J. F. TIGHE.

ELEVATOR SAFETY CLUTCH.

APPLICATION FILED MAR. 14, 1912.

1,041,904.

Patented Oct. 22, 1912.

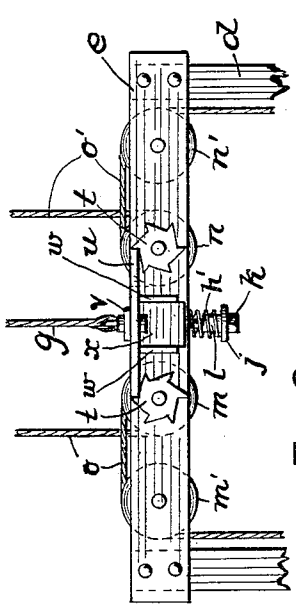

FIG. 2.

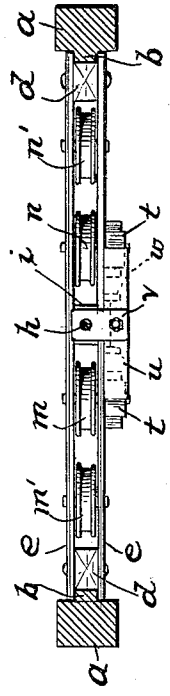

FIG. 3.

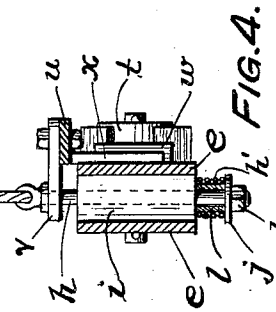

FIG. 4.

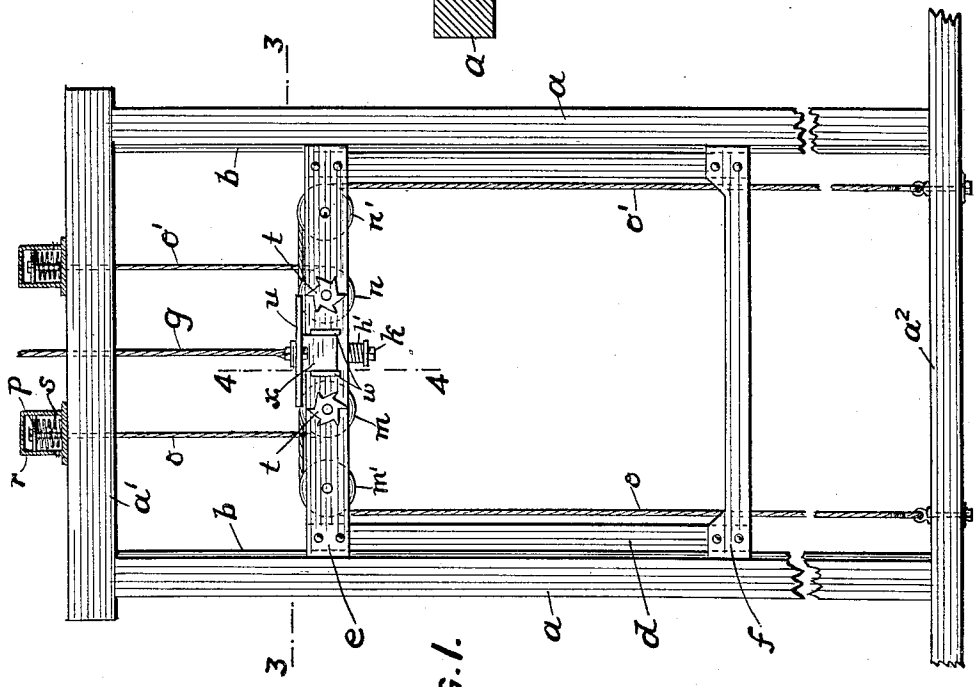

FIG. 1.

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ELEVATOR SAFETY-CLUTCH.

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To all whom it may concern:

Be it known that I, JAMES F. TIGHE, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Elevator Safety-Clutches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The object of my invention is to provide means for automatically stopping an elevator in case the main lifting cable breaks.

The invention consists of brake mechanism located in the elevator car, coacting with safety cables, permanently located in the elevator shaft. These safety cables are attached to the bottom of the shaft, and pass upward through the brake mechanism of the car to supports at the top of the shaft. During normal running of the elevator, the safety cables pass freely through said brake mechanism, but if the main cable supporting the car should break, the brake mechanism becomes automatically locked to the safety cables, preventing the car from falling.

The invention will be thoroughly understood from the following description, and by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the elevator shaft, the car, and the braking mechanism; Fig. 2 is a detail enlarged side elevation of the braking mechanism; Fig. 3 is a sectional plan view on the line 3—3 of Fig. 1, and Fig. 4 is an enlarged sectional view on the line 4—4 of Fig. 1.

a, *a* represent the uprights of the frame of the elevator shaft. *b*, *b* are vertically extending guides thereon.

d is the car frame.

e and *f* each represent a pair of cross-beams on the car frame, adapted for engagement with the guides *b*, *b*, one pair being located at the top of the car and the other at the bottom.

g is the lifting cable, one end of which is secured to a pin or bolt *h*. The pin *h* extends down through a block *i* secured between the cross-beams *e*, *e*. Surrounding the pin near its lower end is a spring *h'*, which is confined between the block *i* and a washer *j*, the latter being sleeved on the pin and held in place by a nut *k*.

l is a collar loose on the pin *h* within the spring *i* and between the block *i* and the washer *j*.

Two pairs of pulleys *m*, *m'* and *n*, *n'*, are secured to shafts extending between, and rotatably mounted in, the cross beams *e*, *e*. A supplemental cable *o*, secured at its lower end to the bottom cross-beam a^2 of the elevator shaft, extends up into engagement with and over pulley *m'*, thence extends across to and around pulley *m*, and thence extends to the cross-beam *a'* at the top of the elevator shaft. Secured to the upper end of the cable *o* is a plate *p* sliding within an inverted cup or box *r*. A spring *s* is confined between the plate *p* and the bottom of box *r*. Another supplemental cable *o'* extends from the bottom of the elevator shaft up and around pulleys *n'* and *n* and thence to the top of the shaft, the arrangement being similar to that of cable *o*.

The shafts of pulleys *m* and *n* project beyond one of the cross-beams *e* and have secured thereto toothed-wheels *t*, *t*.

A plate *u* is secured to the pin *h* by a cross pin *v*, at a distance above the cross-beams *e*, *e*, sufficient in its normal position to clear the teeth of the wheels *t*. This plate extends along one side of the cross-beams, normally above, and out of engagement with, the teeth of wheels *t*, *t*, but adapted when moved down, to have its two ends engage the teeth of said wheels. The plate *u* is guided, in its up-and-down movement, by means of guides *w* on one of the cross-beams *e* of the car, and a slide *x* depending from the plate; the space between the guides *w* forming a way for the slide *x*.

In the normal operation of the elevator, the weight of the car compresses the spring *h'* and thereby causes the lifting cable *g* to move up relatively to the car, the collar *l* limiting the relative upward movement of the cable. During the travel of the car up and down in the elevator shaft, the supplemental cables *o* and *o'* constantly feed on and off the pulleys *m*, *m'* and *n*, *n'*, causing said pulleys, and with them the toothed wheels *t*, *t*, to rotate. If the lifting cable should break or become disconnected from its driving mechanism, the spring *h'* will immediately move down the pin *h* and plate *u*, bringing the ends of the plate *u* into engagement with the toothed wheels *t*, *t*. This immediately stops the rotation of the toothed wheels and the corresponding pul-

leys m and n in one direction, namely the direction in which they rotate when the car moves downward. The car cannot now descend due to the fact that the frictional engagement between the supplemental cables o and o' and the pulleys m, m' and n, n' is so strong that the supplemental cables cannot slide on the pulleys. The yielding supports for the upper ends of the supplemental cables permit the latter to give to the extent necessary to avoid undue strain upon the same.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In an elevator, the combination with the elevator shaft and the car-body movable therein, of a lifting cable, two pairs of pulleys carried by the car, one pulley of each pair located near the center of the car and the other pulley located near the side thereof, supplemental cables, each cable extending from the bottom of the shaft upwardly near the walls thereof thence over the outer pulley of a pair, thence over and around the inner pulley and thence up to the top of the shaft, toothed wheels on the shafts of the inner pulleys, and a spring-actuated plate connected with, and normally held inactive by, the lifting cable and adapted, when moved into operative position by reason of the breaking of the lifting cable, to engage both wheels and lock them from rotation.

2. In an elevator, the combination with the elevator shaft and the car-body movable therein, of a lifting cable, supplemental cables extending vertically through the shaft, idler pulleys carried by the car and around which the supplemental cables extend, toothed wheels on the pulley shafts, a block on the car frame, a pin extending through the block, a plate carried by the pin, a guide on the cross-frame, means rigidly connected with the plate and slidable on said guide, and a spring tending to move said plate into engagement with the toothed wheels.

3. In an elevator, the combination with the elevator shaft and the car-body movable therein, of a lifting cable, supplemental cables extending vertically through the shaft, idler pulleys carried by the car and around which the supplemental cables extend, toothed wheels on the pulley shafts, a block on the car frame, a pin extending through the block, a plate carried by the pin, a spring confined between said block and the pin and tending to move said plate downward into locking engagement with said toothed wheels, and a collar on the pin adapted to engage the block and limit the upward movement of the pin.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 9th day of March, 1912.

JAMES F. TIGHE.

Witnesses:
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M. M. HAMILTON.