Nov. 19, 1935. J. H. PIKUL 2,021,636

SEWING MACHINE

Filed Oct. 27, 1934 4 Sheets-Sheet 1

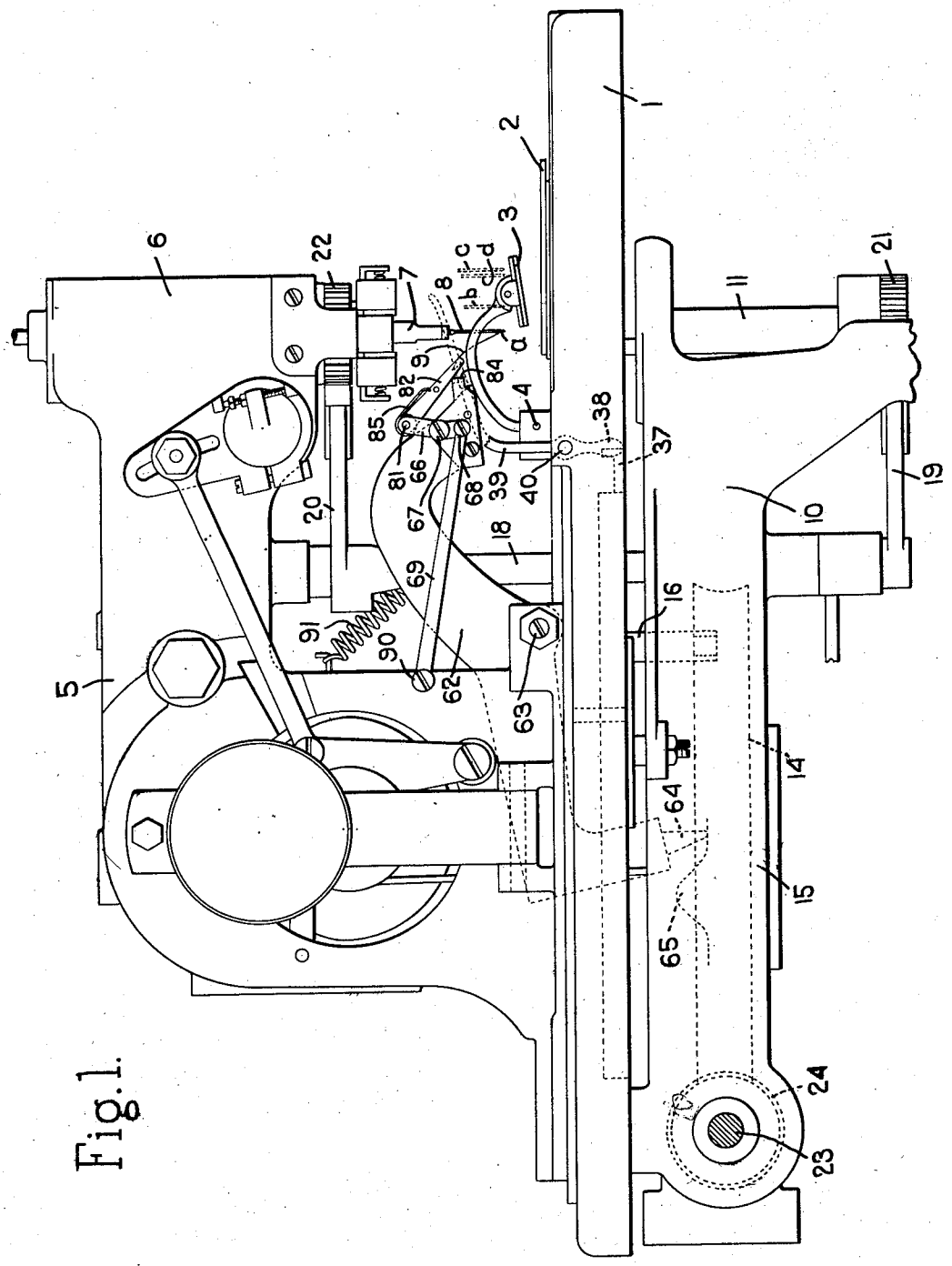

Fig. 1.

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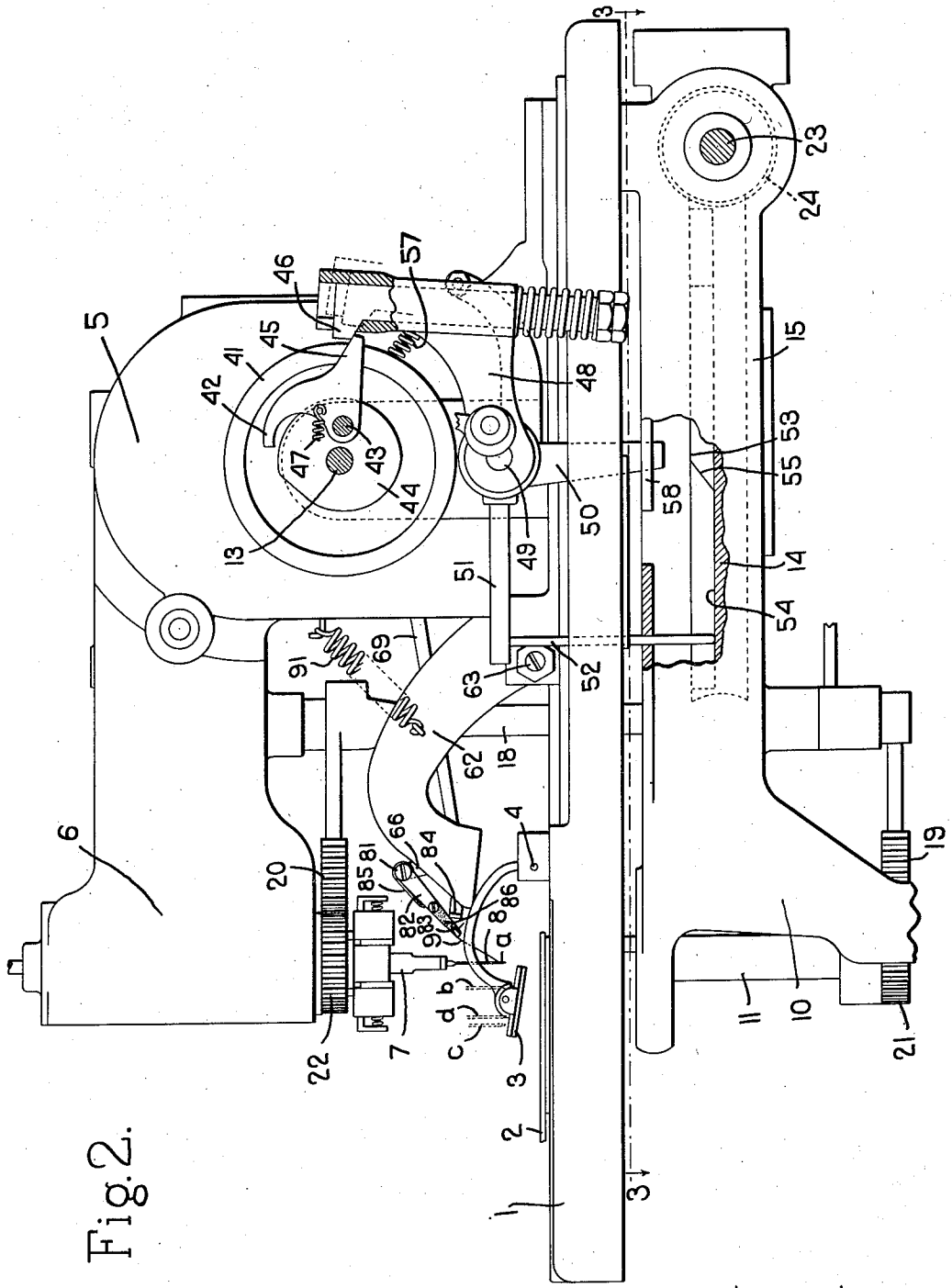

Fig. 2.

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SEWING MACHINE

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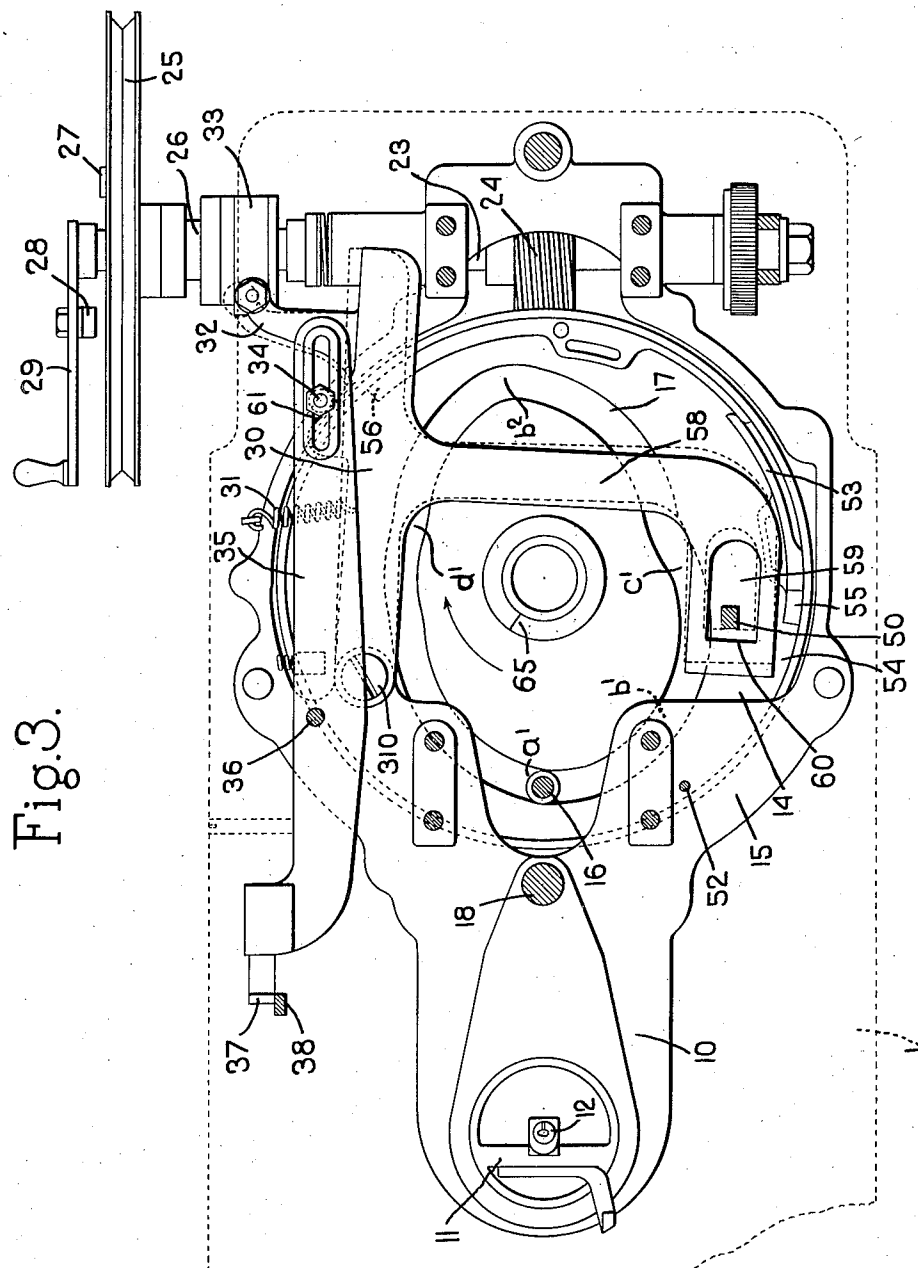

Fig.3.

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SEWING MACHINE

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Fig. 4.

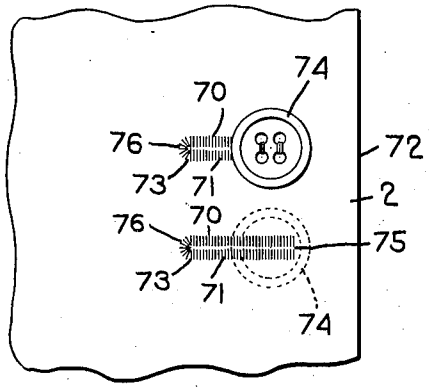


Fig. 5.

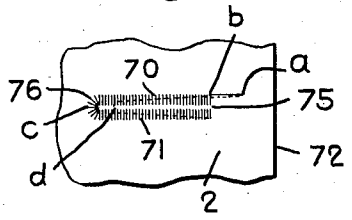


Fig. 6.

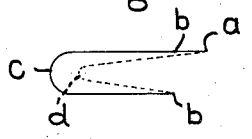


Fig. 7.

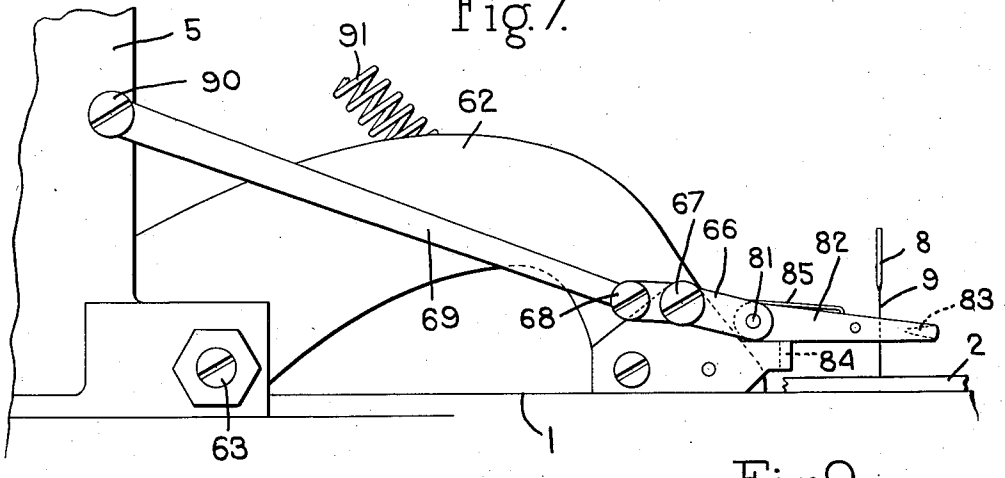


Fig. 8.

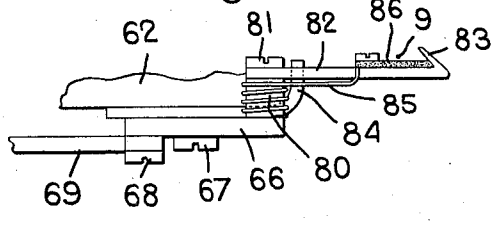
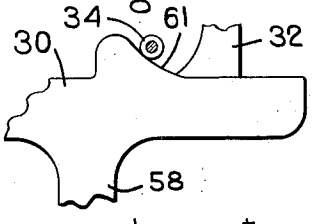


Fig. 9.



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Patented Nov. 19, 1935 2,021,636

UNITED STATES PATENT OFFICE

2,021,636

SEWING MACHINE

Joseph H. Pikul, Boston, Mass., assignor to The Reece Button Hole Machine Company, Boston, Mass., a corporation of Maine

Application October 27, 1934, Serial No. 750,335

11 Claims. (Cl. 112—71)

This invention relates to sewing machines of the buttonhole type and especially to a sewing machine designed to sew imitation buttonholes.

In making some garments it is customary to sew buttons on the garments at some points, such for instance as on the sleeve of a coat, for the purpose of ornamenting or dressing up the garment, and sometimes it is desirable to sew an imitation buttonhole (that is, a line of buttonhole stitching simulating the stitching of a buttonhole but without the buttonhole slit) on the garment at the point where the button is fastened, thereby to give the garment the appearance of being buttoned together at this point. Such imitation buttonholes are usually placed on the garment adjacent a seam, and in making the garment the imitation buttonhole is usually sewed in the fabric of the garment adjacent an edge thereof which subsequently is seamed up.

The sewing machine herein shown for sewing imitation buttonholes is in some respects similar to an ordinary buttonhole sewing machine, but it has this difference, that while in a sewing machine for sewing regular buttonholes the stitching usually begins at the end of the buttonhole furthest from the edge of the fabric and proceeds along one side of the buttonhole toward the edge of the fabric and then around the end of the buttonhole adjacent the edge and then back to the starting point, in the device of the present application the machine is arranged so that the stitching begins at the ends of the imitation buttonhole adjacent the edge of the fabric and then proceeds along one side of the imitation buttonhole in a direction away from the edge of the fabric and around the end of the imitation buttonhole furthest from the edge of the fabric and then proceeds back to the starting point.

The machine herein shown is also similar to a buttonhole machine for sewing regular buttonholes in that in both cases the fabric is placed in the sewing machine with the edge thereof adjacent which the buttonhole is to be sewed directed away from the operator or toward the back of the machine, but there is this further difference that while in sewing a regular buttonhole the relative feeding movement between the stitch-forming mechanism and work-holding means is first away from the operator toward the rear of the machine and toward the edge of the fabric while sewing on the first side of the buttonhole and then is toward the operator and toward the front of the machine and away from the edge of the fabric during the sewing on the second side of the buttonhole, in sewing the imitation buttonhole by the machine embodying the present invention the relative feeding movement between the stitch-forming mechanism and work-holding means is first in a direction away from the edge or toward the operator and the front of the machine for sewing the stitches on the first side of the imitation buttonhole, and after the stitching has been carried around the end of the imitation buttonhole adjacent the operator the relative feeding movement is then in a reverse direction away from the operator and toward the rear of the machine to carry the stitches along the second side of the imitation buttonhole to the starting point.

The sewing machine herein illustrated is similar to that type of buttonhole sewing machine in which the under thread mechanism is in the form of oscillatory loopers and with this type of sewing machine the stitch-forming mechanism comes to rest at the end of the sewing operation on a buttonhole with the needle raised and with a loop of needle thread caught on the loopers.

In the machine of this application a construction is employed by which after the stitch-forming mechanism comes to rest at the end of a sewing operation, said stitch-forming mechanism and work-holding means are given a relative movement in a direction away from the edge of the fabric, or in the same direction as the feeding movement during the sewing on the first side of the imitation buttonhole, of sufficient extent to cause the upper thread to be broken at the last stitch, and after the thread has been broken the stitch-forming mechanism and work-holding means are given a reverse relative movement toward the edge of the fabric or in the same direction as the feeding movement during the sewing on the second side of the buttonhole thereby to bring the parts to stopping position.

In order to give an understanding of the invention I have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a side view of a sewing machine embodying the invention;

Fig. 2 is a view of said machine looking from the opposite side from that shown in Fig. 1 and with the parts broken out;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a view of a portion of a fabric showing the imitation buttonhole sewed therein;

Fig. 5 is a view of an imitation buttonhole and also showing the path of the needle in forming

the stitches and in breaking the thread at the end of the sewing;

Fig. 6 is a diagrammatic view illustrating the needle path;

Fig. 7 is a fragmentary view showing the operation of the upper thread pull-off;

Fig. 8 is a fragmentary plan view of the upper thread pull-off;

Fig. 9 is a fragmentary view of the clutch-controlling lever;

Before describing the machine herein illustrated I will refer to Figs. 4, 5 and 6 which show the character of the stitching which is made by the machine.

In Fig. 4, 2 indicates a piece of fabric which may be the portion of the sleeve of a coat, in which is formed two imitation buttonholes shown at 73, each buttonhole having a line of stitching 70 along one side and a second line of stitching 71 along the other side thereof, the stitching extending around the end 76 of the buttonhole furthest from the edge 72 of the fabric. This imitation buttonhole has the square end 75 nearest the edge 72 and the rounded end 76 furthest from said edge. 74 indicate the buttons which are sewed to the garment at the imitation buttonhole, and said buttons are usually sewed to the square ends 75 thereof. Fig. 4 shows one button in full lines with the corresponding buttonhole partly hidden and the other button in dotted lines with the imitation buttonhole shown in full.

The sewing machine herein shown is similar to that type of buttonhole sewing machine in which the work is held on a stationary work frame and the stitch-forming mechanism is carried in a stitch frame movably mounted on the work frame.

In the drawings 1 indicates the bed frame or work frame to which the work 2 is clamped by means of suitable work clamps 3 pivoted to the bed frame at 4.

The stitch-forming mechanism is carried by a stitch frame indicated at 5. This frame is formed with the usual overhanging arm 6 in which reciprocates a needle bar 7 carrying the needle 8 which controls the upper thread 9, and said stitch frame is also provided with the under portion 10 in which is rotatably mounted a turret 11 that carries under thread mechanism, preferably in the form of oscillatory loopers, and which also supports the usual throat plate 12.

The stitch-forming mechanism is operated in usual manner by the stitch shaft 13 which is carried by the stitch frame 5 and is driven by a driving pulley 41. The stitch frame is moved back and forth on the bed frame or work frame 1 by means of a main cam 14 which is received in a cam housing 15 formed in the lower portion 10 of the stitch frame.

The connections by which the rotation of the cam 14 produces the back and forth feeding movement of the stitch frame are similar to that usually found in buttonhole sewing machines of this type in that it comprises a stud 16 rigid with and depending from the stationary bed frame 1 and operating in a cam groove 17 formed in the cam 14.

The movements given to the stitch frame by the cam 14 comprise first a movement from starting position to stitching position and then a feeding movement lengthwise of the imitation buttonhole first in one direction and then in the other to form the stitches along opposite sides of said imitation buttonhole and to bring the stitch frame back to the position where the stitching began, at which point the stitch-forming mechanism comes to rest, and then a reverse movement from stitching position, during which the upper thread is broken at the last stitch, and finally a movement back to starting position.

The stitch-forming mechanism is turnable about a vertical axis to provide for sewing around the end of the buttonhole and the usual means are provided for giving such turning movement, such means comprising a rock shaft 18 which is actuated by the main cam 14, and which has fast thereon gear segments 19, 20 meshing with gears 21, 22 formed on the turret and on the needle bar mechanism respectively.

The usual means are provided for rotating the main cam, such means being a shaft 23 having a worm 24 thereon meshing with worm teeth formed on the periphery of the cam 14.

The shaft 23 has loose thereon a combined driving pulley and clutch member 25 by which the shaft is rotated when the machine is set in operation and while the parts are moving from starting position to stitching position. When the stitching position has been reached the stitch shaft 13 is set in operation thereby actuating the stitching mechanism and the rotation of the shaft 23 is then derived from the stitch shaft 13. After the stitching has been completed the stitch shaft comes to rest and the pulley 25 is again clutched to the shaft 23 to rotate the shaft and give the cam 14 the necessary movement to carry the parts from stitching position to thread-breaking position and then back to starting position.

The means for clutching the pulley 25 to the shaft 23 is such as is usually found in buttonhole sewing machines of this type. This pulley is mounted on a sleeve 26 which is slidable on the shaft 23 and is provided with a clutch dog 27 adapted to engage a corresponding clutch dog 28 on the crank arm 29 that is fast to the shaft 23. The position of the sleeve 26 is controlled by a clutch-controlling lever 30 which is pivoted to the stitch frame at 310 and which has an arm 32 that is connected to a collar 33 operating in a groove in the sleeve 26. This clutch-controlling member 30 is acted on by the spring 31 which tends to move it in a counter-clockwise direction Fig. 3, which movement will shift the sleeve upwardly, Fig. 3, thereby clutching the pulley to the shaft 23. The clutch-controlling lever 30 is held in the position shown in Fig. 3 by engagement with a projection 34 carried by a lever 35 pivoted at 36 on the under side of the bed frame 1. The outer end of this lever is provided with an extension 37 which is adapted to be engaged by the tail 38 of the usual starting lever 39, the latter being pivoted to the bed frame at 40.

When the starting lever is depressed the tail 38 is disengaged from the extension 37 thereby freeing the lever 35 and the spring 31 then acts to swing the clutch-controlling lever 30 into the dotted line position Fig. 3 and cause the pulley 25 to be clutched to the shaft 23. This is the construction usually found in buttonhole sewing machines of this type.

The sewing machine herein shown is also provided with the usual means for disconnecting the pulley 25 from the shaft 23 and setting the stitch shaft 13 in operation when the parts have been shifted from starting position to stitching position. The stitch shaft 13 is driven by the usual driving pulley 41 which is clutched to the stitch shaft at the proper time by means of the

usual clutch dog 42 pivoted at 43 on a disk 44 fast on the shaft 13.

Fig. 2 shows the clutch disengaged and with the tail 45 of the clutch dog engaging the stop projection 46. When the stop projection 46 is moved to the right into the dotted line position Fig. 2 thereby to disengage it from the tail of the clutch dog, the latter will be thrown into operative position by the usual spring 47 thereby clutching the pulley 41 to the shaft 13 in the usual way. This stop projection 46 is carried by a rocking member 48, such as is commonly employed in sewing machines of this type, and which is pivotally mounted on the stitch frame at 49 and is formed with the depending arm 50 and with a laterally-extending arm 51. The lateral arm 51 is engaged by a thrust pin 52 which extends through a slot in the bed frame 1 and co-operates with a stitch cam 53 carried by the main cam 14.

When the stitch-forming mechanism is at rest the thrust pin 52 rests on the face 54 of the main cam 14.

When the machine is started and while the parts are moving from starting position to stitching position the main cam 14 is turned in a clockwise direction Fig. 3 and when stitching position is reached the inclined face 55 of the cam 53 engages the under side of the thrust pin 52 and forces the pin upwardly thereby rocking the lever 48 clockwise and disengaging the stop projection 46 from the clutch dog 45. This will start the stitch-forming mechanism in operation as will be understood by those familiar with buttonhole sewing machines of this type.

The stitch cam 53 is a curved cam which follows the peripheral shape of the main cam 14 and is of sufficient length to maintain the thrust pin 52 raised during the entire time that the stitching operation is being performed.

When the end 56 of the stitch cam passes out from under the thrust pin 52 the rocking member 48 will be given a counter-clockwise movement Fig. 2 by the spring 57 thereby bringing the stop projection 46 into position to engage the tail of the clutch dog 45 and cause the latter to become disengaged. This will bring the stitch-forming mechanism to rest.

The usual means are provided for disconnecting the clutch pulley 25 from the shaft 23 at the time that the clutch dog 45 is released for clutching the pulley 41 to the stitch shaft 13. Such means comprises the arm extension 58 extending from the clutch-controlling lever 30 and provided with an opening 59 in which the lower end of the depending arm 50 is received.

When the starting lever is operated thereby releasing the clutch-controlling lever 30 and the latter is shifted under the influence of the spring 31 into the dotted line position Fig. 3, which shifting movement causes the driving pulley 25 to be clutched to the shaft 23 as above described, the edge 60 of the opening 59 will be brought substantially into engagement with the lower end of the arm 50.

When the stitch cam 53 raises the thrust pin 52 and thereby rocks the rocking member 48 to release the clutch dog 45 the corresponding swinging movement of the arm 50 will by its engagement with the edge 60 of the opening 59 swing the clutch-controlling lever 30 into the position shown in Fig. 3 thereby disconnecting the pulley 25 from the shaft. When the stitching has been completed and the stitch cam 53 has passed out from under the thrust pin 52 the counter-clockwise movement of the rocking member 48 and the arm 50 by which the clutch dog 45 is disengaged allows the clutch-controlling lever 30 to swing into the dotted line position Fig. 3 under the influence of the spring 31 thereby again clutching the pulley 25 to the shaft 23 so that the main cam will be driven by this rapid feed drive to move the parts from stitching position to thread-breaking position and then back into stopping position.

Figs. 1, 2 and 3 show the parts in the position they take when the machine is brought to rest and just before it is started, the needle at such time having the position indicated at *a* (see Figs. 1, 2, 7 and 8) and the follower 16 occupying the position in the cam groove 17 shown in full lines Fig. 3. The stitch frame 5 is then in its rearmost position.

The cam 14 rotates in a clockwise direction Fig. 3 and when the machine is started and the clutch wheel 25 is clutched to the shaft 23, thereby to give said cam its initial high speed movement, the cam will, by its rotation, shift the stitch frame 5 forwardly to bring the needle from the position shown at *a* to the dotted line position *b* in Figs. 1 and 2, and to the *b* position in Figs. 5 and 6, which is the position at which the stitching starts. During this interval the cam 14 has turned sufficiently so that the follower 16 has travelled from the starting position *a'* to approximately the position indicated at *b'* in Fig. 3. As the cam continues its rotation the follower 16 travels through the portion of the cam groove from the point *b'* to *c'* thereby moving the stitch frame 5 forwardly to carry the needle from the *b* position to the *c* position during which time the stitches 70 along the first side of the imitation buttonhole are formed. When the *c* position has been reached the turret and the stitch-forming mechanism are turned to sew around the end 76 of the imitation buttonhole and during the further continued turning movement of the cam the follower 16 is caused to travel from the point c^1 to the point b^2 thereby giving the stitch frame a backward movement to bring the needle back from the *c* position to the *b* position again, during which movement the line of stitching 71 on the other side of the imitation buttonhole is formed.

When the cam has turned so that the follower has travelled to the point b^2 in the groove 17 and the needle is in the *b* position the stitching has been completed and the stitch-forming mechanism is brought to rest. At this time the clutch wheel 25 is again clutched to the shaft 23 to produce a rapid rotation of the cam 14 for the remainder of the buttonhole cycle. During the further rotation of the cam the follower 16 is caused to travel through the portion of the cam groove between the point b^2 in Fig. 3 and the point *d'*, during which movement the stitch frame is given a second forward movement to carry the needle from the *b* position to the *d* position. During this forward movement the upper thread is broken at the last stitch and this takes place because when the stitch-forming mechanism comes to rest the needle will be raised and a loop of needle thread will be caught on the looper mechanism. As the stitch frame moves forwardly while the work is still clamped the strain on the loop of upper thread will be sufficient to cause said thread to break where it is bound into the last stitch.

The shape of the cam groove 17 between the points b^2 and *d'* is such that the forward thread-

breaking movement of the stitch frame is less than the forward sewing movement but is, however, sufficient to cause the upper thread 9 to be broken. As the cam 14 completes its rotative movement and the follower passes from the point *d'* to the starting point *a'*, the stitch frame will be moved backwardly again to carry the needle from the *d* position through the *b* position, which is the position at which the stitching starts and stops, to the stopping position indicated at *a* and shown by full lines Fig. 3, at which time the machine is brought to rest by the disengagement of the clutch wheel 25 from the shaft 23. This final disengagement of the clutch wheel from the shaft to bring the machine to rest is produced by the co-operation of a cam surface 61 on the clutch-controlling lever 30 with the projection 34.

It will be understood that the clutch-controlling lever 30 is mounted on the stitch frame and during the final backward movement of the stitch frame to bring the parts into the position shown in Figs. 1 and 2 this cam surface 61 engages the projection 34 and thereby causes the lever 38 to swing from the dotted to the full line position Fig. 3, such movement disengaging the clutch wheel 25 from the shaft 23.

The breaking of the needle thread 9 at the last stitch leaves beneath the work the length of thread which constituted the loop that was caught on the looper mechanism when the stitching mechanism was brought to rest. The present invention provides an improved means for engaging the needle thread between the needle and the work and withdrawing this end of needle thread from the work and holding it until the first stitch is formed on the next succeeding imitation buttonhole.

Buttonhole sewing machines are usually provided with buttonhole-cutting mechanism including a cutter lever pivoted to the stitch frame and actuated by a cam projection formed on the main cam 14 thereby to cut the buttonhole after the stitching has been completed. In the machine embodying the present invention the buttonhole cutter is omitted since it is desired not to cut the buttonhole slit but the cutter lever on which the cutter element of the regular buttonhole sewing machine is mounted is made use of in the present invention as a means for mounting and operating a thread pull-off for the upper thread.

In the drawings 62 indicates a lever pivoted to the stitch frame 5 at 63, said lever having a tail portion 64 adapted to be actuated by a cam projection 65 that is carried by the main cam 14. This cam projection operates to rock the lever 62 from its raised inoperative position shown in Figs. 1 and 2 to its operative position shown in Fig. 7 and then to release the lever and allow the spring 91 to return it to its inoperative raised position between the time that the stitch frame is moving from the position in which the stitching stops and the stopping position shown in full lines in the drawings. This movement of the lever 62 is made use of to pull the end of the needle thread back through the work as stated above. For this purpose the lever arm 62 has a short lever 66 pivoted thereto at 67, one end of said lever being pivoted at 68 to one end of a link 69, the other end of which is pivoted to the stitch frame at 90. The outer end of the lever 66 is provided with a lateral extension 80 to which is pivoted at 81 a pull-off finger 82, the latter having the hooked end portion 83. This pull-off finger normally rests against a laterally-extending rest 84 with which the lever arm 62 is provided and it is acted on by a spring 85 which holds it yieldingly against the rest.

86 indicates a piece of felt which is secured to the inner face of the finger.

When the lever 62 is in its normal raised position shown in Figs. 1 and 2 the pull-off finger 82 will be situated in the rear of the needle as shown in Fig. 1. When the lever arm 62 swings clockwise Fig. 1 into the position shown in Fig. 7 the short lever 66 will be turned from the position shown in Fig. 1 to that shown in Fig. 7 by the action of the link 69 and this turning movement will throw the pull-off finger 82 forwardly a sufficient distance to bring the hooked portion 83 thereof in front of the thread 9. During this forward movement of the pull-off finger the hooked end 83 will wipe by the length of upper thread leading from the needle 8 to the work 2 thus bringing the thread into the position relative to the pull-off finger shown in Figs. 7 and 8. As the lever arm 62 swings back into its raised position the pull-off arm 82 will be given a backward movement during which the needle thread is caught by the hook 83 with the result that the end of the thread will be pulled free from the fabric. During this operation the thread becomes wedged between the felt pad 86 and the hook 83 so that the end of the thread will be frictionally held as shown in Fig. 1.

I claim:

1. A sewing machine adapted to sew a short seam and then come to rest, said sewing machine having work-holding means, stitch-forming mechanism including a needle, feeding means to give the work-holding means and stitch-forming mechanism a relative feeding movement first in one direction and then in the opposite direction thereby to form two parallel lines of stitches, and means to bring the stitch-forming mechanism to rest at the end of the movement in said opposite direction, said feeding means operating after the stitch-forming mechanism has come to rest to give the work-holding means and stitch-forming mechanism a sufficient relative movement in the first-named direction to break the thread extending from the needle to the work, and then a return relative movement to starting position.

2. A sewing machine adapted to sew a short seam and then come to rest, said sewing machine comprising work-holding means, stitch-forming mechanism including a needle, feeding mechanism to give the stitch-forming mechanism a feeding movement relative to the work-holding means first in one direction and then in the opposite direction, thereby to form two parallel lines of stitches, and means to bring the stitch-forming mechanism to rest at the end of the movement in said opposite direction, said feeding means operating after the stitch-forming mechanism has come to rest to give the stitch-forming mechanism a sufficient movement in the first-named direction to break the thread extending from the needle to the work and then a return movement to starting position.

3. A sewing machine adapted to sew a short seam and then come to rest, said sewing machine comprising a bed frame, work-holding means mounted thereon, a stitch frame, stitch-forming mechanism carried thereby, means to give the stitch frame a feeding movement first in one direction and then in a reverse direction thereby to form two parallel lines of stitches, means to bring the stitch-forming mechanism to rest at

the end of the reverse movement, said first-named means operating after the stitch-forming mechanism has come to rest to give the stitch frame a second movement in the first-named direction of sufficient extent to break the thread at the last stitch, and then a reverse movement to starting position.

4. A sewing machine for sewing an imitation buttonhole comprising a bed frame, work-holding means mounted thereon, a stitch frame movable on the bed frame, stitch-forming mechanism carried thereby, a main cam, connections between the main cam and the stitch frame by which during each complete buttonhole cycle the stitch frame is moved first in one direction and then in the opposite direction, and then is moved a second time in the first-named direction and back to the starting point, and means to bring the stitch-forming mechanism to rest at the end of the first reverse movement.

5. A sewing machine for sewing imitation buttonholes comprising a bed frame, work-holding means mounted thereon, a stitch frame movable forwardly and rearwardly on the bed frame for movement toward and from the front of the machine, stitch-forming mechanism carried by the stitch frame, means to give the stitch frame a forward movement from starting position to stitching position and then a further forward movement and a return movement to stitching position, means to start the stitch-forming mechanism in operation when the stitch frame first reaches stitching position and to bring the stitch-forming mechanism to rest when the stitch frame returns to stitching position, said first-named means operating after the stitch-forming mechanism has come to rest to give the stitch frame a second forward movement sufficient to break the thread and then a return movement to starting position.

6. A sewing machine for sewing imitation button holes, said machine comprising a work frame, work-clamping means mounted thereon and adapted to clamp the work in position with an edge directed away from the front of the machine, a stitch frame, a stitch-forming mechanism mounted thereon, means to give the stitch frame and work frame a relative movement toward the front of the machine and away from said edge of the work and subsequently a return relative movement away from the front of the machine and toward said edge of the work, thereby to form two parallel lines of stitching in the work, and means to bring the stitch-forming mechanism to rest at the end of the return relative movement.

7. A sewing machine for sewing imitation buttonholes, said machine comprising a work frame, work-clamping means mounted thereon and adapted to clamp the work in position with an edge directed away from the front of the machine, a stitch frame, a stitch-forming mechanism mounted thereon, means to give the stitch frame and work frame a relative movement toward the front of the machine and away from said edge of the work and subsequently a return relative movement away from the front of the machine and toward said edge of the work, means to rotate the stitch-forming mechanism between the forward and return relative movements, thereby to form two parallel lines of stitching in the work connected by a curved line and means to bring the stitch-forming mechanism to rest at the end of the return relative movement.

8. A sewing machine for sewing imitation buttonholes, said machine comprising a work frame, work-clamping means mounted thereon and adapted to clamp the work in position with an edge directed away from the front of the machine, a stitch frame, stitch-forming mechanism mounted thereon, means to move the stitch frame on the work frame forwardly toward the front of the machine and away from said edge of the work and subsequently rearwardly away from the front of the machine and toward said edge of the work, thereby to form two parallel lines of stitching in the work, and means to bring the stitch-forming mechanism to rest at the end of the rearward movement.

9. A sewing machine for sewing imitation buttonholes, said machine comprising a work frame, work-clamping means mounted thereon and adapted to clamp the work in position with an edge directed away from the front of the machine, a stitch frame, stitch-forming mechanism mounted thereon, means to move the stitch frame on the work frame forwardly toward the front of the machine and away from said edge of the work and subsequently rearwardly away from the front of the machine and toward said edge of the work, thereby to form two parallel lines of stitching in the work, and means to bring the stitch-forming mechanism to rest at the end of the rearward movement, said first-named means acting after the stitch-forming mechanism has come to rest to move the stitch frame again forwardly toward the front of the machine a sufficient distance to break the thread at the last stitch, and then rearwardly to starting position.

10. In a sewing machine for sewing two approximately parallel rows of stitches connected at one end by a curved row of stitches the combination with work-clamping means arranged to clamp the work adjacent the edge thereof, of stitch-forming mechanism, means to give the stitch-forming mechanism and the work a relative movement away from the edge of the work and then a return relative movement toward the edge of the work, and means to give the stitch-forming mechanism a partial rotation between said relative movements whereby the curved connecting row of stitches is at the end of the parallel rows furthest from the edge of the work and said rows extend from the curved row toward the edge of the work.

11. In a sewing machine, the combination with work-clamping means for clamping material adjacent an edge thereof, of stitch-forming mechanism, means to give the stitch-forming mechanism and the material a relative feeding movement first inwardly away from the edge of the material and then outwardly toward the edge of the material, means to rotate the stitch-forming mechanism at the end of the inward relative movement and means to bring the stitch-forming mechanism to rest at the end of the outward relative movement.

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