

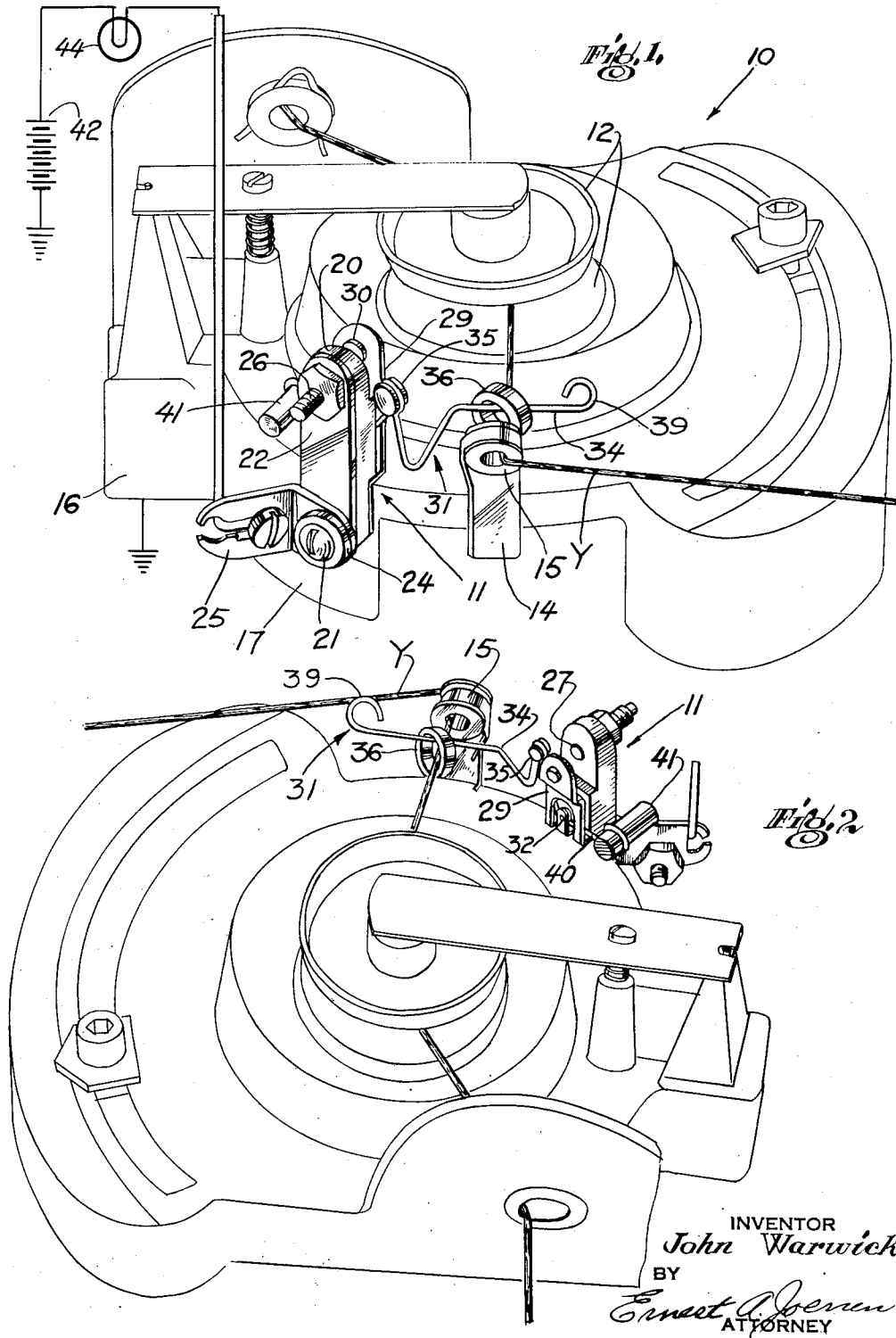
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YARN TENSION RESPONSIVE SWITCH

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YARN TENSION RESPONSIVE SWITCH

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The present invention relates to electrical circuit makers and breakers adapted for special applications such as detecting the absence or loss of tension due to yarn breakage, and, more particularly, such apparatus adapted for use in conjunction with yarn tension compensating devices.

Accordingly, an object of the present invention is to provide switch apparatus of the foregoing character which is simple and economical in construction, is practical and reliable in operation, and can be conveniently installed on both new and existing yarn tension compensators.

Another object is to provide such apparatus which is extremely compact and does not increase the space requirement of yarn tension compensators equipped therewith.

A further object is to provide such apparatus which does not adversely affect the controlling of the tension in the yarn and thereby is suitable for use with tension compensators of the type used in connection with warping yarn on beams.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

In accordance with the present invention, the foregoing objects are accomplished by providing switch apparatus which comprises a pair of switch contacts, a movably mounted arm for moving one of the contacts relative to the other contact, and a member loosely mounted on the arm for slideable movement thereon and having an aperture therein through which the yarn is adapted to pass.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

Fig. 1 is a perspective view of switch apparatus in accordance with the present invention illustrating the same applied to a yarn tension compensator and a diagram of an electrical circuit controlled thereby.

Fig. 2 is a fragmentary perspective view of the switch apparatus as viewed from the side opposite of that in Fig. 1.

Referring to the drawing in detail, there is shown a yarn tension compensator 10 of the type illustrated in United States Letters Patent No. 2,597,044 which is primarily adapted for use in connection with warping yarn on beams, and switch apparatus 11 mounted on the compensator and cooperating therewith in the manner described hereinafter.

For the purpose of understanding the illustrative embodiment of the present invention, the compensator 10 comprises yarn tensioning means such as a pair of discs 12 between which the yarn Y is adapted to pass, mechanism (not shown herein but illustrated and described in the aforementioned patent) for varying the effective-

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ness of the yarn tensioning discs including an arm 14 responsive to the tension in the yarn having an eye 15 through which the yarn is adapted to pass, and a body including an electrically conductive mounting bracket 16 having a wall portion 17 for securing the switch apparatus thereto.

The switch apparatus comprises an upright insulating body or supporting member 20 secured to the wall portion 17 by a screw 21, a connector strip 22 secured at its lower end to the outer side (Fig. 1) of the body by the head of the screw but insulated from the screw by a washer 24, a terminal connector clip 25 secured by the screw between the strip and the washer, a contact pin 26, extending through the body and the strip at the upper end thereof in electrical connection with the strip and having a contact face 27 at the inner side (Fig. 2) of the body, a spring contact element 29 having its lower end secured between the body and the wall portion, and in electrical connection with the latter, by means of the screw 21 and having a contact face 30 at its upper end opposite the face 27, and a switch operating assembly, about to be described in detail.

The switch operating assembly, as illustrated in Fig. 2, comprises a member 31 pivotally mounted at 32 on the inner wall of the body 20 and having an arm 34, a contact element 35 carried by the arm adapted to fit between the contact faces 27 and 30 to place the same in electrical connection, and an apertured member, such as a yarn guide ring 36 or other annular member which is loosely mounted on the arm 34 for slideable movement thereon and has the yarn Y passing therethrough as it runs from the discs 12 to the eye 15 of the arm 14. As shown herein, the arm 34 extends through the central opening 37 of the ring, and is formed at its free end with an enlargement 39 for retaining the ring thereon.

Preferably, the member 31 is provided with a second arm 40 and a counter-weight 41 is secured thereto which overcomes the mass of the arm 34 and the ring 36 thereon, whereby the arm 34 is rocked upwardly upon breakage of the yarn and the contact element 35 is positioned between the contact faces 27 and 30. It will be noted that the member 31 is constructed of wire to reduce its weight to a minimum and that the ring 36 and counter-weight 41 are relatively small and hence light in weight, whereby the switch operating assembly exerts a force on the yarn which is negligible and does not affect the tension in the yarn.

Yarn breakage is detected by connecting the switch apparatus in a circuit such as shown in Fig. 1 which includes a source of electrical energy such as a battery 42 and alarm means such as a lamp 44 or other indicating means. In this circuit, one side of the battery is grounded and the bracket 16 is grounded through its support (not shown), or this side of the battery is directly connected to the spring contact element 29 (or through the bracket or wall portion thereof), the other side of the battery is connected to one side of the lamp, and the other side of the lamp is connected to the terminal clip 25 which is in electrical connection with the contact face 27, whereupon when electrical connection of the contact faces 27 and 30 is established by the element 35 the circuit is closed and the lamp is energized.

While the apparatus of the present invention has been described in connection with a warp tension compensating device by way of example, it will be understood that it is adapted for use with other types of yarn tension compensating devices.

From the foregoing description, it will be seen that the present invention provides novel and useful switch apparatus which is readily applied to newly manufactured compensators and compensators already in use. This

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apparatus is compact and light in weight but can readily withstand such constant and rough usage to which it may normally be subjected.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

I claim:

1. In apparatus of the class described, a pair of switch contacts, means for electrically connecting said contacts including a movably mounted arm, and a member loosely mounted on said arm for slideable movement thereon and having an aperture through which yarn is adapted to pass.

2. In apparatus of the class described, a pair of switch contacts, means for electrically connecting said contacts including a movably mounted arm, and a member having an aperture therein through which said arm extends to loosely mount said member for slideable movement thereon and through which yarn is adapted to pass.

3. In apparatus of the class described, a pair of switch contacts, means for electrically connecting said contacts including a pivotally mounted arm, and a yarn guiding ring loosely mounted on said arm for freely slideable movement thereon and for operating said arm in response to the yarn passing therethrough.

4. In apparatus of the class described, a pair of switch contacts, means for electrically connecting said contacts including a pivotally mounted arm, and a yarn guiding ring loosely mounted on said arm for freely slideable movement thereon and for operating said arm in response to the yarn passing therethrough, said arm having means at the free end thereof for retaining said ring thereon.

5. In apparatus of the class described, a pair of switch contacts, means for electrically connecting said contacts including a pivotally mounted element having a pair of arms, a slideable member loosely mounted on one of said arms having an aperture through which yarn is adapted to pass, and weight means connected to said other arm

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constructed and arranged to normally rock said element to effect switch contact connecting by said first mentioned means.

6. In apparatus of the class described, a pair of adjacently spaced switch contacts, a pivotally mounted member having contact means thereon adapted to be positioned between said contacts and electrically connect the same, said member having a pair of arms, a yarn guiding ring loosely mounted on one of said arms for slideable movement thereon, and weight means on said other arm for normally rocking said member into a position to effect electrical connection of said contacts by said contact means.

7. In apparatus of the class described, yarn tensioning means, means for varying the effectiveness of said yarn tensioning means including an arm responsive to the tension in the yarn, switch means including an operating member between said yarn tensioning means and said yarn tension responsive arm, and a yarn guiding ring loosely mounted on said operating member for slideable movement thereon.

8. In apparatus of the class described, yarn tensioning means, means for varying the effectiveness of said yarn tensioning means including an arm responsive to the tension in the yarn, a pair of switch contacts, means for electrically connecting said contacts including a pivotally mounted arm between said yarn tensioning means and said tension responsive arm, and a yarn guiding ring loosely mounted on said pivotally mounted arm for slideable movement thereon and through which the yarn extends in passing from said tensioning means to said yarn tension responsive arm.

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