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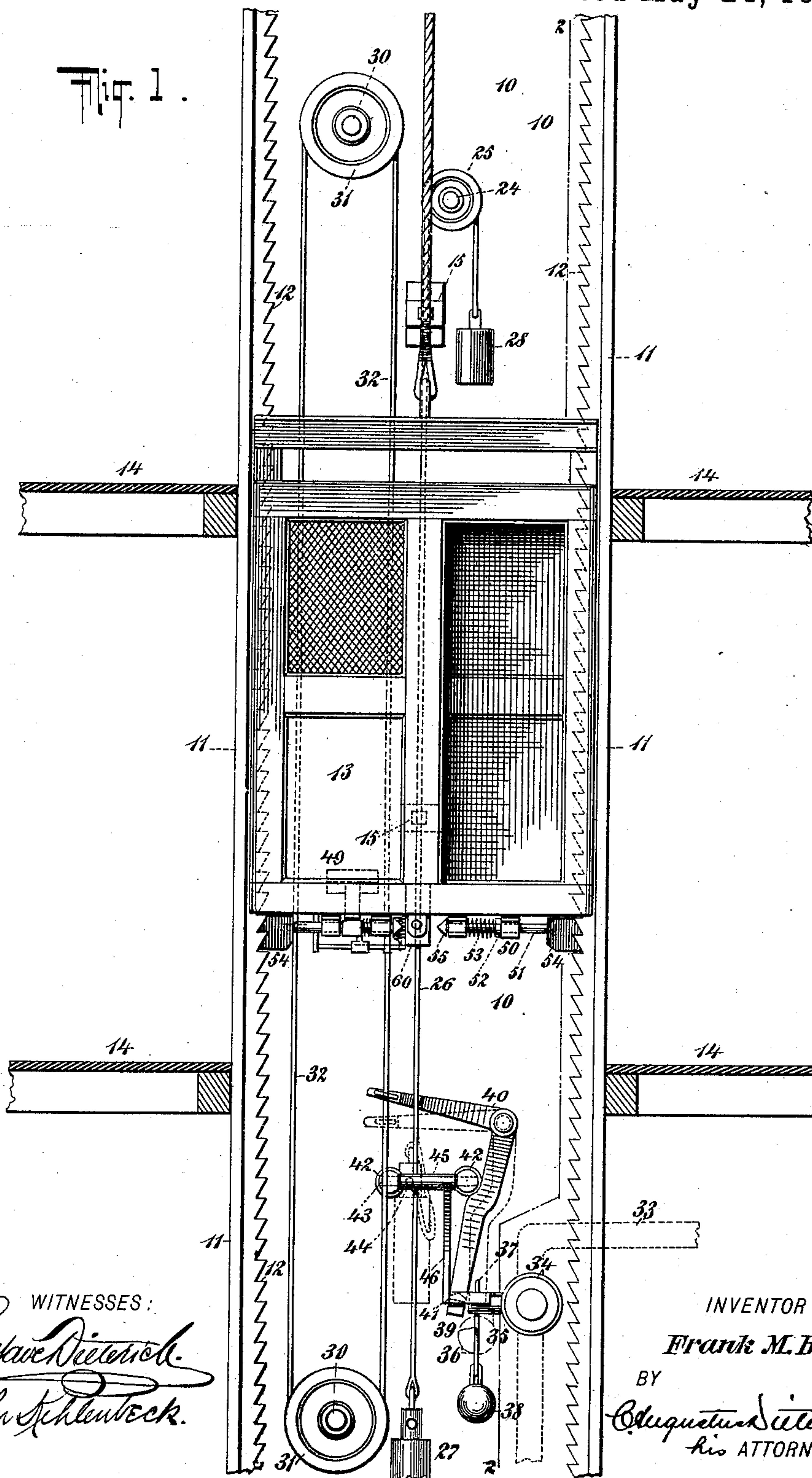
4 Sheets—Sheet 1.

F. M. BELL.
SAFETY DEVICE FOR ELEVATORS.

No. 604,361.

Patented May 24, 1898.

Fig. 1.



WITNESSES:

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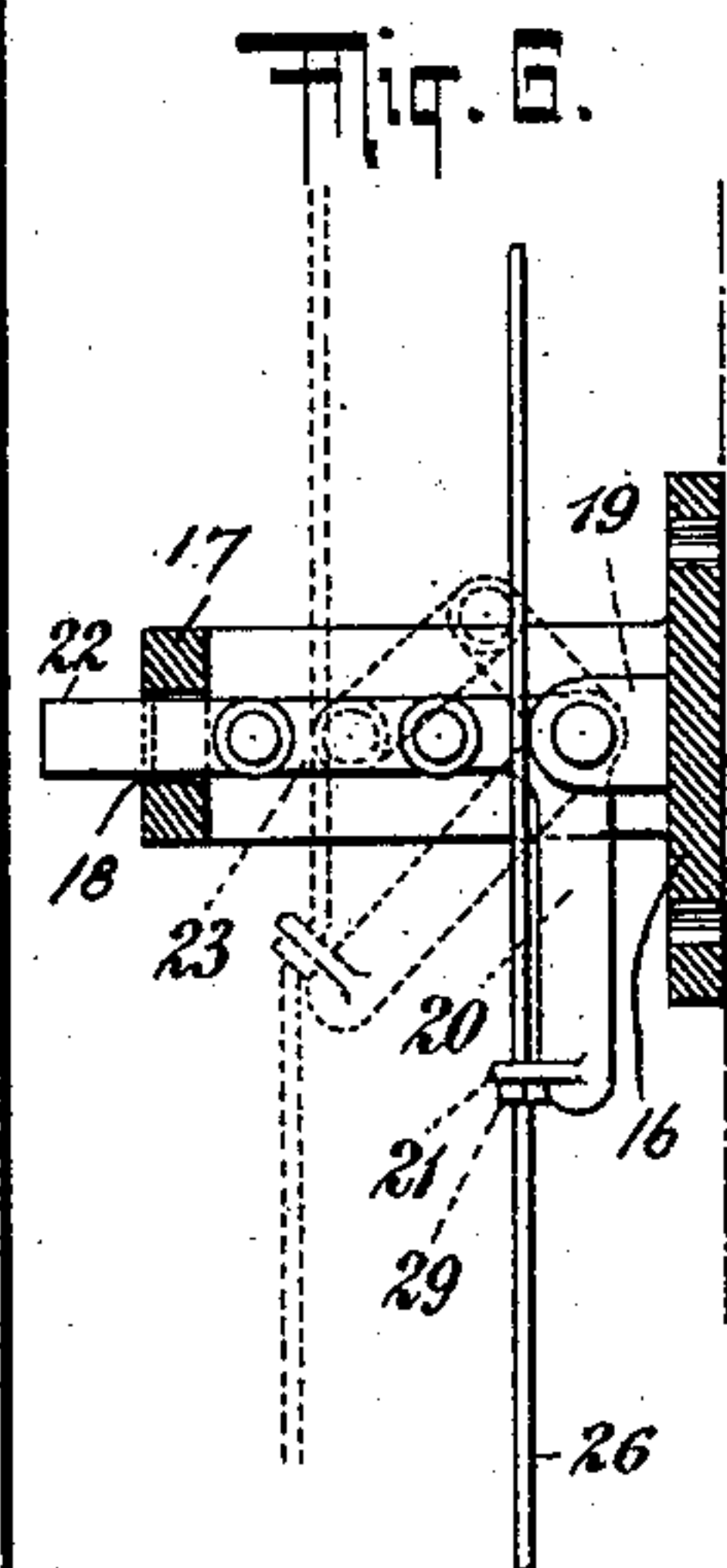
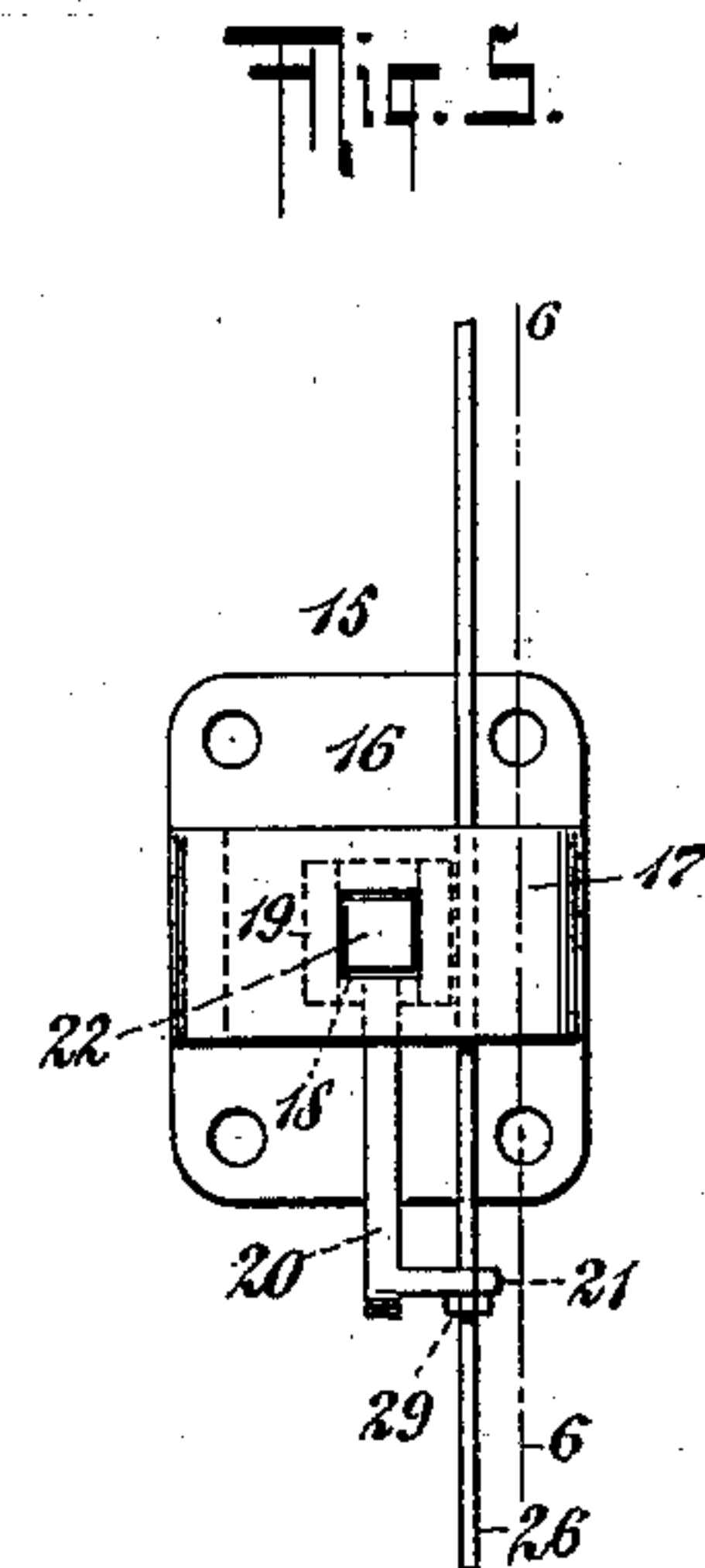
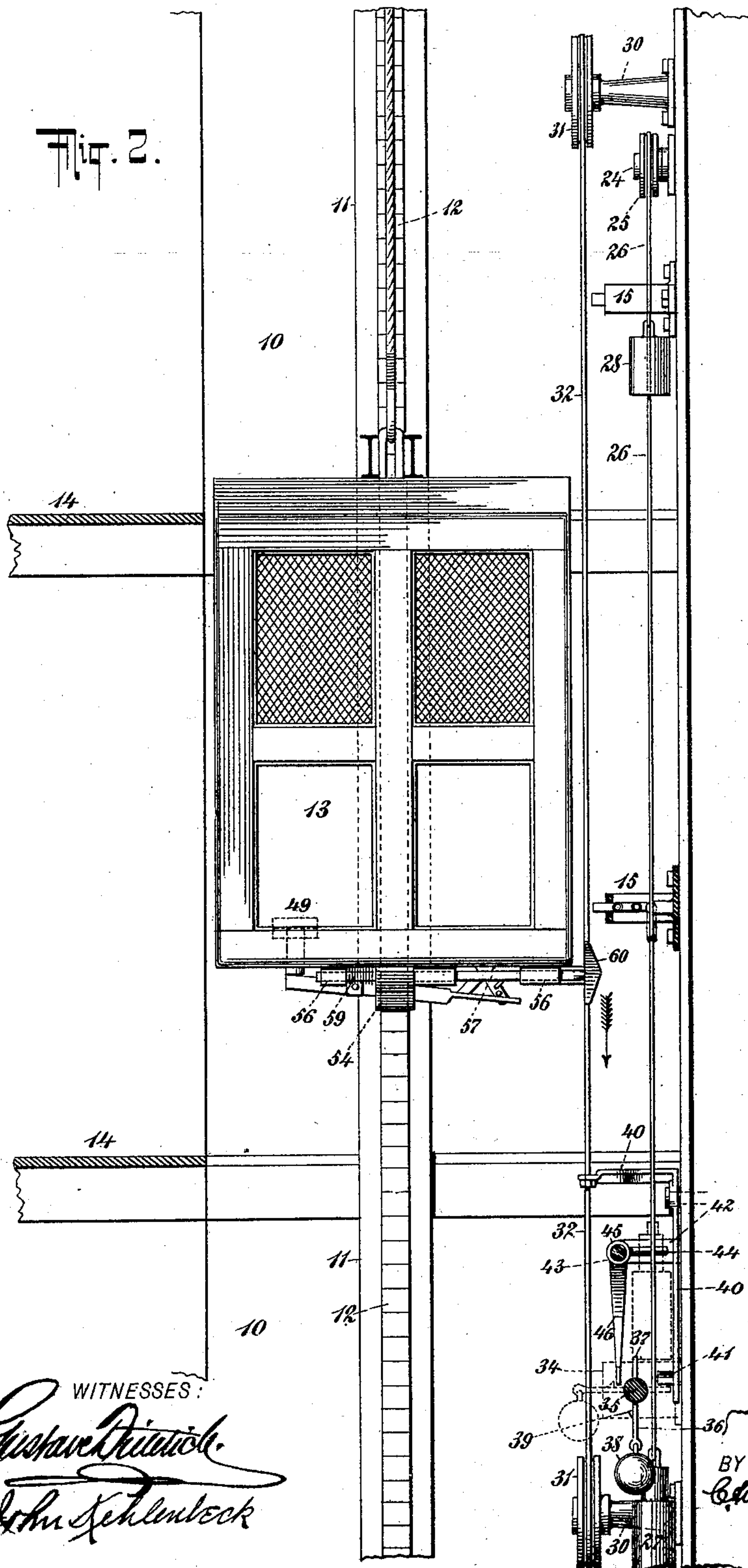
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4 Sheets—Sheet 2.

F. M. BELL.
SAFETY DEVICE FOR ELEVATORS.

No. 604,361.

Patented May 24, 1898.



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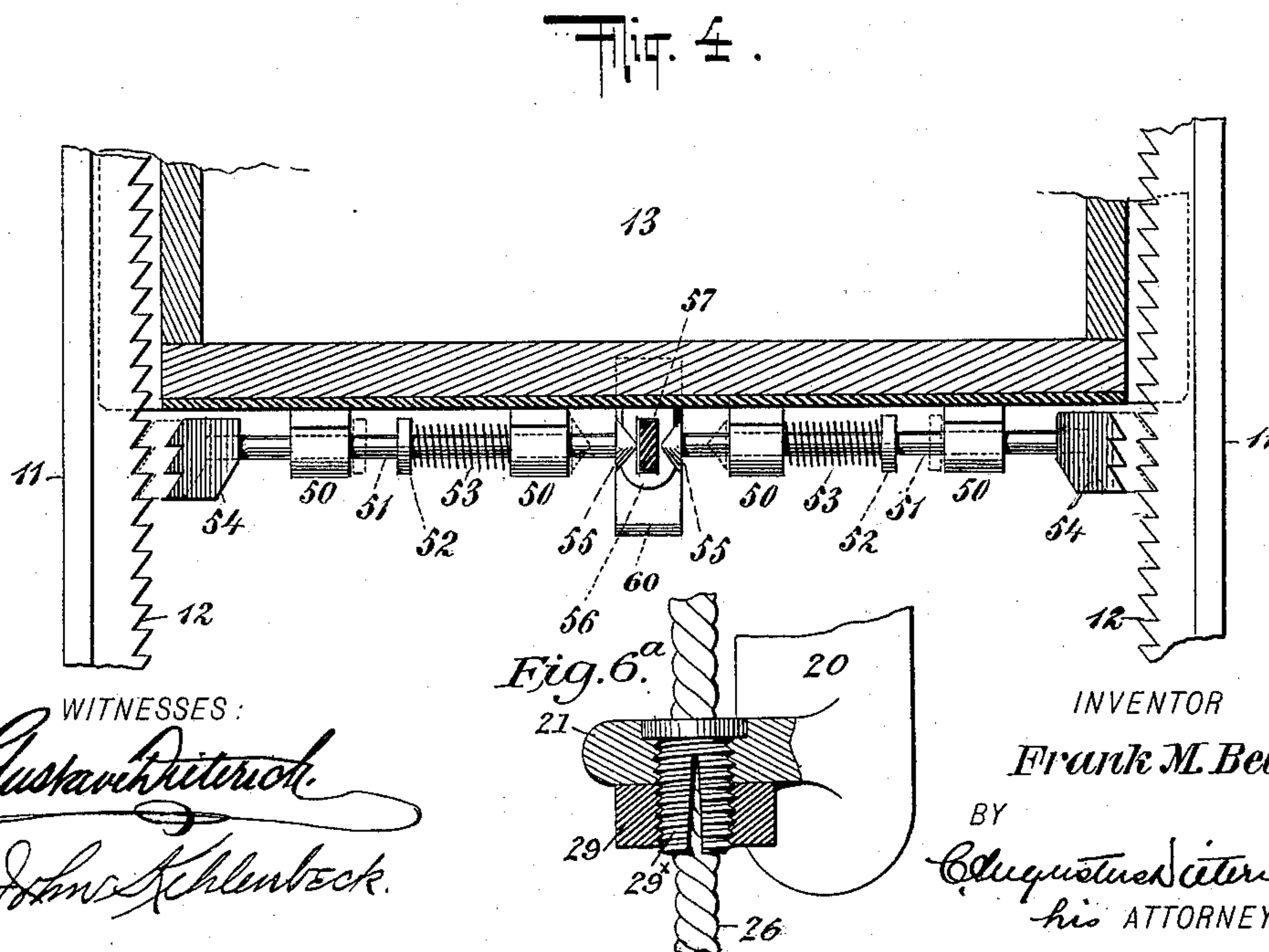
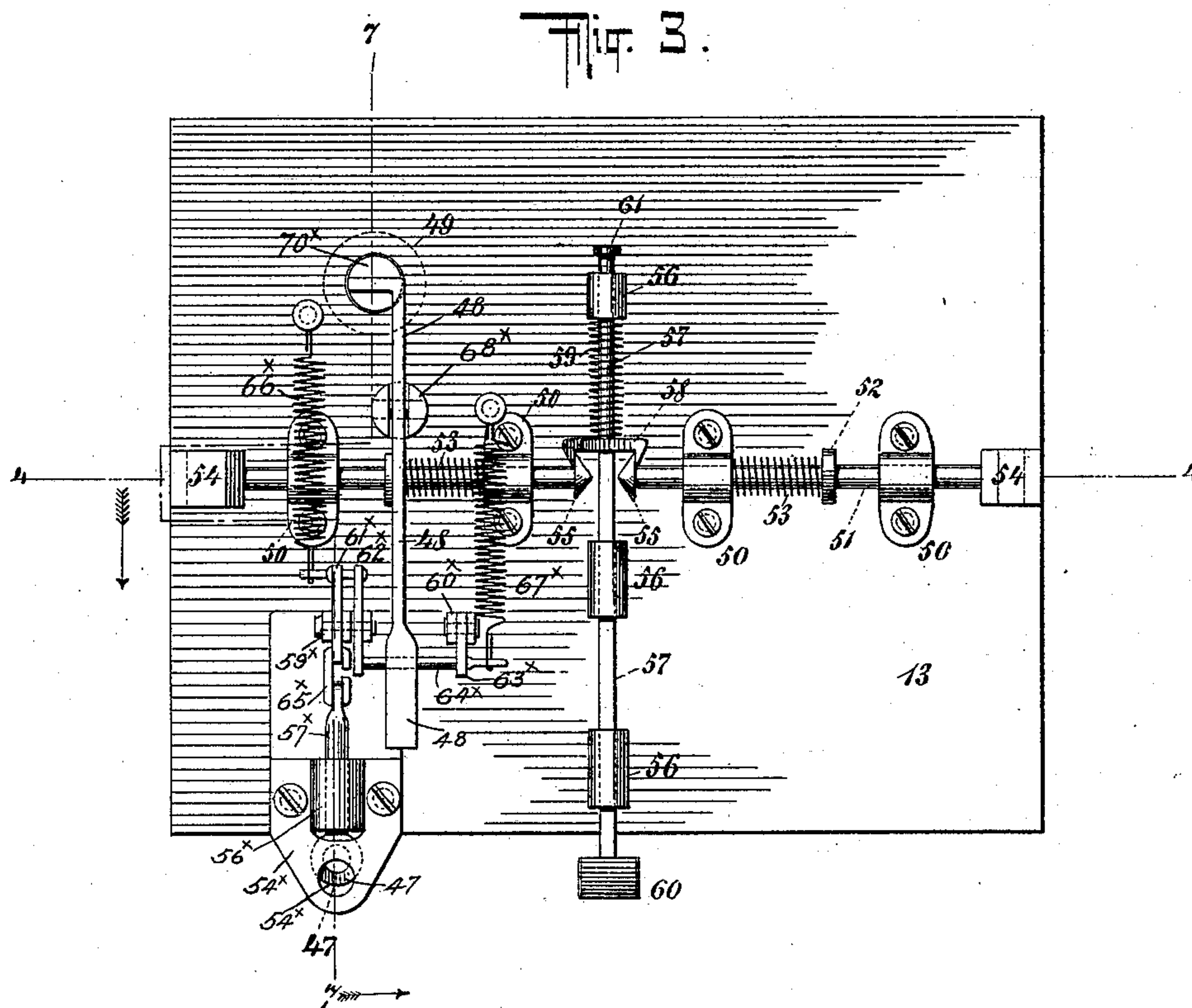
(No Model.)

4 Sheets—Sheet 3.

F. M. BELL.
SAFETY DEVICE FOR ELEVATORS.

No. 604,361.

Patented May 24, 1898.



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(No Model.)

4 Sheets—Sheet 4.

F. M. BELL.
SAFETY DEVICE FOR ELEVATORS.

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Patented May 24, 1898.

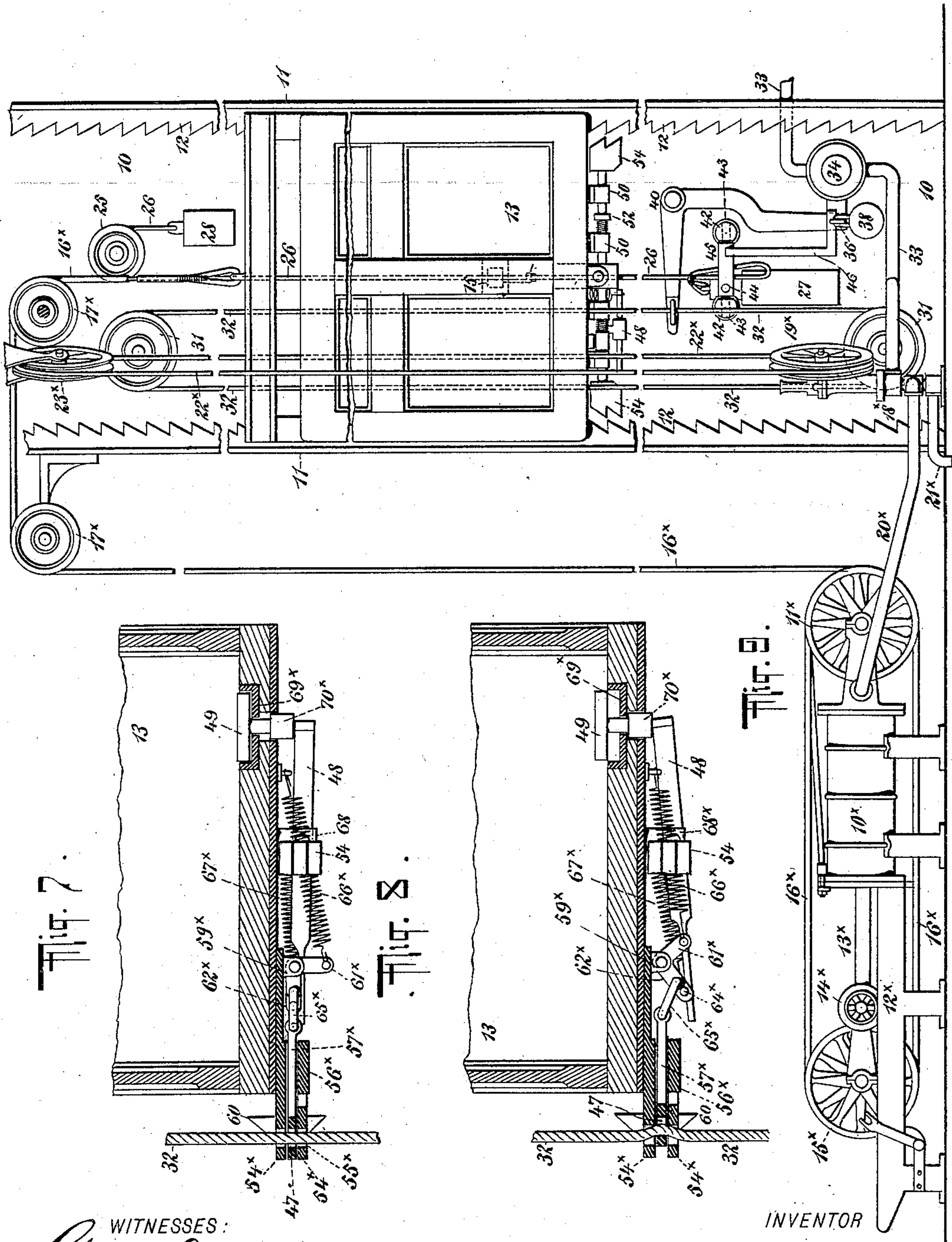


Fig. 7.

Fig. 8.

Fig. 9.

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UNITED STATES PATENT OFFICE.

FRANK M. BELL, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO WILLMA POLLACK, OF SAME PLACE.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 604,361, dated May 24, 1898.

Application filed December 3, 1897. Serial No. 660,568. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. BELL, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Safety Devices for Elevators, of which the following is a full, clear, and exact specification.

My invention relates to improvements in hoisting apparatus, and more particularly to that class wherein the car is provided with clutch mechanism for arresting the movement thereof when the car becomes uncontrollable when traveling in either direction; and said invention has for its object to provide a simple and reliable apparatus operable from the car, whereby the hoisting-engine may be thrown out of operation and the clutches carried by the car projected beyond the outline thereof when the customary controlling means become inoperative.

The objects above set forth I am enabled to accomplish by means of my invention, which consists in the novel details of construction and in the combination, connection, and arrangement of parts, as hereinafter more fully set forth, and then pointed out in the claims.

In the accompanying drawings, forming part of this specification, wherein like numerals indicate like parts, Figure 1 is a front view of an elevator-shaft and car with my invention applied thereto. Fig. 2 is a section taken on the line 2 2 of Fig. 1. Fig. 3 is an inverted plan view of the car-bottom, showing the grip and clutch mechanism carried thereby. Fig. 4 is a section taken on the line 4 4 of Fig. 3. Fig. 5 is a front view of one of the tripping devices arranged within the shaft, and Fig. 6 is a section taken on the line 6 6 of said last-mentioned figure. Fig. 6^a is an enlarged detail view, partly in section, showing the method of securing the tripping devices to their cable. Figs. 7 and 8 are sections taken on the line 7 7 of Fig. 3, respectively showing the grip mechanism out of engagement and in engagement with its cable; and Fig. 9 is a diagrammatic view showing an elevator-shaft, a car adapted to work therein, and means for operating the same with my invention applied thereto.

In said drawings, 10 denotes the shaft, pro-

vided with the customary guides 11, having racks 12 arranged upon their inner opposing faces. 13 denotes the car adapted to work within said shaft, and 14 the several floors of the building.

Adjacent to the base of the shaft 10 is arranged the means for operating the car, which comprises a hydraulic elevator-engine of the multiple-sheave pattern, consisting of a horizontally-supported cylinder 10^x, provided at one end with suitable bearings, in which is mounted a shaft carrying a plurality of sheaves 11^x, and at the opposite end of said cylinder 10^x is provided a platform 12^x. Within said cylinder 10^x works a piston having a rod 13^x, provided at its outer end with a cross-head carrying rollers 14^x upon its ends, adapted to ride upon the edges of the platform 12^x. 15^x denotes a plurality of sheaves carried by said cross-head, which sheaves correspond in size with the sheaves 11^x at the opposite end of the cylinder, and 16^x denotes the hoisting-cable, having one end secured to the cylinder 10^x and its other end passed across the cylinder 10^x and over the sheaves 11^x and 15^x and thence upward over pulleys 17^x, provided at the top of the shaft 10, and its other end secured to the top of the car 13.

18^x denotes a valve arranged at the base of the shaft 10, having a projecting stem and a sheave 19^x for raising and lowering the same, the operating fluid being received by the pipe 33 and conducted into the cylinder 10^x by a pipe 20^x and discharged from said cylinder 10^x by the pipe 20^x and the pipe 21^x.

22^x denotes an endless cable passing through the car 13 and over a sheave 23^x at the top of the shaft 10 and the sheave 19^x of the valve 18^x.

At intervals upon the rear wall of the elevator-shaft are arranged tripping devices 15 for operating the clutch mechanism, said devices each comprising a base-plate 16, adapted to be bolted to the wall of the shaft; a bail 17, having its ends secured to the base-plate 16 and provided at its front portion with an opening 18; a bifurcated bearing 19, arranged upon the base-plate 16, within which bearing 19 is pivotally supported a bell-crank 20, having an eye 21 projecting from the end of its vertical member and an externally-threaded

tapering split thimble 29^x secured therein, a bolt 22, adapted to work within the opening 18 of the bail, and 23 denotes a link connecting the rear end of the bolt 22 with the end 5 of the horizontal member of the bell-crank 20 and serves to hold the bolt 22, when projected, locked against the inward pressure of the clutch-shoe carried by the car, which is adapted to contact therewith.

10 Arranged upon the rear wall of the elevator-shaft 10, near the top thereof and projecting outward therefrom, is a short shaft 24, having a roller 25 mounted upon its outer end, over which passes a cable 26, one end of which extends 15 downwardly through the thimbles 29 of the bell-cranks 20 and is provided at its lower end with a weight 27, and its other or upper end is provided with a counterweight 28, and 29 denotes nuts secured to the threaded ends 20 of the thimbles 29^x, whereby the ends of the vertical members of the bell-cranks 20 are secured to the cable 26. Also upon the rear wall of the elevator-shaft 10 is arranged the means for operating the cut-out mechanism 25 comprising the short shafts 30, having pulleys 31 mounted upon the ends thereof, over which passes an endless cable 32, which extends through the grip mechanism carried by the car, and upon said rear wall near the base of 30 the shaft is further provided the cut-out mechanism for controlling the supply of energy or power to the hoisting mechanism and is shown in the form of a pipe 33, connecting the source of water-supply with the hoisting-engine, having a valve 34 arranged therein, the stem 35 of which is provided with an arm 36, extending through the same, having a short projecting portion 37 at the rear thereof.

38 denotes a weight arranged upon the end 40 of the arm 36, and 39 a spring-actuated catch arranged in said arm 36 near the valve-stem 35.

40 denotes a bell-crank pivotally supported upon the rear wall of the shaft above the valve 34, having the end of its horizontal 45 member secured to the endless cable 32 and the end of its vertical member provided with a toe 41, against the under side of which the portion 37 of the valve-stem arm is adapted to rest to hold the valve 34 open, and 42 denotes 50 bearings arranged upon the rear wall of the shaft, having a rod 43 supported in the ends thereof, upon which is the means for holding the valve open and supporting the weight 27, comprising a pivotally-supported 55 bell-crank 45, the horizontal portion 44 of which is adapted to receive and support the weight 27, while the end of its vertical member 46 is adapted to lock against the spring-actuated catch 39 of the valve-stem arm 36.

60 Upon the under side of the car is arranged a grip mechanism (see Figs. 3, 7, and 8) which projects rearward and beyond the outline of the car-body and comprises the bifurcated portion 54^x, secured to the under side 65 of the car-bottom and provided with apertures 55^x, a guide 56^x, arranged within said bifurcated portion near the middle thereof,

and a rod 57^x, working within said guide 56^x, having an eye 47 at its outer end in line with the apertures 55^x of the bifurcated portion 54^x. 70

Adjacent to the inner or rear end of the rod 57^x, upon the under side of the car, are provided bearings 59^x and 60^x, within which are pivotally supported bell-crank levers 61^x 75 and 62^x and an arm 63^x, the lower or free end of which arm is connected with the horizontal portion of the bell-crank 62^x by a rod 64^x and the short member of the bell-crank 61^x, connected with the rear end of the rod 80 57^x by a link 65^x, and 66^x and 67^x denote springs having their forward ends secured to the lower end of the bell-crank 61^x and the end of the rod 64^x, whereby to hold the grip in engagement with its cable when the pressure 85 upon the forward end of the lever 48 is relaxed.

48 denotes a lever pivotally supported on the under side of the car in a depending bearing 68^x, said lever having its rear end in contact with and bearing upon the rod 64^x, connecting the arm 63^x and bell-crank 62^x, and its other end projecting forward. 90

69^x denotes a bushing countersunk in the floor of the car, and 70^x a stem extending 95 through said bushing, provided at its upper end with a foot-plate 49 and having its lower end in contact with and bearing upon the forward end of the lever 48, as shown, described, and claimed by me in another application filed November 22, 1897, Serial No. 659,358, which said application, in addition hereto, shows, describes, and claims the general subject-matter of this application, with the exception of the clutches 54 and the mechanism to project the same to arrest the movement of the car, which are herein shown, described, and claimed. Also arranged upon the under side of said car is the clutch mechanism comprising bearings 50, within which 110 are supported rods 51, having clutches 54 at their ends, conical heads 55 at their inner opposing ends, collars 52 intermediate the bearings, and springs 53 disposed upon said rods 51 intermediate the collars 52 and the bearings 50. 115

Arranged at right angles to the bearings 50 are bearings 56, whereby the clutch-holding mechanism is supported, comprising a rod 57, adapted to work within said bearings 56 and 120 projecting partly beyond the car, a double detent 58, adapted to engage the heads 55 of the rods 51, a spring 59, disposed upon the rod 57 intermediate the bearing 56, supporting its inner end and the double detent 58, a shoe 60, carried upon the projecting end of the rod 57, and a stop 61, arranged upon the inner end of said rod 57 to limit the outward movement thereof. 125

The operation of the apparatus is as follows: It is to be observed that the elevator-operator is under ordinary circumstances required to be in position upon the foot-plate 49 on the car in order to maintain the grip 130

47 released of its engagement with the cable 32. However, as soon as he discovers that the ordinary means for controlling the car become inoperative he should at once remove his weight from the foot-plate 49, and thereby cause the grip 47 to engage the cable 32, release the portion 37 of the valve-stem arm 36, cause the weight 38 to drop, and close the valve 34. Simultaneously herewith the vertical end of the bell-crank 45 will be released of its engagement with the catch 39 of the valve-stem arm 36, the weight 27 caused to be released and drop and operate the tripping-device 15, arranged in the shaft to project the bolts 22 thereof and hold the same locked to their projected positions. Thereupon as soon as the shoe 60, carried upon the car, comes into contact with the first tripping device in its path the shoe will be forced inward, the double detent 58 released of its engagement with the heads 55 of the clutch-rods, and the clutches 54 projected by the action of the springs 53 into engagement with the racks 12 in the shaft, and arrest all further movement of the car. To reset the apparatus, it simply becomes necessary to again adjust the bell-crank 40, raise the valve-stem arm 36 to open the valve 34, and lock the portion 37 of the arm 36 against the toe 41 of the bell-crank 40, hang the weight 27 upon the rearwardly-projecting portion 44 of the bell-crank 45, and lock the end of its vertical member 46 against the catch 39 of the arm 36. As soon as this has been accomplished the counterweight 28 on the cable 26 will withdraw all the bolts 22 of the tripping devices 15. Finally, the clutches 54, carried by the car, are again forced inward until the heads 55 upon the inner ends of the rods 51 are engaged by the double detent 58 of the rod 57.

It is to be observed that the invention herein shown and described is applicable to hoisting apparatus of divers character, whether operated by steam, water, or electricity, and that the clutch mechanism carried by the car and the racks arranged upon the sides of the shaft may be varied without departing from the spirit of the invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a shaft, racks arranged therein, a car adapted to work within said shaft, means for operating said car, and clutch mechanism carried by said car, with means operable from the car whereby to render inoperative from the car the means for operating said car, and project the clutch mechanism into engagement with the racks, substantially as specified.

2. The combination of a shaft, racks arranged therein, a car adapted to work within said shaft, means for operating said car, and clutch mechanism carried by said car, with cut-out mechanism interposed between the source of power and the means for operating the car, and means operable from the car whereby to operate the cut-out mechanism to

shut off the power and render the means for operating the car thereupon inoperative from the car, and project the clutch mechanism into engagement with the racks, substantially as specified.

3. The combination of a shaft, racks arranged therein, a car adapted to work within said shaft, means for operating said car, clutches carried by said car, and means for holding said clutches normally within the outline of the car, with cut-out mechanism interposed between the source of power and the means for operating the car, a series of devices arranged within the shaft adapted to engage the clutch-holding means on the car, and means operable from the car whereby to operate the cut-out mechanism to shut off the power, and operate the devices arranged within the shaft to trip the clutch-holding means, and project the clutches beyond the outline of the car and into engagement with the racks, substantially as specified.

4. The combination of a shaft, racks arranged therein, a car adapted to work within said shaft, means for operating said car, clutches carried thereby, and means arranged partly within and partly without the outline of the car adapted to hold the clutches normally within the outline of the car, with cut-out mechanism interposed between the source of power and the means for operating the car, a series of tripping devices arranged within the shaft normally out of the path of the projecting portion of the clutch-holding means carried by the car and means operable from the car whereby to operate the cut-out mechanism to shut off the power, and the tripping mechanism to be projected into the path of the clutch-holding means to trip the same, and project the clutches into engagement with the racks, substantially as specified.

5. The combination of a shaft, racks arranged therein, a car adapted to work within said shaft, means for operating said car, bearings arranged upon said car, rods supported therein, clutches disposed upon the outer ends thereof and heads upon the inner opposing ends thereof, springs for projecting said clutches outwardly, bearings arranged at right angles to those aforesaid, a rod supported therein, a double detent arranged thereon adapted to engage the inner opposing ends of the clutch-rods, a shoe carried upon the end of said rod beyond the outline of the car, with cut-out mechanism interposed between the source of power and the means for operating the car, a series of tripping devices arranged within the shaft normally out of the path of the shoe carried by the car, and means operable from the car whereby to operate the cut-out mechanism to shut off the power, and project the tripping devices into the path of the shoe aforesaid to release the clutches and cause the same to be projected into engagement with the racks, substantially as specified.

6. The combination of a shaft, racks ar-

ranged therein, a car adapted to work within
 said shaft, means for operating said car,
 clutch mechanism carried by said car, means
 arranged partly within and partly without the
 5 outline of the car adapted to hold the clutches
 normally drawn back with a series of tripping
 devices arranged within the shaft normally
 out of the path of the clutch-holding means
 carried by the car, a cable secured to said
 10 tripping devices provided at its lower end
 with a weight, and at its upper end with a
 counterweight, cut-out mechanism interposed
 between the source of power and the means
 for operating the car, means for holding said
 15 cut-out mechanism in position to permit of
 the passage of the operating fluid there-
 through, and support the weight at the lower
 end of the cable aforesaid, and means opera-
 ble from the car whereby to release the afore-
 20 said holding means and cause the cut-out
 mechanism to shut off the power, and release
 the weight to operate the tripping devices to
 trip the clutch-holding means carried by the
 car, substantially as specified.
 25 7. The shaft, racks arranged therein, a car
 adapted to work within said shaft, means for
 operating said car, clutch mechanism carried
 by said car, means arranged partly within and
 partly without the outline of the car adapted
 30 to hold the clutches normally drawn back
 combined with a series of tripping devices,
 each comprising a bolt, normally out of the
 path of the clutch-holding means carried by
 the car, a bell-crank for projecting said bolt,
 35 a link intermediate the rear end of the bolt
 and the bell-crank adapted to hold the bolt
 to its projected position, a cable secured to
 the bell-cranks of said tripping devices hav-
 ing a weight at its lower end, and a counter-
 40 weight at its upper end, and cut-out mechan-
 ism interposed between the source of power
 and the means for operating the car, means
 for holding said cut-out mechanism in posi-
 tion to permit of the passage of the operating
 45 fluid therethrough, and support the weight

at the end of the cable aforesaid, and means
 carried by the car adapted to release the hold-
 ing means aforesaid and cause the cut-out
 mechanism to shut off the power, and release
 the weight to operate the tripping devices, 50
 substantially as specified.

8. The shaft, racks arranged therein, a car
 adapted to work within said shaft, means for
 operating said car, grip mechanism carried by
 said car, clutch mechanism likewise carried 55
 by said car, means for holding said clutches
 drawn back, tripping devices arranged with-
 in the shaft adapted to release the clutch-
 holding means, a cable for operating said trip-
 ping devices having a weight at its lower end, 60
 and a counterweight at its upper end, com-
 bined with an endless cable extending through
 the shaft, adapted to be engaged by the grip
 mechanism carried by the car, a valve having
 a stem, an arm secured thereto extending be- 65
 yond the valve-stem at the rear thereof, a
 weight arranged upon the outer end of said
 arm, a spring-actuated catch arranged in said
 arm intermediate its weighted end and the
 valve-stem, a bell-crank pivotally supported 70
 above said valve having the end of its hori-
 zontal member secured to the endless cable
 and the end of its vertical member provided
 with a toe adapted to contact with the end of
 the arm projecting at the rear of the valve- 75
 stem, a bell-crank pivotally supported at right
 angles to the one above named, the horizon-
 tal member of which is adapted to receive and
 support the weight on the cable for operating
 the tripping devices, and its vertical member 80
 adapted to lock against the spring-actuated
 catch in the valve-stem arm, substantially as
 specified.

Signed at the city of New York, in the county
 and State of New York, this 1st day of Decem- 85
 ber, 1897.

FRANK M. BELL.

Witnesses:

WILLIAM L. POLLOCK,
 GUSTAVE DIETERICH.