MECHANISM FOR OPERATING AND CONTROLLING EXCAVATOR DIPPERS

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The object of my invention is to provide a simple, durable and inexpensive means for controlling and imparting movement to the dipper stick of an excavator.

More specifically it is the object of my invention to provide a simple mechanism for moving the dipper stick longitudinally through its supporting guide, said operating and controlling means being mounted on the excavator platform rather than on the boom as is usually the practice, thereby relieving the boom of a considerable amount of weight, and at the same time mounting the controlling mechanism in close relation with the table operating mechanism so that the two may be built as a unit.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of my improved mechanism showing the manner in which it is applied to an excavator.

Figure 2 is a detail sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 1; and

Figure 4 is a detail sectional view taken on the line 4—4 of Figure 2.

I have used the reference numeral 10 to indicate an excavator truck on which is pivotally mounted the excavator platform 11, one end of which is provided with a pivotally mounted boom 12, said boom having its outer end supported by means of a cable 13. The said boom comprises a pair of members 14 spaced apart and parallel with each other, their upper ends having mounted between them a pulley 15. The upper edges of the members 15 are provided at their central portions with bearing members 16 designed to receive a pivot shaft 17, on which is pivotally mounted a yoke 18. In the yoke 18 is mounted a pair of rollers 19 and a sheave 20 having cable grooves 21 and 22. Slidably mounted in the yoke 18 is a dipper stick comprising a pair of parallel members 23, each of which is designed to rest on one of the rollers 19 with the sheave 20 between said members 23. The members 23 are designed to slide longitudinally through said yoke. The said yoke and the members 23 are adapted to swing about the shaft 17 as a pivot center.

The outer ends of the members 23 are provided with a dipper 24 supported and operated by means of a cable 25 extending over the pulley 15 and to an operating drum 26 mounted on the platform 11. The cable 13 is controlled through a drum 27 in front of the drum 26. The said drums 26 and 27 are operated by suitable gears 28.

Mounted on the platform 11 in front of the drums 26 and 27 I have provided transversely arranged shafts 29 and 30. The shaft 29 is provided with a gear 31 while the shaft 30 is provided with a gear 32 which meshes with the gear 31. The gear 31 is driven through the gear mechanism 28, and continuous rotary movement is imparted to the gears 31 and 32 which will rotate in opposite directions, causing the shafts 29 and 30 to rotate in opposite directions. The shaft 29 is provided with a drum 33 while the shaft 30 is provided with a drum 34, both of these drums being similar in construction and rotatively mounted on their respective shafts. Each of said drums is provided with a brake drum 35, each of which is provided with a friction band 36, one end of which is anchored to a pin 37 mounted in the lever 38 which is keyed to the shaft 30.

The lever 38 is provided with a lever 39 pivoted to the lever 38 by means of a pivot 40, one end of the lever 39 being provided with a pin 41 to which the other end of the band 36 is connected. The inner end of the lever 39 rests normally near the shaft 30. A cone 42 is slidably mounted on the shaft 30 and designed to engage the lever 39 so as to move its inner end outwardly and to cause the band 36 to be tightened on the drum 33, which will cause the said drum 33 and the shaft 30 to rotate in unison.

A yoke 43 is provided for the cone 42, which may be operated by any convenient lever arrangement through a suitable link 44. The drum 33 is designed to be operated in unison with the shaft 29 in a similar manner.

Wound about the drum 33 is a cable 45 secured in position by means of clamps 46. The other end of the cable 45 is wound on
the drum 34 in the opposite direction and secured thereto by means of clamps 47. One end of a cable 48 is also secured to the drum 34 by means of the clamps 47 and extends upwardly into the groove 21 of the pulley 20, and is secured to the inner end of the dipper stick by means of a rivet 49. The drum 33 is provided, with a cable 50, one end of which is secured by means of the clamps 46, the cable being wound in the opposite direction from the cable 45 and extends into the groove 22 of the sheave 20 and outwardly between the members 23 and connects with the outer ends thereof by means of a rivet 51.

The practical operation of my device is as follows:

Assuming that the dipper 24 is moved to its outer limit of movement as illustrated in Figure 1, and it is desired to move it to its inner limit of movement, then the operator slides the cone 42 of the shaft 29 inwardly, causing it to engage the corresponding lever 39 and the drum 33 to be operated in a counterclockwise direction. This will cause the members 23 to be slid through the yoke 18 and the dipper 24 moved inwardly. The inner end of the members 23 will cause the cable 48 to be run out and the drum 34 unwound. It will be noted that the cable 45 will be unwound from the drum 33 and wound on the drum 34. The cable 45 serves to prevent any spinning action of the drum 34 as it is being unwound, and also to prevent any slack from entering the cable 45, all of said cables being under tension regardless of the position of the dipper stick relative to the yoke 18, inasmuch as said dipper stick and said yoke 18 are pivotally mounted on the same shaft as the sheave 20. The dipper stick may be moved outwardly by rotating the drum 34 through the clutch mechanism above described, which will be rotated in the opposite direction from the drum 33 due to the fact that the gears 31 and 32 are in mesh with each other.

Thus it will be seen that I have provided a simple, durable and inexpensive construction for moving the dipper stick, the mechanism being mounted on the platform of the excavator, and only the sheave 20, the yoke 18 and the coacting parts being mounted on the boom 12, thus providing a simple and effective mechanism for controlling the dipper stick, which is quiet in its operation as well as being of light weight.

I claim as my invention:

1. In a device of the class described, a support, a boom, a dipper stick pivotally and slidably mounted on said boom, means 60 for imparting sliding movement to said dipper stick relative to its pivot center comprising a pair of parallel shafts, means for imparting rotary movement to said shafts in opposite directions, a drum for each of said shafts loosely mounted thereon, a cable, one end of which connects one end of said dipper stick, the other end of said cable being wound on one of said drums, a second cable for said drum wound in the opposite direction, said second cable being wound on said second drum in an opposite direction from the first drum, a third cable wound on said second drum in the opposite direction from the winding of the first cable on the first drum, said third cable having its other end connected to the opposite end of the dipper stick from which the first cable is connected, means for throwing either of said drums into or out of operative relation with its respective shaft.

2. In a device of the class described, a support, a boom, a dipper stick pivotally and slidably mounted on said boom, means for imparting sliding movement to said dipper stick relative to its pivot center, comprising a pair of parallel shafts mounted on said support, a gear wheel for each of said shafts, said gears being in mesh with each other to impart rotation to said shafts in opposite directions, a cable drum loosely mounted on each of said shafts, a clutch device for locking each of said drums to its respective shaft, means for imparting rotation to said gears, a cable, one end of which is connected to one end of said dipper stick and the other end being wound on one of said drums, a second cable having one end connected to the other end of said dipper stick and its opposite end wound on the second one of said drums, in a reverse direction from the first said cable, a third cable connecting both of said drums, said third cable having its ends wound in opposite directions, substantially as described and for the purposes stated.

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