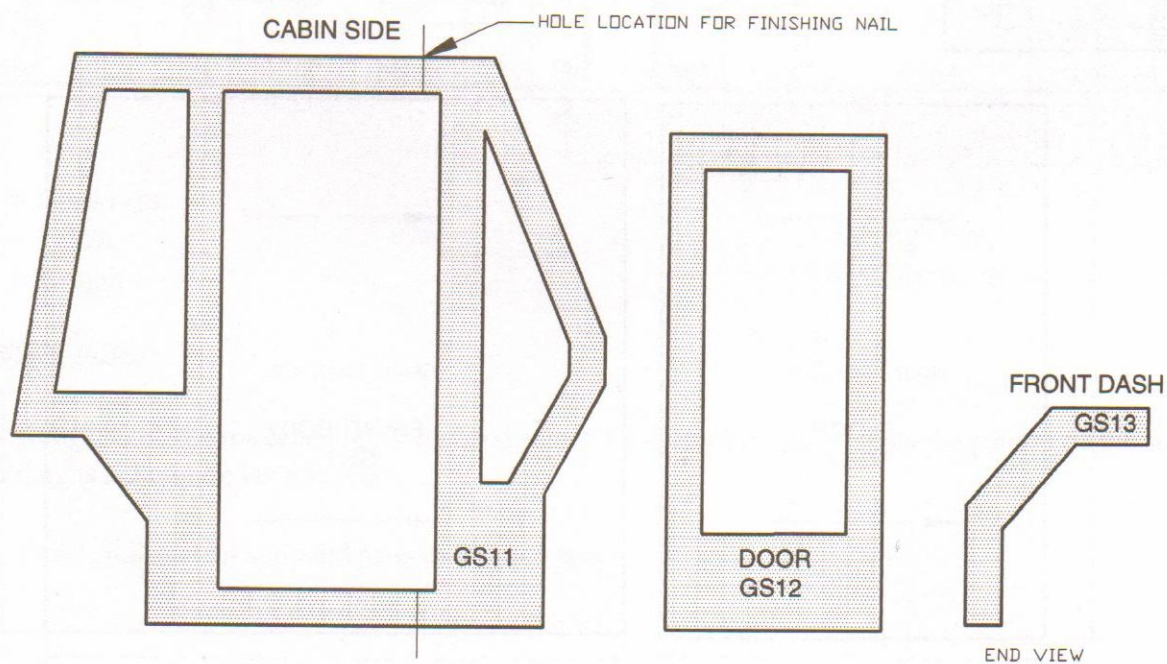
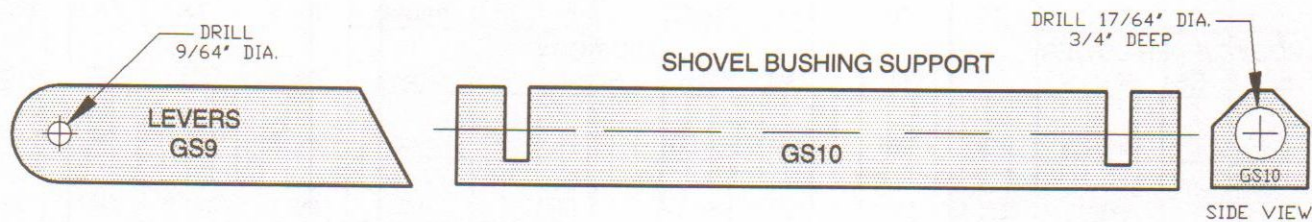
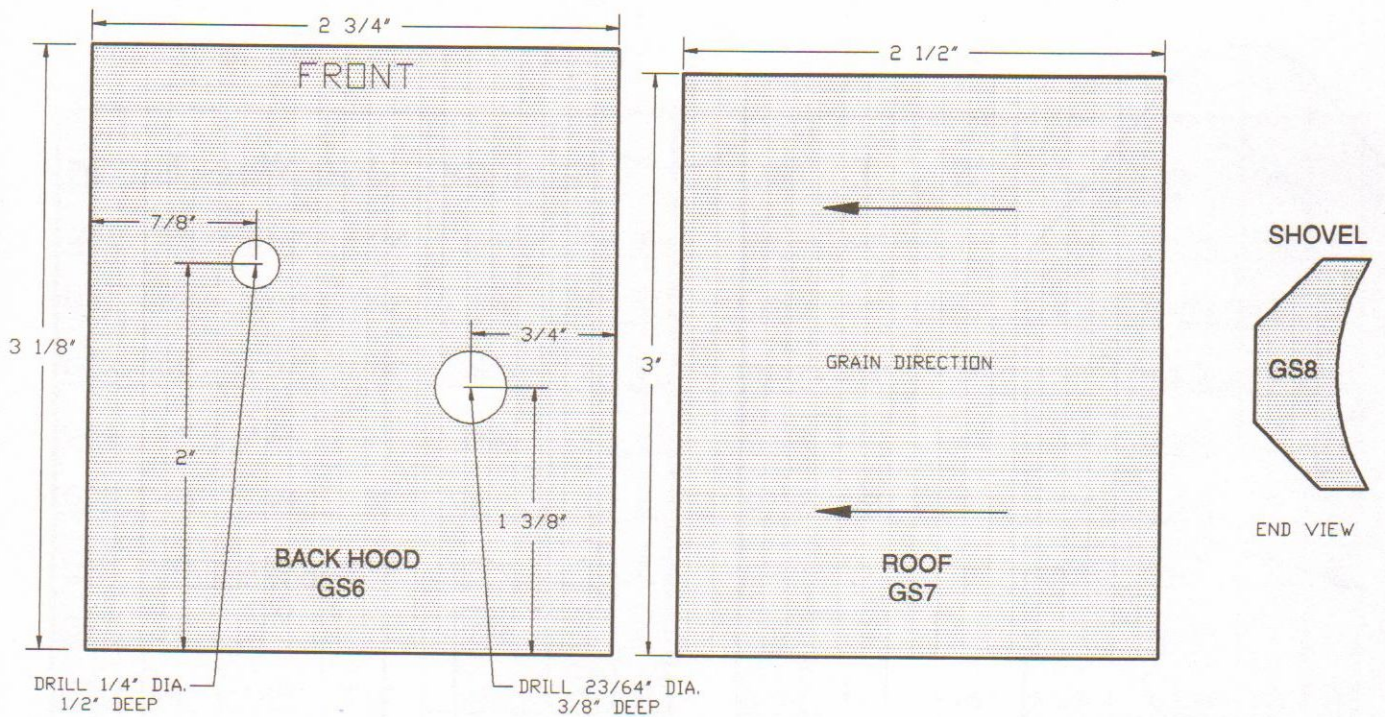
F = Finished Size: Cut and sand parts to finished size.



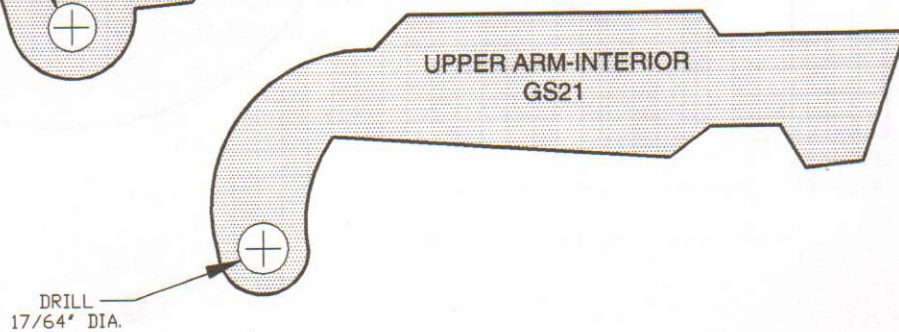
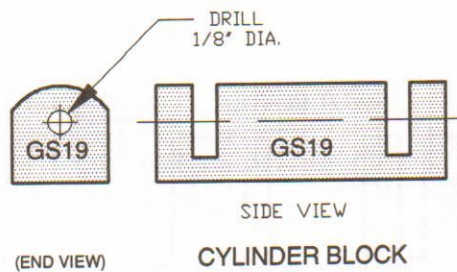
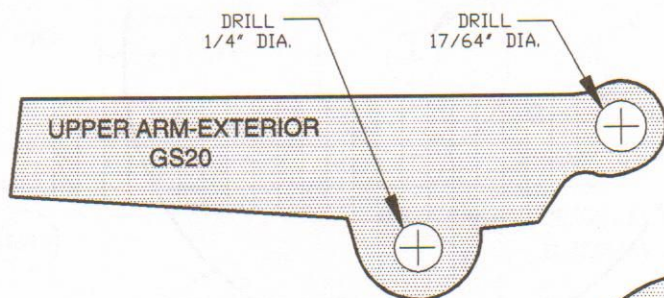
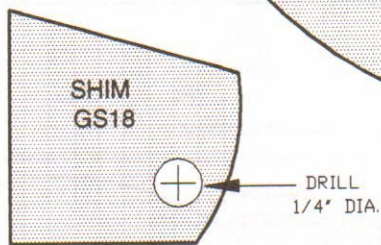
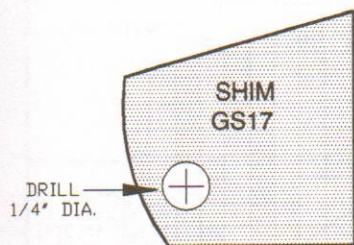
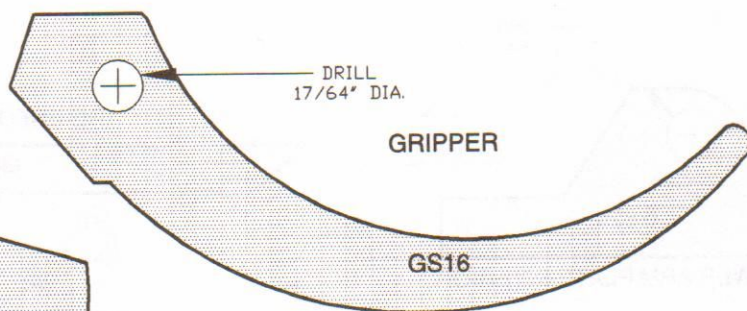
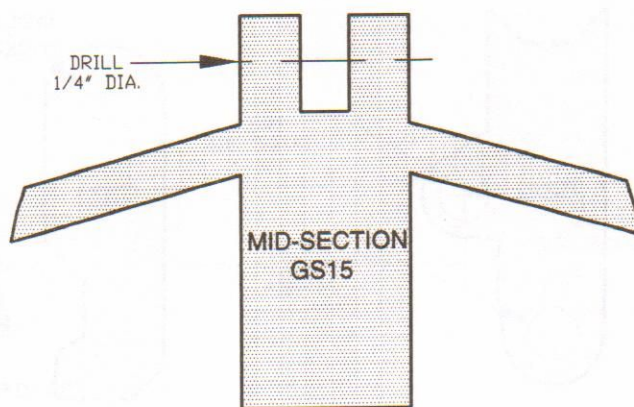
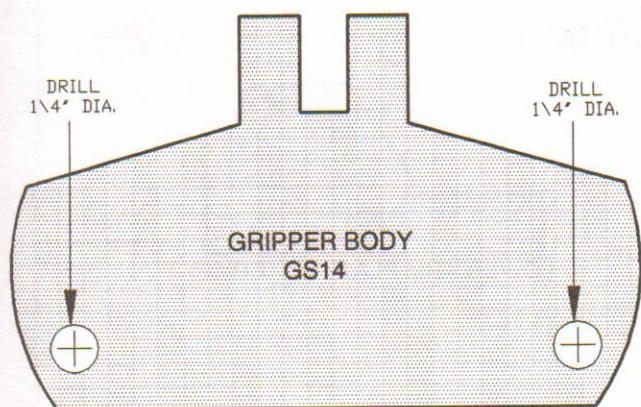
# Full-Sized Patterns: Set One





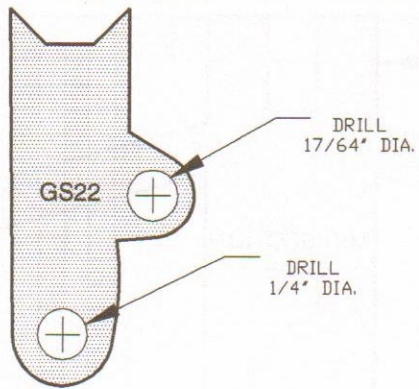




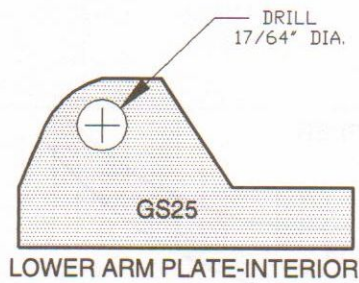
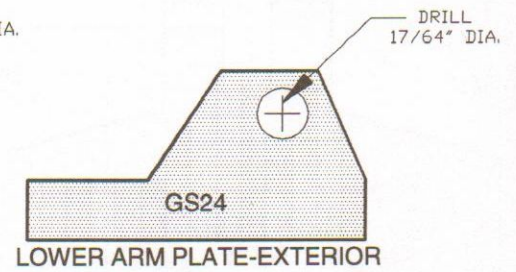
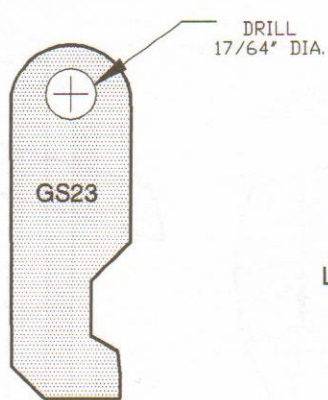




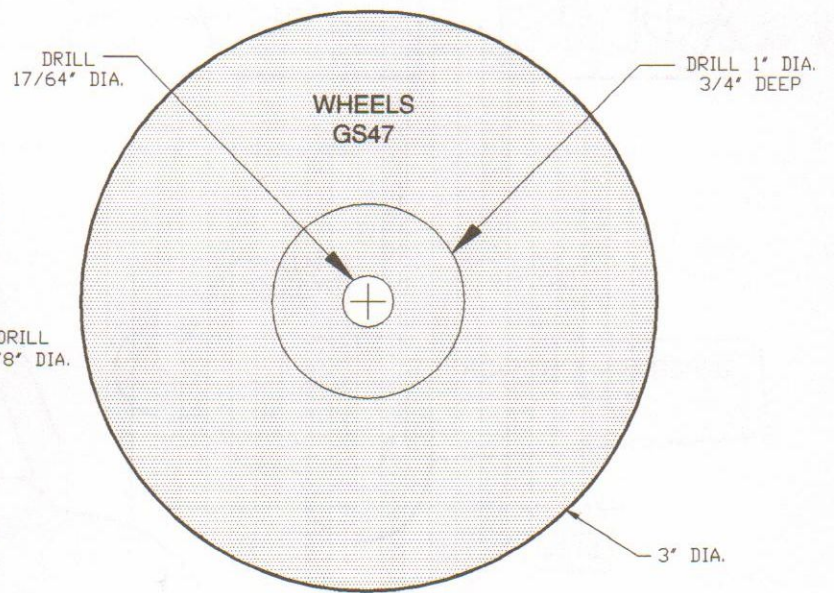
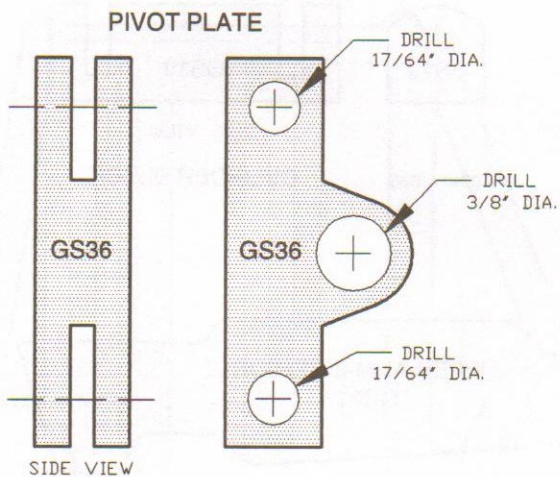
LOWER ARM-EXTERIOR



LOWER ARM-INTERIOR



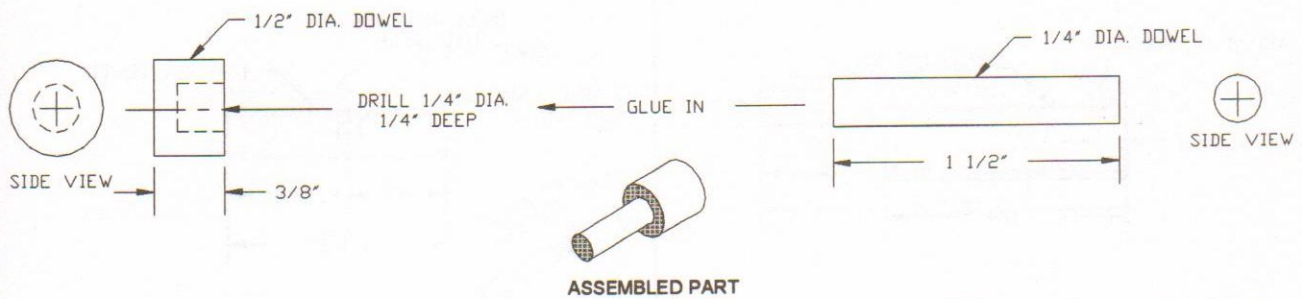
RE-ENFORCING BARS





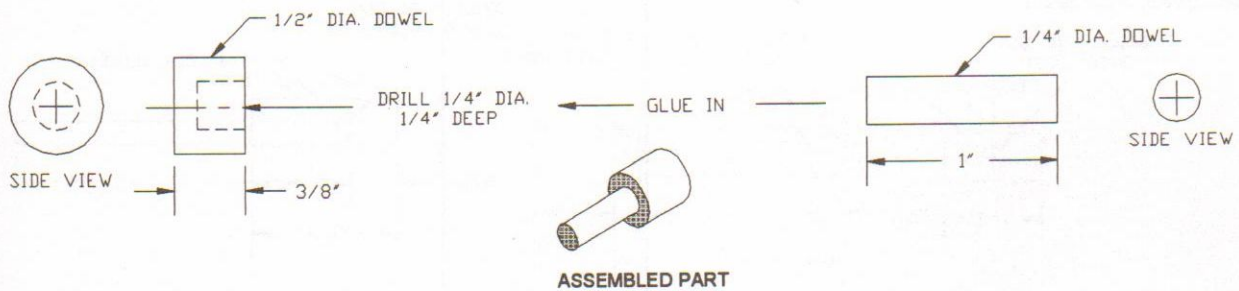
GS26

**WHEEL PINS**  
(4 REQUIRED)



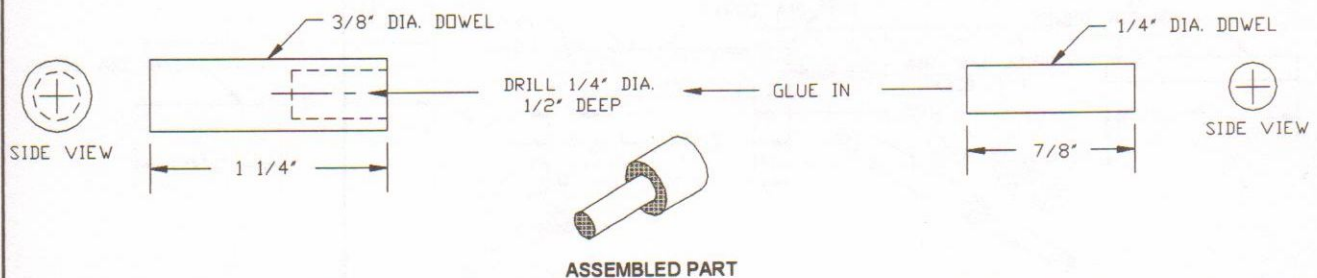
GS27

**AIR FILTER**  
(1 REQUIRED)



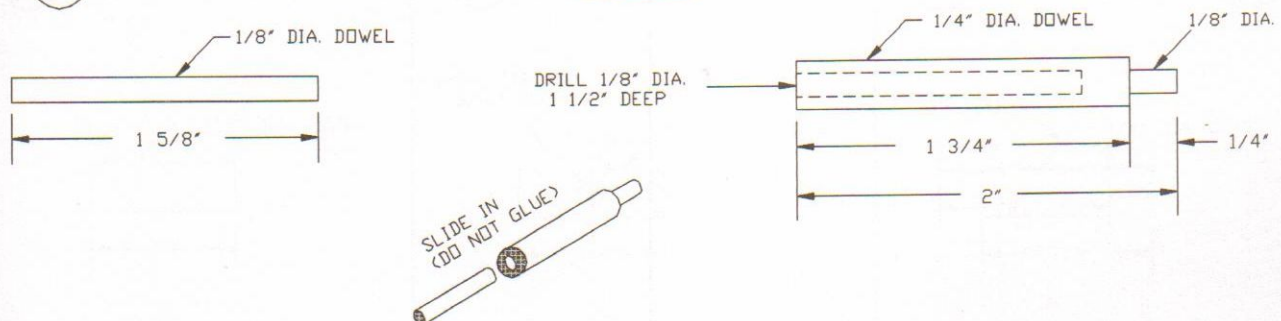
GS28

**MUFFLER**  
(1 REQUIRED)

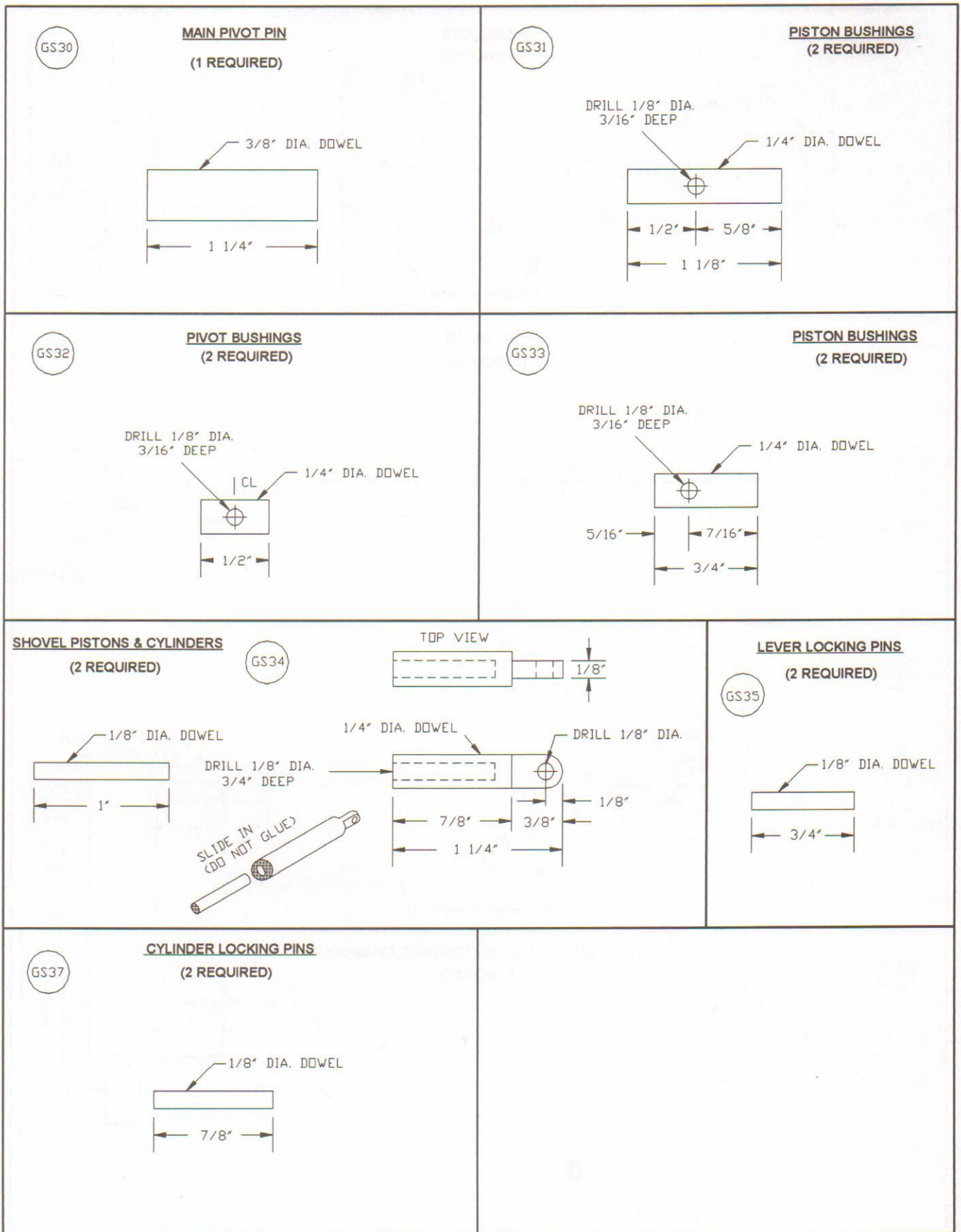


GS29

**CYLINDERS AND PISTONS FOR BODY ASSEMBLY**  
(2 REQUIRED)



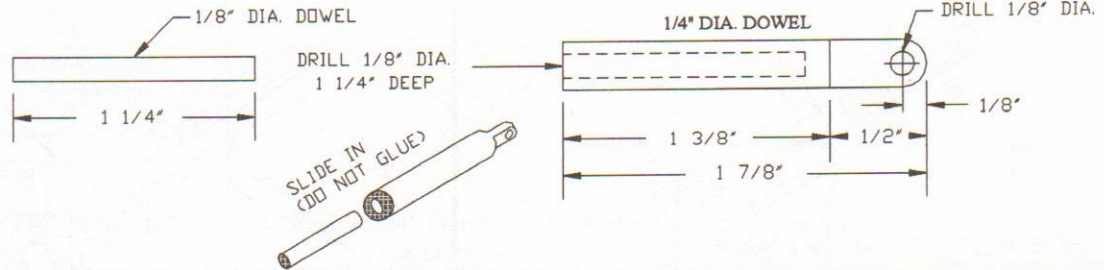






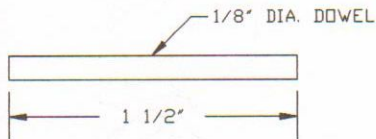
**CYLINDERS AND PISTONS FOR ARM ASSEMBLY**  
(2 REQUIRED)

GS39



GS40

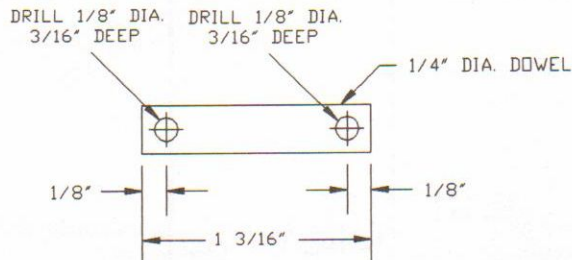
**CYLINDER LOCKING PIN**  
(1 REQUIRED)



GS41

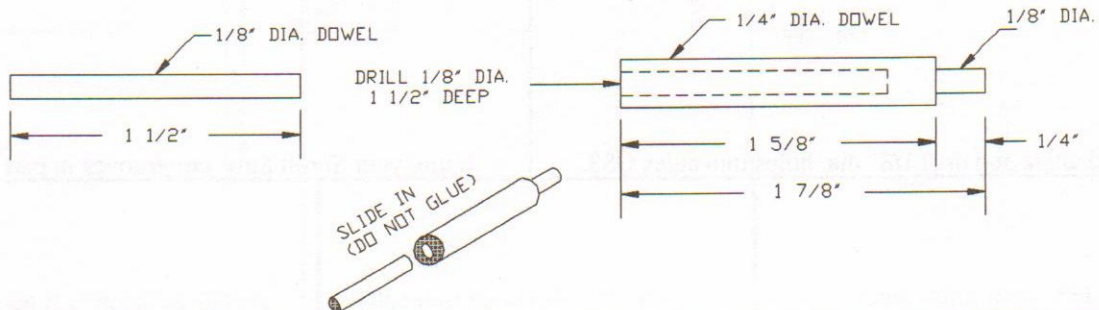
**PISTON BUSHING**  
(1 REQUIRED)

PLEASE NOTE:  
MAKE SURE THAT THESE  
TWO HOLES ARE ON THE  
SAME AXES (SAME LINE)



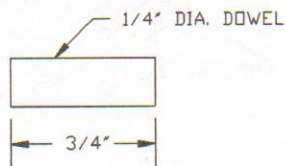
GS42

**CYLINDER AND PISTON**  
(1 REQUIRED)



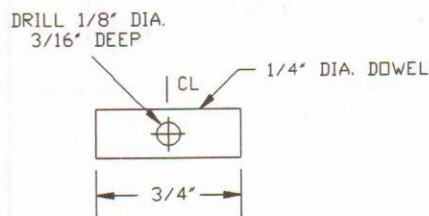
GS43

**PINS**  
(2 REQUIRED)



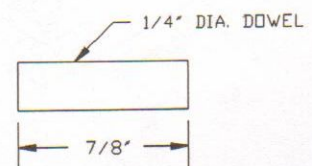
GS44

**BUSHINGS**  
(2 REQUIRED)



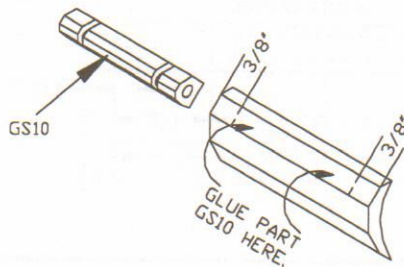
GS45

**PINS**  
(3 REQUIRED)

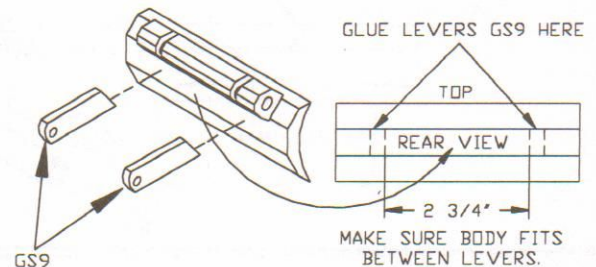




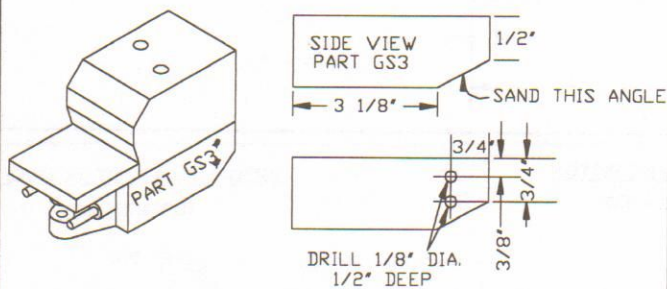
## Additional Information - Grapple Skidder



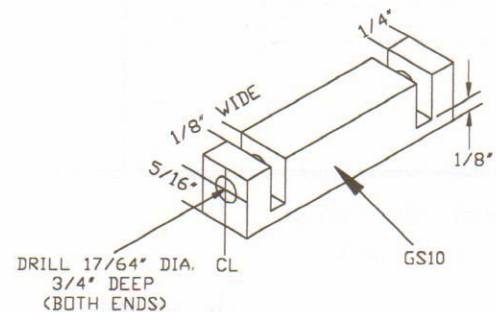
Glue part GS10, as shown.



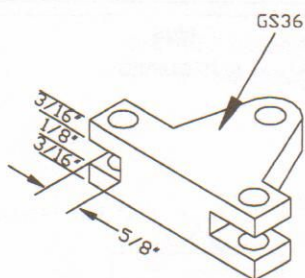
Glue parts GS9 to shovel, as shown.



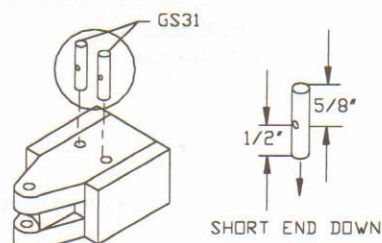
Sand angle and drill 1/8" dia. holes into sides GS3.



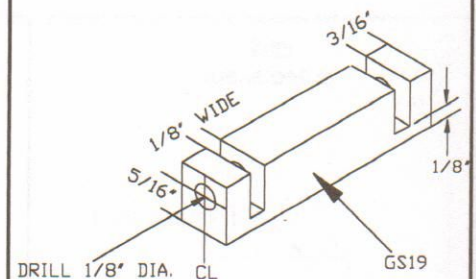
Using your Scroll Saw, cut grooves in part GS10.



Using your Scroll Saw, cut grooves in part GS36.



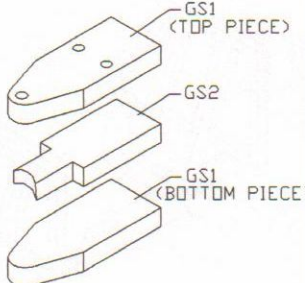
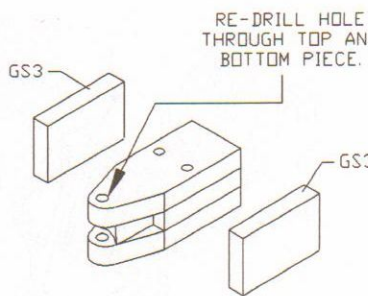
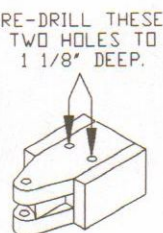
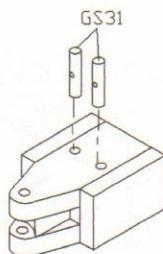
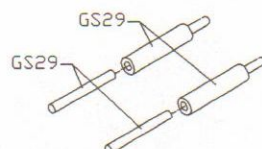
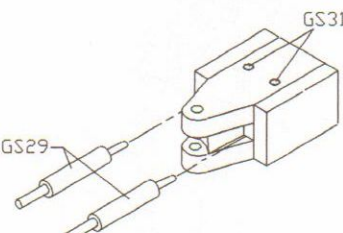
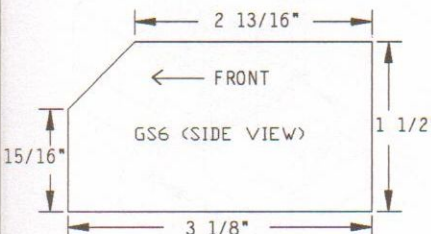
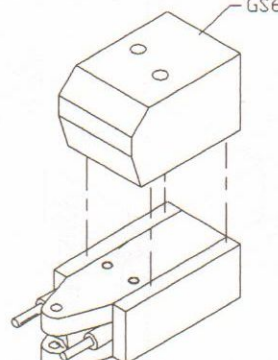
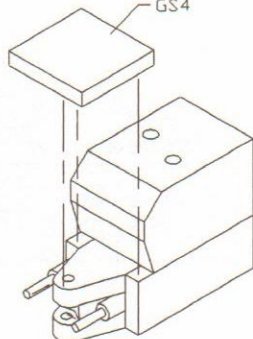
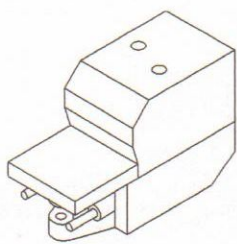
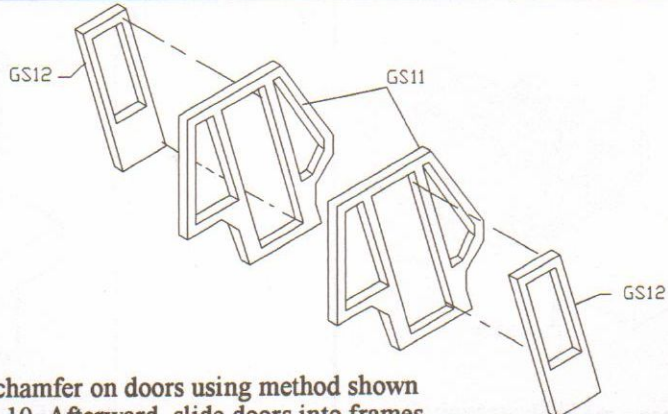
Insert bushings GS31 with short end going in first. Do not glue.



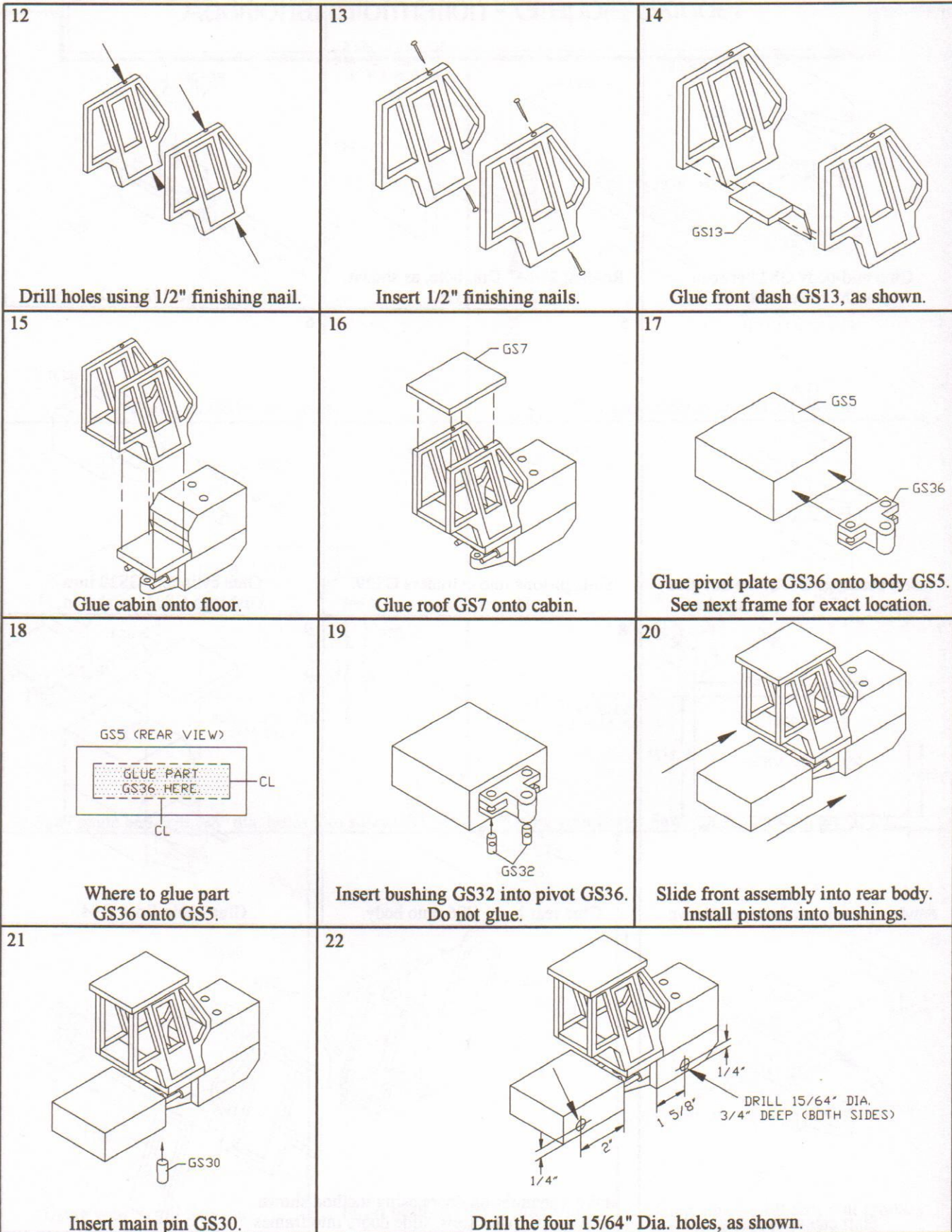
Using your Scroll Saw, cut grooves in part GS19, as shown.



# Grapple Skidder - Assembly Drawings

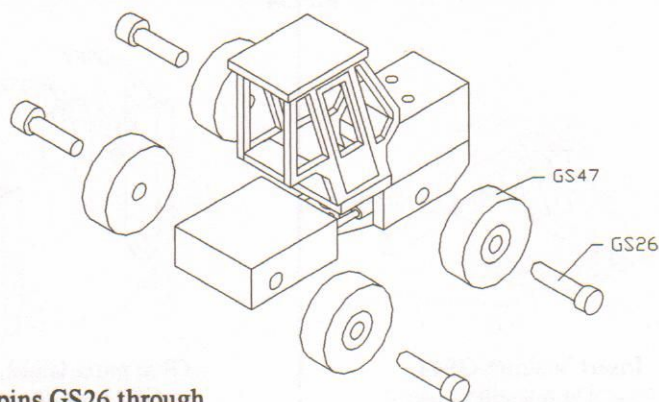
<p>1</p>  <p>GS1 (TOP PIECE) GS2 GS1 (BOTTOM PIECE)</p> <p>Glue mid-body GS2 between upper and lower body GS1.</p>	<p>2</p>  <p>GS3</p> <p>RE-DRILL HOLE THROUGH TOP AND BOTTOM PIECE.</p> <p>GS3</p> <p>Re-drill <math>23/64</math>" Dia. hole, as shown. Glue sides GS3.</p>	<p>3</p>  <p>RE-DRILL THESE TWO HOLES TO <math>1\frac{1}{8}</math>" DEEP.</p> <p>Re-drill the two <math>17/64</math>" Dia. holes.</p>
<p>4</p>  <p>GS31</p> <p>Insert bushings GS31. Do not glue See page 115 for important detail.</p>	<p>5</p>  <p>GS29</p> <p>GS29</p> <p>Slide pistons into cylinders GS29. Do not glue.</p>	<p>6</p>  <p>GS31</p> <p>GS29</p> <p>Glue cylinders GS29 into bushings GS31, as shown.</p>
<p>7</p>  <p>2 <math>13/16</math>"</p> <p>FRONT</p> <p>GS6 (SIDE VIEW)</p> <p>1 <math>1/2</math>"</p> <p>15/16"</p> <p>3 <math>1/8</math>"</p> <p>Sand angle on rear hood, as shown.</p>	<p>8</p>  <p>GS6</p> <p>Glue rear hood GS6 onto body.</p>	<p>9</p>  <p>GS4</p> <p>Glue cabin floor GS4.</p>
<p>10</p>  <p>Start cabin assembly.</p>	<p>11</p>  <p>GS12</p> <p>GS11</p> <p>GS12</p> <p>Make a chamfer on doors using method shown on page 10. Afterward, slide doors into frames.</p>	





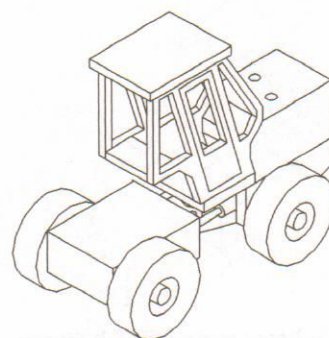


23



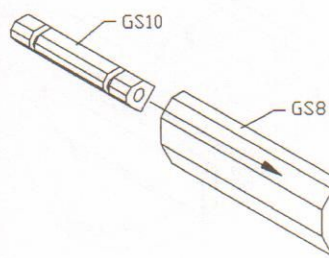
Insert pins GS26 through wheels GS47 and into body.

24



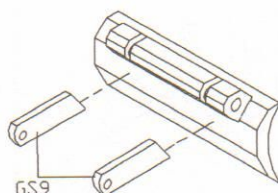
Start shovel assembly.

25



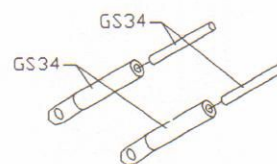
Glue parts, as shown.  
See page 115 for exact location.

26



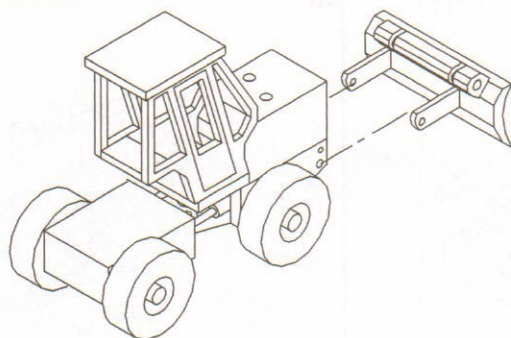
Glue levers GS9.  
See page 115 for exact location.

27



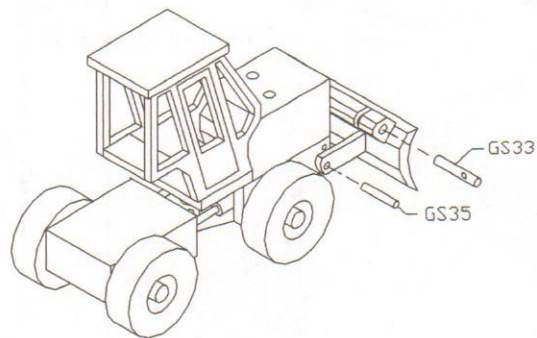
Slide pistons GS34 into cylinders.  
Do not glue.

28



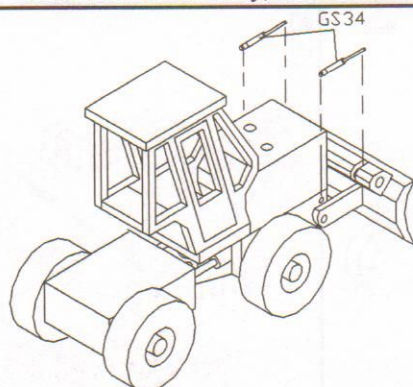
Slide shovel assembly, as shown.

29



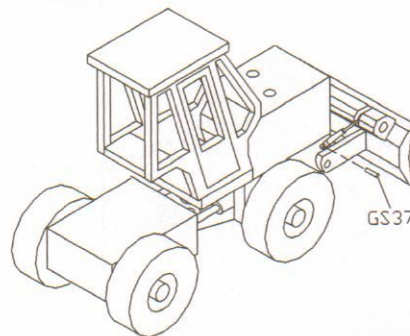
Insert pins GS35 and bushings GS33.  
Do not glue.

30



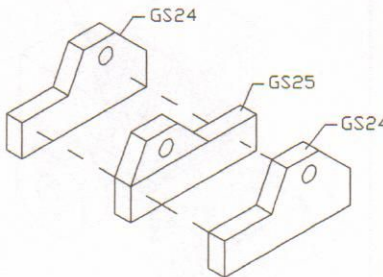
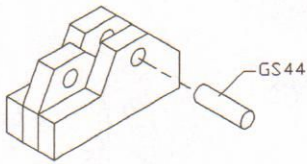
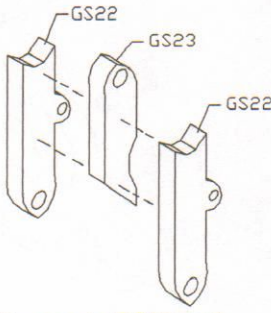
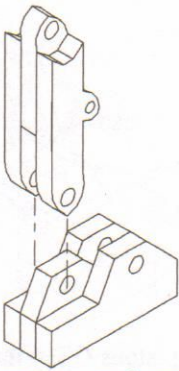
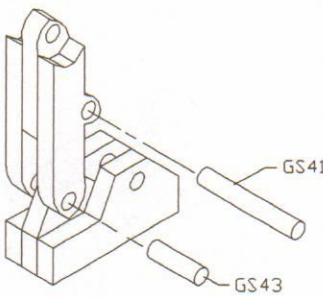
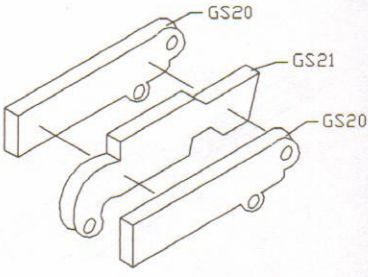
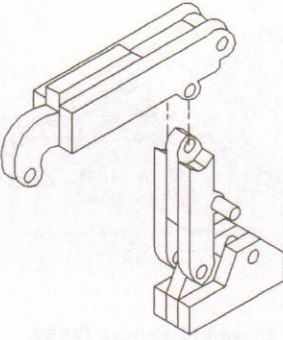
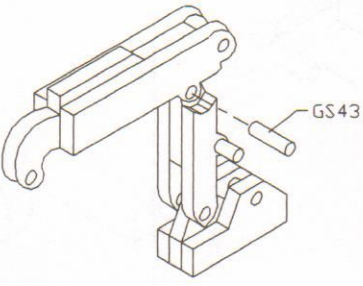
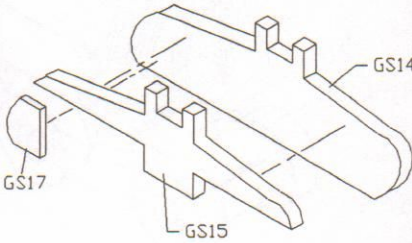
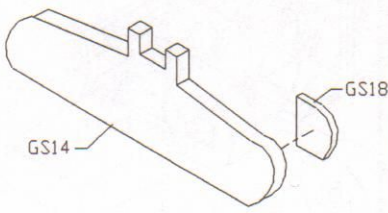
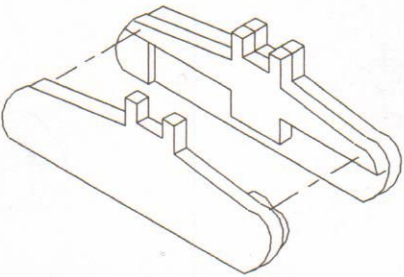
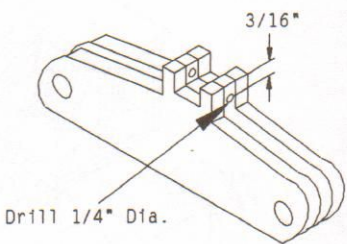
Install pistons GS34, as shown.

31



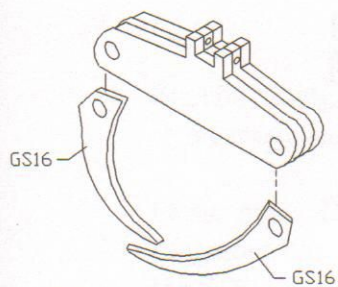
Insert cylinder pins GS37.



<p>32</p>  <p>Glue lower plate GS25 between lower-plate exterior GS24.</p>	<p>33</p>  <p>Insert bushing GS44. Do not glue.</p>	<p>34</p>  <p>Glue parts GS22 and GS23, as shown.</p>
<p>35</p>  <p>Slide lower arm, as shown.</p>	<p>36</p>  <p>Insert pin GS43 and bushing GS41. Do not glue.</p>	<p>37</p>  <p>Glue parts GS20 and GS21, as shown.</p>
<p>38</p>  <p>Slide in parts, as shown.</p>	<p>39</p>  <p>Insert locking pin GS43.</p>	<p>40</p>  <p>Glue parts, as shown.</p>
<p>41</p>  <p>Glue parts, as shown.</p>	<p>42</p>  <p>Glue both assemblies together.</p>	<p>43</p>  <p>Drill 1/4" Dia. hole, as shown.</p>

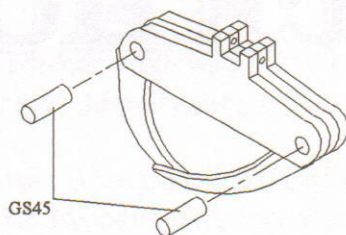


44



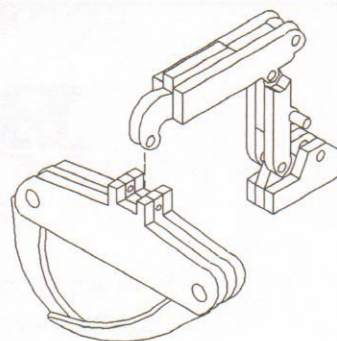
Slide grippers GS16 into gripper body assembly.

45



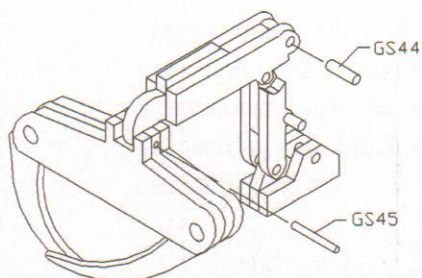
Insert locking pins GS45.

46



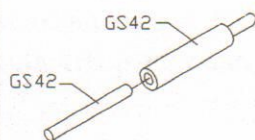
Slide gripper assembly onto upper arm.

47



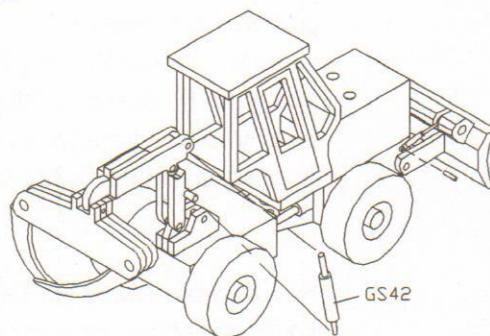
Insert locking pin GS45 and bushing GS44.

48



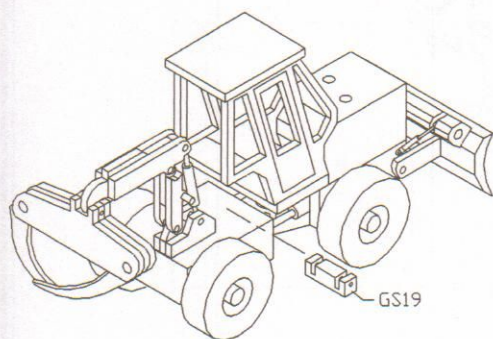
Slide piston GS42 into cylinder. Do not glue.

49



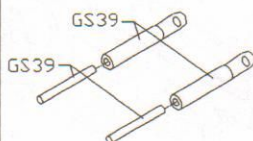
Install piston GS42, as shown.

50



Glue cylinder block GS19.

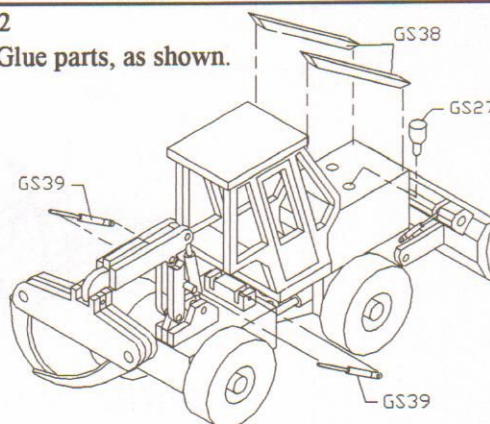
51



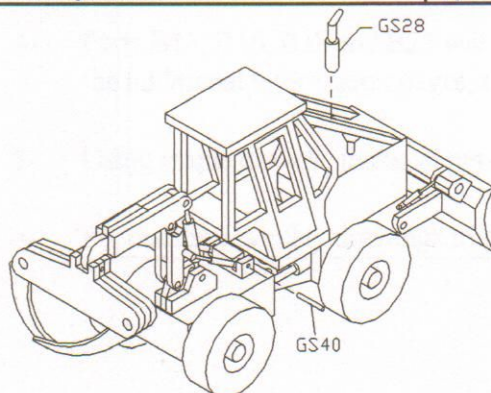
Slide pistons GS39 into cylinders. Do not glue.

52

Glue parts, as shown.

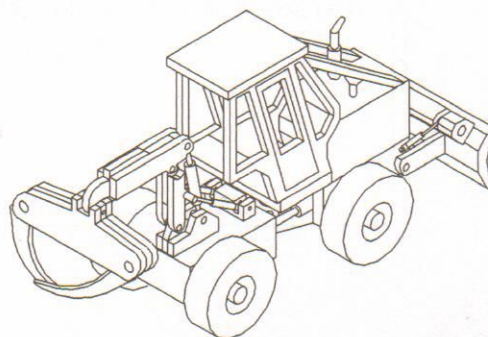


53



Insert cylinder pin GS40 and muffler GS28.

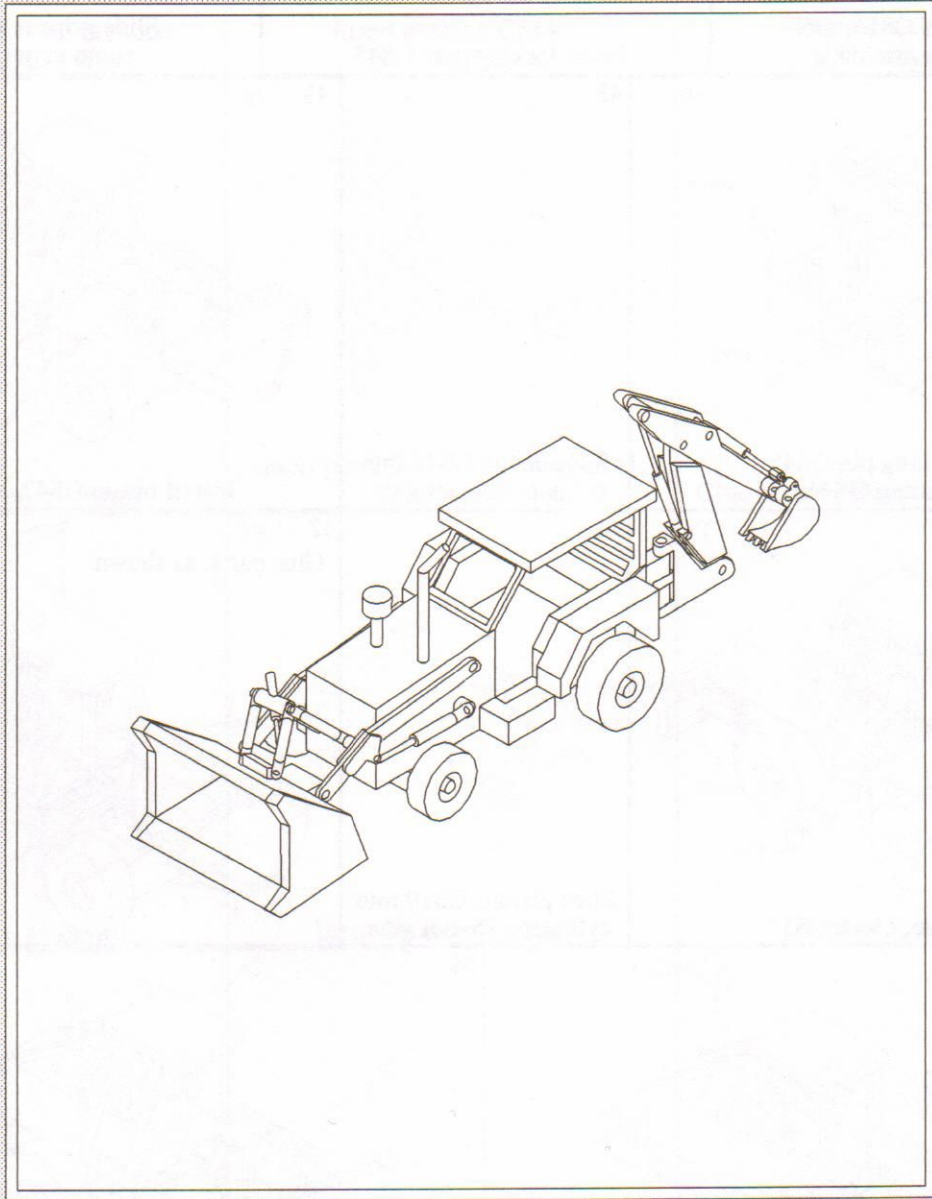
54



Your model should now be complete.



# BACKHOE





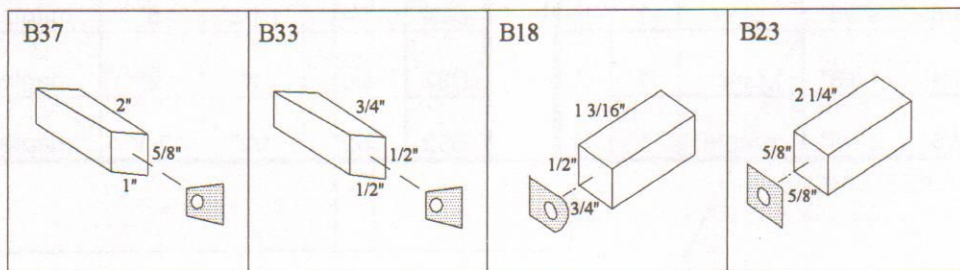
# General Instructions - Backhoe

- 1- Start by cutting materials needed by following the list of materials, paying attention to the rough and finished size. **Identify the parts as they are cut.**

Please note: Different types of wood can be used for the various parts. It is suggested, however, that hard wood be used, since many of the parts would be much too fragile if using soft wood. We have used a combination of pine, maple and oak to give the models a nice contrast!

- 2- Remove the full-size patterns found in the appendix. Cut them out, leaving approximately 1/16" all around, and place on the proper piece of wood. Patterns can be secured to wood using either spray adhesive or rubber cement. If using the latter, cut and sand the part first to finished size. If drilling is required, mark the hole by inserting a scribe or nail through the pattern into the wood. Remove the pattern before drilling.

You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. The drawings below indicate exactly which surface to attach the patterns for these parts.



- 3- Look at the full-size drawing sheets to finish parts B1, B2, B6 and B1B.
- 4- Parts B13, B16, B18 and B23 will need additional cuts and details, please refer to the additional information pages, to complete these parts.
- 5- Using maple dowels, make all pins, shafts, etc.
- 6- Follow the assembly drawings to complete your model.



# List of Materials - Backhoe

Part	T	W	L	Material	Qty.	*
B1	1 1/2"	1 3/4"	3 1/4"	pine	1	F
B1A	3/4"	1 3/4"	6"	pine	1	F
B1B	1/4"	3/4"	2 3/4"	pine	2	F
B2	1/2"	2 1/4"	1 3/4"	pine	1	F
B3	3/4"	1 1/8"	2 7/8"	pine	2	R
B4	1/4"	3 1/4"	4"	oak	2	R
B5	1/4"	1 1/4"	2 1/2"	oak	2	R
B7	1/4"	2 3/4"	3 1/2"	pine	1	F
B8	1/4"	2"	2 1/4"	pine	2	R
B9	3/4"	1 1/4"	1 1/8"	oak	2	R
B10	1/4"	1 5/8"	3 3/4"	pine	1	F
B11	1/4"	2 1/8"	3 3/4"	pine	1	F
B12	1/8"	1 1/4"	4 3/8"	pine	1	R
B13	3/4"	1 7/8"	2 1/8"	maple	1	R

Part	T	W	L	Material	Qty.	*
B14	1/4"	1 1/8"	5 1/8"	maple	2	R
B15	1/8"	1 1/8"	1 3/4"	maple	4	R
B16	1"	1 5/8"	2 1/2"	maple	1	R
B17	1/4"	1 5/8"	2 1/8"	maple	2	R
B18	1/2"	3/4"	1 3/16"	maple	1	F
B19	1/4"	1 3/8"	4"	maple	2	R
B20	1/4"	1 1/8"	4 1/4"	maple	1	R
B21	1"	2 1/2" DIA.		oak	2	F
B22	3/4"	1 1/2" DIA.		oak	2	F
B23	5/8"	5/8"	2 1/4"	maple	1	F
B23A	1/4"	1 1/4"	3 3/4"	maple	2	R
B24	1/4"	1 1/8"	5"	maple	1	R
B37	5/8"	1"	2"	maple	1	F
B52	1/2"	1/2"	3/4"	maple	1	F

T = Thickness

W = Width

L = Length

R = Rough size

F = Finished size

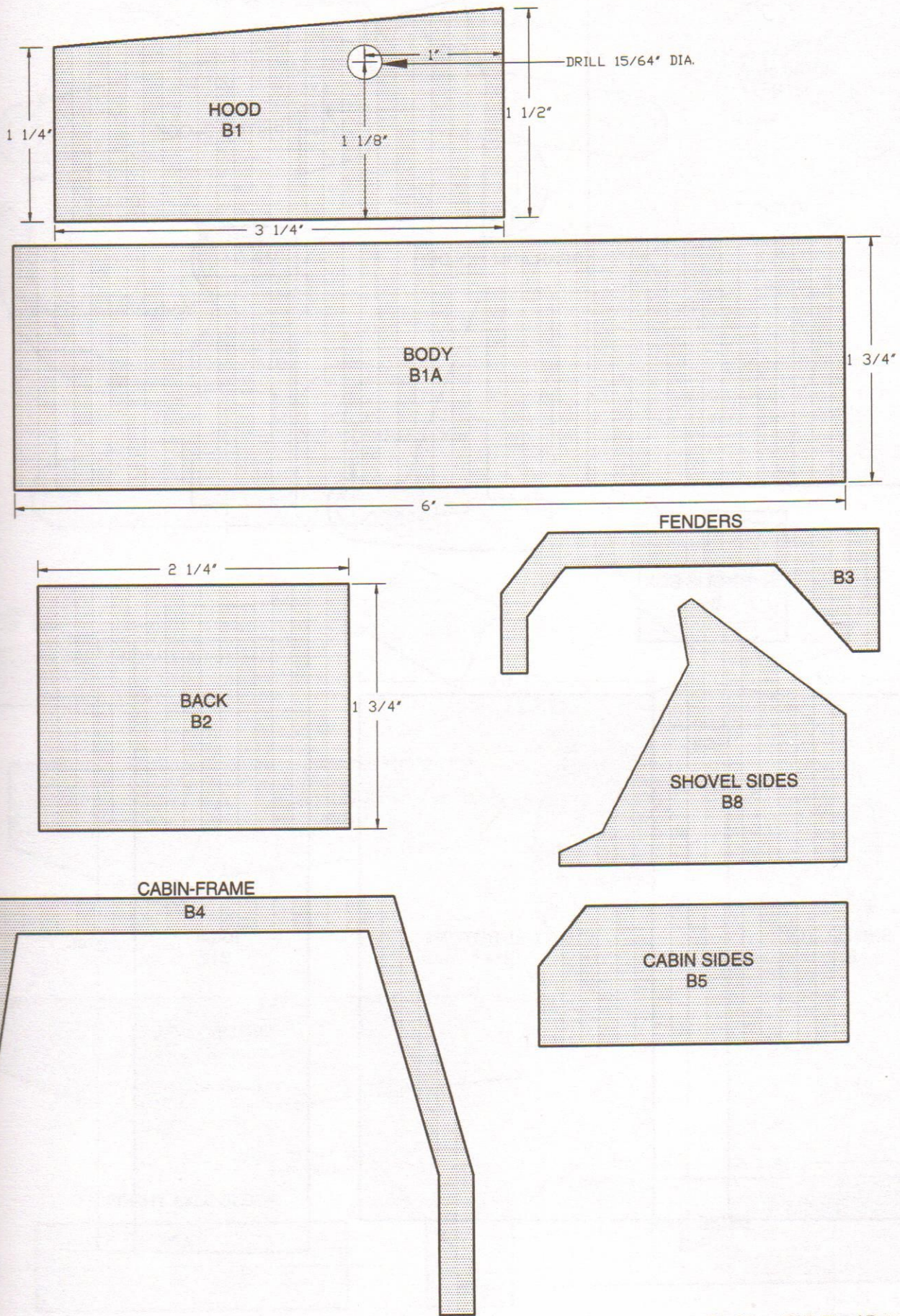
## Instructions:

R= Rough sizes, the material is cut oversized so you have ample room to apply the pattern on the surface. Sanding is not required at this point.

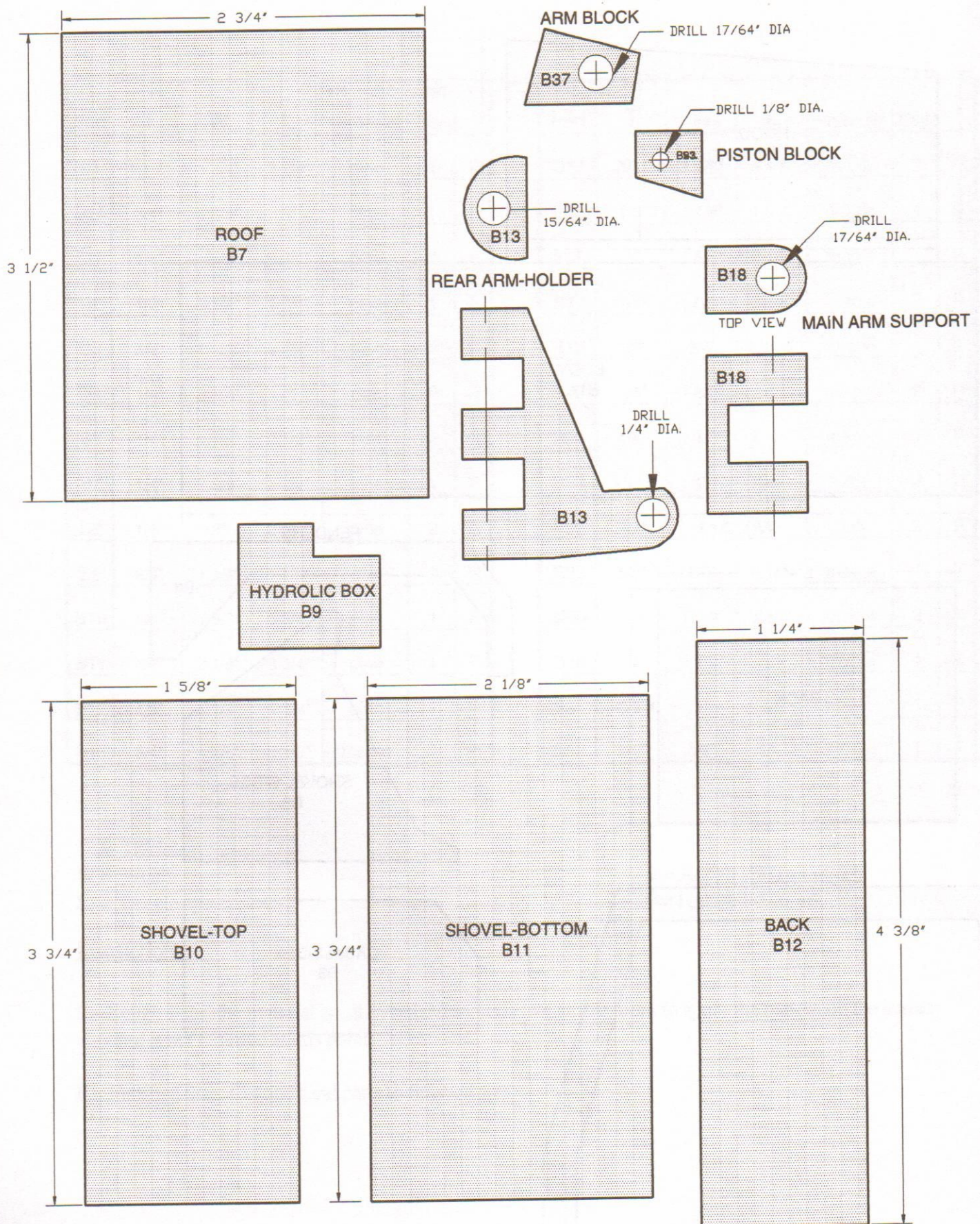
F = Finished Size: Cut and sand parts to finished size.



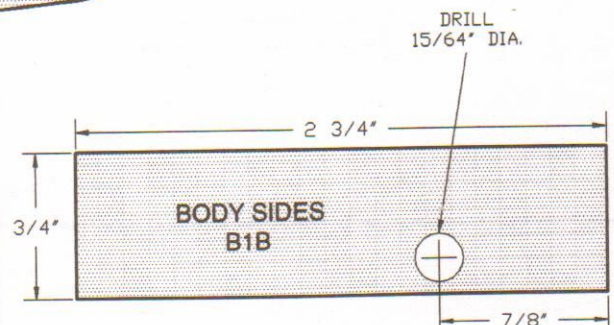
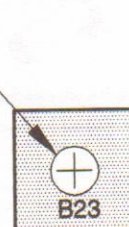
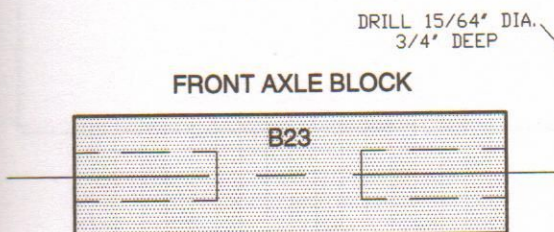
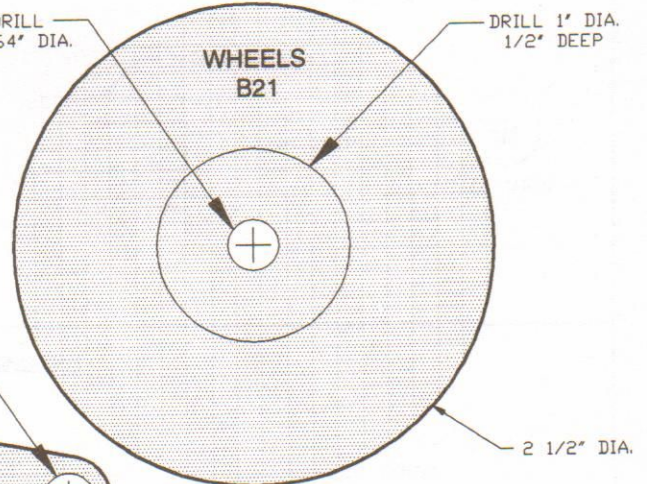
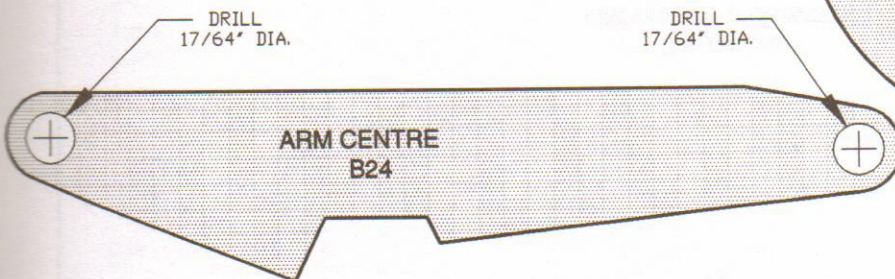
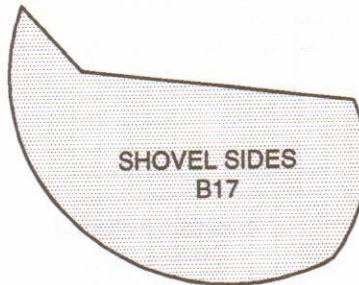
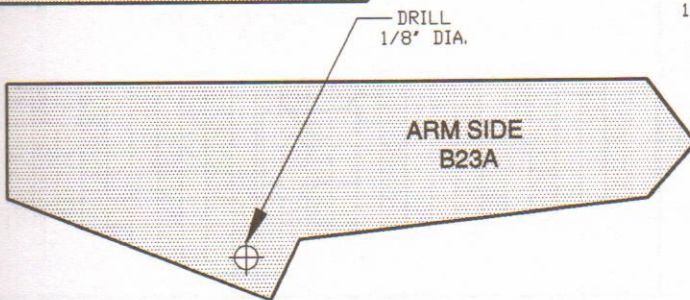
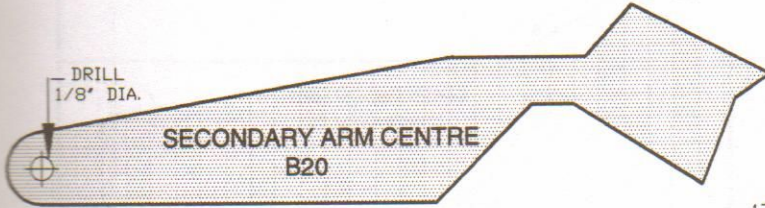
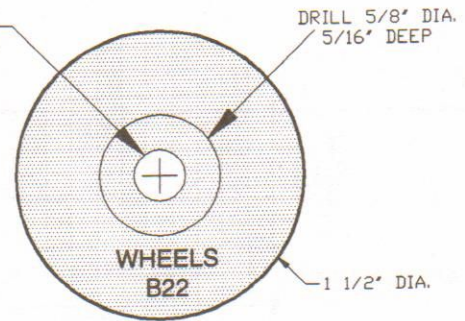
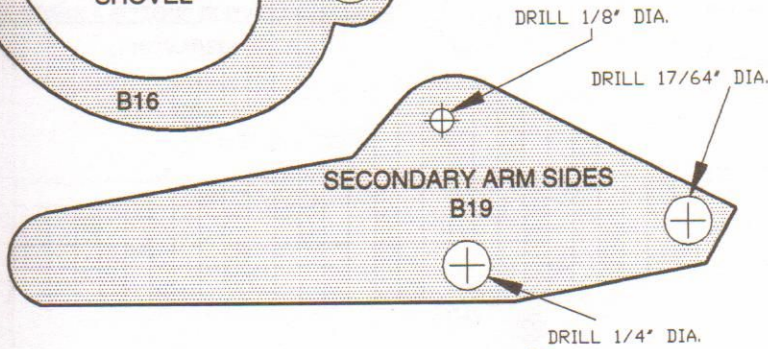
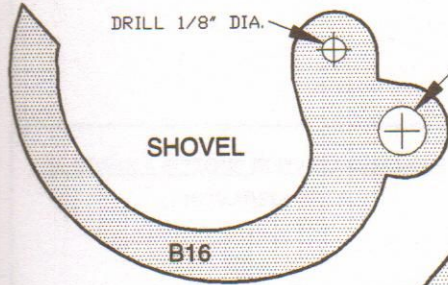
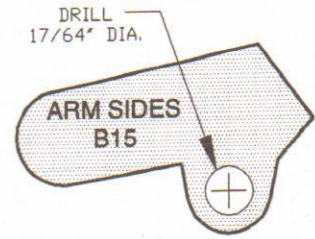
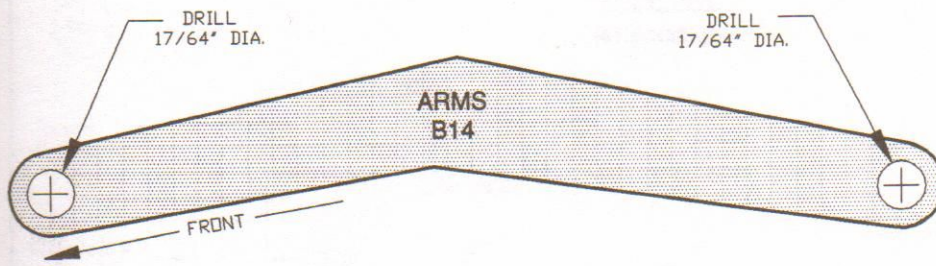
# Full-Sized Patterns: Set One







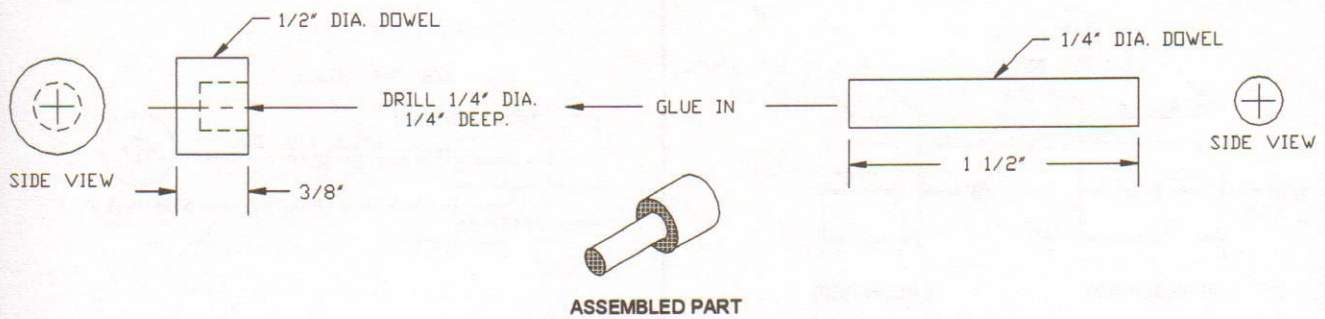






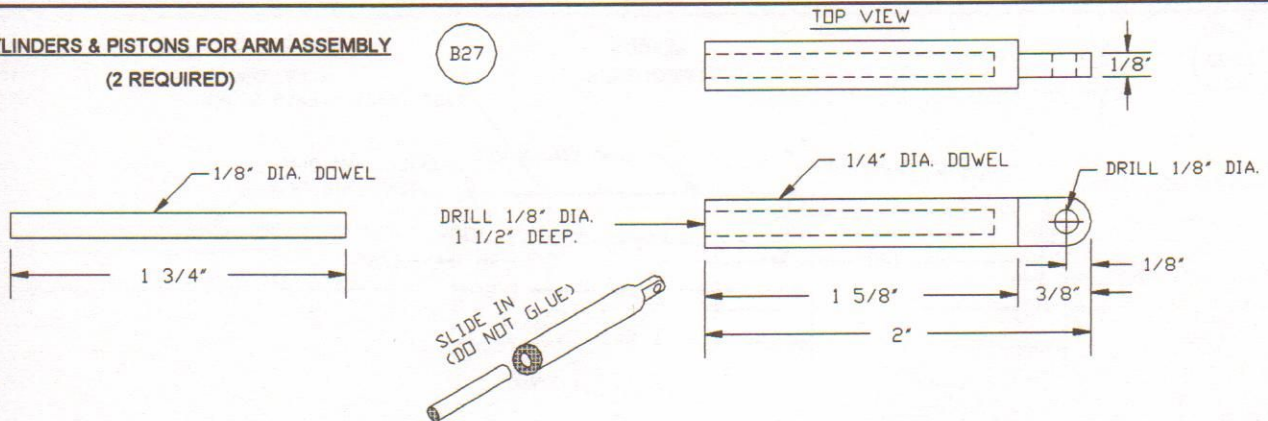
B26

### WHEEL PINS (4 REQUIRED)



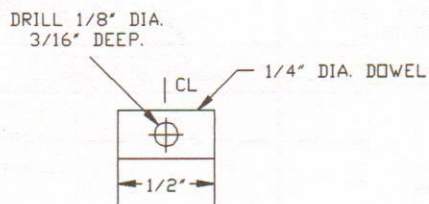
### CYLINDERS & PISTONS FOR ARM ASSEMBLY (2 REQUIRED)

B27



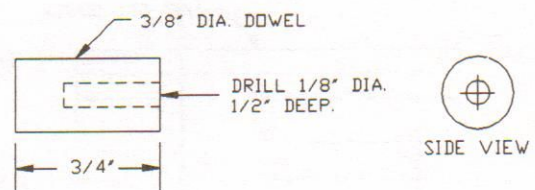
B28

### PISTON BUSHINGS (2 REQUIRED)



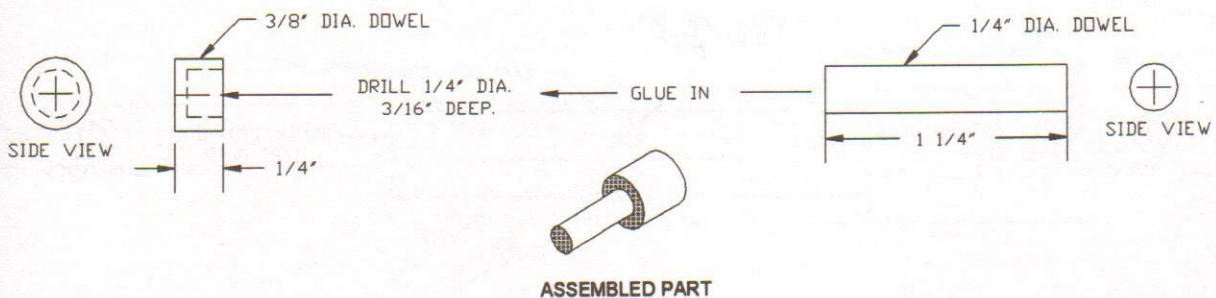
B29

### CYLINDER BUSHINGS (2 REQUIRED)

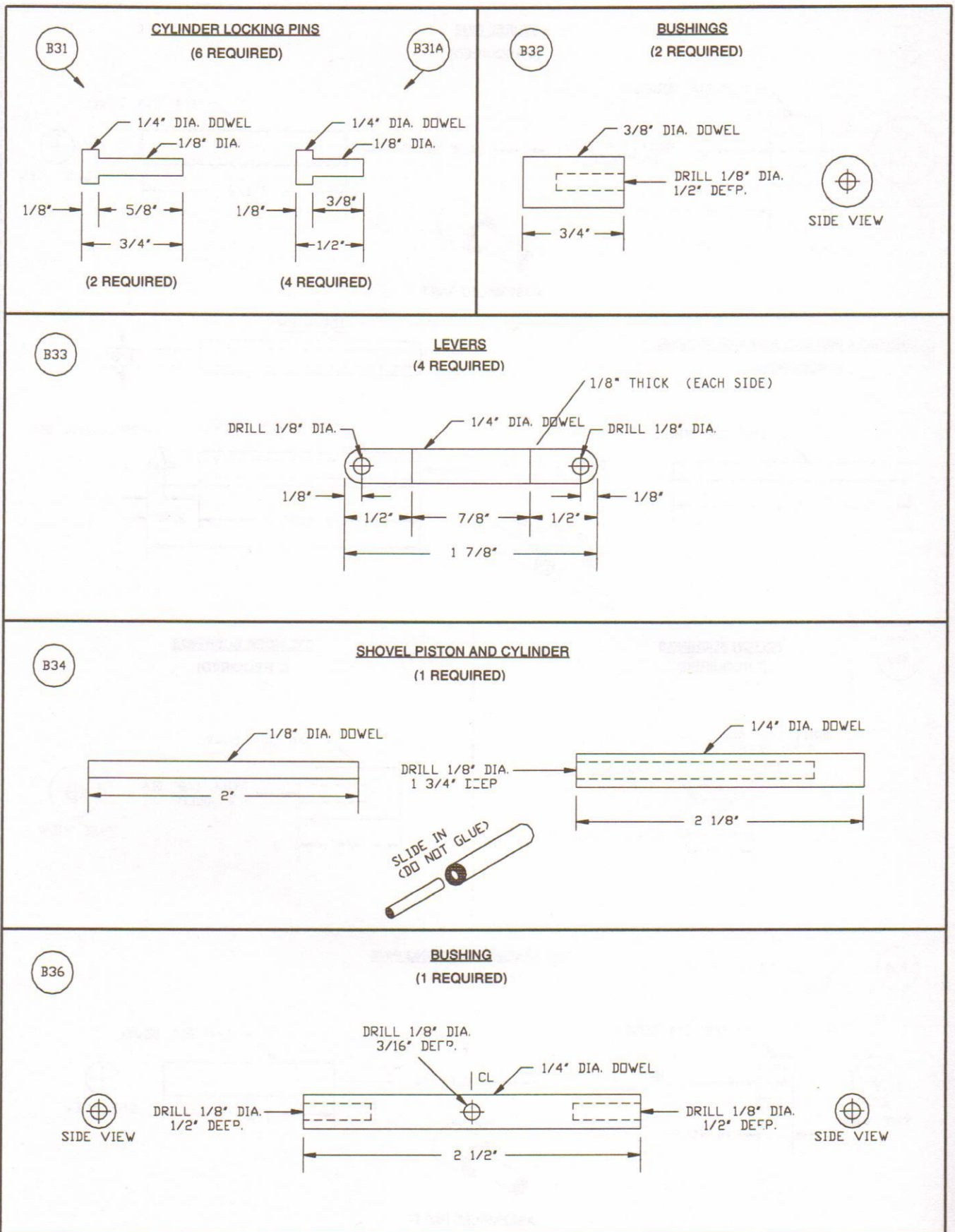


B30

### ARM ASSEMBLY LOCKING PINS (2 REQUIRED)



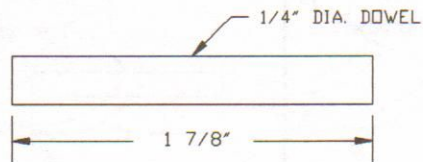






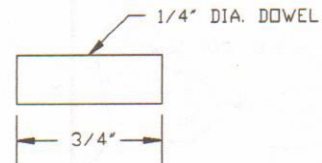
B38

**LOCKING PIN**  
(1 REQUIRED)



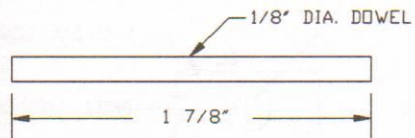
B39

**LOCKING PIN**  
(1 REQUIRED)

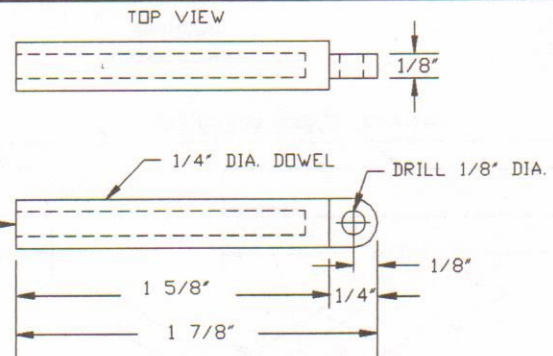


B40

**CYLINDER AND PISTON**  
(1 REQUIRED)

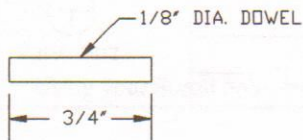


DRILL 1/8" DIA.  
1 1/2" DEEP



B41

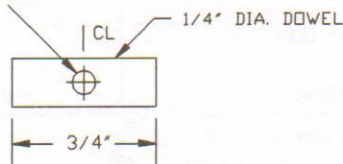
**CYLINDER LOCKING PIN**  
(1 REQUIRED)



B42

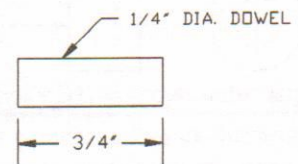
**PISTON BUSHING**  
(1 REQUIRED)

DRILL 1/8" DIA.  
3/16" DEEP



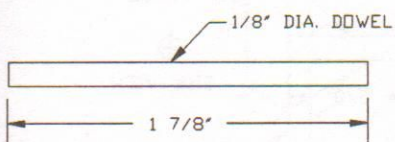
B43

**LOCKING PIN**  
(1 REQUIRED)

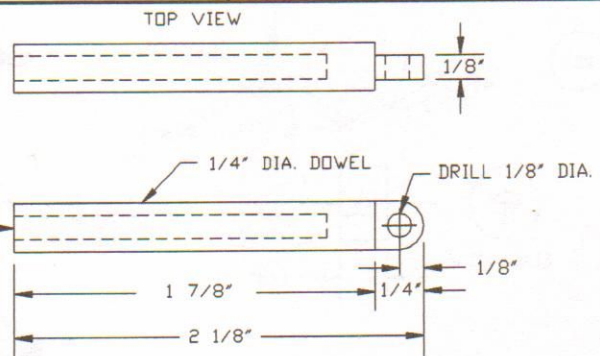
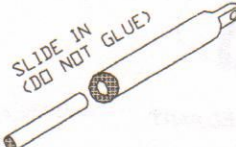


B44

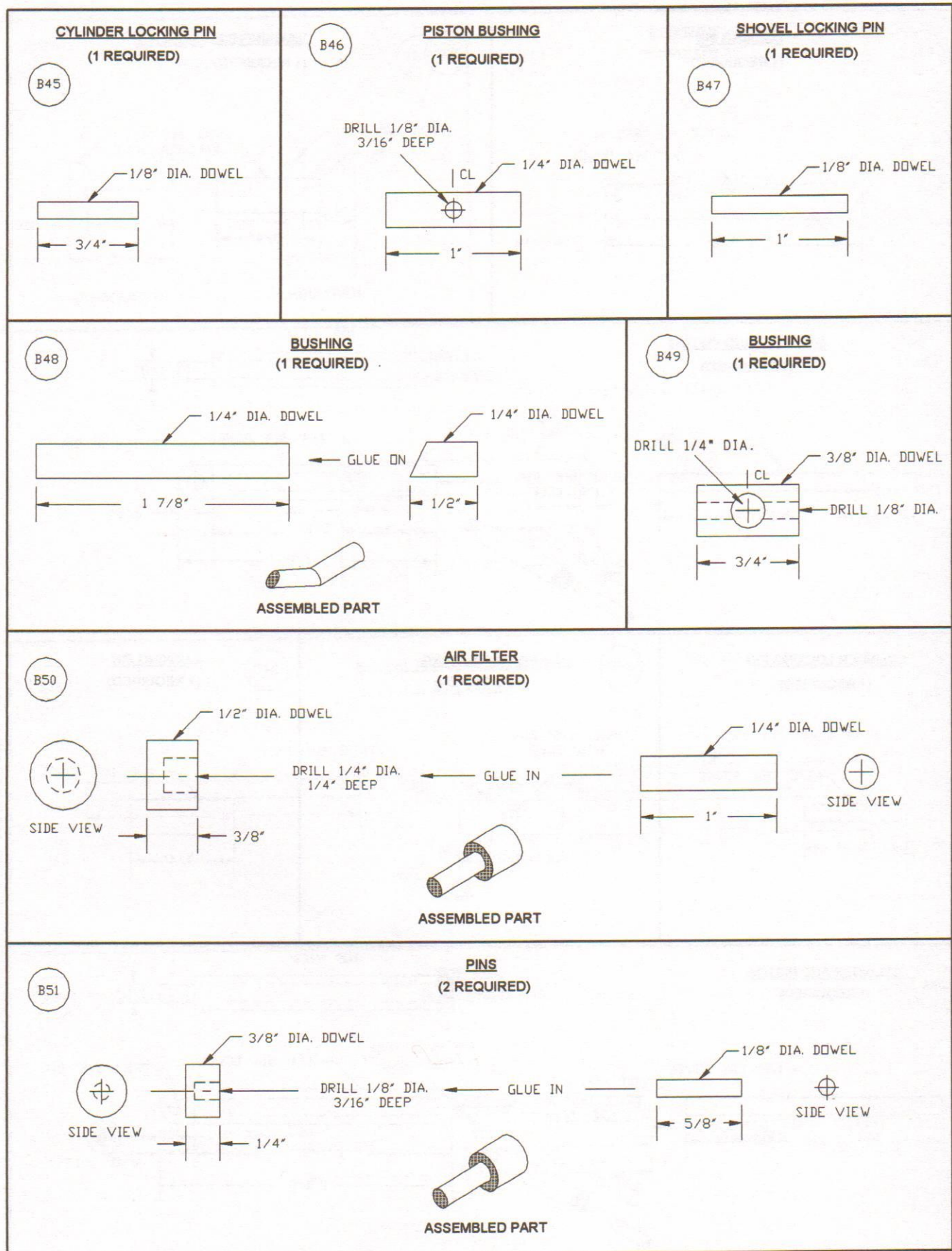
**CYLINDER AND PISTON**  
(1 REQUIRED)



DRILL 1/8" DIA.  
1 5/8" DEEP

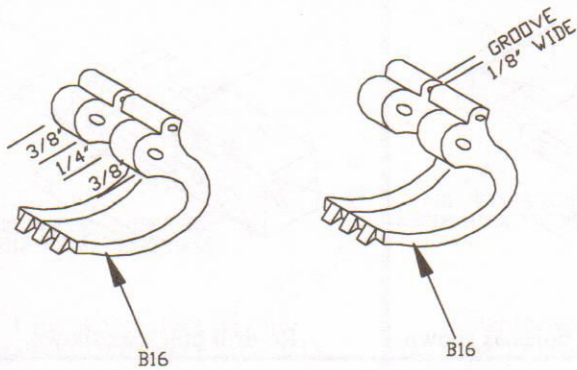




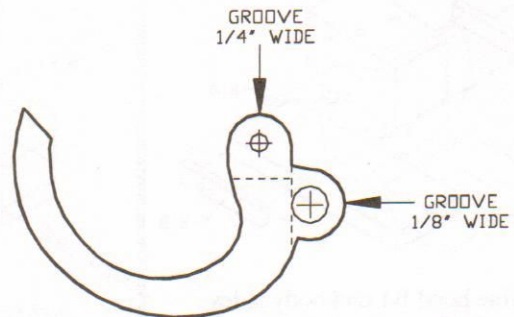




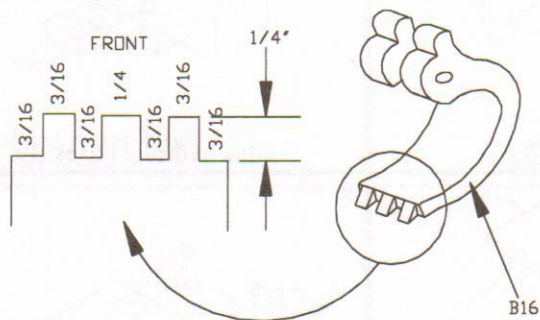
## Additional Information - Backhoe



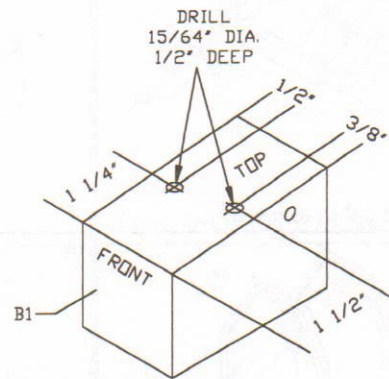
Using your Scroll Saw, cut grooves in part B16, as shown.



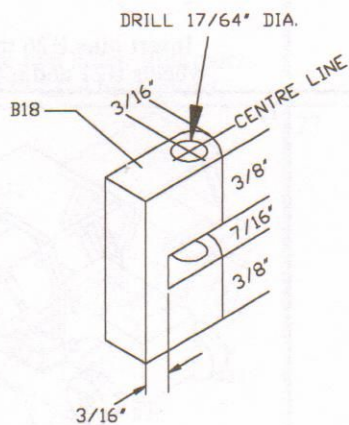
Additional details - grooves.



Using your Scroll Saw, cut grooves, as shown.

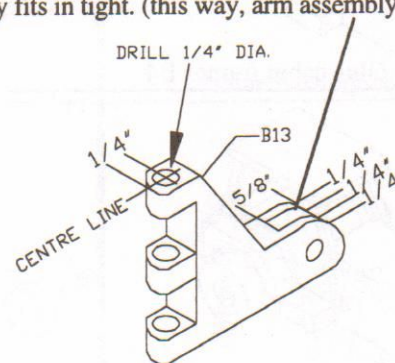


Drill holes into body B1, as shown.



Using your Scroll Saw, cut groove in part B18, as shown.

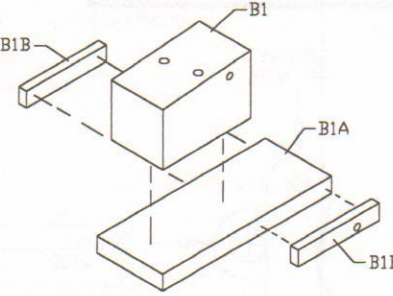
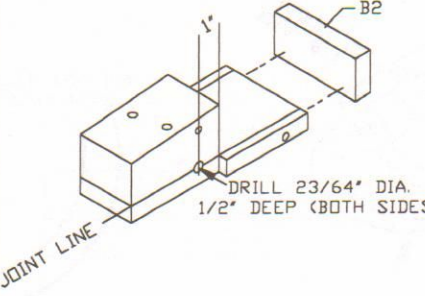
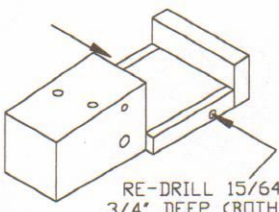
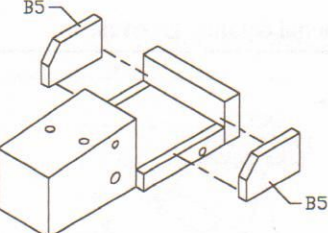
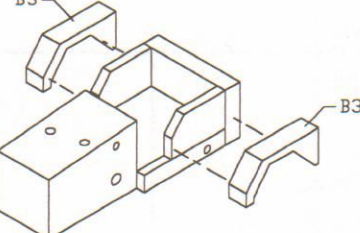
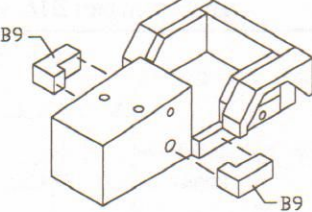
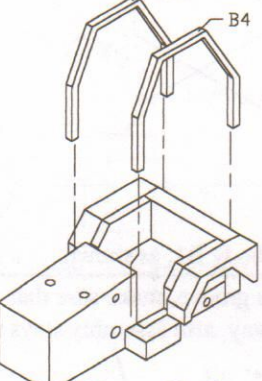
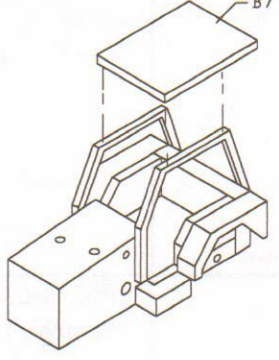
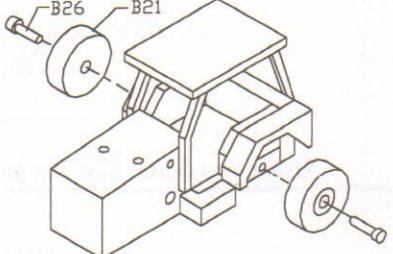
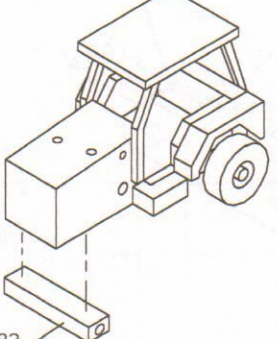
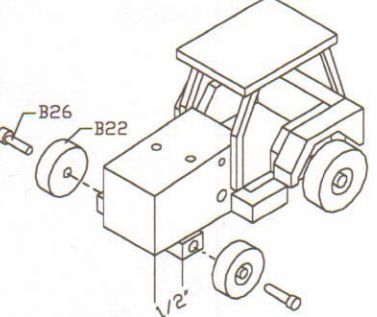
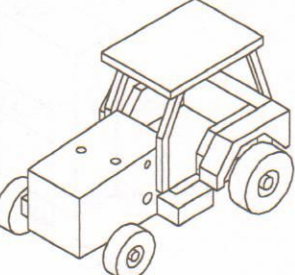
Important: When you cut this groove, make sure that arm assembly fits in tight. (this way, arm assembly stays up)



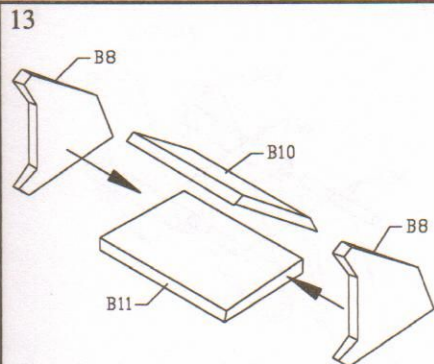
Using your Scroll Saw, cut grooves in part B13, as shown.



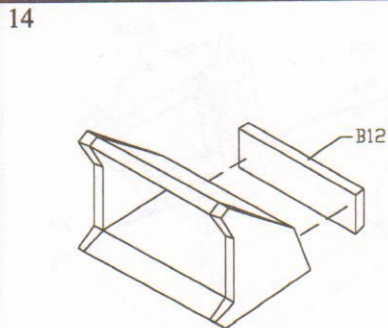
# Backhoe - Assembly Drawings

<p>1</p>  <p>Glue hood B1 and body sides B1B onto body B1A.</p>	<p>2</p>  <p>Glue back B2 and drill holes, as shown.</p>	<p>3</p>  <p>Re-drill holes, as shown.</p>
<p>4</p>  <p>Glue cabin sides B5.</p>	<p>5</p>  <p>Glue fenders B3.</p>	<p>6</p>  <p>Glue hydraulic boxes B9.</p>
<p>7</p>  <p>Glue cabin frames B4.</p>	<p>8</p>  <p>Glue roof B7.</p>	<p>9</p>  <p>Insert pins B26 through wheels B21 and into body.</p>
<p>10</p>  <p>Glue front axle block B23.</p>	<p>11</p>  <p>Insert pins B26 through wheels B22 and into body.</p>	<p>12</p>  <p>Start working on shovel assembly.</p>

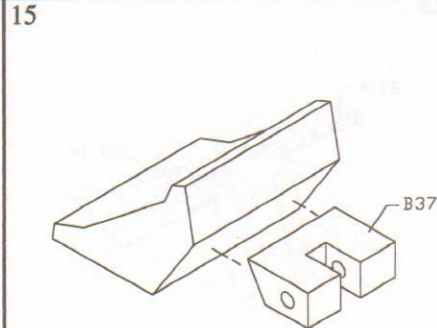




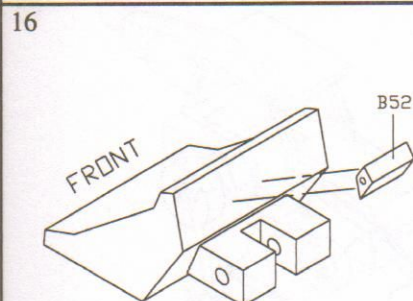
Glue shovel sides B8 onto shovel top B10 and bottom B11.



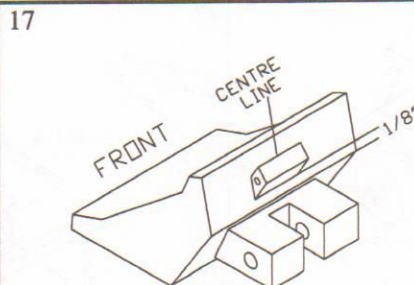
Glue shovel back, as shown.  
See page 7 for hints on making shovel.



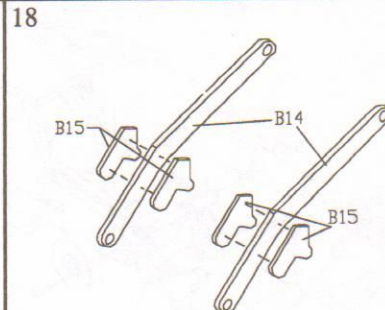
Glue arm block B37



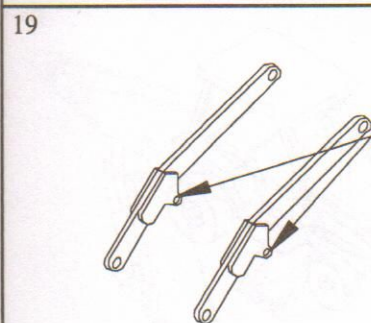
Glue piston block B52.  
See next frame for exact location.



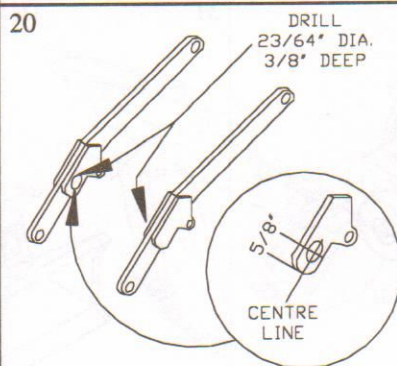
Where to glue B52.



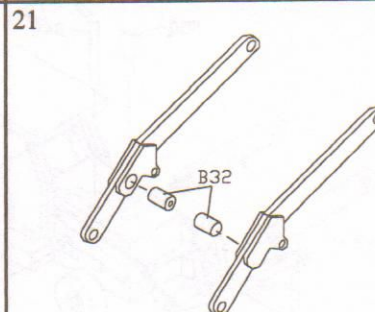
Glue arm sides B15 onto arms B14.



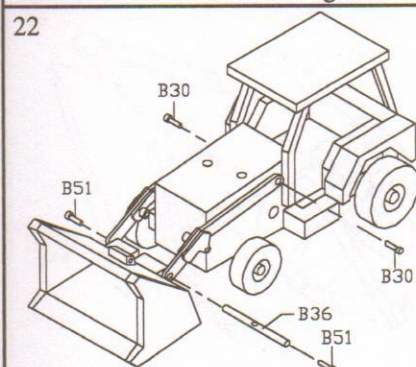
Re-drill these two holes after parts  
B14 and B15 have been glued.



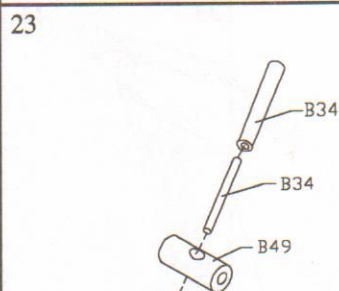
Drill holes, as shown.



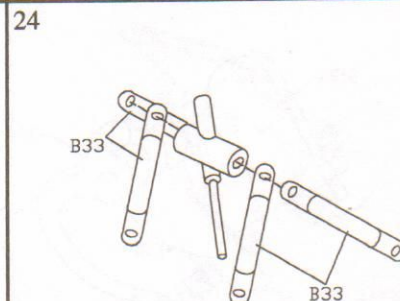
Glue bushings B32.



Insert pins B30 and bushings B36.  
Do not glue B36. Insert pins B51.



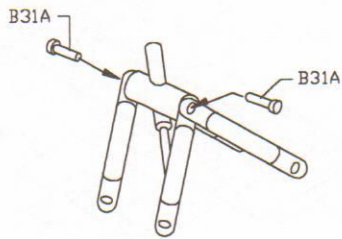
Slide piston B34 into cylinder B34.  
Slide cylinder B34 into bushing B49.



Assemble cylinder B33 onto  
bushing B49 using pins B31.

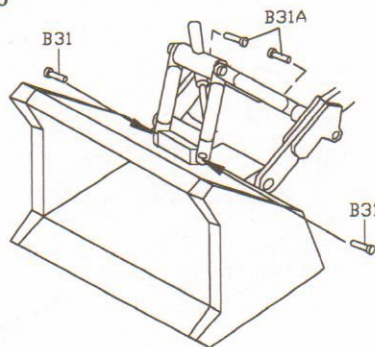


25



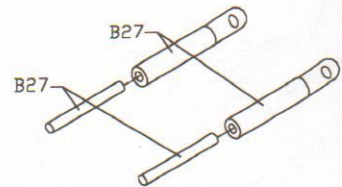
Insert pins B31A.

26



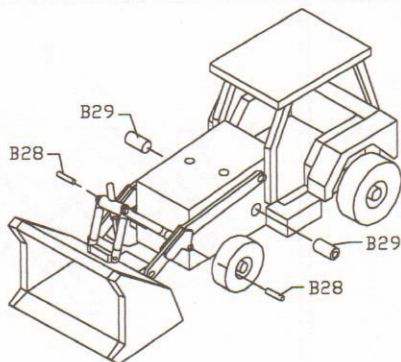
Insert pins B31 and B31A.

27



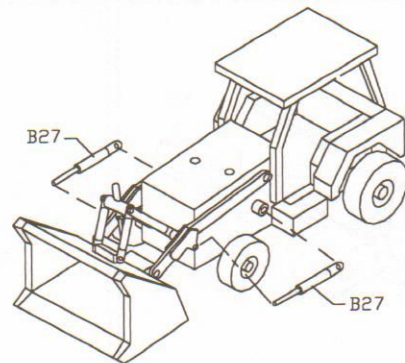
Slide pistons B27 into cylinders.  
Do not glue.

28



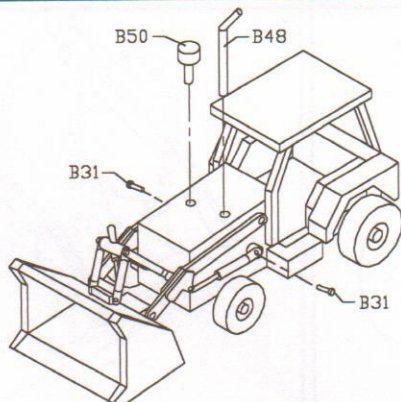
Glue bushings B29 into body.  
Insert bushings B28. Do not glue.

29



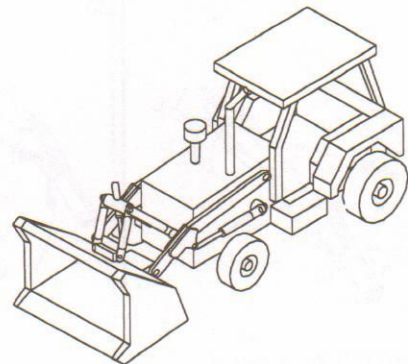
Install pistons B27.

30



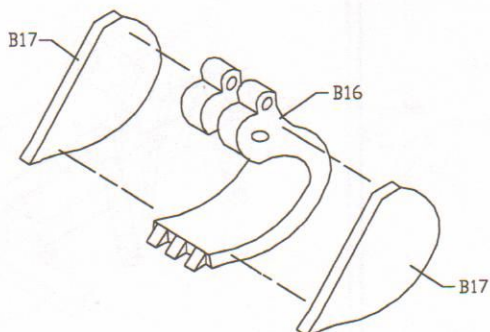
Install parts, as shown.

31



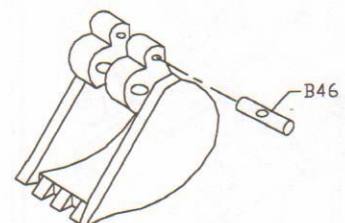
Start working on rear shovel assembly.

32



Glue sides B17 onto shovel B16.

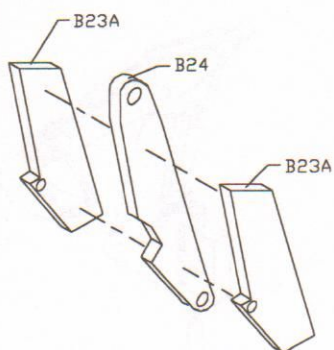
33



Insert bushing B46.  
Do not glue.

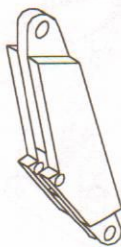


34



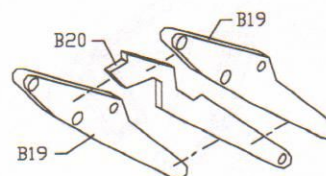
Glue arm centre B24  
between arm sides B23A.

35



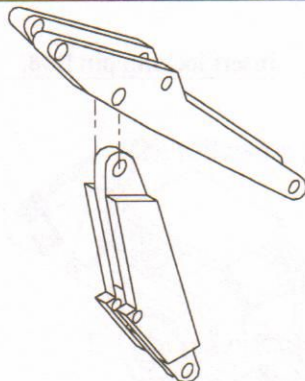
Start working on secondary  
arm assembly.

36



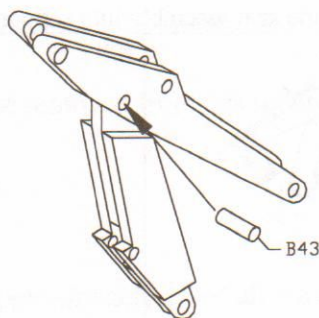
Glue parts, as shown.

37



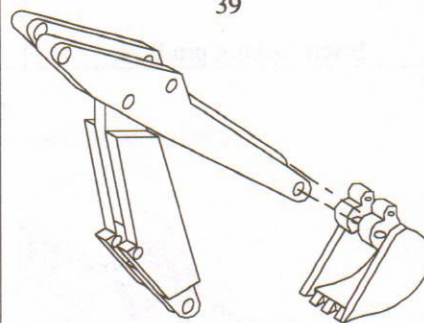
Slide arm assembly, as shown.

38



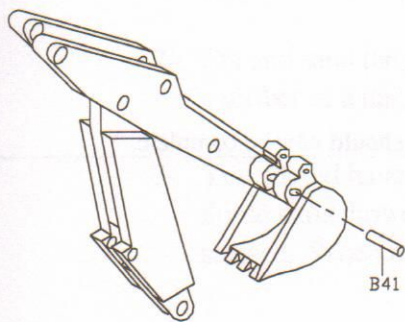
Insert locking pin B43.

39



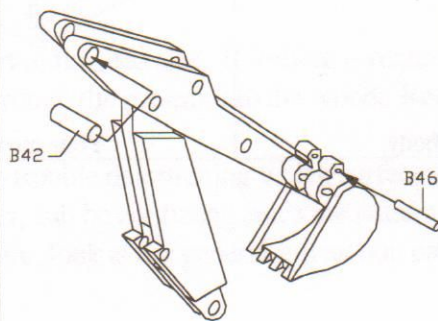
Slide shovel onto arm assembly.

40



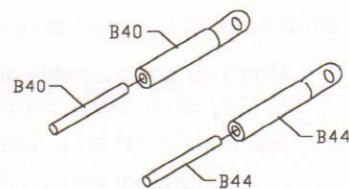
Insert locking pin B41.

41



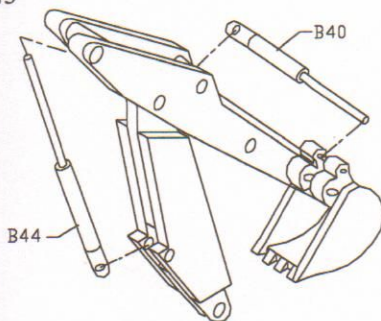
Insert parts, as shown.  
Do not glue.

42



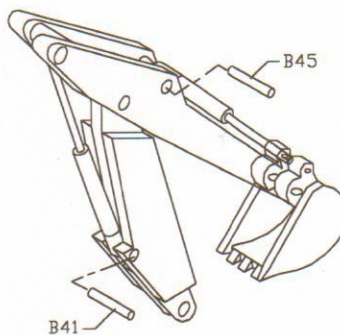
Slide pistons B44 into cylinders.  
Do not glue.

43



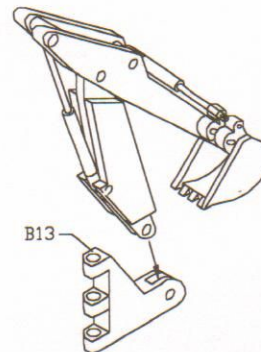
Assemble pistons, as shown.

44



Insert locking pins B41 and B45.

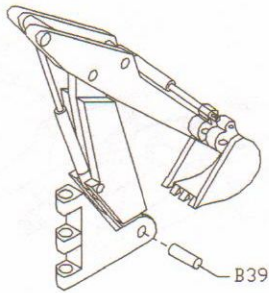
45



Slide rear arm into part B13.

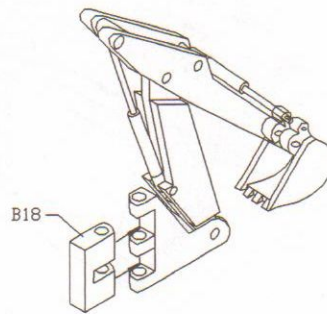


46



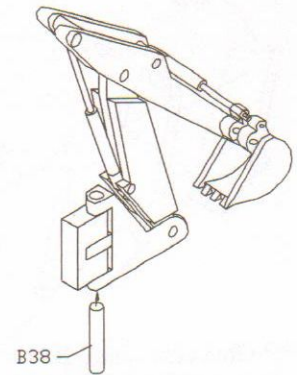
Insert locking pin B39.

47



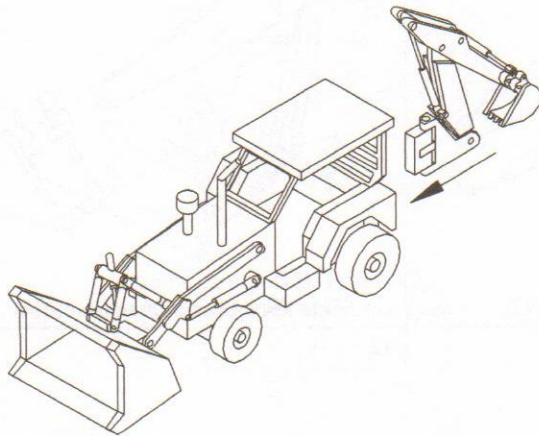
Slide arm assembly into support B18.

48



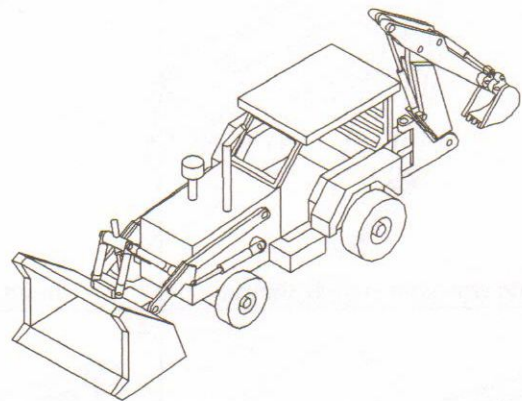
Insert locking pin B38.

49



Glue rear arm assembly onto body.

50



Your model should now be complete.



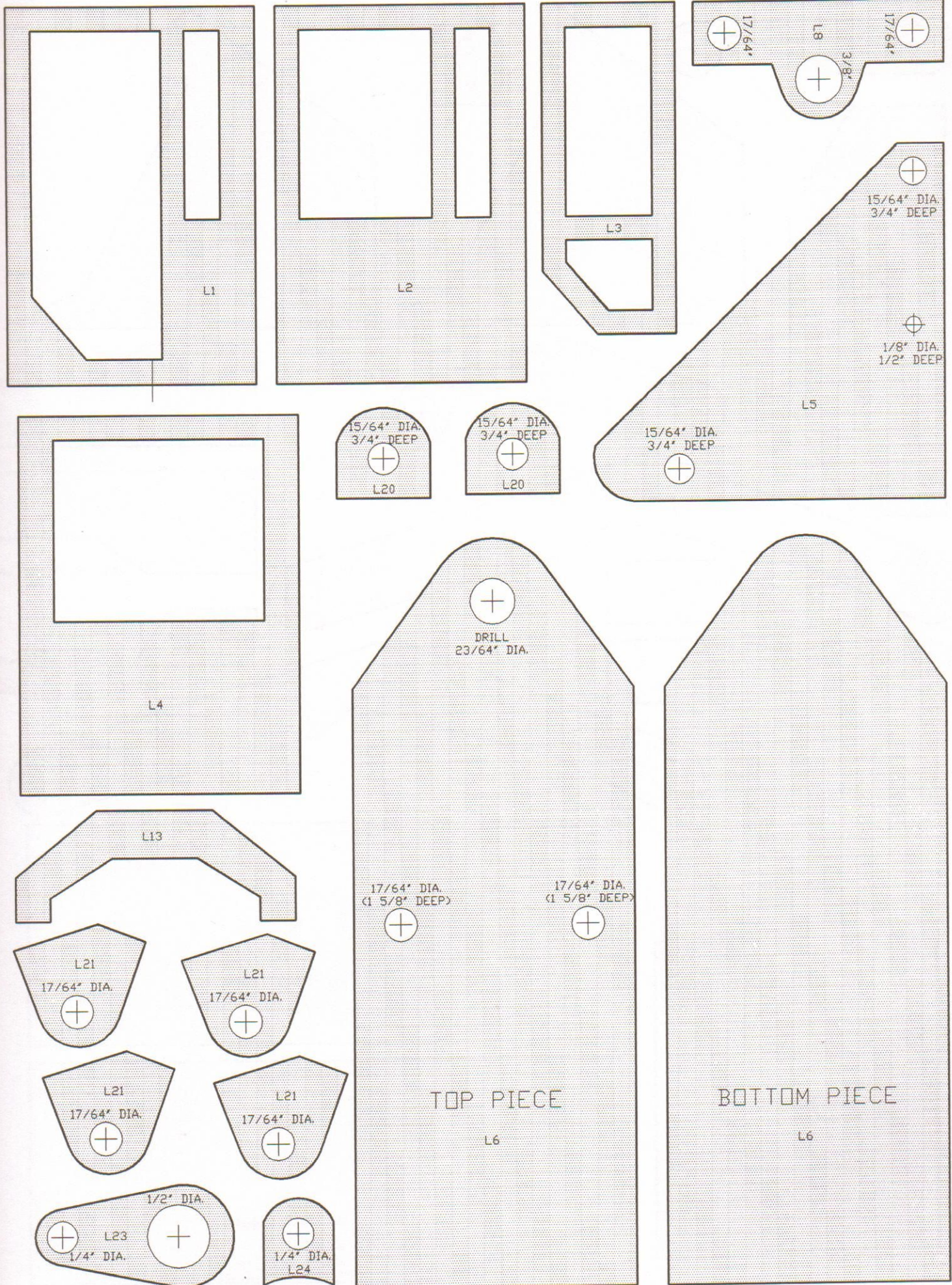
# Appendix

The following page(s) can be removed from this set and be used as templates.

- 1- Cut out patterns , leaving approximately 1/16" all around, and place on the proper piece of wood (which has already been identified).  
Patterns can be secured to wood using either spray adhesive or rubber cement (a glue stick can also be used, but the pattern is often hard to remove afterward!).
- 2- Cut and sand the part to finished size. If drilling is required, mark the hole(s) by inserting a scribe or a nail through the pattern into the wood. Remove the pattern before drilling.
- 3- You should have no trouble determining which surface to attach most of the patterns. Some parts, however, can be confusing since the pattern could fit on more than one surface. When unsure, look at the general instruction page for exact location.

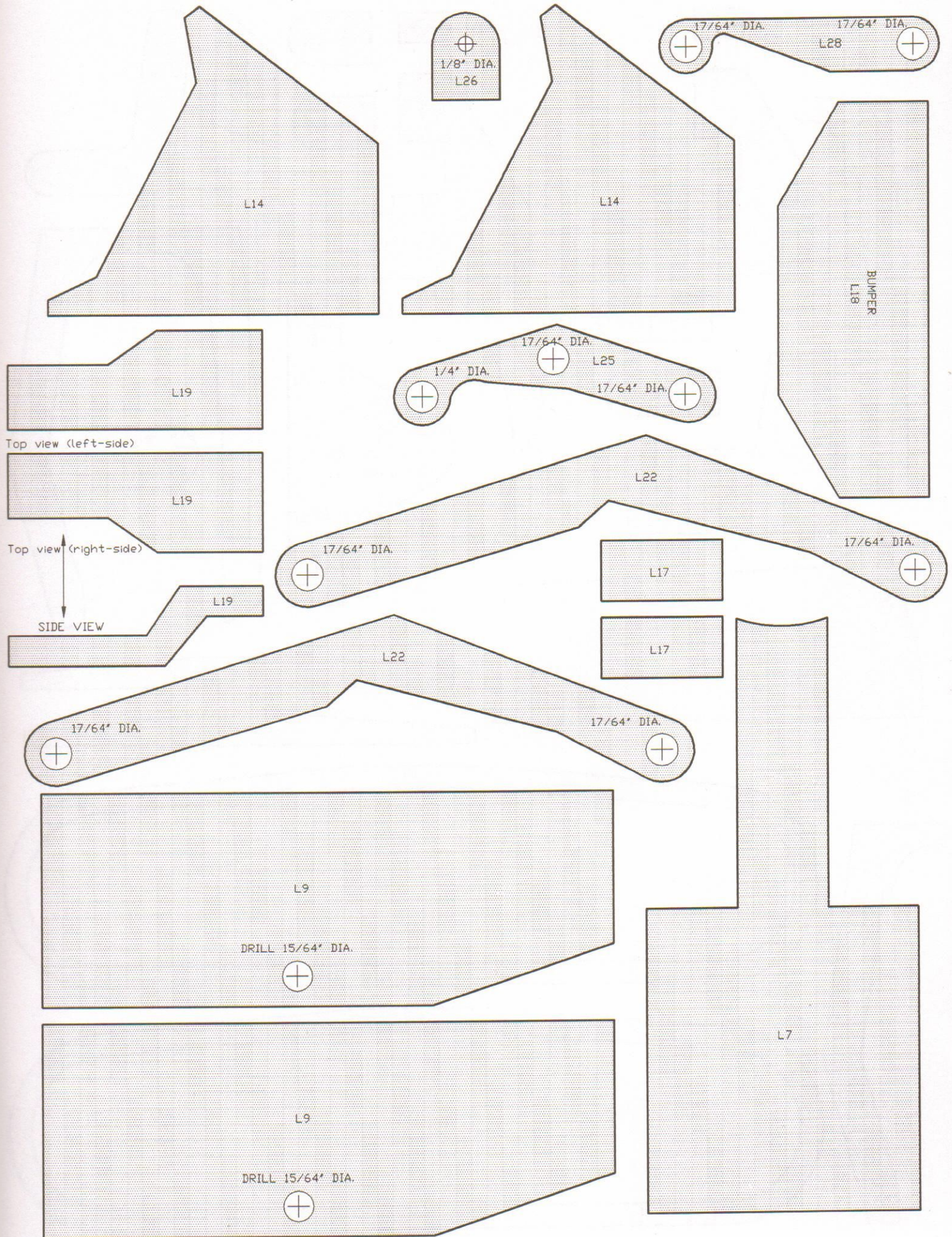


# Full-Sized Patterns: Second Set - Loader



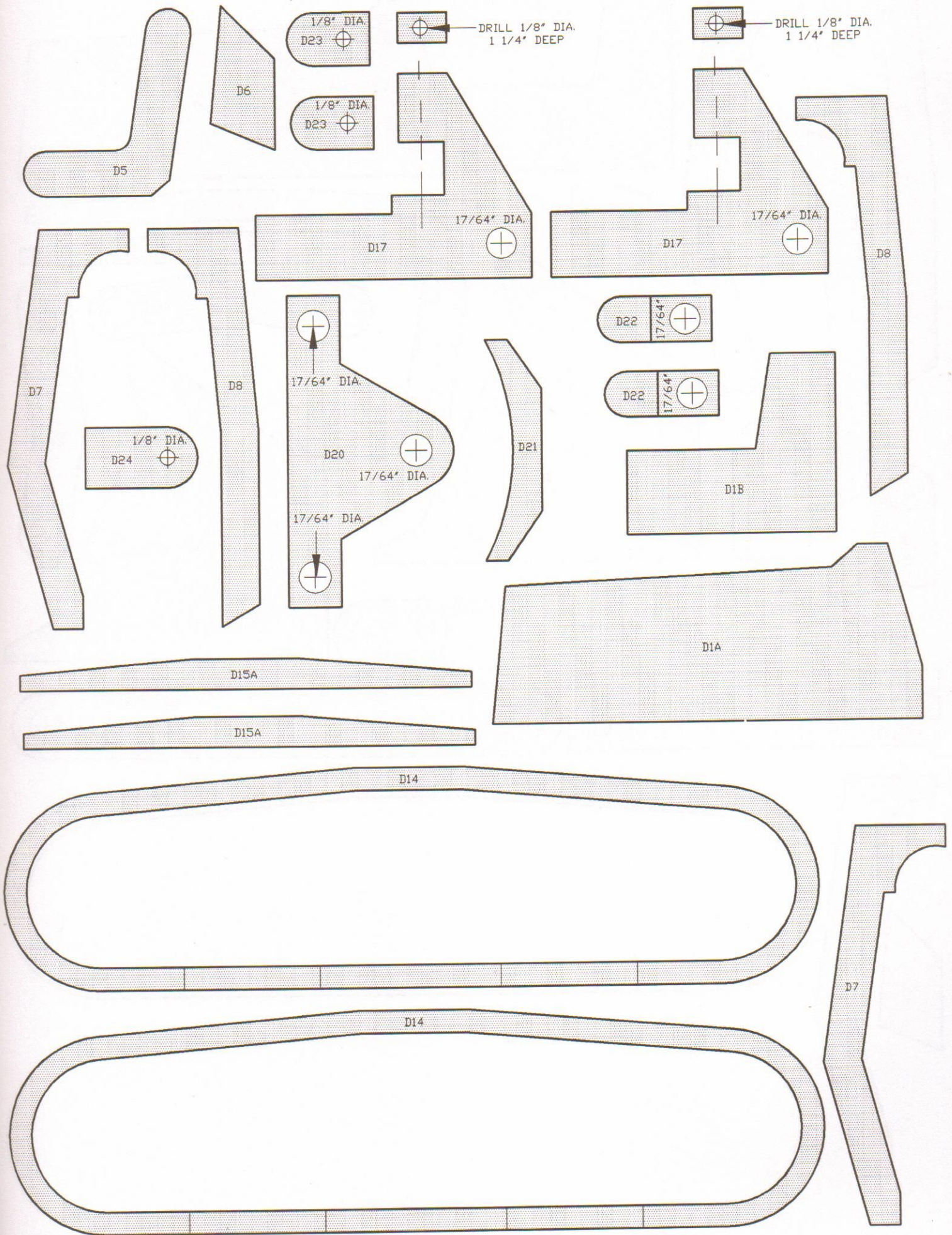


# Full-Sized Patterns: Second Set - Loader



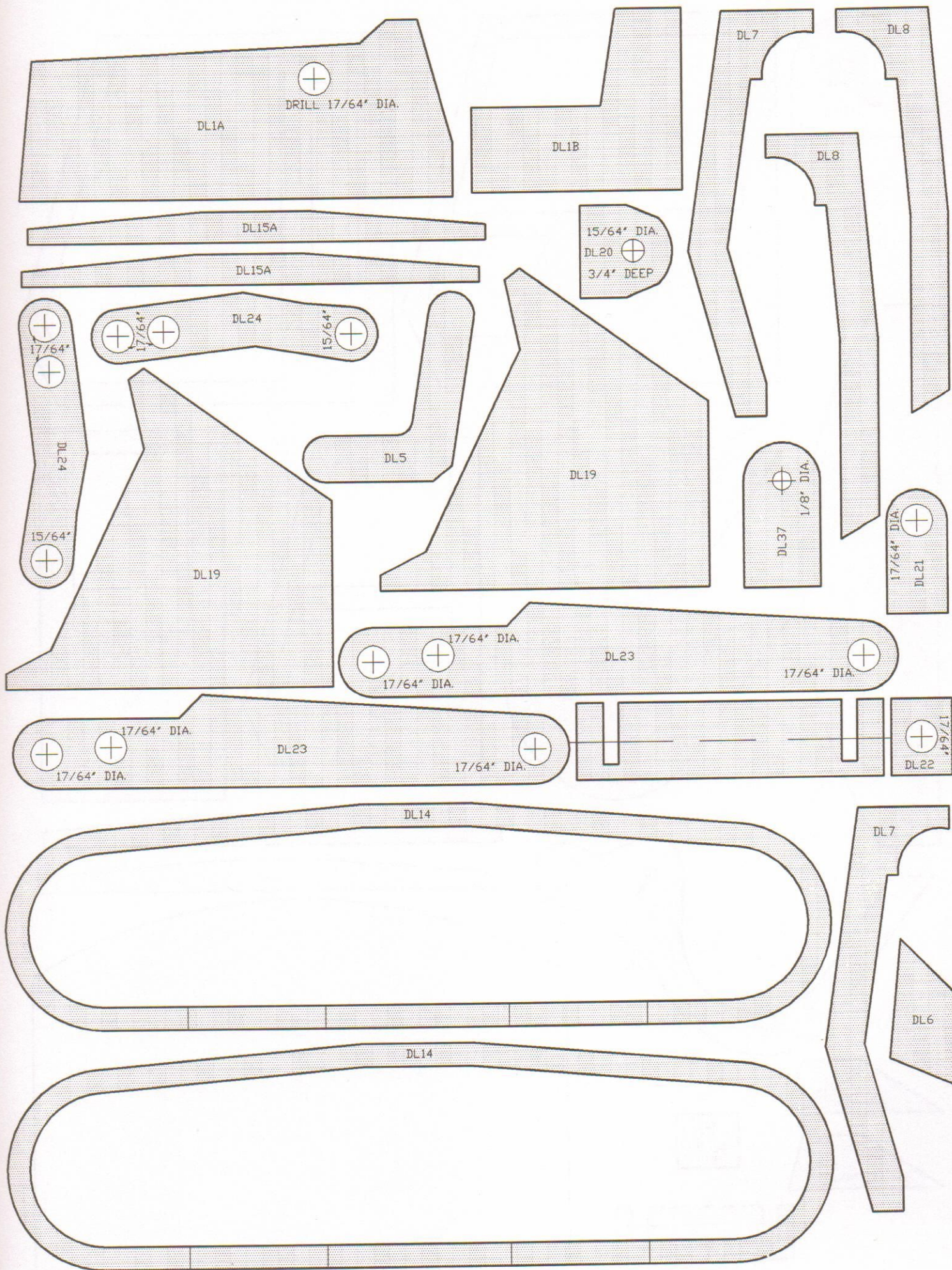


# Full-Sized Patterns: Second Set - Dozer



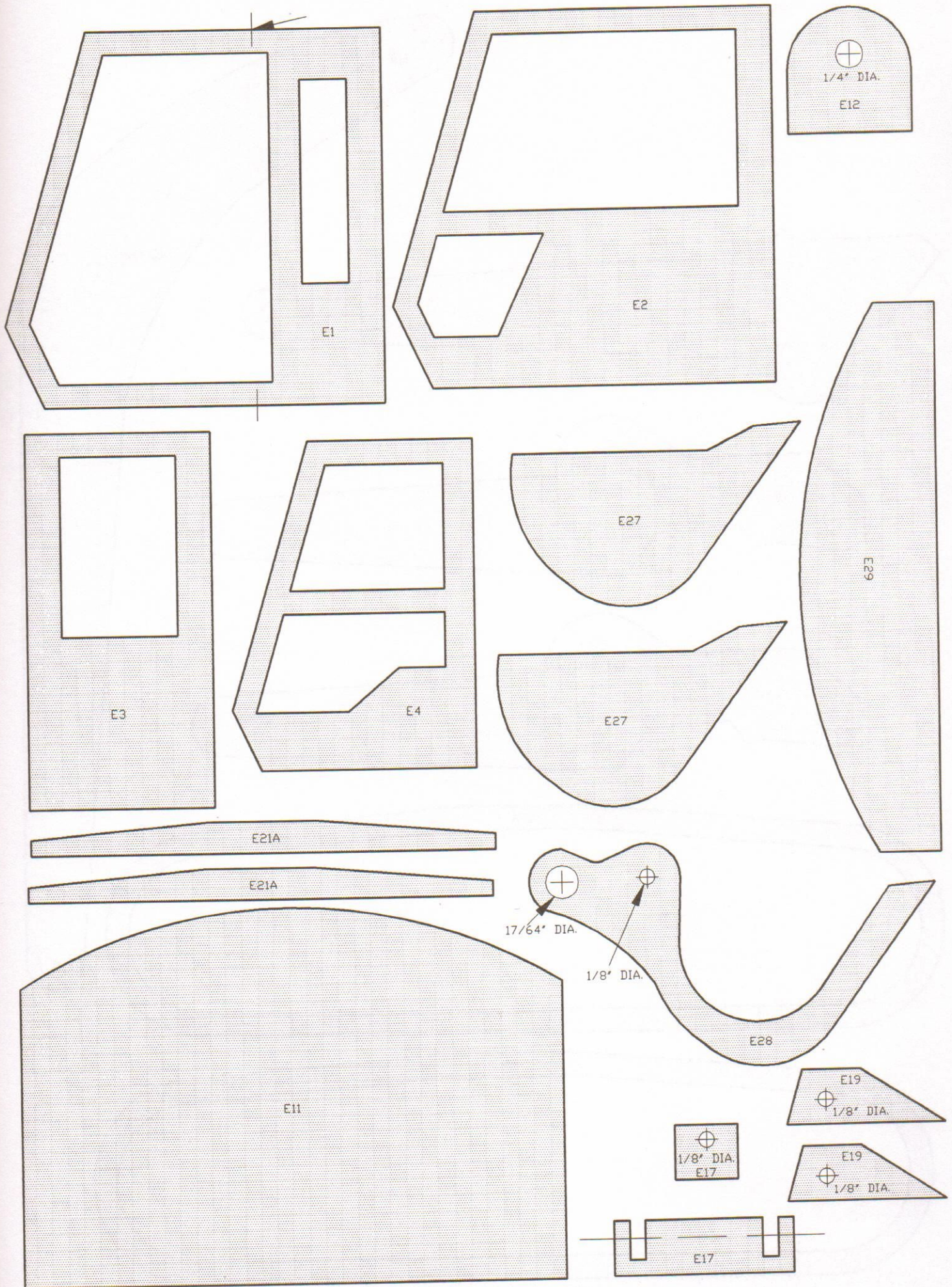


# Full-Sized Patterns: Second Set - Dozer Loader



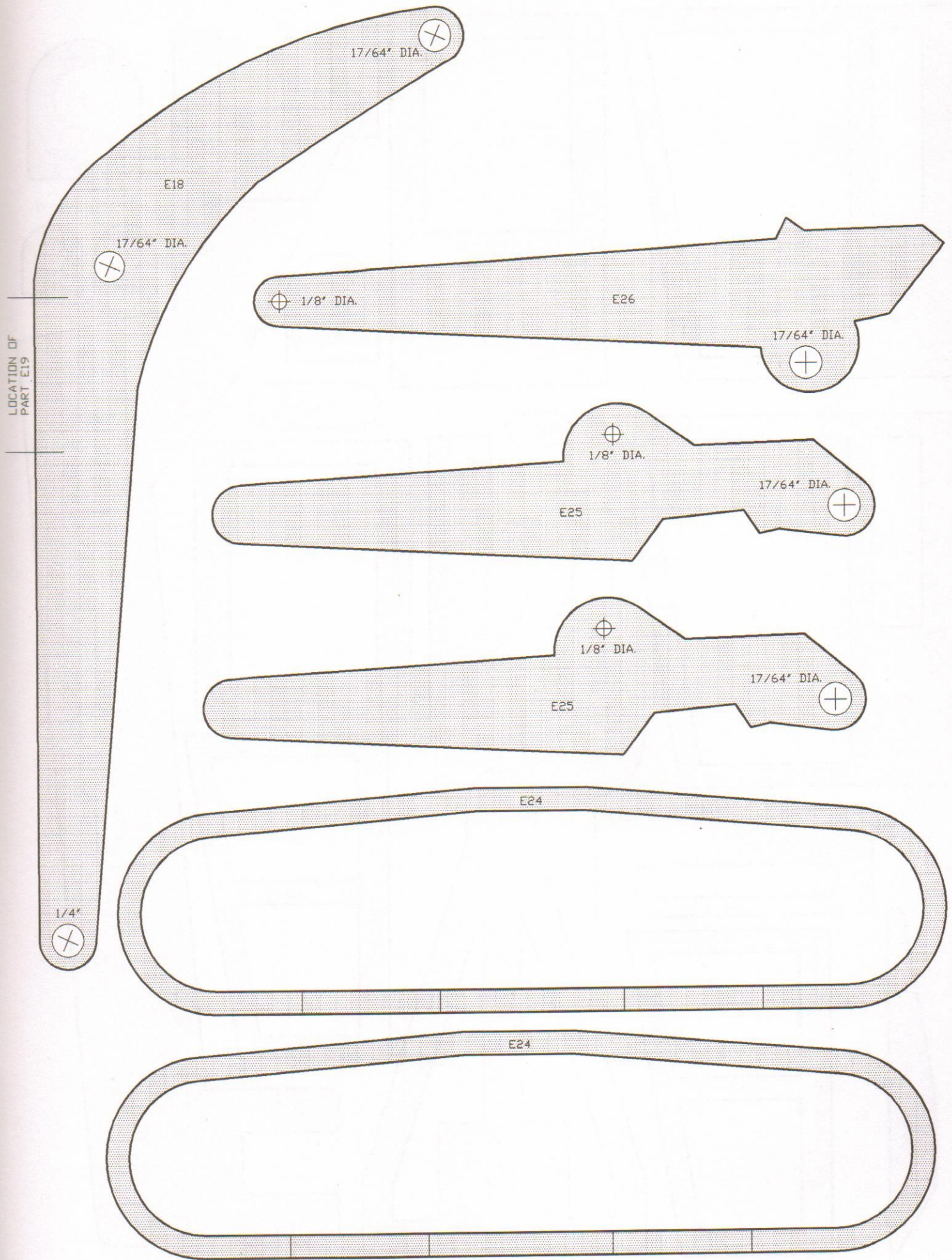


# Full-Sized Patterns: Second Set - Excavator



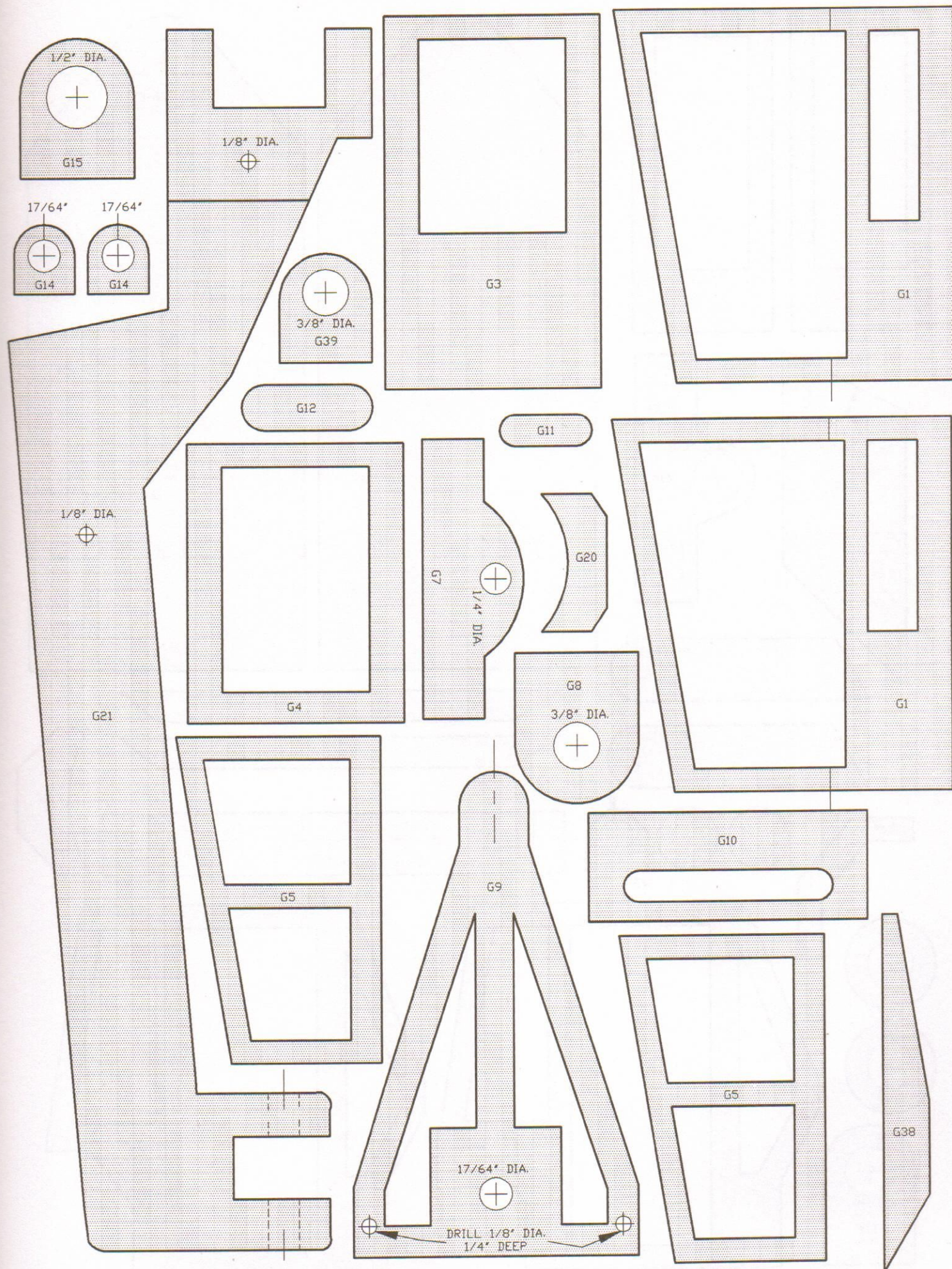


# Full-Sized Patterns: Second Set - Excavator



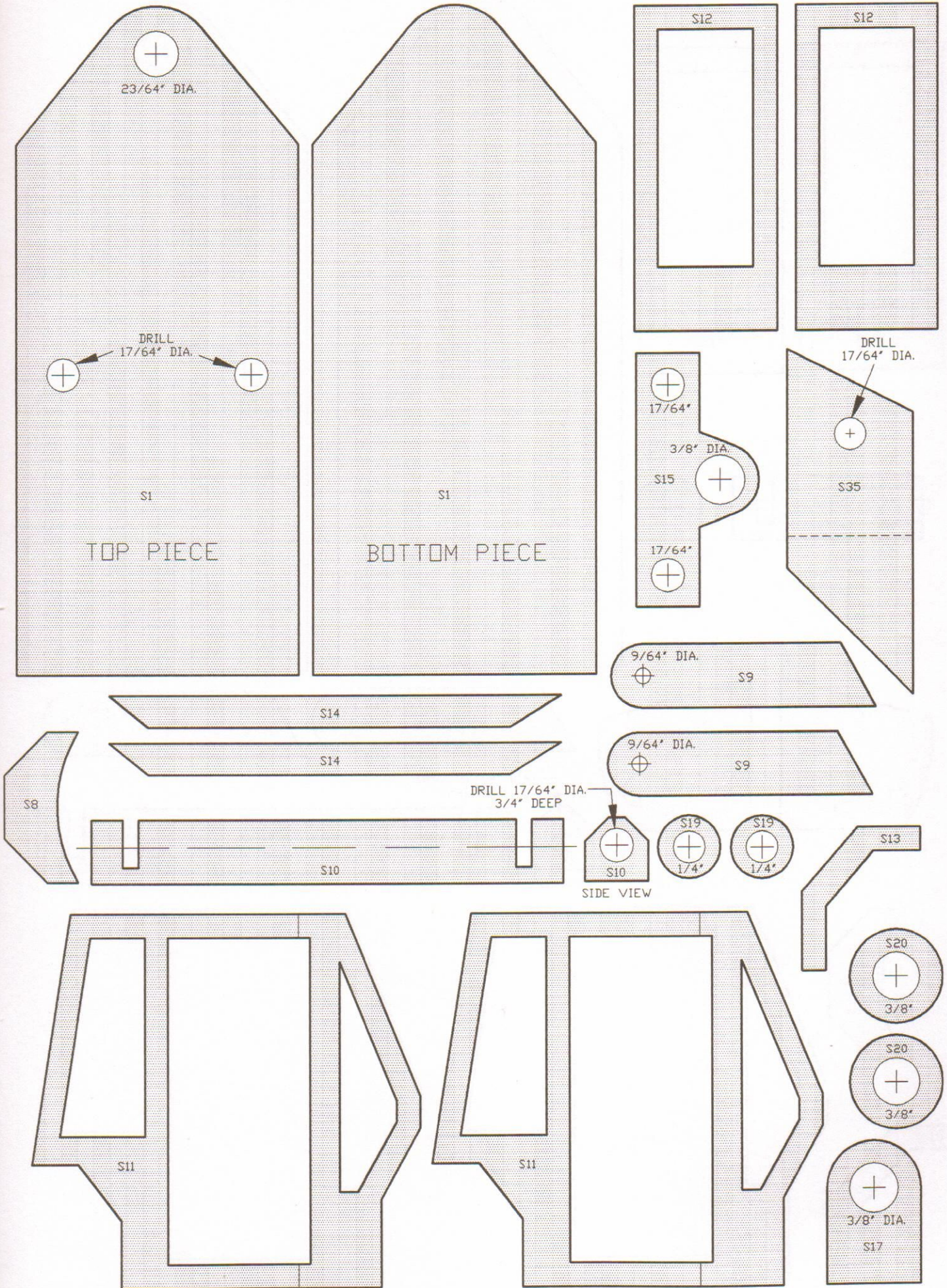


# Full-Sized Patterns: Second Set - Grader



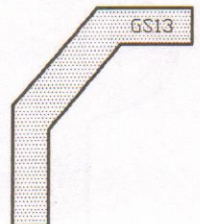
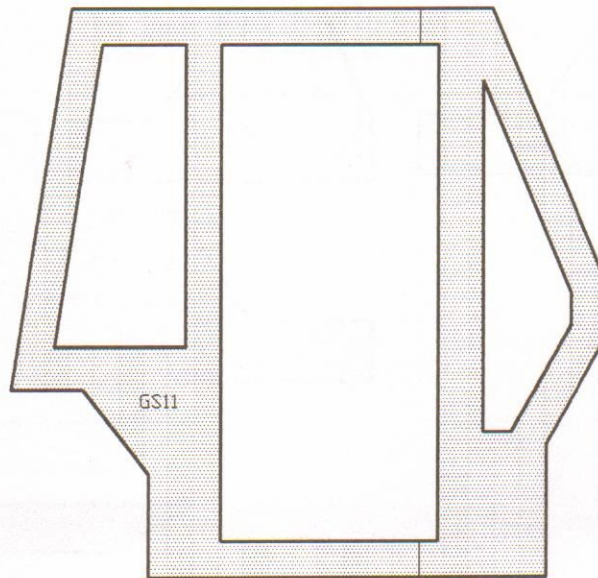
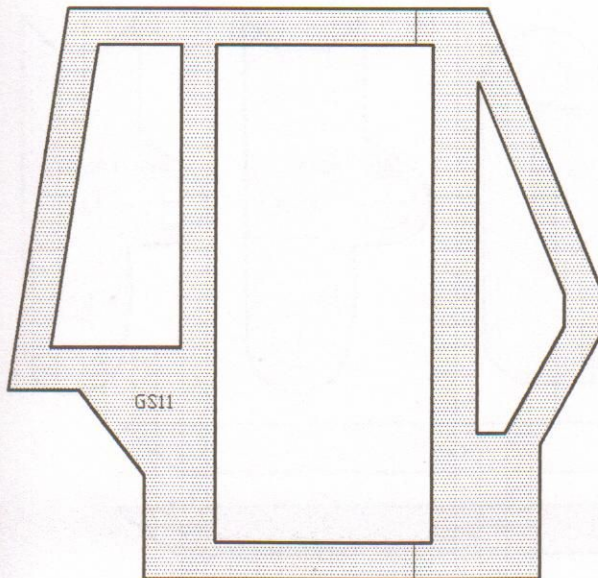
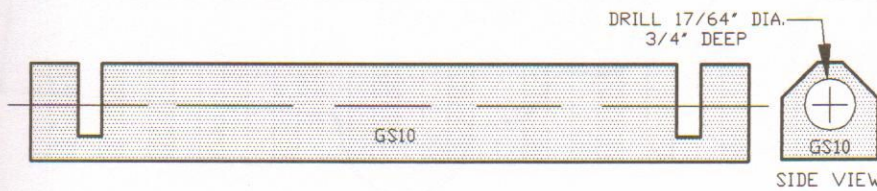
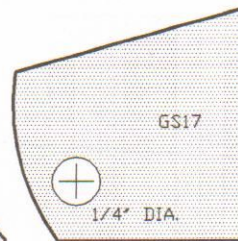
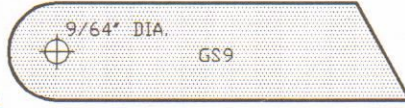
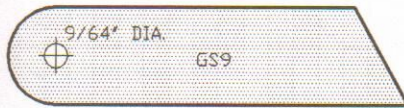
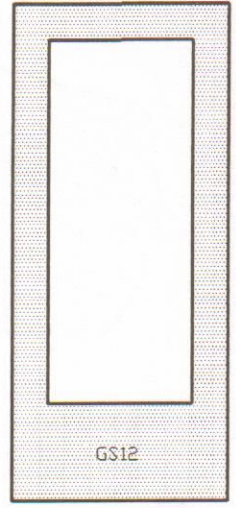
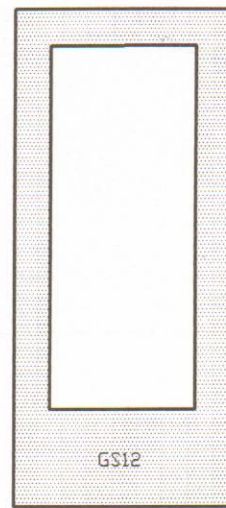
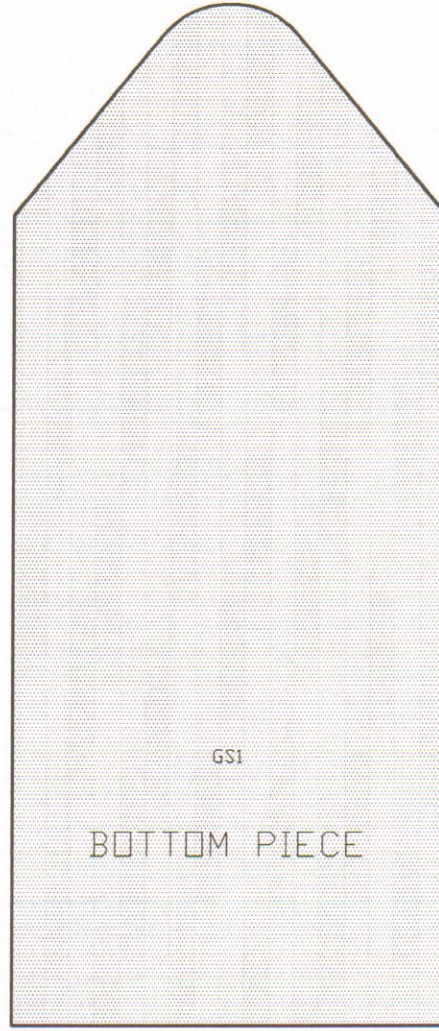
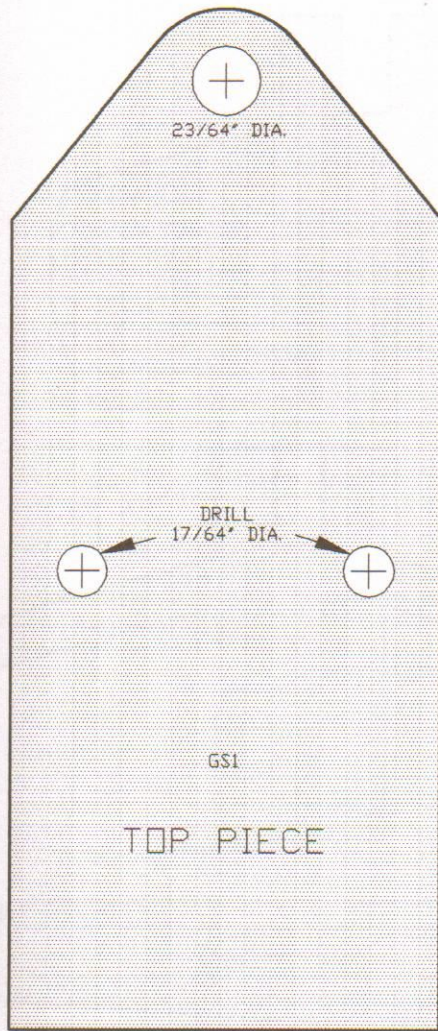


# Full-Sized Patterns: Second Set - Skidder



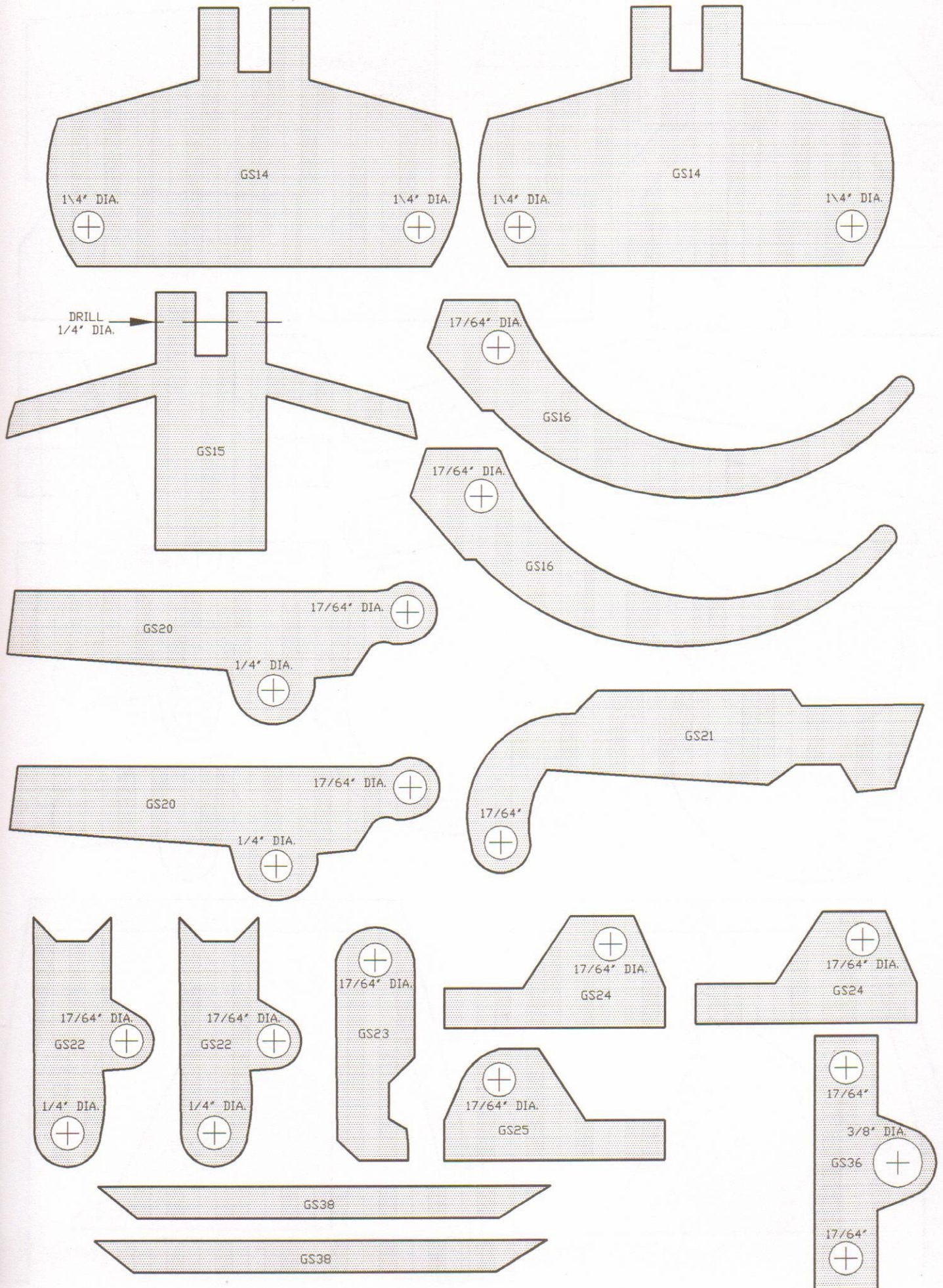


# Full-Sized Patterns: Second Set - Grapple Skidder



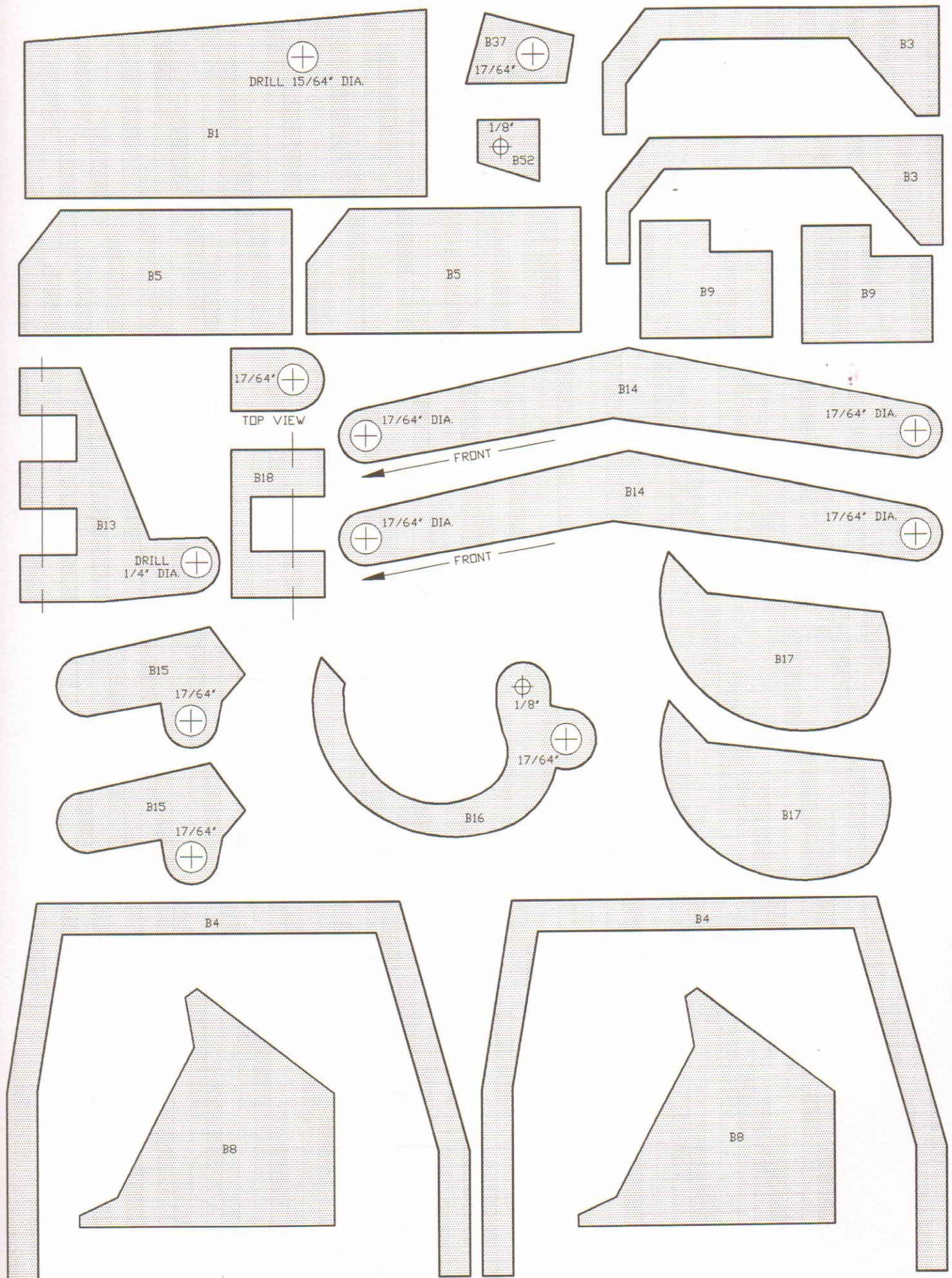


# Full-Sized Patterns: Second Set - Grapple Skidder



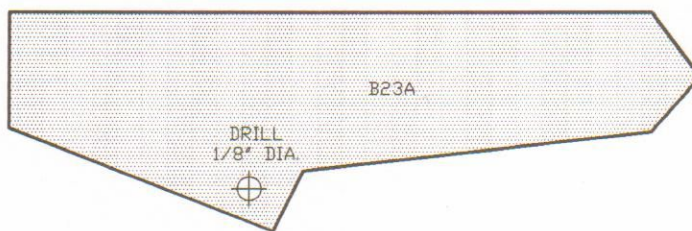
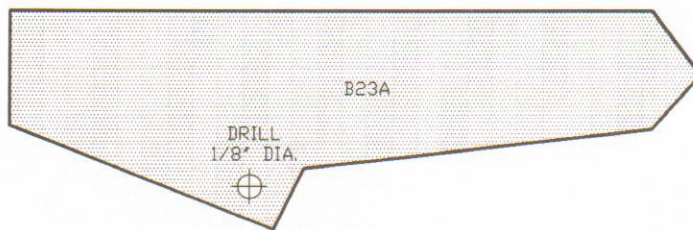
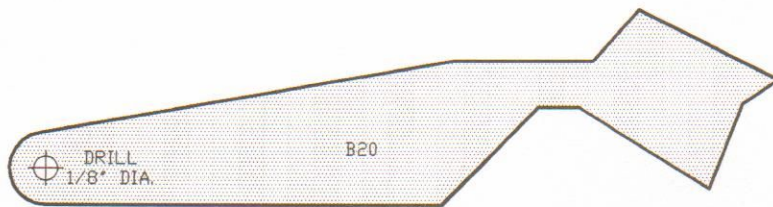
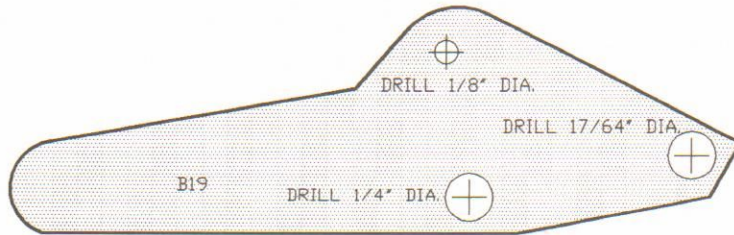
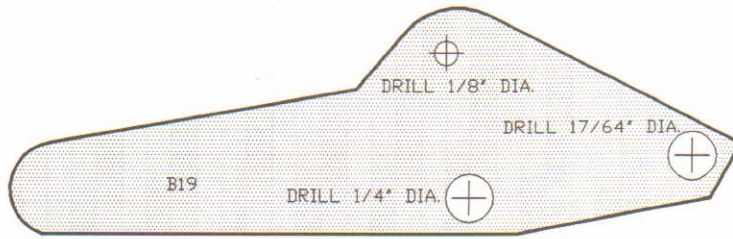


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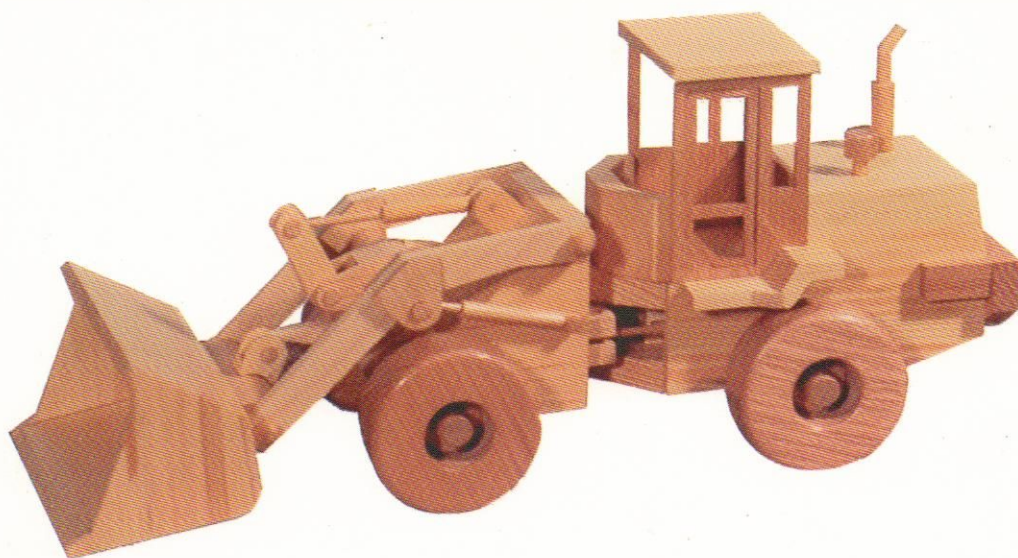




# Full-Sized Patterns: Second Set - Backhoe







*Realistic Construction Models You Can Make* allows you to create beautiful display models, quickly and easily.

This edition contains plans to build a collection of eight construction vehicles with:

- ❑ Functional parts including doors that open, moveable cylinders and pistons, and much more.
- ❑ Two sets of full-sized patterns that allow you to build parts quickly and with more precision. One set remains in the book, while the second set can be cut out and placed directly on to the material.
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