

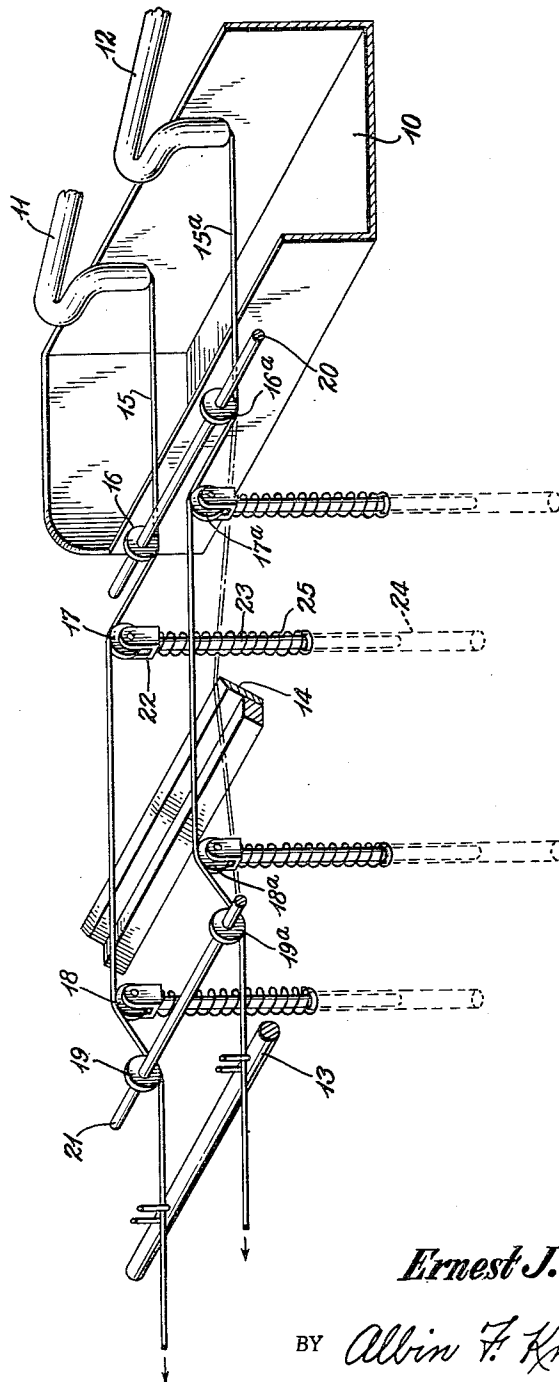
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SAFETY DEVICE FOR USE IN THE PRODUCTION OF TOW

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SAFETY DEVICE FOR USE IN THE PRODUCTION OF TOW

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6 Claims. (Cl. 164—36)

This invention relates to the production of rayon tow by tube spinning and more particularly to a safety device for the protection of personnel and machinery for use in the production of large denier rayon tows.

In the manufacture of high denier tows, the tube spinning system has been most successful. In this use the tube spinning system includes a series of large glass tubes arranged in accordance with the system shown in application Serial No. 324,948, filed December 9, 1952, now Patent No. 2,725,277, and commonly owned herewith. These glass tubes are quite large being designed to accommodate a tow of 10,000 denier or more. It is realized that the strength of a composite thread of this high denier is tremendous. Consequently in the event of some sort of stoppage in the movement of the tow, very dangerous tensions can be built up.

In a tube spinning system the exit end of each tube is usually bent down in order that the liquid may be recycled while the thread is drawn off at an angle to the vertical, these spigots being an integral part of the glass tube and being very easily broken off if the tow tension gets too high. Furthermore, operating personnel could be very seriously injured if arms or clothing were caught in the running tow.

It is therefore an object of this invention to provide a safety device for use with high denier tube spinning machines, in order that any tow tension that is dangerously high be quickly and automatically relieved before opportunity for either equipment or personnel injury.

Other objects and advantages of this invention will be apparent from the following detailed description of a preferred embodiment thereof when considered in conjunction with the annexed drawings the single figure of which is a fragmentary perspective view of a portion of a tube spinning machine for tow including the device of the present invention.

In the drawing, reference numeral 10 represents the last liquid discharge zone from the last treating stage of a multi-stage tube spinning machine. The two of the many tubes with which such a machine is provided are shown at 11 and 12. The tow runs through these tubes and is led from their mouths to a guide 13 from whence the tow is conveyed to a drying system. The treating liquid from the tubes 11 and 12 is collected in the container 10 and recycled in a manner already known. Between the discharge ends of the tubes 11 and 12 and the guide 13 there is arranged for each tow a series of rollers adapted to guide the tow in a path above but out of contact with a knife 14. The tow 15 which issues from the tube 11 passes under a roller 16, over a roller 17, over a roller 18 and under a roller 19. The tow 15a which issues from the tube 12 similarly passes under a roller 16a, over a roller 17a, over a roller 18a and under a roller 19a. The rollers 16 and 16a are mounted on a freely rotatable shaft 20 and the rollers 19 and 19a are similarly arranged with respect to a shaft 21. The roller pairs 16—19 and 16a—19a define a straight line tow path, as shown in dotted lines, normal to, and intersecting the cutting edge of knife 14.

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The rollers 17, 17a, 18 and 18a are each mounted independently for individual vertical movement. The roller 17 is pivotally mounted between the shanks of a U bracket 22. The U bracket is supported by a rod 23 in telescoping relation to a socket 24. A spring 25 extends in compression between the mount of the socket 24 and the bottom of the bracket 22. This spring acts in compression to bias the roller 17 to the position shown in the drawing. An exactly similar mounting arrangement is used for the rollers 17a, 18 and 18a. The spring 25 and the other springs which correspond to it are so adjusted that they will hold the respective rollers high enough to keep the tow out of the straight line path between the rollers 16—19 and 16a—19a and hence out of contact with the knife 14 whenever the tow tension is below the level which would break the mouth or exit end of the tubes such as 11 and 12. The tension level at which the knife will act can be predetermined by selection of springs of suitable thrust or by preloading them by various arrangements known to the art.

When the tension becomes high enough to be dangerous to the tubes, the springs such as 25 are compressed, the rollers move down and the tow runs in the straight dotted line path and is automatically cut by the long knife 14 whereby the dangerous tension is instantly relieved. While the knife 14 serves a large number of tows, each individual tow is independently supported by a pair of spring urged rollers such as 17 and 18. If a dangerous tension is reached by any one of the tows, it will be severed quickly and completely without interference with the remainder of the operation of the machine.

What is claimed is:

1. In tube spinning apparatus for tow, guiding means defining a straight line tow path beyond the end of the last tube in the system, yieldable means normally modifying said straight line path, a knife extending in cutting relation to said straight line path whereby when the tension is excessive the resilient means yields and moves the tow into contact with the knife.

2. In tube spinning apparatus for tow, guiding means defining a straight line path beyond the end of each last tube of each group of tubes in the system, resilient guides normally modifying each straight line path, a knife extending transversely of all of said straight line paths whereby when the tension is excessive the resilient means yields and moves the tow from one of the modified paths into contact with the knife.

3. Safety apparatus for a machine for propelling high denier threads and the like that comprises a pair of guides defining between them a straight line thread path, cutting means acting in said path, spring urged guiding means normally biasing thread running between said guides out of said straight path, the loading of said guiding means being such that when thread tension is excessive, the bias of the guiding means is overcome and the thread runs in the straight path and is thereby cut to relieve the excessive tension.

4. Safety apparatus for a machine for propelling high denier tows and the like that comprises a pair of guides defining between them a straight line path, a knife extending across said path, a pair of guiding means normally spring biased to hold tow running between said guides out of said straight line path, the loading of said springs being such that when low tension is excessive, the springs are compressed and the tow runs in the straight path thereby to be cut to relieve the excessive tension.

5. In tube spinning apparatus for tow, two guides defining a straight line thread path beyond the end of the last tube in the system, a knife positioned between said guides with its cutting edge vertically spaced in one direction from the straight line thread path, guide means

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mounted between said guides and resilient means urging said guide means to a position where said guide means with said guides define a thread path vertically spaced in the same direction from said cutting edge, said guide means adapted to be moved vertically against said resilient means to a position where said guide means with said guides define a thread path which intersects said cutting edge.

6. In tube spinning apparatus for tow, two guides defining a straight line thread path beyond the end of the last tube in the system, a knife positioned between said guides with its cutting edge extending upwardly above the straight line thread path, guide means mounted between said guides, and resilient means urging said guide

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means upwardly to a position where said guide means with said guides define a thread path above the cutting edge of said knife, said guide means adapted to be moved downwardly against said resilient means to a position where said guide means with said guides define a thread path below the cutting edge of said knife.

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