Nov. 20, 1962 R. SEIFERT ETAL 3,064,633

CYLINDER BLOCK AND CRANKCASE FOR MULTICYLINDER PISTON ENGINE

Filed Dec. 9, 1960

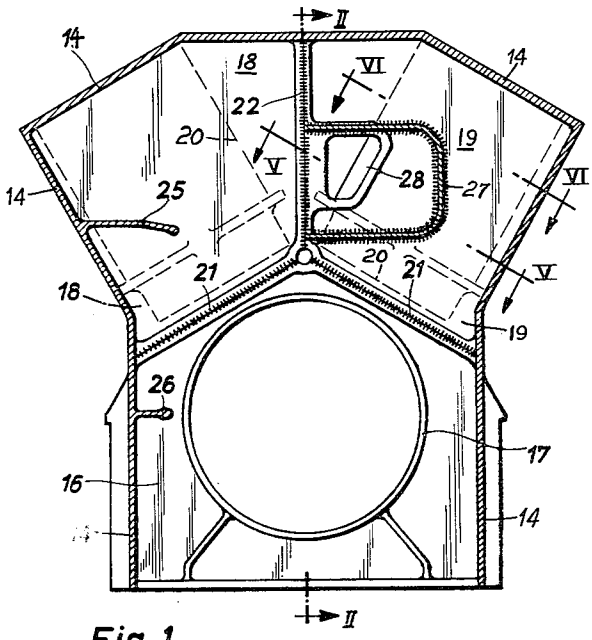


Fig. 1

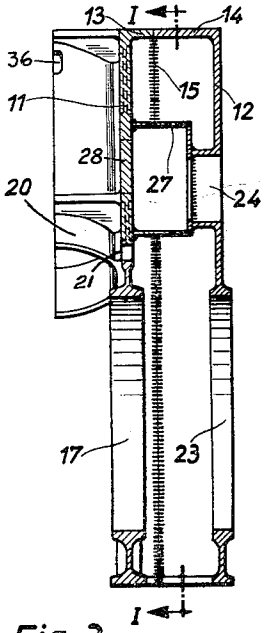


Fig. 2

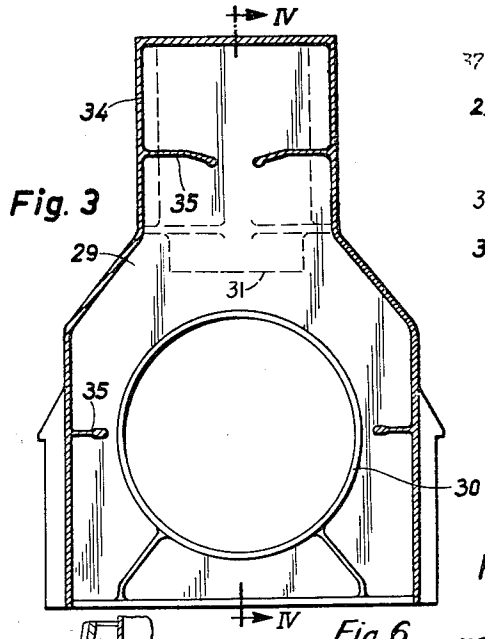


Fig. 3

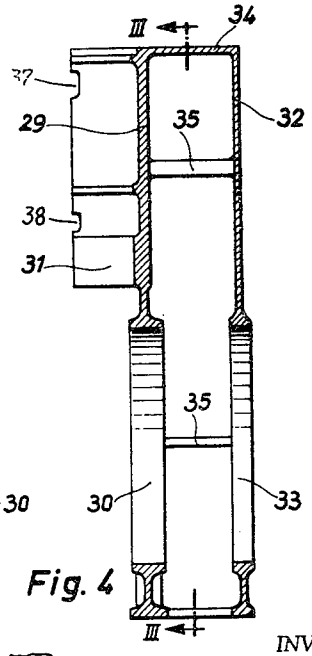


Fig. 4

Fig. 5

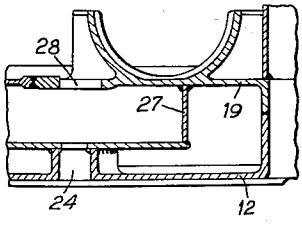
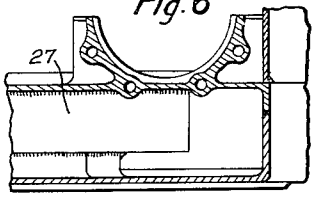


Fig. 6



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CYLINDER BLOCK AND CRANKCASE FOR MULTI-CYLINDER PISTON ENGINE

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4 Claims. (Cl. 123—41.72)

The present invention relates to the construction of a cylinder block and crankcase for a piston engine having a plurality of cylinders arranged in a row, and particularly to end elements of cylinder block and crankcase structures as shown in Patent No. 2,838,038 which are especially suitable for crankcase and crankshaft arrangements of the type shown in Patent No. 2,729,117.

It is an object of the present invention to provide reenforced and rugged end elements for a cylinder block and crankcase which is subdivided in planes normal to the rotation axis of the crankshaft and is composed of a plurality of individual castings which are connected by welding. One or more castings are located at the ends of a row of cylinders and other castings are placed between the said end castings. The castings between the end castings or elements individually form one half of two adjacent cylinder cooling jackets and a wall in a plane between said jackets which wall supports a crankshaft bearing. The end castings or elements individually form a support wall and the outer halves of the cooling jackets of the cylinders at the ends of a row of cylinders. Whereas the inside elements are mirror-symmetrical with respect to their main center plane, the end elements are one-sided, because they include only the cooling jacket or jackets of the cylinder or cylinders at the ends of the row of cylinders. Therefore, the end castings or elements are not as resistant to deformation as the inside elements. In order to increase the strength and stability of the end elements, these elements are provided, according to the invention, with two transverse walls, namely, an end wall and a support wall and the transverse walls are connected by walls which are parallel to the longitudinal axis of the engine to form a box.

In a modified embodiment of the invention the walls which are parallel to the longitudinal axis of the engine and form the top and side walls of the box-like end element are split in a plane normal to the longitudinal axis of the engine and have opposed edges which are connected, for example, by welding.

The novel features which are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, and additional objects and advantages thereof will best be understood from the following description of embodiments thereof when read in connection with the accompanying drawing wherein:

FIG. 1 is a cross sectional view of an end element according to the invention of a cylinder block and crankcase of a V-type internal combustion engine, the section being made along line I—I of FIG. 2.

FIG. 2 is a sectional view along line II—II of the element shown in FIG. 1.

FIG. 3 is a cross sectional view of an end element according to the invention of a cylinder block and crankcase of a single line internal combustion engine, the section being made along line III—III of FIG. 4.

FIG. 4 is a sectional view along line IV—IV of the element shown in FIG. 3.

FIGS. 5 and 6 show sections of the element illustrated in FIGS. 1 and 2 and made along lines V—V and VI—VI of FIG. 1.

The end element shown in FIGS. 1 and 2 comprises two transverse walls: a supporting wall 11 and an end wall 12. The marginal portions of these walls continue into wall portions 13 and 14 which extend parallel to the rotation axis of the crankshaft. The opposed edges of the wall portions 13 and 14 are connected by a weld forming a seam 15 so that the walls 11 to 14 form a box.

The support wall 11 comprises a portion 16 which surrounds a crankshaft bearing 17, and upper portions 18 and 19 which are individually connected to the outer halves 20 of cylinder cooling jackets. The wall portions 18 and 19 are connected to the wall portion 16 by means of weld seams 21 which absorb the forces between the cylinder heads and the crankshaft bearing. The portions 18 and 19 are connected to each other by a weld seam 22.

The end wall 12 is provided with an opening 23 affording insertion and removal of the crankshaft into and from the crankcase. An opening 24 is provided in the end wall 12 for connecting a coolant conduit.

A rib 25, shown in section in FIG. 1, is composed of a first rectangular plate having one edge connected to the wall 18 and a second edge connected to the wall 13, and a second rectangular plate having one edge connected to the wall 12 and a second edge connected to the wall 14. The edge of the first plate opposite the edge connected to the wall 18 and the edge of the second plate opposite the wall 12 are welded together in the plane containing the seam 15. The rib 25 is normal to the walls 18 and 12 and interconnects these walls. The rib 26 is composed in the same manner as the rib 25 and interconnects the walls 16 and 12. The ribs 25 and 26 provide an additional reinforcement of the end element. Instead of reinforcing ribs spacer bolts, struts or the like may be provided. As a further reinforcement a box 27 is welded to the wall 11 at the elevation of the cooling jacket half 20. The box 27 is also welded to a socket extending from the opening 24 for receiving a portion of the coolant flowing through the opening 24 to and from the cylinder cooling jackets. The box 27 is connected for coolant flow to a jacket 20 by an aperture 28 in the wall 19. The box 27 provides sufficient reinforcement so that the ribs 25 and 26 can be omitted in the right half of the casting shown in FIG. 1.

The wall portions 16, 18 and 19, the end wall 12 and the box 27 are individual castings which are welded together as described above.

FIGS. 3 and 4 show a simplified end element of a cylinder block and crankcase of an internal combustion engine whose cylinders are placed in a single row. The end element is formed by a single casting and comprises a support wall 29 surrounding an end bearing 30 of a crankshaft, not shown. The outer half 31 of a cylinder cooling jacket is united with the wall 29. Numeral 32 designates the end wall of the cylinder block and crankcase which end wall is provided with an opening 33 for inserting and removing the crankshaft. The top and side walls 34 of the end element are parallel to the longitudinal axis of the cylinder block and crankcase. Reinforcing ribs 35 connect the walls 29 and 32. Numeral 36 in FIG. 2 and numerals 37 and 38 in FIG. 4 designate recesses which form with complementary recesses in the adjacent castings apertures permitting flow of coolant.

We claim:

1. A cast end element of a cylinder block and crankcase for a piston engine having a plurality of cylinders arranged in a row, said end element comprising one half of an axially split cylinder cooling jacket, a support wall extending normal to the longitudinal axis of the engine and forming a crankshaft bearing, said support wall being connected to said cooling jacket half, an end wall parallel

to said support wall, and top and side walls extending parallel to the longitudinal axis of the engine and connecting the marginal top and side portions of said support wall and of said end wall to form a box therewith.

2. A cast end element as defined in claim 1 wherein said top and side walls are split in a plane normal to the longitudinal axis of the engine and having opposed edges interconnected by welding.

3. A cast end element as defined in claim 1 including means interconnecting said support wall and said end wall and being placed inside of the box formed by said walls.

4. A cast end element as defined in claim 1 including a box-like part interposed between and rigidly connected to said support wall and to said end wall inside of the box formed by said walls.

References Cited in the file of this patent

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