(No Model.)

2 Sheets—Sheet 1

J. C. McDERMOTT.

PULLEY MOLDING MACHINE.

No. 411,390. Patented Sept. 17, 1889.

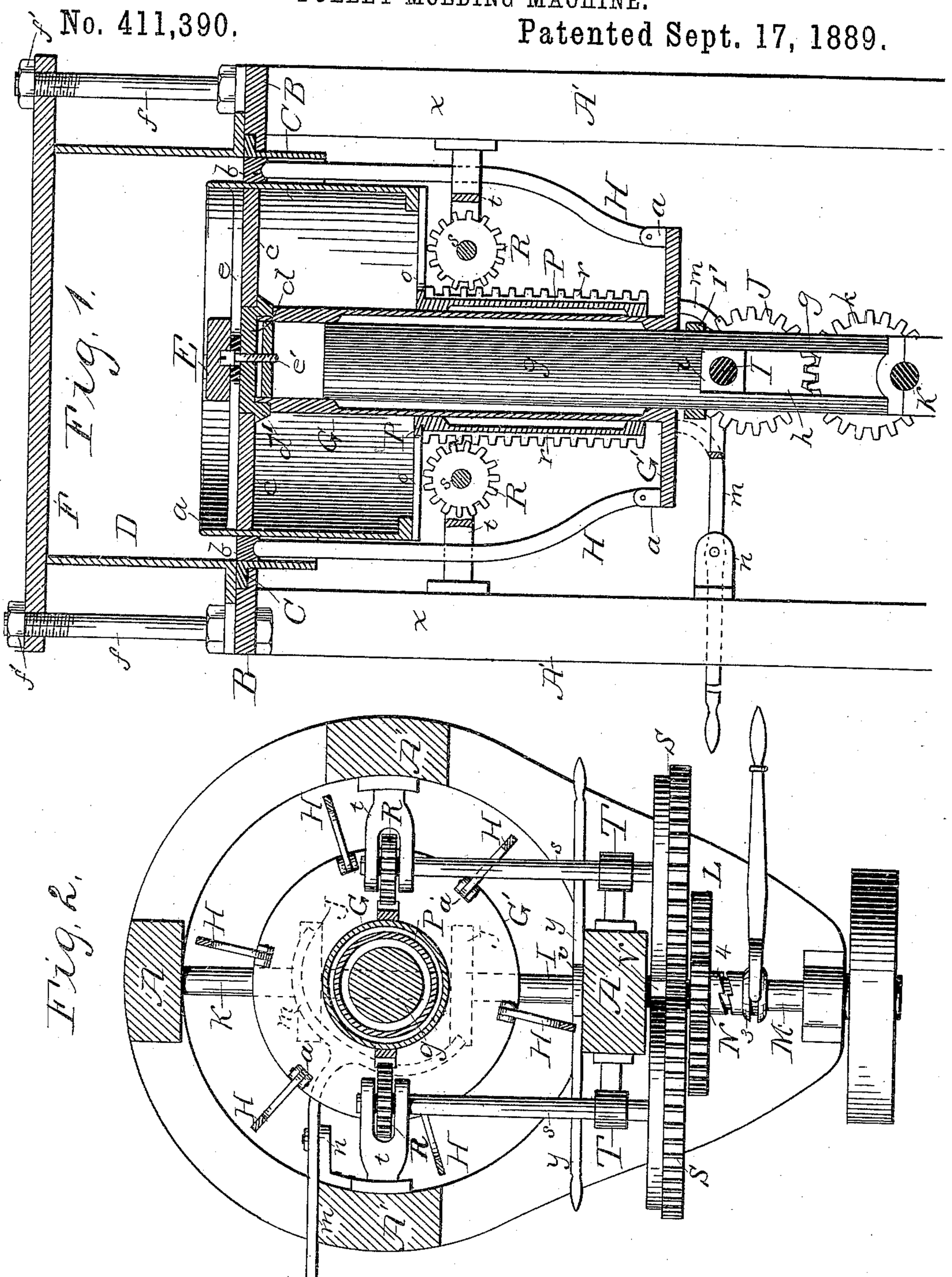

Fig. 1.

Fig. 2.

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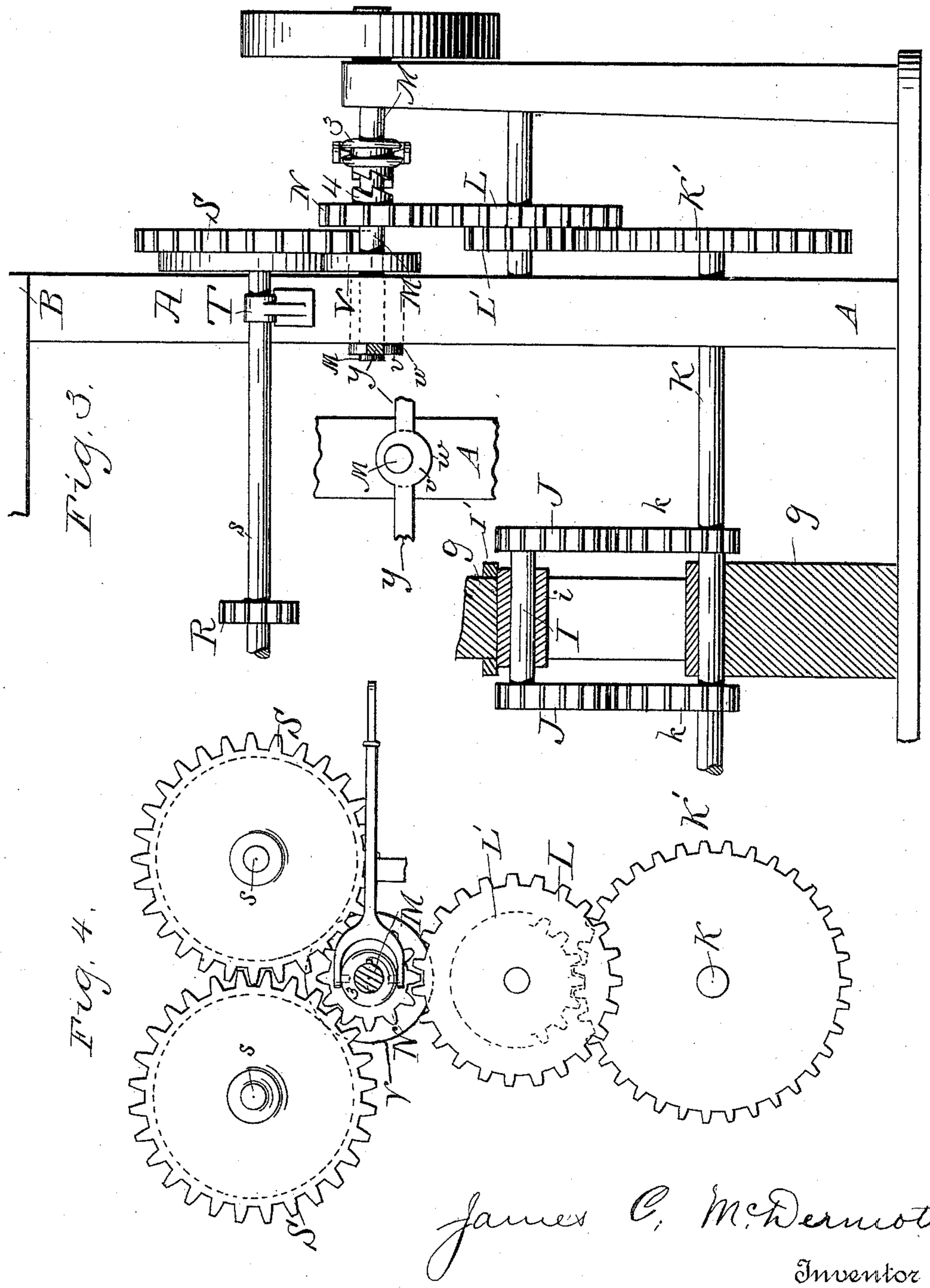

Fig. 3.

Fig. 4.

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UNITED STATES PATENT OFFICE.

JAMES C. McDERMOTT, OF CHICAGO, ILLINOIS.

PULLEY-MOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,390, dated September 17, 1889.

Application filed August 8, 1888. Serial No. 282,280. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. MCDERMOTT, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pulley-Molding Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings and the letters of reference marked thereon.

Heretofore pulley-molding machines have been made which enable foundrymen to make a mold much quicker than can be made in the usual and common flask; but even these machines can be improved by dispensing with the manual labor involved in packing or tamping the sand around the pattern and substituting some automatic mechanical action therefor. This it is the object of my invention to do, and this I accomplish thoroughly and quickly by the means hereinafter fully explained, and as illustrated in the drawings, in which—

Figure 1 is a transverse vertical section of my improved pulley-molding machine. Fig. 2 is a horizontal transverse section taken on line *x x*, Fig. 1. Fig. 3 is a diagram showing in side elevation the arrangement and location of the actuating-gear of my improved machine with the remaining structure omitted or broken away. Fig. 4 is a front elevation of the same.

Referring to the drawings, A A and A′ A′ represent four vertical pillars, which are secured to and arise from a suitable base-plate, and which support a circular plate B. This circular plate B has a large circular opening in it, whose edges are rabbeted so as to provide a seat for the lateral flanges projecting from the upper edges of the ring C. The basal flange of the flask D rests concentrically upon the upper surface of the plate B and ring C, and between the inner vertical surface of ring C and the rim-pattern *a* is an annulus *b*. The rim-pattern *a* is perfectly concentric with the annulus *b*, and fits snugly against the inner edge of the same. Inside the rim-pattern and concentric therewith is a circular plate *c*, which has a circular opening in its centers through which the cap *d* projects. This plate *c* is supported by flanges *d′*, projecting laterally from the lower edges of said cap, which project in the same manner as the rim of a hat. The upper surface of said annulus *b* and plate *c* are always in the same plane. Secured to the cap *d* concentrically with the rim-pattern *a*, by means of a vertical screw *e′*, is the pattern *e* for the arms of the pulley; and E represents the boss-pattern, which is dropped over the screw *e′*, which centers it. The arms of the pattern may be of any suitable number, are an equal distance apart, and terminate at a point where they bear against the rim-pattern.

In arranging the patterns for the rim, the arms, and the boss, the rim is pushed up into the flask from below a distance from and above the plane *e* corresponding to one-half the width of the rim of the pulley to be cast plus the extent of compressibility of the sand. The arm-pattern is then placed and secured concentrically within said rim-pattern, with the end of each arm bearing against the inner surface of the sand. The desired size of boss-pattern is then centered on the head of the screw which secures the arm-pattern down. This being done, the flask is filled with molding-sand. Heretofore sand has been packed by hand with a suitable beater or tamping device. I avoid this labor by closing the top of the flask by a suitable cover F, which is held securely in place by the vertical bolts *f f*, (which latter are secured in and arise from the circular plate B,) passing through it, and by nuts *f′ f′*, as shown. When the cover F is thus secured over the flask and the patterns are properly adjusted, the annulus and plate *c* are automatically moved upward by mechanism which will hereinafter be fully described, and which compresses or packs the sand thoroughly and rapidly.

In order to accomplish the packing movement of the annulus and circular plate *c*, I place the cap *d* over the upper open end of a sleeve G, which sleeve extends down a suitable distance and surrounds the cylindrical central post *g*. The lower end of the sleeve is provided with a wide lateral flange G′, which has lugs arising from near its circumference, at regular intervals apart, to which are pivoted the lower ends of the arms H H. These arms pass upward outside of the rim-pattern and between the same and the ring C, and enter suitable sockets made in the under surface of the annulus. Thus when said sleeve

is raised, so as to obtain the packing movement of plate *c*, the annulus is raised also at the same time. In order to accomplish this vertical movement, I make a vertical slot *h* in the post *g*, below the said sleeve G, and place therein the bearing-block *i* of the shaft I. This shaft I has eccentric gear-wheels J on its ends, which latter terminate on either side of said post, and these gear-wheels engage with corresponding eccentric gear-wheels *k k* on the shaft K. Shaft K is properly journaled in said post and in the pillars A A, and is driven, through the medium of a large gear K′ and idle-gears L L′, by the pinion N on the drive-shaft M. As shaft K revolves, the shaft I is carried up and down by the action of the eccentric gear-wheels, and through the medium of a collar I′, which surrounds the post and rests upon the projecting ends of the bearing-box of shaft I, the sleeve G, plate *c*, and annulus *b* are pushed upward to pack the sand in the flask.

The depth of sand to be packed in the flask varies according to the size of the pulley desired to be made. When a small pulley is to be made, the depth of sand is less than when a large pulley is to be made. I therefore have to make allowances for this difference. This I accomplish by a lever *m*, which is fulcrumed in a suitable bracket *n*, which is secured to and projects inward from one of the side pillars A′. The inner end of this lever is bifurcated, so as to pass equally to either side of post *g*, and the ends of the bifurcations are upturned and bear against and support the flange G′ of sleeve G at points diametrically opposite each other. This lever is operated to raise the said sleeve a given distance, thus raising the annulus *b* and circular plate *c* to a higher plane. The patterns are then arranged and adjusted and the flask filled with sand. The collar I′, as it is carried upward by shaft I, does not strike the sleeve G until it has moved a distance equal to that which the lever *m* has raised said sleeve. It then pushes the sleeve upward the remainder of its throw, or sufficient to pack the sand in the flask.

The rim-pattern has lugs projecting inward laterally from its lower edges, which rest and are secured upon the extremities of the arms *o o* radiating from the upper end of the sleeve P, which surrounds the sleeve G, and is preferably a little more than half as long as sleeve G. This sleeve P has secured longitudinally to opposite sides, intersected by the vertical plane passing through the pillars A′, the racks *r r*, and these racks are engaged by the pinions R R, fast on the shafts *s s*. The shafts *s* are journaled in the brackets *t t*, secured and projecting inward from the pillars A′, and the other ends of said shaft, on which are the combined friction and cog gears S, are journaled in brackets T, secured to and projecting inward from the front pillar A. The cogs of the gears S mesh one another. The friction-surfaces thereof, however, are less in diameter than the cog-gear, and are alternately engaged by the friction-pinion V on the drive-shaft M. As will be inferred, in order that the friction-pinion may engage the friction-surfaces of gears S alternately it must have some lateral movement. This is accomplished by journaling the inner end of the drive-shaft eccentrically in a circular block *v*, which is itself journaled in a suitable bearing *w* made in the front pillar A. The inner end of this block *v* is provided with two handles *y*, which extend to each side horizontally, and to such distance that they can be conveniently grasped. By pressing down the handle *y* on one side the drive-shaft is so shifted that the friction-pinion V engages with the friction-surface of the gear S on that side of the machine. By pressing down on the opposite handle the other gear S is engaged thereby, and by restoring the handles to a perfectly horizontal position the friction-gear is thrown out of engagement with both gears S.

By referring to Figs. 1 and 4 it will be seen that if the movement of the drive-shaft is from left to right when the friction-pinion engages the left-hand gear S the shaft *s* will so revolve as to move sleeve P upward, and that when the right-hand gear S is engaged the reverse motion of the sleeve P results.

The power-shaft M is driven, preferably, through the medium of a large pulley on the end beyond its outer bearing, which latter is so constructed as to permit of the slight lateral oscillation of the inner end of the shaft on which the friction-pinion V is situated.

The drive-shaft is supposed to revolve all the time. As it is only necessary that one revolution of the eccentric-gears *k* and J should be had to pack the sand in the flask, the drive-shaft should impart its motion to the actuating-gearing thereof for but a short space of time. I therefore make pinion N run loose on the drive-shaft and impart motion to it by a friction-clutch 3, which has an independent longitudinal motion on the shaft by means of a suitable feather, and which can be brought into engagement with a counterpart 4, made in and integrant with the boss of said pinion N.

If desired, the plate *c* may be made without a central opening and be suitably secured to and rest upon the top of the sleeve G.

The operation of my invention is substantially as follows: After the several patterns have been properly arranged, as hereinbefore described, the flask filled with sand, and the cover secured over the flask, the clutch 3 is shifted to engage with the counterpart 4 of the pinion N, which then slowly revolves the shaft K through the medium of the large gear K′. As the shaft K revolves, it, through the medium of the eccentric gear *k* and J, raises the shaft I in the slot *h*, which shaft I, directly or indirectly, pushes the sleeve G upward. As the sleeve G moves upward it raises the plate *c*, the boss-pattern, and the arm-pattern upward into the flask and at the same

time, through the arms H, pushes the annulus *b* upward. As the sleeve G approaches the limit of its upward movement, the pinions R on shafts *s s* are revolved by throwing the friction-pinion V into engagement with the friction-surface of one of the gears S, and the pinion R, meshing with rack *r r* on the sides of the sleeve P, moves said sleeve and the rim-pattern carried thereby upward until the sleeve G reaches the limit of its upward movement, whereupon the sand in the flask will be so well packed that it will remain in the upper part of the flask. The rim-pattern *a* (and sleeve P) is then automatically lowered by reversing the motion of the pinions R by oscillating the friction-pinion V so as to obtain the reverse revolution of the shafts *s*, upon which said pinions are mounted, and then the annulus, plate *c*, boss-pattern *e*, and the arm-pattern are automatically lowered by the shaft I moving downward. When the shaft K has completed one revolution, the clutch 3 is disengaged from the pinion N, thus stopping the machine. The cover of the flask is then loosened and the flask lifted bodily from the plate B and ring C and disposed of in the usual manner common in foundries to make a complete mold.

What I claim as new is—

1. The combination, with the flask D, cover F, and rim-pattern *a*, of the vertically-movable plate *c*, sleeve G, post *g*, having a slot *h* therein, vertically-moving shaft I, eccentric-gears J on the ends thereof, shaft K, and eccentric-gears *k* thereon engaging with said eccentrics J, as set forth.

2. The combination, with the flask D and cover F, of the plate *c*, sleeve G, having a basal flange G′, post *g*, having a slot *h* therein, vertically-moving shaft I, eccentric-gears J on the ends thereof, shaft K, eccentric-gears *k* thereon, which engage gears J, and lever *m*, suitably fulcrumed about midway its length and having its inner end bifurcated so as to support said sleeve on either side of said post *g*, as set forth.

3. The combination, with the flask and cover F, of the vertically-movable rim-pattern *a*, arm-pattern *e*, and boss-pattern E, plate *c*, annulus *b*, sleeve G, arms H, connected to and projecting from the lower end of sleeve G, and supporting the annulus *b* on their upper ends, and post *g*, as set forth.

4. The combination, with the circular frame B, the ring C, flask D, and cover F, of the annulus *b*, vertically-movable rim-pattern *a*, plate *c*, sleeve G, arms H, and post *g*, as set forth.

5. The combination, with the flask D and cover F, of plate *c*, sleeve G, post *g*, having a vertical slot *h* therein, vertically-movable transverse shaft I, eccentric-gears J on the ends thereof, shaft K, eccentric-gears *k* thereon, which engage with gears J, gear K′ on the forward end of shaft K, idle-gears L L′, drive-shaft M, loose pinion N, and clutch on said drive-shaft, which engages the counterpart made integral with the boss of pinion N, as set forth.

6. The combination, with flask D, cover F, and the plate *c*, and sleeve G and post *g* supporting the same, of the vertically-movable rim-pattern *a*, sleeve P, supporting the rim-pattern by means of arms projecting therefrom, racks *r*, secured longitudinally to sleeve P diametrically opposite each other, pinions R, engaging said racks, and shafts *s*, as set forth.

7. The combination, with flask D, cover F, plate *c*, annulus *b*, sleeve G, and post *g*, of the vertically-movable rim-pattern *a*, sleeve P, supporting said rim-pattern, racks *r*, secured longitudinally to the sleeve P, pinions R, shafts *s*, combined cog and friction gears S on the forward ends of shafts *s*, the frictional portions of which are arranged to engage with friction-pinion V, drive-shaft M, eccentric journal *v* therefor, and handle *y*, for operating the same so as to throw said friction-pinion alternately into engagement with first the friction-surface of one gear S and then the other.

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Witnesses:
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