A. R. Buffington.

Steam Engine Valve.

No. 87,538. Patented Mar. 9, 1869.

Fig. 2

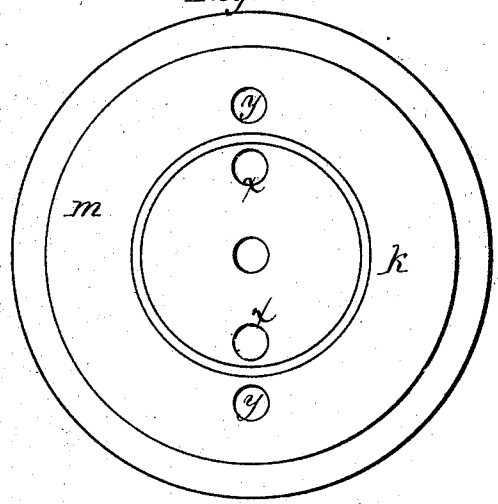


Fig. 3

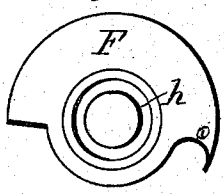


Fig. 5

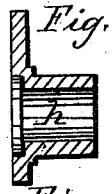


Fig. 4

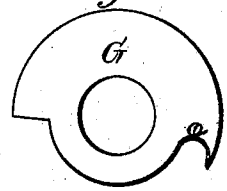
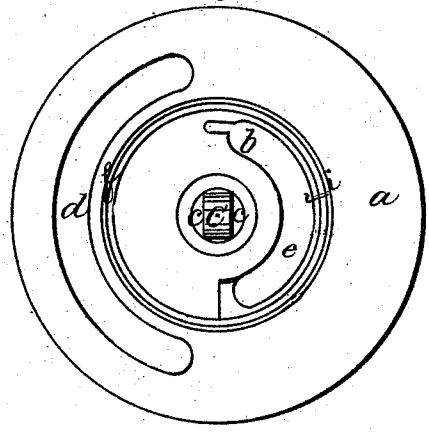


Fig. 1



Witnesses
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United States Patent Office.

A. R. BUFFINGTON, OF UNITED STATES ARMY.

Letters Patent No. 87,538, *dated March* 9, 1869.

IMPROVEMENT IN STEAM-ENGINE ROTARY VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, A. R. BUFFINGTON, captain of ordnance, and brevet major, United States army, have invented a new and useful Improved Valve, for use in and with steam and other engines, viz, a revolving valve, that can be adjusted to "cut off" and "lead," at will, the "exhaust" fully opening before, and closing slower than the "port;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a plane view of valve, and

Figures 2, 3, 4, and 5, plane views of parts of valve and valve-seat.

The valve consists essentially of a plate, *a*, fig. 1, fastened to an arbor or shaft, *c*, fig. 1, so as to revolve with it, and having two concentric annular slots *d e*, as shown in fig. 1.

Between these slots, on each side of the valve-plate, an annular spring-packing, *l*, fig. 1, is placed, in a groove of rectangular cross-section.

Inside of this groove, on each face, a plate is embedded. These plates are shown in F, fig. 3, and G, fig. 4. One of these, F, fig. 3, has a "sleeve," *h*, shown in section *h*, fig. 5, through which the shaft or arbor turning the valve passes.

These two plates, F and G, figs. 3 and 4, constitute the "cutting-off" arrangement, or device, and on the valve are connected, by a pin or bolt, *i*, figs. 3 and 4, whose position, when the "port" is open throughout the whole stroke, is shown at *b*, fig. 1.

m, fig. 2, represents the valve-seat. The four holes, *x x*, *y y*, are, the inside ones, *x x*, the ports, and the outside ones, *y y*, the exhaust; one of each connected, as below indicated, with the top and bottom, or ends, of the steam or other cylinder.

Passing between the ports and exhausts, as shown in the fig. 2, is an annular groove, *k*, of rectangular cross-section, corresponding, in distance from the centre, to the annular packing on the face of the valve-plate in contact with the seat.

The cover of the valve corresponds exactly with the valve-seat, the grooves and holes, ports and exhausts, being alike, and opposite.

The annular slots *d e*, fig. 1, of the valve-plate, are concentric with the centre, and so arranged that one exhaust-hole, and the port farthest from it, are always open during the revolution of the valve, except at one point, viz, when the change to the other exhaust and port-holes is about to take place. At this time, all are closed.

The valve-plate being adjusted to the shaft or arbor, so as to permit it to be turned around the shaft or arbor, and fastened again at any point, the time of this changing, just named, from one port and exhaust-hole to the other set, may be made to correspond to any position of the piston-head in the cylinder, and consequently the "lead" can be adjusted at will.

The sleeve *h* of the "cut-off" plate, figs. 3 and 5, projecting on the shaft or arbor, through the valve-cover, permits the "cut-off" device to be turned around it in one direction, and fastened again at any point, without removing the valve-cover; and thus for stationary, not reversible engines, the "cut-off" may be adjusted at will.

From the nature of the motion—angular—of the valve, and relative position of the port and exhaust-holes, their centres being in the same straight line, it follows, that the ports being nearer the centre of motion, will open slower than, and begin to close before the exhausts.

To "pack" the valve, besides having the parts all "ground together," the steam or other motor enters between the plates of the cut-off device and the valve-plate, the former being made sufficiently thin to permit some "play" between the valve-plate, and seat and cover; and in the annular grooves, in valve, and seat, and cover, as above described, annular spring-packings are placed, which, also acted on by the motor entering the grooves, through connections, (grooves on valve-plate faces,) made at any point, as at *l*, fig. 1, with the slot *e*, fig. 1, press outward, and "pack" between the ports and exhausts.

The relative position of the valve herein described, to the cylinder, is not fixed; for instance, the valve may be placed on the "crank-shaft," dispensing with the devices used to move the slide and rotating valve. Therefore,

What I claim as my invention, and desire to secure by Letters Patent, is—

The improved revolving valve, for steam and other engines, consisting of devices herein described, embracing the valve-plate *a*, with the two concentric circular slots *d* and *e*, and the groove *k*, for the reception of the annular packing *l*, the cut-off devices F and G, sleeve *h*, seat *m*, with its groove *k*, and ports *y y* and *x x*, arranged to operate substantially as herein set forth.

A. R. BUFFINGTON.

Witnesses:

FRANK H. PHIPPS,

JOHN APPLIN.