No. 665,574. Patented Jan. 8, 1901.

C. A. MORRIS.

HOISTING AND DUMPING APPARATUS.

(Application filed Apr. 4, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

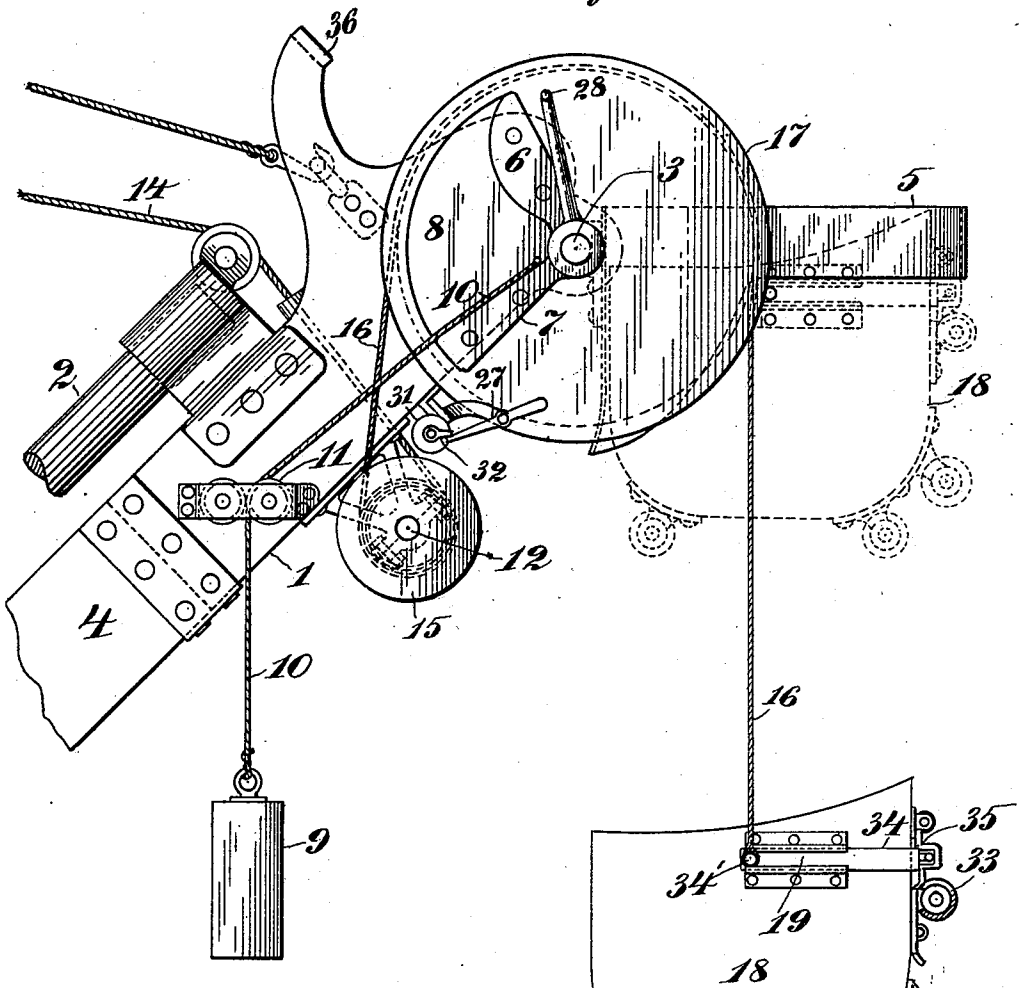
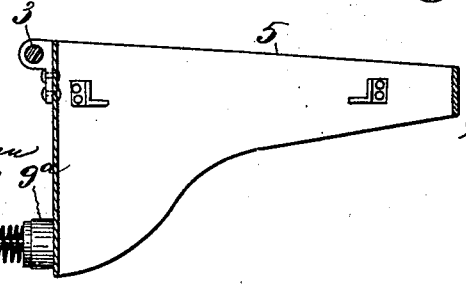


Fig. 6.



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Fig. 2.

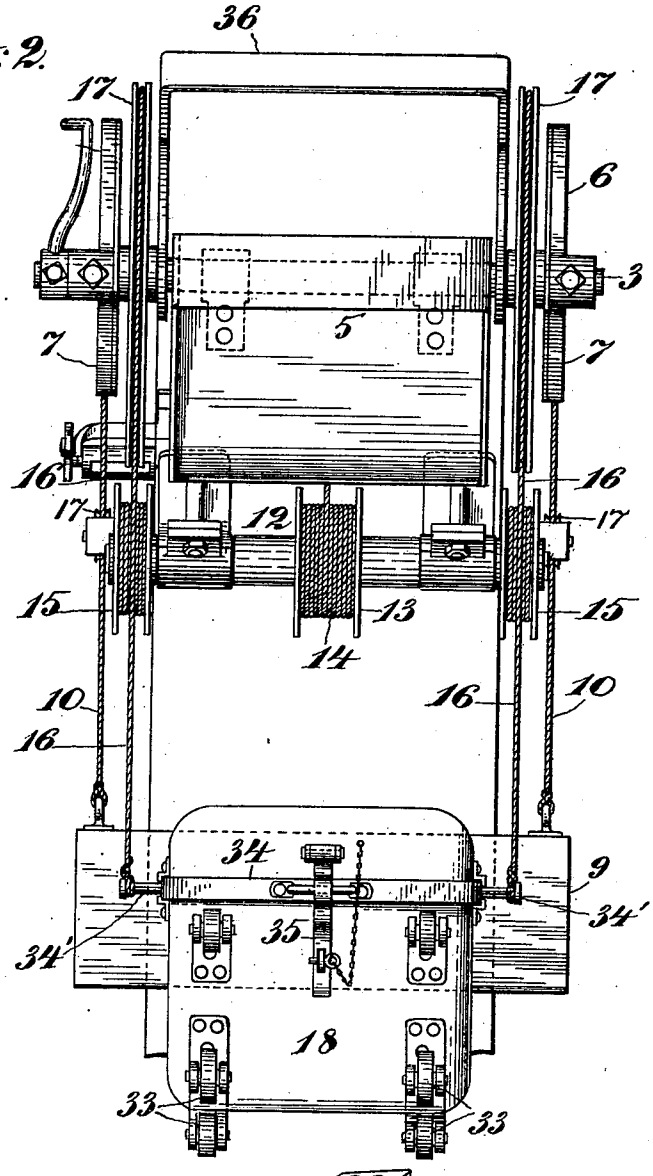
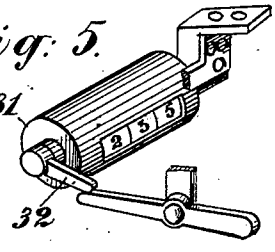


Fig. 5.



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Fig. 3.

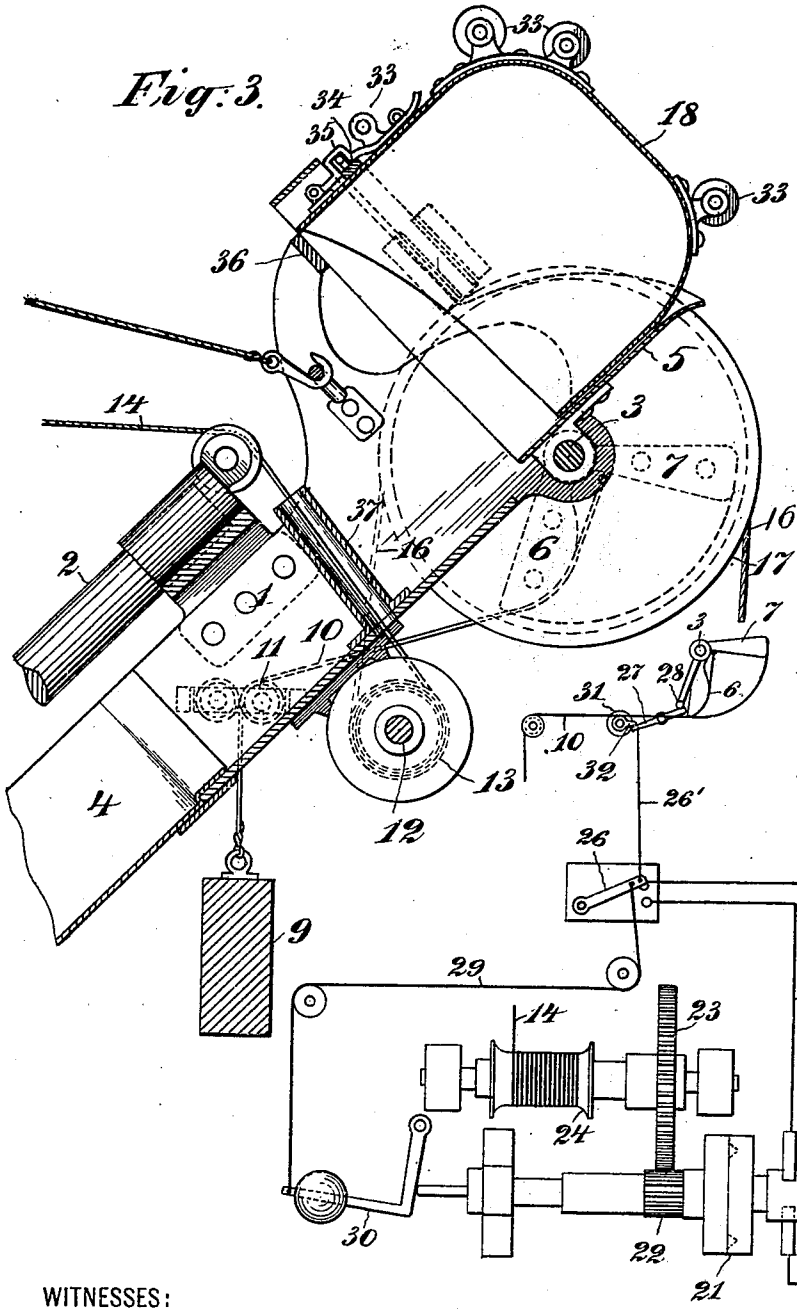


Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES A. MORRIS, OF GLEN RIDGE, NEW JERSEY.

HOISTING AND DUMPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 665,574, dated January 8, 1901.

Application filed April 4, 1900. Serial No. 11,436. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. MORRIS, a citizen of the United States, residing at Glen Ridge, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Hoisting and Dumping Apparatuses, of which the following is a specification.

This invention relates to the class of apparatus employed for hoisting and dumping materials such as coal, earth, and the like, and the object of the invention is to provide such an apparatus furnished with a counterweighted dumping-guide and a special arrangement of the hoisting-ropes and guide-sheaves whereby the power used in hoisting the bucket or loaded receptacle is applied independently of the dumping-guide during the ascent of the bucket.

Other features of novelty will be hereinafter described.

In the drawings, which serve to illustrate the invention, Figure 1 is a side elevation of the apparatus. Fig. 2 is a rear elevation as seen from the right in Fig. 1, and Fig. 3 is a sectional elevation showing the dumping-guide and bucket in the dumped position. Fig. 4 is a diagrammatic view illustrating the automatic stopping mechanism and counter, and Fig. 5 is a face view of the counter. Fig. 6 is a sectional view of the dumping-guide provided with a cushion which differs somewhat from that seen in the principal views.

1 represents a frame supported on the boom 2 of a derrick, for example, and in this frame is mounted a rock-shaft 3. An inclined chute 4 is fixed in the frame to receive and direct the dumped material wherever desired. Rigidly secured by suitable means to the shaft 3, at one of its sides, is a dumping-guide 5, and rigidly secured also to said shaft at its respective ends are counterweighting and returning cams 6 and 7. For convenience the cams 6 and 7 of each pair are connected together by a base-plate 8. There will be a pair of these cams at each side of the apparatus, and there is a counterweight 9 suspended from two ropes or cords 10, one for each pair of cams. The rope is attached at one end to the connected cams of the pair near the boss and passes over a suitable guide-sheave 11 to the weight 9. When the guide 5 is in its normal substantially horizontal position, as seen in Fig. 1, it is supported by the cam 7 taking under the taut portion of the rope 10, between the sheave 11 and the rock-shaft, thus giving to the guide a yielding or cushioned support, and when the guide 5 is turned in dumping the convex cam 6 presses down on the rope 10, (see Fig. 3,) thus depressing it in a manner to raise the weight 9.

Mounted on the chute 4 is a counter-shaft 12, on which are a drum 13 to receive the hoisting-rope 14 and two drums 15 15 to receive the bucket-ropes 16 16. Preferably these latter will be wire ropes, and they pass, respectively, over two relatively large bearing-sheaves 17 17, mounted to turn loosely on the rock-shaft 3. These sheaves 17 are of such diameter that the bucket-ropes depend from them out as far from the shaft 3 as the center of the guide 5, and each rope is provided with a hook to engage a lug in the side of the bucket 18.

The operation is as follows: The bucket or receptacle being down and filled or loaded, the hoisting-rope 14 will be wound on the drum 13, and the bucket-ropes 16 will be mainly or wholly unwound from the drums 15. Power is applied to the rope 14, which rotates the drums 15 and winds up the bucket-ropes thereon. These latter play over the sheaves 17 and elevate the bucket, which latter is of such form and size as to enter rather snugly into the dumping-guide 5 when the bucket shall have been hoisted high enough. As the bucket enters the guide, cleats or projections 19 thereon take under the lower edge of the dumping-guide and compel the latter to turn about the shaft 3 as a center until the guide and bucket reach the dumping position. (Seen in Fig. 3.) The lugs on the bucket to which the bucket-ropes 16 are attached are situated at the respective sides of the bucket, at about the center of its width, so as to hold it level in hoisting, and the guide 5 is so mounted with respect to the sheaves 17 and the bucket that in ascending the bucket will enter the guide accurately. In effect a vertical line passing down through the center of the guide will pass through the center of the suspended bucket or substantially through it. It will be noted that in turning over the points where the bucket-ropes are attached

to the bucket move about the peripheries of the sheaves 17 and concentric with the shaft 3, about which the bucket and the dumping-guide turn, so that there is no oblique strain or force exerted along the chord of the arc traversed by the dumping elements in turning, and it will also be noted that the power applied in hoisting the load is wholly independent of the dumping-guide. In these features my apparatus differs from all others for the purpose, so far as I am aware. Heretofore it has been customary to mount the guide sheave or sheaves for the bucket-rope on the dumping-guide, so that they swing or move in an arc bodily about the axis upon which the dumping-guide turns, and by the word "independent" as used above is meant that the strain in hoisting is not in any manner applied to the dumping-guide either directly or indirectly until the bucket itself enters and takes under the guide. The sheaves 17 rotate axially about the hinging axis of the guide. They do not swing or revolve bodily about said axis. As the dumping-guide turns in dumping, the cams 6, as before stated, are caused to depress the respective ropes 10, and thus raise the counterweight 9, and when the hoisting-rope is slackened the weight 9, acting through the cam 6, swings back the dumping-guide and the bucket to a point where gravity will act upon them to return the guide to its normal position and to allow the bucket to descend by gravity.

In order that the motor or hoisting-engine may be stopped automatically when the bucket is fully dumped, the device illustrated most fully in Fig. 4 may be employed. In this view an electric hoisting-windlass of a known construction is illustrated somewhat diagrammatically. 20 is an electric motor. 21 is a friction-clutch which drives a pinion 22, gearing with a spur-wheel 23 on the same shaft with the windlass-barrel 24, on which is wound the hoisting-rope 14. The circuit 25, which supplies the motor 20, has a break closed by a switch-lever 26, and this lever is connected by a wire or cord 26′ with one arm of an operating-lever 27, the other arm of which is in the path of a stud 28, carried on an arm fixed to the end of the rock-shaft 3. When the shaft 3 is rocked in dumping, the stud 28 strikes and actuates the lever 27, thus breaking the circuit through the motor. At the same time the members of the clutch 21 are allowed to separate, so that all strain is instantly removed from the hoisting-rope. This latter is effected by a cord or wire 29, which is attached to the switch-lever 26 and led down to the weighted lever 30, which holds the members of the clutch 21 in driving contact. Thus at the completion of the dumping movement the motor is automatically stopped and the clutch which drives the hoisting-windlass is disengaged. This automatic device is precautionary to prevent damage, and the attendant or engineer will be expected to reverse the motor or operate a brake to permit the descent of the bucket. The same or substantially the same device may obviously be employed to stop a steam hoisting-engine as well. In this case the switch-lever 26 would merely be replaced by an ordinary throttle-valve lever.

The apparatus may have a counter 31 of known construction actuated by one of the moving parts for counting and registering the number of buckets of material hoisted and dumped. For example, the arm of the lever 27 may be made to strike the arm 32 of the counter (see Fig. 5) at each dumping operation, and thus count and register the dumps.

Obviously the shape, size, or construction of the bucket 18 is not important to my invention nor is the invention in any way limited in this respect. In the construction illustrated the bucket is of moderate capacity, provided with rollers 33 and made detachable from the bucket-ropes, so that it may be drawn or rolled away for filling. The bucket has keepers which form the cleats 19 on its sides, and a bail or yoke 34 of U shape, which embraces the rear of the bucket, the ends of the yoke slipping into said keepers. On the respective ends of the yoke are projecting lugs 34′, to which the bucket-ropes are secured. The yoke is detachable to permit the bucket to be separated and rolled away, and it may be secured, when in place, by a hasp 35. A car-body or wagon-body may of course be utilized as a receptacle for the material to be hoisted and dumped.

The tilt of the dumping-guide and bucket is limited by a bar 36 on the frame 1, and the hoisting-rope 14 plays or may play through a tube 37, fixed in the chute. The object of this is to prevent the earth or other material dumped from sifting through the aperture about said rope and also prevent injury to the rope by the dumped material.

The apparatus has been described as illustrated in the principal views; but obviously some changes may be made in the construction without departing materially from the invention. For example, the counter-shaft 12 might be placed above the chute 4, if preferred, in which case the tube 37 would not be needed. The sheaves 17 are preferably adapted to turn loosely on the shaft 3; but they might be mounted in any other manner, so as to turn concentrically with said shaft.

Fig. 6 illustrates a construction wherein the counterweight 9^a for the dumping-guide 5 is fixed to the guide itself, as far from the center of oscillation as convenient, and the guide is cushioned in its normal position by a spring or springs 38 on the stationary part of the structure. In this construction, as well as in that of the principal views, the guide always offers a yielding resistance to the movement of the bucket during the entire dumping movement and is carried over by the bucket, and on the return the guide follows the bucket back until the guide reaches its normal position of rest. This feature of cushioning the

guide in its normal position is, I believe, new in this class of apparatuses.

In the construction of Fig. 6 the guide 5 may turn loosely on the counter-shaft and the sheaves 17 be fixed thereon.

Having thus described my invention, I claim—

1. A hoisting and dumping apparatus having a hinged and cushioned dumping-guide weighted to resist in a yielding manner the movement of the bucket or receptacle in dumping, whereby the latter carries the guide over in dumping and the guide follows the bucket on the return, substantially as set forth.

2. A hoisting and dumping apparatus having a hinged dumping-guide and means for cushioning said guide in its normal, substantially horizontal position, substantially as set forth.

3. A hoisting and dumping apparatus, having a hinged dumping-guide, means for cushioning said guide yieldingly in its normal position, and means whereby the said guide offers a yielding resistance to the movement of the bucket in dumping, substantially as set forth.

4. A dumping apparatus having a supporting-frame, a chute therefrom, a dumping-guide hinged in the frame, bearing-sheaves rotative axially about the hinging-axis of the guide, a bucket, and hoisting bucket-ropes over said sheaves for hoisting and dumping the bucket, substantially as set forth.

5. A dumping apparatus having a supporting-frame, a chute therefrom, a dumping-guide, hinged in the frame and having means for resisting yieldingly its movement in dumping, bearing-sheaves independent of said guide, hoisting bucket-ropes over said sheaves for hoisting the bucket, and the said bucket or receptacle, substantially as set forth.

6. In an apparatus for the purpose specified, the combination with a supporting-frame, a chute, and a dumping-guide hinged in said frame, of a weight, rope and cam for supporting said guide yieldingly in its normal position, a bucket or receptacle, and means for hoisting said bucket into said guide, substantially as set forth.

7. In an apparatus for the purpose specified, the combination with a supporting-frame, a chute therefrom, and a dumping-guide hinged in said frame, of a weight, rope and cam for supporting said guide in its normal or bucket-receiving position, a cam which raises said weight when the guide is turned to the dumping position, a bucket, and means for hoisting said bucket into said guide, substantially as set forth.

8. In an apparatus for the purpose specified, the combination with a supporting-frame, a chute therefrom, a rock-shaft in the frame, and a dumping-guide hinged on said rock-shaft, of bearing-sheaves rotative axially about said shaft, a bucket, and hoisting bucket-ropes over said sheaves for hoisting and dumping the bucket, substantially as set forth.

9. In an apparatus for the purpose specified, the combination with a supporting-frame, a chute, and a dumping-guide hinged in the frame, of a counterweight which supports said frame yieldingly in its normal position, a bucket and bucket-ropes, and bearing-sheaves for said ropes, said sheaves turning freely about the hinging-axis of said dumping-guide, substantially as set forth.

10. In an apparatus for the purpose specified, the combination with a supporting-frame, a chute, a dumping-guide hinged in said frame, and means for supporting said frame yieldingly in its normal position, of the counter-shaft, the drums thereon for the hoisting-rope and bucket-ropes, the said hoisting-rope and bucket-ropes, the bearing-sheaves for the bucket-ropes rotatable concentrically with the hinging-axis of said guide, and the bucket, substantially as set forth.

11. In a hoisting and dumping apparatus, the combination with the supporting-frame and the chute, of the rock-shaft 3 mounted in said frame, the dumping-guide 5, hinged at one side on said shaft, the bearing-sheaves 17, rotatable about said shaft and having diameters substantially equal to that of the guide, the bucket-ropes over said sheaves, the bucket, and automatic means for turning back the dumping-guide after dumping, substantially as set forth.

12. In a hoisting and dumping apparatus, the combination with the supporting-frame, the chute, the rock-shaft mounted in the frame, and the dumping-guide hinged at one side on said shaft, of the counterweight and rope, and the cams 6 and 7 taking on opposite sides of said rope, the former for returning the guide after dumping and the latter for supporting the guide yieldingly in its normal position, substantially as set forth.

13. In a hoisting and dumping apparatus, the combination with a supporting-frame, a chute, the hinged dumping-guide, the bucket, the hoisting-ropes, and motor mechanism for hoisting, of means actuated by the dumping elements for stopping the motor at the termination of the dumping operation, substantially as set forth.

14. A hoisting and dumping apparatus having a hinged dumping-guide, and means for balancing said guide, in its normal position so that it may yield to pressure in both directions and return automatically to its normal position, substantially as set forth.

In witness whereof I have hereunto signed my name, this 30th day of March, 1900, in the presence of two subscribing witnesses.

CHARLES A. MORRIS.

Witnesses:
PETER A. ROSS,
HENRY CONNETT.