

[54] **TEXTILE FABRIC OR PAPER SHRINKING MACHINES**

727,569 4/1955 Great Britain 26/18.6
 913,194 12/1962 Great Britain 26/18.6
 973,023 10/1964 Great Britain 26/18.6

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[57] **ABSTRACT**

[30] **Foreign Application Priority Data**

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A textile fabric or paper shrinking machine of the type in which an endless belt travels over front and back rollers and in contact with a pressure roller driven at a speed different from the belt, the textile fabric or paper being shrunk by the contraction of the belt after passing the nip between the pressure roller and the front roller, wherein the pressure roller is driven by an electric motor through a reduction gear or by a commutator motor with a second drive taken through the reduction gear and a positive infinitely variable speed gear and a second reduction gear to the front or back roller to drive the pressure roller at 20 percent - 25 percent above the speed of the front or back roller to produce a texturized or stretch fabric or paper web.

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[51] Int. Cl. D06c 21/00

[58] Field of Search 26/18.6, 69 A; 162/111,
 162/113, 197, 205, 206, 280, 361

[56] **References Cited**

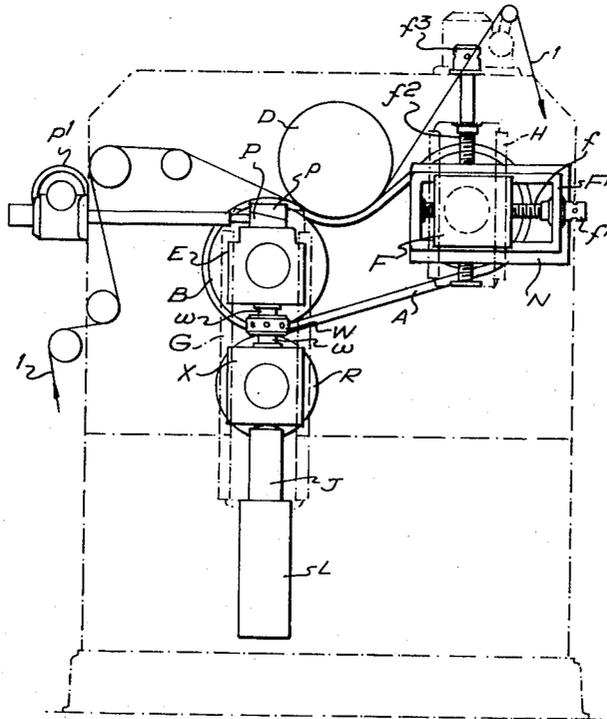
UNITED STATES PATENTS

2,078,904 4/1937 Cluett 26/18.6
 2,146,694 2/1939 Wrigley et al. 26/18.6
 3,290,209 12/1966 Ihrman 26/18.6 X

FOREIGN PATENTS OR APPLICATIONS

712,427 7/1954 Great Britain 26/18.6

5 Claims, 3 Drawing Figures



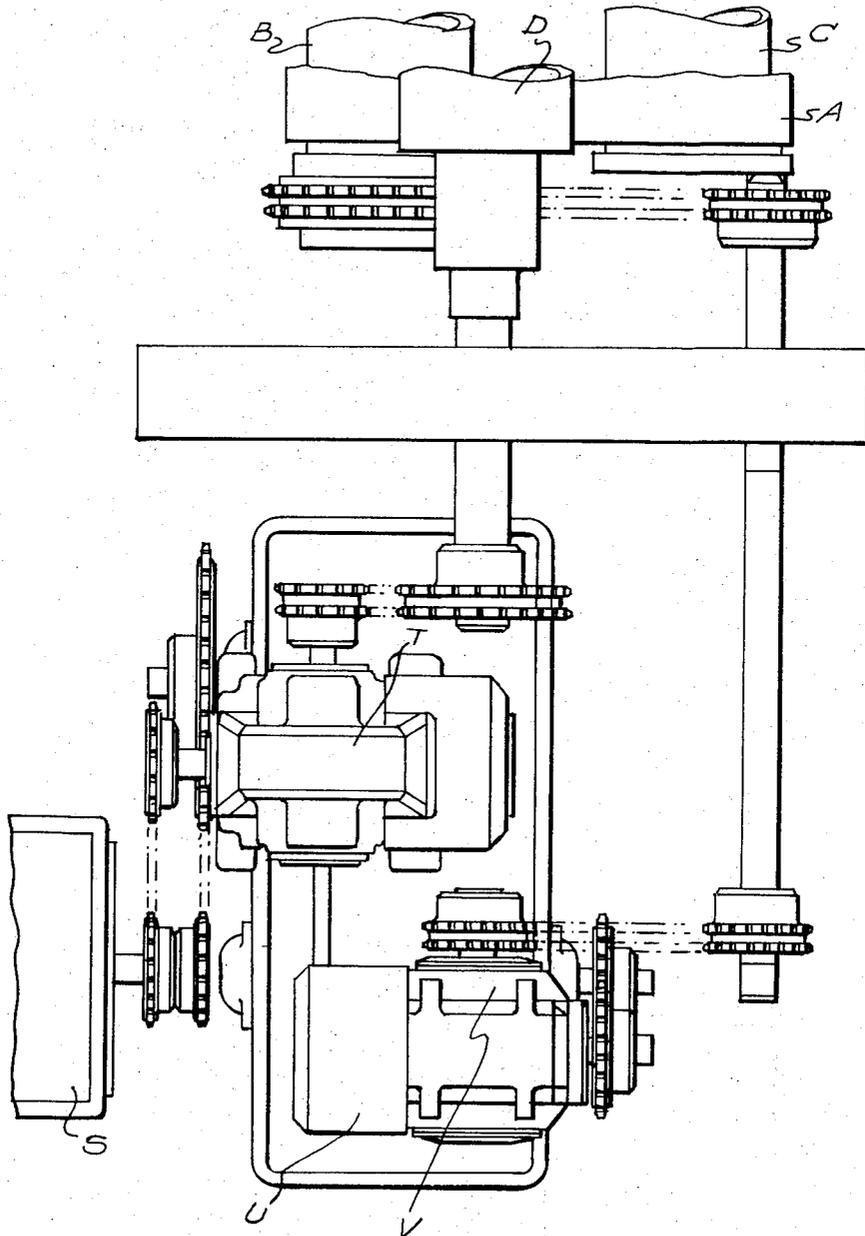


FIG. 3

TEXTILE FABRIC OR PAPER SHRINKING MACHINES

This invention relates to improvements in textile fabric or paper shrinking machines of the type in which an endless belt travels over front and back rollers and in contact with a pressure roller driven at a speed different from the belt, the textile fabric or paper being shrunk by the contraction of the belt after passing the nip between the pressure roller and the front roller.

British Pat. No. 913,194 discloses a fabric shrinking machine in which the back or rear roller is mounted in a block capable of two adjustments in the machine frame viz, a vertical adjustment and a horizontal adjustment to and from the front roller, to vary the arc of contact of the belt with the pressure roller and the tension of the belt, and the front roller is mounted in a block capable of vertical adjustment in the frame to adjust the nip of the belt between the front and pressure roller.

I have now found that by driving the front roller or the back roller and the belt and driving the pressure roller at a higher speed than that at which the belt is travelling a greater degree of compaction can be imparted to the textile fabric or paper and that this increase in compaction produces a texturized or stretch fabric or paper when employed on fabric, paper or paper containing man-made fibers.

According to the invention the pressure roller is driven by an electric motor through a reduction gear or by a commutator motor, a second drive being taken from the reduction gear or from the commutator motor through a positive infinitely variable speed gear ($p\ i\ v$) and a second reduction gear to the front roller or the back roller which drives the endless belt passing over the non-driven belt roller, the belt driving roller being driven at a slower speed than the pressure roller.

The invention will be described with reference to the accompanying drawings in which:

FIG. 1 is a side elevation of one form of the invention;

FIG. 2 is a side elevation of modified form;

FIG. 3 is a plan view of the apparatus of FIG. 1.

The machine comprises a front roller B mounted in bearing blocks E at each side of the machine frame, a rear or back roller C mounted in bearing blocks F at each side of the machine frame and an endless belt A passing over the rollers B, C and under a pressure roller D for traversing the fabric or paper web I through the machine.

Referring to FIG. 1 the bearing blocks E of the front roller B are vertically slidably adjustable in guides G, and below the front roller B a belt nip roller R is mounted in vertically slidably adjustable blocks X on guides G. A rotatably adjustable stop W is connected by opposite thread rods w to bearing blocks E and X, providing a solid motion transmitting connection between those blocks and at the same time providing an effective turnbuckle which through rotation of stop W may change the belt nip pressure between rollers B and R. Hydraulic cylinders L have their rams J in abutment with blocks X at each side for vertical adjustment of front roller B to vary the arc of contact between belt A and pressure roller D which is driven to rotate on a fixed axis.

An additional vertical adjustment is provided for the front roller B to enable accurate pressure control to be

obtained between the belt A and the pressure roller D. The additional vertical adjustment comprises a horizontally slidable wedge P engaging between the top of the block E and a fixed wedge p on the machine frame and inserted or withdrawn by a control worm wheel P^1 engaging a worm (not shown) on the spindle on which the wedge P is mounted. This additional vertical adjustment for the front belt roller B also enables accurate pressure control to be obtained between the belt A and the pressure roller D.

The bearing blocks F of the back roller C are mounted for vertical slidable adjustment in guides H, and this adjustment may be effected by hydraulic cylinders M having rams K in abutment with blocks F at each side.

Either front roller B or back roller C may be driven by suitable means (not shown). While vertical adjustment is shown for both of these rollers in FIG. 1 only one of them is usually driven, and the non-driven roller is then the only one provided with the disclosed vertical adjustment.

The pressure roller D is driven by an electric motor S through a worm reduction gear T. The drive from the worm reduction T also drives a positively infinitely variable gear U ($p\ i\ v$). The output from the $p\ i\ v$ gear U drives a second worm reduction gear V which drives the front belt roller B or back belt roller C and the endless belt A. The undriven belt roller is rotated by the belt A.

The speed of the pressure roller D can be varied through the first reduction gear T but any such variation is also transmitted to the drive for the belt driving roller B or C and therefore the relationship between the speed of the pressure roller D and that of the belt rollers B and C remains as controlled by the $p\ i\ v$ gear U.

It has been found that a speed of the belt A of some 25 percent less than that of the pressure roller D gives satisfactory results but the speed variation can be up to 3-1. The front or back roller B or C drives the endless belt A and in order to prevent slip, nip roller R is provided for engaging the outer surface of the belt A to maintain the belt A at the retarded speed of the driven belt roller B or C.

With a pressure roller D surface speed of 8 yards per minute and a hydraulic pressure of 80 pounds per square inch and a back roller C surface speed of 5.33 yards per minute, compactions of 20 percent to 26 percent are obtained at a temperature of 200°F at the pressure roller D; of up to 36 percent at a temperature of 275°F, with similar compaction at 350°F depending to some extent on the fibers of which the fabric or paper is composed.

It has been found that variation in compaction can be obtained by adjustment of the temperature of the pressure roller D and adjustment of the difference in speed between the belt surface relative to that of the pressure roller.

Somewhat greater compactions have been obtained by reducing the surface speed of the back roller to 5 yards per minute.

FIG. 2 illustrates an embodiment wherein the adjustment for the front roller B and the drive of belt A are the same as in FIG. 1, but wherein the back roller C is differently adjustably mounted. Here the bearing blocks F are carried on a frame F^1 which is horizontally slidable in a frame N. The lateral position of frame F^1

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is controlled by a screw having an operating head at f^1 . Frame N in turn is vertically slidably mounted in fixed guides H, adjustment being effected by a screw f^2 having an operating head f^3 .

What I claim is:

1. In a machine for shrinking textile fabric or paper, a front roller, a rear roller, an endless belt of contractible material passing over both of said rollers, a pressure roller disposed to exert pressure on said belt between the front and rear rollers and to form a belt engaging and compacting nip between said front and pressure rollers, means providing a web of said textile fabric or paper to be shrunk and passing the web through said nip between the front and pressure rollers, means for adjusting said front roller for varying the nip between said front and pressure rollers, said front roller being supported in vertically adjustable bearing blocks and fluid pressure cylinders being provided for effecting such adjustment, means providing a further vertical adjustment for said front roller comprising laterally adjustable wedge means between the machine frame and said bearing blocks, means for rotating at least one of said front and rear rollers for driving said belt at a controlled speed, and means for rotating said pressure roller at a higher surface speed than said belt.

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2. A textile fabric and paper shrinking machine as in claim 1 in which said drive means includes means to drive the belt at a speed is substantially 20 - 25 percent less than the speed of the pressure roller to produce a texturized and stretch material.

3. In the machine defined in claim 1, bearing blocks supporting the opposite ends of said rear roller in vertical slide guides, and fluid pressure cylinders connected to said blocks for selective adjustment of said rear roller.

4. In the machine defined in claim 1, vertically adjustable members supporting opposite ends of said rear roller, and bearing blocks carrying opposite ends of said rear roller mounted for horizontal adjustment in said members.

5. In the machine defined in claim 1, said wedge means comprising at each side of the front roller, a wedge slidably engaged with the bearing block, a spindle on which the wedge is mounted, and a second wedge on the machine frame slidably engaged by the first wedge, and worm and worm wheel adjustment means for displacing said spindles to effect relative sliding of said wedges.

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