

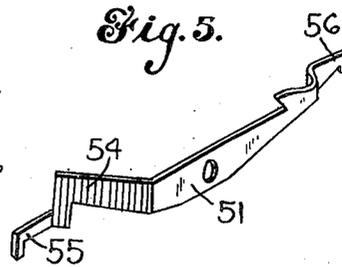
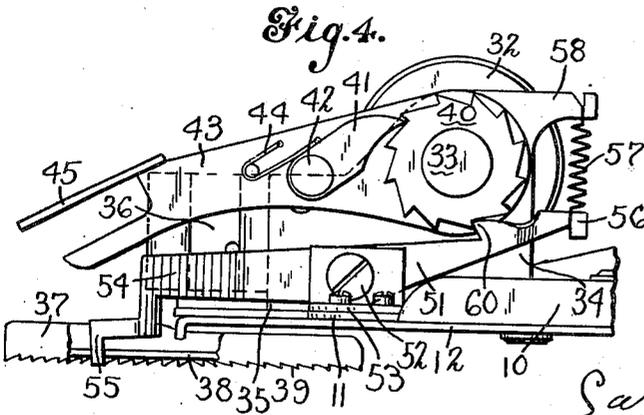
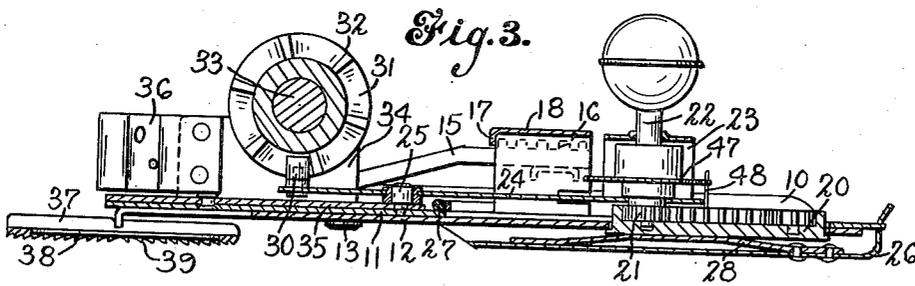
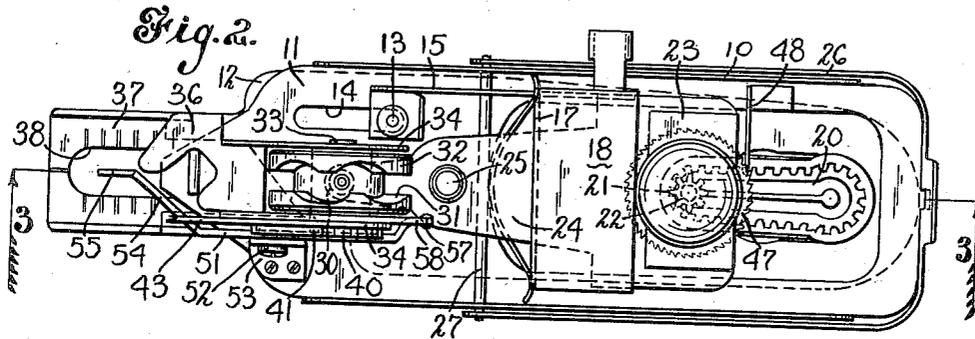
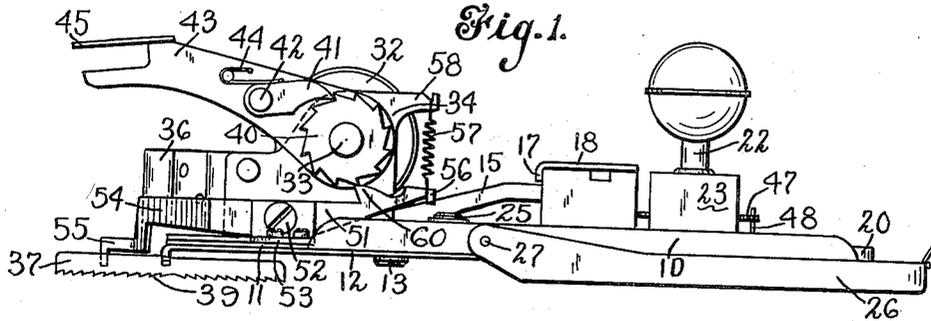
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C. G. BAEHR

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CLOTH-HOLDING DEVICE FOR BUTTONHOLE ATTACHMENTS

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Inventor  
*Carl G. Baehr*  
By  
*Rockwell & Swetstone*  
Attorneys

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## CLOTH-HOLDING DEVICE FOR BUTTON-HOLE ATTACHMENTS

Carl G. Baehr, West Haven, Conn., assignor to  
The Greist Manufacturing Company, New  
Haven, Conn., a corporation of Connecticut

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This invention relates to sewing-machine attachments and more particularly to a cloth-holding device for certain of such attachments, or a means to prevent the cloth being pulled upwardly by the needle when it is withdrawn from the cloth, or other material being sewed, upon the upward movement of the needle bar.

As illustrated the invention is applied 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 usual presser bar. 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 downwardly 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 lying relatively close to the needle. This member in the present instance is actuated by the usual ratchet wheel, which wheel is in turn actuated by the fork arm so that during the upward movement of the fork arm, which is the movement effecting the feed of the material, the forward or operating end of the holding member will be moved upwardly from the material and will be held out of engagement with the material during the feeding operation. At the end of this operation, the holding foot will be released and will be moved downwardly against the cloth or material so as to hold the latter during the stitching operation and prevent the lifting of the cloth by the needle so that the latter will be loosened from the material and not draw it upwardly and cause it to blouse.

Thus, the cloth will be held down against the bed of the machine when this is desired, but will be released during the feeding movement of the material so that there will be no interference with the feeding movement. As the hold-down device is actuated by the ratchet wheel which is fixed on the shaft of the main cam wheel, it will be synchronized in its movement with that of the cam wheel so as not to interfere with the normal sewing operations.

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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 as the needle is drawn therefrom, but at the same time will release the cloth for proper feeding movements thereof.

Still another object of the invention is to provide a cloth-holding device, as described above, which device comprises a lever located below the ratchet wheel which is actuated by the fork arm so that the holding lever may be actuated from this ratchet wheel.

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;

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

Fig. 4 is an elevational view of the forward portion of the device similar to Fig. 1 but showing the parts in another position; and

Fig. 5 is a perspective view of the hold-down 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. The feed blade is pivoted to the plate by the pivot pin 13, which pin is slidable in the slot 14 in the plate 11 so as to adjust the position of the pivot pin and thereby adjust the lateral throw of the forward portion of the feed blade. The pivot pin 13 may be adjusted in the slot 14 by means of the adjusting arm 15 attached to the pivot pin at its forward end and provided adjacent its rear end with a plurality of teeth 16 designed to be engaged with the flanged edge 17 of a housing member 18 mounted upon the frame.

Secured to the feed blade 12 is an endless rack member 20, the teeth of which are engaged by those of a pinion 21 mounted upon a shaft 22, which shaft is rotatably mounted in a housing 23 carried by an actuating lever 24 pivoted at 25 upon the frame plate 11.

The rack member 20 may be held in place by a cover plate 26 pivoted to the frame at 27 and

3 provided with a flat spring member 28 which engages the lower side of the rack member 20.

The lever 24 oscillates in a substantially horizontal plane about the pivot pin 25 and at the forward end of this lever is provided a pin or roller 30 which acts as a cam follower and is disposed in the cam track 31 of a cam wheel 32, this cam wheel being secured to a shaft 33 rotatably mounted in spaced upstanding frame members 34 which may be formed integrally with a plate 35 riveted or otherwise secured to the base plate 11. Also secured to the members 34 is an adapter 36 by which the device may be secured to the presser bar of a sewing machine after the presser foot has been removed.

It will be obvious from the above arrangement that when the cam wheel 32 is rotated, the lever 24 will be oscillated as will also the pinion 21 carried thereby, and the engagement of this pinion with the teeth of the rack 20 will effect oscillation of the feed blade and thereby effect lateral movements of the work due to the fact that a feeding foot 37 is carried at the forward end of the feed blade 12. As shown in Fig. 2, this feeding foot is provided with a relatively large oblong opening 38 through which the needle is designed to operate and this foot may be roughened as shown at 39 on its lower face so as to properly engage and move the material which is being sewed.

Secured to the shaft 33 is a ratchet wheel 40, the teeth of which are engaged by a pawl 41 pivoted at 42 to a fork arm 43 loosely mounted upon the shaft 33, this pawl being urged into engagement with the ratchet wheel by the spring 44. The fork arm 43 is provided with a bifurcated end 45 designed to be engaged with the needle bar of the sewing machine so that the arm 43 will be reciprocated upon reciprocation of the needle bar. This will effect step-by-step rotation of the ratchet wheel 40, and, therefore, of the shaft 33, and of the cam wheel 32 secured to this shaft. As has already been described, rotation of the cam wheel will effect lateral oscillation of the lever 24 and lateral feeding movements of the work.

Secured to the shaft 22 is a ratchet wheel 47, the teeth of which are adapted to intermittently engage a resilient pawl 48 fixed to the frame upon oscillation of the lever 24. The engagement of the teeth of the ratchet 47 by the pawl 48 during lateral movements of the lever 24 will effect step-by-step rotation of the shaft 22 and, therefore, of the pinion 21 carried thereby. This step-by-step rotation of the pinion 21, by its engagement with the teeth of the rack 20, causes longitudinal movements of the feed blade 12 to which the rack is secured, so as to effect longitudinal movements of the cloth for proper oblong stitching around the buttonhole.

The operation of the parts above described is substantially like that of the device shown in the Alquist Patent No. 2,482,607, granted September 20, 1949, so that no further description thereof is believed to be necessary. It will be apparent, however, that upon oscillation of the fork arm 43 by the needle bar of the sewing machine the mechanism will cause the material engaged by the feeding foot 37 to be moved laterally and at the same time feed longitudinally so that it will travel in a generally oblong path and effect a line of zig-zag stitches at each side of the buttonhole.

As illustrated, the hold-down lever 51 is pivoted at 52 upon a bracket 53 secured to the base

4 plate 11. This hold-down lever has at its forward end an inwardly and forwardly extending portion 54 which terminates in a downwardly projecting foot 55 adapted to engage the material being sewed. This foot 55 extends within the elongated slot 38 of the feeding foot, as shown particularly in Figs. 2 and 4, so that it engages the cloth closely adjacent the needle.

The lever 51 is provided with an inwardly offset rearwardly projecting end 56 to which is secured one end of a spring 57, and the other end of this spring is secured to an arm 58 formed integrally with one of the upstanding frame members 34. It will be apparent that the spring 57 acts in such a manner as to urge the rear end of the hold-down lever 51 upwardly and the downwardly projecting cloth-engaging foot 55 downwardly against the cloth.

Rearwardly of its pivot 52, the hold-down lever 51 is provided with a tooth or cam portion 60 adapted to be engaged by the teeth of the ratchet wheel 40 so that as the teeth ride over the surface of the tooth 60 the rear end of the lever 51 will be depressed against the tension of the spring 57 and raise the foot 55 out of engagement with the cloth.

In Fig. 4 of the drawings the fork arm 43 is shown in approximately its lowermost position, and it will be seen that a tooth of the ratchet wheel 40 has just released or passed over the high point of the tooth or cam 60 so as to permit the spring 57 to move the holding foot 55 downwardly as shown in this figure so that it will engage the material. As the fork arm moves upwardly from this position, the succeeding tooth on the ratchet wheel 40 will engage the cam surface of the tooth 60 and cause the holding foot 55 to be raised slowly from its lowermost position. The needle will be withdrawn quickly from the cloth while the latter is held by the foot so that it will not follow the needle upwardly.

As the fork arm continues upwardly to the position shown in Fig. 1, the high point of one of the teeth of the ratchet wheel 40 will come into engagement with the high point of the tooth 60 on the lever 51 and hold the holding foot 55 in its uppermost or highest position. During this upward travel of the fork arm, at which time the feeding movement is imparted to the cloth, the latter will be free from engagement with the holding foot and will be properly fed forwardly and laterally. The fork arm will travel upwardly slightly beyond the position shown in Fig. 1 so that the cam 60 on the hold-down lever will be released by the high point of the tooth on the ratchet wheel so that at the end of the upward stroke of the fork arm, the lever 51 will be released by the ratchet wheel and moved downwardly by the spring 57. The hold-down lever, of course, remains in this downward position during the down stroke of the fork arm to the position shown in Fig. 4.

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:

70 1. In a sewing-machine attachment a frame, a shaft rotatably mounted on the frame, a cam wheel secured to the shaft, a ratchet wheel secured to the shaft, means for effecting step-by-step rotation of said ratchet wheel, a lever pivoted

75 to the frame and having a downwardly-extend-

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ing cloth-engaging foot adjacent its forward end, and means on said lever engaged by the teeth of the ratchet wheel to effect actuation of the lever in one direction.

2. In a sewing-machine attachment a frame, a shaft rotatably mounted on the frame, a cam wheel secured to the shaft, a ratchet wheel secured to the shaft, means for effecting step-by-step rotation of said ratchet wheel, a lever pivoted to the frame and having a downwardly-extending cloth-engaging foot adjacent its forward end, and means on said lever engaged by the teeth of the ratchet wheel to effect actuation of the lever in a direction to raise the foot about the pivot of the lever.

3. In a sewing-machine attachment a frame, a shaft rotatably mounted on the frame, a cam wheel secured to the shaft, a ratchet wheel secured to the shaft, means for effecting step-by-step rotation of said ratchet wheel, a lever pivoted to the frame and having a downwardly-extending cloth-engaging foot adjacent its forward end, means on said lever engaged by the teeth of the ratchet wheel to effect actuation of the lever in a direction to raise the foot about the pivot of the lever, and a spring acting between the frame and lever to urge said foot downwardly.

4. In a sewing-machine attachment a frame, a shaft rotatably mounted on the frame, a cam wheel secured to the shaft, a ratchet wheel secured to the shaft, means for effecting step-by-step rotation of said ratchet wheel, a lever pivoted to the frame intermediate its ends and having a downwardly-extending cloth-engaging foot at its forward end, and a projection on said lever rearwardly of its pivot adapted for engagement by the teeth of the ratchet wheel whereby said lever is actuated in a direction to raise said foot.

5. In a sewing-machine attachment a frame, a ratchet wheel rotatably mounted thereon, a fork arm pivoted on the frame and engaged with

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said ratchet wheel to effect step-by-step rotation of the latter upon oscillation of the fork arm, and a lever pivoted to the frame intermediate its ends and having a downwardly-extending cloth-engaging foot forwardly of its pivot, said lever having a portion rearwardly of its pivot disposed adjacent to and in the plane of said ratchet wheel and adapted to be engaged thereby to effect movement of the lever in one direction upon rotation of the ratchet wheel.

6. In a sewing-machine attachment a frame, a ratchet wheel rotatably mounted thereon, a fork arm pivoted on the frame and engaged with said ratchet wheel to effect step-by-step rotation of the latter upon oscillation of the fork arm, a lever pivoted to the frame intermediate its ends and having a downwardly-extending cloth-engaging foot forwardly of its pivot, said lever having a portion rearwardly of its pivot disposed adjacent to and in the plane of said ratchet wheel and adapted to be engaged thereby to effect movement of the lever in one direction upon rotation of the ratchet wheel, and spring means connected to the lever to urge it in the opposite direction.

7. In a sewing-machine attachment a frame, a ratchet wheel rotatably mounted thereon, a fork arm pivoted on the frame and engaged with said ratchet wheel to effect step-by-step rotation of the latter upon oscillation of the fork arm, and a lever pivoted to the frame intermediate its ends and having a downwardly-extending cloth-engaging foot forwardly of its pivot, said lever having a cam projection thereon rearwardly of its pivot, said projection being disposed in the plane of the ratchet wheel and adapted to be engaged by the teeth thereof to actuate said lever and move said foot upwardly.

CARL G. BAEHR.

No references cited.