

WORKSHOP HINTS. AND TIPS

CRANKCASE CORE BOXES

BY
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NEXT to pistons required to be cast with circular bosses for gudgeon pins, the most common types of components demanding core boxes to produce their hollow interiors are, possibly, crankcases—at least for small enclosed in-line multi-cylinder engines—though cast bedplates for open horizontal engines also often need core boxes for their production.

The average single cylinder engine crankcase with circular interior can be made with a round core needing only a core print on the pattern; but for a neat light construction for an in-line multi-cylinder engine crankcase, a special core box is a necessity; particularly if construction is to be "monobloc," the cylinders and crankcase in one, all in cast iron, or in light alloy with Dressed-in cylinder liners.

Types of engines for which this construction can be employed are, mainly, four-cylinder four-stroke in-

temal combustion engines, and twin-cylinder single-acting steam engines. The latter with half the number of cylinders and simpler valve gear is, of course, the smaller and less complicated, and for that reason is best taken as the basis of what can be an attractive model.

Diagrams *A* and *B* illustrate transverse and longitudinal sections of cylinders and crankcase—with the core in position, though for the moment it need not be considered. The casting would be machined flat and parallel top and bottom, and similarly at the ends, where there would be bores machined in line for the main bearings, which would be located by spigots and bolted up with flanges

The crankshaft would be a double-throw pattern with crankpins at 180 deg. In assembly, it could be entered at an angle from the bottom of the crankcase, threaded into position and the main bearings fitted—the bottom of the crankcase being closed by a flat plate with mounting lugs.

The bolted-on cylinder head would contain a single piston valve lying horizontally over the cylinders and operated by an eccentric at the top of a vertical shaft—this driven by bevel gears from the crankshaft, and the gears possibly enclosed in a small casing.

The pattern for such an engine crankcase would be a simple solid type, or one halved on the vertical centre line. With allowances for machining faces, and slight shrinkage, it would be the size and shape of the casting—built-up and carved as required. At *S* and *T* would be circular core prints for the cylinders, and at *U* and *V* similar circular core prints for the main bearing bores, all under-size for metal to be left for machining.

These four positions would then support the core in the mould; and a slight extension *W* could be added to the pattern to bring the core out from the bottom of the casting.

The core box for use with the pattern could be in halves, built-up as at *C*, each half consisting of two main pieces *X* and *Y* with a flat piece *Z* at the end. The main pieces *X* would form the cores for the cylinders; after dowelling the pieces they would be drilled and bored on the centre line, on a chuck, faceplate or angle plate set-up.

The halves forming the main pieces *Y* would also be dowelled: then to form the cores for the main bearing spigot bores, the pieces would be bored on the centre line at the appropriate position, possibly turning the pieces end for end and machining each bore separately.

Following this, the wood in the centre would be drilled, chiselled and filed out to the inside dimensions of the crankcase—with a slight enlarging to the centre, providing a "draw" for the core to release easily. The curved portion for each upper half of the crankcase would be formed by a separate fillet, as at *D*, whose fitting could be tested by a simple gauge.

Each two main pieces, *X* and *Y*, and the end *Z* would then be screwed together or held by long bolts right through. Openings to the bores could be covered if desired, though in these the core could be rammed then scraped off level.

