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ATTACHMENT FOR SEWING MACHINES

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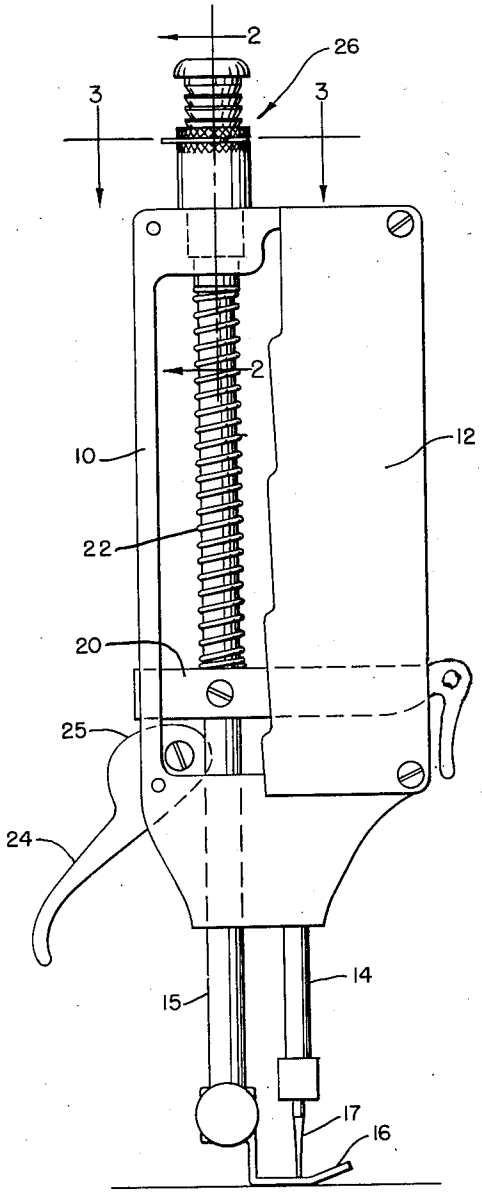


FIG. 1

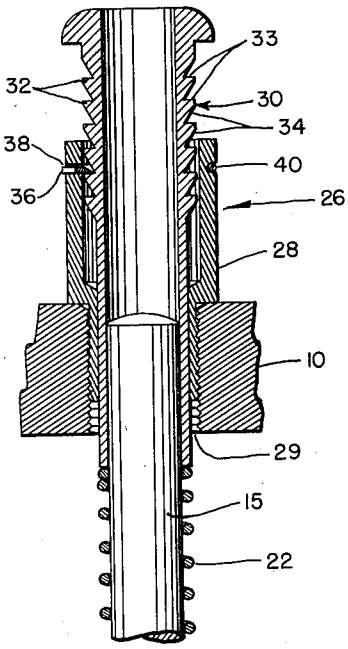


FIG. 2

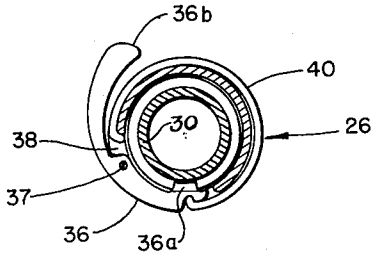


FIG. 3

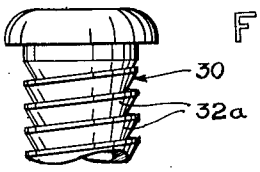


FIG. 4

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ATTACHMENT FOR SEWING MACHINES

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7 Claims. (Cl. 112—236)

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The present invention relates generally to attachments for sewing machines, and more especially to attachments which provide means for adjusting or regulating the pressure applied to the work by the presser bar.

In sewing with a sewing machine, it is often desirable to be able to change the pressure exerted by the presser foot. This is especially true with certain types of sewing, as for example darning when it may be desirable to have quick and easy adjustments of pressure. These may be desired to compensate for the kind of fabric being handled, the pull of the thread, or various other factors encountered in sewing.

There have been some attachments devised for this purpose, but so far as known these have not been entirely satisfactory. For example, a device which permits only a maximum or minimum pressure is not satisfactory because it does not afford enough variations in pressure. Other devices have not been positive in their action, that is they cannot be relied upon to maintain a definite setting after adjustment, or else they are too slow and difficult to manipulate to provide the desired variation. Devices of this latter class are of very little value since the machine operator cannot take the time to change the settings, especially when many frequent changes are desired.

Hence it becomes a general object of my invention to provide an attachment for a sewing machine which enables a wide selection of pressures to be exerted by the presser bar and presser foot.

It is also another object of my invention to provide an attachment of this character which is positive in its operation and is adapted to remain securely in any adjusted position.

It is a further object of my invention to provide an attachment of this character which is not only simple in its manufacture and construction, but is also quick and easy of manipulation so that the machine operator can obtain any desired setting with a minimum of time and so obtain a maximum amount of benefit from the attachment.

I have attained these and other objects in a pressure regulator constructed according to my invention by providing a sleeve which is slidably mounted on the upper end of the conventional presser bar with the lower end of the sleeve bearing against the upper end of the conventional compression spring. This spring is usually a coil spring which surrounds the presser bar and bears at its lower end against a

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transverse member attached to the presser bar so that the compressive force exerted by the spring is transmitted to the presser bar and to the foot on the lower end of the bar. A collar surrounding at least a part of the sleeve is held stationary by engagement with the frame of the sewing machine. The external surface of the sleeve is serrated in a manner to provide a number of radially extending teeth which are spaced axially along the sleeve and which can be engaged by latch means on the collar which holds the sleeve against upward movement. The latch means is manually retractable, and is also preferably retracted by an inclined cam face on the sleeve. When fully retracted, the sleeve may be moved freely with respect to the collar; but the action of the cam face also retracts the latch and permits the sleeve to move downwardly in response to manual pressure applied thereto by the machine operator to increase the compression of the spring and hence increase the force on the presser bar.

How the above objects and advantages of my invention, as well as others not specifically mentioned herein, are attained will be more fully and readily understood by reference to the following description, and to the annexed drawings, in which:

Fig. 1 is an end elevation of a conventional type of sewing machine with a portion of the end cover plate broken away in order to show the presser bar and associated spring, a pressure regulator constructed according to my invention being mounted on the upper end of the presser bar;

Fig. 2 is a fragmentary vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is a horizontal section through the pressure regulator taken on line 3—3 of Fig. 1; and

Fig. 4 is a fragmentary elevation of a variational form of sleeve for the regulator.

Fig. 1 shows in elevation the end of a conventional type of sewing machine comprising a frame 10 on which the end cover plate 12 has been partially broken away in order to show the pertinent parts of the interior mechanism. Mounted for vertical reciprocation in machine frame 10, is needle bar 14 and presser bar 15 which carries on its lower end presser foot 16 which is associated with needle 17 on the lower end of needle bar 14.

At a point intermediate its ends, presser bar 15 has attached to it a transverse bar 20 against which bears the lower end of coil spring 22 which is mounted on the presser bar. The presser bar

may be lifted and held in raised position by means of cam handle 24 pivotally mounted on the machine frame and provided with cam 25 which engages the under side of transverse bar 20 to lift the presser bar when handle 24 is lifted or rotated clockwise as viewed in the figure. The mechanism so far described is conventional and well known and forms no part of the present invention. It is described here in order that my invention, as well as its application to a sewing machine, may be more fully understood.

The pressure regulator, or darning attachment, as it is sometimes called, is mounted on the machine at the upper end of the presser bar and is generally indicated in the drawings at 26. It consists of an outer hollow collar 28 which is threaded at its lower end so that it can be screwed into a suitable threaded bore 29 in machine frame 10, as shown best in Fig. 2. Collar 28 receives with a loose sliding fit sleeve 30 which is also hollow and is slidable on the upper end of presser bar 15 with the lower end of the sleeve bearing against the upper end of spring 22 around the presser bar. The sleeve is here shown as being directly in contact with spring 22 but a washer or the like may be inserted if desired between the sleeve and spring.

The interior bore of sleeve 30 extends for the full length of the sleeve and is of a diameter to take presser bar 15 with loose sliding fit so that the sleeve provides a guide for the upper end of the bar and the bar and sleeve are longitudinally movable with respect to each other. Any movement of sleeve 30 is also relative to collar 28 since the latter is stationary by virtue of its engagement with machine frame 10.

Spring 22 is normally maintained under compression between sleeve 30 and transverse bar 20, the compressive force exerted by the spring being transmitted to the presser bar through the connection of transverse member 20 to the presser bar. Naturally the spring pressing against the lower end of sleeve 30 urges it upwardly; and in order to maintain compression on the spring it is necessary to provide means for holding the sleeve and collar against relative movement in order to maintain the compression on the spring.

For this purpose, the upper part of the external surface of sleeve 30 is serrated in such a manner as to produce a longitudinally spaced series of teeth having upwardly facing and radially extending surfaces. This is done preferably by providing the sleeve with a plurality of circumferential ridges 32 each of which has an upper face 33 that faces upwardly and is substantially radial or normal to the length of collar 30, and a lower inclined face 34 which is inclined downwardly and inwardly toward the axis of the sleeve. The number of these ridges, and hence the spacing between successive surfaces 33, may be as much or as little as desired, but I find it convenient and satisfactory to provide about six such faces within the normal travel of sleeve 30.

There is provided on collar 28 latch means which is engageable with any selected one of the several faces 33 and which is adapted, by such engagement, to hold the sleeve in a selected position against the upward movement induced by spring 22. This latch means is shown best in Fig. 3, and comprises lever 36 pivotally mounted on the collar by pin 37. The lever is bent or curved and is located partly in slot 38 which extends through the collar wall for a fraction of its periphery. Lever 36 is provided at one end with an inwardly projecting lug 36*a* which can be moved into position to engage any one of the radial surfaces 33. The other end of the lever is provided with a handle 36*b* by means of which the lever can be manually manipulated.

Latch 36 is normally urged toward the position of Fig. 3, in which it engages sleeve 30, by means of wire spring 40 which is fastened to collar 28 at one end and at the other end seats in a notch in lever 36 opposite lug 36*a*.

The operation of the device will be readily apparent from the foregoing description and the drawings. When the machine operator manually depresses sleeve 30, spring 22 is compressed and a correspondingly greater force is exerted on presser bar 15. At any position in which one of the radial faces 33 engages the under side of lever 36, the latch holds the sleeve against upward movement relative to the presser bar and collar 28; and the amount of compression in spring 22 depends upon how far the sleeve has been depressed or which one of the radial faces is in engagement with the latch means.

If the end 36*b* of the latch lever is manually pressed toward the collar, the other end moves out of engagement with the radial faces on the sleeve and the sleeve is then free to move within collar 28 relative to the collar and the presser bar. While the latch is in its normal or engaging position, as shown in Fig. 3, the collar can be moved downwardly without manual manipulation of the latch means by simply pressing on the upper end of the sleeve. Downward movement of the sleeve causes a downwardly facing inclined surface 34 to engage projection 36*a* and, by cam action, to move the latch lever outward a sufficient distance to allow the sleeve to move down at least to the next radial face. At all times spring 40 urges projection 36*a* inwardly toward a sleeve-engaging position so that the sleeve is immediately engaged and held in any adjusted position when downward pressure on it is released.

I have described above a form in which circumferential ridges 32 provide one form of a series of longitudinally spaced shoulder means. Obviously the ridges can be made as a spiral or screw thread as shown at 32*a* in Fig. 4. The faces are still radial and are in an axially spaced row, when viewed in section, but have a slight tilt that can be compensated for by inclining projection 36*a* on the latch means.

From the foregoing description of a preferred embodiment of my invention it will be evident that various changes in the construction may be made by persons skilled in the art without departing from the spirit and scope of my invention; and consequently I wish it understood that the foregoing description is considered as being illustrative of, rather than limitative upon, the appended claims.

I claim:

1. A pressure regulator for a presser bar assembly having a compression spring that forces the presser bar downwardly, comprising: a stationary collar; a sleeve slidable within the collar and bearing against the upper end of the spring, the sleeve having a plurality of axially spaced radially extending external faces; and latch means carried on the collar engageable with a selected radial face to hold the sleeve against relative upward movement.

2. A pressure regulator as in claim 1 in which the latch means is manually disengageable from the sleeve faces to permit free movement of the sleeve, and also includes spring means normally

urging the latch means toward the face engaging position.

3. A pressure regulator for a presser bar assembly having a compression spring that forces the presser bar downwardly, comprising: a stationary collar; a sleeve slidably carried by the collar and bearing against the upper end of the spring, the sleeve having a plurality of axially spaced circumferential ridges each of which has an upper radial face and a lower inclined face; and latch means carried on the collar engageable with a selected radial face to hold the sleeve against relative upward movement, the latch means being retractable by engagement with an inclined face during downward movement of the sleeve to increase the spring compression.

4. A pressure regulator for a presser bar assembly having a compression spring that forces the presser bar downwardly, comprising: a stationary collar; a sleeve slidably carried by the collar and bearing against the upper end of the spring, the sleeve having a plurality of axially spaced radially extending external faces; a latch member pivotally mounted on the collar and movable into engagement at one end with a selected radial face to hold the sleeve against upward movement; and a spring normally urging the latch into said engagement.

5. A pressure regulator for a presser bar assembly having a compression spring that forces the presser bar downwardly, comprising: a stationary collar; a sleeve slidably carried by the collar and bearing against the upper end of the spring, the sleeve having an external spiral ridge forming an axial row of spaced radially extending faces; and latch means carried on the collar engageable with a selected radial face to hold the sleeve against relative upward movement.

6. In means for varying the pressure imposed upon the presser foot of a sewing machine having a head, said foot being carried upon the lower end of a presser bar of which the upper end is longitudinally movable in said head under

the pressure of a spring thereon, the combination comprising: a stationary collar adapted to be fixed upon said sewing machine head; an inwardly projecting member carried on the collar; and a sleeve slidably carried on said collar and provided with a plurality of longitudinally spaced shoulder means selectively engageable with said inwardly projecting member to lock the sleeve in any one of a plurality of predetermined positions intermediate the extremes of its slidable movement in opposite directions to place said spring under correspondingly different compressions.

7. In means for varying the pressure imposed upon the presser foot of a sewing machine having a head, said foot being carried upon the lower end of a presser bar of which the upper end is vertically movable in said head under the pressure of a spring thereon, the combination comprising: a stationary collar adapted to be fixed upon said sewing machine head; a sleeve slidably carried by said collar for movement to a plurality of intermediate positions between the extremes of its slidable movement in opposite directions to place said spring under correspondingly different compressions, said sleeve having a plurality of shoulder means spaced apart in the direction of sliding movement; and a lock member carried on the collar and engageable with a selected one of said shoulder means for holding the sleeve in any of said intermediate positions of adjustment.

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