F. A. JOHNSON.

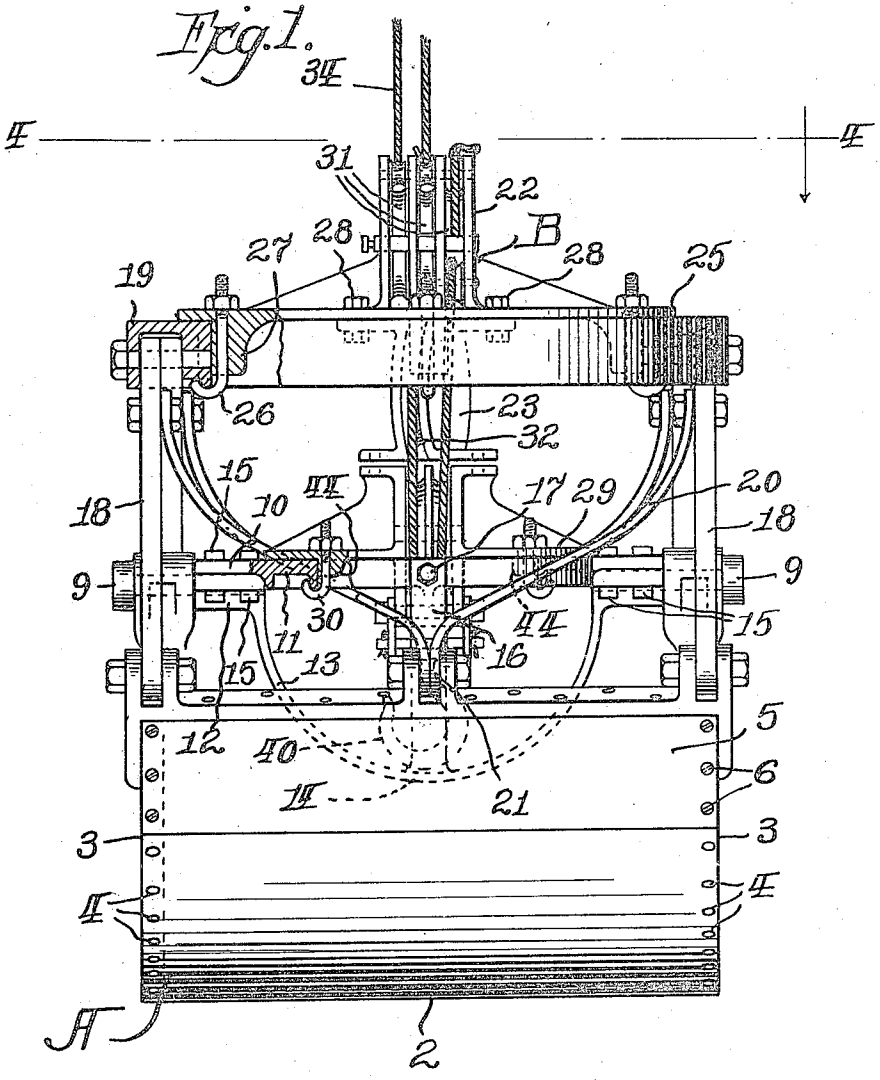
BUCKET AND HOISTING APPARATUS.

APPLICATION FILED OCT. 16, 1919.

1,424,910. Patented Aug. 8, 1922.

3 SHEETS—SHEET 1.

Fig. 1.



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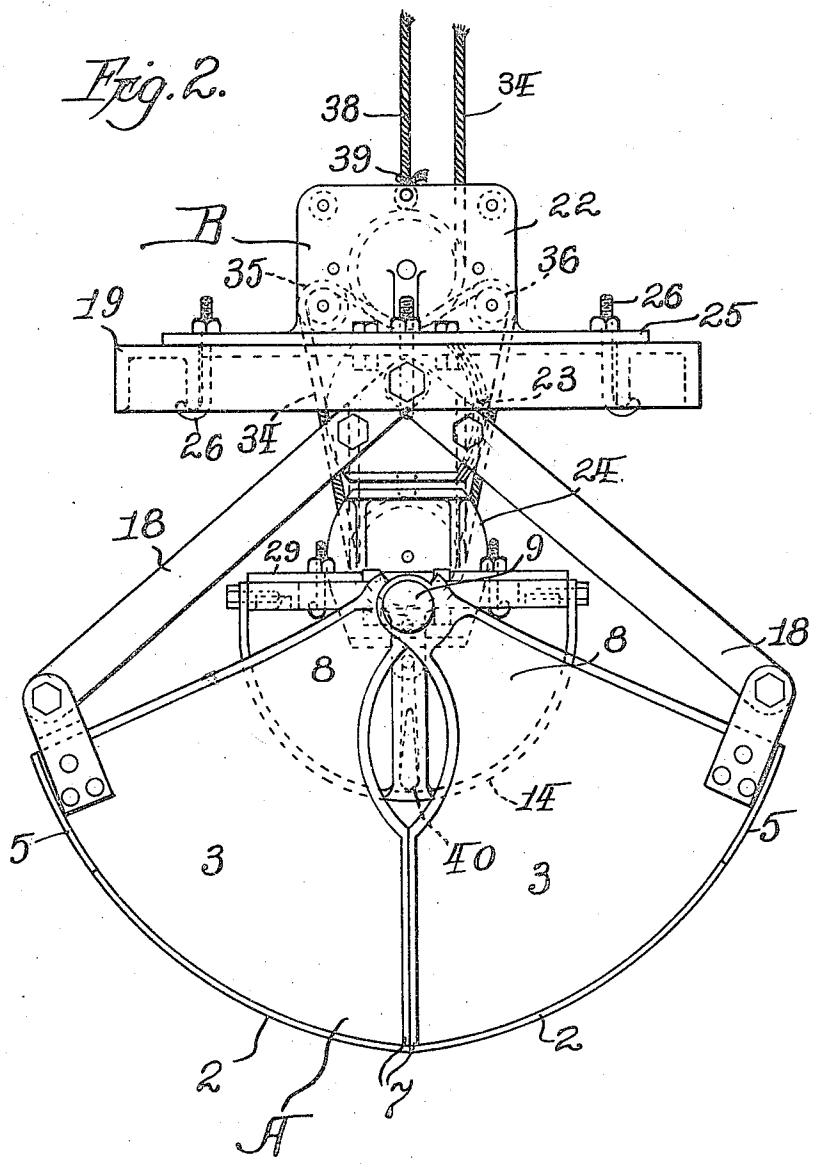
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

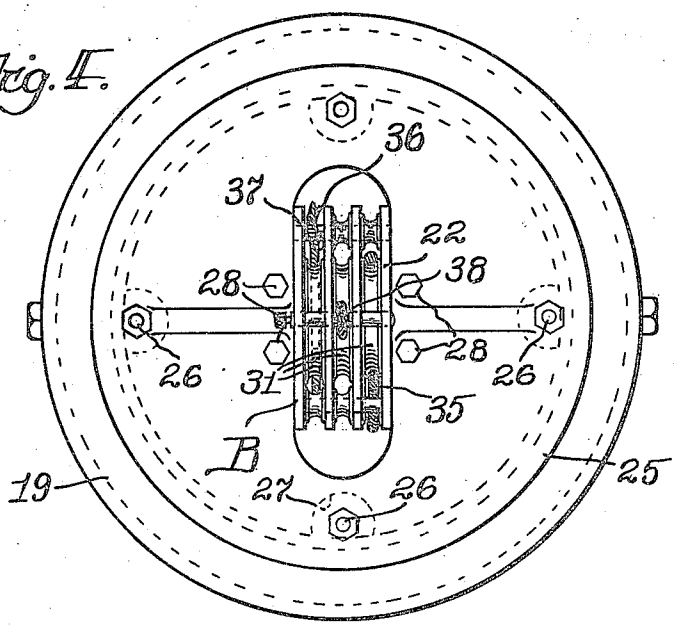


Fig. 3.

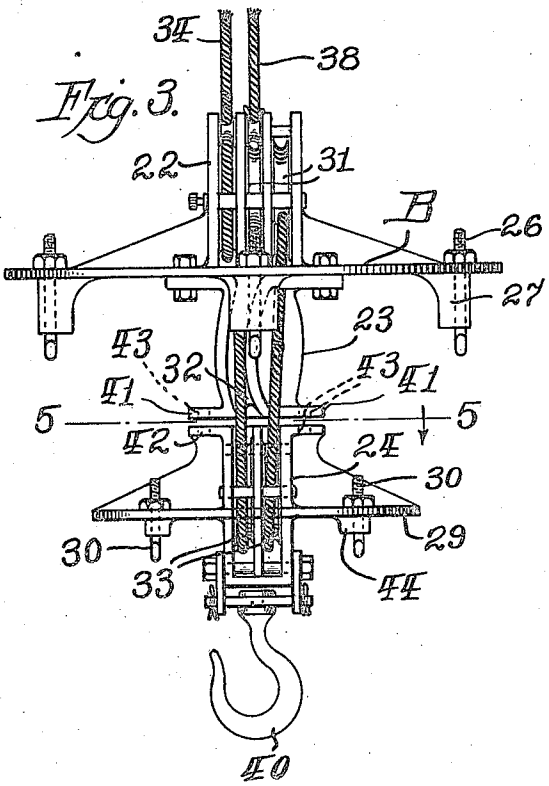
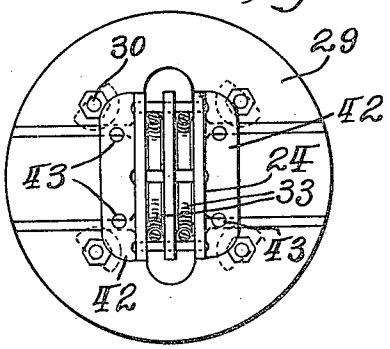


Fig. 5.



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UNITED STATES PATENT OFFICE.

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BUCKET AND HOISTING APPARATUS.

1,424,910. Specification of Letters Patent. Patented Aug. 8, 1922.

Application filed October 16, 1919. Serial No. 331,136.

To all whom it may concern:

Be it known that I, FRED A. JOHNSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented a new and useful Improvement in Bucket and Hoisting Apparatus, of which the following is a specification.

My invention relates to buckets of the grab or clam shell type, or other grabbing devices for various purposes. Buckets of this nature are often used for ore, coal or sand and my invention would apply equally well to grabbing and hoisting devices for other purposes, such as sugar cane and the like. My device is constructed so that the bolts holding the hoisting mechanism to the bucket or grabbing device can be readily loosened and the hoisting mechanism rotated in a horizontal plane in the circular head member and a similar member below the head member, which is connected to hold the stub shafts for the hinged ends of the bucket jaws. This construction provides a simple means for adjusting the spread of the bucket blades in relation to the hoisting mechanism, to allow the bucket to enter a hatchway or car without the necessity of an attendant to turn the bucket

In the use of any grab bucket, it is desirable at times to change the relation of the hoisting mechanism to the spread of the bucket blades and it is very desirable to have a device which can be easily and quickly operated. My device is designed to accomplish these results in a simple form.

My invention further provides means for removing a portion of the bucket blades to gage the amount of material to be carried by the bucket, this being a very essential feature in connection with the use of the bucket for coal, ore and other heavy materials.

My invention provides a hoisting mechanism which is readily detachable from the grabbing device or bucket and to which is attached a hook or clevis for use for grappling a chain or sling in a hoisting operation when the hoisting mechanism is separated or disengaged from the bucket or grabbing device. A spider guard and brace is provided on the bucket, which holds the stub shafts of the operating arms to hingedly hold the operating ends of the bucket jaws, the spider guard protecting the hook or clevis when the hoisting mechanism is connected with the bucket and reinforcing the bucket frame construction at the hinge points of the jaws. It is often an advantage to disengage the hoisting mechanism from the grabbing device at which time it is desirable to have a hook or clevis connected with the hoisting mechanism. My invention provides a hoisting mechanism to which the hook or clevis is connected at all times ready for use when the same is detached from the bucket or grabbing device and can be readily operated for various purposes.

In the drawings forming part of the specification:

Figure 1 is a side elevation of my bucket and hoisting device.

Figure 2 is an end elevation of the same.

Figure 3 is a front elevation of the hoisting mechanism separated from the bucket.

Figure 4 is a plan view of the head portion and hoisting mechanism of the device on the line 4—4 of Figure 1.

Figure 5 is a plan view of a portion of the device on the line 5—5 of Figure 3.

The drawings illustrate the grab bucket A, which is operated by the adjustable and detachable hoisting mechanism B. The bucket A is provided with bucket blades 2, which are attached to the cheeks 3 of the bucket by suitable screws or rivets 4, and a detachable portion 5 of the blades 2 is secured by the screws 6 to the cheeks 3. The portion 5 may be removed to limit or gage the capacity of the bucket A and is an essential feature in connection with the use of the bucket for coal, ore and other heavy material. The size of the portion 5 may be varied to suit the occasion so as to diminish the capacity of the bucket by removing the portion 5 of the blades 2, as may be predetermined. The biting edge of the blades 2 and cheeks 3 may be reinforced with a removable steel edge 7, which is secured to the same in any suitable manner and which can be replaced when it is necessary.

The cheeks 3 are extended to form operating arms 8, which are hingedly connected by stub shafts 9. The shafts 9 are rigidly clamped in suitable sockets formed in the projecting lugs 10, which extend from the circular channel shaped operating member 11 and the portion of the socket formed in the projecting ends 12 of the arms 13 of the semi-spherical guard 14. The portions 10 and 12 are clamped together by the bolts 15 to rigidly hold the shafts 9 diametrically

opposite to the circular operating member 11 so that the shafts 9 are, so to speak, rigidly connected to the operating member 11. The arms 16 of the spider guard 14 are secured to the member 11 by the bolts 17 to rigidly attach the guard 14 to the member 11 and to form a reinforcing brace to rigidly hold the shafts 9 to the member 11.

The outer ends of the bucket jaws and blades are pivotally connected by the arms 18 to the circular head member 19, which is channel shaped in cross section, and suitable brace arms 20 are pivotally connected at 21, centrally, to the bucket blades and to each of the arms 18 near the head member 19.

The hoisting mechanism B is composed of a top block 22, intermediate block 23 and lower block 24. The top block 22 is formed with a circular flange or horizontally disposed plate 25, which rests on the circular head member 19 and is detachably and adjustably connected thereto, by the hook bolts 26, which engage the inner flange of the channel shaped, ring like member 19. Spacing lugs 27 are formed projecting from the plate 25, which engage the inner surface of the member 19 to center the top block 22 in the head member and in relation to the bucket A. The bolts 26 extend through the lugs 27, which form reinforcing means at the point of engagement of the bolts 26 for the plate 25. When the bolts 26 are drawn tightly into engagement with the member 19 the block 22 is rigidly clamped in the member against movement, but by loosening the bolts 26 slightly the block 22 and plate 25 can be rotated without entirely disengaging the hook end of the bolts 26 to adjust the position of the block 22 in relation to the bucket A.

The block 23 is attached to the under side of the plate 25 by the bolts 28, with the block 23 set at a slight angle in relation to the block 22, the purpose of which will be hereinafter described.

The block 24 is formed with a horizontally extending plate or flange 29, which rests upon the circular operating member 11 and is rigidly clamped by suitable hook bolts 30 to the member 11 in a similar manner to the attaching of the block 22 and plate 25 by the bolts 26 to the member 19, so that the block 24 is detachably and adjustably held to the operating member 11.

Suitable sheave wheels 31 are held in the block 22 while the sheave wheel 32 is positioned in the block 23 and sheave wheels 33 in the block 24 so that an operating cable 34 can be reeved about the sheaves to form a block and tackle means for operating the bucket or grabbing device A to cause the blades or jaws of the same to open and close and thus receive or dump a load. The pivotal connection of the bucket blades or jaws is such as to freely clear at the rear ends of the blades as the bucket closes and to open freely in dumping its load or sufficiently to grab a load in the operation of filling.

As illustrated in the drawings, the operating cable or rope 34 is reeved below one of the sheaves 31 and over a sheave 35, which is positioned forward of one of the outer sheaves 31, thence the cable 34 extends downward about one of the sheaves 33 in the block 24 and upward over the sheave 32 in the block 23 and thence downward over the other sheave 33 in the block 24 and upward over a sheave 36 similar to the sheave 35 and positioned on the opposite side to the sheave 35 in the block 22 and from thence the cable is extended about the other outer sheave 31 and attached at 37 in the block 22 to rigidly secure the one end of the cable 34.

A second cable 38 is rigidly attached at 39 to the block 22 and which acts as the raising and lowering cable for the bucket and hoisting mechanism, while the cable 34 is the operating cable and operates in unison with the cable 38 when the bucket and hoisting mechanism is raised and lowered. This manner of connecting one end of the cable 34 causes the bucket A to be drawn downward to increase the bite or grip of the blades of the same in filling.

It it obvious, however, that the cables for operating the hoisting mechanism can be reeved about the various sheaves in any suitable manner so as to give a single or double purchase, depending upon the way in which the operating cables are reeved about the sheaves, the reeving of the cables being varied for different purposes.

A hook or clevis 40 is pivotally secured to the lower end of the block 24 and when the hoisting block and tackle mechanism B is attached to the bucket A, the hook 40 is enclosed or protected by the guard 14 and will not interfere with the operation of the bucket A. The guard 14 forms a central resting portion for the blades of the bucket A when the same are opened and come into engagement with the ground or other material and also prevents the hook from interfering with the loading of the bucket.

It is a material advantage to have the hook 30 remain attached to the hoisting mechanism B, which, when disengaged from the bucket A, is free to be used for various purposes with the hook 40 in readiness for use. Thus it only requires a few moments to disconnect the hoisting mechanism B from the bucket A, whereupon it can be used as may be desired.

The blocks 23 and 24 are formed with horizontally disposed flanges 41 and 42, which are provided with holes 43 so that the blocks 23 and 24 can be rigidly attached when it is desired for use with the mech-

anism B disengaged from the bucket or grabbing device.

The hook bolts 30 extend through suitable spacing lugs 44, which are formed projecting from the plate 29 so as to center the block 24 in the circular member 11. The lugs 27 and 44, together with the hook bolts 26 and 30 provide means for freely adjusting the hoisting mechanism B with the sheaves of the same in various positions in relation to the spread of the bucket blades or grabbing means and in fact allow the hoisting mechanism to be set at any angle in relation to the spread of the blades.

The construction of my device provides apparatus which is useful for many different purposes and which is readily convertible for the various uses, a feature which is of great importance in a device of this nature.

In accordance with the patent statutes I have described the principles of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims:

1. The combination of a grab bucket, a circular head member having an opening formed in the center thereof, a plurality of bucket sections, pivotally connected to said head member, a circular operating member positioned below said circular head member and connected to the buckets, and operating blocks detachably mounted on said circular head and operating member and adapted to be drawn through the opening in said head and removed therefrom.

2. A grab bucket comprising a head, an upper block detachably mounted on said head, a downwardly facing flange formed on said block, a bucket, a lower block detachably connected to said bucket and adapted to move relatively to said upper block, an upwardly facing flange on said lower block adapted to be positioned opposite said other flange and means for securing said flanges together.

3. A grab bucket comprising a lower frame member, a head, means for connecting said head to said bucket sections, a plurality of bucket sections pivoted to said frame member, a casing secured to said frame member forming a guard and an operating mechanism mounted on said frame member and head having a portion positioned within the guard.

4. The combination of a grab bucket, block and tackle operating means rotatably adjustable horizontally to any angle in relation to the blades of said bucket and a hook or clevis connected to said block and tackle means at all times and in an operative position when said block and tackle means is detached from said bucket.

5. A grab bucket comprising a lower frame member, a plurality of bucket sections pivoted to said frame member, a head, means for connecting said head to said bucket sections, a depending hemispherical casing secured to said frame member, and an operating mechanism mounted on said frame member and head having a portion positioned within the guard.

6. A bucket having grabbing blades, a circular channel shaped head member to which said blades are pivotally attached, a circular operating channel shaped member, stub shafts hingedly connecting the operating arms of said blades to said circular operating member, block and tackle means for operating said blades and means for adjustably and detachably connecting said block and tackle means to said circular head and operating members, whereby said block and tackle means can be rotated to the desired position in relation to the spread of the bucket blades and rigidly attached or disengaged from said head and circular operating member to be used independent of said bucket.

7. The combination of a grab bucket, a circular head member having an opening formed in the center thereof, a plurality of buckets, pivotally connected to said head member, a circular operating member positioned below said circular head member and connected to the buckets, operating blocks detachably mounted on said circular head and operating member, and a clevis secured to one of said blocks, said blocks and clevis being adapted to be withdrawn as a unit through the opening in said head and removed from the device.

8. A grabbing device in combination with a block and tackle operating means, means for adjustably connecting said block and tackle means in a horizontal plane to said grabbing device and means for rigidly connecting the blocks of said tackle means, rigidly together, for use when detached from said grabbing device.

FRED A. JOHNSON.