

H. C. SERGEANT.

Valve-Movements for Reciprocating Engines.

No. 143,261.

Patented September 30, 1873.

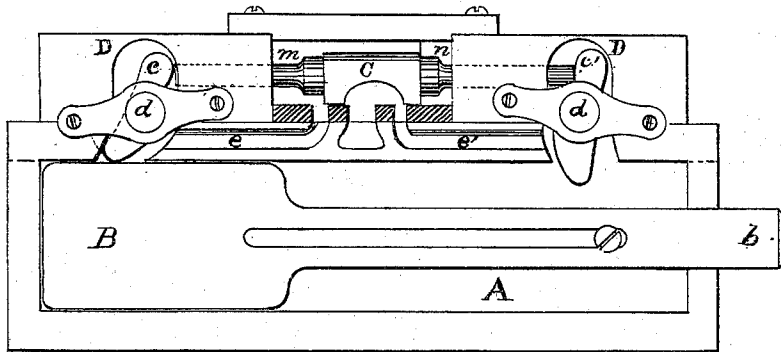


fig. 1.

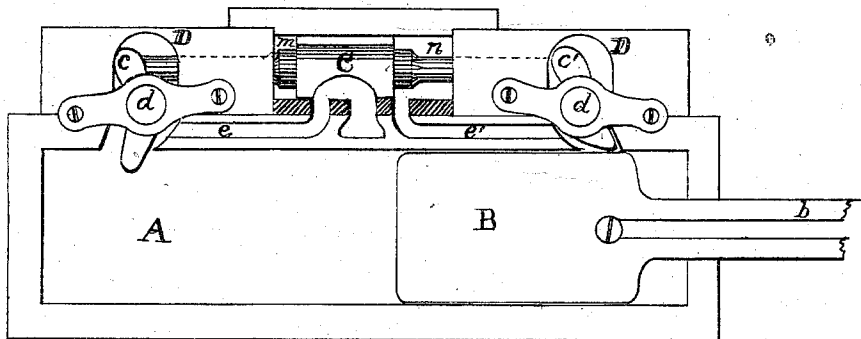


fig. 2.

Attest  
S. M. Pool

Inventor  
H. C. Sergeant  
by H. R. K. Evans  
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# UNITED STATES PATENT OFFICE.

HENRY C. SERGEANT, OF NEW YORK, N. Y.

## IMPROVEMENT IN VALVE MOVEMENTS FOR RECIPROCATING ENGINES.

Specification forming part of Letters Patent No. **143,261**, dated September 30, 1873; application filed July 10, 1873.

### *To all whom it may concern:*

Be it known that I, HENRY C. SERGEANT, of the city and State of New York, have invented a new and useful Improvement in Valve Movement for Reciprocating Engines, of which the following is a clear, full, and exact description, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a longitudinal section, showing the piston in one position; and Fig. 2, a similar section, showing the piston in the opposite position.

My improvement has reference more particularly to valves used in steam rock-drills, where they are subjected to an extraordinary strain; and it consists in constructing the valve-stems in such a manner that the heads of the stems will act as valves to close the openings alternately through which the valve-stems pass. It also consists in the construction and arrangement of the tappets with reference to the valves, valve-stems, and piston.

To enable others skilled in the art to make and use my invention, I will proceed to describe the exact manner in which I have carried it out.

In the cylinder A works the piston B, having the rod *b*. Immediately above the cylinder, or on the side, and as near as possible in the same horizontal plane with the cylinder, is placed the steam-chest, having the valve C working loosely between the valve-stems *m n*. These stems pass through suitable openings into the recesses D D, where are placed the tappets *c* and *c'* supported on their journals *d d*. (See figures in drawing.)

When the piston is in the position as shown in Fig. 1, the tappet *c* is forced against the valve-stem *m*, which carries the valve C to a position to open the exhaust *e'*, when the head of the valve-stem *n* will be pressed tightly against the opening through which that valve-stem passed, and will there act as a valve to close the opening without the necessity of a packing; but as the piston moves to the position shown in Fig. 2 it strikes the tappet *c'*, and forces its upper or outer end against the valve-stem *n*, and thereby causes the valve C to shift its position so as to open

the exhaust *e*, and the head of the valve-stem *m* then effectually closes the opening on the left, through which that stem passed.

It will be seen that as the piston B moves along the cylinder A each of the tappets *c* and *c'* is moved partially in the same direction with the piston, and thus the injurious strain to which rock-drill valves are now subjected is entirely avoided.

By my arrangement I secure the direct action of the piston upon the tappets, which move and control the valve-stems, and thus avoid intermediate connections, which are unable to stand the jarring of the machinery when the drill is in operation. To secure this great object it becomes essential to bring the steam-chest to the nearest possible position to the piston, and as near as may be in the same horizontal plane. It is also essential, for the effective working of a steam rock-drill, that there should be as little packing required and used as possible.

By my arrangement of the double valve-stems, I cause the heads of the stems to act as valves, alternately closing the openings; and it is evident that, however much the stems may wear and become loose, this will not affect the efficient working of the heads or valves to close the openings.

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

1. The tappets *c* and *c'*, arranged as described, in combination with the valve-stems, the valve C, and the piston B, as set forth.

2. The duplex valve-stems, having the heads *m n* acting alternately as valves to close the openings through which the valve-stems pass, in combination with the valve C, all constructed and arranged substantially as and for the purpose set forth.

3. The valve-stems *m n*, constructed with heads, as shown and described, and so arranged as to close alternately the openings through which they pass, substantially as set forth.

HENRY C. SERGEANT.

Witnesses:

JOHN S. SMITH,  
M. VANSANT.