

(No Model.)

2 Sheets—Sheet 1.

R. K. BROWN.
SASH BALANCE.

No. 491,762.

Patented Feb. 14, 1893.

Fig. 1.

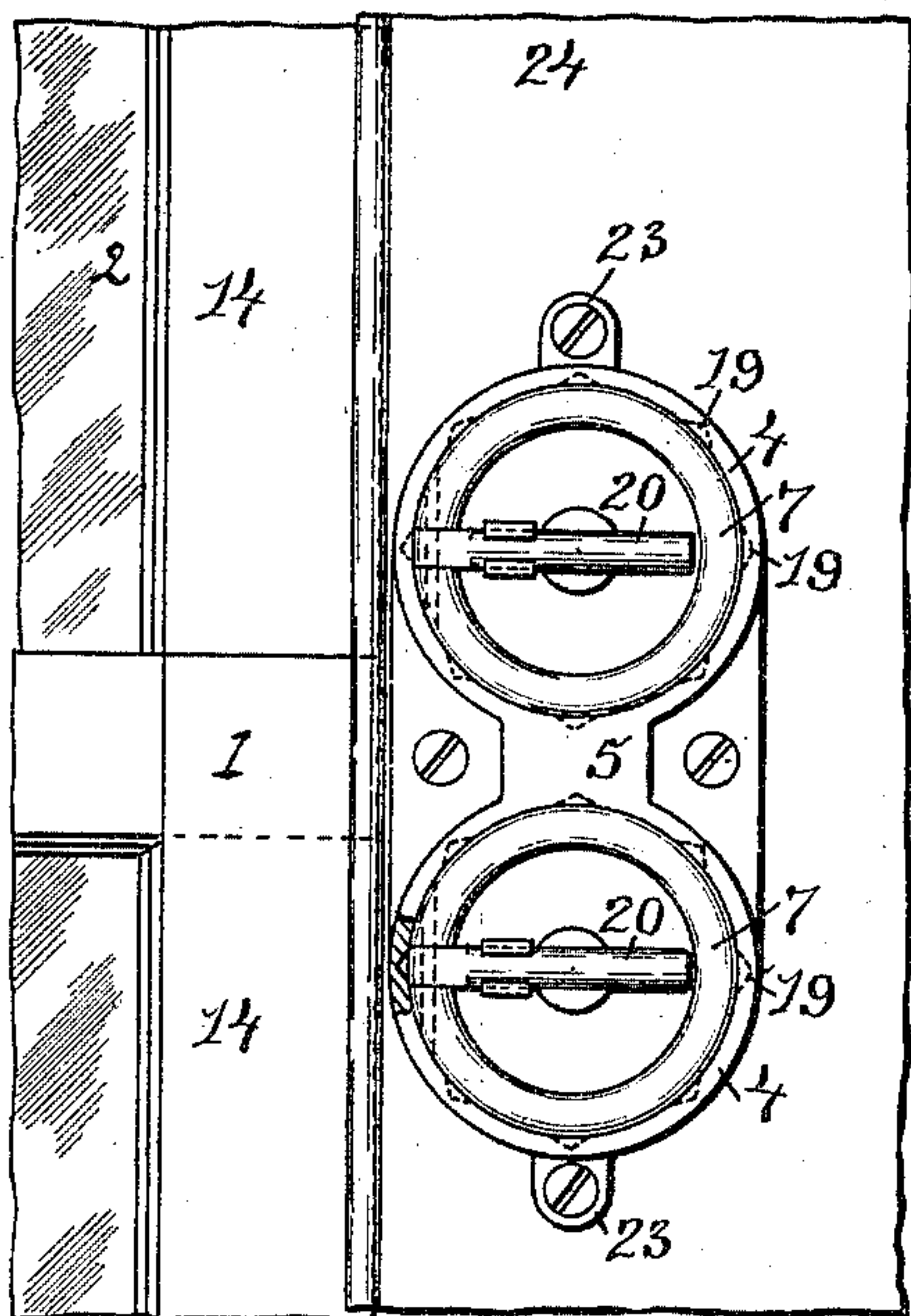


Fig. 3.

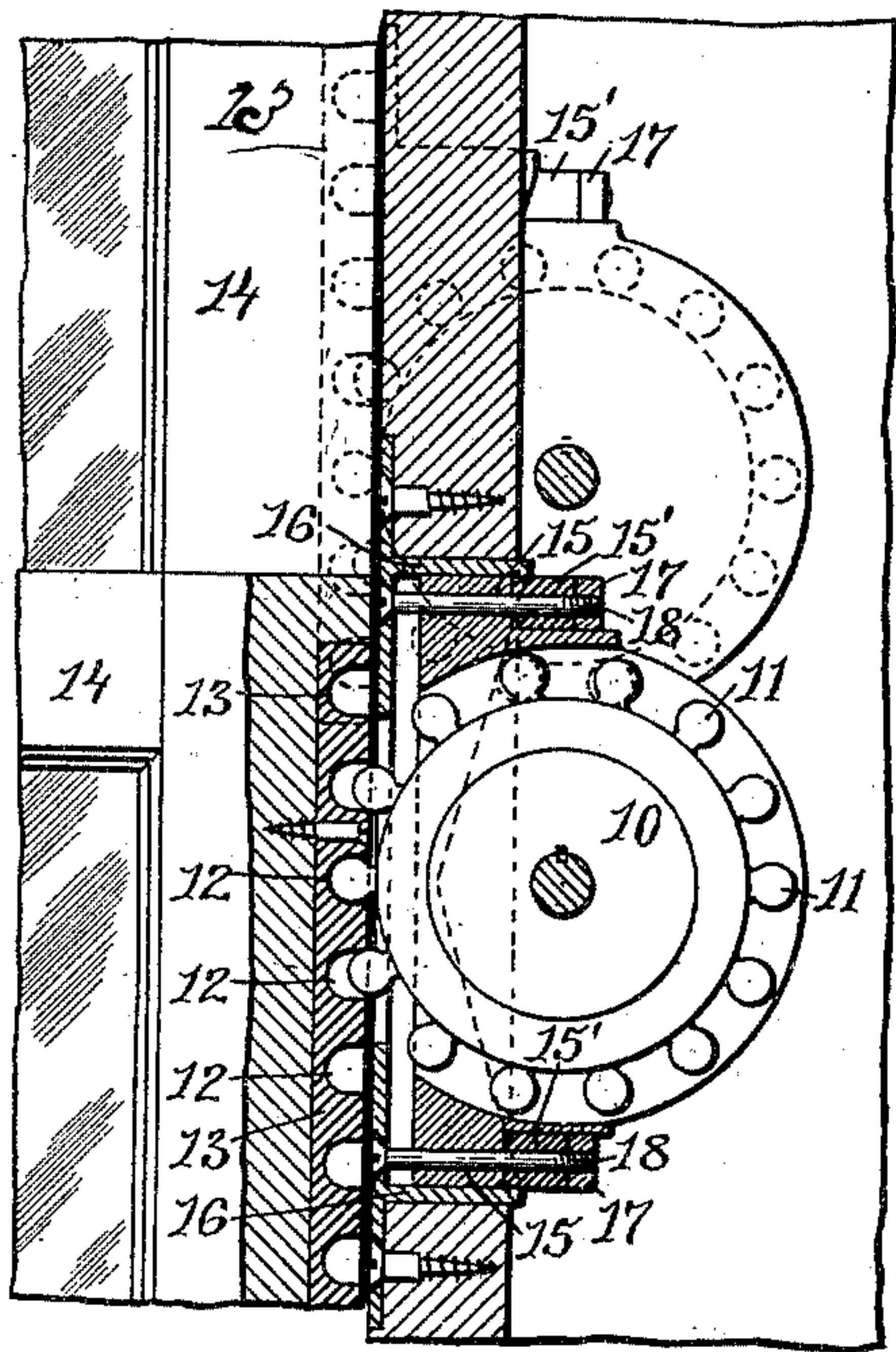


Fig. 2.

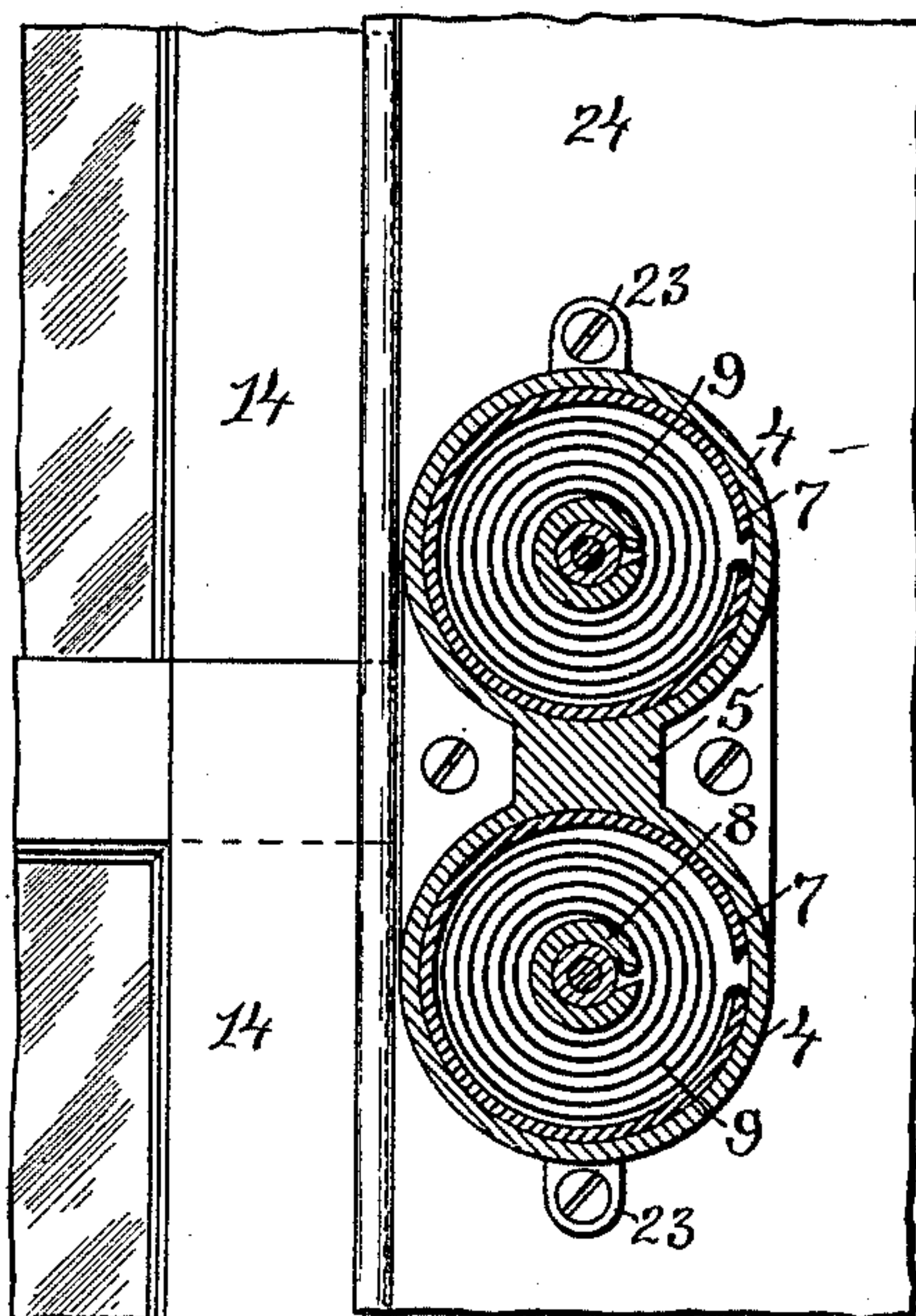
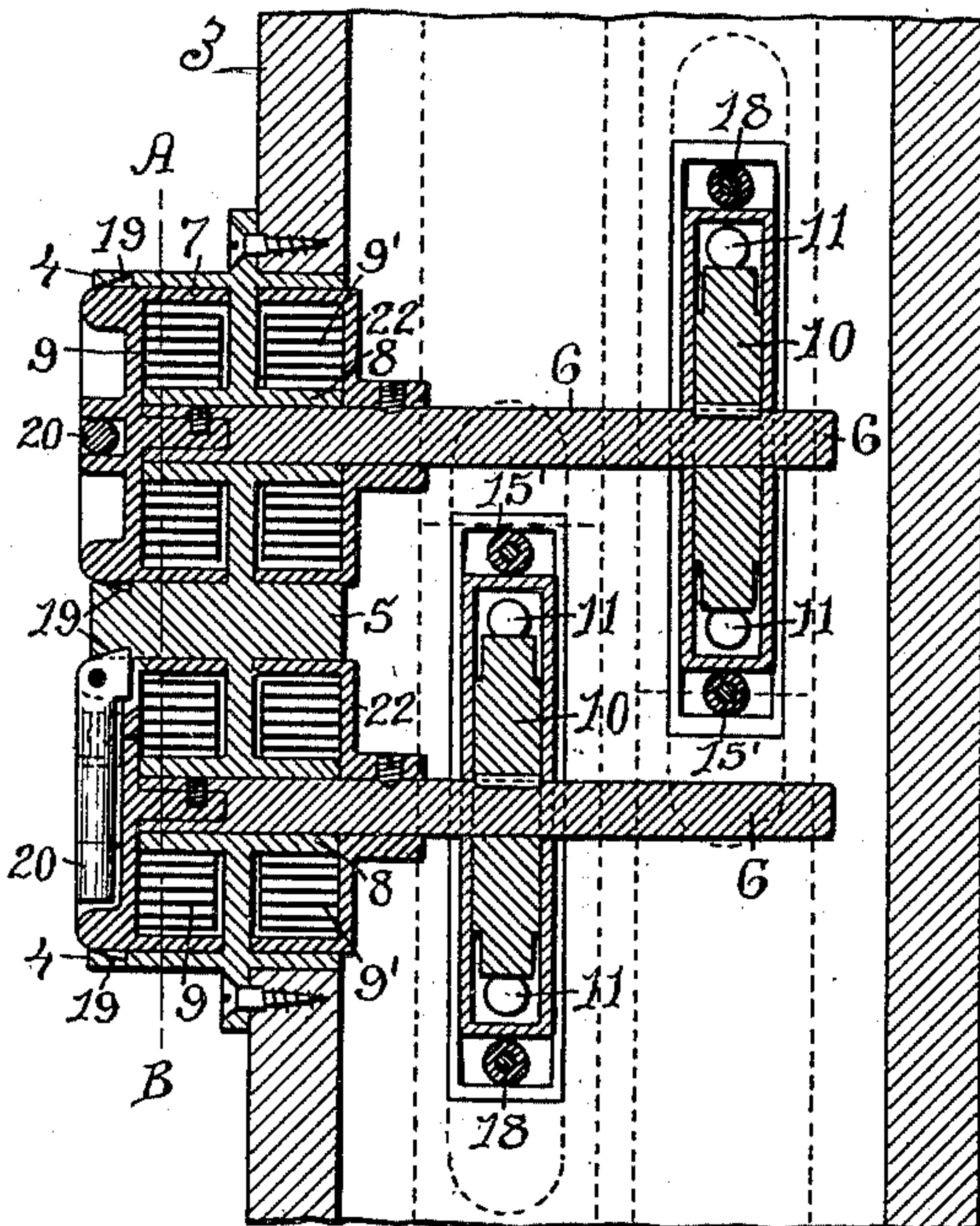


Fig. 4.



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Fig. 5.

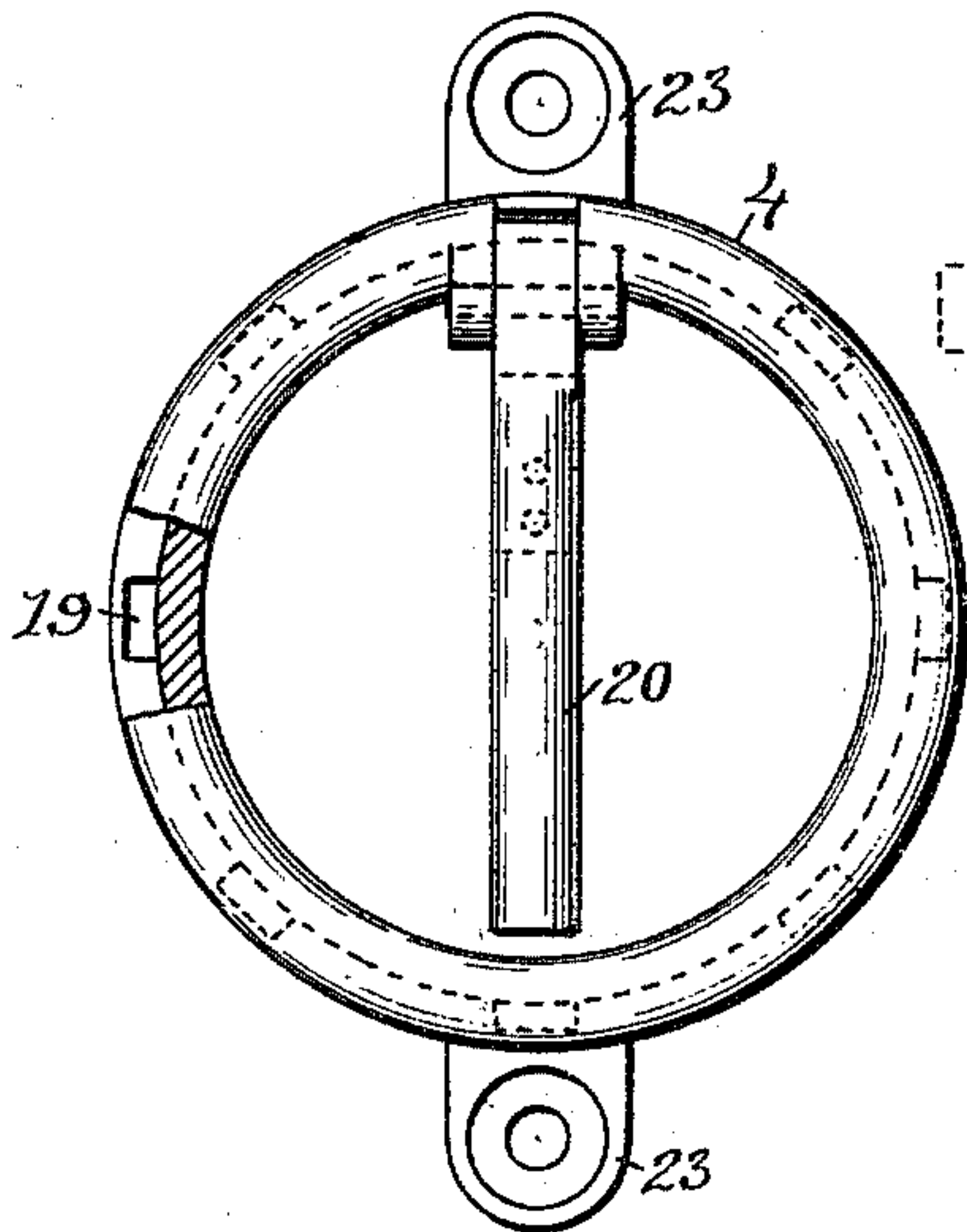


Fig. 6.

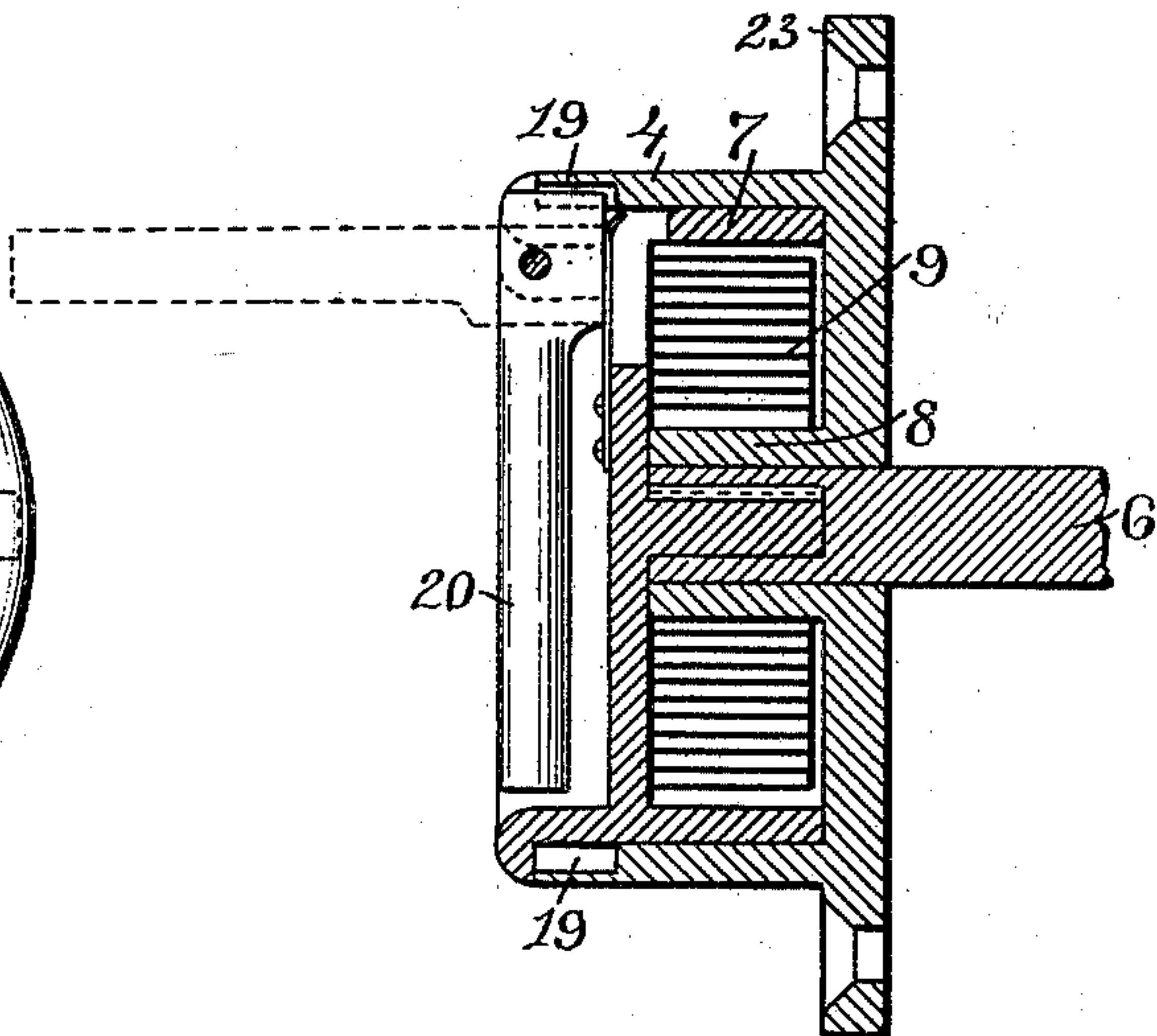


Fig. 7.

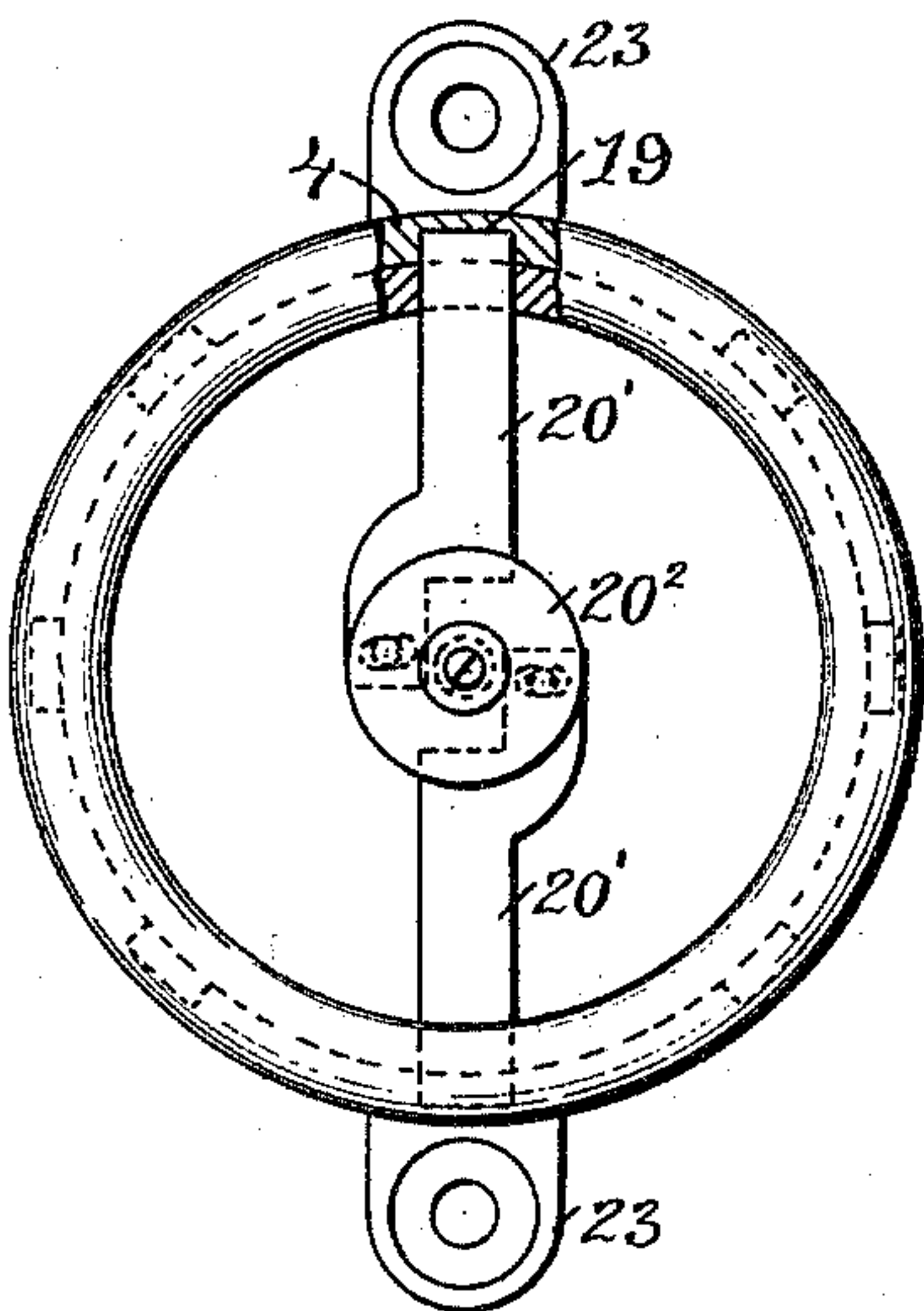
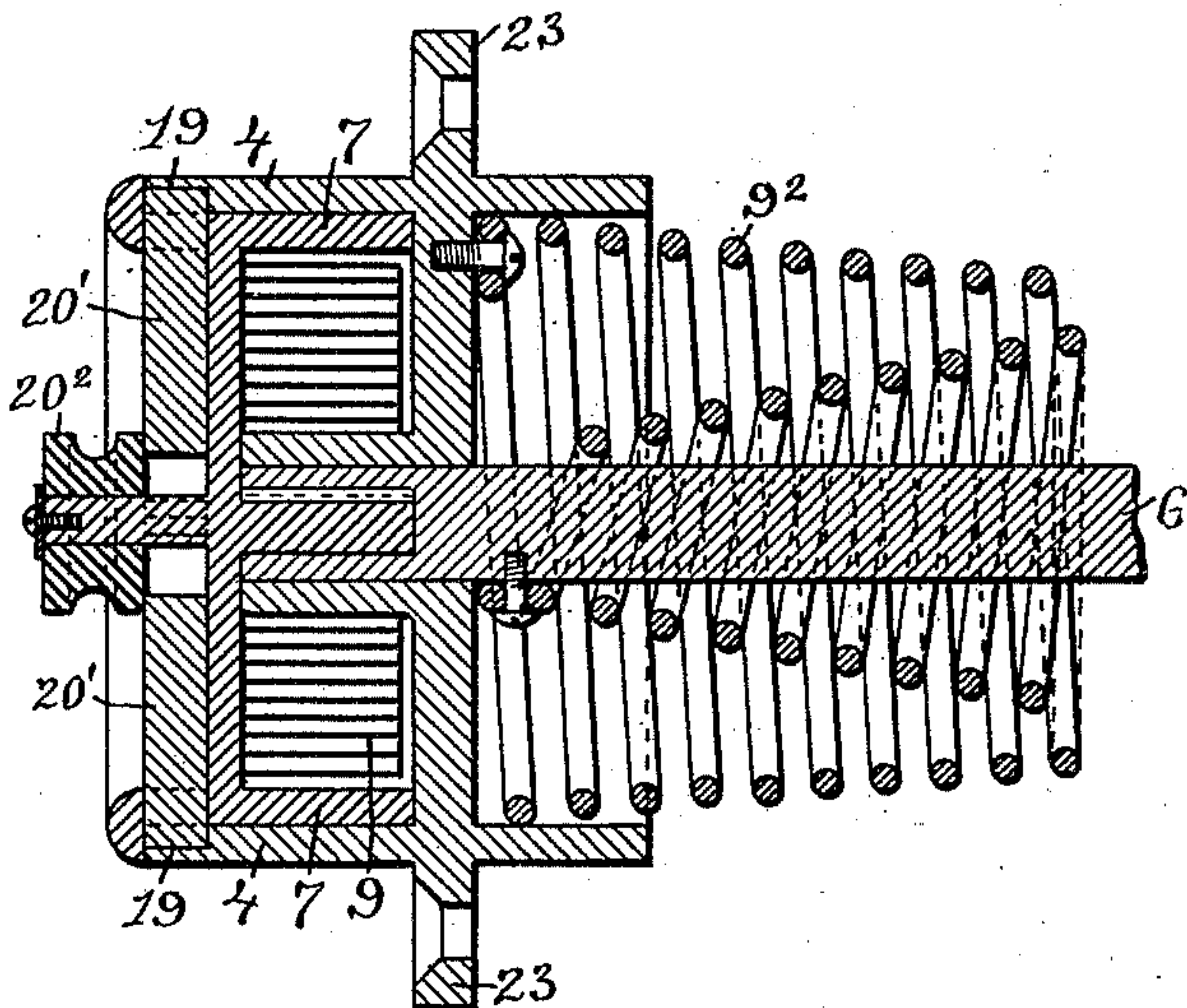


Fig. 8.



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UNITED STATES PATENT OFFICE.

ROBERT K. BROWN, OF WHITINSVILLE, MASSACHUSETTS.

SASH-BALANCE.

SPECIFICATION forming part of Letters Patent No. 491,762, dated February 14, 1893.

Application filed June 15, 1892. Serial No. 436,762. (No model.)

To all whom it may concern:

Be it known that I, ROBERT K. BROWN, of Whitinsville, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Window-Sash Balances; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in the class of sash-balance in which a spring is used to operate a gear connected with a rack secured to the sash so as to counterbalance, or partially counterbalance, the sash.

The invention consists in the peculiar and novel construction and arrangement of the parts, as will be more fully set forth hereinafter.

Figure 1 is a view of part of a window and frame showing the sash-balance lock secured to the frame so as to connect with both sashes above and below the meeting-rail. Fig. 2 is a view of part of a window and frame showing the spring case in section on the line A—B of Fig. 4. Fig. 3 is a vertical sectional view showing the rack secured to the sash and the gear-wheels supported in an adjustable frame. Fig. 4 is a transverse sectional view of the two sash-balances for operating the upper and lower sashes. Fig. 5 is a front or face view of a single sash-balance shown partly in section. Fig. 6 is a vertical sectional view of the spring case of my improved sash-balance. Fig. 7 is a front view of the sash-balance, partly in section, showing a modified form of locking-device. Fig. 8 is a sectional view of the spring case of my improved sash-balance showing the application of two kinds of springs.

Similar numbers of reference indicate corresponding parts in all the figures.

In the drawings 1 indicates the lower sash, 2 the upper sash, 3 the window-frame which is shown in the drawings as the usual box-frame used when the sashes are balanced by weights. I prefer to construct my sash-balance in pairs secured together, one adapted for the upper and one for the lower sash, and in Figs. 1, 2, 3 and 4, they are so shown with the two spring cases secured together to form

a double sash-weight placed opposite the meeting-rail of the sashes. I do not, however, wish to confine myself to this twin construction and may use my improved spring sash-balance so as to place them in any desired position to operate one or more window-sashes.

As shown in Figs. 1 to 4 inclusive, the two cylindrical cases 4 are cast in one piece with the connecting-piece 5,—the shafts 6 are secured at their outer ends to the cylindrical cups 7 and have their bearing in the central sleeve 8 forming part of the cylindrical-case 4. One end of the coiled-spring 9 is secured to the sleeve 8 and the other end to the cup 7. As in ordinary window-sash, such as is largely used in dwelling houses, one spring is sufficient to assist in raising the sash,—I will first describe my device when made with the spring 9 only. The other ends of the shafts 6, which are provided each with a longitudinal groove, are inserted into the central holes of the gear-wheels 10 provided with keys, or splines, which enter the grooves in the shafts 6, so that the gears and shafts must turn together. The gear-wheels 10 are provided with the ball-shaped teeth or projections which enter the cup-shaped cavities 12 in the rack-bars 13 secured to the edges of the window-sashes 14. The cup-shaped cavities have cylindrical walls for the first half of their depth, the rest of the depth being of semi-spherical shape. By this peculiar construction a more direct vertical lifting-action by the gears on the sash is secured and the tendency existing in the ordinary form of rack and pinion to crowd the rack away from the gears, or pinions, diminished. In a device for lifting window-sash which is usually used on one side of the sash only, this peculiar construction of the gear and rack is important, as thereby the friction on the opposite side of the sash is diminished.

Window-sashes are liable to shrink, the distance between the rack and the gear is thereby increased,—to permit of ready adjustment of the gear to the shrinking of the sash, I journal the gear in the frame 15 and support the same adjustably in the frame 15 which is secured to the window-frame,—the frame 15 is provided with the screw-threaded nuts 17, and the screws 18, having a countersunk bearing in the face-plate of the frame 16, extend

into the nuts 17, so that, when the sash has shrunk, by turning the screws 18 with a screw-driver the frames 15 may be drawn toward the face-plate of the frame 16 and there-
 5 by the gears 10 made to project farther beyond the face-plate of the frame 16 and into proper relation with the racks 13. Between the nut 17 and the frame 15 a spring 15', which may be a piece of rubber, or a spiral
 10 spring, is inserted by which the gear is held with an elastic, yielding pressure against the rack and can adjust itself to any inequality.

To lock the window-sash in any desired position, I provide the inner surface of the cy-
 15 lindrical cases 4 with the notches 19 and pivotally secure the arm 20 near one end to the outside of the cup 7, so that when the arm 20 is in the position shown in Figs. 1, 4 and 6, the end near the pivot enters one of the
 20 notches 19 and thereby locks the cup 7 and with it the shaft 6 against rotation and thus securely locks the sash.

In Figs. 7 and 8 a modified form of locking-arms is shown, they consist of the arms 20' pivoted to the central thumb-piece 20² by the
 25 partial rotation of which they are pushed into the recesses 19 or withdrawn therefrom.

In a sash where more than one spring is required, the auxiliary cups 22, shown in Fig.
 30 4, may be secured to the shafts 6, the spring 9' being secured at one end to the cup and at the other end to the sleeve 8, or the coiled-spring 9² may be secured at one end to the cylindrical-case 4 and at the other end to the
 35 shaft 6, as is shown in Fig. 8. The cylindrical cases are formed with the lugs 23 provided with holes, so that they can be secured to the frame 24,—they project from the face of the frame and form a neat and substantial device
 40 which may be readily detached for adjustment or repairs.

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

45 1. A sash-balance consisting of a cylindrical case adapted to be secured to the window-casing, a cup adapted to rotate within the cylindrical case, a shaft, secured to the cup, extending into the window-casing, a gear se-

cured on the shaft so as to rotate with the
 same, a rack secured to the window-sash, and a coiled actuating-spring one end of which is secured to the fixed and the other end to the rotating portion of the sash-balance, as de-
 55 scribed.

2. In a sash-balance, the combination with the cylindrical-case 4 adapted to be secured to the window-frame and provided with the sleeve 8, of the cup 7, the shaft 6 secured to the cup 7, the gear 10 connected with the
 60 shaft 6, the rack 13, and one or more springs adapted to balance the weight of the sash, as described.

3. In a sash-balance, the combination with the cylindrical-case 4, the cup 7, the shaft 6, the gear 10 provided with the spherical teeth or projections 11, the rack 13 having the cavities 12, and one or more springs adapted to balance or partly balance the weight of the
 70 sash, as described.

4. The combination with the cylindrical case 4, the cup 7, the shaft 6 secured to the cup 7, the gear 10, the rack 13, and the actuating spring, of a locking device secured to the cup 7 and adapted to lock the same to the cylin-
 75 drical case 4, as described.

5. In a sash-balance, substantially as herein described, the combination with the case 4 provided with the notches 19 on its inner surface, of the cup 7 and the pivoted arm 20 adapted
 80 to lock the sash-balance, as described.

6. In a sash-balance, adapted for operating the upper and lower sashes of a window, the combination with two cylindrical-cases 4, cast in one piece, provided each with the sleeve 8,
 85 of the cups 7, the shafts 6 connected with the cups and the lifting-gears, the gears 10 provided with the spherical-teeth 11, the racks 13 having the cavities 12, and one or more springs adapted to balance or partly balance
 90 the weight of each of the two sashes, as described.

In witness whereof I have hereunto set my hand.

ROBERT K. BROWN.

Witnesses:

JOSEPH A. MILLER,
 JOSEPH A. MILLER, Jr.