

(No Model.)

T. T. BROWN.

SLIDE VALVE.

No. 370,725.

Patented Sept. 27, 1887.

Fig. 1.

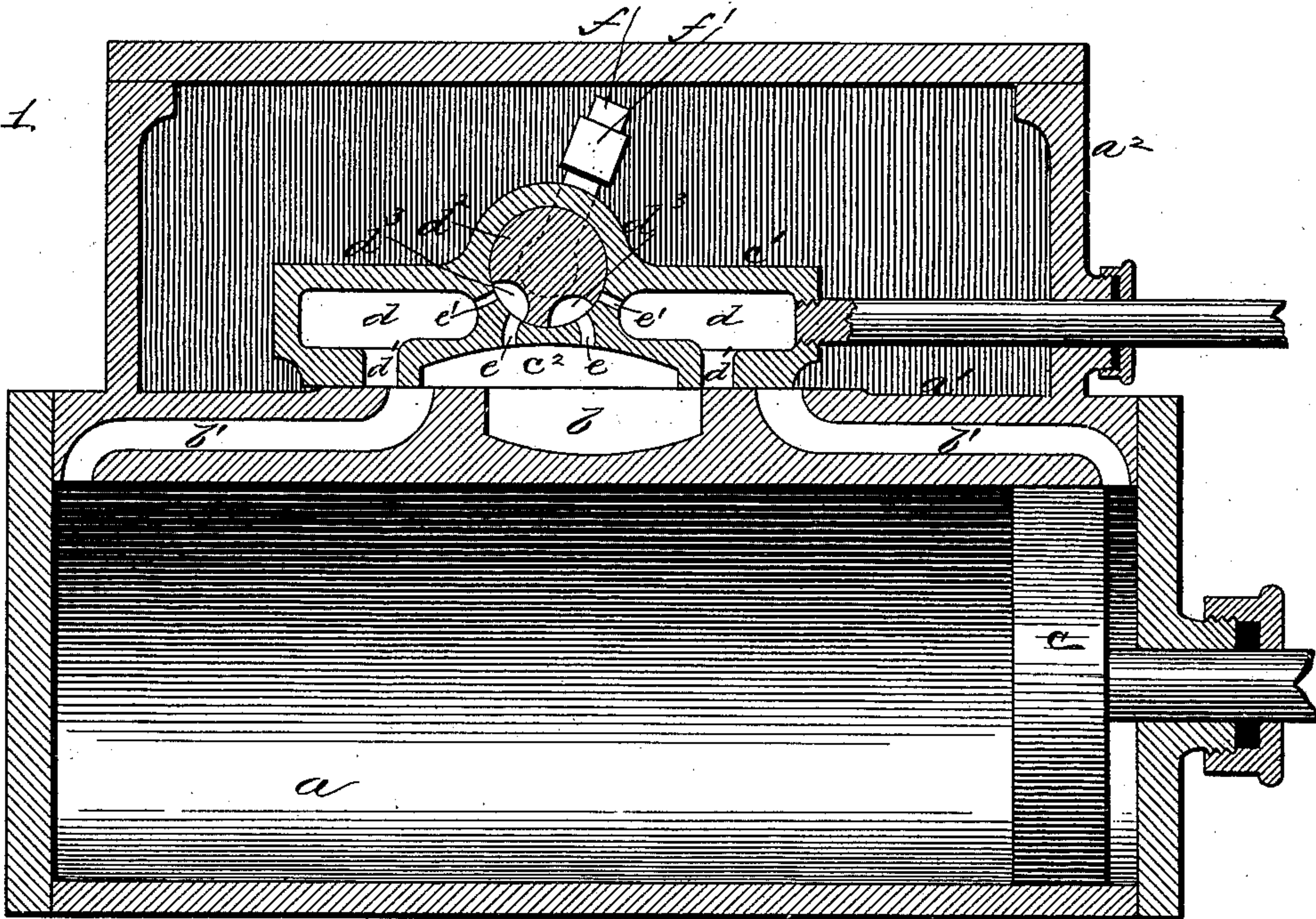
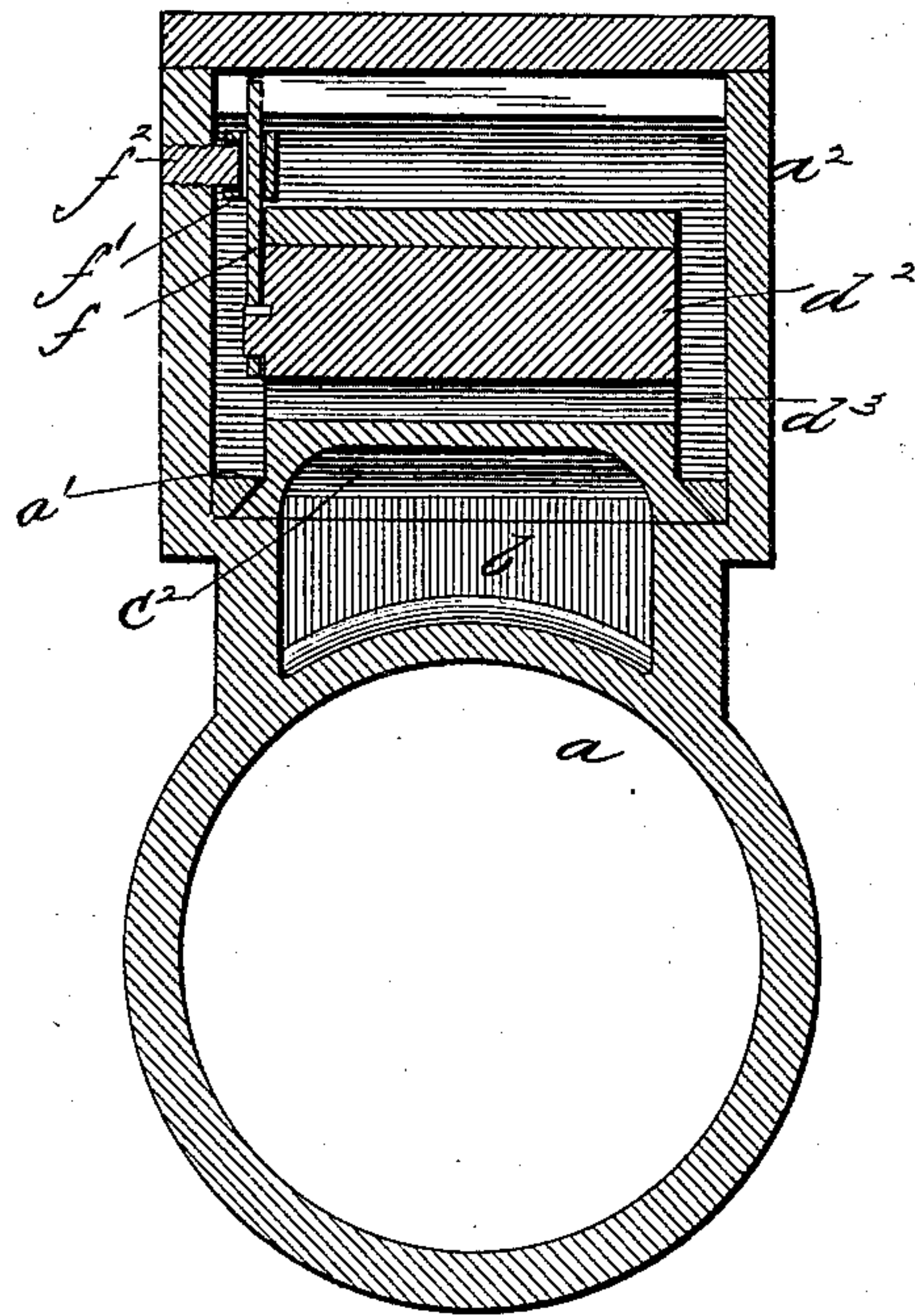


Fig. 2.



Witnesses.

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# UNITED STATES PATENT OFFICE.

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## SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 370,725, dated September 27, 1887.

Application filed November 24, 1886. Serial No. 219,814. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS T. BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Slide-Valves, of which the following is a specification.

This invention relates to slide-valves for engines; and it consists in certain novel details of the construction and arrangement of the same, substantially as will be hereinafter more fully set forth and claimed, whereby the back-pressure of the steam upon the exhaust side of the piston is relieved.

In order to enable others skilled in the art to which my invention pertains to make and use the same, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a steam-cylinder and my slide-valve, and Fig. 2 is a transverse section of the same.

*a* represents a steam-cylinder formed upon one side with a seat, *a'*, for the usual slide-valve, and *a''* is the steam or valve chest. The seat *a'* is centrally cored or chambered, as at *b*, for the main exhaust, and formed also with cored steam-passages *b'*, connecting with the ends of the cylinder and acting alternately as supply and exhaust-passages, in the usual way. All these parts are constructed of any suitable size, and in any of the usual and well-known forms common to such devices, and not needing a more detailed description at this point.

The steam-piston *c* is moved back and forth in the usual manner by the admission of live steam behind it by the action of the slide-valve *c'* in its travel back and forth upon its seat. This valve is formed with a cored exhaust-passage *c''* in its face, which serves to connect the main exhaust-passage *b* with either of the two passages *b'*, according to the movement of the valve.

When an engine is first started, it is common to give the valve its full stroke, so as to admit a full charge of live steam to aid in overcoming the inertia of the load; but after being fully started not so much power is required to retain a given speed, and in order to economize it is usual to shorten the valve-stroke, so as to cut off the live steam at a given point of

stroke and utilize the expansion of the steam, as will be readily understood. This, however, often results in the opening of the supply-port and the admission of some steam behind the piston before the exhaust has been opened far enough to relieve the pressure upon the other side, and the result is a back-pressure, as the live steam upon one side must act against the expanded steam upon the other side till the travel of the valve has opened the exhaust sufficiently to give relief. This I avoid as follows: I form the valve *c'* with a cored chamber, *d*, in each end, and each chamber is by a passage, *d'*, connected with the face of the valve. In a cylindrical seat formed transversely through the upper part of the main valve is placed a rocking exhaust or auxiliary valve, *d''*, formed with two or more cored ports, *d'''*, in its face; and this transverse seat is by a pair of exhaust ports or passages, *e*, connected with the main exhaust-passage *c''* in the face of the main valve, and by two passages, *e'*, with the chamber *d*, as clearly shown in Fig. 1. An arm, *f*, upon one end of the auxiliary rock-valve is passed loosely through a guide-sleeve, *f'*, swiveled upon a stud, *f''*, secured in the side of the steam or valve chest, as in the drawings.

The operation will be obvious from the foregoing description. Steam is admitted to the valve-chest, and from there to the cylinder at either end, as the supply-ports are alternately uncovered by the sliding valve. In Fig. 1 I have shown the piston at the end of its stroke and just ready to commence its return movement. It will be noted that the main valve has just begun to admit live steam behind the piston, the supply-port being represented as partially open. At the same time the other passage, *b'*, which is now the exhaust, is connected by the cored face of the main valve with the main exhaust-port. This opening is, however, not sufficient to sufficiently relieve the pressure of the expanded steam upon the piston-face, and it will be seen that at the same time the auxiliary exhaust through the passage *d'*, chamber *d*, and the cored auxiliary valve, is in connection with the passage *b'* and serves to give an additional vent to the exhaust and fully relieve all back-pressure till the onward movement of the valve has opened



a sufficient area of the main exhaust-passage  $c^2$  to pass the necessary amount of steam, when the auxiliary passage closes; and it will be at once understood that this action is repeated at 5 each stroke, and in connection with each end of the cylinder alternately, and it will be noted that the reciprocating motion of the main valve carries the auxiliary one past its stationary actuating-pin, and its arm, sliding 10 freely in the guide, rocks the auxiliary valve in proper time to open and close the auxiliary exhaust-passages.

I do not desire to confine myself to the exact construction herein shown and described; 15 but the principle of my auxiliary valve and ports will not be departed from in any small changes of form which may be found necessary to adapt it to different engines.

Having thus fully described my invention, 20 what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a slide-valve formed with suitable main and auxiliary ex-

haust-passages and a rock-valve seated in said auxiliary passages, of an operating-arm 25 on this rock-valve, and a guide for said arm swiveled upon the steam-chest at a point past which the auxiliary valve is carried by the stroke of the main one, substantially as and for the purpose set forth. 30

2. The combination, with the main valve  $c'$ , formed with the cored passage  $c^2$ , the chambers  $d$ , and the passages  $d' e e'$ , of the rock-valve  $d^2$ , seated transversely in the main valve and formed with the passages  $d^3$ , the arm  $f$ , 35 sleeve or guide  $f'$ , and the stud  $f^2$ , on which it is swiveled, all constructed and arranged to operate substantially as and for the purpose set forth.

In testimony whereof I affix my signature in 40 presence of two witnesses.

THOMAS T. BROWN.

Witnesses:

W. C. MCARTHUR,  
CHAS. C. TILLMAN.