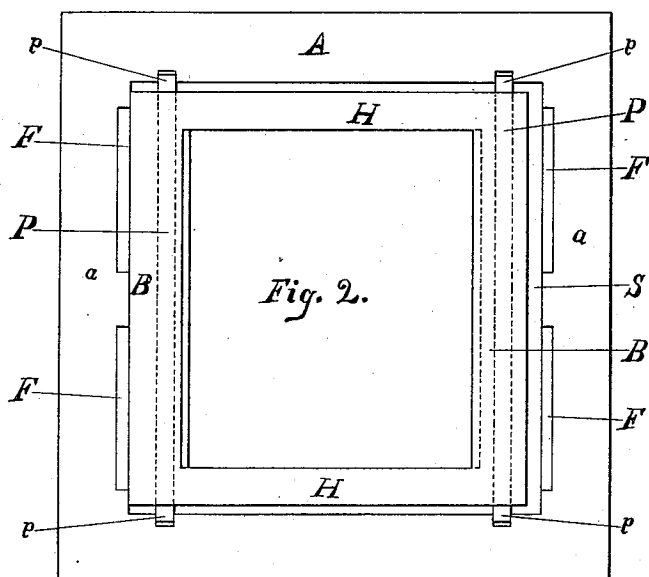
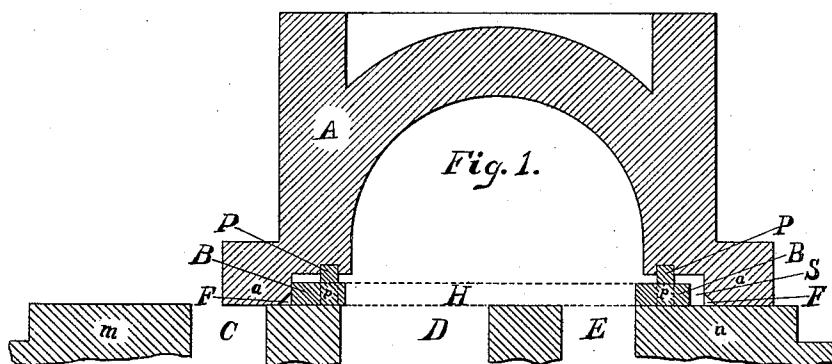


(No Model.)

J. A. HALEY.
SLIDE VALVE.

No. 473,152.

Patented Apr. 19, 1892.



WITNESSES:
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JOSEPH A. HALEY, OF FORT WAYNE, INDIANA.

SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 473,152, dated April 19, 1892.

Application filed July 13, 1891. Serial No. 399,274. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. HALEY, a citizen of the United States, residing at the city of Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in slide-valves for steam-engines; and its objects are to provide means whereby when the valve is operated the steam-port at one end of the cylinder or valve-seat is kept closed for a longer period than heretofore for the purpose of using the steam more expansively, while the port at the opposite end is kept open for a longer period of time for the purpose of reducing compression.

The invention relates specially to valves operated by what is known as the "link motion," and to the use of steam expansively.

I attain the objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my improvement, showing the port-holes of the valve-seat. Fig. 2 is a bottom view of the valves shown in Fig. 1.

Similar letters refer to similar parts throughout the several views.

My invention consists in the construction and combination of a main valve constructed with shortened faces adapted to actuate independent valve-faces, two independent valve-faces adapted to supplement said shortened faces, and devices and means whereby the independent valve-faces during a portion of the travel of the main valve are not operated thereby but remain stationary and adapted to give an increase of inside lap at one part of the valve-seat with increased clearance at the other part alternately with each stroke of the main valve.

By the term "independent valve-faces" I mean valve-faces which during a given portion or space of the travel of the valve-rod

remain stationary, not being actuated by it directly or indirectly.

The preferred form of construction of my improvement is shown in Figs. 1 and 2, and is as follows: The main valve A has portions of its faces cut out, preferably in the form of a rabbet, leaving the faces *a* thus shortened to rest upon the valve-seat and form with the independent valve-faces B combined valve-faces. These rabbets are cut out sufficiently deep to permit independent valve-faces B to be placed underneath them and afford room for their independent motion.

The independent valve-faces B are constructed so that when connected together, preferably by a cross-bar H, which is also placed under a rabbet on either side of the face of the valve A there will be between the extreme length of the two faces B and the extreme length of the rabbets on the inside of the faces of the valve A a space S. This frame consisting of the independent valve-faces B and the connecting-bars H is placed on the valve-seat within the rabbeted parts of the face of the main valve A, and packing P is placed above the independent faces, as shown in the drawings, and other packing *p* is placed upon the side in the side rabbets, as shown in Fig. 2, for the purpose of preventing steam from passing between the valve-faces B and *a*. The space S is for the purpose of and designed to allow a movement of the main valve A that distance or space without moving the independent valve-faces B. Its length is determined by the requirements for inside lap and inside clearance, as will appear in describing the operation. When the space S has been traversed by the valve A moving from N to M, the end of the rabbet impinges against the independent valve-face B at the port E and moves both independent valve-faces, as will be readily seen, to the end of travel of the main valve. On the return stroke the positions and movements are reversed. The faces A have chamfers F on their inside corners, as shown in the drawings. These chamfers are for the purpose of permitting the steam to operate against the ends of the independent valve-faces B to aid in keeping them alternately pressed against the ends of the

rabbets for the purpose of preventing any movement of the valves B, except when actuated by the faces *a*. This is my preferred construction, but the independent valve-faces B B are not necessarily connected together by the bars H, but could be operated between the rabbets of the face of the valve A by lugs extending down for the purpose on either side of the exhaust-cavity of the main valve, or by other projections answering the same purpose. I do not therefore confine myself to the particular method shown of operating the valve-faces B independently.

The operation is as follows: When the engine is first started, it is usual to use full openings of the ports. In such case my improvement has no special operation; but when the stroke of the valve is reduced or shortened for the purpose of using steam expansively then the following results take place: Say, for example, that the opening of the port C, as shown in Fig. 1, is the extreme opening for a given point of cut-off. Fig. 1 then shows that the limit of the stroke opening the port C has been reached. At this point the cylinder is therefore taking the full amount of steam at such point of cut-off, while the port E is exhausting at the other end and is open to its full extent.

The width of the exhaust-cavity, measured on the valve-seat, is determined by the fixed distance apart of the inner edges of the two independent valve-faces B B, because the packings P p prevent the passage of steam between the faces B and *a* into and from the exhaust-cavity. In the drawings such distance or width is shown, preferably, as slightly less than the distance over the inner edges of the steam-ports C and E; but the spaces on the valve-seat, covered by the combined valve-faces B and *a*, vary during the travel of the valve. When the valve travels, say, on the return stroke, (see Fig. 1,) the faces B remain stationary until the distance S has been traveled by the face *a* at the end N of the valve-seat, which then impinges against and actuates the faces B. At this point of travel, and continuing to the end of the return stroke, the combined faces B and *a* on the end N of the valve-seat, cover a diminished distance, while the faces B and *a*, on the other end M, cover an increased distance over the ports

and valve-seats, the difference being represented by the space S. Such movement increases the inside lap of the combined valve-faces B and *a* on the end M of the valve-seat, because of the inside lengthening of the combined valve-faces, and thereby, as is well known, delays the exhaust of steam at the port C, thus permitting a greater expansion of steam in that end of the cylinder. At the same time, while so traveling, the distance covered by the combined valve-faces B and *a* at the end N has been reduced correspondingly, and the face B has remained stationary for a portion of the travel, so that the closing of the port E has been delayed, thereby giving increased clearance and reducing the compression at that end of the cylinder. This increase of the inside lap at the end M of the valve-seat and increased clearance at the opposite end N is reversed with the reverse of travel, as will readily be seen.

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

1. In a slide-valve, the combination of a main valve constructed with shortened faces adapted to actuate independent valve-faces, with independent valve-faces adapted to supplement said shortened faces, chamfered edges or openings in the shortened faces adapted to permit steam to act against the ends of the independent valve-faces and confine such action to said ends, and suitable packing adapted to permit the passage of steam between the valve-faces and permit the motion of the main valve without actuating the independent valve-faces.

2. In a slide-valve, the combination of a main valve constructed with shortened faces adapted to actuate independent valve-faces, with independent valve-faces adapted to supplement said shortened faces, and means to prevent the steam from passing between said valve-faces into the exhaust.

In testimony whereof I hereunto subscribe my name, in the presence of two witnesses, this 8th day of July, 1891.

JOSEPH A. HALEY.

Witnesses:

ALBERT BAKER,
H. C. HARTMAN.