No. 738,278. PATENTED SEPT. 8, 1903.

A. K. BECKWITH.

MOLDING APPARATUS.

APPLICATION FILED MAY 3, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

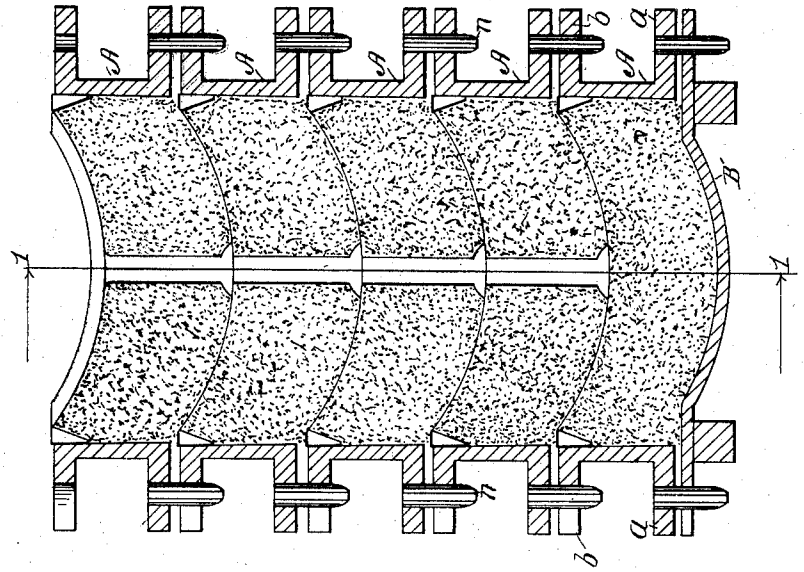


Fig. 2.

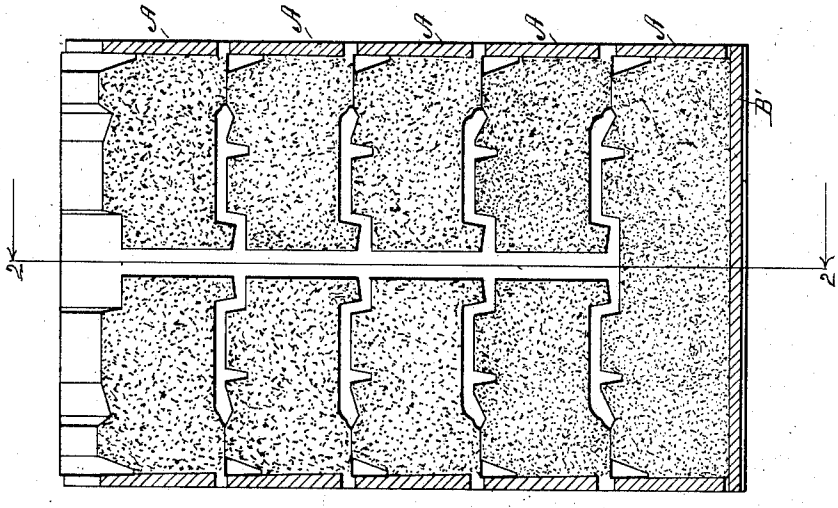


Fig. 1.

Witnesses:
Ethel A. Teller
Otis A. Earl

Inventor,
Arthur K. Beckwith
By Fred L. Chappell
Att'y.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

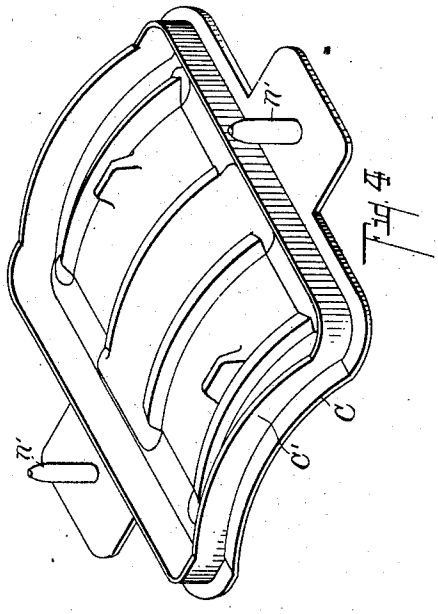


Fig. 4.

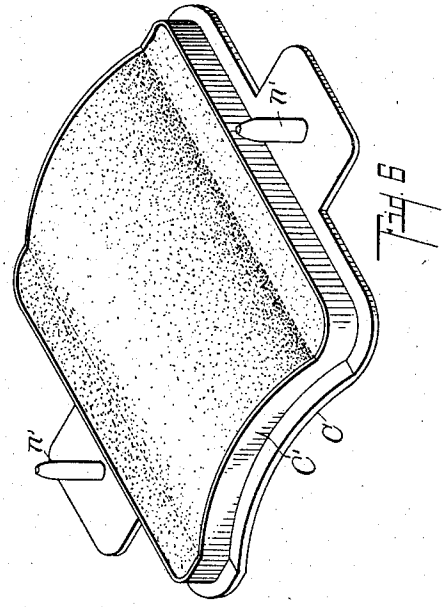


Fig. 6.

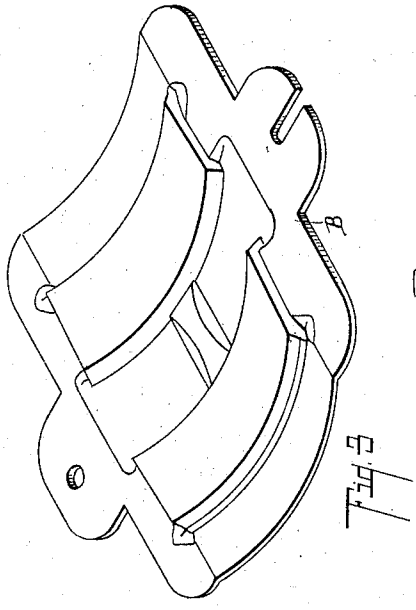


Fig. 3.

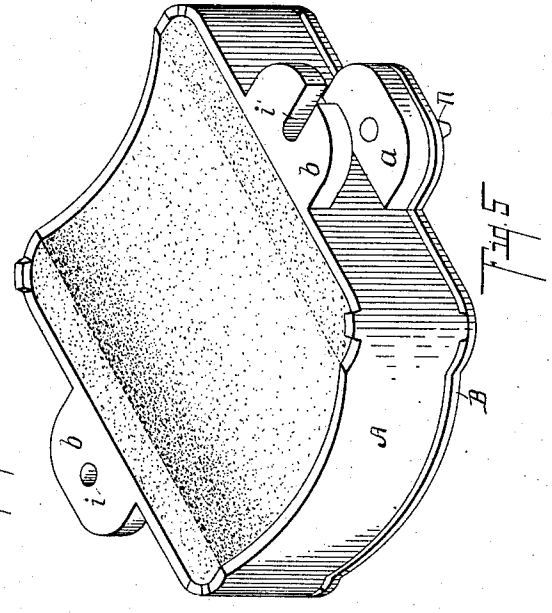


Fig. 5.

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No. 738,278. PATENTED SEPT. 8, 1903.

A. K. BECKWITH.

MOLDING APPARATUS.

APPLICATION FILED MAY 3, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

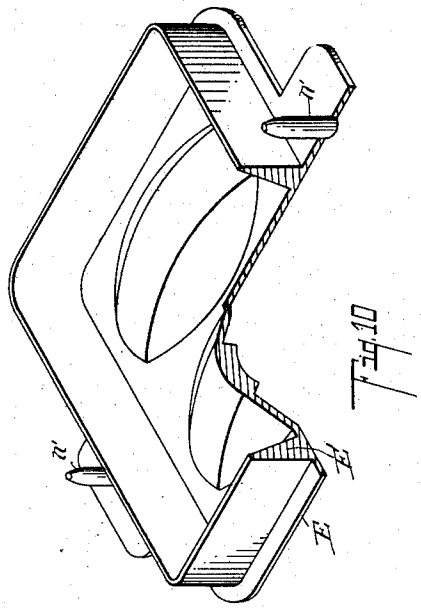


Fig. 10

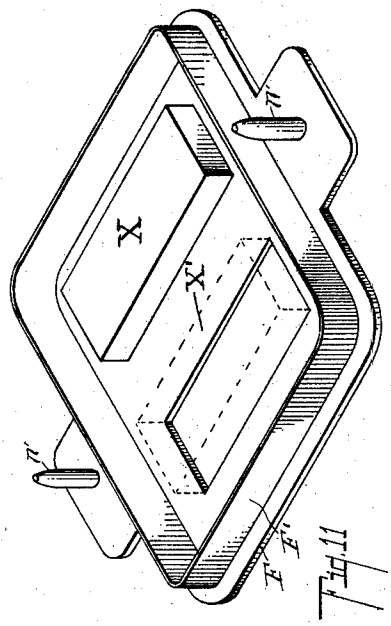


Fig. 11

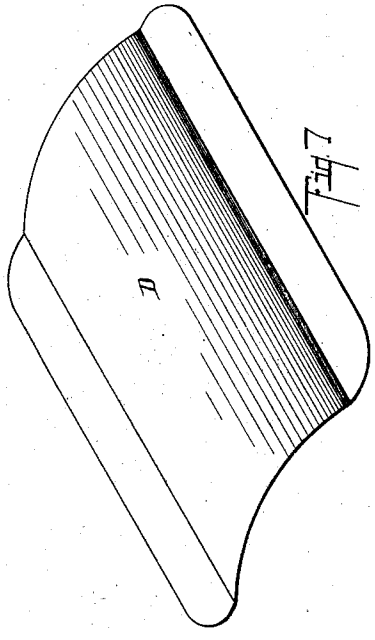


Fig. 7

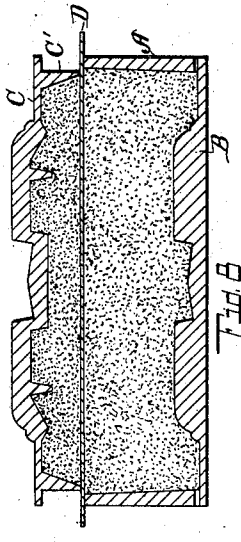


Fig. 8

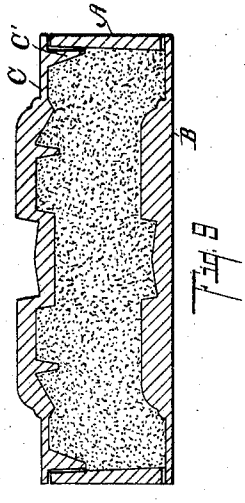


Fig. 9

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No. 738,278. Patented September 8, 1903.

UNITED STATES PATENT OFFICE.

ARTHUR K. BECKWITH, OF DOWAGIAC, MICHIGAN.

MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 738,278, dated September 8, 1903.

Application filed May 3, 1902. Serial No. 105,775. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR K. BECKWITH, a citizen of the United States, residing at the city of Dowagiac, in the county of Cass and State of Michigan, have invented certain new and useful Improvements in Molding Apparatus, of which the following is a specification.

This invention relates to improvements in molding apparatus for producing multiple molds.

The objects of the invention are, first, to provide a satisfactory multiple mold in which the molds can be superimposed one above the other; second, to provide an improved apparatus for securing satisfactory molds of any description which are adapted to be superimposed one above the other to economize floor-space and the labor incident to casting metal.

Further objects will definitely appear in the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical central sectional view through a multiple mold made by my improved apparatus, the same being taken on the line 1 1 of Fig. 2. Fig. 2 is a vertical sectional view of the same mold and flask, taken on a line corresponding to the line 2 2 of Fig. 1. Fig. 3 is a detail perspective view of the under match-plate on which my improved flask is located in the process of molding. Fig. 4 is a detail perspective view of the top match-plate inverted, which is provided with a downwardly-projecting rim C'. Fig. 5 is a detail perspective view of the flask located upon the lower match-plate, loosely filled with molders' sand. Fig. 6 is a perspective view of the upper match-plate inverted and filled with sand up even with the bottom of rim C'. Fig. 7 is a perspective view of the retaining-plate which retains the sand in the upper match-plate. Fig. 8 is a detail sectional view of the flask A, located on the lower match-plate in position with the retaining-plate D between, taken on a line corresponding to line 2 2 of Fig. 1, all parts being loosely filled with molders' sand. Fig. 9 is a detail sectional view of my improved molding apparatus as it appears in position on completion of the mold after the plate D is removed and the parts are pressed together, it being also taken on a line corresponding to line 2 2 of Fig. 1. Fig. 10 is a detail perspective view of a modified form of the upper match-plate inverted, showing the proportion of the parts where a straight-joint flask is desired with an irregular pattern. Fig. 11 is a perspective view of the match-plate F inverted, which is perforated for the reception of movable patterns, a parallelepipedon being shown, this being also applicable to casting-gears.

In the drawings all of the sectional views are taken looking in the direction of the little arrows at the ends of the section-lines, and similar letters of reference refer to similar parts throughout the several views.

Referring to the lettered parts of the drawing, A is a flask.

B is a match-plate on which the flask is placed in forming the mold, as seen in Fig. 5, the match-plate appearing in perspective in Fig. 3.

C is the upper match-plate, on which is formed a raised rim C', corresponding to the top dimensions of the flask A and conforming in general outline thereto. This rim is of such height as to extend above the highest point of the pattern formed on the plate within the receptacle formed by the rim.

The match-plates B and C carry corresponding parts of a pattern and are provided with the usual guides for guiding them into position on the flask A. The guiding means are pins n' n', that engage the holes i and slots i' on the ears of the flask. The flask A is placed on the match-plate B and loosely filled with molders' sand, which is struck off by a straight-edge. The under side of the match-plate C is then filled with sand and struck off in the same way. The plate D (see Fig. 7) is then placed on the bottom of the upper match-plate C, to which it is conformed to fit closely to the rim C' like a cover, retaining the sand in position. This top match-plate is then inverted and placed on top of the flask as it appears in Fig. 5, the same being accurately guided in position by the guides provided thereon. The plate D

can then be readily withdrawn, and the top match-plate will be in position over the flask, with loose sand in between, retained by the flange C'. Pressure is then applied to the top match-plate by any suitable means—as a molding-machine, for instance—when it will be forced down into the flask A, as appears in Fig. 9. It will thus be seen that a mold is formed on the top and bottom of the flask A, and the molding-sand within the flask is evenly compacted, owing to the fact that corresponding parts of the pattern are opposite each other, and the entire space is filled with loose sand in the process of molding, which is compacted by an even pressure. When the sand is compacted by this pressure, the top match-plate C is removed, the sprue-hole cut, and the flask A is lifted off from the bottom match-plate and placed in a vertical pile on others, as appears in Figs. 1 and 2, the lower flask being provided with a bottom B' to support the superimposed molds contained within the flasks. No sprue-hole is cut in the bottom mold. The flange C' is slightly wedge-shaped—that is, it is thickest at the point of union with the match-plate C—and when forced into the sand compacts it toward the pattern, causing the molding material to make a very effective and satisfactory mold. The flasks are of course properly guided into position on top of each other by pins *n* on ears *a*, engaging holes *i* and slots *i'* in suitable ears *b* or by other suitable guiding means. It is not attempted to fit the entire top and bottom of the flasks together; but slight projections *e* are provided at each corner, which it is very easy to bring properly together, whereas if it were attempted to fit the entire upper and under surfaces of the flasks together it would be practically impossible. A sprue is formed down through each of the superimposed molds except the bottom one, and suitable gates lead therefrom to the molds between the different flasks.

I show the top of the flask and the match-plates curved in form, this being desirable where a curved or irregular pattern is to be made. With this apparatus, however, it is not a necessity to make the flasks or match-plates irregular, as the same can be modified, as appears in Fig. 10, making the rim considerably deeper. This will enable a flat plate to be used between the top match-plate and the flask in place of the specially-formed plate D, as I have shown in Fig. 7. As I have already remarked, the match-plate can be made use of with removable patterns or may be perforated for various classes of castings, this method being illustrated in the top match-plate of Fig. 11, in which the match-plate F forms the ordinary stripping-plate, the pattern being shown in position at X and drawn through the plate at X'.

The device is very desirable in casting gears and other patterns from which it would be difficult to lift the sand, owing to straightness of the sides, fineness of the teeth, &c.

From what I have stated it will certainly appear that there is no difficulty whatever in forming molds in this way, because the entire mold is evenly filled with loose sand, and when the match-plates are forced together in the flask the pressure on all parts will be perfectly even and the entire mold will be properly compacted. This is greatly facilitated by making the rim C' wedge-shaped; but I am aware that this may be satisfactorily accomplished by providing a different rim, and it is not really necessary that a rim be of such shape as to compact the molding-sand in the mold, though that is undoubtedly a very great advantage, and I desire to claim that feature in connection with my improved molding apparatus.

I desire to remark that my improved molding apparatus can be greatly varied in its details without departing from my invention. Any suitable guiding means can be provided for the match-plates and different flasks. These can be of a variety of forms, irregular or flat, and so long as the mold is made up in the way I have shown it will be found that the flasks will support the same perfectly, so that molds can be made of any height desired without danger of breaking down under the weight of metal or of the molds themselves.

This mold might be made to a limited height with snap-flasks, though it would probably not be practical to make them full height from snap-flasks for any heavy work.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a molding apparatus, the combination of a series of flasks A with suitable guides thereon, adapted to be superimposed and rest one upon the other; bottom match-plates B conformed to the bottom of flask, with suitable patterns thereon for supporting the flasks; and top match-plates conformed to the top of the flasks, said match-plates carrying corresponding parts of a pattern; rims upon the under side of said top match-plates and integral therewith and extending above the patterns adapted to receive and hold a quantity of sand; cover-plates to fit on the under sides of the top match-plates and adapted to be withdrawn from between the said match-plates and the flasks when the same are superimposed one above the other, to permit the parts being pressed together.

2. In an apparatus for forming multiple molds, the combination of a flask A with a suitable guide thereon; a bottom match-plate B conformed to the bottom of the flask with a suitable pattern thereon for supporting the flask; a top match-plate conformed to the top of the flask carrying a corresponding part of the pattern; a rim upon the under side of said match-plate integral therewith and extending above the pattern, adapted to receive and hold a quantity of sand; a cover to fit on the under side of said match-plate and adapt-

ed to be withdrawn from between the said match-plate and the flask, when the same are superimposed one above the other to permit the parts being pressed together.

3. In an apparatus for forming multiple molds, the combination of a flask A; a match-plate for supporting said flask; a top match-plate with a rim integral therewith and conformed to the same and adapted to form a receptacle to maintain the sand in position on the match-plate; a cover for said receptacle, the same being adapted to be withdrawn from between the match-plate and the flask when the same are properly superimposed above each other, for the purpose specified.

4. An apparatus for making molds consisting of parts having the patterns for the molds supported in receptacles such patterns being integral with one of said receptacles; a cover for the receptacle with the integral pattern to retain the molding material in place therein while it is being placed over the corresponding part, said cover being adapted to be withdrawn from between the parts to permit them to be pressed together.

5. In an apparatus for making molds, a match-plate or mold-board provided with a raised rim integral therewith extending beyond the pattern and adapted to go within the flask, whereby the same can be filled with sand for use in connection with other parts of the mold, for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

ARTHUR K. BECKWITH. [L. S.]

Witnesses:

MELVILLE J. SHEPARD,

M. A. SAWYER.