

April 21, 1931.

C. A. SHIPPLING

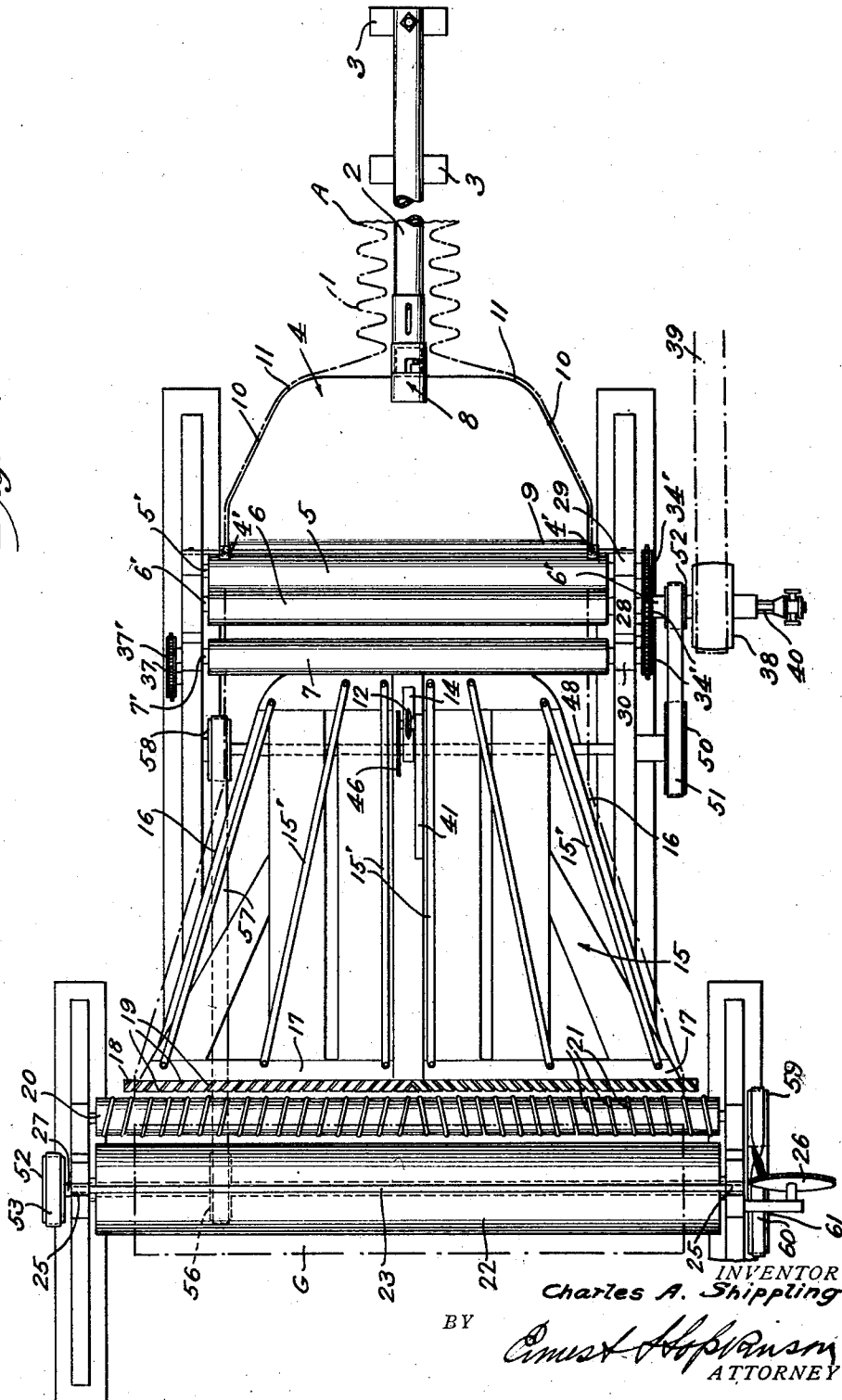
1,801,757

SLITTING MACHINE

Filed Aug. 1, 1928

2 Sheets-Sheet 1

Fig. 1.



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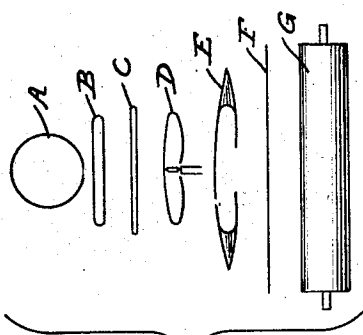
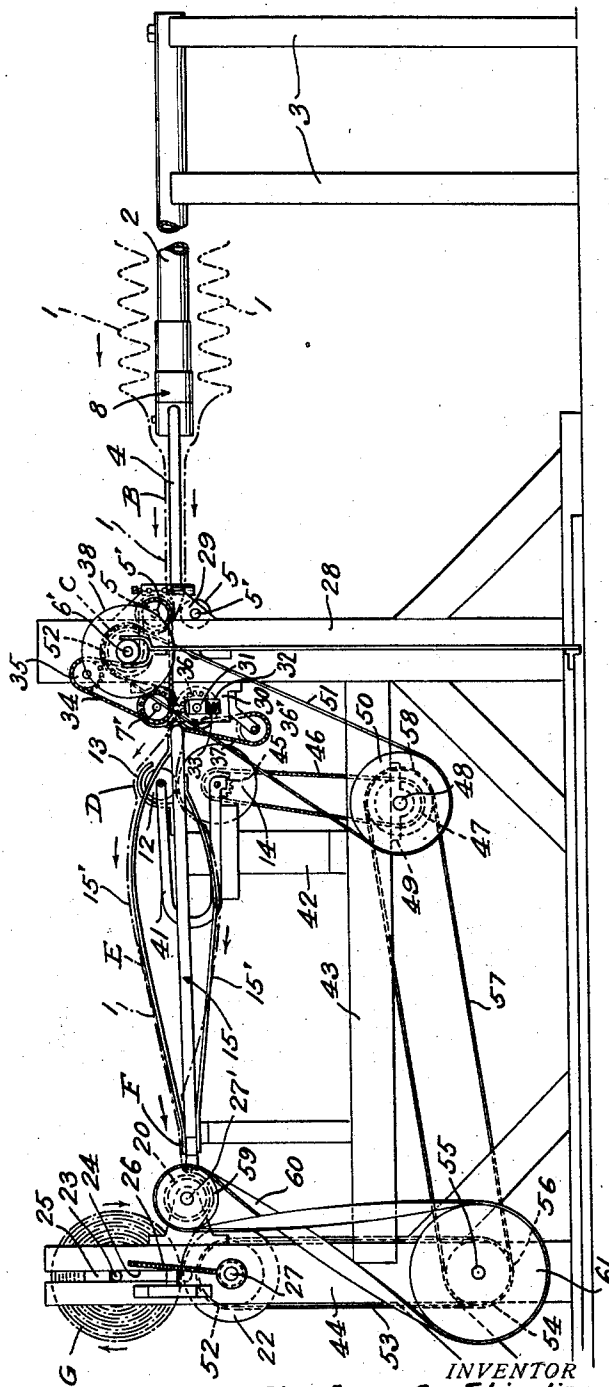
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2 Sheets-Sheet 2



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## SLITTING MACHINE

Application filed August 1, 1928. Serial No. 296,686.

This invention pertains to means for forming a strip of knit goods from a tube thereof.

Knit fabric is generally produced in tubular form and then slit lengthwise and the margins thus produced spread apart so as to form a flat strip, whereby the goods may be more easily handled in making up various articles. In producing a tube especially of fleece goods, it is customary to run the tube through a napping machine. During this napping operation, the machine puts so much lengthwise tension on the tube that its circumference is materially reduced, sometimes as much as 8 or 10 inches. It then becomes necessary to enlarge this reduced tube to its original size before slitting and opening to flat form. In methods heretofore employed for enlarging the reduced tube, it was necessary to run several different spreaders through the tube, increasing the width of the spreader each time until the tube was finally enlarged to the required size. The type of spreader heretofore used was in the form of a frame placed loosely inside of the tube and having a base portion which rode against the bite of a pair of rolls through which the tube was advanced lengthwise so as to continuously stretch the tube over the frame. As the goods travelled through the rolls, the base of the spreader was drawn against the rolls and there was a considerable amount of friction caused by the gripping effect against the cloth between the base of the spreader and the rolls, and this friction combined with the friction of enlarging the tube did not result in entirely satisfactory operation.

One object of the present invention is to provide a spreader adapted to overcome the foregoing disadvantages, reduce friction, and to enlarge the tube to proper size by one passage over a spreader.

Another object is to combine in one machine the operations of enlarging the tube to the required size, slitting the tube, opening and spreading the margins of the slit tube outward to form a substantially flat strip of fabric, measuring the strip, and winding the same into a roll.

Other objects and advantages will appear as the description proceeds.

Reference is to be had to the following specification and the accompanying drawings in which:

Fig. 1 is a plan view of a machine embodying the invention;

Fig. 2 is a side elevation of the machine;

Fig. 3 is a detail of feeding mechanism; and

Fig. 4 is a developed view of the operations performed by the machine.

Referring to the drawing which illustrates one practical embodiment of the invention, the reference character 1 represents a length of tubular knit goods which has been reduced in circumference by the process of running the tube through a napping machine.

The tube 1 is preferably supported upon a pipe 2, which is supported by upright members 3. The pipe 2 may be of any convenient length whereby to conveniently hold the tubular goods 1 which is to be subjected to treatment about to be described. A spreader 4 is placed within the outer end of the tubular goods 1 which latter is entered between a pair of rollers 5, then carried around an elevated roller 6 and then down and between a pair of feed rolls 7. The upper one of the rollers 5, and the rollers 6 and 7 are generally sand paper covered, the lower one of the rollers 5 being an idler. The free end of the tube supporting pipe 2 is detachably coupled to the spreader 4 by means of any suitable coupling device such as the sleeve and bayonet slot connection 8, the sleeve of the connection being slidable on the tube to permit the spreader 4 to be easily disconnected from the pipe 2 and inserted within the tubular goods 1. The spreader 4 includes a substantially straight edge 9 which is held spaced by the pipe 2 a sufficient distance away from the rollers 5 so that when the tubular goods 1 is passing between the rollers 5, there will be no friction against the goods between the rollers and the edge 9 of the spread 4. In order to effect easy enlarging of the tube in one passage over the spreader 4, the side edges of the spreader are converged in the opposite direction to the tube advance, as indicated at 10,

and may also be rounded at 11 so as to provide easy passage of the goods as it advances over the spreader from the pipe 2. The spreader 4 is substantially flat as indicated in Fig. 2 so that the tube 1 is not only enlarged as it passes over the spreader but is also flattened whereby it may more easily enter between the rolls 5. Guides 4' may be provided at the sides of the tubular goods 1 in advance of the rollers 5.

After the tubular goods 1 is spread and flattened by passage over the spreader 4 and passes from between the feed rolls 7, a revolving knife 12 engages the travelling goods 1 and continuously slits the same lengthwise. The knife 12 engages only one side of the tube 1, and a shield 13 is provided around the knife 12 to prevent cutting through the opposite wall of the goods. The goods is supported upon a revolving disc 14 which co-operates with the knife 12 to slit the goods. After slitting, the goods 1 passes over an opening and spreading table 15 having upwardly and downwardly curved bars 15', the side edges of the table being converged in opposition to the direction in which the slit tube is advancing, as indicated at 16. The side edges 16 of the table engage the side margins formed by the slit and spread the margins apart so as to open the goods to substantially flat form as it advances along the table 15. Upon reaching the end 17 of the table 15, the strip of goods thus formed has been completely spread and then passes over a spreading bar 18 provided with a multiplicity of grooves 19 diverging outward from the center in opposite directions and adapted to smooth out any wrinkles. As a further aid in removing wrinkles, a roller 20 adjacent the bar 18 has a series of spirally arranged ribs 21 extending in opposite directions from the center of the roll and adapted to continuously smooth the goods in opposite directions from its center toward the margins of the goods.

After the strip of goods has been smoothed, it advances to a roller 22 which is preferably covered with sand paper so as to grip the goods, the end of the goods being attached to a wind-up bar 23 which is journaled in a slot 24 and weighted downward by slidable weights 25 at opposite sides of a bar 23 to hold the strip of goods 1 against the roller 22. A measuring wheel 26 is driven by a shaft 27 upon which the sand paper roller 22 is fixedly mounted, and measures the strip of smoothed goods as it is wound into a roll on the wind-up bar 23.

Fig. 4 shows diagrammatically the several stages of operations upon the tubular fabric 1 by the foregoing mechanism. The tubular goods 1 is first in substantially round form, as indicated at A. As it advances in the direction of the arrows it is reduced in two stages, B and C, to substantially flat form.

Then as it advances further, the knife 12 engages the tube and slits the same as indicated at D; and then as the goods travels along the table 15, it assumes the shape substantially as indicated at E, and finally reaches spread out form F, prior to measuring and winding into a roll G.

All of the above mechanism beyond the spreader 4 may be supported and driven in any suitable manner. For instance, the supporting means may include a standard 28 having a journal member 29 secured thereto, and in which shafts 5' of rollers 5 are journaled, a shaft 6' of the roller 6 being journaled in the standard itself, and another similar journal member designated 30 may be provided for shafts 7' of the feed rolls 7. The shaft 7' of one of the rollers 7 is preferably yieldingly mounted in the journal member 30 by means of a vertical slidable bearing block 31 which rides in a vertical slot 32 and rests upon a spring 33 whereby the two rolls grip the goods with the proper degree of tension. The roller 6, the upper roller 5, and the upper feed roll 7 are preferably connected together through the medium of a chain 34 and suitable sprockets 34' secured to their respective shafts, so that they are all driven in unison, and an idler sprocket 35 is adapted to keep the chain 34 in proper adjustment with relation to the sprockets 34'. The lower one of the feed rollers 7 is driven by a sprocket 36 through the medium of a chain 37 running upon a sprocket 37' on the shaft 7' of the upper roller 7, an idler being provided as indicated at 36'. A pulley 38 on the shaft 6' of the roller 6 is driven by a belt 39 from any suitable source of power, and a clutch 40 may be thrown in or out of engagement whereby to connect and disconnect the driving power from the pulley 38. It will be seen that turning of the shaft 6' by means of the driving pulley 38 imparts motion to the rollers 5, 6 and 7 so that the tubular goods 1 is continuously fed from the pipe 2 over the spreader 4 and thence through the feed rolls 7. The slitting knife 12 and the revolving disc 14 may be conveniently journaled in a U-shaped spring element 41, which is adapted to press the knife against the disc 14, and is supported upon an up-right 42 resting upon cross members 43 connected at one end to the standards 28 and at the other end to similar standards 44. The disc 14 has a sprocket 45, connected by a chain 46 to a sprocket 47 on a shaft 48 carried in suitable journals 49 supported upon the cross members 43. A pulley 50 on shaft 48 is connected by means of a belt 51 to a pulley 52 on the shaft 6' of the roller 6 driven by the pulley 38, so that as the tube of goods 1 feeds beyond the feed rolls 7, the disc 14 is rotated positively during cutting of the tube by the knife 12.

For driving the sand covered roller 22, the

shaft 27 may be provided with a pulley 52 which is driven by a belt 53 running upon a pulley 54 secured upon a shaft 55 journaled in the standards 44. A pulley 56 secured to shaft 55 is connected by means of a belt 57 to a pulley 58 on the driven shaft 48. For revolving the smoothing roll 20, the shaft 27 of said roll is provided with a pulley 59 connected by a belt 60 to a relatively large pulley 61 on the shaft 55. By means of this combination of belts and chains, all the various parts of the mechanism are driven at the proper rates of speed and carry the tubular goods 1 continuously through the machine when it has once been entered between the feed rolls and slit sufficiently to enable the leading end to be secured to the wind up bar 23 and the clutch 40 operated to connect power to the pulley 38. All of the foregoing operations are carried out in one passage through the machine, that is, the tube is enlarged, slit, spread out to form a substantially flat strip from edge to edge, smoothed, measured and then wound into a roll or otherwise accumulated, and friction at the spreader 4 is materially reduced.

It is to be understood in conclusion that the invention is capable of various modifications and alterations within the scope of the appended claims, and it is therefore not intended to limit the invention to the exact embodiment described.

Having thus described my invention what I claim and desire to protect by Letters Patent is:

1. In apparatus for forming knit goods into a strip from a tube thereof, in combination, a support for the tube, feed rollers for continuously feeding the tube from said support and advancing the tube lengthwise, a spreader disposed within said tube between the feeding means and the support for enlarging said tube circumferentially, and a knife arranged to engage and slit the tube as it advances, said spreader being demountably connected to the support and held by said support free of the feed rollers.

2. In apparatus for forming knit goods into a strip from a tube thereof, in combination, a bar projecting axially within a length of said tube whereby to support the same, a stretcher demountably connected to said bar within the tube, feed rolls for continuously advancing said tube lengthwise, said stretcher being shaped to enlarge said tube before reaching the feed rolls, and a knife adapted to engage the tube and slit the same lengthwise.

3. In apparatus for forming knit goods into a strip from a tube thereof, including in combination, a pair of rollers between which a tube of knit goods is advanced, means for slitting the advancing tube lengthwise, a spreader disposed within the tube adapted to increase the circumference of the tube and

direct it between the rollers, and a support for said tube from which said tube advances to the spreader, said support being arranged to hold the spreader free of the rollers.

4. In apparatus for forming knit goods into a strip from a tube thereof, including in combination, a pair of rollers between which a tube of knit goods is advanced, means for slitting the advancing tube lengthwise, a spreader disposed within the tube adapted to direct the tube between the rollers, said spreader being substantially flat and having a rear edge from which the tube advances to the rollers, said spreader also having side edges converging in the opposite direction to the tube travel whereby the spreader flattens the tube and gradually increases its circumference before reaching the rollers, a support from which said tube advances to the spreader, and means for detachably connecting the spreader to the support, said support being arranged to maintain said rear edge of the spreader free of the rollers.

Signed at Kitchener, Province of Ontario, Dominion of Canada, this 25th day of July, 1928.

CHARLES A. SHIPLING.

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