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3,404,645

BRIM STITCHER

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FIG. 1

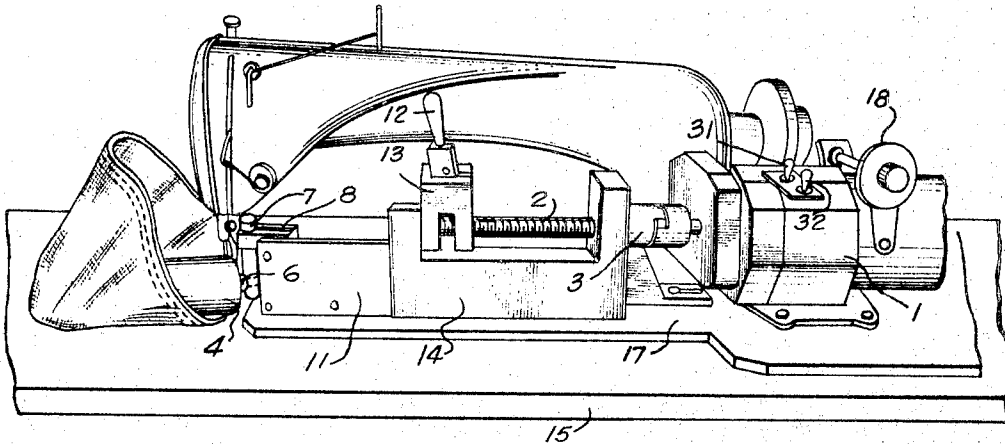


FIG. 2

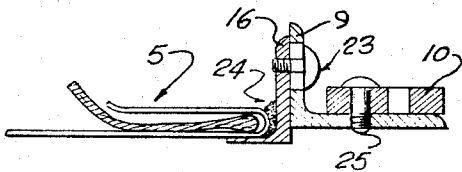
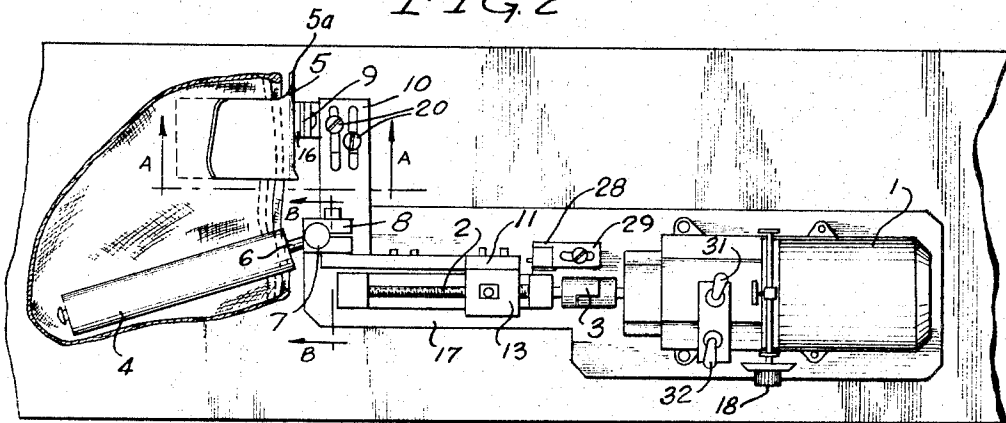


FIG. 3

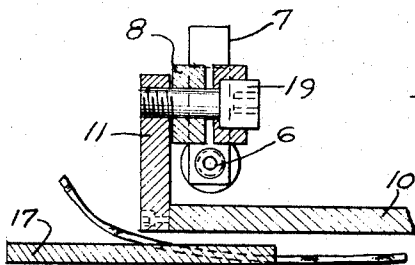


FIG. 4

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1

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BRIM STITCHER

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7 Claims. (Cl. 112—2)

ABSTRACT OF THE DISCLOSURE

A unitary guide attachment for spiral stitching of a frustoconical hat brim on a conventional sewing machine includes a guide for shifting the edge of a hat brim with respect to the sewing needle as the brim is progressively urged in a direction transversely of the stitching direction under the influence of an inclined roller, both the guide and the roller being carried by an arm progressively driven by a worm drive coupled to an electric motor through an adjustable speed reducer.

This invention relates to a sewing machine attachment which is especially adapted for stitching hat brims. The attachment provides synchronization with, but is independent of, the speed at which the sewing machine to which it is attached is stitching.

Prior art brim stitching attachments are rather complicated and require much time and skill to install. Further, these older attachments cannot be installed unless the sewing machine itself is substantially modified. The prior art equipment, even though incorporating some advancements, still requires the services of a skilled operator. This invention, however, overcomes these difficulties.

The object of this invention is to provide an attachment which can be easily installed to operate in conjunction with a wide variety of conventional sewing machines to thereby extend the capabilities of these sewing machines to include hat brim stitching.

It is another object of this invention to provide an attachment for use in conjunction with a conventional sewing machine which permits selecting and controlling the width of spacing between adjacent rows of stitching.

It is another object of this invention to provide an attachment for use in conjunction with a conventional sewing machine which permits correlating the width of spacing between adjacent rows of stitching with the speed of stitching of the sewing machine thus obtaining uniformly spaced rows of stitching regardless of hat size when stitching hat brims.

Another object is to provide an attachment which can be easily adjusted once installed, thereby reducing the time required to stitch hat brims.

Another object is to provide means for holding the hat while being stitched, thereby reducing the amount of handling required.

These and other objects of the present invention will become apparent from the following description taken in conjunction with the drawings in which:

FIG. 1 is a perspective view of the device attached to a conventional sewing machine;

FIG. 2 is a plan view of the novel brim stitching attachment;

FIG. 3 is a view taken on the line A—A of FIG. 2 showing the brim guide; and

FIG. 4 is a view taken on the line B—B of FIG. 2.

The unitary brim stitching attachment according to this invention includes a brim engaging roller 4 and a U-shaped brim guide 5, both supported and driven for brim guiding movement, as described hereinafter, by means including: an electrically driven speed reducer 1 and a worm drive 2 with a flexible coupling 3 therebe-

2

tween, and a rigid supporting structure movable by the worm drive and carrying both roller 4 and guide 5.

The unit shown in FIG. 2 is attached to any conventional sewing machine to obtain the arrangement of FIG. 1. The unit is mounted upon a base plate 17 which is secured to the sewing machine table 15 in any convenient manner. The location of the unit with relation to the feed dog and presser foot of the sewing machine is important. With the base 17 of the unit parallel to the sewing machine table, the brim stitcher unit is positioned so that the brim guide 5 just misses the front of the feed dog and the guide extension 5a barely clears the right side of the presser foot. The guide extension 5a extending rearwardly from the junction of the legs of the brim guide will thus provide additional support laterally adjacent the presser foot to the edge of a hat brim during a stitching operation. The brim guide 5 can be adjusted relative to the support member 10 by means of adjusting bolts 20. When the brim guide 5 is in correct position in relation to the feed dog and presser foot of the sewing machine the sewing machine head can be tipped back without removing the brim stitcher from the sewing machine table. A variable speed reducer 1 is coupled by a flexible coupling 3 to a lead screw 2 having uniform pitch and mounted upon a U-shaped lead screw support 14. A U-shaped yoke 13, which is essentially a travelling nut, is in threaded engagement with the lead screw 2. As the variable speed reducer 1 drives the lead screw 2, the nut 13 travels along the threads of the lead screw. A drive arm 11 mounted upon the side of nut 13 is connected to a support member 10. The adjustable feed roll 4 is supported on the arm 11 by an adjusting pin 7 held in a universal clamp 8 and the brim guide 5 is mounted upon the support member 10 secured to arm 11. One portion of the hat brim is placed within the brim guide 5 as shown in FIGS. 2 and 3; another portion passes around the feed roller 4.

The hat brim feeds continuously through the horizontally disposed brim guide 5 and is guided thereinto as it passes around the surface portion of roller 4 which faces, and is freely exposed, toward the operator or away from the guide 5. A conventional feed dog found on any sewing machine, not shown, but located in close proximity below the sewing machine needle and mounted upon the sewing table, causes the hat band to feed about the roller 4. The axis of roller 4 is spaced from the brim guide 5 and is oriented as to generally converge with the path of movement of the guide in the direction of its progressive movement so that the roller will urge the brim against the guide during such movement. As the hat brim feeds about roller 4, the travel of the nut 13 on lead screw 2 moves arm 11 attached to nut 13 laterally. Movement of arm 11 is transmitted by direct connection to the support member 10 upon which the brim guide 5 is attached. As the hat brim is pulled around the roller 4 and directly therefrom through the guide 5 to the point of stitching it is also moved in a direction transverse to the direction of stitching by the sewing action, whereby the sewing machine stitches a continuous spiral band upon the hat brim with the successive rows of stitching being uniformly spaced. The brim guide 5 controls the linear distance the brim moves to the right under the influence of roller 4 during one turn of the hat brim.

The independently powered speed reducer unit 1 has an infinite number of speed adjustments ranging from zero to 10 r.p.m. which may be selected by manipulation of control 18. Accordingly, extremely precise adjustments can be made to assure for a desired spacing between successive rows of stitching that the rate of travel of nut 13 has the necessary relationship to the particular sewing machine speed selected, which relationship is dependent upon the size of hat.

Switch 28, carried by adjustable mounting 29, is electrically connected with both the sewing machine motor (not shown) and the variable speed reducer 1. As the lead screw draws the nut 13 from left to right, the drive arm 11 trips the microswitch 28 when the nut reaches the limit of its length of travel. The point at which tripping occurs can be varied by selectively positioning its adjustable mount 29. Accordingly, a wide variety of brim widths can be accommodated. Toggle switch 31 is connected to the sewing machine motor (not shown) for activating and deactivating this motor in conventional manner. Toggle switch 32 is for energizing the speed reducer. The wiring is conventionally arranged such that the sewing machine motor is energized by closing switch 31 and that the speed reducer cannot run unless the sewing machine motor is turned on. Switch 32 is used to turn on the speed reducer once the sewing machine motor is energized.

A half nut toggle 12 when operated, causes nut 13 to engage lead screw 2 for travel along the length of the lead screw.

The drive arm 11 is rigidly mounted along the side of nut 13 to impart the travel rate of nut 13 to support member 10 and clamp 8. FIG. 4 shows drive arm 11 fixedly connected to support member 10. The feed roll adjusting pin 7 is mounted within the universal clamp 8. Socket head screw 19 adjusts the compression of the universal clamp. Feed roll 4 is mounted by passing the feed roll shaft 6 through the adjusting pin 7 as shown. Screw 19 passing through clamp 8 permits raising, lowering, or turning the adjusting shaft 7, to thereby place roll 4 in any desired angular position relative to the brim guide 5 and to the table of the sewing machine.

The brim guide is shaped with wide flat upper and lower legs extending horizontally and parallel to the sewing machine table as in FIG. 3 to allow the hat brim to pass through freely yet make contact with a substantial area of the brim to prevent any longitudinal slippage of the brim as it is fed to the sewing machine.

As the hat brim moves under the influence of the sewing action, the brim guide 5 which is moved at a uniform rate by lead screw 2 allows the hat brim to move so that uniform spacing of the rows of stitching results.

The brim guide 5 is adjustably mounted by brackets 9 and 16 on the support member 10 which forms a rearward extension of the arm 11. One mounting bracket 9 is horizontally adjustable on member 10 in the direction of machine feed by means of screw 20 extending through slots in the member 10. A second mounting bracket 16 is secured to the bracket 9 by a screw 23 which is vertically adjustable in a slot in bracket 9. The brim guide 5 is secured to bracket 16 in any conventional matter such as by brazing or silver soldering at 24. Thus the brim guide 5 may be adjusted with respect to the table 15 so that its legs are horizontally disposed and properly positioned with respect to the table and the feed dog of the machine.

To operate this device the operator places the unit upon a sewing machine table in proper relationship to the feed dog (not shown) and the needle of the sewing machine. A hat brim is placed through guide 5 and around roller 4. The hat brim is rotated by the feeding action of the feed dog (not shown). No power is transmitted by the feed roll 4. It rotates passively as the hat brim passes around its surface. The purpose of the feed roll is to control the angle at which the hat brim enters the brim guide 5. The feed roll must be adjusted so that the brim is urged to the right within brim guide 5, as seen in FIGURES 2 and 3, continually in full contact with the upper and lower legs of the brim guide 5. The lead screw 2 turns in a direction whereby the hat brim is fed toward the speed reducer 1.

The spacing of successive rows of the stitching for any selected speed of sewing machine operation is controlled by adjusting the speed reducer. Wider spacing is obtained by increasing the speed of lead screw 2 by adjusting the variable speed reducer while closer spacing is obtained by decreasing this speed. After spacing of the stitching is

selected the sewing needle is threaded. With nut 13 in driving engagement with lead screw 2 and the hat brim held in the desired position by the brim guide, switch 31 is closed. The sewing machine will start sewing. After the brim has made one complete turn the operator closes switch 32 which will start the speed reducer. No further manual operation is necessary. When the drive arm 11 feeds to the pre-selected position (which can be varied by the adjustable mount 29) microswitch 28 trips, thereby stopping both the sewing machine and the speed reducer. After opening switches 31 and 32, the toggle 12 may be actuated to disengage nut 13 from drive screw 2 to permit the guide 5 and roller 4 on arm 11 to be repositioned for a successive sewing operation. Repositioning of arm 11 releases the tripped microswitch 28.

I claim:

1. A unitary attachment for guiding spiral stitching of a hat brim on a sewing machine comprising:

(a) a base adapted to be secured to a sewing machine, (b) drive means mounted on said base and including a support structure progressively movable relative to said base by operation of the drive means and in a direction transverse to the direction of stitching of the machine,

(c) a brim guide secured to said support structure and having a portion engageable with the edge of a hat brim on the side thereof in the direction of said progressive movement of the structure relative to said base to variably position the brim in accordance with such movement,

(d) a roller carried by said support structure and having a freely exposed surface portion facing away from said guide, said roller having an axis of rotation which remains fixed with respect to said support structure during a spiral stitching operation, said axis being substantially spaced from the brim engaging portion of the brim guide and so oriented as to generally converge with the path of movement of the brim guide in the direction of its progressive movement, said surface portion being positioned to provide rolling engagement with successive portions of the brim as they move therearound directly to the point of stitching and to urge the brim against the guide in the direction of said progressive movement during a spiral stitching operation,

(e) speed control means included in said drive means for adjusting the rate of movement of said support structure relative to the stitching rate of the sewing machine to permit substantially uniform spacing of the spiral stitching on a wide range of brim sizes.

2. The attachment as set forth in claim 1 wherein said brim guide comprises flat legs arranged to be engageable, respectively, with opposite faces of the brim with a junction of said legs arranged to be engageable with the edge of the brim, said guide further including an extension projecting from said junction in the direction of stitching to engage the edge of the brim laterally adjacent the presser foot of the sewing machine.

3. The attachment as set forth in claim 1 including universal clamping means for adjusting the angle of said roller relative to said brim guide and to table of the sewing machine.

4. The attachment as set forth in claim 1 wherein said brim guide comprises a U-shaped member, the legs of said member being horizontally disposed parallel to the sewing machine table.

5. The attachment as set forth in claim 4 including means for adjustably mounting the roller on said support structure comprising:

(a) a universal clamp adjustably secured to said support structure; and

(b) an adjusting pin passing within the clamp and having means for mounting said roller thereon.

5

6. The attachment as set forth in claim 4 wherein said speed control means comprises:

- (a) a lead screw-housing;
- (b) a lead screw mounted in said housing;
- (c) a yoke member having internal threads, said yoke adapted to be meshed with said lead screw and connected to said drive member; and
- (d) a variable speed reducer driving said lead screw.

7. The attachment as set forth in claim 6 wherein said support structure comprises:

- an arm, one end of which is mounted on said yoke, the other end adjustably mounting said roller and a support member, said support member extending from said arm and including means for adjustably mount-

6

ing said brim guide in a position parallel to the sewing machine table.

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