June 16, 1953 R. E. JOHNSON 2,642,022

DARNING ATTACHMENT FOR SEWING MACHINES

Filed Nov. 30, 1948 2 Sheets-Sheet 1

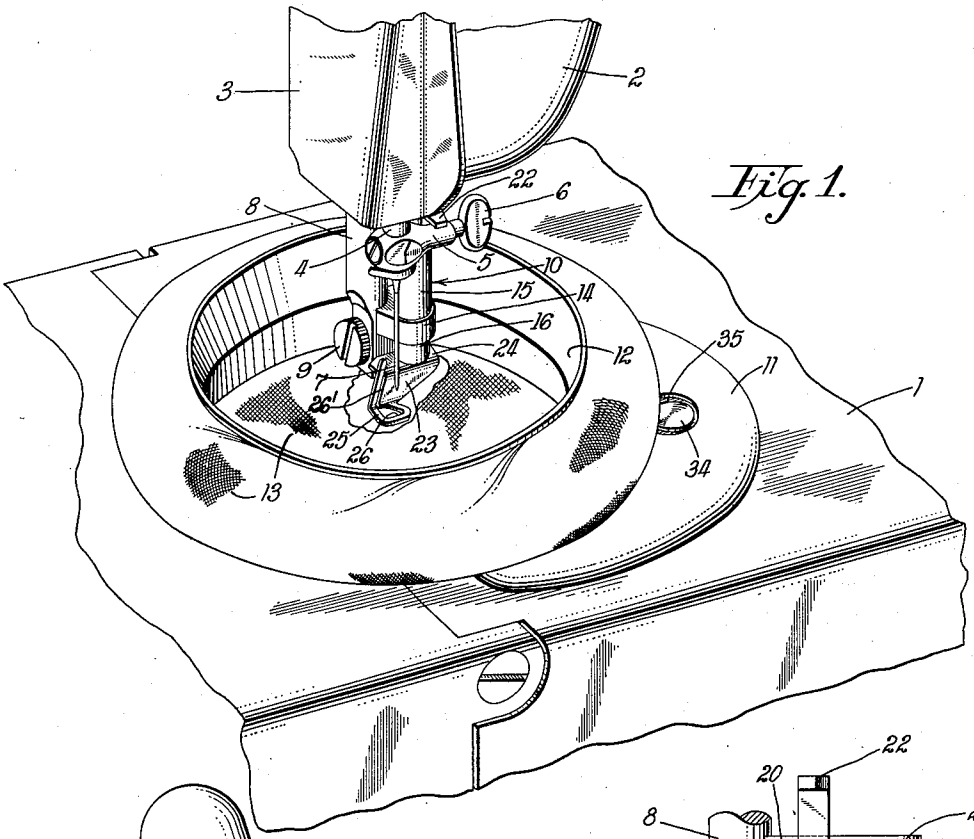


Fig. 1.

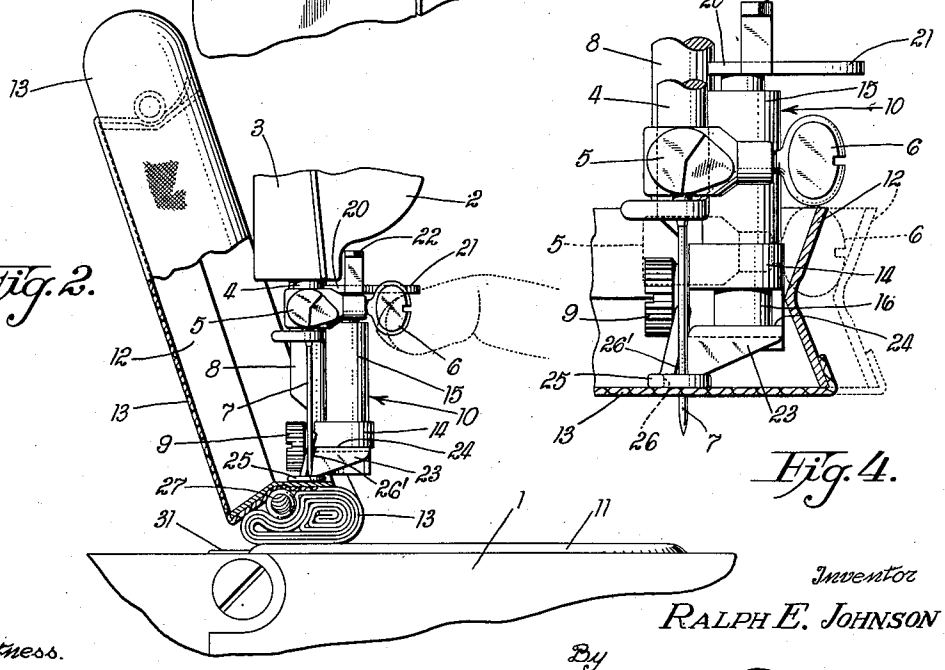


Fig. 2.

Fig. 4.

Witness.
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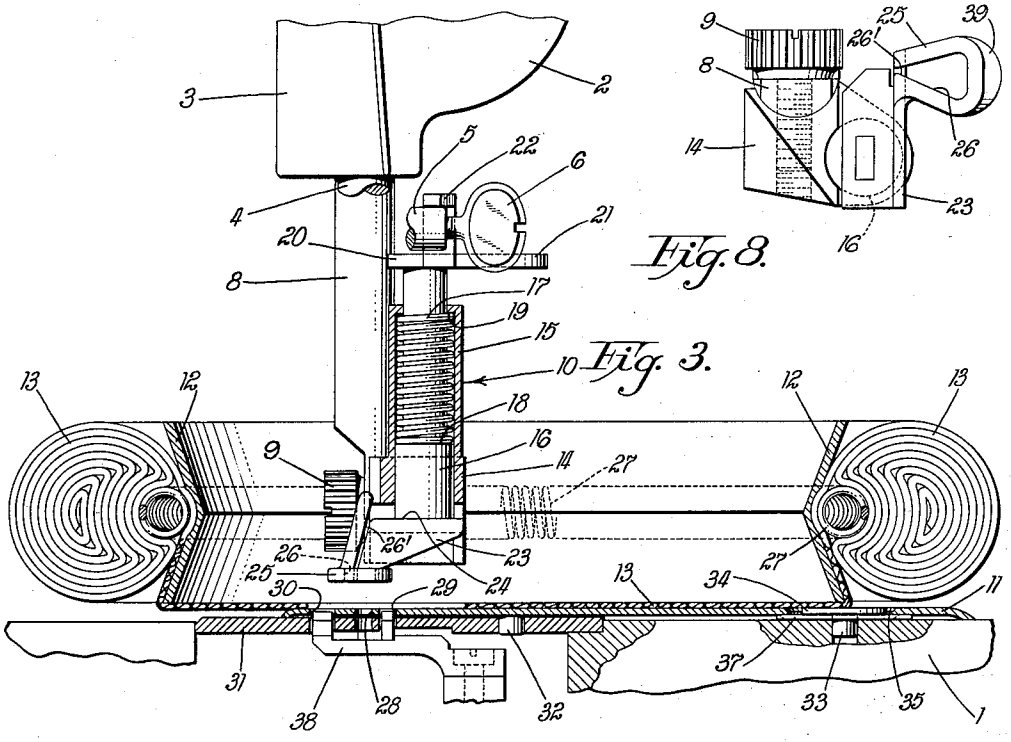
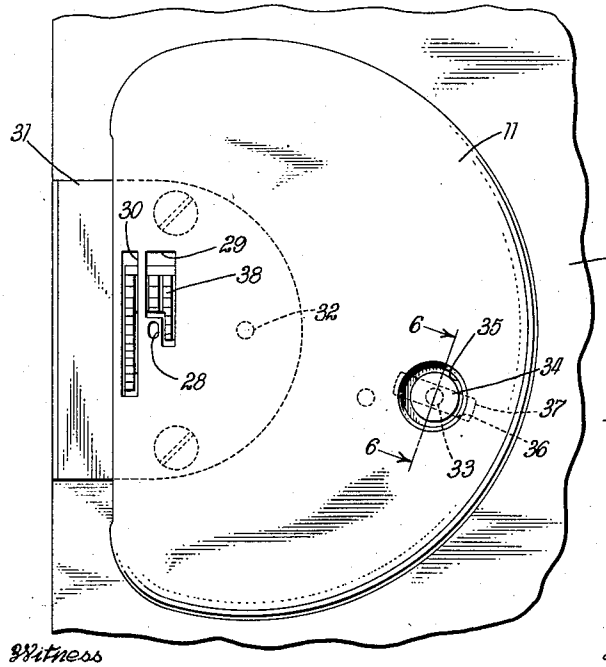


Fig. 3.

Fig. 8.



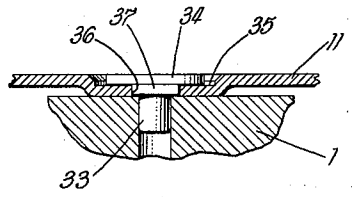


Fig. 6.

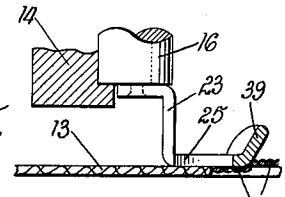


Fig. 5.

Fig. 7.

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DARNING ATTACHMENT FOR SEWING MACHINES

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3 Claims. (Cl. 112—260)

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This invention relates to attachments for sewing machines and more particularly to a combination of attachments by which a flat-bed sewing machine may be readily adapted for darning articles, including those of tubular shape. It finds use in any sewing operation wherein it is desired to manually control the length and direction of the stitch.

Several things must be done to adapt the ordinary sewing machine for sewing of this kind. First, the normal feeding means must be rendered inoperative as far as feeding the work is concerned. Secondly, some means for holding the work must be supplied and, finally, in the absence of a presser-foot, means must be provided for stripping the work from the needle. These several means should be so interrelated as to facilitate introduction and manual shifting of the work to perform stitching operations, with the skipping of stitches reduced to an absolute minimum.

It is known in the prior art to employ a removable plate which completely covers the feed-dog to prevent work-advancing engagement thereby of the material. This practice unnecessarily decreases the available clearance space under the needle by at least the thickness of the plate.

A primary object of this invention, therefore, is to provide means for selectively preventing the feed-dog from feeding the work, without substantially affecting the clearance space under the needle.

Heretofore, work-holders have been provided for holding a stretched portion of the work to be stitched while maintaining the surrounding portion of the work out of the path of the needle. These have been made with restricted dimensions for passing beneath the needle or have been slotted for the same reason. Such limitations have resulted in structurally weak holders inadequate to control a large bulk of material which is often required to be handled.

It is a further object of this invention, therefore, to provide a work-holder of symmetrical shape adapted for structural rigidity and, at the same time, for easy manipulation beneath the needle.

A still further object of this invention is to provide a stripper foot which may be raised for insertion of the work to an elevation equal to the maximum needle point elevation to take full advantage of the available space beneath the needle.

Another object of this invention is to provide a

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combination of a work spacing plate and a work holder having cooperating surfaces which facilitate the positioning of the work under the needle and the manipulation of the work with minimum interference from associated parts of the machine.

The invention will be best understood from the following description when considered in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a perspective view of a portion of a sewing-machine showing the attachments embodying the invention.

Fig. 2 is a front elevation, partly in section, showing a step in manipulating the attachments embodying the invention.

Fig. 3 is an enlarged front elevation, partly in vertical section, the section being taken substantially centrally through the attachments of Fig. 1.

Fig. 4 is a partial section showing the cooperative function between the component attachments embodying the invention.

Fig. 5 is a top plan view of the cover-plate component of the attachments.

Fig. 6 is an enlarged vertical section taken on the line 6—6 of Fig. 5.

Fig. 7 is a vertical section, partly in elevation, taken through a stripper-foot having a modified sole-piece.

Fig. 8 is a bottom plan view of the stripper-foot of Fig. 7.

Referring to Fig. 1, there is shown a portion of a conventional flat-bed sewing machine having a work-supporting plate 1 and a bracket-arm head 2 provided with a face-plate 3. This machine may be of the type described in the U. S. Patent No. 2,063,841, December 8,1936, to which patent reference may be had for a more complete description of this machine. A needle-bar 4 carries at its lower end a needle-clamp 5 in which is removably secured, by means of a screw 6, a needle 7.

A presser-bar 8 which normally carries a presser-foot has secured to it, by means of a screw 9, a special stripper-foot attachment 10. Secured to the work-supporting surface of the bed 1 is a work-spacing plate 11 which functions to hold the work out of feeding engagement by the feed-dog, as will be described subsequently. A work-holding ring 12 holds the work 13 in a condition for presentation to the needle 7 and, at the same time, provides a support for the excess

work, whereby it is held out of the path of the needle.

The stripper-foot attachment 10 comprises a block 14 which, as shown in the drawings, is recessed to receive the presser-bar 8 upon which it is secured by the thumb-screw 9. Rising from the block 14 is a vertically disposed cylindrical sleeve or housing 15, axially bored to slidably accommodate a cylindrical shank portion 16 of the stripper-foot. The shank is urged downwardly by a coil-spring 17 disposed within the housing and compressed between a shoulder 18 on the shank and a spring-abutment 19 formed by the top wall of the housing. The upper end of the shank 16 extends through the housing, and an angular lifter arm 20 is secured thereto to overhang the housing. One end 21 of the arm extends outwardly laterally of the line of feed and serves as a hand lifter for the foot, as seen best in Fig. 2. The other end 22 of the arm overhangs the needle clamp 5 on the needle bar 4 and forms a tappet against which the needle clamp impinges on the ascending stroke of the needle-bar to intermittently raise the foot. The arm 21 overhanging the housing 15 incidentally serves to prevent the shank from being forced downwardly out of the housing by the action of the coil spring 17.

The stripper-foot proper comprises a stepped or Z-shaped element 23, with the depending end of the cylindrical shank 16 terminating in and secured to the upper horizontal shelf 24 of the Z. The rear edge of this shelf slidably engages the front wall of the supporting block 14, thereby providing for vertical sliding movement of the foot and shank but preventing turning thereof about a vertical axis. The lower horizontal portion 25 of the Z forms the sole-piece of the stripper-foot and contains an enlarged needle accommodating aperture 26. The upright wall of the Z is formed to provide an upwardly open slit 26' extending downwardly to the needle accommodating aperture 26 in the sole-piece, thereby facilitating threading.

It will be seen from Fig. 2 that, in the lifted position of the stripper-foot, the upper shelf 24 abuts the block 14 which provides a stop, and, in this position, the point of the needle 7 is guarded by the apertured portion 26, so that material being inserted will not be snagged by the needle.

The stripper-foot 10 may be modified, as shown in Figs. 7, 8 and 9 by providing the sole piece 38 with a rounded plow portion 39 in the form of an upwardly inclined toe struck up from the front end. In this manner, the sole piece cannot snag any darning yarn 40 which may be laid crosswise on the work.

The work holder comprises an endless ring 12 having as a cross-section a radially outwardly flaring V-channel as seen best in Figs. 3 and 4, together with a cooperating garter spring 27. The work to be sewn is maneuvered to a position centrally of the ring 12 and the surrounding fabric portions are drawn about the edge of the ring and clamped in the crotch of the V-channel by the garter spring 27. The ring being symmetrical, the work may be drawn about either edge of the attachment. If the work is a sock, for example, the remaining portions thereof are rolled in the usual manner at the outside of the ring as shown clearly in Figs. 1 and 3. The vertex angle formed by the intersecting walls of the V-channel is preferably obtuse and such that the attachment, the height of which exceeds the clearance between the raised stripper foot 10 and the work spacing plate 11, may be slid beneath the foot by upending the ring 12 as is clearly shown in Fig. 2. The V-channel also provides a space into which the work may be compressed when the ring is upended as shown.

This construction thus obviates the use of vertical slots in the side walls of the work-holder to permit the introduction of the attachment under the needle 7. Furthermore, the upper inclined wall of the ring 12 provides for greater shifting movement of the work-loaded ring during use, before the ring is engaged by the needle-clamp screw 6. Should the needle-clamp screw strike this inclined wall, the tendency would be to cam the ring harmlessly out of the way as is shown by the dotted lines of Fig. 4.

The work-spacing plate 11 contains a needle aperture 28 and feed-dog apertures 29 and 30 and is generally semi-circular in plan having a plane, smooth top surface gradually rounded off at the edges so that when it is placed upon the bed 1, the edges present substantially no obstruction to horizontal sliding movement of objects relative thereto. The plate 11 is held in place on the bed 1 and over an ordinary throat-plate 31 by gravity and by the pressure of the work itself, said plate being positioned by two locating pins 32 and 33 secured to said plate, which pins engage cooperating apertures in the throat-plate and in the bed respectively.

One of the pins 33 is arranged to move relative to the other pin 32 to permit adjustment to meet manufacturing differences in the spacing of the cooperating apertures. To this end, the movable pin 33 is formed with a head 34 seated in a depressed portion 35 of the plate 11, as seen best in Fig. 6. The material in the depressed portion 35 is slotted to form a guideway 36 which carries a guide-plate 37 secured to the pin 33 and extending lengthwise beyond the limits of the guideway. Thus, the pin 33 may be moved in a path along said guideway toward or away from the fixed pin 32 and is limited in the extent of this movement by the fit of the head 34 within the depressed portion 35.

The plate 11 is slightly dished and when properly mounted on the machine bed 1, overlies a portion of the throat-plate 31, as seen in Fig. 3, and has its upper surface positioned so that in its upper position the regular feed-dog 38 just fails to reach through the apertures 29 and 30 to the surface. In this manner, more vertical clearance between the raised stripper-foot 25 and the plate 11 is provided, the gain in this respect being substantially equal to the plate thickness in the case of the customary work plates which actually cover the feed-dog.

From the foregoing, it will be perceived that, by means of the cooperative action of the stripper-foot, work-holder and work spacing plate, according to the invention, I have provided improved means for readily adapting a flat-bed sewing machine for darning, embroidery or similar work.

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

1. A work-spacing device for sewing machines having a work-support provided with an aperture, and a feed-dog operating through said work-support, comprising, a plate adapted to be removably mounted upon said work-support in the region of said feed-dog, and plate securing means including an anchoring pin depending from said plate and adapted to enter said aperture in the work-support, said pin being slidable laterally in a guideway carried by said plate.

2. A work-spacing device for sewing machines

having a work-support provided with a plurality of spaced apertures, and a feed-dog operating through said work-support, comprising, a plate adapted to be removably mounted upon said work-support in the region of said feed-dog, a first anchoring pin depending from said plate and normal thereto and adapted to enter one of said apertures, and a second anchoring pin depending from said plate and normal thereto and adapted to enter the other of said apertures, said second anchoring pin being slidable laterally in a guide-way formed in said plate for pin-positioning movement toward and from said first anchoring pin.

3. A work-spacing element for a sewing machine having a work-support and a feed-dog operating through said work-support, comprising, a generally semi-circular dished plate presenting a plane top surface with gradually rounded side edges, said plate having a circular depressed portion struck into said top surface and containing a straight cut-out portion forming a guide slot, a pin positioned in said slot and having a circular headed portion seated on the top side of said depressed portion, and a guide lug secured to said pin, said guide lug being freely seated in

and extending beyond the extremities of said guide-slot whereby to provide for limited movement of said pin in said guide slot.

RALPH E. JOHNSON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
791,384	Viglini	May 30, 1905
899,574	Towers	Sept. 29, 1908
921,690	Frick	May 18, 1909
937,112	Stafford	Oct. 19, 1909
1,122,999	Pettit	Dec. 29, 1914
1,169,236	Carr	Jan. 25, 1916
1,300,496	Shaw	Apr. 15, 1919
1,905,907	Karle	Apr. 25, 1933
1,943,254	Barron	Jan. 9, 1934
1,981,837	Hemleb	Nov. 20, 1934
2,471,370	Gegauf	May 24, 1949

FOREIGN PATENTS

Number	Country	Date
202,828	Switzerland	May 1, 1939
213,544	Switzerland	May 16, 1939