

(No Model.)

R. WALTON.
BALANCED SLIDE VALVE.

No. 351,547.

Patented Oct. 26, 1886.

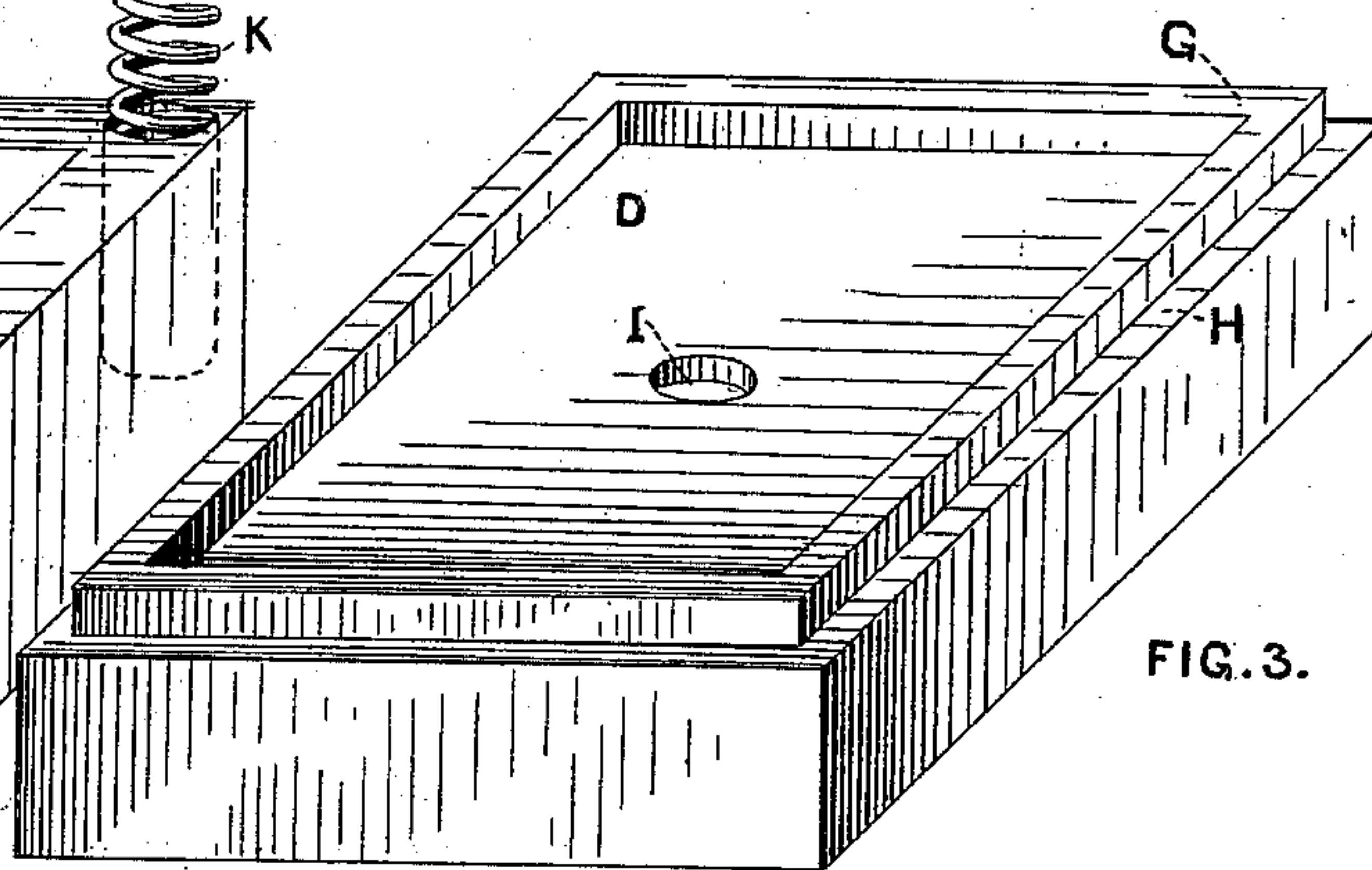
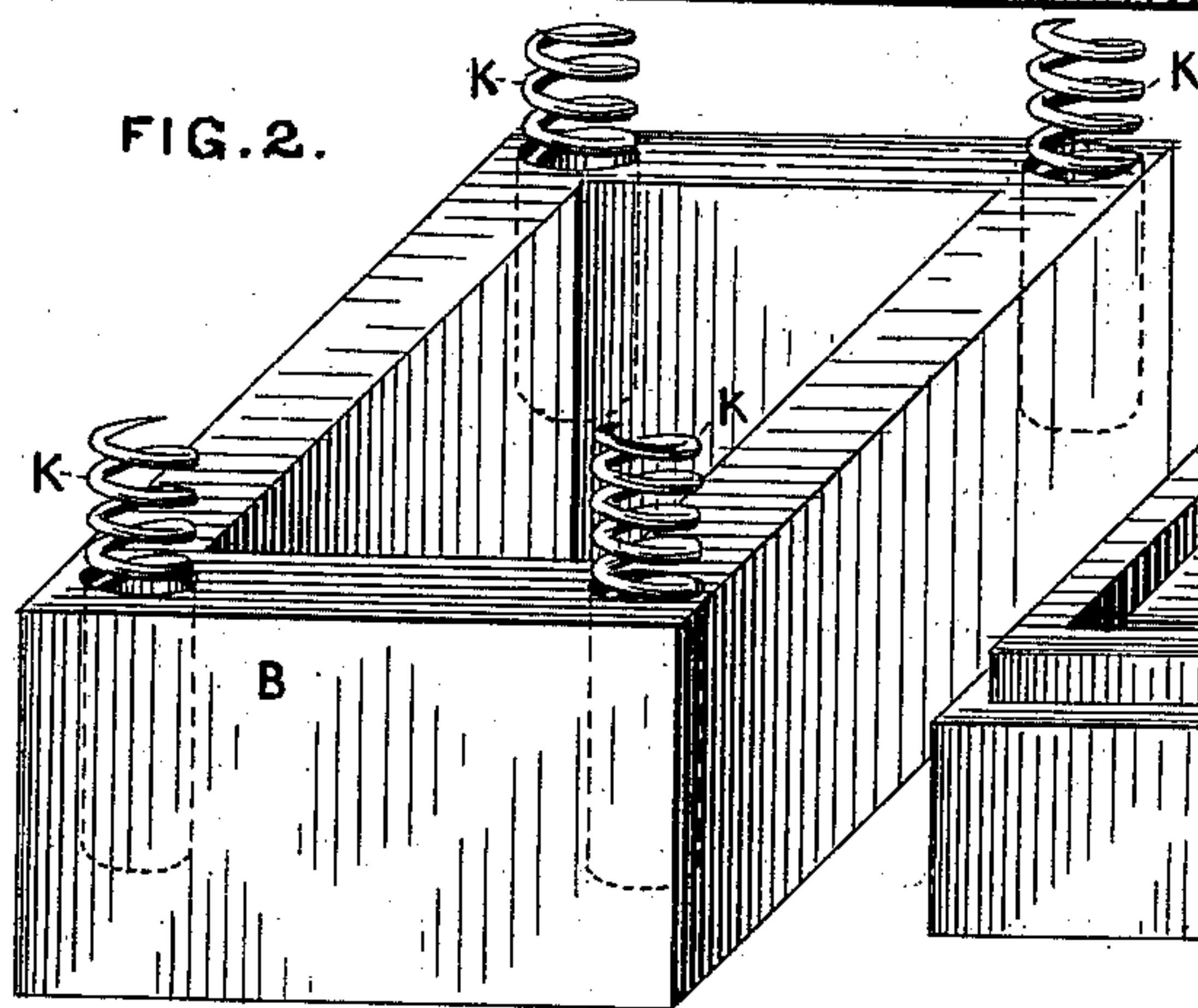
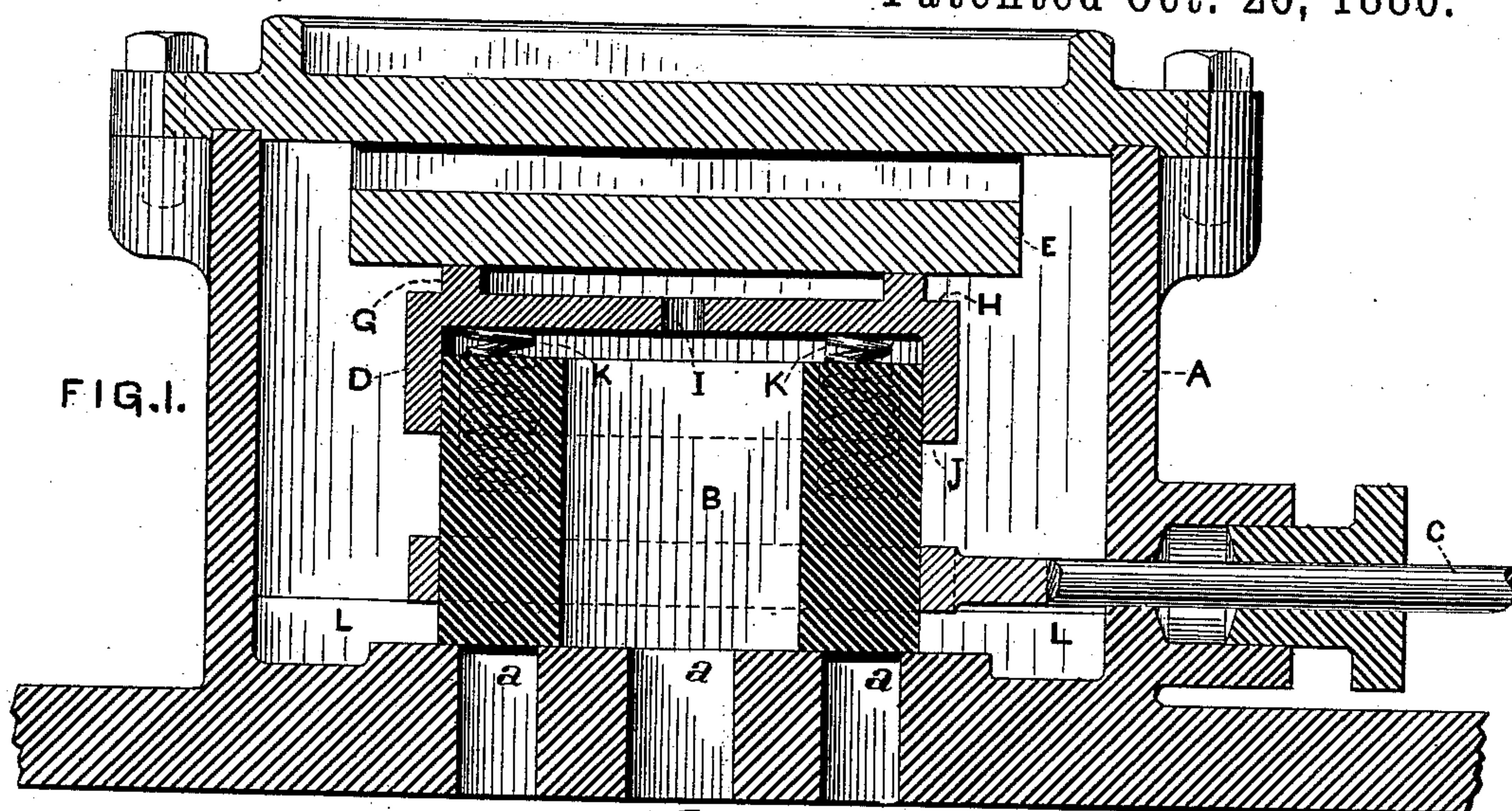
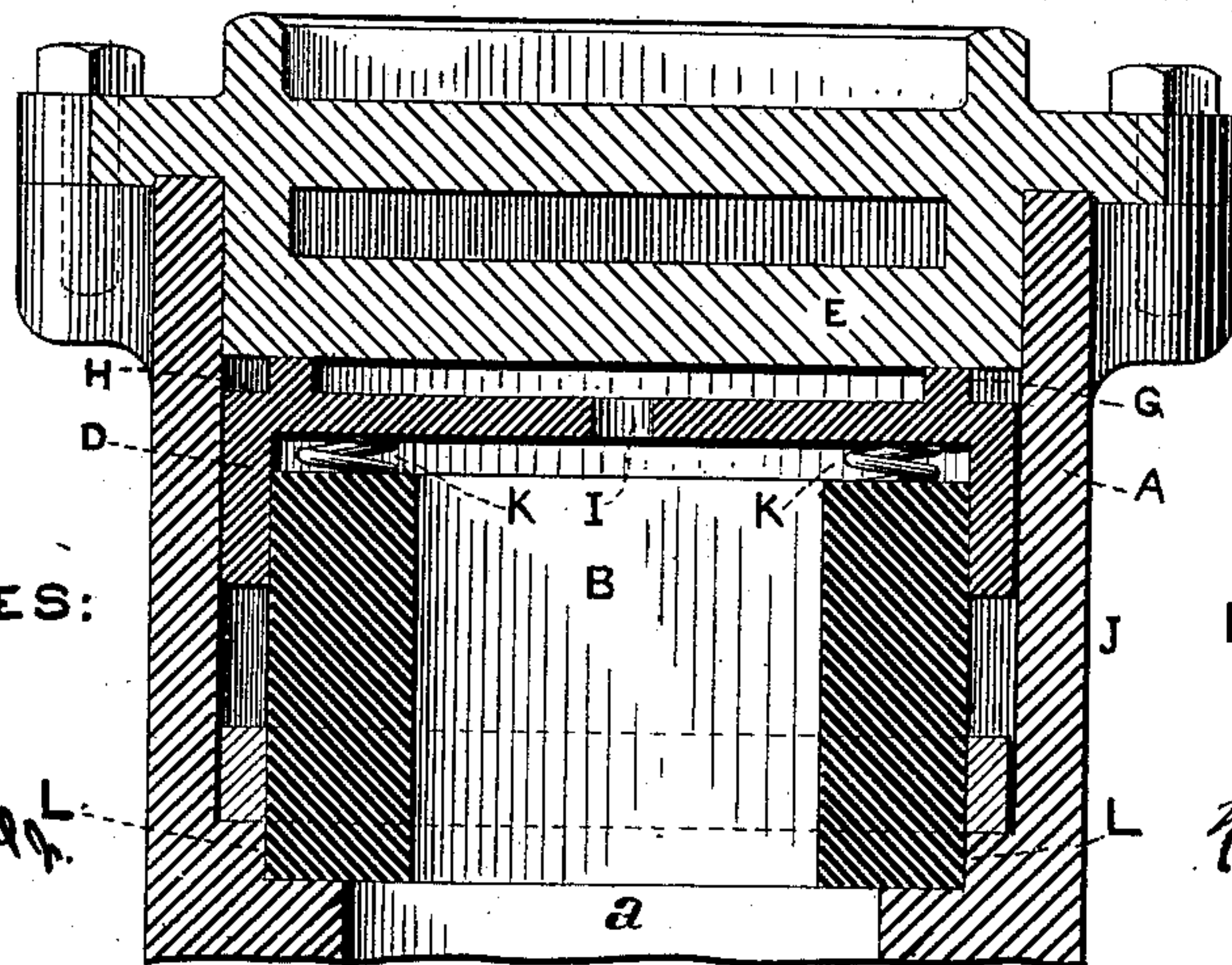


FIG. 4.



WITNESSES:

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RICHARD WALTON, OF ALTOONA, ASSIGNOR OF ONE-HALF TO HENRY REED,
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BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 351,547, dated October 26, 1886.

Application filed November 20, 1885. Serial No. 183,404. (No model.)

To all whom it may concern:

Be it known that I, RICHARD WALTON, of Altoona, in the State of Pennsylvania, have invented certain new and useful Improvements in Balanced Slide-Valves, whereof the following is a specification, reference being had to the accompanying drawings.

The object of my invention is to relieve the valve from steam-pressure without unnecessarily complicating its construction; and to that end I combine the valve with a cap which fits snugly around or within it, so as to form a pair of telescoping members, one of which envelops substantially the whole area of the other, said members being in contact at top and bottom with the bearing-surfaces of the steam-chest, and I provide upon the outer or enveloping member a counter-surface exposed to the steam-pressure in a direction opposite to the pressure upon the inclosing-rim of said member, said counter-surface being substantially commensurate with the area of said inclosing-rim.

In the accompanying drawings, which show a preferred form of the device, Figure 1 represents a vertical longitudinal section through the center of a valve-chest and valve. Fig. 2 is a view of the valve with the cap removed therefrom. Fig. 3 is a view of said cap, and Fig. 4 is a transverse vertical section through the center of the valve.

A represents the valve-chest, having ports *a*, constructed in the usual manner.

B is the slide-valve, actuated by means of the rod C, which may be attached thereto by any suitable device. I prefer to construct said valve, as shown in the sectional view of Fig. 4, of the same width at top and bottom, and to form guides L L upon the bottom of the steam-chest, between which it shall move, although, if desired, the valve may be constructed with a projecting flange along its sides, so as to be guided directly by the sides of the steam-chest in the well-known manner.

The valve should be carefully constructed with its sides and ends perpendicular and true, so that when the cap D is placed thereon a practically steam-tight joint shall exist between the inside of the cap and the outside surface of the valve, while at the same time the cap may move freely in a vertical direction.

The cap D envelops and overhangs the sides of

the valve, as shown, and its sides, which may be of any desired thickness, extend downward to a distance sufficient to give it a firm seat. When in place, said cap is supported upon the springs K, which I prefer to arrange, as shown in Fig. 2, at the four corners of the valve. These springs should be of sufficient tension to always insure the retaining of the parts in position.

The top of the cap D is provided with a raised flange, G, whose exterior periphery substantially corresponds with the periphery of the valve A, so as to leave on top of the cap and around the outside of said flange G an exposed rim or counter-surface, H, whose width is substantially the same as the thickness of the overhanging sides and ends of the cap, as indicated in Fig. 1 at J. I prefer to construct the top of the cap in this manner, although the same result may be obtained by making that portion of the top which is within the line indicated by the outer periphery of the flange G solid, or by exposing some other portion of the top of the cap; but to effect the purpose with a minimum of friction I deem the method shown the best for carrying out my invention.

Above the valve I arrange a "balance-plate," E, which depends downwardly from the top of the valve-chest and has its under surface carefully trued, so that there shall be a steam-tight joint between it and the upper surface of the flange G. If desired, however, the balance-plate may be dispensed with, and the cap allowed to bear directly against the top of the valve-chest. The cap is provided with a central opening, I, through which any steam which may have leaked in on top shall discharge itself through the exhaust-port.

As heretofore constructed, caps for the relief of slide-valves from pressure have usually been made to so overhang that a very considerable bearing-surface was afforded for the steam to press up against, and thus, while the valve proper was relieved of pressure, the cap exerted upon the balance-plate an upward pressure which was proportionate to the exposed area of the overhang. In other cases detachable packing-strips situated in grooves on top of the valve have been used; but as the steam entered beneath these strips it pressed them upward and the valve downward with a force corre-

sponding to the area of the bottom of the strips and grooves. Telescoping rings have also been used in connection with rectangular valves; but in such devices the protection of the ring 5 has only extended to a portion of the valve-surface, and, while parts of the ring itself were balanced, the essential idea of covering substantially all the top surface of the valve by a complete envelope and of balancing the neces- 10 sarily-exposed surface of the enveloping member is not found. When the large dimensions of a locomotive-valve, for instance, and the high pressure used in connection therewith are considered, it will readily be seen that by 15 these former modes of construction a very imperfect relief was obtained.

By reference to the description of my improved cap it is obvious that the area of the overhanging portion (which is represented by 20 J) can be exactly compensated by the area H on top of the cap and external to the flange G, so that the steam-pressure upon the cap itself can be perfectly balanced, and the only friction be that due to the tension of the springs 25 K, which press the valve and cap apart. If desired, a very slight excess of pressure can be permitted upon the bottom of the overhanging edge, so as to relieve the springs K.

I contemplate in some cases the use of a 30 packing between the outside of the valve B

and the inside of the cap D, but have not deemed it necessary to show said packing, as it is not essential to my invention.

It is obvious that, instead of making the cap overhang the valve, as above described, the 35 valve may be constructed so as to receive and surround the cap, as if the device just described were turned upside down; and hence, while I do not deem such mode of construction the best adapted for use, I do not restrict my- 40 self to the arrangement shown in the drawings.

I do not claim, broadly, the use of a cap and balance-plate, nor the use of rings which are not adapted to protect substantially the whole 45 area of the valve; but

I claim—

The combination of a slide-valve and a telescoping cap, one of which envelops substantially the entire area of the other, the outer or 50 enveloping member being provided with an exposed counter surface commensurate with the area of its inclosing rim, and both members being protected throughout the remainder of their respective top and bottom areas by con- 55 tact with bearing-surfaces, substantially as and for the purposes specified.

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Witnesses:

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