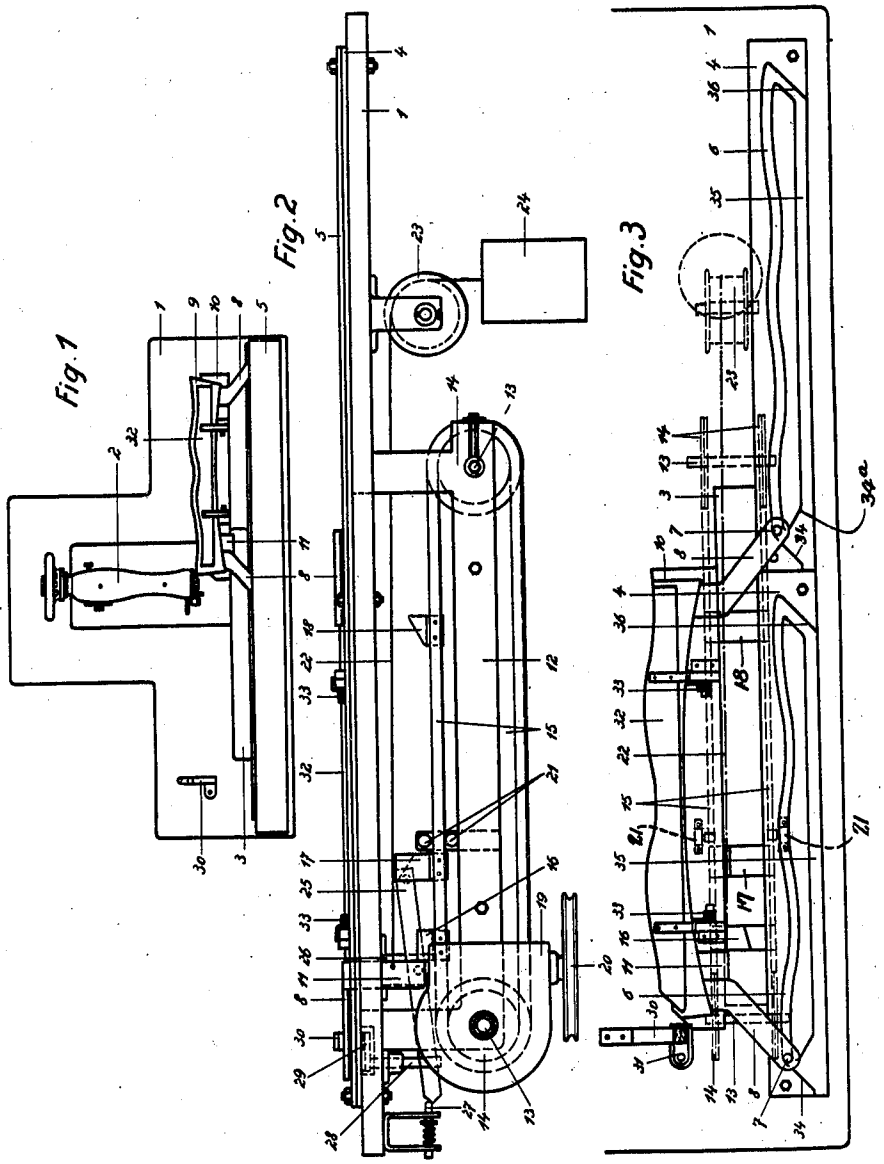
Jan. 2, 1934. E. SOMMER 1,942,128

WORK SUPPORTING AND GUIDING MEANS

Filed March 26, 1931



Inventor
Ernst Sommer
By Spear, Jacobsen & Hoel
Attys

Patented Jan. 2, 1934 1,942,128

UNITED STATES PATENT OFFICE

1,942,128

WORK SUPPORTING AND GUIDING MEANS

Ernst Sommer, Aue, Germany

Application March 26, 1931, Serial No. 525,575, and in Germany April 2, 1930

10 Claims. (Cl. 112—2)

In the factory production of underwear, clothing (ready-made) and objects of leather such for example as the upper leather parts of footwear, gloves, handbags, pocket-books and the like, the mechanical making of seams plays a great part. This invention relates to work supporting and guiding means for sewing machines.

The apparatus hitherto usually used for making such seams places no slight requirements on the aptitude of the sewers, and the product frequently turns out more or less defective according to the degree of aptitude of the worker in question. Furthermore, the production of the seams hitherto usually occupies the attention of the sewers to such an extent that only one machine can at any time be attended to by a worker. The duration of the process of production and the cost of production are thereby unfavourably influenced, and a comparatively large staff is necessary for the production of a particular quantity of objects which include seams made in this manner, within a definite period of time.

The purpose of the invention is to provide work supporting and guiding means facilitating the production of seams on the articles mentioned, in which with a considerably smaller staff the same quantity of work can be dealt with in a certain period of time, and in which no particularly skilful or highly paid labour is necessary, as the work is purely mechanical and can be carried out by inexperienced workers.

The apparatus according to the invention comprises a work holder having projections to be guided in grooves in templates formed to correspond with the course of the seam to be produced, the work holder having a stop projecting into the range of movement of another stop carried by flexible connections running over rollers. Thus the object to be provided with seams is brought up to the machine needle with a positive automatic feed movement.

The apparatus according to the invention is shown in the accompanying drawing as an example of construction. The article chosen as an example is a stand-up turned over collar, but the use of the apparatus is in no way limited to such an article.

Figure 1 represents the general arrangement of the apparatus on a sewing machine.

Figure 2 represents the apparatus independently in front view on a larger scale.

Figure 3 represents the apparatus in plan view.

The reference numeral 1 indicates the work-table fitted on the sewing machine 2. As will be seen from Figure 1, it is at the front of the machine, that is in the range of the needle, considerably wider than with machines as usually constructed. 3 indicates a slot made in the table and the purpose of which is explained below. Between the slot 3 and the front edge of the machine table 1 a pair of templates 4 are interchangeably fixed on the table. The templates are covered by the cover plate 5 (Figure 1). Each of the two templates 4 has a guide groove 6. Each guide groove has the same curve, and each serves to guide a pin 7, if necessary provided with a roller, and which slides in the curved groove 6 from right to left. The guide pins 7 are fitted on the guide arms 8 and project vertically downwards, the guide arms on their part being fixed on a work holder 10 taking the article 9 to be stitched, in this example a collar. From the work holder 10, a driver arm or stop 11 projects downwards through the slot 3 of the machine table 1. On the lower side of the table 1 is fitted a frame 12 consisting of parallel flat bars (only shown in Figure 2). At the ends of this frame are carried the axles 13 on which are arranged chain wheels 14 in pairs. Endless chains 15 in parallel run over the chain wheels 14. By means of bolts which are carried through the chains 15, three stops 16, 17 and 18 are fastened on the chains. The drive of the chains is effected by means of a worm gear driven from the pulley 20. The worm on the shaft of the pulley 20 drives a worm wheel on the adjacent axle 13, the worm gear being contained within a guard or cover 19. A pair of guide rollers 21 is provided for the upper run of each chain 15. The upper runs of the chains 15 pass between the guide rollers 21 which are suitably supported from the frame 12, and which do not extend inwardly beyond the inner or opposing sides of the chains. The guide rollers 21 will not interfere with the feed movement of the stops 16, 17 and 18 due to the fact that the stops are arranged between the chains 15 and due to the fact that the guide rollers do not extend inwardly beyond the chains. A cord 22 engages the stop 11 attached to the work holder 10, and projecting downward, this cord being carried over a roller 23 and a weight 24 being suspended on it. A double armed lever 25 is pivotally suspended in a bearing block 26, the left hand end of the said lever having oppositely inclined surfaces as seen in Figure 2. The right-hand end of the lever projects into the range of movement of the stops 17 and 18, while a spring pin 27 projects into the range of movement of the left-hand end of the lever 25, and by engagement with either of said inclined surfaces on the said lever tends to hold

the said lever in either of two positions. To the lever 25, is linked a vertical rod 28 terminating in a presser 29 with roughened surface. Usually the presser 29 rests in a recess of the machine table 1. At a certain distance above it, a counter pressure plate 30 roughened on its lower side is fixed on the table. A stop 31 close to the pressure plate serves to limit the movement of the work piece 9. The work holder 10 has a folding cover 32 clamping the work piece and held close folded by the springs 33.

The method of operation of the apparatus is as follows:—

If the front edge of the article (collar) 9 curved in flat wave lines is to be provided with a seam, then the flat cover 32 of the work holder 10 is lifted up, the collar 9 is placed in the work holder 10, (as seen in Figure 1) and the cover 32 is allowed to descend under the influence of the springs 33. On the machine starting, the worm gear is set in rotation, which is transmitted to the chain wheels 14 and thus to the chains 15. The chains thus move from the right to the left; the stop 16 moved with the chains comes with its face in front of the stop 11 of the work holder 10 projecting downwards through the slot 3. The work holder is thus carried along by the chains. The left-hand corner of the work piece 9 comes within the range of the machine needle, which commences to make the seam. In addition to its straight longitudinal displacement towards the left, the work piece holder 10 carries out a cross movement perpendicular to the feed movement and corresponding to the ordinates of the guide grooves 6 in the templates 4 which combines with the forward feed movement to effect the movement in a curved path prescribed by the grooves 6. This movement takes place owing to the guide pins 7 fixed on the arms 8 sliding in the grooves 6 on the displacement to the left of the work holder 10. The stops 11 and 16 here coming into contact must naturally be so dimensioned that their faces remain in engagement in the displacement which they carry out. When the work piece has reached the left-hand end of the working stroke, the stop 17 which has a suitable surface passes with this surface over a pin fixed on the double armed lever 25 and forces the right-hand end of the lever 25 downwards; the left-hand end of the lever is thereby moved upwards and snaps over the spring pin 27 by which it is held in the position to which it has thus been moved when the stop 17, in consequence of the further movement of the chain 15, releases the right-hand end of the lever 25. The upward movement of the left-hand end of the lever 25 causes an upward movement of the roughened presser 29, which grips a corner of the work piece and presses it against the roughened bottom of the counter pressure plate 30. The work piece is thus held fast. The flat cover 32 can be easily raised automatically by any suitable device so that the work holder releases the work piece. By the movement of the endless chains 15 the work holder 10 is carried along with the guide pins 7 on its arms 8 sliding in the undulating grooves 6. When the said pins 7 reach the ends of the said grooves, they contact with the oblique surfaces 34 between the ends of the grooves 6 and 35. These inclined surfaces cause the pins 7 to move the work holder forwardly as its movement to the left continues. This forward movement of the work holder causes the termination of the engagement between the stops 11 and 16, immediately following or simultaneously with the clamping of the work piece by the presser 29 and the counter pressure plate 30. The work holder 10 is thus removed from the influence of the movement of the chains 15, and the weight 24 now draws the work holder backward, that is, to the right, when the pins 7 are guided by the oblique surfaces 34*a* seen in Figure 3 into the straight return portions 35 of the grooves. On the work holder approaching the end of its backward travel, the pins 7 encounter oblique surfaces 36. These inclined surfaces cause the pins 7 to move the work holder rearwardly, with the result that the pins are guided to the entrances of the curved grooves 6 and with the result that the stop 11 is moved into position for engagement by the stop 16, so that after the insertion of another work piece the process can begin again.

It must also be mentioned that the collar or the like 9 held by the presser 29 and the counter pressure plate 30 is released as soon as the stop 18 raises, by means of its inclined surface, which is oppositely directed to that of the stop 17, the right-hand end of the lever 25, whereby its left-hand end is drawn downwards, carrying the presser 29 with it.

The use of the apparatus is not limited to the example described, but with obvious modifications its use is almost unlimited in so far as it is a question of the production of curved seams in different substances and for the most varied purposes.

As practically only the insertion of the work piece into the work holder and its removal after the making of the seam have to be performed by hand, cheap labour can attend simultaneously to several machines fitted with the apparatus.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a sewing machine, a driving device, a slotted work table, rollers positioned underneath said table, flexible connections adapted to be set in motion by said driving device and to run over said rollers, templates having grooves shaped to correspond with the course of the seam to be produced, a work holder having guide projections adapted to be guided in said grooves, said work holder having a stop projecting downward through a slot in said table, and a second stop carried on said flexible connections to engage the stop on the work holder and thereby to move said work holder forward.

2. Apparatus as in claim 1, wherein the templates having guide grooves are provided at the ends of said grooves with inclined surfaces and straight return grooves to guide the projections on the work holder in its return stroke.

3. Apparatus as in claim 1, wherein the templates having guide grooves are provided at the ends of said grooves with inclined surfaces and the stop on the work holder is so dimensioned as to disengage the stop on the flexible connections when the guide projections on the work holder encounter said inclined surfaces at the termination of the forward stroke of the work holder.

4. In combination with apparatus as in claim 1, a re-setting device tending to restore the work holder rapidly to its initial position, and means to disengage the work holder from the flexible connections at the termination of its forward stroke to permit said re-setting device to operate.

5. Apparatus as in claim 1, wherein the work holder is provided with a cover impelled by a spring to grip the work piece.

6. In combination with apparatus as in claim 1, a clamping device to receive the work piece

from the work holder, and means carried by the flexible connections to place said clamping device in operation at the termination of the advance of the work holder.

7. In combination with apparatus as in claim 1, a pressure plate roughened on the underside and secured on the work table, a vertically movable pressing member roughened on its upper surface and adapted to cooperate with said pressure plate to hold the work piece, and means to lift said movable pressing member into its operative position at the termination of the advance of the work holder.

8. In combination with apparatus as in claim 1, a clamping device to receive the work piece from the work holder, said clamping device including a vertically movable pressing member, a lever pivotally connected with said pressing member to actuate said pressing member, and means carried by the flexible connections to actuate said lever.

9. In combination with apparatus as in claim 1, a fixed pressure plate, a movable pressure member to cooperate with said plate to clamp the work piece, means carried by the flexible connections to move said pressure member into the clamping position, and other means carried by the flexible connections to reverse the movement of said pressure member to release the work piece.

10. In combination with apparatus as in claim 1, a clamping device to hold the work piece, a lever to operate said clamping device, means to move said lever into the position corresponding with the operative position of said clamping device, other means to move said lever into the position in which said clamping device releases the work piece, and a spring impelled locking device tending to hold said lever in either of the positions into which it is thus placed.

ERNST SOMMER.