A. E. NORRIS.

HOISTING BUCKET.

APPLICATION FILED JULY 15, 1912.

1,231,779.

Patented July 3, 1917.

5 SHEETS—SHEET 1.

Fig. 1.

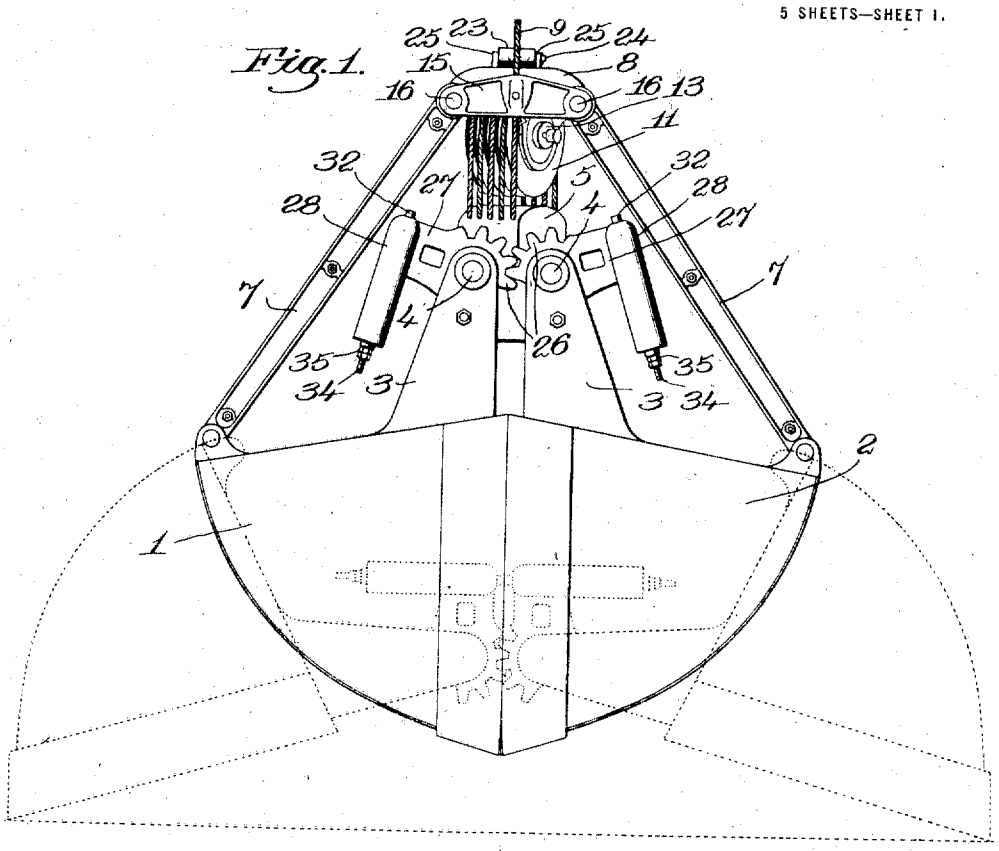
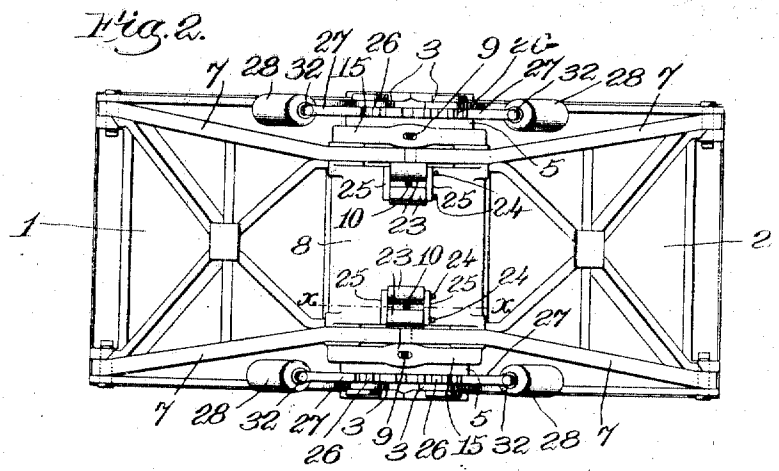


Fig. 2.



Witnesses.

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5 SHEETS—SHEET 2.

Fig. 3.

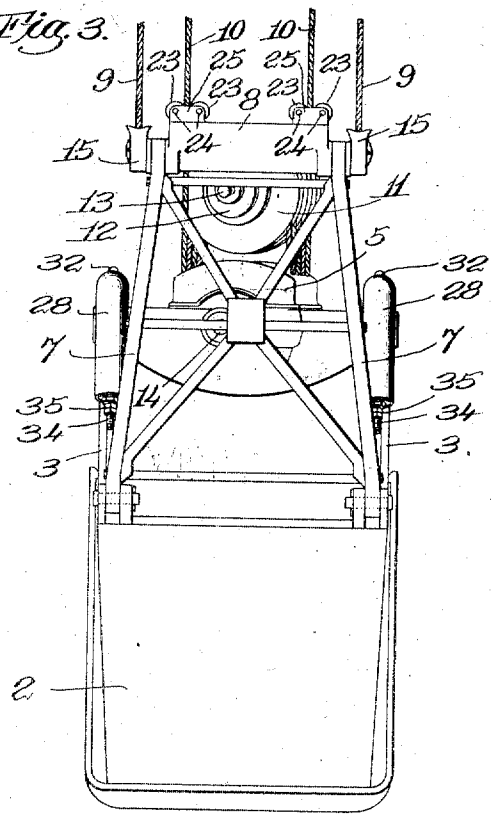


Fig. 4.

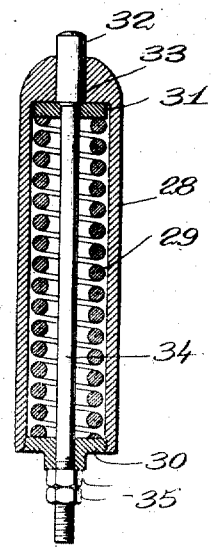
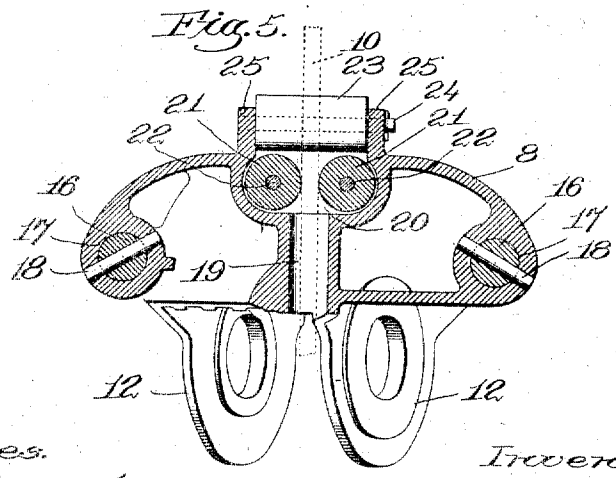


Fig. 5.



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5 SHEETS—SHEET 3.

Fig. 6.

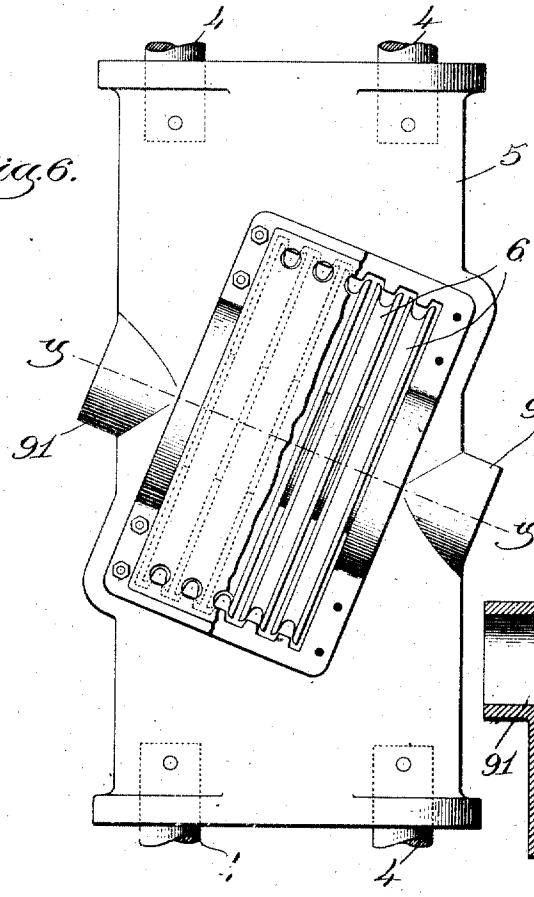


Fig. 7.

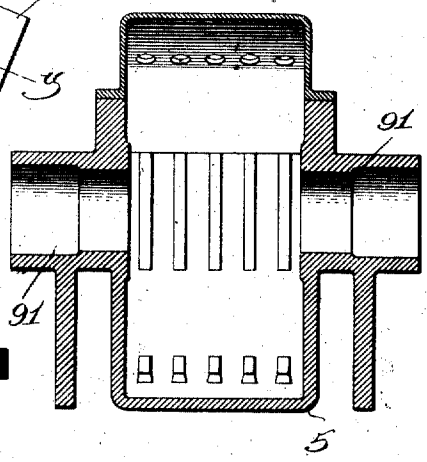
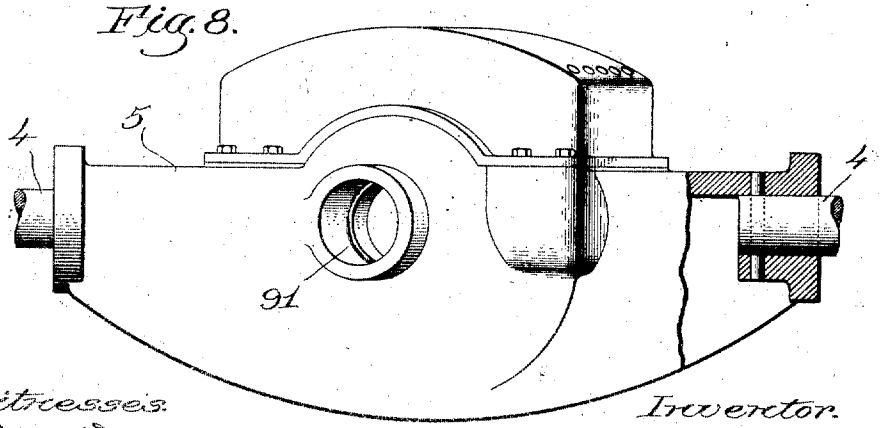


Fig. 8.



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5 SHEETS—SHEET 4.

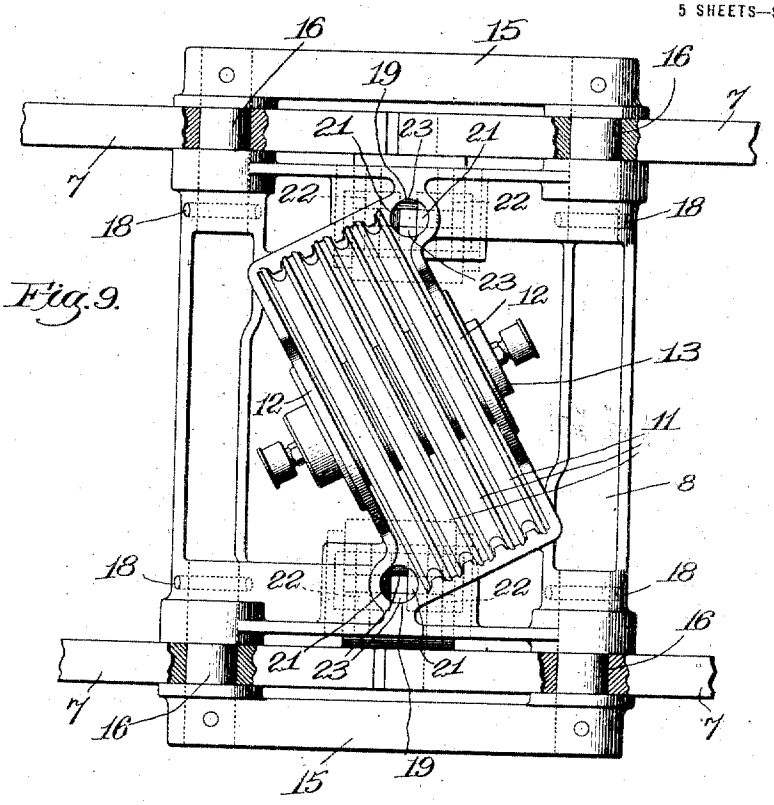


Fig. 9.

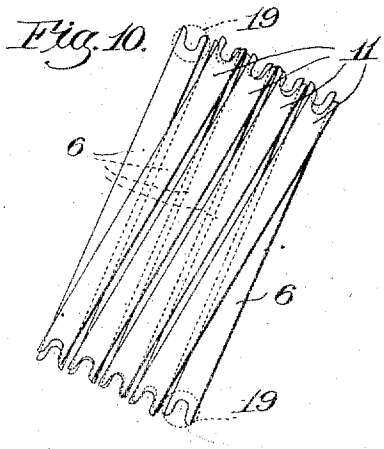


Fig. 10.

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5 SHEETS—SHEET 5.

Fig. 11.

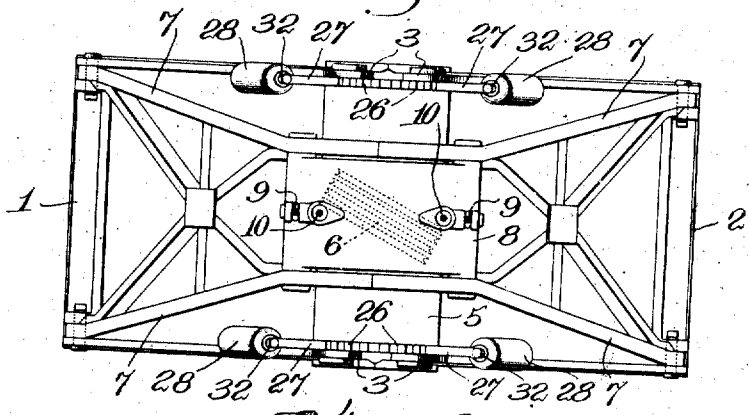
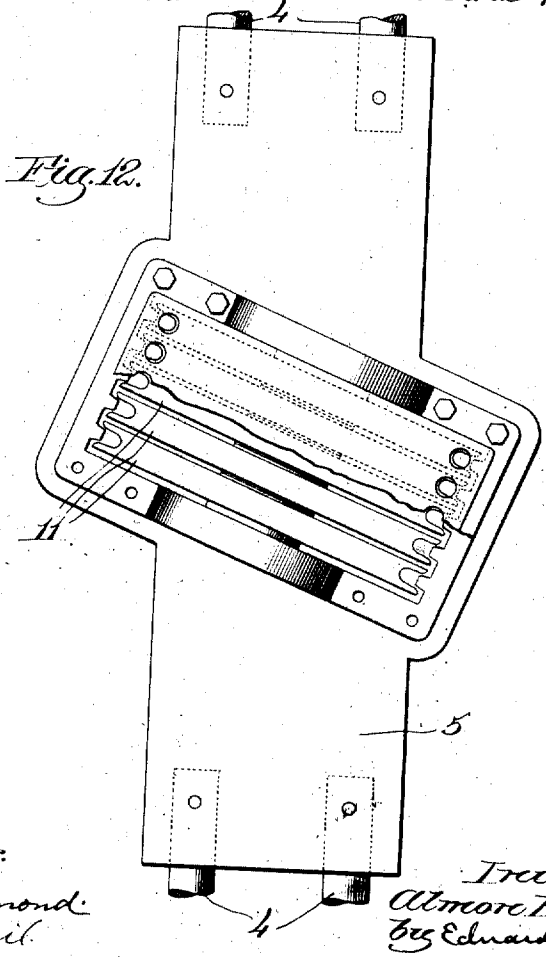


Fig. 12.



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UNITED STATES PATENT OFFICE.

ALMON E. NORRIS, OF CAMBRIDGE, MASSACHUSETTS.

HOISTING-BUCKET.

1,231,779. Specification of Letters Patent. Patented July 3, 1917.

Application filed July 15, 1912. Serial No. 709,392.

To all whom it may concern:

Be it known that I, ALMON E. NORRIS, a citizen of the United States, residing at Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Hoisting-Buckets, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to hoisting buckets or grabs of that type which are commonly used in handling coal, ore, dirt and other similar material.

One of the objects of the invention is to provide a novel grab or hoisting bucket of this type in which the holding rope or cable and the closing rope have such a relation to each other and are so connected to the bucket that the latter will not swing or twist while the grab is being opened or closed. Another object of the invention is to provide a novel grab of this nature having a buffing device for cushioning the opening movement of the grab and for limiting such movement so that when the grab is properly opened the edges of the bucket segments will be in the best position to readily enter the material when the grab is closed. Still another object of the invention is to improve generally grabs or hoisting buckets of this type, all as will be more fully hereinafter described and then pointed out in the appended claims.

Referring to the drawings wherein I have illustrated some embodiments of my invention, Figure 1 is a side view of a grab embodying my invention;

Fig. 2 is a top plan view;

Fig. 3 is an end view;

Fig. 4 is an enlarged sectional view through one of the buffing devices;

Fig. 5 is an enlarged sectional view on substantially the line x—x, Fig. 2;

Fig. 6 is a top plan view of the weight or central member to which the bucket segments are pivoted with a portion thereof broken out to show the sheaves;

Fig. 7 is a section on the line y—y, Fig. 6, with the sheaves omitted;

Fig. 8 is a side view of the device shown in Figs. 6 and 7;

Fig. 9 is a bottom plan view of the head;

Fig. 10 is a view showing the relative arrangement of the sheaves over which the closing rope passes;

Fig. 11 is a top plan view of a bucket embodying my invention in a different form from that shown in Figs. 1–10;

Fig. 12 is an enlarged plan view of the weight or central member of the bucket shown in Fig. 11.

The bucket or grab herein shown is of that familiar type comprising two bucket segments pivotally connected together and each pivotally connected by links to a head to which a holding rope is connected, the bucket segments being closed by means of a closing rope which passes around sheaves carried in the head and by the bucket segments, respectively. The two bucket segments are designated 1 and 2, respectively, and each is provided with the upwardly-extending arms 3 which are pivotally connected at their upper ends to pintles 4 extending from a central sheave-carrying member 5 which receives a plurality of sheaves 6, see Fig. 6, over which the opening and closing rope 10 passes. These bucket segments also have links 7 pivoted to their upper rear corners, the upper ends of which links are pivotally connected to a head 8 to which the holding rope 9 is secured. The head 8 also sustains a plurality of sheaves 11 over which the opening and closing rope 10 passes as usual in this class of devices. In grabs or hoisting buckets of this nature as heretofore made the holding rope has usually been a single rope having its lower end fastened to the head 8, said rope extending up over the trolley of the tower or other supporting device to the drum of the hoisting engine. The closing rope, on the other hand, has usually been a single rope which passes down through an aperture in the head and around the sheaves 6 and 11, the end of the rope being fastened to the head or to some other part of the bucket. Where this arrangement of closing and hoisting ropes is used, the holding rope is usually connected to the center of the head while the closing rope is connected to the head at one side of the center. As a result when the bucket is being held by the holding rope it will hang centrally, while when the weight of the bucket is thrown onto the closing rope, as is done when the bucket is being closed and is being transported, the weight comes on one side of the line of the rope. This shifting of the weight from one rope to the other gives the bucket a twisting tendency which is often sufficient to interfere with the rapid operation of the bucket. In order to over-

come this and to provide a construction wherein the bucket will be held steady at all times, I have provided a construction whereby both the closing and the holding ropes are symmetrically arranged relative to the bucket so that the weight of the bucket always comes centrally on the ropes whether the bucket is being sustained by one set of ropes or by the other. To accomplish this end I make the holding rope in the nature of a double rope, both ends of which are attached to the head of the bucket, said two ends passing up over the trolley and thence to the winding drum in usual manner.

The closing rope 10 is also in the nature of a double rope, both ends or strands of which lead to the bucket and pass into the head thereof on opposite sides of the bucket, the two strands passing up over the trolley or supporting device and thence to the drum of the hoisting engine in usual manner.

I will preferably make the two strands or ends 10 parts of a continuous rope or cable, and the rope will simply pass down through the head and thence around the sheaves 6 and 11 alternately and thence up through the head again, although such a construction is not essential.

The head 8 is provided with depending ears 12 which support a pivotal pin 13 on which the sheaves 11 are loosely mounted, and the central weight or sheave-receiving member 5 is also provided with bearings 91 in which is sustained a pin 14 on which the sheaves 6 are loosely mounted. The ropes 9 are connected at their ends to yokes 15 which in turn are detachably connected to the main portion of the head 8. These yokes 15 are each provided with two studs 16 which extend into apertures 17 formed in the head 8 and the studs 16 are locked to the head 8 by locking pins 18 which extend through apertures formed in the head 8 and transversely through the studs 16. These studs 16 also furnish the pivotal connection between the links 7 and the head, as clearly seen in Fig. 9, said links being provided at their upper ends with eyes which are situated between the yokes 15 and the head 8 and through which the studs 16 extend. The head 8 is also provided with apertures 19 through which the ropes 10 pass, and in order to take the wear between the rope and the head as the rope is paid out or taken in, I have provided a form of fair-leader or rope guide which involves anti-friction rollers over which the rope passes. Each rope guide comprises two pairs of rollers arranged with the rollers of one pair situated at right angles to those of the other pair. As seen in Fig. 5 the head 8 is provided with a recess 20 in which are journaled two rolls 21 between which the rope passes, said rolls 21 being journaled on pintle pins 22 sustained in the head. Situated above the rolls 22 is another pair of rolls 23 which are arranged at right angles to the rolls 22. These rolls 23 are journaled on pins 24 that are sustained in ears 25 rising from the head. The two pairs of rolls 23 and 21 being situated at right angles to each other form an opening through which the rope passes, as best seen in Fig. 9, and these rolls form an anti-friction bearing which will prevent the rope from contacting with or wearing the sides of the aperture 19.

In order to prevent the bucket from twisting while it is being operated I propose to arrange the points of connection between the holding rope 9 and the yokes 15 in line with the apertures 19 through which the ropes 10 pass, as will be clearly seen from Fig. 2. Moreover, I propose to place the two ropes 9 outside of the ropes 10 and equal distances therefrom so that the ropes will have a symmetrical arrangement relative to the bucket. With this construction it will be seen that the center of gravity of the bucket whether loaded or empty will always come midway between the ropes 9 or the ropes 10, and that as a consequence the changing of the weight from the holding ropes 9 to the opening and closing ropes 10 or vice versa will not throw the weight out of alinement with the suspending means. The bucket, therefore, will not tend to twist as would be the case if this symmetrical arrangement was not employed. Moreover, by reason of the fact that the holding rope 9 and the closing rope 10 both have connection with the bucket at two points the bucket is held more steadily and with much less liability to turn around a vertical axis and thereby twist up the ropes or cables.

The arms 3 of the bucket segments are each provided with gear teeth 26 which mesh with each other, thus insuring that the bucket segments will open and close in unison. In buckets of this type as heretofore made it has not been customary to provide any stops to limit the opening movement of the bucket segments, and when the bucket is opened and dropped onto the pile of material to be moved the lips of the bucket segments swing back so far that sometimes they do not bite into the material well when the bucket is closed. The bucket will bite into and enter the material best if the bucket segments are opened about to the dotted line position shown in Fig. 1, and to prevent them from opening any farther I have provided stops which limit the opening movement of the bucket at this point, and I have also made said stops in the form of cushions or buffers so that they will operate to cushion the opening movement of the bucket. As herein shown these stops are

carried by extensions 27 rigidly sustained by the arms 3, and each stop comprises a hollow member or holder 28 (see Fig. 4) in which is situated a spring 29, one end of which bears against the end 30 of said holder and the other end of which bears against a collar 31 that is mounted on a yielding buffer 32 that is sustained in the holder 28. This buffer 32 has a shoulder 33 against which the collar 31 engages and it projects beyond the end of the holder 28. The buffer 32 is formed with a stem 34 which extends through the holder 28 and has the adjusting nuts 35 thereon which limit the extent to which the buffer projects through the holder or carrier 28. When the bucket is opened, as shown in Fig. 1 the holders 28 swing around into alinement with each other and the two buffers 32 meet each other thereby limiting the operating movement of the bucket segments. Since the buffers are yieldingly sustained they operate not only to limit the opening movement of the segments, but they also cushion such opening movement and thus prevent any injury to the parts. It will be remembered that the central member 5 is quite heavy, hence the necessity of the cushioning action, for when the bucket is open this weighted member 5 does not rest on the material which is being handled, but is held in the position shown in Fig. 1 by the engagement of the stops with each other.

In Figs. 1 to 10 a construction is shown wherein the ropes 8 and 9 are in line with each other in a direction extending transversely of the bucket. My invention may also be employed in a construction wherein these ropes will be in line with each other in a direction extending longitudinally of the bucket or at right angles to that shown in Fig. 2. Such a construction would merely involve shifting the position of the pulleys 6 and 11 through an angle of 90°. In Figs. 11 and 12 I have shown this latter construction, the construction shown in these figures being substantially the same as that above described with the exception that the ropes 9 and 10 are in line with each other in a direction extending longitudinally of the bucket segments.

Although I have shown my invention as embodied in a type of bucket wherein the two bucket segments are pivoted to turn about separate axes, yet it will be obvious that the invention may be readily applied to other types of buckets.

I have herein used the terms "holding rope" and "closing rope" to indicate the connection by which the bucket is held and by which it is opened and closed. In the illustrated embodiment of my invention the holding rope comprises two ends or strands 9 and similarly the closing rope comprises two ends or strands 10. Hence by the terms "holding rope" and "closing rope" as used in the appended claims I do not wish to be limited to a single strand or end, but intend to include the entire connection, whether of one or more strands or ends, which performs the holding or opening and closing function. The holding rope and the closing rope may be of any suitable material adapted for the purpose.

One advantage of the construction herein shown is that the weight on the two ends of the closing rope will be automatically equalized, for if during the operation of the bucket one of the ends of the closing rope 10 becomes longer than the other, the extra strain on the shorter end will draw said end through the sheaves and will thus equalize the strain on the two ends. It will be obvious that the heavy strain of lifting the load and transferring it comes on the closing rope and not on the holding rope and in buckets of the large sizes it becomes exceedingly important to equalize the strain on the two ends of the opening and closing rope.

While I have herein shown some embodiments of my invention I do not wish to be limited to the constructional features shown.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a hoisting bucket, the combination with a head having apertures in each of two opposite sides, of two yokes each having studs extending therefrom and entering said apertures in the head, locking pins extending transversely through these studs for locking them to the head, pivotally connected bucket segments, links pivotally mounted on said studs and connected to said bucket segments and a holding rope having two ends, one fixedly secured to each yoke.

2. In a hoisting bucket, the combination with a head comprising a central member having apertures and yokes at each side of the head provided with studs which enter said apertures, of two bucket segments, links pivotally connected to said bucket segments and to said studs, a closing rope operatively connected to the bucket segments, and a holding rope comprising two ends, one fastened to each of said yokes.

3. In a hoisting bucket, the combination with two bucket segments, each having upwardly-directed arms, of a projection extending laterally from each arm, a buffer device on the end of each projection, each buffer device comprising an elongated casing extending rearwardly from the projection substantially parallel to the corresponding bucket arm, a buffer element slidably mounted in each casing and projecting from the front end thereof, and a spring within the casing for resisting the rearward movement of the buffer element, the buffer

devices on one segment being situated to be engaged by those on the other segment when the bucket is fully opened.

4. In a hoisting bucket, the combination with two bucket segments, each having upwardly-directed arms, of a member to which said arms are pivotally connected, a projection extending laterally from each arm in a direction at right angles to the axial line of the pivotal connection between said arm and said member, and a buffer device carried on the end of each projection, said buffer devices being so situated relative to each other that those on the arms of one bucket segment will engage those on the arms of the other bucket segment when the bucket is fully opened.

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

ALMON E. NORRIS.

Witnesses:

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THOMAS J. DRUMMOND.