Oct. 9, 1928. 1,686,882

W. C. SWANCOTT

AUTOMATIC LIMIT STOP

Filed Aug. 12, 1927

Fig. 1.

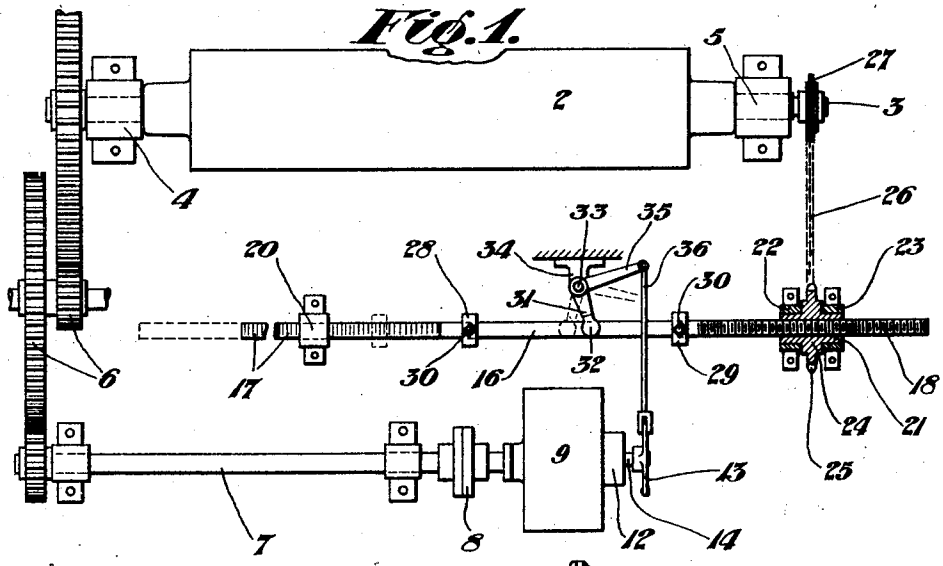
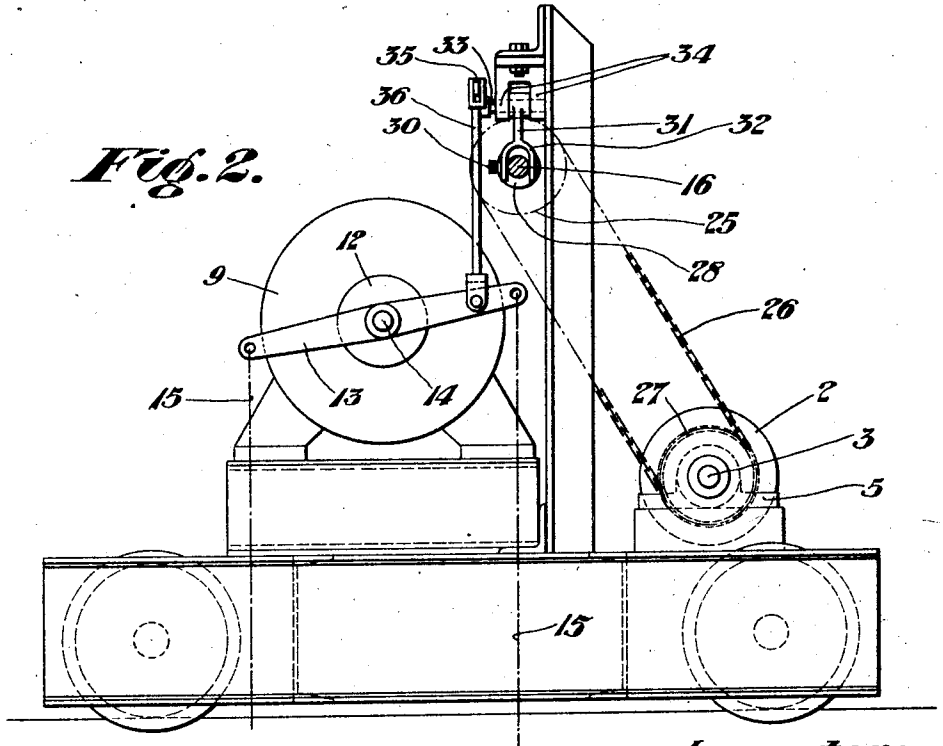


Fig. 2.



Witnesses:

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Patented Oct. 9, 1928. 1,686,882

UNITED STATES PATENT OFFICE.

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AUTOMATIC LIMIT STOP.

Application filed August 12, 1927. Serial No. 212,522.

This invention relates to motor limit stops and, while not limited thereto, relates more particularly to a limit stop for crane motors and the like, and has for its object the provision of a novel stop construction which will be entirely free from all springs, weights, contact points and similar parts which ordinarily wear and break or fail to function when only slightly worn.

Another object is to provide a stop mechanism which is purely mechanical, and one in which the action is positive even though the parts be considerably worn.

In the drawings—

Figure 1 is a diagrammatic plan view showing my invention applied to a crane operating mechanism.

Figure 2 is an end elevation thereof.

Referring more particularly to the drawings, the numeral 2 designates the cable drum of a crane which has its shaft 3 journaled in suitable bearings 4 and 5. One end of the shaft 3 is extended and connected through a train of gearing 6 with a drive shaft 7, which shaft is connected by a coupling 8 with the power shaft of a motor 9, which may be of any desired form, but is shown as an air or fluid motor.

A controlling mechanism of any desired standard construction is indicated by the numeral 12 and is provided to control the operation of the motor 9. The control mechanism 12 is adapted to be operated by a rocking lever 13 secured on a shaft 14. The lever 13 is provided with operating cables 15 which are secured to its opposite ends and are adapted to be pulled to rock the lever 13 to provide for manual control of the motor.

A stop shaft 16 having a square portion 17 and a threaded portion 18 is mounted above the motor 9 and control lever 13. The squared portion 17 of the shaft 16 is slidably mounted in a bearing 20, and the threaded portion 18 of the shaft 16 has a threaded engagement with a nut 21 which nut is journaled in bearings 22 and 23 and provided with a hub portion 24 adapted to bear against and deliver end thrust to the bearings.

A sprocket 25 is secured on the hub portion 24 of the nut and is connected by a drive chain 26 to a sprocket 27 secured on the drum shaft 3, so that the nut 21 will be rotated when the drum 2 is rotated. Rotation of the nut 21, due to its fixed mounting in the bearings 22 and 23, and its threaded engagement with the shaft 16, will cause the shaft 16 to move longitudinally through the nut.

A pair of stop collars 28 and 29 are adjustably secured on the shaft 16 at spaced points by means of set screws 30 or the like, and are adapted to engage a rocking lever 31. The lever 31 has its lower end shaped to form a clevice 32 which is fitted over the shaft 16 intermediate the stop collars 28 and 29 and has its upper end secured to a rock shaft 33 journaled in bearings 34. The shaft 33 also has a lever 35 secured thereto and positioned substantially at right angles to the lever 31. The lever 35 has its other end connected to the upper end of a vertically disposed lever or link 36 which has its lower end pivotally connected to one end of the rocking lever 13 of the control mechanism 12.

In operation, the stop collars 28 and 29 will be adjusted on the shaft 16 so as to be in position to engage and rock the lever 31 when the desired amount of travel is imparted to the drum 2, which drum is directly connected to the nut 21. When the limit of travel is reached in either direction, one of the collars 28 or 29 will engage the lever 31 and rock the lever 31 and shaft 33 which in turn will move the lever 35 and link 36 and thereby rock the control lever 13 into horizontal or off position so as to operate the control mechanism 12 and stop the motor 9 and drum 2.

While I have shown and described one specific embodiment of my invention, it will be understood that I do not wish to be limited thereto, since various modifications may be made and the invention may be applied to many other apparatuses than cranes without departing from the scope of my invention as defined in the appended claims.

I claim—

1. The combination with a motor and a control element for said motor, of means operated by said motor for automatically operating said control element, said means comprising a screw shaft mounted for longitudinal reciprocatory movement and locked against rotary movement, a nut having threaded engagement with said shaft, said nut being journaled in fixed bearings, drive means connecting said nut with said motor whereby said nut will be rotated when said motor is operated, the rotation of said nut

being adapted to compel a longitudinal movement of said screw shaft, stop elements on said shaft, and means operated by said stop elements adapted to operate said motor control element to move said element into off position.

2. The combination with a motor and a control element for said motor, of means operated by said motor for automatically operating said control element, said means comprising a screw shaft mounted for longitudinal reciprocatory movement and locked against rotary movement, a nut having threaded engagement with said shaft, said nut being journaled in fixed bearings, drive means connecting said nut with said motor whereby said nut will be rotated when said motor is operated, the rotation of said nut being adapted to compel a longitudinal movement of said screw shaft, stop collars adjustably mounted at spaced points on said shaft, and lever mechanism adapted to be engaged and operated by said collars when said shaft is reciprocated, said lever mechanism being connected with and adapted to operate said motor control element to move said element into off position.

3. The combination with a motor and a control element for said motor, of means operated by said motor for automatically operating said control element, said means comprising a screw shaft mounted for longitudinal reciprocatory movement and locked against rotary movement, a nut having threaded engagement with said shaft, said nut being journaled in fixed bearings, drive means connecting said nut with said motor whereby said nut will be rotated when said motor is operated, the rotation of said nut being adapted to compel a longitudinal movement of said screw shaft, stop collars adjustably mounted at spaced points on said shaft, a lever having a fixed fulcrum point relative to said screw shaft, a clevis on one end of said lever and fitted over said shaft intermediate said stop collars so as to be engaged by said stop collars when said shaft is caused to move longitudinally by the rotation of said nut, said lever being adapted to be rocked about its fulcrum point when said clevis is engaged by said stop collars, and other levers operated by said first named lever and adapted to operate said motor control element to move said element into off position.

In witness whereof, I have hereunto signed my name.

WALTER C. SWANCOTT.