(No Model.)

3 Sheets—Sheet 1.

J. E. DONOVAN.

MOLDING MACHINE.

No. 542,304. Patented July 9, 1895.

FIG. 1.

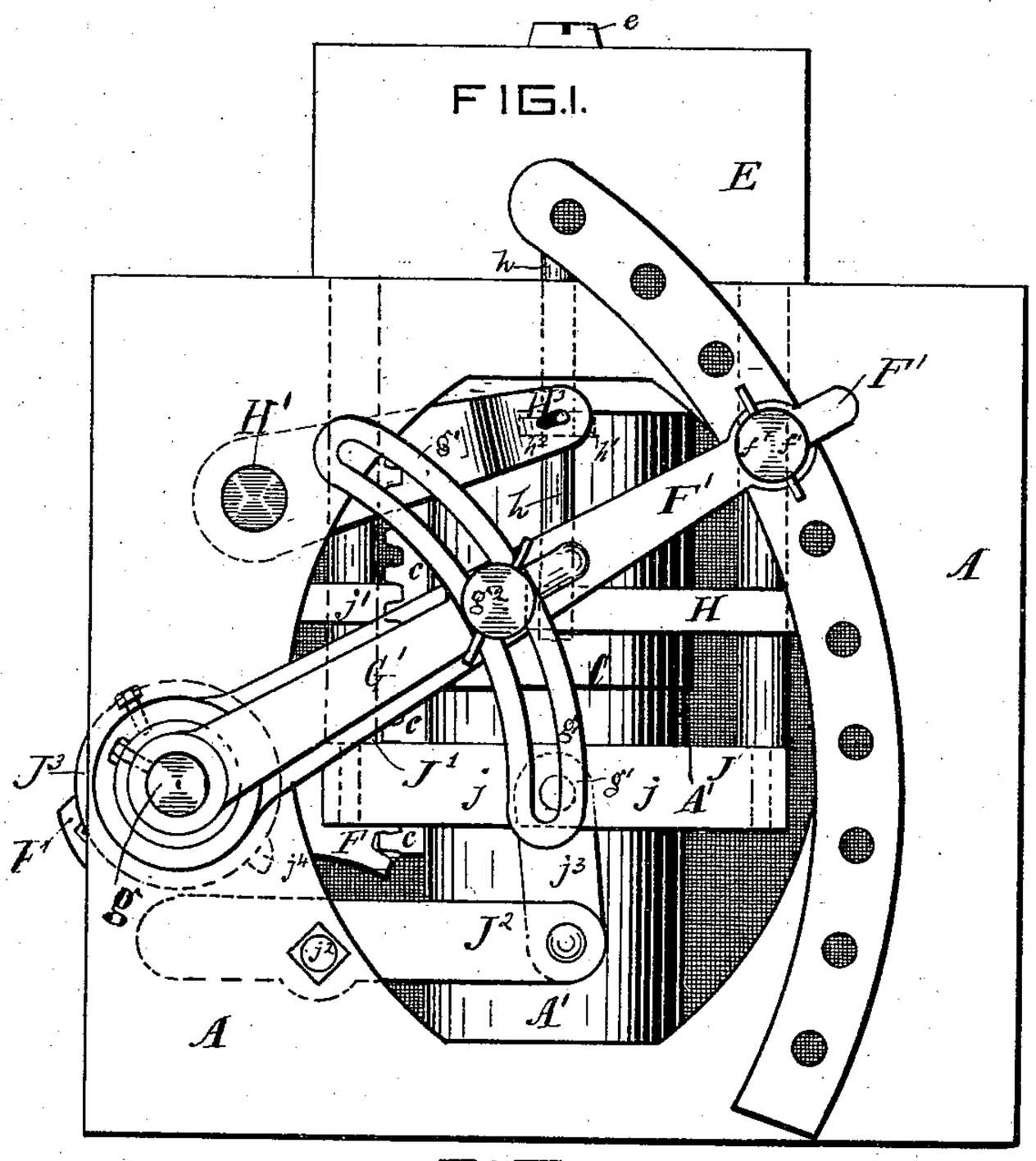
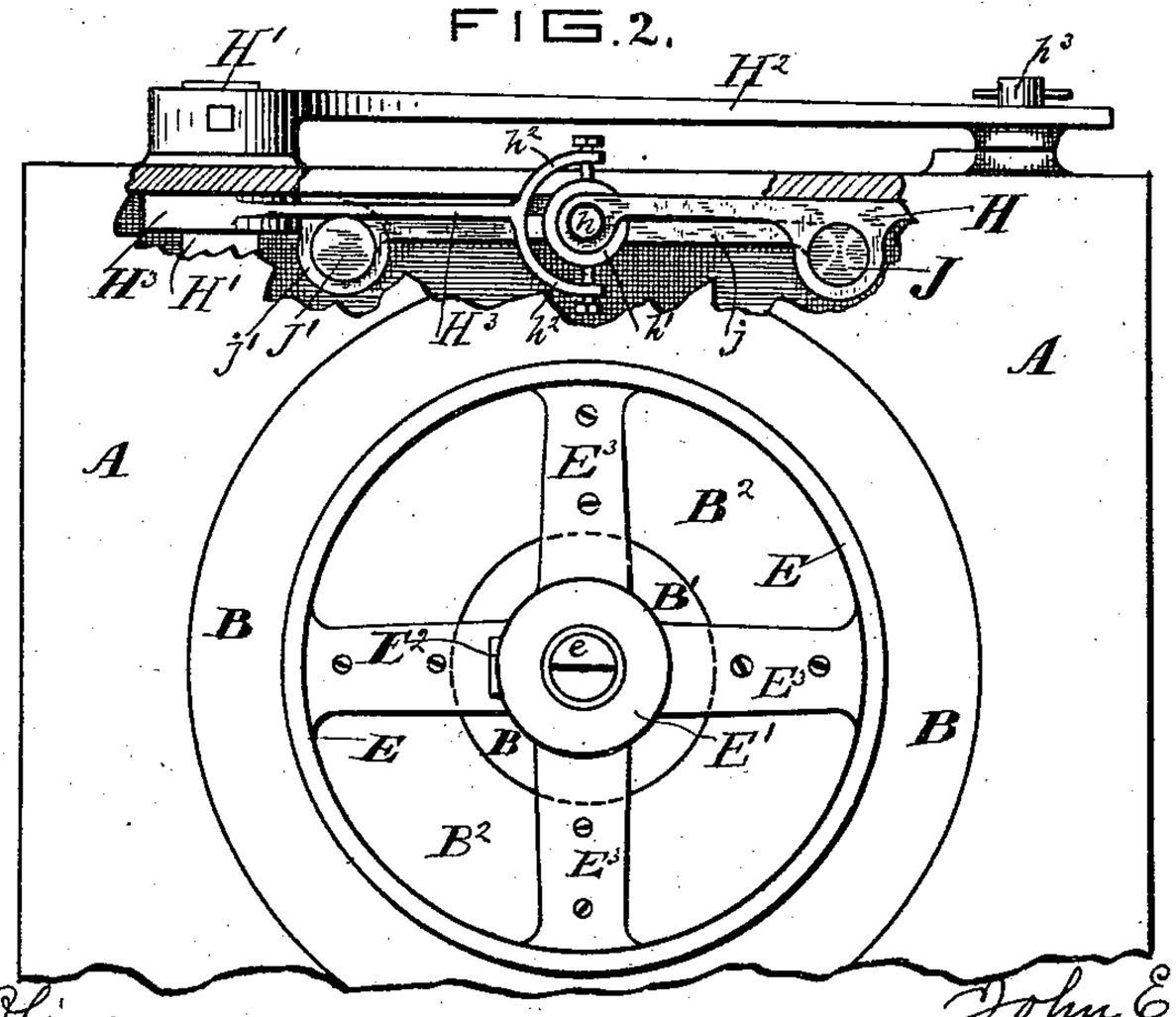


FIG. 2.



Witnesses
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(No Model.) 3 Sheets—Sheet 2.

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FIG. 3.

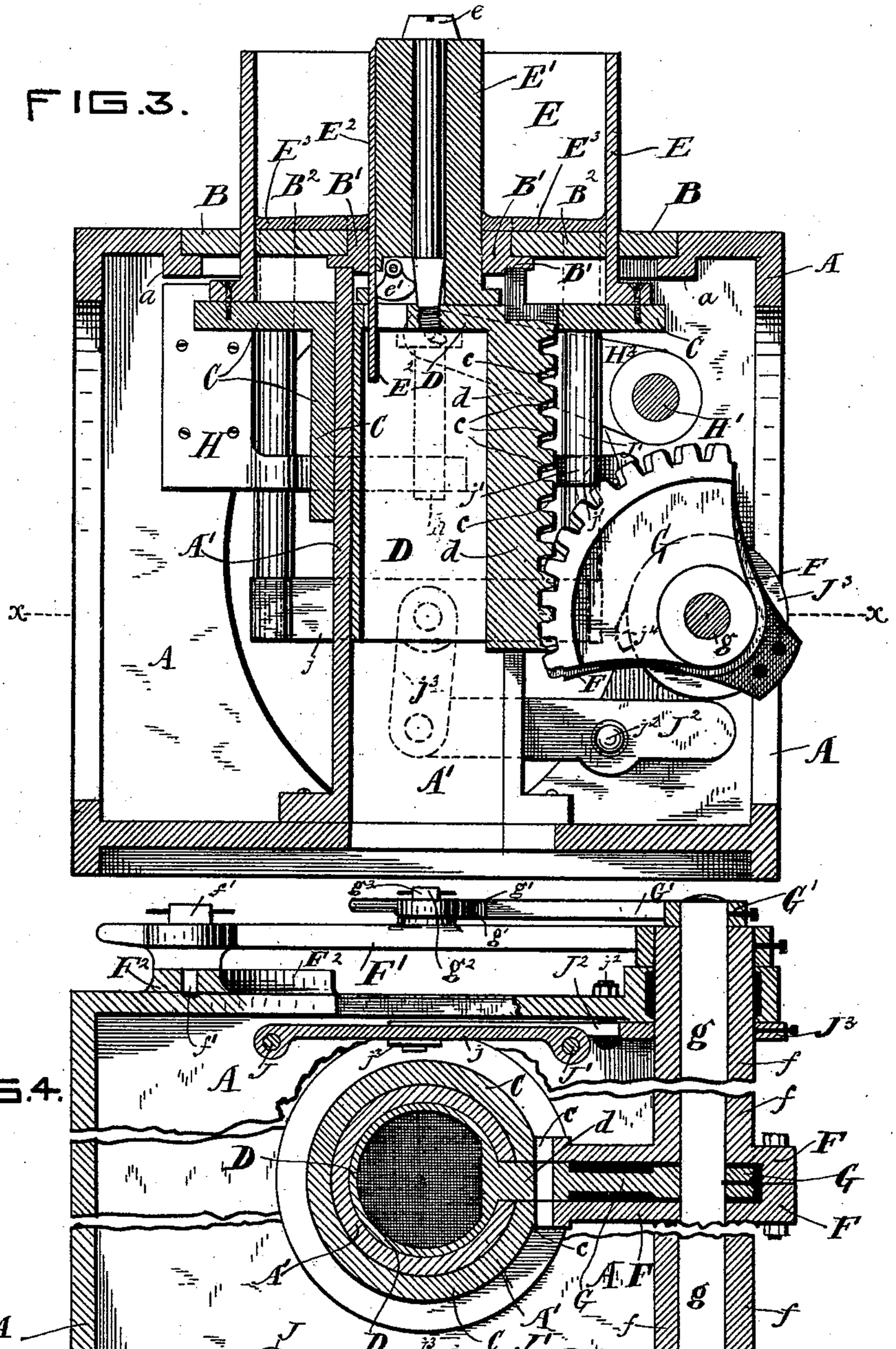

FIG. 4.

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(No Model.)

3 Sheets—Sheet 3

J. E. DONOVAN.

MOLDING MACHINE.

No. 542,304. Patented July 9, 1895.

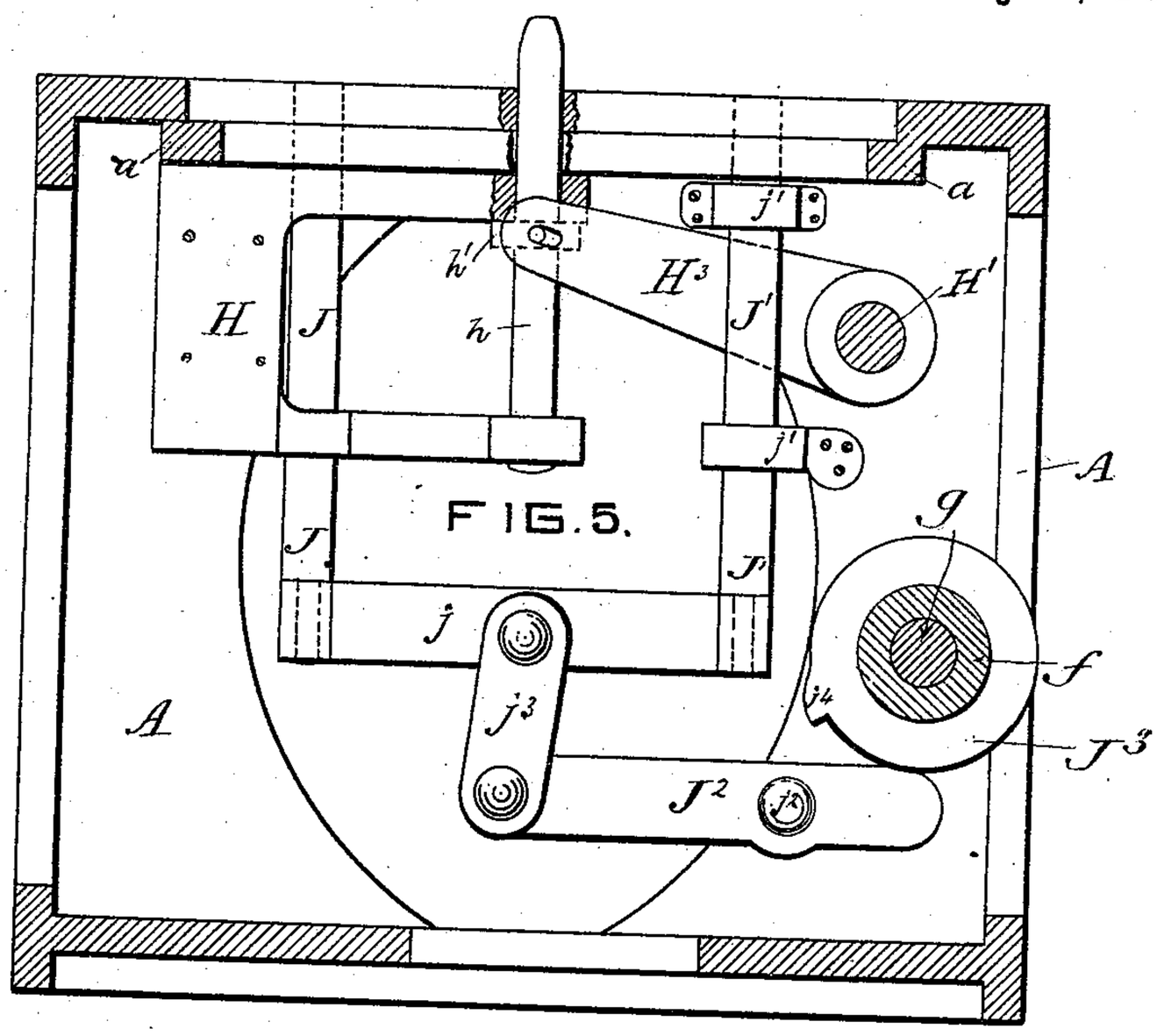

FIG. 5.

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UNITED STATES PATENT OFFICE.

JOHN E. DONOVAN, OF CINCINNATI, OHIO.

MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 542,304, dated July 9, 1895.

Application filed February 27, 1893. Serial No. 463,805. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. DONOVAN, a citizen of the United States, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Molding-Machines, of which the following is a specification.

My invention relates to machines for molding pulleys. Its object is to provide means to simultaneously withdraw the hub and rim of the pulley-pattern from the mold, means to start the flask from the follower-board, and means to provide for molding pulleys of different widths of rim and length of hub from the same pattern.

A further object is to provide convenient means for changing the pattern so as to mold different sizes and kinds of pulleys upon the same machine.

The invention will be first fully described in connection with the accompanying drawings and then particularly referred to and pointed out in the claims.

Referring to the drawings, in which like parts are indicated by similar reference-letters wherever they occur throughout the various views, Figure 1 is a side elevation of a machine embodying my improvements with the pattern elevated ready to receive the flask for molding. Fig. 2 is a partial plan view of the same, a portion of the top being broken away to expose the parts beneath. Fig. 3 is a central vertical section of the same, the parts being in the same position as the parts shown in Fig. 1. Fig. 4 is a horizontal transverse section taken through line *x x* of Fig. 3, with the parts in the position they occupy when the patterns are withdrawn from the mold. Fig. 5 is a central vertical section through the machine, similar to Fig. 3, and with the pattern-moving parts removed, so as to expose the device for moving the flask-pins and raising the flask after the hub and rim patterns are withdrawn from the mold.

The supporting-frame A is a rectangular open-sided box, preferably cast in a single piece. The top of the box has an annular opening, the edge of which is rabbeted, forming an inwardly-projecting flange *a*, upon which the ring B, which forms the outer portion of the follower-board, rests.

A′ is a hollow column rigidly secured upon the bottom of the frame A. On the top of this column rests a flanged ring B′. The neck of the ring projects within the column, and upon the flange of the ring is supported a ring B^2. These rings are held securely in place by any suitable means.

The column A′ is turned off true on the outside and bored true on the inside, and upon the outside of the column is fitted a follower C. This is slotted upon one side and each side of the slotted portion is provided with racks *c*.

D is a follower fitted to slide within the column A′. It has projecting from one side a rack *d*, which projects through a slot in the column A′ and between the racks *c*, the teeth of both sets of racks being in the same vertical plane.

The rim-pattern E is secured upon the upper flanged portion of the follower C and the hub-pattern E′ is secured upon the top of the follower D.

The cogged segments F have long hubs *f*, which project through bearings in the frame of the machine. Upon one of the hubs is secured a lever F′, by which the hubs and segments are partially rotated to elevate the rim-pattern or withdraw it from the mold.

The cogged segment G, by which the follower D is elevated and lowered, is secured upon the shaft *g*, which passes through both of the hubs *f*. Upon the projecting end of this shaft is secured a lever G′, which has a slotted segment *g′* near its handle, through which a screw passes, which screw is tapped into a boss on the lever F′. The free end of the lever F′ is perforated to receive a pin, which passes through it and into any one of the holes in the quadrant F^2. The width of the pulley-rim is determined by the position in which the lever F′ is locked by the pin *f′*, and the length of the hub relative to the rim is determined by the position in which the lever G is locked to the lever F′ by the set-screw g^2.

It is seen when the levers F′ and G′ are locked together that the pulley-hub and rim-patterns are simultaneously elevated to the desired position, and after the mold is formed simultaneously withdrawn through the tem-

plet or follower-board formed by the rings B B′ B².

The hub-pattern E′ is perforated to receive the bolt *e*, the head of which forms the print for the hub-core. The point of the bolt is tapered or cone-shaped above its screw-threaded portion, which is tapped into the follower D, and the lower portion of the pattern is recessed to receive a pivoted cam *e*′.

E² is a boss-pattern, which is used when tight pulleys are molded. It is adjustable upon the hub-pattern and locked in any position desired by tightening the bolt *e*. When a loose pulley is to be molded, the boss-pattern is slipped down, so as to leave the hub-pattern plain. This is done by loosening the bolt *e*. After the boss-pattern E² is slipped down to the desired position the bolt is again tightened up, clamping the boss-pattern firmly and holding it rigidly between the cam and the flange of the hub-pattern.

The pulley-arms E³ are secured upon the ring B².

To adapt the machine for molding different-sized pulleys, a larger or smaller rim-pattern is used. If larger, the ring B must, of course, be replaced by one narrower in diametrical section and the ring B² by one wider, so that the same machine may be adapted to mold several sizes of pulleys.

Referring now particularly to Figs. 2 and 5, I will describe the means by which the flasks are adjusted in position upon the table and lifted perpendicularly to free the steady-pins after the mold has been formed. Upon opposite sides of the machine are secured brackets H, the arms of which are perforated to guide the flask-pins *h*.

H′ is a shaft passing across the frame of the machine and having its bearings in the sides thereof. On the protruding end of the shaft is secured a lever H², by which the shaft is rocked. Upon this same shaft, inside the frame, are other lever-arms H³, which have forked ends passing on each side of collars *h*′, which are secured firmly upon the flask-pins *h*. Pins project from this collar through slotted openings in the ends of the bifurcated arms *h*² of the lever H³. The free end of the lever H² is perforated to receive a pin *h*³, which passes through it and into a quadrant or projection on the frame of the machine to hold the lever in its elevated or lowered position. In the position shown in Fig. 5 the pins *h* are shown protruding through the table-top to enter holes in one-half of the flask. When a half-mold has been formed and the flask removed, these pins are drawn down to their lowest position, so that the pins on the other half of the flask may enter the holes in the table-top. The play of the pins *h* is limited in either direction by the collar *h*′. To elevate the flask perpendicularly, I have provided vertically-sliding pins J J′, two upon each side of the machine, the lower ends of each pair being secured in a bar *j*. The pins J are guided in perforations in the bracket-arms H, and the pins J′ are guided in brackets *j*′, secured to the inside of the machine.

J² are lever-arms fulcrumed upon pins *j*² in the side of the frame. Their inner ends are connected to the cross-bar *j* by links *j*³. The opposite ends of the levers J² are in the path of projections *j*⁴ on disks J³, which are secured upon the hubs *f* of the cogged segments F. It will be seen that when the hubs *f* and shaft *g* are rocked to withdraw the hub and rim patterns from the mold the projections on disks J³ will strike the outer ends of the levers J² so soon as the patterns are withdrawn from the mold, and the further rocking of the shaft will elevate the pins J J′ and lift the flask vertically a sufficient distance above the follower-board to free the flask-pins from the flask and the arm-patterns from the mold.

The pulley-arms E³ are preferably made in two pieces divided on a line with the ring B′, as indicated in dotted line, Fig. 3. The purpose of this arrangement is to avoid fitting separate arms for different-sized pulleys, as the same-sized hub is frequently used for various-sized pulleys. The part of the arm-pattern adjacent to the hub may be left in position and only the parts between that and the rim changed when a larger or smaller sized pulley is to be molded. Indeed, the arm-pattern may be permanently secured upon the rings B², of different sizes, and the other parts permanently secured upon the supporting-ring B′, so that it is only necessary to change the rings without removing the arm-patterns from them.

As the principal part of my invention consists in providing a follower-board of three rings, a center one to guide the hub-pattern and an intervening space between the center and outer ring for the rim-pattern, and means for elevating the patterns for forming half a pulley through the follower-board, and retracting them after the mold is formed; I do not desire to limit myself to the particular means shown for protruding and retracting the half-patterns, as it is obvious that many mechanical changes may be made for accomplishing the same result without departing from the spirit or scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In a pulley molding machine the combination of the frame having an annular opening in its top and a recessed depression surrounding said opening, a rigid central hollow column, the follower board composed of annular sections, the outer one supported in the recess in the frame and the inner one supported upon the central column, the half rim pattern, fitted to slide vertically between the outer and intermediate sections of the follower board, the hub pattern fitted to slide vertically through the central section, and means substantially as shown to elevate the

rim and hub patterns above the follower board and retract them after the mold is formed, substantially as shown and described.

2. The combination of the supporting frame, the rigid central column secured therein, a central flanged ring secured upon said column, the ring B^2 supported upon said flange, the outer ring B supported by the flange on the frame, the follower C arranged to slide upon the column, the follower D arranged to slide within it, the rim pattern secured upon the follower C, and the hub pattern secured upon the follower D, the racks *c* and *d* projecting from said followers, the cogged segments and the shafts and levers for operating the same, for the purpose of elevating and lowering the patterns, substantially as shown and described.

3. In a pulley molding machine, the combination of the frame, a central column slotted upon one side, the follower C having racks *c* fitted to slide upon the outside of said column, the follower D having rack *d* projecting through the slot in the column and adapted to slide therein, a follower board composed of rings B, B′, B^2, the rim pattern secured upon the follower C, and the hub pattern secured upon the follower D, cogged segments F engaging the teeth of the racks *c* and having the hubs *f* journaled in the frame of the machine, the shaft *g* journaled in the hubs *f*, the cogged segment G secured upon said shaft between the segments F and engaging the teeth of the rack *d*, the lever F′ secured on hub *f*, the lever G′ having slotted segments g^2, a set screw for adjusting the levers with relation to each other and securing them together, whereby the followers, with the hub and rim patterns, are simultaneously elevated and lowered, substantially as shown and described.

4. In a pulley molding machine, the combination of the frame, two vertically sliding followers mounted therein, the hub pattern secured upon one follower and the rim pattern secured to the other follower, racks *c*, *d*, secured respectively to the followers, cogged segments mounted upon rock shafts for operating said followers, and means for adjusting the vertical position of the followers in relation to each other and holding them in such position, for the purpose of varying the hub relative to the rim, substantially as shown and described.

5. The combination, in a pulley molding machine, of the main frame having annular opening in the top and recessed depression around said opening, a central hollow column rigidly secured to the base of the frame, the follower board formed of three rings, the outer one supported in the recess in the frame top, and the inner ones supported upon the central column, the rim pattern adapted to slide between the outer and intermediate rings of the follower board, the hub pattern fitted to slide through the central ring into the hollow column, removable rim pattern secured upon the follower board and disconnected from the hub and rim patterns, and means, such as shown, to elevate and lower the hub and rim patterns, substantially as set forth.

6. The combination in a pulley molding machine, with the supporting frame, and vertically sliding hub pattern, of the vertically adjustable boss pattern E^2, the bolt *e*, the head of which forms the core print, and the cam *e′*, actuated by said bolt to lock the boss pattern in any position desired, substantially as shown and described.

7. The combination of the frame A, central slotted column A′, the followers fitted to slide within and without said column, the racks projecting from said followers, the hub and rim patterns secured upon said followers, the hubs and cogged segments to actuate the outer follower, the shaft sleeved within the hubs and having a cogged segment secured thereon to actuate the inner follower, the levers for actuating said shaft and hubs, the cam disks secured upon the hubs of the follower actuating segments, the vertically sliding flask elevating pins and their actuating levers in the path of said cam disks, whereby the hub and rim patterns are withdrawn, and the flask raised by a single movement of said levers, substantially as shown and described.

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