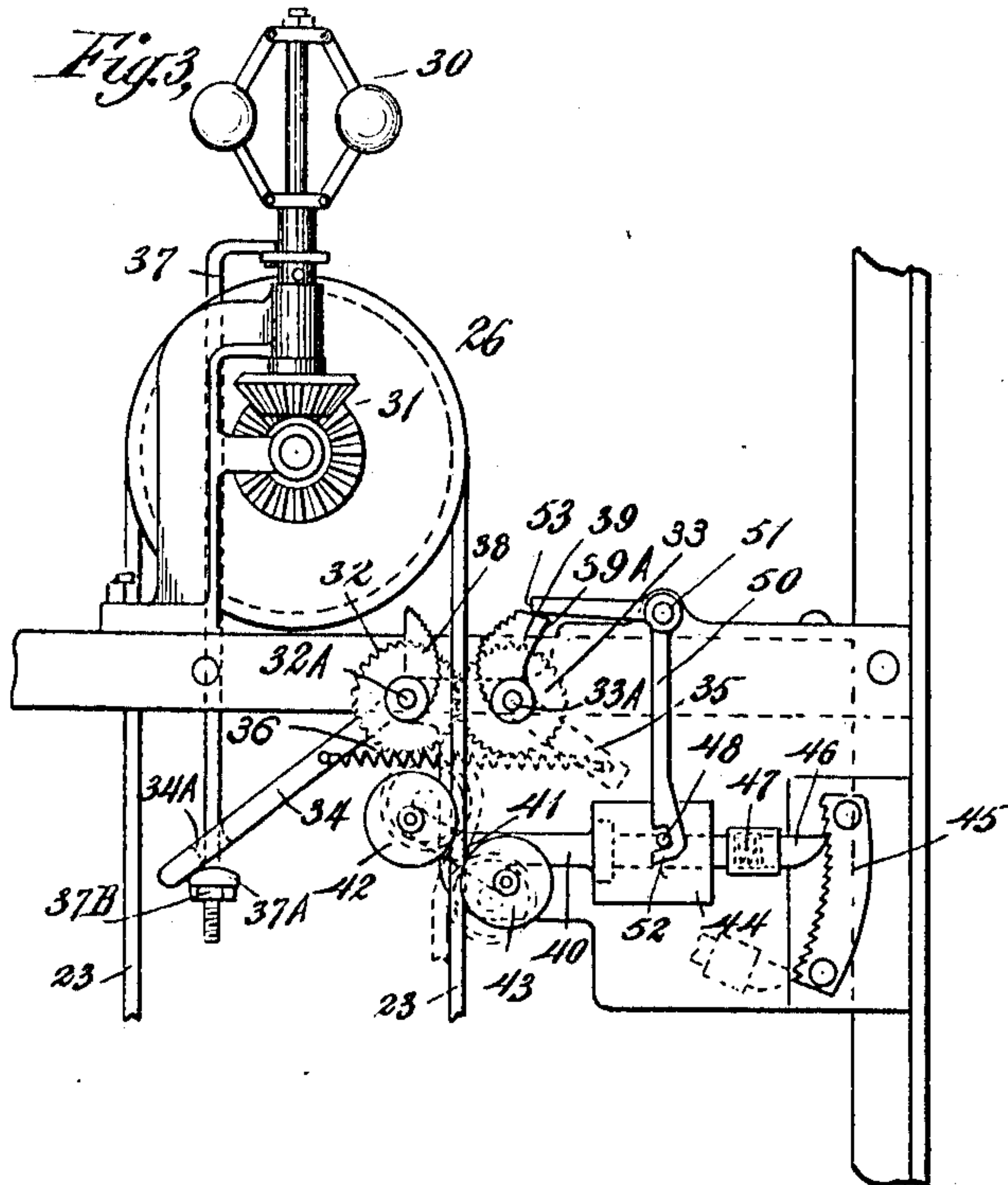
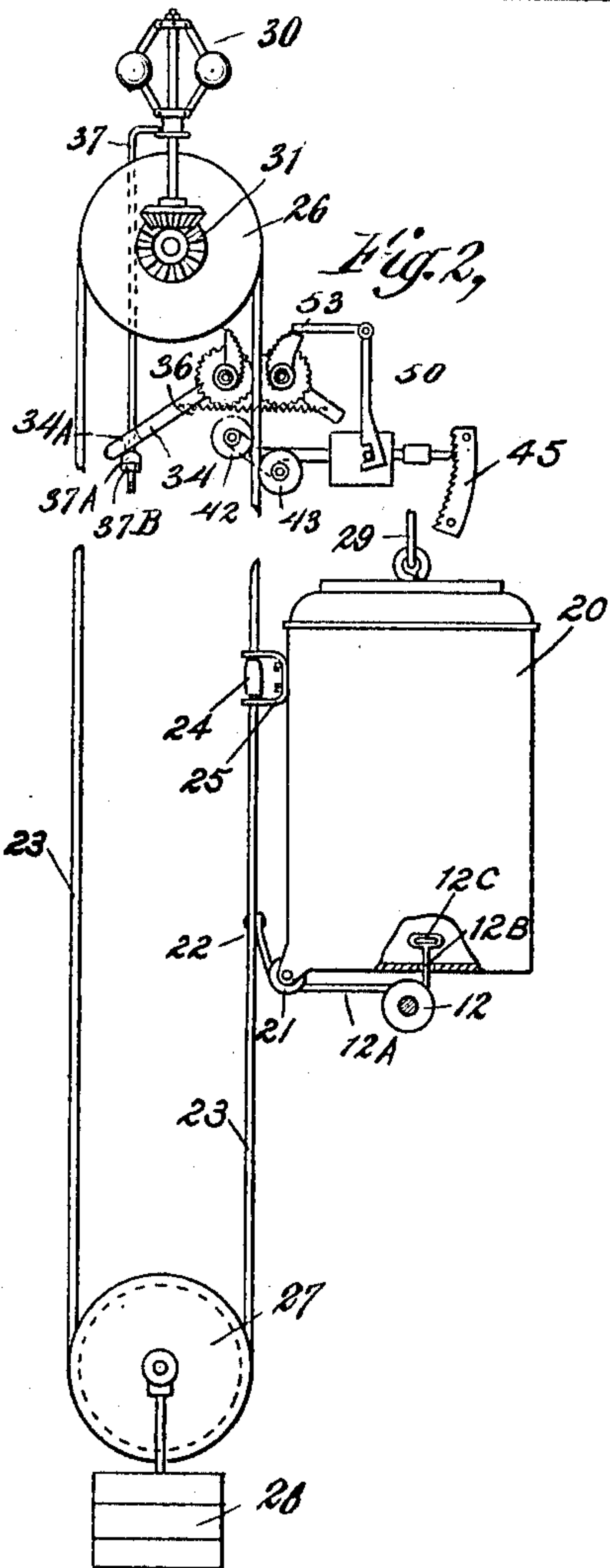
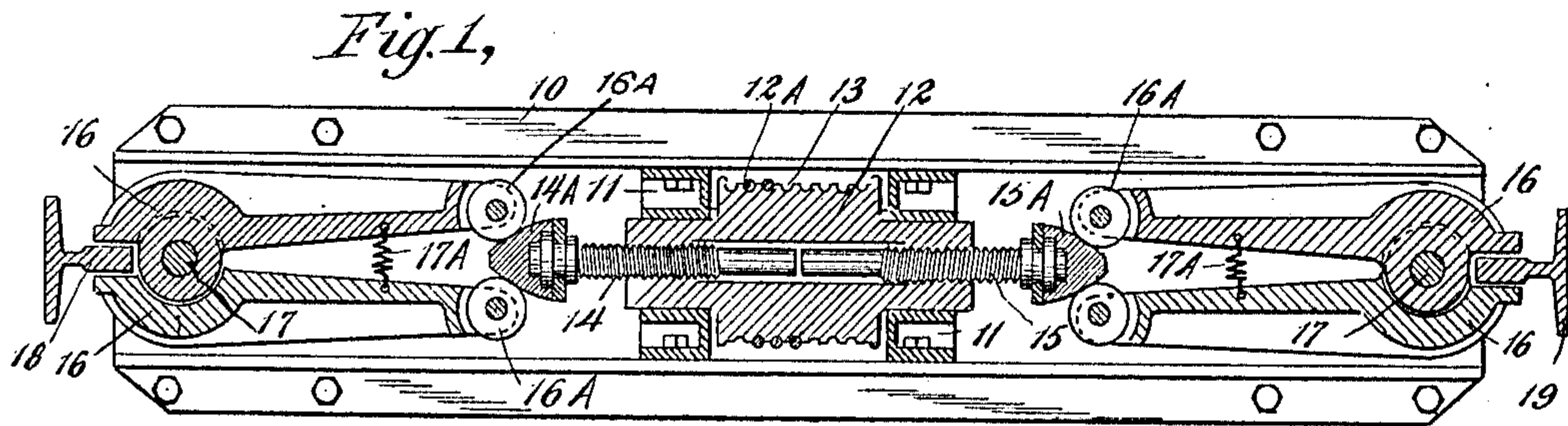


W. C. STRANG.
ELEVATOR SAFETY ACTUATING DEVICE.
APPLICATION FILED DEC. 21, 1905.

969,811.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.



WITNESSES:

Joseph E. Cavanaugh
Ella Luch

INVENTOR

Walter C. Strang
BY
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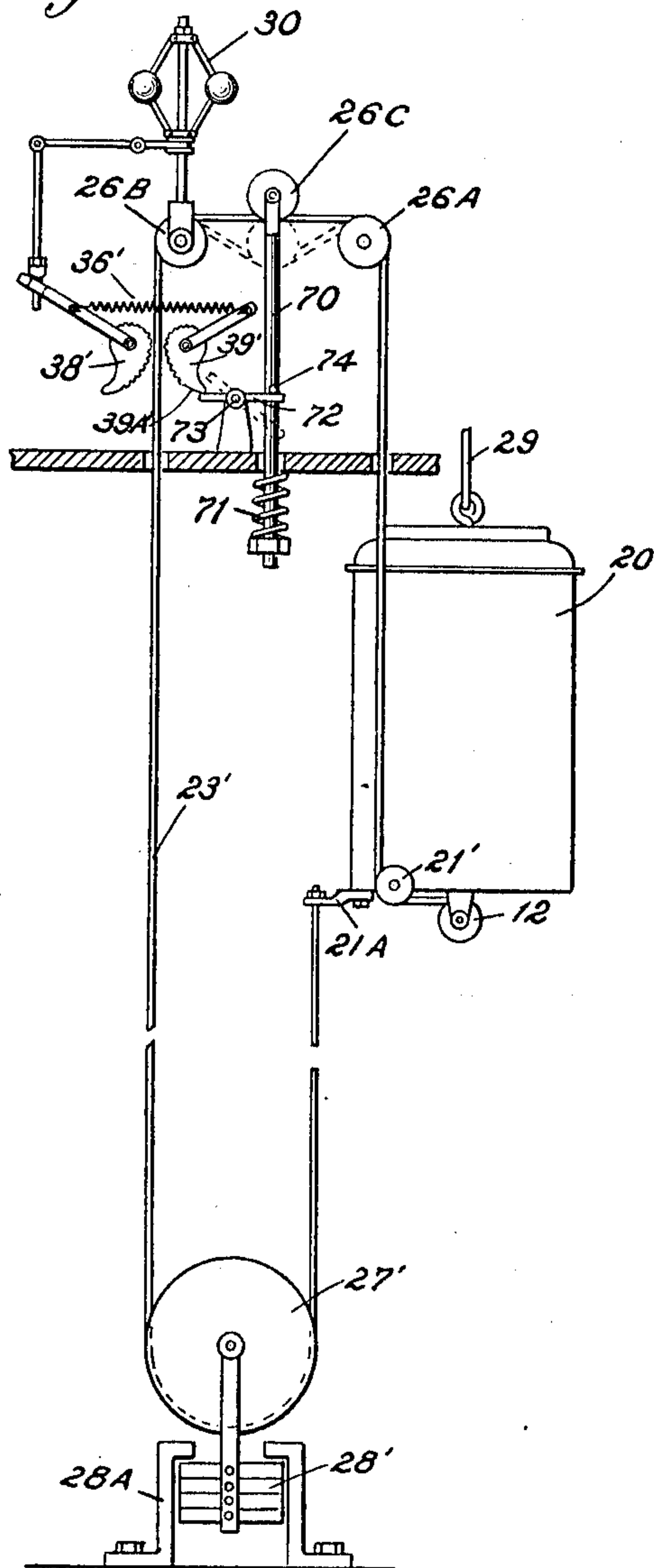
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2 SHEETS—SHEET 2.

Fig. 4.



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WALTER C. STRANG, OF YONKERS, NEW YORK.

ELEVATOR SAFETY ACTUATING DEVICE.

969,811.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed December 21, 1905. Serial No. 292,689.

To all whom it may concern:

Be it known that I, WALTER C. STRANG, a citizen of the United States, and a resident of Yonkers, in the county of Westchester and State of New York, United States of America, have invented certain new and useful Improvements in Elevator Safety Actuating Devices, of which the following is a specification.

My invention relates to elevator safety actuating devices and its object is to improve upon structures of this kind and to provide a device which shall cause the safety devices, which are provided for the purpose of arresting the movement of an elevator-car, to be operated quickly and positively.

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

Referring to the drawing, Figure 1 represents in plan view, partly in section, an elevator safety device of well known construction. Fig. 2 is a side elevation of one form of my invention showing it applied to an elevator-car. Fig. 3 is a side elevation of the same form of my invention but without the elevator-car shown. Fig. 4 is a side elevation of a modification of my invention showing it connected with an elevator car.

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

Referring first to Fig. 1, I will briefly describe the form of elevator safety device which is there shown. 10 designates a frame of any desired design and construction which is arranged to be rigidly attached to an elevator-car. This frame carries brackets 11, 11 which rotatably support the winding-drum 12. The outer surface of this winding-drum 12 may be provided with grooves 13 if desired. A rope 12^A may be attached to this winding-drum 12 and wound in these grooves. 14 and 15 designate right and left-hand screws which are adapted to engage with right and left-hand threads on the inside of the winding-drum 12. 14^A and 15^A are wedge-shaped cams at the ends of these screws. 16, 16 are gripping-jaws which are pivoted at 17 to the frame 10 and which are adapted to engage with guides 18 and 19 over which the car runs. These gripping-jaws may be provided at their ends with anti-friction rollers 16^A, 16^A between which the wedge-shaped cams 14^A and 15^A are arranged to act.

The operation of this device is as follows: Whenever the rope 12^A is pulled so that it is unwound from the winding-drum 12, and the winding-drum 12 is rotated thereby, the right and left-hand screws 14 and 15 will be moved outward and will force the wedge-shaped cams 14^A and 15^A between the anti-friction rollers 16^A, 16^A. This will move the inner ends of the gripping-jaws 16, 16 apart and will force their other ends tightly against the guides 18 and 19. This will firmly clamp the elevator-car to the guides 18 and 19. This form of safety device is no part of the present invention but is well known in the art, and I have described it in order to show more clearly the operation of my invention which I will now describe.

Referring to Fig. 2 it may be seen that the rope 12^A, which is attached to and wound upon the winding-drum 12, runs under a stationary pulley 21 upon the elevator-car 20 and its other end is attached at 22 to a governor-rope 23. This governor-rope has attached to it a stop-piece 24, and a spring 25, which is rigidly attached to the car, is arranged to engage with the top and bottom of this stop-piece 24. In this way the governor-rope 23 is connected to the car and arranged to run with the car. Governor-rope 23 runs up and over a sheave 26 which is preferably situated above the upper limit of the car's travel; thence, down and under another sheave 27 near the lower limit of the car's travel. This sheave 27 may be provided with weights 28 which will serve the purpose of keeping the governor-rope 23 at a proper tension. A mechanical speed-governor 30 is shown connected to the sheave 26 by means of gearing 31, and is therefore arranged to be actuated by the motion of the elevator-car 20. This governor may be of any desired type. I have shown it as a fly-ball governor as this is a simple and efficient form of this type of apparatus. I have, however, provided an improved method of connecting this governor to the rest of the apparatus which I will now describe.

32 and 33 designate intermeshing gears which are respectively supported at 32^A and 33^A on stationary pivots. An arm 34 is rigidly attached to the gear 32, and a similar arm 35 is rigidly attached to the gear 33, and a spring 36 is connected to these arms 34 and 35 and has a constant tendency to pull the ends of these arms together. A

governor-rod 37 extends from the fly-ball governor 30 through the end of arm 34 which is provided with an opening 34^A for the purpose of receiving the governor-rod. This opening 34^A is preferably considerably larger than the governor-rod in order to give it clearance. A stop-piece 37^A is provided on the governor-rod 37 and under the arm 34, and the position of this stop-piece may be regulated by means of a nut 37^B upon the governor-rod 37.

Mounted upon pivots 32^A and 33^A and connected to move with the gears 32 and 33 are two clamping-pieces 38 and 39, the inner faces of which may be made corrugated as shown, if desired. The clamping-piece 39 may be provided with a concentric cam-surface 39^A.

40 designates an arm or lever which is pivoted at 41 and is arranged to carry upon it two sheaves 42 and 43 which are placed on either side of the governor-rope 23. This pivoted arm or lever 40 is arranged to carry upon it a weight 44. A stationary ratchet 45 may be provided near the end of this lever, and a pawl 46, which is pressed outward by a spring 47, may be provided on the end of the lever 40 and arranged to engage with this stationary ratchet 45.

50 is a bell-crank lever pivoted at 51. Its lower end is provided with a hook 52 which is arranged to engage with a projecting pin 48 on lever 40 and its other end 53 is arranged to rest upon the cam-surface 39^A upon the clamping-piece 39. It may be seen that the bell-crank lever 50 is thus arranged to support the weighted lever 40.

I will now describe the operation of my invention. Under usual conditions the elevator-car 20 will run up and down over guides 18 and 19 and in doing so will carry governor-rope 23 with it. This will cause the speed-governor 30 to be rotated at a speed proportional to that of the car. If, for any reason, the speed of the elevator-car becomes excessive, as, for example, if its supporting-cable 29 should break, the speed-governor 30 will then raise the governor-rod 37 to such a degree as to cause the arms 34 and 35 to be raised above a horizontal position. The spring will then quickly draw the ends of these arms 34 and 35 together and will cause the clamping-pieces 38 and 39 to be quickly and powerfully drawn against the governor-rope 23. This will arrest the movement of the governor-rope 23, and a further movement of the car will cause the stop-piece 24 to be pulled away from the springs 25 on the car. This further movement of the car will cause the rope 12^A to be pulled and unwound from winding-drum 12 which will thereby be rotated and cause the gripping-jaws 16, 16 to be forced against the guides 18 and 19 and to thereby arrest the movement of the car.

While I have shown an improved means for locking the governor-rope by means of a speed-governor, the rest of the operation which I have just described is in common use and is well known. It has been found, however, in devices of this kind that the time which elapses from the locking of the governor-rope by the governor until the gripping-jaws have been brought up against the guides has been sufficient to allow a falling car to attain a dangerously high momentum. The purpose of the present invention is to reduce this time to a minimum so that the car will be clamped to the guides immediately upon the locking of the governor-rope.

It may be seen that when the clamping-pieces 38 and 39 have been moved by the governor 30 and the spring 36 in the manner just described, the cam-surface 39^A will be removed thereby from beneath the arm 53 of the bell-crank lever 50. The latter will then be free to move, and the weight 44 will push its supporting hook 52 over to the right and allow the arm 40 to drop into the position in which it is shown by dotted lines in Fig. 3. This will cause sheaves 42 and 43 to be pushed against the governor-rope 23 and to thereby shorten its effective length. The effect of this will be to give the governor-rope a quick upward pull which will be transmitted through the rope 12^A to the winding-drum 12. This will give the winding-drum a rapid primary movement and will cause it to quickly force the gripping-jaws against the guides 18 and 19 so that the retarding effect of the gripping-jaws will take place immediately, as soon as the governor 30 actuates the clamping-pieces and releases the weighted lever 40. If the ratchet and pawl arrangement 45 and 46 is used this will prevent an upward movement of the weighted lever 40 during the subsequent operation of the device. The further movement of the car will, of course, tighten the gripping-jaws upon the guides 18 and 19 until the car comes to rest when there will be no further tendency to rotate the winding-drum 12 and all of the parts will be at rest. The various parts may be reset by hand. The springs 17^A, 17^A may be provided, if desired, to hold the gripping-jaws 16, 16 away from the guides 18 and 19 during the usual operation of the elevator.

It is evident that the locking of the governor-rope 23 and the releasing of the weighted lever 40 may be adjusted to take place simultaneously; or, if desired, the rope may first be clamped and then given its extra pull by having the weighted arm 40 released subsequently to the time of the actuation of the clamping-pieces.

In the modification shown in Fig. 4, the speed-governor 30 is arranged to actuate clamping-jaws 38' and 39' in the manner

previously described. In this case, however, the governor-rope 23' is run up and over two stationary sheaves 26^A and 26^B, and a third sheave 26^C is placed directly over the portion of the governor-rope 23' which is between these two stationary sheaves. This third sheave 26^C has supported upon it rod 70 and is arranged to be forced downward by a spring 71. It is locked, however, by a lever 72 which is pivoted at 73 and rests under the cam surface 39^{A'} and a projecting pin 74 on rod 70. In this case governor-rope 23' is connected somewhat differently than in the arrangement shown in Fig. 2. It is preferably directly connected to the winding-drum 12. It runs under a fixed pulley 21' on the car and then up and over the pulleys 26^A and 26^B before described; thence, down and under a pulley 27' and up to a bracket 21^A on the car to which it is rigidly attached. The pulley 27' may be provided with weights 28' to keep the governor-rope 23' at a proper tension, and these weights may be supported as shown within stationary brackets 28^A. Whenever the governor 30 and the spring 36' actuate the clamping-pieces 38' and 39' and thereby lock the governor-rope 23' against further movement, the lever 72 will be released from the cam surface 39^{A'} and will therefore no longer support the rod 70. The spring 71 will thereupon move the pulley 26^C down into the position in which it is shown by dotted lines and will thereby quickly pull the governor-rope 23' and rotate the winding-drum 12. It may be seen that the amount of this pull will be twice that of the movement of the pulley 26^C. This operation is similar to that previously described.

In my improved arrangement of the parts for actuating the gripping-jaws, it may be seen that as the governor speeds up it raises the arms 34 and 35 until the spring 36 is nearly in line with the common axis of the pivots 32^A and 33^A. The tension of the spring will thus be supported by the pivots 32^A and 33^A and will have but little effect upon the governor 30. Consequently, the governor will be very sensitive to speed variations. Upon an increase of its speed above a predetermined amount the ends of levers 34 and 35 will raise the spring 36 above the axes of their supporting pivots and it will then act to pull the ends of the levers together quickly and positively.

In Fig. 2 I have shown a rope 12^B attached to the winding-drum 12 and provided with a handle 12^C within the car, as it is often desirable to provide some means whereby the operator in a car may manually operate the safety device.

I have shown several modifications of this invention to show that it is not limited to any specific construction. This arrangement may be applied to many of the forms

of elevator safety devices which are well known in the art and I do not wish to limit myself in any way to the particular form of safety device which I have shown and described to illustrate the operation of my invention.

I believe it is broadly new to actuate a safety device for elevators by locking a governor-rope and then giving this rope an extra pull in order to actuate the safety device quickly before the car reaches a dangerous speed.

What I claim is—

1. A speed governor, an elevator-car, a rope connected with the car arranged to operate the governor, and means actuated by the governor for locking the rope and taking up the rope between the point of locking and the car.

2. A speed-governor, a rope, a clamping device actuated by the governor and arranged to lock the rope and a weighted lever arranged to exert a pull on the rope.

3. A speed-governor, a rope, a clamping device actuated by the governor and arranged to lock the rope and a weighted lever arranged to exert a pull on the rope, a locking device for the weighted lever and means actuated by the governor for releasing said locking device.

4. A centrifugal governor, a rope arranged to actuate the governor, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope, a weighted lever arranged to exert a pull on the rope, a locking device for the weighted lever, means operated by the governor for releasing the locking device and means for preventing an upward movement of the weighted lever.

5. A centrifugal governor, a rope arranged to actuate the governor, a pair of clamping-pieces arranged to be moved against the rope, a spring for actuating the clamping-pieces, a pair of sheaves, one on either side of the rope, means for moving said sheaves and causing them to exert a pull on the rope and a locking device for the moving means, said governor arranged to control the movement of the clamping-pieces and to release the locking device.

6. A centrifugal governor, a rope arranged to actuate the governor, a pair of clamping-pieces mechanically connected together and arranged to be moved against the rope, a spring for actuating and holding the clamping-pieces, a pair of sheaves, one on either side of the rope, a lever for moving said sheaves and causing them to form a double bight in the rope and to thereby exert a pull upon the rope, and a locking device for the lever, said governor arranged to control the movement of the clamping-piece and release the locking device.

7. A centrifugal governor, a rope ar-

ranged to actuate the governor, a pair of clamping-pieces mechanically connected together and arranged to be moved against the rope, a spring for actuating and holding the clamping-pieces, a pair of sheaves, one on either side of the rope, a weighted lever arranged to move said sheaves and cause them to form a double bight in the rope and to thereby exert a pull upon the rope, a locking device for said weighted lever, said locking device comprising a bell-crank lever one end of which is arranged to engage with one of the clamping-pieces and the other end of which is arranged to take into the weighted lever, said governor arranged to control the movement of the clamping-piece and to thereby release the locking device.

8. An elevator-car, a safety device therefor, a rope arranged to move with the car, a speed-governor operated by said rope and means actuated by the governor for locking the rope and pulling the rope between the point of locking and the car and thereby actuating the safety device.

9. An elevator-car, a safety device therefor, a rope arranged to move with the car, a speed-governor operated by said rope and a clamping device actuated by the governor and arranged to lock the rope and additional means also actuated by the governor for pulling the rope, said locking and pulling of the rope being arranged to actuate the safety device.

10. An elevator-car, a safety device therefor, a rope arranged to move with the car, a speed-governor operated by said rope, a spring actuated clamping device controlled by the governor and arranged to arrest the movement of the rope and to thereby cause the movement of the car to actuate the safety device and additional means also controlled by the governor arranged to pull on said rope and thereby quicken the operation of the safety device.

11. An elevator-car, a safety device therefor, a rope arranged to move with the car and connected to the safety device, a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope and to thereby actuate the safety device and a weighted lever arranged to pull on the rope and thereby quicken the actuation of the safety device, a locking device for said weighted lever and means controlled by the governor for releasing the locking device.

12. An elevator-car, a safety device therefor, a rope arranged to move with the car and connected to the safety device, a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope, a weighted lever arranged

to exert the pull on the rope and to thereby quickly actuate the safety device on the car, a locking device for said weighted lever and means controlled by the governor for releasing the locking device, said safety device being arranged to be further actuated by the movement of the car.

13. An elevator-car, guides over which said car is arranged to run, a safety device on the car arranged to clamp the car to the guides, a rope arranged to move with the car, a speed-governor operated by said rope and a clamping-device actuated by the governor and arranged to lock the rope, and additional means also actuated by the governor for pulling the rope, said locking and pulling of the rope being arranged to actuate the safety device.

14. An elevator-car, guides over which said car is arranged to run, a safety device on the car arranged to clamp the car to the guides, a rope arranged to move with the car, a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope and to thereby cause the movement of the car to actuate the safety device, and additional means also controlled by the governor arranged to pull on said rope and thereby quicken the operation of the safety device.

15. An elevator-car, guides over which said car is arranged to run, a safety device on the car arranged to clamp the car to the guides, a rope arranged to move with the car and connected to the safety device, a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope and to thereby actuate the safety device and a weighted lever arranged to pull on the rope and thereby quicken the operation of the safety device, a locking device for said weighted lever and means controlled by the governor for releasing the locking device.

16. An elevator-car, guides over which said car is arranged to run, a safety device on the car arranged to clamp the car to the guides, a rope arranged to move with the car and connected to the safety device, a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope, a weighted lever arranged to exert the pull on the rope and to thereby quickly actuate the safety device on the car, a locking device for said weighted lever and means controlled by the governor for releasing the locking device, said safety device being arranged to be further actuated by the movement of the car.

17. An elevator-car, guides over which said car is arranged to run, a safety device

on the car, said safety device comprising gripping-jaws arranged to clamp the car to the guides, a rope arranged to move with the car and connected to the safety device, 5 a speed-governor operated by said rope, a spring-actuated clamping device controlled by the governor and arranged to arrest the movement of the rope, a weighted lever arranged to exert the pull on the rope and 10 to thereby quickly actuate the safety device on the car, a locking device for said weighted lever and means controlled by the governor for releasing the locking device, said safety device being arranged to be further 15 actuated by the movement of the car.

18. An elevator-car, guides over which said car is arranged to run, a safety device on the car, said safety device comprising gripping-jaws arranged to clamp the car to 20 the guides, right and left-hand screws arranged to actuate the gripping-jaws, a rope arranged to move with the car and connected to the safety device, a speed-governor operated by said rope, a spring-actuated device controlled by the governor and 25 arranged to arrest the movement of the rope, a weighted lever arranged to exert the pull on the rope and to thereby quickly actuate the safety device on the car, a locking device for said weighted lever and means controlled by the governor for releasing the 30 locking device, said safety device being arranged to be further actuated by the movement of the car.

35 19. An elevator-car, guides over which said car is arranged to run, a safety device on the car, said safety device comprising gripping-jaws arranged to clamp the car to the guides, right and left-hand screws ar- 40 ranged to actuate the gripping-jaws, a rope arranged to move with the car, said rope being connected to the safety device, a centrifugal speed-governor operated by said rope, a pair of clamping-pieces mechan- 45 ically connected together and arranged to be moved against the rope, a spring for actuating and holding the clamping-pieces, a pair of sheaves, one on either side of the rope, a weighted lever arranged to move 50 said sheaves and cause them to form a double bight in the rope and to thereby exert a pull upon the rope, a locking device for said weighted lever, said locking device comprising a bell-crank lever one end of 55 which is arranged to engage with one of the clamping-pieces and the other end of which is arranged to take into the weighted lever, said governor arranged to control the

movement of the clamping-pieces and to thereby release the locking device. 60

20. A speed governor, a sheave connected therewith, a rope running over the sheave, a clamping device for directly gripping and locking said rope, a spring arranged to ac- 65 tuate the gripping device, said spring arranged to be drawn by the governor over a dead center to actuate the clamping device.

21. A speed-governor, a rope, a clamping device for the rope, said clamping device comprising two levers, pivots for the 70 levers and a spring connecting the levers, said governor arranged to raise the levers and the spring, said spring being arranged to actuate the clamping device whenever the governor raises said spring above said 75 pivots.

22. A speed-governor, a rope, a clamping device for the rope, said clamping device comprising two levers, pivots for the levers and a spring connecting the levers, said 80 governor arranged to move the levers and the spring, said spring being arranged to impart a snap-action to the clamping device whenever the governor moves said spring beyond the pivots, and a loose connection 85 between the governor and the levers.

23. A speed governor, a rope arranged to actuate the governor, means actuated by the governor for locking the rope, and other means controlled by the governor for exert- 90 ing a pull upon the rope.

24. A speed governor, a rope arranged to actuate the governor, means actuated by the governor for locking the rope, and ad- 95 ditional means released by the actuation of the locking means for exerting a pull upon the rope.

25. An elevator-car, guides over which said car is arranged to run, a safety device on the car arranged to clamp the car to 100 the guides, a rope arranged to move with the car, a speed governor operated by said rope, means actuated by the governor for locking the rope, and means controlled by the governor for pulling the rope, said lock- 105 ing means and pulling means being arranged to actuate the safety device on the car.

In testimony whereof, I have signed my name to this specification in the presence of 110 two subscribing witnesses.

WALTER C. STRANG.

Witnesses:

ERNEST W. MARSHALL,
ELLA TUCH.