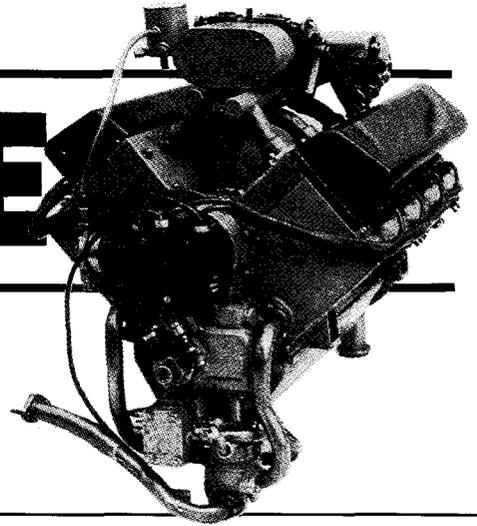


V8 ENGINE

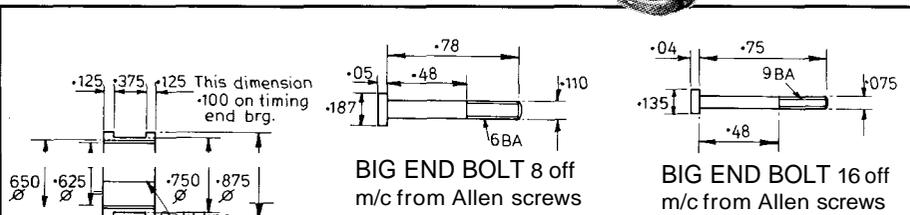


Roy Amsbury describes and details the building of a 120cc V8 i.c. engine which he developed for use with his 5 in. gauge Hymek locomotive. The engine could well have other traction applications *Part II, from page 490*

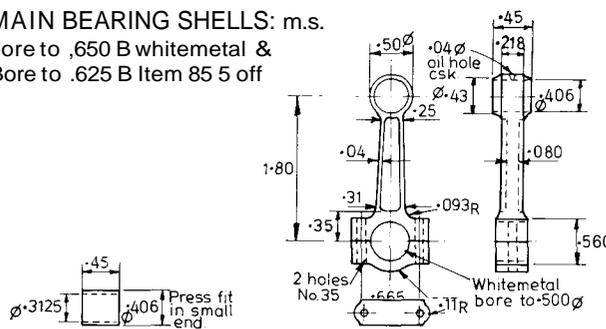
In the first part of the series the Author discussed the design of the engine and went on to detail the fabrication of the crankcase, the machining of the crankshaft, its bearings, and moved on to deal with the connecting rods. Due to pressures on space we held over certain of the drawings until this issue.

Timing Gear Cover

The next fabrication is the timing cover. Take a piece of 16 s.w.g. brass about 5 in. x 2 in. and cut the centre out to the shape of the outside of the raised portion, cut a strip of 20 s.w.g. brass 7/16 in. wide by about 10.6 in. long, and bend it to fit inside the first piece. It must be a good fit all around and just butt together at the ends. Now lay another piece of 16 s.w.g. material on top – about 1/8 in. larger all round, on top of this put a disc to form the boss for the petrol pump housing and silver solder this lot

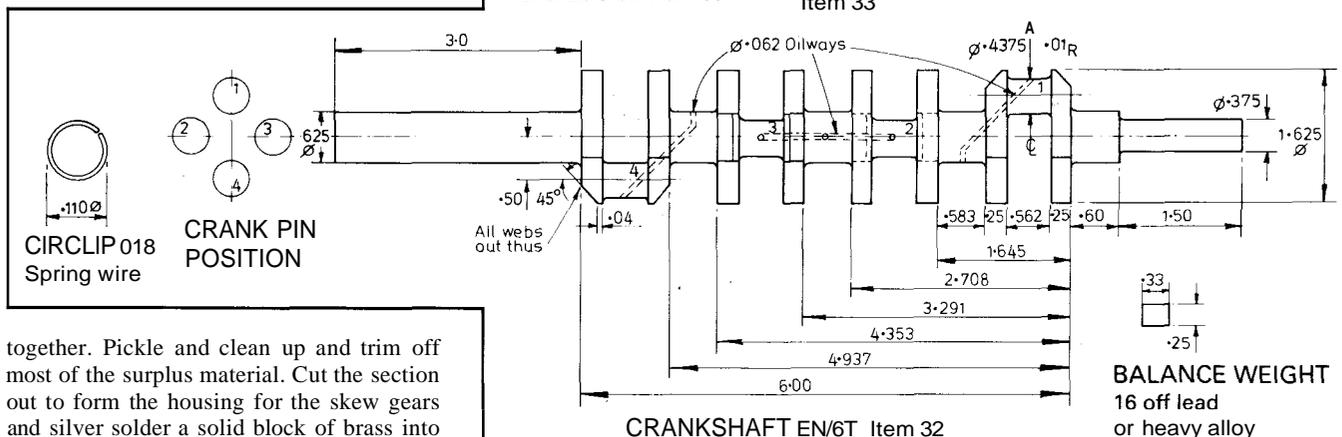


MAIN BEARING SHELLS: m.s.
bore to .650 B whitmetal &
Bore to .625 B Item 85 5 off



LITTLE END BUSH
Bronze 8 off Item 53

BLADE CON ROD 4 off EN8
Item 33



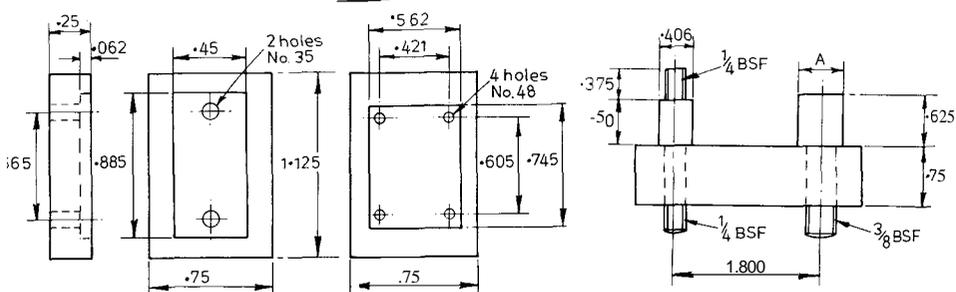
CRANKSHAFT EN/6T Item 32

BALANCE WEIGHT
16 off lead
or heavy alloy

together. Pickle and clean up and trim off most of the surplus material. Cut the section out to form the housing for the skew gears and silver solder a solid block of brass into this space. If one is quick and careful this can be silver soldered without the rest falling apart.

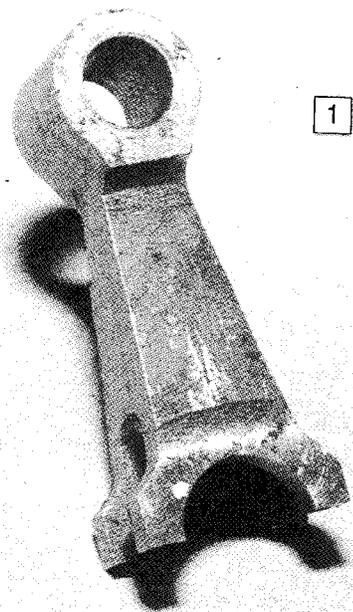
The assembly can now be marked out and set up for machining the various bores. These can be done by mounting on a face plate and on an angle plate off the face plate for the water pump shaft bores. Finally mark and drill the bolt holes and clean up all surplus material to size.

The best way to locate the bolt holes in the crankcase for the timing cover is to make two plugs, one for the crank bore and one for the camshaft bore, with their outer ends to fit the holes in the timing cover – it will also check if you have got the centres correct. The cover can then be located on these and the bolt holes spotted through.



CON. ROD DRILLING FIXTURE
m.s. 1 off each Item 90

CON. ROD MACHINING FIXTURE m.s.
Base 3/4x 3/4x 3 b.m.s.
Dimension A 1 off .580 Item 91
1 off .500



1

gudgeon pin bosses. These holes should be tapered to the outside with a 10 deg. taper reamer. The slot to the top face produces the gusset to the top of the piston and needs a slight taper also.

The centre square piece is bolted to the base of the casting fixture, the four outer parts assembled (without the pins) and the outer sleeve put on – this should be a reasonable – but not tight fit on the inner core. This is now heated and filled with the molten aluminium. When the metal has solidified – but still hot, the outer sleeve is lifted up – this of course lifts the casting and outer members of the core, leaving the square centre on the base. The four outer pieces can then be removed from the inside of the piston – with a bit of wriggling, then the piston will come out of the sleeve and the whole thing can be assembled again. The hotter the casting is when the cores are removed, the easier it is to get the core out.

When you have a set of 8 or more piston castings the next job is to turn a stepped stub mandrel to fit the top and bottom piston bore diameters, i.e. the section below

the ring grooves. Two flats will have to be machined on the sides to clear the gudgeon pin bosses. There is no need to make the mandrel a tight fit in the piston which can be held on by the back centre.

With this set up, the piston O.D. can be rough turned to be true with its cast bore, leave it about 0.05 in. oversize and machine the bottom of the skirt true. The gudgeon pin bore is next and for this another fixture is needed, see item 95. This fixture can now be set up on the drilling machine and clamped down with the centre of the gudgeon pin boss locating plate concentric with the drill axis. The pistons can now be clamped on the fixture in turn and the bosses drilled and reamed. They should come out with the gudgeon pin square to the piston axis and in the centre of the cast boss. A small error in squareness can be corrected by slightly filing the bottom of the skirt so that the distance from the pin to the skirt is identical on both sides.

A further simple jig is needed now to hold the piston for machining the O.D. and ring grooves. A temporary gudgeon pin is used to hold the piston on the fixture, item 89 which is held in the 3 jaw. The piston is now located by the skirt – hence the need to get this true to the gudgeon pin, and the O.D., top face and ring grooves can all be machined at one setting. The grooving tool must be accurately made with the sides relieved at about 5 degrees.

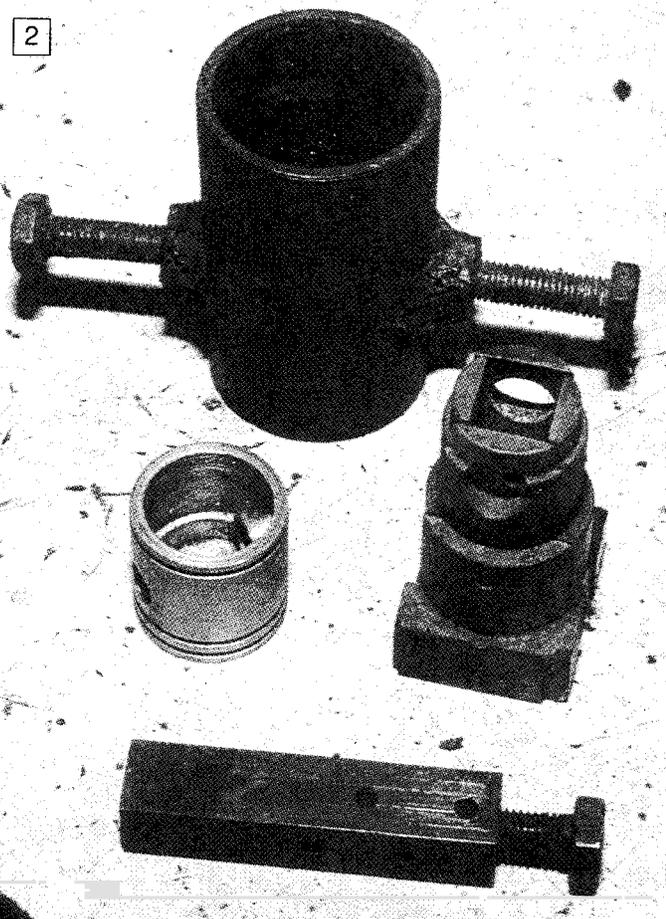
pinned together by 1/8 in. dia. silver steel pins near one end. This assembly is then held in the four jaw chuck and the circular end machined up. It is then dismantled and the two side pieces are drilled to form the

1: One of the forked connecting rods from the Author's engine.

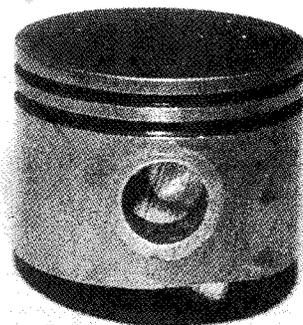
2: A built-up die used for casting the pistons.

3: A finished piston, this is one of an earlier batch with no extra scraper ring fitted.

2



3



As you will have to make your own piston rings, the width is not too critical, but make sure to use the same tool for all the ring grooves – the same applies to the scraper ring grooves. The tool must be set square to the lathe axis and plunged straight in without sideways movement. The O.D. is of course most important and should be turned to 0.0005 in. to 0.0008 in. less than the bore diameter of the appropriate liner and one must get a high finish.

To be continued

Readers' Work

The following information and advice supplements the notice which appears elsewhere. Readers who submit material which they would like considered for publication are asked to type it if possible (or have it typed) and use one side of the paper with double spacing for the manuscript. A margin of at least one inch on each edge of the page is needed for editing purposes. Manuscripts submitted in this form do not require the additional work of re-typing in this office, which is frequently under pressure. Also, the decision whether to publish or not can be influenced by the amount of office work

needed to be done to prepare material for the printer! Line drawings accompanying a manuscript should be clear and unambiguous, as they often have to be re-drawn for our printer to process properly. Photographs, if submitted, should be good glossy black and white prints with good gradation, good quality colour prints can be used. Anywhere between Enprints to 7in. by 5in. size photographs are suitable; it is unnecessary to submit larger ones than this although, of course, they can be used. A stamped addressed envelope should accompany unsolicited work for its return if it is not accepted.