

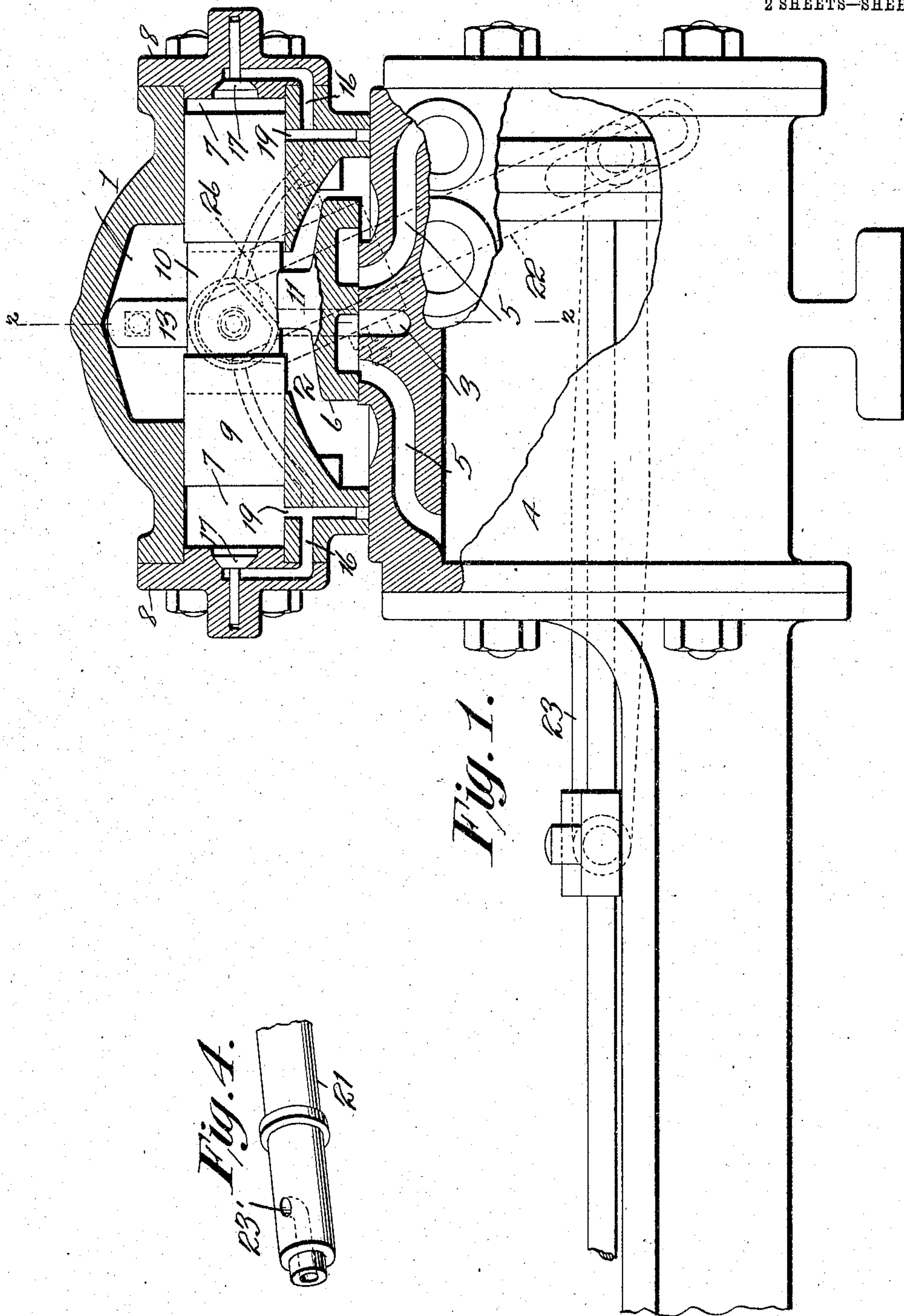
No. 791,762.

PATENTED JUNE 6, 1905.

S. F. FIELD.
VALVE.

APPLICATION FILED JULY 18, 1904.

2 SHEETS—SHEET 1.



Witnesses

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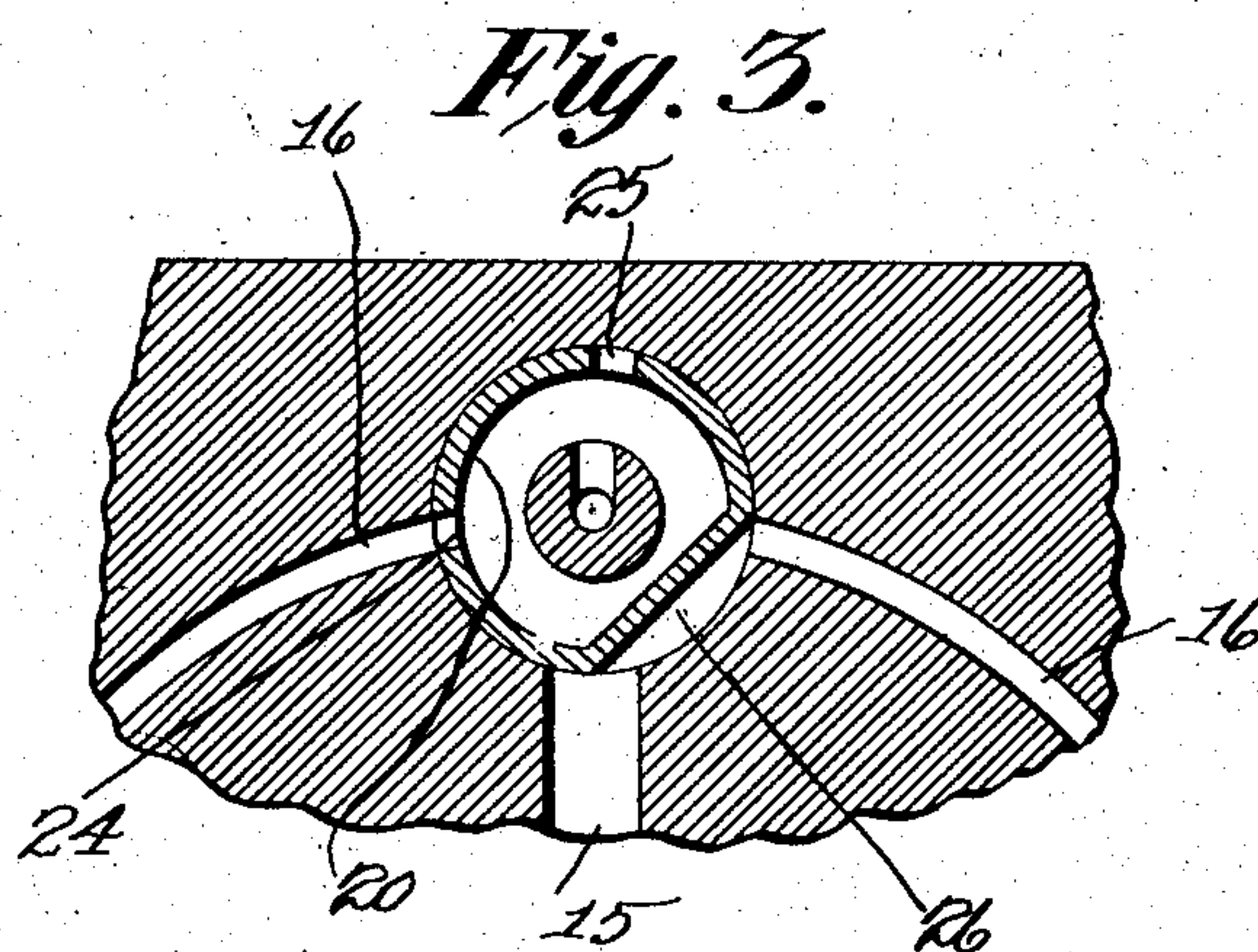
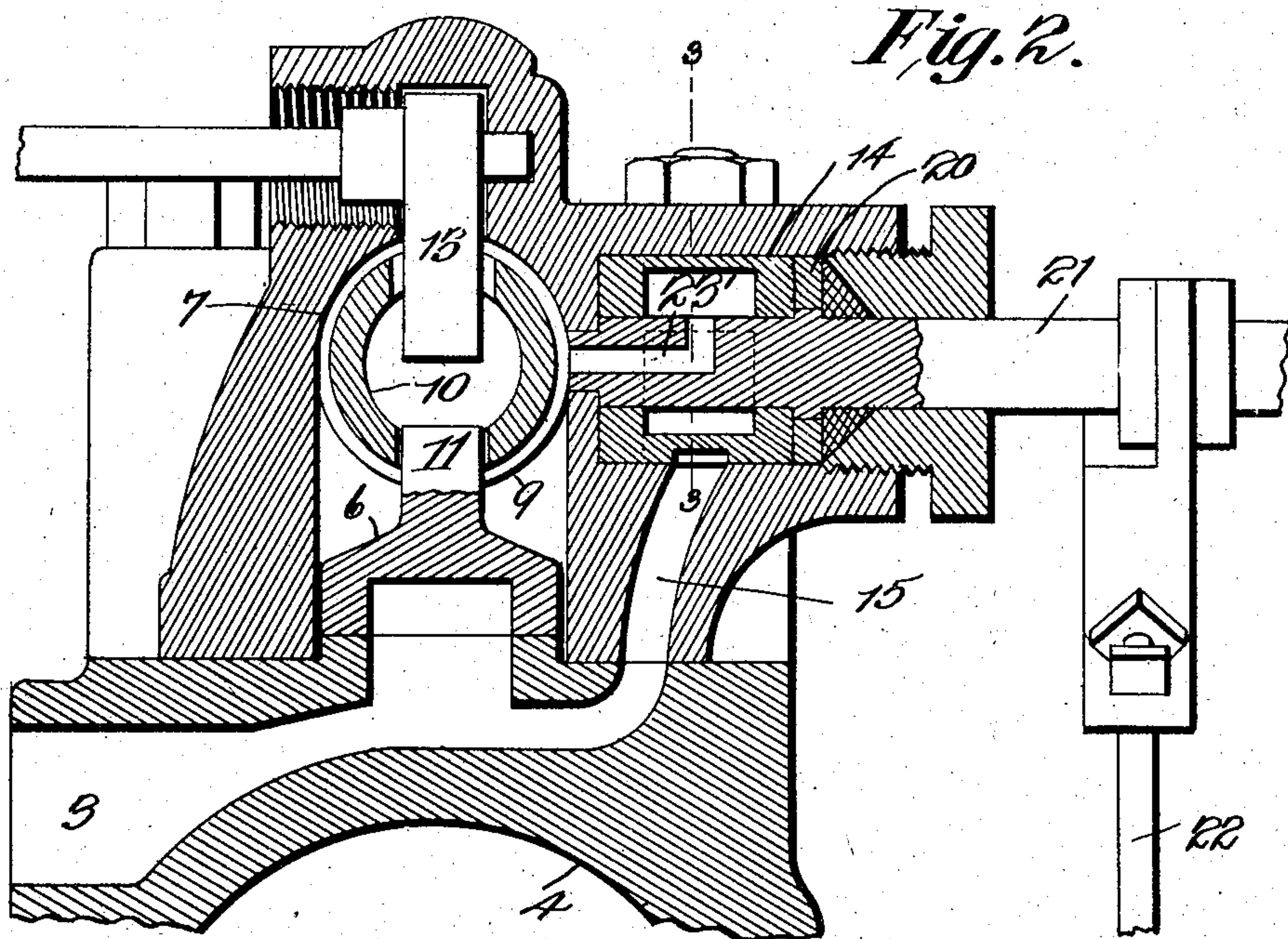
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UNITED STATES PATENT OFFICE.

SAMUEL F. FIELD, OF FINDLAY, OHIO, ASSIGNOR TO FINDLAY FOUNDRY AND MACHINE CO., OF FINDLAY, OHIO.

VALVE.

SPECIFICATION forming part of Letters Patent No. 791,762, dated June 6, 1905.

Application filed July 18, 1904. Serial No. 216,995.

To all whom it may concern:

Be it known that I, SAMUEL F. FIELD, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Valve, of which the following is a specification.

This invention relates to improvements in steam-actuated valves, and has for its principal object to provide a novel form of valve and valve mechanism of that class in which a primary valve operable from a movable part of the engine controls the flow of steam or other elastic fluid for actuating the main valve.

A further object of the invention is to provide a valve mechanism in which undue friction on the primary valve is avoided by admitting the live steam or other fluid to the interior of the valve, and a still further object is to insure a positive movement of the main valve by admitting fluid under pressure to one end of the actuating-piston of the valve at the same time that fluid is allowed to exhaust from the cylinder inclosing the opposite end of said piston.

With these and other objects in view, as will more fully hereinafter appear, the invention consists of the novel 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 longitudinal sectional elevation of sufficient of a steam-engine to illustrate the invention. Fig. 2 is a transverse sectional elevation of the same, on an enlarged scale, on the line 2 2 of Fig. 1. Fig. 3 is a sectional view of a portion of the valve-casing on the line 3 3 of Fig. 2. Fig. 4 is a detail perspective view of the operating-stem of the primary valve.

Similar numerals of reference are employed to indicate corresponding parts

throughout the several figures of the drawings.

The main steam-chest 1 is provided with a main inlet 2 and an exhaust-port 3, and between the steam-chest and the opposite ends of the power-cylinder 4 lead suitable ports 5, these ports and the port 3 being controlled by a double-D slide-valve 6, the ports of which move beyond the end of the main-valve seat for the admission of steam to the cylinder-ports, so that the effect of the pressure of the steam on the upper solid face of the valve is counterbalanced to some extent.

In opposite ends of the upper portion of the steam-chest are arranged two axially-alined cylinders 7, the ends of which are closed by removable heads 8, and within the cylinders is arranged a pair of pistons 9, coupled by a hollow stem 10, that is grooved for the reception of a vertical lug 11, projecting from the top of the main steam-valve, the construction being such that downward pressure of the steam on the valve will not exert corresponding pressure on the pistons, so that the latter will not be worn unevenly. The upper portion of the stem is slotted for the reception of the usual manually-operable arm 13, which is operated in case the valve stops in the central position.

At a point to one side of the disk is a cylindrical valve-chamber 14, from which leads an exhaust-port 15 in communication with the main exhaust 3, and this chamber further communicates through ports 16 with passages in the removable heads 8 of the steam-chest, and at the ends of said passages are arranged valves 17, normally held in place by spring cross-bars. The ports 16 are provided with branches 19 in direct communication with the cylinders 7, these ports entering the cylinders at some distance from the ends thereof in order to form cushioning-spaces for the pistons. In the valve-chamber 14 is an oscillating valve 20, carried by a stem 21, that is connected by a rocker-arm 22 and link 23 to a movable portion of the engine—as, for instance, a cross-head or block carried by the piston-rod—and at each movement of the latter the rocker-arm will be actuated and the

position of the valve 20 will be shifted. In the inner end of the valve-stem 21 is formed a port 23', which opens at one end to the interior of the valve-chest and at the opposite end to the interior of the oscillating valve 20, so that the latter is at all times filled with steam under boiler-pressure. The valve 20 is provided with two ports 24 and 25, and in its lower face is a transverse port 26, which does not, however, communicate with the interior of the valve, but serves merely to place the ports 16 alternately in communication with the exhaust-port 15.

When the parts are in the position shown in Fig. 1, the main power-piston has been moved to one end of the cylinder and the valve 6 has been moved to such position as to permit the entrance of steam to the same end of the cylinder, so that the piston is about ready to start on the return stroke. During this return stroke the valve 20 is rocked until the port 26 places the port 16 at the left of the steam-chest in communication with the exhaust-port and the steam-port 25 of valve 20 is in communication with the steam-port 16 at the right of the steam-chest. The steam under pressure entering the cylinder 7 at the right will open the valve 17 and force the pair of pistons toward the left, and this movement will occur at a comparatively rapid rate owing to the fact that the steam is exhausting from the left cylinder out through the port 16 and passage 26 to the exhaust-port 15. When the left piston 9 closes the communicating port 19, the valve 17 is also closed and a cushion-space is formed, so as to gradually stop movement of the piston and the main valve. By this time the position of the main valve has been shifted and steam is free to flow into the left end of the power-cylinder.

By permitting steam to enter the interior of the valve 20 the excessive wear of this

valve, which frequently occurs when the valve is forced to its seat by steam-pressure, is avoided. At the same time the movement of the main valve is rendered more positive by subjecting one of the pistons to steam-pressure, while exhausting from the cylinder in which the end of the opposite piston is contained.

Having thus described the invention, what is claimed is—

The combination with a main valve, of a main steam-chest, a pair of alined cylinders opening into the steam-chest at one end, a pair of connected pistons disposed in said cylinders and connected to said main valve, a primary-valve chamber disposed adjacent to the steam-chest, and in communication with the main exhaust, ports leading from said primary-valve chamber to the outer ends of both of the cylinders, each of the ports having two branch connections, one communicating with the cylinder at a point to be closed by the piston in advance of the completion of its stroke, and the other terminating in a valve-seat in the cylinder-head, a pressure-closed valve at each of the seats, a rotary primary valve disposed in the primary-valve chamber, said primary valve being hollow and provided with two ports that may be placed alternately in communication with the ports leading to the cylinders, and an escape-port being formed in the wall of said primary valve, and a hollow stem carrying said primary valve and provided with a port that places the interior of the valve in communication with the main steam-chest.

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

SAMUEL F. ^{his}FIELD.
mark

Witnesses:

ROSS J. WETHERALD,
JOHN W. GRIMM.