

No. 778,103.

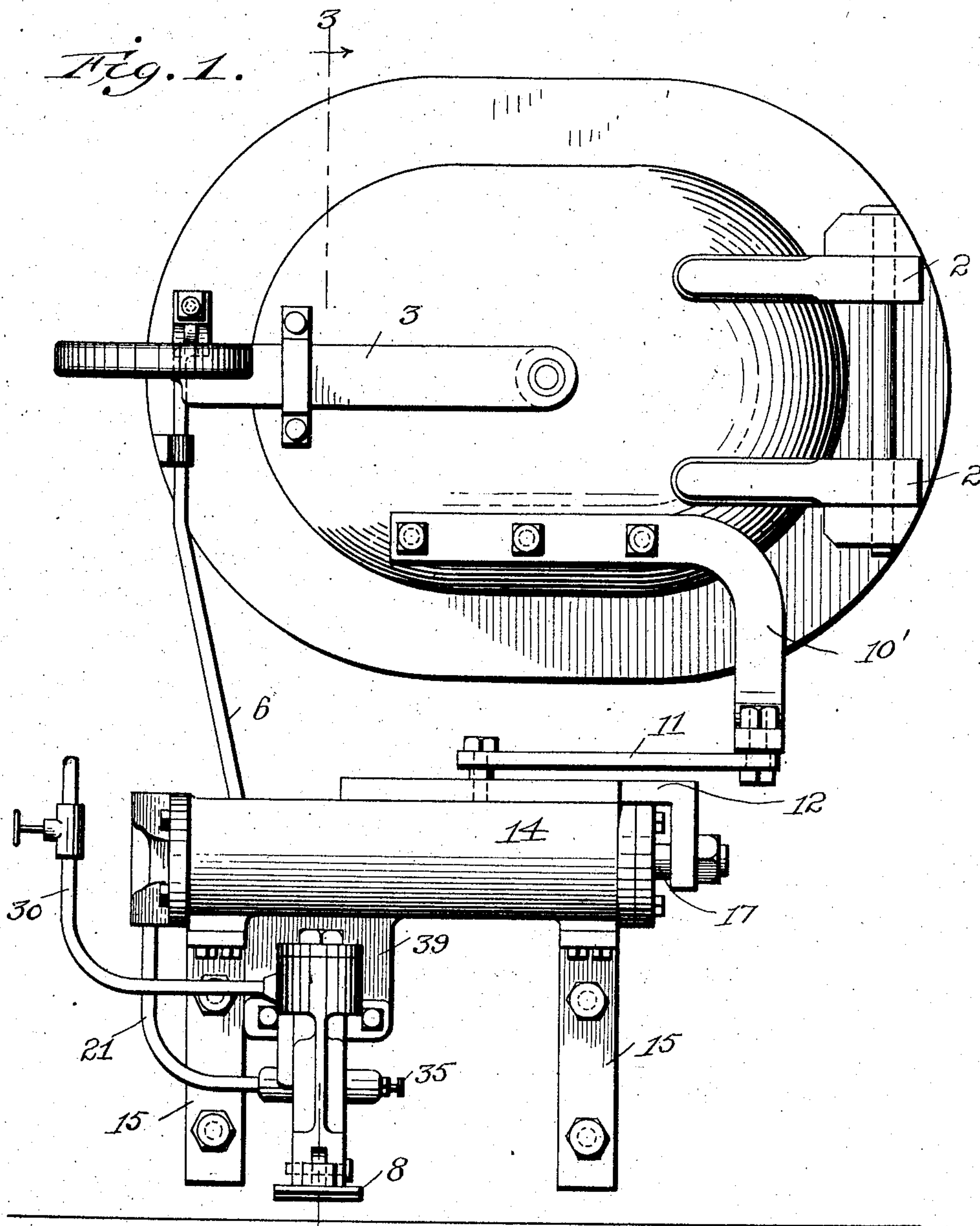
PATENTED DEC. 20, 1904.

F. L. BREWER.
DOOR OPERATING APPLIANCE.

APPLICATION FILED MAR. 22, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES

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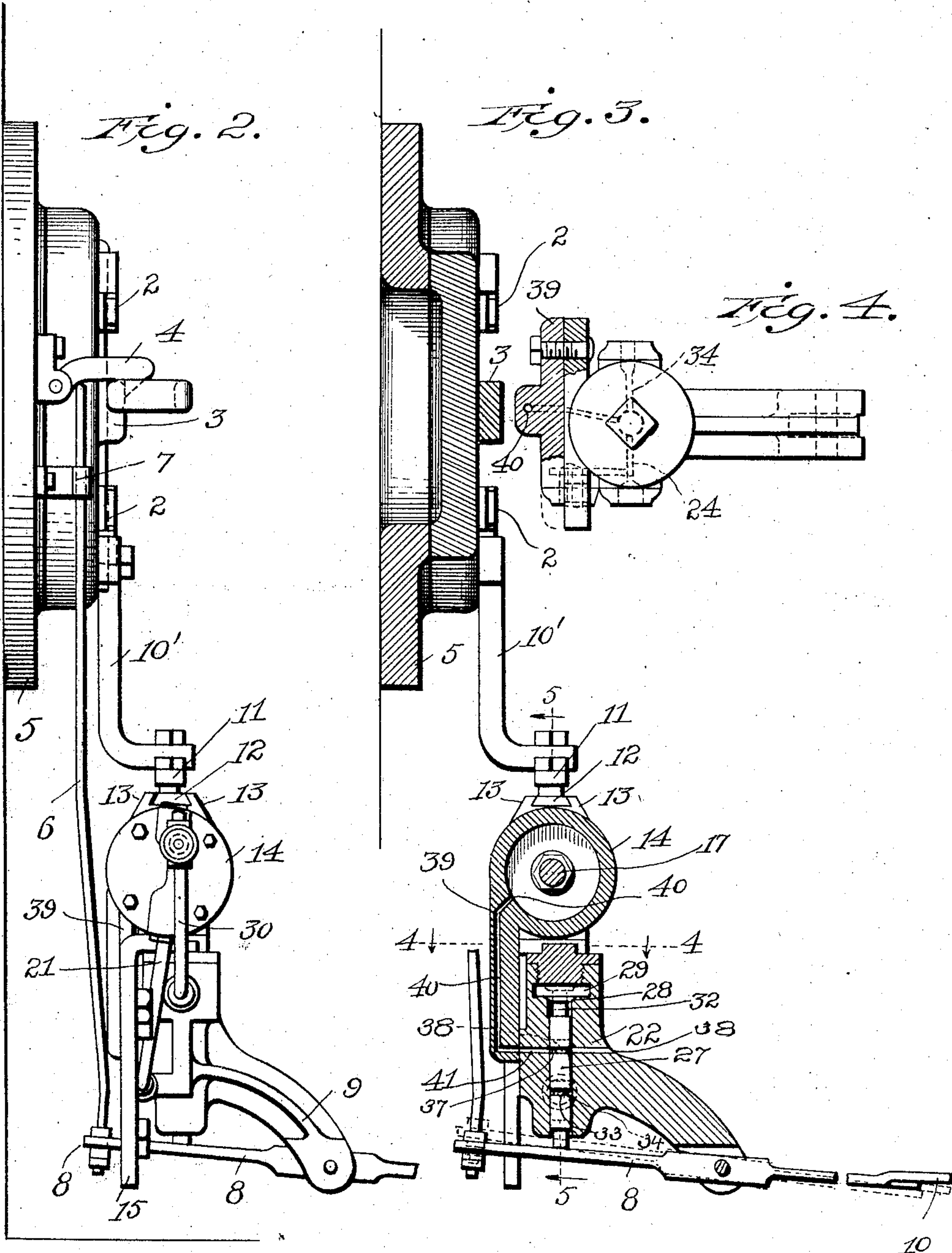
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

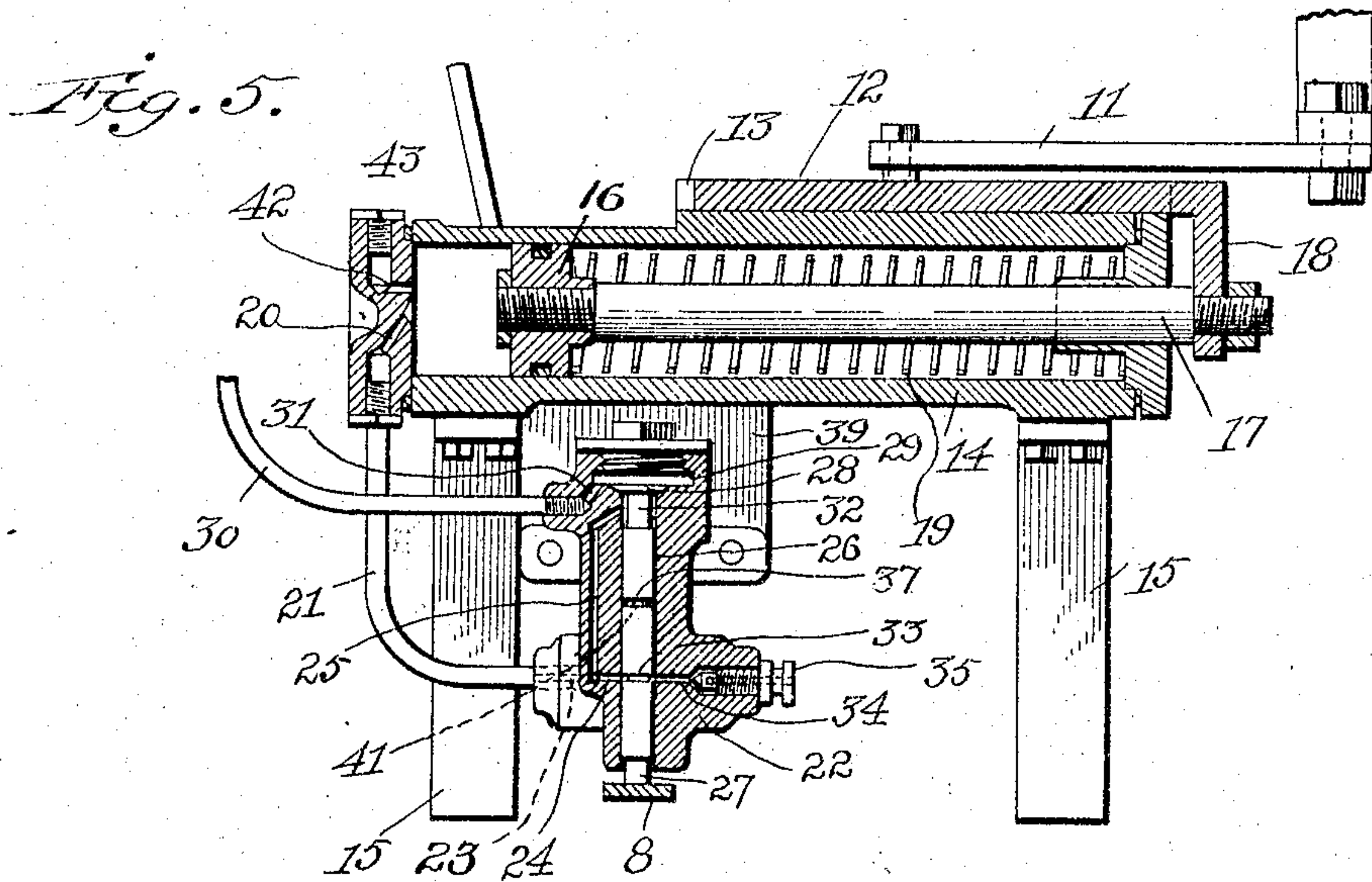


Fig. 7.

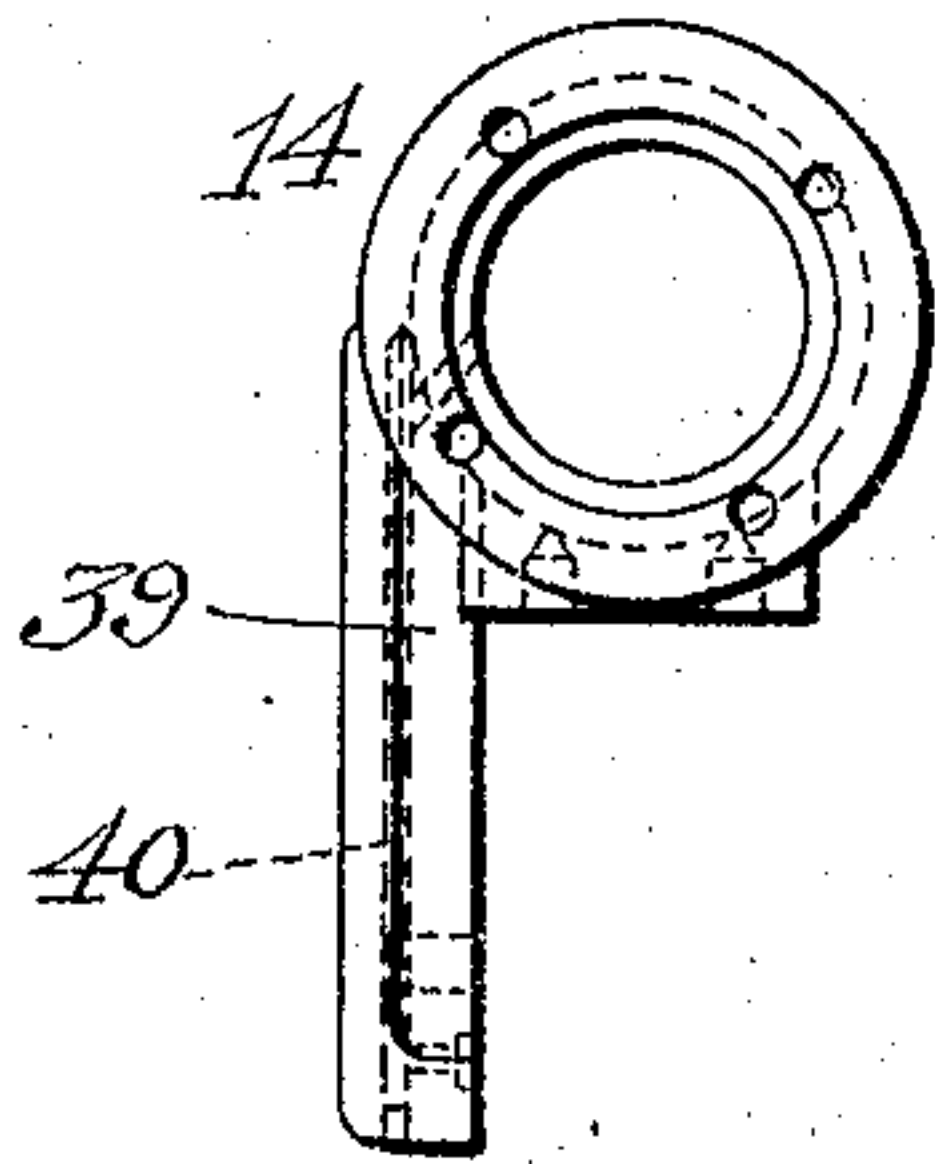


Fig. 6.

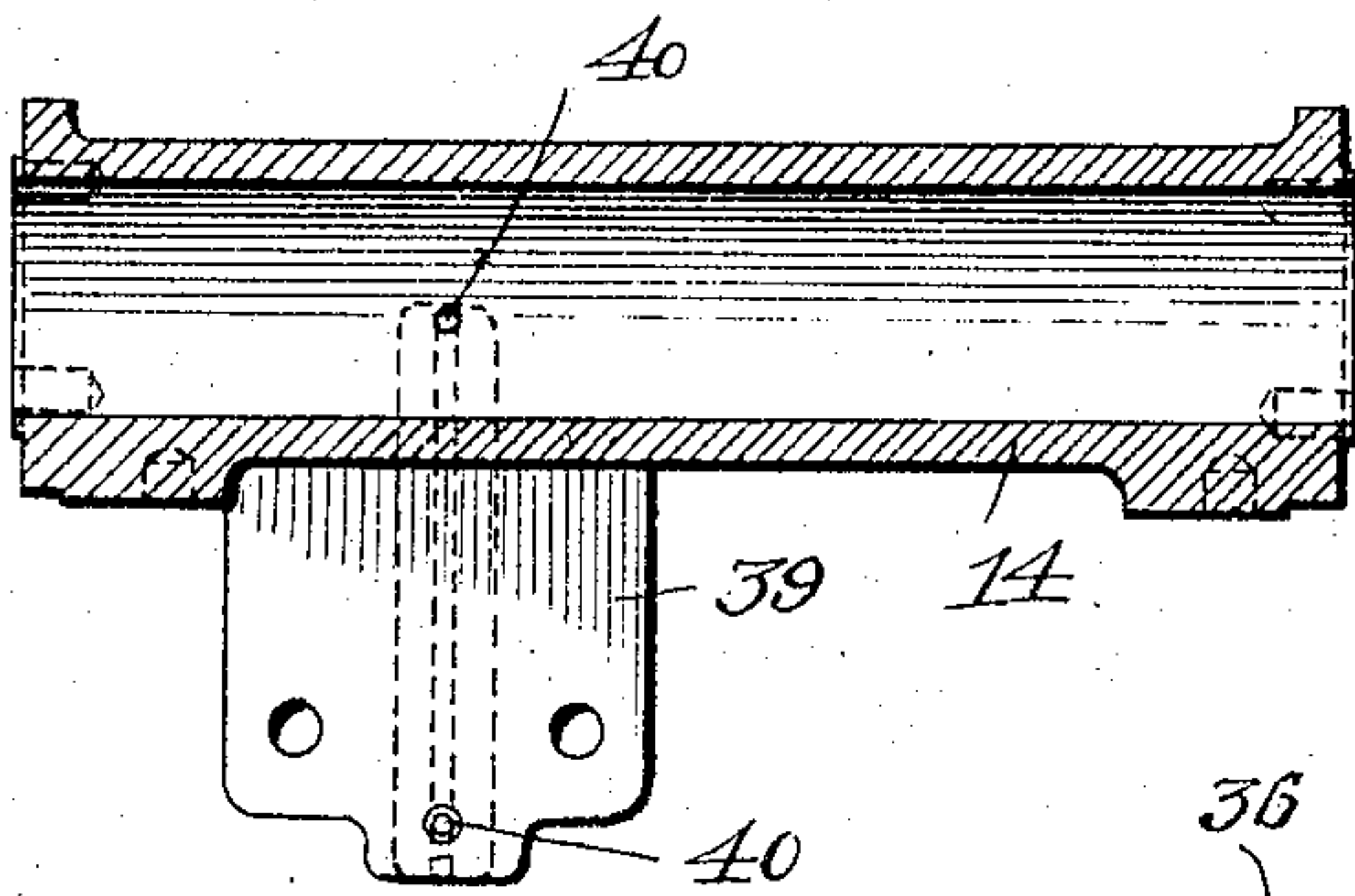


Fig. 9.

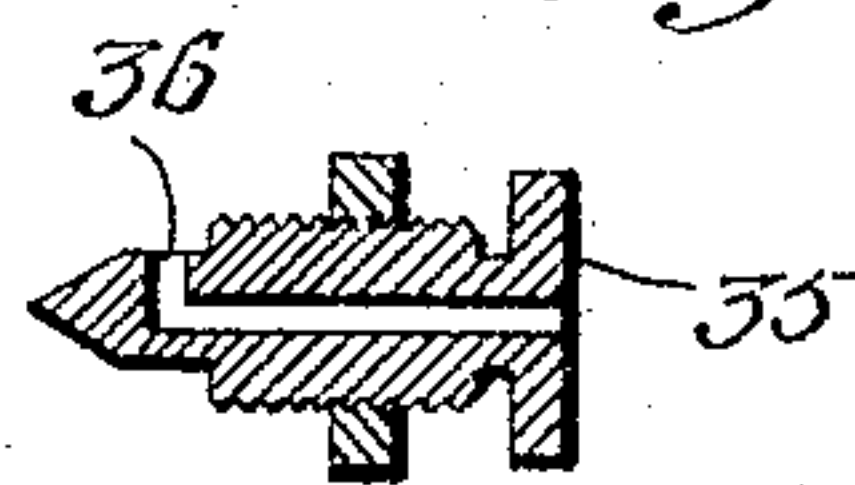
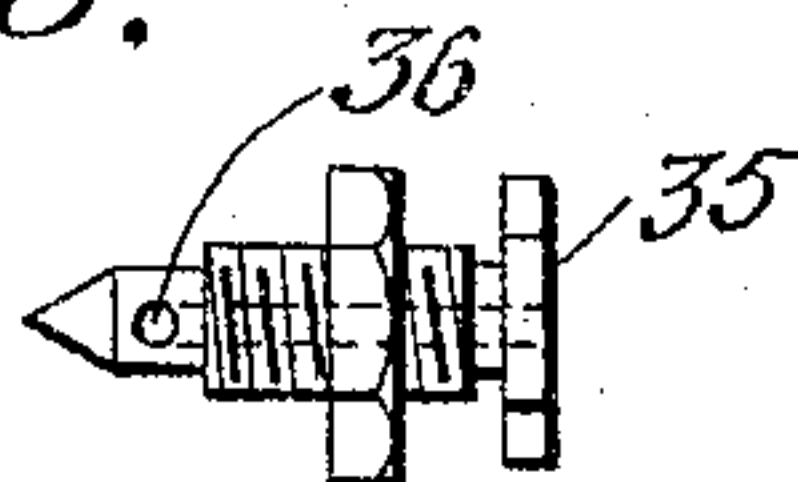


Fig. 8.



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UNITED STATES PATENT OFFICE.

FREDERICK L. BREWER, OF CHICAGO, ILLINOIS.

DOOR-OPERATING APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 778,103, dated December 20, 1904.

Application filed March 22, 1904. Serial No. 199,426.

To all whom it may concern:

Be it known that I, FREDERICK L. BREWER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Door-Operating Appliances; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in furnace-door openers and closers.

The object in view is the provision of means for facilitating the opening of a furnace-door and for automatically closing the same.

With this and further objects in view the invention comprises certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a view in elevation of a door and mechanism for opening and closing the same, embodying the features of the present invention. Fig. 2 represents a view in side elevation thereof. Fig. 3 represents a vertical section taken on the plane of line 3 3 of Fig. 1 and looking in the direction indicated by the arrow. Fig. 4 represents a horizontal section taken on the plane of line 4 4 of Fig. 3 and looking downwardly. Fig. 5 represents a longitudinal vertical central section taken on the plane of line 5 5 of Fig. 3. Fig. 6 represents a longitudinal vertical central section taken through the cylinder detached. Fig. 7 represents a view in end elevation of the same. Figs. 8 and 9 represent enlarged detail elevational and sectional views of the exhaust-plug detached.

Referring to the drawings by numerals, 1 indicates any door to be opened, swinging on any suitable hinges 2 and provided with a latch-bar 3. A gravity-pawl 4 is pivotally carried by the casing 5, surrounding the doorway closed by the door 1, said pawl normally engaging the latch 3 for retaining the door 1 in a closed position. A vertically-reciprocating operating-rod 6 extends to a point just beneath the pawl 4 and is guided by any suitable bracket 7 near the upper end and at its

lower end is connected to an operating-lever 8. The lever 8 is pivoted intermediate its length to a bracket 9 and is provided at its outer end with a suitable treadle 10.

A strap 10' is fixed to the door 1 and depends therefrom and has its free end pivotally engaged by a link or pitman 11, said link or pitman being in turn pivotally connected at its opposite end to a cross-head 12, slidably mounted in guideways 13 13, arranged in the upper surface of a cylinder 14. The cylinder 14 is supported by suitable brackets 15 15 and incloses a piston 16, carried by a piston-rod 17. The cross-head 12 is relatively long and fits snugly the guides 13 for the full length of its stroke and is provided at its exposed end with a depending bar 18, extending at right angles to said cross-head and engaging the piston-rod 17, whereby reciprocation of the piston 16 is designed to reciprocate the cross-head 12 and through the link 11 and strap 10' effects the opening and closing of the door 1.

A coiled spring 19 surrounds the piston-rod 17 and is disposed between one end of the cylinder 14 and the piston 16, said spring 19 serving to normally maintain the piston 16 in position for retaining the door 1 closed. The opposite end of the cylinder 14 from that engaged by spring 19 is provided with a port 20 in communication with a pressure-supply pipe 21. The supply-pipe 21 extends to a valve-casing 22 and communicates with a port 23 therein. The port 23 extends to and communicates with a horizontal port 24 and a vertical port 25. The casing 22 is provided with a central longitudinal bore 26, within which is arranged a gravity-valve 27, having its lower end extending beyond the casing 22 and resting upon the operating-lever 8. The upper end of the valve 27 is formed with an enlarged downwardly-tapering head 28, designed to be moved vertically within a chamber 29, formed in the casing 22 at the upper end of the bore 26. A pipe 30 leads from any suitable source of pressure-supply to and communicates with a port 31 within the casing 22, communicating with the chamber 28. Each of the ports 24 and 25 extends to and communicates with the bore 26, and the valve 27 is

formed with an annular reduced portion 32 just beneath the head 28 for permitting the passage of pressure from the chamber 28 through the port 25 when the valve 27 is elevated. The valve 27 is also formed with an annular groove 33, registering with the port 24 when the head 28 is upon its seat, and a port 34 is formed in the casing 22 and leads from the groove 33 to the atmosphere, said port being closed by a ground valve-plug 35, the plug 35 being seen in detail in Figs. 8 and 9 and being formed with a longitudinal passage 36, adapted to permit the escape of pressure therefrom, such escape being prevented, if desired, by threading the plug 35 into the threaded portion of the outer end of port 34 until the point of the ground valve has closed the reduced portion of said port 34. Thus it will be seen that the rate of discharge of pressure through port 34 may be effectually controlled. The valve 27 is formed intermediate its length with an annular groove 37, similar to groove 33, and a port 38, leading to the atmosphere, communicates with said groove 33 when the valve 27 is upon its seat.

A plate 39 depends from the cylinder 14 at one side of the valve-casing 22 and is formed with a port 40, communicating at one end with the interior of the cylinder 14 and at the other end registers with a port 41, communicating with groove 37, the port 40 communicating with the cylinder 14 at that point in the length thereof adapted to permit a sufficient stroke of the piston 16 for opening the door 1 before communication is established between the cylinder 14 and the port 41.

The head of the cylinder 14, provided with port 20, is also provided with a port 42, normally closed by a plug 43, said port being adapted to receive the end of pipe 21 when desired, it being understood that if the port 42 is used in conjunction with the pipe 21 the port 20 will be closed by a suitable plug, the use of the port 42 facilitating the adjustment of the valve-casing 22 to positions other than that disclosed in the drawings. The port 42 may also be used for facilitating introduction of a lubricant into cylinder 14, if desired.

In operation when it is desired to open the door 1 it is only necessary to place the foot upon the treadle 10, which causes the longitudinal upward movement of the rod 6, lifting the pawl 4, and releasing the latch 3, the door being thus left free to swing open. The upward movement of the inner end of lever 8 effects an upward movement of the valve 27 to the position indicated in dotted lines in Fig. 3, whereupon pressure supplied through pipe 30 moves, through the port 25, pipe 21, and port 20, into cylinder 14, the ports 24 and 41 being closed by the valve 27 when in its raised position. Pressure entering cylinder 14 causes the rearward travel of the piston 16, which movement of the piston effects a similar move-

ment of the cross-head 12 and causes the door 1 to swing open under the action of link or pitman 11 and strap 10'. It will be observed that the cross-head 12 consists simply in a slide dovetailed into longitudinally-arranged guides, whereby the movement of the link 11 is made positive and the door 2 readily opened. The piston 16 in opening the door 1 moves past the port 40, and the operator moving his foot from the treadle 10 releases the valve 27 and permits the same to drop to its normal position, cutting off the supply of pressure through pipe 30 and permitting the pressure within the cylinder 14 to escape, through port 40, port 41, annular groove 37, and port 38, to the atmosphere, the pressure also being free to escape through port 20, pipe 21, port 24, annular groove 33, and port 34. The greater quantity of pressure escapes almost instantly through ports 40 41, groove 37, and port 38 before the piston 16 passes port 40; but after the piston passes said port the escape of the remaining pressure may be controlled by plug 35, and if the escape of pressure is too rapid it is only necessary to adjust the plug 35 until its ground point engages the seat formed by the reduced portion of the port 34, and the escape of pressure may be reduced to any desired degree and the speed of the return stroke of the piston 16 thereby controlled, said return stroke being accomplished through the action of spring 19.

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

1. In a device of the class described, the combination with a cylinder and piston, of means for supplying pressure thereto, an exhaust-port communicating with said cylinder, a plug threaded longitudinally into said port and formed with a tapered point adapted to close the port, said plug being formed with an internal, longitudinal passage normally permitting exhaust of pressure from said cylinder, and door-operating elements actuated by said piston.

2. In a device of the class described, the combination with a door, of a cylinder, a piston operating therein, guides fixed to and extending longitudinally of said cylinder, a dovetailed, sliding cross-head inclosed by said guides, connections between the piston and cross-head, and connections between said cross-head and door for transmitting movement from the cross-head to the door.

3. In a device of the class described, the combination with door-operating elements, a piston for actuating the same, and a cylinder inclosing said piston, of a pressure-supply-controlling valve formed with a plurality of annular grooves, a head on said valve, a casing inclosing said valve formed with a seat for said head and formed with a chamber above said seat, means for establishing communication between said cylinder intermedi-

ate the length thereof and said valve-casing in line with one of the annular grooves in said valve, a port being formed in said valve-casing and leading from said last-mentioned groove to the atmosphere, pressure-supply means communicating with said valve, a pressure-supply pipe communicating between the casing and said cylinder, and means for moving said valve for establishing communication between said pressure-supply and said pipe.

4. In a device of the class described, the combination with door-operating elements, a piston for actuating the same, and a cylinder inclosing said piston, of a pressure-supply-controlling valve formed with a plurality of annular grooves, a head on said valve, a casing inclosing said valve formed with a seat for said head and formed with a chamber above said head, means for supplying pressure to said chamber, means of communication between said casing, below said seat, and said cylinder, means for elevating said valve for lifting said head off its seat for establish-

ing communication between said chamber and said means of communication, and an exhaust-port leading from said cylinder to said valve-casing in line with one of said annular grooves when the valve is upon its seat, a port leading to the atmosphere being formed in said valve-casing communicating with said last-mentioned, annular groove when the valve is upon its seat, and a second port being formed in said casing and extending from another of said annular grooves, when the valve is upon its seat, to the atmosphere, a port being formed in the valve-casing for establishing communication between said last-mentioned groove and the means of communication between the valve-casing and said cylinder.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

FREDERICK L. BREWER.

Witnesses:

GEORGE E. WISSLER,
CHARLES C. SPENCER.