

(No Model.)

W. H. PAINE.

TENSION DEVICE FOR THE CABLES OF CABLE RAILWAYS.

No. 411,675.

Patented Sept. 24, 1889.

Fig. 2.

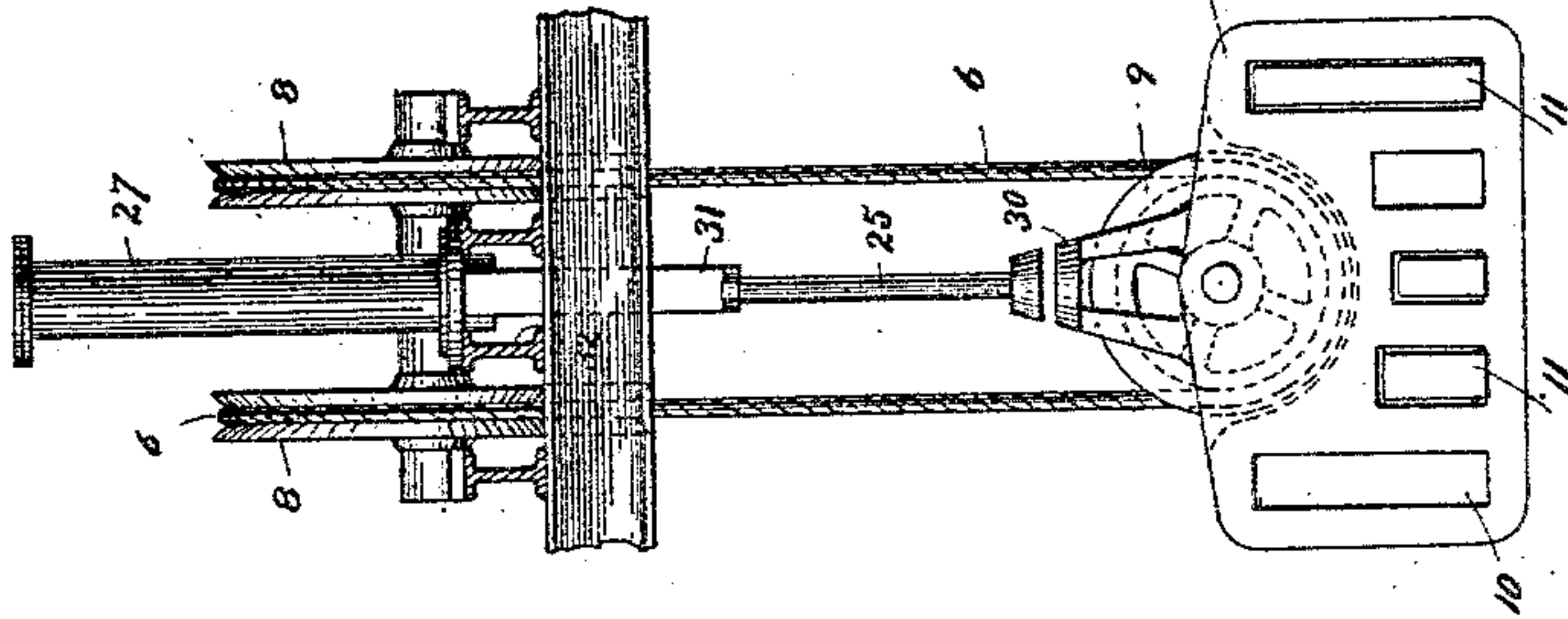


Fig. 1.

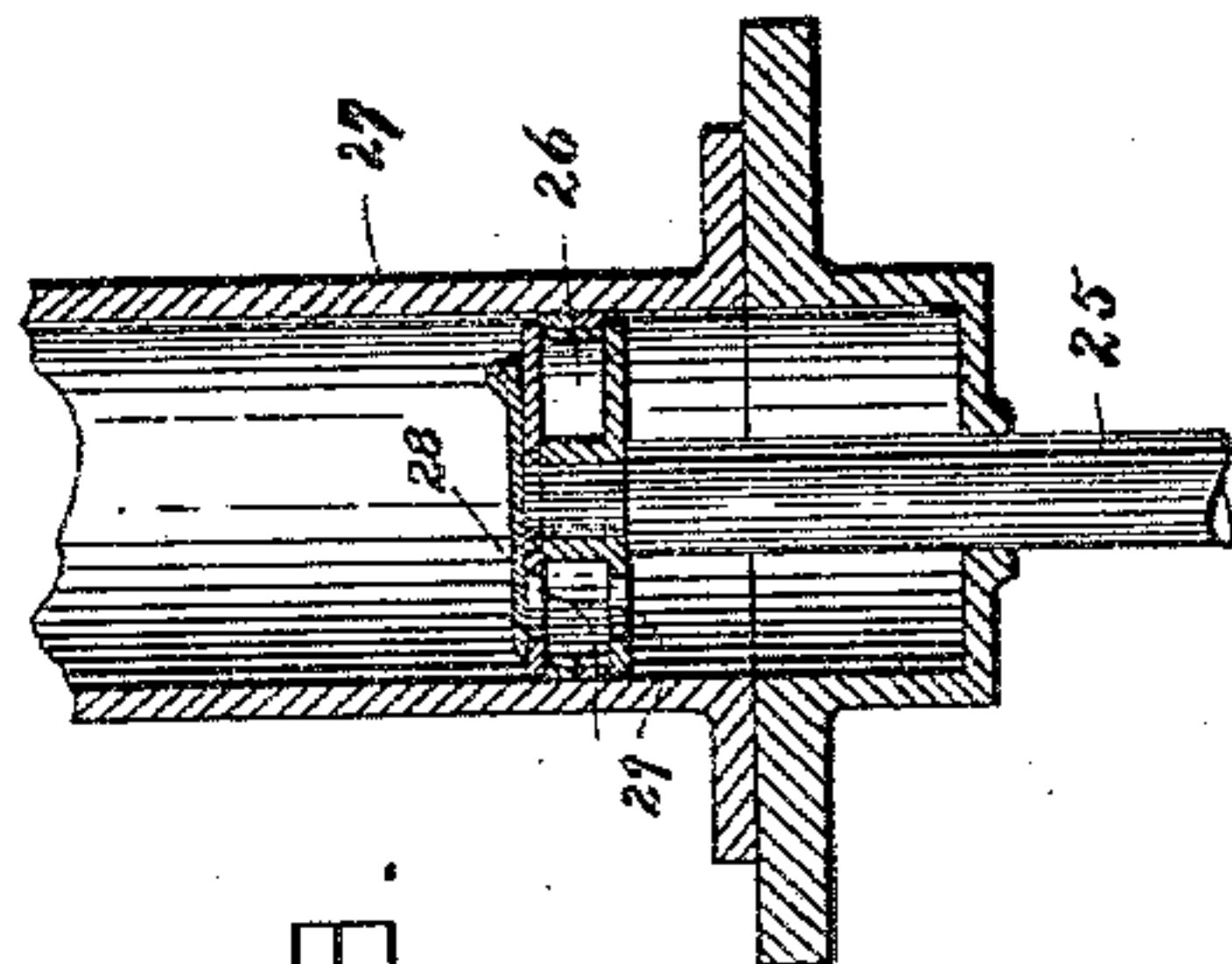
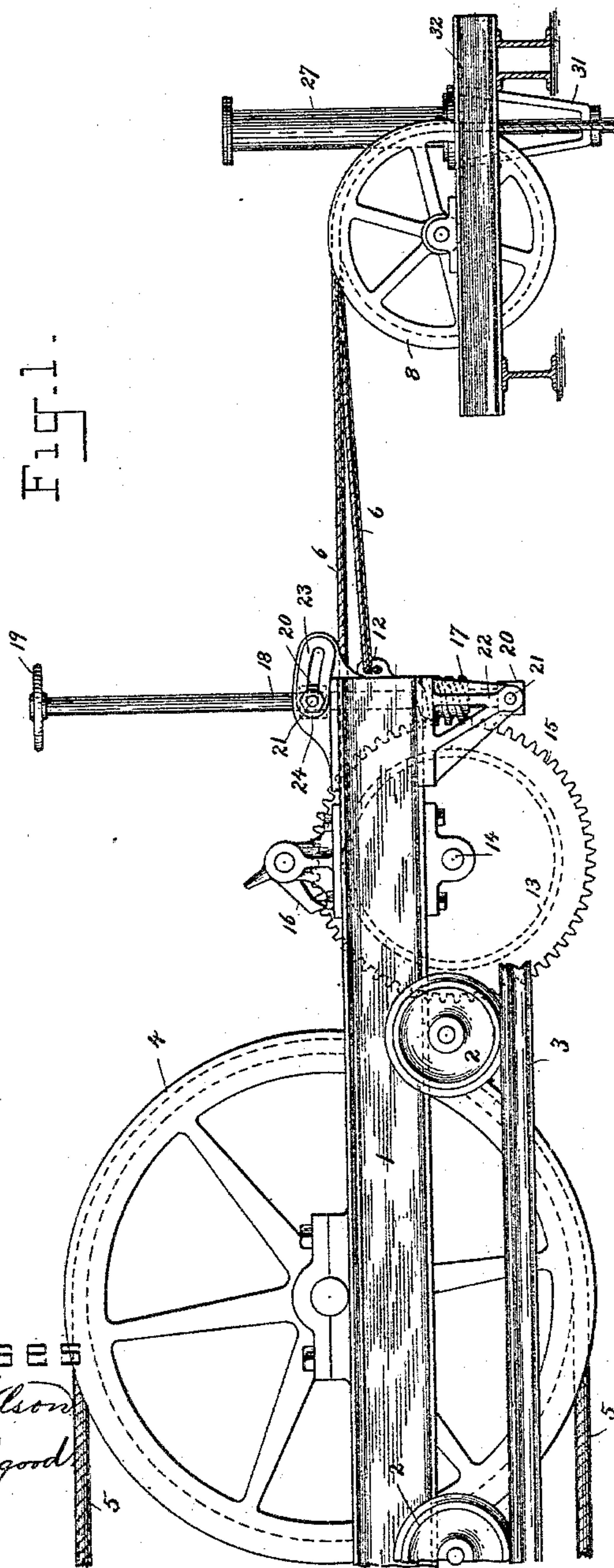


Fig. 3.

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TENSION DEVICE FOR THE CABLES OF CABLE RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 411,675, dated September 24, 1889.

Application filed February 6, 1889. Serial No. 298,834. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PAINE, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Tension Devices for the Cables of Cable Railways, of which the following is a specification.

My improvements relate to the devices employed for maintaining the cable of a cable railway as nearly as possible at an even tension whatever be the fluctuations in the amount of load or strain upon it. On some roads the cable as it passes from the driving-drum runs over a pulley or drum carried by a truck, to which a weight is connected in such a manner as to effect a constant tensional strain upon the cable. The weight is connected to the truck by a cable, which passes over an idle roller or pulley, and as the truck constantly vibrates on its track this cable as it travels over its sheave or pulley is subjected to constant wear upon some portion of its length. With the ordinary arrangement the portion so subjected to wear remains the same, even when this cable is shortened in length in order to keep the weight at about the same position, notwithstanding an increase of length in the main driving-cable. The customary arrangement also has the disadvantage that when sudden and great strains applied to the cable are by the tension-truck transmitted to the tension-weight they are apt to cause the weight to rise with such rapidity as to endanger breakage of the sheave and frame from which it is hung.

My improvements have for their object the remedying of these defects and the addition of certain further novel features, which will be described with reference to the accompanying drawings, and then pointed out in the claims.

In said drawings, Figure 1 is a side elevation of the tension devices of the cable of a cable railway embodying my improvements. Fig. 2 is an end elevation. Fig. 3 is a sectional view of a portion of the air-cushion and plunger.

1 may represent a portion of the frame of a truck, the wheels of which are shown at 2, running upon track 3. This truck carries a sheave or pulley 4, around which passes main

driving-cable 5 on its way from the driving-drums. (Not shown.) The cable 6, attached to the truck 1 and having weight 7 suspended upon it, applies a constant strain to the cable 5, so as to take up all slack whatever be the variation of strain upon the cable owing to differences of load or other causes, so that the friction or "grip" of the cable upon the driving-drums will remain the same.

Customarily the cable 6 has been single and has been passed over a single idle-roller. I double this cable, as shown, and pass its two parts over the two sheaves or pulleys 8 8. I provide the weight 7 with a pulley 9, under which the cable 6 passes, and which thus serves as a suspensory device for the weight. The weight 7 is preferably provided with a number of holes 10, in which any number of suitable bars of iron 11 or heavy metal may be placed, so that the tension upon the cable 6 may be adjusted as required. One end of cable 6 is, as shown, directly attached to the frame 1 of the truck at 12. The other end is fixed to a drum 13, carried by shaft 14, having bearing upon the truck-frame 1, and having keyed to it a gear or ratchet wheel 15, with the teeth of which a gravity-pawl 16 may engage to hold the drum and fix the length of the cable 6 at any point of adjustment. To turn the drum 13 for lessening the length of the cable 6 when it becomes necessary by reason of the increase of length of the main cable 5, I employ a worm or endless screw 17, carried by a shaft 18, having hand-wheel 19. The worm 17 engages with the teeth of the wheel 15, so that by turning the hand-wheel 19 the drum 14 may be turned as required. This drum may, if desired, be employed also for retaining the drum from rearward movement, thus doing away with the ratchet 16. The shaft 18 preferably turns in blocks 20, having pins 21, one pivoted in a bracket 22 on the frame 1 and the other traveling in a slotted bracket 23 on said frame. By this means the drum 17 may be thrown away from engagement with the wheel 15, so that on lifting the ratchet 16 said wheel may revolve and pay out the cable 6. When the worm 17, however, is put in engagement with the gear-wheel 15, it may be so held by screwing tight the nut 24 on the pin 21, which slides in slotted bracket 23.

The advantage in employing a double instead of a single cable 6 and using two sheaves or pulleys 8 in connection with the pulley upon the weight 7 will now be apparent. So long as the length of cable 6 remains unchanged the vibration of the truck 1 upon the track will cause the cable 6 to run over both the sheaves 8, thus distributing the wear of the cable over two surfaces. When, however, the lengthening of the main cable 5 causes the truck 1 to gradually approach the sheaves 8, and so lower the weight 7 more than is desired, the drum 13 is turned by the means already described and the cable partially wound onto the drum. By this means a new portion of the cable 6 to take the wear is brought over both the sheaves 8 and under the pulley 9, and, this change of all the wearing-surfaces being produced at every adjustment of the drum 13, the life of the cable 6 is greatly lengthened. Besides the saving of the cable 6, the doubling of it over the pulleys 8 9 and the attachment of but one end of the cable to the drum 13 enables the winding of the cable on the drum with one-half the power which would be required to wind a single cable.

It is desirable that, while the strain of weight 7 upon the truck 1 should remain substantially constant during the main part of the traverse of the truck upon its track, some means may be employed to arrest more firmly the upward movement of the weight, and so prevent the outward movement of the truck when any unusual strain is put upon the main driving-cable. For this purpose, therefore, I throw in extra resistance as the weight reaches the upper limit of its movement. Preferably for this purpose I employ a plunger 25, whose head 26 moves in a cylinder 27, which may be closed both at top and bottom. A downwardly-closing clack-valve 28 on the head 26, covering apertures 29 in said head, while freely opening to allow the downward movement of plunger 25 under the influence of gravity when the weight 7 falls away far enough to release said plunger, closes on the upward movement of the plunger, so that the air-cushion above the head 26 and the partial vacuum below it in the cylinder 27 oppose a gradually-increasing resistance to such upward movement. The packing of the head 26 within the cylinder may be made as tight as required, but is not necessarily air-tight. Preferably the impact of the weight 7 on the lower end of the plunger 25 is central of the weight, and to this end a frame 30 may be

fixed or placed on the weight to straddle the pulley 9 and receive said plunger.

The cylinder 27 and the guide-bracket 31 of plunger 25 are preferably both mounted, as shown, upon frame 32, which carries the pulleys 8.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination, with the truck carrying the tension sheave or pulley, of a cable, a weight, two sheaves or pulleys, and a single cable doubled on itself, as shown, said cable connecting the weight to the truck and having one member passing over each of said sheaves or pulleys, substantially as set forth.

2. The combination, with the truck-carrying tension-sheave, of a cable, a weight, two sheaves or pulleys, and a single cable doubled on itself, as shown, and connected to said weight and having its two members passing over its two sheaves or pulleys, and mechanism on said truck for adjusting said cable, substantially as set forth.

3. The combination, with a truck carrying the tension-sheave, of a cable, a weight, pulleys, a single cable doubled on itself running over said pulleys and connected to said weight, and an adjustable drum on said truck to which one end of said second cable is connected, substantially as set forth.

4. The combination of the truck 1, drum 13, having bearing on said truck, weighted cable 6, connected to said drum, gear 15, and pivoted worm-shaft 18, all arranged and adapted to operate substantially as set forth.

5. The combination of the truck 1, pulleys 8, weight 7, having pulley 9, and cable 6, passing over said pulleys and having means of adjustment on said truck, substantially as set forth.

6. The weight 7, having holes 10, in combination with additional weights 11, adapted to occupy said holes, substantially as set forth.

7. The combination of the truck 1 and weight 7, connected to said truck, with a resistance adapted to arrest said weight as it nears the upper end of its movement, substantially as set forth.

8. The combination of the truck 1 and weight 7, connected to said truck, with the air-cushion 27 and plunger 25, both arranged and adapted to operate substantially as and for the purposes set forth.

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