No. 839,327.

PATENTED DEC. 25, 1906.

F. E. SMALL & T. M. LATSCH.

SAFETY ELEVATOR AIR BRAKE.

APPLICATION FILED APR. 24, 1906.

Fig. 1

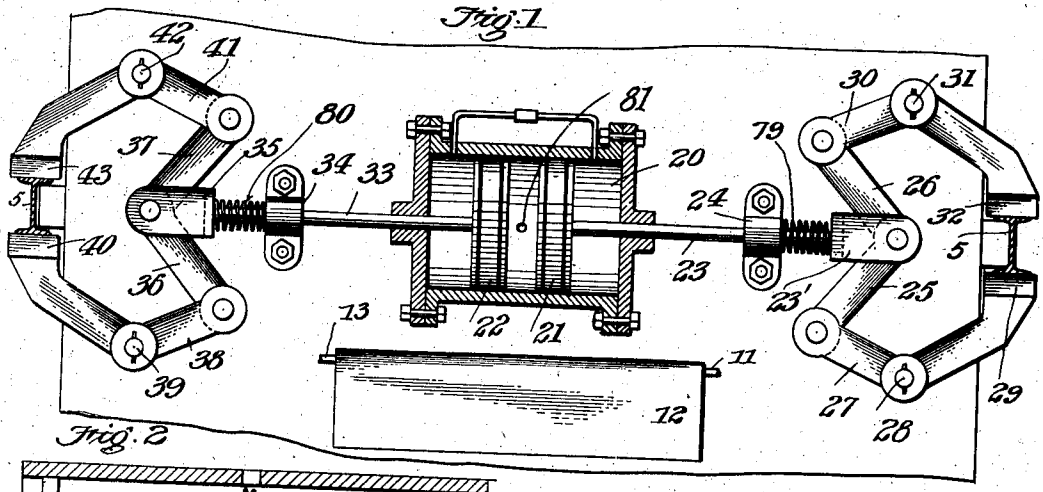


Fig. 2

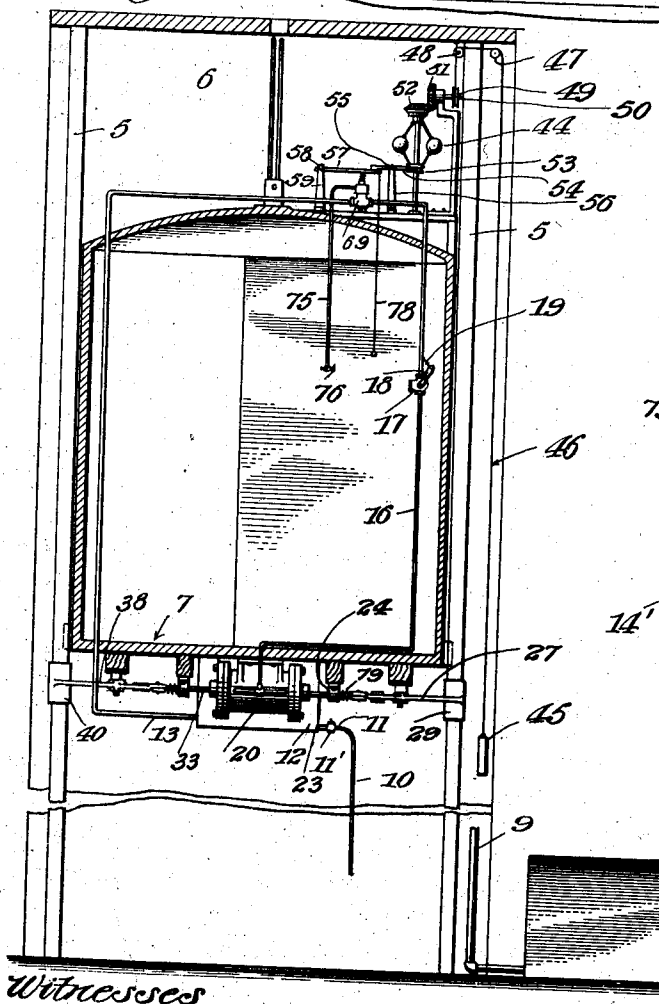
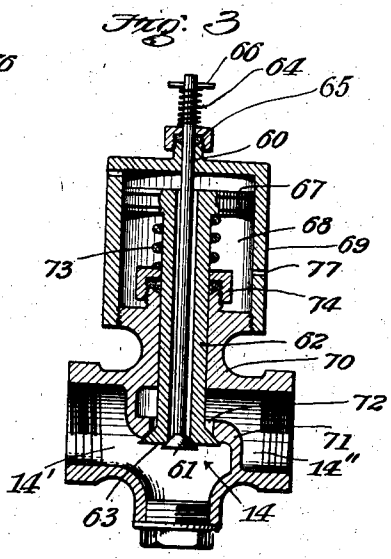


Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

FRED E. SMALL AND THEODORE M. LATSCH, OF LOS ANGELES, CALIFORNIA.

SAFETY ELEVATOR AIR-BRAKE.

No. 839,327. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed April 24, 1906. Serial No. 313,371.

To all whom it may concern:

Be it known that we, FRED E. SMALL and THEODORE M. LATSCH, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Safety Elevator Air-Brakes, of which the following is a specification.

Our invention relates to means for preventing an elevator-cage from ascending or descending an elevator-shaft too rapidly; and the object thereof is to produce an elevator-brake operated by air mechanism which will automatically operate to prevent the elevator from moving up or down the shaft at a greater rate of speed than is safe and which can also manually be caused to operate. We accomplish this object by the mechanism described herein and illustrated in the accompanying drawings, in which—

Figure 1 is a bottom plan view of a portion of the elevator-cage with a portion of our mechanism in central section and a part broken away, the elevator guide-beams being shown in cross-section. Fig. 2 is a longitudinal vertical section of the elevator cage and shaft, taken a little off the center. Fig. 3 is a central vertical section of one of the valves used in our device.

In the drawings, 5 represents the central vertical guide-rails of the elevator-shaft 6.

7 is the elevator-cage, of any desired construction, which is moved in the elevator-shaft by any desired mechanism.

Adjacent to the bottom of the elevator-shaft is a compressed-air-storage tank 8, which is supplied with compressed air from any suitable source. From this storage-tank leads a pipe 9, which preferably extends a distance of nearly one-half the height of the elevator-shaft. To the upper end of this pipe is connected air-hose 10, which connects pipe 11, which last pipe opens into the auxiliary storage-tank 12, which is secured upon the bottom of the elevator-cage. Pipe 11 is provided with check-valve 11′, which permits the air to enter the auxiliary tank. From this auxiliary storage-tank pipe 13 leads to valve-chamber 14 of the air-controlling valve. (Shown in detail in Fig. 3.) A pipe 16 leads from valve-chamber 14 and passes down through the elevator-cage. At a convenient point in the elevator-cage on said pipe is a three-way valve 17, the handle 18 of which is normally held by spring 19 to provide an open way through the valve for the unobstructed passage of air through the pipe. Below the floor of the elevator-cage this pipe branches and each branch opens into a piston-chamber 20, in which are located pistons 21 and 22. Piston 21 is provided with a stem 23, which passes through guide 24, secured to the bottom of the cage, and is provided with a head 23′, to which are pivotally connected links 25 and 26. Link 25 is pivotally connected to brake-lever 27, which is pivotally mounted on shaft 28, which shaft is secured to the bottom of the cage. Lever 27 is provided with a shoe 29 on its free end, which when the brake is set, as shown in Fig. 1, engages the guide-rail on one side thereof. This guide-rail is preferably a steel I-beam. Link 26 is pivotally connected to one end of brake-lever 30, which is pivotally mounted on shaft 31, which shaft is secured to the bottom of the cage. This lever is provided with a shoe 32, which engages the other side of the guide-rail when the brake is set. Piston 22 is provided with a stem 33, which passes through guide 34, secured to the bottom of the car, and is provided with a head 35, to which is pivotally connected links 36 and 37. Link 36 is pivotally connected to brake-lever 38, which is pivotally mounted on shaft 39, secured to the bottom of the cage. The free end of this lever is provided with a shoe 40, which engages the vertical guide-rail when the brake is set. Link 37 is pivotally connected to brake-lever 41, which is pivotally mounted on shaft 42, which shaft is secured to the bottom of the cage. The free end of this lever is provided with shoe 43, which engages the central guide-rail on the opposite side to shoe 40 when the brake is set.

A ball-governor 44 is secured upon the top of the cage, and may be operated in any convenient manner. In the drawings we have shown the same operated by means of the weight 45, cord 46, pulleys 47 and 48 pulley 49, shaft 50, and bevel-gears 51 and 52. The movable collar 53 of the governor is operatively connected to lever 54, which is pivoted at 55 to a support 56, secured to the

top of the cage. The other end of lever 54 rests upon the outer end of bar 57, which is pivoted at 58 to a support 59, secured to the top of the car. Bar 57 rests upon stem 60 of valve 61. Stem 60 passes through the hollow valve-stem 62 of valve 63, which has a central opening therethrough which is normally held closed by valve 61. Valve 61 is normally held on its seat by spring 64, which is coiled around stem 60 between stuffing-box 65 and pin 66, which passes through the top of stem 60. On the upper end of stem 62 is a piston 67, which works in piston-chamber 68, the casing 69 of which is screwed upon the casing 70 of valve-chamber 14. A web 71 divides the valve-chamber 14 into two parts, the inlet-chamber 14′ and the outlet-chamber 14″. In web 71 is a port 72, which is normally closed by valve 63, which is held on its seat by spring 73, coiled around stem 62 between stuffing-box 74 and piston 67. A pipe 75 leads from the upper part of piston-chamber 68 and terminates within the cage, and is provided with a petcock 76, by means of which the air may be exhausted from the upper part of piston-chamber 68 when desired. A port 77 in the side of the piston-chamber permits the air to pass freely in and out of the same below piston 67. A cord 78 is attached to the outer end of bar 57 and hangs down in the cage, so that, if desired, valve 61 can be manually operated. In the operation of our safety-brake should the cage move so rapidly either up or down that it was not safe the ball-governor would operate lever 54 to depress the outer end of bar 57. This movement would depress valve 61, which would open the upper end of piston-chamber 68 to air-pressure, which would act upon piston 67 to force valve 63 off its seat, thereby establishing communication between the storage-tanks filled with compressed air and the piston-chambers and the pistons would through connecting mechanism cause the shoes on the ends of the brake-levers to engage the guide-rails and stop the motion of the car. Should the governor fail to work, the operator in the cage by pulling on cord 78 could operate bar 57 to open valve 61, when the air would unseat valve 63, as before explained. As soon as the brake-shoes stop the motion of the cage the operator would open the petcock on pipe 75, which would bleed the upper part of the chamber 68, and thereby permit valves 61 and 63 to resume their normal positions. He would then operate the three-way valve to exhaust the air from the piston-chambers. As soon as the air exhausts from the piston-chambers springs 79 and 80, located on stems 23 and 33, respectively, between the heads of said stems, and the guides therefor cause the disengagement of the shoes from the guide-rails, so that the cage can again move freely. A port 81 in the side of the piston-chamber 20 permits the air to move in and out of the chamber freely between pistons 21 and 22.

By this construction it will be seen that we have provided an automatic safety air-brake for an elevator-cage which will be powerful enough to prevent the cage from falling when set and which can be automatically or manually set. Should the control mechanism by means of which the movement of cage is controlled by the operator get out of order, the operator could stop his cage at any desired floor, and if the supporting-cable for the elevator should break and the cage stop between two floors the operator could by means of the three-way valve and cord 78 and cock 76 lower his car to any desired floor below.

By the use of the check-valve 11′ should the hose break a sufficient quantity of air will be carried by the auxiliary tank to operate the brake-levers.

Springs 64 and 73 are preferably very light springs, intended to counterbalance the weight of the valves, and can be omitted.

Having described our invention, what we claim is—

1. A safety elevator air-brake, comprising brake-levers pivotally connected to the elevator-cage; an air-cylinder secured to the cage; pistons in said cylinder and attached to said levers; whereby when the pistons are moved in one direction the brake-levers are rendered operative to hold the cage against movement and when moved in the opposite direction the brake-levers are disengaged and rendered inoperative; and means for supplying said cylinders with air to operate said pistons.

2. A safety elevator air-brake, comprising brake-levers pivotally connected to the elevator-cage; an air-cylinder secured to the cage; pistons in said cylinder and attached to said levers whereby when the pistons are moved in one direction the brake-levers are rendered operative to hold the cage against movement and when moved in the opposite direction the brake-levers are disengaged and rendered inoperative; means to supply air to said cylinder to operate said pistons to render the clutch-levers inoperative; means to exhaust said air-supply from said air-cylinder; and means to return said levers to an inoperative position.

3. An elevator-shaft; guide-rails secured thereto; an elevator-cage vertically movable in said shaft and guided by said rails; a pair of brake-levers pivotally connected to the bottom of said cage, a pair on each side thereof; an air-cylinder secured to the bottom of said cage; pistons in said cylinder and

attached to said levers whereby said levers may be moved to engage the guide-rails or to be disengaged therefrom; means to supply compressed air to said cylinder to move said pistons to cause said levers to engage said guide-rails; and means to cause the disengagement of said levers from said guide-rails.

In witness that we claim the foregoing we have hereunto subscribed our names this 18th day of April, 1906.

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Witnesses:
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