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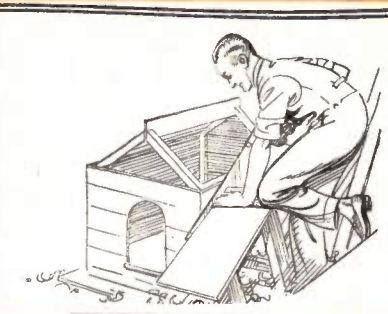


The first article of a series on

WOODWORKING JOINTS

Sound advice for all who seek to make things in wood

THE instructions in *Hobbies Weekly* usually give details of the various joints required for any particular article, but this does not help the handyman who is trying to design and make a piece of furniture himself.

We propose, therefore, to give a series of articles dealing with joints and methods of fixing for fretwork, furniture, toys, models, etc. The diagrams on this page show how the sides of a box may be joined together. The joint required is known as an angle joint and the illustrations show plan views of ⅜in. wood cut correctly and incorrectly.

Common Butt Joint

In fretwork and modelmaking the most commonly used angle joint is the 'butt' joint, the ends of the wood being placed one on the other, box fashion, as shown at (A). The experienced carpenter with his variety of tools will always make a perfect joint, but it is not so easy for the handyman who has only a kitchen table or makeshift bench to work on. Edges, especially if cut with a fretsaw, are often far from true.

Let us examine some of the usual faults and see how we can avoid them or correct them. One of the most common causes of a bad butt joint is a sloping fretsaw when cutting. You must hold the saw perfectly upright, or you will get the effect shown in (C) and (E). The end of the wood is not square, and when a nail or screw is driven in, it will pull the box out of shape as shown in (F) and (H).

A rounded edge, as shown in (D) is usually caused by glasspapering; the glasspaper block must be held perfectly square if you are to avoid this. When these pieces are nailed together they give a very unsatisfactory joint.

Test the Edges

All edges should be tested with a square before attempting to fix them together. For ¼in. and ⅜in. wood, *Hobbies* small planes, the all steel at 2/9 and the No. 1 at 4/- post free are ideal for correcting inaccuracies in cutting. For heavier work a larger type of plane is required, either a metal or a jack plane.

Although a badly fitting joint can be camouflaged to a certain extent it is unwise to submit exhibition work of this type. The judges will not be deceived and it may mean the loss of those few precious points that would gain you a 'first'.

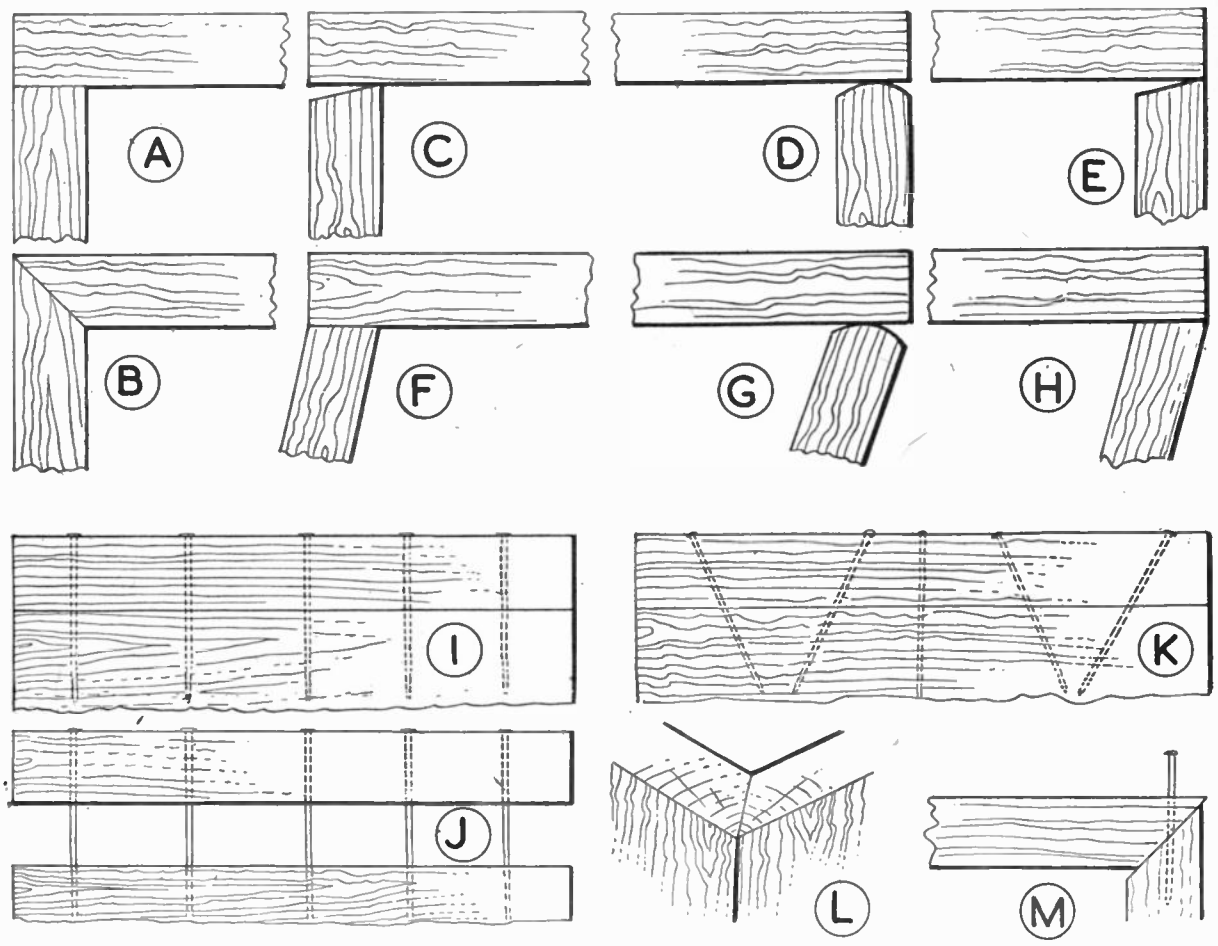
The Mitre Joint

An alternative to the butt joint is the plain mitre, shown in (B) and (L). The ends are planed off to 45 degrees and then glued and pinned.

In both butted and mitred joints a strengthening fillet can be glued on the

IN THIS ISSUE

All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.



inside. This can be in the form of a triangular or rectangular section strip-wood.

Fixing

The two methods of fixing are screwing or nailing, and in either case glue may also be used. With small toys and models, nails and screws can be dispensed with and glue used throughout.

Nails or fretpins should be about 2½ times as long as the thickness of wood. For example ⅜in. wood requires nails or pins about ⅞in. or 1in. long and certainly not less than ¾in. Naturally, the nail must not be too thick when using thin wood because of the danger of splitting.

To make the nails hold better they can be driven in at an angle as shown in (K). The centre one is driven in straight to hold the wood in position, while the others are driven in at an angle. Diagrams (I) and (J) show how the pieces can be pulled apart when the nails are driven in straight.

When nailing the mitred joint the two pieces should overlap slightly as shown in (M). When the nail is driven home the top piece will be pushed down slightly to come level with the other.

There are other more elaborate angle joints which are variations of those already described. We shall illustrate some of these in a later article. (442)

(To be continued)

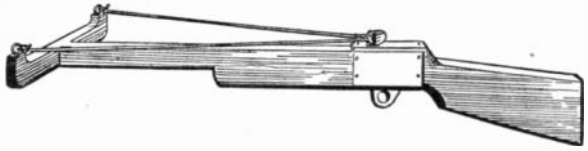
The Reluctant Tortoise

I HAVE a tortoise which has been moving round for nearly a month now but I cannot get him to eat or drink; he will go out of his way if I put anything down. I wonder if he is missing the other tortoise—we had two tortoises last year and one died, we presume, during his long sleep. (*A.C.*—).

THE tortoise will refuse to eat *before* hibernation, but in the spring when he wakes up he should be ready for food. Are you offering him the right stuff? Nice young lettuce might tempt him, dandelions, sow thistles, chickweed and similar. See that he has some water handy in a shallow dish or saucer. There may be something in what you say about your pet missing his mate. But we cannot say definitely that this is affecting him. Why not get another tortoise and see what happens? In selecting a tortoise, remember that the breastplate of the male is concave in shape—that of the female is flat. It is better to keep two than one. Single ones incline to wander off if they get a chance. You did not say where you keep your pet. Not always indoors, we hope. Let him have a bit of garden enclosed with wire-netting; put him in a cool greenhouse if you have one, to hibernate, when the time comes.

Here are instructions for

Making a Catapult Gun



THIS is an improved form of the common catapult, and would be an interesting weapon to make. It is, of course, intended for amusement only, and used with harmless missiles such as peas, for example, would be good training for marksmanship, and as good a sport as archery. In any case, it should be handled sensibly and used with care.

The main parts of the gun are grouped together under Fig. 1. The stock of the gun consists of two parts, (A) and (B), joined together by side wooden plates, and leaving a gap between for the trigger to work in. This arrangement is more simple than driving a mortise through the stock for the same purpose. Cut (A) and (B) to the shapes shown from ⅞in. thick board, deal, if nothing stronger is available.

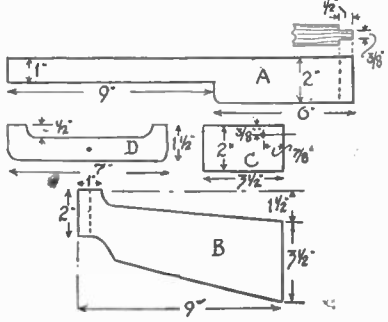


Fig. 1

The shapes are not difficult to set out direct to the wood, being mostly straight cuts with a handsaw, with a little rounding at parts.

The Side Plates

At the two inner ends, saw out rebates ¼in. deep and ½in. wide, as shown at (A) for the side plates to sink in. The side plates mentioned are shown at (C) and are cut from fretwood ¼in. thick. Near the top right-hand corner, bore a hole through both, through which the pivot, on which the trigger moves, can be driven in. This pivot can be a 1in. wire nail and the size of hole should be suitable to it. A tight fit is wanted, but not such as might cause the wood to split, of course. Now screw the plates in the recesses, thus bringing parts (A) and (B) together to form the gun stock. One plate can be glued as well, but the other should be screwed only, for removal later on when fitting the trigger in position.

At the end of the barrel, a fitment (D) is attached, to which the elastic of the catapult can be tied. This can be cut from a piece of, preferably, hardwood, about ¼in. thick or thereabouts; no need to be too particular here. The shape of this is quite simple, and in the two vertical projections a screw eye is driven in. Fix it to the barrel with one central round-headed brass screw, and to prevent any tendency to twist round, at ¼in. from the screw, drive in a small nail as well.

The trigger is shown at (E) in Fig. 2. Mark this carefully out on to ¼in. hardwood, drill a hole at $\frac{5}{16}$in. from the top right-hand corner for the pivot nail, a loose fit here, and trim the corner to a quarter circle. At the bottom, bore a

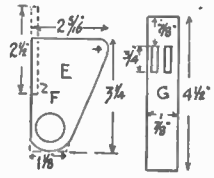


Fig. 2

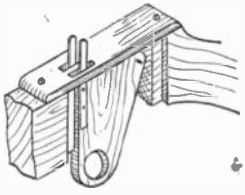


Fig. 3

¼in. finger hole, as shown. The inside of this hole should be glasspapered smooth for a comfortable grip.

The catapult release consists of a pair of metal strips, $\frac{3}{16}$in. wide and 2½ins. long, shown fixed to the trigger at (F). The metal should be not thicker than $\frac{1}{16}$in., so if it does exceed this a trifle, a little filing will be necessary. Round off the tops and screw to the trigger, leaving the top portions sticking up above it just ⅛in. Now remove one of the side plates and fit the trigger in position, driving the nail through the holes in the plate. A thin metal washer should be placed each side of the trigger to keep it central in the slot.

Rescrew the remaining plate, then test the action, which should be quite easy, but not wobbly. A cover plate (G) is now to be cut from ¼in. fretwood, to the size given. The two slots shown should be carefully sawn out; they are $\frac{3}{16}$in. wide and separated by $\frac{3}{16}$in. also. On pulling the trigger the parts (F) should sink level with this cover piece, so fix it on top of the gun stock, with parts (F) in the slots, and test it. If the tips still stick out a bit, when the trigger is pulled, just file the ends of the slots, and possibly the sharp corner of the slot, until the tips sink level. Then the side plate can be screwed back again. The detail sketch, Fig. 3, shows this arrangement, and should make all the above details quite clear.

There is just one point to mention. When drilling the screw holes in metal parts (F) see their position differs a little in each, otherwise the wood being thin, the fixing screws will foul each other. This arrangement of the holes may also be carried out when the side plates (C) are fitted on.

Glasspaper the gun stock to smoothness, and those parts to be gripped by the hands should be rounded off a little for comfort. The butt could also be rounded off, in fact any part where the appearance could be improved by so doing, a matter for the taste of the reader, naturally. The only part now remaining is the actual catapult itself.

For this about 1yd. of square catapult elastic will be required, and a small piece of thin washleather, or a piece from an old glove. It should be about 1in. wide and 4ins. long. Cut the elastic into equal halves and thread each through a hole in the ends of the leather, and double. Now tie to the screw eyes on part (D), and wind some stout thread round the ends of the leather where the elastic paper goes through.

Firing the Gun

In operation, the missile is placed in the leather and gripped between thumb and finger, it is then drawn back and slipped between the metal parts (F), the missile preventing it flying forward as the fingers release it. Pressure on the trigger will free the catapult, and the missile will be projected forward with some force.

The completed gun can be, with advantage to its appearance, stained and varnished. Apart from the small piece of board needed for the gunstock, a panel of ¼in. fretwood, 4ins. by 9ins. will be all the wood required. (438)

Final Hints Before Running

DESIGNING AND BUILDING MODEL RAILWAYS

By E. F. Carter

LIKE most things savouring of the idealistic, model railways ideals are seldom attained, but there is every satisfaction in trying hard to achieve success in working, realism of appearance and novelty of design.

Skill alone will not see you through to your ideal, certain fundamental rules and regulations—both full-sized and model must be kept strongly in mind all the time. This means during designing, building and running. Never let your imagination run past the bounds of good railwaylike practice, nor let a single piece of track be laid without a good sound reason. Track is reasonably cheap, but mere agglomerations of an unnecessarily complicated nature are neither desirable from the 'initial cost' nor the 'finished appearance' angles.

Evil Influence

Speaking of fundamental rules and their influence upon rationalised model railway design, the writer doubts if there is any one thing which has a greater bearing upon layout design, or has a more insidiously 'evil' influence by its non-observance, than the use of small radius track when large radius is strongly called for. There is no difference in the price, so it must be supposed that the beginner—who gets committed to sharp curves—does not then like to scrap them. There is a lesson to be learnt here.

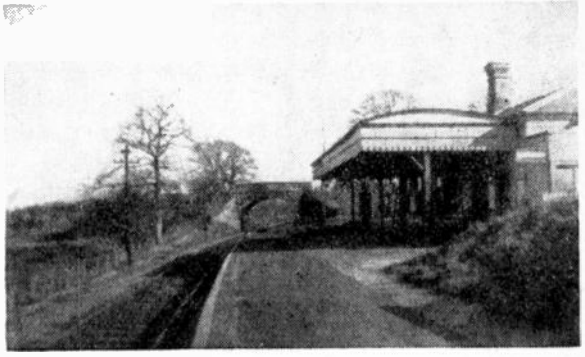
Moreover, it is well to remember that, if we scale down to 4mm. to the foot, the smallest real railway track radius upon which it is permissible to run stock without a continuous check-rail, we find that a circle no less than 17ft. in diameter is required. So when we proudly speak of using 4ft. radius curves on the main-lines of our 'OO' railway, we are in effect asking our express locos to do their best on curves which, if scaled up to full-size, would be the equivalent to requiring a 'Duchess' and train to turn a complete circle at 70 m.p.h. within the confines of a football field!

The charm of model railways is well illustrated by this picture of part of a gauge 1 garden layout

Another good rule to observe is that of never incorporating curved track on a gradient. This will inevitably lead to dissatisfaction with one's power-units, though through no fault on their part, but due to excessive flange friction—particularly on long-wheelbased stock.

Grades should also be built so that they never exceed 1 in 45 or 50, except when used exclusively for light-engine working into sheds. Care should also be taken to get a smooth approach in a vertical sense to the graded portion both at the bottom and the top of the grade. If this is not done, trouble will be experienced with couplings, particularly on long-wheelbased rolling-stock having more than two pairs of wheels.

Reverting once more to the subject of baseboards. Do not imagine that anything will do for this purpose, for it is a mistaken notion; the misleading effects of which will surely be realised after much work has been put into the railway. It is something of a heartbreak when one has to tear up the results of many months' unremitting labour.



On the average indoor layout it pays to avoid attempting to model large stations. This picture of an actual single line passenger station gives an excellent idea of the sort of model required

The finest material for a baseboard—particularly in 'OO' scale—is, undoubtedly, 5-ply wood battened to 2ins. by 1in. framing, but this material is not obtainable these days, and if any of the proprietary 'compo' boards are used—such as 'Essex board' or 'Tree-tex'—then cross-battening *must* also be used as already mentioned. 'Compo' boards are not to be recommended for layouts of a greater width than 3ft. or 4ft.

Felt Underlay

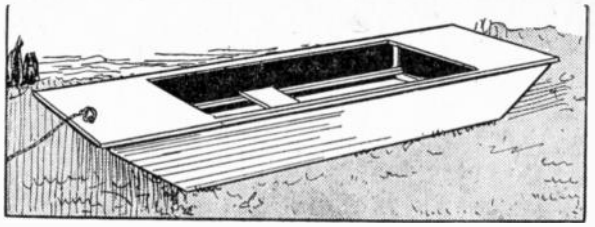
There is purchaseable felt in strips just wide enough to lay under a single road, and this should be used as a standard underlay all over the layout. Quietness of running is not its only advantage. Any inequalities of the baseboard are smoothed out by reason of the fact that it extends *lengthways* under the track, which is just what is needed.

When laying felt in place, however, always be sure to cut it where it passes under the point-operating tie-bar at turnouts, for if this is not done the point will be well-nigh unworkable due to friction after the track has been pinned in place on top of the felt.

Finally. Never pin your track down too solidly on the felt. Allow it to 'float' to some extent by making a feeler-gauge of visiting card which can be placed under the sleeper being spiked down. The spike can then be driven right home and the card removed leaving a uniformly freely-floating track.

The latter remarks about baseboards and felt underlays are equally applicable to both 'O' and 'OO' gauge model railways. (427)

Make Yourself a Fishing Punt



READERS who enjoy the sport of fishing could greatly enhance their chances of a good catch with the aid of the punt illustrated. It is of simple design and quite within the scope of any handy woodworker, as it needs no particular skill in boat construction. It does, however, need care in making if it is to be watertight, and look well on the river.

Particulars of the two side pieces are given in Fig. 1. These should, if possible, be cut from a board to the full width, so it is suggested that shelving board, which is obtainable 11ins. wide and ¾in. thick, be the wood to employ. Cut the ends sloping as in the drawing, and note that the extremities are not pointed, but cut to leave a flat on each, just 1½ins. long. At the three spots, indicated by the dashed cross lines, square pencil lines across, as these are the places where the frames are to be fitted across subsequently.

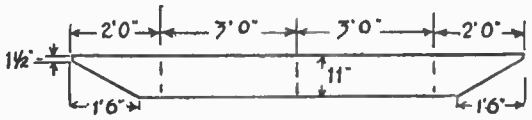


Fig. 1

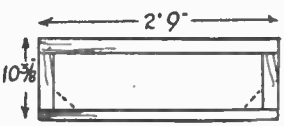


Fig. 2

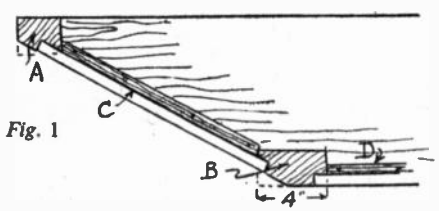
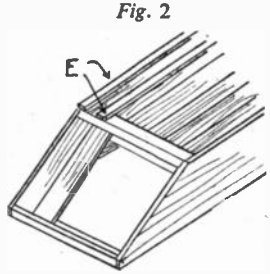


Fig. 3



Fitting the Crossbars

An enlarged view of the end portions of the sides is given, also in Fig. 1, to make clear where the crossbars (A) and (B) are fitted between the sides. Bar (A) is cut from timber 3ins. long and 2¼ins. wide, (B) from wood 4¼ins. long and 2¼ins. wide. Each is 2ft. 9ins. long, and is planed to the sectional shape shown by the shaded lines. Plane to shape first, then on the inner edges chisel out rebates 1in. wide and ¾in. deep, in which to seat the bottom and sloping end boards.

Screw the side pieces of the punt to these bars and use brass screws, as iron ones would rust, and fix firmly. Between these bars, where shown, nail ¾in. square wood fillets along, as at (C) and (D). These must be level with the bottom of the rebates, as the bottom boards of the boat will be nailed to them.

Making the Frames

The frames, three of which will be required, are nailed together from 1in. by 1½ins. wood for the bottom parts, and 1in. by 2ins. wood for side and top parts. Nail and glue them firmly together. One frame only is strengthened at the bottom corners with triangular brackets, as shown by the dotted lines. This particular frame is the central one, the others at the ends, on the pencilled lines already drawn across the sides as a guide. Screw the frames in position, ¾in. up from the bottom, to be level with the rebates, and remove from the central frame the top crossbar, as it is not needed now. It will be necessary to saw away a piece of the fillets at (C) and (D) to enable the frames at these points to enter; that, of course, will be plain on fixing the frames across.

For the bottom and sloping ends boards, employ tongued and grooved wood ⅜in. thick. Cut enough of the boards to fill the spaces closely, then to the tongues and grooves, and also to the rebates and fillets, apply a paste of white lead and linseed oil, or a thick paint would serve, then nail and screw the boards in position. All nails employed should be of copper, and to economise in screws, it would be a good plan to use, say, an equal quantity of each. Nail the sides to the boards, and the boards to the rebates and fillets also the frames.

Use plenty of the lead paste or paint to seal the joints against water seeping in, and wipe away any surplus.

Cover the joints of the bottom boards with strips of wood 2ins. wide and ⅜in. thick, coating them heavily with the lead paste, and nailing with copper nails. Two only of these strips are shown at (E), but every joint should be covered, of course, except those on the sloping ends, which are not so likely to suffer as the boat is drawn in from the water.

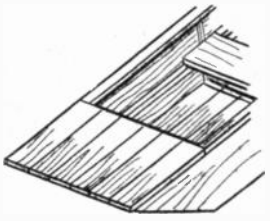


Fig. 4

Now deck the ends of the punt with boards as in Fig. 4. These extend beyond the sides and ends of the vessel by ¼in. and over the frames by an equal amount. Cover the top edges of the sides, between the decks, with strips of wood of the same thickness as that employed for the decks, and 3½ins. wide, to finish off.

Painting

Glasspaper the whole to smoothness, apply a coat of red lead paint, and two coats of good quality paint, any colour to choice. A coat of clear varnish would make the result pleasing. The inside could be painted or varnished as preferred. A simple seat or two can be fitted inside by nailing a wood fillet across the frame and resting two plain boards about 6ins. wide across them.

Complete the punt with a brass ring at one end for hitching purposes, and a pole for propulsion. For the latter, any pole of sound ash wood could serve. (402)

Watch next week for details of a Speedy Model Sailing Catamaran

OUT OF DOORS

Packing for a Day's Ramble

WITH summer here again, we can enjoy all the delights of long tramps at week-ends over field and fen, moor and mountain; or just a walk across the fields and over the hill and back again. It is glorious summer, we pick our day—if possible when the weather forecast says 'fine and dry'—and pack a haversack with a few oddments, and set off with eager feet and a glad heart.

First, it is well to remember that the fun of tramping is to get right off the main roads. When we come to a stile, climb over it. If we see a wood, go through it, if there is a public footpath. If we have access to the moors and fells, strike over the tops where the heather clings to our feet where the track is narrow. But don't trespass anywhere that is private!

Wayside Snacks

Now, as it is less of an adventure if we keep to the beaten tracks, we like to explore the out-of-the-way spots, 'far from the madding crowd'. Therefore, it is necessary to go prepared, carrying our own food, and other things we may require on a long day's march.

Food will be a necessity if walking in remote places distant from cafés, inns, and refreshment houses. We may get a meal at a lonely farm or some isolated cottage or at the village inn, but it is unwise to depend upon such chances, though ramblers and cyclists are well catered for by country folk nowadays. It is better to prepare against the chances of *not* finding somewhere to dine, or obtain a cup of tea.

Therefore, in your haversack or knapsack pack a small spirit stove with a supply of methylated or other suitable fuel, and a small kettle. Cost is not much; they are usually made of aluminium, and weight is negligible. One or two collapsible cups, a tea infuser, and some tea and sugar, carried in small tie-up bags or in tins with tight-fitting lids, and then you can 'mash' a refreshing drink anywhere. Don't try to light the stove in a wind; seek a sheltered spot. Tea is much more drinkable if brewed direct than if carried in a flask. If you do have to depend on a flask, carry the milk in a separate bottle.

For food, sandwiches are handy to make. Carry them in a sandwich tin, and they will keep nice and fresh. Sandwiches made of brown bread and butter and spread with one of the excellent cheese-spreads now obtainable are recommended; or cucumber and lettuce sandwiches. There are several kinds of fillings for sandwiches to be had at the grocery stores. All are acceptable.

Sandwiches containing sliced tomatoes are refreshing on a hot day. Generally speaking, bread and butter—or margarine if the butter ration does not run to it—cheese, and fruits are the chief standbys for the hiker tramping across country. Biscuits may be substituted for bread—they are lighter in weight and take up less room in the haversack. Don't carry food in your coat pockets if you can avoid it!

Fruits are thirst quenching in hot weather. Oranges, grapefruit, apples, lemons, all are satisfying, and refreshing. Small tomatoes can be carried in the indispensable sandwich tin without fear of squashing, and are most quenching to the thirsty palate. Big raisins are sustaining—but they are not easy to come by nowadays. Dates tend to induce thirst, so we avoid them. Chocolate is 'stuffing' and stodges you if you eat much of it on a hot afternoon when tramping.

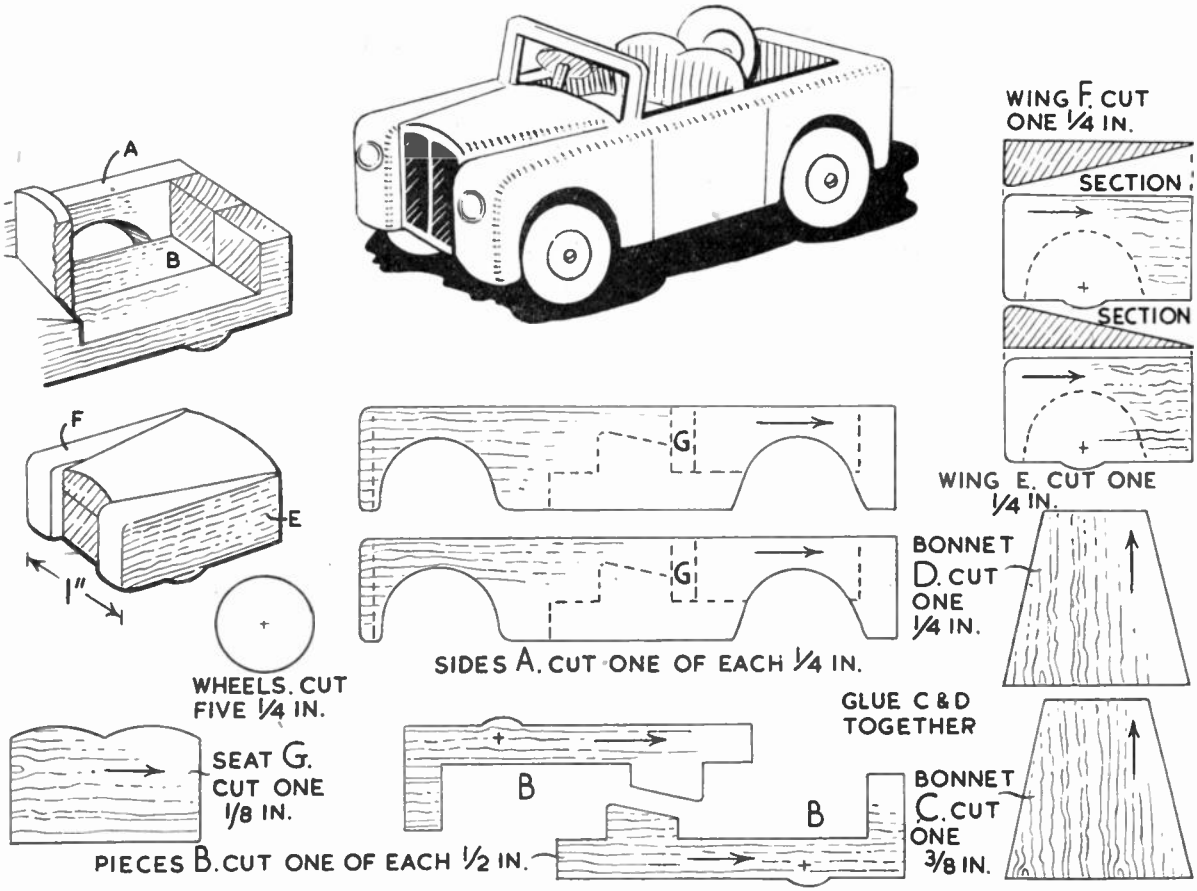
Avoid all fizzy drinks. Tea is always a sound proposition, never out of place, so it pays to carry the few utensils needed and a drop of milk and spoonful of sugar. Then you can enjoy a cup of the right stuff even if miles away on the rolling fells.

Other Needs

When packing the haversack, room should be found for a light cape or 'mac' if the outlook is a bit doubtful, and a small first-aid compact, as accidents sometimes occur even to the cleverest of us. Then you must not forget your O.S. map and a compass if tramping over wild moorland and trackless fells. Another thing we may pack is the camera, in case we desire to take some 'snaps' to record an enjoyable tramp in the glorious countryside. It is also a good idea to pack in a small towel, to dry the face and neck if we should desire a refreshing rinse in a pool of spring water—it will save dirtying handkerchiefs. (431)

OUR TOY CAR SERIES

A Miniature Farm Run-About



THIS little farm run-about is only 2¾ins. long and can be made from odd scraps of wood. The scale is in keeping with the cars in previous issues of *Hobbies Weekly*.

Marking Out

The various pieces are all shown full size so that you can transfer them direct to the wood by means of carbon paper. You can easily make your own, by scribbling on the back of a thin piece of notepaper.

The body of the run-about consists of two pieces (A) and two pieces (B). Pieces (A) form the sides, and the pieces (B) are glued together and put between the sides. The upper diagram on the left of the page shows two pieces (B) and one piece (A) glued together. Once these have been glued you will see how the other parts fit in position.

The bonnet is made from two pieces glued together and these in turn are glued between the two shaped pieces (E) and (F). These are wedge-shaped pieces and project slightly in front of the bonnet. They will be level with the side pieces (A) when glued in position between them. Notice that the top of the bonnet is slightly rounded.

Glue the seat (G) in position and round off the top edges slightly. The windscreen is optional and, if required, can be cut from stiff card or, alternatively, bent from wire. The steering wheel could be a button or piece of tin impaled on a nail. The lamps are painted on later.

The Wheels

Cut the wheels from ½in. round rod in ¼in. lengths. Drill a hole through the centre of each one and round off the edges to represent the real thing as near as possible. They can be screwed in place after the painting has been finished.

Use Good Paint

A good quality enamel should be used for painting, allowing ample time for drying between coats. The best colour to use would be dark green, picking out the radiation in silver or light grey. The radiator grill and underneath parts should be black.

Screw the wheels in position, not forgetting the spare wheel in the back, and the little toy is ready for the road. (445)

Lighting Dolls' Houses & Other Models

THE appearance of some models is vastly improved when lights are fitted, and this is particularly so with a doll's house. The wiring of bulbs resembles that used in ordinary domestic installations, in this case, though full-sized household fittings are not used, of course.

It seems that some readers are a little confused about how the lights should be wired, but the matter is really quite straightforward and no particular difficulty need arise. A doll's house is transformed when lights are burning in every room, and the overall cost, including bulbs, can be very small.

The same method of wiring can be used with a variety of other models—toy garages, stations, model railway layouts, and so on. Each of these will give the builder an opportunity to adopt special arrangements, such as illuminated petrol-pumps, coloured lighting and signals, and so on, but the actual electrical side of the work will be basically the same.

The lights may be operated from dry battery, accumulator, or mains, as will be explained.

Circuit to Use

For normal purposes it is best to wire all the bulbs in parallel. With this arrangement, if any bulb or bulbs be removed or broken the others will not be influenced. When it is required to control each bulb separately a switch is inserted in series with one lead to the bulb holder, and a circuit for five lamps wired on this system is shown in Fig. 1. Here, lights for four rooms and hall or stairway are shown, each controlled by a small switch. These switches may be situated in the rooms themselves, at suitable points, or can all be on an external switchboard. If further lights are required, these are wired in the same way—namely, one supply line to switch, second switch contact to bulb, and remaining bulb connection to second supply line.

In the event of no individual switches being required, the switches are omitted from the leads shown. In this case all the bulbs will be in parallel and all will come on when current is applied. When this system is used, a single large switch should be fitted at some convenient point. This will control all the bulbs at once.

Other special methods of switching should be clear. For example, if the model is of such a type that it is necessary to control one light separately from all the others, then a separate switch can be added in one lead to the holder.

Bulb Fitments

The small screw-in bulbs such as are used in torches are most easy to obtain, and are cheap and durable. Assuming that such bulbs will be employed, two types of holder can be purchased, as illustrated in Fig. 2. The first type is about 1in. in diameter and has two small screws to which leads are taken. Two further holes allow the holder to be screwed or bolted in place. Such holders cost about 9d. each. No soldering will be necessary, as the bared ends of the leads can be secured under the screws.

The second type of holder shown has

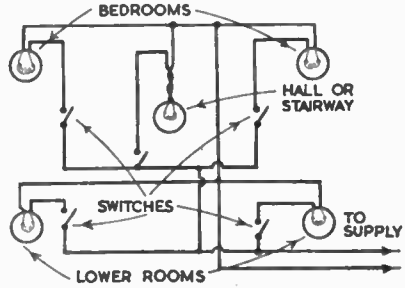


Fig. 1—Wiring diagram for four rooms and a hall

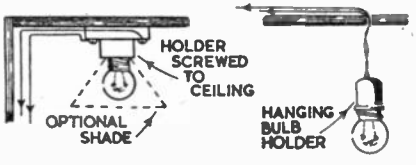


Fig. 2—Two suggested ceiling fitments

two flexible wires issuing from a small moulded cup, being the same type as used with the 'Fairy Lights' used for Christmas Tree decoration. The leads are taken through a small hole in the ceiling, or secured to the ceiling with a clip, if this is not possible. Somewhat similar holders, but of bare metal and with soldering tags, are obtainable, of the kind used for dial-lights in radio receivers. These are about 4d. to 6d. each.

In most cases a variety of holders will be best. The suspended type is most suitable for a stairway. Or it can be used in an inverted position in model stand lamps, the leads being drawn down through the hollow pedestal.

If the builder is handy at soldering it is extremely easy to solder the bared ends of the leads directly to the bulbs. One lead should be soldered to the screwed part; the second, to the small 'pip' at the end of the bulb. If the bulbs are fitted with shades made from coloured paper, etc., the soldering will not be visible.

The Wiring

The voltage is low, and only a small current flows to each lamp. Accordingly the plastic covered wire (usually sold as 'bell wire') consisting of a single strand about 22 or 20 S.W.G. in size, is suitable. This is about 1½d. to 2d. per yard, and only a few yards are required.

The wiring should be kept as much out of sight as possible, and run neatly along the ceiling and down the walls, where it has to show. The type of wire mentioned may be used throughout the model, but from the model itself to the accumulator, dry battery, or transformer, stouter wire, preferably flexible, is best. Here, the leads will have to carry the total current of *all* the bulbs, so that a long length of thin wire will make the lights dim. Because of this, 1yd. or so of twin flex, such as used to connect table-lamps, etc., will be best, and can be coiled up without breaking, when the model is not in use.

A Switchboard Arrangement

If the lights are all to be controlled separately from some point, a switch such as that in Fig. 3 can be made up. The dimensions are not important. A small strip of wood or other insulating material forms the base, and pivoted metal strips can be moved to press upon the heads of screws. The leads to the individual holders are taken from the latter.

It is also possible to buy small toggle switches, if the expense is permissible, and these would cost about 8/- per dozen, from a surplus stores. They can be mounted on a panel, or fitted as convenient elsewhere on the model.

Actually, a variety of small switches can be made up without much difficulty. The current flowing is small, and the voltage low, and no shocks would be experienced from supplies of this kind.

Battery Operation

Operation from batteries is not very economical unless the lights will only be on for comparatively short periods. Further economy can be obtained by using low-consumption bulbs. The average torch bulb consumes about ¼ amp., so that six such bulbs, on together, would consume 1½ amps. This

is rather heavy for a dry battery, unless one with large cells is used. Usually, however, a powerful light is not required. Therefore, the low-consumption bulbs, usually rated at ·06 amp., and sold for dial-lights in battery-operated receivers, and tail-lights for some cycle-dynamo sets, can be used. Six of these would consume only ·36 amp., so that several hours running would be obtained from a dry battery of reasonable size.

If an accumulator is to hand, or used for other purposes, it offers an economical source of supply, if mains are not available. With a 2-volt accumulator, 2 or 2·5 V. bulbs should be used. 3·5 V. bulbs *can* be employed, but would not light at full brilliance. With a 4 volt accumulator, 3·5 V. bulbs can be used where maximum light is required, but will be slightly over-run. The only other type of screw-in bulb generally available is the 6·3 V. kind. This will give a good light with a 4 V. accumulator, or operate at full brilliance with a 6 V. accumulator. Similarly, with dry batteries the bulbs must be of approximately suitable voltage, i.e. 3·5 V bulbs, with a 3 volt (two-cell) battery.

Mains Operation

If A.C. mains are available, the use of a small transformer offers the best method of obtaining current, as the initial cost is not large, and running costs are almost zero. In some cases the transformer can be hidden away in part of the model. The way in which it is wired is shown in Fig. 4. The primary has to withstand the full mains voltage, so good quality insulated flex, with a proper mains plug, must be used, and this part of the circuit so wired that no chance of shocks can arise.

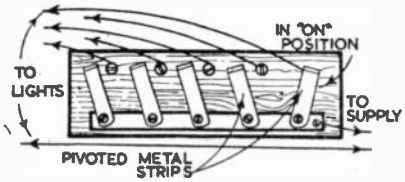


Fig. 3—A switchboard for five lights

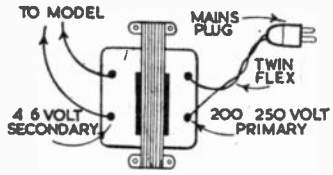


Fig. 4—Using a mains transformer

A small transformer, suitable for about four bulbs, would cost about 5/-. A larger one, able to supply current for up to about ten 6·3 V. ·3 amp. bulbs would cost about 12/6. The voltage rating of the secondary should be approximately suitable for the bulbs to be used. A rating of 4 to 6 V. is convenient. Transformers giving a higher voltage can be used. Quite a number of 12 V. transformers are seen, and these can be used with 12 V. bulbs. Such bulbs cost about 6/- per dozen, from clearance stores. The bulbs of lower voltage cost about 4/- per dozen, from similar sources.

When using a transformer, withdraw the mains plug, or switch off at the supply point, when the model is not in use. Transformers cannot be used on D.C. mains. (428)

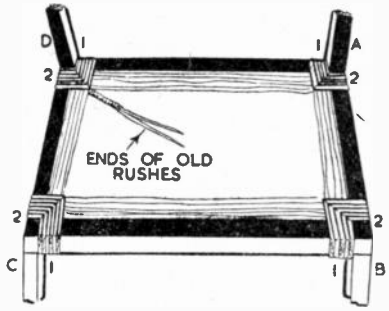
How to Re-seat Rush Chairs

ALTHOUGH they wear well on the whole, rush-seated chairs look untidy once some of the rushes have worn through, and, if there is a cat in the house, it is extraordinary how soon he will find the loose ends and proceed to play 'birds' nests' with them. It is quite an easy job to repair a rush seat, however, and the only materials required are the rushes (obtainable from handicraft suppliers or direct from growers) and a large sack needle.

Five or six hours before starting work the rushes should be soaked in cold water for about 5 minutes, then wrapped in an old towel or piece of sacking to keep the moisture in. Avoid bending them as far as possible, and try not to soak more rushes than you are likely to need at a time as, if left lying about in a damp condition, they will soon mildew. Start with a good handful (approximately 80 rushes) the first time, and subsequently you will be able to estimate your own requirements.

Rush seats are made in one continuous strand (all the joins being made underneath), starting from the outside edge of the seat and finishing at the centre. So that, wherever the rushes have worn through, they will have to be taken out from the centre as far as that point, though actually it is easier to unwind towards the centre with the broken strand. When this has been done, make sure that the remaining strand, from which you are going to start remaking the seat, is perfectly sound, and wipe it with a damp cloth to make it pliable. Then unwind it until it is in the position shown in the diagram (when you have learnt the process, you will, naturally, be able to start in any position).

Join two new rushes on to the old piece with an ordinary reefer knot,



This drawing will help to make the instructions clear

being careful that the join will come on the underside of the seat. This frequently means wasting several inches of rush, but do not cut it off as all these odd pieces will be tucked in at the end to form the stuffing.

Note that the rushes are worked in pairs, and are twisted together, always towards the centre of the chair, before being stretched over the top of the seat, but are left plain on the underside.

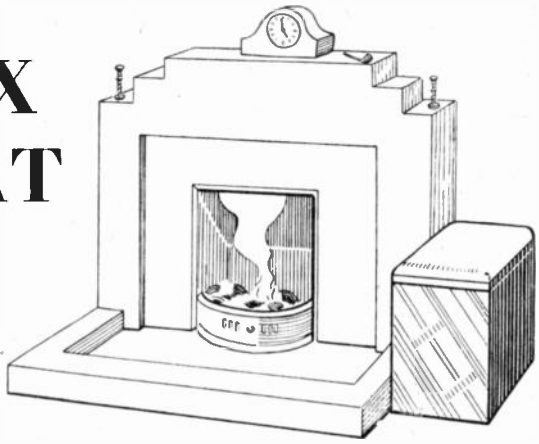
Pulling the rushes tight and keeping the strands as close together as possible on the stretchers of the seat (when dry, they will tend to shrink and loosen), pass the rushes over and under in the following order, tying on new rushes as required: over and under A2; over and under A1; over and under B1; over and under B2; over and under C2; over and under C1; over and under D1; over and under D2.

You will now have made a complete round, and will have noticed that alternate strokes lock the previous stroke in position, giving a dovetailed appearance in the corners. So that after a little practice there is no risk of 'losing the place' and not knowing in which direction to work next. Continue in this way until you reach the centre. As the majority of chair seats are not actually square, the shorter sides will be completed before the longer ones, and the remaining gap is filled in with a figure of eight pattern.

When the work is nearly finished it will be found necessary to thread the rushes on to a sack needle in order to get them through the narrow space in the middle, but remember to push the blunt end through first as the point might easily damage the bottom layer of rushes. To finish, turn the chair on one side and tidy all loose ends away by lifting the bottom layer of rushes with a ruler or a paper knife and pushing the ends under with the blunt end of the sack needle. (410)

For the home — a

HANDY COAL-BOX AND FIRESIDE SEAT



Well within the capabilities of the average handyman, and a worthwhile addition to the home. Can be adapted for use as a lady's workbox.

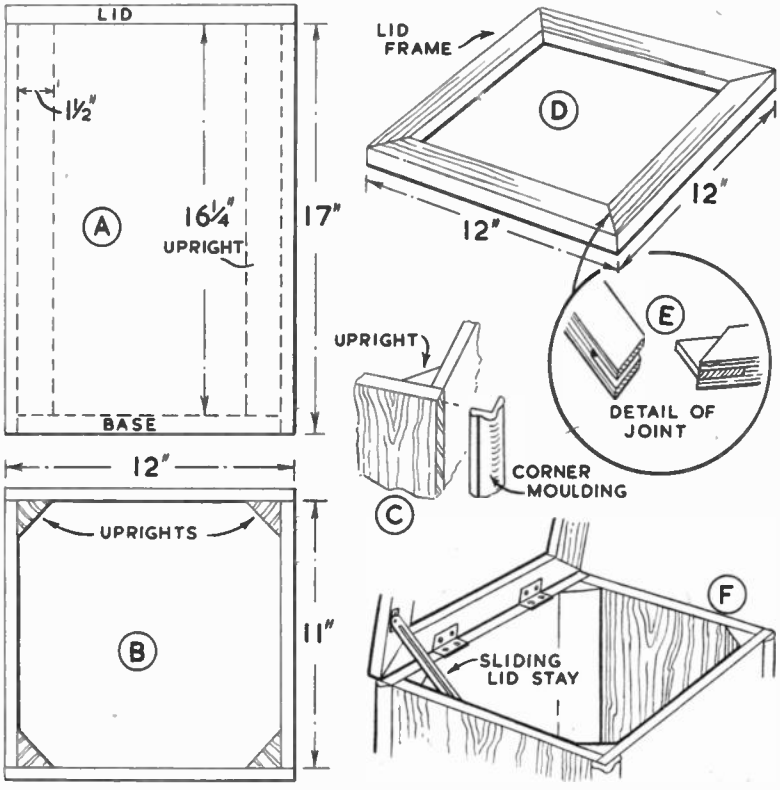
ILLUSTRATED here is a useful piece of furniture which can be constructed during the summer months, ready for the long winter evenings. The coal-box can be made to serve as a seat by the addition of a padded top. By adding a false floor about 6ins. from the top it could also be used as a lady's workbox.

The Box

The sides are made from ¾in. material to the measurements shown in diagrams (A) and (B). The ideal wood to use is plywood, and if you are fortunate enough to obtain it, you can stain it to suit existing furniture.

Four strengthening pieces are glued and pinned in the corners. These are triangular pieces made by cutting a length of 1½ins. square wood in half. These pieces are each 16¼ins. long. The base is cut from ¾in. wood and is pinned inside as indicated by the dotted lines in diagram (A).

If ordinary wood is used, the butt joints will not show, since the grain runs upwards, but if plywood is used, the corners should be covered with moulding. *Hobbies* corner moulding No. 302 is made specially for this purpose. It may be glued over the corners as shown in (C). You will need four pieces 17ins. long.



Helpful constructional drawings

The Lid

Cut four pieces of wood 2ins. by ¾in. by 12ins. long and mitre the corners in the usual way as shown in (D). Next cut out the mitres as shown in the inset (E) and insert a square of wood. When this is glued in position and pinned or screwed from underneath it will make a strong joint.

If the corner moulding is used, the mitred pieces could be slightly larger in order to overlap all round. Alternatively, the moulding could be neatly chamfered off at the top to make a good finish.

The seat need not be sprung since it will have only occasional use. A piece of wood about 11¼ins. square and ¾in. thick should be used as a base for the padding. Flock or cotton wool can be used as a filling and the whole covered with material to match existing furniture.

Lap the material underneath and fix by screwing up from underneath the mitred frame. It may be necessary to drill holes in the frame before attempting to screw.

The lid should be hinged to the box as shown in diagram (F). The hinges are slightly recessed before fixing.

To keep the lid open when in use, and to prevent it from straining the hinges, a metal lid stay should be fixed on the inside as shown.

Fixing a Handle

Since it is usually necessary to tip the box when getting at the coal it would be advisable to fix a handle about halfway down on the same side as the lid. A chromium, plastic, or even a wooden handle could be used.

The method of finishing will depend upon the existing furniture but we recommend that either an enamel or varnish which is heat-resisting be used. A suitable brand is 'Totem' which we have found to be excellent for the amateur. (446)

An old hand gives you

Some Hints on Dry-Fly Fishing

DRY-FLY fishing is the finest art of angling with rod and line. So attractive is it that it pays the ambitious young angler to learn it, and to practise it.

Usually, when hearing of dry-fly methods, most beginners associate the craft with trout, but though trout-fishing is not everybody's pigeon, being more difficult and more expensive than float-fishing for roach and similar fish, this is no deterrent to its pursuit. For, during the summer months, there are quite a few species of those fish commonly classified as 'coarse'—and which are widely distributed all over the country where rivers and lakes abound—which will readily take a dry fly.

Indeed, often when such fish are inclined to ignore such usual baits as maggot, paste, and worm, they will come eagerly to a nice little artificial fly floating on the water, if properly presented to their notice.

In this respect we would mention rudd, chub, and dace in particular. Roach will also accept such a lure on occasions, during warm summery weather conditions. Therefore, if trout-fishing is not available there is plenty of scope with the quarry mentioned.

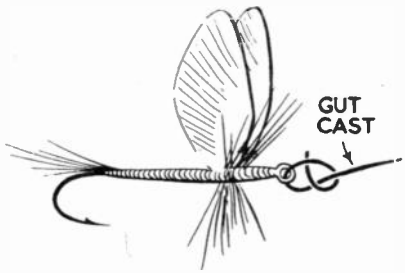
Why Beginners Fail

Many beginners fail to become successful dry-fly experts because they expect to attain efficiency all in a day. It can't be done! No short cuts here to proficiency. The young angler who aspires to reach the highest skill in the art of angling with such a lure must first practise assiduously. After all, it's not so difficult if you have patience to proceed slowly at first, especially for those who have already served an apprenticeship in the more elementary forms of fishing.

The aspirant can manage quite well with any light and pliant rod, but if he can afford a proper fly-rod or greenheart or split-cane all the better—one about 10ft. long. He will need a 3in. or 3½in. reel carrying about 30yds. or 40yds. of tapered dressed fly-line, though a tapered line is not essential; if necessary a level line will serve. This reel line should be attached to a length of backing line which is fastened first on to the reel, and the reel line is then spliced neatly to the backing line. To the reel line is fastened the gut cast, about 5yds. in length, tapering from 3x strength to 5x to which the fly itself is secured. Such a tapered cast may be of gut, nylon, or any good quality gut-substitute or synthetic gut, as it is often called.

Your Fly Should Float

For dry-fly fishing you need only one fly on the cast, this being usually dressed on an eyed hook. You can easily tie the fly to the gut cast yourself, but if not sufficiently confident about its security to the cast, you can buy flies tied to the gut or nylon all ready for use. But most dry flies sold separately are 'dressed' on eyed hooks, and anyone with nimble fingers should have no difficulty in attaching such eyed flies to the gut-point (see illustration).



WINGED DRY FLY

A simple way of attaching eyed fly to gut cast. Drawn tight, with the gut noose worked over the 'neck' of the fly, this forms a secure hold

When dry-fly angling, it is essential that the lure should float well, and keep on floating on the surface of the water. To gain this desired end you have to anoint the fly with a drop or two of some preparation sold by tackle dealers, such as Mucilin, Allcock's 'Linflot', or similar. If you cannot get anything else a spot of vaseline will do. Touch up the fly with it, lightly. This keeps the lure floating for quite a little time. If a fly begins to sink re-anoint it. A water-logged fly is not very enticing to the fish when they are feeding on surface insects. The line, too, should be greased with the same stuff. But do endeavour to keep the fly floating nicely on the surface.

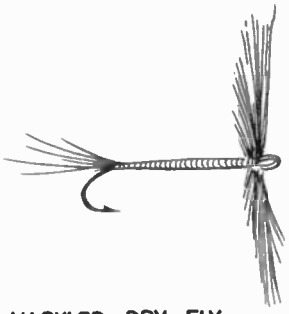
Clever Work

Now, to get the fly on to the water neatly, and without disturbing the fish, is a clever bit of work. It can only be done if you devote some time to practising the art of casting a fly. If at all possible, get some friend or other who is something of a fly-fisher to show you how to hold the rod and how to make a cast. This is much better than trying to get the hang of it from the written word.

If you have no tutor available, then start off by going into a field or on your lawn—if there is one at your house—or some open space, private if possible, and practice daily until you can cast the fly a reasonable distance.

Commence with short casts, with line out about the same length as your rod; use the rod and line as though they were a whip. You'll quickly catch the idea, if you have already done a bit of casting out a baited hook.

When you can throw the fly accurately, lengthen the line bit by bit until



HACKLED DRY FLY
DRESSED ON EYED HOOK

you can cast a good distance. Start with, say, 10ft. of line, and as you become efficient, let out more and more line until you have reached a limit you can conveniently control. It's only practice and more practice that will make you expert. *But a little tuition from someone who knows the art will be of considerable help.*

Fly-takers in Summer

Rudd, chub, dace and roach (if there are grayling available, then in September and autumn you can fish for them with dry fly and expect good sport) are the likeliest quarry from June onwards through summer. Rudd will take a red or black fly, dressed with wings, and other likely lures include black and quill gnats, or a coachman when evening fishing, after a warm or hot day. If on a lake and angling from the bank take a fairly long rod so that you can cast well out.

In the dusk of a summer's evening rudd often rise very briskly, and great fun is to be had. Some anglers 'nick' a maggot on to the hook of the fly—they believe it to be more killing that way.

(*Continued on page* 220)

Rust on Cycle Wheel

RUST has developed on the chrome of the front wheel of my bicycle. I have tried rubbing hard with oil, but it takes no effect. Can you give me a method that will take it off without spoiling the chrome? (*H.M.—Alness*).

THE probability is that the appearance of rust on the wheel of your cycle is due to the rubbing off of the chrome occasioned by the friction of the brakes. In any case, if a chromed surface shows signs of rust it almost certainly indicates that the chromed surface has broken down and there is no remedy other than to have it re-chromed, which, however, is now restricted to articles for defence or export. If the chrome is discoloured for some other reason, it could be removed by rubbing with an oily rag dipped in pumice powder.

* * *

AC/DC Operation

I HAVE a 9·5 mm. cine projector 200-250 volts AC/DC, which I bought secondhand, and at the time it was running on AC 230 volts. I am now running it on DC 200 volts. A friend tells me that if I run it for a long period on DC and then change to AC, I may have trouble and he says I ought to run it on AC occasionally. Is this correct, or will I be all right on DC for a long period and then change to AC? (*M.T.S.—Lenton*).

IT is true that with some kinds of motors continuous operation on DC will cause some permanent magnetisation of the field-coil cores. If, however, the projector is of reputable manufacture, and definitely intended for AC/DC operation, then it is likely that no difficulty will arise even with long continuous operation from DC mains. Such magnetisation as might arise would rapidly disappear, when the motor was operated on AC. It would be possible to reverse the polarity at which you supply current to the motor, at occasional intervals, but normally there is little chance that trouble will arise.

* * *

Gilt Lettering

I HAVE bound a book with leather cloth and would like to finish it off with gilt lettering. Is this possible? (*E.L.D.—Ilford*).

GOLD blocking is what you refer to, but, unfortunately, this is much too expensive for such purpose, the tools alone costing several pounds. A cheap substitute is to press the titles on the leather cloth with a metal printing outfit costing a few shillings from E. M. Richford Ltd., Snow Hill, London, E.C.1. Using gold size in lieu of ink, and dabbing over the impression afterwards with gold bronze powder, quite a good effect is obtained. It is preferably done while the book cover is in the flat, but, perhaps, could be done when made up if a stiff cardboard support can be slid in between. Another method is to use light coloured book binders' cloth and print the titles in printing ink, or print as above, on thin leather or art paper, and stick down to the back of the book, when already bound, as, presumably, yours are.

* * *

Modelling Tunnels

I WISH to make some tunnels for O-gauge railway. Could you assist me in selecting a suitable plastic or moulding material? I have heard of various ways, including papier mâché; would this be suitable. (*W.J.N.—Carshalton*).

ALMOST any papier mâché or plaster of paris mixture would be suitable for making the O-gauge tunnels you have in mind, and built on a suitable wooden frame you would need only a thin layer to give the desired effect. A piece of canvas or brown paper should be placed over the wooden frame first, unless the framework is particularly closely spaced. You might like to obtain a copy of A. J. Ahern's 'Modelling in Miniature', published by Percival Marshall & Co., which is a very full account of the various methods of doing the kind of modelling you have in mind.

* * *

Electric-plating

I WOULD like to electro-plate several small items of jewellery, but do not know the details regarding a simple electro-plating tank. I should like to use gold or silver to plate the articles. (*R.G.M.—Ryhope*).

ELECTRO-PLATING, like most other technical processes, calls for considerable skill, care and attention. We recommend you to study any good handbook dealing with the subject as the details are too numerous for a reply here. In brief, the tank can be any glass or earthenware vessel of suitable size and shape, the source of energy can be a large car battery, the anode can be pure silver, the solution or electrolyte can be potassium silver cyanide for silver plating. The articles to be plated must be mechanically clean, and suitably wired to the cathode and immersed in the electrolyte. Leads from the battery must be connected—with a suitable resistance in the circuit, to the anode and cathode.

* * *

De-furring a Kettle

PLEASE tell me a way to remove the furry substance which collects inside kettles. (*J.M.—Llanhilleth*).

BOIL some water in another vessel, let it cool, then put it in the kettle and boil gently for some time. Pour out the whole of the water and scrape out the fur which will then be found to be quite soft. Repeat the above process, but swirl and shake the water about before pouring it out, when most of the remaining fur will come away. A final cleansing can be achieved by boiling with some fresh acid-type fruit (such as rhubarb) in the water.

DRY-FLY FISHING

(*Continued from page* 219)

You may use either hacked or winged flies when dry-fly fishing.

The chub is one of the best fly-takers among 'coarse' fish. Flies to use include Zulu, Red Tag, Wickham's Fancy, Red Palmer, Black Palmer, Alder-fly, Coachman, Blue-bottle, and Sedge-fly. Your tackle should be of the best quality, but fine. Chub are wary and keen-sighted—also very powerful when of any size, and strong tackle is needed. They often haunt gravelly shallows and runs in hot weather, seeking the duns and spinners skipping on the surface of the water.

The dace is another excellent fly-taker. This sprightly fish takes a fly much quicker than does the chub, and you need a keen eye and supple wrist. Tackle must be fine, flies small dressed on No. 0 or 00 hooks. And you have to strike quickly for they come up at the floating fly in a flash.

A summer evening is the best time to seek dace on the fly-rod. Any small dark-hued fly will do, the Black Gnat, or a Red Tag or a Wickham. (456)

Development to Finality

MANY photographers are investigating the proposition that films can be given much smaller exposures and developed for much longer than usual, to obtain good negatives with which to make prints as good as those produced normally. The possibilities of this method are tremendous. Photographs can be taken in poor light when flash bulbs or floodlights would normally be used, or else taken with artificial light at much higher speeds. Outdoor photos can also be taken at much higher speeds.

No hard and fast rules exist, in fact quite a few conflicting reports are in circulation, but many workers have proved that it can be done. Certain combinations of developer and film are suitable, others are not. It is best to find by experiment what combination suits your own technique, standardise your procedure and stick to it. As the time of development is long, the method is only suitable for tank development. See—sawing a film through a dish of developer for 80 minutes would be most uncomfortable.

One suitable combination is Kodak Super XX Film with M.C.M. 100 Developer. These materials were used for the photograph illustrating this article. The exposure was measured by an old and well-tried, photo-electric meter. The result was then divided by 4. As a further test, one normally exposed negative on the same film was developed with the others. This was so dense that it could only be printed by using an exceptionally long exposure time in the enlarger.

Development to finality seems to increase contrast, so it can be safely used for dull subjects. As a first trial take two shots in a bad light, then a few in a moderate light and then one or two in bright contrasty conditions. Study the results carefully before trying again. Measure the exposure by your usual method and divide by four. E.g., if you decide that you would use *f*8 at 1/23 second, then take it at *f*8 at 1/100.

Do not expose your film just a little bit less and then overdevelop a little to make up. Underexpose four, five or six times and develop for four times the normal. 80 minutes at 70 deg. F. is a good average time for MCM 100.

After exposure, load the film into the tank and give it a good soak in plain water at 70 deg. F. for three minutes. This is to remove the backing from the film and should always be done, as certain chemicals used for some of the backings will affect the developer. It is better to make sure by removing the backing. Empty the tank and fill with developer at 70 deg. F. and agitate for a few minutes to ensure that development commences evenly. Then agitate as you normally do, that is, once every five minutes or whatever your usual method is, during the whole of the 80 minutes. Don't neglect this, or else development will not be complete. The monotony of this part is the price to be paid for the advantages gained. Then pour out the developer and pour in water at the same temperature.

Wash well for a minute or so, empty the tank, pour in the fixer and fix for ten minutes; then wash and dry in the usual way. As the time of development is so long, have some method at hand of keeping the tank at the right temperature. A bowl of warm water is useful in the winter. Use a thermometer to check at intervals, as a difference of three or more degrees in any of the fluids can cause reticulation; a swelling of the gelatine film emulsion.

'See my New Hat!'

This pleasing study of the little lady with a 'saucepan hat' was made by the method described in this article

Be Bold

To sum up, be bold, underexpose four, five or six times and overdevelop for four times the normal. Do not extend the development beyond this, as you might get a chemical fog on the film. Keep the tank temperature as constant as possible, and when you have found a method that suits you, stick to it.

Other suitable combinations to try are:—HP3 Film and ID2 Developer, Super XX Film and Unitol Developer, Gevapan Film and Johnsons Universal MQ Developer, HP3 Film and Johnsons Fine Grain Developer. (436)

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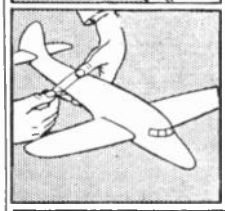

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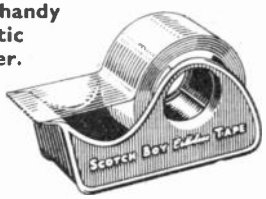

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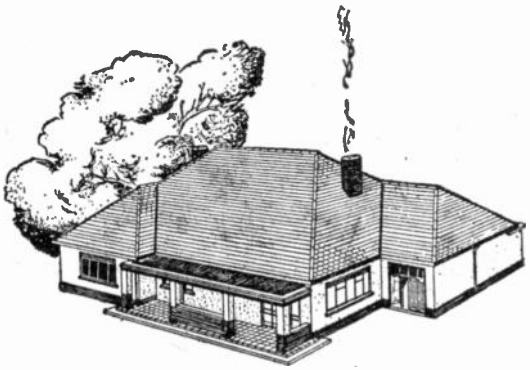

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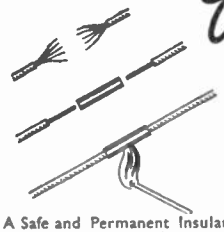

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