Nov. 1, 1938. H. E. McWANE 2,134,829

MOLD

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FIG. 1.

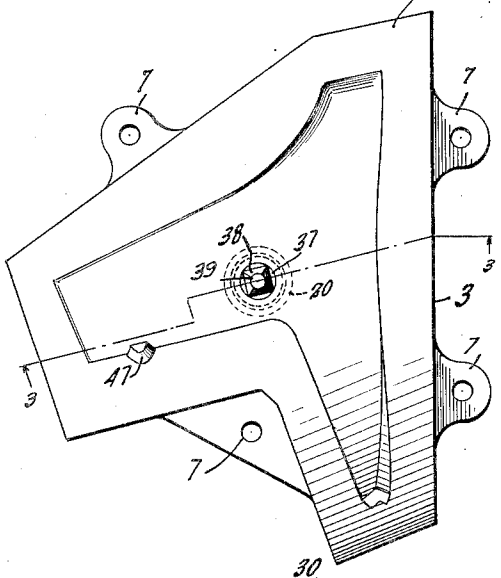


FIG. 2.

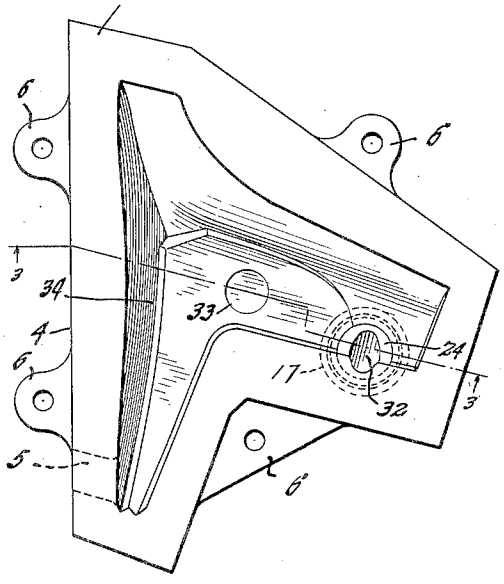
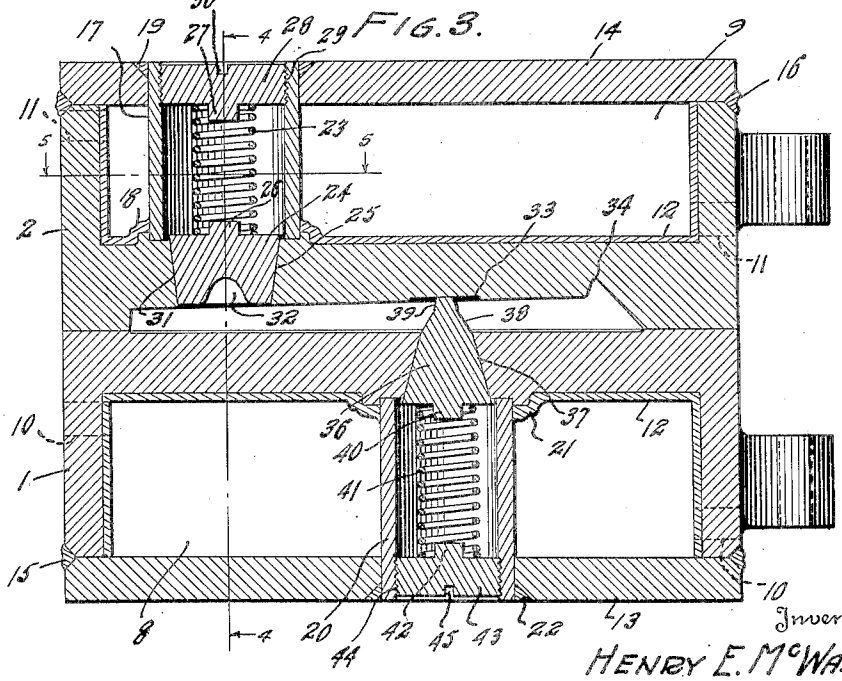


FIG. 3.



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FIG. 4.

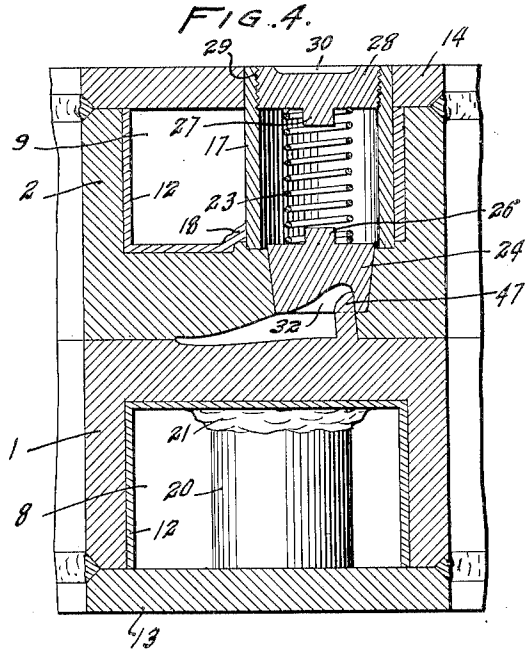


FIG. 5.

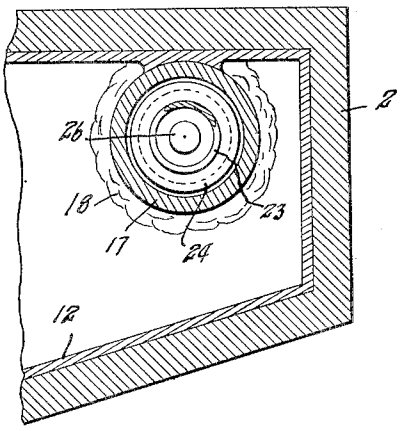


FIG. 6.

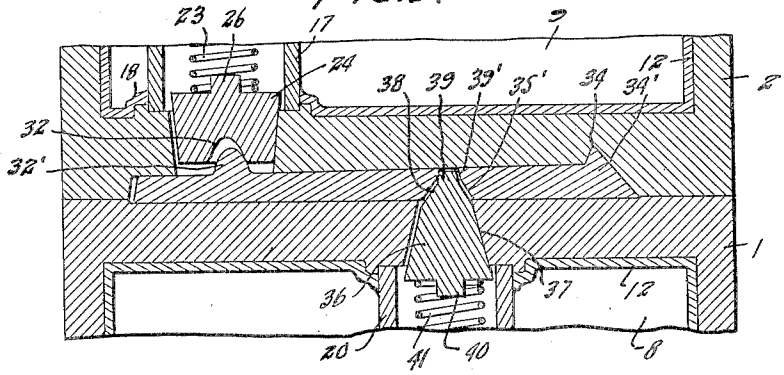
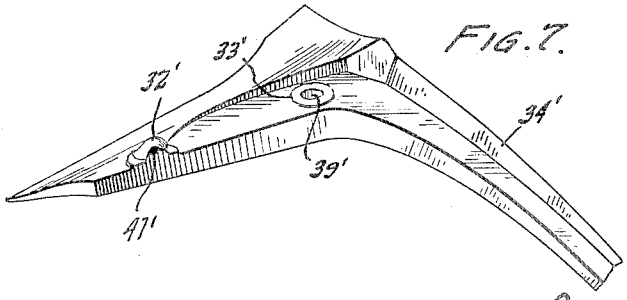


FIG. 7.



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UNITED STATES PATENT OFFICE

2,134,829

MOLD

Henry E. McWane, Lynchburg, Va.

Application November 30, 1935, Serial No. 52,432
Renewed March 25, 1938

10 Claims. (Cl. 22—136)

My invention relates to molds and more particularly to molds of the permanent type adapted to be made of hard material and intended for continuous re-use.

Such molds are customarily made of metal or some metallic alloy, and if properly used should last a considerable length of time. I have found, however, that in casting certain types of articles, these permanent molds produce cracks and fractures in the casting. This is believed to be due to temperature changes in the metal of the casting which produce points of strain. For instance, in casting plow points there are certain protuberances and depressions or recesses on the plow point which in a permanent mold cause strains to be produced upon the solidifying of the metal of the casting.

I have heretofore shown a type of core which I have adapted for permanent molds which is movable under stresses and strains set up by reason of temperature changes of the metal which forms the casting.

In the present application I not only show a movable core to produce a recess in the casting, but also a movable mold section which is adapted to cast protuberances on the castings. The method of forming the recess and protuberances is such that the strains which would otherwise produce cracks and fractures in the casting are eliminated or compensated for by movement of the parts.

It is an object of my invention to produce a mold which will permit of quick cooling of the molten material without producing objectionable stresses and strains in the molten material whereby fractures and cracks in the molded article may be eliminated.

A further object of my invention is to provide a structure for accomplishing the objects herein which is strong and durable and which will last for continued periods of constant use.

A still further object of my invention is to produce a structure which is simple and cheap and easy of repair and replacements.

With these and other objects in view, which may be incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the undertsanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangement, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions, which, for the purpose of explanation, have been made the subject of illustration.

In the drawings:

Figure 1 is a plan view of one-half of a mold looking into the interior;

Figure 2 is a plan view of another half of a mold looking into the interior;

Figures 1 and 2 are halves of a mold which is adapted to the casting of plow points.

Figure 3 is a view taken along the line 3—3 of Figures 1 and 2, when the two halves of the mold are in place and in engagement with each other;

Figure 4 is a view taken along the line 4—4 of Figure 3, looking in the direction of the arrows;

Figure 5 is a view taken along the line 5—5 of Figure 3, looking in the direction of the arrows;

Figure 6 is a sectional view illustrating what I believe to be the action of the mold in casting during the cooling of the casting within the mold;

Figure 7 is a perspective view of a plow point.

Referring to the drawings I have shown two parts of a permanent mold construction 1 and 2. The bottoms of these mold parts are indicated by the numerals 3 and 4. The mold parts are adapted to be filled through a gate 5 in the mold part 2 which is shown in dotted lines. The mold parts are filled from the bottom up. I have shown fastening means 6 on the mold part 2 and fastening means 7 on the mold part 1 for fastening the mold parts together. The means for holding them together in operative position to be filled constitutes no part of this invention and is not shown.

In actual operation the mold parts are adapted to be opened and the casting removed, the mold parts closed, the refilling operation accomplished, all occurring in rapid succession.

Mold part 1 is provided with a fluid chamber 8 and the mold part 2 with a fluid chamber 9. Chamber 8 is provided with apertures 10 and chamber 9 with apertures 11 through which cooling fluid may be passed to the chambers 8 and 9, respectively, to cool the mold to produce proper chilling and permit the rapid operation of the mold.

Each chamber 8 and 9 is lined with a ductile metal liner 12 which may be welded onto the interior of the chamber or otherwise suitably fastened. This is done in order to minimize the danger of cracks forming in the mold which will permit water from the chambers 8 or 9 to enter

the mold and come in contact with heated portions, thus possibly producing explosions. The metal liner 12 is the subject matter or another application which I have just filed.

Chamber 8 is provided with a cover 13 and chamber 9 with a cover 14 which are welded as indicated at 15 and 16, respectively, to the chambers. Chamber 9 is provided with a tubular member 17 which passes through the chamber and is held in place by welding, as indicated at 18, at its inner end, and at its outer end by welding as indicated at 19.

Likewise, there is a tubular member 20 which passes through the chamber 8 which is held at its inner end as indicated at 21 by welding, and at its outer end by welding, as indicated at 22, to the cover 13.

Within the tube 17 is a compression spring 23 which bears at its lower end against a movable mold section 24 having tapered body portion 25 provided with an upstanding centering lug 26 over which one end of the spring 23 fits. The other end of the spring 23 fits over a lug 27 formed on a cover 28 that is screwed as at 29 into the tubular member 17.

The cover 28 is provided with a wrench or screw aperture 30 which permits the cover to be screwed in place, thus compressing the spring 23 and forcing the tapering mold section 24 inwardly against its tapering seat in aperture 31 formed in the mold part 2. Mold section 24 is provided with an aperture 32 which is adapted to receive a portion 32' of the finished casting (see Fig. 7). There is formed in the interior of the mold an annular depression 33 which forms a shallow boss 33' on the casting. The plow point is formed with an upwardly projecting surface 34', see Figure 7, which is formed by the corresponding depression 34 in the mold part 2.

The face of the casting (not shown in Figure 7) is formed in the mold part 1. There is provided a frusto-conical aperture 35' which passes through the body of the point and is formed by a core member 36 which has a frusto-conical section 37, another frusto-conical section 38, and a third smaller frusto-conical section 39.

The core 36 is provided with a lug 40 over which fits one end of a compression spring 41. The other end of the compression spring fits over a lug 42 formed in cover plate 43 which is screw-threaded as indicated at 44 into the tubular member 20. The cover plate 43 is provided with a screw or wrench slot 45 whereby it may be screwed into place and force core 36 into the mold.

The lug 32' is provided with a specially formed surface 47' which is formed by a tit 47 which projects from the face of the mold part 2 into the aperture 32 formed in the mold section 24 (see Figure 4).

In operation, when the metal of the plow point shrinks due to cooling, the movable nature of the frusto-conical mold section 24 and the frusto-conical core 36 allow contraction to take place without cracking the metal of the plow point or subjecting it to harmful strain. The exact nature of the movement of the core 36 and of the mold section 24 is not thoroughly understood. It is believed that there is a giving between the parts which may occur in the manner illustrated in Figure 6, but I do not wish to be limited to any particular theory of operation. Suffice it to say that I have actually made and tested many times molds embodying sections such as 24 and cores such as 36, and find that the construction illustrated is efficacious and does prevent injury to the castings. Therefore, I want it distinctly understood that if the movement of the parts is not exactly as illustrated in Figure 6, I shall not be bound by this theory of operation. I have illustrated and explained the construction of a practical device which does the work and constitutes in my opinion a useful advance in the art.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth, by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. A permanent mold construction for relieving strains in castings comprising a tapered movable mold section adapted to form a protrusion on the casting, said section being adapted to give in the direction of strain set up by reason of temperature changes in the casting.

2. A permanent mold construction for relieving strains in castings comprising a mold section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, and means to yieldingly hold the section in place while permitting it to give in the direction of strain occurring through temperature changes.

3. A permanent mold construction for relieving strains in castings comprising a tapered mold section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, and means to yieldingly hold the section in place while permitting it to give in the direction of strain occurring through temperature changes.

4. A permanent mold construction for relieving strains in castings comprising a tapered mold section adapted to form a protrusion on the casting, a tapered aperture in the mold in which the section lies, and means to yieldingly hold the section in place while permitting it to give in the direction of strain occurring through temperature changes.

5. A permanent mold construction for relieving strains in castings comprising a mold section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, and spring means pressing the section in the direction of the casting.

6. A permanent mold construction for relieving strains in castings comprising a tapered mold section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, and a spring pressing the section in the direction of the casting.

7. A permanent mold construction for relieving strains in castings comprising a tapered mold section adapted to form a protrusion on the casting, a tapered aperture in the mold in which the section lies, and a spring pressing the section in the direction of the casting.

8. A permanent mold construction for relieving strains in castings comprising a mold section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, a spring pressing the section in the direction of the casting and means permitting the removal of the spring and section.

9. A permanent mold construction for relieving strains in castings comprising a tapered mold

section having a depressed area adapted to form a protrusion on the casting, an aperture in the mold in which the section lies, a spring pressing the section in the direction of the casting, and means permitting the removal of the spring and section.

10. A permanent mold construction for relieving strains in castings comprising a tapered mold section adapted to form a protrusion on the casting, a tapered aperture in the mold in which the section lies, a spring pressing the section in the direction of the casting, and means permitting removal of the spring and section.

HENRY E. McWANE.