April 8, 1952 C. YOST 2,591,903

SPREADING APPARATUS FOR FLATTENING TUBULAR FABRIC

Filed Feb. 28, 1951 3 Sheets-Sheet 1

FIG. 1.

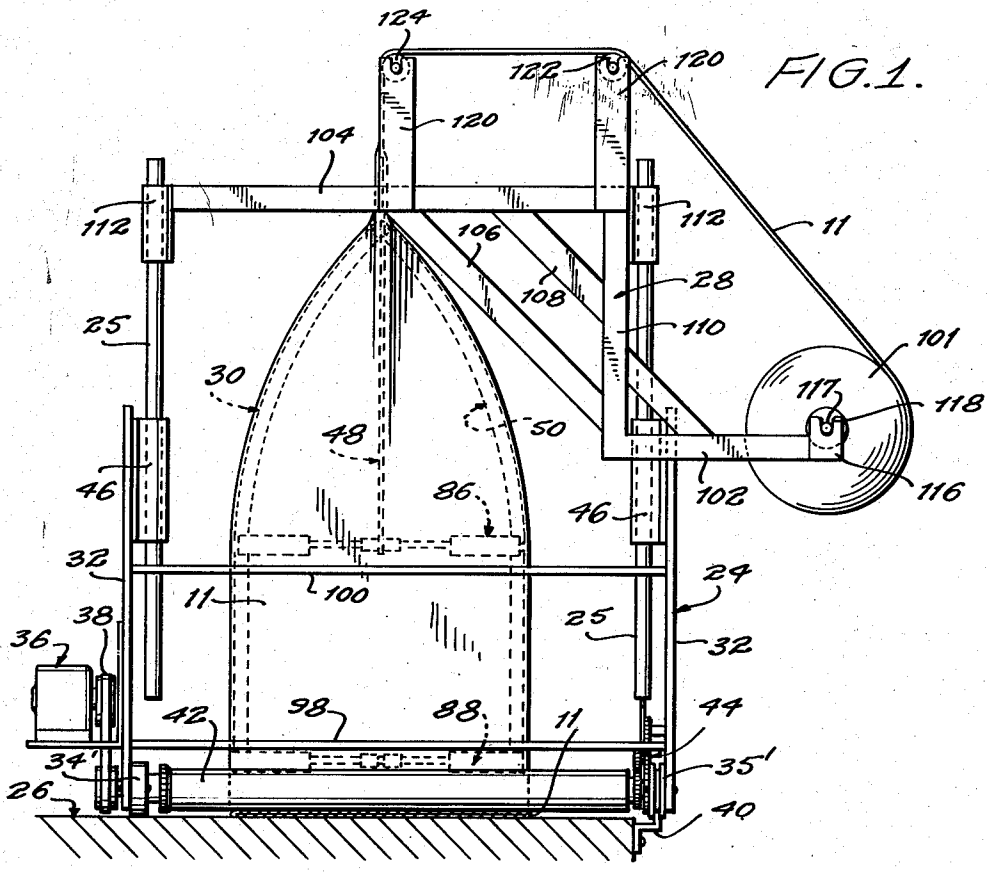
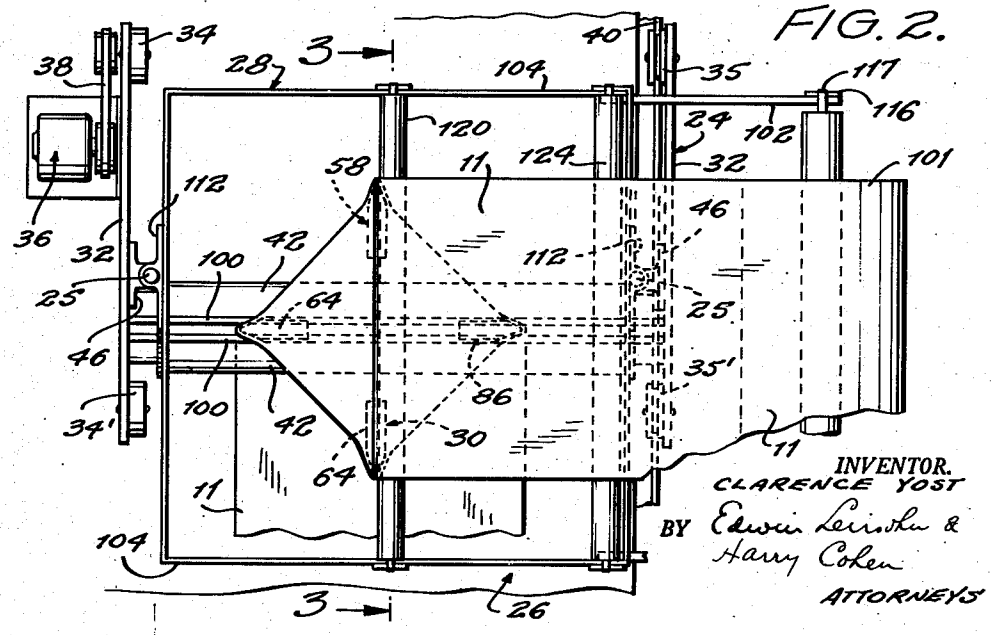


FIG. 2.



INVENTOR.
CLARENCE YOST
BY Edwin Leirsohn &
Harry Cohen
ATTORNEYS

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SPREADING APPARATUS FOR FLATTENING TUBULAR FABRIC

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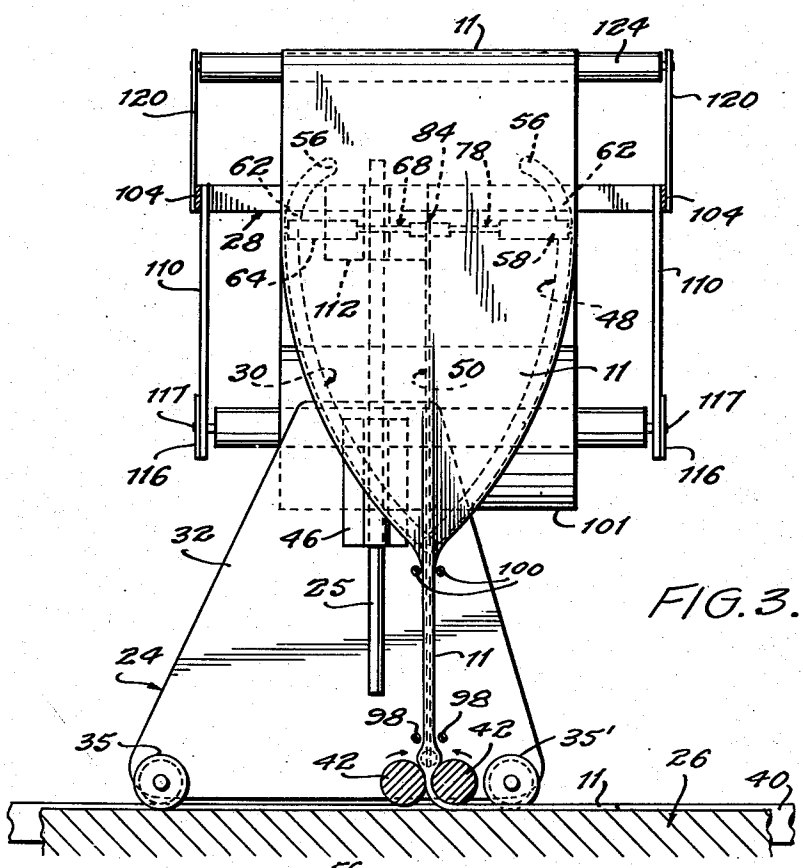
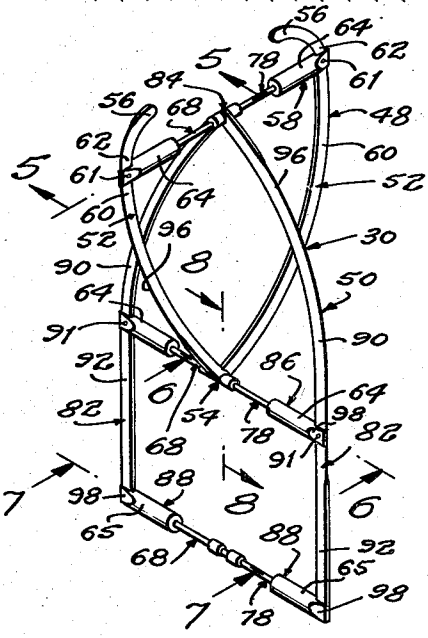


FIG. 3.



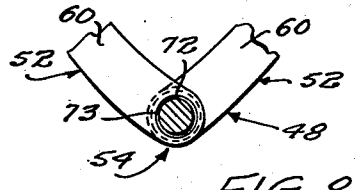


FIG. 8.

FIG. 4.

INVENTOR.
CLARENCE YOST
BY Edwin Leisohn &
Harry Cohen
ATTORNEYS

April 8, 1952 C. YOST 2,591,903

SPREADING APPARATUS FOR FLATTENING TUBULAR FABRIC

Filed Feb. 28, 1951 3 Sheets-Sheet 3

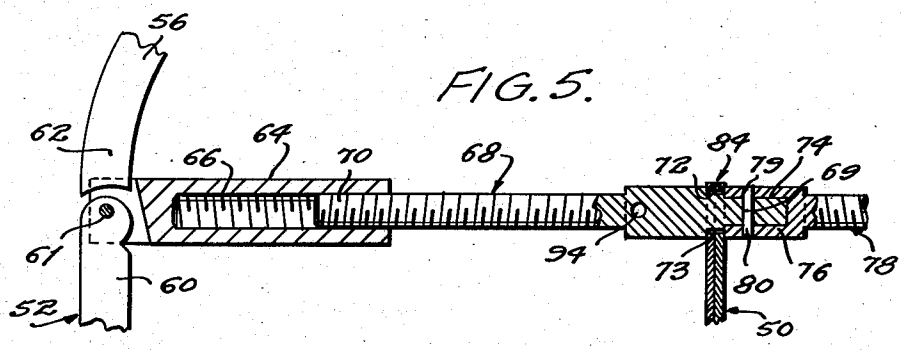


FIG. 5.

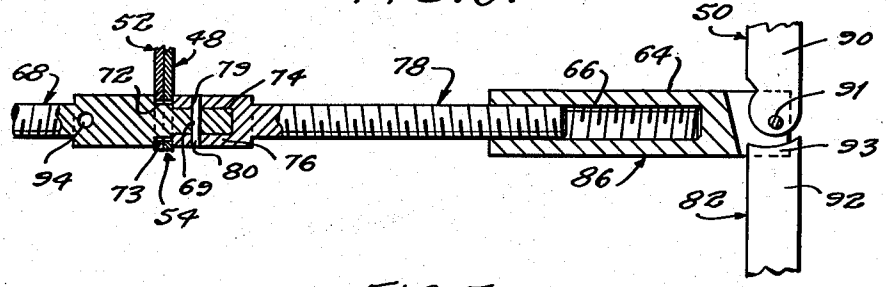


FIG. 6.

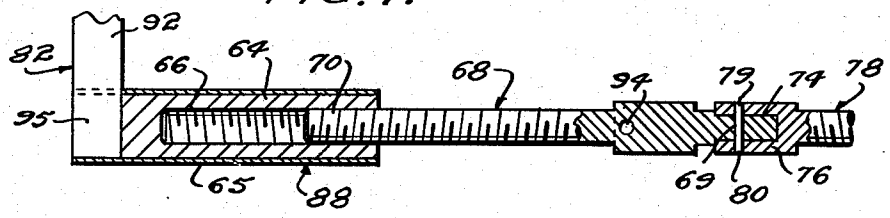


FIG. 7.

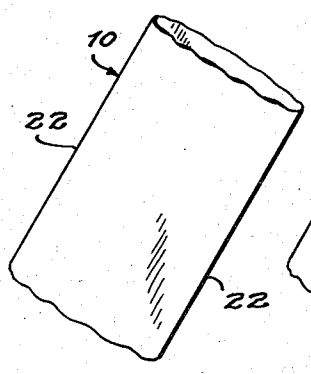


FIG. 9.

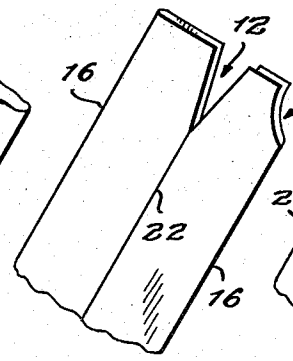


FIG. 10.

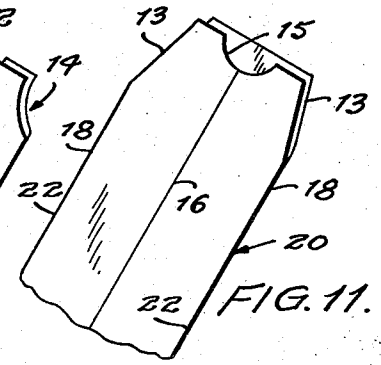


FIG. 11.

INVENTOR.
CLARENCE YOST
BY Edwin Reinhardt & Harry Cohen
ATTORNEYS

Patented Apr. 8, 1952 2,591,903

UNITED STATES PATENT OFFICE

2,591,903

SPREADING APPARATUS FOR FLATTENING TUBULAR FABRIC

Clarence Yost, Hazleton, Pa., assignor to Y & S Mfg. Co., Hazleton, Pa., a copartnership

Application February 28, 1951, Serial No. 213,181

27 Claims. (Cl. 26—55)

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This invention relates to spreading apparatus for flattening tubular fabric.

The primary object of the present invention is the provision of a spreading device for flattening tubular fabric wherein the fabric tube will be flattened and discharged from the spreading device in a divergent plane transversely disposed relative to the plane of entry of the fabric tube onto the spreading device.

Another object of the present invention is the provision of a spreading device for flattening tubular fabric wherein the fabric tube will be flattened and discharged from the spreading device in a divergent plane transversely disposed relative to the plane of entry of the fabric tube onto the spreading device in which the spreading device is so constructed and arranged as to engage the traveling tubular fabric for positive and accurate alignment thereof.

Another object of the present invention is the provision of a spreading device for flattening tubular fabric wherein the fabric tube will be flattened and discharged from the spreading device in a divergent plane transversely disposed relative to the plane of entry of the fabric tube onto the spreading device in which the spreading device is so constructed and arranged as to effect the fabric directional change for the proper positioning and alignment of the creases without slippage or creepage.

Another object of the present invention is the provision of a spreading device for flattening tubular fabric wherein the fabric tube will be flattened and discharged from the spreading device in a divergent plane transversely disposed relative to its plane of entry onto the spreading apparatus in which novel means are provided for the adjustment of the spreading device within a pre-selected range so that the spreading device is capable of spreading fabric tubes of various sizes.

Another object of the present invention is the provision of a spreading device adapted to float in tubular fabric which is extremely simple in construction, compact, and highly efficient in operation.

Another object of the present invention is the provision of spreading apparatus for flattening traveling tubular fabric in which a spreading device is associated with a movable carriage in a new and novel manner whereby the fabric tube will be flattened and discharged from the spreading apparatus in a divergent plane transversely disposed relative to its plane of entry onto the spreading apparatus.

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Yet another object of the present invention is the provision of spreading apparatus for flattening traveling tubular fabric, in which the spreading device, movable carriage, and a fabric supply roll are integrated in a novel and ingenuous manner whereby the traveling tubular fabric undergoes a directional change with the proper positioning and alignment of the fabric creases without creepage or slippage.

Other objects, features and advantages of the invention will become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings in which:

Fig. 1 is a front elevational view of the spreading apparatus according to the present invention;

Fig. 2 is a top plan view of the spreading apparatus according to the present invention;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the spreading device according to the present invention;

Fig. 5 is a partial sectional view taken on the line 5—5 of Fig. 4;

Fig. 6 is a partial sectional view taken on the line 6—6 of Fig. 4;

Fig. 7 is a partial sectional view taken on the line 7—7 of Fig. 4;

Fig. 8 is a partial sectional view taken on the line 8—8 of Fig. 4;

Fig. 9 is a perspective view of a tubular fabric portion on entry onto the spreading device and prior to its undergoing a change of direction;

Fig. 10 is a perspective view of a tubular fabric portion on discharge from the spreading device and after the cutting operation; and

Fig. 11 is a perspective view of a tubular fabric portion on completion of the cutting and folding operations.

With reference to Figs. 9 to 11, in the manufacture of tubular yarn or goods the finished tubular roll is creased flat as by steam pressing, which imparts to the tubular roll a relatively permanent crease set, and, in the manufacture of finished goods, it is the usual practice to cut off a suitable length of goods 10 from the tubular roll and in its flattened condition suitable patterns are cut through the layers of creased flat goods, as a sleeve pattern as indicated at 12 and a neck pattern as indicated at 14 of Fig. 10. On opening the flattened roll and folding the roll along its longitudinal axis so that the former edge creases 16 as shown in Fig. 10, substantially overlie each other, symmetrical cut out portions

13 for the sleeves and a symmetrical cut out portion 15 for the neck results, as clearly shown in Fig. 11. In this semi-finished state the steam pressed creases, in the conventional method described above, are longitudinally disposed at 16 midway between the longitudinal edges 18 of the semi-finished garment portion 20. The steam pressed or set crease in the center of the finished garment along the line 16 of Fig. 11 is highly undesirable to the purchasing public and has a relatively permanent set which cannot be removed by any of the normal or conventional pressing operations. To eliminate this crease in the center of the garment along the line 16, it has sometimes been the practice to fold the finished tubular roll along its longitudinal axis, by hand, so that the steam pressed creases 22 of Fig. 9 are disposed down through the center of the semi-finished garment portion as indicated by the crease line 22 of Fig. 10. Thereafter suitable patterns are cut through the sheets of goods in the same manner above described with reference to the conventional method, so that on opening the flattened goods the steam pressed creases 22 in Fig. 10 are positioned along the longitudinal edges of the finished product, as indicated at 18 in Fig. 11. Thus, it will be seen that the steam pressed creases down through the center of the finished garment may be eliminated by folding the finished tubular roll along its longitudinal axis, so that the former edge creases substantially overlie each other, in advance of the practice of cutting patterns through the sheets of goods in its flattened condition. The spreading apparatus, according to the present invention, does automatically, by a single machine, what the above referred to hand method heretofore accomplished.

The spreading apparatus, according to the present invention, comprises a spreader carriage 24, a cutting table 26, spreader carriage superstructure 28 and a spreading device 30.

The spreader carriage 24 comprises a carriage frame 32 which is conventionally mounted in a horizontal position on four wheels 34, 34', 35 and 35', the wheel 34 being the driven wheel which is mechanically connected to motor drive 36 in any conventional manner, as by belt 38. The carriage 24 is adapted to travel at a regulated speed on cutting table 26, two of the wheels 35 and 35' being adapted to cooperate with an angle track 40 which is suitably affixed to one side of the cutting table 26. The wheels 34 and 34' have flat peripheral surfaces and are adapted to ride on the surface of cutting table 26. It will be understood that the spreader carriage 24 reciprocates back and forth on the surface of the cutting table 26 and any suitable conventional means may be used to provide for the automatic reverse action of the motor drive 36 at the end of each lay. The spreader carriage 24 also includes a pair of spaced feeding rollers 42 which are suitably secured to frame 32 and which are adapted to rotate in the direction indicated by the arrows in Fig. 3, said rollers 42 being disposed transversely of said carriage 24. Integrated with the carriage 24 is a clutching gear mechanism generally shown at 44 in Fig. 1 for driving the feeding rollers 42 with provisions for rotating the rollers 42 in the same direction regardless of the direction of movement of the traveling carriage 24. The feeding rollers 42 are also driven from the motor drive 36 in any conventional manner (not shown). The carriage frame 32 is provided with apertured hangers 46 in which is disposed upright shafts

25 which are slidably mounted relative to said hangers 46, said shafts 25 being adapted for the reception of the carriage superstructure 28, and which will be described in detail hereinafter. It is to be understood that the spreader carriage 24, as described above, is conventional in all respects and forms no part of the present invention.

The spreading device 30 of the spreading apparatus, which is constructed of metal or any other rigid material, comprises a first spreader element 48 for flattening the fabric tube 11 in one plane and a second spreader element 50 for flattening the tube 11 in another plane. Spreader element 48 comprises a pair of members 52 which are pivotally connected to each other at 54. Each of the members 52 have their end portions 56 curved inwardly for a purpose to be described hereinafter. An adjustable cross member 58 extends between the pivotally connected members 52 and is positioned away from the pivotally connected end 54 of members 52 and adjacent to the portions 56. Each of the members 52 is formed in two parts, lower part 60 being pivotally connected to one end of cross member 58 at 61 and upper part 62 being permanently secured to said cross member 58, adjacent to the area where member 60 is connected to the cross member 58, by welding or any other suitable means, as best shown in Fig. 5. Cross member 58 comprises a pair of internally threaded parts 64 and a pair of cooperating central shaft members 68 and 78. A threaded part 64 is affixed to parts 60 and 62 of each of the spreader element members 52 and each of the parts 64 is provided with an aperture 66 which is internally threaded for the length of the aperture, each of the associated pair of parts 64 being threaded in opposite directions. Central shaft member 68 has its end portion 70 threaded and is adapted to be threadingly received in the aperture 66 of part 64. Shaft 68 is provided with a portion of reduced diameter 72 for a purpose which will be described in detail hereinafter and has another portion of further reduced diameter 74 which is adapted to be received in fork 76 of complementary central shaft 78. In order to secure the shafts 68 and 78 to each other and against relative rotation, there are provided aligned slots 69 and 79 in the shafts 68 and 78, respectively, for the reception of a locking pin 80. It will be seen that on the rotation of the central shaft members 68 and 78, its associated threaded parts 64 will be longitudinally displaced relative to said central shaft members to thereby effect relative movement of the spreader element members 52 about their respective pivotally connected ends 54.

The second spreader element 50 comprises a pair of members 82 pivotally connected to each other at one end, as indicated at 84, and is provided with a pair of adjustable cross members 86 and 88 which extend between said pair of pivotally connected members 82, and are positioned away from the pivotally connected end 84 thereof. Cross member 86 extends between its associated pair of pivotally connected members 82 at an intermediate point thereof whereas cross member 88 extends, or spans, the pivotally connected members 82 on the opposite end relative to the pivotally connected end 84 thereof. Adjustable cross members 86 and 88 are structurally identical with the cross member 58 associated with the first spreader element 48. With reference to Figs. 6 and 7, spreader element members 82 are constructed of two parts 90 and 92, part 90 being pivotally secured to cross member

86 at 91, in a conventional manner, and part 92 being rigidly secured to cross members 86 and 88 at 93 and 95, respectively, in any conventional manner, as by welding. Each of the central shaft members 68 are suitably apertured, as indicated at 94, for the reception of a suitable rod or lever for the manual rotation of said shaft member for the adjustment of the spreader element members 52 and 82, respectively, as aforedescribed. Each of the spreader element members 52 and 82 is provided with a substantially pointed outside edge 96 which extends longitudinally for a substantial distance, as indicated in Fig. 4, and which is adapted to engage the traveling tubular fabric 11 for the positive and accurate alignment thereof. Each of the parts 64 have a suitably tapered portion, as shown at 98 in Fig. 4, so that the spreading device 30 may float in the tubular fabric smoothly and with a minimum of resistance. The spreader elements 50 and 52 are axially overlapped and connected with the pivotally connected ends 84 and 54, respectively, being disposed in opposite directions. With reference to Figs. 5, 6 and 8, said spreader elements 50 and 52 are connected to each other by fitting the apertures 73 of each associated pair of spreader element members 52 and 82, respectively, over the portion 72 of the central shaft member 68 prior to the assembly of shafts 68 and 78. It will be seen from this arrangement that the cross members 58 and 86 act as a pivot pin for the spreader element members 52 and 82 at its central portion. Threaded parts 64 of cross member 88 may be covered with wood or any other suitable material, as indicated at 65 in Fig. 7, to reduce friction in the engagement of spreading device 30 with the traveling tubular cloth.

With reference to Figs. 1 to 3, the spreading device 30 is mounted in a vertical or upright position with respect to the spreader carriage 24 and is adapted to rest on the feeding rollers 42 positioned transversely of said carriage at the base thereof. The feeding rollers 42 are suitably spaced to receive the traveling tubular fabric 11, cross member 88 of spreading device 30 being suitably dimensioned so as to be restrained from entry between the feeding rollers 42. In order to support spreading device 30 in a vertical or upright position, there is provided two pairs of vertically spaced transverse guiding rollers 98 and 100, each pair being laterally spaced to receive spreader element 50 and the traveling tubular fabric 11 therebetween, said guiding rollers being rotatably mounted on carriage frame 32. It will be understood that the spreading device 30 rests on the feeding rollers 42 and is restrained in a substantially vertical position by the pairs of guiding rollers 98 and 100, respectively, and is not attached to any part of the carriage 24 or the superstructure 28, said spreading device 30 being adapted to float in the tubular fabric and to spread the tubular fabric by internal engagement therewith. When the spreading device 30 is restrained in a substantially upright position relative to carriage 24, cross member 58 of the spreading device 30 is positioned in a plane parallel to the longitudinal axis of said carriage 24 whereas cross member 88 is positioned in a plane substantially perpendicular to the longitudinal axis of said carriage. In order to provide for the tubular fabric 11 being fed to the spreading device 30, in a plane parallel to the plane of cross member 58 of the spreading device 30, there is provided a carriage superstructure 28 which is

adapted to support a tubular fabric supply roll 101 in a plane parallel to the longitudinal axis of carriage 24 and the plane of cross member 58. Superstructure 28 comprises horizontal frame members 102 and 104 and vertical frame members 110, secured to each other as shown in Fig. 1, and suitably braced by brace members 106 and 108 extending between members 102 and 104. Suitably secured to the extremities of each of the horizontal members 104 are a pair of apertured hangers 112 which are adapted to cooperate with the upstanding shafts 25 of the carriage 24. It will be understood that hangers 112 are provided for the vertical adjustment of superstructure 28 relative to carriage 24, which adjustment is accomplished by the relative slidable movement of hangers 112 on shafts 25, hangers 112 and shafts 25 being adapted to be secured to each other in any relative position within the design range of the structure, in a conventional manner. Suitably attached to the outside end of horizontal members 102 are plates 116 slotted at 118, said plates 116 being adapted to support the axle or shaft 117 of the tubular fabric supply roll 101 in a plane parallel to the longitudinal axis of the carriage 24. Suitably secured to each of the horizontal members 104 are a pair of upwardly projecting vertical support members 120 which are provided with slots 122 at their top ends. Members 120 are adapted to support the shafts of a pair of rollers 124 which guide the tubular fabric from the supply roll 101 to the spreader element 48.

In operation, the tubular fabric 11 is fed from the supply roll 101, mounted outboard of the carriage 24, over the rollers 124 and onto the inwardly curved portions 56 of spreader element 48. As the tubular fabric 11 is downwardly moved over the spreading device 30, it will be spread over the members 52 and will then contact members 82, whereby a change of direction will be effected. The fabric tube 11 will then be discharged from the spreader element 50 and fed between the spaced rollers 42 to be positioned on the cutting table 26. It will be understood that the rollers 42, being power driven, provide the motor force whereby the tubular fabric will be moved through the above circuit and fed to the cutting table 26. It will be observed that the tubular fabric 11 will be spread in two directions, approximately at right angles to each other, for a portion of its travel down through the intermediate zone of the spreading device 30, as shown in Fig. 2.

On the cutting table the goods are laid evenly, accurately and continuously and at the end of each lay the previously described automatic reverse action will come into play reversing the movement of carriage 24 whereby said carriage will reciprocate with respect to cutting table 26. The carriage 24 will travel at a regulated speed and at the end of each lay the ends of the tubular fabric will be folded over evenly and naturally without the use of weights or catchers. In the above arrangement the tubular fabric 11 will be accurately turned and spread without pulling or stretching and will be substantially tension-free. It will be understood that as the layers of cloth pile up on the cutting table 26 the feeding rollers 42 will be automatically raised at a regulated rate in a conventional manner.

It will be seen that the above arrangement provides for a spreading device for flattening tubular fabric wherein the fabric tube will be flattened and discharged from the spreading device in a

divergent plane relative to its plane of entry onto the spreading device. The arrangement of the spreader element members 52 and 82 with their pointed outside edges 96 are adapted to engage the traveling tubular fabric 11 for positive and accurate alignment thereof and to effect the fabric directional change for the proper positioning and alignment of the creases without slippage or creepage. It will be readily understood that this positive change of direction with accurate crease alignment is a salient feature of the present invention, it being necessary to have the steam pressed creases straight and uniform in the longitudinal edges of the finished product. It will be readily apparent that the spreading device of the present invention is capable of turning and spreading fabric tubes of a wide range of sizes by the adjustable cross member arrangement. The spreading device, movable carriage, carriage superstructure and fabric supply feed are all integrated in a novel and ingenuous manner which is relatively simple in construction, compact and highly efficient in operation.

While there is shown and described herein certain specific structure embodying the invention, it will be manifest to those skilled in the art that various modifications and re-arrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept and that the same is not limited to the particular form herein shown and described except insofar as indicated by the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, said spreader elements being axially overlapped and connected, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

2. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a plurality of members pivotally associated with each other, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

3. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being axially overlapped and connected with the pivotally connected end of said spreader elements being disposed in opposite directions, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

4. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, said spreader elements being overlapped axially and connected, whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

5. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being coaxially overlapped and connected with the pivotally connected ends of said spreader elements being positioned in opposite directions along the axis of said spreader elements whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

6. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, said spreader elements being coaxially overlapped and connected, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

7. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being coaxially overlapped and connected with the pivotally connected ends of said spreader elements being positioned in opposite directions along the axis of said spreader elements whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range so that the spreading device is capable of spreading fabric tubes of various sizes.

8. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flatten-

ing the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being coaxially overlapped and connected with the pivotally connected ends of said spreader elements being positioned in opposite directions along the axis of said spreader elements whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range so that the spreading device is capable of spreading fabric tubes of various sizes, said means comprising adjustable cross members extending between said spreader element members.

9. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, said spreader elements being coaxially overlapped and connected, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range, said means comprising adjustable cross members extending between each of said spreader elements and connected thereto, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

10. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being coaxially overlapped and connected with the pivotally connected ends of said spreader elements being positioned in opposite directions along the axis of said spreader elements whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range so that the spreading device is capable of spreading fabric tubes of various sizes, said means comprising cross members extending between said spreader element members, said cross members being longitudinally adjustable and positioned away from said pivotally connected ends of said spreader element members.

11. A spreading device for flattening traveling tubular fabric by internal engagement therewith comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane intersecting said one plane on a line extending longitudinally of the fabric path, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end, said spreader elements being coaxially overlapped and connected with the pivotally connected ends of said spreader elements being positioned in opposite directions along the axis of said spreader elements whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device, and means associated with each of said spreader elements for adjusting the width thereof within a predetermined range so that the spreading device is capable of spreading fabric tubes of various sizes, said means comprising cross members extending between said spreader element members and positioned away from said pivotally connected ends thereof, each of said cross members comprising a pair of internally threaded parts, one part being affixed to each of said spreader element members, said each pair of parts being oppositely threaded, and a central shaft member, said shaft member having its end portions oppositely threaded and adapted to be threadingly received in said pair of parts whereby on the rotation of said central shaft member its associated threaded parts will be longitudinally displaced relative to said shaft member to thereby effect relative movement of said spreader element members about their respective pivotally connected ends.

12. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a pair of members pivotally connected to each other at one end, said first spreader element having an adjustable cross member extending between said one pair of pivotally connected members and positioned away from said pivotally connected ends thereof, said second spreader element having a pair of adjustable cross members extending between another pair of said pivotally connected members and positioned away from said pivotally connected ends thereof, one of said cross members of said second spreader element extending between its associated pair of pivotally connected members at an intermediate point thereof, and the other of said cross members of said second spreader element extending between said associated pair of pivotally connected members at the opposite end relative to the pivotally connected end thereof, said pivotally connected end of said first spreader element being connected to said one of said cross members of said second spreader element positioned at said intermediate point thereof, and said pivotally connected end of said second spreader element being connected to said cross member of said first spreader element whereby said spreader elements are axially overlapped and connected, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

13. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a pair of members pivotally connected to each other at one end, said first spreader element having an adjustable cross mem-

ber extending between said one pair of pivotally connected members and positioned away from said pivotally connected ends thereof, said second spreader element having a pair of adjustable cross members extending between another pair of said pivotally connected members and positioned away from said pivotally connected ends thereof, one of said cross members of said second spreader element extending between its associated pair of pivotally connected members at an intermediate point thereof, and the other of said cross members of said second spreader element extending between said associated pair of pivotally connected members at the opposite end relative to the pivotally connected end thereof, said pivotally connected end of said first spreader element being connected to said one of said cross members, substantially centrally of the longitudinal axis thereof, of said second spreader element positioned at said intermediate point thereof, and said pivotally connected end of said second spreader element being connected to said cross member of said first spreader element substantially centrally of the longitudinal axis thereof, whereby said spreader elements are axially overlapped and connected, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

14. A spreading device for flattening traveling tubular fabric, comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a plurality of members pivotally associated with each other, each of said plurality of members having substantially pointed outside edges longitudinally extending for a substantial distance to engage the traveling tubular fabric for positive and accurate alignment thereof, said spreading device being adapted for internal engagement with the fabric tube whereby the fabric tube on discharge from the spreading device will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on the spreading device.

15. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table and having a pair of spaced feeding rollers positioned transversely of said carriage at the base thereof, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second connected spreader element for flattening the tube in another plane, said spreading device being guided in a substantially vertical position and resting on said feeding rollers, guiding means for restraining said spreading device in a substantially vertical position whereby the tubular fabric will be discharged from said spreading device between said feeding rollers and will be flattened in a divergent plane relative to the plane transversely disposed of entry of said fabric tube on said spreading device.

16. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second connected spreader element for flattening the tube in another plane, and means to restrain said spreading device in a substantially upright position relative to said carriage and resting thereon whereby the tubular fabric will be discharged from said spreading device at the bottom thereof and will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on said spreading device.

17. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second connected spreader element for flattening the tube in another plane, means to restrain said spreading device in a substantially upright position relative to said carriage and resting thereon, the fabric tube being adapted for entry on said first spreader element and for discharge from said second spreader element, and fabric supply means associated with said carriage, said means having its longitudinal axis positioned in a plane substantially parallel to the plane of entry of the fabric tube on said first spreader element whereby the tubular fabric will be discharged from said spreading device at the bottom thereof and will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on said spreading device.

18. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table and having a pair of spaced feeding rollers positioned transversely of said carriage at the base thereof, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second connected spreader element for flattening the tube in another plane, said spreading device being guided in a substantially vertical position and resting on said feeding rollers, guiding means for restraining said spreading device in a substantially vertical position, the fabric tube being adapted for entry on said first spreader element and for discharge from said second spreader element, and fabric supply means associated with said carriage, said means having its longitudinal axis positioned in a plane substantially parallel to the plane of entry of the fabric tube on said first spreader element whereby the tubular fabric will be discharged from said spreading device between said feeding rollers and will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on said spreading device.

19. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table and having a pair of spaced feeding rollers positioned transversely of said carriage at the base thereof, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, said spreader elements being axially overlapped and connected, said spreading device being guided in a substantially vertical position and resting on said feeding rollers, guiding means for restraining said spreading device in a substantially ver-

tical position, said guiding means comprising a plurality of spaced transverse rollers, the fabric tube being adapted for entry on said first spreader element and for discharge from said second spreader element, and fabric supply means associated with said carriage, said means having its longitudinal axis positioned in a plane substantially parallel to the plane of entry of the fabric tube on said first spreader element whereby the tubular fabric will travel from said supply means onto said spreading device and will be discharged from said spreading device between said feeding rollers and will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on said spreading device.

20. Spreading apparatus for flattening traveling tubular fabric comprising a spreader carriage adapted to be movably mounted on a cutting table, a spreading device adapted for location within the fabric tube and comprising a first spreader element for flattening the fabric tube in one plane, and a second spreader element for flattening the tube in another plane, each of said spreader elements comprising a plurality of members pivotally connected to each other at one end and having adjustable cross members spanning said spreader element members and positioned away from said pivotally connected ends thereof, said spreader elements being axially overlapped and connected with the pivotally connected ends of said spreader elements being disposed in opposite directions, said first spreader element adapted to flatten the fabric tube in a plane parallel to the longitudinal axis of said carriage and said second spreader element adapted to flatten the fabric tube in a plane substantially perpendicular to the longitudinal axis of said carriage, the fabric tube being adapted for entry on said first spreader element and for discharge from said second spreader element, means to restrain said spreading device in a substantially upright position relative to said carriage and resting thereon, and fabric supply means connected to said carriage, said means having its longitudinal axis positioned in a plane parallel to the longitudinal axis of said carriage whereby the tubular fabric will travel from said supply means on to said spreading device and will be discharged from said spreading device at the bottom thereof and will be flattened in a divergent plane transversely disposed relative to the plane of entry of said fabric tube on said spreading device.

21. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal side edges of the web in said one flattened condition thereof, are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising two members arranged to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members overlapping each other in the direction of web travel so that said other member engages the web at lateral portions thereof substantially simultaneously with the release by said one member of portions of the web which are in substantial lateral alignment with said first mentioned lateral portions.

22. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal side edges of the web in said one flattened condition thereof, are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising two members arranged to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereon and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members overlapping each other in the direction of web travel so that said other member engages the web at lateral portions thereof substantially simultaneously with the release by said one member of portions of the web which are in substantial lateral alignment with said first mentioned lateral portions, and a carriage for said members adapted to move longitudinally of a longitudinally extending table for disposing the transposed tubular fabric in superimposed horizontal layers on said table during the travel of said fabric in relation to said two members.

23. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal side edges of the web in said one flattened condition thereof, are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising two members arranged to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members overlapping each other in the direction of web travel so that said other member engages the web at lateral portions thereof substantially simultaneously with the release by said one member of portions of the web which are in substantial lateral alignment with said first mentioned lateral portions, and a carriage for said members adapted to move longitudinally of a longitudinally extending table for disposing the transposed tubular fabric in superimposed horizontal layers on said table during the travel of said fabric in relation to said two members, and means on said carriage for supporting a roll of the fabric in said first mentioned flattened condition for supply of the fabric to said two members.

24. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web

portions which were at the longitudinal side edges of the web in said one flattened condition thereof are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising a longitudinally extending table to receive the transposed fabric, a carriage mounted on said table for movement longitudinally thereof, and two members mounted on said carriage and movable therewith longitudinally of said table above the top thereof, said two members being arranged on said carriage to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members overlapping each other in the direction of web travel so that said other member engages the web at lateral portions thereof substantially simultaneously with the release by said one member of portions of the web which are in substantial lateral alignment with said first mentioned lateral portions.

25. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal said edges of the web in said one flattened condition thereof are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising a longitudinally extending table to receive the transposed fabric, a carriage mounted on said table for movement longitudinally thereof, and two members mounted on said carriage and movable therewith longitudinally of said table above the top thereof, said two members being arranged on said carriage to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members overlapping each other in the direction of web travel so that said other member engages the web at lateral portions thereof substantially simultaneously with the release by said one member of portions of the web which are in substantial lateral alignment with said first mentioned lateral portions, said two members being disposed in vertical planes transversely of the horizontal plane of the top of the table, and the plane of said other of said two members being disposed transversely of the longitudinal extent of said table.

26. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal side edges of the web in said one flattened condition thereof are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising a longitudinally extending table to receive the transposed fabric, a carriage mounted on said table for movement longitudinally thereof, and two members mounted on said carriage and movable therewith longitudinally of said table above the top thereof, said two members being arranged to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members being disposed in vertical planes transversely of the horizontal plane of the top of the table, and the plane of said other of said two members being disposed transversely of the longitudinal extent of said table.

27. Apparatus for transposing a web of tubular fabric from one flattened condition thereof to a second flattened condition in which the web portions which were at the longitudinal side edges of the web in said one flattened condition thereof are transposed so that they lie along longitudinal median lines in the opposed layers, respectively, of the web in the second flattened condition thereof, said apparatus comprising a longitudinally extending table to receive the transposed fabric, a carriage mounted on said table for movement longitudinally thereof, and two members mounted on said carriage and movable therewith longitudinally of said table above the top thereof, said two members being arranged to engage the interior of the web while the latter travels in the direction of its length in relation to said two members, one of said members being disposed in the plane of the fabric in said one flattened condition thereof and being progressively narrower in the direction of web travel and the other of said members being disposed in a plane transversely of said plane of said one member and being progressively wider in the direction of web travel, said two members being disposed in vertical planes transversely of the horizontal plane of the top of the table, and the plane of said other of said two members being disposed transversely of the longitudinal extent of said table, and means on said carriage for supporting a roll of the fabric in said first mentioned flattened condition for supply of the fabric to said two members.

CLARENCE YOST.

No references cited.