

[54] **APPARATUS FOR PRODUCING APERTURES FOR JETTED POCKETS ON CUT PARTS OF GARMENTS**

[75] Inventors: Peter Hintzen, Krickenbach; Fritz Jehle, Alsenborn; Erich Willenbacher, Karlsruhe, all of Germany

[73] Assignee: Firma Pfaff Industriemaschinen GmbH, Kaiserslautern

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[58] Field of Search..... 112/65, 66, 68, 70, 112/121.14, 130

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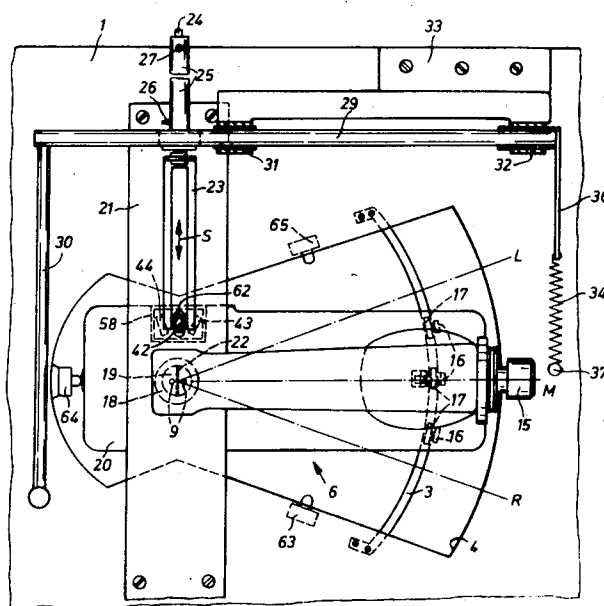
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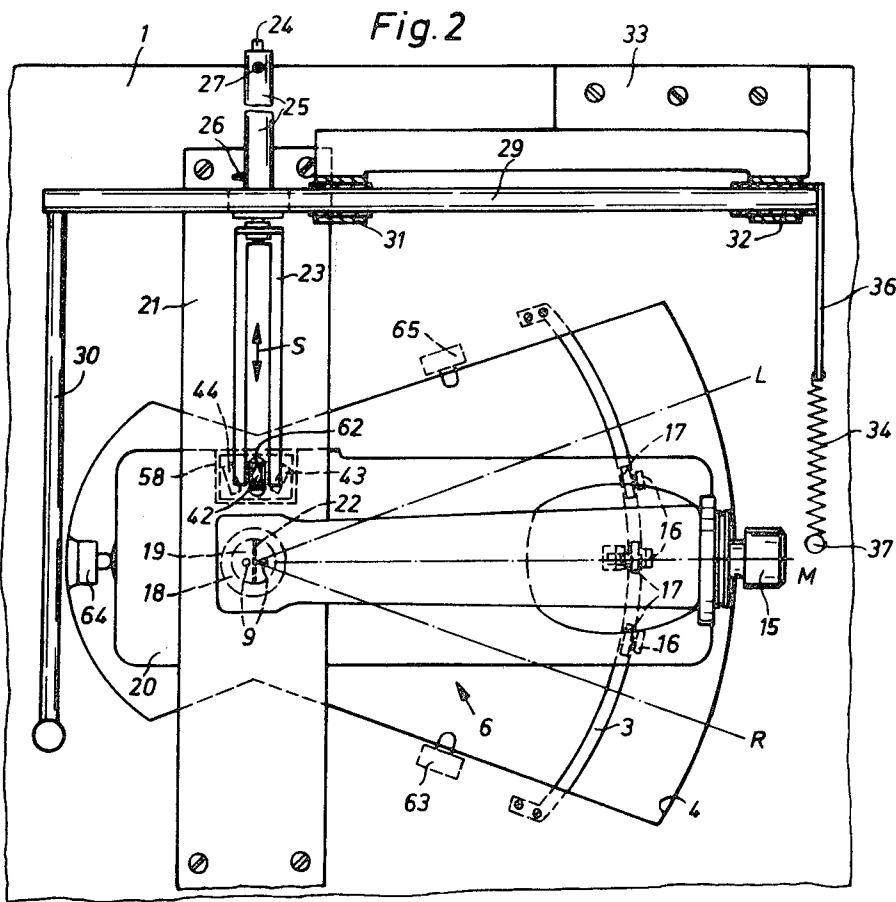
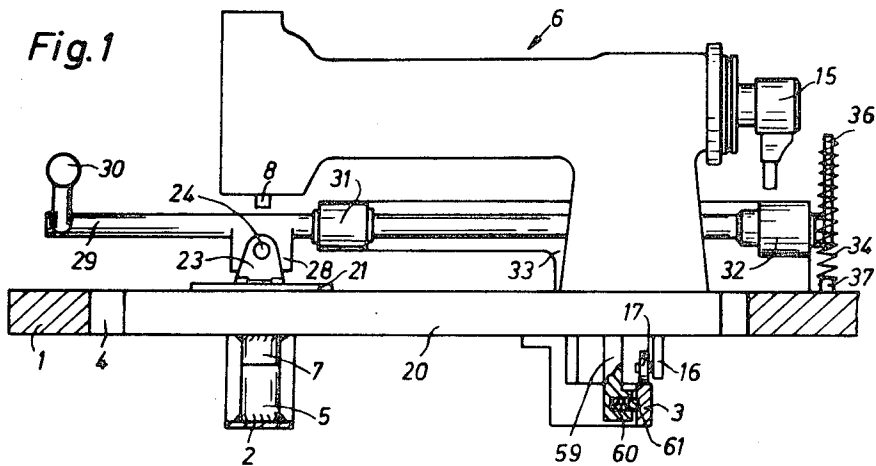
Primary Examiner—H. Hampton Hunter
Attorney—Robert H. Jacob

[57] ABSTRACT

Arrangement for producing jet openings for jetted pockets in cut pieces of garments using a displaceable work piece clamp on a two-needle sewing machine having a pleat guide for the jet strip, a severing cutter for the longitudinal slit operating between the needles and cutting means for producing the angular cuts at the ends of the longitudinal slits, said machine being rotatable about a pivot axis which coincides with the axis of symmetry of the needles and which may be latched in predetermined angular positions (R, M, L), and a number of sets of angular cutters corresponding in number to the angular positions, which sets of cutters comprise angular cutters that are individually guided.

6 Claims, 7 Drawing Figures





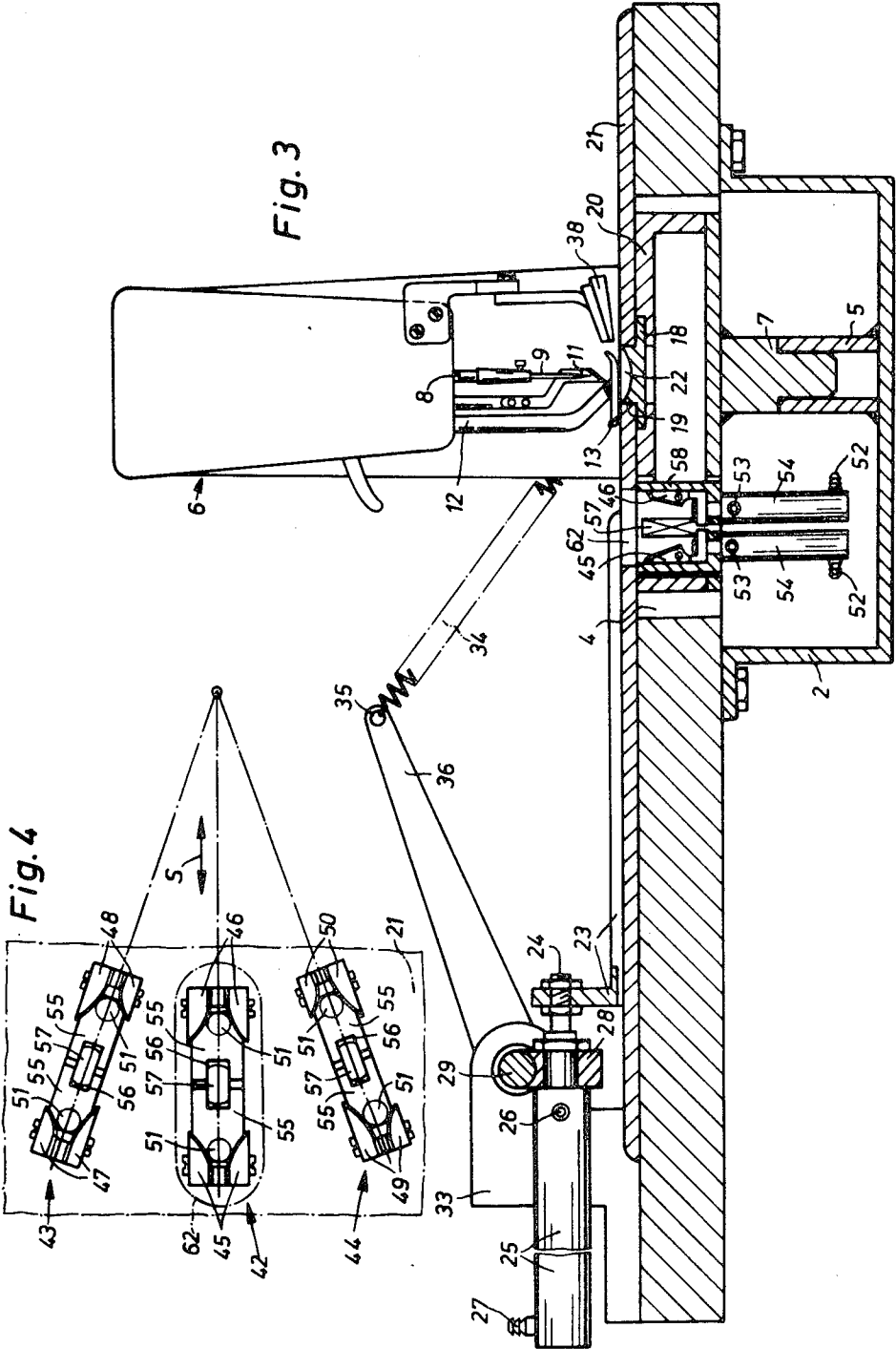


Fig. 7

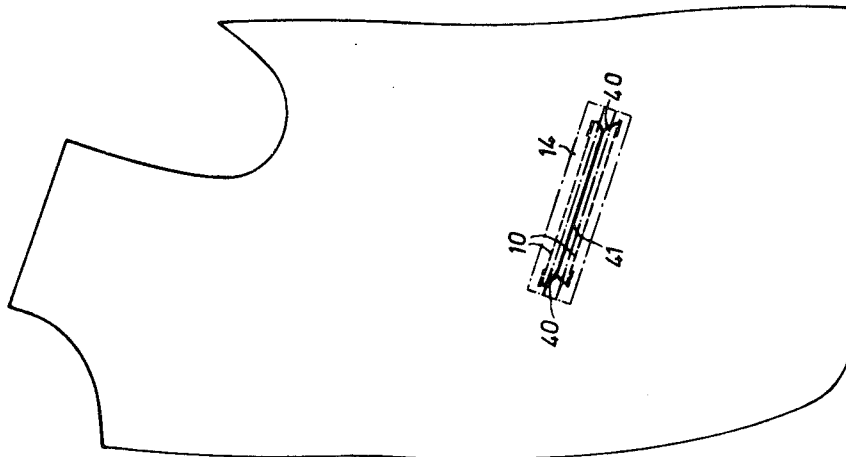


Fig. 6

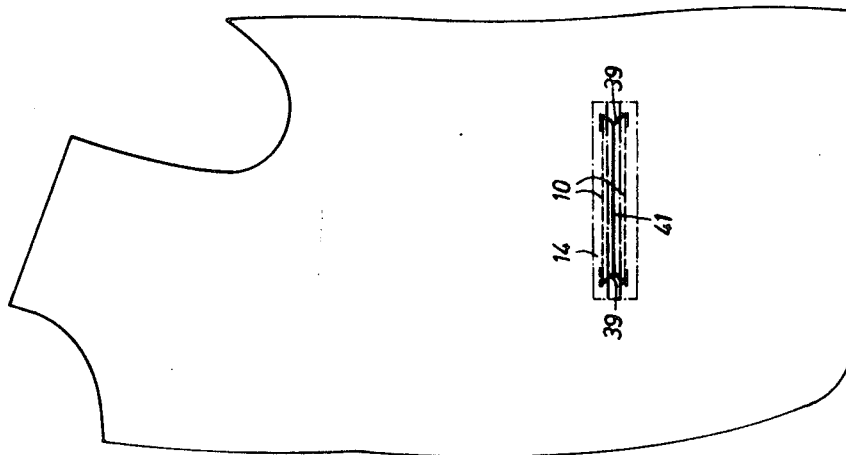
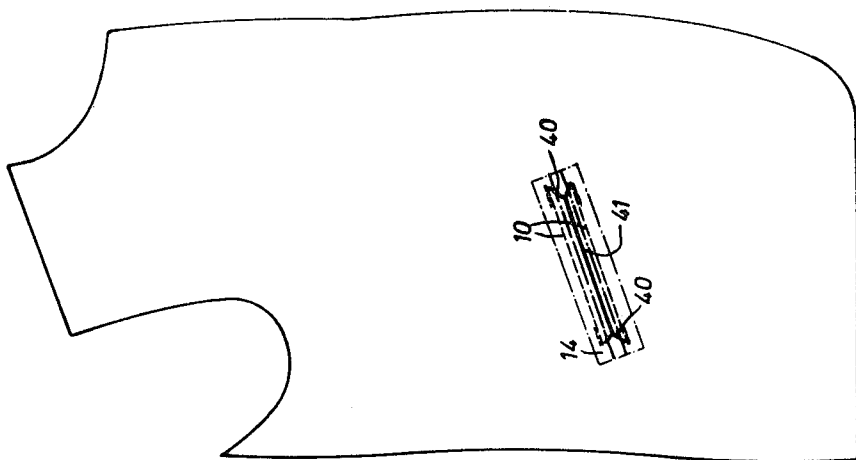


Fig. 5



APPARATUS FOR PRODUCING APERTURES FOR JETTED POCKETS ON CUT PARTS OF GARMENTS

BACKGROUND OF THE INVENTION

The invention relates to the art of sewing and to means for providing cut parts of garments with pocket openings. More in particular, the invention concerns apparatus for producing jetted pocket openings in cut garment parts by utilizing a displaceable clamp component and a two needle sewing machine having pleat guide means for the jetted pocket strip, a severing cutter for the longitudinal slit and a cutting device for making the angular cuts at the ends of the longitudinal slit.

Arrangements of this type are known for the fully automatic production of jetted pocket openings in cut parts of garments, including arrangements which are adjustable for producing jetted pocket openings of different lengths.

With devices of this type one generally proceeds in order to produce the jetted pocket opening, in that the cut piece or blank that has previously been provided with markings is placed under the work blank clamp and so oriented that the severing cutter for the longitudinal slit is located in alignment with the marking for the longitudinal slit and that the cut blank assumes a particular initial position relative to the needles, whereupon the work blank clamp is lowered onto the cut piece of material, a strip of jet material is folded to a T-shape by means of a feeding device and fed to the needles and finally the sewing machine is started. The work blank clamp and the remaining devices are then guided by means of a control device in such a manner that upon bar stitching the beginning of the seam and after the sewing a stretch of seam which makes possible the forming of the first one of the V-shaped angular cuts the severing cutter for the longitudinal slit is connected. At the location of the longitudinal slit intended for the second angular cut the severing cutter is disconnected. Then the sewing is continued to the end of the marking and the end of the seam is bar stitched. The machine is then stopped and the clamp with the cut piece is moved to a cutting station for effecting the angular cuts at the end of the longitudinal slit which advantageously affect the turning of the jet strip. The two angular cuts are made, the clamp is opened after cutting off the threads, the cut piece is removed and the clamp is moved back to its initial position.

All devices known heretofore are only suitable for making straight jet openings where the two parallel seams by means of which the T-shaped jet strip is sewn onto the cut piece of material begin and end at the same level of the longitudinal slit.

On modern jackets having slanted or oblique jetted pockets with the jet strip it was necessary heretofore, on the one hand for accurate workmanship and on the other hand, due to the displacement required by the obliqueness of the two seams of equal length provided on both sides of the longitudinal slit in order to sew on the jet strip, to have the sewing done by skilled operators on a single needle sewing machine. The required angular cuts that advantageously affect the turning of the jet strip had to be made manually. At that, this manner of operation which is time consuming and therefore expensive does not even ascertain uniformity of production.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an arrangement to make possible the fully automatic production of jetted openings on cut pieces of garments which extend not only along straight lines but also obliquely.

In accordance with the invention this is accomplished in that the sewing machine can be turned about an axis which coincides with the axis of symmetry of the needles and can be locked in several angular positions determined by the direction of sliding of the work piece clamp and the longitudinal axis of the arm shaft, and that a number of sets of angular cutters corresponding to the number of angular positions are provided on the sewing machine each of which consist of angular cutters that are individually controllable.

In order to maintain the direction of withdrawal of the cut pieces of material the stitch plate of the sewing machine is provided with a pivot stud that coincides with the axis of symmetry of the needles which receives a stationary plate having a sliding surface for the work blank clamp, straddles the material support plate of the machine, and which has an aperture for the passage of the angle cutters.

In order to insure of the exact execution of the angular cuts and of their mutual orientation in relation to the longitudinal slit, each set of angular cutters comprises angular cutters guided in pairs on a common or mutual vertical guide.

To meet all requirements in the practice the angular cutters are suitably disposed in a spider pattern at equal distances from the axis of rotation.

For compensating the displacement of the start and the end of the two seams caused by the oblique jet opening, the angular cutters of those sets of angular cutters which are disposed at an angle deviating from 90° formed by the direction of feed of the work piece clamp and the longitudinal axis of the arm shaft have legs of unequal length.

To make pivotal movement easier the sewing machine is supported at a lateral distance from the axis of rotation by way of rollers on an arcuate rail.

BRIEF DESCRIPTION OF THE DRAWINGS

Hereinafter the invention is described more in detail with reference to an embodiment illustrated in the accompanying drawings in which

FIG. 1 is a front view of the machine accommodated in a cut out of the table top of a supporting frame,

FIG. 2 is a top view of the arrangement in accordance with FIG. 1,

FIG. 3 is a side view of the arrangement partly in section drawn to an enlarged scale,

FIG. 4 is a plan view of the angular cutters,

FIGS. 5, 6 and 7 each show the front part of a jacket with a right oblique, left oblique and a straight jet opening.

DESCRIPTION OF THE INVENTION

The table top 1 of the machine frame, on the bottom side of which a support 2 and an arcuate rail 3 are fastened a cut out 4 is provided for accommodating a two needle sewing machine.

The support 2 is provided with a sleeve 5 which receives a pivot stud 7 secured to the sewing machine 6. The longitudinal axes of the pivot stud 7 and of the sleeve 5 coincide with the axis of symmetry of the two

needles 9 (FIGS. 2,3) provided on the needle bar 8 of the sewing machine. The needles 9 each cooperate in a known manner with a looper (not illustrated) rotating about a vertical axis to form independent parallel seams 10 (FIGS. 5-7). The sewing machine is a two-needle flat bed machine without feed dog having a cutting means for the looper and needle threads, known per se and therefore not illustrated. It is equipped with a severing cutter 11 operating between the two needles 9 and a pair of pressure feet 13 (FIG. 3) provided on the pressure foot bar 12 adapted to be seated with light pressure on the material being sewn. Between the pressure feet the raised bridge of a jet strip 14 folded in the shape of a T is passed through (illustrated in FIGS. 5, 6 and 7 in dot and dash lines). The pressure with which the pressure feet 13 are seated upon the material being sewn is sufficiently great that the material is held down but can still be displaced. For driving the sewing machine 6 a stop motor is provided which is known per se and not illustrated, by means of which the sewing machine 6 can be stopped in predetermined positions of the needle bar 8 in cooperation with the synchronizer 15 secured to the arm shaft, for example, in order to cut the threads at the termination of the sewing operation and to enable the subsequent unimpeded removal of the material being sewn.

Rollers 17 are journaled on lugs 16 of the sewing machine 6 by means of which the machine is supported on the rail 3.

The stitch plate 18 of the sewing machine 6 has a cylindrical projection 19 for accommodating a plate 21 provided with a bore for the projection 19, which straddles the base plate 20 of the sewing machine and whose top side is covered with a friction reducing layer which may consist, for example of a commercially available plastic known under the trade name "Teflon." The plate 21 is secured to the table top 1 of the sewing machine frame.

The stitch plate 18 is provided with a slot 22 into which the severing cutter 11 enters during operation.

For clamping and displacing the cut piece of material a work piece clamp 23 of U-shape is provided which is connected with the piston rod 24 of a feeding unit 25. The feeding unit 25 can be of a hydraulic or hydraulic pneumatic type and can be guided in a known manner by way of the two connections 26, 27 with the aid of a programming circuit in a manner that the work piece clamp 23 can be displaced in steps during sewing at the rhythm of the stitch formation while it is returned to the starting position in a rapid continuous movement. The feed unit 25 is secured to a flange 28 which is rigidly connected in the embodiment illustrated with a shaft 29, which is controlled by means of hand lever 30 and secured in bearings 31, 32 of a support 33 secured to the table top 1 and which is biased by a pressure spring 34 for the work piece clamp 23. One end of the pressure spring 34 is hooked to a bore 35 of a lever 36 rigidly connected with the shaft 29 and the other end of the spring 34 is hooked onto an ear 37 mounted on the table top 1.

For feeding the jet strip 14 folded in T-shape to the needles 9 a known guiding device 38 (FIG. 3) is provided on the table top 1.

In order to form the V-shaped angular cuts 39 (FIG. 6), 40 (FIGS. 5 and 7) that advantageously affect the turning of the sewed on jet strip 14 at the ends of the longitudinal slot 41 (FIGS. 5, 6, 7) that extends cen-

trally between the two parallel seams 10 three sets of cutters 42, 43, 44 are provided, each of which consists of two angular cutters 45-50. Each angular cutter has a slot 55 secured to the piston rod 51 of its own compressed air cylinder 54 which can be supplied with air by way of two connections 52, 53 (forward and reverse movement) which has a forked guide 56 and a V-shaped cutting edge that extends generally obliquely to the direction of the cutting force. The angular cutters 45-50 of each angular cutter set 42, 43, 44 are guided by the forked guide 56 each on a flattened common guide bar 57. The guide bars 57 are disposed in a carrier 58 secured to the base plate 20 of the sewing machine on which the three sets of cutters 42, 43, 44 are mounted in spider-like fashion at equal distances from the axis of symmetry of the needles 9.

The sewing machine is pivotable relative to the stationary plate 21 and to the direction of feed S of the work piece clamp 23 about the pivot stud 19 into three positions R, M, L and adapted to be locked in these positions by means of a spring biased (pressure spring 60) ball 61 disposed in a support member 59 which engages corresponding recesses in the arcuate shaped rail 3.

In lieu of a ball 61 it is also possible to introduce a piston pin or a different latching device. Each of these positions R, M, L has coordinated therewith one of the cutter sets 42, 43, 44. For the passage of the angular cutters 45-50 for effecting the angular cuts 39, 40 the plate 21 has a recess 62 (FIGS. 2, 3). Individual recesses may optionally be provided for each angular cutter. The direction of feed S of the work blank clamp 23 remains unchanged independently of the angular position of the sewing machine.

By means of switches 63, 64, 65 (FIG. 2) which are actuated by the sewing machine in the angular positions R, M, L and a corresponding switching arrangement it has to be insured that in each angular position R, M, L only one set of angular cutters can operate at a time.

The base plate 20 of the sewing machine 6, respectively the cut-out 4 in the table top 1 may furthermore be covered by cover blades as far as this is possible in view of the required pivotable movement of the machine, which blades are suitably mounted on the table top 1.

In FIG. 5 a right jacket front portion, in FIG. 7 a left jacket front portion having obliquely extending jetted pocket openings and in FIG. 6 a front jacket portion having a straight jetted pocket opening are illustrated and that in the condition after sewing on the jet strip 14 illustrated in dot and dash lines, and the embodiment of the longitudinal slit 41, as well as the angular cuts 39 or 40 prior to turning of the jet strip through the longitudinal slit 41 onto the inside of the front parts of the jackets.

FIG. 6 shows that the legs formed by the V-shaped cutting edges of the angular cutter 39 are of the same length in the straight jet openings and the two equally long parallel seams 10 begin and end at the same level as related to the ends of the longitudinal slit 41, while the legs formed by the V-shaped cutting edges of the angular cuts 40 are of different lengths with the oblique jet openings in accordance with FIGS. 5 and 7, and the parallel seams 10 of equal length are displaced relative to one another in relation to the ends of the longitudinal slit 41.

In order to obtain the displacement of the seam, the sewing machine is swung into the desired angular position L or R, while maintaining the direction of feed S of the work blank clamp 23 which is always oriented in accordance with the longitudinal slit 41, from the normal central position M for producing straight jetted pockets and for forming the angular cuts 40 with legs of unequal length with the oblique jet openings, the angular cutter 47, 48, 49, and 50 are formed with legs of correspondingly differing lengths.

Besides, the sets of cutters 42, 43, 44 are firmly connected with the sewing machine 6 so that the set of angular cutters that is correct at the particular time is located below the recess 62 in the plate 21.

Starting with the condition where the sewing machine 6 stopped in the top position of the needle is in its center position M for producing a straight jet opening, the work blank clamp 23 assumes its starting position and is raised from the plate 21, in which connection it must be mentioned that for securing the work blank clamp 23 in the raised position, likewise for opening and closing the work blank clamp 23 optional known means may be provided, the arrangement operates as follows: A cut part, for example the front part of the jacket shown in FIG. 6 which has previously been provided with markings, is placed upon the table top 1 and plate 21 in a manner that the direction of feed S of the work blank clamp 23 corresponds with the marking for the longitudinal slit 41, the severing cutter 11 for the longitudinal slit 41 is in alignment with the said marking and the front part of the jacket assumes a predetermined initial position with respect to needles 9. The jet strip 14 of predetermined length folded to I-shape is so guided under the pressure feet 13 that the severing cutter 11 is located between the two raised positions defining the bridge of the "T" of the jet strip 14. The pressure feet 13 are lowered onto the jet strip 14, the work blank clamp 23 is then moved over the aligned front part of the jacket and is lowered by means of the manual lever 30 onto the front part of the jacket. The pressure spring 34 keeps the clamp 23 closed and thus presses the front part of the jacket onto the plate 21 so strongly that unintentional sliding of the front part of the jacket is avoided, but displacing of the work blank clamp 23 with the front part of the jacket is still possible.

After these preliminary tasks the sewing machine is started and the feeding unit is cut in. With the sewing machine 6 running, the movement of the work blank clamp 23 is so guided preferably at the rhythm of stitch formation by supplying pressure fluid by way of the connections 26, 27 that first the beginning of the two seams 10 is locked or bar stitched and then the two seams 10 are sewn.

To guide the arrangement accurately in accordance with a program for producing jet openings, there are several possibilities. One of them provides switching cam rows for activating stationary rows of switches on a support plate rigidly connected with the work blank clamp 23. By means of a selecting switch the individual rows of switches and cams can be selected in preparation, in order to produce for example jet openings of different lengths in continuous alternation. Another possibility exists in that a control roller provided with cams is connected with the drive of the sewing machine for actuating switches.

Since the electric control means is not a part of the subject of the application, no detailed explanation is provided.

After the sewing of a seam stretch required for forming the first angular cut 35, the cutter 11 is switched on, which effects horizontal oscillatory movements besides vertical ones, while it moves down into the guide slot 22 of the stitch plate 18 and cuts open the longitudinal slit 41 during sewing. During the further course of the sewing operation the first angular cutter 45 is actuated in that compressed air is supplied to the compressed air cylinder 54 by way of connection 52, whereby the angular cutter 45 connected with the piston 51 of the cylinder 54 passes upwardly through the recess 62 and forms the first angular cut 39 during the upward movement in the front part of the jacket, and in the lower position (the transverse bridge of the "T" which is standing upside down) of the jet strip 14, the cut edges of which, hereafter referred to as the legs of the angular cut, reach from the ends of the longitudinal slit 41 in V-shape outwardly to the seam ends until closely before the two parallel seams 10. The angular cutter 45 may be returned to the starting position either by a return spring or by supplying air to the second connection 53.

The severing cutter is disconnected at the location for the second angular cut 39, the seams 10 are finished until the length of the jet openings provided for is attached and lock stitched, the threads are then cut off during the last upward movement of the needle bar 8, the pressure feet 13 are raised and the sewing machine is stopped, the work blank clamp 23 with the front part of the jacket and the sewn on jet strip 14 is moved over the second angular cutter 46 for effecting the second angular cut 39 at the corresponding position and is there stopped. The compressed air cylinder 54 of the angular cutter 46 is supplied with compressed air by way of connection 52, whereby the angular cutter 46 which is secured to its piston rod 51 is moved upwardly through the recess 62 and forms the second angular cut 39 in the front part of the jacket and in the transverse bridge of the jet strip 14 during the upward movement, whereupon the angular cutter 46 is returned to its initial position in accordance with FIG. 3 by a return spring or by supplying compressed air by way of the connection 53 of the cylinder 54.

After the opening of the work blank clamp 23 by means of lever 30, the front part of the jacket is removed and the jet strip 14 is turned over through the longitudinal slit 41 onto the inside of the front part of the jacket.

In order to produce an oblique jet opening on a right front jacketpart (shown in FIG. 5) the sewing machine is turned in accordance with the invention about the axis of symmetry of the needles 9 into the position indicated by the line R (FIG. 2), in which position the longitudinal axis of the arm shaft of the sewing machine coincides with the line R. In this connection the set of cutters 44 arrives below the recess 62 in the plate 21. The machine 6 is secured in this angular position R by engagement of the ball 61 in a corresponding recess in the rail 3.

If a jetted opening is to be made on a left front part of a jacket (shown in FIG. 7) then the sewing machine 6 is turned with the arm shaft axle to the angular position indicated at L, whereby the set of cutters 43 arrives in the position below the recess 62 in the plate 21.

The sewing machine 6 is secured in the angular position L by engagement of the ball 61 in a further bore of the rail 3. The feeding direction S of the clamp 23 remains unchanged in any case.

The front parts of the jackets need merely be marked in accordance with the jet opening to be produced prior to placing them into the machine and must be so oriented that the horizontal direction of swing of the severing cutter 11 is in alignment with the longitudinal slit 41 and that the work blank assumes a predetermined initial position in relation to the needles 9.

In each of the angular positions R, M, L a switch disposed in the range of movement of the machine 6 (63 in position R, 54 in position M and 65 in position L) is operated which connects the set of angular cutters 42, 43, 44 required at any particular time to the electric sequence control. The sequence of operations described for the production of a straight opening is fundamentally the same for the sequence of operations for the production of oblique jet openings.

The oblique positioning of the sewing machine does not adversely affect the operation of the severing cutter 11 because the severing cutter effects a cutting movement of substantially elliptical shape and thus forms the longitudinal slit in a pulling cutting movement.

It is evident that the arrangement in accordance with the invention is applicable for straight and oblique jet openings and the setting for the desired type of opening can be undertaken without any difficulty, so that the sequence in which straight, left or right oblique jetted pocket openings are to be produced is immaterial. Inasmuch as the individual angular cutters are controllable independently of one another and the point of time for switching the cutter 11 on or off for longitudinal slit 14 is likewise optional, it is possible with the arrangement to produce jet openings of different lengths. Also, it causes no difficulty to sew on a precut flap together with the jet strip. For this purpose it is merely necessary to provide a displaceable retainer for the flap with the work blank clamp 23.

Having now described our invention with reference to the embodiments illustrated in the drawings, what we desire to protect by letters patent is set forth in the appended claims.

We claim:

1. Arrangement for producing jet openings for jetted pockets on cuts of garments comprising a displaceable work blank clamp and a sewing machine having two needles and an arm shaft, pleat guide means for a jet strip in front of said needles, a severing cutter for a longitudinal slit disposed for operation between said needles and cutting means for producing angular cuts at the ends of the longitudinal slits, a pivot stud defining an axis of rotation coinciding with the axis of symmetry of said needles around which the machine is rotatable, said work blank clamp extending rearwardly of said machine, latching means operative to latch said machine in a plurality of angular positions (R, M, L) related to the direction of feed of said work blank clamp and the longitudinal axis of said arm shaft, and a plurality of sets of angular cutters (42, 43, 44) disposed on said machine in the path of movement of said work blank clamp and corresponding in number to the number of angular positions, each of said sets of cutters comprising separately operable angular cutters.

2. Arrangement in accordance with claim 1 comprising a stitch plate on said machine and a material support or base plate, a pivot stud having an axis coinciding with the axis of symmetry of said needles, a stationary plate on said machine received on said pivot stud and having a sliding surface for said work blank clamp and a recess for the passage of said angular cutters, and extending over said base plate.

3. Arrangement in accordance with claim 1, where each set of angular cutters comprises pairs of cutters and common guide means are provided for said pairs of cutters.

4. Arrangement in accordance with claim 1, where said sets of angular cutters are disposed in a spider formation at equal distances from said pivot axis.

5. Arrangement in accordance with claim 1, where cutters of sets of angular cutters that are disposed at an angle deviating from 90° and defined between the direction of feed of the work blank clamp and the arm shaft have legs of unequal lengths.

6. Arrangement in accordance with claim 2 comprising an arcuate rail and rollers on said machine laterally of said pivot stud supporting said machine on said rail.

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