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METHOD OF INSERTING AND SEALING A CLOSURE IN A PLUG HOLE

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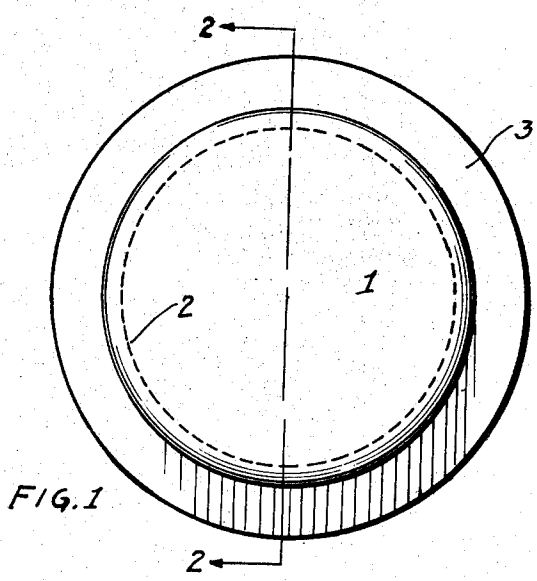


FIG. 1

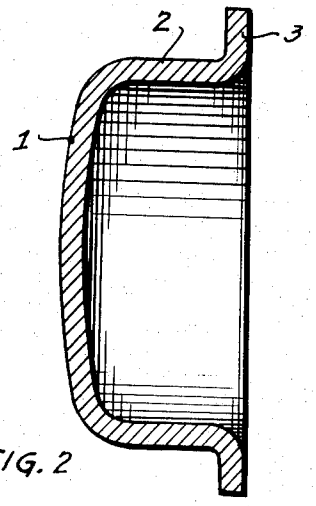


FIG. 2

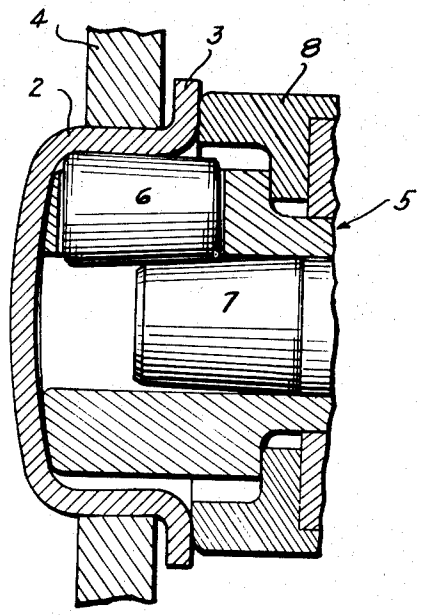


FIG. 3

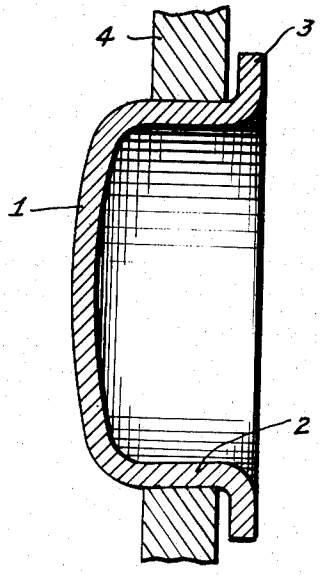


FIG. 4

INVENTORS
LUTHER ROY MOCK
ELDO K. KOPPELMANN
BY

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METHOD OF INSERTING AND SEALING A CLOSURE IN A PLUG HOLE

Luther Roy Mock and Eldo K. Koppelmann, Moberly, Mo., assignors to Madison-Faessler Tool Co., a corporation of Missouri

Application March 17, 1955, Serial No. 494,859

1 Claim. (Cl. 29—523)

This invention pertains to closure caps for the core holes in the water jackets of internal combustion engines and similar manufacturing holes, and to a method for inserting and sealing the same in the plug hole.

An object of this invention is to provide an improved plug, and a simple method for mounting the same in the water jacket, which is simple and rapid and results in an efficient seal.

Further objects will appear from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is an outside view of a plug or closure embodying this invention;

Fig. 2 is a section on line 2—2 of Fig. 1;

Fig. 3 is a section of the water jacket wall, and a plug inserted therein, and showing the method of sealing by the operation of a roller expanding tool; and

Fig. 4 is a similar section of the jacket wall, showing the sealing plug in place.

The cylinder block of an internal combustion engine is usually provided with a water jacket which, in many cases, is cast integral with the cylinder. This jacket is provided with holes passing therethrough to the outside. These may be the holes provided for removing the sand core when the block has been cast, or they may be formed in any well-known manner. They are ordinarily provided with sealing plugs secured therein by friction.

Referring to the drawings, a closure or plug is provided having a cup shape providing a bottom 1, cylindrical side flanges 2, and a radial peripheral flange 3. These plugs are adapted for mounting in a circular hole in the water jacket. The outside diameter of the closure at the cylindrical wall 2 is made less than the diameter of the hole by an amount which will permit the plug to slip easily into the hole. This is done by providing for a suitable tolerance in sizing the holes, and also a tolerance in the outside diameter of the wall 2.

In accordance with the present invention, the closure is applied by simply slipping it into the hole in the jacket wall 4 and inserting a roller expanding tool, indicated generally at 5, Fig. 3. A tool suitable for this purpose is described in applicant's pending application, Serial No. 382,691, filed September 28, 1953. The tool is then operated to expand the wall 2 by the action of rollers 6 cooperating with a rotating mandrel 7 in a well known manner. This expanding operation is continued until the

wall 2 is expanded to a tight pressure fit in the hole in the wall 4. The tool is then withdrawn and the closure remains in the hole, as shown in Fig. 4, having a tight sealing fit therein so as to avoid any leakage.

It will be seen that by making the plug small enough to fit loosely in the plug hole, it may be inserted with the fingers. The expanding tool may then be inserted in the plug and operated to expand the same. During this operation the plug may be pressed into the hole by applying a thrust to the tool 5, which has an outer barrel 8 which may be held stationary and pressed against the plug so as to bring the flange 3 into frictional engagement with the wall 4 to prevent the plug from rotating with the tool. Or, the barrel 8 may simply be held against rotation, thereby causing the tool to expand the plug to the size of the hole and then secure it therein, as fully described in the aforementioned application, Serial No. 382,691. Or, the plug may be mounted on the expanding tool and then inserted in the plug hole and the tool operated to expand the same. In either case, the operation is one which is simple and can be repeated rapidly so that it is well adapted to the mass production methods employed in building internal combustion engines.

Various changes may be made in the details of construction, within the scope of the appended claim, without departing from the spirit of this invention. Parts of the invention may be used without the whole and improvements may be added while retaining some or all of the advantages of the invention.

We claim:

The method of closing a manufacturing hole which consists of inserting a cup-shaped plug dimensioned to fit loosely in a circular plug hole, inserting a roller expansion means internally of the plug, arranging the rollers of said means into engagement with a substantially cylindrical tubular wall of the plug substantially from the bottom of the plug to a peripheral rim portion of the plug located outwardly of the plug hole, holding the cup-shaped plug stationary relative to the plug hole, expanding the rollers laterally outwardly, thereby expanding the cylindrical tubular wall of the plug into sealing engagement with the wall defining said plug hole, and expanding the peripheral rim portion of the plug.

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