H. J. MELVILLE.

AUTOMATIC DIPPER TRIP.

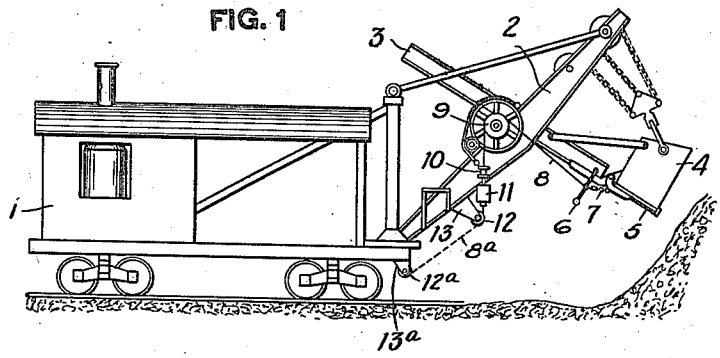
APPLICATION FILED APR. 26, 1915.

1,177,202.

Patented Mar. 28, 1916.

2 SHEETS—SHEET 1.

FIG. 1



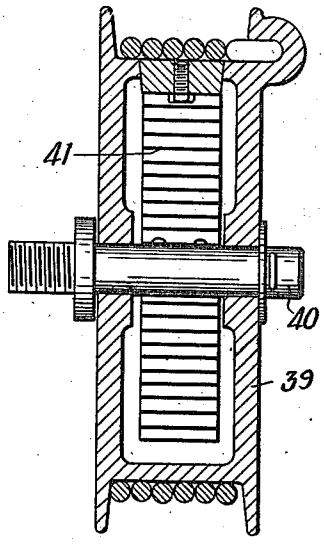


FIG. 6

FIG. 7

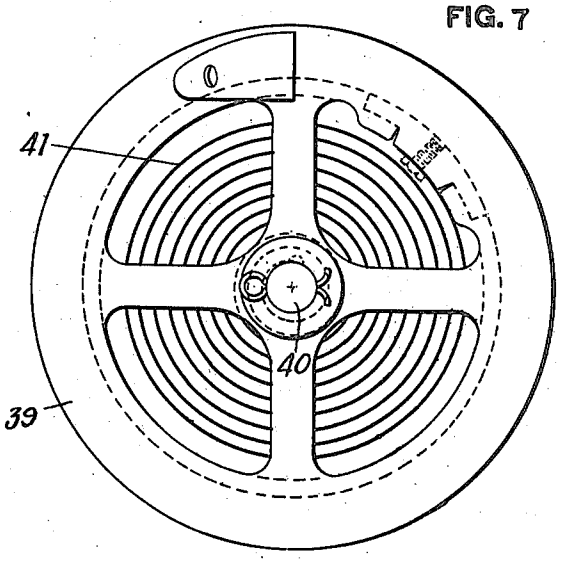
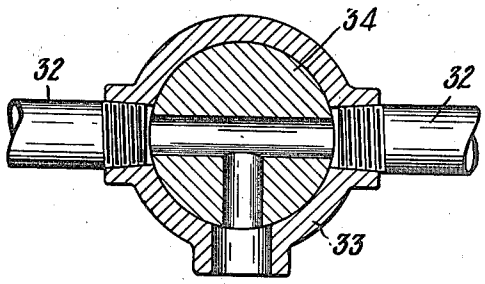


FIG. 8



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2 SHEETS—SHEET 2.

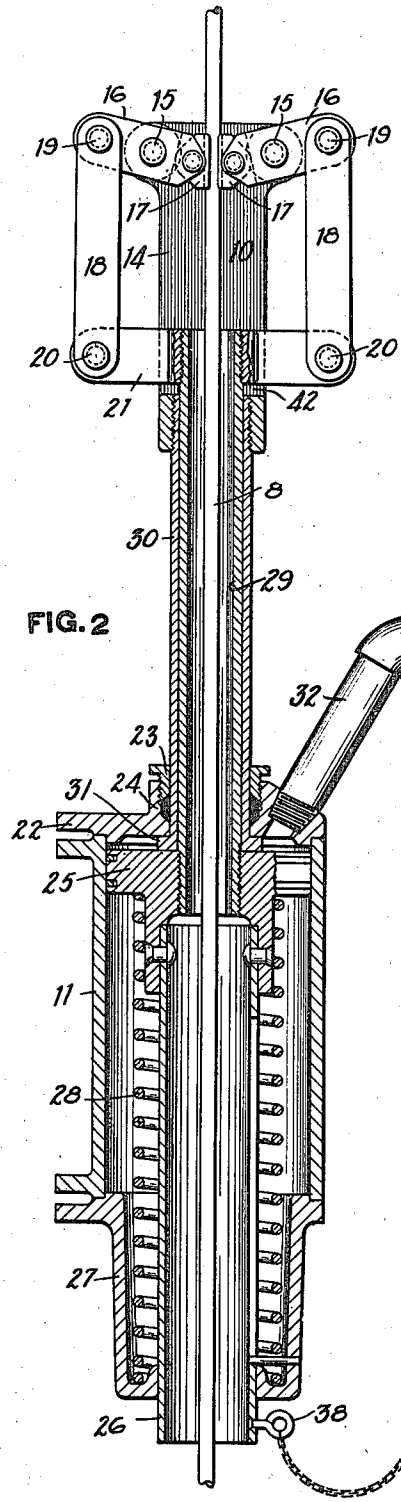


FIG. 2

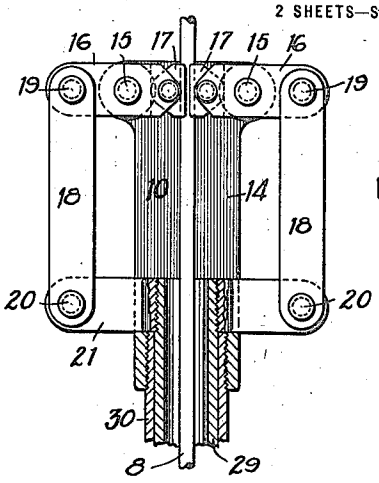


FIG. 3

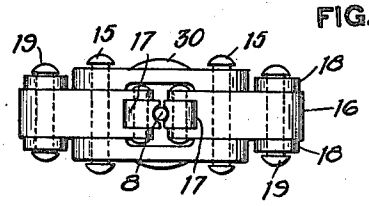


FIG. 4

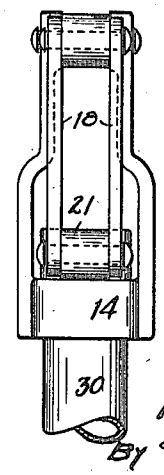


FIG. 5

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AUTOMATIC DIPPER-TRIP.

1,177,202. Specification of Letters Patent. Patented Mar. 28, 1916.

Application filed April 26, 1915. Serial No. 23,896.

To all whom it may concern:

Be it known that I, HERBERT J. MELVILLE, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Automatic Dipper-Trips, of which the following is a specification.

My invention relates to devices for automatically tripping the latches on the buckets or "dippers" of steam shovels, dredges and similar excavating machines or the like.

My improved device comprises an operating cylinder and a wire rope connecting the same with the latch bar on the bucket, together with a rope tensioning device and a three-way cock to control the action of the cylinder.

In present practice it is usual on steam shovels to operate the "trip rope" manually—on small "one man" shovels this causes extra fatigue on the operator as well as loss of time, and on large shovels this duty is more onerous on account of the larger bucket.

Referring to the drawings Figure 1 is a diagrammatic side elevation of a steam shovel equipped with my improved device. Fig. 2 is a vertical section through the operating cylinder and the grip. Fig. 3 is a side elevation of the grip. Fig. 4 is an end view (plan) of the grip. Fig. 5 is an edge view of the same. Fig. 6 is a cross section of the tension drum for the grip rope. Fig. 7 is a side elevation of the same, and Fig. 8 is a diagrammatic cross section of the three-way operating valve.

The shovel 1 is provided with a boom 2 which carries the dipper sticks 3 all of which may be of any usual or desired construction. The dipper sticks 3 carry the bucket or dipper 4 which is provided with the usual hinged bottom 5 having any desired form of latch (not shown). A lever 6 is pivoted to the lower end of one of the dipper sticks 3 and connected with a short chain 7 which releases the latch. A trip rope 8 is also fastened to the lever 6 to operate the same, and this rope is carried over a grooved idler sheave 9 to the grip 10, and thence through the hollow piston rod of the operating cylinder 11 to the tension drum 12 which is mounted preferably on a bracket 13 secured to the boom 2. If desired however the tension drum 12 may be replaced by an idler sheave and the trip rope 8 extended as shown in dotted lines at 8^a to the location shown for the tension drum in dotted lines at 12^a.

The grip 10 comprises a jaw holder 14 provided with a pair of pins 15 upon each of which is pivoted a toggle 16 each having a pivoted gripping jaw 17. The toggles 16 are operated through links 18 and pins 19 and 20 from a crosshead 21.

The operating cylinder 11 is provided with a front head 22 having a gland 23 and packing 24. It also contains a piston 25 secured to a guide 26 which extends downwardly through the back head 27. A spring 28 keeps the piston 25 normally at the upper end of the cylinder 11 as shown in Fig. 2. A hollow inner piston rod 29 has one end screwed into the piston 25 and the other end screwed into the cross head 21. A hollow outer piston rod 30 surrounds the rod 29, and has its upper end screwed into the jaw holder 14. The rod 30 passes through the packing 24 and has a flanged end 31 inside the cylinder 11 between head 22 and piston 25. The grip rope 8 passes between the jaws 17 and then downwardly inside the rods 29 and 30, and the guide 26.

Steam (or air) is admitted above the piston through a pipe 32 in which there is placed a three-way valve 33 having a plug 34 and L shaped handle 35. To the arm 35^a of handle 35 there is fastened a "jerk cord" 36 which leads to the operator. To the arm 35 there is fastened a chain 37 the lower end of which is secured to a ring bolt 38 at the lower end of the piston guide 26 to close the valve.

One end of the trip rope 8 is fastened to the lever 6 which operates the latch as before described, and the other end is fastened to a drum 39 which is loosely mounted on a fixed pin 40. The drum 39 contains a coiled spring 41, one end of which is fastened to the pin 40, and the other to the drum 39 in a well known manner. The trip rope 8 is wound several times around the drum 39 so as to allow ample length for the movements of the dipper.

The dipper latch has not been shown in detail as all steam shovels are provided with a latch operated by a pull rope, and such a construction is well known in the art.

My improved device operates as follows: The grip 10 and cylinder 11 with their contained parts are normally in the position shown in Fig. 2 so that the trip rope 8 may

move freely to accommodate the dipper, the drum 39 maintaining just sufficient tension on the rope 8 to take up the slack thereof without affecting the latch. When the dipper is to be dumped the operator jerks the cord 36 which opens the valve 33 and admits pressure to cylinder 11 above piston 25. Piston 25 then starts down drawing with it the inner piston rod 29, (which is a loose fit inside rod 30) crosshead 21 and links 18 thus the first effect of the motion is to tighten jaws 17 on rope 8. Rod 30 is frictionally held from motion by packing 24 until crosshead 21 moves down and strikes the upper end of the same, (see initial clearance at 42) or until the jaws 17 close firmly on rope 8. After this the piston 25 moves down against the pressure of spring 28 and tightens the grip rope 8 until it operates the lever 6 and dumps the bucket. Near the end of its downward stroke the guide 26 tightens the chain 37 and resets the valve 33 to its initial position. Thus one jerk on cord 36 dumps the bucket.

It is not necessary that my device be applied to a shovel or other excavator in the precise manner shown. The cylinder 11 may be set horizontally or inclined and various other modifications may be made by those skilled in the art.

I claim as my invention:

1. Means for applying tension to a rope comprising a cylinder, a piston therein, a hollow piston rod secured to said piston, a gripping device carried by said piston rod, a central opening in said piston, and a central opening in the bottom of said cylinder through which the rope may pass, whereby all the above parts are grouped concentrically about the rope.

2. Means for applying tension to a rope comprising a single acting cylinder, a piston therein, a spring opposed to said piston, a piston rod for said piston, a sleeve slidably mounted on said piston rod and having a shouldered end within the cylinder, packing surrounding said sleeve, a cross head on said sleeve, a jaw carrier on said piston rod, jaws for gripping the rope on said jaw carrier, and links connecting said cross head and said jaws whereby relative endwise movement of the piston rod and the sleeve may operate to close the jaws.

3. Means for applying tension to a rope comprising a cylinder, a piston therein, a piston rod for said piston, a sleeve loosely mounted on said piston rod and having a limited endwise motion thereon, a device mounted on the cylinder and contacting with said sleeve for frictionally retarding the same, and a gripping device for the rope comprising a fulcrum member provided with gripping jaws and an operating member having links connecting itself and the jaws to operate the latter, the said fulcrum member being connected to the sleeve and said operating member to the piston rod, whereby relative motion between the rod and sleeve operate to open or close the jaws.

4. Means for applying tension to a rope comprising a cylinder, a piston therein, a piston rod extending through one end of the cylinder and provided with a gripping device for a rope, a guide secured to said piston and extending through the other end of the cylinder, a pressure controlling valve connected to said cylinder, means for opening said valve to admit pressure to the cylinder, and a connection between said guide and said valve for closing the latter.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HERBERT J. MELVILLE.

Witnesses:
M. T. PERKINS,
J. I. KLINE.