J. HOFFER.

SAFETY DEVICE FOR ELEVATOR CARS AND MINE CAGES.

APPLICATION FILED APR. 1, 1919.

1,324,451. Patented Dec. 9, 1919.

FIG.1.

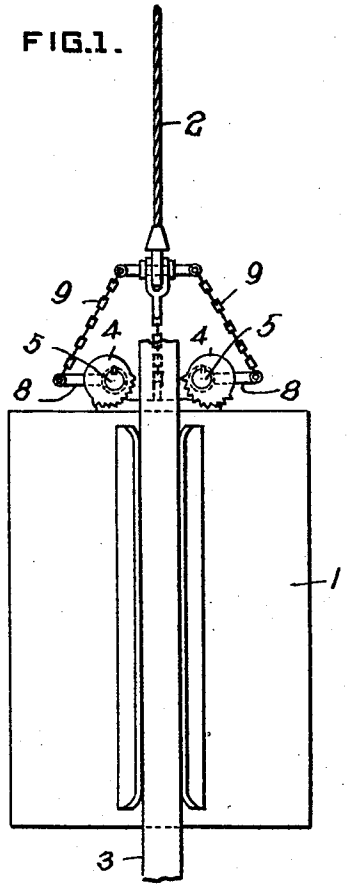


FIG.2.

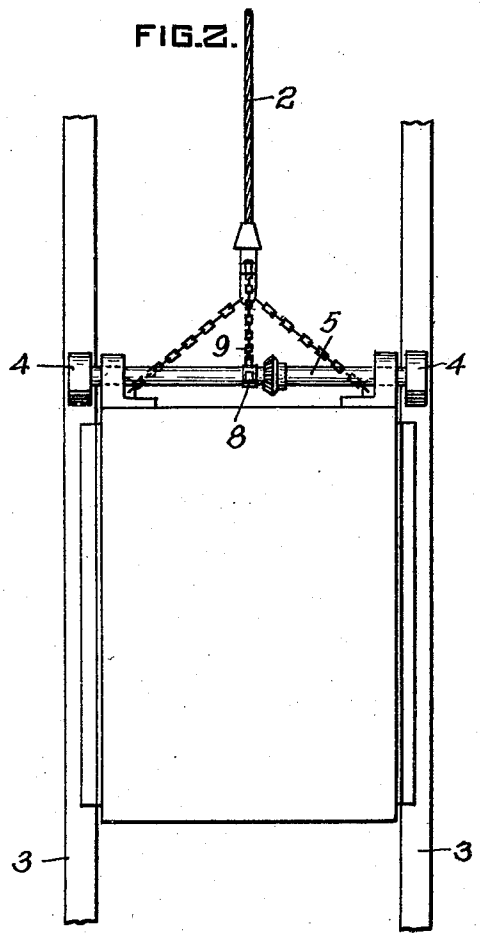


FIG.3.

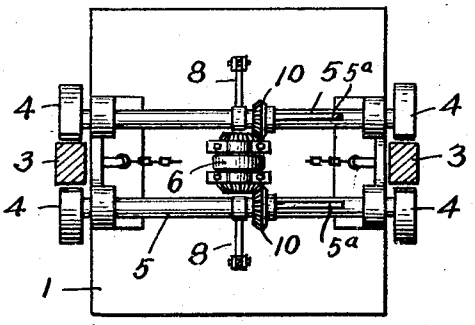
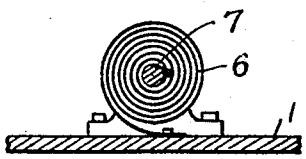


FIG.4.



WITNESSES

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SAFETY DEVICE FOR ELEVATOR-CARS AND MINE-CAGES.

1,324,451. Specification of Letters Patent. Patented Dec. 9, 1919.

Application filed April 1, 1919. Serial No. 286,664.

To all whom it may concern:

Be it known that I, JOHN HOFFER, residing at Marianna, in the county of Washington and State of Pennsylvania, an applicant for United States citizenship, heretofore a subject of the King of Hungary, have invented or discovered certain new and useful Improvements in Safety Devices for Elevator-Cars and Mine-Cages, of which improvements the following is a specification.

My invention relates to improvements in safety-stop devices for passengers and freight elevators and mine cages. The objects are simplicity of structure and effectiveness. Devices of this sort have been proposed to be operated, some of them by springs and some of them by counterweights. The objection to the springs has ordinarily been that they are liable to become clogged or frozen, and so be ineffective, and an objection to counterweights has been the multiplicity of cables in the shaft. I have invented, and shall here describe, a form of spring which may be properly incased and so protected against clogging and against accumulation of moisture which might, in a cold shaft, make trouble by freezing.

The invention is shown in the accompanying drawings in which Figure 1 is a side elevation of the elevator cage sustained in position in a shaft. Fig. 2 is a view of the same cage seen from the point at right angles to that of Fig. 1. Fig. 3 is a view in top plan of the same cage, the stanchions between which the cage runs being here shown in section. Fig. 4 is a view in vertical section, shown in detail and on larger scale, of the coiled spring which is the form of safety operating motor which I prefer to employ.

The cage 1 sustained by cable 2 travels between guides 3. These guides 3 may serve not only as guides, but also, inasmuch as they extend vertically adjacent the path of the cage, they may serve as posts upon which or in coöperation with which the safety device may act. Coöperating with such posts are one or more pairs of post-engaging members borne by the car and in proper time engaging the post to effect emergency stop. As shown in the drawings there are two pairs of these post-engaging members in the form of the cams 4 carried upon shafts 5. These shafts arranged as best shown in Figs. 1 and 3, rotate it will be observed in opposite directions, to bring the cams 5 into engagement upon opposite sides of posts 3.

The cage carries a motor element and carries it in its entirety. There is no accessory counterweighted rope to complicate installation. This motor element is operatively connected to the post-engaging cams, to bring them in proper time into post-engaging position. These post-engaging cams are in the form shown in the drawings mounted upon the shafts 5, and the motor itself consists, in the form shown, of a coiled spring 6 mounted upon a shaft 7. Suitable mechanical connections are made between the shaft 7 and the shafts 5, to cause them to rotate at proper time in response to tension of spring 6, and in opposite direction. This is conveniently effected by the beveled gear connection best shown in the plan view of Fig. 3.

A control is exercised upon the motor, holding it ineffective during all normal conditions, that is so long as the cage is borne by its sustaining cable. This control consists of a tension member connecting the sustaining cable with the spring, and holding the spring under tension. This is conveniently effected by providing arms 8 on shafts 5 and tension members 9 extending between the arms 8 and the coupling to which the rope 2 is secured.

Referring to Fig. 1, and to the post-engaging cam 4 on the right, it will be understood that the arrangement of motor and motor connections being such as shown in Fig. 3, the tension of the spring 6 will tend to turn the shaft 5 in a clockwise direction and bring the cam 4 into operative bearing upon the post 3; while at the same time the tension of the member 9 will tend to hold the spring 6 under compression, and ineffective to turn the shaft 5. (It will be understood that the tension of the spring 6 is small compared with the burden of the weight of the car 1.)

It will be manifest that in case the sustaining cable 2 should break, the restraint exercised upon spring 6 will be removed, and the spring 6 uncoiling will rotate the shafts 5 and cause the cams to engage the posts and effect emergency stop of the car.

To the end that the device may readily be adjusted for service, the gear wheels 10

borne on the shafts 5 may be slidable on feathers 5^a to and from engagement with the companion gear wheels on the shaft 7.

Suppose the safety device to have acted and to be sustaining the cage at an intermediate point in its path of movement. A new cable being provided and attached, the drawing of the cable taut will effect a swinging of the arms 8 and a release of the engagement between cams 4 and post 3. If then the spring 6 is under insufficient tension, the beveled gear wheels 10 may be slid along the shafts 5, leaving the shaft 7 to turn independently of the shafts 5. The shaft 7 may then be rotated by a suitable means (not shown) until the spring 6 is sufficiently taut. Thereupon the beveled gear wheels 10 may be slid back into engagement with the corresponding beveled gear wheels upon shaft 7. The device is then ready for action.

As was said at the beginning, the motor element consisting of the coiled spring 6 may be borne entirely by the cage, requiring no additional cables and counterweights for its proper functioning, and it may be protected against the ingress of dripping water and the accumulation of clogging substances. The safety device may be arranged either at the top or at the bottom of the car, as preferred.

I claim as my invention:

In an elevator safety-stop mechanism, the combination with an elevator car and a car-sustaining cable of a post extending adjacent the path of said car, a shaft borne by said car and provided with a post-engaging cam, a windable spring motor borne by said car, operative connection between said motor and said shaft including a gear-wheel feathered to and sliding on its shaft, and a tension member connected to said cable and normally restraining said motor, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN HOFFER.

Witness:
FRANCIS J. TOMASSON.