May 17, 1960 A. L. BUTLER, JR., ET AL 2,936,506

CLOTH INSPECTION FRAME

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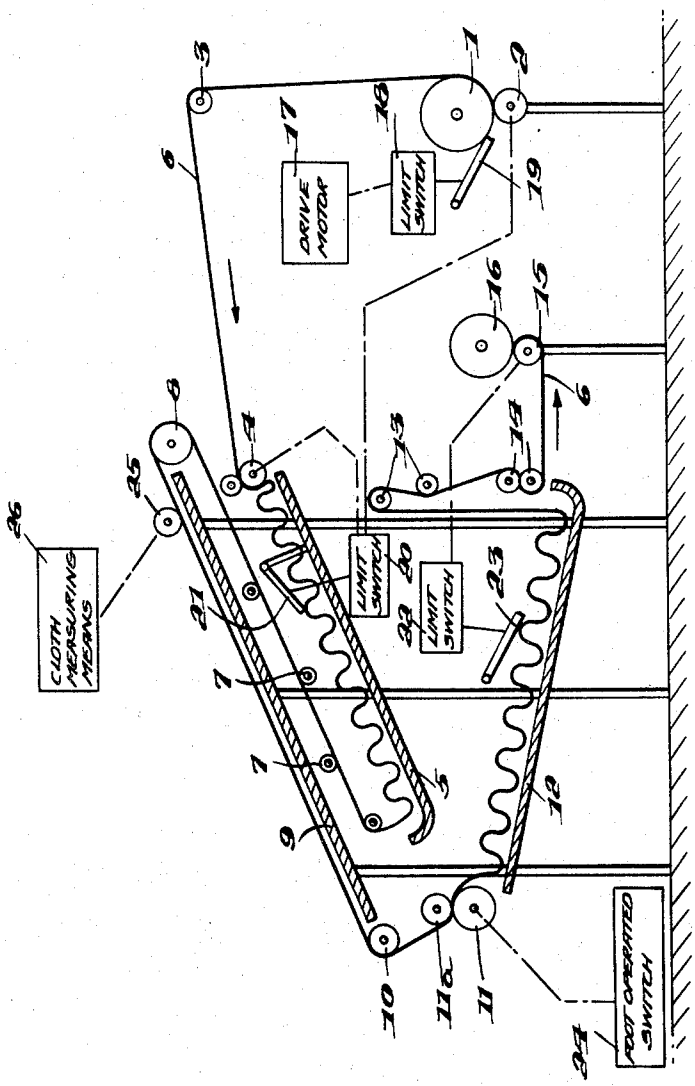


Fig. 1.

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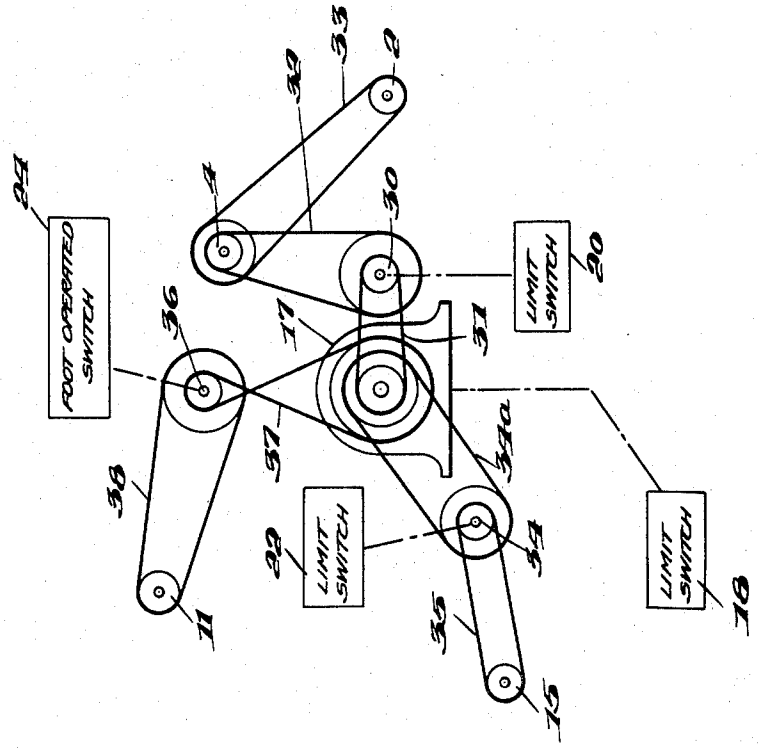


Fig. 2.

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CLOTH INSPECTION FRAME

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8 Claims. (Cl. 26—70)

This invention relates generally to a cloth inspection frame, and more particularly to a cloth inspection apparatus having a pre-inspection scray on one side of the inspection frame and a post-inspection scray on the other side of the inspection frame.

In customary cloth inspection apparatus, a stand is provided containing a roll of cloth to be inspected, a second stand is provided containing a core upon which the inspected cloth is to be wound, and an inspection frame is provided intermediate the two stands over which the cloth is fed. Power means are provided for pulling the cloth over the inspection frame. Where relatively light rolls are used, the power means usually consists of a surface drive on the take-up roll; if heavy rolls are used containing a large number of yards of cloth, the take-up mechanism may be directly coupled to a let-off device for the uninspected cloth roll.

The difficulties of the known apparatus are many. First, the constant starting and stopping of the drive means puts a considerable strain on the apparatus and as a practical matter limits the size of the roll that can be inspected.

A second difficulty is that the cloth running from the uninspected roll over the inspection frame to the take-up roll is always taut, and consequently it is difficult to burl or correct a defect on the underside of the cloth. Thirdly, when a defect passes the reach of the inspector before he can stop the cloth, it is very difficult to back up the cloth even with a reverse motor. Finally, a considerable degree of rotational momentum exists in the heavy rolls which in turn applies tension on the cloth on the inspection frame, thus preventing instantaneous stoppage of the cloth upon detection of a defect when the cloth travels across the inspection frame.

The present invention was developed to provide a cloth inspection apparatus which avoids the above-mentioned drawbacks of the prior art.

The primary object of the present invention is to provide a cloth inspection apparatus having a supply reel of cloth which is to be inspected, an inspection frame over which the cloth is fed, a take-up reel upon which the inspected cloth is wound, a pre-inspection scray intermediate the inspection table and the supply reel upon which loose folds of the cloth are collected, and a post-inspection scray intermediate said inspection table and said take-up reel upon which loose folds are collected.

A more specific object of the invention is to provide a cloth inspection apparatus having an inspection table, a pre-inspection scray on one side of said table and a post-inspection scray on the other side of said table, means for automatically maintaining said scrays substantially full of cloth folds, and means operable by the user of the apparatus for feeding the cloth from said inspection table into said post-inspection scray.

Still another object of the invention is to provide a cloth inspection apparatus having an inspection table, a pre-inspection scray on one side of said table and a post-inspection scray on the other side of said table, means for automatically maintaining said scrays substantially full of cloth folds, and means operable by the user of the apparatus for feeding the cloth from said inspection table into said post-inspection scray, said scrays being so arranged that the user may withdraw folds from either or both of said scrays unto said inspection table so that the cloth may be twisted for examination for defects on both sides thereof.

Other objects and advantages of our invention will become apparent from a study of the following specification when considered in conjunction with the accompanying drawings in which:

Fig. 1 is a diagrammatic view of the apparatus with the drive and clutch means connecting the motor to the drive rollers omitted for simplicity; and

Fig. 2 is a diagrammatic view of the drive and switch-controlled clutch means for driving the four drive rollers.

Referring now to Fig. 1, the cloth to be inspected is fed from the supply reel 1, which is driven by the supply drive roller 2, over the guide roller 3, and over the pre-inspection scray drive roll 4 to the pre-inspection scray 5. The cloth 6 gathers in loose folds in the pre-inspection scray 5 and is fed over rollers 7 and 8 and across the inspection table 9. At the lower end of the inspection table the cloth is fed over guide roller 10 and over the post-inspection scray drive roller 11 to the post-inspection scray 12 wherein the cloth is again collected in loose folds. The cloth then proceeds over guide rollers 13 and 14, and over the take-up drive roller 15 to the cloth take-up reel 16.

As will be explained in greater detail below, all the drive rollers are driven by means of the single motor 17. Limit switch 18 has a feeler actuating member 19 biased against the surface of supply reel 1 to automatically disconnect the operation of the drive motor 17 when the cloth on supply reel 1 is exhausted.

As will be explained below, limit switch 20 has a feeler actuator 21 in contact with the cloth folds in the pre-inspection scray 5 and controls the operation of the supply drive roller 2 and the pre-inspection scray drive roller 4. Similarly, limit switch 22 has a feeler actuator 23 in engagement with the cloth folds in the post-inspection scray 12 for controlling the operation of the take-up drive roller 15. The foot-operated switch 24 operable by the operator of the inspection frame controls the operation of the post-inspection scray drive roller 11. For simplicity, the drive and clutch connections between the drive motor 17 and the four drive rollers have been omitted from the diagrammatic illustration of Fig. 1.

Wheel 25 is rotated by the cloth passing over the inspection table 9 and cams a microswitch which in turn actuates an electric counting device 26 to give an indication of the length of cloth which has passed across the inspection table.

Referring now to the schematic diagram of Fig. 2, the drive motor 17 drives the switch-controlled electrically-operated clutch 30 by means of belt or sprocket chain 31. When clutch 30 is energized, belt 32 drives the pre-inspection scray roller 4 which in turn drives the supply drive roller 2 by means of sprocket chain 33. Thus when the pre-inspection scray 5 is full of cloth folds, feeler actuator 21 is displaced to open limit switch 20 to automatically de-energize clutch 30 to discontinue feeding of the cloth to the scray 5. When the pre-inspection scray is not filled with cloth folds, feeler actuator 21 pivots downwardly to close the limit switch 20 (which may be a mercury type switch) to energize clutch 30 and cause feeding of the cloth into the scray 5. Thus the pre-inspection scray 5 is automatically maintained full of cloth folds.

Similarly, when the post-inspection scray 12 is full of the cloth folds, feeler actuator 23 will cause mercury

switch 22 to be closed and the clutch 34 (driven by the motor by belt 34a) to be energized, with the result that the take-up drive roller 15 will be driven by belt 35. When the scray 12 is not full of cloth folds, switch 22 will be opened and clutch 34 will be de-energized, whereby the driving of take-up drive roller 15 will be interrupted. Thus limit switch 22 causes the post-inspection scray 12 to be automatically maintained full of cloth folds.

Limit switch 18 automatically de-energizes the drive motor 17 when the supply of cloth on the supply reel 1 has been exhausted. In order then to feed the portions of cloth remaining in the machine to the take-up reel 16, the motor 17 may be energized by auxiliary switch means, not illustrated in the drawings.

The foot-operated switch 24 is controlled by the operator standing in front of the inspection frame. When the operator detects a flaw in the cloth passing over the inspection table 9, switch 24 is actuated to de-energize the electrically-controlled clutch 36 which is driven by motor 17 by means of the belt 37. Driving of the post-inspection scray drive roller 11 by the belt 38 is thus interrupted. After the inspector has examined the flaw for severity and has properly marked or corrected the same, release of switch 24 will permit re-energization of clutch 36 with the result that the post-inspection scray drive roller 11 is again driven by the belt 38.

It is important to note that when switch 24 is actuated by the inspector, the cloth is not under tension on either side of the inspection table 9. In this regard it should be mentioned that roller 11 is preferably formed of a light weight material, such as aluminum, and has a relatively low mass and rotational momentum. Thus if the inspector should desire to examine the defect from both sides of the cloth, he may readily pull down a sufficient quantity of slack from the pre-inspection scray 5 to permit one edge of the cloth to be brought underneath the other edge (i.e., to permit twisting of the cloth between the rollers 10 and 25 of Fig. 1). If desired, a portion of the cloth could be removed from the post inspection scray in any one of several manners. For example, the pinch roller 11a could be manually displaced away from the post-inspection scray drive roller 11 (by suitable means, not shown) to permit ready withdrawal of the cloth from the scray 12; another alternative could be an inversion of the connection of drive belt 38 to permit reverse drive of roller 11 upon reenergization of switch 24. Thus it is apparent that by providing both pre-inspection and post-inspection scrays on both sides of the inspection frame, the cloth will not be under tension while on the inspection table.

The present invention makes the inspection of large rolls of cloth (on the order of five hundred pounds and up) by a single male or female operator quite simple, and the inspection apparatus, by its inherent simplicity, requires only one drive motor and is relatively inexpensive to manufacture.

While in accordance with the patent statutes we have illustrated and described the best form and embodiment of the invention now known to us, it will be apparent to those skilled in the art that other changes may be made in the apparatus described without deviating from the invention set forth in the following claims:

We claim:

1. A cloth inspection apparatus comprising an inspection table, a pre-inspection scray, a post-inspection scray, means for feeding the cloth to said pre-inspection scray at a rate to automatically maintain said scray in a substantially filled condition, means for guiding said cloth from said pre-inspection scray across said inspection table, means controllable by an operator of the apparatus for feeding the cloth from said inspection table into said post-inspection scray, and means for automatically withdrawing the cloth from said post-inspection scray at a rate to maintain said post-inspection scray in a substantially filled condition.

2. Apparatus as defined in claim 1 wherein said means for feeding the cloth to said pre-inspection scray comprises a cloth supply reel, a drive roller positioned at one end of said pre-inspection scray for feeding cloth from said supply reel into said pre-inspection scray, switch means operable by the cloth collected in said pre-inspection scray, means including an electrically-controlled clutch for driving said drive roller and said supply reel, and means connecting said switch means to said electrically-controlled clutch to de-energize the same and discontinue the operation of said drive means when said pre-inspection scray is substantially full of cloth.

3. Apparatus as defined in claim 2 wherein said means for withdrawing the cloth from said post-inspection scray comprises a take-up reel upon which the cloth is wound, means including an electrically-controlled clutch for driving said take-up reel, switch means operable by the cloth collected in said post-inspection scray, and means connecting said switch to said clutch to de-energize the same and discontinue the operation of said take-up drive means when said post-inspection scray is substantially full of cloth.

4. Apparatus as defined in claim 1 wherein said means for feeding the cloth into said post-inspection scray comprises a drive roller adjacent the input end of said post-inspection scray, means including an electrically-controlled clutch for driving said drive roller, and switch means operable by the user of the apparatus for de-energizing said clutch to discontinue the operation of said post-inspection scray drive roller.

5. Apparatus as defined in claim 1 wherein said means for feeding the cloth to said pre-inspection scray, said means for feeding the cloth to said post-inspection scray, and said means for withdrawing the cloth from said post-inspection scray are all driven solely by a single drive motor.

6. Apparatus as defined in claim 5 wherein said means for feeding the cloth to said pre-inspection scray includes a cloth supply reel, and further including switch means for disconnecting the operation of said drive motor when the cloth on said supply reel is exhausted.

7. Apparatus as defined in claim 1 wherein the cloth on said inspection table is free from tension upon the deactuation of the means for feeding the cloth from the inspection table into the post-inspection scray.

8. A cloth inspection apparatus comprising a pre-inspection scray, means for feeding the cloth into said pre-inspection scray at a rate to automatically maintain said scray in a substantially filled condition, an inspection table, a post-inspection scray, means for feeding the cloth from said pre-inspection scray across said inspection table into said post-inspection scray, means controllable by the operator of the apparatus for discontinuing the feeding of the cloth from said pre-inspection scray to said post-inspection scray and for permitting portions of cloth to be manually withdrawn from said pre-inspection and post-inspection scrays for placement on said inspection table, and means for automatically withdrawing the cloth from said post-inspection scray at a rate to maintain the same in a substantially filled condition.

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