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Backlund

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[54] **RIBBON POSITIONING APPARATUS FOR USE IN THE AUTOMATIC MANUFACTURE OF AN ANNULAR RIBBON**

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[73] Assignee: **Sven Gerhard Anderson,** Ljungskile, Sweden

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[52] **U.S. Cl.** **112/121.27,** 112/121.29, 112/207

[51] **Int. Cl.** **D05b 21/00,** D05b 35/06

[58] **Field of Search** 112/2, 70, 76, 114, 112/121.12, 121.15, 121.27, 121.29, 207, 262

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Primary Examiner—Werner H. Schroeder
Attorney—Elliott I. Pollock et al.

[57] **ABSTRACT**

A positioning apparatus is provided, in conjunction with a known apparatus for cutting a length of elastic ribbon and for overlapping the ends thereof to form an annular loop of ribbon, to maintain the overlapped ends in proper parallel and overlapping relation to one another during the sewing together of said overlapped ends by a sewing machine. The positioning apparatus comprises guide means associated with the movable presser foot of the sewing machine for guiding the overlapped ends to predetermined positions relative to one another as said presser foot is moved into pressure engagement with said overlapped ends. The apparatus is operative to move the presser foot downward to a first position in which it presses the overlapped ribbon ends relatively slightly against an underlying support, whereafter the presser foot is moved downward further to a sewing position in which it firmly presses the overlapped ribbon ends against said support.

12 Claims, 12 Drawing Figures

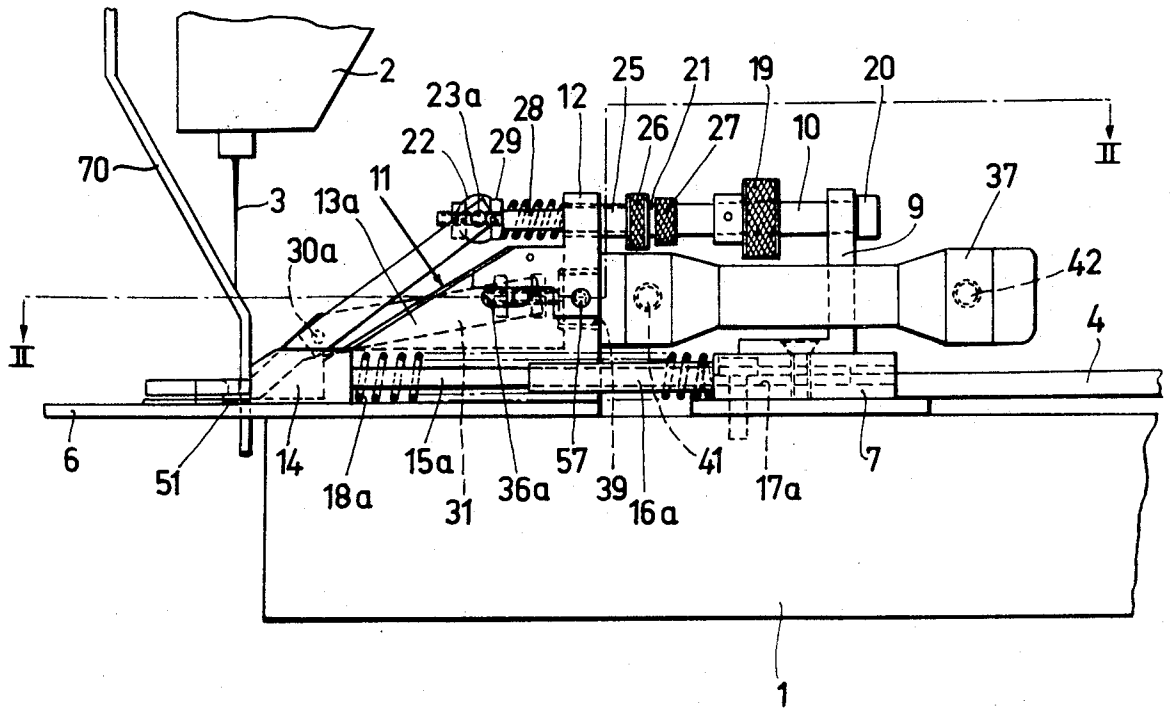
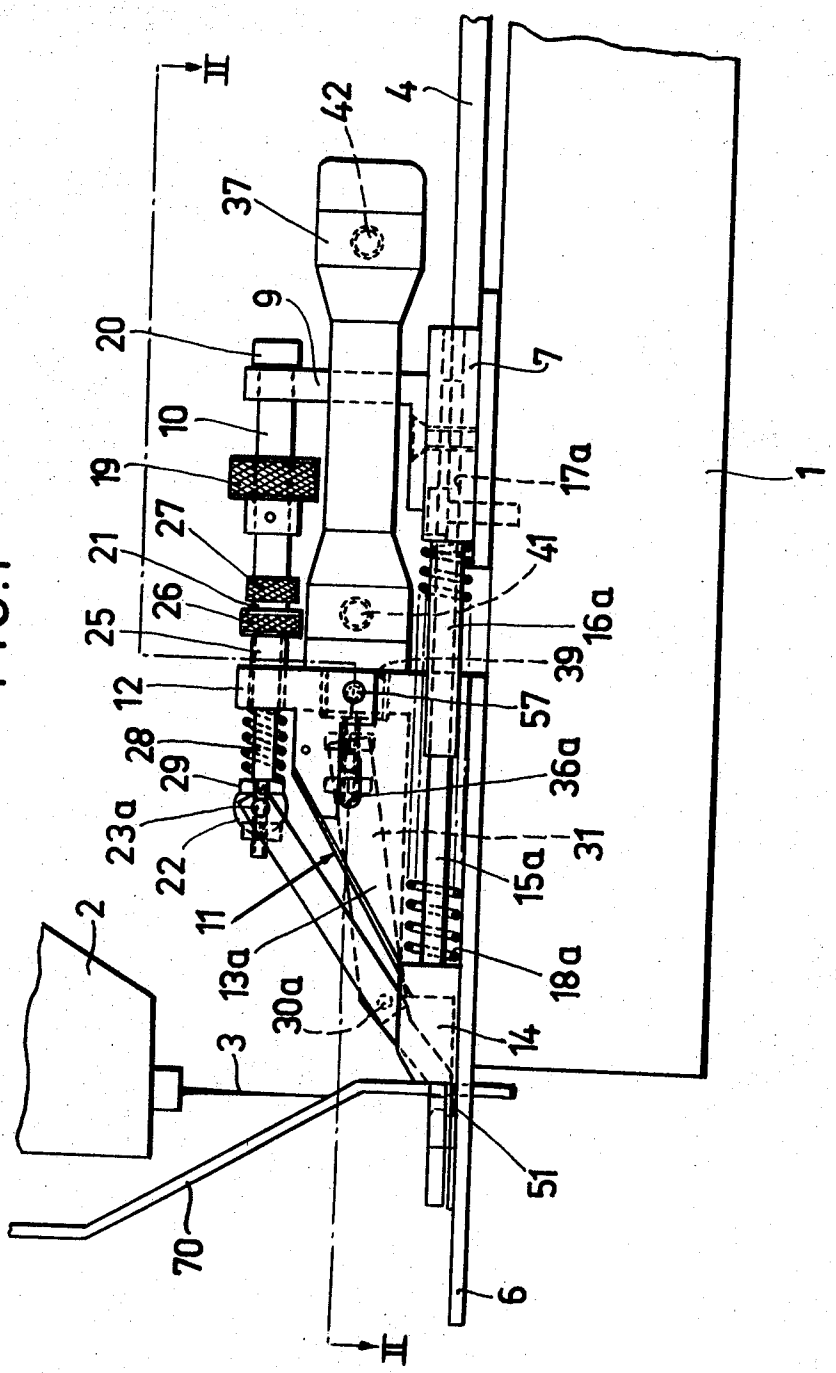


FIG.1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42
4
37
9
20
7
10
17a
19
1
27
41
21
26
16a
25
39
12
57
28
36a
29
23a
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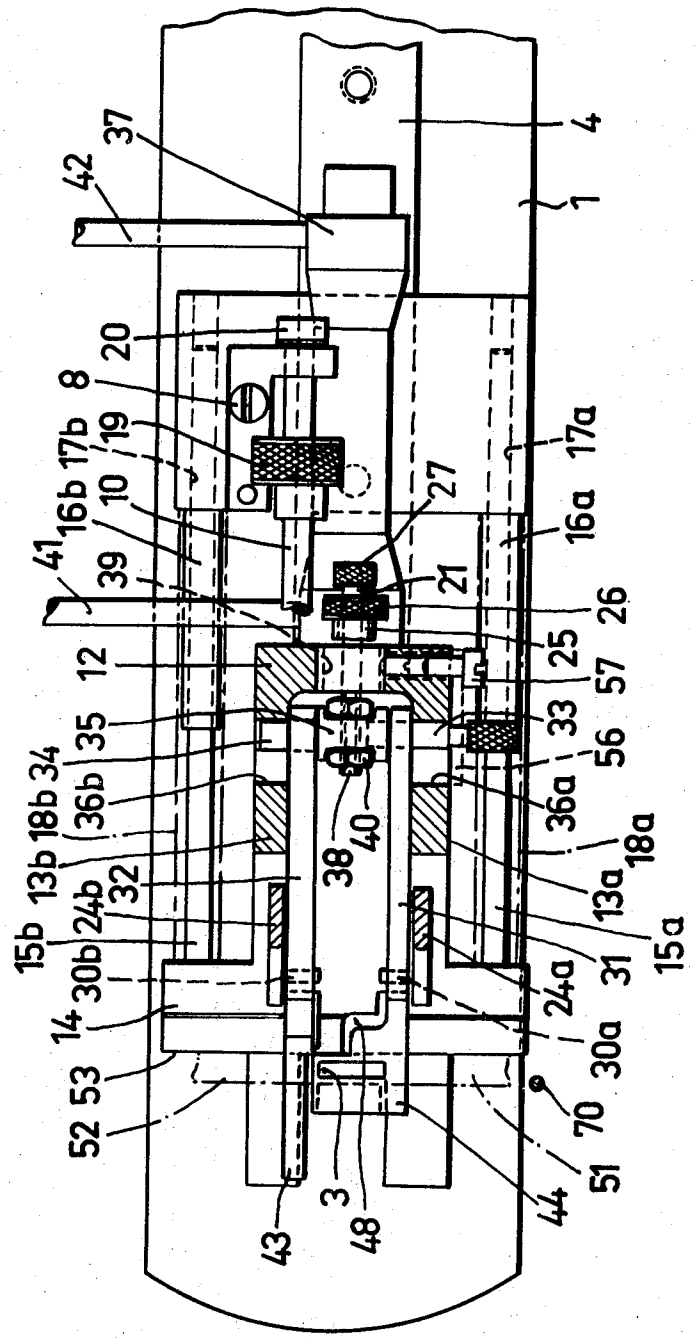
22
15a
11
2
13a
18a
30a
14
3
51
70
6
II

FIG. 2


37
42
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8
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17a
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16a
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57
33
35
56
34
36b
36a
18b
40
38
18a
13b
32
13a
24b
15b
31
15a
30b
24a
14
30a
53
52
70
51
3
48
43
44

FIG. 3

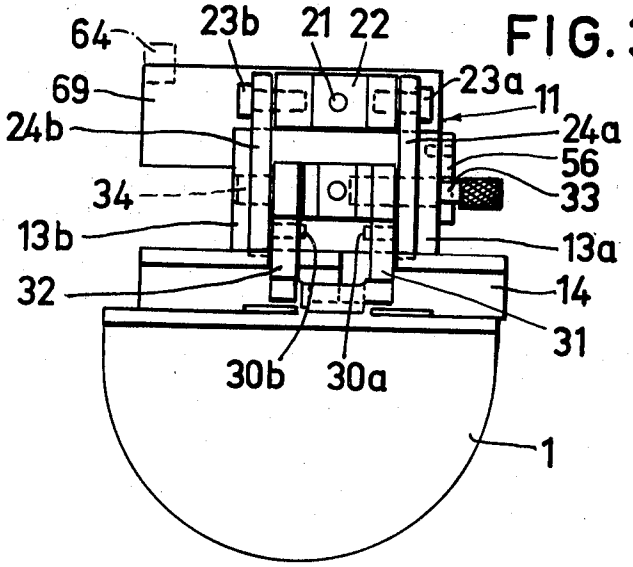


FIG. 5a

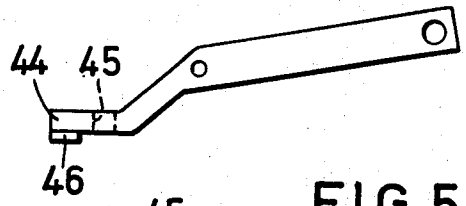


FIG. 5b

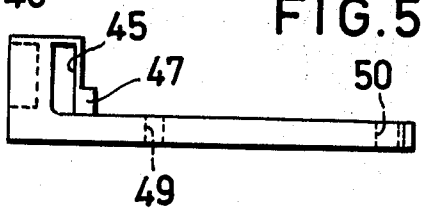


FIG. 5c

FIG. 6a

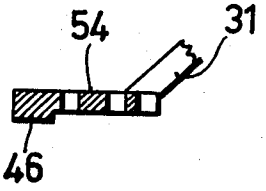


FIG. 6b

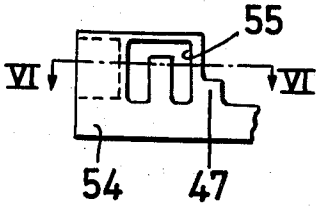


FIG. 6c

FIG. 4

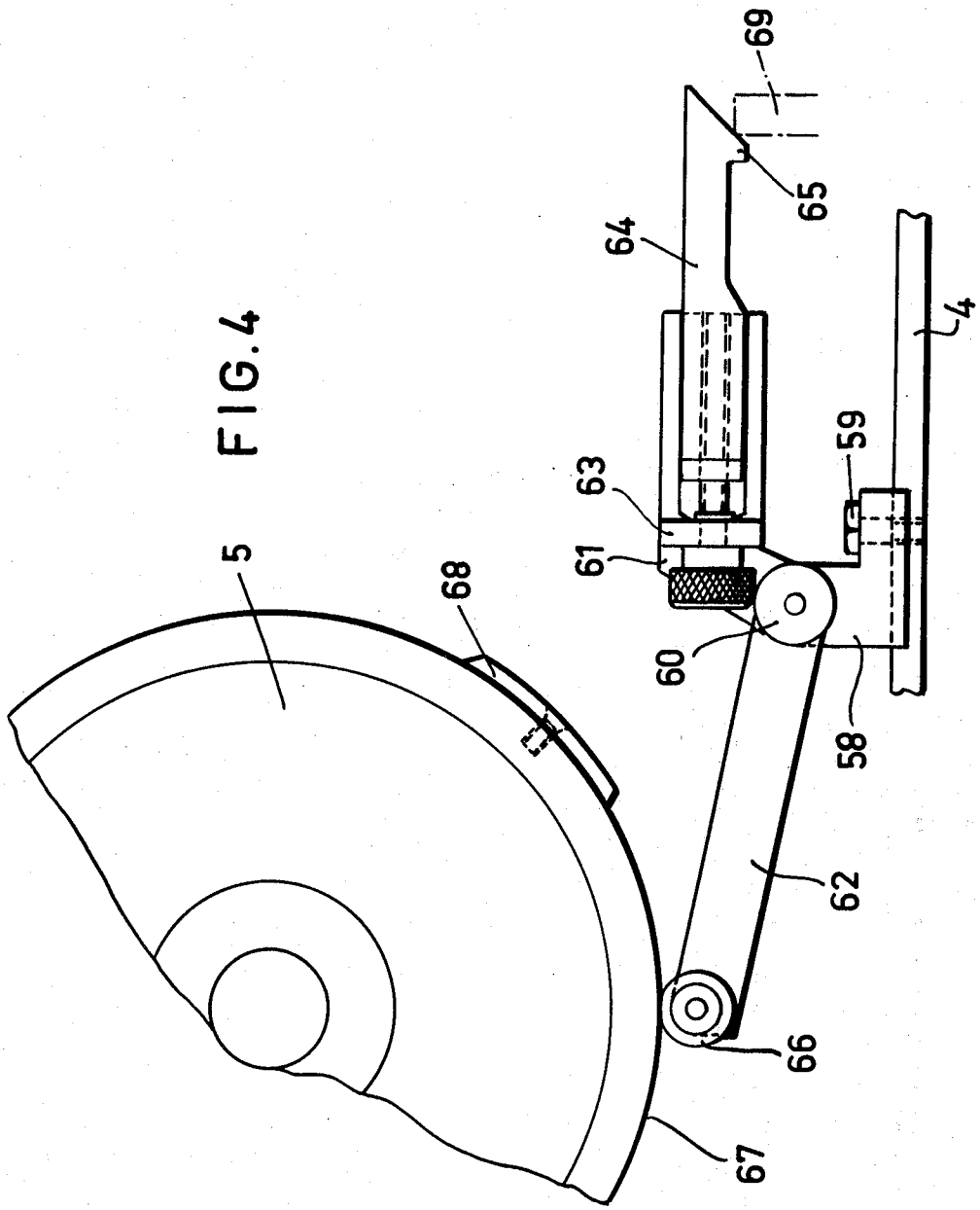


FIG. 7

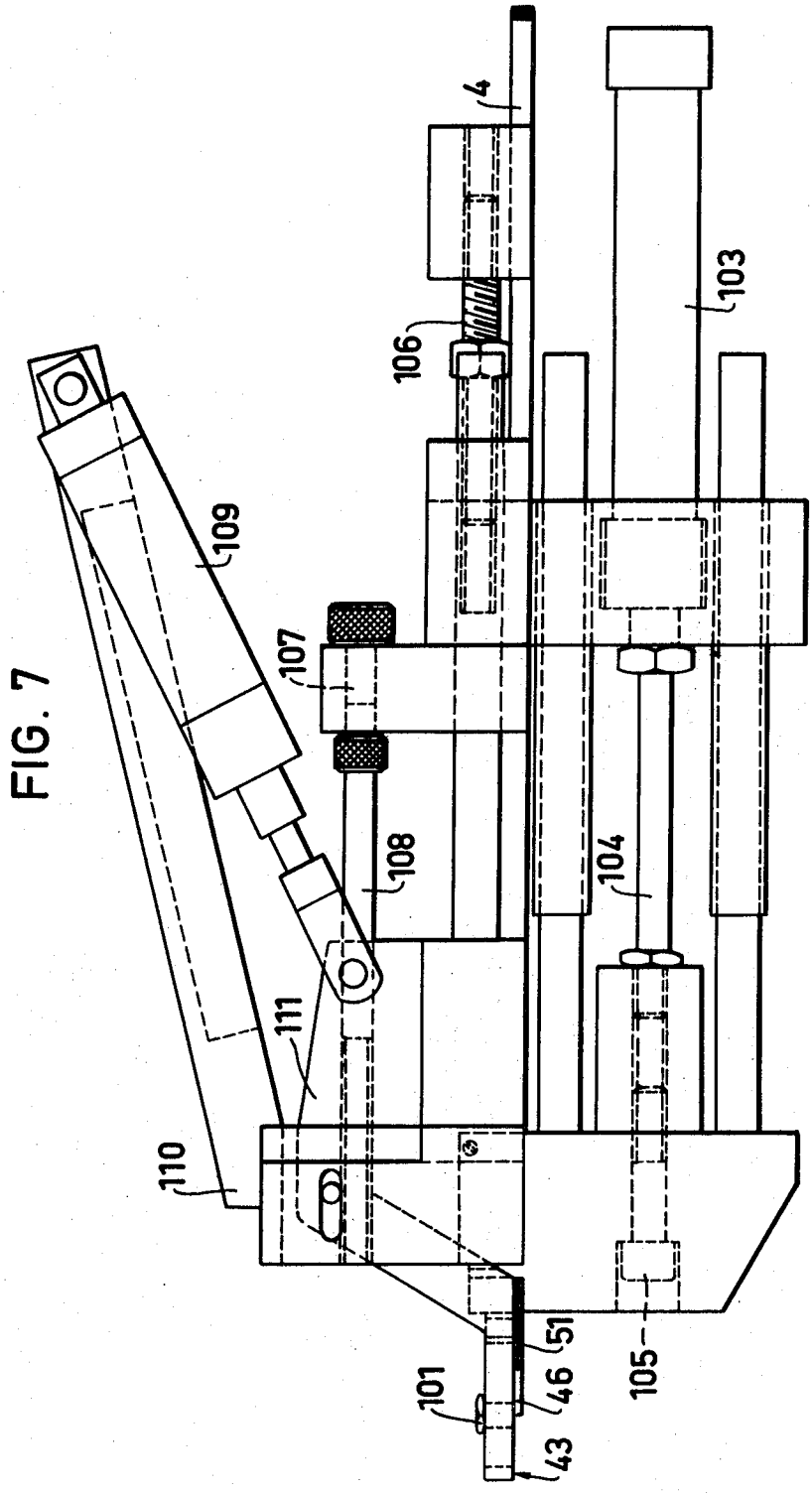
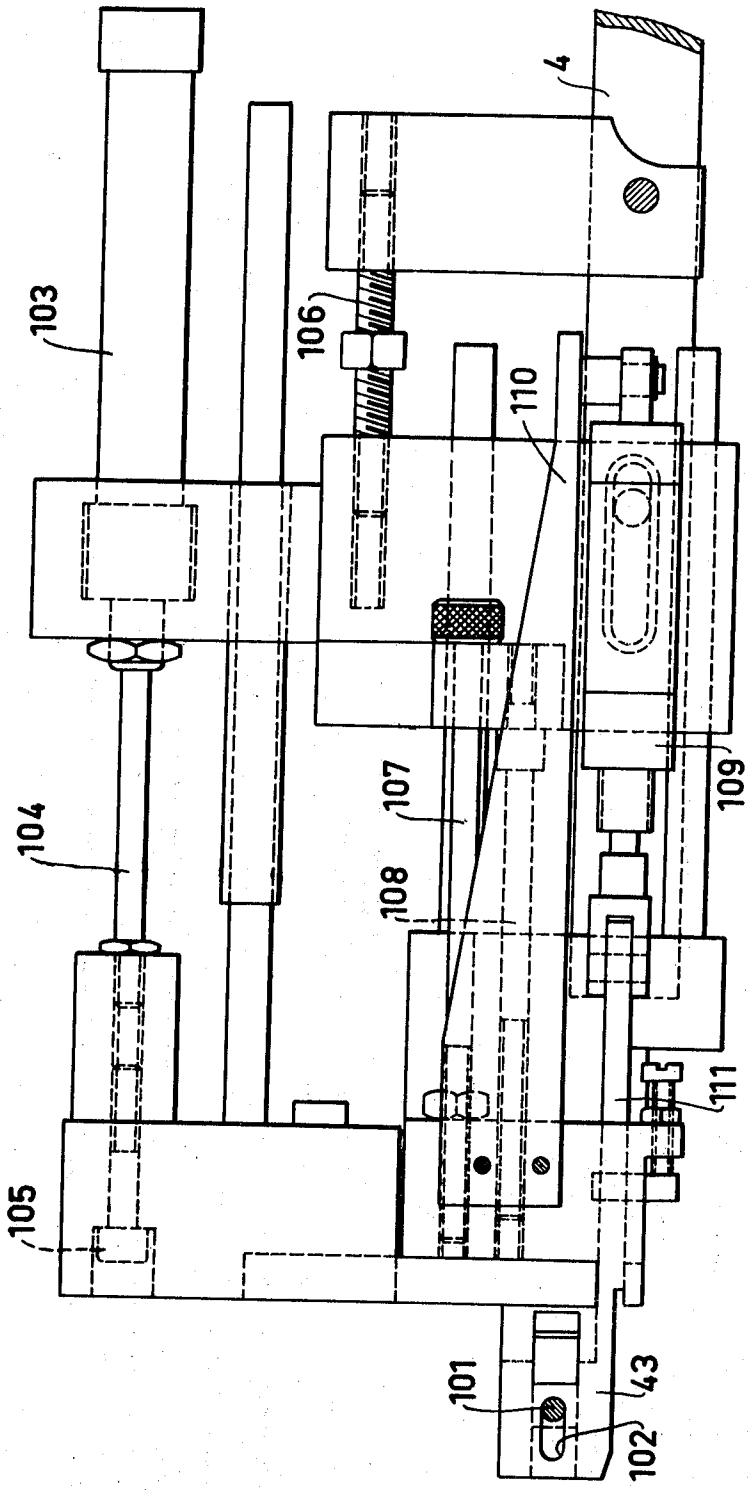


FIG. 8



RIBBON POSITIONING APPARATUS FOR USE IN THE AUTOMATIC MANUFACTURE OF AN ANNULAR RIBBON

This invention relates to an improved apparatus for automatically sewing together ribbon ends in overlapping relation to each other, and is more particularly concerned with a supplementary apparatus adapted to be used in conjunction with a sewing machine for maintaining the ribbon ends in proper position during the sewing operation.

The invention is part of a fully automatic machine for the automatic manufacture of an annular elastic ribbon of predetermined size from a continuous stock of said ribbon. One part of the complete machine, known per se, effects the cutting of a length of ribbon in accordance with the desired size of the finished annular ribbon, and overlaps the free ends of the said length of ribbon through the agency of grip members to permit the said free ends to be secured together by a subsequent sewing operation. This known part of the machine is described in Andersson U.S. Pat. No. 3,426,708, issued Feb. 11, 1969, for "Apparatus For Automatic Manufacturing of an Annular Ribbon," the disclosure of which is incorporated herein by reference. The other part of the complete machine, with which the present invention is particularly concerned, is the sewing equipment for sewing together the overlapped ribbon ends. The apparatus of the Andersson patent was, in the past, used in conjunction with a conventional sewing machine, employing a conventional presser foot; and it was found that when such a conventional presser foot was pressed into place to hold the overlapping ribbon ends for the sewing operation, and the grip members were then withdrawn to permit the sewing operation to commence, the ribbon ends no longer correctly overlapped one another resulting in the free ends of the ribbon being incorrectly secured to one another. The present invention is accordingly directed to a supplementary apparatus, characterized by a novel presser foot arrangement, operative to maintain correct overlapping of the free ribbon ends in accurate parallelism with one another and in a predetermined longitudinally overlapping relation to one another during the sewing together of said overlapping free ends.

The positioning method and the supplementary apparatus of the present invention are applied in combination with a machine of the type shown in Andersson U.S. Pat. No. 3,426,708, which employs gripper members to automatically position a pair of ribbon ends so that they overlap each other. The gripper members of the prior Anderson machine are utilized in the present invention for moving the ribbon ends in their overlapping state to the sewing machine below a presser foot, and the presser foot is guided between a lifted position for receiving the ribbon ends and a pressed-down sewing position for holding the ribbon ends, in a time sequence adjusted to the automatic supply of the ribbon ends.

During the work of developing a fully automatic mechanical equipment providing a reliable method of sewing together the ribbon ends, the problem most difficult to solve has been to always maintain a correct, substantially parallel overlapping of the ribbon ends during the sewing operation. After comprehensive development work resulting in several different constructions and methods, which, however, did not work satisfactorily, at least not for a long period, and did not succeed in

bringing about a continuous correct overlapping, the problem of achieving a proper parallel overlapping of the ribbon ends has been solved by the method and supplementary apparatus the present invention.

The features characterizing the method and the supplementary apparatus according to the invention become evident from the claims enclosed. The invention also in other respects provides an equipment, which operates with high reliability and makes use to a large and cost-saving extent of the automatic system, which is already included in the sewing machine known per se, to which the supplementary apparatus according to the invention is attached. By the invention, furthermore, a fully automatic equipment with a simple and reliable system is obtained, which in a predetermined time sequence actuates different control means for a fully automatic manufacture of ribbon from a supply, for example a roll, to complete ribbons sewn together. The particular object is the production of rings of elastic ribbon, which by their elasticity had increased the difficulty to find a solution for the problem mentioned.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in greater detail in the following, with reference to the accompanying drawings, in which

FIG. 1 shows a lateral view of an embodiment of a supplementary apparatus according to the invention attached to a sewing machine,

FIG. 2 shows a view along the line II—II in FIG. 1,

FIG. 3 shows an end view seen from the left in FIG. 1,

FIG. 4 shows a lateral view of the apparatus seen from the left in FIG. 3, but illustrating only a locking means included in the apparatus,

FIGS. 5*a* and 5*b* show a lateral view and, respectively, plan view of a presser foot arm, and FIG. 5c shows an example of a seam sewn by using said presser foot arm,

FIGS. 6*a* and 6*b* show a portion of another embodiment of the presser foot arm, FIG. 6*a* being a section along the line VI—VI in FIG. 6*b* and FIG. 6*b* being a plan view, and FIG. 6*c* shows an example of a seam sewn by using this presser foot arm.

FIGS. 7 and 8 show by a lateral view and, respectively, plan view another embodiment of the apparatus according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The apparatus according to the present invention, as already mentioned, is attached to a sewing machine and constructed to fully automatically sew together ribbon ends overlapping each other, which are introduced into the apparatus by means comprised in a fully automatic machine for obtaining the overlapping position of the ribbon ends.

The sewing machine is of conventional design. The drawings show only the sewing machine table **1**, the free end of the sewing machine arm **2** with the needle **3**, the guide plate **4**, which guides the movement of the presser foot so that the desired seam according to the setting and the cam plate (not shown) is obtained, and the cutter cam plate **5** (see FIG. 4), which controls the cutting of the thread.

The machine for causing the ribbon ends to overlap each other may, for example, be a machine as disclosed

in Andersson U.S. Pat. No. 3,426,708, the disclosure of which is incorporated herein by reference. Preferably a machine is used in which the control means for obtaining an annular ribbon with the free ends overlapping each other are driven pneumatically and synchronously by means of a camshaft with exchangeable eccentrics, which directly actuate valves so that compressed air is passed through, and cut off, in a determined time sequence to a piston-cylinder means provided for each control means. The supplementary ribbon end positioning apparatus of the present invention is preferably intended for use in combination with such a machine, which, however, is not shown in the drawing since it is not directly comprised in the invention.

On the sewing machine table **1** are provided a forward fixed plate **6** and a rearward bearing plate **7**, which latter in a suitable way is fastened at the guide plate **4** and after release can be moved in longitudinal direction of the guide plate into the desired position. On the bearing plate **7** is fastened, for example by a screw **8**, a bracket **9**, which constitutes the rearward support for an axle **10**. To said plate **6** abuts a forward bracket **11** comprising a vertical wall **12** and two parallel legs **13***a* and, respectively, **13***b*, which project forwards from said wall **12** and in their front portion transform into a portion **14** extending transversely to the legs **13***a*, **13***b*. The axle **10** is mounted at its forward end in the vertical wall **12**. From the rear wall of the transverse portion **14** there project rearwards two parallel guide axles **15***a* and, respectively, **15***b*, which extend through guide sleeves **16***a* and, respectively, **16***b* extending forwards from the front wall of the bearing plate **7**, and into holes **17***a* and, respectively, **17***b* in the bearing plate **7**. Between said walls compression springs **18***a* and, respectively, **18***b* are provided about said guide axles **15***a*, **15***b* and said guide sleeves **16***a*, **16***b*. The bracket or slide **11**, thus, can be moved from the position shown in FIGS. **1** and **2** in the direction toward the fastened bearing plate **7** against the action of the springs **18**, which movement is guided by the guide axles **15** and guide sleeves **16**. The movement of the slide **11** can continue until a stop member **19** adjustable along the axle **10** abuts the bracket **9**. A stop position for the slide **11** moving in the opposite direction is provided by the rearward outer head **20** on the axle **10** abutting the bracket **9**. The slide **11** can also be locked in a fixed position relative to the bearing plate **7** by moving the stop member **19** on the axle **10** to the right in FIGS. **1** and **2** so that the stop member abuts the bracket **9**. An axle **21** supported at an upper position in the wall **12** has limited movability in its longitudinal direction and is provided at its forward free end with a bearing holder **22** for one end of two parallel arms **24***a* and, respectively, **24***b* which are fulcrumed about pivots **23***a* and, respectively, **23***b*. The axle **21** extends through a guide and stop sleeve **25** with head **26** threaded into the wall **12**, and the axle is provided with a stop head **27**. On the opposite side of the wall **12** relative to the stop head **27**, a sleeve **28** is provided about the axle **21**, and about said sleeve **28** and said axle **21** a spring **29** is provided between the bearing holder **22** and wall **12**.

At the free ends of the arms **24***a* and **24***b* two levers **31** and, respectively, **32** are hinged about pivots **30***a* and, respectively, **30***b*, which levers at their outer forward end are shaped so as to form the presser foot of the sewing machine. At their other rearward free end, the presser foot levers **31** and **32** are hinged about pivots **33** and, respectively, **34**, which project from a bearing holder **35** located between the presser foot levers. The pivots are mounted movably in longitudinal grooves **36***a* and, respectively, **36***b* in the bracket legs **13***a* and, respectively, **13***b* of the bracket **11**, in such a way, that by the aforedescribed arrangement of the arms **24***a* and **24***b* the presser foot upon movement of the pivots is caused to pivot between a swung-up position and a pressed-down sewing position. This movement is effected by a pneumatic piston-cylinder means **37**, **38**. The cylinder **37** is screwed into a threaded hole **39** in the bracket wall **12**, and the free end of the piston **38** is fastened by nuts **40** to the bearing holder **35**. In FIG. **2** a forward and a rearward air supply line **41** and, respectively, **42** to the cylinder are shown.

The presser foot lever **32** in its horizontal projection is a substantially straight arm. The free end portion **43** of the presser foot proper extends a distance outwards beyond the outer edge of the other presser foot lever **31**. The presser foot lever **31** shown in FIGS. **1** and **2** is shown in greater detail in FIGS. **5***a* and **5***b*. The presser foot proper is a plate **44** extending from the arm **31** substantially all the way to the end portion **43** of the other presser foot arm, which plate is provided with an oblong hole **45** in said extension and with a shoulder **46** provided on the outer edge of the lower surface of the plate **44**. The plate **44** further is provided with a projection **47**, which extends from the inner side of the plate and at lowered sewing position for the presser foot is inserted into a recess **48** (see FIG. **2**) in the transverse portion **14**. In FIG. **5** holes **49** and **50** for the pivots **30***a* and, respectively, **33** are shown.

As appears from FIGS. **1** and **2**, the ribbon ends **51** and **52** to be sewn together lie overlapping each other in compressed state below the presser foot portions **43** and **44** and between the shoulder **46** and the forward edge surface **53** of the transverse portion **14**. The design of the plate **44** shown for the presser foot lever **31** in FIGS. **5***a* and **5***b* is adapted to sew a seam as shown in FIG. **5***c*, whereby the ribbon ends during the up and down movement of the needle **3** through the hole **45** are moved, together with the presser foot and the entire equipment abutting the plate **6** and fastened on the bearing plate **7**, according to the movement of the guide plate **4**, which movement is determined by the shape of the cam plate provided on the sewing machine. FIG. **5***c* shows by way of example a zigzag seam, but by exchange of the cam plate a straight seam, for example, can be sewn.

FIGS. **6***a* and **6***b* show another embodiment of the presser foot portion of a presser foot lever **31**, FIG. **6***a* showing a section along the line VI—VI in FIG. **6***b*. The presser foot portion here is designated by **54** and provided with a U-shaped hole **55**. It includes, as in the embodiment shown in FIGS. **5***a* and **5***b*, a shoulder **46** and a projection **47**. This presser foot portion is particularly adapted to sew together ribbons of a greater width, and by the arrangement of a suitable cam plate for obtaining the desired movement of the guide plate **4** and thereby of the presser foot **54**, and the ribbon ends, and by an arrangement according to FIG. **3** which is described in greater detail below, two parallel zigzag seams, for example as shown in FIG. **6**, are obtained. The exchange of presser foot lever **31**, for inserting presser foot parts of different design, for example **44** and, respectively, **54**, is carried out as follows. A lock-

ing arm **56** (see FIGS. **2** and **3**) in the position shown in the drawing engages with the pivot **33**, in such a way, that the pivot cannot be drawn out in its longitudinal direction, but is movable in the groove **36***a*. The locking arm **56** is pivotal upwards from the engaging position after a screw **57** screwed into the vertical wall **12** of the bracket **11** has been loosened. When the locking arm is in its upward pivoted position, the pivot **33** can be drawn out and a new presser foot lever **31** with desired presser foot plate **44, 54** can be inserted instead of a previously applied presser foot lever.

The bracket or slide **11**, as mentioned above, can be fixed relative to the bracket **9**, and thereby to the bearing plate **7**, by the set screw **19**. Such a fixed position is expedient when only one seam, such as for example the seam shown in FIG. **5***c*, is to be sewn, i.e. when narrow ribbons are to be sewn together. When sewing together ribbons of greater width, however, it is suitable to sew several parallel seams, as shown in FIG. **6***c*. To be able to sew the two seams shown in FIG. **6***c*, the presser foot must be adapted to be moved together with the ribbon, and thereby the slide **11**, in the extension of the sewing machine table, and during the sewing operation for each seam must be adapted to be held fixed in two positions corresponding to these seams. The movement of the slide **11** relative to the fixed bearing plate **7** has been dealt with above. In FIG. **4** is shown an embodiment of a locking means to keep the slide locked in a position inserted closer to the bearing plate **7** than shown in FIGS. **1** and **2**. The locking device comprises a bracket **58** fastened to the guide plate **4** by a screw **59**. At the bracket is pivotally supported an axle **60**, to which are fastened a forwardly directed arm **61** and a rearwardly directed arm **62**. The arm **61** is provided with a supporting portion **63** projecting perpendicularly from the arm, and on said supporting portion is fastened by screwing a forwardly projecting arm **64** having its free outer end formed as a hook **65**. At the free end of the arm **62** a follower wheel **66** is attached which engages with a follower surface **67** on the knife cam plate **5**. In one or more adjustable places, along the follower surface **67** a cam **68** is provided which upon contact with the follower wheel **66** presses down the arm **62** whereby the axle **60** is rotated and lifts the arm **64**. In FIG. **4** is also shown by dashed lines an outwardly projecting portion **69** on the vertical wall **12** of the slide **11** (see also FIG. **3**). Upon return of the slide **11** from the position shown in FIGS. **1** and **2**, the wall portion **69** lifts the arm **64** which, after the wall portion **69** has passed the hook **65**, drops down and by means of the hook **65** locks the slide **11** in the other end of the aforementioned two fixed positions.

FIGS. **1** and **2** finally show a discard arm **70** which, upon completion of sewing of the ribbon, pivots to the left from the position shown in FIG. **1** and thereby takes along the completed ribbon outwards over the plate **6**, whereafter the ribbon is dropped down over a receiving arm (not shown) adapted to pivot from a receiving position to a neutral position. The pivotal movement of the discard arm **70** and receiving arm is effected by pneumatic piston-cylinder means, of which that for the discard arm preferably is attached upwardly at that portion of the sewing machine arm **2** of which only the free end is shown in FIG. **1**. The piston-cylinder means for the receiving arm preferably may be attached at the stand on which the sewing machine is mounted.

In addition to the piston-cylinder means provided for driving the previously mentioned control means arranged in the machine for bringing about the overlapping ribbon ends, there are thus in the shown embodiment of the invention three further piston-cylinder means, viz. for control of the presser foot levers (piston-cylinder means **37, 38**), discard arm and receiving arm. All of these piston-cylinder means, like the piston-cylinder means comprised in said ribbon overlapping machine, are driven by the aforesaid cam shaft with eccentrics in direct contact with valves. It is thus possible in a simple way to control with correct time sequence all of the means which are comprised in said machine, for feeding from a ribbon supply a definite ribbon length, cutting this length and by gripper means, which hold the ribbon near the ribbon ends, turning the ribbon ends to an overlapping position and moving them to sewing position in the sewing machine (all as described in the aforementioned prior Andersson patent), and also in the supplementary apparatus according to the invention attached to the sewing machine, for holding the ribbon during the sewing operation in a correct overlapping position and, after the sewing operation, releasing the completed ribbon and moving it to a receiving means. The control of the various elements in the ribbon overlapping machine preferably can be carried out simultaneously with the control of the elements in the supplementary apparatus on the machine in order to keep the time of the working cycle from the ribbon supply to the completed ribbon at a minimum. The working cycle includes the automatic system built-in in the conventional sewing machine for controlling the movement of the guide plate **4**, the movement of the thread pull-off mechanism (not shown) and the movement of the lower thread cutting knife (not shown).

In a specially preferred embodiment of the invention, the forward air supply line **41** to the piston-cylinder means **37** extends to a valve (not shown), from which are drawn two air supply lines to respective coacting valves and eccentrics on the cam shaft. The rearward air supply line **42** is drawn directly to its coacting valve and eccentric. The valve coupled to the line **41** is a plunger valve, and its plunger is actuated by the element comprised in the machine for actuating the thread pull-off mechanism, in such a way, that upon said actuation extra air is supplied to the cylinder **37** through the line **41**.

The operation during sewing together a ribbon is described in the following both for the sewing of a narrow ribbon with a pressure foot according to FIGS. **5***a* and **5***b*, and for the sewing of a wider ribbon with a presser foot according to FIGS. **6***a* and **6***b*.

When sewing together a narrow ribbon it is suitable, as mentioned above, to fix the bracket or slide **11** relative to the fixed bearing plate **7**, which in the embodiment shown is effected by adjustment of the stop member **19**. Gripper means, included in the ribbon overlapping machine of the aforementioned Anderson patent, keep the ribbon ends overlapping each other and push in the ends below a lifted presser foot **43, 44**. The air cylinder **37** is actuated so that the spring-loaded piston **38** is moved in a direction toward the cylinder. The presser foot thereby pivots down and presses the overlapping ribbon ends relatively slightly against the support **6**. The thread pull-off member (not shown) comprised in the conventional sewing machine pivots by

the automatic system of the sewing machine to a position to the right of the presser foot (seen in FIG. 3). Simultaneously additional air is supplied, as mentioned above, through the line **41** to the cylinder **37** (by actuation of the valve by the same element actuating the thread pull-off member), whereby the piston **38** is moved into the cylinder and guides the ribbon ends by means of the presser foot into a firmly pressed position between the shoulder **46**, edge surface **53** of transverse portion **14**, and the underlying support **6**. This double movement of the presser foot is highly advantageous, because it ensures a correct overlapping position of the ribbon ends and also a correct sewing position for the ribbon ends between the shoulder **46** and edge surface **53**. The ribbon ends being in a firm and correct position below the presser foot, the gripper means now open and return to the ribbon overlapping machine to grasp new ribbon ends and turn them into an overlapping position. The sewing machine needle **3** now becomes active, and simultaneously the presser foot together with the ribbon ends is guidedly moved by means of the plate **4** in response to the cam plate used at the sewing machine. After completion of the sewing operation, the presser foot is moved back, with a relatively slight pressure against the support, to the position it had assumed first, by actuation of the valve by the same element, which actuates the thread pull-off member, so that the extra air supplied through line **41** for firmly pressing the presser foot is released, whereby said element also actuates the cutting means for cutting off the sewing thread, and the thread pull-off member so that this member pivots back to a position to the left of the presser foot (seen in FIG. 3). Thereafter air is supplied through the line **42**, thereby pushing forward the piston rod **38** and pivoting the presser foot to its lifted position. Now air is supplied to the piston-cylinder means of the discard arm **70** to pivot the arm **70** to the left (seen in FIG. 1), whereby the discard arm moves the completed ribbon loop outwards over the forward edge of the plate **6** so that the sewn ribbon loop drops down and is received by the receiving means. Finally, air is released from the piston-cylinder means of the discard arm **70**, and the arm pivots back to the position shown in FIG. **1**. In this way one working cycle for sewing together a ribbon is completed, and the next cycle commences with the supply of new ribbon ends held in position by gripper members.

The operation during sewing together ribbons of a greater width where suitably two parallel seams are sewn, is described in the following. The presser foot lever with the presser foot plate **44**, used for sewing together the aforementioned narrow ribbon, is a presser foot lever with a pressure foot plate **54** according to FIGS. **6***a* and **6***b*. In addition, the stop member **19** is moved to render possible movement of the bracket or slide **11**, and a cam plate adjusted to the guide plate movement is attached at the sewing machine. The gripper members with the ribbon ends are pushed in below the lifted presser foot and by abutment to the edge surface **53** press the slide **11** in the direction to the fixed bearing plate **7** against the action of the springs **18***a* and **18***b* until the hook **65** of the locking arm **64** engages over the wall portion **69** and retains the slide **11** in this fixed position relative to the bearing plate. The operation continues then as described above, and the seam seen to the left in FIG. **6***c* is sewn. Thereafter the locking arm **64** is lifted by the follower wheel **66** running up on the cam **68**, and the hook thereby is lifted above the wall portion **69**. As a result, the slide is moved back by the springs **18***a* and **18***b* to its original position whereafter the seam shown to the right in FIG. **6***c* is sewn. The working cycle is then completed in the same way as described above after one seam has been sewn.

To sew two seams according to FIG. **6***c*, the wheel **5** preferably is provided with two diametrically arranged cams **68**. By placing the cams in adjusted places along the wheel **5**, and by providing a locking arm **64** with several hooks or recesses, and by suitably designing the presser foot plate, additional parallel seams can be sewn for being assembled in a suitable way to ribbons of still greater width. It further is possible by a suitable design of the presser foot plate and by providing an adjusted cam wheel to impart to the guide plate **4** such a movement that one or more seams are obtained which extend transversely to the seams shown in FIG. **5***c* or **6***c*.

The apparatus according to the invention shown in FIGS. **7** and **8** operates substantially in the same way as the aforedescribed apparatus. Here, however, the shoulder **46** on the presser foot **43** is adjustable by an adjusting screw **101** in the groove **102**. Furthermore, a cylinder **103** is provided instead of a discard arm **70**, and the piston **104** of said cylinder is provided at its outer end with an ejector plate **105**. There is further provided a double-threaded main adjusting screw **106**, by which the presser foot can be roughly set for different ribbon widths. This main adjusting screw renders it unnecessary to move the sewing machine table for said setting. Fine adjustment and locking is effected by adjusting screws **107** and **108**. The cylinder **109** for control of the presser foot operates substantially in the same way as the cylinder **37** according to the apparatus described above, but it is arranged in a different manner, as appears from FIGS. **7** and **8**. The cylinder **109** is at one end hinged to a holding arm **110** and at the other end is hinged to a lever **111** corresponding to the lever **31** in the apparatus described above.

The most essential object of the invention, as mentioned above in the introductory portion, is to ensure a sufficiently correct parallelity of the overlapping ribbon ends. This object has been achieved by the extra down-pressing movement for the presser foot. This extra movement, of course, can be obtained also in a way and by means other than described above, without abandoning the idea of the invention. In this connection, the shoulder **46** shown in the above embodiments (or some similar member) has an important function. The invention, however, includes also other essential possibilities, for example the exchangeability of the presser foot plate, and the simple change of the automatic system for sewing a different number of seams in different ways.

What I claim is:

1. A ribbon end positioning apparatus for use, in the automatic manufacture of an annular ribbon, in conjunction with a sewing machine having support means for supporting ribbon elements during the sewing thereof by said sewing machine, presser foot means movable to a sewing position for pressing the ribbon elements against said support means during the said sewing operation, and means for moving said presser foot means away from its sewing position to a lifted position in relation to said support means; said positioning apparatus comprising grip members for holding a length of

ribbon, with the free ends of said length in overlapping relation to one another, means for moving said grip members to a position in which the overlapped portions of the ribbon length are located between said presser foot means and said support means, means for moving said presser foot means from its said lifted position to its said sewing position, and guide means connected to said presser foot means for guiding said overlapped portions of said ribbon to a predetermined position relative to said support means during at least the last part of said movement of said presser foot means towards its said sewing position, thereby to ensure proper parallel and longitudinal overlapping of said ribbon ends during said sewing operation.

2. The apparatus of claim 1 wherein said means for moving said presser foot means from said lifted position to said sewing position includes means operative to initially move said presser foot means to a first position in which said presser foot means and said guide means relatively lightly engage said overlapping ribbon portions, and means for thereafter further moving said presser foot means from said first position to said sewing position during said guidance of said overlapped portions by said guide means.

3. The apparatus of claim 1 wherein said guide means comprises a shoulder on the lower side of the presser foot means facing said support means.

4. The apparatus of claim 1 wherein said guide means is adjustable in position relative to said presser foot means.

5. The apparatus of claim 1 including means for setting said presser foot means for adjustment to different ribbon widths.

6. The apparatus of claim 1 wherein said presser foot means comprises a presser plate and a bar member spaced from said presser plate, said presser plate and said bar member being provided at the free ends of a pair of arms, and means for pivotally supporting said arms at their other ends.

7. The apparatus of claim 6 wherein the one of said arms provided with said presser plate is exchangeable.

8. The apparatus of claim 1 wherein said presser foot means is disposed adjacent a bracket which is fixed in relation to said sewing position.

9. The apparatus of claim 1 wherein said presser foot means is disposed adjacent a bracket, said bracket being mounted for movement between different locking positions relative to said sewing position.

10. The apparatus of claim 1 wherein said means for moving said presser foot means comprises a pneumatic piston and cylinder.

11. The apparatus of claim 1 further including a discard means, and means for activating said discard means subsequent to completion of said sewing operation and after said means for moving said presser foot means has moved said presser foot means to its said lifted position, said discard means being positioned to move a manufactured annular ribbon away from said sewing position to a receiving means for such manufactured ribbons.

12. An apparatus for manufacturing an annular ribbon of predetermined size from a continuous stock of such ribbon comprising a pair of ribbon grip members, means for feeding a length of ribbon from said stock to said grip members, loop forming means operative to form said length into a loop of preselected size, means for cutting the ribbon between one of said grip members and the stock after the formation of said ribbon loop, means for rotating said grip members thereby to overlap the two free ends of the cut length of ribbon, a sewing machine comprising ribbon support means having pressure foot means disposed for movement adjacent thereto, means for moving said grip members, holding the ribbon loop with its ends overlapped, onto said support means of the sewing machine beneath said presser foot means while said presser foot means is in a lifted position relative to said support means, means for moving said presser foot means from its said lifted position to a sewing position in which the overlapped ends of the ribbon loop are pressed between said presser foot means and said support means, and guide means connected to said presser foot means for guiding said overlapped ends to a predetermined sewing position during at least the last part of said movement of said presser foot means to its said sewing position, thereby to ensure a proper parallel and longitudinal overlapping of said ribbon ends relative to one another during the subsequent sewing together of said overlapped ends by said sewing machine.

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