

V. H. MALSTON.
SAFETY CATCH FOR MINE SKIPS AND CAGES, HOISTS, AND THE LIKE.
APPLICATION FILED AUG. 8, 1908.

917,332.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

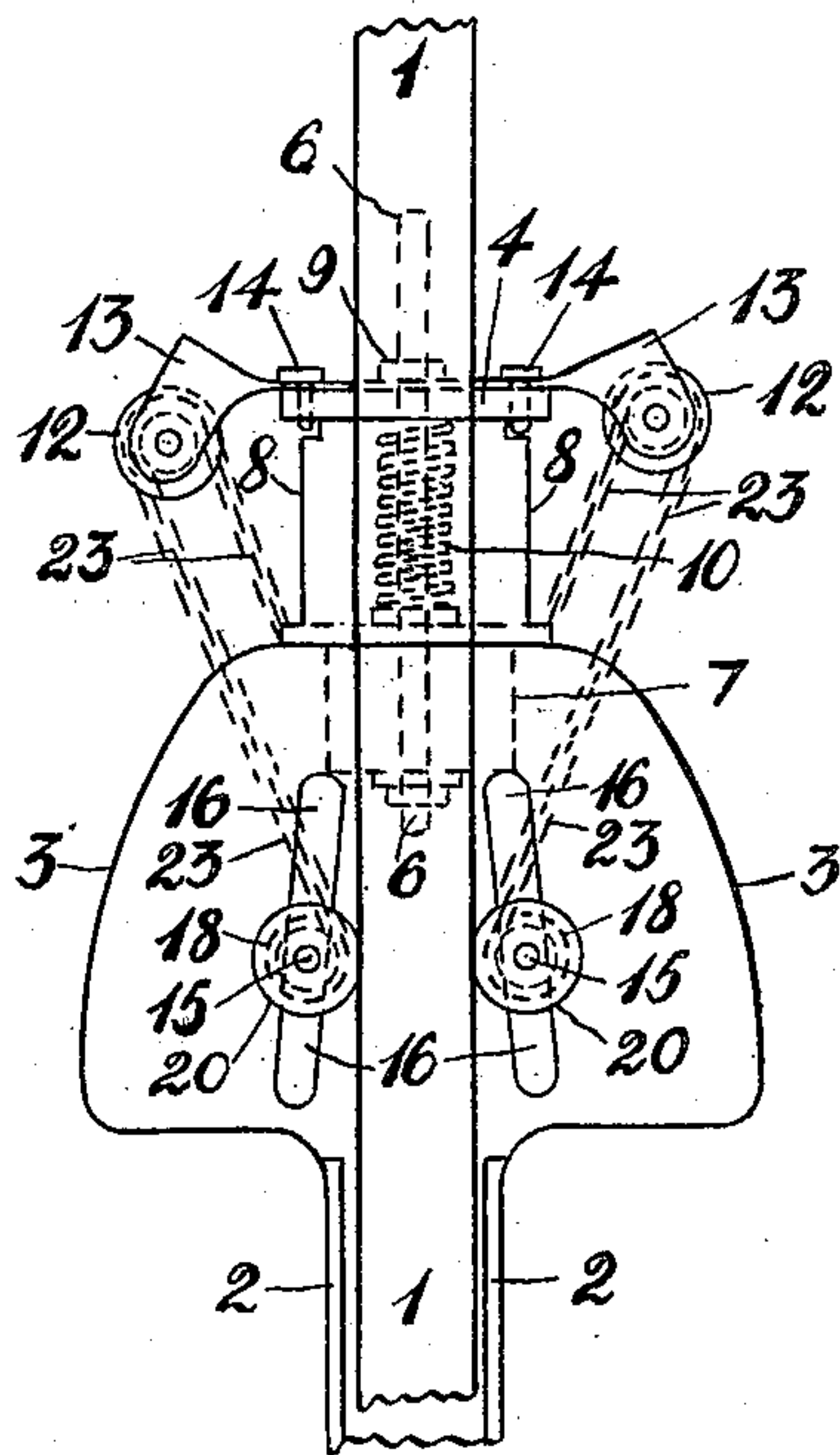


Fig. 2.

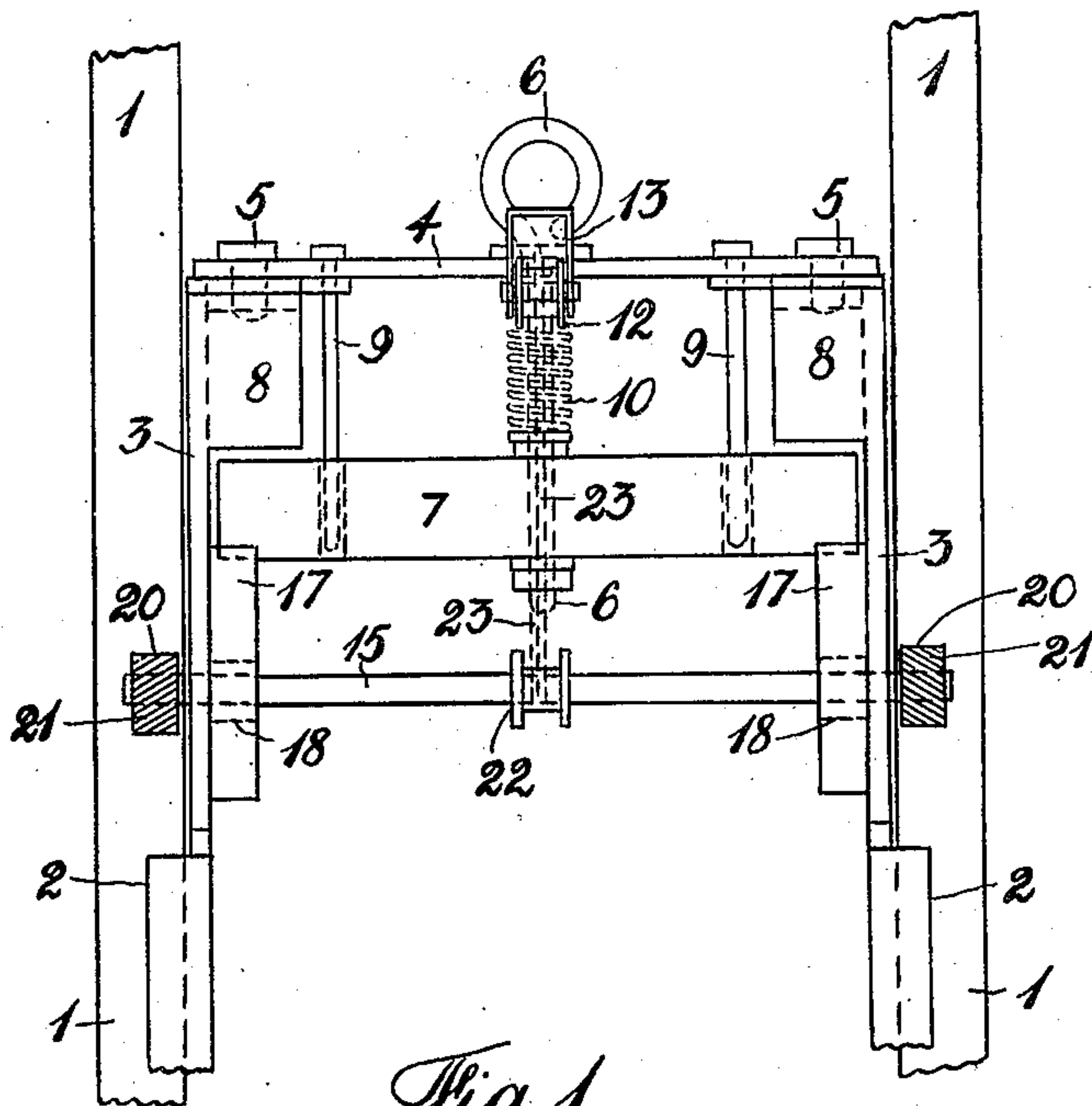


Fig. 1.

Witnesses:-
Chas. Overdale.
R. Reeddale.

Inventor:-
Victor Hugo Malston

V. H. MALSTON.
SAFETY CATCH FOR MINE SKIPS AND CAGES, HOISTS, AND THE LIKE.
APPLICATION FILED AUG. 8, 1908.

917,332.

Patented Apr. 6, 1909.
2 SHEETS—SHEET 2.

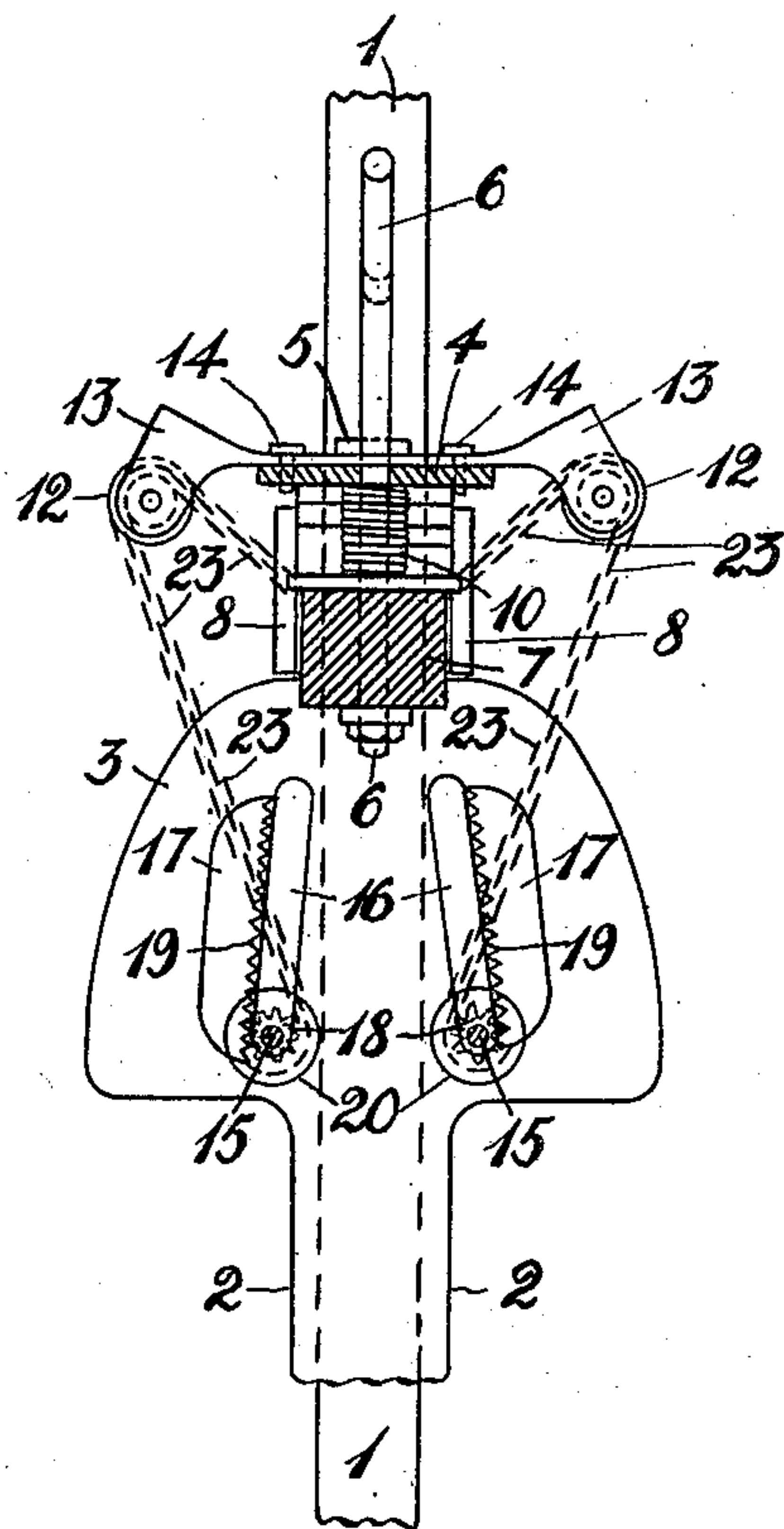


Fig. 3.

Witnesses:-
Chas. Ovendale,
Ovendale

Inventor:-
Victor Hugo Malston

UNITED STATES PATENT OFFICE.

VICTOR HUGO MALSTON, OF JOHANNESBURG, TRANSVAAL.

SAFETY-CATCH FOR MINE SKIPS AND CAGES, HOISTS, AND THE LIKE.

No. 917,332.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed August 8, 1908. Serial No. 447,573.

To all whom it may concern:

Be it known that I, VICTOR HUGO MALSTON, a subject of the King of Great Britain, and resident of Johannesburg, Transvaal, have invented certain new and useful Improvements in Safety-Catches for Mine Skips and Cages, Hoists, and the Like, of which the following is a specification.

This invention has reference to a safety catch designed more particularly for the skips and cages employed in mine shafts, although it may be readily adapted for use with the cars or vehicles employed in that type of hoist, elevator or lift, in which the car or vehicle is guided by runners or skids.

The object of the invention is to provide a reliable safety catch which will come into operation in the event of the skip, cage or conveyance becoming unsupported through breakage of the hoisting rope or fracture of other parts of the supporting means while the vehicle is traversing the shaft.

The invention will now be fully described by aid of the accompanying drawings in which I illustrate it adapted for use with a mine cage. Sufficient of the frame of the cage is shown to illustrate the application of the invention.

Figure 1 is a front elevation of a portion of the shaft runners or skids, a portion of the cage guides or shoes and the safety catch in operative position. Fig. 2 is a side elevation of Fig. 1, and Fig. 3 is a sectional side elevation showing the catch in its inoperative position.

1 represents the runners or skids provided in the shaft of the mine or well of the hoist, lift, elevator or the like, which are slidably engaged by the guides or shoes 2 to guide the vehicle in its ascent and descent.

3 represents the side plates of the cage or vehicle, or extensions of the same above the top of the cage or of the frame to which the side plates are secured. The upper ends of the plates 3 are connected to a transverse and horizontal plate or bar 4 by means of the bolts, rivets or their equivalent 5.

6 represents the kingbolt or its equivalent which serves for making in the ordinary or in any other suitable manner, the connection between the hoisting or winding rope and cage. The kingbolt 6 is attached at or in proximity to its lower end to a transverse

horizontal and guided draw-bar or member 7. The guides for the draw-bar or member 7 may as shown be formed by the inturned and parallel parts 8 of the side plates 3, or be arranged to work in guides fixed to the top or in the upper portion of the vehicle in any other suitable manner.

9 represents two vertical rods depending from the transverse member 4, which rods pass through holes in the draw-bar or member 7 and serve as additional guides for the latter. Surrounding the kingbolt 6 between the draw-bar or member 7 and the upper transverse member 4, is a coiled spring 10 which serves when the tension in the hoisting or winding rope is relaxed through breakage or through fracture of other portion of the suspension gear to accelerate the movement of the draw-bar or transverse guided member 7 in a downward direction. If desired or found necessary coiled springs can be arranged around the guide rods 9 between the draw-bar 7 and top transverse plate 4.

12 are two pulleys, one arranged at the center and at each side of the top transverse member 4. These pulleys 12 are revolvably supported in brackets 13 bolted, riveted or otherwise suitably fixed as at 14 to the top transverse plate 4.

15 is a pair of horizontally disposed shafts arranged below the level of the aforementioned parts. These shafts at their extremities project through the side plates 3 or extensions of the side plates or frame of the cage to the sides of the skids or runners 1. The extremities of these shafts 15 engage in converging slots or guideways 16 formed in the side plates or extensions 3. These slots or guideways 16 converge or are inwardly inclined from the bottom to the top. Arranged parallel with each of the slots or guideways 16 on the inside of the side plates 3 is a correspondingly inclined rack 17. On each extremity of each of the shafts 15 is fixed a toothed pinion 18 adapted to engage or mesh the teeth 19 of the aforesaid rack 17.

On the outer extremities of each shaft 15 is keyed or otherwise suitably fixed a friction roller 20 which is adapted to contact with the sides of the runner 1 when the safety catch comes into operation. The friction rollers 20 may be grooved obliquely on their

faces as seen at 21 in Fig. 1 to insure their rotation when they contact with the sides of the runners 1.

At the center of each shaft 15 is provided a collar 22 or equivalent to which is attached one end of a chain, wire or other flexible rope 23. These chains, wires or flexible ropes 23 pass up and around the pulleys 12 and are attached at their outer extremities to the draw-bar or member 7 or a part rigid therewith.

The action of the catch is as follows:—In the normal running of the vehicle the draw-bar 7 is raised by virtue of its connection with the kingbolt 6 into the position in which it is shown in Fig. 3. In this position the chains or flexible connections 23 between the draw-bar 7 and shafts 15 allow the latter to fall in their guiding slots 16 until the pinions 18 take up a position at the bottom of the racks 17. When the shafts 15 are in this position the friction rollers 20 run clear of the sides of the runners or skids 1 as shown in Fig. 3. When the vehicle becomes unsupported the downward movement of the draw-bar or transverse guided member is accelerated by the spring 10. The draw-bar 7 in its downward movement draws down the ends of the chains or flexible connections 23 attached thereto, which connections draw the shafts in an upward direction. The pinions 18 on the shafts 15 in their upward movement mesh with the racks 17 and combined with the slots or guideways 16 move the shafts 15 inward or toward each other until the rollers 20 have frictional contact with the sides of the skids or runners 1. As the shafts 15 approach each other, a gradually increasing brake pressure is exerted on the sides of the skids or runners by the friction rollers 20 which ultimately arrests the downward movement of the vehicle. Once the friction rollers 20 engage the runners 1 they operate independently of their connection with the draw-bar or member 7 so that any movement of the latter due to its connection with the tail end of the rope does not tend to release the grip of the rollers 20.

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

1. In a safety catch for hoisting apparatus, the combination with the vehicle and guides therefor of a pair of shafts revoluble in converging guiding slots in the sides of the vehicle, friction rollers on the ends of the shafts for engaging the sides of the guides, converging racks fixed to the vehicle, and pinions on the ends of the shafts engaging the racks, a member by which the vehicle is supported and flexible connections between said member and the aforesaid shafts, as set forth.

2. In a safety catch for hoisting apparatus, in combination, a vehicle, guides

therefor, a member for suspending said vehicle, a pair of shafts revoluble in upwardly converging guiding slots formed at the sides of the vehicle, the extremities of said shafts projecting to the sides of the guides, converging racks fixed to the vehicle and arranged parallel with the aforementioned converging slots, pinions on the ends of the shafts meshing the inclined racks, friction rollers on the extremities of the shafts which are adapted to have frictional contact with the sides of the guides when the shafts move upward in the converging slots, and flexible connections between the suspending member and the shafts which raise the shafts in the slots and cause them to approach each other when said supporting member falls, as set forth.

3. In a safety catch for hoisting apparatus, in combination, a vehicle, guides therefor, a member for suspending said vehicle, said member comprising a kingbolt and a transverse guided member rigid therewith, a spring medium for accelerating the downward movement of said guided member when the vehicle becomes unsupported, a pair of shafts revoluble in upwardly converging guiding slots formed at the sides of the vehicle, the extremities of said shafts projecting to the sides of the guides, converging racks fixed to the vehicle and arranged parallel with the aforementioned converging slots, pinions on the ends of the shafts meshing the inclined racks, friction rollers on the extremities of the shafts which are adapted to have frictional contact with the sides of the guides when the shafts move upward in the converging slots, flexible connections which are connected at one end with the transverse guided member and at their other ends to the shafts, and guide pulleys for said flexible connections, as set forth.

4. In a safety catch for hoisting apparatus, in combination, a vehicle, guides therefor, a member for suspending said vehicle comprising a kingbolt and a horizontal guided member rigid therewith, a spring medium for accelerating the downward movement of said member on the vehicle becoming unsupported, pulleys carried by the vehicle above the uppermost position of the guided member, a pair of horizontal and parallel shafts positioned below the lowermost position of the guided member and movable in upwardly converging slots in the sides of the vehicle, the ends of said shafts projecting beyond the vehicle to the sides of the guides, obliquely serrated friction rollers on the ends of the shafts, upwardly converging racks arranged parallel with the converging slots, pinions on the shafts meshing with the teeth of the racks to cause the shafts to approach each other

in their upward movement, the converging
slots serving to maintain the pinions in
mesh with the racks, guide pulleys, and
flexible connections which are connected at
5 one end with the horizontal guided member
then pass around the guide pulleys and are
attached at their other ends to the shafts, as
set forth.

In testimony whereof I have signed my
name to this specification in the presence of 10
two subscribing witnesses.

VICTOR HUGO MALSTON.

Witnesses:

CHAS. OVENDADE,
R. OVENDALE.