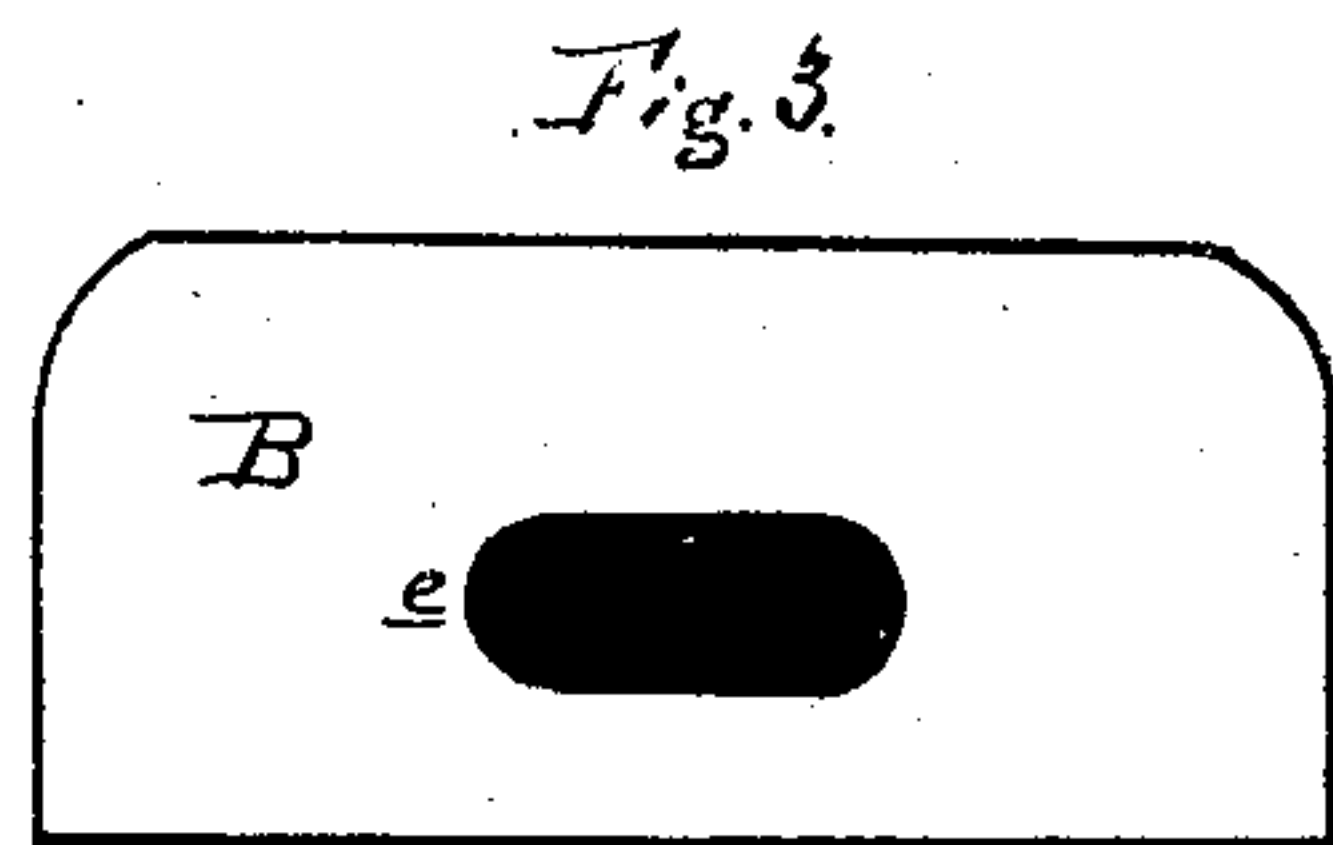
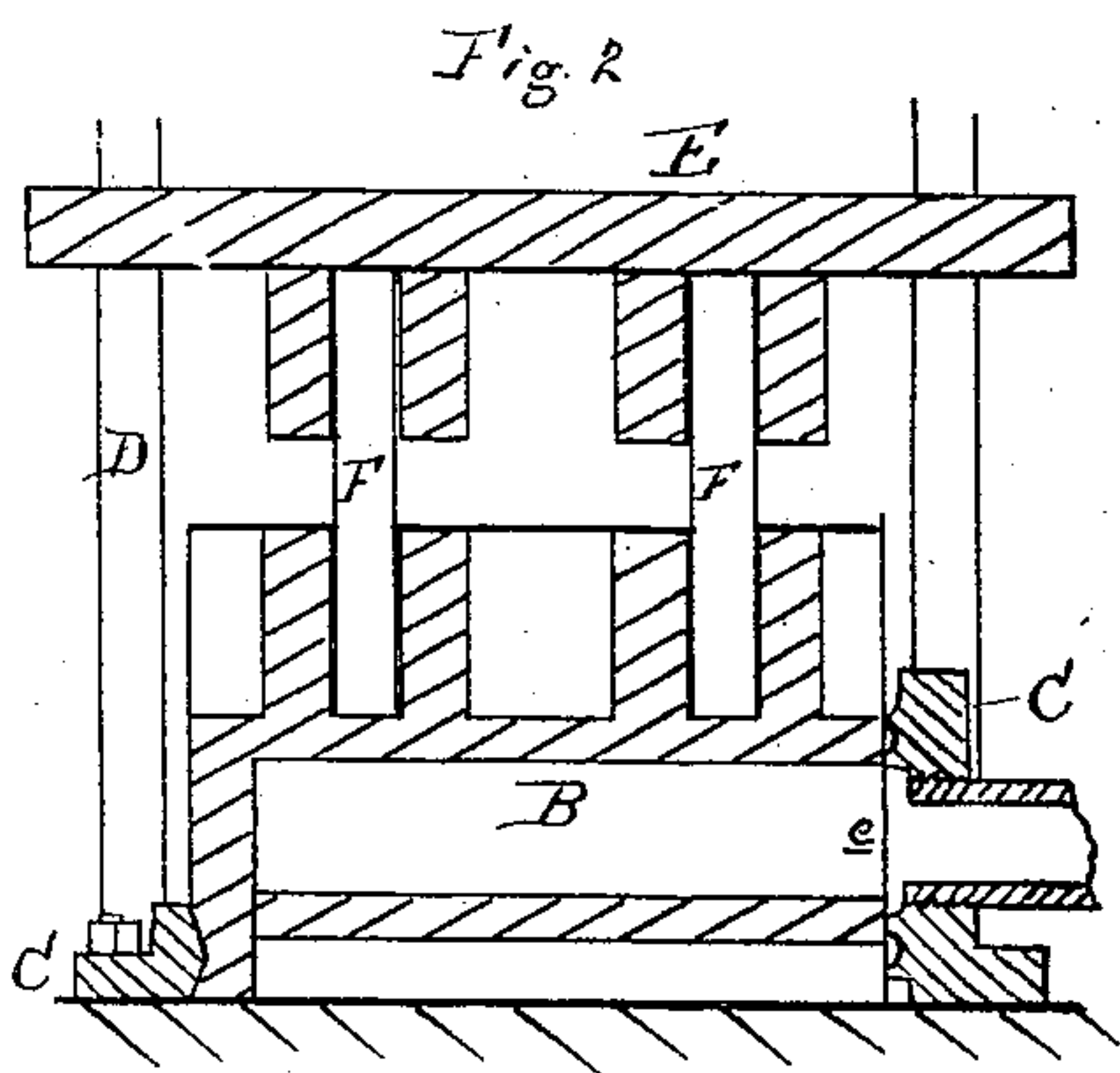
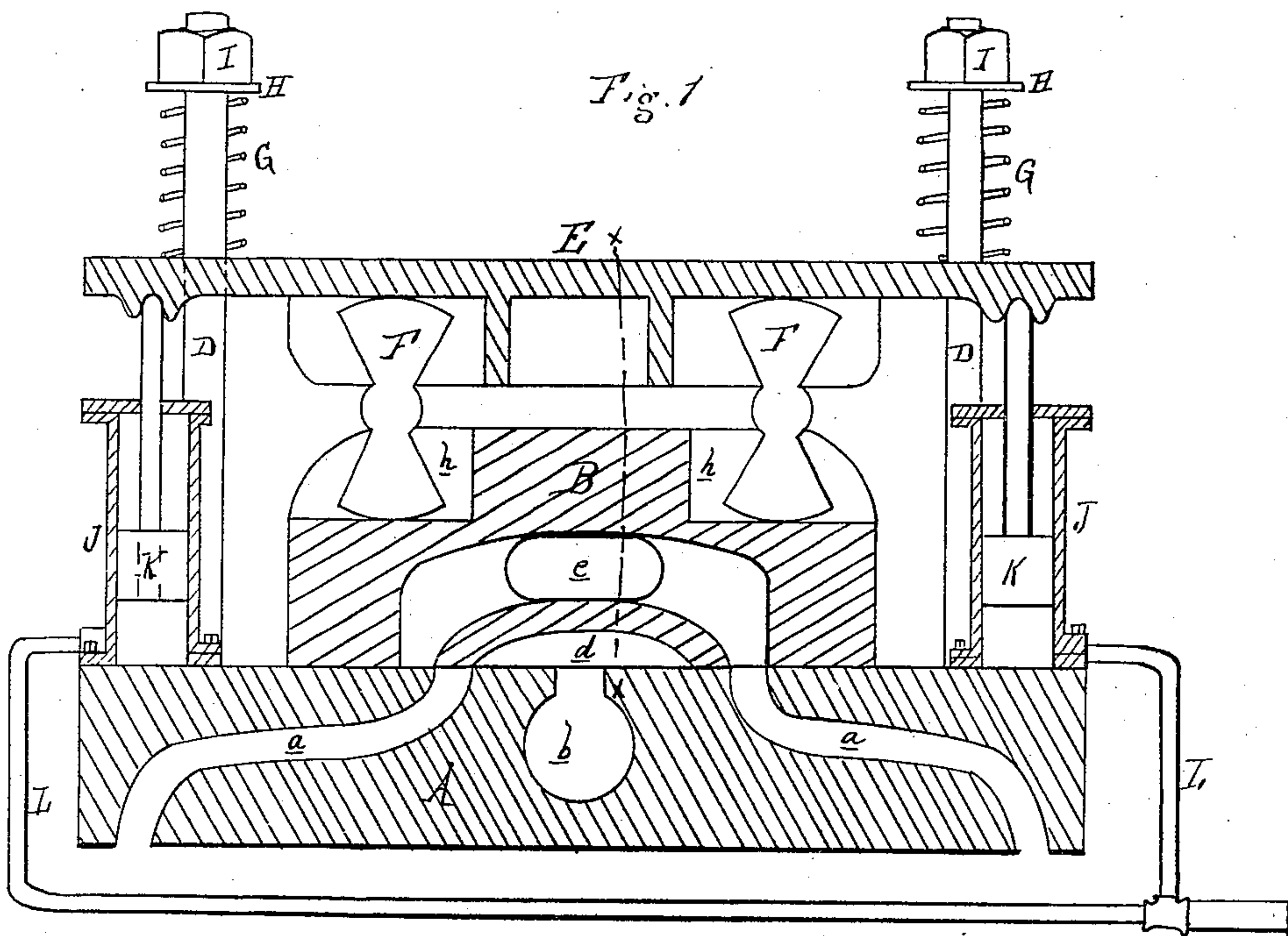


(No Model.)

L. P. NORMANDIN.
BALANCED SLIDE VALVE.

No. 267,450.

Patented Nov. 14, 1882.



Attest:
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UNITED STATES PATENT OFFICE.

LEVI P. NORMANDIN, OF JACKSON, MICHIGAN.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 267,450, dated November 14, 1882.

Application filed July 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, LEVI P. NORMANDIN, of Jackson, in the county of Jackson and State of Michigan, have invented new and useful Improvements in Balanced Slide-Valves; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

10 The nature of this invention relates to certain new and novel improvements in the construction of slide-valves of that class which are provided with a flat face or bearing-surface.

15 The object of the invention is to construct a slide-valve that shall be perfect in its operation, and which shall avoid the necessity of incasing the valves as they are ordinarily constructed.

20 The invention consists in the peculiar construction and arrangement of devices for retaining the slide-valve in its proper position upon its seat, and in the peculiar construction, arrangement, and various combinations of the parts, all as more fully hereinafter described.

25 Figure 1 is a central vertical longitudinal section through the valve-seat provided with my improved valve. Fig. 2 is a vertical cross-section on the line *xx* in Fig. 1. Fig. 3 is a side elevation of the valve.

30 In the accompanying drawings, which form a part of this specification, A represents the valve-seat, which is provided with the ports *a*, which lead to the cylinder, and with the exhaust *b*, as in the ordinary construction.

35 B represents my slide-valve, provided with the ports *c*, which, in the operation of the valve, coact with the ports *a* in conducting steam to the cylinder.

40 *d* represents the exhaust space or cellar in the face of the valve, and *e* the inlet-port in the side of the valve B, there being such a port *e* in each side of the valve to receive steam from a crotched steam-supply pipe where the work to be performed by the engine shall require it. These ports *e* are elongated in their opening, as shown in Fig. 3, and the ends of the steam-supply pipe are brought in close proximity to the sides of the valve, and are provided with any suitable packing which shall

produce a steam-tight joint at that point, but that will allow of the travel of the valve.

C represents guide-plates, which are rigidly secured to the valve-seat by proper bolts; or they may be formed as an integral part thereof. These guide-plates embrace the sides of the valve, and are for the purpose of holding such valve in its proper position in relation to the valve-seat, and through these guide-plates are carried the steam-supply pipes in order to give rigidity to the parts, the packing hereinbefore referred to being in this case upon the inner face of the guide-plates.

From or near each corner of the valve-seat there rise four standards or posts, D; and E is a plate in which are formed suitable holes, which come coincident with the posts in such a manner that the plate will slip over the posts or standards, and, besides performing the function hereinafter described, will serve as a girt or girts to prevent the spreading of the posts at their upper ends.

The upper face of the valve is recessed, as shown at *h*, to receive the lower ends of the truncated or mutilated rollers F, the upper ends of which are received in a similarly-recessed downward projection from the bottom or under side of the plate E, such recess being one of sufficient width to allow the rollers to freely oscillate.

80 G represents coil or other suitable springs placed around the upper ends of the posts D, the lower ends of such springs resting upon the top of the plate E, while their upper ends find resistance against the plates H, which are held in place by proper nuts, I, upon the ends of the standards. The action of these springs and their power is exerted upon the plate S, which compels such plate to force the mutilated rollers down upon the top of the valve and hold it to its relative position upon the valve-seat. The amount of pressure thus brought to bear upon the valve should be somewhat greater than that required to blow off steam at the boiler; and it can readily be seen that such pressure can easily be increased or diminished by screwing down or easing up the nuts I. While I have described and show a pair of these truncated rollers upon each side of the valve, I do not desire to confine myself

to such precise construction and number, as in smaller engines it may be preferable to use but one pair of such rollers and have them bear directly upon the longitudinal center of the valve.

At each end of the valve, and at a suitable distance therefrom, I secure to the valve-seat, or the so-called "steam-chest seat," a cylinder, J, provided with a piston, K, the stem of each of which projects through the head of its respective cylinder, and is received into a proper recess in the under face of the plate E, at or near the outer ends thereof. Each of these cylinders is provided with a supply-pipe, L, by means of which steam may be admitted to the cylinders, which will act upon the respective pistons and force the plate E upward against the force of the coil-springs hereinbefore described, thus relieving the pressure of such springs and the connections described upon the slide-valves, and avoiding the danger and liability of the cutting of the faces of the valve and valve-seat at such times that the supply of steam has been cut off from the engine and the engine still continues to run.

While I have described the valve as receiving steam from a crotched steam-pipe upon each side of the valve, it is obvious that one of these inlet-pipes may be omitted, and as a substitute therefor a suitable covering or cap and packing be employed in the guide-plate to cover up the opening through the plate and to prevent the flow of steam directly through the valve without exerting any force thereon.

I deem the oscillating mutilated rollers F important, as the bearing by this construction is equally divided between the plate E and the valves without rubbing or wearing either part, and I also attach importance to the cylinders J in their relation to the valve B, plate E, and springs.

What I claim as my invention is—

1. In combination with the valve-seat of a steam-engine, the valve B, having recesses *h*, the plate E, held by spring force in the direction of said valve, and the mutilated rollers F, constructed to give equal bearings upon said valve and plate, as set forth.

2. The guide-plates C, rigidly secured to the seat A, combined with the valve B, having recesses *h*, the mutilated roller F, plate E, and springs, as set forth.

3. In combination with a valve held to its seat by adjustable spring force applied to a plate, auxiliary steam-cylinders having independent steam-inlets, and pistons operating therein to overcome the spring force and relieve the valve of the pressure of the spring, as specified.

4. The auxiliary cylinders J, having pistons K and steam-pipes L, combined with the springs G, plate E, mutilated rolls F, and valve B, as and for the purposes set forth.

LEVI P. NORMANDIN.

Witnesses:

H. S. SPRAGUE,
E. SCULLY.