(No Model.)

4 Sheets—Sheet 1.

A. BALL.

STEAM ACTUATED VALVE.

No. 457,505. Patented Aug. 11, 1891.

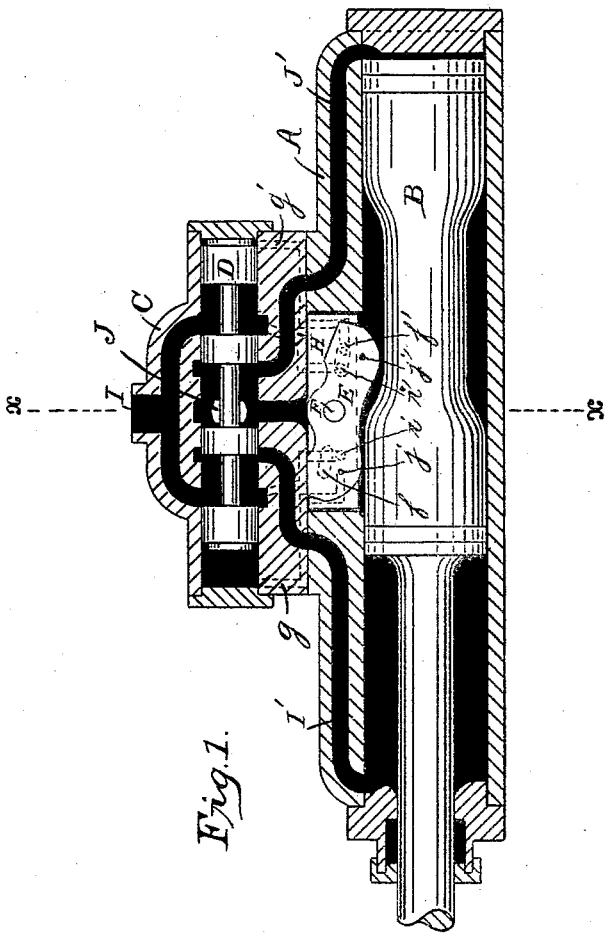

Fig. 1.

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(No Model.) 4 Sheets—Sheet 2.

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Fig. 2.

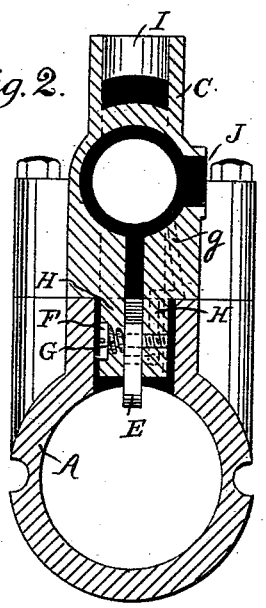

Fig. 4.

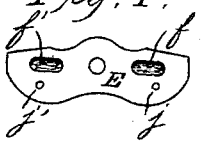

Fig. 3.

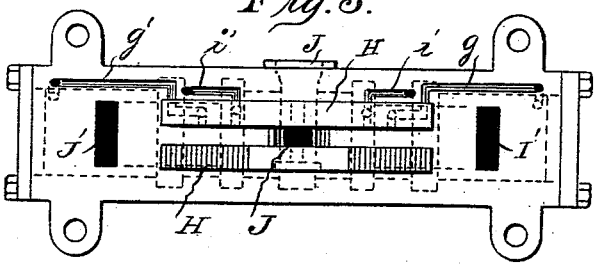

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Fig. 7.

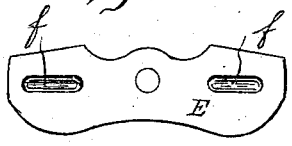

Fig. 8.

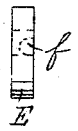

Fig. 5.

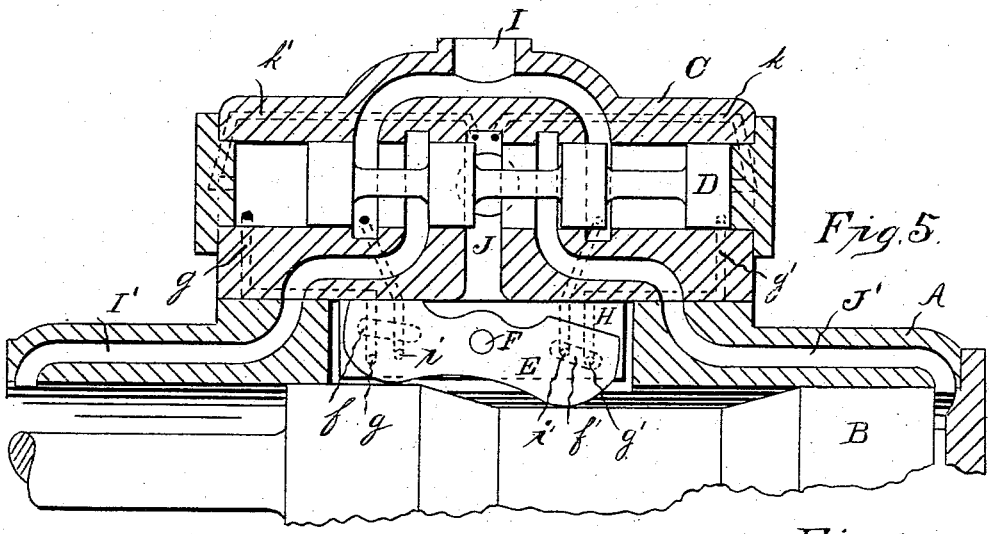

Fig. 6.

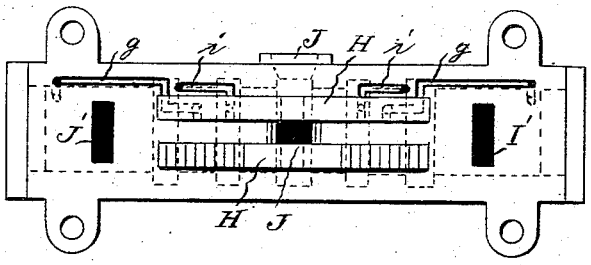

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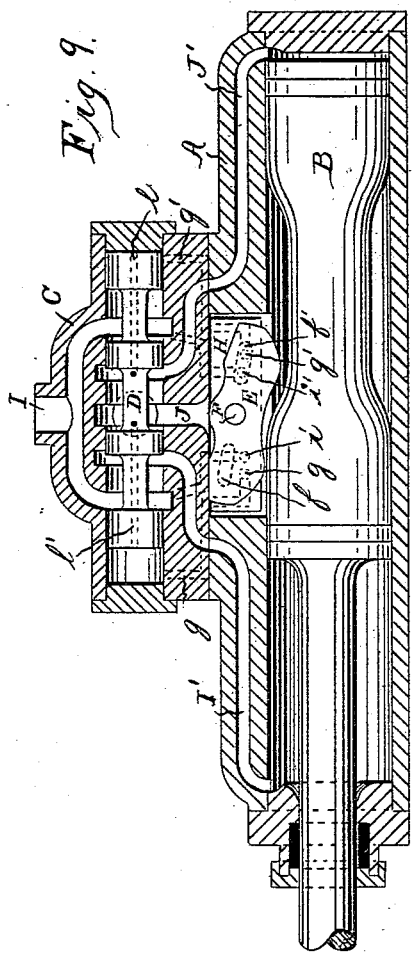
Fig. 9.



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UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO THE SULLIVAN MACHINE COMPANY, OF SAME PLACE.

STEAM-ACTUATED VALVE.

SPECIFICATION forming part of Letters Patent No. 457,505, dated August 11, 1891.

Application filed February 14, 1891. Serial No. 381,489. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BALL, a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Steam-Actuated Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

The invention relates to steam-actuated valves, and has for its object to simplify the construction and at the same time avoid injurious wear, leakage, and expenditure of power; and it consists in the construction hereinafter described and pointed out.

In the accompanying drawings, Figure 1 is a longitudinal central section. Fig. 2 is a transverse section on line *x x* of Fig. 1, the piston and piston-valve being omitted. Fig. 3 is a bottom view of the valve-chest. Fig. 4 is an elevation, the view being opposite to that of the same detail in Fig. 1. Fig. 5 is a partial section of a modification. Fig. 6 is a bottom view of the valve-chest. Fig. 7 is an elevation, the view being opposite to that of the same detail in Fig. 5. Fig. 8 is an end view of said detail, and Fig. 9 is a longitudinal section of a second modification.

The letter A denotes a cylinder, B a piston, and C a valve-chest, of which J is the steam-inlet and I the exhaust-port.

D is a valve-piston adapted to alternately open and close the ports J′ and I′.

H H indicate two webs or partitions located in a recess communicating with the space above the piston B, said space being provided by reducing the diameter of the piston adjacent to its longitudinal center, as shown. Live steam has access to this space. Between the walls H is pivoted at F a valve E.

G is a spring (see Fig. 2) located between the head of the pivot F and the valve E, which presses said valve toward the particular wall H, in which are located ports and recesses next to be described, the object being to prevent too great leakage from said ports.

f f′ are recesses formed in the side of valve E. *g g′* are passages leading from the ends of the piston D or its chamber in the end of the valve-chest through its walls and through the webs H and terminating in openings in the side of H and against the surface of valve E.

i i′ are similar openings to passages leading to the exhaust-port I. *j j′* are holes in the valve E, adapted to alternately register with the mouths of passages *g g′* as the valve E is suitably moved by the piston B.

In the position illustrated in Fig. 1 the passage *g′*, recess *f′*, opening *i′*, and its connecting-passage are in position to exhaust steam from in front of—that is, from above—the piston-valve D. This exhaust is about completed when the parts are situated as represented. This position of valve D admits steam above piston B, said piston having just completed its upstroke. It will be seen that the exhaust-passage *i* is closed, and that the opening *j* and passage *g* are in free communication with the steam-space in the recess in which is the valve E and about the central part of piston B. The piston being now about to be forced down, the valve E will be turned on its pivot by contact with said piston, whereupon live steam will flow through *j′* and *g′* and force down the piston-valve D, the passage *g*, recess *f*, and opening *i* having been simultaneously put in position to exhaust from below piston-valve D.

In the modification shown in Figs. 5 to 8 each end of D is always in contact with live steam, which is free to enter through the passages *k k′* from the inlet J. The movement of the piston-valve D depends upon the opening of the exhaust on that side toward which said movement is to occur. As shown in Fig. 5, the passage *g′*, recess *f′*, and outlet *i′* are in proper relation to exhaust from above D and have just exhausted to allow steam to act through *k′* to raise piston-valve D. Steam is about entering above piston B, the descent of which will turn E on its pivot and close exhaust *g′ f′ i′*, opening *g f i*. Steam thereupon will pass through *k* and force down the piston-valve D, exhaust taking place through passage *g*, recess *f*, and outlet *i*.

The modification illustrated in Fig. 9 only differs from that shown in Fig. 5 in that, instead of the passages *k k′*, passages *l l′* extend from the ends of the piston directly through

the same to the steam-inlet, the operation being identical.

The above-described pivoted valve requires little power to operate it, is not liable to excessive wear, is subject to but little leakage and is of simple construction.

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

1. The combination, with a valve-chest and with the distributing-valve of a piston-cylinder, of a valve pivoted in the cylinder-wall and having a part normally within said cylinder and in the path of the piston, said latter valve being adapted to alternately open and close communication between opposite faces of the distributing-valve and an exhaust-port, and means for supplying live steam to the end of the valve opposite the exhaust.

2. The combination, with a valve-chest and with the distributing-valve of a piston-cylinder, of a valve pivoted in the cylinder-wall and having a part normally within said cylinder and in the path of the piston, said latter valve being adapted to alternately open and close communication between opposite faces of the distributing-valve and an exhaust-port, said opposite faces being also always in free communication with the steam-inlet, substantially as set forth.

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

ALBERT BALL.

Witnesses:
FRANK A. BALL,
GEO. O. BALL.