March 23, 1971 F. L. OLDAY 3,572,268

FUR SEWING MACHINE

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FIG. 1.

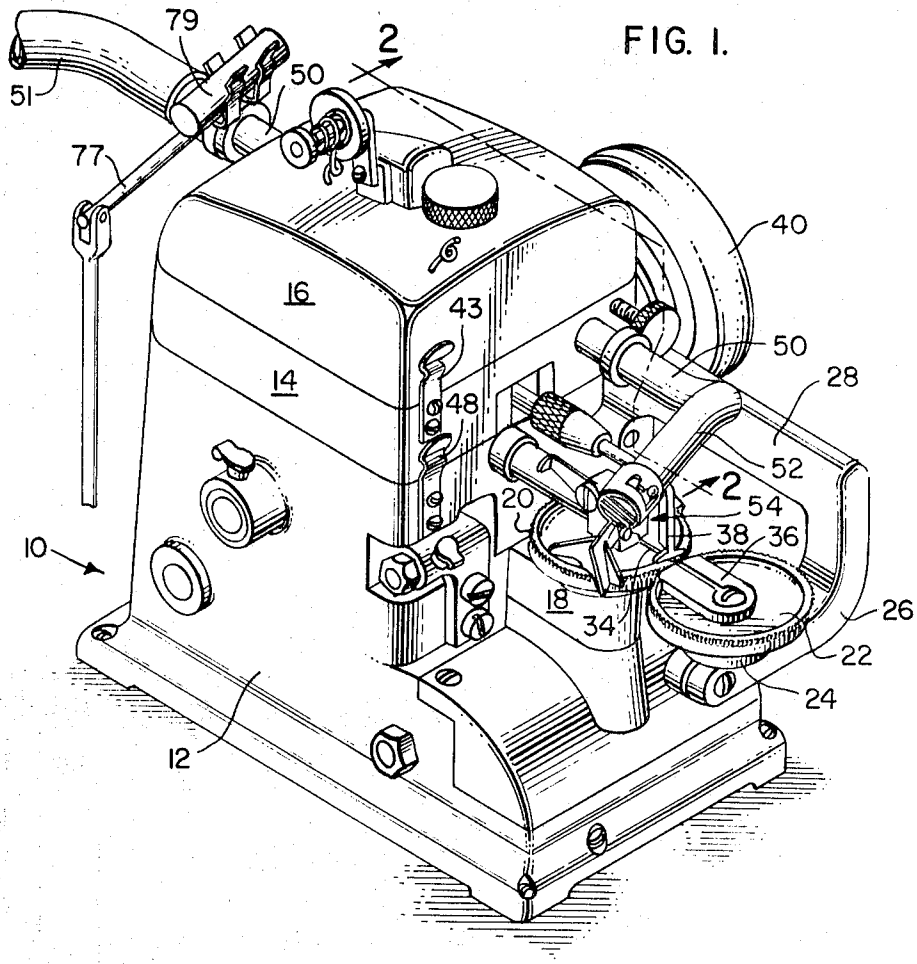
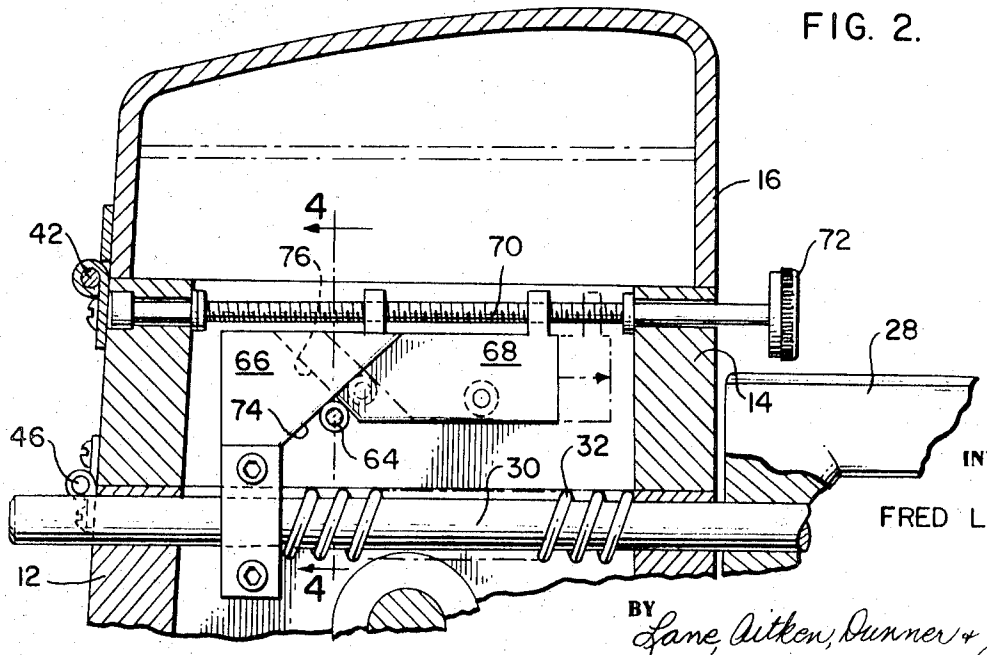


FIG. 2.



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FUR SEWING MACHINE

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FIG. 3.

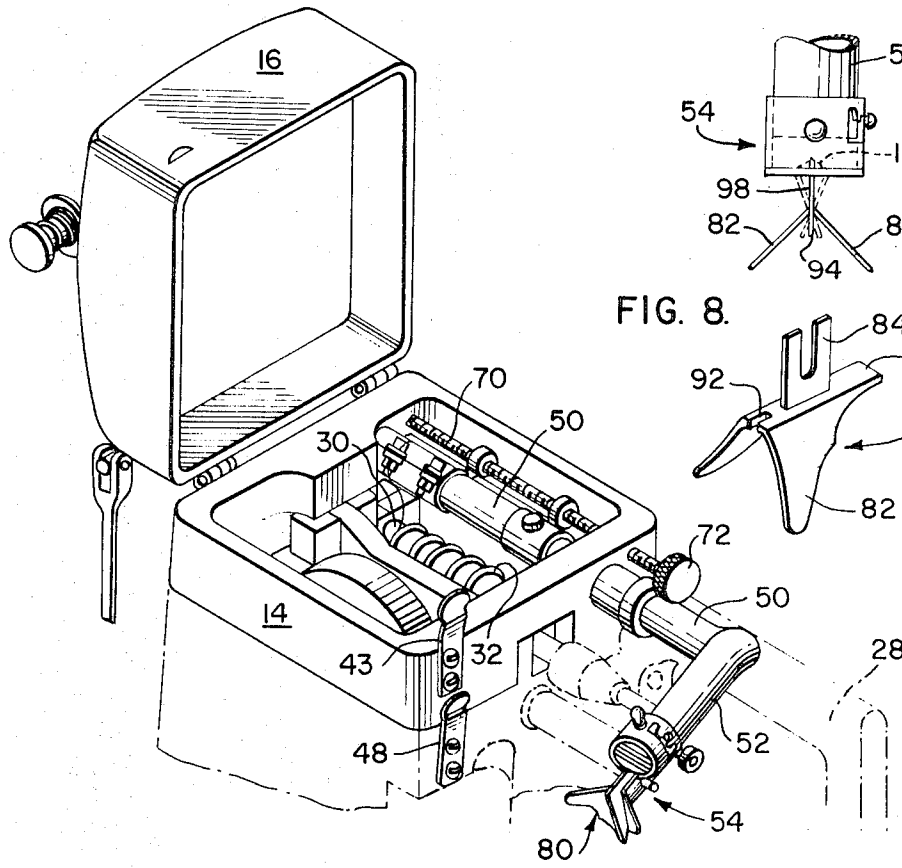


FIG. 7.

FIG. 8.

FIG. 4.

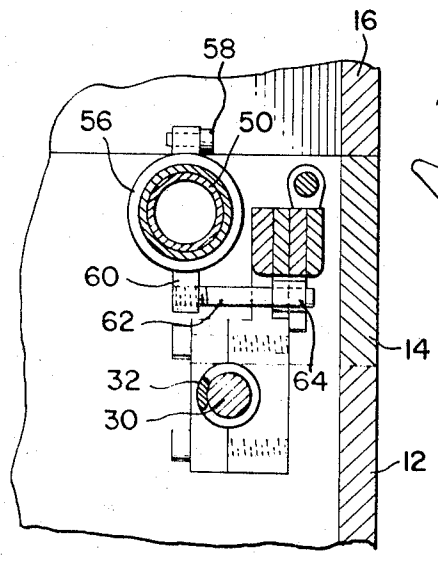
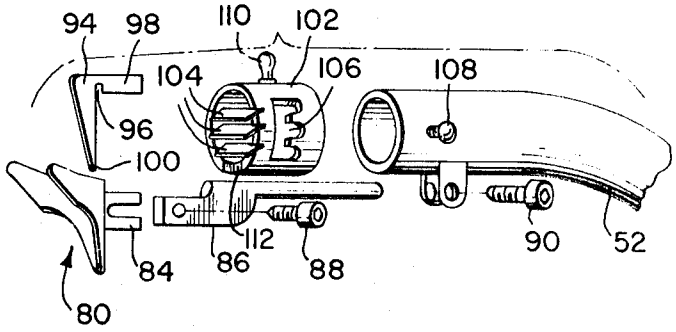


FIG. 6.



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FUR SEWING MACHINE

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FIG. 5.

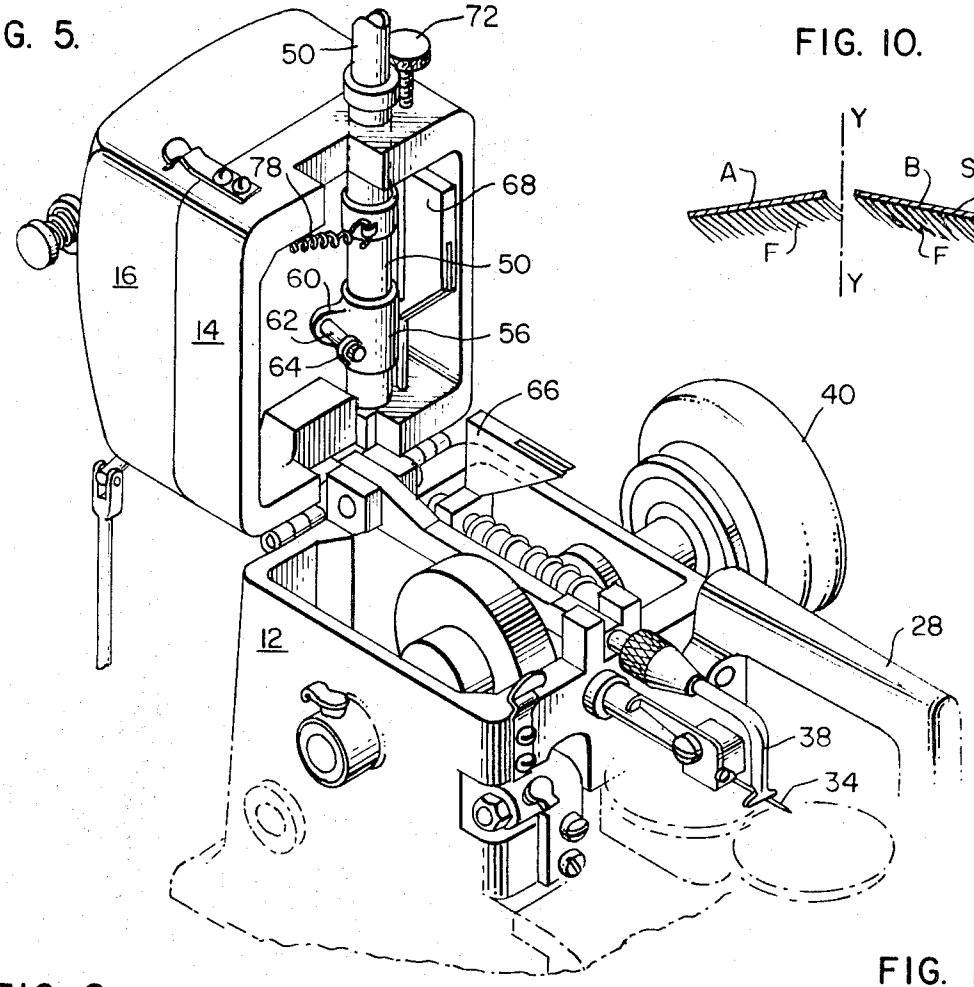


FIG. 10.

FIG. 9.

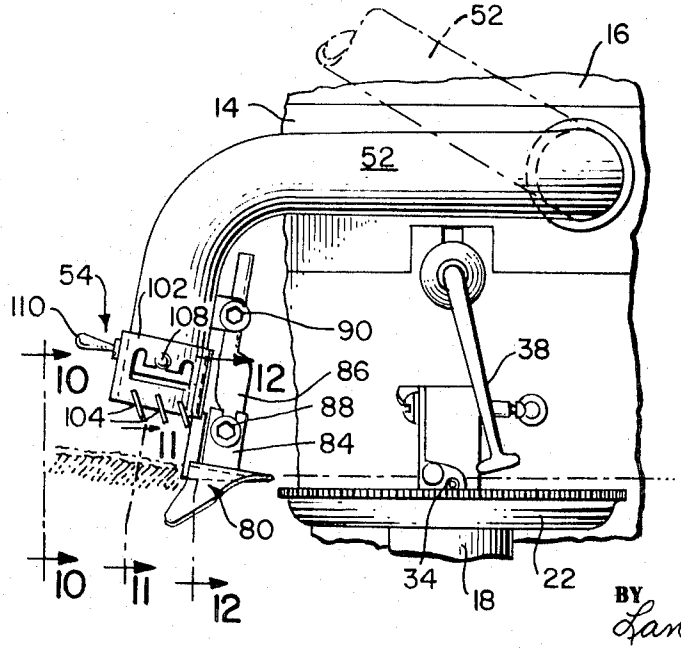


FIG. 12.

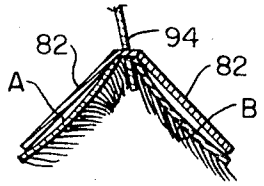
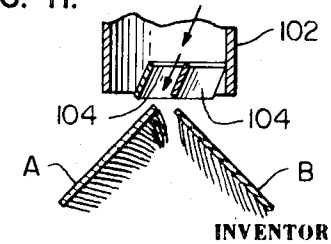


FIG. 11.



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United States Patent Office 3,572,268 Patented Mar. 23, 1971

3,572,268

FUR SEWING MACHINE

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Filed Aug. 22, 1969, Ser. No. 852,413
Int. Cl. D05b 35/00, 23/00
U.S. Cl. 112—149 11 Claims

ABSTRACT OF THE DISCLOSURE

An improved apparatus for guiding strips of fur to the feed mechanism of a fur sewing machine. The apparatus is arranged to maintain a guide shoe in a variably positioned medial plane between a feed wheel pair and also within the medial plane to assure a uniform depth of fur skin taken up by a seam formed between strips to be sewn together. Also, the guide mechanism employs a combined air nozzle and guiding blade whcih is adjustable to account for an imbalance of hair extending from the edges of the fur strips on the seam.

BACKGROUND OF THE INVENTION

This invention relates to improvements in fur sewing machines and more particularly, it concerns an improved guide means for directing strips of fur to the feed mechanism of a fur sewing machine which operates to form a longitudinal seam joining the two strips of fur together.

In the manufacture of fur such as mink for garments, it is common practice to employ the letting out process to modify the shape of a skin before it is sewn together with other skins to form the ultimate garment. The letting out process calls for slicing the skin into diagonal strips ⅛ to ¼ inch in width and sewing the strips together after they have been offset in the direction of slicing to make a longer and narrower skin to run the full length of the garment without seams showing on the fur side. It will be appreciated that this technique of modifying the shape of the skin is extremely tedious and requires highly skilled personnel, even when using currently available, precision sewing machines, because of the tolerances required in making a strong seam without wasting an inordinate amount of the fur strip in the seam itself. In U.S. Pat. No. 2,588,281, issued Mar. 4, 1952 to the present inventor, there is disclosed a guide mechanism for such fur sewing machines by which much of the difficulty theretofore encountered in feeding fur strips to a sewing machine was appreciably alleviated. Essentially, the guide mechanism shown in the aforementioned patent is in the form of an inverted V-shaped guide shoe, having downwardly diverging side blades and a central separating blade, which functions so that the height to which the edge portions of the strips of fur project above the feed wheel pair in a horizontal needle machine can be controlled accurately by varying the height of the guide shoe relative to the feed wheels and needle.

While the basic guide mechanism disclosed in the above-mentioned U.S. patent has proven to be effective in achieving its intended objective (i.e. reducing the time and skill necessary to obtain a uniform and even seam), some difficulty has been experienced in the fur snagging or bunching against the central separating blade of the guide or otherwise extending through to the skin side of the fur and thus interfering with the formation of a completely acceptable seam. A partial solution to this problem is provided by recently developed sewing machines which employ a jet of air positioned ahead of or upstream from the guide shoe, in terms of direction of feed, so that the fur will be blown out from between the

strips of skin to be sewn. In apparatus heretofore available however, the air stream is directed normal to the skins and does not take into account the transverse lie of the fur on the adjacent skin strips to be sewn. In this latter context, it is noted that in most skins which are sliced diagonally in accordance with the letting out process referred to above, the hair on the skin lies in a direction transversely to the length of the strip. As a result, it often occurs that the hair on one of the two strips to be sewn lies or extends away from the edge of one strip whereas on the adjacent strip to be sewn thereto, the hair lies out over the edge to be sewn. As a result of this condition, there is an imbalance of hair on opposite sides of a normal medial plane between the two strips to be sewn. This imbalance of hair is neither accounted for by the air jet developing means in machinery presently available nor is it accommodated by the guide shoe of such machinery.

Another deficiency in available guide mechanisms for fur sewing machines of the type shown in the above-mentioned U.S. patent, is that of maintaining the guide in a central position relative to the nip of the feed wheel pair which presents the edges of the fur strips to the needle of the machine. In this connection, it is noted that in fur sewing machines of this type, one of two cooperating feed wheels is rotated intermittently about an axis fixed with respect to the machine housing whereas the other, though spring biased against the fixed wheel is free to move outwardly from the fixed wheel to accommodate different thicknesses of skins. For example, in the case of mink, the skin thickness in a female hide usually will be about .020 inch whereas the thickness of skin in a male hide will run as high as 0.060 inch. Thus it will be appreciated that the medial plane between the feed rolls will shift outwardly from the fixed roller by a distance corresponding to ½ the variation in the double thicknesses of skins to be sewn. Although optimum guiding of the strips to the wheels requires that the guide shoe be positioned directly on the medial plane between the feed discs, machines heretofore available have fallen short of such optimum guiding because they have not made provision for the varying thicknesses of skins to be sewn.

SUMMARY OF THE PRESENT INVENTION

In accordance with the present invention, an improved apparatus is provided for guiding fur strips to a sewing machine which both compensates for the transverse lie of fur on adjacent skin strips to be sewn as well as for different thicknesses of skin. Essentially, the present invention contemplates a guide shoe resembling that illustrated in the present inventor's prior U.S. Pat. No. 2,588,281, but in which the central separating blade of the shoe is pivotal over at least the forward portion of its length to account for the imbalance of hair on opposite sides of a transverse medial plane passing between the strips to be sewn. Pivotal action of the separating blade is augmented further by an adjustable air jet nozzle which coacts with the separating blade in such a manner that when the blade is pivoted in one direction or toward that strip in which the hair lines away from the edge to be sewn, the air jet will be directed against the hair on the other strip which projects into the space between the two. In this manner, the edges of the skin to be sewn are cleared of hair in a highly effective manner.

Also, the guide shoe and air jet are supported from the sewing machine housing to be adjustable relative to the medial plane between the feed wheels of the sewing machine. Moreover, means are provided for rendering this adjustment automatic in accordance with travel of the movable one of the feed wheel pair as different thicknesses of skin are fed therebetween. Vertical adjustment of the

guide shoe is also contemplated to insure the proper depth of seam uniformly in a manner resembling that of the guide mechanism illustrated in the aforementioned U.S. patent.

Among the principal objects of this invention are therefore: the provision of an improved guide apparatus for fur sewing machines; the provision of an improved guide mechanism of the type referred to, which is adjustable to compensate for the imbalance of hair between a normal medial plane between the strips of fur to be sewn; the provision of such a guide mechanism in combination with an adjustable air jet nozzle to further compensate for the imbalance of hair between the strips as aforementioned; and the provision of a guide apparatus of the type referred to, which will be maintained automatically and precisely on center between the feed wheels of a fur sewing machine. Other objects and further scope of applicability of the present invention will become apparent to those skilled in the art from the detailed description to follow, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a fur sewing machine incorporating the improvements of the present invention;

FIG. 2 is a fragmentary, enlarged cross-section taken on line **2—2** of FIG. 1;

FIG. 3 is a fragmentary perspective view of the machine shown in FIG. 1 but with the cover thereof opened;

FIG. 4 is an enlarged fragmentary cross-section taken on line **4—4** of FIG. 2;

FIG. 5 is a fragmentary perspective view similar to FIG. 3 but with the housing riser portion and cover pivoted to an open position;

FIG. 6 is an exploded view showing the components of the improved guide mechanism of this invention in a retracted position;

FIG. 7 is a fragmentary front elevation of the assembled guide mechanism;

FIG. 8 is an enlarged perspective view illustrating a component of the guide mechanism;

FIG. 9 is an enlarged fragmentary front elevation illustrating the guide mechanism of this invention directing fur strips to the feed wheel pair of a fur sewing machine;

FIG. 10 is an enlarged fragmentary cross-section taken on line **10—10** of FIG. 9;

FIG. 11 is an enlarged fragmentary cross-section taken on line **11—11** of FIG. 9; and

FIG. 12 is an enlarged fragmentary cross-section taken on line **12—12** of FIG. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A fur sewing machine incorporating the improvements of the present invention is shown in FIG. 1 to include a housing, generally designated by the reference numeral **10**, and having a lower base portion **12**, an intermediate riser portion **14** and cover portion **16**. In accordance with conventional practice, the lower housing portion **12** includes a boss **18** for supporting the bearing and final drive components of an intermittently driven, rotatable feed wheel **20** having a fixed vertical axis established by the boss **18**. A second, movable feed wheel **22** is supported freely for rotation, also on a vertical axis, by a journal **24** carried on the lower end of an arm **26** formed as an integral extension of a beam **28** cantilevered from the front end of a slide rod **30** (FIG. 2). Resilient means, depicted by the compression spring **32** in FIG. 2 of the drawings, functions to bias the slide **30** and thus the arm **26** in a direction such that the movable feed wheel **22** is yieldably biased against the fixed feed wheel **20** as shown in FIG. 1. A horizontal needle **34** is carried by reciprocating means supported by the housing base **12** above the feed wheels **20** and **22** in cooperation with a needle guide **36** fixed above the movable feed wheel **22**. The needle **34** cooperates with a looper **38** to form a seam between

two strips of fur skin fed by the wheels **20** and **22** when the machine is driven by power transmitted to a fly wheel pulley **40**.

The sewing machine components described above, as well as all other components thereof supported directly by the lower base portion **12** are conventional and well known to those familar with the fur sewing art. Additional information concerning such sewing machines may be found by reference to the above-mentioned U.S. Pat. No. 2,588,281 and further by reference to U.S. Pat. No. 2,132,379, issued Oct. 11, 1938, to C. Bonis. The point at which the structural organization of the present invention departs from that of conventional fur sewing machines is depicted most clearly in the drawings by the riser **14** and the components carried directly thereby. In this context it is noted that in conventional fur sewing machines, the cover **16** carries a lubricant to be dispensed by suitable means to the movable machine components incased within the lower housing part **12** and is movable away from the upper portion of the housing part **12** to facilitate inspection and maintenance of such sewing machine components. In accordance with the present invention and as shown in FIGS. 1 and 2, the cover **16** is pivotally supported on the riser **14** by hinges **42** located to the rear of the housing and retained in a closed position by latch means **43** on the front thereof. The riser **14**, in turn, is pivotally mounted to the top of the lower housing **12** by similar hinges **46** and retained in a closed position against the housing by resilient latch means **48**. Thus, it will be appreciated that the riser **14**, as well as the parts carried thereby, can be easily incorporated as a module in the existing structure of presently available fur sewing machines merely by inserting the riser between the cover **16** and the lower housing portion **12**.

As shown in FIGS. 1, 3 and 5 of the drawings, a fluid conveying tube **50** is rotatably and slidably supported by the riser **14** by bearing openings formed in the front and rear walls respectively of the riser. The rear end of the tube **50** is connected to a source of compressed air (not shown), by a flexible hose **51**. The portion of the tube **50** projecting from the front of the riser is formed to provide a lateral arm **52** which carries the improved fur strip guiding mechanism of this invention, generally designated in the drawings by the reference numeral **54**. Although the details of the guide mechanism **54** will be described more fully in the description to follow, it will suffice at this point to note that the guide mechanism is positioned relative to the feed wheels **20** and **22** as well as the needle **34**, both in term of vertical elevation or height above the operating plane of the needle and laterally with reference to a vertical medial plane passing through the nip of the rollers **20** and **22**, by movement of the tube **50** on which it is supported by the arm portion **52** thereof. Specifically, relative vertical positioning of the guide mechanism **54** and the feed wheels **20** and **22** is effected by rotation of the arm **50** whereas lateral positioning of the guide mechanism relative to the medial plane of the feed wheel nip is effected by longitudinal sliding movement of the tube **50**.

The manner in which the tube **50** is positioned automatically to bring about proper position of the guide mechanism **54** may be understood by reference to FIGS. 2–5 of the drawings. As shown in FIGS. 4 and 5, a collar **56** is clamped to the exterior portion of the tube **50** extending between the front and rear walls of the riser **14** by suitable means such as clamping screws **58**. The collar is formed with a radially extending ear **60** for supporting a laterally extending pin **62** carrying a cam follower bearing **64** on its outboard end. Thus it will be seen that the locus of the follower bearing **64** will establish both the angular position of the tube **50** and thus of the arm **52** as well as the axial position of the tube **50** relative to the riser **14** in which it is slidably and rotatably mounted. To position the bearing follower, a pair of bifurcated cam members **66** and **68** are adjustably positioned within the

riser **14** as shown in FIG. 2. The member **66** is clamped about the slide **30** to which the movable feed wheel **22** is connected by way of the arm **26** and beam extension **28**, thereby insuring that the cam member **66** will be moved directly with movements experienced by the axis of the feed roller **22** to accommodate different thicknesses of skin fed between it and the fixed roller **20**. The camming member **68** is carried for adjustable fore and aft positioning by a rotatable screw **70** having a position control knob **72** projecting from the front wall of the riser **14**. As shown in FIG. 2, the camming member **66** carries a forwardly and downwardly directed camming surface **74** whereas the camming member **68** carries a rearwardly and downwardly facing, inclined camming surface **76**, the camming surfaces **74** and **76** being formed on bifurcated interleaved fingers so that the members **66** and **68** may be engaged against lateral separation. The respective camming surfaces **74** and **76** extend at 45° to the vertical and merge to establish an inverted V-shaped cradle for the follower bearing **64**. The effect of this arrangment is that if the member **66** is moved forwardly by outward movement of the feed wheel **22** to accommodate an increased thickness of skin fed between it and the fixed feed wheel **20**, the point of intersection between the camming surface **74** thereon and the camming surface **76** on the member **68** will be advanced forwardly by half the distance through which the member **66** is moved. Hence, the tube **50** and guide mechanism **54** will similarly be moved so that the latter maintains a medial position between the feed rollers assuming that such medial position was established initially. Manual adjustments of the position established by the locus of the bearing follower **64** may be made by rotating the knob **72** to change the fore and aft position of the bearing member **68**. The bearing follower **64** is maintained in the cradle established by the surfaces **74** and **76** by a treadle (not shown) connected to linkage **77** coupled to the rear end of the tube **50**. A return spring **78** (FIG. 5) imparts a rotational bias on the tube **50** against the treadle. Also, a mercury switch **79** (FIG. 1) is carried by the link **77** to control the delivery of air to the hose **51** in a known manner.

A more complete understanding of the guide mechanism **54** and its operation may be had by reference to FIGS. 6–12 of the drawing. As shown in FIGS. 6–8, the guide mechanism **54** includes a guide shoe **80** having an elongated ridge plate **81** and a pair of outwardly diverging side blades **82** extending from the sides of the ridge plate **81**. A bifurcated supporting plate **84** extends upwardly from the ridge plate **81** for attachment to a strut **86** by a screw **88**, the strut **86**, in turn, being attached adjustably to the terminal end of the tube arm **52** by a further screw **90**. The leading end of the shoe **80** is formed with a notch **92** (FIG. 8) in the ridge plate portion **81** to receive a pivotal separating blade **94** (FIG. 6) having a similar notch **96** formed therein at the base of an upstanding control lever portion **98**. As shown most clearly in FIG. 6, the separating blade **94** tapers rearwardly to a point **100** at its trailing end. The shoe **80** and separating blade **94** are preferably assembled by advancing the blade **94** longitudinally under the ridge plate **80** of the shoe until the notches **92** and **96** interengage to establish a pivotal connection between the blade **94** and the shoe **80**. To secure the assembly, the trailing tip **100** of the blade **94** is soldered, welded or otherwise fixed to the ridge plate **81** centrally thereof. Since the trailing tip **100** undergoes very little if any movement, this manner of connecting the separating blade **94** to the shoe **80** will permit pivotal movement of the leading end of the blade **94** relative to the shoe **80** with a slight measure of flexing in the blade **94** due to the fixed connection of the tip **100** thereof to the shoe.

An air nozzle in the form of a cylindrical sleeve **102** is rotatably mounted on the open end of the tube arm **52** and carries a plurality of inclined louver-like vanes **104** or other fluid directing means across the terminal end or mouth thereof. An aperture **106** formed in the side of the sleeve **102** is notched to cooperate with a pin **108** on the arm **52** to facilitate angular adjustment of the nozzle and thus of the vanes on the tube arm **52**. A knob **110** may be provided on the nozzle **102** to facilitate such adjustment manually. Also, it is to be noted that the mouth end of the sleeve **102** is formed with a notch **112** to receive the control arm **98** on the separating blade **94**, the assembled connection of these two members being illustrated most clearly in FIG. 7 of the drawings.

The notch **112** is located to lie in a diametric plane normal to the vanes **104**, or parallel to the direction in which air is deflected by the vanes **104**, and on the side of the sleeve **102** toward which the air is directed by the vanes. Because of this arrangement, when the nozzle **102** is rotated to change the direction of air flow as directed by the vanes **104**, the upstanding control arm **98** on the separating blade **94** will be carried with the notch to pivot the blade **94** in a direction opposite to that in which air is directed by the vanes. The importance of this interrelation of the blade **94** and the nozzle **102** may be appreciated by reference to FIGS. 10–12 of the drawings. The cross-section through a pair of fur strips A and B in FIG. 10, is taken at a plane located immediately upstream of nozzle **102** as it is shown in FIG. 9. The two strips A and B each include a skin S and fur F, the skins being symmetrically disposed relative to a medial plane Y—Y which lies midway between the feed wheels **20** and **22**. Because of the natural pitch or lie of the fur F on the respective skins, the fur on the strip A extends over the edge of the skin and into the medial plane Y—Y whereas the fur on the skin B extends in the other direction or away from the medial plane Y—Y. Inasmuch as the fur sides of the two strips A and B are brought against one another by the feed wheels **20** and **22** in the actual sewing operation, it will be appreciated that the fur on the strip A will tend to project behind the skin S and pose problems to the development of an effective seam. In accordance with the present invention however, this problem is overcome in part by the directional air nozzle **102** and in part by pivotal movement of the separating blade **94**. Specifically, and as shown in FIG. 11, upon passing under the air nozzle **102** which has been adjusted to direct air more heavily against the fur of the strip A than on the strip B, the fur tending to project up through the seam on the strip A will be blown downwardly as shown. Because there will be a build-up of fur on the sewing edge of the strip A, the corresponding pivotal action of the separating blade **94** as shown in FIG. 12 will compensate for this build-up and facilitate the guiding of the strips to the feed wheels **20** and **22** of the sewing machine. Yet the adjacent or seam edges on the respective strips A and B will be presented in true overlying coextensive relation to the feed wheels **20** and **22**, the height of the skin above the needle **34** being governed by the lower surface of the ridge plate **81** in the manner described in the aforementioned U.S. Pat. No. 2,588,281.

To prepare the machine for operation, the operator first determines the lie of the fur F on the two strips A and B to be sewn and adjusts the nozzle **102** so that the proper notch in the opening **106** therein registers with the pin **108** on the arm **52**. In the example illustrated in FIGS. 10–12 of the drawings, the nozzle would be adjusted so that the vanes **104** therein were inclined toward the left of the medial plane Y—Y and so that the blade **94** beneath the ridge plate **81** in the shoe **80** is inclined toward the right as shown respectively in FIGS. 11 and 12. If on the other hand, no detectable imbalance of hair at the edges of the strips to be sewn could be observed, the nozzle and thus the blade would be adjusted to a neutral position or one in which the vanes were directed in line with the medial feed plane Y—Y and so that the blade **94** assumed a truly vertical position. Correspondingly, if the imbalance of fur on the strips were the reverse of that shown in FIGS. 10–12, the nozzle and

blade would be adjusted to the opposite direction of that shown.

Because of the return spring **78** (FIG. 5), the rest position of the arm **52** will be elevated to that shown by phantom lines for example, in FIG. 9 of the drawings. To initiate the sewing operation, the treadle (not shown) to which the linkage **77** is connected is depressed, causing air to flow through the tube **50** and out through the nozzle **102**, and rotating the tube **50** so that the arm moves downwardly to the position illustrated in solid lines in FIG. 9 of the drawings. This operative position of the arm **52** and thus of the guide mechanism **54** is established by engagement of the follower bearing **64** on the pin **62** connected to the tube **50** (FIGS. 2 and 4) moving into the inverted V-shaped cradle established by the inclined camming surfaces **74** and **76** on the members **66** and **70** respectively. As various thicknesses of skins are incurred, causing outward movement of the feed wheel **22** relative to the fixed axis feed wheel **20**, the cam member **66** will be moved accordingly. Because of the 45° disposition of the cam surfaces **74** and **76**, the locus of the cradle formed thereby and thus of the bearing follower **64** will be moved through half the distance through which the wheel **22** is moved to maintain the feeding center of the guide shoe **80** and blade **94** on the medial plane between the feed wheels **20** and **22**. Some attendant vertical repositioning of the guide shoe **80** will occur with such lateral positions. Because the swing of the shoe approaches tangency with the plane of the needle **34**, however, such vertical repositioning will be negligible. If on the other hand, the wheel moves through a distance exceeding that anticipated with the particular skins of the fur strips being sewn, an appropriate adjustment can be made by repositioning the cam member **68** by manual rotation of the knob **72**.

Thus it will be appreciated that by this invention there is provided a highly improved guide mechanism for fur sewing machines and by which the above-mentioned objections are completely fulfilled. Although the embodiment disclosed is preferred, structural variations therefrom are contemplated. Accordingly, the foregoing description is intended to be illustrative and not limiting in connection with the true spirit and scope of the present invention.

What is claimed is:

1. A guide for directing strips of fur to a fur sewing machine, said guide comprising: a guide shoe having an elongated ridge plate portion and a pair of outwardly diverging side blades extending from said ridge plate portion, and a separating blade mounted centrally along said ridge plate portion extending between said side blades in generally parallel relation to the direction of strip feed, said separating blade being pivotable over at least the front portion of its length at the juncture thereof with said ridge plate portion toward one or the other of said side blades.

2. The apparatus recited in claim **1** wherein said separating blade is pivotally connected at its front end to the front end of said guide shoe, the trailing rear end of said separating blade being fixed to said guide shoe.

3. The apparatus recited in claim **2** wherein said separating blade tapers to a point on its trailing end.

4. The apparatus recited in claim **1** wherein said separating blade and said ridge plate portion are formed having inter-engaging notches to secure said separating blade pivotally to said shoe.

5. The apparatus recited in claim **1** including means to adjust and secure the pivotal position of said separating blade relative to said shoe.

6. Apparatus for guiding strips of fur to a fur sewing machine, said apparatus comprising in combination: a guide shoe having an elongated ridge plate portion and a pair of outwardly diverging side blades extending from said ridge plate portion, a separating blade mounted centrally along said ridge plate portion and extending between said side blades, said separating blade and said side blades establishing adjacent paths of feed for a pair of fur strips to be sewn, one such path on each side of said separating blade, said separating blade being pivotable over at least the front portion of its length at the juncture thereof with said ridge plate portion toward one or the other of said side plates, and means positioned in front of said guide shoe for discharging a stream of air between said paths of feed to clear hair from the edges of the skin of the fur passing through said guide shoe and to be joined by sewing.

7. The apparatus recited in claim **6** wherein said air stream discharging means is adjustable to direct the stream to one side or the other of a medial plane between the paths of strip feed.

8. The apparatus recited in claim **7** including means interengaging said air stream discharge means with said separating blade so that said separating blade is pivoted to the side of said medial plane opposite from the side of said plane to which said air stream is directed.

9. The apparatus recited in claim **6** wherein said air stream discharging means comprises a nozzle in the form of a rotatably adjustable cylindrical sleeve defining a discharge mouth, and at least one inclined vane across said mouth to direct air in the direction of inclination of said vane.

10. The apparatus recited in claim **9** wherein said separating blade includes an upstanding control arm near the front portion thereof, and means engaging said control arm with said sleeve to pivot said separating blade in a direction opposite to that direction in which the air stream is directed by said nozzle.

11. The apparatus recited in claim **10** wherein said means engaging said sleeve with said control arm includes a notch formed in the mouth end of said sleeve, said notch receiving the upper end of said control arm and being located in a diametric plane normal to said vane and offset from said vane in the direction to which the air is directed thereby.

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