



J. A. BRODIN.  
MOLDING APPARATUS.  
APPLICATION FILED FEB. 8, 1904.

3 SHEETS—SHEET 2.

Fig. 3.

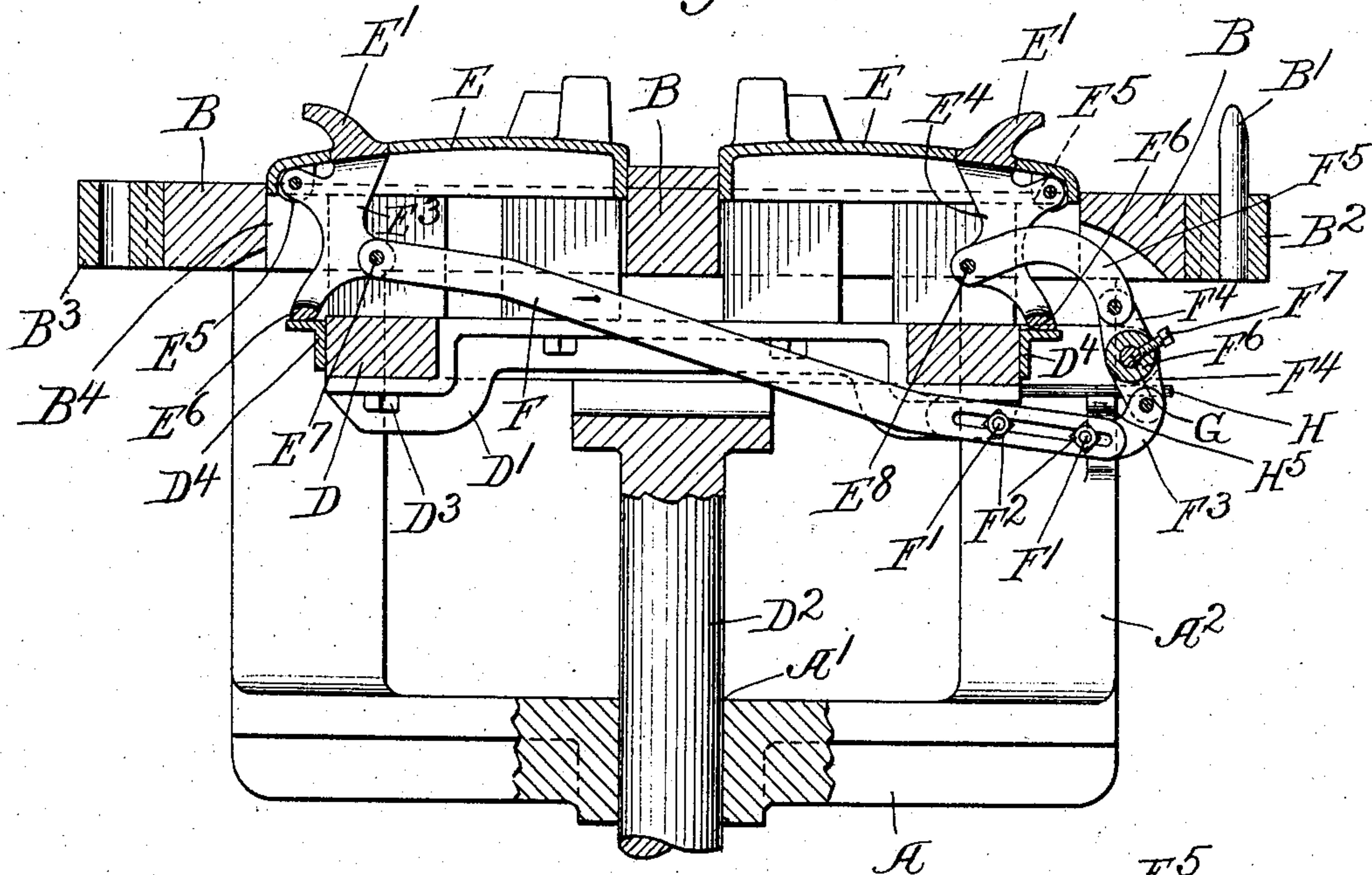
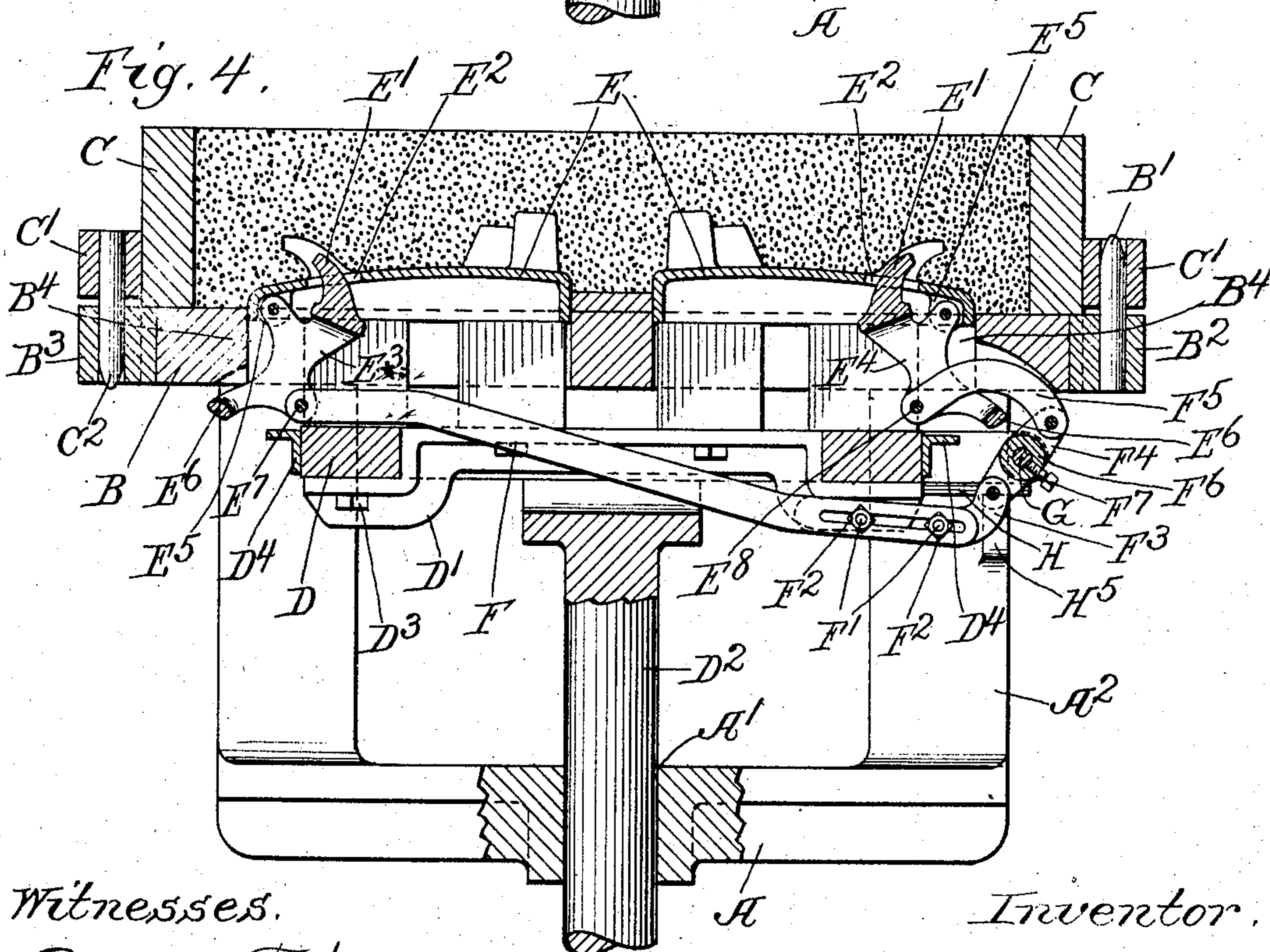


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 6.

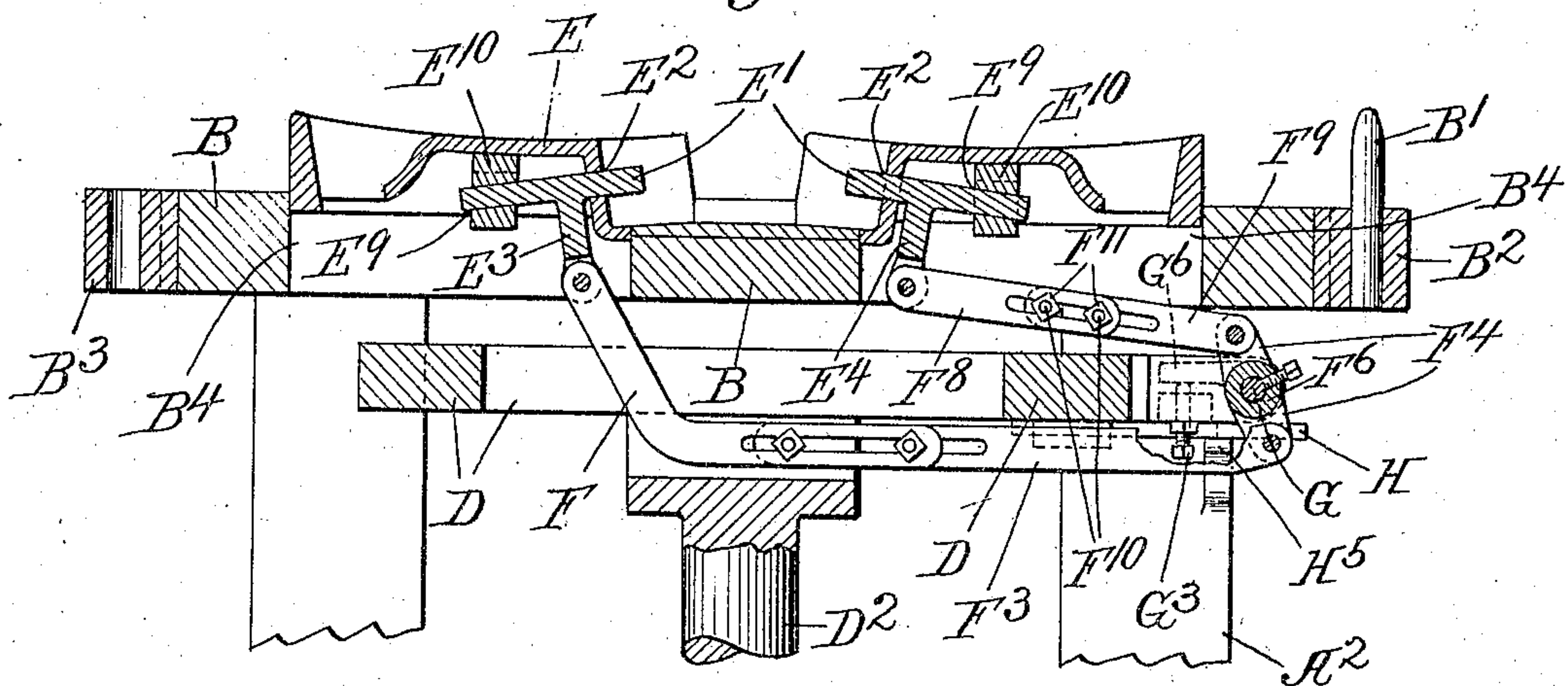


Fig. 5.

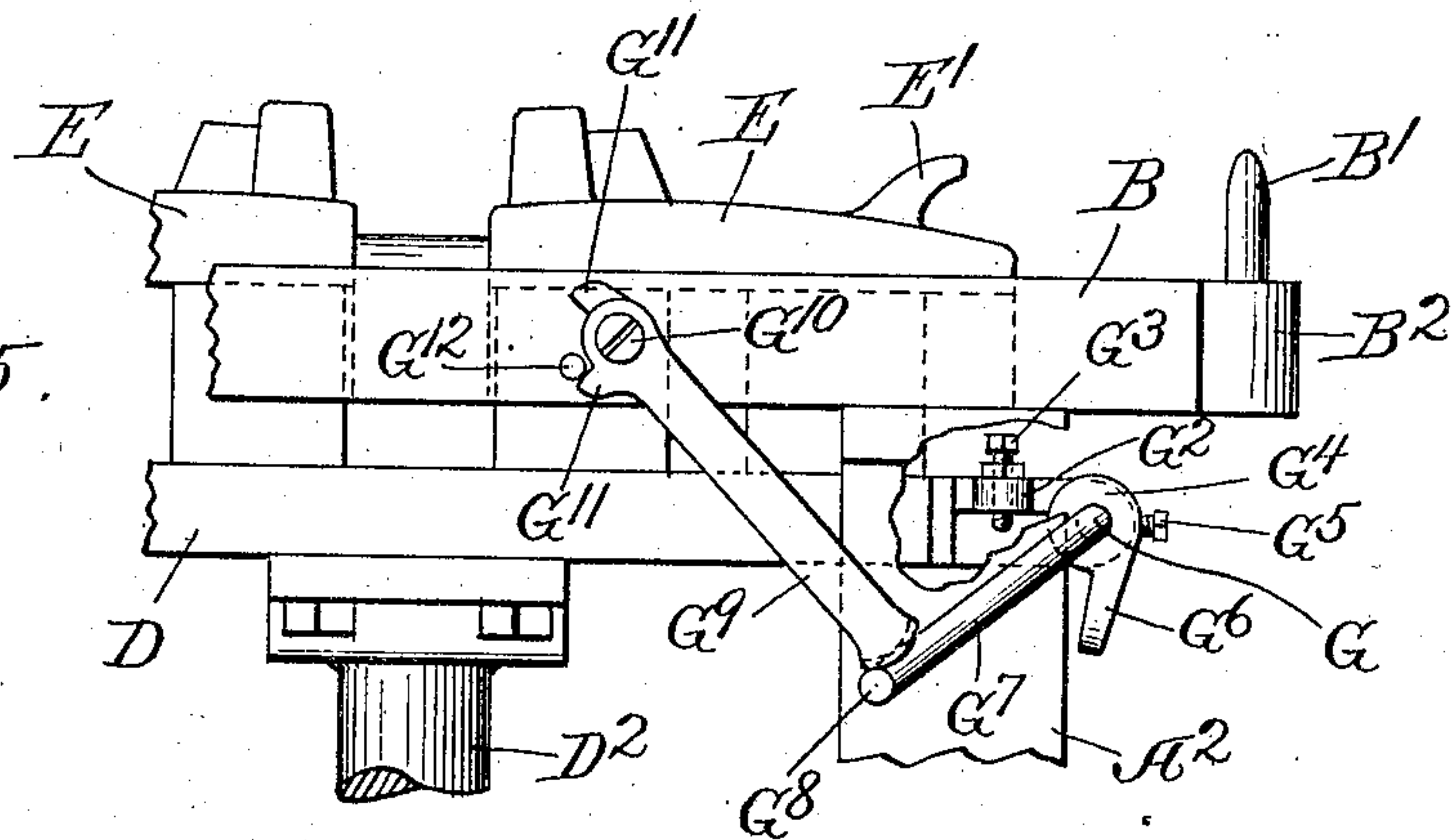
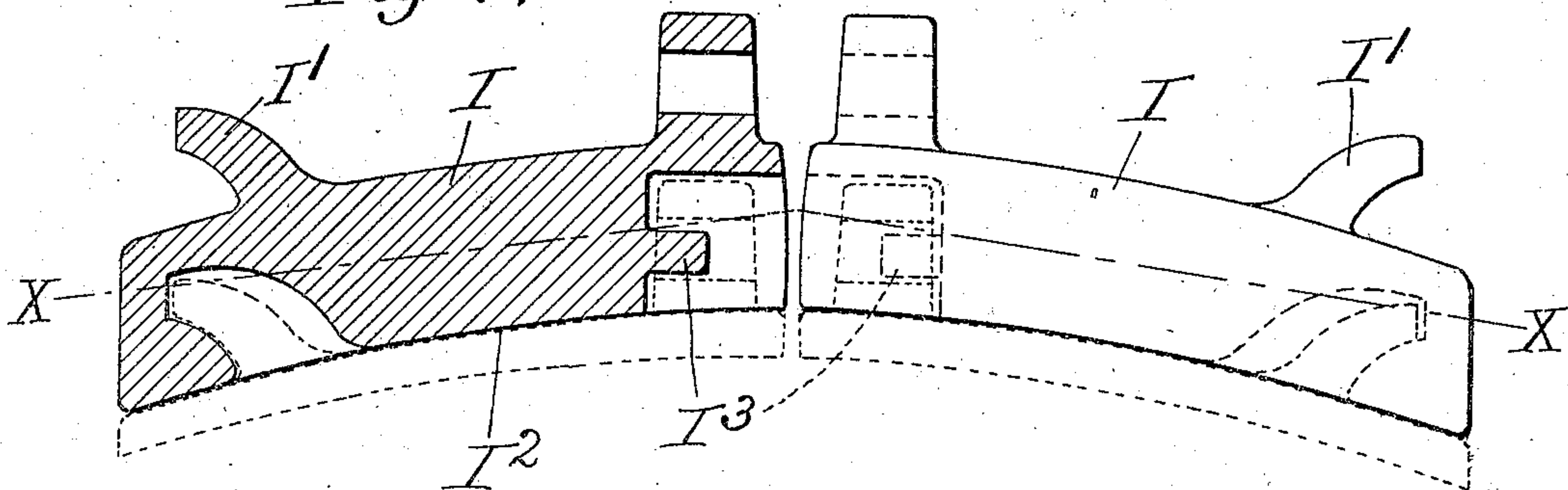


Fig. 7.



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# UNITED STATES PATENT OFFICE.

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## MOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 791,177, dated May 30, 1905.

Application filed February 8, 1904. Serial No. 192,637.

*To all whom it may concern:*

Be it known that I, JOHN A. BRODIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Molding Apparatus, of which the following is a specification.

My invention relates to machines or devices for making molds for castings.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a molding-machine with the pattern in place. Fig. 2 is an inverted plan view of the pattern-carrier and pattern. Fig. 3 is a vertical section on line 3 3 of Fig. 1. Fig. 4 is a vertical section on the same line with the parts in another position, showing the pattern ready to be lowered after the mold has been made. Fig. 5 is a detail side elevation to show the latch for locking the patterns into position. Fig. 6 is a vertical section similar to Fig. 3 of a modified form of the machine. Fig. 7 is a side view, partly sectional, of an interlocking brake-shoe, the dotted line *xx* showing the line of parting of the drag and cope.

Like parts are indicated by the same letters in all the figures.

Referring to Figs. 1 to 5, inclusive, A is the frame of the machine supporting the stripping-plate B, which carries the flask C, secured to it on one side by the pin B', integral with and extending upward from the projecting lug B<sup>2</sup> on the stripping-plate B and passing through a perforation in the rim C' of the flask, and on the other side by the pin C<sup>2</sup>, integral with and extending downward from the rim C' and passing through a like perforation in the lug B<sup>3</sup> on the stripping-plate B. D is a rectangular frame braced underneath by the horizontal arms D', carrying the pattern E and resting upon a vertical support D<sup>2</sup>, which moves freely through an aperture A' in the frame A, so as to allow the pattern E to be raised and lowered through apertures B<sup>4</sup> in the stripping-plate B. The pattern E is secured to the carrier D by bolts D<sup>3</sup> or in any preferred manner and has two movable hook-shaped parts E', turned in opposite directions and projecting through the apertures E<sup>2</sup> in the pattern

E, so as to give the desired contour to the mold at these places, the apertures E<sup>2</sup> being so conformed as to contact closely with the projecting parts E' when such parts are at their farthest extension therethrough. The projecting parts E' are integral with two like arms E<sup>3</sup> E<sup>4</sup>, which are pivoted between pairs of downwardly-extending lugs E<sup>5</sup> of the pattern E and have convexed faces E<sup>6</sup>, which rest upon the horizontal faces of angle-irons D<sup>4</sup> on the sides of the carrier D when the projecting parts E' are at their farthest extension through the apertures E<sup>2</sup>. At a point upon the arm E<sup>3</sup> below its connection with the pattern E is pivoted by the pin E<sup>7</sup> one end of the bent bar F, the other end being slotted, so as to make an adjustable connection by means of bolts F' and nuts F<sup>2</sup> with the slotted end of the bar F<sup>3</sup>, which at its other end is pivotally connected to one end of the lever-arm F<sup>4</sup>. The other extremity of lever F<sup>4</sup> is pivotally connected to an upwardly-curved arm F<sup>5</sup>, similarly joined to the other arm, E<sup>4</sup>, of the two like arms by the pin E<sup>8</sup> at a point below its connection with the pattern E. The lever-arm F has a hub F<sup>6</sup> at its middle embracing the shaft G, to which it is rigidly secured by the screw F<sup>7</sup>. The shaft G turns in bearings in the supporting-arms G', which are secured to and project horizontally from one end of the carrier D and are provided with lugs G<sup>2</sup>, having threaded perforations for the reception of the set-screws G<sup>3</sup>, one of which is headed upward, as shown in Fig. 5, the other in the opposite direction. In alignment with the set-screws G<sup>3</sup> on the shaft G are the hubs G<sup>4</sup>, fastened to the shaft G by the screws G<sup>5</sup> and carrying oppositely-pointing stop-lugs G<sup>6</sup>, which contact with the ends of the set-screws G<sup>3</sup>, so as to limit the turn of the shaft G in each direction. One end of the shaft G terminates on the crank G<sup>7</sup> and handle G<sup>8</sup>. Upon the crank G<sup>7</sup> rests the grooved end of the latch G<sup>9</sup>, pivoted at G<sup>10</sup> on the stripping-plate B and having the stop-lugs G<sup>11</sup>, which engage with the pin G<sup>12</sup> to keep the latch from turning too far either way. This form of my machine as illustrated is particularly adapted for making the upper portion of molds for casting interlocking brake-shoes, as indicated by I, Fig. 7, and particularly the



aperture in the mold for forming the projecting part I'.

Fig. 6 is a vertical section, similar to Fig. 3, of a modified form of my machine, wherein the projecting portions E' of the pattern E extend approximately horizontally through the apertures E<sup>2</sup> in the upright faces of the pattern, necessitating a form of mechanism somewhat different, though without departure from the scheme of my invention as above described. The parts E' are in this form made to slide through slots E<sup>9</sup> in vertical supporting parts E<sup>10</sup> of the pattern E and are integral with like downwardly-extending arms E<sup>3</sup> E<sup>4</sup>, which are joined to the opposite ends of the lever-arm, F<sup>4</sup> by like pivotal connections—viz., arm E<sup>3</sup> by the adjustable slotted and bolted arms F and F<sup>3</sup>, as in the form of machine heretofore described, and the arm E<sup>4</sup> by two similar slotted arms F<sup>8</sup> and F<sup>9</sup>, rigidly fastened together by the bolts F<sup>10</sup> and nuts F<sup>11</sup>. I have also provided the latches H. (See Fig. 2.) These latches are particularly required in the form of my machine last described because of the peculiar shape and position of the projecting parts of the pattern, which might be seriously damaged if the pattern were lowered while such projections were extended. I may also, however, use these latches upon the other form of machine for the same purpose. These latches H have perforations H' at one end, through which pass freely the pins H<sup>2</sup>, rigid with the shaft G and extending downward and outward therefrom, the other ends of the latches H sliding through supports H<sup>3</sup> on the under side of the carrier D. On the outer sides of the latches H are the lugs H<sup>4</sup>, which are slightly above the inwardly-extending lugs H<sup>5</sup> on the upright support A<sup>2</sup> of the plate B when the pattern-carrier D reaches its highest point. When the crank G<sup>7</sup> and shaft G are turned to set the projecting parts E in position, the lugs H<sup>4</sup> will be drawn by the outward revolution of the pins H<sup>2</sup> so as to engage the lugs H<sup>5</sup> and the pattern E, held in position on the machine. On this form of machine can be made the lower portions of the molds for casting interlocking brake-shoes, as shown at I<sup>2</sup>, Fig. 7, and in particular the apertures in such molds which form the projecting parts I<sup>3</sup> of such castings.

The purpose of my invention, it will be seen from the foregoing, is to provide a means for making molds for castings which will obviate the necessity of coring, the means provided involving the use of a pattern having those parts which would, if rigid with the rest of the pattern, prevent the separation of pattern and mold, made capable of being first withdrawn from contact with the mold, so that the free separation of mold and pattern becomes possible.

In operation (referring to Figs. 1 to 5, inclusive) the projecting parts E' are set by

turning the crank-handle G<sup>8</sup> until the convexed faces E<sup>6</sup> rest on the angle-irons D<sup>4</sup>, the turn of the shaft G being arrested at this point by one of the stop-lugs G<sup>2</sup> contacting with its set-screw G<sup>3</sup>. The latch G<sup>9</sup>, the grooved end of which follows along the crank G<sup>7</sup>, prevents the projecting parts E' from being forced back by impact of the sand in the process of making the mold. When this process is completed, the latch G<sup>9</sup> is lifted and the crank G<sup>7</sup> turned in the opposite direction, so as to withdraw the projecting parts E' through the apertures E<sup>2</sup> enough so that the pattern may be lowered without injury to the mold. The backward turn is arrested at the proper point by the contact of the other stop-lug G<sup>2</sup> with its set-screw G<sup>3</sup>. In the modified form of machine the horizontal projections E' are set in manner similar, the latch H operating in the way above described to lock the carrier to the frame and prevent injury to the projecting parts E' by an accidental lowering of the carrier. When the mold is completed, in similar manner the projecting parts E' are retired by being slid backward through apertures E<sup>2</sup> and slots E<sup>9</sup> in the supports E<sup>10</sup>.

While the devices above described in specification and drawings are particularly designed for making sand molds for interlocking brake-shoes, it will be clear that my invention could be used in other cases where similar conditions are met with. It will also be clear that while I have described in detail the various constructions embodying my invention these constructions may be varied in many particulars and parts omitted and others used with parts not herein shown without departing from the spirit of my invention. I therefore do not limit myself to the devices illustrated.

I have used the word "arm" to refer to the connection between the projecting part or pattern projection and the rock-shaft or driving device; but I also use the word "link" for the same purpose, since it in ordinary construction involves a link-like motion as distinguished from a rotary motion in the operation of the devices. The driving mechanism or rock-shaft is preferably mounted on or in some way associated with or placed so as to operate in connection with the pattern.

I claim—

1. In a molding-machine the combination of a supporting-frame, a flask, a movable pattern-carrier, a pattern thereupon having apertures therein, projecting parts adapted to extend through the pattern, a rotating device associated with the pattern-carrier, adjustable arms connecting the projecting parts with the rotating device so that when such device is rotated, the projecting parts will be simultaneously moved in and out of such apertures, and means for operating such rotating device.

2. In a molding-machine the combination of a supporting-frame, a flask, a movable pat-



tern having parts thereof capable of motion independent of the rest of the pattern, means for simultaneously moving such parts comprising a rotating device having connections at different points with each of such parts, a slot in the supporting-frame, and a latch associated with such rotating device and adapted to be drawn into and out of such slot when the rotating device is operating.

3. In a molding-machine the combination of a supporting-frame, a flask, a movable pattern adapted to be reciprocated in and out of the flask having an aperture therein, a projecting part movably connected with the pattern and adapted to extend through such aperture, a rotating device associated with the pattern, an arm connecting the projecting part with the rotating device so that when such device is rotated, the projecting part will be moved in and out of such aperture, means for operating such rotating device, and means for adjustably limiting the amount of rotation of such device in each direction.

4. In a molding-machine, the combination of a supporting-frame, a flask, a movable pattern-carrier, a pattern thereupon having an aperture, a projecting part adapted to extend through the aperture, a rotating device associated with the pattern-carrier, an adjustable arm connecting the projecting part with the rotating device so that when such device is rotated, the projecting part will be moved in and out of such aperture, and means for operating such rotating device.

5. In a molding-machine, the combination of a flask, a pattern adapted to be reciprocated in and out of the flask, a projection on such pattern movably connected therewith and extending therethrough, and means for withdrawing such projection from its aperture in the mold, such means comprising a rock-shaft with a rotating arm thereon and a pivoted link connecting such arm with the projecting part.

6. In a molding-machine, the combination of a flask with a movable pattern adapted to

be received by the flask, pattern projections extending through apertures in the face of the pattern and in different directions into the flask, and movably mounted on the pattern, a driving part, and connections each containing a separate link from such driving part to such pattern projections whereby when the driving part is operated the movable projections are retracted within the pattern.

7. In a molding-machine, the combination of a flask, a movable pattern adapted to be received by the flask, a projecting part mounted on the pattern and extending through an aperture in the face thereof into the flask, a driving device associated with the pattern, an adjustable connecting device containing a link from the driving device to the projecting part so that when such driving part is operated the projecting part will be retracted.

8. In a molding-machine, the combination of a flask with a movable pattern adapted to be received by the flask, pattern projections extending through apertures in the face of the pattern and in the desired directions into the flask, and movably mounted on the pattern, a driving part, connections from such driving part to such pattern projections, and an adjusting device in one of such connections whereby when the driving part is operated the movable projections are retracted within the pattern, and by operating the adjustment the pattern projections may be made effectively equal.

9. In a molding-machine, the combination of a flask, a movable pattern, apertures in such pattern, projecting pattern parts extending through such apertures in contrary directions, and means for simultaneously withdrawing such projecting pattern parts, comprising a driving part and a connection, including a link from such driving part to each of such projecting pattern parts.

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