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R. E. JOHNSON ET AL

2,633,816

SEWING MACHINE

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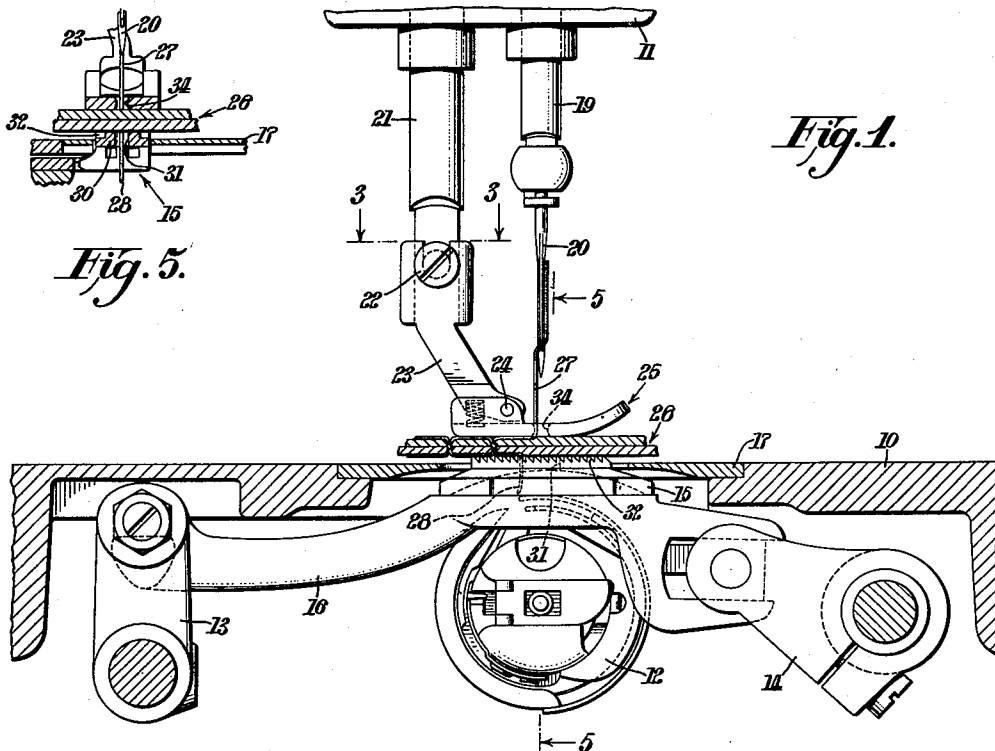


Fig. 1.

Fig. 5.

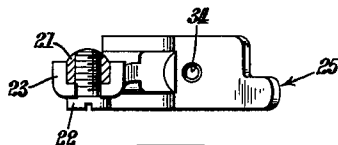


Fig. 3.

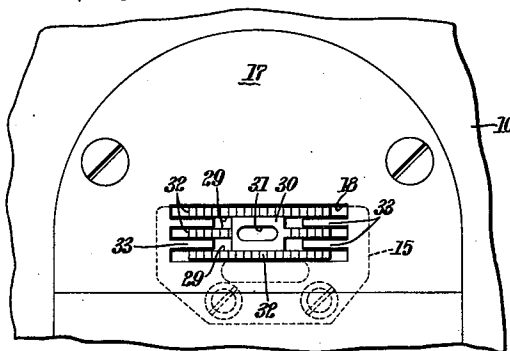


Fig. 2.

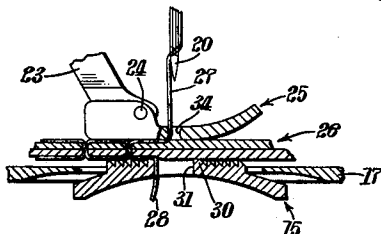


Fig. 4.

Witness.

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UNITED STATES PATENT OFFICE

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SEWING MACHINE

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1 Claim. (Cl. 112—215)

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This invention relates to sewing machines and more particularly to a sewing machine which is adapted to be employed in the stitching of elastic material.

The conventional lock-stitch sewing machine employs a throat-plate which is provided with a plurality of parallel feed-dog slots and a circular needle-receiving aperture positioned between a pair of such slots. Employed in conjunction with such a throat-plate is a feed-dog having serrated arms which move within the slots and a presser-foot having a longitudinal needle-receiving slot. Experience has indicated that such a conventional sewing machine causes elastic cloth, such as "nylon," to be unduly stretched during the stitch-setting operation due to the fact that the feed-dog functions to advance the cloth over the throat-plate and past the needle-receiving aperture at the same time that the take-up mechanism sets the stitch. These two actions occurring simultaneously cause the needle-thread to exert a pull on the cloth in a direction opposite to the direction of feed and thus the elastic cloth is stretched with the result that the finished article has a tendency to pucker upon the completion of the stitching operation.

A primary object of the present invention is the provision of a sewing machine which is capable of sewing elastic cloth, such as "nylon," without causing the cloth to stretch during the stitching operation.

The foregoing object and others ancillary thereto have been attained by the provision of a novel throat-plate, feed-dog and presser-foot which, when applied to a conventional type sewing machine, cooperate together to feed elastic material past the stitching area of a sewing machine without causing the material to be unduly stretched to the end that the resulting stitched material will have no tendency to pucker.

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 drawings 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 drawings—

Fig. 1 represents an end elevation, partly in section, of a stitch-forming and feeding mechanism of a sewing machine showing the improved mechanism.

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Fig. 2 represents a top plan view illustrating the sewing machine bed, throat-plate and feed-dog.

Fig. 3 represents a sectional view taken substantially along the line 3—3 of Fig. 1.

Fig. 4 represents a fragmentary longitudinal sectional view through a portion of the presser-foot, throat-plate and feed-dog of the present mechanism.

Fig. 5 represents a fragmentary sectional view taken substantially along the line 5—5 of Fig. 1.

In the embodiment of the invention selected for illustration, my improved mechanism is shown applied to a sewing machine having a bed 10 and a head 11. Journaled below the bed 10 is a rotary loop-taker 12 and the usual feed-rockers 13 and 14 which impart a four-motion movement to a feed-dog 15 through the medium of a feed-bar 16, in the usual and well-known manner. Mounted upon the bed 10 is a throat-plate 17 formed with an aperture 18 through which the feed-dog 15 operates.

Journaled for reciprocatory movement in the head 11 is a needle-bar 19 carrying an eye-pointed needle 20. Also journaled for right line up and down movement in the head 11 is the usual spring depressed presser-bar 21 having secured thereto, by means of a screw 22, a presser-foot shank 23. Pivotaly mounted upon the presser-foot shank 23, by means of a cross-pin 24, is a pressure-foot generally designated by the numeral 25, which presser-foot cooperates with the feed-dog 15 in the feeding of the work 26 to and past the stitching area. For a more complete and detailed description of the sewing machine mechanism, reference may be had to the patent of Kaier, No. 2,206,285, dated July 2, 1940.

As hereinabove noted, a conventional sewing machine causes elastic work material to be unduly stretched during the stitch-setting operation due to the fact that the feed-dog functions to advance the work-material over the throat-plate and past the needle-receiving aperture at the same time that the take-up mechanism sets the stitch. These two actions occurring simultaneously cause the needle-thread to exert a pull on the work-material in a direction opposite to the direction of feed and thus the elastic cloth is stretched with a result that the finished article has a tendency to pucker as the material relaxes. This action may be better understood by referring to Fig. 1 wherein the work-material is designated by the numeral 26 and the needle 20 is illustrated as provided with needle-thread des-

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ignated by the numeral 27, while the bobbin thread is designated by the numeral 28. During the stitch-setting operation, the usual feed-dog functions to advance the work 26 over the throat-plate and past the stitching area in a left-hand direction as viewed in Fig. 1, while at the same time the take-up mechanism sets the stitch by pulling upwardly on the needle thread 27. These two actions occurring simultaneously cause the needle-thread to pull upwardly and away from the work material 26 in a right-hand direction which is directly opposed to the feeding action which urges the work-material in a left-hand direction, and thus the elastic cloth is stretched with the result that the finished article has a tendency to pucker. The present sewing machine, however, was devised in order to overcome the above noted shortcoming in a conventional sewing machine.

The present feed-dog, generally designated by the numeral 15, is provided intermediate the ends of its teeth-carrying bridge elements 29, 29 with a horizontally disposed platform 30 which is provided with an elongated needle-receiving slot 31. The upper surface of this platform 30 is disposed flush with the top portions of the feed-dog teeth 32 which surround it.

The present throat-plate 17 differs from a conventional unit in that it is provided with no needle-receiving aperture and in lieu thereof it is formed with a large central opening 18 which is adapted to receive the above noted feed-dog platform 30 as well as the bridge elements 29, 29 as the feed-dog advances the work over the throat-plate. At opposite ends of the throat-plate opening 18 there are provided finger elements 33, 33 which extend between the various feed-dog bridge elements in order to support the work during the feeding operations.

The present presser-foot 25 differs from a conventional unit in that the usual open-ended needle-receiving slot has been replaced by a circular needle-receiving aperture 34.

It is the function of the present feed-dog to have its platform member 30 clamp the work being stitched against the presser-foot 25 in the area directly surrounding the needle-thread 27 so that any relative lateral motion between the work 26 and the thread 27 will not tend to stretch the work. By referring particularly to Figs. 1, 4 and 5 it will be appreciated that the feed-dog platform 30 not only completely surrounds the work in the area directly surrounding the needle-

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thread, but at the same time it locks the needle-thread itself between the platform and the presser-foot thereby to prevent the thread from stretching the work during the stitch-setting operation. Since the usual presser-foot slot has been eliminated and in lieu thereof the presser-foot has been provided with a circular aperture 34, the work may be rigidly clamped between the presser-foot and the feed-dog platform 30 and thus the needle-thread has little opportunity to cause portions of the material to be stretched in a lateral direction.

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

A sewing machine for sewing elastic work material and having, in combination, a flat apertured work-support, a reciprocating needle, a presser-foot spring-biased toward said work-support and having a needle-receiving aperture therein, said needle and said presser-foot each being disposed at one side of and being confined for rectilinear movements toward and from the flat surface of said work-support, a feed-dog disposed at the other side of said work-support and adapted for movements within the work-support aperture and longitudinally of said presser-foot thereby to cooperate with said latter element in the feeding of work material over said work-support, a platform member having a flat upper surface and an elongated needle-receiving aperture therein and carried by said feed-dog for cooperating with said presser-foot in clamping the work material between the flat upper surface and said presser-foot in an area surrounding the puncture made in the work by said needle, serrated work-feeding elements carried by said feed-dog and having their upper surfaces disposed in a substantially coplanar relation with the flat surface of said platform, and means for imparting work-feeding movements to said feed-dog.

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