Dec. 25, 1945. S. COHN ET AL 2,391,547

FABRIC FEEDING SYSTEM

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Fig. 1

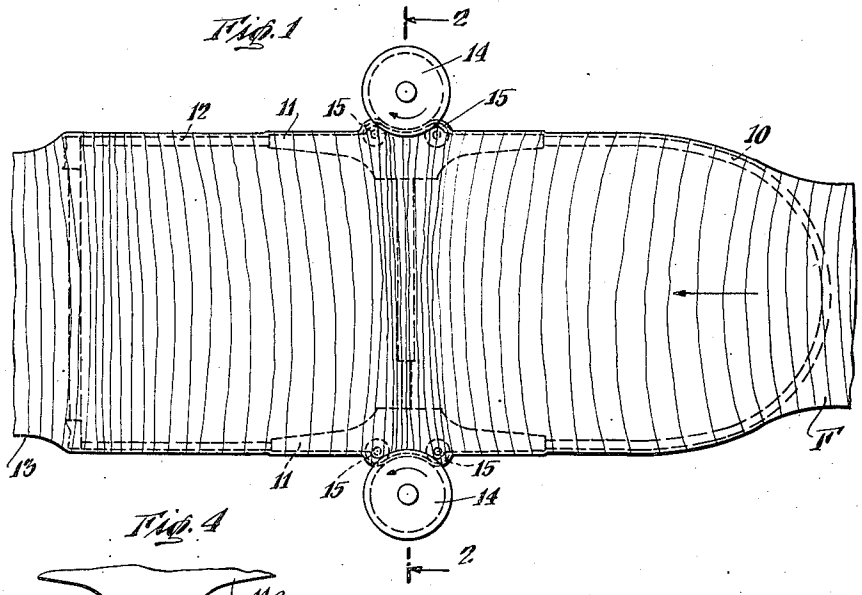


Fig. 4

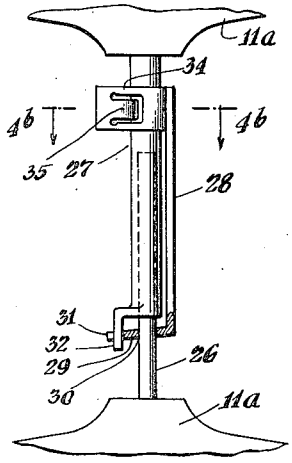


Fig. 4a

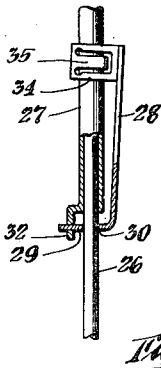


Fig. 4b

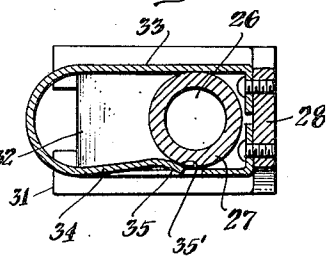


Fig. 2

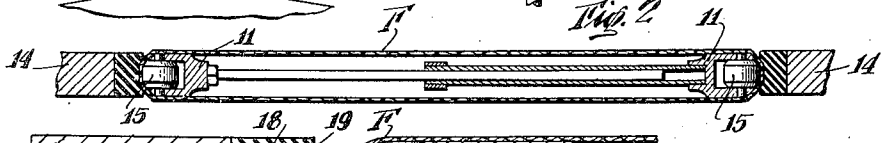
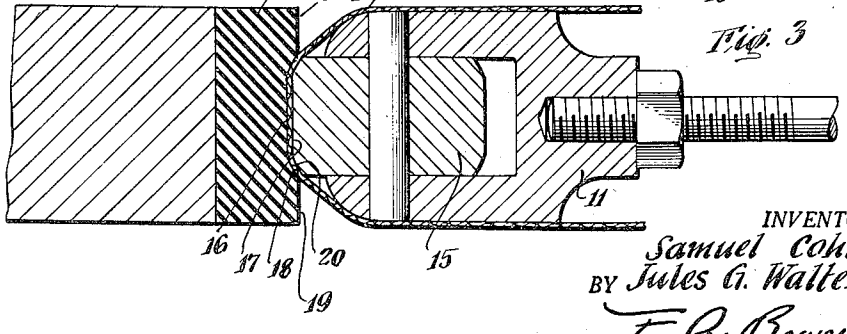


Fig. 3



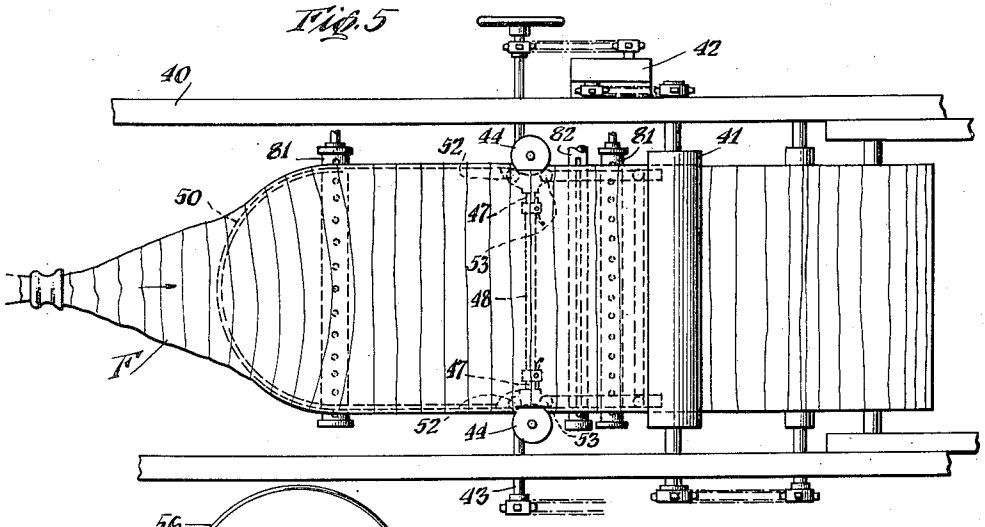
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Fig. 5



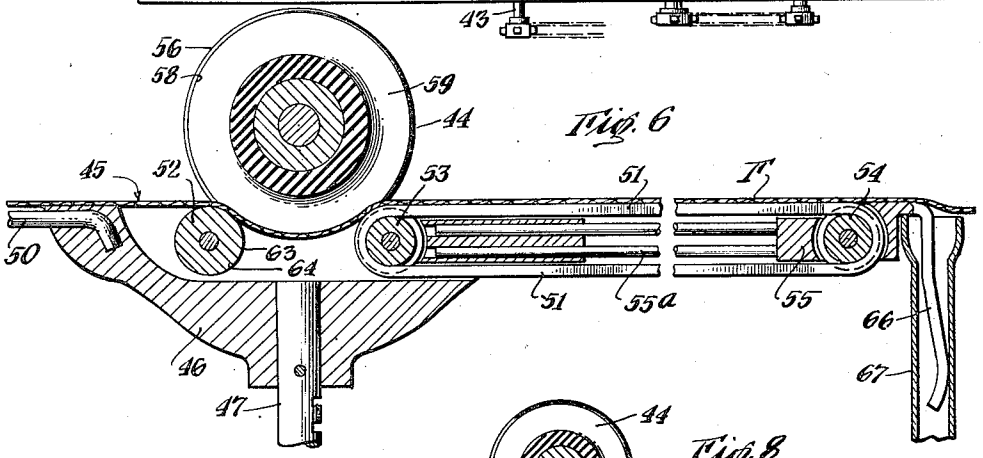


Fig. 6

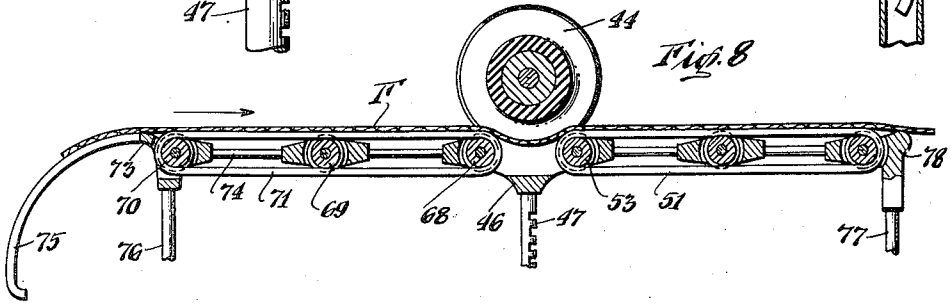


Fig. 8

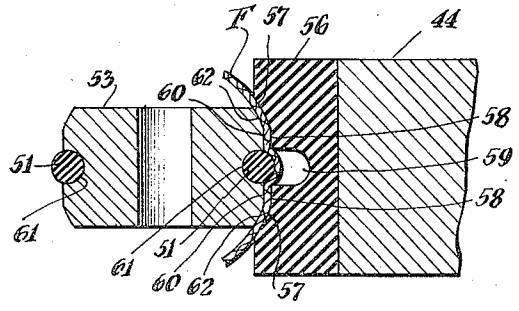


Fig. 7

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FABRIC FEEDING SYSTEM

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Application May 25, 1944, Serial No. 537,302

6 Claims. (Cl. 26—55)

This invention relates to the feeding of fabric and particularly to a feeding system in which an internal spreader or propeller within a length of tubular fabric cooperates with outer rolls to pass the fabric while maintaining it uniformly and regularly spread during the feeding.

The object of the invention is to provide cooperating inner and outer rolls shaped to bear evenly against the fabric between and to contact and grip the fabric similarly at all points so as to avoid relative slippage between the fabric and rolls and the marking of the fabric by the rolls during the passing of the fabric between them.

In the accompanying drawings illustrating the invention

Fig. 1 is a plan view of a spreader having side supporting rolls cooperating with rollers on the spreading means within the fabric;

Fig. 2 is a sectional view on enlarged scale taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlargement of a portion of Fig. 2;

Fig. 4 is a fragmentary view of a modified form of spreader structure;

Fig. 4*a* is a view partly in section of a portion of the apparatus shown in Fig. 4;

Fig. 4*b* is a sectional view on enlarged scale taken on the line 4*b*—4*b* of Fig. 4;

Fig. 5 is a plan view of another form of spreader;

Fig. 6 is a partial sectional view on enlarged scale of a portion of the apparatus shown in Fig. 5;

Fig. 7 is a sectional view on enlarged scale of the cooperating roll and roller of Fig. 6; and

Fig. 8 is a sectional view of a modified form of spreader.

In the specific embodiment shown in Figs. 1 to 4*a*, a tubular knit fabric F is stretched over the front spreader 10 and passed over the propeller castings 11, 11 on each side and then along the rear spreader bars 12 to the nip of gripping feed rolls at 13. The spreader as a whole is supported by the side rolls 14, 14 grooved to cooperate with the propeller rollers 15, 15 mounted in castings 11.

The rolls 14 and rollers 15 have substantially cylindrical surfaces 16, 17 engaging opposite surfaces of the fabric tube along each edge and applying radial pressure to said surfaces.

The surfaces 16 of rolls 14 are inset with inclined surfaces 18 at each end extending to the outermost peripheral surfaces 19. The surfaces 17 of the rollers 15 terminate short of surfaces 18 and have end surfaces 20 inclined inward substantially parallel to the surfaces 18. These cooperating surfaces 18, 20 take the axial thrust between the rolls and rollers and make them self-centering and confine this thrust to a relatively narrow area so that the extended surfaces 16, 17 are under direct perpendicular pressure radial in direction and with the fabric running at substantially equal linear velocities.

This combination of the roll and roller surfaces gives an extended area of equal pressures and greater driving power in comparison with continuously arcuate cooperating surfaces tending toward a line engagement concentrating the radial pressures and likely to result in marking of the goods being handled. The flat radial engagement of the present surfaces reduces the unit pressure and avoids slippage giving better control of the fabric propulsion with less wear and longer life for the engaging surfaces.

The spreader is preferably adjustable in width, the telescoping tubes 24, 25 connecting the castings 11 being relatively slidable for this purpose. In Figs. 4, 4*a* and 4*b* the castings 11*a* of the spreader are connected by a rod 26 sliding in a tube 27 carrying a clamp 28 having an angular end 29 with orifice 30 fitting the rod 26 so as to tightly grip the rod when tipped as shown in Fig. 4. A tongue 31 of the end 29 extends through an opening in the bracket piece 32 of the tube 27 to hold the parts against longitudinal slippage and the other end of the clamp 28 has a yoke portion 33 straddling the tube 27 and carrying a spring member 34 with a lip 35 engaging tube 27 at 35 (Fig. 4*b*) to hold the clamp in gripped position (Fig. 4). By pressure to the right on yoke 33 the clamp may be tipped to inclined position (Fig. 4*a*), the lip 35 of spring 34 slipping under the tube 27 to contact at the point 36 and retain the clamp in this released position in which the orifice 30 freely slides on the rod 26. This adjustable connection is simple and positive in action and may be manipulated by hand with the fabric in place on the propeller, so that the adjustment in width may be made without removing the fabric from the spreader.

In Figs. 5, 6, 7 and 8 the cooperative surfaces are shown combined with anti-friction belting in contact with the fabric on the spreader. In Fig. 5 the spreader is incorporated with a finishing machine of the type for finishing tubular knit goods. The apparatus is mounted on a frame 40 and includes a pair of pressure rollers, such as finishing rolls 41, which may be heated and are driven through a speed changer 42 from shaft 43, which drives propeller rolls 44. The spreader 45 comprises propeller heads 46 provided with

studs 47 adjustably connected by sleeve 48 to provide a unitary structure adjustable in width. Each head 46 is provided with means extending internally along the margins of the flattened fabric for maintaining the fabric in distended position. Such means includes a spreader bow 50 fixed to head 46 and having a curved end portion for receiving an initially distending tubular fabric F.

From bow 50 the fabric passes between propeller rolls 44 bearing against spaced rolls 52, 53 on each head 46. In this embodiment a belt 51 is provided at each side of the spreader traveling in suitable grooves 61 in rollers 52, 53 and in pulley 54 mounted on frame block 55 connected by frame rods 55a to the head 46. Belt 51 may fit snugly in the grooves of the rollers 52, 53 and pulley 54 with the belt face protruding slightly beyond the faces of said rollers and pulley as shown in Figs. 6 and 7. Smooth surfaces are provided on rollers 52, 53 for pressing the fabric against the abutting faces of propeller roll 44 which may be surfaced with rubber or other yieldable material, and for maintaining the smooth travel of the fabric over the pulley 54 at the discharge end of belt 51 frame blocks 55 carry spring arms 66 engaging within the tubular dead bar 67 and yieldingly pressing this bar into the nip of the rolls 41.

Each propeller roll 44 has an outer periphery 56 connected by inclined surfaces 57 with the set in surface 58 divided into two parts by the groove 59 accommodating the protrusion of the belt 51 and fabric as shown in Fig. 7.

The rollers 53 have peripheral surfaces 60 opposite surfaces 58 and separated by belt groove 61 opposite groove 59, the ends of the rollers being rounded off along slightly arcuate surfaces 62 substantially parallel to the cooperating surfaces 57 of rolls 44. Rollers 52 have plain cylindrical peripheries 63 with receding end surfaces 64 similar to the surfaces 62 of rollers 53.

The fabric F in passing from rollers 52 to rollers 53 follows around the surfaces 57, 58 of the roll 44 with some slight protrusion into the groove 59. Where the rolls and rollers meet on opposite surfaces of the fabric the pressure is radial and perpendicular at surfaces 58, 60, any supporting axial thrust being taken by inclined surfaces 57, 62. In the modification illustrated in Figs. 5 to 7, the fabric may be treated while on the spreader, for instance, by steaming nozzles 81 and air nozzle 82, the side rolls 44 preferably being driven as shown but these rolls 44 may be idlers, the rolls 41 being used to feed the fabric.

In the spreader shown in Fig. 8 the fabric F is fed to the side rolls 44 by side belts 71 running on rollers 68, 69 and 70 in roll heads connected together by the rods 74. The forward frame block 73 carried by the adjustable cross rod 76 has the feed bow 75 protruding forward to spread the fabric over the frame. At the rear end the frame blocks 78 are connected by the adjustable cross rod 77.

The driving system of this invention provides more contact area under direct perpendicular pressure and consequently more driving power with less pressure of the side rubber rolls against the small rolls of the spreader. Slippage is largely eliminated and there is better control of the fabric propulsion with elimination of marking of the fabric likely to be encountered where there is a point contact instead of a linear surface engagement. In addition there is less wear and more life for the rolls and the belts, and there are no sharp or sudden creasings or manipulations of the fabric tending to overstretch it at any point or disturb the regular texture of the knit loops.

We claim:

1. Apparatus for feeding fabric comprising a spreader frame adapted to fit within continuous lengths of tubular fabric, internal rollers engaging the inner surface of the fabric and having inclined surfaces at each side of a central radial plane and substantially cylindrical surfaces perpendicular to said plane and extending centrally from said inclined surfaces, and external rolls engaging the outer surface of the fabric opposite the internal rollers and having inclined and cylindrical surfaces matching and cooperating with the similar surfaces of the inner rollers to relatively center the rolls and rollers and floatingly support the propeller and simultaneously apply the direct perpendicuar pressure of the cylindrical surfaces to the fabric as it passes between said rolls and rollers.

2. Fabric feeding apparatus as set forth in claim 1 in which each internal roller has oppositely inclined end surfaces with the intermediate cylindrical surface between them.

3. Fabric feeding apparatus as set forth in claim 1 in which each external roll has oppositely inclined end surfaces with the intermediate cylindrical surface between them.

4. Fabric feeding apparatus as set forth in claim 1 in which there are fabric feeding means drawing the tubular fabric over the spreader and the external rolls are idlers rotated by the movement of the fabric.

5. Fabric feeding apparatus as set forth in claim 1 in which there are power means for driving the external rolls to feed the fabric along the spreader.

6. Fabric feeding apparatus as set forth in claim 1 in which the internal rollers carry belting running in grooves in said rollers and in contact with the inner surfaces of said fabric.

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