

Hobbies

WEEKLY



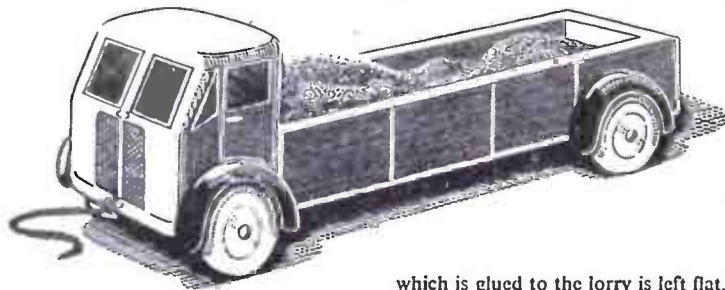
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A quickly and easily made PULL-ALONG LORRY

Full-size patterns
are on page 31

THERE is a great demand for patterns of block toys that can be quickly made, with a minimum of shaping. Several such toys can be turned out in an evening or two and a few hours spent on painting produces a range of toys for sale or gifts. A typical example is shown in our illustration. Although shaping and cutting are greatly reduced, it gives a very good impression of a real lorry as can be seen.



Full Size Patterns

If you turn to page 31 you will see the patterns all ready to transfer to the wood. The thickness of the wood is clearly indicated in each case and all you have to do is to note the direction of the grain which is shown by the arrows. Pin the page to the wood and after placing the carbon paper between the pattern and the wood, trace each line carefully, using a hard pencil or ball-point pen. For the circles, prick through with a pin and draw in with the compasses afterwards. This applies particularly to the wheels and mudguards which have to be repeated.

Having transferred the shapes to the wood, the next step is to drill holes in the parts which have to be cut out. A fretwork drill is used for this purpose and the parts are then cut out with the fretsaw before the main cutting is done. Finish off the cutting and clean up the parts with coarse and fine glasspaper.

Assembling

First glue the two centre pieces

together as shown in Fig. 1. Since two pieces are very difficult to cut exactly alike, it will be necessary to do a little trimming as work proceeds. Pay particular attention to the back of the cab, the floor and the tailboard at this stage, because once the sides are in place, it will be impossible to do any further trimming here.

Next glue the sides in position as shown in Fig. 2. Pins or screws may be added for the sake of strength. If screws are used they should be countersunk and the heads filled with putty or plastic wood. Note that the whole cab is not hollow, but that the fretted sides give a true impression of a proper cab.

An alternative method is to omit the fretted windows in the cab sides and paint them on afterwards. This method is shown in our picture of the finished thing.

The mudguards are now cut out and rounded off. Remember that the side

which is glued to the lorry is left flat, so that the mudguards must be shaped on one side only. It does not matter which side you shape because they are symmetrical and need not be made up in pairs. Glue them in place as shown in Fig. 3 and leave until dry. Cut out the wheels and trim up until they are as near round as possible. Round off the edges, too, if you wish, to represent a real wheel. A good alternative for making the wheels is to cut them from lin. diameter round rod. Place the rod in a mitre block and cut off $\frac{1}{4}$ in. or $\frac{3}{8}$ in. lengths with a tenon saw. By using the mitre block you are certain to get the lengths square. The wheels will not be screwed in place until after painting is completed.

Refuse Cart Alternative

On the pattern page you will see a shaped T piece, two of which are required for the refuse cart. These are

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

THE MAGAZINE FOR MODELLERS,
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World Radio History

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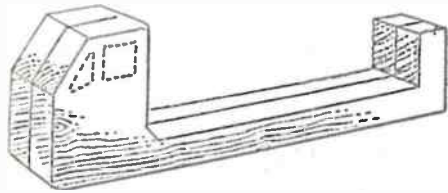


Fig. 1—Gluing the centre pieces together

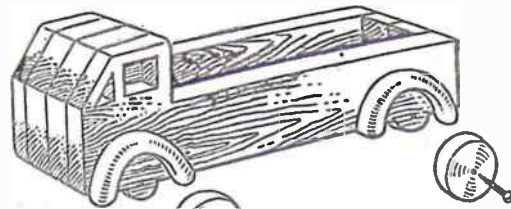


Fig. 3—Fixing the mudguards and wheels

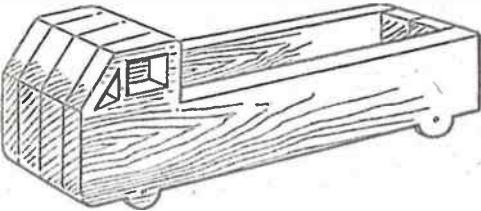


Fig. 2—The sides glued in place

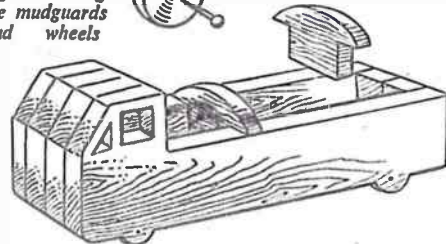
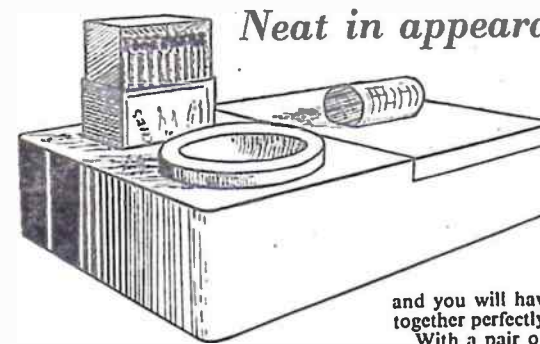


Fig. 4—Showing the partitions for a refuse cart



Neat in appearance and simple to make— A SMOKER'S COMPANION

and you will have two halves which fit together perfectly.

With a pair of compasses, describe a circle 2½ ins. in diameter towards the front of one of the halves, so that the edges of the circles are ½ in. from the front and ½ in. from each side. Reference to Fig. 1 will show its position clearly. Remove the circle of wood with a fretsaw. If the reader is using an ash tray of a different size, then measurements can, of course, be altered to suit.

THE article illustrated is well worthy of the title 'smoker's companion', for it holds all the requirements of the man who enjoys a cigarette. At one side is a compartment to hold a supply of cigarettes, while at the other is an ash tray and a box of matches. It will not be out of place in any room, and yet it can be made easily, and with the minimum of expense.

At ½ in. from the back of the same half and 1 in. from either side, cut out a rectangle 1½ ins. by ½ in.—the width and depth of an average box of matches.

Inexpensive Ash Tray

The ash tray itself is the least expensive of the components, as it is nothing more than one of the small jars in which one buys Senior's meat pastes. Any other similar receptacle could be used, of course, varying as necessary the size of the hole into which it slips in the top of the companion, but readers will find the particular jars mentioned admirably suited to the job, as they are smooth, white and opaque.

Before placing this half of the top

¼ in. wood 4½ ins. by 2½ ins. to form the underside, and glue into position (Fig. 1). Note carefully that the underside is positioned ½ in. from three sides of the lid (allowing for the thickness of the sides of the box), but only ¼ in. from the side nearest the centre of the box. This is because the ½ in. piece of wood which divides the box into two compartments projects only ¼ in. into the cigarette compartment, the other ¼ in. being used to support the fixed half of the top.

When the two parts of the lid are properly positioned, leave under weights until the glue has hardened. A piece of ½ in. dowel, slightly flattened as shown in Fig. 1, is then glued into position to act as a handle.

Now stop all the small holes made by

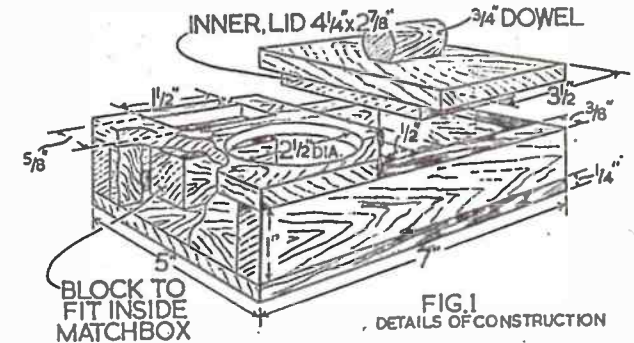


FIG. 1
DETAILS OF CONSTRUCTION

finally in position, make the block over which the matchbox is to fit (see Fig. 1). This should be ½ in. high and slightly under 1½ ins. wide by ½ in. deep, and should be smoothed up so that it will slip comfortably into the bottom of the box of matches. Now put a thin coat of glue on the bottom of the block and the edges of the top, and put the top in position on the box with a box of matches in the slot and over the block of wood. Use a few fret pins to secure the top firmly in place, and make sure, by pressing down on the top of the box of matches, that the block in its base is properly seated. Then leave to dry, when the box of matches can be withdrawn, leaving the wooden block in the exact position required.

The other half of the top can now be completed to form the lid for the cigarette compartment. Cut a piece of

fret pins with plastic wood. If the finished job is to be left in its natural colour and wax polished, colour the plastic wood with suitable stain until it matches the colour of the woodwork. Do this while the plastic wood is still moist, and before it is placed in the holes. If the article is to be stained a deeper colour, proceed in much the same way with the plastic wood, darkening it to the desired shade before using it. In this way you will ensure a subsequent match with the woodwork instead of having the work spoiled by the plastic wood showing through in a lighter shade. This happens inevitably if it is allowed to harden before staining begins, as it will then not absorb the dye.

When all the holes have been nicely

(Continued on page 20)

glued in position in the lorry as indicated in Fig. 4. They divide the lorry into three separate compartments and represent the sliding cover supports that are seen on the real thing.

Before commencing the painting it will be necessary to fill the grain with wood-filler. The first coat of paint can then be applied. This should be allowed to dry thoroughly before applying the next coat. If the grain appears rough in places it should be rubbed down slightly with fine glasspaper. If the design is to be used as a refuse cart the

final coats should be of medium grey. The windows and radiator should be black and the frames lined with lighter grey to represent chromium plating. This also applies to the lining out of the radiator. The mudguards will be jet black and the body may be lined out or left plain.

In the case of an ordinary lorry it would be of some bright colour such as red or green, with the mudguards, windows, etc., black. The framework of the body could be lined in with a hard

pencil. Details such as door handles, lamps, etc., can be added in paint if desired. The wheels will first be painted dark grey and the centre of the wheel painted in colour will leave a grey band round the outside to represent the tyre. The wheels are finally screwed in place, using ¼ in. roundhead screws.

Completing the Job

The addition of a screw eye at the front, and a length of string, completes this fine little pull-along toy. (338P)

satisfactory method of joining is by welding, which is quite simple—the two parts are merely pressed together with a hot iron (either a soldering bit or a domestic flat-iron). Practice on some scrap pieces so as to get used to the correct heat.

Veneering

PLEASE let me know the simplest method of removing old veneer from woodwork, and applying new walnut veneer. (T.C.—Kilmallock).

THE old veneer can be removed by pressing a hot iron over it until the glue becomes softened when it can be stripped off. Remove all scraps of veneer left, with a good scraper, glasspaper the old surface left, then apply thin glue to it and to the veneer. Lay the latter over and rub the hot iron along the surface. Press the veneer down with a veneering hammer until it adheres all over, and work out any blisters which may come through trapped air beneath. It is wise to rub a little soap over the new veneer to prevent the hammer sticking. It is rather a tricky business, and you would be advised to study the matter a little from a text book or instructional article beforehand.

We are sorry not to be able to advise an electric device for firing, as so far as we know, this means has not proved altogether satisfactory. Something after the style of the ordinary gas lighter with flint and wheel and with the spark falling on to a tray on which the powder is heaped, is a safer proposition.

Underwater Suit

I AM making an underwater suit of plastic, and require a good solution to join the already cut pieces of plastic together. The plastic I am using is like that used for mackintoshes. (C.M.—Malta).

THE plastic you are using is known as 'P.V.C.' So far chemists have not been able to discover any adhesive which will make firm joints. The only



Using Flash Powder

IN using flash powder for photographs I find that sometimes the touch paper fizzles out and spoils a negative. Could you advise me how to fire it with an electric spark? Could I use old bell papers? (W.H.—Liverpool).

YOUR trouble must be entirely due to the touch paper becoming slightly damp, and we think that if you place a strip near the fire for a short while or on a hot plate for a few minutes you should find the spark travel quite satisfactorily to the small heap of powder. Another suggestion is that you try rubbing with your finger a small quantity of the mixed powder into each strip of paper just when about to use it; and you might try using only half a strip by cutting it lengthwise into two pieces. The actual sparking should not be of sufficient power to spoil your film.

How to do your own FOUNTAIN PEN REPAIRS

As the barrel and cap of a fountain pen are made of vulcanite or one of the more modern plastics, it is usually impracticable, if not uneconomical, to attempt to repair these parts. Spare parts are readily available from most of the manufacturers of the well known makes, and these are invariably supplied at nominal cost.

However, fountain pens are not entirely free from wear or accidental damage and so it is useful to have a look at the construction of a fountain pen and consider how some of the more common faults can be remedied.

The diagram on this page shows a sectional view of a fountain pen with the names of the component parts which go to make it up. The inset diagrams show alternative methods of operating the filler mechanism.

Common Faults

Now as to the more common faults. One of the most likely is the clogging of the ink-feed, which may normally be cured by immersing the nib and ink-feed in warm water for a few minutes and operating the filler mechanism. This will flush the water back and forth through the nib and feed channels and clear any obstructions in this part of the pen. Another common fault is the failure of the filler mechanism. As will be seen from the diagrams, a rubber sac normally contains the ink stored in the pen and this sac can be deflated or inflated by the lever or whatever type of filler is used. The method of getting to the ink sac is quite straightforward. All that is necessary is to grip the nib holder which, on gentle pressure, should yield to rotation within the barrel and, when freed, come away from the barrel, bringing the ink sac with it. If the sac is perished or seriously punctured, there is only one remedy, namely, to fit a new sac. Sometimes it is possible to repair minor punctures with rubber solution, but if the neck of the sac expands and slips off the end of the nib holder, the best remedy is to secure the sac in position with a binding of a dozen or so strands of silk thread. Saturate thread with rubber solution to

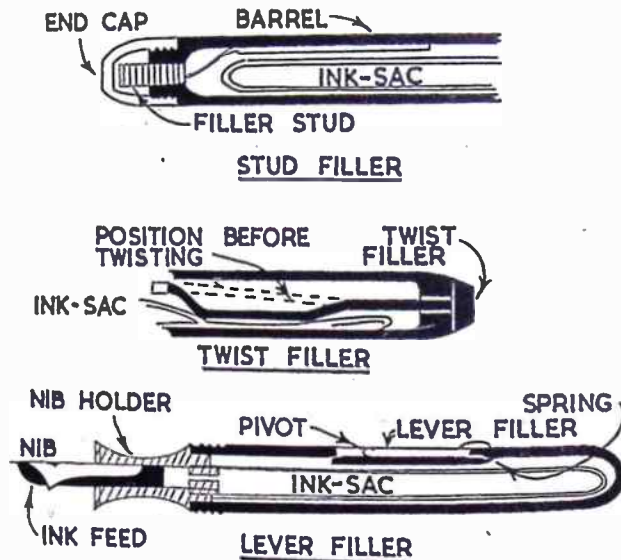
preserve it against possible immersion.

Mechanical Damage

One of the most common forms of mechanical damage is that caused to the nib by the physical violence of the pen falling on to a hard surface or, worse still, by treading accidentally on the nib.

The first step in a repair of this kind is to remove the nib from its holder. This

be lightly beaten to its true shape. Care must be taken in doing this and if a really light hammer is not available, it is better to beat the nib to shape with another piece of soft metal. Use a small pair of pliers or tweezers, if need be, to straighten the points of the nib and adjust these until the points are together. When the nib is adjusted to its original shape or as near as possible thereto, it



must be done carefully if further damage is to be avoided and the method normally adopted is to grip the nib and ink-feed in one pair of pliers and the nib-holder in another pair. Protect the surfaces of the nib-holder with small slips of fibre or rubber wrapped around these parts. Once the nib is free it will be possible to examine the curvature of the undamaged portion and to find a piece of soft metal, preferably brass or copper, which has, or can be given, a curvature similar to that of the nib so that the metal can be set up in a vice and used as a miniature anvil on which the nib can

should be returned to the nib-holder and tested by writing in the usual way.

It is possible, indeed probable, that action of the kind just described may well result in the nib being somewhat rough in use, particularly at first. This fault may in some cases be insuperable, but it is worth while trying the device of writing with the nib on a fine carborundum stone. The 'writing' should, of course, be dry and should be done by the person normally using the pen with a somewhat heavier hand than usual. A few minutes' treatment of the kind will do much to alleviate the difficulty. (337)

A SMOKER'S COMPANION

(Continued from page 19)

filled, clean up the whole job and round off the corners. Finish with wax polish or stain as mentioned. Those who intend to paint the article will not, of course, need to worry about matching

the plastic wood. Whatever finish is used, however, no stain or polish should be used in the compartment which is to hold the cigarettes, or on the underside of the lid.

The ash tray and box of matches are now slipped into place in their respective positions and — with the cigarette compartment comfortably filled—the companion is ready for use. The ash tray can easily be removed from time to time as required for cleaning. (331)

Some timely hints on SPRING CLEANING A CAMERA

ALTHOUGH the faster films that are now on the market have really made photography an 'all-the-year-round' hobby, there are still many who only take pictures during the summer months, their cameras being put away throughout the darker days of winter.

For the benefit of these, then, and others who want to keep their instruments in trim, here are a few hints about overhauling for the season.

Having unearthed the camera, the first thing is to get rid of obvious dust, if any, on the outside. This can be done best with a slightly moistened cloth, screwing it to a point for getting close around and under items of metal-work. Placed over the point of a sharpened match, the cloth can often be got to places that defy even a twisted end. Clean thoroughly the folds of the bellows by taking off the back and stretching each fold separately by an inserted finger.

The outside finished, now deal with the inside of the bellows. It is truly remarkable how quickly dust can collect here and it should be got away, otherwise it is liable to settle on the film and cause small spots of clear gelatine in the negatives, which show as black spots on the eventual prints.

A slightly moistened camel-hair paint brush is best for this inside work, as it effectively brings away specks and grains from folds and corners. In this case flatten the bellow folds from the outside as the dusting proceeds.

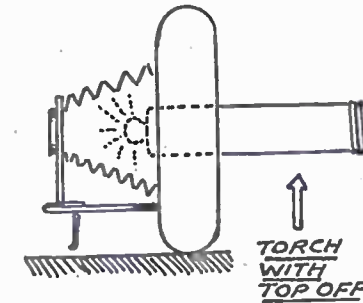
The Lens

Next look at the lens. The surfaces may be 'smear' and in this condition they will give a picture that is lacking in brightness and kick. Quite apart from the 'spring cleaning', anyone who is being troubled with an unaccountable dropping off in quality in their snaps would be well advised to see if their lens has become filmed over. It is a common cause of poor results, but, curiously, one that is not often thought about—especially if the lens is not of the protruding type. Both inside and outside components, if the lens is a composite, should be examined. They readily unscrew.

Greatest care must be taken in the cleaning. Optical glass is not very hard and easily scores with minute scratches unless the softest of materials are employed. If the lens is merely dusty the camel-hair brush will do all that is necessary, but if the surfaces have become greasy then they must be

definitely cleaned. Looking through the camera against the light will quickly show if filming has taken place. A well softened piece of chamois leather dipped in methylated spirits is best for the job and the work should be carried out with as few movements as possible—anything like vigorous rubbing being avoided like the plague. Repeated rubbings, especially with unsuitable materials, can soon destroy the surface polish and cause the lens to lose definition.

Now test if the camera is absolutely light-tight—especially if there were any unaccountable fog patches showing on your pictures last season. The best way



How to test camera bellows for small pinholes

to test for light-tightness is to put an unexposed film or plate in position and leave the camera for a time out in the sun (the dark slide sheath being drawn in the case of a plate camera). Leave it thus for a few moments and then turn each side to the light and stretch the bellows leather on that side. Upon development the material should be just clear gelatine, but if there are dark bands, then light is getting in somewhere.

With a plate camera the 'light trap' velvet which surrounds where the slide goes in may have become depressed. Vigorously brushing the pile may eliminate the trouble but it is best to replace doubtful strips.

In a film camera the trouble most likely is that a 'pinhole' has developed in the bellows. This can, of course, also occur with plate camera but it is best to suspect the light-traps first.

Making a Test

To test bellows, take the camera in a totally dark room. Remove the back and insert an electric torch with the top off so that the light is spread well

around. Stretch the leather section by section when it will be possible to detect any small pinholes by the point of light that comes through.

Repair can be effected by pressing a small piece of thin insulating tape on the inside over the hole, this being previously creased if it comes on a fold. Now have a look at the shutter. Test it on 'Time' and 'Bulb' and the various speeds, and if all is well, or as near well as makes no difference, leave it alone. Never attempt to improve a shutter action with oil.

Shutter Troubles

Shutters sometimes become sluggish when a camera has been lying by, but easing up can be effected by working the trigger a number of times in quick succession. Should the action still be very sluggish, take the instrument to a qualified camera repairer for attention, as probably something has got lodged in the leaves and cleaning is beyond the scope of the ordinary amateur.

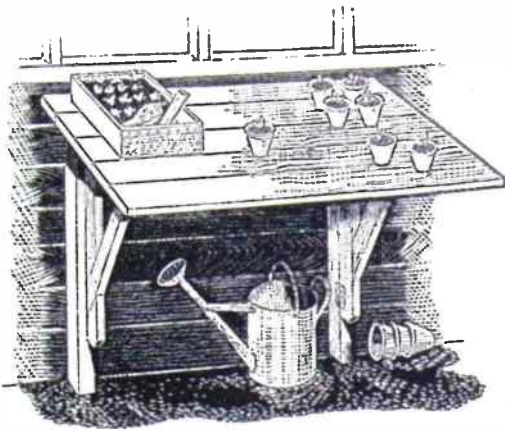
If your camera is of the film type, see that all the pressure springs are doing their work evenly and see that all the various channels are perfectly free from grit, as foreign substances here cause 'telegraph lines'—those unsightly horizontal lines.

Any small repairs that are necessary should be seen to during the spring overhaul. Replace with strong scotch tape any bits of leatherette that have got knocked up and take a look at the case where a stitch in time may definitely save nine. View-finders, too, should have a clean up, as dust often collects on the sloping mirror or other glasses. Clean the same way as the lens. The sloping mirror in some finders can be easily reached; with a 'built in' type it may be necessary to unscrew the front.

As a final point of the overhaul, it is good to test the accuracy of the distance scale. To do this with a plate camera is simple. With a film camera a piece of ground glass must be laid across the film guides at the back of the camera (frosting inwards) and some object at a measured (scale) distance carefully focused on. To get the finest of focus examine the image on the 'screen' with a magnifying glass. Note if the reading on the scale is the same as the measured distance. If not, adjustment must be made and this is usually possible by the slotted screw holes at the ends of the scale which allow of the whole plate being slightly moved one way or the other. (345)

For the greenhouse, shed or workshop — make

A SERVICEABLE FOLDING TABLE



2ft. This should be a handy size for most requirements, but the measurements can, of course, be modified to fit any particular position in the house or shed. The thicknesses and construction can remain unchanged, so the only calculation would be to determine the new

lengths of the timbers.

Constructing the Frame

The folding brackets and table top are supported on a substantial frame

THIS type of table is a useful addition to the amateur's greenhouse. Not many of us possess a proper 'potting' shed, and consequently most of the 'potting up' is done in the greenhouse itself. When not required, the table can be folded flat, leaving just enough projection for a row of small plants in pots. It would be extremely useful, too, in the shed or workshop, or if suitably coloured with enamels, in the kitchen or scullery.

We have allowed for a size of 3ft. 4ins. long by approximately 2ft. 6ins. high. The overall width with table in use is

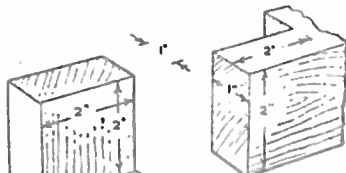


Fig. 2

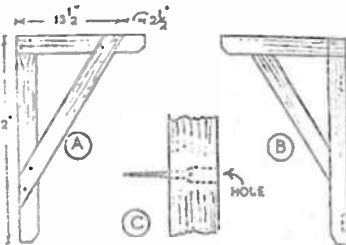


Fig. 3

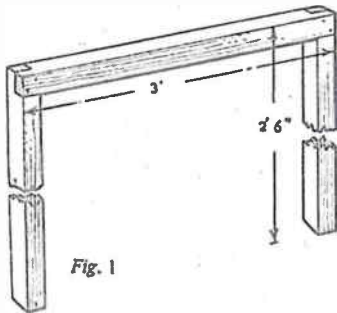


Fig. 1

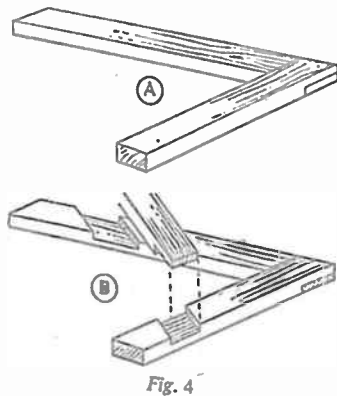


Fig. 4

which is secured to the wall. The methods of fixing will be detailed later. Construct the frame, as shown in Fig. 1, from three pieces of 2in. square timber. The long pieces across the top measure

3ft. and the two shorter pieces 2ft. 6ins. They are secured by an angle half-lap joint which is shown in greater detail in Fig. 2. This joint will present no difficulty if the measurements are marked out carefully on to the wood. The appropriate parts are cut out with a handsaw. Nails or screws can be used for fixing.

The Brackets

These are constructed of 2in. by 1in. wood to the dimensions given in Fig. 3A. The diagrams lettered (A) and (B) show the two sides of the bracket and the position of the hinges. Cut the upright and top bars, first and make a half-lap joint similar to the one used for the frame. Nail or screw together as in Fig. 4A. Now lay the brace piece across in the position indicated in Fig. 3A, and mark carefully the top bar and upright, and also the brace itself. Cut the joints as shown in Fig. 4B, using a saw and chisel and fix with screws or nails. Note

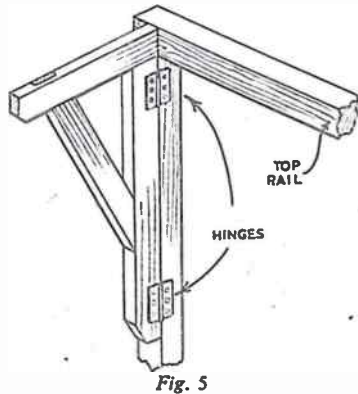


Fig. 5

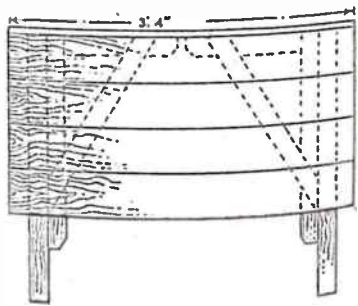


Fig. 6

that the brackets will have the joints on opposite sides so as to form a pair with the brace on the outside of each when assembled.

The Folding Table Top

The top consists of four planed boards of 1/2in. thick wood, measuring 3ft. 4ins. long and 5ins. wide. They are held together by means of two battens measuring 20ins. by 2ins. by 1in. The fifth piece, measuring 3ft. 4ins. by 4ins. by 1/2in. is now hinged to the top by means of two 2in. butt hinges on the underside, that is the same side as the battens. The table is now ready to assemble and we will deal first with the fixing to the wall. The small diagram, Fig. 3C, shows how this is done. Bore holes, half way through the frame, with a brace and bit, and finish off by drilling a small hole just large enough to take the screw. Four screws will be sufficient, one in each upright and two in the cross piece. Stand the frame in position and mark the holes through on to the wall. In the case of a brick wall bore holes about 1 1/2ins. deep and plug with a tapered wood dowel. The screws can now be driven home into these. When fitting to a timbered structure the screws will be driven straight home into this.

It will be as well to give the frame a coat of paint or wood preservative

before fixing. A good proprietary brand such as Cuprinol is ideal.

Having fixed the frame securely in position you can now screw the brackets in place. The hinges will be on the inside of the upright and the top of the bracket will be dead level with the top of the frame as shown in Fig. 5. Swing the brackets out and lay the top in place

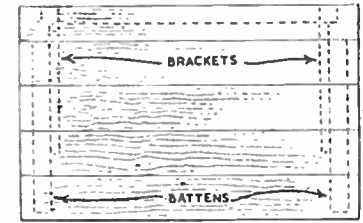


Fig. 7

with the 4in. hinged piece at the back. Screw this piece securely to the cross member of the frame and the table is complete. For your further guidance Fig. 6 shows a front view with the top down, Fig. 7 is a plan view looking down on the extended table top and Figs. 8A and B show a side view with the top up and down respectively.

Finishing

The actual finish is left to the worker,

but we must warn you not to use creosote on any part of the table if this is to be used in the greenhouse. The fumes given off are detrimental to plants. The best preservative is one made specially for the purpose as previously mentioned. Since this is sold in various types for different jobs, be sure to ask for the correct type for use in a greenhouse. For kitchen or scullery use we suggest using a good quality enamel. Fill the wood first, stopping any holes with putty, and then apply one undercoat. This should be the same brand as the finishing coat for best results. Two coats of the finishing colour will complete our smart and useful little table. (343)

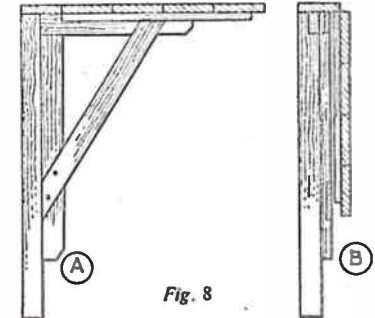


Fig. 8

WORKSHOP NOTES AND HINTS (4)

A Word About 'Invisible Screws'

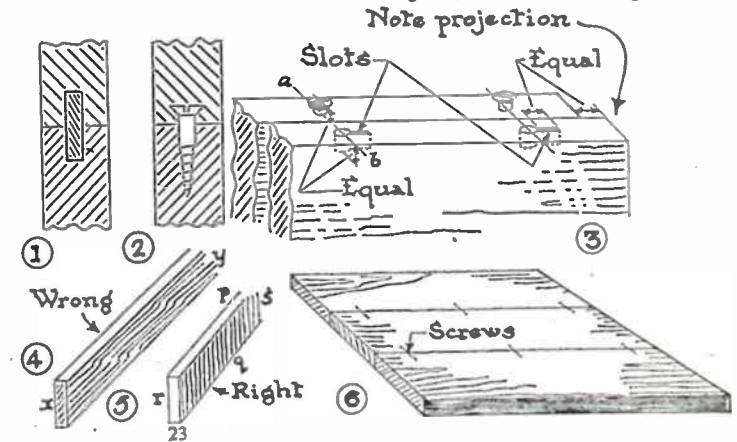
AS wood does not grow in wide pieces, and as maximum width boards are expensive, narrower boards have frequently to be joined together when making, for example, a table top. Tongued joints of the type shown, in section, in Fig. 1 are frequently used. This joint requires the use of a plough plane, however. Most amateurs make the mistake of fitting a 'feather' tongue as in Fig. 4. Such strips are very easy to plane up: indeed, ordinary stripwood could be used, but they have no strength along line (x-y), where it is most needed. A cross-grain tongue (Fig. 5), is quite strong along line (r-s) where strength is needed. It is weak along (p-q), but once in the grooves, no strength is needed along this line. A cross-grained tongue is, naturally, more difficult to prepare.

A method of jointing that might be better known, however, is the 'invisible screw' method. The pieces are first planed up accurately as though for gluing. Lines (a-b) are marked across the edges (see Fig. 3) taking care that one board projects, as shown. Screws are then driven in one piece so that their heads project a little. Into the facing piece, opposite the screw heads, holes are bored equal in diameter to the

heads of the screws, and, in depth, to the height of the screws projecting. Slots are also cut (a twist drill and twist bits being useful here) equal, in length, to the projection of the board, and, in width, equal to the *shank* of the screw.

The edges are now glued (warm them first), the heads of the screws dropped into the holes and then, with a tap or

two of a mallet, the projecting board is knocked in line with the other. This has the effect of forcing the screw heads into the narrow slots, the bevel on the screw head cutting an extra groove, and, by its wedge action, drawing the pieces of wood together. This method is particularly useful for softwoods. The sizes of the screws and slots will vary, of course, with the thickness of the wood. For wood 1in. thick, a 1/2in. diameter screw projecting 1/2in., and with a 1/2in. long slot, would be about right. (312)



The Lighting of a Microscope

MOST microscopes are made with a small mirror in the sub-stage, to reflect light up through the object being examined. Some of the most expensive instruments, costing into the hundreds of pounds, however, often have an electric lighting system built in with the microscope, and there is no reason why any amateur should not build a simple electric lighting system into his instrument. This offers the advantage of being able to alter the intensity of the lighting by a small resistance, and also that the light is always in the correct position.

The picking up and reflecting of light by the mirror is much less convenient. Fig. 1 shows a miniature bulb fixed to a microscope instead of a



Fig. 1—An instrument fitted with a miniature bulb

microscope who has written several works on microscopy and laboratory technique, for many years lighted his microscope by using an ordinary electric bulb fixed into a large metal shade. A small rectangle was cut from the bottom of the shade so that a beam of light could play straight on to his microscope mirror. Later, he changed to having a small bulb built in and he found this most convenient when used in conjunction with a variable resistance. The reason for desiring to alter the intensity of the lighting in this manner is that when a higher magnification is used a stronger light is needed as it has

intense lighting for the object to be seen clearly, yet the same lighting, with more normal magnification would be blinding. A variable resistance, or a number of different voltages into which your instrument can be plugged, is accordingly very convenient.

Further Advantage

Another advantage of such a controlled lighting system, over the picking up of a more distant light by the mirror, is that when the microscope is used in a darkened room, the lighted object shows up much more clearly, and for projection work, i.e. projecting an image from your microscope on to a small screen, or for taking photomicrographs, it is useful to be able to work in complete darkness, all the light



Fig. 2—Similar to Fig. 1, but the bulb is enclosed in a brass tube

mirror, and Fig. 2 shows another instrument where a similar bulb is enclosed in a small brass tube, with a ground glass disc fixed to the top by scotch tape. This gives a much more even lighting and reduces the glare. Both of these bulbs are lighted from a bell transformer on the mains supply, but they could be just as easily lighted from a battery or accumulator.

For those who wish to retain the mirror various types of lantern are available on the market, and these direct a beam of light straight on to the mirror, but any resourceful amateur can devise such a lantern without much difficulty. Fig. 3 shows such a lantern made from a bomb-sighting instrument and bought from an 'ex-Government store for 4/6, but Fig. 4 is a very simple arrangement where an ordinary electric bulb is mounted in a cocoa tin with a hole cut away so that light shines on to the mirror without illuminating the whole room. One authority on the

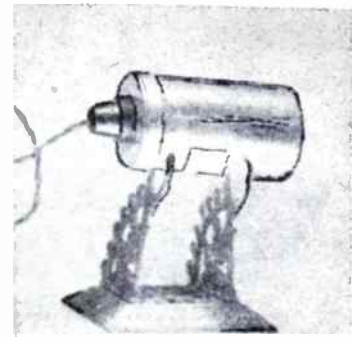


Fig. 4—Electric bulb mounted in cocoa tin

apparently to be spread from a smaller spot over a wider area, until, with a really high power lens you are really taking a most minute spot of lighted material and tremendously magnifying it. Such a spot requires much more

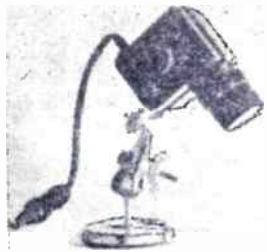


Fig. 3—Lantern made from ex-Government bomb-sighting instrument

present being that which passes up through your instrument. (336)

SPECIAL NEXT WEEK

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DESIGNING AND BUILDING MODEL RAILWAYS

By E. F. Carter

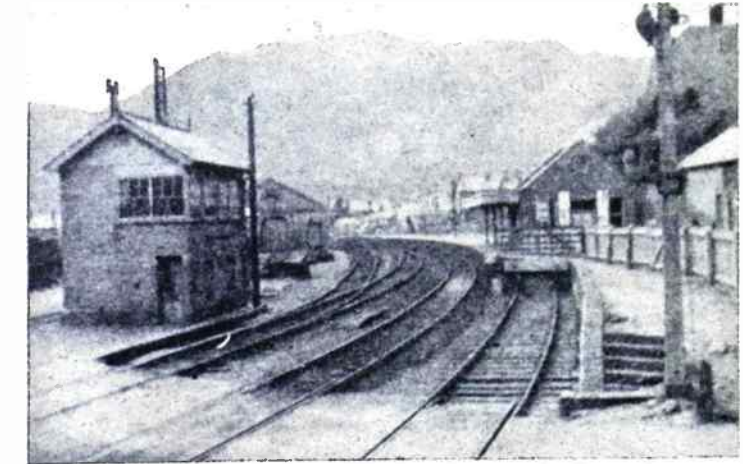
IT will have been seen that the underlying scheme of good layout planning is that of incorporating as few turnouts as possible. Just enough to permit of every necessary movement—no more, and no less. The prevalent idea of laying a maze of useless or redundant points in incorrect positions is all wrong, and it becomes vital to test any paper-plan of a layout by moving a dummy (card) train and engine over it to prove its workability or otherwise, as already outlined in an earlier article in this series.

Coming now to the short single-line branch, diverging from the circuit of track, and running out to a high-level terminus, the arrangements shown in Fig. 7 will be found necessary unless a 'push-pull' ('motor') train, consisting of a small tank engine permanently coupled at one end of a one or two coach train is used to work the branch.

Run-Round Loops

The two engine run-round loops at (X) and (Y) will be needed if it is desired to use the branch-line engine always at the head of its train, and the design of the junction station is arranged so that the 'up' platform (No. 2-3) has two faces, serving both the 'up' main and branch lines.

It will be seen that it is possible to run a short train from the down platform (No. 1) right round the main circuit, over the facing crossover (A-B), and then out on to the branch terminus. Similarly a short train can be run from the terminus, straight on to the 'up' main circuit, thereafter running a complete circuit and stopping at Platform No. 2.



Simplicity is the keynote of success in station planning

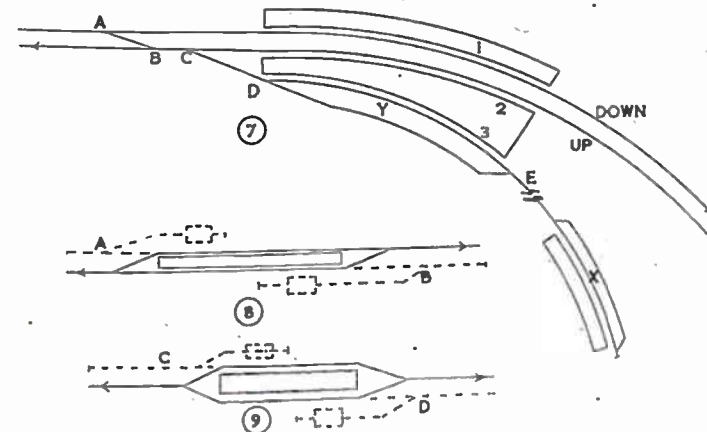
main-line stock be run on the branch, for should the latter have to be laid within the inner radius of the main-line circuit, it will be bound to embody some rather short-radius curves, to which main-line stock does not take too kindly.

(51mms. in 'OO' gauge, and 101mms. in 'O' gauge; both measurements being taken from rail level to the underside of the high-level baseboard) can be obtained within the linear distance available between the point of divergence from the circuit to the entry into the high-level station, without producing too steep a gradient. Only a true-to-scale plan of the whole layout can determine whether or not this is a practical proposition.

Intriguing

Admittedly, two-level layouts are very intriguing and look 100 per cent better than those built on one level, but they need much more care in design, and can only be worked on a small area layout with engines of known power and hauling capacity, coupled to short trains. All these points should, then, be well weighed up before a decision is made to attempt to build a graded layout of even the simplest nature.

Should the total area available be inadequate for the inclusion of a branch



Here are a number of worthwhile HINTS FOR NEW CYCLISTS

EACH spring brings a host of new recruits to swell the ranks of cyclists. No need to marvel at this assertion, for cycling is one of the most economical, care-free, and enjoyable forms of spending week-ends—and longer holidays—in spring and summer. Commencing at Easter there follow splendid opportunities for grand outings in this beautiful countryside of ours. There is a fascination about the rolling wheel, the delightful sensation of speeding along by one's own energy, too, in addition to the joys of exploring interesting places.

Getting Ready

Getting the machine ready for the road is an important matter, and requires careful thought. It is, perhaps, unnecessary to point out to the new recruit that the bicycle should be in first-class condition, and road-worthy in every way. Look to the tyres. Never set off on a long run with doubtful ones; badly worn covers are liable to let one down, even in these days of smooth roads.

Give an eye to all bearings, and correct adjustment so that they run freely but not too slack. The chain should be correctly adjusted for tension. Above all, the brakes must be effective; your life might depend upon them. Adjust so that they act instantly when required. If the blocks are worn they should be changed. Never ride your machine with only one brake.

If you are getting a new bicycle do not be in too much of a hurry in deciding upon the type and make. Get the best—it comes cheapest in the long run. Suitable machines are those of light-weight pattern, with flat or upturned handlebars, rigid frame, a good com-

fortable saddle, tyres of medium width with good treads. The brakes, variable gear and lighting accessories, should be specially suited to touring. Remember, the light racing patterns with low handlebars and spidery wheels and a frame inclined to be whippy, are not satisfactory for long-distance touring, when you have to carry a certain amount of luggage.

Not too Heavy

Beware of a too-heavy machine, which may be all right for a big hefty fellow. The average rider will find that it is such labour pushing one along, after the first ten miles, that all the fun of the outing is killed. Always try out the size of a new machine, to make sure that it 'fits' your height. Sit on it. Unless, when seated on the saddle, you can reach ground with the forepart of both feet, the machine is too big for you, and is undesirable. See that the saddle is of a comfortable design. Though there are old riders who still seem to prefer a fixed gear, be wise, and have a variable one; you will find it better for helping you to travel gradients, and when riding against a strong head wind.

On the Road

Newcomers to cycle-touring must remember that cycling calls for a certain amount of grit and perseverance. Start sensibly. Some beginners are full of enthusiasm at first, and then throw up the sponge before they have given it a fair trial. The thing to do is to take your cycling easy from the start. Get your leg muscles 'run in'—to borrow a motoring term. Limber up those muscles used most in pedalling by undertaking

short spins, gradually lengthening distance on successive runs, and always maintain a moderate pace. You have the day before you, and it is not necessary to cover 50 miles before lunch! Never ride 'all out'—always keep a bit of energy in reserve. Struggling uphill against a wind is never worth it. Dismount, and walk. Take a rest now and again.

Do not ride too long on an empty tummy. But do not eat and drink much between meals. In summer the temptation to keep drinking must be resisted. To indulge repeatedly in slaking your thirst is to court discomfort, and even disaster.

To overcome thirstiness, suck an acid drop or a small piece of dried orange or lemon peel, as you ride; but avoid sweets in general, and especially chocolate, whilst in the saddle on a hot day's ride.

Keep Tyres Hard

Keep your tyres board hard—thus making riding easier, and saving risks of punctures. But carry a repair outfit—just in case. Do not leave your machine in a public place for any length of time unless you have a good lock on it. If you leave a bicycle leaning outside a cafe or shop or inn for ten minutes, you may find that someone else has taken a fancy to it. Always be careful where you leave it, or you might get stranded.

Travel with ease, curbing your youthful energies, and you will find the benefit when late afternoon still finds you a few miles from your destination. Never plan too ambitious a daily mileage. And, finally, memorise the rules of the Highway Code. (348)

DESIGNING MODEL RAILWAYS

(Continued from page 25)

line, then it is much the better plan to arrange two through stations—single or double-line—and to let the main operational interest focus around the marshalling and shunting of goods stock in a well-laid-out goods yard.

Assuming that a single-track main-line is used, Figs. 8 and 9 show how a passing loop can be arranged to suit either a one or a two-platform station. To either of these plans the previously-described goods yards can be added with advantage at any one of the situations shown dotted at (A), (B), (C)

or (D). It will be noticed that in each case the entrance to the goods yard is made from the main-line after the latter has split into a passing loop, so that the turnout from the running road is not made to face the direction of the passing main-line traffic.

This principle of siding exits trailing the direction of the main-line traffic should always be observed when designing a station layout. In prototype practice it is only under the most exceptional circumstances that sidings may be entered directly from the

running lines—a back-shunt almost always has to be made.

It is the observation of such small, but highly vital details of real railway practice, and their interpretation into model form which gives a layout that subtle, yet much-sought-after 'atmosphere', and a 'real' look which cannot be obtained in any other way. The mere addition of railway buildings and line-side accessories to a model—however well they are produced—will never make up for an inaccurately-designed track layout. (334)

Don't neglect the advertisement pages of this magazine. They are worthy of your attention.

Too many books? — Then make A STUDENT'S BOOK RACK

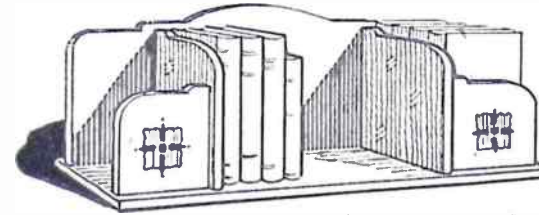


Fig. 1—The finished rack with its three roomy sections

A REQUEST has reached us from a reader who asks for a design of what we should term 'an outside in book racks'. What he seeks is a rack having three distinct compartments, as it were, in the one article. We give at Fig. 1 an illustration of such a three-in-one rack, which would, no doubt, be found useful by many of our workers.

Materials

Good straight-grained deal would answer for the rack if it is to be painted, but one of the hard woods such as mahogany or oak would, of course, make the better job. As our reader desires the rack for students' text books, and not necessarily as a piece of furniture, it would seem that the softer variety of wood would be suitable, and would look well painted or enamelled.

The rack shown here is 20ins. long and 8ins. high at the back, and it stands on a base 20½ins. long and 7ins. wide. Wood ½in. is used throughout, and while the construction is simple, the article must be strongly put together with glue and screws. In places, the simple open mortise and tenon joint should be used. The back is cut from a piece 20ins. long by 8ins. wide, and the shaping may be set out from the measurements given in Fig. 2. To get a firm fixing between the back and the outstanding divisional pieces (A), it is suggested the latter be tenoned into the back as shown in the detail Fig. 4. Here we see that a 3in. tenon is to be set out on the two pieces, the total width of these being 6½ins.

Tight Joints

Corresponding mortises, to take the tenons, are cut in the back, and when cutting them with the fretsaw, be sure to cut along the inside of the drawn line, so that a tight joint will result when the tenons are glued in. The mortises will, of course, be rather less than ½in. wide, and the tenons will be checked for length after the mortises have been made.

Now take in hand the two pieces (A),

and note the 2ins. radius for setting out the rounded front. This also applies, as will be seen from Fig. 2, to the two extreme top corners of the back board.

On piece (A) again, note the housing which is to be cut down ½in. to receive the back edge of the side uprights (B). A fine-tooth tenon saw can be used for

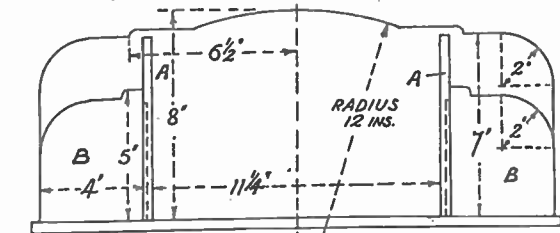


Fig. 2—Details of the back and two side uprights

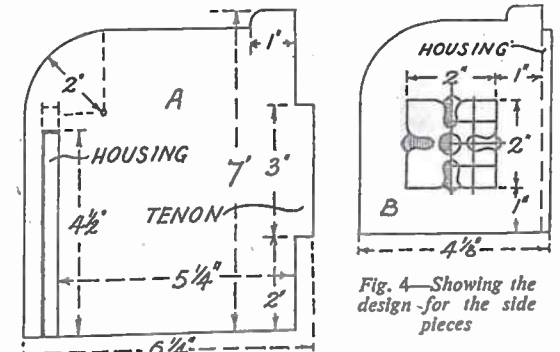


Fig. 3—The partition pieces

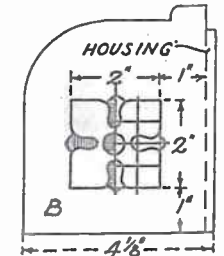


Fig. 4—Showing the design for the side pieces

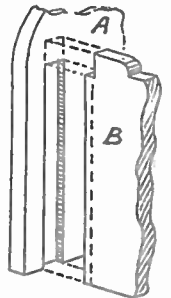


Fig. 5—How the side pieces are housed in the partitions

gluing up. Fig. 5 gives a detail of the finished joint ready for assembly. Glue each pair of uprights together and then glue pieces (A) into the mortises of the back. Run countersunk screws up through the base into the back and the four uprights. Clean off the backs of the tenons with glasspaper to make a clean and neat surface.

Finish

It only remains now to add the finish to the wood, and if some simple decoration should be desired, then that shown on the two ends might be added in some contrasting colours. The design shown can be enlarged by means of the ¼in. squares given in Fig. 4. Only a half, or even a quarter, of the design need be drawn, the rest of the work being put in

cutting down the sides of the housing, with a ½in. chisel for clearing away the unwanted wood between.

In Fig. 4 is shown the outline of one of the uprights (B). Each measures 5ins. high by 4½ins. wide, this width includes the housing which is ½in. wide. Note again that the curved outline is cut to a radius of 2ins.

Test the housing with its recess in piece (A) to get a good fit before

by making a paper tracing and transferring the outline each side of the centre lines. (344)

Do your friends know about the 'new' HOBBIES WEEKLY? If not tell them right away. They won't be sorry.

Mirrors are the secret of these examples of SCIENTIFIC MAGIC

A STAGE trick which startled the British public about a hundred years ago was the 'Talking Head' introduced by Colonel Stodart. The Colonel walked on to the stage carrying a small square case. He placed this on top of a three-legged table and then removed the front of the box facing the audience so that they could see inside.

Revealed was a head, apparently human, which could talk, smile, change its expression and obey other commands—all this with the Colonel at the other side of the stage, or far enough away at least to avoid any possibility of ventriloquism. (See Fig. 1).

'Extraordinary Illusion'

An issue of the *Times* of 1865, reporting on this illusion, went so far as to say: 'This is certainly one of the most extraordinary illusions ever presented to the public. That the speech is spoken by a human voice there is no doubt; but how is a head to be contrived which, being detached from anything like a body, confined in a case which it completely fills, and placed upon a bare-legged table, will accompany a speech which apparently proceeds from its lips, with a strictly appropriate movement of the mouth and a play of the countenance that are the reverse of mechanical?'

Apparently the secret lived with Colonel Stodart until his death. He was not the inventor of the illusion, however. The idea was originally thought up by a Mr. Tobin who had

also sold the secret to another magician exhibiting in Paris. This magician chose to use a very gruesome head resting on a pile of 'bloodstained' straw which proceeded to relate the gruesome details of its demise!

One night, a more than usually rowdy audience apparently decided to test just how much 'sensation' the decapitated head still retained and shied it with pellets and small stones. One badly aimed missile bounced off the stage floor just in front of the table and instead of passing between the legs, mysteriously bounced back again, accompanied by a loud crack!

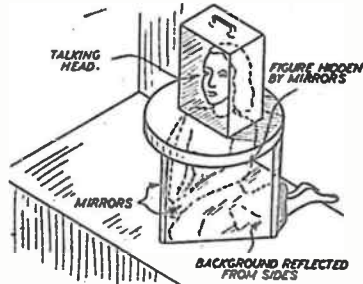


Fig. 2—The secret of the Colonel's trick

As Fig. 2 shows, the illusion was completed by completely filling in the space between the legs with mirrors. What the audience thought was the back of the stage seen through the legs, was actually the reflection of the sides, flawless mirrors and careful arrangement of the side and back drapes making the illusion perfect. In the space hidden by the mirrors, of course, an assistant could crouch, ready to pop his head through the open bottom of the case as soon as it was placed on the table. All that the magician had to remember was to be careful not to walk behind the table—otherwise his legs would disappear from view, and only to approach the table directly from head-on.

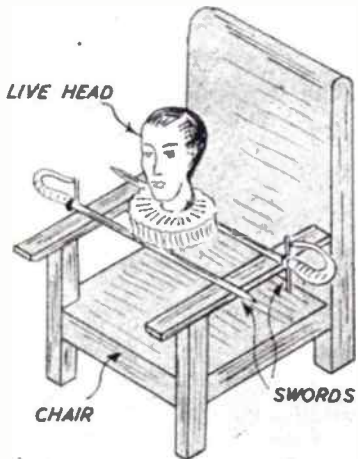
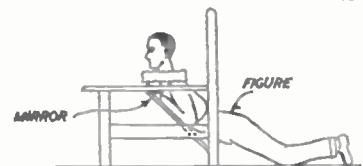


Fig. 3—The head on two swords, and (right) how the illusion was accomplished



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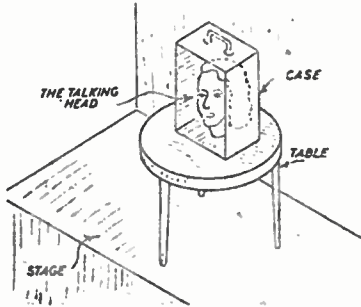


Fig. 1—Colonel Stodart's 'talking head'

It was during this period—the latter half of the nineteenth century—that other similar 'mirror' illusions became extremely popular and many were equally as mystifying as the 'Talking Head'. The best of these other tricks, however, usually employed only a single plane mirror at an angle of 45 degrees to the stage or property floor. Two such examples are shown in Figs. 3 and 4.

The head, wearing a ruff collar in Fig. 3, is apparently resting on two swords laid across the arms of a chair. The second diagram shows how the mirror is arranged to hide the 'body' and, by reflection, present an

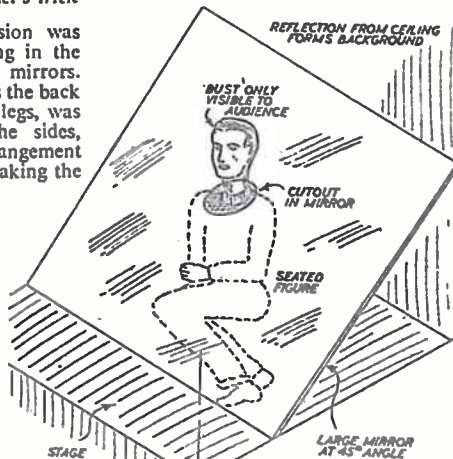


Fig. 4—How a mirror was used to make a human head appear to be floating in mid-air

(apparently) unobstructed view of the back of the chair. The swords or some similar support are very necessary. Th

(Continued on page 29)

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SCIENTIFIC MAGIC

(Continued from page 28)

front one has to hide the top edge of the mirror!

The second illusion is a living 'bust' apparently suspended in mid-air in the middle of a brilliantly lit stage. As Fig. 4 shows the performer's head is actually projecting through a hole in a large sloping mirror. The head is suitably draped to hide the edges of the

hole in the mirror and the 'back' of the stage as viewed by the audience is merely the reflection of the ceiling, which is draped accordingly. An interesting point about this illusion is that another actor can stand quite close to the mirror and talk with the 'bust' without fear of his reflection appearing in the mirror.

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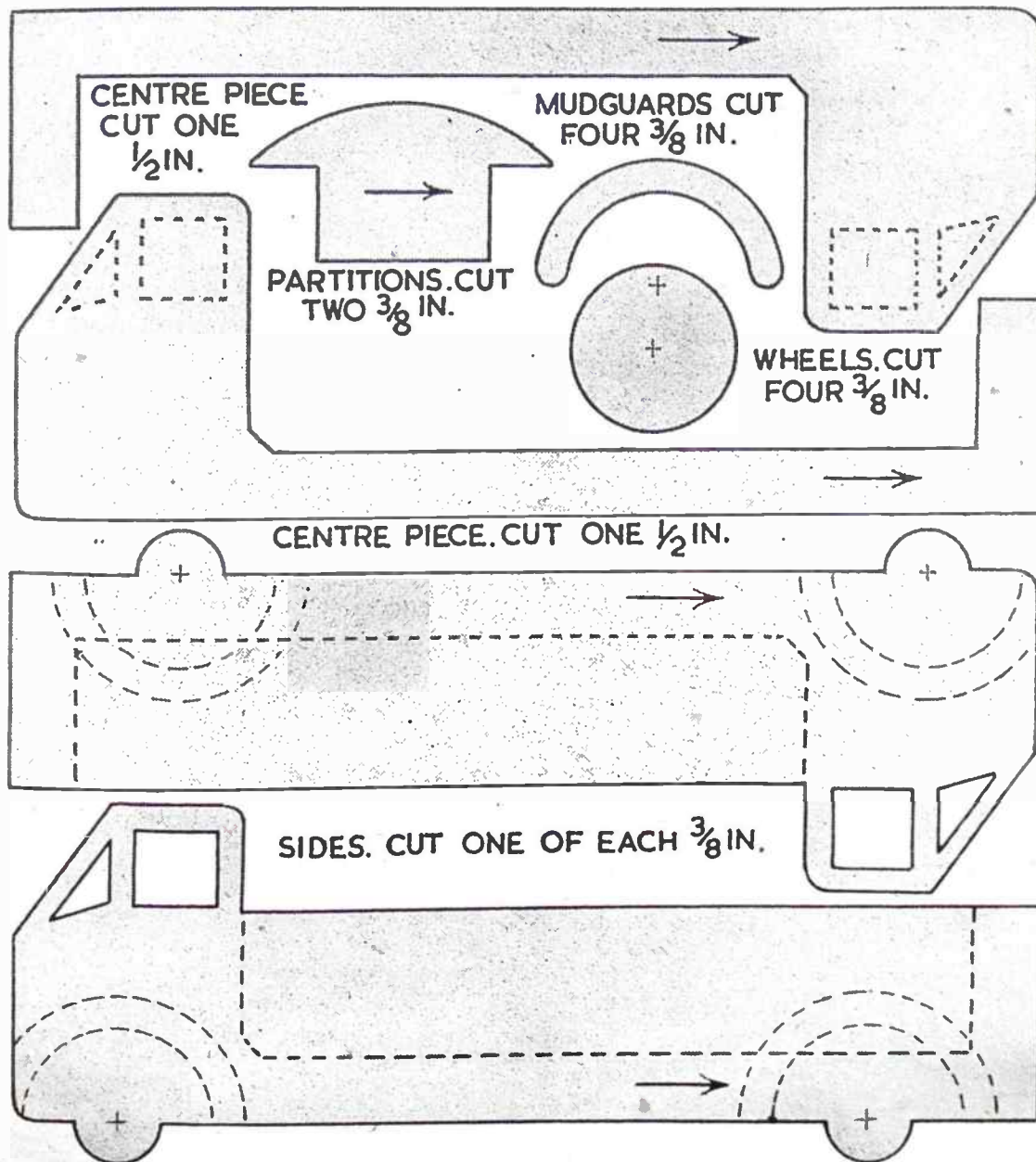
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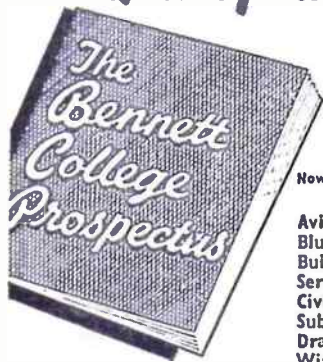
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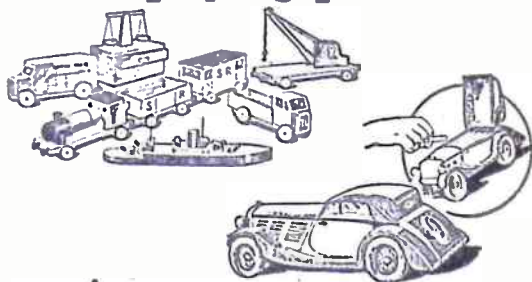
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