RING FRAME CONTROL DEVICE
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This invention relates to the twisting of textile yarns and more particularly to a device to sense ends down.

Many previous attempts have been made to construct a sensing device for use on a ring frame and the like for sensing ends down. Some of these devices have involved modifications to the pig-tail guides or have required the addition of a drop wire or feeler mechanisms which leaned on or were guided by the textile strand.

From these prior attempts, it has been learned that any mechanism leaning on or otherwise contacting of the textile strands will ill effects on the yarn produced through breakage or increasing the stretch of the textile strand and often causing the strand to break. Since twisting speeds have been increased and the size package has also been increased, it has become more important than ever to furnish adequate supervision of the twisting operations with respect to ends down without affecting the cost of the finished product to any substantial extent.

The problem has been made more important since the mills are more concerned with cleanliness than ever. Increased labor costs and the need for higher quality production has accentuated this problem which has long existed in connection with the twisting operations.

Accordingly, it is an object of this invention to provide an effective device for a spinning frame or twister and the like for sensing ends down.

An important object of the invention is the provision of a ring frame control device for sensing ends down which will operate electrically and which will not engage the textile strand being produced.

Another object of this invention is to provide a control device for indicating ends down using the ring and the traveler positioned at rest, following a stretching or breaking of the textile strand for actuating a mechanism sensing the ends down condition.

Another object of this invention is to reduce labor costs by providing a signaling device which will show the operator where attention is needed so that the search for ends down will be minimized.

Another object of the invention is to provide a sensing device for indicating ends down which does not contact the textile strand.

Still another object of this invention is the provision of electrical sensing means which may serve as a counting mechanism indicating the number of ends down.

Some of the methods provided to carry out the invention will be hereinafter described.

The invention will be more readily understood from a reading of the following description and by reference to the accompanying drawings in which like reference numerals throughout wherein some illustrative examples of the invention are shown, and wherein:

Figure 1 is a perspective view showing a ring frame and the like having a device constructed in accordance with the present invention shown therein.

Figure 2 is an enlarged transverse sectional view taken through a twisting ring and holder as shown in Figure 1.

Figure 3 is an enlarged transverse sectional view taken through the twisting ring holder and ring rail showing a device constructed in accordance with a modified form of the invention, and

Figure 4 is a transverse sectional view similar to Figure 3 showing a device constructed in accordance with a modified form of the invention.

Referring more particularly to the drawings, Figure 2 shows a twisting ring which includes a contact or conductor element A which will be contacted by the traveler B when the yarn breaks or becomes slack causing the traveler to fall into contact with the upper surfaces of the twisting ring C. The conducting portion A is insulated from the ring C which is grounded through the twisting ring to the frame of the machine. The conducting portion A is electrically connected to another conductor D. A sensing circuit E is connected across the conductor D and ground and it will be noted that the fulling of the traveler B due to an ends down condition will result in the closing of the circuit between the conductor D and ground across the sensing circuit E which will then serve as a control for the ends down condition.

Figure 1 shows a ring frame and the like with which the ends down control device of the present invention is adapted to be employed. The frame is indicated at 10 and has a suitable creel arrangement 11 positioned longitudinally along the top thereof carrying roving or yarn packages 11a. The textile strands or rovings R are fed over the guide bar 11b through the roll system 12 and thence through the pig-tail guides 13 to be wound on the bobbins 14 in the form of yarn Y. The bobbins 14 are carried on spindles 15 mounted in a holder rail 16 and the whorls 17 of the spindles are engaged by driving tapes 17a which are driven by the cylinder drive (not shown). The bobbins 14 are positioned on the spindles 15 and project upwardly through a ring rail 18.

The ring rail 18 is essentially a channel shaped member having its arms projecting downwardly and having a plurality of spaced circular holes 18a therein for accommodating a twisting ring holder 19. The holder 19 is carried therein by a retaining ring 20 which is shown positioned in a notch 19a in the holder to confine the holder 19 within the annular holes 18a. During the twisting operation the ring rail 18 traverses in an up and down motion to distribute the yarn in even courses upon the rotating bobbins 14.

The holder 19 is an annular ring having a groove 19c in the inside top portion thereof for accommodating a twisting ring C which is substantially I-shaped in cross section. The ring C has a lower flange 21, a vertical web portion 22 and an upper flange 23 integral therewith. The upper flange 23 serves to confine the traveler B thereon as it travels around the ring C. The traveler B includes an annular portion 24 and a pair of inwardly projecting legs 25 and 26 which pass beneath the upper flange 23. The traveler B is normally held in a raised position as shown in Figure 2 and serves as a guide for the yarn as it is wound upon the bobbins 14.

The conducting element A of the present invention is shown in Figure 2 as being an annular portion 23a which forms the outer portion of the flange 23 and which is electrically insulated by suitable material 27 from the remainder of the ring C. The insulating material 27 extends downwardly within the slot 28 within the ring C wall so as to provide insulation for a conductor 29 which passes within the slot 28 and is suitably connected to the conducting element D as by soldering. The conducting element D may be securely to any suitable portion of the ring rail 18 and is shown secured to the outer lower portion of the depending flange 18a of the ring rail 18 by a C-clamp 30.

The ring C is electrically connected to ground, in this
case the frame of the machine, so that it is evident that
if a textile strand being wound upon a bobbin 14 breaks
that the traveler B will fall against the upper portion of
the ring C so that the traveler will then slide upon the
ducting element bridging the annular conducting element
A, which is connected to the conductor D, and the re-
mainder of the upper flange 23 which is connected to
ground through the ring C.

The sensing circuit E, which is thus connected across
the conductor D and ground to serve any desirable use-
ful function in the control of an ends down condition,
becomes actuated. The sensing circuit E includes a pri-
mary coil 32 which is supplied with a source of elec-
tric energy through the double switch 31 and suitable
fuses 31a which are shown connected in series with the
switch 31. A secondary coil 33 is shown in inductive
relation to the primary coil 32. The secondary coil 33
is positioned across ground and the low potential side of
a relay coil 34 which operates the switch 35. The switch
35 is provided to insure an effective closing of the circuit
while the switch 36 is provided to place the light or any
suitable signaling means 37 and the like across the pri-
mary circuit. A coil 38 may be placed in parallel with
the light 37 to operate a counting mechanism. If desired,
the stop motion device (not shown) could be arranged
in lieu of the signaling means shown to stop the
machine upon the occurrences of an ends down con-
dition.

Figure 3 shows a device constructed in accordance
with a modified form of the invention in which like ref-
ERENCE characters are used to refer to like parts with
prime notations added. It will be noted that the ring
C' is divided substantially down the middle to provide an
inner annular portion 40 and an outer annular portion
41. The inner annular portion 40 is insulated from the
outer annular portion 41 and the holder 19' by the insula-
tion 42. The inner annular portion 40 forms the con-
ducting element of this embodiment of the invention and
is shown in electrical connection with a power connec-
tion through a spring contact 43. A sensing circuit simi-
lar to that described in connection with the embodiment
of the invention shown in Figures 1 and 2 is connected across
this power connection and ground. The holder 19' is shown
connected to ground in Figure 5.

Upon the occurrence of an ends down condition the
traveler B' falls into engagement with the upper surface
of the ring C' to short the inner portion 40 and the outer
grounded portion 41 to close the sensing circuit (not
shown) as described in connection with the embodiment
of the invention previously described.

Figure 4 shows another modified form of the inven-
tion in which the conducting element is shown in the
form of an annular ring 50 carried by the outer portion of
the vertical web 22' of the ring C''. It will be noted
that in the description of this embodiment of the inven-
tion like reference characters are used with double prime
notations added to indicate like parts. The annular con-
ducting element 50 is suitably insulated from the ring by
the insulation 51. An inner annular ring 52 is provided
and is insulated from the ring C'' by the insulation 53
and serves to impart a camming action against the
traveler B'' so as to cause engagement between the outer
ring 25'' and the conductor 50 when an ends down
condition occurs. The conductor element 50 is con-
nected to a power connection through a spring contact
53 while the camming ring 52 is grounded through a
spring contact 54 which is carried by the inner portion
of the holder 19'' by the screw 55.

Upon the occurrence of an ends down condition the
traveler B'' falls into engagement with the upper sur-
face of the ring C'' and the leg 25'' of the traveler B''
is cammed into engagement with the conductor 50 by
the ring 52 to short the conducting element 50 to
ground and close a suitable sensing circuit.

Several other forms of the invention are presently con-
templated including a modification in which a plastic
or other insulating type material could be employed to
construct the twisting ring and a pair of spaced annular
conductors embeded in the upper surface of the ring so
as to have exposed portions for contact by the traveler
upon falling so as to close suitable contacts across the
sensing circuit. It is contemplated that suitable devices
located in close proximity to the twisting ring and which
could be actuated by the traveler upon the breaking of
the textile strand so as to close a suitable sensing circuit
may be employed to carry out the objects of the inven-
tion.

It is further contemplated that the sensing circuit could
actuate suitable signals preferably in the form of a light
as shown herein which may be located so as to signal
both the bay and the particular ring frame where an ends
down condition has occurred. Signals could also be ar-
ranged to indicate the side of the ring frame involved
so as to further limit the searching of the operator.

As stated above, counting mechanisms can be employed
to provide a record of the number of ends down. The
operator may simply piece a textile strand together and
the frame operation continued. This is an important
factor because the operator will not have to become
accustomed to piecing the yarn in a different fashion than
that to which he has already become accustomed.

The foregoing disclosure and description of the inven-
tion is illustrative and explanatory thereof and changes
and variations will occur of those skilled in the art which
may be made within the scope of the appended claims
without departing from the spirit of the invention.

What is claimed is:
1. In a textile machine having a ring and a traveler
which is normally supported in raised position by the
yarn being wound thereby during a normal twisting
operation, the improvement including, an electrical sensing
circuit which is normally open during a normal twisting
operation, and means closing the sensing circuit respon-
sive to the action of the traveler upon breakage of the
yarn being wound thereby positioned closely adjacent
the traveler, whereby a signal and the like may be given
indicating breakage of the yarn.

2. In a textile machine having a ring and a traveler
which is normally supported in raised position by the
yarn being wound thereby during a normal twisting
operation, the improvement including, a conducting element
positioned closely adjacent the traveler, said conducting
element being so positioned so as to be engaged by the
traveler should yarn carrying the traveler break and a
sensing circuit actuated by engagement of the traveler
with said conducting element, whereby a signal and the
like may be given indicating breakage of the yarn.

3. In a textile machine having a ring and a traveler
which is normally supported in raised position by the
yarn being wound thereby during a normal twist insert-
ning operation, the improvement including, an annular
correcting element positioned adjacent the traveler, said
annular correcting element being so positioned so as to
be engaged by the traveler should yarn carrying the
traveler break, and a sensing circuit actuated by engage-
ment of the traveler with said correcting element, where-
by a signal and the like may be given indicating breakage of
the yarn.

4. In a textile machine having a ring and a traveler
which is normally supported in raised position by the
yarn being wound thereby during a normal twist insert-
ning operation, the improvement including, a pair of an-
nular correcting elements positioned adjacent the travel-
er, said pair of annular correcting elements being insu-
lated from each other and positioned so as to be engaged
by the traveler should the yarn carrying the traveler
break, and a sensing circuit actuated by engagement of
the traveler with said correcting elements, whereby a sig-
nal and the like may be given indicating breakage of the
yarn.
5. In a twisting ring having an upper flange and a traveler which is normally supported in raised position by the yarn being wound thereby during a normal twist inserting operation, the improvement including, an annular conducting element positioned adjacent the traveler, said annular conducting element forming a portion of the upper flange and being insulated from the remainder of the ring and being so positioned as to be engaged by the traveler should the yarn carrying the traveler break, and a sensing circuit actuated by engagement of the traveler with said conducting element.

6. In a twisting ring having a traveler which is normally supported in raised position by the yarn being wound thereby during a normal twist inserting operation, the improvement including, a pair of annular conducting elements positioned adjacent the traveler forming the ring, said pair of annular conducting elements being insulated from each other and being substantially channel shaped in cross section and so positioned as to form the twisting ring, and a sensing circuit actuated by engagement of the traveler with said conducting elements when the yarn breaks.

7. In a textile machine having a ring and a traveler which is normally supported in raised position by the yarn being wound thereby during a normal twist inserting operation, the improvement including, an annular conducting element positioned adjacent the outer portion of the traveler and being insulated from the ring, an annular camming surface positioned beneath and adjacent the inner portion of the traveler so as to exert a cam.

8. A control device for ring frames and the like having a ring and a traveler moved on the ring by the yarn being wound thereby during normal operation including, sensing means positioned closely adjacent the traveler actuated by the action of the traveler upon the breakage or excessive slackness of the yarn, and a sensing circuit actuated by said sensing means upon such actuation of the sensing means, whereby a signal and the like is given of such breakage or excessive slackness of the yarn.

9. In a textile machine having a ring and a traveler which is normally moved on the ring by the yarn being wound thereby during normal operation, the improvement including, an electrical sensing circuit which remains inactive during normal operation, and means positioned closely adjacent the traveler actuating the sensing circuit responsive to the action of the traveler upon breakage or excessive slackness of the yarn being wound thereby, whereby a signal and the like is given indicating such breakage or excessive slackness of the yarn.

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