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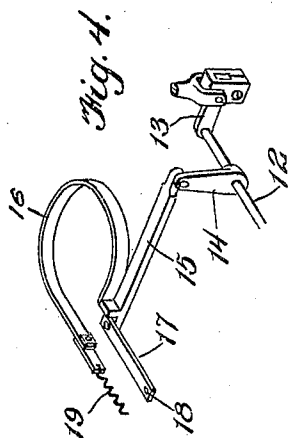
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C. J. SIBBALD ET AL

ATTACHMENT FOR SEWING MACHINES

Filed July 28, 1923

2 Sheets-Sheet 1



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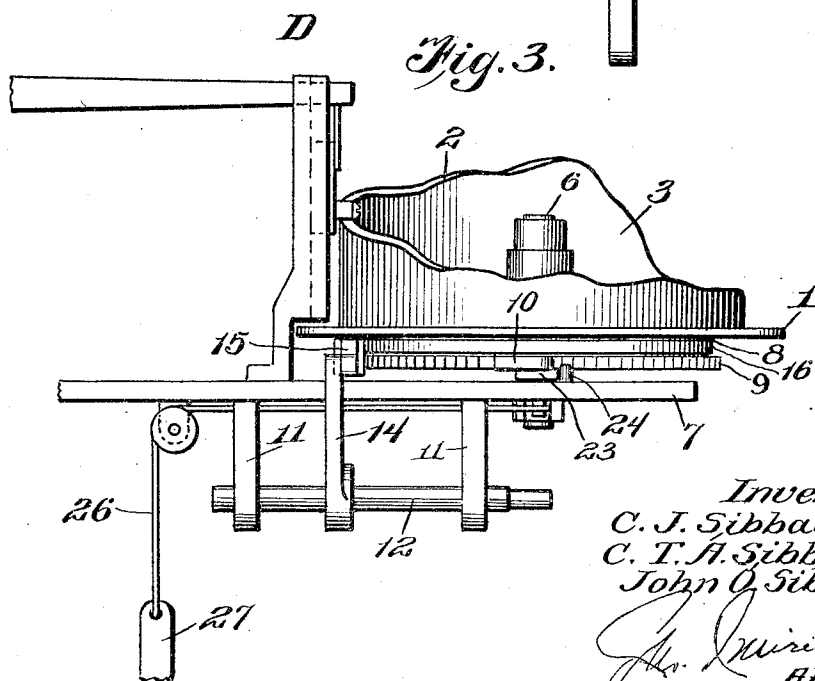
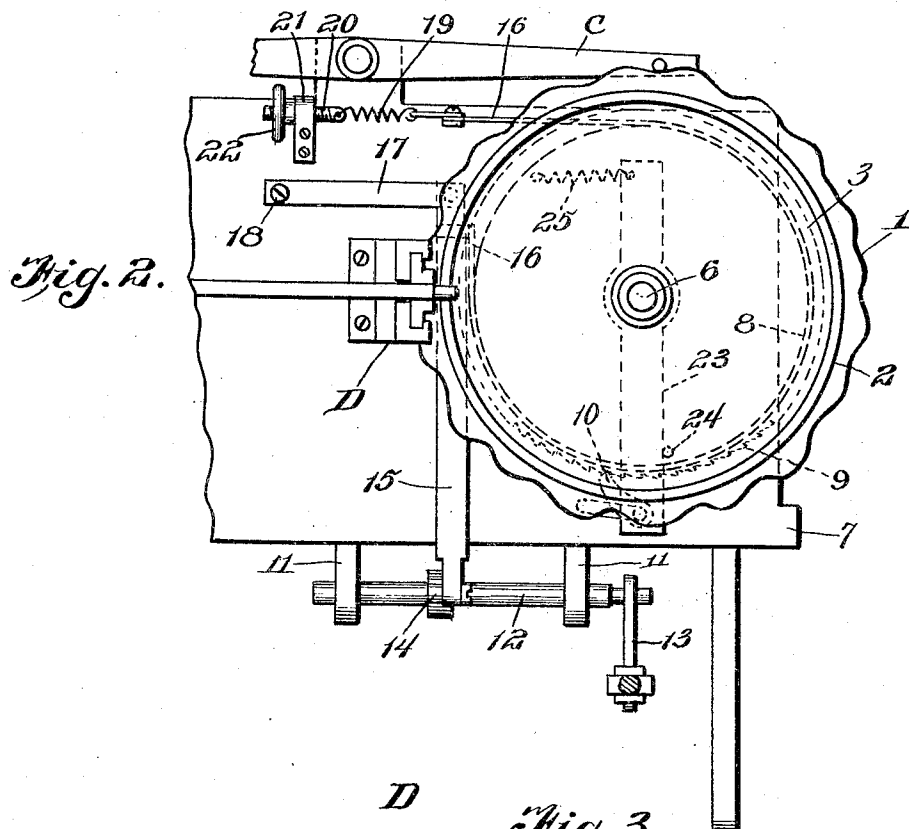
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR SEWING MACHINES.

Application filed July 28, 1923. Serial No. 654,411.

This invention is directed to an improvement in attachments for sewing machines designed for such cooperative working relation to an ordinary sewing machine that thereby the machine is adapted to stitch in a predetermined cycle of operation, a letter, groups of letters, a word, or words, as may be required.

The present invention is designed specifically as an improvement upon our co-pending application filed April 21, 1922, Serial No. 555,925, and is directed towards simplifying the means for operating the cam for controlling the movement of the cloth clamp.

Generally, as defined in the aforesaid application, the cloth clamp is controlled by a cam having independent cam surfaces to impart to the material, through appropriate mechanism, that movement forming a component of the movement responsive to both cam surfaces, and for this purpose the cam is given an intermittent motion through operating mechanism arranged to receive an oscillating movement, for example, from the shaft employed in connection with the stitching means of the sewing machine, and the present invention is more particularly directed to an improvement of this operating mechanism.

The invention also provides means for manually advancing the cam at will independently of the operating mechanism, whereby the cam may be manually set to a normal starting position after the stitching operation has terminated, for the starting of a new operation; or the cam may be manually advanced as may be required for spaces between words, signs, or letters of the same stitching operation, in which spaces stitching is not to be performed.

In the drawings:

Fig. 1 is a perspective view illustrating the application of the improvement.

Fig. 2 is a plan view of the same.

Fig. 3 is an elevation of the same.

Fig. 4 is a perspective view of the cam operating means.

In order that the specific application of the present improvement may be more clearly understood, reference is had to Fig. 2, wherein the general structure of the co-pending application is illustrated, and in which A represents a stitching means of any conventional or appropriate type, B a cloth

clamp to receive the material to be operated upon, and C and D the mechanism operated respectively from the cam surfaces 1 and 2 of the cam 3, to thereby componently control the cloth clamp for properly presenting the material to the stitching means A.

In the preferred form of the present invention here shown, the cam 3 which is designed to suitably control the cloth clamp from cam surfaces 1 and 2, is mounted for free rotation upon a shaft 6 secured in and extending vertically from the bed plate 7 of the attachment. Secured to and arranged beneath the cam is an annular member presenting in part a friction surface 8, said member below the friction surface being formed as a ratchet 9. A pawl 10 is pivotally supported on a bar mounted on the shaft 6 for a purpose hereinafter described, the pawl normally serving to cooperate with the ratchet 9 and prevent retrograde or rearward movement of the cam, and also serving as a means to manually operate the feeding means.

Depending from the bed plate are hangers 11 in which is supported a rock shaft 12, connected through the medium of a link 13 with an oscillating means, such as the shaft employed in connection with the feeding means of the sewing mechanism. Secured to and extending upwardly from the shaft 12 is an arm 14, to which is connected a bar 15, which extends across the face of the bed plate beneath the cam proper. A friction band 16 is connected to one end of the bar 15, this bar being guided in substantially a straight line movement through the medium of a link 17 connected to the free end of the bar and pivotally supported at 18 on the bed plate 7. By this means the bar is reciprocated in the movement of the rock shaft 12 and is prevented from contacting with the cam or with the friction surface 8.

The friction band 16 extends from the free end of the bar 15 into cooperation with the friction surface 8 passing around said surface in a direction from the free end of the bar 15 towards the rock shaft 12. The remaining terminal of the friction band 16 is connected to a tension spring 19, which spring is in turn adjustable through the medium of a threaded rod 20 cooperating with a bracket 21 fixed to the bed plate 7 and provided beyond the bracket with an adjusting nut 22.

The pawl 10 is mounted on one end of a bar 23 mounted for swinging movement coaxially with the cam 1, being limited in movement in one direction by a stop 24, and normally held against the stop by a spring 25. That end of the bar carrying the pawl 10 is connected by a flexible suitably guided connection 26 with a foot pedal 27, whereby the bar may be moved and the pawl advanced to correspondingly advance the cam. Thus, after cessation of any stitching operation, the cam may be advanced to a normal starting position; or if clear non-stitched spaces are to be provided for between letters, symbols, words, figures, or the like of the stitched reproduction, such may be provided for by manually advancing the cam the requisite distance.

The friction band extends practically entirely around the cam in more or less close cooperation with the friction surface 8 of the cam, and it will be apparent that as the rock shaft 12 is reciprocated, the movement of the bar 15 across the bed plate towards the cam will tighten the friction band about the surface 8 and result in a movement of the cam practically responding to the movement of the bar 15 in the one direction. In the movement of the bar 15 in the opposite direction, the band engagement with the surface 8 is sufficiently released to avoid undue friction, the spring 19 taking up the looseness which would otherwise be permitted in the friction band and maintaining said band in a sufficiently taut relation to permit the described operation.

At each progressive or feed movement of the cam, the pawl or dog 10 engages the ratchet 9 at the limit of such feed movement and prevents a retrograde or return movement of the cam under the opposite movement of the friction band.

The spring 19 in operation serves a particularly important function. As the bar 15 is moved toward the cam, the band 16 is tightened about the friction surface 8 and the cam and band move together. During this movement, the spring 19 is increasingly stretched and is at its greatest tension at the end of the drive movement. During this period of movement, the mass of the cam has been accumulating momentum, which momentum is at the maximum at the end of the stroke, that is to say, that at the end of the stroke, the cam has the greatest tendency to continue its rotation. However, at the end of the stroke, the spring 19 is at its greatest tension, which naturally increases the tension of the band, and thereby the friction between the friction surface and the band is at the maximum at the moment the band ceases its forward or drive movement. This maximum friction of the band at this particular moment is essential to prevent the momentum accumulated by the cam

from continuing the rotative movement of the cam. On the return stroke of the bar 15, the band is moved through the same distance as in the drive stroke. The cam however, is, through the friction described, given a retrograde movement, but this retrograde movement is only sufficient to insure the complete engagement of the pawl 10 with the teeth of the ratchet 9. This retrograde movement of the cam is so small that the spring 19 is still at nearly its maximum tension, thus insuring sufficient pressure and friction between the band and friction surface to retrograde the cam until the pawl positively engages with the teeth of the ratchet. As the bar 15 continues its return stroke after the retrograde movement of the cam has been stopped by the pawl engaging the ratchet, the band 16 continues to retrograde, to thereby lessen the pressure and friction between the band and cam surface, the band being kept in contact with the friction surface 8 by being slipped around such surface by the pull of the spring 19. More specifically, the spring may be said to serve three functions; first, provide the maximum friction with the cam at the end of the stroke so as to prevent movement of the cam under the momentum induced by the stroke; second, provide sufficient friction during the initial part of the return stroke to cause the cam to be moved backwardly until the pawl positively engages the ratchet; and third, during the remainder of the return stroke serving to take up the slack in the band and maintain it in contact with the friction surface of the cam to insure the proper relative position of the cam as held by the ratchet.

From the above, it will be clearly apparent that in the reciprocation of the arm 15, that is, in the oscillating movement of the described shaft of the sewing machine, the cam will be progressively fed to cause its relative cam surfaces to carry out the functions of controlling the cloth clamp in accordance with the description of the application referred to. The tension of the band may be adjusted at any time through movement of the threaded rod 20 to thereby provide for a positive movement of the cam in the feeding means described.

It will be understood that the cam operating movements must occur while the needle is free of the cloth, and hence while the present invention is directed to a specific means for feeding the cam, it is more particularly concerned with a cam feeding means which may be so co-related to the stitching mechanism, or an appropriate part thereof, that the cam will be given its definite advance in exact time with and under control of the appropriate part of the stitching mechanism, to thereby insure a co-relation between the stitching means and

cam feeding movement which will tend to the desired result.

The construction is such that the movement imparted to the cam is positive and no undue strain on the parts occurs.

Claims:

1. In combination, a stitching mechanism, a cam for feeding material to the stitching mechanism, a band to frictionally cooperate with the cam, and means operated by the stitching mechanism for moving one end of said band in the desired direction of cam movement to thereby impart a predetermined movement to the cam, the opposite end of the band having an adjustable tensioned connection with a fixture.

2. In combination, a stitching mechanism, a cam for feeding material to the stitching mechanism, a band to frictionally cooperate with the cam, means operated by the stitching mechanism for moving one end of said band in the desired direction of cam movement to move the cam, and means for manually advancing the cam independently of said band.

3. In combination, a stitching mechanism, a cam for feeding material to the stitching mechanism, a band to frictionally cooperate with the cam, and means operated by the stitching mechanism for moving one end of said band in the desired direction of cam

movement to move the cam, and means for preventing retrograde movement of the cam, said last mentioned means being manually operable at will for advancing the cam.

4. In combination, a stitching mechanism, a cam for feeding material to the stitching mechanism, a friction band partly encircling the cam, means operated by the stitching mechanism for moving the band to thereby move the cam, a ratchet carried by the cam, a pawl engaging the ratchet to prevent retrograde movement of the cam, and means for normally moving the pawl to engage the ratchet and advance the cam.

5. In combination, a stitching mechanism, a cam for feeding material to the stitching mechanism, a friction band partly encircling the cam, means operated by the stitching mechanism for moving the band to thereby move the cam, a ratchet carried by the cam, a pawl engaging the ratchet to prevent retrograde movement of the cam, a pivoted bar carrying said pawl, and means for operating the bar at will to cause the pawl to engage the ratchet and move the cam.

In testimony whereof we affix our signatures.

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