

3rd JANUARY 1962

VOL. 133

NUMBER 3447

THE ORIGINAL
'DO-IT-YOURSELF'
MAGAZINE

HOBBIES *weekly*

FOR ALL
HOME CRAFTSMEN

Extra large **FREE Plan**

MODEL GARAGE WITH LIFT

Also in this issue:

PATTERNS FOR A
FIXIE GONG

COLLECTORS' CLUB
NEW STAMP ISSUE

RADIO—ADDING
A TRANSISTOR

DISC BREAK
WITH VERA LYNN

MAKE BAS-RELIEF
PHOTO PRINTS

CHEMISTRY AND
SHIP MODELLING

ETC. ETC.



**NEW LAYOUT
FOR SMALL CARS**



**LATEST
STAMPS
FROM
ISRAEL**

(See Collectors' Club)



Up-to-the-minute ideas

Practical designs

Pleasant and profitable things to make

World Radio History

5^D

MANY readers on the pen friend list have asked for a check list of recent Soviet stamps. Here is a brief summary.

91st Anniversary of Birth of Lenin — 4 Kopeks — April 22nd.

Tabor commemoratives — May 8th.

Costumes (see illustrations) — continuation of current series. 'Georgian' — 2 Kopeks; 'Belorussian' — 3 Kopeks; May 11th. 'Estonian' — 12 Kopeks; June 8th.

Russian Fairy Tales — continuation of series. 'Konjok-gorbunok' — 4 Kopeks; 'Muzhik and Medved' — 6 Kopeks; May 15th.

Soviet Check List



Estonian

Belorussian

Georgian

RUSSIAN 'SPORTS' SET



International Labour Exposition 1961 — 6 Kopeks shows Garibaldi, Italian National Hero; 4 Kopeks shows Man Conquering Cosmos — May 24th.

May 27th, June 13th and 22nd were release dates of three further stamps honouring Lenin.

Capitals of Autonomous Republics (continuation). 3 stamps depicting 'Nalchik' — capital of Kabardino — Balcar, ASSR; 'Ulan-Ude' — capital of Burjat, ASSR; 'Suchumi' — capital of Abchaz, ASSR; May 29th.

Note: This set has great thematic value as each stamp shows the main streets of the capitals with the state emblems of each Republic in corner.

Patrice Lumumba Commemoration — 2 Kopeks — May 29th.

International Children's Day — set of 3 — May 31st.

Mechanization of Agriculture — 6 Kopeks — June 8th.

V. G. Belinsky Commemoration — 4 Kopeks — June 13th.

First Space Flight — June 17th.

Hydrometeorologic Service of U.S.S.R. Commemoration — 6 Kopeks — June 21st.

Sports — various (see illustrations) — July 5th.

This list will bring you right up to date — keep it handy.

STOP PRESS ADDITIONS

Two stamps to mark the World Youth Forum. Two others commemorate 'Teams of Communist Labour'. Other singles mark the 10th anniversary of the International Federation of Resistance and 22nd Congress of Communist Party. All were released on 28th September.

The following stamps have just arrived. 'Russian Monuments' — Another 2 Kopeks value appeared on 28th August, in honour of NIKOLAJ ALEXANDROVICH SCHORS (1895-1919), organizer and commander of the Red Army during the Socialist Revolution.

'Russian Fairy Tales' — 30th August saw the release of 2 further values. The 1 Kopek stamp depicts a scene from 'Geese-Swans,' the 3 Kopeks shows a scene from 'Fox, Hare and Cock'.

... and News from other Countries

A 1 forint stamp was issued in August, from Hungary representing JOSEF RIPPL-RONAI the famous Hungarian painter, and in September, a 1 forint stamp representing SANDOR LATINKA a Hungarian revolutionary who died a martyr's death. These stamps form part of the 1961 set of portraits.

EIRE

A special Irish stamp to mark the fifteenth centenary of the death of St. Patrick, Ireland's Patron Saint to whom Churches have been dedicated throughout the World, was issued on 25th September. The design is based on a representation of the Saint contained in a Biography of Irish Saints published in Paris in 1624 by Reverend Dr Thomas Messingham.

A further special stamp will be issued

early in 1962 marking the centenaries of the deaths of John O'Donovan, and Eugene O'Curry the distinguished Irish scholars.

SWEDEN

Commemorating the famous 'Runestone of Oland'. Release date 23rd October.

LUXEMBOURG

8th June saw the release of two landscape stamps. The 2,50 F, green depicts a central view of Clervaux, chief town of the North of the country, situated in the heart of the Luxemburg Ardennes. It shows the medieval castle, the modern parish church, and the abbey of St. Maurice and St. Maur towering over the wooded glens. The 2,50 F, blue and grey, features the tourist centre of Ettelbruck.

A Luxembourg CEPT commemorative has also been issued.

AUSTRIA

A set of stamps marking the '15th Anniversary of Nationalized Industries' was released during September. The 'World Bank Congress 1961 at Vienna' was marked on 18th September, by the issue of a special stamp.

Commemorating 150th anniversary of birth of Franz Liszt. Also 40th anniversary of Federation of the Burgenland (both October).

NETHERLANDS

1961 Child Welfare stamps (5 in set). Released 30th September.

On 18th September a special stamp commemorating the Economic Commission For Latin America was released by United Nations.

ADDING A TRANSISTOR

WHEN more volume is wanted than can be obtained from a single transistor, a further transistor may be added. This can easily be done with the 1-transistor circuits so far described, in order to make a 2-transistor receiver. It is also possible to add a 2-transistor amplifier to a 1-transistor receiver, so that there are three transistors in all.

In reasonably favourable circumstances, two transistors can give good speaker reception of local stations. In unfavourable conditions, two transistors will be insufficient for this purpose, but will allow good phone reception.

A directly coupled circuit for two transistors is shown in Fig. 9, and it requires very few components indeed. Its main disadvantage is that two separate batteries are needed, but these can be very small — a single cell for 1.5V., and a 2-cell battery for 3V. To switch off, a double pole switch is needed, with one section wired in series with each battery.

In Fig. 9, a white spot transistor is used as detector. It is quite in order to use another red spot (A.F. type) transistor here instead, and to add a diode detector

than 1 μ F is not much recommended, or results will tend to sound a little high pitched. Miniature electrolytic condensers, of about 2 μ F to 8 μ F, are often used.

Actual results obtained with this type of circuit are again somewhat variable. This is because the base voltage is obtained from single 100K resistors, and thus depends on the internal leakage of the transistors.

This type of coupling is often used, and a circuit is shown in Fig. 10. Only one battery is required. This will usually be 3V. to 4.5V. for phone reception, or 7½V. to 9V. for speaker listening.

A crystal set, or diode detector, may be connected to the 'Input' points. If the signal from the crystal set or diode gave good phone volume, satisfactory speaker reception should be obtainable. The amplifier may, of course, be used to boost volume for loud headphone reception.

The transistors can be red spot types, or almost any audio amplifier transistors, including surplus. This type of circuit is often used in compact receivers designed to use as few components as possible. The value of the coupling condensers is not very important, and may be about 0.25 μ F to 8 μ F. However, less

Volume control

When more than one transistor is used, it will probably be necessary to provide a volume control, especially if an efficient aerial and earth are available.

One method of doing this is shown in Fig. 11. If a crystal set has been used to feed the transistor amplifier, this means that the volume control is connected in place of the headphones. It is not necessary to use the exact value shown.

The volume control may have a switch. If so, tags for the switch will be found on

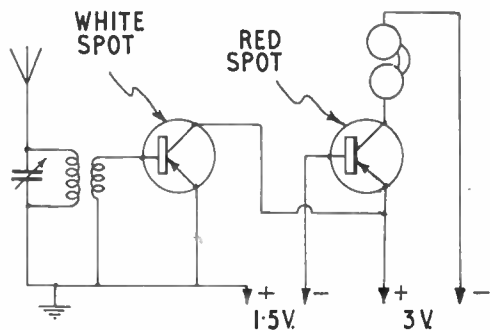


Fig. 9—Directly coupled detector and amplifier

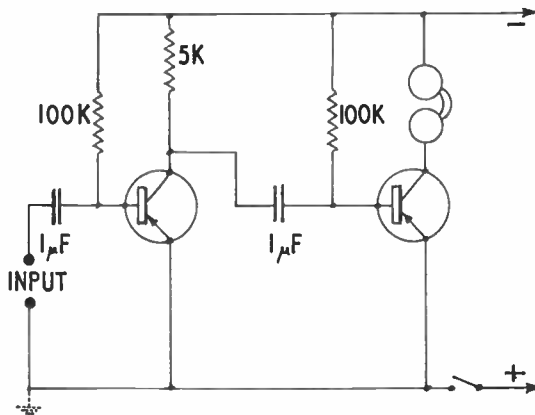


Fig. 10—Two-stage amplifier with condenser coupling

as shown previously in Fig. 4. If the white spot transistor is not in very good condition, the diode detector with it will improve results.

This circuit will work well with some transistors, but is not so successful with others, due to the effects of the direct coupling. If two red spot transistors are used, for example, it may be found that results are much better with one of the pair used in the first stage. With a reasonably effective aerial and earth, moderate speaker results are possible. Good phone reception should be obtained, with a poor aerial and no earth.

The transistor coupling winding can

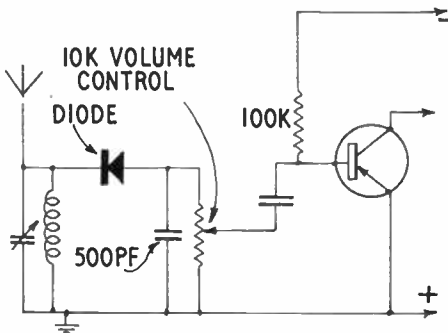


Fig. 11—How a volume control can be added

the back of the control. This switch can be wired in one battery lead. The single knob will then provide on/off switching, in addition to volume control. This arrangement is used in many receivers. If it is found that turning the volume control knob clockwise reduces volume, instead of increasing it, then the two leads going to the outer tags of the control element should be reversed.

A 2-transistor amplifier may be used for purposes other than radio reception, and it is then often convenient to add the control between stages, as in Fig. 12. Here, the 5K

fixed resistor in Fig. 10 has been replaced by a potentiometer (or volume control). It may have a switch, for the purpose already described.

A transistor amplifier may be used to amplify the signal from a gram pick-up, or from a microphone. Or it may be used in conjunction with microphones and receiver earpieces, or speakers, to make a two-way amplifier home telephone. Such circuits are also occasionally used for 2-way communication between motorcycle drivers and side-car rider.

Volume control circuits do not increase volume over that which would be obtained if no volume control were fitted. They only allow the amplification, and volume, to be reduced. There is thus little need for a volume control in a very small or single transistor set or amplifier, because the maximum amplification will probably be wanted at all times.

If size is of no importance, the usual type of radio volume control can be

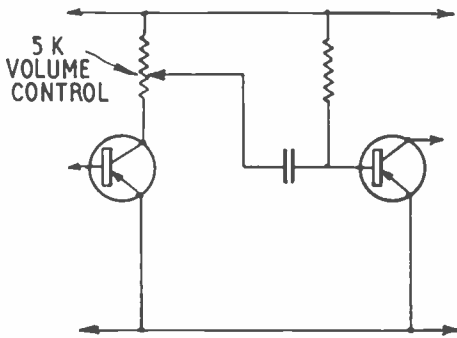


Fig. 12—Volume control in a 2-stage amplifier

fitted. But in miniature sets, the very small type of control will be wanted. One of these was shown in Fig. 3.

Emitter bias

In circuits for one transistor, it was pointed out that best possible results under all conditions, and with any transistors, can be assured by using emitter bias. Such circuits need extra components, but the cost of these is very small. With emitter bias, resistors are used to hold the base and emitter voltages at the figures which allow the transistor to operate most favourably. Such circuits thus give best amplification, and a good output, and will work satisfactorily even with different transistors. That is, they are less effected by the exact character of the transistors, than the circuits in Fig. 9, or Fig. 10.

In commercial receivers, which are expected to give good results at once, and to work correctly with any transistor of the appropriate type, such bias circuits are generally used.

A 2-stage amplifier, with emitter bias, is shown in Fig. 13. Almost any of the transistor types mentioned in the first

article of this series will be satisfactory. But for best results, the first transistor should be an AF amplifier type (of which the OC71 is an example), while the second transistor is for output purposes (such as the OC72). If transistor holders are used, it will be an easy matter to plug in any transistors which are available, and this will allow their performance to be compared. Generally, white spot, red spot, yellow/red spot, and any similar types will work well in the first stage, with yellow/green spot, OC72, and similar types in the output stage.

The amplifier may be used with a loudspeaker, or phones. If maximum output for a speaker is wanted, the 33K resistor may be reduced to 12K, and the 10K resistor in the same stage may be reduced to 2.7K. There is no point in

hissing, which spoils reception.

An output stage, on the other hand, has to deal with a much stronger signal, especially when a loudspeaker is used. If this stage introduces a little noise, it will probably not be audible, because there will be no subsequent stages to amplify the hiss.

Typical resistor values which may be used are as follows:

1st amplifier. Base, 47K and 10K, collector 3.3K, emitter 1K, as in Fig. 13.

2nd amplifier. Base, 33K and 10K, collector 3.3K, emitter 470 ohms.

Either of the above will also be suitable for an output stage which is primarily intended to work headphones.

Small output stage. Base, 33K and 10K, emitter 220 ohms, as in Fig. 13. The collector load is provided by the speaker

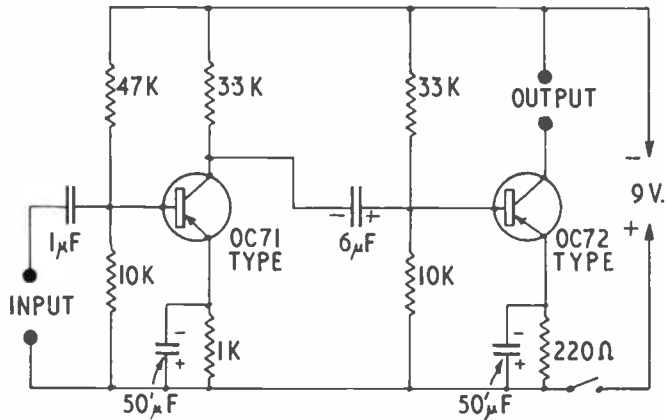


Fig. 13—Efficient 2-stage amplifier with emitter bias

doing this for phone listening.

Such an amplifier can be built on a small paxolin panel. Resistors and transistors (or transistor holders) are placed on one side of the panel, and their leads pass through small holes, so that they may be wired up on the reverse side. Insulation should be placed over leads, if these cross.

If a volume control is required, this can be added in the way shown in Fig. 12. A volume control with switch will be convenient.

It is worth noting that the resistor values which are best used depend to some extent on the exact purpose which the stage fulfils. The resistor values may be different, even when the transistors are of the same type, for this reason. As example, the first stage in an amplifier does not have to handle a very strong signal, but it should give as much amplification as possible, and not cause background noise. In an amplifier with several stages, lack of background noise is important, in early stages. If noise is generated, it will be amplified by late stages, and will be heard as a loud

or its coupling transformer.

Larger output stage. Base, 12K and 2.7K, emitter 220 ohms. Collector load as before.

Such values can be used when the best possible results are wanted, for a particular purpose. This does not mean that other values will not be satisfactory. For example, if really good phone reception is obtained, there is no reason whatever why a loudspeaker should not be used instead, without bothering to change resistors

The audio frequency amplifier part of a radio receiver can be regarded as a separate part of the equipment, merely intended to bring volume up to the level needed. So the same audio amplifier could be used with a crystal set, a diode detector circuit, a transistor detector, a regenerative detector, or any other circuit which gives an audio output (that is, a signal, such as speech or music, which may be heard with phones).

The correct types of phones and speakers to give the best results from transistor circuits will be described in the next article.

Hold-all for a Vacuum Cleaner

THE vacuum cleaner is a recognized necessity in the home, and as such, it deserves a decent home of its own — a place where all its parts can be stowed neatly and quickly.

The cylinder type of cleaner is perhaps the most awkward to house although the various attachments of any cleaner present storage problems if they are not to litter the cupboard.

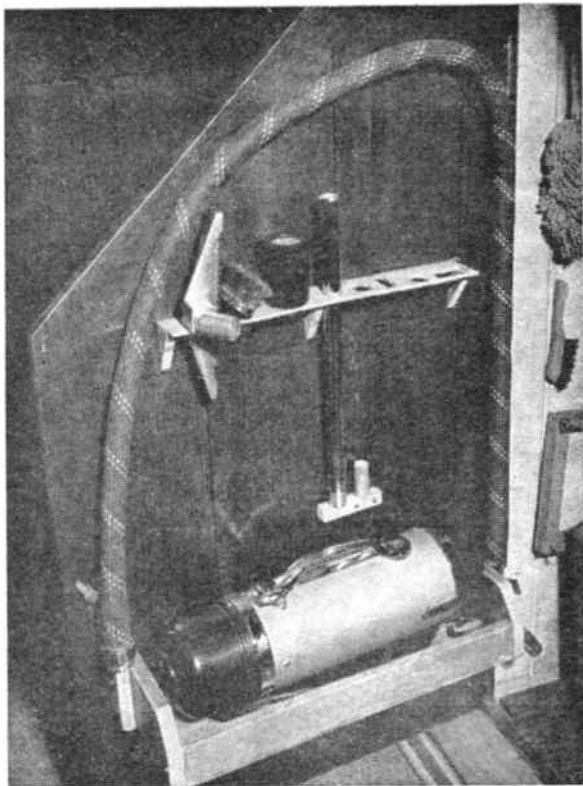
In the photograph, a useful hold-all is shown, fitted behind the door of an under-the-stairs cupboard. The compartment holding the cylinder itself should be of strong construction, from 1 in. planed deal screwed together, as the cylinder is quite weighty. The two ends should be of a fair height but the front piece is preferably made shallow. This will allow for easy extraction and replacement of the cylinder.

Do not make the cylinder a tight fit in the compartment but allow one inch clearance all round. The compartment should finally be fixed to the cupboard door, resting on and screwed to a pair of suitably sized shelf brackets.

To the side of one end of the compartment screw a short length of broom handle, into which one end of the cleaner hose will locate, as shown. At the other end of the compartment make a tongue fitting into which the metal nozzle piece of the hose will rest.

By
E. Capper

The free length of the hose is held to the door by passing it over two open-ended brass coat hooks. These are sited so that the hose forms a square with its ends sitting just nicely into their holds without any sag.

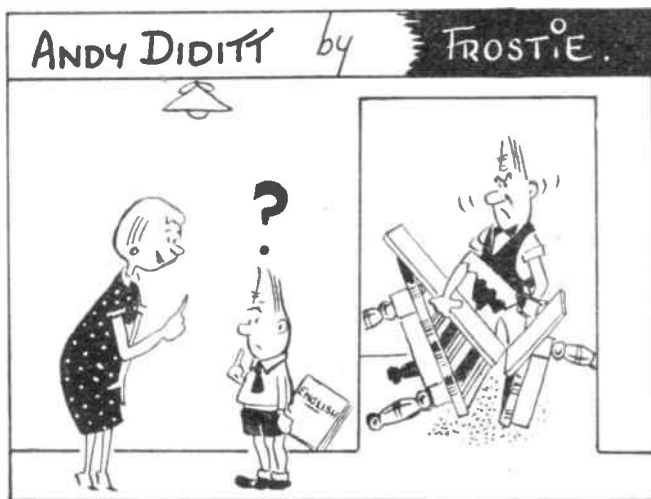


The attachments shelf itself will have to be tailor-made to fit individual items of your particular cleaner. As is shown, they are housed in a length of three-ply wood, supported by three triangular wood brackets, held to the door by screwing through the front.

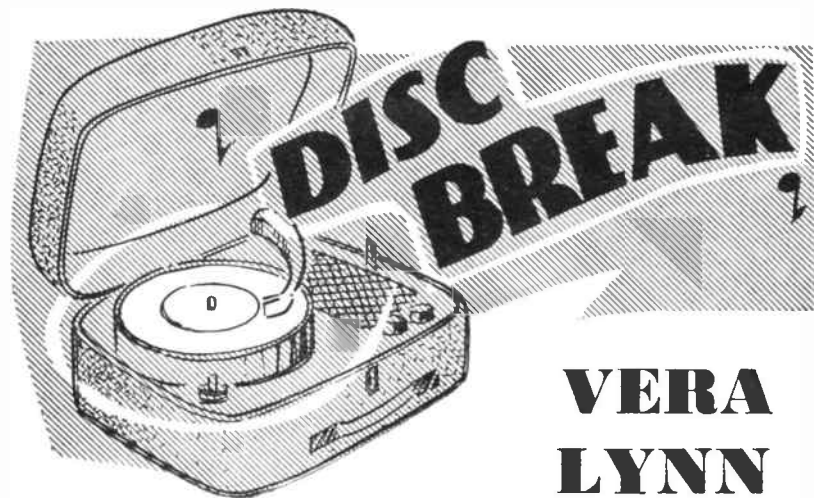
Some of the attachments in the photograph have been removed to show the construction but your shelf should be designed to hold everything connected with the cleaner. Cut out the various shaped holes for the attachments, keeping them as close together as possible, and then trim off the ends of the plywood length.

Note the central housing of the twin tubes (one has been removed in the photograph). The tubes pass through clearing holes drilled through the shelf, whilst their ends come to rest into short stubs of broom handle, fitted upright to a length of 1 in. square timber which itself is screwed to the door.

Note the location of the cylinder compartment. The end on the outside edge of the door should be set back some 3-4 in. otherwise its extended front will foul the door jamb and the door will not close. Remember that you will need a little free space just inside the cupboard to allow for the extension.



"DARLING, YOU CAN'T SAY 'DADDY'S' SAWED THE TABLE,
— IT'S 'DADDY SAW THE TABLE.'"



VERA LYNN



IF any British singer has truly earned for herself the title of 'Sweetheart of Song' it is the girl from London's East Ham — Vera Lynn. During the dark and dismal days of the Second World War the voice of Vera Lynn singing always-to-be-remembered sentimental songs was the link between tens

of thousands of servicemen and women and their loved ones at home.

The memories evoked by such well known melodies as her *We'll Meet Again* are countless, and since the war appearances on the stage, radio and television — besides the continuation of a supremely successful recording career — have kept the name of Vera Lynn shining brightly in the world of show business at home and overseas.

Vera started singing at the tender age of seven. Four years later she joined a dancing troupe, and at the age of fifteen she had her own troupe. Her first professional vocal engagement was with a dance band directed by Howard Baker. She stayed for two years and then, in 1935, made her first sound radio broadcast singing with the Joe Loss band.

This debut resulted in a series with the late Charlie Kunz. After eighteen months Vera left Charlie to take one of the major steps in her career by joining the famous Ambrose Orchestra. Regular listeners to these popular broadcasts will remember her particularly for her version of such favourite songs as *The Bells of St. Mary's*. After three years with Ambrose she left for a three-week engagement in variety and this was followed by a part in a revue at the Holborn Empire with Max Miller and Florence Desmond. During the run the theatre was bombed and the show was moved to the London Palladium where it ran for thirteen weeks.

It was at this time that Vera Lynn had, for the first time, her own programme on the B.B.C. sound radio. Entitled *Sincerely Yours*, it enjoyed nationwide success. After this followed more variety and then another show, *Gangway*, at the London Palladium.

With the Second World War in its

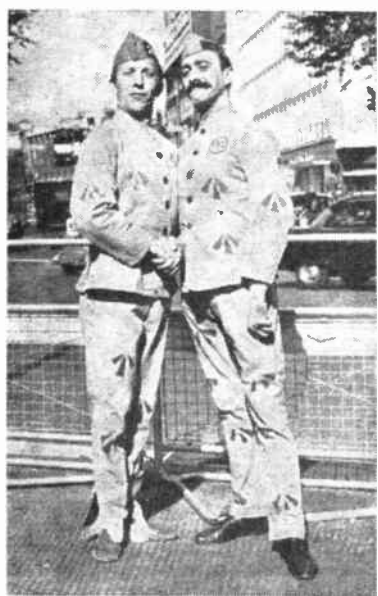
stride the name of Vera Lynn spelt magic wherever British servicemen and women were stationed. In 1944 she went to Burma to entertain the troops and after that returned to this country to 'retire'.

It was in the summer of 1951 that Vera Lynn returned to show business. She appeared in a Tallulah Bankhead 'Big Show' broadcast from the London Palladium and scored a resounding success. In the United States she repeated this success and returned to star in *London Laughs* at the Adelphi which ran for two years. It was at this time that perhaps her biggest record success — *Auf Wiedersehen* — reached the coveted million sales and won for her a Golden Disc.

In 1956 Vera appeared in seventeen shows for Associated-Rediffusion TV. After that she moved over to B.B.C. Television for the popular *Vera Lynn Sings* Programmes. Honoured by being asked to appear in seven Royal Variety Command Performances, Vera Lynn has been recording for twenty-five years.

In the St. John's Wood, London, studios of E.M.I. she recorded three LP's entitled *Sing With Vera, Yours and As Time Goes By*. Her first single on the M-G-M label was *Accordeon and Again* on 45 M G M 1104.

Vera married music publisher Harry Lewis in 1941, and they have one daughter, Virginia, who was born in March 1946. Her hobbies include needlework, cooking, gardening and oil painting, particularly landscapes.



Television personalities Harry Fowler and Mario Fabrizi are not 'on-the-run'. It's just their way of pointing out that, come what may, they are buddies . . . through thick and thin, in fact. They've made a real chummy record about it, too — 'Buddies' (of course) on H.M.V. 45 — Pop 891. Flip features Harry Fowler as he sings 'Follow Flogger'.

TOY GARAGE WITH LIFT

A TOY garage is a 'must' for children to go with the small motor cars and other vehicles which are in popular demand nowadays. Our model, which is pictured on the front page, is particularly attractive in that the cars are transported on to the flat parking roof by means of a lift operated by the youngster. When the car has been lifted on to the roof and removed for parking, the lift is lowered to receive next vehicle.

Standing on a baseboard measuring 15 in. by 12 in., the garage is about 12 in. high. It has a forecourt with pumps for supplying petrol. On the ground floor there is a combined showroom and workshop, and as already mentioned, the flat roof provides for parking space in a modern manner. The scale of the model garage will be particularly suitable for the Matchbox range of models and others of a similar size.

Hobbies kit

Besides all the wood and materials for building the garage, the Hobbies kit includes a set of petrol pumps, transparent material for the display windows, and display posters for sticking on to various buildings in an authentic manner. The car models are not included in the kit.

All the intricate parts which go towards the make-up of the garage are shown full size on the extra large plan. Other parts are given with full measurements. Transfer the full-size parts on to the wood and mark out those for which measurements are given. For those using

a Hobbies kit of materials, the various parts should be laid out on the 15 in. by 20 in. panels as shown in Fig. 1. This will ensure that all parts are allowed for in the wood provided. Cut out all the parts neatly with a fretsaw and clean them up thoroughly with glasspaper ready for assembly. Note that the door shown leading to the showroom can be made to open by cutting out and replacing with adhesive tape as hinges.

ILLUSTRATIONS OPPOSITE

All parts will be assembled throughout the model by gluing and pinning for extra strength. The first stage is shown in Fig. 2. Glue and pin pieces 4 and 5 to piece 2, noting that the exact position of piece 2 is shown by dotted lines on piece 4 on the plan. Add pieces 3, 6 and 7, tack the transparent material behind the windows, and then fix this portion to the base 1. If you wish to paint inside it should of course be done before fixing.

Now make up the lift shaft as shown at Fig. 3. Pieces 9 and 10 go between the sides 8 and the small lift stops are glued in the corners. Positions of pieces 9 and 10, and the four stops 11 are shown by dotted lines on piece 8 on the plan. The roof 12 is next added to this section.

Now make up the tower and lift mechanism as shown in Fig. 4. Glue piece 14 to pieces 15 and then add to piece 13 after screw eyes have been inserted inside piece 14 and in piece 13. The positions of the screw eyes are shown on the plan. Then add the top

(piece 16).

The lift winding mechanism consists of pieces 17, 18, 19 and 20, which are assembled as shown in Fig. 4. The completed assembly is shown in Fig. 5. Note that the spindle 18 which is operated by the handle, should work freely. It is on this spindle that the lifting cord will be wound.

The cage is next assembled as detailed in Fig. 6. The floor 24 and pieces 22 and 23 are glued between the sides 21. A screw eye is inserted in the centre of piece 22.

Before assembling the parts which make up the lift, study Fig. 7, and you will see that the cage is raised by a cord attached to the screw eye in piece 22. This cord goes through the roof 12, passes through the two screw eyes in pieces 14 and 13, goes down again through the roof 12 and is then tied to the winding spindle 18.

Lift mechanism

Tie the cord first to the screw eye on piece 22, and then thread the cord through the hole in piece 12, draw the cage up into the shaft, and then thread the cord through the two screw eyes in pieces 14 and 13 while holding the parts close together. Next take the cord down through piece 12 again, and then tie it off tightly round the spindle close to the washer 17. The two lift assemblies are now fixed together to screws through the sides 8 into piece 13 (see Fig. 8). The screwing on of this section is recommended in order that it can be removed in case the cord has to be renewed after a while. Note that the end of the spindle 18 will fit into the hole already provided in piece 9. This will prevent the cord from running off the spindle when it is wound up. Fig. 8 also shows how a strip of wood is fixed in the shaft, to fill the gap between the base and cage. By turning the handle the cage is lifted when the cord winds round the spindle. When the car is removed from the cage on reaching the flat roof, the cage should descend under its own weight as the handle is unwound.

The lift assembly is now fixed on the baseboard as seen in Fig. 9, which shows the completed structure. To this is added the flagstaff and base (pieces 25 and 26) and the model can now be painted as desired.

Bevel off the baseboard at the entrance to the garage as indicated in the finished illustration. The clock and name can be painted on by those proficient with a lettering brush.



Fig 1—How parts are laid out on Hobbies panels

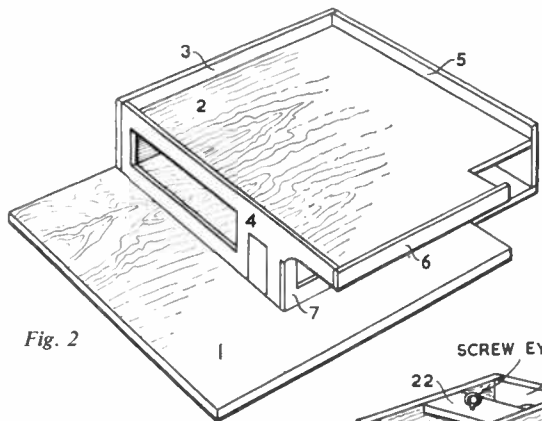


Fig. 2

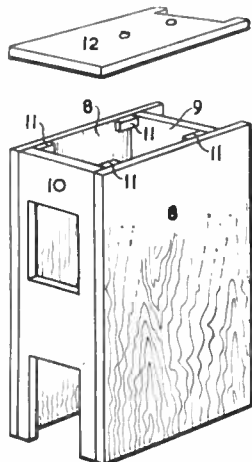


Fig. 3

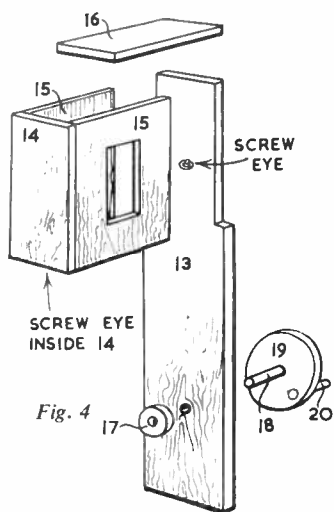


Fig. 4

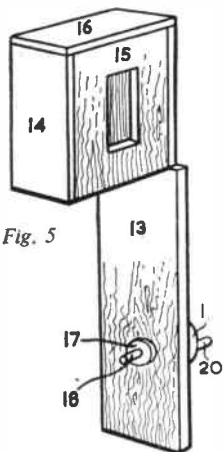


Fig. 5

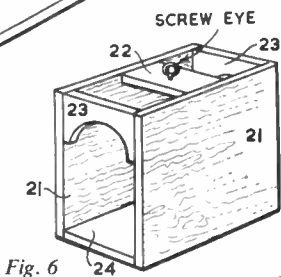


Fig. 6

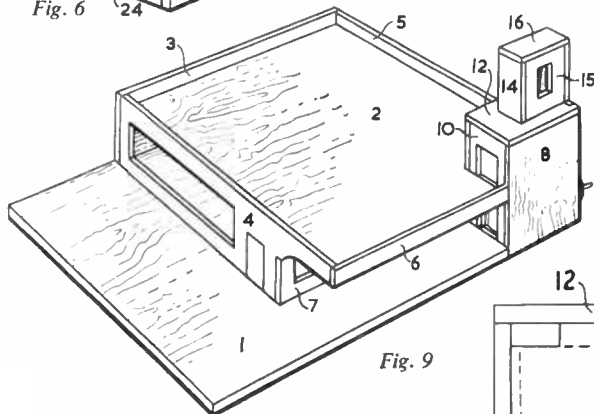


Fig. 9

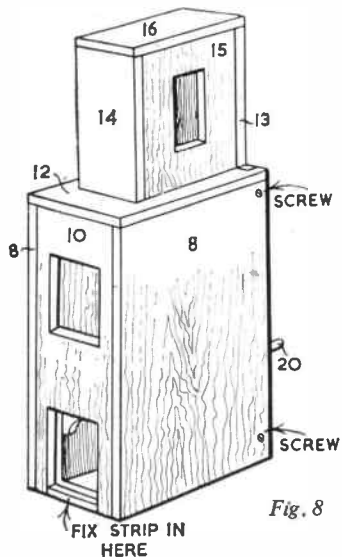


Fig. 8

A KIT FOR ONLY 17/-

Hobbies Kit No. 3447 for making this attractive Garage contains all plywood, transparent material for windows, posters, etc. and a set of pumps. Kits price only 17/- from Hobbies branches, etc. or by post from Hobbies Ltd, Dereham, Norfolk (carriage 3/- extra).

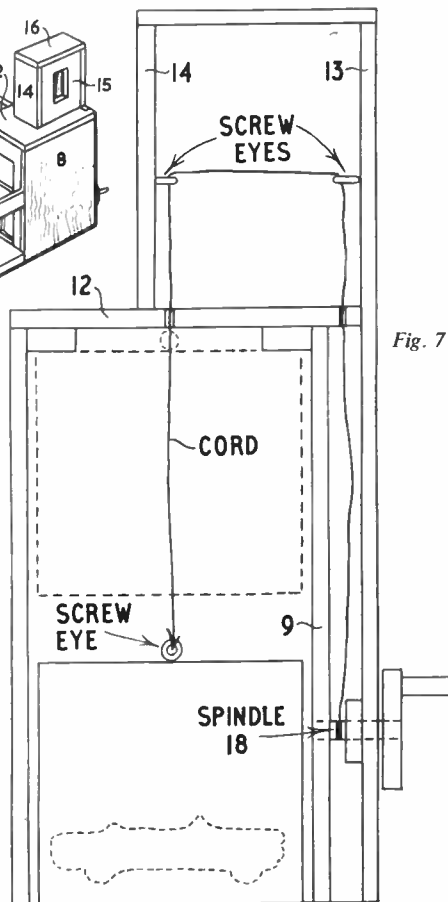


Fig. 7

CHEMISTRY

AT HOME

SODIUM sulphate (Glauber's salt), $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, shows us the curious phenomenon of supersaturated solution, that is of a solution which contains an excess of dissolved solid and which ought by rights to crystallize out. Carefully warm some water in a conical flask to a temperature of 30°C . This is more easily controlled by clamping the flask in a water bath. Add sodium sulphate until no more will dissolve. Carefully pour off the solution from any remaining solid into another conical flask and reheat the solution to 30°C . Insert a plug of cotton wool in the neck of the flask and, without shaking, stand the flask on a pad of flannel.

No solid separates on cooling and standing. Carefully remove the plug and drop in a crystal of sodium sulphate. The solution at once crystallizes in a spectacular manner. Absence of dust, vibration, and of any undissolved sodium sulphate has kept the excess solid in solution. As soon as a crystal was dropped in this formed a nucleus for crystallization and rapidly spread through the solution.

The effect of heat on alum (potassium aluminium sulphate), $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$, is interesting. Put some alum in a crucible and heat gently. It melts and dissolves in its own water of crystallization. Remove the flame and let the crucible cool. The alum solidifies to a glassy mass. This is the basis of the styptic pencils used for stopping the bleeding of cuts acquired during shaving. To make your own styptic pencils, simply pour the melted alum into upright glass or metal tubes whose bases are

sealed by pressing them into dabs of clay on a board. When the alum has solidified, remove the clay and push out the stick of alum, warming the tube momentarily with a flame if the alum adheres too firmly.

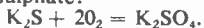
2 — EXPERIMENTS WITH SULPHATES

Having seen the action of gentle heat, now reheat the crucible. The alum loses its 24 molecules of water of crystallization, and when a low red heat is reached the mass balloons up beyond the rim of the crucible like a spongy white mushroom.

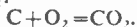
If you now heat this anhydrous alum with one third its weight of finely divided carbon (such as lampblack), the famous Homberg's pyrophorus is obtained. A pyrophorus is a powder which takes fire spontaneously on exposure to air. Therefore put the lid on the crucible during the heating and cooling. The heating should be continued until the crucible is red hot.

When the crucible is cold remove the lid and scatter the powder through the air. It burns in a shower of sparks.

The explanation of this phenomenon is that some of the carbon reduces the potassium sulphate, K_2SO_4 , in the alum to potassium sulphide, K_2S . This being in a very finely divided state avidly combines with the oxygen, O_2 , of the air to reform potassium sulphate:



The heat of reaction is great enough also to cause the carbon to glow and in its turn to burn to carbon dioxide, CO_2 :



Copper sulphate, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, forms splendid blue crystals. Try heating a few small crystals in a crucible. They give off all their water of crystallization as steam and fall to a white powder consist-

ing of anhydrous copper sulphate, CuSO_4 .



When it has cooled put about half of the powder into a dry test tube as a temporary reserve supply. To the rest in the crucible add a few drops of water. It hisses and instantly becomes blue again owing to its avidity to regain those five molecules of water of crystallization.

This reaction affords us a valuable means of detecting water. Put a little ferrous sulphate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, into a dry test tube, clamp it horizontally and insert a little of the reserve supply of anhydrous copper sulphate so that it rests about 1 in. from the ferrous sulphate, as shown in the diagram. Gently heat the ferrous sulphate. It gives off a colourless liquid which condenses and runs on to the copper sulphate. The latter is instantly turned blue, indicating that the ferrous sulphate contains water of crystallization. Keep the tube and contents for a later experiment.

Leave the remainder of the reserve supply of anhydrous copper sulphate aside. In a shorter or longer time, according to the humidity of the air, it turns blue. This change even occurs in a well corked bottle. Hence it follows that to be effective as a means of water detection it is best freshly prepared.

Copper also forms several basic sulphates. One of these occurs native as the fine green mineral brochantite, $\text{CuSO}_4 \cdot 3\text{Cu}(\text{OH})_2$. It may easily be formed synthetically in the home laboratory. Dissolve 5 grams of copper sulphate in 100 c.c. of warm water. Pour the blue solution into a wide mouthed screw capped bottle and let the whole cool. Put in a piece of limestone, which is essentially calcium carbonate, CaCO_3 . Close the bottle. No immediate change is visible, but after about a day a blue-green coating begins to appear on the limestone. During the next few weeks the limestone becomes entirely covered with a fine green coating of brochantite and the solution pales.

Calcium sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, and carbon dioxide are also formed in this reaction:

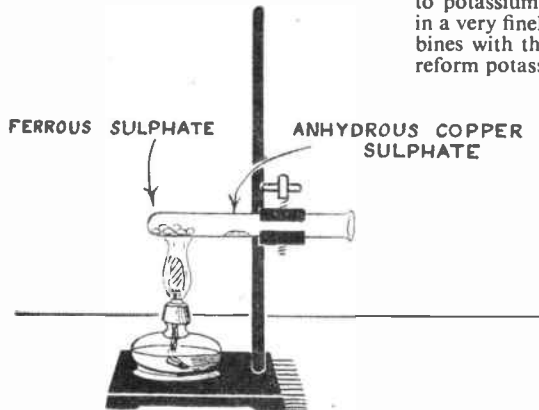


$\text{CuSO}_4 \cdot 3\text{Cu}(\text{OH})_2 + 3\text{CaSO}_4 + 3\text{CO}_2$.
Remove the stone, rinse it and let it dry. If you now scrape an edge of the stone the grey limestone becomes visible, showing that the reaction is only superficial.

Ferrous sulphate undergoes interesting changes when heated. We have already seen that it gives off water of crystallization when gently heated. The ferrous sulphate loses six of its seven molecules of water forming the monohydrate, which is pale straw coloured:



● Continued on page 227



Detecting water of crystallization

MAKING PRINTS IN BAS-RELIEF

A CONTINUOUS stream of straight forward 'black and white' enlargements from your negatives is liable to look 'monotonous'. If broken occasionally by making use of one of the other printing techniques a great deal of variety can be added to your photographic work.

By C. Robinson

One of the most effective of these processes is that of giving your prints that 'etched' look, technically known as 'bas-relief'. This also has the added advantage of being quite easy to accomplish. I would like to mention, however, that like all special techniques or variations from the recognized path it is best used discriminately, as one can easily tire of seeing it if used too much.

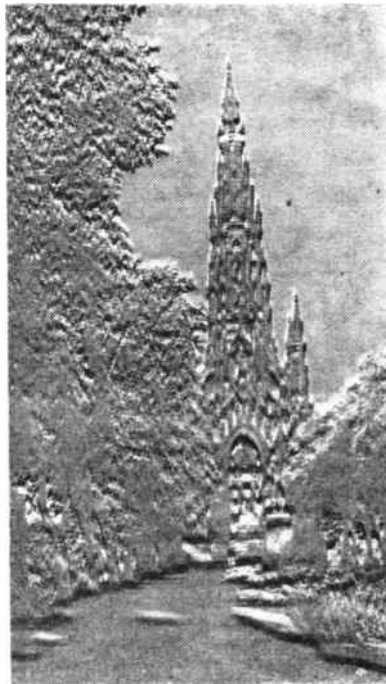
The best types of picture for this process are those containing a lot of straight lines and sharp details; portraits, too, can often look very effective so printed but landscapes are not very well suited to the method.

First of all a transparent positive is required, exactly the same size as the negative. This is easily obtained by simply 'contact' printing from your negative on to a sheet of cut film. As your negative is black and white there

is no need to use Panchromatic film for making this transparency. Commercial orthochromatic is by far the best, as being slower it is easier to control and it can also be developed by inspection in the light of a red safelight.

When this positive has been fixed, washed, and dried, your final print is made by simply 'sandwiching' it together with the negative in the enlarger and exposing on to bromide paper in the normal way. The required effect is obtained by having the positive and negative slightly out of register; the amount this can be done can be varied both in distance or direction, either lateral or vertical, according to the result desired which is best found by experiment.

The amount they should be 'out of register' is governed to a certain degree by the size of enlargement required. The smaller the enlargement the nearer it will be viewed from, therefore a minute degree of 'out of register' will give the desired effect. But in the case of a very big enlargement viewed from further away this may have to be increased. The only possible way of finding out is making and studying a test strip taken over an important part of the picture area. With experience, however, one begins to be able to judge by viewing the projected image on the enlarger easel.



Scott Memorial, Edinburgh

I hope the accompanying illustrations together with this article will introduce some readers to what to them may be a new method of printing; it is certainly an enjoyable one.

● Continued from page 226

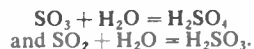
SULPHATES

Now re-heat the ferrous sulphate monohydrate strongly. It turns dark red and white fumes are given off. Hold a slip of moistened blue litmus paper in the fumes. The litmus is reddened, indicating the presence of an acid. When no more fumes are given off let the tube cool. A red powder remains. This consists of ferric oxide, Fe_2O_3 , which is well known as the jeweller's polishing powder rouge.

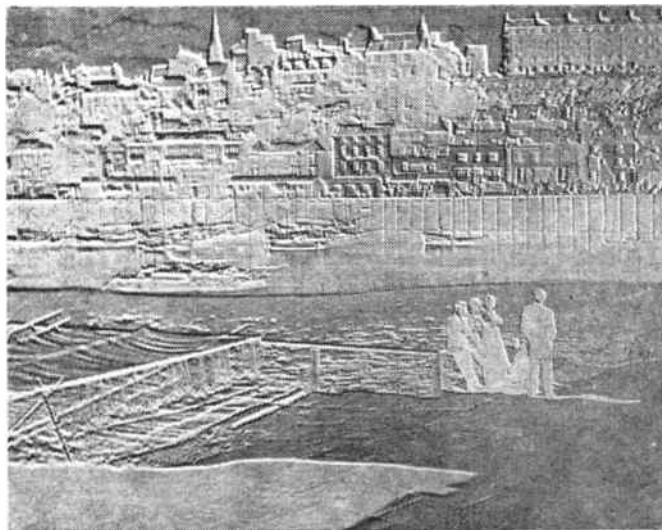
The acidity of the vapours is due to sulphur trioxide, SO_3 , and sulphur dioxide, SO_2 . The breakdown is shown by the equation:



On combination with water the sulphur tri- and dioxides yielded sulphuric acid and sulphurous acid, H_2SO_3 , respectively:



Industrially, under special conditions this reaction is modified to give the important fuming sulphuric acid, or pyrosulphuric acid, $H_2S_2O_7$.



Across the harbour—Whitby

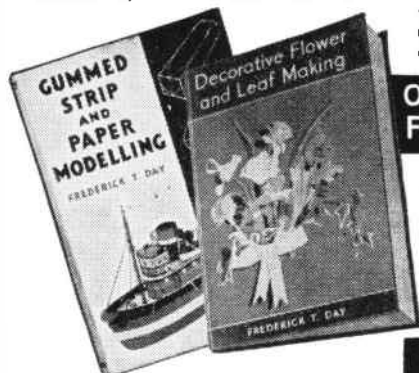
NEW Angles

on OLD favourites

from these Books bulging with BRIGHT IDEAS

Any volume in this most interesting range of books, each dealing with a different aspect of gummed paper-craft, will show you a wealth of ideas, the way to carry them out, and give hours of intense enjoyment.

Each is the key to an economical hobby that is rich in variety, ranging from the making of a charming picture to framing it delightfully — from three dimensional models to wall decorations, from paper sculpture to charming flower studies.



Other books by FREDERICK T. DAY

- Coloured Paper Decoration 7/6
- Coloured Papercraft for Schools .. 7/6
- Coloured Papercraft for Infants' Schools .. 6/-
- Lampshade and Parchment Craft .. 8/6
- Decorative Flower and Leafmaking .. 8/6
- Gummed Strip and Paper Modelling .. 7/6
- Paper Sculpture for Schools 7/6



8/6

All books obtainable from:
Newnes & Pearson Ltd.
Tower House, Southampton St., Strand, W.C.1.
Ask your stationer to show you the Butterfly range of handicraft materials.

SAMUEL JONES & CO. LTD.

STATIONERY MILL, CAMBERWELL, LONDON, S.E.5. RODNEY: 5064

54 page Edition WHERE'S THAT CAR FROM?

Price 1/- (Postage 4d.)

Entirely new! Brief Guide to

INN SIGNS

Price 1/6 (Postage 4d.)

Of all Booksellers

or

RALEIGH PRESS, Exmouth, Devon

STOP SMOKING

You can overcome the Smoking habit in 3 days or money back. Safe, pleasant, permanent. The only scientific way. No will power necessary. 'Conquered the habit in 2 1/2 days'—F.C. 'Within 2 days I was free.'—W.G. Complete Course 7/6 Details 2/4d. Sent under plain cover.
NATURE REMEDIES, (H157), 28 Dean Road, London, N.W.2. Established 1928

IT'S EXCITING. IT'S PROFITABLE.
Flower painting can bring extra income. Previous experience unnecessary. Waiting markets. Inexhaustible demand. Details free. Popular Art Services (HW), Clun, Salop.

PERSONAL COLUMN LTD., Falcon House, Burnley, Lancs. Pen Friend — all hobbies. Correspondents in almost every Country. All ages. S.A.E. for details.

EVERY STAMP A BARGAIN. Old stamp collection (started 1910, and mostly before 1935). Split into packets at 5/- each. — Hayward, Red Gables, Blean, Canterbury. (Post only).

LEARN

RADIO & T.V. SERVICING

for your OWN BUSINESS/HOBBY

● by a new exciting no-maths system, using practical equipment recently introduced to this country
FREE Brochure from:—

RADIOSTRUCTOR

DEPT. G81, READING, BERKS.

3/1/62

MAKING YOUR HOBBY MAKE MONEY

HOW, WHY any handicraft can make money for you — everything you should know.

40 pages of experience — 5/6 from

G. SEALE

Regent House, 26 Queen's Rd., Coventry

HOMEWORKERS required to make up and machine simple household goods. Experience unnecessary. Good pay. Regular work. S.A.E. for details to Dept. 28, Arnold, 10 Shelley Road, Worthing, Sussex.

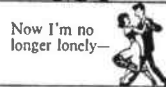
MAKE YOUR OWN table tennis table. We can supply all the materials required to make a really first-class job. In fact, everything down to the last screw. Complete kit including plans sent carriage paid for £12/10/-. Plans sold separately, 10/-. — Edrank Trading Co. Ltd, 66A Susans Road, Eastbourne, Sussex.

LEARN RADIO & ELECTRONICS the NEW Practical Way! Very latest system of experimenting with and building radio apparatus — 'as you learn'. **FREE Brochure from:** Dept. H.W. 10, Radiostructor, Reading.

I went to a dance to find a girl friend—
—but my dancing didn't make girls 'friendly'!



—till a pal told me the secret of Escort's Sure Step System



Now I'm no longer lonely—
—the girls know my steps are sure!

Can't afford private lessons? Learn ballroom dancing at home! Send for exciting booklet "Dance Escort"—**FREE** to readers of 'Hobbies Weekly' — which explains the dynamic **SURE STEP** system.

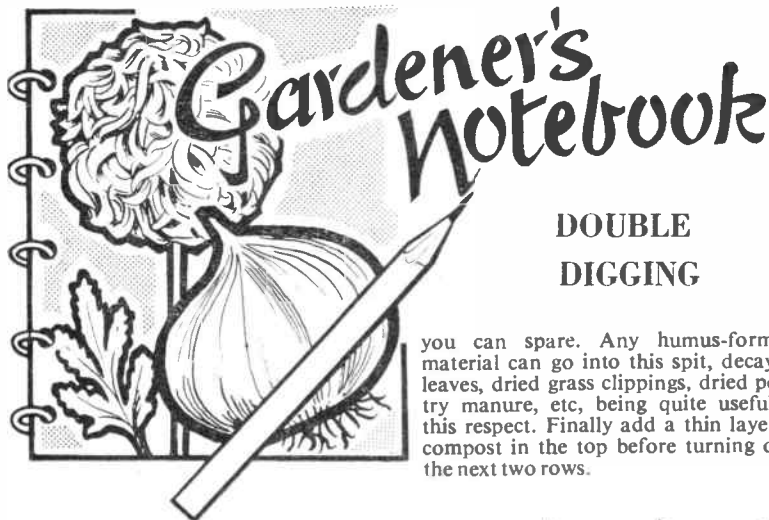
Just send name and address to: ESCORT DANCE INSTRUCTORS

Studio H34 Harrogate
(or Rock 'n' Roll Course — send 4/6 P.O.)
or Old Time Course 8/6 or Cha-Cha Course 5/6
or Escort's complete Ceili Course 6/6.

100 DIFFERENT stamps free! Request 1d. upwards discount approvals. — Bush, 53 Newlyn Way, Parkstone, Dorset.

ENJOY WRITING? Then write for Profit. Send for 'Writers' Handbook' (free) detailing countless opportunities for beginner or experienced. — 'Writers' Ring (HW), 5 Edmund Street, Birmingham.

50 STAMPS FREE to applicants for fine stamps on approval. Discounts and Post Paid. — McKendrick (H), 9 Nethercourt Farm Road, Ramsgate, Kent.



DOUBLE DIGGING

you can spare. Any humus-forming material can go into this spit, decaying leaves, dried grass clippings, dried poultry manure, etc. being quite useful in this respect. Finally add a thin layer of compost in the top before turning over the next two rows.

Double digging is quite simply digging to double the normal depth or two spits deep instead of one and is essential for new or neglected gardens. It is a means of improving the subsoil and does NOT imply that the subsoil is brought to the top, as many people suppose.

Briefly it has the effect of improving drainage and admitting air, which in turn encourages the deep root growth so necessary to many vegetables and flowers. At the same time compost or manure can be incorporated when digging to increase the fertility of the second spit.

It is not easy work and it is better to tackle a selected area each year. Digging can be carried out any time during the winter months if the conditions are suitable. To try and dig when the ground is waterlogged does more harm than good.

Frost action

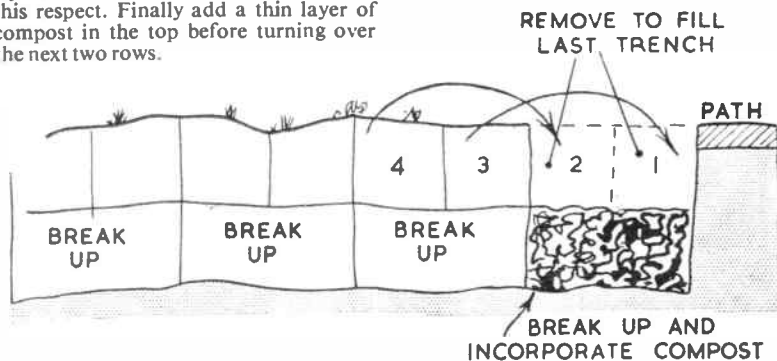
As far as heavy soils are concerned the work should be carried out as early in the winter as possible so that the soil can be broken up by the frosts. To the uninitiated it is nothing less than a miracle to see how the frost will break up the stickiest clay soil to a workable tilth.

Start work by taking out the first two rows with the spade, removing them to the other end of the plot ready for filling the last trench. Keep the spade upright when digging and take a good spadeful each time. This will leave you with a trench about 12 in. or 15 in. wide and about 10 in. deep. This is shown clearly in the diagram, the first two rows being 1 and 2.

Now break up the soil in the trench to the full depth of your fork and incorporate as much compost or manure as

The illustration shows how these are turned over on to the first two rows. Carry on as before, breaking up the subsoil as you go along. The top spit will, of course, be treated in the normal way according to the crops which are to be grown, e.g. farmyard manure for cabbages, etc. or complete fertilizer but no manure for beet, etc.

Annual weeds and stones may be buried in the second spit, but perennial weeds such as thistles, docks and bindweed should be removed and burned. It will be found that thistles and docks go very deep and it is worth while taking trouble to remove every single piece of root. (M.h.)



A Novel 'Pixie' Gong



pieces 1, 2, 3 and 4 from $\frac{1}{4}$ in. thick wood, and two of piece 5 from $\frac{3}{8}$ in. wood. All the parts are shown full size so you have only to transfer them to wood by means of carbon paper.

FULL-SIZE PATTERNS ON FACING PAGE

Assemble the gong by gluing pieces 2, 3 and 4 in the appropriate positions. Pieces 5 will be glued on either side of piece 4 and shaped to form the small toadstool. The large one, which forms the gong, is of course the bicycle bell. It is simply jammed hard on to the projection on piece 3, which is rounded for this purpose.

The hammer consists of a piece of wire (7) and the head (6) which is a piece of $\frac{1}{2}$ in. round rod or a piece of shaped wood. Two small screw eyes are inserted on the figure at S and the handle (7) slipped into these as shown in the illustration above.

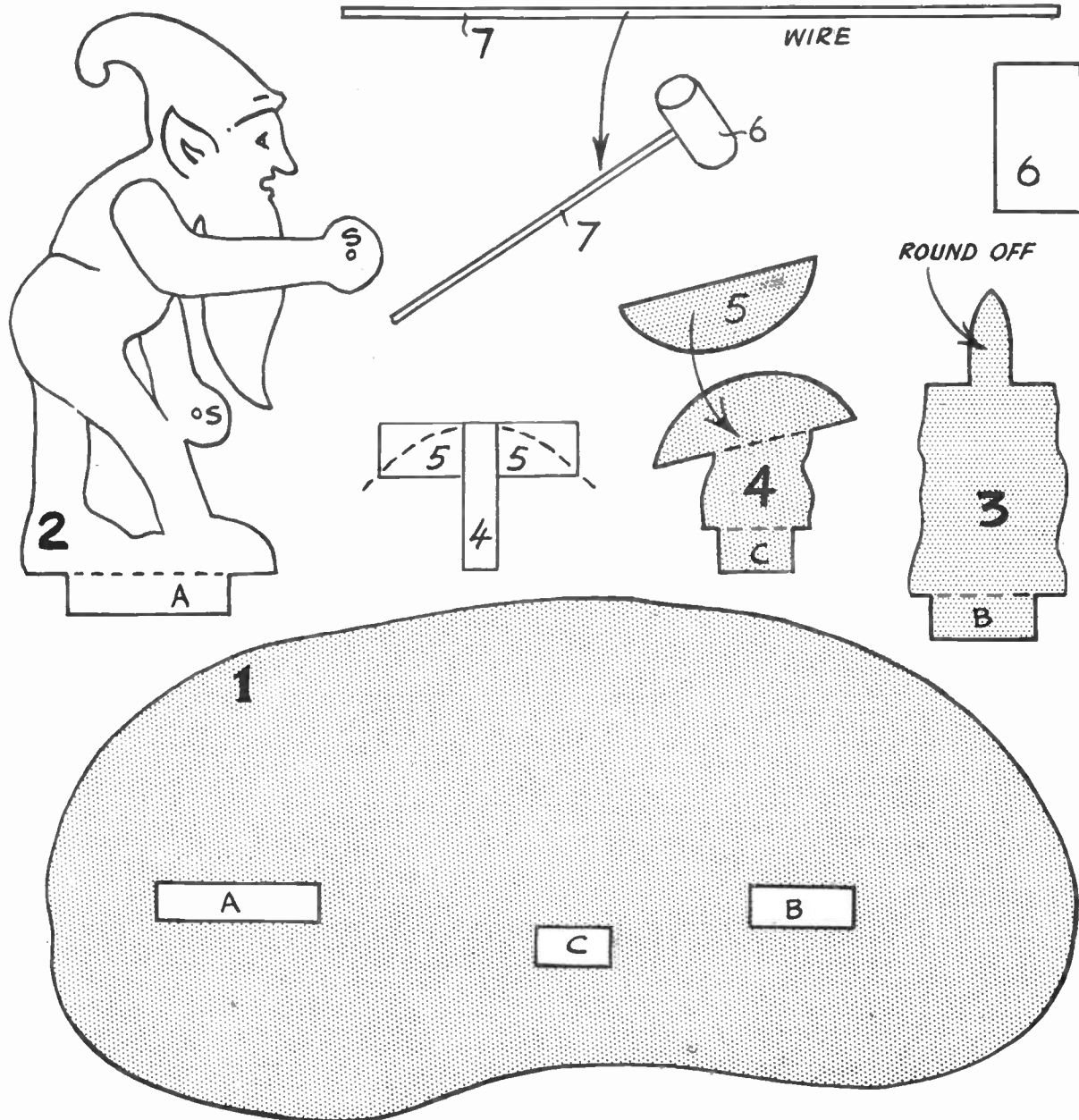
Finish off by painting in bright colours. (M.p.)

THE gong of this little novelty consists of a cycle bell top. It should not be too difficult to obtain one of these, even if you have to buy a new one. They are not very expensive.

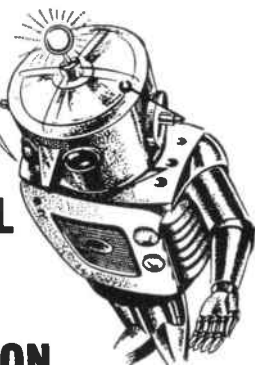
It is not intended that you should use this gong at every mealtime, it is better to keep it for parties or barbecues. If it is carefully painted it would make an excellent gift.

Use your fretsaw to cut one each of

PATTERNS FOR THE PIXIE GONG



Come early



9 a.m. — 7 p.m. Daily

35th NATIONAL SCHOOLBOY'S AND SENIOR STUDENTS OWN EXHIBITION

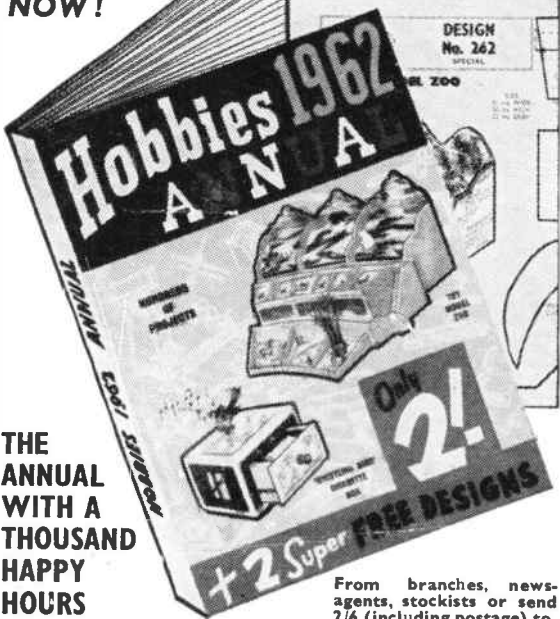
A host of fascinating displays, competitions and demonstrations of scientific engineering marvels. Working model of proposed Channel Tunnel, one of the fastest Jet Aeroplanes in the World, Cycling Competitions, Famous Personalities, Sports and Hobbies. Every Exhibit a Star Attraction for Boys and Girls.

1st to 13th JANUARY, 1962
Admission 2/-



NATIONAL HALL, OLYMPIA, LONDON

Get it NOW!



THE ANNUAL WITH A THOUSAND HAPPY HOURS

HOBBIES LTD, 99 DEREHAM, NORFOLK

From branches, news-agents, stockists or send 2/6 (including postage) to

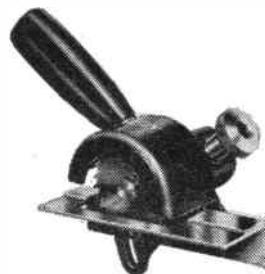
If your hobby is working in wood ARCOY PRODUCTS make ideal tools for you.

ARCOY RABBETTER

For use with any Portable Drill. A boon for all workers in wood. It rebates for panelling, etc. It slots for drawers. It strips for laths. It tongues, grooves and fillets.

PRICE £2.2.6

Moulding cutters for use with rabbetter £1.3.6 each.



ARCOY POWER PLANE

Combines the handiness of the normal smoothing plane with the efficiency of the planing machine. Will never split wood, lift fibres or tear. Depth of cut adjustable from 0- $\frac{1}{8}$ in.

PRICE £16.10.0



ARCOY DOVETAILER

With the aid of any $\frac{1}{4}$ in. capacity power tool you can produce joints at $\frac{1}{4}$ in. pitch in timber up to 9 in. in width in any combination of thicknesses from $\frac{1}{8}$ in. to 1 in. in five minutes!

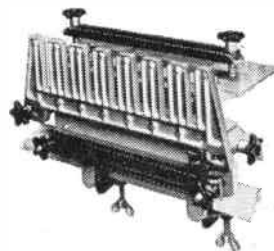
PRICE £6.6.3

Housing Joint Attachment

PRICE £1.11.9

Multi-Pitch Attachment

PRICE £2.16.6



If you have difficulty in obtaining

ARCOY PRODUCTS, write for FREE literature to: **ARCOY PRODUCTS** KNOWSLEY RD., BOOTLE, LIVERPOOL 20

