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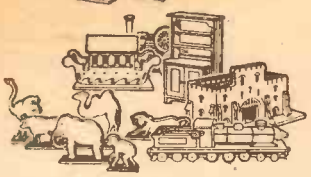

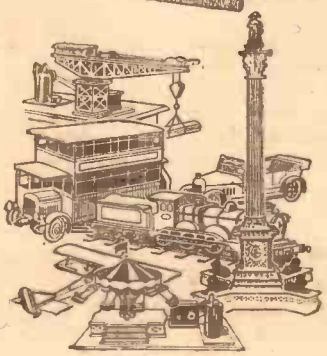

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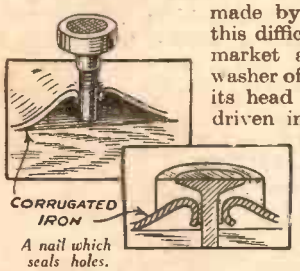
Hobbies

Vol. 71. No. 1,825. Published Every Wednesday. OCTOBER 11th, 1930.

THIS WEEK'S CLEVER IDEAS.

A Nail which Seals Holes.

THOSE of you who have built sheds or awnings know how difficult it is to attach the roof covering material so that the rain does not penetrate through holes made by the nails. To get over this difficulty, there is now on the market a nail which has a small washer of lead attached underneath its head so that when the nail is driven in this piece of lead automatically seals the hole.



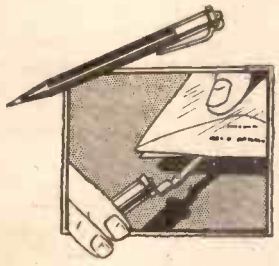
A nail which seals holes.

A Tell-tale Accumulator.

AN ingenious wireless accumulator recently invented tells you at once whether it is fully charged, half-charged, or discharged. Three little floats, one red, one green and one white, act as tell-tales; they are visible through the side of the accumulator. When the red float is down it is time to recharge, when the green float falls the accumulator is half-charged, when the white is down the battery is completely discharged. It is aptly described as an accumulator which thinks.

Pencil Clip and Paper-cutter Combined.

THE hinged pencil clip recently marketed acts ordinarily as a pencil clip, but when turned back makes a convenient letter opener. It is easily adjusted and remains firmly in position. The clip costs a penny.


Combined pencil clip and letter opener.

The Flying Fool.

A NEAT little glider which is propelled into the air by means of a gun is the latest model aeroplane novelty. You place the glider on the barrel of the gun, pull the trigger and the glider is propelled into the air. It flies for about 70yds.

A Glue "Pencil."

A LITTLE device which enables glue to be applied in a clean way consists of a pencil that leaves a spot of glue on the paper when it is pressed upon it. The tip of the pencil is provided with a ball-valve which closes the pencil and makes it leak-proof, but allows the glue to flow when the pencil, held vertically, is pressed upon the paper. The valve head is removable to allow the barrel to be refilled when necessary, and for cleaning should the valve itself become stuck.

A Screw that Can be Hammered In.

IT is claimed that a new sort of screw, under the blows of a light hammer, will cut its own screw thread into soft metals, stone, and even cast-iron, as well as into wood. Holes have to be drilled for it, but no tapping is necessary. The lower portion is smooth to fit into the hole drilled, and above is a very steep spiral thread. This thread is case-hardened.

A Useful Wireless Tool.

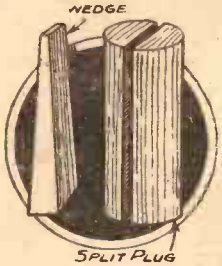
WIRELESS constructors will appreciate the usefulness of a novel screwdriver that can be fitted with box spanners and thus do a double job. The screwdriver is provided with an adjustable knurled ring which enables the operator to rotate the screwdriver continuously, while the handle remains stationary in the palm of the hand. Thus once the screwdriver blade is in the slot of the screw, all one has to do is to turn the knurled ring till the screw is out. The blade does not slip and the screw comes out in a few seconds. There are supplied with the screwdriver three box spanners to take 2, 4, and 6 BA nuts, the spanners fitting over the blade. Since these can also be made to rotate continuously, the nut is unscrewed in record time. These box spanners also facilitate the placing of nuts in position in awkward places.

Rear View Spectacles.

A BRAINY inventor, who seeks to reduce the risks attached to cycling, has produced a pair of spectacles with a mirror placed at an angle in front of each lens. In this way the cyclist is enabled to see behind him as well as in front at the same time. This little idea lends itself to use in many other directions which will readily occur to the reader. For example, in the form of pince-nez they can be secretly donned and enable you to see what your friends are doing behind your back, and they can also be applied to other forms of conjuring.


These spectacles enable cyclists to see what is coming behind.

INGENIOUS IDEAS FROM OUR READERS.



An excellent plug for walls can be made in this way.

Wall Plugs.

AN excellent wall plug may be made by cutting a round plug to fit the hole in the wall, splitting the plug and driving a wedge between it as shown in the diagram. The wedge is inserted in the hole first, and in hammering the plugs in, the wedge opens them out so that they are immovably bedded in the hole. It is an extremely satisfactory manner of doing a difficult job.

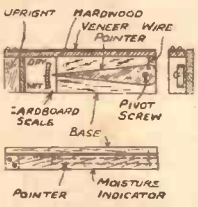
To Prevent Carpets Slipping.

THE problem of the slipping rug may be solved by fixing small sockets in the floor and passing a neat brass-head nail through the rug into the socket. Two should be sufficient for even a large rug or carpet. The sockets may be purchased from the ironmonger.


A dodge to prevent carpets slipping.

A Simple Weather Indicator.

THIS simple, yet accurate, weather indicator may be made from a piece of pine 1ft. long, 4in. wide, at the left end of which another piece ¾in. by 1in. is nailed. At the side is screwed at one end only a piece of hardwood 1ft. by ¾in. by ¼in. Glue a strip of veneer to the hardwood strip. The dial is of cardboard and the pointer of pine, loosely pivoted with a screw, and secured to the veneered strip with wire. The veneered strip will warp according to the weather and so work the pointer, and the pointer should be set in the first instance to point to the Zero mark on the scale. This idea may be varied in design, and the principle lends itself to several applications.



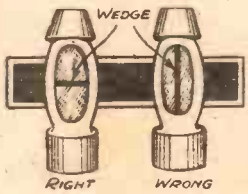
A simple weather indicator.

THAT DODGE OF *YOURS!*

Why not Pass it on to us? We pay Five Shillings for every item published on this page. Mark your envelope "Notes and Notions."

Wedging the Hammer.

HAMMERS are dangerous things if used with a loose head. It is a singular fact that nearly all hammers are wrongly wedged when

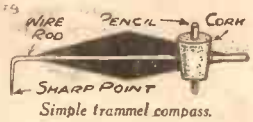


How to wedge the hammer.

bought, with the result that they soon work loose. The diagrams show the correct and incorrect methods of wedging the heads. It should always be wedged at right-angles to the head, and not in line with it, as the force of the blow does not tend to loosen the head sideways.

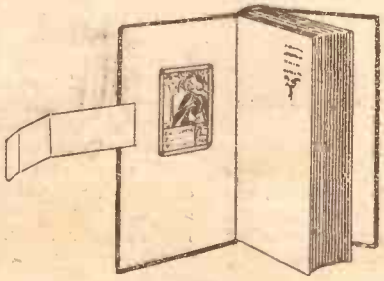
A Simple Trammel Compass.

TO make this simple trammel compass all that is needed is a cork, a piece of stiff wire and a pencil. The wire should be about 8ins. long and should



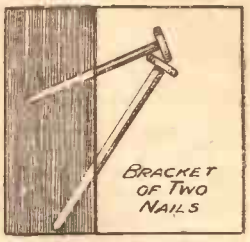
Simple trammel compass.

be bent to a right-angle 1in. from the end, the end being filed to a point. The pencil is fitted in the cork in the manner shown in the diagram. The cork may be moved in or out to make a circle of small or large radius.


An easily-made bookmarker.

Book Plate and Marker in One.

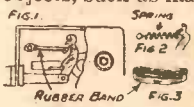
THE sketch shows a book plate and marker that doesn't fall out or get in the way when reading. It consists simply of a flap of stout but flexible paper extending from the book plate pasted inside the front cover. The bookmarker may also be used for making notes.



A strong wall-bracket made from two nails.

A Bracket of Two Nails.

WHERE a strong bracket is wanted for suspending heavy objects, such as machine parts, from the wall or a wooden post, two nails driven in at different angles may be employed as shown in the sketch, the lower nail acting as a strut for the upper one. Knock the two heads into close contact.



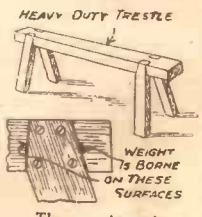
Rubber band as lock spring.

Rubber Band as Lock Spring.

IF the spring of a lock breaks, a rubber band, used as shown in Figs. 1 to 3, serves as an excellent substitute. The rubber band needs to be fairly strong, and if one stout enough cannot be found, use several smaller ones. A piece cut from an old bicycle tube acts well on small locks. In some locks it is possible to use pieces of old clock-spring to replace the broken one.

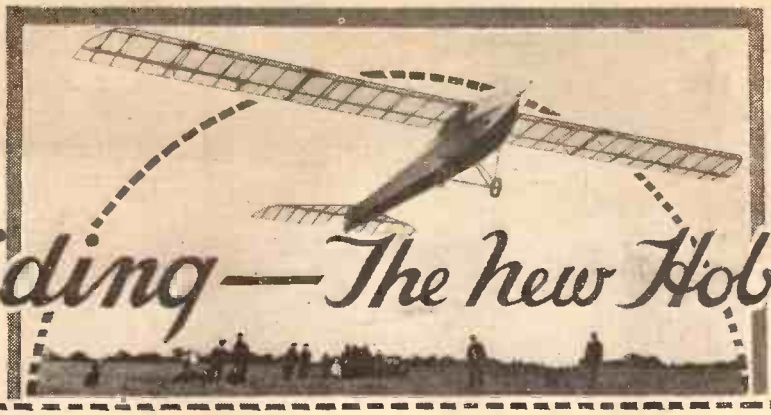
Making Trestles.

WOODEN trestles are often made so that the weight is borne by the nails that hold the legs to the top. A much better method is to bevel off the inside edge of each leg, as shown in the sketch, and make a notch of corresponding shape in the top. The joint is then wedge-like in principle and makes the trestle absolutely rigid.



The correct way to make a trestle.

Gliding is easy to learn, cheap, and safe.



There are seventy-two gliding clubs in England.

Gliding—The new Hobby!

MAKING A MODEL CATAPULT GLIDER— | By a Gliding Expert. | IS DEALT WITH ON THE NEXT PAGE

IT is a little over twenty-five years ago that the brothers Orville and Wilbur Wright created their record glide in a motorless 'plane, by remaining aloft for a little over nine minutes. Little further interest was taken in the sport until four years ago, when some German students developed some highly efficient gliders on which they were able to remain aloft for hours.

Gliding and Sailplaning.

In England gliding is rapidly gaining in favour. Already there are seventy-two gliding clubs, each of which has several gliders in regular use. Within a short while it will be almost as popular as boating. There is no reason why any fellow should not learn to glide straight away; it costs but a few shillings a year to belong to a gliding club, and in return you receive tuition in gliding and sail-planing. There is a distinct difference between these two things. In gliding, the machine is towed or catapulted from the top of a hill, and the glider gradually comes to rest some hundreds of yards farther on, but in sail-planing he requires much more skill, as he takes advantage of up-currents to gain altitude and is able to keep aloft for considerable periods, and even to make lengthy cross-country flights.

Gliding Meetings.

All those readers who can possibly do so, should go and witness one of the gliding meetings which are being held every week-end in various parts of the country. Upon joining the gliding club you will first of all have a few towed flights. You take your seat in the pilot's cockpit and are then towed down the hill by the other members of the club by means of rope attached to the wing tips. As the glider gains speed you will gradually ascend to a height of about 40ft., and by means of these ropes those towing are able to correct the mistakes made by the inexperienced pilot.

After a few towed flights, you will rapidly get the "feel" of the machine, and then you will be allowed to make a free glide with the tow-ropes released. After you have gained a little experience in this way you will then be catapulted into the air in the manner shown in the photograph on the next page.

A length of fairly stout rubber cord is attached to the nose of the glider, the ends of the rubber catapult being tethered to the ground. Several members then pull the glider backwards to stretch the rubber cord. Upon releasing, the glider is catapulted into the air, and you will be able to make glides of longer duration. It is all very simple and quite safe, as is evidenced by the fact that no accidents of any kind have happened.

Herr Kronfield, the famous German gliding expert who has been teaching gliding over here, has been carrying out flights from Firle Beacon, near Lewes, recently. He came to this country at the invitation of the British Gliding Association in order to help put the sport on a firm basis in England. His demonstrations have been mainly confined to comparatively short flights which were intended to show the spectators what a glider of the advanced type can do and just how it flies.

A short time ago, however, he made what must be one of, if not the finest flight which has been made with a glider in this country.

A 70 Miles Glide!

He started from Firle Beacon, near Lewes, at about 5.30 one evening, and without any public announcement, although he had intimated his intention to a few who were actually helping him, he set off to fly direct to Bedhampton, near Portsmouth. During the day he had been giving a series of exhibition flights before a large crowd, and in the evening no doubt he felt that he would be justified if he allowed himself the pleasure of a

Towing a glider to the top of a hill.

Herr Kronfield being catapulted into the air on his glider "Wien."

Inset: Herr Kronfield in the pilot's cockpit of the "Wien." Note how the catapult is attached.

more experimental flight of the type which interests him so much.

He circled a few times and gained a height of about 1,700ft., and then set off westwards at a fairly fast speed. Over Lewes he found that it was again necessary to circle round and gain height, but once he reached the further range of the Downs it was all plain "sailing," and in fact he made such speed that the cars which were following him in the valley were unable to keep up with him, and after a flight lasting just under three hours he landed at Bedhampton, a little over seventy miles from his starting point.

Details of the "Wien."

This flight was really remarkable for the fact that Herr Kronfield set himself a definite goal and then reached it. It was not as if he had gone up to see where and in which direction he could get, but on the strength of his gliding experience in the neighbourhood.

This is the first time that a glider has been able to make a cross-country flight to a pre-determined spot, and it opens up immense possibilities for gliding in the future. It also makes possible the production of a low-powered aeroplane, the engine of which would merely be used to get the machine off the ground and thus dispense with the catapult. It would also be used to correct the direction of the machine if high winds tended to take it from its course.

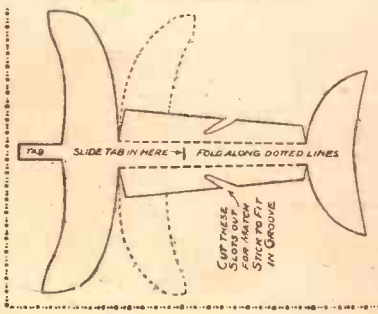
The "Wien" is transported in a crate fitted with road wheels, so that it may be towed behind a car. With four helpers, the machine can be erected in about twenty minutes.

The shock-absorber cord used for launching was double ⅛in., and five men were used on each side. By this means the "Wien" was shot fairly high into the air, and she immediately started to gain height until she was soaring up and down some 700ft. above the hill.

A Model Catapult Glider.

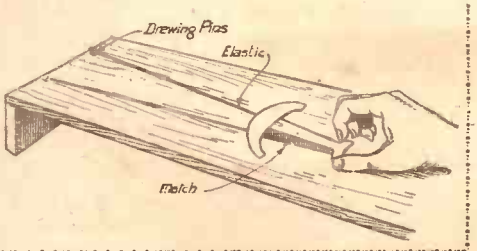
You can learn quite a lot about gliding by means of the simple glider shown in the diagrams here. The only materials you require are a piece of thin cardboard, a length of elastic and any suitably arranged platform. You will see that the catapult is fixed down to the platform by means of drawing pins, and the looped end is placed into sloping slots cut in the side of the fuselage. You pull the glider back and release it, when it will be shot into the air and glide for a fair distance. You will be able to try the glider by varying the angles of the wing tips and tail, and it will thus help you to understand the principles of the new hobby if you choose to take up full size gliding. Those readers who would like to take up gliding may have the address of the nearest club, upon application to the Editor.

The wing is 4½ins. span, the tail 2½ins. span, width of the fuselage ⅜in., depth ⅛in., and the total length of the glider when folded is 4ins.



Left: How to make a simple catapult glider, and

Right: How it is launched.



MAKING A PANTAGRAPH FOR COPYING DRAWINGS.

A Useful Instrument which Takes an Hour to Construct.

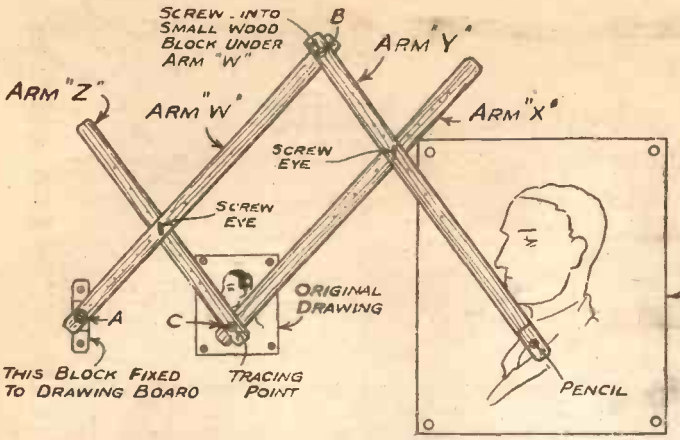


Fig. 1.—The pantagraph completed. The assembling of the parts is shown in this diagram.

A PANTAGRAPH is a simple tool by means of which you may copy, enlarge or reduce drawings and illustrations. The device shown in Fig. 1 consists of the various parts shown in Figs. 2 to 5. Use strips of oak $\frac{3}{8}$in. wide and $\frac{1}{8}$in. thick for the four arms, and carefully mark off the distances shown in Fig. 2. Drill the holes shown to accommodate the screw-eye illustrated in Fig. 5.

At the point A a little bar of wood is attached, as shown in Fig. 3, so that the end of the pantagraph can be screwed down to the drawing-board. The tracing point C consists of a nail with a washer soldered beneath the arm X to keep it in place; the nail should be filed up to a sharp point and serves as the tracing point.

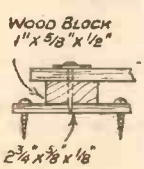


Fig. 3.—The block for clamping the pantagraph to the drawing board.

Fig. 5.—An ordinary screw eye is used where shown in Fig. 1.

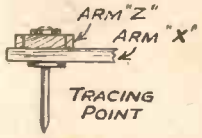


Fig. 4.—How the tracing point is made.

To accommodate the pencil a piece of wood is glued over the end of the arm Y, as indicated in Fig 2, and a hole is drilled in it of a size to suit the diameter of the pencil. The other joints are made clear from the drawings.

To enlarge a drawing to, say, three times its size, insert the screw-eyes into the holes marked 3, and upon tracing over the drawing with the tracing point, the pencil will trace out the drawing three times the original size.

When it is required to reduce the size of a drawing, the positions of the pencil and tracing point must be reversed, and for this purpose a short stumpy piece of pencil should be pushed over the tracing point, and a piece of round iron pointed up at one end and of the same size as the pencil, should be pushed in the pencil hole. The various letters in Fig. 1 correspond to those shown in Fig. 2.

It is absolutely important, if accurate scale copying is to be done, that the distances of the holes from the points A, C and B (Fig 2) should be carefully marked out. To ensure this, place the arms W, Y and Z together and scribe the three off at once with a square. Then place the point 8 on arm X level with the point 8 on arm W, and by means of the square scribe off the positions on arm W on to arm X. You will then be quite certain that the positions are correct.

In using the instrument let the left hand press on the tracing point and the right hand grasp the pencil. Now guide the tracing point over the drawing to be copied and at the same time exert a slight pressure on the pencil. As the tracing point is moved over the drawing the pencil will draw out and enlarge copy of the original. A little practice may be necessary to get the best results. You will probably find at first that the pencil lines are wavy, and this is because the pencil magnifies any false movement of the tracer. So for best results make bold and confident movements with the tracing point, and after a little practice you will find that the right hand in holding the pencil will tend to help the left hand. It is a curious fact that when using both hands together in this way they both tend to make exactly the same movements.

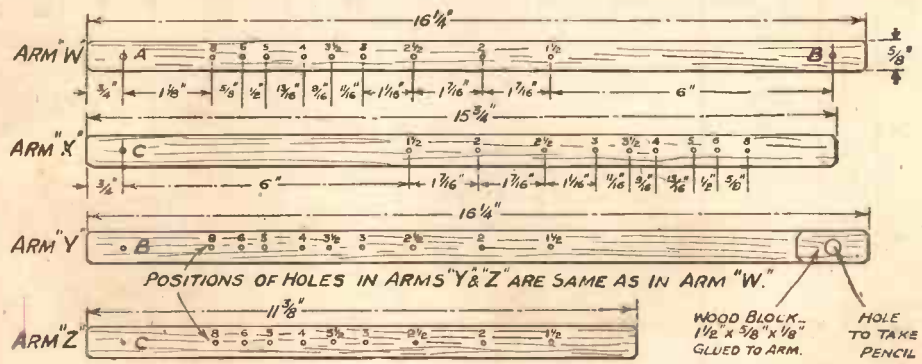


Fig. 2.—How to mark out the four arms of the pantagraph.

HOW Do you drive in nails ?

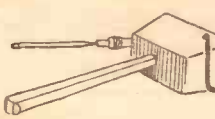
DO you realise that there is a right way of driving in nails in ordinary woodwork, so that the head of the hammer is clean and bright, and hits the nail fair and square every time. Finish driving it home by a series of taps rather than a final heavy blow, which tends to "bounce" the nail and loosen its grip. If you use a wedge-shaped nail its tapering face is driven in the direction of the grain. If you put it across you are apt to split the wood. Remember that ordinary wire nails driven in at an angle across the grain, will hold more firmly than if put in straight. The diagram herewith shows you how much more difficult it is to break apart wood put together in this way with the nails at different angles. When you have a butt joint bend the end of the nail slightly. This makes it *curl* into the wood and draw the parts together much more firmly.

Is a "bullnosed" plane WHEN used ?

A "BULLNOSED" plane, as can be seen from the illustration, is one in which the cutting iron is brought right to the front of the body instead of being some way back. In this way the plane can be used to get into corners which the ordinary plane would not reach. In cutting a stopped rebate on any work, the "bullnose" is also essential. The tool is an essential part of a woodworker's kit, and being made of metal will stand any amount of usage. The one illustrated (supplied by Hobbies, Ltd.) is a double purpose plane, in that it has two slots in the bed—one to use the tool in the ordinary way, and the other for special occasions in rebate or stopped work. The blade and handle are transferable as required.

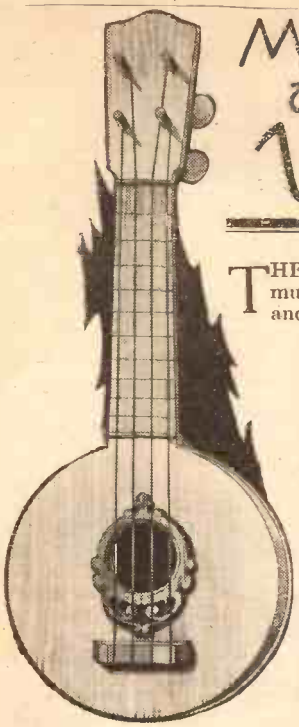
A "Bullnosed" plane is made of metal with the blade controlled by an oval eyed screw. The smaller illustration is a view of the underside of the plane, showing the two alternative slots. Remember that a plane should never be stood flat on a bench or the blade is likely to get scratched or indented.

Use a mallet on a chisel — WHY ?



HAVE you ever seen the handle of a perfectly good chisel ruined by being all splayed out and broken ? That has been done by hitting it with a hammer instead of a mallet. A mallet is the tool a carpenter uses, for he knows that a hammer, being metal which will not "give" at all, is very likely to split the handle of the chisel. For light driving he uses the palm of his hand, whilst for heavier work he handles a mallet. Remember to keep the work steady in a vice or against a stop firmly fixed to the bench. Be careful not to try and drive the chisel too hard or the wood is liable to jump. Hold the chisel firmly, too, and put it in its proper place on the work before you hit it with the mallet.

The illustration shows how the chisel and mallet are held on flat work. Wherever possible, of course, the wood should be held in the bench vice so that a rigid grip is maintained.



Make Yourself a UKULELE BANJO

The patterns for making this full-size instrument are given on this week's chart No. 1825. Any clever handyman can make it up

THE fellow who can make music is popular anywhere, and proof of it will be found more than ever a little later on when Christmas parties are the thing, and people who can keep them going with a musical instrument will be in great demand. Possibly the most popular instrument now is the Ukulele. It is small, can be played without a great deal of practice, and provides great fun for those who are musically-minded. The cost of one is usually anything between 15s. and 30s. But that is where the handyman comes in, for he can make the whole thing for 4s. 3d. This includes all the necessary wood, planed and ready for cutting, and a complete set of strings and pegs. The picture herewith shows the instrument any handyman can make, if he carries out the cutting instructions on the chart carefully, and makes all parts exactly as shown. Before beginning, of course, he will want to have some idea of how the thing is put together and the various parts concerned. Study the design sheet to see exactly how the thing is made up. It can be completed with very few tools, but the great essential is that all parts are accurately cut and securely glued together. Obtain the parcel of wood supplied by Hobbies Ltd., and check off the various pieces needed, in conjunction with the design patterns shown on the sheet. These patterns in some instances show the front and side view, because, as in the case of the neck, for instance, the wood has to be shaped both on its thickness as well as on its flat face.

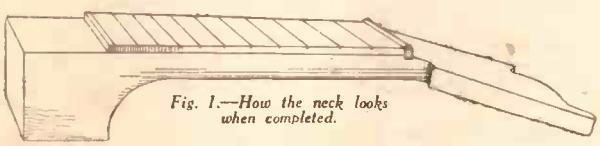


Fig. 1.—How the neck looks when completed.

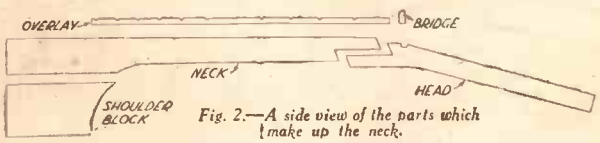


Fig. 2.—A side view of the parts which make up the neck.

Forming the Neck.

On the patterns dotted lines indicate the position of other parts to be glued over them. The wood, however, will ultimately have this paper marking cleaned off and the positions will have been rubbed away. A good plan to overcome this difficulty is to buy a further copy of HOBBIES and its design sheet to use as a working chart. The first operation is the completion of the neck, as at Fig. 1. This part is really made up of four pieces, seen in the diagram at Fig. 2, where the parts are separated. There is the head, neck, shoulder block, and string board overlay. The larger pattern of the head is pasted down, the shape cut out and the four holes made for the pegs with a ¼in. bit. Then paste on the *edge* of the wood, the pattern of the side view, and (holding the wood in a vice) with a wide tenon saw cut the thickness to the shape indicated. The groove for the bridge is cut out with a ⅛in. chisel.

Making the Shape.

The neck is a long, flat piece shaped on the underside and rounded off to the section shown on the pattern. Here again the top design should be pasted down on to the wood, and the shape required cut out. Then paste on the pattern of the side view and very carefully cut out the shape now provided. It will be noticed that at one end we have a splice joint which is to fit into the other piece already cut in the head. The pull of the strings is actually on this joint, so we must be careful to make it strong and accurate. Shape up the parts to make a good fit here, and then make two holes for screws which will give strength to the glue when the two parts are put together later. The curved underside of the neck is carried down 5in. from the splice end; the bottom end is left quite plain at present. An indentation shown 1½ins. from the body end is merely a vertical cut with a coarse tenon saw to take the very thin plywood which passes round the body of the instrument.

At the body end of this neck the thickness required is made up by a shoulder block cut from wood 1⅛in. thick, and glued to come flush with the end of the neck. We give at Fig. 3, a picture of this block glued under the neck itself, and showing exactly how one end of it is shaped to make a nice curve. All these pieces are, of course, glued together to form a com-

plete neck. The bridge for the strings at the top of the neck is a small strip of ¼in. hardwood, one edge of which is rounded off and then nicked with a file in four places for the string to pass over. This bridge is glued into the small groove cut in the head, and a detail of it ready to go into position is given at Fig. 4. Close

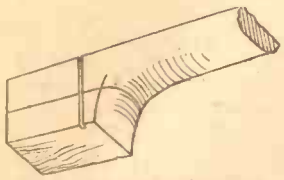


Fig. 3.—The shoulder block beneath the inner end of the neck, with a groove for the plywood body.

Fig. 4.—The head of the instrument with the bridge ready to be fitted in place

to this bridge, and on the flat surface of the neck is glued the hardwood keyboard of the strings.

Marking Off the Notes.

This overlay goes down as far as the body, and the side view of Fig. 2 shows the manner in which nicks are made across the overlay (with a file) to indicate the tuning notes. These note divisions are indicated on the pattern part with dotted lines, but it is, of course, impossible to get these absolutely accurate unless they are tested with a piano. Make the note indications on this wood when the instrument can be tested against a piano. Whilst we are dealing with the neck we can also test out the keys. These are tapering, so we must, with a small circular file, enlarge the holes on the underside in the neck so the keys will pass through to make a friction-tight joint when the hole for the string is about ¼in. through the neck.

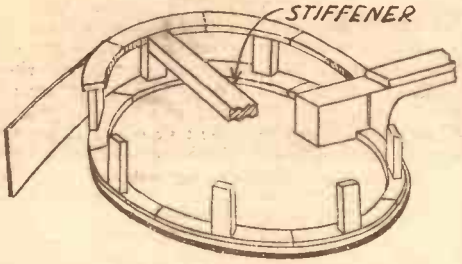


Fig. 5.—The body of the instrument showing the construction before the top is added.

The Construction of the Body.

A good idea of the manner in which the body of the instrument is made is given by the detail at Fig. 5. A top and bottom circle of wood are held apart by flat rib pieces with upright strips glued between. The pattern shows exactly the shape of the bottom and top. The hole in the centre is cut only in the piece of instrument pine (the light yellow piece of wood) which forms the top. Don't clean off the pattern pasted down to the bottom until some indication has been made of the position of the flat segments round the edge. These ribs (shown as A to D) will make a circle of wood joining up to the shoulder block of the neck. The position of this shoulder block is shown by dotted lines, and we can prove its accuracy by standing the neck in place and lightly pencilling the shape on the wood.

Completing the Body work.

Each rib has on it an upright strip. Seven of these strips are required, and they—like the top—are cut from the yellow pine. Glue one to each of the ribs and further strengthen by driving in a very fine nail from the underside. Thus we have seven complete pieces (shown at Fig. 6) to glue to the bottom in the position mentioned. A similar circle of these ribs goes round the top of the uprights and the duplicate set—A to D—must be glued on as in the other case. Here again a nail should be driven down into the end of the upright pieces. A stiffener is provided in the pine wood which, if cut to the shape indicated, will lie flush with the top ribs and be glued between them. It is shown in place in Fig 5. The circular top of the ukulele is the same shape as the bottom, and is glued flat to the stiffener, the circular ribs, and to the top of the neck block.

The Bridge for the Strings.

Before fitting the top in place, however, cut and glue a fancy overlay, and fit a bridge to hold the end of the strings. The bridge is cut from a piece of ¼in. thick padouk and glued to the top ⅜in. below the overlay. As this bridge takes the strain of the strings, it should be screwed from the underside. Holes have also to be made through the bridge for the strings to pass through, and the actual method of stringing is shown in the small detail at Fig. 7.

Two pieces of the thin plywood 10½in. by 1⅞in., are required to form the sides of the instrument. One end is put into the sawcut, already made in the shoulder block of the neck, and is then taken round the upright supports between the top and the bottom. Glue holds the plywood to each of these and the other end is nailed with light fretnails to the centre upright. The manner of this fixing is shown by the picture at Fig. 8. If 10½in. is a little too long, a piece must be cut off one end in order that it may lie down the centre of the middle upright. The other piece of the plywood comes round the opposite side to meet on the same pillar.

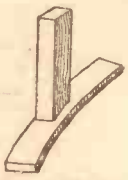


Fig. 6.—The two-piece strut between the top and bottom of the body.

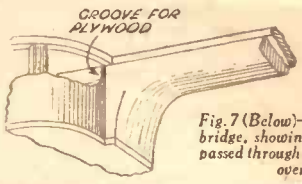
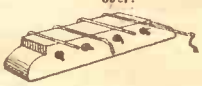


Fig. 8.—How the plywood is bent round and fitted in the neck groove.

Fig. 7 (Below)—The lower bridge, showing the strings passed through and brought over.



"HOBBIES" EASY-TO-MAKE ONE-VALVE LOUD-SPEAKER SET

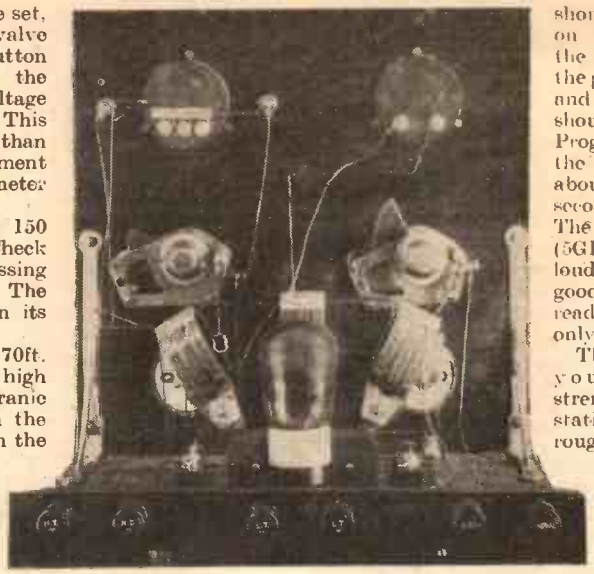
By Ralph Stranger.

Operating and Adjusting the Controls.

HAVING assembled the set, insert the PM3 valve and, pressing the button on the left-hand side of the volt-meter, measure the voltage across the valve filament. This will be found to be lower than 4 volts; adjust the filament regulator till the volt-meter reads 4 volts.

The PM3 valve requires 150 volts on the anode. Check the H.T. voltage by pressing the *right* hand button. The volt-meter should read on its lower scale 150 volts.

With an aerial about 70ft. in length and about 30ft. high you should need a 50 Igranic coil in the primary, a 50 in the secondary and a 40 coil in the reaction. Bring the primary coil near the secondary coil, leaving them about a quarter of an inch apart. Move the reaction coil away from the secondary coil to an angle of about 45 degrees.



Rear view of our one-valve loud-speaker set.

Brookmans Park and London Regional.

Your milliameter should read 7.5 milliamperes when you are tuned in to Brookmans Park. You should get the London Regional Programme (356.3 metres) with the primary condenser on about 95 degrees and the secondary condenser on about 75 degrees, provided that the aerial has the approximate dimensions mentioned above. Now move the primary condenser to 85 degrees and the secondary condenser to 54 degrees and you should get the National Programme from Brookmans Park on 261.3 metres. With a 500 coil in the primary, a 300 coil in the secondary and a 75 for reaction you should get the National Programme from Daventry 5XX (1,554.4 metres). The primary condenser dial reading should be about 40 degrees and the secondary condenser—42 degrees.

If you are within 20 miles range from Brookmans Park and about 60 miles from Daventry, you should get all three stations on the loud-speaker with the PM3 valve. With a 75 coil in the primary, 100 in the secondary and a 50 for reaction, you should get the Midland Regional Programme (479.2 metres) with the primary condenser reading about 55 degrees and the secondary condenser 10 degrees. The strength of this station (5GB) is, however, weak on the loud-speaker, although quite good on headphones. The reading on the milliameter is only 4 milliamps.

Thus, if you use a PM3 valve you can get loud-speaker strength from at least three stations within a radius of roughly 50 miles, and 5GB on the headphones.

The Pentode Valve.

Now let us see what another valve will do for us. Our alternative is the so-called Pentode valve (a valve with five electrodes), the Mullard equivalent of which is the PM24. In an ordinary three-electrode valve, as you know, there are three electrodes: the anode (plate), the grid and the filament. The Pentode has a plate, a filament and *three grids*. If you look at the diagram in Fig. 1, you will see that the grid next to the filament is the *control grid*, which corresponds to the grid of a three-electrode valve. Next to it is the *screening grid*, which is connected to a separate terminal in the base of the valve. Between this grid and the anode there is another grid, called the *collector grid*, which is connected inside the valve to the filament. Apart from the terminal in the base of the valve, the Pentode has the customary four legs as in any ordinary valve and the circuit is as shown in Fig. 2. Remove the wander plug from plus H.T. and take the PM3 out of the valve holder. Insert in its stead the PM24 valve, having connected a length of wire to the base

(*Continued on page* 64.)

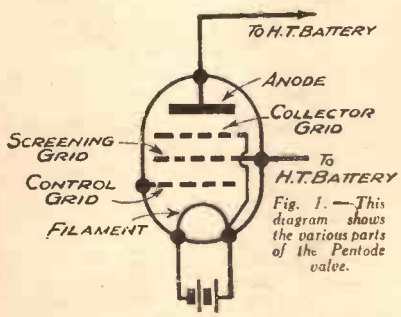


Fig. 1.—This diagram shows the various parts of the Pentode valve.

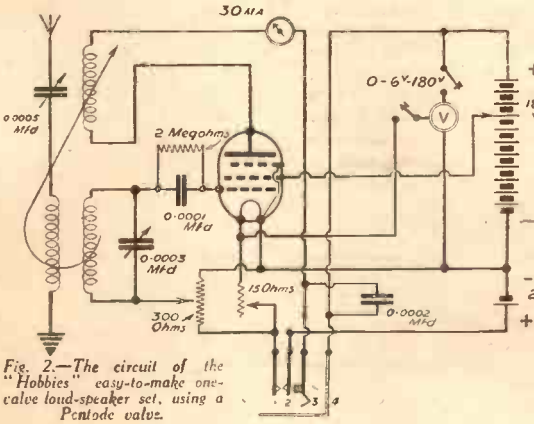


Fig. 2.—The circuit of the "Hobbies" easy-to-make one-valve loud-speaker set, using a Pentode valve.

BE YOUR OWN PRINTER.

How to Make a Practical Printing Press.

By H. BRAMFORD.

ONE of the most interesting of hobbies is printing. Its fascination appeals to all, and every boy at some time or other has tried, in some crude way to devise some means whereby he can print something. The uses of such a hobby are too obvious to be explained. First, I want my readers to appreciate the fact that printing is an art, and, secondly, that the apparatus I intend to describe, although simple, easy, and not costly to make, is designed to produce real work, so that priuting in this instance may be taken seriously. We first have to construct our press, which cannot claim to be elaborate, but which will perform its work just the same. We must remember that Caxton worked with a press which we would to-day term crude in every sense of the word, but his work was nevertheless good. We do not aim at speed; we have no use for that at the moment, the object is good work and how to produce it. Before we commence making the press it must be intimated that its construction, although simple, must be of first-class workmanship, for unless the press is accurately and truly made it will be of little use. Careful detail is given with this object.

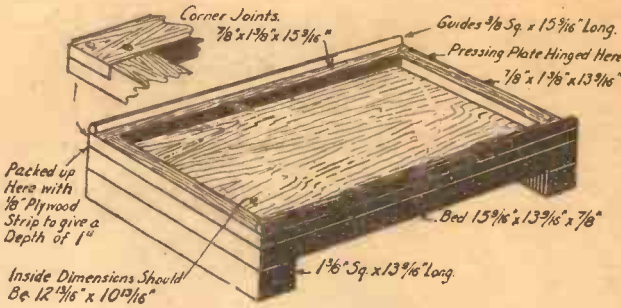


Fig. 1.—How to make the press bed.

The Bed.

The important part of every printing press, even those wonderful almost human machines which turn out our daily newspapers, is the bed. In our case, this consists of a prepared wood base which *must* be perfectly true and flat. This, added to solidity and strength of construction, together with accurate workmanship, are its most essential factors. The entire section is made of oak, as this wood is strong and most suitable for the purpose. Be sure that the wood is well seasoned and dry, for new wood is quite useless as it will warp after assembly and render our efforts at accuracy of no avail. Concise details of this section are shown in the illustration Fig. 1, and dimensions are also given. The press is designed to print up to 8in. by 6in. size, which is as large as we are likely to require, while at the same time we can print anything smaller.

First, cut the actual bed piece from one piece of oak, and see that the grain runs in the direction indicated. This is important. Finish the upper side with sandpaper until it is perfectly smooth and flat. Under this piece at each end is secured an oak runner. These serve two purposes; first they prevent the bed piece from warping across the grain, and, secondly, they serve to provide a level for the press. These are fitted by gluing and screwing at each end, the heads of the screws being countersunk. On the upper side of the bed piece we fit a framed edge which allows for the *Chase* to be dropped in. This must be true and square, and the simple joinery at each corner is shown in the diagram. Finally, down the right and left sides of the frame we fit two guide pieces which are glued and pinned in position and these serve as a guide for the press-plate. This completes the *Bed*, which is of very simple construction, but once again, the work must be well done if disappointment is to be avoided.

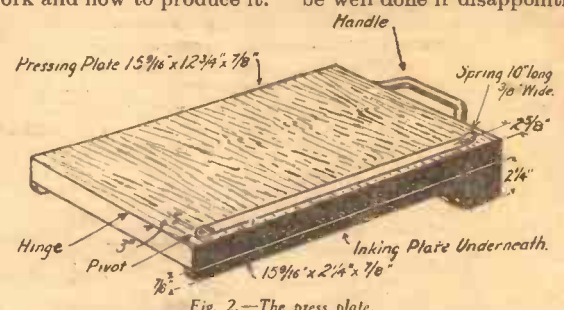


Fig. 2.—The press plate.

The Press Plate.

The next section of our press is the *Press Plate*. This is hinged to the back edge of the bed and serves also as an inker. The main wood piece, which is of substantial oak, is cut to size first. The complete details of this section are shown in Fig. 2. The under face, which is to face the bed, must be finished quite smooth and flat, and the grain should be in the same direction as that of the bed as shown. The purpose of this is to balance any very minor inaccuracy. The sides of this piece must also be true and smooth and fit between the guide pieces of the bed truly. At the front edge of the press plate is fitted a metal handle which must be strong and firmly secured. Any handle will do for the purpose, and no doubt you will have such an item in the spare box, or it is quite easy to obtain one. At each side of the back of the press plate are fitted side pieces as indicated, and these serve the combined purposes of maintaining the straightness of the plate, allowing plate to be dropped back level without straining the hinges, and enclosing the inker. The next item required is a strip of springy steel drilled at one end, which is fitted at the right side of the front of

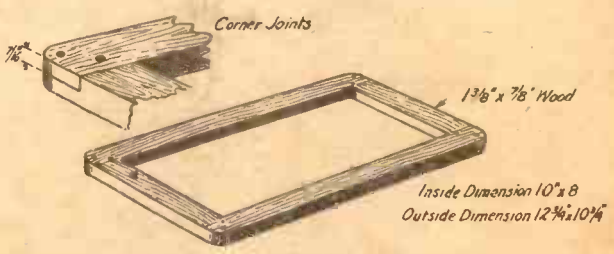


Fig. 3.—The chase in which the type is held or set.

(*Continued on page* 64).

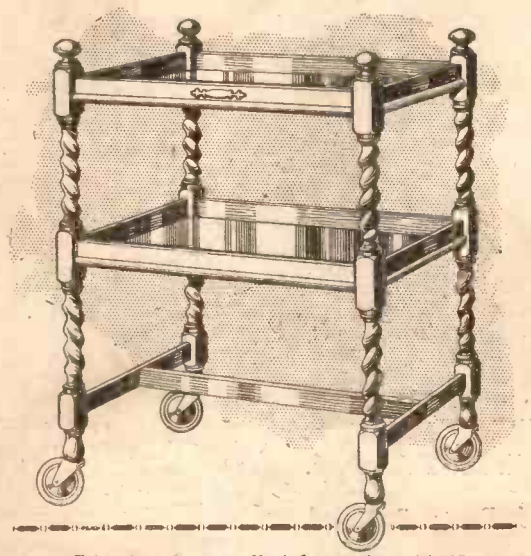
A set of the usual carpentry tools is sufficient for anyone to make this practical Service Wagon. It stands 2ft. 8ins. high, is 2ft. long and 16ins. wide, is built in oak, and the materials cost under 20/-. These instructions tell you how to make it. Quite simple to construct from the design and wood supplied by Hobbies, Ltd., the enthusiastic carpenter will want to start work at once.

A HOME-MADE SERVICE WAGON.

THE handyman who is an amateur carpenter, and wants to turn his hands to good account should certainly make up the Service Wagon illustrated below. Whilst actually being a piece of furniture, it is really quite simple to make, and well within the ability of the average fellow who knows how to handle carpentry tools and a fretsaw. Moreover, there is not even the usual measuring up and marking out of patterns to be done, for the whole of the parts required are printed on the chart given away with the HOBBIES 1931 Catalogue. Even more than that, all the necessary wood is supplied as a complete parcel by Hobbies, Ltd., for 15s. This not only includes the actual planed wood, but the four turned Jacobean legs nicely finished in oak. Thus the worker is able to make up this practical Jacobean Service Wagon for 20s., and when it is completed with polish or stain and varnish, it is undoubtedly worth double that sum. Such a suggestion is surely worth considering as a matter of making a handsome profit for a few hours' pleasure. The design is 179 Special.

Preparing the Legs.

With the design sheet in front of us it is easy to work out the construction of the wagon in conjunction with the picture of the finished article. Four legs are held together by two flat trays, and a cross rail at the bottom. As can be seen, this necessitates the cutting in each of the four legs of five mortises to take the respective tenons in the rails. A picture of one of the legs (No. 504) is shown at Fig. 1, and by the side of it is a detail of the manner in which the marking off must be done to get the positions of the mortise openings. The design sheet actually contains full-size patterns, which can be pasted down to one of the legs to serve as a guide to the other four. Of course, the four are laid together and marked off (measured from the top end) all at once, with a square to ensure the rails being level. The mortise joints are made with a brace and a ¼in. bit, final cleaning up being done with a chisel. For the two trays, the mortises are on the inside of each leg, but at the bottom end only one mortise is required—to take the rail across the end. The mortise at the top, and the centre of the leg, will meet in the middle, and when the rails are cut it will be found that the ends must be chamfered to an angle of 45 degrees in order to allow them to meet, as shown by the section at Fig. 2.



Patterns are supplied for making this JACOBEAN SERVICE WAGON.

The Rails.

Get out the four long rails and four short rails which form the sides of the trays. Only half the side rails are shown on the chart, but the piece printed can easily be duplicated or measured off the other side of the centre line provided. Cut, clean and test the rails, then get out the two short ones and the long centre one which are to be fixed at the bottom end of the legs. The centre rail is mortised into the end rails at A, and these in turn are mortised into the leg at B. Fit all the rails temporarily in position, and see that the joints are good. Then cut out the two floors of the tray, and test them in position by turning the whole framework of the wagon upside down, and standing the floors on the rails. The broken pattern

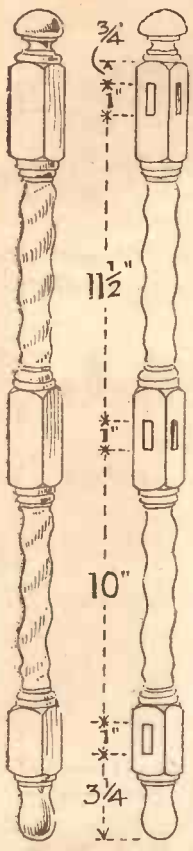


Fig. 1. On the left is the leg as bought and on the right measurements for cutting the necessary mortises.

of the floor shown on the design sheet can be extended until there is exactly 2ft. between the ends, or we can mark out a piece of wood 2ft. long and 15½ins. wide, from the corners of which are cut notches ⅝in. deep, to allow for the projection of the legs.

Fitting the Parts Together.

Now we are ready for the fitting of the various parts already tested for accuracy. Glue together a complete end—consisting of two legs and three cross rails, as shown at Fig. 3. Then build up the other end in the same way. The framework of the wagon is then completed by fixing the four side rails of the trays, and the long centre rail at the bottom between the two end structures. All these, of course, must be glued in quite strongly, and a square used to test the correct angle, both vertical and horizontal. Before the glue is set, the whole framework should be turned over, so that the floor of the trays may be laid on the bottom edge of the rails and there screwed in place. The join of the rail to the floor is covered up by the half-round beading (No. 35) provided in the parcel. The detail at Fig. 4 illustrates this quite clearly. On each side of the top rail we have also to add a small fretted overlay cut from ⅛in. wood to the designs given. Finally the wagon is lifted on to four rubber castors, which are sunk into each leg with a brace and bit. Before fitting them, we must see that the wagon stands level on the ground, and if it does not, shave off as required from the bottom of one leg. The completed wagon should be stained to the usual Jacobean shade, and then given a coat of Hobbies Lightning Polish, or left with a dull wax finish.

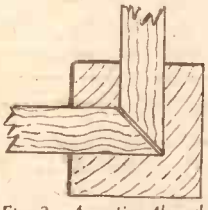


Fig. 2. A section through the leg joint showing how the two chamfered rails meet inside the mortises at the corner.

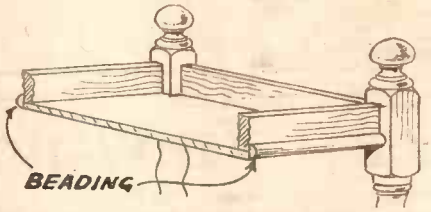


Fig. 4. The top tray and rails broken to illustrate construction and particularly the way in which the half-round beading covers the join of the tray to the rail.

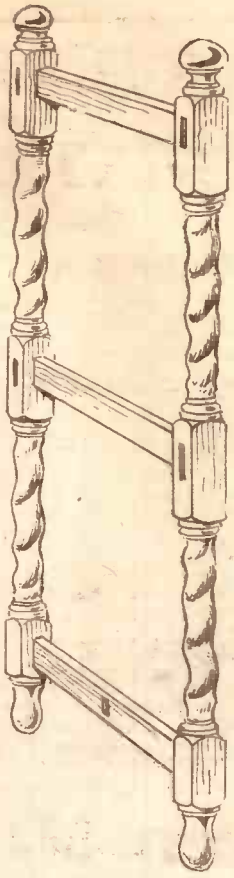


Fig. 3. One end of the wagon complete. Two have to be made like this and then connected up.

THE DESIGN.

A Pattern Chart, No. 179 Special — Jacobean Service Wagon — Presented free with Hobbies 1931 Catalogue or obtainable separately for 6d. (postage 1d.).

THE WOOD AND FITTINGS.

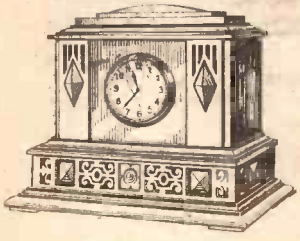
Suitable oak board shown in Hobbies Catalogue. Turned Jacobean Legs in Oak (No. 504) 6/6 for four (post 9d.). Half round ½in. beading (No. 35) 10d. for 12ft. 2in. rubber tyred wheels (No. 6170) 4/6. per set of four. Larger castors (3in. No. 6177) price 5/6 per set. Please give reference numbers when ordering and add sufficient return postage.

A COMPLETE PARCEL.

A complete parcel of oak, turned legs, beading, and a set of 2in. castors supplied for 19/6. Sent carriage paid for 21/-.

IF YOU WOULD LIKE TO MAKE THIS MANTEL CLOCK.

THE making of a clock case sounds a bit complicated—especially such a good-looking one as this. It is really quite simple, however, if one has the patterns of the various shapes—ready to paste to the wood and cut out. The Clock shown is built in oak for 5/- and can be fitted with a 30-hour movement or an eight-day movement. We are going



to tell you next week exactly how to do it. A set of fretwork tools is all that is needed beyond the design and wood supplied. It will prove a fascinating piece of work any fellow can make up—look out for it next week. The completed clock stands 10¼ ins. high and 12¼ ins. wide, and has a clear-faced dial measuring 3 ins. across. A splendid piece of work.

"HOBBIES" F
MODEL S

How to assemble the mechanism
hints on flyin

This photograph clearly shows how the model should be launched; lightly thrust the model forward; do not hurl it into the air.

THE envelope included in this week's issue contains all the parts (illustrated on page 36 of last week's issue) required to complete our Model Seaplane, the first part of which was presented last week. The various diagrams on this page, which show how the parts are put together, should be carefully examined before you start work, otherwise you may spoil the material.

The Bearing.

The bearing is the flat piece of steel with a hole in one end of it for the propeller shaft, and the only treatment this needs is to drill two small holes in the other end so that, when bent across the dotted line shown in Fig. 1, it may be firmly screwed to the piece of wood glued inside the nose of the fuselage. See that the bearing is bent at right angles, otherwise the propeller will not run truly on it; and make quite certain that the upright part stands clear of the nose, so that the propeller, in revolving, does not touch it. Small fretwork screws, or even brass nails, should be used to fix it. Its exact position is marked B on the front of the fuselage. Having drilled the bearing, place it in position, prick through the two screw holes with an awl, and then fix the bearing in the manner described.

The Propeller.

Special care is necessary in assembling this, for its job is to *propel* the model, and all the care you have expended on the rest of the model will be wasted if the propeller is wrongly made. Take one of the blades and press the large black eyelet through the centre hole, and a small brass eyelet through each of the other holes. Now pass the propeller shaft (the piece of wire with a crook on each end of it) over the centre eyelet, and push the second blade over the three eyelets, making quite sure that the propeller shaft projects from the *straight* edges of the two blades, as shown in Fig. 2. The shaft, you will notice, is now *between* the two blades, and it now only remains to clinch the eyelets over. This is done by pushing the pointed end of a pair of scissors into each eyelet in two or three places to spread it, and then firmly hammering it down. The method of doing this is clearly shown in Fig. 3.

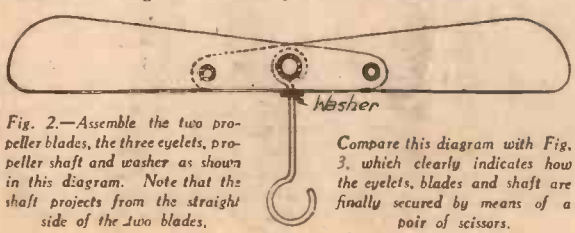


Fig. 2.—Assemble the two propeller blades, the three eyelets, propeller shaft and washer as shown in this diagram. Note that the shaft projects from the straight side of the two blades.

Compare this diagram with Fig. 3, which clearly indicates how the eyelets, blades and shaft are finally secured by means of a pair of scissors.

Bending the Propeller.

The tractor propeller is made of vulcanised fibre; it is therefore practically unbreakable and may be bent cold, no steaming being necessary. Bend each blade so that the propeller takes on the shape shown by Fig. 4, and *see that each blade is bent the same amount.* You can easily check this by twirling the propeller between the fingers and viewing the blades. Set the shaft so that the blades revolve at right angles to it; don't make the mistake of bending the blades in the wrong direction, for it will then be a "pusher," and not a tractor. The *curved* edges of the blades are bent *towards the shaft,* not the straight edges towards the curved ones. Examine Fig. 4 and you will see exactly what is meant.

In this illustration the model has ju

The Tail Skid.

This is the straight piece of wire with a crook at one end of it, and the first thing to do is to drill a fine hole just in front of the tail at the point marked A. Then push it through this hole, as illustrated in Fig. 5, and bend it forward for ¼in. into close contact with the bottom edge of the fuselage. Bend the remaining portion down and shape the lower end into the form of a skid, as shown by the lower sketch in Fig. 5, finally neatly binding it into place with strong thread. Smear this binding with glue to keep it in place.

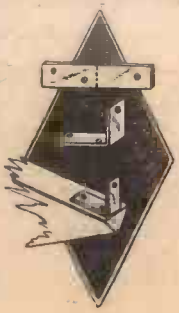


Fig. 1.—How to bend and fix the bearing.

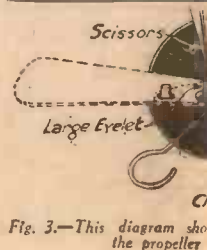


Fig. 3.—This diagram sho the propeller

REE FLYING EAPLANE

given with this week's issue, and g the model.

t been launched and is climbing well.

The Axle.

The axle is the straight piece of wire which passes through the float and wheels. Prick through the two white dots on the lower ends of the chassis, smear some glue over the sides of the float, and also over the insides of the chassis at the point where the axle passes through. Next pass the axle through the float and also through the two parts of the chassis and tie some thread from end to end of the axle to make sure that the chassis sticks firmly to the float. The top edge of the latter must be parallel to the top edge of the fuselage. When dry, place a small bead over each end of the axle, put the wheels on, and push a small piece of cork over each axle end to keep the wheels in place, as indicated in Fig. 6.

The Elastic.

Get an assistant to lap the two ends of the elastic and stretch them while you bind them with thread (see Fig. 7). Next place the small brass washer which you will find in the envelope over the propeller shaft, pass this through the bearing, and having made the loop of elastic into a skein of four strands, stretch it between the two hooks.

Smear each strand with soft soap so that the strands easily slide over and do not cut into one another—this is important! Very many more turns can be given to the elastic when it is lubricated in this way; do *not* use vaseline or grease on the elastic. Also lubricate the bearing with vaseline, so that the propeller runs smoothly. Little pieces of valve tubing placed over the hooks greatly prolong the life of the elastic.

Remember that a model aeroplane is not like a clockwork toy; it needs careful adjustment if it is to fly as the designer intended, and these little points, trifling in themselves, make a lot of difference in the flying qualities and life of the model.

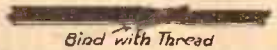


Fig. 7.—How to join the two ends of the length of elastic.

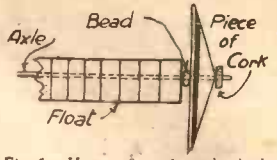


Fig. 6.—How to fix axle and wheels.

Flying the Model.

We can now carry out a preliminary flying test. Choose a calm day on which to fly it outdoors. Wind up the propeller about 100 times *in the correct direction* (this is such that, when you hold the model and let the propeller unwind, air is driven towards the tail). Now hold the model above the head as shown in the photograph on page 56, and gently thrust the model forward; do not *throw* it. If these instructions have been carefully carried out, the model should fly for a few yards and land. On the next flight increase the number of turns to 150, and on each subsequent flight by 25 turns until the maximum number, 300 turns, has been reached. Every half-dozen flights lubricate the elastic and bearing.

If, however, the model fails to fly, a little adjustment will soon put matters right. For example, the model may fly steeply banked (one wing higher than the other) and in small circles; in this case bend the rudder slightly to make it fly in the opposite direction. The rudder will affect the direction of flight in exactly the same way as the rudder of a boat.

Perhaps the model will dive; in which case, bend the flaps of the tail up slightly. If it tends to stall (ascend at a steep angle), it is a sign that the front edge of the main plane is higher than the back; readjustment of the bracing threads will correct this.

Should the model flutter in a lifeless manner, the propeller is insufficiently bent; and, alternatively, if it shoots off at a high speed and then dives, the propeller is bent too much.

The model is a splendid flier if it is kept in nice adjustment, and if it fails to perform satisfactorily you have probably made a slip somewhere. Should you therefore not be able to make it fly after carefully carrying out the adjustments recommended, the designer of the model will gladly help you out of your difficulty if you address a letter to the Editor, explaining exactly what your model does when it is launched.

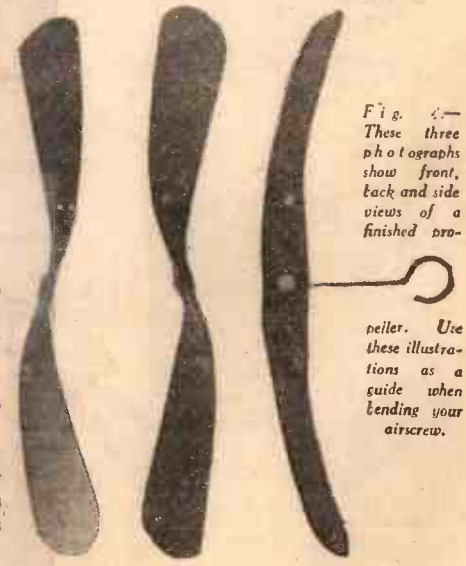


Fig. 4.—These three photographs show front, back and side views of a finished propeller. Use these illustrations as a guide when bending your airscrew.

the Bearing, and Tailskid.

ws how the various parts of are put together.

Fig. 5.—How to fix and bend the tail-skid.

MAKE YOUR MODEL LOCOMOTIVE KEEP TO THE RAILS.

By HENRY GREENLY.

Fig. 1. An "accident" on a model railway.

ALTHOUGH the results are not so serious, either in men or money, accidents on model railways are perhaps more frequent than in real life. It should be the aim of every owner to minimise derailments.

One of the most fruitful sources of trouble is "buffer-locking." This is due in the main to the use of long vehicles on sharp curves. Naturally, model railway curves are sharper than they are on a full-size trunk line like that of the G.W.R., where curves are sharp if they are as much as a quarter of a mile in radius. A No. 0 (1¼") gauge model is roughly 1/44th full size and, on the quarter of a mile (440 yards) basis the model curve should be 10 yards radius to be in proportion.

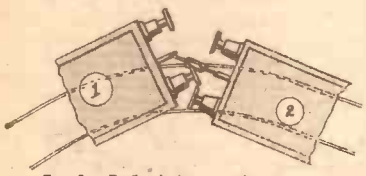


Fig. 2. Buffer locking on sharp curves.

In actual practice 1 yard radius is not at all bad for a model No. 0 gauge line, while with 2 yards (6') radius curves the model seldom derails.

In actual model practice a curve of about 1 yard radius is more usual for a railway of this gauge, while with a 2 yard radius (12" diameter circle) a model railwayman would think himself exceptionally well served. Therefore the overall length of carriage or truck must be reduced if this trouble of buffer-locking is to be eliminated entirely. Carriages made to a scale length of, let us say, 19¼" over the frames, are obviously quite impracticable with railway curves of only 3ft. radius.

To prevent-buffer locking — it happens with even the shortest vehicle on an ordinary model curve —the usual cure is the use of a straight link coupling, shown in Fig. 3. This coupling acts like a pole or strut between the two vehicles when the train is pushed. It keeps the buffers from touching each other, and therefore they cannot lock. Fig. 4 illustrates a typical example, but there are, of course, other patterns equally as practicable.

It is important that the couplings should be fixed so that they may swivel freely, and the hole, or rather slot in the buffer-plank (headstock), should be slotted to allow the coupling to swing laterally. The longer the vehicle, the wider should be the slot.

The second preventative is to employ only comparatively short vehicles, oval-headed buffers, in conjunction with three-link couplings. But absolute success is only to be obtained under these conditions where the curves are of fairly large radius, say, 3' and over for No. 0 (1¼") gauge railways. It is not easy to give definite data, however; with the average oval buffer carriages may be up to 12" in overall length. No great difficulty in finding the precise width (the long dimension) of oval head of the buffer that will prevent buffer-locking should be experienced. A few trial and error experiments may be made to get at the most favourable dimensions.

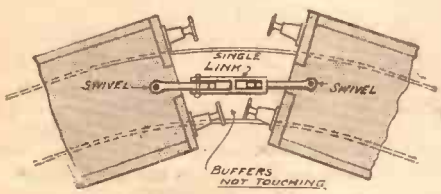
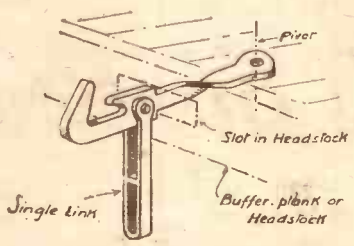


Fig. 3. Left. The push and pull coupling.

Fig. 4. Right. The single link hook coupling.



Where double bogie trucks and carriages are employed it is best to fix the bogies as near to the ends of the frames as is possible.

In almost every case it is advisable to give some attention to the couplings of model locomotives as purchased. Oil the swivels and see that they move freely. All sliding parts should be smoothed up with a smooth file or emery-cloth. One cause of derailment is faulty joining up of the track on the curves. A little attention to these details before you actually run the locomotive will prevent derailment.

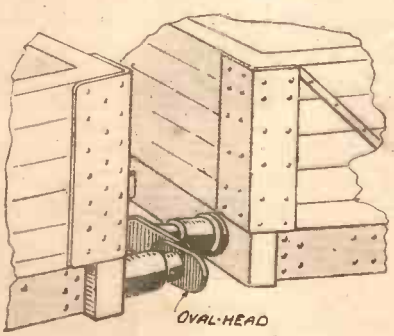
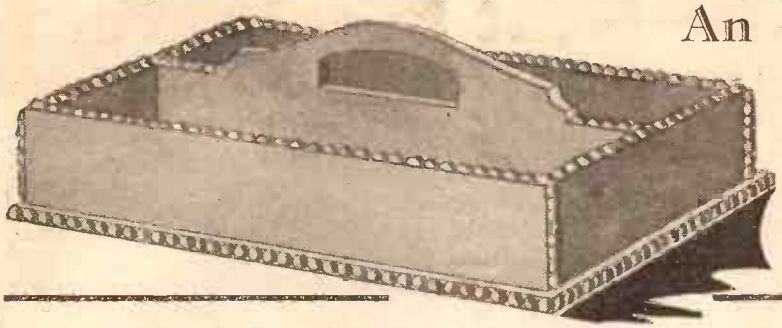


Fig. 5. The oval-head buffer.



An Easy-to-make KNIFE BOX.

THE illustration above shows an ornamental but easily-made knife box, which will come well within the scope of the amateur woodworker, as the parts only need to be cut from fretwood, glued and nailed together, and ornamented with fancy beading.

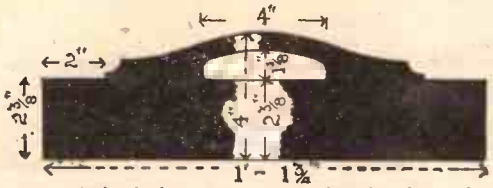


Fig. 1.—A detail of the centre division of the box showing how to mark it off. Cutting out is done with a fretsaw.

The fretwood should be ⅜in. thick, and light Oak or Spanish chestnut could be selected. The box is made with two or three sides, two ends, a division, and a bottom. All may be cut from a piece of fretwood 3ft. 2ins. long by 9ins. wide. This is less than 2½ sq. ft., and Oak of the thickness required costs 1s. 1d., or Spanish chestnut 11d. per sq. ft. In addition, 10ft. of half-round ball beading (No. 53), size ⅜in., costing 9d. for 12ft., is required to decorate the box.

Cutting the Parts.

The sides are cut 1ft. 2⅜ins. long and 2⅜ins. wide, whilst the ends are 7⅜ins. long and 2⅜ins. wide. The size and shape of the division is shown in the pattern at Fig 1. The enlarged detail at Fig. 2 has ruled lines with ½in. squares, which will enable the shape to be easily enlarged to full-size. The bottom is cut a plain piece 15ins. long and 9ins. wide. An economical method of purchasing the wood required is to obtain a board 3ft. 2ins. long and 9ins. wide. From this all the necessary parts can be taken, and a useful diagram of their layout is given at Fig. 4. The bottom is marked at one end, the two sides and the division are next, and finally the two ends are drawn on. It will be noted that most of the parts are rectangular in shape. Some of the edges of the board itself can be used as the edges of the parts concerned. This will save a double amount of cutting. So far as choice of fretwood is concerned, this has already been mentioned, and either Oak or Spanish chestnut is suitable. The Spanish chestnut is, of course, a softer wood than Oak, but it can be stained down or finished with polish in the same manner as Oak.

Fig. 2.—The squares represent ½in. spaces, so you can draw the proper shape on to the wood.

Fixing the Box Together.

Care should be taken to see that the sides and ends are square, and that the top and bottom edges are straight. The sides and ends are fixed together as shown at Fig. 3 the joints being coated with Hobbies' Fretwork Glue, and long, fine nails driven through the sides into the ends. The bottom is nailed to the bottom edges of the sides and ends, and the division is fitted between the ends and nailed through them and the bottom. The beading is glued and pinned to the edges of the sides, ends and bottom, as shown in the picture of the finished article. The box is finished by varnishing, or staining and wax-polishing.

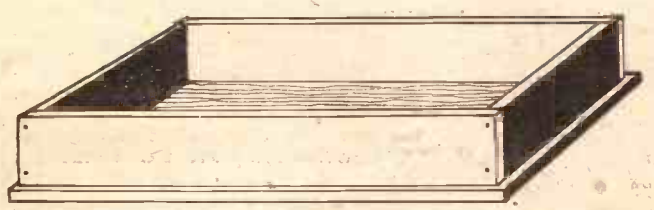


Fig. 3 (above).—The general construction of the box before the centre partition is added.

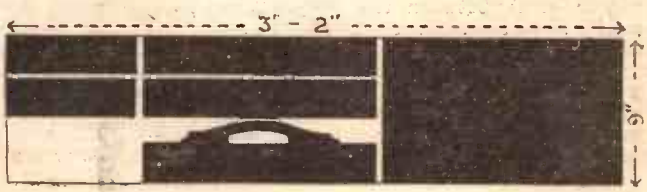


Fig. 4.—Showing how the different parts can be cut from a board 3ft. 2ins. by 9ins.

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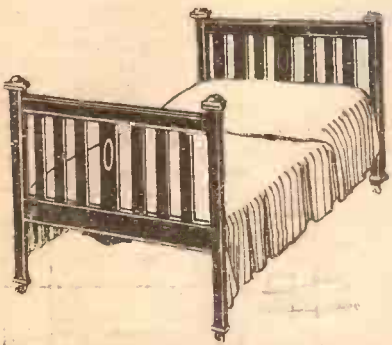

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The prizes will be fully illustrated in next week's issue.

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Each of the pictures on this page represents one of the pastimes to be found in the list of words below. Study each picture carefully before filling in your Solution in the coupon. Keep your solution; do not send it in until the competition closes. A second set of pictures will be published next week, and the concluding set the following week. With the third set of pictures instructions will be given as to the posting of your solutions. Remember there are 110 prizes! You have as much chance of winning as any other reader. Read the rules printed below and start now!

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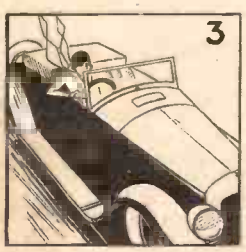
ANOTHER SET OF PICTURES WILL APPEAR NEXT WEEK.



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2.—Only one name may be inserted against each number on the coupon. Defaced or altered coupons will not be accepted.

3.—Each complete Set of 24 Pictures will be judged on its own merits.

4.—The first prize will be awarded to the reader who sends the greatest number of correct solutions to any one complete set of 24 pictures. The remaining prizes will be awarded in the order of merit.

5.—Should either of the first three prizes offered be won by more than one reader the cash value of the article will be equally divided.

6.—No responsibility can be undertaken for pictures delayed or lost in the post.

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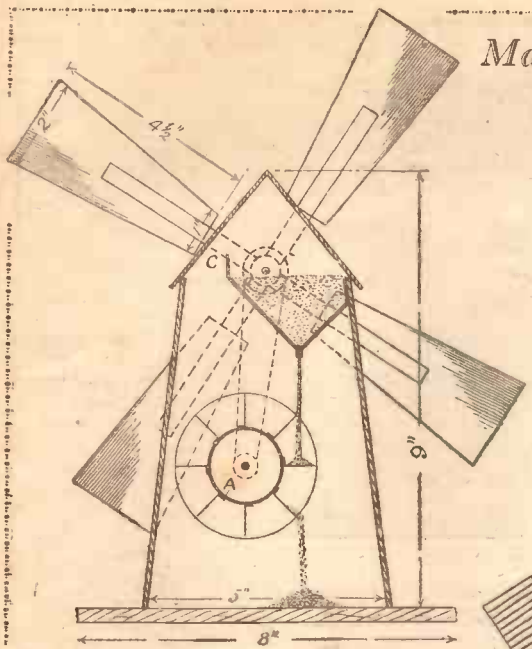


Fig. 2. Diagram showing how the various parts fit together.

Make this fine

MODEL WINDMILL WORKED BY SAND.

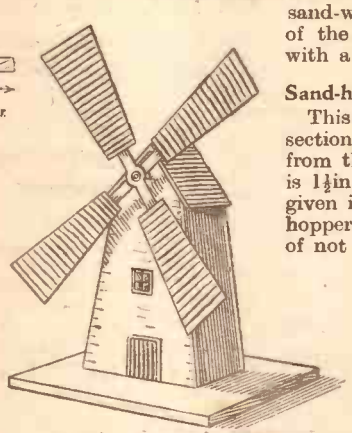


Fig. 1. The finished windmill.

THIS interesting toy, in the form of a windmill, can easily be constructed from a few pieces of cardboard, a wooden knitting needle and a piece of wood for the base. It will be seen, by referring to Fig. 2, that the sails are driven by a sand-wheel, on the shaft of which is mounted a little pulley-wheel. This is connected to another pulley on the sail shaft by means of a band of strong thread or very fine string. Just below the sail shaft is fixed a sand-hopper, and the flow of sand from this, like that of an egg-timer, falls on to the blades of the sand-wheel, causing it slowly to revolve. As the driving power is very small, all the working parts of the toy must be made as light as possible.

The Mill-house.

This can be made of stout cardboard, preferably grey faced, the front and back being cut out to the dimensions given in Fig. 4. Mark out the window and door on the front part, but a window only on the back. These can be painted in later on. Make the two holes in each part in the positions indicated, and just large enough to allow a small diameter wooden knitting needle to turn freely The pieces for the sides of the mill-house are 7in. long and 3½in. wide, and these are glued in position between the front and back parts (see Fig. 1.).

The roof is simply a piece of cardboard measuring 6½in. by 4½in. wide, scored across the centre and bent to the angle required It can be glued in place after all the other parts are assembled. The baseboard is a piece of ¼in. wood 8in. long by 6in. wide.

The Sand-wheel.

This can be made from thin, stiff card such as is used for postcards. Cut out two discs 3in. in diameter, and then, from a strip 4¾in. long and 1½in. wide, form the centre part A, 1½in. diameter, and glue this between the two discs. Now cut eight pieces for the blades, each measuring 1½in. by ¾in., and across one of the long edges of each piece turn up a flange ¼in. wide, as shown at B. These parts are glued in place as depicted in Figs. 2 and 5. In order to get the blades evenly distributed around the wheel, it would be as well to mark carefully the eight positions on the insides of the wheel discs before these are glued to the centre barrel.

From a wooden knitting needle, about ⅛in. diameter, cut a piece 4¾in. long and pass it through the holes in the mill-house, just above the door, and also through the central hole in each side of the sand-wheel. Glue a small wood washer on each and also a little wood pulley on the rear end of the shaft, as in Fig. 3. Adjust the sand-wheel so that it comes in the middle of the shaft, and then fix it in place with a touch of glue on each side.

Sand-hopper.

This is in the form of a square-sectioned funnel, and can be fashioned from thin, stiff cardboard. The hopper is 1½in. deep, the other dimensions being given in Fig. 6. In the bottom of the hopper a tiny paper tube, with a bore of not more than $\frac{1}{16}$in., is glued in. The little tube can be made by rolling a short strip of paper round a stout sewing needle and glueing the joint. The hopper is glued to the front and back and one of the sides of the mill-house in the position shown in Figs. 2 and 3.

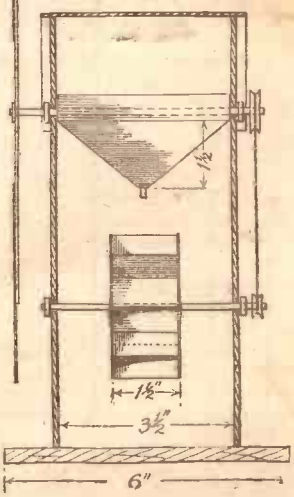


Fig. 3. The hopper and sand-wheel mechanism.

The Sails.

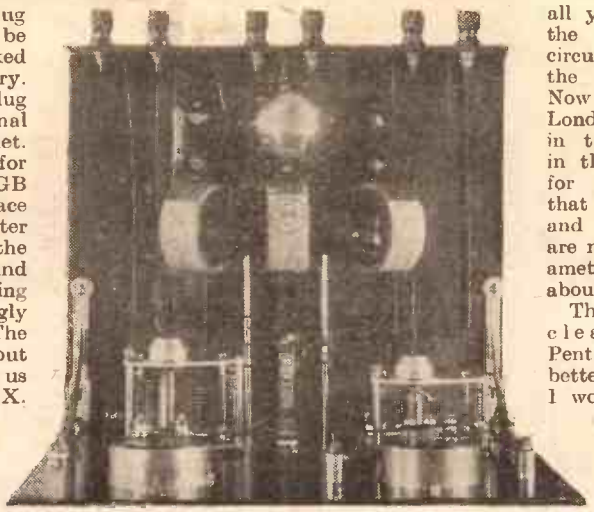
These can be cut out from thin, stiff, brown cardboard. The two arms, which can be a little thicker, are cut to the sizes given in Fig. 7, and have an enlarged part in the centre of each as shown. The central hole should be a push fit on the end of the shaft, which is a piece of wooden knitting needle 5¼in. long and the same diameter as the sand-wheel shaft. Glue the sails to the arms so that

(*Continued on page* 68.)

"HOBBIES" EASY-TO-MAKE ONE-VALVE LOUD-SPEAKER SET—(*Continued from page 51.*)

terminal, with a wander plug attached, which should be placed in the socket marked 70 (or 72) on the H.T. battery.

Replace the wander plug from the plus H.T. terminal of the set in the 150 socket. Since our coils are those for 5GB, let us start with 5GB on the Pentode valve. Place the potentiometer pointer about midway between the two ends of the wire, and after a little tentative tuning 5GB should come in strongly on the loud-speaker. The milliameter should read about 6 milliamperes. Now let us replace the coils for 5XX. With a little tuning to adjust for the new valve and adjusting the grid bias (*with the H.T. plug out*), you will find that you are getting 5XX very nicely on the loud-speaker with the milliameter reading about 15 milliamperes. Do not put more than 72 volts on the screened grid, as all you will do is to increase the current in the anode circuit without adding to the loud-speaker strength. Now let us go back to London. Replace the 50 coil in the primary, the 50 coil in the secondary and the 40 for reaction. You will find that now both the National and the Regional Programmes are much stronger. The milliameter reading should still be about 15 milliamperes.



Top view of the set.

Thus, it will become quite clear to you that the Pentode valve gives very much better results in the circuit. I would like to have reports from all parts of the country as to the behaviour of the set, at various distances from the four above-named stations. Next week it is intended to carry out some interesting experiments with the PM3 to see what happens inside our circuit.

BE YOUR OWN PRINTER—(*Continued from page 52.*)

the press plate, and this is to hold in position the paper to be printed with the addition of registering pins. The back of the plate is fitted with a piece of flat tin, or a stout piece of zinc is to be preferred, or, if possible, a steel plate. The press plate is now hinged to the bed and this part of the work must be very well done, the hinges being recessed into the wood to give perfectly flat contact between bed and plate. The only type of hinge which may be used is the long piano hinge, and this should be strong.

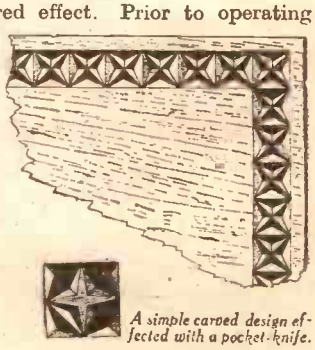
The chase, or forme as it is sometimes called, is a frame in which the type is set up. The construction of this must be just as true as the rest of the work, but it consists simply of a wood frame which must be perfectly square and flat. Details are given in Fig. 3, and from the dimensions it will be noticed that this is designed to drop into the bed of our machine and that the space for type setting allows for printing on quarto size paper. This part is made of oak and the corner joints if well made in the manner indicated, and glued in addition to screwing, will ensure a square setting. When screwing by the way, a hole should be drilled and countersunk to suit the screw, in each instance in one piece. This will make the work of screwing much easier, avoid the possibility of the wood splitting and ensure a firm grip between the two pieces. For all marking out of the wood use a steel square. The corners of the chase are rounded so that it is easy to drop it into the bed and to lift it out again and the fit should be smooth, not tight. We are now ready to get on with the practical side, and this will be dealt with next week.

Simple Carving with a Penknife.

A VERY simple and effective type of decorative carving can be done with an ordinary fine-bladed penknife.

Cigars of the more expensive variety are packed in cabinet boxes of quite good finish, and are usually furnished with clasps. These boxes are made of a very fine wood adaptable to this kind of decorative carving. The knife-blade should be very thin on the top end for about ¼ in. down and sharpened on an oilstone; in fact, a liberal application of the oilstone is an essential factor to successful work.

Do not attempt to carve a box all over. The accompanying illustration shows just a corner of a lid so treated with a penknife. The light and shade clearly shows the method, and the designs are cut down at an angle to gain the desired effect. Prior to operating with the penknife the design must be marked out with, say, a copying-ink pencil or a scriber. The design can, in many ways, be variable, and the illustrations show a further design, but with a little initiative and adhering to simple design some very pretty work can be executed.



A simple carved design effected with a pocket-knife.

TRIANGULAR STAMPS

By P. L. PEMBERTON.

THOUGH the normal, and certainly the most convenient, shape for a postage-stamp is the ordinary upright rectangle, which has been adopted for fully 90 per cent. of the world's issues, octagonal, hexagonal, diamond-shaped, oval, triangular, and other forms have been used from time to time. Of these the triangular is the most popular. No collector, young or old, used to be content until he could show at least one of the "three-cornered Capes," though the collector of to-day has the choice of many triangular stamps, issued during the past twenty years, if he wished to satisfy his desire for the unusual.

The Three-Corner "Capes."

The lure of the triangular shape in stamps is due to its uncommonness, for if the cases were reversed and the rectangular were conspicuous in

Iceland Air-stamp.

a sea of triangulars, it would doubtless give us a similar thrill.

Be that as it may, there is hardly a middle-aged man who has not a vivid recollection of the three-cornered Capes he himself possessed as a boy, or of those he coveted in the albums of his friends. They stood alone in the world of stamps for many years after their first appearance, in 1853, as curiosities.

The shape, however, is by no means the only attraction of the Cape stamp. They are magnificent examples of the engraver's art, printed by the well-known London firm of Perkins Bacon & Co., from plates reproduced by a process of their own invention. The design, which was the work of the Surveyor-General, Mr. Charles Hall, shows a seated figure of Hope—the emblem of the Colony.

Why Triangular?

So far as I know the choice of the triangular shape has never been

The "Woodblock" Cape.

explained. Though it has given so much satisfaction to stamp collectors, it was unpopular with the inhabitants of the Colony, where, on its first appearance, it received a bad "Press." Complaints were made that the stamps were too large, and awkward to cut apart, and it was asked why the Queen's head was not made use of in the design as in nearly all other Colonies. Later, after the invention in England, in the early fifties, of the perforating machine, there were complaints because it was not found practicable to make use of the invention on stamps of this shape, as the corners would be apt to become damaged in tearing them apart.

The set consisted of the four values,

Portuguese Nyassa Postage Due.

1d. red, 4d. blue, 6d. lilac, and 1s. green, and despite their awkward shape they remained in use for eleven years. The issue is divided into two main sets—the first printed by Perkins Bacon and the second, printed from the same plates, by De la Rue & Co., of London. The two printings can be easily discriminated by the shades of colour and by a subtle difference in the class of impression. During the period between the two printings a shortage of the 1d. and 4d. stamps occurred, and some provisionals were made hurriedly in Cape Town, in a design which is a copy of the original, printed on thin laid paper. These are the scarce and desirable stamps which are still popularly known as the "wood-blocks," though they are in reality printed from stereotypes

Austrian Newspaper Express Stamp.

which were cast from steel dies which are still preserved in the Museum at Cape Town. The work was indifferently performed and the resulting prints are so coarse as to be easily recognizable from the beautiful engravings of the regular issue. In making up the printing plates a block of the fourpenny accidentally got into that of the one penny value, and vice versa, thus producing those great rarities the *one penny* blue and *fourpence* red errors, which are worth about £300 each.

Colombian Triangulars.

The next triangular stamps to flutter the hearts of collectors came from Colombia. In 1865 this country

issued a 2½c. stamp, printed in black on lilac paper, in the form of an equilateral triangle bearing the Arms of the Republic. In this case there was a special reason why the stamp should have been a conspicuous shape, as its presence on a letter was a signal to the postal officialsthat it was to be delivered to the addressee: letters without it were kept at the post-office till called for. This was followed four years later by another triangular stamp of the same denomination but in a different design, the triangle being a right-angled one, with its longest side for the base. Neither of these is a very attractive-looking stamp, but there are rare varieties of the second one on laid paper instead of the ordinary wove, which are worth several pounds apiece.

The right-angled triangle of Colombia.

Liberian Stamps.

Many years passed before any other country ventured to issue a triangular stamp, but in 1894 Liberia, the negro republic, brought out a 5c. stamp printed by Waterlow & Sons, of London. This was printed in red with a black centre and shows a figure of Liberty reclining against a globe, with bales of merchandise at her feet and the figures of two negros at the right. On a scroll appears the legend: "The love of liberty brought us here." The same country has since issued two other triangular stamps for ordinary postage and her different registration stamps.

During the present century triangular stamps have become much more common. In 1908 Ecuador brought out a special set of stamps to commemorate the 25th anniversary of the opening of the railway between Guayaquil and the capital. Of these, five values are triangular, each bearing a portrait of some local celebrity. That on the 50c. is of Sivewright, the American engineer, employed in the construction of the railway.

Recent Issues.

Latterly, it is to be feared, many of those countries which have always the possibilities of the stamp market in view, have realised the appeal of this form to the collector. Among the recent issues we find triangular stamps issued in Esthonia for its air-post stamps of 1920 and again in 1924. Portuguese Nyassaland brought out a set of Postage Due stamps in the same year. A 5 centavos stamp was issued by Salvador in 1921 and two values of the current set of North Mongolia are in the same shape. Guatemala produced a set of triangular official stamps last year, and South Africa a 4d. stamp, for ordinary postage, which is a fairly close imitation of the original Cape of Good Hope, but printed in a pale blue. This created a great stir when it appeared, but it had a short life owing to the complaints from business firms of the waste of time in cutting them apart.

Austria and Fiume.

So far the three-cornered stamps I have dealt with have all been designed so that the stamps are upright when one of the sides forms the base. Austria, however, during the War, brought out two triangular newspaper express stamps which are upright when one of the angles points downwards. This idea was copied by Fiume, during its short-lived independence, and Latvia and Iceland have since followed suit for their air stamps.

Esthonian Air Stamp.

A MODEL WINDMILL WORKED BY SAND—(*Continued from page* 63.)

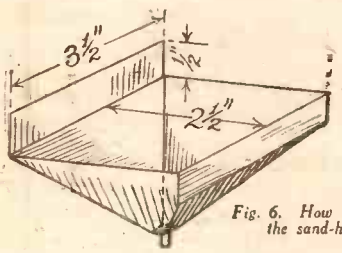


Fig. 6. How to assemble the sand-hopper.

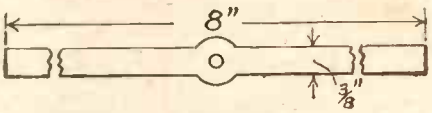


Fig. 7. The arms of the windmill.

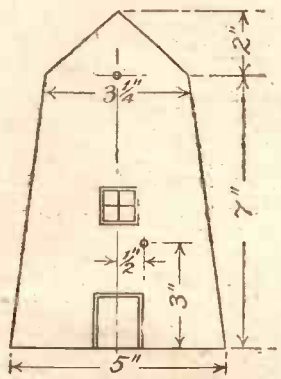


Fig. 4. How to mark out the mill-house.

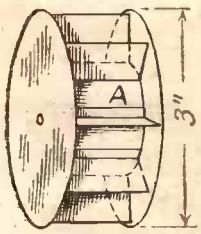


Fig. 5. Assemble the sand-wheel in the manner shown here.

each pair of sails measures exactly 11½in. from tip to tip. Now glue the central parts of the arms together, so that they are set at right-angles, and then press them on the end of the shaft. After gluing them to the shaft, slip on a small washer and glue that in place.

You will see by Fig. 3 how the sail-shaft is kept in place by a small wood washer at each end. On the rear end of the shaft a pulley about 1in. diameter is glued, and this is connected to the pulley below by a band made of strong thread.

Having got so far, give the sails a few turns with your finger to see if everything works freely, and then proceed to glue the house on to the baseboard. When the glue is quite dry, fill the hopper with very fine sand, and see that it issues freely from the little nozzle in the bottom. If all the adjustments have been carefully made the sails should slowly revolve till all the sand runs out.

The roof can now be glued on, and this completes the toy. To get the sand back again into the hopper, turn the windmill slowly upside down, so that the sand falls into the roof through the slot C (Fig. 2). On continuing to turn the mill round the sand will fall back into the hopper.

Let Your Editor Help You. Address your letters and queries to The Editor, "Hobbies," Geo. Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2. All letters and queries must bear the full name and address of the sender.

Our Grand Competition—Try *Your* Hand!

BY the time you have reached this page I expect you have made up your mind that *one* of those hundred and ten prizes announced on page 62 is going to be *yours*! And why not? Every competitor stands an equal chance, the conditions governing the competition are not stringent, and it has been my first consideration to make it *fair* for all. Study the pictures carefully, and consider every detail before you fill in your solutions. There are only two more sets, each consisting of eight pictures, to solve, and as I have arranged with the Competition Editor to have a large staff ready to tackle the task of judging, you won't be kept waiting long for the result!

I have planned the prize list on generous lines, and every one of those prizes is well worth winning. Very well, then! Try *your* hand. No reader stands a *better* chance than you!

And That's Not All!

OUR fine model seaplane, a competition and—ah! What? Don't think that those two items on the agenda spell finale to our programme of surprises. They merely indicate that we are getting into our stride. I realize that to have *been* first merely proves antiquity, but to *become* first is something quite unconnected with the passage of time. And it is my aim that HOBBIES shall be the hall-mark of journals of its type. Interesting articles on all subjects which rightly come within our scope, an abundance of illustrations—we don't stint 'em, do we?—fascinating competitions, and—let's be cryptic—many other things, prepared by a staff of contributors and artists who share my enthusiasm for HOBBIES—all these things, and more, will combine to make you *want* HOBBIES and to see that you get it! And you know the only way of making sure of that.

As I said Last Week—

FOR the benefit of those readers who this week make their acquaintance with HOBBIES for the first time, let me repeat that a band of experts on all subjects accomplished at untangling readers' difficulties, are waiting to render assistance to any reader who encounters a problem in connection with his hobby. No charge, either, for this service. Just send along your query to me at the address printed at the top of this page, and almost by return of post you will receive a solution to your difficulty. I've garnered this band of enthusiasts together for your benefit. It's up to you to keep them busy! The following is a selection of replies to this week's most interesting queries:

A Home-made Model Worm-drive.

B. W. (Malvern) wants to know whether it is possible to make a simple worm-drive for a clockwork toy he is building. This may be done without the use of a lathe by soldering a length of coil spring over a wire nail of suitable diameter. The spring thus forms the screw thread. The nail should be sufficiently long to project through the spring to form pivots.

Those Wonderful Bubbles.

E. W. P. (Edinburgh) wonders how it is that conjurers and professional entertainers are able to produce those large bubbles on the stage which bounce and may be cut in half with the stroke of a wand and made into two bubbles. The secret lies in the solution used, for ordinary soapsuds are useless for stage purposes. The solution is made by dissolving 1oz. of sodium oleate in one and a half pints of boiling water. When this has cooled off, add four tablespoonfuls of glycerine. Bubbles may be blown with this solution as much as 18in. in diameter. Sodium oleate is obtainable from all chemists quite cheaply.

Removing Dent from a Model Boiler.

"I have made a nasty dent in the boiler of my model steam-engine. Is it possible to remove it?" is the query from J. S. (Wraysbury). Quite possible, and fairly easy. Clean the dent with a piece of emery-cloth, and solder a piece of strong wire to the bottom of the dent. By pulling on the wire the dent will be removed. It is then only necessary to unsolder the piece of wire and scrape off all trace of solder.

Metal that Melts in Water.

Yes. M. T. H. (Winkfield), it is quite possible to make a solder which melts in boiling water. Use 1 part tin, 1 part lead, and 2 parts bismuth. This alloy melts at under 200° Fahrenheit, and is used for soldering enamelled and similar articles which would be ruined if greater heat were applied.

Who Invented the Pneumatic Tyre?

Not Dunlop, W. H. D. (Padiham), as is generally supposed, but Thompson, who patented a pneumatic tyre in 1847. Dunlop's patent is dated 1888, so Thompson was 41 years before him! The discovery of Thompson's patent meant that anyone could manufacture air tyres.

Automatic Gas Lighter.

"I have seen," writes G. M. (Doncaster), "a flintless gas lighter which is merely held over the gas, when the latter immediately lights. How can I make one?" That's fairly easy, G. M. Obtain a piece of spongy platinum (your chemist will get it for you), and attach it to the end of a wire rod having a handle at the other end. Spongy platinum becomes white hot when held in a stream of hydrogen, and that is why it lights the gas without the aid of the usual flint.

The Lightest Wood.

F. N. (Ringwood) asks the name of the very light wood used to make those all-wood model gliders sold for a few pence. It is balsa wood, which weighs 7½lbs per cubic foot—only half the weight of cork! It is found chiefly in Central and South America and, as might be expected from its low weight, grows at a rapid rate. It is not very strong or durable, but is an excellent material for certain parts of model aeroplanes. An indoor model made of balsa recently flew for nearly ten minutes in a large hall!

What is the "Gear" of a Cycle?

The gear of a cycle, H. N. B. (Birmingham), refers to the distance travelled in one revolution of the chain wheel, as compared with a "penny farthing" or "ordinary" bicycle. In the early days of cycling a bicycle was referred to as a 56in. or a 60in. according to the size of its front wheel. A 60in. wheel travels about 189 inches in one revolution, and to-day, when a bicycle travels 189 inches for one revolution of the chain wheel, its "gear" is said to be "60."

Engraving Tools.

You may etch the tools with your name in the following manner, B. J. E. (Woking). First warm the tool and coat it with beeswax at the part where you wish to etch your name. Next scratch your name into the wax with a steel needle or other pointed instrument, and then fill the incisions with sulphate of copper solution, a pennyworth of which will etch dozens of tools.

Curing Smoky Model-Locomotive Lamp.

S. V. (Ringwood) complains that the wick of his model-locomotive lamp smokes, no matter how carefully he adjusts it. To cure this defect, cut the top of the wick to a wide V-shape with a pair of scissors.

Advertisements are accepted for these columns at the rate of 1d. per word, prepaid.

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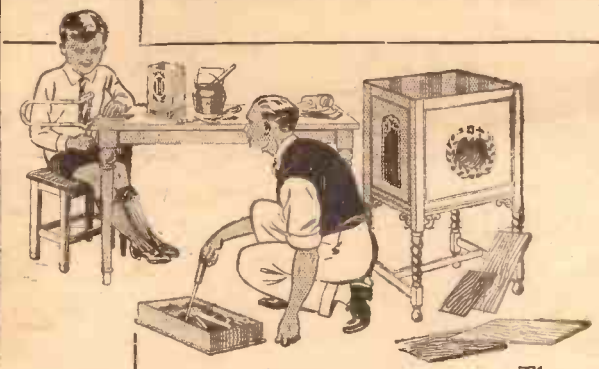

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