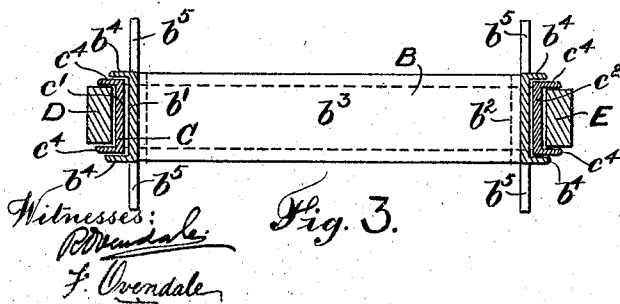
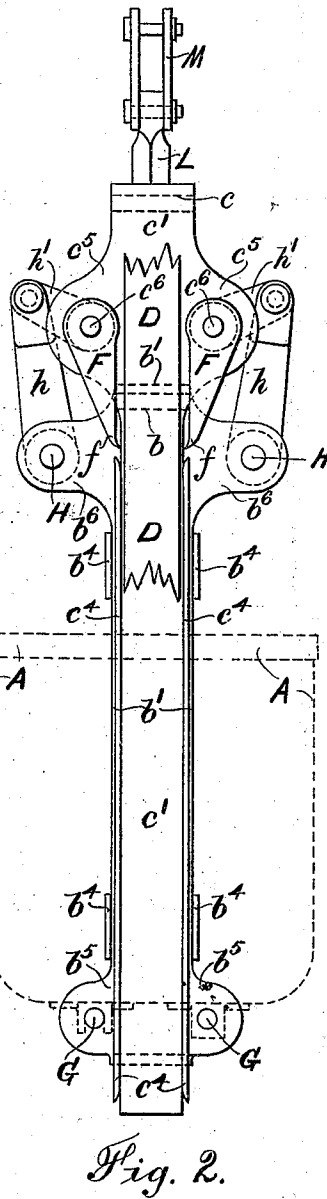
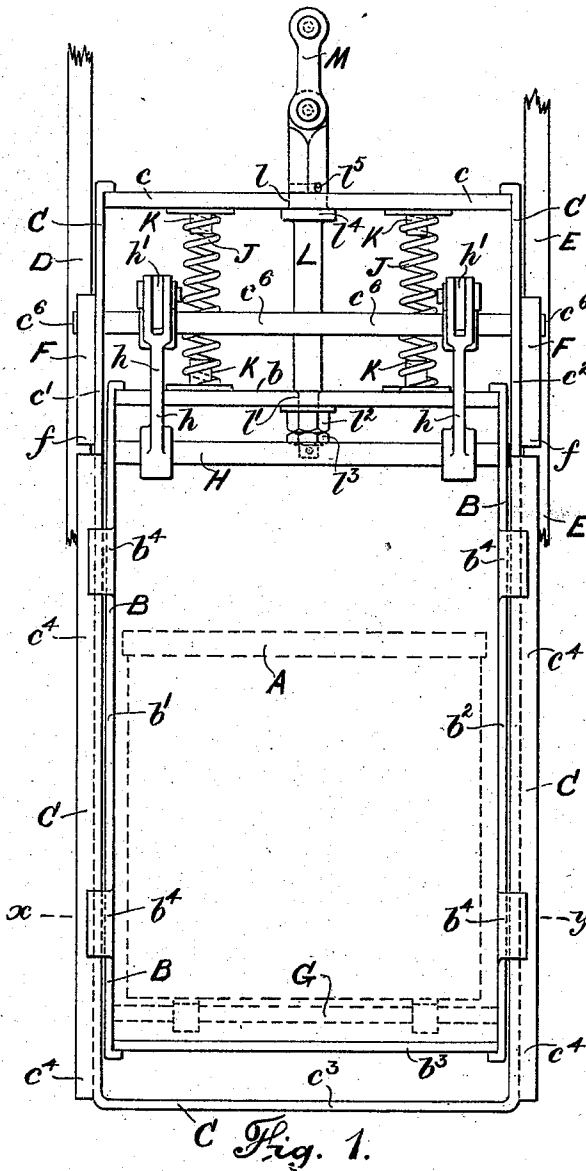


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PATENTED MAR. 13, 1906.

J. H. PICKAVANCE.
SAFETY MECHANISM FOR HOISTING APPARATUS.
APPLICATION FILED DEC. 21, 1904.



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SAFETY MECHANISM FOR HOISTING APPARATUS.

No. 814,870.

Specification of Letters Patent

Patented March 13, 1906.

Application filed December 21, 1904. Serial No. 237,820.

To all whom it may concern:

Be it known that I, JOHN HENRY PICKAVANCE, a subject of the King of England, residing at Johannesburg, Transvaal, have invented certain new and useful Improvements in Safety Mechanism for Hoisting Apparatus, of which the following is a specification.

This invention relates to safety appliances or mechanism applicable for the skips or cages employed in the shafts of mines for hoists, lifts, elevators, or similar apparatus in which a skip, cage, bucket, or the like is hoisted or hauled by means of a rope and said skip, cage, or bucket traverses guides, rails, runners, or their equivalent in the shaft of the mine or well of the hoist or elevator.

Now the object of the present invention is to utilize the energy of the unsupported and falling load to operate the catch or safety-gear to bring the skip, cage, or bucket to rest should it become detached from the hauling-rope or be unsupported thereby from any other cause or to insure that the energy of the falling load will be utilized to work with the safety-gear and not against it.

In order that the invention may be more readily understood, I append an explanatory sheet of drawings.

Figure 1 shows the invention in side elevation. Fig. 2 illustrates it in end elevation, or is a view taken at right angles to Fig. 1; and Fig. 3 is a sectional plan on line $x-y$ of Fig. 1.

The skip, cage, bucket, or its equivalent is represented at A. It is, as shown, carried by or supported in an inner frame B, which latter is arranged within an outer frame C, the latter being constructed to traverse the guides or runners D E at opposite sides of the shaft of the mine, the well of the lift, or the like.

The outer rectangular frame C comprises the top horizontal member c , the two vertical side members c' c^2 , and the bottom horizontal member c^3 . The two vertical members c' c^2 of the frame C are constructed with flanges or projections c^4 , which project to either side of the guide-rails or runners D E, and so operate to guide the skip, cage, or bucket A as it traverses up and down the shaft or well. The vertical members c' c^2 of the outer frame C are formed at or in proximity to their upper ends with lugs or enlargements c^5 at either side of the frame C. In bearings formed in the lugs c^5 are journaled two horizontally-arranged rods or spindles c^6 , constructed so that their extremities project to either side of the

guides or runners D E, as is clearly illustrated in Fig. 2 of the drawings.

On each end of each of the two horizontally-disposed rods or spindles c^6 are keyed or otherwise securely fixed the catches F, one at either side of each of the guides or runners D E. The catches F at their lower extremities f are constructed so that they will penetrate the sides of the guides or runners to arrest the movement of the skip, cage, or bucket should the latter become unsupported in the shaft or well. In the normal working of the hoisting apparatus—that is to say, when the skip, cage, bucket, or the like is suspended in the shaft and supported by the hauling-rope—the catches F run clear of the guides or runners D E. The manner in which they are operated will be hereinafter fully explained.

The inner frame B comprises the top horizontal member b , the two vertical and oppositely-arranged side members b' b^2 , and the bottom horizontal member b^3 . The two side members b' b^2 of the inner frame B are constructed with flanges or projections b^4 in proximity to the upper and lower ends of said members which project to the outside of the flanges c^4 , formed on the vertical members c' c^2 of the outer frame C. By this means the inner frame B is prevented moving except vertically inside the outer frame C.

The vertical members b' b^2 of the inner frame B at their lower ends are formed with lugs or projections b^5 , in which holes are formed to receive the rods G, which form rests for the bottom of the skip, cage, or bucket A. The means for supporting the skip, cage, or bucket A in the frame form no feature of the present invention, and they may be of any desired form or construction.

The vertical members b' b^2 of the inner frame B at or in proximity to their upper ends are constructed at each side of the runners D E with lugs or enlargements b^6 , in which are provided bearings for two horizontally-arranged rods or spindles H.

On each of the two horizontally-arranged rods or spindles H are loosely mounted two links h , one at either end, and on each of the two horizontally-disposed rods or spindles c^6 , carried by the outer frame C, are keyed or otherwise securely fixed two rock-arms h' , one in proximity to each end. The outer ends of the rock-arms h' are pivotally attached to the upper ends of the links h .

Between the top horizontal member c of

the outer frame C and the top horizontal member *b* of the inner frame B are located two suitable helical springs J. K represents cylindrical projections formed on or fixed to the two horizontal members *b c*, which project for a suitable distance between the coils of the springs J and serve to maintain the latter in correct position between said horizontal members *c b*.

The draw-bar L is free to move up and down through a hole *l*, formed in the top horizontal member *c* at the center. The lower extremity of the draw-bar L projects through a hole *l'* in the top horizontal member *b* of the inner frame B, in which it is secured by means of the nut *l²* and check-nut *l³*, screwed on the end of the draw-bar L beneath said horizontal member *b*. On the draw-bar L is formed a collar or enlargement *l⁴*, which engages the under side of the top horizontal member *c*, which collar *l⁴* operates to prevent the inner frame B being raised inside the outer frame C beyond a certain point in the normal working of the skip, cage, or bucket in the shaft or well. In the draw-bar L above the top horizontal member *c* is formed a hole *l⁵*, which provides means for putting the safety-gear out of operation by placing in said hole *l⁵* a pin or key, which by engaging the top of the horizontal member *c* prevents the draw-bar L falling inside the outer frame C. M is a shackle or means for attaching the hauling-rope to the upper extremity of the draw-bar L. This may be of any preferred construction.

The action of the mechanism will now be readily understood and may be shortly described as follows: In the event of hauling-rope breaking or of the skip, cage, or bucket A or the like becoming unsupported by the rope from any other cause the draw-bar L by virtue of its weight, assisted by the spiral springs J and the weight of the unsupported skip, cage, or bucket A, will fall down inside the outer frame C, and the inner frame B being thus permitted to fall inside the outer frame C will draw down with it the links *h*. The downward movement of the links *h* will rotate the rock-arms *h'*, and with them the rods or spindles *c⁶*. The rotation of the rods or spindles *c⁶* will bring the lower extremities *f* of the catches F into engagement with the sides of the guides or runners D E, whereupon the catches F will penetrate said guides or runners, and so bring the skip, cage, bucket, or equivalent to rest in the shaft or well.

In the accompanying drawings my invention is shown, by way of example, applied to wooden guides or runners and adapted to operate catches to penetrate said wooden guides to arrest the movement of the skip, cage, or bucket. It will be evident that the invention is equally applicable to safety-gear, in which the catches are arranged to be brought

into engagement with teeth, projections, notches, or recesses formed in the guides or runners.

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

1. Safety mechanism for hoisting apparatus comprising in combination, an outer frame adapted to traverse the guides of the shaft, spindles journaled in said frame on each side of the guides, catches fixed on said spindles, an inner frame adapted to slide in the outer frame, rods supported in said inner frame, connections between the spindles in the outer frame and the rods in the inner frame which operate the catches when the inner frame falls inside the outer frame, and means for effecting said falling movement of the inner frame when said inner frame becomes unsupported, substantially as described.

2. Safety mechanism for hoisting apparatus, comprising in combination, an outer frame adapted to traverse the guides of the shaft, spindles journaled in said frame at each side of the guides, catches fixed on said spindles at each side of the guides, rock-arms fixed on said spindles, an inner frame adapted to slide on the outer frame, rods supported in said inner frame, links loosely mounted on said rods and loosely pivoted at their other ends to the rock-arms fixed on the spindles carried by the outer frame, and springs interposed between the frames which operate to cause relative movement of the frames in the event of said inner frame becoming unsupported to operate the catches, substantially as described.

3. Safety mechanism for hoisting apparatus comprising in combination, an outer frame having flanges adapted to traverse the guides of the shaft, two horizontally-arranged spindles journaled in bearings in the upper end of the frame, one at each side of said guides, catches fixed on the extremities of said spindles at each side of the guides, rock-arms fixed on said spindles at each end, an inner frame constructed with flanges adapted to traverse the sides of the outer frame, two horizontally-arranged rods supported in the upper end of said inner frame, links loosely mounted on each end of each of said horizontal rods, said links being attached at their other ends to the rock-arms fixed on the horizontal spindles carried by the outer frame, springs arranged between the top horizontal members of the two frames which serve to cause the inner frame to fall inside the outer frame when said frame becomes unsupported, and means for attaching the hauling-rope to said inner and outer frames, substantially as described.

4. Safety mechanism for hoisting apparatus comprising in combination, the guides in the shaft, the inner frame having lugs at its upper end forming bearings at each side of

said guides, two horizontally-arranged spindles journaled in said bearings, a pair of rock-arms fixed on each spindle, one at each end, a pair of catches fixed on each of said spindles, one at each extremity outside the outer frame and adapted to engage the guides, said outer frame having flanges and adapted to traverse the guides and formed with a hole in the top horizontal member through which the draw-bar works, the draw-bar, an inner frame having flanges adapted to traverse the vertical members of the outer frame, constructed at its lower end to support the bucket or the like and having lugs which form bearings at each side of the guides, two horizontally-disposed rods supported in said bearings, a pair of links loosely mounted on each rod, one at each end, said links being pivotally attached at their upper ends to the outer ends of the rock-arms, the top horizontal member of said inner frame having a

hole through which the lower end of the draw-bar projects and in which it is secured, the draw-bar having a collar which by engaging the top horizontal member of the outer frame prevents the inner frame rising in the outer frame beyond a certain point, and a pair of spiral springs located between the top horizontal members of the two frames, and the two cylindrical projections on said top horizontal members to maintain said springs in position between the frames, substantially as and for the purposes described and shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN HENRY PICKAVANCE.

Witnesses:

CHAS. OVENDALE,
R. OVENDALE.