

(No Model.)

F. BARDEZ.

MOLDING MACHINE FOR FOUNDRY USE.

No. 287,996.

Patented Nov. 6, 1883.

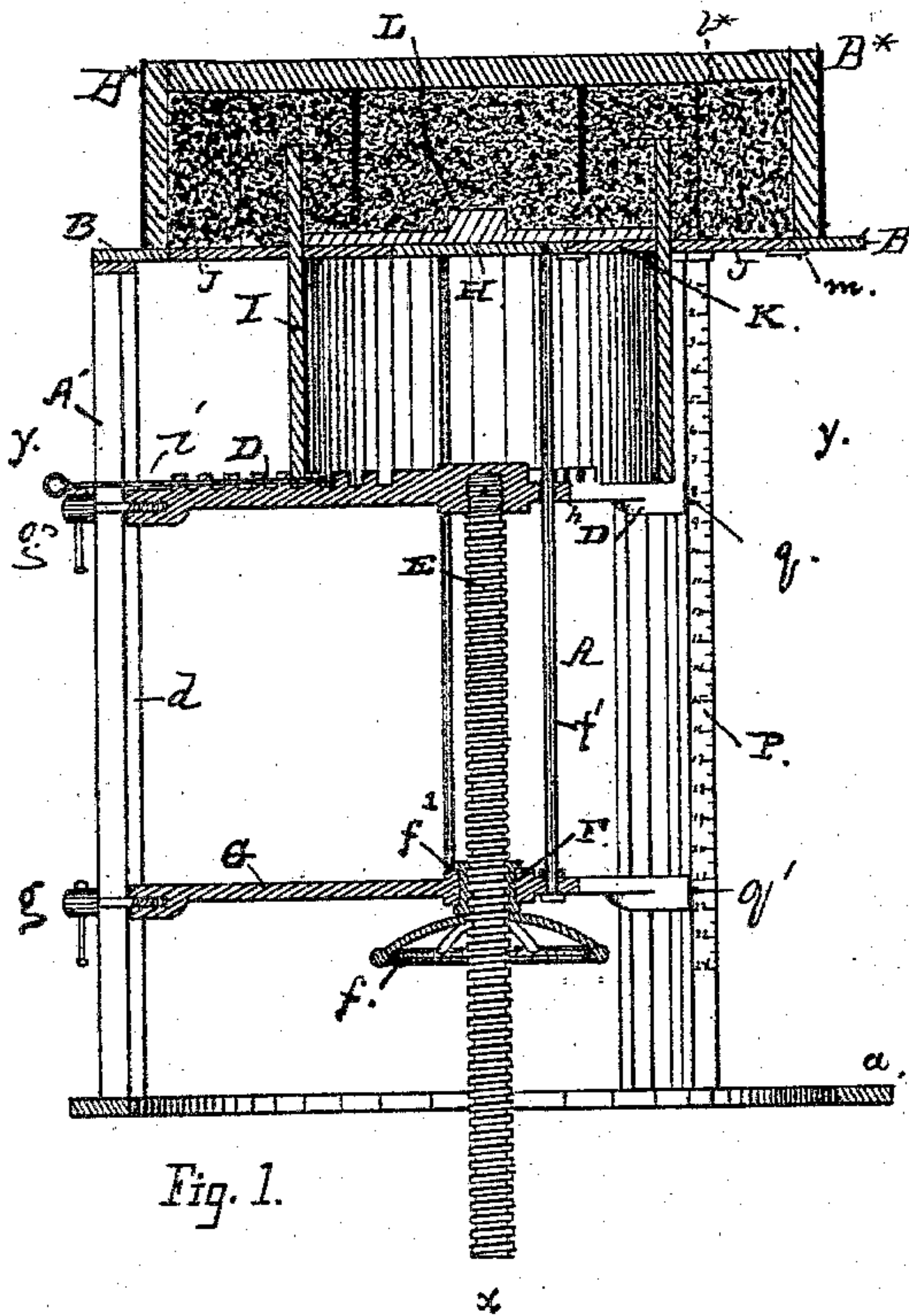


Fig. 1.

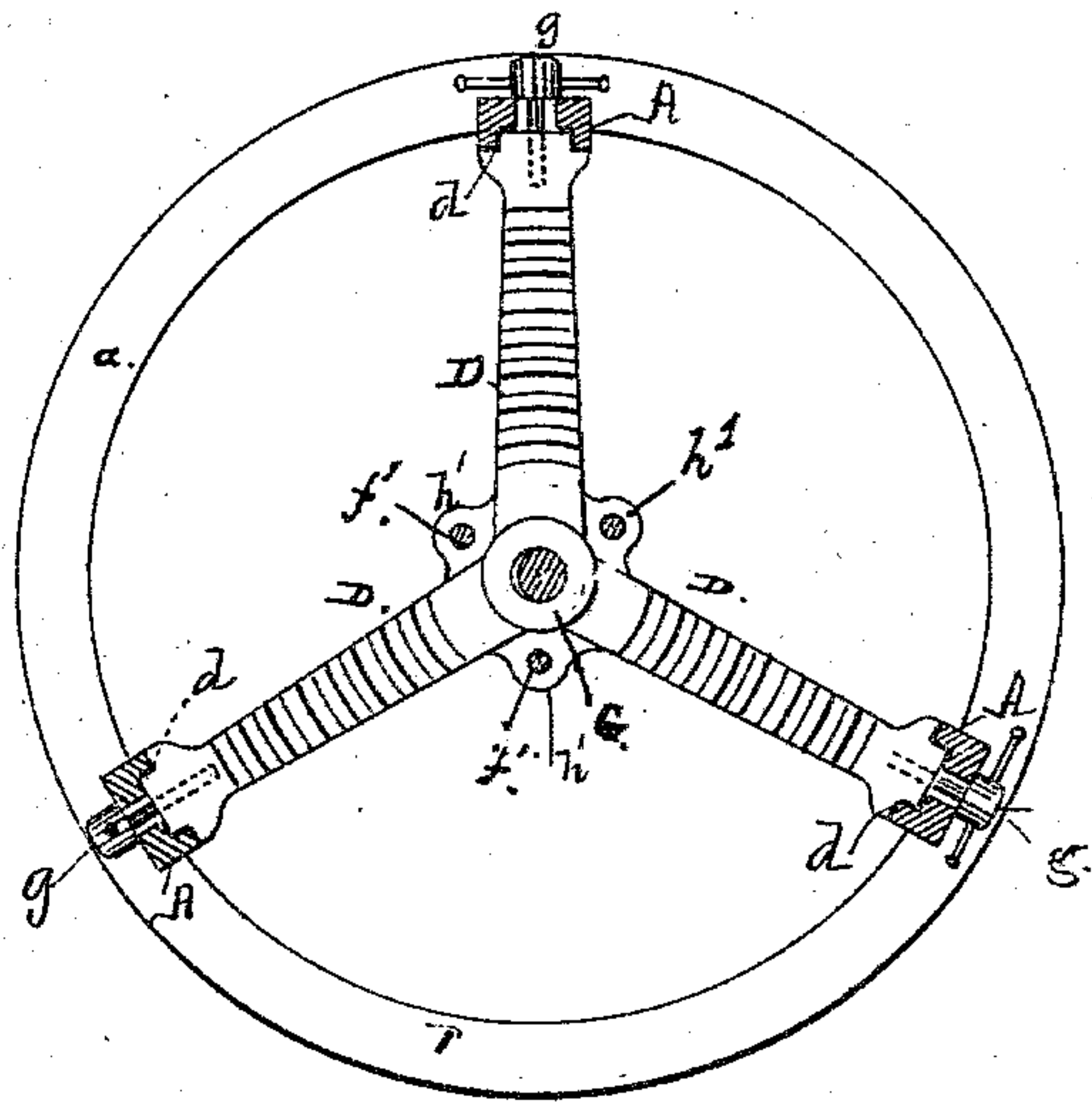


Fig. 3.

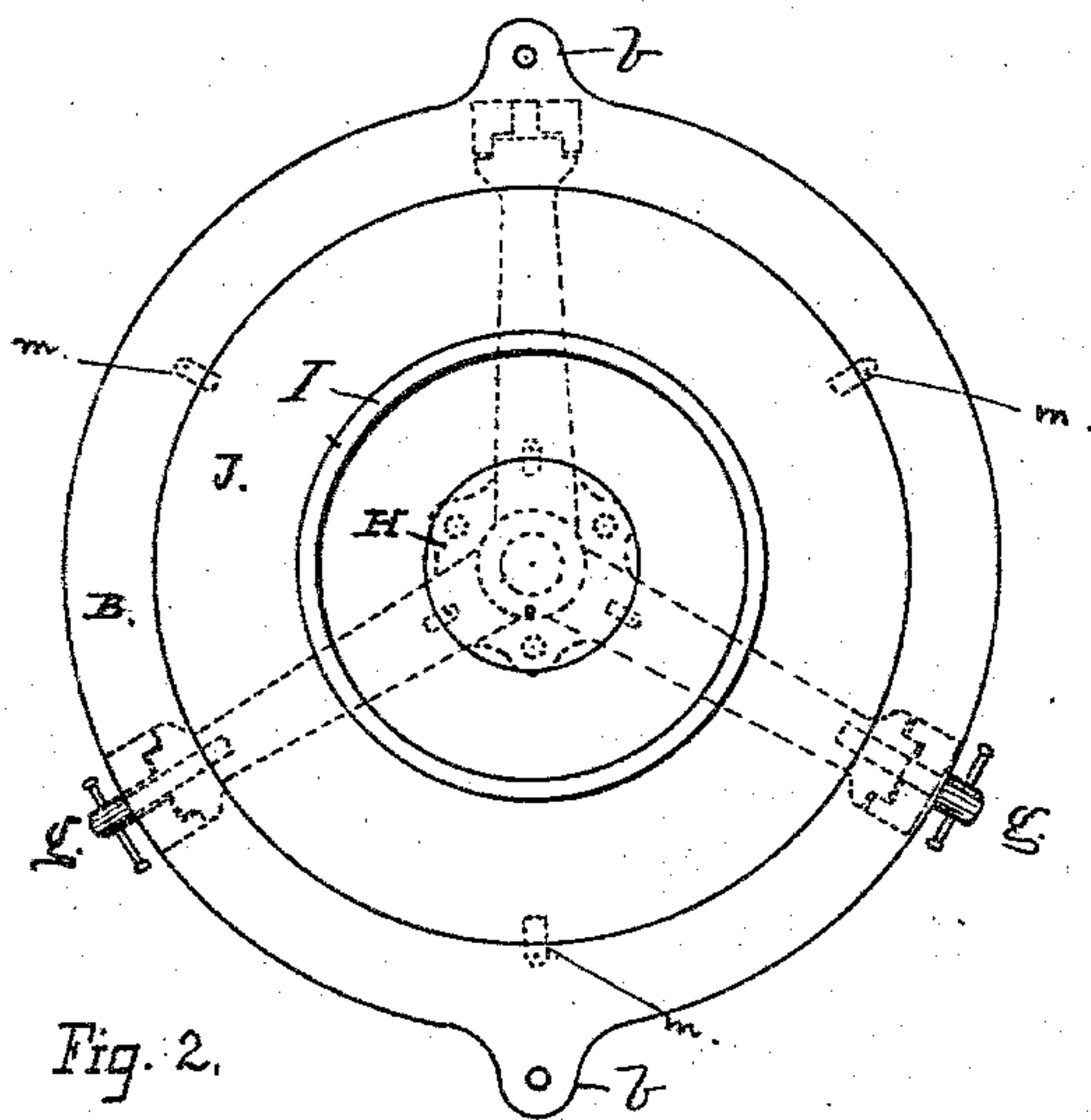


Fig. 2.

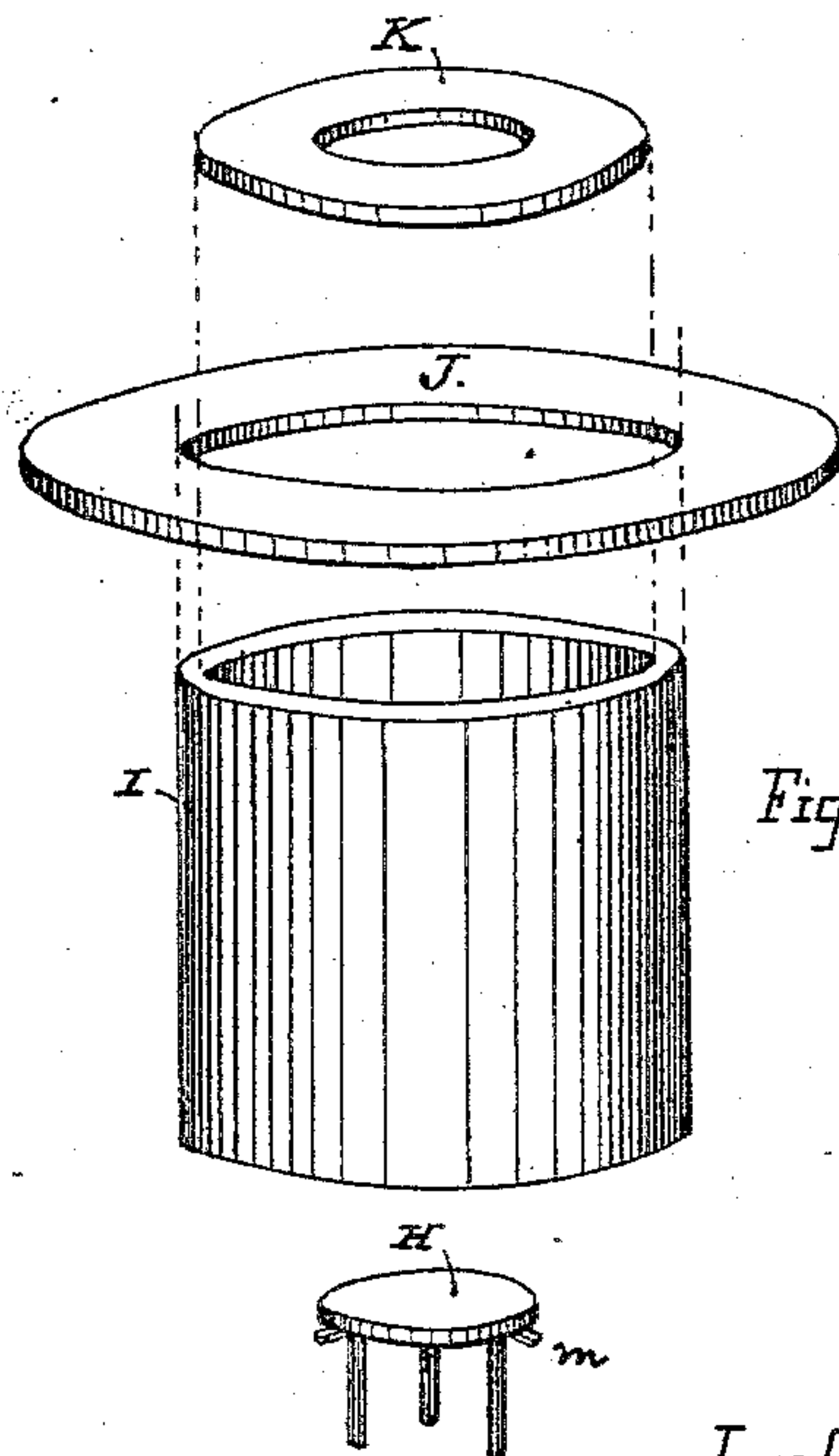


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## MOLDING-MACHINE FOR FOUNDRY USE.

SPECIFICATION forming part of Letters Patent No. 287,996, dated November 6, 1883.

Application filed June 25, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK BARDEZ, a citizen of France, but residing in the city and county of San Francisco, State of California, have invented certain Improvements in Molding-Machines for Foundry Use; and I do hereby declare that the following is a full, clear, and exact description of my said invention, the accompanying drawings being referred to as a part of the specification.

My invention relates to a machine or apparatus for use in foundry work.

The object sought to be attained is to produce a machine to facilitate foundry work in casting pulleys, fly-wheels, cone-pulleys, cylinders, piston-rings of any required width and diameter, and other regular work, whereby a multiplicity of patterns is dispensed with and accurate work can be done in a rapid manner.

The following description fully explains the nature of my said invention and the manner in which I proceed to construct, apply, use, and operate it, the said drawings referred to being—

Figure 1, a view in vertical section through the center of a machine with a half-flask placed on its top plate, and showing a pulley in process of molding. This section is taken on the line  $xx$  in Fig. 2. Fig. 2 is a plan or top view of the machine before the flask is set on it. Fig. 3 is a horizontal cross-section taken through the line  $yy$ , Fig. 1. Fig. 4 shows details of the molding-cylinder form, the rings, the movable platen to carry the pattern for the hub or center part of the article, and the intermediate rings that close the spaces between the platen and the molding-cylinder and between the cylinder and the outside flange rim or plate that supports the flask.

I construct my improved machine substantially as follows:

Upon an open base-plate,  $a$ , I fix upright posts or standards  $A A$ , either two or three, according to the size of the machine. For a heavy machine three standards would give more stable support to the top plate,  $B$ . This plate  $B$  is a flat circular rim fixed to the top ends of the standards, and provided with ears  $b$ , in which are holes to receive pins on corre-

sponding ears on the flask. These insure the accurate centering and adjustment of the flask-sections.

$B^*$  represents the outline of the flask which rests upon the rim  $B$ , and  $b^*$  the line dividing the two halves thereof. The section in Fig. 1 is taken on a line which does not show any of the ears  $b$ .

The standards  $A$  are slotted, and have grooves  $d$  on the inner side, to receive the ends of a three-armed follower,  $D$ . These grooves are guides to insure a true horizontal position of the follower at all times.

A vertical screw-shaft,  $E$ , works through a nut,  $F$ , and the nut  $F$  is provided with a hand-wheel,  $f$ , and is held in a movable hub,  $G$ , from which radial arms extend to and fit into the guides in the standards in the same manner as the follower  $D$  above. This lower follower,  $F G$ , carries the center plate,  $H$ . It is therefore movable up and down to set this plate, and also to withdraw it from the flask during the molding operation. Three guide-rods,  $f'$ , connect the center plate and the follower  $F G$  together.

To insure a horizontal position, accurate movement, and a true working of the plate  $H$ , these rods pass through holes in ears or webs  $h'$  between the arms  $D$ . Movement of the follower  $D$  thus sets the outside pattern or form, while the follower  $F G$  operates the center plate. At the end of each arm of these two followers is a clamp-screw,  $g$ , which works through the slot in the standard and takes into the arm. By setting up these screws the arms are securely held at desired points between the base and the top of the machine.

The follower  $D$  has a number of concentric grooves, increasing in size in regular manner from the smallest, which is of a size to receive and hold a cylinder,  $I$ , having a diameter equal to that of the center plate,  $H$ , up to the largest, which corresponds to the size of the outer rim,  $B$ . I employ, in a machine of medium size that would have the capacity to turn out ordinary sizes of articles, a number of these pattern-cylinders, each one about twelve inches length of face and regularly increasing in diameter, according to the grooves provided



in the follower D. The construction here given has grooves for eight different sizes.

The intermediate rings, J K, are in two sets and of various breadth of face, as they are required to cover the spaces and fit accurately between the plate and the interior surface of the cylinder and between the rim and the exterior of the cylinder. The difference in the size of each pair of rings J K is then exactly equal to the thickness given to the cylinder. These rings are held in place by means of pivoted lugs or buttons *m m* beneath the rim B, and similar ones on the under side of the center plate. When these parts are in place, there is presented a smooth level surface on the machine-top to receive the flask and sand, of which the portion outside of the pattern-cylinder is stationary, but that portion inside is movable up and down.

Upon the side of one of the standards A, I provide a scale, P, to indicate the amount of projection of the top edge of the cylinder above the surface of the machine bed or plate. A pointer, *q*, on the end of the corresponding arm, D, enables the follower to be accurately set, and any required position of the pattern insured without applying the rule. A similar scale upon one of the other standards, with pointer *q'* on arm G, will serve to adjust the lower follower, by which the position of the center plate is determined.

The cylinder I is held in place upon the arms G by having a rod, as *i*, passed through openings in the arm, and in it the cylinder.

The utility and advantage of this machine will be evident to any practical workman; but in order to clearly show the mode of handling it I will proceed to describe the operation of molding a pulley with six-inch face and without joint on the outside.

As the preliminary adjustment, the part H is run down by lowering the followers D F G until the top surface presents a smooth surface, the edge of the cylinder and the face of the center plate being thus brought flush with the rim. A half-pattern, L, to form the hub and arms of the pulley, is then laid upon the center plate, H, inside the cylinder, and a half-flask containing sand is inverted over the surface and properly centered by bringing its holes into line to register with the holes in the rim B. A pattern-cylinder, I, of the required diameter having been previously set upon the follower, the edge of this cylinder is then projected above the surface-plate on which the sand and flask rest until the arm D, carrying the indicator, is brought to figure "6" on the scale, and the clamps *g* are tightened. The cylinder then extends six inches into the sand, which gives the full width of face for the pulley. The next step is to mold the arms and hub. For this purpose the clamps of the lower follower are loosened, and the center plate, having the half-pattern on it, is pressed upward into the mold by turning the hand-wheel until the arm G of the lower follower is brought

to figure "3" on the standard-scale, at which point the follower is then set by its clamp-screws. The face of the center plate, H, is then exactly three inches below the top edge of the cylinder within the sand at the center of the six-inch rim, and the whole rim of the pulley and one-half of the arms and hub are molded. The cylinder and center plate, with half-pattern, are then drawn down clear of the sand, and the flask is lifted off and turned over. After the center plate is raised to position and the cylinder is set up also flush with the rim, the cope or upper half of the mold is inverted and set in place to produce the central or male portion of the mold. This is formed by simply drawing down the center plate, with its half-pattern, into the cylinder until the face of the plate is exactly three inches below the top face of the flask-supporting rim, and then fixing the follower by setting up the clamp-screws. After the sand is properly rammed and the molding operation finished, the cylinder is drawn down until the top edge comes to the level of the center plate, when the flask is readily raised from the machine and placed on the drag or lower previously-formed part of the mold.

In making pulleys with outside joint in the rim the machine is set as shown in the sectional view, Fig. 1. Each half of the mold will be formed in the same manner and with the center plate in the same position—i. e., flush with the rim.

From this description, with the aid of the drawings, it will be seen that plain rings of any diameter can be molded of different thickness and breadth of face; also, solid center pulleys, double arm pulleys, cone-pulleys, and fly-wheels can be produced in a rapid and accurate manner. By substituting a gear-pattern in place of the cylinder-pattern I and providing rings J K with edges corrugated or properly formed to fit into the pattern, I can also mold gear-wheels.

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

1. In a molding-machine, the combination of the stationary flask-supporting rim, movable pattern-cylinder, ring J, movable center plate, and intermediate ring, K, substantially as herein described.

2. In a molding-machine, the combination of a flask-supporting rim, a vertically-movable pattern-holding follower, a vertically-adjustable center plate, and means for moving and setting the said pattern-holding follower and the center plate independently of each other and in any required position with respect to the flask-supporting rim, substantially as described.

3. In a molding-machine, the combination of a stationary flask-supporting rim, a vertically-adjustable pattern-carrying follower, and a follower adjustable in like manner, carrying a center plate, the screw-shaft E and operat-



ing-nut F, and a means or device for setting and holding each follower in position of adjustment, substantially as described.

4. In a molding machine, a base, *a*, a flask-  
5 supporting rim, B, supporting-standards A A,  
a pattern-holding follower, D, a center-plate  
follower, F G, a screw-shaft, E, and operating-  
nut F, as a mechanism for moving and setting

the said followers, and the rings for extending  
the surface of the center plate and the flask- 10  
supporting rim, substantially as described.

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Witnesses:

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