

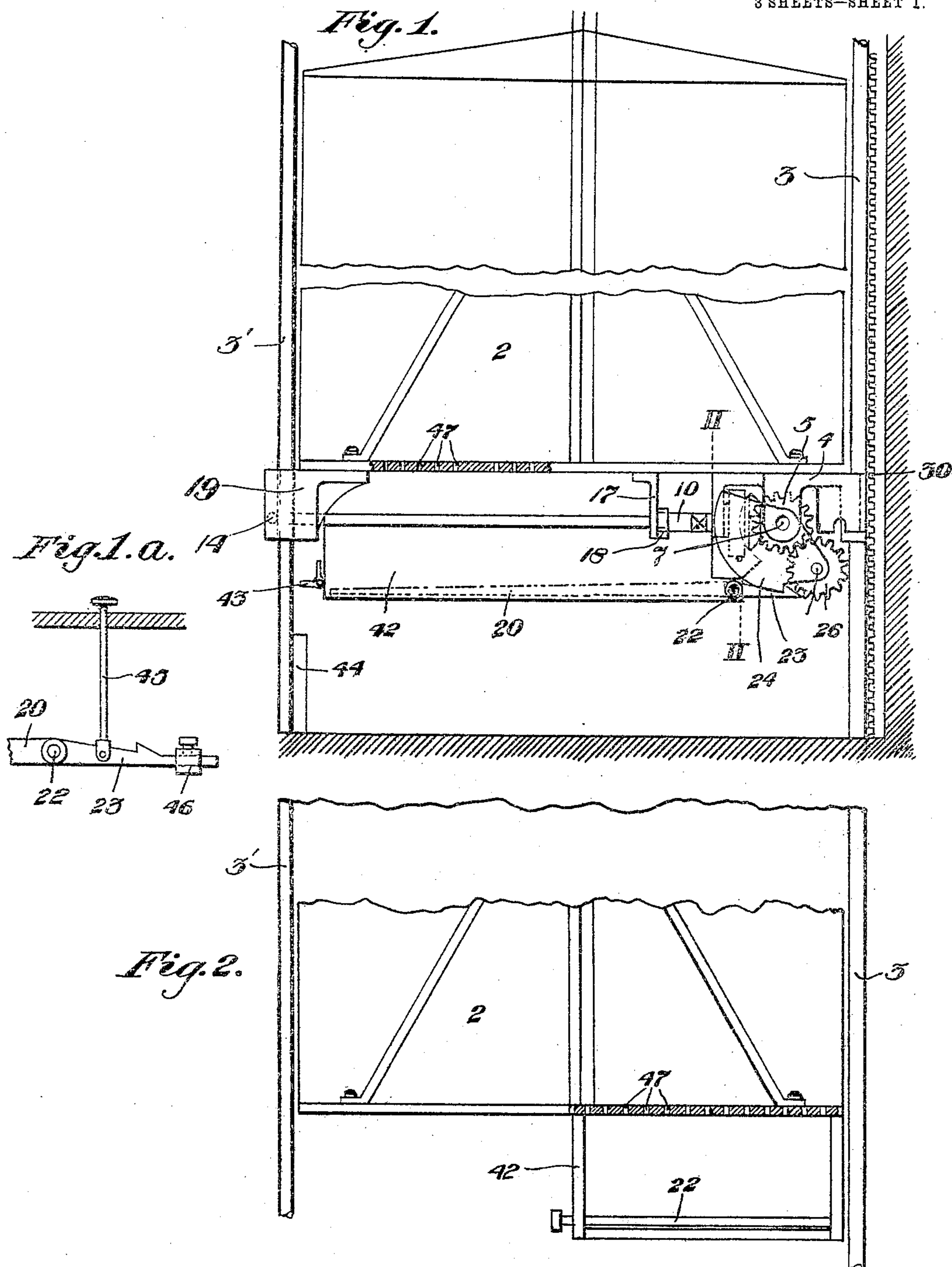
No. 778,616.

PATENTED DEC. 27, 1904.

A. WHELAN.
ELEVATOR SAFETY CLUTCH.

APPLICATION FILED MAY 31, 1904.

3 SHEETS—SHEET 1.



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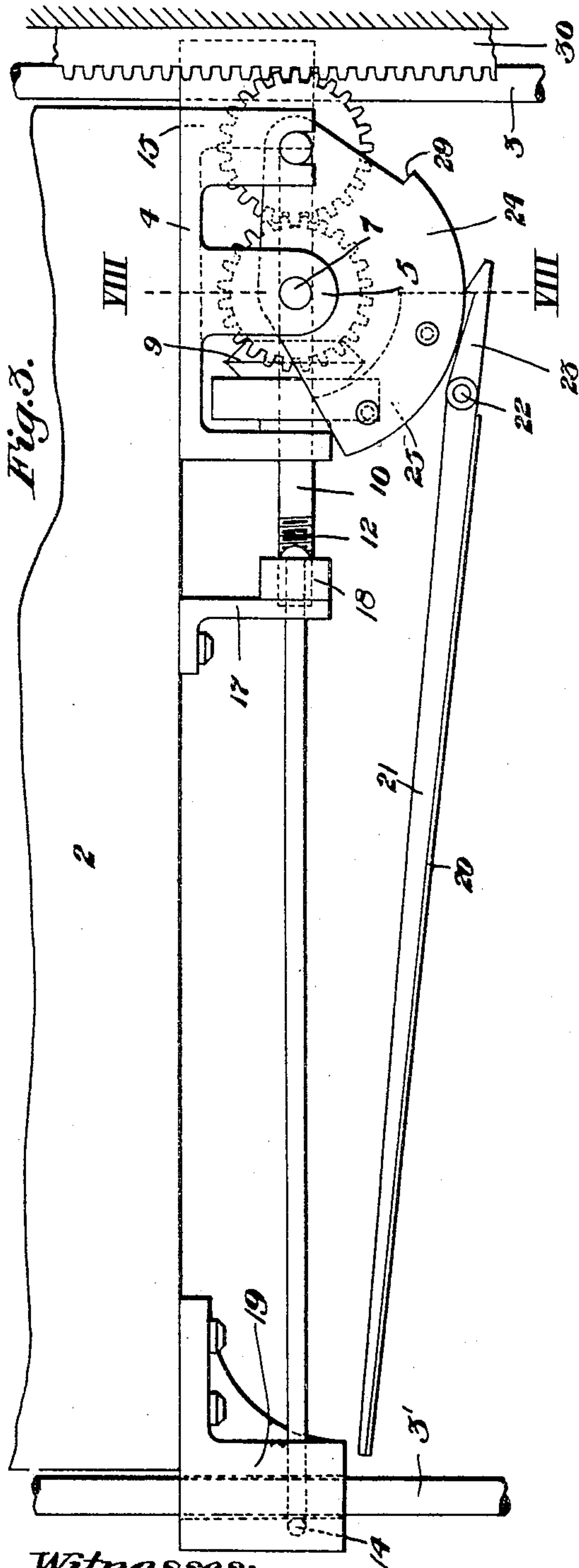
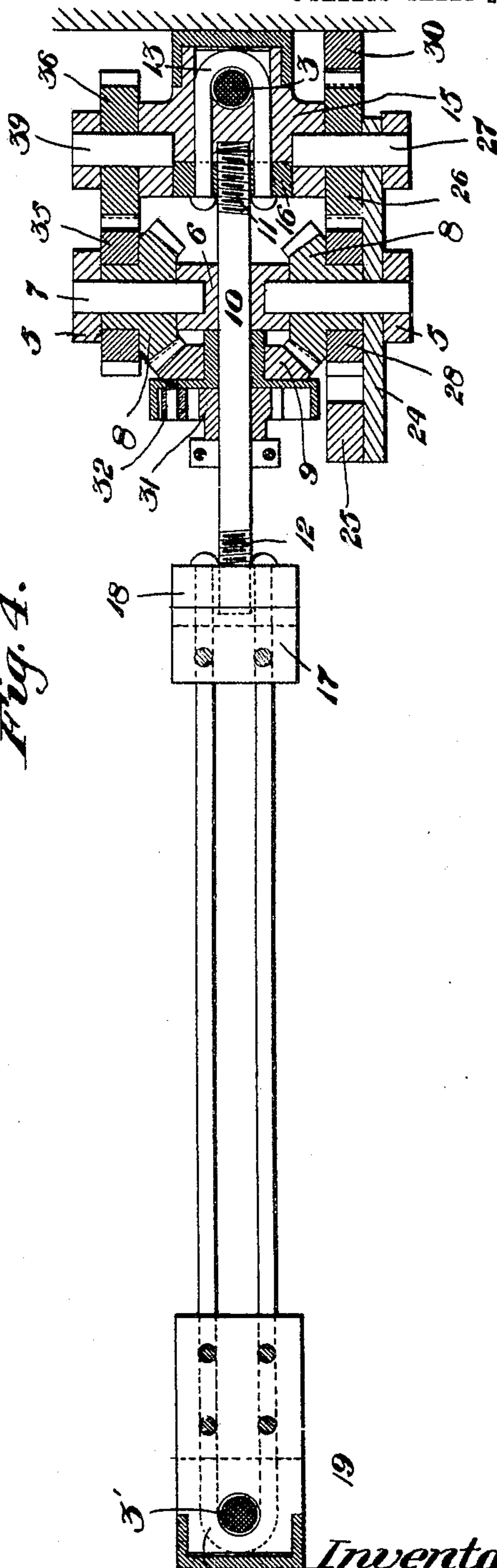


Fig. 4.



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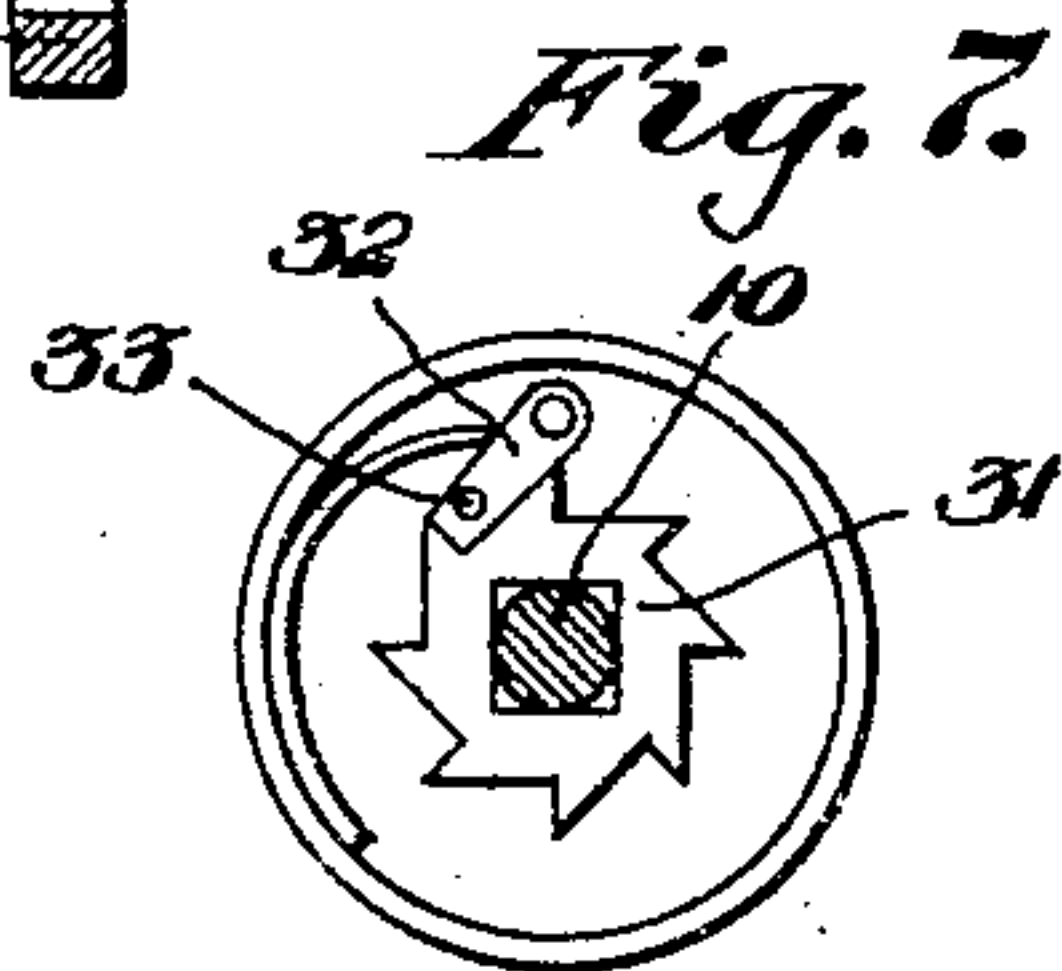
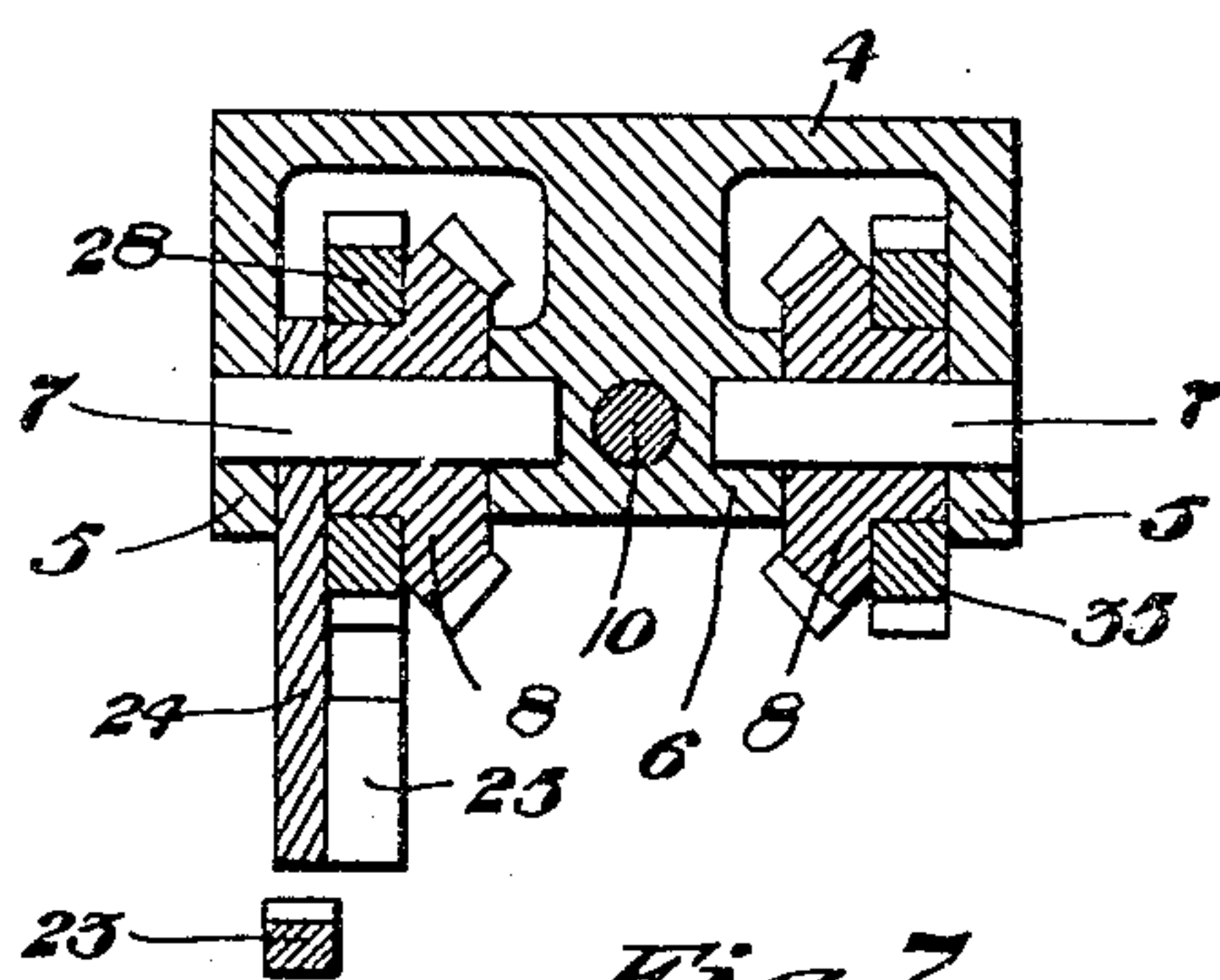
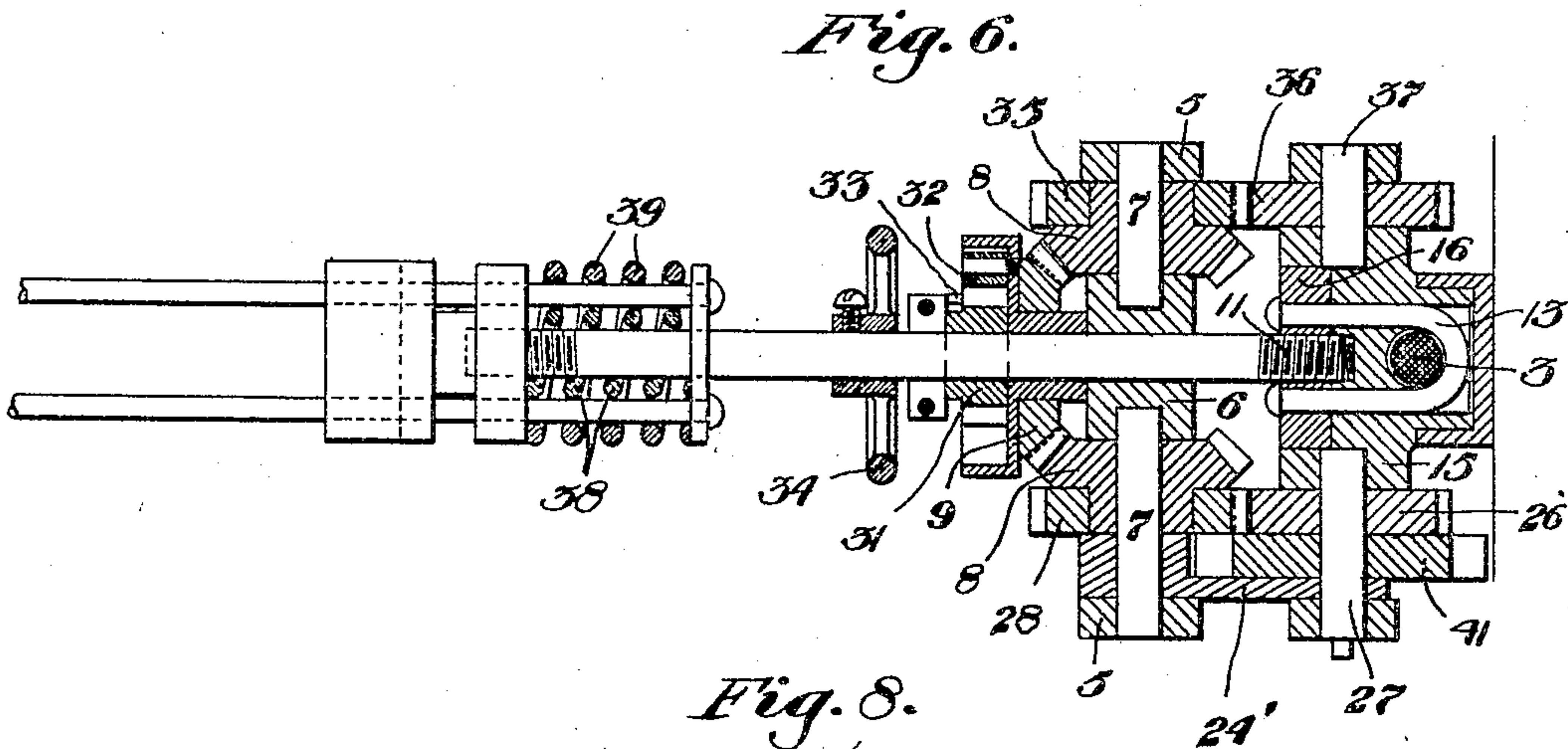
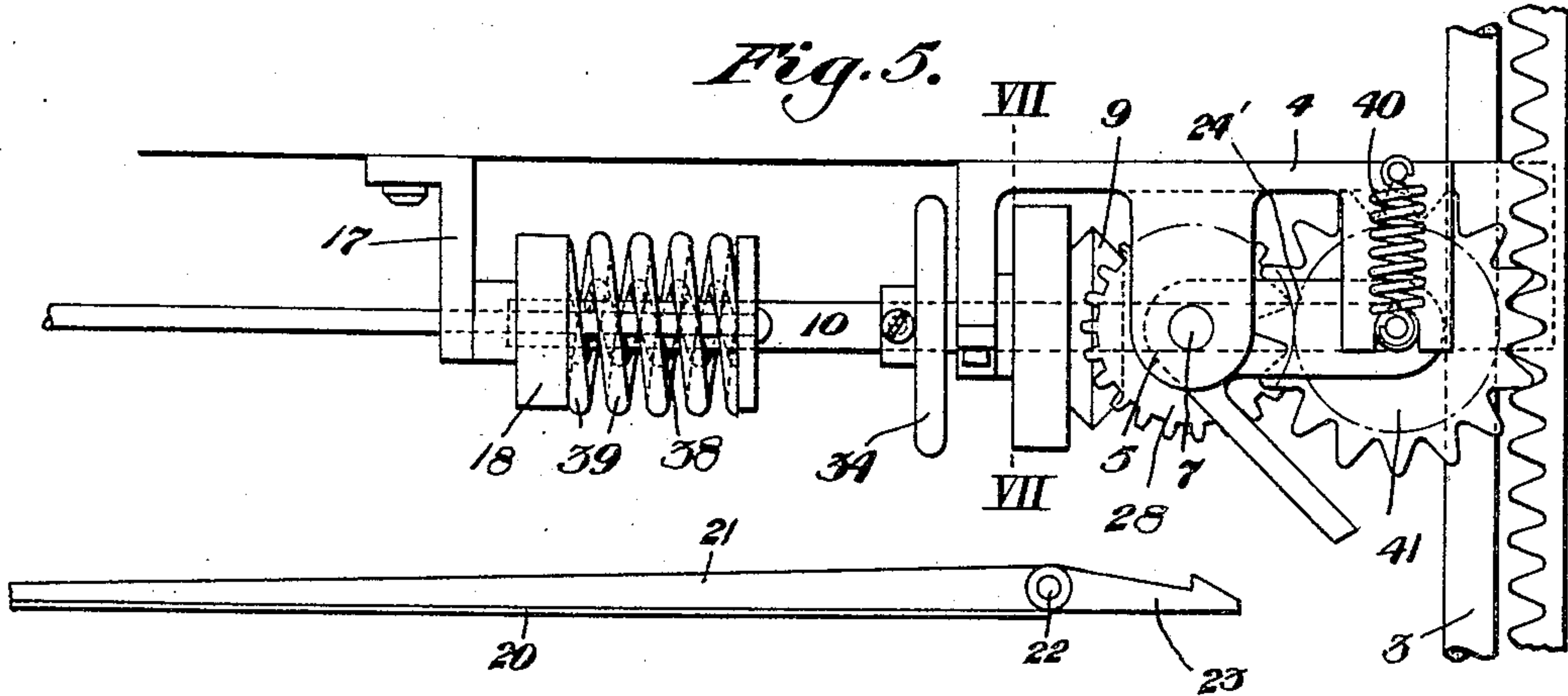
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ANDREW WHELAN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO W. H. PITTENGER, OF PITTSBURG, PENNSYLVANIA.

ELEVATOR SAFETY-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 778,616, dated December 27, 1904.

Application filed May 31, 1904. Serial No. 210,502.

To all whom it may concern:

Be it known that I, ANDREW WHELAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Elevator Safety-Clutches, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in side elevation of an elevator-car equipped with my improved safety locking apparatus, showing the device as out of engagement. Fig. 1^a is a detail view of the latch. Fig. 2 is a sectional view on the line II II of Fig. 1. Fig. 3 is a partial side view showing the device in engagement. Fig. 4 is a partial plan view of the actuating mechanism detached and in engagement with the rack. Figs. 5 and 6 are views similar to Figs. 3 and 4, showing a modified construction. Fig. 7 is a cross-sectional view on the line VII VII of Fig. 5, showing the ratchet mechanism. Fig. 8 is a cross-sectional view on the line VIII VIII of Fig. 3.

My invention consists of an improvement in mechanism for automatically arresting the descent of elevator-cars in case of accidental falling, utilizing the pressure of air to apply the braking mechanism simultaneously with the fall of the elevator-car whenever a certain predetermined downward speed is exceeded.

The present invention constitutes an improvement upon the subject-matter of my previous application bearing the Serial No. 188,427, and refers particularly to the means for applying braking pressure equally at each side, means for releasing the device after having been actuated, modified means for engaging the rack, an improved apron construction and lock, with other details of improvement, as shall be more fully hereinafter described.

Referring to the drawings, 2 is the elevator-car, suspended by the usual cables and provided with the customary guides within the shaft. Rigidly secured at the top of the shaft and also preferably at the bottom are cables 3 3' or their suitable equivalent, as rods,

chains, &c., of sufficient size and strength to support the car and its load when gripped by the brake.

4 is a bracket secured upon the under portion of the car at one side adjacent to its edge, provided with downwardly-depending bearings 5 5 at each side and an intervening similar bearing 6, in which are mounted the oppositely-rotating shafts 7 7. Secured to shafts 7 at each side are bevel-wheels 8 8, meshing into a driven bevel 9, secured upon shaft 10, mounted in central bearings 6, extending outwardly at each end thereof and provided with oppositely-threaded terminals 11 12.

Embracing the cables 3 at each side are U-shaped braking-shoes or grips 13 14, conveniently formed of rods bent to suitable U form, as shown, the grip 13 being suitably mounted in a downwardly-depending supporting portion 15 of bracket 4 and connected at its inner ends, as by riveting, with the nut 16, into which the terminal 11 of rod 10 is tapped. The other grip, 14, is similar in construction, but considerably longer, extending across the elevator-car, passing through guide-bearing 17, and connected with a terminal nut 18 in the same manner as nut 16, described. The oppositely-threaded terminal 12 engages nut 18, and it will thus be seen that when motion is imparted to shaft 10 it will draw the nuts 16 and 18 inwardly or extend them outwardly at the same time. The cable 3', engaged by grip 14, like the other cable, 3, engaged by grip 13, passes through a bracket 19, secured underneath the car at the opposite side, and each of such cable-bearings, while providing a bearing for the grip, also constitutes a shoe against which the cable will be instantly clamped upon drawing the grips inwardly. It will be understood, of course, that sufficient clearance is provided to allow the cables to pass freely through these bearings.

For the purpose of rendering the device operative automatically I employ an apron 20, of canvas or other light material, secured to arms 21, which are mounted adjacent to the mechanism which I have just described upon a

pivoted rock-shaft 22, mounted in suitable bearings. Integral with one of the arms 21 or secured to shaft 22 is an outwardly-extending latch 23, adapted to engage and retain the rack-engaging element, which I shall now describe. This element comprises a plate or other suitable frame 24, preferably provided with a counterweight 25, adapted to throw it forwardly into locking position to cause the pinion to engage the locking-rack.

The frame 24 is pivoted on shaft 7 and carries a toothed wheel 26, pivoted on pin 27 and in mesh with a driving-pinion 28, secured to one of the bevels 8. The frame is also provided with a shoulder 29, adapted to be engaged by the latch 23 of the apron-frame, which thus holds the frame 24 back in the position shown in Fig. 1. 30 is a stationary rack extending vertically along the elevator-shaft, adapted to be engaged by wheel 26, when the upward pressure of air (upon excessive downward travel of the car) causes the apron to rise and unlatch the frame, which then swings forward, due to the counterweight 25. Upon engagement with the rack the pinions 26 28 and bevels 8 9 immediately rotate shaft 10 and apply the grips to the cables simultaneously.

Between the bevel 9 and shaft 10 is inserted a ratchet-wheel 31, rotatively engaging the shaft by its hub, but free to reverse the shaft 10 when the pawl 32 is disengaged. This is done by withdrawing the pawl by its pin 33 and rotating the shaft backwardly to release the grips by a hand-wheel 34 or a wrench until the device is again ready for operation.

The hub of the ratchet-wheel engages the shaft by being squared or splined with it, and sufficient clearance is provided to allow for longitudinal movement of shaft 10. By this means the tension on the grips is equalized and the same pressure applied simultaneously to the cables at each side. On the other side a pinion 35 is secured to the other bevel, 8, and meshes into a corresponding pinion 36, mounted on a non-swinging pivotal pin 37 and adapted to come into engagement with a section of rack similar to rack 30, but located at the top of the shaft. The object of this construction is to check excessive upward travel of the car, should such occur, by imparting movement to shaft 10 in the manner already described.

For the purpose of cushioning the action of the grips somewhat I interpose buffer-springs 38 39 between rod 10 and grip-yoke 14, as shown in Figs. 5 and 6, thus easing the first sudden action when the rack is engaged. These figures also show a modified construction of swinging rack 24' of simpler and lighter construction, adapted to dispense with the counterweight and to be thrown up by a tension-spring 40, as clearly shown, when the frame is unlatched. These figures likewise show an additional wheel 41 of somewhat greater diameter than wheel 26 and having longer teeth, thus insur-

ing greater leverage and a better bearing with the rack. In other respects, however, the construction and mode of operation is the same.

For the purpose of confining the apron and accurately regulating its effective area I provide an inclosing box 42, within which the apron is mounted, as shown in Figs. 1 and 2.

To prevent the operation of the apron when nearing the bottom of the shaft in case the air below the car should be unduly confined, I provide an apron-lock, consisting of a pivoted arm 43, adapted to engage an abutment 44 near the bottom of the shaft, which throws the arm 43 over the end of the apron, thus preventing it from rising. If for any reason it should be desired to actuate the mechanism from the car, a depressing-pin 45 is connected to the latch-arm and extends up through the car-floor, as shown in Fig. 1^a. An adjustable counterweight 46 may be used to delicately adjust the mechanism to operate at the desired speed, while for the purpose of relieving the pressure above the apron the floor may be perforated, as indicated at 47.

The operation will be readily understood from the foregoing description, while the device may be utilized or adapted with considerable change or variation to different conditions of use.

What I claim is—

1. The combination with oppositely-located fixed cables, of gripping devices, means for imparting gripping action to both devices simultaneously, and a wind-apron adapted to control the operation of said devices, substantially as set forth.
2. The combination with oppositely-located fixed cables, and gripping devices therefor, of an arresting-rack, gearing adapted to engage said rack and to impart movement to the gripping devices, and a wind-apron adapted to control the operation of said devices, substantially as set forth.
3. The combination with oppositely-located fixed cables, gripping devices therefor, and a rotatable shaft adapted to draw both of said gripping devices inwardly; of an arresting-rack, gearing adapted to engage said rack and to impart movement to the gripping devices, and a wind-apron adapted to control the operation of said devices, substantially as set forth.
4. The combination with oppositely-located fixed cables, gripping devices therefor, and a rotatable shaft connected by right and left hand screw-threads with said gripping devices; of an arresting-rack gearing adapted to engage said rack and to impart movement to the gripping devices, and a wind-apron adapted to control the operation of said devices, substantially as set forth.
5. The combination with oppositely-located fixed cables, gripping devices therefor, a rotatable shaft connected by right and left hand screw-threads with said gripping devices, and

a ratchet-releasing mechanism; of an arresting device, gearing adapted to engage said rack and to impart movement to the gripping devices, and a wind-apron adapted to control the operation of said devices, substantially as set forth.

6. The combination with oppositely-located fixed cables, gripping devices therefor, a rotatable shaft connected by right and left hand screw-threads with said gripping devices, and spring-buffers located between said shaft and one of said gripping devices; of an arresting device, gearing adapted to engage said rack and to impart movement to the gripping devices, and a wind-apron adapted to control the operation of said devices, substantially as set forth.

7. The combination with oppositely-located fixed cables, of cable-gripping devices connected by a rotatable oppositely-threaded rod, a bevel-wheel in ratchet engagement with said rod, a second bevel in engagement with said first bevel, pinions adapted to engage a fixed rack and to impart movement through said bevels to the rod, and a wind-apron provided with a latch adapted to retain said gearing in inoperative position until released by undue air-pressure upon excessive speed, substantially as set forth.

8. The combination with oppositely-located fixed cables, of cable-gripping devices connected by a rotatable oppositely-threaded rod, a bevel-wheel in ratchet engagement with said rod, oppositely-located bevel-wheels in engagement with said bevel-wheel, intermeshing pinions adapted to be actuated by contact with racks on downward or upward travel respectively, and a wind-apron provided with a catch adapted to retain the gearing on one side in inoperative position until released by undue

air-pressure upon excessive speed, substantially as set forth.

9. The combination with a latch-controlled frame provided with a rack-pinion, of a spring device adapted to throw the pinion into engagement with the rack, substantially as set forth.

10. The combination with a wind-apron, of a locking-arm, and an abutment adapted to throw said locking-arm into engagement with the apron, substantially as set forth.

11. The combination with a wind-apron provided with a locking-latch adapted to retain grip-actuating gearing, of a depressible pin connected with the latch, substantially as set forth.

12. The combination with a wind-apron provided with a locking-latch adapted to retain grip-actuating gearing, of a depressible pin connected with the latch and an adjustable counterweight secured on the latch, substantially as set forth.

13. The combination with an elevator provided with clutch-actuated gearing and a wind-apron adapted to release said gearing, of a surrounding protecting-box for the apron, substantially as set forth.

14. The combination with an elevator provided with clutch-actuated gearing and a wind-apron adapted to release said gearing, of a surrounding protecting-box for the apron provided with air-vent openings leading upwardly through the elevator-floor, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW WHELAN.

Witnesses:

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C. M. CLARKE.