May 24, 1938. H. E. McWANE 2,118,764

MOLD CONSTRUCTION

Filed Oct. 13, 1934

FIG. 1.

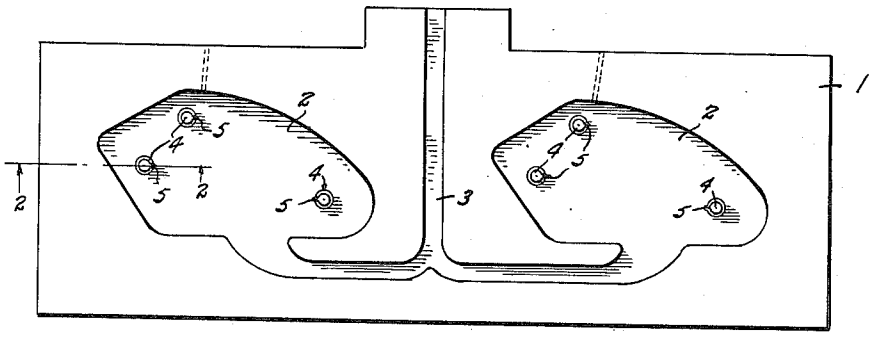


FIG. 2.

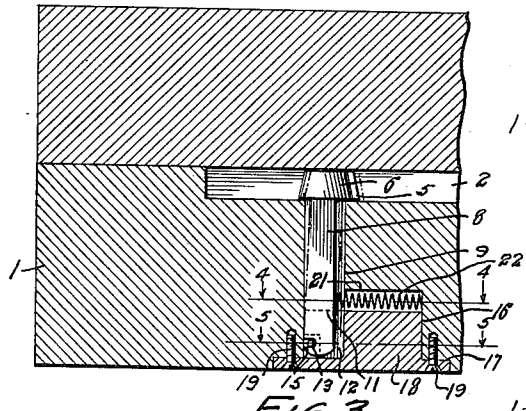


FIG. 6.

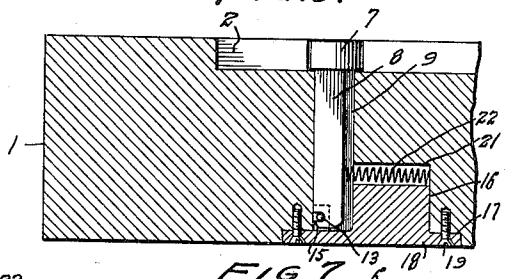


FIG. 7.

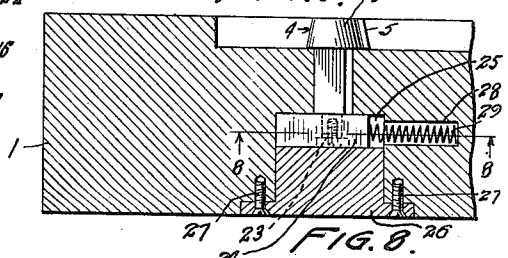


FIG. 3.

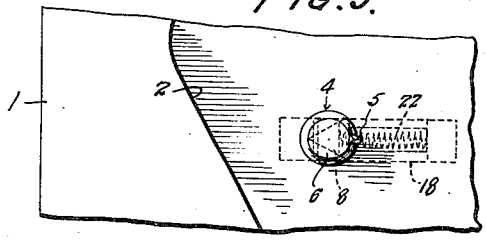


FIG. 8.

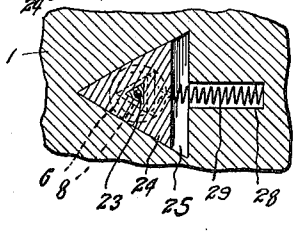


FIG. 4.

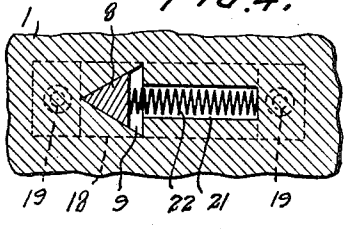
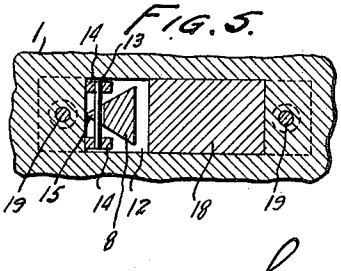


FIG. 5.



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Patented May 24, 1938 2,118,764

UNITED STATES PATENT OFFICE

2,118,764

MOLD CONSTRUCTION

Henry E. McWane, Lynchburg, Va.

Application October 13, 1934, Serial No. 748,229

3 Claims. (Cl. 22—151)

This invention relates to casting, and more particularly has reference to a mold and a core for use in connection therewith.

Considerable difficulty has been experienced in the past when it has been necessary to use a core in casting objects in metal or other materials. During shrinkage of the casting upon cooling, there is of course a tendency to displace the core. If this tendency is resisted by a fixation of the core, appreciable stresses and strains are set up in the casting, frequently resulting in the splitting or cracking thereof. In order to overcome this it has been proposed to employ cores that are capable of moving upon shrinkage of the casting.

Certain disadvantages have inhered in such prior cores, however, inasmuch as they have usually been of the destructible type such as sand cores, for instance, and furthermore it has heretofore been necessary to manually arrange the core in the mold cavity prior to each pouring operation.

One of the objects of my invention is to overcome the above mentioned difficulties.

Another object of my invention is to provide a permanent core which is free to move upon shrinkage of the casting, and which is automatically repositioned for a pouring operation upon removal of the casting from the mold cavity.

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 understanding 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 drawing 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 drawing:

Figure 1 is a top plan view of a mold section equipped with my invention.

Figure 2 is a sectional view along the line 2—2 of Figure 1, showing one type of core that may be employed.

Figure 3 is a top plan view of the core shown in Figure 2.

Figure 4 is a sectional view along the line 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is a sectional view along the line 5—5 of Figure 2, looking in the direction of the arrows.

Figure 6 is a view partly in section and partly in elevation of a core similar to the core of Figure 2, save only that it is cylindrical instead of frusto-conical.

Figure 7 is a view partly in section and partly in elevation of a somewhat modified type of core and associated mechanism.

Figure 8 is a sectional view along the line 8—8 of Figure 7, looking in the direction of the arrows.

In the drawing, I have shown my invention as applied to a mold for casting plates in which it is desired to provide apertures, but it will of course be appreciated that it is of wider application, and may be used in connection with castings of various types.

In Figure 1 I have shown the lower half of a mold 1 provided with the usual mold cavities 2 and gates 3. The cores forming the subject matter of my invention I have designated generally by the numeral 4. The metal in the cavities 2 is adapted to flow about the cores 4 to thereby form bolt holes or other apertures in the finished casting. If guide grooves are desired in the apertures of the casting, a rib 5 may be formed upon the core.

The core may be of frusto-conical shape, as indicated at 6 in Figure 2, or may be cylindrical, as shown at 7 in Figure 6. Of course, cores of various other shapes may be employed.

As shown in Figures 2 and 6, the core is mounted on a stem 8 which extends into a channel 9 drilled in the mold and runs from the base thereof to the mold cavity.

As best shown in Figures 4 and 5, I prefer that the stem 8 and the channel 9 be triangular in cross section, and that they be corresponding triangles. The position of the core in the mold cavity is such that the stem 8 fits tightly within the apex of the channel, as shown in Figure 4. This serves to seat the core and to insure a seating of the core at one place for all pouring operations.

The stem may be secured in the channel 9 in various ways, and I have merely shown two ways of mounting the stem therein.

In Figures 2 through 6 I have shown a pivotal arrangement. In these figures the lower portion of the channel 9 from the dotted line 11 terminates in a square channel 12. In this channel I have provided a pivot bar 13 suitably supported by arms 14. A horizontal slot 15 is cut into the apex of the stem 8 adjacent its lower end, and

is adapted to receive the pivot bar 13. It will therefore be appreciated that the stem 8 and the core 4 are adapted to swing about the bar 13 as a pivot. The arc described by the core 4 is very slight and only an inappreciable clearance between the core and mold cavity need be maintained. This clearance is not sufficient to permit of the leakage of any of the molten metal that is poured into the cavity.

To facilitate the assembly of the core in the mold, I prefer to drill a recess 16 in the base of the mold and adjacent and communicating with the channels 9 and 12. This recess may be provided with shoulders 17, if desired. A block 18 is adapted to be inserted in the recess to form the base and one wall of the channel 12. Screws 19, or other suitable fastening means, may be employed to secure the block in position.

It will be noted that the block 18 fills the recess 16, but in the top wall of the recess there is formed a channel 21 which communicates with channel 9. In the channel 21 there is positioned a coil spring 22 which is adapted to have one end bear against an end wall of the channel 21 and its opposite end bear against the base of the triangle of stem 8. This spring serves to maintain the apex of stem 8 against the apex of channel 9, but of course resiliently permitting movement of the stem 8 from this position. As stated above, I prefer that the stem 8 and channel 9 be triangular in cross section, in order to guide the stem to its seat for a pouring operation. It will of course be appreciated, however, that under some circumstances the shape of the stem and channel may be varied.

As stated above, the movement of the core in Figure 2 is, to all intents and purposes, horizontal. However, in Figures 7 and 8, I have shown a modified arrangement in which the core and its associated elements truly slide horizontally rather than being pivoted. In this form the stem 8 and channel 9 may be triangular, as in the case of the previously described core structure, or may be of a different shape, as above mentioned. Secured to the base of the stem 8, preferably by means of a screw 23, is a block 24. The block 24 is preferably triangular, and is adapted to slide within a correspondingly triangular recess 25. The recess 25 is drilled from the base of the mold and is adapted to be filled by a plug 26. The plug 26 is maintained in position by means of screws 27 or other appropriate fastening means. It will of course be appreciated that that part of the recess 25 filled by the plug 26 need not be triangular, and furthermore, the block 24 need not be triangular. I prefer, however, that the plug 24 and recess 25 should be triangular in order that the block and core might be guided to a uniform seat for the pouring operation.

Communicating with the recess 25 is a channel 28 adapted to hold a coil spring 29. One end of the coil spring bears against the base of channel 28 and the other end against the base of the triangular block 24. It will therefore be appreciated that the spring 29 tends to urge the block 24 into the apex of the triangle of recess 25 and to maintain it in that position. At the same time, however, it permits of retraction of the block 24 from that position. It will also be noted that the base of the core 6 lies flush upon the base of the mold cavity, and that the block 24 fits snugly between the upper part of recess 25 and the top of block 26.

From the foregoing, the operation of my device is believed to be apparent. In the case of the form shown in Figure 2, the shaft 8 is extended into channel 9, and the slot 15 fitted over the pivot bar 13. The spring 22 is then arranged between the stem 8 and the end wall of channel 21.

In the case of the device shown in Figures 7 and 8, the stem is inserted in channel 9 from the mold cavity, and the block 24 is then screwed thereon, after first arranging spring 29 in its channel 28. The block 26 is then screwed into position.

It will be noted that during a casting operation the core 4 is adapted to freely move with respect to the core body and in the direction of shrinkage of the casting. As is well known, a casting shrinks so that its edges recede from the walls of the mold cavity, and the channels 9 are so formed as to take care of this direction of movement by the core 4. With respect to the device of Figure 2, while it is true that the core theoretically describes an arc, in actual practice this arc is so slight that for all intents and purposes the movement is in a single plane. As pointed out above, a slight clearance suffices to take care of the throw of the arc, a clearance which is not sufficient to permit a leakage of the molten metal.

When the casting is removed from the mold cavity, the springs 22 and 29 urge the stem 8 and core 4 to their seated position for the next pouring operation. The triangular shape of the stem and block 24 determines the uniform seated position for all pouring operations.

The advantages of my invention are believed to be obvious. It permits of the free contraction or shrinkage of a casting upon cooling, thus preventing the imposition of objectionable stresses and strains in the casting. Also, upon removal of the casting, the core is automatically returned from its displaced position to its true seat, a seat which is uniform for every casting. It is also obvious that my invention is inexpensive to manufacture and effects an appreciable economy over those prior structures in which the core has been manually seated in the mold cavity.

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. In a casting apparatus, a mold having a cavity, a permanent core located in the cavity, said core being provided with a stem pivoted to the mold, and means for resiliently maintaining the core at a predetermined position in the cavity.

2. In a casting apparatus, a mold having a cavity, a core mounted upon a stem, the said stem lying within a channel extending from the mold cavity and pivoted therein, and means for resiliently maintaining the stem in a predetermined position.

3. In a casting apparatus, a mold having a cavity, a triangular shaped channel extending from the cavity, a core adapted to close the cavity end of said channel, a stem of triangular shape secured to the core and pivoted within the channel, and resilient means to urge the stem into one apex of the channel.

HENRY E. McWANE.