

from the elbow. For a start, make a continuous series of "dots" or transmit the letters E, H, I and S, these having dot values only. Then try the dashes, sending out such letters as T, O and M. The usual Distress Signal (S.O.S.) can then be tried, keeping it up constantly until expertly transmitted, following which the tapping of the victory "V" can be tried (three dots and a dash) to make a good mixture.

Speed in manipulation, naturally, comes with constant practice. Try to cultivate a nice, steady, rhythmic transmission. This will have to be built up by degrees. At the beginning, transmit each letter slowly, but in close uniformity. Allow a

greater pause between each letter, with longer pauses between each word.

You know *how* a letter is formed. Endeavour to recognize a letter, however, by its complete buzzing sound. Dots and dashes should be completely in the background. In time, the letters will sound to you as though they were spoken by yourself or the other operator.

That is how the signals are "received" by expert wireless operators. Learning the Morse Code amounts to learning a new, dumb, language. Like all difficult things, study and practice makes it a comparatively simple business.

Incidentally, if you have nobody to

help you, there are special "tutor" gramophone records available. One can easily reduce the speed of the records, or increase it. The correct wireless sounds are reproduced so that one soon becomes conversant with the real thing.

The records can be played on a portable gramophone or else through the intermediary of a pick-up connected to the gramophone terminals on a radio set. If such terminals are not provided, a valve holder could be obtained (secondhand).

To fix the adaptor, remove the detector valve from the set and place the adaptor in position, then replace the valve. The terminals on the adaptor are used as pick-up terminals.

A straightforward and simple method of making SMALL PICTURE FRAMES

AN artist friend of the writer makes all his own frames. Those made from picture moulding which vary from $\frac{1}{2}$ in. to 1in. in body are indistinguishably as good as if made by a professional craftsman.

The illustration shows at a glance the gadget used for a cramp; it is really a box with locking-up wedges, made from hardwood. A mitre-box, a fine tenon-saw, a pot of glue, and a piercer and hammer, are all that are required.

A Block Framework

Upon the block, or bed, are screwed firmly and countersunk, two hardwood straps each 18ins. long, and two 12ins. long. They are about 2ins. wide and 1in. deep. They are arranged as shown, the angle at "A" being dead square.

The first thing to do is to cut a

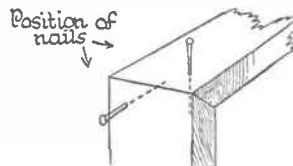
mitre, at, of course, an angle opposite to the first.

Cut and mitre another piece the exact duplicate of this, and you have the top and bottom pieces. Cut the two side pieces in the same way.

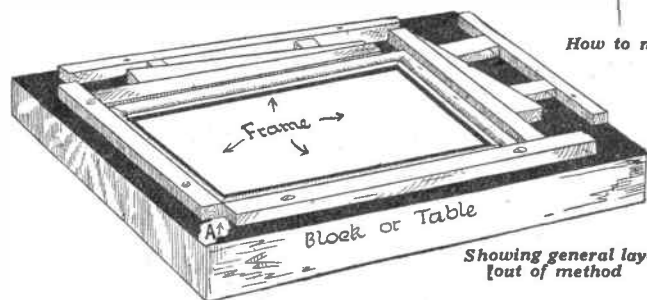
Assembly

Assemble the four pieces in the bed and tighten the wedges. If your mitres are right they will join up easily and the frame will be square. Then loosen the wedges and take the lengths out, one at a time for gluing.

The faces of the mitres could be glasspapered very lightly to give a better join, but if you do this avoid any tendency to "round" the mitre-corners.



How to nail the corners



mitre on one length of the moulding which can still be procured. To cut this first mitre put the back of the moulding against the kerf of the mitre-block and saw it through with a short and easy movement. Do not push the saw.

Having thus made the cut, measure the length of the picture (or length of the mount, if the picture is mounted), along the rebate side of the moulding. Mark and cut a second

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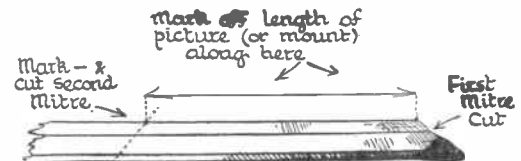
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Finishing Hints

It is a good plan before nailing up to pierce the holes first. A word of caution here about putting in the nails. Remember that your frame, though sound and solid, is not a plank. You can again use the bed (clearing it of its wedges and filling out blocks), as a "check" when tapping the nails home. Place the frame face down.

Moulding which has a recessed or shaped back, presents a little more difficulty, but with care it can be manipulated as easily as the solid-back material.

Natural hardwood, or oak, is very popular just now. So if you decide to try your skill on it first, here is a



Marking and cutting mitres

simple method of giving such a frame a good polish.

Rub in a little white boot polish, and after it has dried, bring it up by gently rubbing with a clean, soft cloth. You will be surprised at the quality of the finish, which will be even better with a second application. If you have followed these instructions you and your friends will be amazed at the perfect picture frames you can make.

Hobbies

WEEKLY

September 8th. 1943

Price Twopence

Vol. 96. No. 2499

MODEL TANK AUTOMATIC CIGARETTE BOX

THE tank slides along the base, and when it goes back a cigarette is left lying in the groove. A real novelty which anyone with a fretsaw can make.

The whole thing is easily made and the painting of the camouflage is readily done with poster paint or ordinary water-colours to which a little Chinese white had been added to give body and make the paint opaque. Ordinary matt oil paint would also of course make a very good job, and leave a surface which could be cleaned if necessary from time to time with soap and water.

The Base

The illustration at Fig. 1 gives a view showing how the base, which is the most important part, is made up, and it is this part which will receive first consideration. It would be well if the whole article be made from a toughish wood such as sycamore, this would look well and will as regards the sliding motion, wear well, and would therefore last longer than a soft wood.

Upon a base of $\frac{3}{4}$ in. wood measuring $7\frac{1}{2}$ ins. by $2\frac{1}{2}$ ins. is glued an upper base made up of two pieces (A and B in Fig. 1). These pieces are 7ins. long, A being $1\frac{1}{2}$ ins. wide, and B $1\frac{3}{4}$ ins. wide. See these measurements are the

same throughout, and that they are glued together with an equal margin each side. It will depend on these two pieces how smoothly the tank pushes backwards and forwards.

Glue the pieces to the main base. Then, at one end glue on another piece (D) on the top of (B), the former being half the length of the latter—viz. $3\frac{1}{2}$ ins. long by $1\frac{1}{4}$ ins. wide and

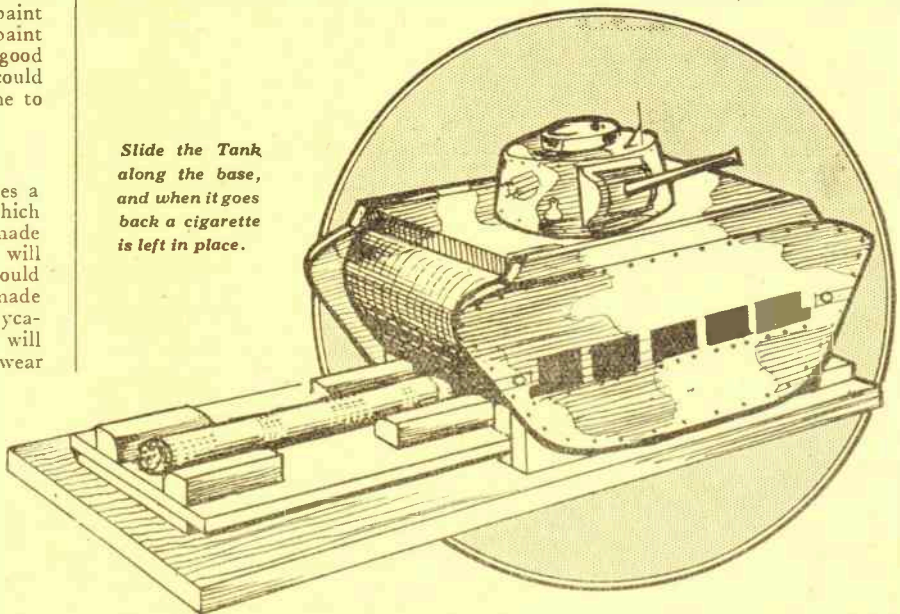
$\frac{3}{8}$ in. thick

The piece (C) at one end is required as a stop for the end of the tank to rest against. Four $\frac{3}{8}$ in. blocks of wood are next glued on in the positions shown, in alignment with piece (D). The length of each block is $1\frac{1}{4}$ ins.

The Tank

In Fig. 2 the general construction of the tank is shown, and the measure-

Slide the Tank along the base, and when it goes back a cigarette is left in place.



ments may be taken direct from this diagram for marking out the various pieces. There is a box-like construction inside which are two sloping partitions (E) as seen in the cross section Fig. 3. These partitions run the length of the box and are $1\frac{1}{4}$ ins. wide.

Runners

The sides must be chamfered to fit and also shaped on their lower edges to slide clear of the base blocks (F). At the extreme lower edges of the sides of the box glue on pieces of $\frac{1}{8}$ in. square stuff as G in Fig. 3. These pieces act as guides for the box, and work freely in the

them in one by one through the slot formed between the two partitions (E).

The sides of the tank are formed as two additional outer sides glued to the sides of the box. In Fig. 2 one of these outer sides is shown ready to be fixed on, and in Fig. 4 a detailed outline of the side. One half is crossed with $\frac{1}{2}$ in. squares ready for enlarging on to the wood.

When one side has been outlined and cut round with the fretsaw, the second one can be marked out by using this cut-out as a template for drawing round. Or of course, as these outer sides are only $\frac{1}{8}$ in. thick

shaped up and ready to be glued to the end of the box. Take care to test the working of the box before screwing on the lid or cover by putting in a cigarette and checking if it leaves the container and partitions correctly. Glasspaper off any sharp angles or edges inside the box and clean off the outside surfaces ready for the paint.

The gun turret is cut circular from a piece of $\frac{1}{2}$ in. wood, its lower diameter being about $1\frac{1}{8}$ ins. It will look better if you get it to taper upwards. The projecting gun bracket is shaped from a solid block and glued on afterwards.

The Gun

The gun may consist of stout wire filed to taper towards the muzzle and let into a hole in the gun bracket. A disc of $\frac{1}{8}$ in. thick wood is glued to the turret as a final capping.

After cleaning the wood with glasspaper, paint the base matt black all over. Also paint the squares representing the openings in the sides of the tank matt black after the whole tank has been coated green and brown to represent the camouflage.

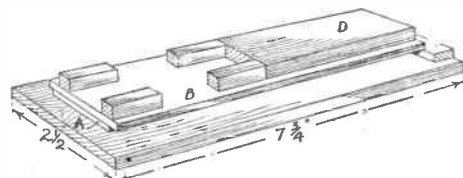


Fig. 1—Base, showing the Guide parts

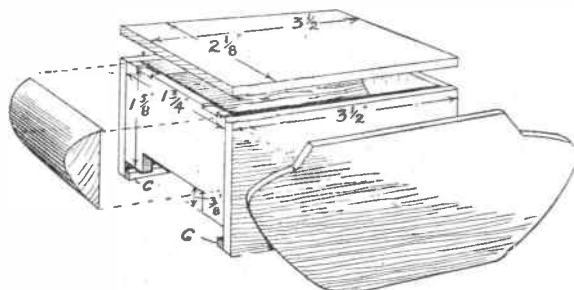


Fig. 2—Showing general construction of body

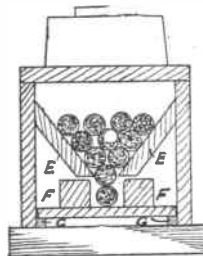


Fig. 3—End section showing cigarettes

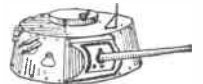


Fig. 5—The Gun Turret

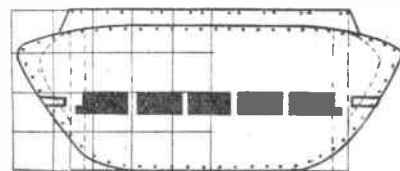


Fig. 4—Outline of tank sides

groove of the base formed between pieces (A) and (B).

The top of the box is formed into a lid with hinges at one of its ends (Fig. 2) where recesses for the small brass hinges are located. The cigarettes are put in the box, by opening this lid.

If desired, however, this lid can be a fixture and the cigarettes put into the box by running the tank right off the track as it were, and dropping

the two may be cut at one operation thus minimising the work.

To form the rounded ends of the tank, shaped blocks are glued to the ends of the box, the lower edges being glued just at the level of the top of the slot-like opening in the sides. This can be seen in the dotted outlines on the side in Fig. 4.

The blocks measure $1\frac{1}{8}$ ins. long by $1\frac{1}{8}$ ins. deep by $\frac{1}{8}$ in. thick, and in Fig. 2 one of the blocks is shown

Paint the rivets black round the edges of the sides, and finally glue on a square of green baize below the base so the whole base grips the table while tank is being pushed backwards and forwards.

The baize should be cut about $\frac{1}{2}$ in. smaller all round than the base itself to allow for stretching. Apply the glue warm and evenly to the wood, and lay the baize smoothly in place. Rub out any creases and weight down.

The Editor's Notes—

WHAT must it feel like to be a King at 8 years of age? And would the present shortage of toys be so serious as to an ordinary boy? I wondered when I read an interesting story, in the Toy Trader recently of King Faisal I the 8 year-old monarch of Iraq. Even if he is a king he, like most boys, is keenly interested in war toys.

BEARING this in mind, some British Army craftsmen in the Middle East were ordered to produce a model of a "General Grant" tank as a present for the young king. The tank was 3ft. long and fitted with

guns capable of firing blank shells. When the Iraqi Regent was in Cairo after a tour of the Western Desert battlefield, General Alexander told the Regent of the intention to present the tank. It was found, however, that the miniature tank was too heavy to be taken to Iraq by the same aeroplane in which the Regent and his suite returned, so the model was packed and delivered by road and rail to the Palace at Baghdad. Quite an interesting story isn't it?

SOME of our readers who have followed these pages over 25 years may remember a photograph and

details of Mr. W. I. Easton who was a regular prize and cup winner in our various competitions. Our friend is still going strong and now is as keen as ever modelmaking and, as only to be expected, helpful with suggestions and hints of working which his his experience has taught.

IN a recent letter he spoke of a model Spitfire he had made with novel addition. He cut out the small figure of an airman standing on the wings, near the cockpit, as though it was the pilot ready to enter. The propeller was cut in black xylonite and its spinner was the bottom end of a fountain pen, shaped to size.

The Editor

Mystify your friend by making this amusing HIDDEN NUMBER PUZZLE

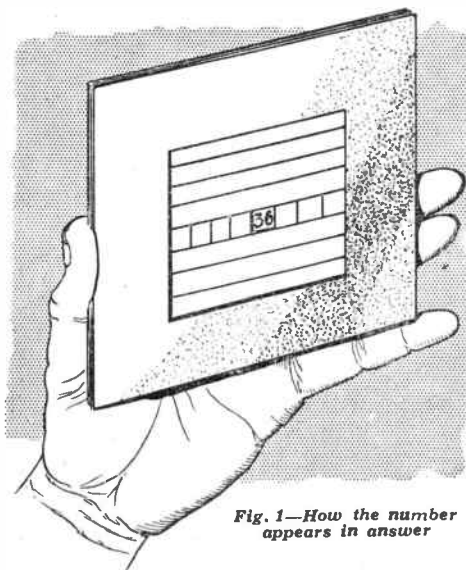


Fig. 1—How the number appears in answer

THIS is a most interesting and mystifying puzzle to make. Consisting of seven cards, it can easily be carried in the pocket ready to be produced for entertainment purposes whenever the opportunity occurs.

The cards are numbered 1 to 7, number 1 having an additional 64 numbers on it, in numerical order. Just let your friend choose a number, but keep it to himself.

Then show cards 2 to 7, one at a time, and ask your friend to answer yes, or no, if the number chosen is on the card presented or not. The hidden number will then appear on card number 7 as in Fig. 1 to the puzzlement of your pal who will probably wonder how it is done.

Suitable Card

For the cards, choose a thin glazed cardboard. Bristol board, 4 sheet thickness would be excellent for the purpose if obtainable. Any suitable cardboard, however can be used.

Cut the card into seven equal sized cards to the size given in Fig. 2, and on each draw an inner square, as shown. Number these cards, 1 to 7 in the top righthand corner. Readers who own a drawing board and T square will find it easier to mark off the squares on the card board before cutting it up. Accuracy is more easily obtained by this method.

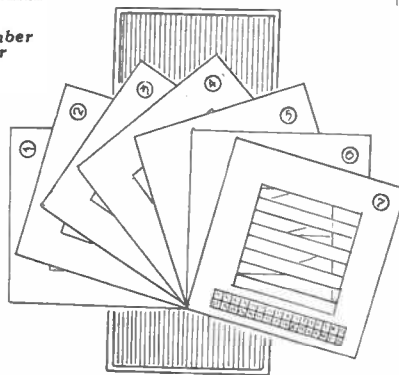
On card 1, divide the inner square into 64 parts by drawing 7 lines across and down the square, $\frac{1}{4}$ in. apart. Number these 1 to 64 neatly in black ink.

A quite artistic effect can be obtained by drawing the lines and square

in coloured ink, and the numbers in indian ink. Also by putting the card numbers 1 to 7 inside circles.

The remaining cards, 2 to 7, have 3 lines $\frac{1}{4}$ in. apart, drawn across them under the squares. These lines are divided by cross lines to make 32 squares, as in Fig. 3, and are to be numbered as will be described.

Divide the inner squares on cards 2, 3 and 4, into 2, 4 and 8 equal vertical divisions respectively. Then with a sharp penknife and a ruler, cut out the divisions marked with a cross. Divide squares on cards 5, 6 and 7 into 2, 4 and 8 equal horizontal divisions, and cut out those marked with a cross, as before.



The set of Cards for the Trick

The cut edges of these openings will be improved if darkened with ink. This can be effectively done by drawing the back of a pen along them. Fig. 4 shows cards 3 to 7 reduced size and how the squares are marked out before cutting.

Careful Cutting

Care should be taken to mark and cut these squares and divisions accurately and to see the inner squares are truly central on the cards. If this is not done the subsequent opening left, in which the hidden number appears, may trespass on other numbers and make the result appear doubtful.

Some care taken over this part is well repaid by a fully satisfactory result. The double line of squares below the inner squares on the cards can now be filled up.

To do this correctly, take card number 2 and place it on card 1. Now copy the numbers on view and ink them in the squares below.

For instance, these numbers will be 1 to 4, 9 to 12, and so on, the other half of the numbers being obscured by the card above. Take card number 3 and place it on card 1, removing card 2, of course, and copy the numbers on view through the openings as before.

Placing the Cards

Then place each of the remaining cards in turn on card 1, and repeat the procedure. Fig. 3 shows card number 2 completed and will make this all clear.

This completes the puzzle, which should be held together with a rubber band.

To work the cards right is the secret of the puzzle. When a number on card 1 has been chosen, hand each card in turn to your friend and ask him if the number chosen is on it. If, yes, just lay the card on top, 2 on 1, 3 on 2, and so on.

If the answer is no, on cards 2, 3 or 4, then turn them from left to right before placing them on, or in other words, turn them upside down. If the answer is no on cards 5, 6 or 7, turn them also upside down but this time from bottom over to top.

No error will occur here if it is remembered that 2, 3, and 4 are turned vertically, or left to over right and 5, 6 and 7 horizontally or from bottom to over top.

The result is infallible if the cards are turned rightly and if a wrong number appears then the cards were wrongly turned. Memorise this and do the turning, when turning is necessary, casually.

The action will, most likely, be

(Continued foot of page 181)

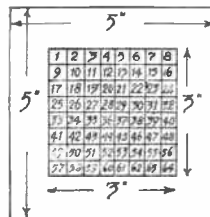


Fig. 2—The No. 1 Card

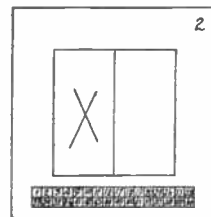


Fig. 3—Cards 2 to 7

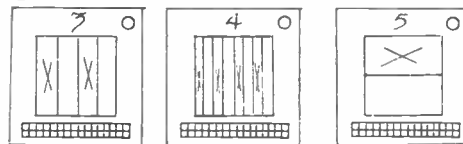
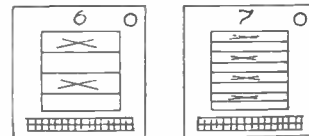


Fig. 4—How the cards are marked and cut out



Little ways which make a big difference show in these GENERAL NOTES

IN by-gone centuries, when there was not the urgent need for speed, the craftsmen of those days showed the result of their labours by marvellous pieces of individual work. Undoubtedly one reason for this excellence was the amount of time they spent over each individual piece of work, and the amount of patience they maintained in getting it correct and satisfactory.

Nowadays, unfortunately, we are so apt to rush through with almost any job we have in hand, and the consequence is seen in the result. If you go to any Arts and Crafts Exhibition, for instance, you will find some splendid pieces of work, and models of a delightful character. You cannot imagine, however, that those were completed in five minutes or even in five hours.

Time and Patience

The maker took time over them and was careful of every little point concerned. This is virtue, unfortunately, not shown by all our readers, and from the photographs of models which have been submitted as well as those which we have seen during our travels, there is evidence that considerable more attention should be paid to this point.

Not only in the actual cutting and construction of the article does this apply, but also in the finish, and the final details. A little thought of the best way to display the model, for instance. Think out those little points which will add distinction and possibly originality to every article.

Additional Points

Here is an instance. A model waterline boat can be made and painted quite satisfactorily. How much more different however it is when given those little additions to make it stand out better. A base on which an imitation sea has been painted or moulded. A small strip of paper pasted to the front of that base indicating the name and possibly size of the boat. Pasted on the underside of the base you find the name clearly written or typewritten possibly bearing some interesting notes on the complement, armament, speed, builders, etc.

These points, you see, make all the difference between just a model and one that is really finished and interesting. Do not be disheartened if you feel you cannot get the finished result up to the standard of other people. It is really only by experience and experiment that you can improve and attain the goal you so ardently desire.

Another point arises in the same

connection. A good worker looks after his tools, and cares for them as much as some people take care of animals and pets. These tools of yours can last a lifetime, properly looked after. Not thrown about the bench and broken, or used for some purpose for which they were never intended.

Not lent out to incapable people who will ruin the edge of a chisel or break the head of a hammer. Keep your tools in a proper rack, side by side, and always in the same place.

Put the rack if you can, in a little cupboard or cabinet, to prevent dust smothering them when not in use. Bright tools if not likely to be used often should have a thin film of oil rubbed over them.

Keep them Sharp

Possibly some of the greatest slackness is shown in sharpening appliances. It often seems so much trouble to use the honing stone and sharpen the cutting tools, when this little operation would make the actual work so much easier to undertake. Take care of your stone too. See that it is properly oiled and in good condition. Do not leave it uncovered so that pieces of grit on its oiled surface get caught upon the blade of the chisel.

How many people, we wonder, keep their nails and screws in properly partitioned boxes, so they can pick out the right size required at once? Too often the sizes are mixed up and

screws, nails, brads, tacks, screw eyes, etc., are confused. In consequence time is lost in sorting them out to find just the one wanted at the right moment. It is really just as easy to keep them in proper places and it certainly saves considerable time when you come to use them.

Useful Containers

Those little partitioned boxes can easily be made and several suggestions have appeared in these pages already. An old cigar box, for example, is quite suitable and can easily be put in 8-10 partitions bearing the size according to the quantity of the article likely to be used.

Or, of course, if you have a number of 1oz. or 2oz. tobacco tins or any of a similar nature they can be used for almost any individual article. If there is a lid to these small boxes, then the name of the article it contains, as well as the size, should be shown on a piece of paper pasted to the top.

These little things make so much difference to the time wasted when you want to find say a 1" nail or tack, to go through half a dozen different boxes to find which is which. If the size is neatly printed on the lid, you find what you want immediately.

All these points may seem small, and unimportant. They do, however, make a difference between good and bad workmanship, and in the end add to the enjoyment of our hobby.

Another Simple Crossword

CLUES ACROSS.

1. The George Cross Island.
5. We can stand up to an air one.
8. We don't care one...about Hitler.
9. Castor-oil ones aren't welcome.
10. To exist.
11. A short sleep.
13. Tide running with the wind.
15. Shorthand.
17. To make a mistake.
18. Don't cut one.
19. A kind of board game.
20. A wild ox, like the buffalo.
22. Money lent to someone.
24. To blow sharply down the nose.
25. Made during an election.
26. Odd parts of things.
27. Short for "edition."

CLUES DOWN.

1. Hitler's brain is in this.
2. One who makes out lists.
3. Corn on one is annoying.
4. Auxiliary Territorial Service (abbr.)

6. To execute vengeance.
7. To let something fall.
12. To shake.
14. Animal of the weasel kind.
15. A pig does this.
16. To unfold.
19. High title bestowed on man.
20. Balance Sheet (abbr.)
21. Boy is to mother and father.
23. Favourite name for a donkey.



Complete patterns on Cover iv for this amusing MINIATURE BOWLS GAME

BOWLS—one of the oldest and most popular of English games—is played on a green of about 40 square yards. You, however, can play it in a novel miniature form on a piece of wood measuring $8\frac{1}{2}$ ins. by $6\frac{1}{2}$ ins.—and get just as much excitement out of it, too!

The idea of the game (as you will play it) is to see who can touch the "jack" (a small white ball) with what is called a "wood" (playing ball) a point thus being scored as a result.

A $\frac{1}{2}$ in. diam. steel ball is used as the jack, while an old $\frac{1}{2}$ in. diam. wooden ball foot is converted into a playing ball, or one could be made from plastic wood, or putty, etc., or a "pea" marble could be utilised.

Playing the Game

To play the game, only *two* bowlers should compete with each other. It is immaterial who bowls first, although this can be decided upon tossing a coin. Each player is allowed 4 shots with the one ball and a note made of the individual scoring until the winning score of 21 (it is never more than that) is reached.

There are no penalties to be paid as, for example, a player failing to bowl the wood out of the runway in trying to bowl it gently so that it returns to him repeatedly.

As this can be very annoying to the other participant, a bowler could be made to pay a forfeit of 1 shot, not a point, to prevent the habit. As to scoring, a player could be allowed 2 or 3 points should he manage to knock the jack out of position instead of merely touching it with the playing ball.

After having 4 shots, the waiting bowler takes his turn at bowling 4 times, then comes the first man's turn again, then the second man again and so on until the game is finally won.

Cutting the Parts

To make the game, you require a piece of $\frac{1}{2}$ in. and $\frac{3}{16}$ in. or $\frac{1}{4}$ in. fretwood $8\frac{1}{2}$ ins. long by $6\frac{1}{2}$ ins. wide. The patterns on cover iv should be pasted down on the $\frac{1}{2}$ in. thick wood.

Before doing so, however, it will be necessary to set it over the $\frac{1}{2}$ in. piece

of stuff and mark the position of the trigger pivot screw, the jack position and the formation of the striking pins. The marking is done with a nail or pin.

It is advisable to also mark the four corners to obtain the exact size (apart from the true shape) the wood is cut, this being $8\frac{1}{2}$ ins. by $6\frac{1}{2}$ ins. It is a simple matter to rule straight lines from one corner point to the other.

Regarding the grain direction, that of the holder must run the long way, i.e., upright with the figure. Cut the pattern from the page with scissors and paste it on the waste wood cut from the overlay piece. The trigger can be cut out as it stands in the pattern: cut with the usual fretsaw blade and try to have the statuette mortise cut so that the tenon of the latter is a fairly tight fit.

Assembly

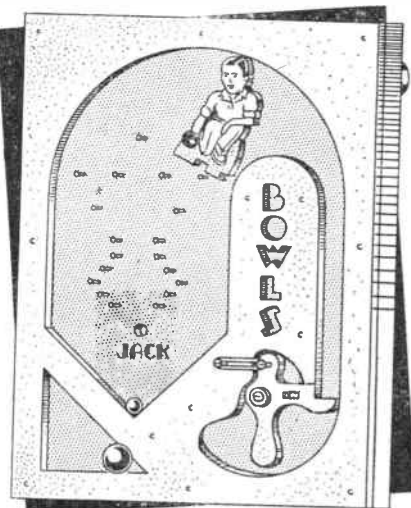
Having glued and pinned the overlay work to the $\frac{1}{2}$ in. back piece, trim the edges and ends neatly with a block plane. The jack hole in the back piece should be slightly rounded at the rim with a tiny "cone" of rolled glasspaper, this being inserted and twisted about, using pressure.

When the rest of the board has been glasspapered with a fine grade of paper, obtain sixteen panel pins $\frac{3}{8}$ in. long. These are the striking pins. If you cannot get them $\frac{3}{8}$ in. long, cut to this length with the pincers.

Owing to the removal of the points, it will be found difficult to drive the pins into position. And as they will be also difficult to hold, it would be a good idea to first drive a $\frac{3}{8}$ in. panel pin into the positions to make the holes. Otherwise a fretwork drill should be used, fitted with a headless panel pin instead of the usual drill bit.

The Trigger

The trigger is pivoted in place with a $\frac{3}{8}$ in. long by 3 roundhead brass screws. The pivot hole in the trigger should be large enough to allow some freedom in movement. Prior to attaching the trigger, however, drive another $\frac{3}{8}$ in. by 3, screw into its lug until the point projects or makes a slight bulge at the underside. The point or the bulge is then removed with a flat file.



Having inserted a thin $\frac{3}{8}$ in. diam. brass washer on the pivot screw, the latter is inserted into the trigger, a further washer being slipped on. When the trigger is screwed in place, these thin washers facilitate the movement. One could do without using them, if desired.

The trigger is worked with an elastic band, so drive a further screw for same into the overlay. An elastic band about $\frac{1}{2}$ in. long is inserted over the screws as shown by the illustration.

An Elevated End

The head end of the board is elevated with ball toes or $\frac{1}{4}$ in. discs of $\frac{1}{2}$ in. wood. One could use a $5\frac{1}{2}$ ins. long by $\frac{1}{2}$ in. by $\frac{1}{2}$ in. This would be glued along the bottom, flush with the top end.

Do not, by the way, glue the statuette figure to the trigger. When the game is not in use, the statuette can be set flat on the board "field" as shown. The pattern, of course, remains a fixture on the wood.

As a suitable finish, the "field" and runway is painted green, with the top of the overlay and sides and ends grey or red. The word "JACK" is printed on in black.

Take care to get all painting nicely finished, with even colouring.

Number Puzzle—(Continued from page 179)

unnoticed and make the result more puzzling, especially when your friend tries it himself, thinking he knows the trick—and fails.

Readers artistically inclined can paint the middle squares, where the "cut-outs" occur, black or coloured. This allows the number to show up more clearly.

It will be understood that the dimensions given need not be considered arbitrary, but at the same time it is best not to reduce the size of the cards too much or the numbers will appear so small as to make reading them difficult to those not possessing good eyesight.

It will be a good plan, too, to keep

the cards in some form of container. A stiff paper can be made into an envelope type of wallet, and even a name painted on the front. This will keep the cards clean and in place, besides giving a more professional touch.

Better still if you can find a small flat cardboard or tin box.

Beginners and expert can learn something from these MORSE CODE HINTS

READERS learning the Morse Code—and there are many interested in the subject—should find the various hints in this article helpful and refreshing. All hints are practical and based on actual experience, they will also help to make the task of mastering the code less difficult and formidable than it may seem at present.

Memorising the Code

Obtain a good chart giving the values of the code letters, numerals, punctuation marks, etc., in crystal-clear formation. Avoid using small-printed charts, such as those seen in books and diaries. Learning the dot and dash values is difficult enough without having to peer at them.

First impressions invariably stick in the mind. Good or bad, it will be the same, so make sure you get good impressions by buying a decent chart. Forget the numerals and other details; concentrate on the alphabet until you master it expertly.

There are twenty-six letters in the alphabet. If desired, you could learn the first thirteen letters thoroughly before attacking the remaining half. Rather than learn the values of the letters as they occur in alphabetical order, however, be wise and “jumble” them.

A typewriter keyboard is scientifically set out so certain letters are grouped conveniently together as they are most likely to occur in spelling words. This simplifies matters and saves time. The letters run thus:—Q, W, E, R, T, Y, U, I, O, P, A, S, D, F, G, H, J, K, L, Z, X, C, V, B, N, M. It would be a good idea to learn the letters in the same order.

Sound is Important

When memorising the dot and dash values, aim at obtaining a rhythmic sound of them rather than a graphical sense of them. You do not want to associate a letter, such as A, for example, with a mental picture of a dot and a dash. Think, instead, of its sound, which could be “dit” (for the dot) and “dah” (for the dash). These particular words represent the actual sounds closely.

The duration of a dash is, of course, three times greater than a dot. Get to be conversant with the “sounds” of each letter. Like a musician, you will be more above to “play” it on your “instrument” (transmitter) without the “sheet music” (chart). Having mastered half the alphabet, try actual words.

A friend can be a big help in

“testing” your knowledge of the signals. He “reads” the values from the chart and you write their respective letters down. Your friend, naturally, makes up a word from the first thirteen letters of the alphabet. It could be TREES, DRESSED, QUEER, WASTE, STREET, etc., if you are learning the alphabet on the typewriter keyboard principle.

If you prefer to learn the letters as given on the chart, i.e., in alphabetical order, such words as CALL, FILM, HELM, MEDAL, MILE, FADE, BACKED, etc., are possible, to mention only a few. In this way, you proceed slowly, but carefully. There is no confusion; a “clear” brain is everything.

The Equipment to Use

So much for the preliminary stage. Now for actual practice. Signals can be sent in three popular ways, (1) by a buzzer, (2) by light and (3) by a valve oscillator, the last-named being the best. The sound obtained is the nearest thing to the actual transmission sounds frequently heard on a wireless receiver, but it may prove too costly an apparatus.

You should, if possible, buy a small, reliable transmitting set. This is merely a key and buzzer mounted on a base, connected in series with a battery.

You should learn to “read” signals before attempting to send them; the transmitting will come all the easier as a result. That is why a good “assistant” is a valuable asset to the novice (see foot-note regarding records for learners).

Cheap transmitting keys are a poor investment. There is usually some amount of side-play and the contacts, not being made from a non-corroding metal like silver alloy or tungsten, soon give trouble.

Should you find that direct sound from a buzzer set proves

annoying to the rest of the household it is possible to listen to the sound by means of head-phones. These are connected across the buzzer coils in series with a high variable resistance, or a small condenser, same reducing the volume adequately. Head-phones are also used in conjunction with valve oscillator sets, too, of course.

Wrist Exercises

If you have to send your own signals, a supple wrist is wanted. A beneficial wrist exercise is to place the first two fingers on the edge of a table top and work the wrist up and down as though sending an actual signal. Another plan is to rest the wrist near the table edge and “tap” the table.

The transmitting key (when you are ready to use it) should be held in the most comfortable manner. The thumb usually goes against the side of the knob, with the third finger at the other side, slightly crooked. The first finger rests on top of the knob, overhanging it slightly.

It is the wrist which should move the key up and down—not the fingers. No movement should come

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from the elbow. For a start, make a continuous series of "dots" or transmit the letters E, H, I and S, these having dot values only. Then try the dashes, sending out such letters as T, O and M. The usual Distress Signal (S.O.S.) can then be tried, keeping it up constantly until expertly transmitted, following which the tapping of the victory "V" can be tried (three dots and a dash) to make a good mixture.

Speed in manipulation, naturally, comes with constant practice. Try to cultivate a nice, steady, rhythmic transmission. This will have to be built up by degrees. At the beginning, transmit each letter slowly, but in close uniformity. Allow a

greater pause between each letter, with longer pauses between each word.

You know *how* a letter is formed. Endeavour to recognize a letter, however, by its complete buzzing sound. Dots and dashes should be completely in the background. In time, the letters will sound to you as though they were spoken by yourself or the other operator.

That is how the signals are "received" by expert wireless operators. Learning the Morse Code amounts to learning a new, dumb, language. Like all difficult things, study and practice makes it a comparatively simple business.

Incidentally, if you have nobody to

help you, there are special "tutor" gramophone records available. One can easily reduce the speed of the records, or increase it. The correct wireless sounds are reproduced so that one soon becomes conversant with the real thing.

The records can be played on a portable gramophone or else through the intermediary of a pick-up connected to the gramophone terminals on a radio set. If such terminals are not provided, a valve holder could be obtained (secondhand).

To fix the adaptor, remove the detector valve from the set and place the adaptor in position, then replace the valve. The terminals on the adaptor are used as pick-up terminals.

A straightforward and simple method of making SMALL PICTURE FRAMES

AN artist friend of the writer makes all his own frames. Those made from picture moulding which vary from $\frac{1}{2}$ in. to 1in. in body are indistinguishably as good as if made by a professional craftsman.

The illustration shows at a glance the gadget used for a cramp; it is really a box with locking-up wedges, made from hardwood. A mitre-box, a fine tenon-saw, a pot of glue, and a piercer and hammer, are all that are required.

A Block Framework

Upon the block, or bed, are screwed firmly and countersunk, two hardwood straps each 18ins. long, and two 12ins. long. They are about 2ins. wide and 1in. deep. They are arranged as shown, the angle at "A" being dead square.

The first thing to do is to cut a

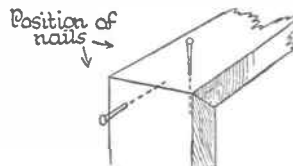
mitre, at, of course, an angle opposite to the first.

Cut and mitre another piece the exact duplicate of this, and you have the top and bottom pieces. Cut the two side pieces in the same way.

Assembly

Assemble the four pieces in the bed and tighten the wedges. If your mitres are right they will join up easily and the frame will be square. Then loosen the wedges and take the lengths out, one at a time for gluing.

The faces of the mitres could be glasspapered very lightly to give a better join, but if you do this avoid any tendency to "round" the mitre-corners.



How to nail the corners

Allow the frame to sit for a full twenty-four hours. It will then be hard-set and you will appreciate this when you come to nail the corners, as shown in the illustration. One nail at each corner is often sufficient.

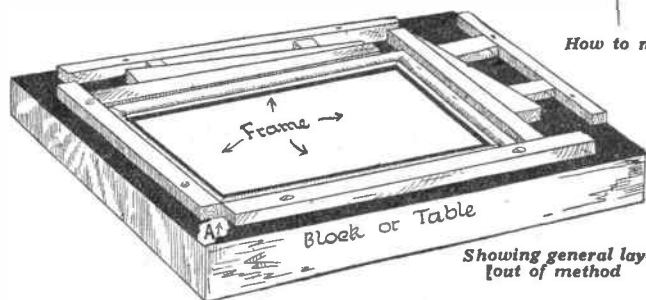
If you still find any glue protruding, wipe it off with a damp cloth. Nothing is uglier or harder to remove than glue when it dries on wood.

Finishing Hints

It is a good plan before nailing up to pierce the holes first. A word of caution here about putting in the nails. Remember that your frame, though sound and solid, is not a plank. You can again use the bed (clearing it of its wedges and filling out blocks), as a "check" when tapping the nails home. Place the frame face down.

Moulding which has a recessed or shaped back, presents a little more difficulty, but with care it can be manipulated as easily as the solid-back material.

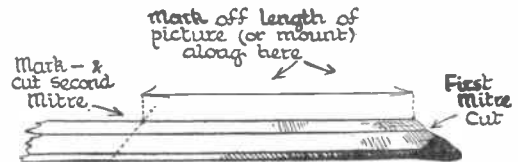
Natural hardwood, or oak, is very popular just now. So if you decide to try your skill on it first, here is a



mitre on one length of the moulding which can still be procured. To cut this first mitre put the back of the moulding against the kerf of the mitre-block and saw it through with a short and easy movement. Do not push the saw.

Having thus made the cut, measure the length of the picture (or length of the mount, if the picture is mounted), along the rebate side of the moulding. Mark and cut a second

Have the glue hot and thin, and apply it evenly and sparingly. When all the lengths have been glued and placed back in the bed, the wedges may be tightened up a little. This is to allow some playroom for it is a good plan to rub the mitre faces against each other to squeeze out any surplus glue. Then tap home the wedges until you can see that the mitres are properly meeting. Sometimes a wedge may require slackening.



Marking and cutting mitres

simple method of giving such a frame a good polish.

Rub in a little white boot polish, and after it has dried, bring it up by gently rubbing with a clean, soft cloth. You will be surprised at the quality of the finish, which will be even better with a second application. If you have followed these instructions you and your friends will be amazed at the perfect picture frames you can make.

MINIATURE BOWLS PATTERNS (See page 181)

