

Patented Mar. 14, 1871.

Fig: 2.

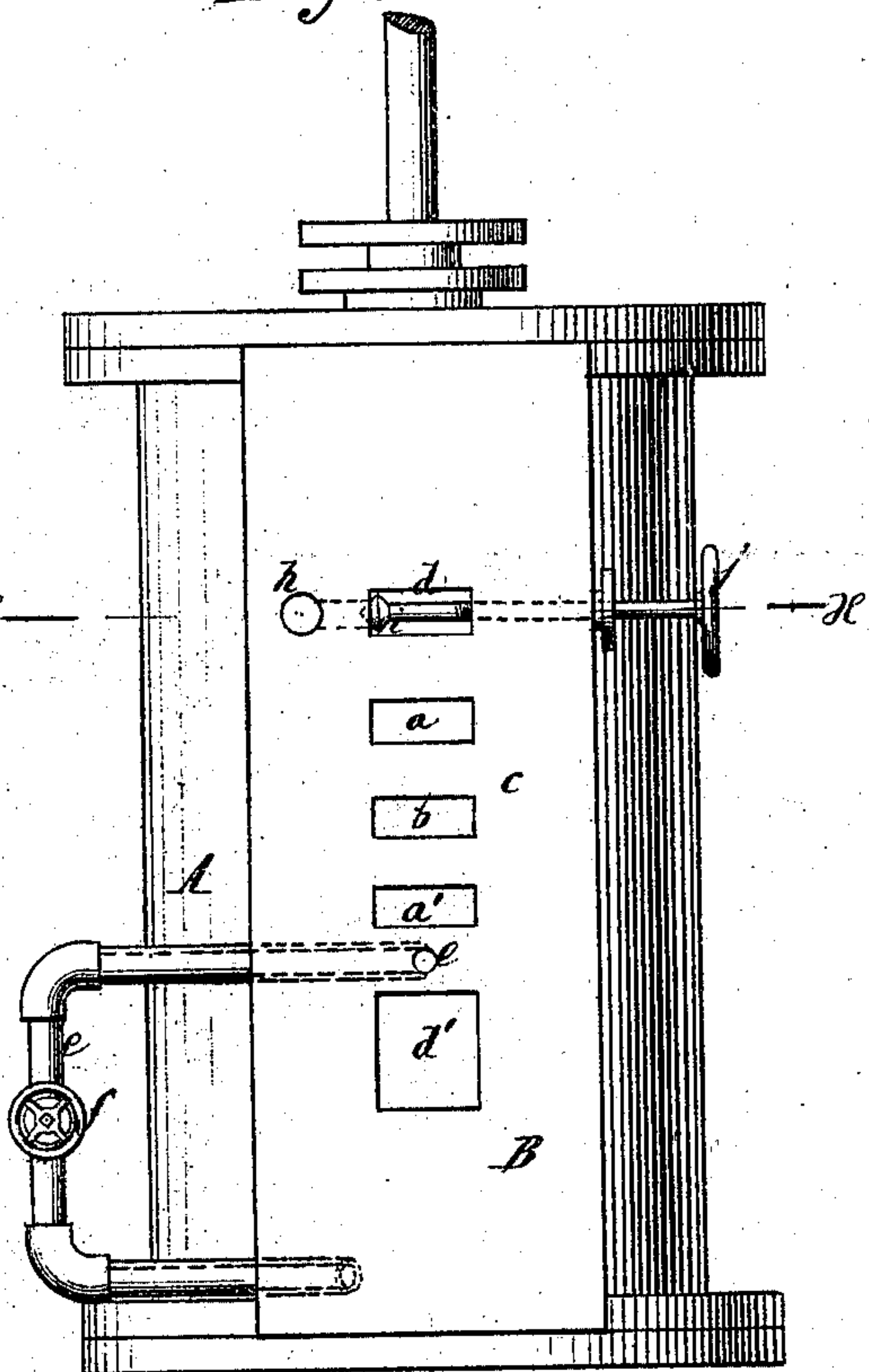
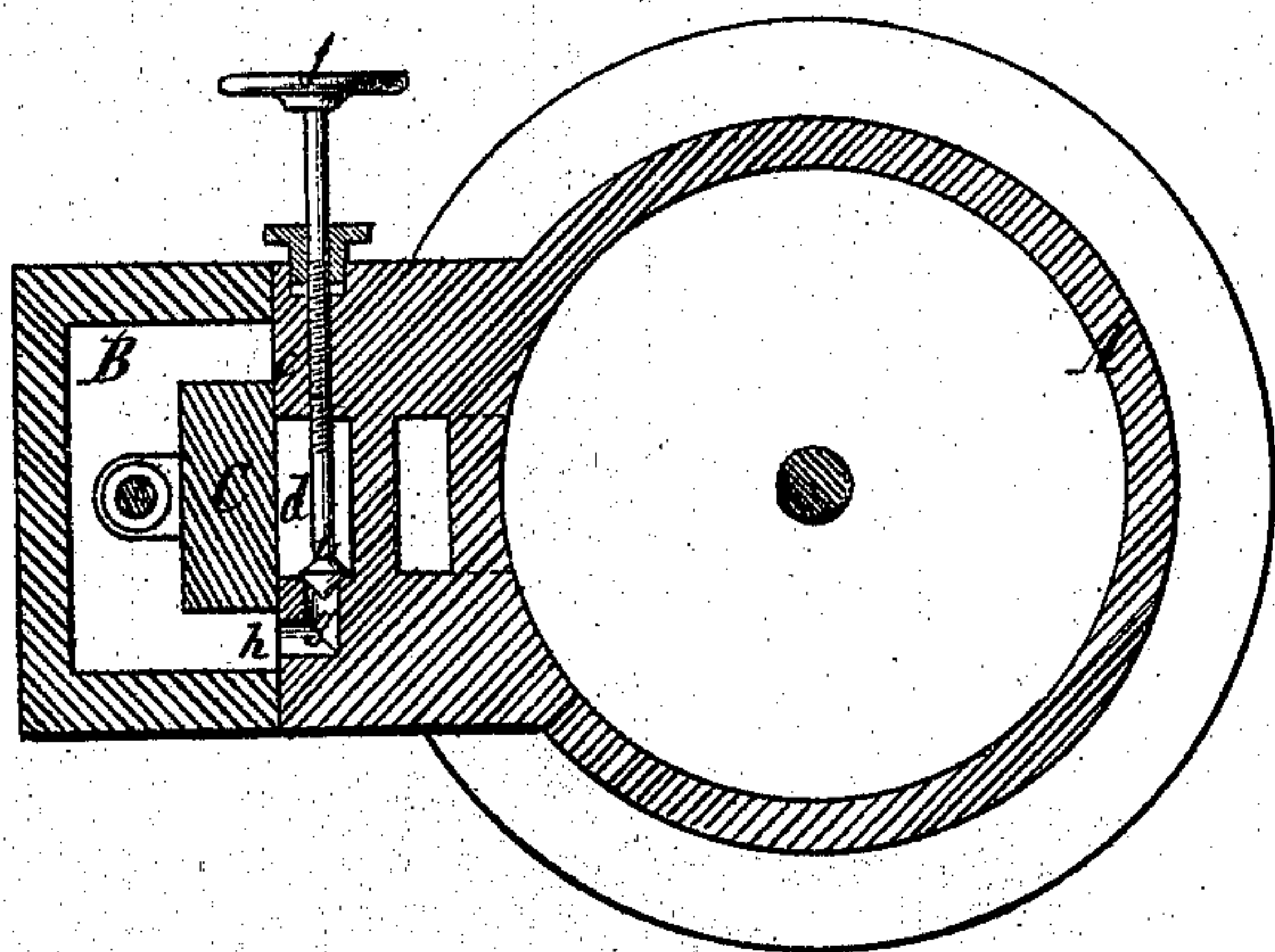


Fig: 3.



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IMPROVEMENT IN STEAM-VALVES.

Specification forming part of Letters Patent No. 112,684, dated March 14, 1871.

To all whom it may concern:

Be it known that I, ADAM S. CAMERON, of the city, county, and State of New York, have invented a new and useful Improvement in Steam-Valves; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which drawing—

Figure 1 represents a vertical central section of this invention. Fig. 2 is a front view of the same, exposing the valve-seat. Fig. 3 is a horizontal section of the same, the line *x*, Fig. 2, indicating the plane of section.

Similar letters indicate corresponding parts.

This invention consists in the arrangement of a supplementary steam-passage, extending from the valve-seat to the end of the cylinder, between the ordinary steam-port and the cylinder-head, and controlled by the slide-valve in such a manner that the piston will cover the ordinary steam-port before it reaches the end of its stroke, and will therefore be cushioned, and then steam will be admitted to the cylinder through the supplementary steam-passage, causing the piston to return until the ordinary steam-port is uncovered, when steam is admitted to the cylinder both through the supplementary passage and the ordinary steam-port. The supplementary steam-passage is provided with a stop-valve, by means of which the quantity of steam passing through it can be regulated.

The invention consists, also, in the arrangement of a channel which can be opened and closed by a stop-valve, and which leads from the bottom of the steam-chest into a cavity in the valve-seat in such a manner that, by adjusting the stop-valve, the quantity of steam admitted to the cylinder can be regulated, and that, in case my valve is applied to an upright cylinder, the quantity of steam admitted at the top of said cylinder can be diminished to compensate for the weight of the piston.

In the drawing, the letter A designates a steam-cylinder, to which steam is admitted from the valve-chest B through ports *a* *a'*, and from which the steam exhausts through the port *b*. C is the slide-valve, which is ground

down on the seat *c*, said seat being provided with cavities *d* *d'*, so that steam is admitted under the valve. The port *a'* opens into the cylinder at some distance from the cylinder-head, so that the piston in moving down will cover said port before it has reached the end of its stroke, and the steam remaining in the cylinder beneath the piston will cushion the same.

After the piston has completed its down-stroke it is necessary to admit steam beneath the same, so as to drive it up, and since the port *a'* is covered by the piston a supplementary steam-passage, *e*, is provided, as shown in Figs. 1 and 2 of the drawing. This supplementary steam-passage I have arranged between the port *a'* and the cylinder-head, starting the same from the valve-seat between the port *a'* and cavity *d'*, as shown, and it may either be produced in the casting by drilling or otherwise, or it may be produced by a pipe extending outside the valve-chest and cylinder, as shown.

In this last-named case I am enabled to insert in the passage *e* a stop-valve, *f*, so that the quantity of steam admitted through the same to the cylinder can be regulated from the outside.

In Fig. 1 of the drawing I have shown the piston and the slide-valve both traveling downward, the piston having arrived close to the end of its downstroke. As soon as the valve moves down a little more, steam is admitted below the piston through the cavity *d'* and supplementary passage *e*, while it begins to exhaust through ports *a* and *b*, and, as soon as the piston has traveled up far enough to uncover the port *a'*, steam is admitted beneath it through this port as well as through the supplementary passage. If the cylinder is placed in a horizontal position, or whenever it is desirable to cushion the piston on both ends, a supplementary steam-passage may be arranged at both ends of the cylinder. If the cylinder is in a vertical position, it is desirable to regulate the quantity of steam admitted to the top of the cylinder so as to compensate for the weight of the piston. This object I have accomplished by the following means: The cavity *d* at the upper end of the valve-seat, instead of being long, like the cavity *d'*,

is short, so that the same will be completely covered by the valve when it (the valve) travels up to admit steam to the top end of the cylinder. From the cavity *d* extends a passage, *g*, (see Fig. 3,) to a recess, *h*, in the bottom of the valve-chest, beyond the valve-seat, and this passage is opened or closed by a stop-valve, *i*, mounted on a spindle, which extends through the side of the valve-seat, and is operated by a hand-wheel, *j*. When this valve is wide open the full force of steam passes through the recess *h*, passage *g*, and cavity *d* under the slide-valve and into the top part of the cylinder; but by regulating the stop-valve *i* the quantity of steam admitted to the top part of the cylinder can be diminished so as to compensate for the weight of the piston and other parts connected thereto.

I am aware that supplementary steam-passages have been used for the purpose of cushioning the piston in a steam-cylinder—such, for instance, as described in the patent of E. D. Barrett, January 19, 1858, No. 19,119; but in his case additional valves are required to control these supplementary passages and to prevent the steam from blowing through and

being wasted. I have dispensed with these additional valves.

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

1. The arrangement of a supplementary steam-passage, *e*, extending from the valve-seat to the end of the cylinder, between the ordinary port *a'* and the cylinder-head, and controlled by the main slide-valve *C*, the whole being constructed and operating substantially as shown and described.

2. The arrangement of a pipe situated on the outside of the steam-chest, and forming the connection between the supplementary port *e* and the interior of the main cylinder, said pipe being provided with a valve, *f*, substantially as and for the purpose set forth.

3. The recess *h* and passage *g*, in combination with the cavity *d* and stop-valve *i*, substantially as and for the purpose shown and described.

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Witnesses:

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