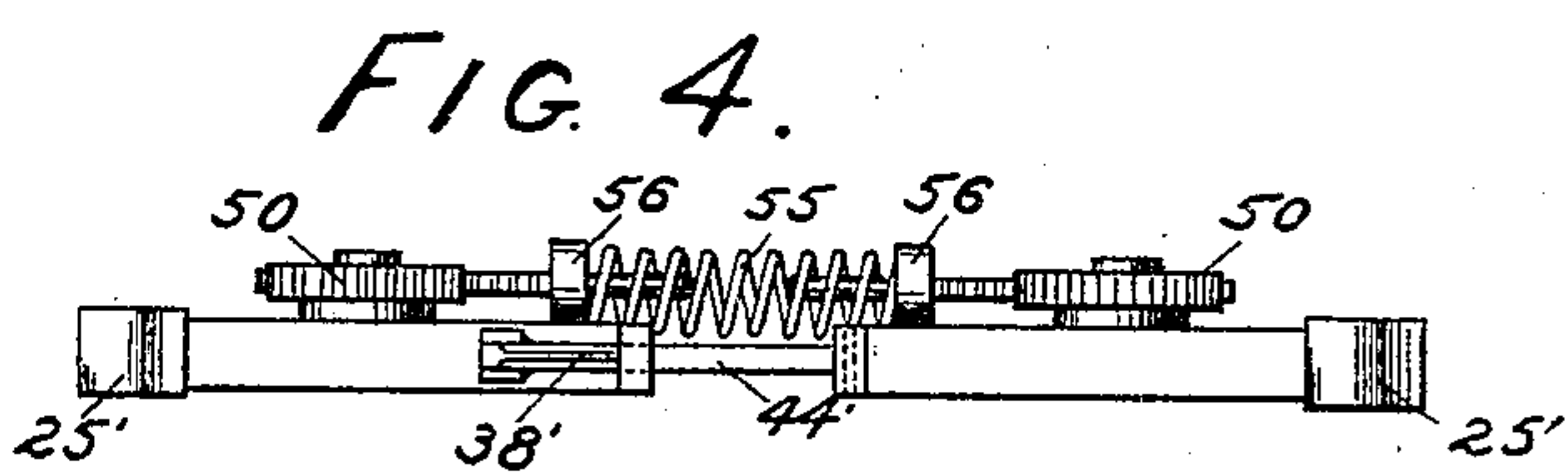
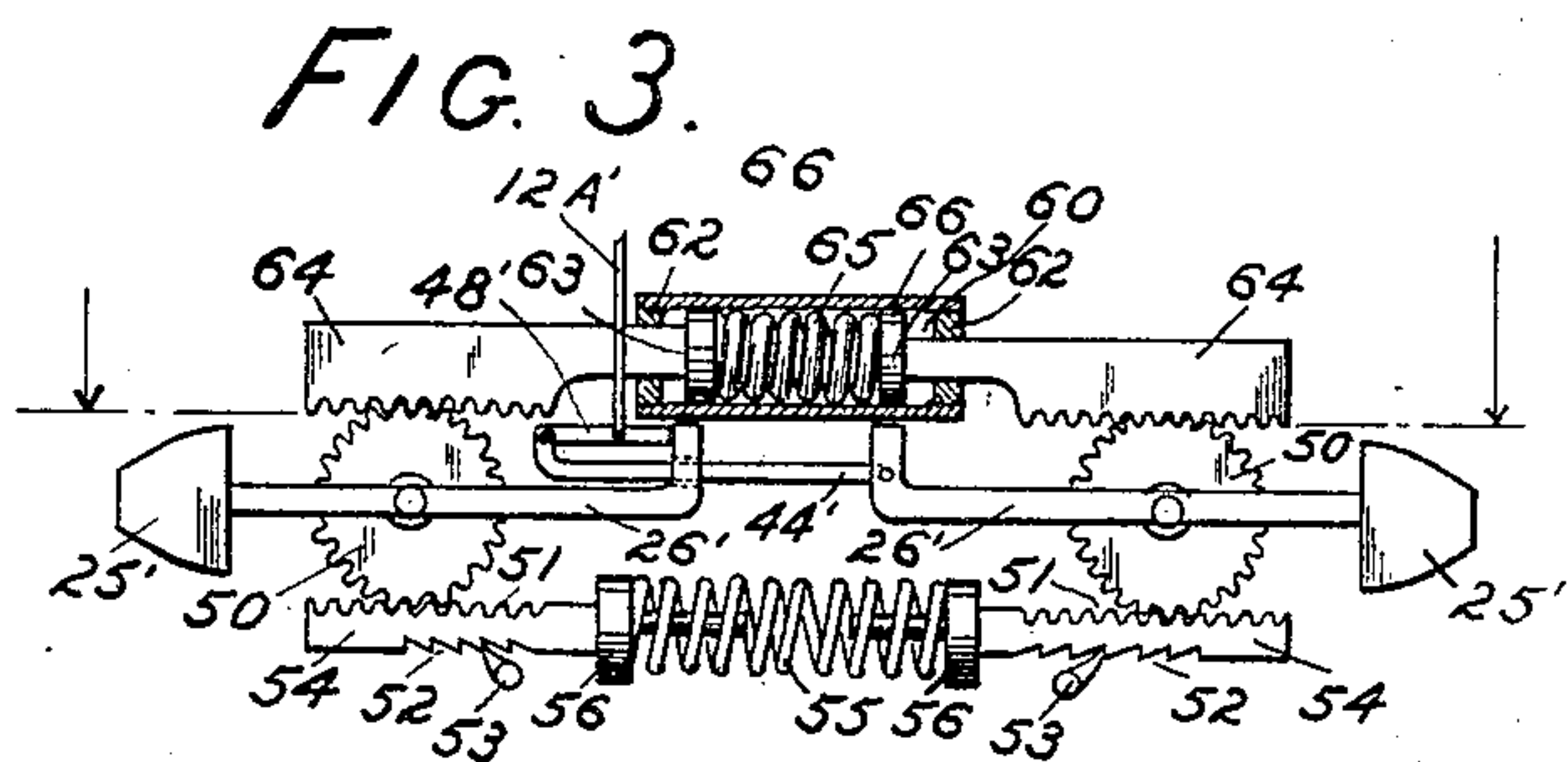
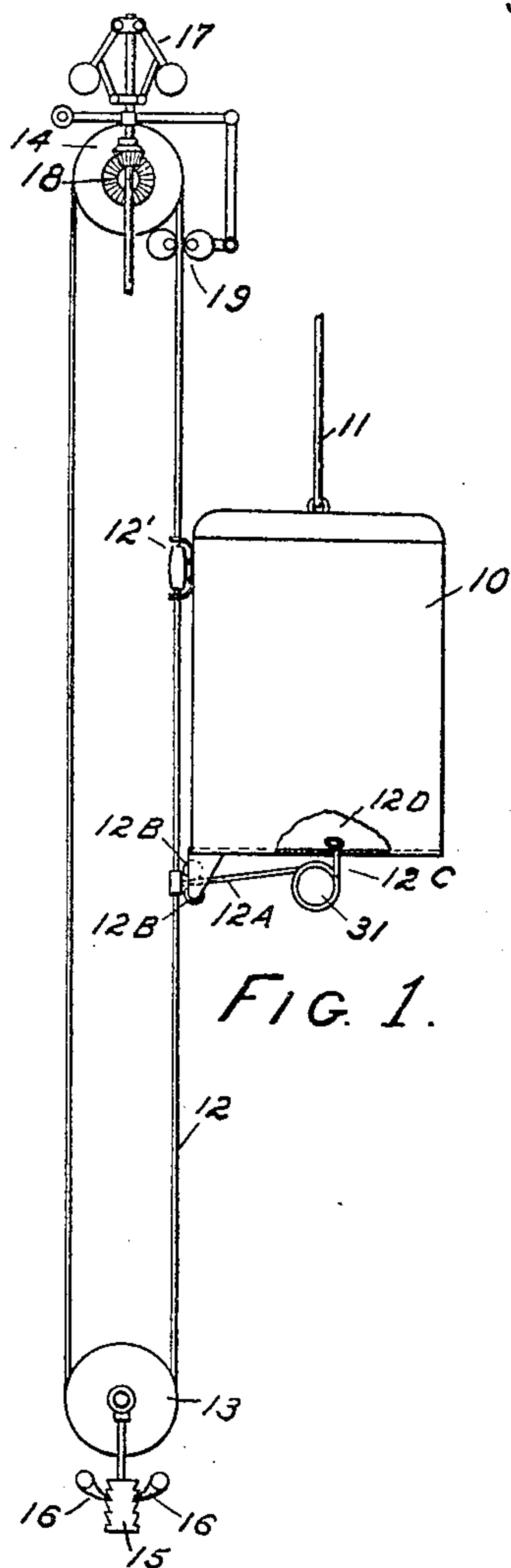
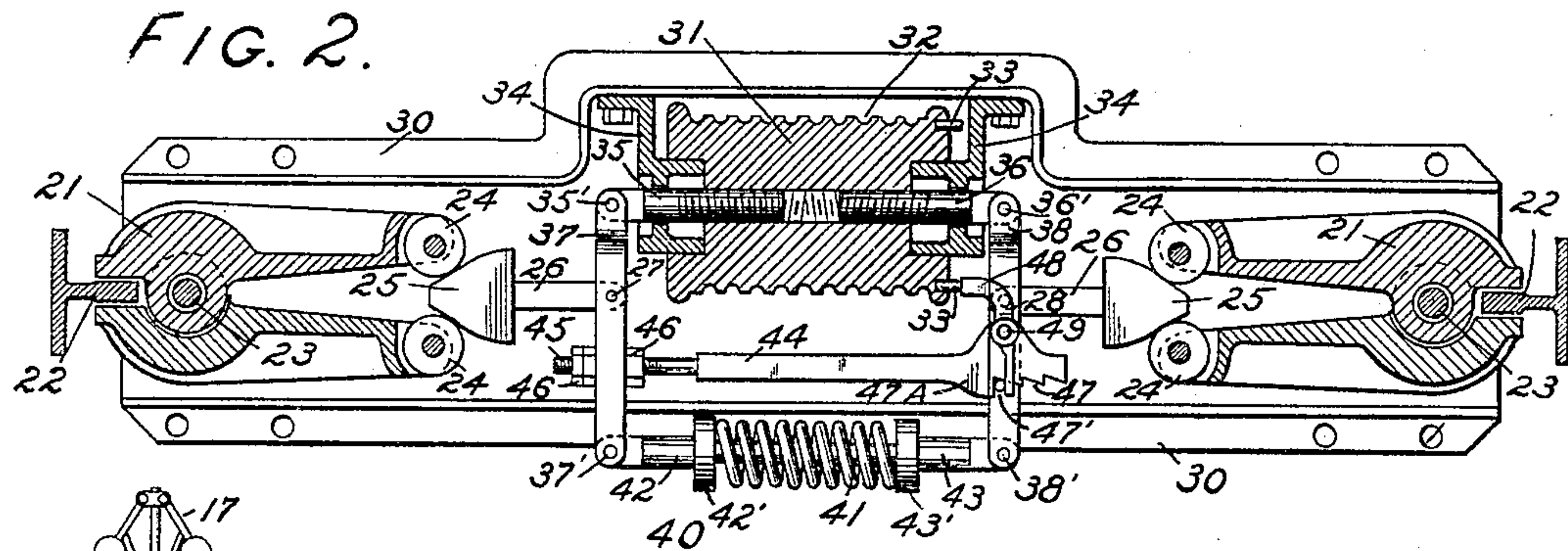


No. 795,341.

PATENTED JULY 25, 1905.

E. R. CARICHOFF.
SAFETY DEVICE FOR ELEVATORS.
APPLICATION FILED MAR. 8, 1905.



WITNESSES:

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EUGENE R. CARICHOFF, OF EAST ORANGE, NEW JERSEY.

SAFETY DEVICE FOR ELEVATORS.

No. 795,341.

Specification of Letters Patent.

Patented July 25, 1905.

Application filed March 8, 1905. Serial No. 249,119.

To all whom it may concern:

Be it known that I, EUGENE R. CARICHOFF, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Safety Devices for Elevators, of which the following is a specification.

My invention relates to safety devices for elevators; and its object is to improve upon structures of this kind now in use and to provide a device for quickly and powerfully clamping an elevator-car to the guides over which it is adapted to run.

I will describe my invention in the following specification and point out the novel features thereof in claims.

Referring to the drawings, Figure 1 is a diagrammatic view in elevation of an elevator-car and certain connected apparatus which may be used in carrying out my invention. Fig. 2 is a plan view, partly in section, of my safety device, showing sections of the guides which it is intended to clamp. Fig. 3 is a plan view of a modification of my invention, and Fig. 4 is a side elevation of the device shown in Fig. 3.

Like characters of reference designate corresponding parts in all of the figures.

10 designates an elevator-car to the bottom of which my device is attached.

11 is a hoisting-rope for the car.

12 is a governor-rope connected to run with the car. This governor-rope runs under a sheave 13, situated near one end of the car's travel. It may be weighted, as at 15, and pawls 16 16 may be provided, if desired, to engage with ratchets in the sides of the weight 15 to prevent its upward movement. The governor-rope 12 runs over another sheave 14 near the other end of the car's travel, which is connected to a governor or speed-regulator 17 by suitable gearing 18. The speed-governor is arranged to actuate a gripping device 19, which grips and positively locks the governor-rope whenever the car runs in excess of normal speed. It may be regulated or set to operate at any desired speed and may be arranged to operate when the car is running in either direction. The governor-rope is yieldingly connected to the car at 12' and is so arranged that when the governor-rope 12 is stopped and the car continues to move it will pull away from the yielding connection. This will cause the rope 12^A, which

is attached to the governor-rope 12, to be pulled through the pulleys 12^B 12^B and to be unwound from a drum 31 on the safety device, and thereby impart a rotary motion to the winding-drum 31. It is sometimes desirable to rotate the winding-drum 31 by hand from the car, and for this purpose I have provided another rope 12^C on the winding-drum and attached this rope to a handle 12^D within reach of the operator in the car.

I will now refer to Fig. 2 and describe the clamping device or safety device for the elevator-car, which is there illustrated. The winding-drum 31 is rotatably supported by brackets 34 34, which are rigidly mounted upon a frame 30 30, which holds the safety device and which is preferably attached to the bottom of an elevator-car. The drum 31 may be grooved, as shown at 32, for the reception of the ropes 12^A and 12^C, which are attached to it. The inside of the drum is provided with right and left hand screw-threads in which screws 35 and 36 work. The outer ends of these screws are attached to floating levers 37 and 38, as shown at 35' and 36', respectively. The other ends of these floating levers are connected to a spring-actuating mechanism 40 at 37' and 38'. This mechanism comprises a spring 41, which is preferably under considerable compression, and two end pieces 42 and 43, which are provided with collars 42' and 43', which abut against the spring 41. This spring-actuating mechanism has a tendency to spread the floating levers 37 and 38 apart, but is prevented under ordinary conditions from doing so by an adjustable locking-arm 44. This locking-arm 44 is threaded on one end 45, and this end passes through the floating lever 37 and may be provided with adjusting-nuts 46 46. The other end of the locking-arm 44 is provided with a ratchet 47, which is adapted to engage with a pin 47' on the lever 38. The locking-arm also carries a tripping-piece 48, which is pivoted at 49 and which bears against one of a series of pins 33 33, which are provided on one end of the winding-drum 31 for this purpose, and against the pin 47' on the locking-arm 44.

At 27 and 28 are attached rods 26 26, on the other end of which wedge-shaped cams are provided. These cams 25 are adapted to be forced between the antifriction-rollers 24 24, which are provided near the ends of gripping-jaws 21 21, which are pivoted at 23 23 to the frame 30 and the other ends of which are

arranged and adapted to clamp the upright guides 22 22.

I will now describe the operation of my device. Whenever the car attains undue speed, so that the governor acts and causes the rope 12^A to be pulled in the manner previously described, the winding-drum 31 will be turned thereby. The first effect of this movement of the drum will be to remove the one of the pins 33 33 against which the releasing-piece 48 has been pressing from the releasing-piece 48. The latter will then be free to move from its locking position and will allow the spring 41 to spread the floating levers 37 and 38 quickly apart. The wedge-shaped cams 25 25 as they are connected to these levers by the rods 26 26 will be forced by this movement between the rollers 24 24 on the ends of the clamps 21 and will thus cause the clamps to be moved against and to grip the guides 22 22. The pin 47' on the floating lever 38 will engage the ratchet 47 and positively hold the levers apart in the position into which they have been forced by the spring 41. Upon a further movement of the winding-drum 31 the right and left hand screws 35 and 36 will be forced outward and through their connected parts will force the clamps 21 21 against the guides 22 22 with great power. It will be seen then that in this arrangement an ideal elevator safety-stop has been provided, for upon the slightest movement of the winding-drum 31, which movement may be obtained automatically or by hand, the clamping device is immediately forced against the guides and its retarding effect at once brought into action, and that this retarding effect is then increased by a positive mechanical movement without the intervention of springs or other yielding mechanism until the car is brought to rest. Then of course the movement of the winding-drum 31 ceases.

The various parts may be reset by hand. If desired, springs may be provided to hold the clamps 21 21 away from the guides when not forced on by the above-described mechanism. I have provided a projection 47^A at the end of the ratchet 47 to prevent the floating levers 37 and 38 from coming nearer together than a certain predetermined distance, which may be regulated by the adjusting-nuts 46 46 on the other end of the locking-arm 44. This serves a double purpose. First, it makes it possible to limit the distance which the clamps may be moved from the guides; second, it makes the part of the safety device which is actuated by the right and left hand screws 35 36 a complete and operative device in itself, and it will operate to apply the clamps to the guides even if the spring-actuating mechanism 40 should become disabled.

I will now describe the modification of my invention which is illustrated in Figs. 3 and 4. In this case the wedge-shaped cams 25'

25' are attached to arms 26' 26', on which gears 50 50 are pivoted. The inside ends of these arms are bent up at right angles, as shown. To one of them a locking-bar 44' is connected, to the other end of which a tripping-piece 48' is attached. The other end of the tripping-piece bears against the other arm 26'. The rope 12^A is in this case attached directly to the tripping-piece 48' without the intervention of any winding-drum. In case there are two spring-actuating mechanisms, one of which comprises a spring 55, which bears against collars 56 56 on the arms 54 54. These arms are each provided with a rack 51, which engages with one of the gears 50 50, and a ratchet 52, into which a pawl 53 works. It is evident that when the tripping-piece 48' is released by a pull on the rope 12^A and the locking-arm 44' is released thereby the spring 55 will then force the arms 54 54 apart and through their connected mechanism will move the cams 25' 25' apart. These cams may be arranged to move clamps against the elevator-guides, as before described. The spring 55 is preferably made comparatively light and quick-acting, so that it will move the clamps against the guides almost instantaneously. After it has thus forced the arms 54 54 apart the latter are prevented from returning to their first position by the ratchet-and-pawl arrangement shown. Another spring 65 is shown, which acts in substantially the same way; but this spring is preferably made heavy and powerful, so that it will move the arms 64 64 and the cams 25 25 apart with great force. It is, however, surrounded by a cylinder 60, closed at its ends, as shown at 62 62, and the collars 66 66 on the arms 64 64 form pistons which work in the cylinder 60. The cylinder may be filled with oil and arranged to act as a dash-pot or retarding device for the spring 65. Holes 63 63 may be provided in the pistons 66 66 to allow for the circulation of the oil and to regulate the speed of the pistons' travel. It may be seen then that the action of the spring 65 will be slow but powerful. When the tripping-piece 48' is moved to release the parts, the spring 55 will immediately move the clamps against the elevator-guides, so that their retarding effect will be at once effective, and the spring 65 will then slowly increase this retarding effect with great force. The spring 55 may not be powerful enough to stop the car; but the spring 65 should be strong enough to stop the car with maximum load traveling at any speed. This arrangement provides an ideal safety-stop for elevators, as its action is quick; but it will bring the car to rest gently.

What I claim is—

1. In a safety device for elevators, the combination of a car, guides for the car, a clamping device for the car, means for quickly mov-

ing the clamping device to the guides, a lock to prevent the clamping device from moving back from the guides, and additional means arranged to tighten the clamping device on the guides.

2. In a safety device for elevators, the combination of a car, guides for the car, a clamping device for the car, spring-actuating mechanism for the clamping device, a lock arranged to prevent the clamping device from moving back from the guides, and additional means arranged to tighten the clamping device on the guides.

3. In a safety device for elevators, the combination of a car, guides for the car, a clamping device for the car, spring-actuating mechanism for moving the clamping device in one direction, a lock arranged to prevent the spring-actuating mechanism from moving in but one direction, and means arranged to tighten the clamping device on the guides.

4. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring arranged to move the clamping device against the guides, a lock to hold the clamping device against the guides, and a screw arranged to tighten said clamping device on the guides.

5. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring arranged to move the clamping device against the guides, a lock to hold the clamping device against the guides, a screw arranged to tighten said clamping device on the guides, and means for actuating the spring and the screw.

6. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring normally held under compression arranged to move the clamping device against the guides when released, a holding device for the spring, means for locking the spring mechanism after it has acted, a screw arranged to tighten the clamping device on the guides, and means for actuating the screw and releasing the spring.

7. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring normally held under compression arranged to move the clamping device against the guides when released, an adjustable holding device for the spring, a ratchet to lock the spring mechanism after it has acted, a screw arranged to tighten the clamping device on the guides, and means for actuating the screw and thereby releasing the spring.

8. In a safety device for elevators, the combination of, a car, guides over which the car is adapted to run, a clamping device on the car, a spring arranged to move the clamping de-

vice against the guides, a lock to hold the clamping device against the guides, a screw arranged to tighten said clamping device on the guides, and means for actuating the spring and the screw by the motion of the car.

9. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring arranged to move the clamping device against the guides, a lock to hold the clamping device against the guides, a screw arranged to tighten said clamping device on the guides, means for actuating the spring and the screw when the speed of the car reaches a predetermined limit and means for actuating the spring and the screw by hand.

10. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, a clamping device on the car, a spring arranged to move the clamping device against the guides, means for retaining the clamping device against the guides, a screw arranged to tighten said clamping device on the guides, and a governor connected to run with the car and arranged to actuate the screw and to release the spring when the speed of the car reaches a predetermined limit.

11. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, clamping devices on the car, a spring arranged to move the clamping devices against the guides, means for retaining the clamping devices against the guides, and right and left hand screws arranged to tighten said clamping devices on the guides.

12. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, clamping devices on the car, a spring arranged to move the clamping devices against the guides, means for retaining the clamping devices against the guides, right and left hand screws arranged to tighten said clamping devices on the guides, and means for actuating the spring and the screws.

13. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, clamping devices on the car, a spring arranged to move the clamping devices against the guides, means for retaining the clamping devices against the guides, right and left hand screws arranged to tighten said clamping devices on the guides, and a governor arranged to actuate the spring and the screws by the movement of the car when the speed of the car reaches a predetermined limit.

14. In a safety device for elevators, the combination of a car, guides over which the car is adapted to run, clamping devices on the car, a spring arranged to move the clamping devices against the guides, means for retaining the clamping devices against the guides, right and left hand screws arranged to

tighten said clamping devices on the guides, a governor arranged to actuate the spring and the screws by the movement of the car when the speed of the car reaches a predetermined limit and means for actuating the springs and the screws by hand.

In witness whereof I have hereunto signed

my name in the presence of two subscribing witnesses.

EUGENE R. CARICHOFF.

Witnesses:

JOSEPH E. CAVANAUGH,
ERNEST W. MARSHALL.