S. BISCEGLIA.

ELEVATOR SAFETY DEVICE.

APPLICATION FILED DEC. 6, 1910.

996,051. Patented June 27, 1911.

Fig. 1.

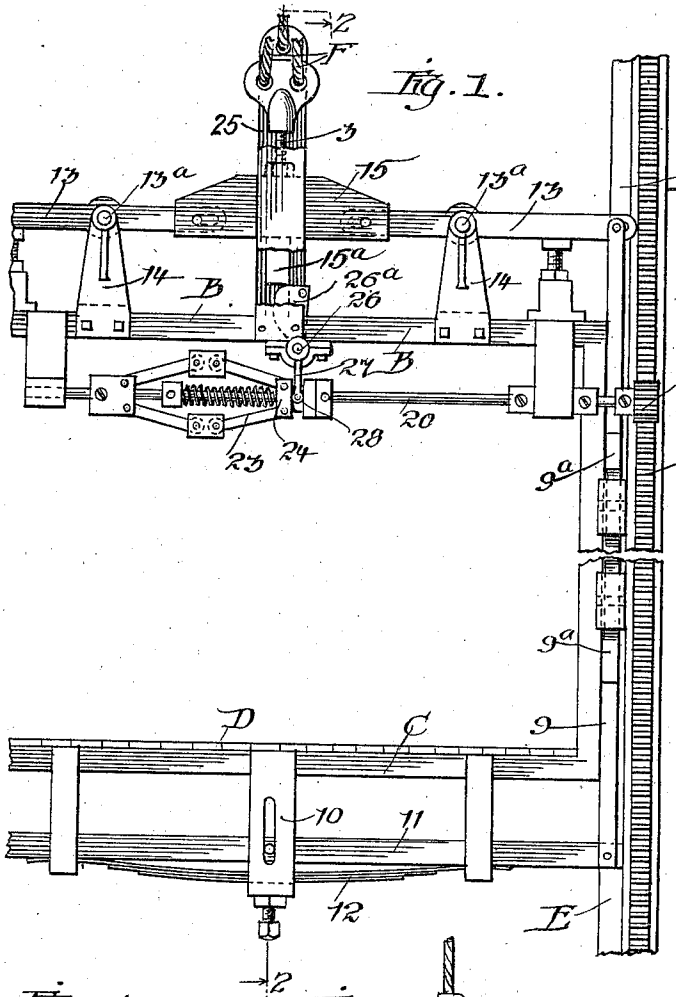


Fig. 2.

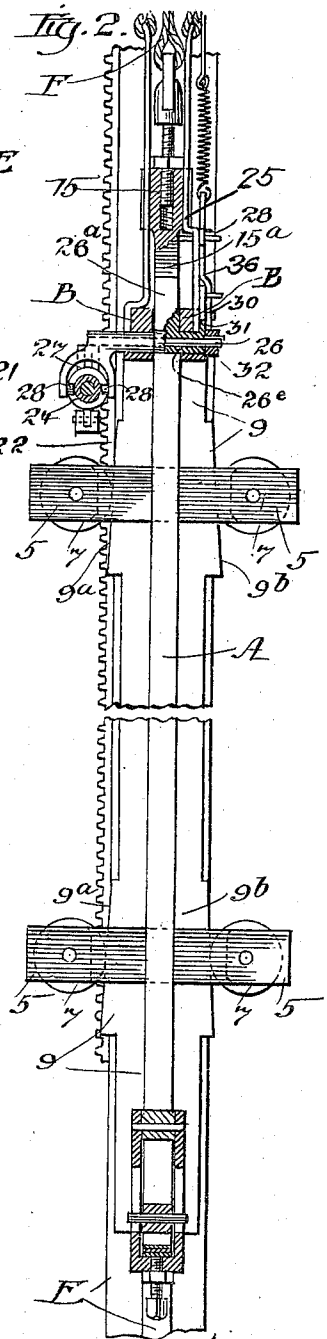


Fig. 4.

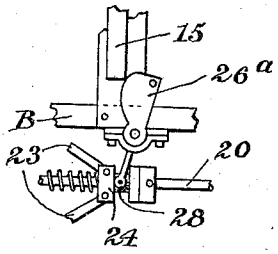
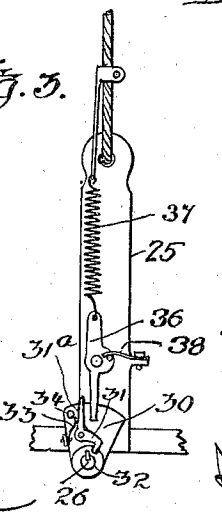


Fig. 3.



Witnesses:

Frank L. Blanchard

Robt. H. Burton.

Inventor:

Salvatore Bisceglia

By Chas. A. Burton & Burton

his Attorneys.

UNITED STATES PATENT OFFICE.

SALVATORE BISCEGLIA, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO LEE N. ELKAN, OF CHICAGO, ILLINOIS.

ELEVATOR SAFETY DEVICE.

996,051. Specification of Letters Patent. Patented June 27, 1911.

Application filed December 5, 1910. Serial No. 595,597.

To all whom it may concern:

Be it known that I, SALVATORE BISCEGLIA, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Elevator Safety Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide improved devices for automatically arresting the fall of an elevator car in case of breaking of a hoisting cable.

It consists of the features of construction and their combinations shown and described as indicated in the claims.

In the drawings:—Figure 1 is a partly sectional front elevation of an elevator embodying this invention, portions being broken away to reduce the compass of the figure and certain details being shown in section at a medial vertical plane. Fig. 2 is a section at the line 2—2 on Fig. 1. Fig. 3 is a detail elevation showing a device for actuating the brake-graduating cam in case of failure of the governor to act. Fig. 4 is a detail elevation showing the parts operated by the governor in a different position from that shown in Fig. 1.

The elevator cage is represented by frame structure comprising vertical side bars of which one is shown at A, top bars, B, and a bottom bar, C, on which there is represented platform or floor, D. The elevator is represented as running between vertical guide posts, of which one is shown at E.

F is the hoisting cable.

For engagement of the elevator cage with the posts, there are mounted on said cage frame at two points in the height thereof, roller bearing blocks, 5, 5, on each of which there are journaled two pairs of rollers, 7, 7, at opposite sides of the intermediate post, E, and spaced off therefrom sufficiently to admit between the post and the rollers wedge bars, 9, 9, which bear at their inner edges against the opposite sides of the post, their outer edges being formed with two outwardly projecting slopes, 9^a, 9^b, in position to coöperate with the upper and lower pairs of rollers, respectively. To the lower horizontal cage frame bar or sill, C, at the middle of its length, there is secured a depending loop, 10, between whose side bars there is lodged the transverse bar, 11, which at its opposite ends (only one of which is shown) is forked to engage the posts, E, and to extend under and form supports for the lower ends of the wedge bars 9. A bow spring, 12, preferably formed of a plurality of leaves, is lodged at its middle point in the lower end of the loop, and bears at its ends upon the under side of the bar, 11, tending to yieldingly uphold the latter and thereby uphold the wedge bars, 9, relatively to the elevator cage.

When the wedge bars are forced and held upward by the bow spring to the full limit to which said spring is adapted to force them, their inclines, 9^a, 9^b, being forced against the rollers, 7, cause the wedge bars to be wedged inward toward and pressed against the opposite sides of the posts, E, which they embrace with a firmness depending upon the tension of the spring, 12. Such action of the wedge bars, it will be noticed, is designed to occur only in case of breakage or disengagement of the hoisting cable, said wedge bars being at all other times inactive by reason of not being pressed against the post; and they are prevented from being thus pressed against the posts during the operation of the elevator cage while its weight is carried by the hoisting cable, by the draft connections which comprise pivoted levers, 13, 13, having their pivots, 13^a, journaled in brackets, 14, bolted to the upper transverse bars, B, of the car, which may be called the draft beams. The inner or proximate ends of the levers, 13, 13, are connected by a cross-head, 15, of a draft rod, 3, to which the hoisting cable, F, is attached. The upward pull of the hoisting cable on the draft rod and its cross-head, 15, pulling upward on the inner ends of the levers, 13, thrusts them downward at their outer ends, where they are formed for engaging the upper ends of the wedge bars, 9, so as to thrust the latter downward out of encounter with the rolls, 7, thereby causing them to be out of frictional engagement with the guide posts so long as the hoisting cable is taut. In case of the slackening of the cable by its breaking or releasing, the spring, 12, operates to thrust the wedge bars upward into encounter with the rolls, 7, by which they are forced into frictional engagement with the guide post.

The construction thus far described is substantially that which is shown in the

pending application of myself and Lee N. Elkan, Serial No. 553,956, filed April 7, 1910. The operation of this structure is to cause a very sudden stoppage of the elevator in case of breaking of the cable. To prevent such sudden arresting of the elevator in cases in which undue shock might thereby be given to the supporting structure or to the cage, I provide means for graduating the frictional grip of the wedge bars with the guide post according to the rate at which the cage is falling. For this purpose, there is mounted upon the elevator cage conveniently near the top cross bars or draft beam a horizontal shaft, 20, having at its outer end a pinion, 21, meshing with a rack, 22, mounted on the side of the post, E, so that the up-and-down travel of the cage causes the shaft to be rotated. Mounted on said shaft in a familiar manner is a centrifugal governor, 23, whose collar, 24, is caused to slide on the shaft by the spread of the governor balls. A rock shaft, 26, journaled on the draft beams, B, has a lever arm, 27, forked for engagement by means of suitably projecting stud rolls, 28, with a peripheral groove in the sliding collar, 23, so that said rock shaft is rocked by the sliding of the collar on the shaft, 20. A cam 26^a which is in general of helically eccentric form is fast on the rock shaft between the beams B, said rock shaft being positioned so as to locate the cam under the end of a stem, 15^a, of the cross-head, 15, which connects and actuates the levers, 13, so as to act as a stop for the movement downward of said stem. Said cam is shaped so that at the position of the rock shaft when the governor is at rest the most eccentric point of the cam periphery is in line with the stem, 15^a; and the cross-head, 15, is thereby upheld at substantially the highest position to which it is normally drawn by the hoisting cable operating against the weight of the car. The rotation of the governor rocks the cam, and the parts are constructed and proportioned so that when the governor's speed excels that which will result from a normal or safe rate of travel of the elevator cage, the cam is rocked around to a position at which the point in its periphery in line with the stem, 15^a, is low enough to permit the cross-head 15, to descend far enough to cause the wedge bars to come into frictional engagement with the post, E. If the speed of the governor should still increase, indicating increasing speed of descent of the elevator cage, the cam being rocked still farther out of the way of the stem, 15^a, permits the cross-head, 15, to descend still farther and increase the frictional grip of the wedge bars upon the side post. If such additional grip of the wedge bars is not sufficient to diminish the speed of the elevator, the governor still farther rocks the cam until the descent of the cross-head rendered possible by such rocking of the cam out of the way of the stem of the cross-head results in sufficient grip of the wedge bars to slacken the fall. The effect of the governor thus applied, it will be seen, is to insure that the brake device shall be applied gradually, but without preventing it from being applied to the full limit, if necessary, to check the descent of the cage, but to prevent its being applied to the full limit suddenly. The purpose, therefore, of preventing undue shock to the elevator cage and supporting structure is effected by this governor.

Since the normal position of the helical cam, 26^a, is such that it would prevent the operation of the brake device unless moved out of said normal position by the action of the governor or otherwise, it is desirable to provide for its movement from said position in any cause in which the governor, for any reason, should fail to operate. For this purpose, there is pivoted upon one of the standards, 25, between which the cross-head, 15, moves, a lever, 36, which is connected at its upper end with the hoisting cable by any flexible means adapted to be held taut, preferably, a coiled spring, 37. A spring 38, fast at one end on the standard, bears at the other end against said lever, tending to swing said lower end thereof outward, but prevented from doing so, so long as the connection, 37, is held taut. The cam, 26^a, is mounted on its rock shaft releasably, and for this purpose it is provided with an elongated hub, 26^e, which extends through one of the journal boxes in which the rock shaft is supported; and beyond said journal box there is rigid with it a disk, 30, on which there is pivoted a dog, 31, which engages a collar, 32, fast on the rock shaft for connecting the cam with the rock shaft, a spring, 33, being provided tending to hold the dog in engagement with the collar. The dog is in the form of a bell-crank having an arm, 31^a, extending up alongside the disk, 30, and standing near to a stud, 34, which projects from the disk when the dog is engaged with the collar. The lower end of the lever, 36, when the cable is taut, laps slightly by the upper end of the arm, 31^a, of the dog when the latter is in the position which it occupies when the cam is not rocked by the governor but stands in a position most obstructing the stem of the cross-head. If the cable breaks when the governor is entirely inactive, the lower end of the lever being swung outward by the action of the spring, 38, first strikes the upper end of the arm, 31^a, of the dog disengaging the dog from the collar, thereby releasing the cam from the shaft and then forcing said arm, 31^a, against the pin, 34, rocks the cam out of the path of the stem of the cross-head, leaving the latter free to descend with the effect of setting the brakes.

If, however, the governor is operating, its speed resulting from the safe descending speed of the cage will have rocked the cam so far as to carry the dog arm, 31ª, entirely out of the path of the lower end of the lever, 36, so that if breakage of the cable should occur, the said lever released and being actuated by its spring, 38, as above described, will nevertheless fail to encounter the dog and will have no effect upon the cam, which will move under the action of the governor, as hereinabove described, for graduating the engagement of the brakes.

I claim:—

1. In combination with an elevator cage and hoisting apparatus, a brake device connected with the hoisting cable so as to be applied upon the breaking of the cable, a centrifugal governor and means for operating the same by the descent of the cage and in proportion to the rapidity of such descent; a graduating device mounted for movement to limit the application of the brake, and connections from the governor for moving such graduating device.

2. In combination with an elevator cage and vertical guide posts for the same, wedge bars mounted on the cage for vertical movement with respect thereto positioned for frictionally engaging the guide posts; a spring operating on said bars tending to force them into such frictional engagement; a hoisting cable and means connected therewith and with the wedge bars for holding them out of frictional engagement with the guide posts by the pull of the hoisting cable; an adjustable stop for limiting the movement of said wedge bar operating connections in the direction for their frictional engagement with the posts; a centrifugal governor mounted on the cage; means by which it is rotated by the descent of the cage, and connections from said governor for operating said adjustable stop.

3. In combination with an elevator cage, hoisting cable and guide posts, frictional devices mounted on the cage for engaging the guide posts; a spring connected with such frictional devices for forcing them into such frictional engagement; levers connected with the hoisting cable for holding them out of such engagement against the tension of the spring; a rock shaft mounted on the cage; an eccentric cam on the rock shaft operating as a stop for said lever connections; a centrifugal governor mounted on the cage; means for rotating it by the descent of the cage, and connections from the governor to said rock shaft for rocking the eccentric cam.

4. In combination with an elevator cage and hoisting apparatus, a brake device connected with the hoisting cable so as to be applied upon the slackening of the cable; a graduating device for limiting the application of the brake and a governor for operating the graduating device in accordance with the speed of the governor; a spring for throwing the graduating device out of operative position, and connections between the hoisting cable and the spring for holding the spring out of action when the cable is taut.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 30th day of November, 1910.

SALVATORE BISCEGLIA.

Witnesses:

C. S. BURTON,

M. GERTRUDE ADY.