May 17, 1949. O. J. NORTON 2,470,575

CLOTH INSPECTION AND HANDLING SYSTEM

Filed Oct. 18, 1945 2 Sheets-Sheet 1

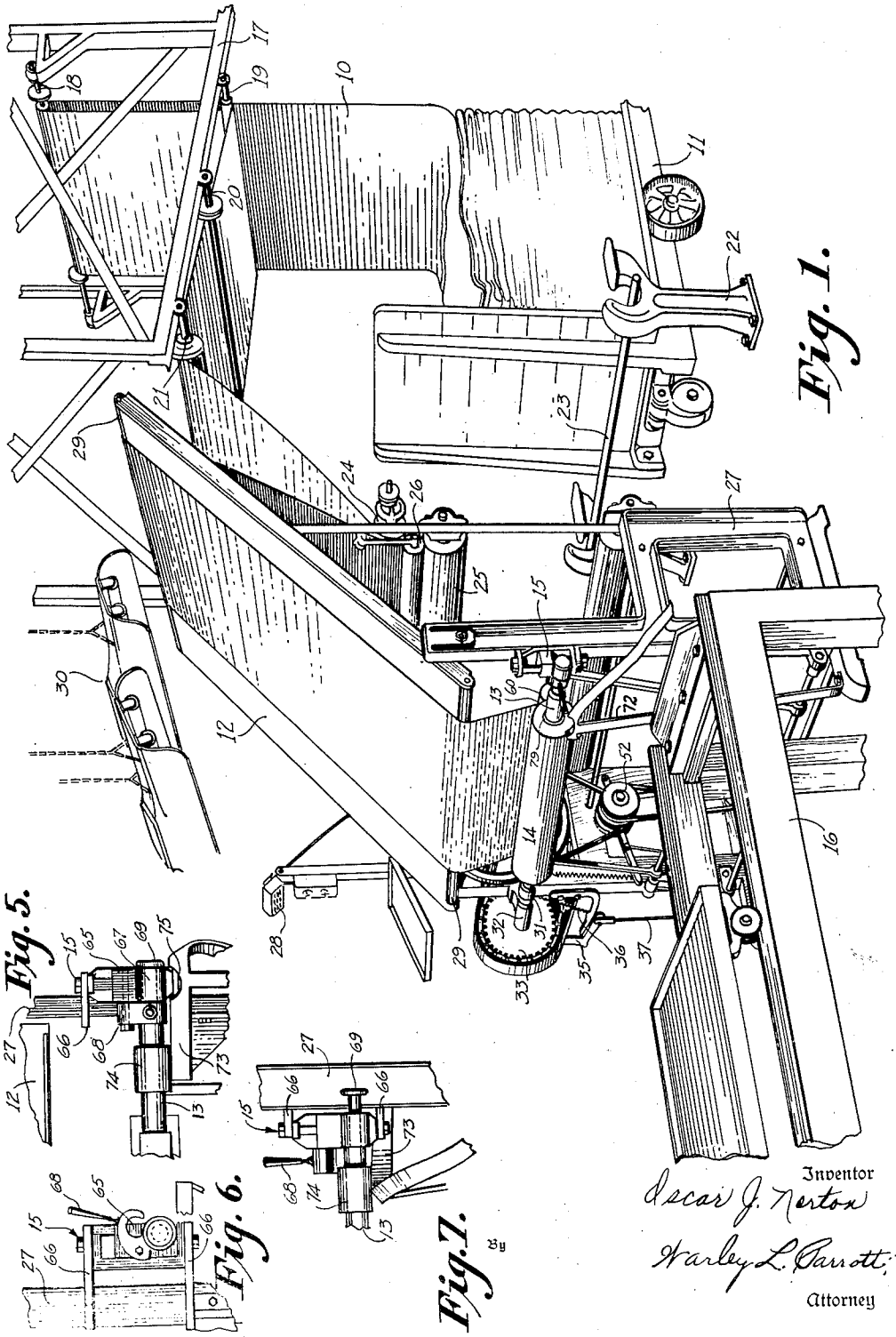


Fig. 1.

Fig. 5.

Fig. 6.

Fig. 7.

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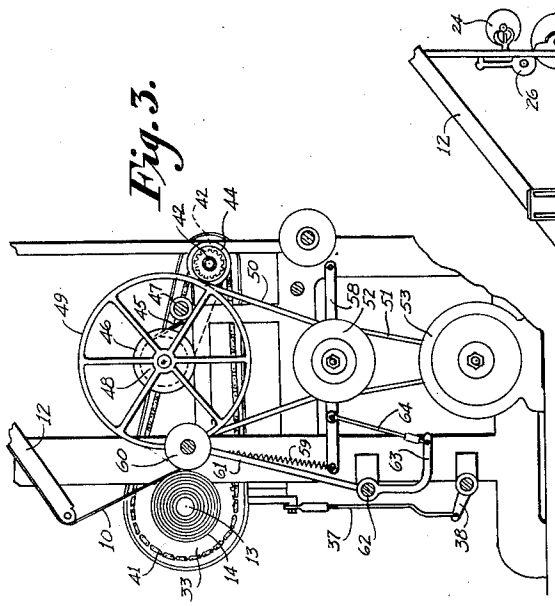


Fig. 3.

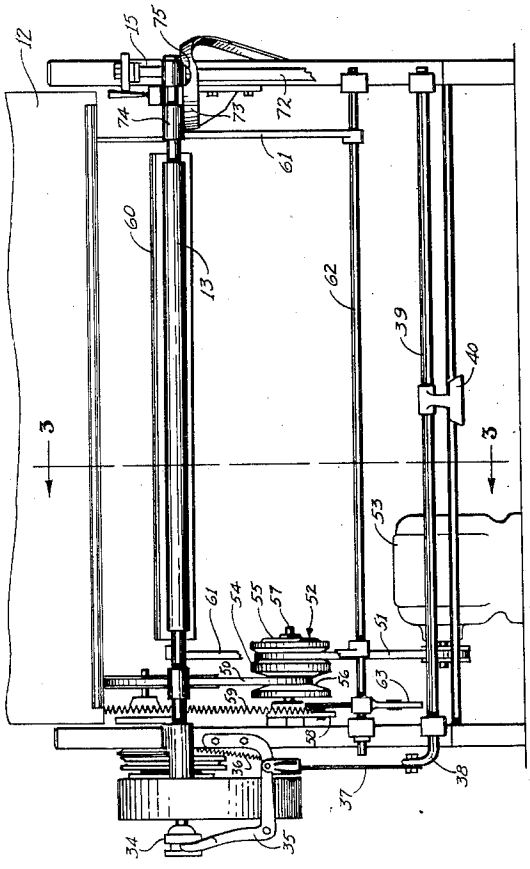


Fig. 2.

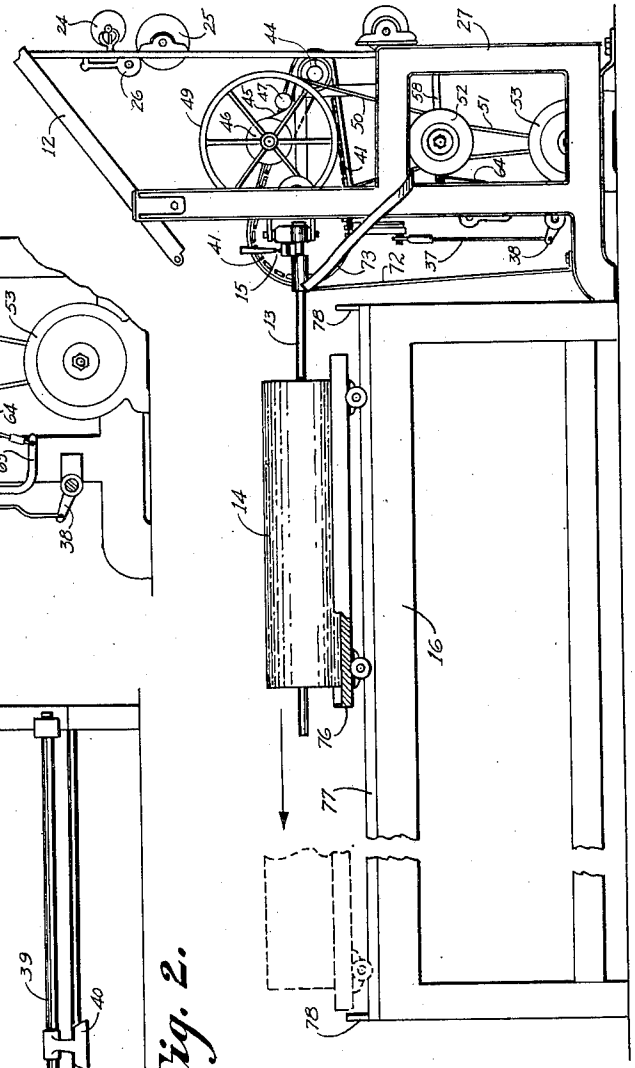


Fig. 4.

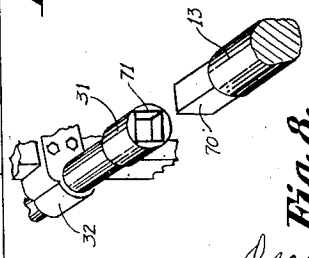


Fig. 8.

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CLOTH INSPECTION AND HANDLING SYSTEM

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6 Claims. (Cl. 26—70)

1

In the manufacture of textile bolt goods it is usual after the cloth has been completely processed to carry out an inspection operation to determine any imperfections in the cloth before shipment. In a typical case, the inspection operation is carried out by passing cloth over an inspection table to a wind-up roll. A difficulty common to this method of cloth inspection has been the problem of providing a means for causing the cloth to travel at a constant speed past an inspection station. This difficulty is occasioned by the fact that as the cloth is wound in rolls it tends to be taken onto the winding roll at a progressively increasing speed as the roll builds up during winding. This varying, increasing, speed prevents accurate inspection by the inspector who watches the cloth as it passes over the inspection table.

The usual expedient for overcoming this difficulty and providing a constant rate of travel for the cloth during inspection has been to wind the inspected cloth on a floating roll which is driven by surface contact with one or more associated driven rolls rotating at constant speed. A disadvantage of this method is that the driven rolls often mar the cloth as it is wound up and thus introduce defects after the inspection operation which are not detected.

A further and even more important objection to the use of the above mentioned floating rolls driven by surface contact is that they are unsuited for use with "Sanforized" cloth. As is well known, "Sanforizing" consists in setting the yarn elements of cloth initially in a "wrinkled" condition which will be maintained under normal handling until the cloth is laundered, at which time the "wrinkles" will come out to compensate for shrinkage. Where inspection methods involve a floating roll driven by surface contact, however, the pressure necessary to drive the floating roll by surface contact is sufficiently great to remove "Sanforizing". That is, the surface contact pressure which is exerted directly on the cloth being inspected at it is wound up on the floating roll tends to remove the set placed in the cloth by the sanforizing treatment and thus nullify the effect of the treatment.

According to the present invention the disadvantages of prior methods of inspecting cloth are avoided by providing a means for varying the speed of a driven cloth skewer so that the peripheral speed of a roll of cloth wound on the skewer is maintained constant, and the cloth is accordingly drawn past an inspection station at a constant rate of travel and without marring of the

2

cloth. My invention also provides means for easy removal of the inspected roll of cloth from the winding skewer.

My invention is illustrated in the accompanying drawing in which:

Fig. 1 is a perspective view of equipment embodying the cloth inspection and handling system of my invention;

Fig. 2 is partial front elevation;

Fig. 3 is a corresponding section substantially on the line 3—3 of Fig. 2;

Fig. 4 is a right side elevation showing a wound cloth roll disposed for removal on the take-off table;

Fig. 5 is a detail in front elevation of the pivoted mounting of the cloth roll skewer;

Fig. 6 is a left side elevation of the pivoted mounting with the locking lever elevated to allow pivoting of the cloth roll skewer;

Fig. 7 is a right side elevation showing the pivoted mounting with the cloth roll skewer in pivoted position; and

Fig. 8 is a detail in perspective of the skewer chuck.

Generally described my cloth inspection and handling system comprises means for guiding cloth 10 to be inspected from an industrial truck 11 or the like on which it may be disposed after processing to an inspection table 12. The cloth 10 is drawn over the inspection table 12 at a constant rate of travel by virtue of constant speed control means, described more in detail below, on to a driven cloth skewer 13 which winds the cloth 10 in roll form, as at 14. The cloth skewer 13 is provided with a special pivoted mounting, indicated generally in Fig. 1 at 15, which allows the skewer 13 to be extended from the inspection table 12 for removal of a wound cloth roll 14. A take-off table 16 may be arranged as shown in Figs. 1 and 4 in relation to the extended position of skewer 13 so that after a roll 14 has been inspected and wound it may be easily removed from the skewer 13 and packaged for shipment. The take-off table 16 may be replaced by any other convenient conveyor system or the like for handling the cloth rolls 14 removed from skewer 13.

To dispose the folded cloth properly for the inspection operation, the cloth 10 is led from the truck 11 to an overhead structure 17 which supports a system of guide rolls. The cloth is first led over a top guide roll 18 which is positioned with sufficient elevation on the overhead structure 17 to extend the cloth 10 from the truck 11 so as to remove folds from the cloth before the

guide roll 18 is reached. The cloth 10 is led from the top guide roll 18 under a lower guide roll 19, and then over succeeding guide rolls 20 and 21 to the forward end of the overhead structure 17.

The cloth 10 may also be supplied to the inspection operation from rolls, if desired. For this purpose, standards 22 and a cross bar 23 are provided as illustrated in Fig. 1. The cloth roll (not shown) is disposed on the cross bar 23, which is free to rotate on the standards 22, and the cloth is led directly from this roll to the group of tensioning rolls described below.

From the overhead structure 17, or from the standards 22 and cross bar 23 if the cloth to be inspected is disposed in rolls, the cloth 10 is led to a group of tensioning rolls 24, 25 and 26 which are mounted on the supporting frame 27 of the inspection table 12. The rolls 24 and 26 are arranged in relation to the roll 25 so that the cloth 10 is disposed over a major portion of the peripheral surface of roll 25 with the result that sufficient drag is effected to tension the cloth 10 as it passes over the inspection table 12. The tensioning roll 25 is also used as a yardage metering roll, and a suitable counter 28 is actuated as the roll 25 revolves to record the yardage of cloth 10 passing to the inspection table 12.

The inspection table 12 is mounted on the supporting frame 27 with a suitably slanted disposition to facilitate the inspection operation. Rollers 29 may be inserted in the table 12 at each end to protect the cloth 10 as it passes over the ends of the table 12, and lights 30 may be arranged over the table 12 to insure adequate illumination for the inspection operation.

The cloth 10 is led over the inspection table 12 from the group of tensioning rolls 24, 25 and 26 to the driven cloth skewer 13 which, as previously mentioned, winds the cloth 10 in roll form, as illustrated in Fig. 1 at 14. The cloth skewer 13 is mounted at one end, as mentioned above, in a special pivoted mounting 15, carried by supporting frame 27, and at the other end in a skewer chuck 31. The skewer chuck 31 is carried in a bearing 32 also mounted on the supporting frame 27 and extends beyond the frame 27 to support a sprocket wheel 33. The sprocket wheel 33 revolves freely on the extending portion of the skewer chuck 31 but may be engaged for driving connection with the skewer chuck 31 by an associated clutch mechanism 34. The clutch mechanism 34 is shifted by a bell crank member 35 to which a spring 36 is attached to keep the clutch mechanism 34 normally in disengaged position allowing the sprocket wheel 33 to revolve freely without driving the skewer chuck 31. The clutch mechanism 34 is shifted to engaged position through a link member 37 which extends from the bell crank 35 to a pivoted arm 38 carried by a rod 39 which extends transversely at the lower portion of the supporting frame 27. The rod 39 is fitted with a foot pedal 40 which may be depressed to actuate the above described linkages to shift the clutch mechanism 34 to engaged position when desired. The spring 36 returns the clutch mechanism 34 to disengaged position whenever the pedal 40 is released from depressed condition.

The sprocket wheel 33 engages a sprocket chain 41 which runs to a second sprocket wheel 42 mounted on a shaft 43 at the rear of the supporting frame 27. The shaft 43 also carries a pulley 44 which is connected through a belt 45 to a second pulley 46. The pulleys 44 and 46 are suitably of the multiple-position type to provide for a speed adjustment at this point, and provision may be made for tensioning the belt drive 45 by an adjustably mounted auxiliary roller indicated at 47. The pulley 46 is mounted on a shaft 48 which also carries a larger pulley wheel 49 which is connected by belt drives 50 and 51 through an automatic speed control mechanism 52 to a motor drive 53.

The speed control mechanism 52 comprises a speed change pulley of the type in which a laterally shiftable, double-faced, pulley flange 54 is mounted between outer pulley flanges 55 and 56 on a shaft 57. The shaft 57 is carried on an arm 58 pivoted on a supporting frame 27 and normally held in raised position by a spring 59 also attached to the frame 27. Under normal conditions the arm 58 will be raised by the spring 59 so that the double faced pulley flange 54 will be shifted to dispose the belt drive 51 at an inner position between the pulley flanges 54 and 55, and the belt drive 50 at an outer position between the pulley flanges 54 and 56. Under these conditions it will be understood that the speed of rotation transmitted from the motor drive 53 will be increased through the speed change mechanism 52.

To provide for varying the speed transmitted from the motor drive 53 through the speed change mechanism 52 to maintain a constant peripheral speed of the cloth roll 14 wound up on the skewer 13 so that the cloth 10 will be drawn over the inspection table 12 at a constant rate of travel, the speed change mechanism 52 is connected so that it is forced to change position as the cloth roll 14 builds up on the cloth skewer 13. This change in position is effected from an idler control roll 60 which is mounted for rotation on arms 61 which extend from a transverse rod 62 pivotably mounted in bushings on the supporting frame 27. The idler control roll 60 is mounted so that it can be disposed in peripheral contact with the cloth skewer 13 or with a cloth roll 14 wound on the skewer 13 as the case may be, and the supporting arms 61 are fixed on the rod 62. Also, fixed on the rod 62 is an arm 63 extending to a pivoted connection with a link member 64 which is likewise pivotably connected with the arm 58 on which the speed change mechanism 52 is mounted. The above described arrangement is adjusted so that the idler control roll 60 is disposed in peripheral contact with the cloth skewer 13 when the speed change mechanism 52 is held in fully raised position by the spring 60. As cloth 10 is drawn over the inspection table 12 and wound on skewer 13 to form the cloth roll 14, the idler control roll 60 is displaced by the cloth roll 14 as it builds up. This change in position of the idler control roll 14 causes the arms 61 to pivot and shift rod 62 so that arm 63 is also pivoted. When arm 63 is pivoted in this manner it exerts a pull through link member 64 to lower arm 58 supporting the speed change mechanism 52 against the force of spring 59. Lowering of arm 58, and consequently of speed change mechanism 52, in this manner, causes a shift of the belt drive 51 from an inner toward an outer position between the pulley flanges 54 and 55, and a correspondingly opposite shift between pulley flanges 54 and 56, so that the increase of the speed of rotation transmitted from the motor drive 53 will be reduced and may even be changed to a decrease if desired. By this means, the speed of rotation transmitted to the driving cloth skewer 13 can be varied to maintain the peripheral speed of the cloth roll 14, and in turn

the rate of travel of the cloth 10 over the inspection table 12, substantially constant throughout the inspection operation.

After an inspected roll of cloth has been wound on the cloth skewer 13, the pivoted mounting 15 for the skewer 13 is adapted to allow the skewer 13 to be extended from the inspection table 12 so that the roll 14 may be removed. An indication of the yardage wound on the cloth skewer 13 is provided by the previously mentioned counter 28 actuated from the tensioning roll 25. When the desired yardage is indicated by the counter 28, the cloth 10 may be cut to free the cloth roll 14 built up on the skewer 13 and prepare it for removal.

The pivoted mounting 15 for the cloth skewer (see Figs. 5, 6 and 7) comprises a pivot block 65 mounted between support brackets 66. The pivot block 65 carries a bearing 67 in which the skewer 13 is journaled, and a pivoted locking lever 68. The skewer 13 extends in reduced diameter through the bearing 67 and this reduced diameter continues for a distance sufficient to receive the locking lever 68 as well. During the inspection operation the locking lever 68 is maintained in lowered position to engage this reduced diameter of the skewer 13 and together with an end flange 69 lock the skewer 13 against transverse movement. When it is desired to remove a roll of cloth 14 from the skewer 13, however, the locking lever 68 may be raised so as to allow the skewer 13 to be shifted transversely in the bearing 67 as illustrated in Fig. 6. This shift allows the opposite end of the skewer 13 to be disengaged from the skewer chuck 31. Engagement with the skewer chuck 31 is effected through the reception of a square end portion 70 of the skewer 13 in square jaws 71 of the skewer chuck 31, and the transverse shift of the skewer 13 in the pivoted mounting 15 allows this square end portion 70 to be removed from the jaws 71 of the chuck 31 (see Fig. 8). As a result, the skewer 13 may be freely pivoted about the mounting 15 to extended position from the inspection table 12 (see Figs. 4 and 8).

A bracket structure 72 is provided to support the skewer 13 as it is extended in this manner. The bracket structure includes a rail arm 73 which is disposed in supporting engagement with an enlarged portion 74 of the skewer 13 which is spaced somewhat from the pivoted mounting 15. This spacing provides sufficient supporting leverage to avoid undue strain on the pivoted mounting 15. The rail arm 73 describes an arc which the enlarged portion 74 of the skewer 13 rides as it is extended. A depression 75 in the rail arm 73 receives the enlarged portion 74 and locates the skewer 13 in fully extended position.

When the skewer 13 is fully extended in this manner it assumes a position in relation to a take-off table 16 as illustrated in Fig. 4. The take-off table 16 shown in the drawing supports a movable carriage 76 which rides rails 77 arranged on the table structure, and may be moved between end stops 78. The table 16 is arranged so that when the cloth skewer 13 is extended in fully pivoted position a cloth roll wound on this skewer 13 is disposed on the movable carriage 76. The skewer 13 is usually fitted with a paper core (as at 79 in Fig. 1) as a base for the cloth roll 14 to be wound on the skewer 13. With the cloth roll 14 disposed on movable carriage 76 as just described, the carriage 76 is easily moved away from the inspection table 12 to strip the roll 14 on the paper core 79 from the skewer 13. By placing wrapping paper or other packaging means on the movable carriage 76 before the skewer 13 is extended to dispose the cloth roll 14 on the carriage 76 the inspected and wound roll 14 can be readily packaged and prepared for shipment immediately after inspection.

The above described take-off arrangement makes it possible to remove the roll of cloth 14 from the skewer 13 and package it for shipment easily and without the necessity for any heavy lifting or other strenuous manual effort. The rail arm 73 supports the roll of cloth 14 as it is pivoted to the take-off table 16, and in pivoted position the roll 14 is fully supported on the carriage 76.

I claim:

1. In a cloth inspection machine having a frame structure supporting an inspection table and a driven cloth skewer rotatably mounted on said frame structure for drawing cloth over said inspection table and winding the inspected cloth in rolls, means for mounting said cloth skewer comprising a driven chuck journalled on said frame structure for engaging one end of said cloth skewer, a pivoted journal mounting disposed on said frame structure for slidably supporting the other end of said cloth skewer, and means for selectively retaining said cloth skewer against sliding movement in said pivoted journal mounting for engagement with said driven chuck or for releasing said cloth skewer for sliding movement whereby said cloth skewer may be disengaged from said chuck and pivoted about said journal mounting to dispose a roll of inspected cloth wound thereon in a position extending from the machine and thereby allow said roll of cloth to be stripped from said cloth skewer.

2. A winding mechanism for cloth and the like comprising a skewer member adapted for winding material in roll form, a driven chuck for engaging and supporting one end of said skewer member, a pivoted journal mounting for slidably supporting the other end of said skewer member, and means for selectively retaining said skewer member against sliding movement in said pivoted journal mounting for engagement with said driven chuck or for releasing said skewer member for sliding movement whereby said skewer member may be disengaged from said chuck and pivoted about said journal mounting to allow removal of a roll of material wound on said skewer member.

3. A cloth inspection machine comprising an inspection table, means for guiding cloth to be inspected to said table, a driven, rotatably mounted, cloth skewer arranged to draw the cloth over said table for inspection and wind the inspected cloth in rolls, a constant speed driving means for said cloth skewer, speed change means interposed between said driving means and said cloth skewer, means responsive to the diametric size of a roll of inspected cloth wound on said cloth skewer for controlling said speed change means in relation to the diametric size of said roll and thereby varying the speed of rotation of said driven cloth skewer to maintain the speed of travel of the cloth over said inspection table substantially constant, and a pivoted journal mounting for slidably supporting said cloth skewer at one end and means for selectively retaining said cloth skewer against sliding movement in said pivoted journal mounting for driving engagement or for releasing said cloth skewer for sliding movement, whereby said cloth skewer may be disengaged for pivoting about said journal

mounting to dispose a roll of inspected cloth wound thereon in a position extending from the machine and thereby allow said roll or cloth to be stripped from said cloth skewer.

4. In a cloth inspection machine having a frame structure supporting an inspection table, a driven cloth skewer rotatably mounted on said frame structure for drawing cloth over said inspection table and winding the inspected cloth in rolls, variable speed driving means disposed on said frame structure for engaging said cloth skewer at one end, an idler control roll disposed on said frame structure in yieldingly pressed peripheral contact with said driven cloth skewer for displacement by inspected cloth wound on said cloth skewer, said control roll being operatively associated with said driving means for varying the speed of rotation of said driven cloth skewer in relation to the displacement of said control roll whereby the speed of travel of the cloth over said inspection table is maintained substantially constant, and a pivoted journal mounting disposed on said frame structure for slidably supporting the other end of said cloth skewer, and means for selectively retaining said cloth skewer against sliding movement in said pivoted journal mounting for driving engagement or for releasing said cloth skewer for sliding movement whereby said cloth skewer may be disengaged for pivoting about said journal mounting to dispose a roll of inspected cloth wound thereon in a position extending from the machine and thereby allow said roll of cloth to be stripped from said cloth skewer.

5. In a cloth inspection machine having a frame structure supporting an inspection table, a driven cloth skewer rotatably mounted on said frame structure for drawing cloth over said inspection table and winding the inspected cloth in rolls, driving means disposed on said frame structure for engaging said cloth skewer at one end, a pivoted journal mounting disposed on said frame structure for slidably supporting the other end of said cloth skewer, means for selectively retaining said cloth skewer against sliding movement in said pivoted journal mounting for engagement with said driving means or for releasing said cloth skewer for sliding movement whereby said cloth skewer may be disengaged from said driving means and pivoted about said journal mounting to dispose a roll of inspected cloth wound thereon in a position extending from the machine, and a movable carriage disposed for receiving said roll of cloth in supporting relation when said cloth skewer is pivoted to extending position and for stripping said roll of cloth from said cloth skewer by movement away from said machine.

6. A winding mechanism for cloth and the like comprising a skewer member adapted for winding material in roll form, driving means for engaging and supporting one end of said skewer member, a pivoted journal mounting for slidably supporting the other end of said skewer member, means for selectively retaining said skewer member against sliding movement in said pivoted journal mounting for engagement with said driving means or for releasing said skewer member for sliding movement whereby said skewer member may be disengaged from said driving means and pivoted about said journal mounting to dispose a roll of material wound thereon in a position extending from said mechanism, and a movable carriage disposed for receiving said roll of material in supporting relation when said skewer member is pivoted to extending position and for stripping said roll of material from said skewer member by movement away from said machine.

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