

W. W. BURKE.
ELECTRIC CIRCUIT CLOSING DEVICE.
APPLICATION FILED AUG. 15, 1913.

1,101,009.

Patented June 23, 1914.

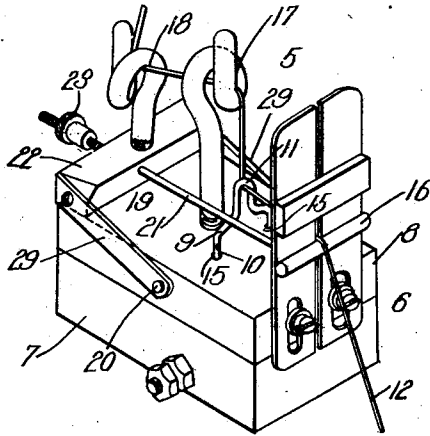


Fig. 1.

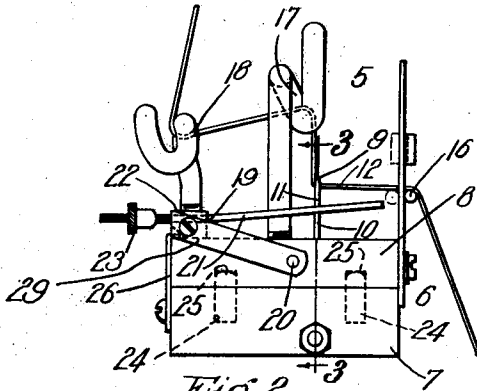


Fig. 2.

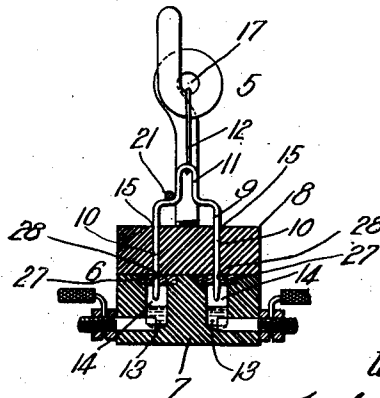


Fig. 3.

Witnesses:

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By his attorney,

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UNITED STATES PATENT OFFICE.

WILLIAM W. BURKE, OF BENNINGTON, VERMONT, ASSIGNOR OF ONE-FOURTH TO JAMES E. BURKE AND ONE-FOURTH TO ALEXANDER J. COOPER, BOTH OF BENNINGTON, VERMONT.

ELECTRIC-CIRCUIT-CLOSING DEVICE.

1,101,009.

Specification of Letters Patent.

Patented June 23, 1914.

Application filed August 15, 1913. Serial No. 784,923.

To all whom it may concern:

Be it known that I, WILLIAM W. BURKE, a citizen of the United States, residing at Bennington, in the county of Bennington and State of Vermont, have invented new and useful Improvements in Electric-Circuit-Closing Devices, of which the following is a specification.

This invention relates to an electric circuit closing device particularly adapted to be used in machines employing a thread or a strand of yarn such as knitting machines. Said device embodies in its construction a drop device which is adapted to open and close said electric circuit, the device being so constructed and arranged that when a thread or yarn breaks, or when abnormal tension is brought to bear upon said thread or yarn the drop device will be operated to close the circuit.

The invention is an improvement in certain specific features upon the invention embodied in applicant's co-pending application Serial No. 766,685, filed May 10, 1913, to which reference may be had. It is very essential that said drop device shall be moved freely and as it is formed with two legs which project through holes in a base containing the contacts, it is desirable at times to remove from said holes any dust or lint that may gather therein. The construction of the base whereby such an operation may be performed easily and quickly is one of the objects of this invention.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a perspective view of a circuit closing device embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse section taken on line 3-3 of Fig. 2.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 5 is the circuit closing device consisting of a base 6 in two parts, namely, a lower part 7 and an upper part 8. These parts preferably are formed of insulating material and in the upper part 8 a drop device 9 is slidably mounted consisting of a wire bent in U-shape, the legs 10 constituting contact points and the closed end of said drop device being bent at 11 to

form a guide for a strand of yarn 12. When said strand of yarn breaks or the supply runs out or when abnormal tension is applied thereto the legs 10 will be caused, in a manner hereinafter described, to engage the contacts 13, which preferably consist of mercury inclosed in chambers 14 contained within the base 6. The legs 10 are arranged to slide in holes 15 formed in the upper part 8 of the base, said holes leading into the chambers 14 from the top of said upper part 8.

In the upper surface of the lower part 7 and immediately above the chambers 14 washers 27 are provided which have holes 28 therein through which the legs 10 project into the chambers 14. These washers are preferably made of felt and prevent any of the mercury in the chambers 14 from leaking out between the parts 7 and 8.

When the circuit is open the parts will be in the position illustrated in Fig. 3. When the circuit is closed by the drop wire 9 the electromagnet in the circuit (not shown in the drawings) will be energized and the armature of said electromagnet will be drawn toward said electromagnet and operate mechanism to release a suitable stop motion mechanism whereby the machine will be stopped, all as particularly set forth in said application Serial No. 766,685. The drop wire 9 is held out of contact with the contacts 13 by the strand of yarn 12 which passes from a yarn mass through suitable guide eyes and over a yarn guide 16 to the guide eye or bend 11 formed in the drop wire 9, thence upwardly through a stationary guide eye 17, through a movable guide eye 18 and thence through stationary guide eyes (not shown in the drawings) to the primary needles of a knitting machine. The movable guide eye 18 is fastened to a U-shaped lever 19 consisting of two side arms 29 joined together by a cross-bar 22. The side arms 29 are pivoted to pins 20 fast to the upper part 8 of the base. These side arms are made of spring metal, so that they can be sprung off of the pivotal pins 20 when it is desired to remove the lever from the base for the purpose hereinafter specified. A pin 21, constituting an arm, extends through the cross-bar 22 of said lever 19 and projects over the closed end of the U-shaped drop wire 9 and forms a stop

therefor to prevent said eye from being moved away from the contacts 13 more than a certain distance. The pin 21 projects through the cross-bar 22 and is provided with a weight 23 which has screw-threaded engagement therewith, so that by moving said weight on said pin toward and away from the pivot 20 of the lever 19 the tension on the yarn 12 may be decreased or increased, respectively, so as to hold the lever 19 downwardly in substantially the position illustrated in Fig. 2, with the cross-bar 22 in contact with the upper part 8 of the base under normal conditions or when the yarn is subjected to a normal tension.

Different sizes of yarn require more or less tension. For larger sizes the weight 23 is moved outwardly from the pivot 20 and for smaller sizes said weight is moved toward said pivot. In order that the part 6 may be quickly and accurately located upon, and locked to, the part 7 of the base 6 two dowel pins 24 are fastened to the lower part 7 and are arranged to project into holes 25 in the upper part 8. A spring catch 26 is fastened to the lower part 7 and is formed to hook over the top of the upper part 8, thus locking the two parts 7 and 8 together.

The device hereinbefore described is operated and used as follows: When it is desired to clean out the holes 15 the parts 7 and 8 are separated one from the other by moving the catch 26 out of contact with the upper part 8 of the base and then pulling said parts 7 and 8 apart the operator blows through the holes 15 and dislodges any dust or lint that may be gathered therein. He then replaces the parts as before, allowing the spring catch 26 to spring into place over the top of the upper part 8, thus locking said parts together. The weight 23 is moved toward or away from the pivot 20 by rotating the same upon the pin 21 in the proper direction, so that the weight of the lever 19, including the nut 23, will be properly distributed to apply the correct tension to the yarn which is being used according to the size of said yarn.

Assuming the device to be attached to a knitting machine, it will be seen that the drop wire 9 is raised by the tension of the yarn 12, so that the contact points 10 are out of contact with the contacts 13 and, therefore, the electric circuit is open. The guide 16 is at such a height relatively to the drop wire 9 that the contact points 10, while close to the contacts 13, do not engage the same. The yarn extends substantially in a horizontal direction from the guide 16 to the guide-eye 11 of the drop wire 9, then said yarn extends in a substantially vertical direction to the guide eye 17 and from the guide eye 17 said yarn extends through the guide eye 18 and thence to a suitable guide eye on the frame of the machine (not shown

in the drawings) leading the yarn in such a direction as to form a bight (see Fig. 2). The reason for this arrangement is that when an abnormal tension is applied to the yarn the lever 19 will move upwardly from the position illustrated in Fig. 2 and at the same time the pin 21 will positively push the drop wire 9 downwardly to engage the contacts 13 and close the electric circuit.

When the wire 9 is thus pushed downwardly by the pin 21, it is evident that yarn must be paid out to said drop wire or the device will become locked and by the arrangement hereinbefore set forth, by which a bight is obtained in the yarn 12 adjacent to the thread guide 18, this yarn can be paid out to a sufficient extent so that no locking of the mechanism by said yarn will occur. Thus, when abnormal tension is applied to the yarn, it will be understood that the lever 19 will be rocked on its pivot and the pin 21 will force the wire 9 downwardly until the contact points 10 engage the contacts 13 and complete the circuit. As soon as the circuit is completed the stop motion mechanism will be operated through the action of the electromagnet and armature lever to stop the machine, as set forth in said co-pending application, and if the yarn should break the drop wire 9 will of its own weight drop until the contact points 10 engage the contacts 13, completing the circuit and causing the stop motion mechanism to be operated, as hereinbefore described. The same would be true if the supply of yarn ran out.

It will be understood that one of the circuit closing devices hereinbefore described will be supplied for each feed of yarn in a knitting machine and also that the circuit closing device is applicable to any machine employing a strand of thread or yarn for the purpose of operating a stop motion mechanism when the tension becomes abnormal upon said thread or yarn, or when the thread or yarn breaks or when the supply of thread or yarn runs out.

It sometimes happens that a piece of lint or portion of a strand of yarn will become entangled and wound around the drop wire 9 in such a manner that it is difficult to dislodge the same while the parts of the circuit closing device are assembled, in which case the operator can spring the side arms 29 of the lever 19 apart, so that they will become disengaged from their pivotal pins 20 and remove the lever 19 so that the drop device can subsequently be removed from the base and the lint or yarn easily removed therefrom.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A circuit closing device having, in combination, a base in two parts, a catch connecting said parts together, a pair of con-

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tacts in one of said parts, and a drop wire forming a portion of an electric circuit and constituting a guide for a strand of yarn, said drop wire having two legs projecting through holes provided in the other of said parts in alinement with said contacts.

2. A circuit closing device having, in combination, a base in two parts, dowel pins, a spring catch connecting said parts together, a pair of contacts in one of said parts and a drop wire forming a portion of an electric circuit and constituting a guide for a strand of yarn, said drop wire having two legs projecting through holes provided in the other of said parts in alinement with said contacts.

3. A circuit closing device having, in combination, a base in two parts, means detachably connecting said parts together, one of said parts being provided with two chambers, mercury in said chambers constituting contacts, washers located at the upper ends of said chambers constituting a packing means and a drop wire forming a portion of an electric circuit and constituting a guide for a strand of yarn, a plurality of guides for said yarn, said drop wire having two

legs projecting through holes provided in the other of said parts and through holes provided in said washers in alinement with said contacts.

4. A circuit closing device having, in combination, an electric circuit including a drop device adapted to open and close said circuit and constituting a guide for a strand of yarn, a plurality of guides for said yarn, a lever adapted to engage said drop device, said lever consisting of a cross-bar and two side arms, pins upon which said side arms are pivoted constituting pivots for said lever and a guide for said yarn mounted on said lever, said side arms adapted to be sprung laterally out of engagement with said pins, whereby when under abnormal tension said lever may be rocked by said yarn to move said drop device to close said circuit.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM W. BURKE.

Witnesses:

ROBERT E. HEALY,
CHAS. HY. GREEN.