June 13, 1933. G. P. FLANAGAN 1,913,379

STOP MOTION APPARATUS

Filed Sept. 18, 1930

Fig. 1.

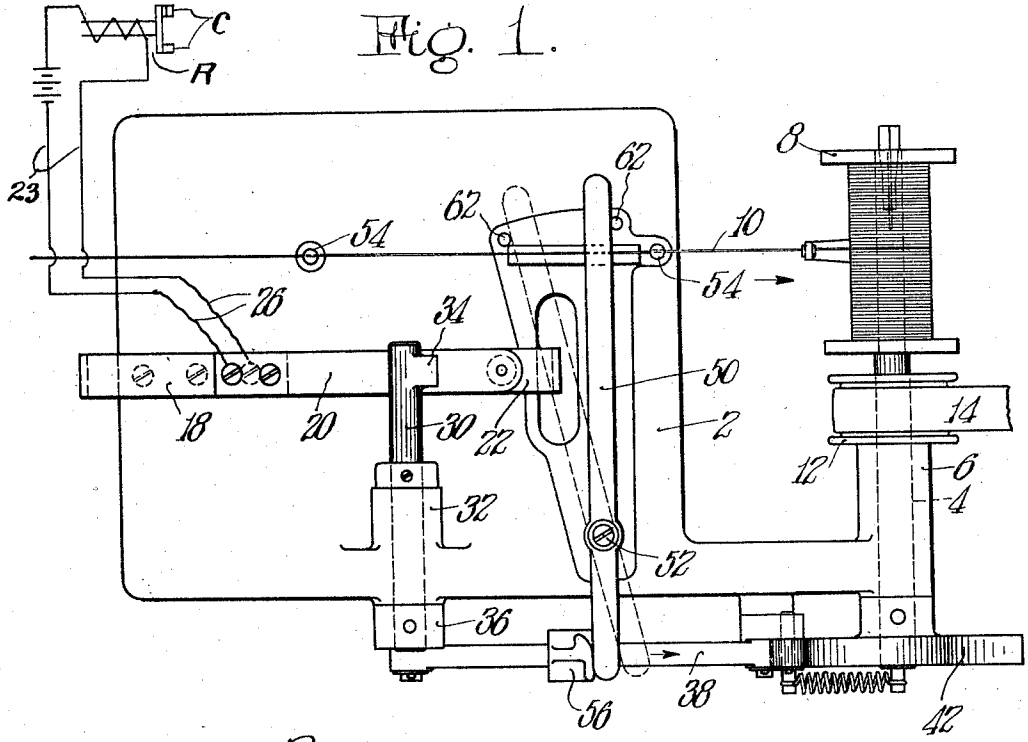
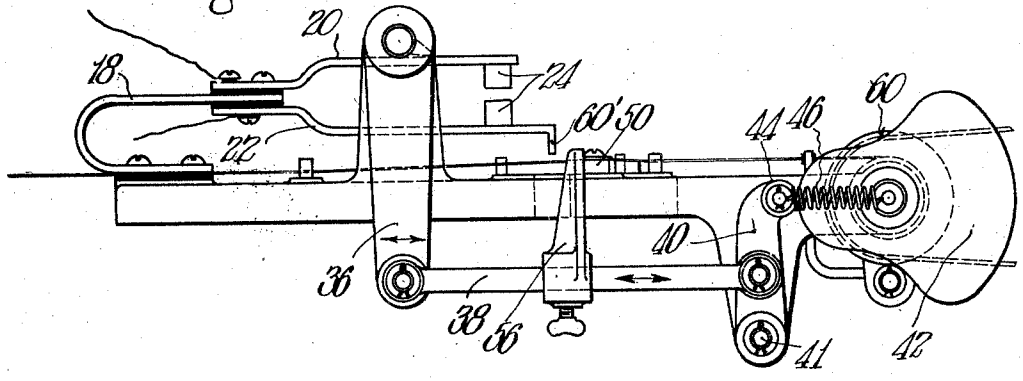


Fig. 2.



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STOP MOTION APPARATUS

Application filed September 18, 1930. Serial No. 482,719.

This invention relates to improvements in stop motion apparatus, and is directed particularly to apparatus adapted for use in connection with various machines for stopping the operation thereof.

The principal object of the invention is a provision of an apparatus which is adapted and arranged to interrupt the operation of a machine. It is particularly useful in connection with machines where yarns, wires and the like are led from one unit to another and is adapted should the yarn or wire break to stop the operation of the apparatus to interrupt the operation of the machine.

For the purposes of disclosing the novel features of the invention it will be assumed that yarn or the like is being wound up by a spool and that it is desired to stop the rotation of the spool should the yarn become broken.

It will be understood that the novel features of the invention are adapted for broad application and that the disclosure is merely for the purposes of describing the invention in the form at present preferred.

In the drawing:

Fig. 1 is a plan view of an apparatus embodying the novel features of the invention, and

Fig. 2 is a front elevational view of the same.

Referring now to the drawing more in detail the invention will be described.

A support or base 2 is shown which may take any desired form for supporting the apparatus. This may be made so as to be attachable to any form of machine or apparatus with which the stop motion apparatus may be used.

In the form of the invention shown a rotatable member such as a spindle 4 is mounted for rotation in a bearing 6 carried by the support 2. This spindle may receive on its upper end a spool 8 on which is to be wound a yarn 10 or the like. A pulley 12 is fixed to the spindle and may be rotated by a belt 14 driven by an electric motor not shown. As will be apparent the operation of the motor may be controlled by the apparatus of the invention.

A spring member 18 in the form of a U has one end such as its lower end insulated from and secured to the frame 2 as shown. This member is spring-like and more or less yieldable and carries on its outer end a pair of contact members 20 and 22 insulated from one another. These contact members are relatively yieldable and on their adjacent inner faces carry contacts 24 which are normally out of contact as shown.

The contact members 20 and 22 may be included in an electrical circuit 23 connected to a suitable electrical device such as a relay R which when short circuited is adapted to operate to break a circuit C of the motor (not shown) which drives belt 14 and spindle 4. When the contacts 24 are brought into contacting engagement so as to close the circuit 23 in which leads 26 are included the motor for driving 14 will be disconnected from its current supplying circuit so that spindle 4 is no longer driven. This short circuiting is desired in case of breakage of the yarn or wire indicated by 10.

The spindle 4 may represent a rotating element of any machine and is utilized to operate the apparatus of the invention. The wire or yarn 10 may represent any element passing into or through a machine, the movement of which is utilized to control or actuate the stop motion apparatus as will appear.

A cam shaft 30 oscillatable in a bearing 32 of the support 2 has on its end a cam member 34. This is arranged to bear on the upper side of member 20. As the shaft is oscillated the cam will act on member 20 and depress the upper inner end of the spring member 18 and as the member 18 is depressed the fingers 20 and 22 carried thereby are depressed. Normally both the fingers 20 and 22 are swung up and down with the contacts 24 out of contact. That is, the fingers 20 and 22 are not moved relative to one another as they are swung up and down.

A lever arm 36 fixed on shaft 30 is connected at its lower end by a link 38 to a lever 40 pivoted at 41 on the support 2 for swinging movements. A cam 42 on the end

of spindle 4 is arranged so that its peripherial face is engaged by a roller 44 on the upper end of lever 40. A spring 46 connected between the upper end of the lever 40 and spindle 4 is provided for urging the roller of the lever 40 against the periphery of the cam as shown.

The parts are arranged so that as the spindle is rotated the cam will swing the lever 40 which swings the lever 36 back and forth and thereby cause the upper contact finger 20, spring 18 and the lower contact member carried thereby to be moved up and down.

The cam shown is arranged so that the contacts will be depressed and returned to the upper position by action of the spring 18 once for each revolution of the shaft 4, but it may be desirable in some cases to depress the contact members a greater number of times for each revolution of the spindle or other rotating element 4.

It will be noticed that if the contact members 20 and 22 are depressed while in the relative position shown, the contacts are not engaged, but it will be appreciated that if the lowering movement of the contact 22 is restricted that it would cause the contacts 24 to be engaged. To accomplish this the following is provided:

A lever 50 is pivoted at 52 to the upper side of the support 2. Its inner end overlies and rests on the yarn 10 as it travels to the spools 8. This yarn may be guided in guides 54. The outer end of lever 50 lies in the path of an arm 56 on the link 38. The cam 42 is provided with a depression 60 in the periphery thereof so that as it is rotated counter clockwise, the roll 44 of lever 40 will follow into the depression so that the arm 40 and link 38 moves to the right. This will swing the inner end of the lever 50 to the left into the dotted line position shown in Fig. 1.

In this position the lever underlies a projection 60′ provided on the lower finger 22, but since the lever overlies the yarn the said yarn which is being wound up by the spool will as it travels toward the spool swing the lever 50 to the right again until its end abuts one of a pair of stops 62.

In the operation of the apparatus it will be assumed that the belt 14 is driven from a motor so that spindle 4 is rotated, whereby the spool 8 will wind up the yarn 10 which passes beneath lever 50. As the spindle rotates the cam 42 moves the lever 40 first to the right from the position shown in Fig. 2 and then to the left. As lever 40 swings to the right as when the roll 44 thereof follows the depression 60 in the cam, the arm 50 is swung to the left to underlie finger 22. While yarn is being wound up by spool 8, the lever is returned immediately to the right by the yarn and from beneath contact finger 22. Then as lever 40 swings to the left as its roll rides on the larger diameter of the cam 42, the contact fingers are depressed without contacting the contacts 24.

Should the yarn break so as to not move the lever 50 to the right, it remains beneath lower contact finger 22. The lever then acts to restrict the downward movement of finger 22 whereby contacts 24 are engaged when cam 34 acts to depress the fingers and the upper outer end of spring member 18.

The apparatus of the invention in the form preferred may be arranged for use in connection with any machine wherein yarn, wire or the like travels from one unit to another. It will be noticed that the lever 50 is positively swung in one direction so as to be located beneath the contacts while it is retracted by the yarn itself. The yarn or wire itself is depended upon to control the operation of the contacts 24. By this means if the yarn or wire is broken so that it does not actuate the lever, the fact that it has broken is utilized to effect the operation of the apparatus which may cut off the current and stop the machine.

Having described the invention in the form at present preferred, what I now desire to secure by Letters Patent of the United States is:

1. A stop motion apparatus of the class described comprising in combination, a pair of relatively yieldable contact members normally out of contact which are movable between upper and lower positions, actuating means for moving said members towards said lower position, a member movable into and out of the path of movement of said contact members and means for operating said actuating means and said member in timed relation whereby said member is moved to underlie said contact members when they are in said upper position.

2. A stop motion apparatus of the class described comprising in combination, a support, a yieldable member fixed to said support, a pair of relatively yieldable contact members carried by said yieldable member which are normally out of contact, an actuating member for moving said contact members towards said support, a member movable on said support into and out of the path of movement of said contact members having a part engageable by a strand and movable thereby away from the path of movement of said contact members, operating means for moving said member into the path of movement of said contact members and connections between said operating means and said actuating means whereby the member is moved into the path of movement of the contact members when they are upwardly of said lower position.

3. A stop motion apparatus of the class described comprising in combination, a pair

of contacts yieldingly held in non-contacting relation and mounted on a support for movements towards and away therefrom, a lever on said support oscillatable into and out of the path of movement of said contacts having a part engageable by a continuously moving strand by the means of which it may be moved out of the path of movement of said contacts, an oscillatable member for moving said contacts towards said support, a reciprocable member for oscillating said lever into the path of movement of said contacts and connections between said oscillatable member and reciprocable member whereby the lever is moved into the path of movement of said contacts when they are upwardly of said lower position.

4. A stop motion apparatus of the class described comprising in combination, a support, a yieldable member fixed thereto at one end thereof, a pair of contacts at the other end of said member yieldingly mounted thereon in normal non-contacting relation, an oscillatable member for yieldingly moving said contacts in non-contacting relation towards said support, a lever mounted on said support for movements into and out of the path of movement of said contacts having a part engageable by a strand moving across said support, a rotatable shaft, means associated therewith for moving a strand across said support, connections between said shaft, oscillatable member and lever whereby the contacts are moved towards said support and the lever is moved into the path of movement thereof as the shaft is rotated.

5. A stop motion apparatus of the class described comprising in combination, a support, a yieldable member fixed thereto at one end thereof, a pair of contacts at the other end of said member yieldingly mounted thereon in normal noncontacting relation, an oscillatable member for yieldingly moving said contacts in non-contacting relation towards said support, a lever mounted on said support for movements into and out of the path of movement of said contacts having a part engageable by a strand moving across said support, a rotatable shaft, a cam and a lever associated with said shaft and support, respectively, a crank on said oscillatory member, connections between said crank and lever and a member associated therewith for actuating said first named lever.

6. A stop motion apparatus of the class described comprising in combination, a support, a yieldable member fixed thereto at one end thereof, a pair of contacts at the other end of said member yieldingly mounted thereon in normal non-contacting relation, an oscillatable member for yieldingly moving said contacts in non-contacting relation towards said support, a lever mounted on said support for movements into and out of the path of movement of said contacts having a part engageable by a strand moving across said support, a rotatable shaft, a cam on said shaft, a cam lever on said support oscillatable by said cam, a lever on said oscillatable member connected by a rod to said cam lever and a member associated with said rod for engaging said first-named lever.

In testimony whereof I affix my signature.

GEORGE P. FLANAGAN.