

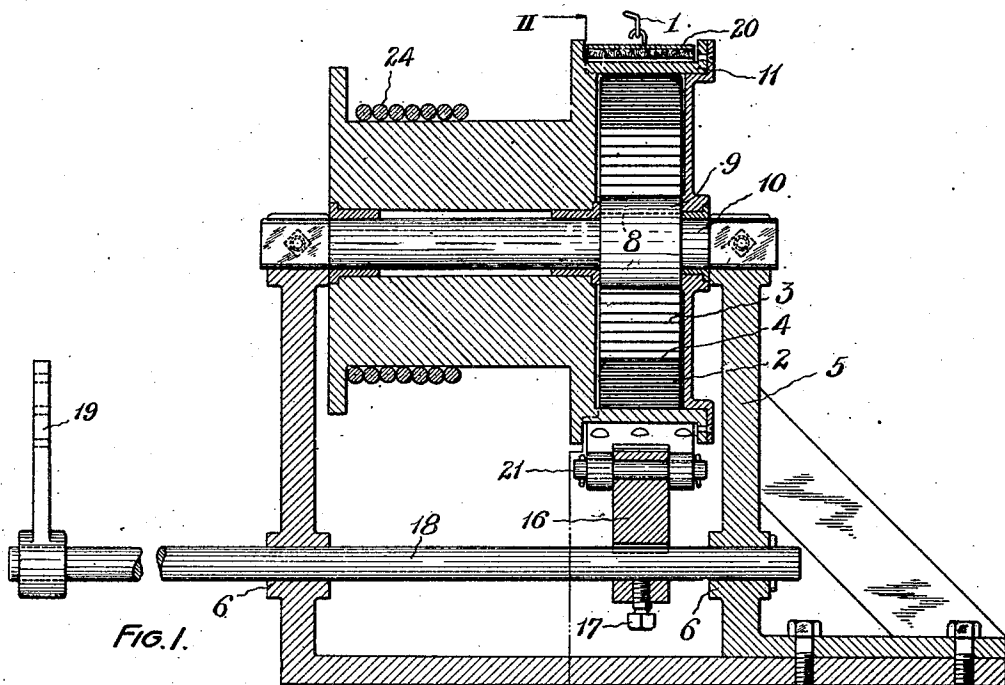
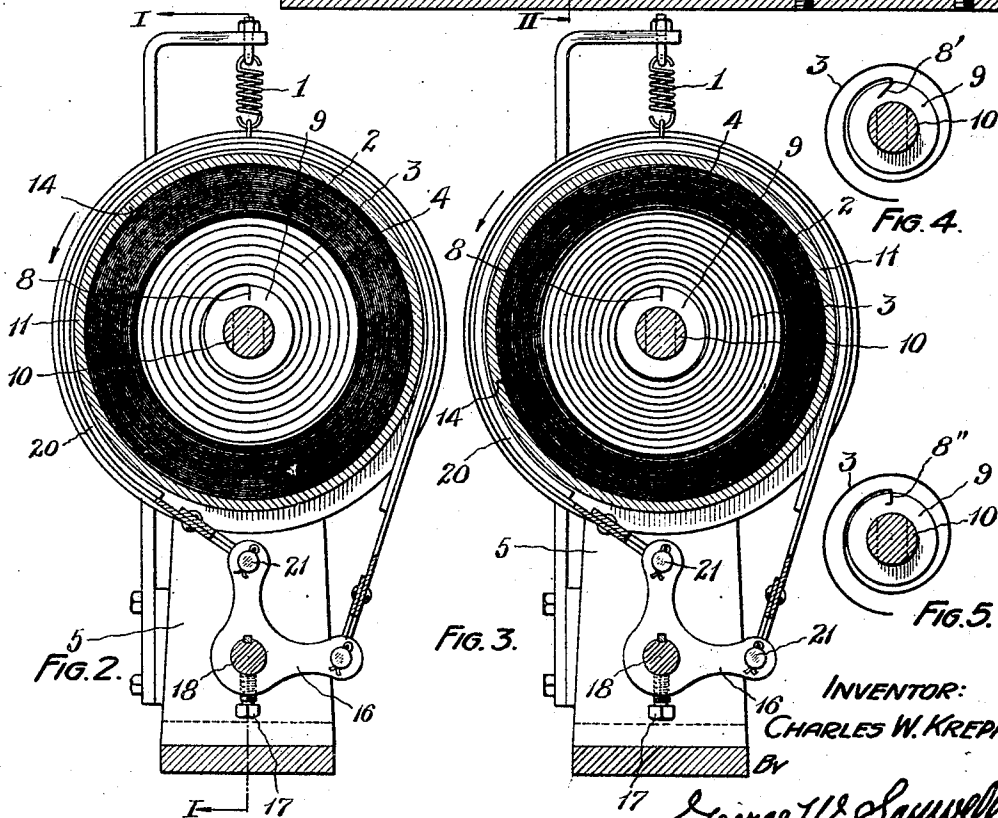
Aug. 6, 1929.

C. W. KREPPS

1,723,484.

SPRING.

Filed Oct. 5, 1925



INVENTOR:

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BY

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SPRING.

Application filed October 5, 1925. Serial No. 60,379.

My invention relates to spring mechanism and is illustrated by its application to the operation of certain trip control mechanism hereinafter fully described. One of the objects of my invention is to eliminate the breaking of coiled springs at the points where they are fastened by the bending stress on the spring as the latter is tightened by the rotation of the drum to which the spring is fastened. Because a spring anchor which is elevated by bolts or pins by which it is fastened will not wrap truly, another object of my invention is to provide means of making smooth connections where the springs are fastened at either end, whereby local strains are eliminated. A further object of my invention is to provide means for obtaining the benefits of a large hollow section of a spring without using a correspondingly large shaft. In general my invention aims to provide working and practicable actuating means in a trip control or similar machine wherein a coiled spring is the actuating power. While my invention is illustrated and described for use with trip control mechanism for excavator scoops, the principle and use are not thus limited.

The annexed drawing and the following description set forth in detail certain means embodying my invention, such means constituting, however, but one of the various forms in which the principle of the invention may be applied.

In said annexed drawing:

Fig. 1 represents a vertical longitudinal section through a cable winding drum and associated elements, forming part of a scoop excavator, in connection with the operation of which one form of my spring and spring mounting is shown;

Fig. 2 represents a vertical cross section on the line II—II, Fig. 1, showing the spring in its normal or expanded position;

Fig. 3 represents a view similar to Fig. 2, but showing the spring in its tensioned position;

Fig. 4 is a fragmentary view showing a modified form of spring anchor; and

Fig. 5 is a fragmentary view showing another modified form of spring anchor.

Referring to the annexed drawing in which the same parts are indicated by the same respective ordinals in the several views, I designate a drum by the ordinal 11 which revolves on the shaft 10 which is rigidly connected with set screws to the frame 5, as plainly shown in Fig. 1. One side of the drum is formed for engagement with the brake band 20 whose ends swivel on the pins 21 of the bell crank 16 secured to the shaft 18 by means of the set screw 17. The shaft 18 is pivotally mounted in bearings 6 of the frame 5. As the shaft 18 is turned from outside sources by means of the lever 19 rigidly connected to the shaft 18, the bell crank 16 tightens or releases the brake band 20. In its released position the brake band 20 is positively lifted from the drum 11 by means of the spring 1, as shown in Figures 2 and 3.

In an enlarged hub 9 secured to the shaft 10 there is formed a slot 8 in which one end of a coiled spring 4 is fastened. The spring 4 has numerous coils and in its normal position forms two distinct portions, a dense portion 2 in which the coils are close together and an open portion 3 in which the coils are relatively far apart. The other end of the spring 4 is fastened to the drum 11 by inserting a bent end into a slot 14 formed on the inner surface of the enlarged portion of the drum 11, as indicated in Fig. 1.

As the drum 11 is rotated in the direction of the arrow, shown in Figures 2 and 3, the open portion 3 of the spring coil experiences a bending strain, and, as this is continued, coils from the denser portion 2 of the coiled spring are drawn toward the hub 9, thereby preventing the continued bending of the open portion of the spring up to its breaking point. The tendency of the spring 4 to reassume the position shown in Fig. 2 is utilized to prevent the spring being bent until it breaks at either its point of connection with the drum 11 or at its point of connection with the hub 9. The object of the invention is to obviate the continued bending of a coil spring up to its breaking point, and is attained by providing different sections of a coil spring whose respective coils are spaced varying distances apart whereby the tensioning of the coils in one

section will be compensated by the loosening of the coils in another section. The purpose of the various forms of mountings illustrated is to obviate thickened connections and the local strains on the springs thereby caused.

The drum 11 is rotated by means of the cable 24, one end of which is fastened to the drum. As the cable 24 is unwound the spring 4 becomes tightened, and as the tension on the cable is removed, the spring causes the cable to be rewound on the drum.

The particular improvements claimed for this spring, in which the limits of elasticity are increased, result from the form of the anchorage, the enlarged hub to which the inner end of the spring is secured, and particularly from the secondary spring effect obtained by using a spring with a relatively large number of coils and having sections differing as to the distances by which the coils are spaced. The forms of anchorage employed assist in keeping the bending strain on the spring at the points of connection at a minimum by not adding any local strains in the form of thickened connections. The enlarged hub enables the spring to be wound a greater amount with less bending strain on the spring at the point of connection with the hub than would be experienced if the anchorage is formed in the shaft itself, which is preferably of slight diameter. The use of a multi-coil spring increases the elasticity in so far as the elasticity of the dense portion

of the spring, as shown in Fig. 2, can neutralize the bending torsion on the entire spring as the latter is wound up and tends to assume the shortest distance between the point of connection with the drum and the point of connection with the hub.

While the use of my invention is described and illustrated in connection with a trip control, it is not thus limited, but may be employed in all cases where the requirements and conditions are similar.

What I claim is:

In a trip control device having a shaft and a drum revoluble about the shaft for winding and unwinding a cable operating a trip; a spring mechanism comprising a multi-coil spring having an outer section of tightly wound coils and an inner section of loosely wound coils, the outer and inner ends of the spring being bent; means for anchoring the outer end of the spring to the drum, said means including a portion of the drum formed with a slot adapted to receive the outer bent end of the spring; and an anchorage for the inner end of the spring, said anchorage including an enlarged hub provided on the shaft and formed with a slot on its periphery adapted to receive the inner bent end of the spring.

Signed by me this 18th day of September, 1925.

CHARLES W. KREPPS.

CERTIFICATE OF CORRECTION.

Patent No. 1,723,484.

Granted August 6, 1929, to

CHARLES W. KREPS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, line 4, beginning with the word "One" strike out all to and including the word "eliminated" in line 16, and insert instead "The object of the invention is to obviate the continued bending of a coil spring up to its breaking point, and is attained by providing different sections of a coil spring whose respective coils are spaced varying distances apart whereby the tensioning of the coils in one section will be compensated by the loosening of the coils in another section."; same page, line 94, beginning with the article "The" strike out all to and including the word "section", line 2, page 2, and insert instead "If the spring 4 is composed of only a relatively few coils, there is no tendency for the spring to assume a dense outer portion, and the points of connection with the drum 11 and the hub 9 being at a constant distance from one another, there is nothing to prevent the spring being bent at the points of connection with either the drum 11 or the hub 9 until broken.

Figures 4 and 5 show modified forms of the slots, 8 prime and 8 double prime, in which the bent ends of the spring 4 may be fastened. The preferred form of spring mounting is shown in Figures 2 and 3, although the forms shown in Figures 4 and 5 will produce approximately the same results."; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of September, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.