

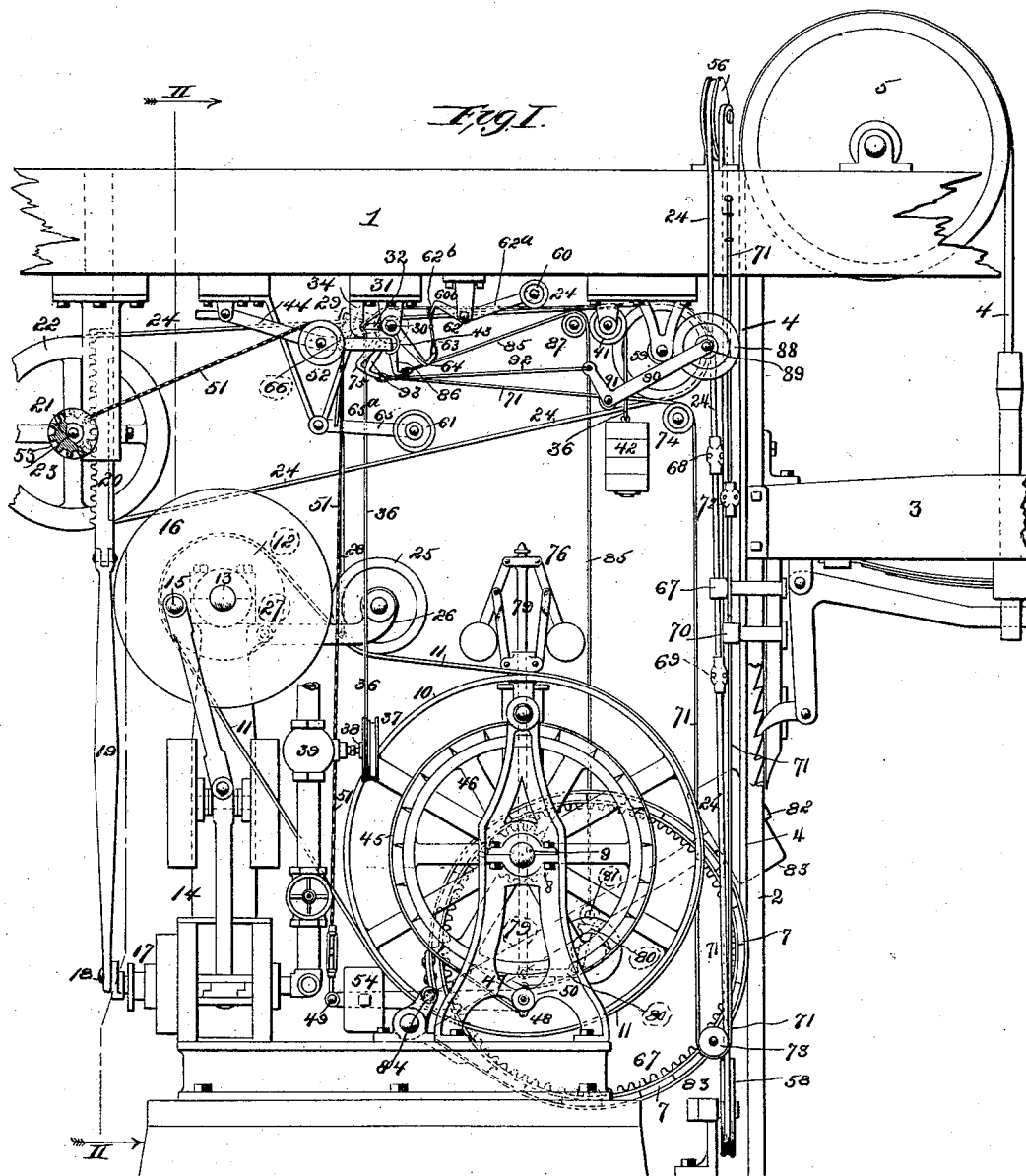
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3 Sheets—Sheet 1.

A. A. STOLTZENBURG.
SAFETY ATTACHMENT FOR ELEVATORS.

No. 483,025.

Patented Sept. 20, 1892.



Attest:
George E. Cruise.

Inventor
Andrew A. Stoltzenburg
By *N. Knight* Bro. & Co.

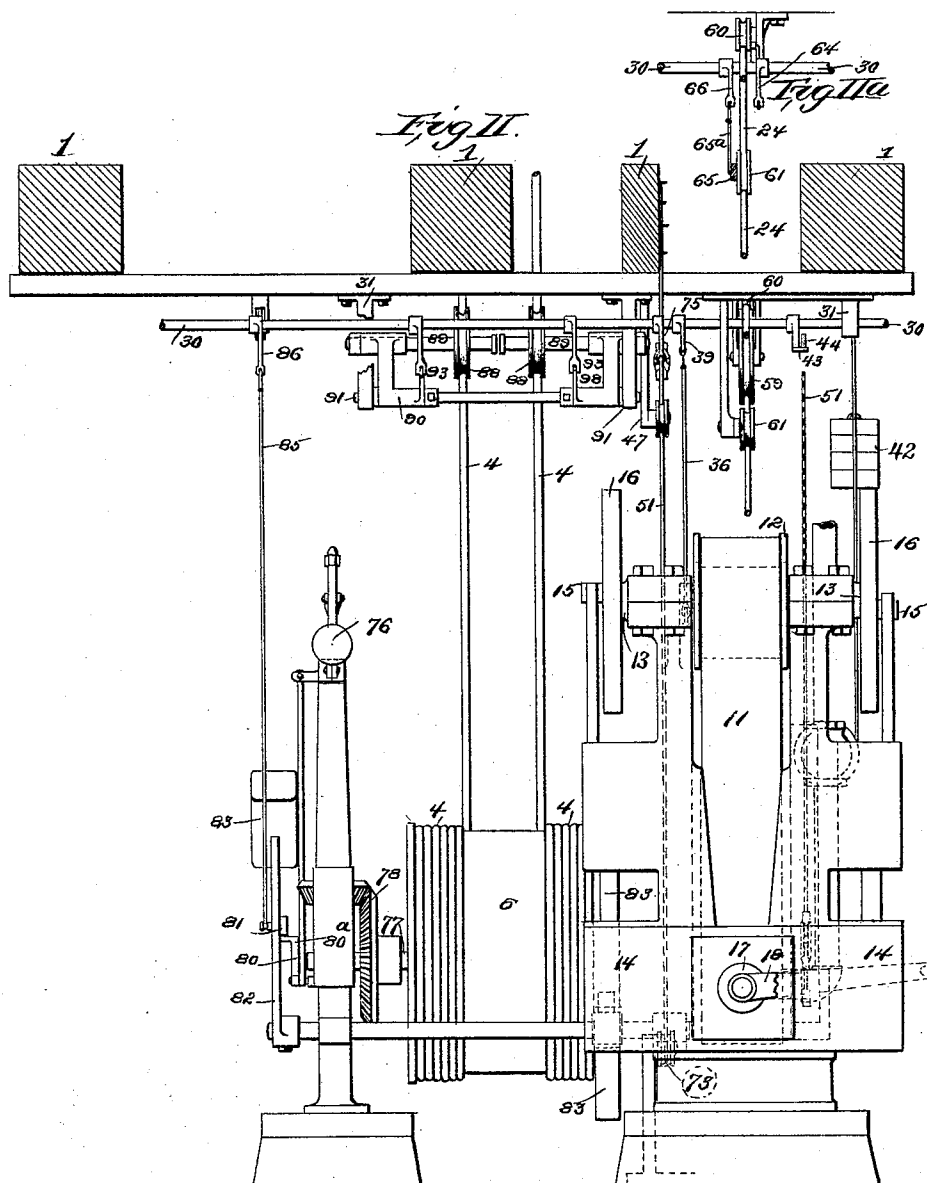
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3 Sheets—Sheet 2.

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By Knight Bros. Atty

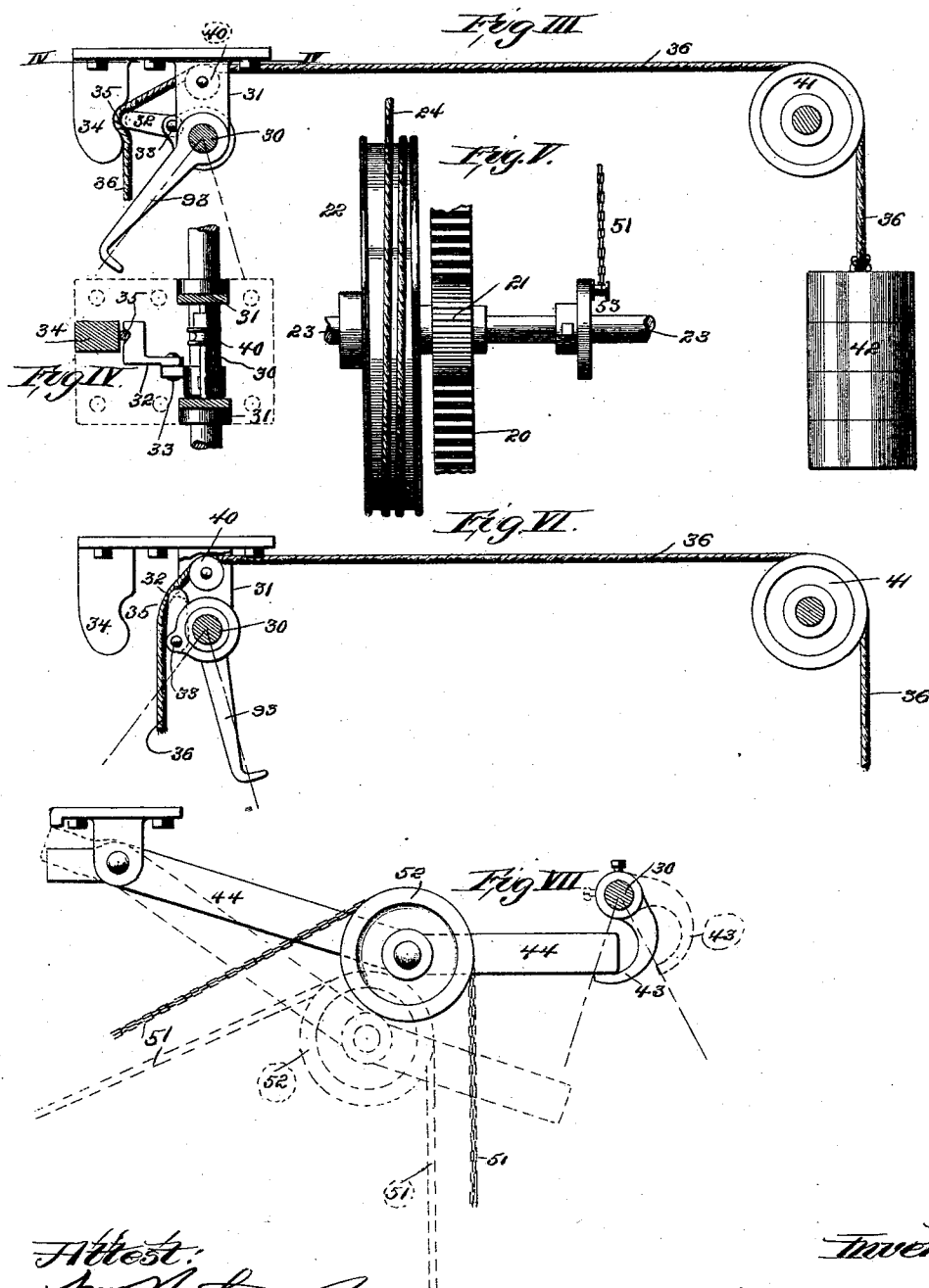
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3 Sheets—Sheet 3.

A. A. STOLTZENBURG.
SAFETY ATTACHMENT FOR ELEVATORS.

No. 483,025.

Patented Sept. 20, 1892.



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UNITED STATES PATENT OFFICE.

ANDREW A. STOLTZENBURG, OF ST. LOUIS, MISSOURI.

SAFETY ATTACHMENT FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 483,025, dated September 20, 1892.

Application filed May 18, 1892. Serial No. 433,467. (No model.)

To all whom it may concern:

Be it known that I, ANDREW A. STOLTZENBURG, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Safety Attachments for Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improved means for sustaining the car in position in case one of the hoisting-cables or other part of the mechanism should break. The features of novelty will be fully described, and definitely set forth in the claims.

Figure I is a side elevation illustrating the invention. Fig. II is an end elevation of the same. Fig. II^a is a detail elevation. Fig. III is an enlarged detail elevation showing the detent of a weighted safety-cord connected to a pulley upon the stem of the throttle-valve of the engine so as to shut off steam on the release of the cord. Fig. IV is a horizontal section taken at IV IV, Fig. III. Fig. V is a detail side elevation of the reversing-pulley. Fig. VI is a detail showing parts exhibited in Fig. III, but with the trip-detent disengaged. Fig. VII is a detail side view of the trip-lever by which the drum brake-lever is sustained in inactive position.

1 are beams or joists at top of the elevator-shaft.

2 is a side guide of the elevator-car 3.

4 are the hoisting-cables of the car. These cables pass from the top bar of the car over a pulley or pulleys 5 and down to the drum 6, to which their lower ends are made fast. The drum-shaft carries a wheel 7, having an interior gear engaging with a pinion 8 upon a counter-shaft 9. The counter-shaft 9 carries a belt-pulley 10, connected by a belt 11 with a pulley 12 upon the crank-shaft 13 of the engines 14. The cranks of these engines are set at quarter-stroke with each other, so as to avoid dead-centers. The wrist-pins 15 are upon the sides of balance wheels or disks 16.

17 is a reversing-valve operated by a crank 18, pitman 19, rack 20, pinion 21, pulley 22, and a reversing-cord 24 on the pulley. The pulley 22 and pinion 21 are upon the same shaft 23.

The parts above described are of usual or any suitable construction, and no novelty is claimed in them *per se*.

25 is a tightening-pulley bearing on the belt 11, and in case the belt gets too slack or is broken or runs off the pulleys, so that the pulley 25 descends below its normal position, certain mechanism, which I will now describe, operates to close the throttle-valve. This pulley has journal-bearing in a bracket 26, hinged at 27 to the housing of the engine. The joint 27 may, if preferred, have the construction of a rule-joint, the ascent of the pulley being thus limited. It is necessary, however, that the pulley should be free to descend.

28 is a cord or other connection extending from the hinged bracket 26 to the end of an arm 29 upon a rock-shaft 30, having bearing on brackets or hangers 31.

32 is a detent hinged to the rock-shaft at 33.

34 is a downward projection of the bracket, having a depression 35, in which a cord 36 is held by the detent 32 when the parts are all in normal position and the elevator is at rest, but in condition for service. The normal position is shown in all the figures, except in Fig. VI and in dotted lines in Fig. VII. The cord extends downward from the detent and is coiled upon and its end fastened to a pulley 37 upon the shaft 38 of the engine throttle-valve 39. The part of the cord 36 above the detent passes over pulley 40 41 and has its depending end attached to a weight 42. The construction is such that when the cord is released from the detent the end which is coiled on the pulley 37 is drawn upward and closes the throttle-valve, and of course the engine and other mechanism is brought to rest. So it will be seen that whenever the cord 36 is released from the detent 32 the steam is shut off from the engine. My invention includes a number of means for tripping the detent, and thus stopping the engine by closing the throttle in different cases of danger.

43 is a hook upon the rock-shaft 30, that engages when the parts are in normal position the free end of a lever 44, fulcrumed to the beam or some other fixed point.

45 is a strap-brake surrounding a wheel 46 on the shaft 9. The ends of the strap-brake

are attached, respectively, to lugs 47 48, projecting upwardly and downwardly from a lever 49, fulcrumed to the fixed frame at 50.

51 is a cord, chain, or other connection whose lower end is attached to the free end of the lever 49 and which extends over a pulley 52 upon the lever 44 and from that to a disk 53 or other fixed attachment of the shaft 23 of the reversing-pulley 22.

54 is a weight upon the lever 49, that normally holds down the free end of the lever and sets the brake 45. When, however, the reversing-pulley is turned in either direction to cause the ascent or descent of the car, the chain or cord 51 is coiled upon the shaft 23, and the free end of the lever 49 is lifted and the wheel 46 released from the brake 45.

As the rock-shaft 30 is turned from the position shown in Fig. III to that shown in Fig. VI, in addition to releasing the cord 36, it also releases the lever 44 from the catch 43 and the lever descends into the position shown by dotted lines in Fig. VII, thus slackening the chain or cord 51 and setting the brake 45 whatever the position of the reversing-pulley. It will be seen that when the rock-shaft 30 is turned from the position shown in Figs. I and III to the position shown in Fig. VI, by whatever means, the throttle is always thereby closed and the brake 45 applied. The endless reversing-cord has, as usual, a vertical part extending the whole height of the elevator-shaft and within easy reach of the car-operator, the cord also having a part, as usual, coiled on the reversing-pulley and secured to the pulley, so that the pulley may be turned in either direction by the vertical movement of the vertical part. The cord 24 is shown passing half around pulleys 56 and 58, and from these pulleys to pulleys 59, and from the latter to the reversing-pulley 22.

The construction and arrangement of the reversing mechanism *per se* is not new and it may be arranged in any suitable manner, the requirements being a portion extending vertically within reach of the car-operator and a part coiled on the reversing-pulley 22, the intermediate parts being carried according to convenience. The reversing-cord has parts upon which bear grooved pulleys 60 and 61. The pulley 60 is upon one arm 62^a of a lever 62, whose other arm 62^b is connected by a cord or link 63 with an arm 64 upon the rock-shaft 30. The pulley 60 and its arm 62^a are heavier than the arm 62^b and its attachments, so that the pulley, with its arm, descends in case of the breakage or sagging of the reversing-cord and the arm 62^b is thrown up, turning the rock-shaft 30 into the position seen in Fig. VI, and thus cause the stoppage of the engine and the setting of the brake 45, as before described. The same result follows if the part of the reversing-cord beneath the pulley 61 sags or gives way, for this pulley is on a hinged arm or link 65, connected by a link or cord 65^a to an arm 66 upon the rock-shaft 30. The vertical part of the reversing-cord passes

through the eye of a stud 67 upon the car 3, and upon the cord are stop-collars 68 and 69 that the stud comes in contact with when it reaches its extreme upward or downward position. The arrangement is such that the reversing-valve is turned to a neutral position when the car has reached the limit of its movement in either direction, and thus danger from running past is avoided. This stop mechanism for the car is old and needs no further description.

70 is a stud projecting from the cage or car and having an eye through which passes a cord 71, with a stop-collar 72, against which the stud impinges before the car in its ascent reaches a place of danger. The upper end of the cord is attached to the beam 1. The cord extends down vertically from the beam 1 to a pulley 73, then upward to and over a pulley 74, and from thence to an arm 75 upon the rock-shaft 30. The construction is such that when the stud 70 lifts the collar 72 the rock-shaft 30 is turned from its normal position (seen in Fig. III) to the position seen in Fig. VI, with the consequences before described.

The cord 71, stop 72, and projection 70 are auxiliary to the cord 24, stops 68 69, and projection 67, so that if the cord 24 breaks or does not act through its stops when the elevator-cage reaches the top of the shaft the cage will be arrested by means of the cord 71 and stop 72 acting on the throttle-valve and brake.

The means for stopping the engine when from any cause the speed of the engine exceeds a given point will now be described.

76 is an ordinary ball-governor rotated from the drum-shaft 77 by miter-gearing 78. As the balls rise the stem 79 is pushed downward and depresses the horizontal arm of the bell-crank 80. The upright arm of the bell-crank has a segmental end 80^a, that forms in the normal position a rest for a stud 81 upon a weighted brake-lever 82. The stud 81 preferably carries an antifriction-roller. The brake-lever carries a weight 83, that carries down the free end of the lever as soon as it is released from the support of the end 80^a of the bell-crank arm and sets a strap-brake 83 upon the cable-drum or upon a wheel attached to its shaft 77. To this end the lever has an arm 84 hinged to one end of the brake-strap 83.

85 is a cord extending from the lever 82 to an arm 86 upon the rock-shaft 30. The cord may pass over a pulley 87, as shown in Fig. I. The arrangement is such that the descent of the lever 82 will cause the rock-shaft 30 to turn into the position shown in Fig. VI, and thus the throttle will be closed and the brake 45 set, as well as the brake 83.

88 are two similar grooved pulleys bearing against the two hoisting-cables 4, a description of one pulley and its appendages and connections applying equally to the other. Each pulley has bearing on an arbor 89, on which it turns loose, and has a limited end-

wise movement to enable its accommodation to the position of the cable as the cable is wound on and off the drum. The arbor 89 is upon one arm of a bell-crank 90, fulcrumed at 91 and having an arm connected by a cord 92 with an arm 93 upon the rock-shaft 30.

The construction and arrangement are such that when either of the hoisting-cables breaks or gets slack from any cause the pulley draws down the arm of the rock-shaft on which it has bearing and pulls the rock-shaft 30 into the position seen in Fig. VI, with the result before described—namely, shutting off the steam and setting the brakes.

To place the elevator in normal running position after any of the safety devices have been in operation, the parts must be restored to the condition shown in Figs. I, II, and III.

It will be seen that in the event of breakage or other derangement of any one of a variety of parts, all of which are liable to fail without notice, the steam is shut off from the engine, and in addition brakes may be applied to the machinery, as set forth, and all by substantially the same means—namely, the turning of a rock-shaft common to all the devices by means of a cord connecting an arm on the rock-shaft to an arm that is released by the failure of the part of the machinery upon which the arm is supported or by other abnormal condition of the mechanism.

The reversing-cord and other connections have been generally described as cords. It is not to be understood that the word is used in a restrictive sense, for any suitable means of connection may be used, as cable, chain, or link, according to requirements. The words may be used interchangeably. The connection of the cord 36 with the throttle-valve is described to be by means of a pulley on the valve-stem. An arm or disk might take the place of the pulley, or the cord might be coiled directly on the stem, the essential thing being that the stretching of the cord shall close the throttle-valve.

It is obvious that springs may be substituted for the weights used to stretch the cord 36 and to set the brakes. Springs may be also used instead of gravity to hold the pulleys against the belts, cords, and cables, whose sagging or breaking serves to close the throttle and set the brakes, as described. It is also obvious that if the main subject-matter of the invention were applied to a single cable, belt, or cord, so as to shut the throttle-valve on the failure of such cable, belt, or cord, a simple hinged arm, as 93, carrying a detent 32, might be adopted, the pivot of the arm 93 forming the full equivalent of the rock-shaft, and the term "rock-shaft" will be used in the claims with this understanding. The drawings and description set forth the best manner of carrying out the invention according to my experience and judgment, as required.

The cords attached to the arms 93, &c., upon the rock-shaft 30 may be called "tripping-

cords" and the arms "tripping-arms," as they act to turn the shaft and trip the detent 32, holding the weighted cord 36, and the lever 44, stretching the brake-lever cord or chain 51.

I claim as my invention—

1. The combination, with a throttle-valve of an elevator-engine, of a weighted cord connected with the valve-stem and adapted to close the valve by the stretching of the weighted cord, the bracket having a downward projection formed with a depression, the rock-shaft 30, having a detent normally engaging the weighted cord in the depression, a pulley bearing against a part of the mechanism liable to sag or break, and an arm upon the rock-shaft, with which the pulley is connected, substantially as described.

2. The combination, with a throttle-valve of an elevator-engine, of a weighted cord connected with the valve-stem and adapted to close the valve by the stretching of the weighted cord, the rock-shaft 30, having a detent normally engaging the weighted cord, a pulley bearing against a part of the mechanism liable to sag or break, an arm upon the rock-shaft, with which the pulley is connected, a brake mechanism having a weighted brake-lever, a lever provided with a pulley, a catch on the rock-shaft normally engaging the pulley-lever, and a cord passing over the pulley and secured to the brake-lever, substantially as described.

3. The combination, with a hoisting-cable, of a hinged arm, a pulley upon the hinged arm, bearing against the cable, the bracket having a downward projection formed with a depression, a rock-shaft having an arm connected with the hinged arm, a throttle-valve, a weighted cord connected with the valve-stem and adapted to close the valve by the stretching of the weighted cord, and a detent on the rock-shaft normally engaging the weighted cord in the depression, substantially as described.

4. The combination, with a hoisting-cable, of a hinged arm, a pulley upon the hinged arm, bearing against the cable, a rock-shaft having an arm, a detent, and a catch, a throttle-valve, a weighted cord connected with the valve-stem and adapted to close the valve by the stretching of the weighted cord, a brake mechanism having a weighted brake-lever, a lever provided with a pulley and a cord passing over the lever-pulley and secured to the brake-lever, the hinged arm being connected with the arm on the rock-shaft, the weighted cord being normally engaged by the detent, and the pulley-lever being normally engaged by the catch, substantially as described.

5. The combination, with the throttle-valve of an elevator-engine, of a weighted cord attached to the stem of the throttle-valve and adapted to close the valve when stretched, a rock-shaft having a detent normally engaging the cord and having an arm 75 and a cord 71 attached thereto, having a portion adjacent to

the travel of the car provided with a projection 72, and a projection 70 on the car, adapted to engage with said projection 72, substantially as and for the purpose set forth.

- 5 6. The combination, with the throttle-valve of an elevator-engine and the elevator mechanism, of a weighted cord connected with the throttle-valve and adapted to close the valve under the influence of the weight, the bracket
10 having a downward projection formed with a depression, and a rock-shaft 30, having a detent adapted to lock the weighted cord in the depression, and an arm connected with part of the mechanism liable to sag or break, substantially as described.
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7. The combination, with the throttle-valve of an elevator-engine, of the weighted cord 36, connected with said valve, the rock-shaft 30, having a detent 32, a hook 43, and an arm, the lever 44, normally engaged by the hook, a
20 weighted brake-lever, a cord connecting the brake-lever to the lever 44, an operating-cord

attached to the arm, and a lever provided with a pulley, substantially as described.

8. The combination of a throttle-valve, a 25 weighted cord connected to the valve-stem, a rock-shaft 30, having a detent 32 and trip-arms, the tripping-cords, the hoisting-cables 4, the reversing-cord 24, the drive-belt, the hinged arms, and pulleys journaled on the hinged 30 arms, substantially as described.

9. The combination of a throttle-valve, a weighted cord connected to the valve-stem, a rock-shaft 30, having a detent 32, a hook 43, and trip-arms, tripping-cords, the hoisting- 35 cables 4, reversing-cord 24, the drive-belt, the hinged arms, the pulleys journaled on the hinged arms, the weighted brake-lever 49, the cord 51, the lever 44, and the pulley upon the lever 44, substantially as described.

ANDREW A. STOLTZENBURG.

Witnesses:

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BENJN. A. KNIGHT.