June 13, 1933. G. G. MORIN 1,913,944

FRICTION TYPE DIPPER TRIP

Original Filed May 17, 1930 2 Sheets-Sheet 1

Fig. 1.

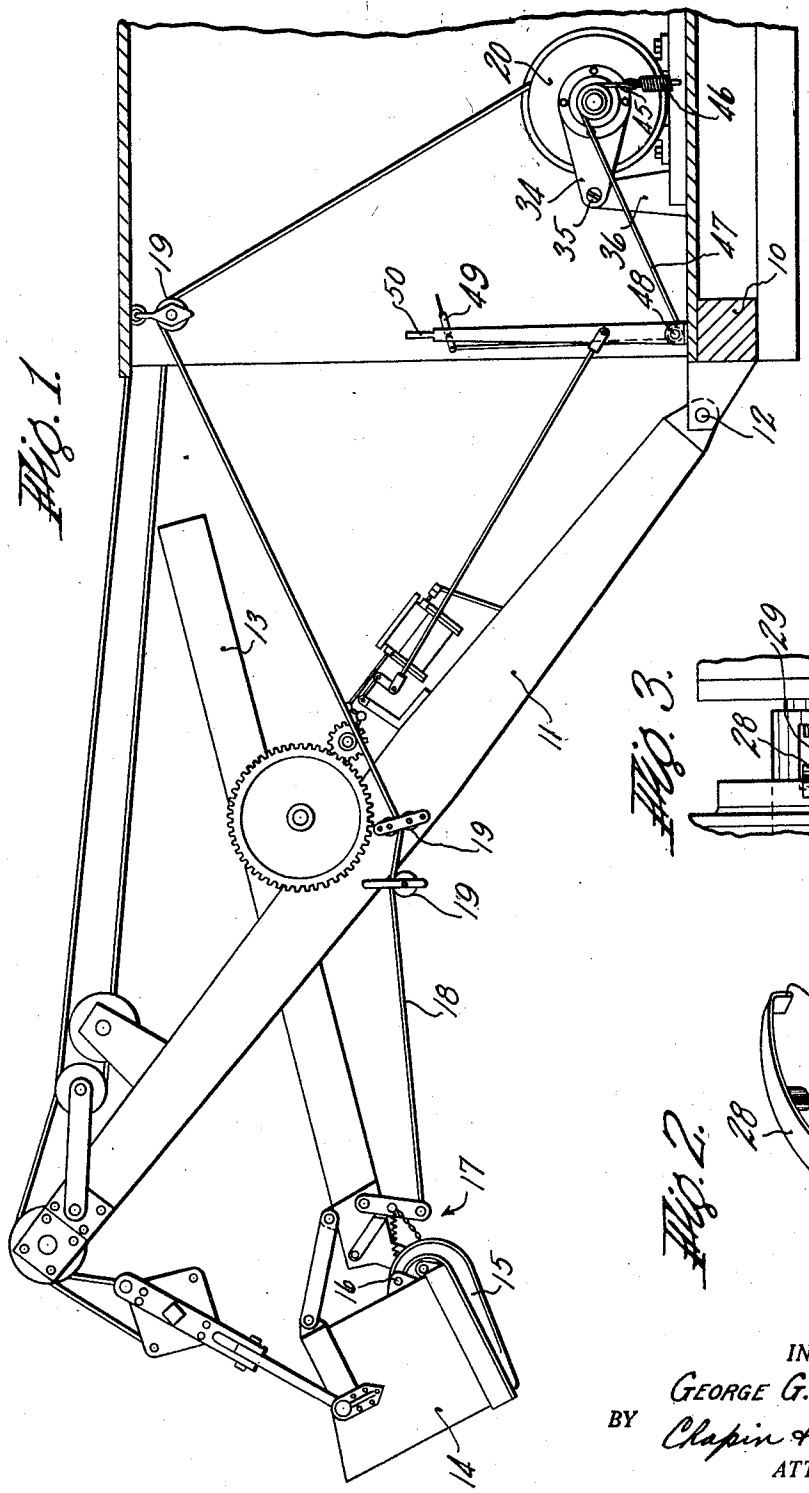


Fig. 3.

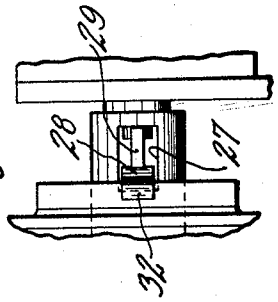
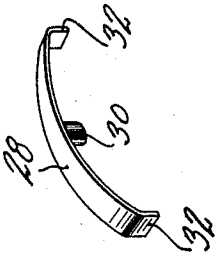


Fig. 2.



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Fig. 4.

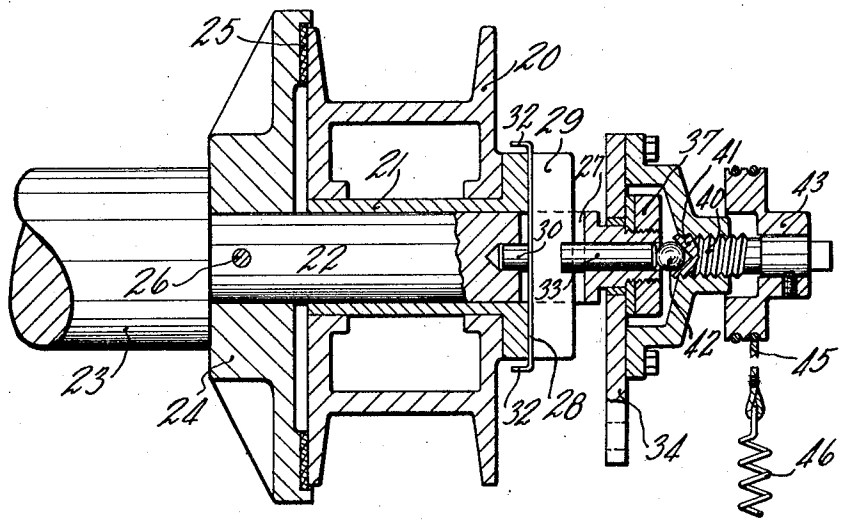
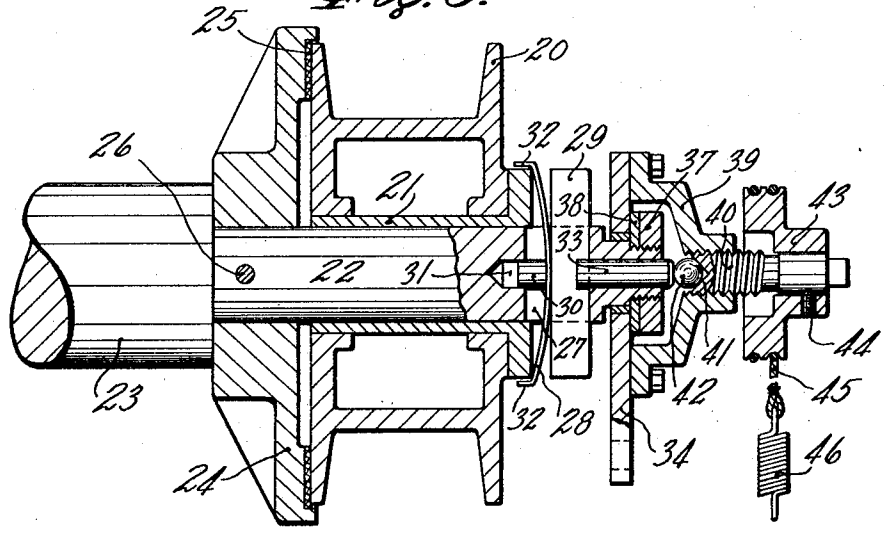


Fig. 5.



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UNITED STATES PATENT OFFICE

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FRICTION TYPE DIPPER TRIP

Application filed May 17, 1930, Serial No. 453,272. Renewed November 4, 1932.

This invention relates to power mechanism for tripping the bottom of the dipper on an excavating machine and has specific reference to that form of power dipper tripping device which is operated by means of friction. It is the general object of the invention to improve prior devices of this character by simplifying their construction and, therefore, providing a dipper trip having a minimum number of parts. A further object is to provide a friction type dipper trip in which the pull of the tripping cable is always derived from a single source, whether the cable is tensioned only to the point of taking up its slack or tensioned further until the latch mechanism of the dipper bottom is actuated.

The invention will now be described with reference to the accompanying drawings, in which—

Fig. 1 is a side elevation, partly in section, of an excavating machine having my improved dipper trip attached thereto;

Fig. 2 is a perspective detail of a spring member;

Fig. 3 is a fragmentary top plan view of mechanism shown in Fig. 5;

Fig. 4 is a sectional detail of the mechanism for supplying tension to the tripping cable; and

Fig. 5 is a detail similar to Fig. 4 but showing the parts in different positions.

An excavating machine has been shown conventionally in Fig. 1. It possesses the usual cab 10 containing the power units and serving as a support for the excavating parts. A boom 11 is pivoted at 12 to the cab and carries a dipper handle 13 bearing at its end the dipper 14. These parts may be actuated by any of the usual types of mechanism. The bottom 15 of the dipper is hinged at 16 to the dipper body, and latch mechanism indicated generically at 17 is provided to release the dipper bottom when desired. This mechanism also may be of any desired type, one form being illustrated in my prior application Serial No. 413,890, filed December 13, 1929. Extending from the latch mechanism is the usual tripping cable 18 passing over guides 19 and being wound upon a drum 20.

The drum 20 is mounted upon a sleeve 21 freely rotatable upon a turned-down end 22 of a constantly rotating shaft 23 which may conveniently be the shaft supplying power for the actuation of the various movements of the excavating machine. A disk 24 bearing a friction facing 25 is pinned at 26 to the shaft. At the opposite side of the drum 20 from the disk 24 the shaft is provided with a slot 27 into which fits a spring 28 and a key 29. The spring 28 shown in detail in Fig. 2 is provided with a pin 30 adapted to extend into a hole 31 formed in the shaft 23 adjacent the slot. The spring is also formed with turned-down ends 32 which assist in keeping it in position The key 29 is secured to a pin 33 slidable in a hole in the shaft 23 which is aligned with the hole 31 previously mentioned. By this means the key may slide from the position of Fig. 4 in which the spring is compressed to the position of Fig. 5 in which most of the compressive action on the spring has been removed.

In the case chosen for illustration, the portion of the shaft to which the tripping mechanism is applied overhangs the bearing; and as it is necessary to prevent rotation of certain parts of the trip operating mechanism, a member 34 is loosely mounted upon the end of the shaft 23 and is secured by a pin 35 to a bracket 36 fixed upon the cab relative to the shaft. While the shaft turns freely within the member, relative axial movement is prevented by a nut 37 bearing against the member through intervention of a washer 38. Secured to the member 34 is a housing 39 internally threaded to receive a screw 40. This screw is provided with a conically recessed end 41, between which and the end of the pin 33 is positioned a ball 42. At the end of the screw a pulley 43 is secured

by a pin 44. A cord 45 is secured in a groove in the pulley and extends to a spring 46 which is strained between it and a stationary part of the machine. A second cord 47 is secured in another groove of the pulley and extends over a guide roll 48 to the end of a handle 49 pivoted to one of the machine control levers 50.

The operation of the device will now be considered. The normal position of the mechanism is that shown in Fig. 5. The shaft 23 and the disk 24 are constantly rotating and the drum 20 is pressed against the friction surface 25 by the slight tension of spring 28. This pressure is sufficient to cause rotation of the drum but is not enough to exert any substantial tension upon the cable 18 above that which is required for the removal of any slack which may form in the cable due to the movement of the dipper from one position to another. As the dipper is moved about the cable will be constantly kept taut by the tendency of the drum to turn whenever permitted by the pressure of slack in the cable.

When it is desired to trip the dipper, the handle 49 is depressed. This rotates the screw 40 by means of the cord 47 and pushes the pin 33 to the position of Fig. 4. It will be noted that in this figure the spring 28 has been completely compressed so that direct pressure is applied to the end of the sleeve 21, this pressure being directly regulated by the pull on the handle 49 and not by the force of the spring 28. Under these conditions the pressure between the drum 20 and the friction face 25 is increased to a point where the tension on the cable 18 is sufficient to trip the latch mechanism 17. It will be observed that a single friction contact is maintained and that the change in tension on the cable is secured by varying the pressure with which the frictional elements bear against each other.

The device has been described in its preferred embodiment as a dipper trip. The same device can, however, be used as a tag line winder for preventing a clam shell bucket or hook block from twisting; or as a slack take-up on a clam shell bucket holding line. In such cases the spring may be changed to provide the constant pressure necessary, and the extra pull resulting from the shifting of key 29 utilized to give temporary tugs on the line, as for opening the clam shell bucket or for resisting a sudden tendency of the bucket or block to twist.

What I claim is:

1. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable-receiving drum rotatably and slidably mounted upon said shaft, a disk fixed upon the shaft and having a friction facing in contact with one end of the drum, a key slidably mounted in a slot in the shaft at the other end of the drum, a flat bow spring in the slot and interposed between the key and the drum, a stationary abutment, a screw threaded into the abutment, connections between the screw and the key, and means under the control of the operator for rotating the screw to shift the key in the slot from a position where the only axial pressure on the drum is due to the spring to a position where the key exerts positive pressure upon the drum.

2. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable-receiving drum rotatably and slidably mounted upon said shaft, a disk fixed upon the shaft and having a friction facing in contact with one end of the drum, a key slidably mounted in a slot in the shaft at the other end of the drum, a flat bow spring located in the slot and interposed between the key and the drum, and means operable during rotation of the shaft for shifting the key in the slot from a position where the only axial pressure on the drum is due to the spring to a position where the key exerts positive pressure upon the drum.

3. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable receiving drum rotatably and slidably mounted on the shaft, a member fixed upon the shaft and having frictional engagement with the drum, means non-rotatable with the shaft and operable during the rotation thereof for forcing the drum against the member with a pressure sufficient to give to the drum a turning force sufficient to produce relatively heavy tension in the cable, and yieldable means forcing the drum against the member with a lesser pressure when the first means is released, said lesser pressure being sufficient to take up any slack in the cable.

4. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable-receiving drum rotatably and slidably mounted upon the said shaft, a disk fixed upon the shaft and having a friction facing in contact with one end of the drum, a key slidably mounted in a slot in the shaft at the other end of the drum, a spring interposed between the key and the drum, and means non-rotatable with the shaft and operable during the rotation thereof for shifting the key in the slot from a position where the only axial pressure on the drum is due to the spring to a position where the key exerts positive pressure on the drum.

5. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable receiving drum rotatably and slidably mounted on the shaft, a member fixed upon the shaft and having frictional engagement with the

drum, means non-rotatable with the shaft and operable during the rotation thereof for forcing the drum against the member with a pressure sufficient to produce relatively heavy tension in the cable, and a replaceable spring acting upon the drum when said means is in inoperative position to hold the drum against the member with a lesser pressure, said spring being rendered inactive and the pressure of the drum against the member made positive instead of yielding by the action of said means.

6. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable receiving drum rotatably and slidably mounted on the shaft, a member fixed upon the shaft and having frictional engagement with the drum, an abutment relatively stationary with respect to the drum, a spring interposed between the abutment and the drum, and means for pushing the drum positively away from the abutment and against the member, the spring causing a normal yielding pressure between the drum and the member and having its effective yielding action superseded by the positive pressure of said means when said means is actuated.

7. A cable tensioning device capable of use as a dipper trip or tag line winder comprising a constantly rotating shaft, a cable receiving drum rotatably and slidably mounted upon the said shaft, a disk fixed upon the shaft and having a friction face in contact with one end of the drum, a member slidable relative to the shaft, means non-rotatable with respect to the shaft and movable axially with respect thereto to cause said member to push the drum positively against the disk, and a spring acting upon the drum when said means is not actuated to cause the drum to be pressed yieldingly against the disk, the spring being so positioned that its yielding pressure on the drum is superseded by the positive pressure of said means when the latter is actuated.

In testimony whereof I have affixed my signature.

GEORGE G. MORIN.