

United States Patent

Bernewasser

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[54] **APPARATUS FOR TRIMMING AND
CLIPPING THE EDGES OF TEXTILE
FABRIC CUTS**

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[58] Field of Search.....112/130, 129, 122, 121.14,
112/121.15, 121.12

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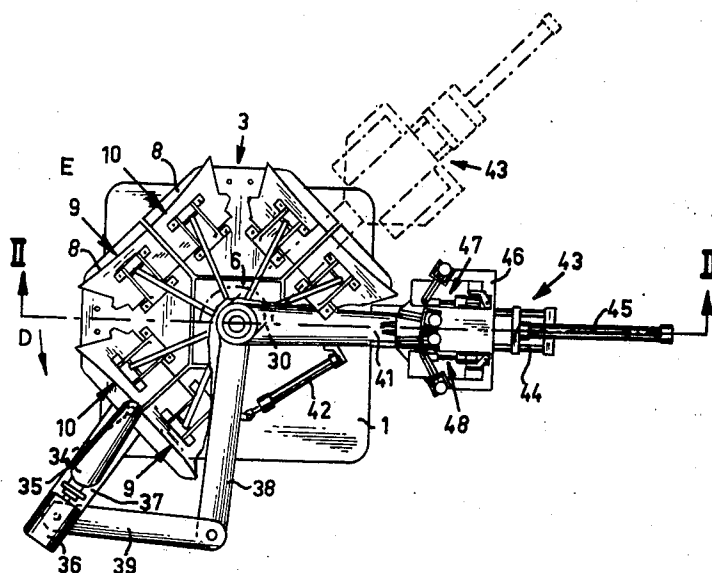
Primary Examiner—H. Hampton Hunter

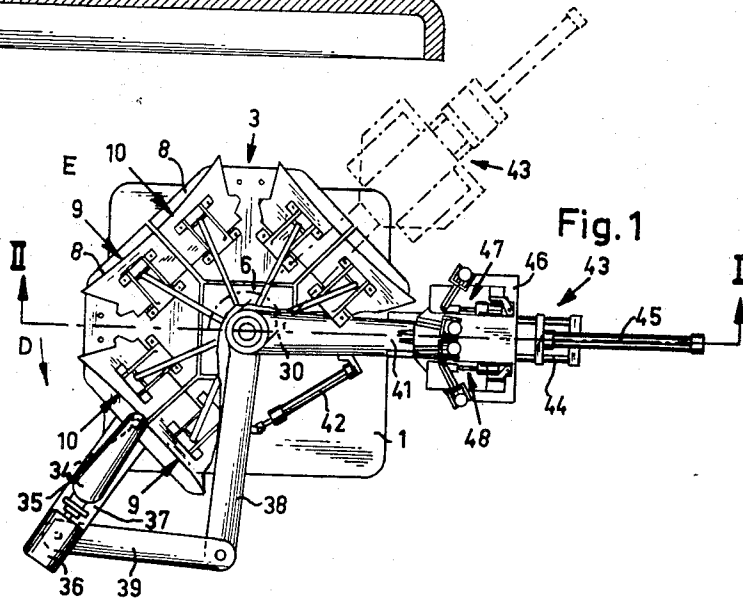
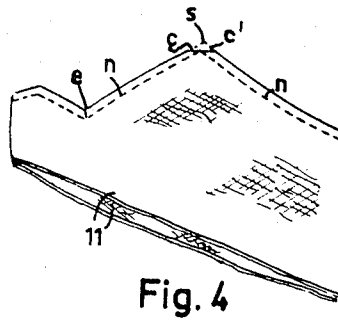
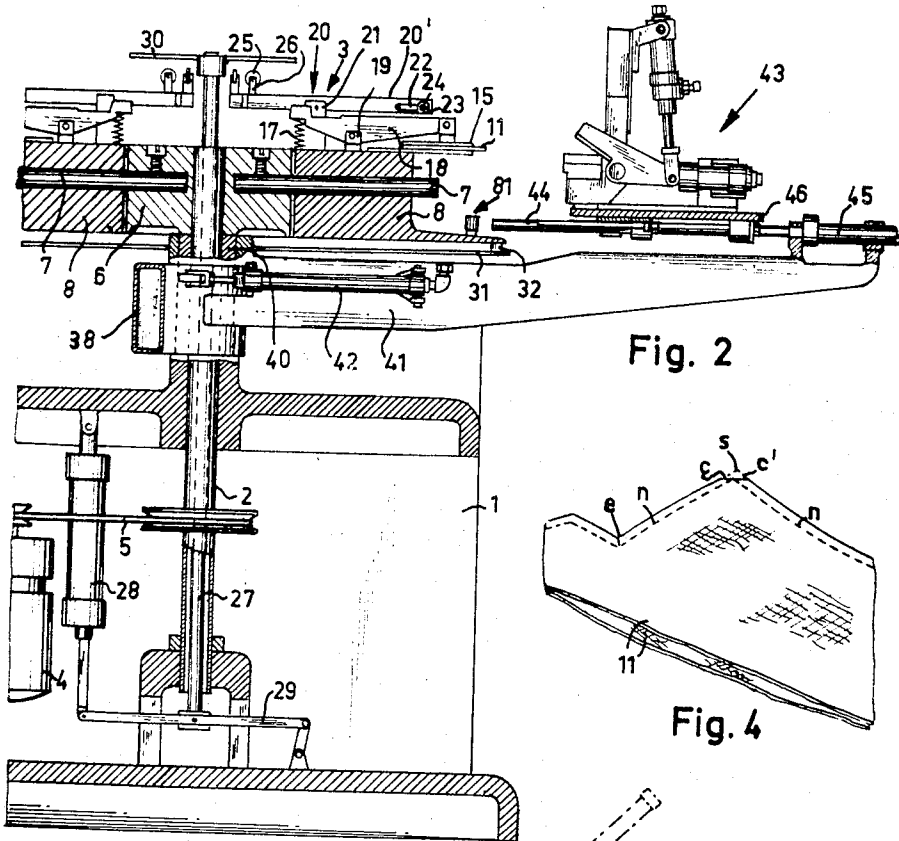
Attorney—Jacob L. Kollin

[57] **ABSTRACT**

An apparatus for trimming and clipping the edges of textile fabric cuts, particularly collar cuts of men's shirts after joining together for the purpose of preventing the formation of material accumulation at the points and other places of the collars after these are turned over. The trimming and clipping apparatus, suitable for use in an automatic sewing device having a rotary table, is disposed on a supporting arm pivoted about the axis of the rotary table is fed to the rotary table and taken along by the same within a section of its angle of rotation. After the cutting and clipping operations are completed, the trimming and clipping apparatus is disconnected from the rotary table and brought automatically into the starting position.

11 Claims, 8 Drawing Figures





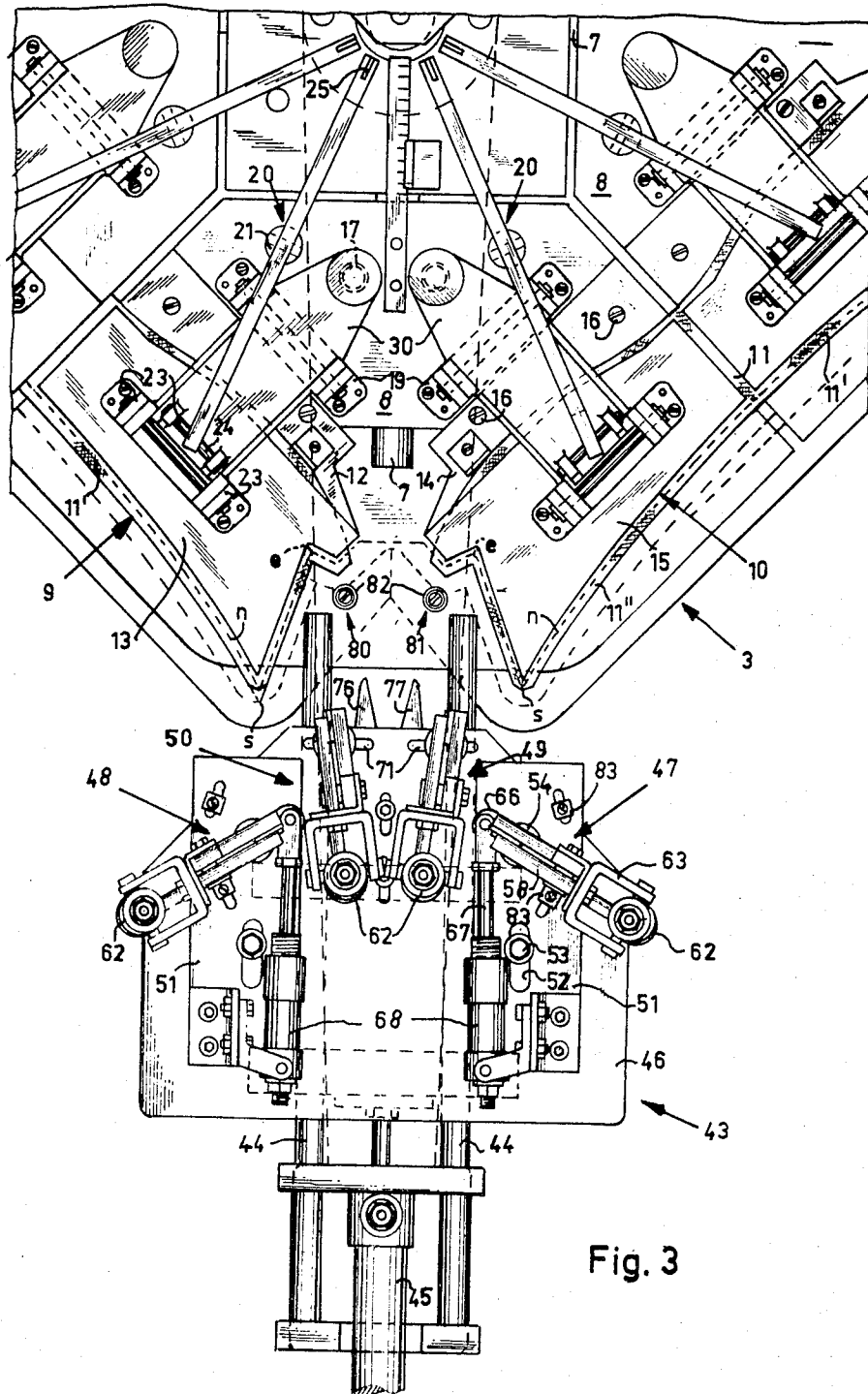


Fig. 3

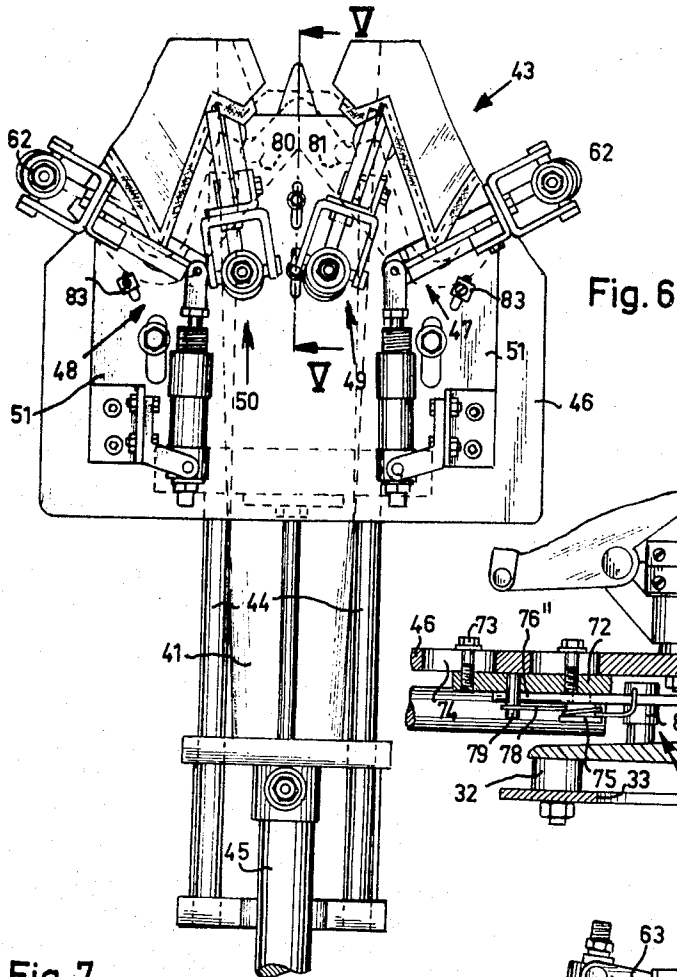


Fig. 6

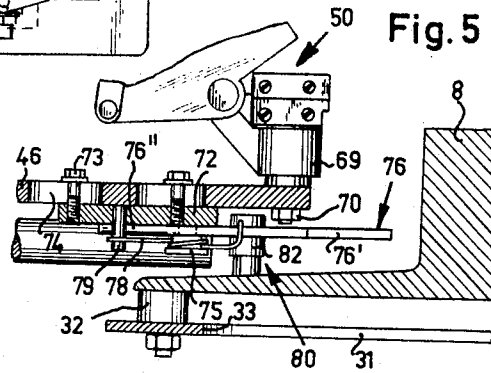


Fig. 5

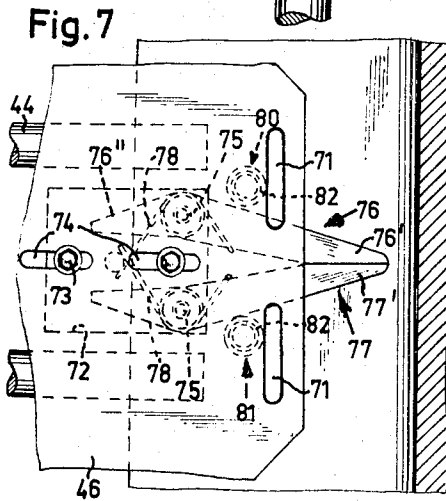


Fig. 7

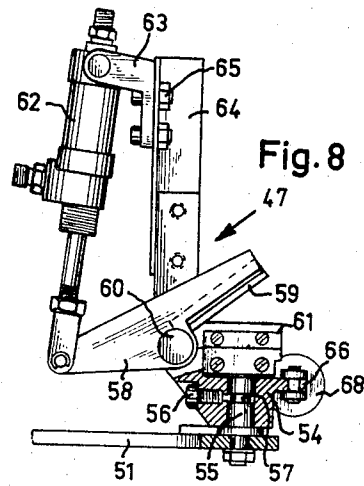


Fig. 8

APPARATUS FOR TRIMMING AND CLIPPING THE EDGES OF TEXTILE FABRIC CUTS

BACKGROUND OF THE INVENTION

This invention relates to an apparatus for trimming and clipping the edges of textile fabric cuts which are received in workpiece holders and carried to the trimming device in continuous sequence and, more particularly, to an apparatus adapted for stitching together collar cuts in continuous sequence and trimming and clipping the seam edges of the collar cuts after they are stitched together.

In forming the collars of men's shirts, it is necessary to trim the points and to clip the corners of the collar cut after joining by lines of stitches placed at a uniform distance from the edges and before turning the collar for preventing an accumulation of material at these spots after turning the collars. These cutting operations, which must be performed with a certain care for avoiding the cutting through of the threads forming the stitch line, are made predominantly manually.

There is already known an automatic device which is provided with a sewing machine and a device for trimming the edges of the stitched workpiece cuts. This known device consists of a cutting tool formed as a steel pin and a die bushing arranged in a sewing machine-like casing in which the reciprocating needle bar receives the steel pin and the die bushing is secured to the throat plate. In this automatic sewing and trimming device there is provided a swingably hinged arm carrying the trimming device which is arranged oppositely to the sewing machine. The hinged arm further receives a driven magnet roller, movable along a control template, the axis of which lies in the elongation of that of the steel pin.

This known trimming device is adapted for trimming the edges or seams of workpieces, but not for producing cuts without diminution of material because of the cylindrical steel pin, has a short life. This insufficiency is due to the fact that, in order to prevent a wavelike formed cutting edge, the cutting tool has to operate with a high cutting edge, the cutting tool has to operate with a high cutting sequence in proportion to the feed of the workpiece. Due to the small feed, only a part of the cutting tool is loaded during every cut, the steel pin is deflected from the cutting point and impinges upon the cutting edge of the bushing. As a result, the cutting tools, after slight wear and tear, cannot assure an unobjectionable cutting of the workpieces, since the fine fibers are drawn in between the cutting tool and the die bushing.

BRIEF SUMMARY OF THE INVENTION

It is an object of his invention to provide an apparatus of the above character in which the above mentioned shortcomings are obviated.

It is another object of this invention to provide an apparatus of the above character, which will achieve substantial savings in the fabrication of parts of clothes.

Still another object of this invention is to provide an apparatus which will make it possible to trim the edges at the tops of men's shirt collars and to clip simultaneously the edges at predestinated places in one operation.

It is a further object of this invention to provide an apparatus which will be suitable for use in an automatic

sewing device having a rotary table, for sewing together workpiece cuts and trimming and clipping the edges of the joined cuts in one continuous operation.

It is yet another object of this invention to develop the above mentioned apparatus in such a manner that the change of the production to other forms and measurements of workpieces may be done in a relative short time.

The aforementioned and additional objects and advantages of this invention are attained by the provision of an installation having devices for feeding the trimming and clipping tools from an inoperative position to the places to be treated during movement of the workpieces for synchronous following of the tools with the workpieces; for executing the trimming and clipping operations during this following; for removing the tools from the workpieces after termination of the trimming and clipping operations and for returning the tools into the normal position in a moving direction opposite to the workpiece feed. Further details of this invention will be more clearly understood by reference to the following description, the appended claims and the views illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a top plan view showing a sewing unit with a rotary table, a sewing machine controlled by means of patterns and swingably pivoted, and the trimming device of the invention;

FIG. 2 is a section on an enlarged scale taken along line II—II of FIG. 1;

FIG. 3 is a partial plan view showing the rotary table and a top plan view showing the trimming device;

FIG. 4 shows a part of a workpiece shaped as a shirt-collar;

FIG. 5 is a section along line V—V of FIG. 6;

FIG. 6 is a top plan view showing the trimming device with two displaceable cutting means;

FIG. 7 is an enlarged partial plan view showing the plate carrying the cutting means and

FIG. 8 is a side elevation showing a cutting means operated by an air cylinder.

In a support 1, (FIGS. 1 and 2) there is pivoted a vertical hollow shaft 2, carrying a rotary table 3 and driven by a motor 4 (FIG. 2) by means of a belt 5.

The rotary table 3 is provided with a block 6, secured to the hollow shaft 2 and carrying guide rods 7, on which segments 8 are displaceably pivoted and which can be simultaneously displaced on the guide rods 7 radially from the center of the rotary table 3 outwards by means of a device which is described in U.S. Pat. No. 3 407 759.

Each segment 8 (FIGS. 1 and 3) carries two workpiece clamp holders 9, 10. The workpiece clamp holders 9 receiving the right halves 11' of the workpieces 11, and the workpiece clamp holders 10 the left halves 11'' of the workpieces 11 (in this case shirt collars).

The workpiece clamp holders 9, (FIG. 3) are provided with a right lower clamping plate 12 and a right upper clamping plate 13, while the workpiece clamp holders 10 have a left lower clamping plate 14 and a left upper clamping plate 15. The lower clamping plates 12, 14 are secured to the segments 8 by means of screws 16, while the upper clamping plates 13, 15 are pressed on the workpiece 11 under the tension of springs 17 (FIGS. 2 and 5). The upper clamping plates

13, 15 are articulated to rocker arms 18, which are pivoted in bearing blocks 19 disposed on the segments 8, and liftable by means of levers 20 extending radially to the center of the rotary table 3. The levers 20 are pivoted in bearing blocks 21 which are also secured to the segments 8. One arm 20' of the lever 20 is formed with an oblong hole 22, (FIG. 2) through which is guided a bolt 24 which is received in bearings 23 in the rocker arm 18. A roller 25 received in a bearing part 26 disposed on the other arm 20-- of the lever 20.

Pivoted in the hollow shaft 2 (FIG. 2) is a vertically displaceable rod 27 which can be lifted and lowered by an air cylinder 28 through a linkage 29. The rod 27 carries on its upper end a semicircular disk 30. When the air cylinder 28 is charged, the disk 30 presses, simultaneously, downwards four of these levers 20 by means of the rollers 25, so that the neighboring workpiece clamp holders 9, 10 are lifted for the feed and withdrawal of workpieces 11.

Screwed to the segments 8 are guide patterns 31 by means of distance pieces 32 (FIGS. 2 and 5).

Resting against the inner contour 33 of the pattern 31 is a driven magnet roller 34 (FIG. 1) for a sewing machine 35 which is driven by motor 36. The sewing machine 35 and the motor 36 are supported on a movable link arm 37 in which is also received the driven magnet roller 34. Arranged between a jib 38 fixedly supported on the support 1 (FIGS. 1 and 2), and the movable link arm 37 is an intermediate link arm 39.

Secured to a cylindrical part 40 of the support 1 is the jib 38 and above this part 40 is swingably supported a supporting arm 41, which can be swung from a position, illustrated in FIG. 1, into a dotted line position and returned into the extended position by means of a pneumatic reset cylinder 42, hinged between the stationary jib 38 and the supporting arm 41.

The supporting arm 41 carries a trimming and clipping device 43, which serves for trimming the collar points "s" of the joined collar cuts 11 at c and c' and for clipping the cuts 11 at e (see FIG. 4).

Supported on the free end of the supporting arm 41 are two parallelly extending supporting rods 44 and a pneumatic driving means 45. On the supporting rods 44 is arranged a plate 46 displaceable by means of the pneumatic driving means 45. On this plate 46 there are symmetrically arranged two swingable trimming units 47, 48 (FIGS. 1 and 3) for trimming the collars at "s" (FIGS. 3 and 4) and two clipping units 49, 50 for clipping the cuts 11 at "e".

The swingable trimming unit 47, 48 is arranged on a carrier plate 51 having an oblong hole 52 for the displaceable securement on the plate 46 by means of a screw 53. In this carrier plate 51 (FIG. 8) is pivoted a blade holder 54 about a bolt 55 which is screwed to the carrier plate 51. A trunnion screw 56 engaging with the groove 57 in the bolt 55, prevents an axial displacement of the blade holder 54.

Secured to a double-armed lever 58 which is pivoted on the blade holder 54 about a bolt 60, is a knife 59 cooperating with a counterknife 61. Actuation of the double-armed lever 58 is effected by a knife-actuating air cylinder 62. Swingably supported in a forked piece 63, which is secured to an extension piece 64 connected with the blade holder 54, by means of screws 65.

Furthermore, the blade holder 54 is provided with a projection 66, to which is articulated the piston rod 67 (FIG. 3) of an horizontally arranged adjusting air cylinder 68 swingably supported on the carrier plate 51.

The blade carries 69 (FIGS. 5 and 6) of the clipping units 49, 50 are stationarily secured to the plate 46 and can be turned after loosening the nuts 70 and can be displaced in the oblong holes 71, thus enabling the modification of the angular position of the cuts at "e" (FIGS. 3 and 4) and their spacing from one another. Since these clipping units 49, 50 are not displaced during the operation of the device, the horizontally arranged adjusting air cylinders 68, which are provided for the trimming units 47, 48, are not required. Since the remaining structure of the devices is similar i.e. symmetrical, the clipping units 49, 50 require no further description.

Secured underneath the plate 46 (FIGS. 5 and 7) is a base plate 72 by means of screws 73 which are displaceable in oblong holes 74. On the base plate 72 are pivoted two symmetrically designed entrainment levers 76, 77 about collar screws 75 which are the tension of a torsion spring 78, which is received by the collar screw 75. The ends of the spring 78 are supported by a bearing pin 79 and the arms 76' 77'. During the extended position of the trimming and clipping device 43 (FIGS. 1 and 3) the torsion springs 78 cause the arms 76' and 77' to rest against the pin 79.

Two stop means 80, 81 consisting of two rollers 82 which are pivoted on each segment 8, cooperate with the entrainment levers 76, 77.

OPERATION OF THE DEVICE

When the air cylinders 28 (FIG. 2) is charged, the workpiece clamp holders, 9, 10 which are in the position "E" (FIG. 1) are lifted by means of the rod 27 and the semicircular disk 30. After inserting, clamping and turning of the rotary table 3 in the direction of the arrow "D," the collar cuts arrive in the radius of action of the pattern controlled sewing machine 35, for seaming together and forming the workpiece 11. After reaching a turning angle of 90°, the rotary table 3 and the workpiece clamp holders 9, 10 are in a position shown in FIG. 3.

In this position the stop means 80, 81 secured to the segments 8, are in the area of action of the spring entrainment levers 76, 77. During the charging of the pneumatic driving cylinder 45, the plate 46 carrying the trimming units 47, 48, the clipping units 49, 50 and the entrainment levers 76, 77 is moved on the supporting rods 44 in the direction of the center of the rotary table 3. After the entrance of both entrainment levers 76, 77 between the stop means 80, 81 the stop means 80 abut against the entrainment lever 76, whereupon, after attaining a certain tension of the tension spring 78, the supporting arm 41 carrying the trimming and clipping device 43, taken along by the rotary table 3. Simultaneously or immediately after this, the further movement of the plate 46 is stopped by this penetration of both entrainment levers 76, 77 into the area between the stop means 80, 81 and abutting against the latter, as shown in FIGS. 6 and 7.

Before the operation of the whole device, the trimming units 47, 48 and the clipping units 49, 50 have

been prepared in such a manner that after arrival and arresting of the entrainment levers 76, 77 between the stop means 80, 81, the knives 59, 61 of the trimming and clipping units 47 to 50 are in such a position in relation to the seamed workpiece cuts 11, that after the actuation of the knives 59, 61, the cutting lines "e" and c,c' (FIG. 4) do not cross the threads of the seam "n." This preparation is made by displacing the base plate 72 (FIG. 7) carrying the entrainment levers 76, 77 by displacing the carrier plates 51 (FIG. 3), which receive the trimming units 47, 48 and the clipping units 49, 50 received in oblong holes 71 of the plate 46. Immediately after adjusting the trimming and clipping device 43 to the rotary table 3 in motion, the knife actuating air cylinders 62 of the trimming and clipping units 47 to 50 are charged. Now the trimming units 47 and 48 are in a position as shown in FIG. 3. By this action, the clippings "e" (FIGS. 3 and 4) are formed at the right half 11' and the left half 11" of the two neighboring collars and the points "s" (FIG. 4) are trimmed at "c."

Subsequently, the horizontally acting adjusting air cylinders 68 are charged and the trimming units 47, 48 will be swung into the position shown in FIG. 3 which is determined by the stops 83. Thereupon, a new charging of the knife actuating air cylinders 62 of the trimming units 47 takes place, causing the cuts "c" at the collar-points "s" to be effected.

In the meantime, the supporting arm 41, carrying the trimming and clipping device 43, is removed from the rotary table 3 by means of the pneumatic driving cylinder 45 and by charging of the pneumatic reset cylinder 42 the supporting arm 41 is brought to its starting position. A short time later, this device can repeat the action as described, again.

I claim:

1. An apparatus for intersecting and clipping the edges of textile fabric cuts, comprising, in combination, a support member, a driven shaft for vertical rotation on said support member, a rotary table carried by said driven shaft, a plurality of workpiece holders arranged at the circumference of said rotary table for receiving textile fabric cuts, and a device for simultaneously intersecting the edges and clipping the angles of said textile fabric cuts, said device including means for moving said intersecting and clipping device from a retracted starting position to a position adjacent said textile fabric cuts received in said workpiece holders, and back to said retracted starting position, means for carrying along said device in synchronism with said rotary table from a normal to a predetermined position, means for operating said device while carried along with said rotary table, means for resetting said device in direction contrary to that of said rotary table into said normal position, after termination of the intersecting and clipping operations.

2. The apparatus defined in claim 1, wherein said device for intersecting and clipping further includes a plate, intersecting and clipping means secured to said plate, a supporting arm pivoted about the axis of said driven shaft carrying said rotary table, and supporting rods secured to said supporting arm for slidably receiving said plate, and said means for carrying along said device in synchronism with said rotary table comprises follower means attached to said rotary table and said plate slidably received on said supporting rods, and said

means for resetting said device in contrary direction to said rotary table into said normal position includes an air cylinder linked between said supporting arm and said support member.

3. The apparatus defined in claim 2, wherein said rotary table is provided with segments displaceably supported on said rotary table in a radial plane, each of said segments being provided with two workpiece clamping holders for holding a left half and a right half of fabric cuts carried by two adjacent segments, and said intersecting and clipping device is provided with intersecting and clipping means secured on said plate for simultaneously intersecting and clipping the left half of a fabric cut clamped in one workpiece holder and the right half of another fabric cut clamped in the neighboring holder.

4. The apparatus defined in claim 3, further provided with displacing means for changing the direction of cutting of said intersecting means and said clipping means secured on said plate.

5. The apparatus defined in claim 4, wherein said clipping means are pivoted about the axis crossing the cutting line of said clipping means, further provided with controllable driving means for said clipping means for turning said clipping means into a changed clipping position.

6. The apparatus defined in claim 3, wherein each of said intersecting and clipping means includes a cutting knife, a counterknife and a pneumatic driving means for actuating said cutting knife.

7. The apparatus defined in claim 5, wherein said controllable driving means includes a pneumatic control cylinder horizontally arranged, and movable stops for limiting the rotating motion of said clipping means.

8. The apparatus defined in claim 2, further provided with a pneumatic motor for moving said plate on said supporting rods.

9. The apparatus defined in claim 3, wherein said follower means includes stop means secured to said rotary table, and entrainment means arranged on said plate and cooperating with said stop means.

10. The apparatus defined in claim 9, further including a base plate slidably secured to said plate and receiving said entrainment means pivoted on said base plate, and springs acting upon said entrainment means for causing a shockless locking in after abutment of said entrainment means against said stop means.

11. In an automatic sewing device comprising, in combination, a support member, a driven shaft for vertical rotation on said support member, a rotary table carried by said driven shaft, workpiece holders formed as segments displaceably supported at the circumference of said rotary table in a radial plane, each of said segments provided with two workpiece clamping holders for holding a left half and a right half of shirt collar cuts carried by two adjacent segments, patterns secured to the lower portion of said segments, a jib fastened to said support member, a movable link arm, a sewing machine carried by said movable link arm, an intermediate link arm between said jib and said movable link arm, and a driven magnetic roller arranged in said movable link arm for engaging with said pattern, said roller being aligned axially with the needle of said sewing machine, a device for simultaneously intersecting the seam edges and clipping the angles of said shirt

collar cuts joined together by said sewing machine, including a supporting arm pivoted about the axis of said driven shaft carrying said rotary table, supporting rods secured to said supporting arm, a plate slidably mounted on said supporting rods, a pneumatic driving means for shifting said plate on said supporting rods, two stop means secured to each of said segments and arranged between said workpiece clamping holders clamping a left half and a right half of said collar cuts, entrainment means cooperating with said stop means for carrying along said plate in synchronism with said rotary table from a normal position in a certain sector of dial, said entrainment means comprising a base plate, means for displaceably fastening said base plate on said plate slidably mounted on said supporting rods, entrainment levers pivoted on said base plate, and springs acting upon said levers for causing a shockless locking-in after abutment of said entrainment levers against said stop means, means for resetting said supporting arm carrying said plate into said normal position, having an air cylinder linked between said supporting arm and said jib, two clipping units for clipping

the tapered seam edges of a left half and a right half of two neighboring collars, each of said clipping units including a carrier plate, means displaceably securing said carrier plate to said base plate slidably mounted on said supporting rods, a blade holder pivotally mounted on said carrier plate, a counterknife secured to said blade holder, a knife pivoted on said blade holder, a knife actuating air cylinder carried by said blade holder, a driving means for said blade holder to change the direction of cutting of said knife and said counterknife, said driving means including a pneumatic air cylinder linked between said carrier plate and said blade holder, and movable stops secured to said carrier plate for limiting the rotating motion of said two clipping units, and two intersecting units for intersecting the seam edges at the inner angles of said collars, each of said units including a blade carrier, means for displaceably receiving said blade carrier on said plate slidably mounted on said supporting rods, a knife, a counterknife, and a knife actuating cylinder.

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