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METHOD OF AND APPARATUS FOR FORMING MOLDS.

APPLICATION FILED OCT. 5, 1906.

925,249. **Patented June 15, 1909.**

Fig. 1.

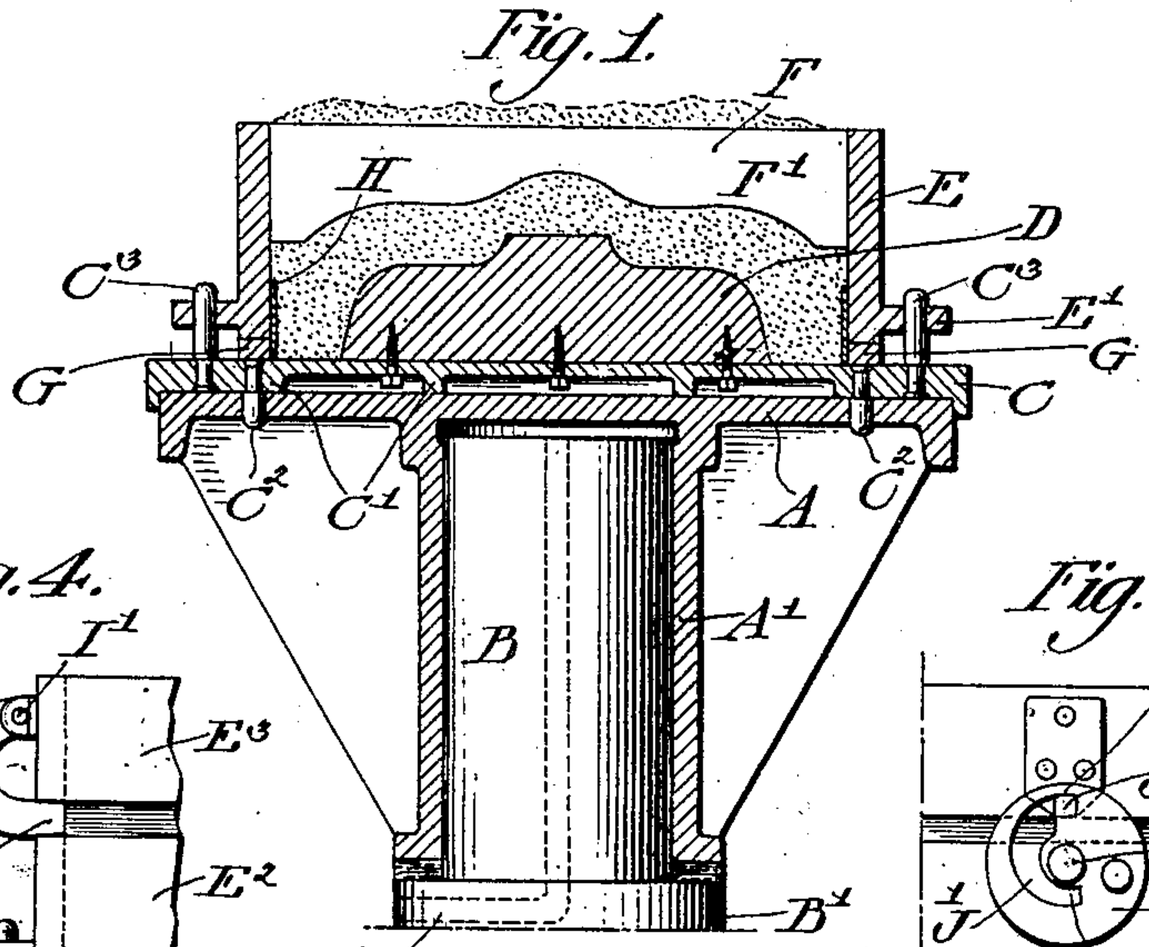
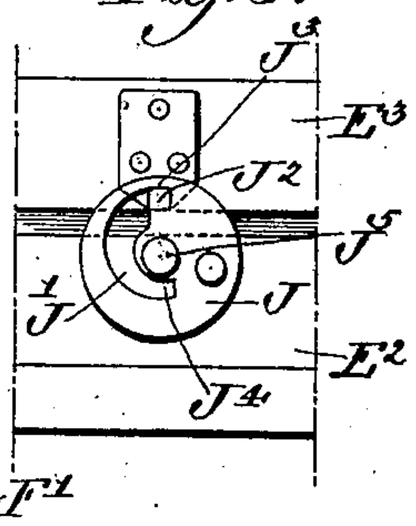


Fig. 2.

Fig. 4.

Fig. 5.



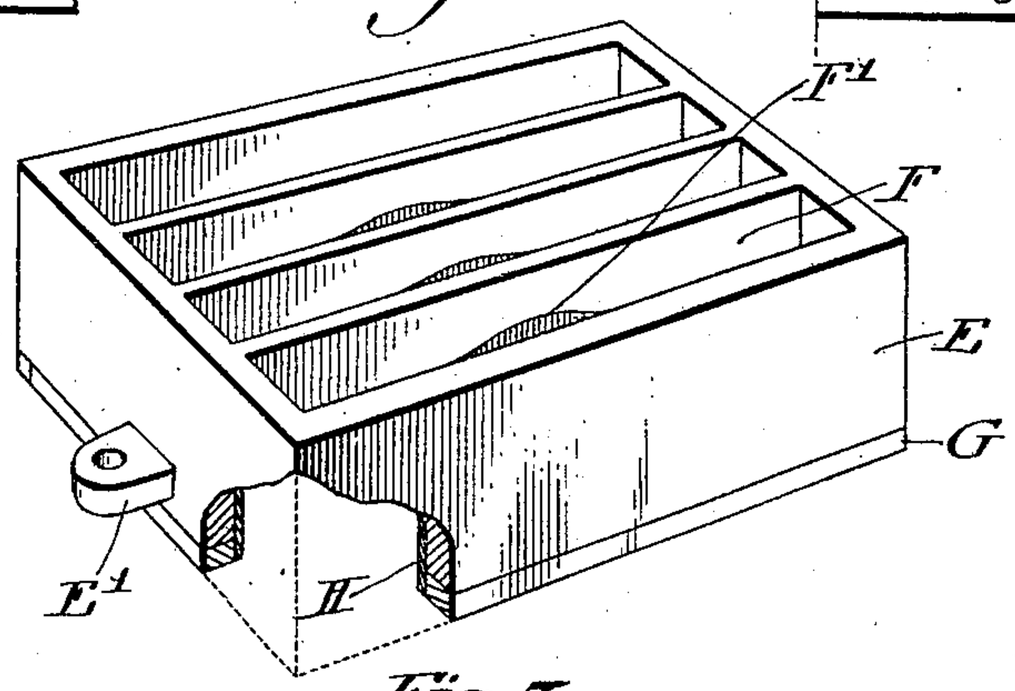
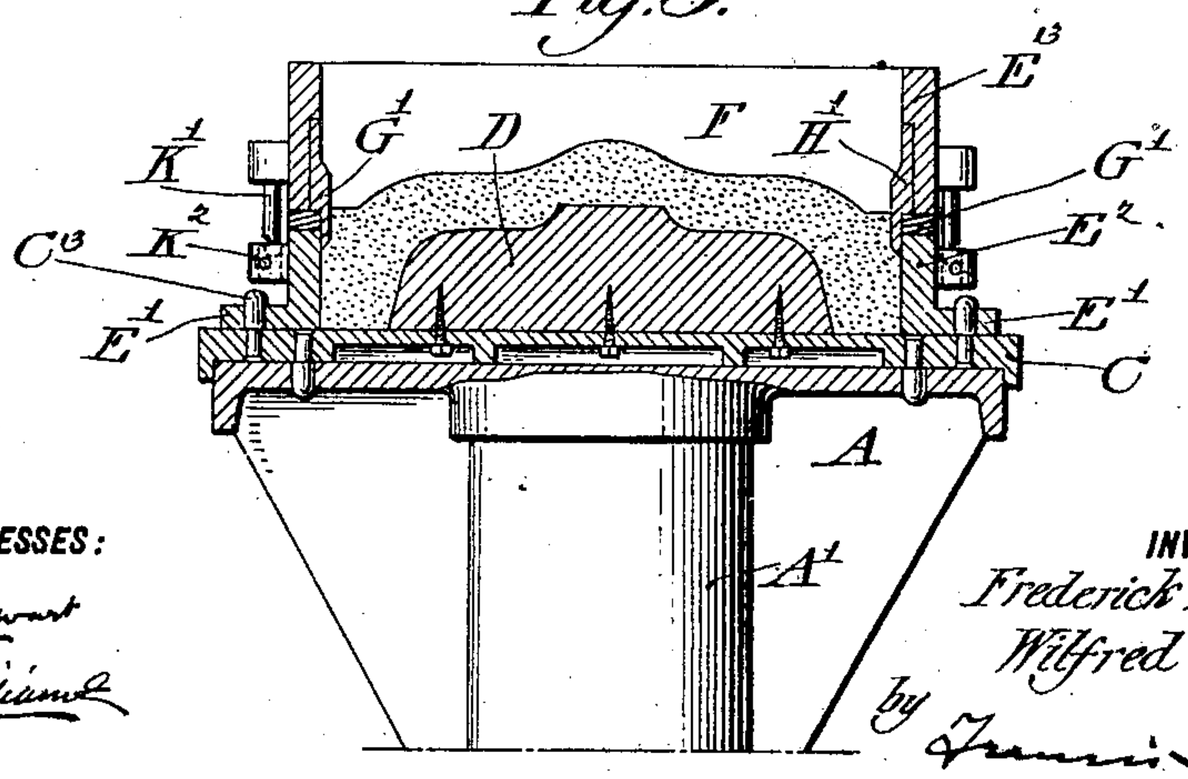


Fig. 3.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR FORMING MOLDS.

No. 925,249. Specification of Letters Patent. Patented June 15, 1909.

Application filed October 5, 1906. Serial No. 337,521.

To all whom it may concern:

Be it known that we, FREDERICK W. TAYLOR and WILFRED LEWIS, citizens of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Methods of and Apparatus for Forming Molds, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

Our present invention relates to the forming of molds in sand and is particularly designed for use in connection with molding operations in which the sand is packed about a pattern by jarring the support on which the pattern and flask or sand retaining structure is carried.

The object of our invention is to cause the sand to be packed in a simple and expeditious manner about the pattern and with the desired firmness at all points. To accomplish this we arrange to jar the pattern, sand retaining flask and sand to settle the latter about the pattern and at one stage of the jarring operation we provide for a relative movement between the pattern and the flask, or a portion thereof to obtain a solidity of certain portions of the sand which would not otherwise be had.

The various features of novelty which characterize our invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of our invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which we have illustrated and described forms by which our invention may be carried out.

Of the drawings, Figure 1 is a sectional elevation of a portion of a molding machine and one form of our flask. Fig. 2 is a perspective view of the flask shown in Fig. 1 with parts broken away and in section. Fig. 3 is an elevation partly in section showing a modified flask construction. Fig. 4 is an elevation showing one form of spacing device which may be employed with the flask construction shown in Fig. 3, and Fig. 5 is an elevation showing a different form of spacing device for the same purpose.

In the drawings, A represents the table or frame member upon which the flask is supported. The table A is jarred to settle the sand in any suitable manner, and for that reason we call it a jar table. In the construction shown, the member A is provided with a cylinder A^1 surrounding a central stationary member B. Air, or other fluid, admitted to and exhausted from the piston space in the cylinder A^1 above the piston B in any suitable manner, as through the passage A^2 is employed for successively lifting the table A and then allowing it to drop. The downward movement of the cylinder A^1 is stopped by the engagement of its lower end with the flange B^1 of the piston member B.

The construction so far described is essentially that shown by the application for Patent of Wilfred Lewis, Serial No. 327,631, filed July 25, 1906 and the means for controlling the flow of the working fluid into and out of the cylinder may be that shown in said application, though our invention is not limited to use with any particular form of jarring apparatus.

The table A supports a pattern plate or carrier C provided on its under side with ribs C^1 and pins C^2. The pins C^2 enter holes in the table A formed to receive them and serve to prevent lateral displacement of the table and carrier. The pattern or patterns D are secured to the upper side of the carrier C. The carrier C is also provided on its upper side with elongated projections or pins C^3 which enter apertured ears F^1 of the flask E.

The flask shown in Fig. 1 is in the form of a box-like member or frame open at its upper and lower end and provided in its upper portion with a sand retaining bridge-work consisting, in the form shown, of bars F which are cut away at F^1 to properly clear the pattern or patterns D, which may be in the form of the article to be produced or a portion thereof as is well known to those skilled in the art. In the condition of the apparatus shown in Fig. 1, the flask E is spaced away from the table A by strips G.

It will be understood that sand thrown into the upper end of the flask E will drop between the bars F and be packed about the pattern D as the table A is jarred by the impact of the cylinder A^1 upon the flange B^1. We have found, however, that the sand in the flask of the type shown when not

movable with respect to the table does not pack with the desired firmness in all parts of the flask. In particular, the sand immediately beneath the lower edges of the cross bars F will not ordinarily be packed as firmly as the sand beneath the spaces between adjacent bars. In using our invention, to avoid this difficulty, we first partly pack the sand by jarring the table A while the flask member is spaced away from the table by the strips or spacers G, after which we remove the spacers G and continue the jarring action. After the removal of the spacers, the flask under the jarring action moves into engagement with the table, thus sinking the bars F in the sand and packing or ramming the sand beneath the cross bars with the desired firmness.

To prevent the sand from running out beneath the edges of the flask E, when the strips G are removed, we provide a retainer in the form of an open ended box-like member H which rests on the carrier C within the flask E. As the flask E descends after removing the strips G, the members E and H telescope. Preferably the member H should be made of thin material.

In the construction shown in Fig. 3, a divided flask is employed which comprises a lower flask member E^2 resting upon the table A and provided with ears E^1 and an upper flask member E^3 supported by the member E^2. The member E^3 is provided with bridge members F and may be spaced away from the member E^2 during the preliminary jarring operation by strips G^1 similar to the strips G of the construction first described. In this form a retaining member H^1 is secured to the member E^3 in telescopic relation with the member E^2. Instead of spacing strips, other suitable means may be employed for holding the movable flask member at different levels above the table during different stages of the jarring operation. For instance, in Fig. 4 we have shown a divided flask construction in which the spacing members consist of arms I pivoted to the upper flask member E^3 at I^1. The ends I^2 of the arms are inserted between the flask members E^2 and E^3 when it is desired to hold these members apart and are swung out of this position when the member E^3 is to be moved into engagement with the member E^2.

In Fig. 5, we have shown the member E^2 as having pivoted to it disks J, each formed with a slot J^1 which receives a projection J^2 carried by the flask member E^3. The slot J^1 has end portions J^3 and J^4 which are at different distances from the pivoted center J^5 of the disk. When the pin J^2 is in the end J^3 as shown, the flask parts are spaced apart and when the disk is turned so that the pin is in the slot portion J^4 the parts are locked together.

With the constructions shown in Figs. 3 and 4, various means for locking the members E^2 and E^3 together at the completion of the jarring operation may be employed. This may be accomplished as shown in Fig. 3 by the provision of the movable cross keys for locking guide pins K^1 carried by the upper flask member E^3 in the guide ears K^2 carried by the flask member E^2.

It will be readily understood by those skilled in the art that changes may be made in the form of our invention without departing from its spirit, and we do not wish the claims therein made to be limited to the particular embodiment disclosed more than is made necessary by the state of the art.

Having now described our invention, what we claim as new and desire to secure by Letters Patent is,

1. In molding apparatus, a jar table, a flask member supported from the table, and means whereby the flask member may be held at a different level above the table during one stage of the jarring operation from that which it is held during a different stage of the operation.

2. In a jar molding apparatus, the combination of a two-part flask, means for jarring it, and means whereby the two parts of the flask are held at different distances apart during different portions of the jarring occurring in a single mold forming operation.

3. In jar molding apparatus, a jar table, a pattern supported thereon, a flask member also supported from said table and provided with a bridge work extending over said pattern, and means whereby said flask member is so held that said bridge work is located at different levels above said pattern at different stages of the jarring operation.

4. In a jar molding device, a horizontal jar table or support, a pattern supported thereon, a flask member surrounding the pattern and also supported by said table, and spacing devices for holding the flask member at one level above the table during a portion of the jarring action and movable to permit the flask member to approach the table during another portion of the jarring operation.

5. In a jar molding device, a horizontal jar table or support, a pattern supported thereon, a flask member surrounding the pattern and also supported by said table, spacing devices for holding the flask member at one level above the table during a portion of the jarring action, and movable to permit the flask member to approach the table during another portion of the jarring operation, and an open ended box-like sand retaining member within and overlapping the lower edge of the flask member.

6. In a molding apparatus, a jar table, a flask member, means for supporting it from,

and at different levels above the table at different stages in the jarring operation, and a sand retaining member within and overlapping the lower edge of said flask member.

7. The method of forming a mold which consists in packing sand around a pattern by jarring the sand and pattern and producing relative movement between the pattern and a sand retaining flask member at some stage in such jarring operation in the direction in which such movement tends to pack the sand about the pattern.

8. The method which consists in packing sand about a pattern by jarring the sand and pattern and supporting a flask member relatively stationary with respect to the pattern during one portion of the jarring action and allowing it to move relatively to the pattern in the direction in which such movement tends to pack the sand about the pattern during another portion of said operation.

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