July 1, 1947. J. KATZ ET AL 2,423,101

MACHINE FOR THE ARRANGEMENT OF SEAMS

Filed Nov. 9, 1943 3 Sheets-Sheet 1

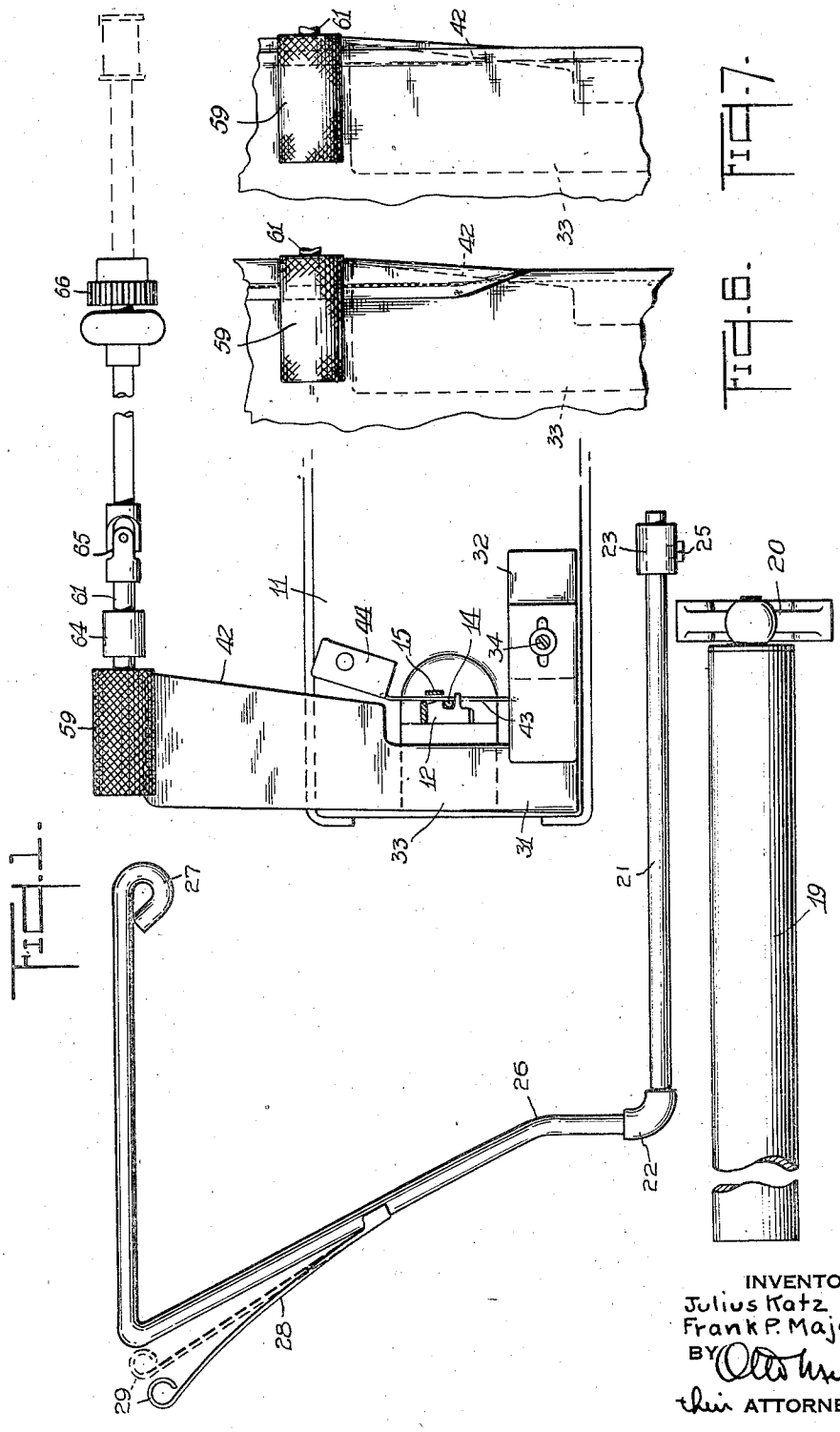


FIG. 7.

FIG. 6.

FIG. 1.

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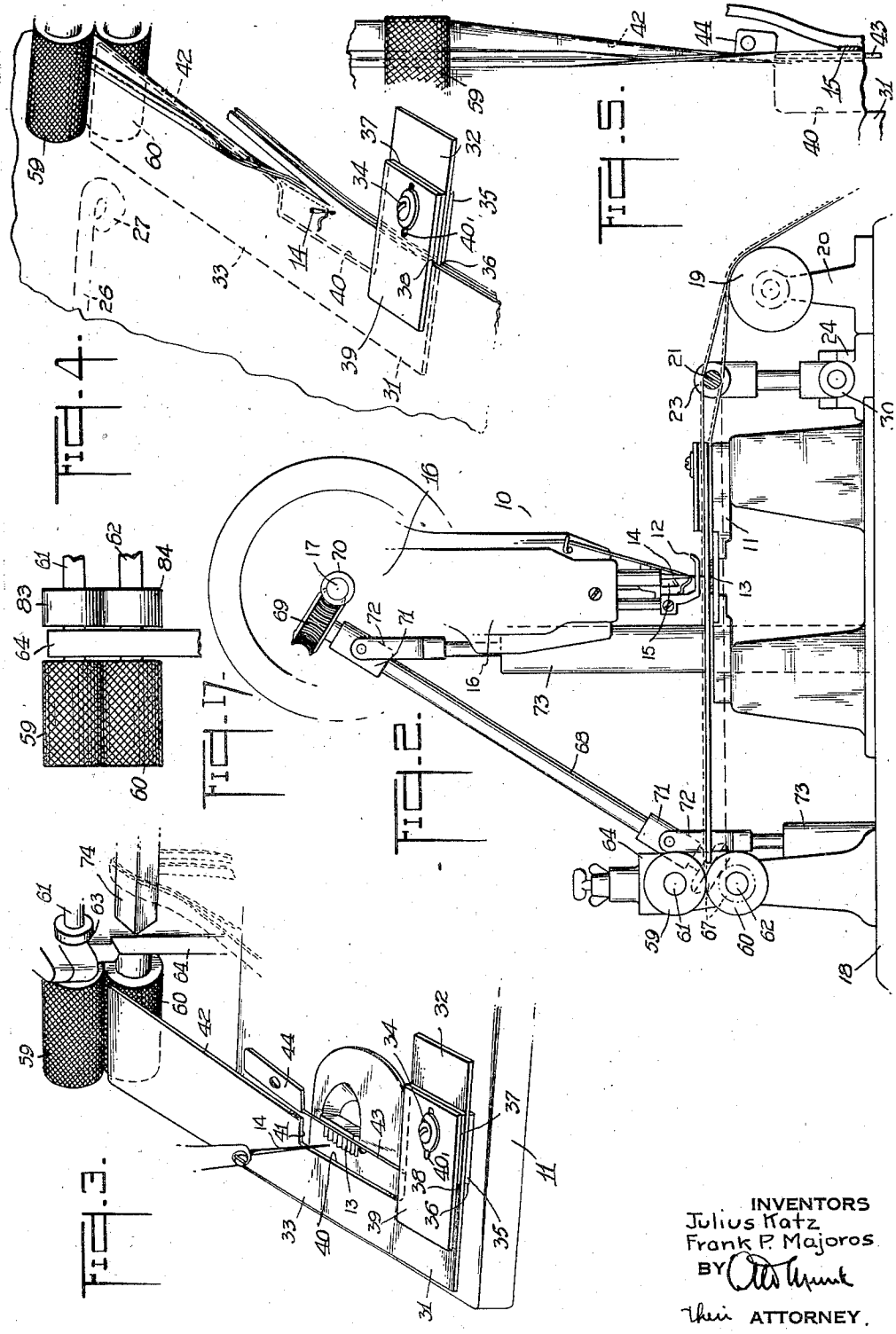


FIG. 4.

FIG. 5.

FIG. 1.

FIG. 2.

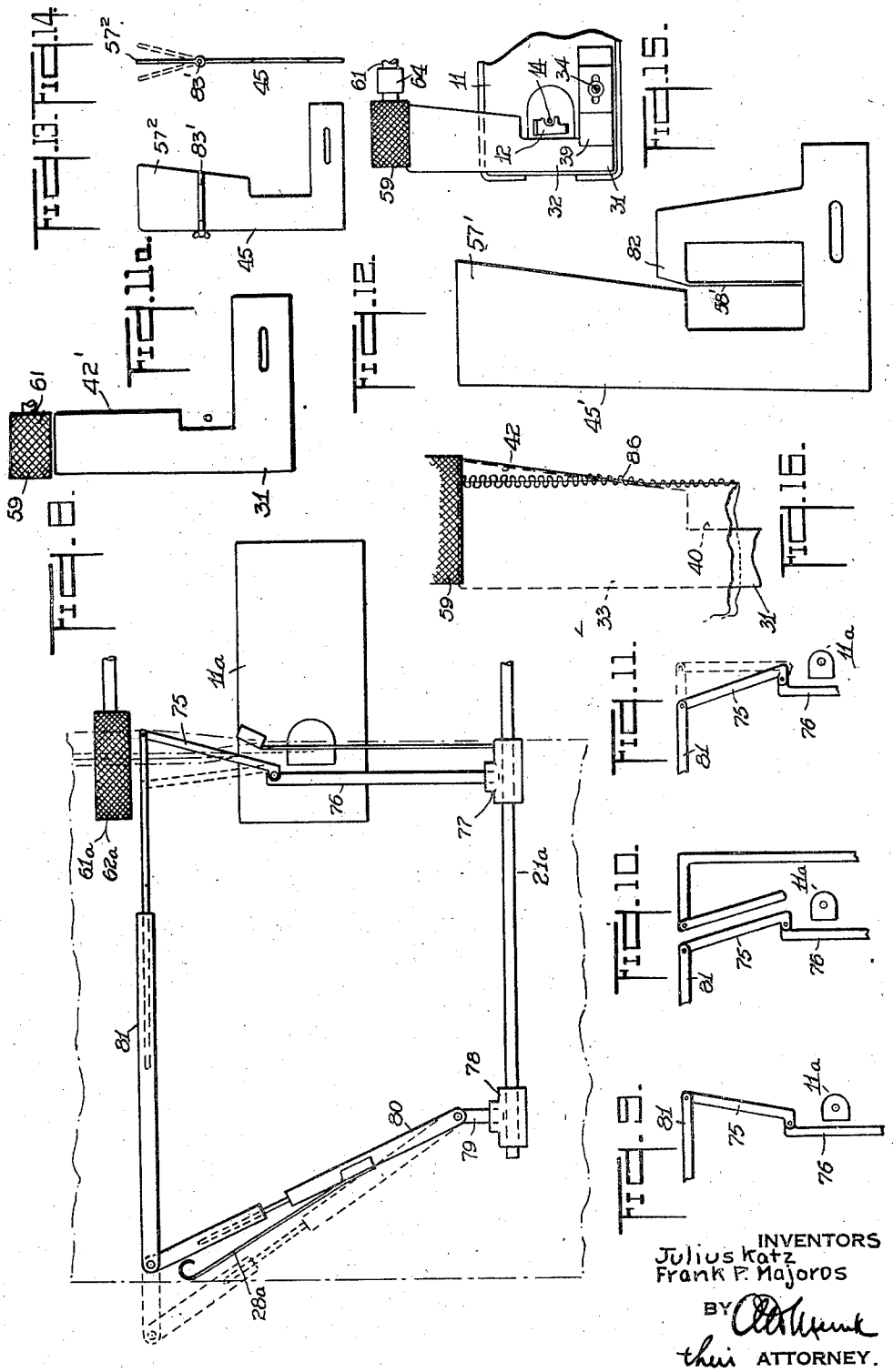
FIG. 3.

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2,423,101

MACHINE FOR THE ARRANGEMENT OF SEAMS

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11 Claims. (Cl. 112—217)

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This invention relates to an attachment operating in conjunction with a seaming machine to fold back the marginal edges of the fabric along the line of the seam and to press the folded edges neatly and evenly upon the fabric.

Devices of this character are known commercially as seam opening attachments for seaming machines and are employed extensively in connection with the latter machines producing tubular material, which is manufactured particularly to be run through a bias cutting machine for the purpose of obtaining bias cloth. In addition to the opening operation on the edges of the seam it is also desirable to form seams with adjacent free edges or folded to either side of the line of the seam as distinguished from the so-called open seam. In order to carry out these operations this invention was devised as another means for controlling the formation and arrangement of the seam. In any of these instances, however, the opened or folded marginal edges of the fabric are subjected to a pressing operation which secures the final arrangement of the edges.

The attachments heretofore in use for operating on the edges of the stitched material to open up and fold the edges and then press them, were complicated in construction and required the use of skilled workers in their operation.

With the above objection in mind, it is the principal object of this invention to provide a seam opener and a pressing element to form the seam of the fabric, which is extremely simple in construction and operation and which is applicable to any type of sewing or seaming machine devised for forming a seam by joining two-ply material.

A further object of the invention is to provide a seam operating mechanism of this character with a guide means whereby plies of fabric being joined together along their edges are properly guided into the seaming machine and thereafter along the means to guide the material and bring the seam itself inside the adjacent folded side edge of the material and into the pressing device.

A still further object of this invention is to provide an attachment of this character with a pressing arrangement operating upon the seams to move the material in the direction away from the seaming means and to assist the seam to ride over the surface of the plate during which movement the side fold is formed while the edges of the seam are arranged to enter the pressure rollers.

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These and other objects are accomplished by means of an attachment several embodiments of which are described in the following specifications, set forth in the appended claims and illustratively exemplified in the accompanied drawings, in which:

Figure 1 is a plan view of a portion of a seaming machine equipped with the present seam operating attachment and material moving and pressing arrangement;

Figure 2 is an end elevational view of the seaming machine and attachment therefor;

Figure 3 is a perspective view of the guide and pressing arrangement without the material;

Figure 4 is a similar perspective view showing the material in position to receive its seaming and opening operation;

Figure 5 is a top plan view of the seam opening means, pressing rollers and material, the latter being operated upon;

Figure 6 is a top plan view of the seam opening means showing the edges of the material adjacent the seam folded over to the left of the line of the seam;

Figure 7 is a similar view showing the edges folded over to the right of the line of the seam;

Figure 8 is a top plan view of a modified form of seam opening means and guiding device showing the guide and edge as being adjustable to predetermine the relative position of the edge in relation to the seaming point and the seam line, thereby regulating the width of the marginal fold and the position of the edge in relation to the seaming point;

Figure 9 is a plan view of the arm illustrated in Figure 8;

Figure 10 is a view of the same arm showing an adjustable guide to carry the tubular material at the fold thereof outside the seam;

Figure 11 is a similar view of the arm adjusted to a position different from that of Figures 9 and 10;

Figure 11*a* is a plan view of an arm having its leading edge parallel to the line of seaming;

Figure 12 is a plan view of a modified form of arm showing the guide wire and other parts all as integral portions of a single unit;

Figure 13 is a plan view of an arm showing the free tongue end adjustable;

Figure 14 is a side elevational view of the same;

Figure 15 is a plan view of the arm and presser rollers, with the guide wire omitted;

Figure 16 is a plan view of the tongue end of

the arm and presser rollers operating on an overedge seam; and

Figure 17 is a front elevational view of the presser rollers and take up rollers for the cut away marginal side edges of material.

Referring to the drawings and particularly to the embodiment of the invention illustratively exemplified in Figures 1 to 7, 10 denotes a sewing machine or other seaming means to perform the seaming and comprises a bed plate 11, presser foot 12, feed dog 13 and needle 14. The present means of joining the material may consist of a cutting and trimming blade 15 which operates adjacent the seaming point to trim the edges of the material. The usual bracket arm 16 rising from the rear end of the bed plate 11 supports the presser foot 12, needle 14 and cutting blade 15. A main shaft 17 operating in the bracket arm 16 imparts the vertical reciprocating movement to the needle 14 and cutting blade 15 after the known manner of machines of this character. The seaming machine 10 is supported upon a suitable table 18.

The plies of material to be seamed together along their opposite longitudinal side edges are superposed one upon the other in the usual manner. It is then fed to the seaming machine with the superimposed edges being stepped along by the feed dog 13 as they pass under the presser foot 12 and into the path of the means used to join with both plies of the material.

In order to give proper guidance to the folded over material entering the seaming machine, a freely moving roller 19 is mounted upon a suitable standard 20 disposed upon the table 18, so as to bring the roller 19 directly in front of the bed plate 11 and at approximately the same height thereof, the folded material being allowed to rest in rolling engagement upon the uppermost peripheral surface of the roller 19 as illustrated particularly in Figure 2. The roller 19 is supported only at its rearward end to allow the closed edge of the folded material to pass around its outer free end. Intermediate the roller 19 and bed plate 11 is one arm of a guide member 21, which runs parallel to the roller for a distance short of the outer free end thereof when it carries an elbow fitting 22, the inner end of the arm being supported in the socket 23 of a bracket 24 also mounted upright upon the table 18. Suitable set screw arrangement 25 in the socket 23 allows the arm to be fixed in any desired position. The guide member 21 beyond the elbow 22 comprises an extension 26, one end thereof being carried in the elbow 22 and part of which projects at an angle outwardly and away from the forward end of the bed plate 11, the other end or arm of the extension 26 running rearwardly towards the machine along a line substantially parallel to the arm 21. The inner end of the extension 26 terminates in a loop 27 and the angularly disposed portion of the extension adjacent the elbow is provided with a spring compensator arm 28, which is attached to the extension, and which projects outwardly and away from the arm at its free end, also terminating in a loop 29, see Figure 1. In operation the closed side of the folded material rides from the roller 19, about the V-shaped extension and towards the back of the machine, the edges of the material being arranged to run one layer above and the other below the arm 21, as shown clearly in Figure 2. The bracket or socket 24 is mounted in a base socket 30 which allows the guide member 21, as a unit, to swing about the axis of the socket 30 to any desirable elevation.

The two separated edges of material beyond the arm 21 are drawn towards the machine and about a guide plate 31. The guide plate 31 in the present embodiment comprises a metal fitting of approximately L-shape form, the slotted arm 32 thereof being supported upon the front edge of the bed plate 11, while the opposite arm 33 runs towards the back of the machine to a line corresponding approximately with a projection of the longitudinal axis of the extension 26 at its inner end. The guide plate 31 is provided with a slot longitudinally disposed in the mid portion of the arm 32 to receive an upright threaded pin 34 mounted in the bed plate 11. Intermediate the bed plate 11 and arm 32 and held in position by the pin 34 is a spacing plate 35, which supports the guide plate 31 slightly above the bed plate 11 and which provides the space through which the lower edge of the material passes in the direction of the means for joining both plies of material, and which is arranged with its guiding side or edge 36 parallel with a line projecting beyond the line of seaming. Superposed on the arm 32 directly over the spacing plate 35 is a second spacing plate 37, the guiding side or edge 38 thereof receiving and guiding the edge of the upper layer of the material. A cover plate 39 having a slot 40' is arranged upon the upper spacing plate 37 with its outer end projecting over and beyond the guiding edge 38, and its slotted end receiving the pin 34, which when tightened securely fixes all the plates and bed plate 11 into a rigid unit.

The inner side of the arm 33 is cut away from the corner of the two arms to a point substantially beyond the ply-joining means, to provide operating space 40 for the seaming mechanism. The outer end of the cut away portion provides a shoulder 41 which forms a corner with, and is part of, the edge 42 which is directed across the seam line, forming that part of the edge lying beyond the seaming point. A guide wire 43 extends across the cut away portion 40 from the slotted arm 32 to a point just outside the corner of the shoulder 41 and the side 42, where it is attached to a terminal piece 44 adjustably fixed upon the bed plate 11, as shown in Figure 1. The guide wire 43 traverses a line running parallel to the line of seaming and adjacent the ply-joining means and the cutting and trimming blade 15, the ply-joining means operating inside the guide wire while the cutting blade operates on the opposite side to sever the edges of the material beyond the seam.

After the edges of material are subject to the seaming operation and the marginal portions of the free edges of material have been trimmed away by the cutter, there remain two narrow free edges of the material outside the seam, and in the operation of the present machine these edges are intended to be spread apart to form an open seam or folded over to one side or the other of the line of seam to form what may be termed a flat side seam.

The seamed material is drawn rearwardly over the arm 31 by a pair of knurled rollers 59 and 60 which may be heated, no heating element being shown. The rollers are arranged at the delivery end of the arm 33, which if projected would enter the rollers along their common tangent. The seamed material is therefore clamped and pressed between the two rollers 59 and 60 as it passes from the arm 33 and it is the

pressing operation which is used to press the seam open or to one or the other side of the line of the seam. As illustrated in Figure 4, particularly, the seam rides forward on the plate until the material engages the offset edge of said plate, which causes the moving seam to turn and then to continue on said plate substantially directly to the moving and pressing means. The slanting edge 42, being progressively offset from the point of seaming, causes the material to be pulled over the edge of the plate to expose a marginal portion thereof adjacent the edge of the plate, the seam moves along the top surface of the plate, as shown in Figures 4 and 16. The edge 42 of the plate need not be oblique, as shown, so long as the edge is offset with respect to the seaming point in the direction of the seam. If the seam is open as it meets the rollers it will be pressed flat and if it reaches the rollers folded over on one or the other side of the line of the seam as illustrated in Figures 6 and 7, then the edges will be pressed flat one on the top of the other. The important feature of the plate is that the edge is out of line and lies across with respect to the seaming point and the line of seaming issuing from said seaming point, and that the seam travels in a substantially rectilinear path substantially directly to the moving means. That portion of the edge of the plate lying outside of the seaming point is the means used to cause the side fold to be formed in the material adjacent the seam, and aids in shifting the edges of the seamed plies of material from the horizontal seaming position to a substantially upstanding position for pressing. After pressing the tubular material may be rolled upon itself without causing the seam to do anything but remain flat; it will be appreciated that where the seam remains at the fold in the tubular material there is a tendency to close or become mutilated, especially as it coils upon itself in the rolling-up process.

In the present instance the rotation of the rollers 59 and 60 is connected with the feed mechanism of the seaming machine. The rollers 59 and 60 are mounted upon the free ends of two shafts 61 and 62, respectively, which are supported in journal bearings 63 arranged in suitable standards 64, mounted upon the table 18. The bearing 63 of the upper shaft 61 is resiliently mounted to allow for slight separation of the two rollers, the upper shaft being provided with a universal joint 65 to facilitate angular movement of the upper shaft. A pair of miter gears 66 are keyed to the two shafts 61 and 62 to enable the lower shaft 62 to drive the upper shaft 61. Movement is imparted to the lower shaft 62 by a pair of beveled gears 67 one gear thereof being keyed to shaft 62 while the other is keyed to the lower end of an upwardly and forwardly inclined drive shaft 68, the upper end thereof being provided with a worm wheel 69 in mesh with a worm 70 on the rear end portion of the main shaft 17 of the machine arm 16, as illustratively exemplified in Figure 2. The drive shaft 68 is supported in bearings 71, pivotally carried in yoke shaped supports 72 which are arranged upright in standards 73 on the table 18.

Referring to Figure 3, 74 denotes a square bar mounted on and turning with the lower shaft 62 adjacent the bearing 63 therefor. The bar 74 is used to support the ribbon pieces cut from the free edges of the material beyond the seam, the revolving corners of the bar being adapted to pick up the ribbons and draw them from the trimmer blade 15 and away from the rollers 59 and 60 to clear the machine.

Referring now to Figures 8 to 11, the embodiment illustrated therein comprises the seaming machine bed plate 11*a* and presser rollers 61*a* and 62*a*. In this modification the width of the side fold which may be directed towards the rollers 61*a* and 62*a* adjacent the seam is variable in that instead of the plate 31 a pivoted edge 75 is used. The edge 75 is pivotally connected at its forward end to a supporting rod 76, which projects rearwardly over the bed plate 11*a*, and which is carried on a fixture 77 of the guide rod 21*a* at the front of the seaming machine. The outer free end of the guide rod 21*a* is provided with a second fitting 78 provided with a short arm or rod 79, the rearward end of which is the pivotal point of a telescopic rod 80. The rod 80, corresponds to the extension 26 of Figure 1, and carries the spring arm 28*a*, the outer end of the rod 80 being pivotally connected to one end of a telescopic link 81, the other end thereof having a pivotal connection with the rearward end of the edge 75, which is extensible to permit angular adjustment of the edge 75 and still retain its position parallel to the axes of the rollers 61*a* and 62*a*. Figures 9, 10 and 11 show various relative positions of the edge adjacent to and out of line with the seaming point, whereby the side fold is guided over or under the arm 75 or at any required distance from the seam to vary the relative position of the fold with respect to the line of seaming. Figure 10 shows a guide bar to carry the inner folded side of the material.

Figure 12 illustrates a modified construction for the plate or arm 45′ wherein the device is a single member comprising the tongue portion 57′, wire 58′ and anchor 82 for the rearward end thereof. Figures 13 and 14 illustrate a still further modification of arm 45, wherein the tongue portion 57^2 is attached to the leg of the arm 45 by means of a hinge connection 83′. The hinge 83′ allows for adjustment of the tongue 57^2 to accommodate different elevations of the arm and the consequent change in the position of said arm determines the manner of delivery of the material from the tongue to the presser rollers.

Figure 15 illustrates an arm 32 mounted upon a sewing machine bed and a pair of presser rollers 59 for moving the seamed material from the seaming point, but in this arrangement no wire guide 43 is used. The edges of the material are simply brought together at the point of seaming to form the seam, which travels over the arm 33, where it turns about the latter and moves onto the surface thereof, in the direction of the line of seaming. After arriving at the surface of the arm 33 the side edges of the seam are opened up or are folded over, and as they enter the rollers 59 and 60 the side edges are neatly and securely pressed down upon the adjacent material.

Figure 16 shows the present device used in combination with a machine to make an over edge or similar seam and to place the folded edge thus formed adjacent the line of seaming.

Figure 17 illustrates a means used to dispose of the cut away portions of the material which are severed by the operation of the cutter 15. The means comprises a pair of rollers 83 and 84 fixed on the shafts 61 and 62, respectively, of the presser rollers 59 and 60, and disposed inside the bearing post therefor. The cut away ribbons move rearwardly at the same rate of speed as the

tubular material and are drawn through the rollers 83 and 84.

It has been found that the present device is also applicable to arrange seams made on so-called over edge sewing machines or related seaming devices for the purpose of opening the seams and pressing them directly after leaving the stitching zones of the machines. The details of the sewing machines used to make such seams are not being illustrated, suffice it to state that practical embodiments of the types of such seaming machines are used in the industry and are familiar to those connected with the manufacture of seamed tubular material. The present invention is concerned with the means for arranging the seams after formation thereof. Figure 16 illustrates the arrangement whereby the material A having its side edges joined by an over edge stitch is drawn over the arm 33 and as the seam rides about the edge of the tongue it opens to the point where the edges of the sides of the material abut and the stitching 86 bridges the abutting edges to form the seam which moves between the presser rollers 59 and 60 in the manner previously described exposing a marginal portion of the material adjacent the seam.

From the foregoing description and mechanisms illustrated in the drawings, it will be seen that the moving seam with its opened up or folded over free edges follows a substantially straight line from the point of seaming (which varies with the varying characteristics of the material being handled) to the drawing rollers, the seamed edge moving over the guiding means and bringing the marginal portions thereof from a horizontal to an upstanding position (Figure 4) or folded to the left (Figure 6) or right of the line of the seam (Figure 7) and at the same time drawing material over the edge to provide a side fold adjacent the seam.

Having described the present invention and the manner in which the same operates, what we claim and desire to secure by Letters Patent is:

1. In combination, means for seaming plies of material, guide means within said plies and extended beyond the seaming point and across the seam line, and means for drawing the material directly from the point of seaming over said guide, whereby the material is moved over the guide means to bring a marginal portion of said material over the edge thereof adjacent the seam line, thereby arranging the seam for pressing.

2. In combination, means for seaming plies of material, a plate lying between the plies of material and having an edge which extends laterally beyond the seaming point and the seam line, means for drawing the material substantially directly from the point of seaming over said plate, whereby the material is moved over said plate to bring a portion of the material to the seam line to form a fold, thereby arranging the seam for pressing adjacent the folded edge thus formed.

3. A device as claimed in claim 2 in which a portion of the plate adjacent the drawing means is adjustable to vary the plane of the plate with respect to the plane of the common tangent of said drawing means.

4. A device as claimed in claim 2 in which the plate has a pivoted portion adjacent the drawing means, said pivoted portion being adjustable to vary the plane of the material passing thereover with respect to the plane of the common tangent of the drawing means.

5. A device as claimed in claim 2, including means adjacent the seaming point for cutting away the marginal side edges of the seamed material, and means cooperating with the presser means to remove the severed edges.

6. In combination with a sewing machine for joining the edges of material with an overedge stitch, means for sewing the edges of the material, a plate lying between the plies of the material and having an edge which extends beyond the sewing point and the line of stitching, means for drawing the material substantially directly from the point of stitching over said plate, whereby the material is moved over said plate to bring a marginal portion of the under ply thereon and to cause the seam to rest in pressing position on the plate adjacent the folded edge thus formed, said edge lying within the folded portion of the material adjacent the seam line.

7. In combination, means for seaming a strip of material into tubular form, means for drawing the seamed material substantially directly from the seaming point and for pressing the same, and means disposed in the path of said material between said seaming point and drawing point and extended across the seam line to a position outside of the seaming point, said means causing the material as it is drawn forward to contact the extended portion thereof and to supply a material portion to form a fold adjacent the seam thereby arranging the seam for pressing.

8. In combination, means for seaming plies of material, a guide within said plies and projecting laterally of the seaming point and the seam line, and means for pressing and drawing the material substantially directly from the point of seaming over said guide, to cause the marginal edges of the material outside the line of seaming to erect themselves as the moving seam passes over the guide, into the presser means to press open the marginal edges.

9. In combination, means for seaming plies of material including a seaming point and means for pressing and for moving the seamed material directly from the seaming point, a material guiding and seam arranging means disposed between the plies of material, said means comprising a plate having a working edge portion directed across the line of seaming and leading obliquely away from the seaming point so as to present a portion offset from the seam line of the material and the seaming point, said offset portion being disposed in the path of the material between the seaming point and the moving means, said guiding means causing the seamed material after leaving the seaming point to change from a horizontal to an upstanding position as it moves to the pressing means to be folded back upon the body of the material.

10. A device as claimed in claim 2 in which the edge disposed in the path of said material between said seaming point and drawing point lies within the folded edge of the material thus formed.

11. In combination, means for seaming plies of material including a seaming point and guide means within said plies having an adjustable edge portion to extend across the seam line and to vary the position of the edge with respect to the seaming point, means for drawing the material substantially directly from the seaming point over the said guide to place a marginal portion of material adjacent the seam to form a fold, the degree of change in the position of the edge regulating the position of the said edge portion with respect to the seaming point as well

as the width of the marginal fold adjacent the line of seaming.

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