

No. 852,072.

PATENTED APR. 30, 1907.

J. N. MICHELL.
SAFETY STOP FOR ELEVATORS.
APPLICATION FILED JUNE 12, 1906.

2 SHEETS—SHEET 1.

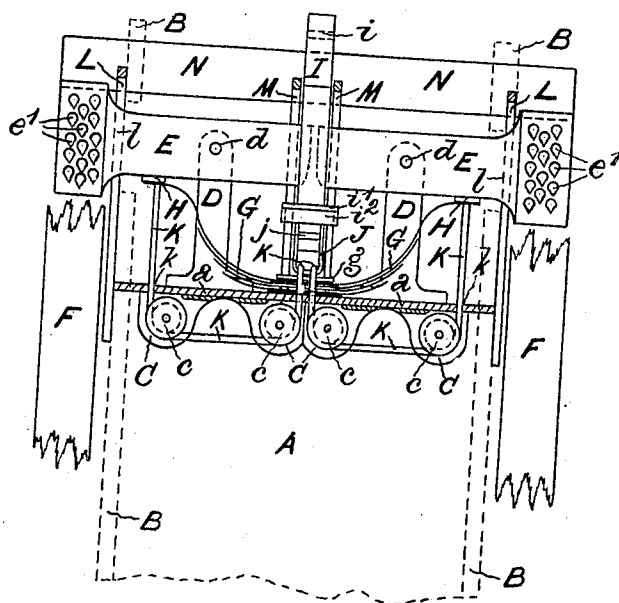


Fig. 1.

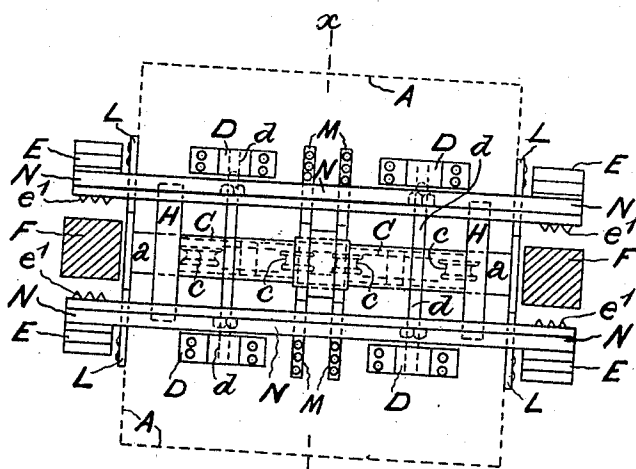


Fig. 2.

Witnesses:

R. Wendale
F. Wendale

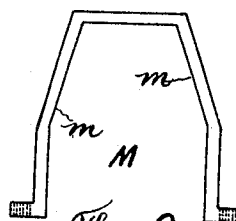
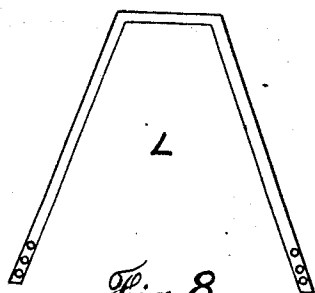
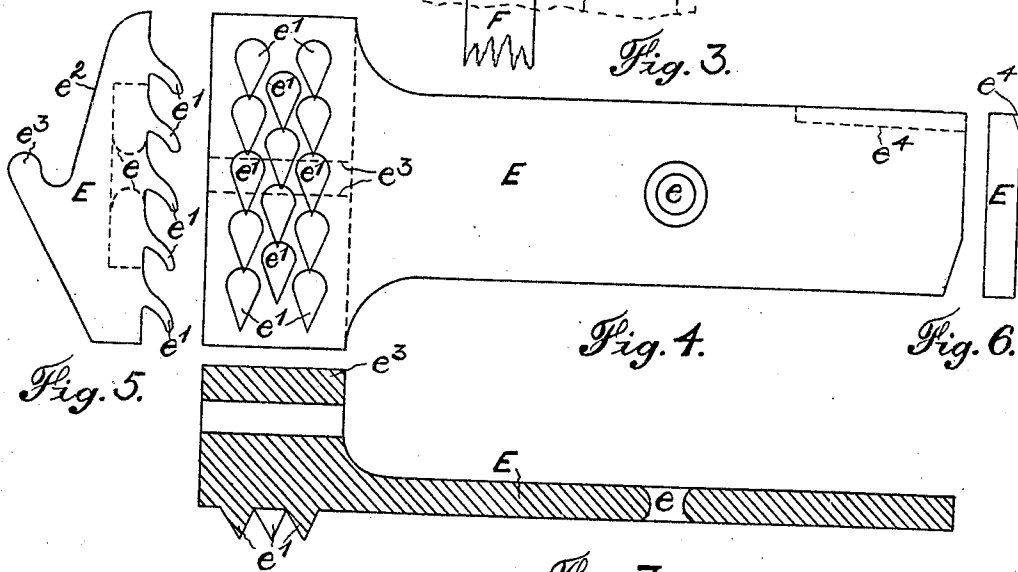
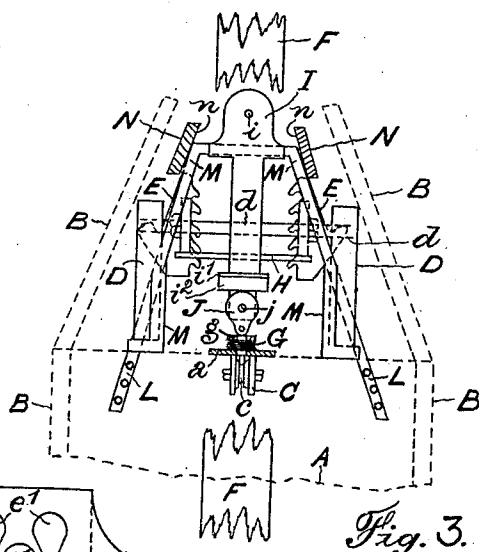
Inventor:
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2 SHEETS—SHEET 2.



Witnesses:
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Fig. 9. Inventor:
Joseph Nimis Michell
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UNITED STATES PATENT OFFICE.

JOSEPH NINNIS MICHELL, OF GERMISTON, TRANSVAAL.

SAFETY-STOP FOR ELEVATORS.

No. 852,072.

Specification of Letters Patent.

Patented April 30, 1907.

Application filed June 12, 1906. Serial No. 321,404.

To all whom it may concern:

Be it known that I, JOSEPH NINNIS MICHELL, a citizen of the United States of America, residing on the property of Knights Deep, Limited, Germiston, Transvaal, have invented certain new and useful Improvements in Safety-Stops for Elevators, of which the following is a specification.

This invention has reference to safety arrangements applicable for the skips, cages or like vehicles employed in the shafts of mines or for cars or other conveyances employed in hoists, lifts, elevators and other analogous hoisting apparatus in which the car is equipped with shoes or guides which traverse skips or runners in the well of the hoist etc.

The invention is designed with the object of providing a reliable safety arrangement which will come into operation to retard and arrest the movement of the skip, cage or car in the event of the hoisting or winding rope breaking or the load becoming unsuspended in the shaft or well.

The mechanism is withal of simple and inexpensive construction, and is equally adapted for vertical or inclined shafts.

To elucidate the further detailed description of my invention I append two sheets of drawings illustrating the application of my invention to a mine cage.

In the drawings:—Figure 1 is a sectional elevation of the arrangement showing the outline of the cage in dotted lines. Fig. 2 is a plan of Fig. 1. Fig. 3 is a sectional elevation of Fig. 2 on line $x-x$. Fig. 4 is a front elevation of one of the gripping levers. Fig. 5 is an end elevation of Fig. 4. Fig. 6 is an end elevation of Fig. 4 from the inner end. Fig. 7 is a sectional plan of Fig. 4. Fig. 8, is an elevation of one of the guides for the outer ends of the gripping levers, and Fig. 9 is an elevation of one of the guides for the inner ends of the gripping levers.

In Figs. 1, 2 and 3, A represents the cage, built up in the frame B. On the top of the cage A is placed a plate a which is shown extending the full width of the cage. To the underside of the plate a or to the top of the cage on the inside are fixed four brackets C which revolvably support the grooved pulleys c . On the top of the cage A are bolted, riveted or otherwise suitably fixed four brackets D which support the two horizontally

disposed parallel rods or spindles d . E are four gripping levers, arranged in two pairs, one pair for each of the skips or runners F. On the top of the plate a is arranged a laminated spring G. g is a small plate which serves for bolting the spring G to the plate a . The spring G at its ends has attached to it the two plates H which extend to either side, and at their outer ends project under the outer arms of the gripping levers E. Thus the two parts of gripping levers E are operated by the one spring G. I represents the shackle, to the eye or hole i in the upper end of which is connected the hauling rope, not shown. On the lower end of the shackle I is placed a washer i^1 and nut i^2 and to the shackle i below the nut i^2 is attached a D or eyepiece J fixed by means of the pin j . To the D or eyepiece J are attached the ends of two cords or chains K. These chains K pass through a hole formed at the center of the small plate g and through the laminae of the spring G and top plate a , and pass round the pulleys c , up through the holes k formed in the outer ends of the plate a and are attached by means of an eyepiece or other suitable device to the ends of the spring G.

In Figs. 4 to 7 I illustrate one of the gripping levers E. They are constructed at or about the center of their length with a hole e which as shown in Figs. 4, 5, and 7 is rounded at the edges. The gripping lever E moves about the hole e on the rod or spindle d , and by rounding the hole e as shown, it allows of the requisite movement of the toothed or gripping face of the lever, toward or away from the sides of the skips or runners F. The gripping end of the lever E is enlarged and the teeth e^1 which penetrate the sides of the runners F are formed on the inside. The outer end of the lever E at the back of the toothed portion is beveled off or inclined as indicated at e^2 and at the bottom of said bevel or incline e^2 has formed upon it a transverse horizontal projection e^3 . The other or inner end of the lever E is preferably beveled off as indicated at e^4 for a purpose to be hereinafter explained.

With the object of moving the toothed extremity of the four gripping levers E simultaneously into engagement with the skips or runners F, I provide for each pair of gripping levers E two guides L M. The two guides L (see Fig. 8) are fixed at opposite sides of the

cage, so that they engage the outer arms of the gripping levers E at the point *l*, see Fig. 1. The gripping lever E at the point *l*, may be beveled off at the back to correspond with the inclination of the guide L on the inside. The other guide M for each pair of levers E is arranged in proximity to the inner ends of the arms. Such a guide M is shown in Fig. 9. The bevel indicated at *e*⁴ in Figs. 4 and 6 corresponds to the inclination of that part *m* of the guide M which is engaged by it. The guides L M may be bolted riveted or otherwise suitably fixed to the sides and top of the cage A.

Fixed to the frame B of the cage A above the gripping levers E are two inclined stationary bars N. These bars N are so disposed that when the gripping levers E move toward the skids or runners F, the inclined backs *e*² of the enlarged ends of the levers E ride up the inclined inner edges *n* of the stationary bars N and are forced tightly into engagement with the sides of the skids or runners F. The projections *e*³ on the backs of the enlarged ends of the levers E by engaging the lower ends of the stationary bars N serve as stops to arrest the movement of the cage. Instead of arranging the guides L M to engage the outside of the gripping levers E they may if preferred be arranged to engage them on the inside. If desired helical or other suitable springs may be placed on the rods or spindles *d* between the gripping levers E so as to maintain them apart.

The operation of the arrangement is as follows:—In the event of the winding rope breaking, then the shackle I falls and the cords K becoming slack permit the spring G to raise the plates H into engagement with the outer arms of the gripping levers E. The spring G thereupon raises the outer arms of the levers E and the levers E engaging the inside of the guides L are moved toward each other until they come into contact with the sides of the skids or runners F. The further movement of the gripping levers E causes the inclines *e*² on the enlarged toothed ends of the gripping levers E to ride up the inside *n* of the stationary bars N and so force the toothed surfaces tightly against the sides of the runners F to arrest the movement of the cage. Should the outer arms of the gripping levers E move sufficiently far in an upward direction, it will be obvious that the lower ends of the stationary bars N will engage the projections *e*³ and so prevent further movement of the outer arms of said levers E. When the shackle I is raised either by the winding rope or otherwise, it draws the cords or chains K taut, pulls down the ends of the spring G and permits the gripping levers E to resume their normal and inoperative position. When said gripping levers E are disengaged by the spring G the outer and heavier arms move in a downward direction and the inner

arms engaging the inside of the guides M move the toothed extremities of the levers E out of contact with the sides of the runners F.

What I claim as my invention and desire to protect by Letters Patent is:—

1. In a safety arrangement such as described, the combination of two pairs of oppositely disposed toothed gripping levers adapted to engage the skids or runners of the shaft, a centrally disposed spring located beneath said levers, means carried by the extremities of said spring which serve for simultaneously operating said gripping levers in pairs, a shackle or drawbar and flexible connections between said shackle or drawbar and the extremities of the spring which serve for placing the spring in compression when the weight is on the winding rope and putting the gripping levers out of operation.

2. In a safety arrangement such as described, the combination of two pairs of oppositely disposed toothed gripping levers adapted to engage the skids or runners of the shaft, a centrally disposed spring located beneath said levers, means carried by the extremities of said springs which serve for simultaneously operating said gripping levers in pairs, a shackle or drawbar and flexible connections between said shackle or drawbar and the extremities of the spring which serve for placing the spring in compression when the weight is on the winding rope and putting the gripping levers out of operation, and means which move the toothed faces of the gripping levers toward or away from the skids or runners, substantially as described.

3. In a safety arrangement such as described, the combination with two pairs of oppositely disposed gripping levers adapted to engage the skids or runners of the shaft, said gripping levers being constructed at the back of their gripping faces with a beveled or inclined surface and a projection serving as a stop, and inclined bars which by engaging the inclined backs of said levers force the toothed surfaces into the faces of the skids or runners, substantially as described.

4. In a safety arrangement such as described, the combination of two pairs of gripping levers, one pair for the skids or runners at each side of the shaft, means for pivotally supporting said levers, a centrally disposed spring located beneath said levers and adapted to simultaneously operate both pairs of levers, guides which serve for moving the gripping faces of said levers into engagement with the skids or runners when said levers are moved in one direction, guides which serve for moving the gripping levers out of engagement with the skids or runners when said levers are moved in the opposite direction, a shackle or drawbolt forming the connection with the winding rope, flexible connections between said shackle and the ends of the spring which

place the latter in compression when the weight of the vehicle is on the winding rope and so allow the gripping levers to run clear of the skids or runners, and inclined bars carried by the vehicle which engage the gripping levers to force them into contact with the skids or runners when actuated by the spring and serve as stops for said levers, substantially as described.

5. In a safety arrangement such as described, in combination, two pairs of oppositely arranged gripping levers which are adapted to engage the skids or runners of the shaft, said gripping levers being formed with an enlargement at their toothed or gripping end and beveled or inclined at the back of the gripping face and formed with a projection or stop, stationary inclined bars carried by the vehicle which are adapted to engage the inclined or beveled backs of the gripping levers to cause the latter to engage the skids or runners and which serve as stops when engaged by the projections on the backs of said levers, guides which serve for moving the levers into contact with the skids or runners when said levers are moved in one direction, and guides which serve for moving said levers out of contact with the skids or runners when the levers are moved in the opposite direction, a centrally disposed spring adapted to simultaneously actuate both pairs of gripping levers, a shackle or drawbolt, flexible connections between said shackle and the ends of the spring, guide pulleys for said flexible connections, said flexible connections serving to place the spring in compression when the load of the vehicle is on the winding rope, substantially as described.

6. In a safety arrangement such as described, in combination, the vehicle A, the brackets D fixed on the vehicle, the spindles *d* supported in the brackets, the gripping levers E pivotally mounted on the spindles, said levers each being constructed with a hole rounded at the edges to permit it to move on the spindles toward or away from the skids or runners the ends of said gripping

levers being enlarged and formed with the teeth *e*¹ and at the back with the incline *e*² and projection *e*³, the guides L and M for the opposite ends of the levers E, the inclined plates N adapted to engage the inclined backs of the gripping levers and the stops *e*³, the spring G arranged on the top of the vehicle beneath the gripping levers, the plates H fixed to the ends of the spring so that the latter actuates both levers of each pair simultaneously, the shackle I, the pulleys C, and the ropes K connecting the shackle with the ends of the spring, substantially as described.

7. In a safety arrangement such as described, in combination, the vehicle A, the plate *a* secured on the top thereof and formed with holes at the center and at each end, the laminated spring G and plate *g* for bolting it to the plate *a* and top of the vehicle, the plates H fixed to the ends of the spring G, the shackle I, the ropes K connecting the lower end of the shackle with the plates H, the brackets C, the guide-pulleys *c* round which the ropes K pass, the brackets D fixed on top of the vehicle, the spindles *d* carried by the brackets D, the gripping levers E each beveled as at *e*¹ formed with a hole *e* rounded at the edges to permit it to move on the spindles *d* toward or away from the skids or runners and formed with an enlargement constructed with the teeth *e*¹ on one face and inclined or beveled at the back as at *e*² and constructed with the projection *e*³, the guides L and M fixed to the vehicle for moving the levers E toward and away from the skids or runners, the skids or runners F and the inclined plates N fixed to the frame of the vehicle A above the levers E, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses:—

JOSEPH NINNIS MICHELL.

Witnesses:—

CHAS. OVENDALE,
R. OVENDALE.