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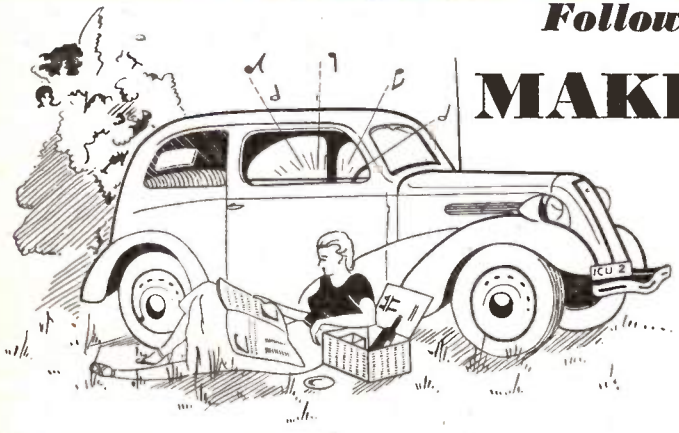
Follow these instructions to

MAKE YOUR OWN CAR RADIO



THE average car radio is fairly complicated for several reasons. The signal pick-up of an aerial on a vehicle is small, so that a good deal of amplification is necessary to secure good loudspeaker volume, while the actual signal strength varies as the vehicle passes buildings, etc., which offer some degree of screening. Because of this, a superhet circuit with automatic volume control is desirable, and that shown in Fig. 1 is about the simplest possible circuit of this nature. Further complication arises from the fact that both high tension and heater current must be obtained from a single 6 or 12 V. accumulator, with the result that the power-supply section of a car radio is slightly more complicated, and requires more components, than is so with the usual mains-operated receiver. But the constructor who has built up a number of receivers should not find it too difficult to follow the circuit and wiring.

The Receiver Circuit

As shown in Fig. 1, a frequency-changer operating on medium waves only is used, the signal grid being tuned by C1 and the oscillator coil by C2. These two condensers will be the two sections of a standard ·0005 mfd. gang condenser; the small condensers in parallel with them are the pre-set trimmers built upon the condenser itself. (In the event of a condenser with no trimmers being used, two ·00005 mfd. pre-sets should be wired in parallel with the condenser sections). Throughout the tuning range the frequency of the oscillator circuit differs from that of the aerial circuit by 465 kc/s, thereby producing an intermediate-frequency of this figure, which is amplified by the 6K7 and demodulated by the first diode of the 6Q7. The second diode of this valve rectifies part of the signal, thereby developing a variable bias, which is returned to the grids of the 6K8 and 6K7 to control the amplification. This A.V.C. (automatic volume control) assures that the output remains fairly constant despite fluctuations in signal pick-up.

Initial Amplification

The triode section of the 6Q7 provides initial L.F. amplification, being followed by the 6V6, which operates the speaker through the usual coupling transformer. All the fixed condensers in the foregoing part of the circuit should be of 350 to 500 V. working, and are of the usual small paper type. All the resistors may be ½ watt components, except the 240 ohm one, where a 1 watt value is desirable.

IN THIS ISSUE

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Smoothing is provided by the choke and C3 and C4. The latter two condensers may be separate components of about 8 mfd., or a twin '8 plus 8 mfd.' or '8 plus 16 mfd.' component. The positive tags or leads must be wired to the choke; the negative tags or leads to chassis. The 6X5 rectifier is a full-wave type, preferably dust-core tuned. This also applies to the oscillator coil. The condenser marked (P) is the padder, and its capacity will have to be correct for the particular pair of coils used. This is stated by the suppliers of such coils. However, as a guide, a definite make of coil, with suitable capacity, is given at the end of the article.

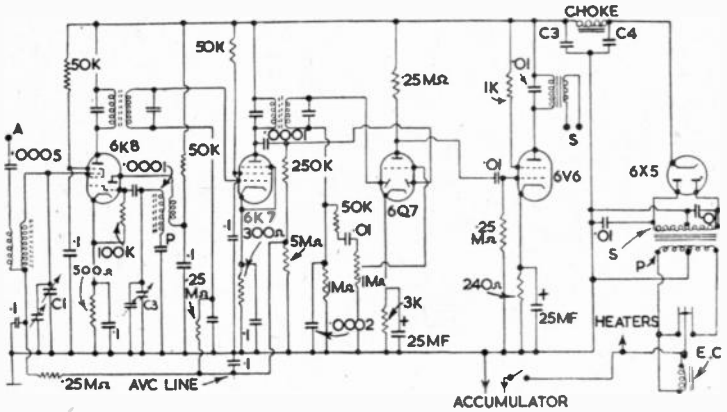


Fig. 1—The theoretical circuit of the receiver

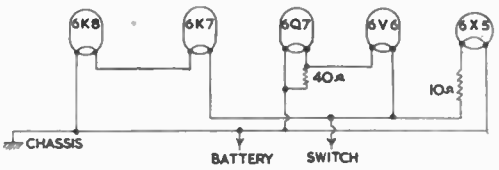


Fig. 2—Heater circuit for 6-volt operation

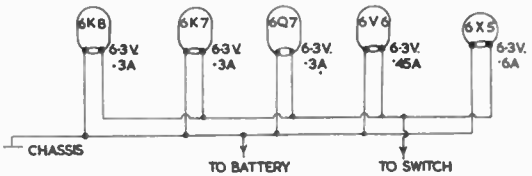


Fig. 3—Circuit to use for 12-volt operation

type, the cathode forming the H.T. positive point.

Component Points

In addition to the parts already mentioned, the valves require special mention. These are very popular types and readily obtainable. They have 6·3 V. heaters, and are suitable for operation from a 6 V. accumulator, when wired in parallel. If wired in series in pairs, as illustrated in Fig. 3, they may be run from a 12 V. supply. This means that the receiver section so far described may be used with either a 6 V. or 12 V. vehicle installation, the heater circuit being wired accordingly. The circuit for 6 V. use is in Fig. 2. These valve types are also available in a somewhat similar range with 12 V. heaters. If these were to hand they could be used with a 12 V. supply. They would, of course, be unsuitable for a 6 V. supply.

The two intermediate-frequency transformers can be of any modern 465 kc/s type. Some are tuned by adjustable dust-iron cores; others by pre-set condensers incorporated inside the screening cans. Both types are suitable.

The aerial coil should be a modern

In the event of Long Waves being required, a pair of L.W. coils, with a 4-pole 2-way switch, could be added. This waverange has been omitted for simplicity. In many areas medium waves only will be required.

The loudspeaker should be a permanent magnet type with matching transformer for 6V6 valve. Its size is not important, and may depend upon the arrangement adopted. A 5in. speaker would be average, but a smaller one may be required if it has to fit in an existing space of limited dimensions.

Vibrator and Transformer

These require special mention, and must be purchased for the voltage which will be used. A 6 V. transformer and vibrator will be unsuitable for a 12 V. supply, and the reverse is also the case.

When the set is switched on, the energising coil (E.C.) of the vibrator makes the armature of the latter vibrate rapidly; this produces a fluctuating current in the primary (P) of the transformer. The secondary consists of many more turns, so that an increased voltage is obtained. This is unsuitable for high tension purposes, but is rectified by the 6X5, and smoothed by the choke and C3 and C4, when it may be used. New and ex-service vibrators for 6 and 12 V. use may be obtained readily; a suggested source of new vibrators is listed. They are obtainable with a variety of bases, and instructions for connections will always be supplied when the component is purchased from a reputable manufacturer. The wiring plan is for type NSB using a 4-pin U.X. holder.

It might be noted in passing that the manufacturer listed can supply a complete unit to operate from 6 or 12 V. accumulator, with means of rectifying, ready-made. This can be used to operate any suitable receiver from the vehicle accumulator.

(*Continued on page* 310)

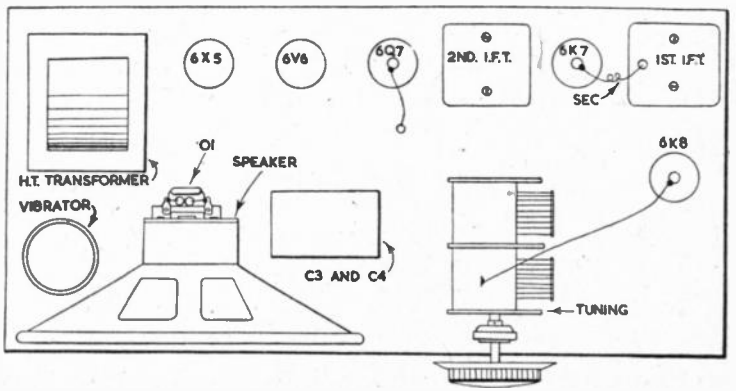


Fig. 4—Top of chassis, showing layout of parts

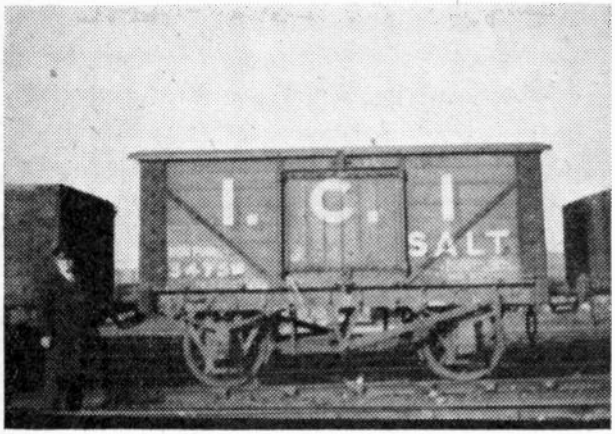
DESIGNING AND BUILDING MODEL RAILWAYS

By E. F. Carter

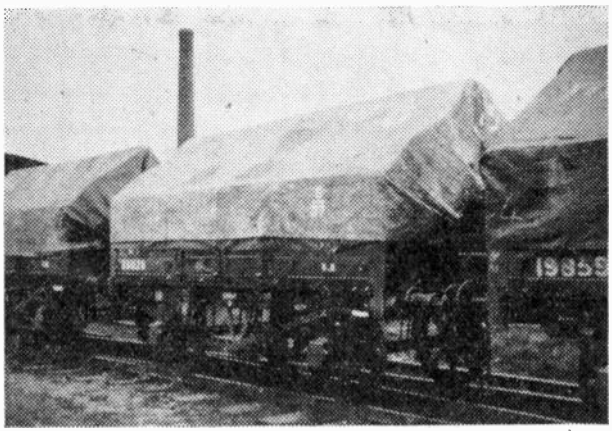
As was mentioned in the last article in this series, the addition of super-details to 'O' gauge wagons makes a very interesting start for the amateur who is desirous of improving the quality and general appearance of his goods rolling-stock.

In the close-up photographs shown was seen the great improvement which corner-strapping and riveting can make to a wagon, and how realistically its appearance is enhanced by even such simple additions to the bodywork.

The work involved is not difficult, nor is it a job which needs special tools or materials. All that is required is a sheet of thin Bristol board, hot-pressed board, or even a good quality post-card,



A high-sided salt van showing strapping



A wagon fitted with tarpaulin improves its appearance

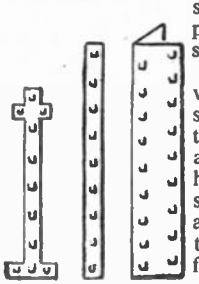
a safety-razor blade of the single-edged variety, and a ruler or straight-edge—preferably made of metal.

A start can be made by cutting off strips from the card a fraction under ¼in. wide, making a longitudinal crease down the centre-line of each strip with the point of a knitting-needle, and using the straight-edge to preserve a straight line when cutting and creasing. A sharp edge, such as a pen-knife blade should not be used for forming the crease, which should not be a cut line, but merely an indentation.

Imitation Rivets

The lengths of card are then embossed with imitation rivet heads in staggered lines as shown by laying the strip on a flat surface of thin sheet lead and pressing the end of a knitting-needle thereon to produce minute humps on the other side of the card. Care must be taken to do this without actually breaking through the surface of the card, and if a sheet lead underlay is used on a hard flat surface, this will not be found at all difficult.

The strips are then painted all over with two coats of French polish or shellac varnish, which will harden them and prevent the rivet heads from being crushed by handling. This shellac varnish can be made by taking half a bottle-full of flake shellac, and topping up the bottle with methylated spirits, allowing twenty-four hours for the shellac to become completely dissolved. The mixture should be shaken occasionally during this period to assist in solution.



Left: Examples of corner plates and strapping

After painting with varnish, the strips should be cut to correct lengths, according to the height of the wagon sides to which they are to be fitted, and they should be folded neatly along the centre-line crease to form an angle strap; noting that the raised 'rivets' are on the outside of the corner.

As to the preparation of the wagons to receive the strapping, all the paint or enamel should first be scraped off at the corners, so that the tin-plate shows up bright and clean; then a little gum benzoin (3d.-worth from the chemist's will do two or three dozen wagons) should be painted on to the bright metal and allowed to dry.

Four straps are then taken and fairly liberally coated with 'Croid', or other 'tube' glue, and when tacky, pressed into position on the metalwork. The glue should *not* be applied to the metal. After all is hard dry—in twenty-four hours or so—the body with its new straps can be painted lead grey and lettered anew.

'Planking'

If it is desired to carry this type of work still further, the wagon sides and ends may be scribed into plank-like appearance with the back of the tip of a pen-knife blade and the straightedge, cutting through the original paintwork of the wagon. This work should be done before the corner-plates are fitted. When all is treated to two coats of not too thick paint, the 'planks' will show up to advantage.

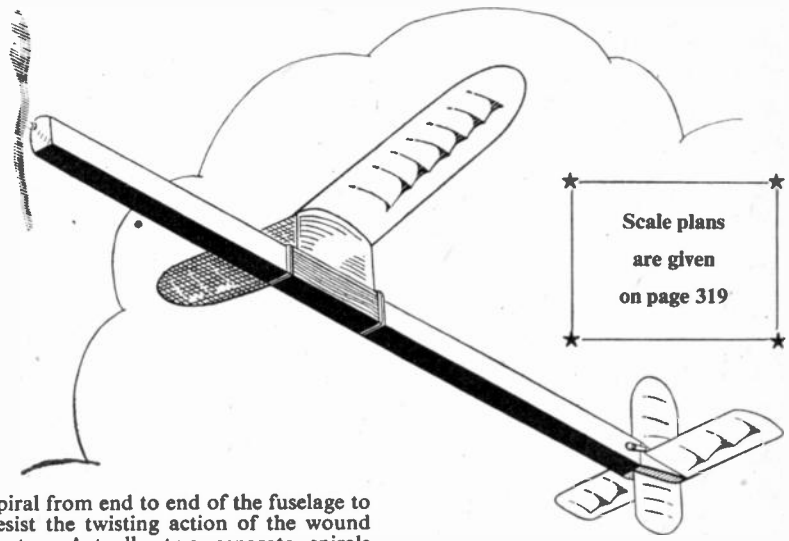
Vertical and diagonal strapping, as

(*Continued on page* 310)

An Unusual Duration Model

MANY people say that duration model aircraft look like freaks. To the person who insists that a 'model' aeroplane should 'look like the real thing', perhaps they do. But where sheer performance is the aim, design requirements for *models* are different from those of full size aircraft. Hence it is little wonder that duration *models* do look quite distinct from full size aircraft.

Quite recently an even more unusual type of duration model has appeared—one in which the fuselage is extremely long and, seemingly, out of all proportion to the rest of the model. The basic reason for this is to use a long length of rubber motor *taut* between front and rear fixing—not a long motor corded or tensioned in a shorter fuselage. There are several advantages to arranging a motor so that it is always taut between hooks as it is unwinding.



Scale plans are given on page 319

Very Successful

When models of this type first appeared many people thought that any advantage obtained from taut motors would be more than offset by the increased weight and drag of the long fuselage. In practice this does not appear to be so. Rubber models with long fuselages have been *very* successful, particularly in the United States, and a good many people now consider them to be superior to orthodox models for duration flying. They are certainly quite nice models to fly.

So far, all the long fuselage rubber models of this type have been in the Wakefield category. The fuselage length has sometimes been 6ft., whilst 5ft. is almost short for this new layout. Such models, however, are rather tricky to build, particularly as regards keeping the weight down, awkward to transport and readily damaged. So if you want to investigate the possibilities of a long fuselage design for yourself, why not try this small model in the same trend which is about one half of Wakefield area and far easier to build? It should, in fact, make a very good duration model in the 'open' category with a performance superior to many larger models.

The main fuselage is a square 'box' 36ins. long. This is built like any conventional fuselage using $\frac{3}{32}$in. square balsa for longerons and spacers, taking extreme care to get the final assembly true. When the basic fuselage is completed, spiral bracing of $\frac{1}{16}$in. square is cemented in place, as in Figs. 2 and 3. This, in effect, carries a $\frac{1}{16}$in. square spiral from end to end of the fuselage to resist the twisting action of the wound motor. Actually two separate spirals are used, starting from opposite corners of the fuselage. The ultimate effect is diagonal bracing strips every second bay. Once you have completed one 'turn' of the spiral bracing, it will be quite obvious where to cement in all the other $\frac{1}{16}$in. square bracing struts. The completed fuselage is then glasspapered smooth and covered with lightweight tissue. Two or three coats of dope should be given, after water-tautening.

Simple Wing Construction

Wing construction is quite simple, using generous sections for the leading and trailing edges. Ribs are slotted into each and then a top spar of $\frac{1}{8}$in. by $\frac{1}{16}$in. balsa is cemented in place. Build the whole wing flat in one piece, then notch the spars at the centre line and re-cement at the correct dihedral. The $\frac{1}{8}$in. sheet centre rib can then be added. Reinforce the dihedral joints by binding with gauze soaked in cement.

The tailplane is a simple flat structure with outline spars, $\frac{1}{16}$in. square ribs and diagonal bracing to resist warping. This is covered on the top surface only with tissue, water-sprayed but not doped. The wing is covered on both surfaces, water-sprayed and given two coats of dope.

The fin is built around the finished tailplane to form a cruciform structure. The fin trailing edge cements in a notch cut in the trailing edge of the tailplane. The leading edge of the fin is notched on the inside to fit over the leading edge of the tailplane. The outline of the fin is completed with $\frac{1}{16}$in. sheet and $\frac{1}{16}$in. square struts then added. Check the assembly for squareness and then cover the fin on both sides.

Former (D) is then cemented to the front of the fin, as shown on the plan, and a plug built up on this former to fit the rear end of the fuselage—Fig. 3. Cut away this plug to clear the rear rubber dowel. Fair in the tail unit with $\frac{1}{16}$in. sheet and cement a paper tube behind former (D). A rubber band passed through this tube and looped over each end of the motor dowel in the fuselage holds the tail unit securely in place. The tail plug can be packed up or down or sideways for trimming, if necessary. Making the tail unit detachable also facilitates transport and makes it easier to load the rubber motor into the fuselage.

Unusual Wing Mounting

The wing mounting is quite unusual. The wing itself is on top of a pylon but instead of this pylon being secured to the fuselage it is an attachment to the wing. This is done so that the wing can be shifted backwards and forwards for trimming.

Between the centre rib and the first rib in each wing, the underside of the mainspar is backed up with balsa down to the full depth of the rib. The wing is cemented on top of a sheet pylon, cut carefully to shape from the plan, and braced in this position by former (A) cemented each side of the pylon, and to the balsa backing in the wing just

mentioned—Fig. 4. The pylon then cements on to a rectangular piece of $\frac{1}{16}$in. sheet (C) which rests on top of the fuselage.

Former (B), also cut from $\frac{1}{16}$in. sheet, is cemented to piece (C) to complete the assembly. The whole pylon is then covered in with $\frac{1}{32}$in. sheet balsa, shaping to fit against the underside of the wing and cementing securely at all points. It is very important to get this assembly true and square.

To save weight the sheet pylon should be punched or cut out with lightening holes. The formers can also be lightened in a similar manner. Use light but rigid $\frac{1}{32}$in. sheet for covering.

It will be seen that when piece (C) rests on top of the fuselage it projects in front and behind the true length of the pylon. Thus rubber bands around the fuselage will hold the assembly securely in place and at the same time allow it to be moved backwards and forward for trim adjustment.

Single-Blade Prop

The propeller follows another modern trend. It is of the single-blade folding type but the blade is carved from *sheet*, rather than *block*. This is an innovation in propeller carving which was introduced less than a year ago. Its advantages are reduced cost, less waste of wood and easier carving.

The sheet blank—in this case $\frac{1}{8}$in. thick—is first cut to plan shape. On the edges of this blank the *position* of the leading and trailing edges of the finished propeller is marked around the edges. The blank is then carved to these lines without further shaping of the block. The resulting propeller is then identical with one carved from a thicker block in the normal manner.

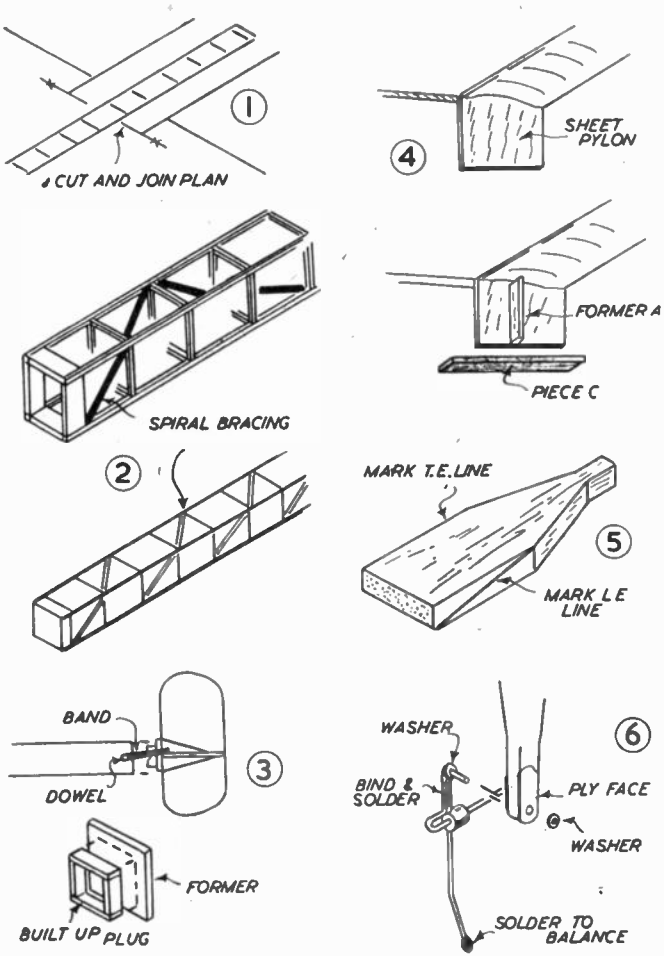
There is just one point to watch in carving a propeller blade in this manner. The underside of the blade is carved first, with the necessary undercamber. Start with the blank the right way round so that the resulting blade is of the normal anti-clockwise type—not the opposite hand. In other words, check the partially finished blade to see if you are working the right way round.

A simple wire hub assembly is used, with a short length of $\frac{1}{4}$in. diameter dowel for the hub. Shaft, winding loop and propeller hinge arm are bent from a single piece of wire. A second piece of wire is bound and soldered in place—Fig. 6—fitting in a notch in the dowel hub and extending the other side to carry the balance weight. Face both sides of the blade root with thin ply or celluloid and drill to fit the hinge wire. Washers soldered each side will locate the blade accurately. Solder is added to the end of the balance arm to achieve static balance. Centrifugal force will hold the blade out when rotating, but a stop can be incorporated to limit the forward movement of the blade, if desired.

Remaining details of the model should be clear from the plan. Normally no undercarriage is fitted, nor is a spring tensioner of propeller stop necessary. The motor will remain taut when unwound, the propeller blade will then fold on top of the fuselage with the balance weight hanging downwards. If an undercarriage is required a simple wire skid type will suffice.

Ample Power

Eight strands of $\frac{1}{4}$in. strip rubber should be ample power. This is made up into a motor 35ins. in length which should then be just taut between hooks when assembled in the model. With the tailplane at zero incidence, the model is balanced by sliding the wing backwards or forwards along the fuselage until the centre of gravity comes under the trailing edge. After that, normal trimming technique can be applied. (452)



FULL-SIZE PLANS

For those who do not wish to scale up the plan provided, a full-size one (24ins. by 18ins.) is obtainable from the Editor, Hobbies Weekly, Dereham, Norfolk, price 2/6, post free.

Other full-size plans obtainable at 2/6 include: High Wing Monoplane (rubber), Pusher Monoplane (rubber), Beginner's Control-line Model (power), Class A Team Racer (power), High Performance Glider, 'Jetex' Duration Model ('Jetex' 100), and Cabin Seaplane (rubber). A plan for a simple Whip Control-line Model is available at 1/9, post free. To assist new readers, building details for any of these aircraft are still obtainable.

Final notes on
Making Your Own Car Radio

(*Continued from page* 306)

The secondary rating of the vibrator transformer shown is not critical; a rating of 150 to 250 V. would be average. This component must be of the type definitely produced for this purpose.

Notes on Construction

Sound construction and wiring are, of course, necessary. Leads should be short and well insulated, and the tag ends of components not allowed to touch the chassis. The size of the latter is not critical, and will depend upon whether the speaker is to be built into the receiver, or to occupy a separate case in the vehicle. A chassis 8ins. by 6ins. would be average, but if the constructor finds the compact assembly difficult, a larger chassis may be employed.

Instructions on the installation of suitable aerials have been given in past issues, and lack of space prevents their reproduction here, at present. A stout wire the length of the vehicle roof, outside, supported on insulators, provides good signal pick-up. A vertical wire or rod, fixed to the vehicle in some convenient position, may also be used. A wire inside will be very inefficient except with wooden bodywork, while wires suspended under the running boards or vehicle chassis, though sometimes used, are not particularly effective.

Operational Notes

The receiver must be aligned. This consists of tuning all the intermediate-frequency windings (four in all) to the same frequency. If an oscillator is available, set this at 465 kc/s and inject the signal into the 6K8 anode. Then adjust the I.F. transformer cores or trimmers with an *insulated* tool for maximum volume. If no oscillator is available, attach a long aerial to (A) and tune in the local station. Then adjust the I.F. trimmers or cores for maximum volume, endeavouring to keep them in a mid-way position. A short aerial should then be substituted and aerial and oscillator circuits aligned. To do this, tune in a station of low wavelength and adjust the trimmers associated with C1 and C2 for maximum volume. Then tune to a high wavelength station and adjust the coil cores for maximum volume.

The whole procedure should then be repeated to cancel out any slight changes which have arisen through subsequent adjustments.

The usual precautions should be taken to suppress ignition and other interference, which will otherwise be picked up by the receiver and amplified to considerable volume. It is intended to give details of these aspects of the installation in a future issue.

Vibrators and the power-supply unit mentioned may be obtained from Messrs. Wright & Weaire, Simonside Works, South Shields, Co. Durham. Suitable coils of the type mentioned may be obtained from Supacoils, 98 Greenway Avenue, London, E.17. For these, condenser (P) should be ·0005 mfd. When aligning, the AVC line (Fig. 1) should be shorted to chassis.

Finally, the receiver may be used with A.C. mains by removing the vibrator and vibrator transformer and substituting a mains-transformer for the latter. This transformer should have a 250-0-250 V. high tension secondary, with 6·3 V. secondary for the valves. (455)

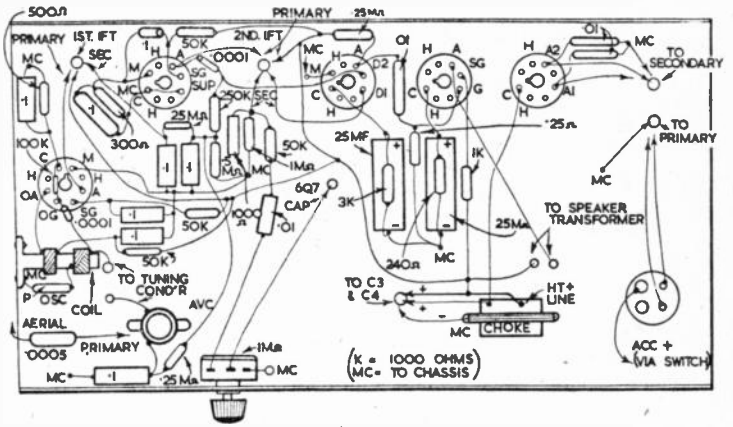


Fig. 5—The under-chassis wiring plan

DESIGNING MODEL RAILWAYS

(*Continued from page* 307)

well as dummy hinges may also be cut from card and applied as already mentioned, everything being held in place by the glue, and protected from atmospheric moisture by the shellac treatment and the subsequent painting.

There are practically no limits to the amount of small detail which can be applied in this manner, and all will be well if it is remembered that, in 'O' gauge (7 mms. to 1ft.) scale, for every 1ft. on the real thing, 7 mms. (about ¼in.) must be taken on the model. If this important point is carefully noted—always—disproportionate fittings, which inevitably mar any model, will be avoided.

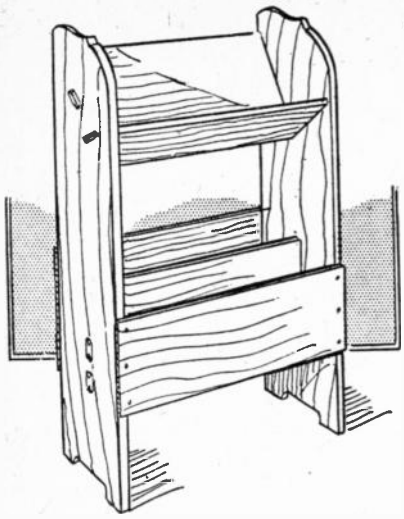
An old wagon, treated semi-experimentally in this way will reveal the great possibilities of even such simple methods, and the reader is advised to make a start in this way, so that proficiency is obtained before attempting the treatment of better-class vehicles on his railway.

It is very important that no work in card should be fitted or painted without treatment with shellac varnish, for without it, dampness will surely disfigure the work in a very short time. Neither should any attempt be made to stick card to metal before treatment with gum benzoin, for without its use, a firm lasting attachment is impossible.

Now just a few hints about the paint used, and the method of using it. Never use paint which is too thick and 'treacly', or attempt to cover work with one such coat. It is imperative to use *at least* two coats of thin paint, allowing each to dry hard before applying the subsequent one. Such work will surely give a 'professional' finish to your job.

In the writer's confirmed opinion, it is much better to purchase a small tin of 'model-makers' ' paint—specially made for such work—than to try to make do with ordinary 'household' paints, strained and 're-hashed'. The latter paints, though good for the type of work for which they were made, are definitely second-rate when used for models. Remember, too, that painting can either make or mar an otherwise excellent job of work. (484)

Handy Book and Newspaper Rack



THIS useful article of furniture provides a convenient rack for newspapers and magazines, and a trough for a few favourite books or library volumes as well, keeping all tidy. It can be made of any wood available, though if oak or other suitable hardwood can be got, a much more pleasing article will, naturally, result. A thickness up to 1in. can be considered suitable; if a choice exists, then use ½in. wood, which is quite strong enough.

Construction is quite simple, and within the scope of any handy woodworker. A side section and front elevation are given in Fig. 1, with dimensions. Cut the two side pieces to length and width given, and shape up the top and bottom parts. The top part is shown enlarged, and over 1in. squares, in Fig. 2, so that copying the shape is rendered easier. About the best plan is to draw the squares on stout paper, trace the design, and cut out. Then the pattern can be laid on each side in turn, and a pencil run round to mark its shape on the wood, and get both sides alike. A bow or keyhole saw will do the cutting quite easily.

The two boards (A) and (B) comprising the book trough, are tenoned into the sides, also the bottom vertical division in the rack. These parts are cut to length, plus the length of the tenons, which should be ⅛in. more than the thickness of the sides, so that they will project that amount outside. Fig. 2 (C) shows the division ends, and Fig. 3 (A) and (B) the ends of the book trough. Cut these tenons accurately, to ensure a good fit across. The necessary mortises in the sides must also be true to size, to leave no ugly gaps in the work afterwards.

To find and mark the correct spots for the mortises for (C) at a distance of 6ins. up from the bottom of each side piece, pencil two lines, the thickness of the wood apart, up the centre. Place the ends of (C) on these lines and pencil round the tenons. All four can be chiselled out easily enough, and should be tried for fit.

To mark the mortises for the book trough, draw a line, starting at 6ins. down from the top, and sloping towards the bottom at an angle of 60 degrees, as shown in Fig. 2. Now place piece (A) on the line, in its correct position, and pencil round the tenon, as before. Cut out, then fit (A) in its mortise, place (B) against it, at right angles, and pencil round the tenon on that also. Glue and nail both (A) and (B) together, then glue all three parts between the sides of the rack. Knock the joints together, closely, and leave for the glue to get hard.

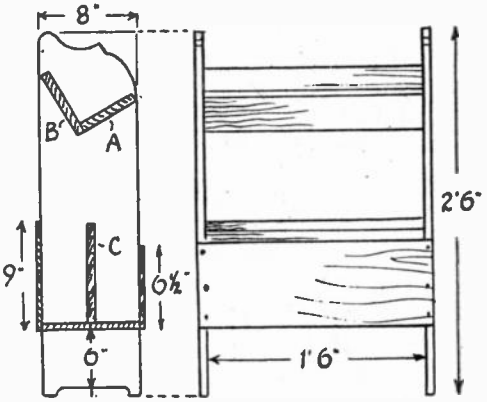


Fig. 1

The joints can be strengthened by the addition of a few oval nails, driven into them above, and below, the tenons. The projecting ends of these tenons should be very neatly chiselled to a diamond formation, a job more easily done before gluing together, then the ends, instead of being something of an eyesore, quite improve the appearance. To finish the rack, a bottom and side pieces are to be fixed across.

The sectional view shows these parts. Cut the bottom from similar thickness wood to the rest and nail across, both to the sides and middle division. The front and back parts, the widths of which are given in Fig. 1, can be cut from plywood. They are screwed across, both to sides and rack bottom. Employ round-headed brass screws here, they look more ornamental than the ordinary flat-headed kind.

Give the completed woodwork a thorough rubbing with medium and then fine glasspaper. All nail holes should be stopped up level, the head having been punched down beforehand.

CUTTING LIST

Sides (2).	2ft. 6ins. by 8ins. by ½in.
Division (C).	1ft. 7½ins. by 7ins. by ½in
Book trough (A).	1ft. 7½ins. by 5ins. by ½in.
Book trough (B).	1ft. 7½ins. by 6ins. by ½in.
Rack front.	1ft. 7ins. by 6½ins. by ½in.
Rack back.	1ft. 7ins. by 9ins. by ½in.

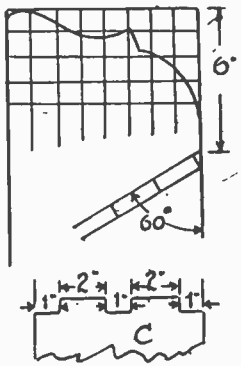


Fig. 2

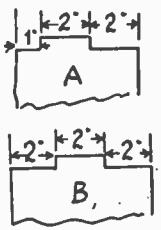


Fig. 3

Coloured stopping should be employed here if the work is to be stained walnut or oak. A combined stain and varnish can be used, but a better result is obtained if the wood is stained first, and then coated with a clear oak varnish.

If deal or other common wood is used, a really better finish can result if the article is given an undercoat, then enamelled, or painted with one of the glossy paints now on the market. (477)

INVENTORS ON STAMPS

THE dictionary tells us that the word 'invention' means the finding out of something new, but it does not tell us anything of the human stories connected with the word.

Throughout the centuries men have spent their whole lives looking for improvements to help ease the lot of their fellow men. Many have endured hardships and lived in poverty, but, in the end, they have triumphed over adversity.

It is only natural, therefore, that many countries have honoured these heroes on their stamps, for they are justly proud of them.

The aeroplane is, perhaps, the greatest invention of the present century. The Frenchman, Louis Bleriot, is well-known as a designer of early aeroplanes, and in 1909 became the first man to fly across the English Channel. The 25th anniversary of this feat was commemorated by France in 1934 with the issue of a 2f. 25c. stamp depicting Bleriot's monoplane over a map of the Channel. The monoplane was also illustrated on the 25-125s. value of the Latvia 1932 Air Charity set, whilst a portrait of Bleriot himself appears on the 10fi. of the Hungary 1948 Airmails, depicting various inventors and explorers.

The aeroplane was preceded by the airship, with which the name of Count Ferdinand von Zeppelin will always be most closely associated. Count Zeppelin was responsible for the development of airships in Germany for both commercial and military purposes. Of the many airships, or Zeppelins as they are popularly known, which he built, the Graf Zeppelin is by far the most famous and the most successful. The Germany 1934 Air stamps show Count Zeppelin with the Graf Zeppelin on the 3m. value. Count Zeppelin can be seen with David Schwartz on the 6fi. value of the Hungary 1948 Air Inventors and Explorers set.

Men had been ascending in balloons before both the airship and the aeroplane came into being, but it was not until later that Professor Auguste Piccard, the Swiss scientist, attempted flights into the stratosphere with a free balloon and air-tight gondola. Belgium illustrated Piccard's balloon on the 1932 set of three values in aid of the Scientific Research Fund.

George Stephenson will always be remembered as the inventor of the locomotive. His first locomotive was designed in 1814, but the following year Stephenson was responsible, with Sir Humphrey Davy, for the production of a safety lamp for miners. Many other locomotives followed, including the famous 'Rocket', which attained the then remarkable speed of 35 m.p.h. A portrait of Stephenson can be seen on the 5fi. value of the Hungary 1948 Inventors and Explorers set.

An American, Robert Fulton (1765-1815) was the inventor of the steamboat and also of flax-spinning and dredging machines. His portrait also appears on the Hungary 1948 set, on the 4fi. value.

Marconi depicted on a 50 cent Italian Stamp

A French stamp bearing the portrait of Claude Chappe

The pioneers of the modern motor car were mostly German. Karl Benz (1844-1929) built a motor car driven by benzine in 1885 with a maximum speed of 15 m.p.h. Benz' compatriot, Gottlieb Daimler (1834-90) invented a motor bicycle in 1885 and a petrol driven car in 1887. Germany honoured these two pioneers in 1936 on the special issue to commemorate the Berlin Motor Show and the 50th anniversary of the First Motor Car. A portrait of Daimler can be seen on the 6pf. and one of Benz on the 12pf.

The telegraphic system of the American, Samuel Morse (1791-1872), was devised in 1837 for use with the self-recording telegraph. Morse had conceived the idea in 1832. The system was widely adopted after the first line between Washington and Baltimore was opened in 1844. The centenary of the telegraph in 1944 was the occasion of a special 3c. stamp to be issued by the U.S.A. showing a pole and wires. The U.S.A. depicted Morse on the 2c. value of the Inventors Section of the 1940 Famous Americans set. Peru commemorated this centenary with an issue of two stamps bearing a portrait of Morse, whilst Argentina devoted her 1944 Postmen's Benefit Fund 3c. stamp to his picture.

The semaphore telegraph was invented by Claude Chappe, the Frenchman (1763-1805). He presented his invention to the French National Assembly in 1792 and it was adopted for general use after a trial between Paris and Lille in 1794. The 150th anniversary of this invention was commemorated by France in 1944 with a 4f. stamp depicting Chappe, whose portrait also appears on the 1949 10f. marking the International Telephone and Telegraph Congress.

The inventor of the telephone, Alexander Graham Bell (1847-1922), was a Scottish-American. He was born in Edinburgh, went to Canada in 1870 and became Professor of Vocal Physiology at Boston University in 1872. He patented his telephone in 1876. The U.S.A. honoured Bell on the 10c. value of the Inventors Section of the 1940 Famous Americans set, whilst Canada commemorated the centenary of his birth with a 4c. stamp showing Bell and the allegory of fame. Argentina devoted her 1944 10c. in aid of the Postmen's Benefit Fund to a portrait of Bell.

Marchese Marconi (1874-1937), was the son of an Italian father and an Irish mother. He migrated to England as he received no encouragement for his experiments from the Italian Government. In 1901 he was able to successfully transmit signals by wireless telegraphy across the Atlantic. His system came to be used by all ships and was instrumental in securing the arrest of the murderer Crippen in 1910, when he was on his way to America with Ethel le Neve. Italy honoured Marconi with the title of Marchese and his portrait can be seen on a set of three stamps issued by Italy in 1938.

Another Italian, Antonio Pacinotti, is credited with the invention of the dynamo in 1859. Italy marked the 75th anniversary of this invention with two portrait stamps in 1934.

One of the most indispensable of

(*Continued on page* 315)

MAINLY FOR MODELLERS

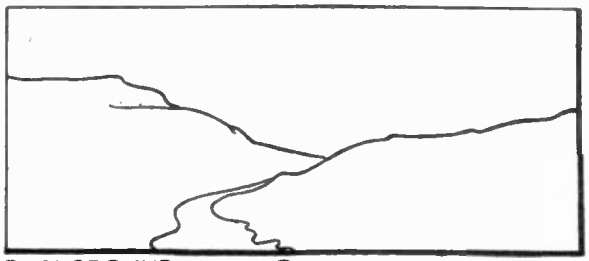
Why Not Try a Scenic Background?

DURING the year, the writer acts as judge at many model exhibitions and often wonders why model-makers do not try their hand at a little scenic model work of a simple and straightforward type. I do, very often, see prizes going begging because there have been no entries in this particular class. If the worker has a flair for painting and drawing, he would find this branch a stimulating interest, and a diversion from ordinary model work.

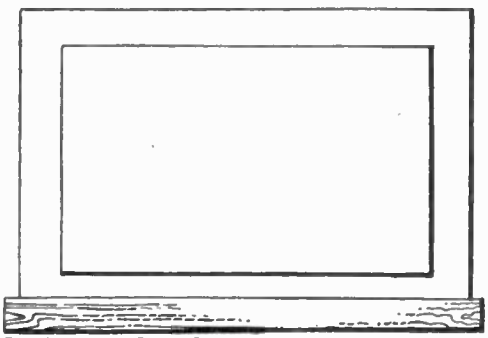
If you have a house model or, perhaps, a good model windmill, why not show this with a scenic background? In Fig. 1 you will see a good plan on which to work. The backsheet can be rounded to fit into a case and drawn up on thin Bristol board or Whatman's heavy cream paper. Being in the distance the treatment should be light and the hills carried out in a bluey-white. Clouds should be in a wash with a wide brush in pale blue. Cloud effects can be made by wiping off with a clean cloth dipped in water and before the wash is dry. You can alter this background to suit the model. A wooded hill with a small spired church will add realism. I know some model makers who now have a set of these backgrounds and these they use according to the model they happen to be exhibiting. Imagine the effect when they have to take a photograph. There is no fitting up of awkward sheets and other difficult bits and pieces. A framework, shown in Fig. 2 will help to bring out the depth of the model. This should be 2ins. wide flat wood and stained in light oak. The model can then be raised on a platform of 1½ins., which again much improves the appearance. In Fig. 3 are shown the side 'flats' as we call them in theatrical terms. Embodied in one of these you can have the top gable of another small cottage.

For these parts, study perspective,

(*Continued on page* 316)

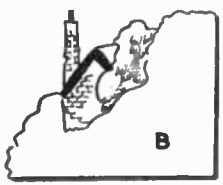


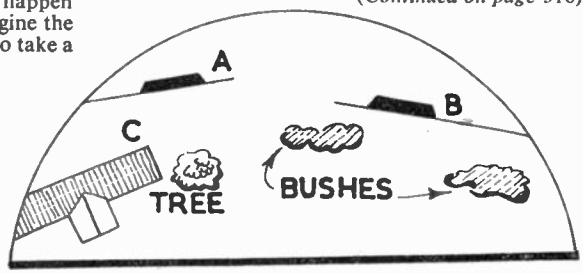
BACKGROUND ①



DISPLAY FRAME ②

③





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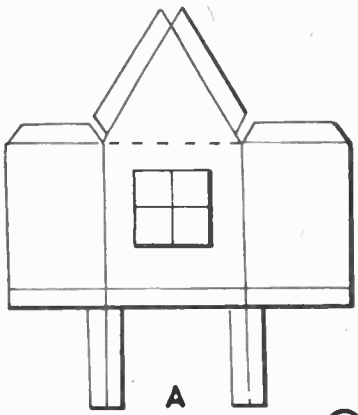

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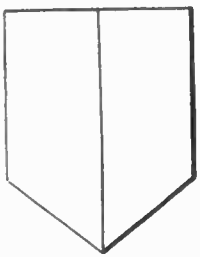
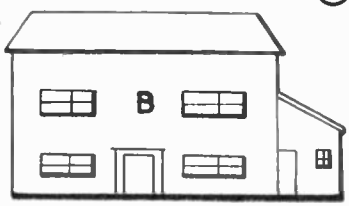




These drawings will assist the modeller.

Effective methods of
WORKING IN METAL

Fig. 1

DESCRIBED here are two very effective methods of working in metal for the making and decorating of name plates, etc. It is not proposed to go deeply into the art of high-class repoussé work, because it is a specialised subject, and one which may incur a considerable expenditure for certain tools which are necessary for such work. Instead, we will deal with the subject in the simplest way.

Repoussé work is the forming of raised designs on metal by hammers and punches, the design being worked up from the reverse side or face of the plate. Various kinds of punches can be purchased, as also can the pitch bed or block upon which the actual 'raising' of the metal is done. Both can be easily made at home, however. You will need several punches of different sizes and shapes, and a piece of mild steel about ¼in. square can be easily worked into tools and shaped as desired (see Fig. 2). A cold chisel will also be needed to cut the metal to size, together with a file or two to reduce the ends to shape, and a few pieces of glasspaper to smooth and polish the end of the tool so that it will not scar the metal.

A metal box should be obtained or made from tin plate to contain the pitch. The pitch itself is prepared by heating and mixing the three ingredients —pitch, plaster of Paris and tallow. The mixture is pitch and plaster in equal parts, with one-tenth part tallow.

See that the pitch and plaster are dry, so that the moisture will not cause the pitch to boil over. Keep stirring the mass so that it really never boils. Melt the pitch first, and add the plaster gradually.

For a trial piece of metal work, tackle a house name plate such as that shown in Fig. 1. Before we can commence work upon the metal, however, we shall need to draw out on paper an alphabet of simple letters (Fig. 3). Each letter should be between ¾in. to 1in. deep, with width in proportion.

Do not attempt an elaborate or well finished letter. The ones shown, consisting of simple shapes and curves, will answer well, and give an old-time effect to the plate.

Having drawn out the alphabet, line it up with ink so as to preserve it for future use. Then, on a strip of tracing paper, or any thin transparent stuff, rule two lines to the width of the letter

Fig. 2

and trace in the name selected for the design, moving the tracing after each letter has been added. Care should be taken to get the spacing between each letter consistent throughout (see example Fig. 1).

Now take a piece of brass or copper of suitable gauge for practice work, and, with carbon paper, transfer the lettering to the metal. Lay the metal on the pitch bed and go over the outline of the lettering lightly with the chisel-edged tool, and, in doing so, endeavour to make the lines continuous.

After this, heat the pitch slightly and place the metal face downwards on the pitch. With the 'raising' punches work the shapes of the letters, the indentations, of course, being worked into the pitch.

When all the lettering has been done, and pressed in to an even depth, turn the metal over and touch-up any places improperly 'raised'. It may be found that the plate has warped a little. To remedy this, it should be annealed before attempting to flatten. Heat the plate to a dull red heat over a gas jet, and then allow it to cool off gradually, when it will become soft enough to flatten easily by hand.

The outline of the plate is next drawn in, and some workers may wish to form a rib all round as indicated in Fig. 1. This, in a similar way to the lettering, can be 'raised' and rounded, care being taken to get the roll the same depth all round and with the outer edge even and flat, so that it will later sit flat on its mounting board.

This latter should be of a suitable hardwood, preferably oak, cut to some simple outline as shown. The cutting is done with the fretsaw, of course, and the cut edges are afterwards cleaned

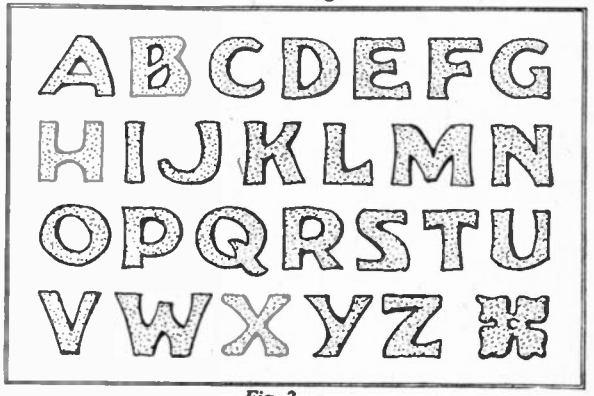


Fig. 3

with fine glasspaper.

In cutting the metal to outline use a special metal cutting fretsaw, lubricated with oil or grease. The face of the metal should be cleaned with fine pummice powder and oil.

Coat the cleansed metal with lacquer to prevent tarnishing and bad colour.

As a help to the worker, it should be mentioned that suitable pitch for making the pitch block can be obtained from any good-class ironmongers quite cheaply in 1lb. to 7lb. cartons. The type of hammer used for 'raising' the metal is shown in Fig. 4, together with the type of hand shears suitable for cutting the

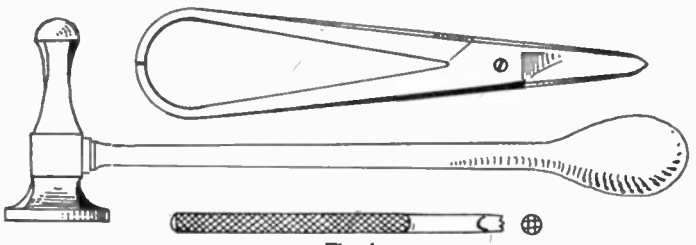


Fig. 4

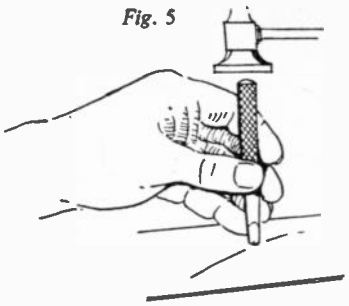
metal when this is not of too great a thickness.

Now for a description of the second method of decorating a name plate, by means of the lining tool and matt punches. Brass or copper are suitable metals, and the name plate design chosen for the first example can be used for this method of finish.

The process of drawing out the lettering and transferring it to the metal is the same as for the previous example. To set the lettering permanently, the outlines should be gone round with a scratch tool. Like this the shapes will not become obliterated during the finishing work with the tracing tool. When this is done a start can be made with the tools. The first thing to do, however, is to fix the plate firmly to a piece of soft wood that will form a solid ground during the matting process.

The outline of the letters should first be indented with the tracing tool. This is not a difficult job, but it would be well to get a little practice first on a piece of waste metal, so as not to spoil the original plate. The manner of using the tracing tool is shown in Fig. 5, and note that the tool is held by the index finger and the thumb, the little finger being placed on the metal and resting against the tool. Thus the tool is steadied while the blows of the hammer drive it steadily forward, and forms a continuous indented line.

Fig. 5



The tool is held sloping slightly backward, the effect of the blows being then to drive it forward. Practice will soon make for perfect and easy handling. The indented line does not need to be deep, the main object being to obtain one that is even and continuous.

Decide on the shape and outline of the plate, and here again form an indented line all round. The matting process will be carried up to this line.

The matting is essential and employed to give a background and to show up the lettering plainly. Matting tools can be obtained as two-point, three-point or four-point, and take the form shown in Fig. 4. They are generally about 3¼ins. long and ¼in. diameter and have a chequered top portion to afford a grip for the fingers. If the worker cannot get these matting tools, they can be easily made at home from large round nails cut down to the length mentioned and with the points filed off. Good matting points can be produced by just filing a cross on the flat end with the edge of a half-round file or a vee file. A chisel-edge tracing or lining tool for lining in can be similarly made from a nail, if desired.

When using the matting tool keep a more or less consistant spacing all over and do not punch too deeply. Cut in just sufficiently to get contrast and light and shade between letter and background. With this second method of working, of course, the contrast in lettering is not so great nor so effective as the raised repoussé finish, but it is, nevertheless, a satisfactory and simple means of making these name plates.

It only remains now to clean up the surface and edges of the plate and drill a few holes for fixing it to a piece of wood. A plain oblong panel would look quite well, especially if a chamfered edge were worked round it. If a shaped board is desired, then it could take the form of that shown in Fig. 1. Brass or copper round-head screws should be used for fixing the plate to the wood backing.

If a finish of oil and stain is used on the wood, this should be applied before the plate is fixed.

INVENTORS ON STAMPS

(*Continued from page* 312)

present day necessities, the electric light, was the invention of the American genius, Thomas Edison (1847-1931). Although an American, Edison was of Dutch and Scottish descent. His many other inventions include the megaphone, the kinetoscope—forerunner of the modern cinematograph, and the carbon telephone transmitter. U.S.A. marked the centenary of his birth with a special 3c. stamp in 1947, and commemorated the 50th anniversary of his first electric lamp with a 2c. stamp in 1929. A portrait of Edison appears on the 8fi. value of the Hungary 1948 Air Inventors and Explorers set.

A somewhat older invention is the electrical battery, which was invented in 1800 by the Italian, Count Alessandro Volta (1745-1827). Volta also invented a hydrogen lamp in 1777. The 150th anniversary of Volta's discovery of the electric cell was commemorated by Italy in 1949 with an issue of two values showing Count Volta and a Voltaic pile.

In the field of electro-dynamics, the name of Andre Marie Ampere (1775-1836) is one of the most well-known. The unit of strength of an electrical current, the ampere, took its name from him. France commemorated the centenary of his death with a 75c. portrait stamp in 1936.

Another Frenchman, Blaise Pascal (1623-62), was responsible for the hydrostatic press and a calculating machine. A portrait of Pascal can be seen on the 1f. 20c. value of the 1944 National Relief Fund set.

Credit for the invention of the printing press is generally given to Johann Gutenberg (1397-1468), the German, whose Bible printed between 1452 and 1455 was sold for £3,400 in 1873. The French Zone of Germany issued a 30pf. plus 75pf. stamp in 1947 bearing Gutenberg's portrait, which is also featured on the 1fi. value of the Hungary 1948 Air Inventors and Explorers set. The 1939 300th anniversary of the first printing in America was the occasion of a 3c. stamp showing the Stephen Daye Press.

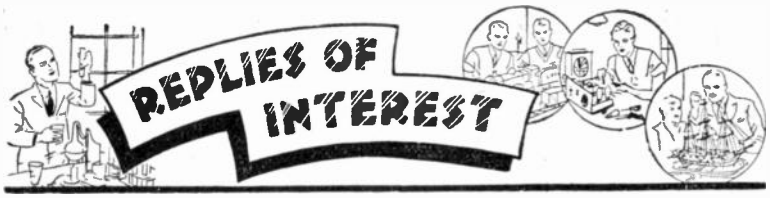
The art of weaving was revolutionised in 1801 by the invention of a silk-weaving loom by the Frenchman, Joseph Marie Jacquard (1752-1834). By the time of his death, his machine was in almost universal use. The centenary of his death brought a special stamp from France in 1934.

Every housewife has at some time blessed the inventor of the sewing machine, even if she did not know his name. He was in fact Elias Howe (1819-67), an American, who produced his first lock-knit sewing machine in 1845. Improvements were later made by Isaac Merritt Singer, who by virtue of his name having been given to a machine, is more well-known. U.S.A. honoured Howe philatelically on the 5c. stamp of the Inventors Section of the 1940 Famous American set.

Manufacture of clothing was made easier by Eli Whitney (1765-1825) when he invented the cotton gin for separating the seed from the fibre of cotton. Whitney's portrait appears on the 1c. value of the Inventors Section of the 1940 Famous Americans set.

The invention of the incandescent gasmantle was the work of an Austrian, Carl Auer von Welsbach (1858-1929). His portrait may be seen on the 40g. value of the Austria 1926 Charity set devoted to Inventors.

The man who made the hobby of stamp collecting possible, Sir Rowland Hill, the inventor of the first adhesive postage stamp is featured on the stamps of many countries, but not, of course, on the stamps of this country, who do not print any other than portraits of the King and Queen on our stamps. Many people feel that the country is the loser by this rule and hope that, in the future, we may see a change. (482)



Terrazzo

I WOULD be very glad if you could tell me how I could do hand Terrazzo, or what tools I would need. (F.F.—Manchester).

WE presume you refer to Terrazzo—a crude form of mosaic work, and if so, this can readily be done. All that is needed is, firstly, a firm foundation, usually of concrete. When set, the concrete is floated off with a mixture of cement and sand, in proportion of about two of sand to one of cement. While this layer of cement which should be about ¼in. thick, is still wet, broken pieces of coloured marble about roughly 1in. square are scattered over it, and well pressed in, preferably with an iron garden roller, which should be wetted with water from time to time and kept free of adherent cement. All the tools needed are a 'float'—that is, a flat straight board about 4 to 6ins. wide and ¾in. thick and wide enough to cover the required area—it is used to level the cement. A shovel for mixing and a trowel for spreading the cement, complete the list of essential tools.

* * *

Auto-Bias

I HAVE converted a T/R9 receiver, and would like to fit automatic bias to the last two valves. Could you inform me of the values, and laws to calculate them? The 3rd valve is 1·5 G.B., 4th 4·5 G.B. (K.G.—Chesterfield).

AUTO-BIAS can be provided by adding resistances which will drop 1·5 and 4·5 volts to obtain these values of bias. The value of the resistances will depend upon the current flowing, which will be the total of all the screen grid and anode currents taken by the valves, and may be found by reference to valve lists or measuring with a meter. Divide the voltage required by the current flowing, in amperes (1 ampere equals 1,000 milliamperes). The resultant figure is the resistance required. For example, if the set consumes 10 mA (an average figure) 150 ohms will be required for the 1·5 V. bias point. As the 4·5 V. point will only require a further 3 volts (this being added to the 1·5 V. already developed) 300 ohms would be wanted, with 10 mA flowing. Connections would be: one end of 150 ohm resistor to chassis. Second end to G.B. 1·5 V. lead and to 300 ohm resistor. Second end of 300 ohm resistor to G.B. 4·5 V. point and H.T. negative on battery. It will usually be necessary to wire condensers of about 12 to 25 mfd. (6 V. working or so) from each G.B. point to chassis, to maintain stability.

* * *

Casting

I AM very interested in the making of plaster casts, etc., using various moulds, plaster of Paris being the chief ingredient. I now have the idea of using instead the powder of marble chippings (after they have been ground down), as they have a very fine crystallised brilliance. Could you please tell me the name of any substance, which after being mixed with the marble powder, would set rock hard and still retain the crystallised brilliance? (C.E.—Swansea).

MARBLE chippings could be used with ordinary cement, but the result would not be very satisfactory, as the marble appearance would be lost. This problem has been tackled by a firm who produce mixtures for making castings which look exactly like marble and other rocks. These are normally made in flexible synthetic rubber moulds. The firm is the Karlena Art Stone Co. Ltd., 55 Deansgate Arcade, Deansgate, Manchester, 3. Ask for leaflets. They supply the material for the flexible moulds, and the stone powders are called Karlenite. This casts into a plain stone colour, but they supply veining pigments which are worked in to get the marble effect.

* * *

Old Picture Frames

I HAVE several large old picture frames, which have been covered with ornamental plaster. I would like to remove this without damage to the wood as I want to wax the plain wood. (C.M.—Chelmsford).

USUALLY the foundation or wooden frame (with a plaster facing) is quite rough and will need making smooth before it can be waxed. However, to remove the plaster the easiest way is to break it off by careful tapping with a hammer and if need be, with a blunt chisel. Then clean up the wood with medium glasspaper, scrub with warm water—allow to dry—then prepare the surface for waxing.

Why Not Try a Scenic Background?

(*Continued from page* 313)

and as they are slightly in the distance do them in a light poster treatment. Flowers and flowering shrubs can be picked out in bright enamels. These give a slightly raised effect and add lustre. These sections should be made with a wood block at the back and a strut of thin wood up the side. Drawings (A), (B) and (C) show the simple line to follow. To break up joins try a little scenic work with loofah dyed the right colour, dyed bass, tissue paper and beads of rice. Cover up all disjointed effects.

If you are ambitious, you may care to light up the model, for this is always a source of interest at any exhibition. You may pick up some good lighting tips by studying window displays at night. You must make the shadows soft and misty in the distant parts and more definite towards the front. If you study the effect of the sun on the trees in the late evening you will notice that the trunks, which are normally dark brown, tend to a yellowish green in this particular light. Remember that when the sunset forms the background, the visible features in the west should be in darker tones, as if they were screened from the glow of the setting sun, whereas the objects to the East would be more tinged with the reflection of reds.

Build your highest trees on the right and, preferably, if you are showing a model building, have this on the left as you look at it. The curling road is another improvement on any model of this type and here you can put in just that odd bit of railing to the right of the road.

In Fig. 5 you will see the simple partly made house which is easy to make and could be a house or an Inn. It can be improved with strips of spills used as the wood slats. Do not overcrowd the scene and cover up all gaps which may be seen in the sets. Additional loofah bushes will help to break up the setting. Dull creams, fawns and yellows are best for these types of houses. Oddments of distemper can be used and also poster paint used fairly thickly. For the roof one can use thick paint of the 'flat' type put on and left to dry. Then give a second coat and scrape down with a comb or cut-down paint brush.

If using any lighting, and the model is fairly well enclosed, consider the danger of heat which would tend to steam the model and cause the card to crumple. To keep the model clean, line the top with some greaseproof paper. This gives a pleasing effect and is easy to replace. (452)

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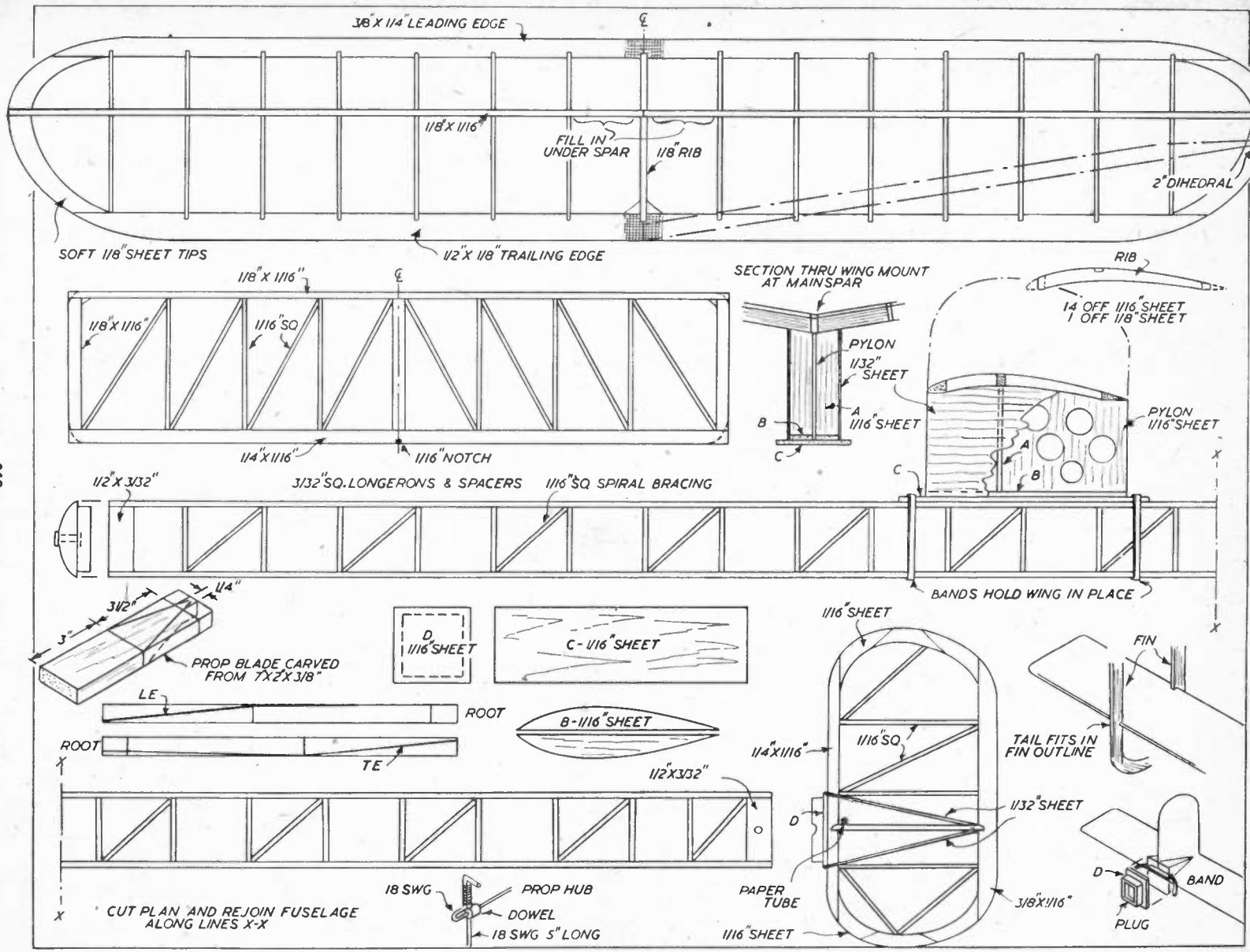
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1/8"X 1/16"
FILL IN UNDER SPAR
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2" DIHEDRAL
SOFT 1/8" SHEET TIPS
1/2"X 1/8" TRAILING EDGE
1/8"X 1/16"
1/8"X 1/16"
1/16" SQ
1/4"X 1/16"
1/16" NOTCH
SECTION THRU WING MOUNT AT MAINSPAR
PYLON
1/32" SHEET
A
1/16" SHEET
B
C
RIB
14 OFF 1/16" SHEET
1 OFF 1/8" SHEET
PYLON 1/16" SHEET
1/2"X 3/32"
3/32" SQ. LONGERONS & SPACERS
1/16" SQ SPIRAL BRACING
BANDS HOLD WING IN PLACE
1/4"
3 1/2"
3"
PROP BLADE CARVED FROM 7"X 2"X 3/8"
D 1/16" SHEET
C - 1/16" SHEET
1/16" SHEET
FIN
LE
ROOT
ROOT
TE
B - 1/16" SHEET
TAIL FITS IN FIN OUTLINE
1/4"X 1/16"
1/16" SQ
1/2"X 3/32"
1/32" SHEET
D
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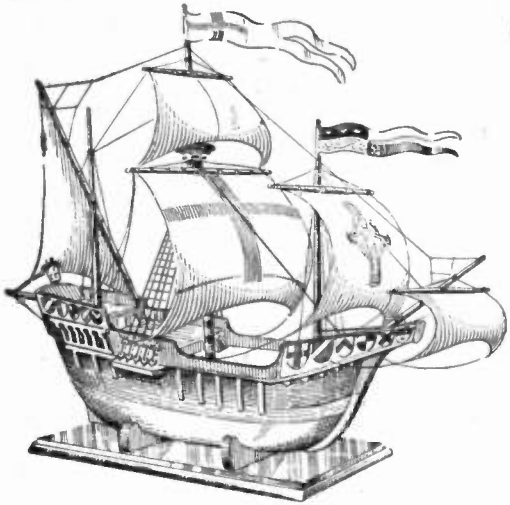

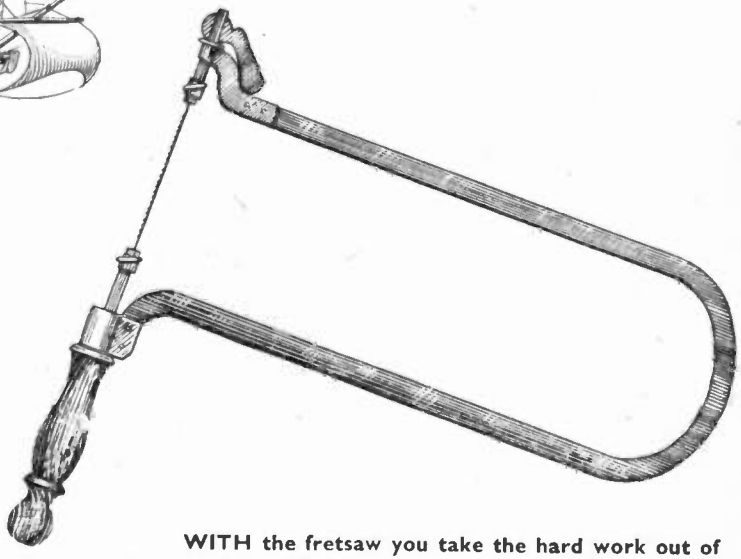

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