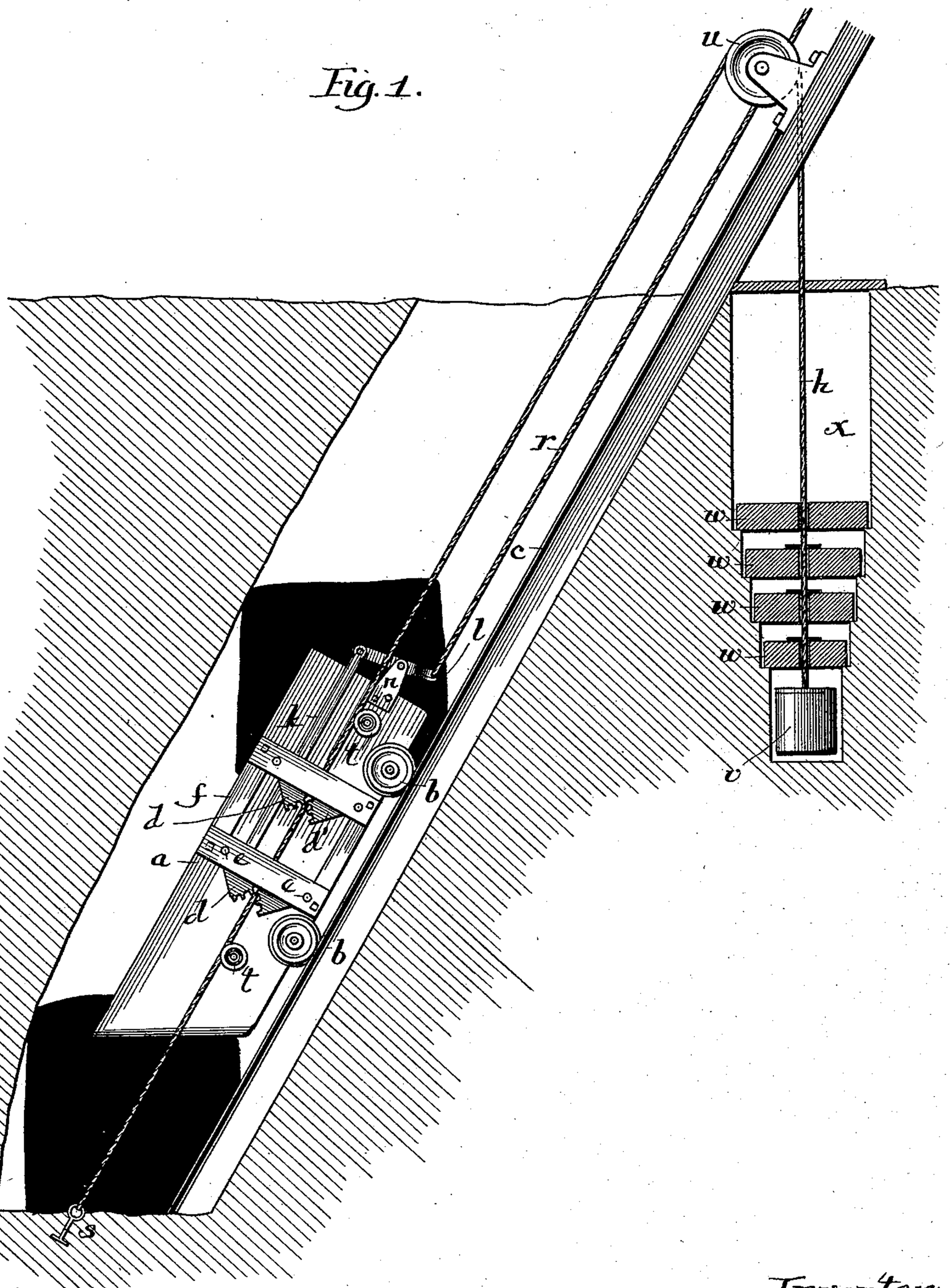
(No Model.) 3 Sheets—Sheet 1.

R. UREN.

SAFETY APPLIANCE FOR ELEVATORS.

No. 488,137. Patented Dec. 13, 1892.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

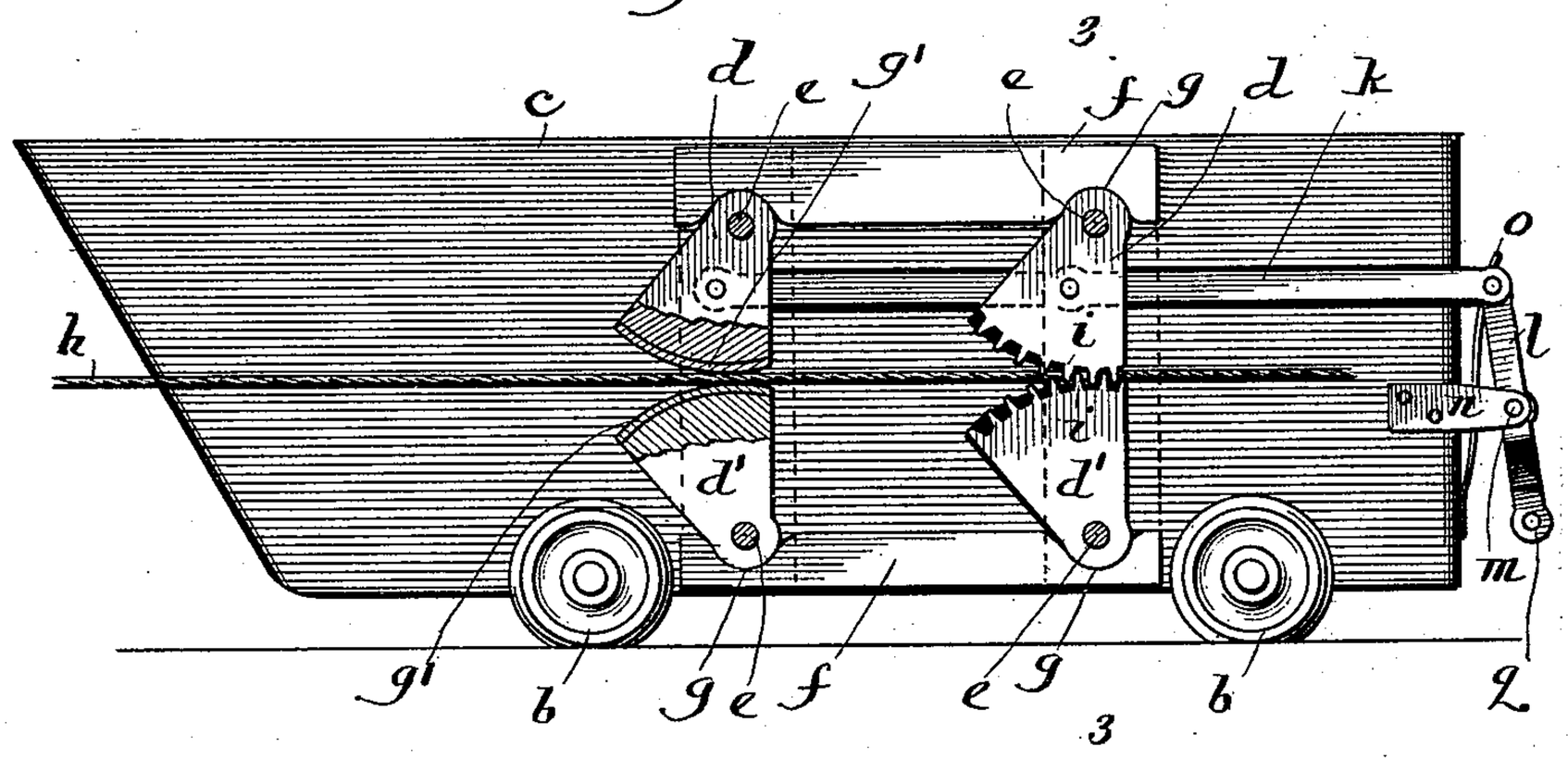


Fig. 3.

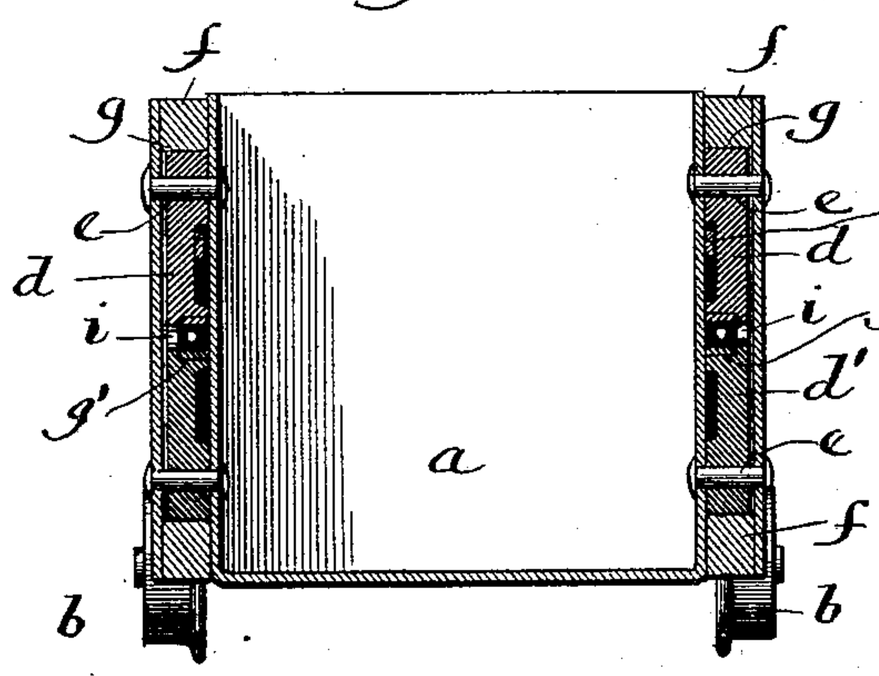
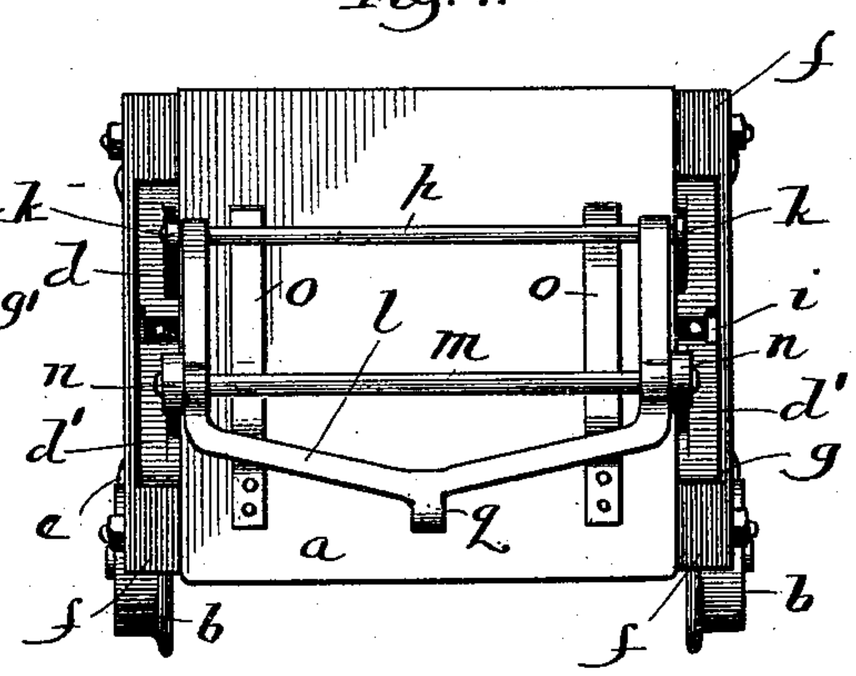


Fig. 4.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 5.

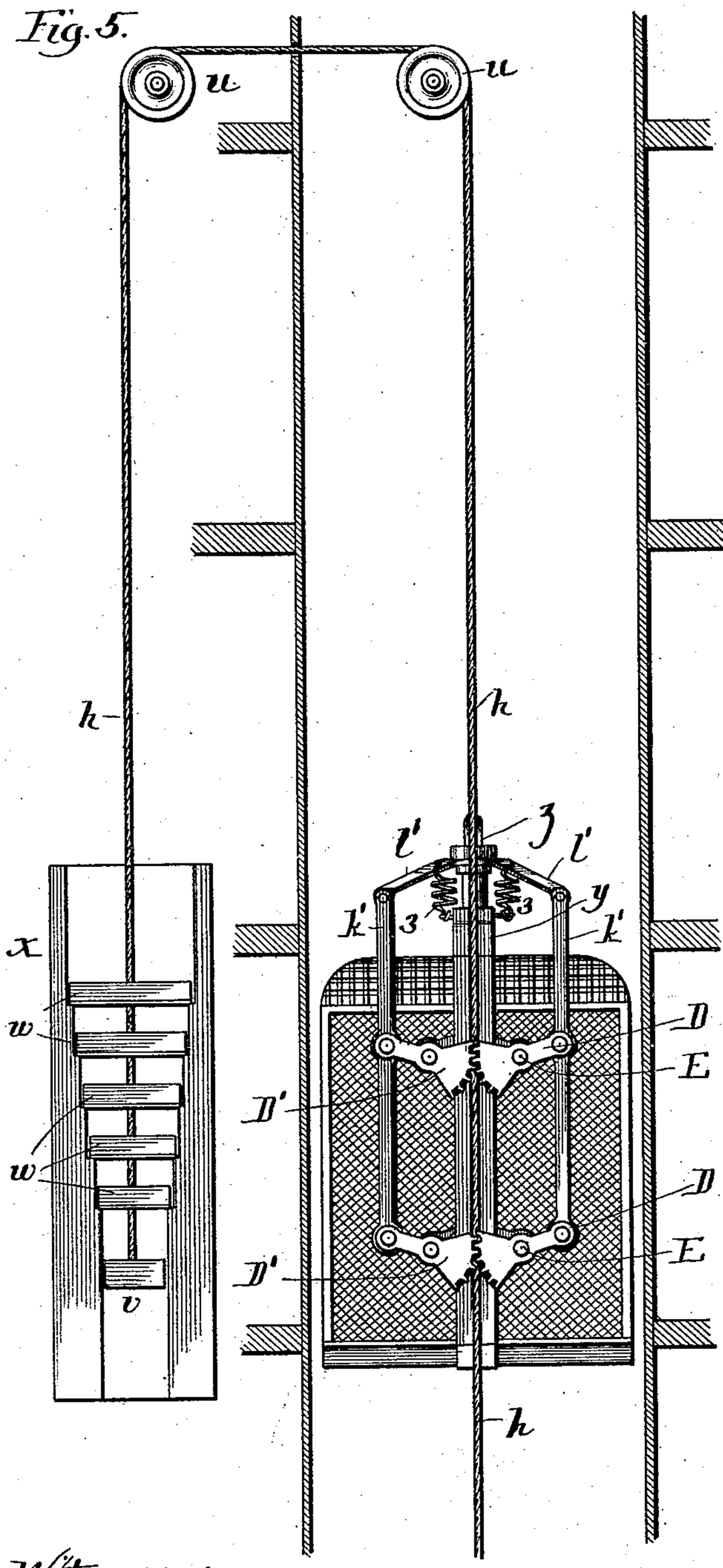
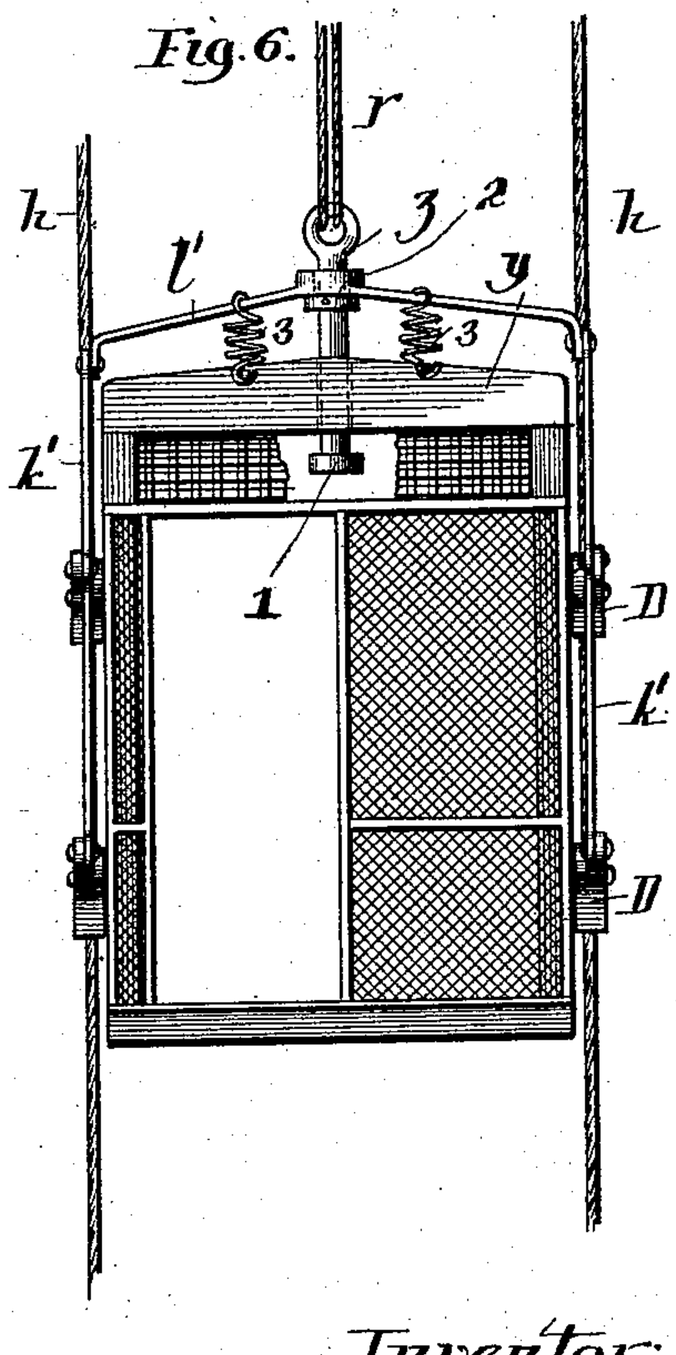


Fig. 6.



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UNITED STATES PATENT OFFICE.

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SAFETY APPLIANCE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 488,137, dated December 13, 1892.

Application filed June 13, 1892. Serial No. 436,427. (No model.)

To all whom it may concern:

Be it known that I, RICHARD UREN, of Ripley, in the county of Houghton, State of Michigan, have invented certain new and useful Improvements in Safety Appliances for Elevators, of which the following is hereby declared to be a full, clear, and exact description, sufficient to enable others skilled in the art to which such invention appertains to make and use the same.

The invention relates to safety appliances which are employed in connection with traveling elevators or lifts to arrest the descent of the car in event the main hoisting-cable breaks or the car otherwise escapes from its control. Instead of clutches or brakes attached to the car and which are released automatically to act directly against a rack or rail extending along the way the present invention designs to provide a supplemental or safety cable with which the car clamp or grip can immediately engage when the main cable breaks or ceases to control the car. The safety-cable is arranged along the path of the grip and by overhead suspension carries a counterpoise weight or spring which comes cumulatively into play and serves eventually to balance the maximum load of the runaway car. By such expedient the descending car is brought ultimately to a standstill, but in a gradual fashion, so that sudden shocks are avoided and as well, also, the dangers of breakage at the racks or brake-rails, which are apt to occur when the full load and the impetus of the car are suddenly brought to bear against them.

The exact nature of the improvements will appear from the description following and be distinctly pointed out by claims at the conclusion thereof.

Referring to the accompanying drawings, wherein like parts are distinguished by like designation throughout, Figure 1 is a view in sectional elevation showing the improvements applied to an ordinary mining-car. Fig. 2 is a detail view of the mining-car in side elevation, showing the safety appliance attached. Fig. 3 is a view of the car in transverse section on line 3 3 of Fig. 2. Fig. 4 is a view of the car in end elevation. Fig. 5 is a view, at the side, of an ordinary passenger-car and well in section elevation, showing the improvements applied thereto. Fig. 6 is a detail view of the improved passenger-car in front elevation.

Referring to the drawings, Figs. 1 to 4, the mining-car *a* is of usual structure, mounted upon the wheels *b*, which ride up and down along the rails *c* of the inclined way. Conveniently secured for unison movement at opposite sides of the car-body *a* are the shifting grips *d d'*, which in the form shown consist of confronting pairs of segment-plates pivotally secured by bolts *e* to the stout frame *f*, fastened to the car-body. Each segment-plate has a rounded seat *g* at the back, which under any severe stress bears against a corresponding seat formed in the frame *f*, and thereby relieves the thrust and strain exerted otherwise upon the pivot-bolts *e*. These latter allow a slight play to the segment-plates *d* sufficient to insure the contact of the seat *g* against the frame when necessary. The confronting edges of the plates *d d'* are struck upon a curve slightly eccentric with reference to the pivotal point *e* and are preferably furnished with shoes *g'*, of copper or like soft metal which will tend to embed the cable *h* when the latter is engaged therewith. Ordinarily the companion segment-plates *d d'*, which together constitute a grip or set of jaw-clamps, are in mesh through the medium of arc racks *i*, so as to turn in unison about the pivot *e*.

To balance the strains and for orderly play the grippers are arranged in dual set, one at each side of the car-body, and for safety it is usually desirable to provide (see Fig. 2) double grips in each separate set. A shifting-bar *k*, pivotally connected with the jaw *d* of each grip, is joined at its opposite end to the yielding connector *l*. As here shown said connector *l* is branched or bow-like in form and is pivotally mounted at its forked ends by through-bolt *m*, retained in the stout lugs *n*, which extend from the end of the car-body. Heavy tension-springs *o*, fastened to the end of the car and curving outward therefrom, rest beneath the cross-rod *p*, which extends between the forks of the yielding connector *l*. Through an eye *q*, at the opposite side of

the connector *l*, is secured the main lifting-cable *r*, which proceeds thence to the winding-drum or hoisting-sheaves.

From end to end of the pit or well passes the supplemental or safety cable *h*. The lower end of said cable is fastened, as at *s*, (preferably in permanent fashion,) and ranges along the side of the car-body in position between the confronting faces of the clamp-jaw. Guide-pulleys *t*, secured at the side of the car, serve to maintain the supplemental cable *h* in proper place between the grip-jaws. Ordinarily the safety-cables will be dual, one at each side of the car, in keeping with the dual grips, which are designed to engage therewith. At the mouth of the pit or overhead the safety-cable *h* passes over a sheave *u* there located and carries at its extremity a weight *v*, which is sufficiently heavy to always maintain the cable *h* trim and taut. A series of "pick-up" weights *w* rest in ledges of the receiver *x* and are lifted therefrom successively as the balance (or normal) weight *v* rises under the lifting action of the cable *h*. All of the weights constitute together a counterpoise cumulative in character and which increases in amount, according as the balance *v* rises higher and higher in the receiver. In lieu of the weights it is plain that a series of springs of increasing power could be arranged in like fashion and be brought successively into play to accomplish the same cumulative effect.

In usual operation the main cable *r* sustains the car *a* through the medium of the yielding connector *l*, which latter turns slightly about its pivot-bolt *m* against the tension resistance of the spring *o*. When thus turned the connector *l*, through the shifting-bar *k*, operates the grip-jaws *d d'* and distends the same sufficiently to permit the jaws to play freely past the safety-cable *h*. Should the main cable break or the car otherwise be no longer within its control, the pulling strain of the main cable upon the yielding connector *l* is relaxed, which latter thereupon yields slightly about its pivot under action of the springs *o* and compels the shifting-bar *k* to actuate the grip-jaws *d d'*. The movement of the grip-jaws toward each other causes them to tightly clamp the supplemental cable *h* and thus transfer the car suspension from the main cable *r* to the safety-cable *h* and its counterpoise resistance. As the car descends, the amount of weight added at the counterpoise gradually increases, until finally it is sufficient to completely balance or overbalance the load, and thus ultimately to arrest or materially lessen the flight of the car. The normal weight *v* is generally made sufficient to serve as a counterpoise for the empty car. The additional weights which develop the cumulative effect are provided in total amount necessary to exceed the maximum load to be carried by the car.

A convenient plan for applying the invention to the ordinary style of passenger-lift or elevator-car used in buildings is shown by Figs. 5 and 6. The car, of usual structure, moving in the well between the ordinary guide-rails, is furnished with the familiar transom *y*. An eye-bar *z* extends freely through the transom *y* and is furnished with a headed end 1, which rests normally against the under face of the transom while the car is in operation.

Instead of being pivoted the yielding connector *l'* here shown has a rectilineal play and is carried, as at 2, by a boss formed upon the eye-bar *z*. The connector *l'* has a hub-like center, through which the eye-bar *z* plays, and at the outer terminals of its arms the connector is pivotally joined to the shifting-bars *k'*, which are united in turn to the clamp-plates D D' of the grips. The grips are pivotally mounted, as at E, upon the car and are preferably furnished with confronting copper blocks and with toothed sectors, as already detailed. The safety-cables *h* extend between the jaws of the dual grips at opposite sides of the car and pass around the overhead sheaves *u* to the counterpoise-receiver *x* and the set of cumulative weights *v w*.

In ordinary operation the main cable *r* lifts the eye-bar *z*, so that the headed end thereof contacts with the transom *y*, and thus serves to suspend the car. Under the lifting action of the main cable *r* the boss 2 upon the eye-bar *z* slightly raises the connector *l'* against the resistance of the coiled springs 3, which latter remain under tension so long as the cable *r* is in normal play. When the yielding connector *l'* is thus lifted, it actuates the shifting-bars *k k'*, and thus distends the jaws of the grips, so that the latter are free from clamp contact with the supplemental cable *h*. The limited play at the eye-bar *z* not only sets the grip-jaws apart in readiness to act under stress of the tension-springs 3, but also brings the head 1 of the eye-bar against the under face of the transom *y*, so that the load is primarily carried thereby and undue stress upon the springs 3 wholly avoided. The tension of said springs, however, is always in play, and when the main cable *r* breaks or for any reason ceases to control the traveling car and its load the springs 3 are retracted, thereby clamping the grips D D' against the safety-cables *h* and necessarily effecting the suspension of the car from said supplemental cables and bringing the cumulative counterpoise *w* into play as an overbalance.

From the foregoing description it is manifest that the improvements are not limited to the mere details of structure set forth, since these may be varied according to the skill of the mechanic without departing from the spirit of the invention, the main purpose of which is to provide a supplemental or safety cable with a cumulative counterpoise connected therewith, and which cable comes automatically into play by grip attachment with

the car at such times only when the car has been lost from the control of the main hoisting-cable.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In elevators, the combination, with the traveling car and with its main cable, of the yielding connector between them, the shifting grip controlled thereby, the supplemental or safety cable located along the path of said grip, and the counterpoise attached to said safety-cable, substantially as described.

2. In elevators, the combination, with the traveling car and with its main cable, of the intermediate yielding connector attached, respectively, thereto, the gripper mounted upon said car, the shifting-bar between said connector and gripper to actuate the latter, the supplemental or safety cable located along the path of said gripper, and the cumulative counterpoise attached at one end of said safety-cable, substantially as described.

3. In elevators, the combination, with the traveling car and with its main cable, of the yielding connector between them, the dual grippers mounted upon opposite sides of said car, the shifting-bars therefor located at opposite car-sides and joining said grippers, respectively, with the yielding connector, the dual safety-cables arranged along the paths of the respective grippers, and the cumulative counterpoise attached at one end of each of said safety-cables, substantially as described.

4. In elevators, the combination, with the traveling car and with its main cable, of the yielding spring-connector between them, the confronting and intermeshing clamp-plates or grip-jaws pivoted to the car, the shifting-bar joined, respectively, to said grip and connector, the safety-cable located along the path of the grip and between the jaws thereof, and the cumulative counterpoise attached at one end of said safety-cable, substantially as described.

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