

May 16, 1933.

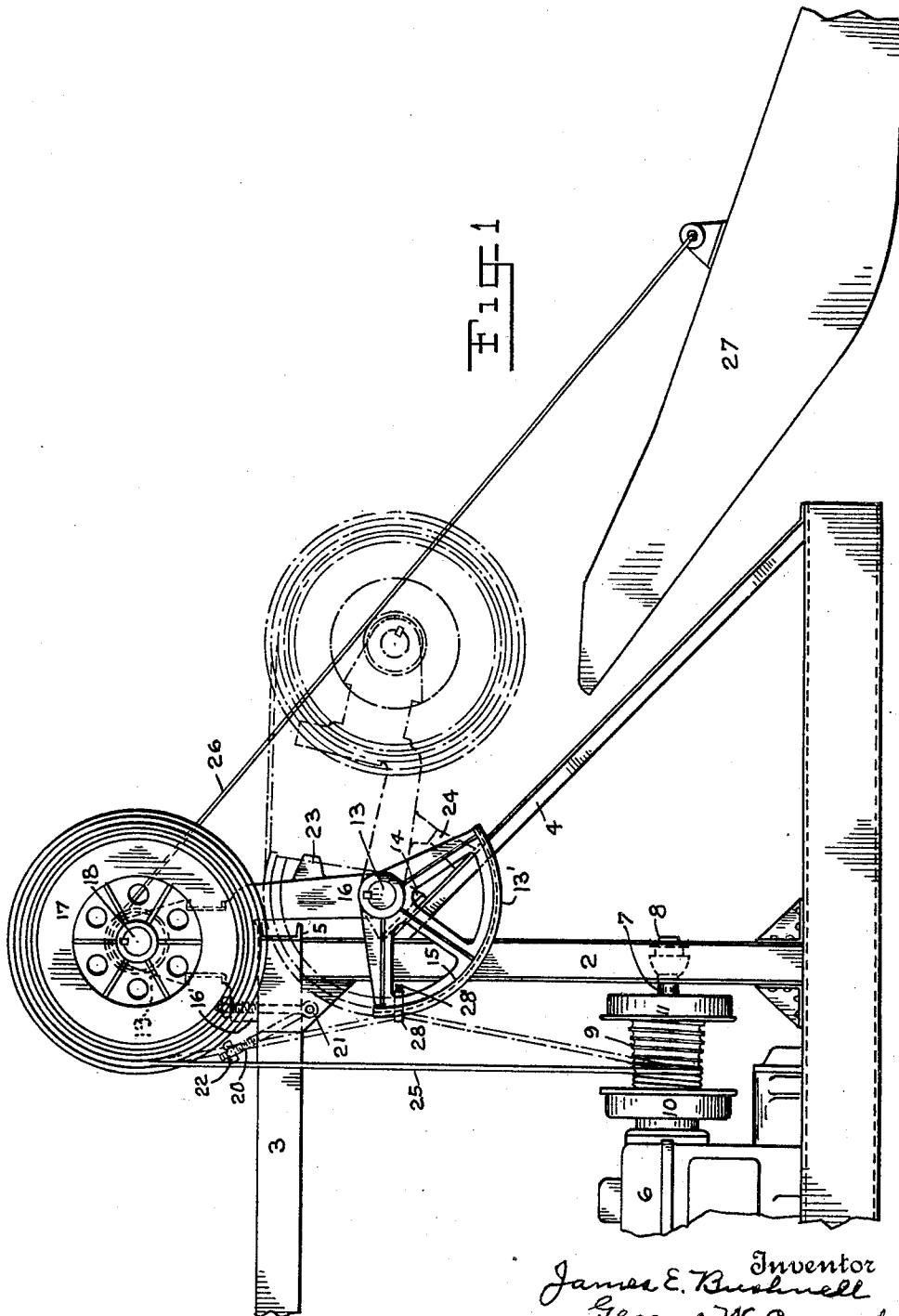
J. E. BUSHNELL ET AL

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CABLE WINDING MEANS FOR LOADING SKIPS

Filed July 9, 1930

2 Sheets-Sheet 1



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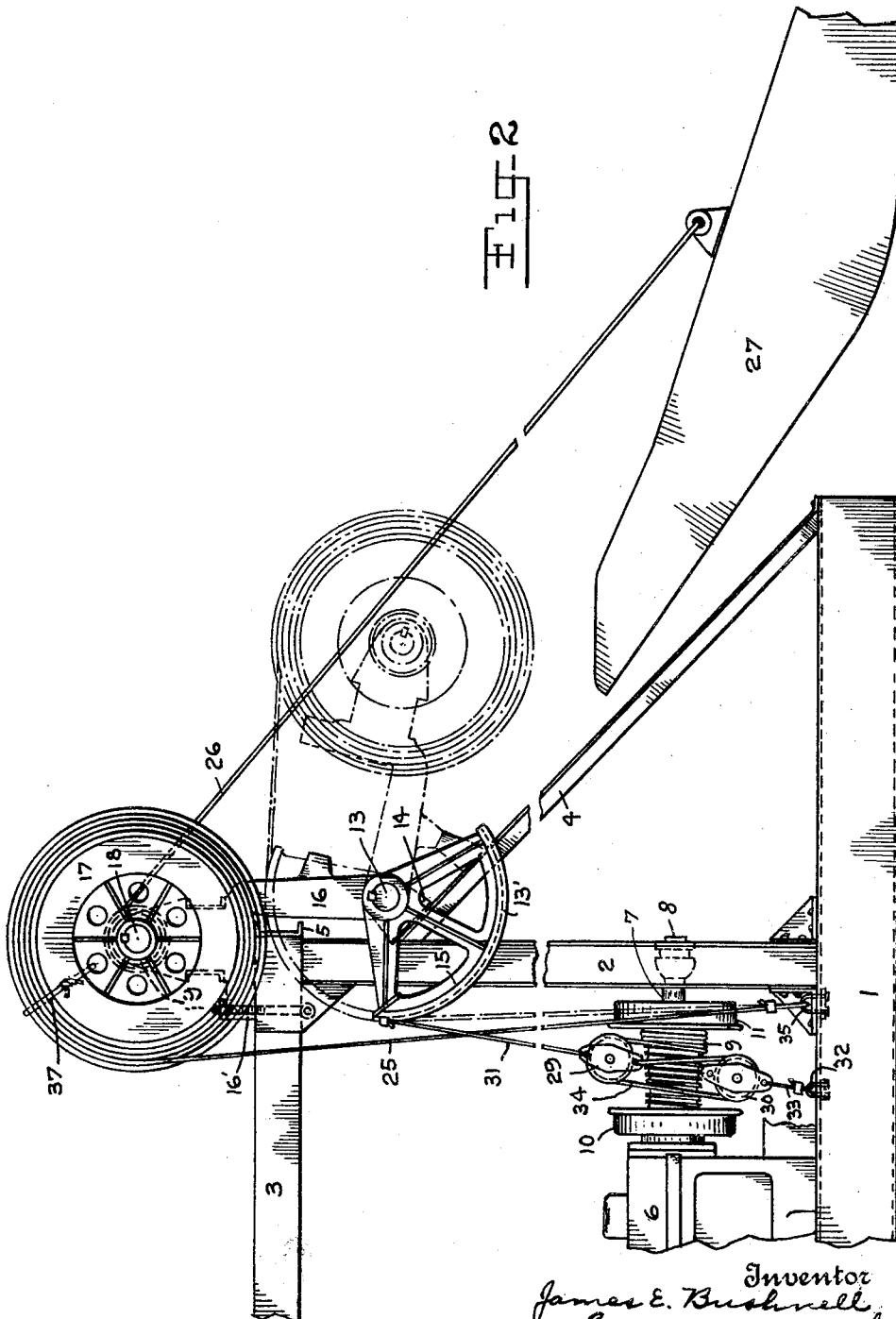
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UNITED STATES PATENT OFFICE

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CABLE WINDING MEANS FOR LOADING SKIPS

Application filed July 9, 1930. Serial No. 466,758.

The improvements relate primarily to the means for raising and lowering the charging hopper or skip of concrete mixing machines, and more particularly to the cable winding drums and their supports and accessories, and have for their objects, among others, the provision of means whereby the winding drums at the top of the mixer frame may be readily and safely raised and lowered with their power cable wheel, to permit the machine to pass under low bridges or other overhead structure, and for other purposes. Their use is principally in connection with concrete paving machines, in which the mixer drum with its frame, loading skip and distributing apparatus are usually all mounted on a truck and have considerable height, the skip cable winding drums and wheel being located at the top of the mixer frame so as to give a convenient and efficient application of the power applied to the cables for raising the loaded skip and of the braking means applied thereto in the operation of lowering the skip. It is possible to construct the mixer frame, mixer and other parts so that they will pass under ordinary bridges or other overhead obstacles, but the winding drums and wheel at the top, extending above the frame are sometimes too high to pass under. Therefore it has been found necessary to so mount them that they may be lowered when necessary. It is also advisable to lower these parts for shipping and storing the apparatus.

The obvious expedient of mounting the drums on a pivoted frame which may be lowered has been resorted to and practiced for many years, and as this frame must have a base of some width with spaced points of support it has been found advisable to pivot the frame below the top of the mixer frame, so that when it is turned down it will be below the top of the mixer frame, and also so that the drums and wheel may be lowered to that level without reversing their frame but merely by turning it through an arc of approximately ninety degrees.

But the work of lowering and raising the heavy drums, wheel and frame and at the same time taking care of the cables connecting the drums and skip and the wheel and the

power winding drum on the truck is not an easy one and is likely to result in damage to the apparatus and the men engaged in it, or both, unless well provided for and mechanically safeguarded. Various means to this end have been devised, but so far as we are aware no means which are safe, and satisfactory in other ways have been obtained. The objectionable necessity for locking the wheel, securing the pivoted frame by means of ropes or cables to portions of the mixer frame remote from the drum frame, disconnecting the cables from one or more of the drums and permitting the skip cable to slack has not been overcome or only partly so, while the more or less ineffective application of power or braking force in the operation is still an obstacle to a satisfactory performance of the operation.

It is for the purpose of overcoming these and other obstacles and objections that the present improvements are designed. Other objects and advantages will appear to those skilled in the art, to whom the present description is addressed.

In the drawings Figure 1 is a general side view of an apparatus constituting an exemplary embodiment of the invention; and Figure 2 is a similar view of a modification or alternate application thereof.

In the said drawings, 1 represents the base or floor of the truck, 2 an upright of the mixer frame and 3 a top horizontal thereof. A diagonal brace rod is shown at 4, and these members are duplicated on opposite sides of the mixer frame, with a cross channel-bar as indicated at 5 connecting the horizontals and verticals at the top front. A motor 6, or other source of power is mounted on the base or body 1 and has its power shaft 7 journaled in the upright frame at 8, and on this shaft the winding drum 9 and its brake and clutch drums 10 and 11 are mounted.

The power winding drum 9 is shown as having a constantly increasing and decreasing diameter from end to end, as shown in Patent No. 1,545,965 of July 14, 1925, to which reference may be had for details of the present upper winding drums and beveled winding wheel construction. The power

drum and the upper winding drum and wheel may, however, be varied in construction and arrangement without affecting the character of the present improvements.

5 Keyed to the rock shaft 13, which is mounted in brackets 14 supported on diagonals 4 is a wheel sector 15, and the L arms or brackets 16, which support and carry the winding wheel 17 with spiral groove and the winding
10 drums 19 for the skip cable, are also keyed to this shaft. The winding wheel 17, which is called a "bull wheel", is keyed to a shaft 18 mounted in the upper ends of the swinging brackets 16, and the winding drums for
15 the skip cable are also keyed on this shaft. The upper end of the bracket 16 and the said winding drums do not appear in the two views of the drawings, but are indicated by dotted lines in both figures. The horizontal legs 16'
20 of the arms 16 are normally secured in position on the top of the frame by means of bolts 20 passing through an open slot in each end pivotally secured below the horizontal frame member 3, as shown at 21, so that by tightening
25 the nuts 22 on the upper threaded ends of bolts 20, the arms may be securely clamped in position, and by loosening these nuts and swinging the bolts out through their slots the arms and the wheels and drums carried
30 thereby are released. In order to check the down swing of the arms 16 and support them properly and in the desired position, lugs 23 are provided on each arm, and supporting blocks 24 on the diagonals 4.

35 The power cable 25 is wound on the power drum 9 by the motor to raise the skip 27, the lifting power being transmitted through the bull wheel 17, in the spiral groove of which the cable 25 winds and unwinds, and the
40 winding drums 19 on the shaft 18, on which drums the skip cable 26 winds. When the skip is lowered a brake band or other braking device is applied to the brake drum 10, so as to permit the skip to descend of its own
45 gravity. In these skip raising and lowering operations the bull wheel and winding drums are, of course, secured in position at the top of the mixer frame.

50 When it is desired to lower the bull wheel and winding drums and their support, the cable 25, in the embodiment shown in Fig. 1, is secured to the periphery of the sector 15 by means of the clamp 28, which may be of
55 any suitable form, but preferably has an open eye or collar through which the cable 25 passes and a clamp bolt 28' passing through the shank thereof and pressing against the inside of the rim of the sector. In this manner the cable is fixed to the sector, so that it
60 cannot slip but must move therewith. If, now the swinging arm 16 is released and caused to move forward beyond its center of gravity it will start to fall to the position shown by dotted lines, carrying the shaft 18
65 with wheels and drums thereon with it. This

movement, however, is checked by the cable 25, which in turn is held by a brake band or other braking device applied to the drum 10. It is then only necessary to permit the cable 25 to unwind slowly and under the control of
70 the brake to lower the arm 16 and the parts carried thereby to the lower dotted line position. In this movement the sector 15 swings upwardly as indicated by the dotted lines, and the portion of the cable 25 below the clip
75 28 winds on its periphery; and it will be seen that the braking power is at all times applied by the cable to a point of the sector's periphery opposite the rock shaft 13 in a horizontal line. In this manner the braking and driving
80 power are given at all times during the lowering and raising operation an advantageous leverage. Dotted lines indicate the position of the cable 25 at the beginning and the end of the lowering and raising movement. A groove 13' to receive the cable is indicated
85 by dotted lines. To raise the arm 16 and the parts carried thereby to upper operating position, power is applied to the drum 9 and the cable 25 is wound thereon, thus causing
90 the sector 15 to rock back to its original, normal position; and after this the cable is released from the sector for use in the skip raising and lowering work.

95 It will be seen from the foregoing that with the present improvements the operation of lowering and raising the wheel with its shaft and winding drums and the oscillating arm 16 may be performed without disconnecting any of the parts or disturbing their normal
100 operative relations, except to the extent of clipping the cable 28 to the sector, and that they may be lowered and raised again to working position with the greatest facility and safety. It will also be seen that it is
105 not necessary to lock or otherwise secure the wheel or the winding drums against rotation, as the maximum of such movement which they may make is limited to that permitted by the slacking of the skip cable. In this
110 operation, however, the skip cable 26 is slacked off, and the power required to raise the swinging structure is somewhat greater at certain points than that required for ordinary skip raising work. It will also be apparent that greater braking power is required
115 than in the ordinary operation of lowering the skip.

120 In order to secure an increase of power in the lowering and raising operation above described, and also to enable the operator to keep the cables taut, the modification of Fig. 2 is provided. In this modification pulley blocks 29 and 30 are utilized, the first or upper
125 one attached to the sector by means of a rope or cable 31 and the second to an eye 32 in the base 1 by means of a short rope or cable 33. The power rope or cable 34 has one end attached to and adapted to wind on
130 one end of the drum 9 and passes through the

pulleys 29 and 30, with its opposite end secured to 29. This arrangement gives a three to one increase in power, and a corresponding decrease in movement of the power cable attached to sector 15. In operation, the

5 cable 34 is wound on the drum 9 to rock the sector back to normal position and raise the arm 16 and its carried parts, and is permitted to unwind on the drum to lower them.

10 In this operation the power cable 25 may be disconnected from the drum and secured to any part of the machine, as to the eye 35 in the base 1, so that when the arm 16 carrying the wheel 17 swings downwardly, it will lie in the groove 13' and extend over the sector, as indicated by dotted lines in Fig. 2. But as the distance between the secured end of the cable 25 and portion which meets the

15 groove of the wheel 17 is approximately the same in both positions, the wheel will not rotate and the skip cable 26 will become slack. The slacking of the skip cable may be prevented however by hauling in on the cable 25 when the winding drums are lowered, or otherwise causing rotation of these drums in skip cable winding direction, and if desired, the power cable may be wound on the wheel 17 and tied by a rope or the like, as indicated at 37.

20 From the foregoing description it will be seen that the improvements also include a novel method of lowering and raising the winding drums for the skip cable with their wheel and the swinging member on which they are mounted, through the instrumentality of the power drum and without the employment of other power or hand operated devices for that purpose.

25 They also include means for practicing this method in various ways, and the said means are not limited to any particular use. Thus, the sector or its equivalent is capable of being used without the special lowering and raising cable, and also without attaching the power cable thereto, it being necessary merely to release the swinging frame upon which the skip cable drums and winding wheel are mounted and permit it to swing outwardly and downwardly while applying braking means to the power drum. This will bring the power cable against the periphery of the sector, while the sector is swinging upwardly, and cause it to retard the downward swing.

30 When the frame is to be raised it is only necessary to wind the power cable on its drum, thus causing the swinging parts to move back to normal position. To prevent the winding wheel from rotating freely the skip may be raised before the lowering operation begins so as to hold the skip cable taut. When this is done, the weight of the skip will move the swinging arm or frame off the top of the mixer frame, after they have been disconnected.

We claim:

1. In combination with a concrete mixer base and frame and a charging device adapted to be raised and lowered, a power operated drum, a power cable connected with the drum and adapted to be wound and unwound thereon to cause raising and lowering of the charging device, a winding drum at the upper part of said frame adapted to be rotated by said power cable, a cable connected with said winding drum and the charging device and adapted to be wound and unwound on the former, a movable member on which said winding drum is mounted, means for releasably securing said movable member and winding drum in upper operative position, and means for controlling the movements of said member and winding drum to a lower position and for returning them to upper operative position, comprising a member in fixed relation to said winding drum supporting member extending therefrom, means for connecting said extending member with said power cable for operation by said power drum and brake means connected with said power drum for controlling the movement of said member in a direction other than its power operated direction.

2. In combination with a concrete mixer base and frame, and a charging device adapted to be raised and lowered, a power operated drum, a power cable connected with the drum and adapted to be wound and unwound thereon to cause raising and lowering of the charging device, a winding drum at the upper part of said frame adapted to be rotated by said power cable, a cable connected with said winding drum and the charging device and adapted to be wound and unwound on the former, a movable member on which said winding drum is mounted, means for releasably securing said movable member and winding drum in upper operative position, and means for controlling the movements of said member and winding drum to a lower position and for returning them to upper operative position comprising a connection between said member and said power drum removed from said winding drum whereby it may be moved in one direction by the operation of said drum and brake means for controlling its movement in another direction.

3. In the mechanism of claim 2, the connection between said member and the power drum comprising means for connecting the said power cable with said member.

4. In the mechanism of claim 2, the said connection between the said member and the power drum comprising means connected with said member and with said power drum, and intermediate means for increasing the power of said drum and reducing the movement of said member with respect to said drum.

5. In combination with a concrete mixer base and frame and a charging device adapted to be raised and lowered, a power operated drum, a power cable connected with the drum and adapted to be wound and unwound thereon to cause raising and lowering of the charging device, a winding drum at the upper part of said frame adapted to be rotated by said power cable, a cable connected with said winding drum and the charging device and adapted to be wound and unwound on the former, a movable member on which said winding drum is mounted, means for releasably securing said movable member and winding drum in upper operative position, and means for controlling the movements of said member and winding drum to a lower position and for returning them to upper operative position without interfering with the rotation of said winding drum, comprising a separate connection between the power drum and said member and disconnected from the winding drum rotating connection between the winding drum and the power drum.

6. In the mechanism of claim 2, the connection between said member and said power drum comprising a sector in fixed relation to said member having radii extending therefrom at different angles and a cable connected at the periphery of the sector and with the power drum and adapted to wind on said periphery and unwind therefrom on the rotation of the power drum.

7. In a device of the character described, the combination of a power operated cable winding drum, a pivoted arm mounted at a point removed from said drum, a cable connection between said arm and said drum for raising and controlling the lowering of the former, a winding drum mounted on said arm and adapted to move to upper and lower positions therewith, a cable connection between said power drum and winding drum, and means for connecting said last named cable connection at a point removed from said power drum during the operation of the arm by said power drum.

8. In a device of the character described, a power operated cable winding drum, a pivoted arm mounted at a point removed from said drum, a winding wheel mounted on said arm, a fixed frame above which said winding wheel extends, said wheel being adapted to be lowered below the top of said frame by the pivotal movement of said arm, a cable connecting said drum and said wheel, and adapted to be wound and unwound on both, power means for operating said drum in winding direction, and brake means for controlling its unwinding movement, and a member extending from said arm toward the said cable and into the path of said cable when it is moved in one direction by the pivotal movement of said wheel bodily with its arm, whereby the

cable is brought in contact with said member when the arm is pivoted and while said member is swinging with said arm, and the direction of the pull of said cable on said arm is maintained at an angle to the radius of the arc described thereby and by the wheel throughout their pivotal movement.

9. The combination of a power drum, a power cable adapted to be wound and unwound thereon, means for braking said cable on its unwinding movement, a loading device, a fixed frame, a cable for raising and lowering said loading device, a drum connected with said loading device cable and a wheel connected with said power cable and drum and adapted to rotate the same, a movable member on the frame with which said wheel is mounted to move to lower and upper positions, and means for controlling the lowering movement of and raising said member comprising a power cable engaging member connected with said movable member and adapted to move therewith and means for connecting a power cable therewith, said connecting means being outside the path of movement of said wheel.

Witness our hands this 7th day of July, 1930, county of Middlesex, State of New Jersey.

JAMES E. BUSHNELL.
GEORGE W. CRONK.