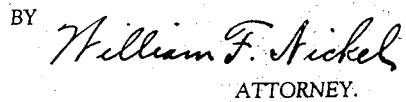


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TRANSMITTING MECHANISM

David Balk, New York, N. Y., assignor to Superba Manufacturing Co., Inc., New York, N. Y., a corporation of New York

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My invention pertains to transferring or transmitting mechanism; and particularly to apparatus for automatically moving a length of bias cloth, a strip of woven or fibrous material, or in fact web material of any kind, in any form, for further processing or treatment; or to wind same into a roll for convenient commercial handling or use, in the various phases or states of any partially or completely manufactured web material now produced.

An object of the invention is to maintain a uniform rate of movement of the web, and within a predetermined range to regulate the tension thereon; with the result that strain, excessive stretching due to customary pulling, and other undesirable effects usually encountered in the manufacture of bias and other cloth, which destroy textile or material finishes so essential to the proper condition and appearance of the web, are prevented. The material is thus transmitted continuously, smoothly and safely within the range of control selected.

Another object is to provide means for obtaining a finished roll of bias web so exactly wound that the continuous ply or convolutions of such a web will eliminate the need for trimming the ends of the roll. A maximum yardage is thus secured without the waste and financial loss frequently incurred from excessive trimming.

A further object is to provide for winding into a roll apparatus that is adapted to actuate a selvage web, a tubular sewn web, a tubular knitted web, or any other kind of web material in any form, so nicely that the edges of the coiled layers fall into position exactly on top of one another; calling for little or no trimming of the web ends of the roll, and making an exceptionally neat roll, with all the turns perfectly wound upon it.

Still another object is to provide automatic means for the rolling or winding without pulling of bias-cut web material, as it runs from any expanding or contracting or tubular bias cutting machine with fixed mandrel, regardless of the angle or position occupied by such machine.

An additional object of the apparatus is to provide complete synchronization between feed rolls and all or part of the remaining component parts of the mechanism that may be in use at any time for any desired function, to suit any type of machine (weaving, knitting, sewing, pressing, finishing, etc.) served by the apparatus.

A still further object is low cost operation by making possible the employment of unskilled attendants. Due to the inherent qualities of the

apparatus, perfect and highly efficient operation of the mechanism results.

One more object of the invention is to provide means for permitting sewing machines to be synchronized with feed rolls in my mechanism, for turning out sewn web tubes to run as long and as quickly as a skilled seamstress can stitch; the mechanism being able to roll a virtually unlimited yardage. This is a highly desired feature for superior and inexpensive operation.

Yet another object is to provide means whereby the usual type of bias-cutting machines (including a suitable mandrel) can be supplied with rolls of tubular-sewn cloth of virtually unlimited yardage, to permit such tubular bias-cutting machines to run much longer than has heretofore been attainable.

It is also an object of this invention to provide means to interrupt the motion of the web whenever the limit of the range aforesaid is reached, and at the same time to cause parts of the mechanism to readjust themselves, again actuate the web into motion and renew the controlling action.

Then, too, it is an object of the invention to provide connections influenced by the receiving roll, when such a member is employed, to cut off the power and stop the operation of the mechanism automatically as soon as the roll has the set or predetermined full yardage upon it.

It is likewise an object to provide a web actuating mechanism having means for stopping the motion of the receiving roll whenever the tension on the web becomes too great; together with means for regulating the tension on the web before stopping, and so related to the stopping means that the latter is caused to become effective by the regulating means at the proper moment. Hence the controlling of the web can be assured to the best advantage.

To this end the mechanism is designed to include a number of rollers, some of which are feed rolls and some idle rolls, while others have the tension-controlling function and are mounted so that they can change position in response to working conditions. These latter rolls move bodily as the tension on the web tends to increase, enabling the web to continue its movement; and they likewise move in a different direction as the tension on the web tends to diminish. In the first case these rolls may move far enough to stop the web receiving roll for an interval; while said receiving roll remains motionless the feed rolls continue to turn and the tension controlling rolls move back to their original positions until enough slack is taken in the

web to ease it. At this point the mechanism restores the operation by again applying the power to the receiving roll and the web resumes its movement.

The invention is of great practical utility for cloth and the like which has to be sewn, treated or wound, or as it may come from any type bias-mandrel cutter, through one or more stages over its whole length. The cloth is made to move automatically, easily and smoothly from one point to another; and during its transmission it can be given the necessary commercial handling or treatment over each successive portion of its length till the desired finish or other result is finally obtained.

The nature of the invention will be more fully understood in the following description, taken with the accompanying drawing; which presents several embodiments of the mechanism, but the disclosure is of course explanatory only, and the constructions shown are given merely as examples. In practice I reserve the right to make substitutions and alterations in the type, shape, size and arrangement and manner of use of the various members, without departing from the principle of the invention or exceeding the broad and general aim and range thereof, or the broad meanings of the terms in which the appended claims are expressed.

On said drawing:

Figure 1 shows the general combination of parts which constitute my invention;

Figure 2 shows a front or end view, including the framework that supports the different parts;

Figure 3 illustrates a modification; and Figure 3a a detail thereof;

Figure 4 indicates a further modification and Figure 4a a detail of same.

The same numerals identify the same parts throughout.

In the particular description of what the drawing actually illustrates, I employ the numeral 1 to indicate a web of cloth, bias, straight, or tubular-sewn, or of any other kind, passing over or under a guide roller 4; and then between a pair of smooth or knurled feed rolls 2; and thence by way of a number of other rolls to a receiving or winding roll 3. The roller 4 is suitably held in a bearing which has a shank 4a, adjustably mounted in a bracket or socket 4b, and engaged by a binding screw 4c. After leaving the rolls 2, the web is delivered to a pair of idle rolls 5, running first over one of these down to a shiftable roller 6 and then up and back to the other idle roll 5, then by way of another idle roll 7 to a second shiftable roll 8. From this roll the web travels to the usual tightening frame 9 and runs past idle rolls 10 and 11 over a guide roll 12 to the receiving or winding roll 3. The rolls 11 and 12 are mounted in a frame 13, pivoted on the axis of the roll 11; and the web passes over these last two rolls in such a way that the pull on the web tends to keep the roll 12 against the roll 3. The frame 13 may be counterweighted at 14. Sometimes the roll 3 can be omitted, and the web run through the mechanism in the same way, whenever, for any reason, the web is not to be wound but merely transferred from one place to another, as between two stages of treatment; or, if necessary to feed the web coming from roll 8 (omitting parts 9, 10, 11, 12, 13 and 3) to any other kind of winding or rolling machine or apparatus. The two rolls 6 and 8 are regulating rolls, and act in a manner to be more fully set forth later to control the tension of the web. For this purpose

they are mounted so that they can move up and down and have their shafts or trunnions engaged in slotted guideways 15. Both of these shiftable rolls can operate in the same way, and for the sake of example I shall describe the action of the roll 6.

Adjacent the lower end of the range of adjustment or shifting of this roll 6, is a shaft 16 parallel to the axis of the roll 6 and carrying a sprocket or chain gear 17. Some distance above the shaft 16 is a similar shaft with a similar chain gear, and over the two gears 17 runs an endless chain 18. A counterweight 19 is attached to one side of this chain, and is constituted of sections so that the weight can be increased or lessened; and the other side of the chain carries bearings 20 in which the ends of the shaft or trunnions of the roll 6 are carried. The weight 19 should substantially balance the weight of the roll 6; and the latter rises and falls in response to changes in tension on the web as it moves through the apparatus. The roll 8 may also be supported in bearings attached to chains like the chain 18, but for the sake of simplicity, such a chain is shown in connection with the roll 6 only. The guideways 15 of the two rolls 6 and 8 are of course substantially as long as the distance between the two shafts 16.

Power for the entire mechanism is furnished by a motor 21, connected by a pulley 22 to a pulley 23 on one of the feed rolls 2 by a belt 24. From another pulley on the shaft of this motor a second belt 25 runs to a pulley 26 of a clutch or like device 27. This device has another pulley 28 connected by a belt 29 to a pulley 30 on the shaft of the receiving roll 3. The clutch is thrown into and out of operating position by a lever 31, which extends from the housing of the clutch device to a point under the roll 6. When this roll drops to its lowermost point, the weight thereof depresses the lever 31 and the clutch is actuated to connect the roll 3 to be turned by the motor 21; but when the tension on the web increases and causes the roll 6 to rise, the clutch lever 31 is pulled up and the clutch is automatically thrown out. The lever 31 may have a hook 31a projecting upward, so that when the roll 6 rises, the roll will at length lift the lever 31 and the clutch be disconnected. Under some conditions the hook 31a can be omitted; and the clutch will then be so designed that it will disconnect the roll 3 from the motor as soon as the weight of the roll 6 is lifted from the rod 31. Hence, as the mechanism operates and the tension of the web is not excessive, the roll 6 remains in lowermost position and the roll 3 winds up the web as fast as the rolls 2 feed it through them. But as the slack in the web is taken up, causing the roll 6 to lift, this roll will eventually throw the clutch 27 out of action and the roll 3 will temporarily stop. The rolls 2 continue to turn, and soon the roll 6 will again be at the bottom of its range; and will again depress the lever 31 to connect the roll 3 to the power through the clutch. Then the rotation of the roll 3 is resumed. The tension on the web is thus controlled and never becomes too great. Of course the roll 8 rises and falls the same as the roll 6. Other means than the clutch to control the winding roll may of course be utilized.

The two rolls 6 and 8 thus insure a sufficient length of cloth or other material between the rolls 2 and 3 at all times. At first the cloth or other material may be fed by rolls 2 a little faster than the roll 3 can receive it. The rolls 6 and 8 take

care of this condition by dropping down and keeping the cloth stretched smoothly over all the rolls; thus holding it smooth and distended. As the roll 3 fills, its peripheral speed becomes greater and the travel of the cloth causes the rolls 6 and 8 to rise. When roller 6 rises high enough it throws the clutch 27 out of action and disconnects the roll 3; and the rolls 6 and 8 again drop until enough slack is restored to prevent excessive tension on the cloth or material on the winding roll 3. The web is guided to the rolls 2 by the roll 4, set at the correct height in the socket 4b. The operative unit or motor 21 is supplied with current from main leads 32, containing a switch 33. The circuit also has a switch 34, which is opened by the roll 3 when the latter attains a selected yardage or thickness, to stop the mechanism. If desired, a yardage appliance may be attached to one of the rolls to stop the apparatus automatically or to enable the attendant to shut down as soon as a predetermined yardage has been reached. The frame 9 may be rectangular, containing rods 35, over and under which the web runs. This frame has bearing lugs 36, mounted on a stationary shaft 37, which may be threaded to receive wing binding nuts 38 to keep the frame in any adjusted position. Of course the web may be run over or under any given roll, depending on the conditions of a case. If it be passed over the roll 6, for example, springs or weights could be used to keep the roll elevated and the tension on the web would depress instead of elevating it; as depicted in Figure 4, to be explained later.

The motor 21 and the feed rolls 2 are thus independent of the condition of the web as to tension, and the amount of cloth wound upon the roll 3, so long as the latter continues to rotate. Alterations in the tension of the web, the degree of slack between the rolls 2 and the web receiving roll 3, and the thickness of the layers on the latter before the switch 34 is opened, do not affect the feed rolls or the motor unit.

Figure 2 shows the arrangement of the above mentioned rolls in a suitable frame comprising uprights 39 and a base or bed 40. The uprights 39 provide bearings for the various rolls, including slotted guideways 15 for the rolls 6 and 8, which these rolls engage by means of projecting shafts or trunnions 41. The lever 31 is presented as being upon the end of a shaft or rod 42, extending into the housing of the clutch 27 and the motor 21 is connected to the clutch shaft through a pulley 43 from which the belt 25 runs to the pulley 26.

Figure 3 shows the roll 6 disposed so that the web passes under it. It is mounted on a shaft 41a in an inverted yoke 44. This yoke moves towards and from a beam 45 above it; this beam having bearings 46 which engage vertical guide rods 47 fixed to the yoke and extending up through the bearings 46. The motor has a pulley 43 joined by a belt 29 to a pulley 30 on the shaft of the roll 3, as before; but the clutch is omitted. One end of the shaft 41a extends through a slot 15' in the frame, which bears at one side adjacent to the beam 45 a switch box 48. The switch in this box is connected to a link 49, which extends down and is pinned to a lever 50, pivoted at 51 on the side of the frame near the end of the shaft 41a. At one end of this lever is a weight 19', and the shaft 41a is in line with the opposite end. The link is joined to the lever between the pivot 51 and the end to be engaged by the shaft 41a. The main circuit of the motor is opened and closed by the

switch in the box 48. This arrangement acts similarly to the combination shown in Figure 1 to cut off the current and stop the motor 21 and the mechanism when the tension on the web is great enough to lift the roll 6. In lowermost position, the end of the shaft 41a presses down on the end of the lever 50, and keeps the switch in the box 48 closed. When the roll 6 rises, the weight 19' actuates the link 49 in the opposite direction and opens the switch. The motor and the roll 3 then stop, and the weight of the roll 6 and yoke 44 then press down and produce a slack in the cloth, in the same way as the roll 6 in Figure 1. With this mechanism, the roll 3 is always used but the feed rolls 2 may be left out. When the mechanism is employed with a machine that does not feed the web, then the feed rolls 2 are included to accomplish this. These are not shown in Figure 3, but when they are used, they will be mounted as in Figure 2. Figure 3a shows the lever 50 and link 49 in side view.

In Figure 4, the roll 6 has the cloth running over it. Here the yoke 44' has guide rods 47' which extend down into guide tubes or cylinders 46' on the base 40, and in these tubes or cylinders are springs 53, which tend to force the yoke upwards. The switch box 48 has a rod or link 49' pinned at 51' to a lever 50' on the side of the frame, with a counterweight 19' as before. As illustrated in Figure 4a, the parts are so disposed that, when the roll 6 is in uppermost position, the end of the shaft 41a will lift the lever and weight 19' so as to pull the link 49'. This action will close the switch in the box 48. When the tension on the web rises, the roll 6 is depressed, and the shaft 41a now releases the link 49'. The weight 19' then pushes the link 49' upward and the switch is opened till the tension eases and allows the roll 6 to rise again and close the switch. Otherwise the apparatus is used in the same way as that of Figure 3.

The side uprights 39 have such shape, width and height as to provide bearings for all the rolls used in the apparatus. Figure 1, for the sake of simplicity, shows only one chain 18 for the roll 6, supporting the near end, and one guide 15 for each of the rolls 6 and 8, presented as engaging the far ends of the shafts of these rolls; but in practice the guides 15 will be at both ends of these rolls; and the roll 6 will have a chain at each end, as indicated in Figure 2. Likewise the roll 8 will be shiftably mounted on two chains whenever chains are employed with this roll.

Having described my invention, what I believe to be new and desire to secure and protect by Letters Patent of the United States is:

1. In a transmitting apparatus for web material, the combination of feed rolls, a tension roll to engage said material in its passage through said apparatus, an endless chain supporting said roll to enable the latter to move vertically between upper and lower positions according to the tension on the material, a winding roll to receive said material after it leaves said tension roll, a motor to actuate the winding roll, means for connecting and disconnecting the motor and winding roll and a lever to control said means shaped to be engaged by the tension roll in one position to cause said means to connect the winding roll to the motor and in the other position to disengage said means.

2. In a transmitting apparatus for web ma-

terial, the combination of a feed roll, a winding roll to receive said material, a tension roll between the feed roll and the winding roll to engage said material in its passage through the apparatus, an endless chain supporting the tension roll to enable the latter to move vertically between upper and lower positions according to the tension on the material, a motor to actuate the winding roll and the feed roll, a clutch connecting the motor and the winding roll and a lever to control the clutch shaped to be engaged by the tension roll in one position to cause the clutch to connect the winding roll to the motor, and when the tension roll is impelled by the material to the other position to disengage the clutch to stop the winding roll while the feed roll continues to rotate.

3. Transmitting mechanism comprising a roll for winding web material, a clutch device, means for connecting said device to said winding roll, feeding means, a power unit to operate said means connected to the clutch device, a lever to render the clutch device operative or inoperative, said lever having a projection thereon, a shiftable roll, an endless chain support to hold the shiftable roll in upper or lower position to engage the projection or the lever according to the tension on the material, and a rod fixed to the lever to connect the latter to the clutch, the power unit and the feeding means being independent of the clutch.

DAVID BALK.