

No. 782,475.

PATENTED FEB. 14, 1905.

J. S. WIGNALL, JR.

STEAM ENGINE.

APPLICATION FILED APR. 17, 1903.

Fig. 1.

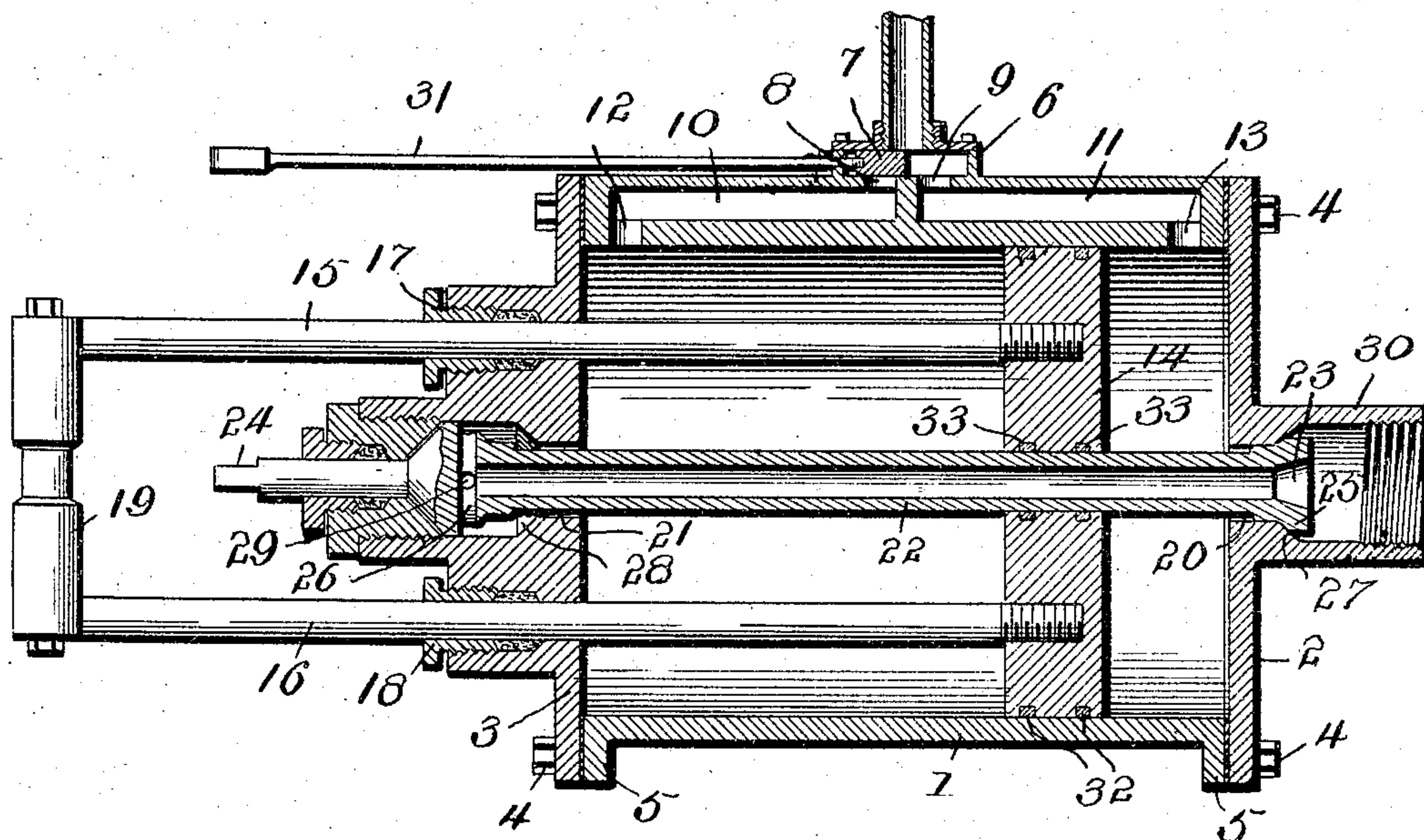


Fig. 2.

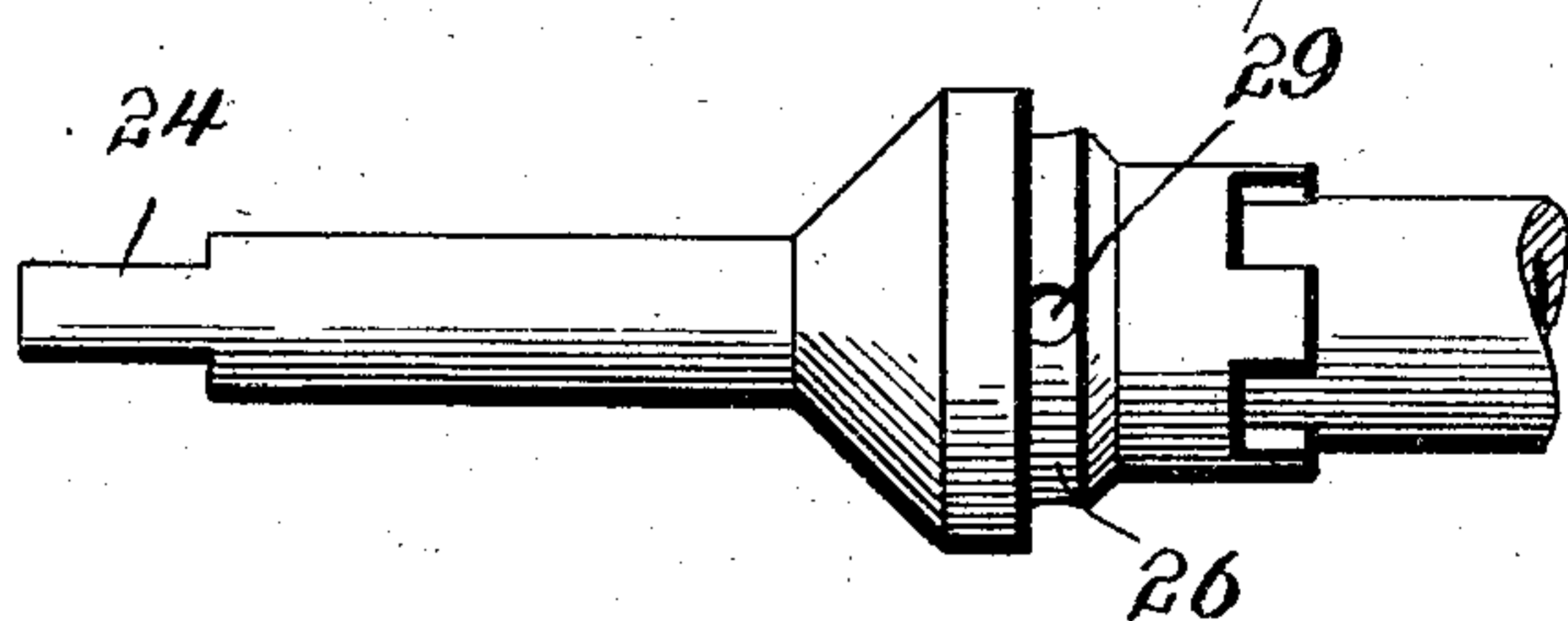
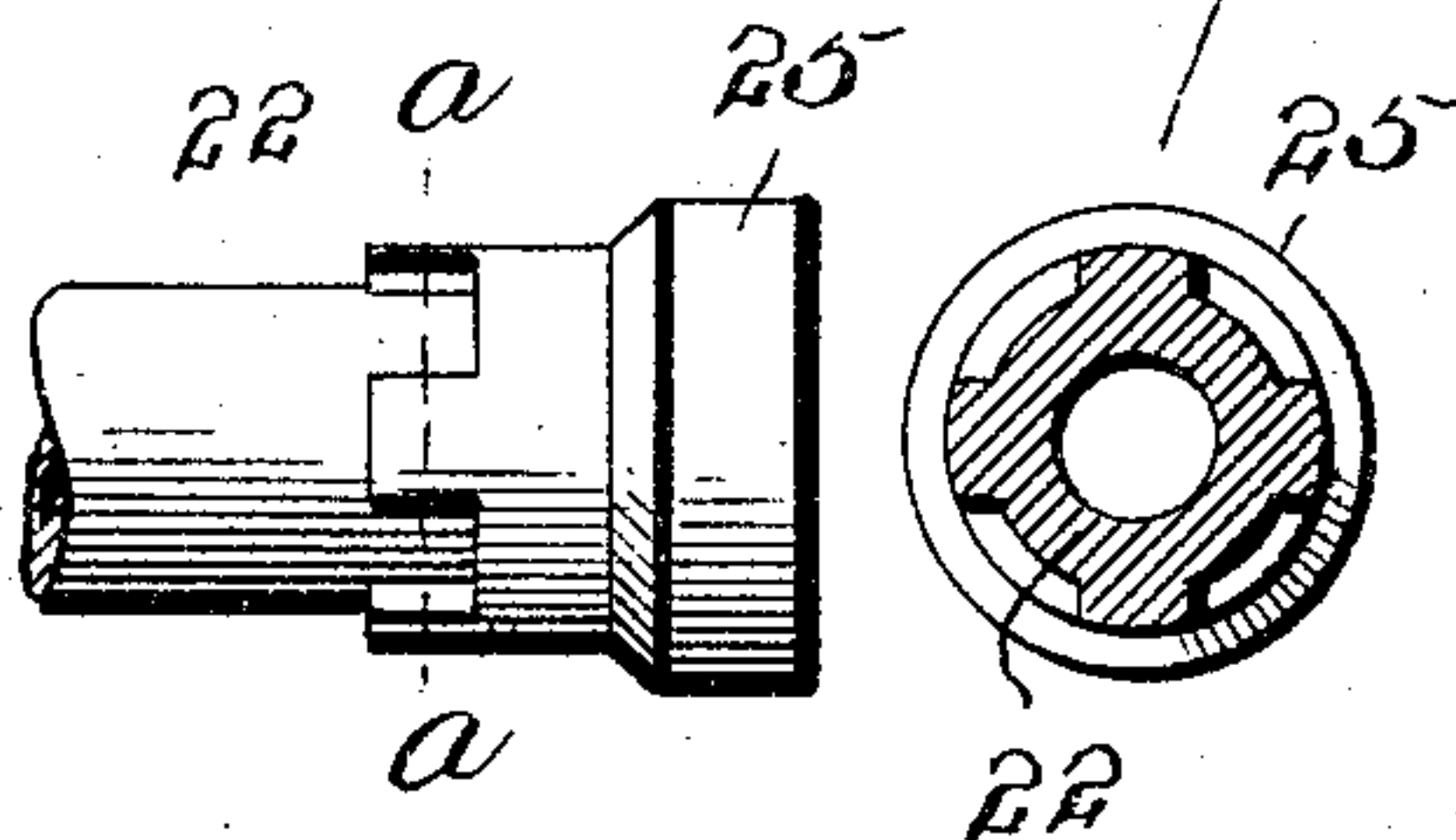


Fig. 3.



WITNESSES

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STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 782,475, dated February 14, 1905.

Application filed April 17, 1903. Serial No. 153,118.

To all whom it may concern:

Be it known that I, JOSEPH SMITH WIGNALL, Jr., a citizen of the United States, residing at Payson, in the county of Utah and State of Utah, have invented a new and useful Steam-Engine, of which the following is a specification.

This invention relates to steam-engines, and has for its object to provide a steam-engine in which the steam enters the cylinder direct instead of through a steam-chest.

A further object of my invention is to utilize the maximum energy of the steam and to avoid any condensation prior to its passage into the cylinder.

With these and other objects in view my invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of this invention.

In the drawings, Figure 1 is a sectional view of a part of a steam-engine, illustrating my invention. Fig. 2 is a detail perspective view of my central valve member; and Fig. 3 is a cross-sectional view of said valve, taken on line *a a* of Fig. 2.

Like characters of reference designate corresponding parts throughout the views.

In the preferred embodiment of my invention the engine-cylinder 1 is provided with the cylinder-heads 2 and 3, secured by bolts 4 to outstanding portions or flanges 5 of the cylinder-casing. Attached to one side of the cylinder, as shown, is the exhaust-steam chest 6 and slide-valve 7. The valve-chest is adapted to be put into connection with the cylinder 1, at the ends thereof, through valve-ports 8 and 9, passage 10 and 11, and cylinder-ports 12 and 13, as in the ordinary well-known cylinder construction.

The piston 14 is provided with two piston-rods 15 and 16, passing through stuffing-boxes 17 and 18, respectively, said piston-rods being joined at their outer ends by the cross-bar 19, to which is connected a drive-rod (not shown)

of the usual construction, by means of which the movement of the piston is communicated to the fly-wheel shaft.

Passing through ports 20 and 21 in the cylinder-heads 2 and 3, respectively, is the hollow valve member 22, open at one end 23 and closed at the other. Carried at one end 23 of the valve member 22 and near the opposite ends thereof are enlargements 25 and 26, forming valves which cooperate with the valve-seats 27 and 28 in the cylinder-heads. The valve member 22 is provided with a plurality of ports 29 in the enlarged portion 26 and is mounted for reciprocating movement in the openings in the ends of the cylinder-heads, the valve at one end closing the opening in one cylinder-head when in one position and that in the other head when pushed to the limit of its movement in the opposite direction.

The coupling 30, carried by the cylinder-head 2, is suitably connected with the boiler which supplies the steam to the engine. Valve 7 is connected by valve-rod 31 to an eccentric-rod (not shown) carrying a strap engaging an eccentric on the fly-wheel shaft of the engine in the usual way and is so arranged and adjusted that one of the ports 8 and 9 is opened for the escape of expanded steam from in front of the approaching piston in accordance with the well-known and accepted practice in engine construction. The end 24 of the valve member is connected to an eccentric-rod (not shown) carrying a strap engaging an eccentric on the fly-wheel shaft, said eccentric being so arranged and adjusted that steam is admitted to each end of the cylinder at about the time the piston is completing its movement in that direction. Owing to the valve member passing through the center of the piston 14, the latter is provided with two sets of packing-rings 32 and 33, arranged as shown.

The operation of my improved engine is as follows: Steam is received from the boiler through a pipe connected with the coupling 30. When the sliding valve member 22 is in the position shown in Fig. 1, the valve 25 being seated, steam enters the valve member, and passes out through ports 29 alongside the valve member 22 in the opening 21 in the cylinder, pushing the piston before it to the other

end of the cylinder, the steam on the other side of the piston escaping through the open port 9, such escapement of steam being, as before stated, in accordance with the accepted practice in engine construction. At or about the time the piston reaches the limit of its movement toward the head 2 the valve member is moved so as to seat the valve 26 and unseat the valve 25, thereby closing the passage 21 and admitting steam through the opening 20 directly into the cylinder. At the same time the slide-valve 7 is shifted to open port 8 and close port 9 to provide for the escape of steam from in front of the piston in its reverse movement, as is customary. The steam entering at 20 will push the piston forward before it until at or about the time it reaches the limit of its movement toward the head 3. The eccentric attached to the valve member 22 will shift it to the position before mentioned, as illustrated in Fig. 1, and the operation will then be repeated as described. The reciprocation of the valve member 22 corresponds to that of the slide-valve 7, so that it is obvious that both might be operated from a single eccentric instead of from independent eccentrics on the fly-wheel shaft, as described.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a steam-engine, a cylinder, valve-seats provided in the heads thereof, a piston with an opening therein slidably mounted within said cylinder, and a tubular valve member passing through the said opening, extending throughout the length of the cylinder and mounted to reciprocate therein independently of the piston and adapted to alternately seat and unseat valves carried thereby in the valve-seats to control the admission of steam to different parts of the cylinder.

2. In a steam-engine, a cylinder, valve-seats provided in the heads thereof, a piston slidably mounted within said cylinder, a tubular valve member passing through said piston and

mounted to reciprocate independently thereof to alternately seat and unseat valves carried thereby in said valve-seats to control the admission of steam to different parts of the cylinder.

3. In a steam-engine, a cylinder, valve-seats mounted in the heads thereof, a piston, having an opening therethrough mounted in said cylinder, and a tubular valve member passing through said opening adapted to reciprocate independently of said piston and carrying valves to cooperate with the said valve-seats to control the admission of steam to each side of the piston.

4. In a steam-engine, a cylinder, valve-seats mounted in the heads thereof, a piston having an opening therethrough, a hollow valve member passing through said opening and carrying valves to cooperate with said valve-seats, said valve member being mounted in openings in the cylinder-heads, one end of said member passing through one of said heads and adapted to be connected with means to reciprocate said member, independently of the piston.

5. In a steam-engine, a cylinder, one of said heads being provided with an opening for the admission of steam, a piston having an opening therethrough mounted in the cylinder, tubular valve member passing through said opening, one end of said member passing through the said cylinder-head opening, and terminating in proximity thereto in a flared open end, the other end of said tubular valve member, being solid and passing through a packed opening provided in the opposite cylinder-head and adapted to be suitably connected with means to reciprocate said valve member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH SMITH WIGNALL, JUR.

In presence of—

WARREN H. PACE,
EUGENE H. PULVER.