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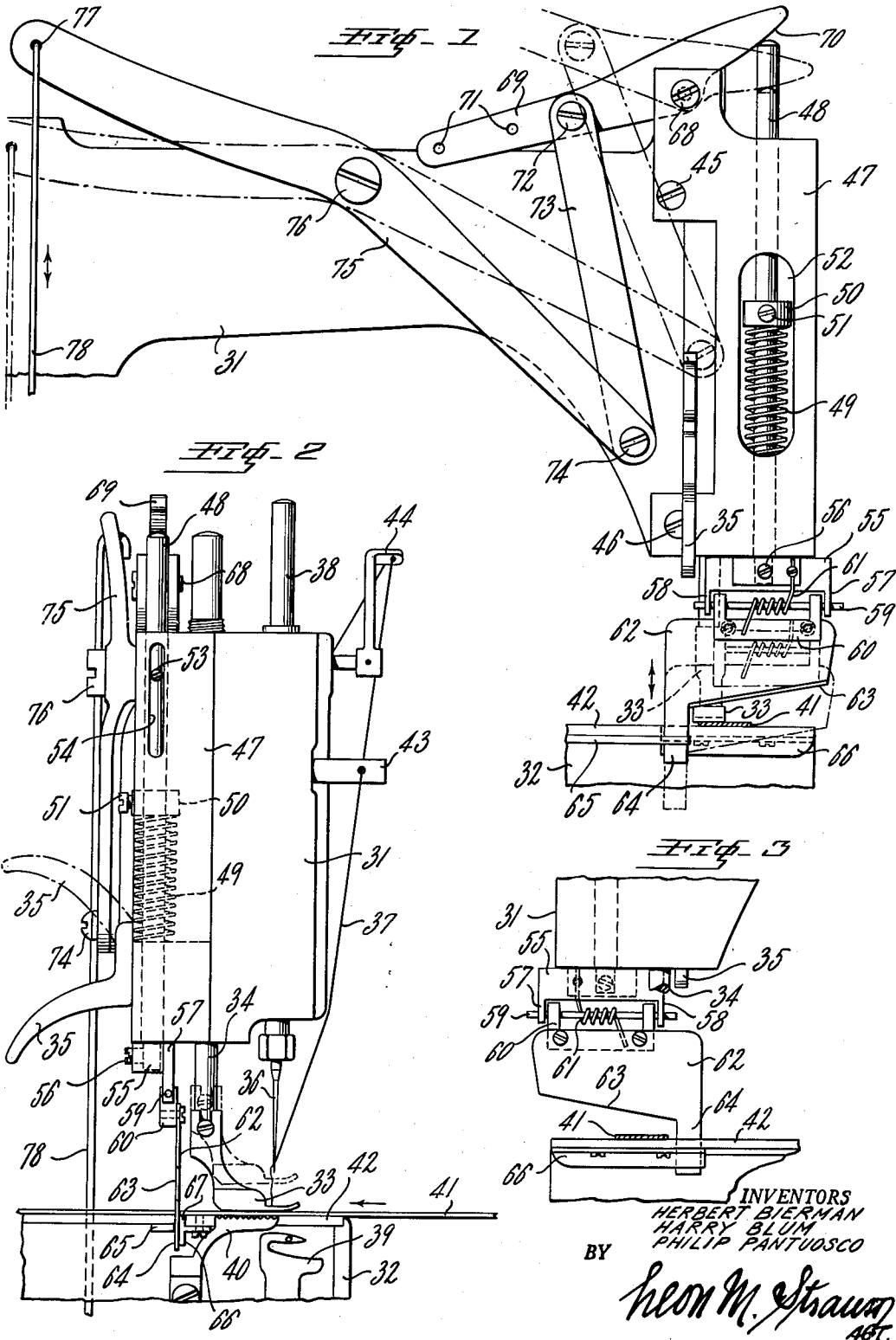
H. BIERMAN ET AL

2,736,282

SEVERING ATTACHMENT FOR SEWING MACHINES

Filed March 5, 1951

3 Sheets-Sheet 1



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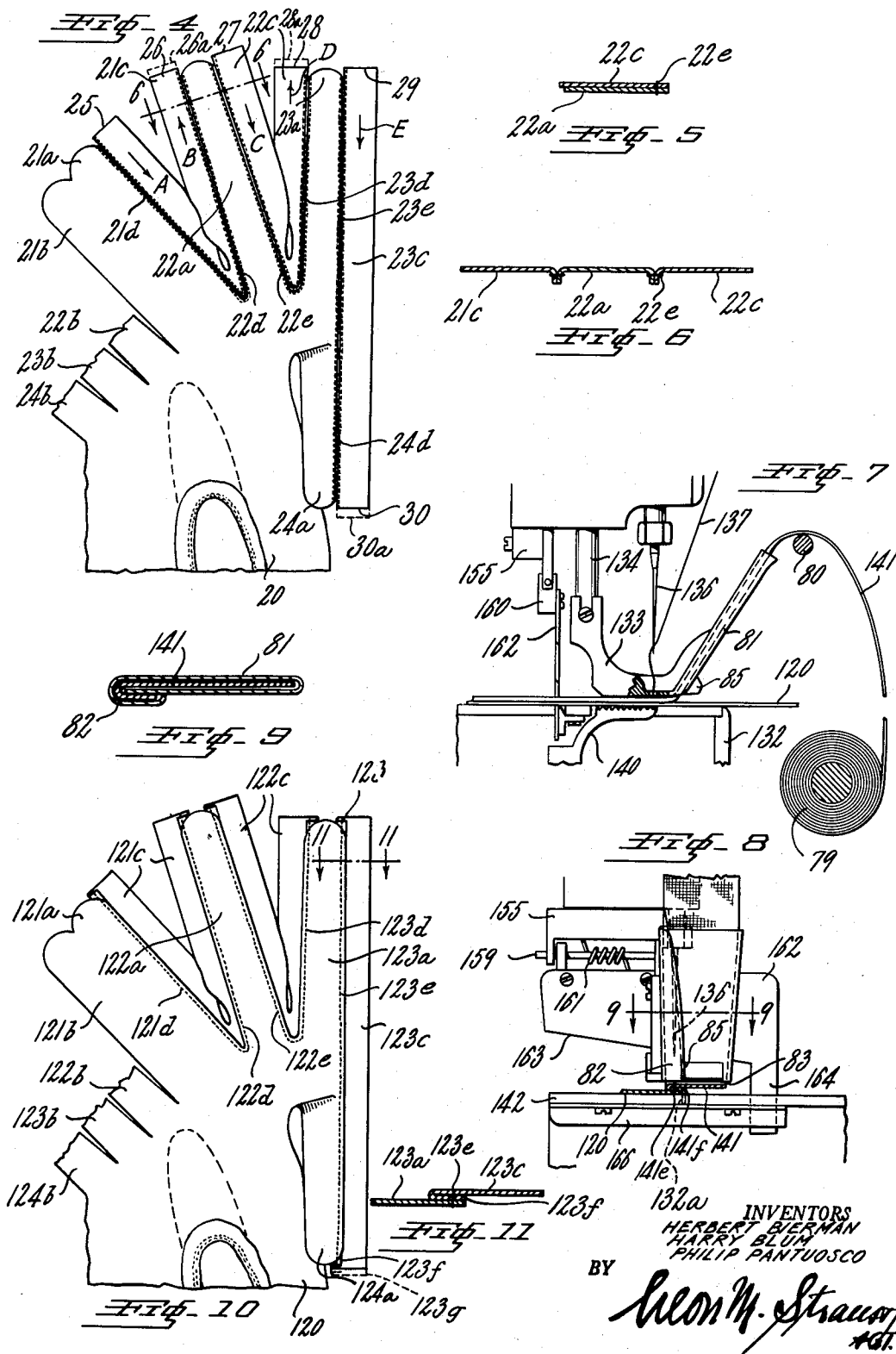
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

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## SEVERING ATTACHMENT FOR SEWING MACHINES

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2 Claims. (Cl. 112-130)

This application relates to a process and means for application of strip or like lengthy material to articles, such as gloves, corsets, and the like, for finishing purposes.

It is one of the objects of the present invention to provide means affording sewing of strip material of different lengths onto gloves and like articles to complete and finish the same whereby strips cut to different lengths form the fourchettes or keils of the fingers of the glove.

It is another object of the present invention to provide means facilitating application of lengthy strip material to the fingers of a glove providing fourchettes therefor, and cutting said strip material to predetermined length after it has been combined with the article whereby considerable reduction in waste of material and of working time is achieved.

It is still a further object of the present invention to provide means conducive to a marked decrease in the manufacturing cost of gloves, corsets and similar wearing apparel in which endless strip material is employed, fed, guided and sewn to the article, and subsequently cut.

Yet a further object of the present invention is to provide means rendering the possibility of simplifying the heretofore known operational steps in glove and similar manufacturing processes while simultaneously increasing the rate of safety for the worker.

Still another object of the present invention is to provide means facilitating speedy operation in the manufacture of gloves and like wearing apparel and resulting in an improved appearance of the finished glove and like product while strip material from a supply roll is used in making fourchettes or keils and cutting same to required length substantially exactly coextensive with the corresponding fingers of a glove and immediately upon termination of respective sewing operations.

It is also an object of the present invention to provide means adapting a conventional sewing machine to serve as a cutting mechanism for lengthy fabric or like strip or tape after the same has been sewn onto a body of fabric or like pliable material, means being further provided preventing untimely operation of said cutting mechanism so as to insure safety for the operator and to guard against rejects, impairment, defects and other damage of the body from which the finished product is obtained.

These and other objects and features will become apparent from the following detailed description, reference being had to the accompanying drawings:

In the drawings:

Fig. 1 shows, in rear elevation, part of a sewing machine with a cutting mechanism according to the invention;

Fig. 2 is a side elevation of the machine with the mechanism seen in Fig. 1.

Fig. 3 is a fragmentary front elevation of the machine with cutting mechanism;

Fig. 4 shows a glove in developed form to which the process according to the present invention is applied;

Fig. 5 is a fragmentary sectional view of two super-

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posed and stitched pieces of material employed in the manufacture of the glove;

Fig. 6 is an enlarged sectional view taken along line 6-6 of Fig. 5;

Fig. 7 is a view similar to that of Fig. 2, showing the lower part of the sewing machine only which is provided with attachments for folding a lengthy tape material and guiding same for the ensuing sewing and cutting operations performed on said machine;

Fig. 8 is a front view of the lower part seen in Fig. 7.

Fig. 9 is a section of the attachment drawn to an enlarged scale and taken along line 9-9 of Fig. 8;

Fig. 10 is a view similar to that of Fig. 4, showing the inside of a blank of a glove in the process of being finished with the aid of fourchettes passed through the attachment shown in Figs. 7 to 9;

Fig. 11 is a section drawn to an enlarged scale and taken along line 11-11 of Fig. 10;

Fig. 12 shows schematically the drive for the cutting mechanism;

Fig. 13 is an enlarged section taken along line 13-13 of Fig. 12; and

Fig. 14 is an end view of Fig. 12, showing only the lower part thereof.

For a thorough understanding of the invention, reference is first made to Figs. 4, 5 and 6 showing some operational steps in the manufacture of a glove. A blank 20 (Fig. 4) has been die-cut or otherwise preformed and comprises a number of lobes designed to form the fingers 21a and 21b (forming a unit) and the further lobes 22a, 22b, 23a, 23b, 24a and 24b. Lobes 21a and 21b are shaped to form the forefinger, lobes 22a and 22b the middle finger, lobes 23a and 23b the ring finger, and lobes 24a and 24b the little finger of the finished glove; only parts of the lobes 22b, 23b and 24b are shown in the drawing.

Complementing the respective lobes (for example 21a at 21d and 22a at 22d) in order to finish the glove fingers are fourchettes 21c, 22c and 23c. It will be seen that part of strip 21c is attached to finger portion 21a along edge stitching 21d while the remaining part of strip 21c is joined to lobe 22a along edge stitching 22d according to arrows A, B. Similarly, one portion of a different length fourchette strip 22c is sewn onto lobe 22a at 22e, while the remainder of said strip is connected to lobe or finger portion 23a along edge stitching 23d (according to arrows C, D), and finally one portion of fourchette strip 23c is attached to lobe 23a along edge stitching 23e; while the other portion of said strip is affixed onto lobe 24a along edge stitching 24d (according to arrow E), each fourchette sewing operation being performed uninterruptedly.

It will be understood that for the completion of the forefinger the free edge of lobe 21b is sewn onto the free edge of strip 21c opposite stitching 21d; the middle finger is completed by sewing the edges of lobe 22b to the free edges of strips 21c and 22c opposite the stitchings 22d and 22e.

The ring finger is finished in analogous manner by sewing the edges of lobe 23b onto the free edges of strips 22c and 23c opposite the stitchings 23d and 23e; and the little finger is produced by sewing the edges of lobe 24b to the free edges of lobe 24a and of strip 23c on opposite sides of the stitching 24d.

The invention is primarily concerned with the operational steps leading up to the stage of completion of said glove as illustrated in Fig. 4, and more particularly with the steps of guiding and sewing the strips 21c, 22c and 23c in place and cutting them to size. In accordance with the invention, the strips 21c, 22c and 23c are cut one after the other from a roll or other supply of tape,

each strip being sewn in a single operation to the two lobes or finger portions associated therewith.

First the tape is placed with its end 25 coextensive and flush with the end of finer portion 21a and then stitched along edges 21d and 22d on lobes 21a and 22a. Thereafter a cut is made at 26 just at or close to the end of lobe 22a to obtain fourchette 21c of substantially exact length as required for the final length thereof. In similar manner, an end of the tape is then placed adjacent the end of portion 22a as shown at 27, followed by stitching at 22e, 23d and a cutting operation is subsequently performed to sever the endless tape at 28 and to form the strip of fourchette 22c.

The end of the tape is finally aligned with the outer end of the finger portion 23a, as shown at 29, whereupon the stitchings 23e and 24d are made; after this the tape is cut at 30, thus forming the fourchette 23c. The final cuts at 26, 28 and 30 occur substantially coextensive with or just above the end of the respective finger end portions 22a, 23a and 24a and not a distance away from the latter as indicated in dotted lines at 26a, 28a and 30a, as would be the case if strips 21c, 22c and 23c would be cut by hand and by means of scissors, as is now usually done.

Thus, enormous waste of strip material is eliminated with a mechanism about to be described.

If the stitching is carried out by machine, the portion of tape designed to form the fourchette and the adjacent finger portion of the blank 20 may be superposed upon each other, as shown in Fig. 5 for the portion 22a and the fourchette 22c, whereupon the two strips are run through the machine to form the stitches such as 22e. After sewing, the superposed pieces may be spread and turned inside out as shown in Fig. 6.

A machine adapted to perform the stitching and cutting operations just described has been illustrated in Figs. 1, 2 and 3. The conventional parts of this machine include the head 31, the cloth plate or work surface 32, the presser foot 33 carried by a presser foot bar 34 and controlled by an operating lever 35, the needle 36 traversed by the thread 37 and depending from a needle bar 38, the looper 39 adapted to engage the thread 37 entrained by the needle 36, and the feed rack or dog 40 serving to advance the cloth or like material 41 over the plate 32, this dog moving in a slot of the feed plate 42 inserted in the plate. Guide means for the thread 37 are shown at 43 and 44.

In accordance with the invention there is secured to the head 31, by means of screws 45 and 46, a body or housing 47 in which a vertical rod 48 is slidably held, this rod being urged upwardly by a coil spring 49 surrounding the rod within the housing 47 and bearing against a collar or ring 50 fixed to the rod by means of a set screw 51. The position of the ring 50 on the rod 48 is adjustable by virtue of an elongated cutout 52, provided in the housing 47, which gives access to the set screw 51. Another set screw 53, projecting laterally from the rod 48, serves as a means to prevent rotation of the rod by sliding in a slot 54 of the housing 47.

Secured to the lower end of the rod 48, which projects from the lower end of the housing 47 forwardly of the presser foot 33, is a bracket 55 which is held on the rod by a screw 56 and acts as an abutment limiting the upward displacement of the rod. Bracket or holder 55 has two depending lugs 57, 58 bridged by a pin 59 on which there is pivoted a U-shaped mounting member or hanger 60 which is acted upon by one end of coil spring 61 surrounding the pin 59, the other end of this spring engaging the bracket 55 so as to tend to swing the member 60 counter-clockwise as viewed in Fig. 2, i. e. toward the presser foot 33.

A blade 62, having an upwardly slanting knife or cutting edge 63, is secured to the member 60 and is provided with a downward projection or extension 64

which extends below the suitably slotted needle or feed plate 42; this projection is positively retained and guided between a strip of metal 65, fixed to the plate 42 rearwardly of the blade 62, and a backing plate 66, attached to the feed plate to the rear of the blade and provided with a horizontal and stationary upper cutting edge 67 which comes up flush with the top surface of feed plate or work supporting surface 42.

It will be noted that coil spring 61 urges the extension 64 into firm contact with the backing plate 66, thus insuring smooth co-operation between the cutting edges 63, 67 which sever the strip of cloth, leather or similar tape, 41 in a drawn cut when the blade 62 is lowered relative to plate 42 by a mechanism about to be described.

Swivelled on the top of housing 47, with the aid of a pivot bolt 68, is a lever 69 provided on its underside with a cam surface 70 which bears upon the tip of the rod 48. Lever 69 has a plurality of tapped holes or perforations 71, differently spaced from the pivot 68, which may be selectively engaged by a pivot screw 72 around which swings a link 73, the latter being similarly joined at 74 to an extremity of a two-arm lever 75 which is pivoted at its center 76 to the machine head 31 and which has its other extremity engaged, at 77, by an operating rod element 78. When element 78, which may be a wire, thin rod or cord, is pulled down, by hand or by a treadle (not shown), the levers 75, 73 and 69 are swung around their respective pivots into the position illustrated in dot and dash lines, and the cam surface 70 depresses the rod 48 against the action of spring 49 to cause the blade 62 to cut the tape 41.

It will be noted that the length of the stroke of the guillotine blade 62 may be varied by inserting the pivot screw 72 into a different perforation 71. It is further to be mentioned that the cutting edge of blade 62 may have any other profile (scallop-shaped, arc-shaped, etc.) according to the purpose intended.

It will be understood that in the manufacture of a glove as shown in Fig. 4, the operator will actuate the mechanism 69-78 upon noticing during sewing operation that the end of the finger lobe has been reached and when tape 41 becomes coextensive with said end (as hereinabove explained) rod 78 will be pulled to cause severance of tape 41 by means of blade 62.

From Fig. 1 it will be seen that the linked ends of the lever members 73 and 75 swing past the operating lever 35 when the blade 62 is being depressed, this movement being possible only when lever 35 is in its lower or operating position as shown in solid lines in Fig. 2. In the other extreme or upper position of the lever, in which the presser foot 33 is lifted off the plate 32 as shown in dot and dash lines, the swing of the lever 75 and of the other lever members connected therewith will be blocked by lever 35 after a short movement, so that accidental actuation of the cutter mechanism during adjustment of the fabric blank and tape or at other inopportune moments will be prevented.

It will be apparent that the actuation of the operating lever arm 75 may be brought about, if desired, automatically, e. g. by means of suitable feeler-controlled relays or with the aid of switches responsive to the movement of a template conforming to the outline of the blank 20.

Figs. 7 and 8 illustrate guide and folding means for the tape from which fourchettes are manufactured to be attached to a glove blank or body. Thus the blank 120 in Fig. 10 is provided with finger portions 121a, 121b, 122a, 123a, etc. and has strips 121c, 122c, 123c, etc. sewn to it by corresponding stitchings 121d, 122d, 122e, 123d, etc. The difference between the gloves shown in Figs. 4 and 10 is that in the latter case, as best seen in Fig. 11, the fourchettes (kips), such as 123c, are folded over at their edges, such as 123f, and are affixed by the stitchings 123e.

123g indicates in dotted lines again the extent of the

waste of strip material heretofore necessarily allowed and now completely eliminated according to the invention. In Fig. 7 there is shown how tape 141, before reaching the work table 132 underneath the needle 136, is taken from a supply roll 79 from which it passes around a guide roller 80 toward the presser foot 133. In order to carry out automatic folding of the tape 141 before the stitching operation, presser foot 133 has been combined with a tubular attachment 81 extending therefrom toward the guide roller 80 and forming a channel within which the tape is received; as best shown in Figs. 8 and 9, flat tubular attachment 81 is bent over at 82 to cause doubling up of the tape 141 as it emerges therefrom at lower end 83.

It is to be noted that the folded over wall 82 of the folding attachment is provided with a sight piece 85 indicating the extent of the fold of tape 141 at fold end 141f next to the stitching 141e which also traverses blank 120.

In order to provide a suitable permanent guide and abutment for the tape 141 in lateral direction and with respect to the lobes of blank 120, a pin 132a is set in plate 142, so that even if presser foot 133 together with folding attachment 81 are lifted, the fed folded tape portion will not laterally give.

An automatic drive for the knife 62 of the sewing machine is illustrated in Fig. 12 according to which a cam wheel 100 is employed to automatically regulate the cutting operation in accordance with different lengths of stitchings and fourchettes employed in a glove structure having a predetermined finger size or length. The cam wheel 100 is mounted on the machine frame or head structure 31 (Fig. 13) by means of an interchangeable machine screw 101.

This cam wheel 100 is driven from the main shaft 102 of the machine which is accommodated within the base thereof through a worm 103 and worm wheel 104 which is seated on a transverse shaft 105. This transverse shaft 105 carries at its free end a pinion 106 which, in turn, is in mesh with a suitable reduction gear 107 which drives cam wheel 100.

This reduction gear 107 is joined to cam wheel 100 in any appropriate manner and is spaced from the frame or head 31 by a suitable spacer element 108 seated on the screw 101. On the cam wheel 100 there are provided, in the present instance, three suitably shaped cam members 109, 110, 111 which are adapted to co-act with a cam follower 112 connected to the pusher rod or link 78. This rod 78 is joined to the double-armed lever 75, as hereinabove disclosed, so that a further explanation of the lever connections of the drive for operating the cutting blade 62 can be omitted.

Follower 112 is urged by a spring 113 which surrounds the lower part of pusher rod 78 and abuts against a predetermined portion of the head structure 31 of the machine (Fig. 12).

It will be noted that the cam members 109, 110 and 111 and the follower 112 have cooperating surfaces 109a, 110a, 111a and 112a, respectively, which when the follower surface 112a is in contact, for instance, with the cam surface 109a and when the cam wheel 100 is driven in the direction of arrow Z, cause successively a rising of the follower 112 in the direction of arrow X until it reaches the peak and the end of the cam surface 109a, whereupon the follower surface 112b is urged to slide alongside a similar cam surface 109b while spring 113 presses follower 112 in the direction of the cam wheel body 100 (as indicated by arrow Y in Fig. 12).

Pusher rod 78 is thus instantaneously shifted and brings about movement of the cutting blade 62 through the link and drive mechanism, as hereinabove mentioned.

Since the distance between the cam members 109, 110 and 111 on cam wheel 100 are different from each other (in accordance with the lengths of the fourchettes to be sewn to the various finger lengths 21a, 22c and 23c) 75

the cutting operations by means of the blade 62 are performed accordingly and in timed relation.

It is further to be noted that the clutch mechanism (not shown) of the machine will automatically stop the machine as well as the drive of the main shaft upon termination or completion of the seam or stitching performed on the respective fourchettes.

If, for instance, fourchette 23c has been stitched along finger or lobe 23a and subsequently along lobe 24a and reaches the end of the stitching at 30, the clutch of the machine will become ineffective in a well-known manner while the follower 112 performs its instantaneous downward movement in the direction of arrow Y and causes the cutting blade 62 to cut the tape 23c at the very end 30 of the fourchette 23c (see Fig. 4).

It is further to be noted that the spring 113 is stronger than the spring 49 to overcome the action of the latter and to bring about the instantaneous cutting operation of blade 62 whereupon spring 49 will become effective to return blade 62 to its uppermost or inoperative position.

It is well to be mentioned that the distance between the cams may be arranged for relative adjustment on cam wheel 100 in any suitable manner, if desired, or a new cam wheel with predetermined cam distances may be employed and fixed in place by means of screw 101 on the machine frame 31 in accordance with the variations of fourchette lengths commensurate with the different sizes of gloves to be sewn and worked upon. Owing to the fact that different glove sizes vary in the proportions of the fourchettes and their stitchings with respect to each other, the cam wheel 100 with respective cams 109, 110 and 111 is interchangeably mounted and may be replaced by a similar cam wheel with different settings, shapes and distances of cams to correspond to the actual changes necessitated by different sizes of gloves.

While several embodiments of the invention have been shown and herein described, it will be understood that the same are capable of modifications without departure from the general scope and spirit of the invention as defined in the claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. In a sewing machine having a work surface provided with a slot; severing means detachably securable to a portion of said machine, said severing means comprising a vertically reciprocable cutter bar, adjustable spring means surrounding said cutter bar and normally maintaining said cutter bar in a position spaced from said work surface, a springedly disposed cutting blade, means pivotally mounting said cutting blade with respect to said cutter bar, said cutting blade being disposed to extend transversely of the direction of feed of the workpiece on said work surface, said cutting blade being provided with a positive guide extension arranged for movement within said slot of said work surface and further provided with a first cutting edge normally disposed above said work surface in a position corresponding to said normal position of said cutter bar, a fixed member adjacent said slot and defining a second cutting edge complementary to said first cutting edge and fixed substantially flush with said work surface, resilient means wound around said pivot means and urging said first cutting edge of said cutting blade into operative cutting contact against said second cutting edge, and means for actuating said cutter bar and for periodically depressing the latter against the action of said spring means and driving said first cutting edge into said slot and against said second cutting edge to thereby sever said workpiece on said work surface.

2. In a sewing machine, the combination, with a work surface provided with a slot, of a spring-biased and swingable cutting blade provided with an extension projecting into and positively guided in said slot and further provided with a first cutting edge normally positioned above said

slot and said work surface, a plate member in said slot and provided with a complementary cutting edge and substantially flush with said work surface, a mechanism for depressing said cutting blade and driving said first cutting edge thereof into said slot against said complementary cutting edge to thereby sever a strip material when positioned on said work surface, said mechanism including a vertical rod with said cutting blade secured to the lower end thereof, a body, an actuating member operatively connected with said rod and mounted on said body, a control arm pivoted to said body, link means adjustably connecting said control arm with said actuating member, thereby enabling variations in the stroke of said cutting blade, a vertically displaceable holder for said cutting blade, means on said holder for pivotally connecting said holder with said

cutting blade, and spring means on said holder urging said cutting blade extension into contact with said plate member.

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