May 10, 1932. C. CORLEY ET AL 1,857,941

CLOTH GUIDE

Filed Dec. 17, 1930

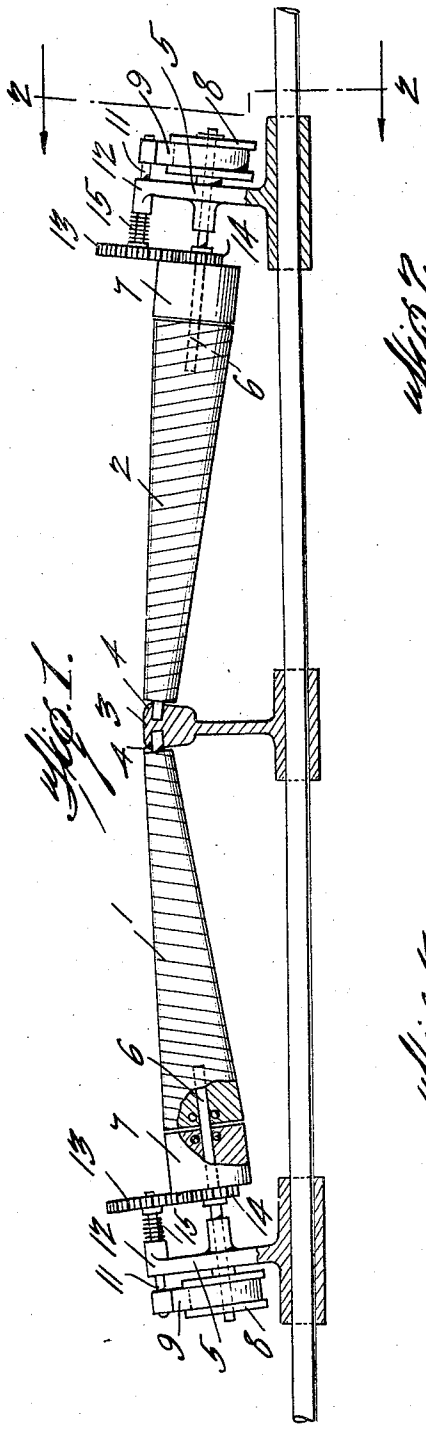


Fig. 1.

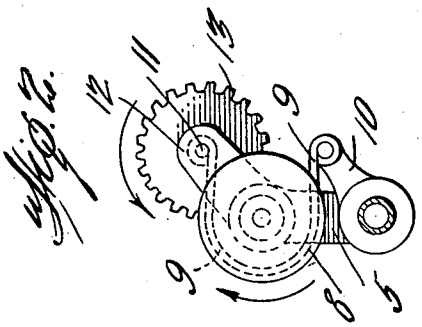


Fig. 2.

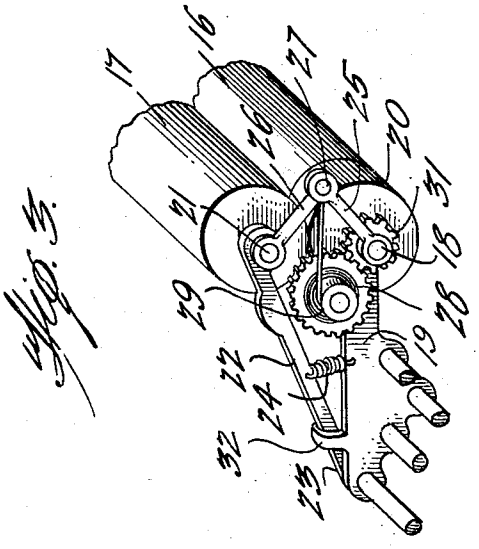


Fig. 3.

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# UNITED STATES PATENT OFFICE

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## CLOTH GUIDE

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This invention is directed to an improvement in fabric guides commonly employed for maintaining the fabric in stretched condition and directing it for uniformly straight travel from one machine or position to another in the handling of fabric.

As ordinarily employed, the guides proper are formed to maintain the fabric under more or less transverse tension to insure it traveling in flat or slightly stretched, even condition, and further the guides provide means to insure the travel of the fabric in a straight line and to automatically correct any substantial deviation from this straight line travel during the movement of the fabric.

Various devices have been proposed for this result, some of which are mechanically controlled, some pneumatically controlled, and others electrically controlled for the automatic direction of the fabric travel, but all such devices involved a very considerable complication of structure to insure automatic operation, by reason of which complication they are liable to derangement and require considerable time, labor and expert knowledge to maintain in working condition.

The primary object of the present invention is the provision of a guide of this character in which the operating and control parts for the automatic government of the guide are extremely simple, both as to character and number, involve no complication either in operation, adjustment or repair, and materially simplify and reduce the initial cost of the article.

A further object of the invention is the provision of means automatically controlled by the fabric when moving out of the predetermined line of travel to so operate the guiding elements as to insure that the fabric be instantly returned to the normal line of travel with more certainty.

A further object of the invention is to utilize in connection with the guides a normally independent, freely rotatable element arranged beyond the predetermined line of travel of the fabric and within reach of the edge of such fabric in the event of any deviation from the predetermined line of travel, such element when in operation under contact from the moving fabric serving to directly operate a simple and mechanical construction, serving in turn to so affect the particular guide as to insure that the opposing guide will instantly return the fabric to the predetermined line of travel.

The invention is illustrated in the accompanying drawings, in which:—

Figure 1 shows in elevation the conventional form of guide, the respective guides being provided with one type of mechanical control means forming part of the present invention.

Figure 2 is a sectional view on the line 2—2 of Figure 1, showing in end elevation the control means.

Figure 3 is a perspective view of another form of guide showing a slightly modified form of control means forming part of the present invention.

In the form shown in Figures 1 and 2, the guiding means is illustrated as rollers 1 and 2 mounted for rotation relative to a central support 3 in which terminal spindles 4 of the respective rollers are mounted and end supports 5 in which terminal spindles 6 of the respective rollers are mounted. The rollers 1 and 2 are of conical form longitudinally, with the ends of least diameter arranged adjacent each other and the rollers proper turning on axial lines which incline downwardly and outwardly from the central support 3. Thus the surface of the roller over which the fabric passes inclines downwardly and outwardly from the center line of the fabric, with the resultant tendency to spread the fabric in both directions from the center line and to exert a more or less continual tension on the fabric in these directions. The combined axial length of the rollers is substantially the width of the fabric being guided so that when the fabric is traveling in the proper line direction, the marginal edges of the fabric are substantially coincident with the relatively outer ends of the rollers.

Loosely mounted on each end spindle 6 of each roll is a deflector 7 in the form of a roll of relatively short axial length and a diameter corresponding to the maximum diameter of the main roll. The deflecting roll is ar-

ranged immediately adjacent the end of the particular main roll with which it cooperates and, while supported on the end spindle 6 of the main roll, is nevertheless wholly free of any connection with that spindle while, of course, the main roll is fixed with respect to the spindle.

The spindles 6, which are rotated in the operation of the main rolls 1 and 2, extend beyond the supports 5 and are provided with brake drums 8 fixed to the spindles. The brake band 9 is arranged to cooperate with the brake drum 8, one terminal of the brake band 9 being secured to an extension 10 of the support 5, the opposite end being fixed relative to and designed for coiling on an auxiliary shaft 11 mounted in an upward extension 12 of the support 5.

Secured upon the inner end of the auxiliary shaft is a gear 13, and cooperating with the gear 13 is a pinion 14 concentric with the stub shaft 6 but fixed to the deflecting roll 7. A spring 15 coiled about the auxiliary shaft 11 and terminally fixed to the gear 13 and to the support extension 12 is placed under tension in the hereinafter described operation of the parts and serves when tensioned to return the parts to normal position with certainty.

In this form of the device, it is apparent that with the fabric to be guided traveling in the proper direction, it will move over and rotate the main rolls 1 and 2, with the selvage or marginal edges of the fabric adjacent the extreme outer ends of said main rolls. Under these circumstances and incident to the inclination of the rolls, the fabric will be transversely tensioned, that is, maintained straight and flat and thus will proceed from one machine to the other in proper order. Should the fabric be deflected to one side or the other from the proper course, the margin of the fabric in the direction of deflection will immediately engage the deflecting roll 7, which roll, incident to its connection in the brake train and to its freedom of connection with the spindle 6, is normally at rest. The cooperation of the moving fabric edge with such deflecting roll, however, tends to an immediate rotation of said roll, with the effect to operate the gear 13 through the pinion 14 and wind the brake band 9 on the auxiliary shaft sufficiently to apply the brake to the drum 8. The drum 8 is fixed to the main roll spindle 6, and the speed of the particular main roll underlying the fabric in the direction of deflection is checked or stopped. Its tendency, therefore, to maintain the spread of the fabric in the direction of its axial inclination is interrupted, and as the tendency of the remaining or opposite main roll 2, for example, remains normal, the fabric will be immediately deflected in the direction resultant from the operation of this main roll 2, that is, moved toward the normal predetermined path of travel.

The movement of the fabric continues in this direction until the particular deflecting roll operated has released from contact with the fabric, whereupon the spring 15 restores the gear 13 to normal position, that is, moves it in a direction opposite to its braking movement, releases the brake on the drum 8, and the main roll 1, which has been checked by the braking operation, is again free to resume it normal rolling and guiding function with respect to the fabric to maintain the fabric in proper line position. Of course, the deflecting control described is arranged at the relative outer ends of the respective main rolls 1 and 2 so that on deflection of the fabric from the proper line of travel in either direction, the braking function of the main roll underlying the deflected fabric area will be immediately checked as described, permitting the remaining main roll to restore the fabric to proper line travel.

Of course, it is understood that a slight deflection of the fabric from the proper line of travel will immediately check the corresponding main roll and permit the opposing main roll to immediately restore the fabric to straight line position. Thus the fabric is substantially maintained at all times in straight line position because under the slightest deflection the restoration is so speedily performed that such slight deflection can have no appreciable effect on the travel of the fabric with respect to disarranging it in connection with the machine to which it is being delivered.

In Figure 3, there is illustrated a slightly modified form of structure wherein the main rolls, instead of being arranged in the form shown in Figure 1, are provided as rolls 16 and 17 of comparatively short axial length with respect to the width of the fabric being controlled, there being a pair of such rolls arranged to engage each edge of the fabric to be guided and the rolls being arranged at an angle to the line of travel of the fabric so that the tendency of the rolls when in rolling contact with the fabric is to draw the edge of the fabric engaged by the rolls toward the rolls, thus maintaining the fabric under transverse spreading function and permitting the fabric to travel between the rolls while being guided and laterally tensioned. Thus each pair of rolls exerts a pull on the fabric toward the edge of the fabric engaged by those rolls, and as the rolls are in opposition, the fabric is held transversely tensioned incident to the cooperation of the respective opposed pairs of main rolls. This is a conventional arrangement of guiding rolls and the function and operation of the same in this particular is well known and understood.

The lower main roll 16 is supported on a spindle 18 mounted in a fixed frame bar 19

arranged to be secured to any suitable fixture. For example, the two sets of main rolls may have their frame bars 19 connected by transverse bars, making the guiding mechanism a unit, and any conventional means provided by which such guiding means may be movably connected in fixed relation to any machine from which the fabric is being fed or to which it is being delivered. This detail is wholly unimportant and any desired arrangement to secure the proper relative disposition of the main guide rolls is contemplated.

In connection with the detail with which the invention is particularly involved, the spindle 18 of the lower main roll is provided with a deflecting roll 20 loose on the spindle and arranged beyond the end of the main roll and having a diameter identical with that of the main roll. The upper main roll 17 of each pair is mounted upon a spindle 21 terminally supported in a frame bar 22 swingingly or pivotally connected at 23 to the frame bar 19 remote from the main rolls, a spring 24 connecting the frame bars 19 and 22 to insure tendency toward surface contact in ordinary operating conditions between the main rolls 16 and 17. The spindle 18 of the lower main roll 16 and the spindle 21 of the cooperating upper main roll 17 provide supports for the ends of toggle levers 25 and 26 pivotally connected at their ends remote from the spindles, as at 27, thus providing a toggle connection between the spindles 18 and 21.

Supported upon an extension of the frame bar 19 is a gear 28 having an integral or relatively fixed drum extension 29 on which one terminal of a cord 30 is connected, the opposite terminal of the cord being connected to the joint 27 of the toggle levers 25 and 26. The deflecting roll 20, which, as stated, is mounted for free rotation on the spindle 18 of the lower main roll 16, is provided with a pinion 31 concentric with the spindle 18 and fixed with respect to the deflecting roll 20, the pinion 31 being in operative engagement with the gear 28.

In the form shown in Figure 3, it will be understood that the respective sets of main rolls 16 and 17 tend to maintain the fabric in flat condition under transverse tension and to insure that it will be permitted to travel in a proper predetermined path of movement toward the machine to which it is being delivered. The transverse tension on the fabric incident to the respective rolls operates in opposing directions relative to the longitudinal center line of the fabric. That is to say, one set of rolls tend to draw the fabric in one direction, while the opposing set of rolls tend to exert an equal drawing tendency on the fabric in the opposite direction. This stretches the fabric to a degree to maintain it flat and exerts a more or less guiding pressure on the fabric. In the event the fabric is deflected from the predetermined path of movement, however, the selvage edge of such fabric will engage the deflecting roll 20 of that set of rolls in the direction in which the fabric is being deflected.

As the moving fabric travels over the deflecting roll thus engaged, the pinion 31 operates gear 28, taking up the cord 30 and drawing upon the connected end of the toggle levers and immediately raising the upper roll 17 with respect to the lower roll 16. As a result of this movement, the contact of the rolls 16 and 17 with respect to the upper and lower surfaces of the fabric is immediately released and these rolls fail to exert the transverse drawing pressure or pull on the fabric. The opposing main rolls, however, still maintain their drawing tension on the fabric, and as a result of this drawing tension of said opposing pair of main rolls, the fabric is immediately drawn in a direction opposite that of its initial deflection from the line of travel, or in other words the fabric is restored toward a true line or path of movement.

As the fabric moves in a direction incident to this drawing tendency of the opposing pair of main rolls, the deflected edge of the fabric leaves the particular deflecting roll previously operated and the spring 24 tends to reverse the operation of the gear 28 by drawing downwardly on the spindle 21 of the upper roll, thus permitting the toggle to resume its normal position, restoring the rolls 16 and 17 to their proper contacting relation with the fabric, restoring the transverse drawing tendency on the fabric, and thus maintaining the fabric in its true line of travel. Of course, it will be appreciated that the slightest deflection from the correct line of travel of the fabric will induce immediate operation of the particular main rolls affected and the opposing pair of rolls will immediately draw the fabric to a position to relieve this deflection and restore the gripping and drawing tendency of the affected main rolls.

If desired and as preferred, the frame 19 may be provided with a stop 32 which will prevent separation of the main rolls 16 and 17 under the operation of the deflecting roll except to a limited degree, thus insuring that the rolls will separate only to the extent of the drawing contact with the fabric and thus holding the rolls in position to be practically instantaneously restored to fabric-engaging contact on the release of the operative function of the deflecting roll. The device thus becomes substantially instantaneous in its effect as the slight deflection immediately relieves the drawing tendency of one set of rolls and this drawing tendency is immediately restored by the drawing tendency of the opposing set of rolls. The fabric will thus be maintained in a true line of travel and any lateral deflection from such line will be im-

mediately corrected to insure that the fabric entering the machine to which it is directed will at all times travel under proper transverse spread and in a true desired path of movement.

We claim:—

1. A fabric guide including inclined rolls cooperating to exert opposed drawing tendencies on the fabric relative to the longitudinal central line of the fabric, a deflecting roll cooperating with each of said drawing rolls, said deflecting roll being normally free and operated by the fabric when deflected from the normal line of travel, gearing operated in the movement of a particular deflecting roll, an element actuated by said gearing, and means operated by the element to interrupt the fabric drawing tendency of the rolls with which the affected deflecting roll is associated without changing the normal inclination of the roll with respect to the line of travel of the fabric to thereby release the fabric to the drawing tendency of the opposing rolls.

2. A fabric guide including inclined roller means cooperating with the fabric and arranged to exert an opposing transverse pull on the fabric relative to the longitudinal center line of the fabric, a deflecting roll associated with each roller means and designed to be operated through engagement of the fabric therewith in the deflection of the fabric from the normal line of travel, a gear operated in the movement of a particular deflecting roll, and mechanism actuated by the gear to interrupt the fabric drawing tendency of the particular associated roller means without changing the normal inclination of the roll with respect to the line of travel of the fabric to thereby release the fabric to the influence of the opposed roller means to restore the fabric to the normal line of travel.

3. A fabric guide including rollers underlying the fabric and operated in the movement of the fabric, said rollers being inclined relatively to exert an opposed drawing tendency on the fabric relative to the longitudinal median line thereof, a deflector roll associated with each main roll, said deflector roll being normally free of fabric and adapted to be engaged and operated by the fabric when deflected from the normal line of travel thereof, braking mechanism for interrupting the movement of the main rolls, and means whereby the operation of a particular deflecting roll will set the brake on the associated main roll.

4. A fabric guide including sets of main rolls engaging the respective edges of the fabric and respectively exerting thereon opposing transverse pull relative to the longitudinal median line of travel, one roll of each set being bodily movable with respect to the other roll of the set, a toggle lever connecting the rolls, a gear operating to move the toggle lever to compel bodily relative movement of the main rolls, a deflecting roll associated with each set of main rolls and adapted to be engaged and operated by the fabric in lateral deflection of the fabric in the predetermined line of travel of the fabric, and means operated by the deflecting roll to actuate said gear.

5. A cloth guide including sets of main rolls having frictional engagement with the opposing edges of the fabric to be guided and respectively exerting opposing pull on the fabric relative to the longitudinal median line thereof, one of each of the sets of main rolls being bodily movable with respect to the other of such rolls, a toggle lever connecting the spindles of the said rolls, a gear, a cord operated in the movement of the gear to actuate the toggle to separate the said rolls to a degree to avoid frictional contact with the fabric, a deflector roll cooperating with each set of main rolls and adapted to be engaged and operated by the fabric on deflection of the fabric from the normal line of travel, and a pinion connected with the deflector roll to operate the gear.

6. A cloth guide including sets of main rolls having frictional engagement with the opposing edges of the fabric to be guided and respectively exerting opposing pull on the fabric relative to the longitudinal median line thereof, one of each of the sets of main rolls being bodily movable with respect to the other of such rolls, a toggle lever connecting the spindles of the said rolls, a gear, a cord operated in the movement of the gear to actuate the toggle to separate the said rolls to a degree to avoid frictional contact with the fabric, a deflector roll cooperating with each set of main rolls and adapted to be engaged and operated by the fabric on deflection of the fabric from the normal line of travel, a pinion connected with the deflector roll to operate the gear, and means for moving the main rolls to a position to frictionally engage the fabric or release the deflector roll actuation of the gear.

In testimony whereof we affix our signatures.

CLIFTON CORLEY. [L. S.]
ELMER A. FLEMING. [L. S.]