

(No Model.)

E. J. ARMSTRONG.
BALANCED SLIDE VALVE.

No. 377,221.

Patented Jan. 31, 1888.

Fig. 1.

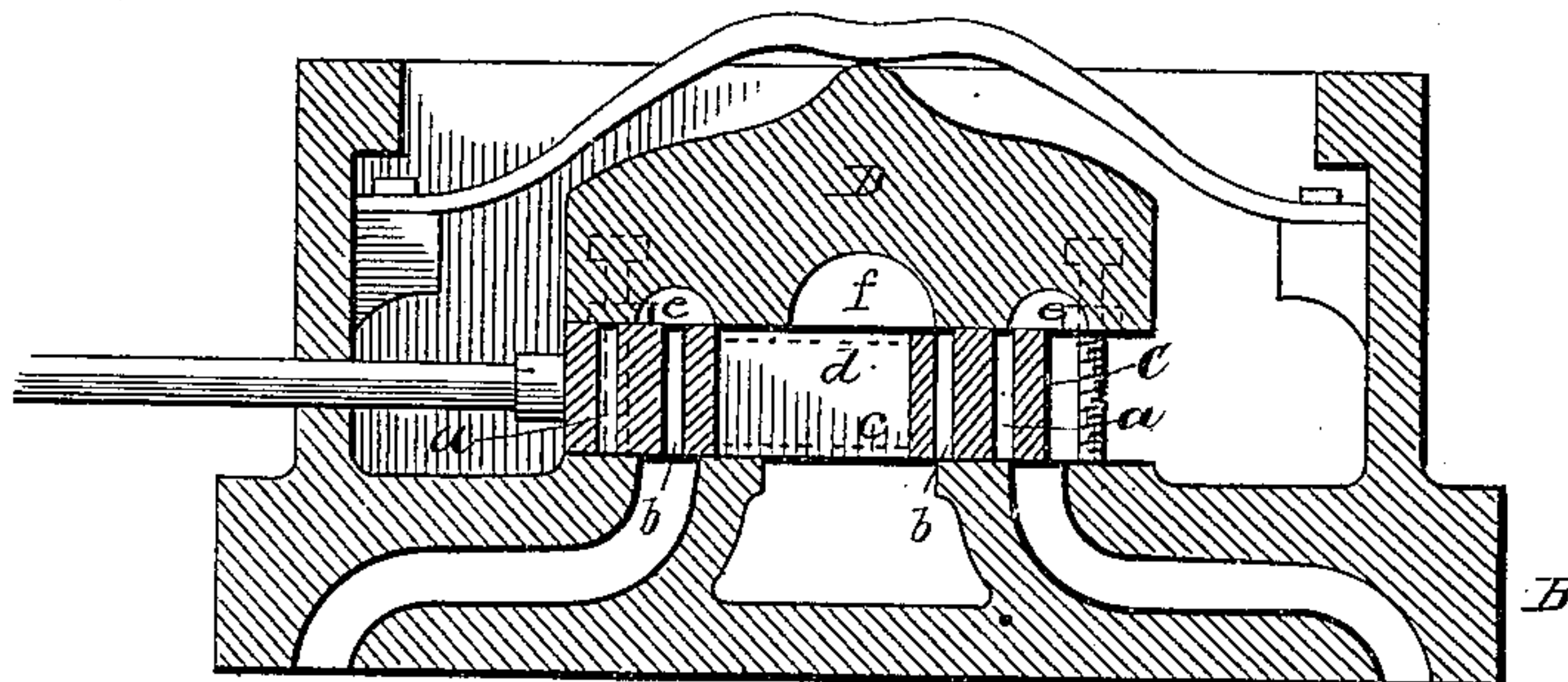


Fig. 2.

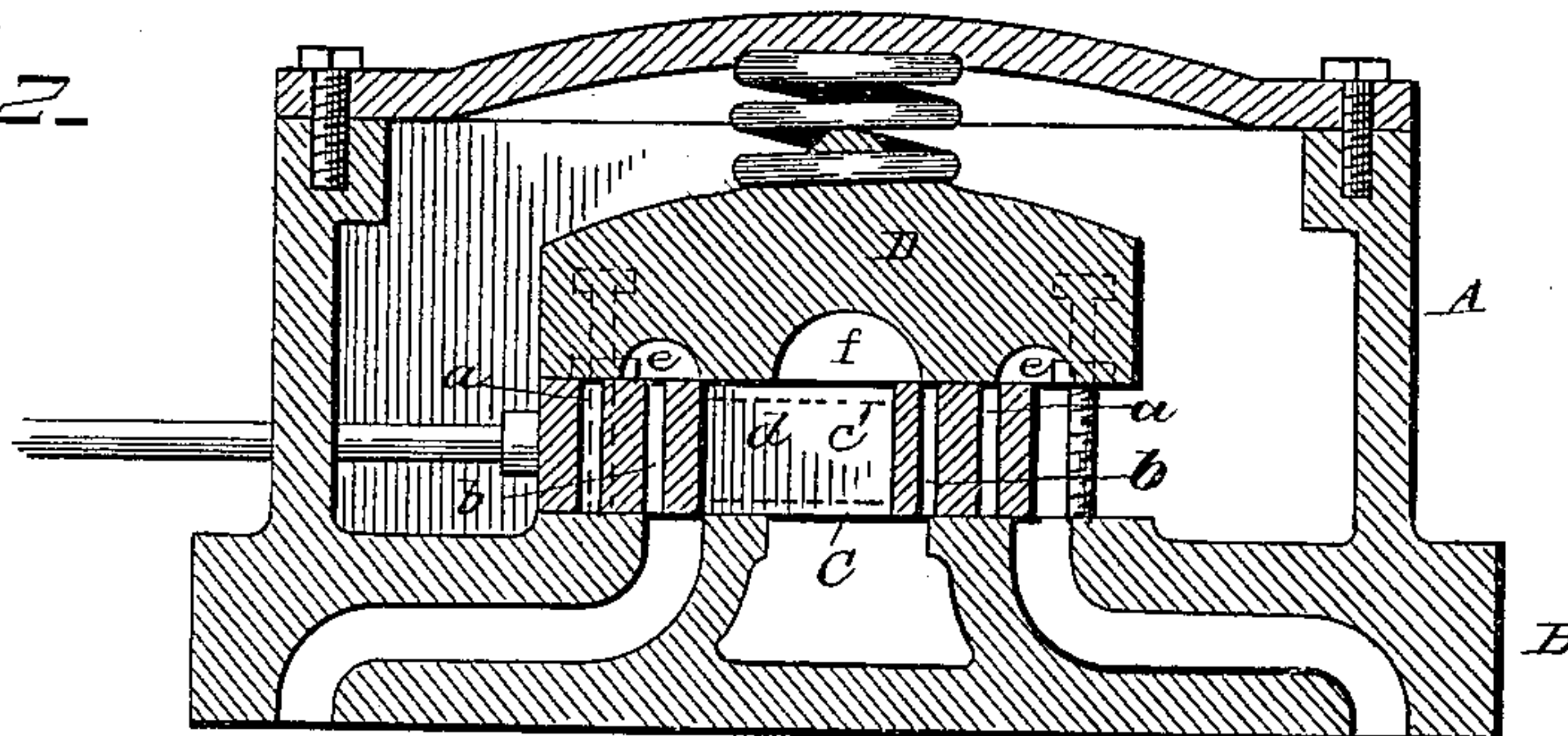


Fig. 3.

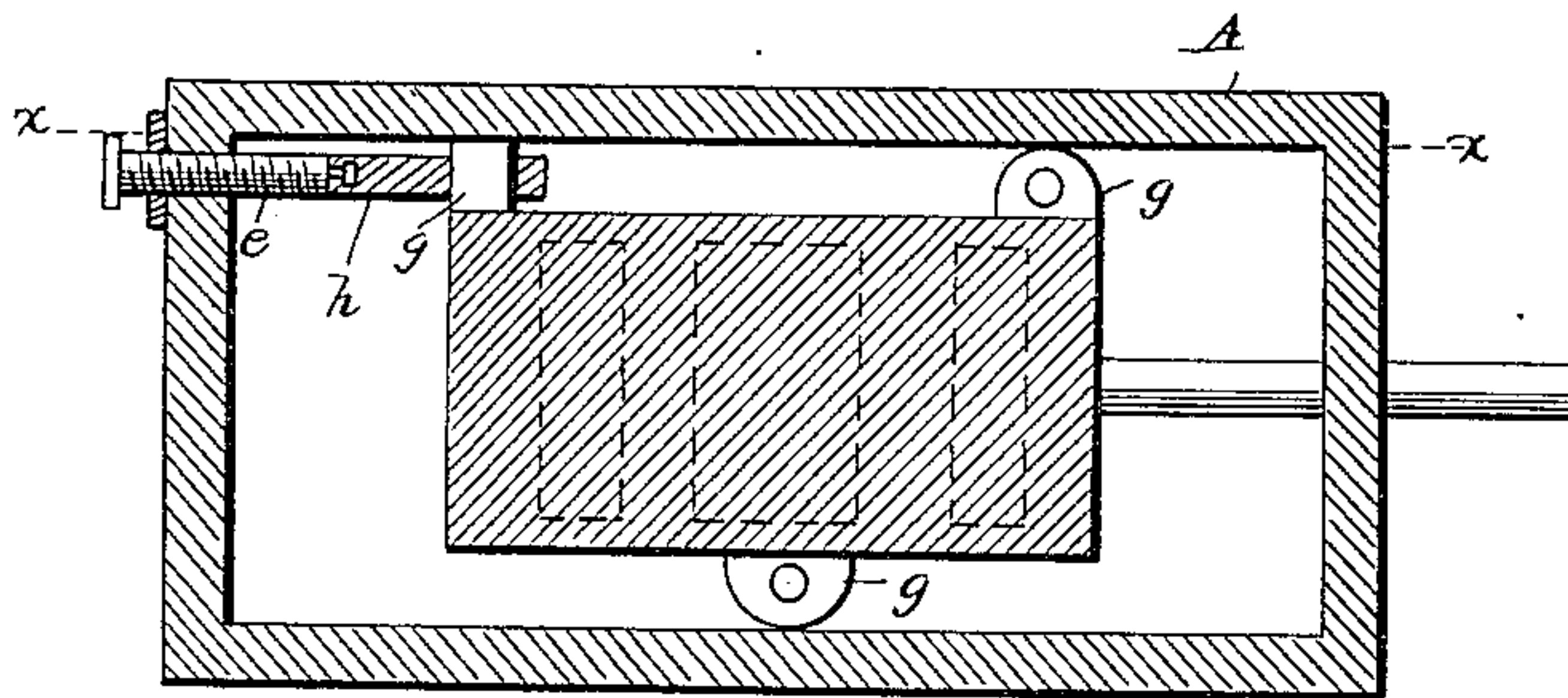
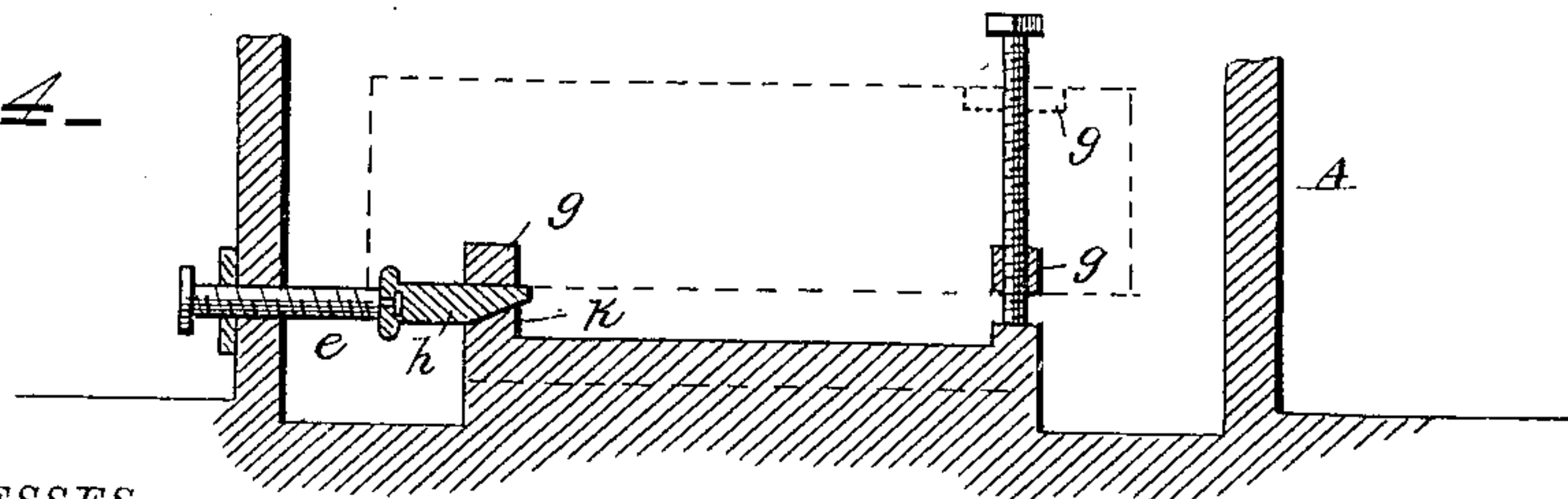


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 377,221, dated January 31, 1888.

Application filed April 30, 1887. Serial No. 236,686. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. ARMSTRONG, a citizen of the United States, residing at Painted Post, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Balanced Slide-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of valves known as "balanced slide-valves," which work between a pressure-plate and the valve-seat of the cylinder, and in which the steam is admitted to the center of the valve and exhausted at its ends into the steam-chest. It has been usual heretofore to obtain the pressure necessary to hold the plate in its proper position by means of flexible diaphragms or other devices, whereby steam-pressure is brought to bear on a larger area on the back of the plate than it is exposed to upon its face. All of the devices for this purpose with which I am familiar are complicated to a greater or less degree, and are open to numerous objections—such, for instance, as their liability to hold the water of condensation, which cannot be drawn or let off, and is therefore liable to freeze in cold weather, numerous steam-joints to make and keep tight, as well as the expense attending the construction of such devices.

Now the object of my invention is to provide simple, durable, and effective mechanical means for obtaining the necessary pressure on the pressure-plate without the use of steam, and at the same time provide for the escape of an abnormal steam-pressure which may be brought on the face of the plate, and do away entirely with the steam-joints and packing heretofore used. I accomplish this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section through a steam chest and valve embodying my invention; Fig. 2, a like view showing a modification; Fig. 3, a plan view, in section, showing means for adjusting the plate; and Fig. 4, a longitudinal section on the line $x x$, Fig. 3.

Similar letters refer to similar parts throughout the several views.

A represents a steam-chest of any ordinary construction, excepting that it is not provided with a cover, nor does the successful carrying out of my invention require a cover, although one is preferably used.

B is a steam-cylinder, having the usual valve-seat and induction and eduction ports; and C, a valve, in this instance provided with four narrow ports, $a b$, the inner ones of which, b , are connected by a cored opening, c , formed in the edges of the valve, as indicated in dotted lines in Figs. 1 and 2. It is also provided with a large central opening, d .

D is a pressure-plate, having two small cavities, e , in its face near its ends, and one central larger cavity, f . As shown in Figs. 3 and 4, this plate is provided with lugs g , projecting laterally therefrom. The lugs shown in the left-hand side of these figures are supported on wedges h , having adjusting screws i , passing through the steam-chest wall and working in recesses formed in the ends of the wedges, whereby the wedges, which rest on inclined projections k , formed on the steam-chest at one side, may be adjusted in or out, to increase or decrease the distance between the plate and the valve. On the right-hand side of these figures I show the lugs as screw-threaded and screw-threaded rods working vertically through the same, the ends of said rods having their bearings on plain or flat surfaced projections, whereby the plate may be adjusted.

In Fig. 1 I show a flat bow-shaped spring, H, having its ends rigidly attached to the inner end walls of the steam-chest and sprung across or having its bearing centrally on the top or back of the plate D. This spring should be so tempered or its strength so calculated that it will exert a force on the pressure-plate adapted to hold it down against any normal pressure of steam which may be brought against its face, but which may give or permit the plate to recede from any abnormal steam-pressure, and thus permit the escape of the steam until the normal pressure is again resumed, so as to prevent breakage of the parts.

It is evident that the style or shape of the

spring is immaterial in producing the result named, so that it is properly adjusted to the normal strain which may be brought on it, and I therefore do not desire to be limited to any particular form of spring. The spring H (shown in Fig. 2) is of spiral form and rests on the center of the plate at one end, and bears against a bar or the steam-cover at the other, and is adapted to perform the same function as the first-named spring.

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

A balanced slide-valve of the hereinbefore-described class, consisting of a steam-chest provided with flat-surfaced projections, a

valve, a pressure-plate having screw threaded perforated lugs projecting laterally therefrom, screw-threaded rods or bolts passing vertically through said lugs, and a spring secured within the steam-chest and adapted to exert its strength to hold the pressure-plate down against any normal steam-pressure and permit it to recede from abnormal pressure, as set forth.

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

EDWIN J. ARMSTRONG.

Witnesses:

PHILIP MAURO,
C. J. HEDRICK.