

(No Model.)

F. N. KEENE.
VALVE.

No. 580,551.

Patented Apr. 13, 1897.

Fig. 1.

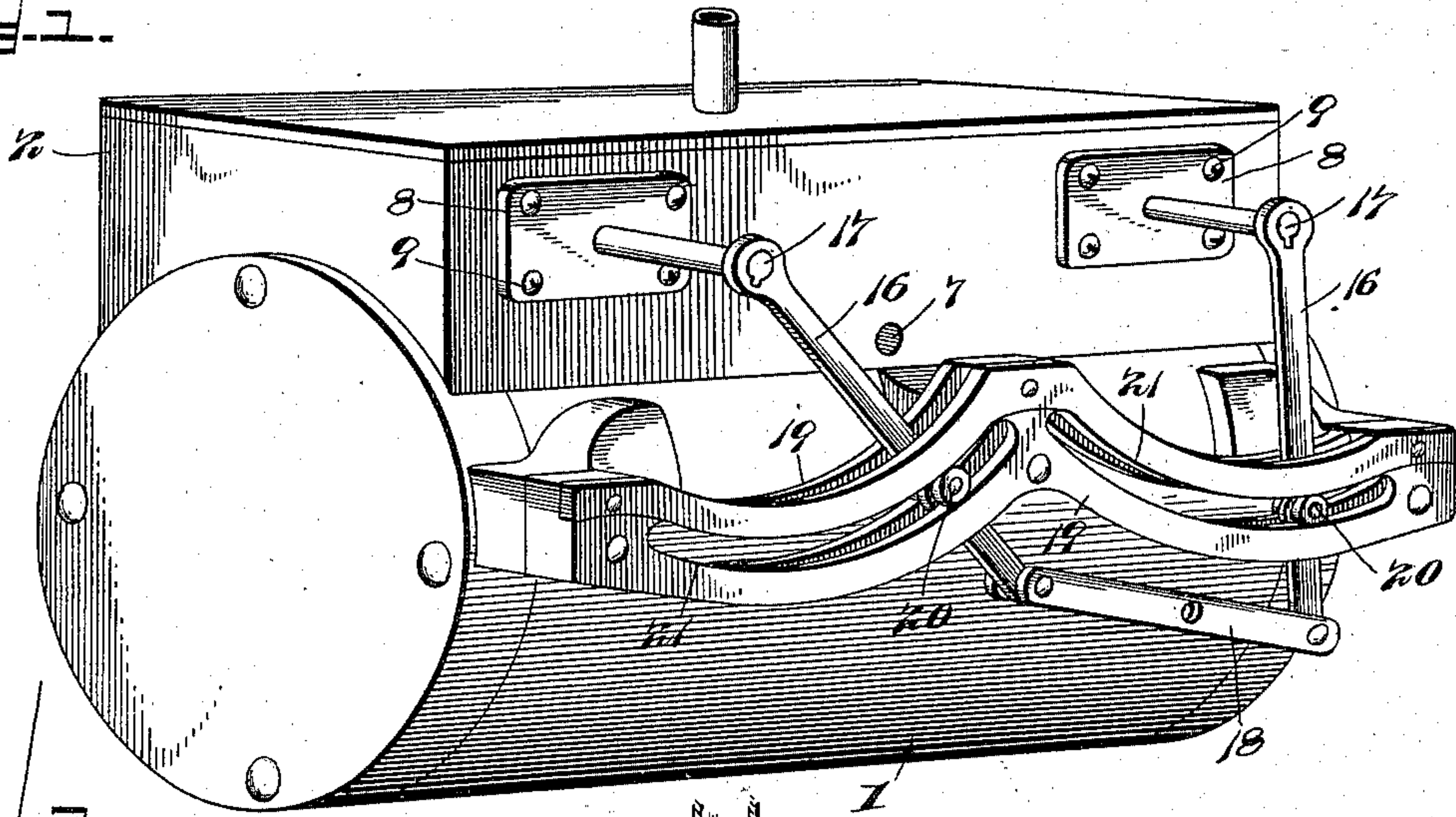


Fig. 2.

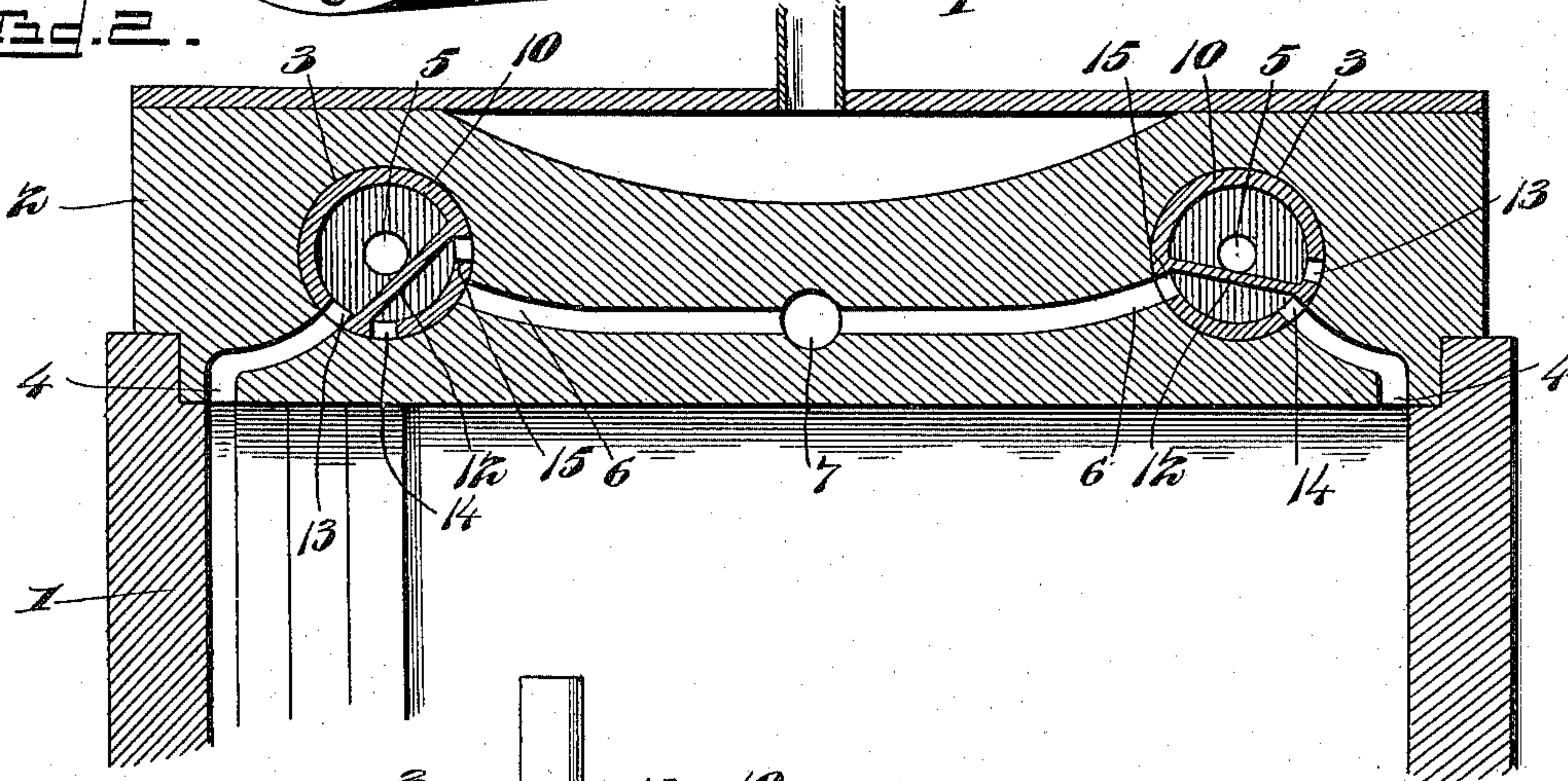


Fig. 3.

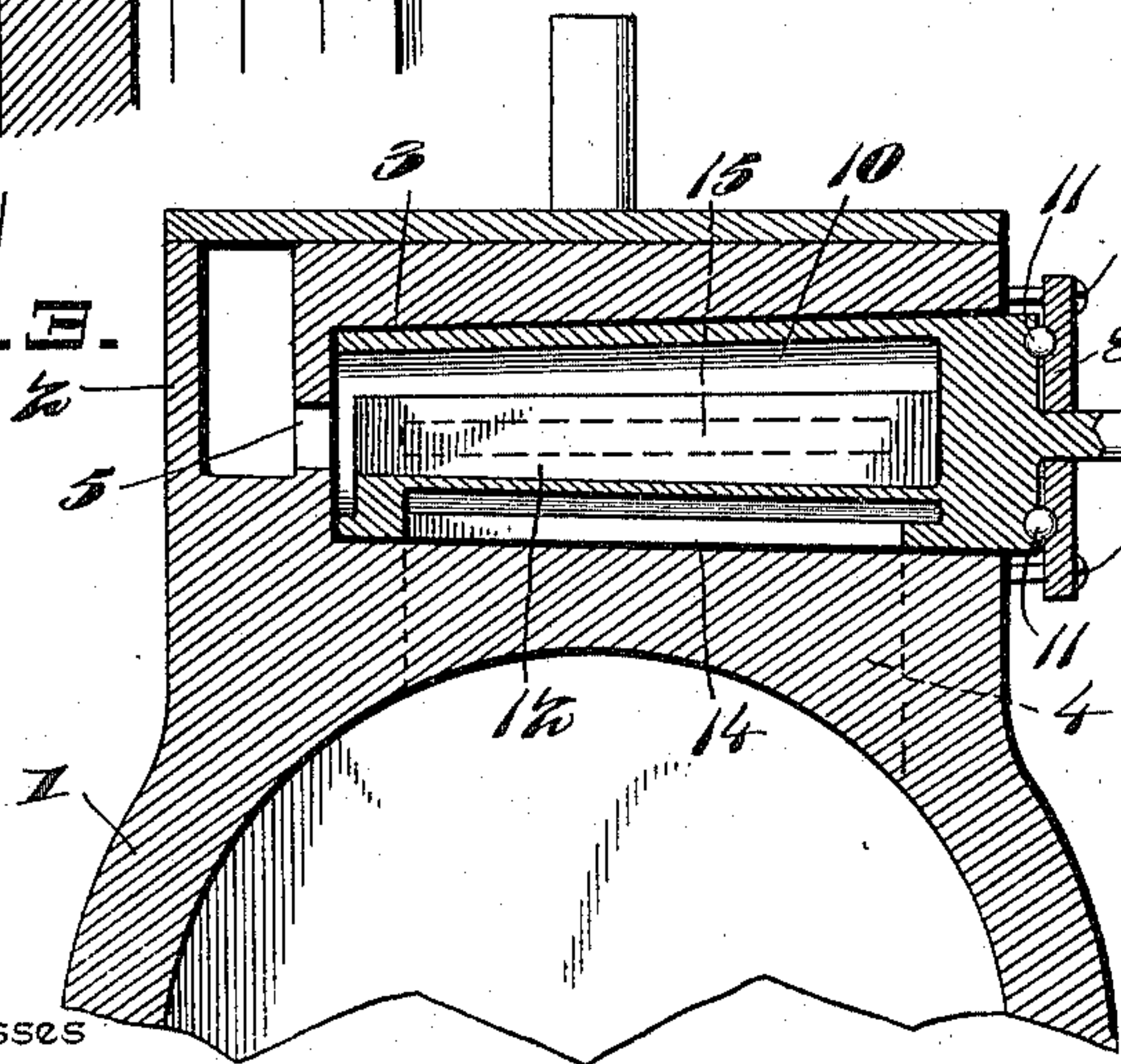
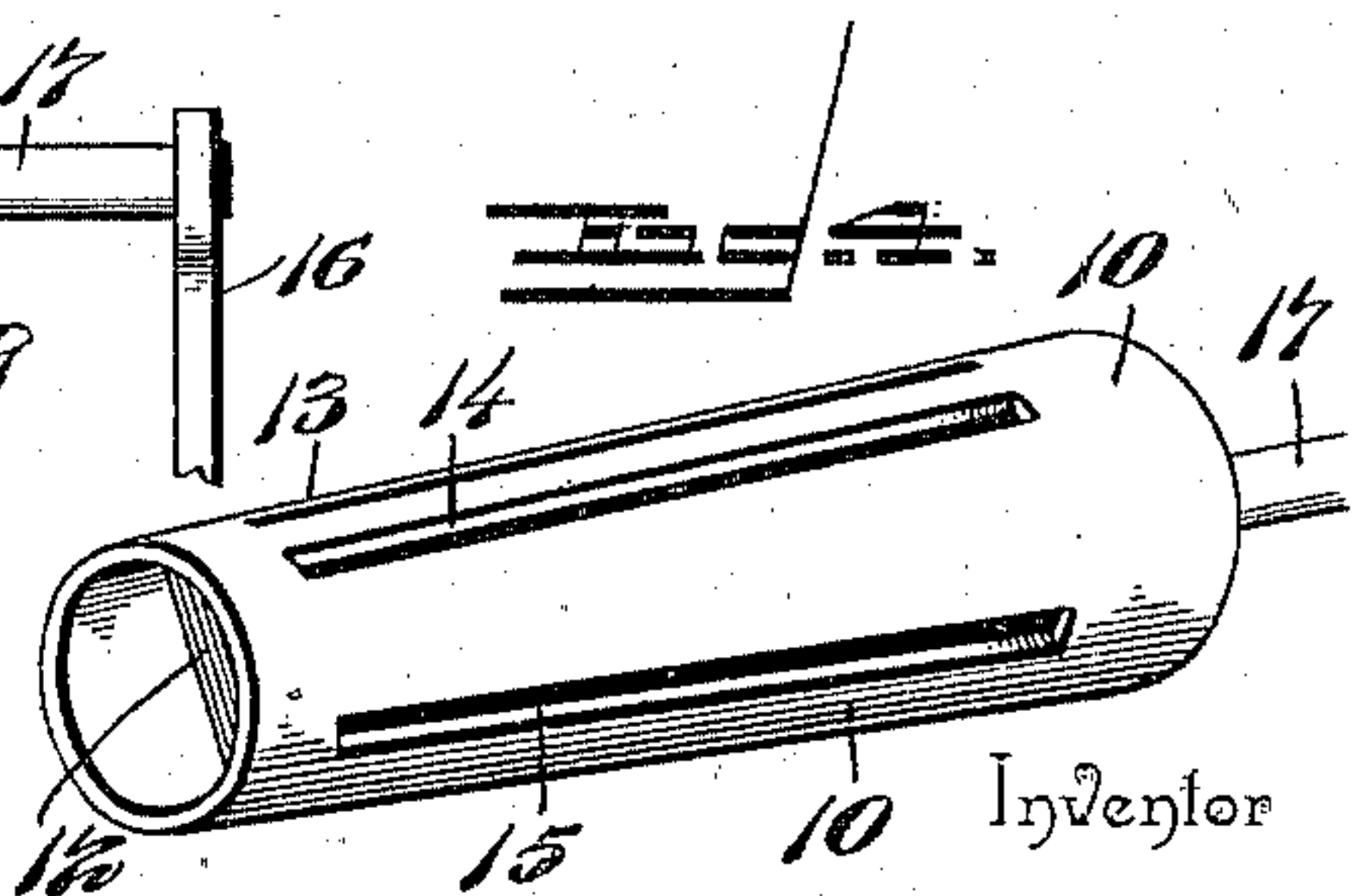


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANK N. KEENE, OF DAVID CITY, NEBRASKA, ASSIGNOR OF ONE-HALF
TO THOMAS W. SLADE, OF SAME PLACE.

VALVE.

SPECIFICATION forming part of Letters Patent No. 580,551, dated April 13, 1897.

Application filed June 23, 1896. Serial No. 596,629. (No model.)

To all whom it may concern:

Be it known that I, FRANK N. KEENE, a citizen of the United States, residing at David City, in the county of Butler and State of Nebraska, have invented a new and useful Valve, of which the following is a specification.

My invention relates to valve mechanism for steam-engines, pumps, and similar machines, and has for its object to provide a balanced valve and means for communicating motion thereto whereby the same may be operated with the minimum amount of resistance.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of the valve mechanism embodying my invention applied in the operative position to a steam-engine cylinder. Fig. 2 is a vertical sectional view of the same, taken transversely to the axes of the valves. Fig. 3 is a vertical sectional view taken parallel with the axis of one of the valves. Fig. 4 is a detail view in perspective of one of the valves detached.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

1 designates a cylinder, and 2 a steam-chest provided with cylindrical valve-seats 3, each of which communicates by means of a cylinder-port 4 with one end of the cylinder, said valve-seats being located, respectively, contiguous to the extremities of the cylinder to avoid extended channels of communication between the steam-chest and the cylinder. The interior of the steam-chest communicates, by means of inlet-ports 5, with the inner extremities of the valve-seats, and said valve-seats communicate, by means of outlet-ports 6, with a common exhaust-port 7.

The valve-seats are open at the front of the valve-chest and are closed by means of cap-plates 8, secured in place by means of adjusting screws or bolts 9, and tubular valves 10 are mounted, respectively, in the valve-seats and fit snugly therein, said valves being closed at their outer ends contiguous to said cap-plates and being open at their inner ends to

communicate permanently with the inlet-ports 5. These valves are preferably tapered or conical in construction to provide for fitting snugly in the seats, which are similarly shaped, and antifriction balls or rollers 11 are interposed between the closed outer end of each valve and the inner surface of the cap-plate.

Each valve is provided with a longitudinal partition 12 to divide the interior thereof into feed and exhaust chambers, each of which extends, approximately, from one end of the valve to the other, the exhaust-chamber being closed at both ends while the inlet-chamber is open to communicate with said inlet-port of the steam-chest. The inlet-chamber of each valve is provided with a feed-port 13 for registration with the cylinder-port, and each valve is also provided, in communication with its exhaust-chamber, with twin lateral ports 14 and 15, the former of which is adapted to be arranged in communication with the cylinder-port, while the latter is adapted to be arranged in communication with the outlet-port of the valve-seat.

In order to provide for taking up lost motion due to wearing of the contacting surfaces of the valve and seat, said valve is arranged to project slightly beyond the face of the steam-chest for contact, through the intervention of the antifriction devices, with the inner surface of the cap-plate, whereby the adjustment of the cap-plate forces the valve inwardly to prevent the communication of pressure to the exterior surface of the valve.

Inasmuch as the entire pressure is maintained within the valve, it is obvious that the latter is balanced, and that by reason of the specific arrangement of the ports in the valve it will be seen that a minimum movement will accomplish the reversal thereof to communicate live or remove exhaust steam from the cylinder.

It will be seen that the inlet-chamber of the valve is permanently in communication with the steam-chest, and hence is permanently filled with live steam, whereby when the feed-port of the valve is brought into communication with the cylinder-port the pressure of the steam or other motive agent is communicated directly to the cylinder with-

out passing through a channel approximately equal to one-half the length of the cylinder, as in the ordinary construction. The disadvantage of this long channel, especially with
5 steam, is that a certain amount of condensation, and hence loss of energy, is caused by reason of the cooling of the channel.

The means which I have illustrated in the drawings for communicating simultaneous
10 motion to the twin valves, located at opposite extremities of the cylinder, includes valve-arms 16, attached to the valve-spindles 17 and connected by a link 18, which is adapted to be attached to an eccentric-rod, (not shown,)
15 and curved guides 19, in which operate anti-friction-rolls 20, carried, respectively, by the valve-arms. The valve-arms operate between the parallel cheeks of the guides, and the slots 21, in which the anti-friction-rolls 20 operate, are concentric with the axes of the
20 valves, respectively, said guides serving to carry the weight of the valve-arms and link 18, together with the contiguous extremity of the eccentric-rod, whereby the only friction
25 in the valve-seats is due to the weight of the valves.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit
30 or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. The herein - described rocking valve mounted for axial movement, the same being
35 hollow with its opposite extremities respectively open and closed, and having a longitudinal partition whereby its interior is divided into inlet and exhaust chambers, of which the former is open at one end and the latter
40 is closed at both ends, the end wall of the exhaust-chamber contiguous to the inlet end of the inlet-chamber being set back from the end of the valve, a single lateral port in communication with the inlet-chamber, and twin
45 lateral ports in communication with the exhaust-chamber, substantially as specified.

2. The combination with a cylinder, of valve-seats in communication respectively
50 with cylinder-ports, rocking valves mounted respectively in said seats and provided with inlet and exhaust ports, slotted segmental guides arranged respectively concentric with the axes of the valves, valve-arms attached
55 respectively to the valve-spindles and provided with anti-friction-rolls operating in the slotted guides, and a connecting-link between the valve-arms, substantially as specified.

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

FRANK N. KEENE.

Witnesses:

CHAS. J. VANICEK,
E. W. HALE.