

Dec. 6, 1966

S. L. CARTER ET AL

3,289,510

SPLITTING MACHINE

Filed Oct. 12, 1965

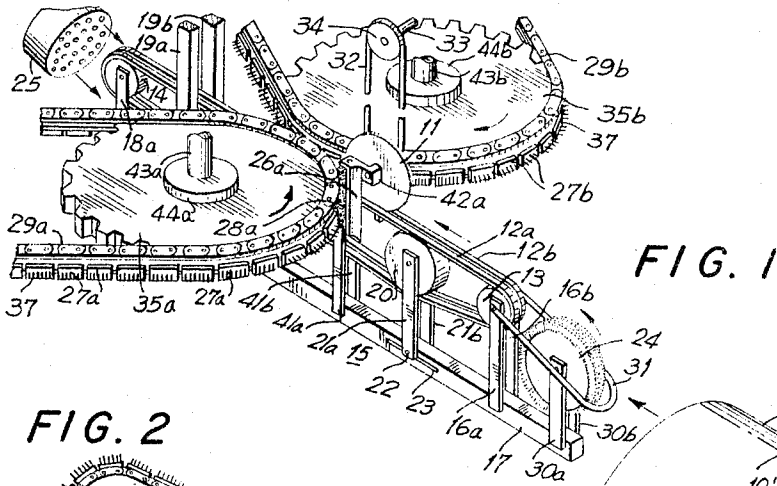


FIG. 1

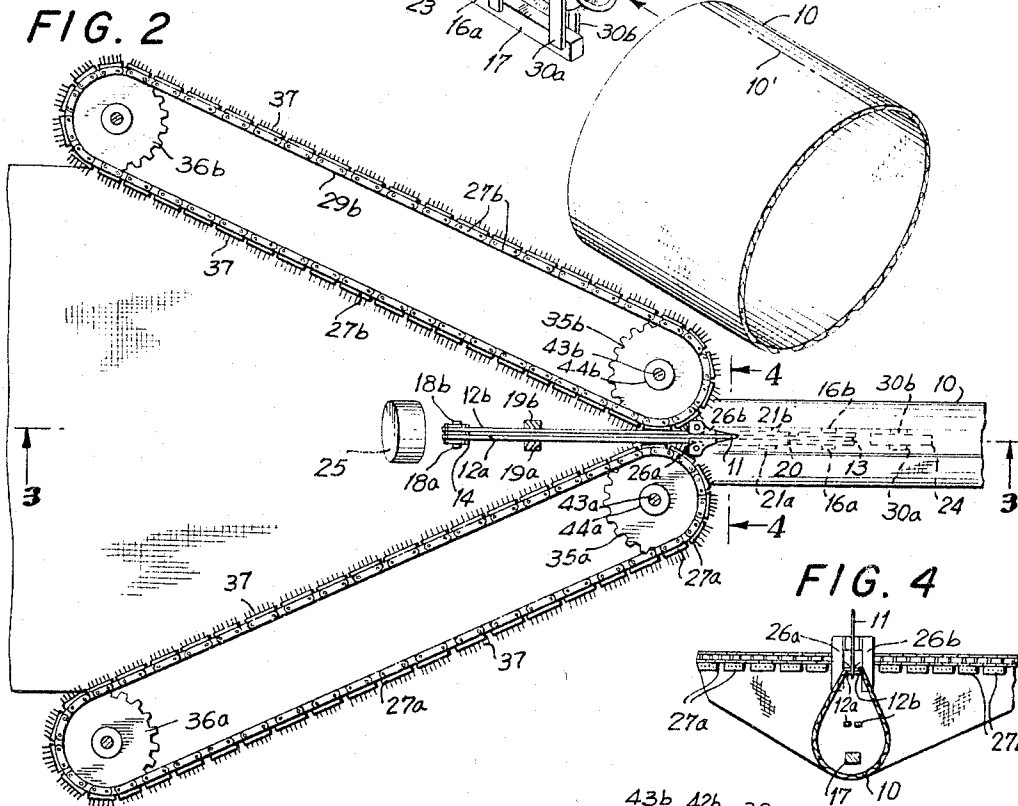


FIG. 2

FIG. 4

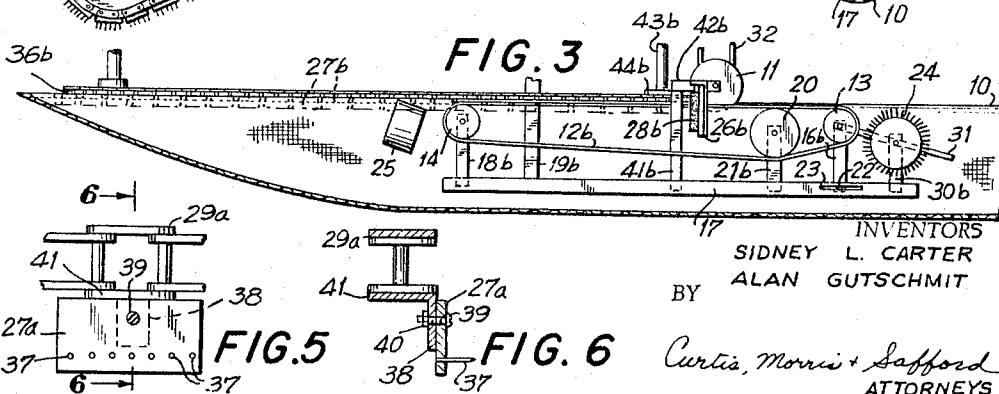
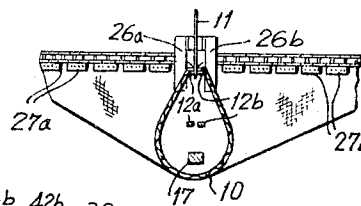


FIG. 3

FIG. 5

FIG. 6

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3,289,510

## SPLITTING MACHINE

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Filed Oct. 12, 1965, Ser. No. 495,107

7 Claims. (Cl. 83—151)

The present invention relates, in general, to textile machinery and, in particular, to apparatus for splitting tubular knit cloth.

At the present time tubular knit cloth is split by inserting an internal spreader into the cloth. The internal spreader has rolls which engage the inside surface of the cloth. Normally, the spreader is clamped in a horizontal position by edge drive rolls. The cloth is held between the external edge drive rolls and the internal rolls of the spreader. The edge drive rolls are driven and move the cloth across the spreader. A set of nip rolls pull the cloth from the spreader at the delivery end of the spreader. A rotary knife is placed at one edge of the cloth between the edge drive rolls and the nip rolls. The cloth is split as it is driven past the rotary knife.

One major shortcoming of this type of splitting machine is that as the cloth is squeezed between the edge drive rolls and the internal rolls of the spreader, the cloth becomes "marked." The "mark" appears through the center of the cloth as it is finished.

It is an object of the present invention to provide new and improved cloth splitting apparatus.

It is another object of the present invention to provide apparatus for splitting tubular knit cloth which does not "mark" the cloth as it is being split.

It is a further object of the present invention to provide cloth splitting apparatus which is relatively simple in construction and easy to maintain.

A preferred form of the present invention to be described in more detail hereinafter includes a cutting tool for splitting a tubular knit cloth and conveying means for feeding a single thickness of the tubular knit cloth to the cutting tool. The conveying means are so disposed as to lie within the tubular knit cloth as the tubular knit cloth is fed to the cutting tool. Also included are means disposed behind the back edge of the cutting tool for supporting the conveying means and means adjacent both sides of the cutting tool for grasping the split edges of the cloth after it has been split by the cutting tool and for drawing the cloth past the cutting tool.

For a better understanding of the present invention, together with other and further objects thereof, reference is made to the following description, taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing:

FIGURE 1 is a perspective view of a portion of a cloth splitting machine constructed in accordance with the present invention;

FIGURE 2 is a plan view of cloth splitting apparatus constructed in accordance with the present invention;

FIGURE 3 is a sectional view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged view of a portion of the apparatus of FIGURE 1; and

FIGURE 6 is a sectional view taken along line 6—6 of FIGURE 5.

Referring to FIGURES 1 through 4, inclusive, tubular knit cloth, designated by reference numeral 10, is conveyed horizontally from a conventional knitting machine, not shown, to a cutting tool such as a rotary knife 11 by

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means of a pair of V belts 12a and 12b. The rotary knife 11 is driven by means of an endless belt 32 which, in turn, is driven by a suitable drive, not shown, coupled through a shaft 33 to a pulley 34. The rotary knife 11 is mounted on a framework designated generally by reference numeral 15 by means of a pair of vertical arms 41a and 41b having angle brackets 42a and 42b, respectively, at their upper ends. The arms 41a and 41b extend upward from a horizontal base member 17.

As will become apparent from the following description, the machinery shown in the drawing is symmetrical about the rotary knife 11. Therefore, corresponding elements have been given the same reference numerals except that the reference numerals of elements to the left of the rotary knife are followed by the letter "a," while the reference numerals of elements to the right of the rotary knife are followed by the letter "b."

The V belts are driven by a suitable drive, not shown, coupled to one of two pulleys 13 and 14 having dual grooves to engage the two V belts. The pulleys 13 and 14 are mounted in the framework 15. The pulley 13 is supported by a pair of vertical arms 16a and 16b extending upward from the horizontal base member 17, while the pulley 14 is supported by a pair of vertical arms 18a and 18b extending upward from the horizontal base member 17. The framework 15 is supported within the main structure of the splitting machine by means of a pair of brackets 19a and 19b which are affixed to the horizontal base member 17 at a point behind the back edge of rotary knife 11.

An idler 20 is provided for supporting the V belts 12a and 12b at some point intermediate the pulleys 13 and 14 and for adjusting the tension of the V belts in the event they stretch. Such an adjustment may be effected by pivoting a pair of arms 21a and 21b which support idler 20 about a bolt 22 or by moving the bolt 22 along a slot 23 in the horizontal base member 17. A brush roller 24 precedes the V belts 12a and 12b. The purpose of the brush roller 24 is to have the cloth 10 engaged by a relatively smooth circular surface rather than by a surface having sharp edges such as the pulley 13. The brush roller 24 is supported by a pair of vertical arms 30a and 30b extending upward from the horizontal base member 17. The brush roller 24 is provided with a guide rail 31 which prevents the cloth 10 from falling between the sides of the brush roller and the arms 30a and 30b. The rail 31 provides the same protection at the pulley 13.

The cloth 10 is allowed to bag down and is placed on the brush roller 24. A fan 25 is provided for blowing air into the tubular cloth 10 so as to balloon the cloth thereby facilitating the guidance of the cloth to the rotary knife 11. The dimensions of the tubular cloth 10 and the framework 15 are such that the framework lies within the tubular cloth on its approach to the rotary knife 11 with the result that the cloth is fed to the knife in a single thickness. The rotary knife 11 makes a single cut along a line 10' at the top of the cloth 10 in splitting the cloth. Upon being cut, the cloth 10 drapes beneath the framework 15.

After the cloth 10 is split, it is guided around a pair of guides 26a and 26b adjacent both sides of the rotary knife 11 to a plurality of pairs of pin plates 27a and 27b. The newly split edges of the cloth 10 are picked up by the pins of the pin plates as the cloth is caught between the pin plates and a pair of rotary brushes 28a and 28b. The guides 26a and 26b prevent curling of the newly split unfinished cloth. The rotary brushes 28a and 28b are supported from angles at the top ends of the guides 26a and 26b, respectively, which, in turn, are affixed to the angle brackets 42a and 42b, respectively.

The pin plates 27a and 27b are arranged on a pair of standard endless roller chains 29a and 29b, respective-

ly. The endless roller chain 29a runs between a first sprocket 35a and a second sprocket 36a, while the endless roller chain 29b runs between sprockets 35b and 36b. The drives to the two roller chains may be imparted through a pair of shafts 43a and 43b secured to the sprockets 35a and 35b, respectively, by means of flanges 44a and 44b, respectively. The pin plates 27a and 27b draw the split cloth past and away from the rotary knife 11 in the same direction in which the tubular knit cloth is fed to the rotary knife. As seen in the drawing, the chains 29a and 29b diverge. The split cloth which is draped beneath the framework 15, therefore, opens or spreads from a tubular piece into a substantially flat sheet as it moves away from the rotary knife. The distance between the sprockets 36a and 36b is adjustable and is set in accordance with the width of the cloth being split.

FIGURES 5 and 6 show the details of the pin plates 27a and 27b and the manner in which the pin plates are arranged on the endless roller chains 29a and 29b. As shown in FIGURES 5 and 6, the pin plate 27a, having a plurality of pins 37, is secured to a lug 38 extending downward from the sideplate 41 of a link by means of a bolt 39 and a nut 40. The pin plates 27a are so dimensioned as to be secured to every other link in the chain 29a. This arrangement permits the pin plates to negotiate the turns at the sprockets 35a, 35b, 36a and 36b.

Although the invention has been described in connection with the splitting of tubular knit cloth, it will be apparent that it may be employed in the splitting of other flexible materials.

While there has been described what is at present considered to be the preferred embodiment of this invention it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and it is, therefore, aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. Apparatus for splitting tubular knit cloth comprising:

a cutting tool for splitting a tubular knit cloth;  
conveying means for feeding a single thickness of said tubular knit cloth to said cutting tool, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said cutting tool;  
means disposed behind the back edge of said cutting tool for supporting said conveying means;  
and means adjacent both sides of said cutting tool for grasping the split edges of said cloth after it has been split by said cutting tool and for drawing said cloth past said cutting tool.

2. Apparatus for splitting tubular knit cloth comprising:

a rotary knife for splitting a tubular knit cloth;  
conveying means including a pair of endless belts disposed on opposite sides of said rotary knife for feeding a single thickness of said tubular knit cloth to said rotary knife, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said rotary knife;  
means disposed behind the back edge of said rotary knife for supporting said conveying means;  
and means adjacent both sides of said rotary knife for grasping the split edges of said cloth after it has been split by said rotary knife and for drawing said cloth past said rotary knife.

3. Apparatus for splitting tubular knit cloth comprising:

a cutting tool for splitting a tubular knit cloth;  
conveying means for feeding a single thickness of said tubular knit cloth to said cutting tool, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said cutting tool;

means disposed behind the back edge of said cutting tool for supporting said conveying means;  
a pair of endless chains disposed on opposite sides of said cutting tool;

and a plurality of pins secured to said chains for grasping the split edges of said cloth after it has been split by said cutting tool and for drawing said cloth past said cutting tool.

4. Apparatus for splitting tubular knit cloth comprising:

a rotary knife for splitting a tubular knit cloth;  
conveying means including a pair of endless belts disposed parallel to said rotary knife on opposite sides of said rotary knife for feeding a single thickness of said tubular knit cloth to said rotary knife, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said rotary knife;

means disposed behind the back edge of said rotary knife for supporting said conveying means;  
a pair of endless chains disposed on opposite sides of said rotary knife;

and a plurality of plates secured to said chains, each of said plates having a plurality of pins for grasping the split edges of said cloth after it has been split by said rotary knife and for drawing said cloth past said rotary knife.

5. Apparatus for splitting tubular knit cloth comprising:

a cutting tool for splitting a tubular knit cloth;  
conveying means for feeding a single thickness of said tubular knit cloth to said cutting tool, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said cutting tool;

means disposed behind the back edge of said cutting tool for supporting said conveying means;  
and means adjacent both sides of said cutting tool for grasping the split edges of said cloth after it has been split by said cutting tool and for drawing said cloth past said cutting tool in the same direction in which said tubular knit cloth is fed to said cutting tool.

6. Apparatus for splitting tubular knit cloth comprising:

a rotary knife for splitting a tubular knit cloth conveyed horizontally from a knitting machine;  
conveying means including a pair of endless belts disposed horizontally on opposite sides of said rotary knife for feeding a single thickness of said tubular knit cloth to said rotary knife to be split along a line on the top of said tubular knit cloth, said conveying means so disposed as to lie within said tubular knit cloth as said tubular knit cloth is fed to said rotary knife;

means disposed behind the back edge of said rotary knife for supporting said conveying means;

a pair of endless chains disposed on opposite sides of said rotary knife;

and a plurality of pins secured to said chains for grasping the split edges of said cloth after it has been split by said rotary knife and for drawing said cloth past said rotary knife in the same direction in which said tubular knit cloth is fed to said rotary knife.

7. Apparatus according to claim 6 wherein the endless chains are arranged to diverge from each other whereby the split fabric spreads into a substantially flat sheet.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

|           |        |             |          |
|-----------|--------|-------------|----------|
| 1,628,215 | 5/1927 | Zoline      | 83—425 X |
| 1,801,757 | 4/1931 | Shippling   | 83—175   |
| 3,196,723 | 7/1965 | Cohn et al. | 83—23    |

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