No. 794,293. PATENTED JULY 11, 1905.

McCLELLAN FULLENLOVE.

ELEVATOR.

APPLICATION FILED AUG. 4, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

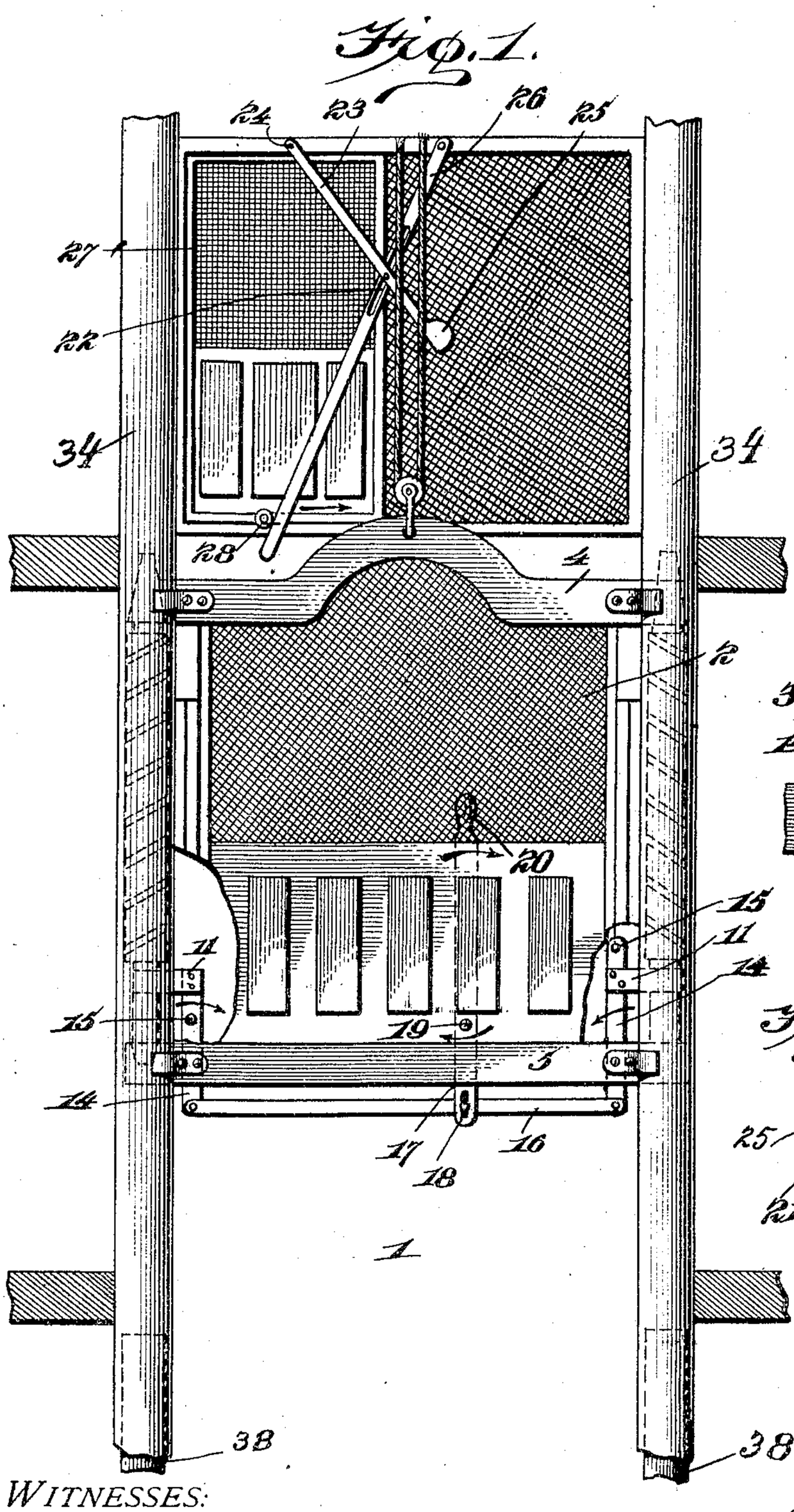
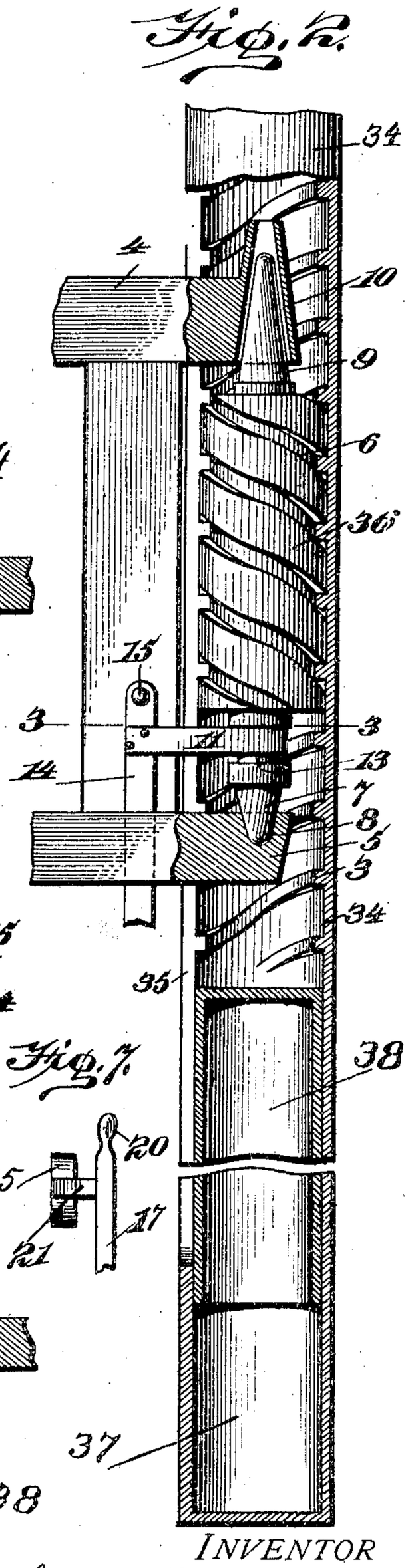


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

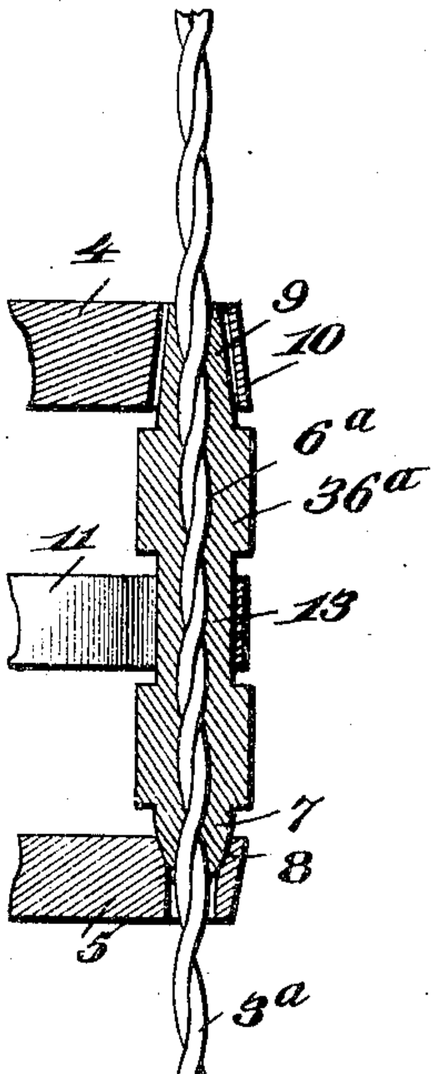


Fig. 5.

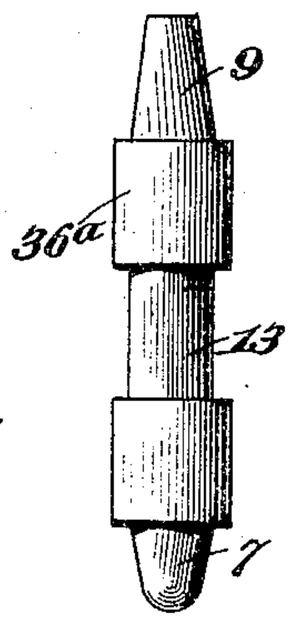


Fig. 3.

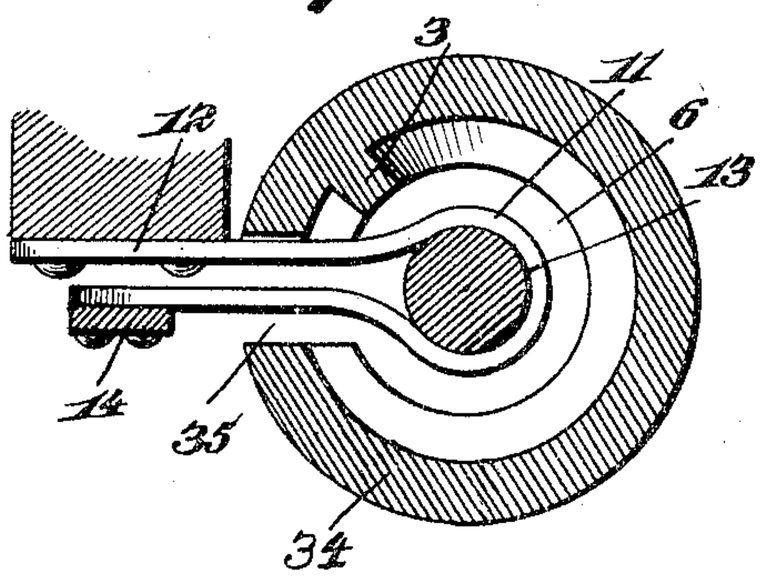
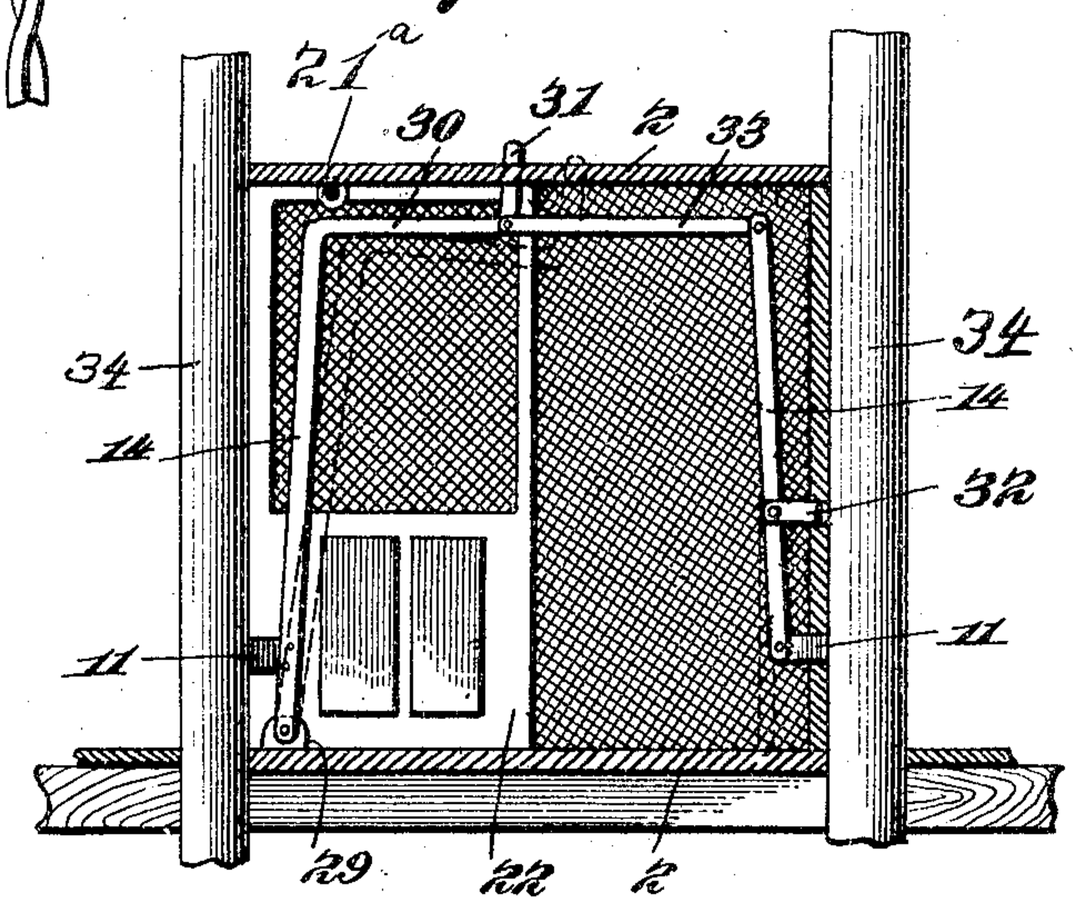


Fig. 6.



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UNITED STATES PATENT OFFICE.

McCLELLAN FULLENLOVE, OF LOUISVILLE, KENTUCKY, ASSIGNOR OF ONE-HALF TO CLINT C. McCLARTY, OF LOUISVILLE, KENTUCKY.

ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 794,293, dated July 11, 1905.

Application filed August 4, 1904. Serial No. 219,507.

To all whom it may concern:

Be it known that I, McCLELLAN FULLENLOVE, a citizen of the United States, residing at Louisville, in the county of Jefferson, State of Kentucky, have invented certain new and useful Improvements in Elevators, of which the following is a specification.

This invention relates to elevators; and it has for an object to provide an improved brake that may be operated by hand or that will be operated automatically when any one of the doors at any of the landings is open or when the elevator-cage travels at too great a speed.

Other and further objects will appear in the following description and will be more particularly pointed out in the claims.

In the drawings, Figure 1 is a vertical elevation of a section of an elevator-shaft with a cage mounted therein, showing the position of the brake and cushioning devices. Fig. 2 is a vertical section of one embodiment of my invention in which the spiral is arranged on the interior of a tube, which is provided at its lower end with the cushioning device. Fig. 3 is a vertical section on a line 3 3, Fig. 2. Fig. 4 is a vertical section of another embodiment of my invention. Fig. 5 is a vertical elevation of the traveling spiral shown in Fig. 4. Fig. 6 is a vertical section of a portion of the elevator-shaft with the cage mounted therein in front of a landing, another embodiment of my brake-operating mechanism being herein shown. Fig. 7 is a detail view showing the hand operating-lever projecting is position to engage the cam-face that is moved in its path by the door.

Referring more particularly to the drawings, 1 indicates an elevator-shaft, and 2 the cage traveling therein. I position on opposite sides of the cage a pair of fixed spirals 3, and between the upper beam 4 and the lower beam 5 of the elevator-cage 2 I journal on opposite sides of the elevator and on vertical axes rotary spirals 6. These rotary spirals 6 are formed at their lower ends with rounded bearings 7, which fit in bearing-sockets 8 in the upper sides and near the ends of the lower beam 5. At their upper ends they are formed with conical bearing ends 9, which are normally spaced from conical bearing-sockets 10 in the under sides and near the ends of the upper beams 4 of the cage 2. This spacing of the upper ends from the upper beam permits of a slight axial movement of the spirals 6 relative to the cage 2, so that when the cage exceeds the speed of the spirals in its downward movement the upper conical ends of the spirals frictionally contact with the walls of the conical socket 10 and produce a braking effect upon the traveling spirals, thereby preventing or retarding their rotation, and consequently the movement of the elevator-cage. In addition to this automatic braking means I provide for each traveling spiral an additional brake. This additional brake consists of a band 11, that is secured at one end 12 to the elevator-cage and thence passed around a frictional surface 13 on a traveling spiral 6 to a lever 14, pivotally connected at 15 to the elevator-cage.

In one embodiment of my invention the levers 14 of opposite traveling spirals depend below the cage and are connected by a horizontal swinging bar 16, that is operated by a lever 17, having a slotted connection therewith at 18 and pivoted at 19 to the elevator-cage. This lever 17 is positioned to one side of the door of the shaft-casing and is provided at its upper end with a hand-grip 20, by which it may be manually operated. The lever is also provided with a projection 21, that extends through the front wall of the cage and is employed for the purpose of causing the lever 17 to be shifted when the doors 22 of the elevator-shaft are open. This latter shifting is caused by a lever 23 for each shaft-cage door, pivoted at 24 to the shaft-cage and provided at its lower end with a cam-face 25, which is thrown into the path of the projection 21 when the adjacent door 22 is open. A lever 26, also pivoted to the shaft-cage, has a slotted connection 27 with the lever 23 and is engaged at its lower end by a friction-roller 28 on the door 22 to cause the lever 23 to be drawn into the path of the projection 21.

In the embodiment of my invention shown

in Fig. 6 one of the levers 14 is pivoted at its lower end at 29 to the bottom of the cage 2 and extends upwardly to a point near the top of the cage, where it is provided with a lateral extension 30, which carries at its end a vertical arm 31, having a cam-face similar to the cam-face 25. (Shown in Fig. 1.) The other lever 14 in this embodiment is pivoted intermediate of its ends at 32 to the side of the cage 2 and is connected to the first-mentioned lever 14 by a link 33. When the door 22 is open, the roller projection 21[a] is in the path of the cam-face on the arm 31. In both embodiments upon the engagement of the cam-face on one part and the projection on the other part the levers 14 are moved in a direction to apply both band-brakes 11, whereby on the downward movement of the cage not only is friction applied through the band 11 to the traveling spiral 6, but the traveling spirals are retarded, thereby throwing the two frictional surfaces 9 and 10 into engagement.

In the embodiment shown in Figs. 1 to 3 the fixed spirals 3 are fitted on the interior of tubes 34, which are provided with vertical slots 35, through which the beams 4 and 5 work, and the traveling spirals 6 are formed on the exterior of barrel 36. In the bottoms of the tubes 34 are formed air-cushion chambers 37, in which work plungers 38, with which the lower beam 5 contacts when it moves past a certain position, so that should the elevator drop or get beyond control there is no danger of it reaching the bottom of the shaft with a thump.

In the embodiment shown in Figs. 4 and 5 the fixed spiral 3[a] is formed by two intertwined cables, while the traveling spiral 6[a] is formed in the center of a barrel 36[a].

The operation of my invention is as follows: In the upward travel of the cage 2 when it is desired to stop the elevator the power is shut off and the levers 14 either moved by hand or automatically, thereby applying friction to the traveling spiral 6 and holding them against rotation, thus preventing the movement of the cage. In the downward travel of the cage the stopping at any landing is accomplished in the same manner as in the upward travel, and in addition on the braking of the traveling spiral the said spiral is caused to move relatively to the cage by being retarded into contact with the frictional surface 10. If the cage should exceed the speed of the traveling spirals in its downward travel or drop in either direction of traveling, the frictional surfaces 9 and 10 will come together, thereby preventing the rotation of the traveling spiral. The cushions on the sides of the cage are an additional prevention against serious accidents.

While I have shown and described several embodiments of my invention, I wish it to be understood that I am not to be limited to these embodiments, but that I may make various changes within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of my invention.

Having thus described my invention, what I claim is—

1. In an elevator-brake, the combination with the elevator-cage, a fixed spiral, and a spiral traveling with the cage and movable longitudinally relatively thereto to cause a braking action, of means for braking the traveling spiral while the cage is connected to its hoisting mechanism to cause the longitudinal movement of the spiral.

2. In an elevator-brake, the combination with the elevator-cage, of a spiral mounted independently of the cage, a spiral traveling with the cage and on the other spiral and movable longitudinally relatively to the cage to cause a braking action, and manually-operated means for causing the longitudinal movement.

3. In an elevator-brake, the combination with the cage and a fixed spiral mounted independently of the cage, of a spiral traveling with the cage and on the fixed spiral, and means operated by an elevator-door when open for braking the spiral traveling with the cage.

4. In an elevator-brake, the combination with the cage, and a fixed spiral arranged in the cage-shaft, of a spiral traveling on the fixed spiral with the cage and also movable longitudinally relatively to the cage, and a brake contacting with the traveling spiral when it moves axially and a band-brake for the traveling spiral.

5. In an elevator-brake, the combination with the cage, of a fixed spiral arranged within the elevator-shaft, a spiral traveling with the cage, on the fixed spiral, also moving longitudinally relatively to the cage and having its upper end provided with a braking-surface, and a braking-surface arranged on the cage, and manually-operated means for retarding the movement of the traveling spiral.

6. In an elevator-brake, the combination with the cage, of a spiral arranged within the elevator-shaft, a spiral traveling with the cage and movable longitudinally relative to the cage to cause a braking action, and a band-brake for the traveling spiral to cause the longitudinal movement.

7. In an elevator-brake, the combination with the cage, of a fixed spiral arranged within the elevator-shaft, a spiral traveling with the cage, and movable longitudinally relative to the cage to cause a braking action, a band-brake for the traveling spiral to cause the longitudinal movement, and a hand-operated mechanism connected to the band-brake.

8. In an elevator-brake, the combination with the cage, of a pair of spirals arranged in

the elevator-shaft on opposite sides of the cage, a pair of spirals traveling with the cage, one on each of the shaft-spirals and movable longitudinally relatively to the cage to cause a braking action, band-brakes for the spirals to cause the longitudinal movements, and means for simultaneously operating both band-brakes.

9. In an elevator-brake, the combination with the elevator-shaft, a door at a landing in the shaft, and the cage, of a pair of spirals, one arranged in the shaft and the other traveling with the cage, and one of said spirals being movable, and means operated by an elevator-door when open to brake the movable spiral.

10. In an elevator, the combination of a cage, a tube provided with a vertical slot, a spiral arranged within the tube and connected with the cage through the slot, and means within the tube for causing the rotation of the spiral.

11. In an elevator-brake, the combination of a cage, a pair of tubes, one on each side of the cage, and each provided with a vertical slot, a spiral arranged within each of said tubes and connected with the cage through the slot, and means within the tubes for causing the rotation of the spirals.

12. In an elevator-brake, the combination with a cage and its hoisting mechanism, of a spiral unconnected with the hoisting mechanism and movable longitudinally on the cage to cause a braking action while the cage is connected to the hoisting mechanism, and a fixed spiral engaging the teeth of the traveling spiral in such a manner as to cause the rotation of the traveling spiral.

The foregoing specification signed this 11th day of July, 1904.

McCLELLAN FULLENLOVE.

In presence of—

E. K. PENNEBAKER,

ISAAC SHERMAN.