

(No Model.)

4 Sheets—Sheet 1.

J. M. BOUCK.
VALVE MECHANISM.

No. 569,166.

Patented Oct. 13, 1896.

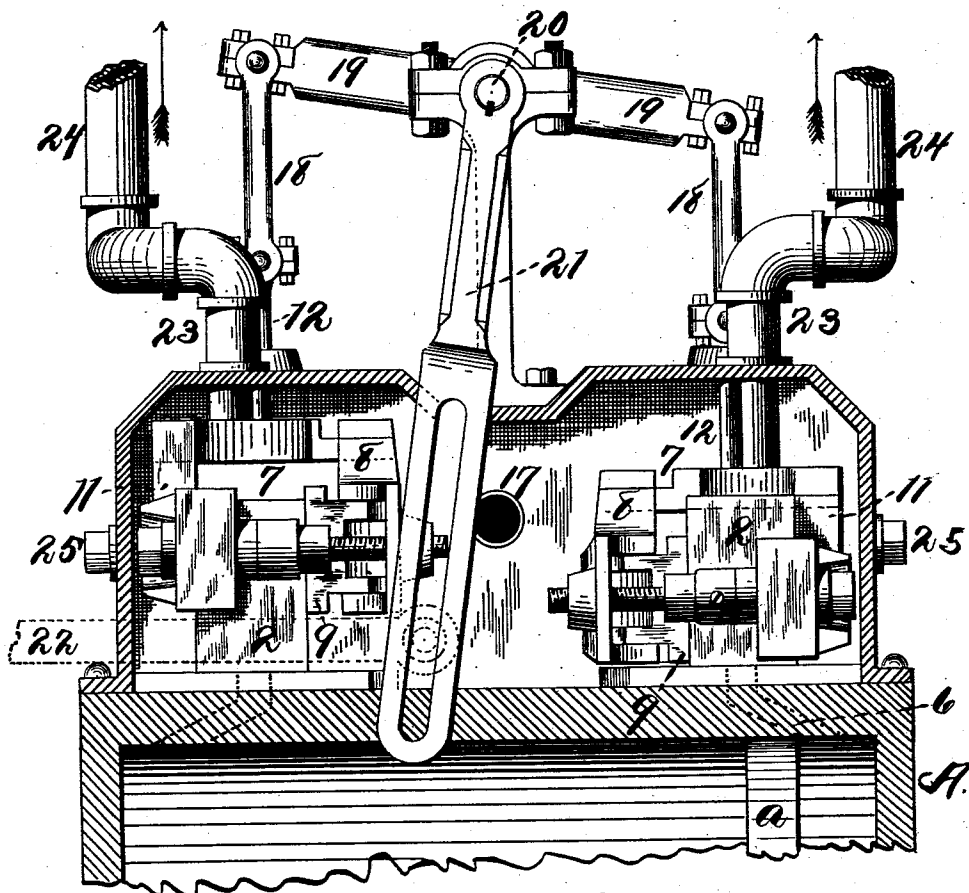
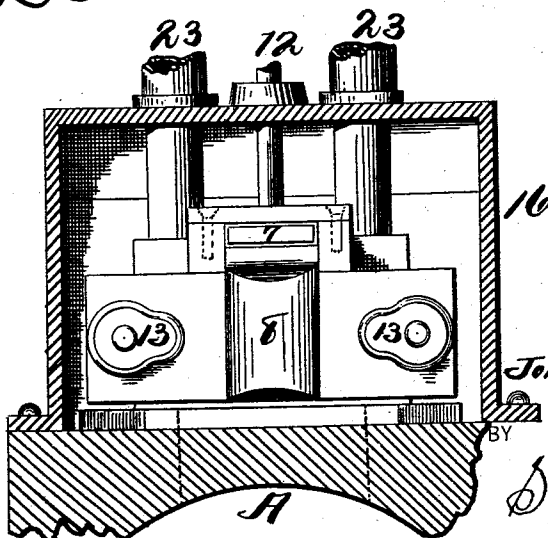


Fig. 1.

Fig. 2.



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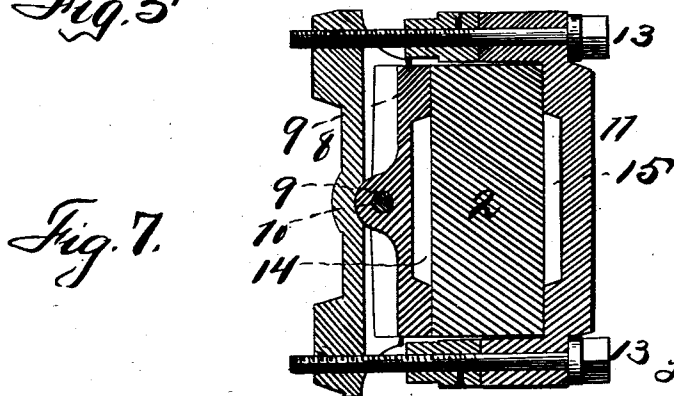
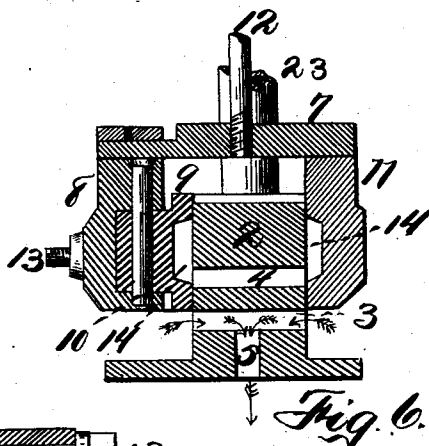
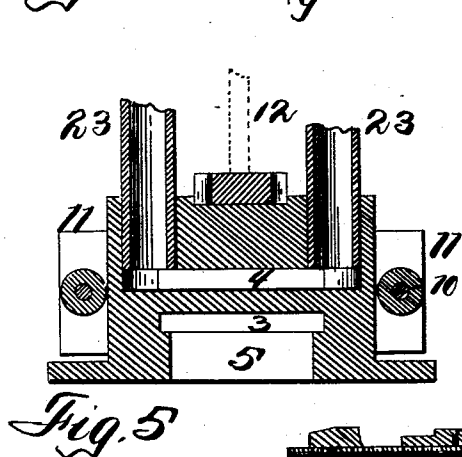
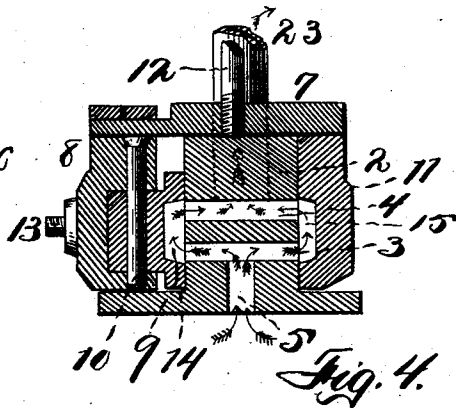
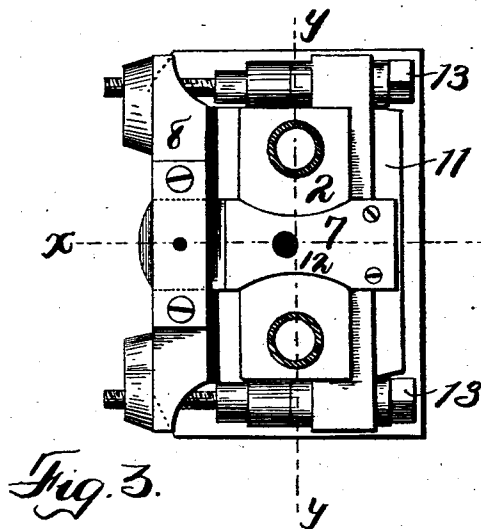
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4 Sheets—Sheet 2.

J. M. BOUCK.
VALVE MECHANISM.

No. 569,166.

Patented Oct. 13, 1896.



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(No Model.)

4 Sheets—Sheet 3.

J. M. BOUCK.
VALVE MECHANISM.

No. 569,166.

Patented Oct. 13, 1896.

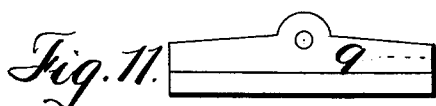
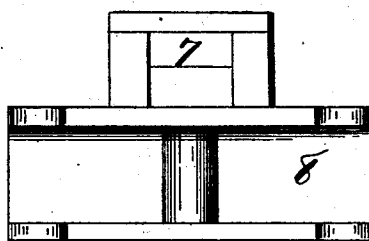
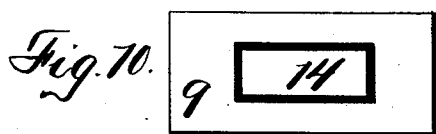


Fig. 16.

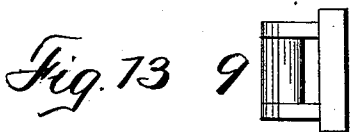
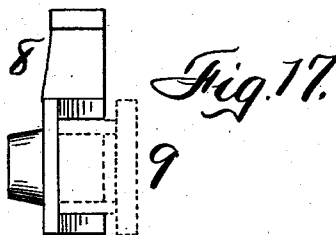
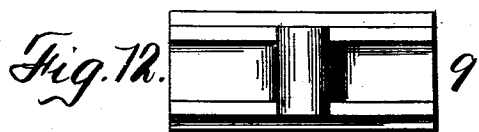


Fig. 8.

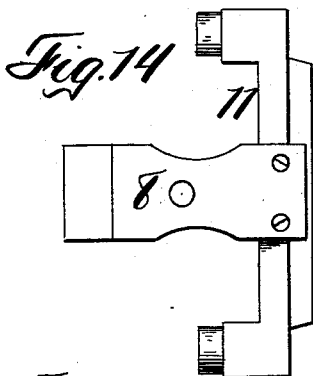
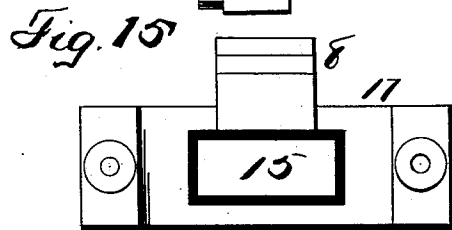
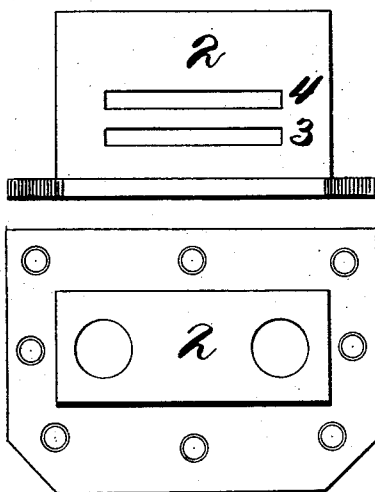


Fig. 9.



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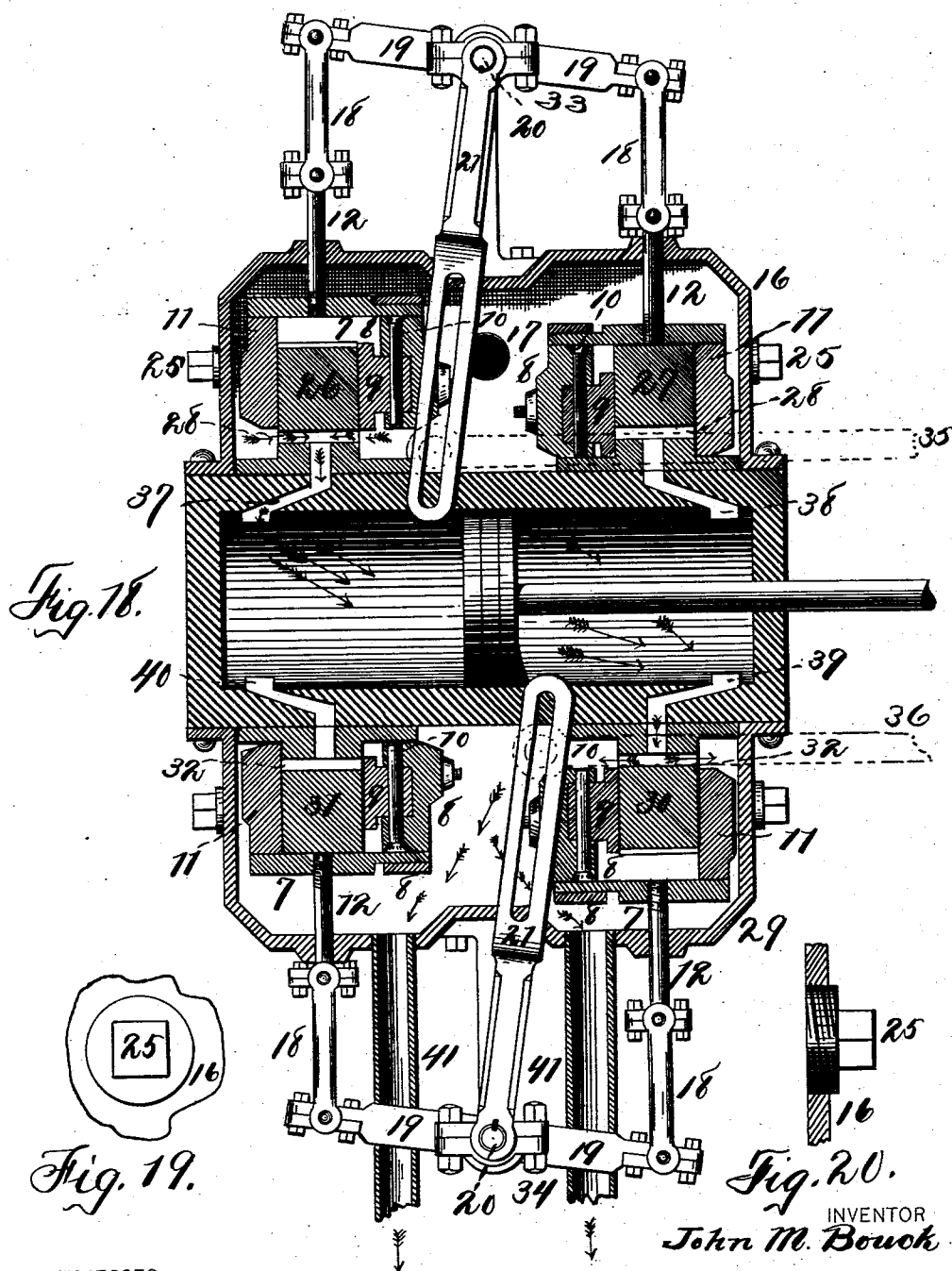
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4 Sheets—Sheet 4.

J. M. BOUCK.
VALVE MECHANISM.

No. 569,166.

Patented Oct. 13, 1896.



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UNITED STATES PATENT OFFICE.

JOHN M. BOUCK, OF GOUVERNEUR, NEW YORK.

VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 569,166, dated October 13, 1896.

Application filed October 11, 1895. Serial No. 565,313. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BOUCK, of Gouverneur, in the county of St. Lawrence, in the State of New York, have invented new and useful Improvements in Cylinder-Valve Mechanisms, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to valves for feeding steam to the opposite ends of a cylinder or opposite sides of a piston, and particularly to self-supporting twin valves which are at all times exposed to the full pressure of the steam, each valve being adapted to be opened as the other is closed, and both being operated by an eccentric mechanism actuated by the drive-shaft, which oscillates a walking-beam, to the extremities of which the valve-rods are connected.

The object of this invention is to provide a twin-valve mechanism in which a walking-beam, erected upon a steam-chest of any suitable style and actuated by the rocking of its supporting-shaft by any suitable crank mechanism, operates to alternately open and close the valves to adjust steam to one side of a piston and shut it off from and open the exhaust-port of the other; in which the vertically-reciprocating slides and valves are within the steam-chamber and under full pressure of the steam, and said slides are adapted to alternately open and close the steam and exhaust ports in a stationary abutment in the steam-chest, both of said ports being suitably connected to the cylinder-port which thus operates to both admit steam and discharge it from the cylinder. Means are also provided whereby access can be had to the interior of said steam-chest to separately adjust and regulate the frictional bearing of the slides upon the faces of the respective abutments, each of said slides being carried by a suitable yoke and a connecting-rod suitably pivoted to said stem and to said walking-beam.

My invention consists in the several novel features of construction and operation hereinafter described, and which are specifically set forth in the claims hereunto annexed. It is constructed as follows, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of the interior of

a steam-chest and twin valves therein and part of a cylinder and piston therein. Fig. 2 is a sectional elevation of the inner side of a valve such as is shown on the right in Fig. 1. Fig. 3 is a top plan of the same: Fig. 4 is a vertical section of the same on line *xx*, Fig. 3, showing the ports opened to exhaust. Fig. 5 is a vertical section of the same on line *yy* 60 in Fig. 3. Fig. 6 is a section on same line as Fig. 4, showing the steam-inlet ports open and the exhaust closed. Fig. 7 is a horizontal section of the same. Fig. 8 is a side elevation of the abutment provided with the steam inlet and exhaust ports. Fig. 9 is a top plan thereof. Fig. 10 is a plan view of the inner or working face of the slide. Fig. 11 is a top plan. Fig. 12 is an elevation of the outer face thereof. Fig. 13 is an end elevation of the same. Fig. 14 is a top plan of the yoke which carries said slide. Fig. 15 is an elevation of said yoke, looking at it from the left in Fig. 14. Fig. 16 is an elevation of the rocker-plate upon which the valve-plate 75 rocks and is pivoted. Fig. 17 is an end elevation of the same. Fig. 18 is a vertical sectional elevation of a cylinder, a piston therein, and a steam-chest and steam-inlet valves and an exhaust-chest and valves on opposite sides 80 of the cylinder or above and below it. Fig. 19 is a plan view of a lock to close the steam-chest and to permit access to the valve-screws to adjust the valve-slides. Fig. 20 is a sectional elevation of part of a wall of the steam-chest and the lock inserted thereinto.

A is an ordinary cylinder, in which a piston-head *a* is suitably mounted.

Referring to Figs. 3 to 9, an abutment 2 is suitably mounted upon the cylinder-casing, 90 consisting of a suitable base and an upright body, said body being provided with transverse ports 3 4 and a vertical port 5 through the base, merging into the port 3 and coinciding with the port 6 through the cylinder-casing and opening into the cylinder. 95

For perspicuity the port 3 will be hereinafter called the "steam-port," the port 4 the "exhaust-port," and the port 6 the "cylinder-port," as it performs the functions of both an inlet and an exhaust port. 100

In Figs. 3, 4, 6, and 7 the valve-yoke and the slides carried by it are shown comprising a cross-bar 7, a presser-bar 8, recessed on top

to receive the end of said cross-bar and recessed in its inner face to receive and form a bearing for the front slide 9, which is pivoted and rocked upon a bolt 10, and a rear slide 11, which is secured to and carried by said cross-bar, the whole being carried by a stem 12, connected to said cross-bar. Suitable bolts 13 adjustably connect the rear slide to said presser-bar and regulate the bearing or frictional contact of said slides against said abutment. The slide 9 is provided with a recess 14 in its inner face and the rear slide 11 with a like recess 15, said recesses being of such width that when the slides are lowered they will connect the steam and exhaust ports and shut off the steam, as shown in Fig. 4, for the exhaust from the cylinder, and when raised will open the steam-port to let steam into the cylinder.

These valves are inclosed within a suitable steam-chest 16, secured to the cylinder-casing with a steam-tight joint, and 17 is a suitable steam-inlet pipe. The valve-stems 12 extend through the body of the steam-chest with a suitable steam-tight joint and are hinged to links 18, which are pivotally connected to the ends of the walking-beam 19, which is mounted upon a rock-shaft 20, and this is rocked by means of the crank-lever 21, secured thereto. This lever is adjustably connected to a rod 22, (dotted lines, Fig. 1,) which leads to and is actuated by an ordinary eccentric (not shown) upon the shaft, which is driven by the piston in the usual manner. This eccentric oscillates said lever and walking-beam, alternately raising and lowering the slides of the twin valves. When said valves are raised, (see Fig. 6,) the steam-port is opened to admit steam to the cylinder and the exhaust is closed. When they are lowered, (see Fig. 4,) the steam-port is closed, shutting off the steam, and becomes directly connected to the exhaust-port to exhaust steam from the cylinder through the exhaust pipe or pipes 23, inserted through the steam-chest and into the valve-abutment and connected to the exhaust-port. (See Fig. 5.) Two exhaust-pipes are shown, connected together, like a Y, to the pipe 24, but it is evident that a single pipe 23 can be used.

In suitable openings in the sides of the steam-chest plugs 25 are secured, and by their removal access is readily had to the heads of the screw-bolts 13 for the insertion of a wrench to adjust the bearing of the valve-slides against the abutment and to take up wear, the rocking of one valve-slide always maintaining the parallelism of the faces of said slides, even though one screw-bolt is turned more than the other. These twin valves are always surrounded by live steam, subjected to the same external pressure, are thereby self-supporting, and are accordingly much easier to operate.

In Fig. 18 the cylinder is provided with a steam-chest 16, which is provided with twin steam-inlet valves 26 27, in which the abutments have only a steam-port 28, and with an

exhaust-chest 29, opposite thereto, containing twin exhaust-valves 30 31; the abutments of which are only provided with exhaust-ports 32. Each pair of these steam and exhaust valves is provided with a separate walking-beam mechanism 33 34, each operated by a suitable rod 35 36, connected to and actuated by an eccentric upon the drive-shaft, said eccentrics being set opposite to each other in the usual manner, so that by their rotation the walking-beam levers are swung in opposite directions, all so that when the walking-beam 33 is in the position shown the valve 26 is open to admit steam to the cylinder through the cylinder-port 37, and the steam-port in the valve 27 is closed, shutting off the steam from the cylinder-port 38. At the same time the exhaust-port of the exhaust-valve 30 and the cylinder exhaust-port 39 are open and the exhaust-valve 31 and the cylinder exhaust-port 40 are closed. Then as the walking-beams are simultaneously rocked in the opposite direction the previously open valves are closed and the previously closed valves are opened.

In Fig. 18 the steam is exhausted directly into the exhaust-chest and is thence conducted away through a pipe or pipes 41. In this construction also the recesses in the working faces of the valve-slides are omitted, such faces being plane.

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

1. The combination with a cylinder its piston, and its cylinder-ports, of twin valves in a single steam-chest, each comprising a stationary abutment provided with a port or ports, slide-valves in contact with the vertical faces of said abutment on opposite sides, a yoke across said abutment carrying said slide-valves, a presser-bar engaging adjustably with one of said slide-valves with a rocking bearing, and means to vertically reciprocate said slide-valves to alternately operate said twin valves to open and close their respective steam and exhaust ports, and means to supply steam to said steam-chest in which it surrounds both valves and from which it enters the cylinder through said valves alternately.

2. A valve comprising an abutment provided with a suitable port or ports, slide-valves in contact with opposite vertical faces of said abutment, a yoke across said abutment carrying said slide-valves, a presser-bar engaging adjustably with one of said slide-valves with a rocking bearing and means to reciprocate said slide-valves, to open or close the inlet or exhaust the ports, in combination with a steam-chest inclosing said valve.

3. The combination with a cylinder provided with a piston and having suitable cylinder-ports, and a steam-chest upon said cylinder, of twin valves, inclosed within said steam-chest, each comprising an abutment, slide-valves in adjustable contact with oppo-

site faces of said abutment, a presser-bar engaging with one of said slide-valves with a rocking bearing and suitably connected to the other one, a yoke by which said slide-valves are carried, a stem connecting each yoke to the end of a walking-beam and means to operate said beam to reciprocate said slide-valves to admit or exhaust steam from the cylinder.

- 10 4. A cylinder and steam-chest thereon in combination with a valve consisting of an abutment provided with a steam-port registering with a cylinder-port and an exhaust-port, said abutment, a slide-valve in contact
15 with the rear face of said abutment, a cross-bar carrying it, a pressure-bar adjustably

supported by said cross-bar, a slide-valve pivoted and adapted to rock upon said pressure-bar and in contact with the front face of said abutment, and means to reciprocate said yoke 20 and slides to close the exhaust-port and open the steam-port and to close the steam-port and connect it and the cylinder-port to exhaust from said cylinder, and an exhaust-pipe connected to said exhaust-port. 25

In witness whereof I have hereunto set my hand on this 8th day of October, 1895.

JOHN M. BOUCK.

In presence of—

W. H. CLARK,

M. E. LOVELAND.