

No. 776,036.

PATENTED NOV. 29, 1904.

W. R. SWIFT.
VIBRATOR FOR MOLDING APPARATUS.

APPLICATION FILED OCT. 14, 1903.

NO MODEL.

Fig. 1.

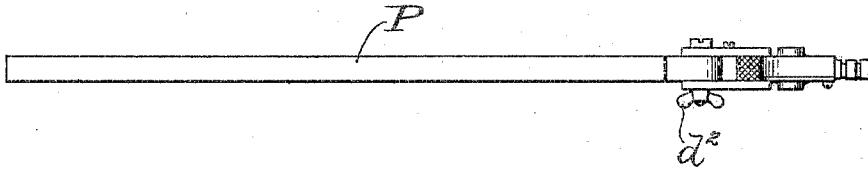


Fig. 2.

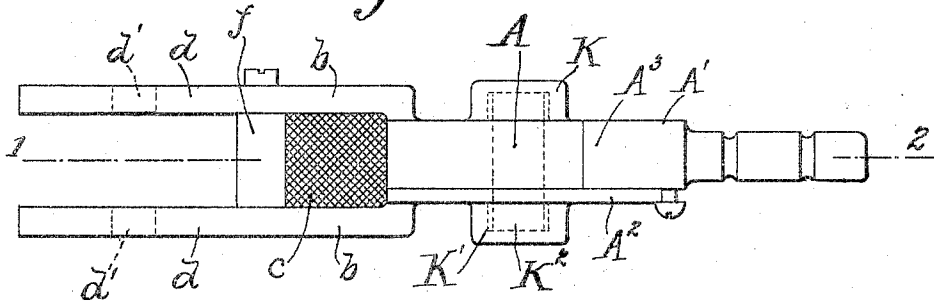
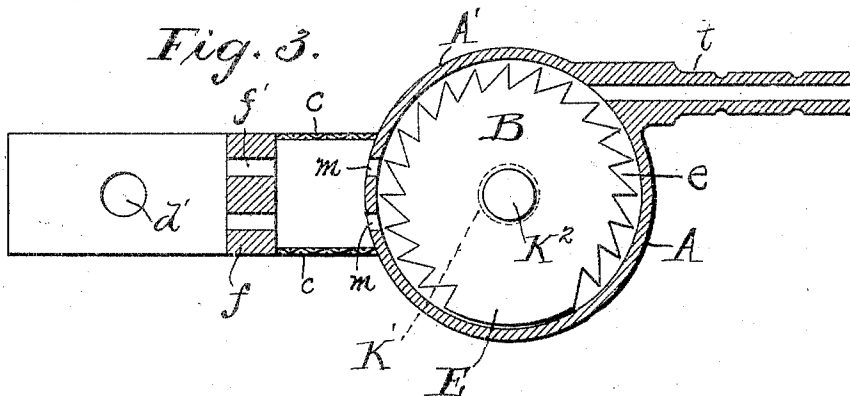


Fig. 3.



WITNESSES:

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WILLIAM R. SWIFT, OF PHILADELPHIA, PENNSYLVANIA.

VIBRATOR FOR MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 776,036, dated November 29, 1904.

Application filed October 14, 1903. Serial No. 176,933. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. SWIFT, a citizen of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Vibrators for Molding Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to that type of molding apparatus wherein the pattern-board, flask, or supporting-trough is vibrated to detach the pattern from the sand or mold-cavity without injuriously disturbing the integrity of the latter, and it relates particularly to the construction of the vibrating device so employed and in its combination and arrangement with the molding apparatus.

The purpose and object of my invention is to provide a fluid-operated vibrator of simple construction wherein the desired vibration is produced by an irregular movement in the rotation of a rotary piston rather than by a hammering effect, as now commonly effected.

My invention further comprises a device of such character that it may be put into and out of action at any point in the rotary movement of the piston and wherein the exhaust is discharged into and through a muffling-chamber.

Another object of my device is the provision of means whereby it may be readily attached either directly or indirectly to the flask or to a vibrating frame between the drag and the cope of the mold.

To these ends my invention consists of the vibrator constructed as hereinafter described and in the combination and arrangement thereof with the molding apparatus.

In the drawings illustrating my invention, Figure 1 is an edge elevation of a mold-pattern board with a diagrammatic view of my vibrator attached thereto. Fig. 2 is a plan view of the vibrator and its adjunctive parts; Fig. 3, a vertical longitudinal section thereof on the line 1 2 of Fig. 2.

The fundamental constructive principle of my device in the respect of the vibration resulting from it and imparted thereby directly or indirectly to the mold-pattern or sand matrix is primarily the provision of means op-

erating to effect an irregular movement in the rotation of a rotary-engine piston, and I have shown this principle exemplified by the application of a counterbalance-weight to a rotary piston. Such weights are commonly used on fly-wheels connected with driving-shafts to give a momentum sufficient to overcome the dead-center; but the absence of the restraining influence of the shaft connection would give to such counterbalanced wheel a jarring effect instead of balanced momentum. I apply that principle to jar or vibrate the rotary piston and through it the containing-cylinder and connected parts.

Secondarily, my invention comprises a rotary engine having a cylinder provided with a pair of oppositely-disposed projecting lugs whereby it is attached to the molding apparatus, said lugs being formed directly on and constituting practically an extension of the engine-cylinder, the effect of which in simplifying the construction and in the transmission of the vibration are decidedly advantageous.

My invention also comprises making the shaft hole or bearing in the cylinder sides for the piston-shaft of an inclosed rotary piston slightly larger in circumference than that of the piston-shaft, whereby the steadying effect on the piston of a close-fitting bearing for its shaft will be prevented, and the jarring or vibrating resulting from an unrestrained counterbalanced rotary piston will be allowed to have its full effect on the piston-cylinder and connected parts.

Finally, my invention further comprises means to effect a division of the exhaust-steam or compressed air, whereby a muffling effect results and the usual noise and other disturbing effects on the apparatus and operator are avoided.

Referring to Figs. 1 and 2, A represents a piston-cylinder for use with a rotary piston B. As shown in the drawings, it is constructed of two circular plates A' and A², forming the cylinder-heads. The former has a deep flange A³, which when the plates are assembled forms the peripheral body of the cylinder. Extending in one direction from the flange of the cylinder-plate A' is a tube-like extension t, with passage-way leading to the interior of

the cylinder and constituting the inlet for the motive fluid. Extending in the opposite direction on the cylinder-plates $A' A^2$ are two arms $b b$, forming two sides of an exhaust-chamber, the two other sides thereof, $c c$, being covered with gauze-wire, through which the exhaust is discharged. Exhaust-passages $m m$ in the periphery A^3 of the engine-cylinder lead therefrom into the exhaust-chamber.

These side arms $b b$ are further extended, as at $d d$, with an intermediate plate f to separate them from the exhaust-chamber, and they form opposite sides of a connecting-lug provided with suitable screw-holes d' or other usual fastening means whereby to attach the vibrator to the molding apparatus. Additional or substitute exhaust-ports f' may be provided in the plate f . The vibrator may be made very small comparatively to the power exerted, as is obvious. It may be detachably secured by the lugs $d d$ through screw-holes d' , Figs. 2 and 3, directly to the pattern-board P by thumb-screw d^2 , as shown in Fig. 1, or to the drag of the flask, or indeed to the sand-trough by providing thereon a projecting bracket-lug R . The piston B is provided with a segment of its periphery weighted, as at E . The piston may be a plain disk with any suitable form of peripheral grooves e usual in a rotary piston to adapt it to receive the impact of inlet motive fluid and with suitable passages in the cylinder to discharge the same. The power may be increased, however, by making the piston periphery in any well-known way to give increased impact surface for the inlet motive fluid. Trunnions K are provided on the outside of the plates $A' A^2$, forming the cylinder-heads. These trunnions are bored, as at K' , to receive the shaft K^2 of the piston. Obviously when the piston-shaft hole K' is made larger in circumference than the piston-shaft, as indicated by the relation of the dotted lines $K' K^2$, the usual steadying effect of a true-fitting bearing for a rotating piston-shaft will not be present, and the vibrations caused by the weighted piston B will have unrestrained as well as increased effect.

The advantages of the device will be plain from this description to those skilled in the art. The provision of a piston out of balance, thereby causing rapid and forceful vibratory movements, will impart this vibration directly to the engine-cylinder and its connecting elements, which are directly secured to the molding apparatus. Other advantages are that the operation of the device may be stopped and started instantly and will be under perfect control, that it is simple in construction and not liable to frequent disarrangement, of very small first cost, and of ready adjustable connection and disconnection to and from any part of the molding apparatus which when

jarred will transmit the jar or vibration to the sand pattern.

It is manifest that many changes may be made in the described details of construction without departing from the constructive principle of my invention, and I do not limit myself to the precise form, size, and disposition of parts shown.

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

1. A vibrator for molding apparatus comprising as elements a rotary engine upon the cylinder of which is formed a pair of projecting parallel lugs, and journal-bearings formed upon the cylinder-heads, a rotary piston with its shaft mounted in said bearings, and a weight applied to a segment of the rotary piston, operating to effect a vibrating rotary movement thereof; substantially as described.

2. A vibrator for molding apparatus, comprising as elements, a rotary-engine cylinder, having journal-bearings in the heads thereof and external connecting-lugs formed thereon whereby the cylinder is adapted to be directly attached to the molding apparatus, a rotary piston, with means to cause it to vibrate in its rotary movement, and a shaft for the piston which is smaller in diameter than the journal-bearings therefor in the cylinder-head.

3. A vibrator for molding apparatus, comprising in combination a rotary engine, the cylinder of which is provided with projecting parallel lugs, a partition-plate between said lugs intermediate of their length, and oppositely-disposed perforated plates; said elements forming a muffled chamber with which the exhaust-port of the engine directly communicates; means to operatively connect the extreme ends of said projecting lugs to the molding apparatus; and a rotary piston within the engine-cylinder, with means to cause it to vibrate in its rotary movement.

4. A vibrator for molding apparatus, comprising a rotary engine, the cylinder of which is composed of two oppositely-disposed cylinder-heads, one of which is provided with a deep flange forming the periphery of the cylinder when the parts are assembled, said flange having inlet and exhaust passages therein and both said cylinder-heads having laterally-extending lugs formed thereon; a rotary piston a segment of which is weighted, and trunnions on said cylinder-heads bored to provide journal-bearings for the piston-shaft.

In testimony whereof I have hereunto affixed my signature this 26th day of September, A. D. 1903.

WILLIAM R. SWIFT.

Witnesses:

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