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MAKE AN INDICATOR

Here's a useful small tool that's both simple and enjoyable to make; all the drawings you need are over the page . . .

To set work accurately we usually use a clock gauge. This, as its name suggests, is rather like a clock but there is a single pointer where the clock hands would be. There is also a pointer with a plunger in it attached to and protruding from the clock. In use, the clock gauge is held securely at a fixed point and the plunger allowed to touch the work. If the work is then rotated, the hand on the clock will alter its position with any inaccuracies in the setting up. By making adjustments to the work, it should be possible eventually to rotate it with the hand remaining stationary. The operator then knows that the work is absolutely accurate. In order that errors show up clearly there is a multiplying factor between pointer and clock dial, usually in some form of gearing. This means that the hand moves a greater distance than the pointer and errors show up that much more easily.

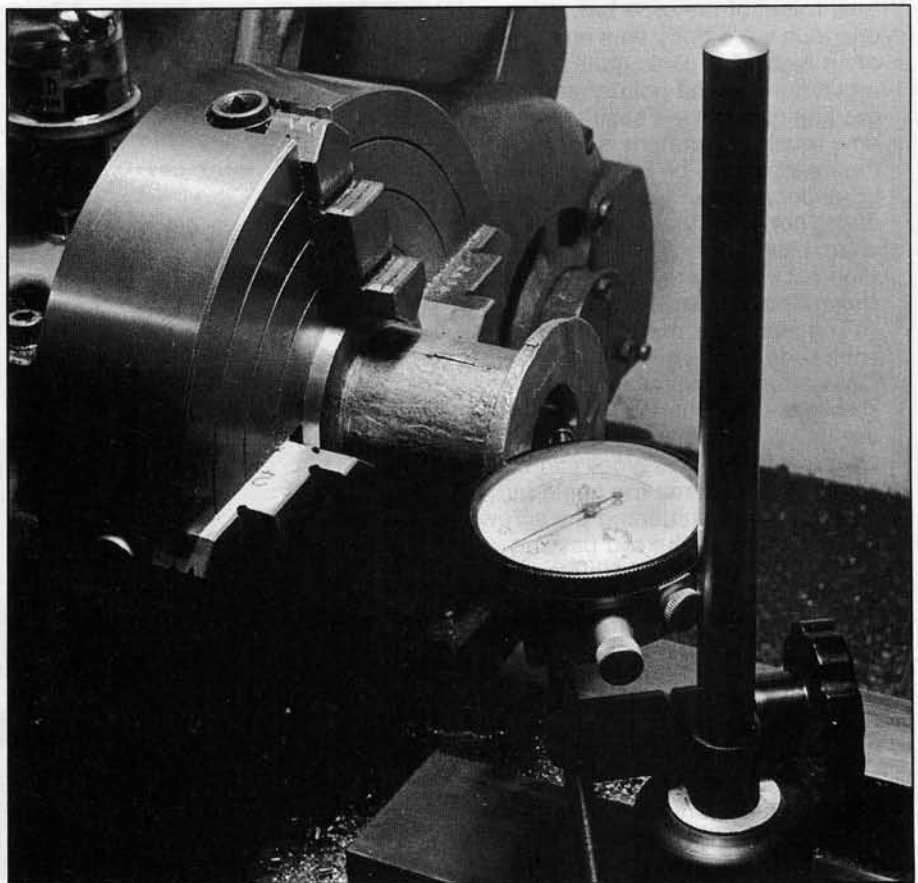
Clock gauges are quite expensive to buy and the poorer ones amongst us may well need to look for alternative means of truing up. A scriber in a block placed near the work will show errors as the gap between the work and scriber point widens and narrows. Getting really accurate with this method is not easy and so some other form of indicator is desirable. At one time these could be purchased in a number of forms but now seem to have gone off the market. Making such a device is, however, remarkably simple as well as being a most satisfying project. It will not be in the form of a clock as this is not necessary; a pointer will show exaggerated movement, however, and be more than sufficient for most purposes.

The main part of the device is a mild steel strip. The drawings specify it as $\frac{1}{2}$ inch (12mm) wide. This will give a small convenient gauge but the narrower it is, the more limited is the distance of error that will be shown. There is no reason why, in fact, it should not be one inch wide, as is the one I made as a demonstration. The extra width will allow the pointer to move further but makes the gauge slightly less convenient to use on the smaller lathe. The choice must, then, be left to the individual to decide, depending on the lathe or other machine on which it will be used. To start with, scribe a line centrally along the length of the strip. Mark

off and drill the four holes, as shown on the drawing, working from the centre.

The needle is next and needs to have two holes drilled in it and then be filed to shape. The smaller hole at the wide end holds a $\frac{1}{16}$ in. diameter pin which can either be soldered in or held with a retaining compound.

The slide bar is a piece of $\frac{1}{16}$ in. diameter rod. I used stainless steel as it will be used as the pointer and will be rubbing on work so there will be some wear taking place. Hopefully, there will be less with stainless steel. The alternative is to use silver steel and harden it, or make it of mild steel and put a small



The usual way to measure any variation is by means of a clock gauge; here one is being used to set a cylinder casting bore. An inexpensive alternative which you can make yourself is described in the text.

bras knob on the end. The block, which is not quite central on the rod, is filed from mild steel after drilling to allow the bar to slide in it. Again, it can either be soft soldered in position or secured with retaining compound.

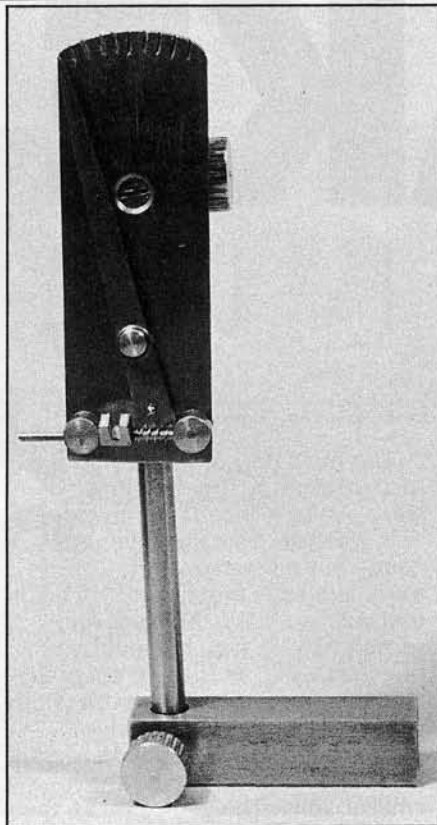
The bearings for the slide bar are a simple turning job. They must be cross-drilled for the bar and the threads to pass through the body, a nut securing the bearings in place when we are ready. The pin on which the pointer pivots is also a simple turning job and preferably should be from bronze, although brass would do. It needs a thread on the end to screw it to the body, but the plain part of the shank must be long enough to pass through the pointer and not rub. I put a washer on either side of the pointer when I assembled the device. This gave better running qualities and the underneath one ensured that the pointer was clear of the body and could swing.

The indicator was assembled with a small spring slipped on the slide bar; this drives the pointer right over to one side. The spring need not be very strong and the type used in ball point pens is ideal both for size and strength.

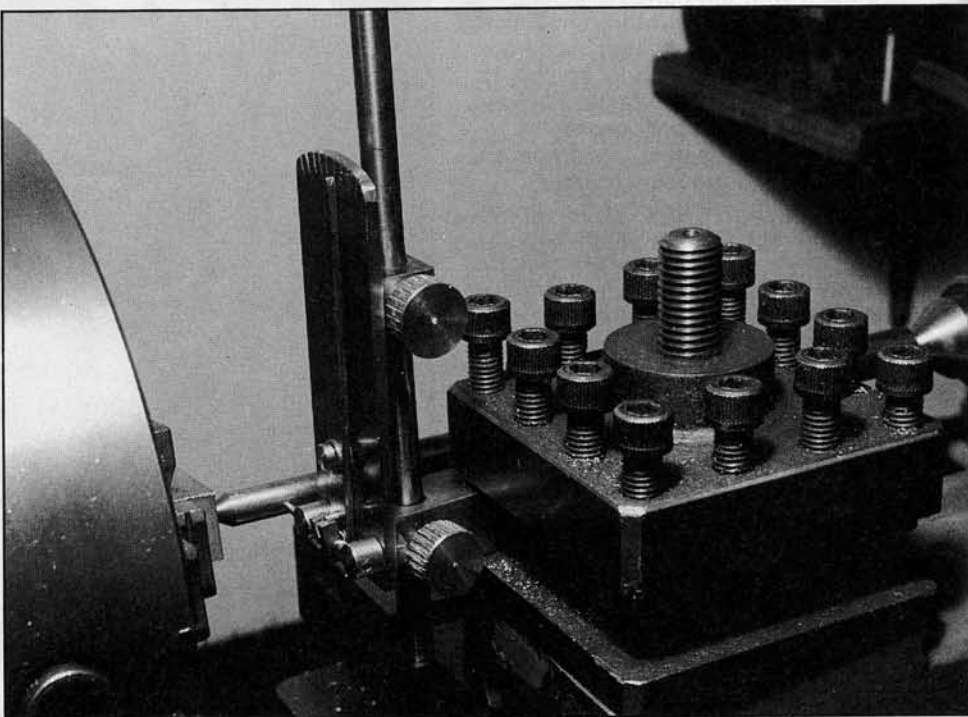
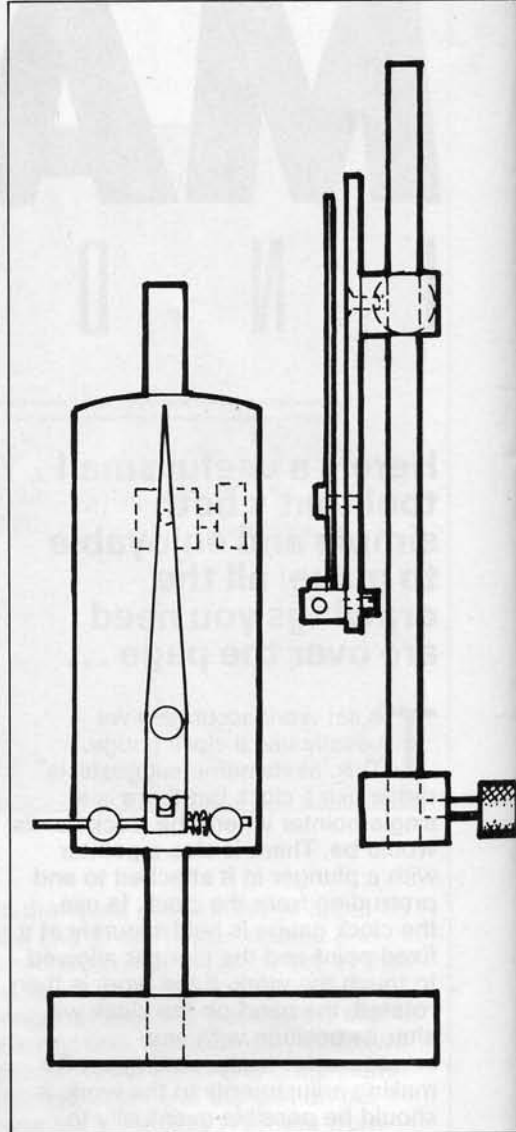
Finally the top of the body was rounded off and the graduations made with a junior hacksaw. The total travel of the slide bar, using a one inch wide body was one eighth of an inch. This gives quite a movement on the pointer and the graduations make it easy to gauge how much adjustment is required. If the need should be felt to get finer graduations, then extend the length of the body and pointer above the pivot. I can easily find even the slightest variation with the one shown, however.

The stand is a matter of choice and readers may have different ideas on what they want. The idea shown is of a round pillar passing through a block screwed to the indicator body. This block can be adjusted as regards the angle by loosening and tightening the screw, the other end of the rod passing through a steel bar which fits the lathe toolpost. It could just as easily be fitted with a clamp if it is to be used in conjunction with a milling machine. The clamping screws on both of these blocks must be of brass to prevent the rod becoming scored and so jamming. Whether or not to knurl them is a matter of personal preference.

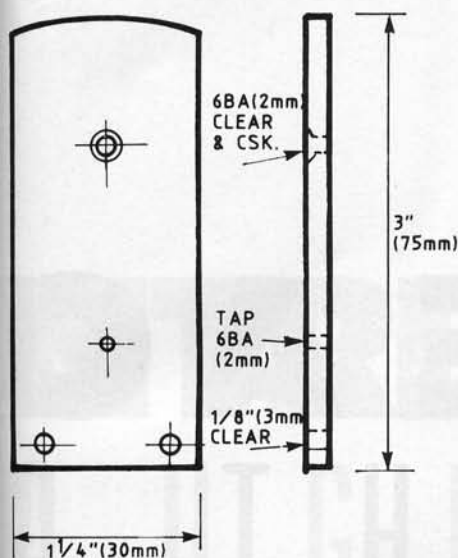
To use the device, clamp it in position and adjust it to the work until the pointer is in the middle of the body. Any variation whichever way will show up as the work is rotated.



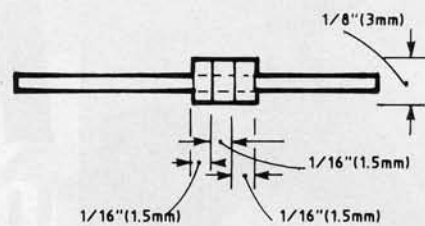
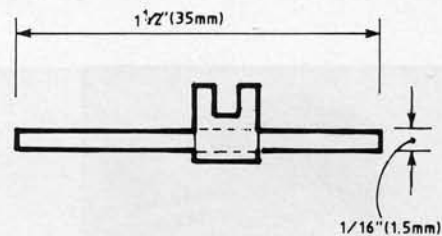
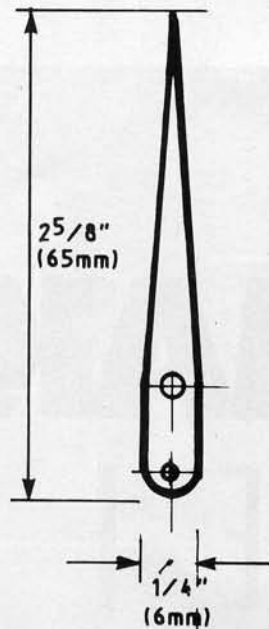
The finished indicator on its stand; size is a matter of personal preference and the nature of the job in hand. However, the dimensions shown opposite produce a very satisfactory working tool.



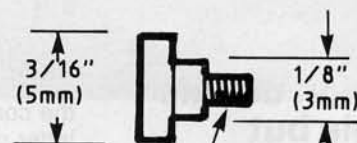
The home-made indicator in use in the author's workshop; here it is being used to measure deviation in conjunction with a centre-finder (also described in this publication).



MAIN BODY 1 OFF 1/8"(3mm) MILD STEEL

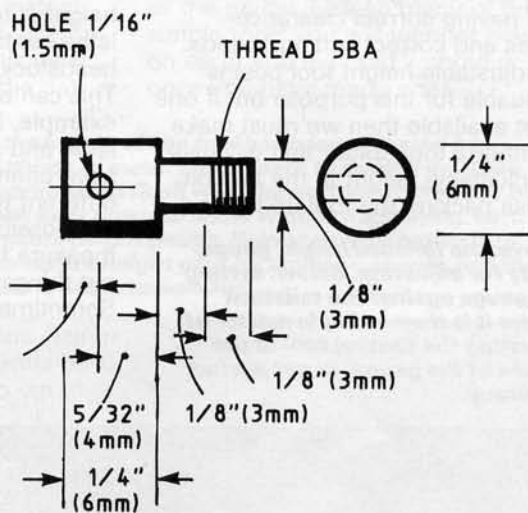


SLIDE BAR 1 OFF M/STEEL SOLDER OR LOCTITE BLOCK IN POSITION

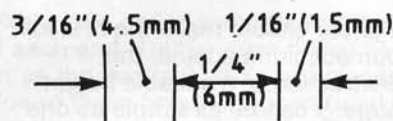


THREAD 6BA(2mm)

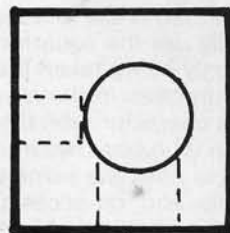
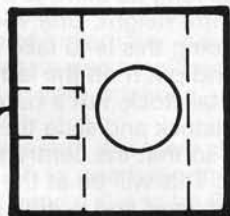
PIVOT PIN 1 OFF BRASS OR BRONZE



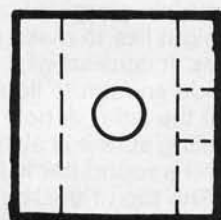
SLIDE BAR BEARINGS 2 OFF BRASS



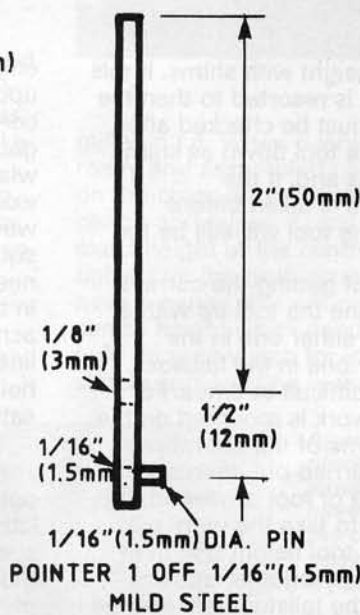
TAP 5BA (3mm)



TAP 2BA (4mm)

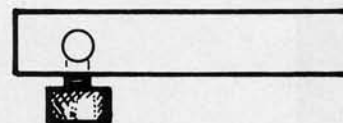


SUPPORT BLOCK 1 OFF M/STEEL SCREWS TO BACK OF MAIN BODY.

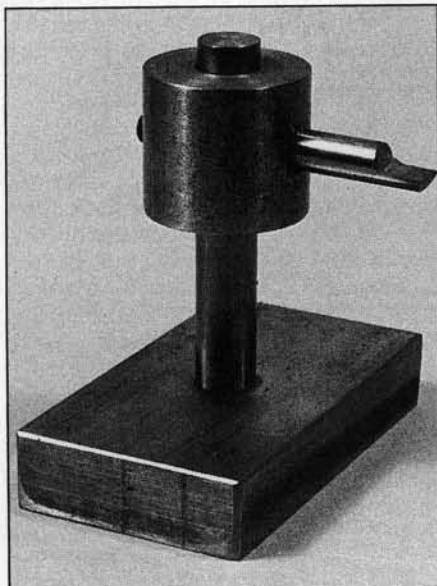


1/16"(1.5mm) DIA. PIN
POINTER 1 OFF 1/16"(1.5mm)
MILD STEEL

NOTE: Views here are not to scale; follow dimensions given.



SUGGESTED STAND. PILLAR 1/4"(6mm) DIA. M/STEEL BASE MILD STEEL TO FIT LATHE TOOL POST SECURING SCREW BRASS 1/2"(12mm) DIA. 2BA(4mm) THREAD. KNURLED TO SUIT OPERATOR. SIMILAR SCREW REQUIRED TO SECURE SUPPORT BLOCK TO PILLAR



Construction details for a simple but useful tool, which can be made on a small lathe

Setting the lathe tool to exactly centre height is as important as having correct clearance angles and correct cutting speeds. An adjustable height tool post is invaluable for this purpose but if one is not available then we must make do either a tool holder that will give an adjustable height to the tool bit, or else packing the tool up to the

Above: the finished height gauge, ready for adjusting. Below: setting the gauge against the tailstock centre it is then a simple matter of adjusting the turning tool to the height of the gauge, to get perfect accuracy.

MAKE A CENTRE HEIGHT GAUGE

the correct height with shims. If this latter course is resorted to then the tool height must be checked after tightening the tool down as shims will compress and, if the measurement is taken before tightening, the tool will still be too low.

One way of getting the correct height is to line the tool up with a lathe centre, either one in the headstock or one in the tailstock. This can be difficult at times. For example, if work is mounted on the lathe and some of the operations have been carried out, then a different type of tool is needed; it is not possible to take the work out, measure the tool height and then put things back together again. Sometimes the tailstock will also be in use, and so that centre cannot be used either.

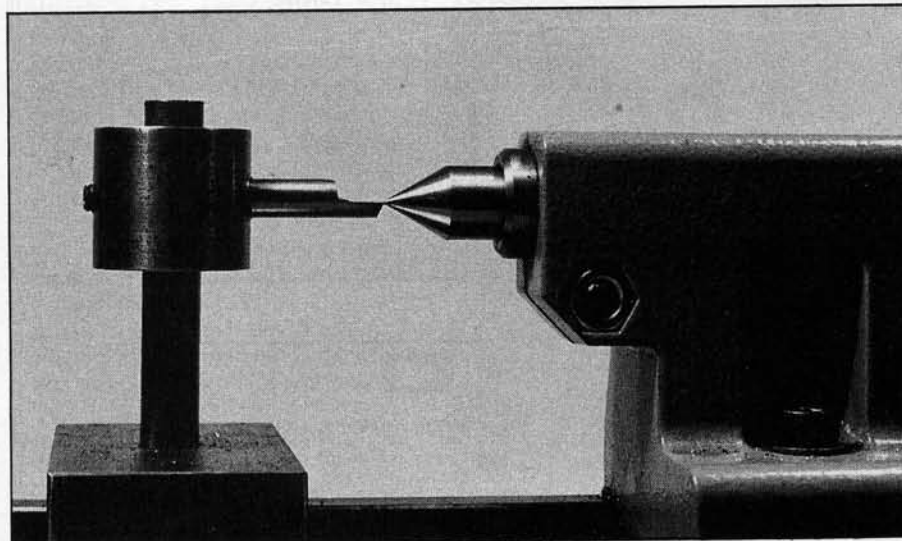
In my opinion every model

engineer should make the first job upon acquiring a lathe, the construction of a suitable height gauge. It can be as simple as one wishes as long as there is a mark at exact centre height. One very simple way of doing this is to take a try-square and put it on the lathe bed near the tailstock. Put a hard centre in the tailstock and slide the square across it so that the centre scribes a line on it. This will be at the exact height required and will be perfectly satisfactory.

The only problem I find with the above method is the fact that I do not usually use the square near the lathe, it only being taken there for special purposes. In the meantime there is a character who lives under my bench who borrows it and then hides it. He does the same with all small tools, and, on occasions, will even hide quite large objects. I even tried moving house to get rid of him but he still managed to follow me and is under the bench at the present one!

To fool him and to make sure I never have any problems, I made myself a simple gauge which readers might like to make for themselves. It consists of a piece of flat bar wide enough to lie across the bed of the lathe. A hole is drilled in this making sure it is absolutely square, and a round bar is fitted into the hole. The top of the round bar will need to be above the lathe centre height. It can be either a push-fit in the block or held in with a retaining compound such as Loctite 601.

Over this round bar goes a collar made from a piece of mild steel bar



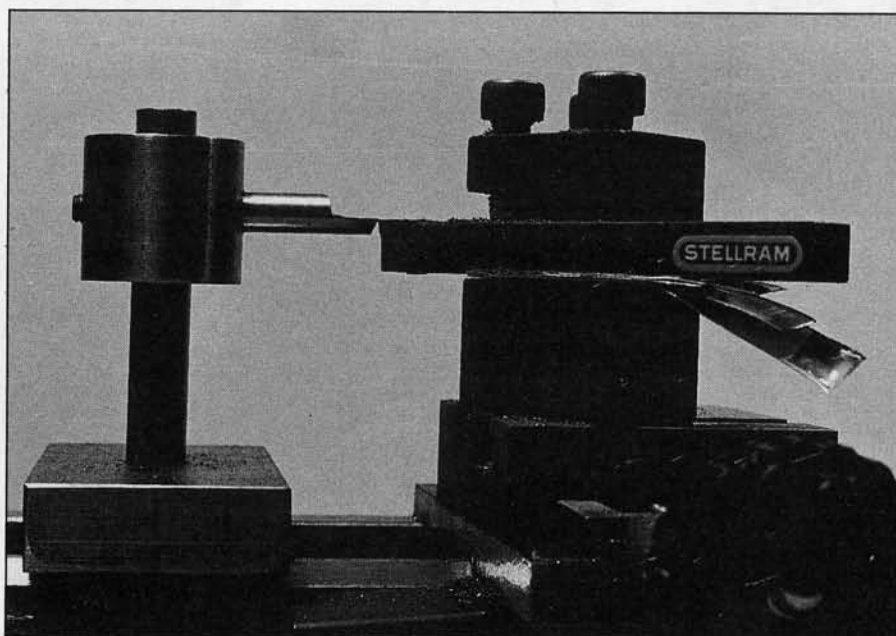
CENTRE GAUGE

with a hole drilled through and faced at each end. This is cross-drilled as far as the central hole in two places. One of these holes is tapped to take an allen headed grub screw. The other is to take a cross-arm and so should be of a diameter suitable for this, and again can be either a press-fit or held in with retaining compound.

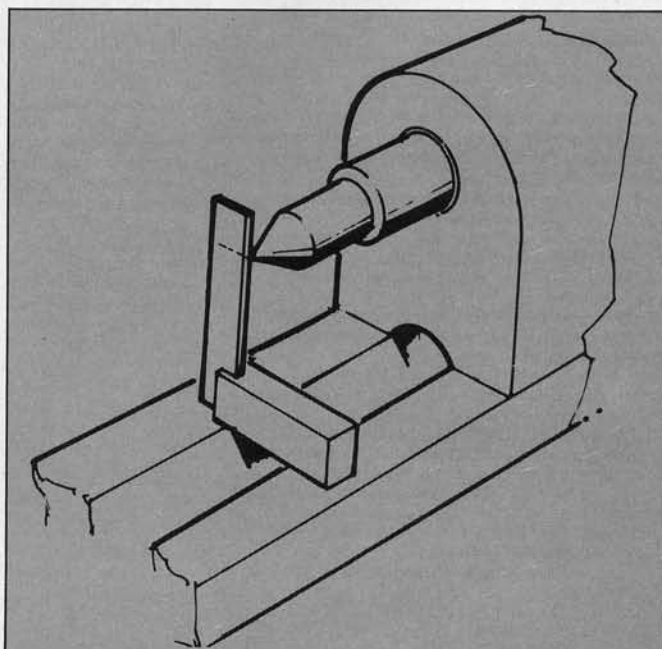
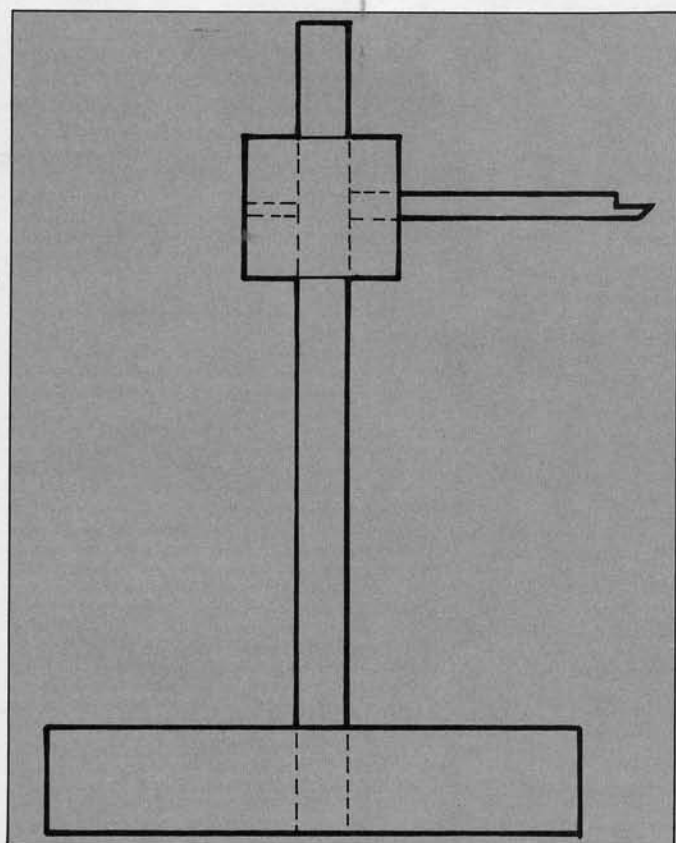
The cross-arm will have to be long enough to overhang the base and it will need a flat to be filed or

milled on it. When everything is ready and assembled check the flat on the cross-arm against the lathe centre and adjust it until it is at the exact height of the centre. Then tighten up the grub screw and you have a gauge that will give instant centre height when needed. The only thing to watch for in this very simple construction is that the flat

on the cross-arm is perfectly level. Otherwise, if it is fitted, the centre height will not be along the whole length. Should you not feel confident of getting it level, turn a point on the cross-arm and use that as the gauge. Like so many of these simple tools you will wonder how on earth you ever did without it once you have made one!



Above: the height of the tool has been adjusted by placing shims of metal underneath to build it up. They would normally lie flush with the bottom of the tool, but have been bent down to show what is happening. Left: the complete height gauge. Below: an alternative is to mark the centre height on a try square – simple, but the try square is liable to wander!



S U P P L I E R S LISTINGS

AKRON TOOL SUPPLY CO.

37 Forest Side, North Chingford, London E4 6BA
Tel: 01-524 7489

Among this company's wide range of tools (over 2,000) are some hard-to-find items at attractive prices: a special anniversary catalogue is available price 85p. **ARGUS BOOKS LTD.**

PO Box 35, Argus House, Boundary Way, Hemel Hempstead, Hertfordshire, HP2 7ST

Publishers of an extensive range of model making and hobby books of all kinds, particularly noted for their fine list of model engineering titles.

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Manufacturers of exhibition standard, scale, super-detailed, ride-on-railway carriages for 5" and 7 1/4/7 1/2" gauge railways. The carriages compliment an exhibition standard locomotive, or will carry a full complement of passengers on ground level track. Various braking systems are available.

ARRAND ENGINEERING

The Forge, Kossington, Nr. Oakham, Leicestershire, LE15 8LN

Tel: 066477 566

Manufacturers of a range of quality taper tooling specifically designed for model engineers. These tools are suited for use with small lathes and milling machines. A recent introduction to the range is a 3in boring head to suit mini-lathes and milling machines. Free catalogues are available on request.

B. ARRIDGE

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Drawings, cylinder castings, wheels, etc., for 5in gauge beginners Crampton locomotive.

ASHDOWN MODELS

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For thirty years this family business has supplied model engineers with a lot of products 'special' to Ashdown, such as double ended flue brushes, a range of specialist transfers and numerous finishing materials.

ATM CO LTD.

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Suppliers of the entire range of Primus Sievert LPG appliances, invaluable for soldering and silver soldering.

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Mail order specialists and suppliers of a wide range of model engineering power tools including lathes, drilling machines and miscellaneous accessories.

A & D BARRACLOUGH LTD.

Elm Street Mill, Elm Street, Burnley, Lancs
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Manufacturers of the well-known Sharp 4in rotary table which they supply complete or in kit form. Check with them for availability of other castings.

BASSETT-LOWKE LTD.

Harvey Reeves Road, Northampton, NN5 5JR.
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A name that needs little introduction to modellers anywhere in the world. The firm mainly specialises in industrial models these days, but they still stock an excellent range of drawings of ships by Harold Underhill. All of which are recognised in the hobby for the high standard they set.

BEATSON & CO (ELECT.) LTD.

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Suppliers of all types of electric motors; telephone or send for free list of stock.

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The firm stocks Myford lathes and accessories, hand tools, and a wide range of castings for workshop equipment, stationary engines, traction engines and locomotives. Other popular items include a cutter grinder which can be made from their castings, the locomotive "Sweet Pea" and all the castings for the Durham and Yorkshire traction engine.

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Well-known range of power tools and accessories including drills, saws and sanders plus the Minicraft range.

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An old-established company dealing in a wide variety of model engineers' requisites.

M. BREEZE

21 Castle Drive, Northborough, Peterborough
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A range of high quality locomotive drawings in 3 1/2 and 5 inch gauges. Castings either are or will be available for the models. The range includes an L.M.S. Pacific, two L.N.E.R. Pacifics and the L.N.E.A. Green Arrow class as well as other types.

B.J. MODEL ENGINEERING SUPPLIES

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Stockist and agents for Myford lathes and products, Rishton and Amold Millers, Sharp 4 Rotary tables, Scot Urghart Drill packages, Excel lathes and products, Warco, Stuart Models, Maxitak locos and track, as well as supplying steel, brass, copper and rivets.

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Manufacturers of a wide range of woodworking power tools, especially a three wheeled bandsaw.

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Fairground items are a rarity. This firm stocks many different items, including those that cause the greatest difficulty to the home constructor. They also stock drawings of fairground equipment.

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Makers of their own design of 3 1/2in narrow gauge engines. A recent addition is an electric diesel type loco, dual gauge, 3 1/2in and 5in and an 'O' gauge Jinty steam 0.6.0 while a no 1 gauge Jinty is coming shortly. They also supply a general range of materials etc.

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Dealers in finished models of traction engines, locomotives, marine models, stationary engines, Mamod models plus the PAYA range of 0 gauge tenplate locomotives and railwayana.

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CHRONOS LIMITED

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Stockists of a wide range of products for model engineers. These include lathes and machine tools from the Hobbymat, Warco, Amolco, Excel, Naerok and Cowells range etc., together with an extensive stock of other items like measuring equipment, hand tools, taper tooling etc.

J.G.S. CLARKE & CO

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Specialist alloy stockholders, including free machining grades of bronze, brass and copper. Based in Northampton, they have branches in London, Halifax and Skegness.

COMPASS HOUSE TOOLS
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Suppliers of a range of special offer and discounted tools and equipment for the model engineer. Available by mail order or from their showroom on the Kent-Sussex border, an associate company can supply used equipment and machines.

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The firm stocks very many designs for clocks in which they specialise. They have in particular a wide range of special brasses of types that are often difficult to obtain. They also stock a wide range of tools and other items of value, to the clockmaker in particular, and the model engineer in general.

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Importers of the well-known Hobbymat and Prazimat lathes from the GDR with an extensive range of accessories including motorized mill/drill and co-ordinate table. Further equipment for the model engineer includes the 'Universal' mini metal-bender. A wood-working lathe is also available in the range.

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Suppliers of a wide range of tools and equipment for the model and professional engineer. A speciality of the house is the supply of chuck spares. The catalogue, obtainable on receipt of a large s.a.e. is a useful item to have in the workshop filing system. Personal callers are welcome and mail orders are dealt with as quickly as possible.

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Suppliers and manufacturers of a various range of machine tools and equipment. Their most popular product is the Astra Mk. VII all geared head vertical milling/boring/drilling and tapping machine. Also worth a mention is the range of 32 sizes of rotary tables, the 5, 6 and 8in for model engineers.

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One of the largest tool stockists in the home counties. Can meet most requirements of the model engineer from stock.

NATHAN SHESTOPAL LTD.
Unit 2, Sapcote Trading Centre, 374 High Road, Willesden NW10 2DH
Tel: 01 451 6188

Stockists of a wide variety of machine tools and accessories and principal source of supply for Primus Sievert gas equipment.

SMALL MACHINE TOOLS LTD.
Oakwood Business Park, Stevenson Road West, Clacton-on-Sea, Essex, C015 4TL
Tel: 0255 473629

Manufacturers of the Cowell range of small lathes, milling machines etc. The range is constantly being developed and includes some items suitable for clock making.

P.J.M. SOUTHWORTH
6 Kennet Vale, Brockwell, Chesterfield, Derby S40 4EW
Tel: 0246 79153

Publisher of 'Some early Robey Steam Engines', 43 pages including 54 photographs and drawings. £3.90 including postage and packing, £5.60 airmail.

NORMAN SPINK
52 Highfield Lane, Chestefield, S41 8AY.
Tel: 0246 277010 anytime

A specialist in locomotive castings and drawings of which they stock a very wide range. Noted for high quality castings and prompt mail order despatch. They have several designs of their own including a 5in gauge British Railways 2-10-0 all of which are proving to be highly popular. The firm also stocks the TOYO range of machines.

STEAM AGE
19 Abingdon Road, Kensington High Street, London, W8 6AH.
Tel: 01 938 1982

Offers a wide range of finished models both old and new. Locomotives, 'O' gauge up to 5in gauge, marine and stationary engines, traction engines, as well as kits and castings, books and boiler fittings. Stockists of the Stuart range of products, and of Maxwell Hemmens models.

STANTON-THOMPSON LTD.
Lys Mill, Watlington, Oxon
Tel: 049 161 3515

Boring, facing and bottoming, threading and recessing operations in bores from as small as 1/8in are simplified by the range of Orkan tools distributed by this company. Made from high speed steel and relief ground right round for extended life and easy re-sharpening, there are 13 sizes standard and extra length cutting head diameters 1/8 to 5/8in.

STUART MODELS LTD.
Wedmore Road, Cheddar, Somerset, BS27 3EB
Tel: 0934 743470

Makers of the famous range of Stuart Turner Models and also the Morewood model boilers. The range needs little introduction being famous the world over. Boilers can be made to order to any design or scale.

KEN SWAN
Dipwood Way, Rowlands Gill, Tyne-and-Wear, NE39 1DH
Tel: 0207 542560

Specialist in 7 1/4in gauge prototypes and supplier of castings and materials for a range of models in this size.

SWINDON
29 Church Walk North, Swindon, Wilts, SN2 3DH
Makers of copper boilers to order for stationary engines, locomotives, or traction engines.

T.E.E. PUBLISHING
The Edwards Centre, Regent Street, Hinckley, Leicestershire
Tel: 0455 637173

Publishers and suppliers of books on the hobby and a regular magazine for model engineers. A useful source for back issues of Model Engineer magazine.

A.G. THOMAS (BRADFORD) LTD.
Tompion House, Heaton Road, Bradford, West Yorks, BD8 8RD
Tel: 0274 497171

A mail order tool catalogue for the model engineer, watchmaker and clockmaker, plus clock movements, clock ornaments and repair material.

JOHN THOMPSON
1 Fieldway, Fleet, Hampshire, GU13 8ER
The catalogue provides an introduction to the fascinating world of model horse-drawn vehicles. It lists plans of the carts, carriages and caravans suitable for the novice and the expert, together with the books and kits which are available from the company.

ALEC TIRANTI LTD.
70 High Street, Theale, Reading, Berkshire, RG7 5AR
Tel: 0374 302775

Suppliers of many different kinds of tools, materials and equipment for sculpture, modelling, mouldmaking and casting. Better known to the modelling world for their Silicone Rubbers and White Metals, which are stocked in a variety of types, they also manufacture the

Centricast Centrifugal Casting and Mouldmaking Machine.

B & R TITE
17 Crescent Road, Colwall, Malvern, Worcs, WR13 6QW

Makers of a range of drawings and castings for stationary and marine steam engines, also drawings, castings and materials for a modern 60cc twin cylinder overhead camshaft petrol engine.

TOWN BENT ENGINEERING CO.
Chapel Works, Barnes Street, Clayton Le Moors, Accrington BB5 5PF
Tel: 0254 31505

This firm has recently taken over the production of the Sharp Milling Machine as well as the other Sharp products such as rotary tables, etc. A well-established engineering firm in their own right, they have considerably improved what was already a very fine milling machine in the first place, making it amongst the finest available for the home workshop. It is British made throughout, something of which the firm are very proud.

TURNER (PREC.ENG.) PRODUCTS
Braeside Works 'H', Teevan Road, Croydon, CR9 6DP
Tel: 01 656 7765

Precision mechanical engineers, specialising in CNC turned parts for the industry and makers of the Turner 'Nibbler'.

TOWNLEY TIMES
Windsor Road, Todmodern, Lancashire OL14 5JY
Tel: 070 681 4931

A range of tools and tooling too vast to be separately listed; send for a free copy of "Townley Times" for a list of bargains.

TRACY TOOLS LTD.
2 Mayors Avenue, Dartmouth, South Devon
Tel: 08043 3134

Suppliers of general model engineering tools; useful catalogues are available.

TRUE-TO-SCALE SERVICES
9 Lodge Road, Bromley, Kent, BR1 3ND
Tel: 01 460 8126

This company offers accurate scale drawings of the last American Steam locomotives, showing g/a and all components, and taken from the original works drawings. These were the giants; 4-8-4's hauling 1,000 ton passenger trains up to 100 mph. For the hardware, Amrail imports a whole range of 5 and 7 1/4 gear bogies, couplers, headlights, bells etc.

TURRET ENGINEERING LTD.
Pindar Road, Hoddesdon, Herts, EN11 0BZ
Tel: 0992 461878

The Amolco milling attachment together with a table unit to form a complete machine tool is now available from this company or one of their regional distributors.

TURTON ENGINEERING LTD.
Moor Lane, Witton, Birmingham, B6 7HH
Tel: 021 356 4777

Manufacturers of the useful 'Crab Clamp'.

VARISCAL
9 Park Place, Clifton, Bristol, BS8 1JP
Tel: 0272 277427

Can reduce or enlarge your plans, or part plans, to the exact size required for the next project.

DAVALL GEAR COMPANY LTD.
Welham Green, Hatfield, Herts, AL9 7JB
Tel: 07072 65432

Manufacturers of all types of power transmission gearing, with over 2,400 standard stock gears. Toothed timing belt drives also available.

JOHN M. ELLIS
Unit 3, Fairfield Drive, Off Stone Lane, Kinver, West Midlands, DY11 6EQ
Tel: 0384 872122

Although particularly specialising in making boilers for the smaller gauges right up to 10 1/4 inch gauge as well as for traction engines of all scales, the firm also makes an interesting range of forged coupling hooks which look highly authentic as well as having the additional strength associated with the forging process.

EMCO MAIER LTD.
10 Woodshots Meadow, Croxley Green, Watford, Herts, WD1 8YZ
Tel: 0923 50051

U.K. importers of the EMCO range of machine tools which are so well established in the hobby as to probably need no description. It includes the well known Unimat and the Compact 5 and Compact 8 lathes. The range has both milling attachments for the lathes and milling machines in their own right. They also stock accessories and other machines likely to be of use to the model engineer.

EUROPA PRECISION
Unit 1, Venture Industrial Park, Ackworth Road, Hilsea, Portsmouth, P03 5JP
Tel: 0705 667331

The firm stocks the Unimat range of machines and, in particular, specialise in the Unimat 1.

EVERETT MODEL ENGINEERING SUPPLIES
24 Station Road, Meopham, Kent
Tel: 0474 814295

Suppliers of metal, drawings, castings, etc. for locomotives and stationary steam engines.

EXCEL MACHINE TOOLS

Unit 1, Colliery Lane, Exhall, Coventry CV7 9NW
Tel: 0203 365255

A wide range of good quality imported machines, in particular larger size milling machines from the Far East.
EXPO (DRILLS) LTD.

Clock Tower Works, Warsash, Hampshire, SO3 6FH
Tel: 04895 83966

A wide range of very useful miniature electric powered hand tools, in particular the Saturn series of drills.

FAN AND MOTOR CENTRE

65 Sidney Street, London, E1 2NH
Tel: 01-247 3710

A large stock of new and second hand electric motors suitable for all model engineering purposes.

FLAMEFAST LTD.

Pendlebury Industrial Estate, Bridge Street, Swinton, Manchester M27 1FJ

Tel: 061-793 9333

Manufacturers of gas equipment for the model engineer; range includes soldering torches, small furnaces, casting tools and equipment, and brazing torches and materials.

FYNE FORT FITTINGS (FRESHWATER I.O.W.)

Clarence Boatyard, East Cowes, Isle of Wight, UK PO 32 6EZ

Manufacturers of live steam fittings for model locomotives, marine, traction and stationary engines. They ship worldwide and will supply special fittings up to full size to order.

PHIL W. GIBBONS

Six Score Road, Langtoft Common, Market Deeping, Peterborough PE6 9QD

Tel: 0778 347515 or 0780 63458 (evenings)

A foundry specialising in castings for the model engineer. Although they have some patterns of their own, basically their work is making castings to customers' own specifications. Either from patterns or drawings. A useful service not always easy to obtain elsewhere.

G.L.R. DISTRIBUTORS LTD.

Great Northam Works, Hartham Lane, Hertford, Hertfordshire

Tel: 0992 552962

Suppliers and stockists of tools and raw materials of all kinds including taper tooling, green grit wheels, aluminium, brass, copper (all types), drill sets, blanks, drills, dies, grinding wheels, heavy metal, non-corrosive balls, carbide-tipped tools. Drawings and castings for "Dolphur" 5in narrow gauge 2-8-4 tank loco. Catalogue available at 75p — everything for the model engineer.

DAVE GOODWIN

43 High Street, Rishton, Blackburn, Lancs, BB1 4JZ

Tel: 0254 885836

Supplier of top quality castings for loco's mainly to M.E. designs, also castings to customers' patterns in iron, gun metal, aluminium or brass. Sole supplier of castings for several designs. Stockist for nuts and bolts, taps and dies, bar sections and other miscellaneous items.

GRAHAM ENGINEERING LTD

Alpine House, Roebuck Lane, West Bromwich, Nr. Birmingham West Midlands, B70 6QP

Tel: 021 525 3133

This company supply a wide range of tooling, and have just introduced a mail order service — offering three day delivery on milling machines, lathes, chucks and measuring equipment.

T.S. HARRISON & SONS LTD.

Union Street, Heckmondwike, Yorkshire, WF16 0HN

Tel: 0924 403751/6 and 0924 409361/6

A 'big' industrial lathe manufacturer who has developed a model specifically for the model engineering hobby market; this is the high quality Harrison M250.

HALL TYZACK LTD

88-89 Merton High Street, London, SW19

Tel: 01-542 6644

Suppliers of a wide range of specialist tools and tooling, ideally suited for use by the model engineer. With extensive knowledge of the engineering and hand tool market, they offer a fast delivery service coupled with an excellent after sales back up.

HEGNER (UK) LTD.

111 Sutton Road, Southend on Sea, Essex SS2 5PB

Tel: 0702 617298

Saws and associated woodworking power equipment.

N.S. HEMINGWAY

30 Links View, Half Acre, Rochdale, OL11 4DD

Tel: Rochdale 45404

Suppliers of tools, free cutting steel, Allen screws etc, but specialising in kits to make your own workshop equipment. Extensive range of designs available; Boring heads, dividing heads, knurling tool, taper turning attachment etc, plus all the George Thomas designs.

D. HEWSON

73 Victoria Road, Barnetby, DN38 6HY

Tel: 0652 6884080 (evenings)

Precision lost wax castings for 5in gauge loco's and scale 5in gauge railway wagons. Also castings supplied

to customers patterns by arrangement.

HEWARD & DEAN LTD

90/94 West Green Road, Tottenham, London, N15 4SE

Tel: 01-802 1731

Suppliers of tools, materials and sundries for model engineers.

HIRSH JACOBSON MERCHANDISING CO LTD.

91 Marylebone High Street, London W1M 3DE

Carbide scribers, Diamond dressers, Diamond needle files, HSS twist drills, HSS hacksaw blades, Calipers, pocket microscopes and air grinders can all be supplied by this company, who pride themselves on their reputation for fast delivery.

F.L. HUNT & CO.

48 Chapel Street, Manchester M3 7AA

Tel: 061 834 1465

A long established firm of foundry suppliers who specialise in the small quantities needed by the home foundryman. The range is vast and it is suggested that you phone or write for a quotation stating your exact needs — despatch is immediate to any address in the U.K.

HUCAR ENGINEERING SUPPLIES

1 Copeland St, Kingswood, NSW 2750, Australia

Tel: 047 31 3950

Major Australian supplier of materials, castings, plans, literature and fittings for the live steam and scale model enthusiast. Enquiries and sales can be made by post or telephone and facilities exist for model construction and repair.

IRON HORSE ENGINEERING LTD.

113 Stein Road, Southbourne, Emsworth, Hants, PO10 8LS

Tel: 0243 373624

Manufacturers of Passenger carrying railways for parks, estates and gardens. Their services include everything from planning through to railway operation for both private and commercial lines. The firm specialise in a range of complete sectional track in all popular gauges up to 10 1/4in including a portable raised level system.

JABUS ENGINEERING LTD.

Ash Barn, Braunton, N. Devon, EC33 2EG

Tel: 0271 815310

The range of Jabus Artisan quality equipment suitable for model engineers includes small diameter turning, tailstock taper turning and spherical turning tools, and a 100mm precision rotary table and accessories. The company can also supply castings and drawings for the Metalmaster Universal Machine Tool.

J.A. JACKSON

Tufagh, Ramsden Park Road, Ramsden Bellhouse, Billericay, Essex, CM11 1NG

Tel: 0258 710444

Designer and supplier of the "Manumatic" Boring and Facing Head which gained high distinction in its class at the 1987 Model Engineer Exhibition, Drawings castings and instructions for use of the device are obtainable only from this source.

J.P.H. ENGINEERING

7 Bournemouth Park Road, Southend on Sea, Essex, SS2 5J0

Tel: 0702 66688

This firm specialises at the moment only in the John Haining designs. These include most of the traction engines and all the other published designs such as the Dairy Engine, the living van and the water cart.

L.C. JAY & SON LTD.

19-21 Oak Street, Norwich NR6 7DT

Tel: 0603 628798

Specialist foundry willing to cast from customers' own patterns in iron bronze or alloy. They also stock castings for popular designs as well as for a couple of their own specialities. These include a neat little lathe suitable for home construction.

A. KELLETT

2a Egerton Street, Denton, Manchester, M34 3LU

Tel: 061 320 0047

Gearmakers of repute and happy to supply small quantities to customers' requirements.

KENNION BROS LTD.

2 Railway Place, Hertford, SG13 7BT

Tel: 0992 582573

Founded in 1901 this is the oldest model engineering firm of them all. Their stocks include a large range of materials and small tools, and they stock drawings and castings for "O" gauge to 7 1/4in gauge models, and two small steam pumps suitable for model locomotives and stationary plants. Their castings include some old and rare designs.

LEEDA LTD.

14 Cannon Street, Southampton, SO9 2RB

Principally manufacturers of fishing equipment, this company's magnifying spectacles (marketed as an aid to fly-tying) are of equal value to model engineers.

LINAZE LTD.

PO Box 343, Old Marsh Lane, Maidenhead, Berks, SL6 0EJ

Tel: 0628 74344

Manufacturers of a demonstration gyroscope with balanced flywheel running on ball bearings. Useful as a

teaching aid, and also as a high quality executive toy for children and adults, it is available direct from the manufacturer.

LIRIMA DESIGNS

Unit 9, Pendre Industrial Estate, Tywyn, Gwynedd, LL36 0AU

LOCOMOTIVE DESIGN CO.

Nyala, Scruton, Northallerton, N. Yorks, DL7 9QZ

Tel: 0609 748315

A recently-established company specialising in 2 1/2in gauge designs who also market the extensive range of castings available from Dave Goodwin.

LOCO STEAM

Keswick Lodge, Keswick, Norwich, NR4 6TY

Tel: 0603 5820

Specialist suppliers of castings, materials etc. for building gauge models, primarily steam locomotives coal, butane or meths, fired, plus other, more general, model engineering equipment.

L.S.M. ENGINEERING

92 Eastfield Road, Wollaston, Northamptonshire, NN 7RU

Tel: 0933 665409

Builders and suppliers of parts, castings and drawings for the larger scale traction engine model.

MACHINE MART LTD.

211 Lower Parliament Street, Nottingham, NG1 1GN

Tel: 0602 411200

A machinery 'superstore', with branches throughout the midlands and north of England. They can supply a range of machine tools, mainly imported, and a large range electric motors and starters.

MACHINE TOOL SALES/PAISLEY MACHINE TOOLS

Sparks Lane, Cuckfield, W. Sussex, RH7 5JP

Tel: 0444 413122/04446 42266

MTS supply the famous British Matosa rotating centres, directly to customers and therefore at a special price. PMT, who share the works and management, offer the full range of Naerok machinery.

MAIDSTONE ENGINEERING SERVICES

50 Hedley Street, Maidstone, Kent.

Tel: 0622 762005

A leading supplier for model engineers, continually extending their range, BMS, stainless steel, copper, brass, phos-bronze etc, in various sections, along with sundries, fittings, books, drawings, castings and tools are all available. They have a mail order service for those unable to visit the shop.

MARDYKE MINIATURE RAILWAYS LTD.

No 3 Factory, Lambs Lane, Rainham, Essex, RM13 9XL

Tel: 04027 54618

Builders and suppliers of ready-to-run locomotives and rolling stock for the large gauge enthusiast or the commercial operator.

A. MARKS (MODELOY)

3 Old Hall Close, Laughton-en-le-Morthen, Sheffield, S31 7YZ

Tel: 0909 563940

Manufacturers of machine tool accessories and other related materials including centre drill holders and chuck adaptors, etc.

ASSET GLEN LTD.

PO Box 250, Chester CH1 4HE

A drill sharpening device is the main item of interest. They also stock a useful flexible sanding disk of above average quality as well as a range of drills etc.

MASON & GANTLETT LTD.

29 Surrey Street, Norwich, NR1 3NX

Tel: 0603 746998

Suppliers of a wide range of magnifiers and optical equipment. Manufacturers of the Versator binocular headband magnifier.

MERCER SKILLED CRAFTS LTD.

Springfield Works, Moorside, Cleckheaton, BD19 6JT

Tel: 0274 872861/874586

Stockists of machine tools, measuring equipment, workshop equipment, tools and tooling for machines, used machines and equipment. They offer most leading makes from stock.

MICROW ENGINEERING

5 Lindsay Street, Kettering, Northants

Manufacturers of machine tool accessories of high quality, in particular a double-ended sliding die holder.

MILNER ENGINEERING

Old School, Main Road, Higher Kinnerton, Chester, CH4 9AJ

Tel: 0244 660791

Consultants, designers and manufacturers of model locomotives and equipment in 7 1/2in to 15in gauge.

MODEL ENGINEERING SUPPLIES AND SERVICES

Mesas House, Alma Street, St. Helens, Lancs WA9 3AR

Tel: 0744 53634/22294

Castings are stocked for many engines including Gemma, Scamp and Stuart Turner. Agents for Myford, Warco, Cowells, and Hobbymat. The company has recently developed several new products, many for the Hobbymat lathe. New to the range is their lock-on milling cutter chuck, and quick change tool post.

MODEL ENGINEER PLANS SERVICE, ASP

Argus House, Boundary Way, Hemel Hempstead,
Hertfordshire HP2 7JT

Whatever your interest in Model Engineering you are almost certain to find a drawing in the extensive Model Engineer Plans Service range which covers traction Engines, locomotives, stationary steam engines, boilers, fittings, petrol engines, workshop equipment and much more. A fully illustrated catalogue (Handbook 2) is available from the above address price £2.00 plus 35p p&p, which is re-fundable on your first mail order worth over £5.00.

MODEL ENGINEERING SERVICES

6 Kennet Vale, Brockwell, Chesterfield, Derbyshire
S40 4EW

Tel: Chesterfield 79153

A wide range of castings and drawings for workshop equipment. These include a milling machine and surface grinder, dividing head, and lapping machine as well as many smaller items. Some of the larger castings are available ready machined. They produce castings for two different cutter grinders for those wishing to sharpen their own milling cutters etc.

MILL HILL SUPPLIES

66 The Street, Crowmarsh Gifford, Nr. Wallington,
Oxon OX10 8ES

Tel: 0491 38653

Specialist mail order tools suppliers; a free list is available on request.

M.J. ENGINEERING

Manor Hatch, 63B Southampton Road, Ringwood,
Hants, BH24 1HE

Tel: Ringwood 6234

Drawings and castings for model traction engines in the smaller scales, and also two locomotives, a 7 3/4in NG 0-4-0 Bagnall, and Ariel, and 5in gauge re-built Merchant Navy. Add to this a comprehensive range of Myford equipment and spares, David Lammas tooling aids, materials, books etc, and you have the full picture.

MOTORUM PHASE CONVERTERS

23 Waldengrave Road, Teddington, Middlesex
Tel: 01-997 0242

Specialist in the supply of electrical phase convertors, particularly useful when purchasing secondhand machinery.

D. MACKAY

85 East Road, Cambridge CB1 1BY

Tel: 0223 63132

Not primarily model engineer suppliers, the firm stocks an exceptionally large range of tools and machinery. They also stock and will cut to size brass steel etc, but that service is for callers only. Stuart Turner castings are also available.

MALDEN TRANSFORMERS

134 London Road, Kingston on Thames

Tel: 01 546 7534

A large range of new and secondhand electric motors as well as phase converters, transformers etc.

MAXITRAK

Rothemay, Offham Road, West Malling, Kent, ME19
6RG

Tel: 0732 840660

Manufacturers of large scale live steam and diesel models in both narrow and standard gauges; the locos are available in either kit or ready-to-run form.

MEDDINGS SALES LTD.

Lee Mill Industrial Estate, Ivybridge, Devonshire
PL21 9LL

Tel: 07554 3277

Manufacturers of a range of high precision drilling machines among other quality machine tools.

MERIDIAN CLOCKS

Wheelwrights House, Hillgrove, Lurgashall,
Petworth, Sussex.

Mail Order Only

Suppliers of an excellent series of specialist books by the well-known horological author John Wilding. The books make an excellent reference source for any horologist, amateur or professional.

MICROFLAME (UK) LTD.

Vinces Road, Diss, Norfolk, IP22 3HQ
Tel: 0379 4813

Importers and distributors of the Dremel range of precision hand-held power tools and Microflame soldering, brazing and welding tools and accessories.

N. MOLE & CO (MACHINE TOOLS) LTD.

5 Tolpits Lane, Watford, Hertfordshire, WD1 8LU
Tel: Watford 43135

A supplier of lathes, milling machines etc.

MY KITS

1A Holly Close, West Winch, Kings Lynn, PE3 0PW
Makers of a small simple indexing device for the Myford 7 series lathes.

MYFORD LTD.

Chilwell Road, Beeston, Nottingham, NG9 1ER.

Myford are the country's foremost manufacturer of screwcutting centre lathes up to 280mm (11in) swing. Included in the Myford range are the series 10, series 7 and the new 254 plus centre lathes, plus a choice of three vertical milling machines from the popular VM series. All Myford machines are backed by a

comprehensive range of accessories and ancillary equipment.

Z.R.D. NADIRSHAW

441 West Green Road, Tottenham, London, N15
Tel: 01-888 1865/4613

Suppliers of taps, dies, drills and reamers in all popular model engineers' sizes; one-off sizes are available, contact for a quote. Send a large SAE for price list.

NAEROCK LTD.

Unit A, Ffrwdgrech Industrial Estate, Brecon, Powys,
Wales

Suppliers of quality imported machine tools, now moved to larger premises, the company's range has been expanded to include cordless drilling machines and professional woodworking machinery from Italy, as well as a range of German woodcutting saws.

NUTOOL GROUP

Carcrafy Industrial Estate, Welskye Road, Adwick-
le-Street, Doncaster, S. Yorkshire.

Nu-Tools have one of the largest ranges of products and machines for the model engineer. Lathes for wood or metal, even a combination lathe, milling, drilling machine. A range of 9 drills, 3 milling machines, and grinders from 5in to 8in, and a 10in Wetstone grinder.

F. O'BRIEN & CO LTD.

Swadlincote, Burton-on-Trent, DE11 0PH

Tel: 0282 217588

Manufacturers of drilling machines, including the Star range and, in particular, the Startrite (Fabco) series.

H.L. PEARSON

5 Ruskin Avenue, The Straits, Sedgley, Dudley

Manufacturers of parts for model cannon which can be obtained as part machines or plain castings. The models are supplied with proper cast iron barrels and look most realistic when completed. The sort of odd project to fill in the shorter periods of time spent in the workshop.

PEATOL MACHINE TOOLS

19 Knightlow Road, Harborne, Birmingham B17 8PS

Manufacturers and suppliers of the Peatol Micro Lathe and its associated spares.

PRO-AM MACHINE TOOLS & MODEL ENGINEERS SUPPLY LTD.

Felmington, North Walsham, Norfolk.

Tel: 0263 732661

Excellent source of both new and used machine tools in most sizes.

PRECISION ENGINEERS LTD.

Mary Street, Rishton, Blackburn BB1 4RF

Tel: 0254 888001

Manufacturers of the Rishton VM series of Vertical Milling Machines and accessories, the union range of grinding, polishing and belt grinding machines, and the clarendon range of hand-operated presses.

PRECISION SERVICES

Princes Drive, Crackley Industrial Estate, Kenilworth
Warwickshire, CV8 2FD

Tel: 0926 59142

Specialists in the supply of quality measuring instruments. The firm also stocks the Unimat range of machine tools.

PROOPS BROS

Unit E, Crescent Works, 3 Nicoll Road, London,
NW10 9AX

Tel: 01 965 2263

Suppliers and stockists of a very wide range of tools, materials and model engineering sundries, many at bargain prices. For a fully illustrated catalogue please send 75p. Trade enquiries are more than welcome.

PROOPS DISTRIBUTORS

Heybridge Estate, Castle Road, London, NW1 8TD.
Tel: 01 267 6911

This company specialises in a very wide range of small items likely to be of special interest to model engineers. They offer good value and callers are welcome to browse around their 10,000 sq ft warehouse.

PAUL WAINWRIGHT

Hayford Way, Staveley, Derbyshire, S43 3JR

Tel: 0246 413115

Castings supplied for 3 and 6in Allchin traction engines, rolling stock components and drawings.

WALSALL MODEL INDUSTRIES

Unit 3, 21-24 Hatherton Street, Walsall, West
Midlands, WS4 2LA

Tel: 0922 33718

Suppliers of a large range of wheel castings, finished wheels, axles, and other components for gauges 0 and 1. A particular feature are the square ended driving axles which give automatic quartering and easy removal of driving wheels.

WARNERS MACHINERY CENTRE

Unit 10, Finedon Road, Irthlingborough, Northants
Tel: 0933 651296

Stockist of secondhand machinery for the woodworker as well as the model engineer. There is always a good choice of lathes, milling machines etc available.

WATCO LOCO WORKS

PO Box 125, Como, West Australia

Specialising in a model 7 1/4in locomotive of an American 2-4-0 design which it is claimed is designed particularly with ease of construction in mind.

H.S. WALSH & SONS LTD.

243 Beckenham Road, Beckenham, Kent, BR3 4TS

Tel: 01 778 7061

Suppliers of horological and general model engineering machines, tools and sundries, a giant (320 pages) catalogue is available.

WERNER WIGGERS

Am Weibhusch 1, D-4152, Kemper 1, West Germany

Tel: 021152 51484

WEXLER MACHINE TOOLS

Wellspring Farmhouse, Southrepps, Norwich NR11
8XA

Tel: 026 379 480

Suppliers of the popular Simat 101 lathe and its associated spare parts and accessories.

J.M. WILD

12 Norton Green Close, Sheffield, S8 8BP

Tel: 0742 745693

This company's catalogue includes all manner of general tools suitable for model engineering and clock making, including lathe overhead drive unit, lathe milling spindle, division plates, lathe overhead drive unit, filing rest, finer plate clamps measuring and hand tools.

E & J WINTER

PO Box 126, Welland, 2287 NSW, Australia

Mainly supplying their own drawings and castings for Australian prototype locomotives, the firm also stock a large range of other goods of interest to the model engineer as well.

COLIN WALTON CLOCKS

Tunbeck Cottage, Alburgh, Harleston, Norfolk

Tel: Homefield 616

Clock parts and tools. The range of products includes a radius turning attachment, and a depth tool. Plus many other clock specialities.

WOKING PRECISION MODELS

10 New Street, Oundle, Peterborough, PE8 4EA

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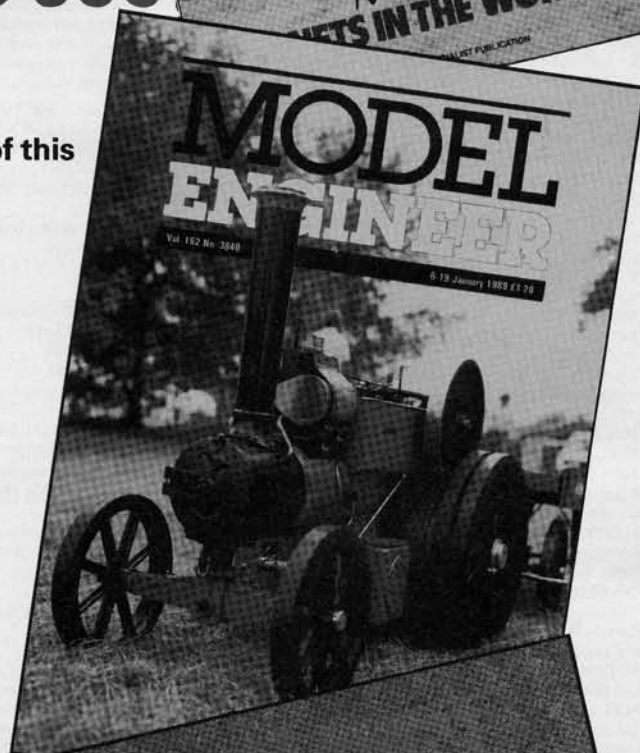
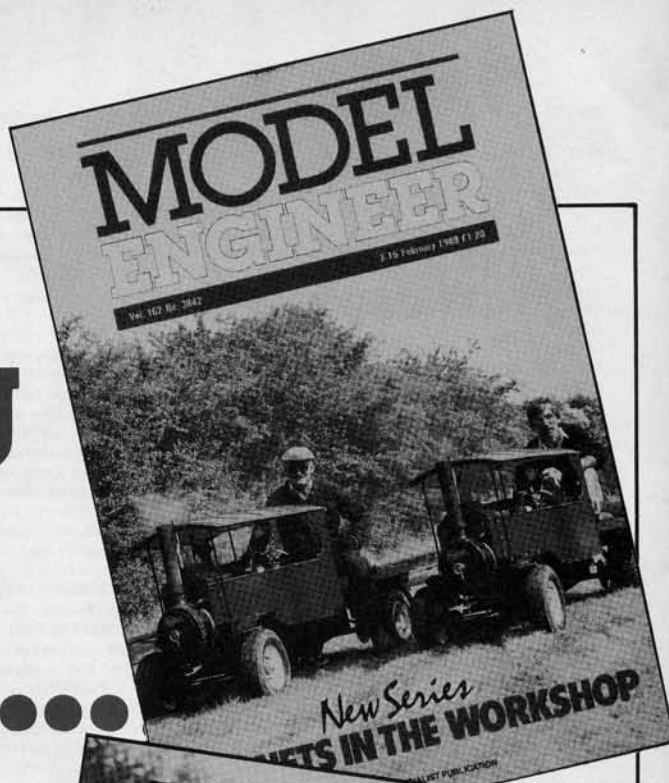
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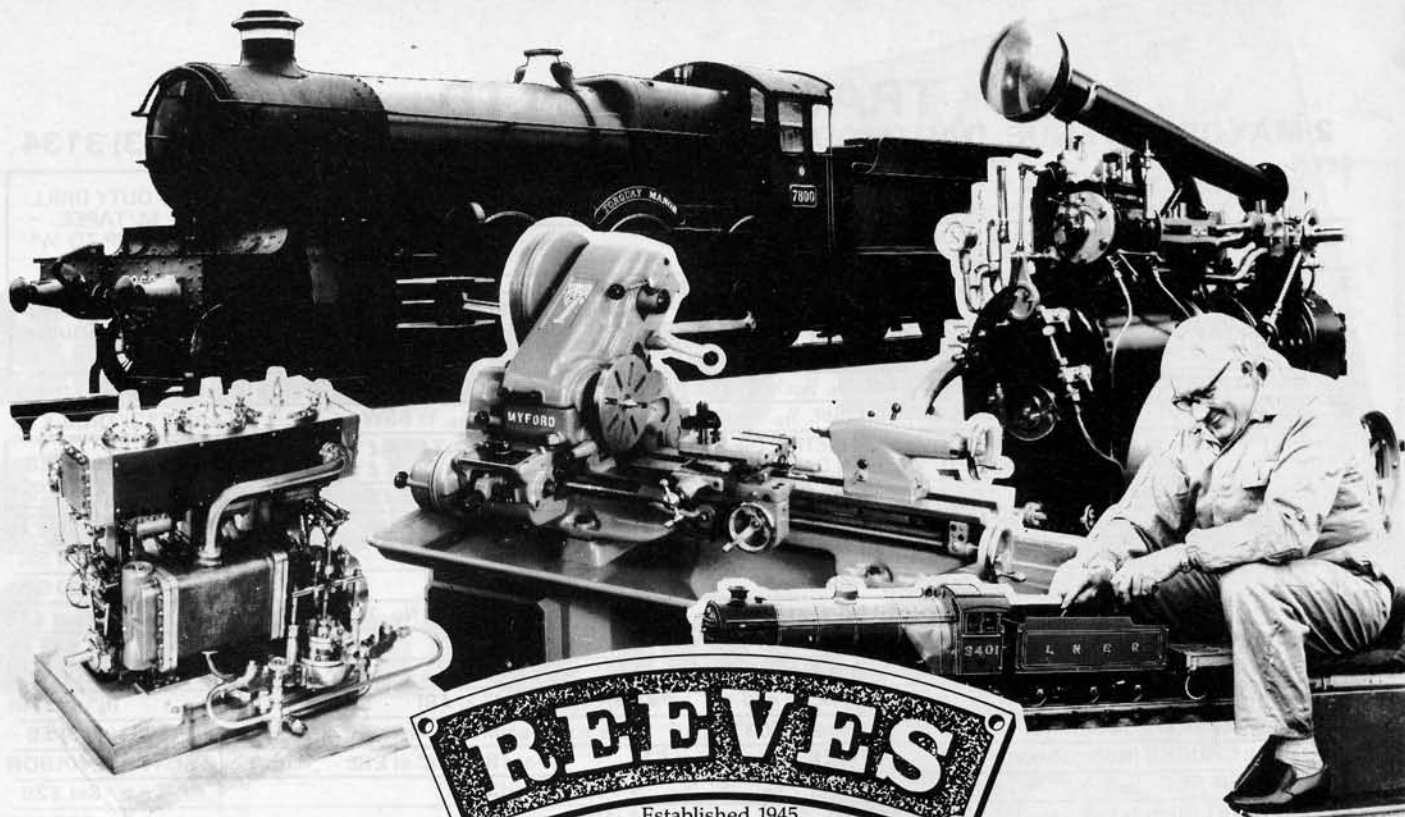
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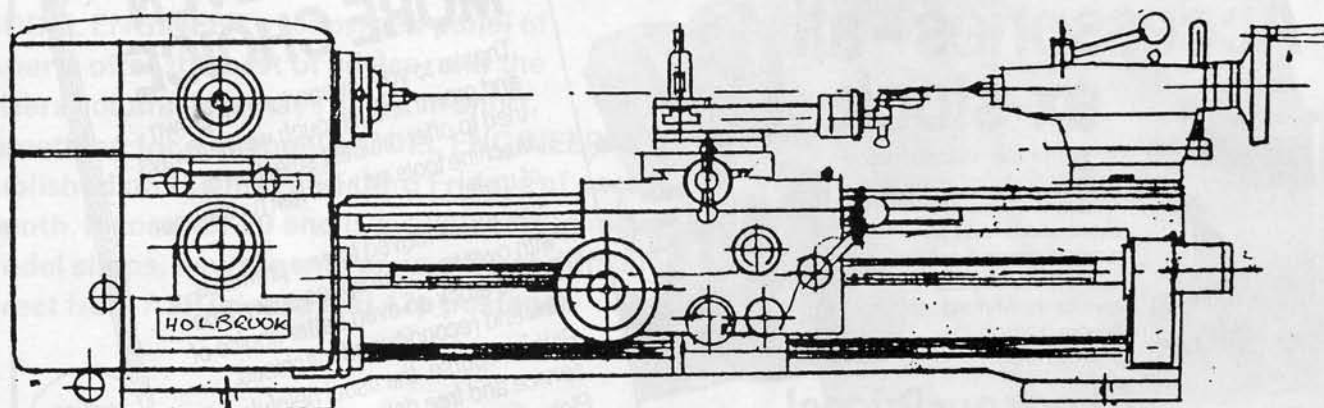
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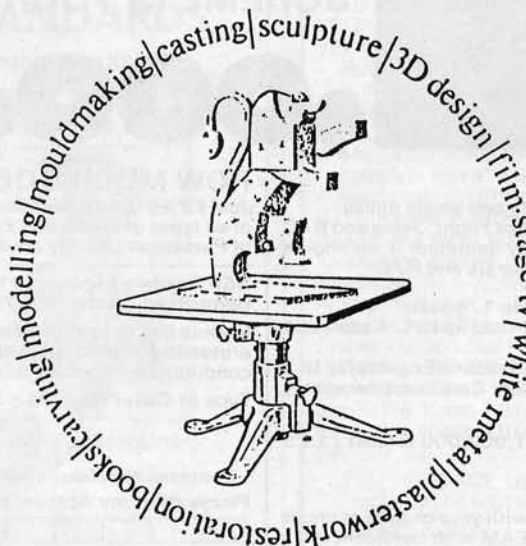
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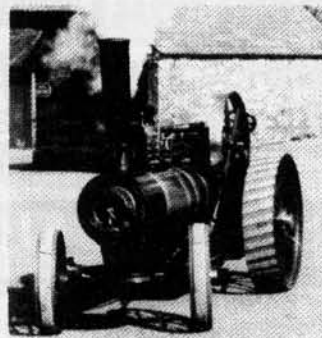
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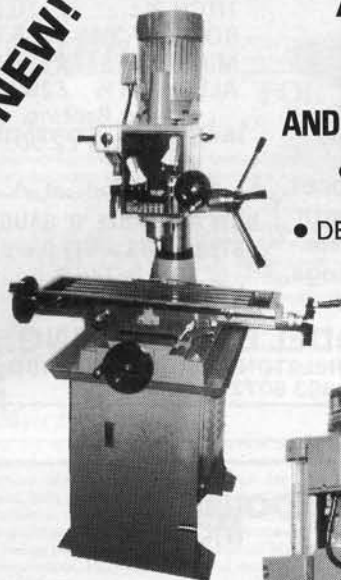
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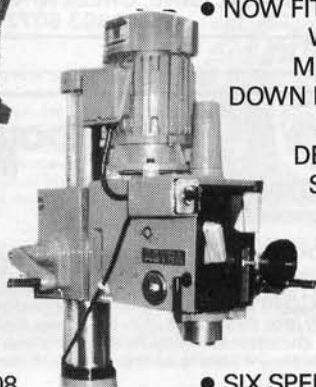
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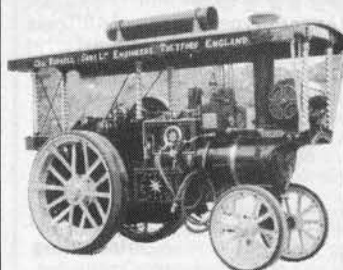
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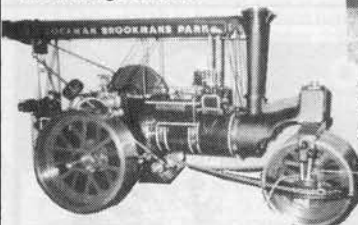
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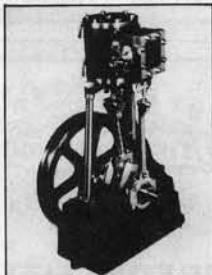
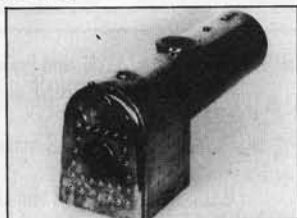
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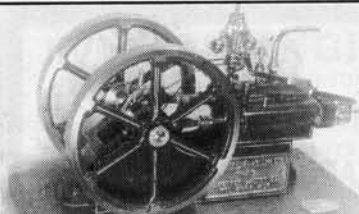
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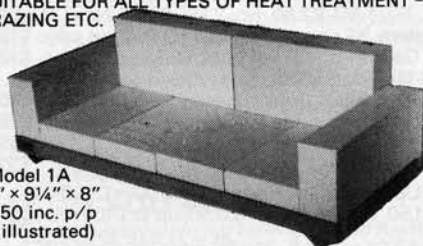
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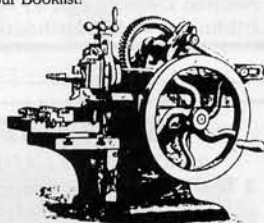
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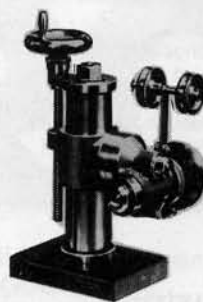
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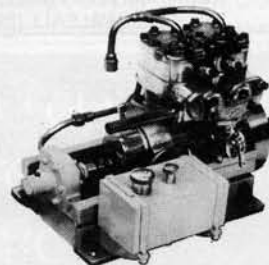


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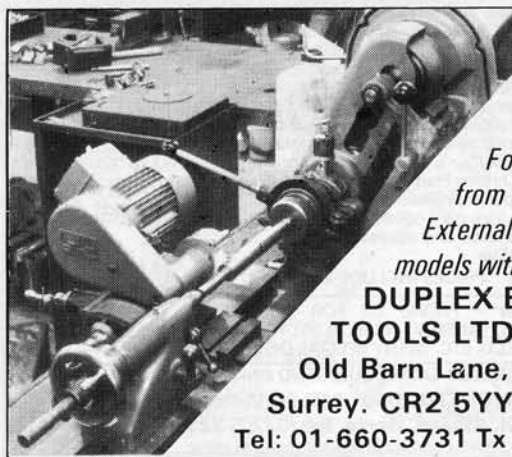
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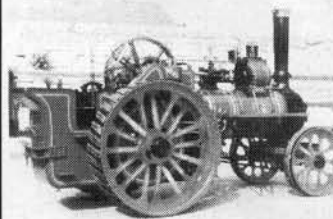
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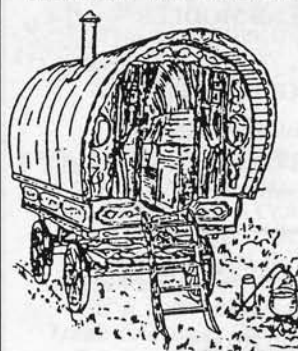


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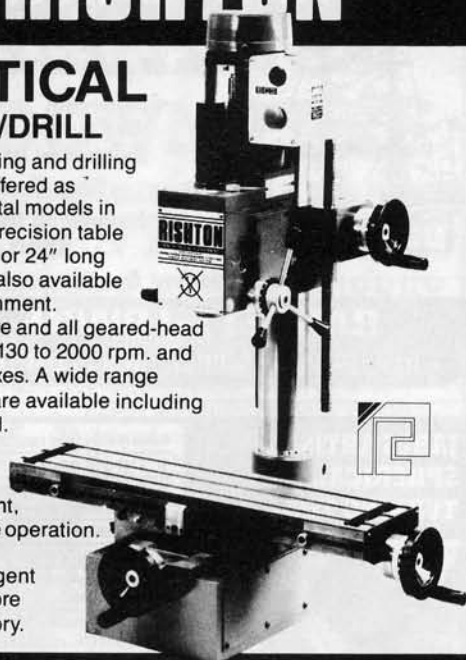
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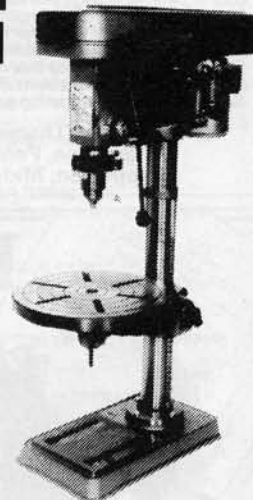
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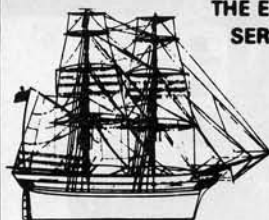
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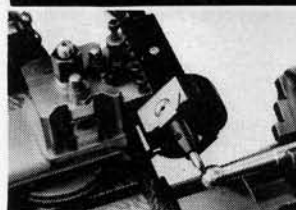
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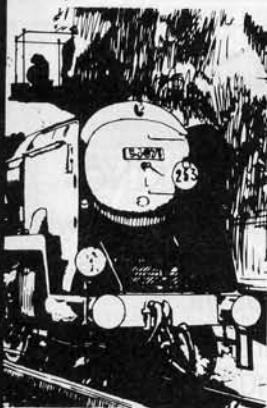
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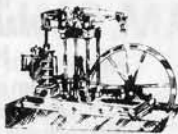
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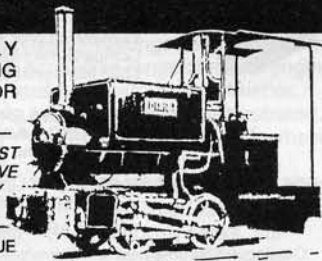
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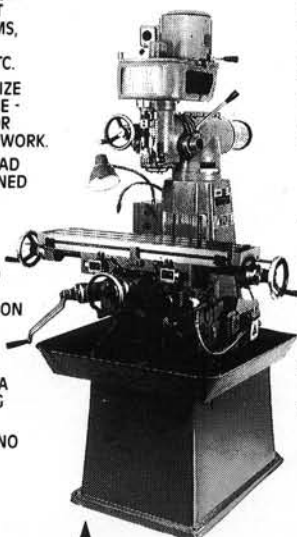
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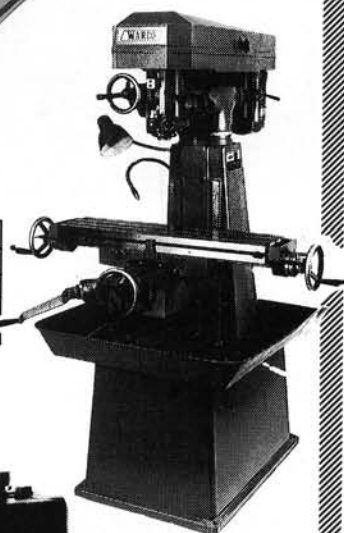


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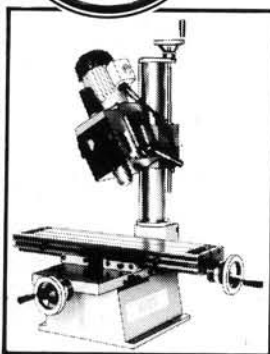
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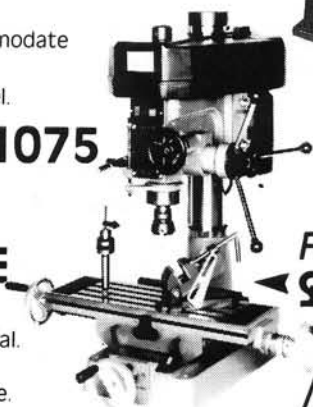
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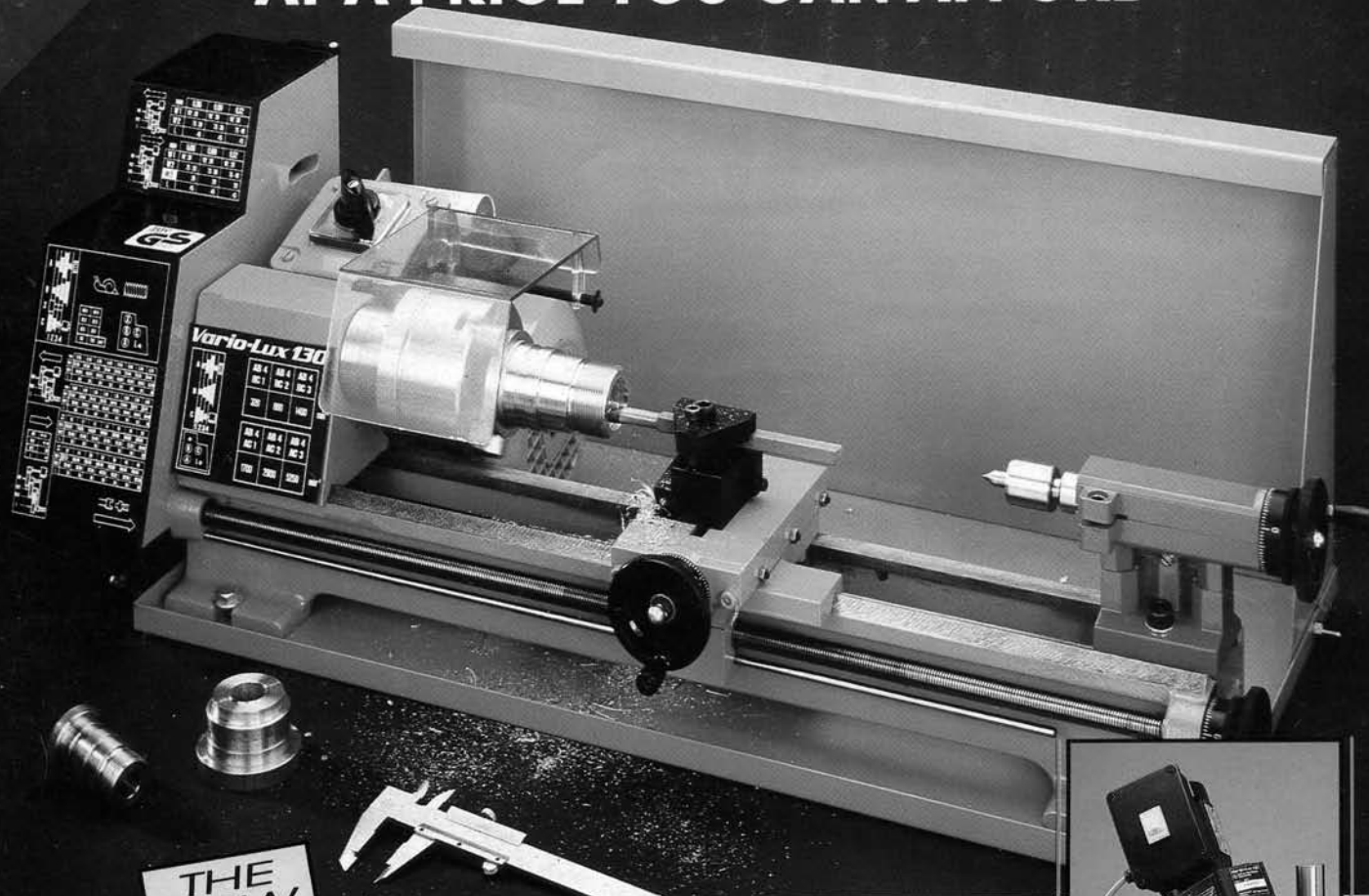
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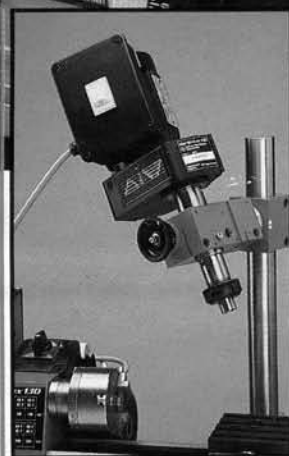
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