J. HOFFER.

SAFETY DEVICE FOR ELEVATOR CAGES.

APPLICATION FILED FEB. 11, 1920.

1,396,752.

Patented Nov. 15, 1921.

FIG. I.

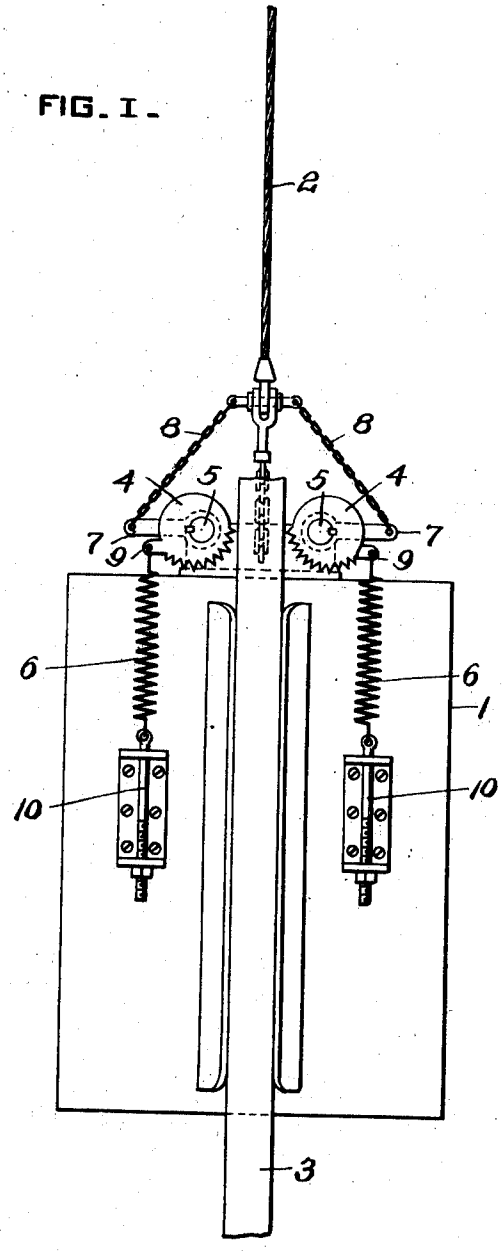


FIG. II.

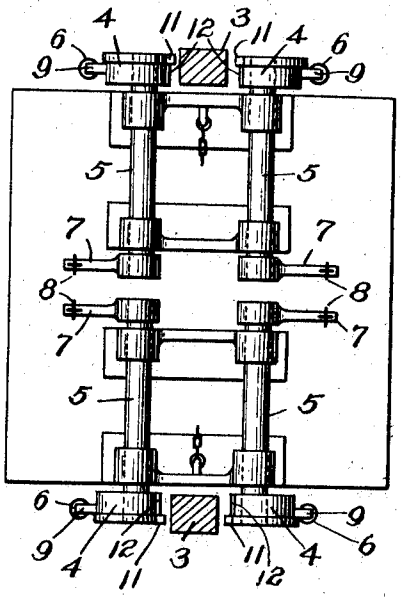
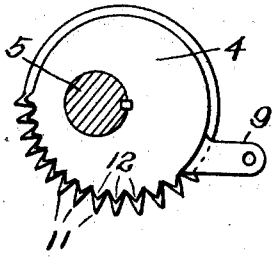


FIG. III.



WITNESSES

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SAFETY DEVICE FOR ELEVATOR-CAGES.

1,396,752. Specification of Letters Patent. Patented Nov. 15, 1921.

Application filed February 11, 1920. Serial No. 357,798.

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, a subject of the former Kingdom of Hungary, in the former Austro-Hungarian Empire, have invented or discovered certain new and useful Improvements in Safety Devices for Elevator-Cages, of which improvements the following is a specification.

My invention relates to safety devices for elevator cages; and by the term elevator cages I mean to include in the field of invention elevator structures, whether operating in vertical shafts or runway or on inclines, whether large or small, and in whatever situation—in buildings, in mines, on hillsides connecting public highways, etc.

The safety device upon which my present improvement is made includes, in combination with the car, traveling in its runway, and a post extending longitudinally of the runway and adjacent the path of car travel, a post-engaging member borne by the car, normally inactive, but coming into post-engaging position automatically when the car-sustaining cable breaks, or when the speed of car travel exceeds a predetermined maximum, and by so coming to post-engaging position, arresting the car and, in case of a broken cable, sustaining it and preventing its falling.

In the accompanying drawings, Figure I shows in side elevation an elevator car in position in a mine shaft and having applied to it the safety device of my present invention; Fig. II is a view in cross section through the mine shaft, showing the posts in section and the car in plan view from above. Fig. III is a view to larger scale in cross section through the machine shaft by which the post-engaging member (in this case a cam) is moved and showing the cam itself in elevation.

The elevator car is indicated by 1, and it is sustained and carried by a cable 2. It travels in its shaft or runway, its path being ordinarily defined by guides such as 3. Two such guides are here shown, defining a vertical runway for the car 1. Such guideways conveniently become the posts upon which the safety device acts, and such is the arrangement shown. All that is requisite of the posts is that they extend longitudinally of and adjacent to the car runway. Special posts may and in some cases must be provided for the proper functioning of the safety device, but in many cases it is convenient, as here shown, to employ the car guides 3 as the posts upon which the safety device acts.

The safety device includes members which, normally inactive, move to post-engaging position on the transpiring of the emergency for which the safety device is intended. In this case pairs of cams 4, mounted on rotary shafts 5, are arranged on either side of each post 3. Means are provided for turning these shafts and bringing the cams to post-enaging position. Such means are here found in springs 6. Under all normal conditions of operation the cams are held retracted and the springs under restraint, but, upon the transpiring of the emergency for which the safety device is intended, the springs come into play and the cams come to post engagement. The emergency here contemplated is the parting of the car-sustaining cable 2. Shafts 5 are connected, through arms 7 and chains 8 to cable 2. This connection, so long as the rope is taut and the weight of the car is exerted on it, holds the safety device inactive; but, immediately this tension is by the parting of cable 2 relieved, springs 6 acting through arms 9 turn cam and shaft together and bring the cams to post engagement. The arrangement is as shown preferably such that the weight of the car tightens the bite of the cams upon the posts; the double arrangement of cams with the member of each pair coöperating upon one and the same post from opposite sides affords the clamping effect desired.

There are three features of the structure to which I here call attention, in which separately or collectively my present invention resides. In the first place, it is to be observed that the cams are mounted on separate shafts, particularly that the opposite and axially alined cams are mounted on separate shafts. Ordinarily, simplicity of structure has dictated, that these opposite cams be carried by twos on single shafts; and this would be well enough, if the installation were always perfectly proportioned in all its parts. But in practice, particularly in coal mines, the posts 3 are formed of timbers which are prone to vary in minute dimension, are liable in the common run of such material to present irregularities, they

are liable when installed to become warped and displaced, liable to become damaged, and liable in continued use (particularly where they serve as guides for the car) to be worn away—and opposite guides may easily under ordinary service conditions show the results of unequal wear. In short, the opposite posts may in practice vary considerably in actual dimensions. And, where there is marked difference in thickness of posts at opposite points, if the opposite pairs of post-engaging cams be carried two by two on common shafts, post engagement on one side may prevent post engagement on the other. By mounting each cam on its own separate and separately impelled shaft, faults in operation of this sort are prevented.

In the second place, it will be observed of the springs 6, as they are particularly shown in Fig. I, that by the turning of the nuts on bolts 10 to which the springs are anchored, and so moving the bolts longitudinally, the intensity of spring tension may be varied. This adjustability is advantageous in such apparatus, where long-continued use may effect changes in the efficacy of parts.

In the third place, the individual cam is provided with two areas of post engaging surface. These areas come successively into engagement; one (the area 11) projects farther from the center of turning, is built on a longer radius; is narrow, and is provided with relatively long sharp tines. It is indeed a spur. The other and lower surface 12 will ordinarily be faced with the usual irregularity, roughness or corrugation, effective to make car-sustaining engagement with the surfaces of posts 10.

The difficulty to the overcoming of which this last item of structure is directed is this: It sometimes happens, in consequence of misshaping, wear and distortion of parts, the spreading of water over wooden surfaces, to render them slippery, and the like, that the ordinary cams fail to hold. They slip off; the posts bulge; and there is danger that the falling car will still escape from the proper action of the safety device. By providing the narrow sharp-tined spur portion of the post-engaging cam surface insurance is had, against escape of the post and cam from engagement one with the other; and then, since the spur has been made relatively narrow to effect its end, the adjacent cam surface is provided, to come into play as the spur sinks into the wood of the post, to afford the normal and usual engagement over surfaces so extended as to insure security.

Variation in detail is of course permissible; the essential features of invention are defined in the ensuing claims.

I claim as my invention:

1. In a safety device for elevator cages, the combination, with a car mounted in a runway and a post arranged adjacent the runway, of a post-engaging member borne by the car and movable to and from post-engaging position, the said member including two post-engaging cams turning in unison upon a common axis, the said cams being of unequal radii and the cam of larger radius being tined substantially as described.

2. In a safety device for elevator cages, the combination, with a car mounted in a runway and a post arranged adjacent the runway, of a post-engaging cam mounted on a center of turning in said car and including two post-engaging parts; a spur of relatively large radius, and a weight-sustaining part of less radius, substantially as described.

3. In a safety device for elevator cages the combination, with a car mounted in a runway, a car-sustaining cable, and a post arranged adjacent the runway, of a post-engaging member borne by the car, means for swinging said post-engaging member from inactive to active position, means for varying the intensity of such member-swinging means, and means rendered ineffective on the parting of the car-sustaining cable normally holding the member-swinging means inactive, substantially as described.

4. In a safety device for elevator cages the combination, with a car mounted in a runway and a plurality of posts arranged adjacent the runway and on either side the car, of a corresponding plurality of post-engaging members borne by the car and movable to and from post-engaging position, each of said members provided with two post-engaging parts coming successively into engagement with a post as the member moves, separate means for moving each of said members, and means for varying separately the effectiveness of each of the member-moving means last mentioned, substantially as described.

In testimony whereof I have hereunto set my hand.

JOHN HOFFER.

Witnesses:

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FRANCIS J. TOMASSON.