

No. 662,287.

Patented Nov. 20, 1900.

L. W. McDONALD.
BALANCED SLIDE VALVE.

(Application filed Sept. 1, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

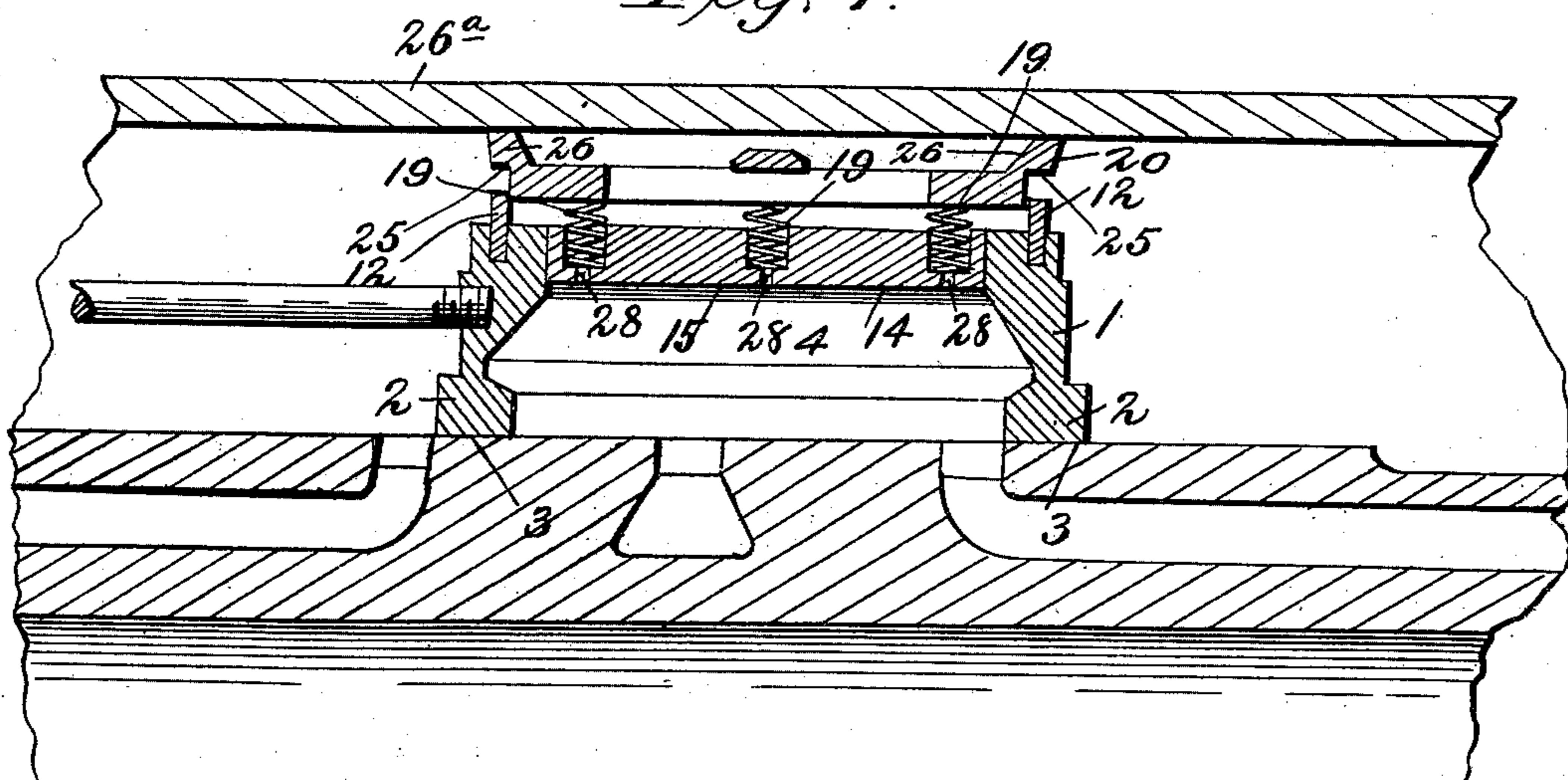
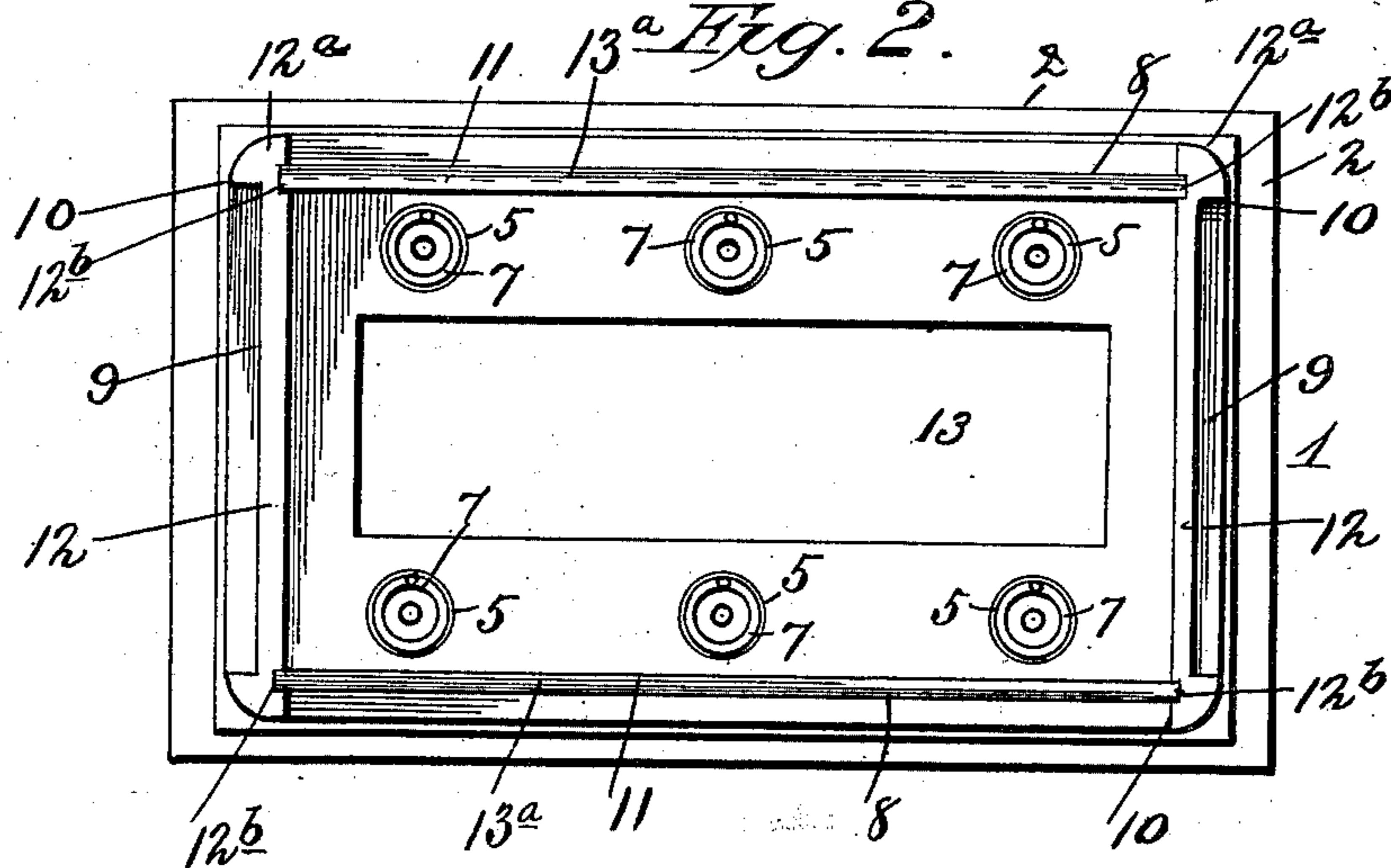


Fig. 2.



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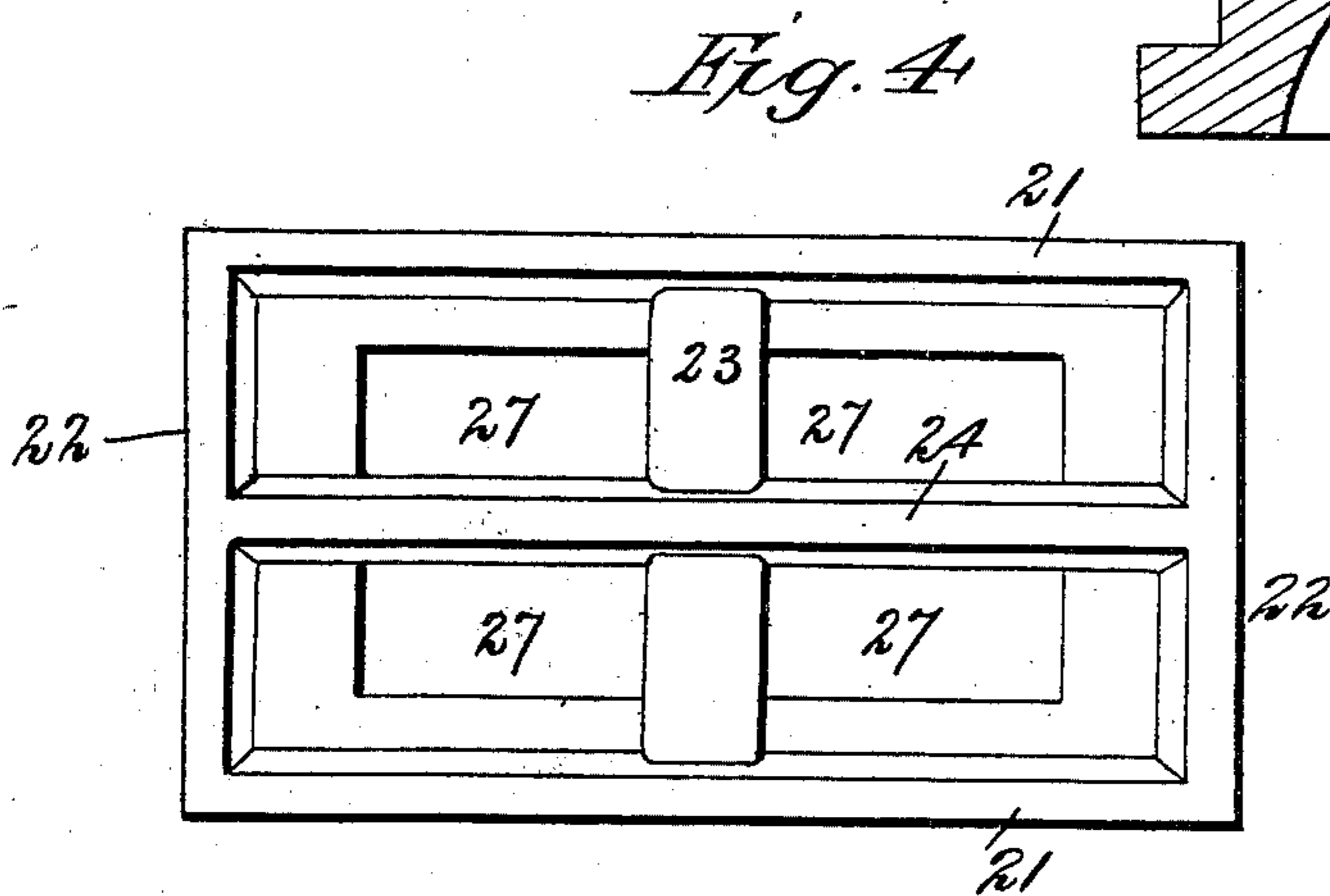
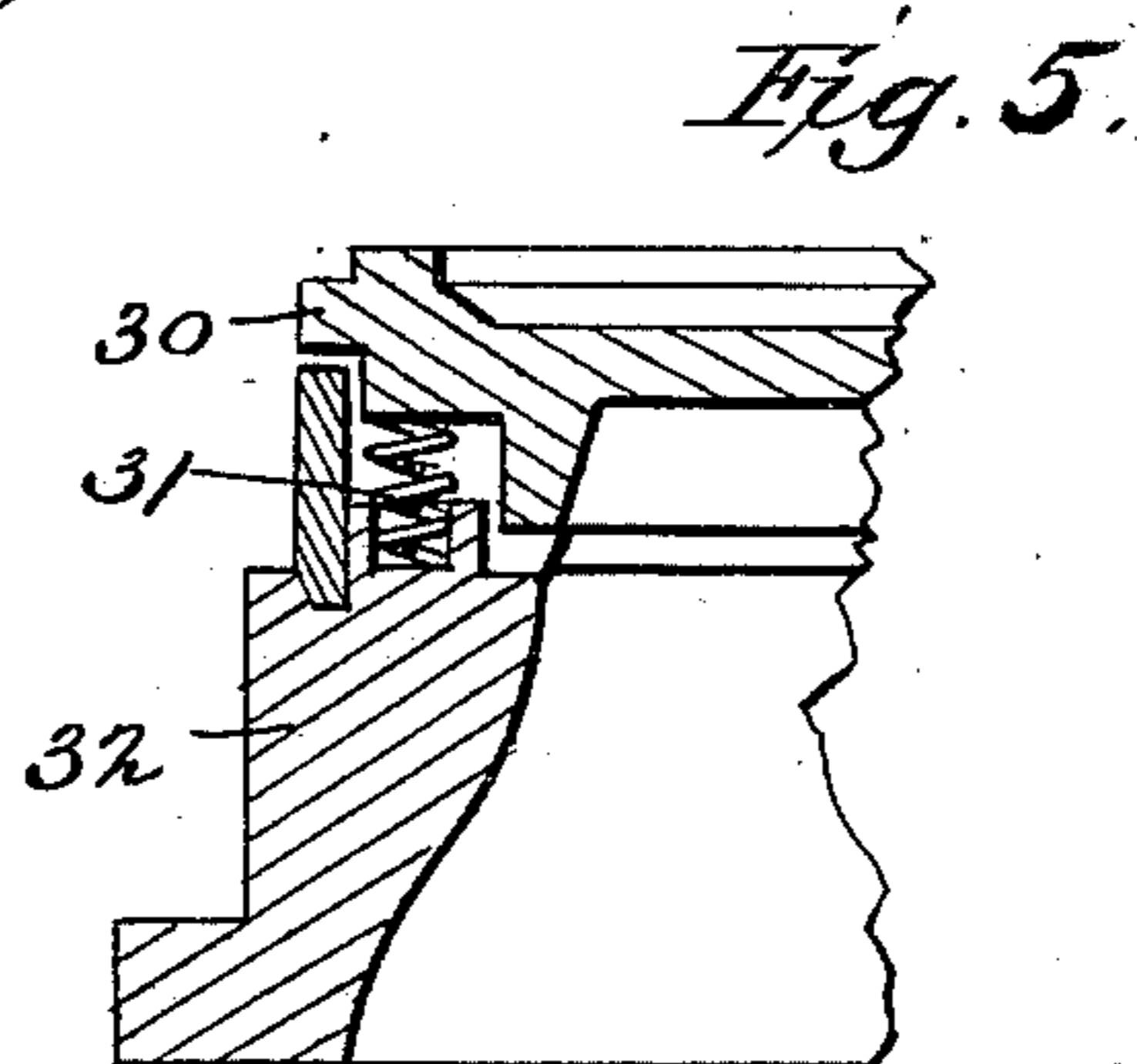
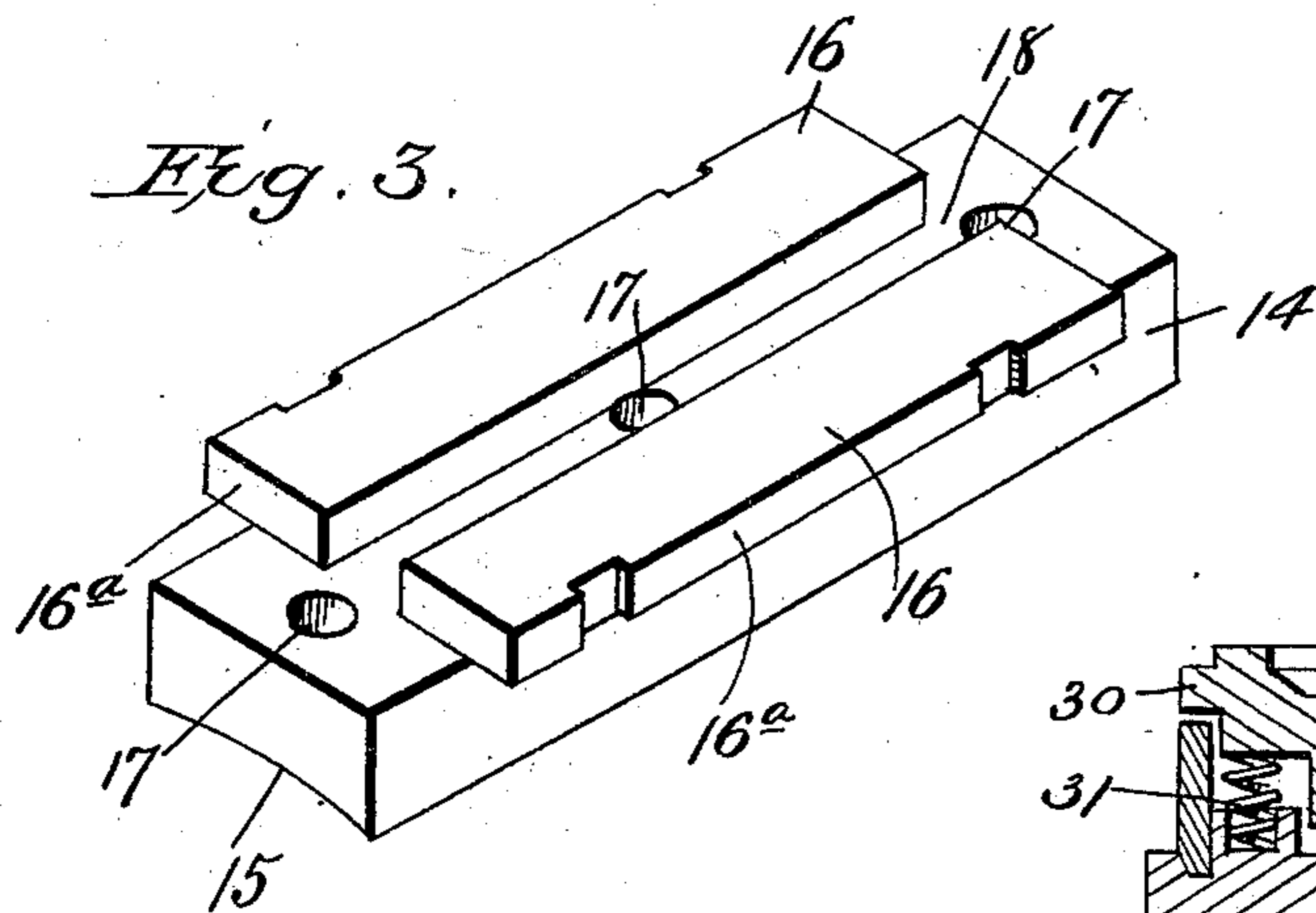
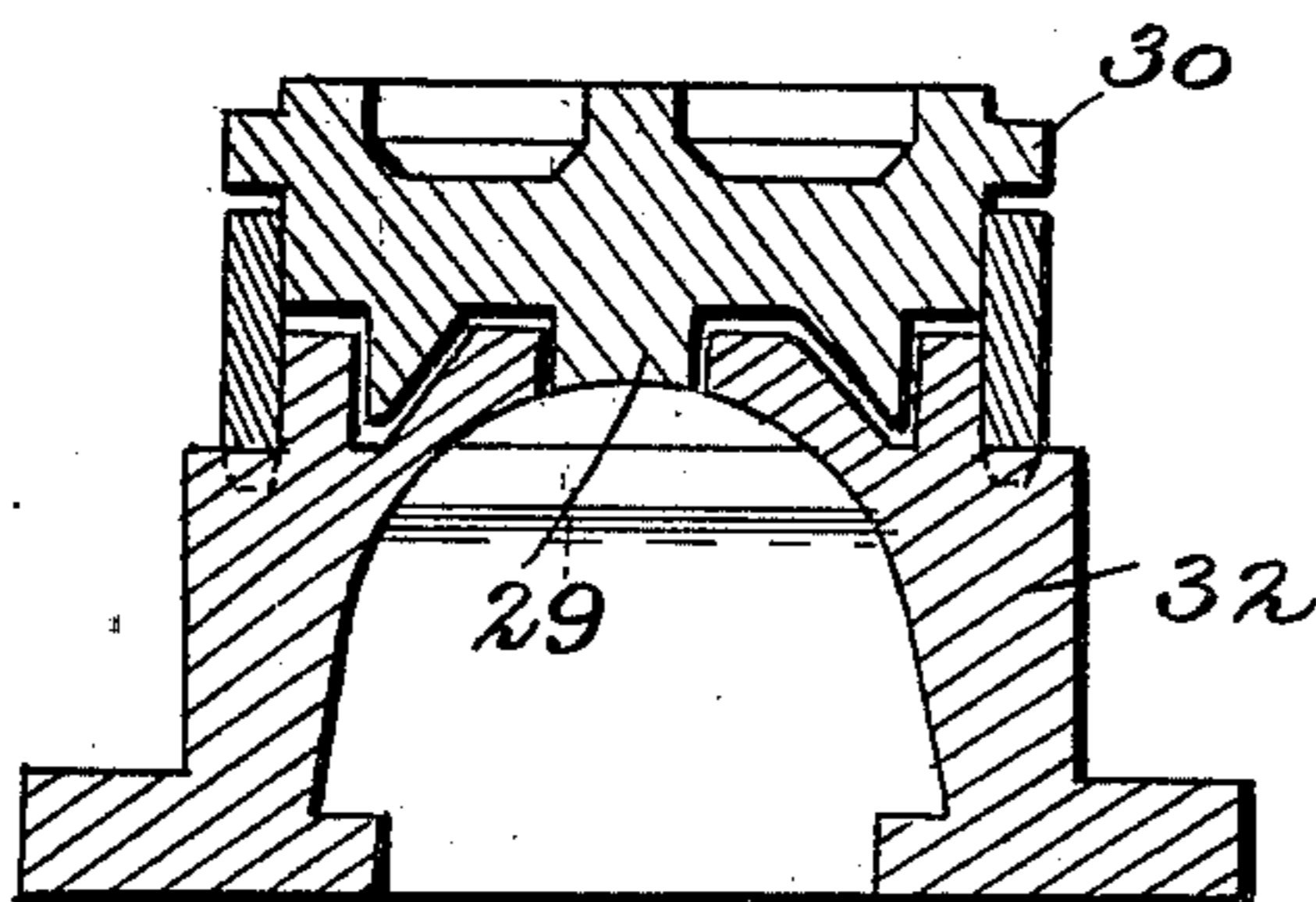


Fig. 6.



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UNITED STATES PATENT OFFICE.

LEWIS W. McDONALD, OF LAFAYETTE, INDIANA.

BALANCED SLIDE-VALVE.

SPECIFICATION forming part of Letters Patent No. 662,287, dated November 20, 1900.

Application filed September 1, 1900. Serial No. 28,805. (No model.)

To all whom it may concern:

Be it known that I, LEWIS W. McDONALD, a citizen of the United States, residing at Lafayette, in the county of Tippecanoe and State of Indiana, have invented new and useful Improvements in Balanced Slide-Valves, of which the following is a specification.

My invention relates to slide-valves for locomotives or other steam-engines, and more specifically to an improved construction for balancing a slide-valve.

In a locomotive equipped with ordinary valves when attempting to make a fast run with a heavy train the resulting exhaust tends to raise or float the valve in the steam-chest, thereby cutting down the speed.

The object of my invention is to nullify this effect. This is accomplished by a balancing device of the nature of a buffer which is simple in construction and which I have found by extensive experiments to be durable and efficient in operation.

The hauling power of a locomotive has been found to be greatly increased by equipping it with my valves.

In the drawings which accompany this specification and of which they form a part, Figure 1 is a longitudinal section of my valve mounted in a steam-chest. Fig. 2 is a plan view of the base of my valve. Fig. 3 is a perspective of the roof-plate. Fig. 4 is a plan view of the cap-frame. Fig. 5 is a longitudinal vertical section of a modified form of my valve.

Like numerals of reference designate like parts wherever they occur in these drawings.

My improved slide-valve consists, essentially, of three parts—a base, a roof-plate, and a cap-frame. These different parts will now be taken up and described in the order named.

The numeral 1 designates the base of my valve, which has flanges 2 formed integral therewith and extending around it. The under side of the base 1 is planed smooth at 3 to fit tightly the valve-seat to prevent leakage. Formed in the base 1 is an exhaust-chamber 4, as is usual in this style of valve, which is adapted to connect the cylinder-pipes in turn with the exhaust-pipe. The sides and ends of the chamber 4 are curved and sloped toward the roof up to the edge of the roof-

plate seat. Seated in recesses 5 in the top of the base 1 is a series of six spiral springs 7. These springs are arranged in two parallel rows, one on each side of the base-block. The top of the base is grooved at 8 and 9, and the corners are cut away at 10. (Not shown.) Seated in the grooves 8 and 9, respectively, and adapted to fit the corners 10 are strips 11 and 12. The strips 11 are of uniform cross-section, are slightly rounded at 13, and fit snugly the grooves 8. The strips 12 fit snugly the grooves 9 and have enlarged portions 12^a formed thereon and transverse grooves 12^b cut therein to accommodate the ends of the strips 11. The enlarged portions 12^a are rounded off on the corners and are shaped to fit the corners 10. The function of the combination of the strips 11 and 12 is to form a steam-tight seat for the cap-frame. To provide accommodations for the roof-plate, the top of the base 1 has a rectangular aperture 13 cut therein, the sides of which extend parallel to the sides and ends of the base.

The roof-plate is designated by the numeral 14 and is seated in the aperture 13. It is an integral member, shaped to fit snugly the aperture 13 and curved on the bottom at 15 to conform with the inner contour of the chamber 4. A pair of parallel ribs 16 are formed integral with the roof-plate and project beyond the sides thereof at 16^a, thereby forming supporting-flanges for it. Seated in recesses 17, positioned in line with the groove 18, which intervenes between the two ribs 16, are three spiral springs 19, identical in every respect with the springs 7. These springs 19 are placed to line up with the springs 7, thus forming three parallel rows of three springs each. Two of the springs 19 are positioned just beyond the ends of the ribs 16 for a purpose which appears hereinafter.

The cap-frame (numbered 20) is similar in form to a gridiron. It is also an integral member and is of rectangular form and is composed of side bars 21, ends 22, and two bars 23 and 24. The bar 24 extends transversely intermediate the top and bottom of the cap and serves as a stop to limit its downward movement. The outside of the cap-frame is undercut at 25, thereby leaving a

projecting flange 26 around the top. The upper surface is planed off perfectly level to run smoothly against the cover 26^a of the steam-chest.

5 To assemble my valve, the roof-plate is placed in the aperture 13, with the projecting portions 16^a resting on the base. The cap-frame is next placed in position, and it fits inside the frame formed by the strips
10 11 and 12, with the side pieces 21 resting on the springs 7 and the bar 23 resting on the springs 19. The rectangular apertures 27 fit the ribs 16. The flange 26 and the bar 24 limit the downward movement when the
15 springs give too much.

When in use, the steam will enter the chamber 4 from the bottom and rise up and press against the roof-plate, which will in turn communicate the stress to the cap-frame through
20 the medium of the coiled springs, and the cap-frame will be forced up against the cover. The escape of the steam sidewise will be prevented by the frame formed by members 11 and 12. The action of the roof-plate and the
25 cap-frame with the interposed springs will keep the valve from being lifted from its seat or "floated."

Communicating with some of the recesses in which the springs are seated are apertures
30 28, which render possible the escape of any steam which might become imprisoned above the cap-frame.

In the modified form of my valve (illustrated by Fig. 5) a roof-plate 29 is shown as
35 formed integral with a cap-frame 30, while springs 31 are seated in a base 32 at a point near the ends of the cap.

I do not wish to be limited as to details of construction, as these can be modified in

many particulars without departing from the 40 spirit of my invention.

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

1. In a slide-valve for steam-engines, the 45 combination substantially as described, of a base provided with a chamber and an aperture in the top communicating with said chamber, a roof-plate seated in said aperture, and a cap-frame bearing against said 50 roof-plate on the bottom and adapted to bear against a cover on top and slide thereon.

2. In a slide-valve for engines, the combination, substantially as described, of a base 55 having an exhaust-chamber therein and provided with an aperture in the top communicating with said chamber, a roof-plate seated in said aperture in said base and adapted to slide therein, and means for taking up the 60 force of the impact of the steam against said roof-plate.

3. In a slide-valve for steam-engines, the combination substantially as described, of a base provided with an exhaust-chamber and 65 an aperture communicating with said chamber, and a series of springs mounted adjacent to the top of said aperture, a roof-plate seated in said aperture in said base, and a cap-frame bearing on said springs and said roof-plate and adapted to slide on the cover 70 of a steam-chest.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LEWIS W. McDONALD.

Witnesses:

W. H. BRYAN,

JOHN M. McDONALD.