HOBBIES WEEKLY

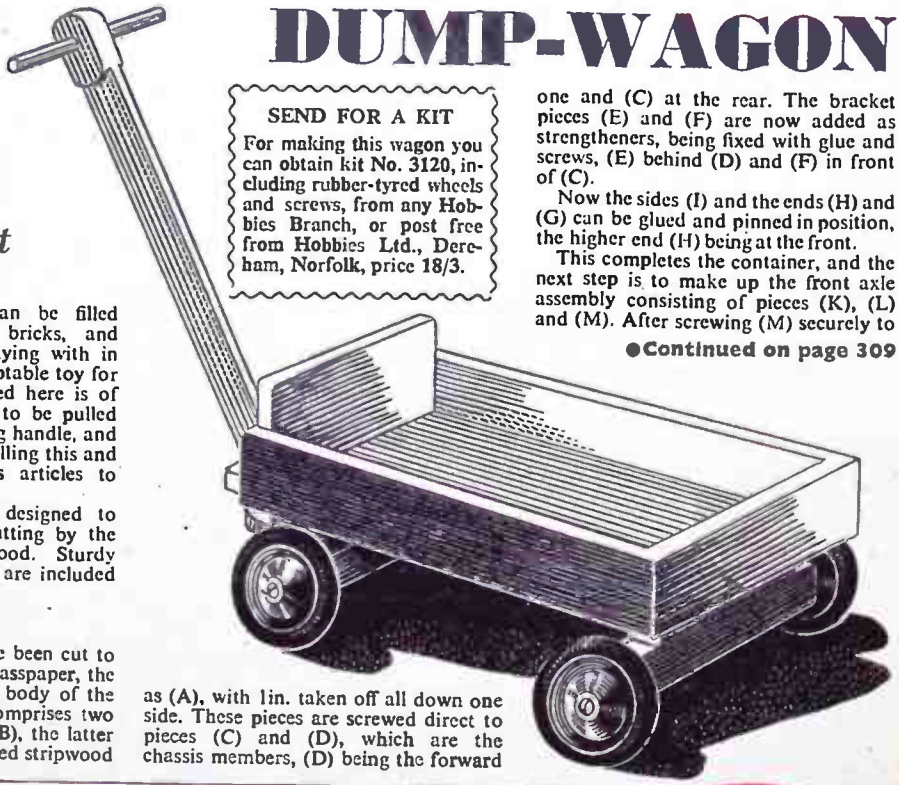
AUGUST 17th 1955 VOL. 120 NUMBER 3120

IN THIS ISSUE

Hobbies

A PULL-ALONG TOY DUMP-WAGON

Make it from this week's FREE Design Sheet



SEND FOR A KIT

For making this wagon you can obtain kit No. 3120, including rubber-tyred wheels and screws, from any Hobbies Branch, or post free from Hobbies Ltd., Dereham, Norfolk, price 18/3.

A WAGON which can be filled with sand, wood bricks, and stones, etc., for playing with in the garden, makes an acceptable toy for children. The one described here is of strong construction made to be pulled along with the aid of a long handle, and youngsters will delight in filling this and transporting their various articles to and fro.

This model has been designed to involve a minimum of cutting by the use of standard stripwood. Sturdy rubber-tyred metal wheels are included in the kit.

Construction

When all the pieces have been cut to size and cleaned up with glasspaper, the first assembly is the main body of the truck. The floor of this comprises two pieces (A) and one piece (B), the latter being cut from the same sized stripwood as (A), with 1in. taken off all down one side. These pieces are screwed direct to pieces (C) and (D), which are the chassis members, (D) being the forward one and (C) at the rear. The bracket pieces (E) and (F) are now added as strengtheners, being fixed with glue and screws, (E) behind (D) and (F) in front of (C).

Now the sides (I) and the ends (H) and (G) can be glued and pinned in position, the higher end (H) being at the front.

This completes the container, and the next step is to make up the front axle assembly consisting of pieces (K), (L) and (M). After screwing (M) securely to

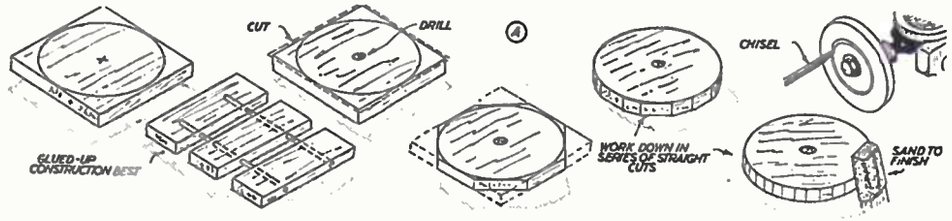
●Continued on page 309

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

MAKING WHEELS

By R. H. Warring

WHEELS for models often present quite a problem for the model maker. Bought wheels, on the other hand, can be quite expensive—sometimes more than the cost of all the materials for the rest of the model—and not always really satisfactory. The biggest trouble is that most people seem to regard making wheels as only a small detail job at the end, whereas they can, in fact, be one of the most important parts of a working model, and worth a fair amount of time and trouble spent on their construction.

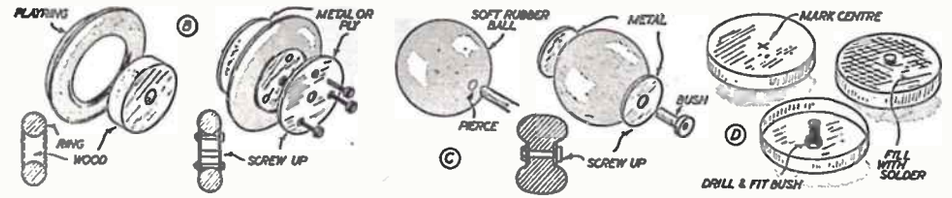


Let us start with the plain disc wheel, which might be used on a small wheelbarrow, push-along toys, etc. These can be cut from a plain piece of wood, simple enough in principle; but this method quite often yields a wheel appreciably out of round, which wobbles badly on its axle, and eventually ends its life by splitting.

Glued-up construction is far better for the basic 'square' of material, with the joints reinforced by inset dowels, as shown. If you prefer to use a plain disc, then braces glued and screwed across the finished wheel at right angles to the direction of the grain are advised, especially if the wheel is likely to take knocks.

Stages in making a solid disc wheel are shown in (A). Mark out the circle first and then drill the centre hole, taking care to get this truly vertical. The edges should then be cut square tangent to the marked circle. Next saw off the four corners, again taking these cuts right up to, or tangent to, the drawn circle. Repeat, cutting off the corners again until you have worked down to a polygonal shape, when further straight cuts would be impossible. It should then be possible to finish absolutely true with a glasspaper block, provided the saw cuts have been accurately made. This method, although seeming long-winded, is the best for cutting thick stock. With thinner stock, of course, you should be able to get equal results cutting to the circle line with a fretsaw.

To finish properly, it is an advantage to turn the wheel. Mount the disc on a nut and bolt and screw up tightly. Then place in the chuck of a hand drill, and secure the drill body in the vice, handle side up. The disc can now be spun by turning the drill, enabling you to finish and round off the edges, and also cut a groove for a 'rim' with a chisel, if required. If the latter is attempted, the chisel must be rigidly supported, otherwise you will be unable to keep it in the same place, and the resulting cut will be ragged and uneven.



A method of making rubber-tyred wheels from rubber playrings is detailed in (B). Cut a disc of wood to be a press fit into the ring. The thickness of this disc should be slightly less than the thickness of the rubber ring. Now cut hub plates in either metal or fairly stout ply of a diameter to fit midway between the disc and the outer surface of the ring. Disc and hub plates should be drilled with a centre hole and assembled on this. They can then be drilled through as one to take the three fastening bolts. The wheel is then assembled on these bolts, screwing up tight to grip the rubber ring strongly. If metal hub plates are used, a bush should not be necessary. A metal bush would, however, be advisable with ply hub plates.

Doughnut-type wheels can be made from solid rubber balls (C). Choose a ball which is fairly soft and compresses easily. Then, using a length of sharpened metal tubing, pierce a hole right through the ball, trying to get this truly axial. Metal hub plates are then cut, about half the diameter of the ball, and drilled to take a screwed bush. The bush should be as long as possible to facilitate assembly. It can be cut off flush after tightening up.

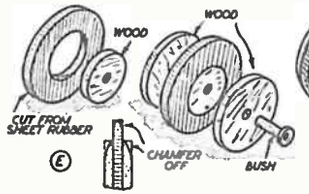
The ball is sandwiched between the two metal hub plates, and as the bush nut is tightened up, the rubber is deformed into a typical 'doughnut' wheel shape. Tighten up as much as necessary to achieve the desired effect, and then lock the nut in place, e.g., by soldering. Cut off the surplus length of bush to complete.

Another simple object which can be turned into a wheel for model use is a tin lid (D). Lids are an excellent basis for making flywheels. First mark the exact centre of the lid, spot with a punch and drill. Then fit a screwed brass bush, tightening up securely and checking the assembly for trueness by spinning on a length of wire.

Make sure that the inside of the lid (and the bush) is clean and free from grease and then fill with molten solder to the level of the rim. Set aside to cool, and when quite cold, the finished flywheel can again be checked for trueness. Balance adjustments can be made, if necessary, by drilling out solder on the 'heavy' side.

A simple way of making rubber-tyred wheels is shown in (E). A disc is cut from sheet rubber to the wheel diameter required. Then cut out the centre (about half the overall diameter) and make a wooden disc of the same thickness of the rubber sheet to fit snugly into the rubber annulus. If you are not too good at cutting circles, the cut-out in the rubber disc, and the matching wood insert, can be made square.

Two further discs are cut from wood to overlap the rubber when assembled, as shown. The whole lot should be glued up, clamping tight until set. The complete wheel should be chamfered off neatly as shown in the detail sketch, and, finally, a metal bush fitted through the hub. Properly made, such a wheel will be quite strong, reasonably light and pleasing in appearance. Thickness of the rubber sheet used for the 'tyre' can be anything from $\frac{1}{16}$in. upwards, according to the wheel diameter.

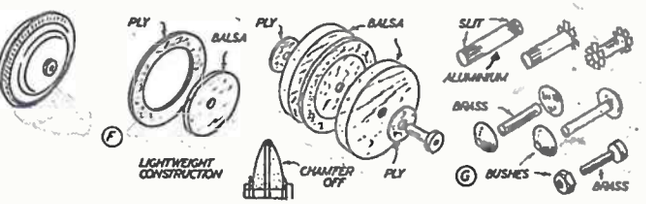


A similar form of construction can be used to make a really lightweight wooden wheel (e.g., for model aircraft) where a ring of thin ply replaces the rubber (F). The ply 'tyre' provides the wearing surface in this case. All the remaining discs are cut from sheet balsa, with the exception of the two hub discs, which should also be of ply. These carry the bush, which is fitted last of all. Assemble with balsa cement and chamfer off to finish, as with the other wheel.

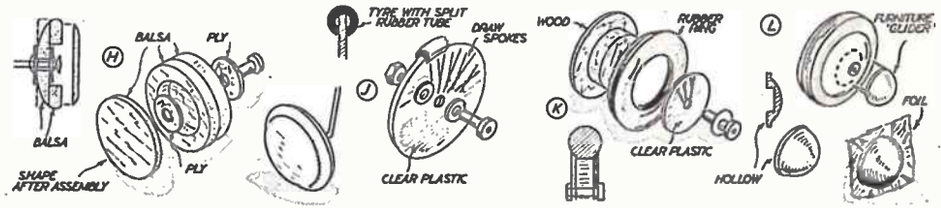
Bushes are one of the most important features with wooden wheels. No wooden wheel is really satisfactory with just a hole drilled through the centre. If the wheel is made from balsa, then the hole will enlarge and deform under even the lightest loads. It should be a rule that a 'functional' wheel, i.e., one that will be used as a wheel, should be fitted with a good bush.

Threaded brass bushes are available to suit 20, 18, 16 and 14 S.W.G. wire sizes, which cover a variety of modelling needs. Equally good bushes can, however, be made from aluminium or brass tubing. The former is particularly suitable for light model aeroplane wheels which demand a minimum of fabricating.

Cut the length of aluminium tube about $\frac{1}{4}$in. longer than the full width of the wheel, and slit the ends with a razor blade or sharp knife, as shown. One slit end is then fanned out and the bush pushed in place through the wheel. The other end is then fanned out in a similar manner to lock the bush in place. A coating of cement can be given over each end as an additional safeguard.



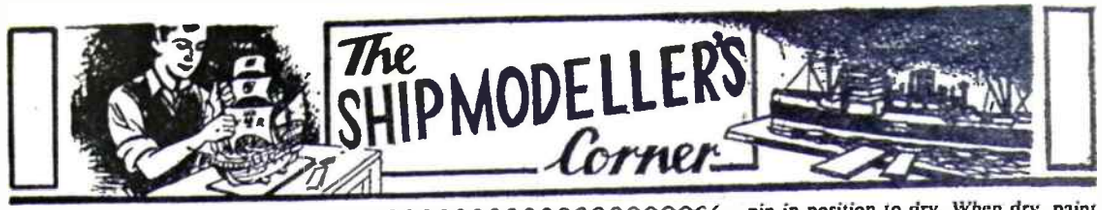
Brass tubing should be cut overlength likewise, and fitted with cup washers, soldered in place. Solder a cup washer to one end first, fit the bush and then solder on the second washer tight up against the hub. Avoid excessive overheating when soldering, as this may char and weaken the wood and result in a loose-fitting bush. Use a hot iron, but with a minimum soldering time.



Hubless wheels are very attractive on all sorts of models. The type shown in (H) is particularly suited to model aircraft, but can be duplicated in harder woods for other models. The actual wheel part, as mounted on the stub axle, is merely a disc of balsa, faced with ply hub plates and suitably bushed. A ring of balsa is cemented to this of a sufficient thickness to clear the made-off axle end (preferably a soldered washer), and a further thin disc of balsa then cemented on. When set, the whole wheel is sanded down to a streamlined shape. One important feature with a wheel of this type is to make sure that there is little or no side play. If the wheel is free to slide inwards along the axle it can drive the axle end fitting out through the outer wheel disc and ruin the whole effect.

Spoked wheels are a problem with many scale modellers. They can be built up, laboriously, or 'mock' spoked wheels used instead. A model of a spoked wheel with a thin tyre can be cut from transparent plastic sheet of $\frac{1}{16}$in. thickness (or thicker, if the wheel is large), which is fitted with a suitable bush. Use fairly large washers on either side of the disc to back up. Before assembling, the spokes can be drawn on with indian ink or thin black dope, using a ruling pen and a straight-edge. The tyre is rubber tubing of appropriate size, split along its length and cemented in place with a rubber solution or latex cement (J). Alternatively, for a 'motor-car' type spoked wheel, the wheel can be built up with a rubber tyre, as in (K), using a clear plastic disc on the outside of the wheel, again with the spokes drawn with indian ink.

With model cars, a frequent bad point is leaving the ends of the axle visible and protruding through the wheels—quite unlike scale practice. Suitable hub caps can often be found in the shape of furniture 'gliders' (as fitted to the legs of tables, etc.) which need only pressing in place. Failing this, the hub caps can be carved from balsa, hollowed out to clear the axle fitting and cemented in place. If you care to go to the extra trouble, balsa hub caps can easily be 'plated' by covering with tinfoil. The balsa hub cap is finished perfectly smooth with two or three coats of grain filler and the tinfoil then moulded to shape. Attach with a rubber solution before finally cementing the hub caps carefully to the wheels.



THE 'ROYAL PRINCE'
Part 2 — Carvings and Decorations.

By 'Whipstaff'

IN approaching this part of our model we have to decide exactly how much detail we want to incorporate. If our model is to be only a beautiful decoration for the home, we can follow the kit directions, using glue as the modelling material.

In my first model from this kit I used this method, substituting plastic wood for the actual modelling material. As I continued with my series of models I began to aim at more and more historical accuracy and improved craftmanship. It is my intention in this series to cover the various methods I have used in making three models from this particular kit, from the first model

Fig. 1

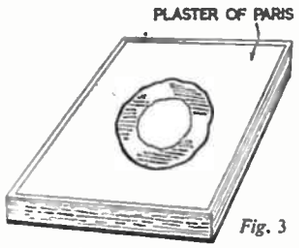


Fig. 3

of twenty years ago to the last model based on the latest research details. Readers can then use the methods best suited to their own requirements.

In Fig. 1 we have a drawing of the type of porthole wreaths of the period and we will now try the various methods of making these. The first method of using plastic wood has been mentioned already and needs no further description, merely the following of the kit instructions.

In the first place, instead of cutting the rings in thin wood as in the design, I suggest you cut them in Bristol board; this can be easily done by sandwiching several layers of Bristol board between two pieces of the plywood and cutting a large number together. The purpose of using Bristol board instead of wood, as a base to build our carvings on, is to enable us to bend the rings to the contour of the hull where necessary. Having carved our hull to show the correct tumblehome, you will find that some of the wreaths will have to be gently bent to bed down flat against the hull. This is best accomplished by bending them before they are set and pinning them in position on the hull. They are then left and the pins removed after they are set. They can be taken off

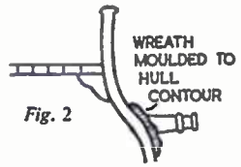


Fig. 2

the hull and painted and gilded before finally gluing into position.

In my second model I used the following method for making the wreaths. Having cut my rings, I obtained some barbola paste and rolling a small portion out to form a sheet about $\frac{1}{16}$in. thick, I cut the individual shapes out with a tiny steel stencil knife (a small home-made needle chisel is excellent for this purpose). The pieces are then applied to the ring and the final shaping done with a small sharpened piece of boxwood from an old ruler. Keep the shaping tool moist by dipping in water. The details are quite easy to model in this way. Add pieces A and B last.

Leave to partly set and then while still pliable bend to the hull shape and pin in position to dry. When dry, paint and gild and glue into final position. The effect gained in this way is quite authentic and gives your model a really professional finish.

On my third model I made my wreaths in the authentic manner, by actually carving them from boxwood, those with a slight curve to meet the shape of the hull being steamed and pinned in position to dry before carving. The boxwood used was planed to 3/32in. thick. For this work I used small home-made chisels and gouges, to supplement the excellent 'Xacto' tools, for the extra fine details.

Those who want to reproduce a number of wreaths quickly can carve one wreath and then proceed to cast the remainder from this master wreath, using dental plaster of paris. To do this make a box as in Fig. 3, some 2½ins. square and about ½in. in depth.

Fill with liquid plaster and when partly set give the original carving several coats of 'Three-in-One' oil as a parting fluid and press into the soft plaster. When the plaster has set this will give a mould from which to take castings. The mould must be liberally treated with 'Three-in-One' oil before each casting.

Pour in liquid plaster and before it sets place one of the Bristol board rings over the cast to form a base. Remove by means of this base before the plaster is quite set and gently pin in position on the hull to dry. This must be done before the plaster is set in order to accommodate the tumblehome curve of the hull, and can only be done if the card base is added. You will find the plaster sticks quite firmly to the card and if handled carefully no difficulty will be experienced in obtaining the slight curve necessary.

In our next article we will make our figurehead and consider the various methods we can use to make the elaborate carved stern and final carved rails, etc.

For Your Bookshelf

Modelling Tudor Ships
by R. K. Battson

THIS is Mr. Battson's survey of development in English ship building during the reigns of Henry VIII and Elizabeth I, a period which included the establishment of the Navy on a permanent basis and saw radical changes in naval armament. This is a book which will be appreciated by and prove a great help to all ship modellers.

Published by Percival Marshall & Co. Ltd., 19-20 Noel Street, London, W.1— Price 4/6.

Some advice from E. S. Brown about

The Care of Vacuum Cleaners

THE cylindrical type of vacuum cleaner is very popular and efficient, and an occasional check-up and minor overhaul will be amply repaid with long and trouble-free service.

The efficiency or otherwise of the cleaner largely depends upon the correct functioning of the motor, for a slight drop in the revolutions will have a marked adverse effect on the displacement of air which forms the partial vacuum in the delivery tubes.

After long service, the brushes of the motor will doubtless require attention and possibly replacement, while the commutator will also require a certain amount of attention. If either the brushes or the commutator are in poor condition, the motor cannot possibly attain its full efficiency and will result in the vacuum cleaner giving unsatisfactory service.

To gain access to these parts, the end cover through which the air exhausts is removed. This is usually retained into position by two clips. On some models the clip lever is screwed into the body of the cleaner, and before releasing the clip the screws must be removed. Usually, the motor is secured to the centre of the end cover by a flexible rubber mounting, and great care must be taken when removing the cover not to damage this mounting. The opportunity should be taken of carefully inspecting the rubber mounting to see that it is in good condition, as one that is partially perished or damaged will result in a rough-running motor.

Beneath the cover is a rubber ring which likewise must be in good condition, as otherwise the suction powers of the cleaner will suffer.

Removing the Motor

When the cover has been removed, the motor should be withdrawn carefully to avoid any damage to the wires connected to the switch. The brush holders are situated on opposite sides of the commutator, and the brushes removed by unscrewing the caps. This exposes a small spiral spring beneath and this is gently pulled out together with the brush. It sometimes happens that fine carbon dust caused through the wear of the brush on the commutator clogs the brush in its holder and renders removal somewhat difficult. In these circumstances, the brush should be lightly pressed down on to the face of the commutator by inserting a small object such as a pencil or similar into the holder. Then alternately turn the motor backwards and forwards by moving the fan or impeller on the other end of the motor. This motion will slightly rock the brush in its holder and will ease it, facilitating subsequent removal.

Inspect the Springs

The brushes should be carefully examined for excessive wear, which reduces their effective length, and also for any cracks or similar damage. The springs also should be inspected for any breaks or loss of tension. The latter can be tested by fully compressing the spring, then releasing, when it should instantly return to its former dimensions. Should any of the above conditions prevail, then a set of replacement brushes should be installed.

The contacting faces of the brushes should be perfectly smooth, otherwise severe arcing will occur, which may eventually burn and pit the surface of the commutator.

When fitting new brushes, they should slide snugly into the holders without binding at any point. Should this occur, the sides of the brush should be very slightly eased with fine emery paper.

The brushes are made with a graphite content to ensure self-lubrication on the surface of the commutator, which would otherwise suffer from excessive wear. After long service, the segments in the commutator tend to become clogged with deposits from the brushes, and they must be cleaned by lightly drawing along them a piece of wire, with the end sharpened. As one segment is cleaned the armature should be turned for the next.

The commutator is cleaned by applying a cloth dampened with petrol to its surface, meanwhile turning the armature by means of the fan. The cloth should be frequently turned to a clean portion and dampened with further petrol as necessary. If the surface of the commutator is in a very bad state, it should be cleaned with very fine emery paper, afterwards finishing with a clean cloth. A deposit of fine dust tends to form in and around the motor. This must be removed with a soft brush, paying particular attention around the bearings. When the motor is reinstalled, make certain that the end-cover ring is snugly fitted into it, and also that the rubber motor mounting is correctly located.

The connecting joints in the delivery tubes must be an accurate and tight fit, and the flexible hose must also be in good condition. If there are any breaks in the latter, the suction will be badly affected, with subsequent poor cleaning results. If there is only a small break in the hose, it can be repaired with a strip of adhesive oxide plaster or empire tape but if the hose is in generally poor condition, a replacement should be fitted.

Repairing the Dust-Bag

The interior dust-bag should give very long service, but occasionally a seam may break away. This should, of course, be restitched with a strong thread. In the event of a tear occurring in the fabric, the best means of repair is to obtain a patch of strong thin material such as calico or gabardine, apply some Bostik 'D' adhesive to one side of the patch and the damaged portion of the dust-bag, and press firmly together when dry.

When using the cleaner, it is a useful tip to soak a sponge in lavender water and then insert it in the dust-bag. The air that is ejected from the cleaner will impart a delightful fragrance to the surrounding atmosphere. In cases of sickness, a germicide could be substituted.

● Continued from page 305

Toy Dump-Wagon

(K), the dowel (L) is then glued in position to act as a pivot in the hole in (D), thus providing the steering for the front wheels.

The handle consists of pieces (N) and (O) and the piece of round rod (P). The two pieces (O) are pinned on either side of the handle top as shown by the dotted line on the design sheet. The handle is pivoted to piece (M) by means of a 1½ins. screw.

The wheels are secured by screws which are supplied in the kit complete with washers. Note that before inserting the wheel screws, the axles must be bored with an appropriate sized drill, otherwise there is a danger of the wood splitting.

Remember that kiddies love the bright reds, greens, yellows and blues when finishing off your work with painting.

A SHOE CUPBOARD

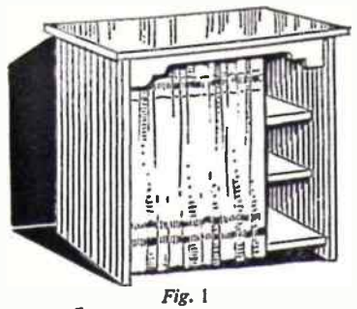


Fig. 1

SHOES and slippers are often the cause of untidiness in the home if there is no definite place in which they may be kept. The answer is to make a cupboard, with racks or shelves for the shoes, etc., and the sketch shows an excellent example, complete with a sliding curtain as cover for the front.

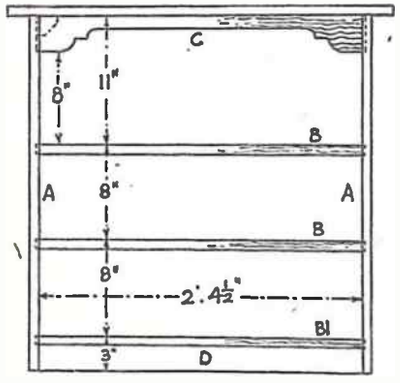


Fig. 2

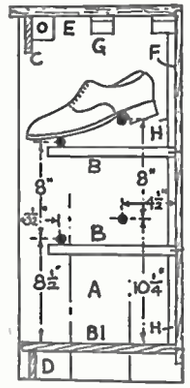


Fig. 3

The cupboard consists of two ends which are connected by three shelves and a top, while a wooden back is helpful to exclude dust. A narrow, shaped rail enhances the front appearance and behind this a rod is fitted to allow the curtain to be drawn aside.

Figs. 2 and 3 show front and cross-section respectively, while Figs. 4, 5 and 6 give enlarged diagrams of construction. In the section Fig. 3 is shown an alternative method of supporting the shoes, etc. They may be placed on the three shelves, or they may rest on cross-rods fixed into the ends of the cupboard. The latter method is to be recommended, as it gives a free circulation of air all round the shoes, the lower shelf, or floor, again being useful for slippers, etc. There is sufficient room for at least nine or ten pairs of shoes in the cupboard.

Deal is suitable for the cupboard, with planed grooved and tongued boarding in narrow widths for the back (F) or, if desired, a sheet of plywood.

Commence work by making the ends (A), two pieces of ¾in. wood 30ins. long by 14ins. wide being required. This width could be made up by gluing together three grooved and tongued boards, the outer edges of the front and back boards being planed down to present flat surfaces. The two shelves (B) and the floor (B1) are to be slotted ¾in. into the ends (A), and the three pieces will, therefore, measure 2ft. 5ins. long. Pieces (B) are 11ins. wide and made up with two widths tongued and grooved together, while floor (B1) is 13½ins. wide of three widths similarly tongued and grooved together. The slots may be cut with a fine-tooth tenon saw, care being taken to stop the housings of shelves (B) 2½ins. from the front edge. Note that the pieces (B) and the floor (B1) must stop off ¼in. from the back edge of ends (A) to allow the back (F) to be recessed, whether this be of ¼in. boards or ¾in. plywood (see Fig. 3).

Slots ¾in. deep must also be cut in at the top front of the sides (A) to take the ends of the rail (C). This is shown in Fig. 5. This rail (C), ¾in. thick, measures 2ft. 5ins. long and is 3ins. deep at the ends and 1¾ins. deep at the centre. A front rail (D), 2ft. 4½ins. long, 2½ins. wide and ¼in. thick, is glued and screwed to the underside of the floor, as shown in Fig. 3.

The back of the cupboard, of whatever material used, will measure 2ft. 4½ins. square and will be screwed to the back of the shelves and in the rebate formed along the underside of the top (Fig. 3). Before the back is fixed, however, the top must be put on. This measures 2ft. 10ins. by 15ins. wide by ¾in. thick, and it overhangs 2ins. each end as in Fig. 2. Countersink screws through the top into the ends (A), the heads being filled with plastic wood before the finishing is carried out. A few glued blocks (G) may be put inside underneath the top for added strength.

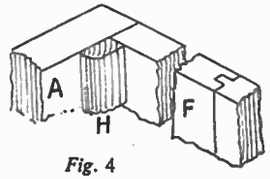


Fig. 4

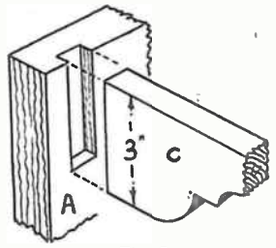


Fig. 5

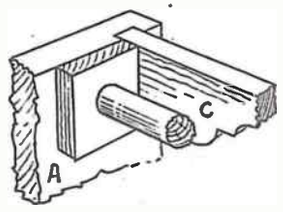


Fig. 6

If the rod method of supporting the shoes be adopted, the position of these must be set out to the measurements given in Fig. 3, and holes made with a brace and bit to the diameter of the rods used. The rods should be run through the sides and the ends glued into them and cleaned off flush on the outside. Six pieces of beading as (H) in Fig. 4 should be glued in the angle between sides and back.

The curtain which covers the front of the cupboard is suspended from a curtain rod which should be about ¼in. diameter and fitted into two blocks of wood about 2ins. square, as seen in Fig. 3 and in the detail Fig. 6. The curtains should hang from rings to slide easily on the rod. The woodwork should be cleaned off and finished either by painting or staining and varnishing.

(S.W.C.)

How to Analyse a Simple Inorganic Salt—Part 1

AN interesting introduction to inorganic analysis is to identify an unknown salt which is soluble in water and containing one metallic and one acid radical. The pitfalls of the insoluble and of the non-metallic compound are avoided, and the newcomer to this field of chemistry gains a clear uncomplicated insight into the basic principles. The experience gained may also have its uses, for some time a label may fade on an infrequently handled bottle; one may remember only that it was a salt, but the methods given in this article and a sequel may identify it. Again, when buying up some lot of second-hand chemicals, neglected labels may be found.

It is suggested that a friend of similar pursuits give you a few grams of a water soluble salt from his own laboratory or from your own shelves.

The colour of the salt may give one a hunch. Hunches should not tempt one to try out a few tests to confirm the hunch. Such a procedure usually leads one astray. Only systematic testing can be relied on. Colours are merely confirmatory of what the systematic testing has revealed.

Two Processes

The analysis of a salt falls into two processes: the detection of the metal (or metallic acting ion, such as ammonium), the detection of the acid ion. Certain reagents will arrange metal and acid ions into groups. The search is then narrowed down by testing for each ion in that group. To ascertain the metal first is simplest.

Dissolve about a gram of the salt in 20 c.c. of distilled water. For brevity, this will be referred to subsequently as the original solution. Pour a little into a test tube and add a few drops of dilute hydrochloric acid. If a white precipitate forms, silver, lead or mercurous mercury is present. The metal present may be recognised by the action of ammonia on the precipitate. Let the precipitate settle, pour off the upper liquid and then add enough ammonia to the precipitate to give a strong smell. If the precipitate dissolves, silver is indicated; no change occurs in the case of lead, whereas mercurous mercury is revealed by the blackening of the precipitate.

If hydrochloric acid has produced no precipitate, boil the solution and pass in hydrogen sulphide until the liquid smells strongly of the gas. A black precipitate indicates the presence of copper, bismuth or mercuric mercury; a yellow precipitate, cadmium; a yellow to yellowish-brown precipitate, stannic tin; a brown precipitate, stannous tin. Arsenic and antimony compounds give yellow and orange precipitates respectively, but these are unlikely to be found in the home laboratory; methods for their detection will, however, be given.

Finding Individual Metals

To ascertain the individual metals where a black precipitate has been formed, take a little of the original solution and add sodium hydroxide solution. The colour of the precipitate formed characterises the metal present, as follows: blue, copper; white, bismuth; yellow, mercuric mercury.

Cadmium is distinguished from stannic tin by filtering off the precipitate, washing it on the filter and introducing a little of it into a test tube. The addition of ammonium sulphide will leave undissolved the precipitate in the case of cadmium, but will dissolve that from stannic tin. Since an arsenic precipitate would also dissolve, add drop by drop a solution of sodium hydroxide to some of the original solution. In the case of stannic tin a white precipitate forms which dissolves as more of the reagent is added. No change occurs in the case of arsenic.

An orange antimony precipitate may be confirmed by its solubility in both ammonium sulphide and in sodium hydroxide.

Where no precipitate has been formed by either hydrochloric acid or hydrogen sulphide, add ammonium sulphide to some of the original solution. A black precipitate indicates iron, nickel or cobalt; white, aluminium or zinc; flesh coloured, manganese; green, chromium.

Iron, nickel and cobalt can be differentiated by adding potassium ferrocyanide solution to the original solution. Ferrous iron gives a white precipitate rapidly turning blue; ferric iron, a Prussian blue precipitate; nickel, a light green precipitate; cobalt, a dirty blue precipitate. Aluminium is distinguished from zinc by the filter ash test. Moisten a piece of filter paper with the solution and place a drop of cobalt nitrate solution on the paper. Dry the paper and heat it in an open crucible until it is converted to ash. In the case of aluminium the ash obtained is blue, whereas with zinc it is green.

If no metal has yet been detected, add ammonium carbonate solution to some of the original solution. If a white precipitate forms, barium, strontium or calcium is present. Boil the liquid, filter off the precipitate and wash it well on the filter. Transfer some of it to a watch glass and add a drop or two of dilute hydrochloric acid to dissolve it. Dip a platinum wire or asbestos thread in the solution and hold the wire or thread in a non-luminous flame. A green coloration in the flame indicates barium; crimson, strontium; dull red, calcium.

To further differentiate strontium and calcium add potassium chromate solution to some of the original solution and let it stand awhile. A slowly forming yellow precipitate shows strontium to be present. Calcium produces no precipitate.

If a blank has still been drawn, there remain only five possibilities and these are easily resolved. Add sodium carbonate solution to some of the original solution. A gelatinous white precipitate indicates magnesium. Confirm this by adding sodium hydroxide solution to some of the original solution, when again a white precipitate is formed.

Heat to Boiling

To be tested for now are sodium, potassium, ammonium and lithium. Add sodium hydroxide solution to some of the original solution and heat to boiling. An odour of ammonia indicates ammonium. If no odour is noted, add disodium hydrogen phosphate solution. A white precipitate indicates lithium.

Sodium and potassium can be distinguished by adding sodium cobaltinitrite solution to a little of the original solution. Potassium produces a yellow precipitate, sodium does not. Dip a platinum wire or an asbestos thread in the original solution and hold it in the flame. Sodium colours the flame intense yellow.

The metal or metallic acting radical having now been detected, the acid radical has next to be sought. A further article will give simple methods for establishing its identity. (L.A.F.)

In photography - It's the

MAN-BEHIND-THE-CAMERA WHO COUNTS

Says E. G. Gaze

IT is often said that the 'camera cannot lie', that it can only record mechanically the subject matter before it. And, putting aside 'trick' photography, it is true that the image which your light-sensitive film supplies is a reproduction of the scene within the angle of view of your lens—neither more nor less.

The very casual family-on-holiday type of 'snapper' accepts this power of the camera 'eye', the lens, and expects nothing more from it when the shutter is clicked. Barring mishaps 'something will have come out' when they collect their prints from the chemist's. They use their cameras merely as mechanical means of making a record of some scene—and it is only a record, it shows it happened and nothing more. They get pleasure from looking back over their records, but the prints hold little to interest other people.

If they see photographs which, whatever the subject matter, make them pause to stare and admire they say, 'Must have had a better camera than mine!' And yet the casual snappers given the very finest, modern camera and instructed in its use would most likely still find that a 'better camera' or a 'more expensive one' alone will *not* produce a final print such as the one they admired.

And so, if the camera doesn't lie and only reproduces what lies before its lens—and if a more expensive camera

Fig. 1—A mere 'record snap'—no more

Fig. 3—The sort of postcard view you would buy in a local shop—not very interesting and rather a jumble

itself doesn't automatically produce an eye-catching, interest-holding picture—what is the essential ingredient in making a photographic picture as distinct from a mere 'snap'?

The answer is quite simple. It is the man-behind-the-camera who *makes* the picture. He has to see it, sense it, compose it, and then present it to his lens for it to do the job of recording what he has seen. Once manipulation of the camera adjustments is mastered, once processing technique is mastered—and that is a matter of careful attention to method of darkroom work, step by step—the 'man-behind-the-camera' is the deciding factor.

If he wants a mere record or 'snap' that is all he will get; if he aims to produce prints that have an intrinsic interest and appeal, then he must cease regarding his camera as a mere recording box of tricks. And by a 'picture' is meant a print that captures the interest and imagination of the viewer, whether he knows or is personally interested in the scene or figures portrayed.

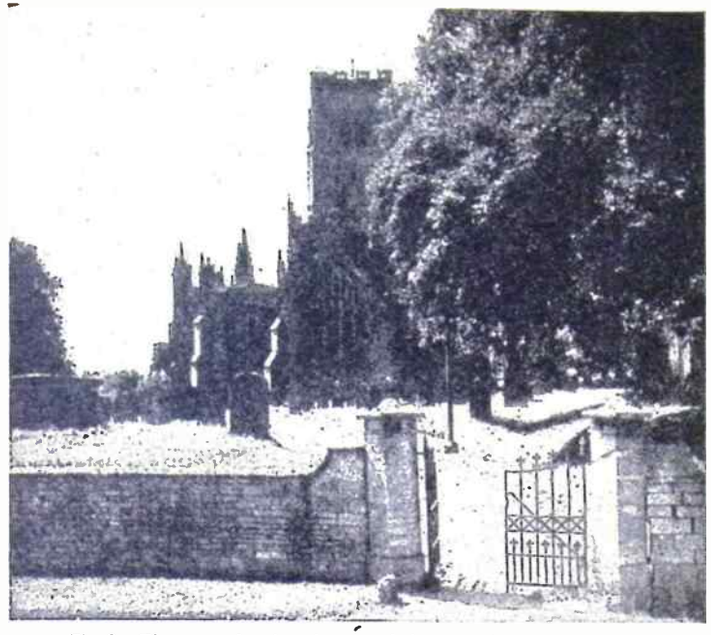


Fig. 2—The same church under same lighting conditions, but less of a 'record' and nearer to the view that caught the eye

I'm not an artist, you say; I can't draw or paint, but I know what I like, and I know when a scene appeals to me *if* I could paint it or draw it as I see it. And yet your camera can be your 'brush'—if you select and direct what the little-eye-that-doesn't-lie sees before it. The difference between a mere 'record snap' and a photographic picture is just that the first shows something as it was or as it happened, and is of little interest to anyone except the taker who likes to look back and be reminded of it, and the second is in truth a 'picture', it presents people or scenes in a way that has a meaning and interest for any ordinary viewer.

Perhaps you have an instinctive sense of what makes the 'picture', and that is invaluable. But if you have not got that sense then you can do something to cultivate it: if you can pick out a print and say, 'Now, I like that—it makes a picture', we already sense the difference between a mere 'snap' and a photographic picture.

You can go on learning and cultivating this 'picture-sense' with every spool of film you use.

Examples are better than words. Let's try one.

You come on a lovely church in a small town on a hot, drowsy afternoon. You like its tower rising above roofs and pinnacles, its tall, storied porch, the side-light on the buttresses, its traceried windows—it all seems warm and peaceful and lovely. You look in the viewfinder; yes, you can get it all in—and you 'click'.

You develop and print, but somehow 'something' is missing. Quite a clear print of the church, even of sunlight and shadows—and yet it might well be a twopenny postcard view bought in the local shop around the corner. It's a record 'snap' of the church, and nothing more: you show it to someone and add, 'That was a lovely old church, made a picture on a sunny, drowsy afternoon'—and you know your print doesn't show that itself; not the scene as it appealed to you (Fig. 1).

Go back and try again. It was the tower rising above the pinnacles, the buttresses picked out by sidelighting, a sense of drowsy sunlight, that made you stop, admire, and click your shutter.

Try to select and direct your camera lens to record what you liked about the scene. It wasn't just the church building as in your first snap (and, incidentally, getting as much of the church in and being too close meant tilting the camera and causing sloping verticals)—it was the play of sunlight, a peaceful setting with the church as the main object.

Fig. 2 shows the second attempt. Somehow it looks less like a twopenny postcard view bought in a shop—it begins to look more like the scene in your mind's eye, sunlit and drowsy and a pinnacled old church. But there were

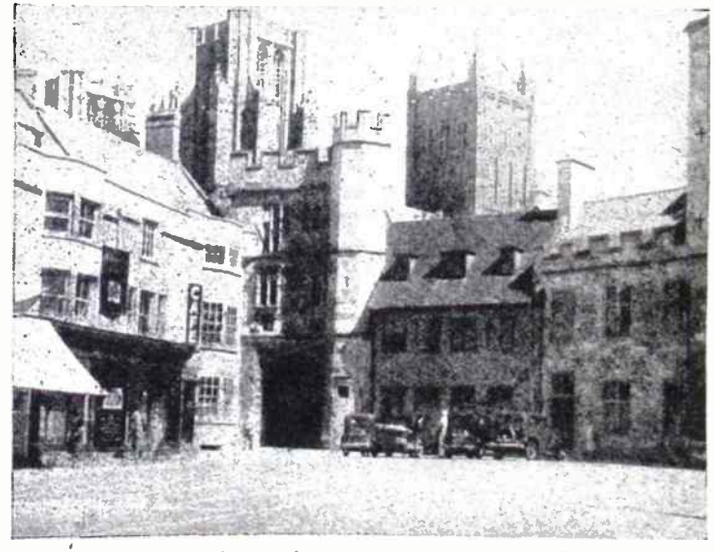


Fig. 4—The second attempt—an improvement on Fig. 3

fleecy clouds against the blue sky; if you'd thought to use your yellow filter you'd have got them out on the negative—and they showed and added to the sense of drowsy warmth against the

● Continued on page 316

These Dovetail Markers will Save Time and Trouble

THE dovetail markers illustrated here will save much time and labour for the woodworker.

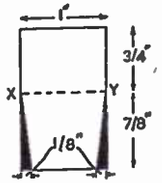
Fig. 1 shows the detail of such a marker made out of a piece of tin. With tin snips and file, remove the waste corners and fold at right angles at XY. Press the angle closely to the end of the wood and mark along the sloping sides for the dovetails.

Use Hardwood

A marker made in wood is detailed in Fig. 2. Prepare and mark out a piece of hardwood to the sizes shown. Mark round the end with a mortise gauge and remove the waste as in cutting a tenon.

Take care to cut the sloping shoulders accurately. To get both slopes for the dovetail, the wooden marker has to be turned over.

These two markers shown will give a slope of one in seven. Other slopes can be achieved by alteration of the measurements. (K.J.)



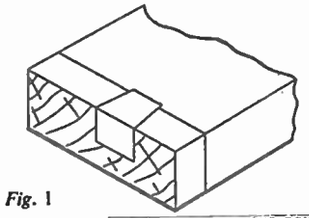
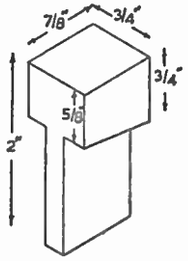


Fig. 1



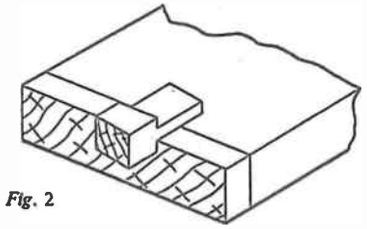


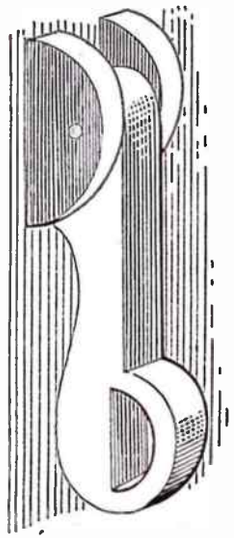
Fig. 2

An Easy-to-Make Door Knocker

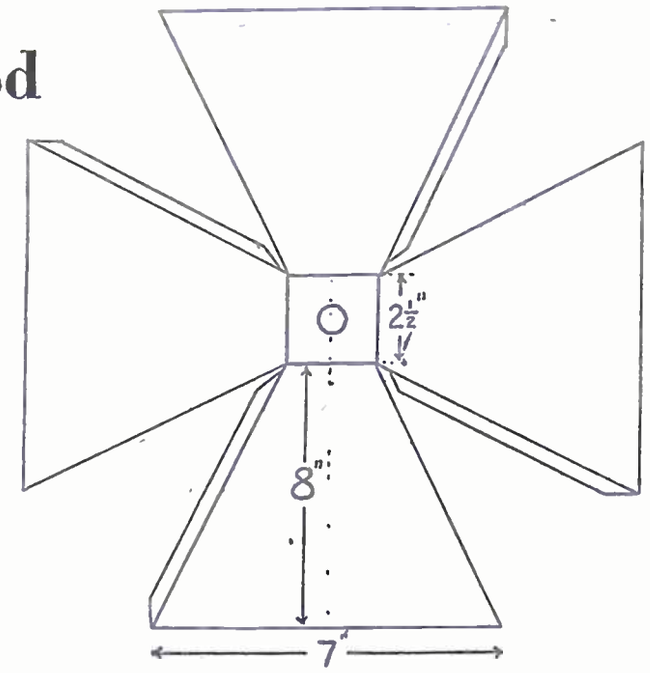
Full-size patterns are on page 319

ONLY three pieces of wood are needed for this useful knocker, the main movable piece and the two semi-circular pieces which are fixed to the door. Cut the main piece from 1in. thick wood and insert the head of a metal bolt as shown on pattern.

Two semi-circles of wood are now cut and fixed one on each side of the centre piece by means of a $\frac{3}{8}$in. diameter dowel going right through. The hole in the centre piece will be $\frac{1}{4}$in. diameter to allow it to pivot freely. Clean up with glasspaper and give two coats of varnish.



A Photoflood Reflector



SIMPLE and inexpensive photoflood lamp reflectors can be made from white cardboard. Most good stationers supply several grades of cardboard in sheets 25ins. by 30ins. or 20ins. by 25ins. The reflector shown measures 21ins. overall, but if it is impossible to obtain the larger size, the measurements may be reduced to fit without effecting the efficiency.

Score with Sharp Knife

Mark out a centre line on the card as represented by the dotted line in the diagram, proceeding to draw the shape according to the prescribed measurements. Score all lines with a sharp knife for bending, except where the waste has to be cut away. The hole for taking the lampholder may be removed by perforating the circle with a needle and gently pushing it through.

After scoring, fold the card for assembly. The lugs, or overlaps, are each coated with glue and attached inside the reflector. For additional strength a piece of scotch tape or passe partout binding may be attached at each corner.

If diffused lighting is required to soften the shadows, make a frame of similar cardboard the same size as the open end of the reflector. Leave a rim about 1½ins. wide and cover the opening with a piece of butter paper. Small Meccano angle brackets—or similar brackets fashioned from tinplate—are attached to the sides and base of the reflector. The diffusing mask may be slipped in when the occasion arises. The white card is quite effective, but if desirable, it is possible to line with a silver paper, as used for decorative purposes. (S.H.L.)

● Continued from page 313

The Man-Behind-the-Camera

blue sky. It is worth another try—we will have to go back in similar lighting conditions and have another go.

Now another example.

You enter the market square, and there's a lovely pattern of towered gateways and cathedral towers rising above horizontal roofs, all picked out in nice side-lighting. You like it and 'click'. But Fig. 3 seems a jumble—the cathedral and gateway towers seem dwarfed, there's a water fountain getting tangled up between foreground and background. The shutter was clicked in too much haste—the mind's eye saw the picture and ignored the other items, but the camera eye couldn't select and concentrate on the real impression that struck you as soon as you turned into the market square—an impression of sunlit towers and pinnacles rising above horizontal roofs. So, try again—and select and direct until your viewfinder shows what you want it to, what appealed to you. The second attempt (Fig. 4) is again less of a two-penny postcard view than No. 3. You could, perhaps, look at it several times and forget you'd been there on holiday and admire the print for its very self. You couldn't with No. 3—it's just a record 'snap' taken on holiday, a sort of postcard shop view.

Take Your Time

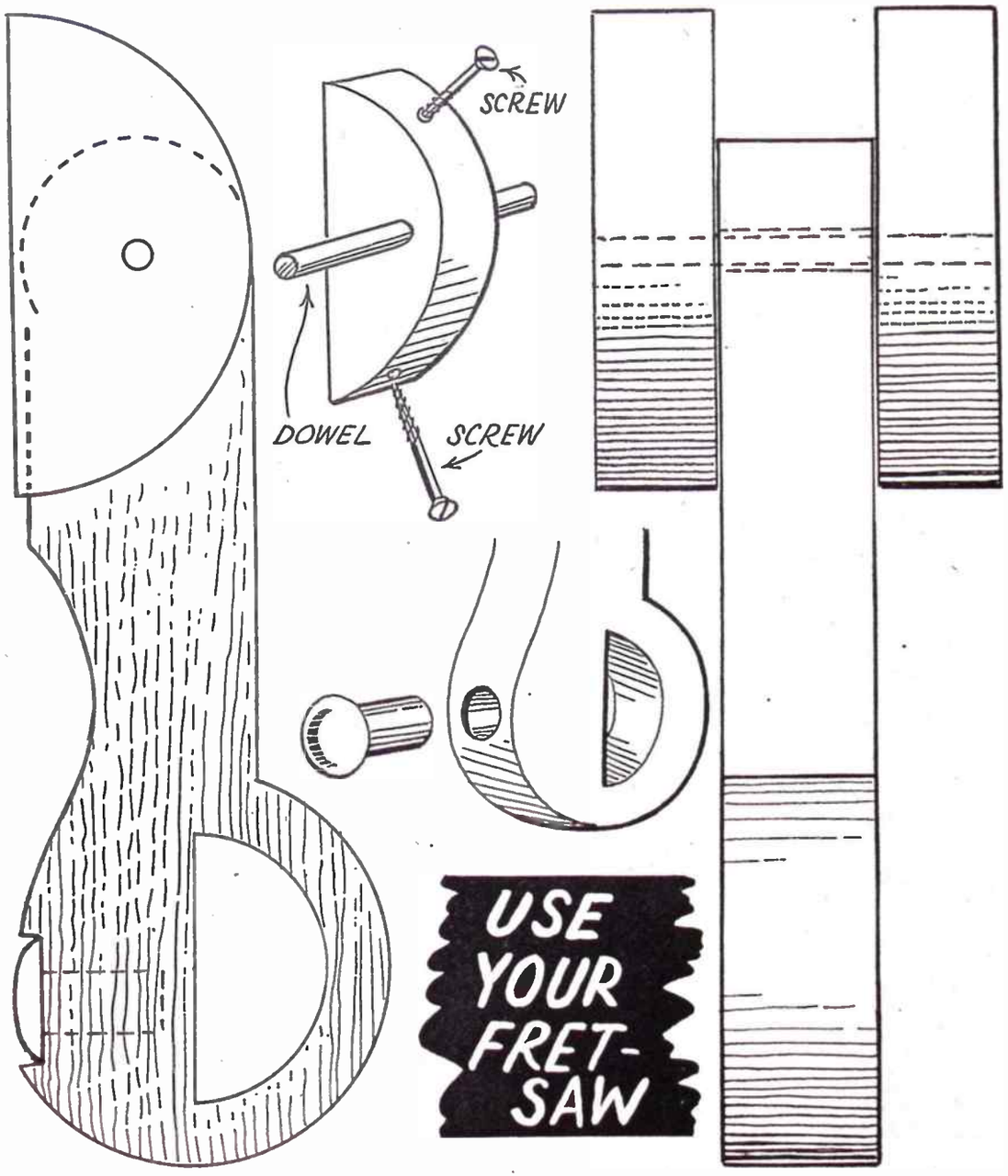
So, don't just snap at random. When a scene appeals to you, try to decide just why it does—and try to select and direct your camera eye to recording part or whole of the subject so as to emphasise the very reason why you paused to click your shutter.

Study photographic pictures in camera club exhibitions and in photographic magazines and annuals. Put aside their perfect exposure and processing technique, and try to decide why they make a picture that appeals to you—that holds the interest and makes you stop to look twice even if the subject matter itself wouldn't normally interest you.

Then look at your own prints—do they express what you felt and saw when you clicked the shutter? If not, why? Maybe if you'd been less hasty, less eager just to get a record 'snap', you'd have selected what your lens saw and recorded mechanically. Try to cultivate this method of picking and choosing, of deciding what does make the scene before you into a picture—your camera lens cannot lie, but it cannot *make* pictures for you. You have to be the 'seeing-eye', you have to select and direct—and then your lens can do the job for you, but only then.

SEE PAGE 314

Patterns for the Door Knocker



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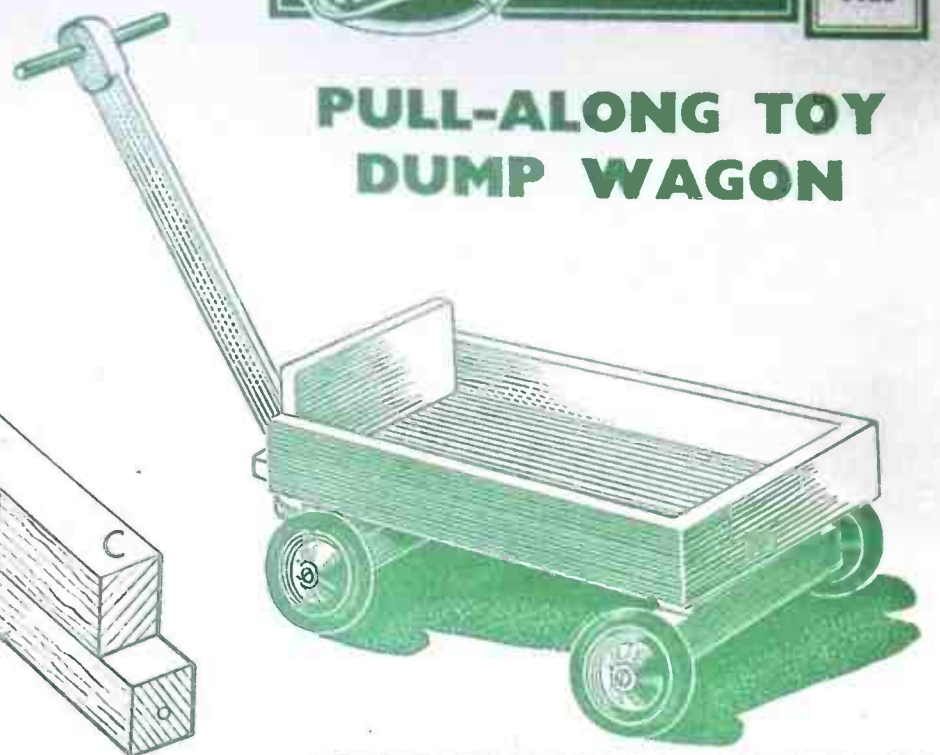
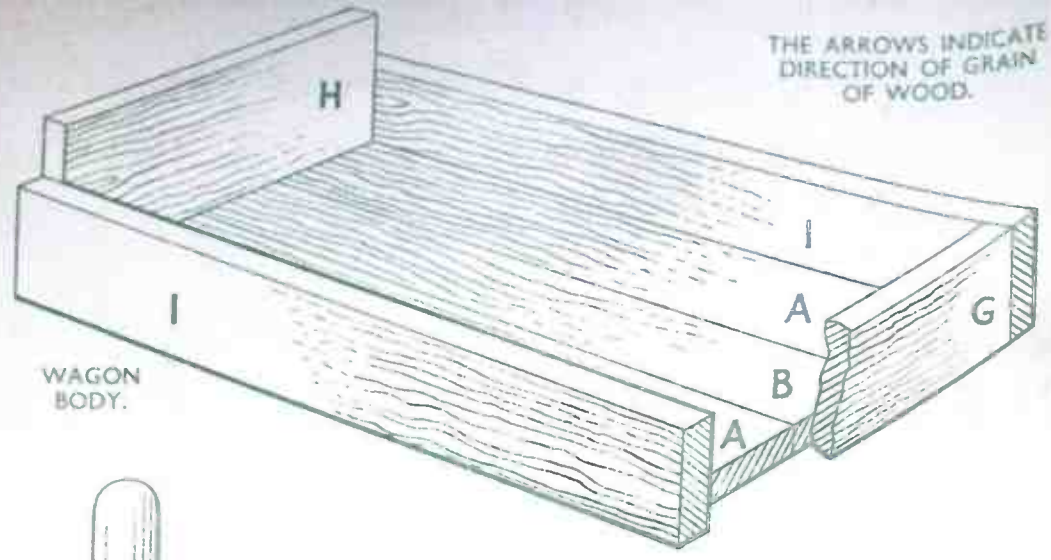
Hobbies DESIGN No. 3120

PULL-ALONG TOY DUMP WAGON



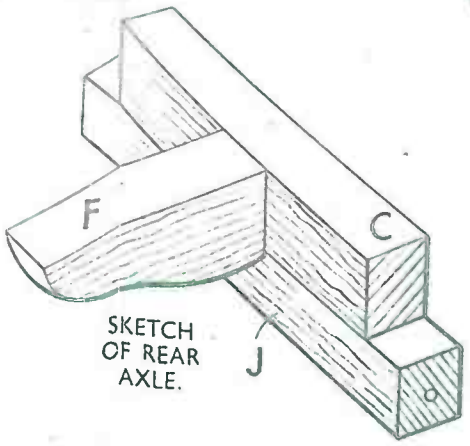
THE ARROWS INDICATE DIRECTION OF GRAIN OF WOOD.



WAGON BODY.

PIECE L. CUT ONE FROM 3/8in. ROUND ROD.

PIECES REQUIRED FOR WAGON BODY.
A TWO PIECES 13½" × 3" × ⅜"
B ONE PIECE 13½" × 2" × ⅜"
G ONE PIECE 8" × 2" × ⅜"
H ONE PIECE 8" × 3" × ⅜"
I TWO PIECES 14" × 2" × ⅜"

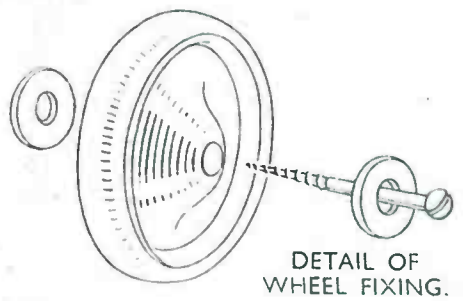


SKETCH OF REAR AXLE.

SIZE. 16ins. LONG.

FRONT AXLE ASSEMBLY.

Note—Pieces A, B, D, G, H, I, J, N, P and O can all be cut from Hobbies standard stripwood.



DETAIL OF WHEEL FIXING.

Materials required for this design

WOOD One piece 11ins. × 5ins. × 1in. (Hobbies ND16)

FITTINGS Two pieces 3ins. × 3/8in. stripwood, 36ins. long
One piece 3ins. × 3/8in. stripwood, 18ins. long
One piece 1in. × 1/2in. stripwood, 18ins. long
One piece 1in. × 1/2in. stripwood, 4ins. long
One piece 1in. × 1in. stripwood, 18ins. long
One piece 1/2in. dia. round rod, 6ins. long
One piece 3/8in. dia. round rod, 2ins. long
One set of four 3ins. dia. rubber tyred wheels complete with 2 1/4ins. × 12 gauge screws and washers

A complete kit of the above materials can be obtained from
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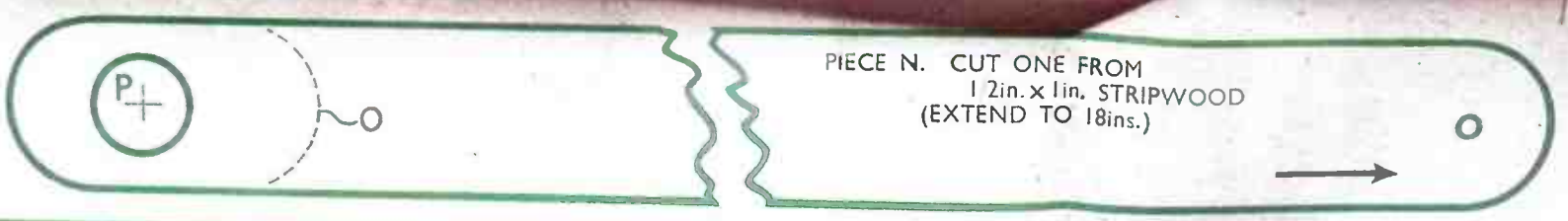
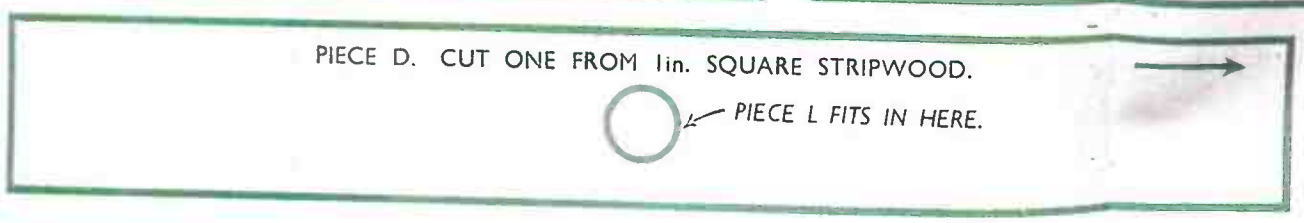
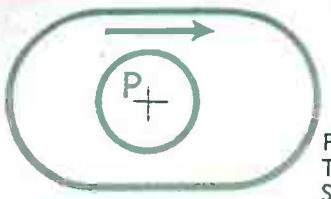
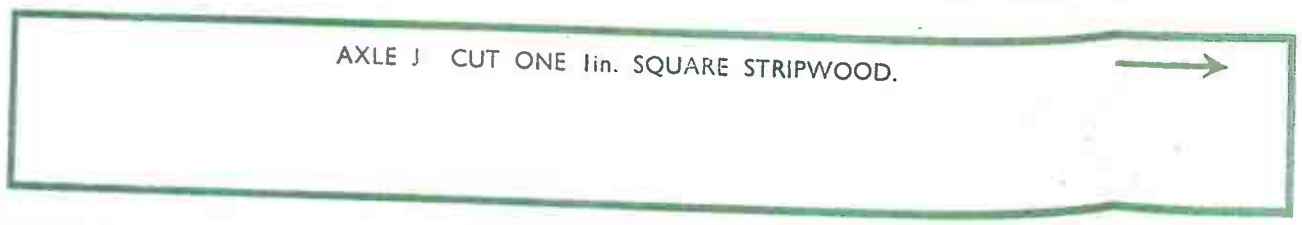


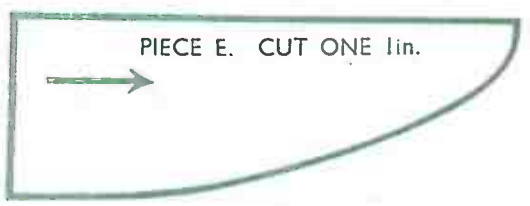
PIECE N. CUT ONE FROM 1 2in. × 1in. STRIPWOOD (EXTEND TO 18ins.)

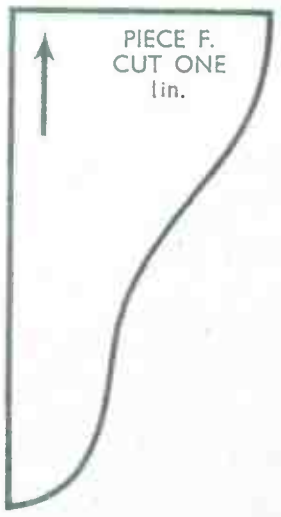


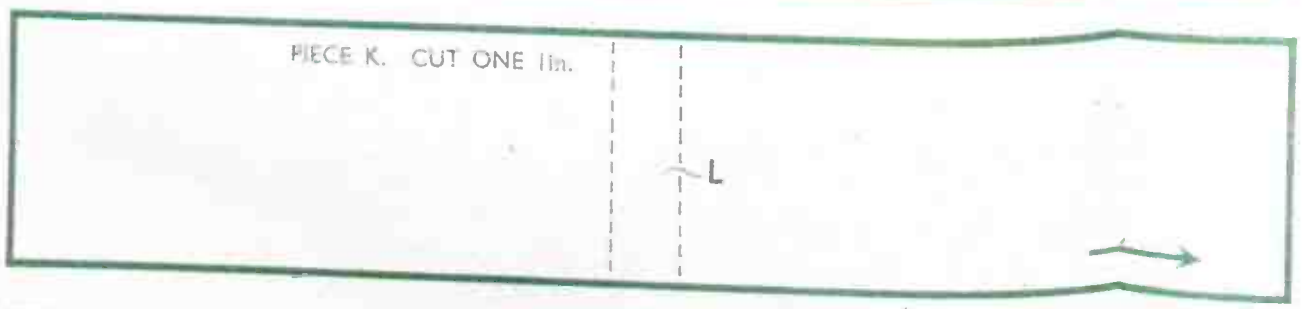


PIECES O. CUT TWO FROM 1 2in. × 1in. STRIPWOOD.









PIECE P FORMS THE HANDLEBAR. CUT ONE FROM 1/2in. DIA. ROUND ROD 6ins. LONG.