No. 822,803. PATENTED JUNE 5, 1906.

F. WILLIAMS.

SAFETY BRAKE OR LOCK FOR ELEVATORS.

APPLICATION FILED DEC. 5, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

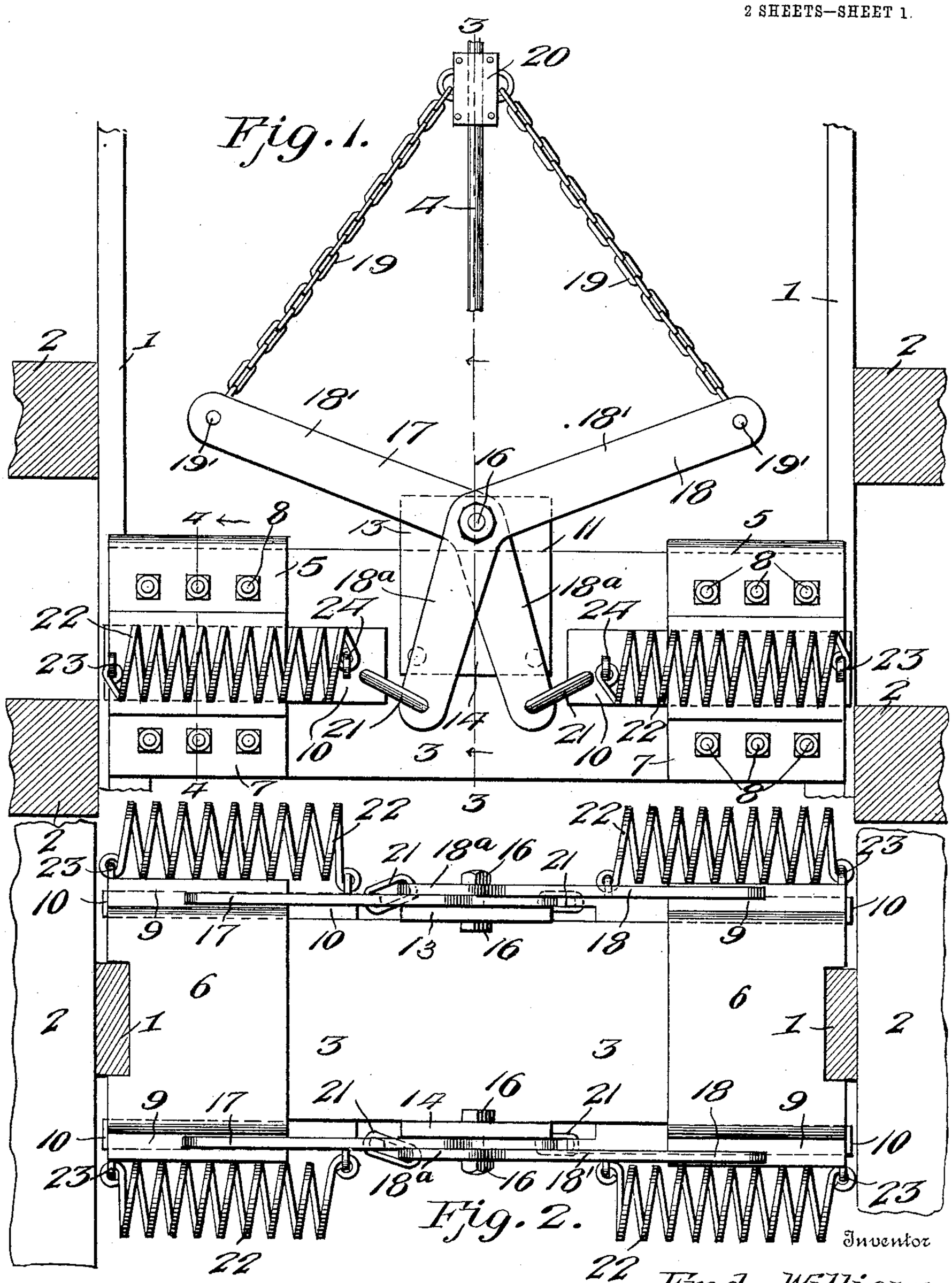

Fig. 2.

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Fig. 3.

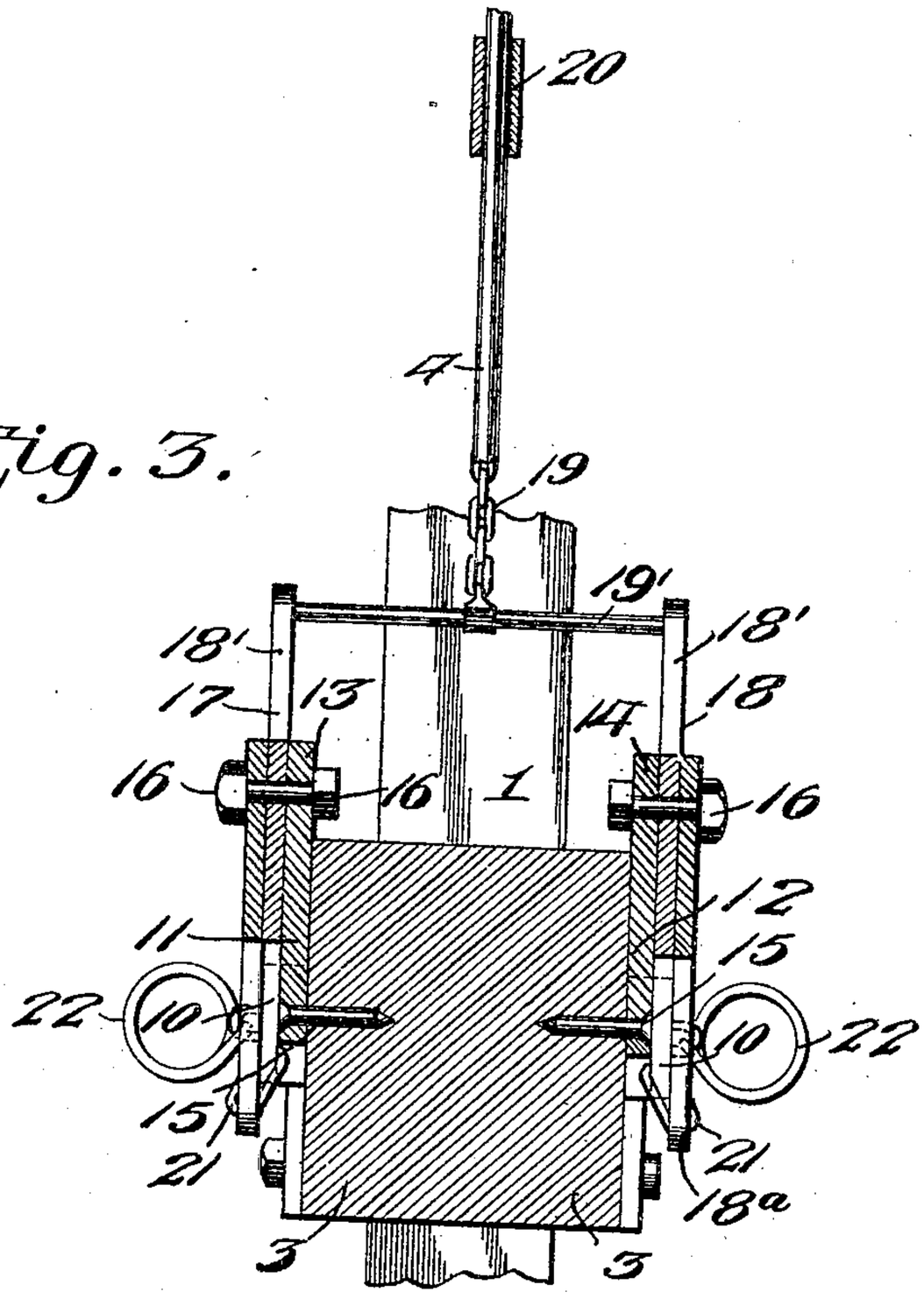
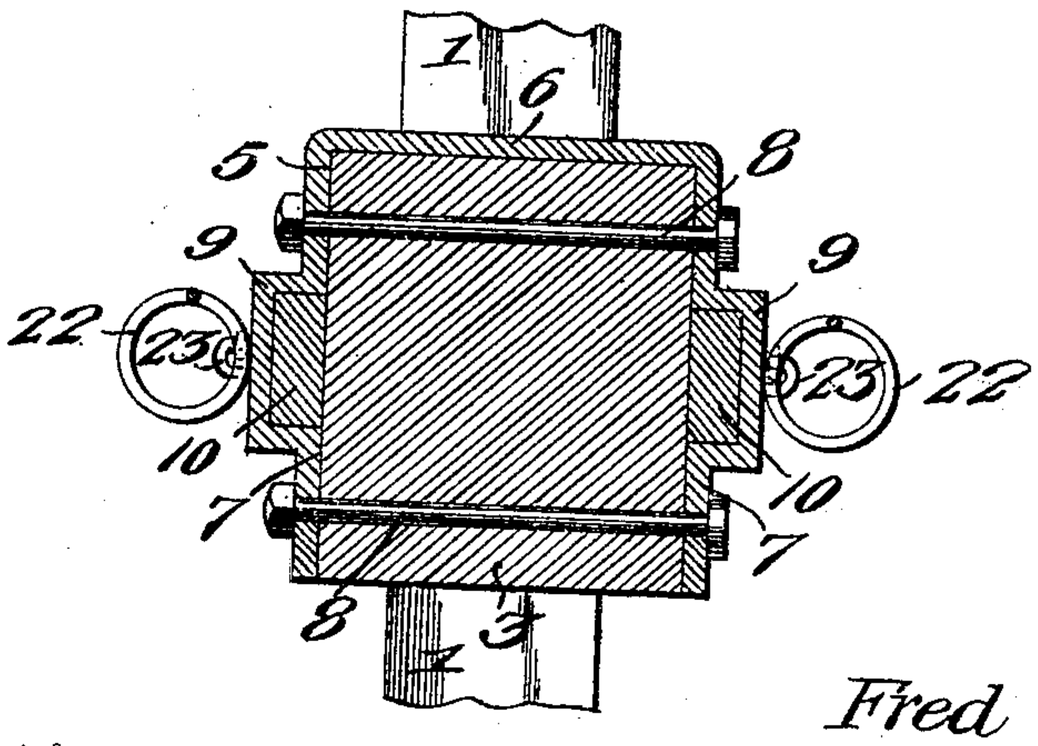


Fig. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK WILLIAMS, OF MINERSVILLE, PENNSYLVANIA.

SAFETY BRAKE OR LOCK FOR ELEVATORS.

No. 822,803. Specification of Letters Patent. Patented June 5, 1906.

Application filed December 5, 1905. Serial No. 290,456.

To all whom it may concern:

Be it known that I, FREDERICK WILLIAMS, a citizen of the United States, residing at Minersville, in the county of Schuylkill and State of Pennsylvania, have invented new and useful Improvements in Safety Brakes or Locks for Elevators, of which the following is a specification.

This invention relates to automatic safety brakes or locks for elevators, and particularly to safety-brakes for mine-cages and similar hoisting conveyances, wherein the guides for the cage are supported by timbers ordinarily known as "timber sets," which are generally arranged at short intervals apart, usually about three feet, throughout the length or depth of the cage-shaft.

The primary object of my invention is to provide a safety-brake apparatus having catches which will be automatically projected beyond the guides and into the path of the timbers when the hoisting cable or rope breaks, so as to engage the adjacent underlying set of timbers when the cage drops, thus limiting the fall of the cage to a minimum degree and utilizing the frame-timbers instead of the guides as stops, which, as these timbers are of materially greater strength than the guides, insures a distinct advantage, as there is less liability of breakage of the parts engaged by the catches and relied upon to support the shock of descent and weight of the cage, and, further, such mode of operation dispenses with the use of racks and other complicated parts to secure a locking action.

Another object of my invention is to provide a safety-brake mechanism which is simple of construction, adapted to be produced at a low cost, and capable of application to mine-cages and similar hoisting conveyances of the types in general use.

In the accompanying drawings, Figure 1 is a view in elevation of the head-beam of a mine-cage and the brake mechanism applied thereto and a transverse vertical section through the shaft-timbers. Fig. 2 is a top plan view of the head-beam and brake mechanism applied thereto. Figs. 3 and 4 are vertical sections taken, respectively, on the lines 3 3 and 4 4 of Fig. 1.

Referring now more particularly to the drawings, the numeral 1 designates the cage-guides disposed upon opposite sides of the cage-shaft in the usual manner and suitably fixed to and supported by beams or timbers 2, forming a portion of the frame of the cage-shaft, and 3 designates a head-beam of the ordinary or any preferred form and attached to the top portion of the cage or car (not shown) in any preferred way. In practice the timbers 2 are disposed in superposed relation at a distance of about three feet apart throughout the depth of the shaft, and it is one of the objects of my invention to utilize these as stops which are engaged by the catches of the brake mechanism to lock the car from downward movement in the shaft when the hoisting rope or cable 4, which is attached in practice to the head-beam 3, breaks or is otherwise rendered inoperative.

Mounted upon each end of the head-beam 3 is an inverted-U-shaped bracket 5, the cross-piece 6 of which forms a head portion which projects over the top of the beam, and the sides 7 of which extend downward on opposite sides of the beam and are apertured for the passage of bolts 8, which project through the beam and securely attach the bracket thereto. The side plates or portions 7 are intermediately enlarged or outwardly offset to form guides 9 for the reception of sliding catches 10, which may consist of oblong rectangular bars of metal or other material possessing the requisite strength. The head portions 6 of the brackets 5 are preferably notched at their outer edges to receive the guides 1 and permit the guides 9 of the brackets to extend at their outer ends on opposite sides of said guides 1. The outer ends of the catches when in normal position lie within the plane of or project slightly beyond the outer ends of the brackets, so as to be disposed on opposite sides of the guides, but out of contact with the frame-timbers 2, so that the cage may normally travel up and down in the shaft without engagement between the catches and the frame-timbers.

Mounted upon the central portion of the head-beam are bracket-plates 11 and 12, having upwardly-extending portions 13 and 14, which plates are arranged to bear against the sides of the beam and are secured thereto by suitable fastening devices 15. Carried by the upwardly-extending portions of the bracket-plates are bolts 16, forming pivotal attachments for opposite sets or pairs of catch controlling or restraining levers 17 and 18. The levers 17 and 18 are of bell-crank form and are pivotally mounted at the angle of intersection of the arms thereof upon the ends of said pivot-bolts. The long arms

18′ of the levers of each pair project outwardly and upwardly in divergent relation above the head-beam and are connected at their outer ends to the long arms of the levers of the other pair by tie rods or bolts 19′, attached by chains or other suitable connections 19 with a coupling 20, engaging the hoisting cable or rope 4, while the short arms 18ª of the levers depend upon opposite sides of the beams 3 and are divergently arranged and connected at their lower end by links 21 to the inner ends of the catches 10, the links being so arranged as to permit the arms 18ª to swing in the arc of a circle, while said links assume different angular positions to adapt the catches to slide in a plane transversely of the direction of movement of said arms in a free and easy manner to prevent any possible interference with their ready projection and retraction.

Arranged upon the sides of the brackets 5 are coiled springs 22, which are suitably connected at their outer ends to said brackets, as indicated at 23, and at their inner ends to the catches, as indicated at 24. The chains 19 are normally held stretched or extended by the coupling 20 to hold the long arms 18′ of the levers from downward movement and the short arms 18ª thereof from outward movement under the action of the springs, which are held expanded by the levers and are adapted when the hoisting-rope 4 breaks and releases the levers to contract, and thereby project the catches beyond the guides into the path of the timbers 2. It will thus be understood that immediately upon the breakage of the hoisting-rope the catches will be released and projected to operative position by the springs 22 into the path of the underlying adjacent set of beams 2 and will come in contact with said beams upon the droppage of the car, and thereby lock the car from downward movement in the cage-shaft. As the beams are arranged in close superposed relation, it will be apparent that the car will be permitted to drop but a slight extent before the catches come into engagement with a set of beams and that if one set of beams engaged by the catches should break the speed of descent of the car will be sufficiently arrested to enable it to be held securely from further downward movement by the next adjacent underlying set of beams. The advantage of this construction and operation of the parts and utilization of the beams 2 as the stationary brake or stop members is that as the beams are disposed in close proximity and form portions of the strongest part of the shaft structure the car will be permitted to have but a slight movement before its descent is arrested and will be held by supporting portions of maximum strength. Hence a car will be caught and held before it gathers sufficient speed to throw objectionable strain upon the brake mechanism and to cause an excessive shock or jar when the parts of the brake mechanism come into interlocking engagement.

Having thus described the invention, what I claim is—

1. In a safety-brake mechanism for elevator-cars or mine-cages, the combination with a shaft structure provided with stationary brake members, of a car having sliding catches to engage said brake members, sets of bell-crank levers having long and short arms divergently arranged and pivoted at their angle of intersection upon the car, links connecting the short arms of the levers with the sliding catches, connections between the long arms of the levers and the hoisting-rope to hold the levers from movement, and normally expanded springs held expanded by the levers and adapted when the levers are released upon the breakage of the hoisting-rope to contract and project the catches.

2. In a safety-brake mechanism for elevator-cars or mine-cages, the combination with a shaft structure provided with stationary brake members, of a head-beam forming part of the car structure, brackets upon the ends of the head-beam and provided with guides, sliding catches operating in said guides and adapted when projected to engage the adjacent stationary members, a central bracket upon the beam, sets of bell-crank levers pivoted to said central bracket, said levers having divergently-arranged upper long and lower short arms, the latter being pivotally connected with the catches, restraining connections between the long arms of the levers and the hoisting-rope, and contractile springs connected with the end brackets and catches to project said catches when the levers are freed for movement by the breakage of the hoisting-rope.

3. In a safety-brake mechanism for elevator-cars or mine-cages, the combination with a shaft structure provided with stationary brake members, of a head-beam forming part of the car structure, sliding catches mounted upon said beam to engage said stationary brake members, contractile springs associated with said catches to project the same, bell-crank levers connected with the catches to normally hold the same retracted and the springs expanded, and connections between said levers and the hoisting-rope for normally holding the levers in restraining position.

4. In a safety-brake mechanism for elevator-cars or mine-cages, the combination with a shaft structure provided with stationary brake members, of a head-beam forming part of the car structure, brackets upon the ends of the head-beam and provided with guides, sliding catches operating in said guides and adapted when projected to engage the adjacent stationary members, sets of bell-crank levers pivotally mounted upon the beam be-

tween the brackets, said levers having divergently-arranged upper long and lower short arms, the latter being pivotally connected with the catches, restraining connections between the long arms of the levers and the hoisting-rope, and contractile springs connected with the end brackets and catches to project said catches when the levers are free for movement by the breakage of the hoisting-rope.

In testimony whereof I affix my signature in presence of two witnesses.

FRED. WILLIAMS.

Witnesses:

SALATHIEL HARRIS,

RICHARD WILLIAMS.