

P. KREGER.
MOLDING APPARATUS.
APPLICATION FILED AUG. 9, 1905.

906,240.

Patented Dec. 8, 1908.

Fig. 1

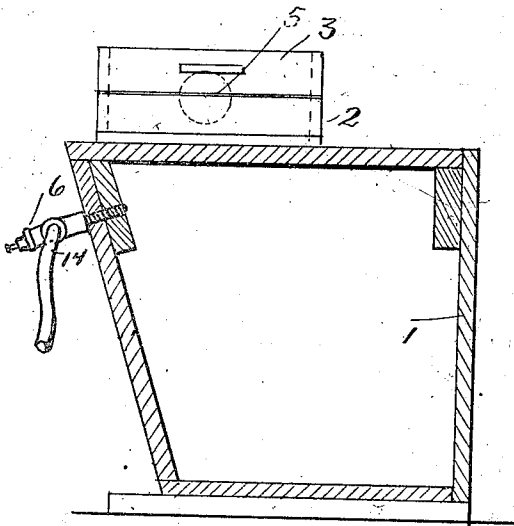


Fig. 2

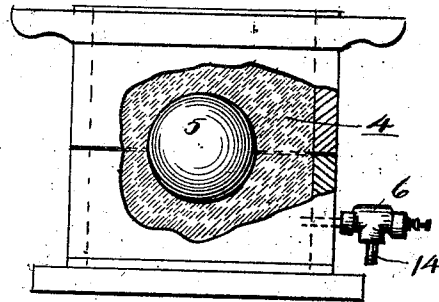
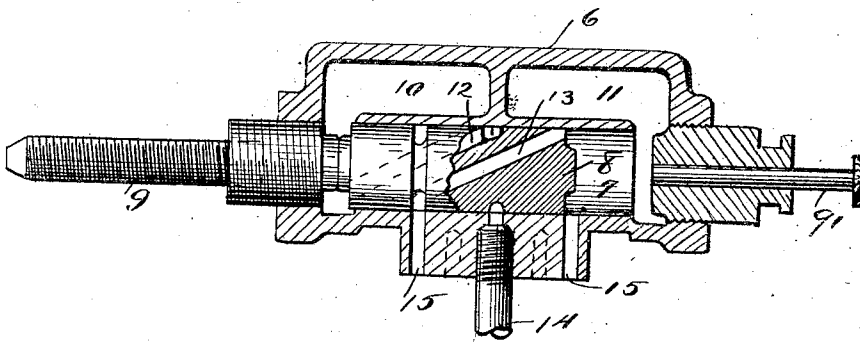


Fig. 3.



Witnesses

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UNITED STATES PATENT OFFICE.

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MOLDING APPARATUS.

No. 906,240.

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Original application filed August 5, 1903, Serial No. 168,313. Divided and this application filed August 9, 1905.
Serial No. 273,444.

To all whom it may concern:

Be it known that I, FRANK KREGER, a citizen of the United States, and resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Molding Apparatus, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention has for its objects to provide an automatic device to give a quick vibratory movement to the mold in the foundry in order to facilitate lifting the cope or upper portion of the mold from the pattern, and to confine the vibration to the drag and lower portion of the mold after the cope begins to lift, thus jarring loose the pattern from the mold in the drag and preventing it from clinging to and tearing or breaking up the surface of the mold as the pattern is withdrawn therefrom.

I am aware that heretofore a vibratory device has been employed, attached to a four sided frame with a metal bottom to which the pattern is secured. In that device the pattern is vibrated by direct contact with the metal surface. This invention however, is of a different character designed to provide improved and more efficient results owing to the "inertia" of the metal pattern inclosed within the body of sand comprising the mold and the natural settling and hardening of the sand about the pattern thus produced, which has a less tendency to shake loose and to destroy the perfect surface of the mold, than if there were any direct connection between the pattern and wall or bottom of the mold.

I accomplish these objects by means of the hereinafter described apparatus, which is exemplified in the accompanying drawings and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a transverse section of a molder's bench showing a cope and drag thereon, and a vibratory device secured to the bench, whereby the vibration imparted thereby will be communicated to the pattern, embedded in the sand of the mold. Fig. 2 is an end elevation of cope and drag, showing the vibratory device attached directly to the drag, and a portion of the figure is sectioned to show more clearly the pattern which is embedded in the sand of the mold. Fig. 3 is a longitudinal section of a vibrating or vibration causing device such

as may be employed to obtain the desired effect, and such as is more fully described in my application for Letters Patent filed August 5, 1903, bearing Ser. No. 168,313, of which application this application is a division.

In these views 1, is the molder's bench, 2 the drag, 3 the cope, 4 the sand filling the mold box. It will be seen that the pattern 5 is embedded in the sand without any attachment whatever to the sides or bottom of the drag and that any vibration communicated to it must be through the sand. On account of the weight of the pattern however, and its inherent inertia it will remain comparatively quiet in the mass about it and any movement will merely tend to settle it in the sand and compact the sand more completely about it, so as to loosen it but not disarrange the mold surface.

6 is the vibrator which in Fig. 3 is shown to comprise an inclosed pneumatic chamber, and an automatically driven plunger weight 8 therein, by means of which a shock and vibration is imparted to the drag. A screw 9 at one end of the vibrator serves as means for attaching the vibrator to the bench or drag. And a pin 9' at the other end of the vibrator is struck by hand to move the weighted plunger when starting the device into motion. Above the cylinder are shown separate chambers 10 and 11 for compression, and release, and the plunger is provided with circulating passages 12 and 13 which connect these chambers alternately with the inlet passage 14, or outlet passage 15, as the plunger reciprocates in the cylinder striking its heads alternately.

The operation of the device may be described as follows. Supposing the plunger to be located in the left extremity of the cylinder, and the air pressure to be turned on the chamber at the left of the cylinder is then open to admission and becomes instantly filled with air under nearly as great compression as it was when it entered the plunger. The compressed air in this chamber serves to move the plunger to the right by pressure on the left end thereof, since there is no pressure upon the right end as the right chamber is open to the discharge at the left outlet and through one of the circulating passages connecting therewith. As soon as the plunger moves sufficiently to cut off the inlet (only the width of the passage), the pressure in

the circulating passage in the piston ceases, but the compressed air stored in the left chamber has sufficient power by expansion to force the plunger to the right end of the cylinder, when the exhaust passage at the right of the cylinder will communicate with the left circulating passage of the plunger and the remaining compressed air in the chamber at the left of the plunger will be discharged at once. Also the left outlet is uncovered by the plunger and assists in discharging. The outlet passage from the chamber at the right is closed as soon as the plunger has moved to the right the width of the passage and has compressed the air ahead of the plunger during the remainder of its travel which makes a slight resistance.

It is obvious that one of the outlet passages can be dispensed with since one will serve the purpose. The end of the plunger will uncover it to discharge the chamber at one end of the stroke and the groove in the plunger will register with it at the other end of the stroke and discharge the other chamber. The utility of the large chamber at each end of the cylinder is therefore apparent since without a greater volume of air than that in the cylinder the compression at the termination of the plunger stroke would be so great that the plunger would stop before reaching the end of its stroke in the cylinder. As the plunger completes its stroke to the right and strikes the right cylinder head the circulating passage at the left of the center of the plunger will register with the admission passage in the plunger and will supply compressed air at once to the chamber at the right extremity of the cylinder, while the chamber at the left is discharged, thus removing all excessive pressure from the left end of the plunger that was in store for moving it to the right. The pressure within the chamber at the right of the plunger then will drive the plunger to the left, finally opening the discharge through the lower passage as at the point of starting. This automatic action will con-

tinue and be repeated indefinitely as long as the pressure continues. Should the plunger stop at its central position so that neither of the passages in the plunger will register with the admission passage when the passage is cut off, it can be started again when the pressure is turned on by moving the plunger by hand until the starting position is regained.

It is apparent that the chambers at the right and left extremities of the cylinder are a very essential feature of the device, since they contain a comparatively large volume of air and while one is filled with compressed air and delivers it under pressure to the plunger to drive it during the central part of its stroke the other receives the air from ahead of the plunger and from its large capacity absorbs the pressure thereof from the cylinder so that it will not be of sufficient density to stop the movement of the plunger.

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

1. The combination with a molding flask comprising a drag and a cope, of a pattern therein, and a vibrating device secured to the drag whereby the drag is given a vibratory motion at the time of removing the cope, substantially as and in the manner set forth.

2. The combination with a molding flask comprising a drag and cope, of a pattern therein, not engaging with any portion of the surface of said flask, both cope and drag of the flask being filled with sand in which the pattern is embedded and a vibrating device secured to the drag whereby the drag is given a vibratory motion at the time of the removing of the cope to free by means of inertia the pattern from the sand in both cope and drag.

In testimony whereof I hereunto set my hand this 31st day of July 1905.

FRANK KREGER.

Witnesses:

WM. M. MONROE,
C. H. OLDS.