No. 859,977. PATENTED JULY 16, 1907.

J. J. RIGBY.

DOUBLE ACTION PRESS.

APPLICATION FILED JULY 30, 1904.

4 SHEETS—SHEET 1.

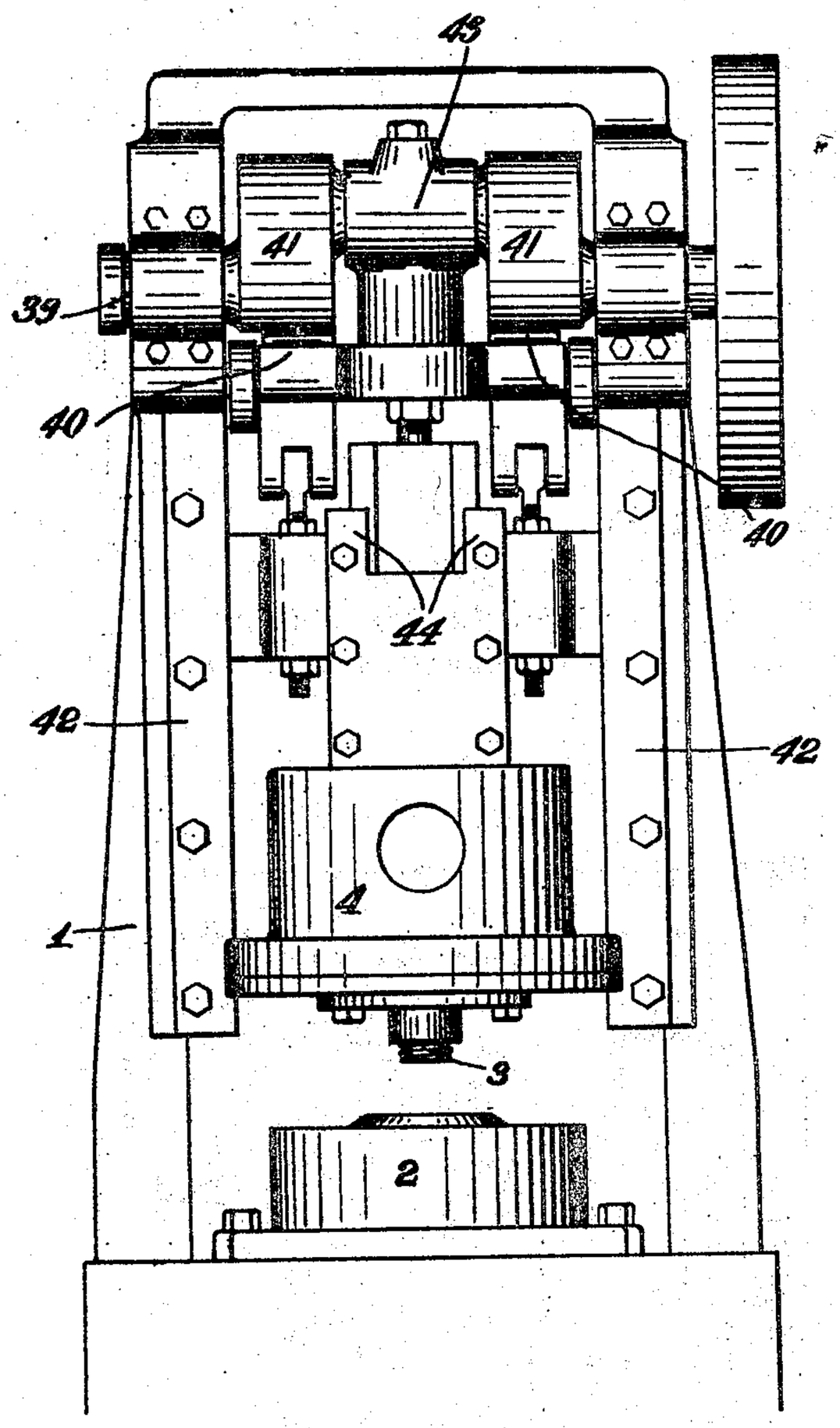

Fig. 1

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4 SHEETS—SHEET 2.

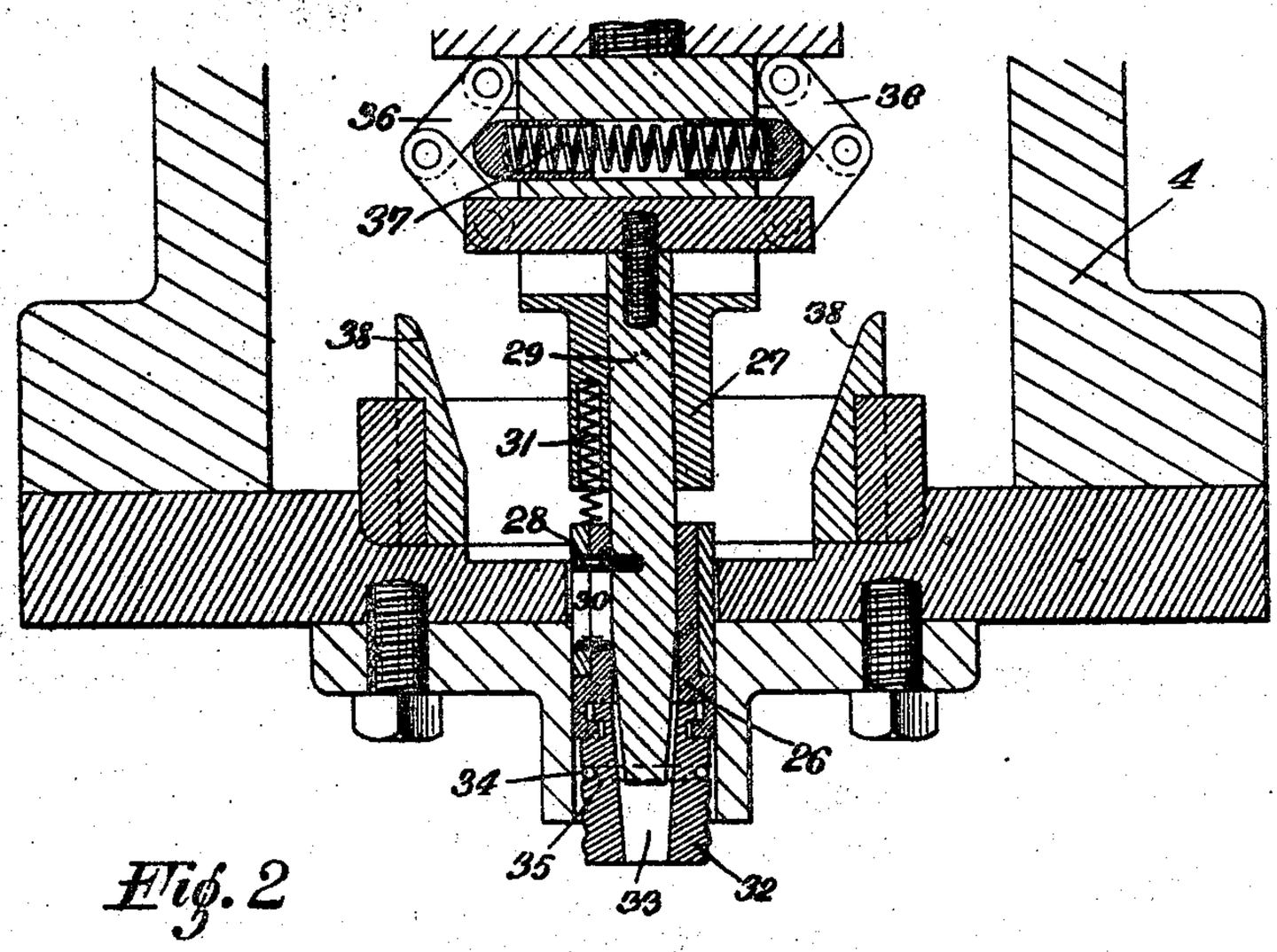

Fig. 2

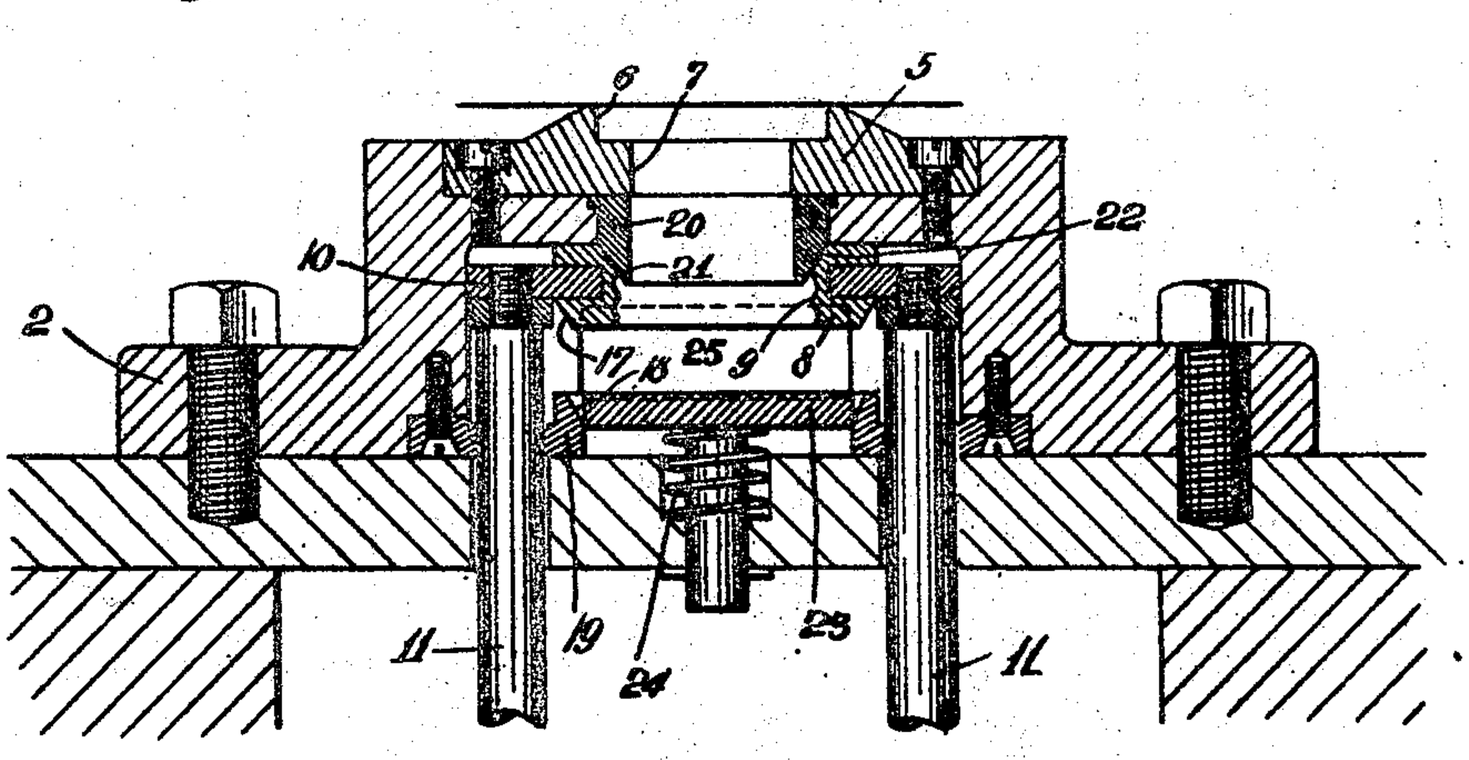

Fig. 3

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4 SHEETS—SHEET 3.

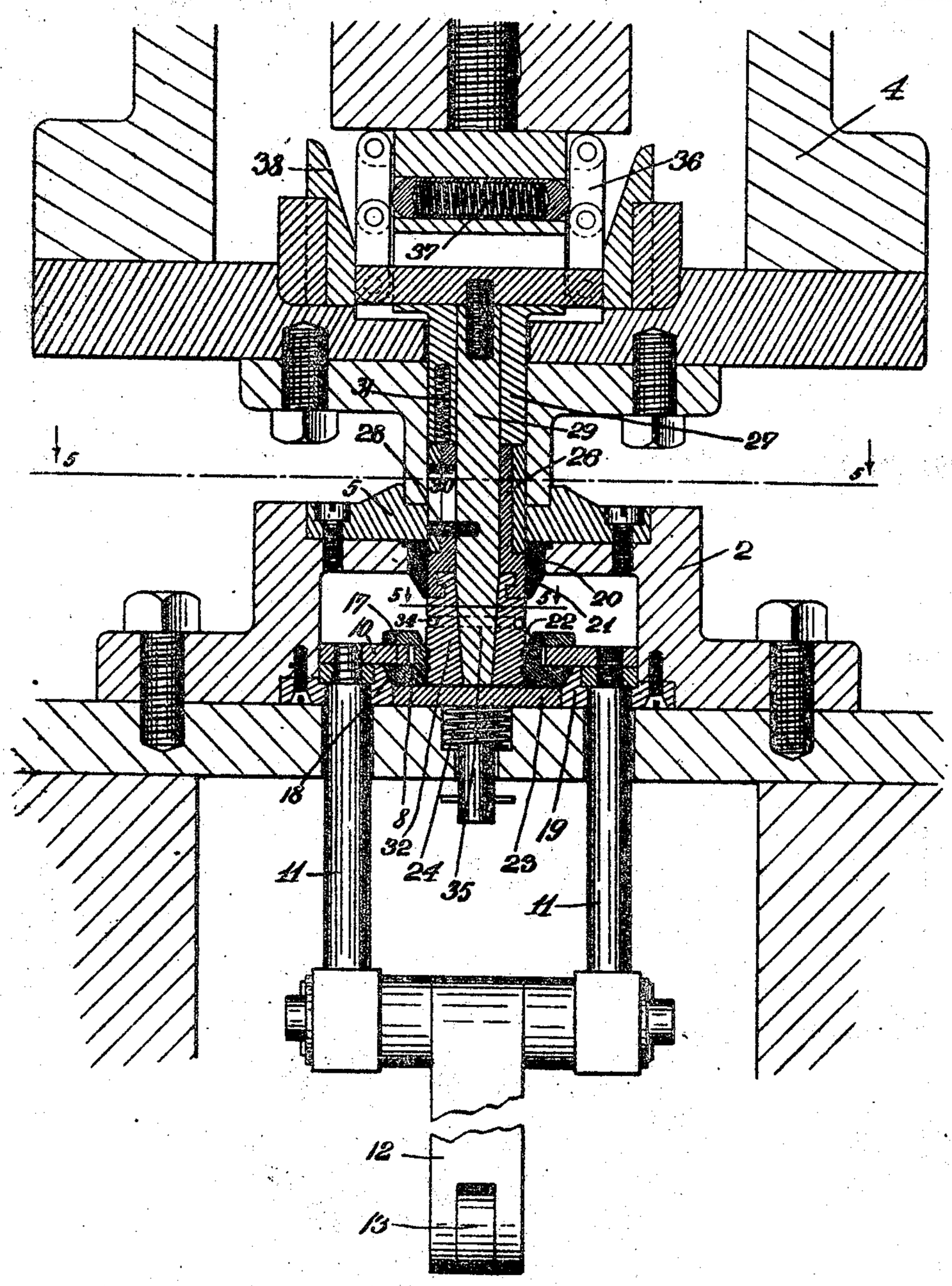

Fig. 4

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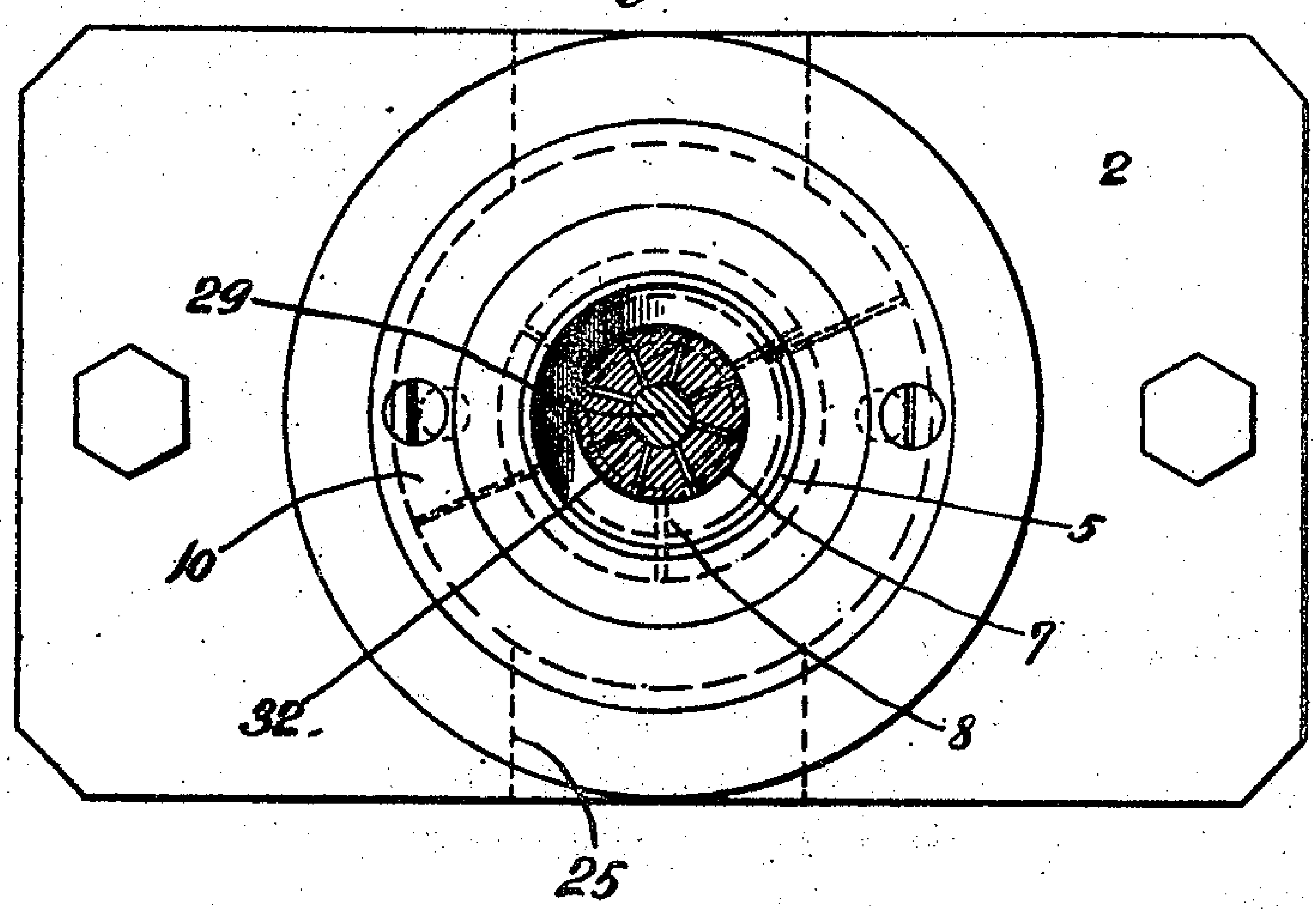
4 SHEETS—SHEET 4.

Fig. 5



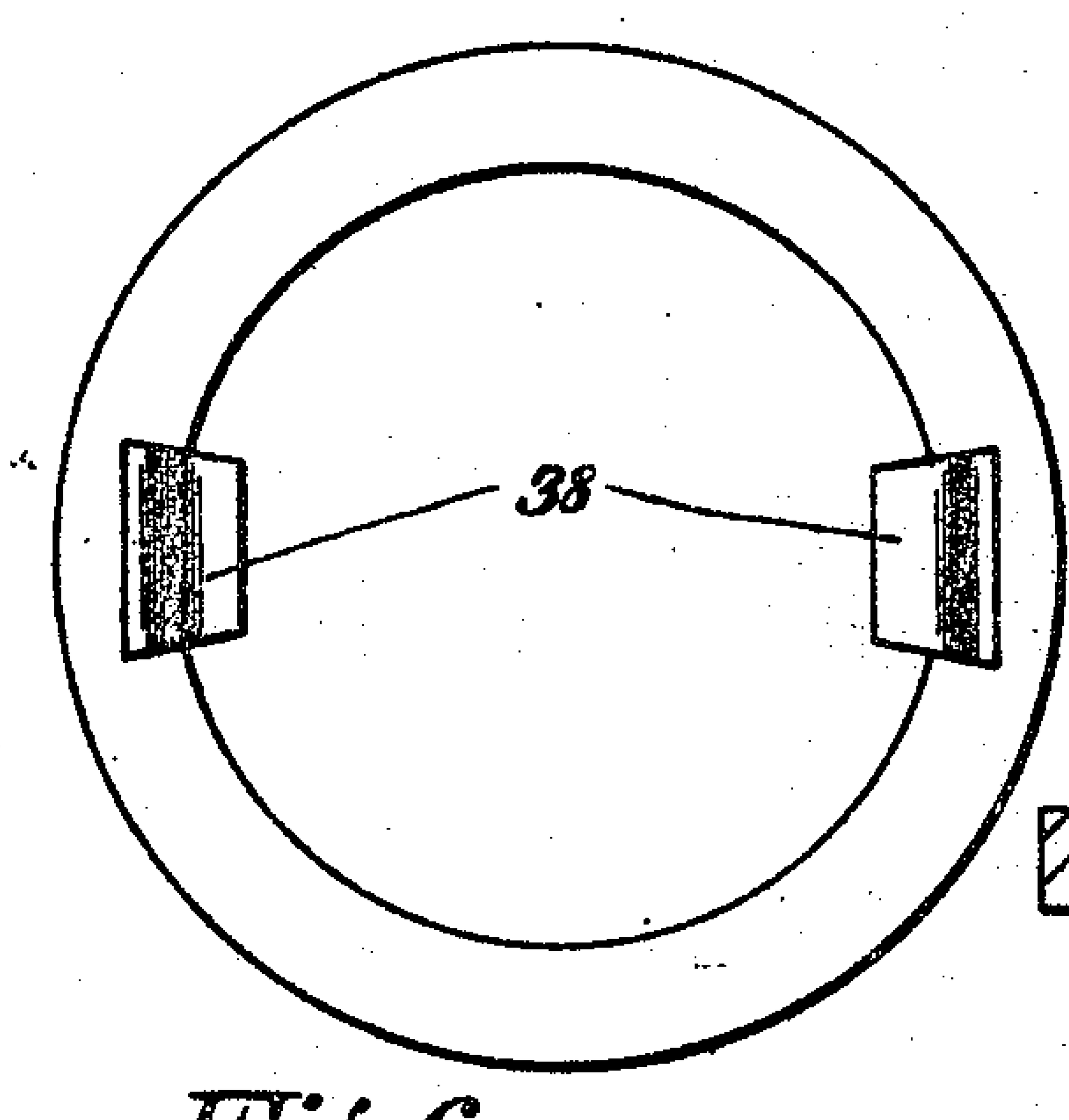
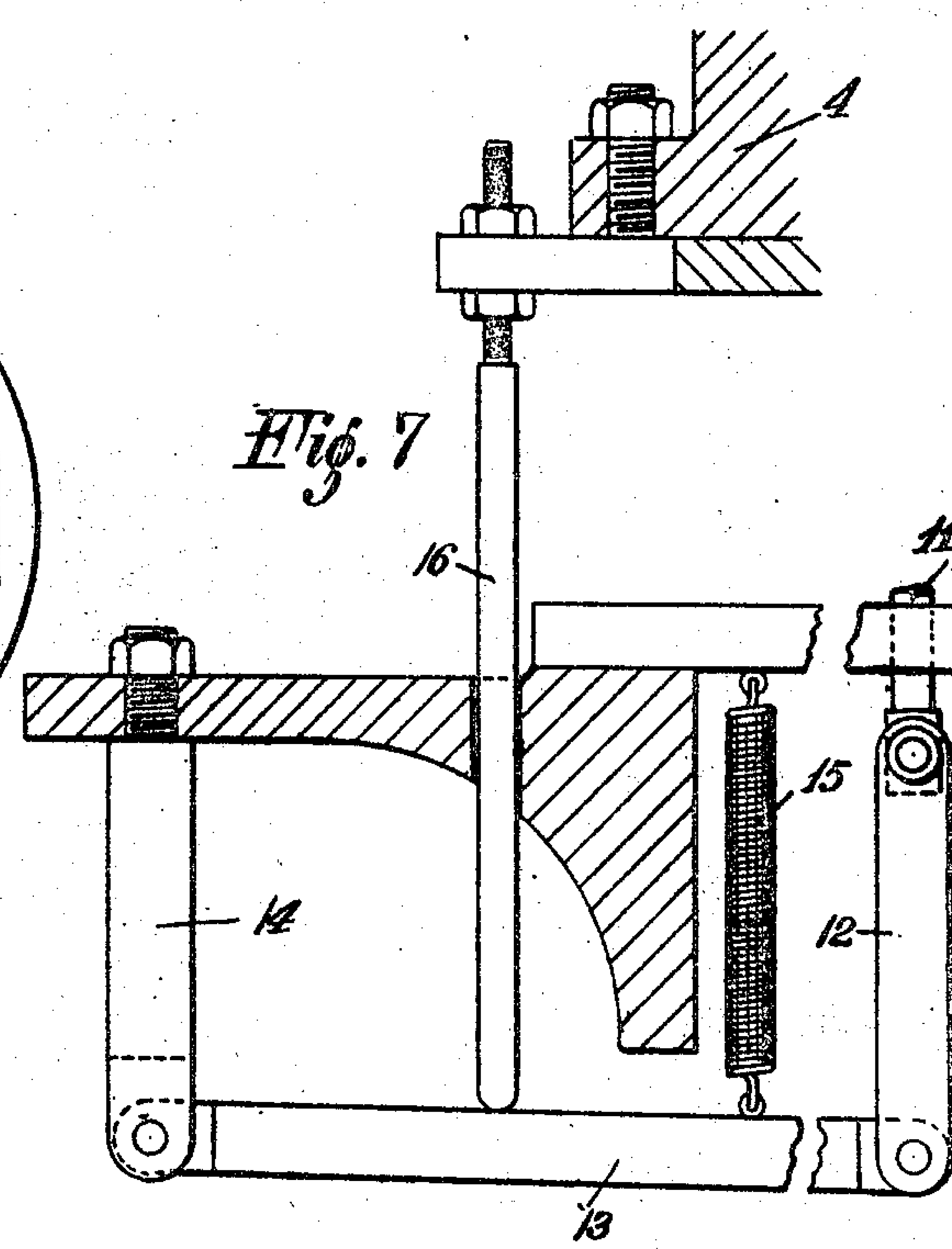


Fig. 6

Fig. 7



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN J. RIGBY, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, A CORPORATION OF WEST VIRGINIA.

DOUBLE-ACTION PRESS.

No. 859,977. Specification of Letters Patent. Patented July 16, 1907.

Application filed July 30, 1904. Serial No. 218,927.

To all whom it may concern:

Be it known that I, JOHN J. RIGBY, a citizen of the United States of America, and a resident of New York, borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Double-Action Presses, of which the following is a specification.

My invention has reference to double action presses, and relates more particularly to a press for cutting and drawing a blank of sheet material into a cap for bottles or other containing vessels and for pressing screw threads into the downwardly projecting flange of the cap, all in one operation. Heretofore two separate machines have been necessary to perform these operations, one for cutting and drawing the blank, and the other for forming it with screw threads.

My machine contemplates the construction of a press or machine in which a sheet of material is cut, drawn and provided with screw threads on the downwardly projecting flange in a single operation.

In the present instance, I have shown my invention applied to a press for making caps for bottles or other containing vessels, but it is obvious that the structure may be used for other purposes than the one stated above.

The particular description which follows will disclose the novel features of construction and combinations of parts comprising my invention.

In the drawings: Figure 1 is a general view of a double action press of a well known type, showing my invention applied to the same. Fig. 2 is a sectional view through the die, punch and blank holder, showing the press in its open position. Fig. 3 shows the development of the blank. Fig. 4 is a view similar to Fig. 2 with the parts in their closed position. Fig. 5 is a view in section on the irregular line 5—5 of Fig. 4. Fig. 6 is a detail view of part of the means for expanding the chuck of the punch. Fig. 7 is a detail view of the means for moving the vertically movable ring of the die down.

Similar characters of reference indicate corresponding parts in the different views.

1 indicates a framework of any suitable construction for properly supporting the various parts comprising the machine.

2 is the die member and 3 denotes the punch, while 4 is the blank holder. The die is composed of an upper stationary ring 5 having the cutting edge 6 and the drawing up portion 7, constituting, in connection with the punch and blank holder, means for cutting and drawing up the blank in the usual way. The said die is further provided with a lower expansible and vertically movable split ring 8 having an internal threaded surface 9. This ring is supported by another split ring 10 carried by the uprights 11 which are vertically movable, and connected to the link 12, which, in turn, is attached to the pivoted rod 13 carried by the member 14. A spring 15 normally tends to keep the uprights 11 and consequently the lower expansible ring 8 in their uppermost positions. The ring 8 is moved downward, in this instance, by means of the blank holder, through the instrumentality of the plunger 16, bearing against the pivoted member 13. When the blank holder descends, the plunger 16 coming in contact with the pivoted member 13 will move the ring 8 downward, and this latter being provided with the lower inclined surface 17 engaging with the opposed inclined surfaces 18 on the stationary ring 19 in the bottom of the die will not only cause the said ring 8 to move downwards but also to become contracted by reason of the said opposed inclined surfaces.

Between the upper stationary ring and the lower expansible and vertically movable ring is an intermediate ring 20 stationarily located below the ring 5 and of a slightly greater diameter than that of the said ring 5. This ring 20 is provided with an inclined surface 21 which, upon coming in contact with the upper inclined surface 22 of the ring 8 will expand the same as it rises.

23 is a knock out pad and is normally held in its uppermost position by means of the spring 24 so that as the punch rises the said knock out pad will lift the finished article and allow it to drop out through the ejection port 25 by gravity, inasmuch as the press is generally mounted slantingly on the framework.

The punch is provided with a head 26 adapted to yield when drawing the blank, so that a motion of about one-half an inch is lost during the drawing up of the blank. This head 26 is moved with the member 27 by means of the screw 28 entering the core 29, the said screw 28 playing in the slot 30 so as to permit its yielding motion. A spring 31 normally tends to keep the head 26 in its lowermost position with regard to the member 27 of the punch.

The head 26 is provided at its lowermost end with an expansible chuck 32, threaded on its external surface and provided with a central tapering aperture 33. This chuck 32 is split into a number of parts like the split rings in the die, and is normally held in its contracted position by means of the spring 34, resting in the groove 35. The core 29 tapers at its lower end, and is suspended from the member 27 by two toggles 36 which are normally bent into a contracted position by means of the spring 37, interposed between the two toggles. Mounted on the blank holder are two inclined projections 38 which, when the punch descends, straighten the toggles 36 thereby moving the tapering core downward and ex-

panding the chuck 32. The blank holder is operated in this instance from the shaft 39 by means of the rollers 40 and cams 41, and slides in the ways 42. The punch is conveniently operated from the same shaft by means of the crank pin 43 and slides in the ways 44.

A sheet of material is fed to the machine in any suitable way, whereupon the blank holder descends and cuts the blank and in addition thereto moves down the lower expansible and vertically movable ring 8 which latter, in turn, depresses the knock out pad and is contracted by coming in contact with the inclined surface 18. Then it dwells, and the punch descends forcing the blank into the drawing up portion 7 thereby drawing up the blank, and while so doing, the head of the punch yields and loses a motion, in this case, of one-half of an inch. The continued motion of the punch moves the blank which is now drawn up, into the intermediate stationary ring 20. This ring being of a diameter somewhat greater than the drawing up ring will free the punch and blank from the jammed position occupied in the drawing up ring, and will allow the head of the punch to make up the lost motion, by dropping down, carrying the blank with it, in addition to its regular continued motion. The toggles 36 now come in contact with the projections 38 of the blank holder thereby moving down the core 29 and expanding the chuck 32. This has the effect of pressing the blank with the screw threads between the externally threaded surface of the chuck 32 and the internally threaded surface of the ring 8. The punch and blank holder now ascend thereby contracting the chuck 32 and expanding the ring 8. The knock out pad 23 rises and allows the blank to drop out through the port 25.

What I claim is:

1. In a double action press, the combination with a die, comprising in part: an upper stationary ring and a lower vertically movable and expansible ring internally threaded, of a blank holder, and a punch having an expansible chuck externally threaded for coöperating with the die.

2. In a double action press, the combination with a die having a cutting edge, a drawing up portion and a threaded bottom die, of a blank holder, and a punch, and means for operating the said blank holder and punch so as to progressively cut and draw a blank, and press a screw thread in the drawn-up portion of the blank.

3. In a double action press, a punch comprising in part: an expansible chuck normally held in its contracted position and having a central tapering aperture, a tapering core, toggles suspending the said tapering core and normally bent into a contracted position, and means for straightening the said toggles as the punch descends thereby causing the core to engage with the tapering aperture, and the chuck to expand.

4. In a double action press, the combination with a die, of an upper stationary ring, and a lower vertically movable and expansible ring internally threaded, in the said die, a blank holder, means for moving the lower ring of the die downwards and contracting it as the blankholder descends, a punch, an expansible chuck, carried by the said punch, externally threaded, and means for expanding the said chuck as the punch descends.

5. In a double action press, the combination with a die, of an upper stationary ring, a lower expansible and vertically movable ring internally threaded, means for normally holding the vertically movable ring in its uppermost and expanded position, a blank holder, means operated by the descent of the blank holder for moving the vertically movable ring down thereby contracting the same, a punch, a head on the said punch adapted to yield on the draw, an expansible chuck carried by the said head, normally in its contracted position and externally threaded, and means for expanding the chuck subsequently to the drawing operation of the punch.

6. In a double action press, the combination with a die, of an upper stationary ring, a lower expansible and vertically movable ring internally threaded and having an upper and a lower inclined surface, an intermediate stationary ring of a greater diameter than the upper ring having an inclined surface for expanding the lower vertically movable ring when in its uppermost position, a ring located in the bottom of the die having an inclined surface for contracting the vertically movable ring when in its lowermost position, means for normally holding the vertically movable ring in its uppermost position, a blank holder, means operated by the descent of the blank holder for moving the vertically movable ring down, a punch, a head on the said punch adapted to yield on the draw, an expansible chuck carried by the said head normally in its contracted position and externally threaded, and means for expanding the chuck subsequently to the drawing operation of the punch.

7. In a double action press, the combination with a die, comprising in part: an upper stationary ring and a lower vertically movable and expansible ring, of a blank holder, and a punch having an expansibe chuck for coöperating with the die.

8. In a double action press, the combination with a die, of an upper stationary ring, and a lower vertically movable and expansible ring in the said die, a blank holder, means for moving the lower ring of the die downwards and contracting it as the blank holder descends, a punch, an expansible chuck, carried by the said punch, and means for expanding the said chuck as the punch descends.

9. In a double action press, the combination with a die, of an upper stationary ring, a lower expansible and vertically movable ring, means for normally holding the vertically movable ring in its uppermost and expanded position, a blank holder, means operated by the descent of the blank holder for moving the vertically movable ring down thereby contracting the same, a punch, a head on the said punch adapted to yield on the draw, an expansible chuck carried by the said head, normally in its contracted position, and means for expanding the chuck subsequently to the drawing operation of the punch.

10. In a double action press, the combination with a die, of an upper stationary ring, a lower expansible and vertically movable ring having an upper and a lower inclined surface, an intermediate stationary ring of a greater diameter than the upper ring, having an inclined surface for expanding the lower vertically movable ring when in its uppermost position, a ring located in the bottom of the die having an inclined surface for contracting the vertically movable ring when in its lowermost position, means for normally holding the vertically movable ring in its uppermost position, a blank holder, means operated by the descent of the blank holder for moving the vertically movable ring down, a punch, a head on the said punch adapted to yield on the draw, an expansible chuck carried by the said head, normally in its contracted position, and means for expanding the chuck subsequently to the drawing operation of the punch.

Signed at Brooklyn New York this 29th day of July 1904.

JOHN J. RIGBY.

Witnesses:

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CHAS. FLEISCHMAN.