

No. 607,271.

Patented July 12, 1898.

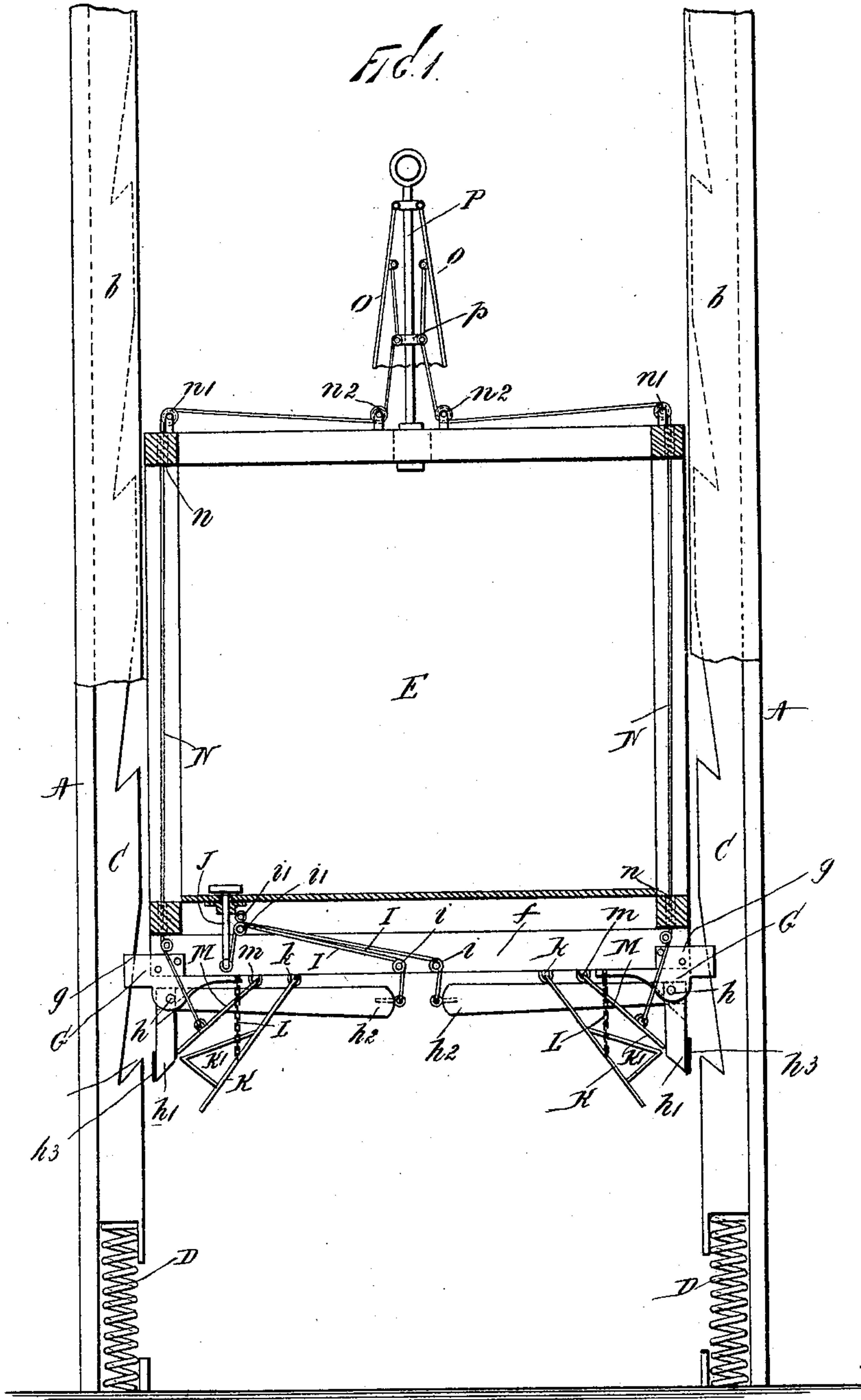
D. I. PRUDDEN.

SAFETY MECHANISM FOR ELEVATORS.

(Application filed Dec. 9, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESS

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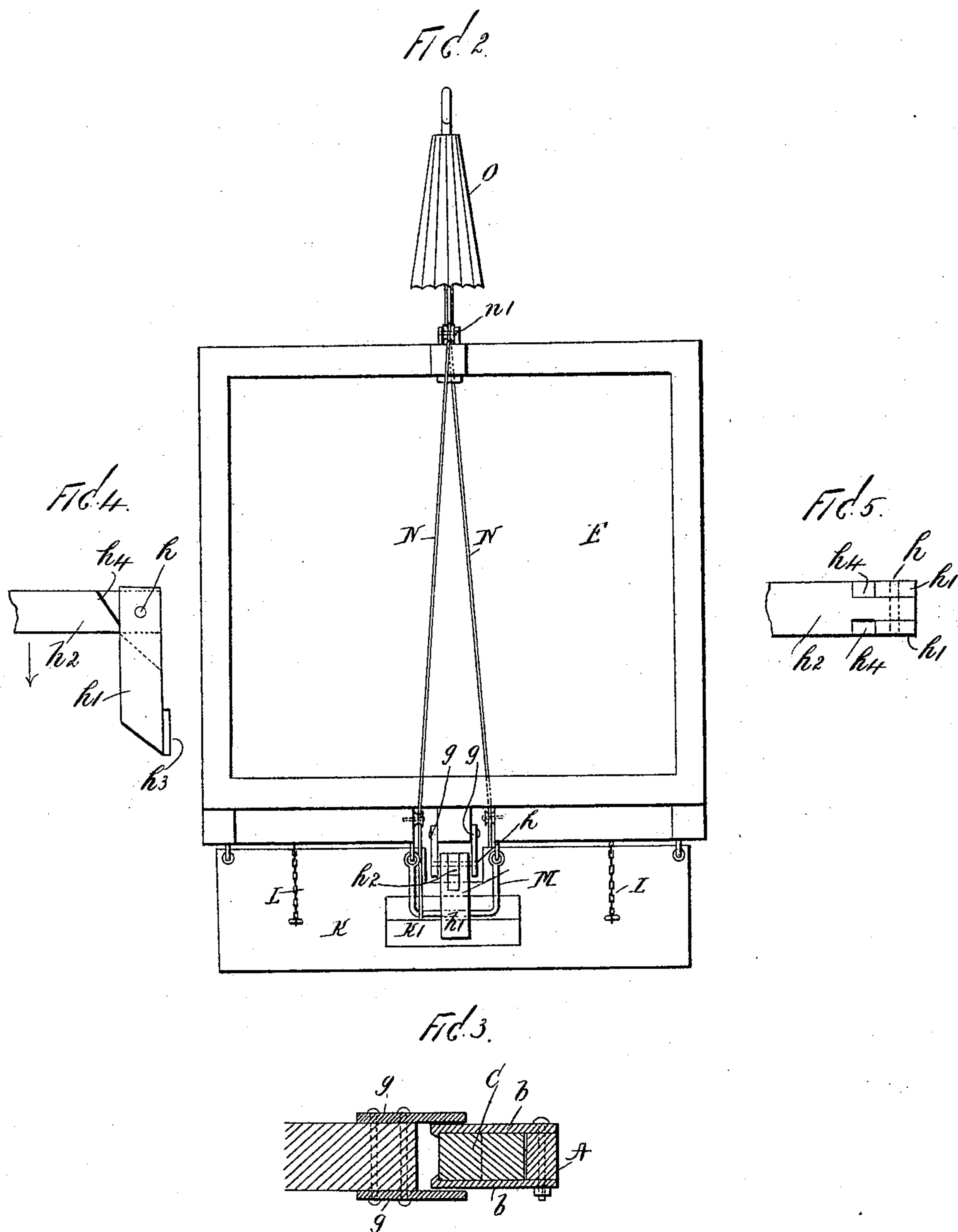
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UNITED STATES PATENT OFFICE.

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SAFETY MECHANISM FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 607,271, dated July 12, 1898.

Application filed December 9, 1897. Serial No. 661,284. (No model.)

To all whom it may concern:

Be it known that I, DAVID IRVING PRUDDEN, a citizen of the United States, residing at Morristown, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Safety Mechanism for Elevators, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to that class of safety elevator-catches which embody a pivoted lever or dog adapted to engage a vertical ratchet-bar.

The object of my invention is to provide a simple and improved safety device of this character which will serve to effectively and automatically arrest the descent of the car whenever the latter attains abnormal speed either by reason of accident or other causes.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by the same letters of reference in each of the views, and in which—

Figure 1 is a front elevation, partly in section, showing an elevator mechanism provided with my improvements. Fig. 2 is a transverse sectional view. Fig. 3 is a detail horizontal sectional view. Fig. 4 is a detail side view of the dog or catch device, and Fig. 5 a detail edge view of the dog or catch device.

Referring to the drawings, A A designate the vertical side beams comprised in the elevator-shaft, which carry vertical guides or plates *b b*, between which are housed vertical rack or ratchet bars C. The rack-bars C normally maintain a fixed position, but are adapted to slide vertically, when engaged by the safety catch mechanism, against the tension of springs or cushions D arranged at their bottom ends, which mechanism operates to relieve the jar or shock in the operation of the safety mechanism. The rack-bars C are thus virtually supported upon the bottom springs or cushions.

E designates the elevator-car, which may be in the main of any suitable or adapted construction, it being preferably provided at its bottom with a transverse cross piece or beam

f, upon which the catch mechanism is mounted. The beam *f* carries at its ends brackets G, which may embody laterally-projecting parallel flanges, as at *g*, embracing the vertical guides *b b*.

h' designates the gravity dogs or catches, which are mounted so as to swing transversely with respect to the elevator-car, one at each side, and beneath the bottom of the same, said dogs or catches being pivoted or fulcrumed, as at *h*, in the brackets G and adapted to be thrown into engagement with the rack-bar C.

The catches or dogs *h'* can be retained in engagement with the vertical rack-bars by means of lever-arms *h² h²*, fulcrumed at *h* in connection with the gravity-dogs and extending inwardly therefrom.

The relative arrangement of the levers *h²* and the gravity-dogs *h'* is such that the dogs can swing independently of said levers and into engagement with the rack-bars C when operated by the automatic mechanisms hereinafter described; but when said levers *h²* swing downwardly they operate as weighted arms, which force the dogs into engagement with the rack-bars and retain them in this position as long as said levers *h²* remain down, this operation being effected by means of shoulders *h⁴*, which bear against the dogs below the fulcrum *h* of the latter and swing them outwardly when the levers *h²* drop. Whenever the levers *h²* are retained in raised position, so that their shoulders *h⁴* do not operate upon the gravity-dogs, the latter will hang downwardly in normal position and free from engagement with the rack-bars. To provide for this retention of the levers *h²* in raised position, cords or cables I I are respectively connected to the inner ends of said levers and extend upwardly therefrom and over guide-rollers *i* upon the beam *f* to other suitably-mounted guide-rollers *i' i'*, over which they pass and are turned downwardly, their ends being connected with a vertically-moving foot-piece J, mounted in the bottom of the elevator-car. When this foot-piece is depressed, the levers *h²* will be held in raised position and the dogs or catches *h'* will depend in normal position free from engagement with the racks C; but when the pressure upon the foot-piece is released the levers *h²*

will drop downwardly and force the dogs or catches h' outwardly into engagement with the racks.

Upon the bottom of the car and in transverse relation to the dogs or catches are mounted in a pivoted or hinged manner, as at k , relatively-diverging fan-plates K , provided upon their outer faces with a projection k' , adapted when the fans are thrown upwardly and outwardly to engage the respective dogs h' and force the same into engagement with the rack-bars. These fans K are suspended in normal position by means of chains L , depending from the bottom of the elevator-car.

It will be understood that the weight or gravity function of the fans is so regulated that the descent of the car at normal speed will not operate the fans; but when an unusual rate of speed is attained in the descent by accident or from any other cause the fans will be forced upwardly by air-pressure and operate against the dogs to force the same into engagement with the ratchet-bars. During the ascending movement of the car the dogs will slip over the ratchet edge of the bars C (should the levers h^2 be dropped down) or they will swing free from engagement with the latter if the foot-piece is operated to raise the lever h^2 . Said foot-piece mechanism will also serve to retain the lever h^2 in raised position and permit the dogs h' to swing free from engagement with the rack-bars during the descent of the car.

M designates arms which are pivotally suspended, as at m , at the bottom of the elevator-car and are adapted to bear at their free ends against the dogs or catches h' to force the latter outwardly and into engagement with the rack-bars when said arms are swung upwardly. These arms are adapted to be operated by a parachute mechanism O , which is mounted at the top of the car and is connected with said arms by means of cords or cables N passing upwardly at the sides of the car through suitable guide-openings n and over guide-rollers n' at the top of the car, from whence said cords or cables pass inwardly and under guide-rollers n^2 and from thence upwardly to the parachute mechanism. The parachute mechanism preferably comprises an upright or standard P , mounted at the top of the car and carrying a folding and expanding body o , having a sliding-collar connection p , to which the ends of the cords or cables N are connected, said collar being arranged to slide upon the standard P .

In operation the parachute mechanism is adapted to automatically open when the descending speed of the car becomes abnormal, so that the collar p slides upwardly on the upright P and draws upon the cords or cables N , which latter pull the pivoted arms M upwardly, and thereby effect the engagement of the dogs or catches with the rack-bars.

Whenever an abnormal rate of speed is attained by the car in its descent, the pivoted

dogs will be instantly and automatically thrown into engagement with the rack-bars by operation of the fan or parachute mechanism, and the movement of the car will thus be checked, any consequent jar or shock being taken up or relieved by the springs or cushions upon which the rack-bars are mounted. This engagement of the dogs with the rack-bars to stop or check the car in its descent may also at any time be effected by the simple release of the foot-piece mechanism and the consequent dropping of the levers h^2 , which serve to operate the dogs.

It will be noted that whenever the operator leaves the car and the foot-piece mechanism is in released condition the levers h^2 will retain the dogs h' in engagement with the rack-bars, and thus automatically serve to lock the car against a descending movement.

If desired, the outer face of the dogs h' may be cushioned with rubber or other elastic material, as shown at h^3 , to provide a friction-piece which will slide noiselessly over the ratchet-face of the rack-bar during the ascending movement of the car.

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

1. A safety mechanism for elevators, comprising vertical ratchet or rack bars, gravity catches or dogs fulcrumed upon the elevator-car, weighted arms adapted to bear upon and operate said dogs, ropes or cables extending from said weighted arms, and a foot-piece or operating device connected with said ropes or cables, whereby the gravity-dogs may be forced into engagement with the rack-bars by simple release of the foot-piece mechanism, substantially as and for the purpose set forth.

2. A safety mechanism for elevators, comprising vertical ratchet or rack bars, dogs or catches mounted upon the elevator-car and adapted to engage said rack-bars, and fan-plates pivotally swung from the car and normally depending in an inclined or diagonal position with relation thereto, said fan-plates being adapted to swing upwardly against the dogs or catches to throw the same into engagement with the rack-bars, substantially as and for the purpose set forth.

3. A safety mechanism for elevators, comprising vertical ratchet or rack bars, dogs or catches pivotally suspended from the elevator-car and adapted to engage said rack-bars, and fan-plates arranged transversely with respect to the elevator-car and with respect to the swinging movement of said dogs or catches and pivotally suspended at their upper edges from the car so that they normally depend in an inclined or diagonal position with relation to the suspended dogs or catches, said fan-plates being adapted to swing upwardly so that their free portions bear against and operate said dogs or catches, substantially as and for the purpose set forth.

4. A safety mechanism for elevators, comprising vertical ratchet or rack bars, dogs or

catches pivotally mounted upon the elevator-car and adapted to engage said rack-bars, and fan-plates pivotally suspended from the car with their free portions in position for direct action against said pivoted dogs or catches, the fan-plates being adapted to swing upwardly so their free portions bear against the dogs or catches and force the catch edge of the same into engagement with the rack-bars, substantially as and for the purpose set forth.

5. A safety mechanism for elevators, comprising vertical ratchet or rack bars, dogs or catches mounted upon the elevator-car and adapted to engage said rack-bars, and a fan mechanism carried by the car and swinging into direct operative contact against said dogs or catches when it is forced upwardly by air-pressure during the descent of the car at abnormal speed, substantially as and for the purpose set forth.

6. A safety mechanism for elevators, comprising vertical ratchet or rack bars, catches or dogs pivotally suspended from the elevator-car and adapted to engage said rack-bars, fan-plates suspended in pivoted or hinged position from the elevator-car and arranged transversely with respect to the swinging movement of said dogs or catches and adapted to bear against the latter when they are swung by air-pressure, and means for sustaining said fan-plates in normal operative position, substantially as and for the purpose set forth.

7. A safety mechanism for elevators, comprising vertical rack or ratchet bars, dogs or catches mounted upon the elevator-car and adapted to engage said rack-bars, a collapsible or folding parachute mechanism carried by the elevator-car, and devices connecting said parachute mechanism with the dogs or catches, whereby the latter are thrown into engagement with the rack-bars when the parachute opens, substantially as and for the purpose set forth.

8. A safety mechanism for elevators, comprising vertical rack or ratchet bars, dogs or catches pivotally suspended from the elevator-car, a parachute mechanism carried by the elevator-car, and comprising a collapsible

or folding member and a sliding member, said collapsible or folding member and the sliding member being connected so that the collapsible or folding movement of one member slides the other member, and connecting cords or devices extending between the sliding member of the collapsible or folding parachute mechanism and the pivoted dogs or catches, whereby when the parachute opens and draws upon the cords the dogs or catches are carried outwardly into engagement with said rack-bars, substantially as and for the purpose set forth.

9. The combination, with an elevator-car, of a collapsible or folding parachute mechanism, safety catch mechanism for governing the speed of operation of the car, and mechanism connecting the parachute mechanism with the safety catch mechanism, whereby when the collapsible or folding parachute mechanism is forced open by the action of the air-current its opening movement operates the catch mechanism, substantially as and for the purpose set forth.

10. A safety mechanism for elevators, comprising weighted arms, catch mechanism adapted to be operated by the dropping movement of said arms, a depressible foot-piece mechanism arranged within the car, and mechanism connecting said foot-piece mechanism with the arms and operating to retain the latter up in elevated position when the foot-piece is depressed, whereby when the operator leaves the car and the foot-piece mechanism is released the arms will automatically operate the catch mechanism to lock the car in position, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 4th day of December, 1897.

DAVID IRVING PRUDDEN.

Witnesses:

W. F. BARKMAN,
DAVID F. BARKMAN,
WILLIAM F. BARKMAN.