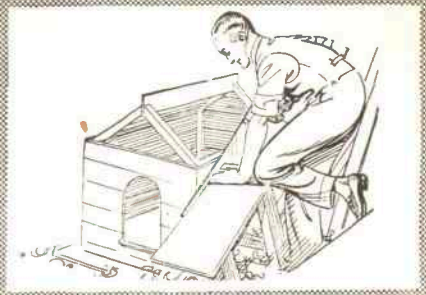
58th YEAR OF PUBLICATION

MAY 6th 1953

Hobbies WEEKLY



VOL. 116 NUMBER 3001

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Specially designed for Hobbies by

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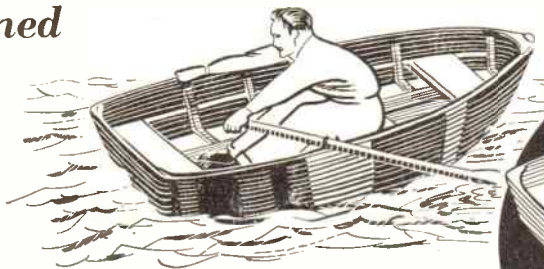

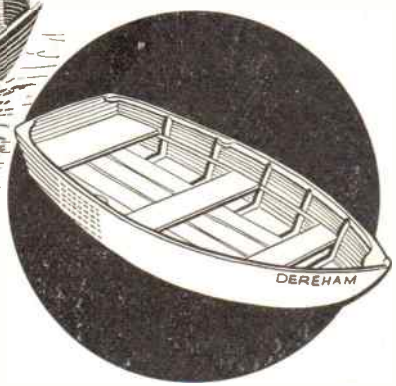

'DEREHAM'-a 10ft ROWING DINGHY

THIS little craft is designed to take advantage of modern materials so that it is light enough for two to lift yet capable of carrying a good load. Construction is fairly simple, and the enthusiastic woodworker should find it an interesting project well within his capability and within the range of his ordinary tool kit. The boat is suitable for use on river or sea, and it may be propelled by oars or a small outboard motor. It will comfortably carry a crew of three with all of their kit for a camping cruise.

Main Framework

The main framework can be made of various woods. Oak will make a strong, but rather heavy boat. Mahogany, or a similar Empire hardwood, will look smart and be much lighter. The lightest boat will have a spruce or other softwood framework. Oak is the best wood for the external rubbing parts. The sides and bottom are plywood. This must be of a marine grade (B.S.S. 1088) which is bonded with a synthetic resin glue, instead of an ordinary glue, which will not stand dampness. All of the parts are assembled with synthetic resin glue, such as Aerolite or Casco-resin. Much of the construction is done with brass screws, but for economy copper boat nails can be used in place of many screws.

Worthwhile Practice

There are a large number of screws or nails to be driven, and some practice on scrap wood is worth while. A clearance hole should be drilled with a twist drill in a wheel brace through the outside piece, then a hole made with a bradawl or smaller drill in the inside piece (Fig. 1A). There should be no need to countersink the hole as the screw head will usually pull in flush. Copper nails

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THE MAGAZINE FOR MODELLERS, FRETWORKERS & HOME CRAFTSMEN

are soft and in most places an undersize hole must be drilled, otherwise the nail will bend. Some nails are driven in the ordinary way, but where thin parts are joined, the nail goes right through and is clenched (Fig. 1B).

Synthetic resin glue is supplied as two parts—the glue proper and a hardener. In some cases you put the glue on one surface and the hardener on the other. In other cases the two are mixed just before use. Joints must be adjusted and screwed or cramped within the time given in the instructions and left several hours to set. Adjusting and setting times vary with different hardeners, but details are supplied with the glue.

The boat is built upside-down on the floor. Ideally, the floor will be flat and

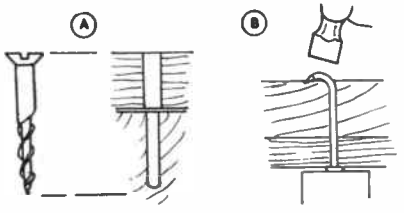


Fig. 1

made of wood, and there will be plenty of space to walk around the boat. Although there are five frames in the boat, it is erected on two frames with the transom and stem, then the other frames put in later. Start by making frames 3 and 5 (Fig. 2A). The sides are extended to rest on the ground and there is a temporary cross-bar at gunwale level. The sides and bottom overlap and are glued and screwed. Check that the frames are true by measuring diagonals. The stem (Fig. 2B) is also extended to the floor. Cut it to the taper and bevels shown, but it will probably need trueing a little with the plane during erection.

Solid Transom

The transom (Fig. 2C) is intended to be made of solid wood. It will look well in varnished mahogany. Elm is another wood obtainable in wide boards. Alternatively, ⅜in. plywood may be used, with its edges stiffened by strips. The sizes shown are to the outside and ¼in. should be left on the sides and bottom to allow for planing the bevel. The two legs are screwed on temporarily to support the transom during erection.

The truth of the boat depends on the accuracy of the transom, stem and the two frames. To avoid the risks of error in marking out by scaling up and measuring, readers are advised to get the full-size drawing which shows these parts and other details actual size and with bevels indicated (see panel on this page).

Draw a straight line on the floor and mark the position of the various parts

PLANS SERVICE

A Full-size Detail Drawing is available, showing the main frames, transom, stem and other parts. This greatly simplifies construction and ensures accuracy. It costs 8s. 6d. post free from the Editor, Hobbies Weekly, Dereham, Norfolk.

The designer is the owner of the copyright in this design, but amateurs may build craft for their own use. The designer will answer boating queries if he is addressed c/o The Editor, and a stamped addressed envelope is enclosed.

(General Drawing A) on it. At these points draw lines across at right angles. Erect the parts in position, by nailing blocks to them and to the floor. Put a temporary lath across to hold the parts rigid (Fig. 3A) and use struts if necessary. Hang weighted strings from the stem and transom to get the bevels right. In a similar way check that the frames are upright. Bend a lath over the frames on to the transom at various places, and plane the edges of the transom to the correct bevels.

Bend the chines into place. They fit into the notches on the transom framing and frames 3 and 5. At the stem they are bevelled to fit against the sides of the post. Glue and screw in each place. Work the two together, doing similar jobs on alternate sides in turn. This rule applies to most work on the boat, as it is unwise to leave it with unequal strains which may cause distortion. Fix the gunwale strips in the same way. When the glue has set, plane the sides of the frames to match the strips and the edge of the chine to match the bottoms of the frames.

Dealing with Plywood

Although plywood is made in large sheets, shorter pieces may have to be accepted. In this case let the joints in the side come aft and that in the bottom forward. The neatest joint comes over a frame (Fig. 3B). Thicken the frame by gluing and screwing on a strip. Let the plywood panels meet in the centre of the thickness of this edge. Joints can be made away from a frame by using a cover strip (Fig. 3C). This is cut to fit between the chine and gunwale, and the parts are joined before bending into shape.

With help the plywood pieces can be bent and held in place while their shape is marked. Alternatively, bend stiff brown paper into place and use that as a template. Make the sides first. Cut them about ⅛in. too big all round. Put a side in position and fix it with a few screws at key points so that it fits closely to the framing. Mark the shape of the framing on the plywood, then remove the screws. Coat the edges of the framework with glue and put hardener between the pencil lines on the plywood. Quickly assemble the parts and replace the key screws. Look for any points where the plywood springs away from the framing and cramp it together. Work all round,

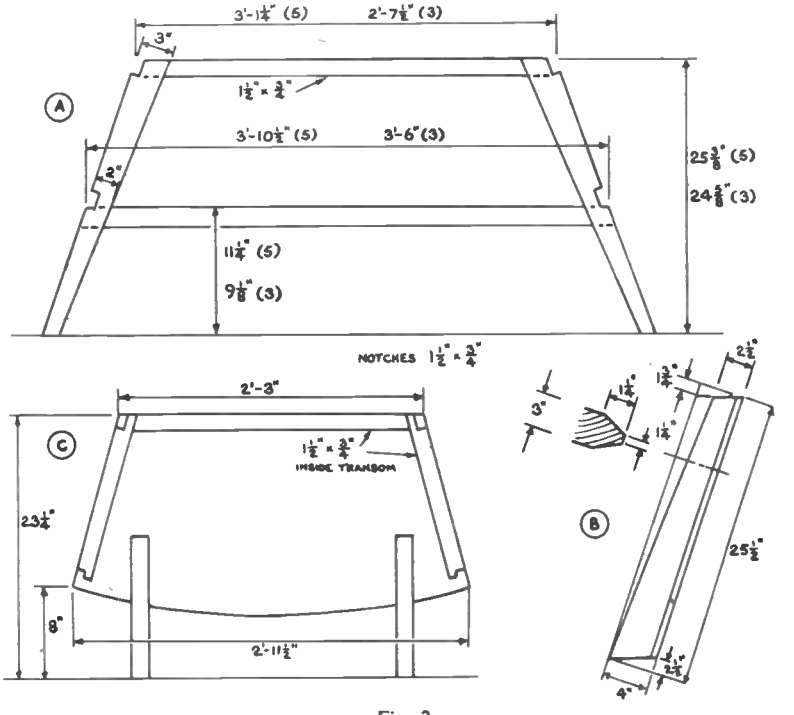


Fig. 2

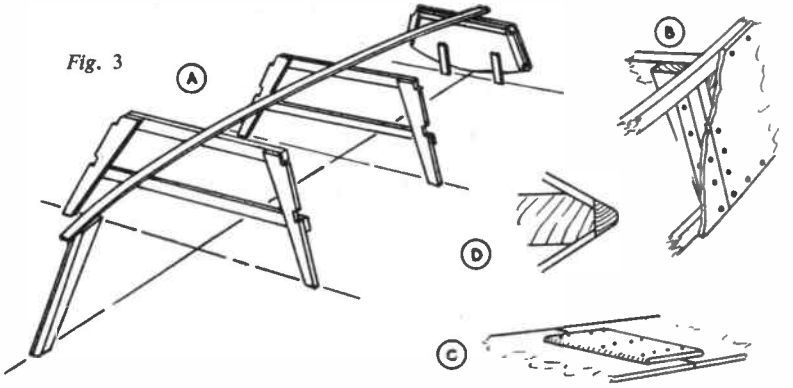


Fig. 3

screwing with ¾in. by 5 gauge screws, first at 6in. intervals, then in between so that screws are finally spaced every three inches. If nails are used, drive them right through and clench. If the work is systematically tackled, a panel can be fixed within the adjusting time of the glue.

Fix the other side in the same way. Plane the edges to match the chine. Mark the positions of the other three frames on the inside of the skin, keeping them parallel to the existing frames. Make and fit these frames, by measuring the actual job. If plywood panels have to be joined on one of these frames, the frame sides can be fitted before the plywood sides.

The General Drawing appears on page 95

The Bottom

Fix the bottom in the same way as the sides, except that screws should be 1in. by 5 gauge if the framing is hardwood, or 1¼in. by 5 gauge if it is softwood. If nails are used, make every third fastening a screw, and fix these first, then drive 1¼in. nails without clenching. Keep all fastenings along the chines far enough from the edge to allow for bevelling to take the chine rubber.

At the stem plane the plywood flush with the post and fix a false stem in front (Fig. 3D), giving it a slight curve in its length for the sake of appearance. Plane a bevel on both chines and screw on a half-round rubbing strip, well bedded in glue. Turn the boat the right way up, but do not cut off the temporary pieces on the frames. Screw and glue on the seat risers. Make and fit the thwarts and stern sheets. Put a strut under the centre of the main thwart (General Drawing B). If the stern sheets are springy, put another under the front. Cut off the surplus parts of the frames.

Stiffen the three corners of the boat with knees and a breasthook (Fig. 4A). These are best made of oak with curly grain following the shape. Use glue with nails or screws. The boat is normally rowed from the main thwart, but with a heavy load the forward seat is better. Get a pair of galvanized crutches, size 2½ins., and an extra pair of crutch plates. Thicken the gunwales 8ins. aft of the rear edges of the thwarts and fix the crutch plates, with under cleats below to take the ends of the crutches (Fig. 4B).

The bottom has to be protected by a keel, skeg and four rubbers. All are fixed by screwing from inside, but as they may have to be replaced if the dinghy gets some rough use, they should be bedded in wet paint instead of glue. The keel and skeg are joined just forward of frame 6 (Fig. 4C). Besides its value as a protection, the skeg also makes rowing a straight course easier. The forward end of the keel tapers slightly to match the stem. A half-round ½in. brass or galvanized iron band can be taken down the stem and a short distance along the keel. The four bottom rubbers are laid parallel to the keel.

It is unwise to walk on the skin of a boat, and bottom boards should be fitted to spread the load over the frames. Make them removable for cleaning.

If you have made a good job of the boat it will look best if varnished above the waterline. Three or four coats of a marine varnish will give a beautiful glossy finish. Alternatively use a marine paint; priming, undercoat and top coat. Below the level of the bottom boards inside and below the waterline outside the simplest finish is black varnish, which is a tar product. Alternatively a marine or bitumastic paint could be used.

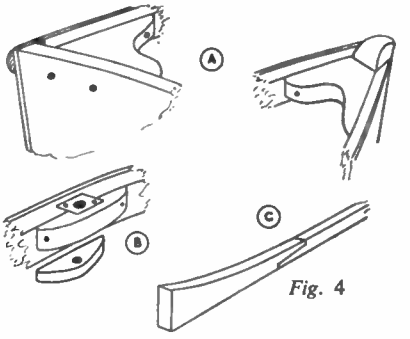


Fig. 4

Fix a ring for a painter on the inside of the stem. A pair of sculls about 7ft. long are needed—ash for sea work or spruce for rivers. A notch can be cut in the transom for sculling over the stern if desired. If a small outboard motor of about 1 H.P. is to be used it can be clamped direct to the transom as it is, but for a larger motor, up to 4 H.P., the transom should be stiffened by a board fixed vertically to its centre, otherwise the thrust of the motor is liable to crack the transom.

TIMBER SCHEDULE

This covers the main parts. Others may be cut from waste of the main parts. In some cases alternative construction may need different materials from those listed.

Part	No. off	Length ft.	Length in.	Width in.	Thickness in.
Gunwales	2	11	0	1¼	¾
Chines	2	10	0	1¼	¾
Risers	2	9	0	1¼	¾
Frames	cut from	24	0	1¼	¾
		18	0	3	¾
Transom	1	3	0	18	¾
Stem	1	2	3	4	3
Main thwart	1	4	0	10	1
Bow thwart	1	2	8	8	¾
Stern sheets	1	3	2	12	1
Bottom boards	4	8	6	6	½
Knees	2		6	6	1
Breasthbook	1		9	5	1
Keel	1	8	0	1	1
Skeg	1	2	0	4	1
Chine rubbers	2	10	0	1	half round
Gunwale rubbers	2	11	0	1	half round
Bottom rubbers	4	9	0	1	¾
Sides	2	11	0	21	¼ plywood
Bottom	1	9	4	39	¼ plywood

Modeller's Own Table

MOST modellers and craftsmen who have to work at a kitchen or living room table, are painfully aware of the nuisance of having to clear the work away when the table is required for meals or other uses. A special table for the modeller's sole use may, therefore, be welcome, so here is a design for one, quite simple to construct. It is also more than a mere table, as the top lifts up to disclose a commodious if shallow compartment, most handy for the storage of many things which the modeller needs, and to complete all, a working tray is provided for doing the actual work upon, which can be contained inside the table, and be hidden from sight and free from dust until required, with the model undisturbed upon it.

A side view of the table is given in Fig. 1, with suitable dimensions, the length (not given) can be 2ft. or more, according to individual requirements. First make the tray, Fig. 3, which forms the compartment directly under the table top. The sides are cut from ½in. by 3in. wood, joined together at the corners with a rebated joint. This is easily made, the ends of the long sides being reduced to half thickness where they meet the short sides, and there glued and nailed together. The outside dimensions of the tray are 1in. less all round than those of the table top, so that the latter can overhang that amount each way. Glue and screw a plywood bottom to the tray.

For the legs, cut four from 1in. by 1½in. wood to length. These have to be paired as they splay slightly outwards. The parts of the legs contacting the sides of the tray to which they are to be screwed, should be cut away to half thickness, as at (A) in Fig. 2. The shoulders here should not be sawn square across but at an angle of 5 degrees as in the drawing, to effect the splay. Deal with each pair of legs separately, and note that the direction of angular cut should be opposite with each pair. A moment's thought on the reader's part will make the need for this quite clear, the legs splaying in opposite directions.

The bottom ends of the legs should have a 5 degree wedge-shaped piece also sawn off, for them to 'sit' flat to the floor. Screw the legs to each side of the tray, just ½in. in from the corners. Use round-headed screws, they look much neater than the ordinary kind, and fix down firmly, with the addition of glue to make a sound joint.

When the glue is set hard, cover the inside, between legs and tray, with plywood, as in Fig. 1, the wood reaching to within 4ins. of the bottom. Glue and nails will fix these parts securely enough. Trim the edges of the ply level with the outer edges of the legs. Another piece of the plywood is similarly nailed and glued across the back, and the angles inside, both back and sides, between plywood and tray at the top, filled up with strips of wood, glued across to support, and keep out dust. These strips should, of course, be planed up to fit the angles closely.

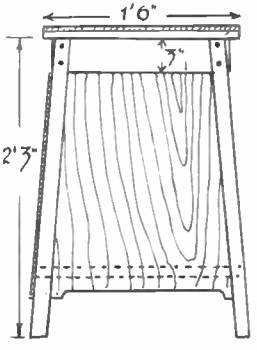


Fig. 1

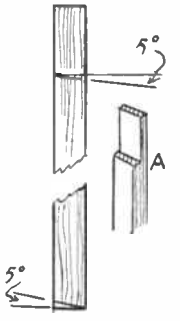


Fig. 2

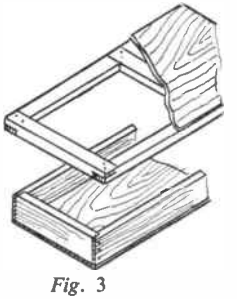


Fig. 3

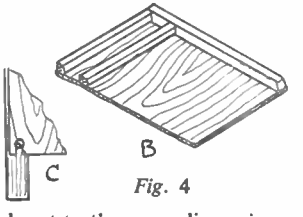


Fig. 4

The table top, which is detailed constructionally above the tray diagram in Fig. 3, is composed of a frame of ½in. by 2in. wood to the required dimensions, with half-lap corner joints, and a middle member half-lapped across as well. Glue and nail all together, and go over the top surface as may be necessary, to make all level. Then glue and pin a top of plywood over. If the plywood is well weighted down or cramped, the pins may, perhaps, be omitted, the glue only making the joint. Trim up the edges afterwards, then hinge the top to the tray with 1½in. brass butts. Recess these in the long side of the tray quite flush. A hook and eye fastener can be fitted also to keep the lid top down.

On the inside of the carcase, at 6ins. above floor level, screw a fillet each side to support the work tray. Measure the length of the fillets, and let this be the depth of the tray, less about ½in. No complete drawing is needed for this tray, it can be seen partially withdrawn in the general view of the completed article, but a detail of its construction is shown at (B) in Fig. 4. The base of it is a piece of good stout plywood, cut to fit across and rest on the side fillets. For edging strips cut some suitable pieces of deal board, ⅜in. thick and ½in. wide, to fit across back and side edges, where they should be well glued and screwed through the plywood bottom. Countersink the screw heads below the surface. A crosspiece of similar wood is then glued, to leave a space of about 3ins. between it and the back strip, to make an enclosed inner tray for holding small tools.

Try the work tray in place, and any portion which may extend beyond the front legs should be sawn off. A cover for the front of the table is made of plywood, cut to the same dimensions as the back. This is not hinged in place, instead a slot, ½in. wide and ½in. long, is sawn out at ½in. in from each bottom corner, as in detail (C) in Fig. 4, and a round-headed screw driven in each front leg at the right position for the slots in the cover to slip in and hold it in place. A small knob on the cover will make a useful grip to handle it. At the top, to the side of the table, fit a wooden button to hold the cover flat in its place.

The table can be left in the plain wood, but if required for use in a living room would look much nicer if stained and varnished. (W.J.E.)

Radio Sets for Low Voltages

ONE of the greatest disadvantages which the constructor of a battery-operated receiver encounters is the need to provide batteries. With a simple 1 or 2 valve set, the cost of the batteries may even exceed that of the receiver itself, while their replacement is also expensive. However, simple receivers can be made up which will work from very small batteries of low voltage. Much expense is thereby saved, and the whole receiver can, if desired, be very small.

In other cases it may be desired to operate a receiver from a low voltage.

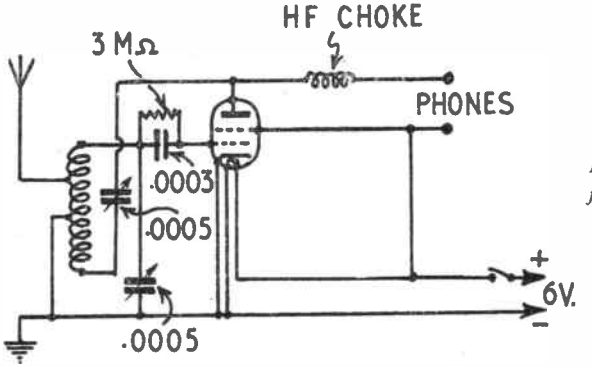


Fig. 1—A one-valver for 6-volt operation

Examples of this arise in vehicles, where the supply will be only 6 or 12 volts, or in houses where small lighting plants are used, usually delivering 24 to 30 volts. In these circumstances, such low-voltage circuits can also be used.

Car-radios, and similar receivers, are not included. These operate with a high voltage, which is usually obtained from the 6 or 12 V. supply by means of a vibrator, transformer, and rectifier. Accordingly, they cannot be termed low-voltage receivers at all. Instead, they are receivers of ordinary type, with a special power-supply arrangement, as explained. This, again, is not practicable for very small and simple receivers, since it would be as expensive as batteries.

A 1-Valve Circuit

A simple low-voltage receiver circuit is shown in Fig. 1, and this will operate with a single 4·5 to 6 V. dry battery—a flash-lamp battery is suitable. No accumulator or H.T. battery is required.

The valve used is a 'mains' type, and will perform almost as well with the 6 V. supply, as would a battery type valve with a 60 V. H.T. battery. This type of valve can be obtained very cheaply indeed from ex-service stockists, and almost any type of pentode will be satisfactory.

The receiver can be built up to any ordinary 1-valve layout. Assuming that an octal valve such as the 6K7 is used, pin connections will be as follows, if the valve is viewed from the bottom, and pins are counted clockwise from the key-way:

1 and 6, not used. 2 and 7, heater.
3, anode (to H.F. choke).
4, S.G. (to positive on battery).
5 and 8, wired together to earth line.
Top Cap to grid leak and grid condenser.

The set is used exactly as with any ordinary 1-valver. The valve requires several seconds to gain operating temperature. If the user wishes to boost up volume, a grid bias battery may be added in the H.T. circuit, so that S.G. and anode receive 15 V. (9 V. plus the 6 V. already provided.) Even with this extra battery, the cost of the batteries will be very small.

To obtain adequate reaction, a coil such as that shown in Fig. 2 is most suitable. With a 1¼in. diameter former, 65 turns of 30 S.W.G. wire can be used between top of coil and earth tapping, with 55 turns for the lower section. Because of the low voltage, some ordinary coils will not provide sufficient reaction. As a result, the valve cannot be brought up to the oscillating point, and weak signals will not be received at best volume. This can be overcome by winding a coil as shown, or by increasing the number of turns on the reaction coil.

A 2-Valve Circuit

A circuit of this kind is shown in Fig. 3 and it can be used in several ways. If two 6 volt valves are used, the heaters may be wired in parallel and operated from a 6 V. battery. Very good headphone results can then be obtained.

With a 12 V. supply, the heaters of the 6 V. valves can be wired in series. Volume will be increased, since the anodes and screen grids of the valves receive 12 V. instead of only 6 V. This type of circuit can be used in a simple car-radio intended to operate directly from the 6 V. or 12 V. accumulator.

With a domestic plant giving 24 to 30 V., reasonable loudspeaker results will be obtained. In this case, it would be necessary to use two 12 V. valves, with heaters wired in series, for 24 V. operation. Or one 6 V. valve and one 25 V. output pentode can be used, wired in series. This totals 31 V., but will operate satisfactorily with 24 to 30 V. supplies. When valve heaters are wired in series, they should have the same current rating. This is ·3 amp for the 25 V. and 6·3 V. types, and ·16 and ·2 amp for the 12 to 13 V. types.

The detector stage in this receiver is exactly as for the 1 valve set described. An intervalve transformer with a ratio of about 1:3 or 1:5 is used for coupling between the valves. The bias resistor, in parallel with the 50 mfd condenser, should be about 200 to 400 ohms. With a 6 or 12 V. supply, used for headphone reception, condenser and resistor may be omitted. The valve cathode is then wired to the earth line.

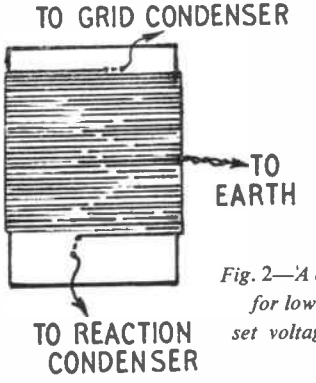


Fig. 2—A coil for low set voltages

A suitable output pentode of 25 V. type is the 43. Viewed from below, pin connections are:

Large pin, heater.
Pin 2, anode (to speaker).
Pin 3, S.G. (to positive on battery).
Pin 4, grid (to coupling transformer).
Pin 5, cathode.
Remaining large pin, heater.

With a 24 to 30 V. supply detector efficiency will be much increased, and normal coils, for Medium Waves, Long and Medium Waves, or Short Waves, can be used.

Increasing Volume

With such low anode and S.G.

(*Continued on page* 86)

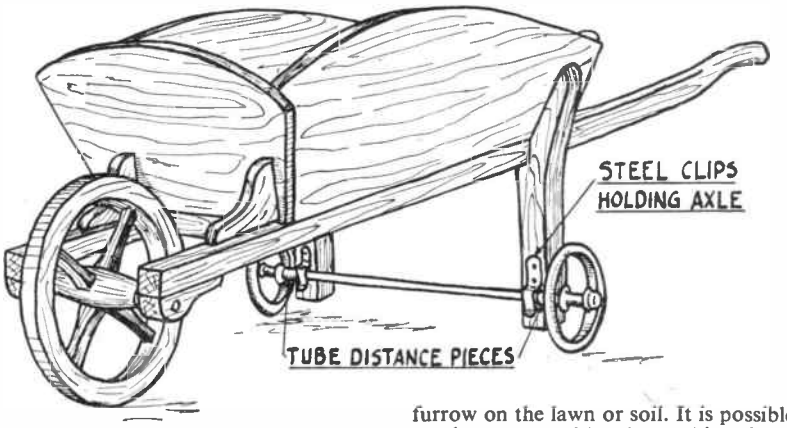
A Hint about your Wheelbarrow

OF all the vehicles invented by man it would be difficult to find one more popular than the humble wheelbarrow. It can be seen on almost any kind of job, but its value in the garden is inestimable.

Like everything else, the wheelbarrow has its shortcomings, perhaps, the chief among these being the fact that a large proportion of the load is carried by the operator.

The sketch shows a method of adapting the wheelbarrow as a three-wheeled vehicle for operations which do not demand one wheel only, and for which the use of three wheels is an advantage. It is realised that under certain conditions, such as on steeply sloping ground, the substitution of wheels in place of the normal legs would be a disadvantage, and for this reason they should be quickly detachable. The sketch shows how provision is made for this.

A pair of suitable wheels is needed, which may require an elongated axle to clear the legs of the barrow. To avoid undue obstruction to the feet the axle is arranged to be carried on the forward sides of the barrow legs. Attached to the legs are simple steel clips into which the axle is fitted at such times as the additional wheels are required. These clips are arranged to spring over the axle so as to hold it in position when the barrow handles are lifted. Some method of preventing lateral movement of the axle will also be necessary.



It will be noted that the height of the axle is such that the wheels protrude only 1in. or so below the ends of the legs, so that the level of the barrow when rested is not unduly disturbed.

Advantages of this wheel attachment are that it is possible to push the barrow forward or backward without any lifting. In wet weather, when the handles are released the legs do not plough a furrow on the lawn or soil. It is possible to alter course either by pushing down the handles and so lifting and swerving the front wheel, or by lifting the handles in the normal way. The barrow may be propelled and steered in the backward direction by lifting and pushing the front wheel.

It is only fair to say that there are occasions when the additional wheels would be a disadvantage. At such times it is only necessary to lift the handles and remove the wheels instantly by kicking down the axle from its clips.

(L.J.B.)

Radios for Low Voltages

(*Continued from page* 85)

voltages, the valves will not deliver a really powerful signal. This can be overcome by using the circuit in Fig. 4, if desired. Better loudspeaker results will then be obtained. As a guide, a type 43 valve, with 24 V. supply, will deliver about as much volume as a small power triode, of battery type, with a 90 to 100 V. H.T. battery. It will therefore be seen that even the single output valve, as shown in Fig. 3, can be worth-while.

With a push-pull stage, the power handling capacity is doubled. A centre-tapped intervalve transformer is used, and the speaker transformer must also be of the centre-tapped type, so that the tapping can go to the positive battery line. The valves should be a pair of the same type. The cathode bias resistor should be of half the value to that used with a single valve.

The usual type of battery valve is not very suitable for this kind of circuit, and it does not operate so efficiently, with low voltages, as do the mains types.

(F.G.R.)

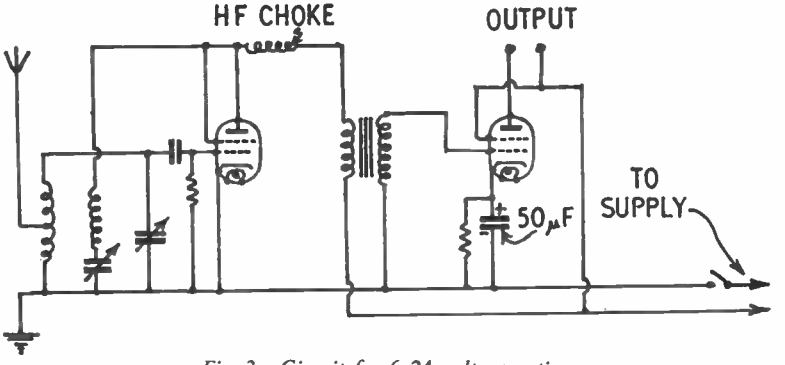


Fig. 3—Circuit for 6–24 volt operation

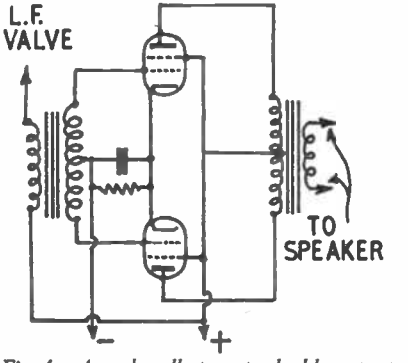


Fig. 4—A push-pull stage to double output

A Model of the Taj Mahal

by C. V. THOMPSON

I IMAGINE that most people who practise a craft feel a constant urge to tackle something ambitious and exceptional. That is how it is with me.

The supreme beauty of the Taj Mahal has always attracted me and I had long considered the possibility of casting a perfect scale model in plaster of paris. However, when one considers the difficulties, the prospect appeared far from encouraging. Plaster has its very definite limitations. It is so soft and fragile and, worst of all, it has a very quick set. Of course, this latter can be retarded with glue water, but, if one works to very fine detail this isn't really satisfactory.

The Ideal Material

So, thinking over all the 'pros and cons' my idea remained but a very nice dream, until about a year ago I tried Karlenite Art Stone for casting pendants, ear rings, cameos and similar miniatures. I was so struck with the beautiful texture and perfect fidelity of detail, that it immediately dawned on me that here was the ideal material for the Taj Mahal. A reasonable setting time, and the result, when set, just like marble itself.

However, my project still seemed of mammoth proportions. Before making the attempt, two questions demanded answers—Could I really accomplish it successfully? and Dare I approach the Karlena Company for their help and advice? I decided that there is nothing like trying and proceeded with my plans.

In answer to my letter I received a most enthusiastic and encouraging reply from Mr. Kavanagh, the Managing Director of the Karlena Company. He thought it was a splendid idea and promised every assistance. I must sincerely thank him and his company for without their constant help and encouragement it would have been an impossible task.

I next set about gathering all the necessary data. What a job this proved, but how wonderfully helpful everyone concerned was.

First I wrote to India House, and asked if they could help. They kindly sent me a book on the building and referred me to the Victoria and Albert Museum where two models might be examined. Arriving at the Victoria and Albert, I found that the models had been sold (and had gone back to India). But they had plenty of pictures.

The India section produced numerous drawings, from miniature sketches to large scale drawings. I was literally surrounded by dozens of them and the more I examined them the more I shuddered. I could never do a thing like this. Then a chance remark by one of the officials settled the matter. 'I don't think this has ever been attempted by a European, has it? That will be quite a feather in your cap. *That is if you could do it.*' There and then I decided I would do it or bust! Another official mentioned that there were some excellent photographs of the original in the Library, and so over to the Library.

Here again no trouble was spared in their attempts to help. I chose several photographs for the preparation of working copies, and then home to my workshop to make a bold start.

Fine Detail

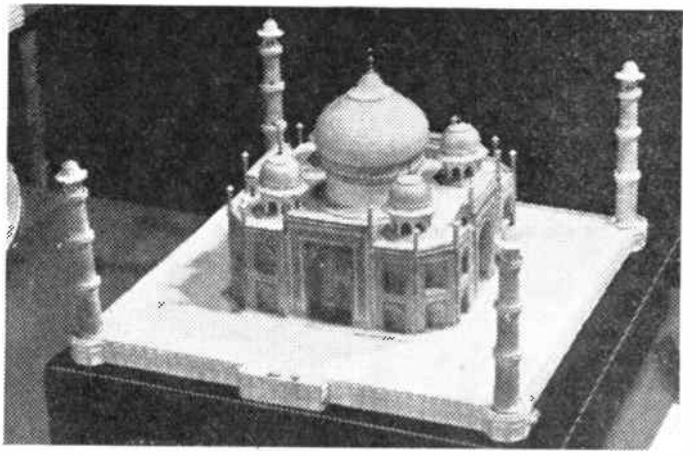
I think I can say without undue modesty that I am used to fine detail work, but this was to be simply one mass of the very finest detail and on quite a large model.

I had still not seen an actual model and was delighted to learn from a friend that there was one in the Finsbury Library. Off to Finsbury I went, but was rather disappointed. The work was certainly beautiful but the scale was hopeless.

A balustrade which was 4ft. high would have been about 20ft. if the model had been to scale. By luck I met an Indian gentleman who knew the Taj Mahal quite well. He informed me that the Indian craftsmen who do this work never think of scale. They model it as it appears to them and often put in little additions of their own 'to improve it'. These models therefore vary considerably.

Then I started—and so did the snags.

It is one thing to carve a straightforward job and make a flexible mould of it, but when the detail (to perfect scale) is so fine and abundant then that is very much another thing. Imagine for yourself. In the space of one square inch fifteen complete arches in lattice work, and this is but a portion on the main entrance. The side arches are ¾in. by 1in. They each comprise a complete arch with roof rafters, twenty inner arches with panels above them, and a door containing fifteen lattice worked window panels.



Mr. Thompson's beautiful model

To give some idea of the extraordinarily fine details, some of the lattice work cannot be seen with the naked eye but requires a good magnifying glass!

This presented considerable difficulty because, apart from carving it, one blurr in the mould is sufficient to spoil the whole piece. In fact, in making the main entrance I just couldn't duplicate this microscopic detail. I made moulds over and over again without success, despite the fact that Karlena flexible moulding material is undoubtedly the best of its kind.

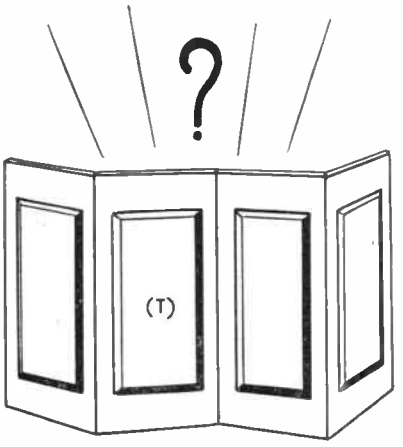
Almost Gave Up

At this point I nearly despaired, and decided on a less exacting standard. However, the Karlena Company then came to my aid and their advice set me thinking of a totally new technique for fine detail mould making. I constructed a gadget for a matter of a few shillings. I

(*Continued on page* 92)

ANOTHER ILLUSION

The Sorcerer's Screen



OF all the illusions in a magician's repertoire, those in which he causes something to vanish or appear are the most popular. Such effects often involve difficult sleight of hand, but with the apparatus to be described, the most amateur magician can produce startling and mystifying results.

It is in the form of a screen, as shown in the illustration. The size can be altered to individual requirements, but the measurements suggested should suit most performers. Both sides of the screen are shown to the audience, and it is then folded into a box shape. From the interior, silks, flags and other articles are produced. Alternatively, articles placed inside are found to have vanished when the screen is unfolded. Both sides are again shown to the spectators.

Fig. 1 gives details of each of the four panels which are cut from $\frac{3}{16}$in. plywood and measure 10ins. by 5ins. They are decorated with bevelled overlays, size 7ins. by 3½ins., cut from similar wood. On three of the panels, these are simply glued in position on either side as shown. The secret of the screen lies in the panel marked (T). This contains a pocket to hold the articles to be produced or vanished.

To prepare this panel, cut a hole 6ins. by 2½ins. as indicated by the dotted lines in Fig. 1. Instead of the bevelled overlays being glued in place, they are hinged at the bottom. Cut two pieces of thin cloth 3½ins. long and about ¾in. wide. Fold them lengthways and stick one side of each piece along the bottom edge of each overlay. Apply more adhesive to the upper sides of the cloth hinges and carefully position the overlays on either side of the hollow panel. When the glue has set, both overlays should hinge outwards from the bottom.

For the sides of the pocket, cut two pieces of strong cartridge paper as shown in Fig. 2. Fold under the top and bottom edges along the dotted lines and stick down. Crease along the sides for fixing to the overlay flaps and fold inwards along the dotted line down the centre. These two gussets are glued between the overlays so that a pocket is formed. Fix them about ¾in. from the edge of the wood and ensure that the paper folds inwards when the overlays are closed to the panel. It should be possible to open the pocket from either the back or front of the panel. Fig. 3 shows the pocket opened from one side. With both overlay flaps closed, the prepared panel looks no different from the other three.

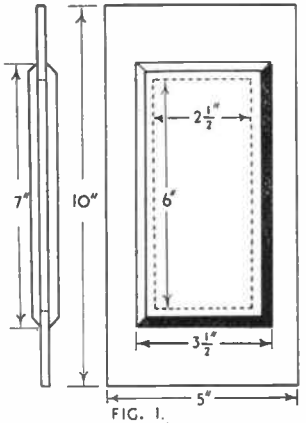


FIG. 1.

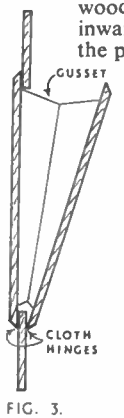


FIG. 3.

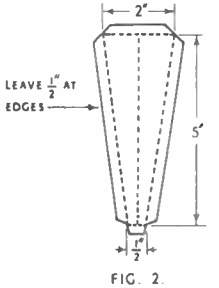


FIG. 2.

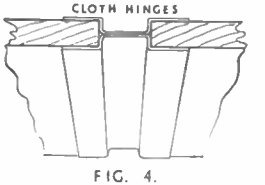


FIG. 4.

To assemble the screen, hinge the sections together with 1in. wide tape or strips of cloth. So that the screen will fold flat, leave about ⅛in. between the panels as shown in Fig. 4. Paint according to taste, using a different colour for the overlays if desired.

With the completed screen before them, enthusiastic magicians will realise its capabilities. To produce articles, the pocket is opened from one side of the screen and packed with production goods such as silk handkerchiefs, flags, streamers or sweets. The overlay on the other side of the panel will be in position, and this side of the screen is displayed to the audience. The screen is then folded into a box shape. Under cover of this movement, the pocket is pushed through to the inside, as shown in Fig. 5. The outsides of all four panels can now be shown, and the screen set on a table. In effect, the audience has seen both sides of the screen. The articles are produced with the aid of suitable magic spells, the screen unfolded and again displayed. If the prepared panel is held at the top, the thumb will naturally grasp it on one side with the fingers on the other. The hand can therefore hold the tops of the overlay flaps and retain them in position against the panel, allowing the screen to be shown from all angles.

Articles may be vanished by the opposite procedure. The screen is shown both back and front, the flaps being held in position as at the end of the previous routine. When the screen is folded into the box shape, the pocket is opened inside. The articles to be vanished are placed in the screen. Actually, of course, they go in the pocket. This is then pushed to the rear of the panel, the screen opened and the articles shown to have disappeared. The back of the screen may be shown by folding each panel across.

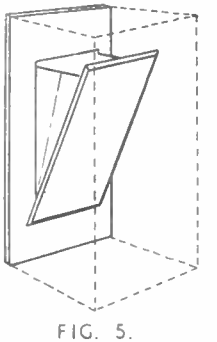
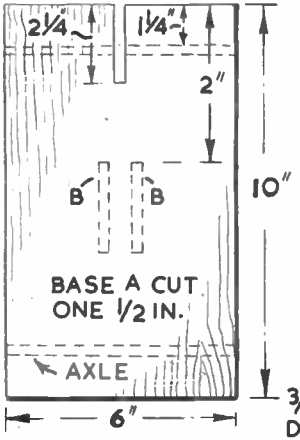


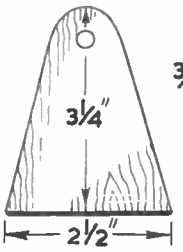
FIG. 5.

As soon as the prepared panel is masked from the audience, the pocket is pushed through to the other side.

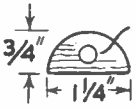
It is a good plan to tie pieces of ribbon round the top and bottom of the screen while the magic is in progress. Take care not to hinder the working of the pocket. With a little practice in front of a mirror, it will be found quite an easy matter to manipulate the pocket with a touch of the fingers. As in all effects where something is happening unbeknown to the audience, do not look at the pocket as you change it. Misdirect the attention of the audience by looking elsewhere. Their eyes will follow yours. (W.C.R.)

Make a Pull-Along Toy Dog





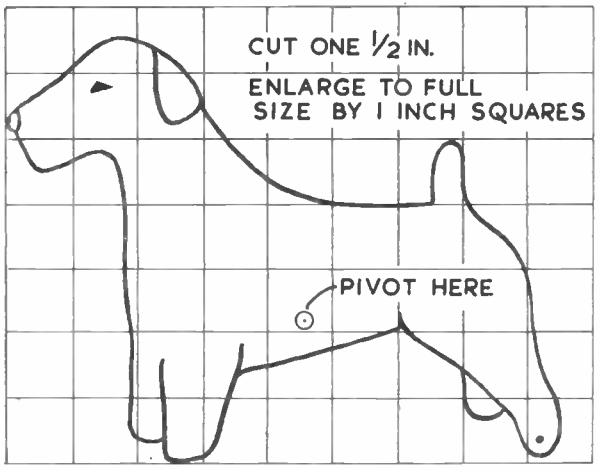
SUPPORTS B. CUT TWO ¼ IN.

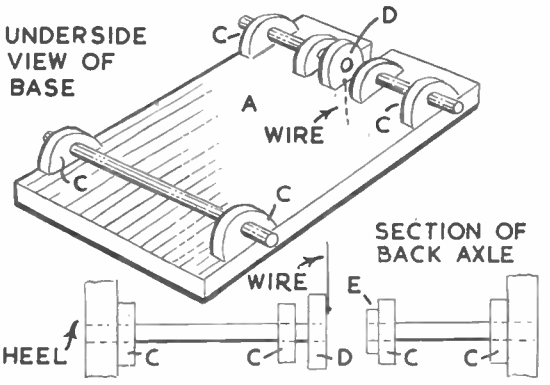


PIECES C CUT SIX ¼ IN.

PIECE D CUT ONE ¼ IN.

PIECE E CUT ONE ¼ IN.





THIS pleasing toy measures 10ins. long when completed. As it is pulled along the dog moves up and down in a realistic manner.

The sizes shown on the diagrams need not be strictly adhered to. You can make alterations, where necessary, to fit odd pieces of wood. The base (A) measures 10ins. by 6ins. and is cut from ½in. or ¾in. wood. Cut a ⅜in. wide slot in one end as shown in the diagram. This slot is situated centrally and is 2¼ins. long.

The supports (B) are cut from ½in. hardwood or ⅜in. to ½in. softwood. The ones shown in the diagram are glued and screwed to the base, but if you wish to put a little more work into it you could make a mortise and tenon. Make the tenon on the support about 1½ins. wide. It should be ½in. deep, i.e., the same as the thickness of the base.

You need four 2in. wood wheels and some ¼in. diameter round rod. You will see by the underside view of the base that the front axle is in one piece, but the rear axle is divided into two. The wood wheels, which are turned from selected hardwood, cost 2/2 for four, post free, from Hobbies Ltd., Dereham, Norfolk.

The holes in the centre of the wheels must be enlarged to take the ¼in. diameter round rod. Take care that you make the axle a tight fit in the wheels.

The two pieces (C), through which the front axles passes, are screwed and glued to the base. Here again you will give added strength to the toy if you cut tenons on the pieces (C) and let them into the base.

The rear axle is divided into two pieces, one of which projects over the slot in the base. To this projecting end is glued the wheel (D). It is 1in. to 1½ins. diameter and to this is fixed a wire arm which is pivoted to the hind leg of the dog. You can pivot the wire to both leg and wheel by means of roundhead screws. To hold the other axle in place it is necessary to glue a washer (E) on the end. This washer should be scant ¾in. diameter.

Cut the dog from ½in. wood to the size shown in the diagram. It is a simple matter to draw the 1in. squares and then sketch in the shape. If you do not feel like doing the actual drawing Hobbies can supply a full size tracing of the dog for 6d. Please send a stamped and addressed envelope with your order.

The dog is pivoted about the middle by means of a short length of round rod. An alternative method of pivoting is to use two roundhead screws driven through the supports and into the dog on either side.

Finish off by painting in bright enamels.

Hints on Photographing Flowers

FLORAL photographs have special charm, and may be taken successfully with even simple cameras. During the spring, summer, and autumn months it is possible to find an abundance of interesting subjects in almost any garden. With a little care, every shot can be successful and some of the negatives, if enlarged, should do admirably for brightening up calendars and similar purposes.

Choice of Subject

A wide variety of subjects can be found, but those chosen should, preferably, have fairly large bold blooms. Plants that have many small leaves and blossoms are best avoided, since photographs of them are likely to be spoiled by there being too much fussy detail. Dark colours, too, show up less well, with the usual black and white print or enlargement. For example, a white or cream rose could provide a photo full of sparkle, whereas a deep red one would be dull and unsatisfactory.

It is, therefore, best to look for fairly large flowers of light hue, at least for a beginning. Narcissus and other bulbs will be found in early spring, with other subjects coming on later.

Accurate focus, for sharp detail, can be obtained as explained in the article

It is best to choose a sunny or fairly bright day as photographs taken during overcast weather are likely to be dull. A windy day is best avoided, since the flowers are likely to be kept moving, especially if of the kind with long stems. Movement of this kind can result in the photos being blurred. Any calm sunny day will be suitable.

The best method of using the camera will depend upon what type of camera it is. If it is a reflex camera, or the kind with a back focusing screen, it will be easy to focus the subject correctly. If it is the kind with a focusing scale upon which distances are marked, then it should be remembered that fairly accurate focusing is necessary, at short distances. As an aid in this direction, it will help to *measure* the distance between camera and subject, using a ruler, tape-measure, or merely a piece of string cut to the correct length. Some cameras of this kind focus down to 3ft.; others to 2½ft. Many cameras of foreign manufacture have a scale marked in Metres. For the purpose in view, a Metre may be taken as being 3ft. 3ins.

Simple box cameras with fixed focus should not be brought nearer than about 6ft. to the subject, unless they have a close-up or 'portrait' attachment. With the latter attachment, a distance of about 2ft. is generally required between camera and subject. The exact distance may be marked, or given in the instructions.

Focusing, or the distance between camera and subject, should be adjusted with reasonable care. If a large error is made, then the photograph obtained will be slightly blurry, and lacking in sharpness and detail.

Successful shots can easily be taken with the camera held in the hand. But if a tripod is available it is as well to use it, as this simplifies accurate focusing.

Background Details

It is best to photograph the chosen group of flowers in such a way that they stand out from foliage or other flowers nearby. If they are lost amid a background of other plants, the photograph will be less satisfactory. To avoid this, the subject should stand out sharply by itself.

This can be achieved in a number of ways. It is often possible to choose a viewpoint which gives a background at some distance away—the background will then be out of focus, while the subject stands out clearly. In some cases it is possible to keep the camera very low, so that the subject stands out against the sky, and this can be very effective. If neither of these methods is possible, then a large piece of cardboard or anything similar that is to hand, can be placed behind the subject, to cut off the background of other plants. The cardboard will be slightly out of focus, and not distinguishable in the final photograph.

A lily that stands out against its background

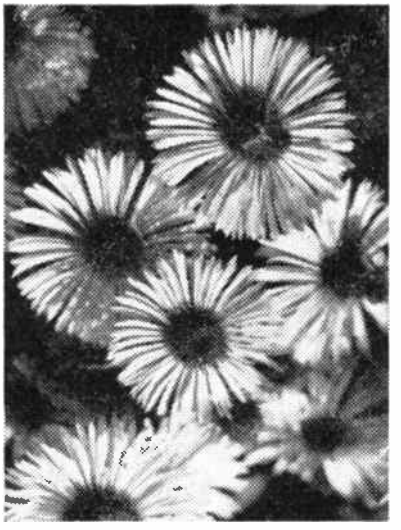
Some plants may have a background that is quite satisfactory, or plunged in

shadow. If so, no particular care in this direction is necessary. In a few cases it may be necessary to remove dead or faded blooms, to obtain the best result.

Since under-exposed negatives are very thin, and over-exposed negatives too dense, it is desirable to get the exposure reasonably correct. Assuming that a fairly rapid film of 30 degree Scheiner is used (such as 'Selochrome'), then suitable exposures will be as follows:—

Weather	*Camera Aperture*
Brilliant sun ..	*f*16
Moderate sunshine	*f*11
Bright, no sunshine	*f*8
Dull	*f*6·3

This is with a shutter speed of $\frac{1}{50}$th second, in each case. The shutter speed control should be set to this figure, and the lens-aperture control then set to the appropriate '*f*' number. Cheap box-cameras have a fixed aperture and speed—usually about *f*11 and $\frac{1}{25}$th second. With these, it is best not to attempt a shot unless the sun is actually shining.



The exposure table is for use in the months of May, June, and July, between 9.30 and 2.30. From 2.30 until 4.30, the exposure should be doubled. From 4.30 until 5.30, it should be doubled again. It should also be doubled in April or August when the light is less good. The exposure may be doubled by using a slower shutter speed (for example, $\frac{1}{25}$th second instead of $\frac{1}{50}$th second), or by opening the lens aperture one stop (e.g., from *f*16 to *f*11, or from *f*11 to *f*8, and so on).

The results are almost certain to be good. As explained, the points to be kept in mind are quite simple. The subject should be motionless, and correctly in focus. It should stand out clearly from the background, and the exposure should be reasonably correct. Some really good pictures, suitable for greeting cards, calendars, and other decorative purposes, can then be obtained. (F.G.R.)

Left:—Tall flowers, such as michaelmas daisies, should not be attempted in windy weather.

FOR RAMBLERS

Why Carry Your Pack?

THE increasing bustle and confusion of the open road is taking much of the pleasure from motoring, and the popularity of rambling on foot along the lesser known byways is correspondingly growing. The hardy rambler was much in evidence during last summer, and judging by the immense loads so cheerfully shouldered he—or she—certainly needs to be hardy. Many ramblers, when carrying full camping equipment, are loaded like pack animals, and it is so unnecessary.

The wheel was invented many centuries ago with the express object of carrying man's burdens, a fact appreciated by the mother with her perambulator, the gardener with his wheelbarrow and the golfer with his wheeled carrier, to mention only a few. In conveying a load it is not necessary to bear its weight.

It is a simple matter for the hiker who is also a handyman to make himself a light wheeled carrier which can make his journeys less strenuous and more pleasurable, and if he can lay his hands upon a pair of perambulator wheels his job is half done.

The sketch shows a simple carrier designed to carry a rucksack, but which could also be used for a variety of useful tasks.

Apart from the wheels and axle, few materials are required.

Assuming a rejected perambulator is available, the first step is to remove the wheels by filing down and knocking out the rivets or removing the bolts which secure the axle to the springs. These holes are used to take bolts securing a simple holder of light sheet metal or wood, which should be arranged to guard the rucksack from contact with the wheels. If there are no holes through the axle two hook bolts may be used.

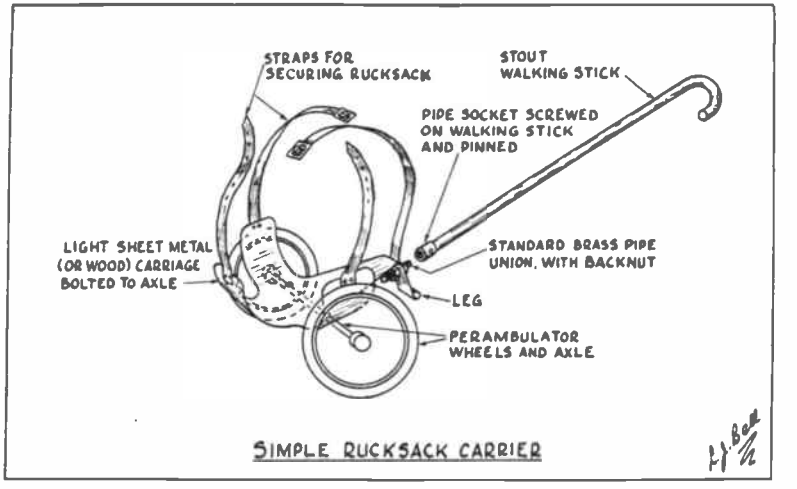
A stout walking-stick performs the duty of drawbar, and is detachable so that in circumstances where it is impossible to wheel the carrier the walking-stick may be unscrewed and the pack, together with the wheels and chassis, carried on the back.

In the arrangement illustrated, a standard pipe-socket of suitable size is screwed firmly on to the walking-stick end, taking the place of the ferrule, and a matching standard union fitting secured to the carrier chassis by means of its normal backnut. It may be found necessary to stiffen the flange attachment to the chassis to avoid bending.

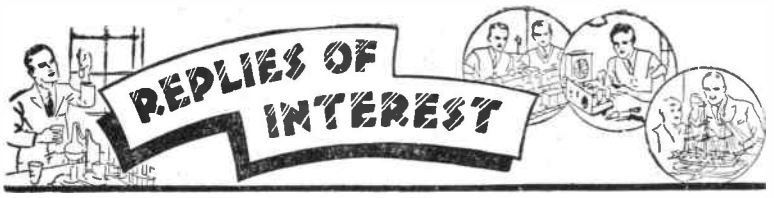
Two stout straps complete the assembly.

It will be realised that the lightest possible construction should be used throughout, and in order that the pack may be carried when occasion demands the normal rucksack straps should be uppermost, and left free.

Dimensions are not given, as these will depend on the sizes of wheels and axle available, but it should not be difficult to adapt the layout to suit measured sizes. (L.J.B.)



SIMPLE RUCKSACK CARRIER



Dyeing Veneers

HOW may I obtain or make some substance which will dye veneer in various colours, and which will penetrate right through without discolouring on glasspapering? I intend mainly to use sycamore. (*C.F.—Whitley Bay*).

COMPLETE penetration of veneer except the knife cut variety, is hard to effect, but several applications of suitable dye will go a long way towards it. You cannot beat aniline dyes, soluble in spirit, for such a purpose. These are obtainable in powder form and only need dissolving in methylated spirit. Apply the dyes with a clean swab on a stick of wood, and rub well in. Sycamore is a hard wood and after a few applications of the dyes, a piece of the veneer should be broken off to test the depth of penetration. It would be best not to use glasspaper for finishing the surface, but a cabinet maker's wood scraper.

* * *

Portable Blackboard

CAN you tell me how to make a portable blackboard; the kind that is made of calico or something, and treated with blackboard paint so that the whole thing can be easily carried rolled up for use at a party or lecture? (*L.M.W.—Reading*).

STRETCH a piece of strong calico on a made-up wood frame and apply a coat of boiled linseed oil. When dry, give a coat or two of Winsor & Newton's black fabric painting colour and try out. If the chalk will not 'bite' on the surface, apply a coat of drop black or lampblack, worked to a paste with the boiled linseed oil, and thinned down with turpentine. Test with this on a spare piece of the treated calico, and add a little patent driers if found necessary. The above is a suggested treatment, which may be effective, and a little experiment may be necessary to get the best results.

* * *

Re-tiling a Passage

I AM going to re-tile a passage with red adamant 6ins. by 3ins. tile. Please tell me how to cut the tiles. Is there a book on tile laying? (*H.W.—Merioneth*).

ABOUT the safest method to employ in cutting the tiles is to lay them on a flat surface and tap gently along the line of cut with a cold chisel. Or cut along with a hacksaw for a depth of about ⅛in., then, with the piece to be removed overhanging the bench, a sharp tap with a hammer will usually cause the unwanted part to drop off. We know of no book on tiling, but the usual method of laying is to make a cement bed first, then, after soaking the tiles, apply a thin layer of tile cement and press tiles in position.

* * *

Glue Query

I HAVE a large supply of glue and find it a nuisance to have to heat it on a gas ring every time for small jobs. Is there any way to make it into a glue to use cold, by adding something to it? (*A.M.—Sunderland*).

WE presume the glue to which you refer is the ordinary carpenter's type of Scotch glue, and in that case there is no practical way for the home-worker to convert it into a liquid glue, which, when spread, will set and harden properly. You could experiment by melting some of the glue and, while thoroughly hot, gradually stir in a small quantity of acetic acid. This acts as a retarder to the gelatinizing of the glue, and thus by retarding its setting time, may sufficiently serve your needs. Experiment alone can determine the appropriate proportions of acetic acid and glue.

* * *

Unsuitable Paper

SIX months ago I papered my kitchen with varnished paper, tiled pattern. Please tell me if the paper requires treatment of any kind, as steam from the cooking stove penetrates the varnish and soaks the paper. This happens on the two outside walls where condensation is heavy. (*H.K.—Altrincham*).

IT would be much better to remove the varnished paper altogether, it being an unsuitable wall covering under such conditions. In place, coat the walls with a non-condensation paint. There are several types on the market—for instance ZAT, which is supplied direct to the public from the Concrete Paint Co., Maiden Street, Barnstaple.

* * *

Preserving Paint

WHEN I have paint in store for a while, I find a skin has formed on the top. Can this be avoided? (*C.B.—Coalville*).

THE first essential is to keep the lid tightly in place after using the paint. If it is oil paint, pour on the top a small amount of linseed oil and turpentine mixed; this will form a film and prevent skin. If synthetic paint or enamels are used, then the correct thinners for whatever proprietary brand of paint you have, should be added to the top in a similar manner.

Is there a problem worrying you? If so, perhaps we can help. Enclose a stamped addressed envelope with your letter. Incidentally, this service is extended only to regular readers of the magazine.

The Taj Mahal Model

(*Continued from page* 87)

tried the scheme out on a simple plaster master with some microscopic detail and it worked beautifully. At a later date I hope to devote another article to the subject of this gadget but at the moment it is the subject of a patent application.

Using this new method it was necessary to prepare a new master, since the one I had been using was no longer suitable, having been surface sealed.

An absolutely perfect mould was taken from the new pattern—and then, on to the corner pieces. Six tiny arches with umpteen inner arches, panels and flagged pavements.

After this it was pretty well plain sailing. Minor snags here and there, of course, as might well be expected. The fact, however, that I could make from a plaster master, a mould so perfect that even microscopic roughness of the plaster was duplicated (and this without any attempt at surface sealing) seemed to me to be something in the nature of a revolution in plaster craft.

Within the passage of a few more weeks the Taj Mahal to the scale of one millimetre (approximately a twenty-fifth of an inch) to the foot stood waiting for the last part (the crescent on the top of the dome pinnacle. When I had fitted this I contemplated it, happy in thought that I had realised my dream.

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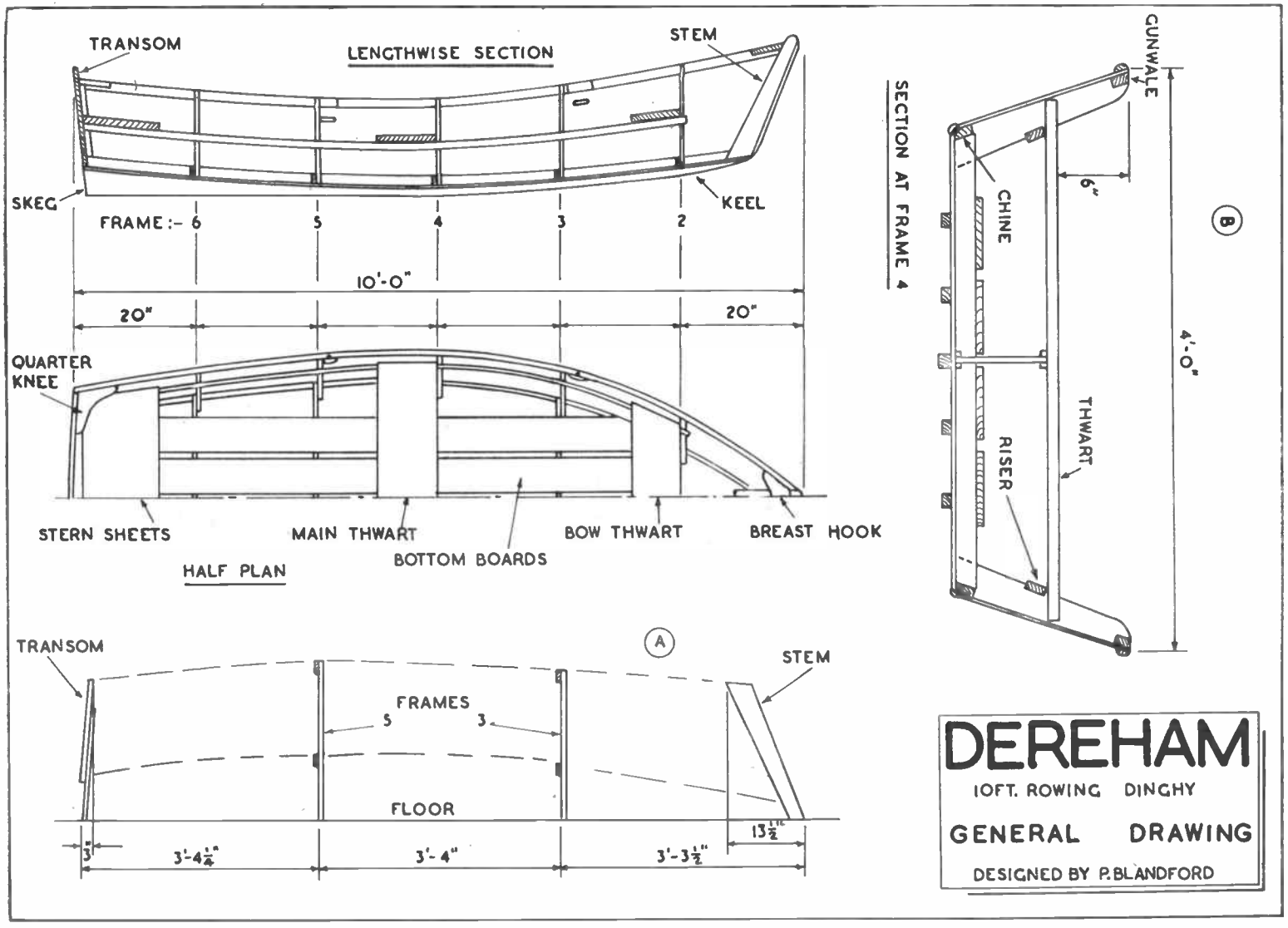

Printed by BALDING & MANSELL, LTD., London and Wisbech, and Published for the Proprietors, HOBBIES LTD., by HORACE MARSHALL & SON, LTD., Temple House, Tallis Street, E.C.4. Sole Agents for Australia and New Zealand: Gordon & Gotch (A'sia) Ltd. For South Africa: Central News Agency Ltd. Registered for transmission by Canadian Magazine Post.