

May 13, 1958

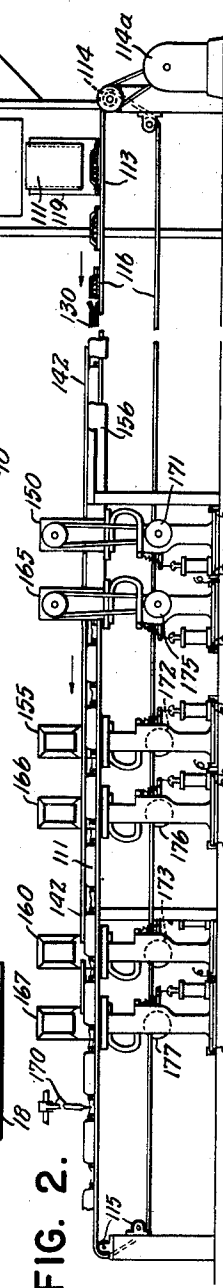
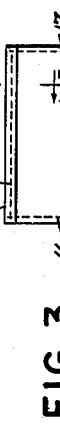
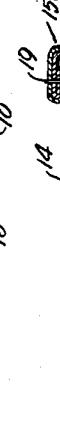
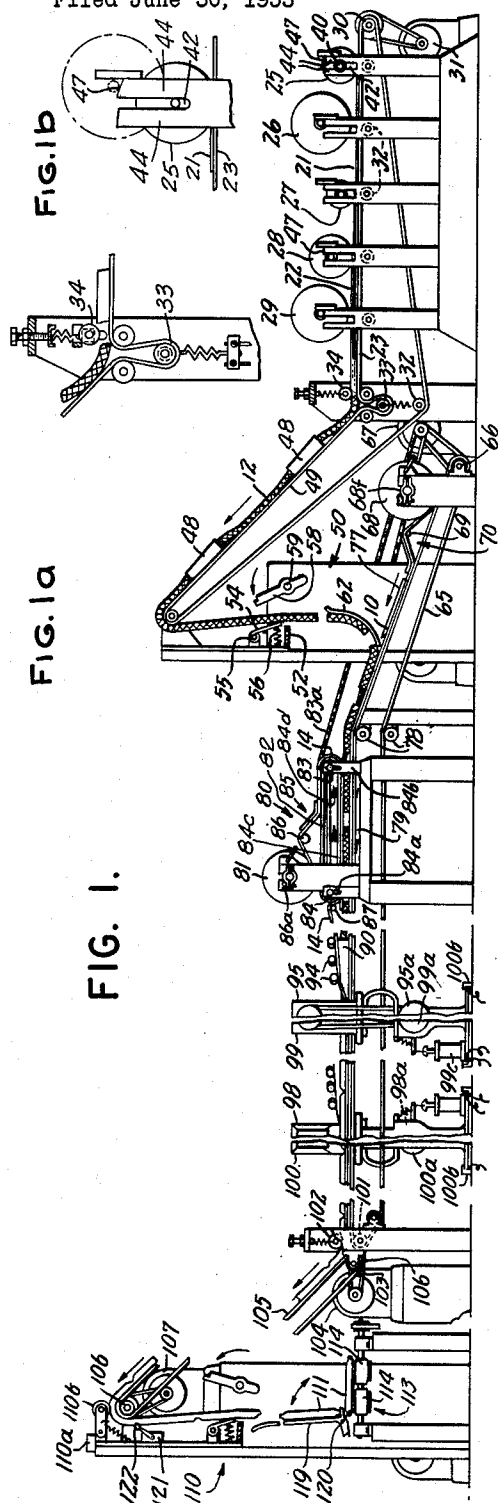
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2834,307

MACHINE FOR PROVIDING DIVIDED FLEXIBLE STRUCTURES

Filed June 30, 1953

4 Sheets-Sheet 1



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FIG. 6.

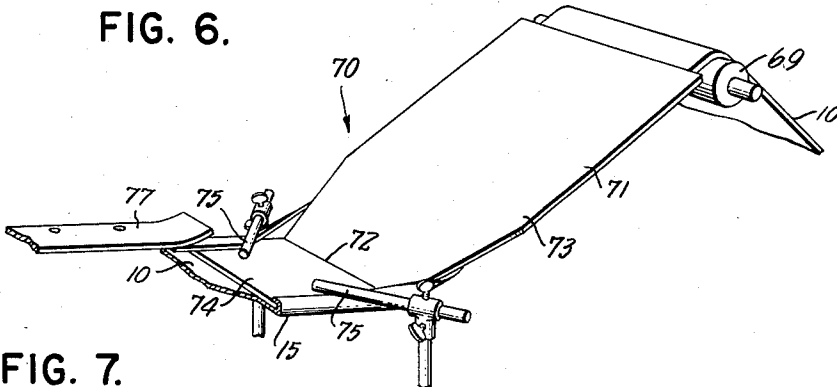


FIG. 7.

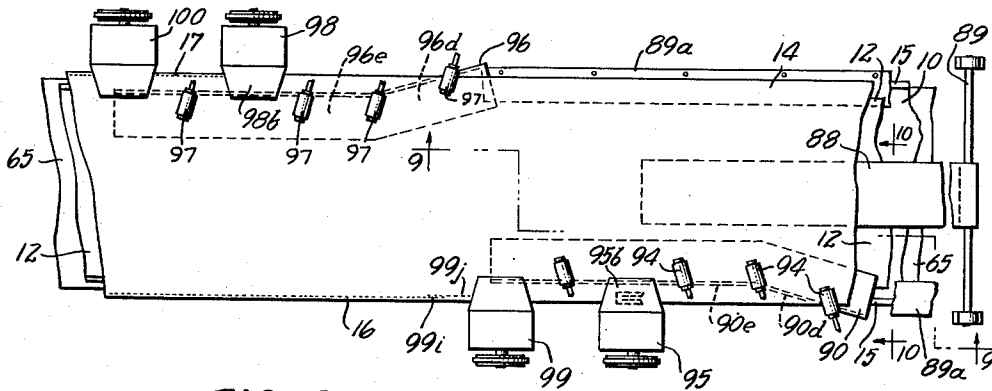
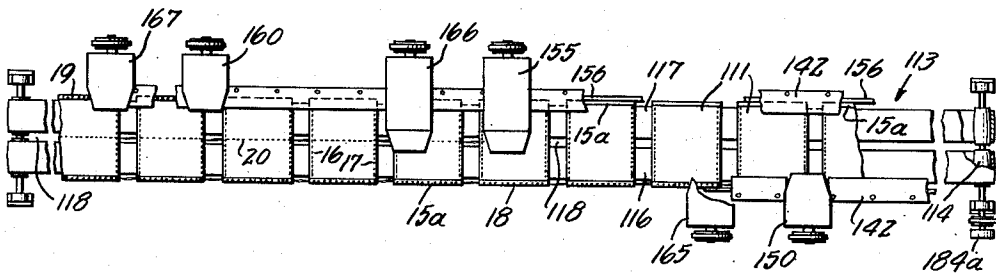


FIG. 8.



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FIG. 9.

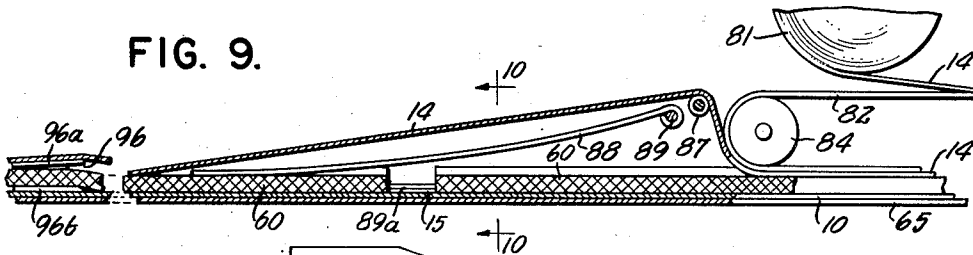


FIG. 10.

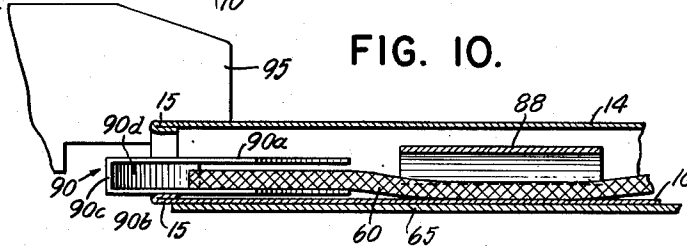


FIG. 11.

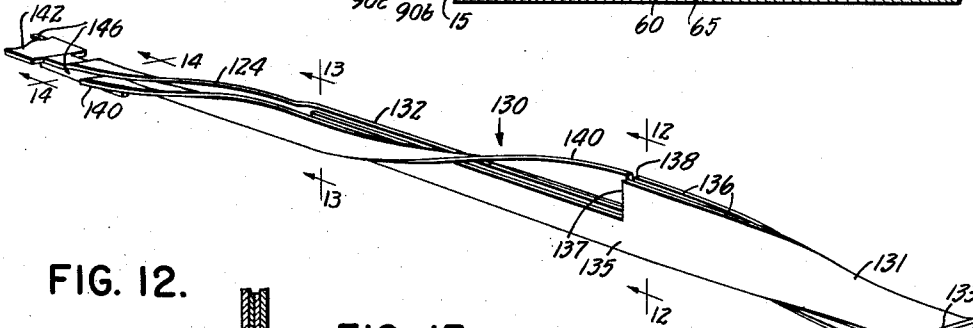


FIG. 12.

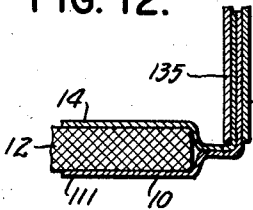


FIG. 13.

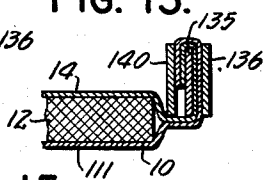


FIG. 14.

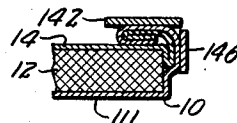
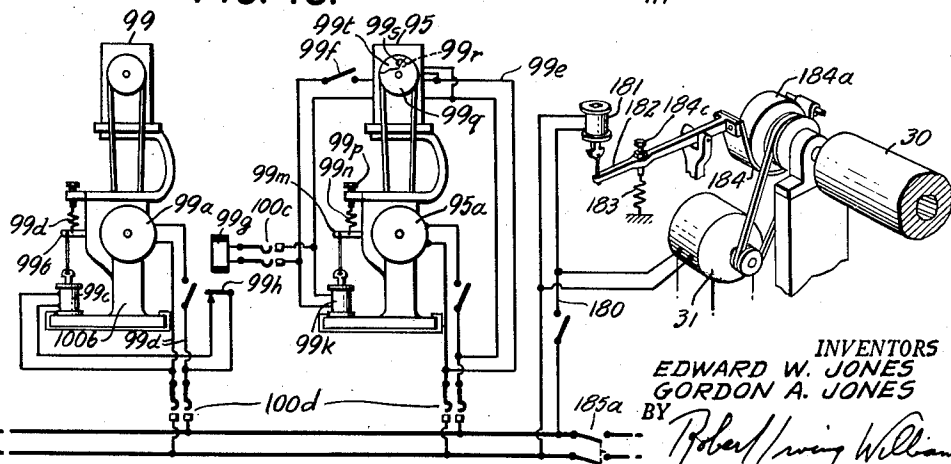


FIG. 15.



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FIG. 16.

FIG. 17.

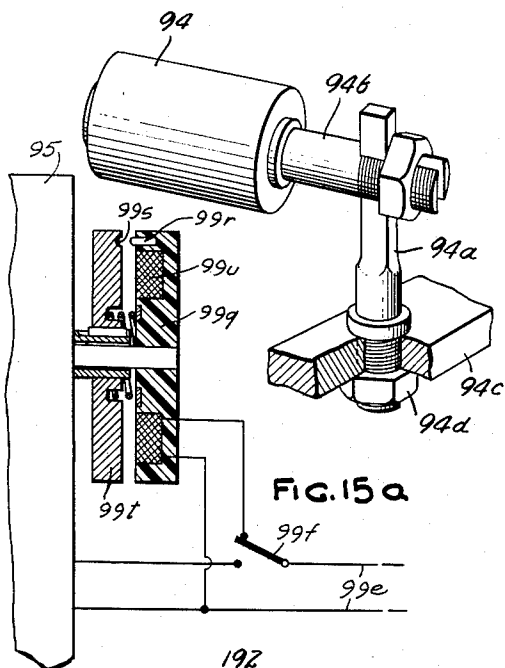


FIG. 15a

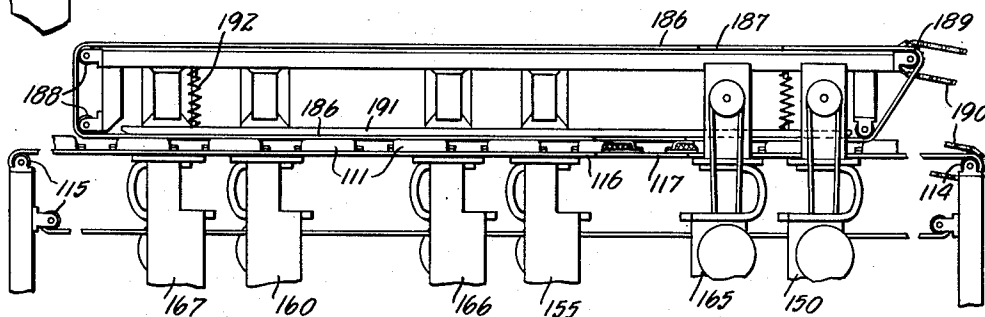
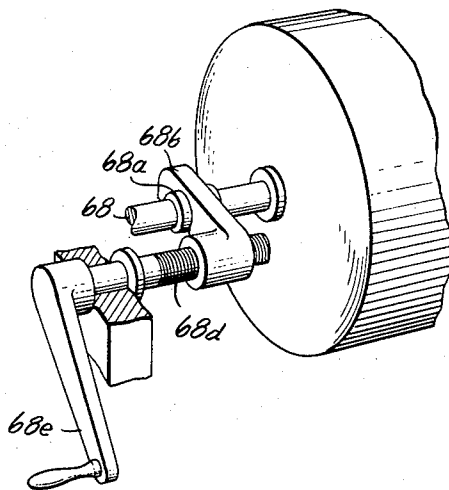


FIG. 18

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MACHINE FOR PROVIDING DIVIDED FLEXIBLE STRUCTURES

Gordon A. Jones, Brooklyn, and Edward W. Jones, Oriskany Falls, N. Y.

Application June 30, 1953, Serial No. 365,082

11 Claims. (Cl. 112—2)

This invention relates to machines for providing divided flexible structures and various types of sewn structures, and especially to methods and machines for folding, cutting, and/or sewing structures of such varying types as divided laminated bandage pads, other types of surgical dressings, bags, towels, sheets, pillow cases, washcloths, handkerchiefs, dustcloths, articles of clothing, and a wide variety of structures formed in whole or in part of cloth, paper, absorbent sheets, and/or other flexible fabrics.

Many advances have been made in recent years in the provision of divided laminated flexible articles and other sewn articles, but there remain various problems in the folding, cutting, and sewing thereof which have proved difficult to overcome. Among these are the provision of automatic and semi-automatic procedures which can continue uninterruptedly even when individual supply and machine units require replacement or repair. Another problem is to provide sewing and article-moving means which will function effectively and efficiently to sew spaced articles. Another is to provide means for folding and/or conveying laminated divided articles, and elements from which the same are formed, with such a degree of certainty and effectiveness that the various articles will have a high degree of uniformity. Another is to satisfy the need for various assemblages of steps and mechanisms which will operate with such efficiency and effectiveness as to result in a high degree of productivity and to require a minimum of supervision.

With the foregoing and other considerations in view, the present invention contemplates the provision of means whereby various of the above enumerated and other problems may be satisfactorily solved and whereby continuity of production, efficiency in operation, and effectiveness and uniformity in result may be obtained. Delays in starting and stopping of sewing machines and other elements are avoided.

The invention contemplates the provision of means for automatically and continuously conveying articles to be sewn to sewing machines. By conventional methods, operators can only handle one or two thousand pieces per day per sewing machine. Pursuant to the present invention, ten thousand, twenty thousand, or more units per day can be conveniently handled dependent on the speed of the sewing machines, and a much more uniform product provided.

The invention accordingly comprises apparatus embodying features of construction, combination of elements and arrangement of parts which are adapted to effect such steps, all as exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a somewhat diagrammatic partly-sectional side view of part of one form of apparatus embodying the invention;

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Fig. 1a is an enlarged side view of a portion of the conveying means;

Fig. 1b is an enlarged side view of the roller-supporting means;

Fig. 2 is a similar view of another part thereof;

Fig. 3 is an enlarged scale top view of the product thereof;

Fig. 4 is a section along the line 3—3 of Fig. 2;

Fig. 5 is a section along the line 4—4 of Fig. 2;

Fig. 6 is an enlarged perspective view of one of the folding devices;

Fig. 7 is an enlarged fragmentary top view on a slightly enlarged scale of the apparatus of Fig. 2;

Fig. 8 is a top view showing another sewing mechanism;

Fig. 9 is an enlarged view on the line 9—9 of Fig. 7;

Fig. 10 is an enlarged sectional view on the line 10—10 of Fig. 7;

Fig. 11 is an enlarged perspective view of another of the folding devices;

Figs. 12, 13, and 14 are further enlarged sectional views of the stages of folding accomplished at the lines 12—12, 13—13, and 14—14 of Fig. 11;

Fig. 15 shows certain of the electrical control circuits associated with the apparatus;

Fig. 15a is an enlarged partly sectional side view of a portion thereof;

Fig. 16 is a perspective detail view of the mounting for the web-centering rollers;

Fig. 17 is a similar view of the lateral adjusting means for the web-supplying rolls; and

Fig. 18 is a side view of an alternative form of conveyor construction at the sewing machines of Fig. 2.

The invention is exemplified in Figs. 1 and 2 as embodied in forms of procedure and construction adapted for the production of the large separated laminated bandages which are utilizable as burn dressings. One such form of bandage is exemplified in Figs. 3, 4, and 5. This comprises a bottom layer of non-woven fabric 10, a layer of filler 12, and a top layer of gauze 14. The layers 10 and 14 are longer and wider than the layer 12 and have their edge portions folded inwardly as indicated at 15 and 15a. The inwardly folded edge portions 15 at the ends of the pads are sewn together by lines of stitching 16 and 17, and the inwardly-folded edge portions 15a at the sides of the pads are sewn together by lines of stitching 18 and 19. An additional central longitudinal line of stitching 20 is also provided in the present instance.

In the formation of these pads, a plurality of webs 21 and 22, from which the filler material 12 is provided, run onto a conveyor 23 from certain of a plurality of rolls. While a large number of such webs and rolls may be provided, there are exemplified in the present instance rolls 25 and 26 of cotton filler, and rolls 27, 28, and 29 of absorbent filler.

The conveyor 23 is driven by a drive roller 30 from an electric motor 31, and is carried on guide rollers 32 and provided with an adjustable tensioning roller 33. There are also provided compression rollers 34 whereby the webs 21 and 22 of filler material 12 are smoothed and compacted into a soft generally homogeneous mass.

Each of the rolls 25—29 is wound on a spindle 40 which is mounted for vertical movement in a slot 42 between guides 44, so that, as the material on a roll is drawn out, the spindle will slide downwardly. A spindle-receiving recess 47 is provided for retaining a roll out of action when it is not in use.

Both of the filler materials are so bulky that a roll is quickly used up. Accordingly, means are provided to assure continuous operation over an extended period. A web 21 runs from either of the pair of rolls 25 or 26, and two webs 22 run successively from two of the rolls 27, 28, and 29. As one roll—e. g., a roll 25—is ex-

hausted, an operator will roll the spindle of an inoperative roll—e. g., a roll 26—into its slot 42, so that the roll 26 will start feeding, whereupon the operator may remove the spindle of the exhausted roll 25 and insert in its recess 47 the spindle of a new roll 25. In a similar manner, each of the rolls 27, 28, or 29 may be replaced when necessary.

After compression by the rollers 34, the web of filler 12 is carried up an inclined portion 49 of the belt 23 and thru hollow tapering guides 48. It is discharged to a cutter device 50 comprising a knife 52, a guide plate 54 pivoted at 55 and spring-urged by springs 56 to hold the web out of contact with the knife 52, and a rotary cutter member 58 turning on a shaft 59 and adapted at each revolution to contact the web and press it and the plate 54 sufficiently against the pressure of the springs 56 so as to cut the web cleanly as the edge of the cutter member 58 meets the edge of the knife 52. The pieces 60 fall from the cutter device 50 onto a curved guide plate 62 which guides them onto a web of non-woven surfacing material 10 riding on a conveyor 65 which is driven at a faster speed than the conveyor 23 by a drive roller 66 from a motor 67. The faster speed of the conveyor 65 permits the spacing of the pieces 60.

The web of material 10 comes from a supply roll 68. The spindle 68a of the roll 68 carries axial adjusting means comprising an arm 68b rotatable between guides 68c, a lead screw 68d, and a handle 68e. The roll 68 is provided with an adjustable brake and frictional drag 68f. Before passing under the plate 62, the web of material 10 passes over a roller 69 and thru a folding device 70 (Figs. 1 and 6) which comprises a plate 71 bent at 72, at an angle of 41°, in the present instance, to provide an upper surface portion 73 the width of which tapers toward the bend 72, and a lower surface portion 74 on which are laid fold bars 75 which lie at a right angle to each other, in the present instance, and at an angle of 45° to the bend 72, and which extend outwardly at the ends of the bend. As the web moves from the surface 73 to the surface 74, the edges of the web are naturally pulled upwardly because of the change of angle of the web, and the bars 75 fold inwardly these upwardly-extending portions to produce folds 15 which provide non-ravel edges for the web. The folds are held down by guide plates 77.

The conveyor 65 moves on guide rollers 78, and over a guide plate 79. Above the guide plate 79 is a feeding-and-folding device 80 for a gauze web 14. The web 14 is fed from a roll 81 onto a belt 82 riding above the conveyor 65. The roll 81 is mounted and equipped similarly to the roll 68. The belt 82 is driven by a drive roller 83 which is driven by a chain 83a from the motor 67. The roller 83 and a guide roller 84 are each mounted for free vertical movement in one of a pair of slots 84a in a pair of brackets 84b; and a plate 84c is pressed downwardly as by springs 84d against the lower run of the belt 82 to urge the belt 82 against the web of gauze 14 and the pieces 60 riding on the web of material 10 and the conveyor 65. The gauze is fed from the roll 81 toward and around the roller 83. Prior to passing around the roller 83, the web of gauze 14 has its edge-portion folded in by a folding device 85 which is of similar construction to that of the folding device 70, and which operates similarly to provide folds 15. The folding device is preceded by a roller 86 over which the gauze passes. The roll 81 is provided with a frictional drag 86a.

As the gauze web leaves the belt 82 it runs over a roller 87 and over a curved gravity plate 88 pivoted at 89. Plates 89a serve to hold the folds 15 down. Under the gauze web, the pieces of material 60 run into a hollow guide member 90 (Fig. 7), at the near side (Fig. 1) of the conveyor. The guide member comprises upper and lower plates 90a and 90b, an upright strip 90c, and an inwardly biased open-ended portion 90d which leads to a straight portion 90e. The guide member assures that the

pieces 60 are centered sufficiently so that the near folds 15 of the webs of material 10 and gauze 14 may be sewn together. At the same time, rollers 94, disposed above the guide member serve to control the position of the near edge of the gauze 14 prior to stitching. Each of the rollers 94 are adjustable angularly by means of a pin 94a keyed to the shaft 94b on which they rotate. The pin is rotatably mounted in frame piece 94c, and carries a nut 94d where-by the pin can be rotated and the roller angulated. A sewing machine 95 operated by a motor 95a thereupon sews the folds 15 together to provide the row 16 of stitching thru the edge portions of the webs at this side. The machine 95 has, in the present instance, the operating direction of its head 95b reversed so as to run out the stitching 17 in the direction of conveyor movement. The pieces of material 60 then, in the present instance, run into a hollow guide member 96 at the far side of the conveyor. The member 96 comprises elements 96a, 96b, 96d, and 96e, generally similar to the elements of the guide member 90 having similar subscripts, and an upright element similar to the element 90c. Thereover, a pair of rollers 97 serve to control the position of the far edges of the gauze 14 down and to smooth them outwardly so as to ready the folds 15 at that side for sewing by a sewing machine 98 operated by a motor 98a. The rollers 97 are angularly adjustable by means similar to those provided for rollers 94. The sewing machine 98 is disposed on the far side of the conveyor and has a normal head 98b.

In order to assure that the operation may continue during such time as a particular sewing machine—e. g., the machine 95—goes out of operation for any reason, a similar sewing machine 99 operated by a motor 99a follows the sewing machine 95. The machine 99 is adapted to be operated when an arm 99b under control of a solenoid 99c (Fig. 15) operates a standard clutch-and-adjustable-brake mechanism (not shown), under the urge of a spring 99d as a result of the de-energization of the solenoid when the circuit 99e of the sewing machine 95 is de-energized, as by the opening of a switch 99f. This de-energizes a double delay relay 99g, permitting the switch 99h to close with the result that solenoid 99c is energized to operate the arm 99b and throw in the clutch of the machine 99. In Fig. 7, the machine 95 is shown stopped, and the machine 99 operative. As indicated at 99i there is an overlap of the line of stitching 16 from the machine 95 and the line of stitching 99j from the machine 99. When the reason for the stoppage of the machine 95 has been remedied, it is only necessary to close the switch 99f. This will energize a double delay relay 99g which will de-energize the solenoid 99c after an interval in which the stitching of the machine 95 has been drawn past the machine 99. The closing of switch 99f energizes a solenoid 99k to operate an arm 99m against the pressure of a spring 99n. The arm 99m operates a brake-and-clutch mechanism of standard character, so that the machine 95 will stop immediately upon de-energization of the solenoid 99k so as to halt the machine immediately or more slowly if desired, dependent on the adjustment of a spring-tensioning screw 99p. When the machine 95 stops immediately or in a time less than the time required for the end of the line of sewing sewn thereby to reach the machine 99, the beginning portion of the line of stitching sewn by the machine 99 will overlap the end portion of the line of stitching sewn by the machine 95, thereby assuring against any break in continuity between the two lines of stitching. In order to prevent the possibility of the needle blocking the movement of the goods when the machine 95 becomes inoperative, the sewing machine is provided with a clutch element 99q carrying a laterally extending pin 99r which is adapted to fit into a mating recess 99s in a mating spring-pressed clutch element 99t activated by the solenoid 99u when the circuit 99e is broken by the switch 99f. Thus, the machine will only stop in a particular position, so

that it cannot stop except with the needle in the desired position. Other sets of machines are similarly equipped.

A similar sewing machine 100 operated by a motor 100a follows the sewing machine 98. Each of the sewing machines is individually supported as at 100b so that the machine may be readily slid in and out of place when lengthy repairs are required. Plug-in connections 100c connect each primary machine—e. g. 95—with its auxiliary machine—e. g. 99. Other plug-in connections 100d connect both primary and auxiliary machines separately to a power source. The motor 100a is arranged for automatic throw-in and throw-out operation in the same manner as the motor 99a.

Safety switches 100e provided to set the machine in operation, the plug-in connections 100c and 100d are closed, the switch 99f is closed, and the safety switches 100e are closed. The circuit to the motor 95a is energized and the relay 99k controlling the drive clutch mechanism is also energized to start the machine 95, and the relay 99g is energized to open the switch 99h to prevent the operation of machine 99. When any difficulty develops in the operation of machine 95, it is only necessary to open the switch 99f, whereupon the relay 99k is energized, thus opening the clutch controlled thereby and stopping the operation of machine 95, and energizing the relay 99g with the result that the switch 99h closes to energize the relay 99c to close the clutch of the machine 99 so that it will be driven by the motor 99a. After the difficulty has been removed, the closing of switch 99f results in starting up the machine 95 and stopping the machine 99.

Beyond the sewing machines the sewn web passes between compression pull-rolls 101 and 102 which are slip-driven by means of belting 103 driven from a motor 104 at a speed greater than that of the conveyor 65. Thence, the assembly is carried up an inclined conveyor 105 which extends between guide rollers 106 one of which is driven by a motor 107. From the conveyor 105, the webbed assembly drops to a cutting device 110 which is similar to the cutting device 50. The cutting device is operated by a microswitch 110a energized in response to the movement of a roller 110b over the web, so that the cutting device 110 will cut the web between the pieces 60.

From the cutting device 110, the cut pieces 111 fall toward another portion of the conveyor means of the present machine. This portion is in the form of a centrally-longitudinally-divided conveyor 113 driven by a roller 114 from a motor 114a at a slightly slower speed than the conveyor 65, so that the articles 111 will be slightly spaced on the conveyor 113. A guide roller 115 is also provided for the conveyor 113. The conveyor 113 extends at right angles to the conveyor 65 and comprises conveyor elements 116 and 117 having therebetween a slot 118 across which the central portions of the articles 111 lie. In order that the pieces 111 may be properly disposed on the conveyor elements 116 and 117, the pieces are caught by a flipper 119 as they come from the cutting device 110. The flipper 119 is pivoted at 120 and operated in a manner well known in the art in response to the closing of a microswitch in box 121 in accordance with the movement of a roller 122 over the web.

The sewn edges of the articles 111 lie end-to-end, and the newly-cut edges thereof lie at their sides. In order to transform the newly-cut edges into non-ravel edges, the edge portions of the articles 111 are folded upon themselves a number of times by folding devices 130 to provide folds 15a. Each folding device 130 comprises a pair of plates 131 and 132 having horizontal flared ends 133 and 134 between which the edge-ports are adapted to enter. The plates 131 and 132 curve up to the vertical positions indicated at 135 and 136, respectively, to bring the edge-ports to the upwardly-extending position shown in Fig. 12, and the upper portions thereof are terminated at 137 and 138 to permit a plate 140 to guide the edge-ports downwardly to a horizontal position and thence downwardly to the bent-over vertical

position shown in Fig. 13. At this point the plate 131 terminates, and the plates 140 and 132 are curved to a horizontal position to bring the upper parts of the folds of Fig. 13 to the position shown in Fig. 14, whereupon the plate 132 merges into or continues as a guide plate 142 which are generally similar to the guide elements 77.

The articles 111 are carried to a battery of sewing elements, which may be any of a wide variety of known types of sewing machines, but which, as exemplified are similar to the machines 95 and 98. Lateral guide means 156 are provided. A sewing machine 150 having a reversed head sews thru the folded-over near edge portions of the articles and thru the articles themselves to provide the stitching 18. Another sewing machine 155 having a normal head is arranged to sew thru the slot 118 to provide stitching 20. This is followed by lateral guide means 156 and a sewing machine 160 having a normal head and adapted to sew thru the folded-over far edge portions of the articles and thru the articles themselves to provide the stitching 19. Auxiliary machines 165, 166, and 167, follow the machines 150, 155, and 160 for substitution when necessary. Thread-cutters 170 sever the lines of stitching 18, 19, and 20, whereupon the articles are ready for folding and/or packing.

The sewing machines 150, 155, and 160 are operated by motors 171, 172, and 173, respectively; and the machines 165, 166, and 167 are operated by motors 175, 176, and 177, respectively, the auxiliary machines being arranged to be automatically thrown into and out of operation in the same manner as the machine 99.

A circuit 180 of the motor 31 is equipped with a solenoid 181 which draws a pivoted arm 182 against the pressure of a spring 183. On the end of the arm 182 is a brake 184 which operates on a wheel 184a attached to the roller 30. When the circuit of the motor 31 is de-energized, the brake is applied to stop the conveyor 23. The drive mechanism for each of the other conveyors is similarly equipped. A lead screw 184c similar to the screw 99p is provided so that the brake can be adjusted to halt the machine immediately, or more slowly as desired. The de-energization of the machines or conveyor may be manually or automatically controlled by including suitable means in the energizing circuits. Manual control may be exercised by switches 185 individual to the motors, or by a master switch 185a.

In the form of construction shown in Fig. 18 there are provided above the conveyor elements 116 and 117 at that portion of their course where they pass the sewing machines 150, 165, 155, 166, 160, and 167, a pair of supplemental belts 186 and 187 of corresponding width, more or less, and carried on guide rollers 188 and a drive roller 189 driven by a chain 190 from the roller 114. The lower runs of these belts are pressed against the articles 111 by plates 191 urged downwardly by springs 192.

Since certain changes in carrying out the above method, and certain modifications in the article which embody the invention may be made without departing from its scope, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. A sewing device comprising a conveyor, a plurality of sewing machines spaced in alinement longitudinally of said conveyor to produce stitching on a single line, means for normally causing the operation of one of said sewing machines to produce a line of stitching, means for rendering said one of said sewing machines inoperative and automatically rendering another of said sewing machines operative to continue said line of stitching, and means for rendering a machine other than said other machine operative to further continue said line of stitching and for automatically rendering said other machine inoperative.

2. A sewing device as set forth in claim 1 wherein there is provided in connection with at least one of said rendering means, means for controlling the quickness of the automatic rendering operation associated therewith.

3. A device as set forth in claim 2 wherein said controlling means is set to cause the stitching by a machine rendered operative to overlap that of a machine rendered inoperative.

4. A sewing device comprising a moving conveyor, a plurality of similar sewing machines spaced in alignment longitudinally of said conveyor to produce identical stitching on a single line, and means causing one or another of such machines to produce stitching in said line without halting the movement of said conveyor.

5. A sewing device as set forth in claim 4 wherein said machines are in fixed relationship with the path of said conveyor, and wherein there is provided means for depositing articles one-by-one on said conveyor, and means for guiding one edge of said articles as they pass said sewing machines.

6. Apparatus for stitching webs which comprises a web-receiving conveyor, and a multiplicity of roll-holding means spaced above and lengthwise of the conveyor and each providing means for holding a roll above and out of contact with the conveyor and means for retaining the same roll in unrolling contact with the conveyor when moved to feeding position to provide for the holding by a plurality of said roll-holding means of webs in position to be fed in overlying relationship to said conveyor and for the holding by another thereof of a replacement roll in non-feeding position, for the movement of the last-mentioned roll into feeding position as the roll on one of said pluralities becomes exhausted, and for the holding of a replacement roll in non-feeding position by successive ones of said plurality of roll-holding means after the previous roll held thereby becomes exhausted, cutter means for transversely severing said webs to provide pieces of filler material, a second conveyor moving under said cutter means to receive at a given point thereon said pieces of filler material, means for feeding a backing web onto said second conveyor in advance of said point, means for feeding a covering web over said pieces of material on said second conveyor at a later point, means for stitching said covering web and said backing web together while on said second conveyor, and means for subsequently transversely cutting said covering web and said backing web between said pieces of filler material.

7. Apparatus for forming laminated flexible articles which comprises an endless conveyor, means to drive the conveyor at a given speed, means to feed filler material in web form to said conveyor, means at the end of the conveyor for repeatedly cutting the filler material transversely as it comes from said conveyor, a second endless conveyor extending under said second cutter means, means to drive said second conveyor at a faster speed than the first conveyor, said second conveyor being arranged to move under said cutter means to receive at a point on surface thereof pieces of material from said cutter means, means to feed a backing web to said second conveyor in advance of said point, means to feed a covering web over the pieces on said conveyor at a later point, means to sew the side edge of the material on said web together while on said conveyor, a second cutter means arranged to repeatedly cut the sewn web transversely in the spaces between the pieces of filler material, an additional endless conveyor extending under said second cutter means, means to drive said additional conveyor at a speed different from that of said second conveyor, said additional conveyor being arranged to move under said second cutter means in a direction generally perpendicular to the direction of movement of said second conveyor and to receive from said second cutter means pieces of sewn cut material, and means to sew the outer edges of said pieces while on said additional conveyor.

8. Apparatus for forming laminated flexible articles

which comprises an endless conveyor, means to drive the conveyor at a given speed, means to feed filler material in web form to said conveyor, means at the end of the conveyor for repeatedly cutting the filler material transversely as it comes from said conveyor, a second endless conveyor extending under said second cutter means, means to drive said second conveyor at a faster speed than the first conveyor, said second conveyor being arranged to move under said cutter means to receive at a point on the surface thereof pieces of material from said cutter means, means to feed a backing web to said second conveyor in advance of said point, an endless belt carried above said conveyor on rollers, means to mount at least one of said rollers for free vertical movement, means to support a web roll above the upper run of said belt, and means to feed a web therefrom to the upper run of said belt and thence under the lower run of said belt wherein it will overlie material on said conveyor.

9. Apparatus as set forth in claim 7 wherein the sewing means associated with at least one of said conveyors comprises a plurality of sewing machines spaced in alignment longitudinally of the last-mentioned conveyor to produce stitching on a single line, means for normally causing the operation of one of said sewing machines to produce a line of stitching, means for rendering said one of said sewing machines inoperative and automatically rendering another of said sewing machines operative to continue said line of stitching, and means for rendering said one of said machines operative to further continue said line of stitching and for automatically rendering said other machine inoperative.

10. Apparatus as set forth in claim 9 wherein there are provided roll holders arranged lengthwise of said first conveyor in a number in excess of the number of webs to be fed thereto, and wherein the covering-web-feeding means is in the form of a belt supported for free vertical movement above said second conveyor.

11. In a bandage-forming machine a pair of closely spaced plates lying in parallel planes to receive between the end portions thereof the edge portions of the cover sheets of a bandage and being bent beyond said ends so as to lie in parallel similarly-spaced planes perpendicular to the aforesaid planes so as to move said edge portions to a position perpendicular to the central portions thereof as the edge portions are moved therealong, one edge portion of each of said plates being cut away at a further point, an element constituting a continuation of one of said plates where it is cut away and being bent at a further point beyond and over the other of said plates and being further bent at a further point so as to lie alongside of said other of said plates whereby the outer portion of said edge portions will be folded over upon the inner portions thereof, said other of said plates terminating at a still further point and said one of said plates and said continuation continuing to provide a guide for the folded cover sheets and being bent further in the same direction at a further point to fold down the folded portions, and terminating at end portions lying parallel to the first-mentioned end portions.

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