Nov. 7, 1944. H. HACKLANDER 2,362,267

FEEDING MECHANISM FOR SEWING MACHINES

Filed Dec. 6, 1940

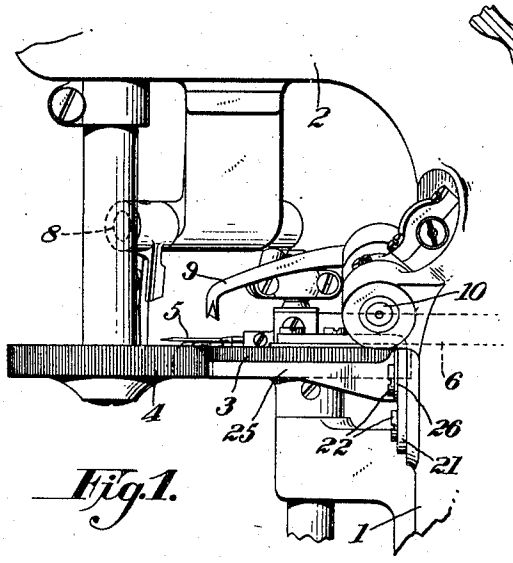


Fig. 1.

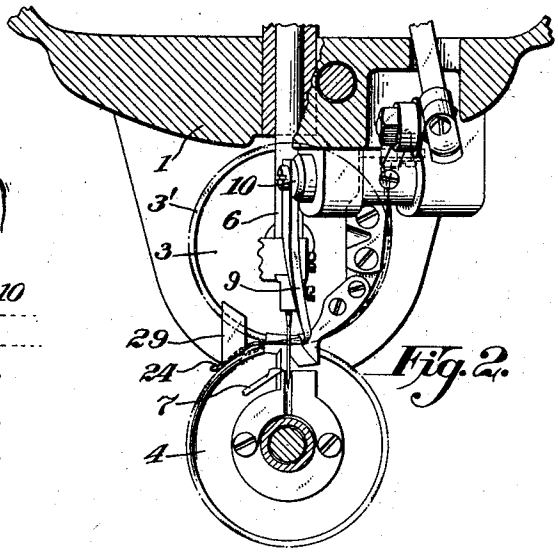


Fig. 2.

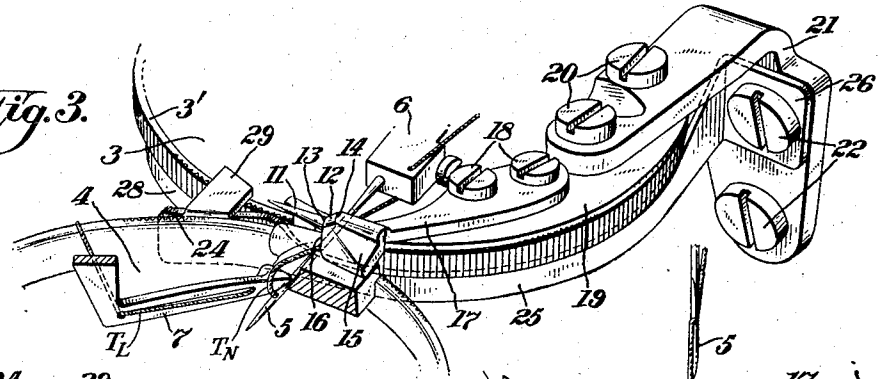


Fig. 3.

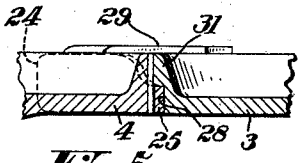


Fig. 5.

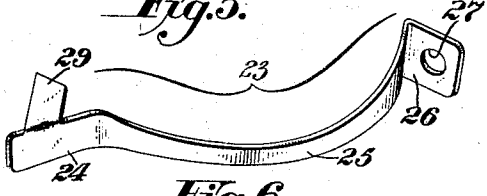


Fig. 6.

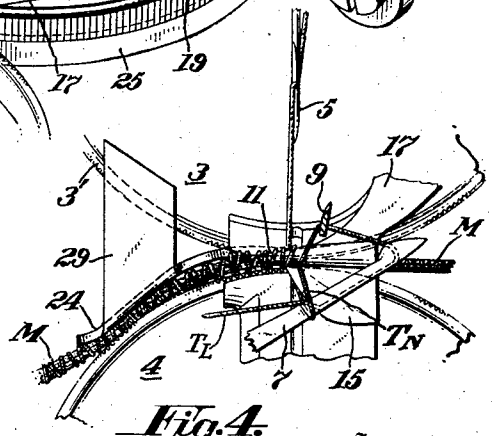


Fig. 4.

Inventor
Hans Hacklander

Witness:
John H. Cave

By John F. Heine
Attorney

Patented Nov. 7, 1944

2,362,267

UNITED STATES PATENT OFFICE

2,362,267

FEEDING MECHANISM FOR SEWING MACHINES

Hans Hacklander, Linden, N. J., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application December 6, 1940, Serial No. 368,793

16 Claims. (Cl. 112—18)

This invention relates to improvements in feeding mechanisms for sewing machines of the type wherein the material being stitched is adapted to be supported and fed through the machine by feeding wheels or "cups."

In sewing machines of this type the two feed-cups are in peripheral contact with one another directly beneath the path of reciprocation of the needle, and overlying the path of reciprocation of the needle and extending substantially at right angles thereto is the usual horizontally disposed stitch-finger about which the stitches are formed and set. When the stitches are tightly set upon the stitch-finger, as is necessary to produce a satisfactory seam, the stitches tend to cling to the stitch-finger and thereby afford a slight resistance to the uniform passage of the material through the machine. This slight resistance does not offer any serious obstacle to the effective operation of the machine when the material being sewn is of relatively firm body, since the stitches are moved off the end of the stitch-finger uniformly by the material as it is advanced through the machine by the feed-cups.

However, when the material consists of fine silk or nylon, which is delicate and of a flimsy nature, any resistance to the easy flow of the material through the machine causes puckering of the material rearwardly of the feed-cups. This puckering results in the formation of a seam in which the length of the individual stitches varies considerably. Such a seam lowers the quality of the finished product and thereby reduces the acceptable output of any one machine.

It is therefore the primary objective of the present invention to provide an improved auxiliary feeding expedient which operates rearwardly of the stitching devices to assist the feed-cups in advancing delicate materials through the machine at a uniform rate and without puckering.

A further object of the present invention is the provision of an auxiliary feeding device which is designed to automatically engage the material rearwardly of the feed-cups, thereby eliminating the necessity of having to manually introduce the material into the auxiliary feeding device.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawing of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawing, Fig. 1 is a fragmentary front elevational view of a cup-feed sewing machine embodying the improvement.

Fig. 2 is a horizontal sectional view of the machine illustrated in Fig. 1.

Fig. 3 is an enlarged fragmentary perspective view of the elements of the machine at and adjacent to the stitching point, showing clearly the auxiliary presser-spring and its preferred arrangement relative to these elements.

Fig. 4 is an enlarged top plan view of the feed-cups, stitch-forming devices, stitch-finger and auxiliary presser-spring, illustrating the manner in which the stitches are formed in the material and about the stitch-finger and the relation of the auxiliary presser-spring to the stitch-finger.

Fig. 5 is a vertical sectional view taken through the two feed-cups and the body of the auxiliary presser-spring in the plane containing the path of needle-reciprocation and with no material between the feed-cups.

Fig. 6 is a perspective view of the auxiliary presser-spring showing its preferred form of construction.

Referring in detail to the drawing, the machine in which one embodiment of the invention is incorporated is constructed substantially in accordance with the disclosure in my U. S. Patent No. 2,277,970, dated March 31, 1942, and includes a machine-frame having a standard 1 which terminates at its upper end into a laterally projecting overhanging bracket 2. Supported by the standard 1 is an inner feed-cup 3 which cooperates with an outer feed-cup 4 depending from the laterally projecting overhanging bracket 2. As is common in machines of this type, the two feed-cups 3 and 4 are positively driven in synchronism, and are adapted to support and feed the material being sewn past the stitch-forming devices.

The stitch-forming devices of the machine illustrated comprise a threaded needle 5 carried by an endwise reciprocatory needle-bar 6, an oscillatory threaded looper 7 secured to a looper rock-shapt 8, and an oscillatory spreader 9 attached to a spreader rock-shaft 10. As clearly shown and described in my above mentioned patent, the needle-bar 6, looper rock-shaft 8 and spreader rock-shaft 10 are operatively connected within the machine-frame to an actuating shaft, and are properly timed and

actuated to effect the formation of a two-thread overseam.

As is common in cup-feed machines of the type disclosed, there is provided a stitch-finger (see Figs. 3 and 4) overlying the feed-cups 3 and 4 at the stitching point and about which the stitches are formed and set to minimize distortion of the marginal edges of the material being sewn. The stitch-finger in the accompanying drawing comprises an attenuated substantially conical blade 11 terminating in an abruptly inclined looper-thread-positioning shoulder 12 having a trough 13 at the junction of the blade 11 and the shoulder 12 and a crest 14 at the top of the shoulder 12, and a horizontally projecting needle-thread-loop positioning fin 15 having a curved thread-deflecting edge 16. The shank 17 of the stitch-finger is secured by two screws 18 upon a support 19 disposed within the upturned peripheral flange 3' of the inner feed-cup 3 and sustained by two screws 20 to an angle-bracket 21 fastened by screws 22 to the wall of the standard 1.

In the operation of the machine the threaded needle 5, after penetrating the marginal edges of the material, shown as M in Fig. 4, is withdrawn and during the initial portion of its withdrawal stroke casts out a needle-thread-loop T_N (Fig. 3) which is entered by the point of the threaded looper 7. The looper, after entering the needle-thread-loop, carries its own thread T_L over the marginal edges of the material M and presents said thread to the spreader 9 which distends the looper-thread-loop for entrance by the needle 5 prior to its next penetration of the fabric. In distending the looper-thread-loop the spreader 9 lays one of the limbs of the loop over the crest 14 of the stitch-finger, which limb slides down the inclined shoulder 12 to the trough 13 at the base of the shoulder 12 and thence onto the conical blade 11. The setting of the stitch thus formed occurs when the stitch is about the conical blade 11 close to the shoulder 12 and the setting action, if sufficiently tight, causes the stitch to cling slightly to the blade 11 of the stitch-finger. The consequent resistance to the free passage of the material through the machine is not serious in the event the material has a relatively firm body. However, when a flimsy material is used it is necessary to provide means adapted to augment the feeding action of the usual cooperating feed-cups in advancing the material through the machine in a condition devoid of puckering.

To this end, there is provided an auxiliary presser-spring 23 having a work-engaging section 24 adapted to yieldingly press the material into contact with the serrated face of the outer feed-cup 4 rearwardly of the stitching point. The auxiliary presser-spring 23 cooperates with the driven feed-cup 4 to effect a pull-feed action on the material, which action assists the feed-cups in advancing the material through the machine at a uniform rate.

The preferred form of the auxiliary presser-spring 23 is best shown in Figs. 3 and 6, and comprises a curved work-engaging section 24 formed on one end of a reversely curved narrowed body-portion 25 which terminates at its other end in a shank 26 apertured as at 27 to receive one of the fastening screws 22 of the angle-bracket 21. Formed along the upper edge of the curved work-engaging section 24 is a lip 29 bent into a substantially horizontal position to rest upon the upper edge of the peripheral flange 3' of the inner feed-cup 3, thereby to provide means for maintaining the work-engaging section 24 in proper elevated position for cooperation with the outer feed-cup 4. When fitted on the machine the work-engaging section 24, which is preferably curved for a portion of its length at a radius substantially equal to that of the feed-cup 4, engages a substantial area of the serrated face of the outer feed-cup 4 rearwardly of the stitching point and the reversely curved body-portion 25 projects forwardly substantially in the line of feed between the feed-cups 3 and 4 through a suitable recess 28 formed in the lower portion of the serrated face of the inner feed-cup 3 and across the front of the feed-cup 3 to the face of the angle-bracket 21. As shown in Fig. 5, the recess 28 is preferably of sufficient depth so that when the body-portion 25 of the presser-spring is disposed therein the serrated faces of the two feed-cups will not be maintained separated, but will positively grip the material. In order that the work-engaging section 24 of the presser-spring will firmly contact the material and press it against the face of the feed-cup 4, the body-portion 25 is preferably curved at a radius substantially equal to the radius of the inner face of the recess 28. In plan view, the presser-spring is of such shape that the body-portion thereof is curved to the extent that between the shank 26 and the work-engaging section 24 the body-portion approximates a 90 degree segment. When so curved the body-portion 25 actually contacts the inner face of the recess 28 along an arc of substantially 90 degrees and any flexing of the presser-spring in response to the traversing of the material by the work-engaging section 24 is effected in the vicinity of the junction of the work-engaging section 24 and the body-portion 25. It will be understood from the above description that by forming the presser-spring so that its body-portion 25 contacts the inner face of the recess 28 and its work-engaging section 24 is supported in its proper operating position by the lip 29, a device is provided which is well supported and durable, yet sufficiently sensitive to effectively perform its function.

One of the important advantages of the present improvement is that, due to the reverse curvature of the presser-spring and its position relative to the two feed-cups 3 and 4, the material M after passing through the feed-cups is automatically introduced between the work-engaging portion 24 of the presser-spring and the serrated face of the outer feed-cup 4. Also, as a result of the presser-spring extending across the normal line of feed (see Figs. 2 and 4), the material M is always directed automatically to one and the same side of the normal line of feed, and preferably against the periphery of the outer feed-cup 4. This is desirable for the reason that the beginning end of the material is not required to be manually introduced between the work-engaging portion of the presser-spring and the serrated face of the outer feed-cup and, therefore, the use of the presser-spring does not reduce or interfere with the production effected by the machine.

While I have shown and described one form of auxiliary feeding device for accomplishing the desired result, it is to be understood that the present disclosure is merely the preferred embodiment of the invention, and that it is obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus set forth the nature of the invention, what I claim herein is:

1. A sewing machine having, in combination, stitch-forming devices including a reciprocatory thread-carrying needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member disposed substantially in the line of feed at the point of cooperation of said feed-cups and having its front end curved in one direction and its rear end reversely curved and positioned to press the material into contact with the work-engaging face of one of said feed-cups.

2. A sewing machine having, in combination, stitch-forming devices including a reciprocatory thread-carrying needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member adapted to be supported at one side of said needle and having its free end disposed on the other side of said needle and at the discharge side of said feed-cups and positioned to press the material into contact with the work-engaging face of one of said feed-cups.

3. A sewing machine having, in combination, stitch-forming devices including a reciprocatory thread-carrying needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member disposed substantially in the line of feed at the point of cooperation of said feed-cups and having its front end curved about the periphery of one of said feed-cups and its rear end reversely curved and positioned to press the material into contact with the work-engaging face of the other of said feed-cups.

4. A sewing machine having, in combination, stitch-forming devices including a reciprocatory thread-carrying needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, one of said feed-cups having a recess formed in its work-engaging face, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member disposed in said recess at the point of cooperation of the feed-cups and having its front end curved about the periphery of said recessed feed-cup and its rear end reversely curved and positioned to press the material into contact with the work-engaging face of the other of said feed-cups.

5. A sewing machine having, in combination, stitch-forming devices including a reciprocatory thread-carrying needle, means including inner and outer feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, said inner feed-cup having a recess formed in its work-engaging face, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member disposed in said recess at the point of cooperation of the feed-cups and having its front end curved about the periphery of said recessed feed-cup and its rear end reversely curved and positioned to press the material into contact with the work-engaging face of said outer feed-cup rearwardly of the stitch-forming devices.

6. A sewing machine having, in combination, a frame including a standard, stitch-forming devices including a reciprocatory thread-carrying needle, means including inner and outer feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, said inner feed-cup having a recess formed completely around its work-engaging face, and a presser-member disposed in said recess at the point of cooperation of the feed-cups and having one of its ends curved about the front peripheral portion of said inner feed-cup and secured to said frame and its other end reversely curved and positioned to yieldingly press the material into contact with the work-engaging face of said outer feed-cup to effect a pull-feed action for assisting the feed-cups in advancing the material through the machine at a uniform rate.

7. A sewing machine having, in combination, a frame, stitch-forming devices including a reciprocatory thread-carrying needle, feed-cups having cooperating serrated work-engaging faces for supporting and feeding material past said stitch-forming devices, one of said feed-cups having a recess formed completely around its serrated face, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a presser-member disposed in said recess at the point of cooperation of the feed-cups and having its front end curved about the periphery of said recessed feed-cup and secured to said frame and having its rear end reversely curved to provide a work-engaging section positioned to press the material into contact with the serrated face of the other of said feed-cups, and means for maintaining the work-engaging section of said presser member in proper position for effective cooperation with the serrated face of the other of said feed cups.

8. A sewing machine having, in combination, a frame, stitch-forming devices including a reciprocatory thread-carrying needle, means including inner and outer feed-cups having cooperating serrated work-engaging faces for supporting and feeding material past said stitch-forming devices, said inner feed-cup formed with a recess extending completely around its serrated face, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a presser-spring disposed in said recess at the point of cooperation of the feed-cups and having its front end curved about the periphery of the inner feed-cup and secured to said frame and having its rear end reversely curved to provide a work-engaging section adapted to yieldingly press the material into contact with the serrated face of the outer feed-cup, and a lip attached to said work-engaging section and overlying the peripheral portion of said inner feed-cup to support and maintain the work-engaging section of the presser-spring in proper operative relation with the serrated face of the outer feed-cup.

9. In a sewing machine having feed-cups provided with cooperating work-engaging faces for supporting and feeding material through the machine, the improvement which consists in the provision of means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a press-

er-member disposed substantially in the line of feed at the point of cooperation of said feed-cups and having its front end disposed forwardly of said point of cooperation of the feed-cups and curved in one direction and its rear end disposed rearwardly of said point of cooperation of the feed-cups and reversely curved to yieldingly press the material into contact with the work-engaging face of one of said feed-cups.

10. A presser-member for use in sewing machines having cooperating feed-cups for supporting and advancing the material through the machine, comprising, a curved body-portion adapted to extend about a portion of the periphery of one of the feed-cups and terminating at one end in a reversely curved work-engaging section adapted when applied to the machine to yieldingly press the material into contact with the periphery of one of said feed-cups, said presser-member terminating at its other end in a supporting shank, the body-portion intermediate said shank and said work-engaging section being curved to approximate a 90 degree segment.

11. A sheet-metal presser-member for use in sewing machines having cooperating feed-cups for supporting and advancing the material through the machine, comprising, a curved body-portion formed at one end with an apertured shank and at its other end with a reversely curved work-engaging section provided with a supporting lip, said work-engaging section adapted to yieldingly press the material into contact with the periphery of one of said feed-cups.

12. In a sewing machine having feed-cups provided with cooperating work-engaging faces for supporting and feeding material through the machine, the improvement which consists in the provision of means for assisting the feed-cups in advancing the material through the machine, said means including a member extending across a straight line tangent to the feed-cups at their point of cooperation and positioned for automatically deflecting the leading edge of the material toward the work-engaging face of one of said feed-cups.

13. In a sewing machine having feed-cups provided with cooperating work-engaging faces for supporting and feeding material through the machine, the improvement which consists in the provision of means for assisting the feed-cups in advancing the material through the machine, said means including a member having a section thereof arranged to deflect automatically the leading edge of the material at the discharge side of the feed-cups to one side of a straight line tangent to the feed-cups at their point of cooperation and having a section thereof positioned beyond the first section to press the material into contact with the work-engaging face of one of said feed-cups.

14. A sewing machine having, in combination, stitch-forming devices including a reciprocatory needle, feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a member disposed substantially in the line of feed at the point of cooperation of said feed-cups and having that portion of the member in rear of said needle positioned to direct the material into contact with the work-engaging face of one of said feed-cups.

15. A sewing machine having, in combination, a frame, stitch-forming devices including a reciprocatory needle, inner and outer feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a presser-member having one of its ends curved about the periphery of the inner feed-cup and secured to said frame and having its other end reversely curved to provide a work-engaging section positioned to press the material into contact with the work-engaging face of the outer feed-cup, and means for maintaining the work-engaging section of said presser-member in proper position for effective cooperation with the face of said outer feed-cup.

16. A sewing machine having, in combination, stitch-forming devices including an endwise movable needle, rotatable feed-cups having cooperating work-engaging faces for supporting and feeding material past said stitch-forming devices in a plane tangent to said feed-cups at the line of cooperation thereof, and means for assisting the feed-cups in advancing the material through the machine at a uniform rate, said means including a work-engaging section positioned at one side of said plane to press the material into contact with the work-engaging face of one of said feed-cups, and a section adjacent said work-engaging section projecting through said plane and having a portion thereof positioned at the other side of said plane to be engaged by the advancing leading end of the material, whereby the leading end of the material is forcibly directed between said work-engaging section and said cooperating feed-cup without requiring a manual separation of said work-engaging section and said feed-cup.

HANS HACKLANDER.