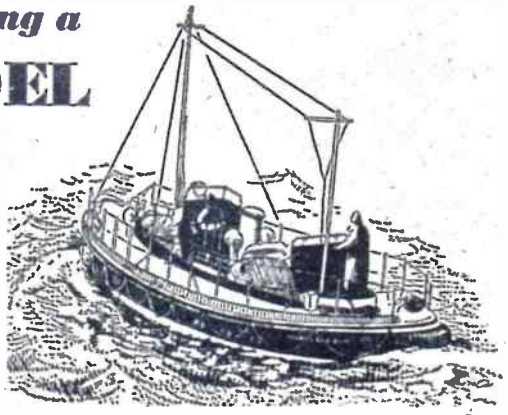
Hobbies WEEKLY

CONTENTS

February 20th, 1952 Price Fourpence Vol. 113 No. 2938

Complete instructions for making a

WATERLINE MODEL OF A LIFEBOAT



An artist's impression of how the lifeboat looks when completed. A fully detailed design sheet for the model is

FREE INSIDE

THE splendid model illustrated on this page is of one of the latest lifeboats brought into service by the Royal National Lifeboat Institution. Among craft of this type now in operation, is the No. 1 lifeboat at Cromer, on the Norfolk Coast—a station which became known throughout the world for the exploits of ex-Coxswain Henry Blogg and his crew.

Appropriately Named

Appropriately enough, the Cromer No. 1 boat is actually named the 'Henry Blogg', in honour of the famous coxswain, a man who was many times decorated and holds the Lifeboat V.C. Now advancing in years, he retired some time ago, but his name, and the tradition he stood for, will be remembered—and not only within the Lifeboat Service.

Readers will have noticed that, in the illustration, the craft is named as the Cromer Lifeboat, and many who make the model will, no doubt, wish to name it similarly. However, those who associate other Lifeboat Stations with such a craft will be able to name their models accordingly.

For those who intend to name their models the Cromer Lifeboat it may be of interest to mention that the R.N.L.I. still have a number of reproductions of an oil painting by Sir Thomas Dugdale, R.A., of ex-Coxswain Blogg. Unfortunately, the coloured reproductions are now out of print, and those obtainable are in black and white only. However, these black and white postcards are still worth having, and it occurred to the writer that some who make the model may wish to have one to exhibit with their model. A small frame could easily be made, either separately or attached to the base, and would add to the interest of the model. The reproductions cost 4d. each, and can be obtained from the Royal National Lifeboat Institution at Lifeboat House, 42 Grosvenor Gardens, London, S.W.1.

4mm. Scale

Others of our readers who like to incorporate new models into existing model settings, should note that the scale of the craft is 4mm. to the foot, the scale so well known to railway modellers as OO gauge. Any who have a railway layout embracing a seaside scene should have no difficulty in finding a place for a true-to-scale lifeboat, in fact their layouts would be enhanced by such an addition.

In passing, we should like to express our gratitude to the R.N.L.I. for the loan of the plans from which this model was evolved, and for their unfailing interest and advice throughout the time taken to complete the model.

Not Difficult

And now for constructional details. On first seeing the design sheet, many of our younger readers, and less experienced modellers, may have decided that the model is too difficult for them, but this is not the case. With moderate patience and care, even a beginner can make a successful model. The main hull and superstructure is quite easily constructed, and the patience and care is only necessary in the shaping and fixing of the detail pieces. And, needless to

say, the reward for that small extra effort is worth while—a model which will always be a source of interest and pride.

After tracing the main patterns on to the required thicknesses of wood, begin by cutting out the hull pieces (A) and (B). Both are from ¼in. wood, and it should be noted that while piece (A) is cut to outline only, piece (B) is cut exactly as shown on the pattern, that is, that there is a small gap left when the cockpit is placed in position. No attempt should be made to remedy this by further shaping. Instead, the gap should be neatly filled in with plastic wood, putty or glue.

The rear cockpit, made from the three pieces (H), is the next task to be undertaken. The pieces are built up in much the same way as those for the front cockpit, shaped in accordance with Fig. 4, and glued into position in the rear well, as shown by the dotted lines on pieces (B) and (C) on the design sheet. The position of this and other parts of the superstructure can also be seen in Fig. 1, and the side view on the design sheet, and these drawings should now be used constantly for reference as the model is built up.

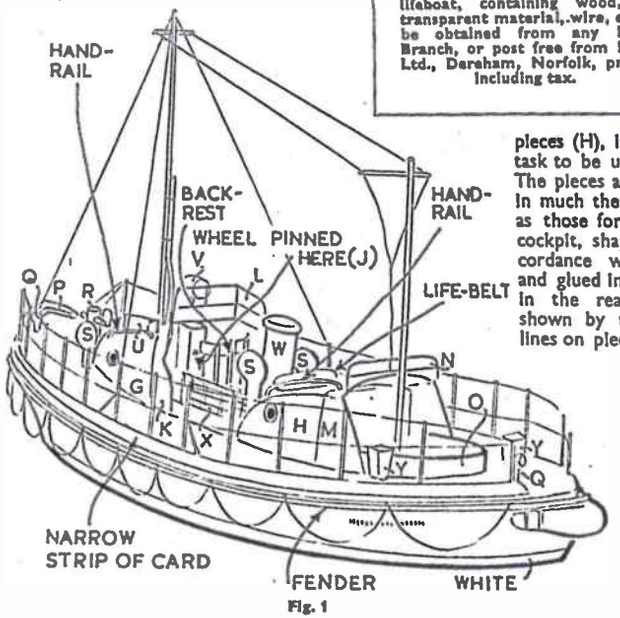


Fig. 1

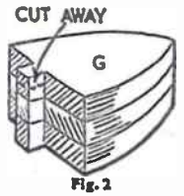


Fig. 2

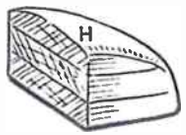


Fig. 4

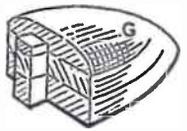


Fig. 3

Fig. 5

MAKE IT FOR ONLY 7/4

A complete kit for making this model lifeboat, containing wood, cord, transparent material, wire, etc., can be obtained from any Hobbies Branch, or post free from Hobbies Ltd., Dereham, Norfolk, price 7/4, including tax.

Main Hull Assembly

Now cut pieces (C), (D), (E) and (F), and all the parts for the main hull are ready for assembly. Glue them together, one on top of the other, in the order shown by the diagram on the design sheet, and, when the glue has hardened, shape the deck to the sweeping line shown, and the hull sides in accordance with the four half sections detailed. Note that the deck itself is slightly rounded from edge to edge.

Next, cut out the three pieces (G), which together form the main structure of the forward cockpit, glue them together, and cut away a small portion of the top of the projection at the rear (see Fig. 2). Now shape the assembly as in Fig. 3, and when you are satisfied that the shape is right, the complete cockpit can be glued into position in the forward well of the hull. The base of the cockpit should form a flush fit with the edges of the well, but the modeller may find, by virtue of the sloping shape of the cockpit, with the well towards the rear of the piece removed.

As with the forward cockpit, any gap left between the sides of the rear cockpit and the edges of the well should be filled in.

With these two cockpits safely in position, the main assembly is complete, and the care and patience mentioned earlier are now called for in shaping and fixing the various details which will give the model life.

Details

Begin adding these details by cutting out and fitting piece (I). It is positioned in the centre of the craft and flush up to the front of the rear cockpit, as seen by the dotted line on piece (C) on the design sheet. Next, cut the wheel piece (J) from thin card, and pin to piece (G) in the position shown.

The piece (K), which forms the extension to the front cockpit, can now be cut from thin postcard and glued into position (see Fig. 5). It should be tried for fit before gluing, as variations in individual shaping of the cockpit have to be allowed for, and trimming cannot be done when the piece has been stuck down or is messy with glue.

The Forward Windscreen

Now add the forward windscreen. This is piece (L) on the design sheet, and is cut from transparent celluloid and painted as shown. When dry, fold to shape and glue in position (see Fig. 1), with the lower edge resting on the steering column. Durofix will be found suitable as an adhesive for this part of the work.

Much the same procedure as for the front cockpit is now followed in adding the rear cockpit cover (M), which is cut from thin card, and the rear windscreen (N), cut from transparent celluloid. The positions of both these parts can be seen from Fig. 1. Remember to try piece (M) for fit before gluing, as with the corresponding piece in the front cockpit.

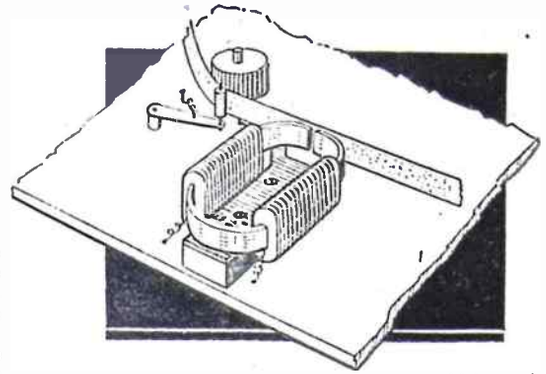
Piece (O), which forms a coaming round the remainder of the rear well (see Fig. 1) is next cut from thin card and glued into position, and the main cockpit assemblies are complete.

We now come to the smaller details, and for these we can start with the bow piece (P), which is cut from ⅛in. wood, shaped to the section shown on the design sheet, and glued into position as seen on piece (E).

Next comes the three small ventilators (Q), which are shaped from ⅛in. round rod. As they are too small to handle easily, they should be shaped up one at a time while still part of the rod, and cut off as completed. When ready, glue two to the forward deck (E) as shown on the design sheet, and the remaining one to the stern piece (F).

(Continued on page 331)

A MAGNETIC RECORDING HEAD



WHEN recording on magnetic tape, the tape is drawn past a head which imposes a magnetic flux upon it. This flux varies according to the signal fed into the recording head, with the result that the programme, which may consist of speech, or musical or other items, is 'stored' in the tape. The programme can then be repeated, when desired, by passing the tape again through the apparatus. This time, the magnetic flux in the tape creates a fluctuating signal in the windings of the play-back head. This signal is amplified and reproduced from a loudspeaker.

A winding mechanism and amplifier for recording and play-back have been described in full detail in recent past issues. Accordingly, it is now proposed to describe the construction of a suitable recording head (which can also be used for play-back purposes).

Ready-made heads may be purchased, and are normally very well made. Good results can be obtained from a home-constructed head, provided essential requirements are kept in mind. It should be noted, however, that careless construction will severely reduce the efficiency, and this must be remembered.

Making the Core

This consists of a single strip of material about 1⅞ins. long and ¼in. wide, and is cut from the lamination of a stamping taken from a disused audio-frequency type transformer. This material is a type of soft iron; it does not retain magnetism, as does steel and similar harder metals. A piece from a high-quality, modern transformer is best, as alloys of a more suitable nature are used here, than in very old transformers. The strip is bent into the shape shown in the diagram. It should then be cleaned and tinned with solder at the three points where the baseplate indicated is to be soldered on.

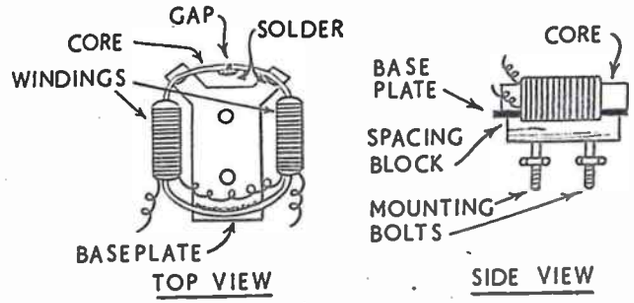
The ends of the strip, which will form the gap across which the tape passes, must now be filed absolutely square and true. A fine-toothed file is necessary, and any roughness must be cleared off carefully. The *inner* side of the ends are now cleaned and tinned, at the tips, using the smallest possible amount of solder. If any gets into the gap, it should be filed away until the core material is visible.

Baseplate and Windings

The baseplate shown is cut from brass. Copper could be used, if available instead. Two holes are drilled through it so that the completed head can be bolted into position eventually.

The windings consist of 90 turns of 28 S.W.G. cotton-covered wire, split into two sections of 45 turns each. The turns on one arm must be in the opposite direction to those on the other, as when winding the usual horseshoe-shaped electro-magnet. The turns may be bound with cotton, or varnished, to hold them in place.

It is essential that the windings be in opposite directions, as mentioned. If they are not, little or no magnetic field will be created in the gap. (This can be ascertained by connecting to a small dry battery).



Constructional details of the head

Adjusting the Gap

This is probably the most critical point, and the one upon which results most depend. The core ends should be bent until touching squarely, then the baseplate soldered on to the points already tinned. The core ends should now be opened very carefully until a sheet of thin tissue paper can just be passed between them. (A space of approximately one-thousandth of an inch is required).

When this has been done, solder is applied at the inner ends of the core, to the edge already tinned. This holds the ends of the core at a set distance. If solder flows into the gap this does not now matter, as it is a non-magnetic material.

The outer face of the gap, against which the tape runs, as in the illustration, should now be smoothed absolutely level. Any stray solder should be removed, and the whole polished up as much as possible. Deep file-markings should not be made, but a very fine file used with a light touch.

Setting up the Head

During recording, the tape passes across the gap in the head, bearing lightly upon the smoothed curvature of the core. The gap must be absolutely upright—that is, at right-angles to the tape. The usual roller, driven from a motor, will be used to draw the tape across the head, while guides maintain it at the correct height.

Electrical Details

This type of head is of low-impedance, and requires to be used with a matching transformer. (A high-impedance head is difficult to wind, since several thousand turns of very thin wire would be required). A multi-ratio speaker transformer of good design is best for this purpose, as different ratios can then be selected to match the impedance of the output stage in the amplifier. For normal purposes, a transformer matching 5,000 to 6,000 ohms to 12 to 15 ohms would be used. The head is connected to

(Continued on page 324)

How to make yourself

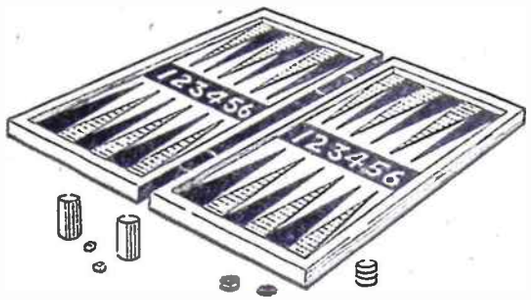
A BACKGAMMON BOARD

YOU can obtain many happy hours with your friends from a backgammon board, apart from, most probably, introducing them to what may seem a new game. Yet it is, in fact, a very old game that never seems to lose its popularity. It is said to have been invented in the 10th century, although there are records of a similar game being played by the Romans. It is played on a special board, each player having a dice cup and sharing a pair of dice.

How to Start

To commence making the board, obtain two pieces of plywood ¼in. to a ¼in. thick, size 10ins. by 13ins., and a length of ¼in. square section beading of sufficient lengths to cut four pieces 9ins. long and four pieces 13ins. long.

The board is made in the form of two trays hinged together on one of the long sides. Each tray has an inside measurement of 9ins. by 12ins. with a rim of the ¼in. section on each side. The first step in the construction is to well glasspaper the boards on both sides, using progressively finer graded paper each time until a really smooth finish is obtained. If the wood tends to be rather coarse it will be advisable to obtain a smooth surface by using a wood filler, and then, when dry, paper down with the fine grade paper, concluding the operation rubbing with the grain. Repeat this operation with the beading.



Next glue the beading along each edge of the two trays. Added strength can be assured by tapping two or three panel pins along each edge, from the reverse side of the board. Carefully sink the heads of the pins slightly below the surface of the board with a centre punch, then fill with plastic wood.

The playing surface of each board must now be marked out. Mark each quarter of the board with six spear-shaped points in the manner shown in Fig. 1. Do this with a light pencil line.

Now stain the sides, the back, and the beading with a water stain, to a uniform colour, and again lightly glasspaper the surface with a fine grade paper.

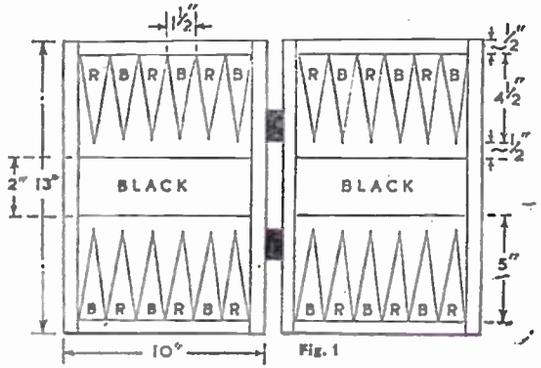


Fig. 1

Make yourself a 'rubber' with a pad of cotton wool, covered with a piece of linen, pour a small quantity of french polish on to the wool, and cover with the linen. Now squeeze the polish through the pad, rubbing lightly over the whole area of the work, and rubbing with the grain. Do not take the pad off the work as you reach the sides but bring it back in a looping action. One or two applications may be sufficient, depending upon the degree of shine that you wish to obtain, but allow each application to set for some hours before repolishing. It is important not to allow the rubbing pad to get dry while working. Finally, to set the surface, finish off with a good wax polish and a dry clean cloth.

Having stained and polished the back and the beading of both trays, turn again to the actual playing surfaces. Paint the centre band of each tray black as shown in Fig. 1 and the triangular spears alternately red and black. The rest of the white wood should be painted with a clear varnish.

Numbers Advisable

To assist play, it is advisable to either paint or stick transfer numbers across the centre black band to correspond with the points, this is not always a feature of backgammon boards, but it will make the actual play quicker.

To complete the board, the two trays are hinged together and a hook latch affixed to the outer pair of long sides. The appearance of the game can be enhanced by the word backgammon painted or transferred in gold letters on the front.

Thirty men similar to draughtsmen must be made, fifteen black and fifteen white, size ¼in. thick and ¾in. in diameter. The best way of making these is to cut ¼in. sections from broomstick or dowel of the right diameter.

Backgammon is quite a fascinating game and easy to learn, but the rules are rather too extensive to print here in the space available. They can be found in most books of games in the local library, or quite often sports or toy shops have cheap copies of the rules for sale. (235)

A MAGNETIC RECORDING HEAD

(Continued from page 323)

the low-impedance winding, or secondary.

Satisfactory recording depends upon the gap being accurately made, and sufficiently narrow, and upon it being square with the tape. If the pole surfaces are not smooth, the tape will cause a continuous rustling sound, as it passes. If the gap is too wide, top notes will be lost. The use of poor material for the core, or a gap of irregular width, will result in loss of volume, generally increasingly manifest on the higher frequencies.

The output of the amplifier used for recording should for preference, be at least 2 watts, in order that the tape may be sufficiently magnetised. For play-back, 3 valves in a circuit providing a fairly high degree of amplification, is about the minimum. (290)

Complete instructions for building a

MODEL 'HERMES' AIRLINER

THE construction of this fine model of a B.O.A.C. 'Hermes' airliner is quite straightforward and is best commenced by getting together the parts shown in the list on this page. Saw and plane the wooden parts to the sizes given and mark each part lightly with pencil for future reference. The plastic propeller 'discs' are cut with a fretsaw so that they are 1in. diameter.

Next mark out and shape the main plane (E) with a fretsaw to the shape indicated in the diagram, Fig. 1, smoothing the edges with a glasspaper block. Now turn the plane on edge and mark out the 'slope' (or dihedral) to the shape shown in Fig. 2; cut out with a tenon saw and finish to the wing sections shown.

Our picture shows a B.O.A.C. 'Hermes' airliner in flight over the English Channel. Makers of this aircraft are Messrs. Handley Page.

Photograph by courtesy of B.O.A.C.

Tail Assembly

The tail plane (G) and the fin (H) should next be tackled. Mark these out as shown in the diagrams and cut to shape with a fretsaw. Both the tail plane and fin are smoothed with glasspaper to the section marked (X) in the diagram.

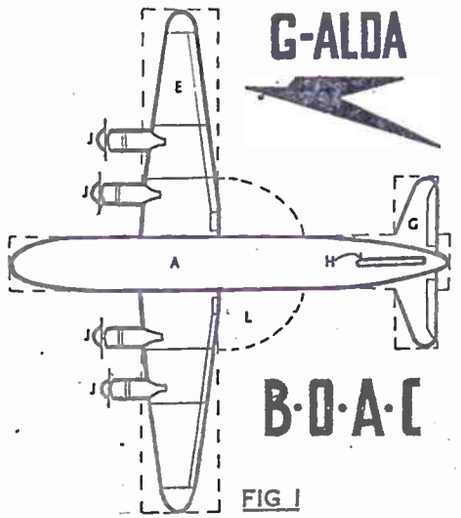


FIG 1

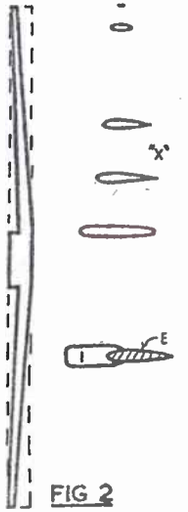


FIG 2

When this work has been done, the fuselage parts (A-D) and (F) should be placed together, temporarily, with the main plane (E), tail plane (G) and fin (H) in their correct positions. (A) and (B) will need to be cut away at the aft end to enable the fin to be fitted. Secure the parts temporarily with a loop or so of thread and carefully mark on the fuselage parts the positions of the slots which will eventually accommodate the main and tail planes and the fin. The fuselage and wing parts may now be taken asunder and the fuselage parts put together again, gluing this time so that they form a rectangular block containing three slots to accommodate (E), (G) and (H).

The fuselage may now be marked out to the size and shape shown in the diagrams and the surplus wood removed from the forward end. Do not trouble about shaping the aft end at this stage as this is done more conveniently later. The fuselage is best set up in the vice and planed to shape. It is cylindrical in section with a gradual taper over the aft 2½ins. of its length. Take care over this part of the work, otherwise a clumsy and distorted shape may well result.

When you are quite satisfied with the shape of the fuselage, the main plane, tail plane and fin may be glued into position.

The engine nacelles are made and fitted as shown in the diagrams. Notice that they are slotted to fit astride the leading edge of the main plane and should be glued into position.

The 'propeller' discs are glued to the cone-shaped bosses (J) and the whole assembly secured with a brass pin to each of the nacelles.

Fitting and Finishing

By this time the model will be assuming the graceful lines of the prototype aircraft and it is at this stage that some deft work with files and glasspaper will be well repaid. Smooth the junctions between the main plane and the fuselage so that they blend quite naturally into one complete whole. Similar treatment should be given to the tail plane and fin.

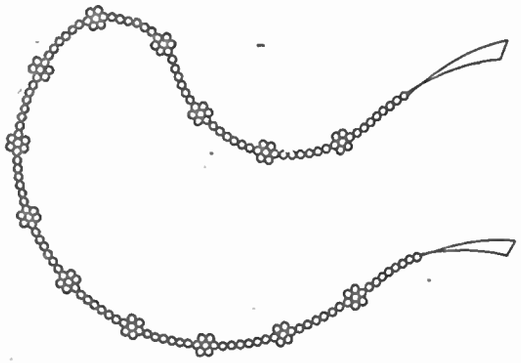
A liberal coat of wood filler can be applied and when this is quite dry, the model should be given another rub down with glasspaper. It is impossible to give this type of model too much treatment in the way of finishing: its long sweeping lines are merciless where faults are concerned and show up even the smallest blemish.

The outlines of the control surfaces on the main and tail planes and fins, the rectangular window openings and the door opening (on the starboard side) on the fuselage and the cowling edges on

(Continued on page 326)

Notes on the simple process of

MAKING BEAD-FLOWER NECKLETS



BESIDES being most attractive, bead-flower necklets are simple to make. All you require are a small needle, a reel of thread, a tiny gilt clasp or a length of coloured ribbon, a quantity of 'cut garnet' beads in light green crystal, yellow porcelain beads for the centres of the flowers and some white or pink ones for the petals. With these few items you can make a permanent daisy chain in no time. If, on the other hand, you prefer forget-me-knots or speedwells, just substitute blue for the white or pink porcelain beads.

Start making the necklet by sewing on one end of the clasp or ribbon and thread on twenty green beads. Now start making the first flower by threading on one white, one yellow and three more white beads. Pass the needle through the first white bead; draw the thread tight, and you will find that the beads encircle the yellow centre bead, forming one half of the flower. Thread on three more white beads; pass the needle through the first of the three white beads threaded on after the yellow bead and draw the thread tight. Now you will find you have the flower complete. A genuine daisy chain should have the flowers spaced about 1in. apart, but there is no reason why the blooms should not be grouped any way you wish. Finish off the necklet at the desired length by sewing on the other end of the clasp or ribbon. (189)

Building the Model 'Hermes' Airliner

(*Continued from page 325*)

the engine nacelles are scored on the surface of the woodwork with the point of a pair of dividers or some other sharp instrument. Do this carefully to avoid damaging the surfaces or lifting the grain of the wood.

Colour Scheme

The top of the fuselage and the whole of the fin are painted white; the middle part of the fuselage, including the windows, is covered with a band of medium blue $\frac{1}{16}$in. wide. The lower part of the fuselage, main plane, engine nacelles and tail plane are all painted with aluminium paint. The window openings are painted black within the outlines already scored on the woodwork. The two bands on the fin are $\frac{1}{4}$in. apart, $\frac{1}{4}$in. wide and painted medium blue.

Two coats of paint are advised for all the above-mentioned work, a rub down with glasspaper being given between each coat.

Now for the lettering and other detail. First, the fuselage. The letters 'B.O.A.C.' are $\frac{1}{16}$in. high and coloured medium blue. These letters are best printed in the style and the position shown in the illustration, using an ordinary pen with a small quantity of specially-thinned paint. Give several coats, if necessary, to secure uniformity of colour.

A pen is also suitable for applying the nationality and registration markings (in blue) between the blue bands. The correct style of lettering is shown in the diagram. Above the blue bands on the fin appears the 'Speedbird' insignia also in blue and a miniature reproduction of the Union Jack flag.

PART LIST

(A) Fuselage—10ins. by 1$\frac{1}{4}$ins. by $\frac{1}{2}$in.
(B) Fuselage—10ins. by 1$\frac{1}{4}$ins. by $\frac{1}{2}$in.
(C) Fuselage—10ins. by 1$\frac{1}{4}$ins. by $\frac{1}{2}$in.
(D) Fuselage—3ins. by 1$\frac{1}{4}$ins. by $\frac{1}{2}$in.
(E) Main plane—11$\frac{1}{2}$ins. by 1$\frac{1}{2}$ins. by $\frac{1}{2}$in.
(F) Fuselage—5$\frac{1}{2}$ins. by 1$\frac{1}{2}$ins. by $\frac{1}{2}$in.
(G) Tail plane—4ins. by 1in. by $\frac{1}{2}$in.
(H) Fin—2ins. by 1$\frac{1}{2}$ins. by $\frac{1}{2}$in.
(I) Nacelle (4)—1$\frac{1}{2}$ins. by $\frac{1}{2}$in. dia.
(J) Propeller boss (4)—$\frac{1}{2}$in. by $\frac{1}{2}$in. dia.
(K) Stand—3ins. by $\frac{1}{2}$in. dia.
(L) Stand—4ins. by 4ins. by $\frac{1}{2}$in.
(M) Plastic discs (4)—1in. dia.

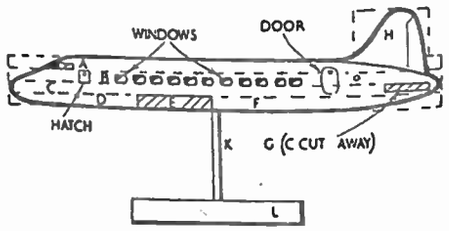
The nationality and registration markings also appear on the under surface of the port wing and on the upper surface of the starboard wing. These are in black, of similar style to that on the fin but in letters $\frac{1}{2}$in. high.

The part of the fuselage nose which lies between the blue bands and the underside of the cockpit windows is also painted blue.

When the paint and all the detail markings are quite dry and hard the model should be given two coats of clear varnish. It is not advisable to rub down between the varnish coats, but it is as well to do the varnishing in a dust-free atmosphere.

Mounting

The model is mounted on a stand consisting of a 4in. diameter circular block drilled to take a $\frac{1}{2}$in. diameter dowel 4ins. long—the stand is finished in the same way as the model except that it is painted black and left unvarnished. The fuselage of the model is drilled with a $\frac{1}{2}$in. hole $\frac{1}{2}$in. deep and midships just behind the main plane to accommodate the upper part of the stand. (277)



Side view of the model

AMATEUR MICROSCOPY

ABOUT MAGNIFICATION

ALL amateurs with a microscope are interested to know the extent to which their instrument magnifies. With a standard model of known eyepiece and known objective lenses, this question of magnification is a very simple matter. The standard microscope today measures 16cms. from the top of the eyepiece to the top (not the bottom) of the objective lens, or is so arranged that a draw tube can be withdrawn to a given calibration so as to give this exact distance.

The face of a sheep tick ×25

With this given distance of 16cms., and knowing your lenses, the magnification is as follows:

OBJECTIVE LENS		MAGNIFICATION	
English system	Metric system	with ×5 eyepiece	with ×10 eyepiece
1"	32 mm.	× 25	× 50
1"	25 mm.	× 32	× 64
$\frac{1}{2}$"	16 mm.	× 50	×100
$\frac{1}{4}$"	12·5 mm.	× 64	×128
$\frac{1}{4}$"	6·25 mm.	×128	×256
$\frac{1}{16}$"	4 mm.	×200	×400
$\frac{1}{8}$"	3.6 mm.	×224	×448
$\frac{1}{8}$"	3 mm.	×265	×530

If your microscope is fitted with a drawtube that will enable the distance between the eyepiece and objective lenses to be increased to 20cms., then the magnification is increased by 25 per cent, or if it is one of the older models with a long body tube, and accordingly 24cms. beteeen the lens tops, then the magnification is increased by 50 per cent.

But what if the power of the eyepiece and/or of the objective is unknown? If they are of standard size they can probably be compared with lenses of known power either on your own instrument or on a friend's, but if this is not possible there are crude methods that will give you an approximate degree of your magnification. Stage micrometers are obtainable consisting of a microscope slide with 1/1000in. and 1/100in. etched on the surface. Place one of these under your microscope, or place a steel ruler with 64ths (or 100ths) of an inch under your objective, heavily lighted from above by a strong electric torch or with light focused on to the scale by a strong magnifying glass. Now place a foot ruler on the stage of the microscope, but not under the lens and practice the following trick. Look through the microscope at the scale to which you have focused, with one eye, and look at the ruler not under the microscope with the other eye. You will soon be able to get a distance on the ruler that is equivalent to an exact measurement under your lens, e.g. 1/64in. under the microscope may equal $\frac{1}{4}$in. on the ruler. Then your magnification is ×16. Probably your 64th or 100th will not equal exactly $\frac{1}{4}$in. or $\frac{1}{8}$in. and you will have to do a sum accordingly to estimate the exact magnification.

When your calculations are complete and you have estimated the magnification, mount a single fibre of net silk. (It must be real silk, not an artificial or rayon silk) and look at this. Such a silk fibre is 1/2,000in. in diameter. Hair from the heads of adult human beings vary between being 1/1,000in. and double that thickness, so these can be used as a rough check by seeing to what size on your ruler they appear to have been increased by your microscope.

Once you have established your magnification, and tested it, everything goes in strict proportion. Thus, if you are using a $\frac{1}{4}$in. objective for your calculations, you double the magnification by changing to $\frac{1}{8}$in. objective, and double it again by changing to $\frac{1}{16}$in. Similarly you double the magnification by changing from a ×5 eyepiece to a ×10 eyepiece, yet as explained in a previous article clearness of definition is of more importance than magnification. There is also no point in seeking to go much beyond ×1,000 as the definition suffers accordingly with further increase of magnification, due to the size of the light waves we are using. Special instruments using ultra violet light or using electron beams instead of light rays exist which allow of magnification up to the order of ×50,000, but such instruments are hopelessly beyond the reach of the amateur.

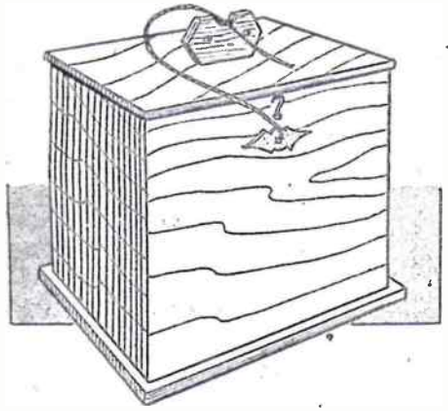
The head and foreparts of a flea ×36

With an instrument that magnifies ×15 to ×30 you have a microscope that will be very suitable for looking at insects. If it magnifies ×50 to ×100, it can be used to examine and identify textile fibres. At ×250 you can examine the scales on human hair or on wool fibres, whilst ×500 is all that is required for the examination of bacteria, but again we are getting beyond the scope of most amateurs, although some have instruments that are capable of such work. (223)

The foot of a bee ×32

Details for making

A PARCEL DESPATCH BOX



THIS useful article should find a place in every household, as the necessity of packing parcels and packets often arises. In the box are contained the string, gummed labels, and labels of the tie-on variety, all ready for use, with the parcel postage rates of the moment written on a card pinned to the inside of the lid. A string cutter is fitted to the centre of the lid, and thus everything, except the wrapping paper is to hand.

For making the box, three-ply is suggested. Sizes of the sides and ends of the box are given in Fig. 1. A good joint to use in fitting together is the lock joint, a little more trouble, perhaps, in marking out and cutting than the common butt joint, but resulting in a neater effect.

Marking Out

To mark out, first run lines down near the edges, $\frac{1}{4}$in. away, or whatever the thickness of the plywood may be. Divide each into five equal parts of 1in. each accurately, then pencil with a cross each part that is to be sawn out, as in Fig. 1. Saw out inside the lines, in all cases, then a close fit should result when sides and ends are fitted together. The tenons at the bottom of each part should also be $\frac{1}{4}$in. deep. From the plywood cut the top and bottom of the box. These parts should be a $\frac{1}{4}$in. larger than the box each way.

In the bottom, saw out mortise slots to fit the tenons. Rest here to fit the box temporarily together, lay it central on the bottom, and pencil round the tenons. See a good fit results. Now glue the box together, glue it to its bottom piece and lay aside for a few hours for the glue to harden. When quite hard, shave off any projection at the corner and give the whole a glasspapering all over, especially the cut edges of the bottom.

Inside the box a divisional piece is to be fitted across near each end, to form the compartments for holding the gummed and tie-on labels. These pieces are shown in Fig. 3. Cut two of them and saw their top edges to the shape shown. They should be a close fit across the box. Cut four of the narrow strips shown, glue these inside the box, where seen in the detail sketch, Fig. 2. Then glue the divisional pieces to them, and fix securely by gluing strips of triangular fillet in the angles. The fillets can be easily planed up from any odd pieces of deal available.

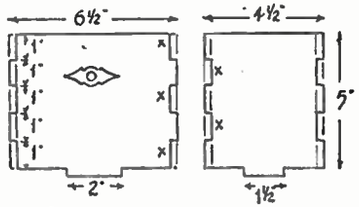


Fig. 1

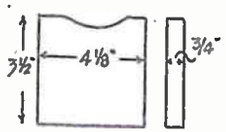


Fig. 3

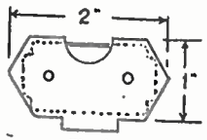


Fig. 4

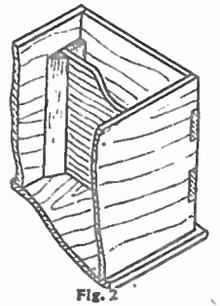


Fig. 2

In the front of the box, a hole for the string to emerge from is bored. This should be large enough to allow the string to pass easily, and should have its rough edges, inside and outside the box, glasspapered to smoothness. The hole can be marked by gluing over it an overlay, cut to the pattern shown in the finished sketch of the box from a scrap of fretwood. The overlay is, obviously, quite optional, but it does add a finishing touch to the whole. If this is included, it might be glued on before the box is fitted together, in the flat, for instance.

Clean up the top of the box, and slightly round the edges with glasspaper. In the centre cut out a mortise slot, 1in. long and $\frac{1}{4}$in. wide, full, for the string cutter to fit in. Now hinge the top, as a lid, to the box, with a pair of $\frac{1}{2}$in. brass hinges. At the front fit a hook and eye fastener. As plywood is not too suitable a wood for fitting small hinges in the usual manner, the top could be of the 'drop-on' variety, an inner rim being glued to it underneath to keep it in place, and a hook and eye fastener fixed at back and front to keep it there.

The string cutter is shown at Fig. 4. It consists of two pieces of the plywood, cut to the shape shown, with a 1in. by $\frac{1}{4}$in. tenon at the bottom of each. These parts are screwed together, sandwiching a razor blade between (as shown by the dotted outline) as the actual cutter. Position the two screws so that they pass through the outer holes of the razor blade and fix it securely. Now glue the cutter to the lid of the box.

An article of this description could be left plain, but, unfortunately, plain wood soon soils, and it is better to varnish it as a suitable finish. The overlay, if added, could be stained to show up better, unless cut in a darker wood, when the staining would be unnecessary.

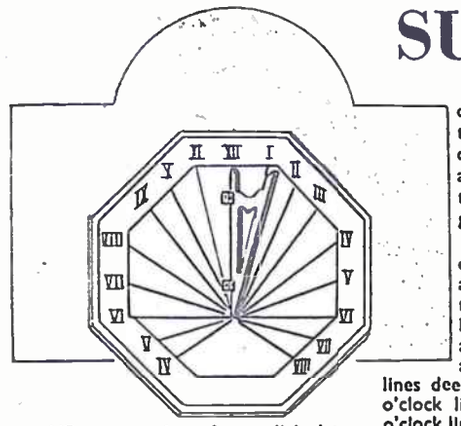
Finish

To finish off the box, write or print the latest packet and parcel post rates on a piece of cardboard (a postcard would suit), and pin with drawing pins to the underside of the box lid, or alternatively cut off the appropriate cover of a book of stamps, if up to date, of course, and fasten to the lid with a spot of glue at each corner. Furnish the box with a ball of string and supply of gummed and tie-on labels to complete.

A piece of $\frac{1}{4}$in. plywood, 1ft. 8ins. long and 1ft. 4ins. wide will be sufficient material for making the article. (258)

To be ready for the Spring, start now making a

SUNDIAL PLATE



THE construction of a sundial plate to your own locality is no difficult job, and an interesting one as well. Plates are normally made of metal or slate, and the latter material has been chosen for this article as being easier to work and much cheaper. Metal, however, is necessary for the gnomon, but the amount is trifling and no difficult work is required, beyond what the fretsaw can accomplish.

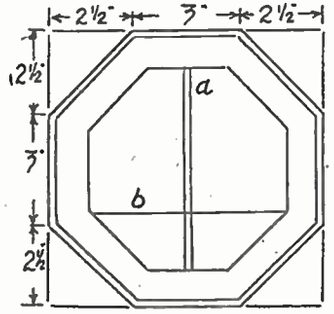


Fig. 1

A sheet of slate with a prepared surface is needed for the dial, and to save labour over this part, it is suggested that a school slate, of large enough dimensions be obtained. Remove the frame, which, of course, will not be wanted, and cut the slate to 8ins. square. From the pattern given in Fig. 1, mark off the edges at the points shown, and draw with a common slate pencil, the octagon. Saw off the corners to complete this shape, and grind the edges smooth by rubbing them over a stone with sand and water. For the job of sawing a hacksaw will do nicely.

On the prepared dial plate, mark off, again with slate pencil, the inner octagon, about 1in. inside the edges, and the outer octagon, some $\frac{1}{4}$in. from the edges. Down the centre draw parallel lines (a) a distance apart equal to the thickness of the metal employed for the gnomon.

These lines we can call the 12 o'clock line, and across these, at one-third distance up from the bottom, draw line (b), this is the 6 o'clock line. Now, with a sharp steel pointed tool and a straightedge, scribe these lines deeply in, the scribing of the 12 o'clock lines stopping short of the 6 o'clock line.

A pattern on thin white paper must now be prepared. First draw the rectangle shown in Fig. 2. From centre (C) draw a line across, and from the same centre, set off the radial lines shown at 15 degrees apart. A protractor will do this easily. From corner (f) draw line (f-g) at (d) angle from (e-f) equal to the complement of the angle of latitude of the town you reside in. The complement is the difference between the angle of latitude and one of 90 degrees. The latitude of any town can be ascertained from an atlas. That of London being 51½ degrees, the complement will be 38½ degrees.

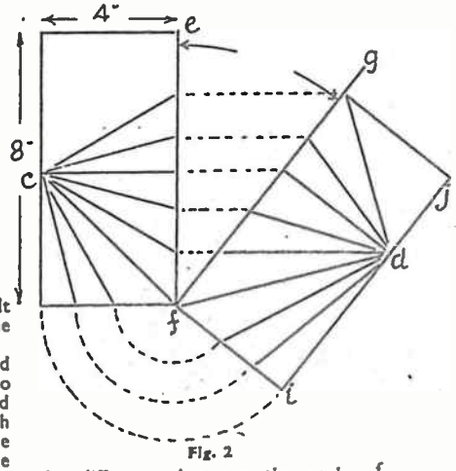


Fig. 2

Where the radial lines contact (e-f), extend these to line (g-f) and (f-i), then draw (g-j) and (j-i) to complete the second rectangle. Extend these lines to centre (d). Cut this second rectangle out, the line (d)—(extended from centre C) is the 6 o'clock line, and line (i-j), the 12 o'clock line. All represent the hour lines of the sundial, and must now be transferred to the plate through carbon paper.

Do one side at a time. Lay the pattern on the slate, with 12 o'clock and 6 o'clock lines touching those on the plate, as in Fig. 3. With carbon paper beneath, trace the hour lines through. Remove pattern, reverse, and similarly trace the hour lines on the opposite side. Now heavily scribe the lines with the steel point, stopping short of the inner octagon, as shown in Fig. 3. This practically completes the plate, leaving only the metal gnomon to be cut out and fitted.

Gnomon from Metal

It is essential that the gnomon be made from stout metal sheet. Any non-rustible metal will suffice, brass would suit nicely, at least $\frac{1}{16}$in. thick, as it needs to be sturdy—not liable to bend or break if accidentally knocked. A pattern for it is given in Fig. 4. The shape is optional, but the angle should be that of the latitude you live in.

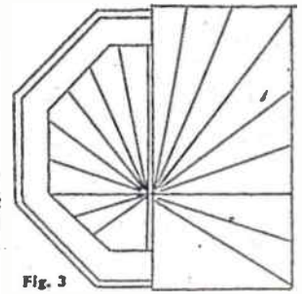


Fig. 3

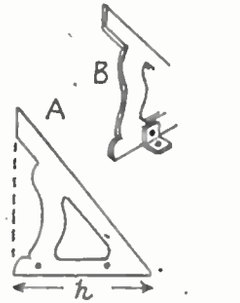


Fig. 4

(Continued on page 330)

Here's how to set about

DRILLING SQUARE HOLES

TO some people the title of this article may appear somewhat crazy. We are all familiar with the drill and its capacity for making circular holes, but when it comes to drilling a square hole we are rather dubious about believing this statement.

Workshop Practice

It is, however, a genuine workshop practice that has been employed in the engineering world for very many years. When doing metalwork or for model-making it often happens that we require a square hole made part of the way through the material. It is easy enough to make a hole right through but when a stop must be made half way the job appears more difficult.

To drill a square hole is practically as easy as drilling an ordinary round one and the job does not take much longer.

Triangular Shape

The drill which is shown in Fig. 1 is triangular in shape, and can easily be made from a piece of round tool steel. In order to cut a perfect triangle, the piece of rod must be about ⅛in. larger than the hole it is to drill. Fig. 4 is an exact scale drawing showing how large a rod is needed in order to obtain a perfect triangle from it.

We will assume that you wish to make a hole ¼in. square. Therefore, in order to make the side of the triangle exactly ¼in., the drill must be made from a rod about $\frac{5}{16}$in. in diameter—it does not matter if it is a little larger than this, but it must not be smaller.

Shaping the Rod

File or grind the rod to shape, and the length to be cut will depend on the depth of the hole, but ½in. to 1in.

Fig. 1

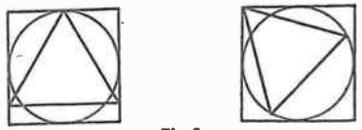


Fig. 2

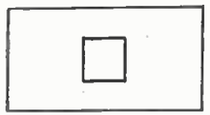


Fig. 3

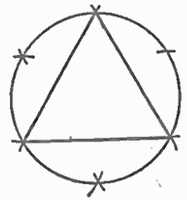


Fig. 4

Guide Piece

A guide piece is now needed, and this is a piece of hard sheet metal with a square hole in it, as shown in Fig. 3. The square is made the same size as the side of the drill (in this case our hole is to be ¼in.).

This guide piece is securely clamped where the square hole is needed and a round hole first drilled to the full size (⅛in.) and the full depth that is needed.

Now put the triangular drill into the drillstock and carefully bore out the hole, using a medium pressure and also speed. You will find that the drill will wobble somewhat as it does its work.

How it Works

By carefully studying Fig. 2 you will see how the sharp edges of the drill are forced into the corners of the guide piece, thus cutting a perfectly square hole.

Any other size hole can be drilled—just remember that the side of the triangle is the same size as the square that is needed. (296)

MAKING A SUNDIAL PLATE

(*Continued from page 329*)

A good plan here is to draw the gnomon on thin paper, and gum it to the metal. It can then be sawn to shape easily enough with a hacksaw. The curved parts can be cut with the fret-saw, using a metal cutting blade for the job. Care should be taken not to attempt to hurry the work, or the blade may overheat and snap. File off rough edges and soak the pattern off the metal.

Fixing the Gnomon

For fixing the gnomon to the dial plate, small angle brackets of sheet metal are used, as in detail (B), suitable holes being drilled both in the brackets and gnomon for the purpose. Small brass bolts and nuts will do for the fixing. Place the gnomon in position on the dial plate, with its pointed end touching the 6 o'clock line, and scribe round the holes in the angle brackets to mark their position on the slate. Remove, and drill the holes in the slate. An ordinary drill and bit will do the job, but the bit should be frequently lifted out of the hole and the dust blown away.

Scribing the Hours

Before fixing the gnomon on permanently, the numerals for the hours should be scribed plainly opposite their respective hour lines. Reference to the general view of the sundial will show how these are arranged on the dial. Using roman figures, it is no difficult matter, with a steel point and straightedge to make a neat job of this part. Then the gnomon can be firmly fixed in position. To make the hour lines and numerals stand out more clearly, rub thick white paint over them and wipe away all surplus with a rag. Enough of the white will remain in the lines for them to be read plainly.

Fixing the Dial

To fix the dial to its pedestal, cover the top of the latter with a ¼in. layer of cement mortar, and press the dial on, with tip (A) of the gnomon pointing due N. A good plan is to draw a chalk line, indicating due N., across the top of the pedestal, and a line also on the dial, as an extension at top and bottom of the gnomon. Fixing then is much easier, as it is only necessary for the lines on dial and pedestal to coincide. The mortar must not, of course, obscure these lines. (205)

Be Sure to Read the Note on page 327. It's important.

DESIGN NO. 2938

Completing the Model Lifeboat

(*Continued from page 322*)

Now make the stem-head cleat (R), which is positioned in the centre of the deck forward of the front cockpit (see piece (E) on the design sheet). The cleat is made up of a piece of ⅛in. rod, with a length of wire run through it, and a small card base. A drawing of the completed fitment is shown on the design sheet.

Next, the larger ventilators (S) are made. There are four of these, and they are cut from ¼in. wood and shaped as shown. Two are glued to the top of piece (I), and two to piece (D) (see the dotted lines on the design sheet in each case).

The small coaming piece (T) situated on the forward slope of the front cockpit can now be cut from thin card, and glued into position as shown by the dotted line on piece (G) on the design sheet. Also positioned on the forward cockpit are the port and starboard lights (U). Each is made up of thin card as shown, with a small piece of wood or a blob of glue fixed in position in the angle of the fold. The wood or glue represents the actual light, the card itself forming guard pieces such as those installed on all vessels to prevent the different coloured lights from being seen from any position other than ahead or abeam. Glue the lights into position as shown on the design sheet.

The Searchlight

Fitting (V), the searchlight, is the next to be made. It is shaped up from a piece of ¼in. wood and a short length of wire, and positioned in a hole drilled centrally on the top of the forward cockpit (see piece (G) and the side view on the design sheet).

Now construct the funnel (W), made up of a piece of ¼in. wood shaped to the section shown and a cap of ⅛in. wood shaped and rounded. The completed fitment goes into position as seen on piece (I) on the design sheet. Two guard pieces (X) are made next from thin card, and painted as shown, before being glued into position on the deck, as seen on piece (C). The small stern cleats (Y) are now shaped up from ⅛in. wood, and glued into position to either side of the rear cockpit coaming (see Fig. 1 and the side view).

The backrest for the helmsman is made from three pieces of wire and a piece of thin card, as detailed on the design sheet, and placed into position immediately in front of piece (I). Next shape up the capstan, and glue this to the starboard side of the front cockpit (see side view), and then make the lifebelt, which is fixed centrally to the top of the rear cockpit.

Four handrails are now made from wire, bent to the shape shown on the design sheet and sharpened at their ends so that they can be driven into position. Two are placed either side of the front cockpit, and two either side of the rear cockpit (see Fig. 1 and the side view).

Also made from wire are the fore and after masts. The spars near the tops of each should be soldered or bound to the masts, and the shaped piece running half way up the fore mast is secured in a similar manner. A hole is drilled in the front cockpit (see design sheet) to

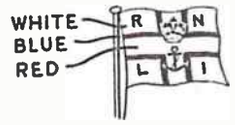


Fig. 6

receive the fore mast, and the rear mast is positioned in a hole drilled in the well of the rear cockpit.

The stanchions placed at intervals round the edges of the deck are made from the wire supplied in the kit, or from pins. Their sizes and positions are shown in the side view, and they should be placed about ⅛in. in from the extreme edge of the deck. When the stanchions are firmly fixed, the guard rails can be glued into place. These are made from thin thread which is tied or glued round each stanchion. One rail runs round the stanchions near the tops and the other half way up. Reference to Fig. 1 will make this clear. Now glue a strip of thin card about ⅛in. wide all round the outer edges of the stanchions and standing upright on the deck. Note from Fig. 1 that these coaming strips on either side of the vessel do not meet at the stern.

Fixing the Fender

The next job is to fix the fender which runs right round the vessel just below the level of the deck. String of the thickness used on tea packets will be about right for this job, and it should be glued firmly in place at an even distance from the top of the deck as seen in Fig. 1. Complete the fender by attaching thin cord in loops round the outside except for the stern. The general layout of these loops can be seen in Fig. 1 and the side view. To make the large fenders on the bow and stern, small pieces of cloth should be wound around a knitting needle, pulled off in a roll and bound with thread at each end. They are then glued round the bow and stern. Their finished appearance can be seen in the illustrations.

It is now time to rig the vessel. As there is a minimum of rigging, this is an easy task, and the positions of the lines, radio aerial, etc., can be seen plainly in Fig. 1. To complete the work of construction, make the anchor as shown on the design sheet and fit it in place (see side view), and then make little coils of rope from thread which can be laid about the deck to give the vessel added life.

The lifeboat can now be mounted on its permanent base unless it is to be used in some sort of scenic layout as mentioned earlier. Those who purchase a kit for this model will find in it a small panel 9ins. by 4ins. by ¼in. and this in its entirety is used as the base piece. It can be finished in any way to suit the modeller; i.e. stained and polished, or built up with plaster of paris to represent a sea. Details of making such a sea have been given in earlier articles in *Hobbies Weekly*.

Alternatively modellers can use the same scheme as detailed in the recent article on making the model of the 'Discovery'. This entailed using a piece of cellophane paper which was glued to the base piece, itself coated with glue, and the model placed upon it while both glued surfaces were still wet. By placing the model slightly back from its actual position and pushing it forward to its final resting place, a wrinkling of the cellophane was occasioned, giving a life-like impression of ripples running round the bow to the stern. Before being coated with glue, the base piece was painted dark blue.

Painting and Finishing

When the method of mounting has been decided and completed, the job of painting and finishing the craft can be commenced. The main colours are as follows: bottom, white; topsides, lifeboat blue (Oxford blue, British Standard colours); fender, vermilion red; cockpits, varnished (light brown); masts, light brown; funnel, buff with a black top; ventilators, yellow ochre to imitate brass; deck, rough grey; guard rails and stanchions, aluminium to appear as galvanised; gratings, coamings, spars, etc., varnished (light brown); rear haul-up cleats and stem head fitting, yellow ochre to represent brass. Details such as the portholes seen in Fig. 1 can be added in black and fittings not mentioned should be varnished light

(*Concluded overleaf*)

An 'old hand' compiled these hints

FOR ALL-WEATHER CYCLISTS

WHEN riding in wet weather the cyclist needs adequate protection for body and legs. Some new riders may fight shy of a wet journey; but provided they don suitable clothing and make themselves weatherproof, they can defy the elements, even though it rains 'cats and dogs'. This applies more particularly to all those who are compelled to ride a bicycle daily in all sorts of weather.

The usual outfit for cycling in the rain consists of poncho or cape, cloth cap or sou'-wester, gaiter leggings—usually carried, when not in actual use, in a neat container. Pay as good a price as you can afford, and your outfit will serve you well. Capes should be made of non-cracking, non-sticking, and non-tearing material; see you get it when buying. And what applies to oilskin capes goes for oilskin leggings and overalls.

A cape should always be fully-cut—so that it comes well down over the handlebars, with a full skirt and a deep storm collar, and with thumb loops. A skimpy skirt that fits too tightly over the handlebars when pulled down over the grips restricts correct steering. Or, if the rider finds his cape too short to cover the handlebars, and allows it to be free, it 'bellies' out behind in the wind, and does not afford full protection from the wet. Choose a cape carefully.

Protecting the Legs

A cape, whilst protecting the back and shoulders, leaves the lower part of the body exposed to every trickle dripping from the skirt of the cape, and the rider soon grows uncomfortable. It is wise, therefore, to protect the nether limbs with leggings or gaiters.

Cycling spats are quicker to get into than ordinary leggings and are not so warm to ride in. They can be slipped on and off in a jiffy, and yet they serve their purpose. And they are kinder to that lovely crease in your well-pressed trousers, if you cycle to the office in all weathers.

Shoes for cycling in wet weather should have strap-over fronts; they will keep out much of the wet that is sure to find a way into your shoes. Cold feet in winter can be prevented to some extent by wearing a pair of silk socks beneath the usual cycling stockings. Both shoes and stockings should be tight-fitting if you would keep feet as warm as possible in cold, wet, and windy weather.

Riding for a long time clad in a full rig-out of such protective clothing may cause the rider to perspire freely, especially in mild weather conditions, and it is not a bad plan to take off jacket or pull-over and ride in shirt sleeves under the cape—you can roll or fold up the garment and tuck it away in your cycle bag, replacing it when you arrive at your destination.

Some new riders may feel chilly and uncomfortable—even miserable—if their hands and wrists are exposed to pelting cold rain; if so, it is sensible to carry a pair of mitts—these are warmer than gloves with separate fingers, and are easily slipped on when it starts to rain, as you are riding.

Efficient Mudguarding

The wet-weather outfit, when not being worn, should be folded up and packed into the cycle-bag or in a container strapped to the machine; if the new rider possesses no proper container or bag he may roll up his outfit in a wrapping of waterproof material before strapping it on the cycle, remembering that oil and grease are enemies of rubber and oilskin.

Mudguards must be effective to be of any good. There are various kinds of side-shields, mud-splashers, or mud-flaps to be had, made of oilskin or celluloid. It is not necessary to fit the oversize mudguards that were at one time popular for use on machines used for work or riding to business; it is more important to make sure they are rigidly and centrally fitted on. A good-sized mud-flap to the front guard protects your feet from getting wet—it also helps to keep your shoes clean!

Efficient mud-guarding makes a lot of difference to one's comfort when riding in the rain.

Other Items worth Remembering

Always take precautions against rain in every way; it is easy to contract a chill if you get soaked to the skin, and cannot get your clothes dried immediately.

Some cyclists take no harm riding bare-headed in rain and sleet—a brisk towelling when their destination is reached and they are all right. But others may have to be careful and wear a soft tweed hat or cap, though some may prefer an oilskin sou'wester. Cyclists who need to wear glasses require a hat or cap with brim or peak to afford some extra protection—glasses blurred by wind-driven rain obscure the outlook.

An old cyclist's advice is—always carry a set of lightweight oilskins and a sou'wester during unsettled weather, and slip them on if the Weather Clerk turns on the tap when you are miles from your destination. It is foolish to be caught in a storm without some protection. However, if you have been remiss and have no protective garments with you, and it is raining when you have to leave your office or factory for home, remember that newspaper pushed down inside your trousers to the knees will keep a good portion of your nether limbs dry.

As to the machine, never omit to clean it after a journey in the rain, and keep all bearings well oiled. (292)

PAINTING THE LIFEBOAT MODEL

(*Continued from page 331*)

brown where appropriate, or painted yellow ochre to represent brass if they are metal. The lights should be coloured red (port) and green (starboard) and their guard pieces matt black.

The Flag

Details of the R.N.L.I. flag are given in *Fig. 6*, and a representation of this flag should be painted on the bows as shown in the side view. The cross is bright red, surrounded by a blue border, shown solid black, and the crown and anchor are lined in white. The background of the flag is white. For convenience, modellers might wish to paint them on paper first, and then cut them out and glue them into position.

The name of the vessel, e.g. 'Cromer Lifeboat' is painted on the stern (see the illustration). Those who have mounted their model on an imitation plaster sea, or by the cellophane method mentioned, should now paint the sea appropriate colours. Dark blue with touches of light blue here and there will be found to give an adequate representation of water, and the tops of the ripples or waves around the vessel and of the foam in the wake should be coloured white.

Photographers — recognise these

Snapshot Faults

A SPOILT negative or print should never be thrown away until it has been given a thorough examination and the exact cause of its failure discovered, if possible.

By continually doing this your knowledge of photography will steadily grow, and so by hardly noticeable steps the pictures you take will improve—for once able to spot the various troubles they will be instinctively avoided in the future.

To help these 'courts of inquiry' therefore, given here is a list of the more usual causes of failure, also the symptoms by which they can be recognised—and the remedy, if any.

Fig. 1—The sort of print given by an under-exposed negative

The troubles can be recognised in either the negative or print, but it is best for the beginner at least to always study the negative as this prevents him being led astray by what is merely a poor print from a good negative.

As first on our list let us consider:

Under Exposure. This means that the time that the lens was open was too short and the light did not act on the film for a long enough period. Under exposure can be recognised by an absence of detail in the shadows. In bad cases only the sky and one or two high-lights may have affected the sensitive emulsion—the rest coming out as clear gelatine. Prints from this sort of a negative have a 'soot and white-wash' appearance. In not too bad cases a more pleasing print can be obtained by printing on a 'soft' grade of paper which does not make the shadows so black. Fig. 1 shows how under exposure appears in the print.

The opposite of this trouble is *Over Exposure.* Here the negative is full of detail everywhere, but is 'flat' and without contrast. As the over exposure gets worse the negative becomes flatter and more lifeless till in very bad cases the image may disappear altogether.

In mild cases, printing on a 'vigorous contrast' paper will help, or the negative can be cleared by putting in a solution called 'Farmers Reducer' which can be bought at any dealers in tabloid form with instructions for use.

Development

If your negative has good detail but is weak all over it has been *Under Developed.* Printing on very contrasty paper may solve the problem here but a great improvement is made by 'intensification'. The solution for this can again be bought in tabloid form. The negative is put in the solution, where it bleaches. It is then washed and put back in the developer when it comes up much darker than it was originally.

Over Development is indicated by the negative being very dense and contrasty and the result again is a harsh 'soot and whitewash' print. Unlike under exposure however, the detail is all there, hidden away in the clogged areas and may be recovered by putting the negative for a short time in what is known as 'Persulphite Reducer', once more obtainable from the dealer with instructions. But you may get quite a good print by using a soft contrast paper.

Another fault you should recognise is *Camera Shake.* This is shown by the whole image being blurred, but upon close examination it will be seen that the blur is in one direction only, as though the picture had slipped. It is caused by

Fig. 2—A picture spoiled by being out of focus

not holding the camera steady while pressing the trigger. There is no cure for a negative so spoilt, but practise working the trigger gently without any jabbing action.

If the whole image is blurred in a general all-over manner, the picture is *Out of Focus* (see Fig. 2), that is to say the lens was not quite in the right position for the range of the image. There is no cure, but practise judging distances so that you will be able to set the scale more accurately. If your camera is of the 'box' type (which has no focusing scale) you have probably had the subject too near.

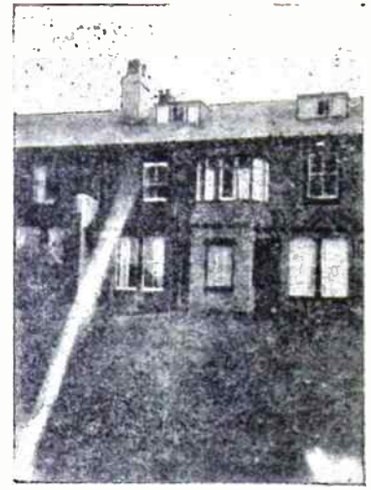


Fig. 3—A case of 'corner fog' produced by a faulty dark slide

Fogging

When dark cloudy areas appear on the negative or corresponding light areas of the print, the film has been *Fogged.* There are several variations of this trouble.

When the patches of fog are along the top and bottom edge of a film it is because the rolling has not been tight enough. If it is in the form of strips, light is probably getting in through a loose corner in the back, or if you are using plates, from the corner of a holder. Fig. 3 is a typical example of 'corner fog'.

If the fog is general all along a length of film the trouble is that the light you develop in is not safe—get a deeper hued glass, therefore, or work much further from the light and shield the film as much as possible.

Sometimes folding bellows develop little holes and fog the film. To test, take camera to some dark place, take off the back and insert a bright torch. Stretch the leather and the offending point will be found. Repair with a strip of adhesive tape.

Clear Circles on the Negative are caused by bubbles forming on the surface of the film while it was being developed. In the future, well wet the roll before putting it into the developer.

If the *Density is Uneven* it is generally due to the temperature suddenly changing as the film was drying or by the film being turned and hung the other way up while half dry. If areas of unevenness are clear cut, then the material has not been fully immersed in the developing solution.

Mottled Surface. This occurs only with plates and is the result of the plate being left too long in the developer without rocking.

Fig. 4—The 'toppling backwards' effect brought about by tilting the camera

Houses, etc., look as though they were Falling Backwards (see Fig. 4). This comes about by pointing the camera upwards, instead of keeping it dead level. If you are taking anything tall like a monument or building it is generally hard to get the top in. The tendency then is to point the camera upwards, but this gives the unnatural appearance shown. The only remedy is to go far enough back to get all the subject in without tilt and then have an enlargement made later to obtain a picture of decent size. Incidentally, on more complicated cameras, what is called the swinging front allows of pictures being taken quite close in without the 'falling back' look.

Question of Time

Too Slow Shutter Speed. Here the picture in general is in good definition but some moving figures alone are blurred (Fig. 5). This is because while the camera was focusing quite well on the scene, the shutter was travelling too slowly to 'arrest' the action in the figures. In other words, they moved a little on the film while the shutter was open. There is no cure for this, but it can be greatly stopped with slow-shutter cameras by taking things coming towards you and not across the field of vision.

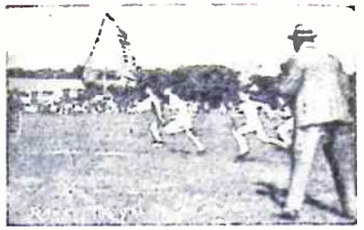


Fig. 5—Shutter speed too slow to arrest movement of the runners

Well, there you get some of the main faults of a photograph and how to recognise them, but one final word. Do not be too hasty in throwing away even apparently spoilt negatives—unless very hopeless. The storing of films at least cause little inconvenience, and it is quite within reason that later, as your skill increases, you will see possibilities in negatives that you now consider absolute failures. (216)

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