United States Patent

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[32] Priority **June 10, 1967**
[33] **Germany**
[31] **K62524**
Continuation-in-part of application Ser. No. 577,975, Sept. 10, 1965, now abandoned.

[54] **THROAT PLATE FOR DOUBLE CHAINSTITCH SEWING MACHINES**
6 Claims, 14 Drawing Figs.

[52] **U.S. Cl.** **112/121.12,** 112/260
[51] **Int. Cl.** **D05b 21/00,** D05b 75/00
[50] **Field of Search** ..... 112/165, 166, 98; 121.11, 121.12, 260, 269/(No Search) 260

[56] **References Cited**

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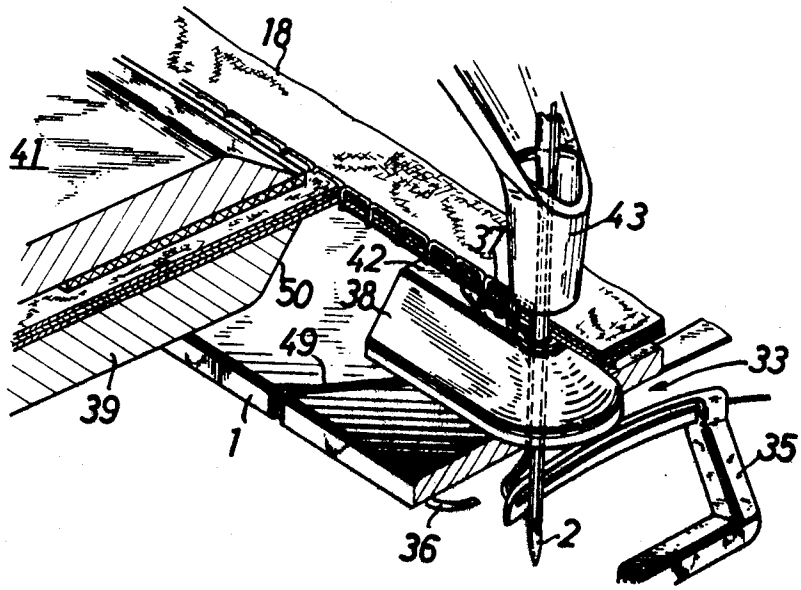
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Primary Examiner—Jordan Franklin
Assistant Examiner—George H. Krizmanich
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ABSTRACT: A throat plate for double chainstitch sewing machines provided with a thread-carrying needle, a thread-carrying chainstitch looper and a thread spreader to permit the forming of seams in any feed direction of the workpiece. The throat plate having a groovelike stitch hole is pivoted in the bedplate about the axis of the needle. For use in sewing devices with restricted guidance of the sewing cycle, the throat plate pivoted in the bedplate of the sewing machine is controlled by patterns of corresponding shape for the alignment of the groovelike stitch hole in the feed direction.



PATENTED JAN 26 1971 3,557,727

SHEET 1 OF 5

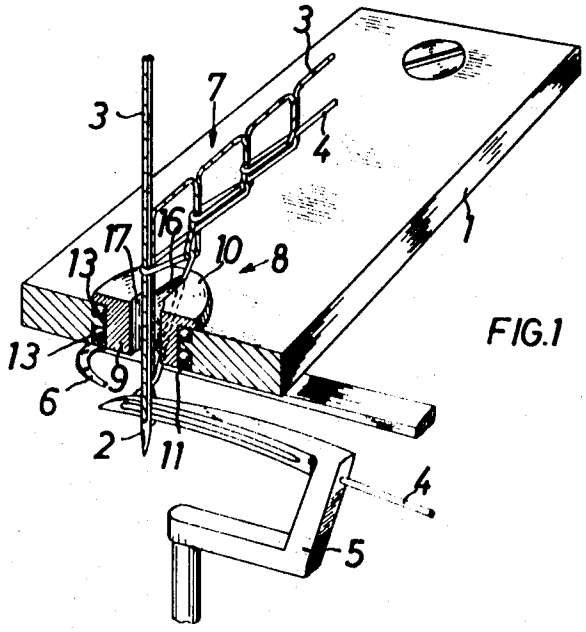


FIG.1

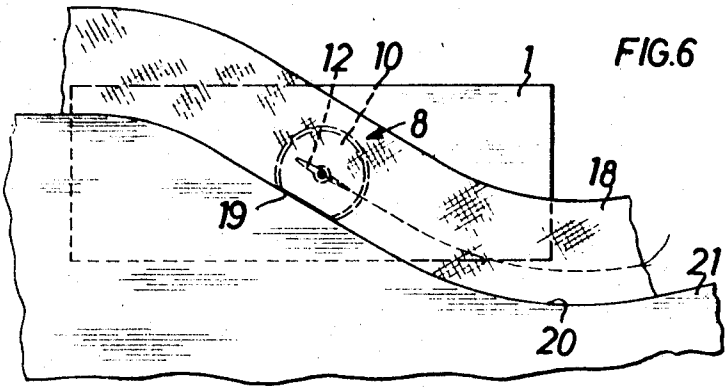


FIG.6

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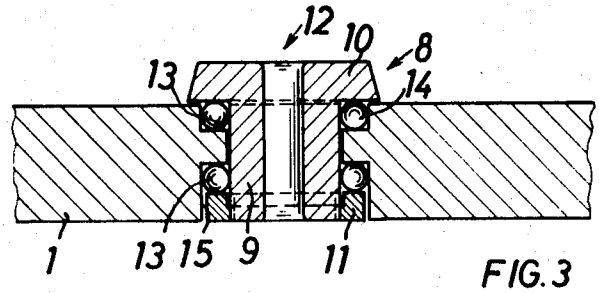


FIG. 3

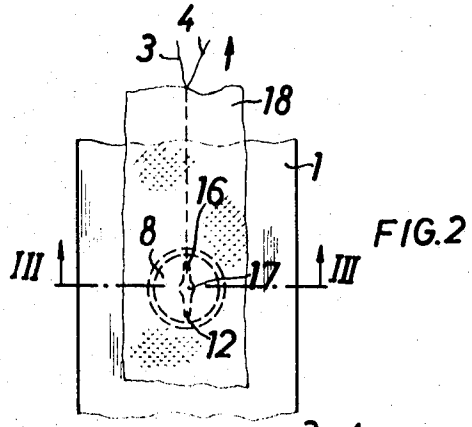


FIG. 2

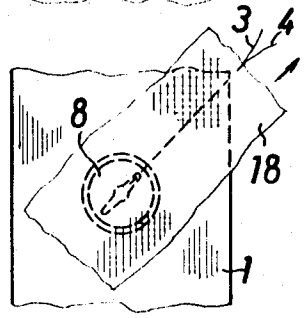


FIG. 4

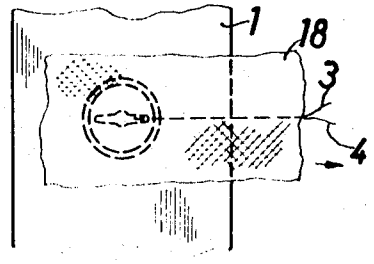


FIG. 5

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FIG. 7

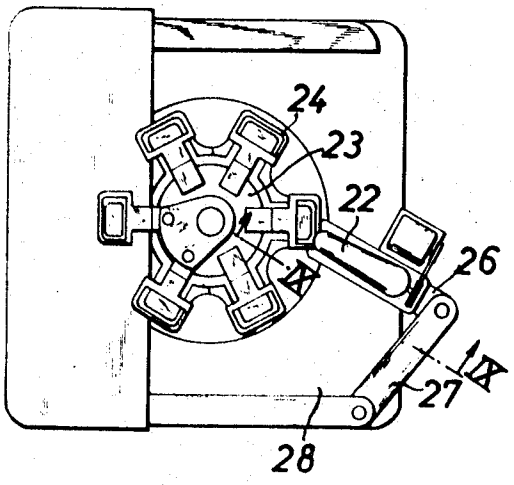


FIG. 8

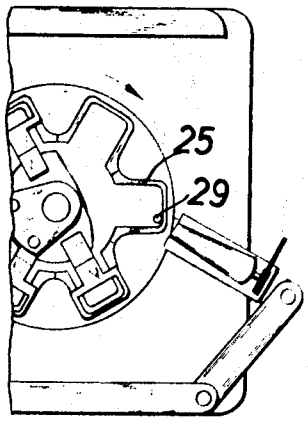
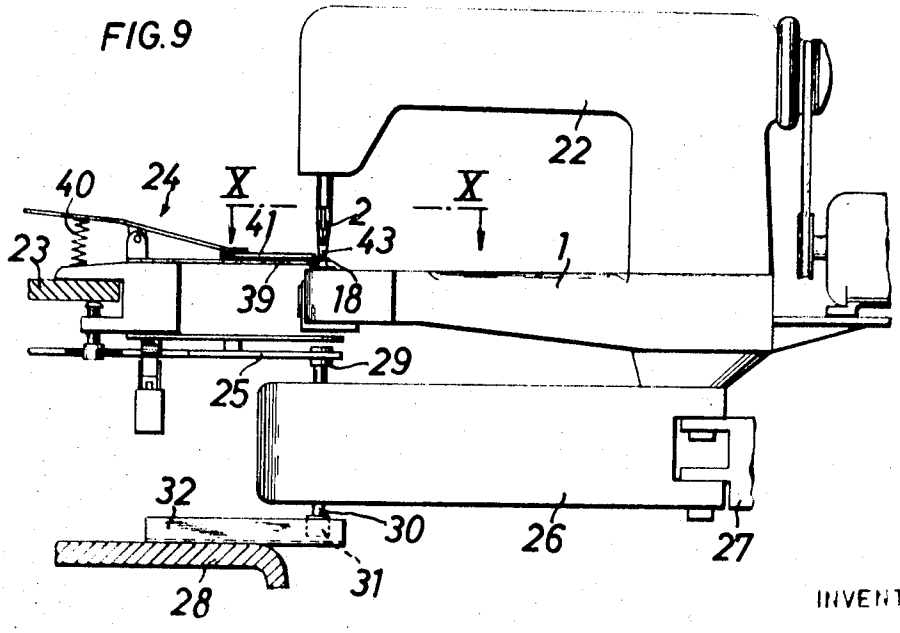
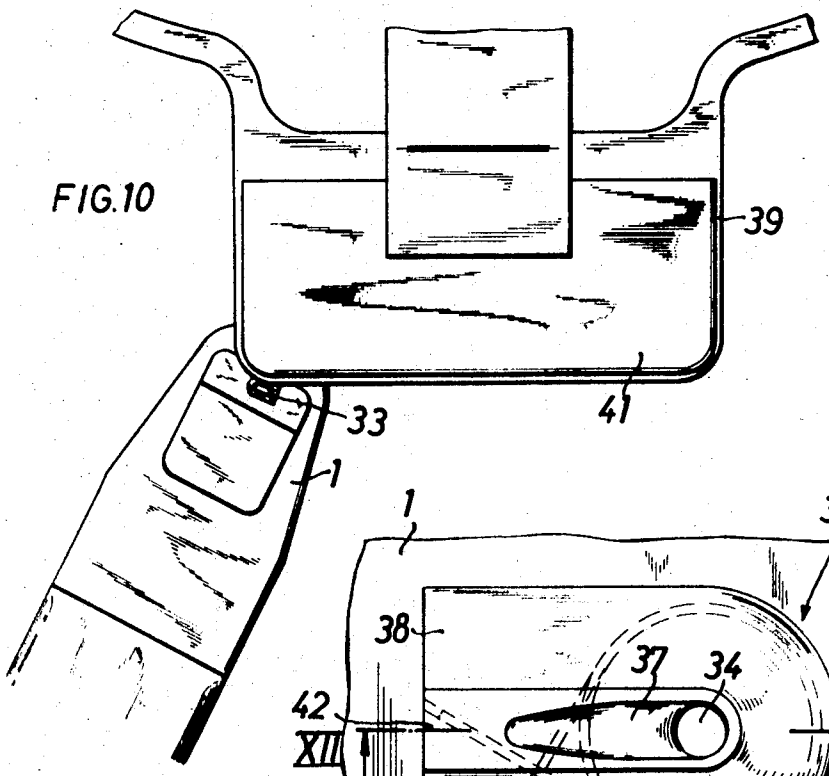


FIG. 9



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FIG.10



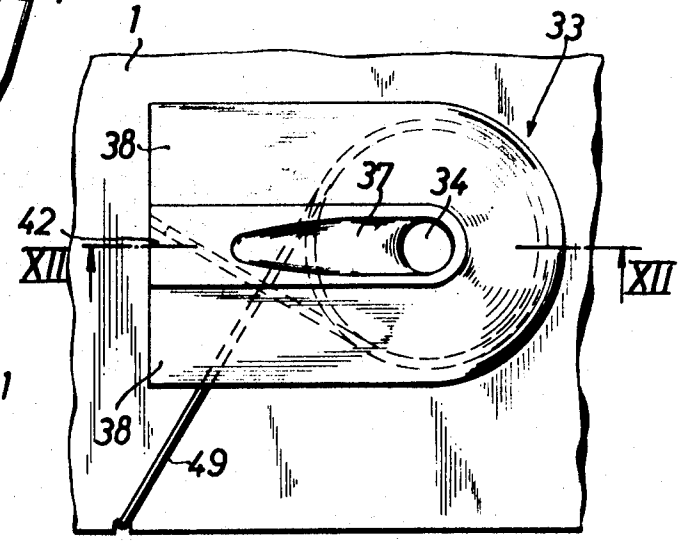
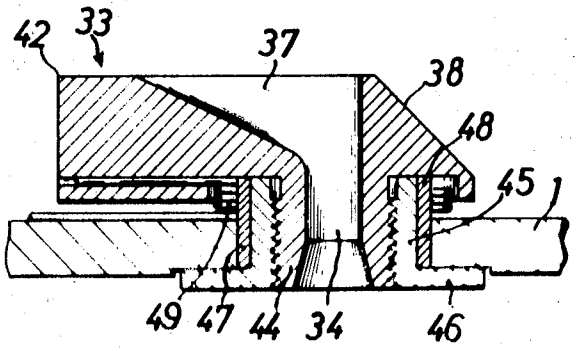


FIG.11

FIG.12



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FIG. 13

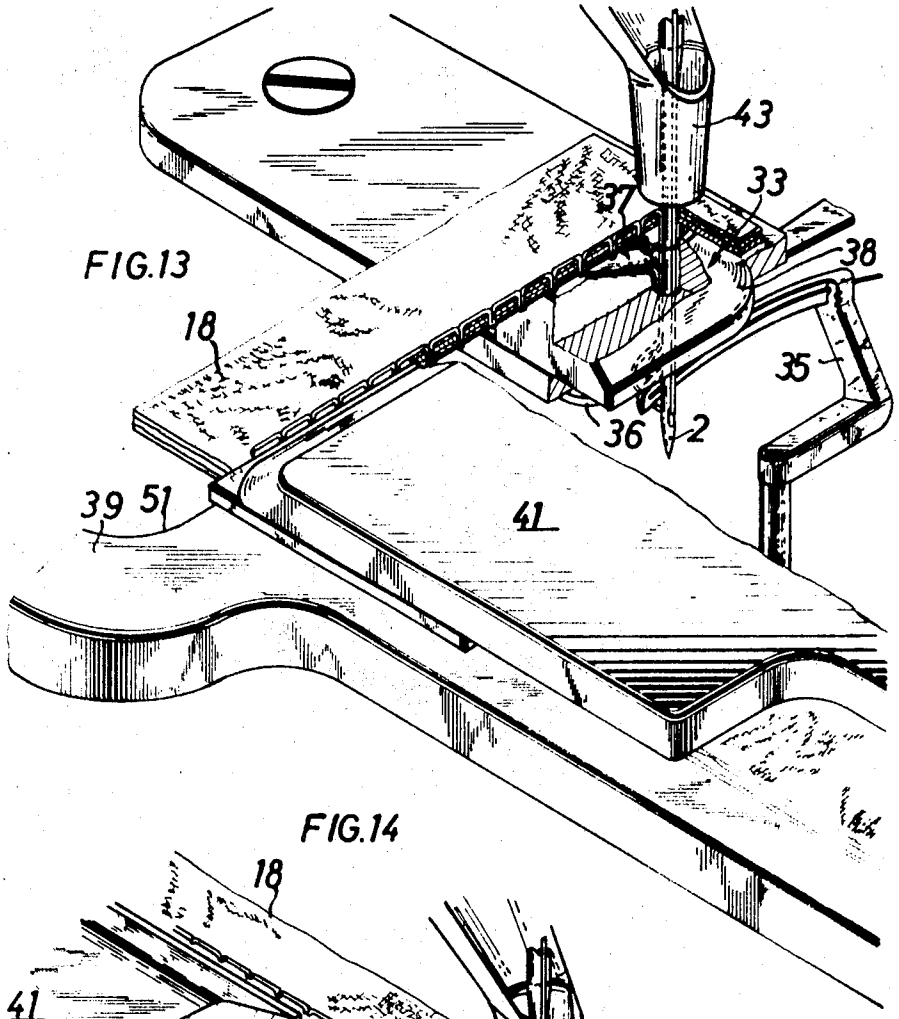
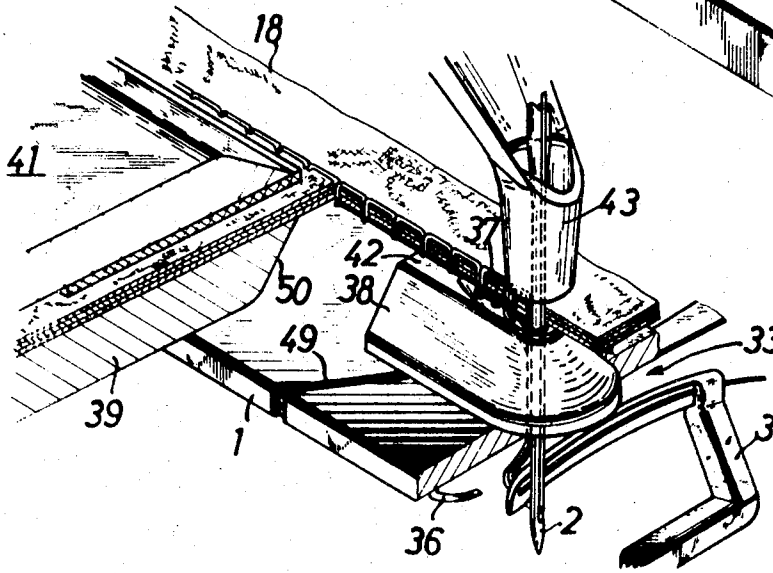


FIG. 14



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THROAT PLATE FOR DOUBLE CHAINSTITCH SEWING MACHINES

BACKGROUND OF THE INVENTION

This invention is a continuation-in-part of my pending application, Ser. No. 577,975, filed Sept. 10, 1965, now abandoned.

It is a primary object of this invention to provide a double chainstitch sewing machine with means which will assure an unobjectionable seam formation, regardless of the feed direction of the workpiece.

It is a further object of this invention to create a throat plate for double chainstitch sewing machines provided with a thread-carrying needle, a thread-carrying chainstitch looper, a thread spreader and a workpiece presser pad, to allow the forming of seams in any feed direction caused by guiding the workpiece by hand.

It is a further object of the invention to provide a double chainstitch sewing machine with means permitting the forming of seams in any feed direction, whereat the workpiece clamped between a workpiece holder, is guided by hand for sewing a seam corresponding to the form of the pattern.

It is also an object of this invention to provide a throat plate for double chainstitch sewing machines, arranged in a pattern controlled automatic sewing device as disclosed in the U.S. Pat. to Hans Scholl No. 3,276,405, having patterns and a driven magnetic roller for the cooperation of the pattern with the sewing machine.

It is already known to develop chainstitch sewing machines which can sew in any desired direction. For this purpose a circular motion is imparted to the thread spreader above the thread-carrying looper. During this motion, the thread spreader runs ahead with the looper and catches the looper thread, as well as the needle thread loop hanging on the looper between the looper point and the stitch hole. When going back, the thread spreader leading the looper deflects the looper thread and the needle thread loop laterally in such a manner that a thread triangle is formed for the entrance of the needle. The joints of the thread triangle are always fixed in the same position by the looper, the thread spreader and the stitch hole, irrespective of the feed. Such an arrangement is disclosed in German Pat. No. 433,989, issued on Oct. 2, 1925.

Since with chainstitch sewing machines the loop of the needle thread is only tightened at the following entrance of the needle, the stitch hole of these sewing machines is developed in sewing direction as an oblong hole. Such a stitch hole, however, allows the formation of a seam only in one or two directions, even if the sewing machine is provided with sewing tools which enable sewing in all directions. In order to be able to sew in all directions with the double chainstitch sewing machine according to the above-mentioned patent, it has been proposed to provide the upper surface of the throat plate with a hollow around the stitch hole. However, this hinders the unobjectionable sewing of thin fabrics, since this fabric is drawn down to the bottom of the stitch hole by the needle while sewing, thus preventing an equal tightening of the threads.

In order to eliminate this shortcoming there has been proposed a throat plate having a needle hole formed therein adapted to provide a path for the passage of a needle therethrough, and having three or more slots formed therein extending from the needle hole in radial relation to said hole. The needle threads are thus enabled to lie down in one of these slots, so that an unobjectionable tightening of the threads, when fixing the stitches is achieved. Such an arrangement is disclosed in U.S. Pat. No. 3,313,259, issued Apr. 1967.

However, it is possible that in feeding the workpiece in certain directions the threads will not slip off from the rounded ends of the arms into the slots, whereby false stitches may be produced. The throat plate according to this U.S. Patent is not suitable for an automatic sewing device in which the workpieces are clamped into clamping holders.

SUMMARY

According to the invention these problems are solved by employing a throat plate pivoted within an opening of the bedplate and about the axis of the needle, this throat plate including a longitudinally extending groove and stitch hole within the groove for the needle. This groove is alignable with the sewing threads in the feed direction during the formation of a seam as the workpiece is being fed.

The throat plate of the device is provided with a cylindrical portion and a flange, and the opening for receiving this cylindrical portion in the bedplate is formed with circular recesses. The cylindrical portion and the flange of the throat plate are supported on ball bearings received in the recesses. The flange of the throat plate may be cylindrical; however, it may be formed with a flattening extending parallel to the groove, for engaging with an edge of a pattern, to thereby align the feed direction of the seam.

According to a further modification of the invention the throat plate pivoted in the bedplate may be formed with a clearance for the threads; this clearance extending in feed direction and directed downwards terminates in the stitch hole. The throat plate is further provided with a beveled portion in the zone of the stitch hole and the clearance. The beveled portion is widened from the top downwards for cooperation with a pattern provided with a chamfered edge, which corresponds to the beveled portion of the throat plate and adjoins it. A spring attached to said throat plate biases it to the chamfered edge of the pattern, to thereby align the clearance in parallel with the chamfered edge of the pattern.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate the embodiments of the invention.

FIG. **1** is a perspective view, partly in section, of the stitch-forming tools and the bedplate with the throat plate pivoted in it;

FIG. **2** is a top view of the bedplate and the throat plate with a workpiece thereon;

FIG. **3** is a cross section of the throat plate, taken on line III –III of FIG. **2**, on an enlarged scale;

FIGS. **4** and **5** illustrate various positions of the throat plate corresponding to various feed directions of the workpiece;

FIG. **6** shows another embodiment of the invention for use in connection with a pattern manipulated by hand;

FIG. **7** is a top plan view of an automatic sewing device provided with a turntable, workpiece holders and a swingably supported double chainstitch sewing machine, and of a throat plate according to a further embodiment of the invention;

FIG. **8** is a top plan view, partly in section, according to FIG. **7**;

FIG. **9** is a section on line IX –IX of FIG. **7**, on an enlarged scale;

FIG. **10** is a section on line X –X of FIG. **9**, with a top plan view of the fabric carrier arm and a workpiece clamp holder;

FIG. **11** shows a top plan view of the throat plate on an enlarged scale;

FIG. **12** is a cross section taken along line XII –XII of FIG. **11**;

FIG. **13** shows a perspective top plan view of the throat plate and the workpiece clamp holder with a workpiece partially in section; and

FIG. **14** is a view similar to FIG. **13**, showing the workpiece clamp holder is in another position.

DESCRIPTION OF THE EMBODIMENTS

Referring now to the FIGS. in detail, there are shown in FIG. **1**, partly in section, the stitch-forming elements and the bedplate **1** of a double chainstitch sewing machine (FIG. **9**). The stitch-forming elements consist of a vertical reciprocating needle **2**, which carries the upper thread **3**, a chainstitch looper **5** carrying a looper thread **4**, and a thread spreader **6** arranged below the bedplate **1** and in cooperation with the chainstitch looper **5** and the needle **3**, to form a two-thread

chainstitch 7. A throat plate 8 (FIG. 3) is pivoted in the bedplate 1. For this purpose the throat plate 8 is provided with a cylindrical portion 9, a flange 10, a threaded setting ring 11 and a stitch hole 12, which is formed with a through bore 17 and oppositely disposed grooves 16 with the edges of the hole and grooves being generally slot-shaped. The throat plate 8 is mounted on ball bearings 13 which are received in recesses 14, 15 formed within the opening of the bedplate 1.

When the workpiece 18 is fed in the directions indicated by arrows in FIGS. 2, 4 and 5, the throat plate 8 pivots in the corresponding feed direction of the workpiece 18 due to the automatic alignment of the grooved stitch hole 12 by means of the chained sewing threads 3, 4 and especially by means of the looper thread 4 which is disposed diagonally within the groove 16 (FIG. 1) and acts like a lever arm upon the flange 10 of the throat plate 8.

In the embodiment shown in FIG. 6, the flange 10 of the throat plate 8 is provided with a flattening 19 extending parallel to the grooves 16. This flattening 19 abuts against the contour 20 of a pattern 21, whereby when this pattern 21 with the workpiece 18 moves along at the throat plate 8 of the sewing machine, alignment of the grooves 16 corresponding to the run of the pattern 21 is effected.

In FIGS. 7—14, a preferred embodiment of the invention is shown in a double chainstitch sewing machine 22, which is a component of a sewing device with guided control of the sewing cycle. This device is provided with a turntable 23 having workpiece and pattern holders 24 clamped to it. The workpieces 18 are held in these so as to be guided under the needle 2 of the sewing machine 22 according to the curvilinear turn of guide patterns 25 (FIGS. 8 and 9).

The sewing machine 22 is arranged on a supporting arm 26 which is pivoted on a swingable link arm 27. The link arm is pivoted on a machine frame 28. A driven magnetic roller 29 is mounted in the supporting arm 26 and cooperates with the guide patterns 25. On an extension of the driving shaft 30 (FIG. 9) of the magnetic roller 29 there is pivoted a loose guiding roller 31, which moves in the path of a U-shaped guide bar 32 secured to the machine frame 28.

Pivoted in the bedplate 1 of the sewing machine 22, as seen best in FIG. 12, is a throat plate 33 provided with a stitch hole 34, for the passage of the needle 2 (FIGS. 13 and 14) which cooperates with a double chainstitch looper 35 and a thread spreader 36 allowing the forming of a seam in any feed direction.

The throat plate 33 is formed with an elongated groove 37 which increases in depth toward the stitch hole 34. The throat plate 33 is further provided with beveled portions 38 (FIGS. 11 to 14) in a zone about the stitch hole 34 and the two sides running parallel with the elongated groove 37. These beveled portions 38 which are widened from the top downwards correspond with a beveled portion 50 with which a pattern 39 of the workpiece and pattern holder 24 is provided.

The throat plate 33 is equal in height to the pattern 39, so that the overhanging part of the workpiece 18 (FIG. 9) clamped by means of a spring 40 between the lower pattern 39 and an upper clamp plate 41, runs parallel with the surface 42 of the throat plate 33, while the workpiece 18 which is not actuated by an intermittent feed dog is guidable between the throat plate 33 and a workpiece presser pad 43 without noticeable friction. With the beveled portions 38 of the throat plate 33 and the beveled portion 50 of the pattern 39 it is possible to form the seam relatively close by the outlet side where the workpiece 18 leaves the upper clamp plate 41 and the lower pattern 39.

According to FIG. 12, a bushing 48 is inserted in an opening 47 of the bedplate 1. A threaded bushing 45 provided with a collar 46, is pivoted in the bushing 48 and screwed to a threaded journal 44 with which the throat plate 33 is formed. A spring 49 (FIGS. 11 and 12) arranged between the bedplate 1 and the throat plate 33 and acting upon the throat plate 33 causes the joining of the beveled portion 38 extending parallel with the elongated groove 37 to the chamfered edge 50 with which the guiding edge of the lower pattern 39 is provided (FIGS. 13 and 14).

According to FIG. 12, a bushing 48 is inserted in an opening 47 of the bedplate 1. A threaded bushing 45, provided with a collar 46, is pivoted in the bushing 48 and screwed to a threaded journal 44, with which the throat plate 33 is formed. A spring 49 (FIGS. 11 and 12) arranged between the bedplate 1 and the throat plate 33 and acting upon the throat plate 33 causes the joining of the beveled portion 38, extending parallel with the clearance 37 to the chamfered edge 50, with which the guiding edge of the lower pattern 39 is provided (FIGS. 13 and 14).

I claim:

1. A double chainstitch sewing machine having a vertical reciprocating needle for carrying an upper thread, a thread-carrying chainstitch looper, a thread spreader cooperating with said chainstitch looper and said needle for allowing the forming of chainstitches in every feed direction of a workpiece, a horizontal bedplate having an opening formed therein and a throat plate rotatably received in said opening, said throat plate being rotatable about the axis of said needle and having a through bore therein forming a stitch hole, and oppositely disposed slot-shaped grooves formed in a wall of said bore for receiving said sewing threads during the formation of a seam and for the alignment of said grooves in feed direction of a workpiece when a seam is formed.

2. In a double chainstitch sewing machine according to claim 1, wherein said throat plate is further provided with a cylindrical portion and a flange, ball bearings received within said opening and supporting said cylindrical portion and said flange of said throat plate.

3. In a double chainstitch sewing machine according to claim 1, further having a pattern with a contour for guiding a workpiece beneath said needle, corresponding to the contour of said pattern, and wherein said throat plate is formed with a flattening on the side portion thereof, said flattening extending parallel with said slot-shaped grooves for engaging with said contour of said pattern to align said grooves corresponding to said contour of said pattern.

4. In a double chainstitch sewing machine having a vertical reciprocating needle carrying an upper thread, a thread-carrying chainstitch looper, a thread spreader cooperating with said chainstitch looper and said needle for allowing the forming of chainstitches in every feed direction of a workpiece, a horizontal bedplate having an opening, formed therein a throat plate rotatably received in said opening, and a workpiece presser member enclosing said needle, said throat plate being rotatable about the axis of said needle and having a stitch hole and an elongated groove formed therein with said elongated groove increasing in depth into said stitch hole, said elongated groove receiving said sewing threads during the formation of a seam and adapted to extend opposite to the feed direction of a workpiece when a seam is formed.

5. In a double chainstitch sewing machine according to claim 4, further having a pattern with a contour for guiding a workpiece beneath said needle corresponding to the contour of said pattern, and wherein said throat plate is provided with beveled side portions in a zone about said stitch hole and the two sides beveled side portions running parallel with said elongated groove, said beveled side portions being widened from the top downwards, said pattern having a chamfered edge at said contour for cooperating with said beveled portions of said throat plate, a spring secured to said throat plate and said bedplate for biasing said throat plate to said chamfered edge of said pattern and aligning said elongated groove in parallel with said chamfered edge of said pattern.

6. In a sewing device with guided control of a sewing cycle, in combination, a support means, a turntable pivoted on said support means a guided pattern mounted below said turntable, workpiece clamping means mounted above said turntable and comprising a lower pattern having a contour corresponding to the seam to be sewn, and an upper clamp plate for clamping a workpiece upon said lower pattern, a swingable link arm on

said support means, a supporting arm pivoted on said link arm, a driven magnetic roller secured to said supporting arm and engaged with the peripheral edge of said guide pattern, a double chainstitch sewing machine carried by said supporting arm and having a vertical reciprocating needle carrying an upper thread, a thread-carrying chainstitch looper, a thread spreader cooperating with said chainstitch looper and said needle for allowing the forming of chainstitches in every feed direction of said workpiece, a horizontal bedplate having an opening formed therein a throat plate rotatably received in said opening, and a workpiece presser member enclosing said needle, said throat plate being rotatable about the axis of said needle and having a stitch hole and an elongated groove formed therein, said elongated groove increasing in depth toward said stitch hole, said elongated groove receiving said sewing threads during the formation of a seam and adapted to extend opposite to the feed direction of a workpiece, and said throat plate being further provided with beveled side portions in a zone about said stitch hole and the two sides running parallel with said elongated groove, said beveled portions increasing in cross section with downwardly, said lower pattern having a chamfered edge of said contour for cooperation with said beveled portions of said throat plate, and a spring secured to said throat plate and said bedplate for biasing said throat plate to said chamfered edge of said lower pattern and aligning said elongated groove in parallel with said chamfered edge of said pattern.