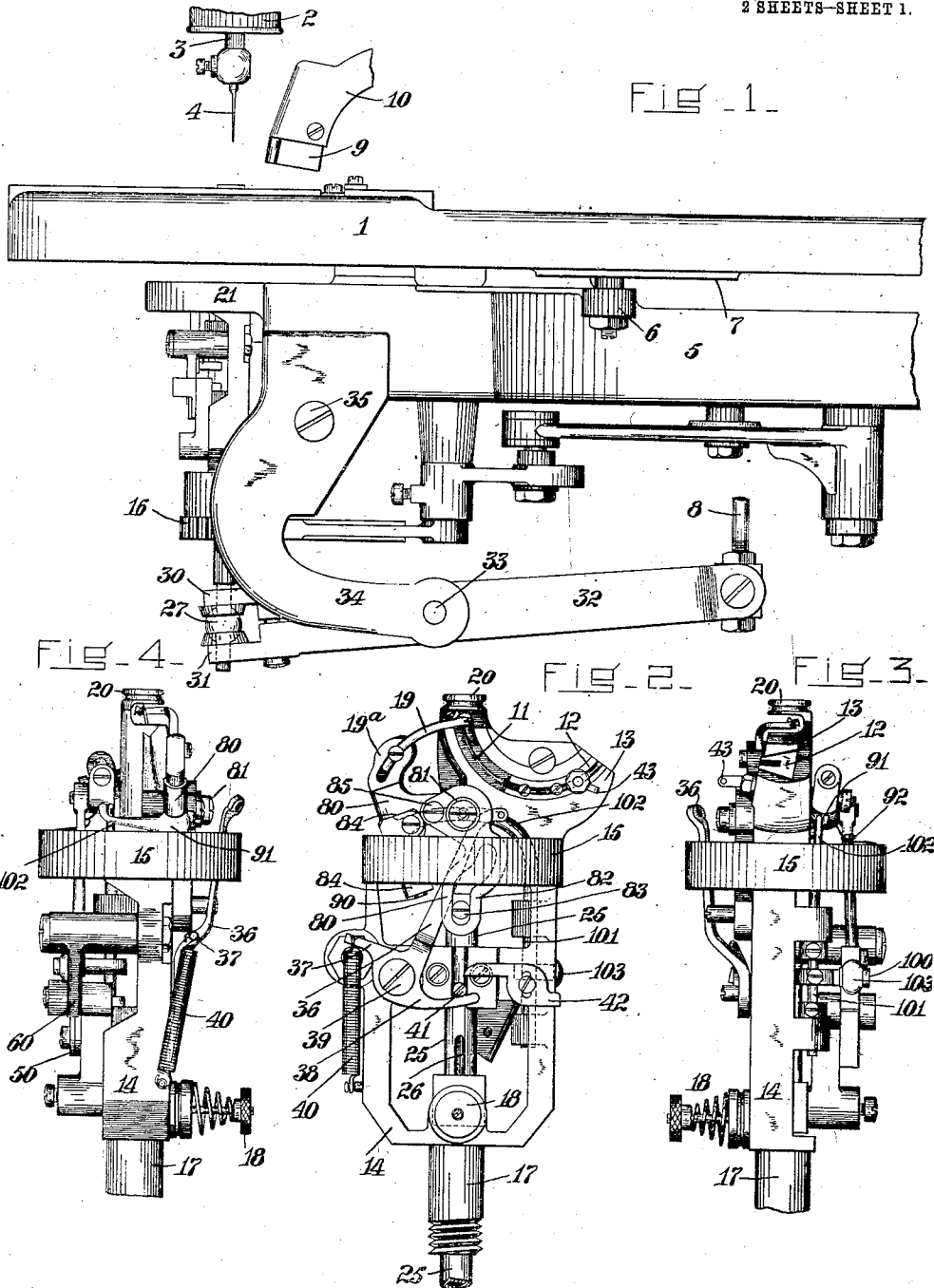


J. KIEWICZ.
 BUTTONHOLE SEWING MACHINE.
 APPLICATION FILED MAY 23, 1912.

1,062,475.

Patented May 20, 1913.

2 SHEETS-SHEET 1.



Witnesses:
 E. B. King
 M. R. Manning

Inventor,
 John Kiewicz
 By his Attorneys,
 Rogers, Kennedy & Campbell.

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2 SHEETS—SHEET 2.

FIG. 5—

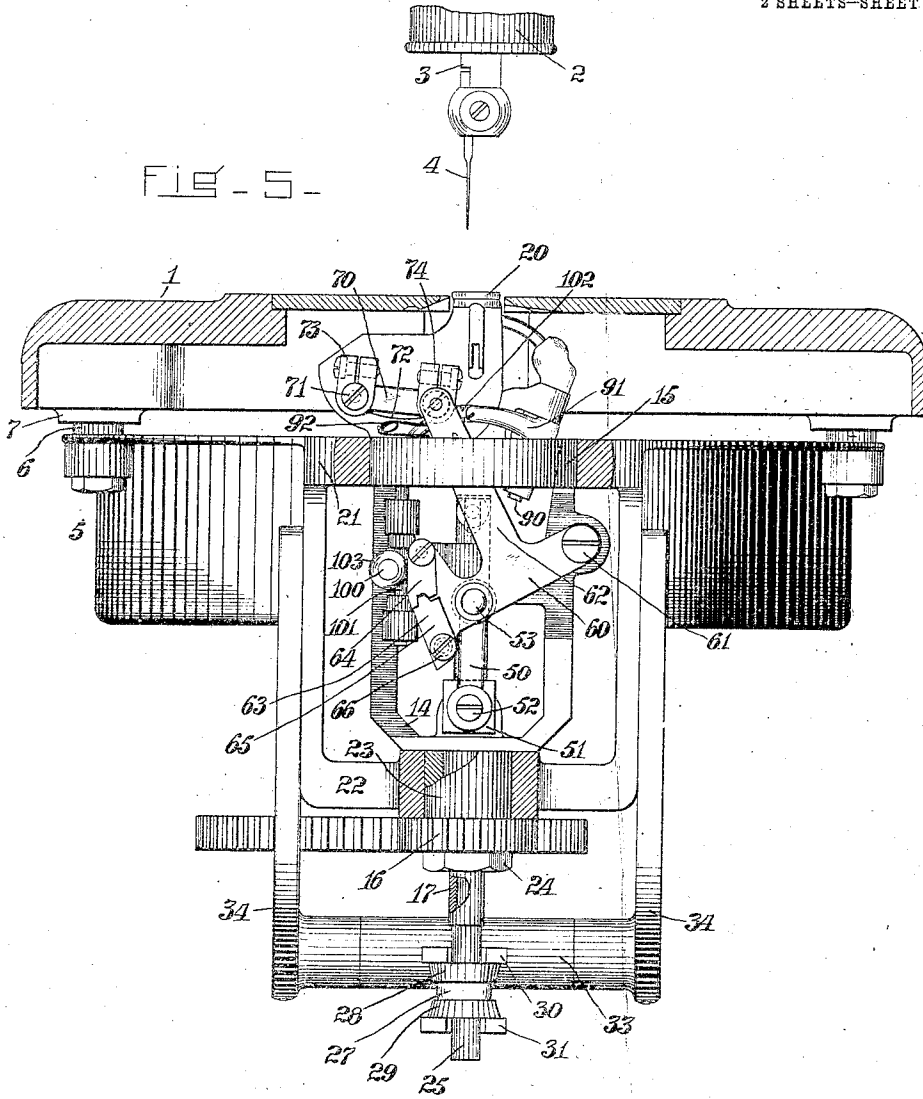
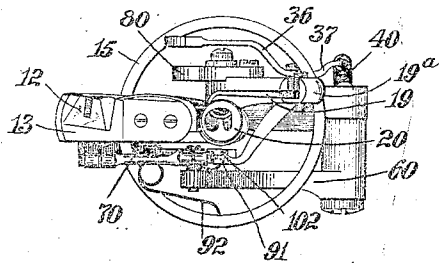


FIG. 6—



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UNITED STATES PATENT OFFICE.

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BUTTONHOLE-SEWING MACHINE.

1,062,475.

Specification of Letters Patent.

Patented May 20, 1913.

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To all whom it may concern:

Be it known that I, JOHN KIEWICZ, a citizen of the United States, residing at Hyde Park, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Buttonhole-Sewing Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

10 My invention relates to button hole sewing machines, particularly of that type which is known to the trade as the "Reece" button hole machine, wherein a stitch frame carrying the stitch forming mechanism on the one hand and a work clamp or support on the other hand, is relatively movable so as to enable the stitching to be carried along the sides of the button hole and around its end or ends. Such stitch forming mechanism comprises usually an eye-pointed needle carrying the upper thread and, below and opposed thereto, the so-called "complemental stitch forming mechanism" or "under-sewing mechanism," which carries and operates an under thread in coöperation with the needle carrying the upper thread. Types of under-sewing mechanism are known and illustrated in the following prior Letters Patent, namely: 30 494,280 of Mar. 28, 1893, 498,216 of May 23, 1893, 655,637 of Aug. 7, 1900, 684,046 of Oct. 8, 1901, 692,904 of Feb. 11, 1902, 695,039 of Mar. 11, 1902.

As will be seen by reference to the above recited prior patents, heretofore known under-sewing mechanisms for button hole sewing machines are extremely complicated and include many and irregularly shaped machine parts, relatively movable and immovable, causing great difficulty in design and construction and adjustment and repair, thereby involving excessive first cost and maintenance. It has been heretofore understood that extreme complication was necessary or inherent in such mechanism. Perhaps more so in this than in any other mechanism, improvements of simplification are both difficult and highly desired. Any improvement rendering the mechanism simpler, dispensing with one or more parts theretofore required, or enabling difficult parts to be more easily constructed or more advantageously arranged in coöperation with other parts, would be highly useful not only because of simplification and

cheapening, but because rendering the mechanism less likely to get into disorder.

It is one of the main objects of the present improvement to effect such simplification as just referred to, particularly by eliminating parts and by more advantageously disposing parts which are retained.

The further and more detailed objects hereof will be set forth in the hereinafter description or will be obvious to those skilled in the art.

I will first refer to my preferred embodiment of my present improvement as applied to the mechanism which save for the features of improvement is generally similar to the mechanism of the aforesaid Patent 695,039, granted Mar. 11, 1902 upon the invention of W. W. Dixon, and will thereafter point out the novel features in the claims.

In the accompanying drawings forming a part hereof, Figure 1 is a partial right-hand side elevation of a button hole sewing machine of the character heretofore referred to and embodying my present improvements. Fig. 2 shows in elevation detached from the other parts the circularly moving block or seat containing the under-sewing mechanism or the so-called "complemental stitch forming mechanism", the same being seen in what may for convenience be termed a rear view. Fig. 3 is a left-hand side elevation of the circularly moving seat and under-sewing mechanism. Fig. 4 is a right-hand side elevation of the same, the parts being seen in the same view as in Fig. 1. Fig. 5 is a front elevation of the machine as it would be seen looking from the left-hand side of Fig. 1, certain parts being broken away and others shown in section for better disclosure of the interior. Fig. 6 is a top plan view of the under-sewing mechanism as seen in Figs. 2, 3 and 4.

Similar letters of reference designate corresponding parts in the several figures of the drawings.

Certain parts are shown and may all be as in said Dixon patent, requiring therefore no detailed or other description except as follows, namely: the clamp frame 1, the casing 2 containing the needle bar 3, it carrying an eye-pointed needle 4 for manipulating the upper thread, said needle bar and its casing being in practice mounted in the stitch frame already referred to but not herein shown,

the curb or cam casing 5 in practice secured to the movable stitch frame so as to travel with it under the clamp frame, said casing 5 having suitable adjustable headed bolts 6 which bear against smooth ways 7 at the under side of the clamp frame, the rod 8 deriving its motion from a cam in the stitch frame, the cutter 9 and its carrying lever 10, the under thread needle 11, the needle carrier 12 to which it is attached, said carrier being fitted to slide in a groove cut in the extension 13 forming a race and rising from and preferably made as part of the block 14, said block having the circular upper end 15 adapting it to receive at suitable times a circular movement, the gear 16 fast on a sleeve 17 extending from block 14, the tension device 18 for the under thread, the looper 19 and the throat plate 20; also the circular ring-like portion 21 of the casing 5, which receives within it the circular upper end 15 of the block 14, and depending from said ring 21 a loop 22 having formed through it centrally at its lower end an opening of such size as to loosely receive hollow hub 23 of gear 16, the gear being applied to the sleeve 17 and fixed there by a suitable nut 24.

The sleeve 17 has extended through it the hollow rod or bar 25, said rod receiving through the opening in its lower end the second or underneath thread, such thread being passed upwardly through the rod 25 and into the under thread carrier 11. The thread may pass out of the hollow rod 25 through an aperture 26, passing about the tension device 18 before passing to the under thread needle 11. The rod 25 has fixed to it below the gear 16 a ball or enlargement 27, it being as herein shown embraced between two loose cup-shaped disks 28 and 29, both loosely surrounding the rod 25 and contacting the ball 27, said disks being borne respectively upon the two forks 30, 31 of a lever 32 pivoted at 33 between two depending curved hangers 34, 34, these hangers being connected in a suitable manner as by screws 35, with the loop-shaped depending portion 22 above referred to. The lever 32 is connected with the rod 8 as shown so that the cam operated movement of the rod causes the oscillation of the lever 32 and thereby reciprocates upwardly and downwardly the hollow rod or bar 25.

In continuing the description of the machine illustrated in the drawings hereof, I will refer to the new parts supplied by me and to the new arrangements and combinations of parts, during which reference will necessarily be made to parts which *per se* are not new herein but are for the first time employed in the novel inter-relations and arrangements which I seek to cover.

The oscillatory seat or so-called block 14, which may take any physical form, I shall

term the "stock," as it is merely a carriage or frame for supporting the various working parts of the under mechanism. It shifts bodily, for example circularly, with all the working parts supported by it, and these parts themselves move as may be required for stitching more or less independently of the stock's shifting.

Generally speaking the under sewing mechanism hereof comprises in combination the shiftable stock referred to (said block or seat 14), and the following further elements supported by said stock, namely, a movable under needle carrier (the slide 12), a movable thread looper (the hook shaped member 19), a movable actuator (the up and down reciprocating rod 25) adapted to be exteriorly operated independently of the stock's shifting, and connections hereinafter to be more specifically described, whereby said actuator actuates both said carrier and said looper.

Before describing the manner of actuation of the needle carrier and looper and the connections therefor, I shall refer to a convenient thread take-up or measuring contrivance shown herein, but which *per se* forms no part of the present invention. This comprises a three-armed lever 36, 37, 38 pivoted at 39, the long arm 36 having at its extremity an eye or aperture for the thread, the arm 37 having a spring 40 for turning the lever leftwise in Fig. 2, and the lever's oscillation being effected through a pin 41 on the up-and-down moving actuator rod 25. In order to adjust the movement of the lever an adjustable stop 42 is provided, a portion of which stands in the path of the arm 38 to limit to any desired degree the upward movement thereof. It will be understood that the carrier 12 is provided with a thread guide, for example as shown at 43, with which the looper arm 36 coöperates as in said Dixon patent.

The movement of the needle 11 and carrier 12 is a simple oscillation in the arc of a circle determined by the guide or race 13, within which the carrier 12 moves to and fro, causing the needle to first pass upwardly through the button hole to a position above the fabric where it coöperates with the upper needle, the under needle then returning to a position beneath the fabric where it coöperates with both the looper and the upper needle in a well known manner. The operation of the looper 19 is not a simple operation. On the contrary the looper has two motions, first a bodily to-and-fro swinging toward and from the under needle, and second a slight oscillation with its carrier 19 upon the fittings of the latter in a direction lateral to the to-and-fro swinging. The resultant of these two motions is a curved path. The purpose of this motion, as will be well understood, is that the looper

which is hook shaped and barbed, may form the necessary loop in the upper thread at each successive descent of the upper needle so that the lower needle may in subsequently ascending pass through the loop, thus causing the interlocking of the two threads. Thus three movements are required to be provided for, namely the up-and-down oscillation of the needle and carrier, the longitudinal bodily swinging of the looper and the slight lateral oscillation of the latter. In the mechanism hereof these movements are all accomplished by substantially but six moving parts between the actuator 25 on the one hand and the needle and looper on the other hand, these six parts affording trains of mechanism which will now be referred to generally by reference numerals, following which will be a detailed description of the same and their fittings.

The train of parts for driving the needle and its carrier 12 comprises link 50 connected at its lower end to the actuator 25, lever 60 connected to said link 50, and link 70 connecting said lever 60 with a stud upon the needle carrier 12.

The train of parts for longitudinally bodily swinging the looper and its carrier 19^a comprises the cam lever 80 driven by a pin on the actuator 25, and shaft 90 by which the looper carrier is swiveled to said cam lever 80; the engagement of the pin and cam effecting the swinging of the lever, looper carrier and looper.

The train of mechanism for causing the slight lateral oscillation of the looper and its carrier 19^a comprises the same link 50 and lever 60 already mentioned, the roller arm 100 whose roller is contacted by the cam-like extremity of lever 60, the rock shaft 101 which is in one piece with the roller arm 100, and with its rock-arm 102 is oscillated through the movement of said roller arm, and the swinging arm 91 which is in one piece with the swivel shaft 90 and is contacted by said rock-arm so that the oscillatory movement is transmitted to the swivel shaft and thereby to the looper carrier and looper.

I will now describe further in detail the trains of mechanism, thus generally referred to.

The link 50 is a short upright link partaking of the up-and-down movement of the actuator 25, the lower end of the link being adjustably secured upon the actuator through a hollow block 51 surrounding the actuator and secured thereon in desired position by a screw 52. The upper end of the link 50 is pivoted by connection 53 with a portion of lever 60. The lever 60 is thus caused to swing about its fixed center shown as a screw stud 61. The lever 60 is of an inverted T shape, the cross arm or base of which is the top of the T and the long ver-

tically extending arm 62 of which is the leg of the T.

It will be noticed that unlike the prior Dixon patent, the lever 60 hereof is a simple one-piece lever instead of being composite or built up of relatively movable parts. It will also be noticed that the pivot 61 is horizontal and that therefore the lever 60 swings exactly in a vertical plane, which is unlike the prior patent where these parts had to be set at a considerable incline, thus involving not only relatively sliding parts composed in the lever, but a swiveling connection to the actuator rod, all of which I have dispensed with. My construction in these respects moreover permits the simple actuation of the lever 60 by a link such as 50, which is one of the simplest, most effective and easily adjustable, mechanical transmitters.

The upper extremity of the upward arm 62 of lever 60, moving of course about the pivot 61, has a slanting motion with a considerable horizontal component. This horizontal component I have transmitted to the needle carrier 12 by means of the link 70 extending from lever 60 to carrier 12. The connection from the link to the carrier is made through a stud 71 projecting from the carrier and extending through the casting 13 which is apertured for that purpose to permit the to-and-fro movements of the stud corresponding to the carrier's movements. This aperture is partly seen in Fig. 5 at 72. As will be well understood the path of the lower needle must be in a slightly inclined plane in order to secure the proper coöperation of the lower and upper needles, this incline being plainly seen in Figs. 3 and 4 hereof. By reason of this the movements of stud 71 and lever arm 62 are not in the same plane, and I have therefore pivoted the link 70 which connects them by universal joints 73, 74 at the two ends of the link. This arrangement permits one end of the link to depart slightly out of the plane of the movement of the other end, while securing perfect ease of movement, efficient transmission and absence of twisting or other destructive tendency. The construction of the universal joints 73, 74 will be well understood and need not be elaborated.

The above completes the description of the operation of the needle and carrier, and of the entire train of mechanism by which the motion of the actuator 25 is transmitted thereto.

The cam lever 80, best seen in Fig. 2, which effects the bodily longitudinal swinging of the looper and its carrier, is an extremely irregularly shaped lever and is in fact for convenience composed of two pieces of metal secured rigidly together when in operation, both of which are fitted on a

common stud 81. The cam part 82 of lever 80 is eccentrically slotted as shown, and is engaged by a pin 83 secured in and projecting rearwardly from the actuator 25, so that said pin as it is caused to rise, passes into the eccentric cam portion, causing the swinging thereof. The yoke part 84 of lever 80 is likewise fitted over stud 81, and the two parts 82 and 84 of the lever are secured together so as to constitute substantially a single lever through a screw 85 passing directly through the cam part 82 into the yoke part 84. The two branches of the yoke part 84 are drilled to afford bearings for swivel shaft 90, which passes through both branches of the yoke part to where at its upper end it has rigidly connected to it the looper carrier 19^a. By this construction and arrangement the looper carrier borne upon the lever 80 is caused to swing bodily to right and left for a distance, for example, approximately equaling half the length of the looper. The looper's oscillation is attained partly through the link 50 and lever 60 before mentioned. Said lever at its lower left-hand portion, Fig. 5, is provided with a cam 63 of the necessary contour to produce the proper looper oscillation. The cam 63 shown has an apex near its center from which it inclines away both above and below, the cam being for convenience constructed in two parts 64 and 65, secured by screws, the lower of which 66 may be loosened for adjustment. Such adjustment is effected through the fact that the aperture in cam piece 65 is larger than the screw shank which engages it, as indicated in dotted lines, so that there is leeway for slightly shifting the cam's apex to right or left before tightening the parts in their final adjustment.

As already stated the cam 63 engages roller arm 100, said arm having a roller 103 on its extremity for that purpose. The up-and-down cam movements cause the roller to move left and right in Fig. 5, thereby causing the arm to swing and causing the rock shaft 101 to oscillate. The upper end of the rock shaft is curved into what may for convenience be termed a rock-arm 102, and this necessarily partakes of the shaft's oscillation. As seen in Figs. 4, 5 and 6, the rock-arm 102 contacts directly behind the swinging arm 91, whereby the rock-arm oscillation causes the swinging arm's swinging. It will be noticed that the contact of rock-arm 102 and swinging arm 91 is substantially an axial contact unlike that shown in the prior Dixon patent, and I consider this arrangement very important in its working and results. By axial contact, I mean contact located in the line or axis about which the looper swings, which is coincident with the center line of the stud 81, on which the lever 80 is fitted. As a con-

sequence of this arrangement the position of the contacting end of the swing arm 91 is not altered during the longitudinal swinging movements of the looper. Consequently also there is upon the rock-arm only one point of contact instead of a line of sliding contact as in said prior patent. Thus not only is wear from sliding avoided, but what is of more importance, the relative adjustment of the parts is rendered extremely easy, since a slight bending or shaping of either the rock-arm or the swinging arm will suffice to bring them into proper relations, where immense difficulty was met in adjusting or readjusting the rock-arm of the prior patent. This advantageous arrangement also permits the employment of a small light pushing spring 92, composed for convenience of spring wire, which presses inwardly against the swinging arm 91, thus keeping it in forcible contact with the rock-arm and thus also exerting a pressure against the rock-arm which serves to keep the roller 103 of the rock shaft in constant contact with its actuating cam 63.

It will be noticed that although the lever 60 hereof is more simple in structure and fitting than the lever of the prior patent, it nevertheless performs greater service, as therein are consolidated not only the lever connections for swinging the needle, but the cam 63 for swinging the rock-arm, whereas in the prior patent a complicated separate rocker cam is employed involving independent slide and block connections with the actuator bar, and an additional hole in said bar which is objectionable owing to the very great strain upon the bar in practical use. This advantageous and simple construction of the present application is due in part to the improvement of shifting the rock shaft from that side of the stock on which the lever 60 is pivoted to the opposite side of the stock, and the improvement in this respect coöperates with the novel relative arrangement of rock-arm and swinging arm above referred to, so that by the combined features of improvement a very great simplification is effected. Additionally attention is called that the advantageous non-eccentric movement of lever 60 and the easier motion occasioned thereby enable dispensing with a special guide for the left end of said lever 60, as had to be employed in said prior patent, and by dispensing with the need of said guide, the lever is better able to be accommodated to the provision of a rocker cam at its left side.

The operation of the present invention will now be sufficiently understood by those skilled in the art. When the under needle is in lowest position the hooked end of the looper partly surrounds the needle path and holds a loop of upper thread. When the parts are in this position the actuator is in

its lowest position. In operation it will be understood that the actuator vibrates upwardly and downwardly with extreme rapidity. On each vibration of the actuator the following operations occur: The under needle commences to rise through the loop of upper thread, and at the same time the looper commences to oscillate in a direction, referring to Fig. 2, away from the observer, thus clearing the barb of the looper from the needle path to permit the looper's subsequent longitudinal movement. During this first portion of the operations, the looper is not being reciprocated or swung longitudinally because the looper lever cam 82 presents a straight or inactive portion to the pin 83. As these motions continue the looper's maximum oscillation from the observer is attained when the roller 103 has reached the apex of the rocker cam 63, and at the same time the pin 83 commences to enter the eccentric portion of the looper lever cam 82, the needle continuously ascending. Thereafter the looper lever commences to swing, thus reciprocating the looper to the right, the looper at the same time oscillating toward the observer until eventually the looper has attained its extreme right-hand position, Fig. 2, in a curved path, and the needle has reached its highest position. Thereupon the operations are exactly reversed upon the descent of the actuator. It will of course be understood that the upper needle is vertically vibrating in harmony with the under sewing mechanism, and it will also be understood that the actuator's up-and-down movements may be regular or irregular without altering the above described order of operations. It will thus be seen that I have provided an under sewing mechanism for button hole sewing machines which possesses the advantages and attains the objects hereinbefore recited, and further and other advantages will be apparent to those familiar with the art.

The following remarks are made to afford a better understanding of the appended claims: The cam lever 80 comprising the parts 82 and 84 is the lever which carries the looper, in its longitudinal movements, and will therefore be termed a looper lever. The lever 60 which is intermediate the actuator and the needle carrier, and also intermediate the actuator and the rock shaft, will simply be termed the intermediary, and it obviously may take different physical forms. The following parts may all be termed connections or connecting devices, namely, the link 50, the cam and roller 63, 103, the link 70, the pivotal or swivel shaft 90, and the pin and cam 82, 83. The contact between rock-arm 102 and swinging arm 91, while not strictly a connection is a direct engagement for which obviously

might be substituted an indirect form of engagement. Indeed for any of the connections referred to, reversals might be made or other connections substituted, and I therefore do not intend any limitation to the details hereof excepting as set forth in the appended claims respectively. Where a member is composed of parts which in use are permanently and rigidly secured together in fixed relation, such member may be termed a one-piece member, although it is not a single integral piece of metal. The bodily longitudinal swinging of the looper with the looper lever 80 will be termed a reciprocation as distinguished from the slight oscillation of the looper about its swivel shaft 90.

What I claim and desire to secure by Letters Patent is:

1. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier fitted to travel in an inclined plane, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and said looper, such connections comprising an inverted T shaped one-piece, intermediary, swinging lever having a cross arm and an upward arm, a horizontal pivot for one end of the cross arm of said intermediary lever at one side of the stock, a link connecting the lever's cross arm to said actuator, and a link connecting the lever's upward arm to said carrier, said last named link having universal joints at its two ends.

2. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a vertically sliding actuator bar adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator bar actuates said carrier and looper, said connections comprising an intermediary which is distinct from, movable relatively to, and driven by, said actuator, and possesses an upward and a transverse arm, a train of mechanical connections from the upward arm of said intermediary to the needle carrier, and an independent train of mechanical connections from the transverse arm of said intermediary to the looper.

3. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism, comprising in combination, a shiftable stock and the following elements supported by

said stock, namely: a movable under needle carrier, a movable thread looper, a vertically sliding actuator bar adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising an intermediary which possesses an upward and a transverse arm, and is swung by connection from the actuator, a rock-arm and shaft, a connection from the said transverse arm to said rock shaft and connections whereby the rock-arm oscillates the looper, and connections from said upward arm to the carrier which are independent of the looper actuating connections.

4. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier fitted to travel in an inclined plane, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and said looper, such connections comprising an inverted T shaped one-piece, intermediary, swinging lever having a cross arm and an upward arm, a horizontal pivot for one end of the cross arm of said intermediary lever at one side of the stock, a link connecting the lever's cross arm to said actuator, a link connecting the lever's upward arm to said carrier, said last named link having universal joints at its two ends, and means at the swinging end of said cross arm for causing the operation of said looper.

5. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a rock-arm and shaft for oscillating the looper, an intermediary lever having a cross arm and an upward arm, said lever pivoted to the stock at one side and said cross arm having at the opposite side a cam connection for operating the rock shaft, and said upward arm having connection to the carrier, and a connection from the actuator to the lever.

6. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable

actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a swinging looper lever actuated from the actuator and having the looper pivotally supported on it, a swinging arm for causing the looper's oscillation, and a rock-arm and shaft oscillated from the actuator, the rock-arm and swinging arm oppositely located and arranged to extend from opposite sides of the stock toward each other into mutual engagement, whereby through said rock-arm and shaft the actuator may oscillate the looper.

7. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a swinging looper lever actuated from the actuator and having the looper pivotally supported on it, a swinging arm for causing the looper's oscillation, and a rock-arm and shaft oscillated from the actuator, the rock-arm and swinging arm arranged and constructed to mutually engage at a point substantially in the looper lever's axis of swinging.

8. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a swinging looper lever actuated from the actuator and having the looper pivotally supported on it, a swinging arm for causing the looper's oscillation, and a rock-arm and shaft oscillated from the actuator, the rock-arm and swinging arm arranged and constructed to mutually contact at a point substantially in the looper lever's axis of swinging, and means for yieldingly pressing the swinging arm toward the rock-arm.

9. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated

independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising fittings for permitting reciprocation and oscillation of said looper, a swinging arm reciprocating and oscillating with said looper, and a rock-arm located to contact the swinging arm in the axis of reciprocation for causing oscillation of the looper.

10. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising an intermediary lever, connections from said actuator to said intermediary, connections from said intermediary lever to said carrier, a swinging looper lever actuated from the actuator and having the looper pivotally supported on it, a swinging arm for causing the looper's oscillation, and a rock-arm and shaft oscillated from the intermediary, the rock-arm and swinging arm oppositely located and arranged to mutually engage, whereby through said rock-arm and shaft the actuator may oscillate the looper.

11. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising an intermediary lever, connections from said actuator to said intermediary, connections from said intermediary lever to said carrier, a swinging looper lever actuated from the actuator and having the looper pivotally supported on it, a swinging arm for causing the looper's oscillation, and a rock-arm and shaft oscillated from the intermediary, the rock-arm and swinging arm arranged and constructed to mutually engage at a point substantially in the looper lever's axis of swinging.

12. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated

independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising fittings for permitting reciprocation and oscillation of said looper, a swinging arm reciprocating and oscillating with said looper, and a rock-arm located to contact the swinging arm in the axis of reciprocation for causing oscillation of the looper, an intermediary lever, connections from said lever to the carrier for actuating it, connections from said lever to the rock-arm for actuating it, and connections from the actuator to the lever.

13. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a lever actuated from said actuator, a rock-arm and shaft for oscillating said looper, a contact or roller arm on said shaft and a cam on said lever for engaging said arm, said cam composed of two tooth-engaged pieces adjustable as to their relative incline and securable in any adjustment.

14. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a lever actuated from said actuator, a rock-arm and shaft for oscillating said looper, a contact or roller arm on said shaft and a cam on said lever for engaging said arm, said cam composed of two tooth-engaged pieces adjustable as to their relative incline and securable in any adjustment by screws at least one of which passes through an aperture in one of said pieces which aperture is substantially larger than the screw shank.

15. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates

said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, an intermediary having a connection to the actuator, a connection between said intermediary and the carrier, a rock-arm and shaft having a connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm.

16. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, a link, a one-piece intermediary connected by said link to the actuator, a connection between said intermediary and the carrier, a rock-arm and shaft having a connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm.

17. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, an intermediary having a connection to the actuator and pivoted to one side of the stock, a connection between said intermediary and the carrier, a rock-arm and shaft located at the opposite side of the stock and having a connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm.

18. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates

said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, an intermediary of the form of an inverted T having a connection to the actuator and pivoted to one side of the stock, a connection between said intermediary and the carrier, a rock-arm and shaft located at the opposite side of the stock and having a cam connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm.

19. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a race for guiding said carrier in an inclined plane, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, a link, a one-piece intermediary connected by said link to the actuator and pivoted to swing in a vertical plane, a link-and-universal-joint connection between said intermediary and the carrier, a rock-arm and shaft having a connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm.

20. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, an intermediary having a connection to the actuator, a connection between said intermediary and the carrier, a rock-arm and shaft having a connection to said intermediary, a pivotal connection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm, the engaging position of said arm and rock-arm being on the axis about which said looper lever swings.

21. For a button hole sewing machine of the type having means for controlling the upper thread, an under sewing mechanism comprising in combination, a shiftable stock and the following elements supported by

said stock, namely: a movable under needle carrier, a movable thread looper, a movable actuator adapted to be exteriorly operated independently of the stock's shifting, and connections whereby said actuator actuates said carrier and looper, said connections comprising a looper lever carrying the looper and having a connection to the actuator, a link, a one-piece intermediary connected by said link to the actuator, a connection between said intermediary and the carrier, a rock-arm and shaft having a connection to said intermediary, a pivotal con-

nection between the looper and looper lever and an arm extending from said looper to engagement with said rock-arm, the engaging position of said arm and rock-arm being on the axis about which said looper lever swings. 15

In testimony whereof I affix my signature 20 in presence of two witnesses.

JOHN KIEWICZ.

Witnesses:

THOMAS J. CARTY,

HAROLD J. WOOD.