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July 2026
Vol. 76 No. 908

model Boats

Norada

The inside story on
this Norfolk Broads' beauty



A Daring choice

Modelling options for this
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The art of modelling

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Evelyn

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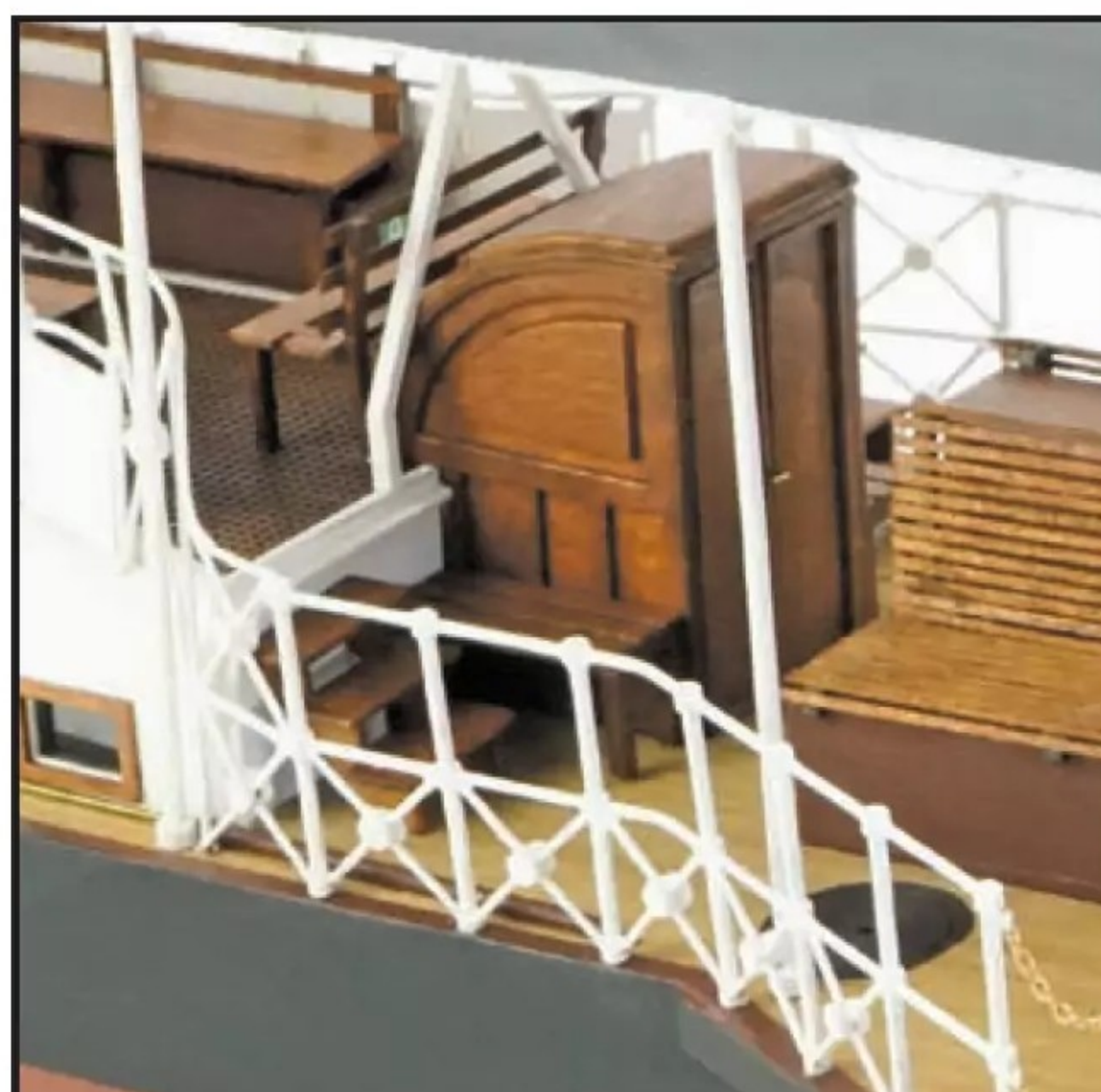
403 Hjejlen

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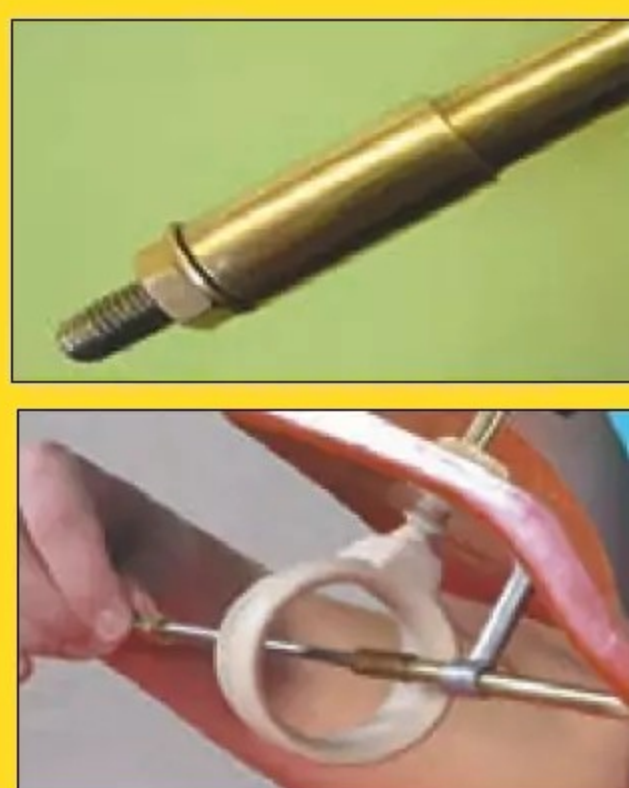
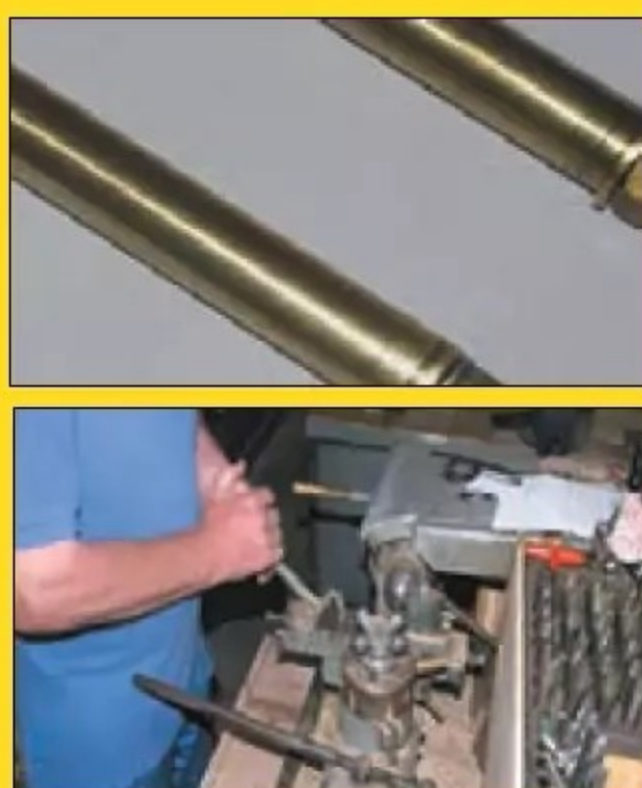
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Editor: Lindsey Amrani

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Tel: 01507 529529 Fax: 01507 371066
Email: editor@modelboats.co.uk

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Answerphone 24hr
help@classicmagazines.co.uk
www.classicmagazines.co.uk

Archive enquiries: Jane Skayman
01507 529423 jane.skayman@kelsey.co.uk

ADVERTISING

Advertising Sales Executive:

Fiona Leak
fiona.leak@kelsey.co.uk
Tel: 01507 529573

Sue Keily
sue.keily@kelsey.co.uk
01507 529 361

By post: Model Boats Advertising, Kelsey Media
Limited, Media Centre, Morton Way, Horncastle,
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WELCOME TO THE JULY 2026 ISSUE OF MODEL BOATS

Well, after spring temperatures in excess of 30 degrees here in the UK, hopefully (as obviously there's no guarantee with the good old British weather) we're in for a belter of a summer and lots of idyllic sailing sessions in the months ahead.

Many of the models featured in this issue are perfect for the tranquillity of those lazy, hazy days of summer. If you fancy getting something a bit zippier on the water, though, then why not try your hand at building the great fun little airboat/hovercraft hybrid designed by Glynn Guest from the free pull-out plan and accompanying step-by-step instructions.

On the more social side of the things, most model boat clubs are now entering peak Open Day season, and you will find a number of events scheduled for July flagged up in this month's Compass 360 news section. As mentioned in the June edition though, being a monthly publication we do have lead times, so if you're involved in organising an event you'd like us to promote this August/September, please be sure to email over details as soon as possible to avoid disappointment.

Fortunately, although received too late for inclusion within the Compass 360 pages, just ahead of writing this column Mark Green, Secretary of the Norwich Model Boat Club, informed me that on July 5 the club will be hosting a Summer Gala at the boating pond in Eaton Park, Norwich NR4 7RH. So, seeing as 2026 marks 100 years of the club, the beautiful Grade 2 listed model boating lake (believed to be one of the largest purpose-built model boating lakes in the UK) and the dedicated clubhouse pavilion, I really wanted to squeeze a mention in! Modellers from other clubs will, Mark tells me, be welcome to attend, but, he points out, the club can only accommodate visitors by prior arrangement. If, therefore, you'd like to join in the celebrations at this or any of the other events the club has planned for its centenary, please email norwichmodelboatclub@gmail.com

For now, though, enjoy your read!

Lindsey



The beautiful purpose-built model boating lake and pavilion in Eaton Park, Norwich.



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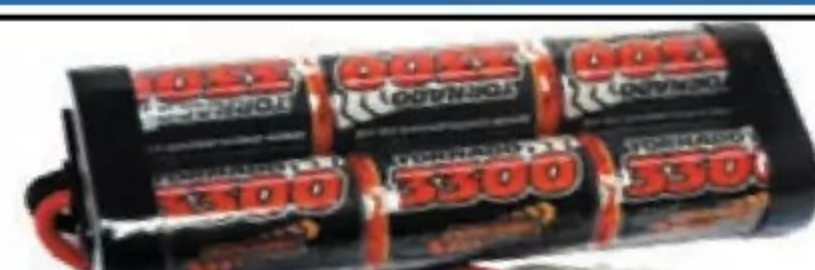
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Compass 360

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OUT AND ABOUT

Kirklees Summer Open Day



Yorkshire WF17 8JH, from 9.30am to

The Kirklees Model Boat Club will be holding an Open Day at Wilton Park, Woodlands Road/Bradford Road, Batley, West

3.30pm on Sunday, July 12, 2026.

A variety of models will be displayed by members (both on and off the water), and visitors will also be welcome to bring along models of their own to sail. Please note, no I.C. or high-performance fast electric boats can be accommodated, and an up-to-date boiler certificate will need to be presented before any steam-powered models are allowed on the water. For those looking to get their models tested, an inspector will be on hand to

carry out steam tests between 10am and 3pm.

Free onsite parking will be available on a first come, first served basis (please allow for the fact that space is limited, so demand may outstrip supply), while light refreshments will be available to purchase in the tea tent throughout the day.

Any updates on this event will be posted on the club's website at kirkleesmbc2021@gmail.com, while further enquiries can be made by emailing kirkleesmbc2021@gmail.com

Vale of Glamorgan MBC Open Day



On Saturday, July 25, the Vale of Glamorgan Model Boat Club will be holding its annual Open Day at Marine Lake (commonly known as the Knap) in Barry, South Wales, which once again will be sponsored by Cornwall Model Boats.

Other local clubs will be joining their hosts in putting on static displays in the long line of gazebos that will be set up along the lakeside and will also be participating in the on water demos, which will feature numerous R/C vessels, including yachts, tugs, powerboats, etc (with specific time slots allocated to fast electric boats).

Adding to the fun, free supervised sailing sessions using the club's 'have a go' model boats will be on offer to all visitors, including children, at this family friendly event.

For updates/further details, visit the club's Facebook page at <https://www.facebook.com/groups/1177917875634429/>



From Fairlie to the World

An exhibition focusing on the world-famous yachts built in the Fairlie shipyard for over 140 years by the three generations of the Fife family will open at the Denny Ship Model Experiment Tank, Castle Street, Dumbarton G82 1QS, this July.

On display will be the models, plans and tools used by skilled craftsmen to turn Scottish wood into stunning yachts, along with period photographs, old postcards and some stunning prints of local artist Alastair Huston's work.

The museum opens from 10am to 4pm from Tuesday through to Saturday. Tickets can be booked in advance via the museum's website: <https://www.scottishmaritimemuseum.org/dumbarton-museum/>



Ayrshire Lass, a beautiful example of William Fife's legendary craftsmanship, is shown here captured by local artist Alastair Houston, more of whose work will form part of the From Fairlie to the World exhibition that opens this July.

OUT AND ABOUT

Boats on the Mote

From 9am to 3pm on Sunday, July 19, 2026, the Cygnets Model Boat Club will be hosting its Boats on the Mote show at the Cygnets Lake in Mote Park, Mote Avenue, Maidstone, Kent ME15 7RN. Members will be displaying a wide variety of models both statically and on the water. In the case of the latter, models will be divided into groups determined by their genre and sailed together on the 30-acre lake during their allocated time slots. The park offers onsite parking (charged at £3 for up to 6 hours), with a café and toilets being just a short walk away from the lake itself. For updates/more info, visit <https://www.cygnetsmbc.org/>



Dover Transport Museum 2026 Model Weekend



Over the weekend of July 25/26, the Dover Transport Museum in Willington Road Whitfield, Dover, Kent, CT16 2JX will be hosting its annual model weekend, featuring a boating lake, indoor model road and railway layouts and R/C military and road haulage vehicle demonstrations within the museum's grounds.

Normal museum admission prices (for details visit <https://www.dovertransportmuseum.org.uk>) will apply, and refreshments/hot and cold food will be available to purchase from the onsite Tram Stop Café.



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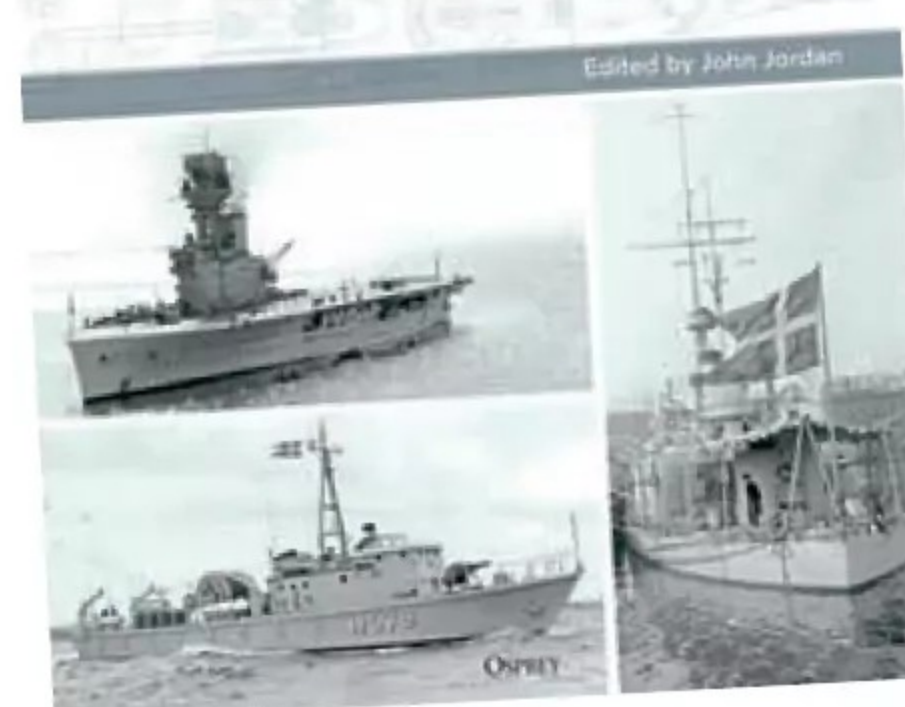
Viking ship kit winner



In the May 2026 edition of Model Boats, we offered you the chance to win Billing Boats' wonderful 1:25 scale wooden kit for the Oseberg Viking ship in its very latest incarnation (this newly upgraded version featuring laser cut parts and some exquisitely carved detailing. We are now delighted to announce the lucky winner as:

Alan Don, Sunderland
Congratulations, Alan!

WARSHIP 2026 winner



Another exclusive prize draw run in our May 2026 saw a copy of the very latest edition of the highly regarded annual WARSHIP up for grabs, courtesy of the kind folk at Osprey Publishing. Here the winning entry form drawn was submitted by:

Mark Eaton, Coventry
Congratulations, Mark!



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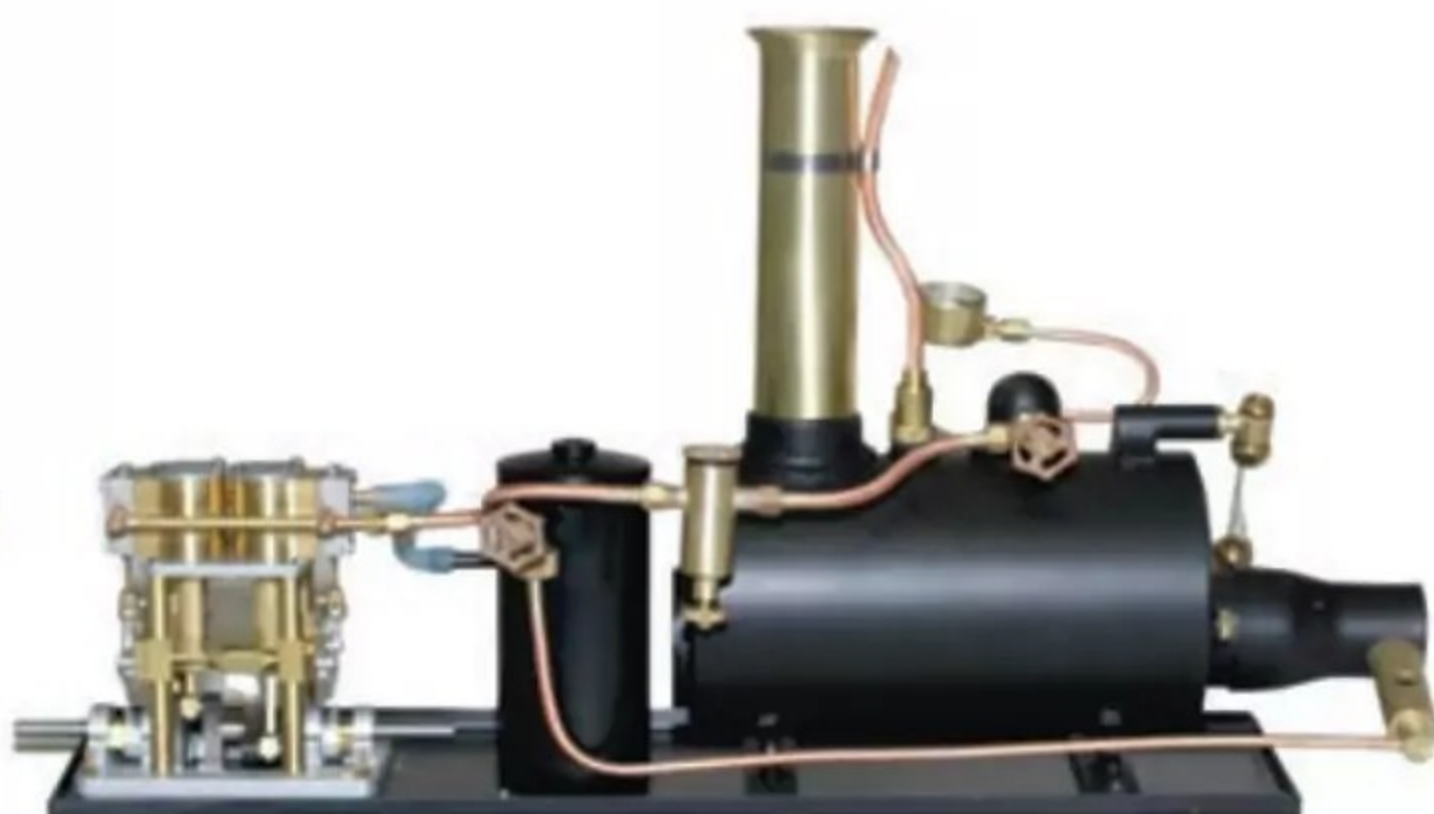
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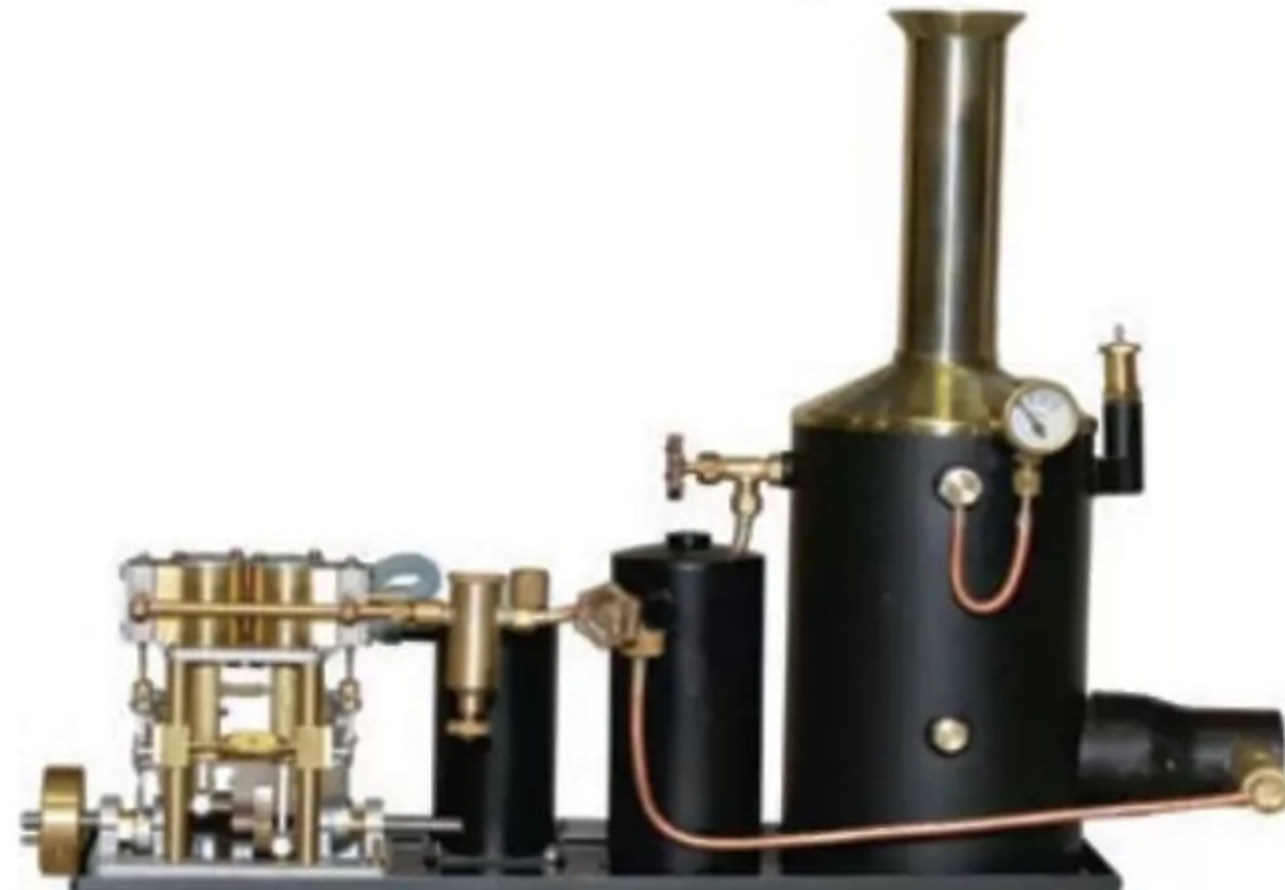
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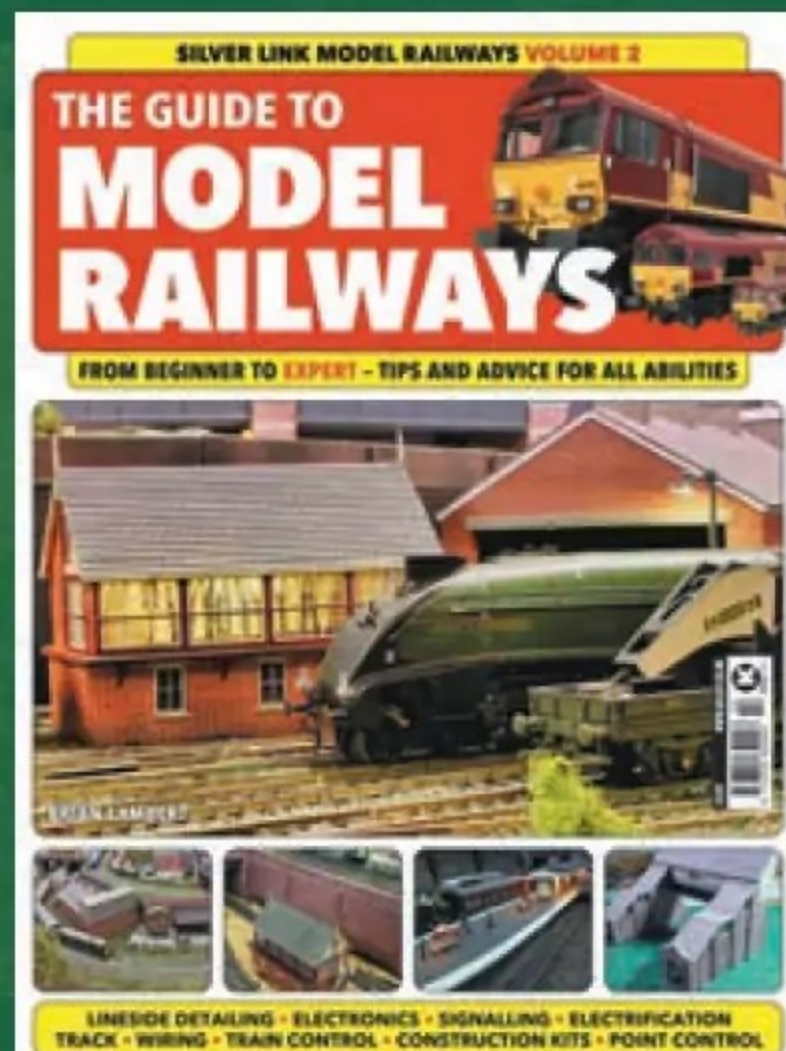
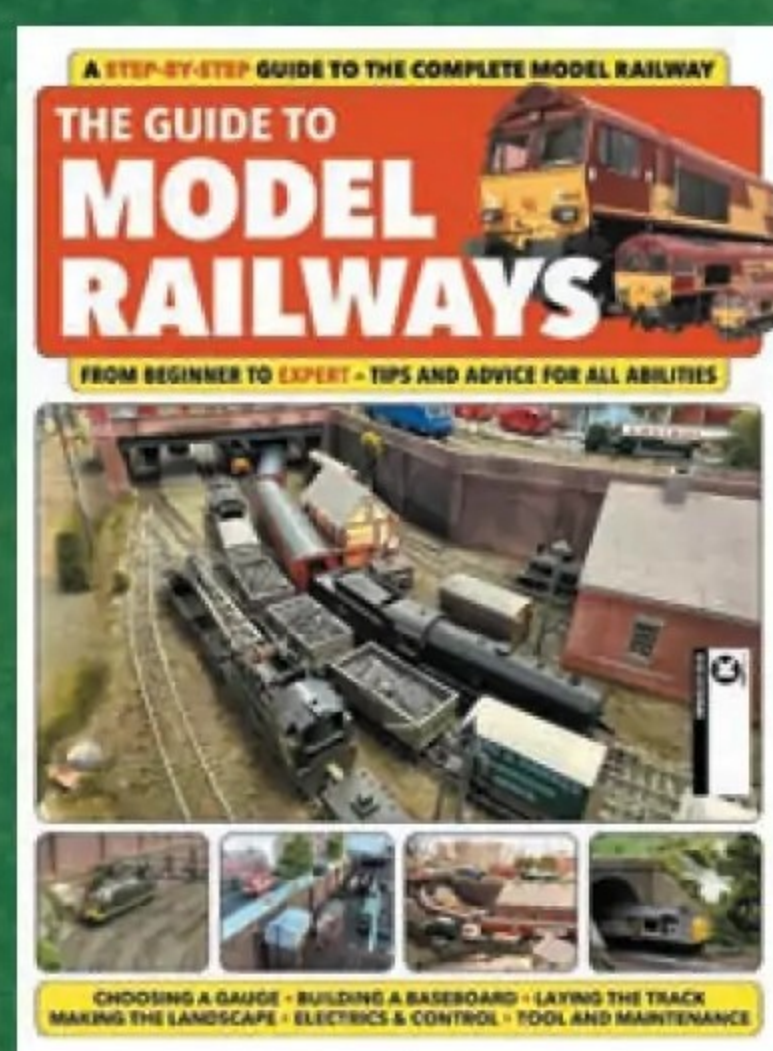
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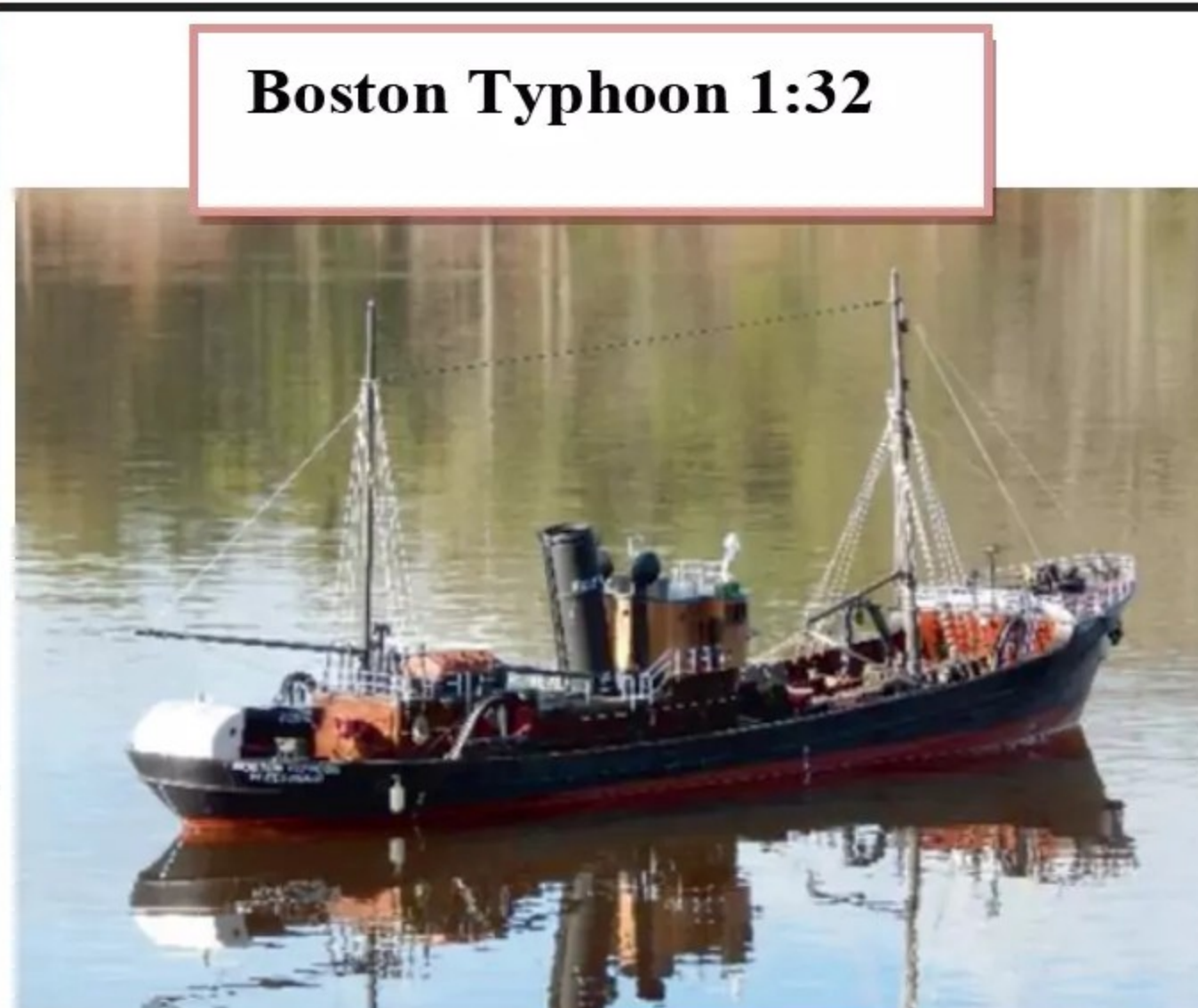
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Use not as intended

Tomasz Klyszynski flags up why it's worth a look taking a look at what the automotive industry has to offer when it comes to products and materials with modelling purpose potential....

As well as being a keen model boat builder I am also a real petrolhead, with cars and motorcycles being a serious passion of mine. Consequently, the tools and materials in my garage often get commandeered for my modelling projects. The purpose of this article, therefore, is to explore the use

of automotive products for modelling purposes and their pros and cons. Let's start, though, with the advantages, which include:

- Easy access
If you don't the additional cost of delivery fees and/or need a product

yesterday, very often it's (sadly) much easier to find a local store selling automotive products than it is a model shop within reasonable striking distance

- More choice
There's an enormous selection of

products to choose from, ranging from budget to really high-end options

- **Price point**

Strong competition means prices for items such as putties, resins, etc, tend to be much lower than those produced and marketed as modelling products

- **Durability**

Automotive products are often much more durable than those intended for scale model use, making them a great choice for working models.

Let me introduce you to just some of the automotive products I use every day, and that I can well and truly vouch for...

Putties

This is a very broad topic because of how many types you can find on the shelf. It's not difficult, therefore, to precisely match the putty to the material we'll be filling. Automotive putties are usually two-component products, meaning they come with a hardener. A big plus is their adhesion to the substrate. They are easy to apply, even when working with very small amounts, and will masque even the tiniest of defects.

In the automotive world, there are a number of different types of putty:

- **Basic (universal) putty**

As the name suggests, this can be used for almost everything, from the smoothing of surfaces to the filling of (small or medium sized) defects. In my opinion, it's a must-have on a modeller's shelf!

- **Fiberglass putty**

This very strong and durable putty can be used for large losses or when we need to reinforce areas exposed to potential damage. It's worth putting a filling layer over this, though, because of its coarse grain.

- **Putty for plastic**

The increased adhesion and flexibility of this putty prove particularly useful for plastic hulls

- **Aluminium dust putty**

This particular putty is resistant to high temperatures, which perhaps isn't a particular concern when it comes to most model boats – unless of course they are steam-driven. One of its benefits, though, is that it stays flexible even on large surfaces.

- **Steel filings putty**

When a car leaves the factory, the paint on each body panel usually has a fairly consistent thickness – typically around 80–150 microns. A paint thickness gauge measures this to help identify repairs. The expected reading would be around 100 microns. A very high reading on the other hand, for example 500–1000+ microns, would indicate repairs with body filler and repainted. Normally, body filler is non-metallic, so the gauge can detect this extra material. Steel-filled putty, however, contains metal particles, which can fool the gauge into 'thinking' it is reading directly from solid sheet metal, suggesting original rather than repaired panels, so is sometime used to mislead during a used-car inspection.

“Most putties (the epoxy types being the exception) are not moisture resistant; so, leaving your putty exposed to even low levels of humidity for too long may result in it gradually swelling and, over time, lifting the beautiful paint finish you've applied over it”

- **Finishing putty**

With its very fine grain, this putty makes light work of achieving a perfectly smooth surface finish, so is ideal for, say, model yachts.

Remember, all putties should be covered with a layer of primer, paint or clear coat. It's advisable to do this as soon as possible as most putties (the epoxy types being the exception) are not moisture resistant; so, leaving your putty exposed to even low levels of humidity for too long may result in it gradually swelling and, over time, lifting the beautiful paint finish you've applied over it.

I should point out that automotive putties, because of their composition, emit a strong smell – unfortunately, it's not a pleasant one and the chemicals released are harmful if inhaled. So, be sure to work in a well-ventilated area and wear a mask while doing so.

Also, be sure to adhere to the instructions regarding how much hardening agent should be added. Too much will cause the reaction time to accelerate and leave you struggling to get your putty applied before it hardens. Too little, on the other hand, will result in a product that is sticky and rubbery



Three different automotive putties (from left: fiberglass, universal and finish), along with the pink hardener.



Filling small defects with universal putty.



First layers of putty, with some large and medium holes filled.



Automotive filler primer.



The less than perfectly prepped hull seen here will be used to demonstrate how it's possible to hide a multitude of sins by using thick layers of this filling primer.



The first thick, still wet, layer of filling primer paint. Once dry, this will be rubbed down with wet and dry sandpaper before the second layer is applied.



The fully primed hull ready for a final sand.



The surface finish after dry sanding.

to work with and likely to take an age to fully harden.

Despite all this, these putties provide excellent adhesion and are very useful for everything from large-scale coverage to very precise modelling work.

Filling primer

A very interesting and useful product for us as modellers is a filling primer. Because of the 'structure' of this primer paint (usually acrylic) it fills very small blemishes/defects and creates a nice even surface for sanding.

Sanding can be done dry with lower grits of paper, or wet to achieve a very smooth surface. This will prep our hull so that it's ready for either spraying or brush painting. In the case of the latter, using a primer paint first will still result in the desired brush stroke finish while at the same being devoid of any other

distracting surface blemishes. We must remember every one-millimetre defect has the potential to look 'crater-like' on a scale model!

For added protection, we can apply the primer paint in layers and adjust the shade to influence the top colour layer – but more on that later.

Wet sanding with very high-grit papers can help achieve a glass-like effect – although with brush painting this can be a bit problematic, as your brush is likely to slide around on such a smooth surface.

All stages of this process are worth doing gradually and should be carried out bearing in mind the specific effect you're trying to achieve/that will best suit your model. For example, leaving some surface texture (often referred to as 'orange peel') can intensify the look of a working boat's hull.

Guide coat

Ideal for large surfaces, this magic powder is used to reveal highs, lows, scratches, blemishes and uneven filler or primer that may need further attention before we start painting. It's worth remembering that with spray painting in particular, even the most miniscule defects are liable to show through the very thin layers of paint applied. It therefore avoids having to rely on filling and sanding paint, which often doesn't look very good and isn't pleasant.

Getting colourful

Now we colour....

When it comes to application, though, most automotive paints are not compatible with the type of airbrush we use for modelling purposes. So, unless you already have, or are prepared to go to the considerable expense of investing in, a spray gun specifically designed for working on full-sized vehicles (i.e., with a nozzle able to cope with the larger size particles found in automotive paint) and an appropriately sized tank compressor, the use of automotive paints may not be you. Other factors to bear in mind are that, a) unless

"Most automotive paints are not compatible with the type of airbrush we use for modelling purposes... Some can be purchased in ready to use cans featuring a wide-angle spray tip, but they don't work at the same pressure as either a modellers' airbrush or automotive body shop spray gun"



Metallic paint – depth of colour will be affected by the primer chosen as a base and the number of coats of paint applied.

working outdoors, an automotive body shop spray gun is going to require a much larger workspace, and a very well-ventilated one, and b) automotive paints usually come in either ready to spray litres (i.e., pre-mixed with the appropriate amount of thinner, or as base litres that will need thinner to be added), which is enough to spray an average sized car! Some automotive paints can be purchased in ready to use cans featuring a wide-angle spray tip; but they don't work at the same pressure as either a modellers' airbrush or body shop spray gun.

On the plus side, the automotive industry does offer an absurdly large range of gloss, matte, satin, metallic, pastel, pearl, etc, paints, in all the car/bike manufacturers' familiar colours, to choose from. And have you heard of chameleon paints? Candy? Speciality paints such as these

“If you're planning on including a metallic or pearlescent element to your colour scheme, be aware that the metallic or mica flakes added to automotive paints can sometimes appear overly chunky/sparkly when viewed at close quarters on a small-scale model. If this is a concern, it's probably best to stick with modelling specific paint – if necessary, adding some scale model pigment powder to achieve the desired effect”

won't be appropriate for warships, hardworking commercial vessels, etc, of course, but how nice would it be to sail, say, a yacht finished with a teak deck, full gloss mahogany accents and a pearlescent-white and red candy paint finish. Candy paints break light beautifully, and with all reflections off the water surface the effect can be spectacular. Is it worth it? Always. The only limit is your imagination.

Back tracking a little, though, your colour/s should be decided upon before choosing your primer. A light primer will result in a lighter final colour finish, whereas a black primer will darken it. Light grey or grey is often favoured for its neutrality.

With spray paints, the more layers applied, the darker the final effect will be. Take care to achieve good, even coverage on every sweep, and be sure to treat each individual part to the same number of layers, otherwise, your model is going to look as it might after multiple trips to local boat yard for repairs/respraying following a series of unfortunate accidents!

If you're planning on including a metallic or pearlescent element to your colour scheme, it's worth noting that its glistening lustre won't, even after your paint has dried, become fully evident until topped with a layer clear coat. It's also important to be aware that the metallic or mica flakes added to automotive paints can sometimes appear overly chunky/sparkly when viewed at close quarters on a small-scale model. If this is a concern, it's probably best to stick with modelling specific paint – if necessary, adding some scale model pigment powder to achieve the desired effect.

Clear coat

After applying colour, automotive paints should be covered with clear coat. Different options are available, mainly gloss and matt varieties, but there are also versions that are more or less scratch-resistant.

Most clear coats are two-component products, i.e. clearcoat + hardener, which need to be mixed in accordance with the manufacturer's instructions. It's highly advisable to buy both components from the same manufacturer to avoid unnecessary problems/issues. For less experienced painters there is a third magic component available – a stabilizer.

As clear coat is a bit thinner than paint, we have to work harder to prevent runs, but we can apply clear coat 'wet on wet', meaning we don't have to wait for the first layer to harden before applying the second. After applying clear coat, we very often get a surface resembling orange peel. Clear coats can be sanded and polished, but it's worth checking how much time the manufacturer recommends you should leave before tackling this. Clear coat can



Automotive pearlescent paint right after application and initial flash-off.



The pearlescent paint after being covered with clear coat. Note the visible difference in colour and reflection compared to the paint directly after application.



A budget spray gun.



A spray can with a trigger handle.



A painted hull ready to receive its first clear coat.



The final clear coat layer. Note the visible orange-peel effect.

take several days to cure and reach full hardness, and in the early phase of doing so it will still be prone to damage. Any runs that appear can be sanded with wet high-grit sandpaper, and it's best to use sanding blocks. Spot sanding is not recommended because it will be visible on the surface.

Sanding

Almost every model build will involve a degree of sanding. Indeed, even with kit builds, shaping or removing the so-called tabs from laser-cut parts will be the bare minimum.

We usually use metal or other types of abrasive files, along with sandpaper sheets or sanding blocks basic grits being 80, 120, 240 and 600. Dry sanding is one of the foundations of modelling.

Wet sanding or machine sanding is also used. Wet sanding usually comes into play in the finishing stages, with sandpaper grit of 1000, 1500, and sometimes even 3000 if we want a 'mirror-like' effect. We'll come back to 'mirror-like', but many building materials (for example, wood or cardboard) and water are not a good combination, until, of course, the model is properly sealed.

With machine sanding you need to be careful because everything happens fast and with less control than by hand. Sanding machines are usually much harder to match to a model's size, and as a result the machine's sanding pad tends to be only slightly smaller than the surface being sanded. We're talking about tools used in automotive work rather than the precision modelling tools, which are often eye-wateringly expensive. You can buy a basic sanding tool in a 'big box' store for very little money, but it may not be very helpful, not only because of the surface area sizes and unusual shapes we as modellers find ourselves needing to sand but also because of the surfaces themselves.

Valued for their versatility, various sponges are also available. I, however, find these prove almost impossible to use while applying pressure evenly across their entire surface. My preference, therefore, is to use abrasive sheets (cloth-backed or paper) and a block (made up either from plastic, hard foam or a piece of wood).

Sanding allows us to smooth and remove defects from just about any surface. With plastic, wood or a filled surface, inspection powder is perfect for checking whether we've achieved a smooth enough surface.

Metal, however, can be sanded and/or polished with compounds until we achieve a mirror-like effect (told you I'd come back to this!). With small metal parts, such as the ones supplied in



A well-painted model will look beautiful on the water, giving great light reflections.



Different types of sanding sponges.



Abrasive sheets.



Hard polishing compound in bar form.

kits, this can be done using micro tools (screwdrivers or grinders fitted with dental or cosmetic like tips).

Protection

After finishing work on our painted surfaces (whether having used

automotive or modelling paint), it's worth protecting them further. Shielding surfaces from UV is certainly something to think about. What's more, with working as opposed to display models, adding a hydrophobic layer will mean there is less chance of

“Ceramic and graphene are often alcohol-based liquids, so do first check whether the paint and/clear coat you’ve used is resistant to alcohol based-solutions; if it isn’t, or you’re not sure, always use wax”

any stains forming on the paintwork – and if they do, this layer will make them much easier to clean off. For this we can use waxes (natural or synthetic) or specialist coatings (such coatings most often being ceramic or graphene). Bottles of the latter are tiny, containing about 10-20 ml, but as that's sufficient for a small or medium-size car, it will certainly be enough for a few models, and the cost isn't shocking. The effect, however, is exceptional. Hydrophobicity and surface slickness become very high. As a caveat, however, ceramic and graphene are often alcohol-based liquids, so do first check whether the paint and/clear coat you've used is resistant to alcohol based-solutions; if it isn't, or you're not sure, always use wax.

Lubrication

We can also use automotive products when choosing greases and oils to free up stuck parts or prepare them for R/C use (so that elements are protected from water and friction is reduced). Many products are now available in spray form with a 'straw', which makes use easier. Rust penetrants, thick greases, silicone greases and even so-called dry lubes can be very useful for lubricating drive shafts and rudders and for filling shaft tubes to prevent water ingress. The manufacturers usually provide purpose suitability descriptions and detailed usage guides, which are worth reading through in order to select the right product for your needs.

PPE

Before using any of the products and materials mentioned in this article, please consider how best to protect yourself against potentially harmful effects. Always have both regular masks and painting masks (these have an extra filter), gloves and safety glasses easily to hand and ready to use, and, likewise, as previously mentioned, make sure your chosen modelling room, workspace or garage is well ventilated.

The automotive products discussed in this article can make certain aspects of our work so much easier and improve the look of our models, but let's use them with common sense! ●



Evelyn

Having never built a plank-on-frame hull before, **Martin Crapper** bravely set to work on this Porthmadog brig, affectionately known in her day as the 'Pudding Ship', ultimately achieving sweet success...

My first foray into scale sail was back in the 1980s. The subject, a 'Western Ocean Yacht' (a topsail schooner), was chosen because of the commercially available 1:32 scale GRP hull for the *M.A. James*, measured and drawn by David R. MacGregor. The research put in ahead of and during this build, however, saw me develop a huge interest in the smaller trading vessels of the British Isles and the hard men that worked them. In amongst the references consulted were

Immortal Sails by Henry Hughes and the later *Porthmadog Ships* by Emrys Hughes and Aled Eames, each of which contained stories and photographs of one of the last British brigs in regular service, the *Evelyn*, a cargo ship built in Porthmadog and finally lost in the Atlantic in 1913. In her day, *Evelyn* was affectionately referred to as 'Y Llong Bwdin' (the Pudding Ship) – because the food served on board was, reputedly, delicious. She was also known as 'The Lucky Ship' – as up until that last fateful

voyage, she had never lost a man or met with any serious misfortune. I knew immediately that I wanted to build this lovely fully square-rigged vessel, but the truth is it took me another 40 years to summon up the courage!

Across the decades, though, she was always in mind, as, along with the aforementioned schooner and a ketch I'd subsequently built, I had this brig earmarked to complete a trio of small British trading vessels.

What's more, *Evelyn* promised to



“The aim was to build a working model that would simply but beautifully give impression of the real vessel under sail, as opposed to a delicate museum quality static scale replica”

similar vessels and eventually settled on Harold Underhill’s drawings of the wooden brig *Marie Sophie*, available in 1:48 scale. As I wanted to build *Evelyn* to 1:32 scale so that she’d match the other vessels in my fleet, I adjusted the measurements based on the keel length of 107ft 2in as quoted in the launch account, giving a scale keel length of 1,002 mm, and used a photocopier to scale up the lines plans. It was clear from photos that both the bow and the stern of the *Marie Sophie* were wrong for the *Evelyn*, so I also had to make some alterations, which I did largely by eye.

The build

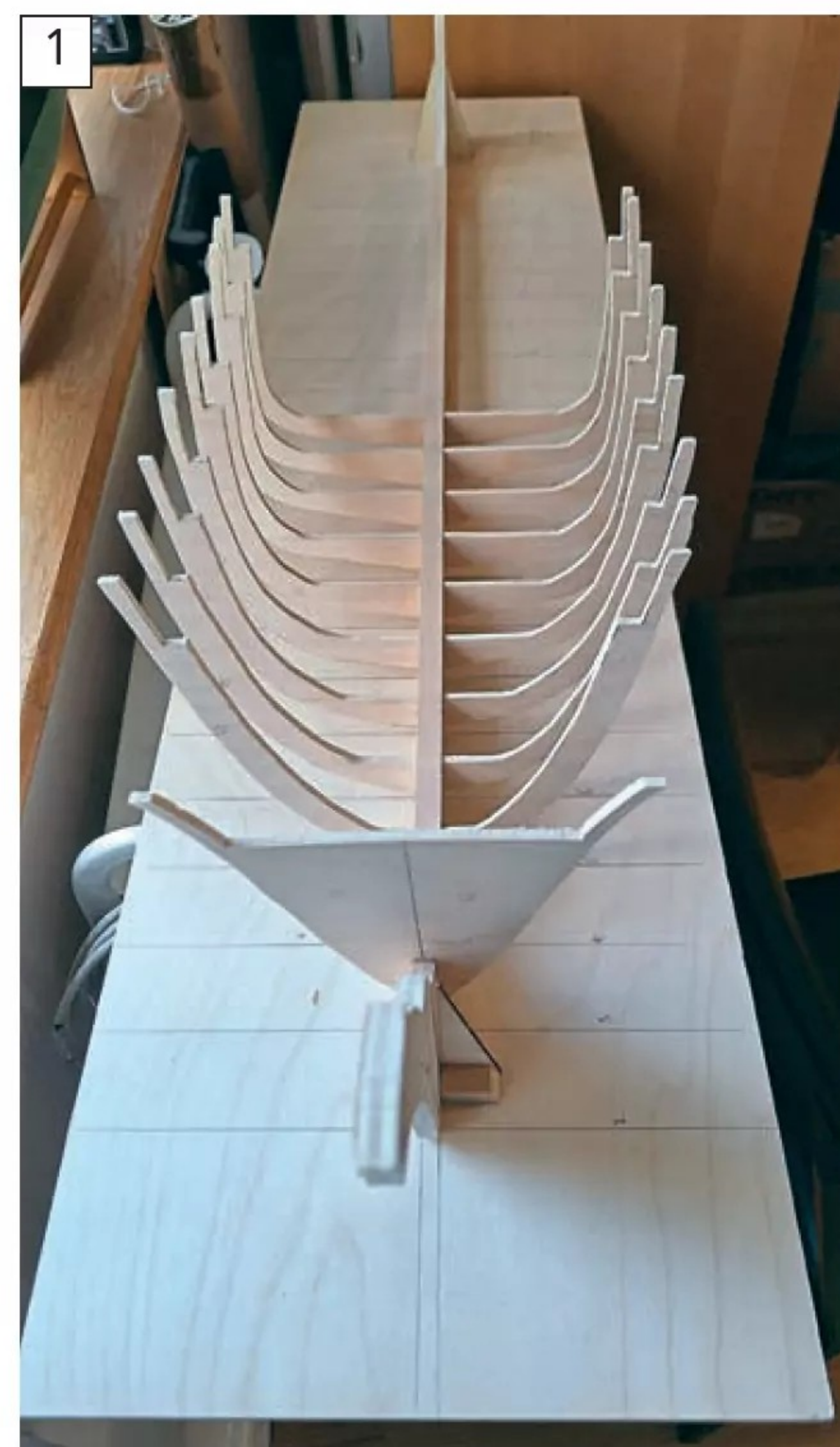
I began the build by making cardboard mock-ups of the frames before cutting out the 5 mm plywood ones I would use for the model and setting them on a 12 mm square strip wood keel (see **Photo 1**).

Having cut out my frames, the next step was planking. Here I used 8mm x 1.5mm limewood strip, where necessary wetted and heated with a steam iron so it could be bent to follow the ship’s curves, with everything pinned in place while the white glue dried.

After much exterior wood filler had been applied and a great deal of sanding undertaken, the fibreglass went on, both inside and out. The result? A hull that was at least as symmetrical as the three commercially moulded ones I’d previously used, and which was

rigid, watertight and a reasonable approximation of what can be seen in the few surviving photos of *Evelyn*. Admittedly, there should be a slightly more pronounced angle towards the stern and perhaps a bit more sheer, but this isn’t something that’s evident when the model is sailing.

The next step was the detachable, ballasted sailing keel. I marked the waterline, launched *Evelyn* in the bath and added lead from a roll of flashing until I had the correct weight – about 10 kg (see **Photo 2**). I then calculated the required size, made a wooden mould, melted this lead over a



Evelyn partially framed up.



Determining the ballast required in the bath.

be a project that, without spending a fortune, would keep me entertained for a good amount of time. Ultimately, the aim was to build a working model that would simply but beautifully give impression of the real vessel under sail, as opposed to a delicate museum quality static scale replica.

The thing is, though, I had never built a hull before; all my previous models having been based on commercially sourced moulded ones. This was going to be a learning experience!

Sizing things up

The first problem I encountered was that there were no drawings. The account of *Evelyn*’s launch from January, 1877, makes a cryptic reference to her ‘drafting’, but it’s likely she was built from a half model (a, usually wooden, exact-scale, 3D representation of one side of a ship’s hull, mounted on a board), and, of course, she was lost well before documenters like David R. MacGregor could have got to her. I therefore searched for lines plans of

3



The completed detachable sailing keel with cast lead ballast.

“This wasn’t undertaken lightly... I first carried out a risk assessment, developed a method and employed a range of safety precautions”

camping stove using an old saucepan and cast it into a rectangular blob – this being done in three stages as the saucepan couldn’t take the full 10 kg in one go. This wasn’t undertaken lightly (no pun intended). I first carried out a risk assessment, developed a method and employed a range of safety precautions before moving heavy pans of molten metal around. I wasn’t particularly bothered about making the sailing keel streamlined; since models generally sail too fast for scale, a bit of extra drag usually isn’t a problem. The rectangular lump of lead was then bolted to a plywood fin, which attaches (by means of wing nuts, which are easily applied and removed at the lake side) to three bolts fitted through the hull, and epoxied permanently into place. (see **Photo 3**).

At this stage, I had to consider the working arrangements.

Firstly, I needed to ensure the location of the masts was correct so that the step and partners could be arranged to support them. The *Marie Sophie* drawings were of no use here, so I had to resort to photographs in the two aforementioned books and on the Porthmadog Maritime Museum’s website (<https://portmm.org/>). I then selected suitably sized dowel from which to make the lower masts and their supports.

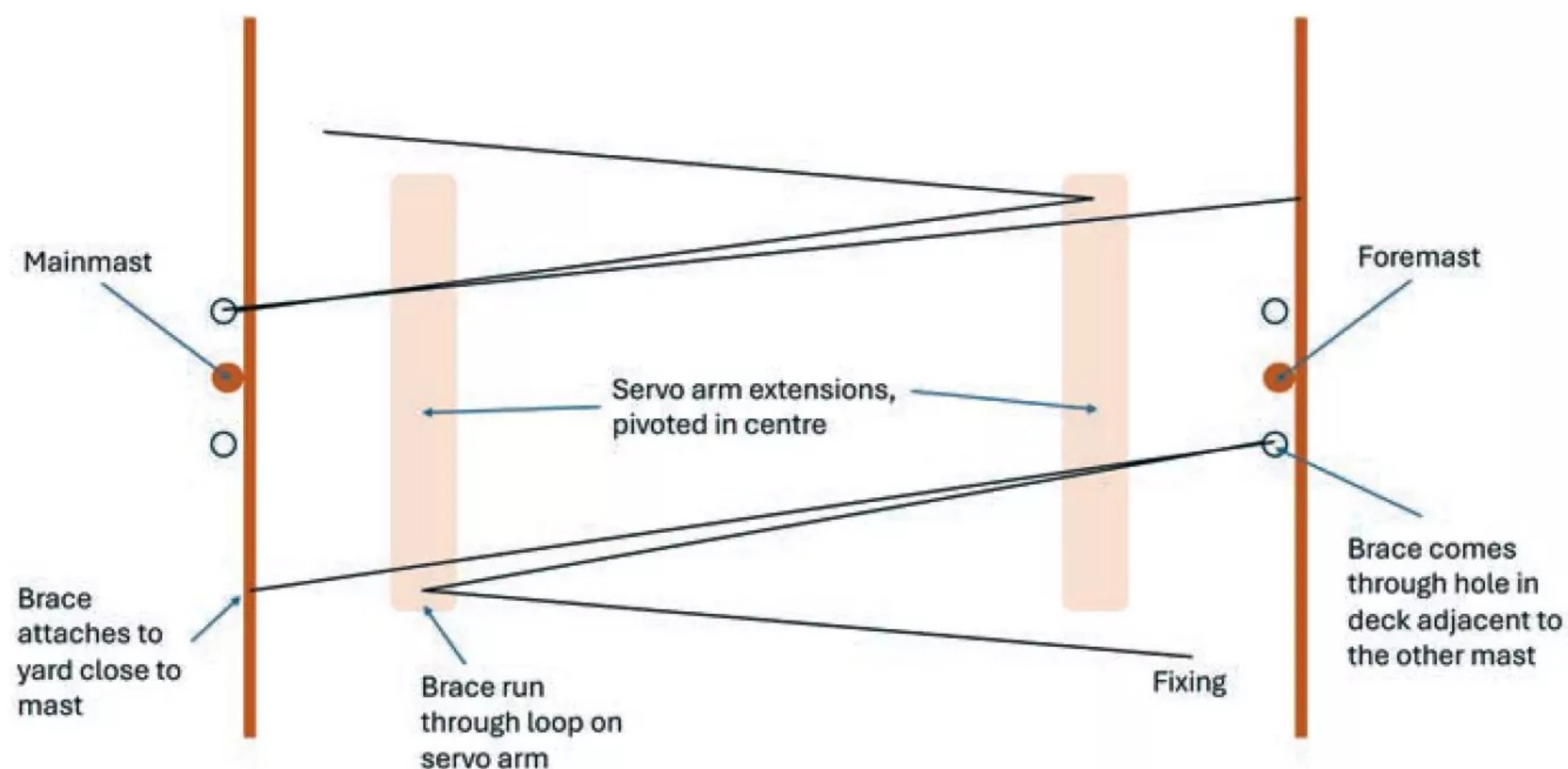
I then had to think about how to operate the sails (see **Photo 4**). I have the good fortune to be a member of the same model boat club as Nev Wade, whose articles on square riggers frequently feature in this magazine.

While his models are all smaller scale versions of larger prototypes than mine, his advice on arranging servos to work square sails proved invaluable.

As a result, my model has two centrally mounted servos, one for the square sails on each mast, a further one for the spanker and one for the steering – the latter mounted in the whaleback wheelhouse at deck level. The working arrangement for the square sails is as shown in **Figure 1**; the looping of the braces through screw eyes on the extended servo arms before belaying them to fixed points giving a little extra movement, and the working braces are not connected to the yard arms but much closer to the mast, again amplifying the movement. In a similar vein, the spanker sheet attaches relatively close to the mast, rather than at the end of the boom, to give more movement than a servo arm would otherwise allow (see **Photo 5**).

Fig 1

The working arrangement for the square sails

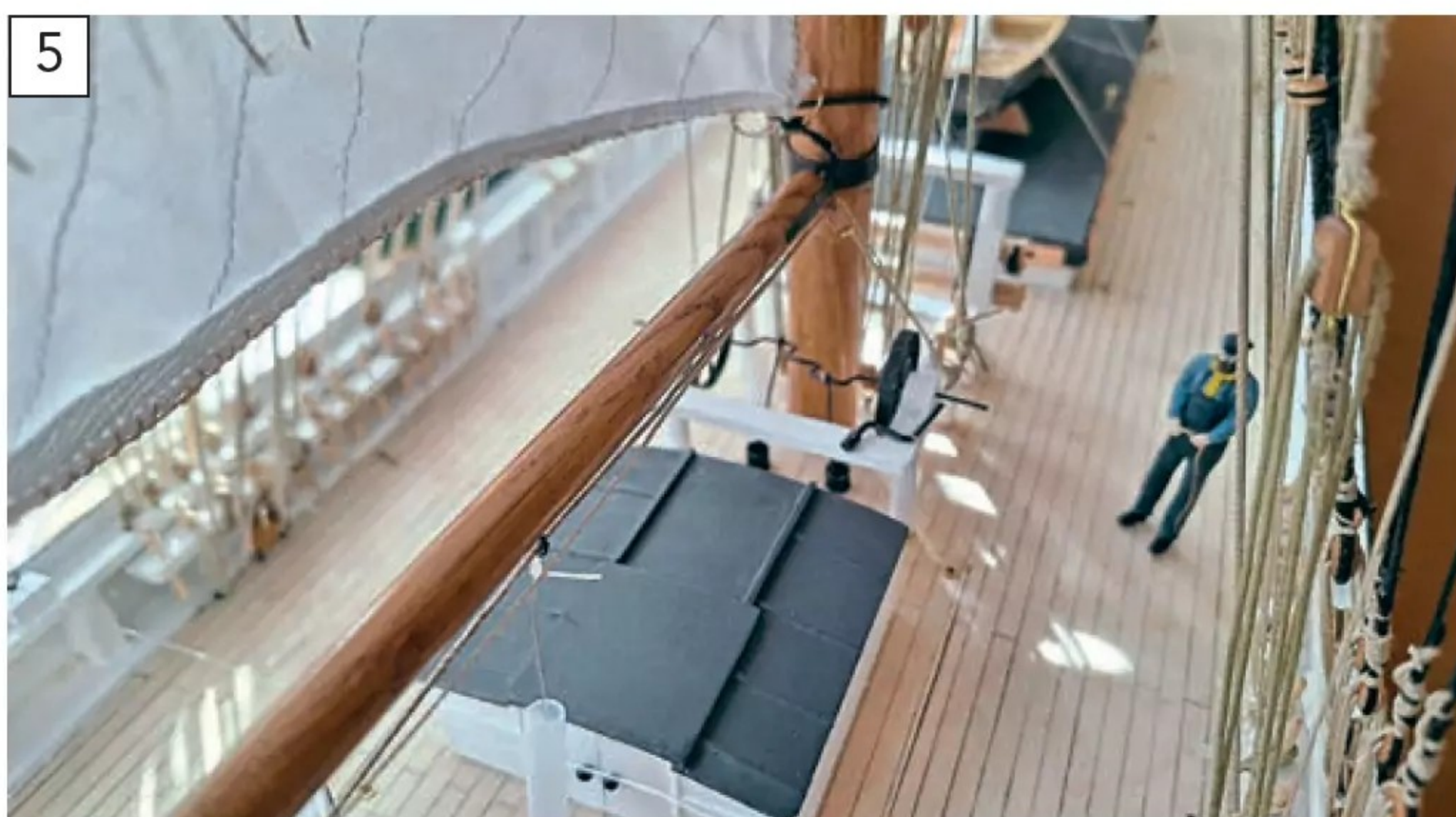


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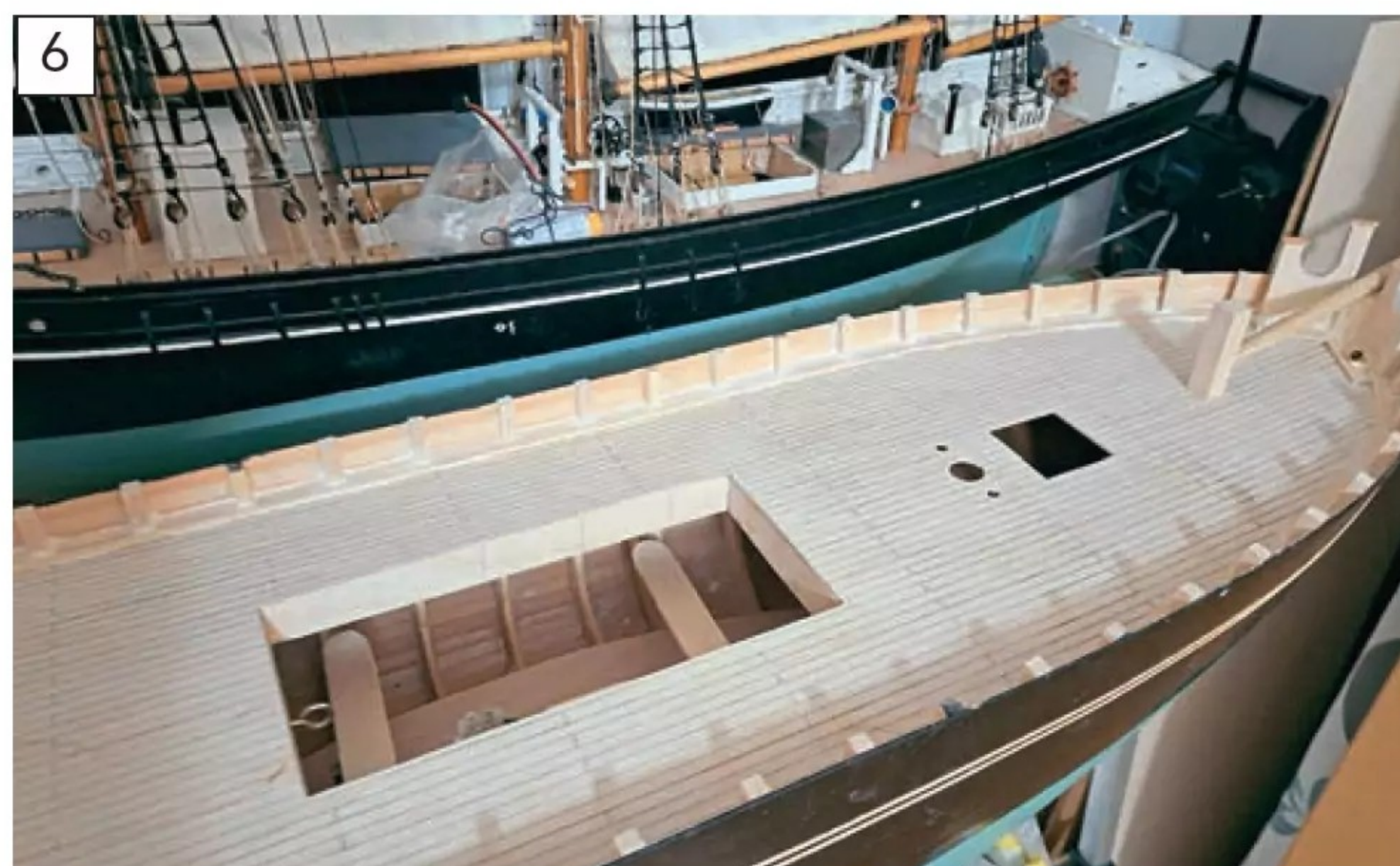


The hull, well on its way to completion, showing the mast steps and partners, with the unfinished masts resting in place.

Having fitted the servos (planning their location carefully so that, for future maintenance purposes, they can be accessed through hatches), the deck was cut from a piece of 1.5mm ply. Rather than actually planking my deck, the individual ‘planks’ were delineated with a soft pencil; it’s a method I find works very well on sailing models designed to be viewed from no nearer than about a metre and a half away as they float on the pond (see **Photo 6**).



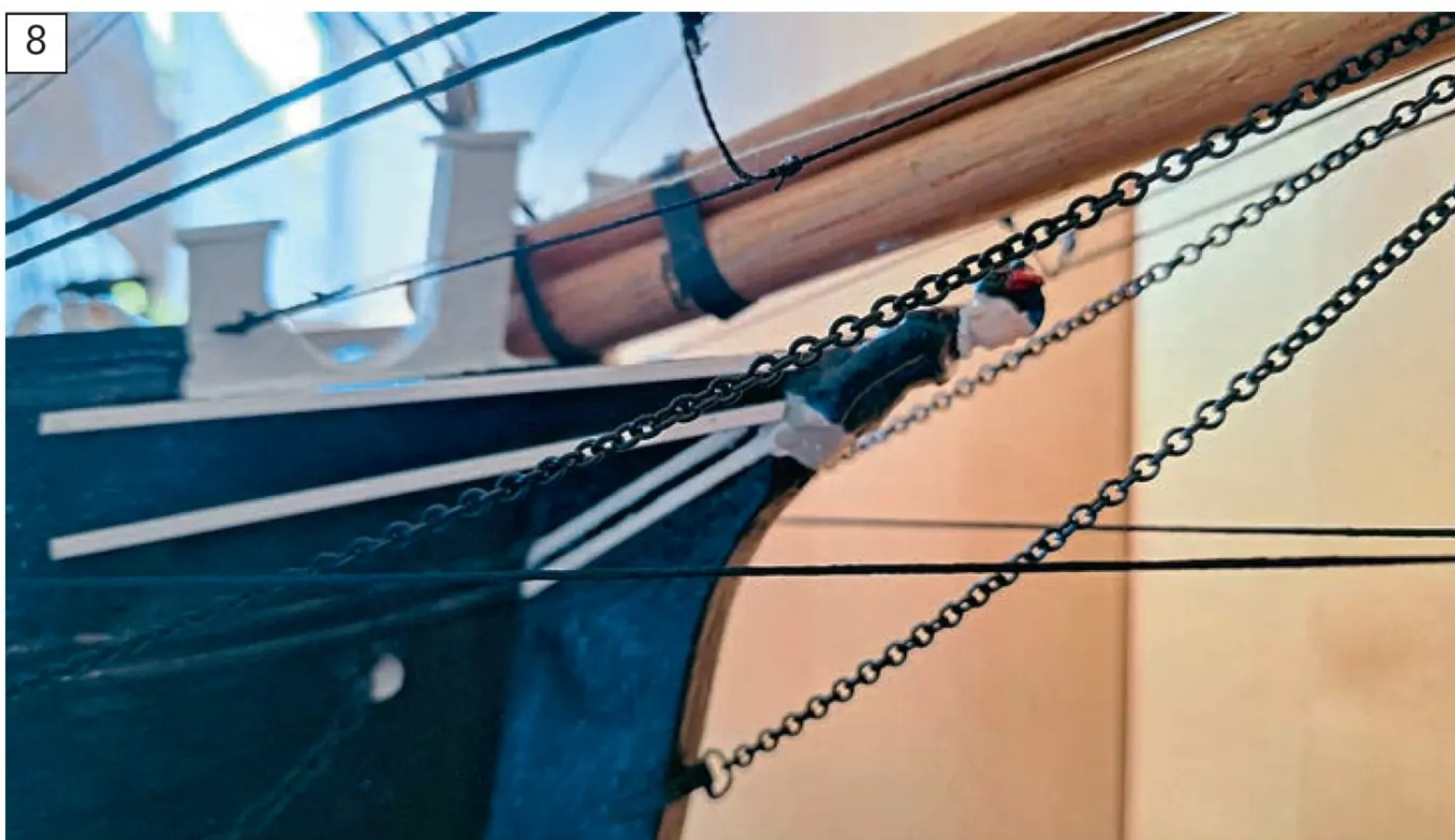
To the fore, the working spanker sheet. The braces for the foremast yards are well disguised behind the 3D-printed pump wheels.



The deck 'planking' pencilled on, with knightheads and pawl post fitted.



The foredeck, showing the windlass with its 3D-printed pawl housings and ratchet wheels.



The figurehead, a much-carved Modelu Victorian lady.

Most of the deck fittings were made from plywood of various sorts, although I did use some commercially sourced components (e.g., the wheel, lifebelts, and, of course, the crew). The anchor windlass and pump wheels, however, were 3D-printed by my daughter's nice young man (see **Photos 5 and 7**) after I'd spent

some considerable time in front of a computer watching YouTube videos on how to create files for them in FreeCAD (a fully functional, free, open-source CAD package). I have now mastered this skill and will use it again on future models. The figurehead was a much carved about Edwardian lady obtained from

Modelu – she represents Frances Evelyn Greaves, daughter of the quarry owner and early Director of the Ffestiniog Railway (see **Photo 8**).

After much fettling and painting, my hull was finished, and I was ready to turn my attention to the masts, spars and rigging. I spent a lot of time getting the proportions of the various spars as 'right' (based on the reference photos) as I could and also began to reflect on practicalities such as how to get the model in the car for transport to the lake without incurring any damage. I have access to a small hatchback, so it was apparent at an early stage that a model this big would need retracting topgallant masts in order to fit. It would also have to travel with the sailing keel removed, to be bolted on at the lake side. I did consider making the jib boom retract as well but eventually decided this would be next to impossible. Fortunately, a trial with masts and everything cut to length and taped together established that the retracting topgallant masts alone were enough and the jib boom could be left as a permanent fixture.

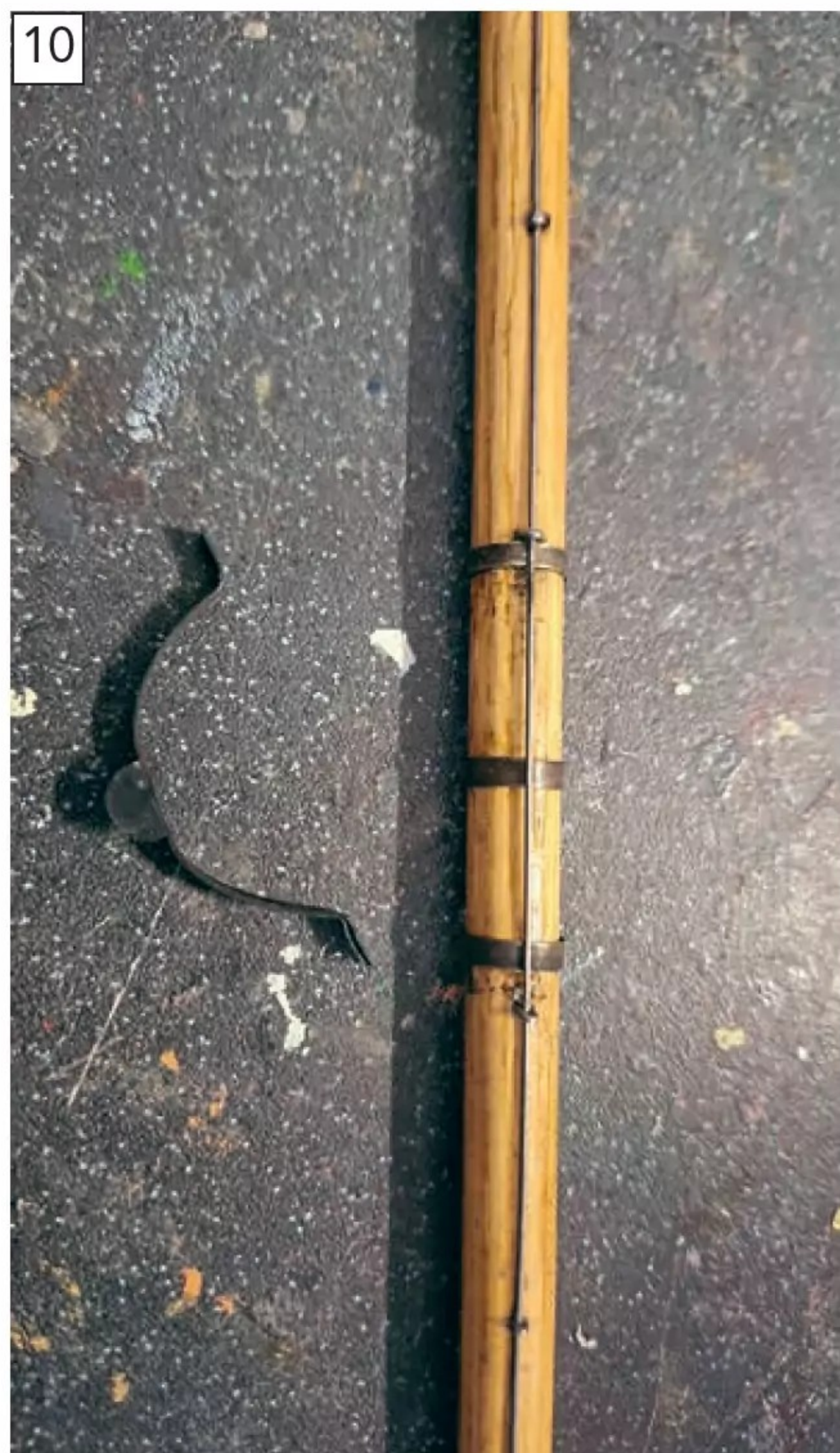
I tapered the spars using a pillar drill, swung sideways so that a spar held in its chuck dangled down the side of my work bench. I sat there with sandpaper for some hours until all were satisfactorily done, creating tapers as indicated in tables in Harold Underhill's *Masting and Rigging: Clipper Ship and Ocean Carrier* (an invaluable tome) and making tops and cross trees from strip wood of various dimensions (see **Photo 9**). The ironwork components were fashioned from brass shim stock, blackened using Birchwood Brass Black (see **Photo 10**). I obtained some very small, black screw eyes from a well-known online retailer, which provided anchoring points for the rigging. The mast rings that hold the luff of the spanker to the main mast were disc-cut from brass tube using a Dremel rotary tool with a suitable attachment

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A close-up of the foretop, showing the complexity of the cosmetic rigging.

10

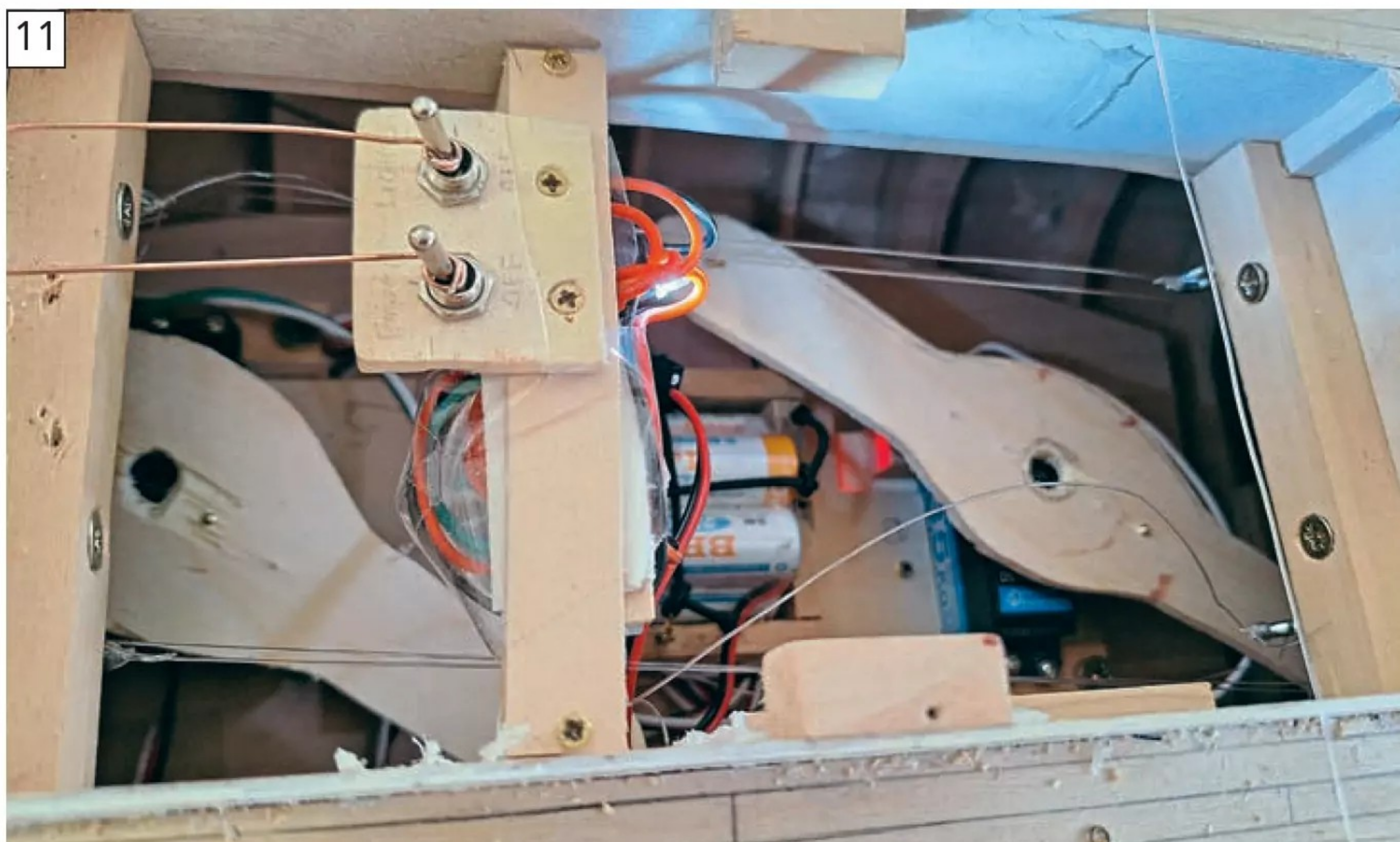


The ironwork for the main yard.

– an interesting exercise that required goggles, fire safety precautions and a certain amount of bottle!

There are two important aspects when it comes to the rigging, one is its functionality in terms of radio-control, and the other is that it looks

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A view through the main hatch, showing the servos for the square sails and their mounting. The fishing line braces can also be made out.

reasonably realistic on the model. I was determined to represent as much the rigging as I could, provided it didn't get in the way of the model's operation. I endeavoured to realistically recreate everything, apart from the braces on the square sails and the vang and sheets on the spanker. Lifts, sheets, clew lines, bunt lines, leech lines, reef points and reef tackles were all fitted and run as near as I could fathom to where they're supposed to. For this I used Underhill's book as a reference

and cord of various lengths and thicknesses, mostly supplied by Cornwall Model Boats (see **Photo 9**). The working braces were made from nylon fishing line to reduce friction and make them less visible; there are two sets for each mast, one to the lower yard and one to the upper topsail yard, the two joining well above the deck and being linked to the same servo. The sails were made from an old cotton sheet, with the stitch lines between the bolts of canvas and the tape around the

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Evelyn on her sailing stand, with keel fitted.

13



A maiden voyage shot Evelyn taken soon after she was launched.



Evelyn on the starboard tack.

“Completing her didn’t come cheap... What’s impossible to put a price on, though, are all the things I learnt while building Evelyn”

edge having been sewn by a kind neighbour on her sewing machine. I used ‘eyes’ from haberdashery ‘hooks and eyes’ for various cringles and the hanks that attach the jibs and staysails to the stays. If anyone would like to buy a load of hooks without eyes, do let me know!

Adding the cosmetic rigging resulted in increased friction in the motion of the yards, so I had some issues with the square sail servos, eventually replacing them with high torque, 270° versions in the same locations, but with improved fastenings (see **Photo 11**). I had correctly planned access via the removable main hatch cover, so this wasn’t too difficult to do. I also had

to move the switches – one for the power and the other for the LED in the stern lantern – to accommodate the run of the braces beneath the deck, something that should have been obvious at the start.

So, to the water...

The first outing didn’t last long. I proved that the retractable topgallant masts were workable, and I was able to check that I had the trim right, but I managed to get the foresheet caught under the hatch cover and the result was a broken servo arm, so it was straight back to the workshop for repairs.

24 hours later it was back to the lake (see **Photo 12**). This time a successful sail was achieved, with the model looking superb and giving a credible impression of real *Evelyn* under sail as captured in the photo reproduced in *Porthmadog Ships* (see **intro shot and Photos 13 to 15**). She went well to

windward, would tack, and, when the breeze picked up, would also give the racing yachts out on the lake a good run for their money.

There were, however, some teething problems, in that the braces under the deck would catch the wiring from the radio receiver and cause breaks in communication at crucial moments. It was, therefore, back to the workshop so that the radio receiver could be moved, thus ensuring there was no further risk of anything catching the wiring.

I’ve since been out with her a few more times and am still learning how best to transport her, set her up and, of course, sail her in various different wind conditions.

Thrills & skills

I’ve largely achieved my objectives with *Evelyn*. She’s a good representation of the prototype, looks fantastic on the water and has kept me entertained for

over a year now. But completing her didn't come cheap. Total expenditure (fortunately, spread out over quite a long period) totted up to well over £1,000.

What's impossible to put a price on, though, are all the things I learnt while building *Evelyn*. I now know I can plank a hull, build the majority of the fittings from scratch myself and draw up any I can't/don't want to for 3D-printing, and successfully tackle the rigging. Of course, there's still plenty of room for improvement; for example, the evenness of my woodwork, the refinement of my metal work, the quality of my painting, the neatness of the seizing on my rigging, and the inclusion of much more detail, such as parcelling on the standing rigging – all things to be considered when working on future projects. But, overall, I am now confident that I can build just about anything I want to a reasonable standard.

The question now is, what next? ●

Reference sources

- *Immortal Sails* by Henry Hughes, 1977, T. Stephenson & Sons Ltd, Prescott, Merseyside.
- *Porthmadog Ships* by Emrys Hughes and Aled Eames, 1975, Gwynedd Archives Service, Caernarfon.
- *Masting and Rigging The Clipper Ship and Ocean Carrier* by Harold Underhill, 1946, Brown, Son & Ferguson Limited, Glasgow.

15



Heeling gently on the port tack.



Nonsuch

Charles Oates pays tribute to the artist/inventor Rowland Emmet with this wonderfully whimsical and delightfully detailed model boat build...

About a year ago this magazine published an article about my Comet boat, a Taycol powered oddity. In that article I mentioned a long-term project. Well, it's finished at last, so I can now share it with you. It's my homage to the comical inventor and creator of amazing kinetic art Rowland Emmet.

The backstory to this build is a strange tale, one that started a long time ago when I was very young. Before I get in to all that, though, I had better introduce the man himself, because in our changing world there will be people who've never heard of him – and they're missing some delights!

Rowland Emmet was born in 1906, the son of an amateur inventor in London. At school he showed a huge aptitude for drawing caricatures of his teachers

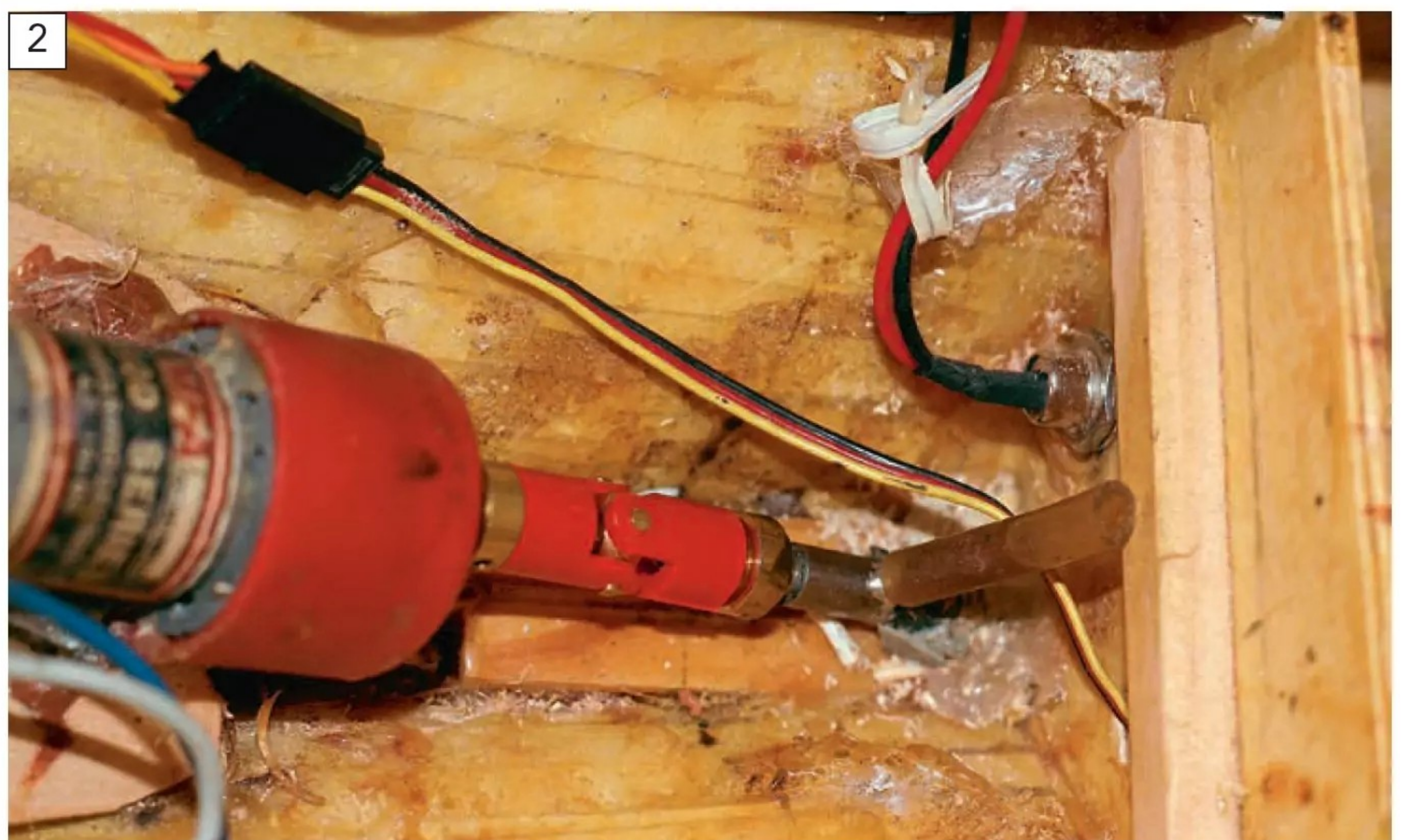
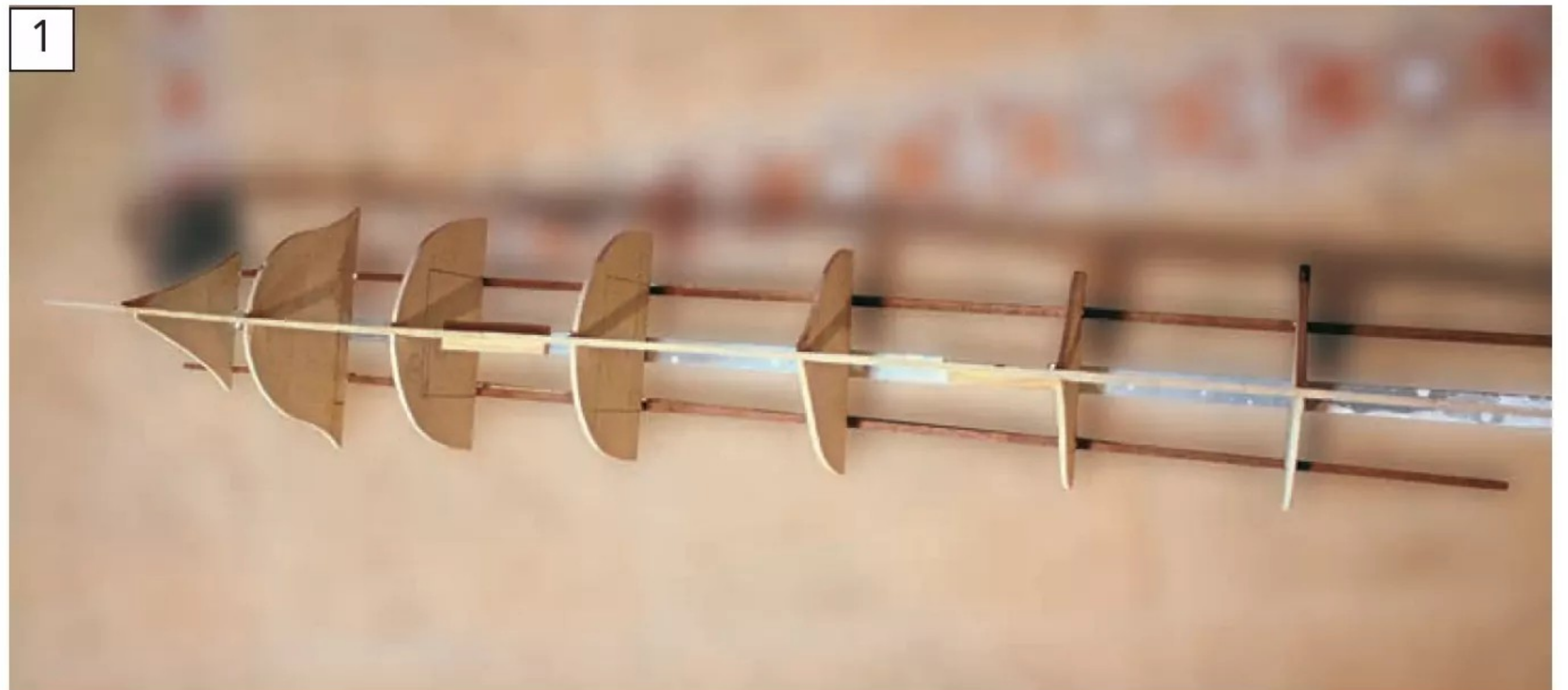
and machinery, a skill that he embraced later in life to produce all the things he became very famous for, cartoons and extraordinary machines, now labelled kinetic art.

Let me cut to the chase here, Emmet built some of the wackiest machines ever conceived, very often out of ordinary household items. If his wife found a colander, fan or whatever missing, she would know that Rowland had pinched it for a new construction, and he always had a rather tall tale that described what each machine did. As time passed, he became most famous for his railway-themed cartoons and constructions, especially the Far Tottering and Oyster Creek railway featuring *Nellie* the locomotive which ran at the Festival of Britain in 1951. He achieved much wider fame after

designing and building all the crazy inventions of Caractacus Potts in the film *Chitty Chitty Bang Bang*.

In 1970 I took a job in Leeds, and while exploring this new to me city I came across an immense glass case in a shopping centre holding Emmet's '*Featherstone kite openwork basket weave mark two gentleman's flying machine*'. For the longest time I found myself just standing and staring at the thing, which featured lots of moving parts. It was ridiculous and yet logical in equal parts, both in its concept and construction.

After this, I moved through life making perfectly normal model boats. Following retirement, though, my wife and son, who I'd frequently banged on to about my love of Emmet's machines over the years, finally ganged up on



me, pointing out I should just build a ***** Emmett boat and get the obsession out of my system. So, I did, and this is how I went about it...

Sizing up & shaping ideas

I wanted to build a model big enough to hold a few working bits and pieces but not so big that lifting it would prove a major challenge. I reckoned that about 4 feet (1.2 meters) long would be as much as I could manage, as *I'm not* as young as I once was!

I also had to think about the hull shape. I knew the model would have to accommodate a *faux* steam engine, boiler and lots of working bits up top, but this would make her liable to flip over in the water – and sailing her upside down would be a bit weird, even by Emmett's standards! Some very old potential approaches to hull design, therefore, popped into my head. I recalled reading that a cod's head and mackerel tail shape was considered by some best suited to hulls back in the 1500s; not true, of course, but perhaps ideal for what I wanted. In practical terms, this meant a very full, bulbous, front end tapering to a fine stern. This would allow me to

put plenty of ballast low in the model, which was just what I needed to do.

Out came a pile of old plans. I had nothing that was suitable but a steam launch plan caught my eye. I worked out that if I increased the bow width and extended the overall length it should be fine. So, I scanned the plan one section at a time, then messed about with the various sections on my laptop. A couple of weeks later, while I still didn't have a full plan, I had managed to produce the lines for the keel and the bulkheads for the hull.

Crafting the hull

Finally, after 50 plus years of talking about it, it was a great feeling to be actually starting the build.

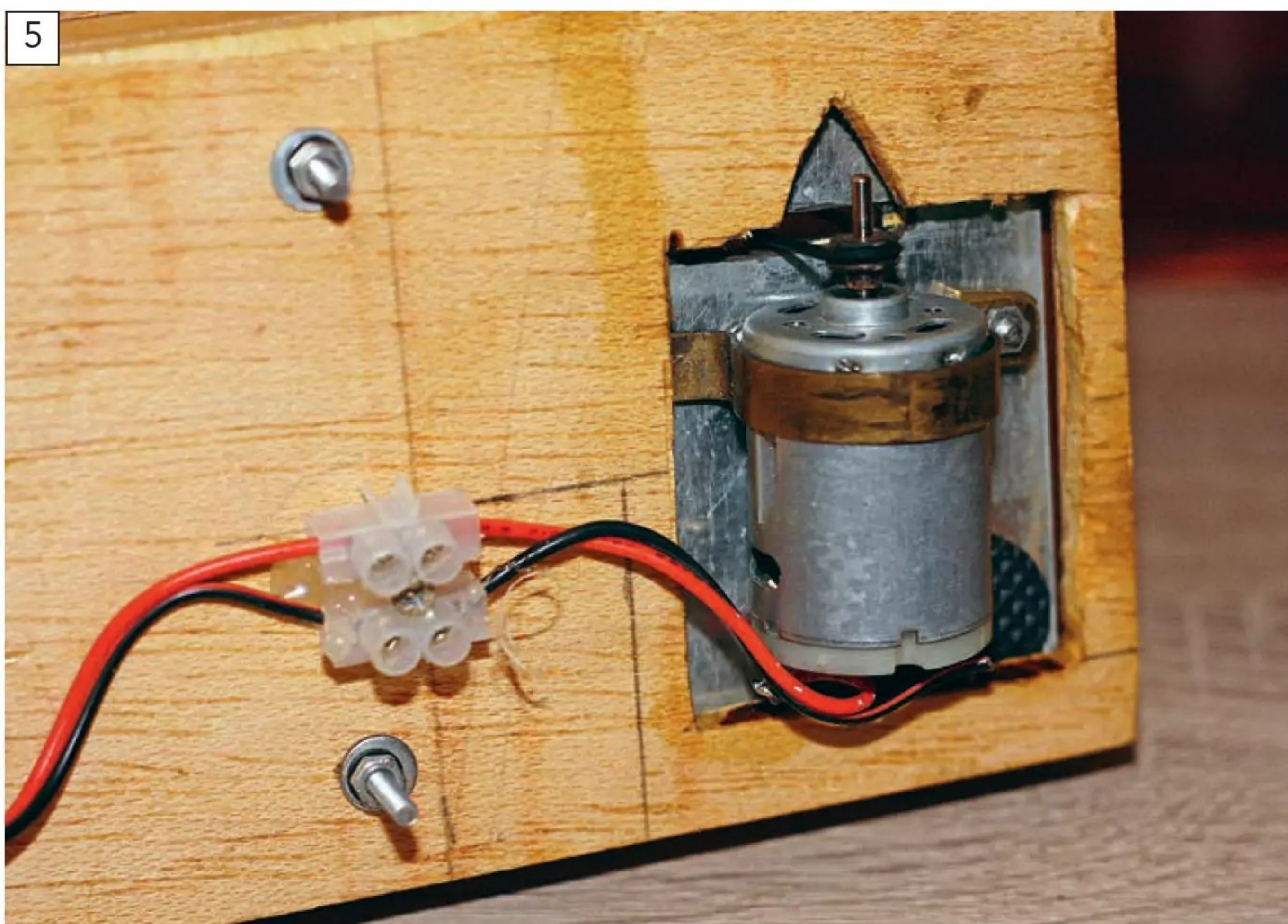
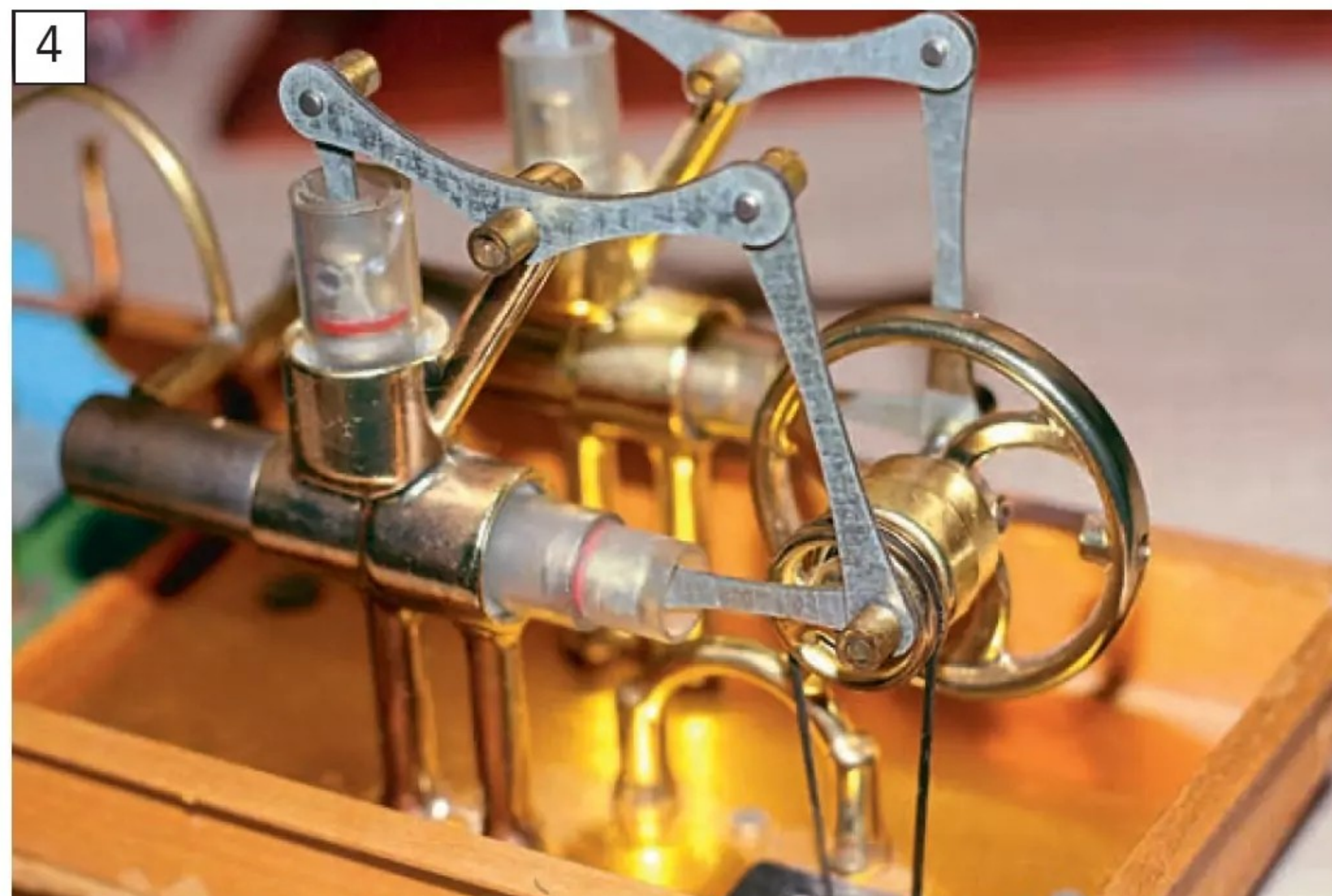
But, after cutting out the keel, I realised I'd made a fundamental beginner's mistake. I'd used wood that was far too thin. Any sensible person would have shrugged his shoulders and started again, but I didn't. I blocked it onto a rigid baseboard and placed the bulkheads in situ, this allowing me to check the lines. All was well. I seemed to have done my drawing of the hull correctly. So, I glued the bulkheads into place and, once the glue had dried, I released the frame

“Knowing I'd probably want to make alternate gizmos at a later date, I designed the model with drop in box sections, each able to accommodate different Emmettish creations”

from the board and screwed a metal strip to the tops, along with two strips of mahogany to keep everything rigid and square see **Photo 1**).

Planking a hull has been covered many times in this magazine, so I won't bore everyone by describing the process, suffice to say that this must be about the 50th model I've planked, and it all went perfectly normally.

This process was done over about six months of very part-time work, much of that spent in rubbing down and using umpteen coats of yacht varnish. Once satisfied with the exterior finish, I made up some liquid epoxy and then poured it into the hull, brushing it into all the cavities and the underneath of the deck; the aim of this being to make all the wood stable and, hopefully, the model long lived.



I'd fretted out the centres of most of the bulkheads so that the internals could be fitted. Knowing I'd probably want to make alternate gizmos at a later date, I designed the model with drop in box sections, each able to accommodate different Emmettish creations. This meant that the wiring in the hull itself needed take off points for each section, and that I would have to standardise the voltage to each part so that the various motors I was going to use would all work on the same power supply.

The main drive motor

Much head scratching later, I decided to use a 6-to-1 geared MFA 385 motor coupled to a big propeller; this runs happily on 3s Li-ion batteries, that's 11.1 volts. I chose this motor because I already had one, and because the 6-to-1 gearing meant it would cope with a propeller large enough to create the necessary torque to get this lump moving.

Placing the motor and coupling in the hull, I could see the length of prop shaft

and tube necessary, so I quickly made one up using stainless steel for the shaft and brass tubing bushed at each end to carry it (see **Photo 2**). I also soldered in an oiling tube to put some fresh lithium grease in occasionally.

While I was working at the stern, I made up a simple rudder from brass sheet and, keeping everything tucked away, sited the servo for it alongside the adjacent bulkhead. I've learnt the hard way that anything difficult to remove is bound to end up going wrong and needing attention or replacement, so I mounted my servo in a metal bracket that's screwed to the keel, with the pushrod passing through a hole to the rudder. I can now rest assured that simply by undoing a couple of screws the servo can easily be popped out (see **Photo 3**).

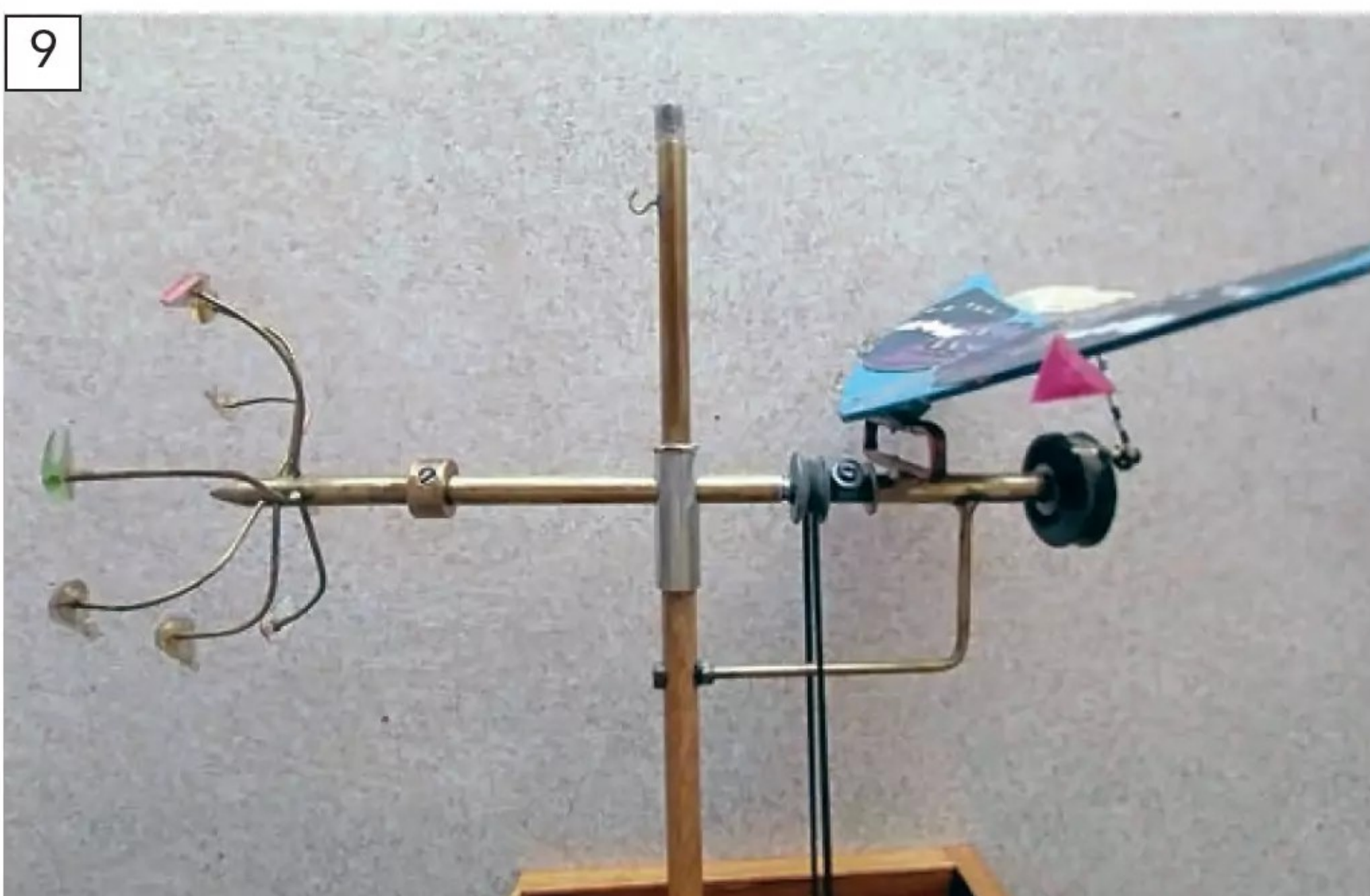
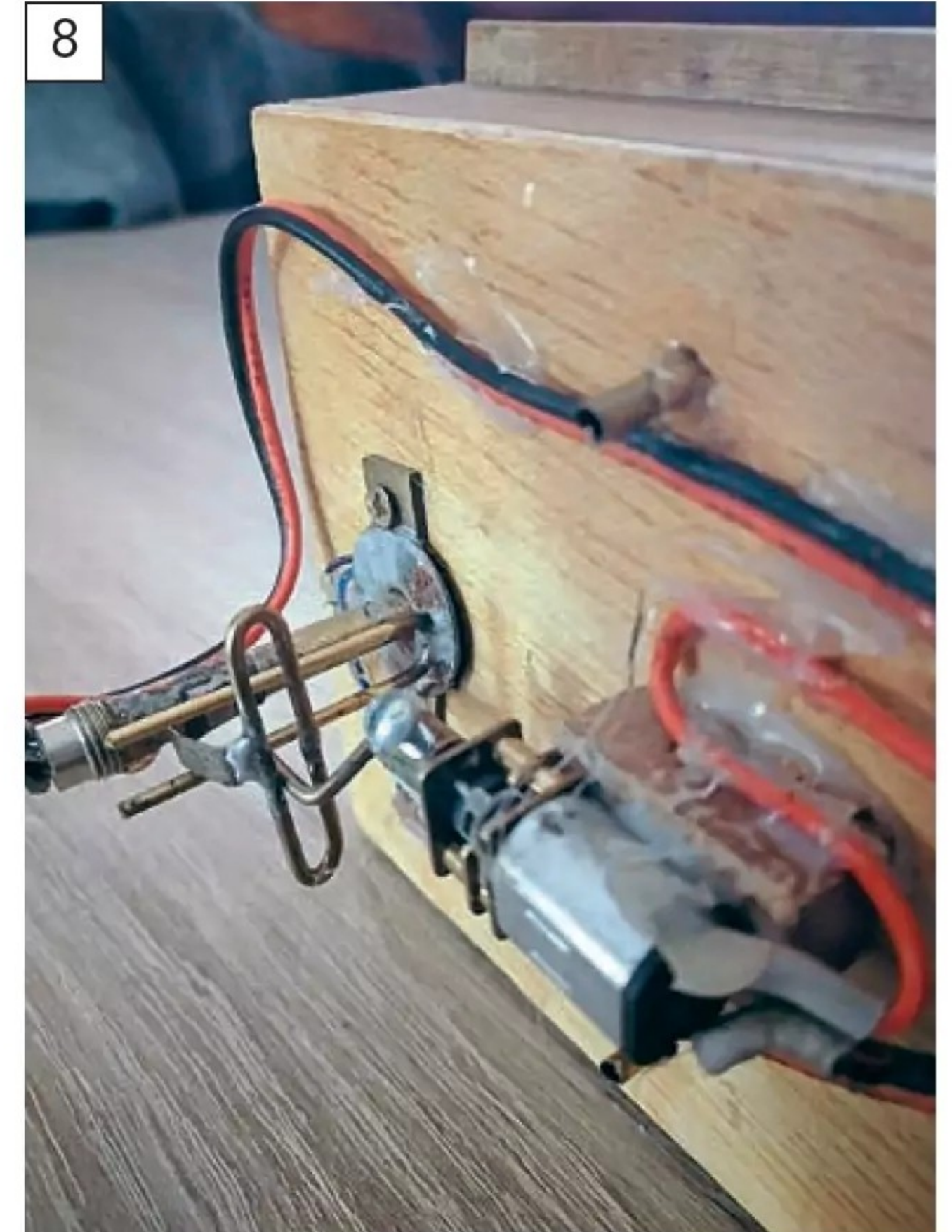
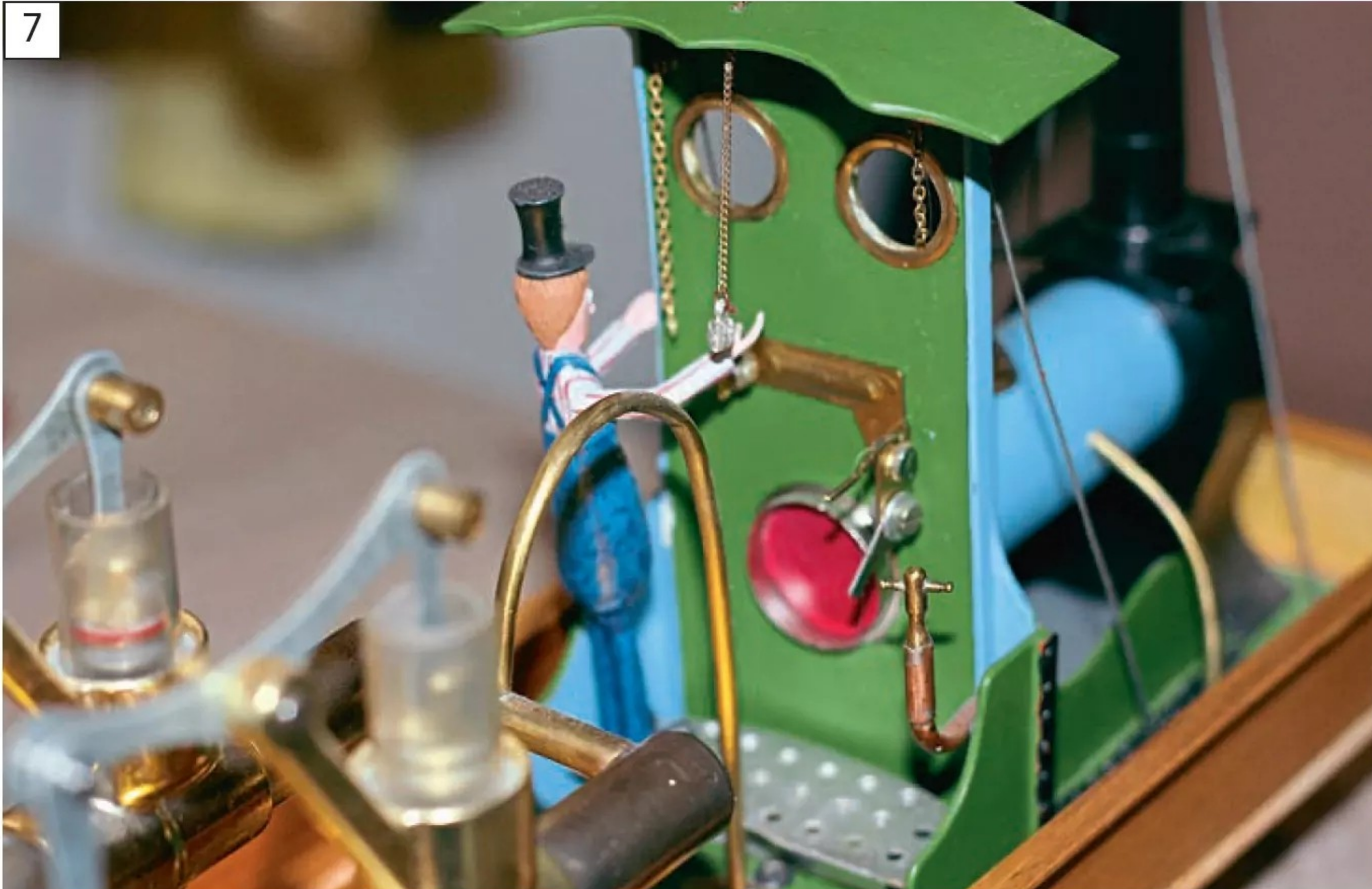
Faux boiler and engine

Going back to when I was planning this boat, I realised that I would need an Emmett-style boiler and an engine to set the scene on the model. Browsing the

internet one day, I saw a Chinese-made Sterling engine that was connected to a small electric motor meant to act as a dynamo. At the time this was ridiculously cheap, about €25, so I ordered one. When it arrived it looked pretty enough, but, oh dear, some of the details were very poor. For instance, the various connecting rods were only retained on their pins by little bits of plastic tubing. So, I stripped the engine down, removing the seals from the piston chambers; this allowed it to spin much more freely. The bits of plastic were replaced by brass tubing carefully superglued in place (see **Photo 4**), while the dynamo was replaced with a little 12-Volt motor, re-arranged to drive the engine from underneath (see **Photo 5**).

The engine and boiler share a common base, with sides that slot snugly into the hull. Installing the engine on this base left a space for the pretend boiler, so I knew the size I needed to build it to.

There were many signature design



features to model (see **Photo 6**). The ridiculously thin boiler tube was formed from a plastic vitamin tube. The high cab, with its two round windows, I constructed from plastic card, while the funnel was created from an old cigar tube. I also fashioned a smokebox, and added various bits, such as the whistle, pull chains, etc (see **Photo 7**) to decorate the whole thing from a box of Emetty things I'd had my family collecting for the last year or so.

Far more fun was making the silly but fun smoke effect. It would have been easy to make a smoke generator to feed up the chimney, but I felt that some cotton wool illuminated by a red LED bobbing up and down would be much more in keeping with the model.

When I'd finished building and painting the boiler, I drilled through the base and through the smokebox underneath the chimney. If you look at **Photo 8**, you'll see a tiny, geared motor with a crank pin. This engages in a hoop attached to an acrylic rod that goes up and down; there are a couple of extra rods that act as keepers to ensure that the whole thing stays

"I'm no engineer, far from it, but it all works without a hitch..."

straight. The top of the rod has a bit of shaped cotton wool, sprayed with my wife's hair lacquer to keep its shape, and on the bottom of the rod is an LED that feeds its light up the rod into the cotton wool (see **Photo 9**). It's all a bit crude; I'm no engineer, far from it, but everything works without a hitch.

Behind the boiler and engine assembly is a construction that is entirely lifted from one of Rowland's machines – in fact, from the aeroplane exhibit I first saw in Leeds. It's a flappy wing and an odd propeller, obviously meant to look like part of the ship's propulsion. This was quite easy to model. If you look at **Photo 10** you will see a shaft running through a tube that passes through the mast. The rear section is located with a stiff brass rod bolted through the mast and has a tube soldered on at the end. The shaft turning rotates the propeller at the front and with a simple wire (fancy paperclip) on a crankpin makes

the rear wing go up and down. The whole thing is powered by another of my 12-Volt geared motors (I bought a job lot of these online for peanuts, and they're not only well engineered but work beautifully on the separate 3.6-Volt lithium supply used for most of the gadgets). A brass pulley that was once in a Victory Industries' crash tender drives a cassette recorder drive belt to the top shaft (see **Photo 11**).

Motoring through the mechanics

Well, that was the back half of the boat built; it was time to put some more thought into the front of the vessel. I consulted my notes about what I wanted to include/build: a helm and helmsman, navigation aid, working rocking chair and a light. Also, I would need some people on deck. Hmm, I'd tried, and failed, to make convincing figures in the past and it had always been an art that eluded me.

I decided, therefore, to put this issue to one side for the time being and instead cracked on with making a tub to slot into the hull in front of the

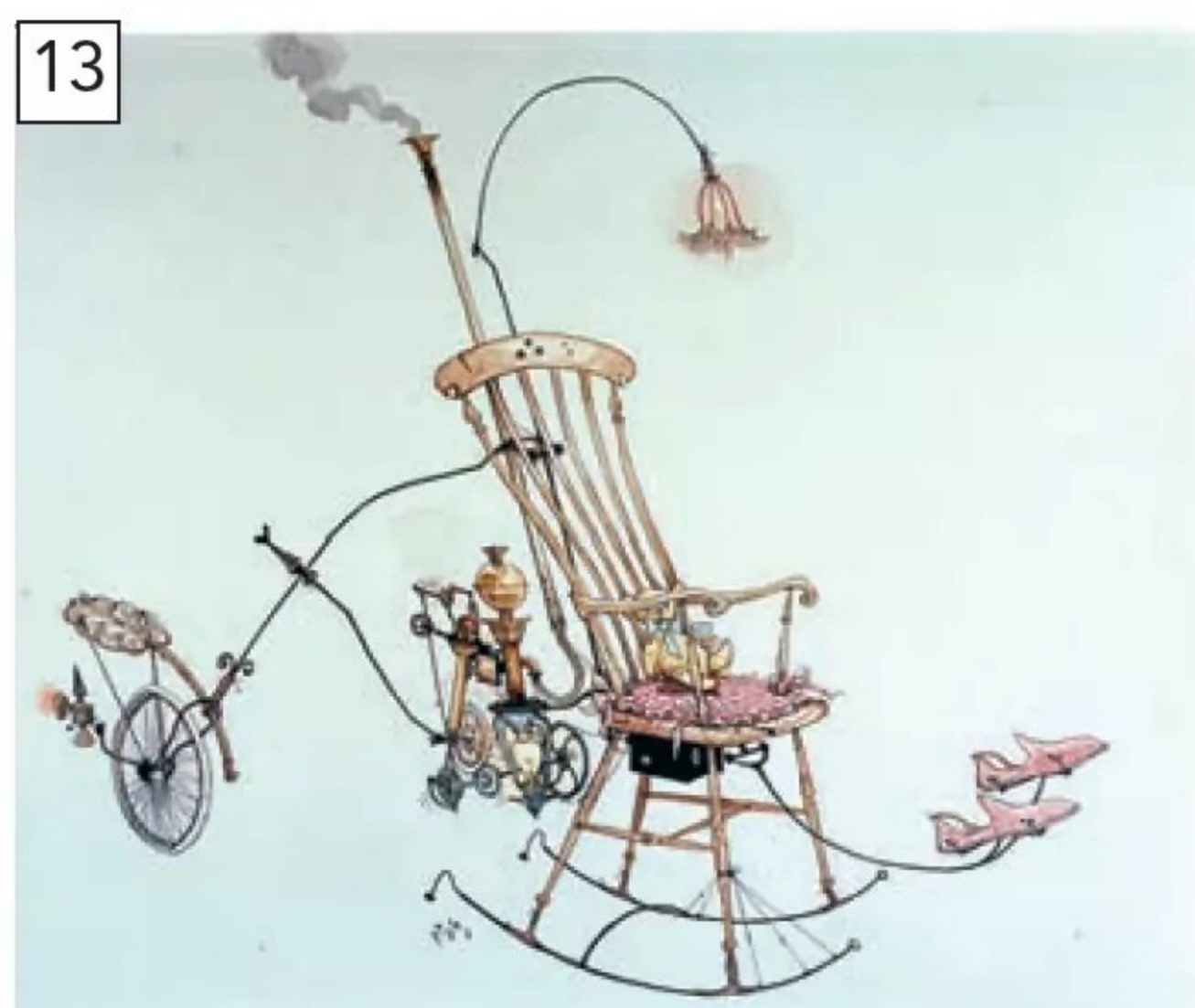
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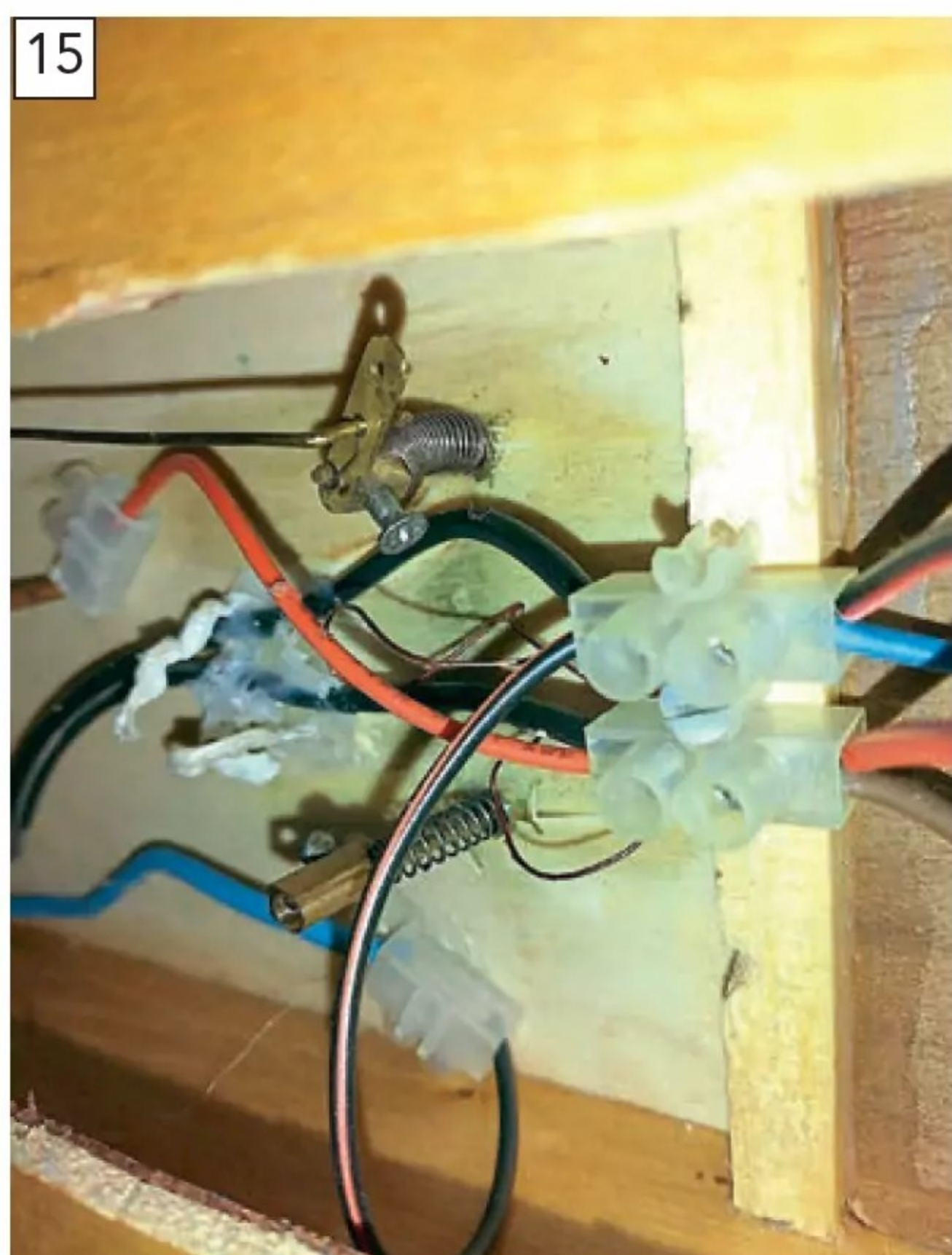
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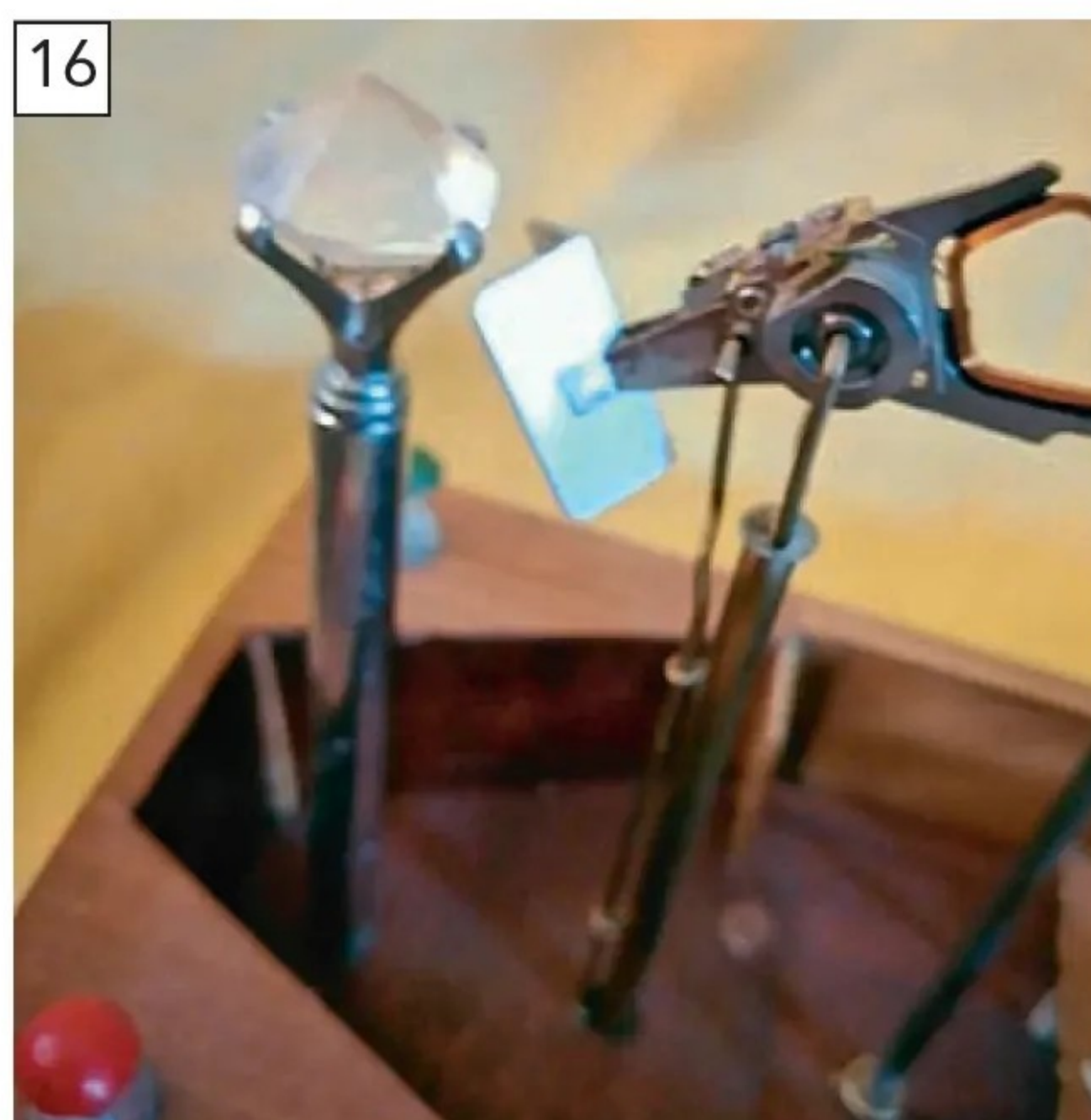
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boiler. I realised at this point that for such a sizeable model there was very little space for all the equipment and ballast required and that everything would need to be fitted below deck. I kept all this in mind as I made a start on the helm and navigation aid.

The helm is a simple box, with LEDs that light up a ship's wheel on a brass pedestal and a couple of gauges. Also

within this box is another geared motor driving a rotating pole. On the top of the pole is a foam plastic ball onto which I glued map sections downloaded from the internet, transforming it into a miniature globe.

Next, out came the metal off-cuts box and some brass wire, from which I fabricated a miniature pair of goggles. These were stuck onto the globe so that, when the whole contraption rotates, the globe appears to be scanning the horizon; this, representing, of course, Goggle Earth! (see **Photo 12**). The area was then finished off with an old steam pressure gauge, positioned so that the helmsman could see it easily.

A steam-powered rocking chair is one of Rowland's seminal inventions and one I therefore really wanted to include on my model (see **Photo 13**). The basic chair went together well enough using Mahogany sheet and slivers and some cocktail sticks. My version isn't an exact copy of Rowlands work (and the chair in his cartoon drawing is completely different to the one he actually made) but all the main features are included. I then had to make some curved rails for the chair to rock on. For this, I used sections of stainless steel taken from some old windscreen wipers – I really do keep everything that might be useful! Next, the chair was superglued to the rails, decorated with bits of old lace, and a reading light on a stalk with another LED wired in was added. Some old cogs, rods, etc, were used to make up the fake engine that I fastened to the back. Lastly, a trailing wheel was created using two coins pressed into a rubber tyre surround, and the whole assembly was hinged to the rear of the chair (see **Photo 14**). I was then confronted with the challenge of keeping it in place and making it rock. I fiddled around with various mechanisms but kept coming back to that old saying 'Keep it simple, stupid!'. Consequently, new rocking rails were made, this time with rods silver soldered to the underneath; these go through holes in the baseboard, reinforced with scraps of brass tubing, securely locating the chair in its proper position. The chair sits on a couple of small nuts so that some space is available for it to rock freely; two springs held in place with the brass inserts from a wire connection block keep it secured down and yet still moveable (see **Photo 15**). One of these springs has a simple arm soldered to it that connects to a crank on another geared motor, with rotation resulting in a rocking movement.

Finally, on to the last bit of mechanical gubbins: Emmett's version of radar. Near the bow is a short mast made from an old radio ariel. Wires fed up this connect to a fancy LED that changes colour all by itself. On top of this is a faux crystal, that came



from an awful biro my wife had been given at a Christmas party and which had subsequently found its way into the Emetty bits box; this drilled out easily to cap the LED (see **Photo 16**). Just behind this is a weird device lifted from an old computer hard drive; it sits within a simple wire frame and has another geared motor that cranks it into a bobbing motion. A small bit of bent aluminium was used to form the scanner bit (see **Photo 17**).

Finishing touches

Having successfully achieved all the mechanical bits and bobs, the remaining accessories (e.g. the navigation lights, flag, bunting made from triangles of insulation tape, the pulpit rail, etc) simply involved very standard model making procedures and techniques. However, there were a couple of things that meant getting a bit innovative.

The deck railings, created from three old sockets from my toolbox screwed on to a small base board and some soft iron wire, were fun to make (see **Photo 18**). I simply took a turn of the wire around one socket, then, ran it in the opposite direction around the next, before making a last turn around the third socket. I then lifted this off and repeated until a suitable length had been formed, finally soldering all these lengths together. A rust preventing spray followed by a few topcoats of white spray finished them off.

Lastly came the figures which I'd been putting off thinking about. I needed three different characters: a boiler man/stoker, a helmsman and an eccentric posh guy (the owner). In desperation I tried the internet and found some I initially thought looked suitable but which, were, in fact, too small. My son eventually pointed out the obvious, telling me to just get them and not overthink the scale – after all, what I was building wasn't a scale replica, so the figures were really just for fun. He also kindly offered to paint them for me. Being made to order by a one-man-operation, they took ages to arrive, but when they did, they look just the part. The last hurdle had been overcome (see **Photo 18**).



“Nonsuch is a pleasure to watch, kids love her, and she’s the only model I’ve ever built/sailed that is frequently given a round of applause by pondside spectators”

My boat would, of course, need a name. This was pinched from Nonsuch Palace built for Henry VIII in Surrey (now, sadly, long gone) as, in its day, reputedly nothing like it had ever been built before.

On the water

Nonsuch was launched at the annual regatta held by the Torre Vieja Model Boat Club, of which I am a member. She was first displayed in the exhibition there, where I was repeatedly asked to

demonstrate all the moving parts, this seeming to fascinate and delight both young and old alike. I then had to lift this beast of a boat down to the lake (she's very heavy due to all the specially cast lead bars in the bilges that keep her the right way up out on the water). It was very rewarding, though, to see her chug off in magnificent style, with everything working and sitting safe and stable. I'd made a mess of the rudder throw, as her turning circle was vast, but that was easy enough to adjust when I got her home.

A consummate crowd pleaser

Was this project worth all the effort? Definitely! *Nonsuch* is a pleasure to watch, kids love her, and she's the only model I've ever built/sailed that is frequently given a round of applause by pondside spectators. ●





Norada

John Hollis presents his first ever sailing vessel build, a Wherry yacht that not only looks wonderful out on the water but features an interior that absolutely wows!

Having built several steam and electric powered models, I decided to try a model of a sailing vessel. I wanted one which would be around 1.5m in length and have a simple sail plan, without loads of rigging to fiddle about with. I also wanted to be able to collapse/remove

the rig for safe and easy transportation. The fact that I have sailed both gaff and Bermudan rigged yachts on the Norfolk Broads, where masts need to be lowered when sailing through the waterways' various bridges, therefore, gave my subject search a geographic focus. A trawl through The Historic

Ships Register suggested a wherry yacht would be a suitable candidate. This led me to contact the Wherry Yacht Charter Charitable Trust, which operates five historic wherries: three wherry yachts and two pleasure wherries. The Trust's wonderful group of volunteers run and maintain all the



vessels from its base in Wroxham on the Broads. Each of these wherries is different; for example, *Hathor*, often moored at How Hill, has an Egyptian themed interior and was built for the Coleman family (of mustard fame). All can be enjoyed by the general public as there are a number of trips aboard them organised each year. Alternatively, a crewed yacht can be chartered for a half day, full day or even longer. So, whether you're working within a budget or willing to splash out a little more on a private cruise, both options offer a very relaxing way to take in the beauty of the Broads from the water. If you're interested, visit www.wherryyachtcharter.org



Work on the wherry yacht's planking started and with the wooden block used to form the end of the counter stern fitted.



Planking of the hull's exterior complete.

Honing in on Norada

I chose to build *Norada* as she's the only wherry with a main boom to the sail; all the others have loose footed sails, which I thought may be more difficult to make sail effectively on a model. *Norada* was built in 1912 to an Ernest Collins design and has a more slender hull form, with a lower freeboard, than some of the other wherries. She was retired from the Ernest Collins hire fleet in 1950 and sold on to a private buyer. She subsequently changed hands a number of times, until finally, in 2012, she was

refurbished by the Trust, which now runs and maintains her.

The model

There are no plans for *Norada*, to my knowledge, so I had to draw up my own. The deck plan, which I was able to base on measurements taken of the original vessel, was easy enough, but the underwater profile proved more difficult. Four sets of line drawings were sent to the boat yard at Wroxham before I finally received confirmation that one looked 'right'. Of course, this absence of plans also meant



The inside of the hull fibreglassed, with deck beams installed and with the interior now also planked.

"There are no plans for Norada, to my knowledge, so I had to draw up my own"

every fitting having to be drawn up from the many photos taken before being made.

The hull, superstructure and rudder

The hull was built upside down on a building board, using the traditional plank-on-frame method. 8.75mm plywood was used for the frames. Originally, I'd wanted to extend these above deck level to provide support for the bulwarks; unfortunately, though, when reduced to the right size (of 4mm square), the intended supports proved too flimsy, so the frames were instead cut off at deck level. I anticipated fitting a fairly heavy false removable keel to the model which would need some support in the hull to minimise the chance of damage to the wooden keel and surrounding area. A wooden block was inserted between the frames in the middle of the hull on top of the oak keel to support the eventual fitting of the false keel. Another wooden block was used to form the end of the counter stern (see **Photo 1**); on the real vessel there appear to be four planks which run across the stern rather from the bow.

Maple was used to plank the hull. Here I employed the normal method of shaping each plank individually, fore and aft, so it could easily be laid next to the adjoining planks, hence avoiding any gaps or introducing any twist or stress into the hull. Wooden cocktail sticks served as 'nails' to hold each plank in place, with Evostick



The false deck and the initial rear bulkhead.

external PVA wood glue used to hold everything together (see **Photo 2**).

Once the final plank had been laid, the external hull was rubbed down until smooth and a couple of coats of fibre glass resin were applied to seal the hull and to fill any imperfections. The inside of the hull had a layer of glass fibre matt applied between the 24 frames to further strengthen it and ensure it was watertight. The deck beams had been incorporated into the frames, and these were cut out to allow for the cabin, forehatch and aft steering position. Strips of wood were let into the ends of these beams to support the deck around the openings. Finally, the insides of the frames were planked to represent the sides of the cabin's interior walls (see **Photo 3**).

A false 1 mm plywood deck was stuck to the beams and a wide margin plank, made from lime wood, was applied to the top of the deck. The bulkhead which formed the entrance to the aft cabin was initially made from a sandwich of three pieces of 1mm ply: an inner core and two outer pieces cut out to represent the panelling. The two doors into the cabin were mounted on hinges made from tinplate (see **Photo 4**). This was later replaced with a bulkhead made from five layers of 1/64th plywood, which gave a better impression and more depth to the panelling.

An unusual feature of this vessel is the auxiliary motor, a small electric motor mounted under a starboard locker outside of the main cabin. The propellor shaft is angled towards the keel and the very large 'barn door' rudder. While there is an opening in

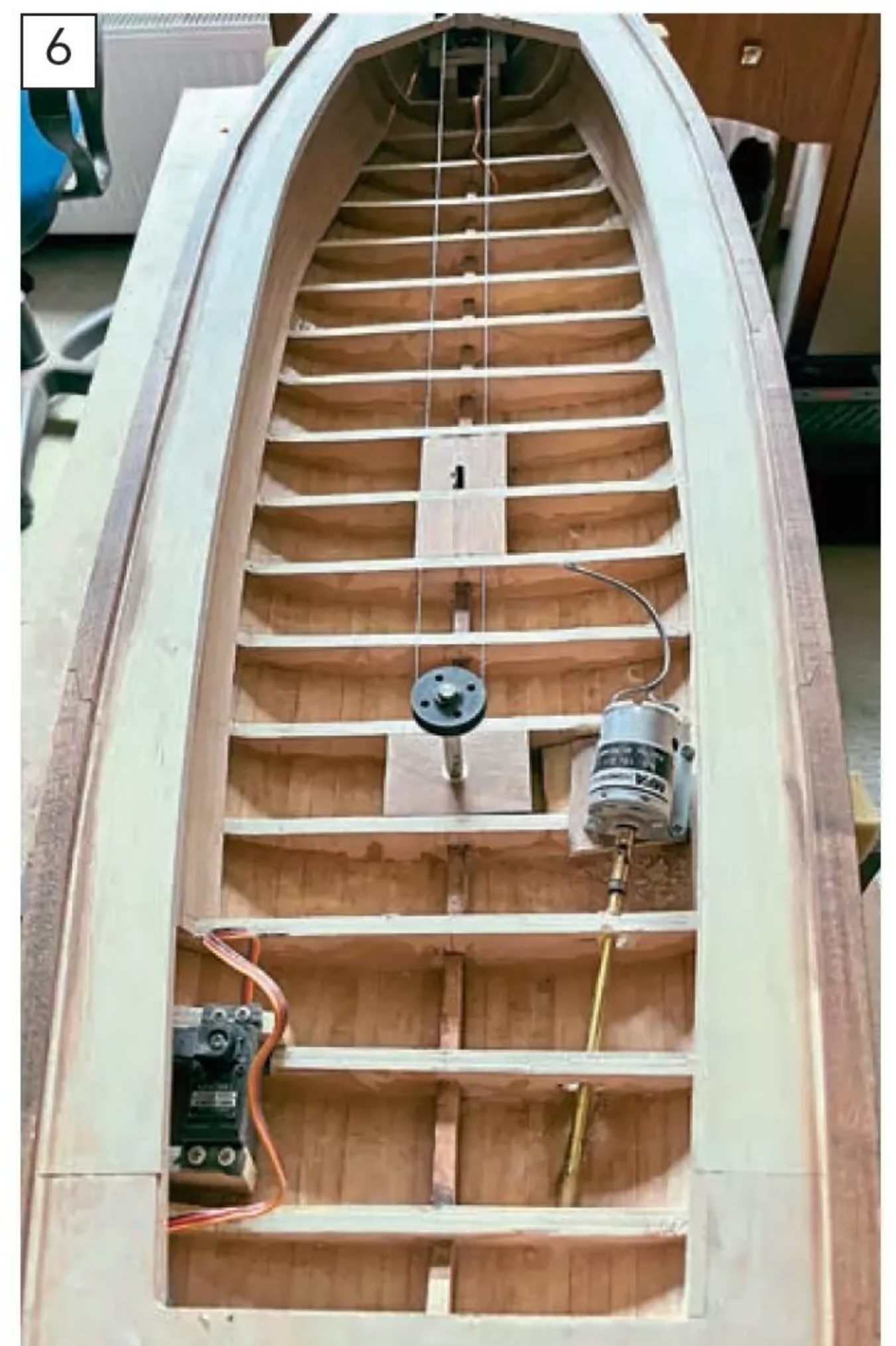
“Due to the limited water depth of the Broads, the yachts that traverse its waterways are not fitted with keels”

the keel where a single screw would conventionally be mounted, this appears to be too small for a propellor but does allow for some water flow from the offset propellor across the rudder. Due to the limited water depth of the Broads, the yachts that traverse its waterways are not fitted with keels. *Norada* has a metal I-beam along her keel to add weight and rigidity. This I've represented on the model by making a brass I-beam and fitting it to the keel. In the centre a gap has been left to allow the false keel to be fitted into the aforementioned wooden block inside the hull. The sides of the gap have been hidden by soldering a brass plate on either side of the I-beam (see **Photo 5**).

The rudder, which looks oversize but is to scale, was made from ply with brass fittings and stuck to a brass rod mounted to the rear of the stern post. The rudder linkage was complex as there wasn't a direct line of sight between the top of the tiller extension and where the rudder servo could be mounted. A further linkage was inserted under the aft deck to connect the rudder and allow a right-angled turn to the servo mounted under the port seat in the steering area. As all the cabins had been fully fitted, space for radio gear and the sail winch was extremely limited. Due to the length of the boom, a long run



The offset propellor shaft, brass keel and false keel slot.



The offset motor, pulley for the sail winch and the rudder servo.

for the main sheet was needed to let the boom out a reasonable distance. A sail winch which turns five and a half revolutions was mounted in the bow, with a string going around a home-made pulley towards the aft of the main cabin; this pulley was made from a piece of aluminium rod and mounted on a shaft from an old photocopier, which in turn was mounted on another wooden block inserted between two of the frames set astride the keel (see **Photo 6**).

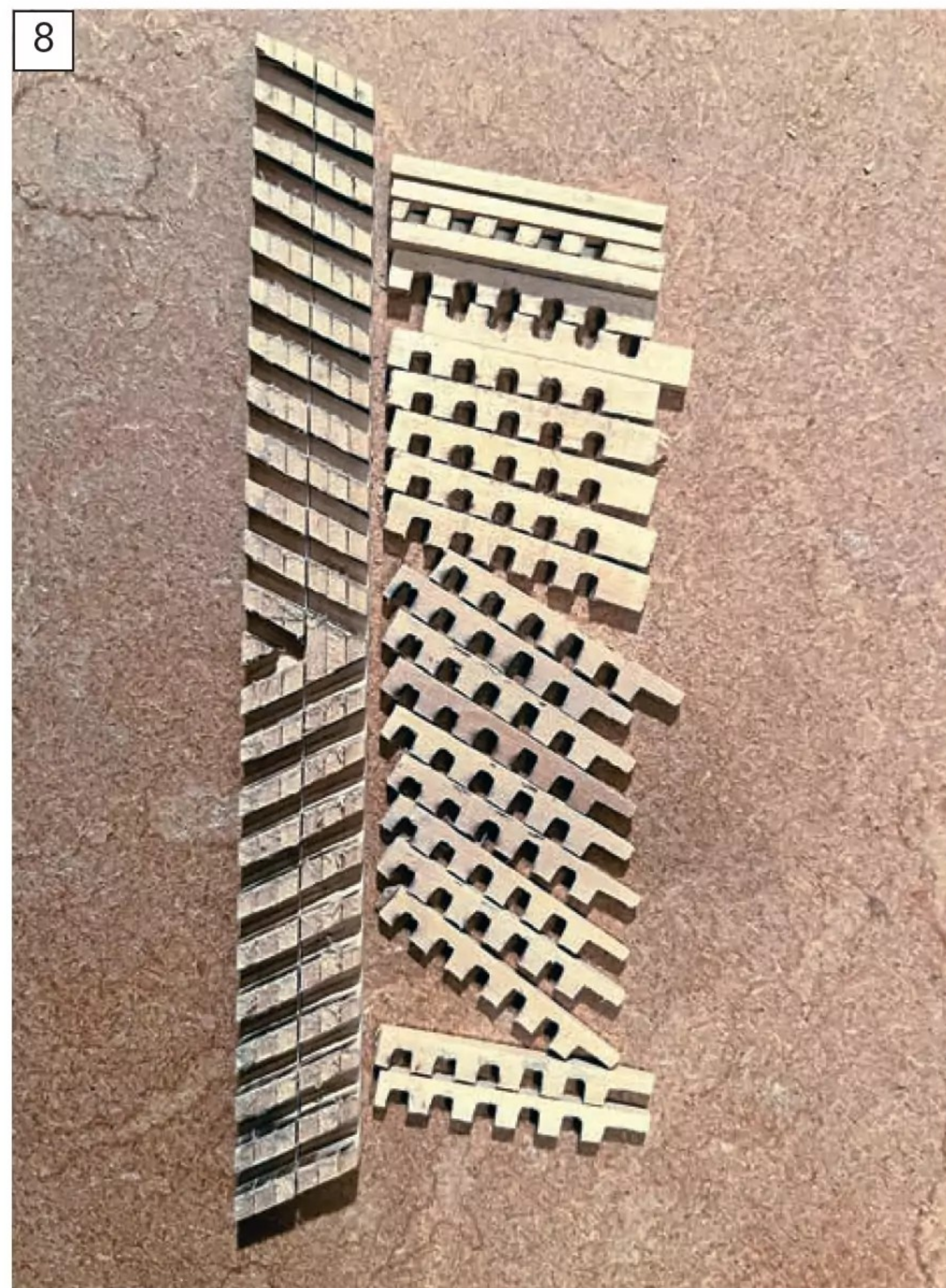
The steering position, lockers and flooring were all made from limewood.



The steering position showing the initial bulkhead plus seats after wood staining.

To allow access to the rudder servo and to add further ballast, I kept all the flooring and seats removable and fitted working hinges on the rear storage compartment. Wanting to avoid a patchy finish, I took particular care not to get any glue on the surface of the wood ahead of staining it (as I am sure most of you are aware, wood stain will not penetrate glue). Three coats of Woodeedoo Italian Walnut water-based wood stain were then applied, followed by three coats of matt varnish (see **Photo 7**).

The next job was to plank the deck using strips of limewood. The original vessel currently has the deck covered with anti-slip material, so the run of the planks cannot be seen. However, thankfully, I was able to reference photos of *Norada* taken in the 1960s to achieve the deck aesthetics I desired for my model. Looking underneath the deck from inside the cabins and the forehatch, the planks can be seen to follow the curve of the outside of the hull and to be considerably wider around



The component parts for the rear seat grating.

the bow than elsewhere. The 1960's photographs indicate the planks tapered towards the stern; bending my 5mm planks wasn't easy but by using clamps and pinning the planks in place I got there. Then, after a good rub down, several coats of matt varnish were applied to seal the deck.

The rear of the aft deck features a low seating area made from a wooden grate over the stern and planks down both sides. The grating isn't square in section but has the fore and aft pieces following the line of the hull sides so that the centre piece meets as a V in shape. For the model, limewood was cut to size for my grating bars (see **Photo 8**). I made up a makeshift saw table for my Minicraft drill so that three fibre disks could be fitted. By using three disks, a slot could be cut to a width that matched the wooden strips used to make the grating bars. By adjusting the height of the saw table, the depth of cut into the bar could be adjusted. While the fore and aft bars were a simple 90-degree cut, those going across the hull required an angled cut. This involved a bit of trial and error, as well as filling the scrap bin, before the appropriate angle was found and the grating could be completed.

The stanchions around the stern were formed from brass rod with brass tube soldered to the top and were painted with a Halford rattle can steel paint (see **Photo 9**).



The finalised rear seat arrangements, stanchions and tapered planking.

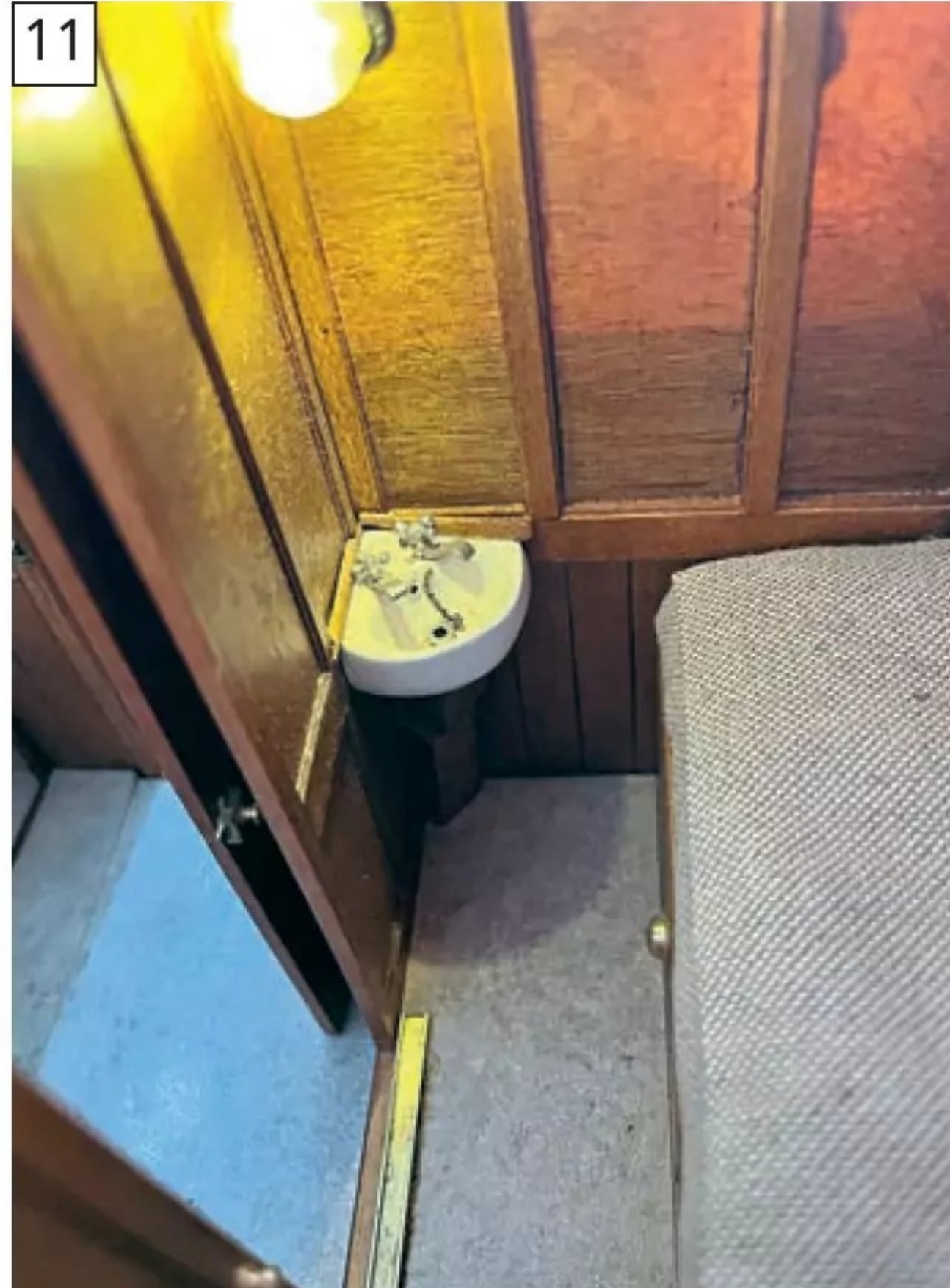


The cabin sides in place, together with the bulkheads.

The beautifully detailed cabins

Work then started on the main cabin. I first made the four further bulkheads using the sandwich method of five pieces of 1/64th inch marine ply. This gave the shape for the cabin sides, allowing cardboard templates to be made before cutting them out from 1mm ply. The outside of the walls were planked, using vertical planks at the fore and aft ends and panels in the middle. The windows, made up from 1/64th inch plywood surrounds and Perspex glazing, open and shut on the runners made from lime (see **Photo 10**).

The central cabin, with its sliding door and washbasin, was made first. I had chosen a scale of 1:12 for the model in the hope that I could find some doll's house accessories with which to furnish it. Unfortunately, apart from the wine glasses and tumblers in the aft cabin, I



The wash basin and mattress in the central cabin (left).

could find nothing suitable. As a result, the washbasin in both this cabin and the fore cabin had to be made from Milliput, with the taps crafted from brass and sprayed with chrome paint, while for the mattresses material outers were sewn up and stuffed with foam inners (see **Photo 11**).

The galley's fridge was made from lithoplate, with the cooker top and oven fashioned from a pie foil tray over a plywood former. I turned the steel kettle and cooker burners on my lathe, crafted a sink from piece of aluminium sheet and moulded a plastic washing up bowl for it from plastic (see **Photo 12**).

For those of you who appreciate the minutia of detail, though, it was the Blake Victory marine toilet that undoubtedly proved the single most complex item to build/assemble, involving somewhere in the region of 75 different parts/components. The bowl was made from Milliput,



The galley looking forward.

“It was the Blake Victory marine toilet that undoubtedly proved the single most complex item to build/assemble, involving somewhere in the region of 75 different parts/components”

first shaped approximately and then sanded to refine. The pipework, pumps, handles and seat cover were made from an assortment of Perspex rod, pieces of brass and wood, with pins being used to represent the bolt heads holding everything together (see **Photos 13 and 14**).

An unusual feature of the rear cabin (see **Photo 15**) is the Chappell yacht piano, with its folding keyboard; all the keys for this were cut individually and stuck to a block, which was then fitted to the limewood case of the piano.



Work underway on the Blake Victory toilet.



The multiple part Blake Victory toilet completed.



The rear cabin with the Chapell piano, seating table and lights.



The forward cabin.



The aft cabin, with the concealed motor and lighting electrics revealed.

Some suitable doll's house material was found for the cushions on the seats, which were made in the same way as the mattresses in the middle and fore cabins (this same material was later used to make the curtains for all the cabins). The drop leaf table you see was strategically positioned to cover a hole in the flooring (for which I used the thinnest lino of the right colour I could find throughout) where the pivot for the sail winch sits.

The fore cabin (see **Photo 16**) has a different washbasin from the one in the mid cabin, although made in the same manner using Milliput. The mirror above the washbasin I cut from a handbag mirror and framed in limewood. The radio receiver and switch, along with the switch for the motor, are accessed through the starboard bunk, while the port bunk covers the receiver and motor batteries. The five wall lights were made, using Perspex rod for the shades, turned to shape before being drilled out to accept an LED. The LEDs were sourced from a model railway supplier, and a friend advised me on the number and value of the resistors required to create a circuit. The circuit board is located under the port seat in the aft cabin, opposite the motor, which is accessible by removing the starboard mattress and seat (see **Photo 17**). The S shaped stems for the lights were made from 2mm brass tube carefully bent to shape to avoid any flattening, as the wires for the LEDs would be threaded through these tubes later; this involved some trial and error, as I found some softer brass tube collapsed very easily while harder tube would not deform. I discovered that placing a wire inside the tube before bending it helped to maintain shape and prevent the tube

from distorting, allowing the LED wires to be subsequently fed through.

The cabin roof was made from three sheets of 1/64th inch ply glued, as a sandwich, in place over the top of the cabin sides and bulkheads. Once the glue had dried, this held its curvature and could be trimmed, with the guttering added, before painting. To the inside I fitted roof beams and (non-working) lights, while on the outside a couple of quant poles, brushes, buoyancy aids, boom tent supports, and a boom cradle were added.

The fittings, mast, sail, and false keel

There are few deck fittings, apart from the three mud weights located in the bow (which act as the anchor), the winch handles and a few mooring ropes.

The mast was turned from a pickaxe handle and features a square bottom section where it slots into the fitting that acts as the pivot point before tapering to where the main halyard passes through it and onwards to the top. The burgee was cut from tracing material, then dyed and attaching to the brass frame (see **Photo 18**) at the mast head. A counterweight made from lead was screwed to the bottom of the mast. For the sail's mast rings, 1/64th inch ply was twisted around a brass pole of slightly larger diameter than that of the mast three times before being glued. Once the glue had dried, these rings were then slid off the brass pole and, after having four brass pins inserted to prevent the ply from parting, were dyed with the walnut stain. The sail winch on the front of the mast is operational (to a



The brass support for the burgee.

19



The paper template for John's sail laid on the sail cloth to which panels have already been pre-sewn.

degree) and can be turned to raise and lower the sail.

Although most of the blocks differ in size or the number of sheaves (turned from brass), they were all made in the same manner. The main body of the block has roughly 1mm sides, with the top and bottom spacers being same width as the sheave. As the blocks work and do carry some load, I found I needed to make any fittings on the blocks holding them to the deck or to a strop an integral part of the block rather than just a hook superglued to the top of the block. By running a strip of tinfoil through the inside of the block and making the pin holding the sheave in place go through the tinfoil before emerging at the top of the block for another fitting to be attached, the load on the block is transferred to the sheave rather than the body of the block.

I wanted to make an authentic looking 'canvas' sail for my wherry yacht. However, I had never made a sail before, so I approached this task with some trepidation. Having found some suitable cotton-based material, I decided to represent the sail's panels by folding the cloth and then double stitching 8mm seams down the sail. A paper template was made by measuring the lengths of the four sides of the sail and adding an allowance for the seams for the panels; then, with the folds in place for the seams stretched out, this template was then used to cut the cloth and sewing began. After a steep learning curve into the mysteries of how sewing machines work, a sail was finally produced. Unfortunately, though, it didn't fit, so I had to start all over again. This time around I sewed in the seams for all the panels in a

20



The model ready to sail with its keel fitted.

piece of cloth before cutting the cloth to shape around my template. Three of the edges of the sail were seamed with binding tape, while a simple seam was sewn into the leach. A bolt rope was then added to all the sail's edges, this being sewn in place by hand, although not along the majority of the leach's length. To represent the points on the sail where it's lashed to the gaff, main and mast rings, plus the reefing points, 1mm rivets were fitted in all the appropriate places. Finally, the sail was washed in a very dilute tea bath to suitably age/weather it without making it appear too dirty.

My models don't usually include figures. In this case, however, I felt they would help add a sense of scale and avoid a *Marie Celeste*-like appearance on the water. So, two figures (a moody teenager and a grumpy old man (no

"I had never made a sail before, so I approached this task with some trepidation..."

likeness to anyone is intended!) were 3D-printed, painted and positioned on deck.

The false keel for this model was made from a 35mm length of steel with a 1.7 Kg lead bulb on the bottom. The bulb was made by turning a piece of wood on the lathe to the correct shape and then making a two-part plaster mould from it to cast the lead in. By drilling a hole into the end of the steel strip and inserting this into the mould while pouring the lead meant the lead also found its way into the hole, fusing the bulb and strip together. A further 3 Kg of lead is required to bring the model down to her waterline.

“As the windows and forward companion way open, and the helm position is not in any way waterproof, Norada is not the most practical of sailing models. I was, therefore, a little nervous when first putting her on the lake for her maiden voyage...”

Operational procedures

The mast lowers by opening the fore hatch and releasing the forestay, as it does on the real vessel. However, as the halyard winch doesn't swing out of the way, the mast cannot be completely lowered on top of the cabin roof. To get into the model to operate it is complicated, with two pieces either side of the mast needing to be removed before taking the roof off; then the galley floor must be removed to fit the keel and the fore cabin's berths must be lifted off to access the radio gear switches and battery. Additional lead weight needs to be added under both the steering position's floor and forehatch. Finally, the pulley for the traveller to the sail winch needs to be inserted into the aft cabin's floor and the main sail's false sheet threaded through the cabin roof so it can be attached to the main boom before everything is reassembled.

Setting sail involves the same procedure followed on the original vessel. The gaff rig is raised by rotating the drum in front of the mast; if the sail is to be reefed, a reefing line must be threaded through all the reefing points on the sail, thereby lashing the sail to the boom (see **Photo 20**).

Norada on the water

As the windows and forward companion way open, and the helm position is not in any way waterproof, Norada is not the most practical of sailing models. I was, therefore, a little nervous when first putting her on the lake for her maiden voyage.

Fortunately, I managed to choose an almost windless day, and I was soon asked by some lads if it would be possible for my boat to nudge their football, which one of them had managed to kick into the water, back to shore. Well, mission accomplished, proving to me, and to them for that matter, just how manoeuvrable Norada is.

Since then, there have been further outings on a local reservoir. She actually performs very much like the real vessel. With no keel, she slides sideways when on a beat. Her gaff rig spills gusts very reassuringly, resulting in very little heel. And she will happily sail with a couple of reefs in when the breeze picks up. ●



Norada on her maiden voyage, sailing under light airs, unladen.



Norada underway on a windy day with reduced sail.



A close-up shot of Norada's bow while underway.

HOVERFLY

HATCH BUILT FROM
AN R/C HOVERCRAFT/AIRBOAT HYBRID
DESIGNED BY GLYNN GUEST

DETACHABLE HATCH

RE380/S400 MOTOR
WITH Ø5" (125mm) x
3" - 4" (75mm - 100mm)
PITCH PROP

SLOT FOR
RUDDER PUSHROD

MOTOR PYLON
4 LAMINATIONS OF
1/4" (6mm) BALSA

HATCH FROM 3mm & 6mm
BALSA BUILT OVER COAMING

COAMING AROUND
DECK OPENING

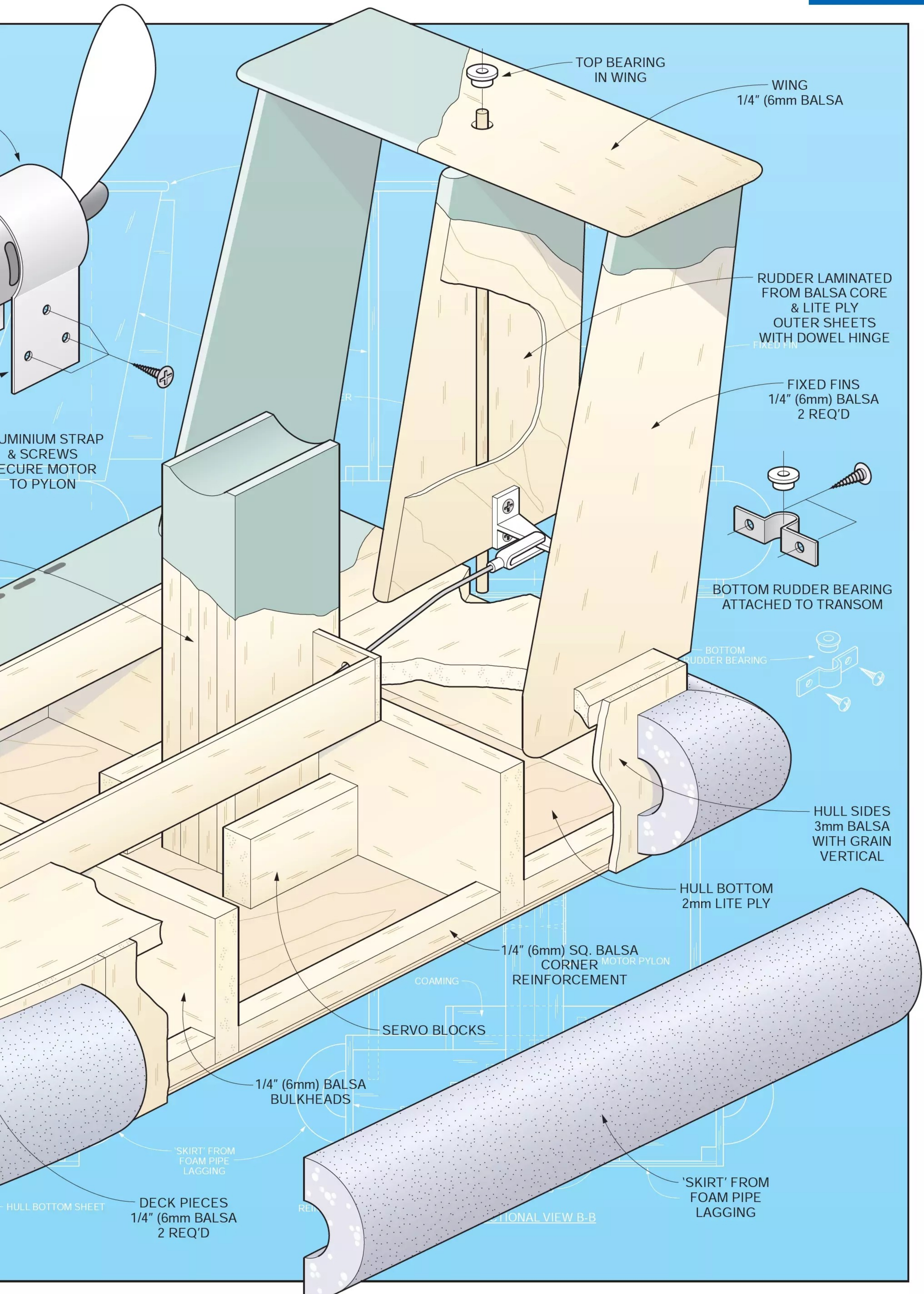
COAMING

DECK

LAMINATED BALSA WEDGE KEEPS
WATER AWAY FROM FRONT OF HATCH

LAMINATED BALSA WEDGE KEEPS
WATER AWAY FROM FRONT OF HATCH

1/4" (6mm)
CORNER REINFC





Hoverfly

Glynn Guest provides a step-by-step guide to the construction of the R/C airboat/hovercraft hybrid model that can be built from this month's free pull-out plan

It's a few years since I built and operated two R/C model hovercraft, one electric, the other I/C powered. Both proved to be interesting challenges and performed successfully both on land and water. Nevertheless, the hovercraft bug didn't really catch on with me. One problem with the I/C model was finding somewhere that a noisy I/C motor with a potentially dangerous airscrew could be safely run at ground level.

Recently, however, while visiting a model show where a group of enthusiasts were operating hovercraft-based models it was hard not to be attracted by their antics both on and off the water, and the idea resurrected itself. This immediately led to sketching out some ideas, but none of these 'designs' looked right and were much more complex than I could justify. Then, out the proverbial 'nowhere' came the thought that on the water they behave more or less like an airboat!

Now, airboats I have successfully designed, built and operated, with my first plan, for *Skimmer*, being published in the September 2007 issue. This airboat drew heavily on my R/C electric flight experience using Speed 400 motors in a simple lightweight model (see **Photo 1**). Since then, a further two similar airboats have been built, both 'pushing the envelope' and testing whether I really understood what I was doing – which, thankfully, I did!

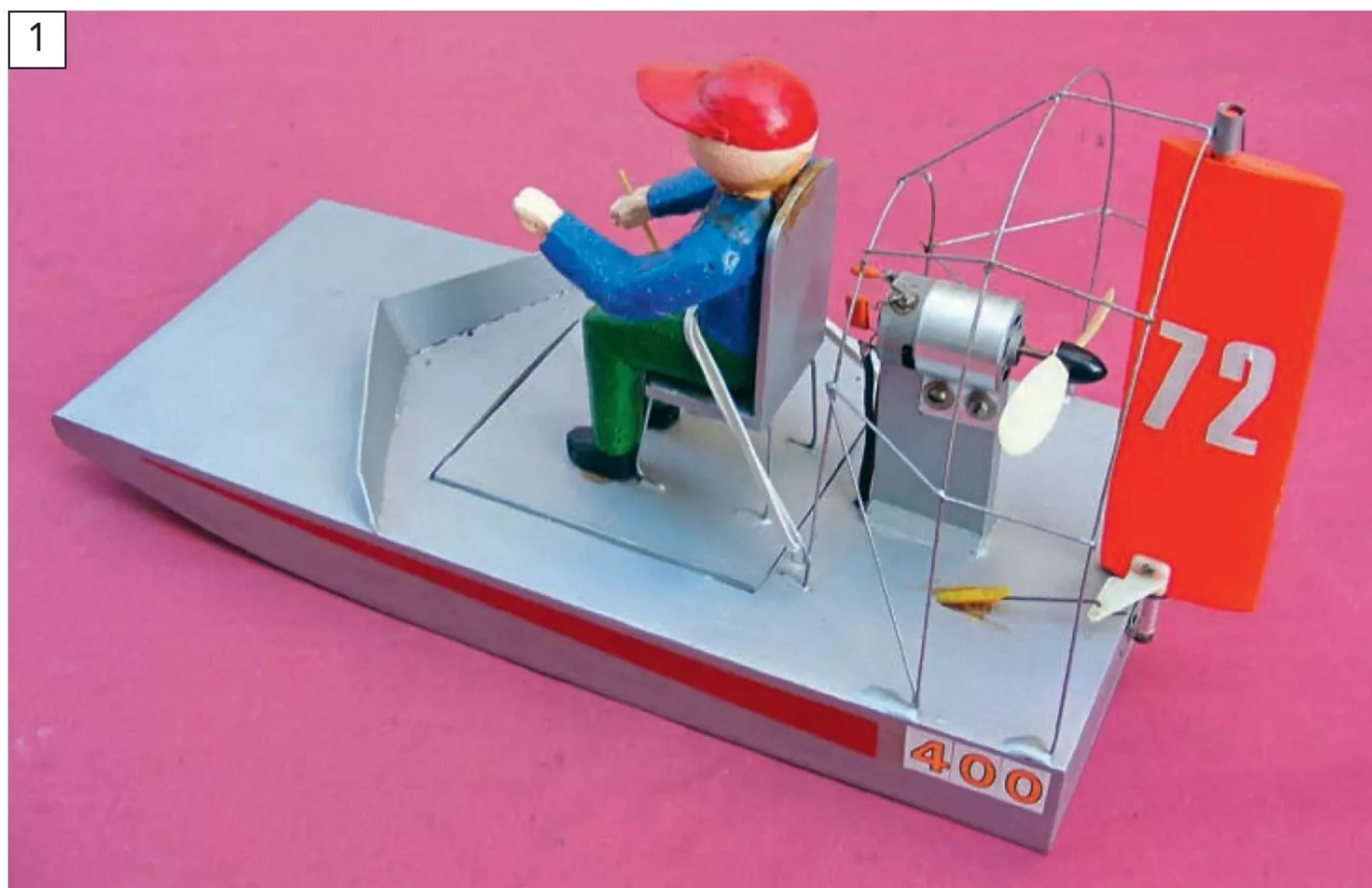
These simple airboat designs were tweaked a little to create a hovercraft appearance while keeping the airboat style hull to ensure good performance. One thing that did worry me was that my previous airboat designs had the propeller covered by a wire guard to keep inquisitive fingers away. The hover-airboat design did not have this feature, but I hoped that the rear facing motor close to the two fixed fins and a wing would help shield the

propeller. It also helped that I had no intentions to overpower the model and use any of the wickedly sharp propellers that some employ.

Let there be lightness

To achieve good performance, this model must be kept as light as possible, yet without sacrificing the strength needed for safe and reliable operation. Balsa is, therefore, the main structural material; if you have to order this, specify a 'medium grade'. As the hull bottom can be subject to impact damage from rubbish floating in the water, I suggest using 2 mm Lite Ply; this is a little denser than balsa but much tougher.

I suggest using one of the RE 380 or Speed 400 types of electric motor to power this model. *Hoverfly* has been designed to incorporate a 5-inch (125 mm) diameter propeller with a pitch of 3 to 4 inches (75 to 100 mm). While building the prototype, my original



“To achieve good performance, this model must be kept as light as possible, yet without sacrificing the strength needed for safe and reliable operation”

the propeller; these items can be sourced from hobby sites that cater for electric flight.

The battery also needs to be as light as possible. I initially considered a pack of seven AA size rechargeable cells, which weighed in at around 26 ounces (750 g). Ultimately, however, I ended up using a three-cell Lipo pack, which reduced the weight to 23 ounces (650 g), and this, along with the greater Voltage, upped the model's performance.

Should anyone try to tell you to build this model a different way, then treat their advice with caution. They are

likely to be speaking from a position of ignorance. You could end up with an overpowered model that will be difficult to operate or an overweight beast that will never perform properly.

Building time

Like most human activities, success often depends heavily, if not totally, on working in the right sequence. There may be situations where going the modelling equivalent of *off piste* is forced upon you, and you may even discover something worthwhile, but it is a risk!

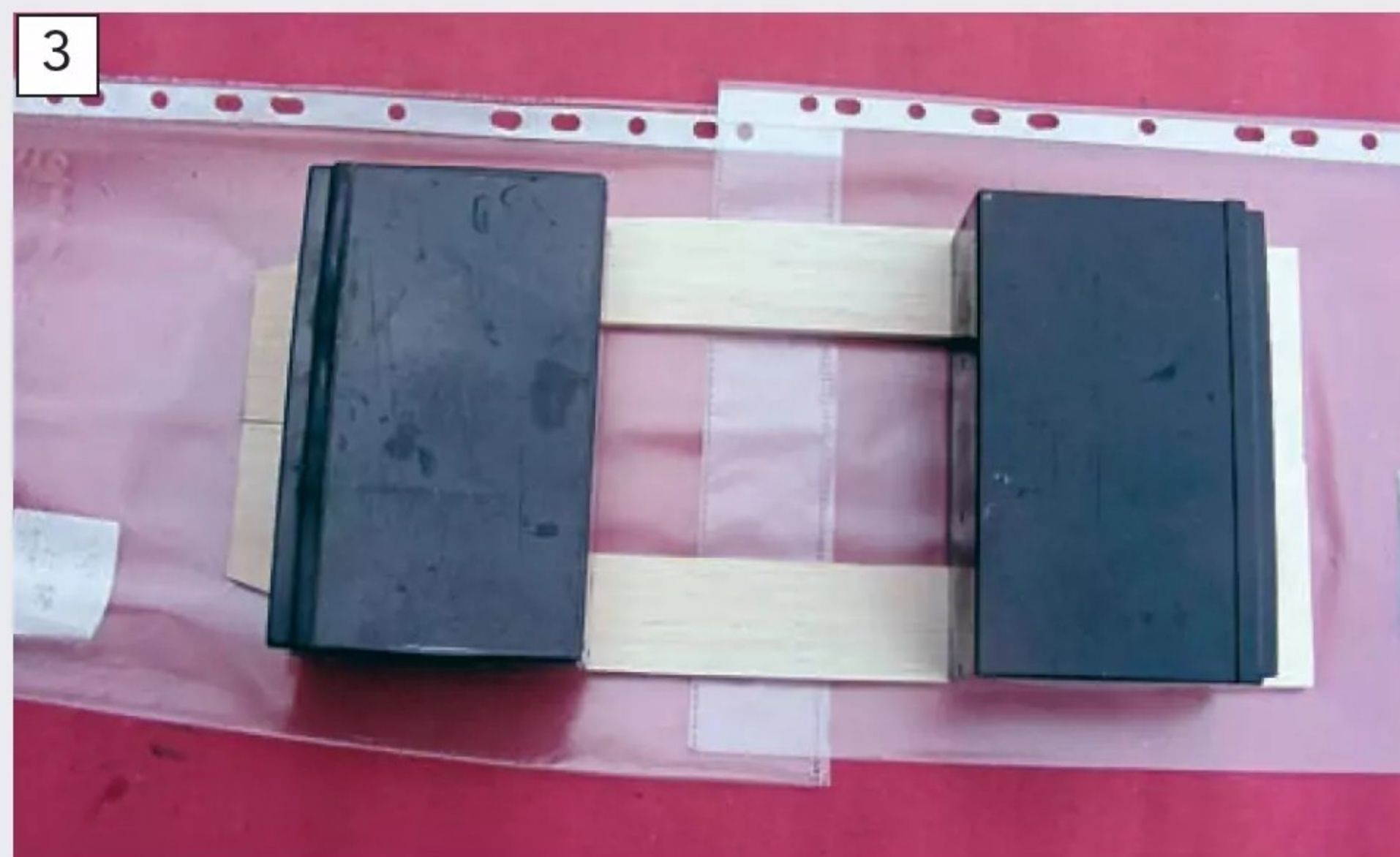
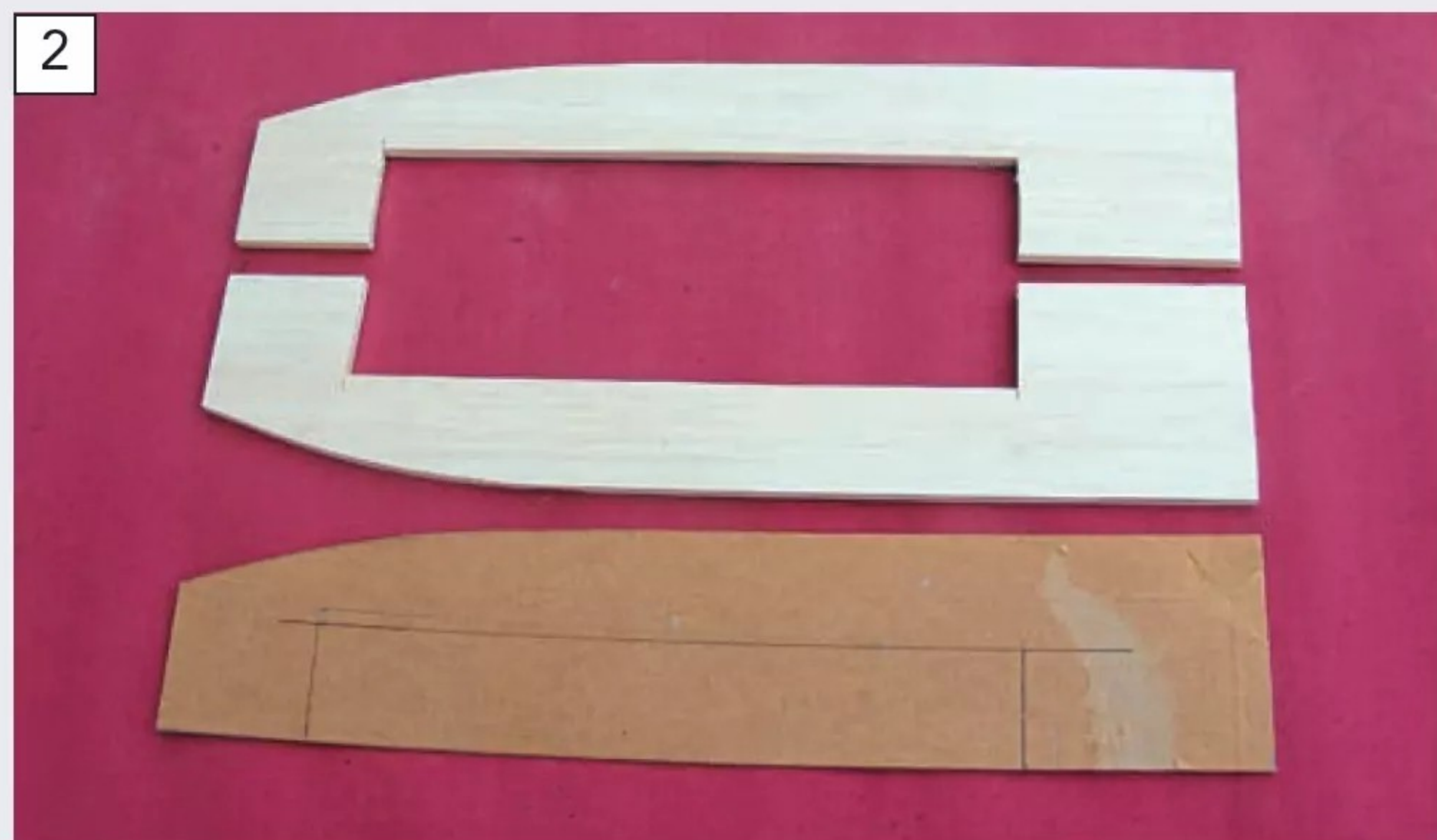
The model is drawn up on two sheets. One shows the layout, with both external and internal views, along with part identification. The other sheet shows the parts shapes and a suggested construction sequence. I will use the latter for the building notes, along with appropriate photographs...

Step 1

The first parts to cut out are the two deck pieces. I made a card template to guide my knife and create two identical shapes (see **Photo 2**). These

parts have to be glued together. I sandwiched them between plastic sheets, lightly pinned to prevent moment and held down with suitable weights to keep them flat (see

Photo 3). **Note:** I did not cut the slots in the deck for the two fixed fins at this stage as these could weaken the decks during assembly of the hull parts.



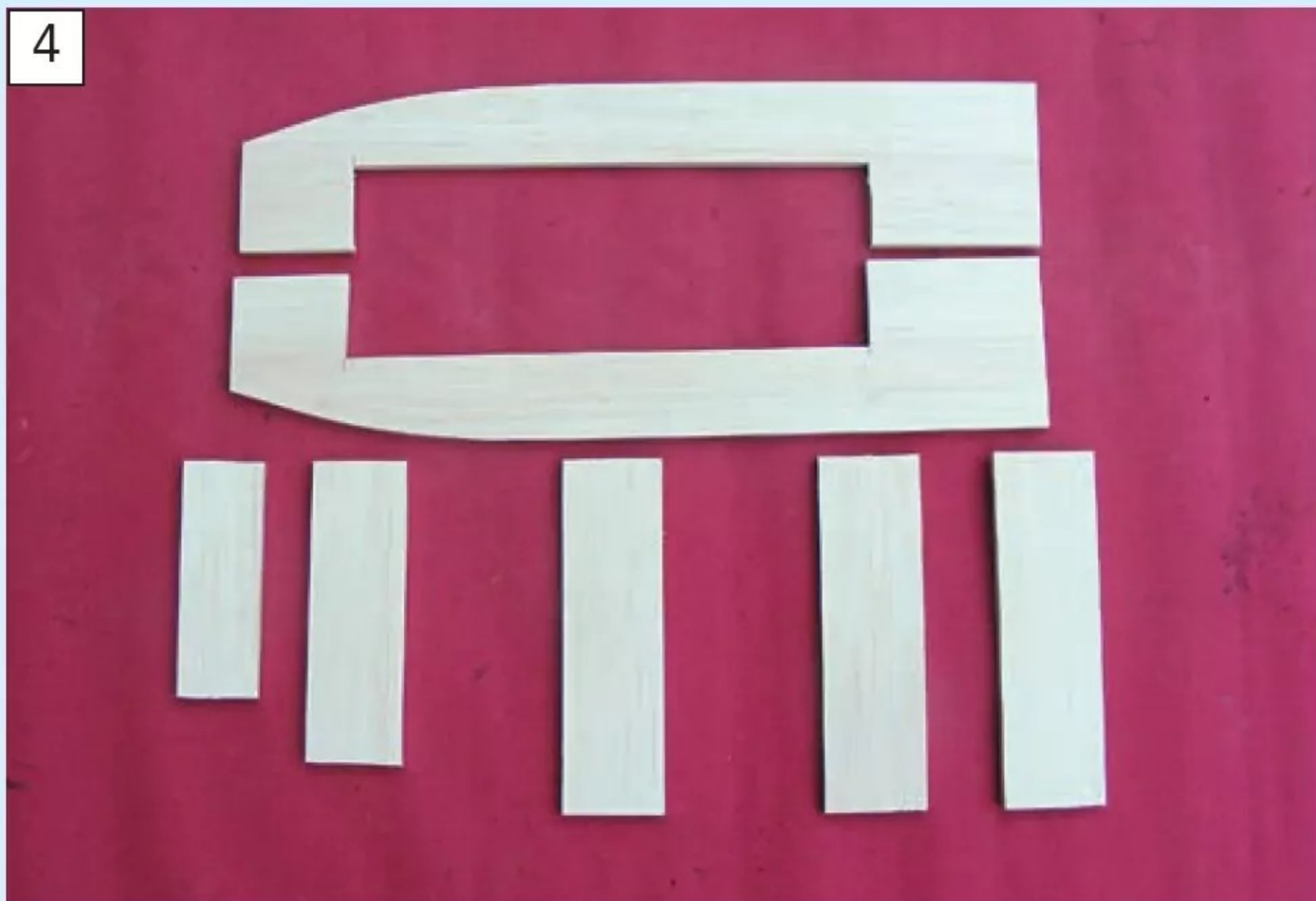
Step 2

Being simple rectangles, the bulkheads and transom are easily to cut out. They do, however, need

square edges and they must match their positions on the deck (see **Photo 4**). Once you're happy with them, they can be glued to the underside of the

deck. Again, I used pins and weights (old lead-acid batteries are handy for this sort of work) to keep them in place and square (see **Photo 5**).

4



5



Step 3

My hull bottom was cut from 2 mm thick Lite Ply. A possible alternative could be 1/16-inch (1.5 mm) plywood, but nothing thicker as you want to

avoid excess weight. **Note:** this piece is slightly longer than the deck to allow for the curve it has to make in the bow section. Attaching it is best done in two stages: firstly, attach the flat rear section

from Bulkhead 3 to the transom (see **Photo 6**); then, once the glue has set, the bottom can be fixed to the other two bulkheads, again using a weight to hold it in place (see **Photo 7**).

6



7



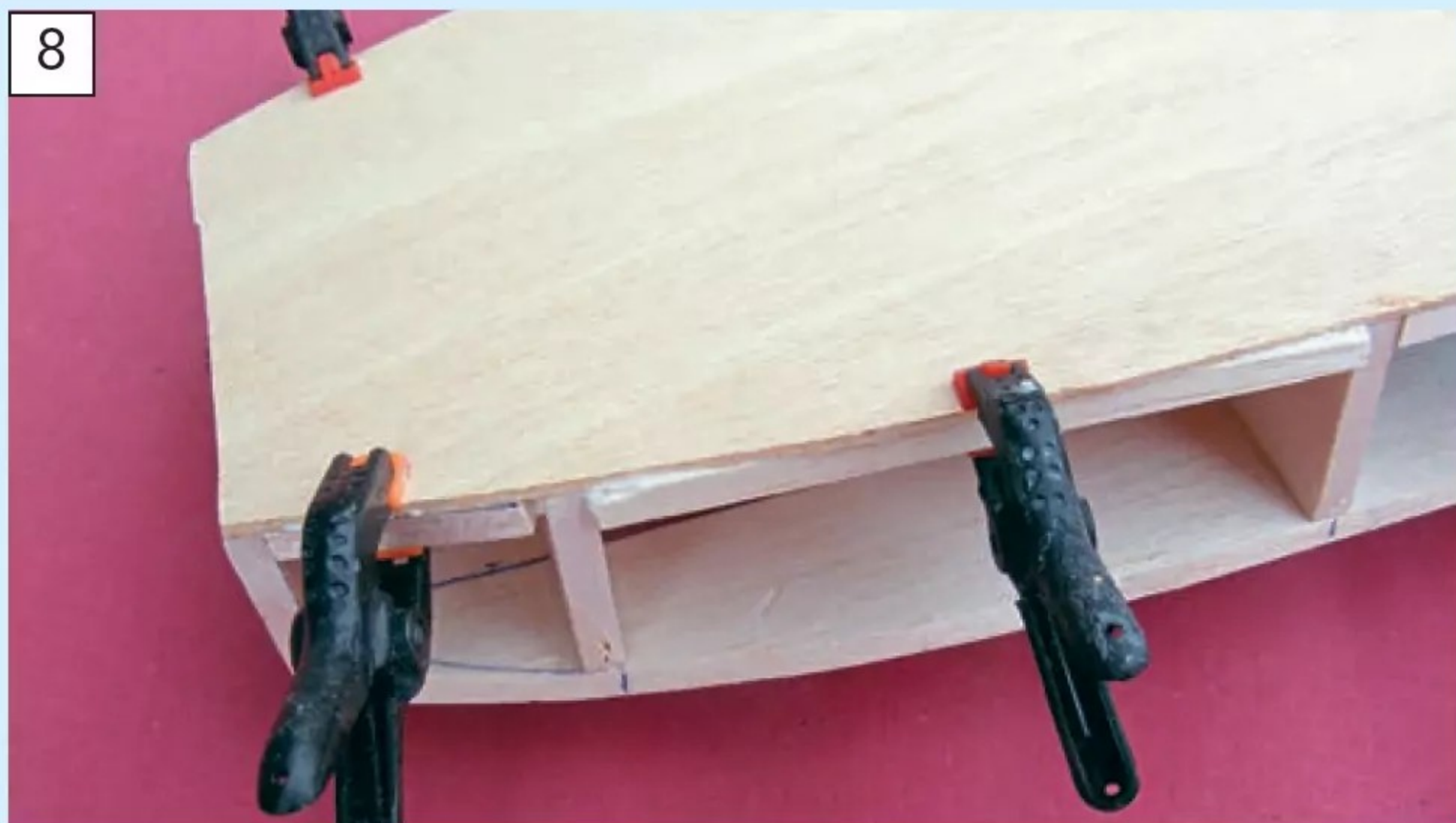
Step 4

The relatively thin bottom sheet will not create a strong-glued joint with the hull side sheeting, so, to strengthen this joint, some strips of

balsa, 1/4-inch (6 mm) square, can be glued along this edge between the bulkheads (see **Photo 8**). These strips stand a little proud of the bottom edge, which allows them to be carefully

sanded to be flush (see **Photo 9**). It is also good idea to use a sanding block to ensure that all the vertical surfaces of the hull will make a good-glued joint with the side sheets.

8



9



Step 5

The hull sides are covered with slightly oversize 1/8-inch (3 mm) balsa sheets. These are applied with their grain vertical; I usually start at the stern and work forwards, alternating between

the sides (see **Photo 10**). **Note:** these sheets must butt firmly with adjacent sheets to ensure a strong-glued joint. Once completed, the excess sheet beyond the deck, bottom, Bulkhead 1 and transom can be sanded away

(see **Photo 11**). **Note:** try to keep the corner at the junction of the bottom and side/transom as sharp as possible; this encourages water to break away cleanly when the model is running at speed.

10



11



Step 6

The coaming around the deck access opening, upon which the detachable hatch will fit, can be made from balsa and/or Lite Ply (see **Photo 12**). My motor mount was a block of balsa made from four laminations of 1/4-inch (6 mm) sheet. This should have a radiused top to match the motor body. To correctly position the motor, it has a cut-out which needs to fit squarely into a notch made in the coaming before gluing in place (see **Photos 13 and 14**).

12



13



14



Step 7

Before adding the two fixed fins, it's sensible to make the motor mounting strap. Soft aluminum sheet is suitable as it can be bent around the motor case (see **Photo 15**). Mine was made such that the two ventilation slots in the case would not be covered.

15



“Try to keep the corner at the junction of the bottom and side/transom as sharp as possible; this encourages water to break away cleanly when the model is running at speed”

Step 8

Two slots must be cut into the deck to accommodate the two fixed fins (**Photo 16**). After checking these fins are square to the deck, they can be glued in place (**Photo 17**). The wing that fits across the top of these fins also needs to be glued, but only after ensuring that it will be parallel to the deck - if this wing is angled, then some odd handling might occur when running at speed! A little streamlining can be created by rounding off the edges of the fins and wing.

16



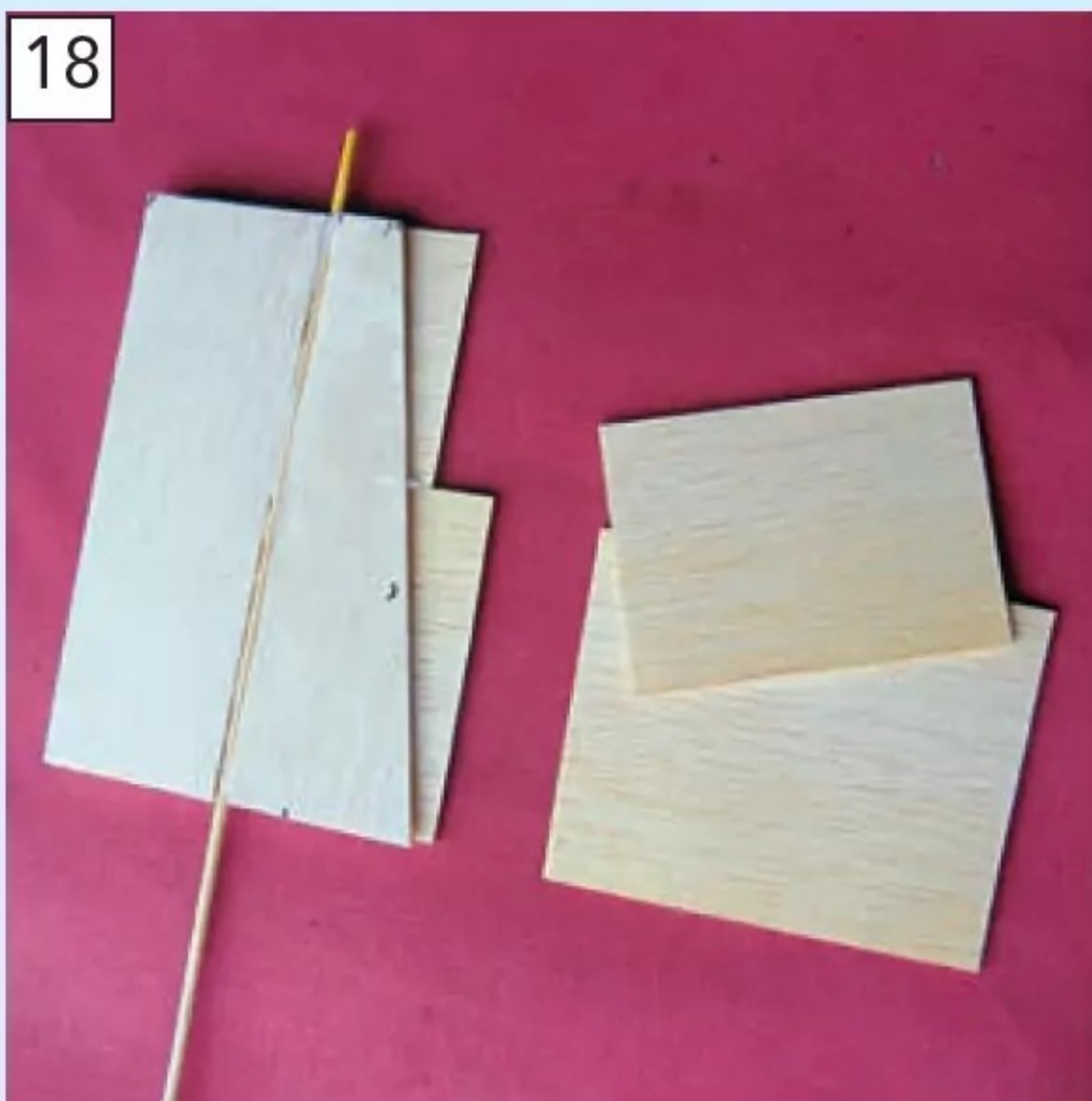
17



Step 9

The rudder that steers the model has to fit between the two fixed fins and behind the propeller. It is of balanced type with part of its area ahead of its axis of rotation. A simple way to achieve this is to build the rudder around a length of dowel, which is both strong and light enough for the task. The dowel should be glued between two balsa core pieces with Lite Ply outers (see **Photo 18**).

18



Step 10

While the rudder must be securely fitted on the model, it also needs to be removable for possible repairs and adjustments. This can be achieved by securing the bottom of the dowel in a matching plastic tube held on the transom by an aluminum strap secured with two screws (see **Photo 19**). A short length of plastic tubing must be fitted through the wing to secure the top of the dowel. Some degree of adjustment will be necessary to ensure the rudder is square and can move freely before things are fixed in place.

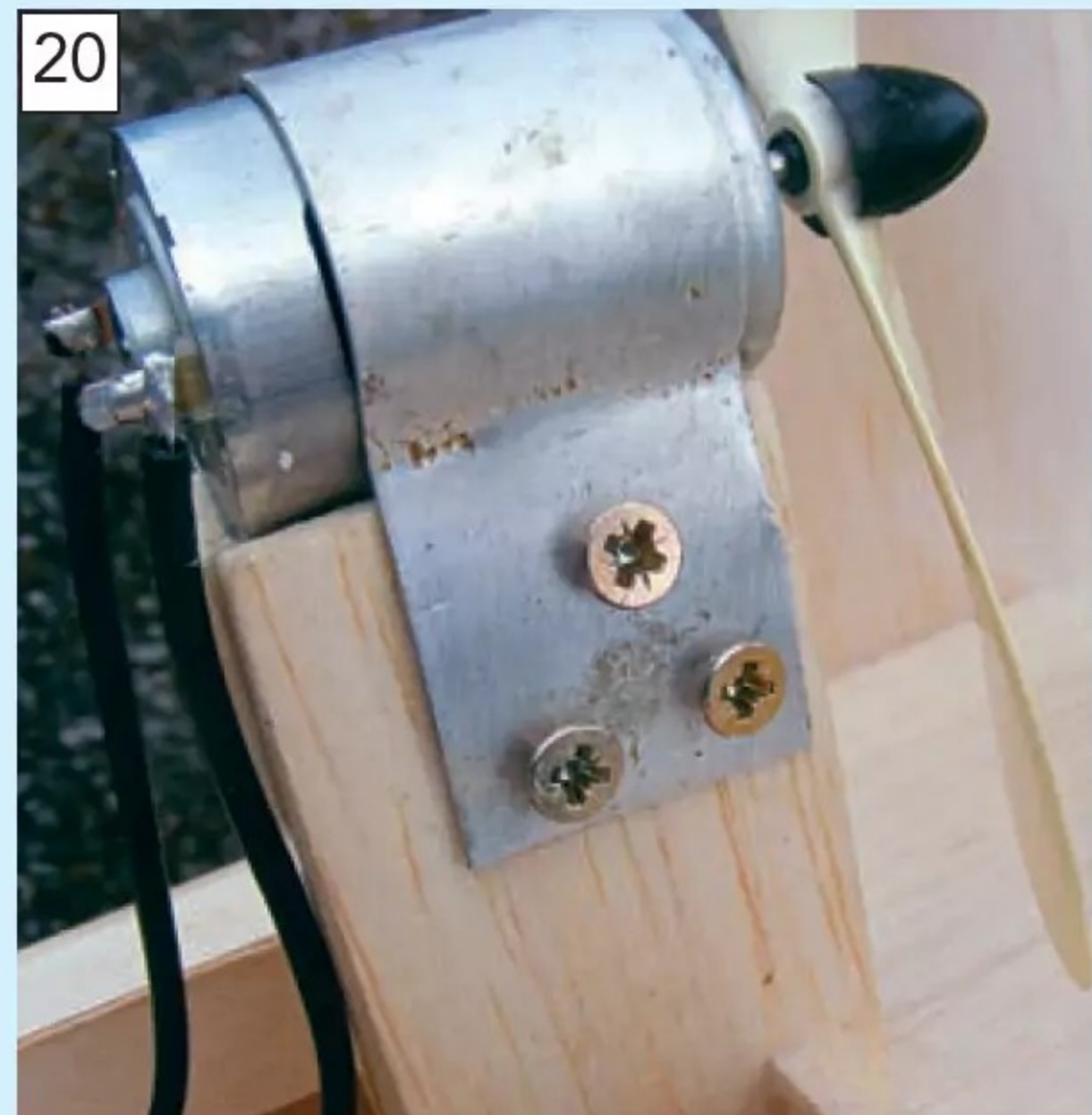
19



Step 11

The motor mounting strap can be fixed to the mount once you've checked that the propeller can rotate without fouling anything. This can be done by using three suitable screws on both sides of the mount. These need to be passed through holes in the strap, taking care that they don't meet inside the mount (see **Photo 20**).

20



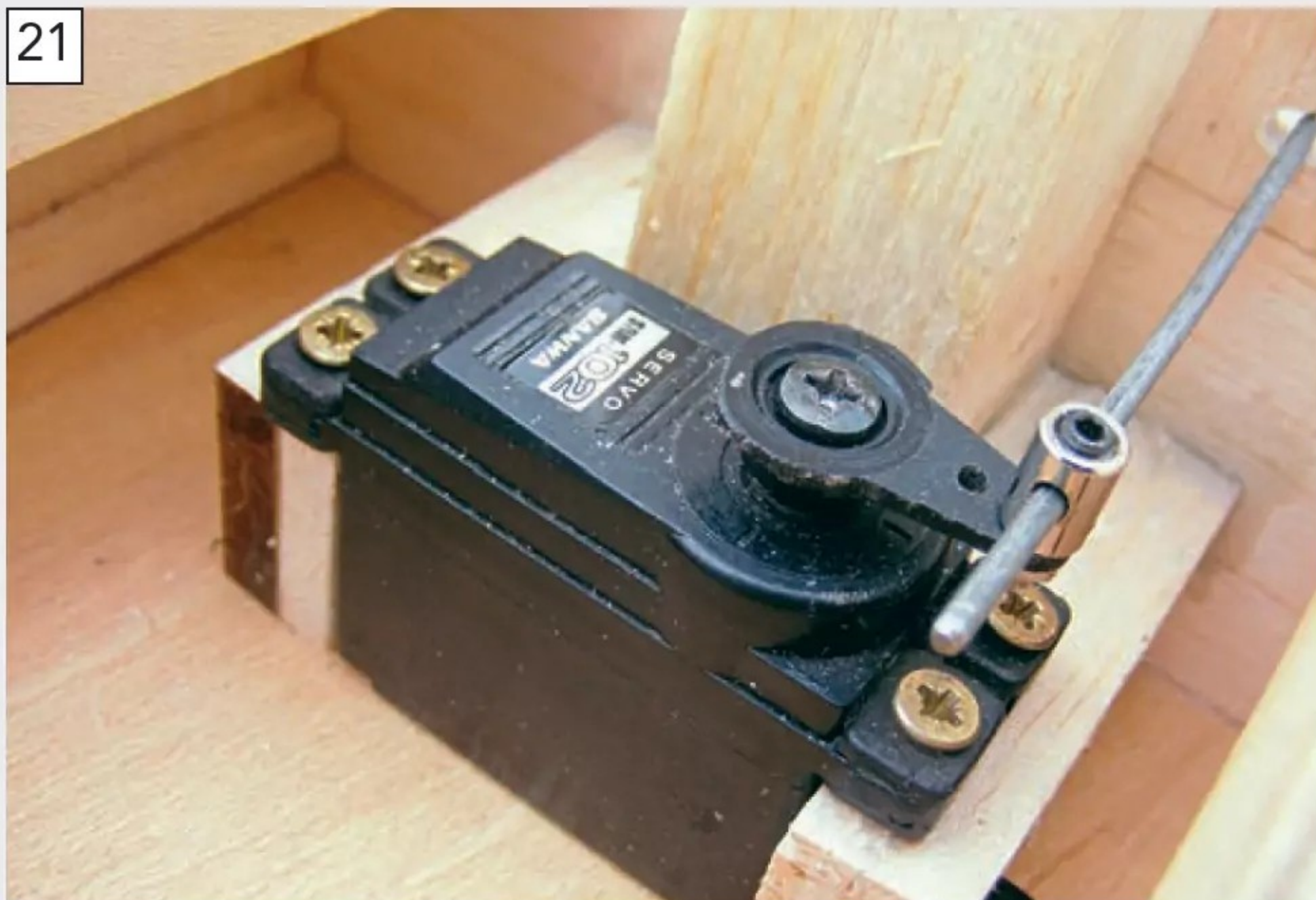
Step 12

Installing the steering should be started by gluing to blocks of balsa to either side of the motor mount in such a way that a servo

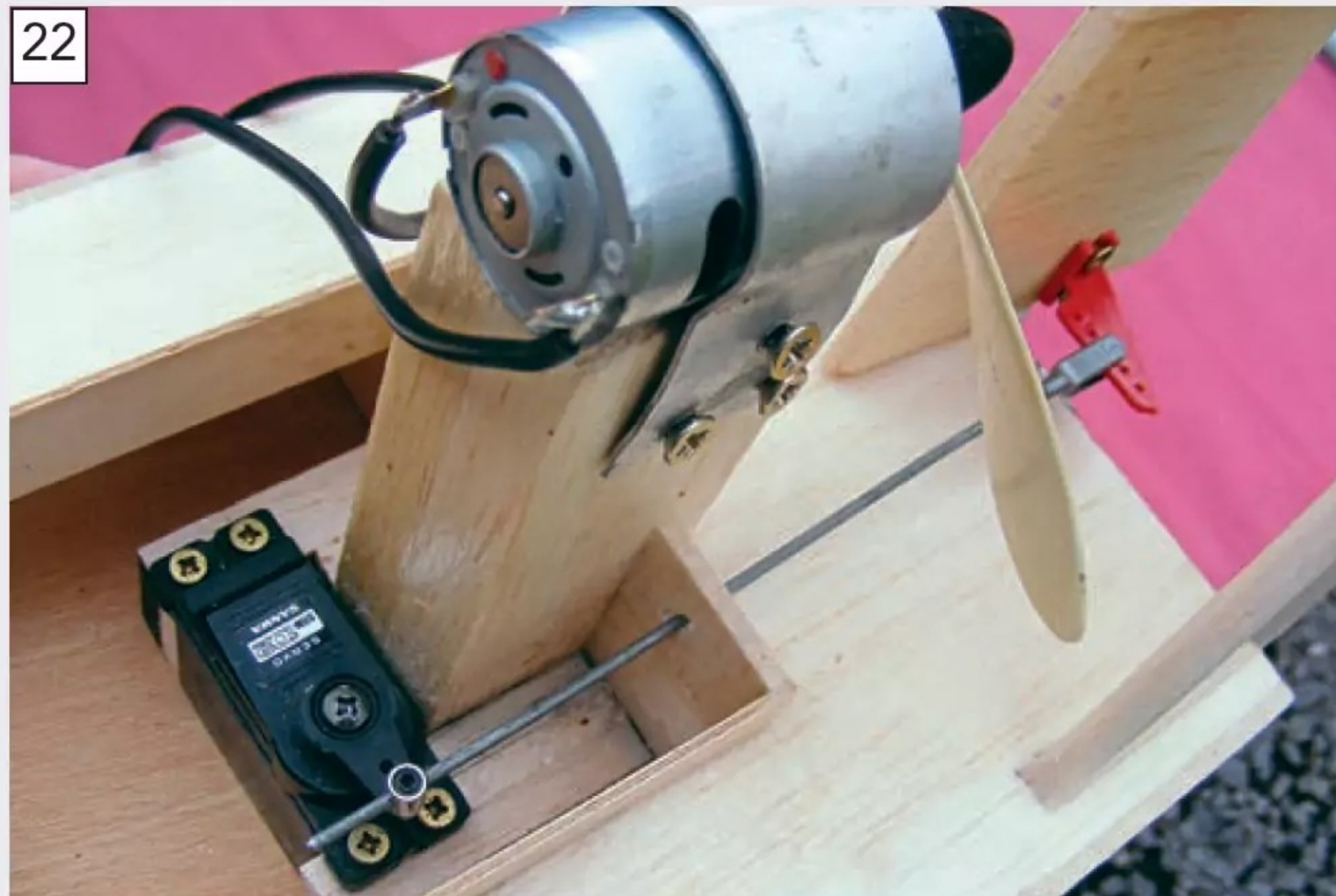
will fit between them (see **Photo 21**). This allows a wire link from the servo arm to be passed through a hole in the coaming and then be attached to a control arm secured

to the bottom of the rudder (see **Photo 22** and refer to plans). Care must be taken to ensure that the propeller cannot interfere with the servo's operation.

21



22



Step 13

The primary task of the removable hatches is to allow easy access to the insides of the model while keeping water out. Their secondary task is to create some degree of scale-like appearance. During the model's construction I had contemplated giving the model a ferry or rescue craft look, but, in the end, I settled on a simple military appearance. The

choice here is wide open, the only proviso being that the model's primary tasks need to be met and that adding too much weight and preventing a reasonably smooth flow of air to the propeller should be avoided. To ensure a good and secure fit on the model, the hatch is best built over the coaming (see **Photo 23**). The resulting 'box' should have smooth shape in the rear section

ahead of the propeller (see **Photo 24**). There are two cut-outs in this section for clearance of the motor mount and rudder linkage (see **Photo 25**). The final item to add is a triangular balsa wedge just ahead of the hatch front (see **Photo 26**). Many full-size hovercrafts feature such a shape and it's a good way to clear any water that blunt nosed airboats can pick up.

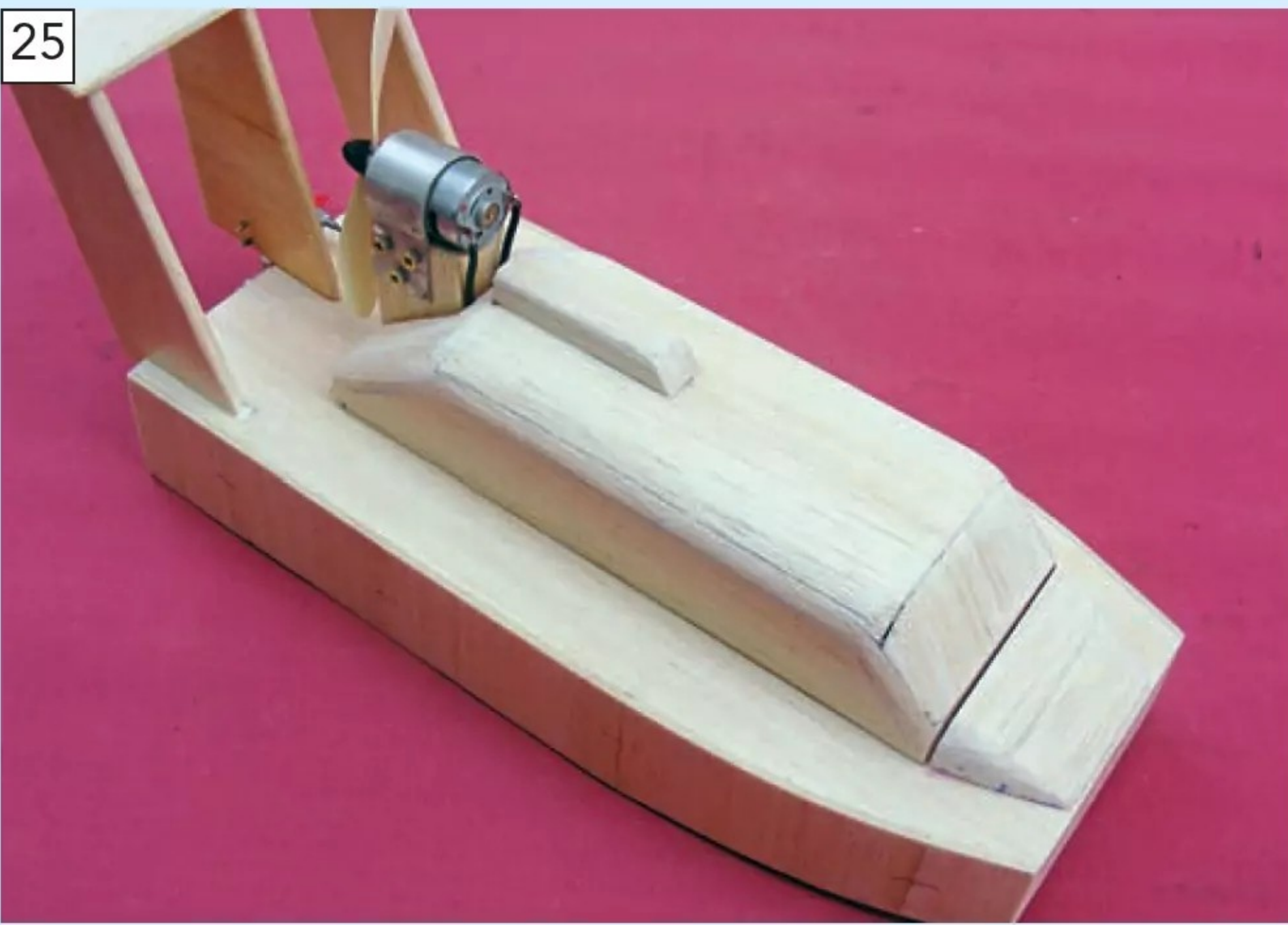
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24



25



26



27



Surface sealing

The external surfaces of the model must be made waterproof and a base created for the paint. There are many suitable methods that can be used here, but, again, I would caution against adding too much weight. I should also perhaps point out that it makes life so much easier if the model is broken down into three components (hull, rudder and hatch) before reaching for a brush!

The prototype was treated to three coats of clear acrylic varnish, with a light sanding after each coat to produce a smooth finish suitable for painting. Using a water-based varnish meant no smell, which kept me in Mrs. Guest's good books!

With my own model being based on a military craft, this called for paint that would look sufficiently close to the 'olive drab' the forces like to cover every bit of their kit with. Luckily, the local DIY store had a suitable can of

28



29



“It’s important that the model doesn’t float with a bow down attitude. For this reason, you should try to keep as much of the R/C gear as possible in the compartment bounded by Bulkheads 3 and 4”

spray paint. The lower half of the hull I painted black, as I didn’t want it to be too visible while sailing.

The bogus ‘skirt’

Real and model hovercraft usually have a flexible skirt around their perimeter, this allowing the hovercraft to rise to a greater height and operate over irregular surfaces. It’s obviously not needed on an airboat, but I felt its appearance had to be duplicated somehow. A solution to this, in the form of lengths of foam pipe lagging, was found in my local DIY store. These tubes came with a partial longitudinal

slit along their lengths, so it was easy to enlarge the slit though the whole pipe wall and make another cut diametrically opposite. This gave two half round lengths of foam plastic that ought to look skirt-like when stuck around my airboat’s hull.

What to stick it with was my first dilemma but, again, the DIY store had the answer. Modern adhesives can be very good at joining different materials and I opted for a tube of Ever Builds’ Stixall; this has successfully held bits on my car for some years now, and the fact that it’s clear makes it easy to achieve nice, neat results.

So, on with the project... These foam lengths need to be stuck around the hull in two stages, first along the sides, then to the front and back sections. The sidepieces are fitted as overlong lengths and held in place with elastic bands (see **Photo 27**). You will then need to allow the glue to fully cure overnight, to ensure the foam is securely bonded to the hull, before proceeding.

The next job is tricky, as the excess must be trimmed away at an angle to create a chamfered joint with the front and back pieces (see **Photo 28**). I will confess that it took me a few goes to make four decent looking joints. Finally, part of the rear skirt must be cut way to give access to the rudder-mounting strap on the transom.

Getting ready to sail

It’s important that the model doesn’t float with a bow down attitude. For this reason, you should try to keep as much of the R/C gear as possible in the compartment bounded by Bulkheads 3 and 4.

The battery and ESC can be fitted into this space, with the wiring neatly tucked out of the way. An ESC having a BEC will also save space and weight. More for convenience than anything, my receiver was fitted into the next compartment. Items should then be secured with a foam plastic to prevent any movement while sailing (see **Photo 29**).







“Hoverfly can soon become an absorbing model to operate due to the difference in its performance when compared with other models, its quirky appearance and even the noise it makes during operation!”

At this stage the model will still be looking a little bare, so this is where you will need to get creative. I first added some windows made from black self-adhesive plastic film before retrieving and fitting a few military-looking items from my spares drawer. I left the motor and mounting strap in a natural metal finish as past experience with these on other models had shown them to get hot when working hard; operating *this* model, however,

has shown that their exposed position keeps them cool, so painting them is a possible option.

This is Glynn's completed model, but how you chose to finish yours is entirely up to you.

Getting the bottom wet

A trial float on the garden pond allowed me to check both the model's trim and its operation at low power (the pond not being big enough for high speeds). This revealed two things. Firstly, at low power and full rudder (about 30 degrees) the model could turn in a circle of 4-5 ft (1.2 -1.5 m) diameter. This could be very handy, as airboat models are often impossible to steer when moving astern. My second observation was that random gusts of wind in that corner of the garden suggested that, with three fins, any

side winds might affect the model.

It was then off to a bigger body of testing water. This confirmed the model's ability to turn very tightly at low speeds with full rudder; in fact, with care, I could almost make it spin on the spot. It also, however, verified that there was no reliable steering when moving astern. Reversing the motor was something best left for bringing the model to rest and slowly backing. Any attempt to move astern at speed could push water onto the deck, which wasn't at all desirable considering the cut-outs in the hatch.

Accelerating up to full speed had the model running in a clean planning attitude. The rudder's steering effect was quite good, but I was very aware that control of this model wasn't something I could let my attention wander away from. It can start to drift in either



direction, although it does only minor rudder corrections are needed. In this respect, it's similar to riding a bike or driving a car; you start to automatically apply small steering inputs to maintain the desired course. I did notice that at less than full power water could build up at the blunt bows, and sometimes come over the bows, especially in choppy conditions. Moving the battery rearwards lifted the bows and improved things, as did running at full speed.

I ended these first sailing trials pleased with the model's handling but feeling that its top speed was a shade less than my similar airboat models produce. I had a suspicion that the pack of AA NiMH cells may not be performing as it should, and indeed on checking I found only about 6.5 Volts were being supplied to the motor. Rather than make up a new battery pack, a small (1350 mAh) three-cell Lipo pack was tried next. This significantly

raised the motor Voltage and reduced the model's weight. The result was not only an increase in top speed but, it would seem, better handling and maneuverability. I still needed to watch this model all the time, but I soon developed the modest unconscious corrections to keep it on course.

Go on, create a pondside buzz!

The objective was to create something that could look like and, at least on the water, perform in a similar manner to a hovercraft model. I seem to have achieved this, as when chatting to spectators they've immediately referred to my R/C airboat as a hovercraft.

The design had to be different from the more traditional types of model boats. However, it has proven to be strong and durable, despite the need to keep the weight to a minimum. The use of electric flight items might take

some out of their comfort zone, but I can assure you these items are readily available via a simple internet search. I did worry about the unshielded propeller, but its position on the model does offer some safety; you will still need to exercise some caution and care, making sure your, or someone else's, fingers don't get into close proximity of it, though.

If you do not desire high-speed performance, then replacing the suggested motors with something like the less powerful RE 385 types is possible. This ought to still make the model look and perform like a hovercraft but at modest speeds, perhaps better suited for smaller waters. Either way, Hoverfly can soon become an absorbing model to operate due to the difference in its performance when compared with other models, its quirky appearance and even the noise it makes during operation! ●

Model Boats is a friendly, inclusive, community-led magazine that welcomes everyone, from the complete novice to the seasoned vet, aboard. As well as including a FREE PLAN in every other issue, no aspect of the hobby is off radar, with content embracing everything from scale static display models to radio-controlled, combustion engine-powered and steam-driven working renditions. From model yachting skills to Fast Electric thrills, we've got it covered!

Lindsey Amrani

Editor

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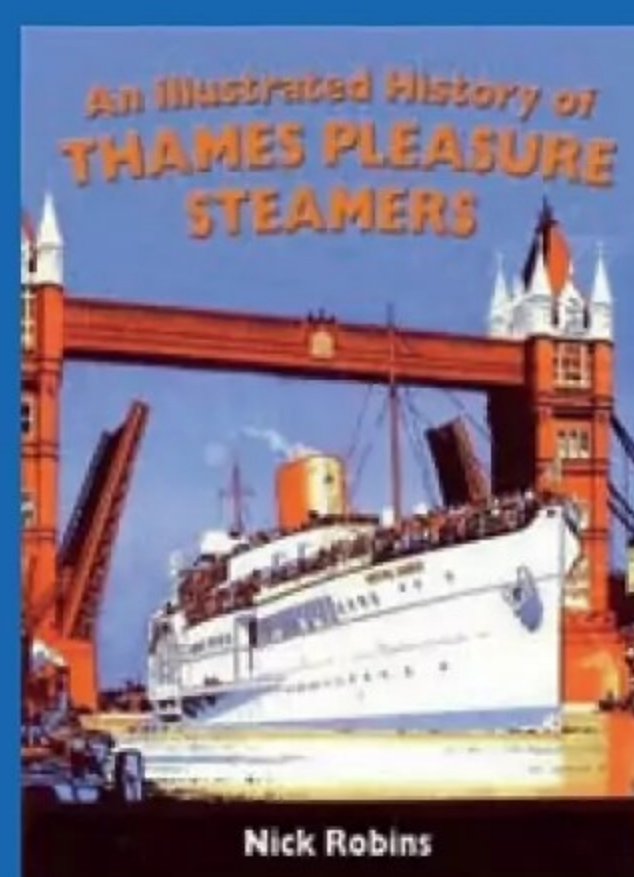


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HMAS Vampire at sea (John's curated AI image.)

The Daring class destroyers

Ready to take on a new challenge? **John Parker** recounts the history of, and modelling options for, these classic post-war naval vessels

Towards the end of World War II, Britain began formulating the design of its next class of destroyer, based on hard-won wartime experience with earlier classes and incorporating a number of 'wish list' features. The result emerged into the post-war world as the Daring class – a classic destroyer design with modern weaponry that was large enough to be considered at one time to serve as a light cruiser.

Characteristics

The appearance of the Darings, while following a traditional destroyer layout for the most part, was influenced by several factors.

Dominating the class visually was the main armament, consisting of three of the newly developed Mk VI twin 4.5in (114mm) gun mounts, two super firing forward and one aft. These were fully enclosed and power-operated dual-purpose guns that could engage aerial or surface targets, obviating the need for a dedicated main AA armament. Their fire control system was advanced for the time, with radar-directed firing for all-weather conditions. Cutting away the corners of the bridge structure allowed 'B' turret an increased firing arc.

The adoption of 'unit machinery' – separation of the boiler and engine rooms to reduce the chances of a single

"The appearance of the Darings, while following a traditional destroyer layout for the most part, was influenced by several factors..."

hit disabling the ship – also influenced appearance. This required an increase in overall length and meant that the boiler uptakes could no longer be trunked into a single funnel, as had become the practice in previous classes. A reduction in the amount of deck space required for the twin funnels was achieved through the innovation of having the forward funnel divested of its outer



HMAS Vampire at the National Maritime Museum, Sydney, alongside the Oberon class submarine HMAS Onslow.



Looking up at 'B' turret



The forward turrets and a single 40mm Bofors, Image courtesy of Wikipedia.

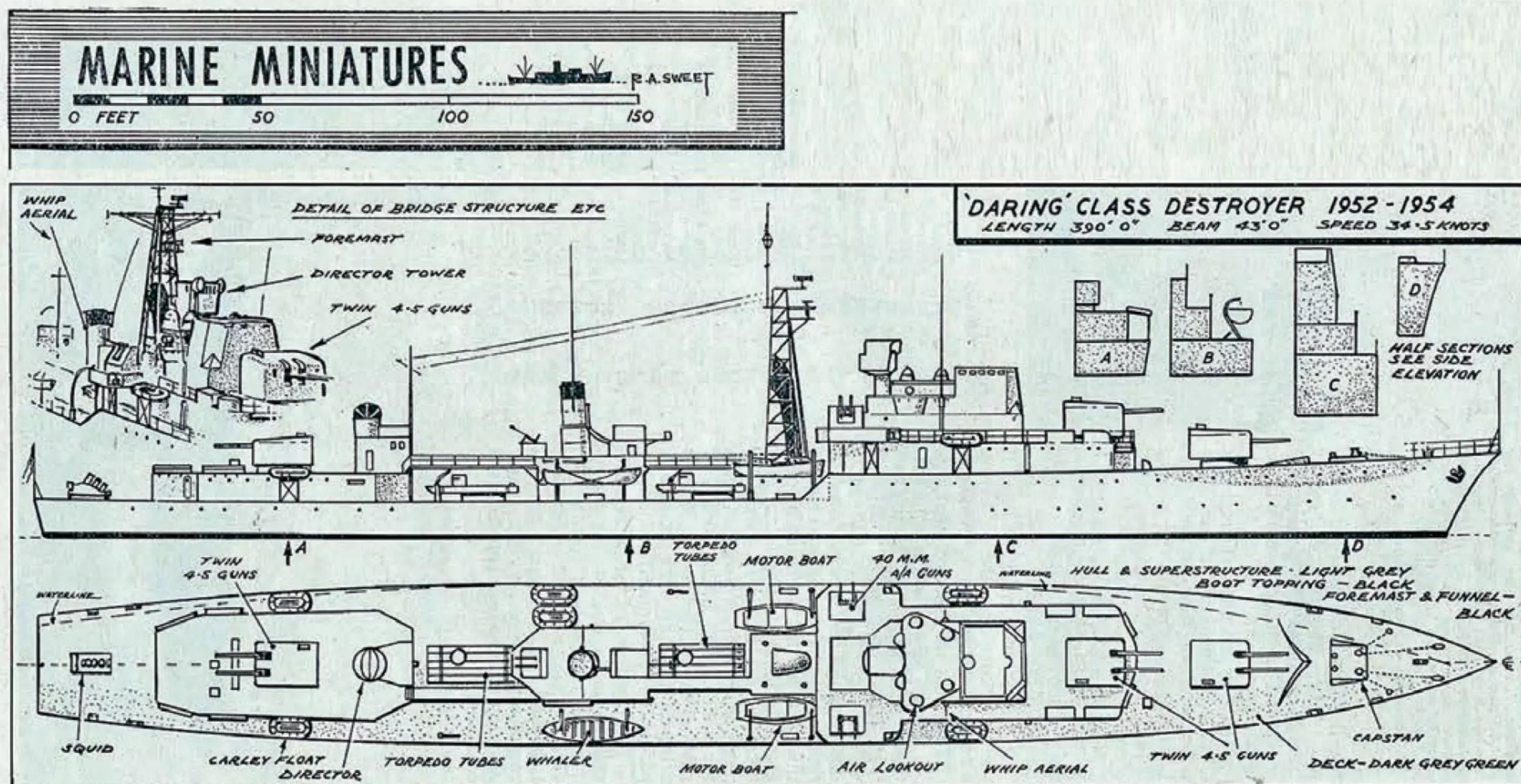
casing, mounted within and exhausting through a lattice main mast.

A long forecastle and high freeboard provided good seakeeping capability, while twin rudders improved manoeuvrability. Steam turbines provided 54,000 hp to twin shafts for a top speed of over 30 knots. The use of higher steam pressures and temperatures (as per US Navy practice) enabled a significant improvement in fuel economy, pushing the range out to 4,500 nautical miles at a 20-knot cruising speed. The increased endurance

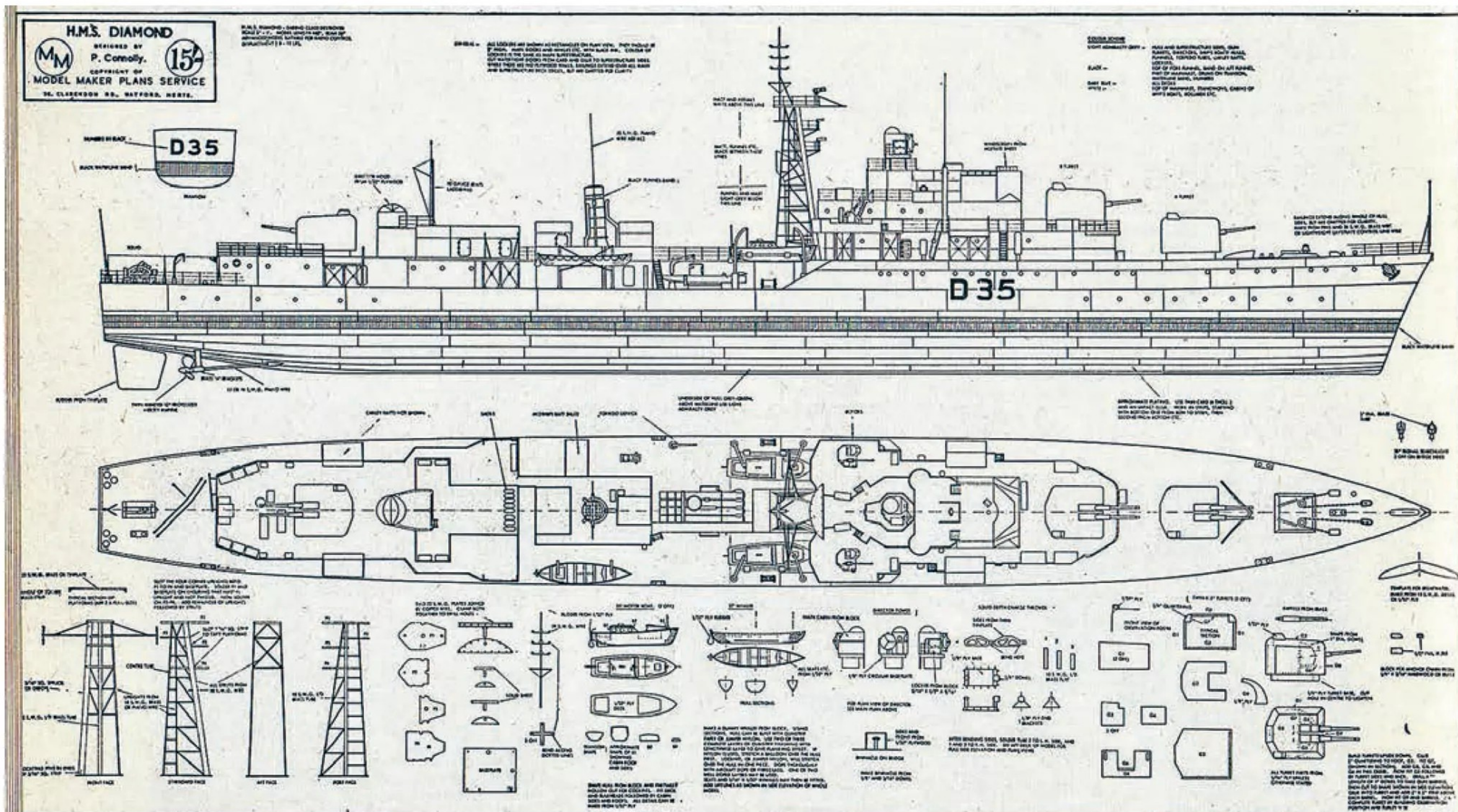
in turn placed a greater emphasis on crew comfort and habitability, and the Daring class was provided with improved accommodation and messing arrangements, had washing machines and, in important areas, air conditioning.

To combat the new generation of Soviet fast submarines that were to become a feature of the Cold War, a Squid anti-submarine mortar with 30 rounds was fitted to the quarter deck. The torpedo armament consisted of two centreline pentad mounts with ten torpedoes and the secondary

“Eight Daring class ships were built for the Royal Navy in 1952-1954: Daring, Dainty, Defender, Delight, Decoy, Diamond, Diana and Duchess... Three examples were built in Australian yards for the Royal Australian Navy in 1957-1959: Vampire, Vendetta and Voyager”



The simple plan from the September 1960 issue of Model Maker.



Plans for HMS Diamond described in the December 1963/January 1964 issues of Model Maker and Model Cars.

armament consisted of various configurations of 40mm Bofors guns. The net result of the specification was a large well-armed destroyer measuring 390 feet (120m) long with a standard displacement of 2,830 tons (3,820 tons full load).

Production

Eight Daring class ships were built for the Royal Navy in 1952-1954: *Daring*, *Dainty*, *Defender* and *Delight* forming the 2nd Destroyer Squadron, and *Decoy*, *Diamond*, *Diana* and *Duchess* forming the 5th Destroyer Squadron. A planned

eight further vessels were cancelled in December 1945. Three examples were built in Australian yards for the Royal Australian Navy in 1957-1959: *Vampire*, *Vendetta* and *Voyager*, while a fourth was cancelled on the slipway in 1954 to help fund a force of aircraft carriers.



An early Airfix kit for the Daring class.

In service
The Daring class vessels, in service with the Royal Navy from the early 1950s, were considered to be of capable and handsome design and of handsome appearance, despite the awkward funnel arrangement. They were deployed to the Suez Crisis of 1956, where HMS *Diana* sank the Egyptian frigate *Domiat*, and participated in many Cold War NATO exercises in the Mediterranean and North Atlantic. In

PRINCIPAL EXTERNAL FEATURES OF A DARING CLASS DESTROYER

Pictured: HMAS Vampire post modification Specification refers to original RN vessels

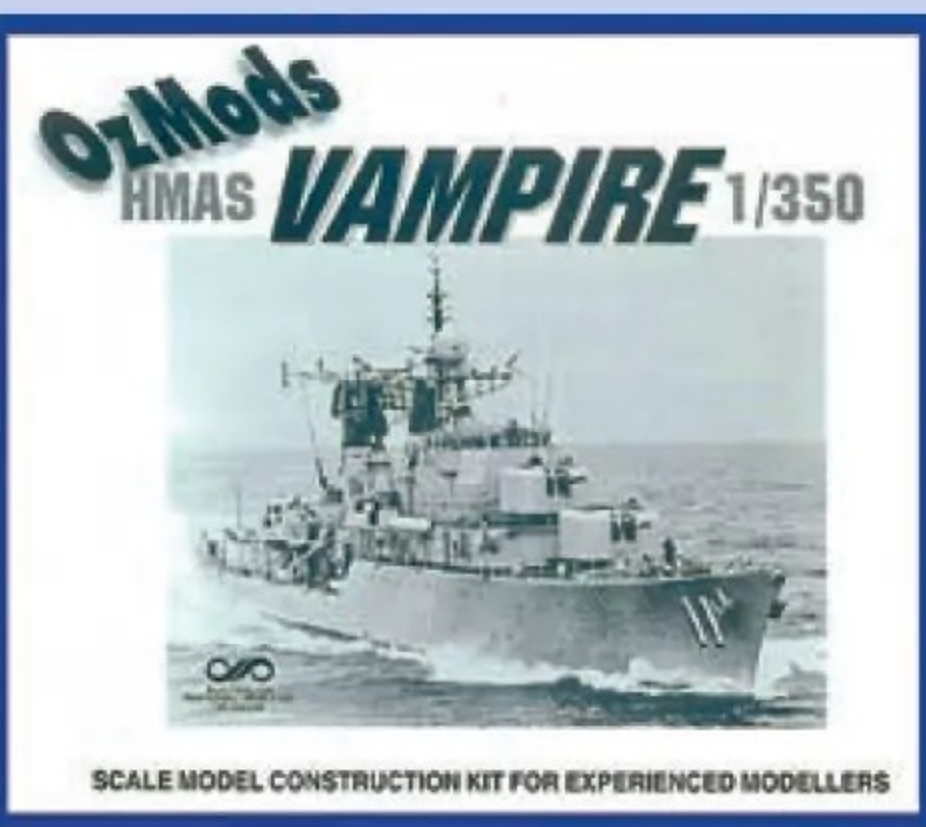


- | | | | |
|---------------------|------------------|-----------------------------|---------------------|
| 1 Twin 4.5" guns | 5 Main mast | 9 Motor boat | 13 Aft gun director |
| 2 Twin 4.5" guns | 6 Forward funnel | 10 Air search radar | 14 40mm AA guns |
| 3 Closed bridge | 7 40mm AA gun | 11 Associated radar/sensors | 15 Aft 4.5" guns |
| 4 Fwd. gun director | 8 Ship's boats | 12 Aft funnel | 16 Limbo A/S mortar |

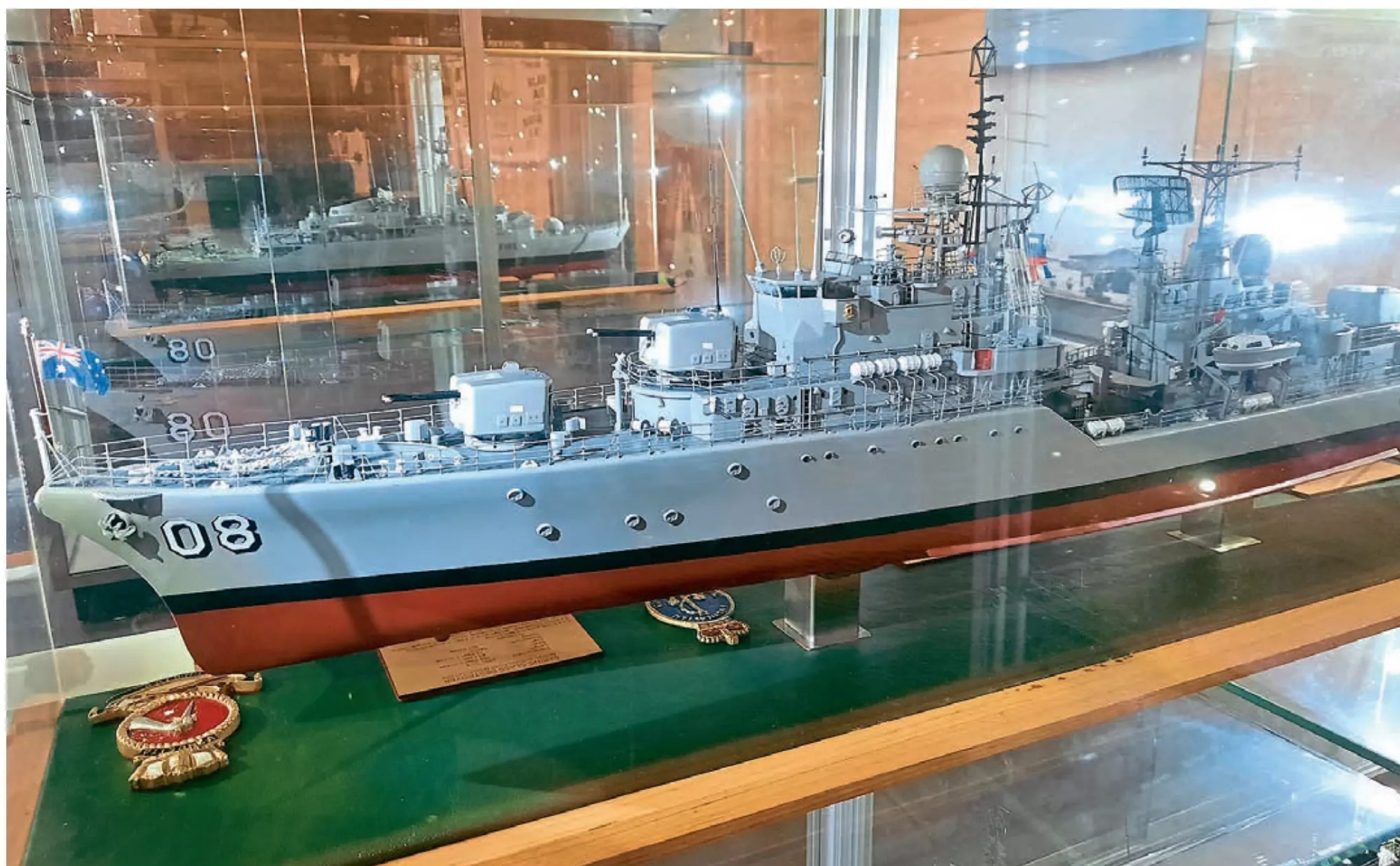
Displacement: 2,830 tons (std.) 3,820 tons (full load) **Length:** 390 ft (120 m) **Beam:** 43 ft (13m) **Draft:** 12.79 ft (3.89m)
Complement: 297 **Propulsion:** 2 oil-fired boilers, 2 turbines, twin shafts **Power/speed:** 54,000 shp (40,000 kW) / 30.5 knots
Armament: 6 x 4.5" (113mm) QF guns in 3 twin mountings; 2 quintuple torpedo mounts; 1 squid anti-submarine mortar
4 x 40mm/60 Bofors A/A in 2 twin mounts; 2 x 40mm/60 Bofors A/A in 1 twin mount



Kits available from GG Model and OzMods.



Alternatively scaled kits from OzMods.



The model of HMAS Vendetta at the Seaworks Museum, Melbourne.

the late 1950s they had one set of five torpedo tubes removed to provide more deck space for an enhanced anti-aircraft capability. During the Indonesia-Malaysia Confrontation in 1963-1966, they performed shore bombardment and routine patrols and took part in long-ranging fleet exercises, often serving as effective escorts for other ships. They received little modification during their time in service and their high manning requirements and lack of a missile armament (planned but never fitted) saw them pass from service in the mid 1970s. Two were sold to the Peruvian Navy and fitted with updated weapons systems that included the Exocet anti-ship missile.

In Australian service, the three Daring class ships were commissioned in 1957-1959 and took part in SEATO (South East Asia Treaty Organisation) fleet exercises, acting as escort to the aircraft carrier *Melbourne* and, in the case of *Vendetta*, providing gunfire support during the Vietnam War. On the night of February 10, 1964, *Voyager* was acting as 'plane guard' to the carrier *Melbourne* off Sydney when she was seen to be manoeuvring erratically before veering across the bows of the carrier and being cut in two. With the loss of 82 lives, this was Australia's worst peacetime naval tragedy. *Duchess*

was taken on loan from the Royal Navy and later purchased as a replacement.

The Australian ships underwent major half-life modernisation in 1971-1972. A closed bridge was fitted along a new mainmast, behind which the forward funnel, now finally with its own casing, exited. New radars were fitted and habitability improved, but the planned replacement of 'X' turret with an indigenous Ikara missile system was not proceeded with on cost grounds. *Vendetta* was paid off in 1979 and *Vampire* reclassified as a training ship in 1980. After decommissioning in 1986, this long-serving vessel was preserved as a museum ship at the Australian National Maritime Museum at Darling Harbour, Sydney, billed as 'The Last of the All-Gun Destroyers'.

Modelling the Daring class

The scratch-builder of a Daring class destroyer is fairly well catered for. From the pages of *Model Maker* came a simple drawing in the Marine Miniatures series by R.A. Sweet in the September 1960 issue that would suffice for a small display model. For those seeking a practical R/C model, Phil Connolly described his 1:96 plans for HMS *Diamond* in the December 1963-January 1964 issues of *Model Maker* and *Model Cars*. This includes many sketches of the various detail fittings that can be

made and results in a model 49 inches (1245mm) long. The two sheet plan, code MM763, is still listed as available by Sarik Hobbies. Another plan listed on the Sarik website is HMS *Diamond*, code number MM1387, by Michael Reading. I have not sighted this, but it's also 1:96 scale and described as a waterline model. A set of full-size drawings for *Vampire/Vendetta* can be found online at the National Archives of Australia.

Display model kits include the venerable 1961 Airfix 1:600 kit of HMS *Daring*, if you can find an example. There are Chinese made 3D-printed kits listed on eBay – these are printed to order but I am uncertain as to the manufacturer's name. From OzMods of Australia (<https://ozmods-kits.com/>) comes mixed media kits of the *Vampire* and *Vendetta* to 1:700, *Duchess* and *Voyager* to 1:600, and another *Vampire* to 1:350.

APS Models of Australia (apsmodels@optusnet.com.au) makes semi-kits (GRP hull plus major detail items) of the Australian Daring class vessels in pre- or post- modification form. These are to 1:72 scale, a full 1700mm long, and can be made into a magnificent model if you have the space and means of transporting it. An example by an unknown modeller that is currently in the possession of A. Henshall served as the basis for the AI images I have used in this article. ●

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Richard Simpson draws on his experiences with a past project to present the pros and cons of buying second-hand plant

The considerable expense of fitting a steam plant into a model is still a much-discussed topic during pondside conversations. While there are manufacturers, such as Miniature Steam Models in Australia, commendably producing a range of smaller package installations using 2" boilers and engines in various configurations, prices rise significant when a large plant is required, and for many models we may be looking at a 3" or 3½" boiler coupled to a twin cylinder oscillator for that additional capacity, power and duration. As cost is still seen as a barrier to the majority of newcomers who'd like to get into model steam as a means of propulsion, there's always an interest in the alternatives to buying new

We've looked at secondhand plant in this series in the past, but always from a generic perspective, noting the potential pitfalls to avoid and the safety measures that need to be taken seriously. This month, however, I will be sharing details of a specific project I was involved with a few years ago. The plant in question was an old Stour Valley Steam, SVS, horizontal boiler and twin cylinder oscillator that most of us would consider suitable to power up to around a 4ft hull for somewhere

in the region of 15 to 20 minutes – just the type of plant that we might be interested in if building a model of such a size and looking to explore the possibilities of steam propulsion. The plant was owned by a colleague, who'd acquired it with some other items and was considering installing it in one of his builds. In view of this, he asked if I'd be prepared to strip it down, return it to reliable operation and, of course, test it.

Initial inspection

So, after picking it up and getting it home, I began by laying all the bits and pieces out on my workbench. I could see I had a complete plant, consisting of boiler and engine on a common baseplate, a separator unit, burner and various silicone tubes.

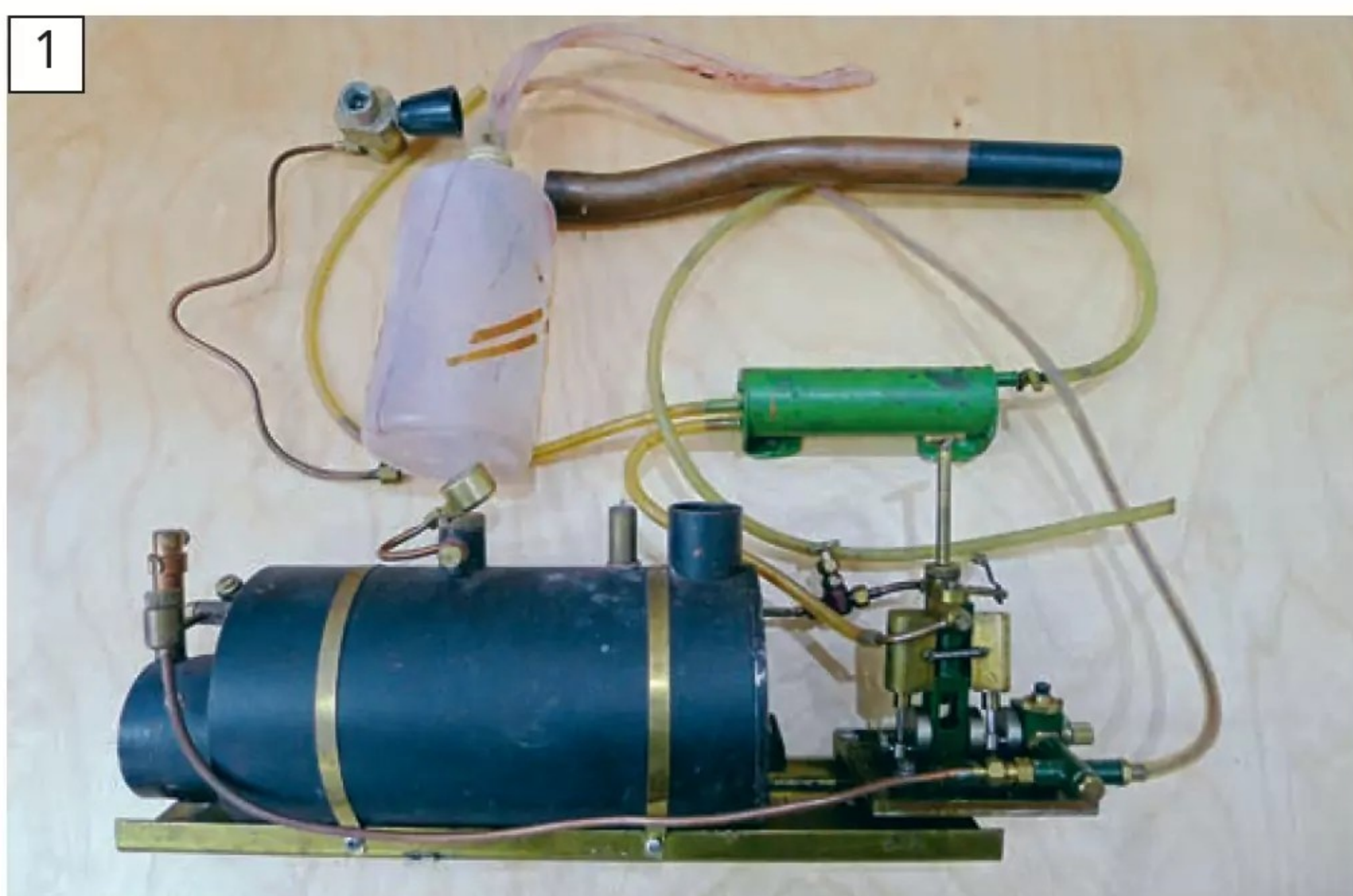
The engine was fitted with a feed pump and a plastic bottle with further silicone tubes included, obviously intended as a feed tank (see **Photo 1**). Initially things looked promising, as the engine turned over and seemed tight with the control valve in the closed position and much easier when it was opened, exactly as you would expect. It was covered in oil, which was old and had hardened up (see **Photo 2**) so

was obviously restricting movement a little. The feed pump, though, actually included a metering valve, which was interesting (see **Photo 3**).

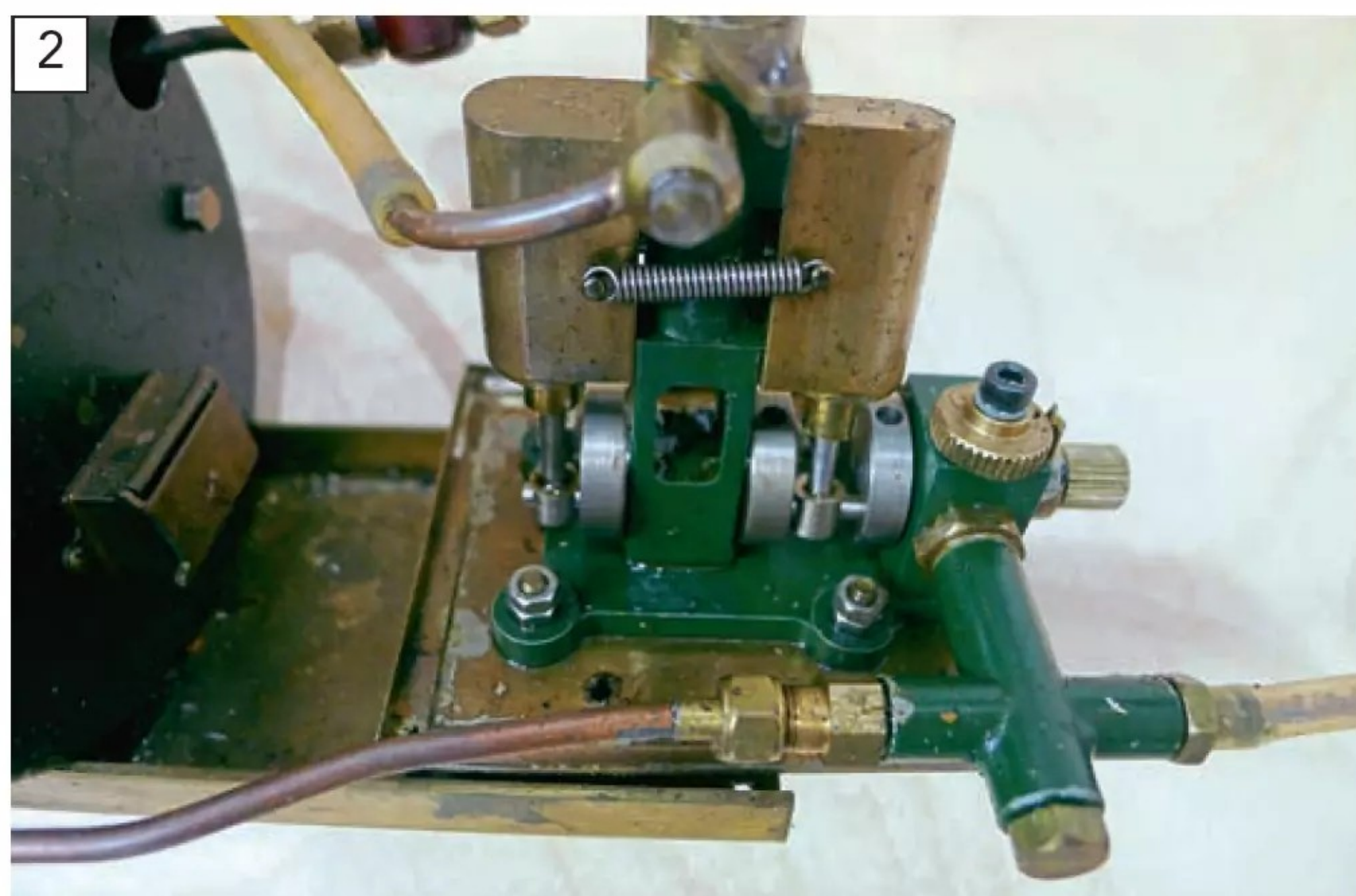
The boiler looked clean from the outside but one particular concern was a red dye in the sight glass (see **Photo 4**). I have occasionally come across this type of thing before when an owner tries to improve the view of the water level in the sight glass by adding dye to the water. Be warned: this should not be done. Ever! All it does is coat the insides of the sight glass with dye, rendering it almost useless and then the dye remains in the boiler for a long time, recoating the sight glass every time it's cleaned again. The only solution is to thoroughly pickle the boiler, maybe even more than once in an attempt to remove all traces of the dye.

The plant also came with a long and narrow separator tank, and I wasn't sure if it was an original SVS supplied unit or a homemade one (see **Photo 5**). Either way the challenge with a long, narrow, horizontal arrangement is that the oil

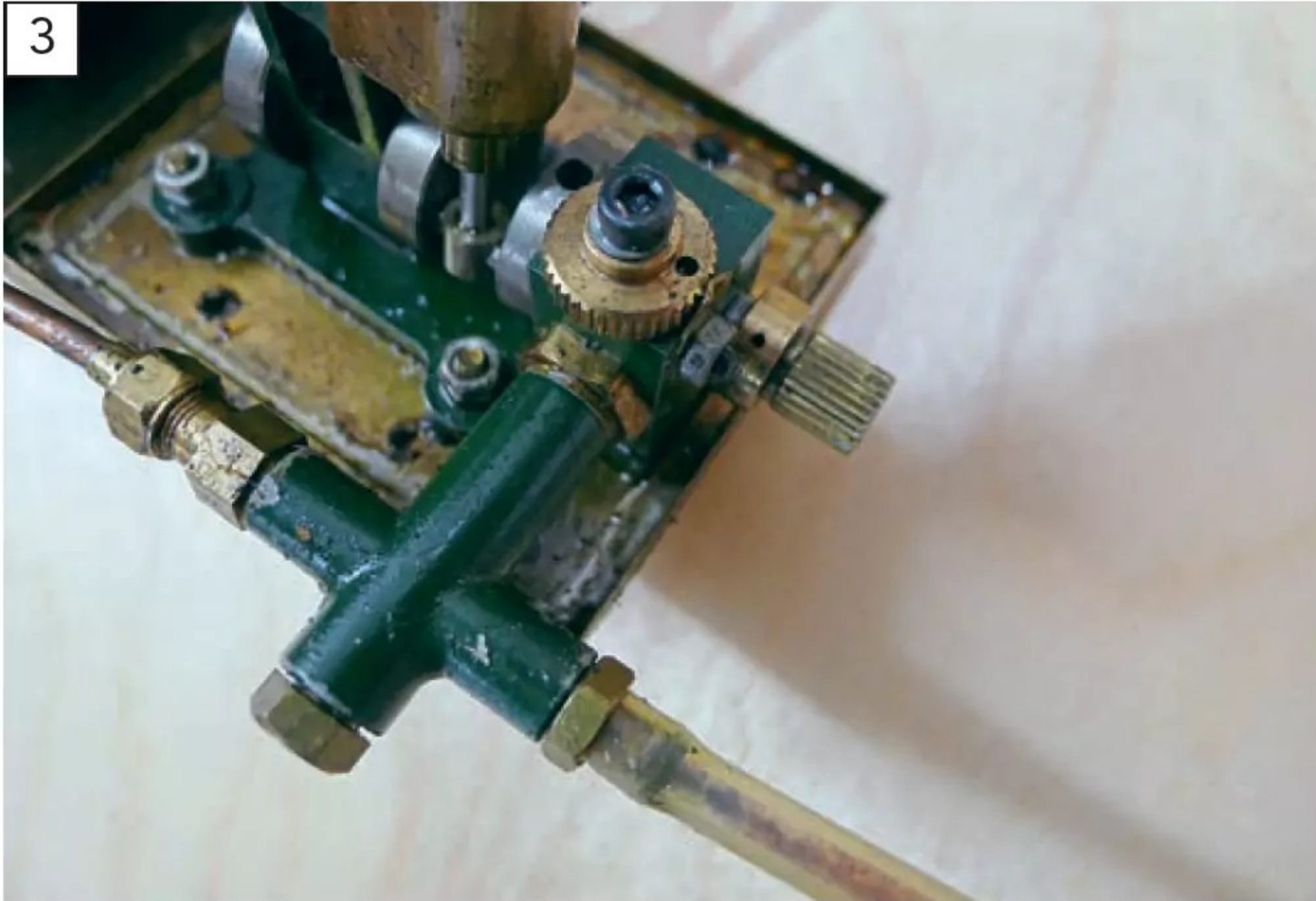
"Be warned: this should not be done. Ever!"



The bits and pieces as they arrived - certainly everything there and generally all looking to be in a reasonably sound condition.



The engine was well lubricated, turned over smoothly, and included a very nice feed pump actually built into the main frame itself.



The feed pump even included a metering valve so flow rate can be closely matched to the engine demand, making it one of the simplest and yet effective boiler water level devices.



One of the biggest concerns was the red dye in the sight glass. Using a dye to help see the water level isn't unheard of, but it always ends up with a dirty sight glass that you can't see anything in. Then it's a lengthy cleaning process.



Separator tanks work best when they are vertical and narrow rather than horizontal. The contents will rarely separate effectively in a tank like this, so the contents have to all be dealt with as waste oil.



The pressure gauge looked to be in good condition, although there was no red line at the working pressure as required by the Boiler Test Code, 2018.



Another interesting little device was the pipe mounted non-return valve. Inside is simply a ball bearing sat on a machined seat. The ball is forced onto the seat by steam pressure but lifts when the feed water pressure rises to above it from the pump.

and water interface inside the tank is constantly being sloshed around by movement of the model on the water, so the oil and water remain well mixed up. Consequently, the contents are never

separated very well, and you simply have to treat everything you remove as waste oil. Another issue is that all this sloshing around invariably leads to carry over of the tank's contents into the exhaust line,



Richard also likes the filling cap on the engine mounted lubricator with the extended spindle to make removing the cap easy.

only to be ejected all over the model as it exits via the exhaust outlet. Taller tanks are far more effective.

The boiler was also fitted with a pressure gauge that appeared to be in good condition (see **Photo 6**), had a

9



Citric acid and hot water will usually prove effective for a general clean up and limescale removal. Verdi gris inside a boiler might require a more aggressive cleaner.

very neat non-return valve incorporated into the feed water line (see **Photo 7**), and also included a displacement lubricator with an extended handle for easier removal of the cap (see **Photo 8**).

So, the first job was to strip down the boiler for a thorough pickling to remove all traces of the red dye coating the insides. This is where I came across a significant challenge. The smokebox end of the boiler was fitted with a cover. This cover was obviously removeable as there were two hex headed screws holding it to the boiler. As I tried to undo them, they both simply sheared off; worse still, when I did manage to remove the cover, I discovered they'd actually been screwed into extensions of the boiler tie rods – so this was going to require some remedial work as well.

The work

I decided to start with a thorough pickling. So, a citric acid solution was

mixed up with hot water in a bucket and the boiler along with a number of fittings were completely immersed in it for a good half an hour (see **Photo 9**). After everything was rinsed off, I repeated the exercise to ensure the insides were as clean as they could possibly be. Following this second pickling, the boiler was thoroughly flushed through and left over night to dry out.

The next day, in order to get good look at the insides, I connected a miniature camera to my laptop. Cameras like these are such handy little devices and can be picked up very cheaply online. Mine has a 4mm head, so it can easily be inserted through quite a number of boiler bushes (see **Photo 10**). It even includes a tiny circle of LED lights around the lens so you can still get a reasonable view of internal spaces. You can't see everything perfectly, but you can get a good idea of the condition and you're

able to view some of the internal silver soldering (see **Photo 11**).

Everything appeared to be clean. I couldn't see any signs of dye and the silver soldered joints I could see looked to be sound, with good penetration.

So, having achieved at least a good, clean boiler, it was time to my turn attention back to those the sheared screws. My initial intention had been to drill out the old screws, but that proved to be not as straightforward as I'd hoped. They were sheared flush with the ends of the tie rods and were of a hard, probably stainless steel, material. The tie rods were of course copper. Being such a small diameter, the drill insisted on flexing off the screw and removing more of the adjacent copper.

I discussed the challenge with a boiler repairer and we agreed that the best course of action would be to remove part of the free end of the protruding tie bars and silver solder new threaded bushes onto them. Consequently I milled away the part of the end of the tie bar that contained the sheared screw to leave a stub of tie bar that a new threaded section could be soldered to. We hoped that this would not affect the joint between the tie bar and the boiler end plate. This was done by mounting the boiler in a milling machine and simply milling the damaged ends off (see **Photo 12**). I then had a good surface for the boiler repairer to silver solder new bushes onto (see **Photo 13**).

Here I had to commit to the cost (around £90) this specialist work involved with no guarantee of success. Repairs will always be done using a silver solder with a melting point at the lower end of the range, or even using a product called Comsol, which is a specific repair solder with a melting point below the normal range of straight silver solder. Even so, there

10

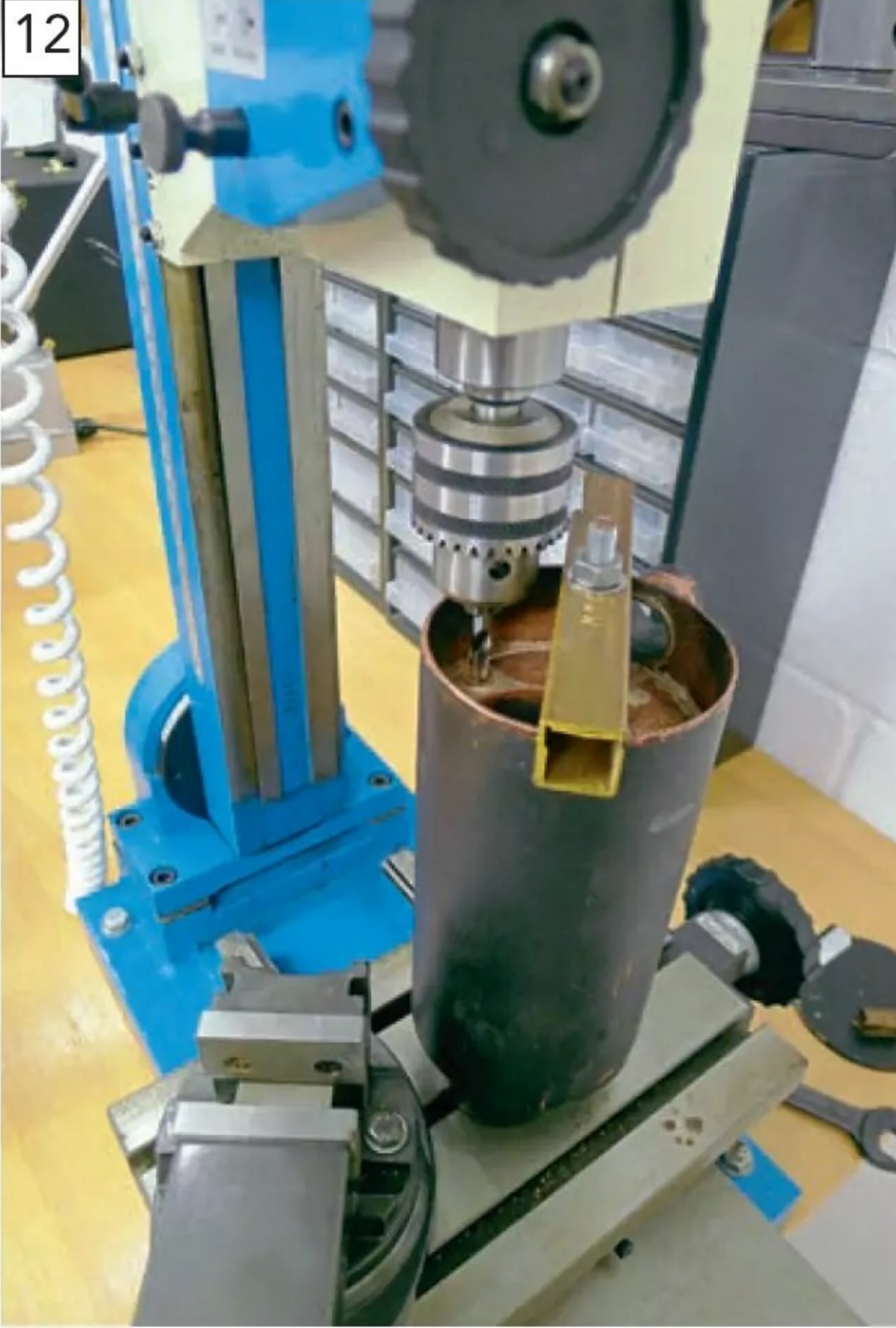


A cheap and cheerful 4mm head camera is an incredibly useful device for looking at the insides of a boiler and can actually be slid through a few of the brass boiler bushes.

11



The picture isn't perfect but good enough to see the silver soldered joints and the general condition and cleanliness of the internal surfaces.



Removing the damaged ends of the tie rods was easily done with a milling machine, taking care not to go too close to the joint with the end plate.



With the ends removed and a clean flat surface remaining, the boiler could be sent away to the repair shop to have the new bushes silver soldered to the ends of the tie rods.



When Richard received the boiler back from the specialist repairers it was fitted with two new threaded bushes to replace the originals, enabling the end plate to be fitted again in exactly the original manner.

is always the danger of existing silver solder joints being disturbed or leaks created during the process.

This is where the whole idea of taking the secondhand route starts to

become questionable. While you may be able to pick up a boiler or plant that's significantly cheaper than a new item, it's a risky business, and one that could see you throwing good money after bad.

In this case, I was lucky as two new threaded bushes were successfully soldered to the ends of the tie rods (see **Photo 14**). The repaired boiler was also returned with a new hydraulic

15



A quick squirt from a rattle can of high temperature exhaust paint, after plugging all the bushes with pieces of rolled up paper, smartens the boiler up again.

17



The easiest and neatest way to mark a pressure gauge is to remove the brass bezel and fit a short length of red lining tape on the face at the working pressure. This is then sealed in place with some gloss acrylic clear varnish.

pressure test certificate, so that didn't need to be done again.

Onwards then, and the next job was to plug all the bushes in the shell and give the boiler a coat of heat-resistant matt black automotive exhaust paint from a rattle can (see **Photo 15**). Once that had fully cured, the reassembly could begin.

Unfortunately, the sight glass resisted all attempts to clean it up and I just couldn't budge the dye inside it with any of the different solvents I tried. So, a new glass had to be cut to length and

16



The safety valve looked to be in a poor condition from the outside, and a quick look inside confirmed that the seat was also badly pitted. It was, therefore, much easier to simply replace rather than attempt to refurbish it.

18



Richard didn't feel that a total strip down was necessary, as the pistons felt good in the cylinders. The port faces were noted as having hardly any wear on them at all. Everything was, therefore, simply washed with WD40 and re-oiled.

slid into the fittings, which had been cleaned up and replaced with new joints.

The remaining valves and fittings were similarly cleaned up and replaced with PTFE thread tape to seal them.

The safety valve was given a good look over before deciding that it simply wasn't worth the effort of trying to clean it up and refurbish the pitted seat (see **Photo 16**), so it was replaced with a new item from Blackgates Engineering.

The pressure gauge was not marked at the working pressure, so the face was removed, marked with a piece of lining tape, sealed with some acrylic gloss varnish, reassembled and refitted to the boiler (see **Photo 17**),

“While you may be able to pick up a boiler or plant that's significantly cheaper than a new item, it's a risky business”

The boiler was then replaced onto its base, with the boiler bands and the burner cleaned up and refitted.

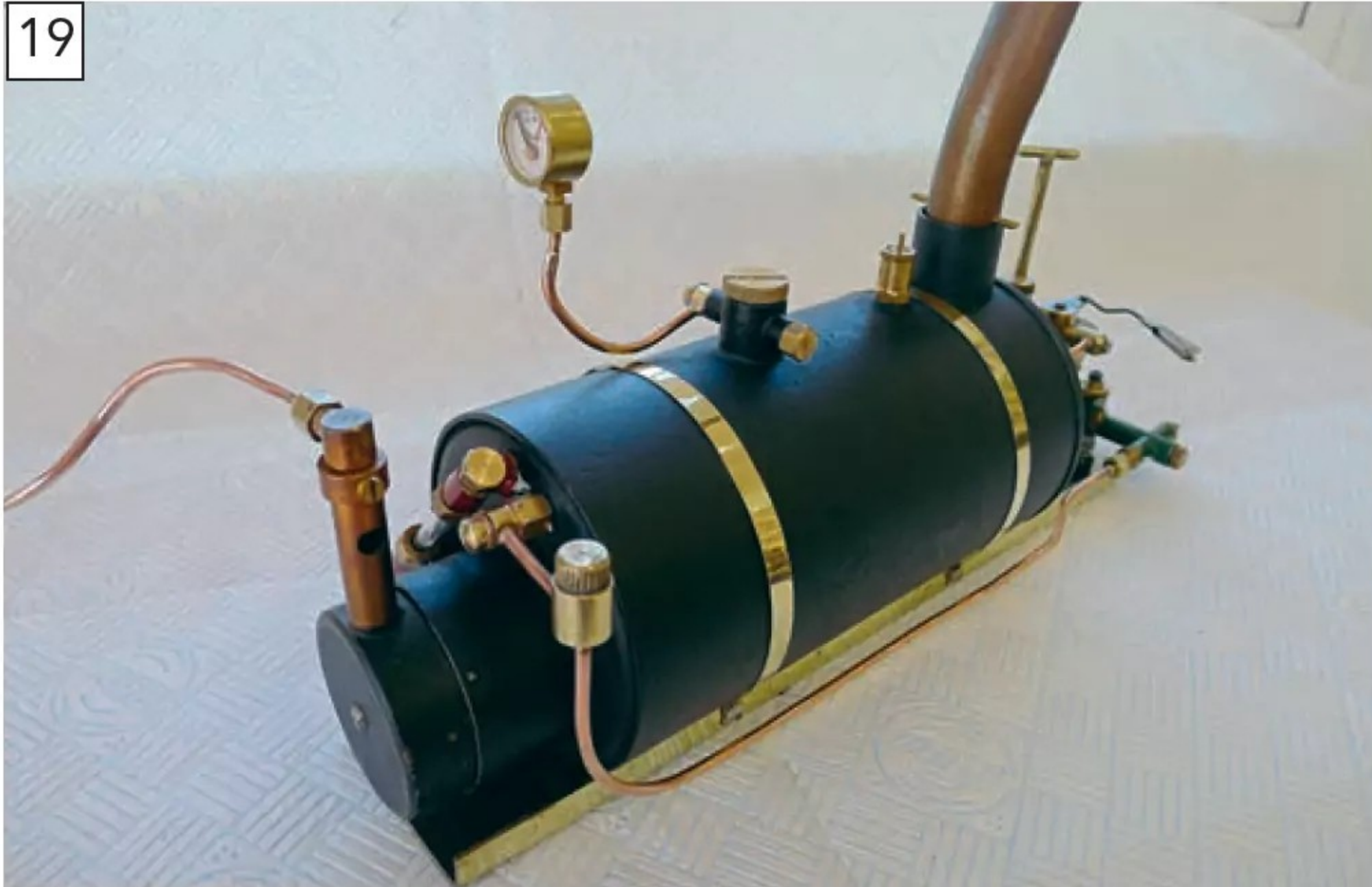
The last item to attend to was the engine, although this did appear to be in a sound condition. As I've mentioned, the engine rotated smoothly when the control valve was open but tightened up when it was closed. So, as I was already happy with the condition of the cylinders and pistons, I decided not to take them apart and risk damaging the 'O' rings. I did, however, take a look at the port faces, which indicated that the engine had hardly been used (see **Photo 18**). Everything was then given a thorough wash with WD40 and a firm brush, before re-oiling and reassembling. As following this the engine turned over very smoothly by hand, I was happy that it was in good condition.

All that remained, therefore, was to give the plant a steam up, set the safety valve and conduct a steam test. I was very pleased to find that everything worked just as it should and the engine ran smoothly and reliably, responding to the control valve perfectly.

Conclusions

The idea of using a secondhand steam plant for a project always has appeal, particularly when it comes to cost. This is even more of a consideration nowadays as there are even fewer plant manufacturers around than there used

19



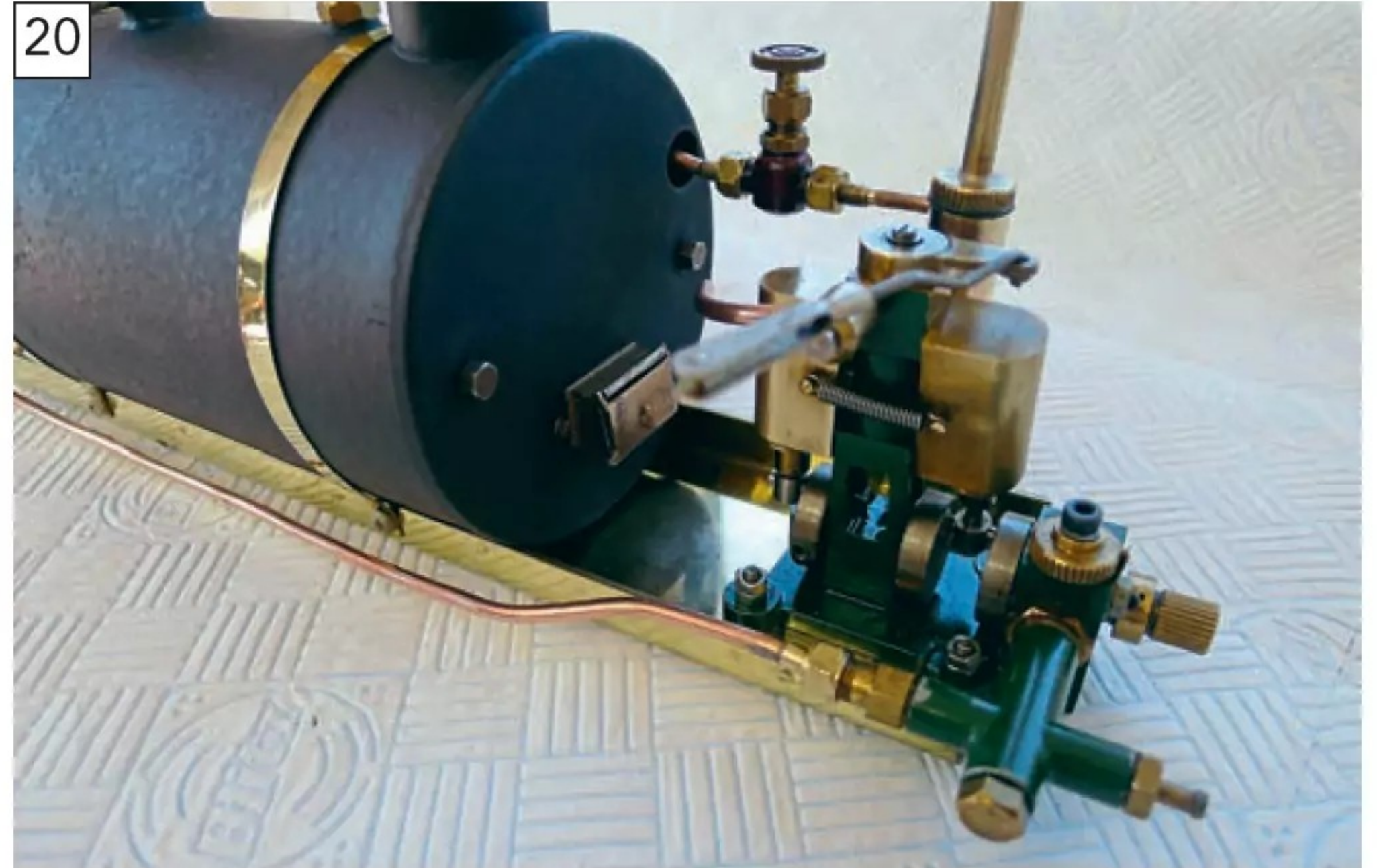
Although repairs were required, the end result was a smart looking operational plant ready to drop into a model boat for a very reasonable total cost.

“You should never commit to a purchase before, at the very least, viewing what it is you’re actually shelling out for, but to avoid getting stung I would strongly advise you also ask for an operational demonstration”

to be, so looking at the secondhand market opens up a few more options. Secondhand plant, however, comes with the caveat that repairs may be necessary, and there’s always the danger that those repairs could end up costing a significant amount of money with no guarantee of success. As I’ve pointed out many times in the past, you should never commit to a purchase before, at the very least, viewing what it is you’re actually shelling out for, but to avoid getting stung I would strongly

advise you also ask for an operational demonstration. I would also be very wary of plant that does not come with original certification. Having said all that, secondhand plant from deceased estates frequently come to market, often, understandably, minus their certification, which may have been lost or discarded during house clearances. Often offered for sale by those with little or no knowledge of our hobby, this then leaves the onus of responsibility on the prospective buyer to thoroughly

20

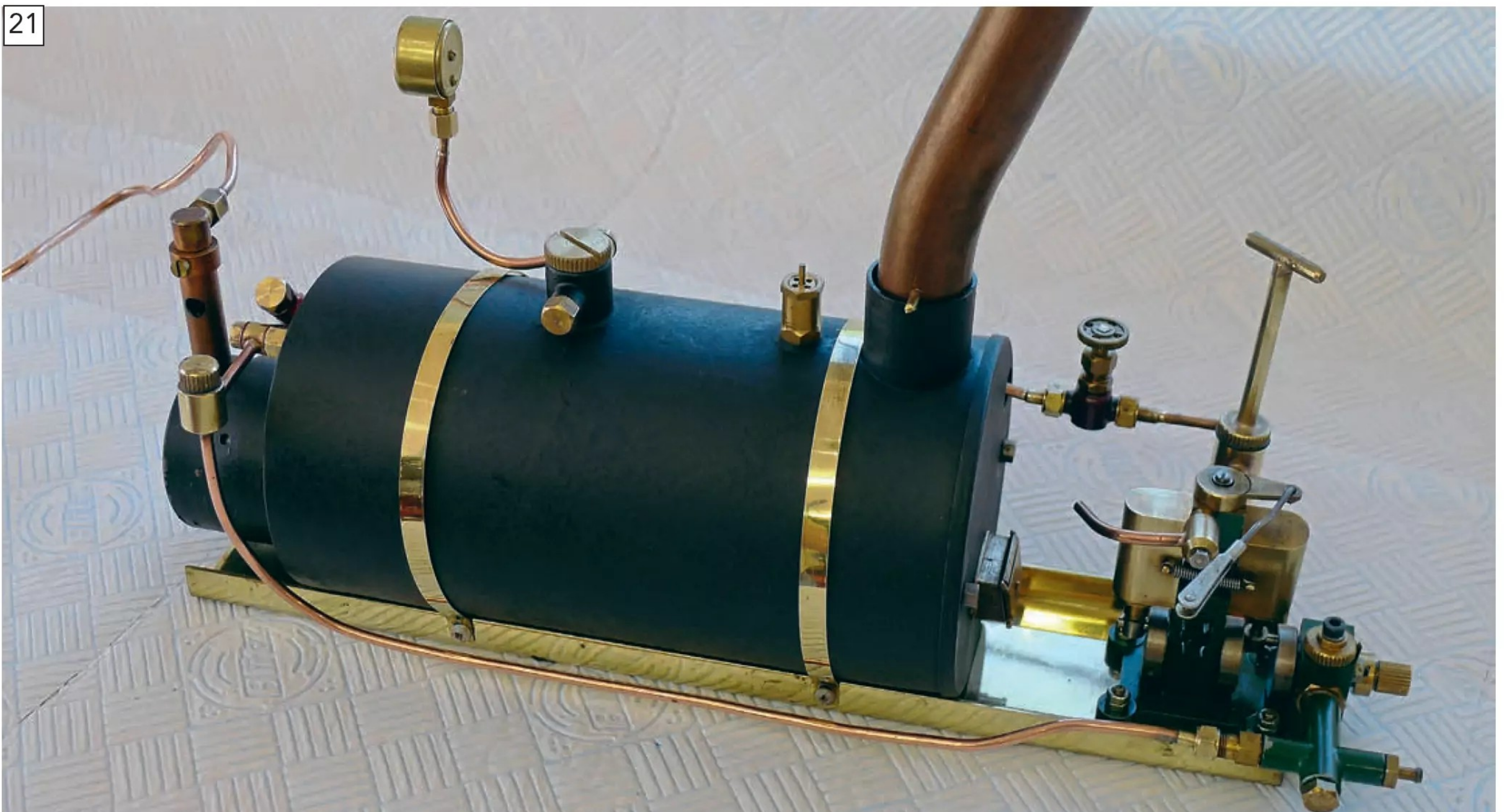


The engine, being a twin cylinder, double acting oscillator should give many years of reliable service if looked after, and the adjustable feed water pump is an excellent addition.

inspect the plant and try to get a feel for how well it’s been looked after. So, if you’re not familiar with steam plant, then take someone with you who is, and don’t fall into the trap of buying something just because it is cheap.

The plant that’s been the subject of this month’s instalment of Boiler Room looked to be fairly sound on first sight. Closer inspection, though, revealed some clues as to how it had been looked after; the dye in the sight glass and the very poor condition of the safety valve being the obvious red flags. Fortunately, we were able to save this particular plant, and so did end up with a good, operational and certificated plant for a fraction of the cost of a new one (see **Photo, 19, Photo 20** and **Photo 21**). ●

21



Richard also replaced the copper pipework, as, he points out, it grates on him to see a nice clean boiler and engine with twisted ugly looking copper pipework!

A Simprop radio for the boat guy

Five decades on, **Dave Wiggins** re-engages with the German radio sets he spent many an hour working on back in the 1970s...

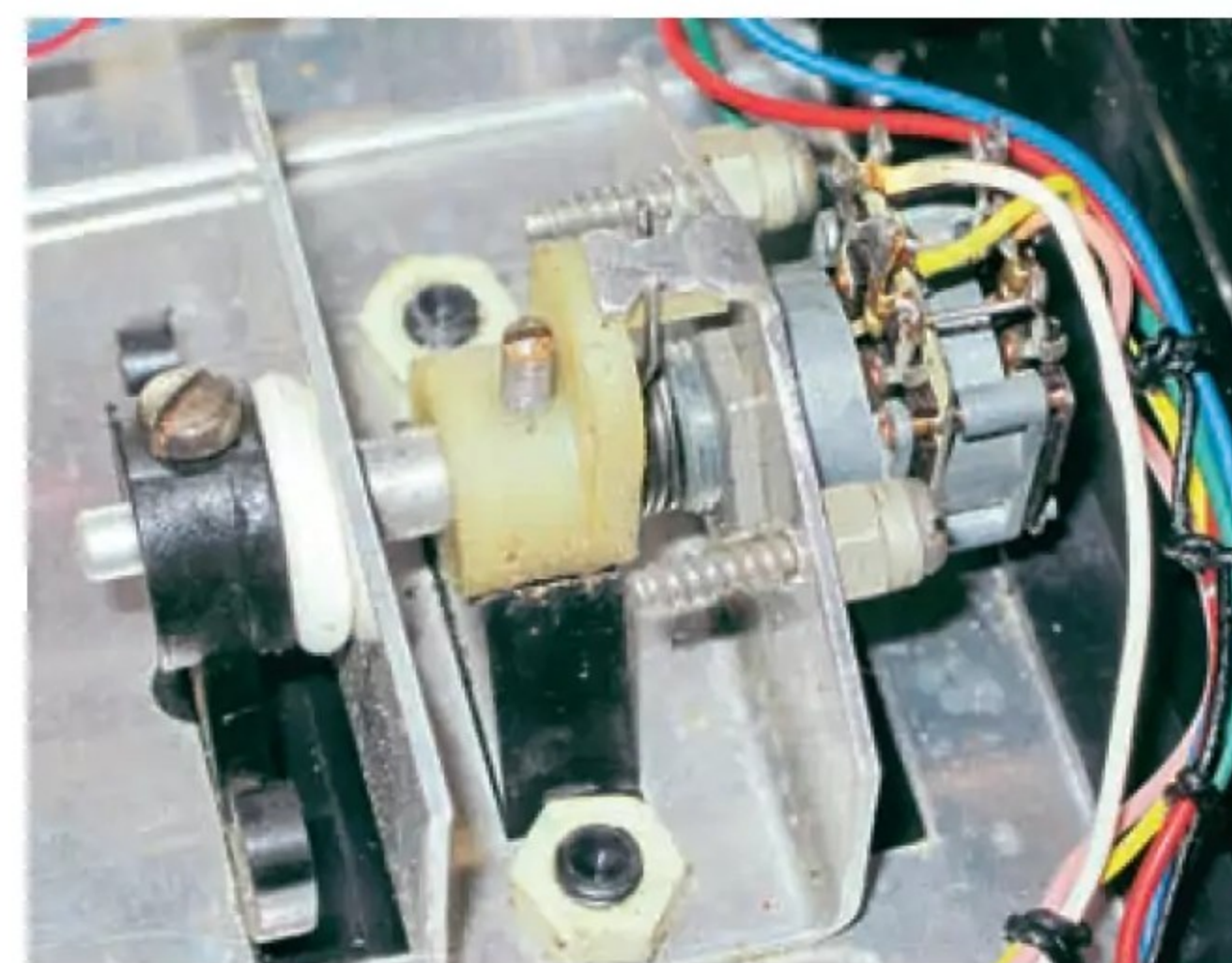
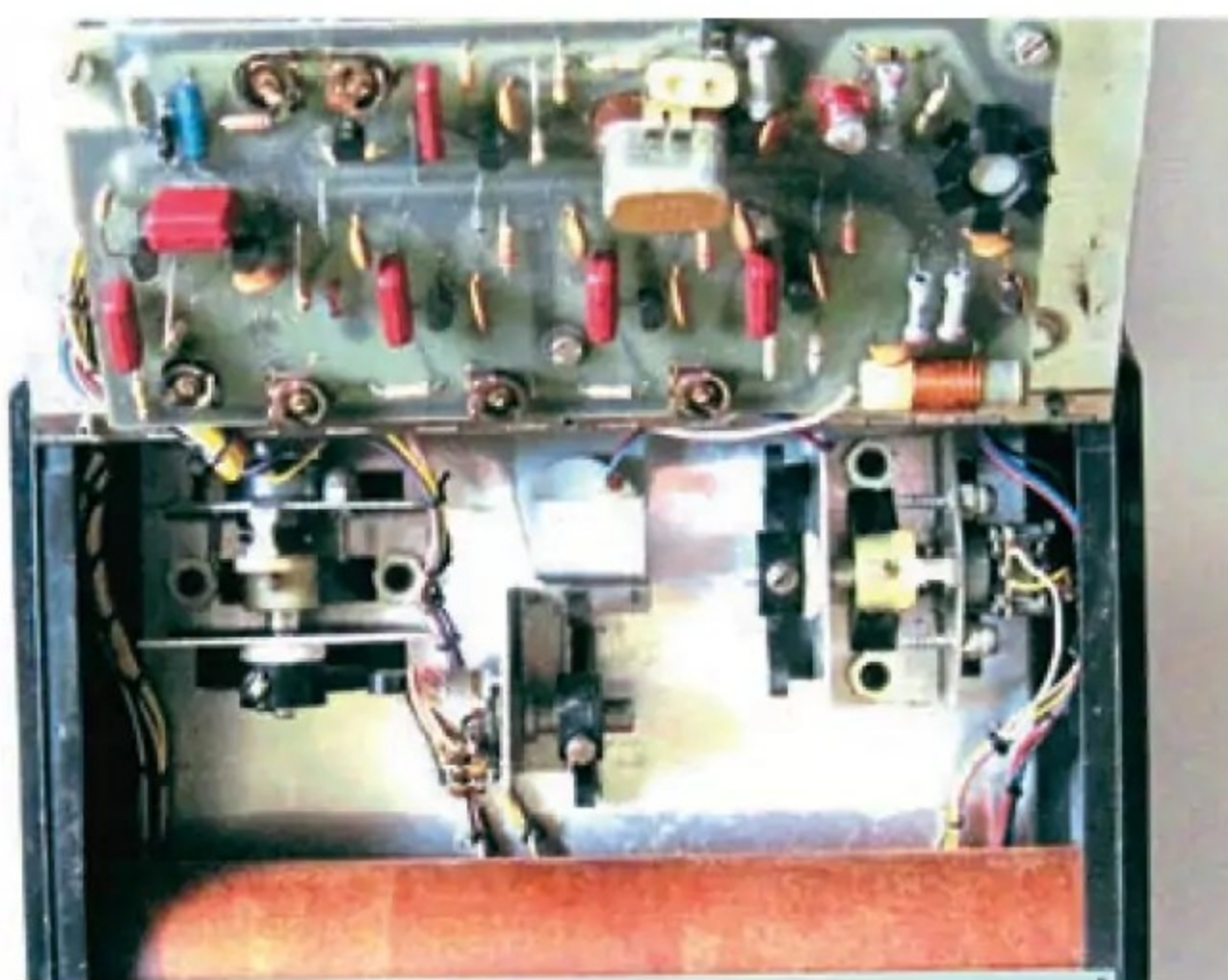
This month's topic was prompted by the acquisition of an original and totally untouched (i.e., in need of a good clean) vintage German radio set, first produced and marketed back in the 1970s by Simprop. Simprop Electronic was established in 1965 by Walter Claas, whose family founded (and continues to run) the globally successful agricultural machinery manufacturing company CLAAS.

Here in the UK, the Simprop radio sets were handled by a large Cheshire-based concern called Mainstream. Mainstream Ltd already offered a couple of entirely British-built sets under the GEM brand name (examples of these 1+1 and 4-channel radios still pop up on auction sites every now and then as their original inexpensive price point meant that many of were sold to boaters on a tight budget). Using its existing network, therefore, Mainstream was able to distribute these imported Simprop radios, along with some other German products, to retailers across the country. Consequently, they became available in virtually all model shops, supported by the advertising and backup organised by this energetic UK distributor. The Essex hobby shop from which I operated my repair service back then stocked Simprop radio sets and had staff members who used them for their own models. As a result, I probably have more experience of repairing these sets than any other brand, even though at that time I didn't actually own one myself.

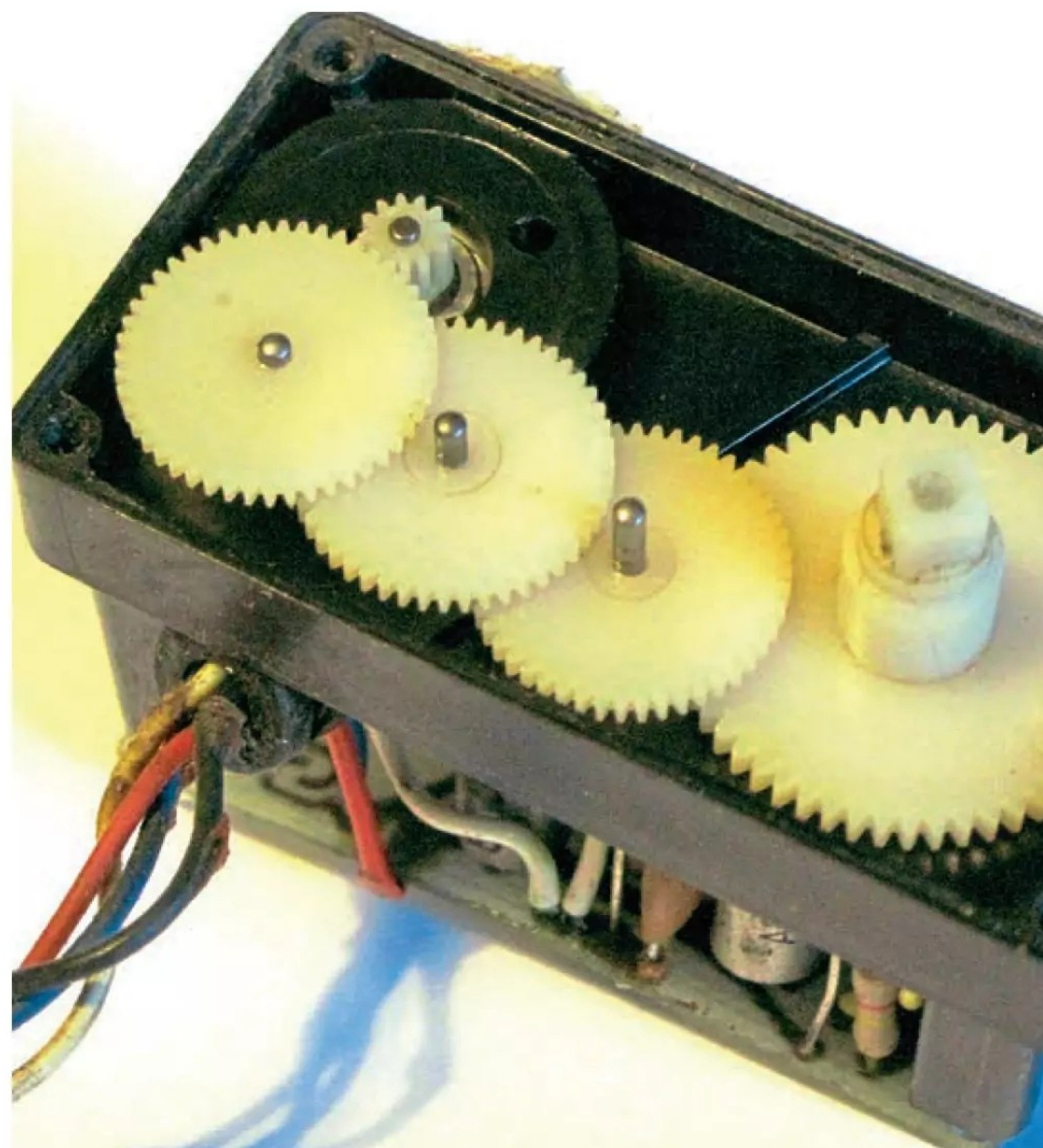
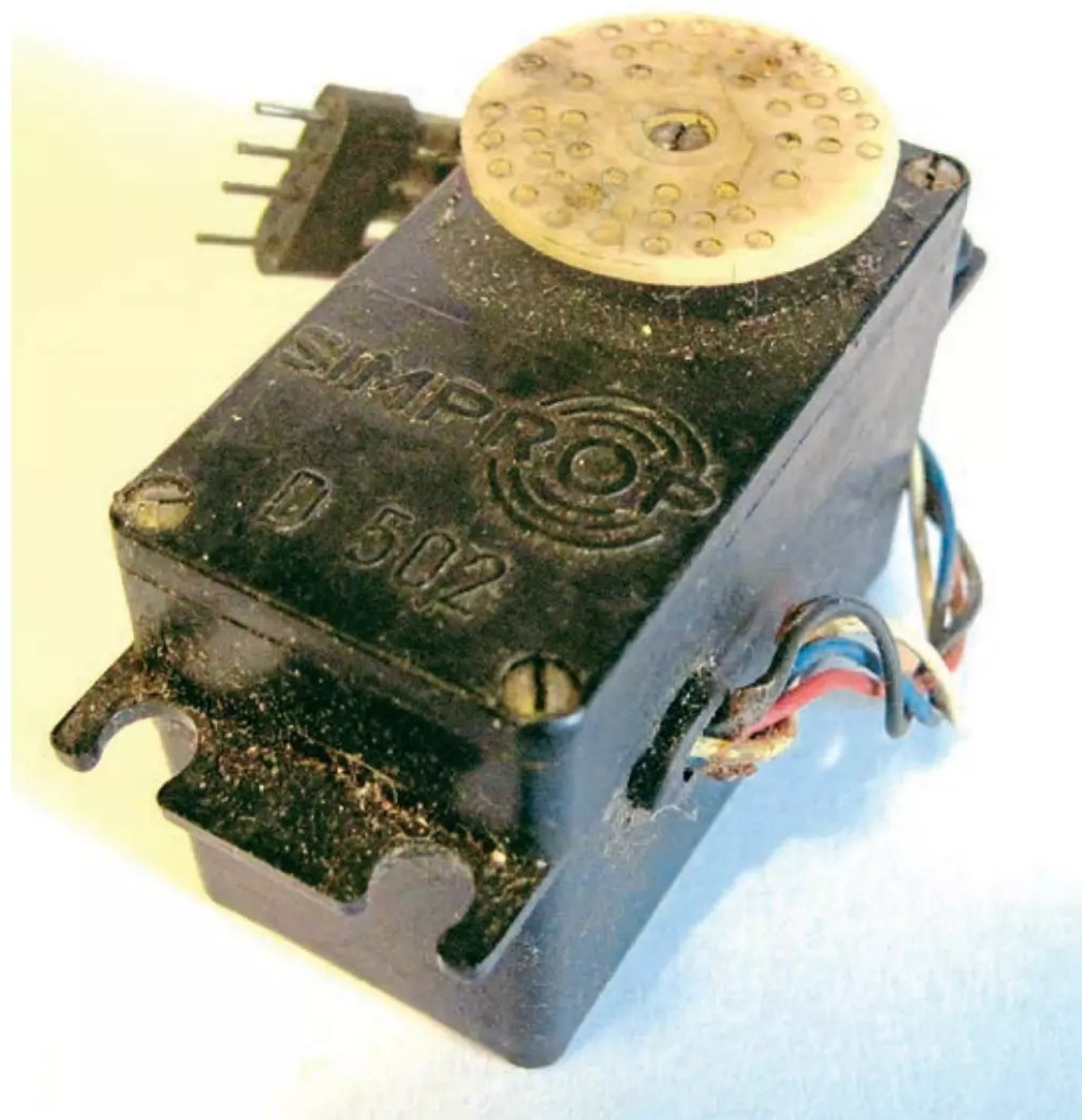
My Simprop 3-channel transmitter

From a service tech's point of view, the very best design aspect of all Simprop transmitters was the hinge down back, which gave wonderful repair access to the entire circuit board and the control pots.

"Here in the UK, the Simprop radio sets were handled by a large Cheshire-based concern called Mainstream"



A Simprop 3-channel marine transmitter, plus several detail shots including the printed circuit RF section, a sample 'double pot' control stick and the loaded antenna.



An example of Simprop's servo model D502 (the larger of two options and the one most suited to marine use) and its gearbox.

“The larger size crystal used by Simprop did have one major advantage...”

The Simprop set I am illustrating is an example of the marine (or glider) radio, offering three channels with the two (single axis) stick layout. Most other manufacturers of 2- or 3-channel radios back then offered a ‘single stick’ layout that was totally unsuitable for model boat control. If any thought was given to this, the idea of introducing their own two stick solution was probably dismissed because the majority of 2- (especially) and 3-channel sets were designed to be low production cost items. I am including a close-up photo of one of the two Simprop single-axis control sticks as they’re rather interesting, having two potentiometers per axis, one for the main control and one for trim, rather than the more common electro-mechanical arrangement for trim used by most brands – which is why Simprop’s transmitter, while only of 3-channel capability, needs five control pots. I will admit that I didn’t notice this at first and was/am surprised at Simprop’s choice. Even amongst the manufacturers of top-end, high-cost radios (all aimed at very serious model flyers), few chose to do things this way – again, most likely due to the increased production expenditure involved.

As you can see, the RF (high frequency) part of this 3-channel features a changeable 27AM plug-in

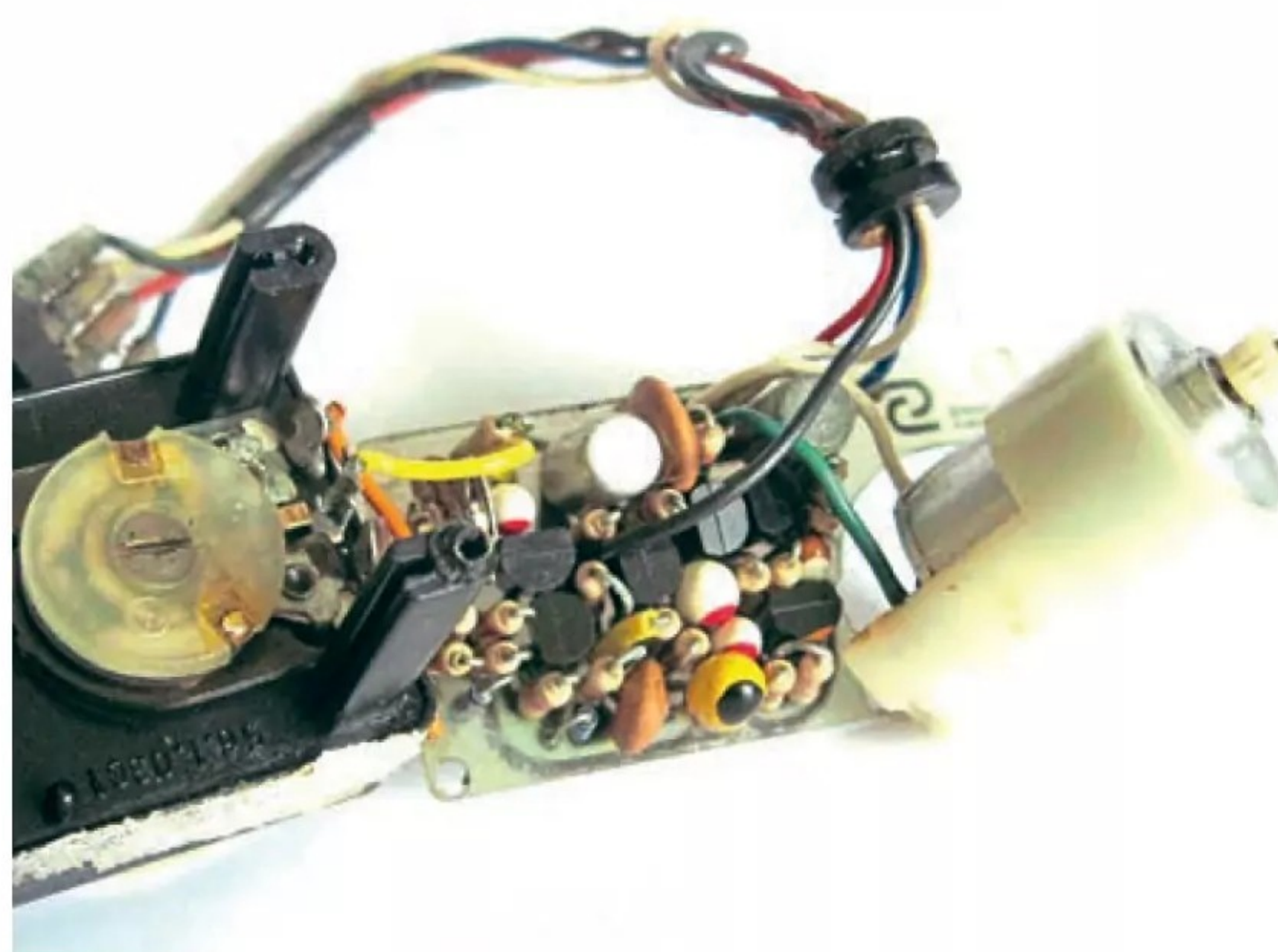
large can crystal (making it quick and easy swap/replace at the pondside). A previous owner of my example has bodged (no other word will do!) in a second crystal socket to accept miniature XTALs, probably when they started to be universally used in other makers’ sets. The larger size crystal used by Simprop did have one major advantage, in that it 100% avoided the user putting in the wrong crystal, but I can understand why the previous owner wanted to change it; I just wish he’d made a better job of it!

I’m including a close-up picture of the 27MHz RF printed circuit board for interest. The coils and capacitors are all very typical of the era and of good quality, and the output transistor wisely sits within a decent metal heat sink. Rather oddly, Simprop transmitters clung on to the primitive centre-

loaded antennae (as shown) long after others had moved as better and more powerful transistors became available – why I have no idea, as Simprop’s output transistor looks to be quite adequate without needing such a boost in radiation.

The encoder strip (not shown) has entirely discrete electronics and is conventional for the period, having a large number of miniature pre-set resistors for factory setting of the pulse timings. These are very corroded and in need of replacement, as is one the old capacitors after so many years in storage.

“Most Simprop receivers were very reliable units... Unfortunately, I cannot say the same of Simprop’s servos”



Two close up views of the model D502 Simprop servo electronics fit.

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The slightly later (1971) Mainstream/Simprop range advertised in RCM&E magazine in February of that year.

To be honest, though, it's unlikely to be a candidate for modernisation or reuse by me.

The Simprop servo(s)

Two servos came with this particular set, these being Simprop's heavier duty option (model D502), surviving examples of which are now rarely seen. Most Simprop sets sold came with this manufacturer's smaller and lighter servo type, which suggests to me that the previous owner of this particular radio was a power-boater and, more than likely, a pretty serious 'multi-racer'. I have included a general view plus a close up of its all-nylon gear reduction. Sadly, the receiver is absent, but most Simprop receivers were very reliable units, being made to a similar standard electronically to our transmitter and housed in decent metal casings.

Unfortunately, I cannot say the same of Simprop's servos, all of which required constant servicing, the fault prone carbon track feedback potentiometer and its wiper being the reason. I must have changed literally hundreds of these horrid items 'back then'. The company made

several attempts at upgrading its pot' wiper assembly, all of which failed, one after another, in much the same fashion. It must have been a big worry for Simprop, just as it was for technicians like me!

I'm including a pair of photographs that illustrate the electronics fit of our servos, and one of these is a close-up view of the troublesome potentiometer wiper – the type shown being Simprop's first effort. The old style four wire amplifier is one of the last of such circuit boards not to include an integrated circuit, which makes it more than averagely interesting. Such amps needed a centre tapped +/- 2.4 Volt supply, and thus this servo has a 2.4 Volt/16mm size motor by Mitsumi of Japan fitted. The centre tapped power supply arrangement could lead to a nasty and quite common fault on all such sets. If any of the power wires were to fracture, the servo would drive to an extreme, the motor would stall causing high current consumption, and the control surface (a boat rudder in our case) would stay at an extreme. None of this is good news, especially for an aircraft user.

The passive components and semiconductors are very tightly packed,

"There was no comparison quality wise between these two ranges..."

and I must say that I wouldn't want to have to service this today at the age I am now, despite still having decent enough eyesight. Within just a couple of years Simprop went 'iC' (along with most other R/C manufacturers), introducing its smart 'Alpha' range of radios (see the RCM&E advertisement illustrated). Its servos thus moved to 4.8 Volt power and to modern three wire operation.

Überlegene technologie

Winding up then, of the many Simprop radios sold here in Southeast England (even more so in the North, I'm sure) there were few system failures other than for the servo pot' problem noted. The range was well made and reliable. Mainstream Ltd became a sizeable distributor and, as I say, offered its own GEM branded radios as well as the top end Simprop line. There was no comparison quality wise between these two ranges, the more expensive German option being way ahead. ●

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Your Models

Whether you're highly skilled and experienced or completely new to the hobby, you're definitely invited to this launch party! So please keep the contributions coming by emailing your stories and photos to editor@modelboats.co.uk

HMCS Snowberry

I'm a newcomer to the hobby: Suzanne, a married, late-50s woman. I work in education, am based in the north-west of England, and have just finished my first R/C model boat, a 1:72 scale Revell HMCS Snowberry R/C conversion.

It's the basic Revell kit, bought about 20 years ago from a shop in York - wasn't planned, but a wet day out turned into the chance to buy the kit and the running gear needed to do the R/C conversion. I started it, got the R/C working, decks fitted and the wheelhouse in place, then it had a fall from the top of a wardrobe and some parts got lost. Consequently, it was put aside for many years, until, that is, hubby decided he wanted to build wooden scale sailing ships, and after getting him a kit for Xmas, I decided the time was right to resurrect Snowberry...

Suffice to say, there was more missing than I thought, the hedgehog,

the gun baffles, one of the bridge supports, bridge gangways, bridge deck, funnel superstructure and a few other bits and pieces. Fortunately, time helping my dad and brother build their OO gauge model railway came in handy in terms of scratch building replacements from plasticard, and I enjoyed the challenge.

She was finished about eight weeks ago. Maiden sea-trials were at New Brighton Model Boating Lake six weeks ago, and she visited the very welcoming Bury Model Boating Club this weekend, where she was well received...

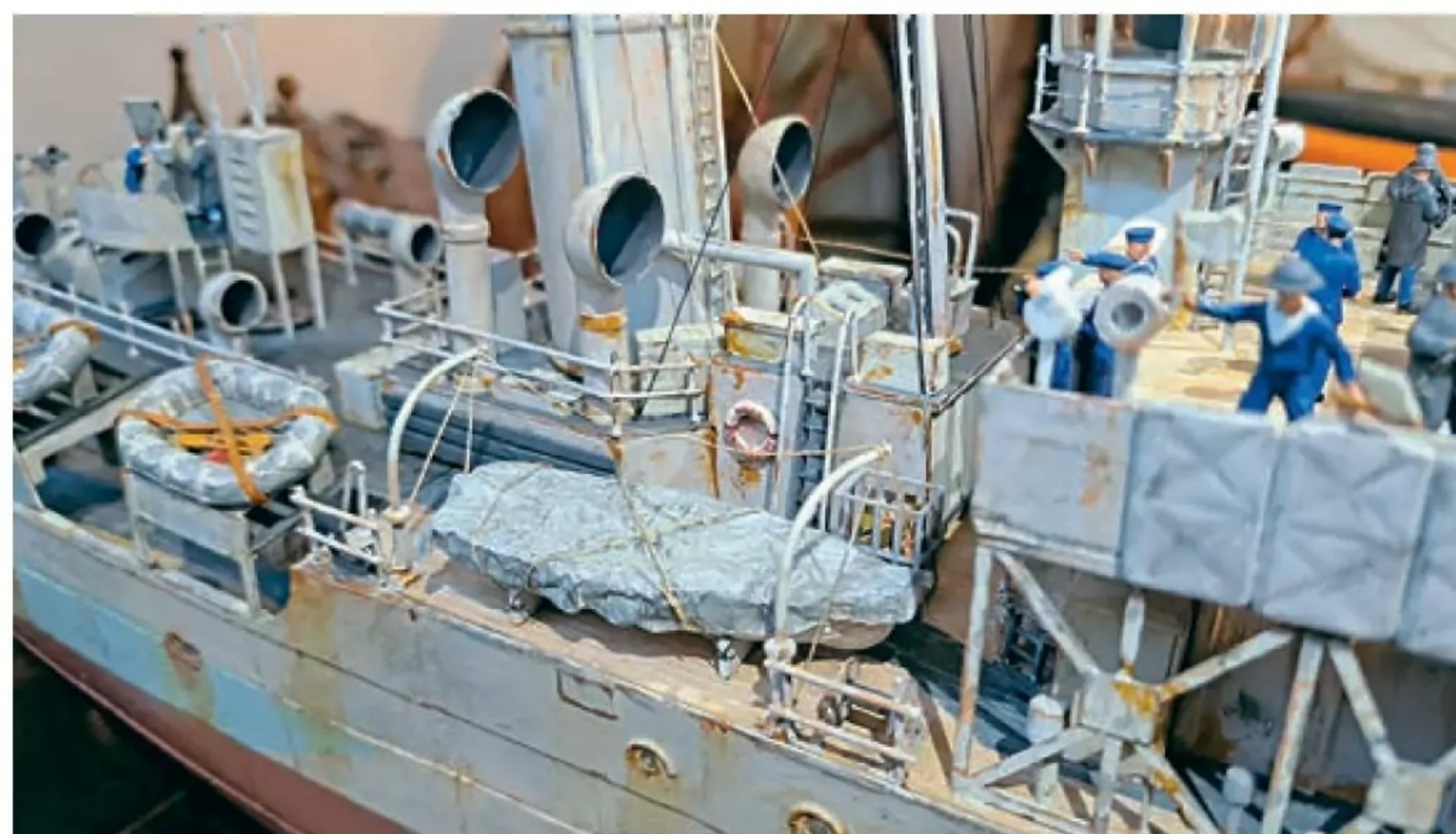
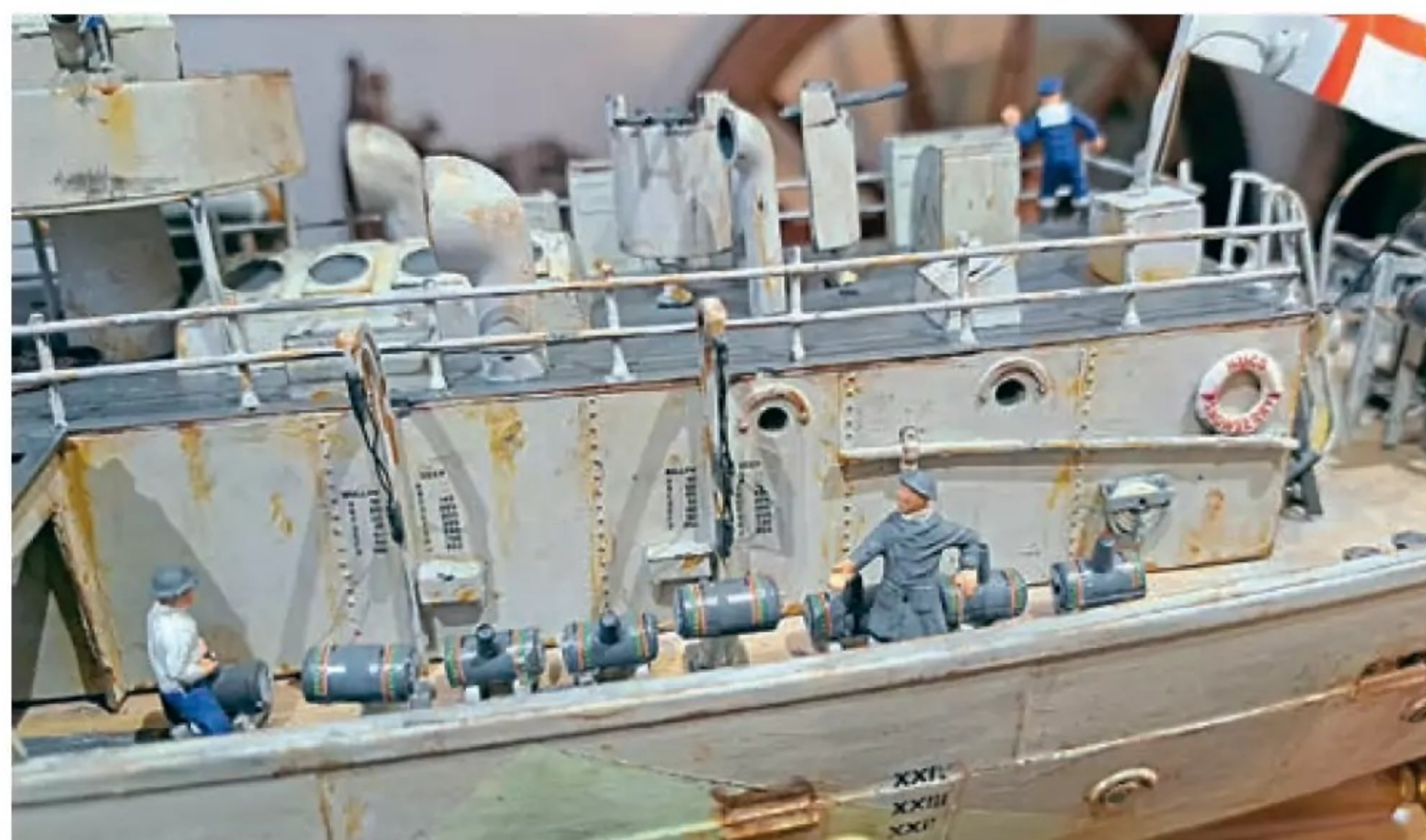
Hubby is now looking for his first R/C boat project, and I am considering what to make next. I am thinking either a tug or a Clyde Puffer, although I also fancy a Vosper MTB, and perhaps, in the future, a Castle Class Corvette to go with Snowberry.

As well as the photographs of

Snowberry I am sending you, I have also posted a short video of her, which can be viewed on YouTube (https://youtu.be/4TIPLa1Bs3c?si=vzJslzJ_h967JpW0).

**SUZANNE READ
EMAIL**

Take a bow! What you have achieved here is absolutely remarkable, Suzanne. The fact that as a 'first timer' you've successfully completed an R/C conversion that sails so well and looks great out on the water is impressive enough, but that fact that you've scratch built so many of the fittings yourself, done such a wonderful job on weathering Snowberry, and really gone to town with all the deck detailing and the finish and positioning of your superbly convincing crew figures really is inspirational. Can't wait to see what you do next! Ed.







Suzanne Read's wonderfully weathered and meticulously detailed build of HMCS Snowberry, based on the 172 scale Revell kit but customised and converted for R/C operation.

Winter wonders

I thought I would share some photos of the projects that kept me busy over the last winter. *The Orca* was built from a laser-cut wood pack, while Deans Marine's *Solebay* has been reconfigured as *Agincourt* and Mountfleet Models' pilot boat *Brittania* has been renamed the *Caractacus*. *Caractacus* and the *Orca* have been successfully maiden and I am now looking forward to doing the same with *Agincourt*.

STEPHEN PAYNE
NORTHAMPTON & DISTRICT MBC

Well, no one could ever accuse you of being idle, Stephen! Wonderful work, and I really hope we now get a nice long summer so that you can really enjoy the fruits of your labour. Ed.



Stephen Payne's beautifully captured version of the Orca.



Deans Marine's 1:96 scale kit for the *Solebay*, reconfigured into the Royal Navy's Battle class destroyer *HMS Agincourt* (D86) by Stephen.



Stephen's build of Mountfleet Models' 1:24 scale kit for the pilot boat *Brittania*, which he has renamed *Caratacus*.

Lady Luck with a twist

The March 2026 edition Included a free plan for Ray Wood's 1950s' style slipper launch *Lady Luck*, along with an article featuring his guide to its build as a 1:24 scale working model. Seeing Ray's rough draft of the plan, featured on page 45, however, made me wonder if a smaller, static display, version might also work. Please, therefore, thank him and show him my efforts.

TERRY CARTER
EMAIL

Your version may be a 'static' model, Terry, but you've really managed to convey a sense of motion with the clever water effect you've used on the display plinth. Bravo for thinking outside the box (or perhaps more appropriately inside the display case) in order to adapt Ray's plan to your own specific requirement. Ed.



Terry Carter's small, static display model inspired by Ray Wood's plan for *Lady Luck*.

Oseberg Viking ship

I was pleased to read about the review of Billing Boats' new 1:25 scale kit for the Oseberg Viking ship in the May 2026 issue of Model Boats.

In 2017, I visited the Viking ship museum in Oslo and saw both the original ship and the amazing artefacts that had been found in it (see photos attached). This, and reading an article in Model Boats about a year later documenting the build of 1:25 scale model for a museum, prompted me to me to buy pre-owned example of Billing Boats' Kit No. 0518 from a popular online auction site.

Unlike the recently upgraded version, the parts in this kit were not laser cut. All the curved planks had to be cut away from their sheets with several strong strokes of a sharp knife. The previous owner had cut out just one, so I rather suspect he'd found this trickier than envisaged and so consequently had decided to abandon ship and sell on! Another difference between the original kit and new and improved version was that with the former the intricate carvings on the bow and stern were represented in plastic, as were the shields.

Even so, I am pleased with the model as completed, especially now I have forgotten which bits I didn't do well! As you will see in my photo of it, I added four 1:24 figures which I modified to serve as my Viking crew.

DAVE NEAL
EMAIL



Dave's build of Billing Boats' original 1:25 kit for the Oseberg longship.

Great to see these museum shots, Dave. Thanks, too, for sharing the photo of your finished Viking ship build, which you've done a cracking job on. Your explanation of the differences between the original Billing Boats' kit and the newly upgraded version for which a build guide and a prize draw featured in our May 2026 issue is really interesting, too. Ed.



David Neal's shots of the Oseberg longship taken during his visit to the Viking Ship Museum in Oslo, Norway. The museum is currently closed while it undergoes massive expansion and is due to reopen as the Museum of the Viking Age in 2027.

Your Letters

Got views to air or information to share? Then we want to hear from you!

Letters can either be forwarded via email to editor@modelboats.co.uk or via post to **Readers' Letters, Mortons Media Group, Media Centre, Morton Way, Horncastle, Lincs LN9 6JR**

Southend MBC Open Day



I thought readers may enjoy seeing some photographs taken at the recent (Sunday, May 17) Open Day we hosted in Southchurch Park, Southend-on-Sea, Essex. The event was well attended by both the public and members alike, with many models, including Thames barges, scale military models, tugs, Fast Electrics, racing yachts and steam-powered vessels, being put through their paces on the lovely lake on which we sail.

The club meets twice a week at Southchurch Park (where we have a small clubhouse beside the lake) – on Wednesdays between 10am and 1pm, and on Sundays between 9.30am and

1pm, plus we run a full calendar of events throughout the year.

New members are always welcome; enquiries can be made via the Contact page on our website, southendmbc.weebly.com, where a downloadable membership application form can also be found.

Our next Open Day in Southchurch Park, at which we hope to include some Club 500 and Tenshock racing, is scheduled for Sunday, September 6, between 10am and 2pm. So, if you are within striking distance, please do join us!

JIM OUGHTON
SECRETARY, SOUTHEM MBC



Next month in **model Boats**

In the August 2026 issue, on sale from Friday, July 17, don't miss...



▲ Onker, onker, onker...

The story behind a unique Scandinavian barquentine build



▲ Nordkap

Tackling Billing Boats' 1:50 scale North Sea trawler kit



▲ Taking a Liberty

There once was an Ugly Duckling...

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You will find more about the exciting content coming next, features of particular interest you may have missed in past editions and details of the very latest subscription offers on our website at www.modelboats.co.uk

You can, of course, order your copy of the August 2026 issue, which goes on sale at all good newsagents from Friday, July 17, now, but why not treat yourself to an annual subscription, as monthly copies will then be delivered directly to your door.

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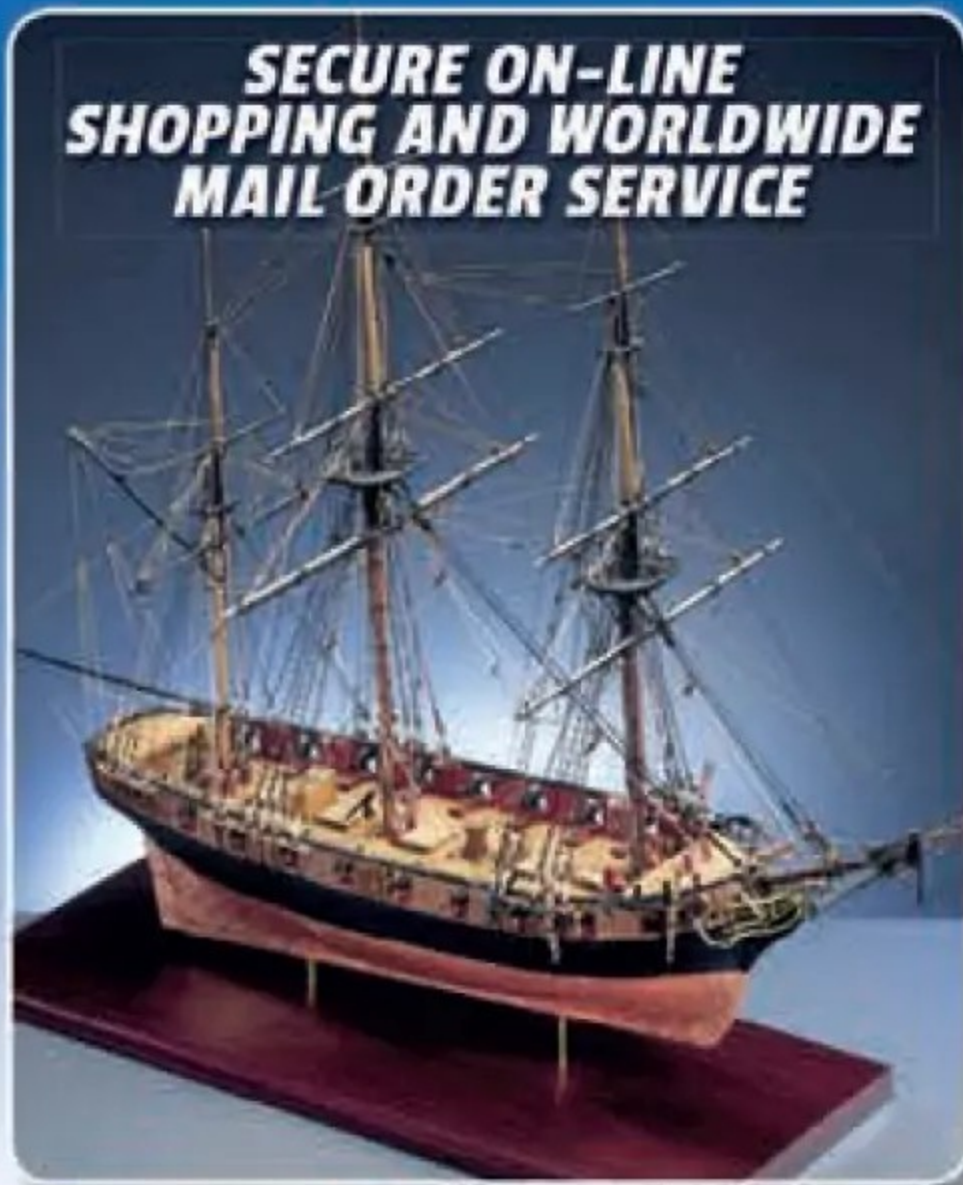
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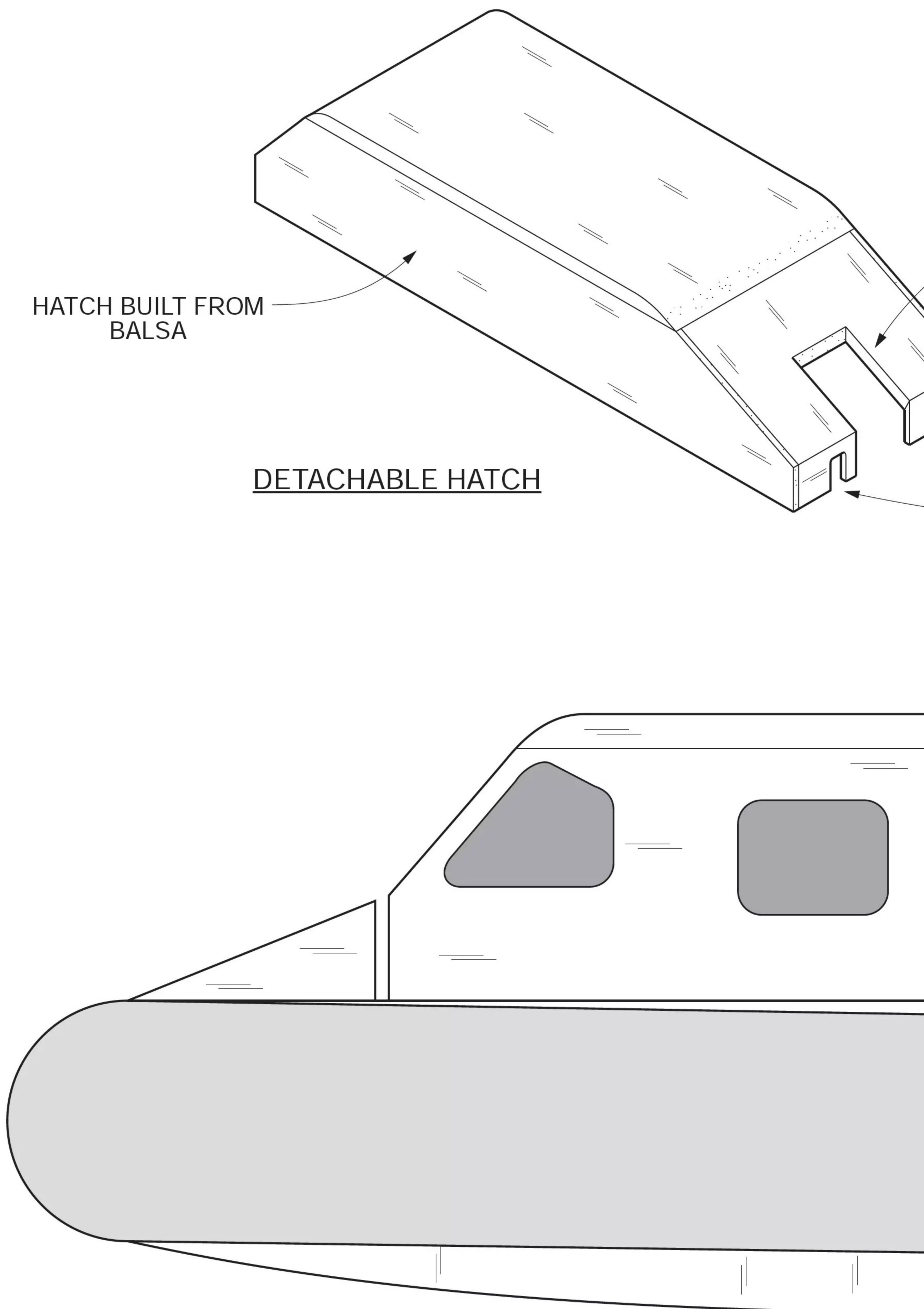
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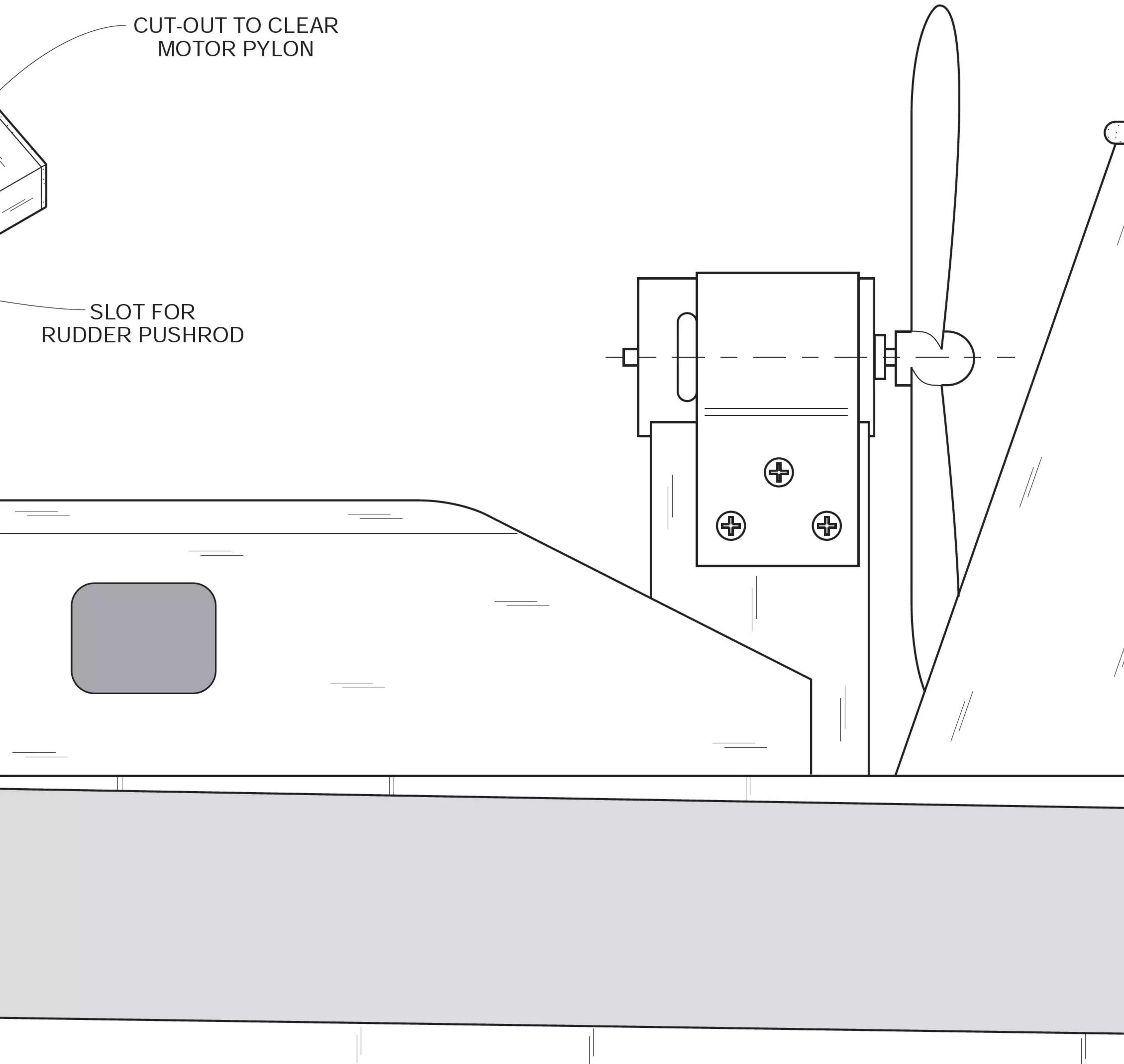
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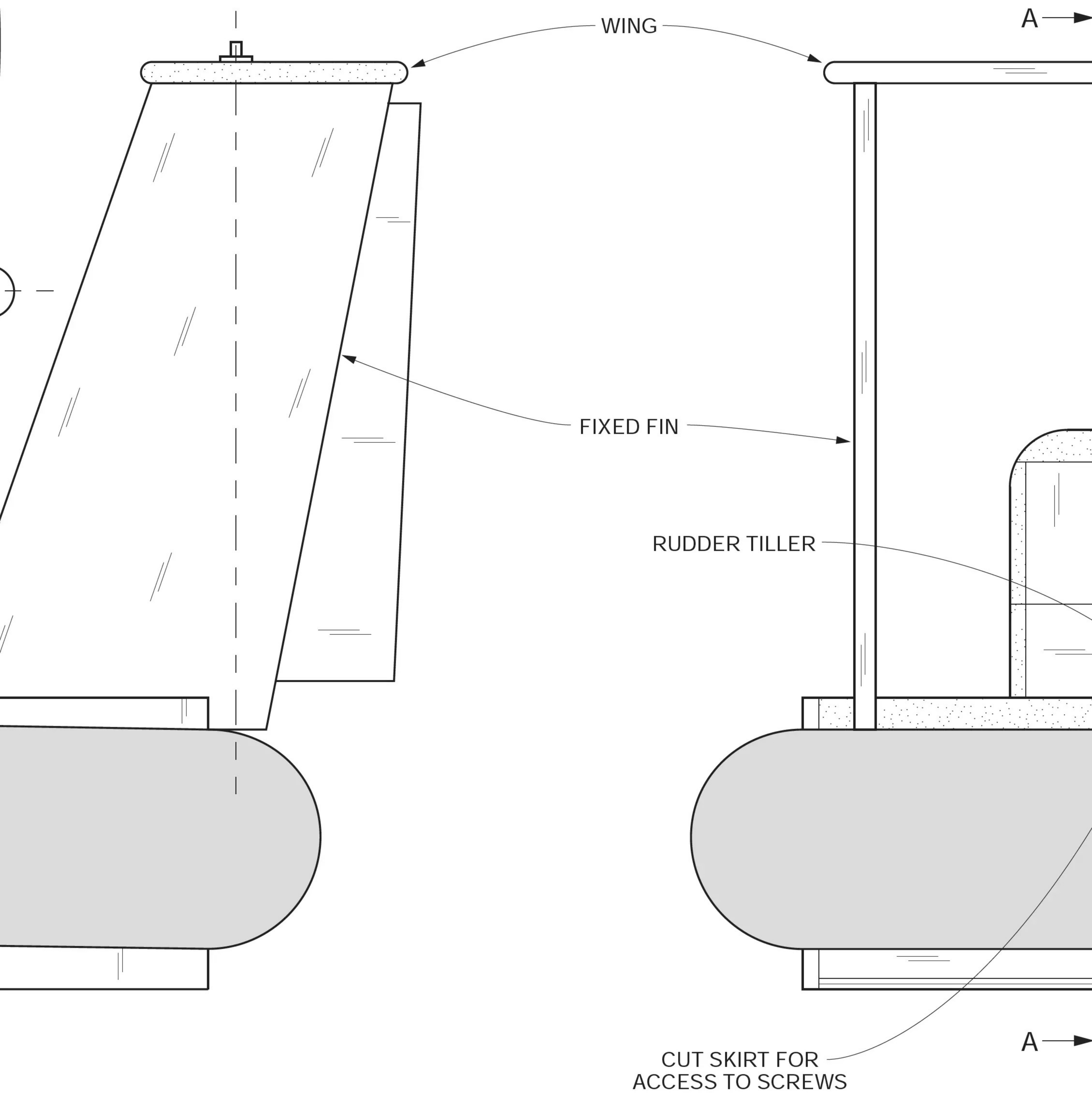


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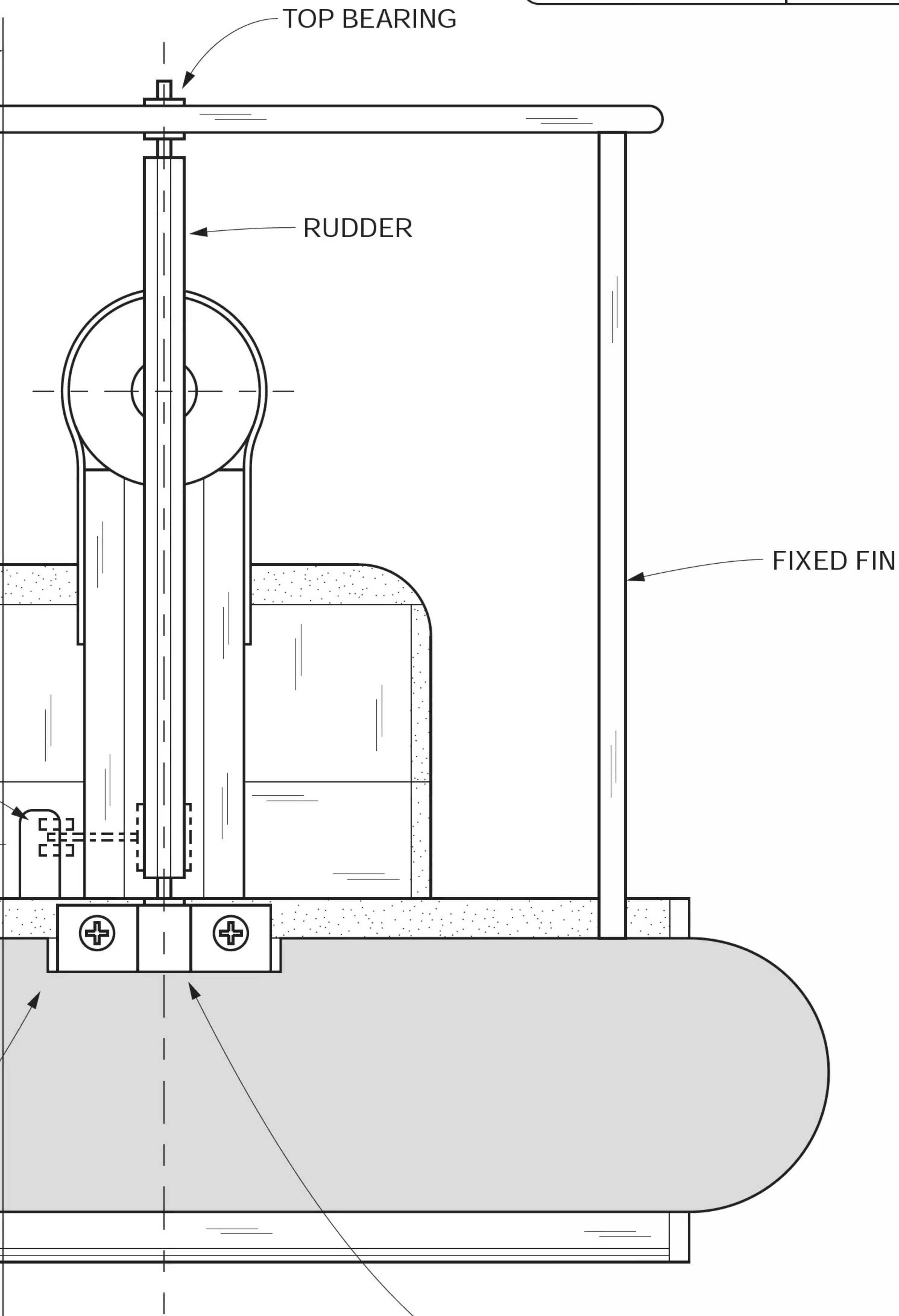
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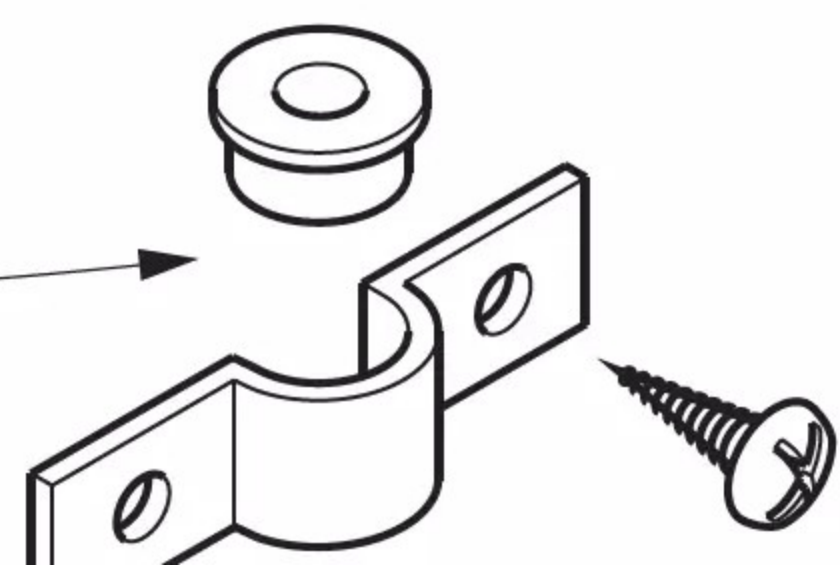
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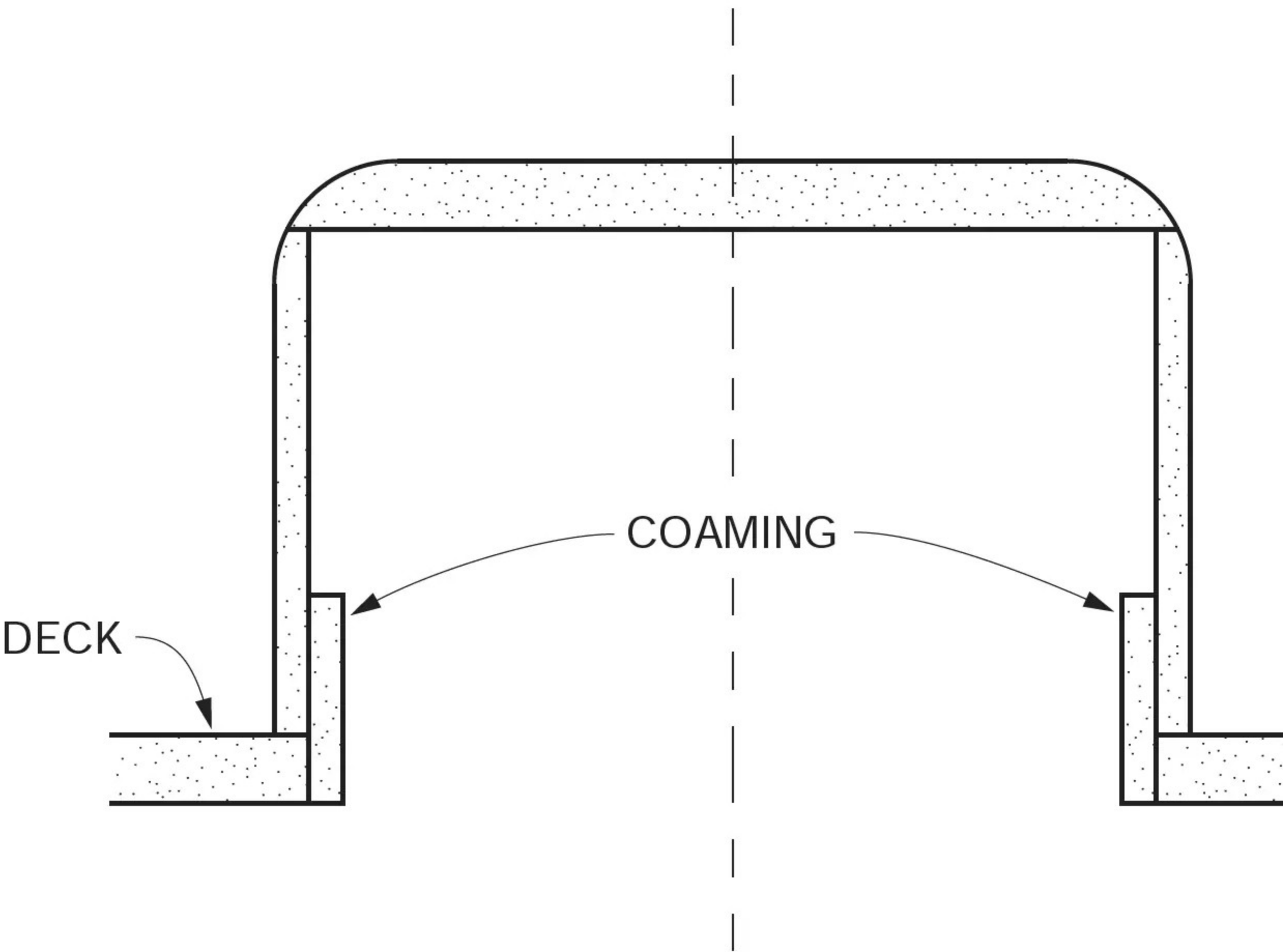


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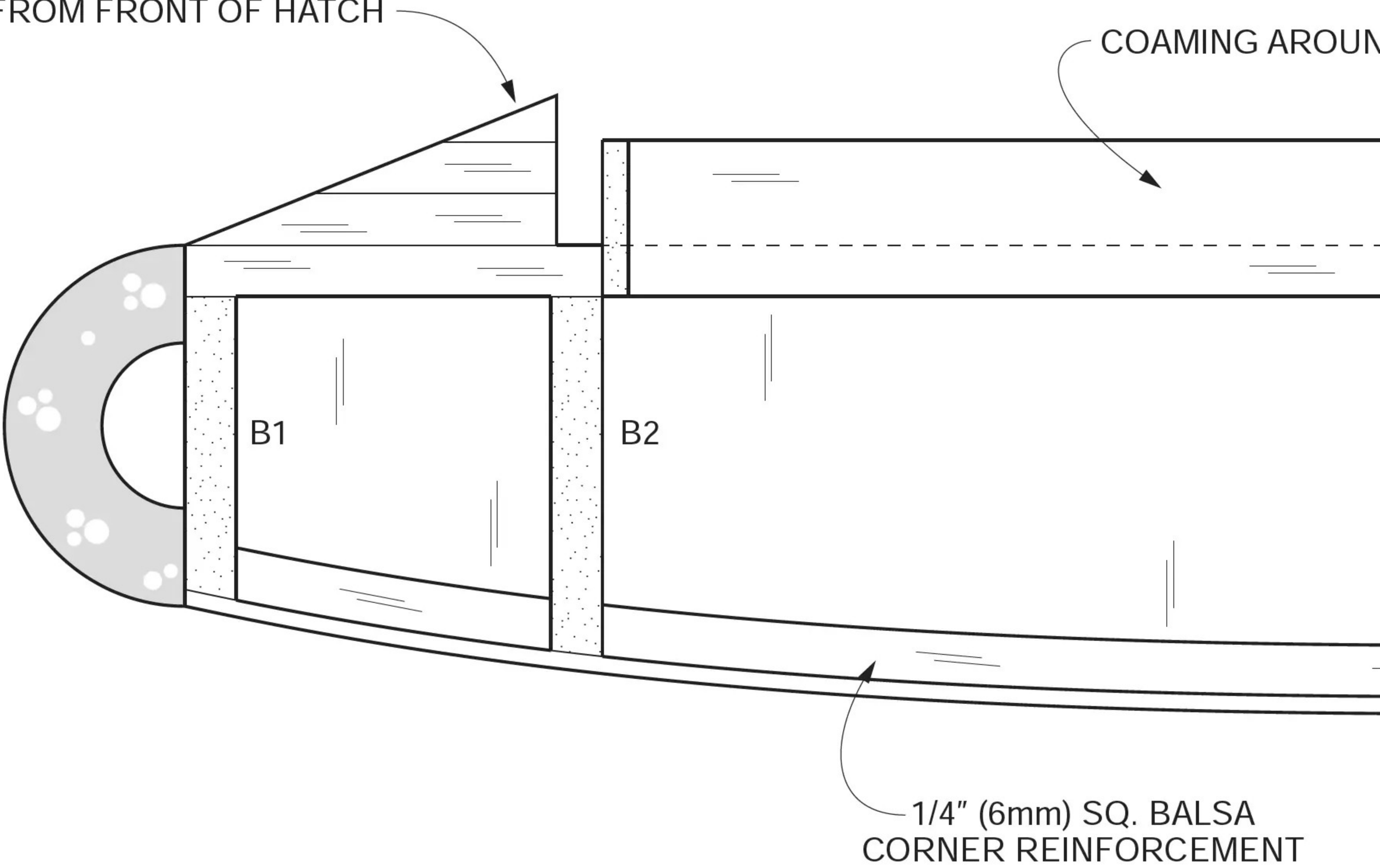


BUILD HATCH OVER DECK
COAMING FOR A GOOD FIT

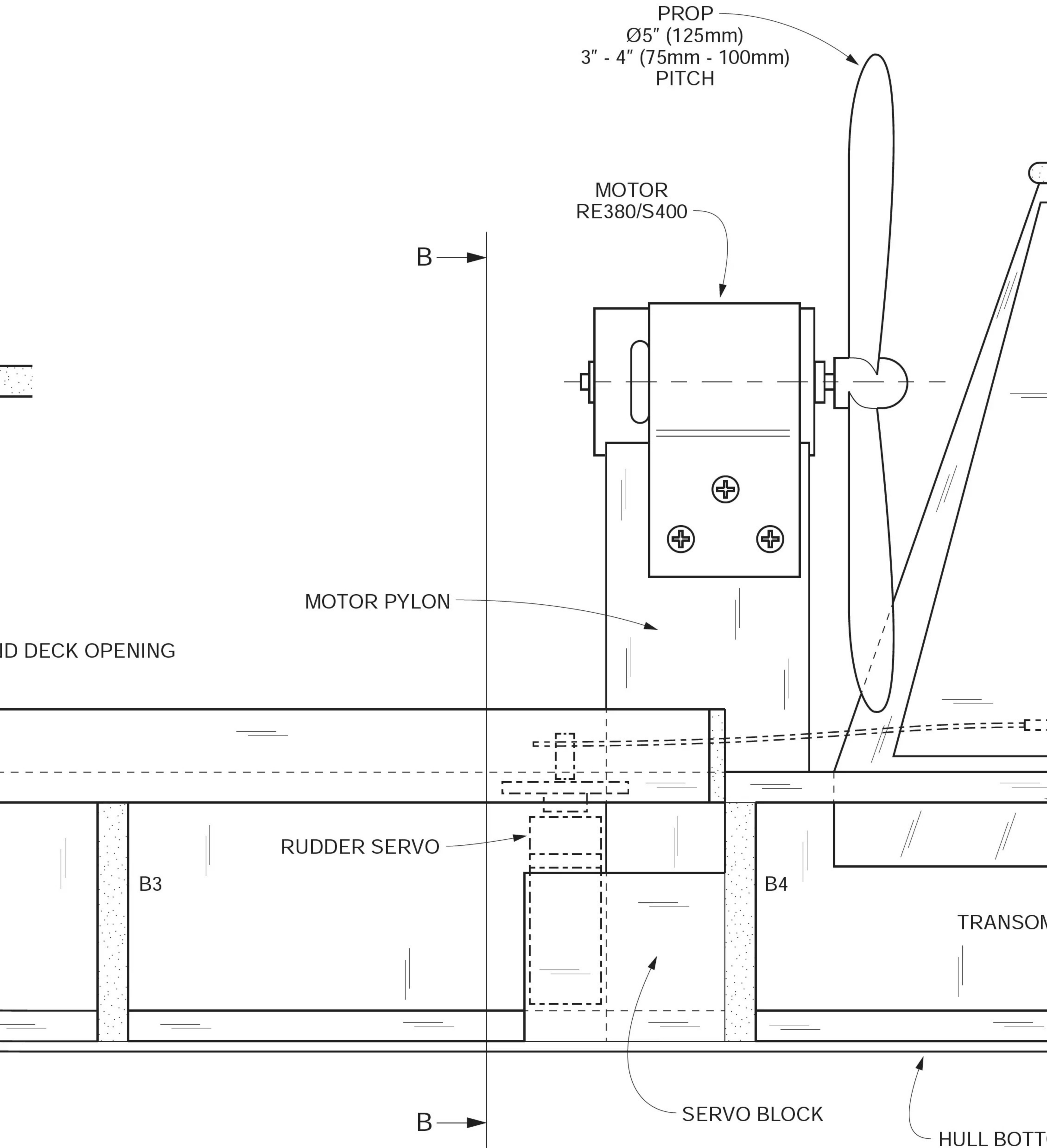


SECTION THROUGH HATCH

LAMINATED Balsa WEDGE KEEPS
WATER AWAY FROM FRONT OF HATCH



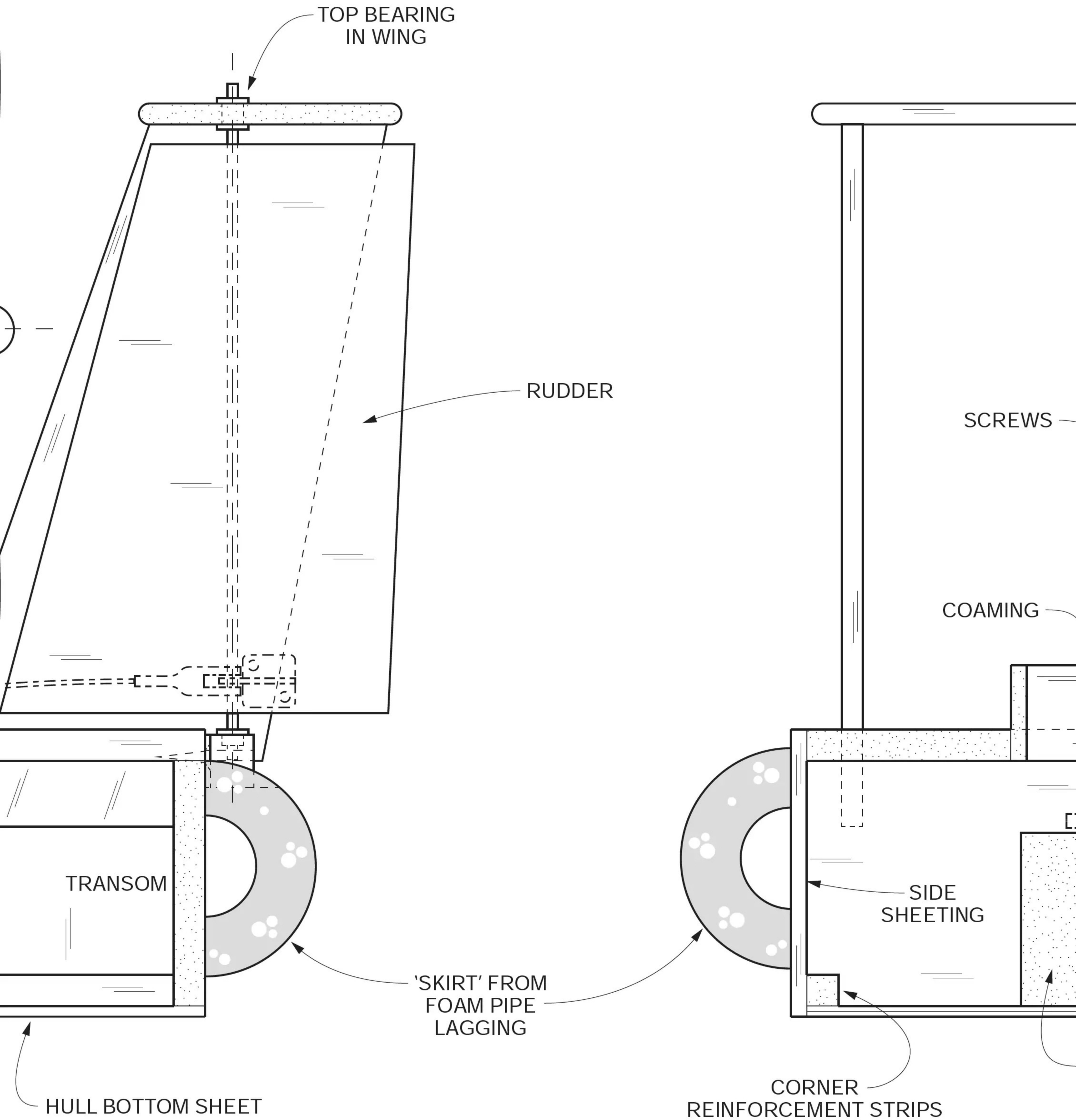
SIDE VIEW



SECTIONAL VIEW A-A

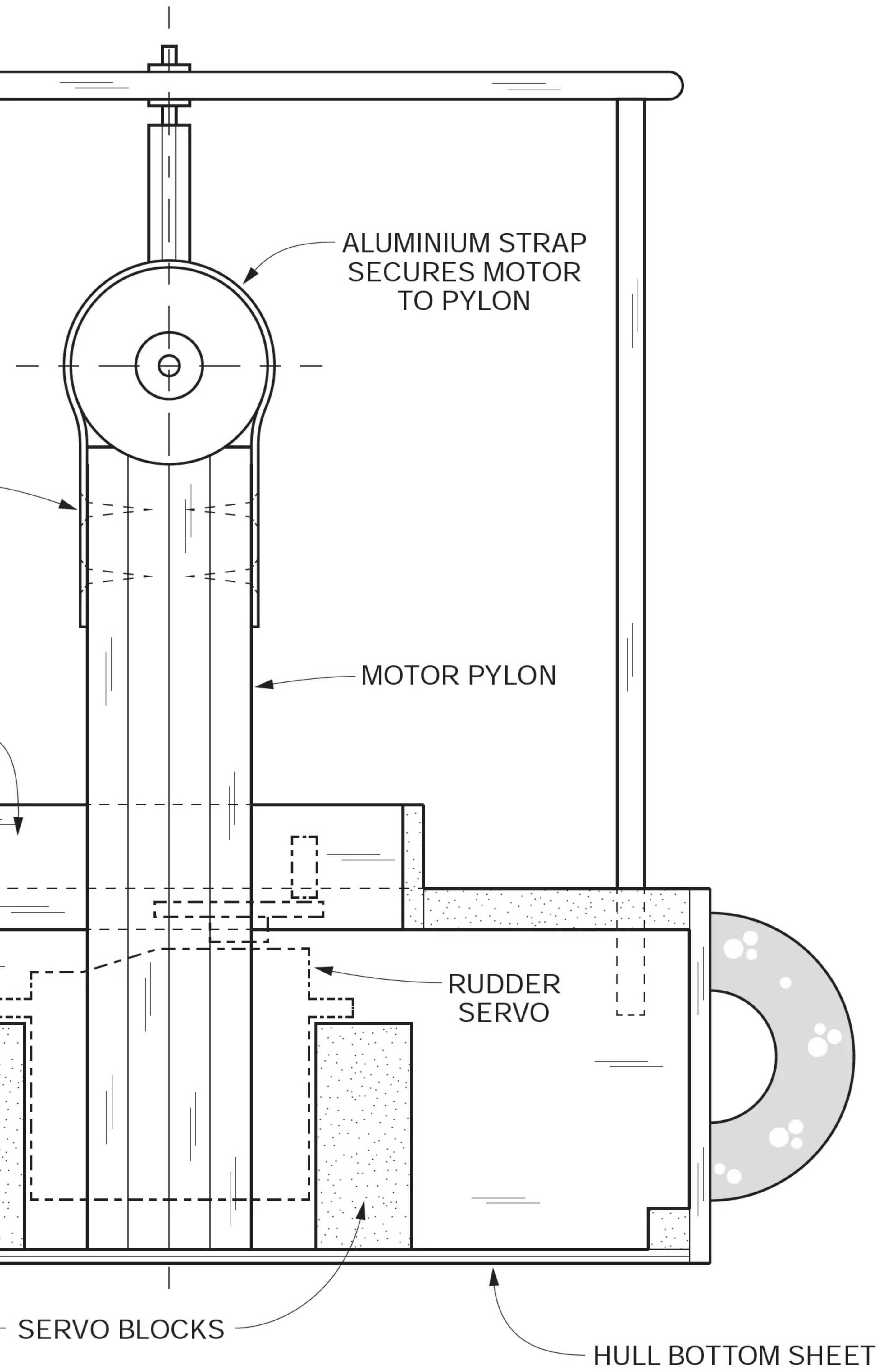
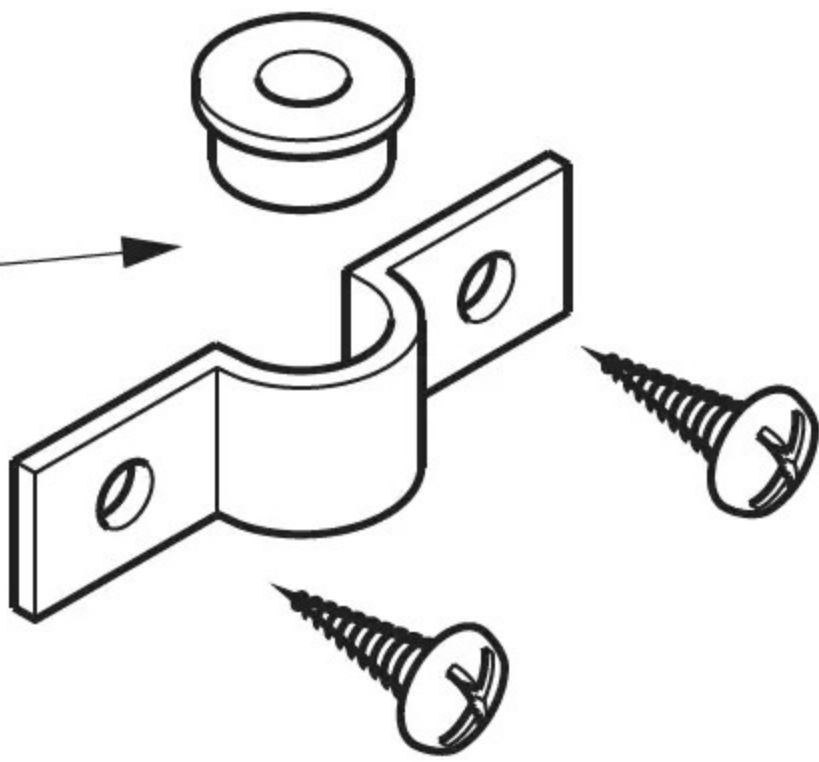
CUT SKIRT FOR
ACCESS TO SCREWS

A →



VIEW FROM AFT

BOTTOM
RUDDER BEARING



SECTIONAL VIEW B-B

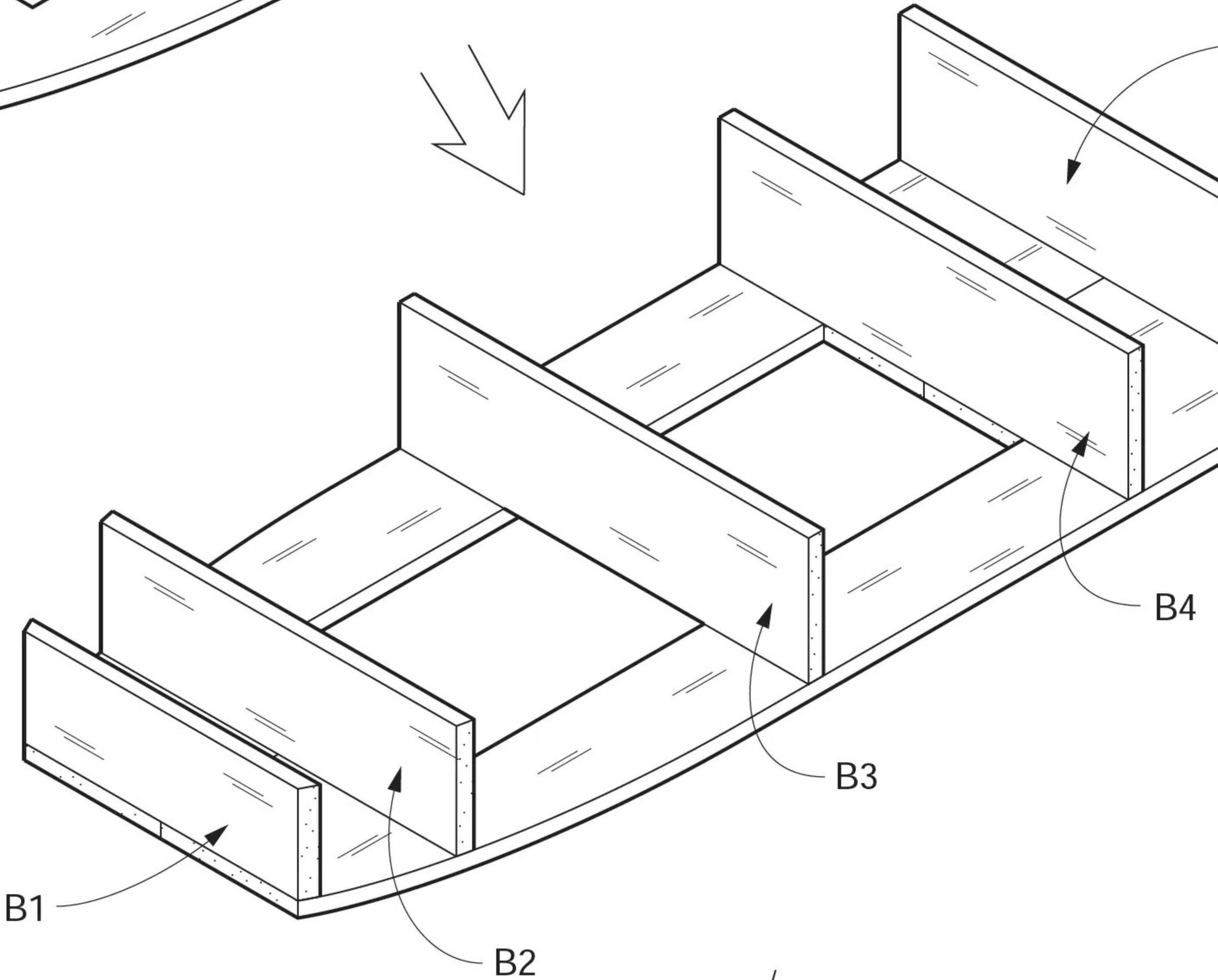
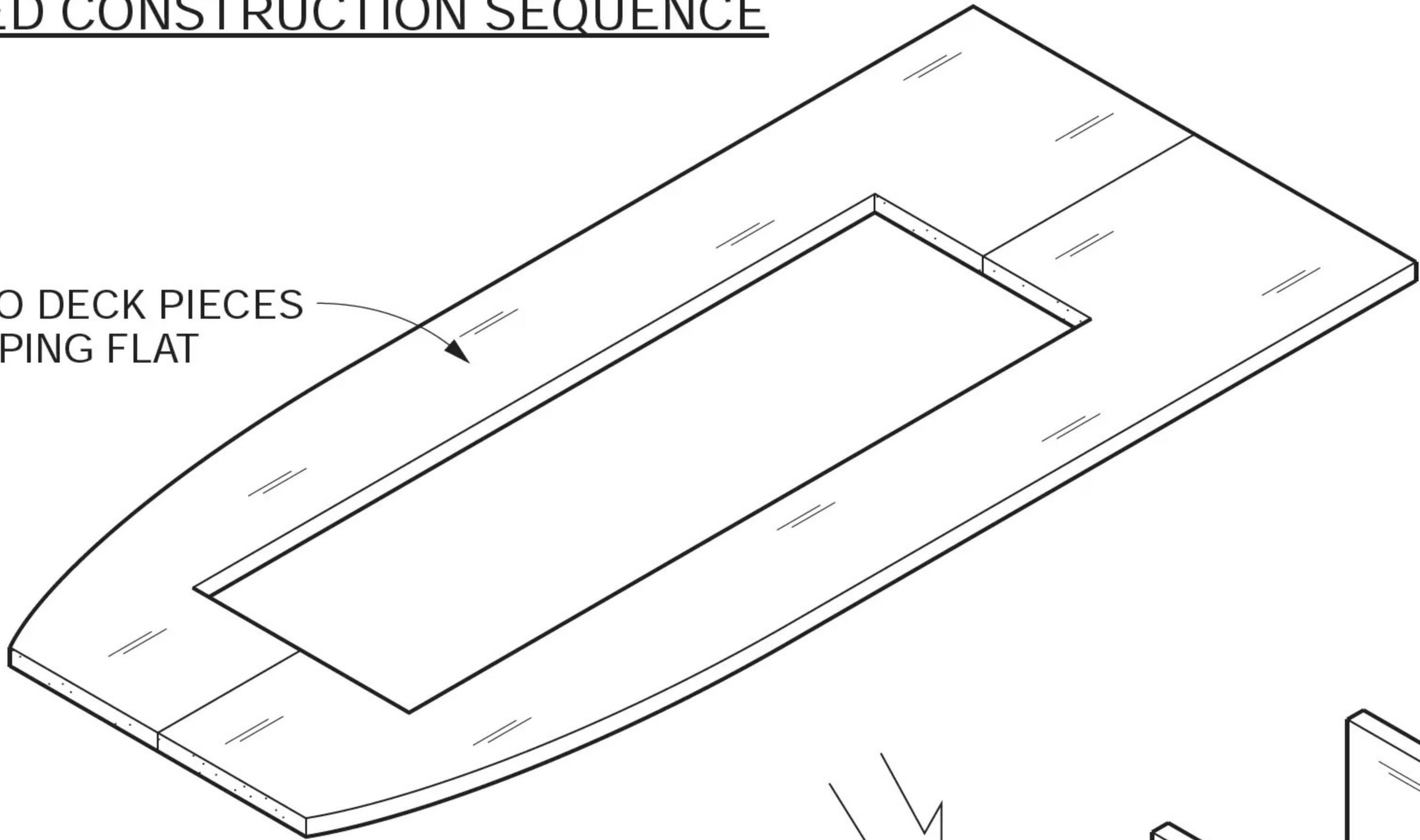
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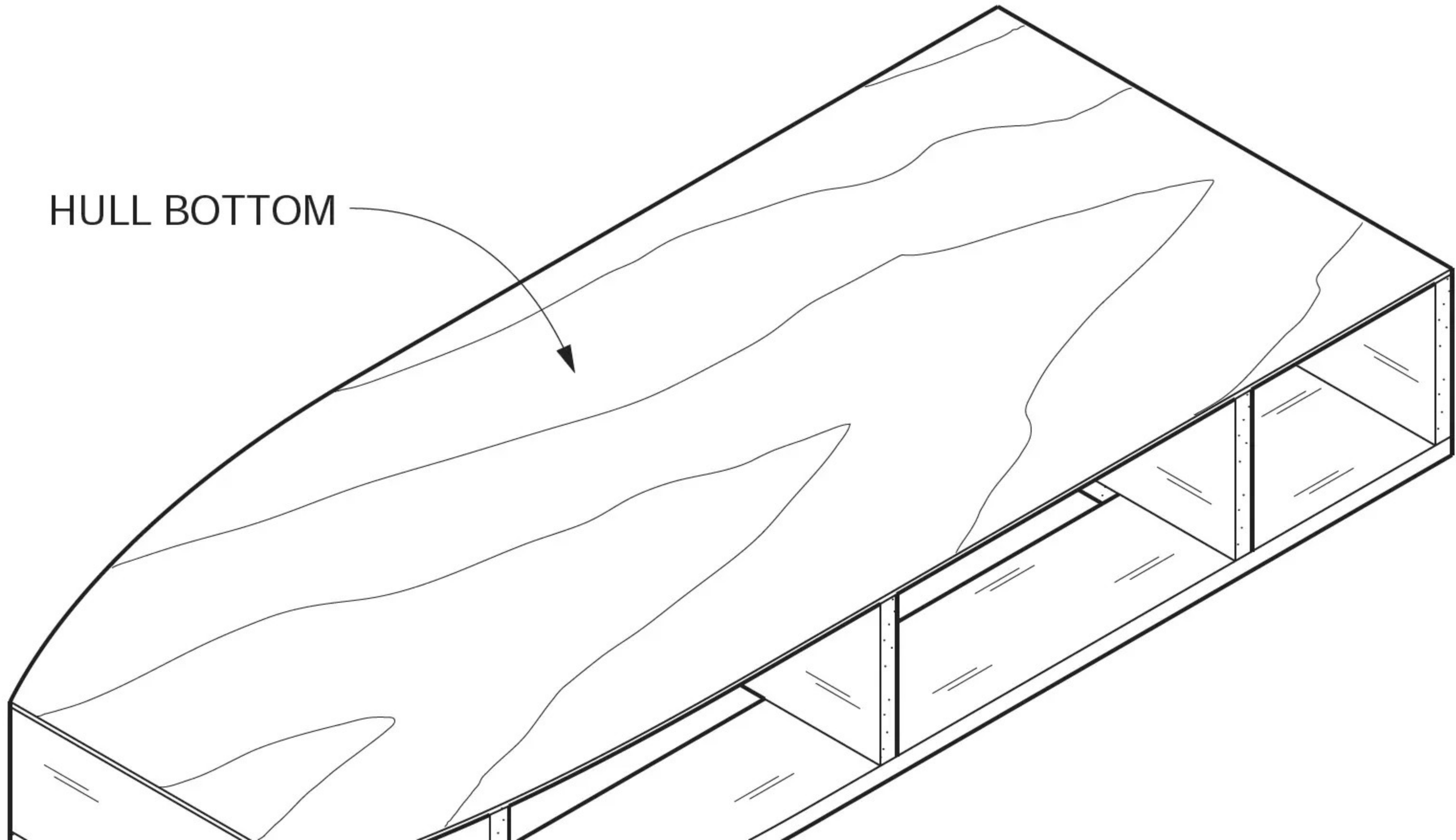
20

SUGGESTED CONSTRUCTION SEQUENCE

GLUE TWO DECK PIECES
KEEPING FLAT



HULL BOTTOM



LEADING EDGE

WING
1/4" (6mm Balsa)

TOP RUDDER BEARING

TRANSOM

RUDDER
LAMINATE FROM BALSA CORE
& LITE PLY OUTER SHEETS

TOP RECESSED
TO SUIT MOTOR

PLEASE VISIT WWW.SARIKHOBBIIES.COM TO VIEW

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D
1/

HULL BO
2mm LITE

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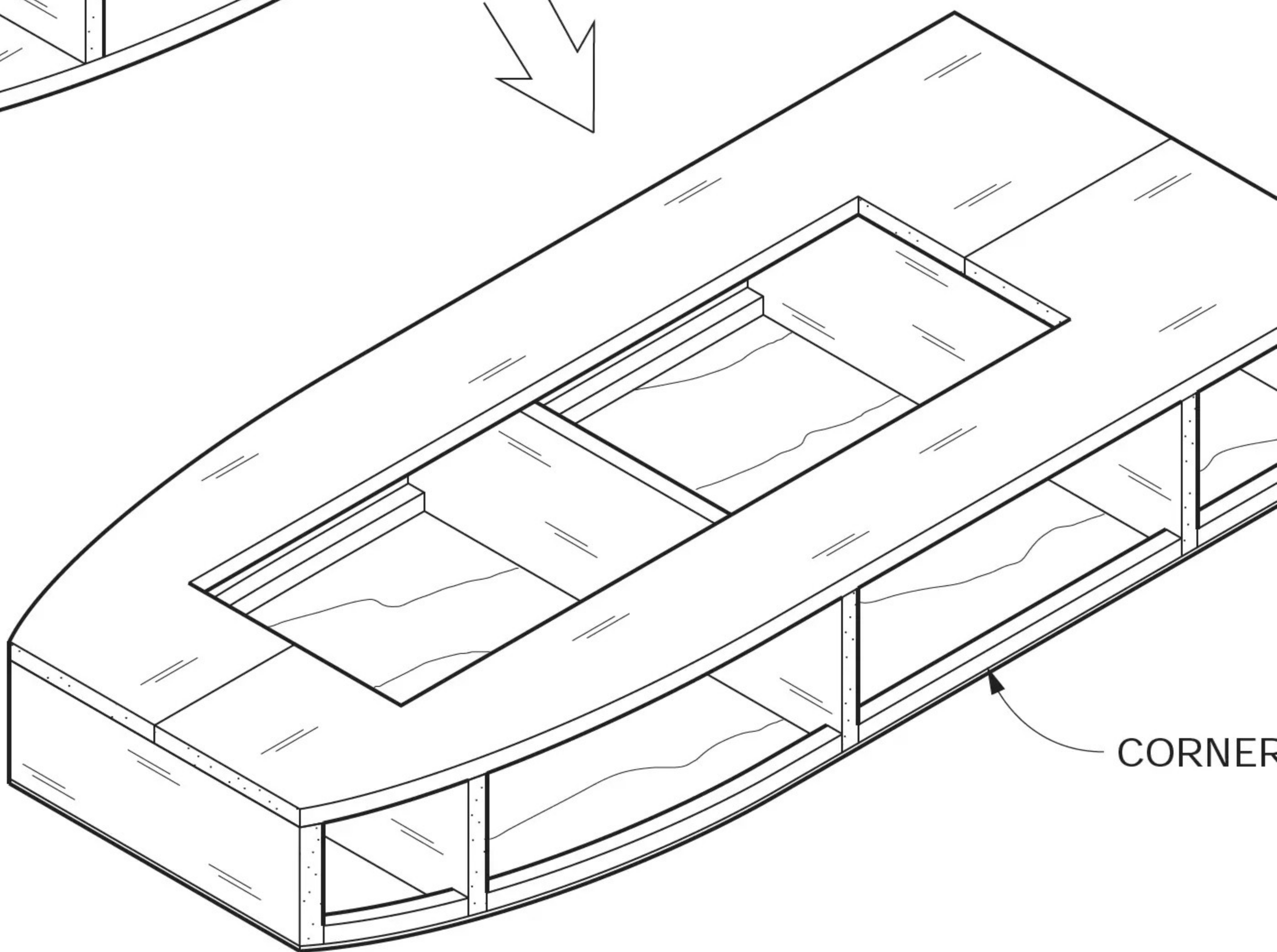
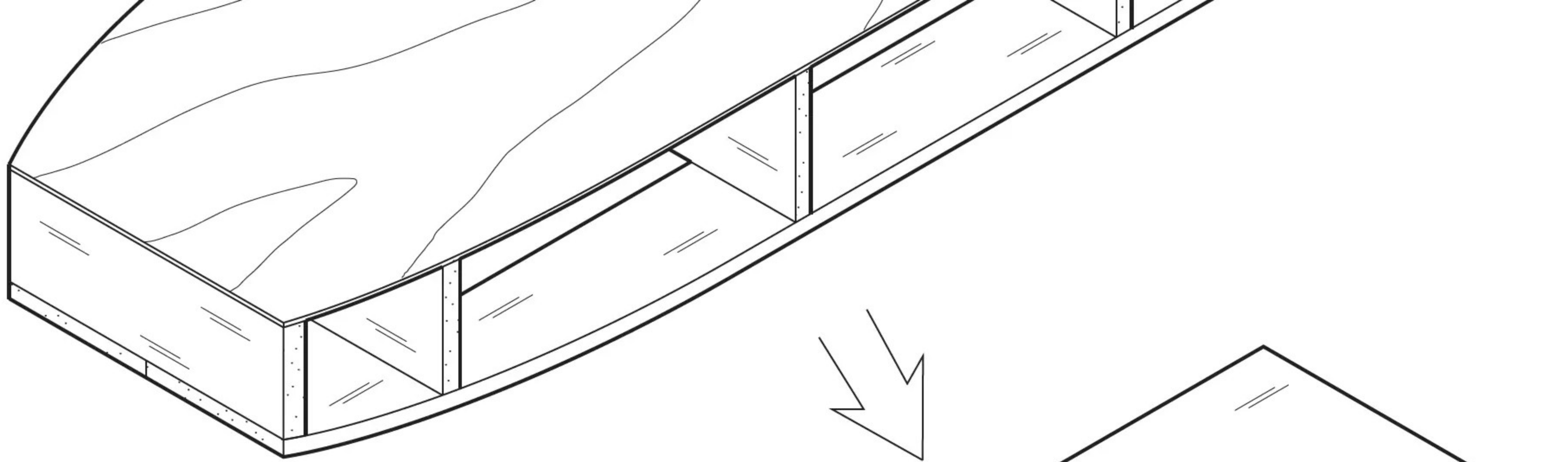
ECK PIECES
4" (6mm Balsa
2 REQ'D

CUT-OUT FOR
FIXED FIN

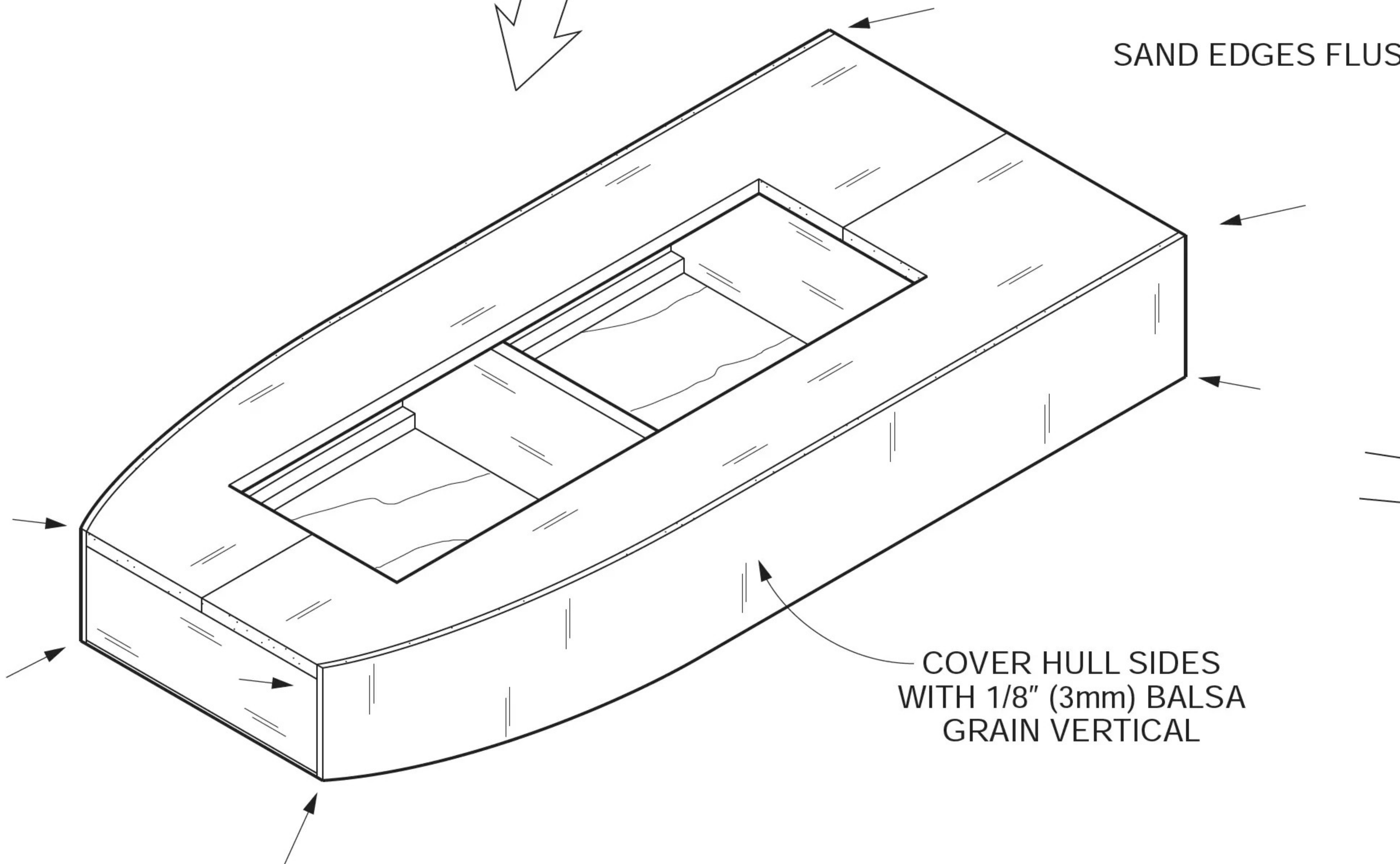
TTOM
E PLY

model
Boats
HOVERFLY
BY GLYNN GUEST

PLAN No: MM2187	No. OF SHEETS: 2 OF 2	First published in Model Boats July 2026
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CORNER



SAND EDGES FLUSH

COVER HULL SIDES
WITH 1/8" (3mm) BALSA
GRAIN VERTICAL

200

100

SCALE
MM

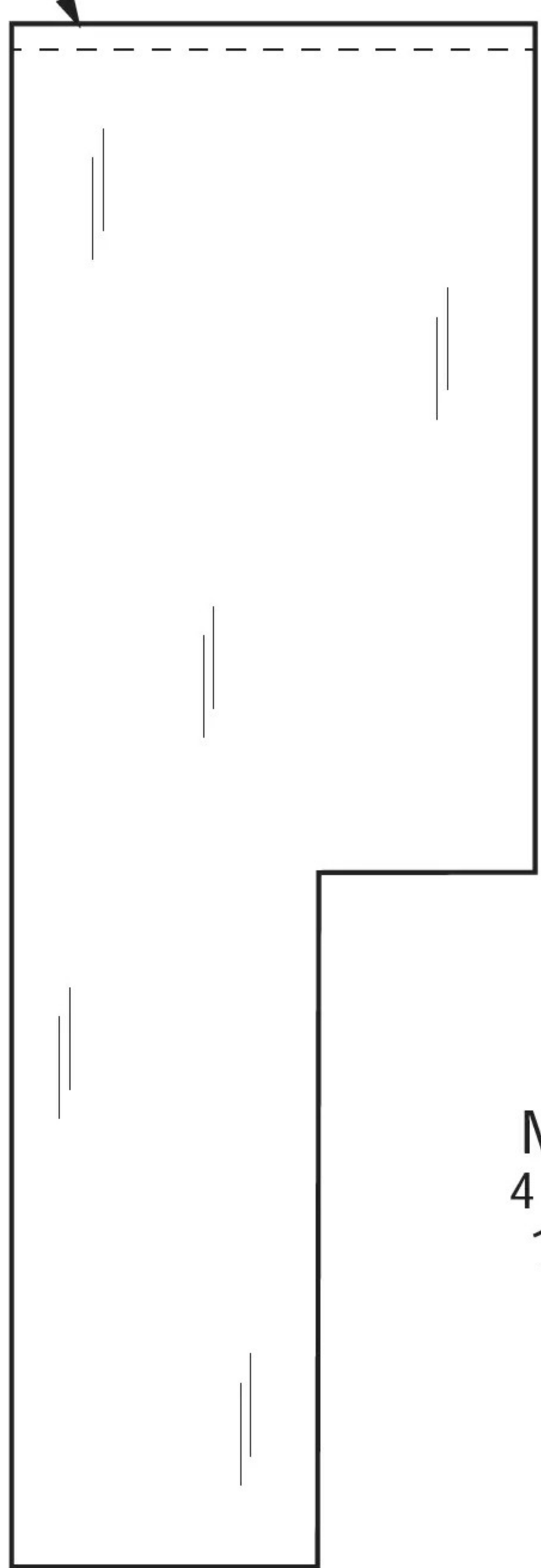
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2

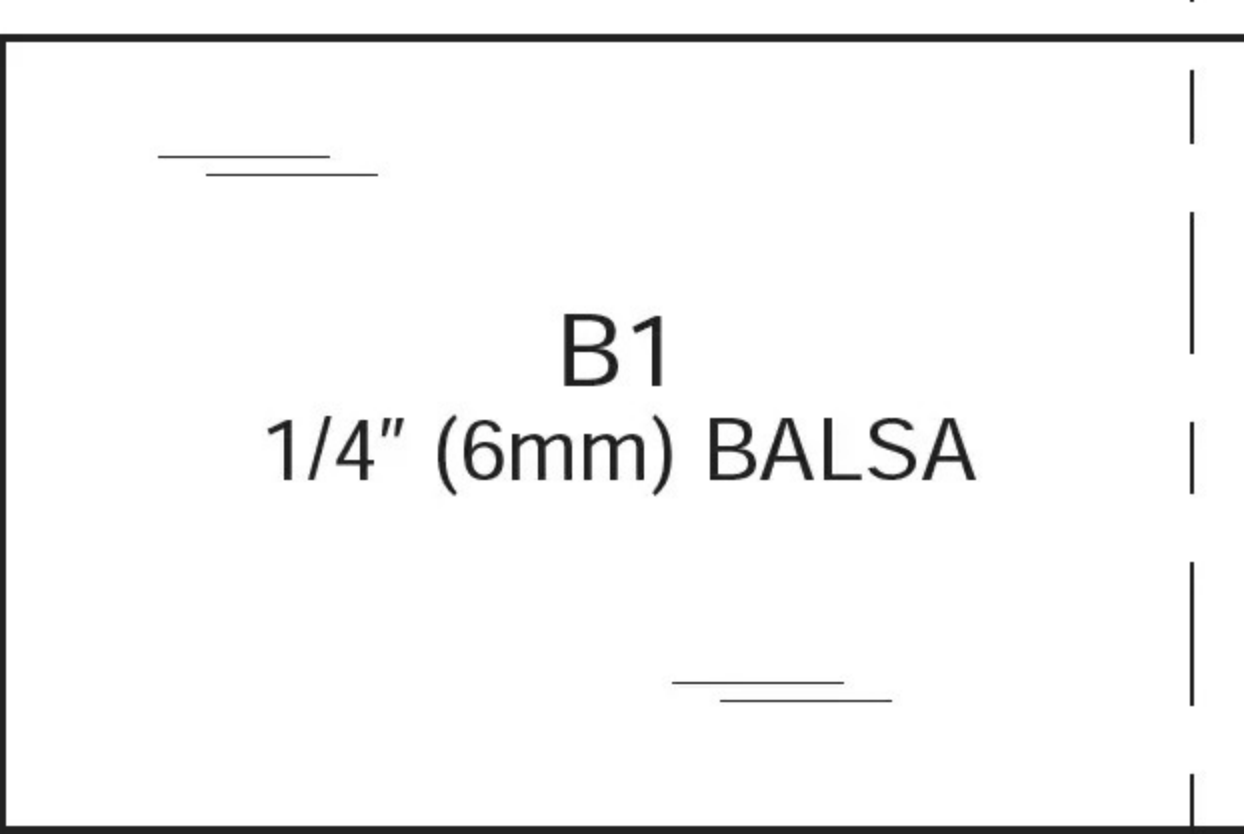
TOP RECESSED
TO SUIT MOTOR



REINFORCEMENT
STRIPS



MOTOR PYLON
4 LAMINATIONS OF
1/4" (6mm) BALSA



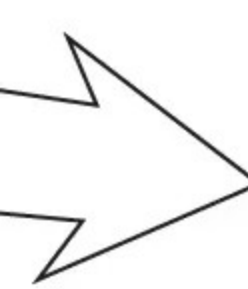
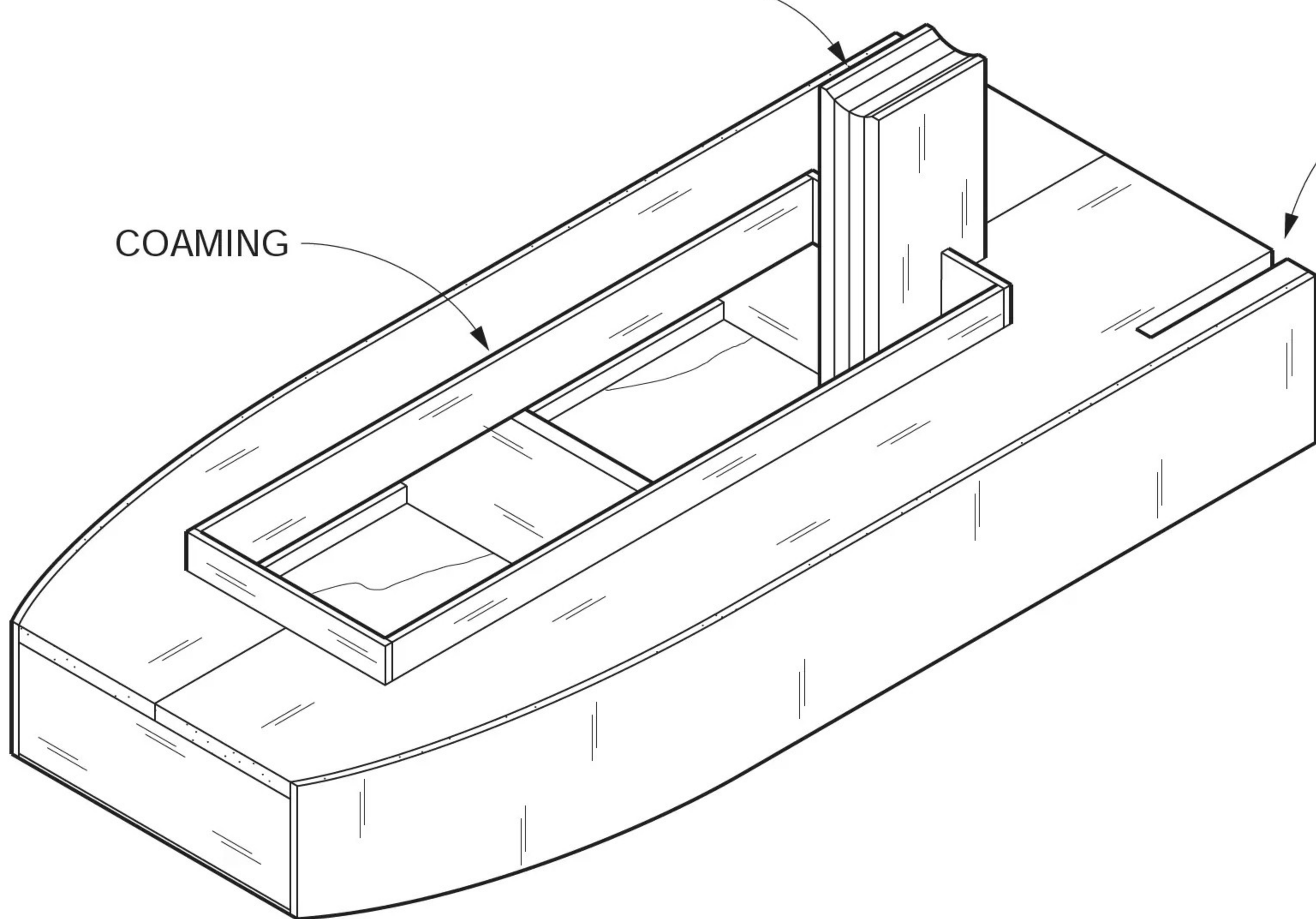
B1
1/4" (6mm) BALSA

H

MOTOR PYLON

COAMING

CUT SLOTS
DECK FOR FIXE

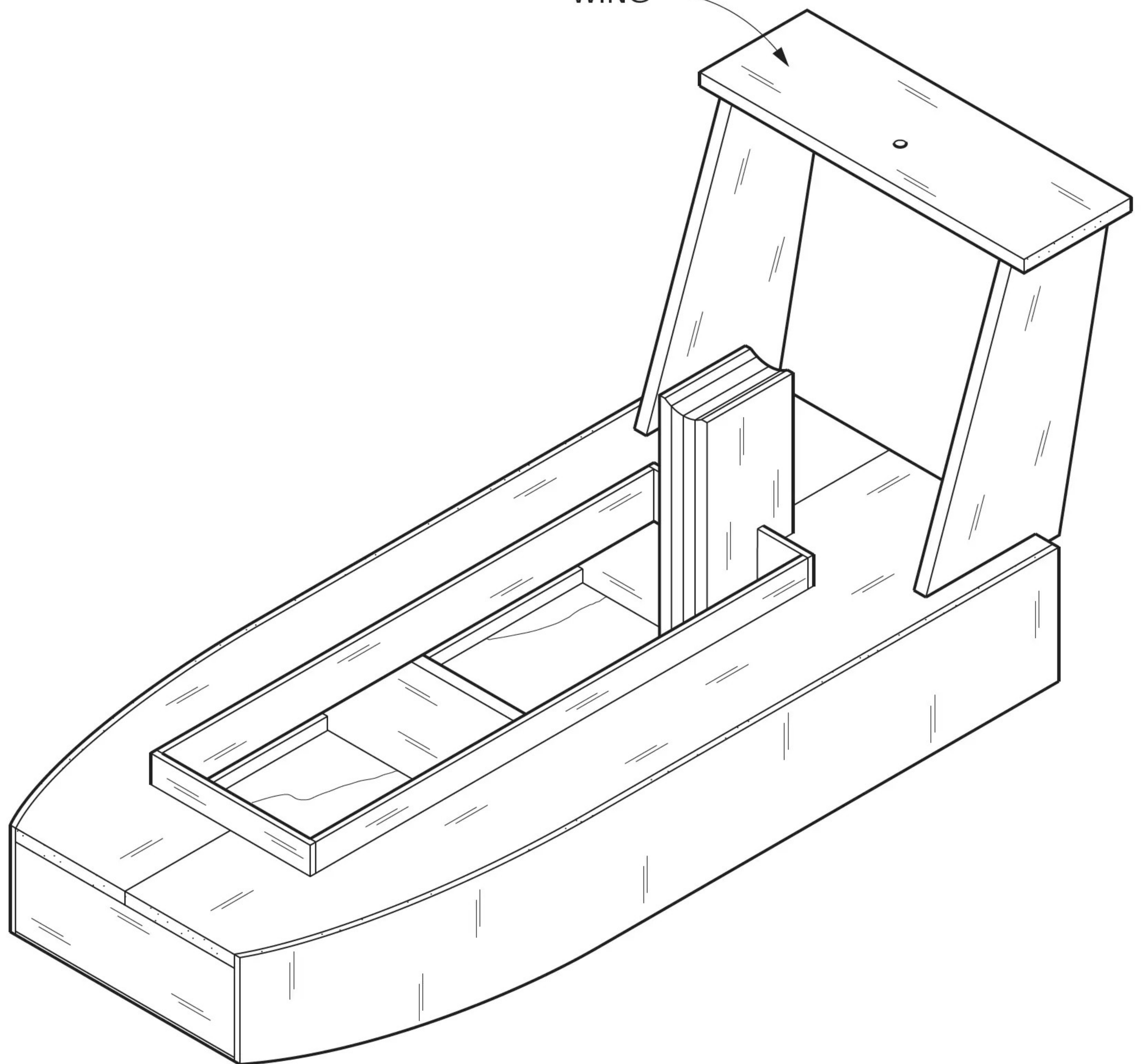


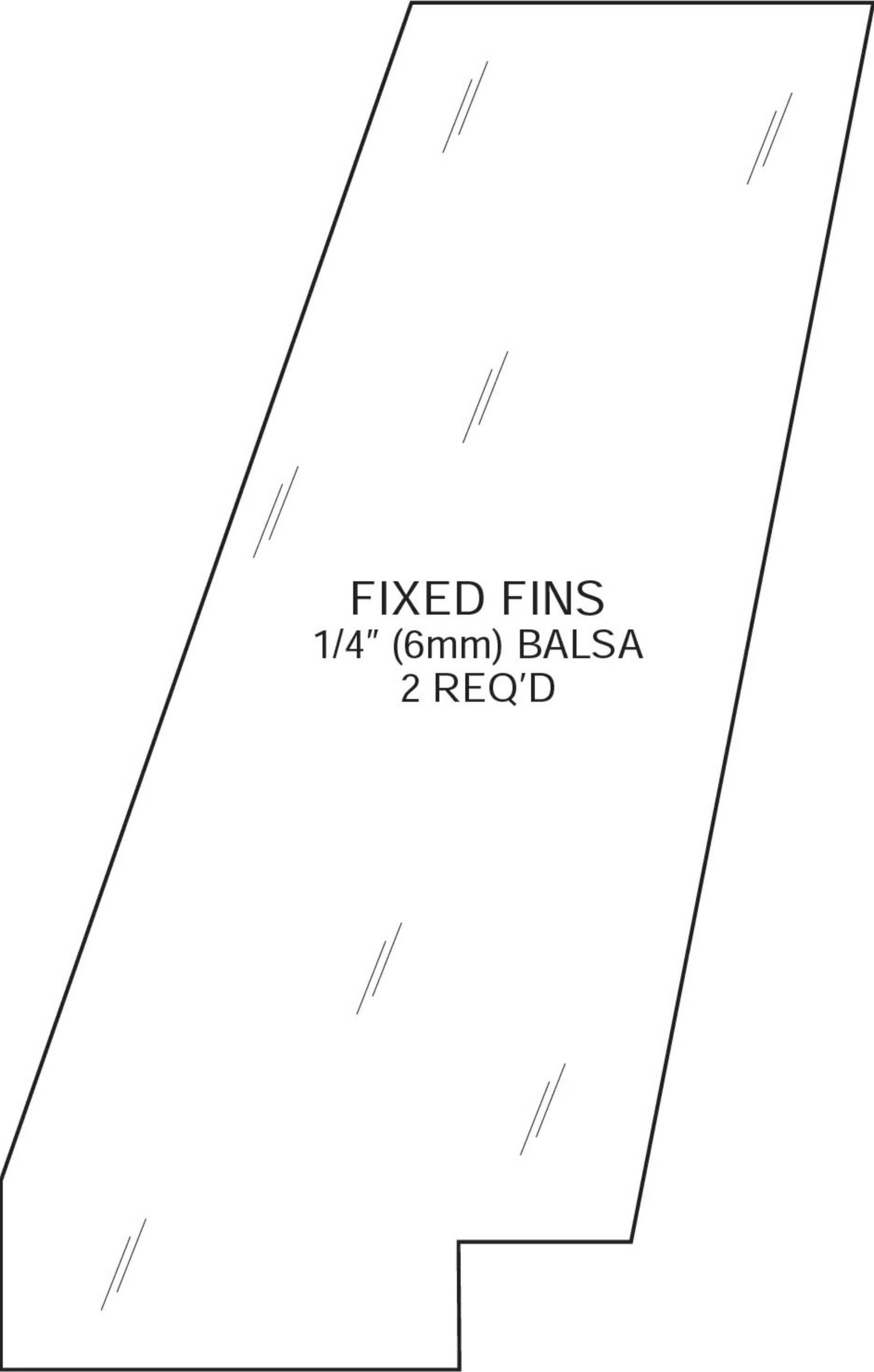
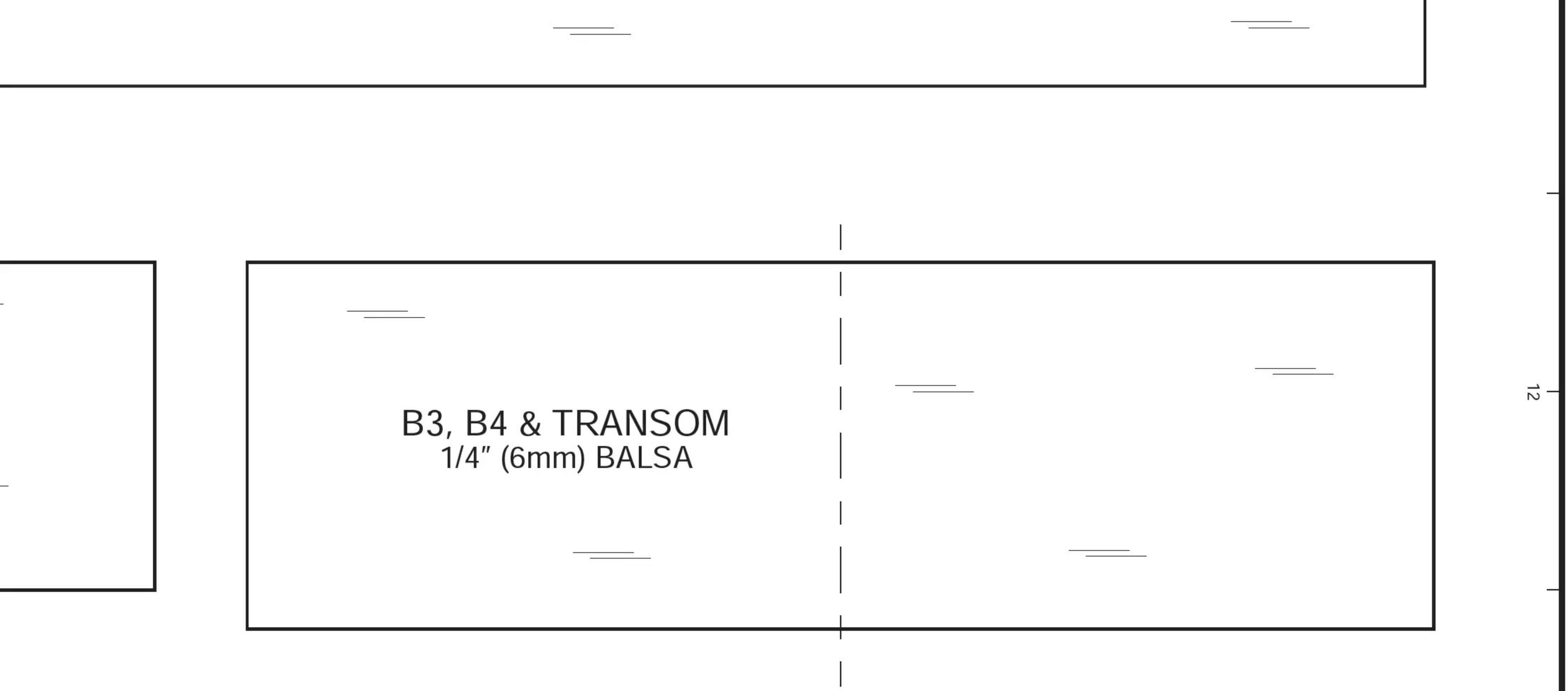
B1
1/4" (6mm) BALSA

B2
1/4" (6mm) BALSA

CUT SLOTS IN
DECK FOR FIXED FINS

WING





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