Jan. 23, 1968 H. SCHIPPERS ET AL 3,364,669

SHUT OFF DEVICE FOR STRETCH TWIST MACHINES

Filed March 21, 1966

FIG. 1

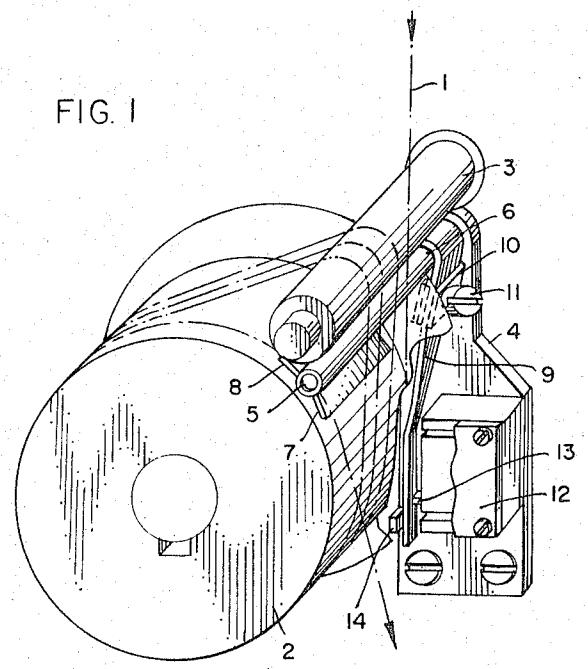


FIG. 3

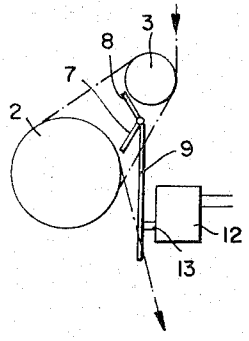


FIG. 4

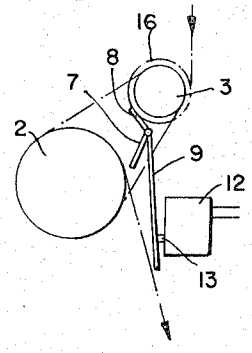
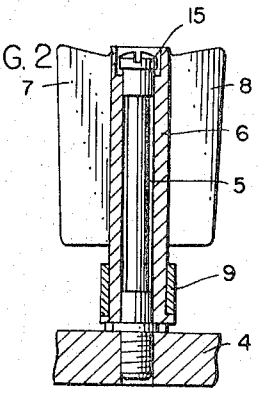


FIG. 2



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United States Patent Office 3,364,669
Patented Jan. 23, 1968

3,364,669

SHUT OFF DEVICE FOR STRETCH TWIST MACHINES

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Filed Mar. 21, 1966, Ser. No. 536,003
Claims priority, application Germany, Mar. 23, 1965, B 61,206
5 Claims. (Cl. 57—80)

The present invention is directed to a shut off device for stretch twist machines. The device operates automatically where lapping occurs in the operation of stretch twist machines for artificial threads especially chemical threads of heavy denier.

In stretching endless threads individual capillaries of these threads frequently break as a result of the stretching strain and form so-called winders or winder lap on the rotating godets and on the run-over rollers traversed by the threads. When this occurs appreciable disturbances are caused in the working process unless the machine is stopped in time.

A number of devices are known in the textile machinery art which detect thread breakages or lapping (winder formation) by means of special feeling means. These devices release a switching means which is capable of stopping the machine or the affected twisting or perning head. In connection with stretch twist machines a roller has been proposed which is positioned in the dead space between the godet and deflection roller, which when a winder of a given thickness forms on the godet is caused to rotate and, in the process, actuates the switching device. This system operates only where the winder is formed on the godet but not where lapping or winder formation occurs on the deflection roller. The latter problem, however, is encountered just as frequently as winder formation on the godet. In this system the winder also has to reach a considerable thickness before the shut off device responds. It has also been proposed to place a so-called thread watcher outside the dead space between the godet and deflection roller. The thread watcher includes two wire bows of a lever type which extend into the dead space and which detect possible winder formation both on the godet and on the deflection roller. The function of such wire bows, however, has proven to be uncertain especially in rough practical operation. Finally, for a rotary pair of tubes on spinning machines it has been proposed to mount a feeler swingably between the two spinning units connected to a switching current circuit, the arms of which feeler extend close to the thread inlet of the two rotary tubes. On clogging of a rotary tube due to ball formation in front of its inlet the feeler switches off the affected spinning unit as well as the adjacent one.

The principal object of the present invention is to provide an improved device for determining winder formation on thread-conveying godets or run-over rollers of stretch twist machines.

It is a further object of the invention to provide means for determining winder formation with precision and as rapidly as possible whereby the machine or the affected twisting unit can immediately be stopped.

In general, it has been found that the above objectives can be achieved by using a disc or platelike device as a feeler or detector means. The disc is rotatable on an axis arranged substantially in its plane or parallel to its plane. The feeling edge or edges of the disc—in secant position to the rotating thread running surface or surfaces—or the feeling surface or surfaces of the disc—in tangential position with respect to the rotating thread running surface or surfaces are arranged at a preselected small, equal spacing from the thread running surfaces along their axial length. A setting (adjusting) member is also carried on

the feeler which, on rotary movement of the responding feeling disc, releases a mechanical, electrical, magnetic or hydraulic shut off switching device. It is advantageous to place the feeling disc with its axis of rotation between the godet and deflection roller entwined in common by the running thread and in the dead space bounded by the thread.

By means of a feeler designed and arranged in this way it is possible to maintain exactly a very closely adjusted air gap between thread running surface and feeling edge or feeling surface, so that the feeler, with constant sureness, is touched and turned by one or only a few winder turns, in which process it then releases the switching mechanism. Although the axes of deflection rollers and godets are not in general parallel but approach one another toward their free end, the disc edges or disc surfaces should form with the thread running surfaces a narrow gap of as uniform width (inside diameter) as possible. It is further proposed that with simultaneous feeling out of both thread running surfaces the one free edge of the feeling disc runs parallel to the godet axis and the other free edge of the feeling disc runs parallel to the axis of the deflection roller. The feeling disc can be substantially level or can also be curved along its axis of rotation. Because the roller axes are not parallel to one another it will generally be executed somewhat twisted on its one feeling side. The feeling disc must be arranged with its feeling sides and with its axis of rotation in such a way in the dead space between the rollers that all lappings (winder formations) produce a feeling disc deflection in the same direction of rotation. In order to assure an exact adjustment of the disc edges or disc surfaces to the run-over surfaces of the conveyance members and in order still further to increase the sensitivity of the feeling system, it is finally proposed that the setting member be arranged shiftably and fixedly on the feeling disc in turning direction and lie with such a lever length against a switching member situated outside the dead space, which length is greater than the spacings of the disc feeling places from the turning axis. Such an arrangement achieves with the simplest means a considerable translation of the deflection paths and thereby a sure response even in the case of very slight lappings.

The invention can best be understood by reference to the attached drawing in which:

FIGURE 1 shows the overall arrangement of the shut off device and is partly in section;

FIGURE 2 shows the disc feeler;

FIGURE 3 is a diagrammatic view of the system during undisturbed normal operations; and

FIGURE 4 is a diagrammatic view of the system after winder formation has occurred on the deflection roller.

As is shown in FIG. 1, thread 1 is entwined several times around the driven godet 2 and loose deflection roller 3. On base plate 4, which carries the transmitter elements of the shut off device, there is turnably borne the feeling disc consisting essentially of carrier tube 6 on which are mounted feeling blades 7 and 8. Plate 4 is attached to the machine frame in such a manner (not represented in detail) that the feeler is situated between the godet and the deflection roller within the space bounded by the thread course, and the free edges of the two feeling blades 7 and 8 are equally far removed from the running surfaces of the godet 2 and of the deflection roller 3. The contours of the two feeling blades are adapted to those of the thread running members, there being simultaneously taken into account the oblique position of the deflection roller axis.

Leaf spring 9 can be used as the setting member of the feeling disc. One end of the leaf spring is wrapped around carrier tube 6 and is fastened to the tube by means of a clamping connection, for example a clip 10 with a screw

11. In this manner the setting member can be so precisely adjusted that the air gap between the feeling edges and the running surfaces of the run-over members is kept very small, and the feeling disc responds at the commencement of lapping and immediately is set in rotation. The switching device to be released by the setting member for the shutting off may be constructed, for example, as a microswitch 12, likewise attached to base plate 4, with switching push rod 13, which is actuated in extremely short switching paths by the other end of leaf spring 9. The electrical connection lines are connected to the microswitch in a known manner. The individual elements of the shut off device may also be attached, instead of to a base plate, individually to the machine frame.

In order to make it possible to operate the microswitch 12 also by hand, there can be arranged outside the thread course range, for example, also a hand grip on setting member 9 or a separate switching lever which has a lug 14, indicated in FIG. 1, which, on operation of this switching lever, acts on setting member 9.

As is shown in FIG. 2, pin 5 carrying the feeling disc is securely screwed into base plate 4 or into the machine frame. The diameter of the central portion of pin 5 is preferably a little smaller than that of the end portions so that carrier tube 6 of the feeling disc is well guided on the thicker end portions of pin 5. An axial shifting of carrier tube 6 is prevented by screw 15 inserted in the pin at the head end.

The manner of operation of the shut off device is apparent from FIGS. 3 and 4. Between godet 2 and deflection roller 3 the feeling disc in connection with setting member 9 is arranged in the space bounded by the thread course. No contact takes place between feeling disc and thread. The lower free end of the setting member is touched, according to FIG. 3, by switching push rod 13 of microswitch 12. The circuit of the switching system is interrupted in this position.

On the formation of a winder 16 on the deflection roller 3, as is shown in FIG. 4, the feeling surface of the appropriate feeling blade 8 is touched and a rotary movement is imparted to the feeling member, whereby setting member 9 is swung against switching rod 13 and in microswitch 12 a current-closing contact is released which actuates the switching apparatus. The same occurs, when on the formation of a winder on the godet 2 the feeling edge of the appropriate feeling blade 7 is touched.

The special advantage of the invention is to be seen in the feature that by means of the feeling disc any possible winder formation (lapping) both on the godet and also on the deflection roller is determined without any contact of the running thread. Winder formation is determined with constant accuracy and through considerable translation of heightened deflection sensitivity the switching system for the stopping of the machine or twisting unit is actuated immediately and automatically. The device consists only of a few parts, is easy to adjust when assembled and in operation, and by reason of its rigid construction is also fully equal to relatively rough treatment. As a structural unit, however, it can also be mounted elsewhere on the stretch twist machine to equal advantage, for example, on the feed mechanism or other run-over rollers.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limtations should be imposed as are indicated in the appended claims.

We claim:

1. A shut off device for stretch twist machines having a thread conveying means which comprises: feeler means including a rotatable tube and feeler blades operatively associated with said thread conveying means of said stretch twist machines, said feeler means being arranged such that the free edge of each of said blades is at a preselected, equal distance from an associated thread running surface of said stretch twist machine; a switching device for shutting off said stretch twist machine, a setting member attached to said rotatable tube, said setting member being operatively associated with said switching device and being arranged to operate said switching device in response to a rotary movement of said feeler means.

2. A shut off device as in claim 1 wherein the stretch twist machine comprises a godet and a deflection roller, and wherein the feeler means includes two feeler blades, the free edge of one of said blades being arranged at a preselected distance from the thread running surface of godet and the free edge of the other blade being arranged at a preselected, equal distance from the thread running surface of deflection roller.

3. A shut off device as in claim 2 wherein one free edge of the blade of the feeling means runs parallel to the godet axis and wherein the other free edge of the blade runs parallel to the axis of the deflection roller.

4. A shut off device as in claim 2 wherein the feeler means is arranged with its axis of rotation between the godet and deflection roller and is entwined in common by the running thread and is in the dead space bounded by said thread.

5. A shut off device as in claim 4 wherein the setting member on the feeler means is arranged to be shiftable and fixable in the turning direction of the latter and has a lever length which lies against the switching member situated outside the dead space which is greater than the distances apart of the axis of rotation and of the edges of the feeler blades.

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JOHN PETRAKES, *Primary Examiner.*