

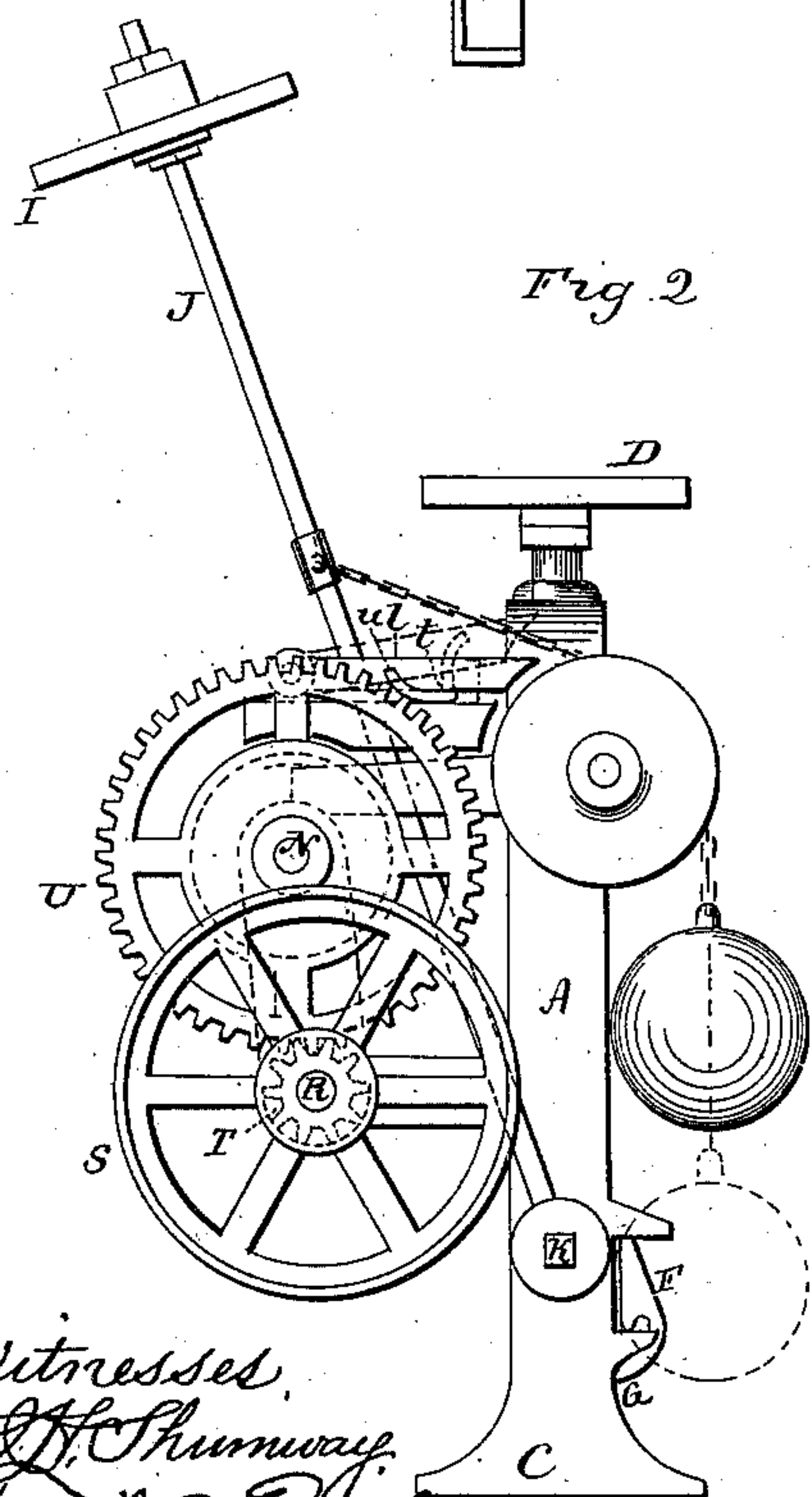
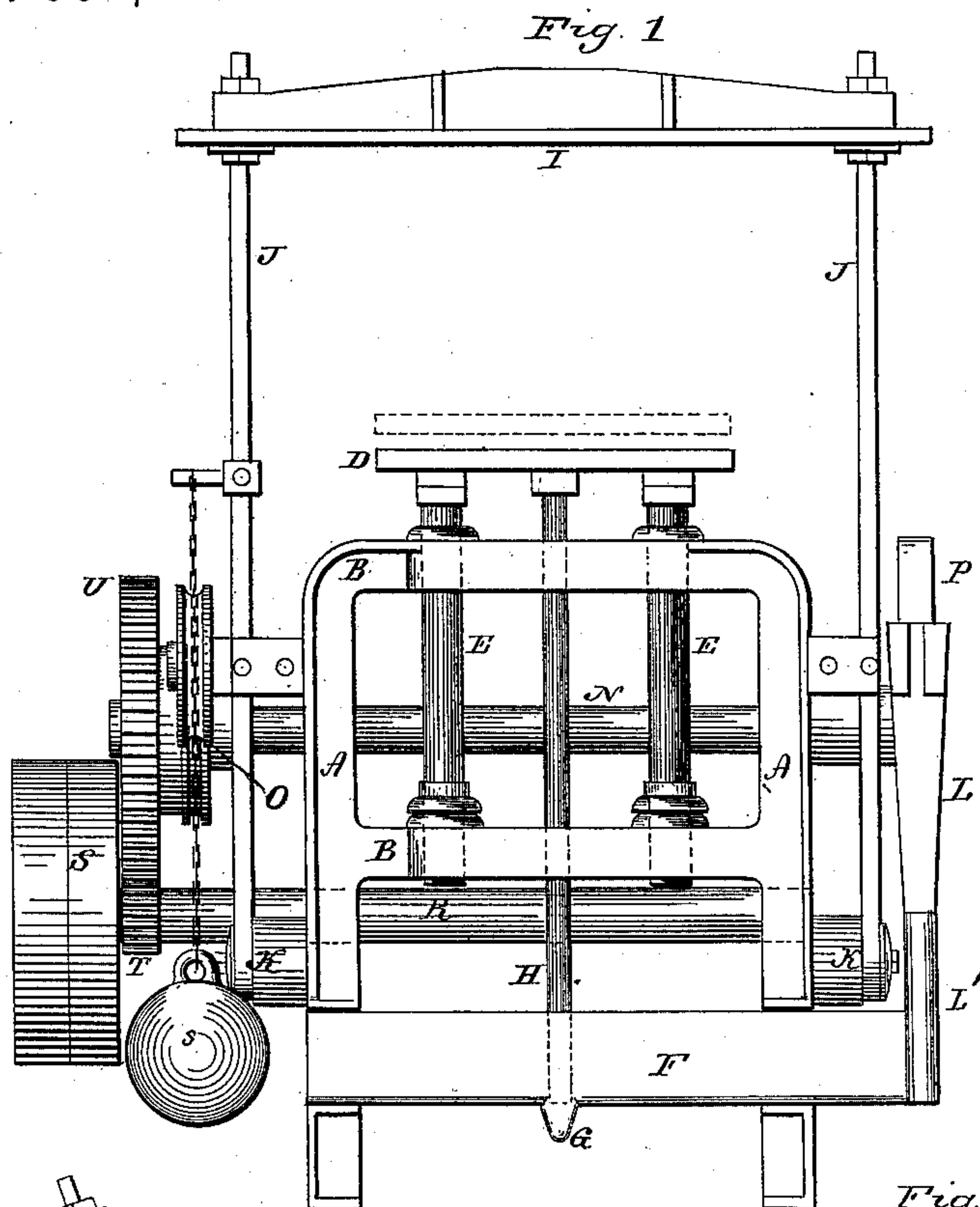
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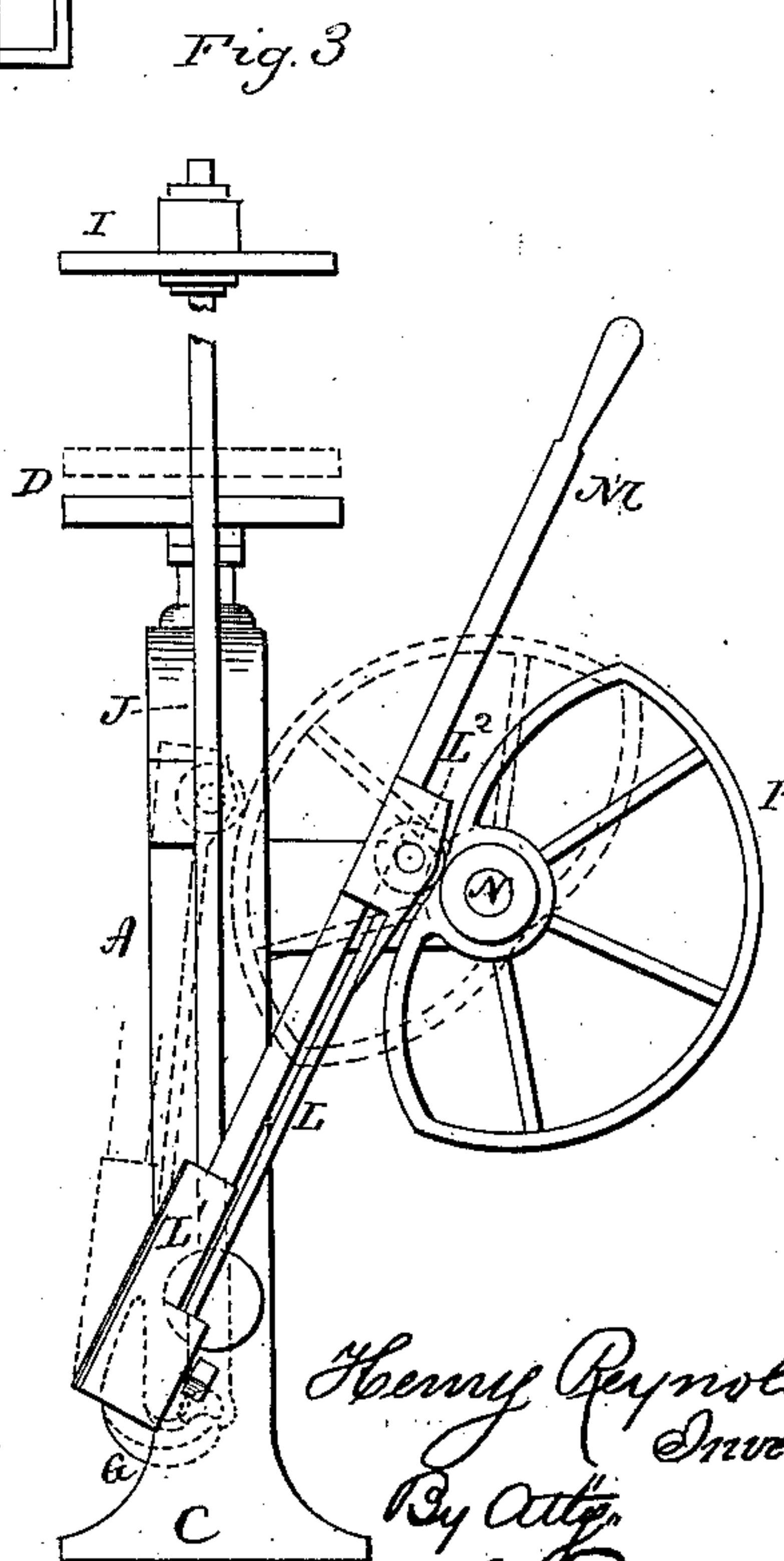
H. REYNOLDS.  
MOLDING MACHINE.

No. 358,220.

Patented Feb. 22, 1887.



Witnesses,  
*H. Shumway*  
*Fred C. Earle*



*Henry Reynolds*  
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By *atlg.*  
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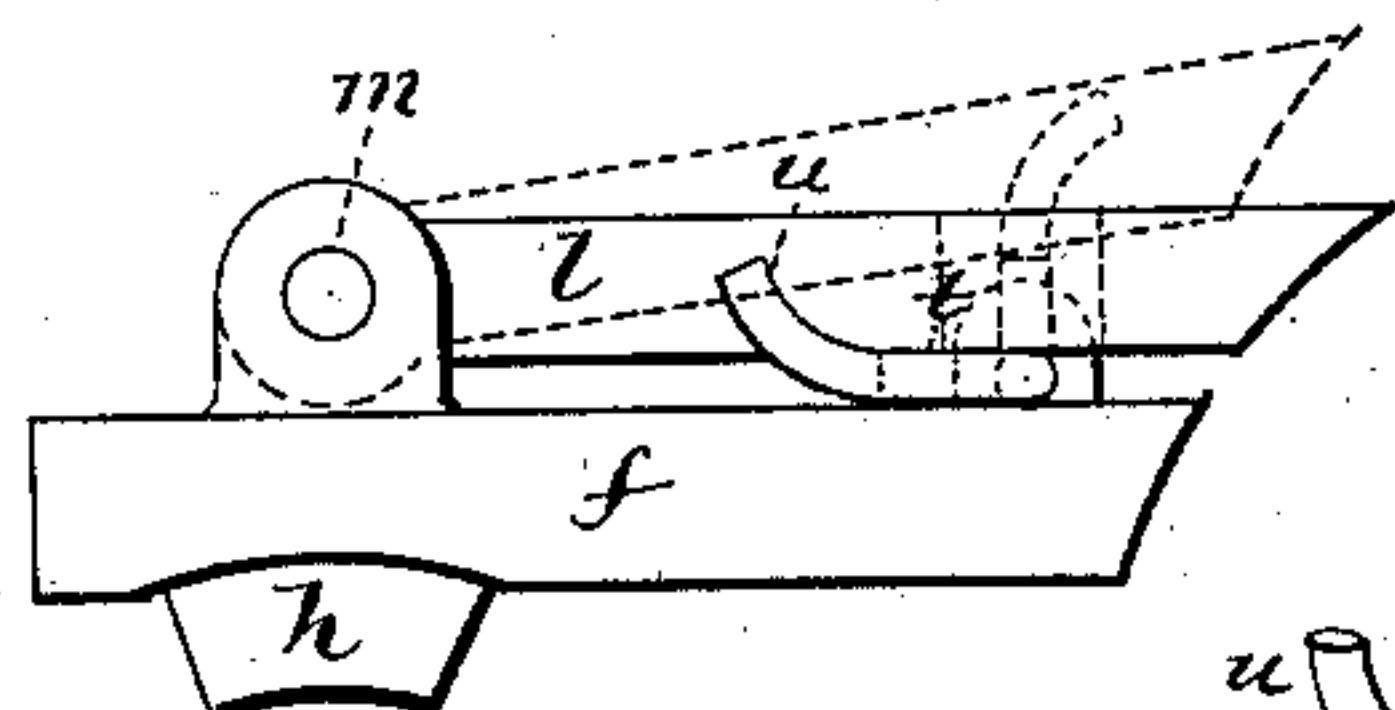
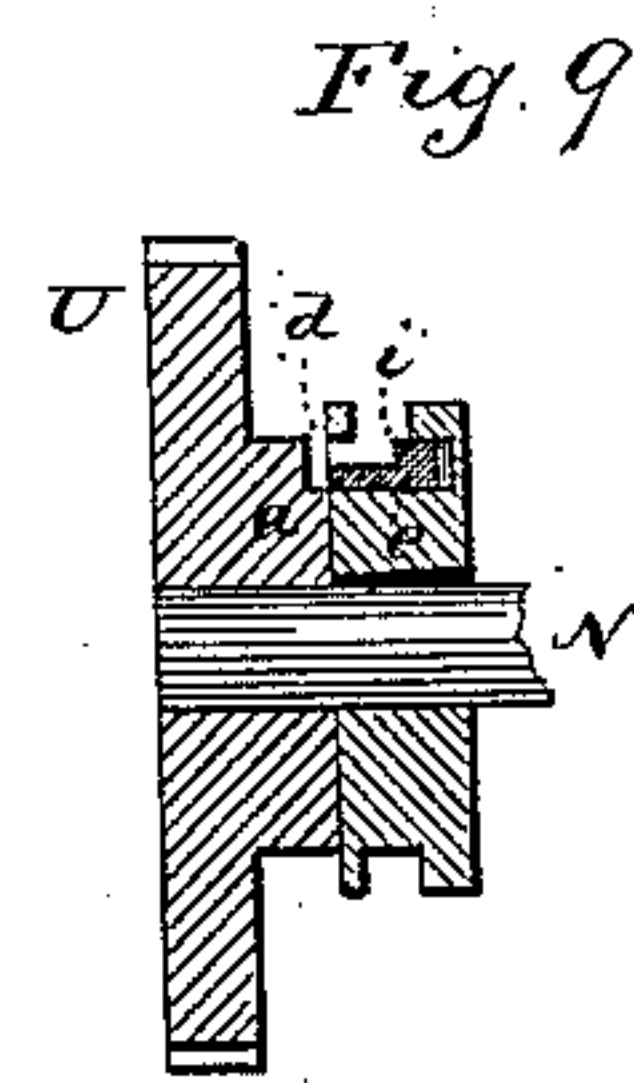
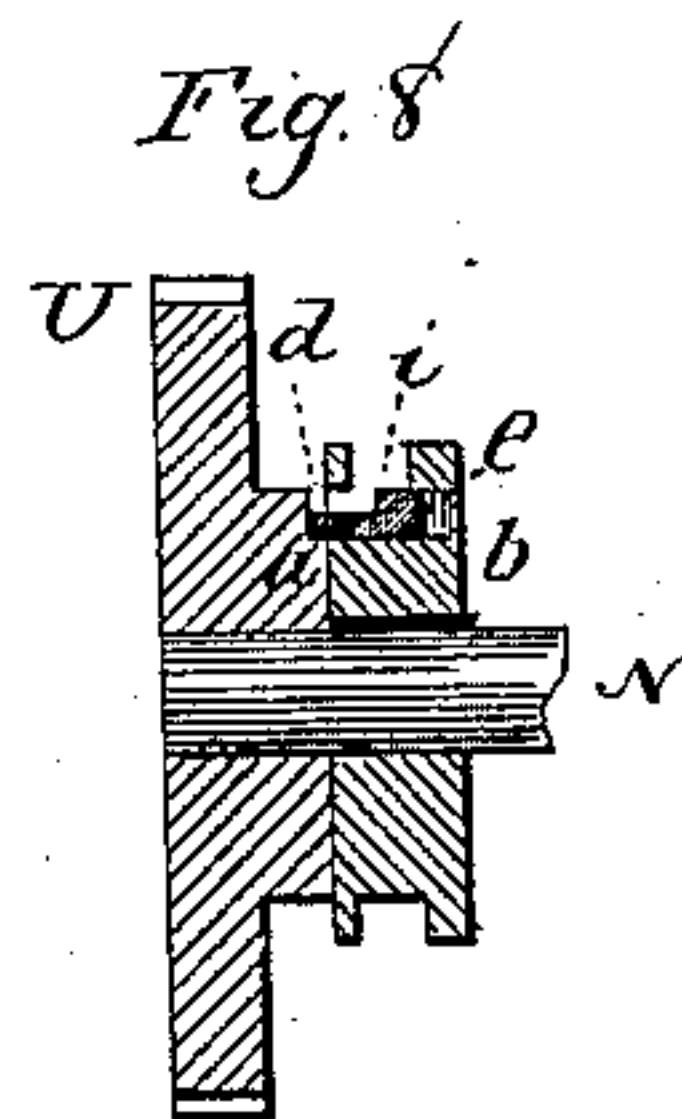
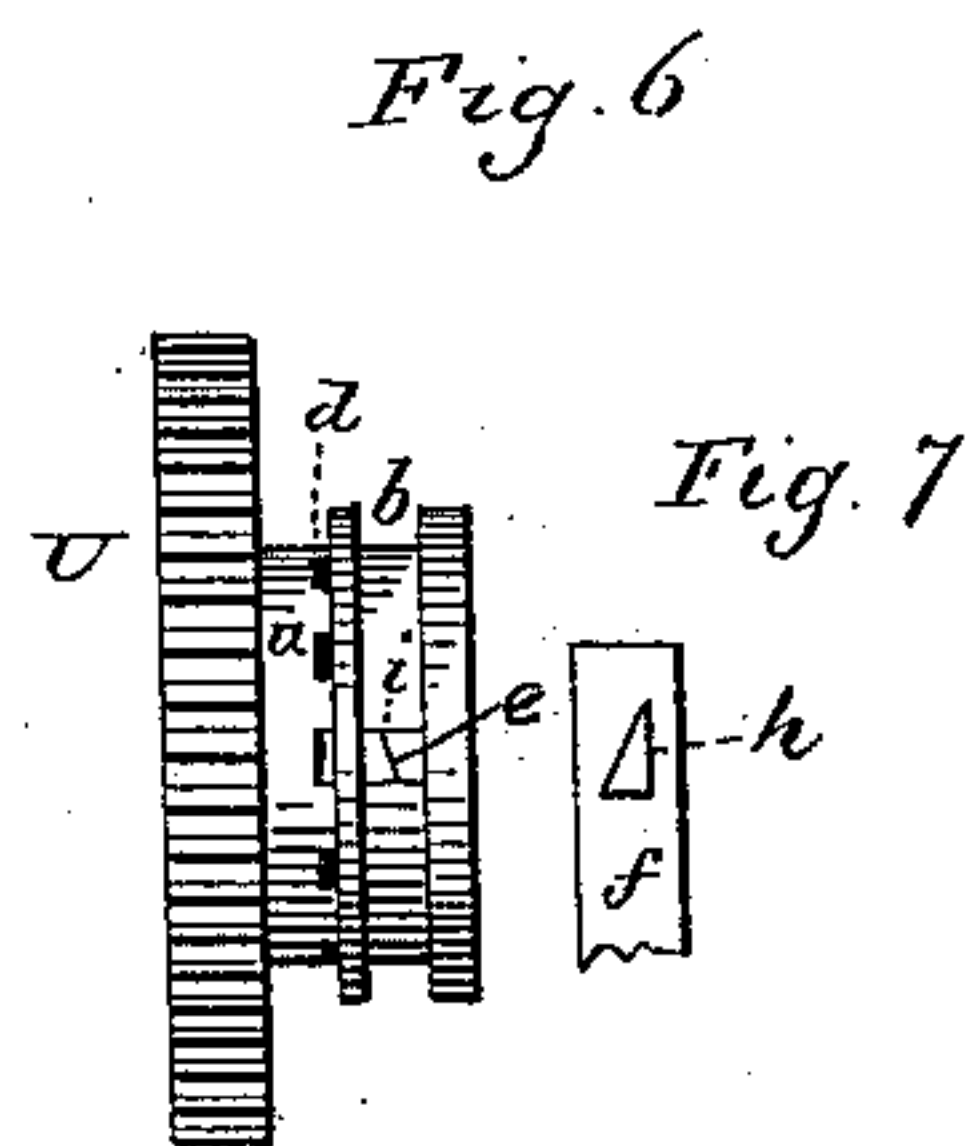
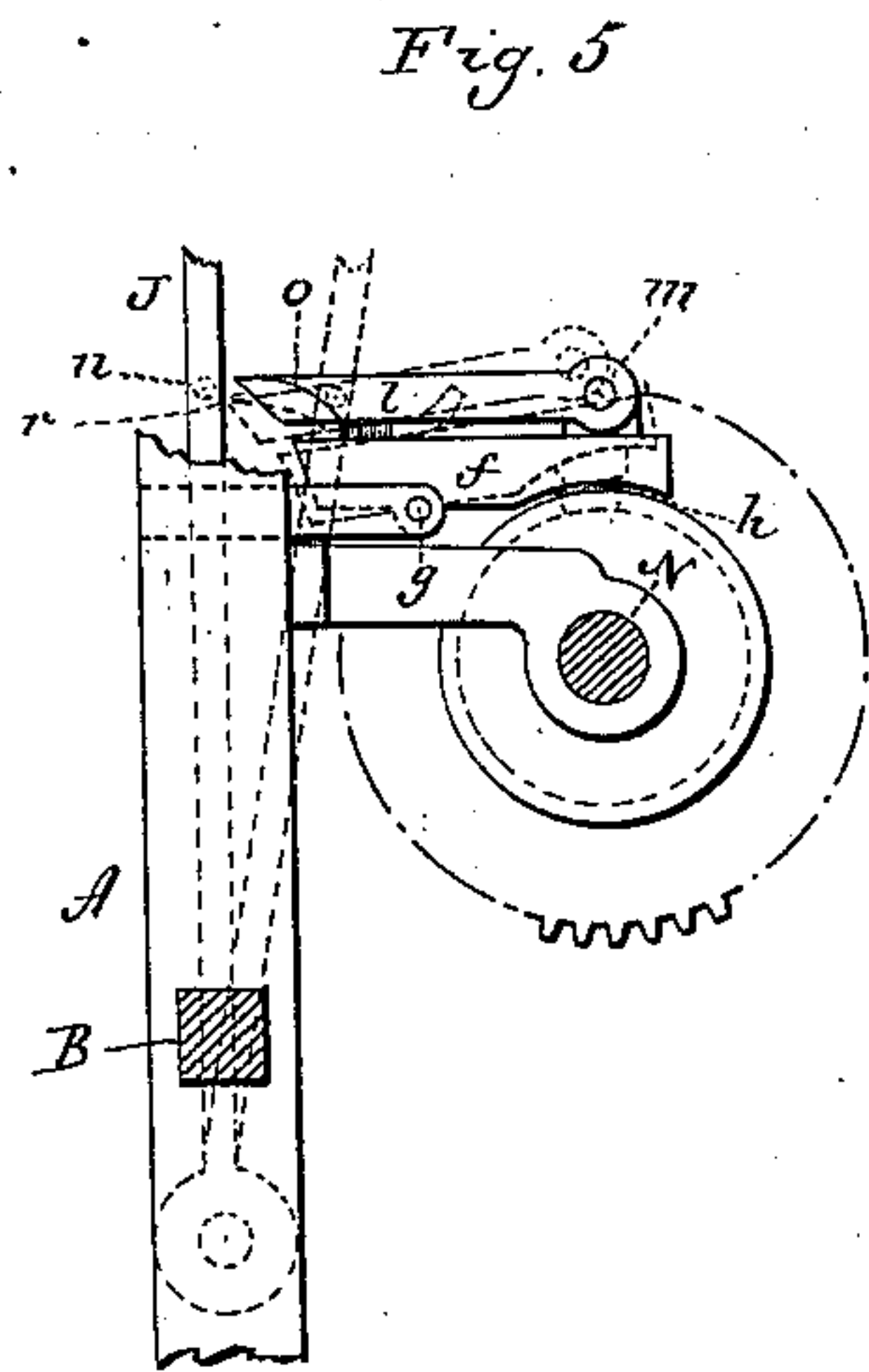
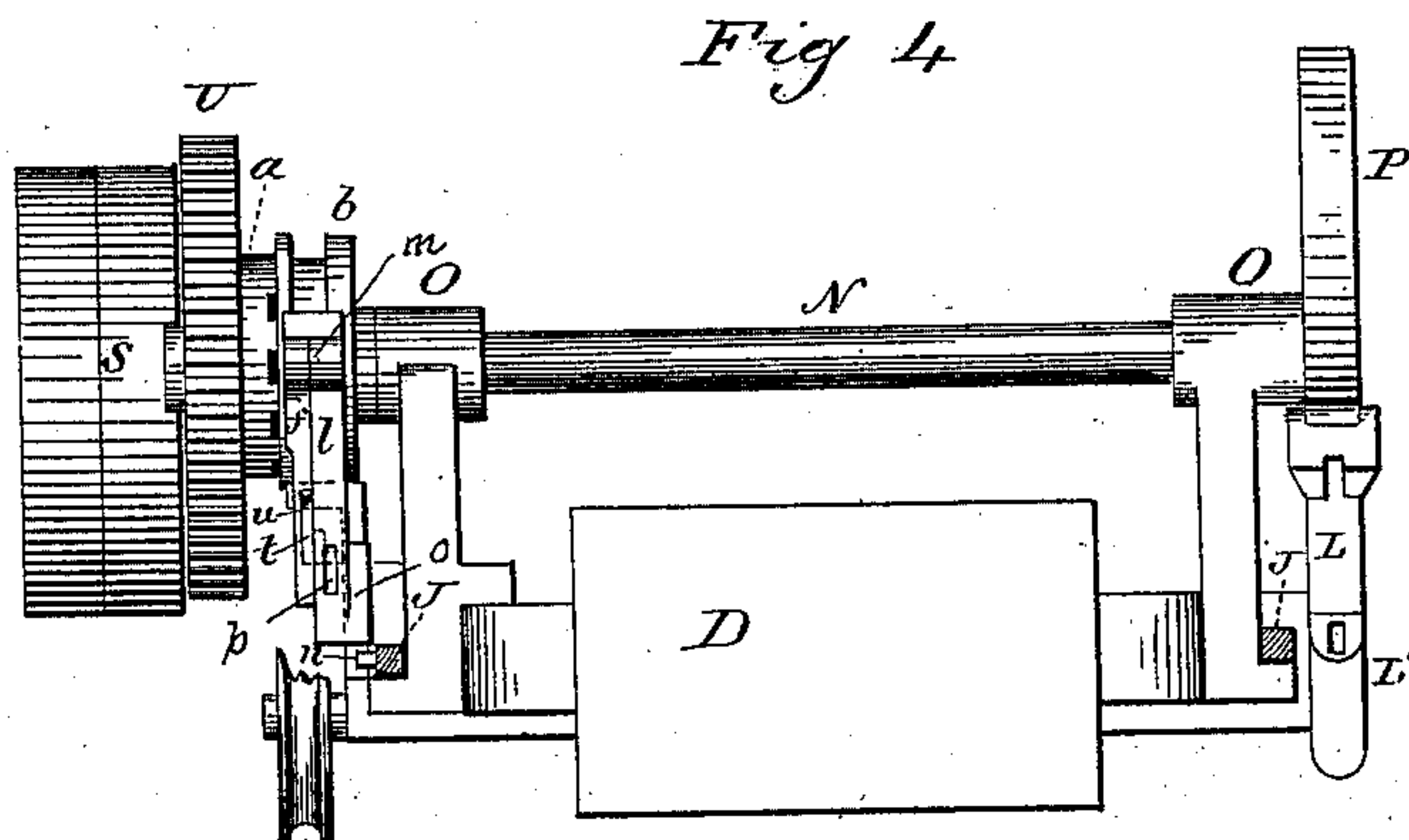
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

HENRY REYNOLDS, OF NEW HAVEN, CONNECTICUT.

## MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 358,220, dated February 22, 1887.

Application filed January 6, 1887. Serial No. 223,599. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY REYNOLDS, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Molding-Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a front view; Fig. 2, an end view looking from the left-hand side, showing the swinging platen in its back or rear position; Fig. 3, an opposite end view showing the swinging platen in the forward position; Fig. 4, a top view, the upper platen being removed; Fig. 5, an inside view of the power-engaging mechanism; Fig. 6, a top or plan view of the driving-wheel, its hub, and the grooved collar, showing a face view of the bolt; Fig. 7, an under side view of the dog, showing the nose *h*; Fig. 8, a vertical central section through the driving-wheel, collar, and bolt, showing the bolt in engagement with the driving-wheel; Fig. 9, the same as Fig. 8, but showing the bolt withdrawn to disconnect the wheel and collar; Fig. 10, a detail view of the dog and trip, showing the cam *t* between.

This invention relates to an improvement in machines for preparing molds for casting iron or other metals, and particularly to that class in which two platens are arranged one above the other, the lower platen movable up and down, and the upper platen adapted to swing backward and forward, and so that when brought forward over the lower platen, the mold, being on the lower platen, will be forced up against the upper platen to compress the sand, then, as the lower platen drops, the upper platen is thrown backward for the removal of the prepared mold and the preparation for another, and it is an improvement upon the machine for which Letters Patent of the United States were granted to me, dated January 1, 1878, and May 14, 1878.

In my previous machines the compressing power was produced by the operator through a lever.

The object of my present invention is to adapt this machine to either hand or power,

so that, if desired, the compression may be produced by power, or, in the absence of power, the compression may be produced by hand, or in case of power only being required, the hand mechanism may be omitted from the machine, and the machine become a power-machine only.

A A represent the two sides of the frame, connected by cross-bars B B, and supported on suitable feet or base, C.

D represents the lower platen, which is supported upon two vertical slides, E E, working through guides in the bars B B, so as to be moved up and down. Supported on suitable bearings in the frame below is a rock-shaft, F, which carries a short arm, G, extending backward, and on this arm G one end of a strut, H, rests or is hung, which strut, extending up, takes a bearing upon the under side of the platen D, and so that as the rock-shaft is turned forward it will raise the platen B, as indicated in broken lines, Figs. 1 and 3, or, returned, will permit the platen D to descend.

I is the upper platen, from which rods J extend downward, one each side of the machine, and are hung by their lower ends, respectively, to trunnions K K, and so that the platen I, resting in the position indicated in Fig. 2, will leave the lower platen exposed for the placing and preparation of the flask and sand thereon, and then so that the platen I may be drawn forward over the platen D, as indicated in Fig. 3, all substantially as in my previous machines.

The rock or cam shaft F, through which the compression is produced, has fixed upon it a lever, L. This lever is made of elastic metal—as steel—rigidly fixed by its lower end to the shaft and extending upward. At the lower end of the spring-lever L is a socket, L', adapted to receive the lower end of a hand-lever, M, and at the upper end of the spring-lever L is an open socket, L<sup>2</sup>, within which the hand-lever rests as a partial support, so that by this hand-lever the compressing movement may be imparted, substantially the same as in my previous machines and in many machines of this class. Under this construction the operator first places the flask and sand with the mold upon the lower platen, D, then draws the platen I forward, and then, turn—



ing the lever L forward, causes the lower platen to rise and compress the sand in the flask.

To apply power to the machine, I arrange a shaft, N, in suitable bearings, O, at the rear of the frame, and on this shaft is a cam, P, adapted to work against the back of the spring-lever L, as seen in Fig. 3. Rotation is communicated to the shaft N from a driving-shaft, R, parallel with the shaft N, and to which power is applied through a pulley, S, or otherwise, there being a pinion, T, on the driving-shaft R working into a corresponding gear, U, on the shaft N, as seen in Figs. 1 and 2.

The power is only required to be applied when the upper platen, I, is in its forward position over the platen D, and a single revolution of the shaft N should produce the compression and automatically detach the power.

To do this the gear U is loose on the shaft N, and on the shaft N, adjacent to the hub *a* of the gear U, is a grooved collar, *b*. (See Figs. 4 and 6.) The face of the hub *a* next the collar *b* is constructed with several notches, *d*, more or less in number. In the periphery of the collar *b* is a transverse spring-bolt, *e*, adapted to enter either one of the notches *d* in the adjacent face of the hub *a*, if free so to do, and if at any time it be so free its spring will force it into the corresponding notch, as seen in Fig. 8, and then the revolution of the wheel U will be communicated to the shaft N; but if, on the contrary, the bolt *e* be withdrawn, as seen in Fig. 9, then the shaft N will stand, while the wheel U will continue its revolution.

In the plane of the collar *b* a dog, *f*, is hung upon a pivot, *g*. (See Fig. 5.) The under face of this dog carries a nose, *h*, adapted to ride in the groove in the collar *b*. From the bolt *e* there projects outward a shoulder, *i*, (see Fig. 8,) and which, when the bolt is in engagement with the wheel U, and the collar *b* therefore revolving, will, at a predetermined time, strike the inclined side of the nose *h* of the dog, and because of the inclined surface of the said nose the bolt will be forced away from the wheel U, so as to disengage the wheel U and collar *b*, as seen in Fig. 9. If, however, the nose of the dog be raised to permit the bolt to escape, then the spring will throw it forward into engagement with the wheel U, as seen in Fig. 8.

On the back of the dog *f* a trip, *l*, is hung upon a hinge, *m*. The trip extends forward to a point beyond the pivot *g*, on which the dog is hung. On the rod J, on the side of the machine next the trip *l*, is a projecting stud, *n*, which, as the upper platen is drawn forward, will ride over an inclined cam-like surface, *o*, on the trip, forward of the pivot *g*, on which the dog is hung, and as seen in Fig. 5. The stud *n* strikes the trip as the platen approaches its forward position, and in completing the forward movement of the platen the stud *n* will depress the forward end of the trip, and consequently raise the rear end of the

dog, as indicated in broken lines, Fig. 5, so as to take the nose of the dog out of the path of the stud *n* of the bolt, and so as to leave the bolt free to make engagement with the gear U; but just as the platen arrives at its forward position the stud *n* escapes from the forward end of the trip and permits the dog to fall; but before it falls the engagement will have been made between the gear U and the shaft N, so as to have commenced the rotation of the shaft N, and taken the bolt beyond or out of the way of the dog. Engagement now having been made with the power, the shaft N continues its revolution and the cam P acts upon the rock-shaft F and raises the platen D, as indicated in broken lines, Fig. 3. The cam should give a certain time of rest, so as to hold the sand under pressure for such certain time. Then the fall off of the cam will permit the rock-shaft F to return and the platen D to fall. The dog, thus falling, brings the nose *h* into the path of the shoulder *i* of the bolt *e*, and so that when the bolt reaches the nose *h* it will be withdrawn from engagement with the gear U, and the cam-shaft N will stop and there remain until, in the next forward movement of the platen, the bolt is again permitted to make its engagement.

The work having been performed, the operator turns the upper platen, I, backward. In so doing the stud *n* rides beneath the backwardly-inclined forward end, *r*, of the trip, and will raise the trip, without effect upon the dog, until the stud *n* passes beyond the rear end of the cam-shaped projection N of the trip, and so as to permit the trip to return and stand in the position for the next forward movement of the upper platen. A counter-balance, *s*, is hung to the upper platen to facilitate this back-and-forward movement under the hand of the operator.

If at any time it be desired to operate the machine by hand without disengaging the power from the driving-shaft, the trip *l* may be raised out of the path of the stud *n*, as indicated in broken lines, Fig. 2, and so that it will not be affected by the forward-and-backward movement of the upper platen; and for convenience in so temporarily disengaging the power, I arrange a cam, *t*, on the back of the dog, with a projecting handle, *u*, as seen in Figs. 2 and 10, so that the operator may turn the cam upward, as indicated in broken lines, Figs. 2 and 10, when it is desired to take the trip out of the way of the movable platen, or turn the cam downward, as in Fig. 2, to permit the trip to be engaged.

The strength of the spring of the lever L is such as to permit the requisite amount of pressure upon the sand under the action of the cam. It is impossible, however, to always fill the flasks with the same amount of sand, and if there be more sand then the action of the cam, were the lever inelastic, would be to give a greater pressure to the sand than was desirable, and sometimes, owing to a greater



quantity of sand, the pressure would be beyond the capacity of the power; but, because of the yielding capacity of the spring-lever L, the cam will raise the pressure to the required point, and then the spring will yield under the completion of the movement of the cam without producing too great a pressure upon the sand, and avoid the liability of stopping the power or breaking the machine.

While I prefer the devices which I have described as a means for engaging the power with the cam-shaft N at a predetermined point, and so that the said shaft will always stop at the same point, other well-known mechanism for such engagement and disengagement at a predetermined point in the revolution of the shaft M may be employed—such, for illustration, as are well known in various kinds of power-presses where such predetermined time of stopping is necessary.

It will be understood that the power may be applied directly to the shaft N, instead of the auxiliary or driving shaft R, connecting therewith by a gear; but this gearing is preferable because of the multiplication of power, which is desirable.

I have for convenience illustrated my invention as applied to my known machine, patented as before mentioned; but, while specially adapted to this particular machine, it will be readily understood by those skilled in the art that my invention, whereby I apply power to the machine, is applicable to machines in which, for illustration, the upper platen is the compressing-platen and is drawn downward, while the lower platen remains stationary, and, for another illustration, it is also applicable to that class of machines in which the upper platen is stationary and the flask is filled outside, and then passed between the upper and lower platen for the pressure. I therefore do not wish to be understood as limiting my invention for applying power to molding-machines to any particular class of such machines.

In machines where the converting capacity of the machine—that is, from hand to power or power to hand—is not desirable, the sockets to receive the hand-lever may be omitted; but, generally, it is desirable that the machine shall have this capacity of converting from power to hand.

I claim—

1. In a molding-machine having a lower platen arranged upon guides for vertical compressing movement, and an upper platen adapted to swing backward from and forward over said lower platen, the combination therewith of a shaft carrying a cam, with mechanism, substantially such as described, between said cam and vertically-movable platen, a wheel loose on said shaft and adapted to receive power, and mechanism, substantially such as described, between said wheel and said swinging platen, and whereby in the forward movement of the swinging platen power is communicated to said shaft and disconnected

therefrom at predetermined times in the revolution of said shaft.

2. In a molding-machine, the combination of the vertically-movable platen D, the back and forward swinging platen I, shaft N, carrying the cam P, mechanism, substantially such as described, between said cam and vertically-movable platen, whereby said cam imparts such vertical movement to said platen, a wheel U, loose on said shaft and adapted to receive power, a collar, b, fixed to said shaft N, transverse bolt e in said collar b, notches on said wheel U corresponding to said bolt e, and a dog constructed with a nose, h, and the said bolt with a corresponding shoulder, i, the said dog adapted to be thrown into or out of the path of said shoulder on the bolt at predetermined times, substantially as described.

2. In a molding-machine, the combination of the vertically-movable platen D, the back and forward swinging platen I, shaft N, carrying the cam P, a rock-shaft, F, lever L, extending from said rock-shaft to said cam, the said lever having a socket adapted to receive an extension or hand lever, and a connection from said rock-shaft F to said movable platen, with mechanism, substantially such as described, to connect the power with and disengage it from said shaft N at predetermined times, substantially as specified.

4. In a molding-machine, the combination of the vertically-movable platen D, the back and forward swinging platen I, shaft N, carrying the cam P, mechanism, substantially such as described, between said cam and vertically-movable platen, whereby said cam imparts such vertical movement to said platen, a wheel, U, loose on said shaft and adapted to receive power, collar b, shaft N, transverse bolt e in said collar b, notches on said wheel U corresponding to said bolt e, the dog f, constructed with its nose h, and the bolt with a corresponding shoulder, i, the trip l, hinged to said dog and extending forward of the pivot upon which said dog is hung, the said dog constructed with inclines o r, and the said swinging platen provided with a projection adapted to engage said inclines on the trip, substantially as and for the purpose described.

5. In a molding-machine having a platen adapted to receive a compressing movement and a platen opposed to such compressing movement, and between which the flask of sand is received for compression, the combination therewith of mechanism, substantially such as described, to impart compressing movement to said platen, a spring-lever having one end in connection with said mechanism, and a revolving cam adapted to work against the free end of said spring-lever, substantially as described, and whereby said cam, through said spring-lever, imparts a yielding pressure to said platen.

6. In a molding-machine having a platen adapted to receive a compressing movement and a platen opposed to such compressing



movement, and between which the flask of sand is received for compression, the combination therewith of mechanism, substantially such as described, to impart compressing movement to said platen, a lever one end in connection with said mechanism, and a revolving cam adapted to work against the free end of said lever, with a socket also in connection with said mechanism adapted to receive a hand-lever, substantially as described, and whereby the said machine is made convertible from power to hand or hand to power. 10

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Witnesses:

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