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CYLINDER WATER JACKET COVER

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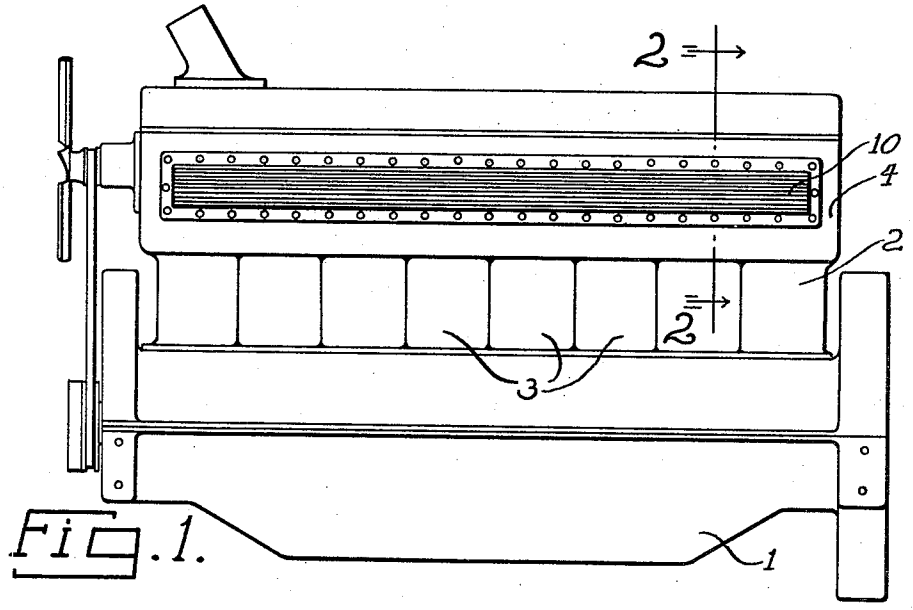


Fig. 1.

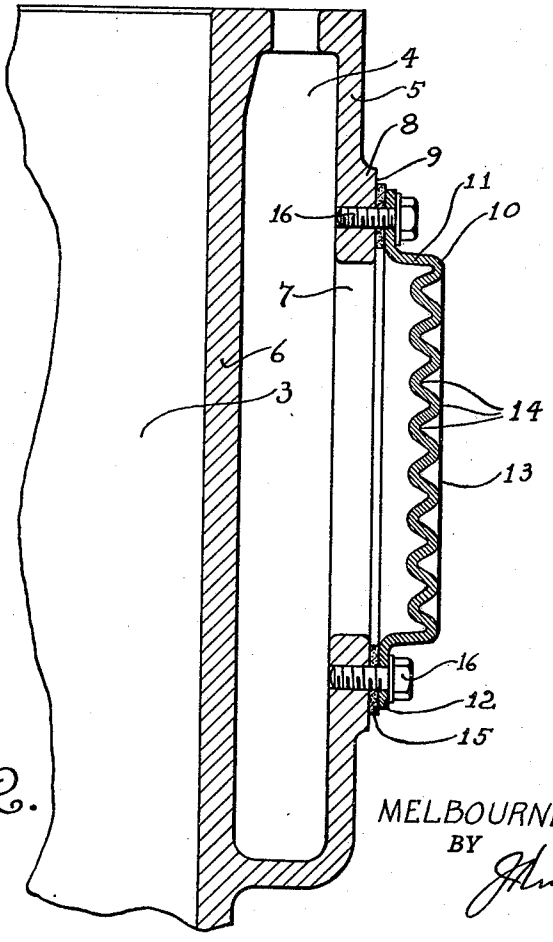


Fig. 2.

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CYLINDER WATER JACKET COVER

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This invention relates to an expansible cover for cylinder water jackets.

In molding cylinder blocks, it is the practice to provide an opening in one side wall of the cylinder water jacket so as to permit removal of the core material employed in the formation of the jacket. Heretofore, this opening has been sealed by an ordinary flat metal cover for forming a water tight jacket.

The main objects of this invention are to provide an expansible closure for the initially open side wall of a cylinder water jacket; to provide a closure of this kind which will yield under the expansion to which the cooling medium is subjected when the medium is frozen so as to protect the cylinders and the cast wall portions of the water jacket from injury; to provide a closure having an outwardly extending body portion which increases the capacity of the water jacket; to provide corrugations in a closure of this kind for allowing a substantial expansion of the cooling medium without applying excessive pressure on the cast walls of the water jacket; and to provide longitudinal corrugations in a cylinder water jacket cover which stiffen the cover and render it self sustaining in shape.

An illustrative embodiment of this invention is shown in the accompanying drawing, in which:

Fig. 1 is a side elevation of an internal combustion engine embodying my invention.

Fig. 2 is a fragmentary vertical section of the water jacket of the engine taken on line 2—2 of Fig. 1.

In the form shown, my improved cover is illustrated in connection with an internal combustion engine which includes a conventional crank case 1 having a cast metal cylinder block 2 in which cylinders 3 are formed. The upper end portions of the cylinders 3 are surrounded by a cast metal water jacket 4 having an outer wall 5 in spaced relation to the wall 6 of the cylinder.

The outer wall 5 of the jacket has an opening 7 therein which extends substantially the full length of the cylinder block. This opening is mainly provided for the removal of the core material used in forming the hollow jacket during molding of the cylinder block. Formed on the side wall 5 of the water jacket is a thickened portion 8 which extends completely around the perimeter of the opening 7 and has a flat machined seat 9.

The opening 7 is provided with a pan shaped cover 10 which preferably comprises a sheet metal stamping. The cover 10 has edge walls 11 on which a continuous outwardly extending flange 12 is formed. The flange 12 is substantially planular and it is formed so as to conform in shape with the machined seat 9 of the wall 5 of the water jacket. The side wall 13 of the pan shaped cover 10 has a plurality of corrugations 14 formed therein which extend longitudinally of the cover substantially throughout the entire length of the opening 7. These corrugations permit the cover 10 to expand under the internal pressure which is created in the jacket 4 when the contents thereof freeze. This capacity of the cover to expand under internal pressure in the water jacket prevents the cast walls of the cylinders and water jacket from being injured when the cooling medium is frozen.

A cover of this kind may be conveniently mounted on the side wall of a water jacket in liquid tight relation thereto by providing a compressible gasket 15 between the seat 9 of the side wall 5 and the adjacent face of the flange 12. The cover may be then firmly clamped upon the side wall and gasket by cap screws 16 which extend through registering apertures in the flange 12, gasket 15 and side wall 5.

Although but one specific embodiment of this invention has herein been shown and described, it will be understood that various changes including the size, shape and arrangement of parts may be made without departing from the spirit of my invention and it is not my intention to limit its scope other than by the terms of the appended claims.

I claim:

1. In an internal combustion engine, a cylinder block, a cylinder water jacket including mainly a non-ductile structure having an opening in a wall thereof, and a closure for said opening having an expansible portion.

2. In an internal combustion engine, a cylinder block, a cylinder water jacket including a cast metal structure having an opening in a wall thereof, and a closure for said opening having an expansible corrugated side.

3. In an internal combustion engine including a cylinder block and a cylinder water jacket comprising mainly a non-ductile metal structure and having a side opening therein, a closure for said opening having substantially flat perimeter portions, a portion of the intermediate part of said closure being bent inwardly with respect to said opening so as to permit expansion of said closure when the contents of said jacket freeze.

4. In an internal combustion engine including a cylinder block and a cylinder water jacket comprising mainly a non-ductile cast metal structure having a side opening therein, a closure for said opening having substantially flat perimeter portion, and a series of reverse bent convolutions formed in said cover between the flat perimeter portions thereof for allowing expansion of said cover under internal pressure in said jacket.

5. In an internal combustion engine including a cylinder block and a cast metal cylinder water jacket having a substantially open side for the removal of core material, a cover for closing said open side having a corrugated central portion extending substantially the full length of said open side, said central portion being expansible for protecting said jacket and cylinder block from injury during freezing of the contents of said jacket.

6. In an internal combustion engine, a cylinder block, a cast metal cylinder water jacket having an opening in a wall thereof, a pan shaped closure for said opening, corrugations in the side wall of said closure, and flanges on the edge portions of said closure located substantially in a common plane for forming a seal between said closure and the wall of said cylinder block in which said opening is provided.

7. In an internal combustion engine a cylinder block, a cast metal cylinder water jacket having an opening in one wall, a seat formed on said wall surrounding said opening, a pan shaped closure for said opening having a flange on its perimeter registering with said seat, a gasket between said seat and flange, means for clamping said flange and gasket against said seat in a liquid tight relation, and expansible corrugations in the side wall of said closure.

8. In an internal combustion engine including a cast metal cylinder block and cylinder water jacket, one side of said jacket having an opening for permitting removal of core material during the construction of said cylinder block, and a closure for said opening comprising a sheet metal stamping having a flat perimeter and a corrugated intermediate part.

9. A closure for a core removing opening of a cylinder water jacket including a pan shaped sheet metal stamping, flanges on the perimeter of the open end of said closure, and corrugations in the bottom wall thereof for permitting expansion of said wall.

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