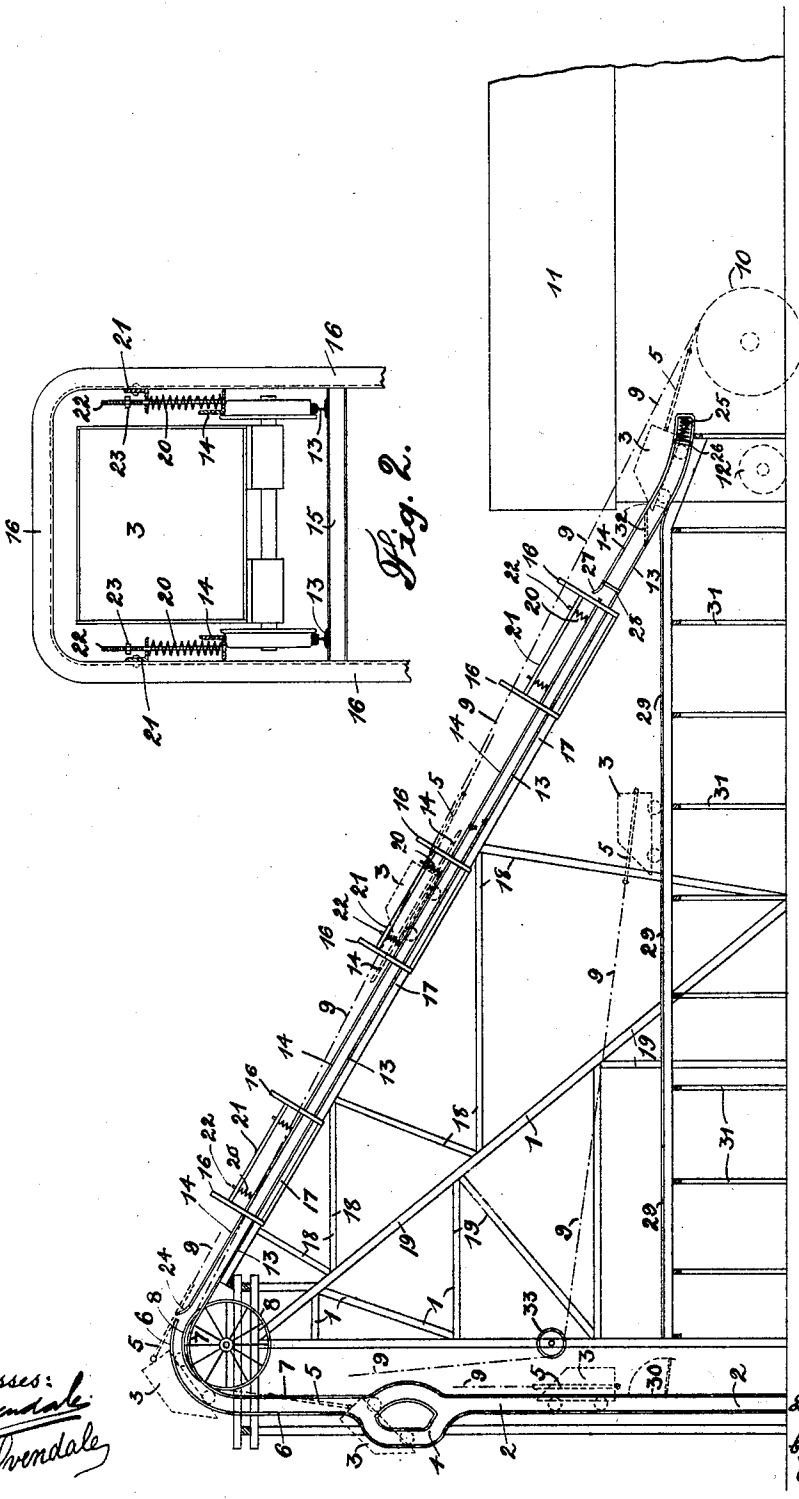


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PATENTED DEC. 12, 1905.

E. G. WELDON.  
WINDING OR HAULING APPARATUS FOR MINES AND THE LIKE.  
APPLICATION FILED JAN. 21, 1905.



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# UNITED STATES PATENT OFFICE.

EDWIN GEORGE WELDON, OF JOHANNESBURG, TRANSVAAL.

## WINDING OR HAULING APPARATUS FOR MINES AND THE LIKE.

No. 806,857.

Specification of Letters Patent.

Patented Dec. 12, 1905.

Application filed January 21, 1905. Serial No. 242,150.

*To all whom it may concern:*

Be it known that I, EDWIN GEORGE WELDON, a subject of the King of Great Britain, residing at Johannesburg, in the Colony of the Transvaal, have invented certain new and useful Improvements Relating to Winding or Hauling Apparatus for Mines and the Like, of which the following is a specification.

The present invention has reference to winding, hauling, or hoisting apparatus for mines and the like. In some arrangements of this kind of apparatus it is customary to employ a main engine for performing the work of raising the minerals from the mine and for raising and lowering the equipment or material required in the mining operations and to provide an additional or auxiliary engine or engines for raising and lowering the miners and other workers, said auxiliary engine or engines also being available for general hauling when not otherwise in use. With such an arrangement it is usual to pass the hauling-ropes from the different engines over different sheaves which run on a common shaft in the head-gear. Now with such an arrangement it will be understood that in the event of the overwinding of the skip or cage by the main engine and as a consequence the head-gear or pulley-wheel being damaged (which is a by no means infrequent occurrence) should the man-hoist be in use it will fall some distance down the shaft owing to the sheave or pulley over which its supporting-rope passes being carried away and the occupants be in all probability killed or at least seriously injured. It is also well known that fatal accidents have occurred to mine-workers who have been waiting at the surface at the mouth of the shaft to descend the mine owing to falling timbers, &c., when overwinding has taken place. This overwinding when it occurs also causes very considerable damage to the winding or hauling engines and mine equipment. In case of overwinding and the rope breaking without damage resulting to the head-gear then the skip is precipitated down the shaft with consequences almost equally serious to those already mentioned.

The object of my invention is to obviate this possible loss of life and serious damage in the event of overwinding; and it consists, essentially, in providing above the tipper or device for dumping the contents of the skips

or cages in the head-gear (where such tipping or dumping arrangement is provided) rails or a track which pass over or above the pulley-wheel in the head-gear and are continued in the direction of and preferably enter the engine-house or parallel with the direction of the pull of the hauling-rope, so that the skip or cage is able to pass over or above the pulley-wheel in the head-gear without any damage being sustained by the latter. Brake mechanism is provided at that portion of the track between the head-gear and the engine-house, so that the skip or cage is subjected to a powerful braking action which tends to arrest its movement between the head-gear and engine-house. An arrangement is also provided in a convenient position in relation to the drum of the winding-engine to brake or arrest the movement of the skip or cage in order to prevent any damage being sustained by the engine.

My invention further provides a wider range for hauling—that is to say, it will allow the skip or cage to be raised to a higher point in the head-gear than with existing arrangements without damage resulting, so that a slight overwinding of the skip or cage above the tipper will not result in the head-gear, pulley-wheel, or shaft being carried away or the breaking of the hauling-rope and precipitation of the skip down the shaft, as at present.

In order that my invention may be fully understood, I append hereto an explanatory sheet of drawings marked with numerals of reference corresponding to the following description thereof.

Figure 1 represents the application of my invention to a typical arrangement of mine head-gear and engine-house; and Fig. 2 represents a transverse section of the track provided for the skip or cage between the head-gear and engine-house, illustrating the means of braking the skip or cage in its passage between these points.

The winding plant may be of any ordinary or suitable construction, and, if desired, a tipper may be provided located in the usual manner in the head-gear and adapted to incline or invert the skip or cage as it is raised in the head-gear to dump the load or contents of the skip or cage.

In the drawings, 1 represents the general arrangement of the head-gear, and 2 represents the rails or guides, between which the

wheels of the skip or cage 3 run, and 4 represents the tipper in which the skip 3 is inclined or inverted to dump the load. The skip 3 is shown in dotted lines in the position in which it traverses the rails 2 as it passes up and down the shaft, and it is also shown in dotted lines in the position it assumes in the tipper 4. In the former position the bridle 5 of the skip 3 spans the skip-body, while in the latter position it precedes or is raised above the body of the skip.

The rails or guides above the tipper 4 are continued upward in the form of a double track or comprising the two parallel sets of rails 6 7, one set at either side of the skip 3, up and along which track the skip 3 is hoisted in the event of overwinding. The track 6 7 is carried round or above the pulley-wheel 8 in the top of the head-gear 1 and made of a suitable curve to allow the skip 3 to pass and be guided over the top of the pulley-wheel 8 in the event of overwinding. The skip 3 is shown in dotted lines in the position it assumes as it is being hauled up over the pulley-wheel 8. The track 6 7 is then continued from the top of the head-gear 1 in the direction of or parallel with the pull of the hauling-rope 9 to a suitable position. In the drawings I illustrate the track continued from the top of the head-gear 1 or pulley 8 to the front of the winding-drum 10 of the main hauling-engine, which is located in the engine-house 11.

12 represents the drum of the man-hoist or auxiliary engine, which is usually located at the front of the main engine. The termination of the track is above the auxiliary engine, so that in the event of overwinding the skip 3 does not come into contact with said auxiliary engine, as at present. That portion of the track between the head-gear 1 or pulley-wheel 8 and the engine-house 11 also preferably consists of bottom and top rails 13 14, which serve to prevent the skip or cage 3 leaving the track in its passage down the gradient or incline from the pulley-wheel 8 to the engine-house 11. The drawings depict the most common arrangement of head-gear and engine-house, in which cases the track from the top of the head-gear to the engine-house is inclined downward, so that the track can, as previously explained, be supported above any auxiliary engines that may be located in the engine-house in front of the main engine or between the main winding-engine and the head-gear. It will be evident that the track from the head-gear to or in the direction of the engine-house may be otherwise arranged and be constructed to guide the skip or cage over any auxiliary engine or engines should overwinding take place to obviate damage to said engine or engines.

The bottom rails 13 of the track rest on transverse members 15, carried by rectangular frames 16, which are secured to longi-

tudinal timbers 17, supported by the struts or timbers 18 from the timbers 19 of the head-gear 1.

To provide for the braking of the skip or cage 3 in its passage along the inclined track between the head-gear 1 and engine-house 11 the top rail 14 at each side of the track is constructed to apply a braking action on all the wheels of the skip 3. This is effected by constructing the upper or top rails 14 to move toward or away from the bottom or fixed rails 13, springs 20 being arranged above the rails 14 to press them in a downward direction toward the fixed rails 13. As shown in Fig. 2, this is effected by fixing between the rectangular end frames 16 angle-irons 21, parallel with the track, and in employing angle-irons for the upper and movable rails 14. To the upper rails 14 are fixed bolts or screwed rods 22, which latter project through holes in the angle-irons 21, spiral springs 20 being arranged on the bolts or screwed rods 22 between the angle-irons 21 and the angle-iron rails 14, so that the rails 14 are forced down with the requisite pressure by the springs 20 in the direction of the fixed rails 13. Nuts 23, screwed onto the bolts 22 above the angle-irons 21, serve for preventing the rails 14 moving too far in a downward direction and for supporting the rails 14 in their normal position. In the drawings three separate frames 16 are shown for carrying the upper and movable rails 14; but it will be obvious that these frames may be carried the full length of the track between the head-gear 1 and engine-house 11, if preferred. The movable rails 14 in normal position are held closer to the stationary rails 13 than the rails 2 or so that the wheels of the skip 3 in passing along the track between the head-gear 1 and engine-house 11 must raise the top rails 14 for some distance against the pressure of the springs 20, which latter supply the braking action through the medium of the top rails 14. The skip 3 is shown in dotted lines between the head-gear 1 and engine-house 11, and the top rails 14 are shown in the position to which they are raised by the skip-wheels. The end 24 of the movable rails 14 where the wheels of the skip enter the track are curved outward or upward to direct the wheels between the rails 13 14.

Although I prefer to make the top and movable rails 14 in one piece between the pulley-wheel 8 and the bottom of the track, as illustrated, it will be evident that they may be made in sections, and between each section there may be provided a non-movable section. With this construction the ends of each of the movable sections will be turned upward to allow the wheels to pass between the rails. The springs 20 are of such a strength that they offer considerable resistance to the passage of the skip 3 along the track between the head-gear 1 and engine-

house 11, so that it will become evident to the driver that the skip 3 has been hauled over the pulley-wheel 8 and is moving down the track toward the engine-house 11.

The track is preferably arranged to enter the engine-house 11 above and in front of the drum 10 of the main winding-engine. At the end of the track I arrange a further brake mechanism which is constructed so that it will stop any further movement of the skip 3 should it by any possible chance be hauled to that point. In the drawings this brake mechanism is shown consisting of springs 25, placed between the lower and upper rails 13 14 of the track, and plates 26 in front of the springs 25, which engage the wheels of the skip 3 just before they reach the end of the track. In this section of the track both the upper and lower rails 14 13 may be made stationary and the upper portion 14 be turned upward, as shown at 27, to allow the wheels to enter the rails and the two rails 13 14 be stayed by means of a strengthening-piece 28. The springs 25 are very powerful and offer great resistance to further movement of the skip 3. The skip 3 is shown in dotted lines at the end of the track, with the wheels engaging the plates 26. In this position the end of the bail 5 is a short distance from the periphery of the winding-drum 10. Instead of the arrangement shown I may employ a plate arranged from side to side of the track, working against powerful buffer-springs and adapted to engage the front of the bridle or the bottom of the skip, as may be preferred.

To facilitate the return of the skip or cage 3 to the head-gear 1 of the shaft in the event of overwinding, I preferably provide a movable track between the engine-house and the head-gear, so that the skip can be run off the track onto the movable track and be hauled by the hauling-rope to and passed into the head-gear at the point ordinarily provided for changing the skips.

29 represents the return-track, carried by a temporary or permanent framework 31, which track 29 at the one end runs into the bottom rails 13 of the track between the pulley-wheel 8 and the engine-house 11.

32 is a point or hinged portion of the bottom rail 13, which is raised into the position shown in dotted lines when the skip 3 is to be run out of the track 13 onto the return-track 29.

A small pulley 33 is provided in a suitable position in the head-gear 1, round which the hauling-rope 9 is passed from the pulley-wheel 8 to be attached to the skip 3 to haul it along the return-track 29.

30 is the hinged or pivoted section of the guides or rails in the head-gear 1, through which the skip passes between the guides or rails 2.

To return the skip 3, the hauling-rope 9 is

detached from the bridle 5 and passed over the pulley-wheel 8 in the top of the head-gear 1 in the ordinary way, then down and round the small pulley 33, and attached to the bridle 5, the latter having been first 70 turned to its position round the body of the skip 3. The points 32 are then raised and the skip 3 hauled along the return-track 29, as is shown in dotted lines in Fig. 1.

What I claim as my invention, and desire 75 to protect by Letters Patent, is—

1. In winding or hauling apparatus of the nature specified, the combination with the head-gear and pulley-wheel round which the hauling-rope passes, of a track for the 80 skip or cage passing over said head-gear and pulley, and connections for drawing said skip or cage past said parts as far as desired and freely thereof, substantially as described.

2. In winding or hauling apparatus of the 85 nature specified, the combination with the head-gear and pulley-wheel, round which the hauling-rope passes, of a track for the skip or cage passing over said head-gear and pulley and extending in the direction of the 90 pull of the hauling-rope, and connections for drawing said skip or cage past said parts as far as desired and freely thereof, substantially as described.

3. In winding or hauling apparatus of the 95 nature specified, the combination with the head-gear, pulley-wheel and the rails or guides traversed by the skip or cage as it ascends and descends the head-gear, of an extension of said guides or rails passing over or 100 round the pulley-wheel for the hauling-rope, said extension serving to guide the skip clear of the pulley-wheel, and a track from said extension in the direction of the pull of the hauling-rope, and means for braking the 105 skip as it traverses said track, substantially as described.

4. In winding or hauling apparatus of the nature specified, the combination with the 110 head-gear, pulley-wheel and rails or guides traversed by the skip or cage as it ascends and descends the head-gear, of an extension of said guides or rails passing over or round the pulley-wheel for the hauling-rope, said 115 extension serving to guide the skip clear of the pulley-wheel, and a track from said extension in the direction of the pull of the hauling-rope, said track comprising lower and fixed rails and upper and movable rails, and means for forcing the latter toward the 120 fixed rails to apply a braking action on the wheels of the skip, substantially as described.

5. In winding or hauling apparatus of the nature specified, the combination with the 125 head-gear, pulley-wheel and rails or guides traversed by the skip or cage as it ascends and descends the head-gear, of an extension of said guides or rails passing over or round the pulley-wheel for the hauling-rope, said 130 extension serving to guide the skip clear of

the pulley-wheel, and a track from said extension in the direction of the pull of the hauling-rope, said track comprising lower and fixed rails and upper and movable rails, frames carrying said movable rails and springs arranged in the frames above the upper rails, which force the movable rails in the direction of the fixed rails to apply a braking action to the wheels of the skip as it passes along the track, substantially as described.

6. In winding or hauling apparatus of the nature specified, in combination, the head-gear, pulley-wheel and rails or guides which are traversed by the skip as it ascends and descends the head-gear, extensions of said guides or rails, which extensions pass over or round the pulley-wheel and serve to guide the skip above and clear of the head-gear and pulley-wheel and a track from said extensions in the direction of the pull of the hauling-rope, said track comprising lower and stationary rails carried by a framework and upper and movable rails carried by said framework, a framework and members parallel with the track, springs between said members and upper and movable rails which operate to force the movable rails toward the lower and stationary rails to apply a braking action to the wheels of the skip as it traverses the track, substantially as described.

7. In winding or hauling apparatus of the nature specified, in combination, the head-gear, pulley-wheel and the rails or guides and tipper, extensions of the guides or rails curved round the pulley-wheel, a track comprising lower and stationary rails and upper and movable rails, frames carried by the head-gear supporting said track, members carried by said frames, bolts attached to the movable rails for supporting said rails from the fixed members and springs located on the rods or bolts between the movable rails and the supporting members, which rods and springs allow the movable rails to move toward or from the lower and stationary rails so that the springs exert a braking action on the wheels of the skip through the top rails in the event of overwinding, substantially as described.

8. In winding or hauling apparatus of the nature specified, the combination with the head-gear, pulley-wheel and rails or guides traversed by the skip or cage, of an extension of said guides or rails passing round the pulley-wheel for the hauling-rope, said extensions serving to guide the skip over the head-gear and above the pulley-wheel, and a track from said extensions comprising upper and lower rails and means for braking the skip as it traverses said track and means for arresting the movement of the skip when it reaches the end of the track, substantially as described.

9. In winding or hauling apparatus of the nature specified, the combination with the

head-gear, pulley-wheel and rails or guides traversed by the skip or cage, of an extension of said guides or rails passing round the pulley-wheel for the hauling-rope, said extensions serving to guide the skip over the head-gear and above the pulley-wheel, a track from said extensions comprising upper and lower rails and means for braking the skip as it travels along said track, said means comprising springs located between the upper and lower rails at the end of the track and plates in front of the springs adapted to be engaged by the wheels of the skip, substantially as described.

10. In winding or hauling apparatus of the nature specified, the combination with the head-gear, pulley-wheel and rails or guides traversed by the skip or cage, of an extension of said guides or rails passing round the pulley-wheel for the hauling-rope, said extensions serving to guide the skip over the head-gear and above the pulley-wheel, a track from said extensions comprising upper and lower rails and means for braking the skip as it travels along said track, means for arresting the movement of the skip at the end of the track, a return-track between the track from the head-gear and the head-gear for returning the skip to the rails or guides in the head-gear, substantially as described.

11. In winding or hauling apparatus of the nature indicated, in combination, the head-gear and the pulley-wheel for the hauling-rope and the rails or guides for the skip, of a tipper or means for dumping the contents of the skip, a track above the tipper passing round the pulley-wheel along which the skip may pass from the tipper above the head-gear, and a track from which the skip may pass from the track above the pulley-wheel, means for applying a braking action to the skip as it passes along said track, means for arresting the movement of the skip at the end of said track and a return-track for passing the skip into the guides or rails in the head-gear, substantially as described.

12. In winding or hauling apparatus of the nature specified, in combination, the head-gear and the pulley-wheel and guides or rails, of the skip adapted to traverse said guides or rails, the tipper for dumping the contents of the skip, a track above said tipper passing round the pulley-wheel along which the skip may pass after it leaves the tipper in the event of overwinding, the track to which the skip may pass from the track above the tipper, said track comprising the bottom or stationary and top and movable rails, the frames carrying said stationary rails and angle-irons parallel with the track, bolts fixed to the movable rails passed through said longitudinal members, springs on said bolts between the longitudinal members and the rails for forcing the movable rails toward the fixed rails, nuts on the bolts for support-

ng the movable rails, the springs in the ends  
of the track and the plates in front of the  
springs for engaging the wheels of the skip at  
the end of the track and in front of the wind-  
ing-drum of the engine, points or hinged por-  
tions of the lower rails, the return-track and  
the small pulley in the head-gear over which  
the hauling-rope is passed to haul the skip  
along the return-track, substantially as de-  
scribed and shown.

13. In a winding or hauling apparatus of  
the nature specified, the combination with  
the head-gear and pulley round which the  
hauling-rope passes, of a track for the skip  
or cage passing over said head-gear and pul-  
ley, connections for drawing said skip or cage  
past said parts as far as desired and freely  
hereof, and a yielding resistance which per-  
mits the overriding travel of the skip or cage,  
substantially as described.

14. In a winding or hauling apparatus of  
the nature specified, the combination with  
the head-gear and pulley round which the  
hauling-rope passes, of a track for the skip

or cage passing over said head-gear and pul- 25  
ley, connections for drawing said skip or cage  
past said head-gear and pulley as far as de-  
sired and freely thereof, and a yielding re-  
sistance pressing upon opposite sides of the  
car and permitting the overriding travel of 30  
the skip or cage, substantially as described.

15. In winding or hauling apparatus of the  
nature specified, the combination with the  
head-gear and pulley round which the haul-  
ing-rope passes, of a track for the skip or 35  
cage passing over said head-gear and pulley  
and extending down an incline in the direc-  
tion of pull of the hauling-rope, and a switch  
for directing the skip or cage from said track  
to a lower track, substantially as described. 40

In witness whereof I have hereunto set my  
hand in the presence of two subscribing wit-  
nesses.

EDWIN GEORGE WELDON.

Witnesses:

CHAS. OVENDALE,  
R. OVENDALE.