March 21, 1933. W. E. KEMP 1,902,559

MOLD

Filed Dec. 3, 1931 3 Sheets-Sheet 1

Fig. 1

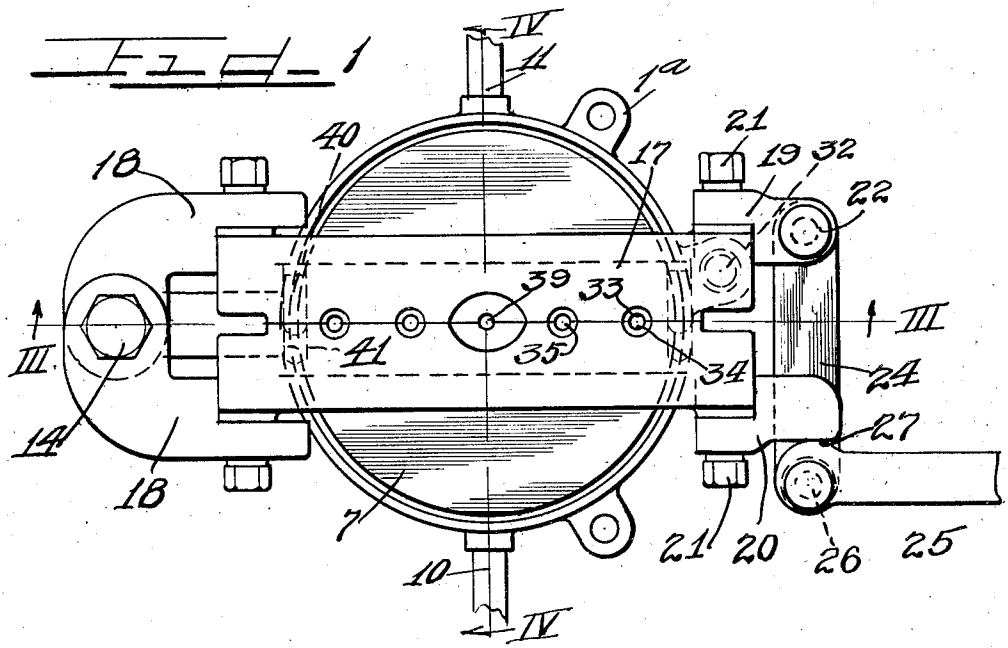
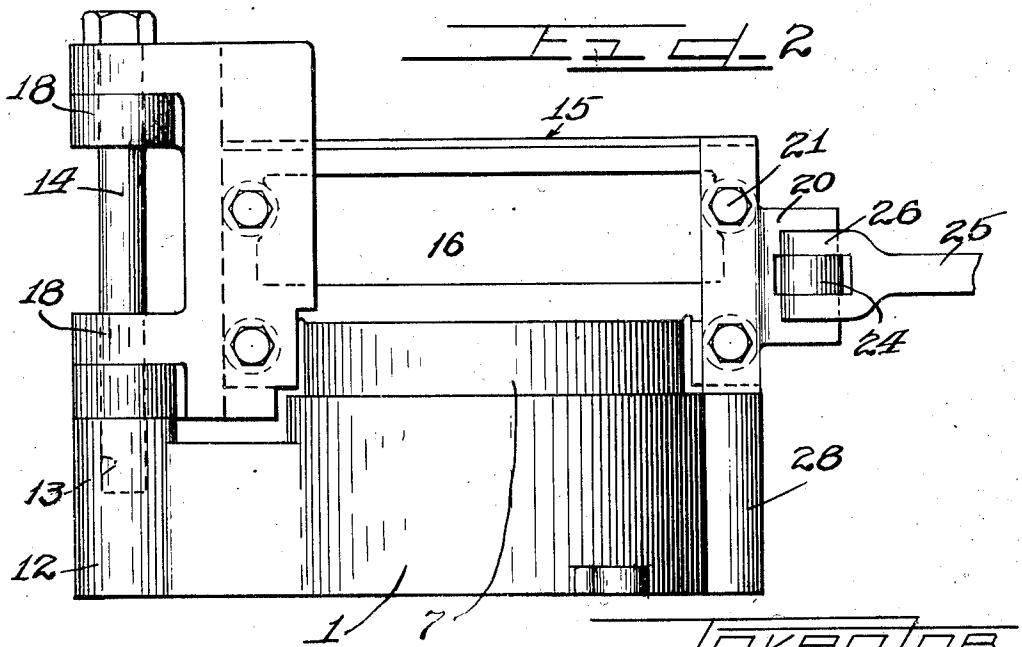


Fig. 2



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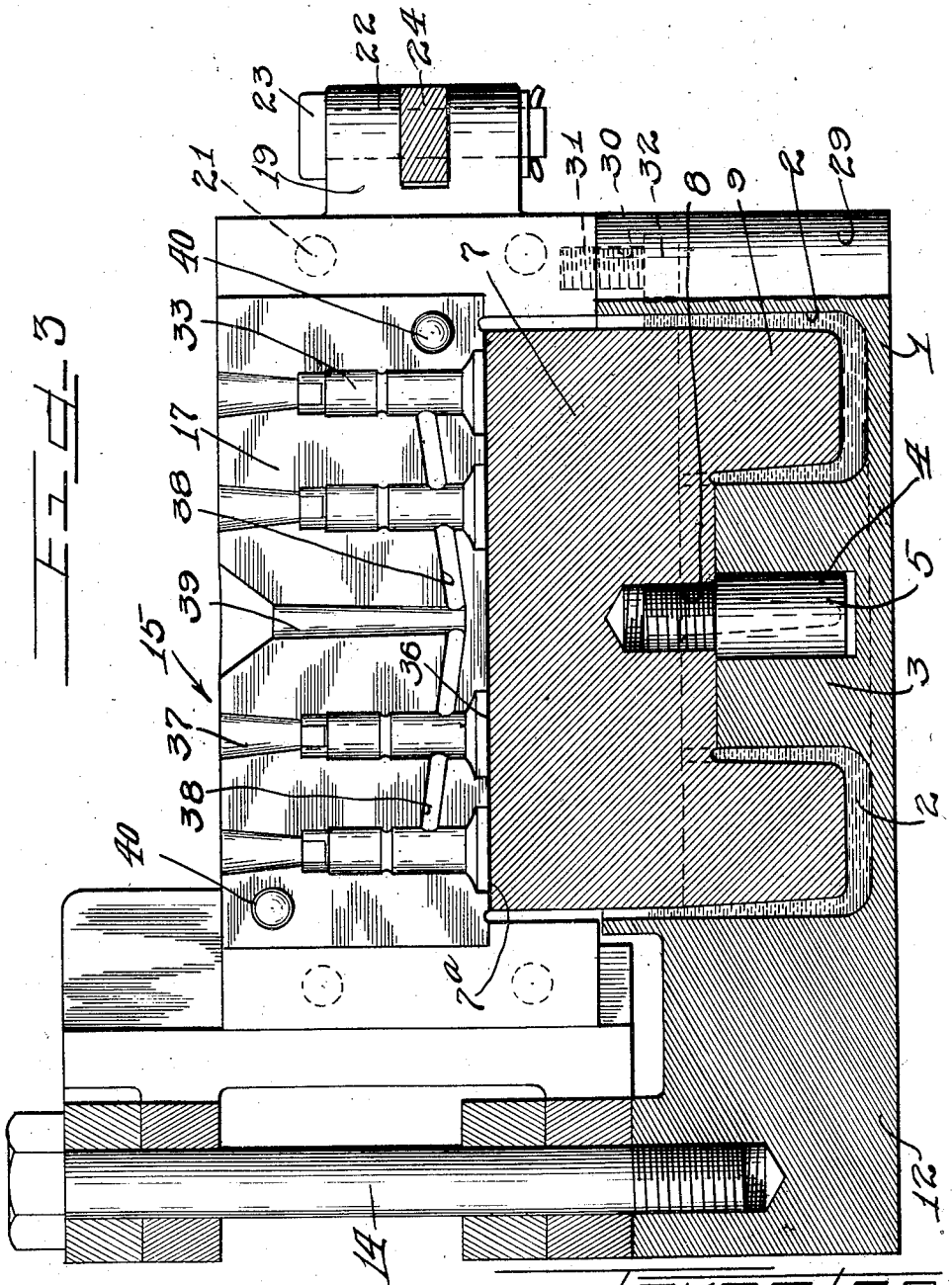


FIG. 3

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MOLD

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Fig. 4

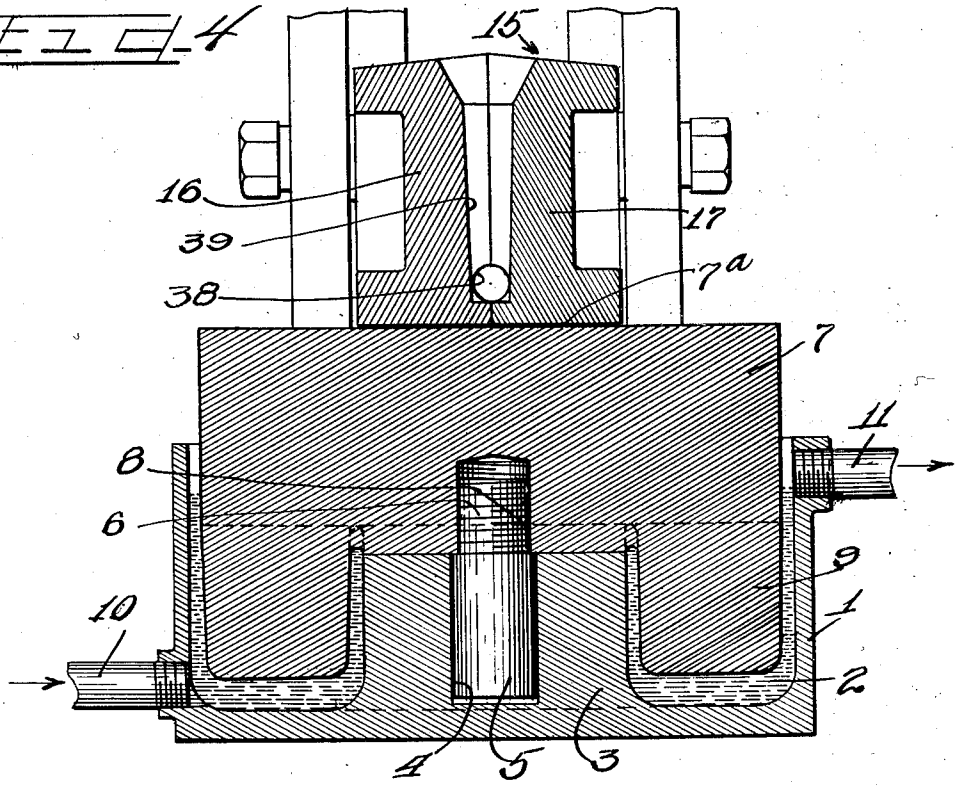
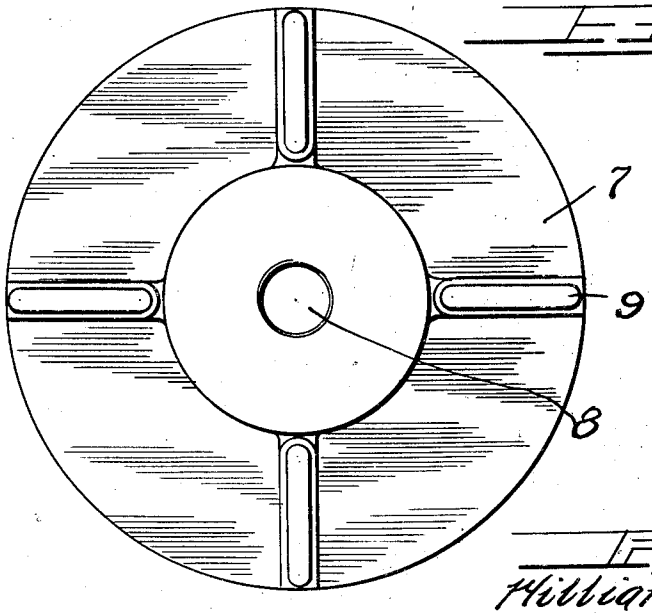


Fig. 5



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Patented Mar. 21, 1933

1,902,559

UNITED STATES PATENT OFFICE

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MOLD

Application filed December 3, 1931. Serial No. 578,648.

This invention relates to molds and particularly to a mold for casting small metallic objects such as valve tappets having localized hardened portions or faces.

Articles of manufacture, such as automobile tappets, require a tough, strong body and a hard, wear-resisting head. Many valve tappets are now produced which are formed of composite metal, such tappets usually comprising a steel body having a cast iron head. Such composite tappets are costly to manufacture and this prohibits their use in moderate priced automotive engines.

It is the purpose of the present invention to provide a new, advantageous and economical method of making a valve tappet.

To this end, it is an object of this invention to provide a mold having an attached chill.

It is a particular object of this invention to provide a mold having a movable chill attached thereto.

It is a further particular object of this invention to provide a mold having a chill plate movably mounted in a reservoir containing a cooling medium so as to enable a fresh surface to be employed in making successive castings.

These and other objects of this invention will be apparent from the following description and claims.

This invention (in a preferred form) is illustrated in the accompanying drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a plan view of a mold embodying the features of this invention.

Figure 2 is a side elevational view of the mold of Figure 1.

Figure 3 is a sectional view taken approximately on the line III—III of Figure 1 with a part in elevation.

Figure 4 is a sectional view taken approximately on the line IV—IV of Figure 1, with parts in elevation.

Figure 5 is a bottom plan view of a chill used with the mold of this invention.

As shown on the drawings:

The molding apparatus of this invention comprises a base 1 formed of cast iron or other similar material, and having apertured ears 1ª for securing the base to any suitable support. The base 1 is preferably cylindrical in shape and has an annular reservoir or depression 2 therein adjacent the outer periphery thereof. A boss 3 is formed at the middle of the reservoir 2. The boss 3 is provided with a recess 4 in which there is journaled a vertical pivot 5.

The upper portion of the pivot 5 is reduced and threaded as at 6. A circular plate 7 also formed of cast iron, is recessed centrally as at 8, and threaded on the pivot 5 so as to rotate on the boss 3. The plate 7 acts as a chill plate for the mold, as will later be explained, and for this purpose is provided with a number of fins 9 which project downwardly from the under surface thereof and dip into the reservoir 2. The reservoir 2 is provided with an inlet pipe 10 and an outlet pipe 11 for circulating cooling fluid therethrough.

The base 1 is provided with an extension 12 having an internally threaded recess or bore 13. A bolt 14 is threaded into the recess 13 and serves as a pivot for a mold 15. The mold 15 is preferably made of cast iron and comprises sections 16 and 17, each of which is bolted at one end to a hinge piece 18. The hinge pieces having upper and lower projecting tongues which are apertured to receive the pivot bolt 14.

The opposite ends of the sections 17 and 16 are provided with bifurcated members 19 and 20, respectively, bolted thereto as at 21. The bifurcated member 19 is provided with a vertical aperture 22 which receives a bolt 23 for pivoting a hasp 24 thereto. The hasp 24 may be swung so as to be received by the bifurcated member 20 and when in such position the hasp 24 extends beyond the bifurcated member 20. The extending end of the hasp 24 is provided with a handle 25 which is pivoted thereto as by the pin 26. The handle 25 is provided with a cam surface 27 which may be swung against the bifurcated member 20 to lock the hasp in place and thereby prevent relative movement of the sections 16 and 17.

The base 1 is provided with projection 28 at the end of the base opposite the extension 12. The projection 28 is provided with a

bore 29 extending upwardly from the bottom thereof. At its upper end, bore 29 has an internally threaded portion 30 alined with an internally threaded recess 31 in the bottom of the mold section 17. A bolt 32 is threaded through the portion 30 into the recess 31 to hold the section 17 of the mold against relative movement with respect to the base 1. The section 16 of the mold is free when the hasp is in unlocked position to rotate about the pin 14.

The adjacent faces of the mold sections 16 and 17 are provided with complementary recesses 33 and 34 respectively forming, when the mold sections are in engaging position, article forming cavities 35. The number of these article forming cavities depends upon the size of the mold 15 and for convenience the mold has been illustrated as having four of these cavities.

The mold cavities 35 take the shape of the article to be formed and the lower ends thereof are open to the chill plate 7, as illustrated at 36. The article forming cavities are also provided with air outlets 37.

The article forming cavities are connected adjacent their lower portions by a conduit 38 which is in turn connected to a pouring chamber 39. It will be understood that the conduit 38 and pouring chamber 39 are formed by symmetrical recesses in the adjacent faces of the mold sections 16 and 17.

The stationary section 17 of the mold 15 is provided with laterally extending alining pins 40 which are received in recesses 41 in the section 16. These pins and recesses serve to maintain the mold sections in proper position during the pouring of the metal.

In using this molding apparatus for forming metal articles such as tappets, the iron which is to be cast into the article is poured in the chamber 39 and allowed to flow through the conduits 38 and fill the article forming cavities 33. As the lower opening of each cavity 33 is adjacent the chill plate 7, the metal in the mold cavities 33 will contact this chill plate. For venting any trapped gases or air, a slight spacing 7^a is left between the upper surface of the chill plate and the bottom of the mold. This spacing is regulable by rotating the chill plate on the threaded pivot 5 and inserting suitable shims between the plate 7 and the boss 3. As is well known, this sudden chilling of the end of the cast article causes the end to have the high degree of hardness necessary in articles of the type mentioned.

After the article has been cast, the section 16 of the mold is swung away from the section 17 and the cast metal removed therefrom.

The metal articles are then broken from the metal formed in the conduits 38 and are machined to the proper finish.

In order to prevent the chill plate 7 from being heated to such an extent as to be inoperative, it is but necessary to swing it about its pivot 5 after each pouring so as to present a new and chilled section at the base of the pouring cavities. The fins 9 extending into the reservoir 2 serve to conduct the heat away from the upper surface of the plate which is in contact with the mold 15.

It will be seen by this invention there is provided novel apparatus for making valve tappets which enables one to produce a good quality valve tappet at a very economical cost. The provision of a permanent mold together with a movab'e chill plate enables the casting operation to be carried on without considerable delay between pourings.

It will be understood that many changes may be made in the arrangement of the parts herein set out without departure from this invention, and I do not wish to be limited otherwise than is necessary by the prior art and the scope of the appended claims.

I claim as my invention:

1. Apparatus for forming metal articles having portions of different degrees of hardness, comprising a mold having a number of article forming cavities, a base having a fluid reservoir, a chill plate pivotally mounted on said base and having a portion thereof directly below said mold and fins on said chill plate extending in said reservoir.

2. A molding apparatus comprising a base, a permanent mold proper formed in separate sections, pivotally mounted on said base and having matched recesses in abutting faces providing mold cavities and a chill plate rotatably mounted in said base, said chill plate forming a bottom closure for said mold cavities.

3. A molding apparatus comprising a base, having a fluid reservoir therein, a permanent mold proper formed in separate sections pivotally mounted on said base, said mold proper having matched recesses in abutting faces providing mold cavities, a chill plate movably mounted on said base and closing the lower ends of said cavities, and fins extending downwardly from the bottom of said chill plate into the fluid reservoir.

4. A molding apparatus comprising a base having a fluid reservoir therein, a permanent mold proper formed in separate sections pivotally mounted on said base, means for maintaining one of said sections in non-rotative engagement with said base, said sections having matched recesses in abutting faces providing mold cavities, a chill plate mounted on said base and closing the lower ends of said cavities, and fins on said plate extending into the fluid reservoir.

5. A molding apparatus comprising a base having an annular fluid reservoir therein, a mold proper comprising sections hinged to each other and pivotally mounted on said base, means for maintaining one of said sec-

tions rigidly attached to said base, said mold sections having complementary recesses in abutting faces thereof forming mold cavities when said faces are in abutting relation, said mold having a pouring chamber and conduits connecting said mold cavities, locking means on said mold sections for maintaining the adjacent faces in abutting relation, alining means on said sections for properly positioning said complementary recesses, a chill plate movably mounted on said base, said chill plate closing the lower ends of said mold cavities and a plurality of fins extending downwardly from said chill plate into said reservoir for dissipating the heat from said chill plate.

6. A molding apparatus for forming cast metal articles having portions of different degrees of hardness, comprising a base, an incomplete mold having an article forming cavity and chill means rotatably mounted on said base, a portion of the chill means forming a closure for the bottom of said cavity, said chill means being slightly spaced from the mold to permit of the venting of trapped gases or air.

7. Apparatus for forming metal articles having portions of different degrees of hardness, comprising a base, a two-part mold having a number of article forming cavities therein attached to said base and a chill plate mounted on said base and movable relative to said mold, said chill plate being disposed beneath the two part mold and forming a bottom for the forming cavities and being slightly spaced from the mold to permit of the venting of trapped gases or air.

8. Apparatus for molding metal articles comprising a base, a two-part mold having article forming cavities therein mounted on said base, one of said parts being pivoted to said base to swing horizontally into and out of engagement with the other part and a chill plate movably mounted on said base, successive portions of said chill plate serving as closures for the bottoms of said mold cavities.

9. Apparatus for molding metal articles comprising a permanent mold having article forming cavities, a support for said mold and chill means rotatably mounted on said support below said mold and disposed such that upon rotation, successive portions form a bottom for the cavities.

10. Apparatus for molding metal articles comprising a permanent mold having mold cavities with open bottoms, a support for said mold provided with a reservoir for cooling means, and chill means secured to said support and movable in said reservoir, said chill means forming a closure for the bottoms of said mold cavities.

11. Apparatus for molding metal articles comprising a permanent mold having mold cavities with open bottoms, a support for said mold having a reservoir therein provided with means for flowing water therethrough and a chill plate pivotally mounted on said support beneath said mold, said chill plate being revolvable to present portions thereof as closures for the bottoms of said mold cavities, and having fins extending therefrom movable in the reservoir.

12. A molding apparatus comprising a base, a permanent mold proper attached to said base, said permanent mold proper being formed in separable sections having matched recesses in abutting faces providing mold cavities, and a chill plate for forming the bottom closure of the mold cavities, said chill plate being rotatably mounted on said base.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

WILLIAM E. KEMP.