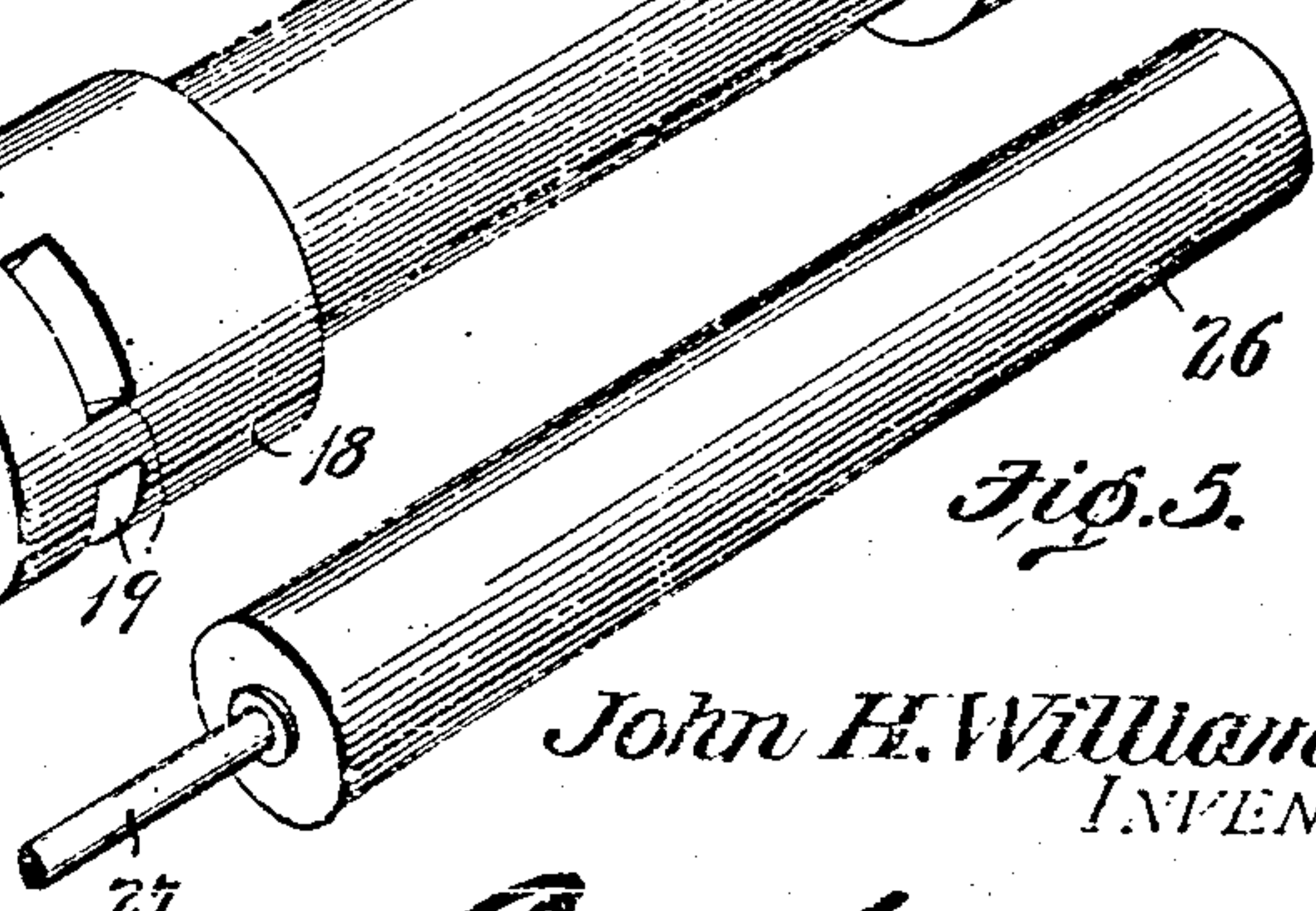
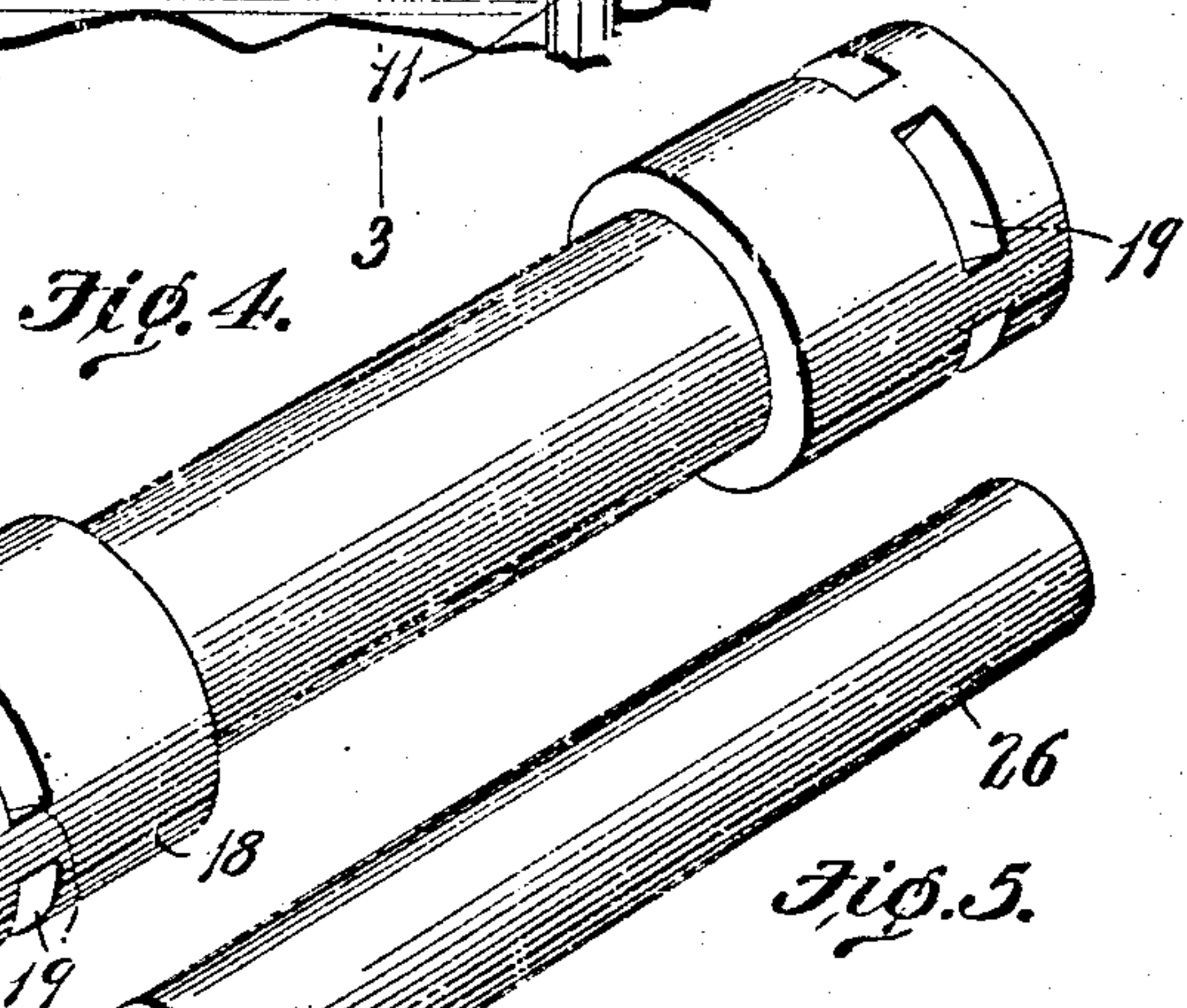
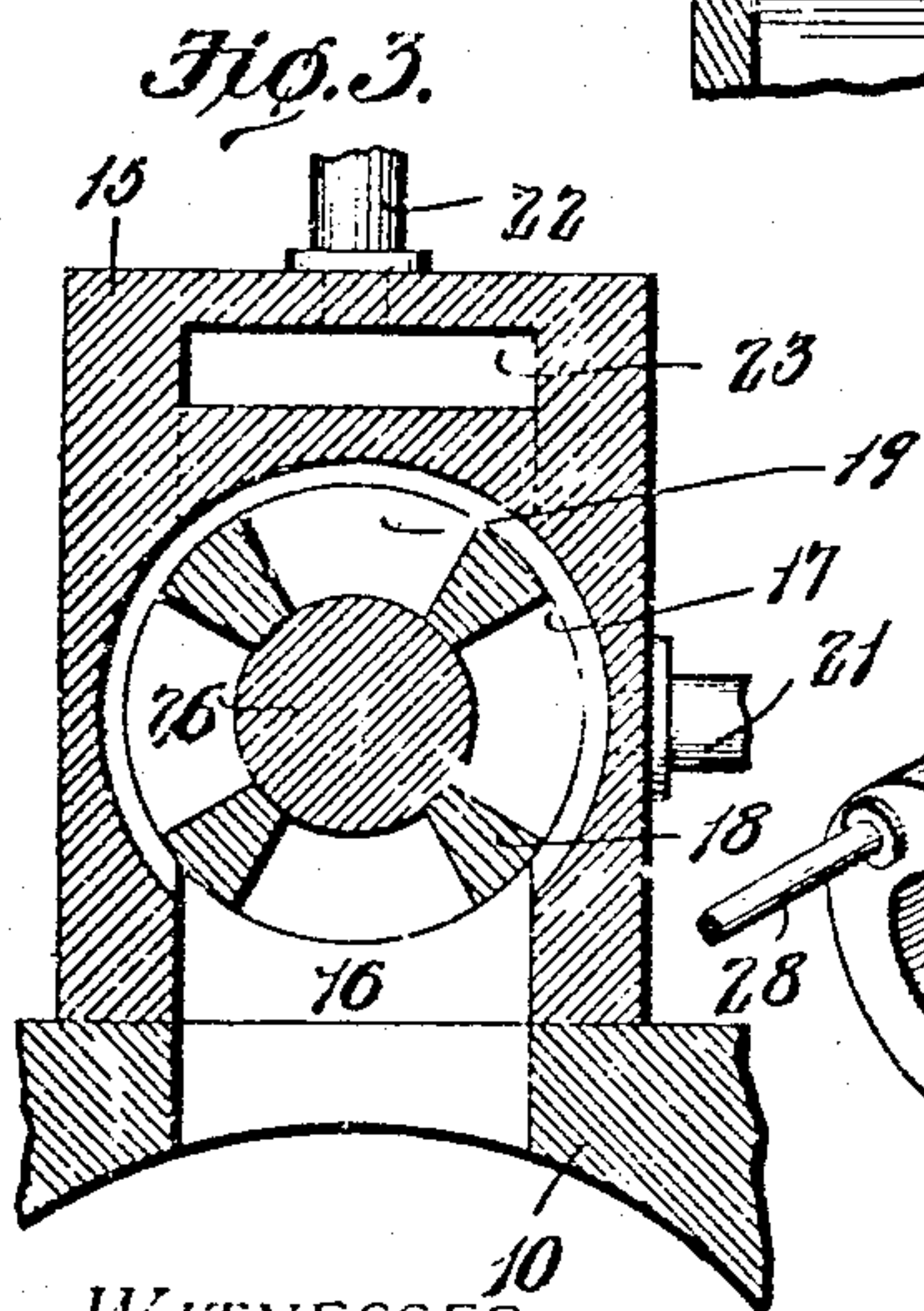
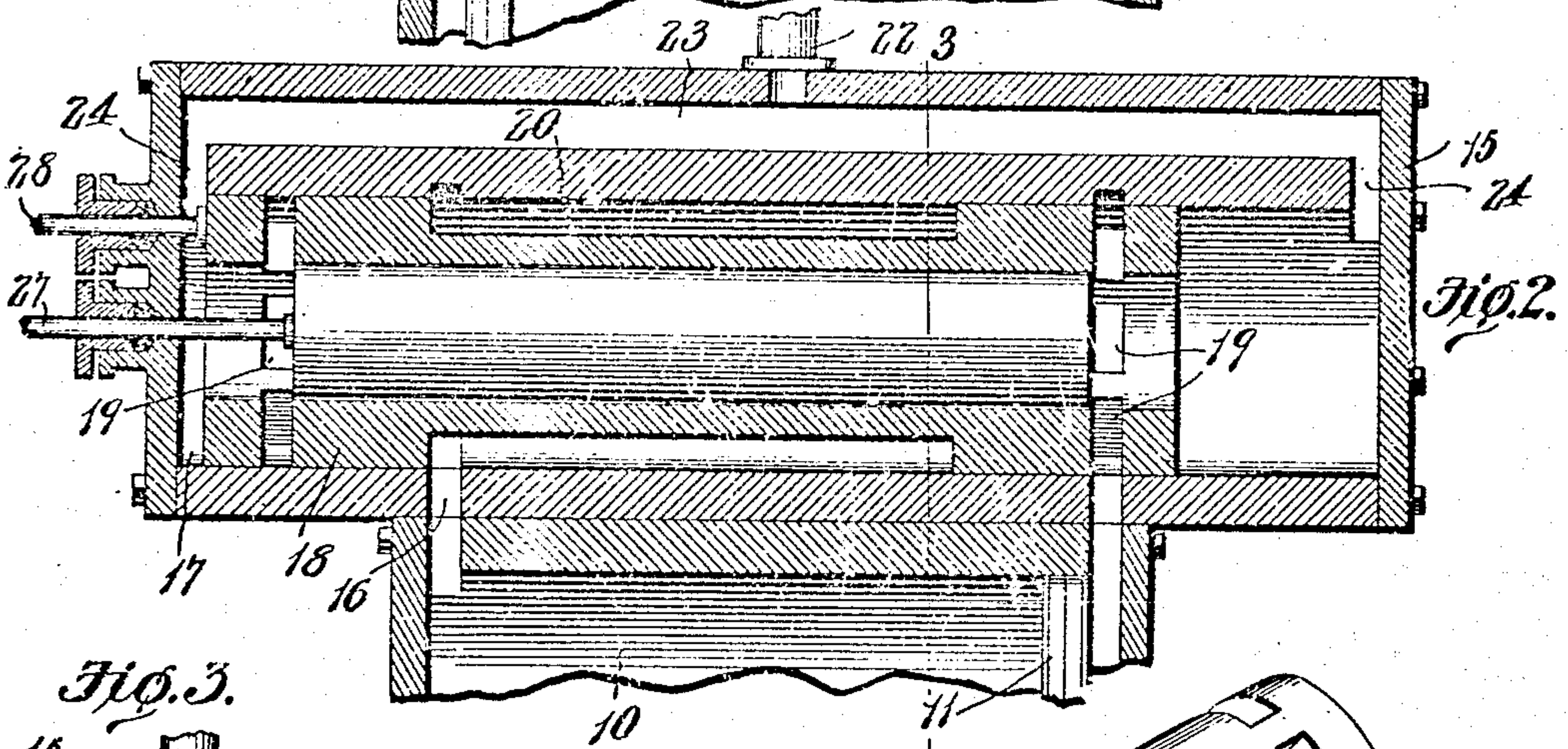
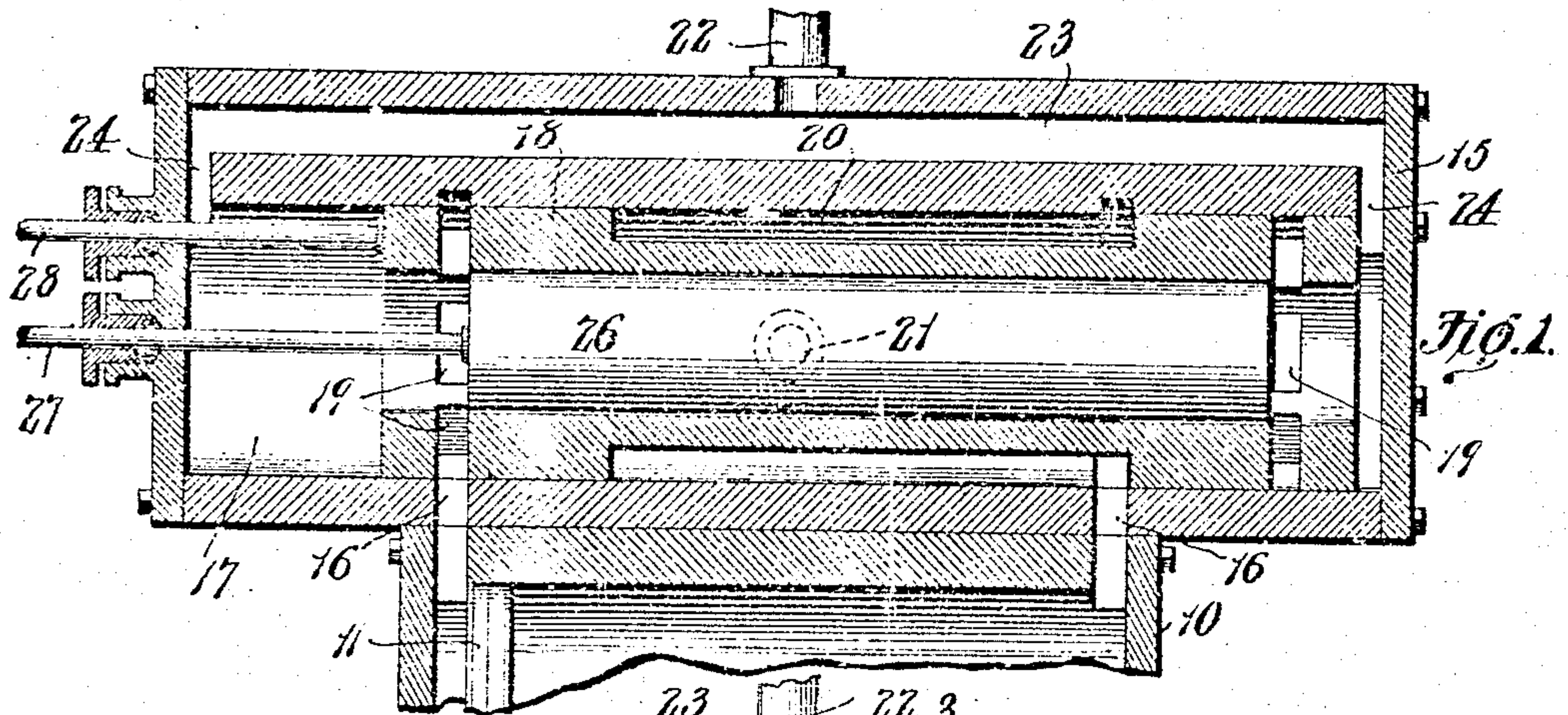


No. 845,155.

PATENTED FEB. 26, 1907.

J. H. WILLIAMS.
CUT-OFF VALVE.

APPLICATION FILED MAY 14, 1906.



WITNESSES:
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UNITED STATES PATENT OFFICE.

JOHN H. WILLIAMS, OF NEW LONDON, IOWA.

CUT-OFF VALVE.

No. 845,155.

Specification of Letters Patent.

Patented Feb. 26, 1907.

Application filed May 14, 1906. Serial No. 316,783.

To all whom it may concern.

Be it known that I, JOHN H. WILLIAMS, a citizen of the United States, residing at New London, in the county of Henry and State of Iowa, have invented a new and useful Cut-Off Valve, of which the following is a specification.

This invention relates to valves for steam-engines, and has for its principal object to provide a novel form of valve which will be perfectly balanced, thus avoiding undue friction between the valve and its seat.

A further object of the invention is to provide a structure in which the chest is longer than the cylinder and in which the two are connected by direct ports leading in straight lines, thus avoiding the waste of steam incident to the filling of the usual indirect ports of ordinary engines.

A still further object of the invention is to provide a novel form of valve in which the steam may be cut off at any desired point in the stroke, the main valve being in the form of a hollow ported cylinder and an auxiliary cut-off valve being arranged within the main valve and being movable independently thereof in order to effect a more or less perfect cut-off, as desired.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a sectional elevation of the steam-chest and a portion of the cylinder of an engine constructed and arranged in accordance with the invention, the piston being shown at the end of the in or crank-shaft stroke. Fig. 2 is a similar view showing the piston at the end of the outstroke. Fig. 3 is a transverse sectional elevation through the chest on the line 3-3 of Fig. 2. Fig. 4 is a detail perspective view of the main valve detached. Fig. 5 is a similar view of the cut-off valve.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the drawings there is shown a portion of a cylinder 10 and a portion of the piston 11, the latter being provided with the usual connections.

Above the cylinder is a steam-chest 15, which is of greater length than the cylinder in order to provide direct ports 16 between the cylinder and the chest. These ports extend in straight lines at a right angle to the longitudinal axis of the cylinder and in the largest engine need not be more than an inch in length as distinguished from the ordinary type of engine where the cylinder-ports are concentrated at about the center of the valve-seat in the steam-chest, the ports being unnecessarily long and being curved, so that the flow of steam is retarded, and at each stroke the volume of steam necessary to fill the ports is wholly wasted.

The steam-chest is bored out to form a cylinder 17, in which is arranged a cylindrical valve 18, the latter fitting snugly within the cylinder, so that the steam-pressure will be equal at all points, and frictional wear, due to excessive pressure on the valve in any one direction, will be eliminated.

The cylinder is bored throughout its entire length, and near each end is arranged a plurality of ports 19, leading through the wall of the cylinder in direct lines at right angles to the longitudinal axis of the valve. The central portion of the cylinder is reduced in diameter, forming an enlarged annular space 20, with which the exhaust-port 21 communicates, and when one of the cylinder-ports is in communication with a set of steam-ports 19 the other cylinder-port is in communication with the exhaust 21.

The steam or other fluid under pressure never flows to the center of the steam-chest, but always remains at the opposite ends thereof. The steam is admitted through an inlet-pipe 22 to a port 23 above the cylinder, and said port communicates with the opposite ends of the cylinder 17 through vertical ports 24, so that each set of valve-ports has an independent steam-supply.

Arranged within the bore of the main valve 18 is a cut-off valve 26 in the form of a solid plunger. This plunger is of a length equal to the distance between the inner or adjacent walls of the two sets of ports 19, as will be evident on reference to Figs. 1 and 2, and the cut-off valve is provided with an operating-stem 27, while the main valve has a separate operating-stem 28.

The main valve and the cut-off valve are connected to independent valve-operating mechanisms, which may be of any desired construction and which operate in such manner that when the parts are in the position shown in Fig. 1 and the left-hand end of the cylinder is taking steam the valve 26 may be moved to the left at any desired speed in order to cut off the flow of steam without disturbing the position of the main valve, so that the exhaust-port at the opposite end of the cylinder may be left fully open to permit the free escape of the dead steam in advance of the piston. When moved to the opposite position, as shown in Fig. 2, and the right-hand end of the cylinder is taking steam, the cut-off valve may be moved to the right in order to cut off without changing the position of the exhaust-port at the opposite end of the cylinder.

It will be noted that the pressure areas at the opposite ends of the valves are substantially equal, with the exception, of course, of the limited area occupied by the stems at the crank-shaft end of the valves; but this will not be sufficient to retard the movement of either valve, and there is no excessive frictional wear due to steam-pressure, as in the case of the ordinary D slide-valve.

I claim—

In combination, a cylinder, a steam-chest of greater length than the cylinder, straight ports leading directly from the ends of the cylinder to the steam-chest at approximately right angles to the longitudinal axis of the cylinder, the steam-chest being provided with a cylindrical bore and arranged to receive steam at both ends and to exhaust at the center, a hollow cylindrical valve arranged in the steam-chest and provided with ports to permit the passage of the steam from the ends of the chest to the cylinder-ports, said valve having a reduced central portion in constant communication with the exhaust, a solid cut-off valve arranged within the hollow valve and controlling the ports of the latter, and independent valve-stems connected to the two valves.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN H. WILLIAMS.

Witnesses:

I. H. REDFERN,
ROSS WALKER.