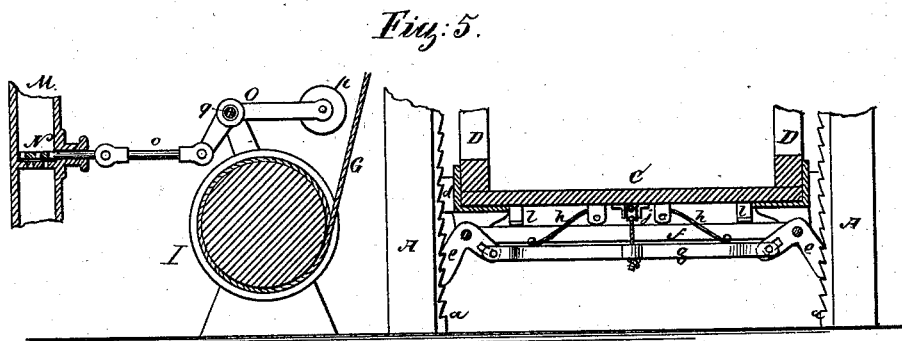
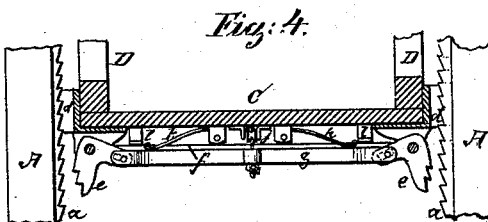
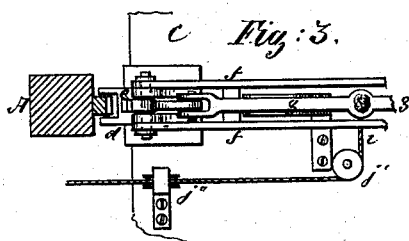
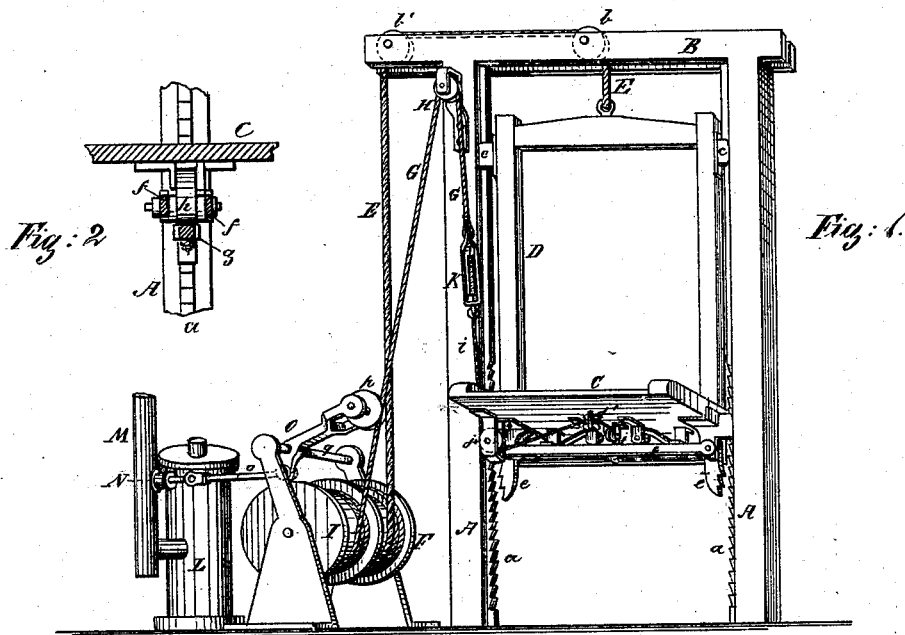


P. J. SCHMITT.
Elevator.

No. 219,367.

Patented Sept. 9, 1879.



Witnesses:
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UNITED STATES PATENT OFFICE.

PETER J. SCHMITT, OF CHICAGO, ASSIGNOR OF ONE-FOURTH HIS RIGHT TO
GEORGE SIEGEL, OF CARLINVILLE, ILLINOIS.

IMPROVEMENT IN ELEVATORS.

Specification forming part of Letters Patent No. **219,367**, dated September 9, 1879; application filed
February 11, 1879.

To all whom it may concern:

Be it known that I, PETER JACOB SCHMITT, of Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Safety Attachments to Elevators; and that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The nature of my invention relates to devices for preventing accidents with rope elevators; and my invention consists in an arrangement of pawls attached to the bottom of the elevator-platform, adapted to engage with ratchet-teeth of the standard guide-bars by the action of springs, said pawls being detained from such engagement by the tension of a small rope or cord, which moves at an equal speed with the hoisting-rope by winding upon a spool of equal diameter with the hoisting-drum to which said spool is coupled. This small rope or cord is to be of sufficient strength only for resisting the elasticity of the springs, and is to be torn asunder by the weight of the platform in case the hoisting-rope should break or its connections should yield, whereby the springs will be set free to act upon the pawls and to compel their engagement with the ratchet-teeth of the standard-guides, or in case the platform should be detained by any obstruction in its down course, thereby causing the hoisting-ropes to become slack. The safety-rope also will slacken, and will release the springs to act upon the pawls for locking the platform at its acquired elevation.

Another improvement consists in applying a throttle-valve to the steam-supply pipe between engine and boiler, and in connecting the same to the vertical arm of a bell-crank, a sheave in the end of the horizontal arm of which leans against the safety-rope while taut, and thereby holds the valve open; but as soon as said safety-rope becomes slack, which it will only by an accident, the gravity of said bell-crank arm will cause the other arm to close the valve and stop the hoisting-engine.

My invention furthermore consists in several minor improvements in the construction of the

device, which will be more fully hereinafter explained.

In the drawings, Figure 1 represents a perspective view of an elevator embodying my improvements. Fig. 2 represents a transverse section of the elevator-platform and safety attachment. Fig. 3 represents a bottom view of the elevator-platform; Fig. 4, a longitudinal section through the elevator-platform while in safe condition; and Fig. 5, a similar sectional view of the same and of the throttle-valve mechanism as appearing after an accident.

Like letters in the several figures of the drawings indicate like parts.

A A are the standards in the hatchway, to the upper extremities of which are framed the beams B B. C is the elevator-platform, the gallows-shaped frame D of which is coupled to the end of the hoisting-rope E, guided over sheaves *b b'*, which are journaled between beams B, and thence passed down to and connected upon hoisting-drum F, a reversible motion to which is imparted by a steam-engine in the usual manner.

To the inward faces of the standards A are secured iron guide-bars *a*, which are provided with ratchet-teeth, and the platform is arranged with guide-shoes *c* and *d*, which overlap the sides of bars *a*. The guide-shoes *d* are strong castings, with angular plates shouldered against the lower corners of the platform C, to insure the greatest strength of resistance to the same, and each shoe *d* is provided with two pendent flanges, between which is pivoted a bell-crank-shaped pawl, *e*, with a series of ratchet-teeth to one of its arms. Two bars, *f f*, are placed externally against the pawl-pivot flanges of the shoes *d*, and are rigidly connected therewith by passing the pivot-bolts through holes in their ends. These bars *f* will give additional strength of resistance to the shoes *d*.

The horizontal arms of the pawls *e* are slotted, and are connected by a bar, *g*, the hoisting and lowering of which will impart an oscillating motion to the pawls *e*. Two springs, *h*, secured by their inner ends to the bottom of the platform C, with their outward-extending ends will exert a pressure upon the bar *g* for forcing the pawls *e* to interlock with the

ratchets of guide-bars *a*; and to the center of bar *g* is connected the end of a cord, *i*, which is guided over pulleys *j*, *j'*, and *j''* to the side of the platform *C*, where by a screw-swivel, *K*, it is coupled with a rope, *G*, which is passed over a sheave, *H*, pivoted in a suitable bracket, and thence is passed down and secured upon a spool, *I*, which is of the same diameter as the hoisting-drum *F*, and may be either made solid therewith or separate, and secured upon the same driving-shaft. This rope *G* can be very light; but the cord *i* should be still lighter, and of sufficient strength only for holding the bar *g* in suspension against the power of the springs *h* while compressed, and thereby holding the pawls *e* clear of the ratchet-teeth of guide-bars *a*. Stops *l* under the sides of the platform will limit the movement of bar *g*, and will prevent a too great contraction of the springs *h*, thereby securing the same against damage.

The *modus operandi* of the above-described device is such that as long as the hoisting-rope and its connections are intact, and no impediment is in the way of the elevator-platform, both drums, *F* and *I*, will pay out or gather in their respective ropes *E* and *G* equally, and therefore the springs *h*, after being once compressed by the tension of the cord and rope *i* *G*, will hold the bar *g* sufficiently suspended for its connecting-pawls *e* to be kept clear of the ratchet-bars *a*, and such tension will be maintained at all positions of the elevator-platform; but in case the hoisting-rope should snap, or the elevator-platform in any way get uncoupled, the whole weight of said platform will at once be brought to bear on rope *G* and cord *i*, which latter, being the weakest of the two, will be torn, whereby the bar *g* will be set free, and by the re-enforcement of springs *h* will swing the pawls *e* into the ratchet-teeth of guide-bars *a* with so quick an action that the platform can fall but a few inches until it is locked in its then occupying position; or, if an obstruction is thrown in the way of the descending platform, so as to impede its down passage, both ropes, *E* and *G*, will become equally slack, whereby the springs *h* are liberated to act upon the pawls *e*, causing the same to lock with the ratchet-teeth of guide-bars *a*.

My object for making the safety-rope in two sections, and using a rope, *i*, lighter than the rope *G*, is for locating the breakage of the rope with an accident at the most convenient position for repair.

The screw-swivel *K*, *I* apply for correct adjustment of the tension of the safety-ropes and for taking up any tensional yield of said ropes.

The pawls *e*, having three or more ratchet-teeth, arranged on the proper angle for an equal bearing with as many teeth of the guide-bars *a*, will insure additional safety by distributing the momentous strain with an accident upon several such teeth.

L is the steam-cylinder of the hoisting-en-

gine, and *M* the steam-supply pipe from the boiler, which *I* arrange with a throttle-valve, *N*, of any suitable construction, and shown in the drawings to be a slide-valve, placed upon a diaphragm with corresponding ports for the steam to pass through while communicating. The protruding stem of this slide-valve *I* connect by a rod, *o*, with the short vertical arm of a bell-crank, *O*, the long and horizontal arm of which is bifurcated at its end, with a fixed pin between its prongs, upon which is pivoted a flanged pulley, *p*, so as to rotate and have lateral movement thereupon. The apex of this bell-crank is mounted upon a shaft, *q*, journaled in suitable standards in such a position that the bifurcated-arm end of the bell-crank is vertically in line with the face of spool *I*, and so that the pulley *p* leans against and follows the spiral winding of the rope *G* upon said spool *I* and holds the arm of the bell-crank diagonal as long as said rope *G* is taut; but as soon as said rope becomes slack, which only, but in every instance, it will with an accident, the gravity of the said pulley *p* and its connecting-arm of the bell-crank will close the throttle-valve *N* and will stop the engine. The object of this device is to prevent damage to the ropes by unwinding on the drum when the platform is obstructed in its down course, or by pulling the ropes off the upper sheaves after snapping when the platform is no more suspended thereto.

The above-described attachment to elevators will obviate the dangers to human life and property which were heretofore frequent with their use, and will indicate at once if anything is out of order with the elevator, not only by securely locking the platform at its acquired position, but also by stopping the engine, and thereby notifying the engine-tender of such defect. The working mechanism of this attachment can be periodically tested, if in good good working order or not, by simply propping the elevator-platform, and by allowing the ropes to slacken.

Safety attachments in direct connection with and depending upon the snapping of the hoisting-rope cannot be relied upon, since the springs intended for operating the pawls or bolts are frequently retarded in their action by the heavily-yielding resistance and the weight of such rope, particularly if the snapping of the same takes place at or near the hoisting-drum, when the weight of the rope on that side will exceed the weight of the end coupled to the platform.

In elevators having a counter-weight the safety-rope, instead of winding upon a drum, may be connected to said counter-weight, or with water-elevators it may be coupled to the piston-rod, so as to move in either case at an equal speed with the hoisting-rope, and to hold the springs compressed under a uniform tension.

In elevators having no independent rope to control the safety attachment the valve *N* may be operated by connecting the pulley *p* of

bell-crank O with the hoist-rope in the same manner described for the safety-rope.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a rope elevator, the combination, with the platform and the hoisting-rope, of a separate and additional rope, moving at the same speed as the hoisting-rope, and connected with the spring safety pawls or bolts of the platform, said additional rope being much lighter than the hoisting-rope, and adapted to break at the same time with the hoisting-rope and at a point near the platform, substantially as and for the purpose set forth.

2. In combination with the standard ratchet-bars *a*, elevator-platform C, hoisting-rope E, and hoisting-drum F, the pawls *e*, bar *g*, springs *h*, cord and rope *i* G, and spool I, the same to be constructed and arranged to operate substantially as set forth.

3. The shoes *d*, attached to the bottom of elevator-platform C, the pawls *e*, arranged to engage with standard ratchet-bars *a*, and

connected by bar *g*, sustained against the pressure of springs *h* by the tension of a cord and rope, *i* G, independently of the hoisting-rope and traveling at a uniform speed therewith.

4. In combination with the platform C, the hoisting-rope E, drum F, and standard ratchet-bars *a*, the spool I, rope G, and cord *i*, coupled by screw-swivel K, and connecting with bar *g*, which again connects with pawls *e* and is depressed by springs *h*, the same to be constructed and arranged substantially as and for the purpose set forth.

5. The steam-supply pipe M, having stop-valve N, connected by rod *o* with bell-crank O, having pulley *p*, in combination with the hoist or safety rope of an elevator, substantially as and for the purpose set forth.

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Witnesses:

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EMIL H. FROMMANN.