

No. 685,065.

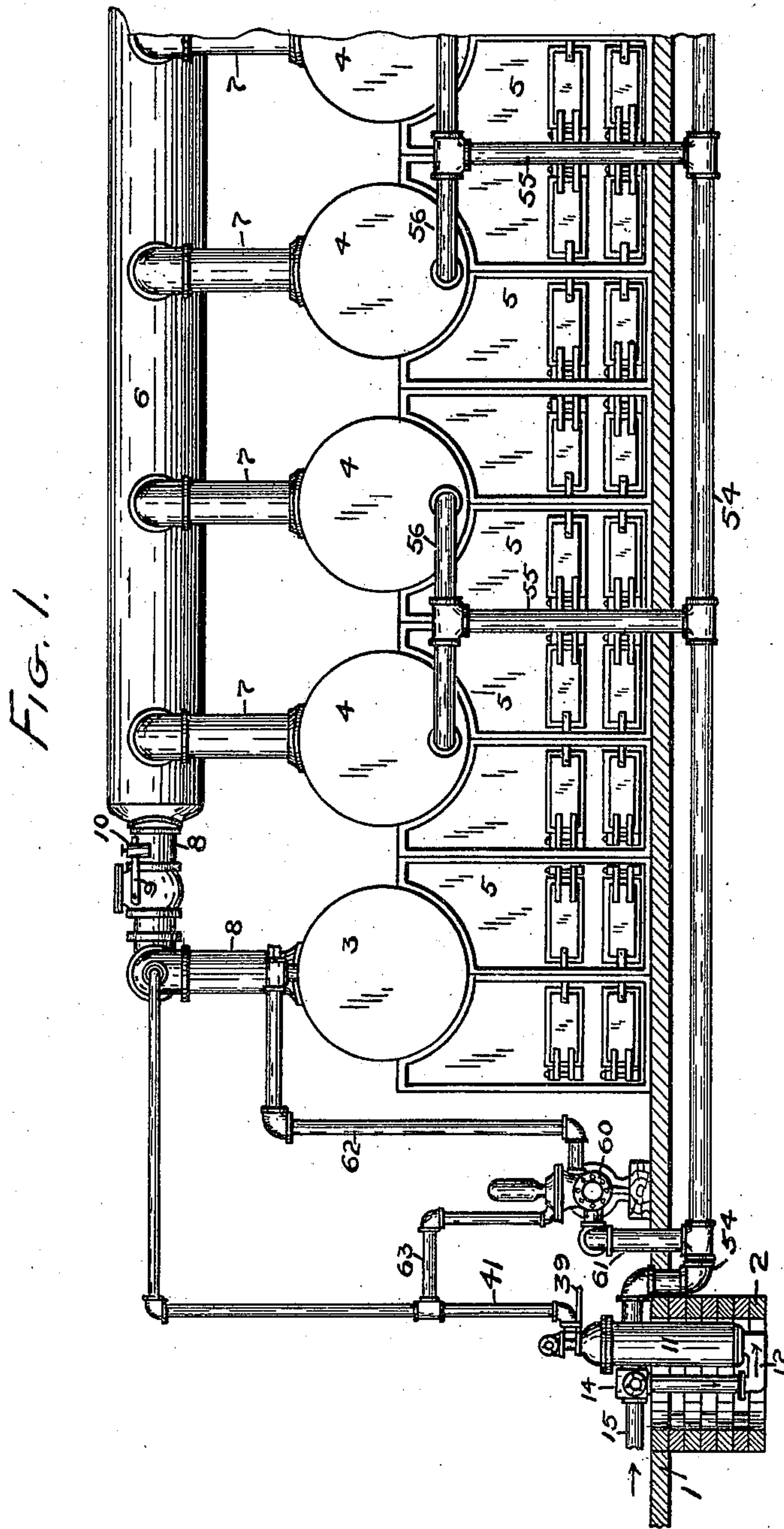
Patented Oct. 22, 1901.

O. J. SCOTT.  
BOILER FEEDER.

(Application filed Nov. 17, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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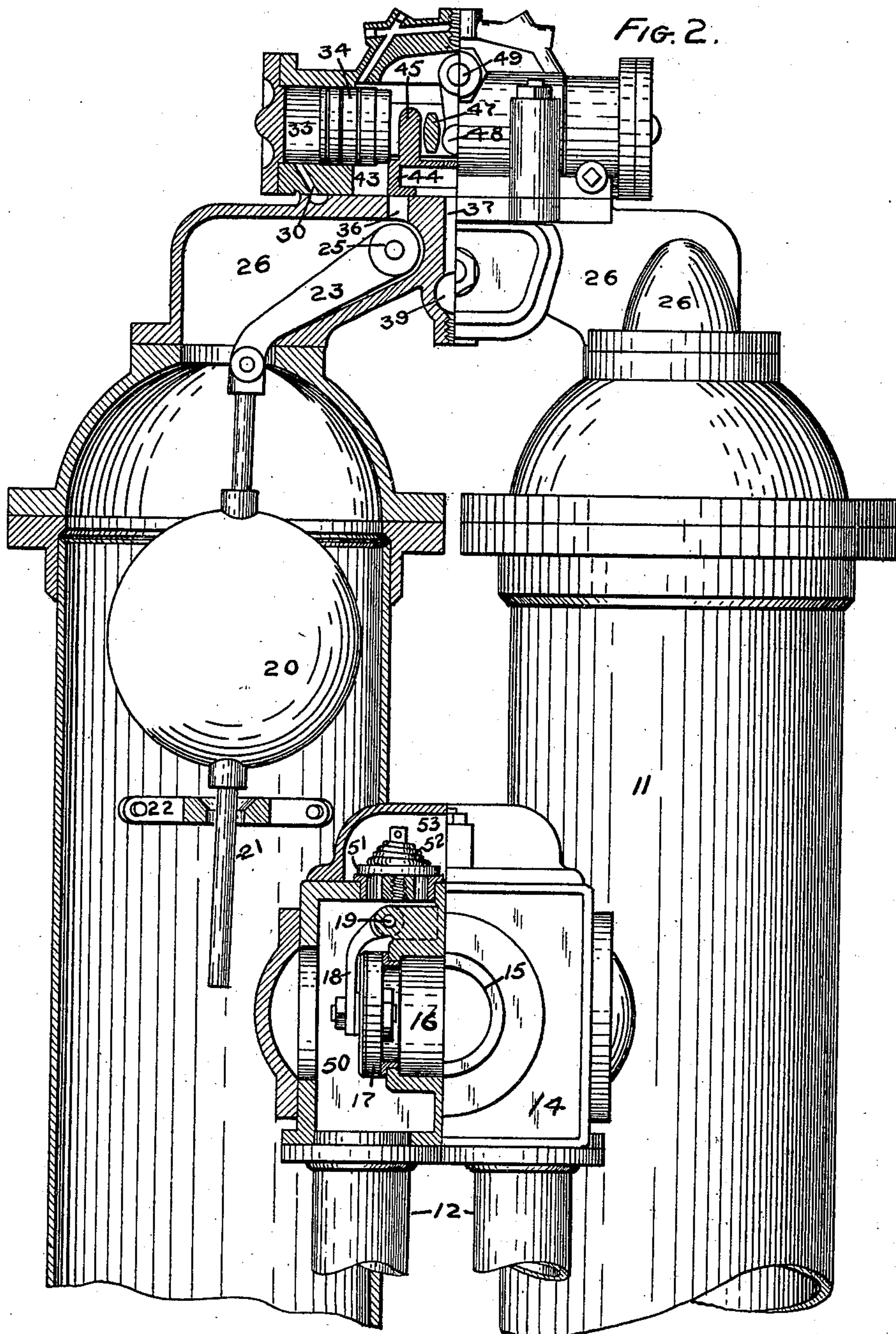
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4 Sheets—Sheet 2.



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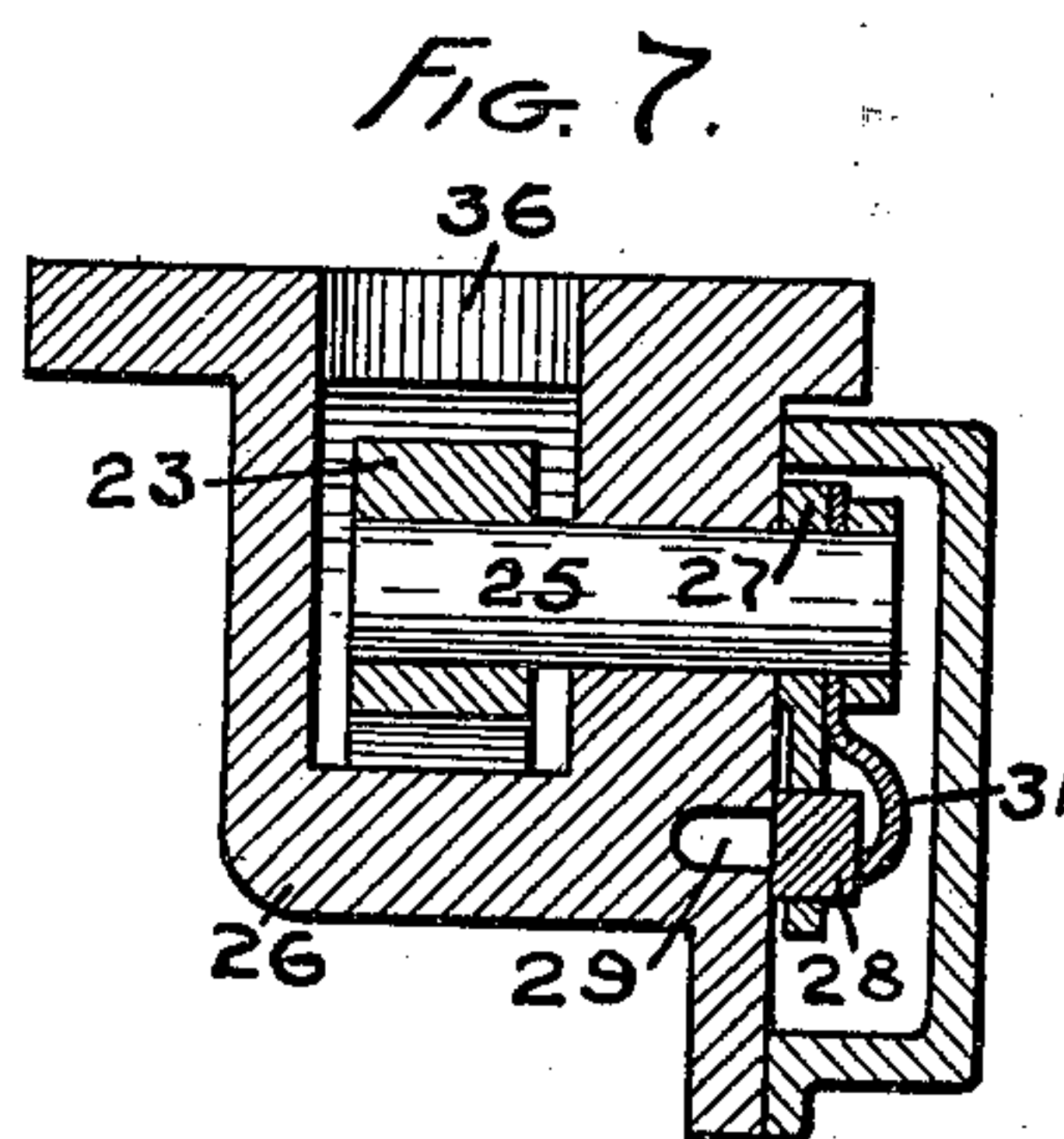
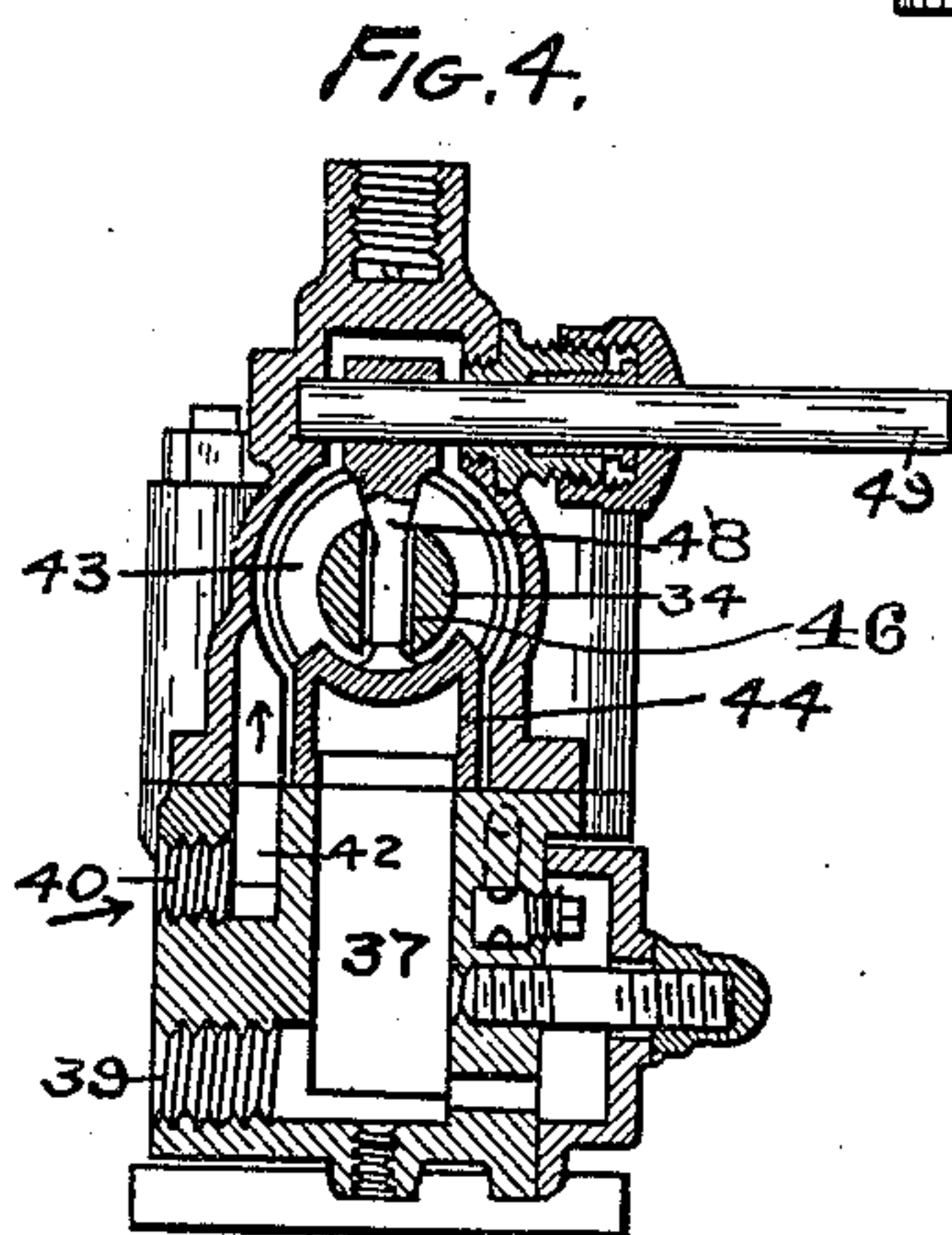
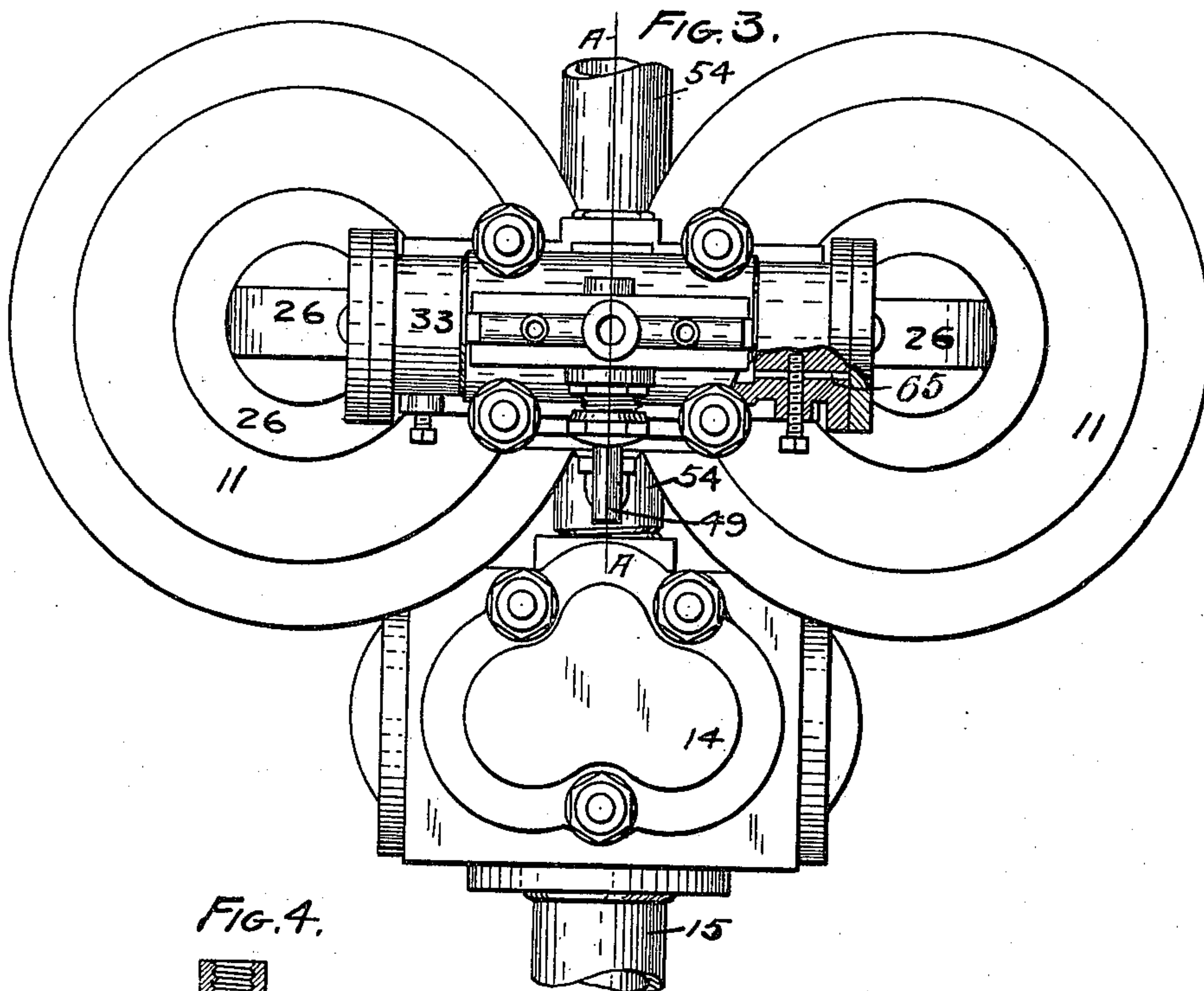
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4 Sheets—Sheet 3.



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4 Sheets—Sheet 4.

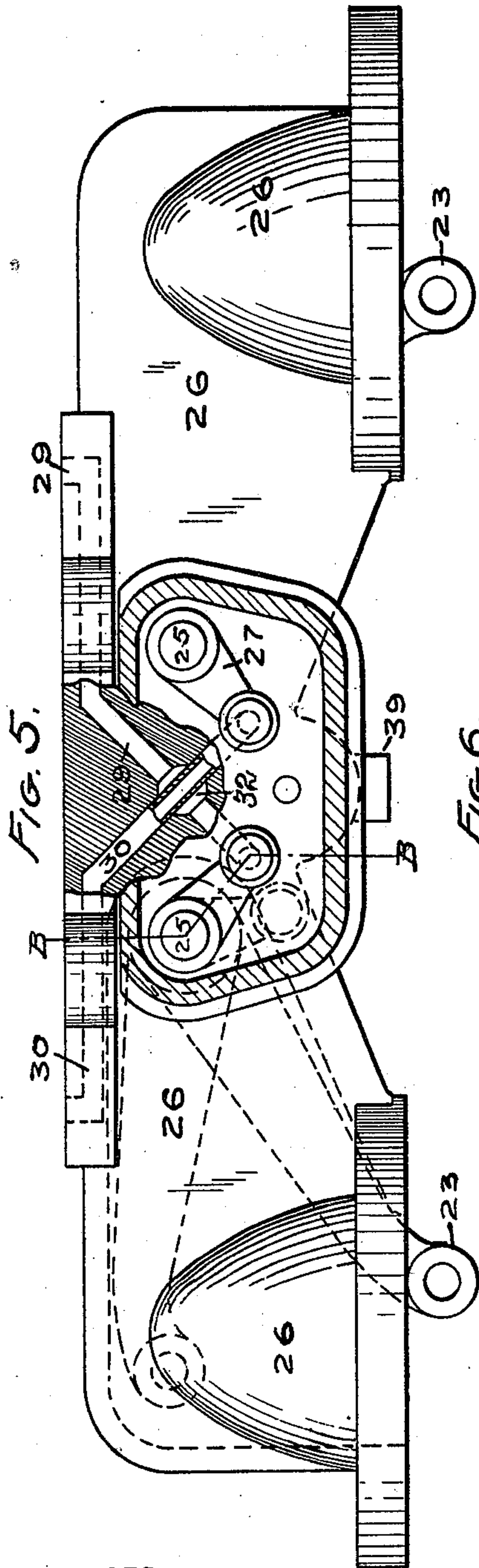
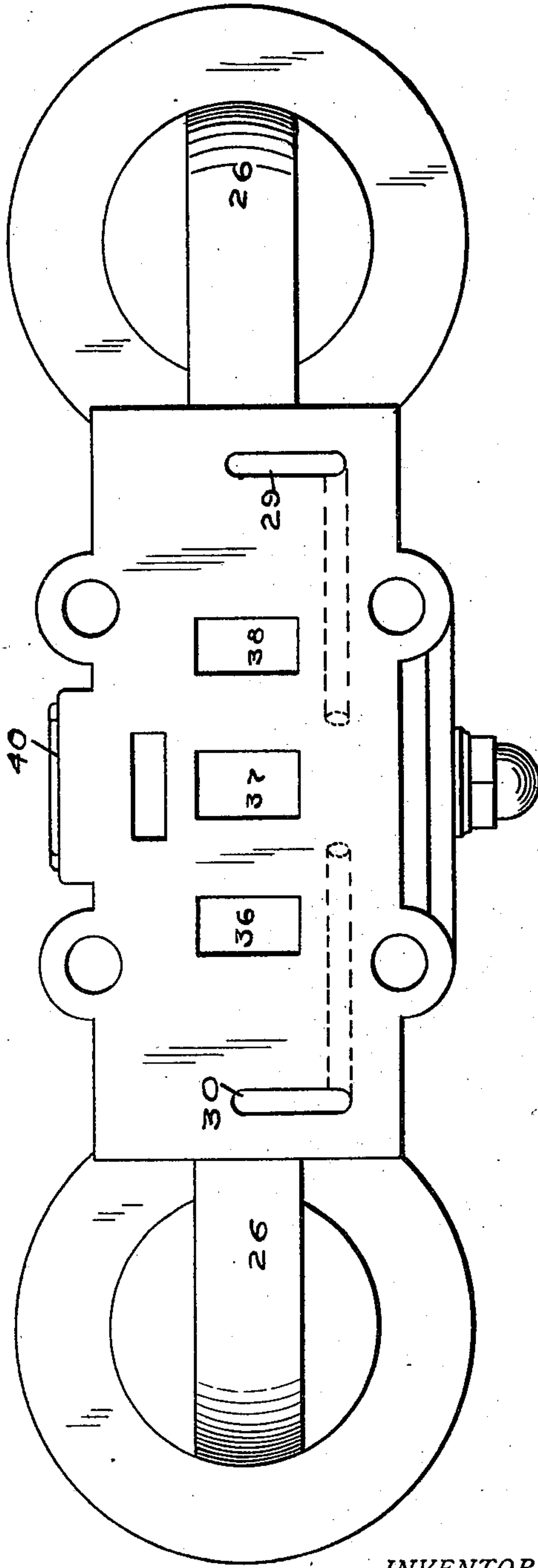


FIG. 6.



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# UNITED STATES PATENT OFFICE.

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A CORPORATION OF KENTUCKY.

## BOILER-FEEDER.

SPECIFICATION forming part of Letters Patent No. 685,065, dated October 22, 1901.

Application filed November 17, 1899. Serial No. 737,344. (No model.)

*To all whom it may concern:*

Be it known that I, ORLA J. SCOTT, of Louisville, county of Jefferson, and State of Kentucky, have invented a certain new and useful Boiler-Feeder; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like figures refer to like parts.

10 This invention relates to means for feeding water automatically to a battery of boilers, and comprises means for maintaining a higher pressure in one boiler than in the other boilers and means for utilizing such higher pressure to force the water from a suitable receiver into the other boilers. In such case the boiler containing the high pressure is fed through a special pump or injector.

20 This boiler-feeder is useful where the ordinary means of feeding is impractical or undesirable, since by its use a very great saving in the steam consumption of the feeding apparatus is effected. In the case of a battery of boilers which are supplied with water in the ordinary way—viz., by the use of a pump or injector—the steam consumption will rise as high as three to five per cent. of the total boiler-output and will average about four per cent. of same; but by combining a receiver with a pump in such a way that all of the water which passes through the receiver must also pass through the pump before entering the boilers the steam consumption of such a combination will be only about one and five-  
35 eighths per cent. of the total which is generated by the boilers. Where the arrangement is that set out in the application, about one and five-eighths of the steam generated in the high-pressure boiler is required to supply it with water, and about five-eighths of one per cent. for each of the other boilers is required, so that on the average in a battery of boilers thus arranged about three-fourths of one per cent. of the steam generated will suffice to feed the water. Broadly speaking, this object is accomplished by employing means for maintaining a higher pressure in one boiler than in the others of the battery. A suitable valve-controlled receiver is then provided  
50 with steam-supply from the high-pressure

boiler to force the water out of said receiver into the low-pressure boilers. A pump or injector is added that takes its water from the receiver and its steam from some suitable source and feeds the high-pressure boiler. 55

The full nature of my invention will appear from the accompanying drawings and the description following of one form of device embodying my invention, and the scope of said invention will be understood from the 60 claims following said description.

In the drawings, Figure 1 is a front elevation of a battery of boilers and the boiler-feeding mechanism. Fig. 2 is a side elevation of one of the receivers and a central vertical 65 cross-section of the other receiver, with the connecting parts, however, half in elevation and half in section. Fig. 3 is a plan of the receivers and water valve-chest connected therewith, one-half thereof being in horizontal section. Fig. 4 is a vertical section on the line A A of Fig. 3. Fig. 5 is a side elevation of the casing containing the relief-valves, parts being in section. Fig. 6 is a plan of the subject-matter shown in Fig. 5. Fig. 7 is a 75 section on the line B B of Fig. 5.

Referring now to the details of construction of the form of mechanism shown herein for the purpose of explaining the nature of this invention, 1 represents the ground-line 80 or floor, and 2 a wall forming a depression for the reception of the receiver.

3 is a boiler carrying a higher pressure than the other boilers.

4 5 are the fronts of the furnaces under 85 said boilers.

6 is a steam-header supplied with steam through the pipes 7, running directly from the boilers of lower pressure. The steam from the high-pressure boiler reaches said header 90 through the pipe 8. In Fig. 1 herein a steam-pressure of one hundred and ten pounds is indicated on the front of the high-pressure boiler and one hundred pounds on the front of the other boilers. The extent of steam- 95 pressure in these boilers is immaterial, provided the high-pressure boiler has about ten pounds pressure in excess of the others. Any suitable means may be employed for maintaining this difference in pressure in said 100



boilers, but in the form herein shown a back-pressure valve 9 is employed, being located in the pipe 8. This valve is adjustable by the weight 10. There is shown a pair of receivers 11, being vertical tanks side by side, to which water is supplied through the pair of pipes 12, that lead from the water valve-chest 14, which receives water through the supply-pipe 15, leading from any suitable source. The water enters the initial chamber 16 in the chest 14 without any special pressure, and by the mere gravity of the water it swings the valve 17 back and passes down through the pipes 12 into the receivers 11 until said receivers are full. The valve 17 is mounted on the arm 18, pivoted at 19 to the casing of the valve-chest. The water rising in the receivers elevates the float 20, that is adjustably mounted on the rod 21, which moves vertically through the guide 22, secured to the inner walls of the tank. At its upper end said rod is pivoted to the float-arm 23, which is secured to the shaft 25, that is horizontally mounted in the casing 26, connecting the two receivers, as appears in Figs. 2 and 7. Said shafts 25 carry the arms 27 and in their outer ends carry the relief-valves 28, that close the ports 29 and 30. The valves are held against the ports by the springs 31. The port 29 is enlarged at 32, and through said enlargement the port 30 passes. The ports 29 and 30 lead, respectively, from each end of the valve-chest 33. (Shown in Fig. 2.) Said valve-chest contains the valve-piston 34, that actuates the slide-valve 44. Said piston 34 is actuated by steam coming from the chamber 43 through the port 65, to be seen in the sectional portion of Fig. 3. The port 65 is constantly open and connects the end of the valve-chest 33 with the live-steam chamber 43. Said valve 44 has one port on its under side that at any moment registers with two of the three ports 36, 37, and 38, to be seen in Fig. 6. The port 37 leads to the exhaust-port 39. The ports 36 and 38 lead, respectively, to the receivers 11.

40 is the steam-inlet from the pipe 41, as seen in Fig. 4. The steam passes up through the chamber 42 to the chamber 43, surrounding the valve-piston 34, and thence through the port 36 into the left receiver (shown in Fig. 2) when the piston 34 has been moved somewhat farther to the right of the position shown in Fig. 2. When the piston is reversed, the steam from the chamber 42 passes through the port 38 into the right receiver. (Shown in Fig. 2.) The valve 44 is operated by the piston 34 abutting against its end and is held in place tight by the lug 45, that extends into the slot 46 of the piston, as shown in Fig. 4. In the slot 46 of the piston there is a rib 47, that engages the depending arm 48 on the shaft 49, that extends out of the valve-chest, whereby said piston 34 can be moved, if desired, and its position can readily be determined from the outside. The receivers alternate in their operation, which is

caused by the operation of the valve 44. Supposing the left receiver, as shown in Fig. 2, is filled with water, the float 20 is forced upward and through the shaft 25, arm 27, and valve 28 the port 29 is uncovered, which relieves the pressure at the right-hand end of the valve-chest 33. This permits the movement of the piston 34 to the right, as shown in Fig. 2, whereby the port 38 is connected with the exhaust-port, and the port 36 is opened by the valve 44, whereby the live steam from the high-pressure boiler through the pipe 41 rushes in through the chambers 42 and 43 and the port 36 to the upper end of the left receiver, as shown in Fig. 2, and forces the water out of said receiver back through the pipe 12, leading from the bottom of said receiver into the water valve-chest 50, and the pressure of the water in that chamber closes the valve 17 and lifts the valve 51 against the action of the spring 52 and passes into the chamber 53, from which it passes through the pipe 54 to the low-pressure boilers through the pipes 55 and 56.

While one of the receivers is being emptied in the manner above described the other is being filled, and when it is full it operates the valve mechanism set forth above through the action of its float, so that the expulsion of water from said receivers is caused to alternate by the action of the valve 44.

The foregoing mechanism suffices to keep full the low-pressure boilers by utilizing through the means above described the surplus of pressure in the high-pressure boiler. The pressure in the high-pressure boiler should be sufficiently more than the pressure in the low-pressure boilers to lift the water to their water-level. In order, however, to fill the high-pressure boiler, it is necessary to employ an injector or pump. Herein there is shown a pump 60, supplied with water from the pipe 54 through the pipe 61. The water is forced by said pump 60 through the pipe 62 into the high-pressure boiler. Steam is supplied to drive said pump 60 through the pipe 63. Any means for increasing the pressure of the water after it leaves the receivers, so as to overcome the extra pressure in the high-pressure boiler, will suffice.

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

1. The combination with a battery of boilers, of a valve connected with said boilers for maintaining a higher pressure in one boiler than in the others, and means for applying steam from the high-pressure boiler for feeding water to the low-pressure boilers.

2. The combination with a battery of boilers, of means for maintaining a higher pressure in one boiler than in the others, a suitable valve-controlled water-receiver, pipes from said receiver to the low-pressure boilers for the passage of water thereto, and a steam-pipe from the high-pressure boiler to said receiver.

3. The combination with a battery of boil-



ers, a back-pressure valve for maintaining a higher pressure in one of said boilers than in the others, a valve-controlled water-receiver, a water-pipe from said receiver to the low-pressure boilers, and a steam-pipe leading from the high-pressure boiler to said receiver.

4. The combination with a battery of boilers, of means for maintaining a higher pressure in one boiler than in the others, a receiver connected with the water-supply, water-pipes from the receiver to the low-pressure boilers, a steam-pipe from the high-pressure boiler to the receiver, a valve for controlling the admission of steam into the receiver, and a valve-operating means that is actuated by the water as it rises in said receiver.

5. The combination with a boiler, a valve-controlled water-receiver, a steam-pipe from the boiler to said receiver, a water-pipe from said receiver to the boiler, and means in said water-pipe for increasing the pressure of the water that is actuated by steam from the boiler.

6. The combination with a boiler, of a valve-controlled water-receiver, a steam-pipe from the boiler to said receiver, a pump, a water-pipe from the receiver to the pump, a water-pipe from the pump to the boiler, and a steam-pipe from the boiler to the pump for driving it.

7. The combination of a boiler, a valve-controlled water-receiver below the water-level in the boilers, a steam-pipe from the boiler to said receiver, a pump below the water-level in the boiler, a pipe from the receiver to the pump, and a pipe from the pump to the boiler.

8. The combination with a battery of boilers, means for maintaining a higher pressure in one boiler than in the others, a valve-controlled water-receiver, a steam-pipe from the high-pressure boiler to the receiver, a water-pipe from the receiver to the low-pressure boilers, a pump, a water-pipe from the receiver to the pump, and a pipe from the pump to the high-pressure boiler.

9. In a boiler-feeder, a pair of water-re-

ceivers, a pair of steam-ports entering said receivers, an exhaust-port between said steam-inlet ports, a slide-valve that opens one of said steam-inlet ports at each limit of movement, means for conveying steam from the boiler to the steam-chest, a piston in said steam-chest for actuating said slide-valve, means for conveying steam under pressure to the end of the piston, the ports 29 and 30 leading from the ends of the steam-chest to the outside, the valves 28 that open and close said ports, the arms 27 that actuate said valves, the shafts 25 on which said arms are mounted, the arms 23 secured to said shafts, the floats 20 in said receivers and a water-pipe leading from the receiver to the boiler.

10. In a boiler-feeder, a pair of water-receivers, the casing 26 mounted on their upper ends provided with the inlet-ports 36 and 38 and the exhaust-port 37, the steam-chest 33 on the casing 26, the piston 34 operating in said steam-chest provided centrally with a longitudinal slot, the port 65 for conveying steam under pressure to the end of the piston 34, the slide-valve 44 so arranged as to be actuated by said piston and to open one of said steam-inlet ports at each limit of movement and having an arm extending into the slot in the piston, the ribs 47 in said slot, a rod extending out of said steam-chest, the arm 48 on said rod extending into the slot in the piston and between the ribs 47, the relief-ports 29 and 30, the valves 28 that open and close said ports, the arms 27 that operate said valves, the shafts 25 on which said arms 27 are mounted, the crank 23 secured to said shaft 25, the floats 20 in said receivers, the guides 22 for said floats, and a water-pipe leading from the water-receiver to the boiler, substantially as set forth.

In witness whereof I have hereunto affixed my signature in the presence of the witnesses herein named.

ORLA J. SCOTT.

Witnesses:

V. H. LOCKWOOD,  
M. C. BUCK.