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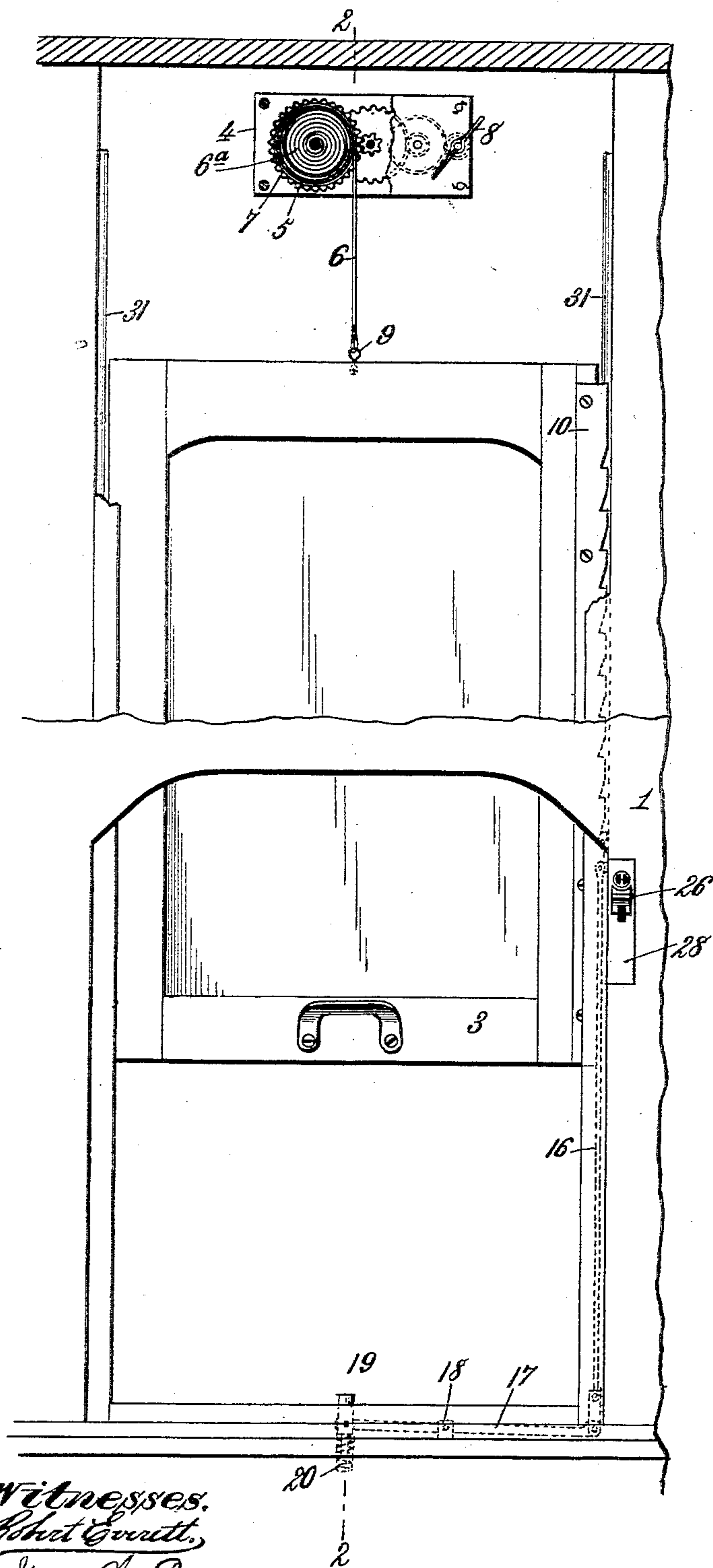
2 Sheets—Sheet 1.

P. S. RIDDELLE.  
SASH OPERATING MECHANISM.

No. 504,620.

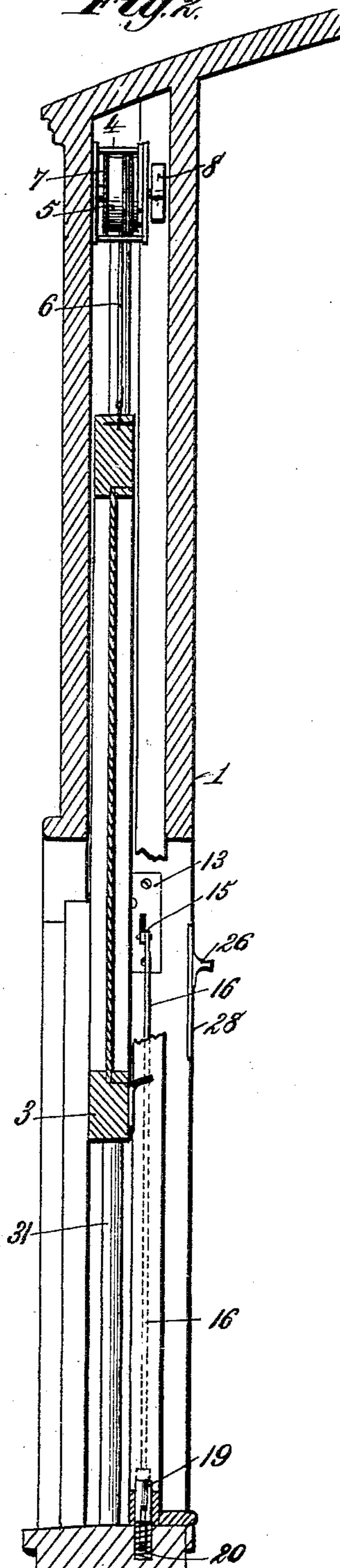
Patented Sept. 5, 1893.

*Fig. 1.*



Witnesses.  
*Robert G. Smith,*  
*Geo. W. Rea.*

*Fig. 2.*



Inventor.  
*Philip S. Riddelle.*  
By *Amos L. Norris,*  
*att'y.*

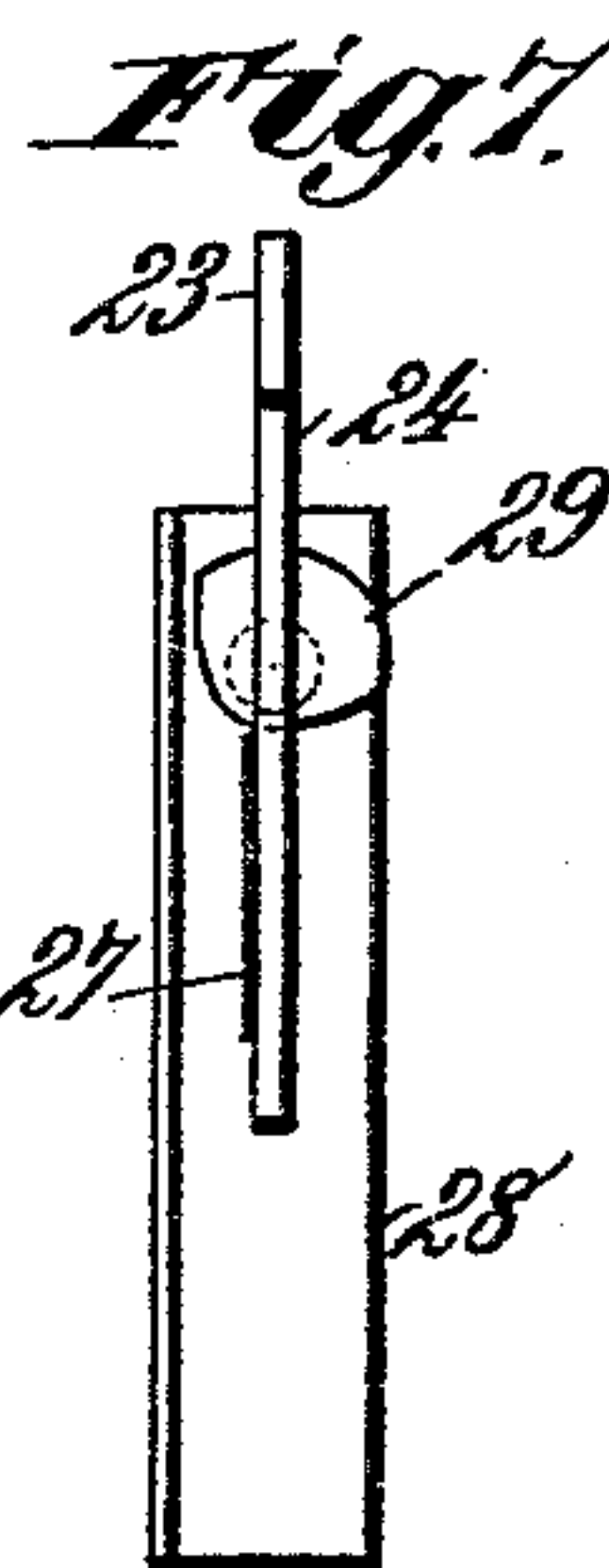
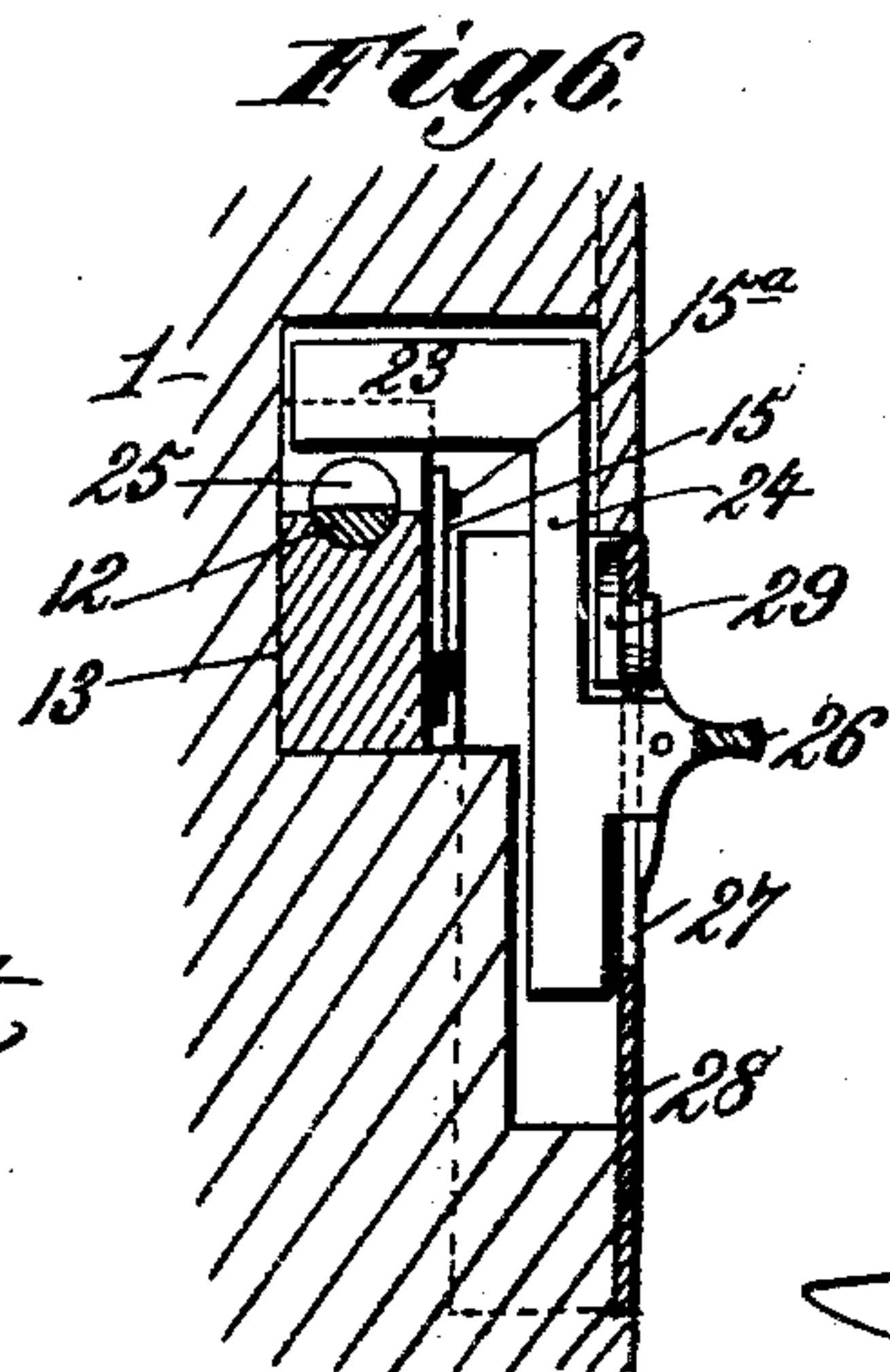
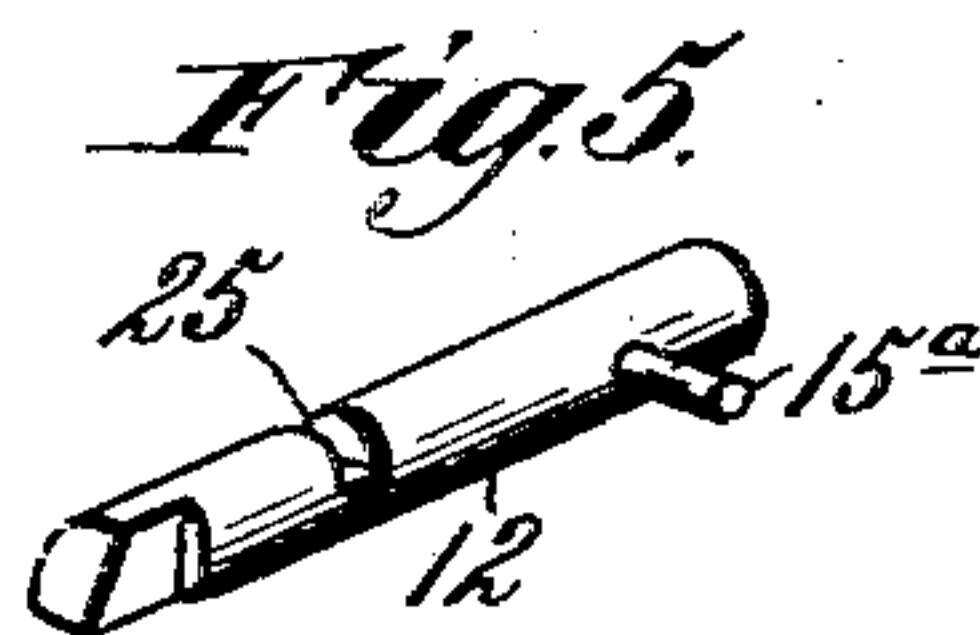
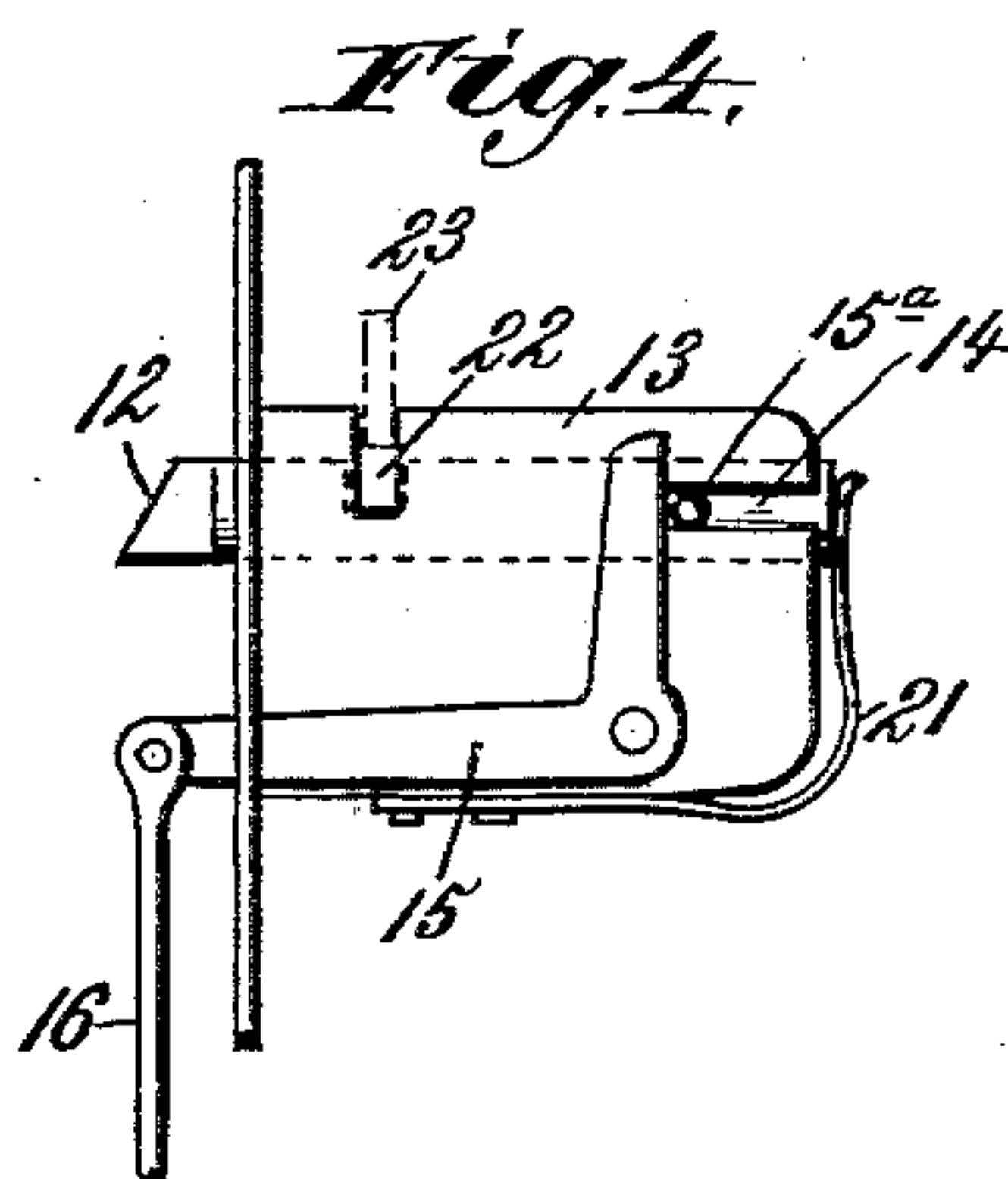
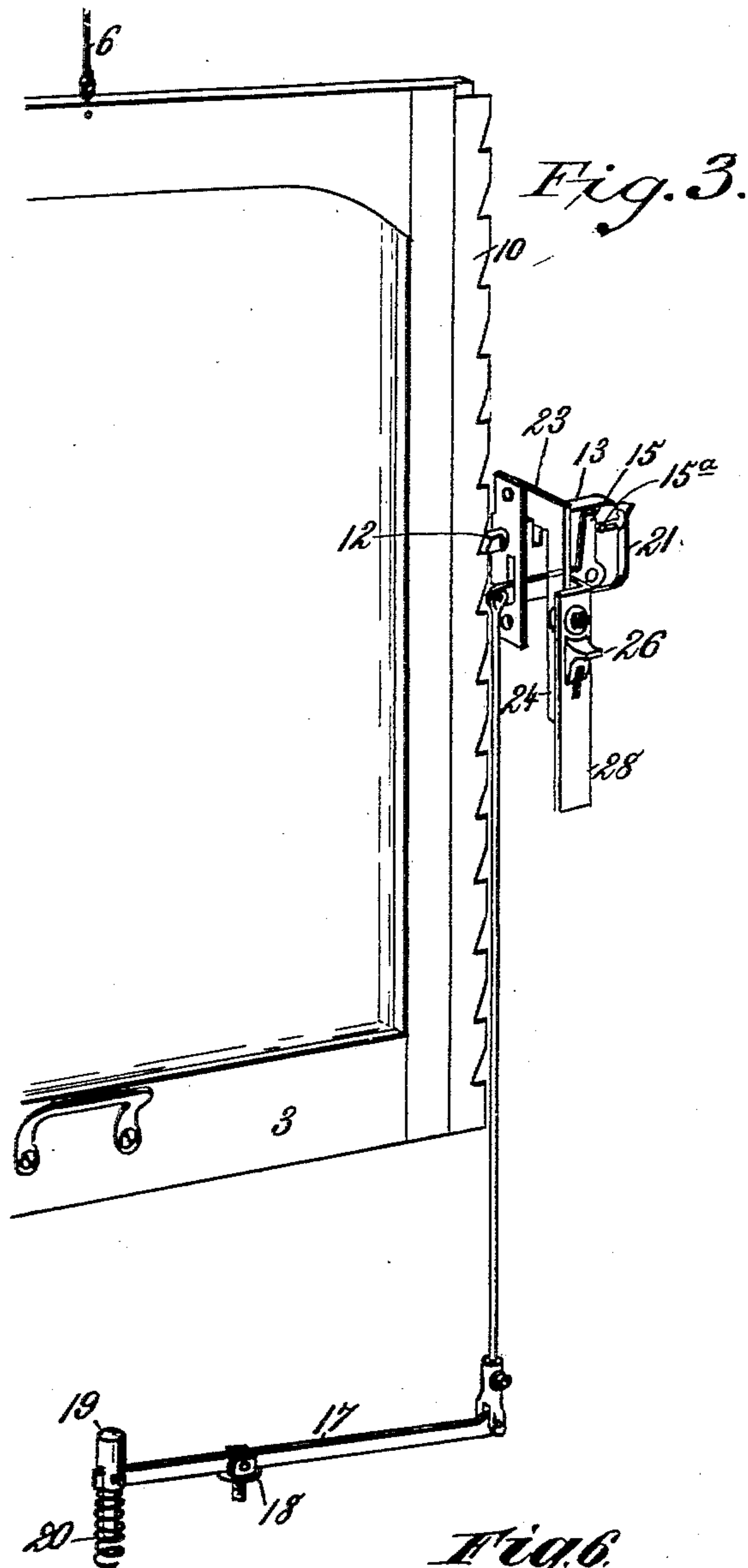
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2 Sheets—Sheet 2

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SASH OPERATING MECHANISM.

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# UNITED STATES PATENT OFFICE.

PHILIP S. RIDDELLE, OF WOODSTOCK, VIRGINIA.

## SASH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 504,620, dated September 5, 1893.

Application filed February 24, 1893. Serial No. 463,596. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP S. RIDDELLE, a citizen of the United States, residing at Woodstock, in the county of Shenandoah and State of Virginia, have invented new and useful Improvements in Window-Sash-Operating Mechanism, of which the following is a specification.

This invention has for its object to provide new and improved mechanism for automatically raising a window sash and instantly stopping it at any desired height by mere pressure on a finger-piece or button.

The invention also has for its object to provide novel means for locking the sash in any position to which it is adjusted.

The invention also has for its object to provide a novel spring mechanism for raising a window sash, the speed of which is governed or controlled to avoid the elevation of the sash with undue velocity.

To accomplish these objects my invention consists in the features of construction and the combination or arrangement of devices hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1, is an elevation showing the window frame broken away and a sash provided with my improved mechanism for automatically raising the same. Fig. 2, is a vertical sectional view taken on the line 2—2, Fig. 1. Fig. 3, is a detail perspective view of the sash and devices for holding and releasing the same. Fig. 4, is a detail side view of the case which contains the pawl. Fig. 5, is a detail perspective view of the pawl. Fig. 6, is a detail vertical sectional view showing the bolt for locking the pawl. Fig. 7, is a front elevation of the same showing the cam or device for locking the bolt; and Fig. 8, is a detail perspective view of the key for operating the cam or device which locks the bolt.

In order to enable those skilled in the art to make and use my invention I will now describe the same in detail, referring to the drawings wherein the numeral 1, indicates a window frame and 3 a sash, which parts may be of any construction suitable for the conditions required.

The invention is designed for the sashes of buildings, cars and vehicles, and obviously the window frame and sash will vary according to the purpose for which they are designed.

A spring mechanism is arranged in the top portion of the window frame and as here illustrated, it comprises a frame 4 in which is journaled a drum 5, containing a convoluted spring 6<sup>a</sup> and having its shaft provided with a gear wheel 7 which is geared with a governor 8, which governs or controls the drum in such manner as to prevent the sash being raised with undue velocity.

The drum 5 is provided with a cable or cord 6, connected at one extremity with the drum 5, and at its opposite extremity to the top rail of the window sash 3, as at 9, all in such manner that when the sash is released from restraint the resiliency of the spring will rotate the drum to wind the cable and elevate the sash. I have illustrated the spring as applied to the lower sash for the purpose of raising the latter, but obviously the spring can be applied to the upper sash so that when the latter is pulled downward and released it will be automatically elevated. In either event the sash is automatically elevated or raised by the spring and therefore the power of the spring must be sufficient to overcome the resistance offered by the weight of the sash.

A rack 10 is secured to one of the side rails of the sash and a pawl 12 is adapted to directly engage the teeth of the rack for the purpose of holding the sash under restraint, or against the power of the spring, so that the sash will be held stationary until the pawl is disengaged from the rack, whereupon the spring will exert its power on the sash for the purpose of raising the same. The pawl is arranged to slide horizontally in a casing 13, Figs. 3 and 4, which is located in a suitable recess in the window frame and is provided with a longitudinal slot 14, for the passage of a laterally projecting pin 15<sup>a</sup> on the pawl. A bell crank lever 15 is pivoted to the pawl-case 13, and one arm of this lever is arranged to bear against the pin 15<sup>a</sup>, while the other arm is connected to the upper end of a



vertical rod 16, the lower end of which rod is pivoted to a horizontally disposed lever 17, fulcrumed between its extremities to a suitable support as at 18. The lever 17 is provided at the extremity opposite that which is pivoted to the rod 16, with a finger-piece or push button 19, acted upon by a spring 20, of any suitable construction, which operates to elevate the finger-piece or push button and thereby swing the lever 17 in the direction required to rock the bell crank lever 15 and cause the latter to release the pawl 12 for its engagement with the rack. The pawl 12 is pressed into engagement with the rack on the sash through the medium of a suitable spring 21.

The spring 20 is represented as a spiral spring, and the spring 21 as a leaf or plate spring, but obviously these springs may be otherwise constructed and arranged to accomplish the results specified.

The pawl-casing 13 is provided in its upper portion with a recess 22, for the passage of the nose 23, of a bolt 24, Fig. 6, and the pawl 12 is constructed intermediate its extremities with a locking notch 25, in such manner that when the bolt 24 is moved in the proper direction the nose 23 of the bolt will enter the notch 25 and thus hold the pawl in engagement with the rack for the purpose of locking the sash at any desired height. The bolt 24, as here illustrated, is adapted to slide vertically in a recessed part of the window frame, and it is provided with a laterally projecting finger-piece 26 which extends through a slot 27 in a guide plate 28, secured to the window frame, Fig. 6, so that by manipulating the finger-piece 26 the bolt can be moved into and out of engagement with the pawl.

For the purpose of locking the bolt 24 in engagement with the pawl and thus prevent any unauthorized person from moving the window sash, I provide the plate 28 with a rotary cam 29, adapted to be operated by a key 30, Fig. 8, the construction being such that when the bolt 24 is adjusted to engage its nose 23 with the locking notch 25 of the pawl 12, the cam 29 can be turned by the key 30 into such position as to bear against the finger-piece 26 and prevent the bolt from being raised or disengaged from the pawl. This is a useful feature of construction for many purposes, especially in dwellings where it is desirable to prevent children from operating the sash, or in cars where the conductor or other attendant may consider it advisable to lock the sash and thus prevent it being operated by a passenger.

The cam described and shown provides a very simple device for locking the bolt in engagement with the pawl, but other locking devices operated by a key from the exterior of the window frame can be employed.

The push button 19, as here represented, is arranged in a suitable recess in the window

sill, at or near the center thereof, for the purpose of placing it in the most convenient position for operating the pawl. I do not, however, confine myself to any particular location of the finger-piece or push button 19, for obviously it can be arranged otherwise than as represented for the purpose of actuating the pawl-operating devices.

The window sash is preferably provided with anti-friction rollers adapted to travel on guide rails 31, Fig. 1, as described and shown in my application for Letters Patent filed of even date herewith, Serial No. 463,597. The anti-friction rollers and guide rails are desirable in that they provide for perfect freedom of movement of the sash and effectually avoid rattling or binding of the sash in the window frame.

In practice the parts normally stand in the position represented in Fig. 3, where the pawl is in engagement with the rack on the sash. If the finger-piece or push-button 19 be depressed, the lever 17 and rod 16 are operated to rock the bell crank lever 15 and thereby retract the pawl from engagement with the rack, whereupon the spring 6 will exert its power against the resistance offered by the weight of the sash and the latter will be automatically raised. When the sash has reached the desired point of elevation, the finger-piece or push button 19 is released from pressure and instantly the pawl springs into engagement with the rack and stops the sash. The speed of the spring-impelled drum 5 is controlled by the governor 8, which latter is in the form of a fly geared to the drum, for the purpose of governing or controlling the revolution of the drum and preventing the sash rising with such undue velocity, incident to the power of the spring if uncontrolled, as would cause concussions and injury to the sash and window glass.

In the construction exhibited by the drawings, the teeth of the rack 10, are beveled or formed like ratchet teeth, whereby it is possible to lower the sash without manipulating the finger-piece or push button 19, provided the pawl is not locked by the sliding bolt. But I do not wish to be understood as confining myself to any particular construction of rack, for obviously the teeth thereof may be otherwise suitably formed to meet the conditions required.

My invention provides novel, simple, efficient and economical devices, whereby a window sash can be automatically raised, stopped and held at any desired height, and by the provision by a rack and pawl directly engaging each other, I entirely avoid the complications and expense incident to that construction where a rotary shaft is journaled in the window sash and carries a gear wheel meshing with a rack on the window frame, a spiral spring serving to rotate the shaft and a locking pawl controlled by a finger-piece be-



ing arranged to engage the gear wheel. In such prior construction the power of the spring must be very great owing to the leverage required to rotate the gear wheel on the rack for raising the sash. The prior devices are also objectionable in that it is essential to provide the bottom rails of the sash with very large recesses to receive the spring roller and gear wheel, which large recesses weaken the sash and are difficult to construct.

It will be obvious that the mechanism described and shown is useful for preventing raising of the sash from the exterior of the building or vehicle, and further that the sash can be locked when closed, or it can be raised a few inches for ventilating purposes and be locked in position so that it cannot be further raised from the outside. This is a safeguard against burglars and particularly useful on the lower floors of the hotels and houses of summer resorts and other places.

Having thus described my invention, what I claim is—

1. The combination with a window frame, and a sash, of a spring-impelled hollow drum mounted on the top portion of the window frame and containing within it the impelling spring, a cable winding on the hollow drum and connected with the sash to automatically raise the latter whenever released, means for stopping the ascent of the sash at any desired point and holding it stationary against the power of the spring which acts on the drum, and a governor geared to the drum for preventing the sash rising with undue velocity, substantially as described.

2. The combination with a window frame, and a sash, of a spring-impelled hollow drum mounted on the top portion of the window frame and containing within it the impelling spring, a cable winding on the hollow drum and connected with the sash to automatically raise the latter whenever released, pawl and rack mechanism for stopping the ascent of the sash at any desired point and holding it stationary against the power of the spring which acts on the drum, and a finger piece for disengaging the pawl from the rack, and a governor arranged in operative connection with the drum and serving to prevent the sash rising with undue velocity, substantially as described.

3. The combination of a spring connecting a sash with the top portion of a window frame and operating to raise the sash when released from restraint, with a rack and pawl directly engaging each other and one of which is carried by the window frame and the other by the sash, a finger-piece or push button for disengaging the pawl from the rack, connections between the pawl and the finger piece or push button, a movable bolt operating from the exterior of the window frame to hold the pawl in engagement with the rack and there-

by retain the sash at any desired height, and a key-actuated locking device for locking the movable bolt in engagement with the pawl to prevent the sash being raised or lowered until the key-actuated locking device is operated by an authorized person, substantially as described.

4. The combination of a spring arranged to raise a window sash when the latter is released from restraint, with a rack and pawl directly engaging each other and one of which is carried by the window frame and the other by the sash, a finger-piece or push button for disengaging the pawl from the rack to permit the spring to raise the sash, connections between the pawl and the finger piece or push button, a movable bolt operated from the exterior of the window frame to hold the pawl in engagement with the rack and thereby retain the sash at any desired height, and a rotary, key-actuated cam for locking the bolt in engagement with the pawl to prevent the sash being raised or lowered until said cam is operated by the proper key, substantially as described.

5. The combination with a window frame, and a sash, of a spring-impelled drum mounted on the top portion of the window frame, and provided with a cable winding thereupon, and connected with the sash to automatically raise the latter whenever released, rack and pawl mechanism for stopping the ascent of the sash at any desired point and holding it stationary against the power of the spring, a movable finger piece arranged on the window sill, and connections between the finger piece and the pawl for disengaging the latter from the rack, substantially as described.

6. The combination with a window frame, and a sash, of a spring mechanism mounted on the upper portion of the window frame and connected with the sash to automatically pull the latter upward whenever released, a rack on the sash, a sliding pawl on the window frame, a lever engaging and operating the pawl, a lever pivoted intermediate its extremities to the window sill, and having a rod connection with the pawl-operating lever, and a spring finger piece arranged in the window sill for vibrating the lever which is pivoted to the latter, substantially as described.

7. The combination, with a window sash having a rack, of a spring-impelled drum located on the window frame above the sash and having its spring connected with the latter for automatically raising the sash when released from restraint, a pawl casing arranged in the window frame, a pawl mounted in the pawl-casing and engaging the rack to hold the sash against the power of the spring, a spring which throws the pawl into engagement with the rack, a finger-piece or push button having lever and rod connec-



tions for operating the pawl and moving it  
out of engagement with the rack, and a mov-  
able bolt operated from the exterior of the  
window frame for locking the pawl in en-  
5 gagement with the rack to prevent the sash  
being raised or lowered until the bolt is dis-  
engaged from the pawl, substantially as de-  
scribed.

In testimony whereof I have hereunto set  
my hand and affixed my seal in presence of 10  
two subscribing witnesses.

P. S. RIDDELLE. [L. S.]

Witnesses:

WM. S. KLINE,  
ALBERT H. NORRIS.