

(No Model.)

F. C. CLEAVER.

SLIDE VALVE.

No. 397,170.

Patented Feb. 5, 1889.

Fig. 1.

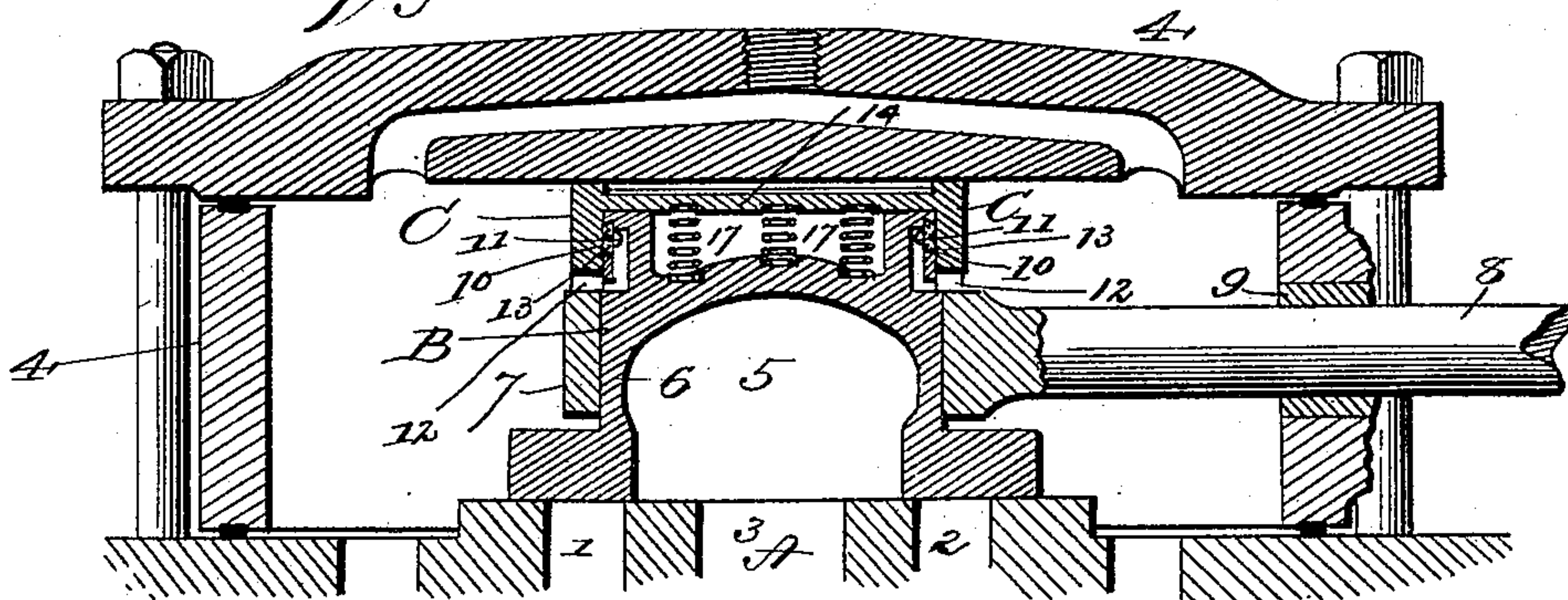


Fig. 2.

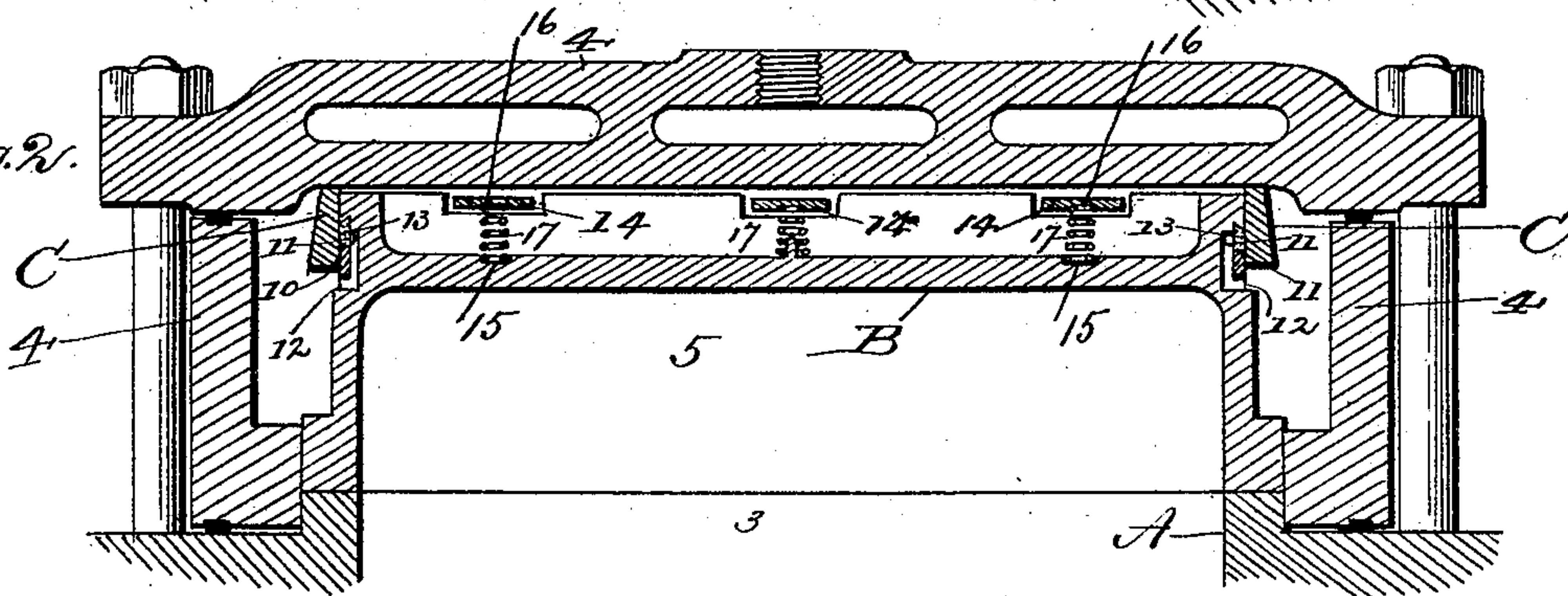


Fig. 3.

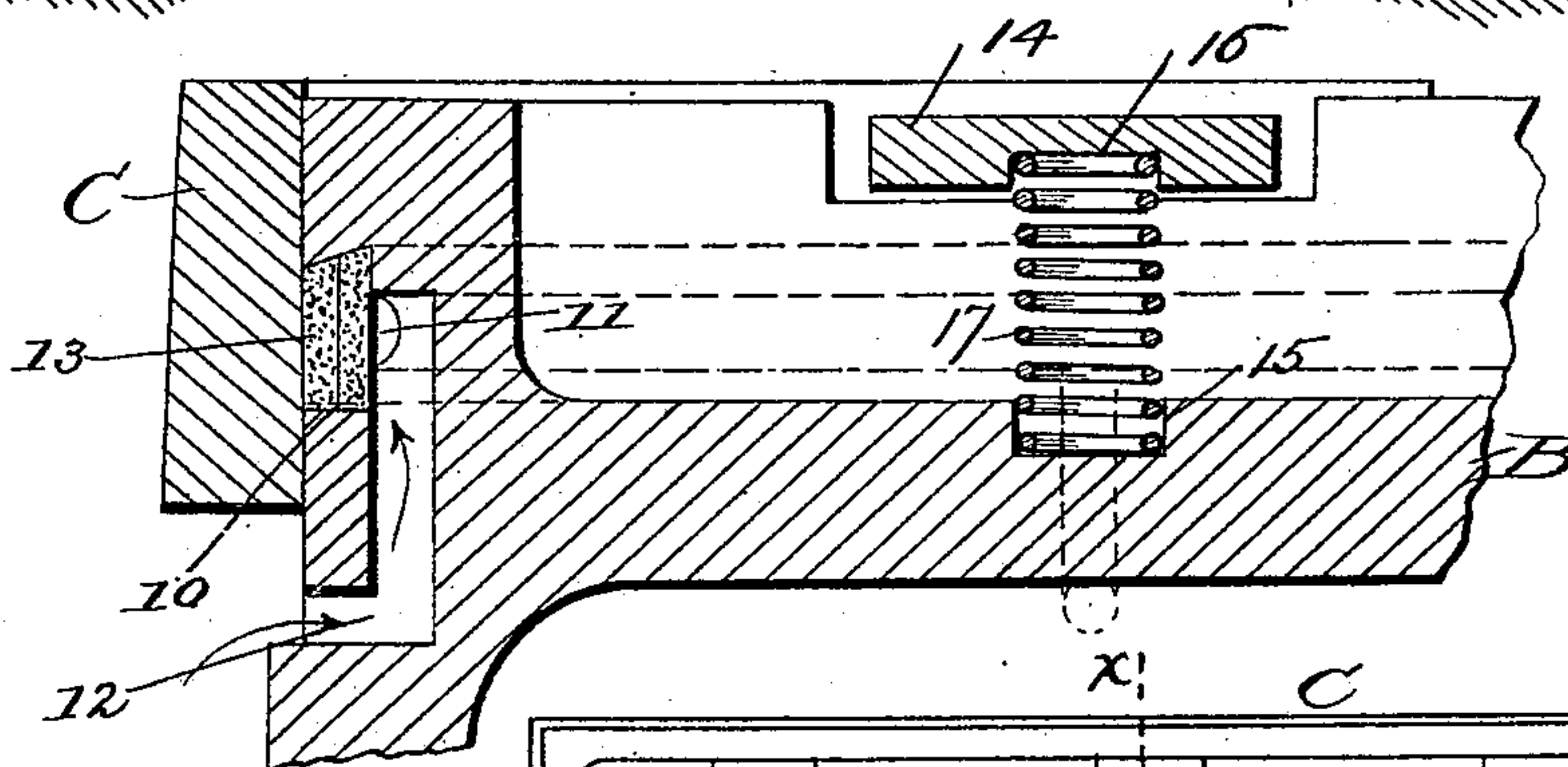


Fig. 4.

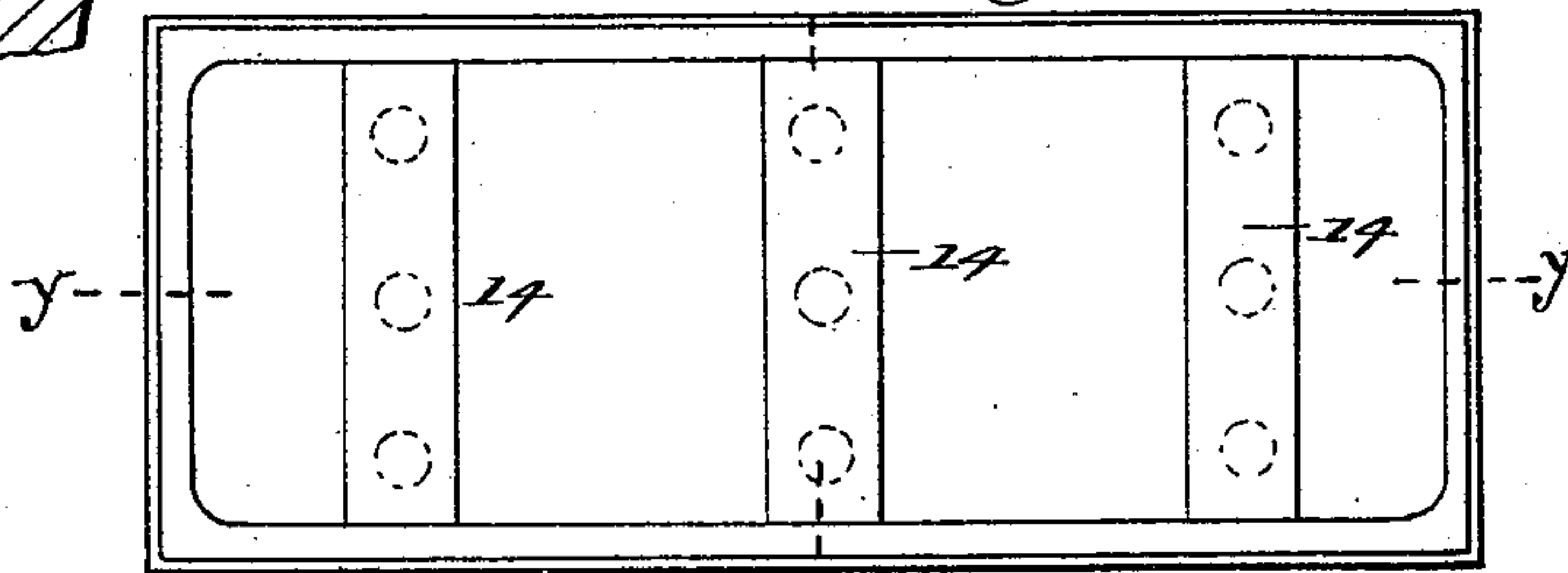
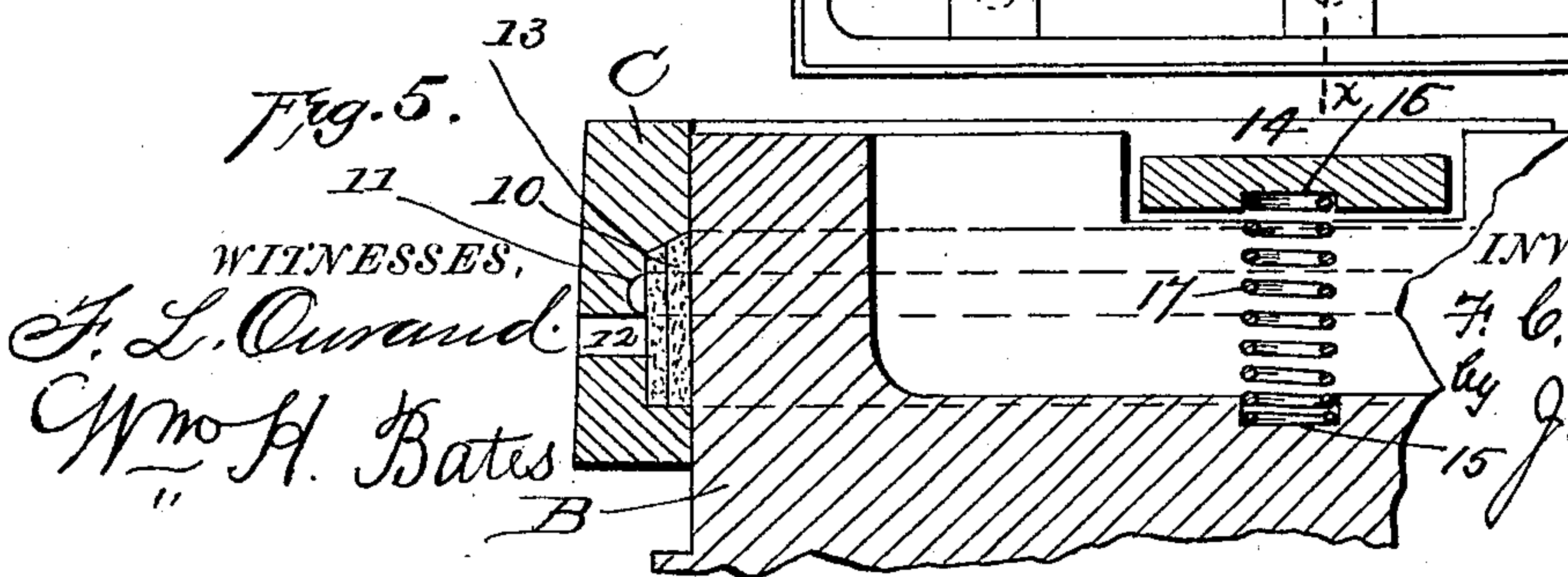


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK C. CLEAVER, OF TERRE HAUTE, INDIANA.

SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 397,170, dated February 5, 1889.

Application filed August 14, 1888. Serial No. 282,713. (No model.)

To all whom it may concern:

Be it known that I, FRANK C. CLEAVER, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Slide-Valves for Steam-Engines; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in slide-valves for steam-engines, and the objects are to provide an improved balancing-ring and packing-joint, whereby the contact between the surfaces of the balancing-ring and valve-body will be maintained steam-tight, and the contact of the balancing-ring with the cover of the steam-chest will also be steam-tight and the steam-pressure be excluded from the top of the valve, reducing or removing the steam-pressure between the back of the valve and the steam-chest. I attain the objects of my invention by means of the mechanisms illustrated in the accompanying drawings, wherein—

Figure 1 is a transverse sectional view, in elevation, on the line *x x* of Fig. 4. Fig. 2 is a longitudinal view, in elevation, taken on the line *y y* of Fig. 4. Fig. 3 is a detail sectional view of a portion of the valve-top and balancing-ring made on an enlarged scale, showing the packing-seat, the packing arranged therein, and the steam ports and ways behind the packing. Fig. 4 is a plan view of the balancing-ring. Fig. 5 is a detail view wherein the packing is arranged in the balancing-ring.

Reference being had to the drawings, A designates the valve-seat on the cylinder, having steam-ports 1 2 and exhaust-port 3, as usual, and on this cylinder over the valve and ports is secured the steam-chest 4.

B designates the valve, having a base to lap the steam-ports, as shown, and an exhaust-chamber, 5, in communication with the exhaust-port of the cylinder. On the neck 6 of the valve is the yoke 7, having attached thereto the valve-rod 8, working through the

usual packing, 9, in the side of the valve-chest. The top portion of the valve is formed with a groove, 10, extending entirely about it, to constitute a seat for the packing. In the back wall of this groove is a channel, 11, into which the steam-ports open. One of the edge walls of the groove 10 is inclined, as shown, in order that the packing, as it may be pressed outward, may always maintain a steam-tight joint and prevent the steam from obtaining access over the top of the valve, causing excessive pressure between the valve and its seat. In this groove 10 is arranged the packing 13, which is packed to fill the groove, except that its back is made to bridge the channel 11 in the back wall to leave steam-space behind it for the steam to distribute in as it finds access through the ports 12.

C designates the balancing-ring. This ring consists of a shell formed to set about the face of the upper part of the valve, as seen in the drawings, and has its sides connected by cross-bars 14, the upper faces of which are arranged a slight distance below the upper face of the ring, in order that their surfaces will not bear on the steam-chest and increase the wearing-surface of the ring. The lower edge of the balancing-ring stops short of the inlet of the steam-ports to the packing, so that the access of steam to these may not be interfered with. I prefer to make the part of the valve above the neck of slightly smaller dimensions than the neck, so that if the yoke wears the neck and has to be dressed down the upper part or head, which carries the balancing-ring, need not be altered. I also make the balancing-ring tapering from bottom to top on the exterior.

On the top of the valve-chest are formed either seats or studs 15, and on the under side of the cross-bars of the balancing-ring are similar devices, 16, which constitute stays or seats for springs 17, interposed between the top of the valve and the cross-bars of the balancing-ring, and exert their force to bear the ring upward with its top against the surface of the valve-chest. The cross-bars not only serve as means for holding the springs, and thus to lift the ring, but they strengthen the ring.

As I make claim to the novel arrangement and construction of the packing and

its functional relation to the parts, whether located in the balancing-ring or in the head of the slide-valve, I have shown in Fig. 5 of the drawings the balancing-ring formed with the packing-groove in its inner face and the steam-ports leading into the channel and the packing arranged in the groove, the head of the valve being smooth and plain on its sides.

By my construction I materially reduce the superficial contact of the top of the balancing-ring and steam-chest, and at the same time effectually seal the steam from finding its way over the valve, thereby reducing the pressure, and consequently the friction between the valve and its seat.

The packing may consist of any suitable material adapted to resist the disintegrating and deleterious effects of steam—such as fibrous material, leather, rubber, asbestos, or composite material now used for the purpose.

What I claim is—

1. The combination of the slide-valve formed with a packing-groove about its vertical faces, said groove having a steam-passages in its back wall and steam-ports leading therein, the packing arranged in said packing-groove, the balance-ring with upwardly and inwardly inclined exterior sides, cross-bars to set over the valve-top, and springs

disposed between the top of the valve and the cross-bars of the balance-ring, substantially as described, and for the purpose specified.

2. In combination, the slide-valve formed with a balance-ring seat of less exterior diameter than the yoke-seat and formed with a packing-seat, the packing arranged in said seat, steam-ports leading to the back of the packing, the balance-ring formed to set over the top of the valve and having upward and inwardly inclined outerfaces and provided with cross-bars, and the springs between the top of the valve and the cross-bars, substantially as described, and for the purposes stated.

3. The combination, with the slide-valve formed with a packing-seat, said packing-seat having one of its edges formed to incline, as shown, and having steam-passages opening through its back, of a packing arranged in said packing-seat and having one of its edges formed to fit the incline of the seat, substantially as described, and for the purpose specified.

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

FRANK C. CLEAVER.

Witnesses:

A. WEINHARDT,
O. T. NOBLE.