No. 726,656. PATENTED APR. 28, 1903.

J. DRUM & M. DOYLE.

SAFETY DEVICE FOR ELEVATORS.

APPLICATION FILED DEC. 10, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

FIG. 1.

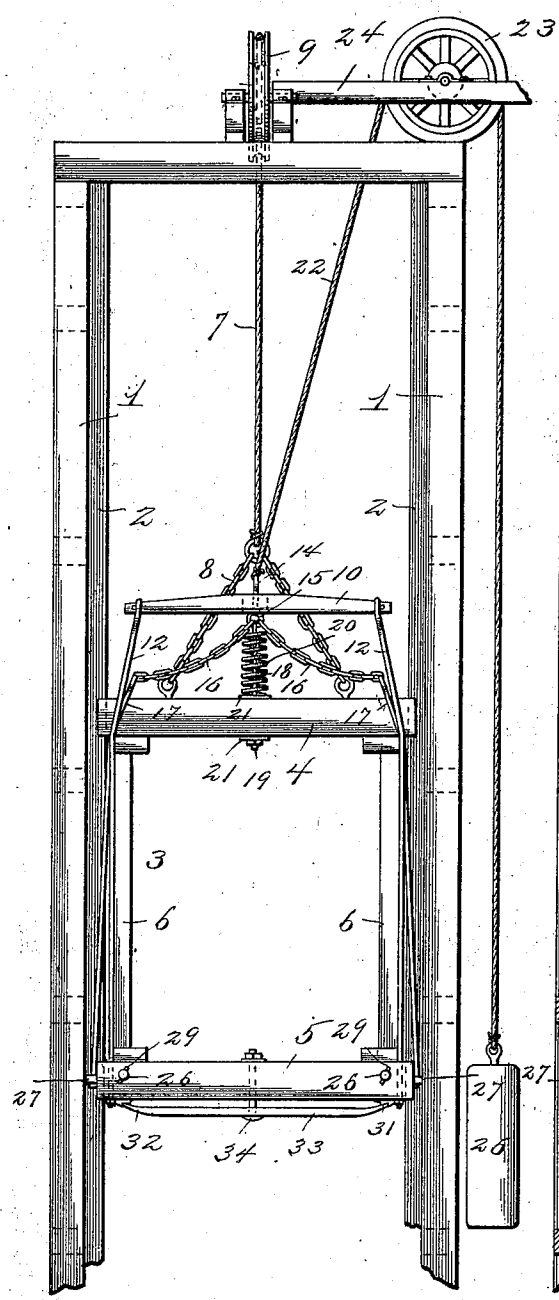
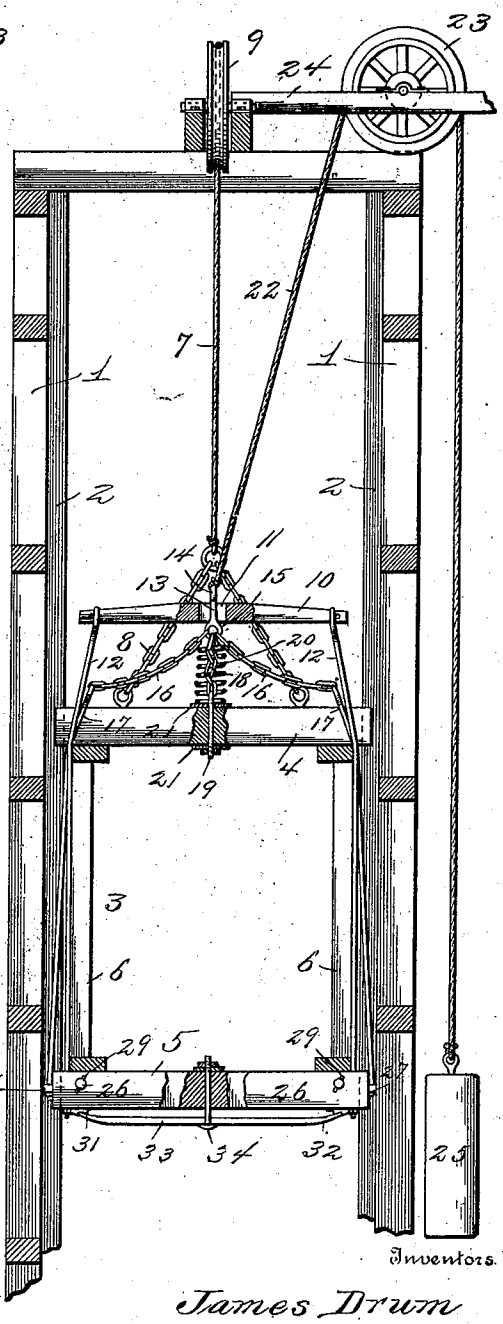


FIG. 2.



Witnesses

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NO MODEL. 3 SHEETS—SHEET 2.

FIG. 4.

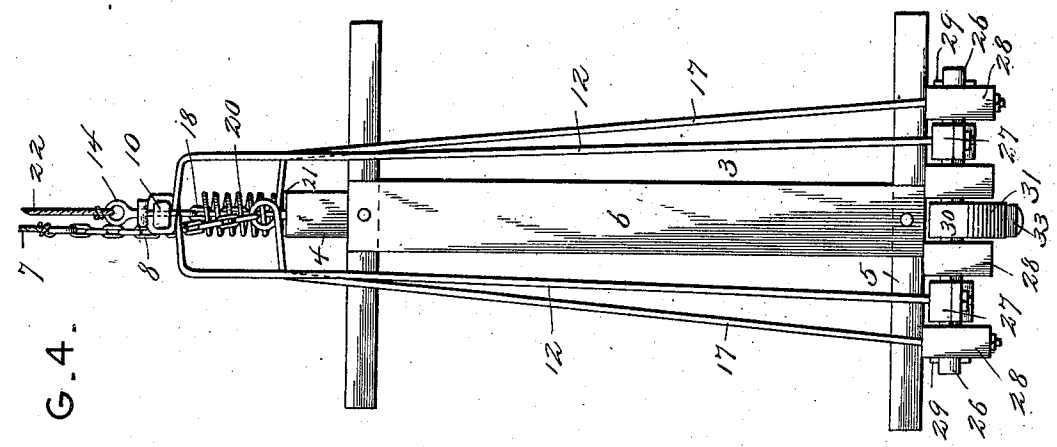
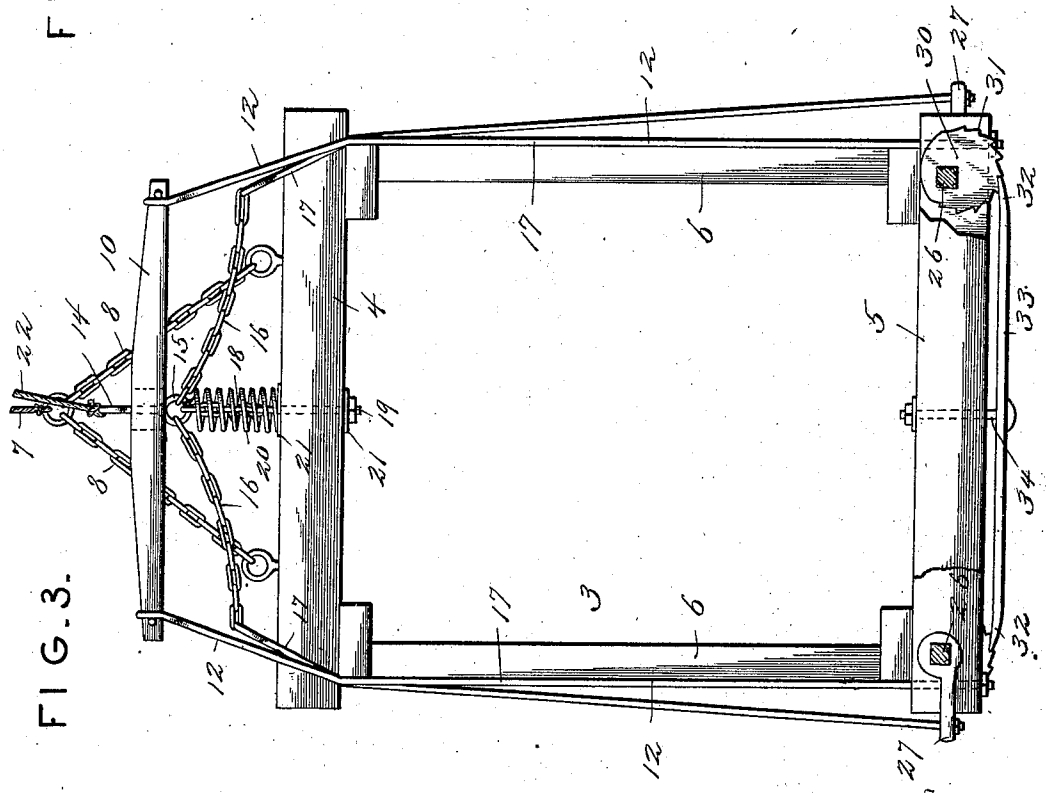


FIG. 3.



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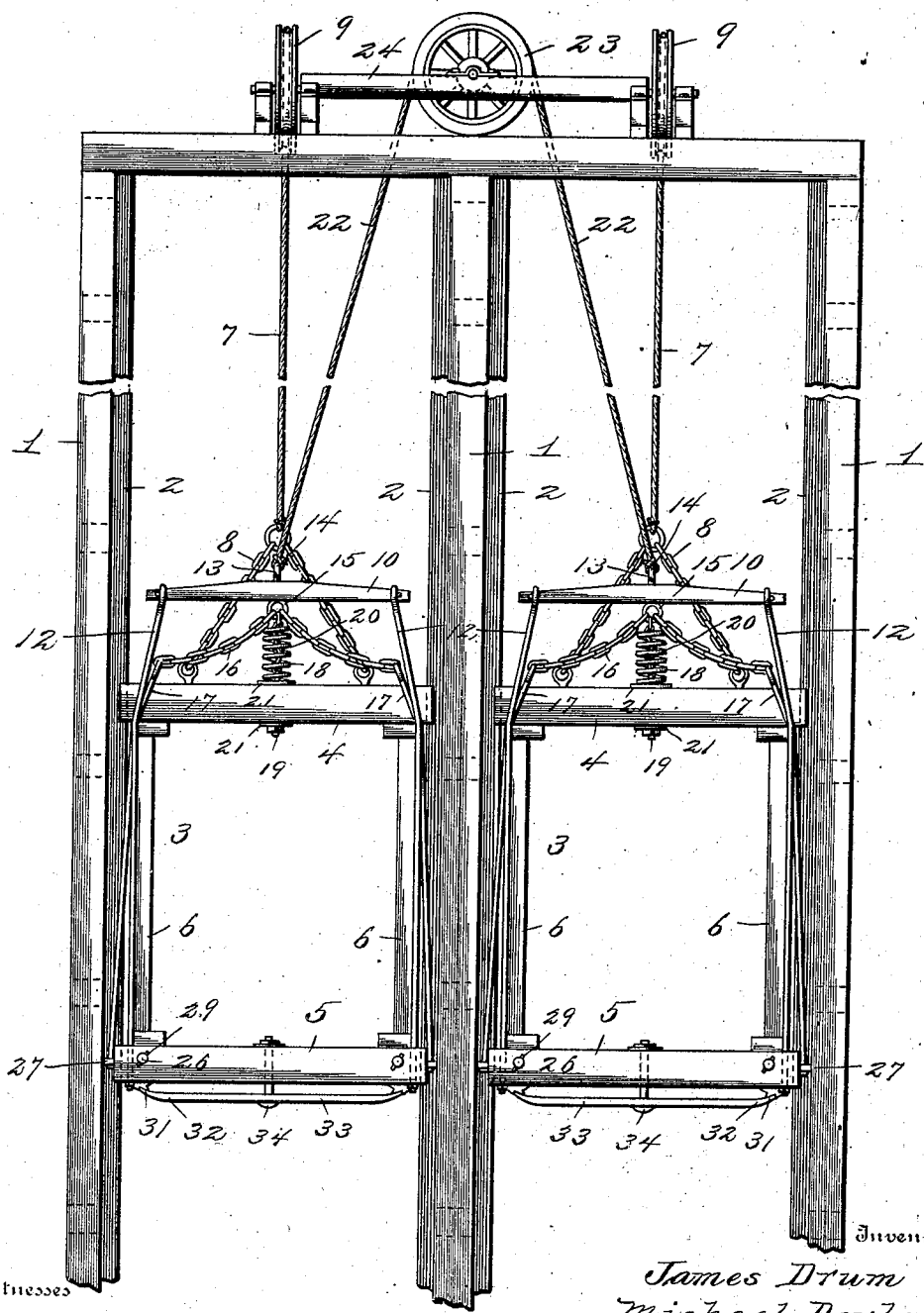
NO MODEL. 3 SHEETS—SHEET 3.

FIG. 5.



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UNITED STATES PATENT OFFICE.

JAMES DRUM AND MICHAEL DOYLE, OF BRAZIL, INDIANA.

SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 726,656, dated April 28, 1903.

Application filed December 10, 1902. Serial No. 134,676. (No model.)

To all whom it may concern:

Be it known that we, JAMES DRUM and MICHAEL DOYLE, citizens of the United States, residing at Brazil, in the county of Clay and State of Indiana, have invented new and useful Improvements in Safety Devices for Elevators, of which the following is a specification.

This invention relates to safety devices for elevator-cages and the like; and the purpose of the same is to provide simple and effective means for causing an immediate obstruction to downward movement or fall of an elevator-cage in the event that the operating-cable breaks, the stoppage of the cage or car being obtained through the automatic operation of devices wholly without the control of the cable used for raising and lowering the said cage or car.

The invention consists in the construction and arrangement of the several parts, which will be more fully hereinafter described and claimed.

In the drawings, Figure 1 is an elevation of an elevator-shaft, showing a cage or car disposed therein and having the improved attachment applied thereto. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is an enlarged side elevation of the cage or car broken away at the lower extremity to show one of the automatic gripping devices. Fig. 4 is an end elevation of the cage or car. Fig. 5 is an elevation of a double-elevator shaft for use in mines, showing the cages thereof equipped with the improved safety mechanism.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates an elevator-shaft of the usual or any preferred form of construction and comprising inner guide-rails 2 for engagement by a car or cage 3, having a top frame 4, bottom frame 5, and side connecting-frames 6. A precise construction of the cage or car 3 is not essential to the practical operation of the improved attachments, and it is proposed to apply the latter to any elevator cage or car now in use to replace the usual safety friction-dogs or other similar biting devices. The top frame 4 and bottom frame 5 of the cage or car are projected outwardly beyond the side frames 6 and suitably grooved to embrace the rails 2. The operating-cable 7 in the present instance is shown secured at its lower extremity to the upper frame 4 of the cage or car through the medium of chains 8, attached to said upper frame and said cable, as in the ordinary freight-elevator construction. The cable 7 passes upwardly through the top of the shaft over a vertically-disposed sheave or pulley 9 and from the latter extends away any desired distance to the operating mechanism for controlling the elevation and depression of the cage or car. An immovable yoke-bar 10 is held at a suitable elevation above the top frame 4 of the cage or car and has a central opening 11 therein. Secured to the opposite ends of the bar 10 are the upper terminals of rods 12, which project downwardly adjacent to the opposite ends of a lower frame 5 and are in the form of yokes, as clearly shown by Fig. 4, and have their members diverging toward the lower frame 5 for immovable attachment to the ends of the latter frame at the front and rear portions of the said frame. It will be seen that the bar 10 is held at a fixed elevation above the top frame 4 by the rods 12, and movable therethrough is a link 13, having an upper eye 14 and a lower eye 15. To the lower eye 15 of the link 13 normally slack chains or analogous devices 16 are attached and extend outwardly and are secured to the upper terminals of operating-rods 17, which are also in the form of yokes and extend downwardly outside of the frames 6 and connect with mechanism which will be more fully hereinafter explained. A limiting-chain 18 is also secured at its upper end to the eye 15 of the link 13 and projects downwardly in a normal slack condition and is secured to the upper end of a bolt-rod 19, centrally disposed in the top frame 4. The chain 18 limits the upward movement of the link 13, and to cushion said movement of the link the upper terminal of a spring 20 is also attached to the eye 15 and surrounds the chain 18, the lower extremity of said spring normally bearing upon the upper surface of the top frame 4, as clearly shown by Figs. 1, 2, and 3. To hold the bolt-rod 19 firmly in vertical position and prevent wear on the top frame 4, metal plates 21 are held against the

upper and lower sides of the said frame around the bolt-rod, and the upper plate 21 also serves as a base-rest for the lower extremity of the spring 20. Secured to the upper eye 14 of the link 13 is the lower end of an auxiliary cable 22, which passes upwardly at an angle of inclination over a sheave or pulley 23, held in a supporting extension 24 in a plane at right angles to the sheave or pulley 9 and located on the upper end of the shaft 1. The auxiliary cable 22 depends from the sheave or pulley 23 at one side of the shaft and has a weight 25 secured on the lower end thereof.

In the opposite ends of the lower frame 5 rock-shafts 26 are mounted, and each has a pair of outwardly-projecting crank-arms 27 extending outwardly therefrom and to which the lower ends of the rods 17 are securely fastened. The frame 5 in the present instance is composed of a series of longitudinal beams 28, arranged in parallel relation and regularly spaced apart, the crank-arms 27 being located between the inner and outer beams at the front and rear of the said frame, and the shafts carrying the same are prevented from having longitudinal movement in the frame by stop-pins 29, inserted through opposite ends of the said shaft and bearing against the outer surfaces of the front and rear beams 28. Between the inner beams 28 clutch-disks 30 are eccentrically mounted on the shafts 26, one on each, and have a portion of their peripheries formed with teeth or transverse serrations 31. The disks 30 are disposed in close relation to the rails 2 of the shaft 1 and are adapted to be thrown out to bring the teeth or serrations thereof in firm contact with the said rails. The disks 30 are normally engaged by the opposite reduced extremities 32 of a strong bar-spring 33, held in close connection and arrangement in relation to the under side or bottom of the frame 5 by a center bolt 34, and when the said disks are thrown outwardly to engage the rails 2 the bar-spring 33 prevents the disks being pressed inwardly, and thereby maintains the latter in reliable contact with the rails 2 to effect a check or stoppage of the cage or car 3 in the event that the cable 7 becomes broken.

As before indicated, under normal conditions the disks 30 will remain retracted during the elevation and depression of the cage or car through the medium of the cable 7. If the cable 7 breaks, the auxiliary cable 22 comes into play, and the weight 25 thereon is sufficiently heavy to exert a sudden upward pull on the link 13 and draw the chains 16 taut and at the same time pull upwardly on the rods 17. The upward movement of the rods 17 will be equal at opposite sides of the cage or car, and the crank-arms 27 will be simultaneously elevated and rotate the shafts 26 and throw out the disks 30 with considerable force against the rails 2. The teeth or serrations 31 of the disk will bite into or against the rails 2 and be held in their projected condition through the medium of a bar-spring 33, as heretofore explained. The engagement of the disks 30 with the rails 2 will check the descent of the cage or car 3, and injury to the occupants of the cage or car or to freight disposed therein will be prevented. The parts are so proportioned that when the chains 16 are drawn taut they will be prevented from exerting any more upward pull on the rods 17 than is necessary to outwardly project the disks 30 by the chain 18, and injurious shock or jar to the movable parts just explained will be overcome by the spring 20. As soon as the tension of the cable 22 is relieved from the link 13 by repair of the cable 7 or the substitution of a new one therefor the disks 30 will be permitted to resume their normal positions by disengaging the terminals of the bar-spring 33 therefrom, and all the parts will be reset for subsequent automatic operation.

Fig. 5 shows the improved attachment applied to a double-elevator shaft adapted for use in mines or other places where two cages are operated, one of the latter rising while the other is lowering. In this instance each cage is equipped with the improved safety organization, and the auxiliary cable 22 after passing over the pulley 23 from one link 13 of one cage connects with the link 13 of the other cage. The same reference-numerals are employed in the application of the attachment as heretofore used, as there is no modification in the structure, but a simple duplication. The cages replace the weight 25, (shown by Figs. 1 and 2,) and in the event of breakage of either of the cables 7 the weight of the cage remaining connected to its cable 7 will act on the safety attachment of the other cage, as heretofore fully explained.

From the foregoing it will be seen that a reliable safety attachment or stopping means for the cage or car of an elevator in the event of accident is provided, and to accomplish different applications changes in the proportions, dimensions, and minor details of construction may be resorted to without departing from the spirit of the invention.

Having thus fully described the invention, what is claimed as new is—

1. In a safety attachment for an elevator, the combination with a shaft and a cage or car, of an operating-cable for the cage or car, eccentrically-mounted gripping devices at opposite sides of the lower portion of the car to engage adjacent parts of the shaft, pull mechanism connected to said gripping devices and extending to the top of the cage or car, and an auxiliary cable attached to said pull mechanism and having a weight secured thereon, the said pull mechanism having devices extending downwardly over the outer portions of the opposite sides of the cage or car.

2. In a safety attachment for an elevator, the combination with a shaft, and a cage or car, gripping devices disposed at opposite

sides of the bottom of the cage or car to engage parts of the shaft, an operating-cable attached to the upper end of the cage or car, and movable over a vertically-disposed sheave or pulley, pull devices connected to the gripping devices and extending to the top of the cage or car, an auxiliary cable attached to a part of the pull devices and having a weight thereon, and a sheave or pulley over which the auxiliary cable passes, the latter sheave or pulley being disposed in a plane at right angles to the former sheave or pulley, a portion of the pull devices extending downwardly over the outer portions of the opposite sides of the car.

3. In a safety attachment for elevators, the combination with a shaft and a cage or car, of a cable for elevating and lowering the said cage or car, gripping devices at opposite sides of the bottom of the cage or car adapted to be projected to engage adjacent parts of the shaft, a bar-spring arranged against the bottom of the cage or car to hold the gripping devices projected, pull mechanism for operating the said gripping devices, and an auxiliary cable attached to said pull mechanism and having a weight thereon.

4. In a safety attachment for elevators, the combination with a shaft and a cage or car, of a yoke immovably held above the cage or car and formed with a central opening, a cable attached to the upper end of the cage or car for raising and lowering the same, gripping devices located at the opposite sides of the lower end of the cage or car and projectable outwardly to engage parts of the shaft, pull-rods connected to said gripping devices, a link movable through the yoke and connected to the pull-rod, and an auxiliary cable attached to the upper end of the link and having a weight thereon.

5. In a safety attachment for elevators, the combination with a shaft and a cage or car, of rock-shafts mounted in opposite ends of the bottom of the cage or car, gripping-disks eccentrically mounted on the said rock-shaft to engage parts of the aforesaid shaft, pull mechanism attached to the rock-shafts for operating the latter and protecting the gripping-disks, a cable attached to the upper end of the cage or car for raising and lowering the same, and an auxiliary weighted cable secured to the pull mechanism.

6. In a safety attachment for an elevator, the combination with a shaft and a cage or car, of an operating-cable for the cage or car, projectable gripping devices at opposite sides of the lower portion of the car to engage adjacent parts of the shaft, pull mechanism connected to said gripping devices and extending to the top of the cage or car, and an auxiliary cable having one extremity attached to said pull mechanism and the other extremity secured to operating means, a portion of the pull mechanism extending downwardly over the outer sides of the cage or car.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES DRUM.
MICHAEL DOYLE.

Witnesses:
PATRICK MCQUADE,
JOHN MOONEY.