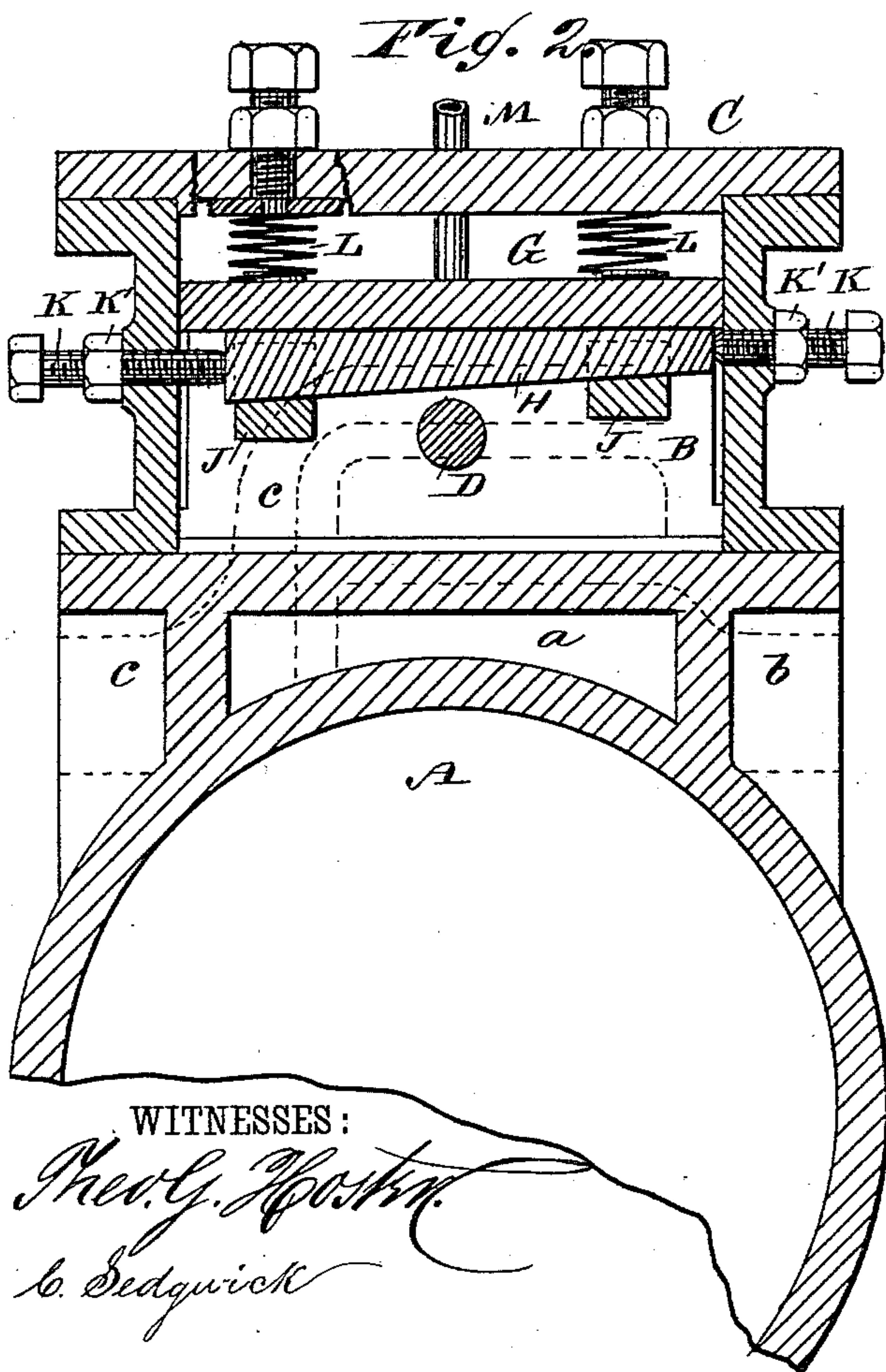
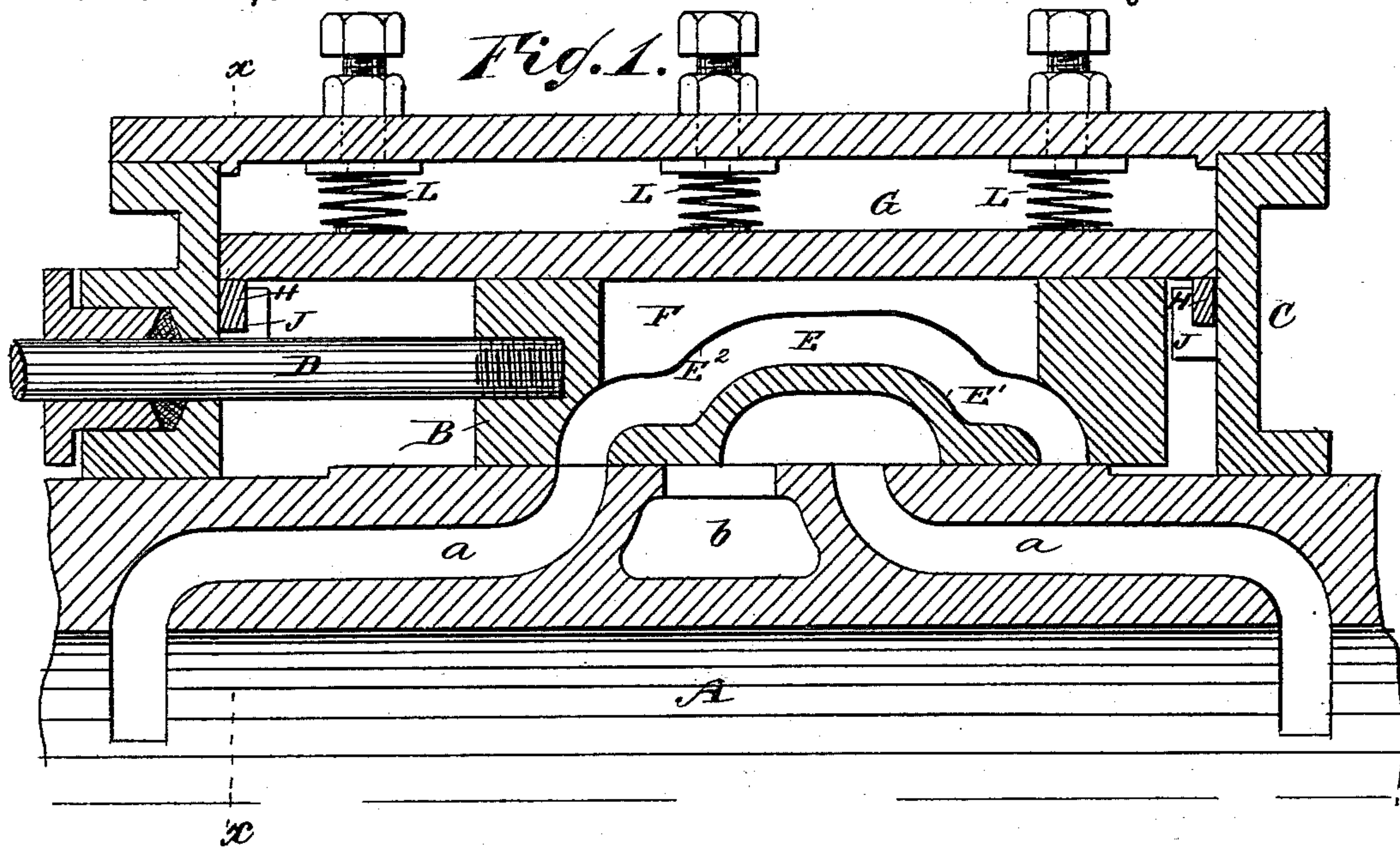


(No Model.)

J. MURPHY.
BALANCED SLIDE VALVE.

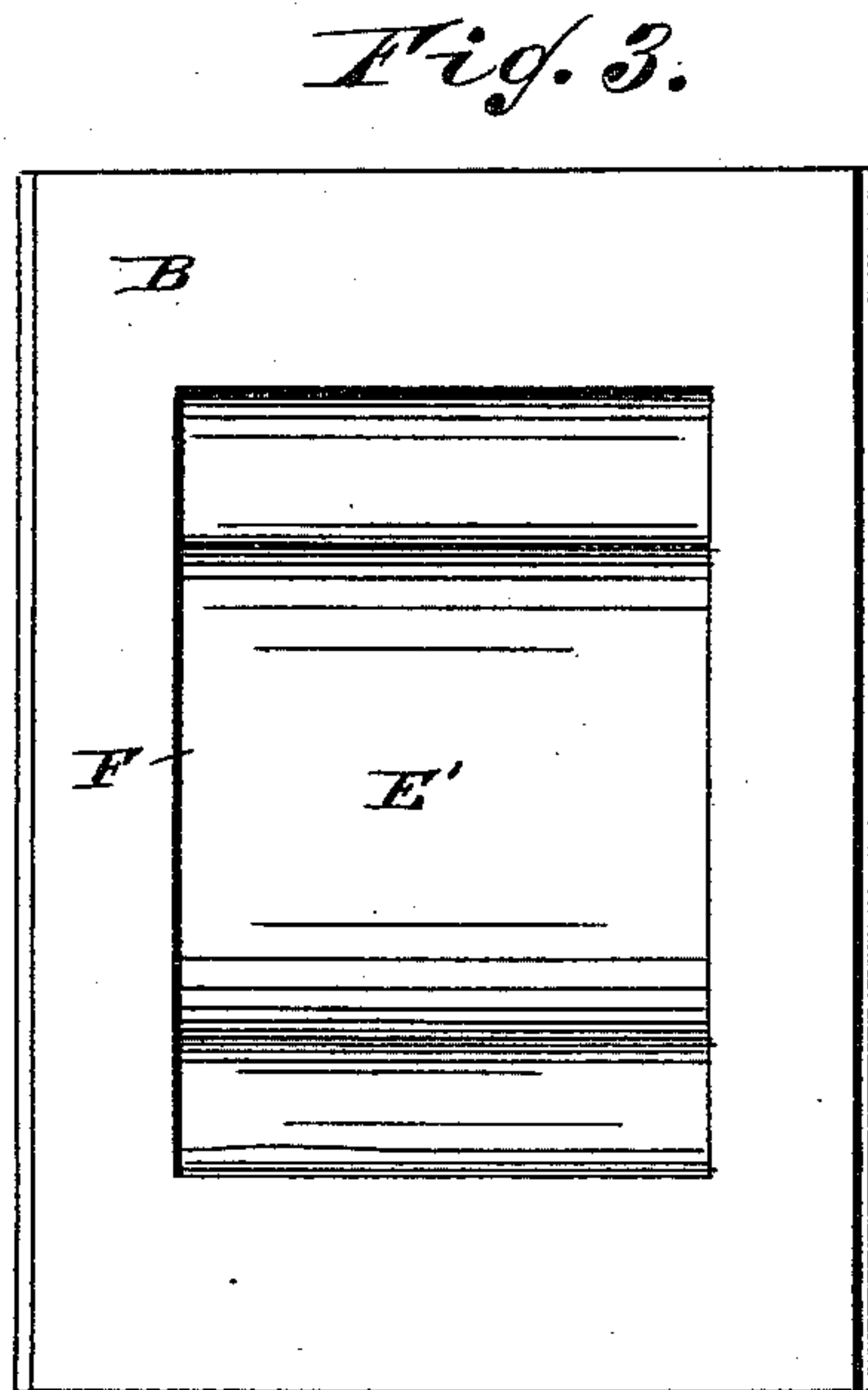
No. 277,328.

Patented May 8, 1883.



WITNESSES:

Thos. G. Hoston
C. Sedgwick



INVENTOR:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

JEREMIAH MURPHY, OF BROOKLYN, NEW YORK.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 277,328, dated May 8, 1883.

Application filed January 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH MURPHY, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Balanced Slide-Valve, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved slide-valve, which is balanced perfectly by the steam passing through the same, thereby relieving the valve of undue friction, and requiring less power for operating the valve.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional elevation of the upper part of a cylinder and of a steam-chest containing my improved balanced slide-valve. Fig. 2 is a cross sectional elevation of the same on the line *x x*, Fig. 1. Fig. 3 is a plan view of the slide-valve.

The cylinder A is provided in its top with the alternate inlet and outlet channels *a a*, with the exhaust-channel *b*, and the steam-inlet channel *c*.

On the top of the cylinder the slide-valve B slides, which valve is contained in the steam-chest C, and is attached to the rod D for operating it, which rod passes through one end wall of the chest, and is packed in the usual manner.

The slide-valve B is provided with a chamber, E, into which the steam is conducted through the channel *c*, as shown in dotted lines in Fig. 2, which chamber E is adapted to conduct the steam to the channels *a a*. The lower surface, *E'*, of the chamber E is smaller than the upper surface or roof, *E²*, and thus the steam would exert a greater upward than downward pressure in the valve, according to the proportion of the lower surface, *E'*, to the upper surface, *E²*, if I had not made provisions to avoid such unequal pressure, as the said unequal pressure would cause great friction of the valve on the top plate of the chest, leakage of steam, wearing off of the valve, and would cause an undue amount of power to be required to operate the valve. To avoid such unequal pressure of the steam on the valve, it is necessary to make the upper surface or roof, *E²*, of the

chamber E exactly equal in area to the bottom surface, *E'*, of the chamber, which I accomplish by making an opening, F, in the roof of the chamber E equal in area to the difference in surface of the bottom *E'*, and top or roof *E²* of the chamber E; or, in other words, the surface of the top or roof *E²* of the chamber E, minus the area of the opening F, must be equal to the bottom surface, *E'*, of the chamber E. The pressure of the steam on the upper and lower surfaces of the chamber E will then be equal and the valve will be balanced. As the steam could escape through the opening F, I place a top plate, G, fitting closely in the chest C on the valve B, which plate must be so adjusted that it fits closely on the top of the valve to prevent the escape of steam, and yet does not fit so closely as to cause undue friction between the under surface of the said plate and the top of the valve. To this end the plate G rests upon transverse wedges H, held in hooks or brackets J, projecting from the inner surface of the ends of the chest, which wedges H are held in the proper position and are adjusted in position by means of screws K, having lock-nuts K', and passing through threaded apertures in the sides of the chest and having their inner ends resting against the ends of the wedges. By moving the wedges in the direction of their length toward one side or the other of the chest the upper edges of the wedges, which upper edges support the plate G, can be raised or lowered more or less until the plate G is in the proper position in relation to the top of the valve.

Strong spiral springs L are held between the top of the plate G and the under side of the top of the steam-chest, and press the plate G down on the upper edges of the wedges. If a sudden increased pressure of steam caused by priming, &c., raises the plate G, the springs L force it down again.

A tube, M, for introducing lubricating material extends through the top of the chest and the plate G.

The above-described balanced slide-valve is very simple in construction, strong and durable, and is not apt to get out of order. By means of the wedges H and the screws K the plate G can easily be adjusted in position very nicely from the outside of the chest and

without removing any parts. If desired, plate G can be supported by screws passing up through lugs on the inner surfaces of the ends of the steam-chest.

5 I am aware that slide-valves have been made heretofore with openings in the roof of the chamber in the valve; but in all cases the said openings served for the inlet or outlet for steam, and did not serve for the purpose for
10 which I provide the opening.

It is evident that, without departing from my invention, in place of the single opening in the top of the valve, several openings may be provided, the sum of the areas of which is
15 equal to the difference in area between the upper and lower surfaces of the chamber. No steam is to pass into the upper part of the steam-chest, except when the plate on the valve is raised by a sudden commotion with
20 undue pressure—for instance, as in priming, &c. The springs L therefore merely act as safeguards when the steam is let on and brings the cylinder and valve to their natural working-temperature, causing them to expand more
25 or less. The wedges and screws permit of a most perfect adjustment of the several parts.

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

30 1. A slide-valve constructed with a chamber having in its roof an opening equal in area to the difference in area between the top and bottom of the chamber, combined with a plate held in the steam-chest over the top of the
35 valve, and with transverse wedges held on the inner surfaces of the ends of the chest, which

wedges support the said plate, substantially as herein shown and described, and for the purpose set forth.

2. The combination, with the steam-chest C, 40 of the slide-valve B, provided with a chamber, E, having an opening, F, equal in area to the difference between the area of the upper and lower surfaces of the chamber E, of the plate G, the wedges H, held on hooks J on the inner 45 surfaces of the ends of the chest, and the adjusting-screws K, substantially as herein shown and described, and for the purpose set forth.

3. The combination, with the steam-chest C, 50 of the slide-valve B, provided with a chamber, E, having an opening, F, equal in area to the difference between the areas of the upper and lower surfaces of the chamber E, of the plate G, wedges H, held on the inner surfaces of the ends of the chest, and of the springs L, inter- 55 posed between the plate G and the top of the steam-chest, substantially as herein shown and described, and for the purpose set forth.

4. The combination, with a slide-valve provided with a chamber having in its top an 60 opening equal in area to the difference in area between the top and bottom surfaces of the chamber, of a plate held in the steam-chest over the valve, and of devices for supporting the ends of the said plate, substantially as 65 herein shown and described, and for the purpose set forth.

JEREMIAH MURPHY.

Witnesses:

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C. SEDGWICK.