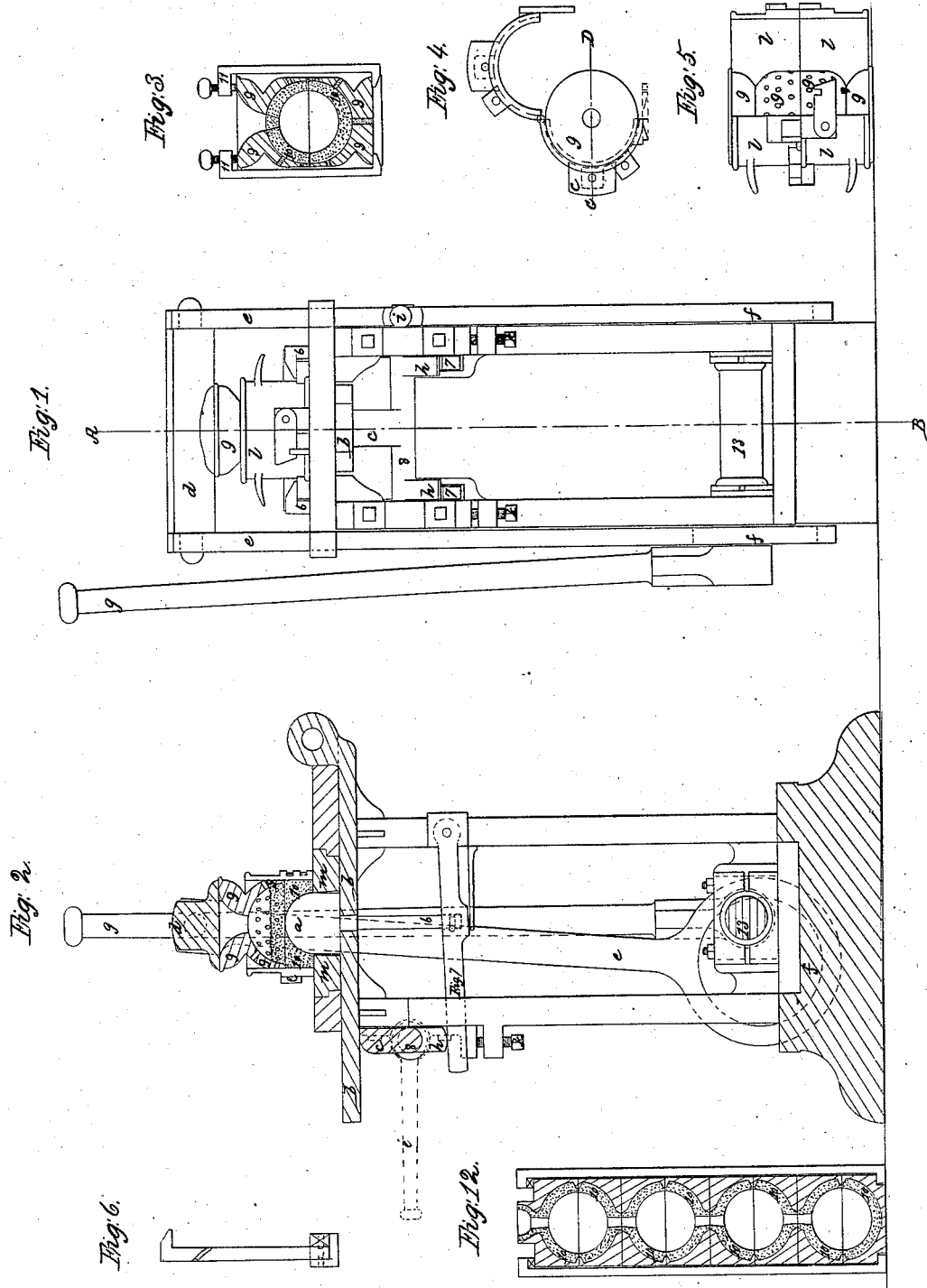


A. Elliot,

Molding Apparatus.

NP 3,295.

Patented Oct. 6, 1843



UNITED STATES PATENT OFFICE.

ABIAL ELLIOT, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN THE MODE OF FORMING MOLDS FOR CASTING CANNON BALLS OR SHOT, BOMB-SHELLS, &c.

Specification forming part of Letters Patent No. 3,295, dated October 6, 1843.

To all whom it may concern:

Be it known that I, ABIAL ELLIOT, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and Improved Mode of Preparing Molds for Casting and Manufacturing Cannon Balls or Shot, Bomb-Shells, Carcasses, and other Articles; and I do hereby declare that the following is a full and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a front view; Fig. 2, a longitudinal section; Fig. 3, a longitudinal section of the mold; Fig. 4, a bird's-eye view of the flask containing the mold; Fig. 5, a view of the flask thrown open containing the mold; Fig. 6, one of the clamps for holding down the flask.

a in Fig. 2 is the pattern, attached to the lever *b* in Figs. 1 and 2, which lever is raised by a cam, *c*, in Figs. 1 and 2, or any other means more convenient. The flask, Figs. 4 and 5, is retained in its place by means of the two clamps, Fig. 6, or such other means as may be preferred. The cross-bar *d*, Figs. 1 and 2, is attached to the stirrups *e*, Figs. 1 and 2, and brought down by the two eccentrics *f*, Figs. 1 and 2, by means of the lever *g*, Figs. 1 and 2. The clamps 6, Fig. 1, and represented in section at Fig. 6, are intended to be thrown up by means of springs or counter-balances, and are attached to the levers 7, which levers are depressed by the cams *h*, Figs. 1 and 2, attached to shaft 8 of cam *c*, which lifts the lever *b*. This is operated by means of the lever *i*, Figs. 1 and 2. The shaft No. 8, on which are the cams *h* and *c*, is elevated or depressed by means of the screws *k*, Figs. 1 and 2.

l in Figs. 1, 2, 4, and 5 is the flask, which is represented inclosing the mold on the top of the machine under the cross-bar *d*, Figs. 1 and 2. *m m*, Fig. 2, is a movable plate or collar to be adapted to the size of the ball, &c., which is to be molded.

No. 9 in Figs. 1, 2, 3, 4, and 5 is called the "follower," which is to have a similar form to the article to be cast, but of greater dimensions, by which an equal thickness of sand or such other material as may be used can be obtained. It is to be made of iron or other metal or material of such thickness as may be deemed proper for each article to be cast. Both the followers

are pierced with vent-holes. The shape of that deemed best for cannon-balls is given in No. 9, Figs. 1, 2, 3, 4, and 5.

No. 10 in Figs. 2, 3, and 12 is the mold. The followers inclosing the mold are secured together by means of the two clamps No. 11, Fig. 3. The gate is formed by means of a plug fitting closely the hole through the upper follower, and which is pierced by a hole of nearly the size of the gate, the lower edge of which is quite sharp, thereby diminishing but slightly the size of the gate. This is forced down with the follower until it comes in contact with the pattern. There are two followers—an upper having the gate in it, and the lower one—these two followers, when put together, constituting, in fact, the double flask. No. 12 is a section of a flask containing four molds for casting balls, &c., one over the other, though I do not confine myself to the particular number of four, which number may be varied at pleasure. No. 13 is the eccentric shaft.

My attention to this matter has been drawn by the imperfect manner in which cannon-balls, shells, and the like have been made in this country and the uncertainty of getting a good article, which have occasioned very great difficulties and caused continual complaints from the War Office. Cannon-balls were formerly made in this country in iron molds; but there were so many objections to them, and such, too, as could not be obviated, that the plan had to be given up. They were then made in what is called "green sand" in the same way as common castings are; but this plan, too, is a bad one and does not give satisfaction, as it is almost impossible to make two balls perfectly alike in every respect, especially balls of the larger sizes. In making cannon-balls in dry sand less difficulty has been experienced than in any other method that has been adopted; but even this is not without difficulties, in consequence of which the balls are not always of the same size, and are frequently found to be elongated. Taking into view all these difficulties, I set myself to work in order to make some improvements by which I might get clear of them and make cannon-balls that would give more general satisfaction to the Government than any heretofore offered. I found that what was wanted to make a round

ball was a uniformity of sand round the ball. To effect this the following is the plan I have adopted: The flask represented in the drawings being placed on the pressing-machine, the drawing of which accompanies this, or any other suitable machine, has a quantity of sand or such other material as may be used sufficient to form the mold deposited in it. The lower follower is then placed in it and forced to its place over the pattern (which is first lifted to its place) by means of the pressing-machine, the cross-bar *d* of which is drawn over the follower, as described, or any other machine that may be preferred or adopted. The one half of the mold, being thus formed, is removed from the machine, and the same process is pursued with the other half of the mold and the upper follower, except that the gate is formed, as described, in the said upper follower. When both halves are thus formed, the two flasks are placed in opposition, as shown in the drawings, Fig. 5. The flasks are then removed, leaving the follower standing, as shown in Fig. 3, (secured by the clamps,) and containing the molds; or the balls, &c., may be cast without removing the flasks, (in which case the clamps are placed outside.) This is to depend upon the pleasure or convenience of the party using them. The molds may be used either with or without drying, though they are preferable when dried. The pattern is brought up from beneath through a movable plate or collar closely fitting it, the opening in which of course depends on the size of the ball, &c., to be cast,

and placed on the machine, as shown in the drawings, thus forming a perfect hemisphere. The flask is secured to the plate by means of hooks or such other plan as may be thought most convenient. The flasks open by means of a hinge or otherwise in case it is thought necessary to remove them from the followers, and are held together by means of a clamp, latch, or any other device. In the drawings it would appear that the metal in pouring comes in contact with the iron follower. This might answer with small balls, &c.; but with the larger kinds it will be necessary to have the follower filled with sand to the top, as shown in Fig. 12.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Forming molds for casting cannon-balls and other articles by molding the sand or other material in followers having a similar form to the articles to be cast, but of greater dimensions, as herein described, by which an equal thickness of sand (or other material) can be obtained, and to insure this equal thickness, and to facilitate the operation.

2. In combination with the above-claimed method of forming molds, the employment of a sliding pattern working through a bed-plate, in the manner described.

ABIAL ELLIOT.

Witnesses:

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