

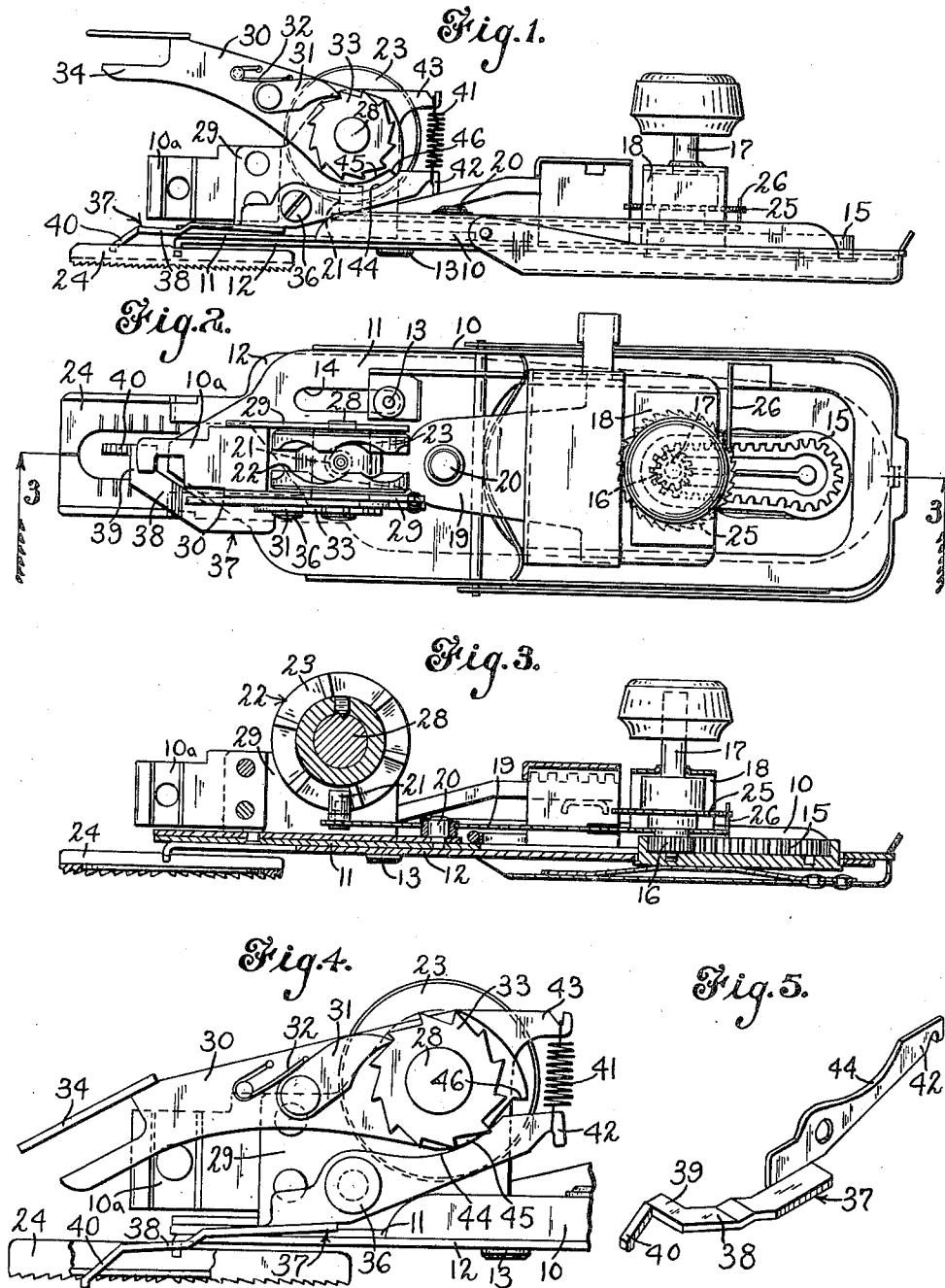
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CLOTH-HOLDING DEVICE FOR BUTTONHOLE ATTACHMENTS

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## CLOTH-HOLDING DEVICE FOR BUTTON-HOLE ATTACHMENTS

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7 Claims. (Cl. 112—77)

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This invention relates to sewing-machine attachments and more particularly to a cloth-holding device for certain sewing-machine attachments, such for example as an attachment for stitching buttonholes.

As illustrated, the invention relates to a buttonhole attachment designed to be attached to the usual household sewing machine after removal of the usual presser foot, the attachment being secured to the presser bar of the machine. In the use of certain of these attachments, such for example as a device for stitching buttonholes where the feeding foot must be provided with a relatively large slot through which the needle operates, difficulty is sometimes encountered in that the cloth which is being sewed will tend to "blouse" or be drawn upwardly with the upward movement of the needle. This is due to the fact that the edges of the slot in the feeding foot do not lie closely adjacent the needle and, therefore, cannot hold the cloth upon the machine bed at points close to the needle.

It is contemplated by the present invention to provide a movable cloth-holding member which will be carried by the attachment and which is provided with a holding foot or end portion which will lie relatively close to the needle. This member is actuated or moved by the fork arm or some other movable part of the attachment, which is conveniently situated, so that when the fork arm descends to drive the needle through the material being sewed, the forward or operating end of the holding member will be carried downwardly against the cloth or material and will remain in this position during the initial portion of the upward movement of the needle. Thus, the holding member will prevent the lifting of the cloth by the needle until the latter is loosened from the material, at which time the holding member will be raised from the cloth to permit the release of the latter for the feeding operation.

In other words, while the cloth is held down against the bed when the needle begins its upward stroke so that it will be loosened from the cloth and not draw the latter upwardly with it, the cloth is released so that it will not be gripped or held during the forward and sidewise feeding of the cloth.

As illustrated, the cloth-holding device is mounted upon a buttonhole attachment such as that shown in Patent No. 2,482,607, granted September 20, 1949, to Nils T. Almquist, but it will be understood that it may be attached to other buttonhole attachments and attachments for

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doing work other than the stitching of buttonholes.

One object of the present invention is to provide a cloth-holding device for a sewing-machine attachment such as a buttonhole attachment.

Another object of the invention is to provide a cloth-holding device for a buttonhole or similar sewing-machine attachment which will engage the cloth being sewed and hold the same against "blousing," but at the same time release the cloth so as not to interfere with the proper feeding of the latter.

Still another object of the invention is to provide a cloth-holding device for a buttonhole or similar attachment which device comprises a lever pivoted upon the frame of the attachment, the lever having a forward end or foot to engage the cloth adjacent the needle of the sewing machine, and which will be operated or moved pivotally by a movable part of the attachment so that it will engage the cloth at the proper time to prevent the latter being drawn upwardly by the needle, and thereafter release the cloth for the cloth-feeding operation.

A still further object of the invention is the provision of a holding device for buttonhole or like attachments, which device comprises a lever pivoted on the frame of the attachment, which lever will be actuated by the fork arm of the sewing machine so that the movement of the lever toward and from cloth-holding position will be synchronized with the movement of the needle bar and also with the movements of the feed blade of the attachment.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a buttonhole attachment having my cloth-holding device applied thereto;

Fig. 2 is a top plan view of the same;

Fig. 3 is a sectional view on line 3—3 of Fig. 2;

Fig. 4 is an enlarged elevational view of the forward end of the attachment; and

Fig. 5 is a perspective view of the cloth-holding lever.

As illustrated in the drawings, the buttonhole attachment comprises a frame 10 having a base plate 11 upon the under side of which is mounted a feed blade 12, this blade being pivoted to the plate 11 by the pivot pin 13, which pivot pin is slidable in the slot 14 in the plate 11 so as to adjust the position of the pivot pin. An

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 adapter 10<sup>a</sup> is secured to the frame, in order to attach the device to the presser bar of a sewing machine.

Secured to the feed blade is a rack 15 of oblong or keyhole shape, the teeth of which are engaged by a pinion 16 secured to a shaft 17 which is rotatably mounted in a support 18.

The support 18 is in turn carried by an actuating lever 19 pivoted to the frame at 20 and the forward end of this lever is provided with a pin or roller 21 which acts as a cam-follower and is disposed in the cam track 22 of a cam wheel 23. It will be obvious from the above arrangement that when the cam wheel 23 is rotated, the lever 19 will be oscillated as will also the support 18 and the pinion 16 carried thereby, all of these parts oscillating about the pivot pin 20. This will effect oscillation of the rack 15, and as this is secured to the feed blade 12, the latter will be oscillated and will effect lateral movements of the work, due to the fact that a feeding foot 24 is carried at the forward end of the feed blade to engage the cloth.

Secured to the shaft 17 is a ratchet wheel 25, the teeth of which engage a pawl 26 secured to the frame. As the shaft 17 is oscillated in a horizontal plane, the teeth of the ratchet 25 engage the end of the pawl 26 and this effects step-by-step rotation of the shaft 17 and of the pinion 16 carried thereby. This step-by-step rotation of the pinion 16 also, by engagement with the tooth of the rack 15 causes longitudinal movements of the feed blade so as to effect the proper oblong stitching around the buttonhole.

The cam wheel 23 is secured to a shaft 28 rotatably carried by spaced upstanding frame members 29 secured to the main frame, and loosely carried by a projecting end of this shaft is the usual fork arm 30 upon which is pivotally mounted a pawl 31, this pawl being urged by the spring 32 into engagement with the teeth of the ratchet wheel 33 secured to the shaft 28. The bifurcated end 34 of the fork arm is designed to be engaged with the needle bar so that the arm 30 will be reciprocated upon reciprocations of the needle bar. This will effect step-by-step rotation of the ratchet wheel 33 and, therefore, of the shaft 28 and cam wheel 23 so as to oscillate the actuating lever 19.

So far as described, the parts are substantially those of the Almqvist patent above referred to and operate in the same manner so that a further and more detailed description thereof is unnecessary. It will be apparent, however, that the mechanism described will, through the feeding foot 24, cause the cloth to travel in a generally oblong path so as to effect a line of stitches about a buttonhole and at the same time will produce what may be termed zig-zag stitches at each side of the buttonhole. Pivoted at 36 to one of the upstanding frame members 29 is the cloth-holding lever designated generally by the numeral 37. As shown more especially in Fig. 2, the forward portion of this lever lies in a substantially horizontal plane and is disposed diagonally or angularly with respect to the longitudinal axis of the attachment, as shown at 38, and is provided forwardly of this angular portion with a transversely extending portion 39 which supports a downwardly projecting work-holding foot 40, the latter lying adjacent the needle and being adapted to engage the cloth adjacent the needle to prevent it being drawn upwardly upon upward movement of the needle. A spring 41 is secured at one end to the rear end

42 of the lever 37 and secured at its other end to an arm 43 which is secured to or is formed as an integral part of the frame member 29. This spring normally holds the rear end of the lever 37 upwardly and, therefore, normally presses the holding foot 40 downwardly against the cloth or material which is being sewed.

It is, of course, necessary to raise this holding foot 40 from the material when feeding movements of the latter are effected, and this may be conveniently done by the movements of the fork arm through mechanism about to be described. The rear portion of the lever 37 lies in a substantially vertical plane and the upper edge of that portion which lies rearwardly of the pivot 36 is of arcuate shape, as shown at 44, so that it lies against the similarly curved portion 45 of the fork arm 30. Rearwardly of the portion 45, the fork arm is provided with a projecting cam portion 46, which, when the fork arm is moved upwardly, will engage the upper surface 44 of the lever 37 and move the rear end of the lever downwardly, thus raising the holding foot 40 from the cloth. The portion 45 of the fork arm is substantially in the form of an arc having at its center the center of the shaft 28, so, as shown in Fig. 4, as long as this portion of the fork arm is in engagement with the arcuate portion 44 of the lever 37, the latter will not be moved but will be held against the fork arm by the spring 41; and the holding foot will be urged in engagement with the cloth.

When, however, the fork arm moves upwardly to the position shown in Fig. 1, the projecting cam portion 46 upon the fork arm will engage the surface 44 and thus move the rear end of the lever 37 downwardly to raise the holding foot from the cloth.

As shown in Fig. 1, the fork arm may be at substantially the upper end of its stroke, and, as it moves downwardly toward the position shown in Fig. 4, the lever 37 will be released by the cam 46 and will be moved by the spring 41 so that the holding foot 40 engages the cloth. Upon the downward stroke of the fork arm the needle enters the cloth and the lower end of this stroke is shown in Fig. 4. It will be apparent that as the fork arm begins to move upwardly again, from the position shown in Fig. 4, the holding foot 40 will be retained in engagement with the cloth during the first part of this stroke, or until the needle has become loosened from the cloth. Thereafter the cam member 46 will raise the holding foot 40 to permit a feeding movement of the cloth which is effected upon the upper stroke of the fork arm by means of the pawl 31 and ratchet wheel 33.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

65 1. A sewing-machine attachment comprising a frame, a fork arm pivoted thereon adapted for connection with a needle bar, a cloth-holding lever pivoted on the frame intermediate its ends, said lever having a cloth-engaging downwardly extending foot at its forward end and extending rearwardly below the pivot of the fork arm, and cam means on the latter to engage the rear portion of the lever to move said foot upwardly.

70 2. A sewing-machine attachment comprising a frame, a fork arm pivoted thereon adapted for

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connection with a needle bar, a cloth-holding lever pivoted on the frame intermediate its ends, said lever having a cloth-engaging downwardly extending foot at its forward end and extending rearwardly below the pivot of the fork arm, cam means on the latter to engage the rear portion of the lever to move said foot upwardly away from the cloth, and spring means to urge said foot downwardly toward the cloth when released by said cam means.

3. A buttonhole attachment for sewing machines comprising a frame, a feed blade movably mounted thereon, means to actuate said feed blade comprising a cam wheel rotatably mounted on the frame, a fork arm pivoted to the frame to actuate said wheel, said fork arm being adapted for connection to a needle bar to be actuated thereby, a lever pivoted to the frame intermediate its ends adjacent the pivot of the fork arm, a cam on the fork arm engaging the lever rearwardly of the pivot during oscillation of the fork arm, said lever having a downwardly turned forward end to engage the cloth being sewed, and a spring connected to said lever to normally urge said downwardly turned forward end against the cloth.

4. A buttonhole attachment for sewing machines comprising a frame, a feed blade movably mounted thereon, means to actuate said feed blade comprising a cam wheel rotatably mounted on the frame, a fork arm pivoted to the frame to actuate said wheel, said fork arm being adapted for connection to a needle bar to be actuated thereby, a lever pivoted to the frame intermediate its ends adjacent the pivot of the fork arm, a cam on the fork arm engaging the lever rearwardly of the pivot during oscillation of the fork arm, said lever having a downwardly turned forward end to engage the cloth being sewed, and a spring connected to said lever to normally urge said downwardly turned forward end against the cloth, said lever being pivoted directly below the fork arm and having its forward end extended inwardly to a point adjacent the center line of the attachment.

5. A buttonhole attachment for sewing machines comprising a frame, a feed blade pivoted on the frame and having a cloth-feeding foot mounted at the forward end thereof, said foot being provided with an elongated slot, means to actuate said blade comprising a cam wheel rotatably mounted on the frame and positioned substantially centrally between the side edges thereof, a fork arm pivoted upon the axis of said cam wheel and adapted to actuate the same in a step-by-step movement, a lever pivoted to the frame at a point intermediate its ends and at one side of said cam wheel, said lever having a portion rearwardly of its pivot lying substantially in the plane of the fork arm and a portion forwardly of its pivot extending inwardly to lie within said slot in the feeding foot, cam means on said fork arm arranged to engage and disengage the rear portion of said lever during oscilla-

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tion of the fork arm to raise the forward end of said lever and then release the same, and spring means connected to the frame and to said lever to urge the forward end of the lever downwardly.

6. A buttonhole attachment for sewing machines comprising a frame, a feed blade pivoted on the frame and having a cloth-feeding foot mounted at the forward end thereof, said foot being provided with an elongated slot, means to actuate said blade comprising a cam wheel rotatably mounted on the frame and positioned substantially centrally between the side edges thereof, a fork arm pivoted upon the axis of said cam wheel and adapted to actuate the same in a step-by-step movement, a lever pivoted to the frame at a point intermediate its ends and at one side of said cam wheel, said lever having a portion rearwardly of its pivot lying substantially in the plane of the fork arm and a portion forwardly of its pivot extending inwardly to lie within said slot in the feeding foot, cam means on said fork arm arranged to engage and disengage the rear portion of said lever during oscillation of the fork arm to raise the forward end of said lever and then release the same, and spring means connected to the frame and to said lever to urge the forward end of the lever downwardly, the upper edge of the rear portion of said lever adjacent the fork arm being of arcuate shape and the center of said arc being substantially that of the pivot of the fork arm.

7. A buttonhole attachment for sewing machines comprising a frame, a feed blade pivoted on the frame and having a cloth-feeding foot mounted at the forward end thereof, said foot being provided with an elongated slot, means to actuate said blade comprising a cam wheel rotatably mounted on the frame and positioned substantially centrally between the side edges thereof, a fork arm pivoted upon the axis of said cam wheel and adapted to actuate the same in a step-by-step movement, a lever pivoted to the frame at a point intermediate its ends and at one side of said cam wheel, said lever having a portion rearwardly of its pivot lying substantially in the plane of the fork arm and a portion forwardly of its pivot extending inwardly to lie within said slot in the feeding foot, cam means on said fork arm arranged to engage and disengage the rear portion of said lever during oscillation of the fork arm to raise the forward end of said lever and then release the same, and spring means connected to the frame and to said lever to urge the forward end of the lever downwardly, the rear end of said lever lying substantially in a vertical plane and the forward in-turned end thereof lying substantially in a horizontal plane and provided with a downwardly turned end portion providing a cloth-engaging foot.

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No references cited.