

VALVE.

962,766.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

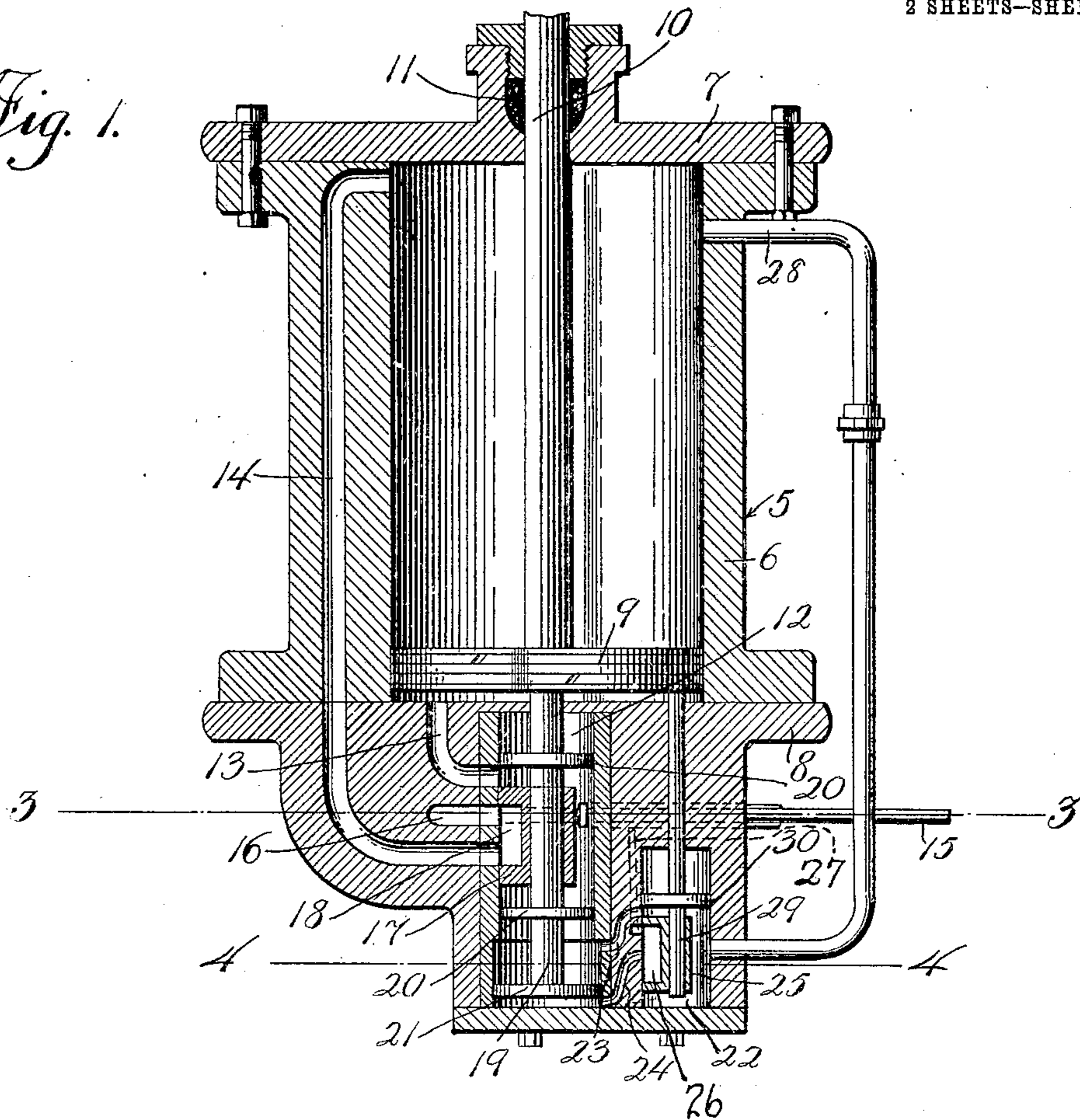
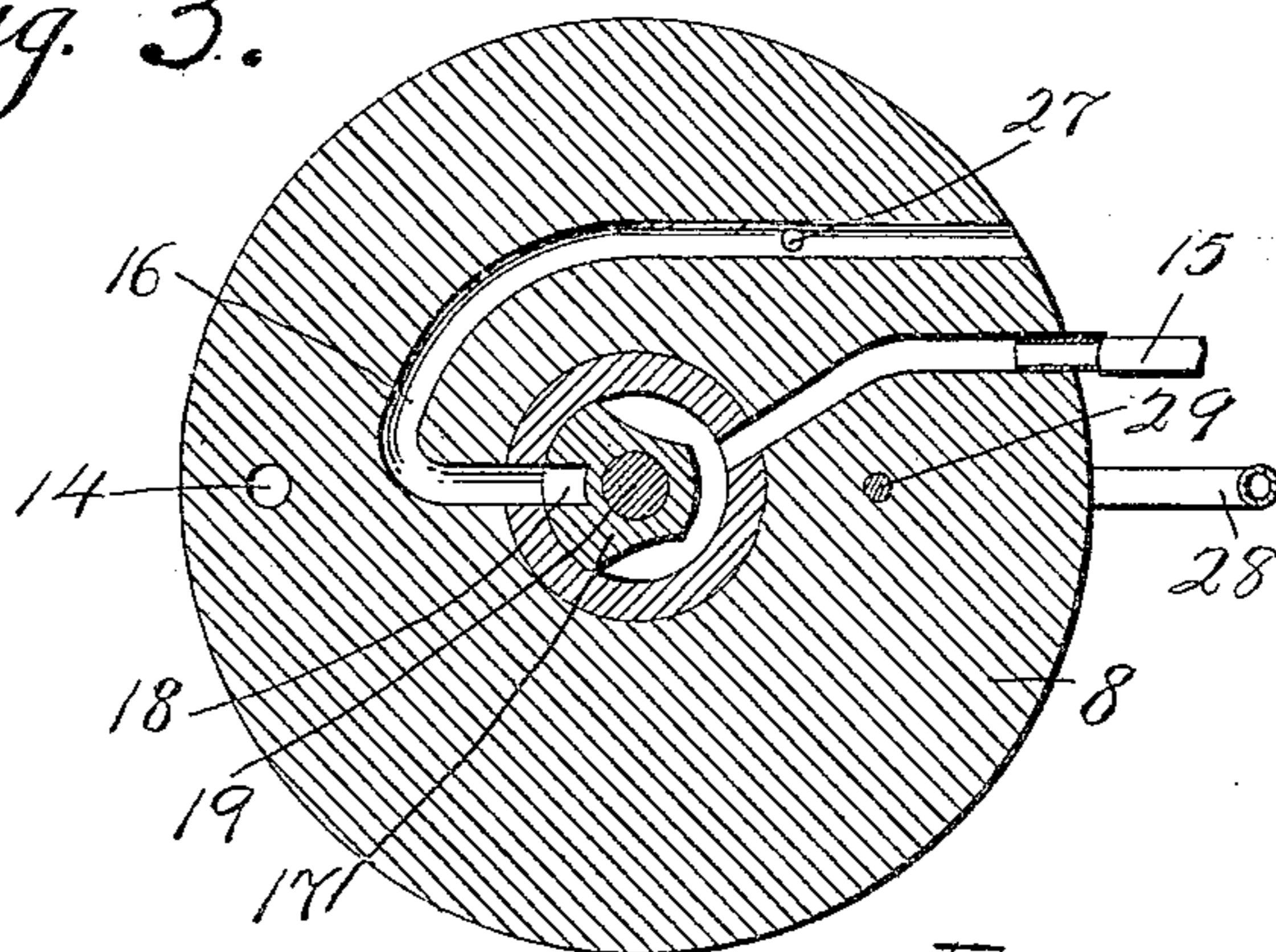


Fig. 3.



Witnesses
Albert L. Krey
J. O. Gardner

Inventors
and Edward A. Lacy,
Fred C. Williams,
By Charles C. Smith.
Attorneys

E. A. LACY & F. C. WILLIAMS.

VALVE.

APPLICATION FILED DEC. 8, 1908.

962,766.

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2 SHEETS—SHEET 2.

Fig. 2.

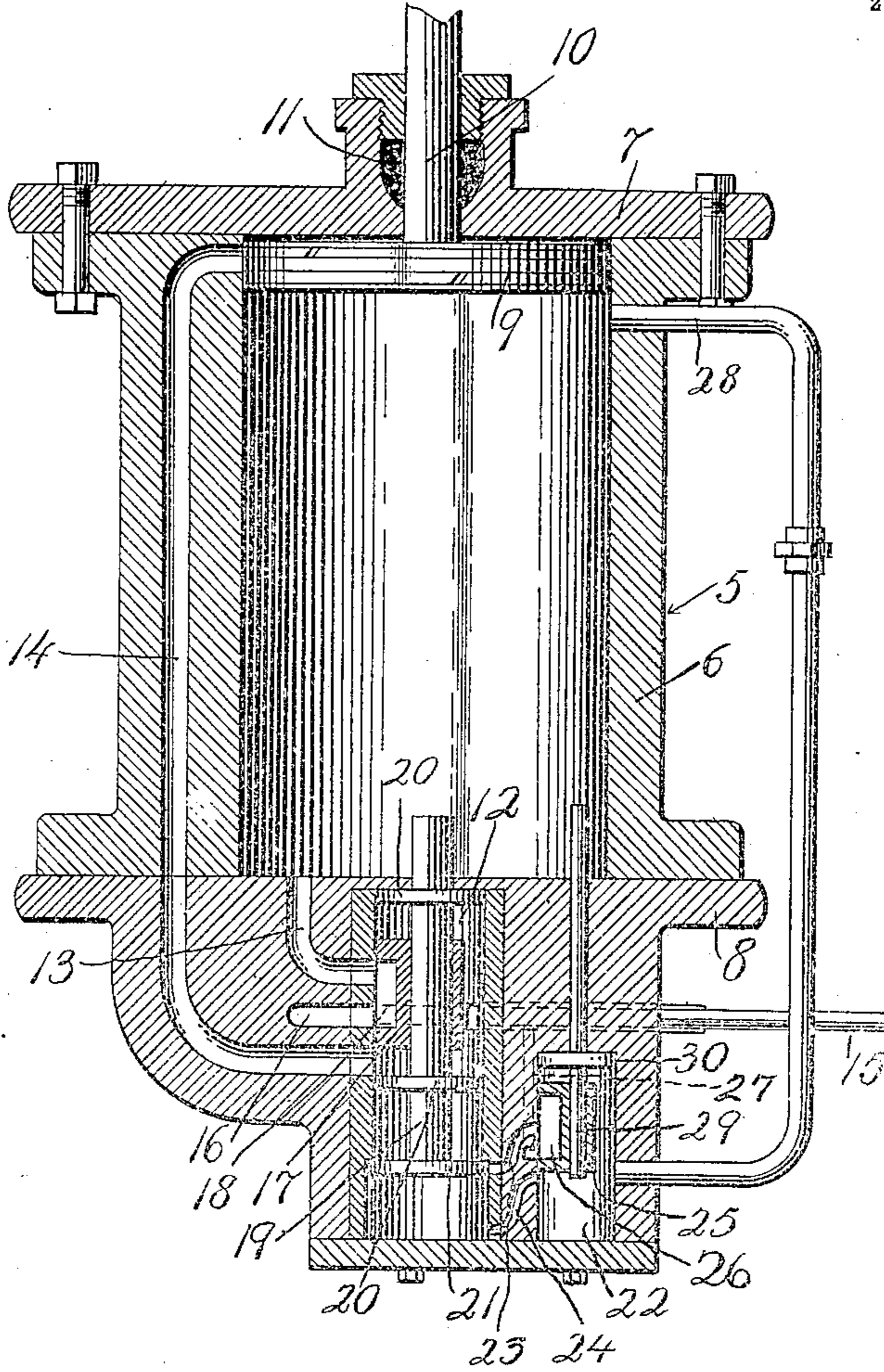
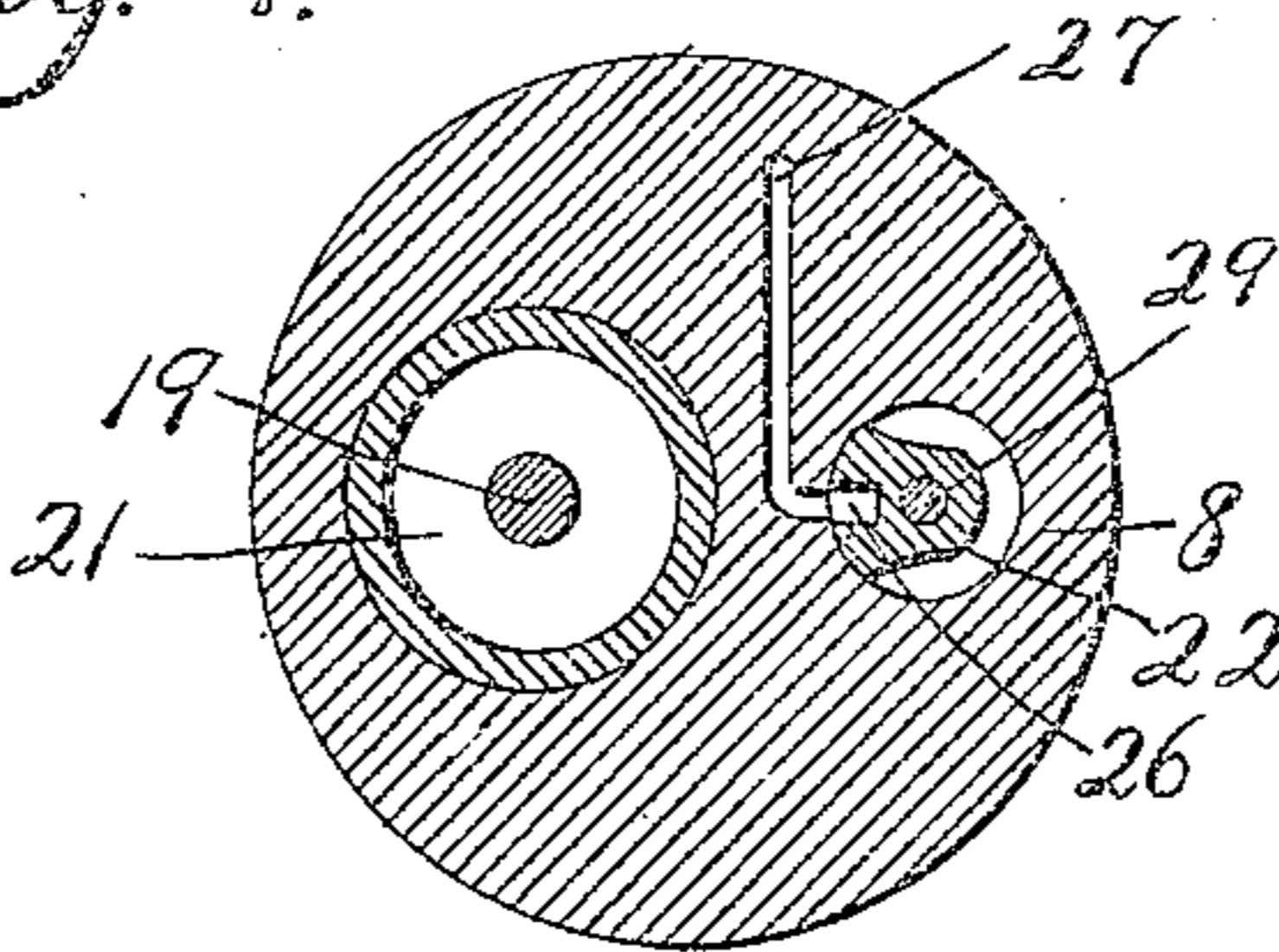


Fig. 4.



Witnesses
Albert L. Key
W. O. Gardner

and Edward A. Tracy
Fred C. Wilcox
Inventors

UNITED STATES PATENT OFFICE.

EDWARD A. LACY AND FRED C. WILLIAMS, OF GALETON, PENNSYLVANIA.

VALVE.

962,766.

Specification of Letters Patent. Patented June 28, 1910.

Application filed December 8, 1908. Serial No. 466,575.

To all whom it may concern:

Be it known that we, EDWARD A. LACY and FRED C. WILLIAMS, citizens of the United States, residing at Galeton, in the county of Potter, State of Pennsylvania, have invented certain new and useful Improvements in Valves; and we 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.

The invention relates to valves and more particularly to the class of valve mechanism to regulate the distribution of pressure in a cylinder or cylinders.

The primary object of the invention is the provision of a valve gear adapted to regulate a fluid supply and exhaust from a main cylinder and adapted to be controlled in one direction of movement by the piston and in its opposite direction by a portion of pressure exhaust from said main cylinder.

Another object of the invention is to provide a novel construction, combination and arrangement of parts having simplicity of structural details, inexpensive in the manufacture, and efficiency and durability.

The details of construction will appear in the course of the following description and as illustrated in the accompanying drawings which disclose the preferred form of embodiment of the invention.

The novelty of the invention will be brought out in the appended claims. It is to be understood however, that changes, variations and modifications may be made such as come properly within the scope of the appended claims without departing from the spirit of the invention.

In the drawings: Figure 1 is a vertical sectional view of a main cylinder and its piston with the invention applied thereto. Fig. 2 is a similar view with the piston in an opposite position and also the valve controlling the movement thereof. Fig. 3 is a sectional view on the line 3—3 of Fig. 1. Fig. 4 is a sectional view on the line 4—4 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

In the drawings, the numeral 5 designates a main cylinder formed with an annular shell or body portion 6 provided with heads 7 and 8 respectively the same secured or otherwise mounted in any suitable manner

upon the body portion 5 of the main cylinder. Working in the main cylinder 5 is a main piston or head 9 having the usual piston rod or stem 10 working through a packing gland 11 formed on the head 7 carried by the main cylinder.

Centrally within the head 8 of the main cylinder is a main valve cylinder or chamber 12 the same having communication through passage or port 13 with one end of the main cylinder and communication with the opposite end of the main cylinder by a passage or port 14 formed in the main body portion 6 and the head 8 mounted thereon. Leading to the main valve cylinder or chamber 12 is a fluid supply passage or port 15 the latter adapted to admit fluid power to be used in the main cylinder or cylinders.

Intermediate the ports 13 and 14 and formed in the head 8 is a main exhaust passage 16 which leads to the atmosphere. Working within the main valve cylinder or chamber 12 is a main valve 17 containing a recess 18 adapted to alternately form communication between the ports 13 and 14 respectively and the exhaust passage 16 leading to the atmosphere. The main valve 17 is fixed to a piston stem or tappet rod 19 one end of which works through the inner wall of the head 8 to project into the path of movement of the piston head 9 on its return stroke to actuate said tappet rod to move the main valve 17 in a position to form communication between the port 14 and exhaust passage 16 leading to the atmosphere. At opposite sides of the main valve 17 and formed on the tappet stem or rod 19 are piston heads 20 to form pressure space therebetween. On one end of the tappet stem or rod 19 is a piston head 21 the latter being of increased diameter with respect to the said piston heads 20 to perform a particular function as will be hereinafter described.

Adjacent the main valve chamber 12 is a supplemental valve chamber or cylinder 22 the latter having ports 23 and 24 the former communicating with the main valve chamber above the piston head 21 and the latter port communicating with the main valve chamber on the opposite side of said piston head 21. Within the supplemental valve cylinder or chamber 22 is a supplemental valve 25 the latter having a recess 26 adapted to alternately bring the ports 23 and 24 respectively into communication with an auxiliary exhaust passage 27 in communica-

tion with the main exhaust passage 16 leading to the atmosphere.

At a point immediately in advance of the position of the piston head 9 when reaching its limit of forward stroke is a bypass or passage 28 leading from the main cylinder 5 to the supplemental valve cylinder or chamber 22. The said supplemental valve 25 is secured to a tappet rod or stem 29 one end of which protrudes into the main cylinder 5 in the path of movement of the main piston head 9 to be actuated thereby upon its return stroke to move the supplemental valve in one direction. Fixed to the tappet stem or rod 29 is a piston head 30 the latter working within the supplemental valve cylinder or chamber beyond the passage or port 23 leading therefrom to the main valve cylinder or chamber.

In operation, the valve mechanism works as follows:—Pressure is admitted through the supply passage 15 into the main valve cylinder or chamber 12 between piston heads 20 and assuming that the main valve 17 is in a position to form communication between passage 14 and the main exhaust passage 16, the pressure within the main valve cylinder or chamber passes through passage 13 to main cylinder 5 behind main piston head 9 causing it to move to opposite end of main cylinder this being the forward stroke of the main piston and when the same arrives at its limit of stroke it uncovers the communication from main cylinder to the bypass or passage 28 which allows pressure to flow into supplementary valve chamber or cylinder 22 under piston head 30 which forces the latter forward or in one direction thereby carrying supplementary valve 25 in the same direction and in this movement the said valve opens port 24 and admits pressure behind the piston head 21 in main valve cylinder or chamber 12 and at the same time the supplemental valve establishes communication between port 23 with the atmosphere through the auxiliary exhaust passage 27 thus relieving the pressure between piston heads 20 and 21 so that the pressure behind the piston head 21 moves main valve 17 in one direction to establish communication between main exhaust passage 16 and passage 13 leading from the main cylinder and at the same time opening passage 14 to establish communication between the main cylinder 5 and the main valve cylinder or chamber. At this time passage 13 is in communication with the atmosphere to allow the pressure behind the main piston to escape to the atmosphere.

Upon movement of the main piston head 9 on its return stroke it primarily contacts with the tappet stem or rod 29 of the supplemental valve 25 as the said stem 29 is of greater length than the main stem or rod

19 of the main valve and in this manner the supplemental valve 25 is moved to uncover port 23 allowing pressure to accumulate behind or in rear of piston head 21 and at the same time putting port 24 in communication with auxiliary exhaust passage 27 by the movement of supplemental valve 25 allowing pressure confined between piston heads 20 and 21 to escape to atmosphere through said port 27 in communication with the main exhaust passage and the pressure accumulated behind piston 9 is exhausted through passage 14 which is in communication with the main exhaust passage thus completing the cycle.

What is claimed is—

1. The combination with a main cylinder and piston, of a valve for controlling the fluid supply and exhaust of the main cylinder and operated in one direction by the piston, and means alternately operated by the piston and part of the fluid exhaust of the main cylinder for moving the valve in the opposite direction.

2. The combination with a main cylinder and its piston, of a main valve cylinder having communication with the main cylinder, a supplemental valve cylinder in communication with the main valve cylinder and the main cylinder, a main valve within the main valve cylinder and actuated in one direction by movement of the piston to control the fluid supply and exhaust of the main cylinder, pressure controlled means for moving the main valve in the opposite direction, and a supplemental valve within the supplemental valve cylinder and controlling the supply of fluid to said pressure controlled means.

3. The combination with a main cylinder and its piston, of a plurality of valve cylinders having communication with each other, the main cylinder and the atmosphere, valves working in said cylinders and successively operated in one direction by the piston, and fluid pressure controlled means operating said valves in the opposite direction, one of said valves controlling the supply of fluid to the fluid pressure controlled means of the other valve.

4. The combination with a main cylinder and piston, of a main valve for controlling the fluid supply and exhaust of the main cylinder and operated in one direction by the piston, and a supplemental valve alternately operated by the piston and part of the fluid exhaust of the main cylinder for moving the main valve in the opposite direction.

In testimony whereof, we affix our signatures, in presence of two witnesses.

EDWARD A. LACY.
FRED C. WILLIAMS.

Witnesses:

A. E. CURRAN,
WM. J. SOXE.