No. 716,950. Patented Dec. 30, 1902.

J. J. SLEVIN.

ELEVATOR.

(Application filed July 26, 1902.)

(No Model.) 2 Sheets—Sheet 1.

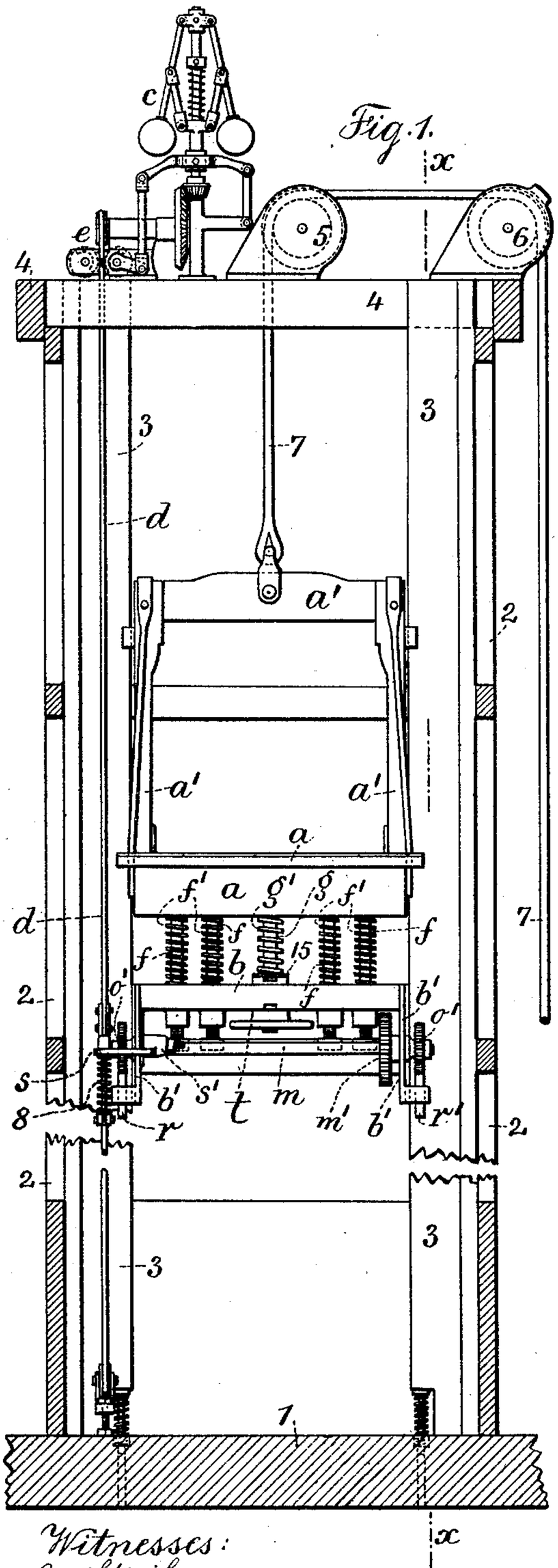

Fig. 1.

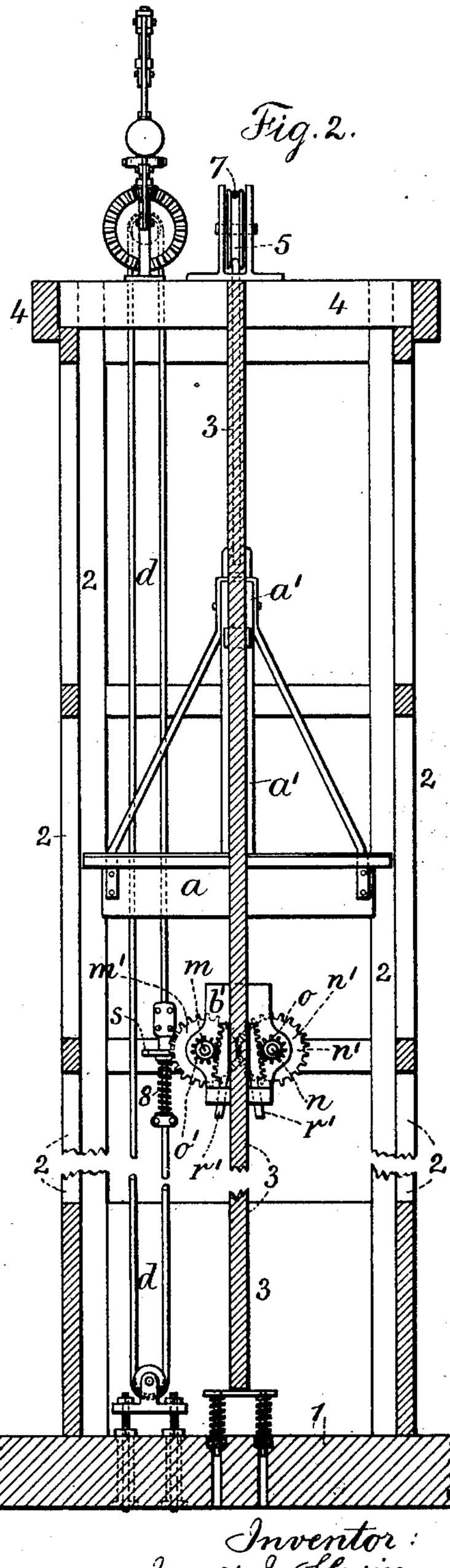

Fig. 2.

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Inventor:
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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

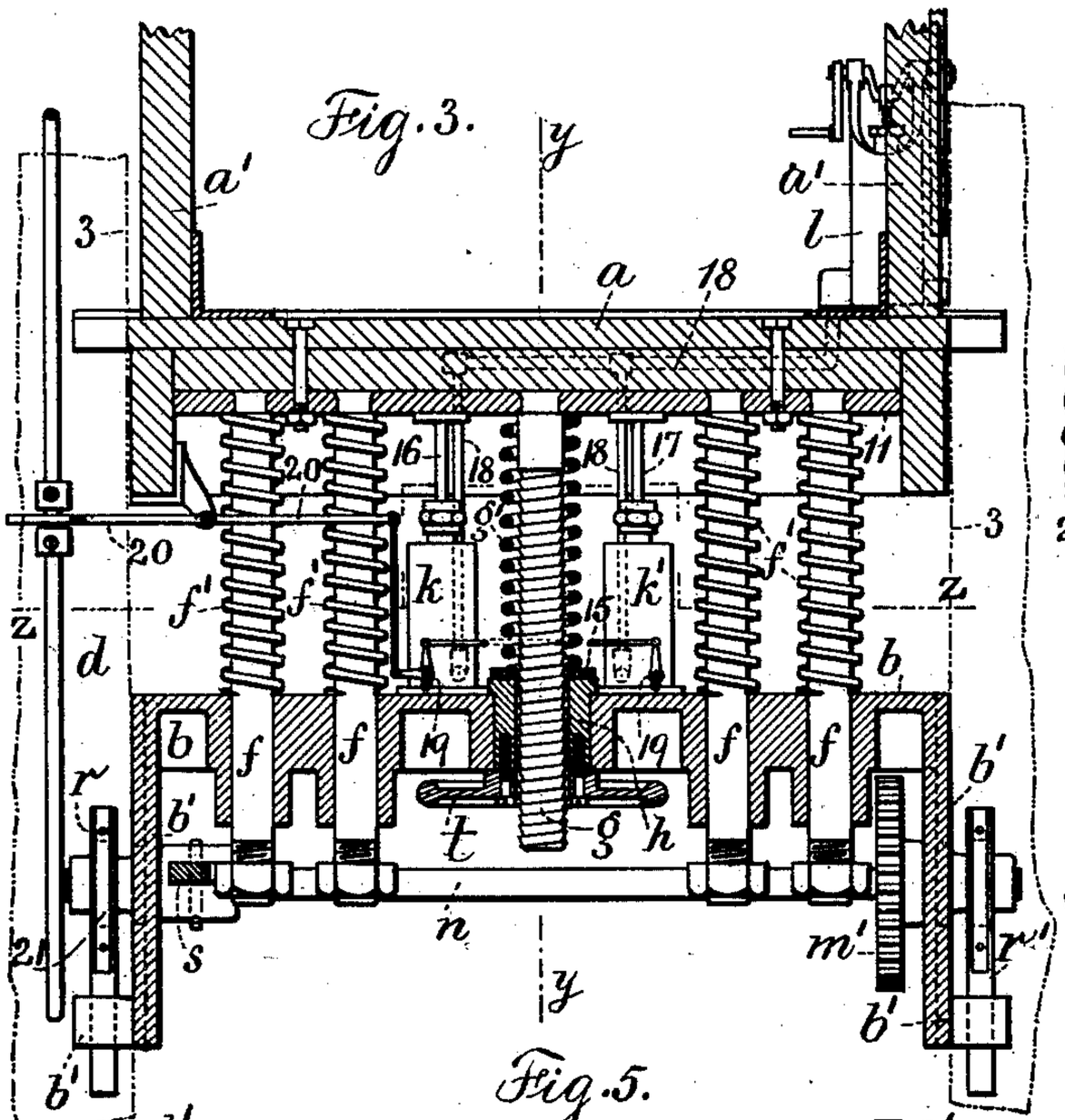


Fig. 4.

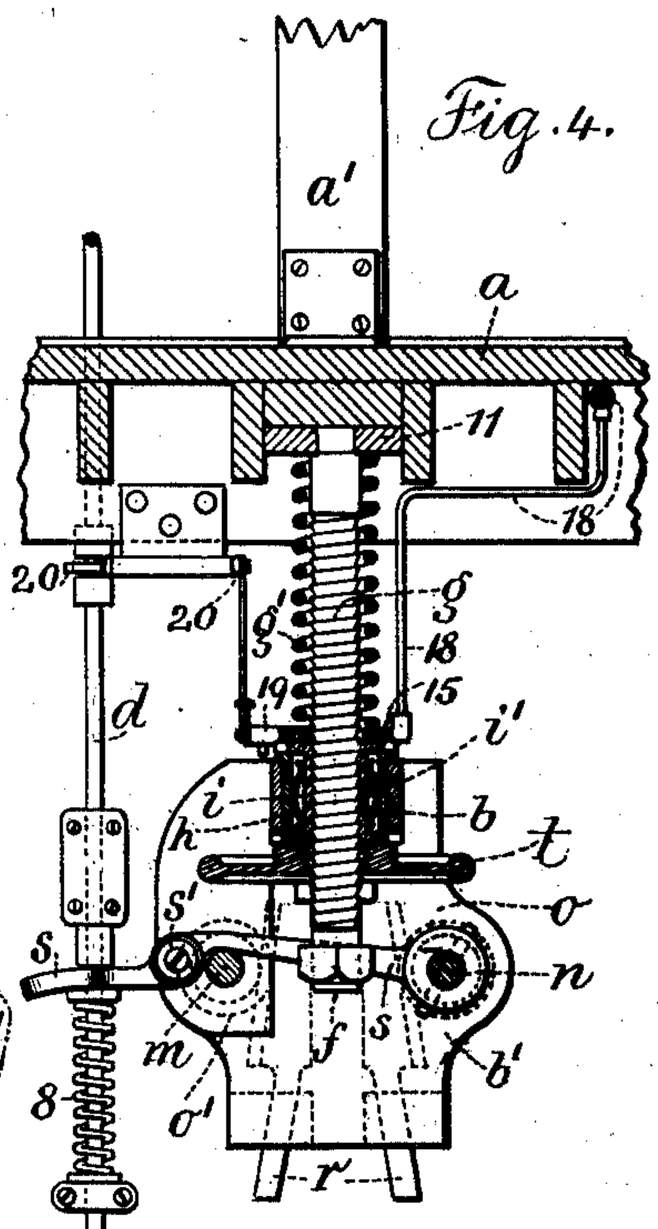


Fig. 5.

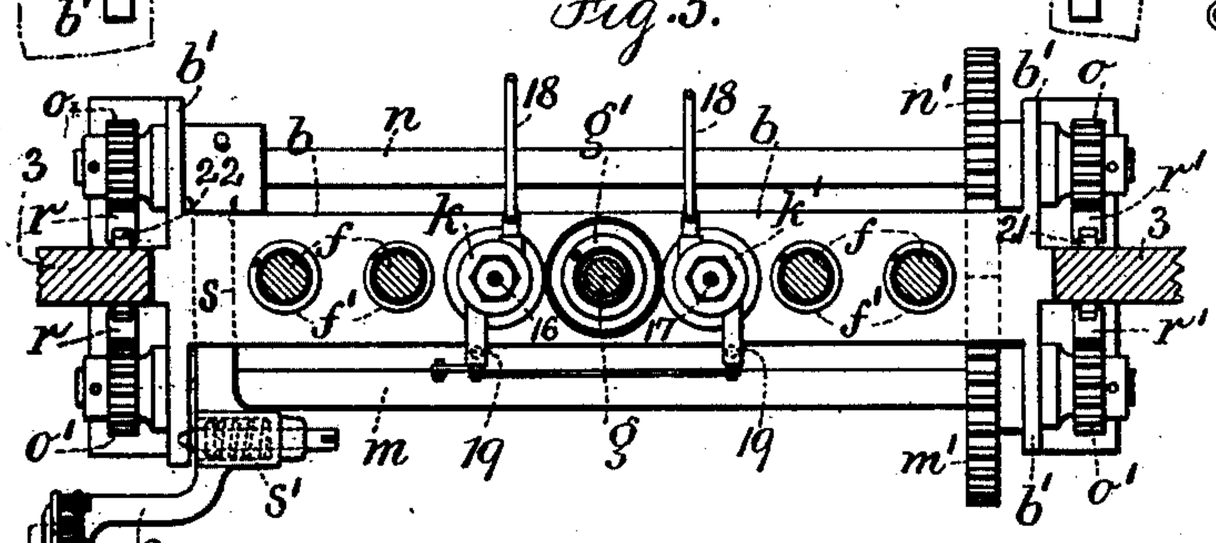


Fig. 6.

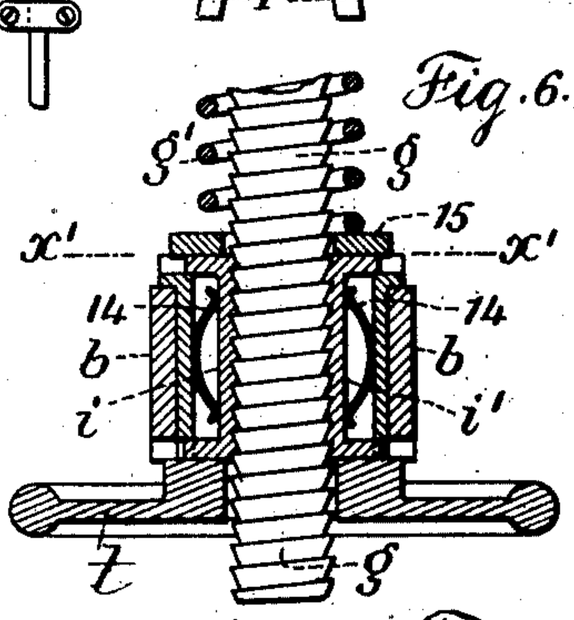


Fig. 10.

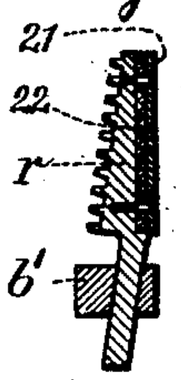


Fig. 11.

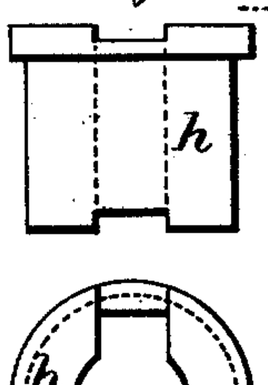


Fig. 12.

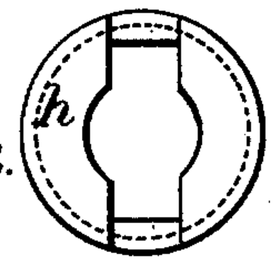


Fig. 8.

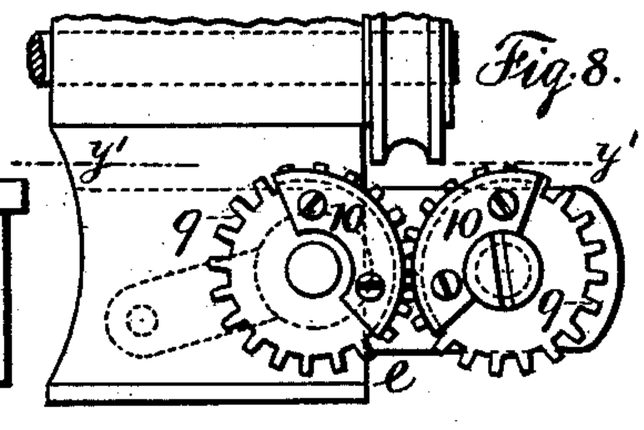


Fig. 9.

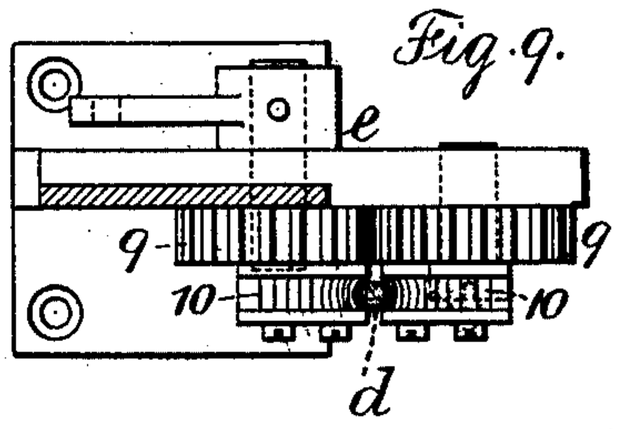
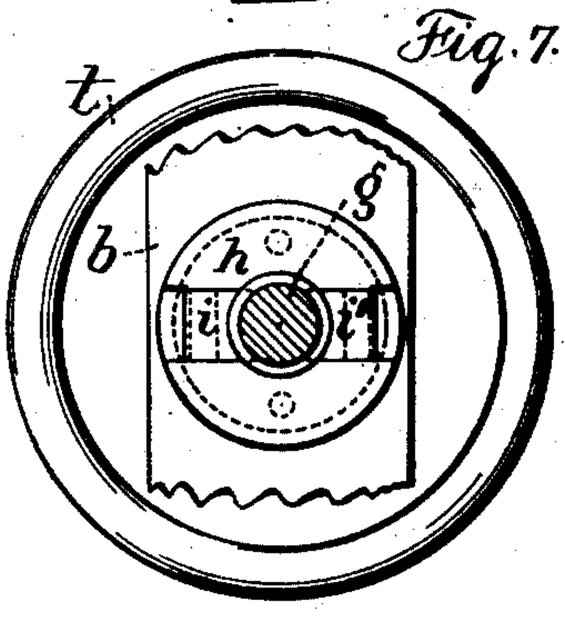


Fig. 7.



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Inventor:
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per L. W. Serrell & Son Attys.

UNITED STATES PATENT OFFICE.

JAMES J. SLEVIN, OF NEW YORK, N. Y.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 716,950, dated December 30, 1902.

Application filed July 26, 1902. Serial No. 117,076. (No model.)

To all whom it may concern:

Be it known that I, JAMES J. SLEVIN, a citizen of the United States, residing at the borough of Manhattan, in the city, county, and State of New York, have invented an Improvement in Elevators, of which the following is a specification.

My present invention relates to improvements upon the device shown and described in my application for Letters Patent filed May 31, 1902, Serial No. 109,757, and duly allowed June 9, 1902.

The object of my present invention is to strengthen the parts, to make the action thereof more positive, to provide pneumatic devices operating in connection with loading the elevator-platform and which are automatically released by the extraordinary or dangerous speed of the elevator.

In carrying out my invention and generally in common with the devices shown and described in my aforesaid application I provide improved yielding devices for the platform, a novel and yielding clutch-held screw the release of which permits the elevator-platform to return to a normal position, pneumatic devices normally supporting or assisting in supporting the load upon the platform and which devices are released when the elevator is running at extraordinary or dangerous speed. I also provide a governor-rope clutch and a lever device upon the governor-rope for operating the wedge-block device. The governor-rope clutch is brought into operation not only by the extraordinary or dangerous speed of the elevator, but the moment that the same occurs by the increased speed of the governor caused thereby throwing the clutch into position to at once engage and hold the governor-rope, so that the same automatically sets in operation the lever device and the parts connected therewith and actuated thereby to operate the wedge-blocks and engage the vertical guides of the elevator-frame to stop the elevator. At the same time arresting the movement of the governor-rope also effects the operation of the pneumatic devices, releasing the platform, so that the same may descend with the weight thereon, and the springs under the platform yield to compensate any shock produced in stopping the mechanism.

In the drawings, Figure 1 is an elevation and partial section representing my improvements. Fig. 2 is a partial elevation and vertical section on the line $x\,x$ of Fig. 1. Fig. 3 is a vertical section and partial elevation of the yielding devices of the elevator-platform. Fig. 4 is a vertical section and partial elevation of the same parts upon the line $y\,y$ and at right angles to Fig. 8. Fig. 5 is a sectional plan at the line $z\,z$ of Fig. 3. Fig. 6 is a section and partial elevation showing the detail of the screw-sleeve and yielding clutch. Fig. 7 is a plan and partial section at $x'\,x'$ of Fig. 6. Fig. 8 is an elevation of the governor-rope clutch. Fig. 9 is a sectional plan at $y'\,y'$ of Fig. 8. Fig. 10 is a section through one of the wedge-blocks of improved form. Fig. 11 is an elevation, and Fig. 12 a plan, of the sleeve surrounding the screw by itself. Figs. 3, 4, 5, and 10 are on the same scale and of exaggerated size over Figs. 1 and 2; and Figs. 6 to 9, inclusive, and 11, 12 are on the same scale and of exaggerated size over the preceding figures.

The foundation 1 may be of any desired character. The uprights 2 rise therefrom and are connected thereto, as are also the vertical guides 3, and 4 represents the top frame, said parts being connected together and to other desired and usual supports.

5 6 represent sheaves on the top frame 4, for and over which the cable 7 passes from the source of power to the elevator. The platform a of the elevator is provided with a frame a', and to this the cable 7 is connected in any usual manner. A beam b extends across between the vertical guides 3 below the platform a. The platform a is made with parts extending at opposite sides of the vertical guides 3, and the beam b fits between said guides and is made with end portions b', extending downward, and these end portions are made with guides for the wedge-blocks.

c represents a governor device of usual or well-known construction rotated by bevel-gears from a shaft carrying a pulley and around which passes the governor-rope d, there being also by preference a pulley and

supports therefor near the foundation 1, around which also the governor-rope passes, and I have shown and prefer to employ helical-spring-buffer devices attached to said foundation 1 below and adjacent to the vertical guides 3 and at opposite sides of the elevator to relieve the shock of the structure if the same should fall and also, if desired, to support the weight of the elevator structure when the same is down at its lowest point.

8 represents a helical spring upon the governor-rope *d* between stops clamped thereto and the function of which is hereinafter described. The clutch device *e* comprises gear-wheels 9, meshing with one another on adjacent shafts suitably supported and to one of which is attached a crank, a link, and the lever device shown in Fig. 1 and associated with and operated by the movement of the governor device *c*.

Upon the faces of the gear-wheels 9 are secured grooved segment-blocks 10 10. These blocks are placed eccentric to the gear-wheels 9, so that in the position thereof shown in Figs. 8 and 9 the governor-rope *d*, which extends through between the grooved segment-blocks 10 10, may pass freely in its movement as the elevator moves up and down. An accelerated movement of the governor will cause the gear-wheels 9 to turn and to bring the faces of the eccentrically-placed segment-blocks 10 10 nearer to one another, and thus grip the rope. This arrests the movement of the rope and brings into operation the elevator devices not only for stopping the elevator, but for relieving the concussion thereof and which are hereinafter more fully described.

A plate 11 is secured to the under surface of the platform *a* in any desired and substantial manner. To this plate and in line across the elevator between the vertical guides 3 are secured a series of rods *f*. These rods extend down through guideways or perforations in the beam *b*, and their lower ends are threaded and receive nuts for limiting the movement of the beam with reference to the platform. Helical springs *f'* surround the rods *f* between the under surface of the plate 11 and the upper surface of the beam *b*. To the central portion of the plate 11 and extending downward is secured a screw-rod *g*, with trapezoidal threads, and around the screw-rod between the under surface of the plate 11 and the upper surface of the beam *b* is a helical spring *g'*.

The beam *b* is provided with an enlarged aperture concentric with the screw-rod *g*. (See especially Figs. 6 and 7.) This aperture receives a sleeve *h*, the aperture of which is transversely elongated, and the opposite inner faces of this aperture are centrally curved to simply contact with the edges of the trapezoidal threads, and in the sleeve-aperture there are section-nuts *i i'*. These nuts engage the threads at opposite points of the screw *g*, and between these nuts and the body of the sleeve there are intervening springs 14, the sleeve serving as a base for the springs 14, which bear upon the nuts. The sleeve *h* is fixed to the hand-wheel *t* by tap-screws. (Shown in Fig. 3 by full lines and in Fig. 7 by dotted lines.) There is a top plate 15 lying upon the sleeve *h*, that the spring *g'* rests upon, and the top of the sleeve has an edge flange fitting over the edge of the beam, and the top and bottom faces or ends of the sleeve are transversely slotted to receive and form guides for the ends of the nuts *i i'*, which move therein. Figs. 11 and 12 show this construction of the sleeve clearly. The slotted upper end of the sleeve is only half-way through the flange.

The connection of the sleeve *h* with the hand-wheel *t* serves to secure all of these parts in a firm and fixed relation to the beam *b*. From this construction it will be noticed that if the platform *a* descends with force the screw-rod *g* slips through the sleeve and past the yielding section-nuts *i i'*, and that the moment this downward movement stops the screw-rod is held firmly by said section-nuts engaging the trapezoidal threads thereof, and to return the platform *a* to its normal position it is necessary to rotate the hand-wheel *t*, the sleeve, and the nuts, and thereby impart a rising movement to the screw-rod *g* to relieve not only the tension upon the spring *g'*, but upon the springs *f'*. As shown in Fig. 3, there is supposedly a slight tension upon all of said springs, because in the normal position, where substantially no tension exists except that which would simply carry the weight of the platform *a*, the nuts upon the lower ends of the rods *f* would bear against the under surface of the beam *b*.

In connection with the structure hereinbefore described it will be apparent that in the use of the elevator and as an illustration, considering that the platform *a* is upon a level with the first floor of a building, as goods are loaded upon the platform the helical springs *f'* and *g'* will be liable to yield and permit the platform to descend and come closer to the beam *b*, so that the platform and said floor of the building will be no longer on a level. To provide for this possibility and to be able to maintain the platform *a* upon a level with said floor during the loading of the elevator, I provide air-cylinders *k k'*, that are secured to and supported by the beam *b* and located between the helical spring *g'* and the nearest springs *f'*. These cylinders are provided with pistons and piston-rods 16 and 17, and the upper ends of the piston-rods bear against the under surface of the plate 11, and I provide an air-pump *l*, secured to the platform and to the frame *a'* of the elevator, and a pipe 18, extending therefrom and with branches to the respective air-cylinders *k k'*, so that by the operation of the air-pump air under pressure may be forced into the cylinders to maintain the platform *a* at its maximum distance from the beam *b*. I also provide and connect to

said air-cylinders valves 19, with cranks, and a rocker-bar 20, pivoted to the lower portion of the platform and having a connecting-bar to one crank and other cranks of said valves connected by a rod. The rocker-bar 20 is grooved or forked to receive or straddle the governor-rope *d*, and stops are fastened to the governor-rope at opposite sides of the rocker-bar 20, so that said rocker-bar is actuated with any movement of the governor-rope. It will therefore be apparent that should the movement of the governor-rope be arrested by the operation of the governor device and the gripping of the rope by the segment-blocks 10 while the elevator is still descending the rocker-bar 20 and the connecting-bar extending therefrom to the cranks of the valves is moved to actuate said valves and release the air contained under pressure in the air-cylinder *k k'*, so as to permit freedom of movement of the platform with reference to the beam, said movement only being controlled by the helical springs *f' g'*.

I provide shafts *m n* parallel with one another and extending in line with the beam across between the end portions *b'* of the beam, and which shafts are in suitable bearings in said end portions. Pinions *o o'* are in pairs upon the respective ends of these shafts, and said pinions mesh with pairs of wedge-blocks *r r'*, which wedge-blocks have depending portions moving in the end portions of the beam, which form guides therefor. These pinions *o o'* and the pairs of wedge-blocks *r r'* are similar to those employed in the device of my aforesaid application, and these shafts *m n* are connected by gears *m' n'*, which mesh with one another, so as to cause said shafts and pinions and wedge-blocks to move together in unison. This movement is effected by a lever *s*, secured at one end to the shaft *n*. Said lever is made with a midway socket part *s'*, containing a helical spring, a pin actuated thereby, and a perforated cap to the socket, through which the pin moves. The pointed end of the pin engages a recess in the end portion *b'*, and the lever *s* is thus normally held in a state of rest. The pin yields to release the arm under excess strain and movement of the governor-rope. The free end of the lever is mortised, and the governor-rope *d* passes through the same. From this structure it will be apparent that a movement of the governor-rope swings the lever *s* and the shaft *n* simultaneously, causing movement of the gears *m' n'*, the shaft *m*, the pairs of pinions, and the pairs of wedge-blocks, so as to raise the wedge-blocks and force the same into intimate contact with the opposite faces of the vertical guides 3, so as to arrest the downward movement of the elevator and with sufficient pressure applied to even hold the elevator in a suspended position. I prefer to make these wedge-blocks of the form particularly shown in Fig. 10—that is, the surfaces which come in contact with the vertical guides are provided with metal plates 21, and between said plates and the main portion of the wedge-blocks there is a yielding filling or packing 22, screws being employed through said parts to secure the same to the wedge-blocks.

The mechanism hereinbefore described and which forms the subject-matter of my present invention is quite simple in construction and is not only effective in operation, but is positive and automatic, and the parts bear such coacting relation to one another that they form a very complete and operative device.

I claim as my invention—

1. In an elevator, and in combination, a beam carried by the elevator structure, devices maintaining the relation of the elevator-platform and the beam and at the same time yielding to permit the parts to come into closer relation, a screw and yielding clutch device providing for holding the beam and platform and for returning said parts to a normal position, devices for arresting the movement of the beam so as to bring the aforesaid parts into operation, means controlling the movement of the governor-rope so as to effect the operation of the means arresting the movement of the beam, and devices for operating the latter means by the governor, substantially as set forth.

2. In an elevator and in combination with the platform, a series of rods secured thereto and having stops on their lower ends, a beam through which said rods pass, helical springs surrounding said rods between the beam and platform, a device secured to the platform passing through the beam and moving freely with the downward movement of the platform in relation to the beam, laterally-yielding devices for engaging and holding the aforesaid device to fix the relation of the platform to the beam, and revoluble devices connected to the beam for returning said parts to their normal positions, substantially as set forth.

3. In an elevator and in combination with the platform, a series of rods secured thereto and having stops on their lower ends, a beam through which said rods pass, helical springs surrounding said rods between said beam and platform, a screw-rod secured to the under surface of the platform passing through an aperture in the beam and having trapezoidal threads, a helical spring surrounding said rod between the platform and the beam, and means surrounding said screw-rod and located in the aperture in the beam, and devices connected therewith respectively engaging the beam and the screw-rod for not only holding the same with reference to the beam, but for permitting the return of the platform to its normal position with reference to the beam, substantially as set forth.

4. In an elevator and in combination with the platform, a series of rods secured thereto and having stops on their lower ends, a beam through which said rods pass, helical springs

surrounding said rods between said beam and platform, a screw-rod secured to the under surface of the platform passing through an aperture in the beam and having trapezoidal threads, a helical spring surrounding said rod between the platform and the beam, a sleeve in the aperture in the beam and a hand-wheel surrounding the screw-rod and secured to the sleeve, the hand-wheel and sleeve connected thereto and having flanged or overlapping portions engaging the beam, section-nuts engaging the screw-rod and intervening springs both located between the screw-sleeve in the aperture in the sleeve and coacting with the sleeve and yet yielding with the downward movement of the screw-rod and engaging the same to prevent its upward movement, substantially as set forth.

5. In an elevator and in combination with the platform, a series of rods secured thereto and having stops on their lower ends, a beam through which said rods pass, helical springs surrounding said rods between said beam and platform, and a device secured to the platform passing through the beam and moving freely with the downward movement of the platform in relation to the beam, and means for engaging and holding said device to fix the relation of the platform to the beam, means for returning said device and parts to their normal position, wedge-blocks connected to and supported by said beam, pinions and shafts for actuating the wedge-blocks, gears for connecting said shafts and a lever device connected to one of said shafts and for effecting the operation of the wedge-blocks, said lever having at its free end an aperture for receiving the governor-rope and adjacent devices for determining the relation of the lever to the governor-rope to effect the movements of the lever, substantially as set forth.

6. In an elevator, the combination with the platform, a series of downwardly-extending rods with stops on their lower ends, a beam having apertures through which said rods pass, and helical springs around said rods between said beam and said platform, of pneumatic devices supported by said beam and acted upon by the platform in a change of relation between the said parts, means for increasing the air-pressure in said devices to maintain a fixed relation between the platform and the beam, and means actuated by the movement of the governor-rope for releasing said air-pressure and reëstablishing the yielding relation of the platform to the beam, substantially as set forth.

7. In an elevator, the combination with the platform, a series of downwardly-extending rods with stops on their lower ends, a beam having apertures through which said rods pass, and helical springs around said rods between said beam and said platform, of air-cylinders supported upon said beam, piston-rods bearing at their outer ends against said platform, an air-pump mounted upon the platform, and a pipe for air under pressure extending therefrom to said air-cylinders, air-valves connected to said cylinders and having cranks, connecting-rods extending between the cranks, a rocker-arm, a connection at one end thereof to said elevator-rope, and a rod connecting the other end to a crank of said valves whereby air under pressure may be forced into the cylinders and the same may be released automatically by the action of the governor-rope, substantially as set forth.

8. In an elevator, the combination with the platform, a beam spaced apart therefrom, a series of rods connected with the platform and passing down through the beam and having stops on their lower ends, and helical springs around the rods between the platform and the beam, of a centrally-located screw-rod with trapezoidal threads secured to the platform and passing through a central aperture in the beam of larger area than the rod, a sleeve in said aperture and surrounding the screw-rod and having a flange edge resting upon the beam, a hand-wheel surrounding the screw-rod below the beam bearing against the under surface thereof and connected to said sleeve, section-nuts in the aperture in the sleeve at opposite sides of the screw-rod and intermediate springs between the section-nuts and sleeve, substantially as set forth.

9. In an elevator, the combination with the platform, a beam spaced apart therefrom, a series of rods connected with the platform and passing down through the beam and having stops on their lower ends, and helical springs around the rods between the platform and the beam, of a centrally-located screw-rod with trapezoidal threads secured to the platform and passing through a central aperture in the beam of larger area than the rod, a sleeve in said aperture and surrounding the screw-rod and having a flanged upper edge resting upon the beam, a hand-wheel surrounding the screw-rod below the beam bearing against the under surface thereof and connected to said sleeve, section-nuts in the aperture in the sleeve at opposite sides of the screw-rod, and intermediate springs between the section-nuts and sleeve, and a plate 15 extending over the segments and sleeve and around the screw-rod and a helical spring around the screw-rod between said plate and the under surface of the platform, substantially as set forth.

10. In an elevator, the combination with the platform, a beam spaced apart therefrom, a series of rods connected with the platform and passing down through the beam and having stops on their lower ends, and helical springs around the rods between the platform and the beam, of a centrally-located screw-rod with trapezoidal threads secured to the platform and passing through a central aperture in the beam of larger area than the rod, a sleeve in said aperture having an elongated transverse aperture with centrally-curved parts for the screw and the top and bottom faces transversely slotted and surrounding the screw-rod and having a flanged upper edge resting

upon the beam, a hand-wheel secured to the sleeve and coming below the beam and bearing against its under surface, section-nuts in the aperture in the sleeve at opposite sides of the screw and having ends received and guided in the transverse grooves at the ends of the sleeves and intervening springs to press said nuts against the screw at opposite sides, substantially as specified.

Signed by me this 19th day of July, 1902.

JAMES J. SLEVIN.

Witnesses:

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S. T. HAVILAND.