

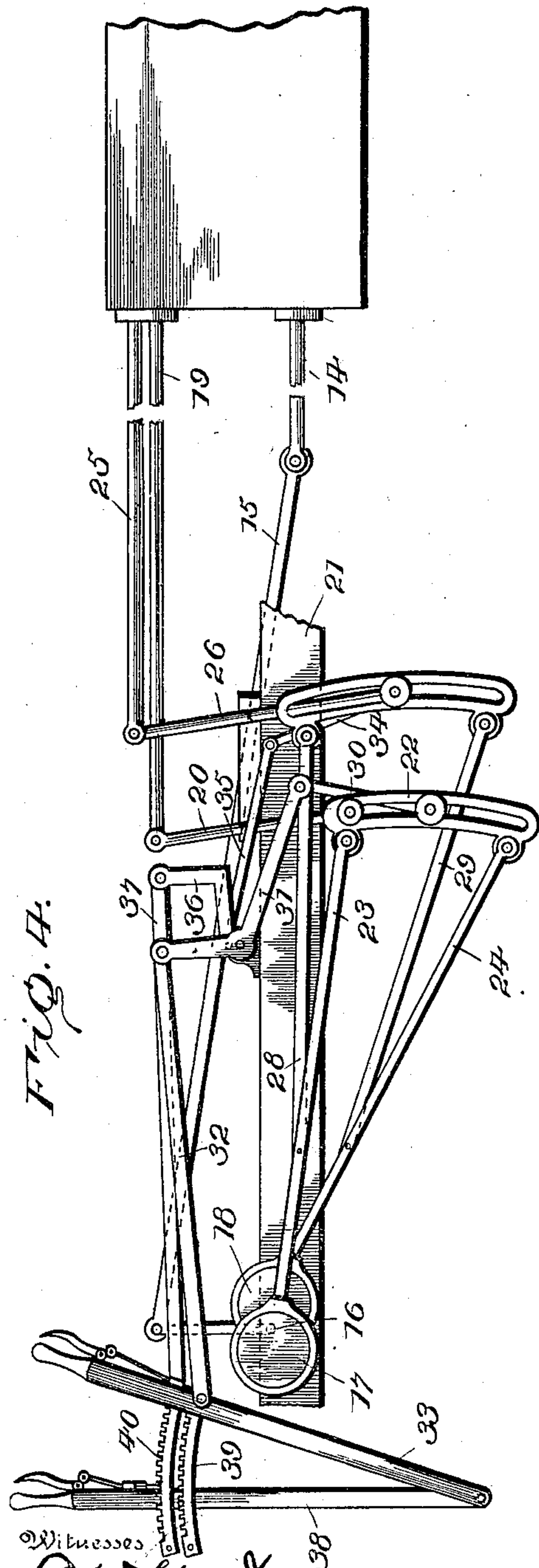
No. 674,265.

Patented May 14, 1901.

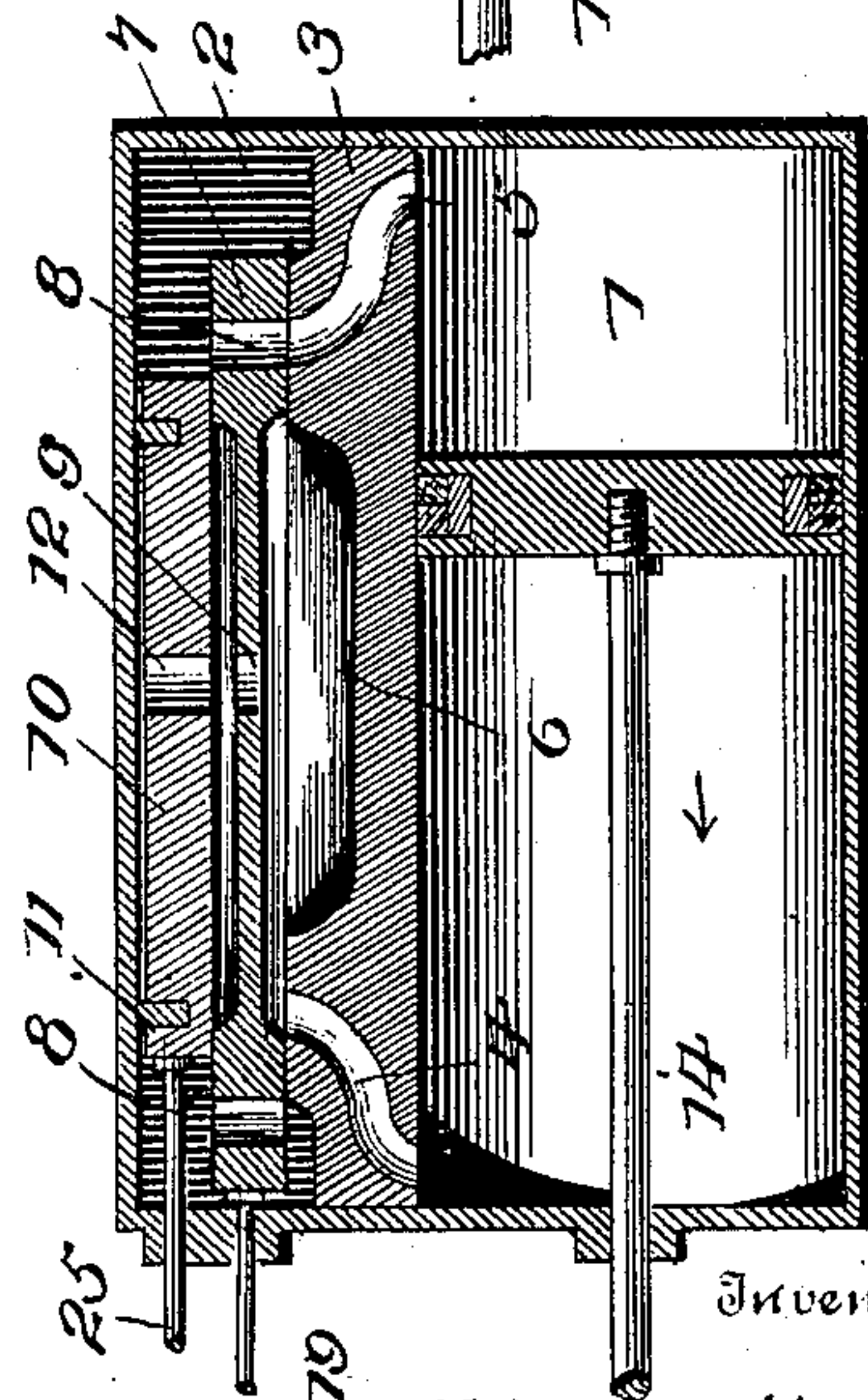
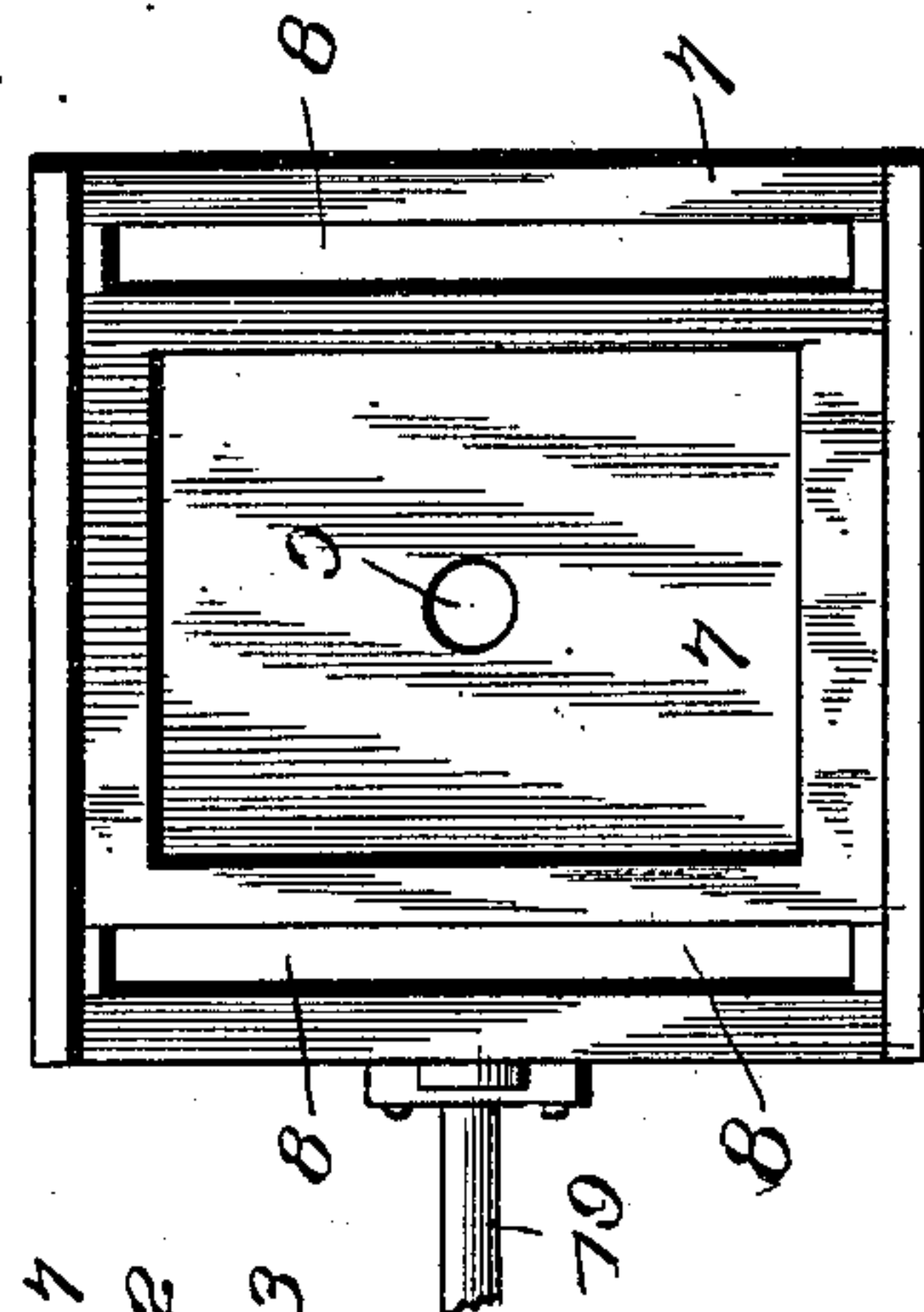
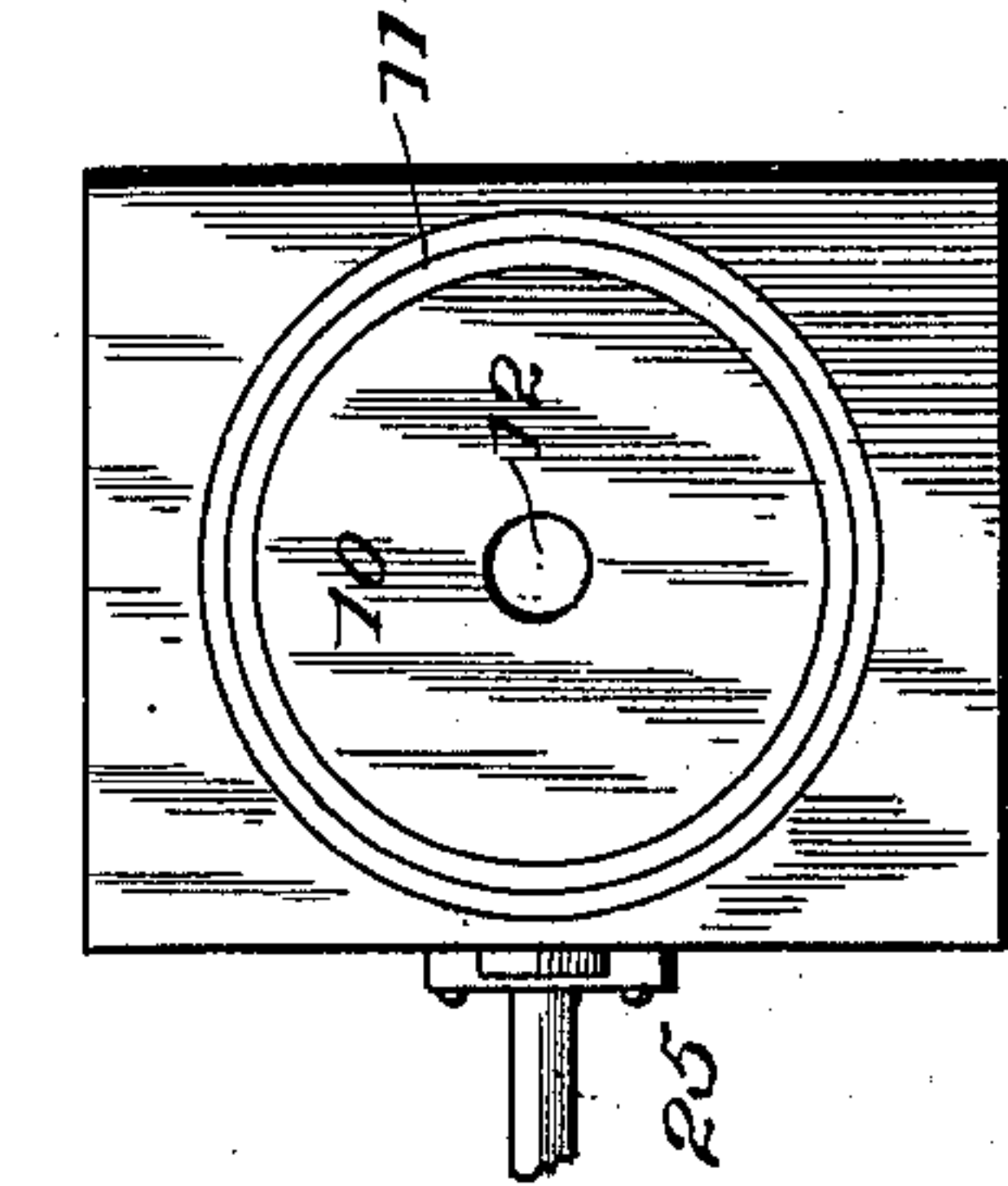
J. F. HALL.
CUT-OFF VALVE.

(Application filed Oct. 25, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

JOHN F. HALL, OF SMITH CENTER, KANSAS.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 674,265, dated May 14, 1901.

Application filed October 25, 1900. Serial No. 34,359. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. HALL, a citizen of the United States of America, residing at Smith Center, in the county of Smith and State of Kansas, have invented certain new and useful Improvements in Cut-Off Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in valves, and may be more particularly designated as a "balanced" cut-off valve applicable alike to locomotives or stationary engines.

15 The invention has for its object to construct a valve which will be balanced or as nearly balanced as is generally found practicable and one that will admit steam to the engines freely through a large opening, and, further-
20 more, a valve whereby it will be possible to cut off the supply of steam at any given point that may be found desirable by the engineer.

Briefly described, the invention comprises a main valve and a cut-off valve riding on
25 the back of the main valve, the main valve being connected to an eccentric having the required throw and set so as to open the ports at any point that may be desired and the cut-off valve connected to the shaft-governor ec-
30 centric in a manner that the cut-off will be made so as to maintain the required speed. These connections are of course for station-
ary engines, and where the valve is employed in reversible engines, locomotives, &c., the
35 main valve is connected to a rocker-arm driven by a link, one end of which link is connected to the eccentric for forward motion and the other end connected to the eccentric for back-
up or reverse motion, so that the engines may
40 be reversed by raising or lowering of the link. The cut-off valve in such engines is attached to another rocker-arm working in a link driven by the same eccentric that drives the main valve, this link having its one end at-
45 tached to the eccentric in the same manner as is the main valve, so that by the raising or lowering of the link controlling the cut-off valve the inflow of steam to the engine may be cut off at any point desired by the engineer.

50 In describing the invention in detail reference will be had to the accompanying drawings, forming a part of this specification, and

wherein like numerals of reference will be used to designate like parts throughout the several views of the drawings, in which—

Figure 1 is a vertical sectional view of a cylinder with my improved valve in position. Fig. 2 is a top plan view of the valve. Fig. 3 is a like view of the auxiliary or cut-off valve. Fig. 4 is a side view of the valve-gear, showing connections with the valve.

The valve-gear which I have shown in this application for the purpose of better illustrating my invention has been made the sub-
ject of a separate application and will there-
fore be described but briefly in connection
with this application.

In the drawings, 1 indicates the cylinder, 2 the steam-chest, and 3 the valve seat or base, which is provided with the usual ports 4 5
for feeding the steam to the respective ends
of the cylinder. The valve-seat 3 is provided
with a centrally-arranged exhaust-recess 6,
with which the ports 4 5 alternately commu-
nicate. Operating upon the valve-seat 3 is a
main valve 7, provided near each end with
passages or ports 8 to register alternately with
the steam-ports 4 5. This main valve is re-
cessed both on the upper and lower face and
is provided with a centrally-arranged ex-
haust-port 9. Operating on top of the main
valve 7 is an auxiliary or cut-off valve 10,
which is of less length than the main valve
7 and is provided in its upper face with an
annular ring or strip 11 and a centrally-ar-
ranged exhaust-port 12.

The piston-rod 14 is connected by a rod 15 to the eccentric-shaft 16, and upon the latter is mounted the double eccentric, (indicated at 17
18.) The main valve 7 is connected at its one
end by a rod 19 to a rocker-arm 20, supported
in any suitable manner (for instance, as
shown) on a stationary support 21 and work-
ing in a link 22, the upper end of which link is
connected by a rod or lever 23 to the strap or
yoke engaging the eccentric 17, and at its
lower end is connected by a rod or lever 24
to a strap or yoke engaging the eccentric 18.
The auxiliary or cut-off valve 10 is likewise
connected at its one end by a rod 25 to a
rocker 26, which works in a link 27, connected
at its upper end by a lever 28 to the lever 23
and at its lower end by the rod or lever 29
to the rod or lever 24. The link 22, control-

ling the main valve, is connected by a lever 30 to a bell-crank 31, mounted upon the support 21, and having its other end connected by a link or rod 32 to the operating-lever 33.

5 The link 27 is connected by a lever 34 to a rod 35, having its other end attached to a bell-crank 36, that is supported in the bearing which supports the bell-crank 31, the upper end of the bell-crank 36 being connected by
10 a rod or link 37 to an ordinary operating-lever 38. These operating-levers 33 and 38 are provided with the usual spring-pawl for holding the links at the position at which they have been set.

15 In the position in which the valve is shown in Fig. 1 of the drawings the steam is entering the cylinder through the port 5, driving the piston toward the rear end of its track and exhausting the steam through the port 4
20 into the exhaust 6. The small exhaust-ports 9 12 in the main and cut-off valve establish a communication from the air-chamber, which is inside the rings or strips 11 used for balancing-valves, so that any steam that might
25 escape between the face-plate on the inside of the steam-chest cover would readily escape through these ports, thereby reducing the pressure on the valve, leaving only sufficient pressure to keep the valves in their
30 proper places and making a steam-tight joint.

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

35 1. The combination with a cylinder connected with a steam-supply and provided with a valve-seat having suitable inlet and exhaust ports, of a reciprocating valve operating upon said seat and provided with a centrally-
40 ranged opening and a pair of inlet-ports adapted to register with the inlet-ports of the valve-seat, and a reciprocating cut-off valve operating upon said main valve and provided with a centrally-arranged opening adapted to
45 register with the central opening of the main valve, substantially as described.

2. The combination with a cylinder connected with a steam-supply and provided with a valve-seat having suitable inlet and exhaust
50 ports, of a reciprocating main valve operating on said valve-seat for closing the ports thereof, said reciprocating valve provided with a central opening and a pair of inlet-ports adapted to register with the inlet-ports of the
55 valve-seat, and a reciprocating cut-off valve operating on said main valve, said cut-off valve

provided with a central opening adapted to register with the central opening of the main valve, and a packing arranged in the upper face of said cut-off valve, substantially as de- 60 scribed.

3. The combination with a cylinder connected with a steam-supply and provided with a valve-seat having suitable inlet and exhaust ports, of a reciprocating main valve operating
65 on said seat, said main valve provided with a central opening and a pair of inlet-ports adapted to register with the inlet-ports of the valve-seat, a reciprocating cut-off valve operating upon said main valve and provided with
70 a centrally-arranged opening adapted to register with the central opening of the main valve, and means connected to the cut-off valve whereby the admission of steam to the cylinder may be cut off at any desired point
75 in the stroke of the piston, substantially as described.

4. In a balanced slide-valve, a valve-seat having inlet and exhaust ports, a reciprocating main valve operating on said seat, said
80 main valve provided with a central opening and with a pair of inlet-ports adapted to register with the inlet-ports of the valve-seat, a reciprocating cut-off valve operating on said main valve and provided with a centrally-
85 ranged opening adapted to register with the central openings in the main valve, and means connected to the main valve for regulating the throw of the same, substantially as de-
90 scribed.

5. In a balanced slide-valve, a valve-seat having inlet and exhaust ports, a reciprocating main valve operating on said seat, said
95 main valve provided with a pair of inlet-ports adapted to register with the inlet-ports of the valve-seat and intermediate of said inlet-ports with an opening, a reciprocating cut-off valve operating on said main valve and provided with an opening adapted to register with the
100 opening in the main valve, means connected to the main valve for regulating the throw of the same, and means connected to the cut-off valve whereby the admission of steam to the cylinder may be cut off at any desired point
105 in the stroke of the piston, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN F. HALL.

Witnesses:

JAMES F. CHELF,
GEO. H. MARTY.