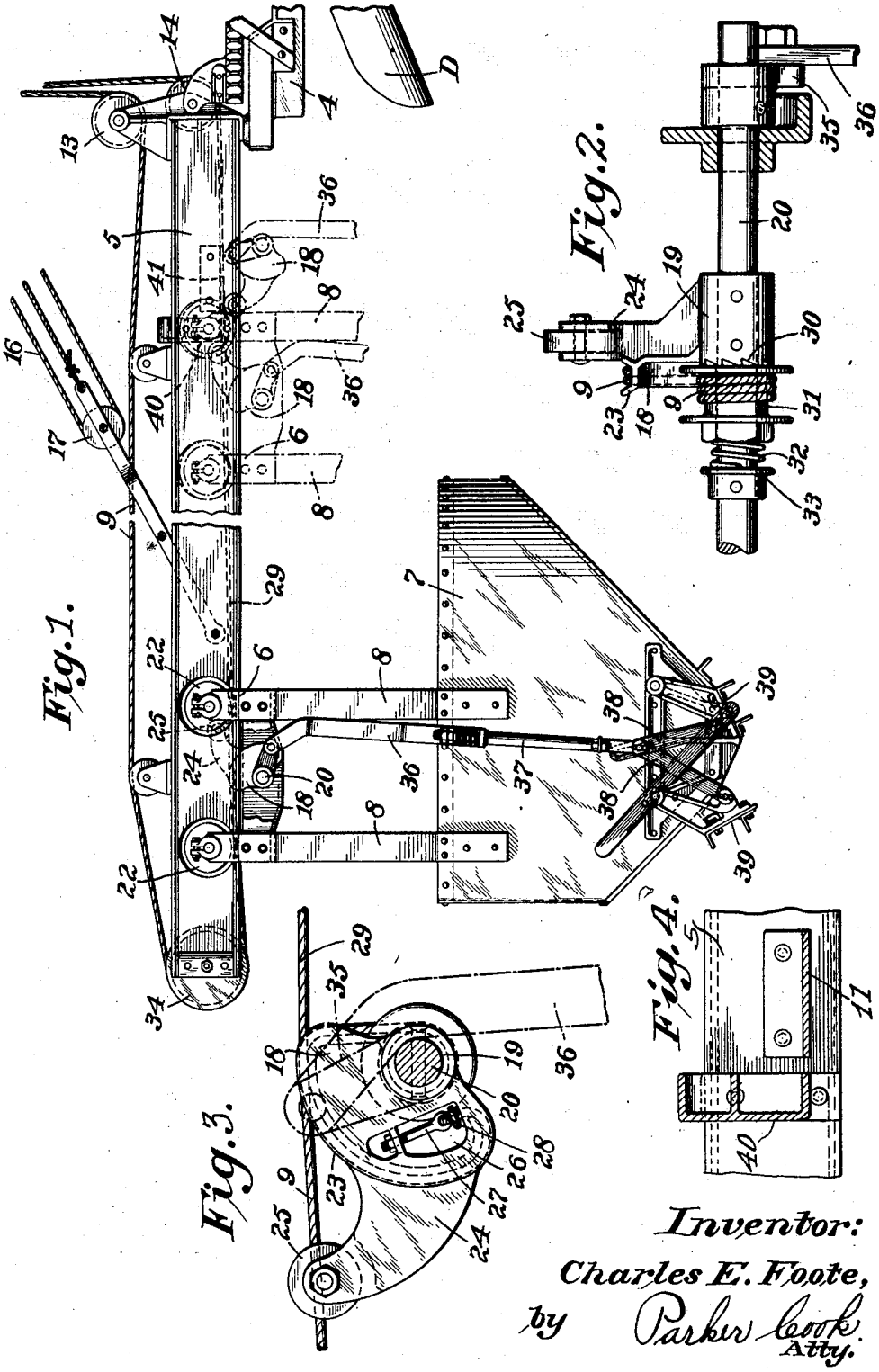
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BOOM AND BUCKET FOR CONCRETE PAVERS

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BOOM AND BUCKET FOR CONCRETE PAVERS

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My invention relates to new and useful improvements in buckets and tripping mechanism for concrete pavers, and more especially to the tripping mechanism, and has for an object to provide a bucket and tripping mechanism wherein the drive cable for the bucket is also arranged to operate the trip mechanism to open and close the doors of the bucket.

The invention in its broadest aspect is similar to the inventions shown in my previous patents, granted January 30, 1923, and December 25, 1923, numbered 1,443,354 and 1,478,945 respectively, but in both instances, it was necessary to provide an additional tripping cable, drum and brake for the drum, to operate the tripping cable, which in turn operated the doors, whereas, with the present invention, the tripping mechanism is changed and the main drive cable for the bucket so arranged with the tripping mechanism, that not only will the bucket be driven to and fro on the boom by the drive cable, but the doors may also be opened and closed by initially reversing the direction of travel of this main drive cable.

The bucket, per se, with its arrangement for opening one or both doors automatically, forms the subject matter of a separate application, filed by Floyd W. DeVinney, on May 8, 1926, bearing Serial No. 107,590, and in that instance my previous form of tripping mechanism is shown in conjunction with the bucket.

Still another object of the invention is to provide a trolley for supporting the bucket in which there is a segment over which is secured the main drive cable, so that as a part of the cable is taken up on the segment, another part pays off, the rocking of the segment breaking the toggle which in turn is connected to the doors of the bucket.

Still another object of the invention is to provide means on the segment wherein the doors will be automatically closed when the bucket has reached its innermost end of travel on the boom, and also wherein means are provided to hold the doors shut as long as the bucket is beneath the chute.

Still another object of the invention is to provide a clutch mechanism on the shaft on which the segment is mounted so that any sagging of the cable may be instantly taken up, so that the doors will always open and close quickly when the main drive cable is operated.

With these and other objects in view, the invention consists in certain new and novel arrangements and combination of parts, as will be hereinafter more fully described and pointed out in the claims.

Referring now to the drawings, showing a preferred embodiment of my invention,

Fig. 1 is a view of the boom and bucket, the bucket, being shown near the outer end of the boom and having started on its inward travel, the tripping mechanism having operated and one of the doors being shown in its open position; the dotted lines showing the tripping mechanism first about to be returned to normal and also returned to its normal position.

Fig. 2 is a detailed view of the cross shaft, showing the segment and clutch for tightening the cable about the segment.

Fig. 3 is an enlarged detailed view of the segment showing the manner in which the cable is attached thereto, and showing the integral arm of the segment which operates the same, and

Fig. 4 is an enlarged detail of the stop with which the segment arm contacts as the bucket approaches its innermost end of travel, and also of the plate for holding the toggle against operation until the bucket is moved from beneath the discharge chute.

Referring now more in detail to the several views, there is fragmentarily shown a platform 4 of a concrete paver on which there is mounted for horizontal as well as vertical adjustment a boom 5 similar to the boom shown in my Patent No. 1,443,354 of January 30, 1923.

Located on this boom 5 is a trolley 6 to which is secured a bucket 7 by the straps 8. The construction so far mentioned is similar to that shown in my previous patent just referred to, but from this point on the construction and operation are different.

There will be noticed a main drive cable

9 which, in the present instance, also operates the doors of the bucket it not being necessary with the present construction to provide an extra tripping cable as was used in my previously mentioned patent. This cable 9 is driven by a drum (not shown), while a brake band (not shown) is also shown for controlling the drum, which drum, it will be understood is driven by power derived from the paver.

It is to be understood that sheaves will be provided over which two bights of the cable will pass and the cable will then extend down over the inner end of the boom and over one sheave 13 and a lower sheave 14, as may be clearly seen in Fig. 1.

There will, of course, be means mounted on the frame of the paver for swinging the boom, while fragmentary portions of supporting ropes 16 are shown as attached to a sheave 17 for elevating or lowering the boom.

As heretofore mentioned, the drum, per se; the mechanism for swinging the boom; and means for elevating the boom; are not the subject matter of the present invention.

Referring now to the gist of the invention, and particularly to Fig. 3, there is shown a segment 18, provided with a hub 19, which hub is pinned to a cross shaft 20 mounted in the trolley 6 to which trolley are secured the straps 8 which support the bucket 7, while the wheels 22 of the trolley are designed to ride along the opposite angles of the boom 5.

This segment 18 is somewhat similar in construction to the segment shown in my earlier Patents, Nos. 1,443,354 and 1,562,751, the segment being provided with the peripheral rim 23 over which the two adjacent ends of the cable 9 pass, but in the present instance, this segment is provided with the integral, curved arm 24, which arm is provided at its outer end with the roller 25, the position of the arm and roller being such that it extends slightly above the upper edge of the segment when the segment is in its normal position, as shown in Fig. 6. The segment is also provided with a small cut out portion 26 so that a bolt 27 may readily secure one end 28 of the cable 9 to the segment, after which the cable passes around the rim 23 of the segment and leads inwardly as may be seen at 29 under the sheave 14, and upwardly over the sheave 12 to the drum 10.

Referring now to Fig. 2 for the moment, it will be seen that this segment has the one face of the hub serrated as at 30, and coacting with this face is a small clutch drum 31, which is held by the spring 32 and the fixed collar 33 against the toothed face 30 of the hub of the segment.

Now the opposite bight of the cable 9 extends downwardly from the drum under the sheave 13 and outwardly over the boom and over the sheave 34 at the end thereof, and then extends inwardly, passing over the rim of the sector, as may be seen in Fig. 6, and finally is secured and wound for a few turns about the take-up clutch member 31, heretofore mentioned, which is loosely mounted on the shaft 20. The clutch member 31 may then be turned until the slack of both bites of the cable are taken up and the clutch, of course, will hold the cable in its tightened position.

By so arranging the cable and segment and clutch, it is a simple matter to take up the slack in the cable at any and all times, so that the operation of the doors of the bucket will be in quick response to the action of the driving drum 10, as will be clearly understood.

Referring now to the toggle arrangement, there will be noticed short stub arms 35 to which in turn are secured the rods 36, which in turn support the yoke rods 37, which yokes in turn support the link 38 which in turn are connected with the doors 39 at the bottom of the bucket.

The particular form of links 38 and yokes connected to the doors as above mentioned, form the subject matter of an application filed by Floyd W. DeVinney, on May 8, 1926, bearing Serial No. 107,590. The arrangement of the short stub arms and toggle mounted on the cross shaft, are shown in a patent granted to me on January 25, 1925, No. 1,562,751. The present invention, therefore relates particularly to the means of operating the doors of the bucket through the driving of the main cable and the segment and operation of same to set and break the toggle, which in turn is connected to the doors of the bucket.

Referring now to Figs. 1, and 4, there is shown a stop or plate 40 secured centrally of the boom and within the path of travel of the roller 25 that is mounted on the arm 24 of the segment 19. Just behind this plate and extending along the boom is a further bracket 41, and at such a height that the roller 25 will pass under the plate, contacting therewith, and at the same time preventing the segment from being thrown to the right which would open the doors of the bucket.

In Fig. 1 I have shown in dotted lines, the position the segment and its roller will assume in contact with the stop 40 and the further position it will assume when under the plate 41.

The operation of the bucket doors 39 is exceedingly simple, discounting the link mechanism, that does not enter, per se, in this application. Presuming the bucket to be under the discharge chute D of the paver, the position of the segment and arm will be the same as shown in Fig. 1, that is, the toggle will be closed and the doors of the bucket will be closed. The drum 10 will then be operated in one direction to move the cable 9, endless in form, and the cable will pull the bucket outwardly on the boom, as it will

be remembered that the inner ends of the cable are fastened to the segment and shaft of the trolley, as described.

The bucket will travel outwardly on the boom to the desired point, and when this point is reached, the drum 10 will be held against rotation and the bucket will come to a stop. Now, to open the doors of the bucket, the drum will then be rotated in the opposite direction, and the portion 29 of the cable, the end of which will be remembered is connected to the bolt 28, will revolve or rock the segment as the pull will be about the rim of the segment over the center and the rocking of the segment will in turn break the toggle and allow one or both doors to open depending on the setting of the link arrangement connected with the doors, which link arrangement, it will be remembered, is the subject matter of an application filed by Floyd W. DeVinney, mentioned above.

As soon as the toggle is broken, the drum may be stopped until the bucket has emptied itself, or it may be retracted slowly while the bucket is in the act of discharging, and when the trolley reaches the position shown in dotted lines, in Fig. 2, the roller of the integral arm of the segment will then contact with the stop 40 and will rock the segment to close the doors. As the bucket continues to move slowly inwardly under the discharge chute, the roller will pass under the bracket 41 and thus prevent the segment from being thrown backwardly and the doors opened, while in this position.

As the bucket is then moved outwardly again, the toggle will not be broken, nor the segment operated until the cable is reversed, as it will be remembered that the strain or pull on the cable in this instance is against the segment to keep it in its normal position. The instant, however, the cable is reversed, the segment will rock and the bucket doors will be opened and the bucket discharged.

I do not wish to be in any way limited to the special link mechanism connected with the doors, as any form of operable means connected with the toggle and the doors will operate with my improved segment and driving means.

From the foregoing it will be seen that I have provided a boom and bucket with a main driving cable for the bucket, and have also provided a special form of segment and clutch mechanism whereby the main drive cable also operates the doors of the bucket to discharge the bucket. Automatic means are also provided for closing the doors of the bucket, and for keeping the doors of the bucket closed while the bucket is being filled.

I have also provided a novel means in conjunction with a segment for taking up any slack in the cable, so that the action of the doors will be in quick response to the movement of the cable.

Finally, it will also be seen that the means and instrumentalities and arrangements for performing the several functions are extremely simple and should call for little or no adjustments, and but little or no repair, as there are but few parts and their movements are simple.

I am aware that it is old broadly to open and close doors of a bucket by a main drive cable, and I do not claim my invention broadly as such, but what I do claim and desire to secure by Letters Patent is:—

1. The combination of a boom and bucket, a trolley for supporting the bucket on the boom, a rockable sector mounted in the trolley, hinged doors on said bucket, a toggle means connecting the doors to said sector, a cable for driving the trolley and bucket along the boom, means for driving the cable, the two ends of the cable so attached to the rim of the sector that as the sector is revolved, one portion takes up and the other portion pays off, an integral arm on said sector, a stop secured near the inner end of the boom within the path of said arm so that when the said arm contacts with said stop it will force the toggle to its normal position to thereby close and lock the doors in their closed position, and the said cable when starting to move the bucket inwardly on the boom, causing the sector to rock to break the toggle to thereby open the doors of the bucket.

2. In combination, a boom and bucket, a trolley for supporting the bucket on the boom, a shaft in said trolley, a sector mounted in said shaft, hinged doors on said bucket, toggle means connecting the doors with said sector, means on the boom cooperating with a part of the sector for moving the sector to its normal position and closing the doors of the bucket when the bucket reaches its innermost ends of travel, a cable endless in form having its ends secured about the sector for moving the trolley inwardly and outwardly of the boom, an inward movement of one portion of the cable rocking the sector and opening the doors of the bucket, and drawing the bucket inwardly, a clutch mechanism on said shaft forming part of the sector and having one end of the cable secured thereto, after the same has passed over the sector, and said clutch arranged to take up any slack in the cable.

3. In combination with a boom and bucket having hinged doors at its bottom, a trolley for supporting the bucket on the boom, a cross shaft in the trolley, a sector for rocking said shaft, a clutch on said shaft, and forming a portion of said sector means for holding the clutch in set position, a toggle connected with the doors of the bucket and said sector, a cable secured about said sector one end being secured to said clutch portion said cable endless in form, a stop on said boom in the path of travel of a portion of said sector to

thereby force the sector to its normal position as the bucket approaches the inner end of the boom, means for driving the cable, and a reversing of the cable operating said sector to open the doors of the bucket.

4. In combination with a boom and bucket, the latter provided with bottom doors, a main cable for both driving bucket to and fro on the boom and for operating the doors of the bucket at the initial returning movement of the bucket, a sector comprising in part a take-up clutch mechanism and having one end of the said cable secured to the clutch and the other end of the cable secured to the sector proper, and the clutch mechanism adapted to take up any slack in the cable.

5. In a trip mechanism for the doors of a concrete paver bucket, a segment having a peripheral rim for the reception of the two adjacent ends of a cable, said segment provided with a hub, a curved arm extending from the hub outwardly and upwardly, a roller on the end of said arm and the plane of the upper edge of the roller being in a plane higher than the upper edge of the rim of the segment.

6. In a tripping mechanism for concrete paver buckets, a segment having a peripheral rim, a hub having teeth formed on its one face adapted to cooperate with a take-up clutch member, an integral arm extending from the lower portion of the segment, and a roller on the end of said arm.

7. A segment for operating the doors of a bucket for a concrete paver having a hub and provided with an outwardly and upwardly extending arm, a roller on the end of the arm, said roller being in a plane slightly above that of the upper edge of the segment when the segment is in its normal position, and in a much higher plane than the plane of the upper edge of the segment when the segment is rocked.

8. A segment adapted to control the opening and closing of the doors of a concrete paver bucket comprising an integral hub, a rim extending about the periphery of the segment and adapted to receive two inner adjacent ends of a cable, an arm extending from the segment and in a plane above the upper edge of the rim of the segment, a cross shaft, the hub of said segment pinned to said cross shaft, a clutch member cooperating with the hub of the segment and the clutch member adapted to receive one end of the cable, and the segment provided with means adapted to receive the other end of the cable.

9. A bucket for concrete pavers comprising swinging doors in its bottom, a trolley for supporting the bucket, a cross shaft on said trolley, a segment pinned to said cross shaft, a take-up clutch member idle on said cross shaft, means for holding it in engagement with the said segment, a cable endless in form having opposite ends oppositely secured about said segment, one end of the cable passing over the segment and secured to said take up clutch member, and the other end of said cable passing about said segment and secured internally thereof.

10. In a boom and bucket for concrete pavers comprising a trolley for supporting the bucket, a cross shaft, a segment mounted on said cross shaft, a cable endless in form secured about the opposite extremities of the segment so that as one portion pays off the other portion takes up, the bucket provided with swinging doors, a link mechanism connected to said doors, toggle means connected to said segment and said link mechanism, the driving of the bucket and the opening of the doors controlled by the movement of the cable, and automatic means for closing the doors of the bucket.

In testimony whereof I affix my signature.

CHARLES E. FOOTE.