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H. L. REYNOLDS.

SUSPENSION DEVICE FOR TWO ROPE BUCKETS.

APPLICATION FILED OCT. 29, 1903.

NO MODEL.

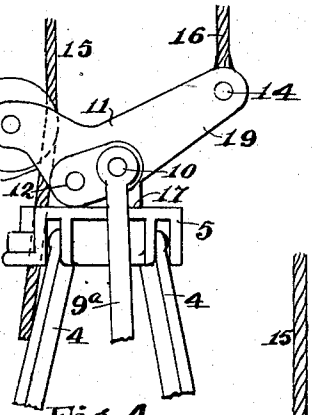

Fig. 4.

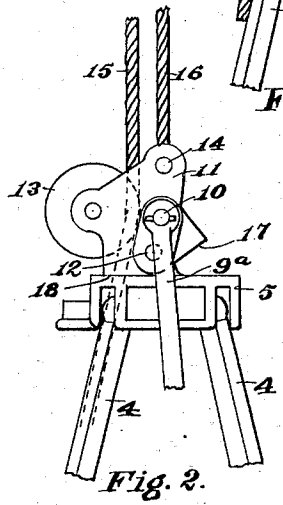

Fig. 2.

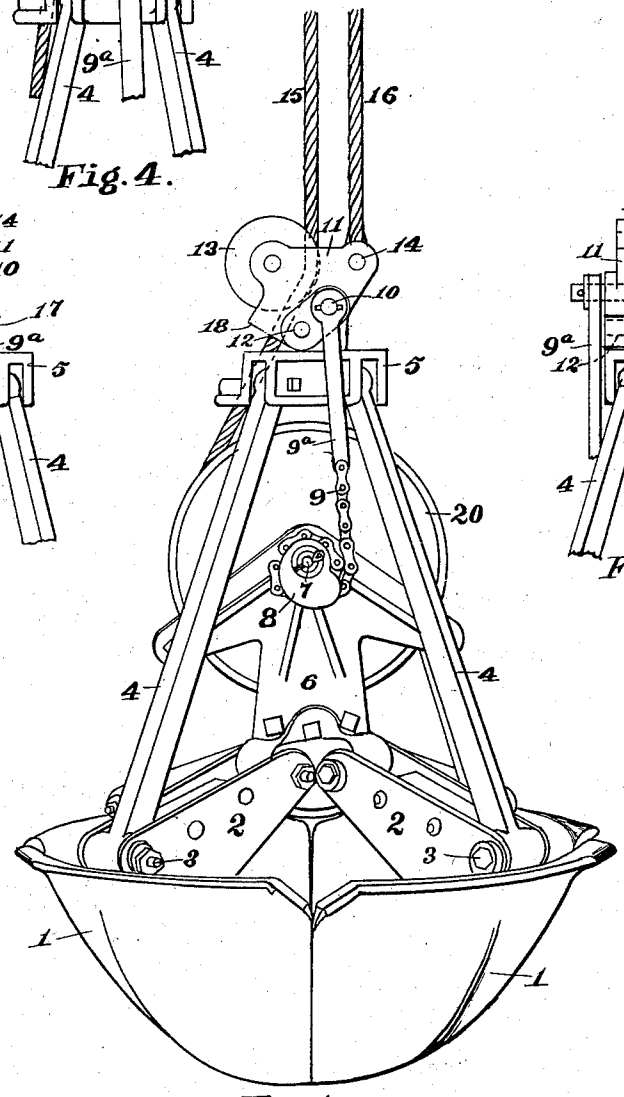

Fig. 1.

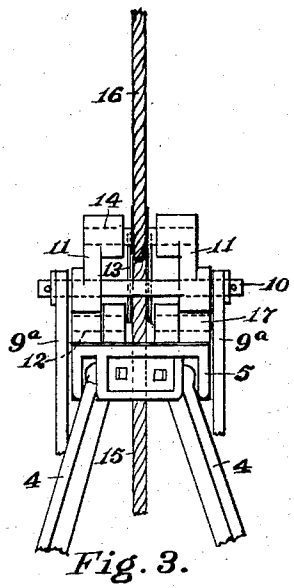

Fig. 3.

WITNESSES:

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No. 748,419. Patented December 29, 1903.

UNITED STATES PATENT OFFICE.

HENRY L. REYNOLDS, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE HAYWARD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SUSPENSION DEVICE FOR TWO-ROPE BUCKETS.

SPECIFICATION forming part of Letters Patent No. 748,419, dated December 29, 1903.

Application filed October 29, 1903. Serial No. 178,973. (No model.)

To all whom it may concern:

Be it known that I, HENRY L. REYNOLDS, a citizen of the United States, and a resident of Jersey City, Hudson county, New Jersey, have invented certain new and useful Improvements in Suspension Devices for Two-Rope Buckets, of which the following is a specification.

My invention relates to an improvement in suspension devices for two-rope buckets.

The object of my invention is to produce a device to be used in connection with two-rope buckets or other constructions which employ two ropes in an analogous manner for hoisting and by which a central suspension of the bucket may be attained at all times, if desired.

Another object which may be attained with my device is a separation of the two ropes while hoisting such that the turning of the bucket in a manner which would tend to twist the ropes may be prevented.

Further objects of my invention may be seen by an examination of the specification and claims.

My invention will be defined by the claims terminating this specification.

The drawings accompanying herewith illustrate my invention in forms now preferred by me.

Figure 1 shows a side elevation of a bucket having my invention applied thereto. Fig. 2 is a side elevation of the bucket-head and my attachment similar to that shown in Fig. 1, but with the parts in a different position. Fig. 3 is a side elevation of a bucket-head with my device attached thereto viewed from a point at right angles to that shown in Figs. 1 and 2, and Fig. 4 is a side elevation of a bucket-head with my device attached thereto in a form adapted to prevent twisting of the bucket.

By the term "two-rope" bucket as herein employed I refer to buckets usually of the clam-shell type, which employ one rope for closing the bucket and another rope for opening the bucket, either rope being employed for hoisting or lowering the bucket, depending on whether the bucket is opened or closed at the time. It is of course evident that the same device would be of advantage in hoisting or lowering any object which was operated in an analogous manner by two ropes.

The form of bucket chosen for the illustration is that which in the trade is known as an "orange-peel" bucket. This bucket belongs to the general class of clam-shell buckets, although not so referred to by the trade. The bucket shown is provided with blades or scoops 1, which are each secured to an arm 2, and all of these arms are pivoted to a central frame 6 at their inner or central ends. The outer ends of these arms adjacent the point of union with the bucket 1 are pivoted by pins 3 to rods 4, which extend upwardly and at their upper ends are pivoted in a head 5. The frame 6 carries a shaft 7, upon which is mounted a wheel 20, about which the closing-rope 15 passes. The same shaft 7 has cams 8 secured thereto, one at each side of the wheel 20, to each of which cams one end of a side chain 9 is fastened, so that when the wheel 20 is turned the chains 9 are wound upon their respective cams and the wheel therefore raised toward the head. The upper ends of the chains 9 are secured to links 9^a, which in turn are pivotally supported from the head.

The above description applies to the construction shown in Fig. 1; but it is evident that any form of bucket-operating mechanism may be substituted therefor if the same be of a type which resembles this in the method of operation for opening and closing the bucket by pull upon separate ropes. The construction described is only given as illustrative of a form of mechanism to which my invention is adapted for attachment.

In the ordinary construction of devices of this character the links 9^a are secured directly to the head. In my device the links 9^a are not secured directly to the head, but are pivotally secured to a suspension member, which latter is pivoted upon the head, the links 9^a being secured thereto in such a manner as to tend to rock the suspension member in one direction. The holding-rope is secured to this suspension member in such a manner as to tend to rock it in the opposite direction. The suspension member 11 is

shown as pivoted upon pins 12, which are supported by lugs carried by the head 5 and preferably in such a manner as to leave a clear opening at the center of the head for the passage of the closing-rope 15. The pivot 10 for the side chains is preferably located above the pivot 12 and a little to one side thereof. This offset from the vertical position should be sufficient to insure a prompt rocking of the suspension member when the strain is released from the holding-rope 16 and applied to the closing-rope 15. I also prefer that the pivot 12, by which the suspension device is secured to the head, be located a little to one side of the center of the bucket and also prefer to provide the suspension member with a surface 18 adapted to contact with the head, so as to limit the swing of the suspension member under the influence of the holding-rope to such a point where the pin 14, by which the holding-rope is connected with the suspension member, is located upon the center line of the bucket. I also prefer to have another surface 17 upon the opposite side of the center adapted to contact with the head and limit the rocking of the suspension member in the opposite direction. A guide-pulley 13 is mounted in the suspension member, and the closing-rope 15 is passed over this wheel in the manner shown in the drawings. In the position shown in Fig. 2 the holding-rope 16 is supposed to be entirely supporting the bucket, the closing-rope 15 being slack. In this position the holding-rope is exactly upon the central line of the bucket and the closing-rope is a little to one side thereof at the point where it contacts with the guide-pulley 13. If no weight is supported by the closing-rope, the bucket will be centrally suspended. If, however, the holding-rope be slackened and strain placed upon the closing-rope, this will permit the pull of the side chains 9 to throw the suspension member into its opposite position, or that shown in Fig. 1. It is true the side pull of the closing-rope being bent over the guide-pulley 13 would tend to throw the suspension member in an opposite direction; but the force exerted in this way would be comparatively slight, as the angle is not very great. Moreover, as the power of the closing-rope is greatly multiplied by reason of the difference in diameter of the wheel 20 and the cams 8 the strain upon the side chains 9 is many times greater than the direct strain upon the closing-rope, and this will more than counterbalance any opposite tendency due to the side pull of the closing-rope. With the suspension member in the position shown in Fig. 2 the holding-rope 16 has been thrown to one side of the center and the closing-rope 15 has been brought to the center line, so that with the holding-rope slack the bucket is still centrally suspended.

By a slight modification in the proportions of the parts it is possible to secure another desirable result—namely, a separation of the ropes in such manner that strain may be maintained upon both while hoisting in such a way as to prevent twisting of the bucket and yet without danger of opening the bucket. A construction designed to secure this result is shown in Fig. 3. In this case the pivot 12, by which the suspension device is secured to the head, is located at a greater distance from the center line of the bucket and the pulley 13 does not throw the closing-rope 15 to the center line of the bucket. In fact, the pulley 13 may be mounted directly upon the head 5, where the exact central suspension of the bucket is not of importance. The arm 19, to which the holding-rope is connected, is lengthened, and preferably the angle of motion of the device is considerably increased. In such case it is also preferred that the pin 10, to which the said chains are connected, and the pins 12, by which the device is pivoted to the head, be horizontally separated a greater distance than would ordinarily be preferable in other cases. In the position of such a device as this, as shown in Fig. 4, the strain upon the side chains 9 being many times greater than the strain upon the closing-rope and the strain upon the closing-rope being supposed to at least equal the strain upon the holding-rope the tendency to hold the arm 19 down will not be counteracted by strain upon the holding-rope until the proportionate length of the arms upon which each acts is the same as the proportion between the two parts of the closing mechanism—that is, the proportiou between the strain upon the closing-rope and the said chains. Ordinarily it would be neither desirable nor necessary to put a strain upon the holding rope while hoisting at all approaching the strain upon the closing-rope. If this were done, it would be necessary in order to maintain a perpendicular suspension of the bucket that the holding and closing ropes should be equally removed from the center line of the bucket. A strain much less than this would be sufficient to prevent twisting of the bucket. The proper poportioning of the distance between the pins and their position is a question of design to be determined by the conditions of any particular case and the results desired. It is evident that these proportions may be widely varied to correspond with the exact results which it is desired to attain without, however, departing from the invention, although the constructions may be widely varied in appearance. I do not, therefore, wish to be limited to the constructions herein shown, but to claim as my invention any construction which will fall within the scope of the claims when broadly constructed.

In the claims I have used the term "windlass" and "wheel mechanism" as applied to the closing means. It will be seen that the wheel 20 and the cams 8 form, in effect, a windlass and wheel, and these, together with the side chains 9 and the other immediately-

coöperating parts, constitute the closing means.

What I claim is—

1. A suspension device for buckets of the type using a holding-rope and a closing-rope, comprising means contained within the bucket for closing the same and actuated by the closing-rope, and means operated by strain upon the said closing means for shifting the line of suspension from said closing-rope toward the center line of the bucket.

2. The combination in a two-rope bucket of means operated by one rope for closing the bucket, with means operated by said closing means for shifting the point of suspension by said closing-rope toward the center line of the bucket.

3. The combination in a two-rope bucket, of means for multiplying the power of one of said ropes to close the bucket, with means operated by said power-multiplying mechanism for shifting the point of suspension of the bucket by the closing-rope toward the center line of the bucket.

4. A suspension device for two-rope buckets adapted to be pivotally connected with the bucket, and having means for attaching the holding-rope thereto, a guide for the closing-rope, and means for attaching thereto a member connected with the bucket-closing mechanism eccentrically of the attachment of said suspension device to the bucket.

5. A suspension device for two-rope buckets having a pivotal connection with the bucket, a connection for the holding-rope, a guide for the closing-rope and a connection from the closing mechanism thereto respectively upon opposite sides of its pivotal connection with the bucket.

6. A suspension device for two-rope buckets having pivotal connection with the bucket, a connection for the holding-rope, a guide for the closing-rope in one direction from the said pivotal connection with the bucket, and a connection from the bucket-closing mechanism to said device at the opposite side of said pivotal connection with the bucket.

7. A suspension device for two-rope buckets adapted to be pivotally connected with the bucket, and having means for attaching the holding-rope thereto, a guide for the closing-rope, means for attaching thereto a member connected with the bucket-closing mechanism to swing said suspension device oppositely to the closing-rope and a stop limiting its swing thereby.

8. A suspension device for buckets of the type using a holding-rope and a closing-rope, comprising means contained within the bucket for closing the same and actuated by the closing-rope, and means operated by strain upon the said closing means for shifting the line of suspension from said closing-rope toward the center line of the bucket, and a stop limiting its swing in this direction.

9. The combination in a two-rope bucket of means operated by one rope for closing the bucket, with means operated by said closing means for shifting the point of suspension by said closing-rope toward the center line of the bucket, and a stop limiting its swing in this direction.

10. The combination in a two-rope bucket, of means for multiplying the power of one of said ropes to close the bucket, with means operated by said power-multiplying mechanism for shifting the point of suspension of the bucket by the closing-rope toward the center line of the bucket, and a stop limiting said shifting movement.

11. A suspension device for two-rope buckets provided with means for pivotal connection with the bucket, a guide for the closing-rope, an attachment for the holding-rope and an attachment for a member of the bucket-closing means, said last two attachments being adapted to swing the suspension devices in opposite directions.

12. A suspension device for two-rope buckets provided with means for pivotal connection with the bucket, a guide for the closing-rope, an attachment for the holding-rope and an attachment for a member of the bucket-closing means, said last two attachments being adapted to swing the suspension devices in opposite directions, and stops limiting the swing of said device in each direction.

13. A suspension device for two-rope buckets adapted to be pivotally connected thereto, and having a guide for the closing-rope, an attachment for the holding-rope and an attachment for a member of the bucket-closing mechanism above the pivotal connection of said device with the bucket.

14. In a two-rope bucket in combination, a frame, bucket members pivoted thereto, a bucket-closing mechanism comprising a windlass-and-wheel mechanism connected with the bucket members, chains adapted to be wound upon the windlass, a closing-rope passing about the wheel, a suspension member pivoted to the frame, a connection for said windlass-chains with the suspension member adapted to swing it one way, a holding-rope connected with said suspension member to swing it the other way, and a guide for the closing-rope carried by said suspension member.

15. In a two-rope bucket, in combination, a frame, bucket members pivoted thereon, a holding-rope, a closing-rope, a wheel-and-windlass mechanism carried by the bucket members and operated by the closing-rope, a suspension member pivoted to the frame and having a guide for the closing-rope, and an attachment for the holding-rope, and a flexible member winding upon the windlass and connected with said suspension member to swing it to draw the closing-rope toward the center line of the bucket and in opposition to the holding-rope.

16. In a two-rope bucket, in combination, a frame, bucket members pivoted thereto, a bucket-closing mechanism comprising a wind-

lass-and-wheel mechanism connected with the bucket members, chains adapted to be wound upon the windlass, a closing-rope passing about the wheel, a suspension member pivoted to the frame, a connection for said windlass-chains with the suspension member adapted to swing it one way, a holding-rope connected with said suspension member to swing it the other way, and a guide for the closing-rope carried by said suspension member, and stops limiting the swing of said suspension member.

In testimony whereof I have hereunto affixed my signature, this 28th day of October, 1903, in the presence of two witnesses.

HENRY L. REYNOLDS.

Witnesses:
ROLLIN C. WOOSTER,
W. P. MAYNARD.