

A. W. ACKERMAN.
SAFETY DEVICE FOR ELEVATORS.
APPLICATION FILED OCT. 5, 1908.

934,645.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.

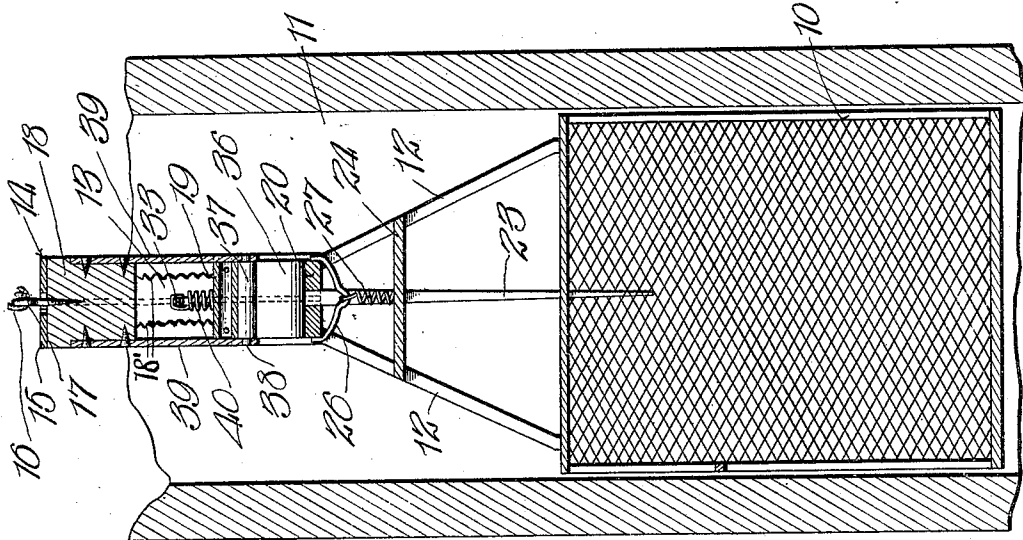


Fig. 2.

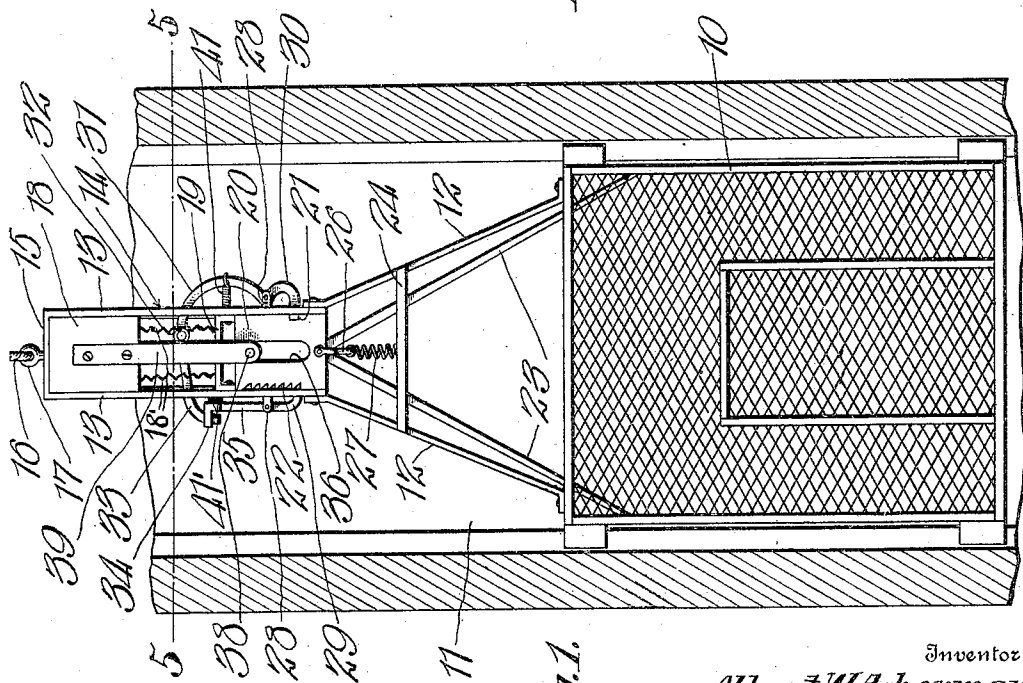


Fig. 1.

Witnesses

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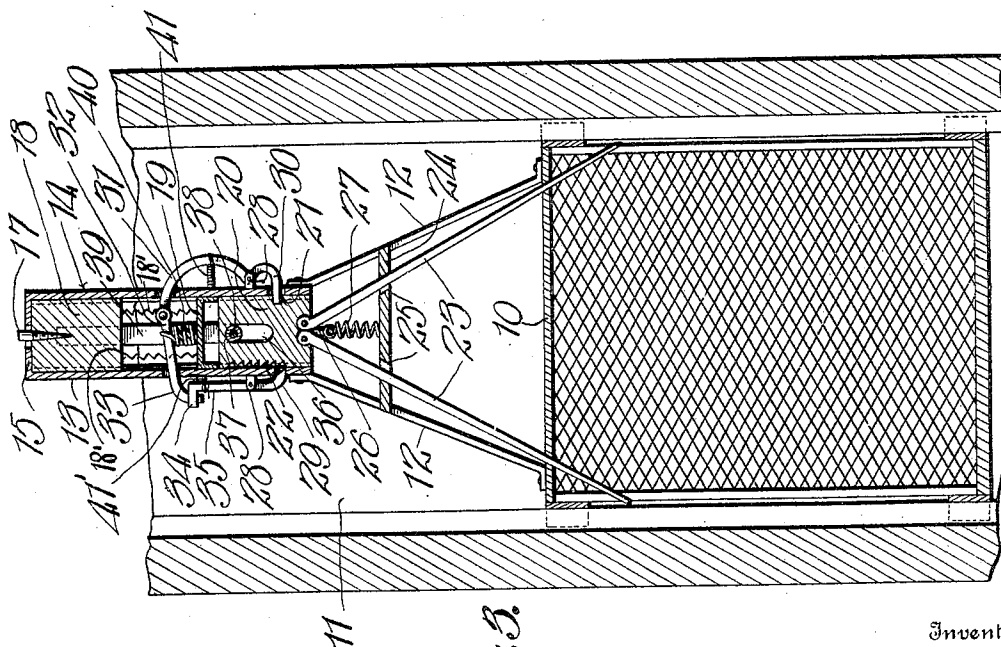
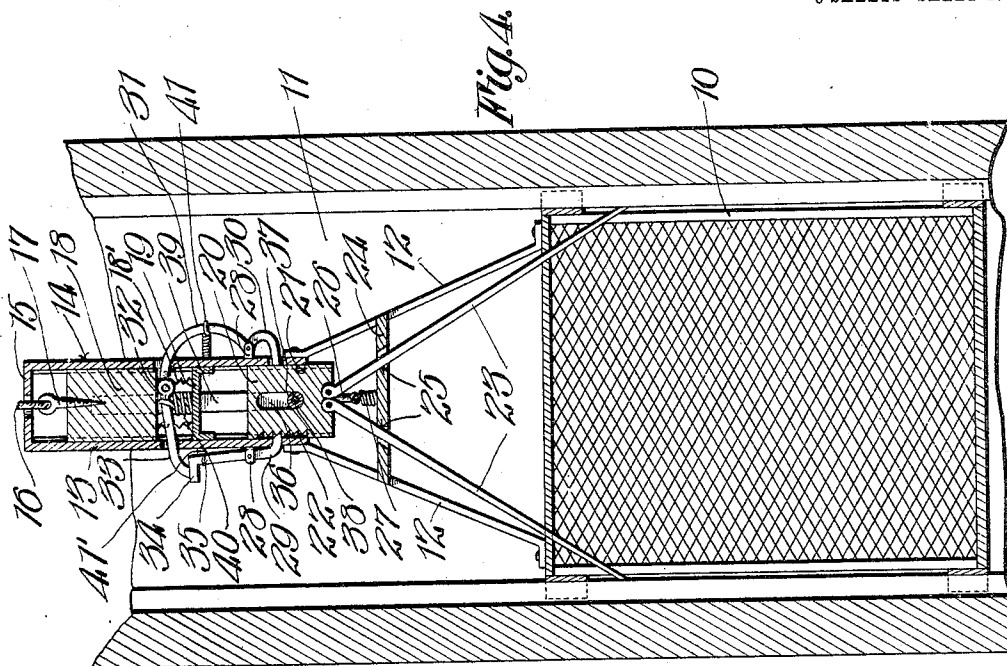
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3 SHEETS—SHEET 3.

Fig. 6.

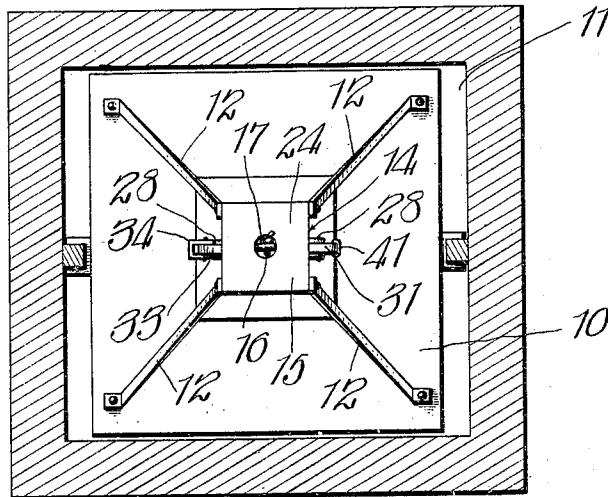
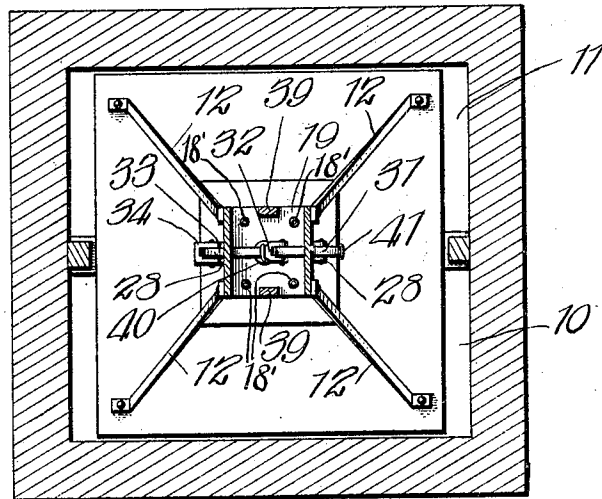


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR ELEVATORS.

934,645.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed October 5, 1908. Serial No. 456,183.

To all whom it may concern:

Be it known that I, ALBERT W. ACKERMAN, a citizen of the United States, residing at Falks Store, in the county of Canyon, State of Idaho, have invented certain new and useful Improvements in Safety Devices for Elevators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to a safety device for elevators and more particularly to the class of automatic safety devices for elevator cages to prevent the same from dropping should the lifting cable become broken or detached therefrom.

The primary object of the invention is the provision of a safety device for elevators such as mining or other cages which device will automatically operate to arrest or prevent the downward flight or drop of the cage should the lifting cable thereof become broken or detached from the cage.

Another object of the invention is the provision of a safety device for elevators, mine cages or the like comprising catcher members adapted to be automatically operated upon the breaking or detachment of the lifting cable to engage the walls of the well between which the elevator or cage travels, so as to prevent the latter from dropping upon the breaking or detachment of the said lifting cable thereof.

A further object of the invention is the provision of a safety device automatically actuated to arrest an elevator cage upon the breaking of its lifting cable or the detachment of the cable from the cage and means to prevent the automatic action of the safety device when the lifting cable becomes slack upon the arrival of the cage at the lowest point of descent within the elevator well in which the cage vertically travels.

In the drawings accompanying and forming part of this specification is illustrated the preferred form of embodiment of the invention, which, to enable those skilled in the art to practice the invention, will be set forth at length in the following description, while the novelty of the invention will be included in the claims succeeding the description.

In the drawings:—Figure 1 is a front elevation of an elevator cage and well and the

invention applied thereto. Fig. 2 is a vertical sectional view taken through the upper portion of the elevator cage and the well in which the same travels, with the invention applied to the cage and partly in section. Fig. 3 is a vertical sectional view through the safety device and showing the same in an inoperative position. Fig. 4 is a similar view with the same in an operative position for arresting the elevator cage. Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 1. Fig. 6 is a top plan view of the elevator cage with the safety device in position thereon.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

In the drawings the numeral 10 designates the elevator cage which is of the usual construction and is adapted to travel vertically in a well 11, the latter also being of the usual or ordinary construction and rising from the top of said cage 10 are bail irons 12, the lower ends of which are connected at opposite points of the cage and converge inwardly toward each other, while the upper ends thereof are fixed to the lower extremities of spaced vertical side walls 13 of a housing or casing 14, the latter having a perforated cross head 15, through which passes a lifting cable 16, the same having its lower end connected to an eye 17 of a stem fixed centrally in a weighted block 18, which latter is mounted for sliding movement between the side walls 13 within the housing or casing.

Centrally of the housing or casing 14 and connected to the side walls 13 thereof is a transverse partition plate 19, dividing the said housing and casing into upper and lower spaces, the space below the partition plate having mounted therein a slidable plunger head or block 20 having formed in one side thereof a notch 21 and in its opposite side a plurality of rack teeth 22 and pivotally mounted in the lower end of the said plunger head or block 20 are catcher arms 23, which latter are adapted to move outwardly at opposite sides of the cage 10 and engage in the side walls of the well 11, to arrest the said cage for preventing the dropping thereof when the lifting cable 16 becomes broken or detached from the same. Connected to the underface of the weighted block 18 and to the transverse plate 19 are

retractile springs 18' which latter serve to lower the said block 18 upon the breaking of the lifting cable 16 so that the weighted block will actuate the locking dogs herein-

after described.

Joined to the bail irons 12 is a bridge piece 24, the same having guide openings 25 through which pass the catcher arms 23 and which bridge piece serves to spread the said arms outwardly to engage the side walls of the well. Mounted upon the lower end of the plunger head or block 20 and depending therefrom is a clevis 26 to which is connected one end of a retractile spring 27, the opposite end of which is connected centrally to the bridge piece 24, the spring acting to bring the catcher arms 23 in position for engagement with the side walls of the well upon the breaking of the lifting cable 16 connected to the elevator cage.

Projecting from the side walls 13 of the housing or casing 14 are spaced ears 28 between which are pivoted locking dogs 29 and 30, the latter normally in locked engagement with the notch 21 in the plunger head or block 20 to hold the same against the tension of the retractile spring 27 and to maintain the catcher arms 23 in an inoperative position, while the locking dog 29 is normally held out of engagement with the rack teeth 22 of said plunger head or block 20, however, upon disengagement of the locking dog 30 from the notch 21 of said plunger head or block 20, and when the latter lowers upon the action of the retractile spring 27, the said locking dog 29 will automatically engage the rack teeth 22 to lock the said plunger head or block against reverse movement and maintain the catcher arms 23 in engagement with the walls of the well to hold the cage against movement or arrest the same from dropping in said well. The said locking dog 30 has an inwardly curved extension 31 terminating in the path of movement of the weighted block 18 above the partition plate 19 and which extension is pivotally connected to a forked arm 32, the latter having a downwardly curved extremity 33 loosely engaging a loop 34 formed on the upper end of the vertical extension 35 of the locking dog 29, so that when the lifting cable 16 becomes detached or broken the weighted block 18 under the influence of the springs 18' will drop and act upon the extension 31 and forked arm 32 so as to disengage the locking dog 30 from the plunger head or block 20 which latter will automatically shift the catcher arms 23 into engagement with the walls of the well 11 to arrest the cage or prevent the same from dropping in the well. The said plunger head or block 20 has formed centrally therein a vertical elongated slot 36 in which is mounted a transverse friction roller 37, the latter rotatably mounted upon a bolt or pin

38 uniting the lower end of spaced parallel strips 39, the upper ends of which are fixed to opposite sides of the weighted block 18 and serve to guide the latter in its downward movement upon the breaking of the lifting cable or detachment thereof from the cage.

Rising from the partition plate 19 is an expansion spring 40, the latter connected to the pivotal connection uniting the extension 31 and forked arm 32 which spring serves to normally hold the locking dog 30 in engagement with the notch in the plunger head or block. Secured to the opposite side walls 13 of the housing or casing are the inner ends of an expansion spring 41 and a retractile spring 41', the outer ends of which are connected to the extension 31 and extension 35 of the locking dogs respectively to reset the same after having been acted upon by the weighted block 18 when the lifting cable 16 has been detached or broken from the elevator cage.

Should the lifting cable become broken or detached and there be danger of the cage falling, the weighted and spring actuated block 18 will fall into engagement with the extension 31 arranged in the path of movement thereof to release the locking dog 30 to free the plunger head or block 20 which latter will move downwardly in the housing or casing, thus forcing the lower ends of the catcher arms 23 outwardly and the ends thereof will engage the walls of the well 11 thus automatically and instantly arresting or stopping the cage in its descent within the well.

It is to be understood that changes, variations and modifications may be made in the construction of this invention such as come properly within the scope of the claims hereunto appended without departing from the spirit of the invention.

The safety device is simple in construction, positive in action, can be applied to any elevator wherein the cage is suspended by a cable and is very effective in preventing the elevator cages from falling, and resulting accidents.

What is claimed is:—

1. In a safety device of the class described, the combination with an elevator cage and its lifting cable, of a housing rising from the top of said cage, a plunger block slidably mounted in the housing, catcher arms pivotally connected to the plunger block and movable from an inoperative to an operative position by the latter, means for locking the plunger block against movement, means operative upon the breaking of the lifting cable of the cage for releasing said locking means to free the plunger block and means for locking the plunger block against reverse movement.

2. In a safety device of the class described,

the combination with an elevator cage and its lifting cable, of a housing connected to the cage above the same, a plunger block slidably mounted in the housing, catcher arms connected to said plunger block and adapted to be moved to an operative position thereby, weighted means slidably mounted within the housing and having connection with the lifting cable of the cage, locking means arranged in the path of movement of the weighted means and normally holding the plunger block against movement and adapted to free the same when operated upon by the weighted means and means coöperative with the locking means to prevent back movement of the plunger block.

3. The combination with an elevator cage and its well in which the same travels, of a lifting cable for the cage, a housing mounted upon said cage, a plunger head slidable in the housing, catcher arms pivotally connected to the plunger head, locking dogs, one of which normally holding said plunger head against movement and means operative upon the breaking of the lifting cable supporting the cage to actuate the locking dogs for freeing the plunger head and preventing back movement thereof.

4. In a safety device, the combination with an elevator cage and its lifting cable, of catcher arms supported by said cage, a sliding plunger head having connection with the catcher arms, locking means normally holding the plunger head against movement to

maintain the catcher arms in an operative position, means operative upon the locking means to free the sliding plunger head upon the breaking of the lifting cable supporting the cage and means controlled by the last mentioned means to prevent reverse sliding movement of the plunger head after the same has been freed.

5. In a safety device the combination with an elevator cage and its lifting cable, of bail irons rising from the top of the latter, a housing connected to the bail irons, a plunger element slidably mounted in the housing, catcher means controlled by said plunger element, spring set locking dogs mounted upon said housing, one of said dogs normally locking the plunger element against movement, a slidable weight arranged within the housing above the plunger element and operative upon the breaking of the lifting cable supporting the cage to actuate one of the dogs to free the plunger element and also to operate the other dog to bring the same into position to engage the plunger head and prevent reverse sliding movement thereof and spring means acting upon the plunger element when freed to bring the catcher means in an operative position.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALBERT W. ACKERMAN.

Witnesses:

FRED FAIRMAN,
GEO. ACKERMAN.