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PROCESS FOR MAKING FORGED LIGHT METAL PISTONS WITH RING SUPPORTS

Filed Nov. 29, 1963

FIG. 1

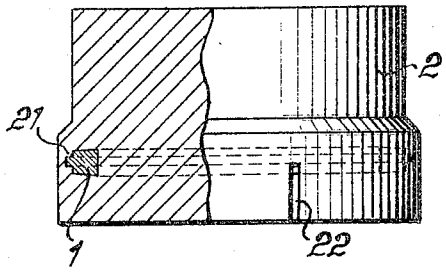
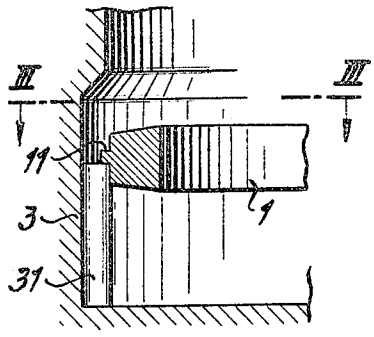


FIG. 2



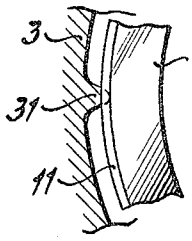
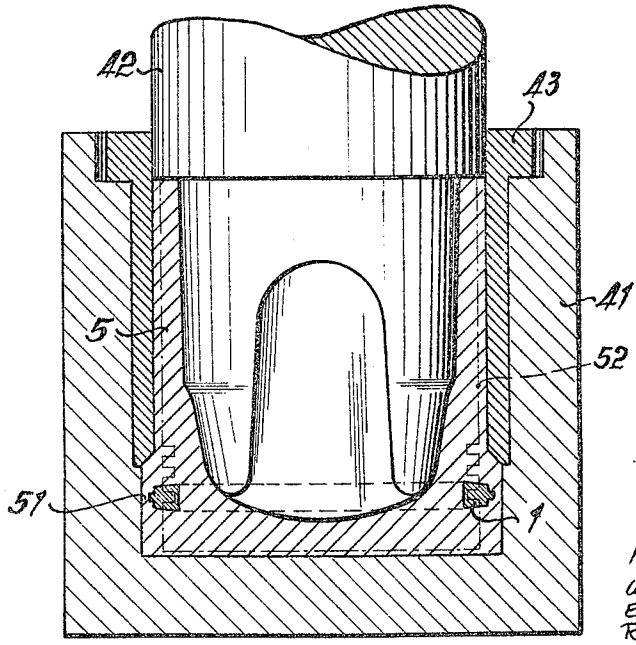


FIG. 3

FIG. 4



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1 Claim. (Cl. 29—156.5)

This invention relates to a method of manufacturing a piston and, in particular, is directed to a method for forging a light metal piston having a ring support composed of a harder material embedded in the piston ring portion of the piston head.

Heretofore, ring supports have been cast in a piston head in a mold having an inner diameter which is the same as the outer diameter of the ring support. The piston blank thus produced is essentially a cylindrical casting in which the ring support is exposed on the circumference of the blank. When this blank is forged into piston form, more or less heavily marked grooves occur regularly between the ring support and the piston head portion. These defective grooves cannot be eliminated even when using casting and forging methods which guarantee a metallic bond between the ring support and the light metal piston. Even though a secure bond has been obtained during the casting, nevertheless, this bond is torn during the following forging step to shape the piston.

The object of this invention is to produce a method by which the formation of the grooves between the ring support and the piston are avoided.

In general, this object is obtained by the use of a mold which has an inner diameter in the ring portion of the piston head which is larger than the outer diameter of the piston support. After the ring support has been placed in the mold, the light metal is cast for forming the piston blank. This light metal completely covers and embeds the ring support. By this simple method, the advantage is obtained in that the layer of cast light metal which completely covers the outer periphery of the ring support remains relatively undisturbed during the subsequent forging and holds back the parts of light metal adjacent the ring support, and which parts have an inclination to flow away during the forging process, or perhaps that the light metal in these parts flows into the areas in which there is danger of tearing.

The means by which the object of the invention is obtained is described more fully with reference to the accompanying drawings in which:

FIGURE 1 is a front elevational view partially shown in section of a piston blank containing the ring support and from which a piston is to be forged;

FIGURE 2 is a cross-sectional view through a mold for casting the piston blank of FIGURE 1;

FIGURE 3 is a cross-sectional view taken on the line III—III of FIGURE 2; and

FIGURE 4 is a vertical cross-sectional view of a die containing the piston blank forged into piston form.

A shown in FIGURE 1, a ring support **1** has been cast into the light metal piston blank **2** which is to be then forged into piston form. The important feature of blank **2** is that the outer periphery of the ring support **1** is covered by a layer of light metal **21**. This completely embedded ring support is obtained by the mold **3** of FIGURE 2, which mold has an inside diameter, at least in the ring portion thereof, which is greater than the outer diameter of the ring support **1**. Shoulders **11** on the periphery of ring support **1** rest on supports **31** in the mold so that the ring support is spaced from the bottom of the mold. As shown in FIGURE 1, slots **22** appear in the piston blank **2** by reason of these supports **31**.

As shown in FIGURE 4, the piston blank **2** is forged into piston form by means of a die **41** and a plunger **42**, the die having a sleeve **43**. Pressure of plunger **42** forges the blank **2** into piston form **5**. This piston form is then machined to remove the metal part **51** covering the periphery of ring support **1** and thus to expose the ring support on the circumference of the piston. After machining, the piston has the shape indicated by the dash-dot line **52**.

Having now described the means by which the object of this invention is obtained, we claim:

A process for making a light metal piston having a ring support of a harder metal embedded in the piston ring portion of the piston head comprising casting a piston blank of the light metal in a cylindrical mold containing the ring support, said mold being of larger inner diameter at least in the piston ring portion of the mold than the outer diameter of the ring support so the latter is completely covered and embedded in the light metal, forging the cast blank into piston form, then machining the circumference of the forged piston form to expose the peripheral edge of the embedded ring support.

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