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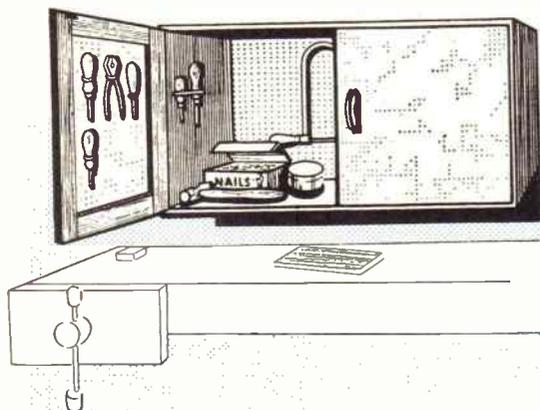
NUMBER 3261

IN THIS ISSUE

	Page
A Cabinet for Tools	49
The Mini-Soccer Game	50
Learn to Swim	51
Hobbies' Crossword No. 15	51
L.F. Amplifiers	52
Contemporary Frames	53
Using Key Cards for Tricks	54
Solution to Jig-Quiz No. 8	54
Hygienic Kitchen Tidy	55
An Automatic Siphon	55
Model Farmyard Animals	56
Hints on Reglazing a Window	57
Good Health for your Shoes	58
The Induction Furnace	58
Collector's Club	60
Mainly for Modellers	62
Patterns for Contemporary Frames	63



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A CABINET FOR TOOLS

A WELL constructed tool cabinet is a real asset to any handyman who possesses a reasonable range of tools, particularly if they are not in constant use.

Tools have an odd habit of disappearing just when they are needed and if left lying around they may be a constant source of danger to other members of the household. Sharp tools such as planes and chisels are easily damaged by knocks and rust. The latter is the worst enemy of the handyman if tools are not greased and inspected periodically when not in use.

The cabinet illustrated is intended to hang behind or just above the bench where the tools can be reached conveniently. For those who have no work-

shop it can be hung in the kitchen and painted to match existing fittings.

Oak or deal is used for the carcase, and for door framing. The doors and back can be cut from $\frac{1}{2}$ in. pegboard or hardboard. When making your choice of wood remember that oak, although excellent for the job, is harder to work than deal.

Commence by making up the carcase, consisting of two pieces A and two B. Pieces A are 32ins. long and B 23ins. long. They are all cut from $\frac{1}{2}$ in. material. The width of these pieces should be between 6ins. and 12ins. The four pieces are glued and screwed together as shown in Fig. 1. It is not essential to make elaborate joints, plain butt joints are quite satisfactory. When gluing and screwing, test with a square to ensure accuracy.

Now cut a piece of $\frac{1}{2}$ in. pegboard (C) 32ins. by 24ins. and pin to the back. Glue can also be used to give added strength.

The construction of the doors is shown in Fig. 2. Each door consists of a piece of $\frac{1}{2}$ in. pegboard or hardboard and frame of 2ins. by $\frac{1}{2}$ in. wood. The frame is halved together at the corners as shown by the inset diagram. Glue and screw the frame together, checking for accuracy by testing in position before finally gluing and screwing. The pegboard is cut to size and pinned to the frame.

Hinge the doors to the cabinet sides using 2in. butt hinges. Recess them with the sides and the frame as shown in Fig. 2. Provide a stop of $\frac{1}{2}$ in. wood at the bottom. Suitable handles (No. 711) for the doors can be obtained from Hobbies Ltd, Dereham, Norfolk, price 1/- per pair. They are 3 $\frac{1}{2}$ ins. long and made of cream or black plastic.

Spring catches No. 6224 may be fitted to the doors as shown in Fig. 3. Fix the catch to the door and the spring to the inside of piece (A) of the cabinet. These

catches can also be obtained from Hobbies Ltd, and cost only 3d. complete.

Tool holders are made from wire as in Fig. 4. Shapes are bent as required and inserted through the pegboard before hanging the unit.

The cabinet should be finished by painting. Apply one coat of sealer to the pegboard before the first coat.

For hanging the cabinet to the wall, bore three $\frac{1}{2}$ in. holes in the pegboard and insert $2\frac{1}{2}$ in. screws in the wall. Screws should of course be Rawlplugged for safety. (Mh.)

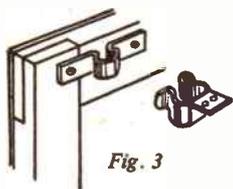


Fig. 3

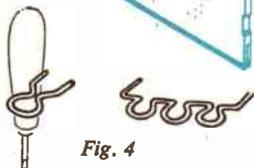


Fig. 4

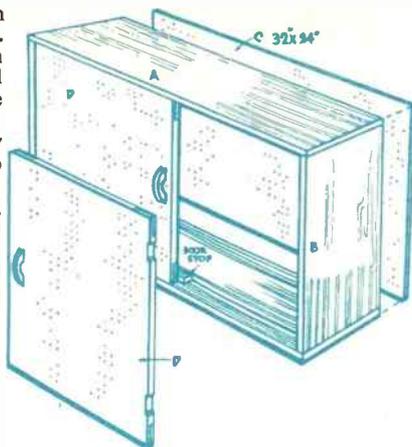


Fig. 1

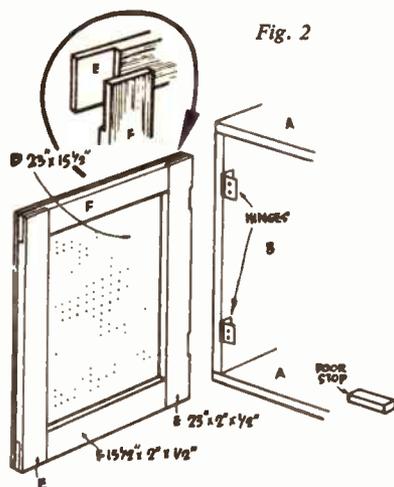
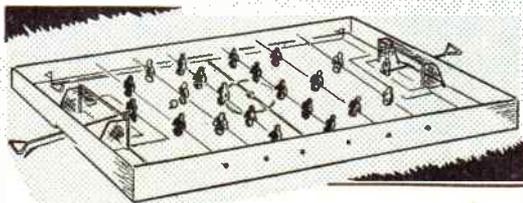


Fig. 2

MANY games are on the market, but there is nothing to beat the home-made ones, for the keen worker has the advantage of enjoying the building with the help of *Hobbies Weekly* instructions, as well as the actual playing of the finished game.

I give here drawings and instructions for a suggested table game of miniature football. This consists of a card or plywood playing field, the measurements and plan of which are shown. The playing board has to have a light framework surround, and strips of about $1\frac{1}{2}$ in. width are cut and glued to the base to provide this. Each end of the frame has a slot cut so that the handles of the goalkeeper models can be manipulated through from outside the field.

The Mini-Soccer Game

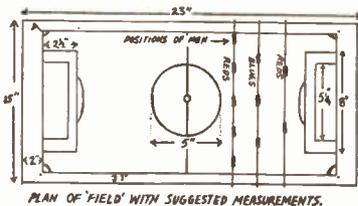
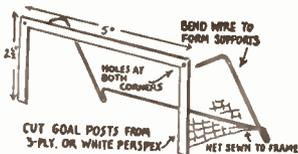
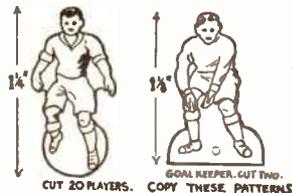


Make a goalkeeper pattern and cut out two from $\frac{1}{4}$ in. wood. Copy also the pattern of player, and transfer twenty on

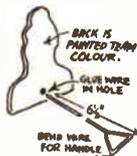
to $\frac{1}{4}$ in. wood. Cut these out with your fretsaw so that you have two teams of ten players. Paint these figures in the appropriate team colours. The goalkeepers have wire handles affixed, while the rest of the players are hung by means of a wire staple at the rear on to two sets of three wires anchored across the board between the two long sides of the frame. By flicking the figures with the finger, they can be made to control the ball quite realistically.

The field is of course painted green with pitch markings in white paint. Details for making up the two goalposts are shown together with other sketches to help in the construction of an interesting little game. If the worker would rather use his ingenuity in making up a set of figures that can be made to actually 'kick' the ball and be moved about the table or floor, rather than those on wires as suggested here, the instructions for model cricket figures I have already given in *Hobbies Weekly*, number 3222, could be effectively adopted.

Your finished game is, of course played in accordance with the rules of procedure of real football. (T.S.R.)



PLAN OF FIELD WITH SUGGESTED MEASUREMENTS.



Part 1

LEARN TO SWIM



A PART from the possibility of saving one's own life or that of another, the ability to swim is a very worth-while achievement, giving a great deal of pleasure and healthy exercise. Unfortunately many young people find it difficult to learn by the usual 'class' methods at school and many adults no doubt regret not having learnt when they were younger and now think it too late or difficult, or have not the time or inclination for swimming lessons.

By P. R. Chapman

Provided a few simple principles are observed, and with a determination to succeed, it is perfectly possible to teach oneself to swim and the lessons may be timed to suit one's own convenience.

It cannot be emphasised too much that the most important factor in swimming is confidence, and for the complete beginner several visits to the baths will be necessary in order to become familiar with the water. If you are a beginner you will naturally prefer to climb slowly down the steps at the shallow end, and although you may be excused for doing this the first time, you must convince yourself that the quicker you can get in, the better you will feel.

Confidence

Diving head first is of course impossible at this stage, but by bending down and grasping the edge of the bath you will find that you can jump in without fear of losing your balance. You should do this at a depth that will be about chest high and should practise at it until you can do it with confidence.

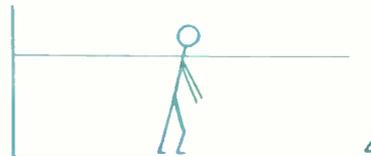
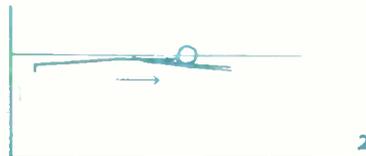
The next stage in familiarising yourself with the water is to get used to ducking. Stand in water at chest level as before, holding on to the bar, take a deep breath, bend at the knees and submerge completely, keeping your eyes open and breathing out slowly through the nose and mouth after a few seconds. Come to the surface again and repeat the performance. Although this may require a little courage at first for the beginner,

continuous practice will make you think nothing of it.

It is now necessary to learn how to get to your feet from a horizontal position. First stand with your back to the side of the bath and with one leg bent behind you with your foot pressing on to the side (Fig. 1). Stretch your hands in front just under the water, drop your head between your arms and push off hard with your bent leg. This will launch you in a gliding motion across the water

(Fig. 2). To regain your feet easily, bend your knees, pulling them upwards and at the same time pull backwards with your hands, throwing your head up (Fig. 3). You will thus regain a vertical position and can extend your legs to the bottom (Fig. 4). This will naturally need to be practised many times until you can do it easily and with more confidence.

Next: More gliding and the Breast Stroke leg kick.



Hobbies' Crossword No. 15

Note: Figures in parentheses denote the number of letters in the words required

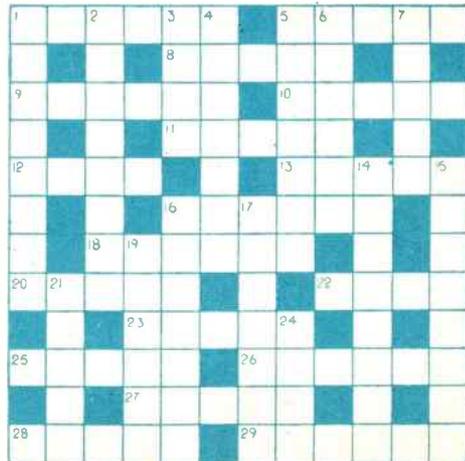
ACROSS:

- Bird of the Hog Age (6).
- Tree with internal curvature (5).
- The sick man is not in, that's conclusive! (5).
- Common finch (6).
- Has beneficial effect from Monte Carlo to Nice (5).
- Chauffeur loses his head — too much water perhaps (5).
- Charity (4).
- Consult both sides (5).

- One returns in ten years (6).
- A penny or a shilling and a pound on the back (6).
- Sporting sort of place (5).
- Mislead without being mad (4).
- Arctic residence (5).
- Descendant (5).
- Governing the drawing of lines? (6).
- Give the amphibians a fresh start (5).
- Credit us at tea with a slice of bread! (5).
- Platforms raised in the darkest ages (6).

DOWN:

- Disease which comes from mixing your lager, pal! (8).
- Deny game (Anag.) (8).
- Cricket period (4).
- Oyster inhabitants (7).
- Word for word (7).
- The fuss a Russian loved (6).
- Striking reminder of the times (5).
- Christmas occupation at Dingley Dell (8).
- Reg gets his own back with seven (8).
- Does it help the fisherman to haul ten up? (7).
- Bounds (7).
- Lachrymatory vegetables (6).
- Keep coming back (5).
- I've got us in: you get us out! (4).



★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
★ SOLUTION WILL BE ★
★ GIVEN NEXT WEEK ★
★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

L. F. AMPLIFIERS

THE output of a crystal or valve detector is not sufficiently powerful to operate a loudspeaker. When loudspeaker reproduction is required, an amplifier is therefore used. This amplifier may use one or more valves, or it can employ transistors. Valves are most generally used at present, except in miniature equipment, because they are simplest to employ, and can give a powerful output signal. Crystal diodes or similar detectors cannot be used for amplification.

Very many receivers use a single low frequency amplifier stage, and this can give satisfactory loudspeaker results. Two or more stages (or valves) are used when more powerful results are required. The

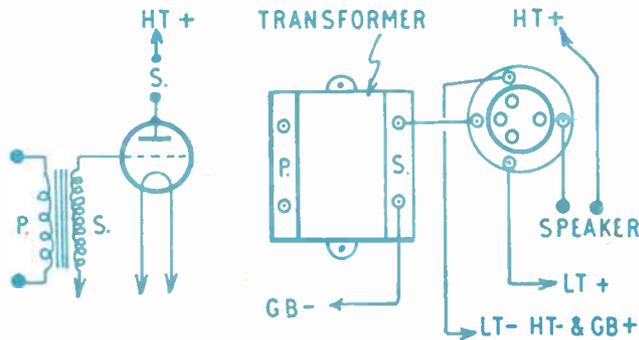


Fig. 1—Transformer coupling

valve used should be of low frequency amplifier type, as this kind of valve is designed to handle a more powerful signal than are valves intended for detection or similar purposes.

Transformer coupling

It is necessary to employ a coupling circuit, to couple the amplifier valve to the detector stage. In simple receivers, a transformer is often used. The primary of this transformer is fed from the detector, by connecting it to the two points to which the headphones were originally wired. (That is, detector and earth with crystal sets, or H.F. choke and H.T. positive, with valve sets.) In Fig. 1, (P) indicates the primary. As the secondary (S) has more turns than the primary, a signal of increased voltage is induced in this winding, and is applied to the grid of the amplifying valve. This signal is further amplified by the valve (it will be remembered that a small signal on the valve grid causes a large signal at the valve anode). The loudspeaker (S) can thus be operated. Fig. 1 shows a practical wiring plan for the amplifier stage.

It is important that the transformer be of a type designed for such circuits, and they are known as 'Intervalve' or 'Interstage' coupling transformers. A step-up ratio of about 1:3 or 1:5 is usual. Transformers may have tags or terminals, or colour-coded leads. It is essential to follow the maker's connecting instructions, because there is no standard method of indicating the correct connections. Sometimes only primary and secondary are marked. With other transformers, the correct primary connections may be indicated by (A) or (P) (for detector Anode or Plate); 'HT' (for High Tension positive); (G) (for L.F. valve grid); and (GB) (for Grid Bias negative).

R.C.C., is often employed instead of the transformer in Fig. 1. This does not give quite so much volume, but it is cheaper, and takes up less space.

The circuit for R.C.C. is shown in Fig. 2. Resistor R1 takes the place of the transformer primary. For detector triodes, a value of 50,000 ohms is satisfactory. For the miniature type of valve (e.g., 1T4) a resistor of 100,000 ohms will be more suitable.

The condenser C1 transfers the signal to the grid of the amplifier valve. This condenser is usually of about $0.01\mu\text{F}$ capacity. A mica condenser is often fitted, because it has better insulating properties than a paper condenser. The condenser must on no account be a

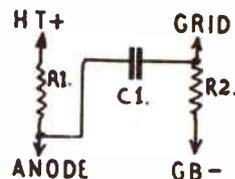


Fig. 2—Resistance capacity coupling

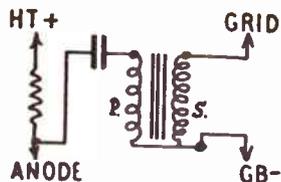


Fig. 3—A parafed transformer

An ordinary amplifier stage of this kind ceases to work properly when the grid becomes positive in respect to the filament. To avoid this, negative bias is applied through the transformer secondary. This bias may be obtained from a small dry battery, and the actual voltage used depends on the valve and H.T. voltage. The correct bias voltage may easily be found if it is remembered that about 3V. to 7½V. would be usual, and that the highest voltage which does not cause distortion of the signal is suitable. G.B. batteries are tapped at each 1½V.

The G.B. battery should never be connected in the wrong polarity (that is, negative to earth), or a heavy anode current may flow, running down the H.T. battery, damaging the valve, and causing distortion.

R.C. coupling

In most modern sets of other than very simple type, grid bias is obtained automatically. This is called 'auto bias' and will be described later.

Resistance capacity coupling, or

defective or leaky one, or positive voltages from the high tension circuit will reach the valve grid, causing troubles similar to those from wrong bias.

Resistor R2 is of about .5 megohm (500,000 ohms) and serves to complete the grid circuit of the output or amplifier valve, so that grid bias can be applied.

Sometimes a resistor and condenser are used with a transformer, giving the circuit in Fig. 3. The signal from the coupling condenser now passes through the transformer primary (P), inducing an amplified signal in the secondary (S). This method is used with very small transformers, which are wound with very thin wire, and could not carry the detector anode current. In Fig. 1, the detector anode current has to pass through the primary. But in Fig. 3 this current passes through the resistor shown. Midget transformers intended for the circuit in Fig. 3 are usually termed 'parafed' trans-

formers, and are not suitable for direct coupling.

Auto bias

Automatic bias is popular because it makes a further battery (e.g., the G.B. battery) unnecessary. Fig. 4 shows an auto bias circuit for a battery operated receiver. R1, C1, and R2 are the coupling components shown in Fig. 2. Transformer coupling could be employed instead, if desired. If so, the secondary would replace resistor R2.

R3 is the bias resistor. The H.T.

shrill reproduction. This is avoided by wiring a condenser, C3, in parallel with the speaker. This condenser reduces the high frequencies, thereby giving a more balanced output. A value of about $.005\mu\text{F}$ or $.01\mu\text{F}$ is usual. Very small capacities will not reduce the high frequencies much; but large capacities will reduce them too severely, giving very low-pitched results. This fact is made use of in some tone-control circuits. Triodes do not give this extra emphasis to high frequencies, so that the condenser may be omitted with them, or be of fairly

with the 1-valver described, this lead goes to the earth circuit. There is no need to use separate batteries, one H.T. and one L.T. battery operating both valves. Lead (X) is taken to the anode circuit of the detector; that is, to the H.F. choke in the 1-valver.

H.T. Voltage

A 120V. H.T. battery is often used with valves such as those mentioned, but a 90V. battery will generally provide sufficient volume. With the small type of valve intended for 'all-dry' running, a

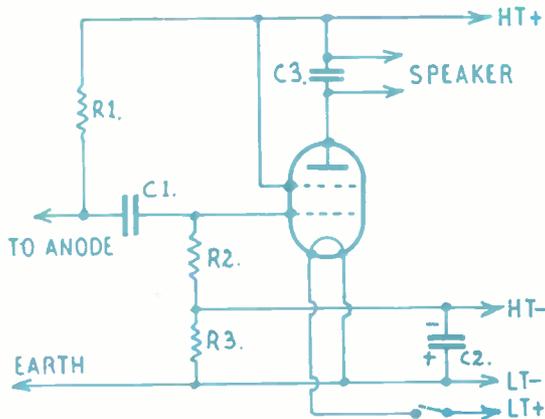


Fig. 4—Amplifier with auto bias

current of the receiver passes through it, causing a voltage drop which acts as grid bias. The value of R3 thus has to be chosen to suit the bias voltage required. For many battery circuits, 500 ohms is suitable. C2 is a large condenser of about $12\mu\text{F}$ to $50\mu\text{F}$, and prevents audio frequency signals developing across the resistor. Such condensers of large capacity are called 'Electrolytic' or 'Bias' condensers, and must always be connected in the correct polarity, as marked upon them. Other small condensers, such as C1, may be wired in either way round.

Tetrodes and pentodes

The valve shown in Fig. 4 has an extra grid, wired to H.T. positive. This is the screen grid. Low frequency amplifier valves with this extra grid are termed 'Output Tetrodes.' They give more amplification than the triode type of valve, which is shown in Fig. 1.

'Output Pentodes' are also often used for L.F. amplification. These have a further grid, situated between the screen grid and anode. This grid is usually wired internally to the valve filament, so that an extra valveholder connection is not required.

Tetrodes and pentodes tend to emphasise high frequencies such as high musical notes, and may thus give rather

small value, such as $.001\mu\text{F}$.

Fig. 5 is a wiring plan of the circuit in Fig. 4. Valves such as the PM22A, 220HPT, and 220/OT fit the 5-pin holder shown. A low frequency or output triode can also be inserted, though it will have no screen grid, or centre pin.

The lead (Y) forms the earth line of the circuit. If such an amplifier is used

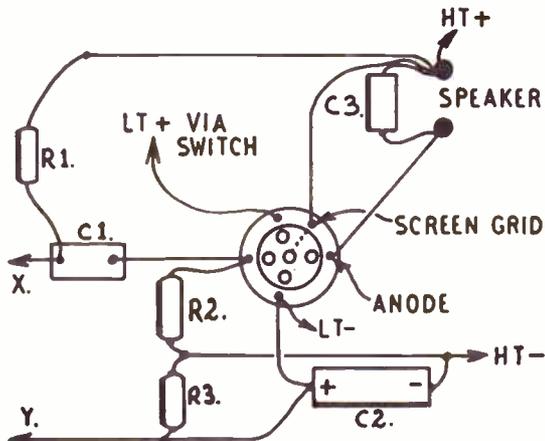


Fig. 5—Wiring plan of circuit in Fig. 4

$67\frac{1}{2}$ V. or 90V. H.T. battery is usual.

In portables and other small receivers, miniature H.T. batteries are often used, and generally have layer cells. These last quite well, but do not have such a long life as full-sized batteries.

The next article in this series will describe the tuning of short waves.



see page 63

Contemporary Frames

of the frame. The sides may also be lengthened by increasing the curves at (X) or (Y) to make any desired size of frame.

The detail at the top of the pattern page shows how the glass and picture are held in place. Glue pieces of $\frac{1}{8}$ in. or $\frac{3}{16}$ in. stripwood $\frac{3}{16}$ in. wide, round the opening, at the back of the frame. The glass and picture are placed in position and a backing piece of $\frac{1}{8}$ in. wood or stout cardboard is pinned or screwed in place.

These frames are painted with high gloss enamel after first applying a coat of sealer if hardboard is used. Edges of plywood can be painted quite successfully if they are filled with wood filler before applying the first coat. (M.p.)

USING KEY CARDS FOR TRICKS

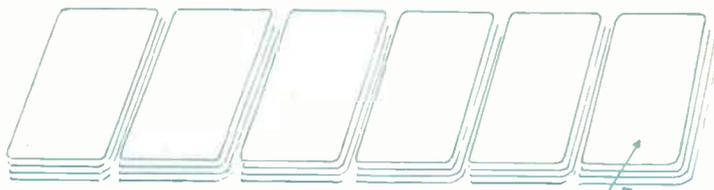
THERE are two types of card tricks, one where some clever manipulation is required involving sleight of hand, and the self-working type which appears to give a magical result. The former may be quite suitable for the practised entertainer but there is little doubt that self-working tricks have the advantage that they may be performed in full view of the small audience in your own room with little chance of detection.

Various devices are used for finding chosen cards among which is the technique of employing key cards to assist. This self-working trick is just such a one, requiring only a minimum of preparation before presentation.

~~~~~  
*By S. Longbottom*  
~~~~~

Take a pack of cards removing one complete suit. Take any one card from this suit and any three others from the pack, placing six of the one suit cards at the bottom and the other six at the top of the pack. You have actually removed four cards from the complete pack leaving a remainder of 48 cards and we are now ready for the presentation.

Deal out six cards separately from the top of the pack in the usual manner as the base for six piles, and it should be immediately recognised that the first six cards dealt out from the top of the pack will all be of the same suit, and ultimately there will be a similar result when we reach the bottom six cards. Continue dealing from left to right until all the cards are now in six equal piles. Again it should be noted that the original suit cards have been so dealt that there is one at the top and one at the bottom of



KEY CARDS AT TOP AND BOTTOM OF EACH PILE

each of the six piles. These are our key cards.

Ask for a volunteer to select any pile, mentioning that the cards have now been thoroughly mixed up by dealing out one at a time. Now take up the selected pile, fan out with the faces away from you, asking your friend to extract any one card from the pile without showing it to you, then replacing the pile in its original position on the table. It is always advisable to ask for the chosen card to be shown to the audience so that there can be no attempt to spoil your trick by cheating, and when this has been done ask for it to be placed on any pile.

With the card returned to a pile your friend is now requested to take up any other pile, place on top of the one selected, and these two placed on any other. Your friend may also select the order of placing the remaining piles on top or below those already collected.

Now let us review what has happened.

Prepared pack

Your friend selected a card and placed it on top of a chosen pile, afterwards placing another pile on top and one below. You will remember that we have prepared the pack so that the key cards are at the top and bottom of each pile, so that it should now be obvious that the

selected card is sandwiched between a pair of key cards.

A modification

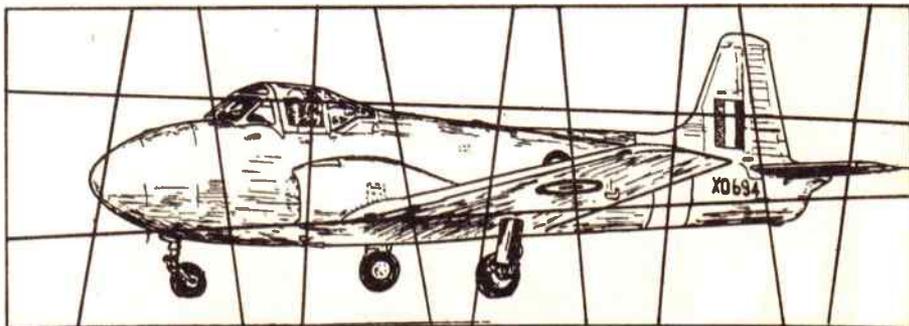
You may now take the pack of cards from the table and by looking through them when fanned out you will quickly find the odd card between a pair of key cards. It may happen that your friend selects one of the key cards, that is a card either at the top or bottom of one of the six piles, but this should not upset you for on reflection it will be realised that when scanning the cards, three of the same suit of key cards will appear together and the central one will be the selected card.

If you wish, you may modify this trick by attempting to find two, three or four chosen cards providing you follow the same routine and make a few trials before presentation.

Another modification may be made by asking your friend to read out the values of the cards without you even seeing them. You will know which is the chosen card because it appears between the pair of key cards. And it will amaze your friend if you tell him you knew it was that card because his voice sounded guarded when he read the value! But remember, you cannot repeat this trick without a new preparation of the pack.

SOLUTION TO JIG-QUIZ No. 8

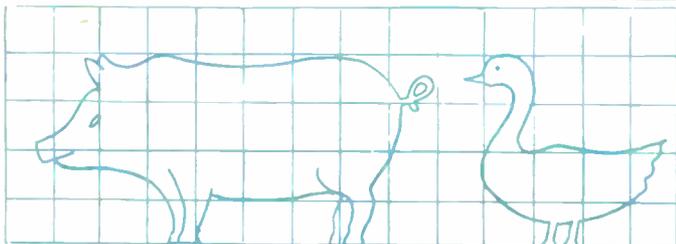
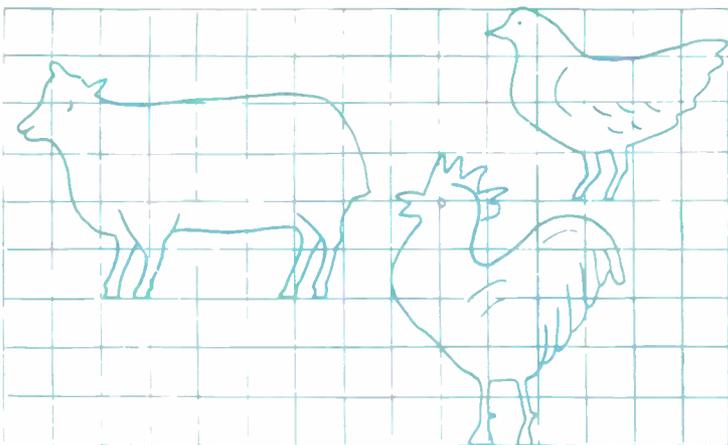
Well, did you manage to piece together last week's aircraft puzzle? If so, you will have found that it was the Hunting Percival Jet Provost. The original Provost referred to in the text was a piston engined monoplane powered by a Leonides engine.



The eyes, hoofs, mane and similar details are best rendered in black lines by using a fine pointed brush after basic colourings have been applied, and it should be remembered that both sides of the models will require decoration. The work is quickly completed since the models are only small, but time should be allowed for each separate colour to dry before proceeding to the next.

Real tails

Those who would like to make an innovation so far as these models are concerned, may modify by the introduction of real tails. The horse's tail can be best made by winding several strands of ordinary sewing cotton round an oblong piece of card. Tie firmly together at one end after winding, cut at the other



end and you have a tufty tail ready for gluing in position on the model. You may glue on plaited threads for the mane, and you should have no difficulty in obtaining a good shade of thread. Alternatively, you may use pieces of string or wool of matching colour and the same applies to most other animals with perhaps an exception in the case of the pig. With such ingenuity you may make really attractive and original farmyard model animals.

Hints on Reglazing a Window

REPLACING a broken pane of glass in a window is probably one of the most common jobs the handyman is called upon to do in the home. For average sized panes, the job is quite simple and can be easily tackled by the home handyman. If, however, the window is very large or is situated in a dangerous position above ground floor level then leave the job to an expert glazier. Large sheets of glass are tricky to cope with, especially to the amateur.

The tools required for the job are a hammer, a hacking chisel and a putty knife. A hacking chisel is a specially shaped tool used by glaziers for removing putty. If one is not available then an old firmer chisel will make a good substitute.

When ordering your glass, remember to get the panes a $\frac{1}{16}$ in. shorter and a $\frac{1}{16}$ in. narrower than the window opening. This will prevent any unnecessary cutting later on.

If the window is made of wood, ordinary whiting putty will do but for steel windows you must obtain steel sash putty which is dark greyish in colour. In either case, the putty should be well softened with linseed oil and must be free from lumps.

To begin with, prise and pull out all the broken glass from the window. With

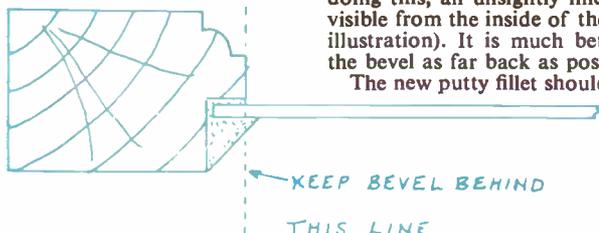
your hacking chisel remove all the old putty and any old brads. It is important that you get all the old putty away from the surface against which the new pane is to be pressed. When this is done, take some putty and knead it in your hand until it is really soft and then make a thin bed along the four edges of the window opening. After this, insert the new pane

The next step is to insert a few glazier's pins to hold the glass in position. These pins are small triangular shaped pieces of thin metal but small headless brads can be used instead.

Next form a fillet of putty around the outside edges of the glass using your putty knife to form an even bevel. If necessary, the knife can be dipped into water to obtain a fine smooth surface.

Many handymen make the common mistake of bringing the edge of the bevel beyond the inside edge of the rebate. By doing this, an unsightly line of putty is visible from the inside of the house (see illustration). It is much better to keep the bevel as far back as possible.

The new putty fillet should be painted



of glass and press it firmly into position. This should be done by using a cloth and applying pressure to the edges of the glass. Do not attempt to press the centre. If your glass is rough on one side then the rough side should be placed to the inside.

as soon as possible after the repair has been carried out. This will prevent the unprotected surface from cracking and allowing moisture to penetrate.

Finally, scrape off the surplus putty from the back and then wash the glass clean of any finger marks. (F.K.)

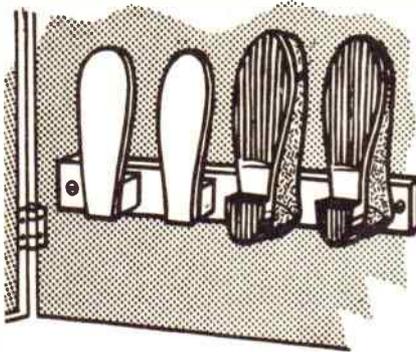
Good Health for your Shoes

WHEN you have been out in the wet you probably take off your shoes, throw them in an odd corner and leave them to take care of themselves. With the very high cost of footwear these days they certainly deserve somewhat kinder treatment, and in order to dry out properly they should be put in a cool place and where air can circulate all round them.

A simple rack on which to hang the shoes is the ideal answer to all this and what could be better than the one which is shown and described here. Fixed on the idle space inside a cupboard door will keep them tidy, out of the way and where you will be able to find them when next wanted.

Make sure that the cupboard is an airy one. It can be in the bedroom, under the stairs, or anywhere in fact provided it is not damp. The average cupboard door should be able to accommodate a row of four shoes, but that will depend upon their sizes, and you may be able to fit in more. Do not put them so close together that air cannot circulate freely, which would defeat the purpose of the rack.

Two methods of holding the shoes are shown and you can use the one that appeals or perhaps incorporate some of each type. One of these is composed of



a loop of wire fixed into a wooden block while the other is entirely of wood, both being made to the shape of the foot.

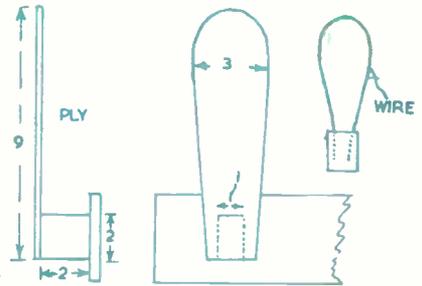
For average sized shoes the measurements given should be about right, but it is advisable to make sure before cutting them out. You could of course make several different sizes to suit all members of the family.

Ply or thin hardwood about $\frac{1}{4}$ in. to $\frac{1}{2}$ in. thick and stiff wire about $\frac{1}{8}$ in. diameter are most suitable and both types are fixed to a block 2 ins. thick to leave room for the shoe to hang freely. Screw the blocks firmly to a strip of

wood 4 ins. wide and $\frac{1}{2}$ in. thick, which is in turn secured to the inside of the cupboard door.

Painting the fittings with two coats of good oil paint will help to preserve them, especially if the shoes are damp when hung up.

Some people like to put screwed up newspaper into damp shoes so that they will keep their shape while drying. Padding the upper part of the wooden shape will admirably fulfil this purpose. A few thicknesses of an old blanket with a wad of cotton wool behind should do the trick: or a piece of foam rubber sheeting could be usefully employed for the same purpose. (A.F.T.)



Simple Science Experiments

THE INDUCTION FURNACE

HERE is a new, silent and very effective way of boiling water and fusing metals. It illustrates the principle of the induction furnace much used for making steel. You have already seen how a heavy electric current can be generated in a secondary six-turn coil using the model transformer previously described. Now if you use a secondary

consisting of a single turn of thick copper the strength of the current will be proportionately greater and much more heat will be generated since the heat generated in a conductor by an electric current is proportional to the (current)².

Cut out a piece of copper in the shape of a ring so that it will just fit over one arm of the core of the transformer. Beat the copper ring into the shape of a circular trough with a ball-panned hammer by placing over a circular groove cut in a piece of wood. Fit a wooden handle to the circular copper trough as shown.

Place the 1840-turn primary coil and the circular copper ring in position on the core of the transformer and clamp down the choke. Connect the primary coil to the mains, pour a little water into the

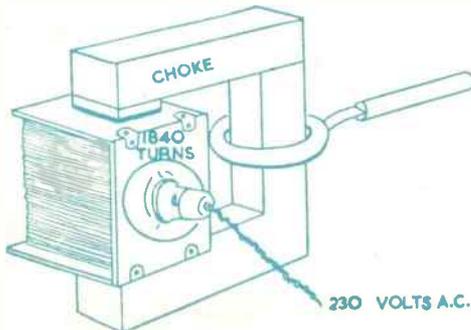
trough and switch on the current. In a very short time the water will boil. Pour out the water and place a few small pieces of lead in the trough. These will quickly melt when the current is passing.

Assuming no loss of power in the transformer and with an electric current of 3 amperes in the primary coil the current in the secondary can be calculated thus:

$$\begin{aligned} \text{Electric Power in the Primary} &= 230 \times 3 = 690 \text{ watts.} \\ \frac{230 \text{ volts in Primary}}{\text{Voltage in Secondary}} &= \frac{1840}{1} \\ \therefore \text{Voltage in Secondary} &= \frac{230 \text{ volts.}}{1840} \end{aligned}$$

$$\begin{aligned} \therefore \frac{230 \text{ volts} \times \text{Current in Secondary}}{1840} &= 690 \text{ watts.} \\ \therefore \text{Current in Secondary} &= \frac{690 \times 1840 \text{ amperes}}{230} \\ &= 5520 \text{ amperes.} \end{aligned}$$

(T.A.T.)



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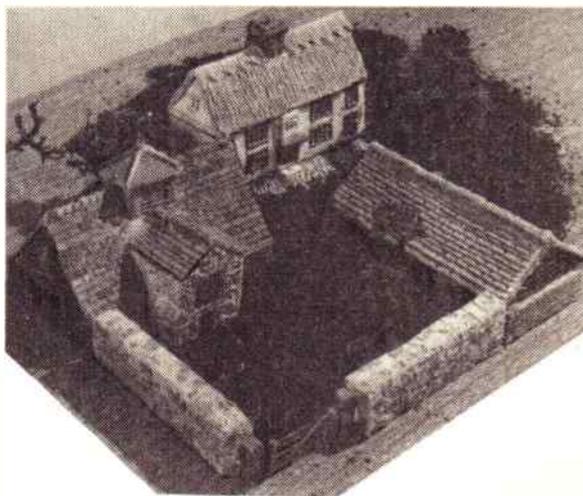
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I have about 80 specimens — some are over 100 years old — all have a story to tell. Many have come from junk shops and auction sales. But

BOBBINS AND GINGLES — By R.L.C.

'Grandma', who has provided dozens of rare buttons and thimbles, has proved my best friend.

The 'bitted bobbin' is one of the oldest; sometimes this is very elegant, of dark wood, with light pieces in various shapes let into it. There is the 'tinsey bobbin', of wood and bone, with tin, in different patterns, sometimes as dots, sometimes twisted round, also let into the wood and bone; some of these are pretty, all are curious. Some of the bone ones are beautifully carved, others are painted; many have names and mottoes on them.

The 'hip-bobbin', so called because it has a waist, is slim and elegant. The wire bobbin has fine wire twisted round it in the wood, and others which hold the gimp or thread, which marks the pattern, have metal rings round them.

I have seen one bobbin in three pieces, two wood, one bone, all of which fitted into each other, and another beautifully carved one, hollow, having a tiny bobbin carved, and let into the hollow place. This was done by a shepherd boy on the hills.

Nearly all the old bobbins are well cut, and of pretty shapes, showing, at least, the taste of the times; and there was perfect rivalry over the lace pillows of the girls, which those same girls, now grandmothers, still keep carefully put away, but which they are delighted to show to an appreciative visitor.

The name and motto bobbin has an interesting history:

In a village, where tradition says the

moon sets, a man lived who made it his business in life to design the bone bobbins. The women used to write out, with their own original spelling, what they wanted put on, and then he would engrave it round, or up and down, or across, as seemed to him best. I have two. On one is — 'Too me, my dear, you may com near'; and on the other, which is a perfect puzzle to read, as it is somehow worked up the bobbin — 'Let no false lover gaine my hart'. Note the spelling.

On one I have seen — 'George Read died February 19th, 1842, aged 6 months'. On another a text. On another a husband's and wife's initials done as a puzzle.

Choosing a Career

TELEPHONISTS are depicted on a 20 leva Bulgarian stamp of 1947 (catalogue 9d. mint). Prior to their permanent engagement, G.P.O. telephonists must serve a probationary period. During this time they attend a special school where they are taught standard expressions and methods of operating.

Every locality is represented on the switchboard by its code letters such as DY for Derby, GW for Glasgow, LE for Leicester, and so on. Code learning forms an essential part of a pupil's homework.

All calls are recorded on tickets, and here again for brevity, the identification codes are used. An E in the bottom left hand corner of the docket means 'number Engaged'; TE, 'Trunks Engaged'; and DTE, Distant Trunk lines Engaged.

Prospective telephonists spend part of their training in a large exchange under the guidance of an instructor and supervisor. After a month's training they are usually competent in all branches of operating. Languages are taught for those who are to operate the continental switchboards.

Male and female G.P.O. telephonists

A sweetheart's name was always burnt into a bobbin. Women often had their own names on their bobbins, which were handed down from daughter to grandchild. I have a 'Betty' and a 'Leah', and, also, what I call an historical bobbin with 'Queen Adelaide, 1830', on it.

The gingle is a number of beads, etc., hung on the end of the bobbin, with 'the bottom bead', as it is called, having some distinction. These old beads are pretty, always quaint and curious, of queer shapes and colours, and mottled and cut in different patterns. Sometimes they are of china, but more often of glass.

The gingle, however, is composed of other things besides beads. Many have individual names. I have one with an acorn for the bottom bead, another has a mite (half-a-farthing), another has a Swiss coin, another a ring, another a purse brass tassel.

All sorts of keepsakes in olden days were hung on the bobbin. When a village girl had a sweetheart, the bottom button of his waistcoat would go on the gingle.

The beads, too, had names of their own. There was 'the bird's egg', like in shape and colouring to its representative, 'the half quartern of soap', and 'the lollipop bead'; also 'the Nelson bead', so called because on Nelson's death they were made, and out of respect to his memory, put in mourning.



are assured of regular employment — an important privilege many other workers do not enjoy. There is a superannuation for the appointed operator, and in addition a dowry for the female telephonist on the occasion of her marriage.

Illustrated details of most forms of employment may be found in the stamp album. Encourage your children to form a collection of these philatelic occupations. The one which rouses most interest could well be the job in which they would excel most.

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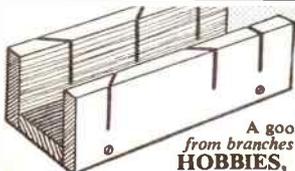
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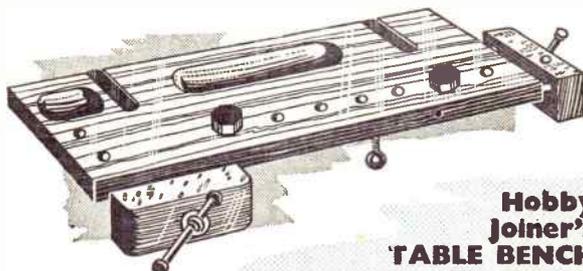
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EXHIBITING YOUR SHIPS

By V. Sutton

MANY hundreds of hours may go into making a good ship model. If you show it at an exhibition, let it look what it is — a good ship model. I often feel that this side of the job is sadly neglected and it is not always the model-maker's fault. Somebody just says, 'Go on, do put it in' and there you are, rushing round, and the model appears on a badly wrapped cardboard box as though apologizing for being

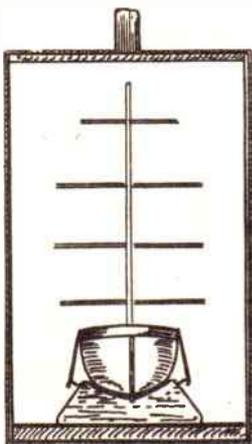
at many really good exhibitions, and, being connected with some of the larger national shows, I feel we must all do something to make our own shows better. It often happens, due to shortage of halls, that many of the best models are shown on tables under a balcony. Thus you have bad position, poor light-

You can, nevertheless be imaginative in the background treatment. I am all for it, provided that background does not overshadow your model. The very lightly outlined jetty idea with the little lamp-house is simple and very effective (Fig. 2). This can be a separate cardboard cut-out against a blue background. It can be very realistic in giving the impression that your boat is leaving the harbour. In Fig. 3 you will see a practical idea of the run-way and part shipyard. This is very good, but should not be too ambitious.

It is up to you to give the 'atmosphere' your model needs. A luxury liner can be shown against a light background which you can pick up from any Travel Brochure obtainable at booking agents. Make the model the exhibit and the accessories the means of showing the exhibit.

Some judges look very closely underneath a boat. They often know if you have the right under-water shade for

Fig. 1



there. Give your model dignity, sense and pride of some achievement and you will walk off with a few more prizes. But watch these points.

Packing

A damaged model is a disaster and loss of face on your part. Yet this is all so simple. Measure the boat and allow all-round clearance at every angle as shown in Fig. 1. Fix it with wood blocks and line over with a padding of green baize or felt (preferably not fluffy), and hold it with stout rubber bands on hooks fixed in the block ends. Getting a suitable box is quite simple if you go to a grocer who will always fix you up. It is a good plan to face up the base of the box with a piece of board as shown.

With the stout wrap-over type of carton you can carry this with ease with a string handle, but light struts across the top will prevent the weight causing the box to bend in and thus prevent any pressure whatsoever on the model. I use many boxes and they are all lined with stiff brown paper, well pasted.

The scenic background problem arises

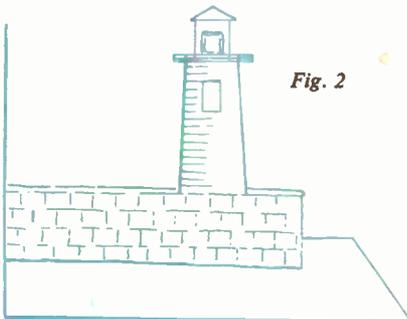


Fig. 2

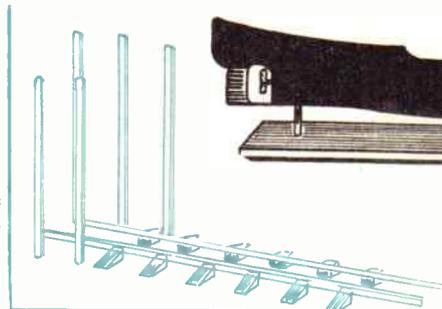


Fig. 3

ing and possibly obstruction from pillars. Sometimes a word with the organising committee will help but this is often too late, as space has already been allocated. However, do try to prevent a fully rigged ship from being silhouetted against a rather antique window frame of many bars — it just does not look right.

Providing your background is half the battle. A fully rigged ship and anything with extensive super-structure needs matt surfaced papers in pale blue or similar shades, and a visit to the local Art and Craft shop will probably give you the answer. I am all against attempts at making 'sea' unless you really can do it. Most of these efforts are subjected to cracking when moved and are best left for the static model.

that particular boat or company. See how the judge is assisted by the little system of the boat being shown on dowel rod lengths, about 4ins. long for the large boat, and on a nicely stained (not polished) board (Fig. 4).

Most ships have a history and the display of a neat tablet to this effect is a great improvement. Remember, an exhibition is a collection of work, but it is also an entertainment for serious-minded people. A little knowledge of the exhibit is very useful.

On this point, model-makers should never make mistakes. If they only write to any of the Shipping Companies and say that they are making ship models and want to include one of theirs, then I am sure they will get some most interesting literature. Like the journalist, get to know the 'P.R.O.' (Public Relations Officer) and, through your activities, you will make some new friends, always there to help you.

Bear this in mind — somebody may be at that next exhibition who served 50 years in the Navy and he can be very helpful — or annoyed, so it's up to you!

Fig. 4

CONTEMPORARY FRAMES

