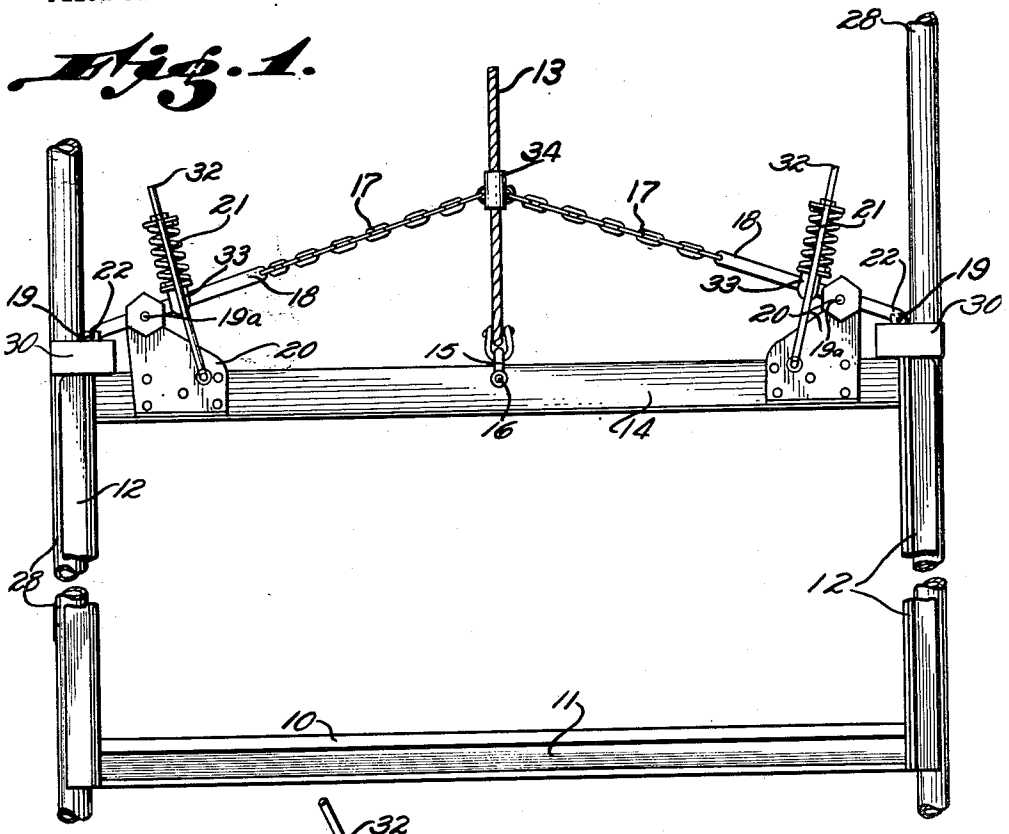
Aug. 27, 1957 J. C. PHILLIPS 2,804,175

ELEVATOR SAFETY APPARATUS

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Fig. 1.



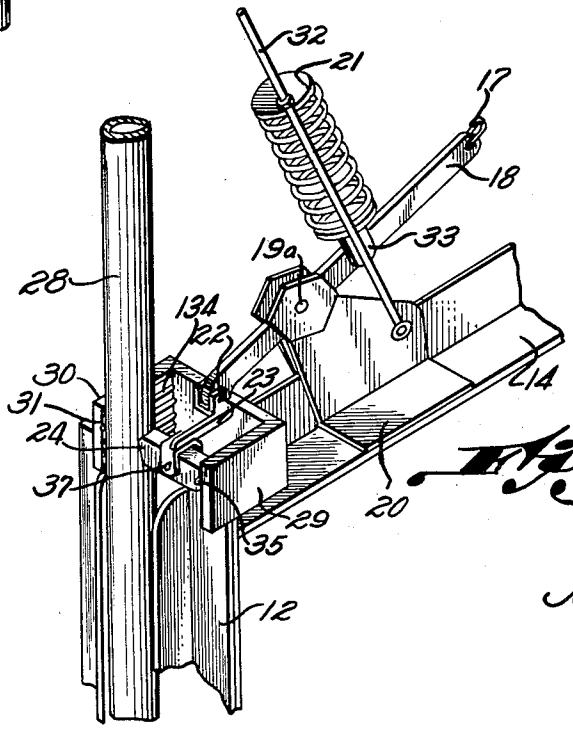


Fig. 2.

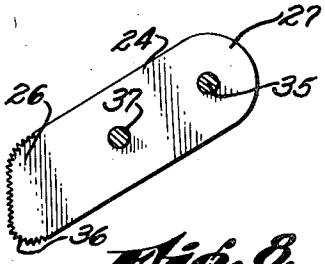


Fig. 8.

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ELEVATOR SAFETY APPARATUS

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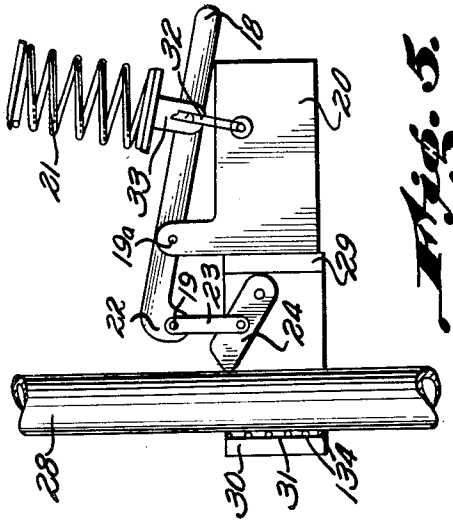


Fig. 5.

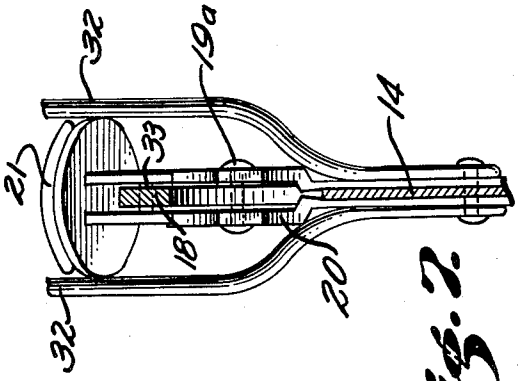


Fig. 2.

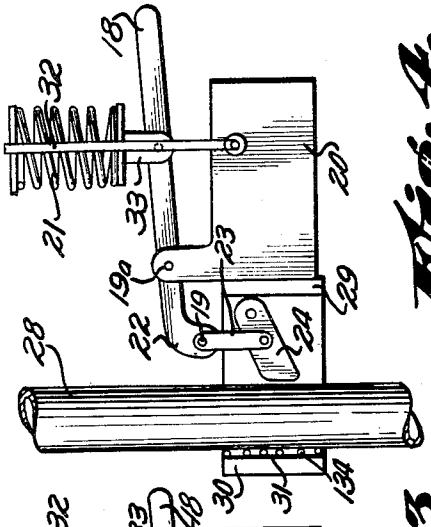


Fig. 4.

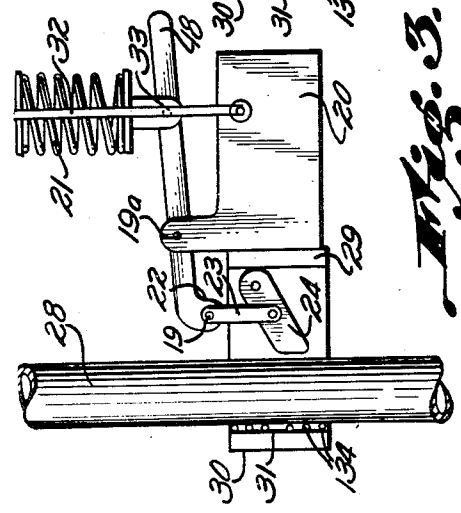


Fig. 3.

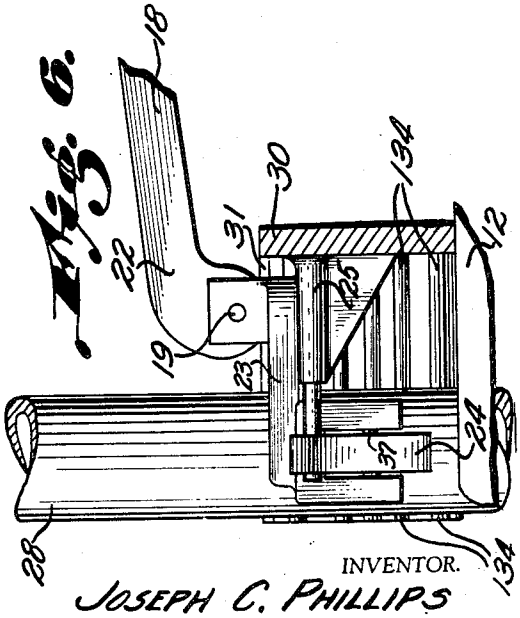


Fig. 6.

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ELEVATOR SAFETY APPARATUS

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Application January 6, 1954, Serial No. 402,560

4 Claims. (Cl. 187—86)

This invention relates to elevators or lifts for carrying persons and material from one height to another through a vertical plane. It is particularly intended for such equipment, used in conjunction with the construction of buildings and serving as a portable or transportable arrangement for the purpose, and the delivery of material needed to the various heights.

While a number of devices have been designed and used in connection with the prevention of elevators from falling and doing damage, when the hoisting cables break such have in most instances proved ineffective because of their tendency to collapse the columns supporting and guiding the elevator platform, as well as slip or break the braking devices involved. In this invention the breaking of the hoisting cables allows braking device to resiliently and powerfully react and work on the supporting columns in such a manner as to avoid collapsing and spreading them apart, while at the same time providing for an effective restraint against further falling of the platform.

An object of this invention is to provide a new and improved safety control for an elevator that will operate positively and effectively, be installable economically, yet be simple, compact and attractive in design.

Another object of this invention is to provide a new and improve safety control for an elevator platform that will act on the supporting columns of the elevator structure without injury to themselves or the control.

A further object of the invention is to provide a new and improved safety control for an elevator platform that will employ an eccentric frictional surface in contact with the supporting columns of the elevator structure immediately operable when the hoisting cables of the elevator break and work efficiently in spite of oil and grease on the contact surfaces.

An additional and important object of the invention is to have a safety control attached to the platform and contactable with the supporting columns of the elevator structure, so arranged that the operation of the control under emergency conditions will not cause the columns to spread or distort into misalignment or form enough to interfere with the proper action of the device.

Other objects of the invention will become apparent as the details of its construction and the principles of its operative functions are explained.

For a better understanding of the invention and the objects thereof, reference is made to the accompanying drawings. These drawings illustrate a particular form of the construction preferably adopted, while the following description indicate how it is made and the basis of its functioning.

In the drawings:

Fig. 1 is a front elevation of an elevator with safety controls embodying this invention;

Fig. 2 is a perspective view of one spring element;

Fig. 3 is a schematic of one spring element in one operative position;

Fig. 4 is a schematic of said spring element of Fig. 3 in a second operative condition;

Fig. 5 is a schematic of said spring element of Fig. 3 in a third operative position;

Fig. 6 is a side elevation of an enclosure with a side thereof broken away;

Fig. 7 is a section along line 7—7 of Fig. 1; and

Fig. 8 is a detail of a pawl.

Similar reference numerals refer to the same parts throughout the drawings.

In the construction shown in the drawings, an elevator carrier consists of a flat horizontal platform **10**, that is supported underneath by a structural member **11**. Vertical struts **12** extend from the member **11** upward and terminate in a channel cross beam **14**, forming a ridge bar across the carrier and serving as a suspension member to which the hoisting cable **13** can be conveniently attached. A thimble **15** at the end of the cable is held by a bolt **16** to the beam **14**. This single cable **13**, is carried to the overhead pulleys and from thence to the winch supplying the power to lift the elevator. This follows conventional procedure and therefore is not shown, as the details are well known to those skilled in the art.

Coupled to the cable **13** is a clamp **34** bolted securely in place at a point selected to direct a pair of chains **17** in vertically disposed angular planes to the outer ends of the channel beam **14**. These chains **17** are attached to brake release bars **18** pivoted on pins **19** and **19***a* in fulcrum plates **20**. When the chains exert a pull on the bars **18** in the angular plane they compress (or extend, as preferred) their individual coil springs **21** and tension them so they induce a resilient force tending to push the bars **18** downwardly. This is resisted when the cable **13**, lifts against them. This force will induce leverage on the bars and lift up on the short ends **22**. The springs **21** are supported on a bolted frame **32** attached to the ridge beam **14**. The short ends **22** are attached to oscillatable positioned shackles or saddles **23** holding brake cams **24** by part **37**. These cams are supported off center by pivots **35** mounted on enclosure **30**. The pivots **35** are held between the arms **25** of the saddles which are made bifurcated for the purpose. The front and rear faces **26** and **27** of the cams respectively are preferably rounded at **27** and serrated at **36** to provide a roughened surface resistance.

U-formed enclosures **30** serve to encompass and support the cams **24** and in definite relation to the ends of the ridge bar **12**. This arrangement aligns the cams so their faces **26** can engage the periphery of their respective pipe guiding column **28** on one side and inner surface **29** of the enclosure **30** by the opposite face **27**. The inner surface **31** of each enclosure **30** is aligned close to the peripheral surface of the respective column **28**, opposite to face **29**. The cams are adjusted so that normally they will not contact the surfaces of the encolsures **30** and the pipe columns **28**, and thus will not interfere with the free running of the elevator carrier in its usual vertical travel. However, when the hositing rope **13** breaks and loosens up on the chains and release bars **18**, the latter allows the coil springs **21** to force the cams **24** upward from the position indicated in Figure 3 or 4 to that shown in Figure 5. The springs **21** push down on a rod **33** and pivots the cams on the fulcrums so that powerful contact effects bring the faces **26** and **27** against the peripheral faces of the column **28** and face **29** of enclosures **30** respectively. This brakes the carrier and quickly brings it to a stop.

The inner surface **31** of the enclosure is preferably roughened, serrated or faced with welding **134** to add to frictional and wear resistance. When the cams make the emergency contact they exert pressure against the

inner surfaces **29** and reacting against the pipe they bring the enclosure over enough to make the surfaces **31** brace against the opposite side of the pipe. This distributes the effect and prevents the crushing of the pipe column **28** and prevents its moving out of alignment. It is of course to be understood that the length of each cam is slightly longer than the space it spans. They become jammed against the pipes **28** when the release bars are loosened at the breaking of the hoisting rope. The movement of the carrier falling and its momentum brings the cams and their serrated surfaces into such engagement with the pipe column, as to bring the carrier to a stop.

The devices are returned to operative condition after repairs have been made, by replacing the hoisting rope and pulling up on the chains **17** with the release bars into position for emergency tension, and future operation. When the hoisting rope normally holds the carrier in lifting positions, it places the emergency braking mechanisms under resilient tension, ready to actuate when released.

The characteristics of the device are important because they include plural wearing surfaces for emergency use; a cam-like wedge for positive yet not too abrupt braking effect; the use of the guide columns for braking coordination without danger of their being destructively damaged during the period of braking; components of the braking mechanism made readily accessible for facile inspection, adjustment, replacement and repair, and designed to operate effectively in spite of grease and other lubricants covering the braking surfaces and components.

While but one general form of the invention is shown in the drawings and described in the specification, it is not desired to limit this application for patent to this particular form as it is appreciated that other forms of construction could be made that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. The combination, with an elevator, of emergency safety mechanism for preventing uncontrolled descent of the elevator; said elevator comprising a pair of oppositely disposed hollow columns, a platform, a cross beam, a pair of struts supporting said cross beam above the platform and each of said struts embracing one of said columns, a cable having one end connected to the cross beam between the ends of the latter, a pair of fulcrum plates secured to said cross beam near the ends thereof, a lever pivoted adjacent one end thereof on each of said fulcrum plates, a saddle connected to one end of each of said levers, a pair of cam members, a pair of pivot elements each connecting one of said cam members to one of said saddles, a pair of U-shaped members each straddling one of said hollow columns, a second pair of pivot elements each connecting one of said cam members to one of said U-shaped members, means connecting the other end of each of said levers to said cable and resilient means tending to swing said other ends of said levers toward said cross beam, said U-shaped members and said cam members having serrated portions confronting said columns; the pivots connecting the cam members to the U-shaped members being positioned to cause lifting of the saddles to swing the serrated portions of the cam members into contact with said columns and the length of the cam members being such as to cause such contact to move the U-shaped members to bring the serrated portions thereof into contact with portions of the hollow columns opposite to the portions engaged by said cam members.

2. A combination of the type set forth in claim 1, in which the means connecting said levers to said cable include a clamp secured to said cable and flexible means connecting said other ends of the levers to said clamp.

3. A combination of the type set forth in claim 2, which includes a pair of frames secured to said cross beam, and supporting said resilient means in position to act on said levers.

4. A combination of the type set forth in claim 3, in which welding material is applied to a part of each of the serrated portions of the U-shaped members.

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