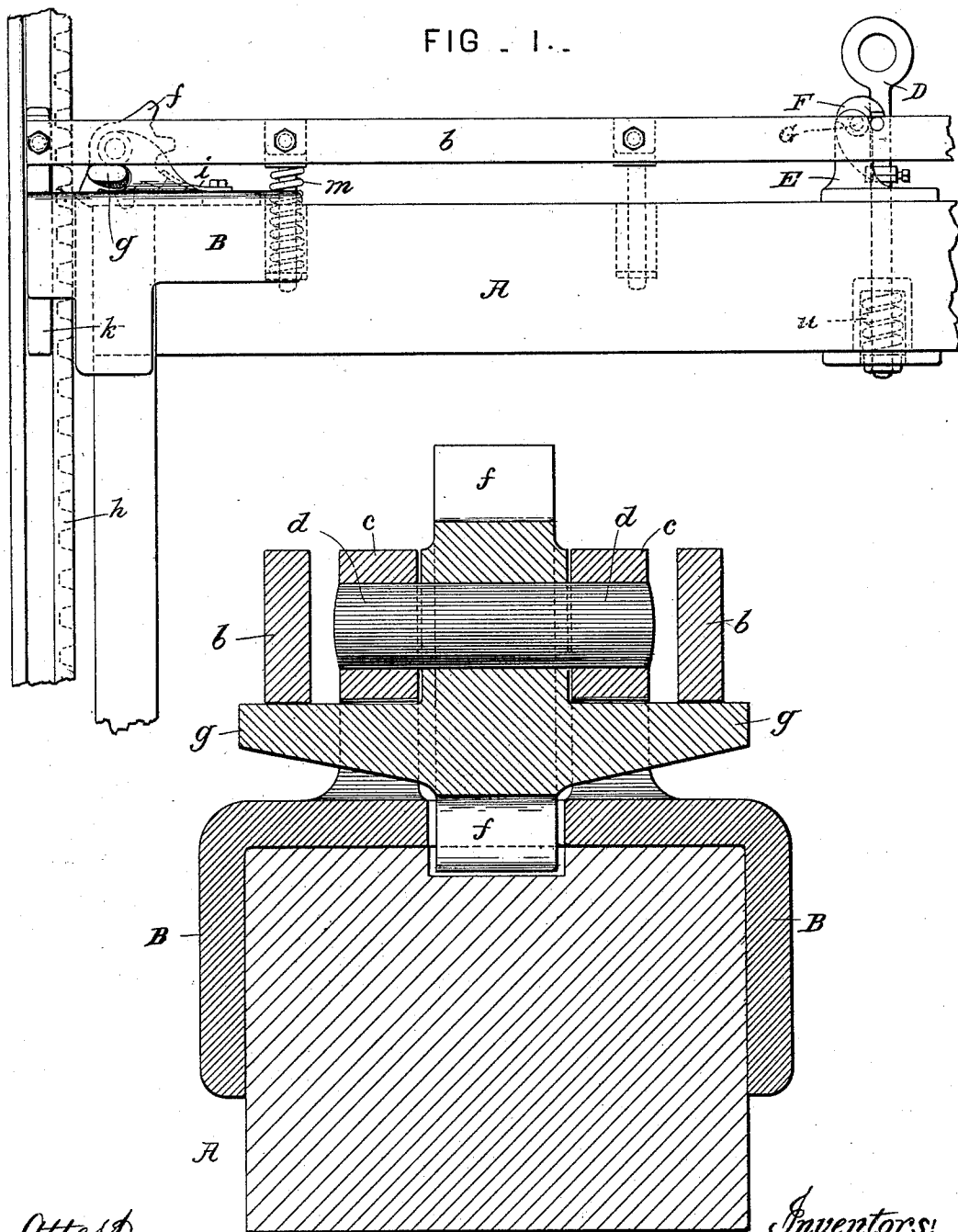


C. W. FOWLER & J. GUSTAFSON.
AUTOMATIC SAFETY DEVICE FOR ELEVATORS.

No. 467,590.

Patented Jan. 26, 1892.



Attest:

Geo. T. Smallwood.
Jonathan Lilly.

FIG. II.

Inventors:

Chas. W. Fowler
John Gustafson
By Robert S. Mauro
their attorneys

(No Model.)

4 Sheets—Sheet 2.

C. W. FOWLER & J. GUSTAFSON.
AUTOMATIC SAFETY DEVICE FOR ELEVATORS.

No. 467,590.

Patented Jan. 26, 1892.

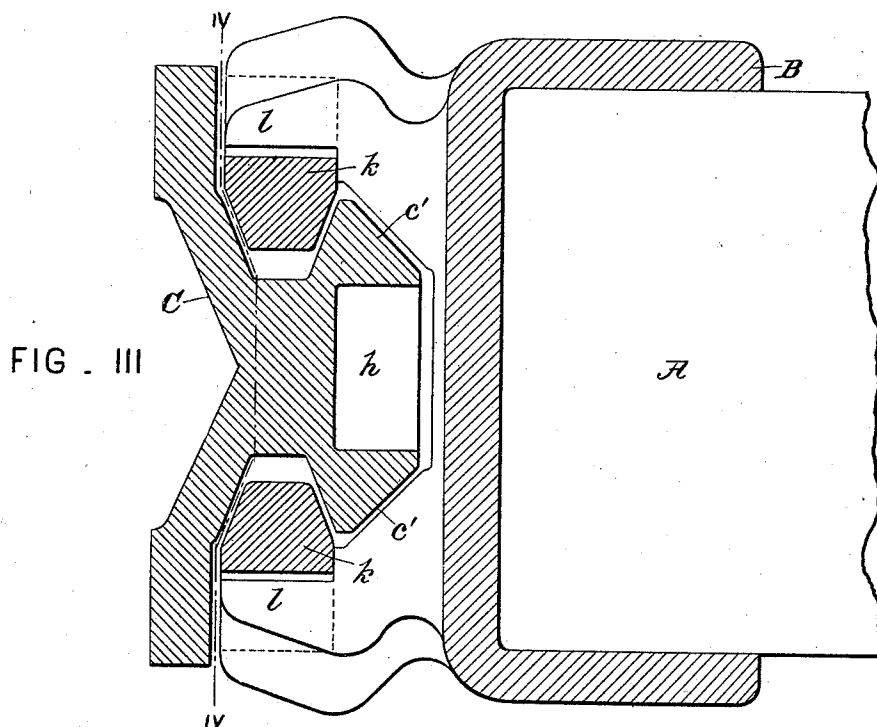


FIG. V.

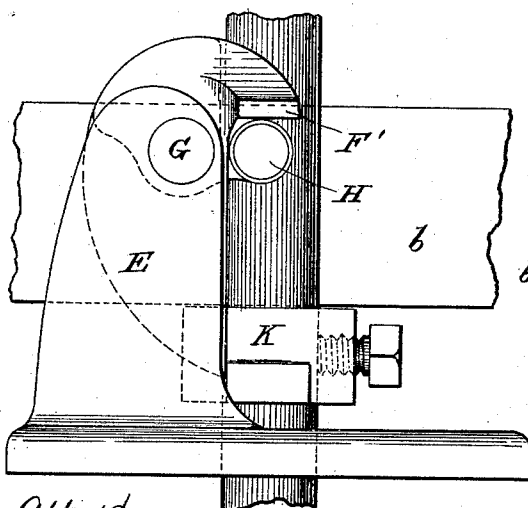
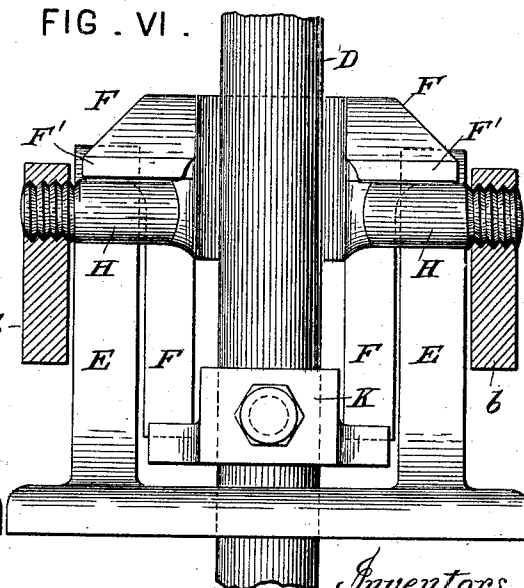


FIG. VI.



Attest:

Geo. T. Smallwood.
Jonathan Kelley.

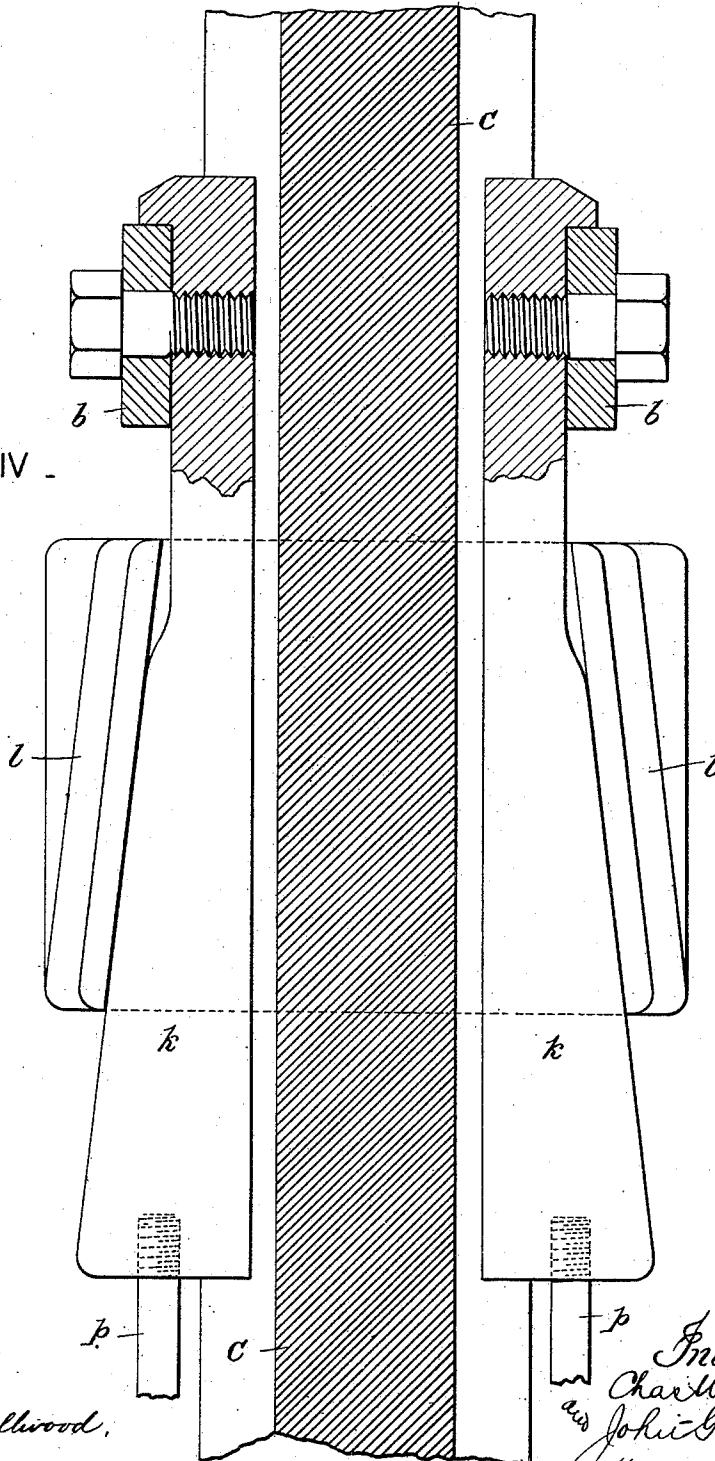
Inventors
Chas. W. Fowler
John Gustafson
by Robert Mauro
their attorneys

C. W. FOWLER & J. GUSTAFSON.
AUTOMATIC SAFETY DEVICE FOR ELEVATORS.

No. 467,590.

Patented Jan. 26, 1892.

FIG. IV.



Attest:
Geo. T. Smallwood,
Jonathan Wiley

Inventors
Charles W. Fowler
and John Gustafson
by *Pollock Mauro*
their attorneys

C. W. FOWLER & J. GUSTAFSON.
AUTOMATIC SAFETY DEVICE FOR ELEVATORS.

No. 467,590.

Patented Jan. 26, 1892.

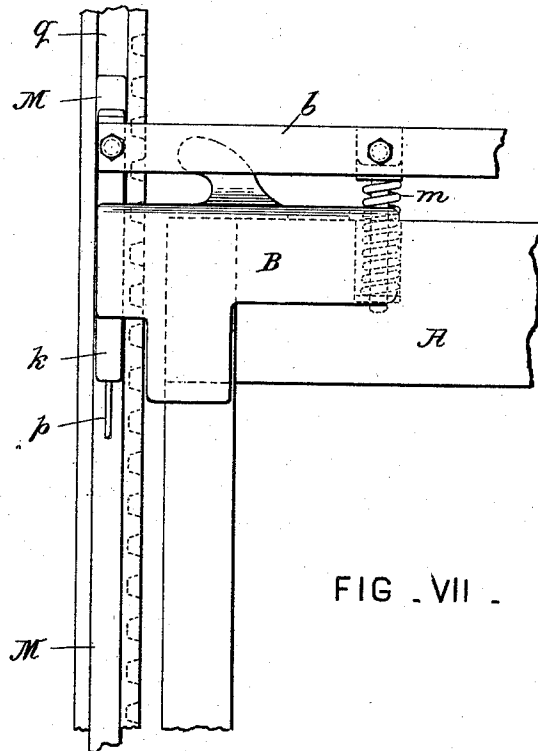
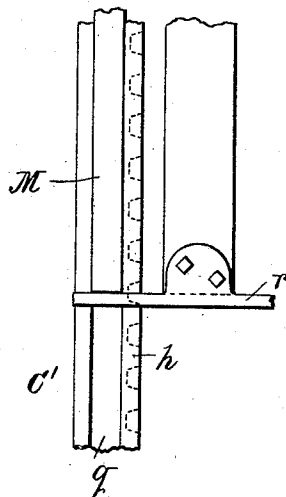


FIG. VII.



Attest:
Geo. T. Smallwood.
Jonathan Kelly.

Chas W. Fowler Inventors
and John Gustafson
by *Palmer & Maier*
their attorneys.

UNITED STATES PATENT OFFICE.

CHARLES WENTZ FOWLER, OF BALTIMORE, MARYLAND, AND JOHN GUSTAFSON, OF ROCKAWAY, NEW JERSEY; SAID GUSTAFSON ASSIGNOR TO NELSON HISS, OF BALTIMORE, MARYLAND.

AUTOMATIC SAFETY DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 467,590, dated January 26, 1892.

Application filed May 9, 1891. Serial No. 392,220. (No model.)

To all whom it may concern:

Be it known that we, CHARLES WENTZ FOWLER, of Baltimore, Maryland, and JOHN GUSTAFSON, of Rockaway, county of Morris, and State of New Jersey, have invented a new and useful Improvement in Automatic Safety Devices for Elevators, which improvement is fully set forth in the following specification.

This invention has reference to devices or means designed for application to the cage or car of an elevator for the purpose of automatically arresting the descent of the cage or car in case of the breakage of the hoisting-rope. Many devices have been heretofore contrived with the same object in view. In one class of automatic safety attachments reliance is placed for the arrest of the car upon the operation of dogs, clutches, or gripping devices of like nature normally held out of action by the tension of the hoisting-rope and designed to be thrown into action by means of springs in case such tension slackens and the car begins to descend at abnormal and dangerous speed. The general objections to devices working on this principle are the uncertainty of operation and the liability of breakage of the parts relied upon to stop the car. When the bolts, clutches, or dogs are thrown out for this purpose, the stoppage of the car is necessarily sudden and the shock upon such holding devices or on their centers when pivoted, as they usually are, is very violent. In all devices of this nature it is necessary to rely upon the action of the springs released by the breakage of the suspensory. Such devices generally act properly when tested with new springs; but in use the constant vibration to which the springs are subjected will in time completely destroy their efficiency. On the other hand, it is well known that a spring may be kept under compression for indefinite periods of time without apparent loss of resiliency, it being not the mere compression, but the incessant jar and vibration that brings about a molecular change in the steel.

It has been proposed heretofore to equip an elevator-cage with wedges running with the car adjacent to the side beams and held out of action by the tension of the rope, springs

being relied on to force the wedges between the beam and a part of the car in case of breakage of the ropes. The objection to the use of springs in this manner has already been pointed out; but, in addition, it should be understood that the cable, instead of breaking close to the car, may break close to the hoisting-drum, and thus the springs, in addition to moving the stopping devices and their supports, have to overcome the additional resistance of a mass of heavy rope and its friction over pulleys, which may be sufficient, especially if the springs be not absolutely new, to prevent the operation of the mechanism. Moreover, when a rope or cable parts under great strain its free end is likely to be lashed around and to catch on any obstruction, which, of course, in the form of apparatus under consideration would have the effect of reversing the action of the safety devices.

The present invention is designed to overcome or avoid the difficulties and objections above indicated and to accomplish particularly the following objects: First, to arrest the car by the use of arresting devices—such as wedges, brakes, or clutch-jaws—applied by means of gearing which is actuated by the weight of the load itself, so that the force applied to the arresting devices is proportional to the energy of the falling car; second, to rely on the action of springs only to engage the positive actuating-gears with a fixed rack or rail by which they are turned; third, to keep the gear-engaging springs under constant compression, so that in the ordinary use of the car they are subject to no jar or concussion whatever, and are therefore always in condition to act promptly and efficiently as soon as the emergency arises; fourth, to render the action of these springs wholly independent of the place where the break of the hoisting-rope may occur, and, fifth, to provide that after a breakage of the rope at any point its entanglement cannot in any way interfere with the function of the safety mechanism.

The accompanying drawings, to which reference will now be made, illustrate mechanism constructed in accordance with and embodying the principles of our invention, which,

however, is capable of embodiment in various forms of apparatus.

Figure I is a view in elevation showing the arresting mechanism on one side of the car, that on the other side, being the counterpart thereof, not being shown. Fig. II is a partial section on a larger scale than Fig. I. Fig. III is a detail in horizontal section. Fig. IV is a sectional view on line IV IV, Fig. III. Fig. V is a detail in side elevation of the automatic releasing mechanism. Fig. VI is a detail in elevation, partly in cross-section, of the said releasing mechanism. Fig. VII is a detail showing a construction whose use is preferred when the side beams are of wood instead of metal.

A represents the central cross-beam on the top of the car. B is a metal casting securely bolted thereto, there being one such casting with the devices now to be described at each end of beam A. This casting has two uprights *c*, in which is supported the stud or center pin *d* of the segmental cog-wheel *f*. Wheel *f* has eccentric lugs *g* projecting one from each side thereof, and on these lugs rest the beams *b*, which are bolted together and extend entirely across the car. Gear *f* is in position, upon a slight rotation in the direction in which flat spring *i* presses, to mesh with the rack *h*, which runs from top to bottom of the elevator-shaft, being sunk in the face of the casting or rail C, bolted to the side of the well. The oblique faces *c'* of the casting C act as guideways for the car.

From the end of beam B are suspended the wedges or brakes *k*, which run in grooves in the rail C, but out of contact therewith. Two lugs *l*, so shaped as to have great strength, project from casting B alongside of the wedges and have their inner faces inclined outward from the top downward, as shown in Fig. IV. It will be seen that when the wedges are drawn or thrown up they will be forced by contact of their inclined sides with these lugs against the rail C, and by referring to Fig. I it will be seen that if as the car is descending gear *f* should engage rack *h* the rotation of the gears would raise the support *b* of the wedges through the action of the eccentric lugs *g*, and thus apply the wedges, and that the force thus exerted on the wedges would be proportional to the weight and momentum of the car. The beam *b*, carrying the wedges is, however, normally locked in position to hold the wedges out of action, and it holds under uniform pressure a series of springs *m* and also holds down the lugs *g*, keeping the gears *f* out of engagement with the racks *h*.

D is an eyebolt which passes through beam A and to which the hoisting-rope is attached. A strong spiral spring *n* surrounds the lower end of this bolt and bears against the beam A, this spring being normally compressed by the weight of the load. The spring is convenient of access from the interior of the car, so that a new spring may be substituted from time to time as deemed necessary.

E is a casting bolted to the beam and having two upright plates, in which is pivoted a latch or locking lever F on a center G. The latch has two forward projections F', which overlie pins H, which are tapped into the beam *b*. The lower ends of the latch bear against a nut K, which is adjustable on bolt D. By reason of the combined pressure of springs *m* against beam *b* the pins H press hard against the locking-lever F and tend to turn it on its center, this tendency, however, being opposed by the nut K.

It will be observed that in the ordinary use of the car the springs *m*, which are the actuating-springs of the safety mechanism, are not subject to jar and vibration, so that their elasticity will not be impaired. Though the bolt D may play up and down slightly as the weight of the load varies or as the rope slackens in starting the car downward, there is no movement of the latch or locking lever, it and all parts controlled by it being held rigidly in place. Should, however, the rope break at any point the stop-nut K moves down until it releases the latch F. Springs *m* are at once brought into play. Beam *b* is raised, applying the wedges and permitting the gear *f* to engage rack *h*, so that the farther these gears are caused to rotate by the weight of the car the farther is beam *b* forced upward by the eccentric lugs *g*, and the pressure of the brakes *k*, which act like jaws, clamping the rail between them, is increased proportionally. When once the locking lever or latch F escapes from the hold of the stop-nut, the safety mechanism becomes independent of the action of the eyebolt or the rope attached thereto, which is an important feature of this invention.

In setting the apparatus the nut K should be adjusted to such height that the slackening of the cord when the car starts downward will not cause the nut to move from in front of the ends of latch F.

In practice there need be no vibration of spring *m* by reason of variation in the weight of the load, as this spring should be so constructed that the weight of the car will draw its coils together, forming in effect a compact cylinder. Its coils may be square in cross-section.

If desired, there may be two or more sets of brake jaws or wedges on each side of the car. In such case the additional wedges may be carried and actuated by rods *p*, screwed at their ends into the wedges *k*, as shown in Fig. IV.

When, as is sometimes desirable, upright wooden beams or posts are used in place of the rails C, it is preferred to employ the construction shown in Fig. VII, in which C' is a wooden beam or post having grooves *q* on each side, in which grooves run brake-shoes M, resting on a plate *r*, projecting from the bottom of the car. The shoes M preferably extend the full height of the car, giving a

large clamping-surface when the wedges $\frac{1}{2}$ are applied to the brake-shoes.

It will be obvious to skilled mechanical engineers that many modifications may be made in the details of construction herein set forth without departing from the spirit of the invention. For example, there are different ways of causing engagement of the gears and rack, and different connections that might be employed to transmit the motion of the gears to the stopping devices. The automatic release mechanism may also be modified without changing the essential principle of that part of the invention, which is to lock the stopping mechanism and the springs for actuating the same in one position until breakage of the rope, and then to release them entirely from control or interference by the rope.

Having now fully described the said invention and the best mode contemplated of carrying the same into effect, what we claim is—

1. In an automatic safety mechanism for elevators, the combination of arresting devices, such as wedges, carried by the elevator-car, a gear also carried by the latter and adapted in case of breakage of the hoisting-rope to engage a stationary rack, and connections such as specified between said gear and the arresting devices for actuating the latter from the former, substantially as described.

2. The combination of a rack fixed in the elevator-shaft, a gear carried by the car and normally out of contact with said rack, springs for throwing said gear and rack into engagement upon the slackening of the cord, arresting devices carried by the car, and connections between said gear and arresting devices for actuating the latter from the former, substantially as described.

3. The combination of the car, wedges or clutch-jaws carried thereby in close proximity to a stationary part of the elevator-shaft and on opposite sides thereof, gearing connected with said wedges or clutch-jaws, adapted to be driven by the weight of the

car, and means, such as springs, for throwing said gearing into action upon breakage or slackening of the hoisting-rope, substantially as described.

4. The combination of the arresting devices, the beam carrying said devices, the actuating-springs normally compressed between said beam and the car, the stationary rack, the gear carried by the car and having eccentric lugs in contact with said beam, and means for releasing the actuating-springs upon breakage of the hoisting-rope, substantially as described.

5. The combination of the arresting devices, the actuating-springs normally locked under uniform compression, and the locking lever or latch controlled by the tension of the hoisting-rope and adapted to release said springs upon the breakage of said rope, substantially as described.

6. The combination of the arresting devices, the actuating-springs normally locked under uniform pressure, the locking-lever holding said springs and arresting devices stationary, and a stop controlling said lever and connected with the hoisting-rope, substantially as described.

7. The combination of the arresting devices, the beam supporting the same, the actuating-springs, the locking-lever normally holding said beam in position to compress said springs, and the stop controlling said lever and normally holding it stationary, but adapted to be displaced upon the breakage of the hoisting-rope, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

CHARLES WENTZ FOWLER.
JOHN GUSTAFSON.

Witnesses to signature of Chas. W. Fowler:

NELSON HISS,
WILLIAM H. BERRY.

Witnesses to signature of John Gustafson:

JONATHAN CILLEY,
PHILIP MAURO.