G. E. ANDERSON.

METHOD OF MAKING MOLDS.

APPLICATION FILED APR. 27, 1911.

1,002,355. Patented Sept. 5, 1911.

Fig. 1.

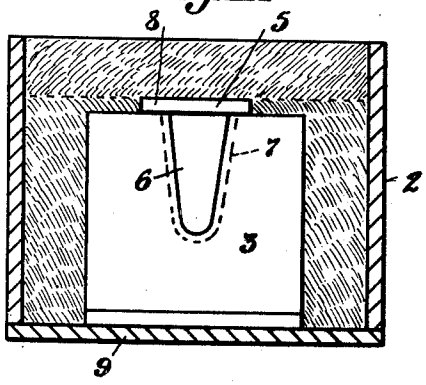


Fig. 2.

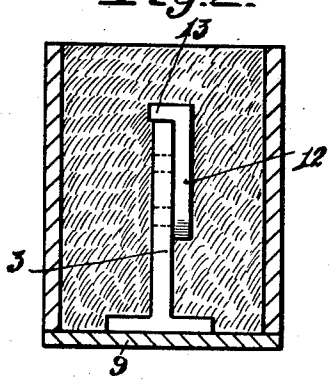


Fig. 3.

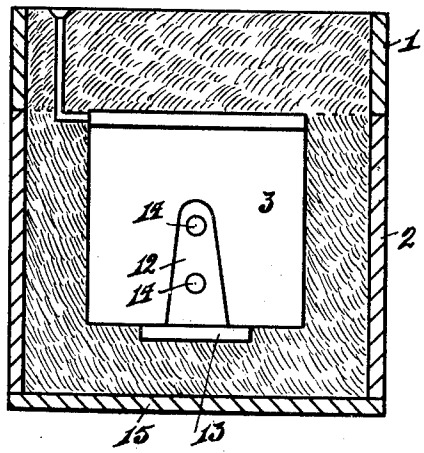


Fig. 4.

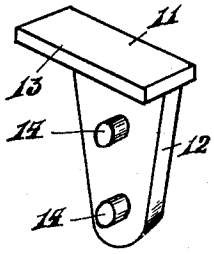


Fig. 5.

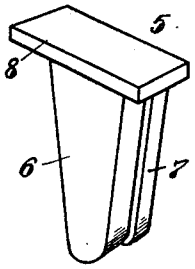


Fig. 6.

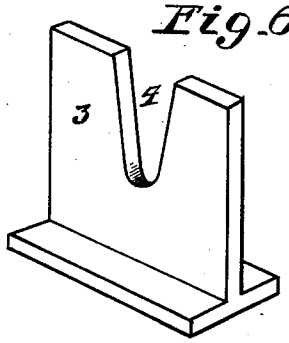
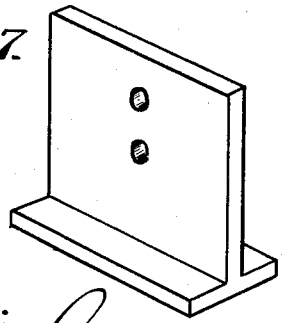


Fig. 7.



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METHOD OF MAKING MOLDS.

1,002,355. Specification of Letters Patent. Patented Sept. 5, 1911.

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To all whom it may concern:

Be it known that I, GUSTAV E. ANDERSON, a subject of Sweden, residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Methods of Making Molds, of which the following is a specification.

My invention relates to a new and improved method of making molds, whereby castings can be made having apertures therein, for the purpose of receiving bolts for fastening purposes as well as for other uses, and the time and expense of drilling or otherwise forming such apertures obviated.

A further object of the invention is to permit a casting to be made in which a plurality of apertures may be formed, either in alinement or in irregular formation, without necessitating both the pattern and the flask to be divided into many parts, in order that the pattern may be withdrawn in forming the mold, as is the present practice.

In the drawings accompanying the application are shown particular means for carrying out my method, which means may be varied at pleasure, and in which—

Figures 1 and 2 are vertical sections of the drag portion of a flask, showing the side and end view respectively of the pattern and print in their related positions therein. Fig. 3 is a vertical section of the complete mold ready to receive the metal. Figs. 4 and 5 are perspective views of a core and a print. Fig. 6 is a perspective view of the pattern, and Fig. 7 is a perspective view of a casting showing apertures formed therein in the manner of my method of forming the mold for that purpose.

While my method is applicable to many forms of castings for the purpose of forming apertures therein of different shapes and designs, I will herein describe it only as applied to the production of the apertured casting illustrated in Fig. 7 of the drawings.

In carrying out the method a two-part flask is preferably used, consisting of the cope 1 and the drag 2. The pattern 3, conforming in general with the form of the casting illustrated in Fig. 7, is provided with an open-ended tapered slot 4. Adapted to fit into said slot is a print 5 which, instead of forming a fixed part of the pattern as is the present practice, is separate and distinct therefrom. Said print is provided with a tapered body portion 6 adapted to fit the slot 4 in the pattern, and an enlarged portion 7 adapted to rest against the side of the pattern, its edges projecting beyond the edges of the portion 6 to form an off-set or shoulder to rest against the pattern and prevent lateral displacement of the print, as illustrated by dotted lines in Fig. 1, during the tamping operations. A base 8 flush with one side of the print and extending beyond the opposite side and edges thereof, serves to form a print for the reception of a similar base member on the core, the form of which will be presently explained.

In carrying out my method, the pattern 3 is placed upon a rolling-over board 9, and the print 5 is mounted thereon with its body portion 6 extending into and filling up the slot 4, with its side flush with the side of the pattern, the shouldered portion 7 engaging the opposite face and the base 8 resting upon the upper edge thereof, in the manner shown in Fig. 2, in which, however, the core is shown instead of the print. The molding sand is next tamped around the pattern and print to a height indicated by a dotted line in Fig. 1, leaving the upper side of the print base exposed. The print is next withdrawn and the core 11, having a body portion 12 and a base portion 13 corresponding in size and form with the print, and having laterally projecting pins 14 corresponding with the form of the apertures the finished casting is to have, is positioned in the cavity formed in the sand by the withdrawn print. The drag is next completely filled and tamped with sand, a bottom board 15 placed thereon and the drag turned over. It will thus be noted that the core is firmly held in the proper position with relation to the pattern, and before the withdrawing of the latter, the pattern holding the core against the slightest displacement from its proper position with relation to the completed mold during the tamping operation. As shown in Figs. 2 and 3, the core is firmly anchored and held against the slightest displacement by the sand being tamped around the greater part of its base, and the edges and one side thereof, with its opposite side forming a part of the side wall of the mold, with the aperture forming pins 14 thereon extending into and in contact with the opposite wall of the mold, as more plainly shown by dotted lines in the former view.

After the pattern has been turned over and the board 9 removed, the cope is positioned on the drag and tamped with sand, after which it is removed and the cast-gate and vent formed in the usual manner. The pattern is next withdrawn, and upon the cope being replaced, the mold is completed and of the form corresponding with the form of the casting illustrated in Fig. 7, the metal being free to flow entirely around the aperture forming pins on the core.

The taper of the slot in the pattern and of the print and core, permits the easy withdrawal and placement of one with reference to the other.

It will be observed from the foregoing description that any number of apertures may be formed in a casting by my method, and the relative arrangement of such apertures obtained with exactitude, whether in regular or irregular formation, as the core members forming the apertures may all be formed integral with a single core, so that it will be impossible for one aperture forming member to be displaced with relation to another, in the slightest degree, as might otherwise occur during the tamping operation in forming the mold where separate aperture forming cores are used, thus providing apertured castings adapted to accurately fit with other parts and their connecting members. Furthermore, as the core is placed and remains in a fixed position prior to the removal of the pattern, the danger of breaking down the mold, even in the slightest degree, as is liable to occur in placing the same after the pattern is withdrawn, is thereby obviated. This is especially true in the case of deep, narrow molds, when it is difficult to place a core after the withdrawal of the pattern without breaking some part of the mold, in consequence of which patching is required, which adds to the time and expense of forming the mold. Lastly, and one of the most important advantages of my method, resides in the fact that it is not necessary to split the pattern at each point at which an aperture forming core is positioned, as is necessary under the present practice, where it is desired to have a number of apertures disposed in relatively different planes, in order that the pattern parts may be drawn. By the use of a single core body in the manner heretofore explained, and by enlarging the same and the print proportionately with relation to the pattern, aperture forming members may be located at any part of the mold with the exception of the immediate edges thereof, and in any formation with relation to each other it may be desired, without requiring the pattern to be split. The great advantage of this is apparent, as when a single form of casting may be put to a great variety of uses, but in which each different use requires differently shaped and located apertures. By my method a single pattern will be applicable for all the different castings, without requiring a single change to be made therein. All that is necessary to be done is to form members on the core corresponding with the shape, size and location of the apertures desired.

Having thus described my invention, what is claimed is—

1. The method of making a mold which consists in placing an incomplete pattern in the drag, then mounting thereon a print of a form to complete the pattern and form a cavity in the sand, then ramming up the sand to completely embed the pattern and a portion of the print, then withdrawing the print and inserting a core in said cavity having an aperture forming member extending into the space forming a part of the mold and previously occupied by a portion of the print, then continuing the ramming of the sand until the drag is filled, then inverting the drag and ramming up the cope, and then removing the cope to draw the pattern and replacing the cope.

2. The method of making molds which consists in placing a pattern and inter-engaging print in a flask, ramming them up together with a part of the print exposed and the pattern wholly embedded, removing the print and placing a core in the cavity formed by the print, then completing the ramming up of the flask, and then withdrawing the pattern without disturbing the core.

3. The method of making molds for apertured castings which consists in placing a partially formed pattern and a print completing the pattern, ramming them up together in the flask with a part of the print exposed, forming a core conforming in part with the cavity formed by the print and in part with the aperture desired in the casting, replacing the print with said core with the aperture forming part extending into the mold cavity previously occupied by a portion of the print, then completing the ramming of the sand until the flask is filled, and then removing the pattern without disturbing the core.

In testimony whereof I affix my signature, in presence of two witnesses.

GUSTAV E. ANDERSON.

Witnesses:
CHARLES A. HAGERTY,
GEORGE OLTSCH.