W. LEWIS.

MOLDING MACHINE.

APPLICATION FILED NOV. 29, 1909.

1,066,825.

Patented July 8, 1913.

Fig. 1.

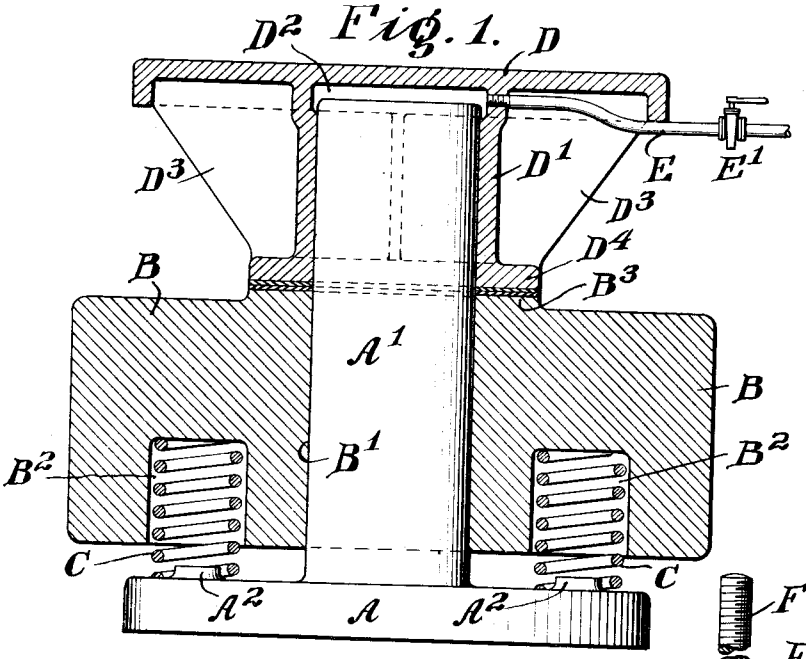


Fig. 3.

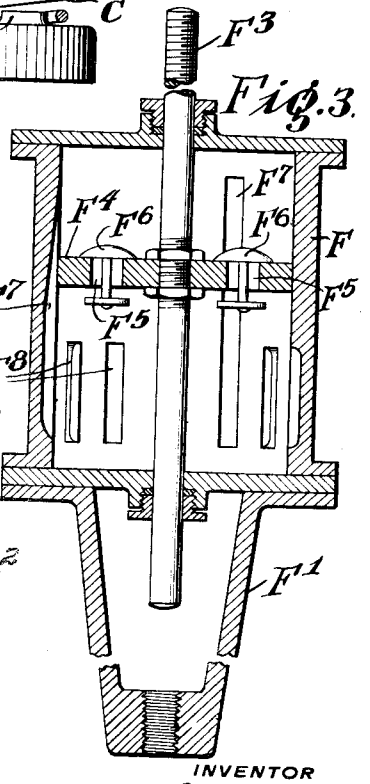
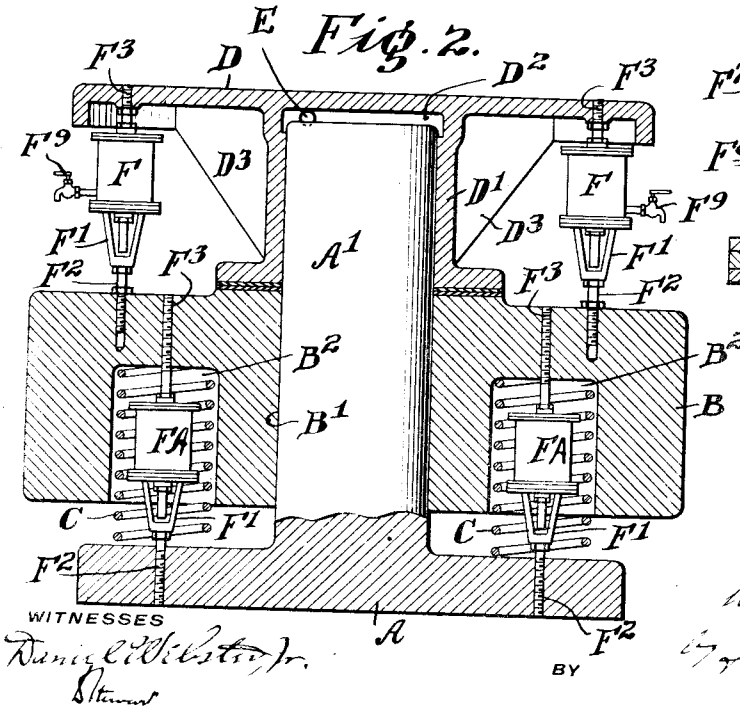


Fig. 2.



WITNESSES

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MOLDING-MACHINE.

1,066,825. Specification of Letters Patent. Patented July 8, 1913.

Application filed November 29, 1909. Serial No. 530,342.

To all whom it may concern:

Be it known that I, WILFRED LEWIS, a citizen 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 Molding-Machines, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to jar molding machines of the kind in which a mold support and an anvil movable relative to each other are employed, and the sand or other mold forming material is compacted about the pattern or patterns by alternately separating the mold support and anvil and then causing them to collide, the shock of collision settling the sand about the patterns.

The main object of the present invention is to provide a novel molding machine of the kind specified, characterized in its essentials by its simplicity of construction and arrangement, and by the provisions made for minimizing the effect on the foundation or other support for the machine proper of the shock incident to collision.

A further object of the invention is to provide the apparatus with certain devices which improve the efficiency, reliability and uniformity of operation of the apparatus.

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

Of the drawings, Figure 1 is a sectional elevation of a simple form of molding machine embodying my present invention. Fig. 2 is an elevation of a molding machine like that shown in Fig. 1, but provided with certain additional regulating devices, and Fig. 3 is a sectional elevation of one of the dash pots employed in the machine shown in Fig. 2.

Referring first to the construction shown in Fig. 1, A represents the base of the machine which is provided at its upper side with a central upstanding guide A′. Sliding on the guide A′ is a disk like anvil B provided with a central passage B′ receiving the guide A′, and formed on its under side with a plurality of pockets B^2 receiving the upper ends of springs C which carry the weight of the anvil B. The lower ends of the springs C bear against the upper side of the body of the base A. Above the anvil B is located the mold support D provided with the usual table at its upper end and with a hollow cylinder portion D′ which surrounds the upper end of the post A′, the latter working as a trunk piston in the space D^2 in the cylinder portion D′. The table portion of the mold support and the cylinder D′ may be connected by the usual stiffening ribs D^3 and the lower end of the cylinder may be enlarged as indicated at D^4 to form a striking portion which engages the striking face B^3 of the anvil.

The mold support is lifted above the anvil and then allowed to drop back into collision with the anvil in any suitable manner, as by means of a pressure fluid, such as compressed air, which may be admitted to and exhausted from the space D^2 above the upper end of the post A′ through the flexible supply pipe E and a suitable valve E′. The latter may be of any suitable type and operated manually or automatically in a known manner. The springs C are stiff enough to normally support the anvil, mold support and its load, flask, patterns and mold forming material, in about the position shown in Fig. 1. When fluid under pressure, as compressed air, is admitted to the space D^2, the mold support and its load is lifted the desired distance and the mold support and its load is then allowed to drop by permitting the pressure fluid to exhaust. When the mold support strikes the anvil the momentum of the mold support and its load is destroyed by the anvil without the direct transmission of shock to the base A or the support for the latter. It is of course true that the anvil will be forced down by the impact with the mold support from the position occupied by it at the instant collision begins, and this results in putting the springs C under an increasing tension until they in turn check the downward movement of the anvil given to it by the collision.

It is also true with the apparatus shown in Fig. 1, that when the mold support is lifted preparatory to collision that the anvil will also move upward to some extent with a consequent decrease in the tension of the springs C. In consequence of these characteristics, the pressure on the base A of the springs C will vary between a minimum at the instant at which collision begins, and a maximum at the instant at which the anvil is thereafter moved into its position of closest proximity to the body of the base A, but the changes in tension of the springs thus produced are gradual, and the maximum tension of the springs will be in practice only a small fraction of the pressure which the mold support would exert against the base during collision if the base and anvil were rigidly connected together. In consequence none of the shock of collision, properly speaking, is transmitted to the base A, and by it to the foundation, although, as I have pointed out, there will be a variation, so to speak, in the static pressure or effective weight imposed on the foundation.

It will be observed that the mechanism disclosed is characterized by its extreme simplicity in construction and arrangement. Moreover, the structure, as a whole, is self-contained and, in operation, the base remains quiescent on and in fixed relation to the foundation.

In order to check the upward movement of the anvil relative to the base when the mold support is lifted off the anvil, the anvil and base may be connected together in such manner as to check the rising movement of the anvil while permitting the anvil all desirable freedom of movement toward the base after impact. One arrangement for thus checking the upward movement of the anvil is illustrated in Figs. 2 and 3, where a plurality of dash pots F each have their casing members connected to the base and their piston members connected to the anvil. In the construction specifically illustrated, a yoke F′ is connected to the lower end of the casing of each dash pot. The yoke is connected to the anvil by a bolt F^2. The upper end F^3 of the piston rod is threaded to permit it to be adjustably secured to the anvil. The piston F^4 is provided with through ports F^5 controlled by check valves F^6 which open on the downward movement of the piston in the casing and close on the upward movement. One or more elongated grooves F^7 are provided in the inner wall of the casing extending nearly the length of the latter. These grooves decrease in cross-section from about the middle of the casing toward the upper end. A plurality of other vertically elongated ports F^8 may be formed in the lower end of the piston chamber. The chamber is preferably filled with some liquid such as oil, F^9 indicating a valved filling connection.

The operation of the dash pots will be readily understood. The rising movement of the anvil as it approaches the upward limit of its movement will be retarded and finally checked by the cushion formed by fluid trapped in the upper end of the piston chamber while the downward movement of the piston may take place freely owing to the provision of the ports F^5. Moreover, the ports F^7 and F^8 permit the anvil to have substantial freedom of movement in either direction in the lower portion of its range of movement.

The provision of the dash pot connections between the anvil and base as described, while not essential to the use of the apparatus described in Fig. 1, possesses certain advantages. The elevation of the anvil, which occurs when the mold support is raised preparatory to collision, decreases the effectiveness of collision to some extent, and the use of the dash pot connections by restricting this movement economizes the power required for the operation of the machine. Moreover, the dash pots, by retarding the upward movement of the anvil, maintain the springs under a higher minimum tension than would otherwise be the case, and thus permit of a more uniform length of effective stroke of the mold support with varying loads, and in consequence reduces the clearance space in the cylinder space D^2, necessary to avoid liability of injury to the mold support by its direct engagement with the upper end of the piston guide A′.

Dash pots FA, similar to the dash pots F, may also be connected between the mold support and the anvil, as shown in Fig. 2, for the purpose of limiting the movement of the mold support away from the anvil, thus avoiding all liability of blowing the mold support off the guide post A′. This permits of the use of a simpler valve controlling the admission of air to the cylinder space D^2 than would otherwise be possible. No claim is made herein however to the use of dash pot connections to the mold support except in connection with the features of construction peculiar to the molding machine described herein as such connections to the mold support of a machine of this general type were invented by Frederick W. Taylor, and are described and claimed in his application Ser. No. 530,289 filed November 29 1909.

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

1. In a jar molding machine, a base member provided with a piston guide, a vertically movable anvil mounted on said guide, means providing a resilient cushion between

the base member and anvil supporting the latter, and a mold support having a cylinder working on the upper end of said guide.

2. In a jar molding machine, a base, an anvil vertically movable relative thereto, means providing a resilient cushion between the base and the anvil supporting the latter, a mold support, and means independent of the anvil for lifting said mold support above said anvil and allowing it to drop back into engagement therewith.

3. In a jar molding machine, a base, an anvil vertically movable relative thereto, means providing a resilient cushion between the base and anvil supporting the latter, a mold support, and means for exerting a thrust between the base and the mold support to lift the mold support above the anvil.

4. In a jar molding machine, a base, an anvil vertically movable relative to the base, means providing a resilient cushion through which the anvil is supported by the base, a mold support above the anvil and movable vertically relatively to the anvil and to the base, and means for causing a force, the reaction of which is taken directly by the base to be exerted against the mold support to move it vertically upward and away from the anvil so that when the force is removed collision between the mold support and anvil will occur.

5. In a jar molding machine, a base member provided with an upstanding guide, an anvil mounted on and vertically movable along said guide, means providing a resilient cushion between the base and anvil through which the anvil is supported by the base, a mold support provided with a hollow cylinder working on the upper end of said guide, and means controlling the admission to and exhaust from the space in said cylinder above said guide of fluid under pressure.

6. In a jar molding machine, a base member provided with an upstanding guide, an anvil mounted on and vertically movable along said guide, means providing a resilient cushion between the base and anvil through which the anvil is supported by the base, a mold support provided with a hollow cylinder working on the upper end of said guide, means controlling the admission to and exhaust from the space in said cylinder above said guide of fluid under pressure and means for cushioning the upward movement of the mold support.

7. In a jar molding machine, a base member provided with an upstanding guide, an anvil mounted on and vertically movable along said guide, means providing a resilient cushion between the base and anvil through which the anvil is supported by the base, a mold support provided with a hollow cylinder working on the upper end of said guide, means controlling the admission to and exhaust from the space in said cylinder above said guide of fluid under pressure, and connections between the anvil and the base for limiting the upward movement of the anvil.

8. In a jar molding machine, a base member provided with an upstanding guide, an anvil mounted on and vertically movable along said guide, means providing a resilient cushion between the base and anvil through which the anvil is supported by the base, a mold support provided with a hollow cylinder working on the upper end of said guide, means controlling the admission to and exhaust from the space in said cylinder above said guide of fluid under pressure, means for cushioning the upward movement of the mold support, and connections between the anvil and the base for limiting the upward movement of the anvil.

9. In a jar molding machine, a base member provided with an upstanding guide, an anvil mounted on and vertically movable along said guide, means providing a resilient cushion between the base and anvil through which the anvil is supported by the base, a mold support provided with a hollow cylinder working on the upper end of said guide, means controlling the admission to and exhaust from the space in said cylinder above the guide of fluid under pressure, and means for cushioning the upward movement of the anvil.

10. In a jar molding machine, a vertically movable anvil, a resilient supporting cushion therefor, a mold support, provisions for lifting said mold support above said anvil and allowing it to fall and collide with said anvil and yielding means for cushioning the upward movement of said anvil.

11. In a jar molding machine, a base member, a vertically movable anvil, springs interposed between said base member and said anvil and supporting the weight of the latter, devices connecting said anvil and base member for cushioning the upward movement of said anvil, and provisions for lifting said mold support above said anvil and allowing it to fall and collide with said anvil.

12. In a jar molding machine, a base member, springs supported thereon, a vertically movable anvil resting on said springs, cushioning connections between said base member and anvil for restricting the upward movement of the anvil, means for adjusting said connections, a mold support adapted to rest upon said anvil and means for lifting said mold support above said anvil and allowing it to fall back and collide with said anvil.

13. In a jar molding machine, a base member, a vertically movable anvil, vertical helical springs resting on said base member and

supporting said anvil, a mold support adapted to rest upon and be supported by said anvil, provisions for lifting said mold support upward from said anvil and allowing it to fall back and collide with said anvil, and means for restricting the upward movement of said anvil, comprising rods axially disposed in said springs and connected at their lower ends to said base member, and cushioning devices connected to said rods and engaging said anvil.

14. In a jar molding machine a stationary member, a mold support, and an anvil, said mold support and anvil being vertically movable relative to said stationary member into and out of engagement with each other and each directly engaging with and being guided by said stationary member in its vertical movements.

WILFRED LEWIS.

Witnesses:
ARNOLD KATZ,
D. STEWART.