

March 6, 1956

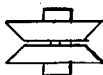
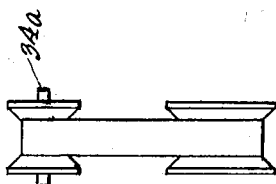
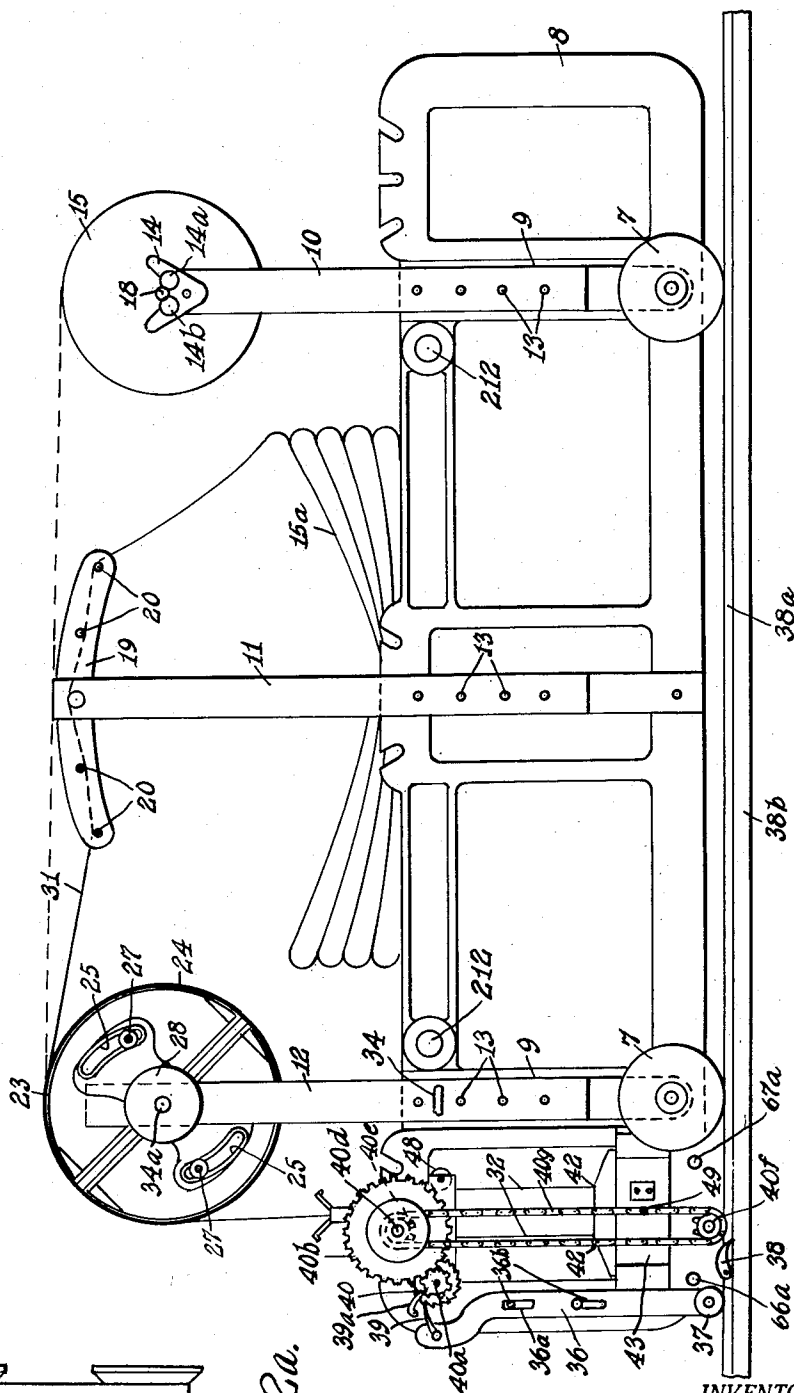
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2,737,385

CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

Filed Aug. 26, 1952

6 Sheets-Sheet 1



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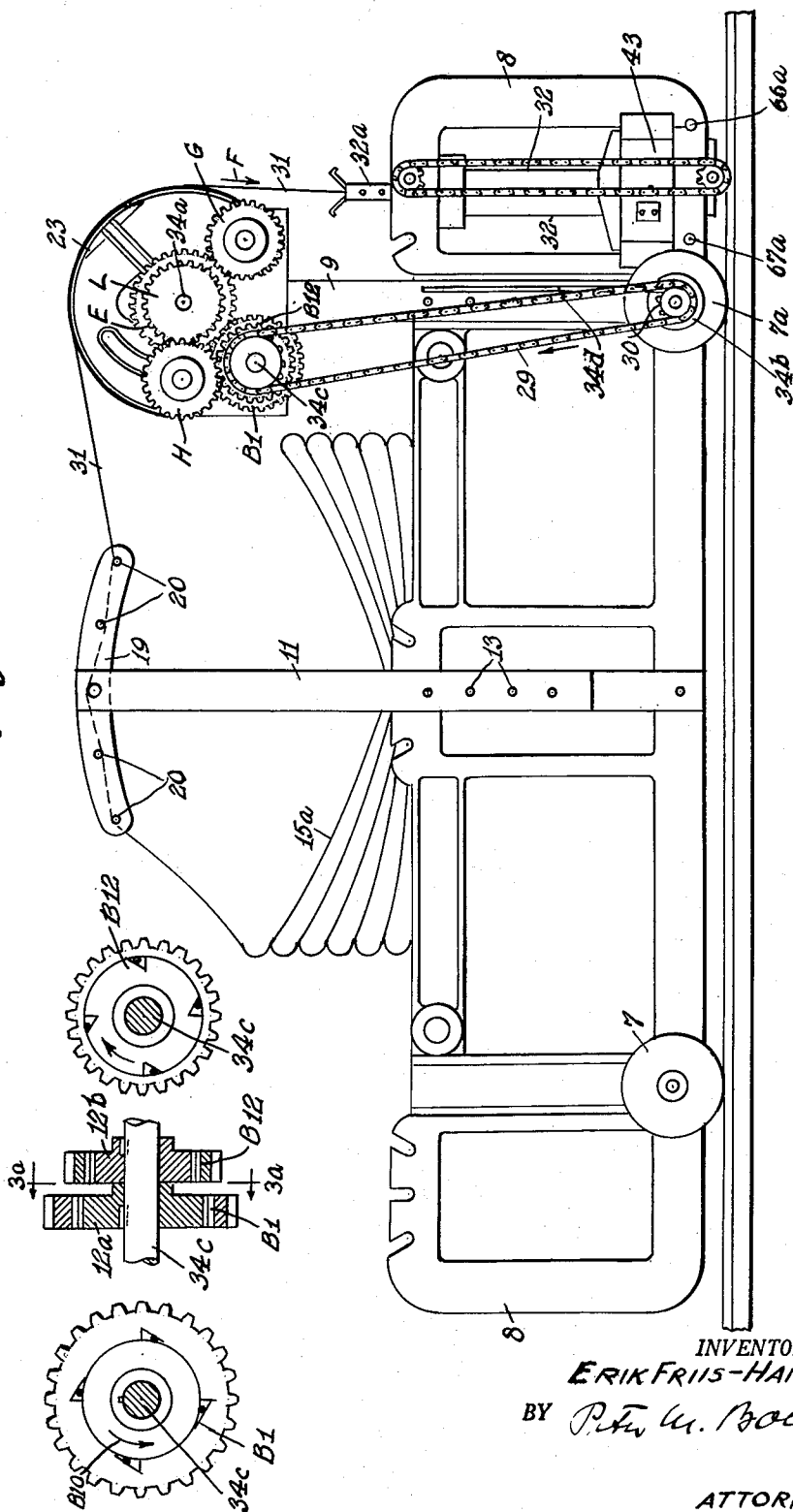
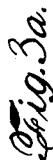
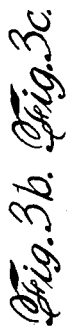
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CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

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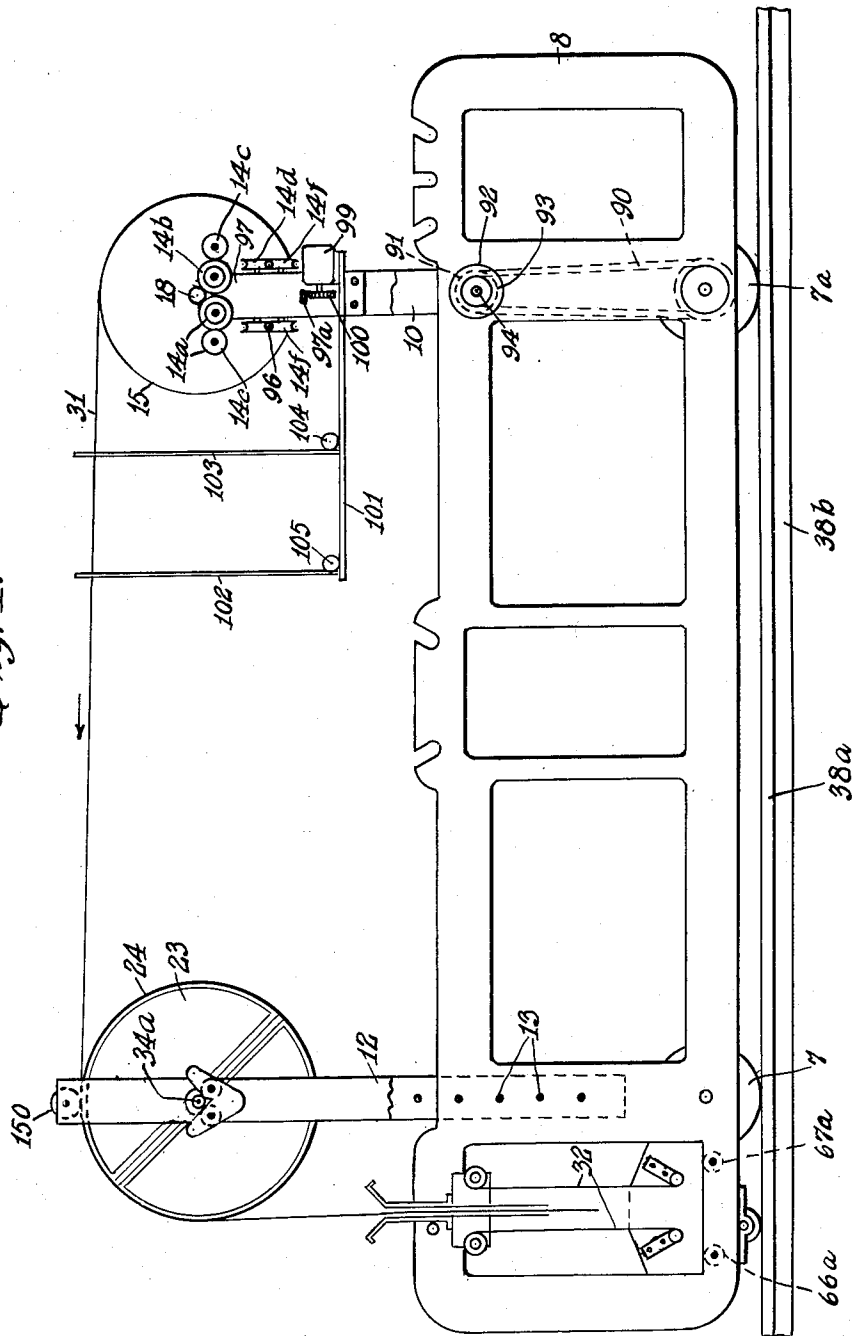
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CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

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Fig. 4.



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Fig. 5.

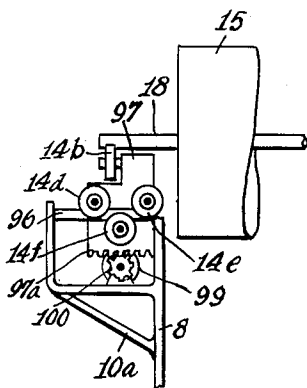


Fig. 6.

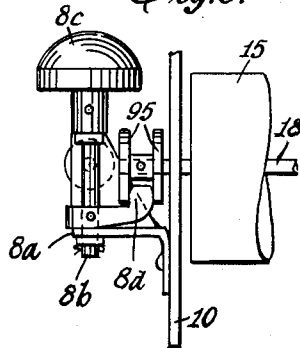


Fig. 7.

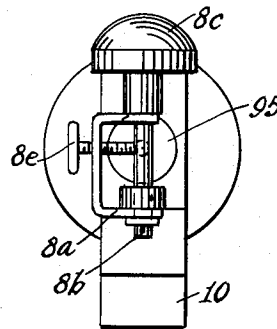


Fig. 8.

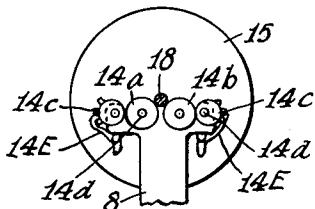


Fig. 8a.

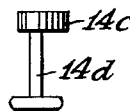


Fig. 9.

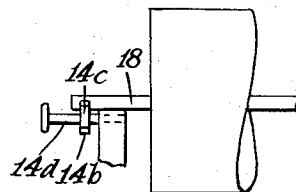


Fig. 12.

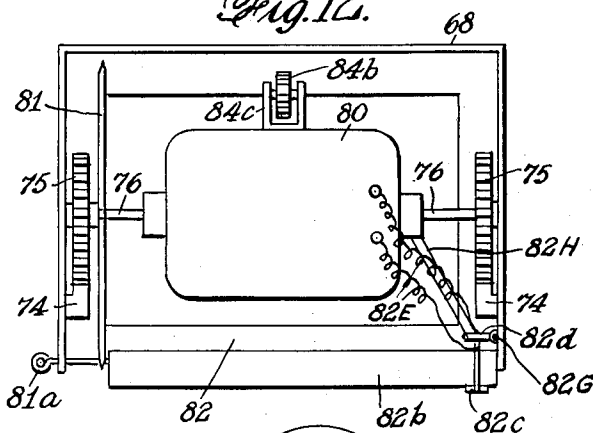


Fig. 13.

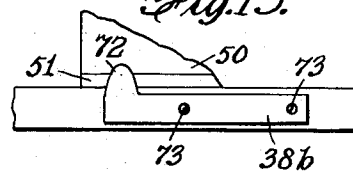
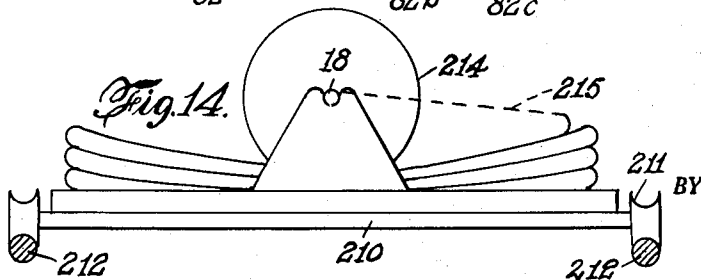


Fig. 14.



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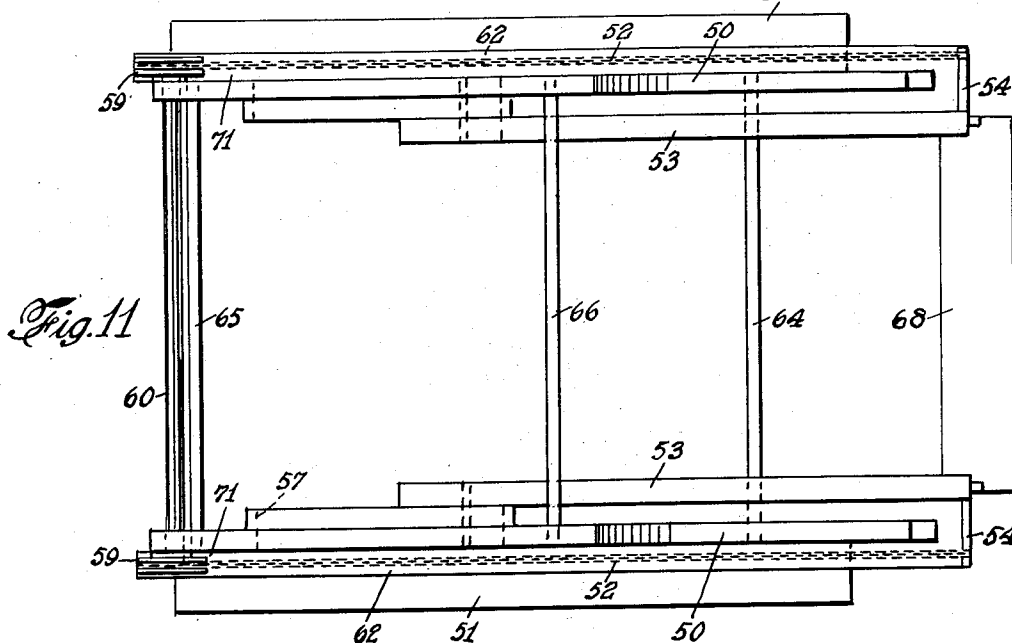
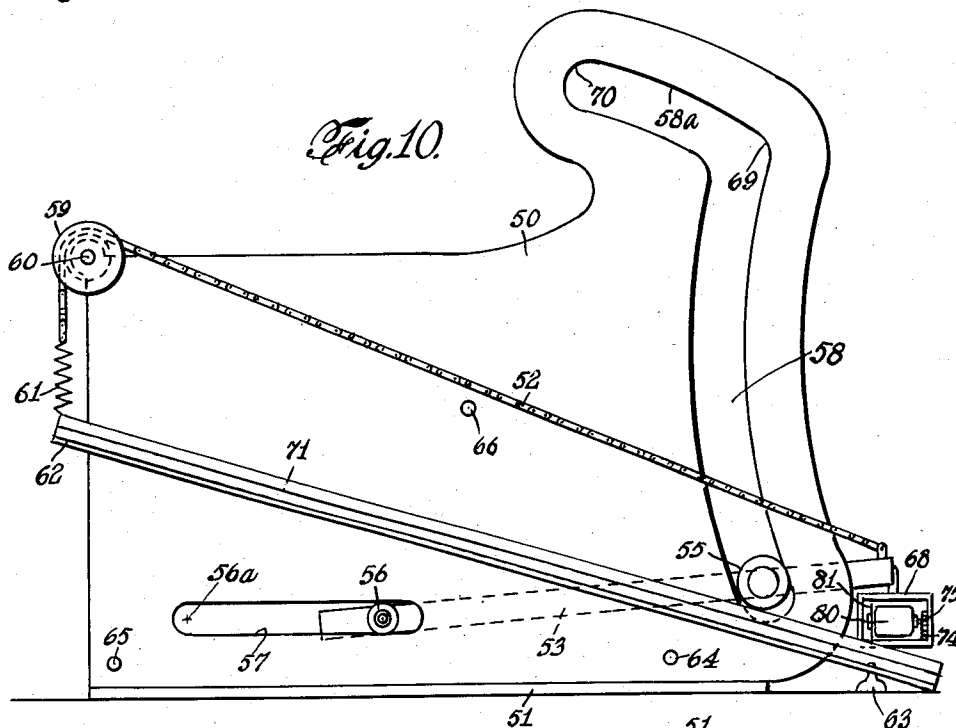
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CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

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6 Sheets-Sheet 5



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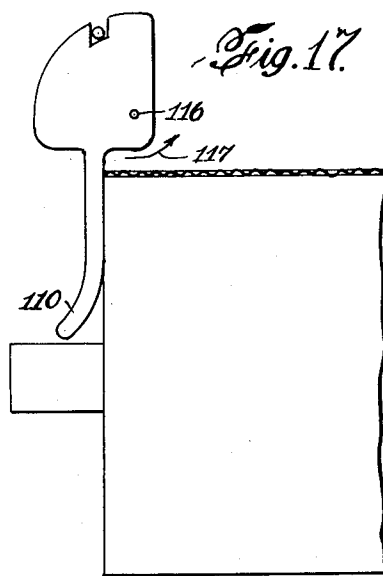
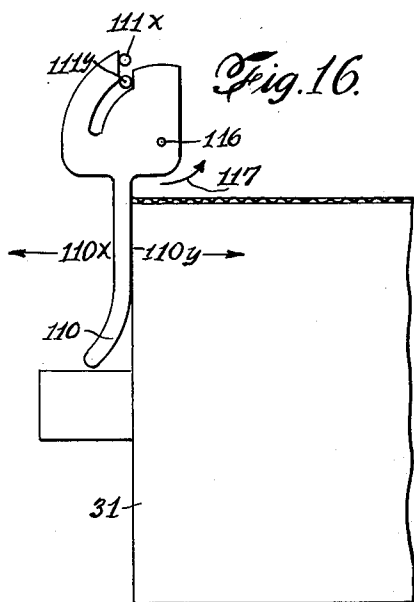
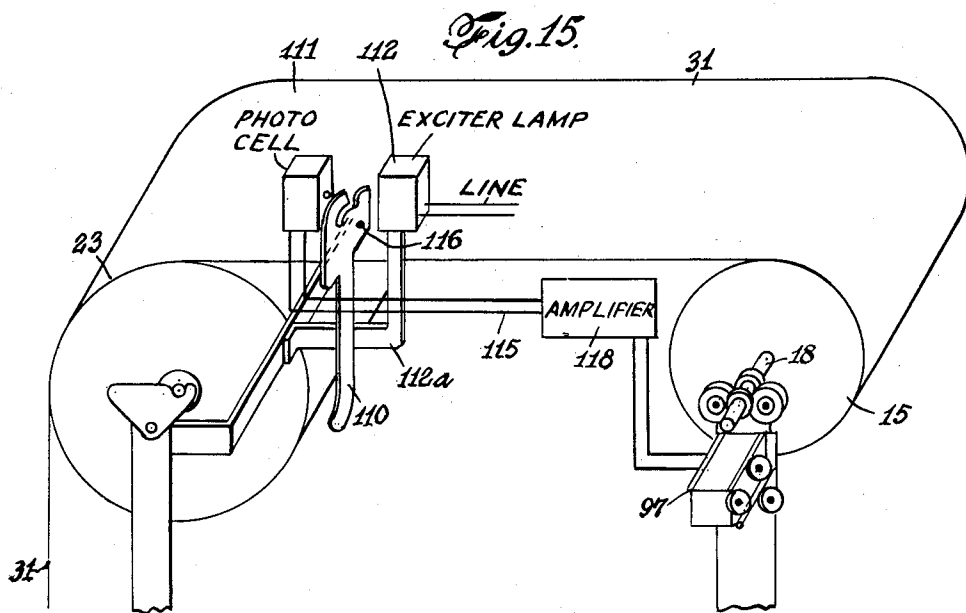
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CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

Filed Aug. 26, 1952

6 Sheets-Sheet 6



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2,737,385

CLOTH LAYING UP, AND CLOTH SPREADING MACHINES

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Application August 26, 1952, Serial No. 306,414

2 Claims. (Cl. 270—31)

This invention pertains to a cloth laying up machine, cloth spreading machines, and related devices, such as machines and rollers for winding and unwinding material in a straight manner.

In spreading cloth it has been found that most of the conventional spreading machines deliver the cloth by a direct pull from a clamp or weight placed on the table, the cloth travelling over a number of rollers, or rods; the source of material being a bolt, or flat folded supply.

By this action a certain stretching has taken place and with flimsy and elastic material this is very detrimental, because when the clamp or weight is released from the lay, said lay will creep, and thus become shorter and not fit the patterns.

This condition introduces difficulties, particularly in the case of material of the nature of tricot because the rolls of this material generally are of considerable width and weight, and, this material being very flimsy, its laying-up presents a serious problem for the industry.

The present invention, however, shows a simple way to lay material without stretching it, and without employing any of the conventionally used clamps.

In the drawing:

Figure 1 is a side elevational view of my device, viewed from the track side.

Figure 2 shows a Reeves drive.

Figure 2a shows a split pulley.

Figure 3 illustrates a side elevational view of my device from the table side.

Figure 3a shows a combination of gears.

Figure 3b shows a gear arrangement on a shaft.

Figure 3c shows a gear arrangement on a rotor.

Figure 4 is a detail side view, seen from the track side.

Figure 5 is a side view of the end of a drum and trolley on which said drum rests.

Figure 6 is a side view of a manually operated control switch.

Figure 7 is an opposite view of the latter.

Figure 8 is an end view of a brake.

Figure 8a is a detail view of a thumb screw and cam.

Figure 9 is a side view of said brake.

Figure 10 is a side view of a clamp.

Figure 11 is a top view of the latter.

Figure 12 is a detail view of said clamp.

Figure 13 shows a stop on the track.

Figure 14 shows a side view of a platform showing a bolt of cloth or flat-folded material.

Figure 15 shows a side view of the application of an electric eye.

Figure 16 shows a control flag and its application.

Figure 17 shows a modification of Figure 16.

Referring more particularly to the drawing, Figure 1 shows a side view of the machine seen from the track side.

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In this view the numeral 7 indicates two grooved wheels, 8 illustrates a side of the frame, 9 shows guide channels in the frame where the arms 10, 11 and 12 may be located vertically, 13 shows holes in said arms and wing nuts, which will permit adjustment of the more intricate part of the machine to any given height desired. The numeral 14 shows a V element provided at the upper end of arms 10 and affording with two bearings, serving as a support, or rest, for a bolt of cloth 15 on the conventional cloth carrying bar 18, while 19 indicates a curved frame with transverse rods 20, acting as a guide or tightening means.

The numeral 23 denotes a drum for feeding the cloth, said drum being covered with rubber 24, or any other suitable material to prevent slippage and to create friction. To secure additional friction (see Figure 4), a friction roller 150 is placed directly above drum 23 on arm 12. The drum 23 is of the split expansible type, the halves being actuated from a rotatable knob 28, through engagement of rods 27 in eccentric slots 26, to contract or expand the circumference of the drum, thus controlling the looseness or tightness of the lay on the table.

The drum may, however, not be split through the center, and arrangement may be made to slow down or speed up the drum action in relationship to the distance travelled of wheel 7, so as to impart either slackness or stress to the material. This may be done by the interchanging of gears or by a Reeves drive, see Figure 2 and Figure 2a, which may be placed on the shaft 34a extending through drum 23, thus changing the speed. A Reeves drive is a vertically split pulley with a V groove using a V belt, and as the two sides of the pulley are moved apart the V belt will be lowered and the speed will be retarded, whereas as the V pulley halves are brought together, the V belt will creep upwardly and the speed be increased. The operator is thereby given control over the tension of the material, as a large or fast moving circumference drum will feed more than a small or slow circumference drum.

The chain 29 (see Figure 3) is connected to a sprocket 30 on the shaft of wheel 7a, and thus it may be observed that, when the machine is pushed, the drum 23 will travel in a certain direction, always leading the unwound cloth 31 down between the curtain 32. However, due to the fact that the machine will be pushed backwards on the return trip, a free-wheeling clutch, and arrangement of gears have been provided (see Figures 3a, 3b and 3c) so that, without regard to in what direction the machine is being pushed, it will always feed the cloth in the same direction, and down between stationary curtain guides 32a and curtains 32.

The cloth 31 may come from a bolt of cloth 15, but it may also come from a flat pile of goods 15a; however, it will be guided in the same way over cross bars 20 to the drum 23. The purpose of having the drum 23 split in two halves, is to control the circumference of same. The drum will, in its normal position, feed a definite number of feet of material, as the machine travels a like number of feet, because the gears (see Figure 3a) are connected with the sprocket 30 on wheel 7a by the chain 29 in such a manner that the machine will feed, due to the predetermined effective periphery of the drum 23, the same yardage of material, as it travels. However, due to the fact that there is a certain stress on the cloth between the drum 23 and the bolt 15, it is necessary to spread a little extra material to absorb or equalize this stress, which is optional with the operator.

When the drum halves are separated, the effective periphery is increased, and it will spread a little surplus

material to relieve the tension on the lay, and thus the problem is solved.

When a tight lay is wanted, the effective periphery of the drum is reduced by contracting, or closing the latter, which will have a reverse action to the one described above, providing a tight lay.

The numeral 34 designates a handle reaching across the machine to the arm 34d and the clutch 34b, which in a conventional way will disengage the sprocket 30 from the wheel 7a, thus permitting the machine to travel without feeding (see Figure 3).

The numeral 36 denotes an arm placed on the side of the machine; and at the bottom of the arm 36 is a wheel 37, which as it climbs over an elevation 38 on the track 38a placed on the side of the table 38b, will cause the arm 36 to be forced upward. The said arm has one pawl 39, which engages the ratchet 40, which, in turn is geared with 40a and 40b in such a manner that the lifting can be adjusted to be only millimeters at a time, this being performed by a series of pawls 39a. A small elevation will require short pawls and a large elevation longer pawls. Thus block 43 may be lifted and the curtains 32 are wound up, as a lay is spread over the table, and thereby making room below the two curtains 32 for a thicker lay.

The curtains 32 are at 42 connected with a block 43 in such a manner that, when the block 43 is lifted by the travelling of the wheel 37 over cam 38, arm 36 with its two slots 36a, being controlled by the two bearings 36b, is lifted and thus the pawl 39 has started the gears 40, 40a and 40b to move. Through the center of sprocket 40e is arranged a shaft 40d reaching to the opposite side of the machine. At the bottom of frame 8 is arranged a sprocket 40f and between sprocket 40f and 40e is a chain 40g, said chain being fastened to block 43 by bolt 49.

It is easily understood that, as the machine travels over cam 38, block 43 will be lifted. This lifting arrangement is simple, but unique; however, other devices may be used for the same purpose.

As block 43 is lifted the curtains 32 become slack and will automatically be tightened up by their own springs 48, Fig. 1, the chief purpose of the curtains being to shield the material against the wind as the machine travels up and down the table, and thus a straight end of the lay will be obtained. However, it is understood that the end of the lay may be bulky, on account of the fold made, when the machine starts to travel in the opposite direction, and for that reason a supplementary unique device has been arranged (see Figures 10, 11 and 12).

As the device has many uses, the purpose of same will be hereinafter fully explained.

Thus the device may be used as a creaser, to eliminate bulk or to hold the material from a machine without mechanical feed; such a device would constitute a clamp or a creaser; however, it has other additional useful features.

Most manufacturers face a problem in regard to cutting the ends of the lay. After the lay is finished the fold will have created a bulk, and it is not unusual that two or three or even more inches of material are lost on each individual ply, when the cutting is done; this, of course, causes a tremendous loss of material, and if a clamp were to be designed which could cut each ply individually the objectionable bulk due to the fold would be done away with.

Therefore, a clamp or creaser has been designed whereby it is feasible to cut each ply as it is laid with a rotary knife travelling inside said clamp, so that the clamp or creaser stands free on the table and the machine never hits the same.

However, on the track is placed a stop, which acts more as an indicator for the length of the lay (see Figure 13) than as a stop; because gravity has been used as a force to lift and drop the clamp. Cutting of the ends of the lay individually, ply by ply, is thus effected and a clamp or creaser has been provided at the same time,

which does not have to be clamped to a table, because it does not act as a stop.

In Figure 10 is shown a side view of a clamp and creaser, the numeral 50 indicating a side view of the casting, which stands on the table on flange 51; and a rectangular cross piece 54 is mounted on an arm 53.

The arm 53 has a bearing indicated at 55 and another bearing indicated at 56.

The end-castings 50 are provided with slots 57 and 58. The chains 52 pass over pulleys 59 pivoted on shaft 60 connected with coiled springs 61, which, in turn are connected with angle irons 62 that have rubber suction cups 63, at their lower ends. The end-casting 50 has three cross bars 64, 65, and 66, which extend over to the end casting 50 on the opposite side of the table, which end casting may thus be viewed as a twin-casting.

In Figures 1, 3 and 4 the numerals 66a and 67a indicate rollers arranged on each side of the block 43 on the frame 8.

Considering now the machine approaching the disclosure in Figure 10 from right to left, it will be noted that the roller 66a will climb up the angle iron 62, and on its climb ahead it thus virtually climbs up a hill, and as it forces the arms 62 down, it will lift arms 53 upwards and the clamping device 68 (see Figure 12) will be lifted in a vertical position, because the slots 57 and 58 are constructed in such a manner that the end of the arms 53, as they travel upward, must travel in a straight line.

When the bearing 55 hits the point 69, the bearing 56 will be at point 56a, and the arm 53 will follow 58a in a true circular curve with the bearing 56 as a center of a circle. As arm 53 travels from the point 69 to point 70, it will have moved the clamping device 68 three inches backwards, thus permitting the machine to reach the very end of the lay before it makes a fold and starts to travel backwards.

The numeral 71 indicates a rubber cushion lying on top of the angle iron 62, which will have the effect, together with the climbing of the hill, to slow down the machine before the end of its travel.

The numeral 38b indicates a track on the table, 72 is a stop to determine the extent of travel of the carriage and the length of the lay, the stop 72 is attached to the track 38b by screw 73 (see Figure 13).

Figure 12 shows clamp 68, which is a channel iron housing; 74 is a rack, while 75 is a pinion on shaft 76 arranged through the motor 80; 81 is a rotary knife mounted on the shaft 76. The channel iron 68 is closed at the bottom by another channel iron 82, the latter being fitted with foam rubber 82b, while the channel iron 82 is supported by bolt 81a at the knife side. 82c denotes a contact arranged in such a manner that, when the foam rubber collapses, the contact 82c will make connection with contact 82d, and thus the electric current is directed through the wires 82e to the motor 80.

Now, it will be understood, that as the clamping device 68 settles down on the top of the cloth, the weight of same will make the foam rubber 82b collapse thus permitting the knife 81 to penetrate an eighth of an inch beyond channel 82, and by the use of any of the switches in existence the motor 80 will be caused to function, while the two wheels 84c and 84b placed one behind the other will keep the motor itself from rotating. Contact 82d is connected with an electric control strip 82g and with a motor 80 through supporting arm 82h in such a way that, when the motor travels, it will get its current through 82d, as it travels down 82g.

Rack 74 could be replaced with two chains without changing the basic idea and the cutting arrangement can also be placed directly on the spreading machine (Figure 1) and would be attached to the block 43 so that the knife 81 would be elevated together with motor 80, and an additional motor to move the first motor and knife across the table.

In this connection it may be noted, the motor will

travel down on the rack 74 and the rotary knife 81 will start to cut the top ply, as it travels ahead. The travel of said motor can be reversed at will by means of any of the well known mercury switches. It may, however, be advantageous to speed up the knife in relationship to the travel of the motor.

Thus, it has been accomplished to provide a clamp or creaser which stands loose on a table, which is shock-proof, and using gravity, and which travels vertically, cutting each ply, as it is laid out, besides cutting down the speed of the motor, and first and last creating a machine, which it is easy to set up.

Another very great reason for the waste is that all machines in existence today, which use automatic clamps have an arrangement whereby the machine hits the clamp in order to stop or set the clamp into operation; and here, of course, the speed of the machine in each individual travel decides the evenness of the end of the lay on account of the recoil, when the machine hits said clamp.

Referring to Figures 3, 3a, 3b and 3c, it might be appropriate to explain the working of the gears placed at the end of the drum 23 and the relationship between the wheel 7a, sprocket 30 and clutch 34b and the chain 29, and sprocket 34c.

Figure 3b shows shaft 34c with rotors 12a and 12b secured to the latter. Clutch B₁ and clutch B₁₂ rotate on rotors 12a and 12b, respectively. When the wheel 7a travels to the left, clutch B₁₂ travels to the left and will idle, and B₁ will go into functioning travelling as arrow F₁₀ indicates, and clutch B₁ will engage gear E and as gear E is fastened solidly to shaft 34a the drum 23 will travel in the desired direction of arrow F.

When the wheel 7a travels to the right B₁ will idle and B₁₂ will get into functioning; clutch B₁₂ will engage gear H and gear H will engage gear L; as B₁₂ travels to the right, gear H will travel to the left, and gear L and drum 23 would again travel in the desired direction of arrow F.

The gear G is only a supporting idler.

The functioning of the clutch B₁₂ and clutch B₁ are well known, but their application to a feed drum is distinctly new.

In Figures 4, 5 and 6 are shown the movement and the controls of the machine in question. The numeral 90 is a chain attached to a sprocket 91 secured to the shaft of the wheel 7a, the numeral 92 indicates a motor and 93 is a sprocket on said motor. The numeral 94 is a shaft extending to the opposite side of the machine, where the same chain arrangement has been made.

It is thought in this connection appropriate to point out that no reference is here made to stops and switches commonly known, as the essential subject here dealt with is a motor-drive that may be reversed at any desired point.

However, it has been found that, when the machine stops at the end before returning back, the flow of the material will continue; this, however, is not the case with automatic feed, but it has been found on such machines that it would be an advantage to be able to put a control on the shaft 18; therefore instead of putting a brake on the shaft 18 it has been decided to put two thumb screws 14d through cams 14c, and with an inlay of plastic or rubber it will be possible to put a little tension on the rollers 14a and 14b without interfering with the replacing of the bolt of material 15, 14c might have teeth to connect with counterweight pawl 14e thus permitting holding the brake in any given position.

As the source of supply may not be rolled up evenly on its cardboard tube base, it has been found necessary to find ways and means to move the source of material left and right, so as to be able to lay the material straight and the same distance all the time, from the edge of the table; and by viewing Figures 6 and 7 it is shown how this can be done by hand.

Thus on the end of the shaft 18 is arranged two

collars 95, and on the side of the frame 8 of the machine is placed a bracket 8a and through the same is arranged a shaft 8b which terminates at the top in a knob 8c. Placed on shaft 8b is a cam 8d, and it will now be understood that as the operator pushes the machine along the table his hand will rest on the knob 8c, and, if he sees that the lay is not straight he can by twisting his hand left or right move the material 15 in the desired direction.

In Figure 7 is shown a side view of Figure 6, and 8e shows a thumb screw, with a plastic inlay, which can be screwed tightly up against shaft 8b thus locking the same in any given position, which permits the operator to rest and pay no attention to the material if the same is rolled perfectly straight on its cardboard tube base.

However, the industry has been wanting an automatic way for taking care of this left and right hand control of the material, and the following construction has been designed for this purpose (see Figure 5).

Thus a sprocket 10a is placed on an upright 10 of frame 8; the numeral 96 indicates a half inch cross bar reaching across bracket 10a; two inches behind 96 is arranged another half inch cross bar in the same way. The numeral 97 is a block having rollers 14d, 14e and 14f placed on each side thereof and fitting onto the two rods 96, whereby a trolley arrangement has been made.

At the top of the block 97 are two rollers 14a and 14b supporting shaft 18 with the collars 95 (see Figure 6) resting on the top of the said bearings 14a and 14b; exactly the same arrangement is formed on the opposite side of the machine, and thus the cloth bolt 15 will rest on two trolleys and can easily be moved left and right.

The arrangement shown in Figure 6 can be applied to the trackside trolley and thus manual control is made possible with this device.

However, a motor may be applied to this device and for that reason such a motor 99 has been placed within the bracket 10a and on the bottom of the block 97 has been arranged a rack 97a meshing in the gear 100 placed on the shaft of the motor 99.

As shown in Figure 4, in order to use electric power to shift the material 31 on shaft 18 left and right, the motor 99 has been attached to the bracket 10a, this motor is connected to wires inside a tube 101 and said wires are, in turn, attached to feeler arms 102 and 103. At points 104 and 105 are placed two switches selected among the many quick acting switches in existence.

As the material passes over the drum 23, it touches on feelers 102 and 103. The feeler 103 has a slight springy action, which forces the same up against the cloth 15. Of course, it is understood that when starting out and 103 is forced against the material 15, the motor is disconnected. Now, if the material should move away from the track side of table 38b, it is readily understood that the support of the material against the feeler 103 ceases, and said feeler will connect the motor, and the motor will forthwith force the material 15 back against the feeler 103, until the current has been disconnected, and the material will be running straight.

Now, if the material is running too far over on the track side of the machine, then the feeler 102 will function, because in neutral position the feeler 102 just touches the material 15 without putting any pressure on same whatever, but when the material runs too far over on the track side, the feeler 103 will be bent, but nothing happens; however feeler 102 will start the motor and bring the cloth back and away from the track side until such a time that there is no pressure on feeler 102 at all, and the current will automatically stop, and the material will run straight.

Figure 14 shows a platform 210 connected with grooved wheels 211 resting on cross bars 212, as in this invention means have been shown for moving a roll of cloth left and right by manual power (see Figure 6); it has also described how to do it with an electric eye (see Figures 5 and 15) as it is just as important to lay a flat folded

piece of goods straight as a roll piece of goods; anyone of the applications under Figures 5, 6 and 15 could be connected and applied with the platform 210. The numeral 214 is a bolt of cloth, 215 is flat folded goods and 18 is a shaft as hereinbefore referred to.

Figure 15 shows an arrangement, whereby the cloth may be controlled by means of an electric eye.

Figure 16 shows a flag to control two electric beams.

Figure 17 shows a flag that controls one electric beam.

The material 31 is coming from a bolt of cloth 15 in a straight line over to drum 23 and, as it passes photocell 111 and an exciter lamp 112, which are attached to frame 112a, it will keep flag 110 in a neutral position, because the material 31 will swing flag 110 into such position around pivot 116, said position representing the desired straight lay.

Now, see Figures 15 and 16, if the flag 110 is being forced in a direction of arrow 110x by material 31, the beam 111x will be broken and the current will go through the wires 115 and amplifier 118 down into the motor 99, and the motor will automatically bring the trolley 97 to move in the opposite direction and thus flag 110 due to gravity will fall back in direction of arrow 117 to normal position, and the electric ray will get into functioning and the motor will stop. If the material 31 should move in direction of arrow 110y the flag 110 would follow the cloth, and ray 111x would be broken and the same procedure described above would take place reversely.

Figure 17 is a simplified flag, controlling only one ray and performing otherwise exactly as described above.

I claim as my invention:

1. In a cloth laying-up machine mounted to reciprocate on tracks extending over a table and including a frame

and a drum carried thereby for feeding cloth: a vertically displaceable block mounted in the frame adjacent the fed cloth; a windbreak curtain secured at its lower end to the block and at its opposite end to the machine; a vertically displaceable member carried by said machine and movable along the tracks therewith; means along the tracks for engagement with one end of the vertically displaceable member to displace the latter; and means, movable by said vertically displaceable member upon its engagement with the means along the track, to displace said block and therewith the windbreak curtain; and means for maintaining said windbreak curtain taut as the block is displaced.

2. A cloth laying-up machine according to claim 1, wherein a sprocket chain attached to the vertically displaceable block is provided, together with a driving sprocket therefor attached to the machine frame, said driving sprocket being controlled by the displacement of the vertically displaceable member.

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