

No. 631,146.

Patented Aug. 15, 1899.

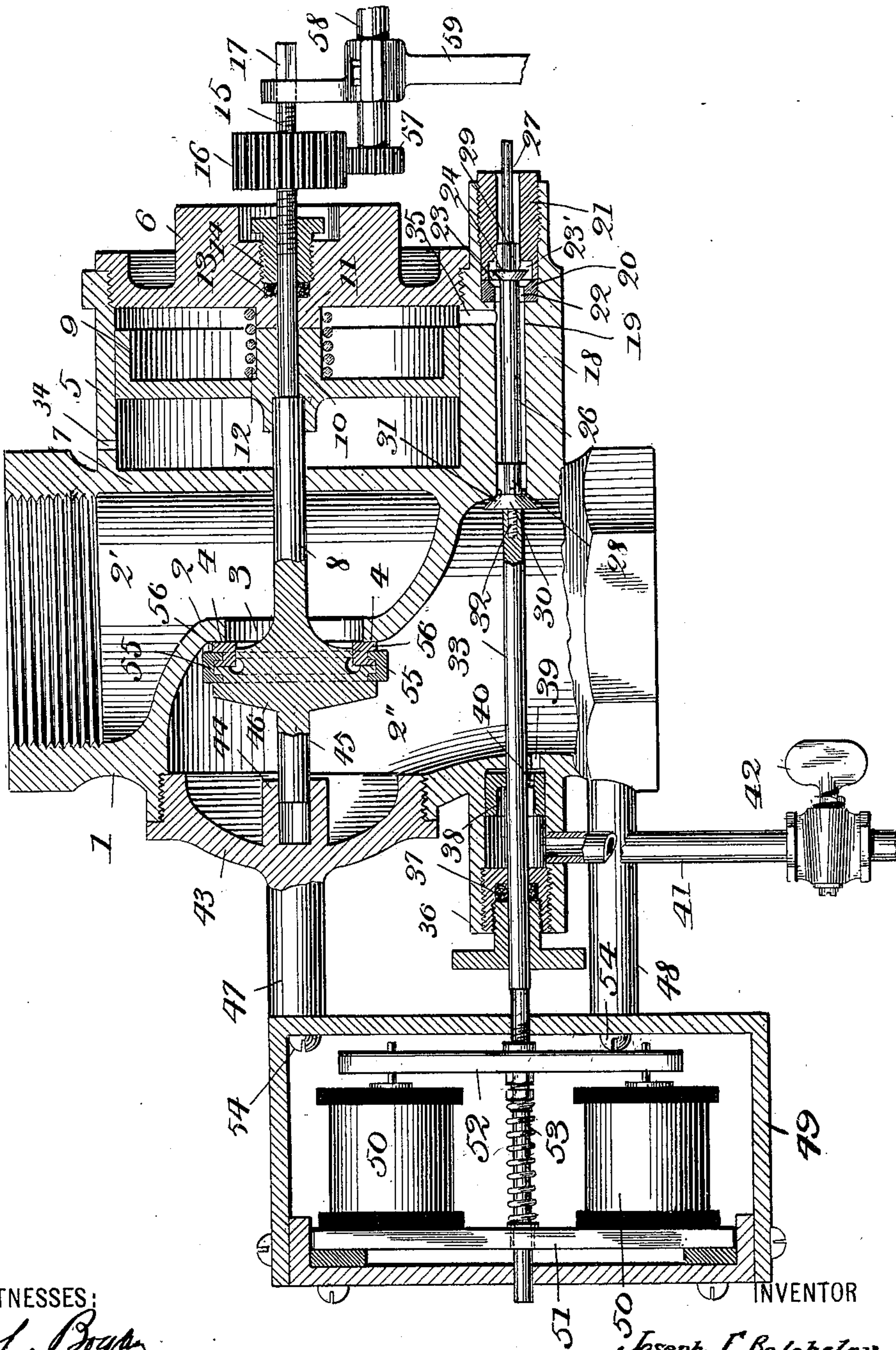
J. F. BATCHELOR.
VALVE.

(Application filed Apr. 1, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1



WITNESSES:

N. L. Boyer
E. M. Kitchen

INVENTOR

Joseph F. Batchelor

BY

A. C. Everett & Co
ATTORNEYS.

No. 631,146.

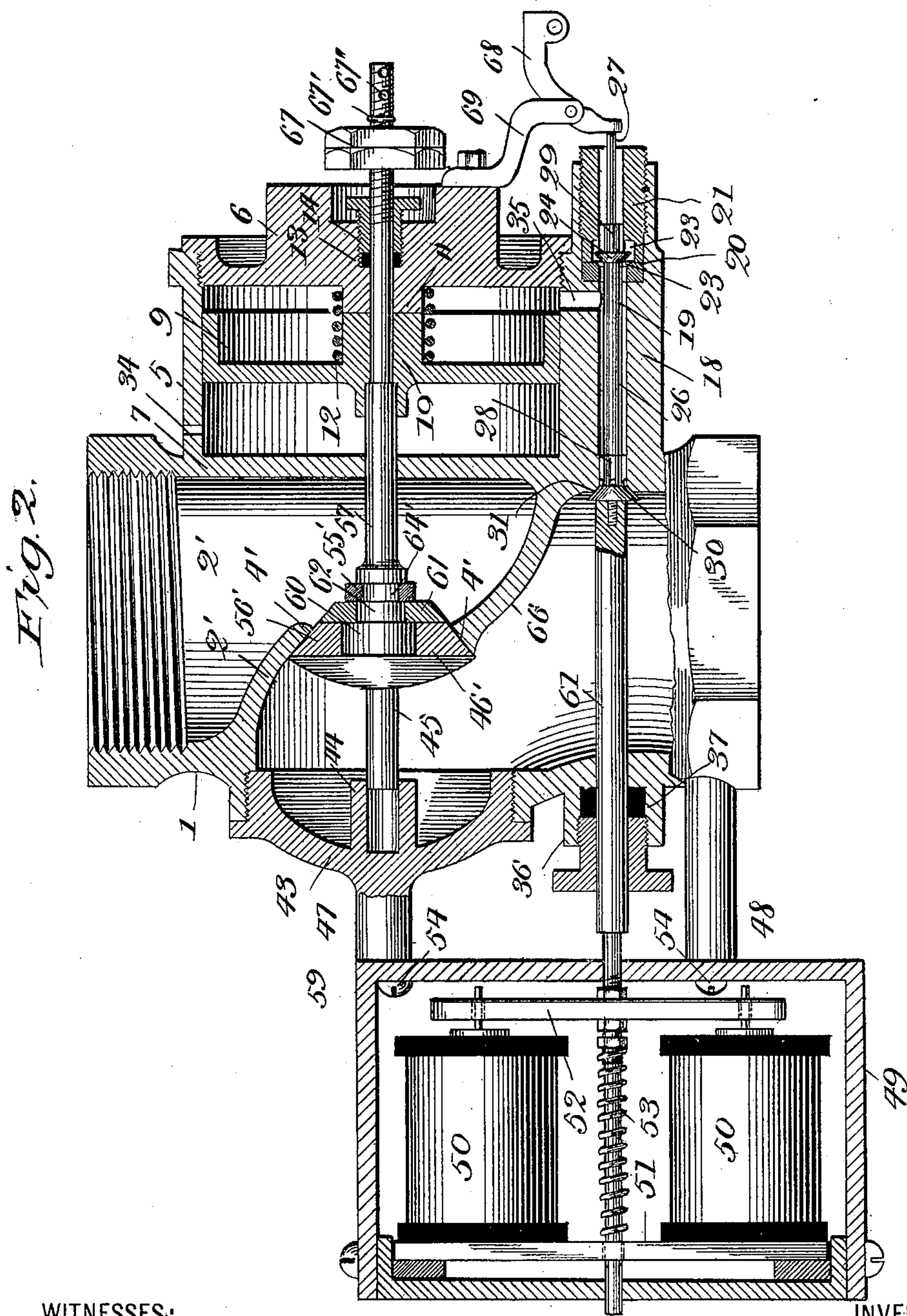
Patented Aug. 15, 1899.

J. F. BATCHELOR.
VALVE.

(Application filed Apr. 1, 1899.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

V. L. Bogan
Em Kitchen

INVENTOR

Joseph F. Ratchelor

BY

BY
H. E. Hunt & Co.

ATTORNEY 3

No. 631,146.

Patented Aug. 15, 1899.

J. F. BATCHELOR.
VALVE.

(Application filed Apr. 1, 1899.)

(No Model.)

3 Sheets—Sheet 3.

Fig. 3.

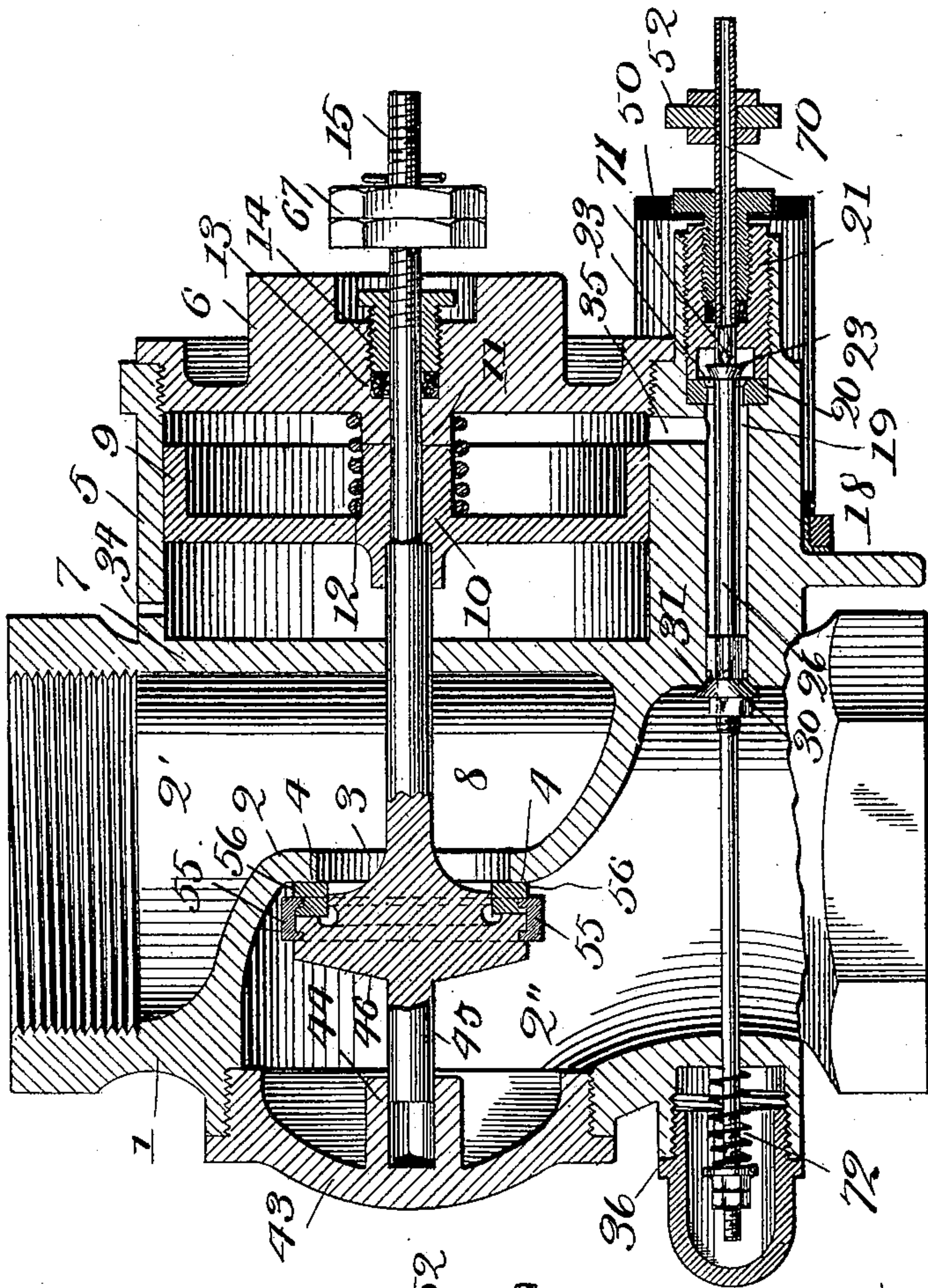


Fig. 4.

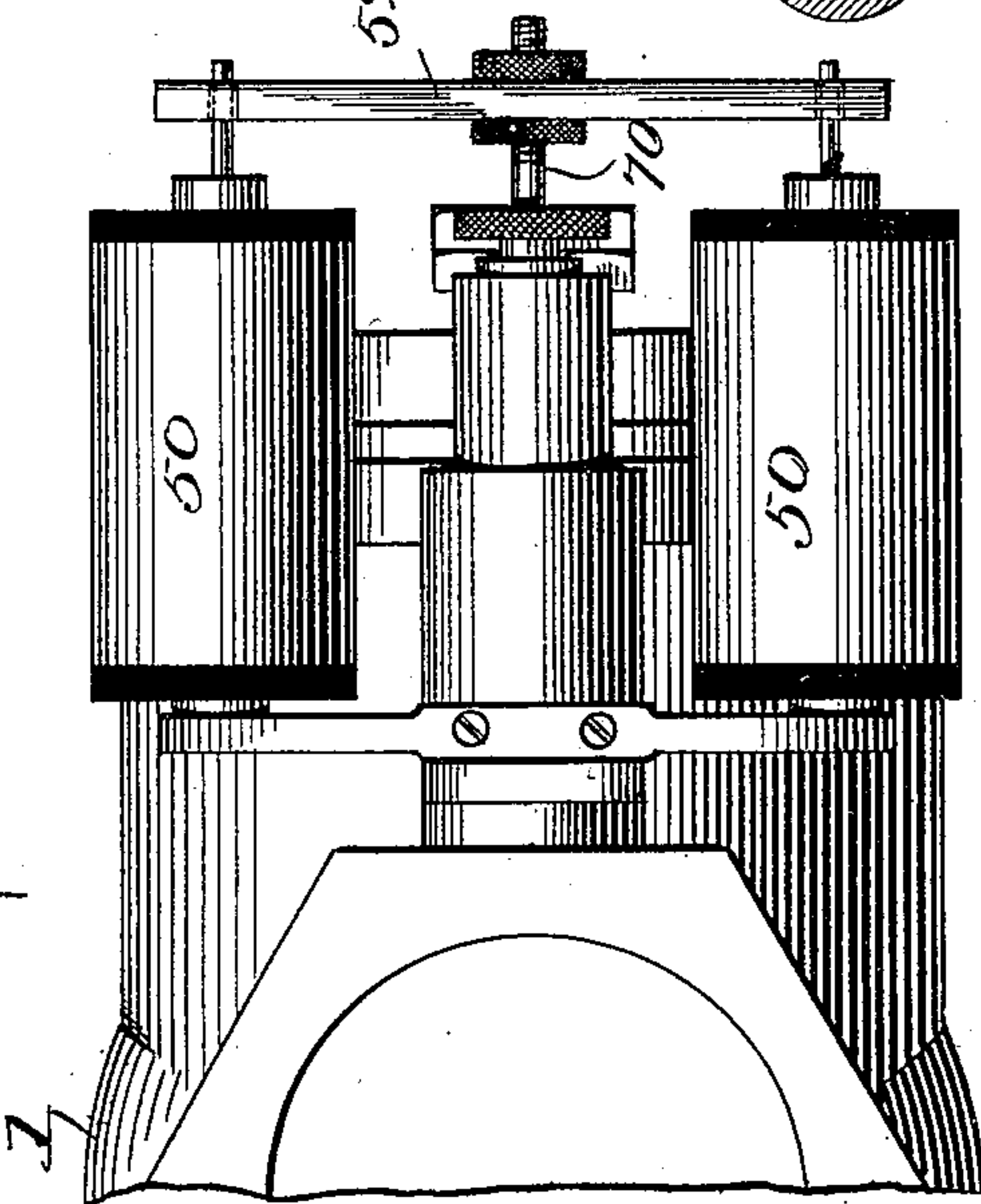
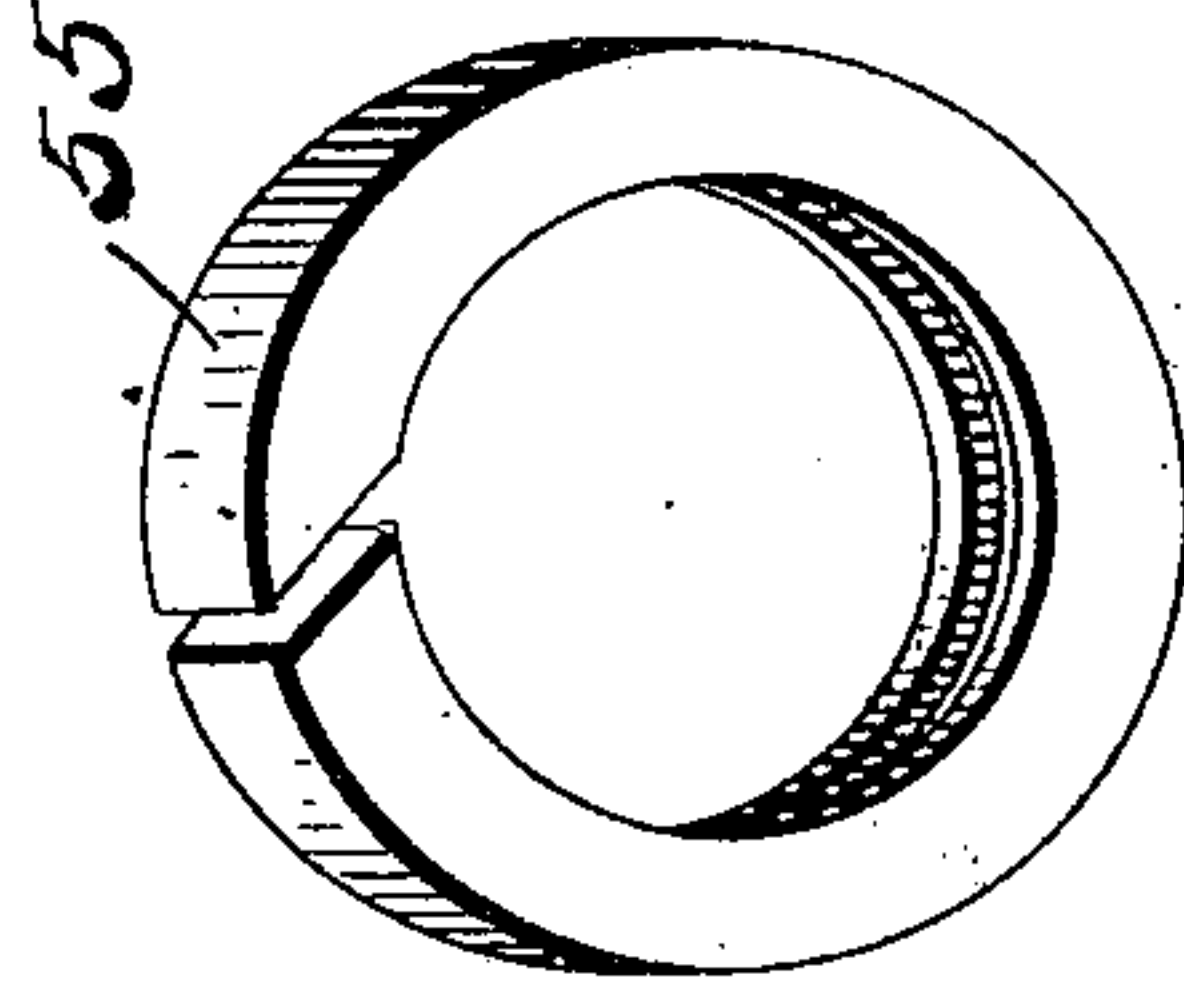


Fig. 5.



WITNESSES:

A. L. Bogan
E. M. Kitchen

INVENTOR

Joseph F. Batchelor

BY

McCauley & Co.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOSEPH F. BATCHELOR, OF NEW YORK, N. Y.

VALVE.

SPECIFICATION forming part of Letters Patent No. 631,146, dated August 15, 1899.

Application filed April 1, 1899. Serial No. 711,446. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH F. BATCHELOR, a citizen of the United States of America, residing in the borough of Brooklyn, in the city of New York and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in valves.

The object of my invention is to construct a valve of large capacity which is or may be controlled in its operation by a valve of smaller capacity or by other suitable means for controlling the flow of fluid or steam through pipes, the operation of this valve of smaller capacity being by either a manual or electrical means.

My invention finally consists in the novel combination and arrangement of parts hereinafter more fully described, and particularly pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, wherein like numerals of reference indicate corresponding parts throughout the several views thereof, and in which—

Figure 1 is a cross-sectional view of my improved valve. Figs. 2 and 3 are cross-sectional views of a modified form of valve. Fig. 4 is a bottom plan view of the magnetic connection for Fig. 3. Fig. 5 is a perspective view of the split ring of the main-valve head.

Referring to the drawings by reference-numerals, 1 indicates a valve-casing provided with the usual inlet and outlet openings having the outer ends of their inner faces formed with a series of screw-threads for securing the valve-casing to the ordinary inlet or outlet pipes. This valve-casing 1 is provided with a partition or diaphragm 2, forming thereby an inlet-chamber 2' and an outlet-chamber 2''. This diaphragm or partition 2 has arranged therein the opening or passage 3, communicating with the two chambers and the one edge thereof—that is, the edge in the inlet-chamber 2' forms a valve-seat, as at 4. The valve-casing 1 is also provided with a tubular extension or cylinder 5 on one side thereof, and a portion of the inner face, at its outer

end, of this extension or cylinder is interiorly screw-threaded to receive a head-plug or cap 6 for closing the same. This extension or cylinder 5 is separated from the valve-casing by means of a wall 7, provided with an opening to allow of the operation therethrough of a valve-stem 8.

The extension or cylinder 5 forms a piston-chamber in which operates the piston 9, (of larger area than the main-valve head, to be hereinafter described,) having a sleeve or offset 10 arranged centrally thereof for the mounting loosely of the piston upon the valve-stem, as shown, this sleeve or offset also forming a bearing. The sleeve 10 registers with an offset 11, formed on the inner face of the head-plug or cap 6, and they are both surrounded by a coiled tension-spring 12. The head-plug or cap 6 is provided with a stuffing or packing box having arranged therein the packing 13, secured therein by means of a smaller plug 14, through which the outer end of the valve-stem operates. A portion of the outer end of the valve-stem 8 is provided with screw-threads 15, upon which is mounted a regulating gear-nut 16. The extreme outer end of the valve-stem 8 is substantially square in contour, as at 17, to allow of a manual connection thereto for operating the main-valve head and for preventing the rotation of the valve-stem.

The extension or cylinder 5 is formed integral at the lower side thereof with an auxiliary casing 18, in which is arranged an auxiliary-valve chamber 19. This auxiliary-valve chamber is of greater diameter at its outer end than at its inner end and is adapted to receive in its larger portion a perforated disk 20 and a hollow screw-threaded plug 21. The disk 20 registers with the smaller portion of the auxiliary-valve chamber and the hollow plug registers with the disk, this registering end of the plug being of the same relative diameter as the disk.

The disk 20 is provided with an opening 22 and a valve-seat on its outer face, as at 23. The opening in the plug 21 is of the greatest diameter at its inner end and registers with the valve-seat formed on the outer face of the disk, as shown. This enlarged opening is designated by the numeral 23' and within which is adapted to have operate a puppet-

valve 24. Of course it will be observed that when the valve 24 is closed it will be brought into registering engagement with the valve-seat 23. This valve I term the "exhaust-valve."

The puppet-valve 24 is formed integral with valve-stems 26 27, which have arranged thereon fluted collars 28 29, the collar 28 operating in the auxiliary-valve chamber 19, while the collar 29 operates in the opening 23'.

The auxiliary-valve chamber 19 is normally closed by means of a puppet or supply valve 30, seating itself against a valve-seat 31, arranged on the inner end of the chamber 19. The inner face of this valve 30 is connected, by means of an inwardly-extending screw 32, to an auxiliary-valve stem 33.

The extension or cylinder 5 is provided with an opening or vent 34 to allow of atmospheric pressure on the inner face of the piston 9 and for the discharge thereof and is also provided with an opening or port 35 to allow of the admission of steam or other fluid pressure from a suitable source of supply against the outer face of the piston for operating the same.

I provide the valve-casing 1 with a smaller cylinder or extension 36 diametrically opposite the valve-chamber 19. This extension or cylinder is provided with a stuffing-box 37 for the auxiliary-valve stem 33. It will be observed that the wall of the valve-casing is apertured to allow of the operation there-through of the auxiliary-valve stem 33, upon which is mounted an auxiliary piston 38, which is arranged within the extension 36, as shown.

Beneath the opening through which the auxiliary-valve stem 33 operates is arranged a port 39, which connects the interior of the tubular extension 36 with the inlet-chamber of the valve-casing 1. The piston 38 is provided with an inlet-opening 40 of less diameter than the port 39.

41 indicates a discharge-pipe, which is connected to the extension or cylinder 36, having suitably arranged therein a blow-off cock 42.

43 denotes a removable plug or cap which is suitably connected to the valve-casing 1, as shown, and has formed integral with its inner face an inwardly-extending sleeve 44, which acts as a guide and support for the guide-stem 45 of the main valve 46. This main valve 46 is formed integral with the guide-stem 45, as well as the main-valve stem 8.

The outer face of the removable plug or cap is formed with an extension 47 and the lower portion of the valve-casing 1 with a like extension 48. These extensions are adapted to have a casing or other means 49 secured thereto, in which are mounted the electromagnets 50.

These magnets are connected by means of the bar 51, through which the outer end of the auxiliary-valve stem 33 operates, and mounted on the valve-stem 33 between this bar and the armature 52 is a coiled resistance-spring 53. The casing or other means 49, in which

the magnets are arranged, is connected to the extension 47 48 by means of the screws 54 or in any suitable manner.

The main valve 46 is provided with an annular groove, which receives a split dovetailed collar 55. This split dovetailed collar 55 rigidly holds in position by means of its dovetail a disk or ring 56. The annular groove has its inner angle cut or cleaned out to prevent the lodgment therein of dirt.

It will of course be observed that the regulation of the distance the main valve may obtain to pass pressure is by the shifting of the gear-nut 16. This is very desirable in connection with whistles, as I have found that the best tone can be obtained from a whistle of a given size only after a careful regulation of the volume of steam under a definite pressure which may be allowed to pass through the valve.

57 indicates a pinion mounted upon the shaft 58, which engages the regulating gear-nut 16 and is supported by means of the standards 59. This pinion is operated by means of a lever handle or grip, which, rotating the pinion 57, will operate the regulating gear-nut 16. The valve-casing being suitably connected to an inlet-pipe, as well as an outlet-pipe, supply being turned on pressure enters through the inlet-port and lies in the valve-chest in the portion thereof in which is arranged the main valve 46 and the puppet or supply valve 30. This portion is indicated by the numeral 2". The pressure necessarily will bear upon the valves and will keep the same in registering engagement with their valve-seats and also penetrates to the pipe-cock 42.

To operate the main valve by means of the auxiliary piston 38, the cock 42 is opened sufficiently to allow a portion of the supply to escape to the atmosphere from the extension or cylinder 36, thus relieving the piston 38 of pressure upon its front side, (this pressure being obtained by means of the port 40,) whereupon the pressure on its rear side actuates the piston, and the auxiliary-valve stem shifts the supply or puppet valve 30, as well as the exhaust or puppet valve 24, or, in other words, the valve-stem shifts the supply-valve 30 from its seat 31 and brings the exhaust-valve 24 into engagement with its seat 23.

It is clearly evident that an opening of the cock 42 to an extent just sufficient to make the exhaust a trifle in excess of the supply of pressure entering the front part of the cylinder through the port 40 would affect the piston, thus causing the supply and exhaust valves to partially open and close upon their valve-seats, as stated above. This is most desirable in connection with controlling the main valve, as the partial shifting of the supply and exhaust valves off and on their seats would effect a correspondingly partial opening of the main valve. Of course it will be observed that when the supply-valve 30 is shifted from its seat the supply passes into

the auxiliary-valve chamber 19, then up through the opening 35 against the piston 9, forcing thereby the main valve 46 from its seat. It will also be observed that by forming a circuit including the magnets upon energizing the same the armature thereof will carry the auxiliary-valve stem 33 toward them, moving the supply-valve from its seat and allowing the steam or other fluid to enter the auxiliary-valve chamber 19 from the main chamber and up through the port 35 and operate against the piston 9, as heretofore stated. The exhaust-valve 24 when the supply-valve is opened will rest against its seat, preventing thereby the escape of pressure to the atmosphere.

By the operation of the handle or grip controlling the regulating gear-nut 16 the main valve may be regulated as to the amount of its opening, or the same may be opened or closed as the occasion desires.

It will be noted that this valve is so constructed that when the main valve is closed the exhaust-valve is opened, thereby providing an automatic drain for the water of condensation which usually forms in the extension or cylinder. This is a very important advantage, as it prevents faulty operation of the valve and precludes all chances of freezing in the winter.

In the modification shown in Fig. 2 I have shown a bevel-faced main-valve seat, as all mechanics do not prefer flat seats, in which is a modified form of valve-stem 57, having a valve-head 46' formed integral therewith, provided with an annular groove receiving the disk 56', which in this instance has its inner face beveled, this disk abutting against or made integral with a smaller disk 61 mounted upon a portion 62 of the valve-stem, this disk being held in position by a split ring 55', (equivalent to the split dovetailed collar 55,) operating in an annular groove or channel 64 between a shoulder 64' and the disk 62, this disk tapering, as shown, so as to form a neat fit when abutting against the tapering valve-seat 4', formed by the arrangement of the partition or diaphragm 2 within the valve-casing, as shown. In this construction the outer end of the valve-stem is provided with set-nuts 67, for limiting the opening movement of the valve, and a split pin 67', rigidly set in holes 67'' in the valve-stem, for preventing the nuts being worked off the stem by shock. The disks 56' 61 may be made integral, but separately is a cheaper construction in use. In this construction I dispense with the cup-shaped piston in the tubular extension on the auxiliary-valve stem, and the supply and exhaust valves may be operated manually by a lever 68, which is fulcrumed to a hanger 69, the one end of the lever 68 being adapted to bear against the auxiliary-valve stem 27 in a direction to operate the same manually. The same reference-numerals designating the parts in Fig. 1

are used in this construction, lacking the reference-numerals set forth above.

In the modification shown in Fig. 3 of the drawings the main valve and valve-stem are the same as set forth in Fig. 1, with the exception that the set-nuts 67 are used on the protruding end of the valve-stem. In this modification the exhaust to the atmosphere from the auxiliary-valve chamber 19 is obtained by means of the outwardly-extending portion of the valve-stem to which the exhaust-valve is connected being hollow, as shown at 70. This portion of the valve-stem is provided with an opening 71, registering with the opening 70, to allow of the discharge of the exhaust to the atmosphere, as well as water of condensation. Of course it will be observed that the mounting of the spring 72 upon the valve-stem in the tubular extension when the same is operated will overcome to a certain extent the pressure in the same or, in other words, assist the supply-valve to leave its seat, or if the pressure in the portion 2' of the valve-casing does not overcome the tension of the spring 72 the supply-valve will be normally opened, which will cause the piston to be operated, thereby opening the main valve. The electromagnets may be connected to the auxiliary-valve stem in any desirable manner, but in the case of excess of spring-pressure the magnets must be working upon a closed electric circuit, such as a telegraph or fire-alarm circuit.

It is thought that the many advantages of my improved construction can be readily understood from the foregoing description, taken in connection with the accompanying drawings.

It will be noted that various changes may be made in the details of construction without departing from the general spirit of my invention.

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

1. In a valve, a valve-casing, a valve operating therein, a valve-stem formed integral therewith, a tubular extension connected to the said casing, a piston mounted on the said valve-stem and operating in the said extension, a supply-valve of less diameter than the said main valve adapted when operated to admit pressure in the said extension and against the said piston thereby operating the same and the main valve, and an exhaust-valve upon the same stem as the supply-valve and operating therewith by a longitudinal movement which remains normally opened but is closed by the operation of the supply-valve, substantially as set forth.

2. In a valve, a valve-casing provided with inlet and outlet openings, a main valve operating therein, a valve-stem formed integral therewith, a piston mounted on the said valve-stem, a supply-valve of less diameter than the main valve adapted when operated to

cause the operation of the said piston thereby operating the main valve, an exhaust-valve connected to the said supply-valve and operated thereby, and means operated by an exhaust to the atmosphere for operating the said supply-valve, substantially as described.

3. In a valve, a valve-casing provided with inlet and outlet openings, a main valve operating therein, a valve-stem formed integral therewith, a piston mounted on the said valve-stem, a supply-valve of less diameter than the main valve adapted when operated to cause the operation of the said piston thereby operating the main valve, an exhaust-valve connected to the said supply-valve and operated thereby, an auxiliary-valve stem connected to the said supply-valve, and a spring mounted on the free end of the said valve-stem adapted to operate or to assist in the operation of the supply-valve, substantially as described.

4. In a valve, a valve-casing having a main-valve seat arranged therein, a main valve operating against the said valve-seat, a valve-stem suitably connected thereto, a piston mounted on the said valve-stem, an auxiliary-valve chamber formed integral with the said valve-casing, a tubular extension formed integral with the said valve-casing diametrically opposite the auxiliary-valve chamber, an exhaust-valve having a valve-stem, an auxiliary supply-valve and stem connected to the said exhaust-valve stem operating in the said tubular extension, a piston mounted on the said auxiliary-valve stem operating in the said tubular extension, and exhausting means for the said tubular extension to allow of the operation of the said piston thereby opening the supply-valves closing the exhaust-valve to allow of the operation of the piston on the main-valve stem for operating said main valve, substantially as set forth.

5. In a valve, a valve-chamber having a main-valve seat arranged therein, a main valve operating against the said valve-seat consisting of a valve-head having a ring or disk mounted thereon adapted to engage the said seat, a dovetailed split ring adapted to secure the said disk to the valve-head, a valve-stem formed integral with the said valve, a tubular extension formed integral with the said valve-casing having the said valve-stem operating therein, a piston mounted upon the said valve-stem, the said extension provided with an exhaust-port beneath the said piston and means arranged on the said valve-stem to allow its operation by manual means, substantially as set forth.

6. In a valve, a valve-casing, a main-valve stem operating therein, a tubular extension or cylinder formed integral with the said valve-casing, a valve-stem connected to the said valve operating in the said tubular extension, a piston loosely mounted against a shoulder on the said valve-stem, an auxiliary-valve chamber formed integral with the said tubular extension and connecting with the inlet-chamber of the valve, a tubular extension

formed integral with the said valve-casing diametrically opposite the said auxiliary-valve chamber, a valve-stem operating in the said auxiliary-valve chamber carrying a supply and exhaust valve, an auxiliary-valve stem operating in the said tubular extension suitably connected to the said supply-valve, a piston mounted on the said auxiliary-valve stem operating in the said tubular extension or cylinder, the said extension provided with an exhaust-port beneath the said piston and means connected to the said auxiliary-valve stem for operating the same to allow of the operation of the piston upon the main-valve stem thereby operating the said main valve, substantially as set forth.

7. In a valve, a valve-casing, a main-valve stem operating therein, a tubular extension or cylinder formed integral with the said valve-casing, a valve-stem connected to the said valve operating in the said tubular extension, a piston loosely mounted against a shoulder on the said valve-stem, an auxiliary-valve chamber formed integral with the said tubular extension, a tubular extension formed integral with the said valve-casing diametrically opposite the said auxiliary-valve chamber, a valve-stem operating in the said auxiliary-valve chamber carrying a supply and exhaust valve, an auxiliary-valve stem operating in the said tubular extension suitably connected to the said supply-valve, a piston mounted on the said auxiliary-valve stem operating in the said tubular extension or cylinder, and electrical means connected to the said auxiliary-valve stem for operating the same to allow of the operation of the piston upon the main-valve stem thereby operating the said main valve, substantially as set forth.

8. In a valve, a valve-casing, a main-valve stem operating therein, a tubular extension or cylinder formed integral with the said valve-casing, a valve-stem connected to the said valve operating in the said tubular extension, a piston loosely mounted against a shoulder on the said valve-stem, an auxiliary-valve chamber formed integral with the said tubular extension, a tubular extension formed integral with the said casing diametrically opposite the said auxiliary-valve chamber, a valve-stem operating in the said auxiliary-valve chamber carrying a supply and exhaust valve, an auxiliary-valve stem operating in the said tubular extension suitably connected to the said supply-valve, a piston mounted on the said auxiliary-valve stem operating in the said tubular extension or cylinder, and means connected to the last-named tubular extension or cylinder when operated for operating the auxiliary-valve stem causing thereby the operation of the piston upon the main-valve stem thereby operating the said main valve, substantially as set forth.

9. In a valve, a valve-casing, a main-valve stem operating therein, a tubular extension or cylinder formed integral with the said

valve-casing, a valve-stem connected to the said valve operating in the said tubular extension, a piston loosely mounted against a shoulder on the said valve-stem, an auxiliary-valve chamber formed integral with the said tubular extension, a tubular extension formed integral with the said valve-casing diametrically opposite the said auxiliary-valve chamber, a valve-stem operating in the said auxiliary-valve chamber carrying a supply and exhaust valve, an auxiliary-valve stem operating in the said tubular extension suitably connected to the said supply-valve, a piston mounted on the said auxiliary-valve stem operating in the said tubular extension or cylinder, and a gear-nut adapted when operated to open the said main valve, substantially as set forth.

10. In a valve, a valve-casing, a main valve operating therein, separate supply and exhaust valves mounted upon a common stem, said supply-valve of less diameter than said main valve and adapted when operated to pass pressure to open the main valve, said exhaust-valve operated simultaneously with said supply-valve, and means connected with said supply-valve for operating the same, substantially as herein set forth.

11. In a valve a valve-casing, a main valve operating therein, a supply-valve of less diameter than the main valve, an exhaust-valve of less diameter than the supply-valve, and electrical means adapted to operate the said supply-valve thereby causing the operation of the main valve and close the exhaust to the atmosphere, substantially as set forth.

12. In a valve, a valve-casing, a main valve operating therein, a supply-valve, an auxiliary-valve stem connected thereto, a piston mounted on the said stem adapted to be operated by an exhaust to the atmosphere for operating the said supply-valve causing thereby the opening of the main valve, substantially as set forth.

13. In a valve, a valve-casing, a main valve suitably arranged therein, a supply-valve, and an exhaust-valve on the stem of the said supply-valve adapted when operated to cause the opening of the main valve, substantially as set forth.

14. In a valve, a valve-casing, a main valve operating therein consisting of a valve-head, a disk or ring mounted thereon adapted to engage a valve-seat, means for securing the same to the said valve-head, a tubular extension or cylinder formed integral with the said valve-casing, a piston operating therein and connected to the said main valve, the said extension provided with an exhaust-port beneath the said piston and means operated by an exhaust to the atmosphere for operating the said piston thereby operating the said valve, substantially as set forth.

15. In a valve, a valve-casing, a main valve operating therein consisting of a valve-head, a disk or ring mounted thereon adapted to

engage a valve-seat, means for securing the same to the said valve-head, a tubular extension or cylinder formed integral with the said valve-casing, a piston operating therein and connected to the said main valve, a supply-valve, and an exhaust-valve on the stem of the said supply-valve adapted when operated to cause the operation of the said piston and main valve, substantially as set forth.

16. In a valve, a valve-casing, a main valve operating therein consisting of a valve-head, a disk or ring mounted thereon adapted to engage a valve-seat, means for securing the same to the said valve-head, a tubular extension or cylinder formed integral with the said valve-casing, a piston operating therein, an auxiliary-valve chamber suitably connected to the said tubular extension or cylinder, a supply-valve adapted to supply pressure to the said chamber, an auxiliary-valve stem connected to the said supply-valve, and a piston mounted on said auxiliary-valve stem for causing the operation of the said supply-valve by an exhaust to the atmosphere, substantially as set forth.

17. In a valve, a valve-casing, a main valve operating therein consisting of a valve-head, a disk or ring mounted thereon, means for securing the same to the said valve-head, a tubular extension or cylinder formed integral with the said valve-casing, a piston operating therein and connected to the said main valve, an auxiliary-valve chamber suitably connected to the said tubular extension or cylinder, a supply-valve adapted to supply pressure to the said chamber, and electrical means for operating the said supply-valve causing the operation of the said piston and closing the exhaust to the atmosphere, substantially as set forth.

18. In a valve, a valve-casing, a main valve operating therein consisting of a valve-head, a disk or ring mounted thereon, means for securing the same to the said valve-head, a tubular extension or cylinder formed integral with the said valve-casing, a piston operating therein and connected to the said main valve, an auxiliary-valve chamber suitably connected to the said tubular extension or cylinder, a supply-valve adapted to supply pressure to the said chamber, an exhaust-valve for the said auxiliary-valve chamber, the said exhaust and supply valves suitably connected together, an auxiliary-valve stem connected to the said supply-valve, and a piston mounted on the said auxiliary-valve stem operated by an exhaust to the atmosphere for operating the said supply and exhaust valves, substantially as set forth.

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

JOSEPH F. BATCHELOR.

Witnesses:

JAMES O'HARE,
A. G. MCPHERSON.