Feb. 9, 1937. C. SEAMAN 2,069,855

SHIRRING DEVICE

Filed April 10, 1936

Fig. 1.

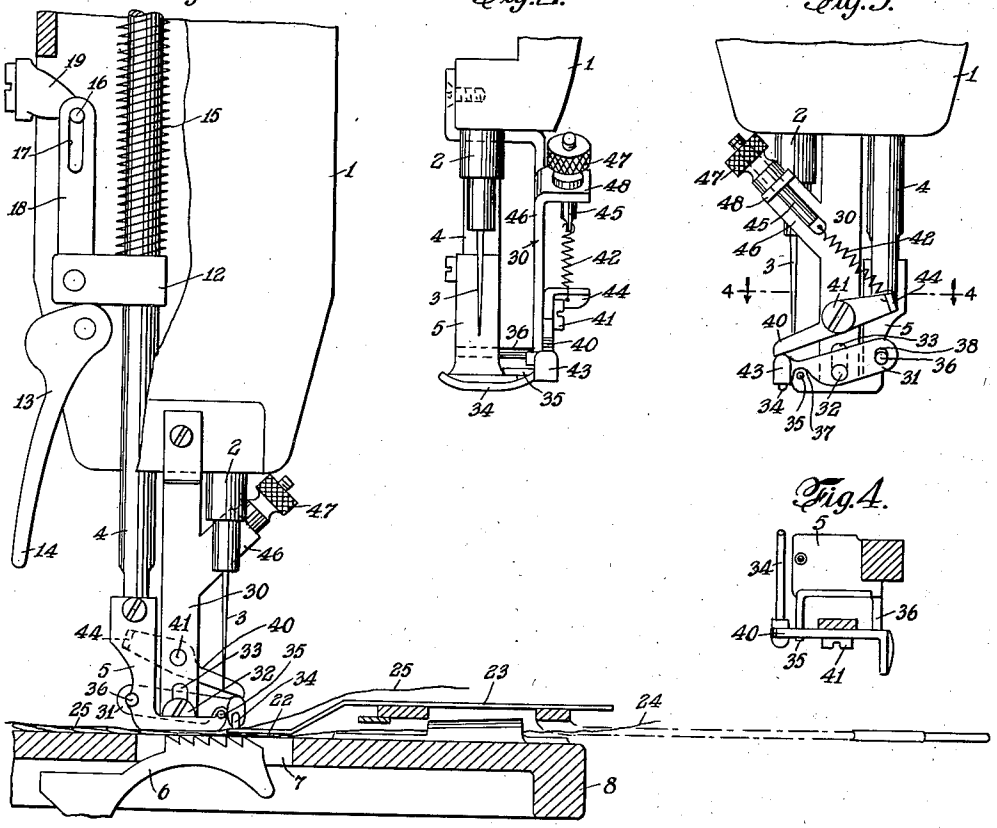


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

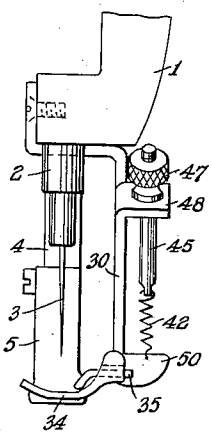


Fig. 6.

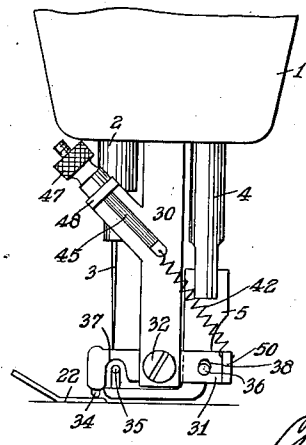
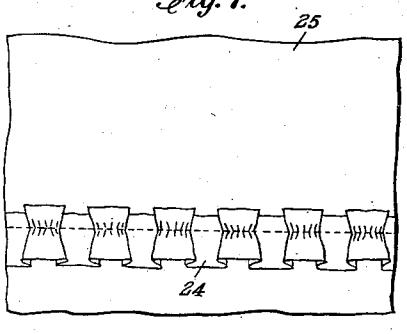


Fig. 7.



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SHIRRING DEVICE

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28 Claims. (Cl. 112—34)

This invention relates to sewing machines and more particularly to a device or attachment for making and stitching shirring or ruffling onto a base material, and is an improvement on the device disclosed in my Patent No. 2,025,530, dated December 24, 1935, for Shirring device.

An object of the invention is to provide a device for controlling the feed of the material which is entirely automatic in operation and is not dependent upon the skill of the operator.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

A feature of the invention consists in a clamp which is adapted to grip the material so as to prevent feed thereof when the presser foot is in elevated position. In one embodiment, this is accomplished by providing the presser foot with a clamp which is operated in response to elevation of the presser foot and is caused to engage and grip the material when the feed thereof is interrupted by elevation of the presser foot. Means is also provided to release the clamp when the presser foot is lowered to hold the material in feeding engagement with the feed dogs.

Another feature consists in the provision of means to elevate both the presser foot and the clamp from the material so as to release the same for purposes of adjustment.

Other features of the invention consist in the details of construction and combinations of parts hereinafter more fully set forth.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the broader aspects of the invention will be better understood by referring to the following description taken in connection with the accompanying drawing in which certain preferred embodiments thereof are set forth for purposes of illustration.

In the drawing,

Figure 1 is an end elevation, partly in section, of a portion of a sewing machine head, showing the shirring device applied thereto;

Figure 2 is a front elevation of the shirring device;

Figure 3 is a side elevation of the shirring device;

Figure 4 is a horizontal section thereof taken along the line 4—4 of Figure 3;

Figure 5 is a front elevation of a modified form of shirring device;

Figure 6 is a side elevation thereof; and

Figure 7 is a plan view showing one type of shirring which can be produced by the present device.

In the specification and in the claims, certain specific terms have been used for convenience in referring to various details of the invention. These terms, however, are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawing more in detail, the invention is shown as applied to a sewing machine having a head 1 carrying a needle bar 2 which is reciprocated by suitable driving mechanism (not shown) and carries a needle 3. The head 1 also carries a presser foot bar 4 having a main presser foot 5 which is adapted to hold the material in driving engagement with feed dogs 6 extending through a suitable aperture 7 in a base 8.

The presser foot bar 4 is provided with an arm 12 which is engaged by a cam lever 13 having a handle 14 for lifting the presser foot bar 4 and main presser foot 5 from the goods, as, for example, when the goods are to be inserted or removed from the machine. The presser foot bar 4 is normally held in engagement with the goods by a spring 15 and is periodically elevated by means of a pin 16 extending through an elongated slot 17 in a link 18 which is connected to the arm 12. The pin 16 is carried by a lever 19 which is pivoted to the head 1 in any convenient manner.

For feeding the shirring material, there is provided an auxiliary presser foot 22 which forms a part of a flat spring 23, secured by suitable means to the base 8, and extends over a portion of the feed dogs 6 ahead of the main presser foot 5. The arrangement is such that the shirring material 24 is fed beneath the auxiliary presser foot 22 in engagement with the feed dogs 6, whereas the base material 25 is fed over the auxiliary presser foot 22 and under the main presser foot 5 in engagement with the feed dogs 6. When both the auxiliary presser foot 22 and the main presser foot 5 are in position to hold the material in feeding engagement with the feed dogs 6, the base material and shirring material are fed at an equal rate and no shirring takes place. When, however, the main presser foot 5 is elevated somewhat, the pressure of the base material 25 upon the feed dogs 6 is released, and the rate of feed of the base material is correspondingly reduced. If the main presser foot 5 is sufficiently elevated, the feed of the base material is completely interrupted. During this period, however, the auxiliary presser foot 22 holds the shirring material 24 in engagement with the feed dogs 6 and causes the shirring material to con-

tinue to feed at a uniform rate. The shirring material is accordingly caused to pucker up or gather in folds at the point of stitching and is stitched in this condition, whereby a single row of stitches holds the material in shirred condition and attaches the same to the base material.

Any convenient means may be provided for periodically elevating the main presser foot **5**, as, for example, the cam mechanism disclosed in the patent above mentioned, which actuates the lever **19** for elevating the main presser foot **5** a given amount and at fixed intervals.

The mechanism thus far described is more fully set forth and the details of operation thereof are explained in the patent above mentioned. Only so much thereof has been shown herein as is necessary to an understanding of this invention.

The present invention provides a clamp for gripping and holding the base material so as to prevent the feed thereof when the main presser foot **5** is in elevated position. For this purpose, a bracket **30** is secured to the head **1** of the machine. A link **31** is pivoted in the lower end of this bracket, as by a pin **32** extending through an elongated slot **33** in said bracket. This link carries a nipper or clamp **34** which extends across the end of the auxiliary presser foot **22** in a position such that the base material **25** can be gripped between the auxiliary presser foot **22** and the clamp **34**.

The main presser foot **5** carries pins **35** and **36** which enter a recess **37** and a slot **38**, respectively, in the link **31**. A lever **40** pivoted by a screw **41** to the bracket **30** is caused by a spring **42** to bear against a boss **43** on the link **31** which is located approximately over the clamp **34**. The spring **42** is held between an ear **44** on the lever **40** and an adjusting rod **45** which is held in a spring support **46** carried by the bracket **30**. A nut **47** engaging a shoulder **48** on the spring support **46** is threaded to the rod **45** and, by its adjustment, determines the axial position of the rod **45** and the tension on the spring **42**.

The arrangement of the above-described parts is such that when the main presser foot **5** is in its lower position the pin **36** engages the bottom of the slot **38** and causes the link **31** to pivot about the pin **32**, thereby raising the clamp **34** out of engagement with the base material and permitting the same to feed under the main presser foot **5** in the usual manner.

When the main presser foot **5** is elevated by suitable actuation of the lever **19** for interrupting or retarding the feed of the base material, the pin **36** is elevated and relieves the pressure at the bottom of the slot **38**, thereby permitting the lever **40** to cause pivotal movement of the link **31** for bringing the clamp **34** into gripping engagement with the base material **25** which extends over the auxiliary presser foot **22**. The base material is then clamped between the clamp **34** and the auxiliary presser foot **22** by means of the force applied by the spring **42** and the lever **40** to the link **31**. It will be noted that this force is applied by means of the boss **43** at the point of engagement of the clamp **34** with the base material. The clamping force may be adjusted to any desired value by adjustment of the nut **47** and does not interfere in any way with the normal actuation of the main presser foot **5**.

When the main presser foot **5** is further elevated, as by means of the cam lever **13**, so as to entirely release the goods, the pins **35** and **36** which are carried by the main presser foot **5** engage the tops of the recess **37** and the slot **38**, respectively, in the link **31** and cause the link to be raised with the presser foot, the pin **32** sliding in the elongated slot **33** in the bracket **30**, and the lever **40** being correspondingly pivoted against the tension of the spring **42**. The clamp **34** and the main presser foot **5** are thus elevated in unison to entirely release the goods from the machine.

In the operation of this device, the base material **25** and the shirring material **24** are fed in the manner above described and the presser foot bar **4** is periodically actuated to elevate the main presser foot **5** so as to release the pressure on the base material **25** and to interrupt the feed thereof. In order to produce a positive action and to prevent the base material from being irregularly fed by the feed dogs **6** when the pressure of the main presser foot **5** is released, the clamp **34** is caused to grip the base material and securely clamp the same against the auxiliary presser foot **22**. In this way, a regular predetermined shirring effect is produced which is not dependent upon the skill of the operator.

It has been assumed above that the clamp **34** grips the base material sufficiently to entirely interrupt the feed. It is obvious, however, that the adjustment may be such that the clamp **34** serves to increase the tension on the material instead of to entirely interrupt the feed thereof. In that case, the base material will be fed at a reduced rate which is dependent upon the increase in tension produced by the clamp **34**. The nut **47** permits adjustment of the spring **42** for this purpose. If the rate of feed of the base material is reduced without entirely interrupting the same, less puckering or shirring will take place inasmuch as there will be less excess material fed under the needle. It is evident that any desired relative rates of feed may be obtained by suitable adjustment of the mechanism above described.

In the modification shown in Figures 5 and 6, the bracket **30**, link **31**, main presser foot **5**, clamp **34** and associated parts are similar to those above described and are given corresponding reference numerals. In this embodiment, however, the lever **40** is omitted and the spring **42** is attached directly to a lug **50** formed on the link **31**. The construction and operation are otherwise identical with that described above. In this embodiment, the pressure on the clamp **34** is determined by the pivotal movement of the link **31** produced by the pull of the spring **42**. In order to cause this movement to be positively transmitted, the elongated slot **33** in the bracket **30** is omitted and the link **31** is mounted for pivotal movement only by means of the pin **32**. In order to provide a sufficient movement for the clamp **34** to permit the same to be entirely disengaged from the material in response to elevation of the main presser foot **5** in response to actuation of the cam lever **13**, the slot **38** in the link **31** is made sufficiently large to provide clearance for the pin **36**, thereby permitting the link **31** to be pivoted by reason of the pin **35** engaging the top of the recess **37**. Hence, elevation of the main presser foot **5** causes pivotal movement of the link **31** which is sufficient in amount to release the clamp **34**.

Although certain preferred embodiments of the invention have been disclosed for purposes of illustration, it is obvious that various changes and modifications may be made therein as will appear to a person skilled in the art. The invention is to be limited only in accordance with

the following claims when interpreted in view of the prior art.

I claim:

1. In a sewing machine, a feed dog, a presser foot to hold a material in feeding engagement therewith, means to periodically release the pressure of said presser foot on said material, and additional means to simultaneously and periodically grip the material to apply a predetermined tension thereto so as to control the feed in a predetermined manner.

2. In a sewing machine, a feed dog, a presser foot to hold a material in feeding engagement therewith, means to periodically release the pressure of said presser foot on said material and additional means to simultaneously grip the material to interrupt the feed thereof.

3. In a sewing machine, a reciprocating needle, means to feed a material to the path of the needle for stitching, clamping means, and means to periodically cause said clamping means to apply a predetermined tension to the material so as to effect a predetermined variation in the feed.

4. In a sewing machine, a reciprocating needle, means to feed a material to the path of the needle for stitching, clamping means, and means to periodically cause said clamping means to grip the material so as to interrupt the feed thereof.

5. In a sewing machine, a feed dog, a main presser foot to hold a first material in feeding engagement therewith, an auxiliary presser foot cooperating with a portion of the feed dog independently of the main presser foot to hold a second material in feeding engagement therewith, means to periodically release the pressure of the main presser foot on said first material, and means to simultaneously grip the first material so as to retard the feed thereof without changing the feed of the second material.

6. In a sewing machine, a feed dog, a main presser foot to hold a first material in feeding engagement therewith, an auxiliary presser foot cooperating with a portion of the feed dog independently of the main presser foot to hold a second material in feeding engagement therewith, means to periodically release the pressure of the main presser foot on said first material, and means to simultaneously grip the first material so as to interrupt the feed thereof without changing the feed of the second material.

7. In a sewing machine, a reciprocating needle, means to feed a first material to the path of the needle for stitching, independent means to feed a second material to the path of the needle for stitching, means to periodically release the first material from the first feed means, and means to simultaneously grip the first material for preventing feed thereof.

8. In a sewing machine, a feed dog, a main presser foot and an auxiliary presser foot cooperating therewith, means to feed a first material over the auxiliary presser foot and under the main presser foot, means to feed a second material under the auxiliary presser foot, means to periodically elevate the main presser foot from the first material, and means to simultaneously hold the first material against the top of the auxiliary presser foot to apply a predetermined tension thereto.

9. In a sewing machine, a feed dog, a presser foot to control the rate of feed of a material thereby, a clamp to engage the material to apply a predetermined tension thereto, a support carrying said clamp, means to elevate said presser foot, and means responsive to elevation of said presser foot for actuating said clamp to cause the clamp to grip said material.

10. In a sewing machine, a feed dog, a presser foot to control the rate of feed of a material thereby, a clamping means adapted to grip the material for controlling the tension thereof, and means to release said clamp when said presser foot is in feeding position.

11. In a sewing machine, a feed dog, a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, clamping means to grip the material for applying a controlled tension thereto, and means carried by said presser foot to release said clamping means when the presser foot is in feeding position.

12. In a sewing machine, a feed dog, a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, clamping means to grip the material for applying a controlled tension thereto, a pivoted link carrying said clamping means, and means associated with said presser foot to actuate said link for releasing said clamping means when the presser foot is in feeding position.

13. In a sewing machine, a feed dog, a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, means to elevate said presser foot into position to completely release the material, clamping means to grip the material for applying a controlled tension thereto, means associated with said presser foot for releasing said clamping means when the presser foot is in feeding position, and means associated with said presser foot for engaging and elevating said clamping means when the presser foot is elevated into material-releasing position.

14. An attachment for a sewing machine having a feed dog, comprising a main presser foot and an auxiliary presser foot for holding a first and second material, respectively, in feeding engagement with said feed dog, means to periodically release the pressure of the main presser foot on the first material, and means to simultaneously grip the first material so as to retard the feed thereof.

15. An attachment for a sewing machine having a feed dog, comprising a main presser foot and an auxiliary presser foot for holding a first and second material, respectively, in feeding engagement with said feed dog, means to periodically release the pressure of the main presser foot on the first material, and means to simultaneously clamp the first material to interrupt the feed thereof.

16. An attachment for a sewing machine having a feed dog, comprising a main presser foot and an auxiliary presser foot for holding a first and second material, respectively, in feeding engagement with said feed dog, means to periodically release the pressure of the main presser foot on the first material, and means to simultaneously clamp the first material against the auxiliary presser foot to interrupt the feed thereof.

17. An attachment for a sewing machine having a feed dog, comprising a presser foot to control the rate of feed of a material by the feed dog, a clamp to engage the material to apply a predetermined tension thereto, a support carrying said clamp, means to elevate said presser foot, and means responsive to elevation of said presser foot for actuating said clamp to cause the clamp to grip said material.

18. An attachment for a sewing machine hav-

ing a feed dog, comprising a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, clamping means to grip the material for applying a controlled tension thereto, and means carried by said presser foot to release said clamping means when the presser foot is in feeding position.

19. An attachment for a sewing machine having a feed dog, comprising a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, clamping means to grip the material for applying a controlled tension thereto, a pivoted link carrying said clamping means, and means associated with said presser foot to actuate said link for releasing said clamping means when the presser foot is in feeding position.

20. An attachment for a sewing machine having a feed dog, comprising a presser foot, means to vary the position of said presser foot with respect to said feed dog to control the rate of feed of a material thereby, means to elevate said presser foot into position to completely release the material, clamping means to grip the material for applying a controlled tension thereto, a pivoted link carrying said clamping means, means associated with said presser foot to actuate said link for releasing said clamping means when the presser foot is in feeding position, and means associated with said presser foot for engaging and elevating said clamping means when the presser foot is elevated into material-releasing position.

21. In a sewing machine, a reciprocating needle, means to feed a material to the path of the needle for stitching, tensioning means to grip the material for retarding the feed thereof, and means to periodically cause said tensioning means to vary the tension on said material so as to effect a predetermined variation in the feed thereof.

22. In a sewing machine, a reciprocating needle, means to feed a material to the path of the needle for stitching, tensioning means therefor, and means to periodically cause said tensioning means to apply a sufficient tension to the material to interrupt the feed thereof.

23. In a sewing machine, a reciprocating needle, means to feed a first material to the path of the needle for stitching, means to feed a second material to the path of the needle for stitching, tensioning means to grip one of said materials for retarding the feed thereof, and means to periodically cause said tensioning means to vary the tension on said last material so as to alter the rate of feed thereof.

24. In a sewing machine, a reciprocating needle, means to feed a first material to the path of the needle for stitching, means to feed a second material to the path of the needle for stitching, and means to periodically apply sufficient tension to one of said materials to interrupt the feed thereof.

25. An attachment for a sewing machine having a reciprocating needle comprising means to feed a first and a second material to the path of the needle for stitching, tensioning means to grip one of said materials for retarding the feed thereof, and means to periodically cause said tensioning means to vary the tension on said last material so as to alter the rate of feed thereof.

26. An attachment for a sewing machine having a reciprocating needle comprising means to feed a first and a second material to the path of the needle for stitching, and means to periodically apply sufficient tension to one of said materials to interrupt the feed thereof.

27. The method of making shirring which comprises feeding a first and a second material to the path of a needle for stitching and periodically applying tension to one of said materials so as to retard the rate of feed thereof for causing one of the materials to pucker or shir with respect to the other of said materials.

28. The method of making shirring which comprises feeding a first and a second material to the path of a needle for stitching and periodically applying tension to one of said materials sufficient to interrupt the feed thereof whereby the other material is caused to pucker or shir.

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