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THREAD CONTROLLING DEVICE FOR ELECTRICALLY OPERATED KNITTING AND HOSIERY MACHINES

Filed Nov. 12, 1958

FIG. 1

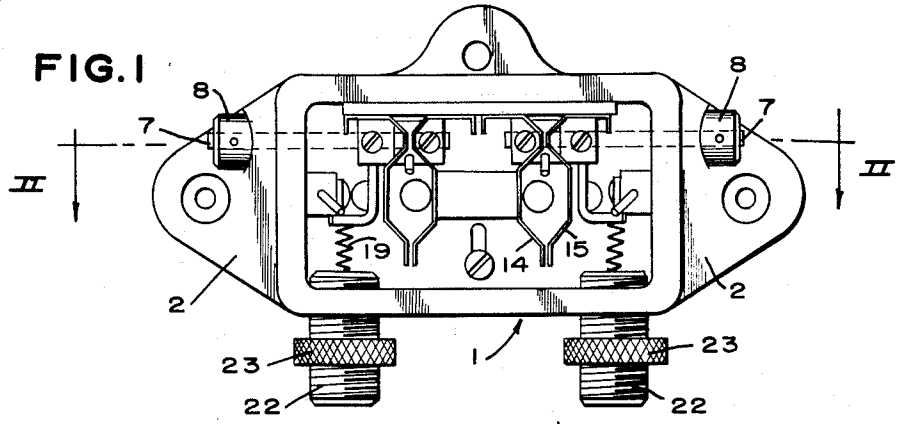



FIG. 2

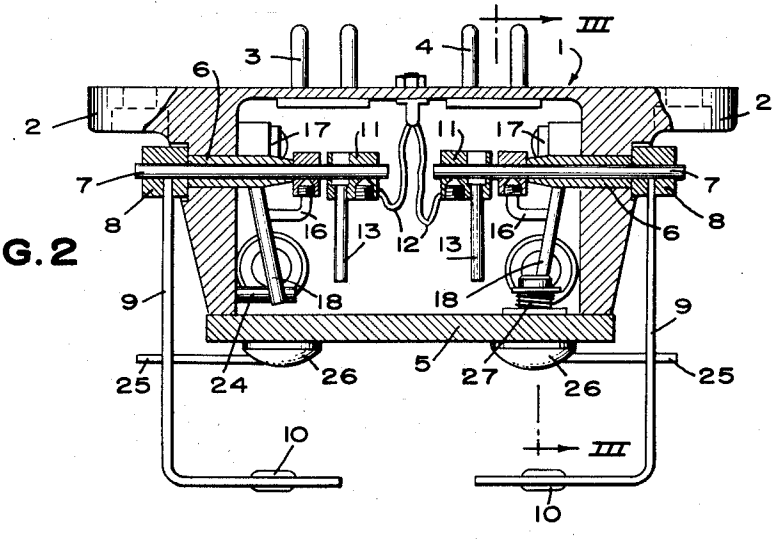
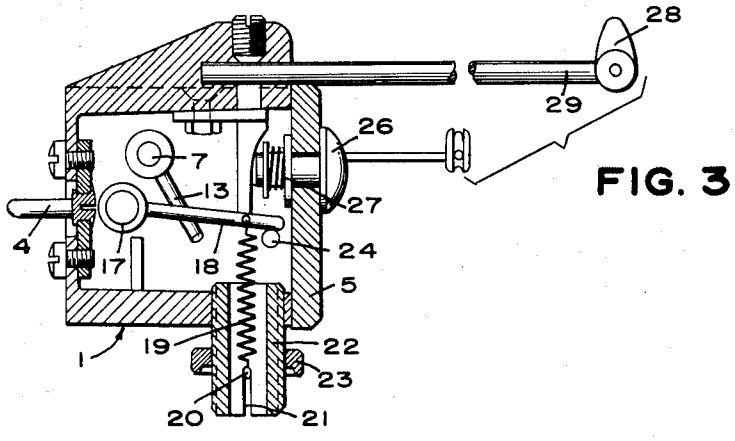



FIG. 3



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# THREAD CONTROLLING DEVICE FOR ELECTRICALLY OPERATED KNITTING AND HOSIERY MACHINES

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2 Claims. (Cl. 200—61.18)

The present invention relates to a disconnecting device for knitting machines or for hosiery machines, and is particularly directed to an electrically operated disconnecting device of this kind provided with a rotary or swinging thread lever which when the thread breaks swings to one of two contact places, and which when the tension increase too much is swung to the other one of the two contact places.

There are already known to the art electrically operated disconnecting devices in which for the control of the thread breaking and of the thread tension a contact lever connected with the lever guiding the thread to be controlled moves between two contact places of which one responds when the thread breaks and the other one when the tension increases too much and then stops the machine. However, in these known devices the contact lever always engages at the same place or surface of the contact means. The result of this is that there are produced at the contact means in course of time burned places which prevent the contact from taking place, so that the danger exists that because of these burned places or because of other impurities the disconnecting device after some time no longer produces the required result.

According to the invention this disadvantage is overcome by the feature that the contact lever of the invention engages between two springs positioned beside each other and extending essentially in the direction of the swinging movement of the contact lever, and of which each one may be connected to one of two circuits, and whereby these springs are so shaped that they are in the two end positions of the contact places, located closely beside each other, and that they between these two end positions extend at larger distance from each other, so that the free swinging of the contact lever is not interfered with.

Because of the friction produced when the contact lever engages between the two springs and because of the constant alteration of the contact place there are burnt places and impurities practically completely avoided, so that contact means of this kind are always ready for action even after a long time of use.

It is true that it is known already for disconnecting devices which perform a rotary movement in the machine to make the element controlling the thread movable in such a way that it is flung by centrifugal force between two contact springs. However, in the invention this element is freely movable, so that the disadvantages resulting from contact making always at the same place are avoided. The feature of the invention of connecting each one of the two contact springs between which the contact lever engages to a different circuit of which, for example, one disconnects the drive of the machine, while the other one energizes a signal lamp, is not per se a patentable feature as the aforesaid known construction provides a contact element actuated by centrifugal force which engages between two contact springs of which each is likewise connected to a



different circuit. However, in the known construction the contact making takes place only when the thread breaks, while contact making is not possible when the thread tension increases too much.

The aforesaid known construction further provides a contact place consisting of a triangular or conical contact which engages at two contact members arranged side by side without being able to move between the latter. A construction like this makes a shifting of the contact places impossible, which shifting would prevent the occurrence of insulating burnt places.

In order to make sure that the contact lever engages between the springy contact members without running the risk of getting jammed up between the springs it is secured on its supporting shaft transverse to its direction of swinging.

The construction of the article of invention permits the accommodation of two units in one casing, whereby the cost of manufacture and material is considerably reduced.

Additional features and advantages of the invention will be understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification and in which an embodiment of the invention has been shown by way of example. However I wish to say that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified, so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appending claims.

In the drawings, in which like parts are referred to by the same reference numerals,

Fig. 1 is a front view of the casing after removal of the cover;

Fig. 2 is a longitudinal sectional view of the device on line II—II of Fig. 1 seen from above;

Fig. 3 is a sectional side-view of the device on line III—III of Fig. 2.

The casing **1** housing the device, that is to say, two disconnecting devices, is provided at its rear wall with two flanges **2** equipped with threaded bores for its fastening at the stop ring (not shown in the drawing).

For the connection of the relays circuit with the disconnecting devices there is provided at the rear wall of the casing **1** one plug **3** or **4** for every disconnecting device.

The casing **1** is open at its forward end and is closed up in dust-tight fashion by the cover **5**.

In each of the side-walls of the casing **1** there is positioned one bearing bushing **6** in which a shaft **7** is rotatably but not axially shiftably supported. The bearing bushing is of such length that through the bearing no dust can enter into the interior of the casing **1**.

Rigidly secured to the free end of the shaft **7** projecting from the casing **1** is an adjusting collar **8** to which is fastened an eye lever **9**. This lever **9** is provided at its free end with the eye **10** through which passes the thread to be controlled.

Rigidly secured to the opposite free end of the shaft **7** within the interior of the casing **1** is a collar **11** to which is connected the wire **12** of the circuit. The wire **12** is kept sufficiently long, so that it can not interfere with the rotation of the shaft **7**. Fastened in the collar **11** is a contact lever **13** which swings together with the eye lever **9**. Positioned on either side of the swinging path of the contact lever **13** is a contact spring **14** and **15** of which one is connected with a disconnecting relay and the other one with a signal lamp. The contact springs are fastened to the upper inner wall of the casing **1** (see Fig. 1) and are so shaped that they are positioned

closely beside each other at the upper end of the contact lever 13 without however touching each other. From there they separate from each other, forming approximately an O-shaped space between each other, and then reapproach each other at the place where the contact lever 13 reaches its lowermost position.

Rigidly secured to the shaft 7 is further a third lever 16 which, beginning at a certain angular position of the eye-lever 9, bears against a lever 18 swinging about a bolt 17 and which, when the eye lever continues its movement, carries the lever 18 along against the pull of a helical spring 19 engaging at the lever 18. In order that the resistance of the spring 19 is, in known manner, adjustable it has its end connected to a spring 20 which is guided, transverse to the axis of the spring, in two longitudinal slots 21 of hollow threaded sleeve 22. This pin 20 projects on both sides from the threaded sleeve 22 and rests on a nut 23. When the nut 23 is adjusted the tension of the spring 19 is changed. The lever 18 rests in its position of rest upon a pin 24 fastened in the casing 1. Rotatably supported on the cover 5 of the casing 1 for every eye lever 9 is a stop lever 25 in such manner that it can be rotated into the swinging path of the eye lever. In order to prevent the stop lever 25 from automatically changing its position it is provided at its place of rotation with a large-sized support 26 which by means of a helical spring 27 positioned on the inner side of the cover 5 is tightly pressed against the outer surface of the cover. The thread to be controlled passes through the eye 10 of the rotatable eye lever 9 and then through the eye 28 at the stationary pin 29.

If, for example, the thread loses its tension through breaking, then the eye lever drops in downward direction and the contact lever 13, rotating with the eye lever, then comes to rest against the lower ends of the two contact springs 14 and 15 and closes that way the two circuits, so that the machine is caused to stand still, and the signal lamp to light up.

The contact lever is loosely secured in the collar 11, so that it is sure to rest against both of the contacts 14 and 15.

If for any reason whatever the tension of the thread increases too much, then the eye lever 9 is pulled upward and the lever 16 carries the spring-pulled lever 18 along until the contact lever 13 hits against the upper ends of the contact springs 14 and 15 and thus closes the circuits. If the eye lever does not carry a thread taking part in the knitting work, then the stop lever 25 is rotated into the path of movement of the eye lever 9, so



that the latter is prevented from dropping into the contact position.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a thread controlling device for electrically operated knitting and hosiery machines the combination with the thread to be controlled and with the electric operating means of, a casing; a shaft rotatably supported in a side wall of the casing and having one of its free ends project beyond the side wall in outward direction; an eye lever adapted to guide the thread rigidly secured to the rotatable shaft for rotation with the latter; resilient resisting means arranged in the path of rotation of said second lever and adapted to resist to an adjustable degree the upward rotation of said second lever; a supporting collar rigidly secured to the opposite end of the shaft and connected by a wire to the circuit; a contact lever loosely securely at one end in said supporting collar for rotation with the latter; and a pair of contact springs having one end secured to the casing and of which one is connected with a disconnecting relay and the other one with a signal lamp, said pair of contact springs extending essentially in the same direction and being so shaped that they are closely approaching each other at two contact places with an enlarged approximately O-shaped space between said two contact places, and said pair of contact springs being so positioned with respect to said contact lever that when breaking of the thread results in downward swinging of the eye lever said contact lever simultaneously swings downward and thereby engages between the two lower ones of the closely approaching contact places closing thereby the two circuits and causing the machine to stand still and the signal lamp to light up, while excess tension results in upward swinging of said eye lever against the adjustable resistance of said resilient resisting means and in engagement of said contact lever between the upper ones of the two closely approaching contact places and in closing of the two circuits.

2. A thread controlling device as specified in claim 1, in which two of said controlling units are accommodated beside each other for simultaneous operation in the same casing.

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