Model Engineer

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Smoke Rings

By VULCAN

WHENEVER a rather primitive society becomes more industrialised the problem arises of finding the men and women who can make the industries work.

However skilled they may be at their traditional crafts they still need—like all of us—to be trained in the new forms of employment. This is seldom easy when they are unable to read textbooks or obtain them in their own language; and when, too, their understanding of machinery is as rudimentary as ours was at the beginning of our own industrial revolution.

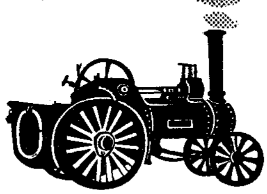
Everything has to be demonstrated. The part which models can play in illustrating the structure and purpose of a machine is well brought out by the experience of a company in Mexico, a land where industrial progress suffers very seriously from scarcity of skilled labour.

Confronted with a great need for trained workmen, the Compania Papelera Maldonado SA of Monterrey, a Mexican concern which manufactures paper, decided to instruct the men by means of a model. In co-operation with the Sandy Hills Iron and Brass Works of New York, the paper manufacturers have now produced a scale model of a machine used at their factory.

Demonstrations

The model is about 26 ft long and is a scale replica of the original. As all the components can be taken apart, the instructor is able to demonstrate, directly and vividly, the working of every single piece. The technicians have already discovered that the model thoroughly teaches not only the functioning of the machine itself but also the working of the entire factory in the relation of one department to another.

According to an article in *Vision*, kindly sent to MODEL ENGINEER by F. Schiff of Amsterdam, the model will be used at first in one of the Maldonado mills where the original machine has been installed and afterwards will be erected permanently at a technical school in Mexico.



There can be no doubt that with the advance of industry in countries such as Mexico and India the craft of the modeller will become increasingly important. The people of these countries have to be trained in the use of machines and there is no better way—sometimes no other way—of training them than from models which display every feature of the "real thing."

It must also please all members of the world-wide modelling brotherhood to learn that live steam is, by a piece of historical aptness, already a part of the industrial revolution which has come belatedly to South East Asia. There are huge areas where, having regard to all the local circumstances, a small steam engine is an ideal source of power.

Fifty years ago MODEL ENGINEER was being used as a textbook in the awakening territories of China. It may, in the years ahead, serve an even greater social purpose, for no intelligent person can fail to see that the stability of East and West together, ultimately depends on the progress of the underdeveloped countries and their capacity to feed those huge and vastly growing populations.

Last Atlantic

THE last Atlantic type locomotive in use on British Railways, No 32424 *Beachy Head*, has just been withdrawn from service. This was one of Marsh's H2 class of the ex-LBSCR and the design was based on the "large" Ivatt Atlantics of the old Great Northern.

The Atlantic wheel arrangement has always been a favourite of mine, and although it originated in America, it always seemed a typical British type.

Nearly all the great railways of the pre-nationalisation era had Atlantics of one kind or another, including the Great Western, North Eastern, Great

Smoke Rings . . .

Northern, Great Central, North British and London Brighton and South Coast.

The Lancashire and Yorkshire had locomotives of the 4-4-2 wheel arrangement, but these were inside-cylinder engines so were not strictly Atlantics. They were notable for the front doors in the cab leading on to the footplate, and also for a claim of having reached 100 m.p.h. in normal service, a claim which I am afraid does not bear too close investigation !

Perhaps the largest and most imposing were the Reid Atlantics of the North British, though the Ivatt large Atlantics achieved the greatest fame, especially after the late Sir Nigel Gresley had carried out a few modifications.

My personal favourites were the two-cylinder simple type of the Great Central, designed by J. G. Robinson. These engines were beautifully symmetrical, and they performed as well as they looked; my last view of one of these Atlantics was at Marylebone in 1945, waiting to pull out a Manchester express, looking, I'm sorry to say, rather drab and dirty in the black finish of the time.

Regular reader!

OF all the contributors to the Diamond Jubilee number none had a better right to be represented than A. E. Bowyer-Lowe. Sixty years ago, at the age of 14, Mr Bowyer-Lowe grabbed eagerly at the first issue. He has reason to remember it, for ME was to play a very important part in his two careers as a professional engineer and amateur modeller.

Like many other model engineers of his generation he had, for his first lathe, a 4 in. round-bed Drummond. He was then 25 and already experienced in the craft. Years earlier he had begun—again like many others at the turn of the century—with simple engineering models and various pieces of electrical apparatus.

As the Jubilee issue recalled, ME was alert to everything new in the fields of mechanical engineering and electricity. Not surprisingly, therefore, Mr Bowyer-Lowe interested himself, as a consulting engineer, in the developments which seemed to spell progress. One of them was radio.

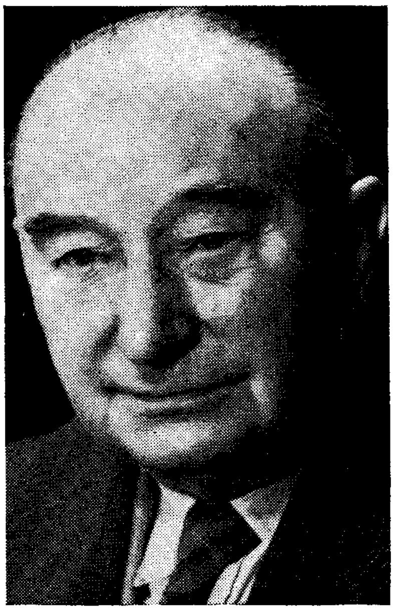
Readers of ME know him best as a maker of clocks and tools. Two Shortt free-pendulum clocks, a Eureka clock and a simplified Hipp clock are among the best known examples of his craftsmanship. In addition he has helped to encourage the skill of others by presenting the ME Exhibition with the tool-making cup that bears his name.

I do not know whether he was at Newport School, Leyton, or Leyton Technical College—he attended both—when he discovered ME. It was a lucky discovery for himself and he has shared the good fortune of it with others.

100 years old

BY an odd quirk it sometimes happens that in starting something new another, totally unsuspected, creation emerges.

When a hundred years ago this year, the British Horological Institute convened its first meeting it was decided that, in order to keep its members abreast of events, it would be advantageous to publish a journal for the trade. Thus the *Horological Journal*, the first issue of which appeared in September 1858, became the world's first trade journal.



Mr A. E. Bowyer-Lowe

It is rather fitting, then, that the staff of MODEL ENGINEER, which this year celebrates its sixtieth anniversary, should congratulate the British Horological Institute on achieving its centenary.

The centenary year is to be marked by the opening in June of the Institute's new headquarters in Clerkenwell and by an exhibition at Goldsmiths Hall from October 14 to 25.

Improvements at the new HQ will include a magnificent library and a council room which will house the Ilbert Library bequeathed by that celebrated collector and antiquarian, the late Courtenay A. Ilbert.

There must be many readers of ME who follow the Institute's affairs with keen interest and I am sure they will join with me in wishing the BHI every success for the future.

Cover picture

Charles Baxmann of the Detroit Model Power Boat Club with his class F world's record holder at 73.77 m.p.h. When the photograph was taken a Dooling 29 engine was in the boat, but a McCoy 29 was used to set up the record. Hull design is Baxmann's. Robert Graham, who took the photograph, also contributed some of the illustrations for "The North American Scene" on pages 598 to 601.

Ideas wanted

HERE is an opportunity to discredit those critics who maintain that nothing practical ever comes out of model engineering.

Mr F. Farrow is a polio victim. With others afflicted like him he is being cared for at Silverwood, a residence for polio sufferers run by the Infantile Paralysis Fellowship.

He tries to overcome his disability and be of some use to society by doing odd jobs like weeding, but being weak and chairborne he finds this exceedingly difficult. In addition the conventional dutch hoe, used lever fashion over one arm of his chair, is not the easiest of gardening implements to wield.

In a letter (passed to ME by the Central Council for the Care of Cripples) he tells us that a dutch hoe made in light steel with a harder and heavier blade, with both the blade and the length of handle adjustable, might serve his purpose.

If any reader feels he could help Mr Farrow his address is Silverwood, Byfleet Road, Cobham, Surrey.

Purchase tax

I AM told that companies who advertise Swiss musical movements, have had numerous enquiries as to whether there has been any reduction in purchase tax. Although there have been changes on similar items, the purchase tax on musical movements remains unchanged.

The camera under water

G. E. MEWIS describes a waterproof case designed for maximum ease of camera operation

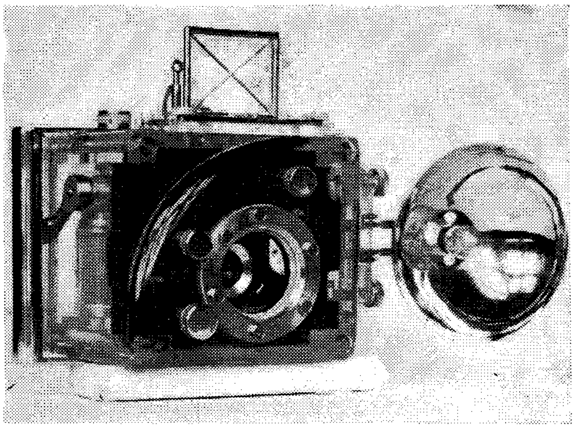
UNDERWATER photography, which can be used as a supplementary method of studying marine life, can be carried out with comparatively simple swimming equipment—fins, face-plate and a snorkel tube.

A rubber suit will insulate one against excessive cold. Additional clothes can be worn under the suit, which, of course, will keep them dry and in turn keep the diver warmer still. With a rubber suit it is possible to stay in British coastal waters for as much as three hours without any discomfort.

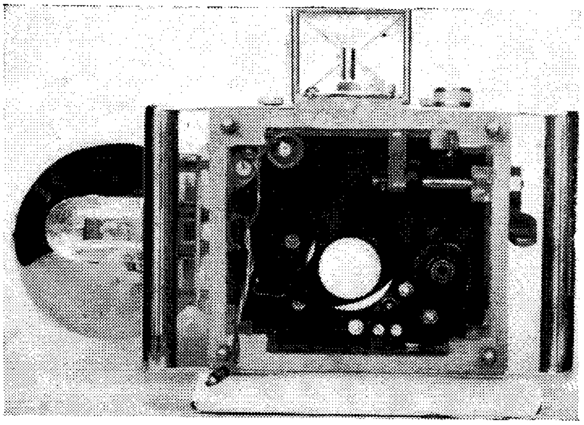
The more hardy biologist and photographer could, no doubt, manage without a rubber suit and wear shorts and woollen sweaters. But although this kind of outfit traps water heated by the body, a disadvantage with it is that one's extremities tend to get very numb.

When using a rubber suit for surface diving it is necessary to counterbalance the swimmer, to give him negative buoyancy with his lungs empty; this can be done with lead weights on a belt. The belt must have a quick release fitting in case of emergency, when it may be necessary to jettison it. Another important safety device is an emergency life jacket which can be inflated by pressing a button on a compressed carbon dioxide cylinder.

The camera case illustrated was built for the Finnetta 88 and could have been made to fit other types of camera.

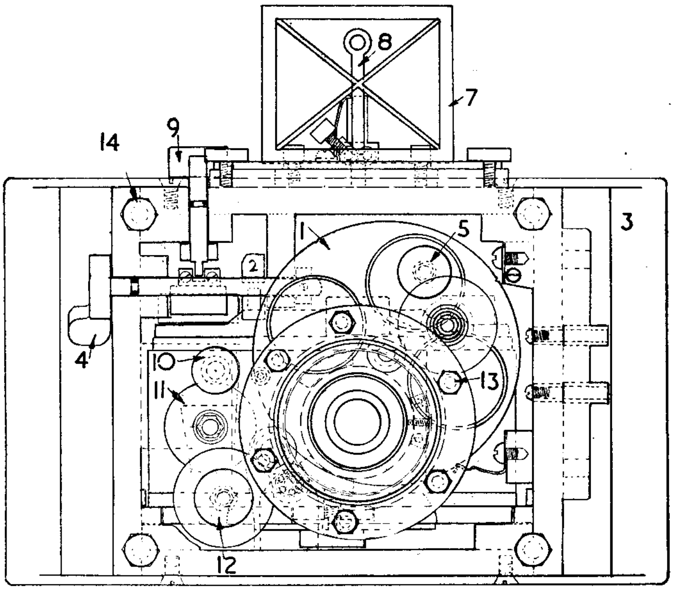


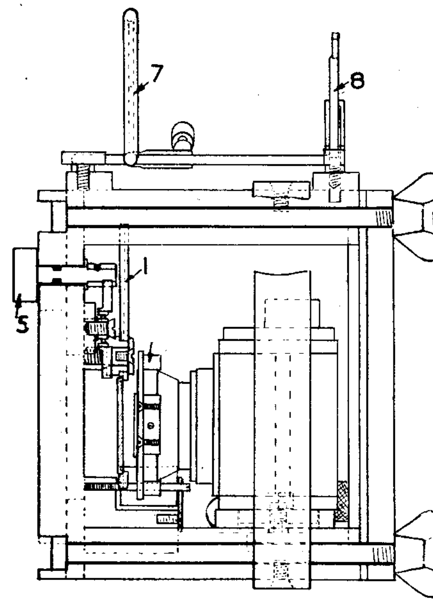
A front view of the finished camera case

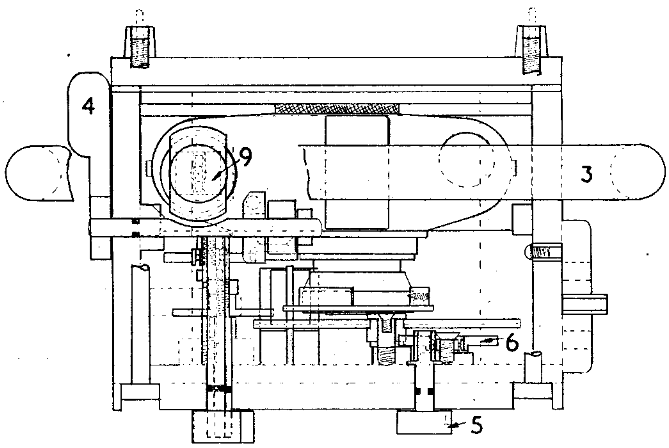


A rear view of the case with the back plate removed

The seabed at 5 ft depth. Taken by the author at Wallace Beach, Looe, Cornwall







The case was designed and built with the idea of complete versatility in mind. The only control lacking is the aperture control. The ring inside the lens mount controls the aperture. It is necessary to revolve the lens mount for focusing—it also moves backwards and forwards during this operation so making it almost impossible to fix a control on the aperture ring.

The window mounting was made as small as possible, care being taken not to cut off the corners of the pictures. This point should be noted when filter size is decided.

A small extension ring can be fitted on to the camera lens so enabling close ups of 10 in. distance to be taken. But there must be clearance for the filter disc at this focusing distance as the lens is nearest to the case front.

Owing to the window mount being more or less in line with the three front controls (the focus, speeds and filter disc) it is necessary to have a cog system to take the control knobs away from the window mount. The type and size of the cog is really an individual matter; those used in the case illustrated were taken from an ex-WD bomb sight.

A combination of three cogs on each of the front controls makes assembly simpler, and the movement of the controlled part is in the same direction as the turn of the outside knob. First, the cogs are fitted on the camera, then the control rod through the case can be set in position with its cog and, finally, the centre cog can be put in. This should be mounted on an additional piece of Perspex which can be stuck into the required position between the two cogs already fitted.

If you follow this routine you cannot fail to get a perfect mesh. With the filter disc, the disc with the cog is placed in position first.

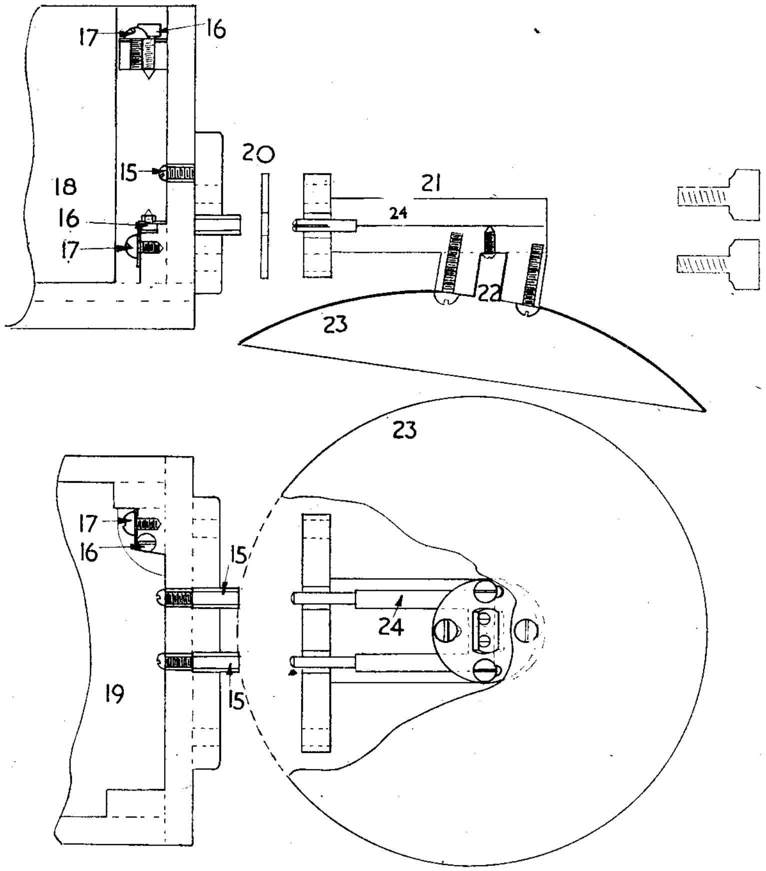
The watertight seals on the control rods are made with $\frac{1}{4}$ in. dia. rubber rings. These are fitted in a slightly less than a $\frac{1}{16}$ in. groove on the $\frac{1}{4}$ in. rod. The hole on the Perspex is $\frac{1}{4}$ in. and is polished to fit the $\frac{1}{4}$ in. rod.

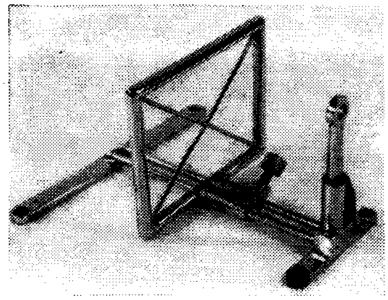
The groove on the rod is wider than $\frac{1}{16}$ in. to allow for the expansion of the ring when the rod is pushed into the hole. The hole in the case is chamfered at the end away from that at which the rod with its ring is inserted. The rings have an outside dia. of $\frac{1}{4}$ in., inside dia. of $\frac{1}{8}$ in., and a cross section of the rubber is $\frac{1}{16}$ in. These rings can be obtained from Hall and Hall, Oldfield Works, Hampton, Middlesex.

All external metal parts were made from brass and were chromium plated professionally, the only exception being the metal ring clamping on the window; this is stainless steel.

The handle was made from brass tube and flat sheet brass. This is a tight fit on the case and is held with four screws. All joints on the brass are silver soldered and *not* lead soldered. Chromium plating cannot be carried out on lead solder.

The optical glass for the window was obtained from R. G. Lewis Ltd. 202 High Holborn, London WC1, who will supply material to customers' specifications.





The adjustable viewfinder

KEY TO THE DIAGRAMS ON PAGES 588-589

1 Filter disc
2 Cam for pressing shutter release, this is fixed on to control rod (4)
3 Handle of the case
4 Shutter release
5 Filter control
6 Centre cog to the filter controls
7 Front sight of the viewfinder, made for angle of view correction
8 Rear sight for parallax correction
9 Wind on control
10 Speed control
11 Centre cog of speed control
12 Focus control
13 Bolts holding window mount
14 Corner bolts and wing nuts to hold the back in place
15 Inside to outside connections of the flash equipment
16 Screws for holding 22.5 v. battery
17 Screws for holding the condenser
18 Top view of the flash contacts
19 Front view of the flash contacts
20 Rubber gasket
21 Top view of the flash arm
22 Bulb holder
23 Reflector
24 Copper strip connections through the Perspex

The wind on control makes direct connection with the wind on knob, while the shutter release is pressed down by a cam on the control rod.

The viewfinder, which is chromium plated brass, is made for the angle of view correction and parallax correction. Refraction by the water had to be taken into consideration when calibrating the viewfinder, and the distance from the subject to the camera should be a total of one and half times that of the focused distance. For viewfinding, the cross wires in the foresight are lined up with the ring in the rear sight

Accuracy of the angle of view is also influenced by the distance the eye is from the back sight, so the depth of faceplate used was taken into account.

The main body work is $\frac{3}{8}$ in. and $\frac{1}{4}$ in. Perspex sheet. This is machined in more or less the same manner as soft metals, and slow speeds are used when working on drills and lathes. Sawing and filing is carried out carefully as over-vigorous working will split the material. Sandpaper suits better than emerycloth for smoothing down, care being taken not to scratch any surface which is intended to have a polished finish.

Square edges to all pieces of Perspex used were made by sanding with a flat sanding wheel in the chuck of a lathe at right angles to a flatplate on the bed of the lathe. A good adhesive to seal the Perspex is Tensol cement which should be allowed at least two hours to dry before further working.

The first four parts of the case to be assembled were the top, bottom and the two sides. These were made from $\frac{3}{8}$ in. material. The reinforcing corner pieces were then put in and these serve as a camera support and make a thick corner which is drilled for a $\frac{1}{4}$ in. bolt. It is necessary to have bolts through the case in this manner to lessen the bowing of the Perspex when the back of the case is clamped on.

The case so far assembled is flattened at both open ends by rubbing in a circular motion on sandpaper on a flat surface. When each end was perfectly flat and the case quite square the corner holes were drilled.

The front of the case was made from one piece of $\frac{1}{4}$ in. and one piece of $\frac{3}{8}$ in. Perspex, the $\frac{1}{4}$ in. piece being the inner one. The holes for the window mounting were cut by lathe; a disc cutter could be used.

The corner holes were then drilled and on the outside piece hexagonal holes were made for the boltheads.

Each piece of the front was fitted, using the bolts to hold it in place. The reasons for the extra $\frac{3}{8}$ in. piece of Perspex on the front are to strengthen the case, give a neat window mount almost flush with the front of the case, and provide sunken bolt heads, so preventing them from turning when fixing the back on. It makes a total of $\frac{5}{8}$ in. to support the control rods.

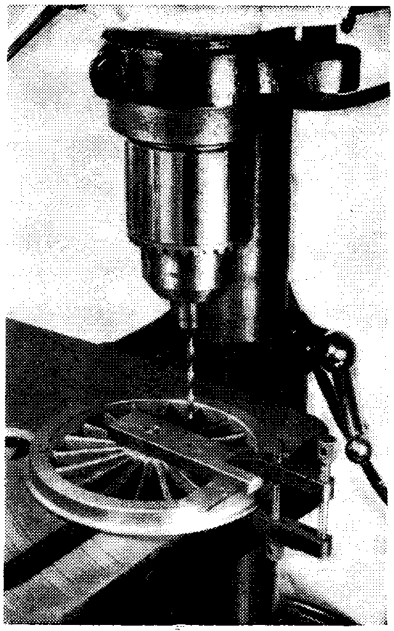
The camera mounting is straightforward as can be seen on the plan. The mount is held in position with stops to prevent upward and forward movement, and a sponge rubber pad

● *Continued on page 614*

JUBILEE

For live steamers, one way of celebrating the 60th birthday of the movement is to build this LMS 2-6-4 tank. The third article describes the construction of further chassis components

By MARTIN EVANS



Jig-drilling for crankpins

THIS week we come to the main axleboxes, which can be made from drawn gunmetal or phosphor-bronze bar, or from the cast sticks supplied by our advertisers. I used the latter, and found that each stick supplied was just enough for three axleboxes.

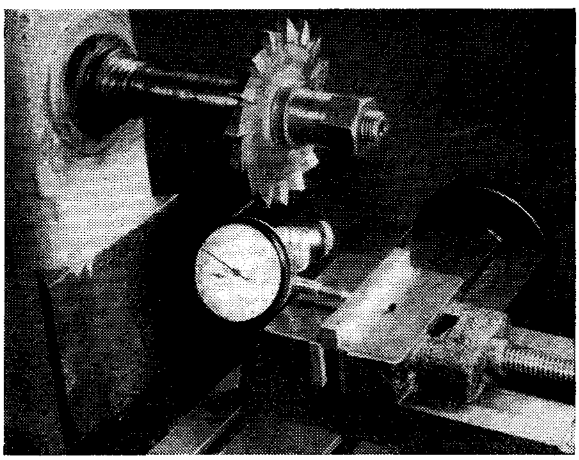
If you are using the cast sticks, the first operation is to chuck each stick in turn in the four-jaw and clean up with a roundnose tool set cross-wise in the toolholder. This will remove the sand and scale and leave clean metal for the milling cutter to tackle.

There are several ways of milling the axleboxes. Undoubtedly the easiest is to do the job in a horizontal milling machine. It is quite a quick job to run across the front, back and sides with a h.s.s. side and face cutter about $\frac{1}{4}$ in. or $\frac{3}{8}$ in. wide. This will reduce each stick to the final size—$1\frac{1}{16}$ in. wide × 0.545 in. thick.

I can hear people asking why this odd dimension of 0.545 in. Why not a nice round figure like $\frac{1}{2}$ in. or $\frac{5}{8}$ in. thick? Well there's a reason. On "miking-up" the main horns in position on my frames, I found that they varied in total thickness between 0.406 in. and 0.412 in. So I filed these down with a smooth file to a uniform 0.405 in. Adding 0.015 in. for clearance (to allow for the rocking motion as the axleboxes work up and down in the horns) and two flanges of $\frac{1}{16}$ in. thickness—total 0.545 in.

The flanges are next milled out. Using the same side and face cutter, remove 3/32 in. from each side, leaving the axlebox $\frac{7}{8}$ in. wide on the working surface. If your vertical slide is graduated, you will not need to measure this depth of flange; if not, remove the bar from the machine vice and check with the micrometer.

The axleboxes can also be milled in the lathe without much difficulty. Two methods were described and illustrated in the ME of March 27 last. If you are using an endmill, one about $\frac{3}{8}$ in. dia. will do the job nicely. Make sure that the stick is set at right angles to the longitudinal axis of the lathe. This can be checked quite easily by traversing the cross-slide and checking with a feeler or with a d.t.i.



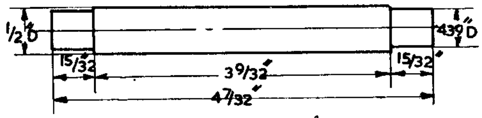
A d.t.i. is used for setting up axleboxes on the milling machine

As the sticks provided are a little on the short side for three axleboxes $1\frac{1}{16}$ in. long it may be better to saw them off rather than part them in the lathe, finally putting each in the four-jaw in turn, to face the top and bottom truly. Be careful that the jaws of the four-jaw do not mark the boxes in this operation. It is worth while inserting little strips of brass or aluminium between each jaw and the axlebox to make quite sure.

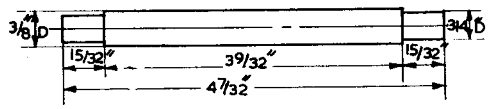
Drilling the axleboxes isn't quite so easy as it sounds. If you have a drilling machine of $\frac{1}{2}$ in. capacity, the following is quite a good method. Mark each axlebox to correspond with the horns and mark also which is the top and the inside of each. Now pair them off and clamp together with the largest size toolmaker's clamp in the position they will be in the frames. Use a piece of brass strip each side about the same length as the box but a little thicker than the depth of the flange—in this case say $\frac{1}{8}$ in.

After marking out the exact centre with a pair of "odd-leg" calipers, on one box only of each pair, the pairs are clamped up on the drilling machine table and centred, for a $\frac{1}{8}$ in. dia. pilot hole to be drilled through the two together.

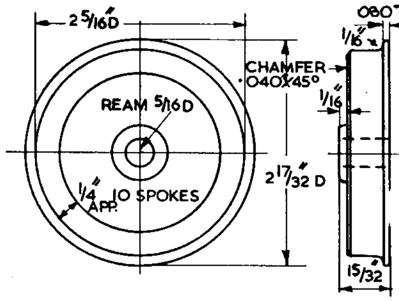
The holes can then be opened out



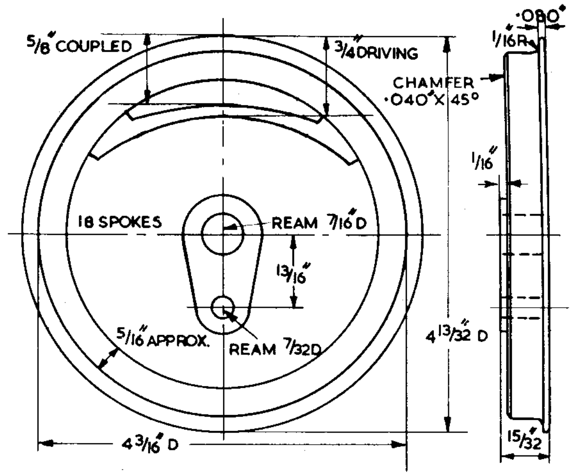
DRIVING AXLE 3 OFF GROUND M S



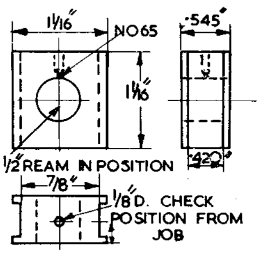
BOGIE & PONY TRUCK AXLE 3 OFF



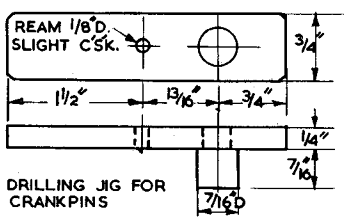
BOGIE & PONY TRUCK WHEEL 6 OFF CI



DRIVING WHEEL 6 OFF CI



MAIN AXLEBOX 6 OFF GUNMETAL CASTING



DRILLING JIG FOR CRANKPINS

gradually to 31/64 in. dia. Be careful that the drill doesn't catch up; a sharp drill is inclined to do this in gunmetal. Don't ream the axleboxes at this stage; it is best done while in position in the frames.

Attention may now be given to the horns once more. Offer up the machined axleboxes and see how much metal has still to be removed from the horns. The boxes should slide easily in the horns, but without shake. If there are only a few thou to come off, it is not worth while to machine the inside faces of the horns. Simply bolt the frames back to back and remove the unwanted metal with a 6 in. smooth file.

If machining is required, it is quite satisfactory to clamp the pair of frames in a machine vice bolted to the vertical slide and use an endmill held in the chuck. Although the overhang with this method may strike readers as excessive, as only a few thou have to be removed, no trouble will ensue (see photograph overleaf)

Not many readers will have a self-centring chuck large enough to grip the driving wheels by the tread, but the four-jaw serves just as well. Set the wheel running true back outwards, going by the inside rather than by the flange of the casting. A roundnose tool can now be set cross-wise in the toolholder with as little overhang as possible, either carbide or high-speed as preferred.

Should you use high-speed, it is a good idea to take a roughing cut across the back of each wheel, and over the flange, before checking for size; then the tool can be removed and re-ground, ready for the finishing cut. Remove enough from the back of the wheel to leave about $\frac{1}{16}$ in. to come off the front. By noting the reading on the topslide dial (the saddle being locked to the bed, of course) or by noting the position of the handle if there is no dial, all wheels will come out much the same for thickness.

On all but the heaviest lathe, the lowest speed in backgear will be required. On a big lathe, and using a carbide tool, the job can be done a good deal faster.

After facing the backs, run the lathe at speed, centre and drill a $\frac{1}{8}$ in. dia. pilot hole, open out to 27/64 in. dia. and ream $\frac{7}{16}$ in. dia. at lowest speed. End by lightly countersinking.

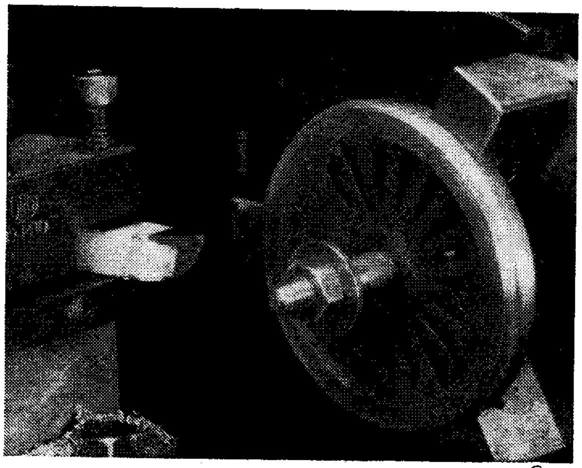
This operation can be performed on all 12 wheels, the bogie and pony being drilled out to 19/64 in. dia. and reamed $\frac{5}{16}$ in. dia.

Incidentally, if you have no chuck large enough to hold the driving wheels, they may be bolted to the faceplate by strips of b.m.s. and bolts through the spokes, the wheels being packed out far enough to enable the boss to clear.

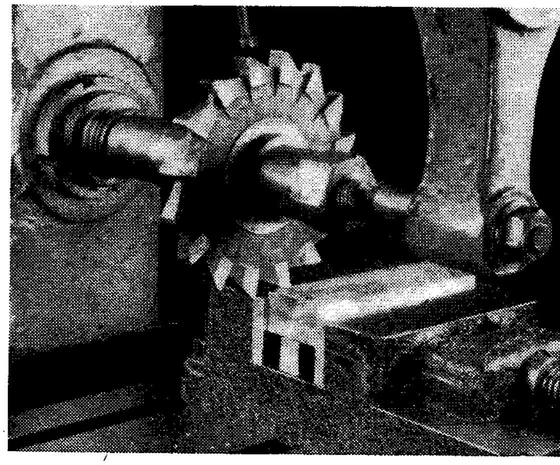
The next operation is to turn the flange and tread. For this the usual type of fixture is required. A spare driving wheel casting will do nicely; otherwise a chuck backplate or pulley casting, or something of the kind a shade smaller in diameter than the finished wheel, will do the job. Make the locking pin first; it is machined out of $\frac{1}{2}$ in. dia. round mild steel. Put a thread, say $\frac{3}{8}$ in. BSF, on one end, long enough to go through the casting. The other end is turned in position.

Now mount up the fixture casting, face right across, and take another very light cut (about 0.002 in.) across the inside 2 in. or so, in order that the back of the wheel being turned bears on its outside only; centre, drill and tap to match the locking pin, which can now be screwed in tightly.

Next, turn the pin to an exact fit for the wheels, to a length a little less than the thickness of the wheel bosses (at this stage); turn down the remainder to $\frac{1}{4}$ in. dia. × about $\frac{1}{2}$ in. long, and thread BSF. Fit a washer and nut.



Fixture for turning front of the wheels



Milling front of the main axleboxes

The wheels can now be mounted in turn for machining the flange, tread and rim. The position of the tool for turning the flange and tread can be seen in the photograph above. A radius of about $\frac{1}{16}$ in. should be left between the flange and tread. If you get chatter as the tip of the tool reaches this radius, stop the lathe and pull the lathe belt by hand very slowly for the last few thou.

By noting the readings on topslide and cross-slide, all wheels should come out exactly the same.

Before going on to the boss, a pointed tool should be used to run around the inner edge of the rim and to make a division between rim and balanceweight.

To machine the bosses, the wheels are chucked lightly by the flange, leaving the centre clear for the tool. This operation can also be carried out on the faceplate, and the wheel need not run *dead* true just for this facing off.

The chamfer on the front edge of the tread can also be put in at this setting. Although it can be done with a file, I much prefer a tool set at the correct angle and run in to a definite reading, which ensures every wheel being alike.

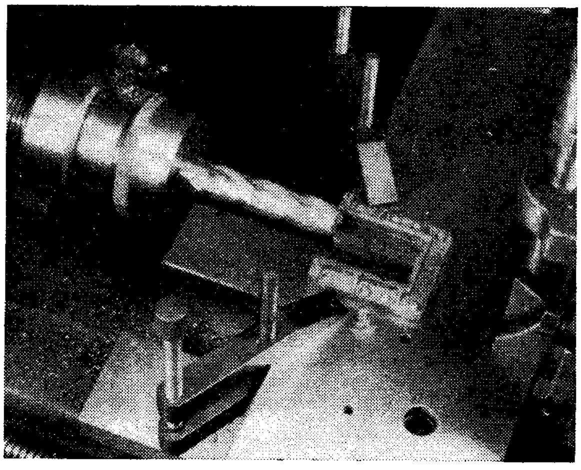
Finally, the flanges need to be rounded. Some folk use a form tool for this, but I don't think it is really necessary when we have only 12 wheels to deal with. My usual method is to skim the sharp edges off with a tool, by manipulating the handles of both the topslide and cross-slide at the same time. Just a touch with a file completes the job.

It is well worth making a simple drilling jig to ensure the crankpins being true and at the correct throw, and on only six wheels I use a piece of mild steel and don't even bother with a hardened bush. The drawing and photograph show the jig and how it is clamped for drilling, using a $\frac{1}{8}$ in. dia. pilot hole, the jig being then removed from the wheel and the hole opened out with the wheel laid flat on the drilling machine table. A 7/32 in. dia. reamer then completes the issue.

The driving axles are turned from $\frac{1}{2}$ in. dia. ground mild steel, and the bogie and pony-truck axles from $\frac{3}{8}$ in. dia. If you have collets for these sizes use them; otherwise the axles can be set to run true in the three-jaw by packing out the offending jaw or jaws with thin brown paper. I was lucky here as my three-jaw proved true to within 0.0005 in. when tested with a d.t.i. on these two diameters. Maybe it was just a fluke !

Turn the wheel seats parallel, to 0.0015 in. larger than the bore of the drivers. Taper the ends only, very slightly, with a smooth file and then try the wheels on. They should just start on their axles by hand pressure. The bogie axles do not have to be quite so tight, so give these a touch with the file if they seem a bit on the large size. We don't want any cracked wheels at this stage of the proceedings !

● *To be continued*



The main frames being held in a machine vice on vertical slide

The first sheet of the working drawings for "Jubilee" is now ready. This gives the general arrangement, frames, buffer beams, hornblocks, wheels, axles and crankpins. It is obtainable from Percival Marshall Plans Service, 19-20 Noel Street, London W1, price 5s. 6d.

WORKSHOP HINTS AND TIPS

RATIOS in GEARING

By GEOMETER

Acquaintance with the main principles of gearing enables many of the problems met with in workshop practice, and in design and layout of simple mechanisms, to be solved without difficulty. In most problems ratios are likely to be involved, for it is usually the function of gearing to achieve definite rates of turning without slip.

In simple gear trains, as at *A*, ratio is settled by the numbers of teeth in the driving and driven gears, without reference to the number of teeth in the intermediate or idler gear. Thus, with 25 teeth in the driving gear, and 50 in the driven, the ratio is 2 to 1, the smaller dividing into the larger twice; in other words, making two turns for one turn of the larger.

The principle applies if there is more than one intermediate or idler gear, as gears in rotating "take in" a tooth and "give out" one. Hence with 25 teeth in the driving gear and 40 in the driven, the ratio is obtained as before: $\frac{40}{25} = 1\frac{15}{25} = 1\frac{3}{5}$ to 1.

Besides connecting driving and driven shafts, intermediate gears can, however, be employed to settle the direction of rotation of the driven gear, and also to distribute wear if this is likely to fall mostly on certain teeth. Simple gear trains with odd total numbers of gears give rotation of the driven gear in the same direction as the driving gear; while even total numbers of gears give reverse rotation.

In a compound train of gears, as at *B*, rotation is the same for the first driving and the final driven gear, but the two ratios must be multiplied together to obtain the final one. With 25 teeth in the first driving gear, 60 in the first driven, 30 in the second driving gear and 50 in the second driven, the ratio is:

$$\frac{60}{25} \times \frac{50}{30} = \frac{3000}{750} = 4 \text{ to } 1$$

The result would be the same if driving gear with 30 teeth engaged driven gear with 60 teeth; and if driving gear with 25 teeth engaged driven gear with 50 teeth.

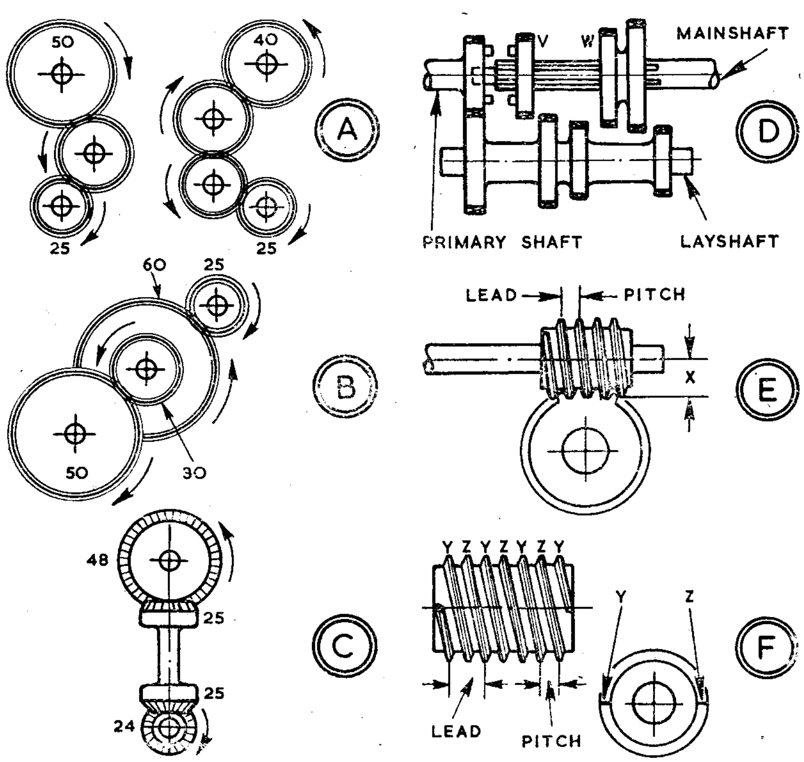
To distribute wear through intermediate gears, the principle is of the "hunting tooth" and is useful where cams may be operated, and where all the load would fall over a few teeth. Thus, as at *C*, an overhead camshaft drive can be arranged for 2 to 1 ratio using appropriate numbers of teeth in the driving and driven gears, and odd teeth in the intermediate gears, the ratio being:

$$\frac{25}{24} \times \frac{48}{25} = \frac{1200}{600} = 2 \text{ to } 1$$

A car gearbox incorporates compound and three-shaft and four-shaft gear trains. In the "crash" type, as at *D*, the engine drives the primary shaft, the mainshaft is coupled to the axle; and the layshaft is in constant mesh with the primary shaft, forming the first ratio of a compound train.

For first, gear *W* is moved to the right; for second, it is moved to the left. For third, gear *V* is moved to the right; for top it is moved to the left, coupling direct primary and mainshafts. For reverse, another gear (not shown) is inserted, making a four-shaft train.

In single-start worm gearing, where lead and pitch are the same, as at *E*, ratio is given by the number of teeth in the worm wheel; but shaft centres can be adjusted by the radius *X* of the worm. Withmulti ple-start worms, the number of starts divided into the worm wheel teeth give the ratio. In a double-start worm, as at *F*, lead is twice pitch, with starts opposite at *Y* and *Z*. ▣



Modelling Severn trows

All the water-gypsy charm of the old Severn river life can be felt in this 18th century panorama by A. E. FIELD who takes the construction of the model a stage further in his second article

THE first measurement was made at the bow, the second 2 in. from the stem, the third 4 in. from the stem, the fourth amidships, the fifth 4 in. from the stern transom, the sixth 2 in. from the transom, and the seventh at the transom. The measurements were made on both sides of the hull.

I found the easiest method was to cut narrow strips of card and to hold one end against the edge of the centre plank while bending it round the bilges and marking it at the point of contact with the sheerline. The strips were then marked for port and starboard sides and numbered one to seven (Fig. 4). I next ascertained how many planks would be required to cover the hull amidships, and divided the strip No 4 into that number of spaces. The remaining strips were then divided into the same number of spaces, the spaces being progressively smaller towards the bow and stern because of the reduced lengths of the strips.

The planks were put on in one piece from bow to stern and the butts of the plank were marked in by scoring with a small chisel after fitting. This enabled the planks to be marked at 2 in. intervals at bow and stern and amidships, with the width of a space from the appropriate strip; and the tapering was then an easy matter. The lower edge of the plank was left straight and the tapering carried out by cutting away the top edge. I did not aim at a perfect fit when laying the planks against each other, as otherwise it would have been difficult to see the separate planks after these had been sandpapered and painted.

While the planks were glued and dowelled as previously described, greater care was taken to prevent the drill penetrating right through the planking in the hold. I stuck a piece of adhesive tape round the drill to indicate the maximum depth the drill had to enter.

After completion of the hull planking, the fo'c'sle and poop decks received attention. Margin planks were cut out with a fretsaw and glued and dowelled into position. The deck planks were laid from the centre line, working outwards towards the sides, the appropriate planks being joggled into the margin plank in accordance with the shipwrights' rule.

To simulate the caulked seam of an actual deck, black Passe-Partout gummed paper was cut into narrow strips and glued to one edge of each deck plank; the projecting edges of the paper and the ends of any projecting dowels being scraped and sandpapered off after the glue had dried. The result is very effective.

Bulwarks and rails were made and fitted, the rudder blade being cut with a fretsaw from a piece of lime, scored on both sides to represent planks then glued and dowelled to a square-sectioned rudder post which had been slotted near the top for the tiller. The gudgeons and pintles for the rudder were made by turning very small drilled " bushes " and soft soldering these to small strips of brass. Small lengths of entomological pins were soldered in the holes of half the number of " bushes " at the same time, and these formed the pintles which were bent round the rudder and secured with short lengths of the same pins, which made excellent rivets (Fig. 5).

The rubbing strake or moulding was made by filing the required shape in the edge of a steel plate and using this to scrape the moulding on a suitably sized strip of wood (Fig. 3). The channels were next cut out and fitted by gluing and dowelling to the hull. The notches for the chains were cut in the edge when the model was being rigged, in order that these could be cut at the correct angle.

Next to be made was the mastbeam, together with the tabernacle and the chock for the heel of the mainmast. The chock was glued and dowelled to the top of the keelson, the two side members being glued to the chock, the thickness of which was slightly greater than the heel of the mast. The two side members were drilled for the mast hinge pin before fitting. The mastbeam was then fitted athwartships, the front edge of the sides of the tabernacle being glued to the after side of the beam.

Sliding covers were made and fitted to the hatches, which I painted dull black inside to give depth.

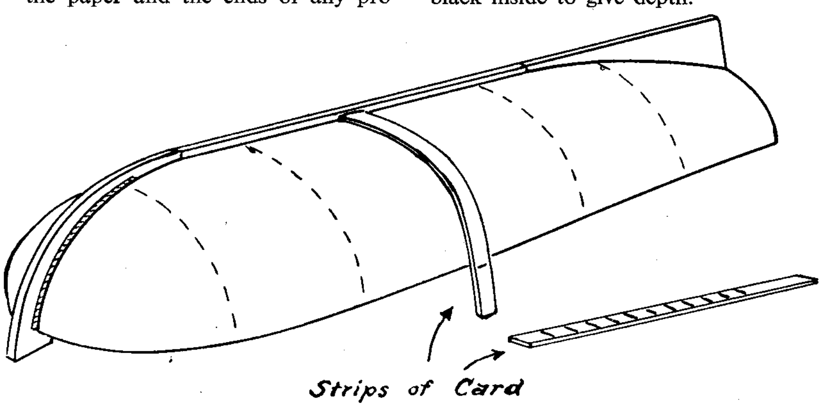


Fig. 4: Measuring the hull to determine the width of the planks

The working winch was built up, the gearwheels originally being of the disc type and obtained from an old electric meter. The spokes for the large wheel were marked out on the disc and the spaces were drilled and filed out with a triangular needle file. The winch drums were turned up in the lathe, the smaller top drum with pinion attached at one end being shorter in length than the lower main drum, an arrangement which enabled the small drum to slide into, or out of, mesh with the main gearwheel. The projecting drum spindles or shafts had square ends at both ends and miniature handles were fitted.

Ratchets and pawls for both drums completed the job.

With the pinion of the small top drum disengaged from the main gear-wheel, each drum could be turned independently. With the gears engaged, the handles would be used on the top shaft and the fall from the tackle wound round the lower drum. This would put the winch into low gear and give considerable purchase. The wooden pillars of the winch were left in natural colours and the metal parts painted with Berlin Black. This paint is very easy to apply, covers well, and gives a very nice matt finish, but unfortunately it is not very hard and will not stand a lot of handling.

At this stage I made the stanchions to support the poles for the sidecloths. These were a simple repetition job, made by bending a piece of strip brass round the shank of a twist drill of suitable size and cutting off to form the semi-circular pieces which were then held in a small vice while the ends were rounded off with a small file. A hole was drilled in the centre and the part threaded on to a piece of wire which formed the shank.

The two parts were now soldered together, cleaned up and painted with Berlin Black. For soldering small parts such as these, I do not think there is anything easier or more simple than the little Britinol kit. I bought mine a long time before the war when the cost was, I think, about 3s. 6d. The self-blowing lamp is very useful and the tube of solder paste is excellent and most economical. I have been using it for at least 20 years and three-quarters of the tube still remains. (Usual disclaimer).

To solder the two parts together, first clean them with a fine file, apply a very small blob of paste (smaller than the head of a household pin) with a needle, at the point of contact on the wire to be used for the shank, thread on the stanchion top, hold it for a second or so in the flame of the lamp and the job is done, requiring only the minimum amount of cleaning up.

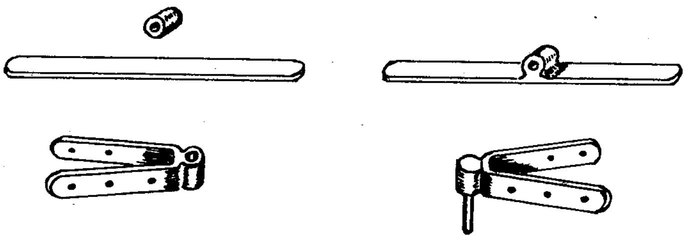


Fig. 5: Step-by-step construction of the gudgeons and pintles

I fitted stanchions in small turned brass ferrules or bushes, painted black, which in turn were pressed into suitably spaced holes around the open hold. The poles were made from $\frac{1}{8}$ in. dowel rod reduced in thickness to the required size.

The deadeyes for the shrouds were turned from round, black vulcanite rod of the same diameter as the finished deadeye; a suitable tool for forming the convex faces, grooving for the strop and parting off, being made first (Fig. 6). With this simple tool, the deadeyes were rapidly turned, after which, the three holes for the lanyards were drilled in each. I cut a small score into each hole in order that the lanyard would not project too far from the deadeye, but the same result can be more easily obtained by using a small countersink.

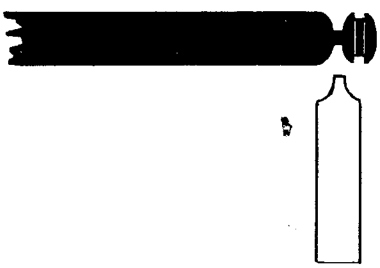


Fig. 6: Tool for turning and parting-off deadeyes for the shrouds

The deadeyes were stropped with thin brass wire, the two ends of which were squeezed out flat, drilled for the rivet, and trimmed up with a small file.

The " chains " for the deadeyes of the trows were actually straps secured to the hull and bent outwards and upwards round the channels, and having a hole drilled fore and aft at the top for the rivet or bolt of the strop. For the models the " chains " were filed up and drilled, using brass strip of very small section.

I built up the anchor from square brass rod which was filed to the necessary taper for the flukes and shank, the palms being cut from thin brass sheet, a thin wire being wrapped round the shank to form the stop for the stock, and the lot being soft soldered together. A piece of brass wire was wound round a drill shank and cut off to make the ring, which was then threaded through the drilled hole in the top of the shank; the two ends were squeezed and soldered together. After painting, the result was quite pleasing.

The wooden stock was filed up from two pieces of boxwood strip (old boxwood rules are worth saving for this type of work), dowelled together while they were being shaped, and separated for the small groove to be cut in each half for fitting round the anchor shank (which I was careful to make slightly smaller than the thickness of the shank). The two parts were then lightly glued on the inner faces, put in position and finally secured with glued dowels, which were hidden by the bands round the stock, made from black paper glued in position.

A pair of bitts with pinrail was made and fitted on the fo'c'sle deck, the starboard post of which carried the hinge pin for the heel of the bowsprit. The belaying pins were made from thin hard brass wire, filed to shape while revolving at high speed in the lathe. The pins were painted black.

Masts and spars were turned from degame, which is very similar to lancewood. The squared parts at the head and heel of the masts were left oversize when turning and then filed square, before removing from the lathe.

Hinge pins were turned, drilled for cotters, and fitted through the tabernacles and the heels of the main and mizen masts. The bowsprit, which also had a square section at the heel, was hinged to the bitts with a similar pin, and the bobstay was fitted with a tackle, the lead from which is belayed to the pinrail fitted to the bitts.

I made the rigging blocks from boxwood, fitting the larger ones with sheaves turned from brass, a simple but monotonous job. For 6 in. blocks a strip of boxwood having a section of $\frac{1}{8}$ in. × 3/32 in. was filed and sandpapered to an oval section. Pairs of holes were drilled along the stick with sufficient space between each pair for cutting off with a fine saw. A groove was cut with a knife edge file along each pair of holes on both sides of the strip. The end of the strip was then sandpapered to a slightly convex shape, a score was cut with the knife edge file on this face, and the partly finished block was cut off. This was held in the forceps and the second face was rounded off and scored (Fig. 7).

A coat of clear matt cellulose finished the blocks. Those that I fitted with sheaves had a slot cut between the two holes and a hole drilled at right angles to the slot through the two cheeks. The small sheave was then inserted in the slot and an entomological pin passed through the cheeks and sheave, the ends of the pin being cut off and filed flush.

The rigging cord was laid up from Dewhurst's Sylko on a rope-making jenny, similar to the one described in MODEL ENGINEER, vol. 89, No 2221, 2 December 1943, and also in *Ship Modelling Hints and Tips* by Jason. This is a fine little machine on which scale-size miniature rope can easily be produced. I used Sylko, sizes 40 and 50, colour black for the standing rigging and dark beige and fawn for the running rigging.

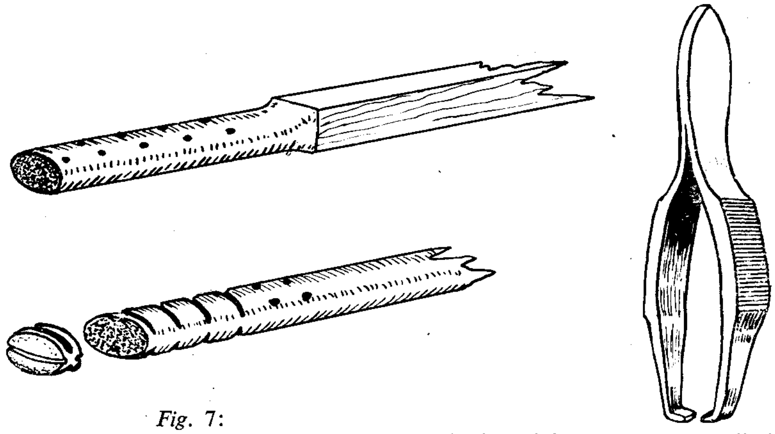
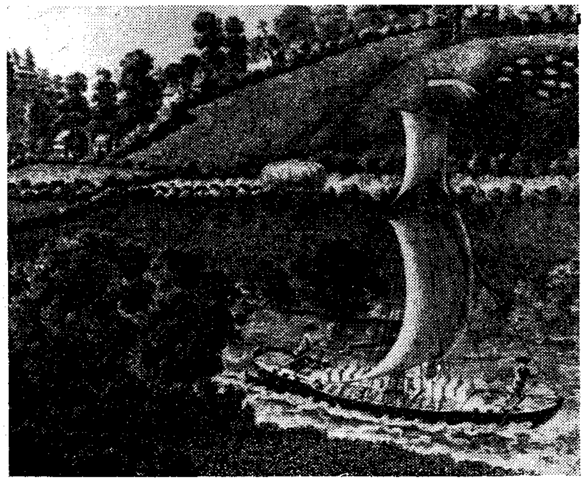


Fig. 7: Old pair of forceps with the ends bent inwards held the rigging blocks for rounding off and scoring the second face



Barge or frigate in James Ross's view of Bewdley 1784. Tickenhill Collection of Mr and Mrs Barker

Owing to the difficulty of splicing such small rope, I resorted to a dodge which is quite effective. The end of the rope to be spliced was seized to the standing part with a couple of turns of No 50 nigger brown or black Sylko, but the ends were purposely left a few inches long and were not cut off at this stage. The end of the rope was then cut off about $\frac{5}{16}$ in. beyond the seizing, and the strands were teased out, smeared with Seccotine and then twisted round the standing part. The long end of the nigger brown or black seizing was used to make the serving of what I call a lazy splice. These proved so successful that I doubt whether anyone could readily distinguish between a proper splice and one of these "lazy splices."

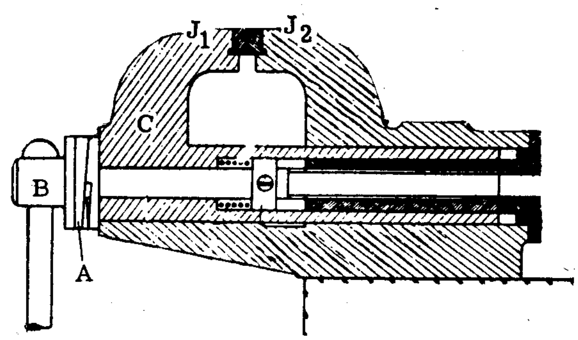
● *To be continued*

QUICK CLAMPING VICE

THE special feature of this vice is that workpieces of various thicknesses can be set between the jaws *J1* and *J2* and the vice completely tightened by only a quarter turn of the handle.

The element which enables this is a washer unit *A* between handle boss *B* and vice body *C*, which comprises three wedge-shaped washers. These component washers can be turned in relation to one another to increase or reduce the effective thickness of the washer unit and so affect the spacing of the vice jaws. The final tightening up is by the vice screw itself.

Digested from "Morsa da Banco a Chiusura Rapida" in "Il giornale dell 'officina," 15 August 1956.



Simplex valve gears

E. G. RIX, an engineer who also makes a hobby of his profession, replies to a New Zealand reader who could not understand the seeming paradox of a shuttle which moved against incoming steam

PUZZLED by a diagram in MODEL ENGINEER showing the mechanism of a Richardson engine, a New Zealand reader—R. N. Wakeling of Morton Mains, Invercargill—wrote to Noel Street for enlightenment. With his letter he enclosed a copy of the diagram—one of the illustrations which I used for my article in this series on 18 April last year.

After quoting my explanation that I had drawn the diagrams for the article solely to show the principle of the gear and to make its operation as clear as possible, our New Zealand friend continued:

I am still at sea on the following point:

The piston moves to the right and uncovers port W1 *to its propelling steam, which moves the shuttle to the left, carrying the slide valve with it. Now, the slide valve is quite well open before port* O1 *is closed by shuttle-valve* S1. *Why does the incoming steam not prevent it from moving over to close port* O1 ?

I have studied the diagram for long periods, and I realise that in the early stages shuttle S1 *receives some help from steam through port* O *acting on* S, *and that, perhaps, the uncovering of* W1 *to the propelling steam as the piston moves left helps; but I still cannot see the reason. If it is due to the disposition of ports, I should be pleased if you would give me a diagram showing correct placing, sizes, and valve travel, say in 5 in. gauge.*

As the reply which I have sent to Mr Wakeling interests others, I am quoting it here:

It is gratifying to learn of your interest in Simplex valve gears, as shown by your study of the apparent paradox of the shuttle moving against incoming steam along port *O*1. The paradox no longer exists if we give (as we must) some measure of time to the sequence of operations.

Let us again study the operation of the right-hand side of the gear. The piston is moving to the right and has full pressure on it at the time of uncovering port *W*1. (Note that no expansion is employed.)

The whole pressure is now on shuttle *S*1 and, what is equally important, the cavity behind *S*1 is full of steam. By the time that piston valve *V*1 cuts off port *W*1 (about dead centre of the slide valve) the shuttle is moving at a high speed, and although no more steam is being admitted behind shuttle *S*1 it is still being pushed by the expanding steam in the cavity behind it.

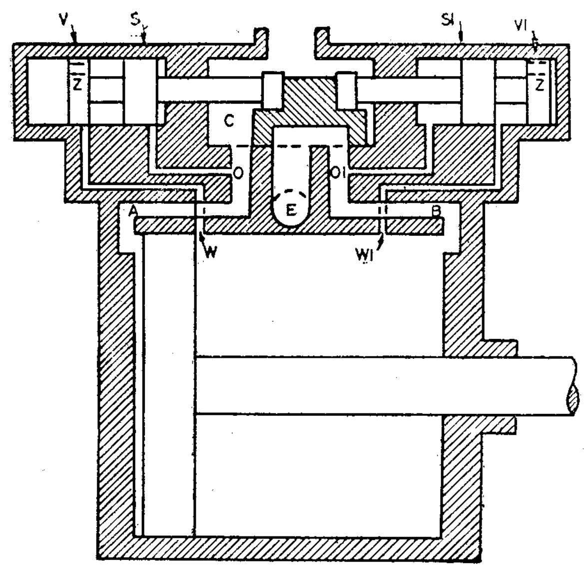
Now, at this instant the main slide valve opens up main port *B*, and although the port has had a very rapid opening it takes some time before pressure rises along port *O*1. By this time, owing to its speed and the expanding steam behind it, shuttle *S*1 has completed its journey and closed port *O*1. Incidentally, once over dead centre the main valve requires very little energy, owing to reduced pressure on the sliding faces. The left-hand portion of the valve gear during the cycle under observation has been inoperative since the pressures are balanced within the cylinder of the shuttle.

I very much regret that I cannot help you with working drawings. When I made a model of this gear, the only drawing I made was scribed out on a piece of zinc, an old clock face, which has long since been cut up. Bore and stroke were $1\frac{1}{2}$ in. × $1\frac{1}{2}$ in., the shuttle was $\frac{9}{16}$ in. dia. and the ports (I think) were $\frac{1}{16}$ in. × $\frac{5}{16}$ in. The shuttles were grooved and packed, the shuttle spindles were glanded, and the slide valve had no lap. The shuttles and their spindles were separate, being secured by a setscrew accessible through a plug hole in the body. The spindles, of $\frac{1}{16}$ in. dia., were stainless while the shuttles were manganese bronze. I am sorry the details which are quoted from memory are so meagre.

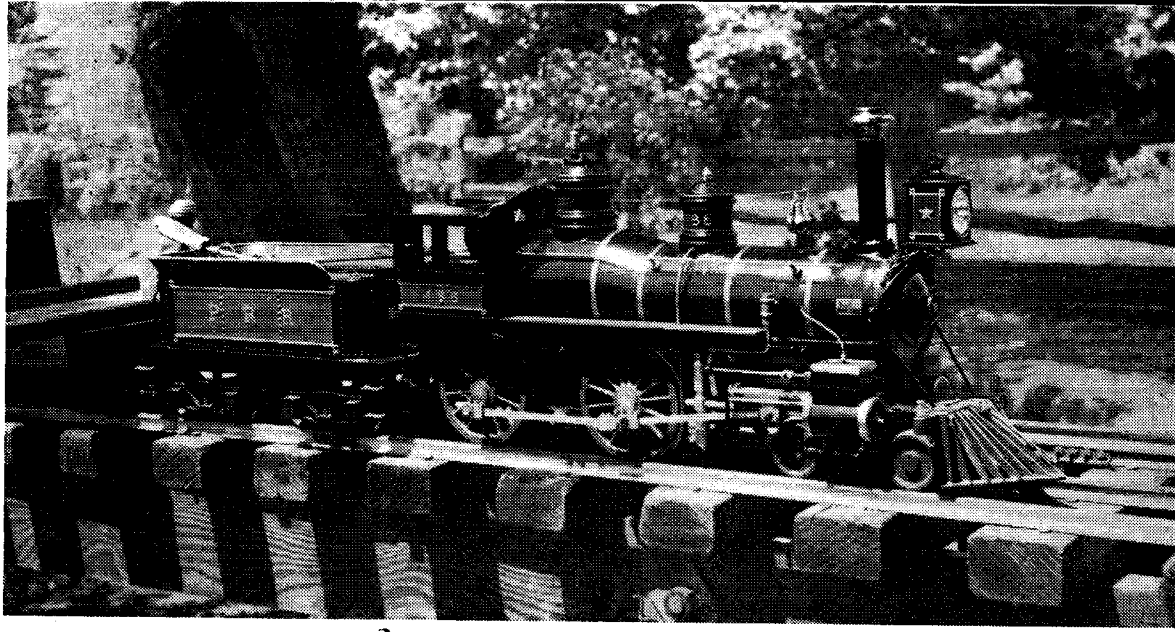
I cannot overstress the importance of maintaining concentricity during the making of a model of this description. Steamtightness with a minimum of friction is the goal to be attained.

Do not make large ports. It is a fallacy here, for we are not after high speeds. Most Simplex engines, when scaled down to the sizes in which we are interested, dislike water with their steam. I spent a long time experimenting with a Cameron Simplex I had made which failed to work on a locomotive but worked perfectly when by chance it was driven by compressed air. Either keep your steam pipe short and lagged or superheat the steam a trifle.

I do not know to what use you propose putting this Simplex, but as you mention 5 in. gauge I presume it is either for a feed pump or an air compressor, in which event your cylinder would probably require to be about $1\frac{1}{8}$ in. × $1\frac{1}{8}$ in. bore and stroke (depending on boiler pressure) and the shuttle, say, $\frac{1}{2}$ in. dia., depending upon the standard of fits. ▣



"I was still at sea." The diagram which puzzled R. N. Wakeling in NZ



MODEL BOAT SPEEDS FOR 1957

The North American s

Canadian and US model makers at work

PERHAPS the most interesting news from the US model boat field is the new Class E (stock 10 c.c.) world's record set up by Larry Richards' McCoy powered boat on 22 September 1957. An official speed of 90 m.p.h. was registered.

Larry is a native of London now living in the USA. He is a member of the New York Model Power Boat Club. The hull of his vessel was designed by Tom Murphy of the same club.

A new Class F (5 c.c.) record of 73.77 m.p.h. was set up by Chas Baxmann of The Detroit Model Power Boat Club in a race on 14 August 1957. A McCoy 29 engine was used in a Baxmann hull design.

Stan Sjoberg of Solna, Sweden has set a new Class H record of 38.13 m.p.h. with a Webra 1.5 c.c. engine.

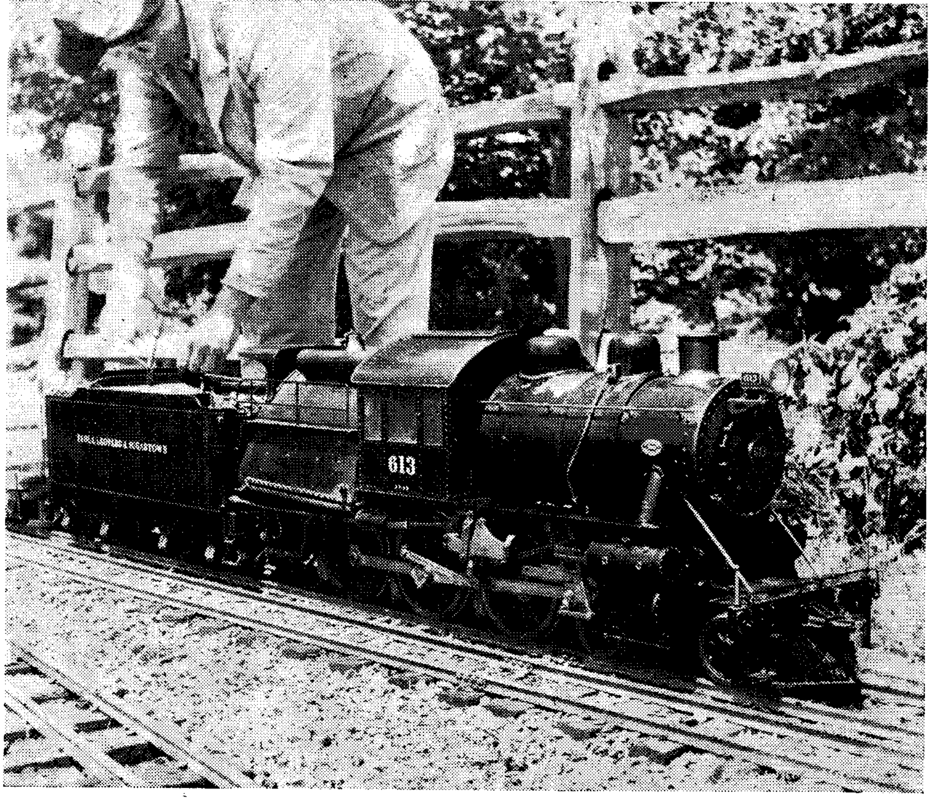
A new screw-driven boat record of 68.18 m.p.h. with a McCoy 29 was made by James Irwin of the Indianapolis Model Speed Boat Club on 6 July 1957 at a Detroit race and a new Class D air-screw record of 52.32 m.p.h. was made by Chadd Rector of the Indianapolis Club using a Space Bug 0.049 c.i. engine on 7 July 1957 also at Detroit.

The last three classes are not used

Photo by Robert Graham

Larry Richards (left) a Londoner now living in the US, meets Gems Suzor of France at a Flushing, New York, race meeting

W. H. Moorewood's old time ¾ in. scale locomotive on the track at Paoli, Pennsylvania, USA



On the Paoli track, a 1 in. scale ten wheel centre-cab locomotive by George Thomas of Haverton

scene

in England but the speeds attained may be interesting. **BOB GRAHAM**

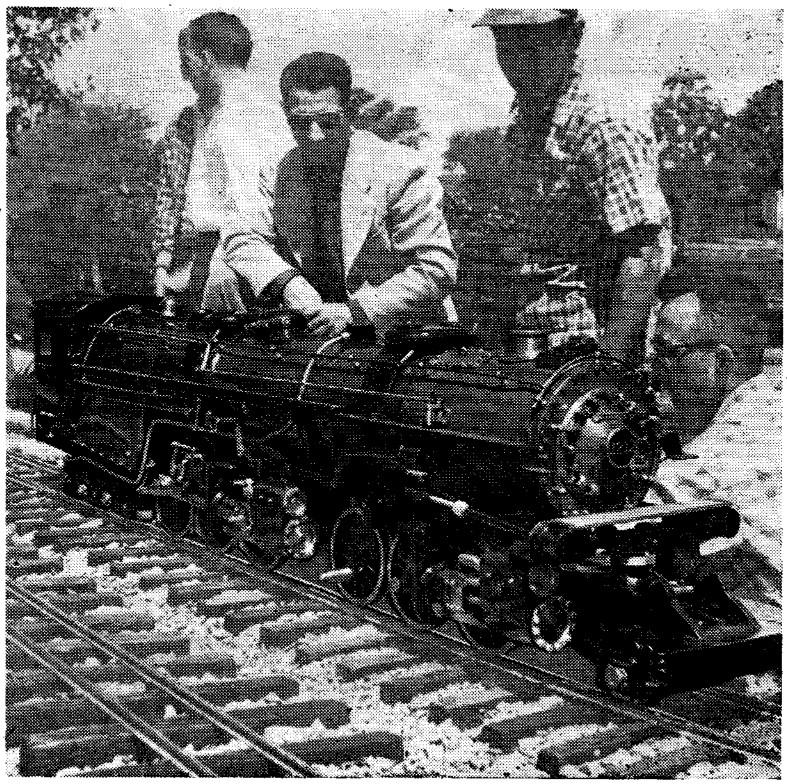
● *The pictures on pages 598-599 were taken by Bob Graham.*

LOCO ACTIVITIES IN CANADA

LOCOMOTIVE BUILDERS are busy in Canada generally and particularly in the maritime provinces of New Brunswick and Nova Scotia. There are many model engineers in Canada but they are spread out over a vast area. However, the very size of our country encourages us to make light of a three or four hundred mile car trip at the end of which is a chinwag with a fellow modeller, his interests attuned to one's own.

Every Sunday morning in Toronto, a city now some 40 miles across, you can see LBSC locomotives and American types under steam on a splendid track. The Toronto Society of Model Engineers, whose track it is, has a keen membership of over a hundred. At the moment locomotive activities in Montreal are rather quiet. Their track was on Canadian National Railways property and has had to be dismantled. Montreal needs some young, fresh blood.

In New Brunswick and Nova Scotia there is plenty of activity although the numbers are few. At present I am running a *Juliet* and a modified *Bantam Cock*. There is a sprinkling of other completed locomotives and some magnificent models are being built. In 1957 the St John



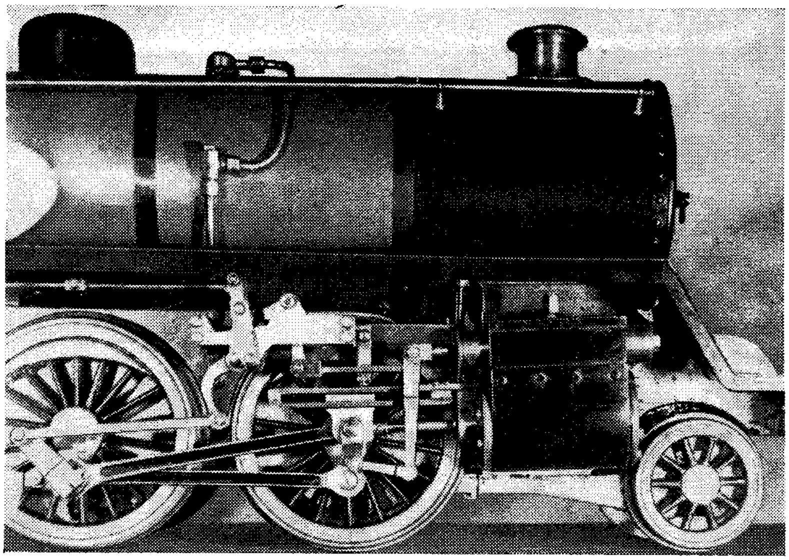
A 1 in. scale articulated loco built by Harry Quick of Mahahoy City, Pennsylvania and operated on the track at Paoli

Exhibition Association financed a 250 ft straight track with 2½ in., 3½ in. and 4¾ in. gauges, and it is confidently expected that a 600 ft loop will be completed this year.

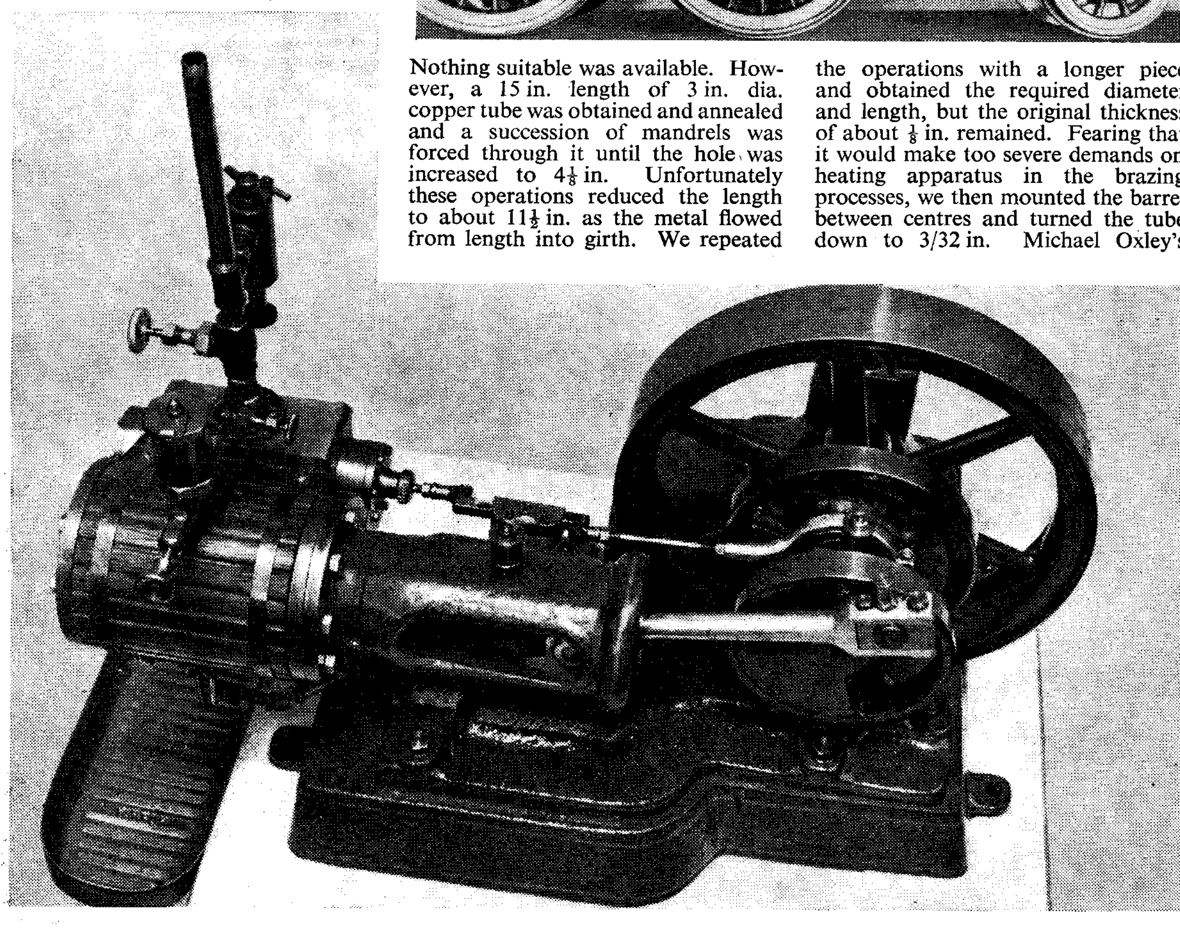
The Atlantic Live Steamers Association is backing this track, and if we get the loop this year it will probably be the best locomotive track in Canada. It is a little early to speak confidently, but we expect to have a meet in August and invite our friends from the United States. They love to come to Canada in the summer, and we are looking forward keenly to these future possibilities.

An amusing incident occurred in constructing the boiler of the locomotive shown above. It is a good illustration of some of the difficulties we have here in obtaining materials.

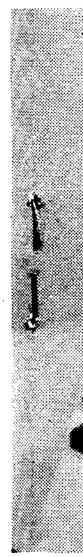
We required a finished boiler shell of 12⅝ in. in 4¼ in. dia. copper tube.



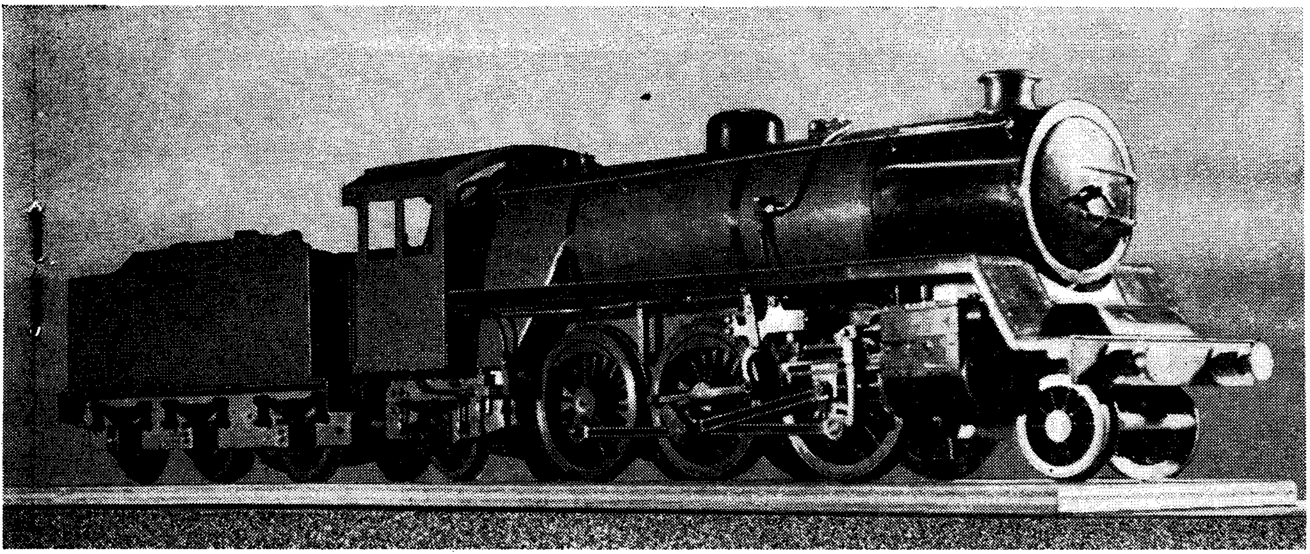
Nothing suitable was available. However, a 15 in. length of 3 in. dia. copper tube was obtained and annealed and a succession of mandrels was forced through it until the hole was increased to 4⅛ in. Unfortunately these operations reduced the length to about 11½ in. as the metal flowed from length into girth. We repeated the operations with a longer piece and obtained the required diameter and length, but the original thickness of about ⅛ in. remained. Fearing that it would make too severe demands on heating apparatus in the brazing processes, we then mounted the barrel between centres and turned the tube down to 3/32 in. Michael Oxley's



C. E. Silvers built this 1½ in. bore 1½ in. stroke engine from a set of Bohaboy castings and designed and added his own governor and piston valve



" Over a year ago I had these pictures made to se
MODEL ENGINEER requesting photographic records of
Sickness and death in my immediate circle have prev
to send them to you until now. I myself am entering th
must suffice."



methods have their transAtlantic students!

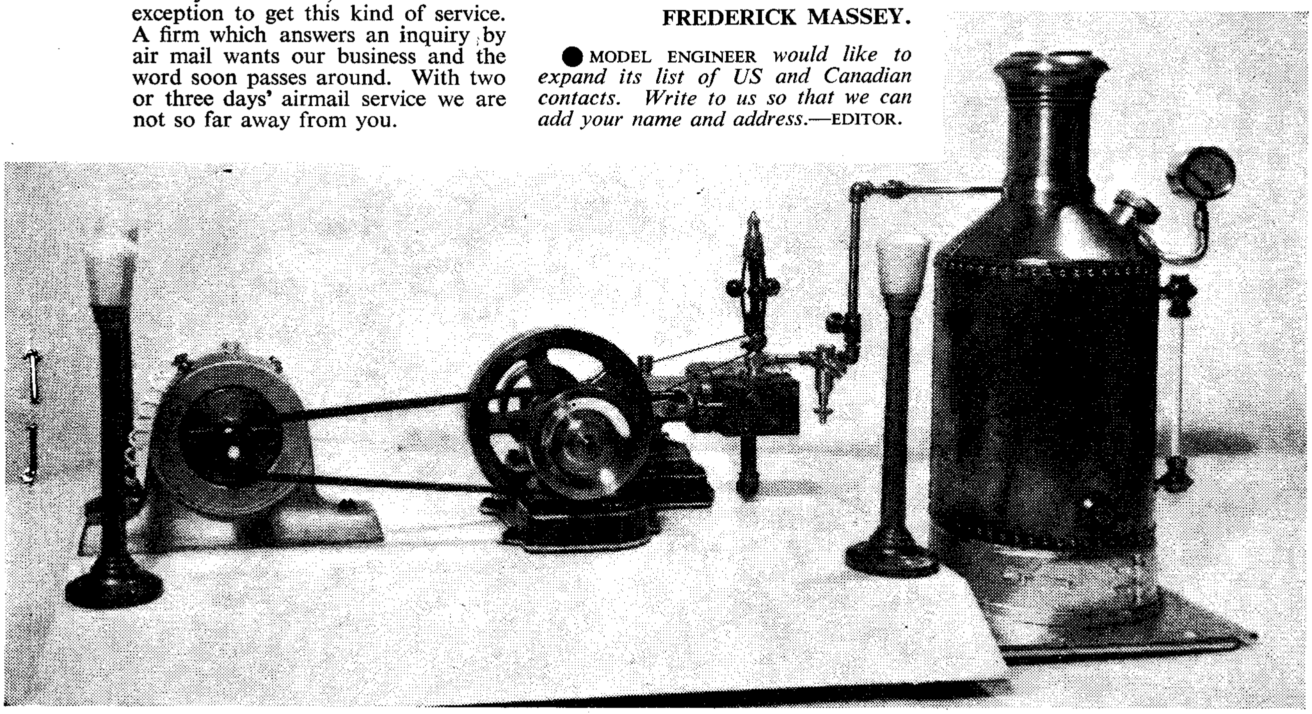
Despite our difficulties, how much we appreciate the very good service that one or two British firms have given us in the matter of supplies. We say one or two, because it is the exception to get this kind of service. A firm which answers an inquiry by air mail wants our business and the word soon passes around. With two or three days' airmail service we are not so far away from you.

If any newcomers to Canada would like to contact locomotive fraternities here they should get in touch with MODEL ENGINEER before leaving the UK. I should be very pleased to hear from any who may wish to settle in the Maritime Provinces.

FREDERICK MASSEY.

● MODEL ENGINEER *would like to expand its list of US and Canadian contacts. Write to us so that we can add your name and address.*—EDITOR.

Frederick Massey's BANTAM COCK, *with detachable smokebox and top water feed, will haul five or six adults with ease. The modified Baker valve gear (above, left) made the very high running boards necessary*



de to send to you, as I had noticed an article in cords of the efforts of the craft for publication. ave prevented me from carrying out my intention tering the hospital tomorrow, so a brief description

C. E. SILVERS

This ¾ in. bore ¾ in. stroke engine, also built from Bohaboy castings by C. E. Silvers, was finished in 1955 with some modifications of his own design

PANSY

In this week's instalment LBSC describes the cylinders for the 5 in. gauge GWR pannier tank

Continued from 17 April 1958, pages 488 to 490

As the coupling-rods for *Pansy* are made in the way that I have so often described for other engines in these serials, there is no need to repeat the ritual in full detail, especially as I referred to the job recently in my notes on " Ways and Means." They can be cut from 1 in. × $\frac{3}{8}$ in. mild steel rod, and milled, turned, or sawn and filed by the methods previously detailed out.

Note that I have shown straight rods in the drawing. Those on the full-size engines are fish-bellied, deeper in the centre than at the bosses, but this is of no advantage whatever in the small one, and entails more work. However, if anybody prefers fish-bellied rods, the easiest way to produce them would be to mill them straight, and then file a slight slope from the centre toward the bosses. If turning the surplus metal away with the blanks between centres, just turn to the desired shape instead of parallel; file away the rounded top and bottom after turning.

There is another way of turning (or rather facing) off the surplus metal from the blanks, and as some may care to do it that way, I have made a sketch plan showing how.

The blanks are bolted edgewise to the faceplate and operated on with a roundnose tool set crosswise in the rest. The attachment can be either by a cleat with a piece of packing the same thickness as the blanks, or by a bent clamp and bolt, as shown at top and bottom of the sketch respectively.

I used this method now and again in the old days at Norbury when I only had a foot lathe and no miller, but frankly I'm not particularly in favour of it, the objection being the intermittent cut. Bang-bang-bang all the time, and unless the clamps are very tight, the tool will knock the blanks through the workshop window if the feed is crowded. However, it certainly saves a lot of sawing and filing !

Another point is that on the full-size job the rods are recessed on both sides, but I have specified front recesses only, for two reasons. One is that the side next the wheels isn't seen, and the second and more important is that it adds to the strength of the rods. If they were thinned down on both sides in proportion to those on the big engines, and the engine slipped violently when starting a heavy load (such things *do* happen with inexperienced drivers on club tracks !) the rods would probably buckle up. In full size, the weight that has to be flung around is of vital importance, but on a little engine the weight of the small rods is practically negligible. Note that the rods are not fluted, which is Swindon practice.

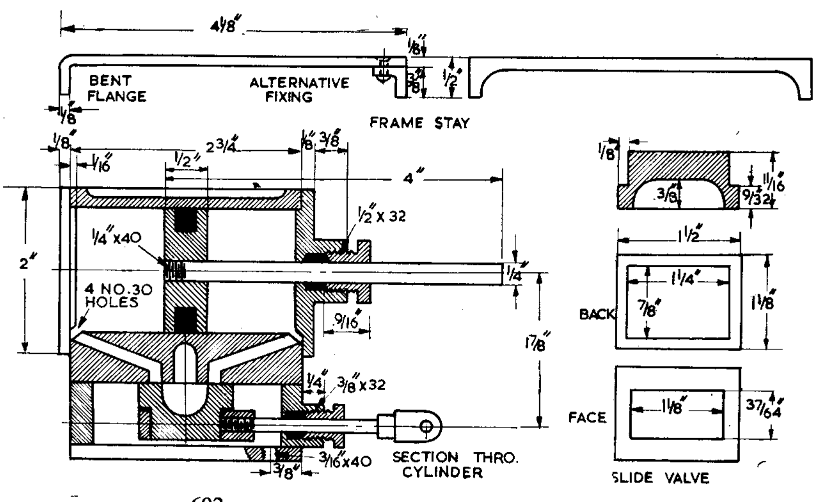
The bushes can be turned from drawn bronze rod, and pressed into $\frac{1}{2}$ in. holes in the bosses. The driving bush should be a nice fit, but the leading and trailing bushes should be quite easy, to allow for axlebox movement. The knuckle joint is made by slotting the end of the shorter rod with a $\frac{3}{16}$ in. cutter and pin-drilling both sides of the bigger boss to form a tongue which fits the slot. The pin is turned from silver steel.

The little brass oilers on top of the coupling-rod bosses give a finish to the job. First centre the tops of the oilboxes and drill a $\frac{1}{16}$ in. hole right through into the journal hole. Open out with $\frac{3}{16}$ in. drill to $\frac{1}{4}$ in. depth. Turn the oilers from $\frac{5}{16}$ in. brass rod to shape and size shown, and press them in.

The holes can be left open. On the LBSCR we used to plug them with little bits of cane, which admitted air and allowed the oil to flow. But sometimes when taking a curve a bit swift the engine would lean over, then if the springs were down a bit, the bits of cane would hit the underside of the runningboard and be knocked in so that they wanted some getting out !

Although it was necessary to redesign the cylinders owing to lack of room for an adequate pair of slide valves between the bores, I have managed to keep fairly closely to the proportionate dimensions of the full-size engine. Bore and stroke are correct, and the ports are right as regards width, but I had to shorten them slightly to make room for a central stay in the middle of the portface for the steam chest cover.

I didn't fancy that vast area of cover being unsupported ! This, however, turned out an advantage, as it gives a clear and unobstructed entry for the steam, which comes down through a hole drilled between the bores, and enters the steam chest through a hole in the portface between the slide valves.



The arrangement of slide valves is the same as on my Webb compound *Jeanie Deans*. The valves are of ample size, and when they are seated on the portface by steam pressure there is $\frac{1}{16}$ in. clearance between them and the cover. When steam is shut off they drop clear by a bare 1/32 in. The valve spindle and buckle are quite strong enough to support their weight, so I have dispensed with a tail spindle, but this can easily be added by anybody who prefers it, and I'll return to that matter when describing the valves.

Machining the cylinder casting

If a big powerful lathe is available, the cylinder casting can be machined in the way I have often described for smaller cylinders, which is to mount it portface down on an angleplate attached to the faceplate, fix it with a bar across its back having a bolt at each end, set one bore to run truly, open out to $1\frac{1}{2}$ in. dia. with a boring-tool in the usual way, then shift the angleplate until the other bore runs truly, then ditto-repeato operations. This ensures both bores being parallel. Face off the end to half the difference between the length of casting and finished length, then face the other end with the casting on a mandrel.

The casting is rather too heavy for this method to be used if the available lathe is a Myford ML7 or any other make of similar size, and the alternative is to mount the casting on the saddle and use a boring-bar between centres. If the portface isn't fairly smooth, teach it good manners with a file. If the coreholes are reasonably true, no marking-out is needed, but if after checking off they are found to be "out," smooth off the end of the casting with a file, plug the holes with pieces of wood, mark the correct centres on them, and strike off the $1\frac{1}{2}$ in. circles on the casting from those centres. If the end of the casting is coated with marking-out fluid, the circles will stand out clearly.

Mount the casting on the lathe saddle, packing it up to centre height. If the coreholes have been plugged, and the centres marked on them, this is easily done by packing under the casting until the lathe centre point is "spot-on" with the marked centre. The casting should be portface down, set parallel with the lathe centre line by testing with a try-square—stock to faceplate and blade to side of casting—and secured with a bar and two bolts as recommended for fixing to an angleplate. Note that the packing must be parallel, and the casting fixed so that it cannot accidentally shift.

The boring-bar should be not less than $\frac{3}{4}$ in. dia. and the cutter not less than $\frac{1}{4}$ in. and the setscrew must hold the cutter tightly. Small boring-bars are not usually provided with screw adjustment, but it is easy enough to drill and tap a $\frac{3}{16}$ in. $\times$ 40 hole alongside the cutter hole, and make a screw with a big cheesehead to fit. The head should overlap the cutter tail, so that by slacking the cutter setscrew and turning the adjustment screw, the cutter can be advanced out of the bar by very small amounts, and the cut adjusted to precision limits.

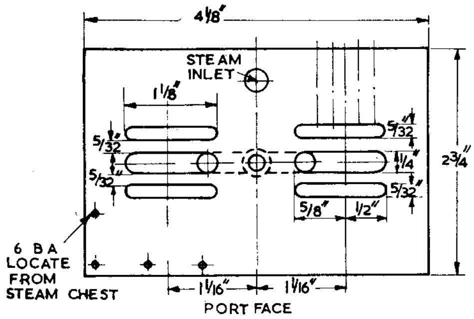
Put the boring-bar through the corehole on the mounted casting, and set it between centres, which should be tightened sufficiently to prevent end movement. Set the cutter to take out about $\frac{1}{16}$ in. from the corehole, to get under the skin of the casting, then with the changewheels set for a fine feed, engage the self-act and go right ahead.

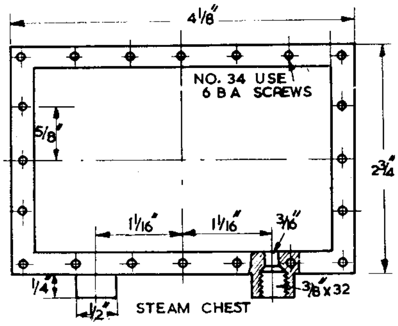
I keep my Milnes lathe set up for 110 t.p.i. and this is about right for the present job. Incidentally, one great advantage of a gearbox such as the Myford, is that a coarser feed can be used for roughing, and a very fine feed for finishing, by simply shifting the lever. I have found this very handy, as I'm too lazy to do much wheel-changing!

Rough out to within about 1/64 in. or less than finished diameter, then shift the saddle—not the casting—until the second bore lines up with the lathe centres, and give that one a dose of the same medicine; then regrind the tool, and take the finishing cut. Go through two or three times without any further adjustment of the cutter, then line up the first bore again, and finish off that one without shifting the cutter. The two bores should then be exactly the same size and dead parallel, which is as it should be.

The ends of the casting can be faced off on a mandrel between centres. I use a Lecount expanding mandrel with steps on the blades, and set up a casting of this sort so that the end of it just overlaps a step, which allows facing over the lip of the bore. An improvised mandrel can be made from a piece of steel shafting anything over $1\frac{1}{2}$ in. dia. and about $3\frac{1}{2}$ in. long. Centre-drill both ends, mount between centres and turn about $2\frac{1}{2}$ in. length to a tight fit in the cylinder bores. When the casting is mounted on this, it will overlap the end without preventing the tailstock centre supporting the mandrel. If a bit of shafting isn't available, a piece of hardwood will do at a pinch, but it needs to be held very tightly between centres. I find that a roundnose tool with the business end bent to the left is just the identical for a facing job of this kind.

The portface and the sides of the casting can be faced off in the manner I described in "Ways and Means," so there is no need for repetition; but watch the balancing, as this cylinder block is mighty heavy for the average small lathe. Set it as centrally as possible, and put the balanceweight opposite the angleplate. Use a roundnose tool set crosswise in the rest with as little overhang as possible.





Ports and passages

If you have a vertical slide, the port-cutting is just a piece of cake. Either mount the casting on an angleplate bolted to the slide, or bolt the casting to it direct with a bar over each end, secured by bolts. The casting must be set level, and exactly at right angles to the lathe centre line; application of rule and try-square will soon settle that bit of business! If no vertical slide is available, the casting will have to be bolted to the saddle in a manner similar to the set-up for boring, but with the portface towards the headstock. It will be too big to go under the slide rest toolholder. The portface should be coated with marking-out fluid and the ports marked out very clearly.

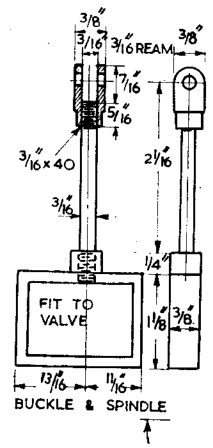
Put a 5/32 in. endmill or slot drill in the three-jaw, set a steam port level with this either by adjusting the vertical slide, or by packing under the casting if mounted on the saddle, and feed into cut by turning the leadscrew. Traverse the casting across the cutter with the cross-slide, *and be mighty careful to avoid overrunning the ends of the ports.*

chippings. The critical point is when the drill pierces the port, which is fatal to the drill if fed in too quickly.

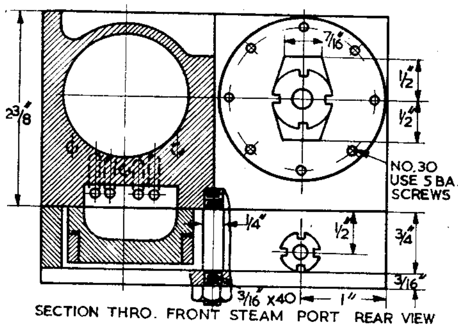
Passages can be drilled by hand if the casting is held in the bench vice at such an angle that the drill will hit the bottom of the port if the handbrace is held horizontally; but the same strict caution must be observed to save the drill point going west when it pierces the port.

Exhaust outlet

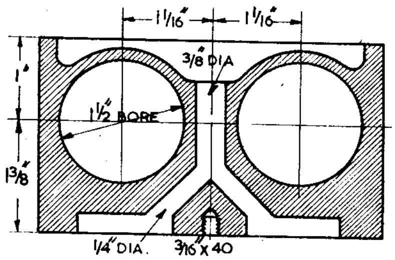
With this arrangement of cylinders you get a very free exhaust, the steam going straight from the port slap-bang up the blastpipe with the genuine Great Western bark. In the middle of the recess on top of the cylinder casting, centrepop and drill a $\frac{3}{8}$ in. hole $1\frac{1}{4}$ in. deep. From the inner end



BUCKLE & SPINDLE



SECTION THRO. FRONT STEAM PORT REAR VIEW

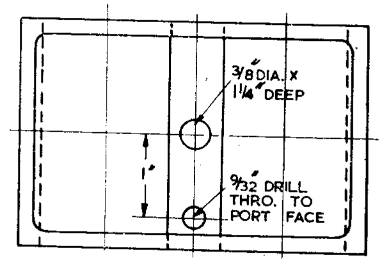


SECTION THRO. EXHAUST PORT

Beginners and inexperienced workers should fix a stop on the slide; when on the munition job in the Kaiser's war I fixed up adjustable cross-slide stops on the small centre-lathes, and all being well, will illustrate them in a further "Ways and Means" article. If cuts of about $\frac{1}{16}$ in. depth are taken, clean ports will be easily made; they should be $\frac{1}{4}$ in. deep.

When one port is done, traverse the cross-slide to bring the corresponding port right for cutting; then adjust the vertical slide, or alter the packing as the case may be, to bring the other steam ports into line. When they are done, change the cutter for one of $\frac{1}{4}$ in. dia. and cut the exhaust ports.

Communication between steam port and bore is by four No 30 holes. File a bevel at the lip of each bore, and mark out and centrepop the entrances to the passages. Grip the casting in a machine vice on the drilling machine table, at such an angle that the drill will just meet the bottom of the port; this can be sighted by bringing down the drill outside the cylinder. Then go ahead and drill. Don't forget the tip about grinding the drill slightly off-centre, so that it is easy in the hole, and keep withdrawing it to clear



TOP OF CYLINDER CASTING

of each exhaust port, drill a $\frac{1}{4}$ in. hole into this at an angle of about 45 deg., as shown in the section. If the area around the hole isn't smooth, endmill it off, or go over it with a riffler file. It doesn't have to be true to "mike" measurements, just smooth enough to make a steamtight joint when the blastpipe flange is attached to it with a gasket between the contact faces.

At 1 in. ahead of the exhaust way, drill a 9/32 in. hole right through the casting between the cylinder bores, and tap the upper end $\frac{5}{16}$ in. $\times$ 32 or 40 for the steam pipe. A hole will be drilled and tapped into this for the oil feed, but that job can be left until later, as I haven't definitely settled yet about the cylinder oiling arrangement. Meantime drill a 5/32 in. hole $\frac{1}{4}$ in. deep, right in the middle of the portface, and tap it $\frac{3}{16}$ in. $\times$ 40 for the cover stay. The portface can then be trued by rubbing it on a piece of fine emerycloth or similar abrasive, laid on a surface plate or something equally flat.

The front covers are just plain turning jobs, the casting being held by the chucking-piece in the three-jaw, turned to 2 in. dia. and the register faced and turned to a nice fit in the bore. Face the flange with a knife tool and very slightly undercut it. The cover can be held in a stepped bush for parting off the chucking-piece and facing the outside.

● *To be continued*

The second sheet of drawings for *Pansy* is now available. It gives details of the hornblocks, axleboxes, wheels, axles, coupling-rods and cylinders and may be obtained from Percival Marshall Plans Service, 19-20 Noel Street, London W1, price 3s 6d.

THE T-SLOTTED CROSS SLIDE

In this first article of a series of two MARTIN CLEEVE discusses some of the advantages and describes the design of this kind of slide

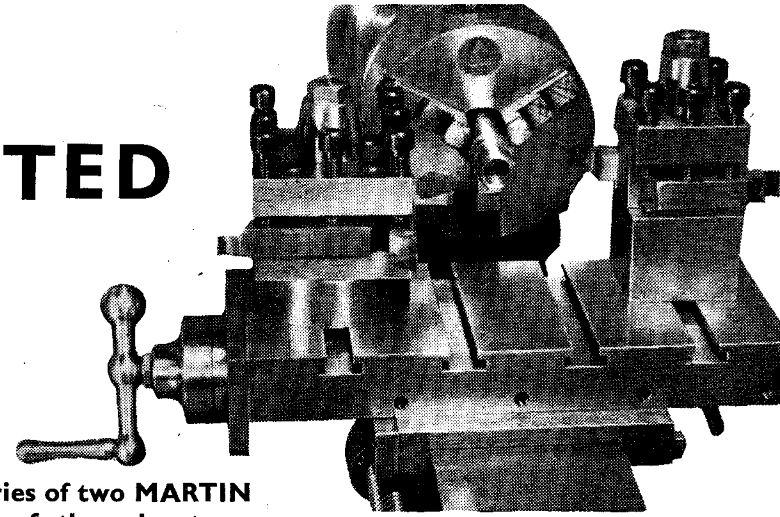


Fig. 2

We have now reached those items for which the help of a lathe larger than the EW would be an advantage, although for this slide it is quite possible that the experienced man will be able to manage if rather more hand work is not objected to.

Some readers may remember my article describing a method for making T-bolts [ME 9 August 1956]. Having prepared the T-bars for cutting to form T-bolt heads it occurred to me that similar bars would form the basis of a highly practicable T-slotted table. With this thought in mind my first action was to lay out the T-bars on the surface plate as shown in Fig. 1, and to contemplate the picture with rising enthusiasm as the many advantages and possibilities chased each other through the mind:

Minimum milling. What milling there is is light. No risk of cutter failure through jamming in the slot because a slot is not there during milling. You can have any pattern and size T-slot desired. If fancy takes one, the T-pieces can be made from high tensile steel or gauge plate which could be hardened before fixing. The T-slots can be assembled easily and to precision limits if desired. All machining is done step by step: one faulty part would not spoil the whole. The pieces do not call for a special cutter: they can be endmilled or milled with an ordinary radial cutter. If a slot component is damaged in actual use it can be replaced without trouble. The milling set up is simple and anyone with the most crude facilities will be almost guaranteed success. Compared with milling from the solid—it's a piece of cake !

The slide made upon these lines for the EW is illustrated at Fig. 2 where it is shown tooled with built-up front and rear turrets.

On the question of strength and suitability, it is only natural that

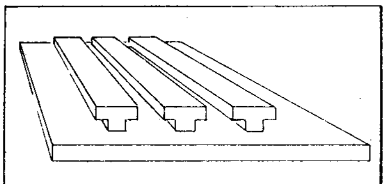


Fig. 1

the prospective constructor will want some reassurance. While I think it will be agreed that it would be an unpleasant task to test it to destruction in the approved manner as a prelude to quantity production, I can say that it has stood up to all normal use without showing any signs of weakness or distortion and it does not have to be used as though made of Ming china.

I particularly asked my friend, for whom the slide was made, to set aside any question of personal feelings and to tell me of the least fault or trouble and that if it was no good to say so, using just those two words. Well, he has done all ordinary turning, parting and milling within the full capacity of the strength of the remaining lathe components and has found nothing wanting, but he did say that, since I was so fussy, the ends of the T-fixing screws which were originally polished out of sight are now just beginning to show—but he thought that would hardly justify a return to the original non-slotted slide !

SLIDE DESIGN

When designing a T-slotted cross slide, or boring table as it is sometimes called (a name symbolic of olden days when the full value of T-slots on a small lathe was not understood and their sole function was to hold work too heavy to swing for boring large holes), it is as well to make it of sufficient length to accommodate a front and rear toolpost and at the same time leave plenty of room between them so that work of reasonable diameter can be tooled alternately from the front or rear.

Also, the available length and the rear overhang with the slide fully closed determines the largest diameter that can be parted from the rear. In having a length of 7 in. and a total travel of 4½ in. (with two gib screws taking effect) this slide meets these needs.

While it would be highly convenient to have sturdy slots with lips thick enough and an under space deep enough to accommodate standard

T - SLOTTED CROSS SLIDE

continued

bolt heads without "thinning," the resulting total thickness of the slide would be such that the diameter of work which could be swung or revolved over it, would be limited to an undesirable extent. The aim, then, should be to design the whole with a minimum total thickness or height, consistent with reasonable strength.

With the foregoing in mind it was decided that the T-pieces for this slide (Fig. 3*A*) should be made from $\frac{1}{4}$ in. stock so as to give lips with a thickness of $\frac{1}{8}$ in., which, as they are of mild steel, is sufficient.

The height dimension of the under slideways was already fixed by the EW saddle itself at $\frac{3}{8}$ in. (Fig. 3*Y*). The only remaining dimension to be decided upon was that of the plate upon which the (upper) T-slot pieces and (under) slideway members were to be fixed (Fig. 3*P*).

In making this a $\frac{1}{4}$ in. thick it is now thought that undue caution was being exercised: for the size of the lathe itself and the loading likely to be placed upon it, a plate as thin as $\frac{1}{8}$ in. would have served, especially when one takes into account the fact that the T-pieces and under slide pieces act as cross bracings. However, the reader can decide this point for himself—perhaps compromising at $\frac{3}{16}$ in. This particular slide is only $\frac{1}{8}$ in. thicker than the original EW plain one.

In deciding upon the size of bolt for use with the T-slots it was thought that as $\frac{3}{8}$ in. can be used with every satisfaction on my ML7, which is a $3\frac{1}{2}$ in. machine, $\frac{5}{16}$ in. would be in proportion with a $2\frac{1}{2}$ in. lathe !

The slot spacing was made the same as that on my lathe—$1\frac{9}{16}$ in. As the EW is a smaller lathe, a greater distance between slots would have been awkward and may have reduced their number unless the slide was made disproportionately long. On the other hand, a larger number of slots within a settled length would have been a waste of time to make as it would be difficult to find a use for some of them !

I now ask the reader to turn to Fig. 3, the general arrangement drawing. Here it will be seen that the slide (excluding the apron and feeding arrangements) consists of eight separate components fixed together with 16 No 1 BA hexagon socket head cap screws passing up through the lower slideways, central plate, and entering tapped holes in the T-pieces.

Returning for a moment to the question of strength, it is worth mentioning here that I used home made mild steel socket screws and although it was originally intended to provide a further row of eight of the 90 deg. countersunk head type along the middle of the slide, my friend and I both agreed that the course was unnecessary.

My own No 1 BA cap screws have heads of $\frac{5}{16}$ in. dia. Those not wishing to make their own are advised to buy the regular high tensile socket head screws having the thin countersunk type heads, making sure that the head diameter does not exceed $\frac{5}{16}$ in. and, if necessary, altering the drilling and tapping instructions to suit. It should be noted that Whitworth threads are best avoided as being unnecessarily

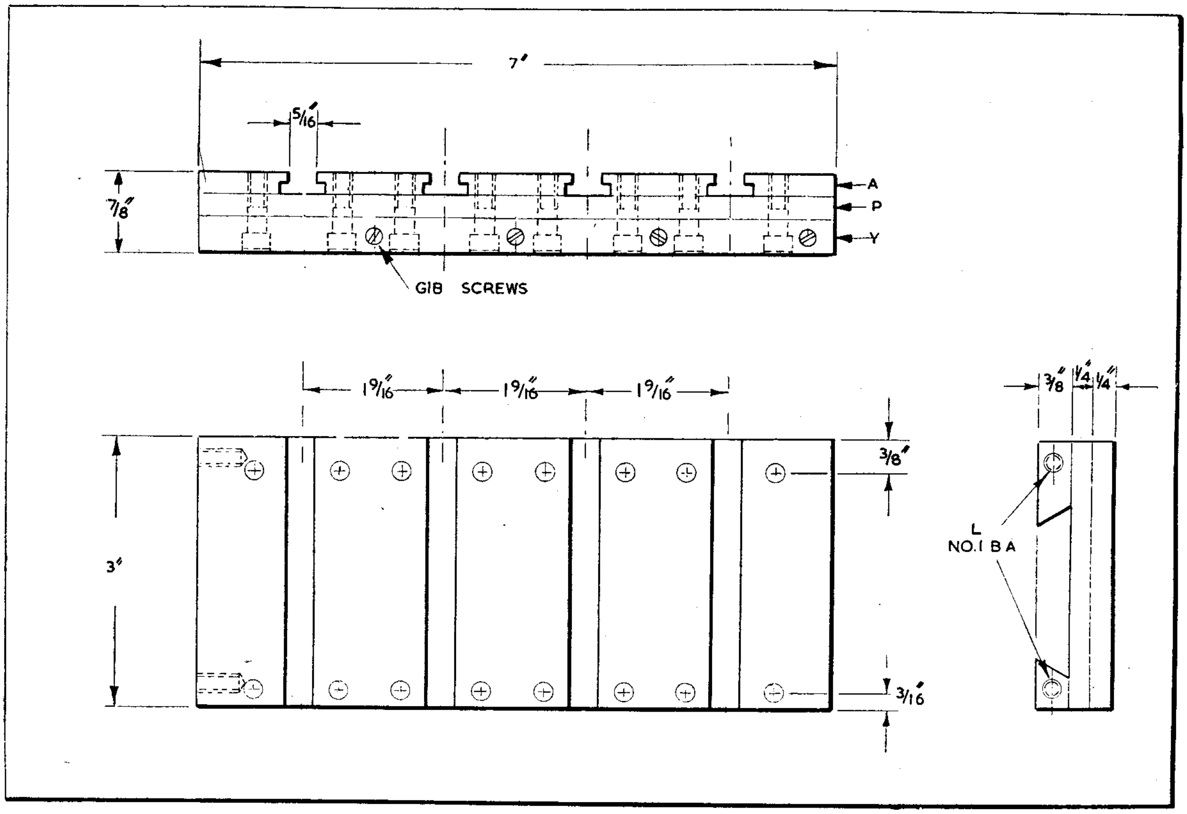


Fig. 3: General arrangement of the built-up T-slotted cross slide

coarse and troublesome to tap.

It was not thought necessary to make a special drawing of the central plate (Fig. 3*P*) since, apart from roughly squaring the ends, the remaining operations upon it are carried out while it is sandwiched between the other components. The plate is from stock 3 in. × ¼ in. bright mild steel which should be cut initially to a length of say, 7 3/32 in. and the ends cleaned to facilitate handling.

Sometimes bright mild steel bar of this sort is bowed along its centre to the extent of from three to six thou. If this is the case here, use it with the concave side underneath and flatten the top by filing: this is by no means such a fearful task, as may first appear. I recently had to flatten the 9½ in. × 6¾ in. table of a tapping machine which is in the course of being made.

While filing this it occurred to me that beginners are often discouraged right at the start when taking the first few strokes because the file slides across the work without biting. This is due to the slight layer of grease which is always present, but it will be found that upon continuing for but a few moments longer the grease will be got rid of and the file will start biting in a most satisfactory manner. The great temptation to run the fingers over the filed surface, either to "feel how it is going" (or whatever one does do it for) or to brush away the chips, must be resisted, as the hand is always greasy enough to spoil the bite. A small clean hand brush or duster should be used.

On the question of the best type of file, my own favourite for this kind of work is the sort known as a hand-saw taper, 8 in. or 9 in. long. The curved or convex working surface coupled with the fact that this kind of file is almost always of the single cut variety, which has less tendency to clog and tear the work, makes it an ideal tool. Unless a lot of work is contemplated it is not worth while obtaining one with very coarse teeth. A second cut will meet most needs and will leave a surface needing but little final polishing.

A good deal of the chips which tend to clog the file teeth can be removed by gently tapping the file on the bench, but despite the warning given by a recent correspondent, I always make and have made very frequent use of a stiff wire brush without noticing any blunting effect upon the files, some of which have been in use for many years. The only troublesome peculiarity about files is that those once used upon mild steel become quite useless for filing brass: a good reason for fitting yellow handles to all files and hacksaws to be used upon brass.

● *To be continued*

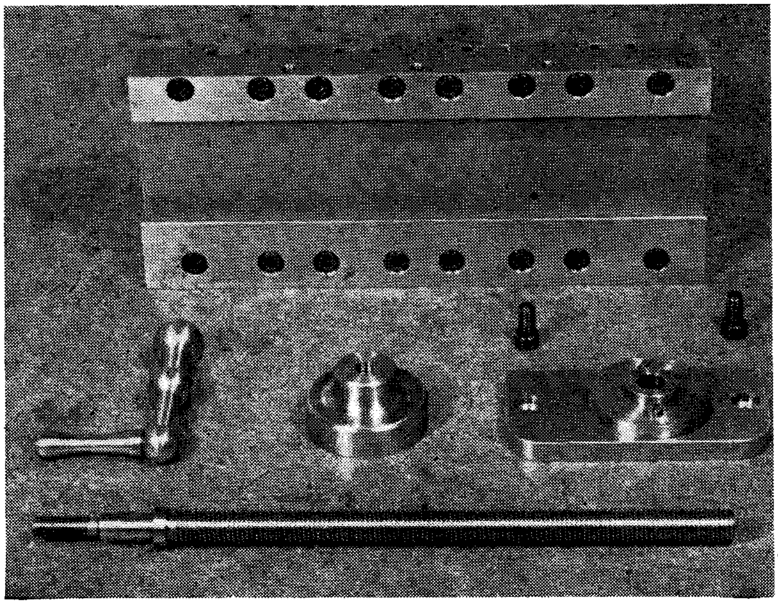


Fig. 4: Showing the underside of the T-slotted cross slide and the feed components

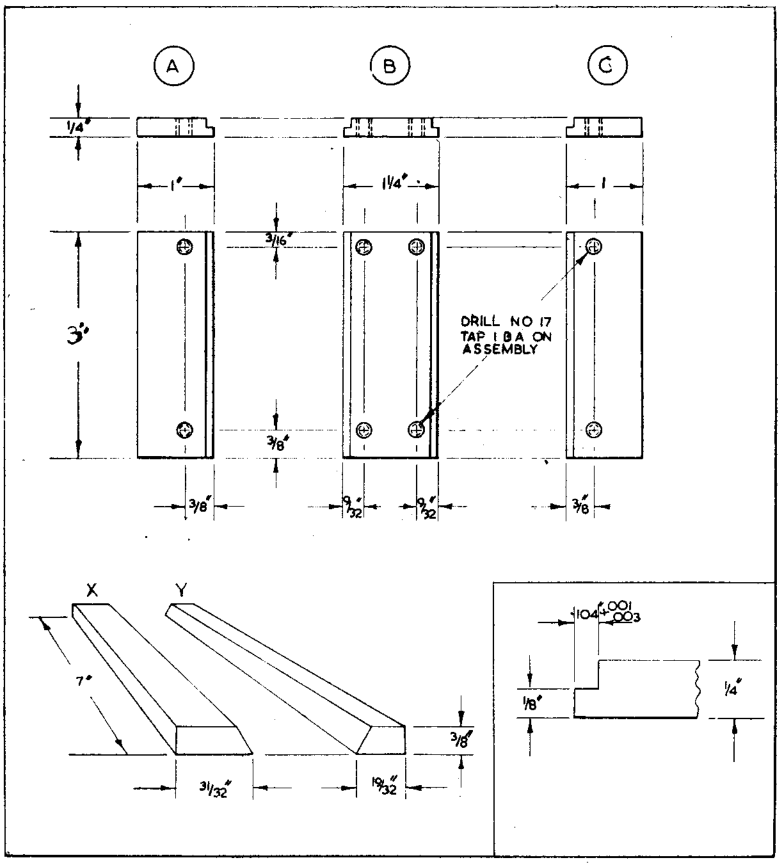


Fig 5 : T-piece details. A *and* C *one off.* B *three off. Below, slideway members. Inset, lip dimensions for (thinned)* $\frac{5}{16}$ *in. BSF bolt head*

IN THE ME WORKSHOP

Fine feed drive for a small lathe

In this fourth and final instalment EXACTUS gives details for finishing the split nut and making the rack and pinion. The owner of a small lathe will, he says, be more than pleased with the results

ONLY the bottom half is required now to complete the split nut. To achieve this I cut the existing leadscrew nut in half and fitted two hinge pins, so that it could swing to engage or disengage the leadscrew.

The cast iron nut on the EW lathe is very conveniently designed for this purpose.

On the side of the nut a lug is cast that normally fits between the mild steel plate and the saddle. Only part of the lug is cut away, leaving sufficient metal for fitting the hinge pins. In the illustration (Fig. 4) the advantage of this lug can be clearly seen by comparing the two nuts, one in its original state and the other after treatment.

I don't think any words are needed from me on how to split the nut, but you may be interested to know how I marked the position of the hinge pins. It will be obvious that the two halves must come together to form a correct diameter, otherwise it will lock the leadscrew when moving into the engaged position. I did this quite simply by placing the two halves on the leadscrew and marking the holes in situ with a scriber (Fig. 5). Once the holes were marked they were drilled $\frac{1}{4}$ in. deep with a No 34 drill and tapped 4 BA.

The pins themselves are made from a piece of 5/32 in. dia. silver steel, one end being threaded for screwing into the nut and the other end slotted to take a screwdriver. The outside diameter of the rod needs reducing slightly with a file to be able to cut the 4 BA thread. If you have 5/32 in. × 40 t.p.i. use those.

On the opposite side to the hinge on the nut mark the position of the tapped hole for screwing in the engaging lever. Drill the hole right through; the amount of thread that it will remove from the nut will not affect its working in any way.

Now for the details of the lever itself. The main part that screws into the nut is turned from a piece of mild or silver steel, the latter for preference, $\frac{3}{8}$ in. dia. As can be seen from the drawing, it is quite a simple affair and no difficulties should be encountered. Just take care when threading the short end that the amount of thread doesn't leave any to spare. It must be screwed in tightly.

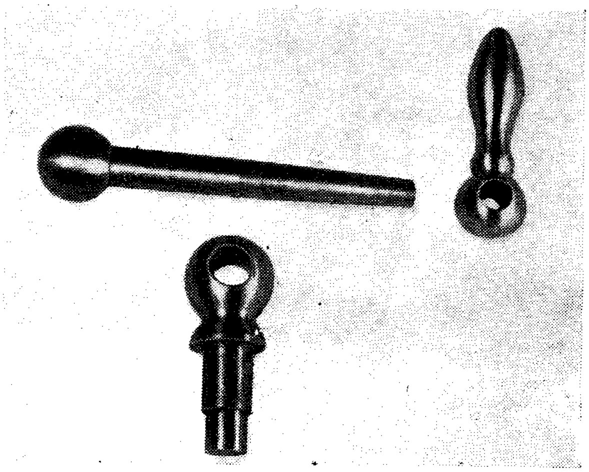
Perhaps my remarks last week about the fitting of the leadscrew nut into the apron may have made it more readily understood. Providing the lever does the job for which it is intended—engaging or disengaging the leadscrew, not driving the saddle—you need not have any fears of its not doing the job.

The outer part of this small lever, the sleeve with a knurled knob, is a bit more interesting to turn. Place a piece of $\frac{7}{8}$ in. dia. mild steel in the three-jaw chuck and take a light cut just to clean up the diameter.

The next job I always do when I have something of this kind is to put the knurling tool to work first. As this operation can be a bit of a strain on the bearings of small lathes, I always use my Brauer hand knurling tool; the result is a first-class job with the minimum of effort. Knurl an area greater than is required; the surplus can always be turned away afterwards.

When the knurling is finished, turn the diameter down to $\frac{1}{2}$ in. for

Fig. 6: The handle parts before they were assembled



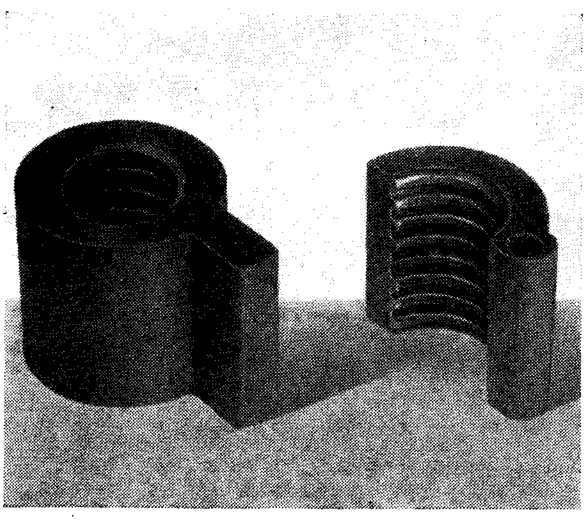


Fig. 4: Leadscrew nut before and after alteration

$\frac{7}{8}$ in. of its length, then further reduce the end to $\frac{3}{8}$ in. dia. for $\frac{1}{8}$ in. for locating in the gate. Before removing the job from the chuck, drill a $\frac{1}{4}$ in. hole $1\frac{1}{4}$ in. deep and remove any sharp corners. Now part the piece off from the bar not less than $1\frac{1}{4}$ in. in length.

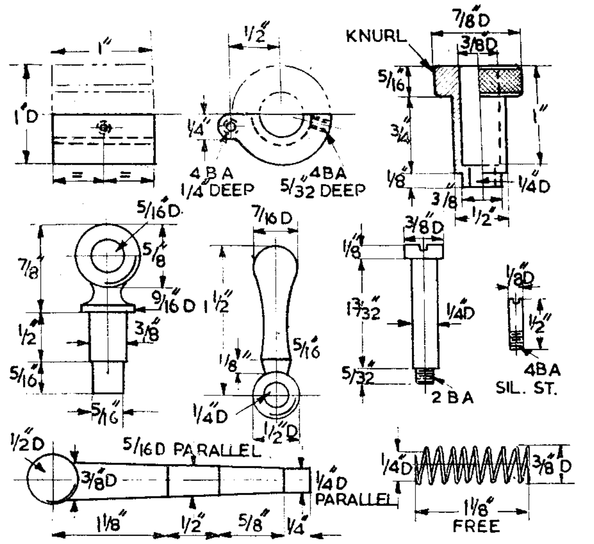
To finish off, hold in the three-jaw by the $\frac{1}{2}$ in. dia. and face off the end to leave the knurled head $\frac{5}{16}$ in. thick, and then open up the $\frac{1}{4}$ in. hole to $\frac{3}{8}$ in. × 1 in. deep. Make a spring to suit. A piece of 20 s.w.g. will be quite satisfactory.

Assemble the whole thing on the lathe and make any minor adjustments that may be necessary. When you are satisfied with your efforts, you can then begin on the last item, the rack and pinion. These items I suggest you purchase, as they are quite inexpensive and can become a bit involved if you try making them.

Here are the general dimensions for guidance when purchasing. There's nothing definite about the pitch as long as the two go together. The pinion needs to be 1 in. dia., $\frac{5}{16}$ in. thick and bored for a $\frac{5}{16}$ in. dia. shaft; if it is bored smaller than this it can always be opened up. The rack is 10 in. in length, $\frac{5}{16}$ in. deep and $\frac{1}{8}$ in. wide.

The parts that will have to be made to complete this part of the assembly is the shaft and handle for turning the pinions. I will describe a ball handle and the method I used; but if you prefer a round type of handwheel which is not quite so much work, fit the one of your choice. The shaft was made with a ball end. In fact, each of the three pieces that make up this handle has one.

Details and dimensions of the components



I think you will find this method quite easy. The ball is roughly shaped with a turning tool and finally shaped with a file and emerycloth.

To get back to the shaft, place a piece of $\frac{3}{4}$ in. dia. mild steel in the three-jaw and turn the two diameters shown on the drawing. Check the diameter for the pinion before taking any final cuts because the pinion wants to be a press fit on the shaft. This will save any pinning to make it secure.

When the diameters are correct, cut or part off the bar to length and then reverse in the chuck for shaping the ball. Drill the hole in the normal way, putting a size smaller drill through first. The tommy bar part of the handle is tapered for appearance with a parallel portion in the centre.

Place the piece of mild steel bar in the chuck and turn the taper first by setting the topslide round about 2 deg. When you come to the parallel part, turn it so that the finished diameter will only allow the shaft to be pressed right home.

You can also grip the bar by this parallel section, when you come to shape the ball end. Before removing from the chuck to shape the ball, turn the end parallel as shown on the drawing for the fitting of the handle.

The shaping of the handle can be done at one chucking as it were. There is no need to reverse the job to shape the ball as on the two previous occasions.

It may be found advisable to have a centre in the bar and to steady the job by locating on a centre in the tailstock. Shape the handle up as shown. Sizes are not all that important.

Before finally parting from the parent piece drill the hole for fitting it to the bar. The piece of material still in the chuck can be gripped in a V-block while drilling, thus making things easy. Then the pieces can be parted and finally finished off. They should look like those in Fig. 6.

Assemble the parts on the apron ready for fixing the position of the rack. The rack is fixed to the lathe bed by four 5 BA screws coming through from the inside and screwing into tapped holes in the rack. The position of the holes is $\frac{1}{2}$ in. in from each end and 3 in. centres.

The rack is held away from the lathe bed by little spacing collars 3/32 in. thick. The quickest way to make these is to place a piece of $\frac{1}{4}$ in. dia. mild steel in the three-jaw, run a No 30 drill up the centre, and then part off four pieces. ■

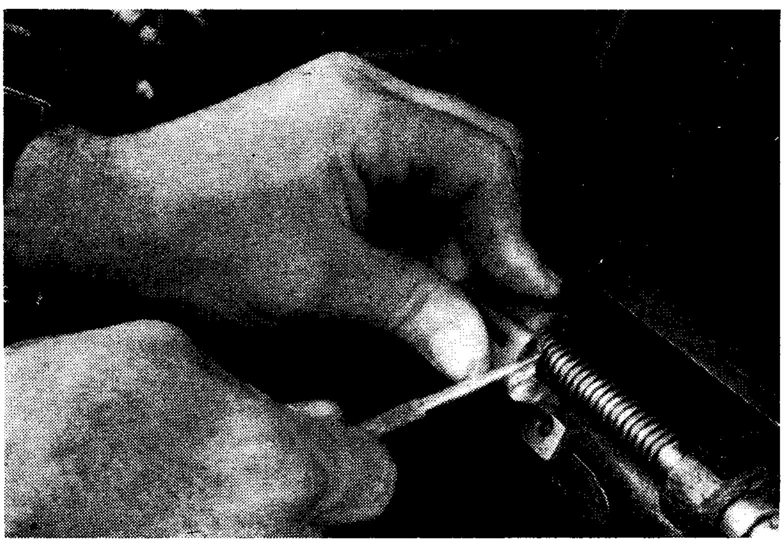


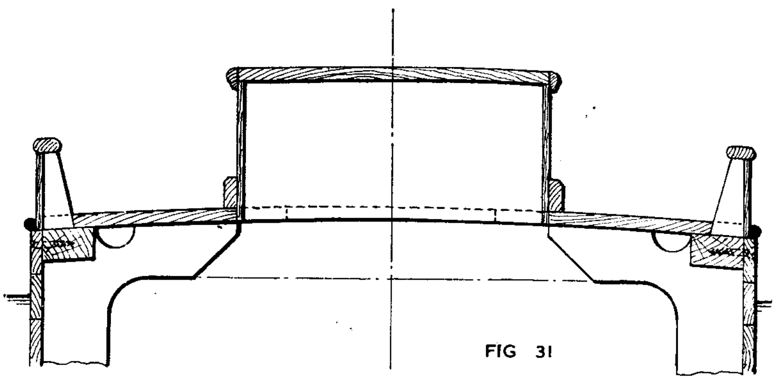
Fig. 5: Marking position of hinge pins

Ship modelling for beginners

QUAYSIDER discusses the mast positions for the various rigs and suggests using the deckhouse for access to the hold. He also gives instructions for fitting the deck

Now that the shell of the hull is complete the deck construction can be considered. As some builders will, I hope, adopt the suggestion made in my third instalment, i.e. to try out various types of rig on the same hull, I have made a careful analysis of the position of the masts for the different rigs. As a result I have come to the following conclusions:

For a cutter the mast should be just aft of station 6. For a ketch the mainmast should be just aft of station 7 and the mizen forward of station 2. For a schooner, whether fore-and-aft or topsail, the mainmast should be just aft of station 4 and the foremast just aft of station 7. For a brig or brigantine the mainmast should be midway between stations 3 and 4 and the foremast just aft of station 7.



Section showing deck and deckhouse

This brings me to another point. If one hull is to be adapted to all these various rigs, the position of the hatchway needs some consideration. In a sailing model a good hatchway is a necessity as it provides access to the interior of the hull for ventilation and for drying it out after sailing. It also provides facilities for carrying the model whether by means of a handle fixed to the keelson or by merely holding it under the coaming. To accommodate the hand an opening about 5 in. long is required. For this, with the frames spaced 3 in. apart, it will be necessary to cut one away. The most convenient position for the hatchway is between frames 4 and 6 as this, being equidistant from the ends, provides equal access to each end and, moreover, enables the model to be carried at approximately its centre of gravity.

The mast for the cutter is situated just aft of frame 6 but if the hatchway is placed flush with frame 4 it will be 1 in. aft of frame 6, which gives sufficient space for the mast. This position for the hatchway is quite clear of the masts in the other rigs.

THE CUTTER RIG FIRST

In the first instance I suggest you use the cutter rig as it is simpler to construct and to sail than the two-masted rigs. Later in the series I will describe these rigs and explain any modification that may be necessary in the hull to accommodate them.

Hatches may be a source of weakness in a sailing model as, if they are not properly sealed, water which gets on the deck may get below and sink the model. My own clipper model —which I am sailing with a temporary staysail schooner rig—has sunk on more than one occasion owing to water getting through the hatches.

On this model, which was my first attempt at a planked hull, the hatches were made by putting a frame of $\frac{3}{16}$ in. plywood around the opening and making a cover for it. I glued a piece of cork $\frac{5}{16}$ in. thick on the underside of the cover and fitted it to the opening, cutting away the corners to simplify the fitting. She was rather over-canvassed and had no provision for reefing the sails and, not having a false keel, was inclined to heel rather badly in rough weather.

Owing to the hatch openings being only $\frac{3}{16}$ in. above deck level it is almost impossible to prevent water getting below, so before I sail her again I intend to seal up completely two of the three hatches and to build up the other in the form of a deckhouse, making the roof to act as the cover.

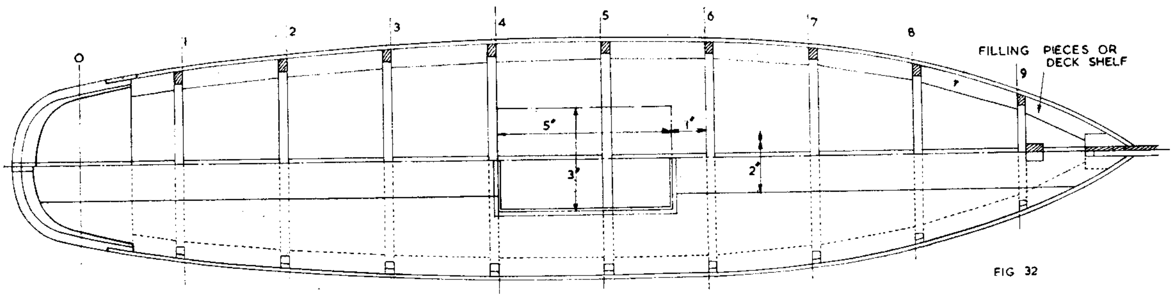
In your model I suggest you use the hatch opening as the basis for a deckhouse, the hatches themselves being dummies with a continuous deck below them. This enables you to have a larger and more convenient opening in the deck and, as the walls will be built and sealed on the deck, water cannot seep through but will run off—over the bulwarks if need be —with no possibility of its getting below. Moreover it is comparatively easy to make the roof of the deckhouse watertight.

Some builders fill the hold with table tennis balls or flotation tanks of one form or another, but if the hull can be made safe in itself it is better to do so.

PREPARATIONS FOR THE DECK

Before starting on the deck construction it is advisable to put a line of filling pieces along the inside of the upper strake of planking, which is the sheer strake, to form a shelf for supporting the deck between the frames.

These must be cut from a strip of wood $\frac{5}{16}$ in. thick × $\frac{1}{2}$ in. wide, and should be fitted so as to lie level with that part of the frame which forms the deck beam, and flush with the upper edge of the sheer strake, as shown in the section (Fig. 31) and in the plan (Fig. 32). They should have been shown in Fig. 19, but they are a refinement which I have added to the design since I built my own hull.



Showing the hull (upper half of drawing) ready to receive the deck and (lower half) the deck in position

Each piece must be fitted individually, the outer curve being made to suit the curve of the planking and bevelled to suit the section; the ends must fit snugly against the frames. Aft they must line up with the floor of the counter pieces and forward with the upper ends of the filling pieces on each side of the stem. In addition to gluing they are secured by small brass screws through the upper strake of the planking (Fig. 31).

The inner edges are not important and may be left straight. For those who have not yet fitted the bulwark strakes these filling pieces should be inserted before doing so, in which case the upper surfaces can be trued up with a rasp or file so that they are flush with the line of the deck beams.

MAKING THE DECK

The deck should be made of good quality pine or cedar or, if available, of sycamore, $\frac{1}{8}$ in. thick. For convenience in fitting it should be made in three widths, the centre piece being 2 in. wide as shown on the deck plan (Fig. 32). The two outer sections should be cut out and fitted closely around the bulwark stanchions. This calls for careful work.

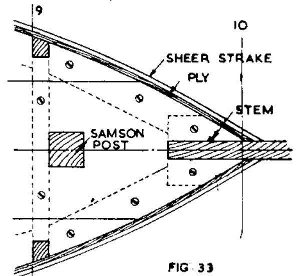
After marking out the position of the slots cut them 1/32 in. or so too narrow in the first instance, to allow for any errors in spacing. Then offer them up to the stanchions and gradually open them out as required until they fit the stanchions and the inside of the bulwarks closely throughout the length of the hull. At the after end they must be fitted to the counter pieces. They will require to be bevelled off at a considerable angle, finishing with a fine edge, as will be realised from a study of Fig. 20 (15 August 1957). At their forward ends they will terminate about $1\frac{1}{2}$ in. forward of frame No 9 (Fig. 33).

The inner edges should be trued up until they are parallel and the space between them is exactly 2 in. Finally, the space for the deck opening should be cut out. This is 5 in. long × 3 in. wide, $\frac{1}{2}$ in. being cut out of each plank, and is located aft at station 4 and forward 1 in. aft of station 6. They may be fixed temporarily by means of fine screws in the frames and filling pieces.

The central piece should now be made. This, as already stated, is 2 in. wide × $\frac{1}{8}$ in. thick and owing to the deck opening is in two pieces, one forward and one aft. It must be a tight fit between the two side pieces as it depends entirely on this, and, of course, on the glue, for its watertightness. Care should be taken that the wood for the deck is thoroughly seasoned as wood shrinks in its width if not seasoned, which is the reason for many leaky decks.

In my last article I mentioned the fitting of the bowsprit and of gluing it in position. I trust my readers are not following too closely on my heels and that none of them have got as far as this, as I find that the forward half of the central section of the deck must be fitted *before* the bowsprit is in position. However, if anyone has already fitted the bowsprit it will be necessary to make the forward piece of the deck in two halves, dividing it on the centre line and fitting the halves on each side of the samson post and underneath the bowsprit.

Continuing, then, with the forward half of the centre section and assuming that the bowsprit is not yet in position, cut off a piece to a length of $15\frac{3}{4}$ in., which allows $\frac{1}{8}$ in. on each end for fitting. Make a hole $\frac{1}{2}$ in. square on the centre line with its centre $2\frac{5}{8}$ in. from the forward end, shape this end to suit the inside of the bulwarks and to fit around the stem piece, and gradually trim it to the correct shape until, when it is pushed down over the samson post, it fits accurately everywhere (Fig. 33).



The fitting of the deck at the bows

The after end should be squared off 1 in. aft of station 6 so as to line up with the deck opening already cut in the side pieces. The aftermost piece of the central section is quite straightforward and calls for no special comment.

DRAINING THE HULL

A hull planked on frames is sometimes difficult to keep dry inside as the frames prevent one draining it properly. With a hull as small as the one being built it is easy to turn it upside down and drain it through the opening in the deck. To facilitate this a semi-circular opening must be cut on one or, preferably, both sides at the inside edge of the filling piece or deck shelf (Fig. 31), making it not less than $\frac{3}{16}$ in. radius. When the boat is turned upside down any water that may have found its way inside falls to the underside of the deck and drains off through these slots to the deck opening.

The central portion of frame No 5 should now be removed. It should be cut straight down at each side of the deck opening and then cut away at 45 deg. to within $\frac{1}{8}$ in. of the deck (Fig. 31). This will not weaken the hull as even when the beam is cut away the frame is still quite rigid.

FITTING THE DECK

The deck should be varnished on the underside with the thick copal varnish already recommended for the interior of the hull. It is now ready to be fixed in position.

Fit the side sections, first applying a liberal coat of glue to both the deck and the shelf prepared for it, and seeing that the adhesive is worked well in around the bulwarks and the stanchions. The centre section should be treated similarly, paying special attention to the longitudinal joints.

The deck should now be screwed down, using countersunk-headed screws about $\frac{3}{8}$ in. long, the centre section being screwed to the deck beams and the side sections to the filling pieces and to the frames.

● *To be continued*

POSTBAG

The Editor welcomes letters for these columns, but they must be brief. Photographs are invited which illustrate points of interest raised by the writer

THE LATE J. H. JEPSON

SIR,—With further reference to the Smoke Rings paragraph "Loss to the Movement" (April 10 issue), I should like to add a further tribute to the memory of Mr J. H. Jepson.

Mr Jepson was apprenticed as an engineer, but joined up during the first world war before finishing his time. He served several years in the RASC, and on leaving the Services took a job as a driver and was soon promoted as a sort of chauffeur to drive the VIPs of a well-known cable manufacturing firm.

His interests in models dated from his time in the Services. He joined the Victoria MSC in the early 1920s, coming under the wing of the late Bill Blaney. In 1925 he formed the Blackheath MPBC and became its first secretary. This club then joined the recently formed MPBA.

Mr Jepson was a staunch exponent of steam. One of his early boats actually attained 22 m.p.h. over a distance of 50 yd. His magnificent performances with engines of the slide-valve double-acting variety were largely explained by his painstaking workmanship and by his attention to early timing and cut-off and to free "breathing" through good-size ports and passages. The last engine he constructed was described and illustrated in the issue of MODEL ENGINEER for 13 June 1957.

His death at the comparatively early age of 60 is a great loss to the Blackheath MPBC and to all of the power boat enthusiasts who received help and guidance from him in the early days of this hobby.

Sidcup. JOHN BENSON.

BATTLE OF THE MODEL T

SIR,—It was a pleasure to see that you published my story about Steam Engines at the Ford Museum, in the March 20 issue. I hope your readers enjoyed it.

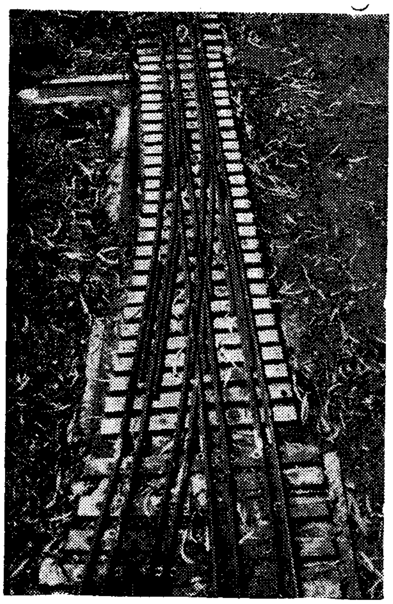
I regret a slight misstatement which your eagle-eyed readers may take you to task for. It concerns the production of the Model "T" Ford car. The text says the first million cars took 15 years to produce and the remaining 14 million took only eight months. I'm sure you will agree this would have been most remarkable. What I intended to say was that the last of the 15th million took only eight months.

This famous car was produced from 1907 to 1927 with only minor changes. But all was not smooth sailing. Back in 1890, a lawyer by the name of George B. Selden patented a vehicle driven by a *sliding* gear transmission and an internal combustion engine. The patent lay dormant for several years but then suddenly came to life, and Mr. Selden received a royalty of $100 per car from each manufacturer—each manufacturer except Mr Henry Ford, that is. So Mr Selden sued the Ford company for infringement of his patent, despite the fact that Ford used a planetary transmission instead of a *sliding* gear.

The case dragged on for eight or nine years and was the most bitterly fought in the history of the US courts. Finally Mr Ford won out, but not before Mr Selden threatened to sue every Ford buyer for $100.

Later, Mr Ford proved his prowess as a salesman. He proposed to advertise that if they sold 300,000 cars that year, every purchaser would receive a refund of $50,00. They sold 310,000 cars, so Mr Ford mailed out 15½ million dollars in $50.00 checks. This deal so aroused the small circle of stockholders that the treasurer resigned. It was then Mr Ford's turn to "blow his stack" and he vowed to buy out every stockholder he had. So he went down to the bank and borrowed 75 million on his personal note and bought out all the stockholders, leaving him undisputed commander of the vast empire.

Chicago. WILBUR J. CHAPMAN.



This set of points accommodates three gauges—2½ in., 3½ in. and 5 in. Mr Holland, of Johannesburg, thinks they are unique

UNIQUE POINTS

SIR,—I think these points installed in the track of the Rand Society of Model Engineers, which carry three different gauges—2½ in., 3½ in. and 5 in., must be unique.

The points were made by Johnny Armstrong, assisted by Doug Glasson, both of the RSME, and they are a wonderful piece of work. They have been in operation now for two years and are a complete success. The rail is flat bottom bronze extruded locally and the sleepers are steel section mounted on a ¼ in. m.s. baseplate. The rails are secured to the sleepers with self-tapping screws through the flanges. Originally the sleepers were of wood, but when they began to rot, steel was substituted.

Johannesburg. D. F. HOLLAND.

ME DIAMOND JUBILEE

SIR,—As a reader from No 1 with the whole 117 completed volumes in my possession, may I offer you hearty congratulations on the attainment of your sixtieth anniversary? Those 60 years have seen many changes, not the least, perhaps, being the rise in cost from 2s. a year to 52s.!

To those of us who can remember the paucity of tools and equipment available to the model engineer 60 years ago, the situation today is just out of this world, and MODEL ENGINEER is undoubtedly entitled to the lion's share of the credit for this development.

The literature available to the model engineer in 1898 was microscopical in quantity and largely valueless technically. Today the model engineer has at his disposal excellent handbooks on almost every phase of the hobby and a wealth of designs and blueprints which is almost embarrassing in its variety. Again P.M. and Co. must take the major share of the credit.

Over the last 60 years the general level of craftsmanship has improved immensely. There have always been craftsmen of outstanding ability, such as the brothers Coates; but whereas in 1898 the Coates brothers and Dr Bradbury Winter stood out like Everest on a prairie, today there are scores of model engineers whose work will stand close comparison with that of these Victorian masters.

Model petrol and c.i. engines have developed in the lifetime of ME from comparatively crude beginnings to their present state of genuine efficiency. Model sailing yachts have developed almost as much. The first ME Speedboat Competition was won over 50 years ago at 5 m.p.h. Today that figure has increased 16 times!

Model steam engines and boilers have developed hardly at all in the last 20 years. Engine designs produced by Henry Muncaster and Henry Greenly up to 50 years ago have never been bettered and rarely matched. About the model locomotive, perhaps, the less said the better. The number of model locomotives which give a performance that completely satisfies their builders has undoubtedly increased to an almost astronomical degree, but the best of them today are probably little, if any, more *efficient* than the *best* of 60 years ago.

For 60 years the MODEL ENGINEER has done great work. Long may it continue to do so, and to grow and prosper.

Rustington, Sussex. K. N. HARRIS.

INHIBITED ACID

SIR,—With reference to F.R.P.'s letter [Readers' Queries, March 27] asking for a material to clean out a small copper boiler with brazed tubes, it is pointed out that some brazing is attacked by ordinary hydrochloric acid.

We are the manufacturers of inhibited acid for this type of job, and if F.R.P. cares to contact us we would be pleased to let him have a small quantity free of charge.

The Geigy Co. Ltd, Rhodes, Middleton, Manchester. G. H. IRELAND, *Chemist.*

RE-BOILERED

SIR,—I read Vulcan's Smoke Ring "Sold to America" [March 20] which I enjoyed immensely.

You refer to W. J. Beinecke whereas my name is Frederick W. Beinecke. You mentioned that the engine was taken down to Florida. As a matter of fact I took it to my summer home in Great Barrington, Massachusetts which is probably thirteen or fifteen hundred miles north of Florida.

The boiler did develop a little trouble, but I have already procured a new boiler and I am very happy to report that at this time everything is progressing satisfactorily.

New York. F. W. BEINECKE.

GUNS

SIR,—Your contributor Jason [page 187, February 6] is not correct in his statement "the first war armed trawlers had a six pounder gun." A 12 pounder was the usual and I remember one with a 4 in. and there were others.

Motor launches and drifters had three or six pounders and possibly a few trawlers used for "gate ship" duties but all that I had to do with and served on had twelves, and I am talking of about 100 vessels or more.

Incidentally, the three and six pounders had sliding block breeches whereas the twelves had interrupted thread breeches—entirely different guns.

Seaford. E. B. HUGHES.

SPEAK UP QUICKLY

SIR,—Having regard to the interest being shown in the old Canadian Pacific 4-4-0 No 29, particularly in the suggestion that it should be preserved in England, the following may be useful information.

My home is near the end of the short line which this engine operates, and I know it well. Most of the old engines have fallen into bad condition, but this one has been kept in good operating form. It would thus be an ideal engine to preserve. Further, it is quite small as engines go.

If any serious effort is to be made to obtain this engine, no time should be lost. It is very seriously suggested that the way to go about it completely eliminates any sentiment which the CPR may be expected to have. Also the approach should be at the highest level. In other words, the best appeal is the highest cash offer. It may be off its duties in a few months now; so hurry.

The other two engines, which are its mates, have interested many on this side of the Atlantic, and are being sought keenly by many organisations for preservation as they are a little older. The interest in No 29 is not so great as it is the *second* earliest Canadian manufactured engine, in present operation, not the oldest. The other, a Rogers, was not made in Canada.

I would also suggest that any organisation seeking the very best, complete information on this group of three engines should write to Mr C. W. Anderson, 222 Brunswick Street, Fredericton, NB who is a well-known locomotive historian. He would be very pleased to supply the complete story. It is too long to tell here.

If there are readers who are interested in modelling No 29, I would be prepared to take time off and make some more photographs. Here again speak up quickly. The opportunity may pass even sooner than we anticipate it.

Rothesay, New Brunswick. FRED MASSEY.

MEMORIES OF 3596

SIR,—I was interested in the article "Locomotives I Have Known" by J.N.M. in issue 2967 of April 3 this year.

The article brought back memories to me as engine 3596 was stationed at the Great Western shed at Birkenhead when I began as a cleaner in 1936.

She had fitted the large type cab and in a panel fixed inside near the driver's head were instructions for running on the Metro lines. I'm afraid that it was too far back to remember exactly what they were.

The little engine used to work a regular train, a local from Birkenhead to Helsby due off the shed at 12.6 p.m. each day except Sunday. The engine used to be kept in a very clean condition in those days, but she was heartily disliked by all the cleaners. Reason No 1 was that there was very little room up behind the big ends and eccentrics, especially if she had been stopped with both big ends behind the axle and was blocked in so that she couldn't be moved.

Another reason was that the plate across the front of the firebox was not very wide, and as a cleaner stood on the pit edges his nether region was apt to get burnt, as she was always in steam when the morning shift came on.

When cleaning the tanks and bunker a ladder had to be used as there were no ledges on which to place one's feet. Last but not least, the space between the front of the tank and the unusual involute springs of the pony truck was approximately 18 in. and one had to sprawl across the top frame and a very uncomfortable sandbox cover to get into the top slide bars and valve rods and guides.

I can vouch for the dancing of these engines. As time passed, so did I—to become a fireman! I had many a trip on the footplate of 3596. If anything, she danced worse travelling bunker first, as she had to do on the return trip. We seldom had more than four "eights" on at a time, but she could rattle them along. At the time the boiler pressure was 165 p.s.i.

I notice J.N.M. has drawn the feed clacks at the front end of the boiler on 3586; 3596 had hers into the back-head. The injectors were situated under the footplate and the water valve was a push-and-pull effort from the floor—a thorn in the fireman's side, as vibration was inclined to close the valve without his knowing—with disastrous results if not noticed.

If the vibration did not close the valve the fireman invariably put his foot on it, as he had to climb down into the well of the footplate, which was formed by the trailing splashers and sandboxes. Because of these boxes several firemen carried scars on their knuckles; the handle of the shovel came about 9 in. from the floor and the sandboxes 12 in.

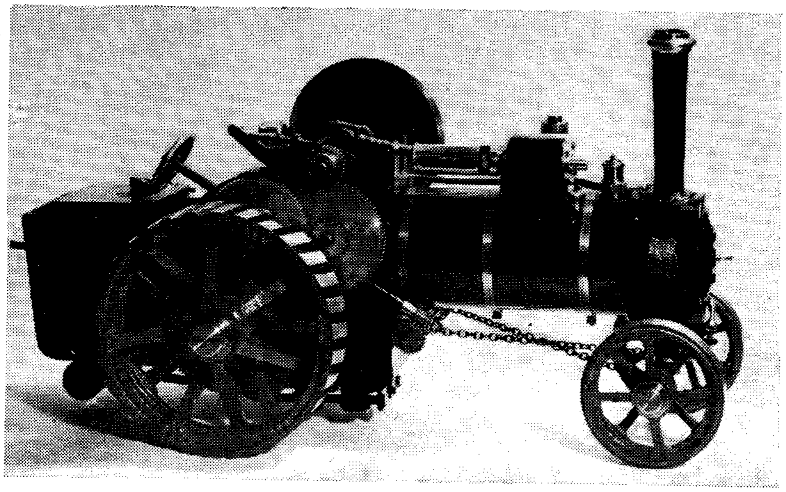
A peculiar thing about 3596 was that when the cab was put on her the windows facing to the front (we called them spectacles) were made wider apart and came directly behind the two boxes on the tank, so that a long neck was required. In spite of all these things, the engine was still doing the same job in 1949. I do not know where she is stationed at present—if she is still going.

Will J.N.M. illustrate the other 35xx engines? We had two of them at the same time, Nos 3577 and 3578. They had an 0-4-2 wheel arrangement but their style was very similar to 3596.

In 1935, as near as I can remember, 3596 was running into Ellesmere Port when the left-hand side-rod broke and dug into the tank, which promptly emptied, and lashed the platform edges. No one was injured and 3596 was towed away to Wolverhampton for repair. She was soon back for the 12.6 p.m. off the shed.

Many thanks to J.N.M. for an interesting series and painstaking illustrations.

Birkenhead. J. H. Roberts.



The ¾ in. scale traction engine constructed as a first attempt by Mr C. P. Kingston, of Swansea

HIS FIRST TRACTOR

Sir,—I enclose a photograph of my Bassett-Lowke ¾ in. tractor, which I have recently completed; construction commenced last September.

This is the first steam model of this kind I have built, being previously interested in aircraft. The model was started with the aid of a small Adept lathe but I am now the proud owner of a new Zyto.

I have derived many hours of absorbing interest from this model, which functions extremely well and appears to have plenty of tractive power—although I am not quite sure just how much weight an engine of this size can be expected to pull. The shield on the smokebox side is the town crest, donated by a friend and probably originating from a souvenir teaspoon!

Incidentally, I have noticed that an important cause of rust on the lathe or hand tools is the handling of same after using soldering fluxes.

Swansea, Glam. C. P. Kingston.

The camera under water

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holds it in position from the back. The camera mount was made before construction of the controls began.

The back of the case was made up of one ¼ in. piece and one ⅜ in. piece (the exact structure of this can be seen in the plan). The ¼ in. inner piece serves to prevent the rubber gasket being forced into the case by water pressure; ⅛ in. rubber was used for the seal.

The flash arm was made from ⅜ in. Perspex with electrical connections sealed inside. The arm is plugged into the side of the case and screwed to the case with four thumb screws, and a rubber gasket is fitted between the two to make a watertight seal. The bulb holder takes a capless bulb and is exposed to the water, and even with this dead short a condenser will fire the flash bulbs. The leads on the inside of the arm are strips of copper foil sealed between two ⅜ in. pieces of Perspex. The complete flash equipment is shown on the plan.

The electrical leads from the inside of the case to the outside were made by sealing two strips of copper foil on the outside of the case with an additional piece of ⅜ in. Perspex. At each end of these copper strips are tubes fitted to make inside and outside connections.

The tubes going to the inside are threaded to take a screw, for connecting the battery, condenser and flash leads from the camera, while the tubes going to the outside are sockets for the flash arm to plug into. The reflector is hand-beaten brass and is chrome plated. An anodised aluminium reflector could be used and would stand sea water fairly well.

The battery, which is a 22.5 volt hearing aid battery, fits into the two-pointed screws inside the case on the flash assembly side. The condenser, which has its own leads, connects to the other screws on the battery mount. Leads from the camera are fitted—one to one of the inside connections of the flash arm, the other to one end of the battery mount. The other end of the battery mount is connected to the other inside connection of the flash arm.

The filter disc is made up of two $\frac{1}{16}$ in. pieces of Perspex. The holes for the filters were made with a disc cutter before the two pieces were joined together. There is a yellow and an orange filter for experiments with monochrome and a blue filter for use with daylight colour film and clear flash bulbs. ▣

A ship modeller's diary

By Jason

DURING the Northern Models Exhibition at Manchester the first national convention of ship model societies and British ship modellers in general was held in the Corn Exchange. Will Gay, the chairman, had organised the meeting with the help of Charles Middleton as local liaison officer and John Fisher as secretary.

What can such a convention achieve? What can it set out to do? It was stated at the beginning that the answers to these questions lay with the convention itself. Quickly, too, it was established that communications were poor. Not all the blame could be placed upon the secretaries, although they came in for a fair share. It was said that no focal point existed. The chairman commented that no up-to-date record existed of the various societies, which numbered nearly 50. He had written for information to the last-known addresses of secretaries and the result had been extremely disappointing. Was this owing to a change of secretary or to the demise of the society?

Thus came the first resolution: that the chairman be empowered to establish, or bring up-to-date, communications with every ship model society or ship modeller in the country. It was much longer than that, as it included suggestions and ways and means. The meeting also agreed that the initial cost should be borne by the Metropolitan societies.

What can be achieved

BEFORE I mention the ways and means of helping in this worthy effort, let us look at what may be achieved by the convention. Models were brought to the exhibition by over a dozen ship model societies; or at least they had participated in some way or another. This could be extended especially as transport of models was one of the subjects tackled, and tackled quite vigorously. Let it suffice to say that Belfast, in common with London, had brought a number of models for exhibition. By road, rail and sea, they came; about 50 models in all.

Here surely is the main achievement. When makers and models get together, then ideas are exchanged, to the lasting benefit of all.

The organisers of the MODEL ENGINEER Exhibition allocate a stand each year for use by the ship model societies. If you have knowledge of a ship model society, check up that the secretary's name and address are correctly noted. Use *Jason's Book* as it should be used. Enter your name and address, the period or type of ship in which you are interested, and the society, if any, to which you belong; and then extract from it the names and addresses of any who live near you.

Above all, make yourself known to those manning the stand. Do not, as many do, "leave it to the other fellow." He may be leaving it to you.

If you do not visit the MODEL ENGINEER Exhibition, get into touch with Bill Gay, 351 Kingshill Avenue, Hayes, Middlesex who normally is in charge of the Ship Model Societies' Stand at the Exhibition. He wants to hear from you about your society and to have the secretary's address and name. A stamped and addressed envelope is a big help.

Manchester Exhibition

THE Northern Association of Model Engineers was founded ten years ago to foster the work of model engineers. Ship modellers are glad to take advantage of the invitation to join them. Many of the engineers who know not the ME Exhibition in London were quite surprised and pleased with the display of ship models this year. The three judges (London, Sheffield, and Manchester) had little difficulty in deciding the winner of the NAME Trophy, which is the principal prize for the marine section.

A. L. Gwynn won with his working model of a drifter-trawler, a robust, faithful-looking job at a scale of 1 in. to 3 ft. Close astern was the radio-controlled working model of the Plymouth lifeboat by W. Marriott. No 3 was an ASR launch by D. Ecle.

Among the other awards, the judges commented very favourably on the Clyde Puffer, which was incomplete. This model was the means of helping to convert an engineer to the ranks of ship modelling. He was willing to tackle "pure metal work." Such was the standard of work in metal achieved by P. A. Waddington in his West Highland coaster (Clyde Puffer) that our engineer friend may be tempted to essay a ship model.

Lancashire and Cheshire SMS had a stand of their own, well filled with models in all stages of construction. In an outstanding ship model display on loan from the visiting societies there were several new items, notably a case of details from the *Cutty Sark* by Harrison (London) and a quartette of native skin craft from West Ireland by Dickie (Belfast).

One of the Russian banners was voted by the convention to be handed to Belfast. There are three of these banners, a gift from the Russian delegation which visited the ME Exhibition last year. They are held by three districts—London, Midlands and the North, for display at important exhibitions throughout the country. On show also was the British banner, recently made, which will be presented to the Russians in the near future.

Rally of sailing models

GET into touch with John Fisher for the entry forms of the rally at the Round Pond, Kensington Gardens on 6 July 1958. As there are four classes, it naturally follows that if your model can sail there is a place for it no matter what rig it is. The Thames barge race is the main sailing race, and this is restricted to "faithful" Thames barges at a scale of $\frac{1}{2}$ in. to 1 ft.

The other three classes cater for everything else. Native craft and galleons are especially welcome. Although the rally is under the auspices of the Thames Shiplovers it is open to all. Light refreshments are available as in the past. Entry forms can be had from 106 Chester Drive, North Harrow, Middlesex.

Mr Biggs, secretary of the Thames Group Marine Modelling Society, is also a film enthusiast. He and a number of others are busily engaged on a script to push ship modelling as a hobby—and they need an attractive young lady. Best of luck, Mr Biggs. Wish I lived in Gravesend. ▣

COLOUR PRINTS

Reproductions of the four coloured pictures illustrating the model locomotives *Como* and *Majestic*, the showman's engine *Supreme* and the tea clipper *Norman Court* are still available. Printed on two unfolded sheets of art paper the set costs 2s. 6d. from Percival Marshall Ltd, 19-20 Noel Street, London W1.