Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

Filed May 20, 1940 8 Sheets-Sheet 1

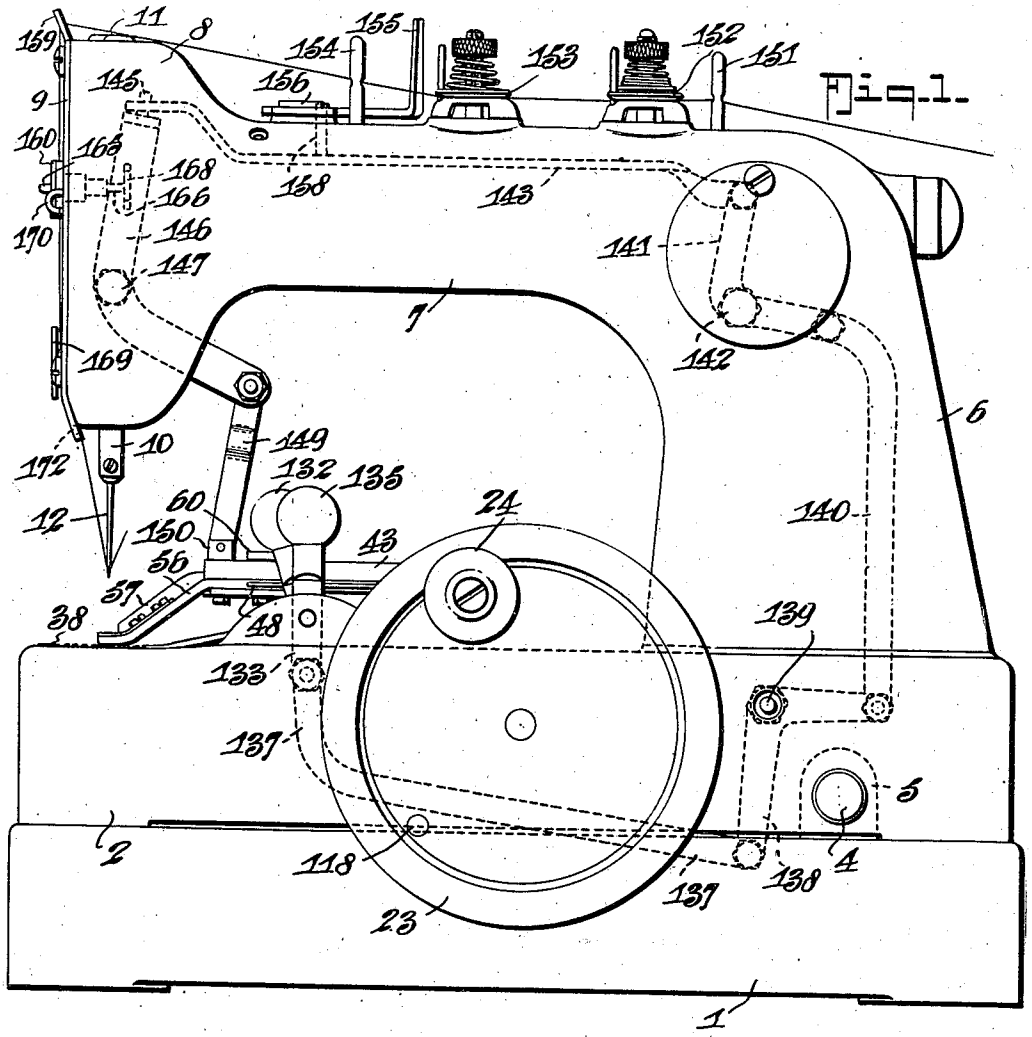


Fig. 1.

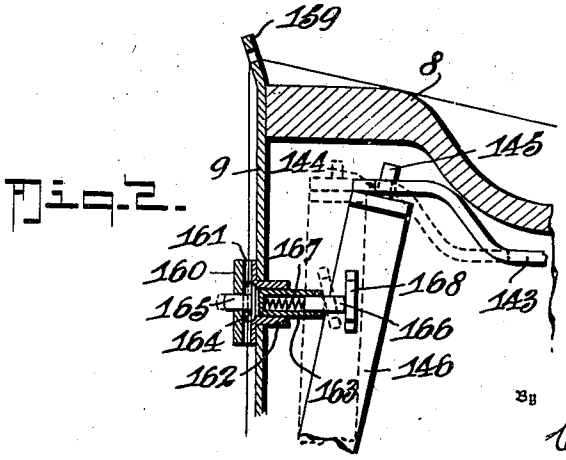


Fig. 2.

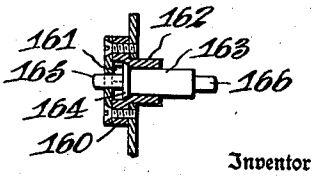


Fig. 3.

Inventor

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His Attorneys

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BUTTON SEWING MACHINE

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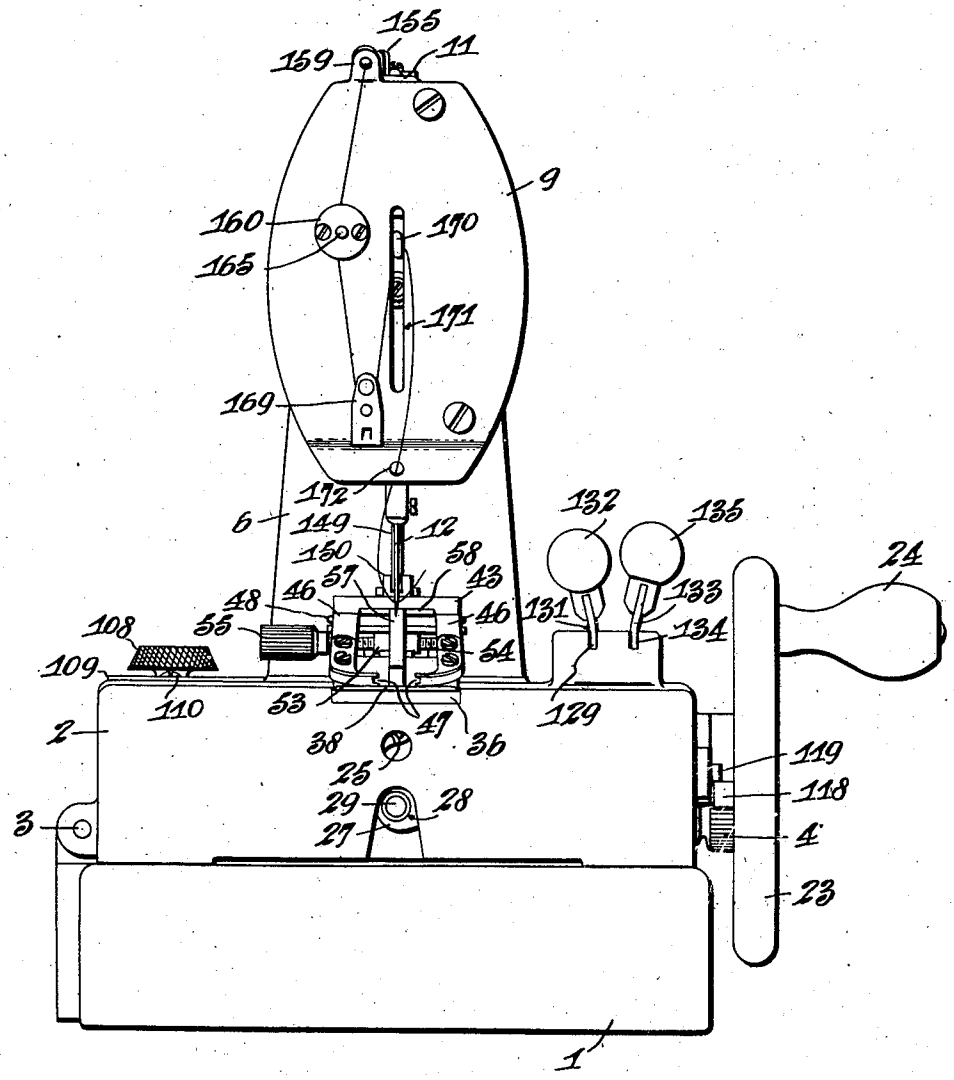


Fig. 4.

Inventor
William T. Maxant
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Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

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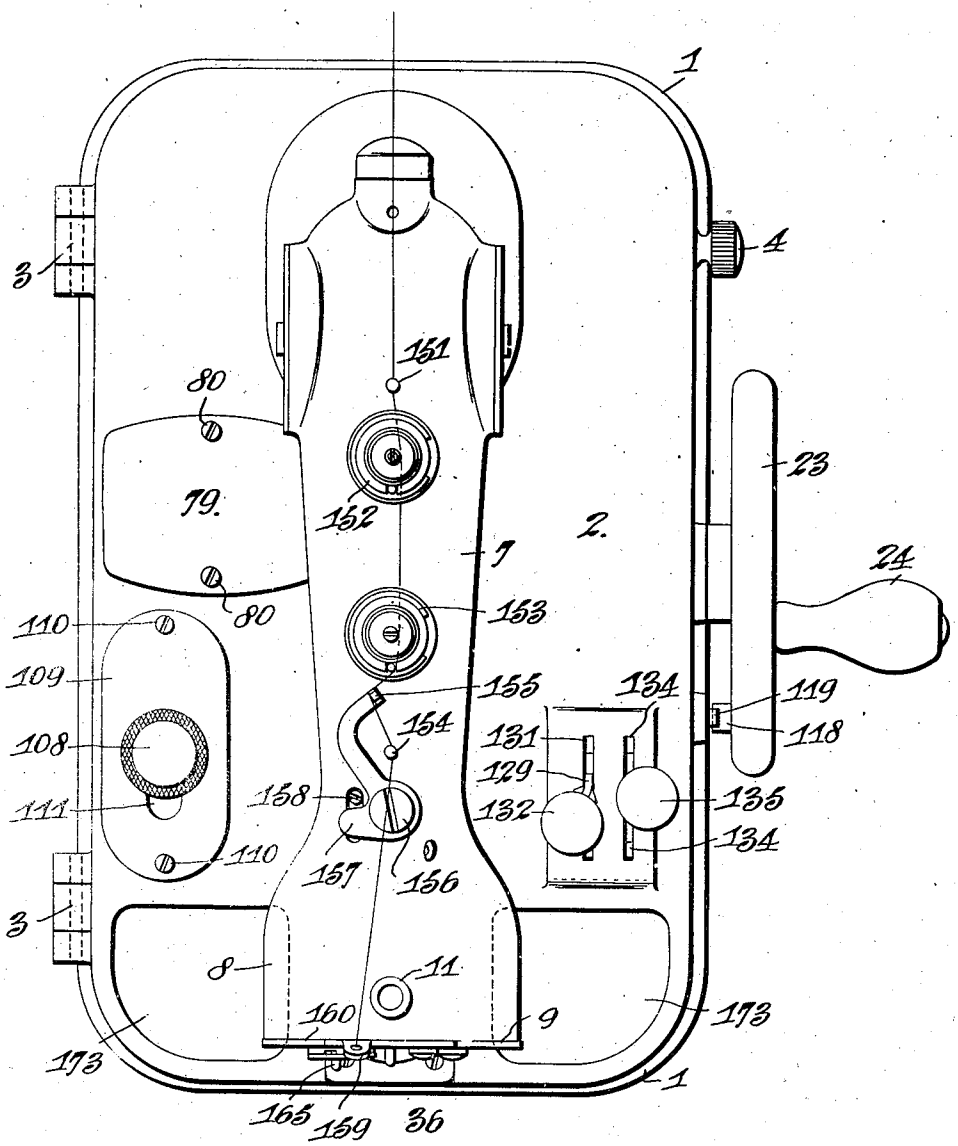


Fig. 5.

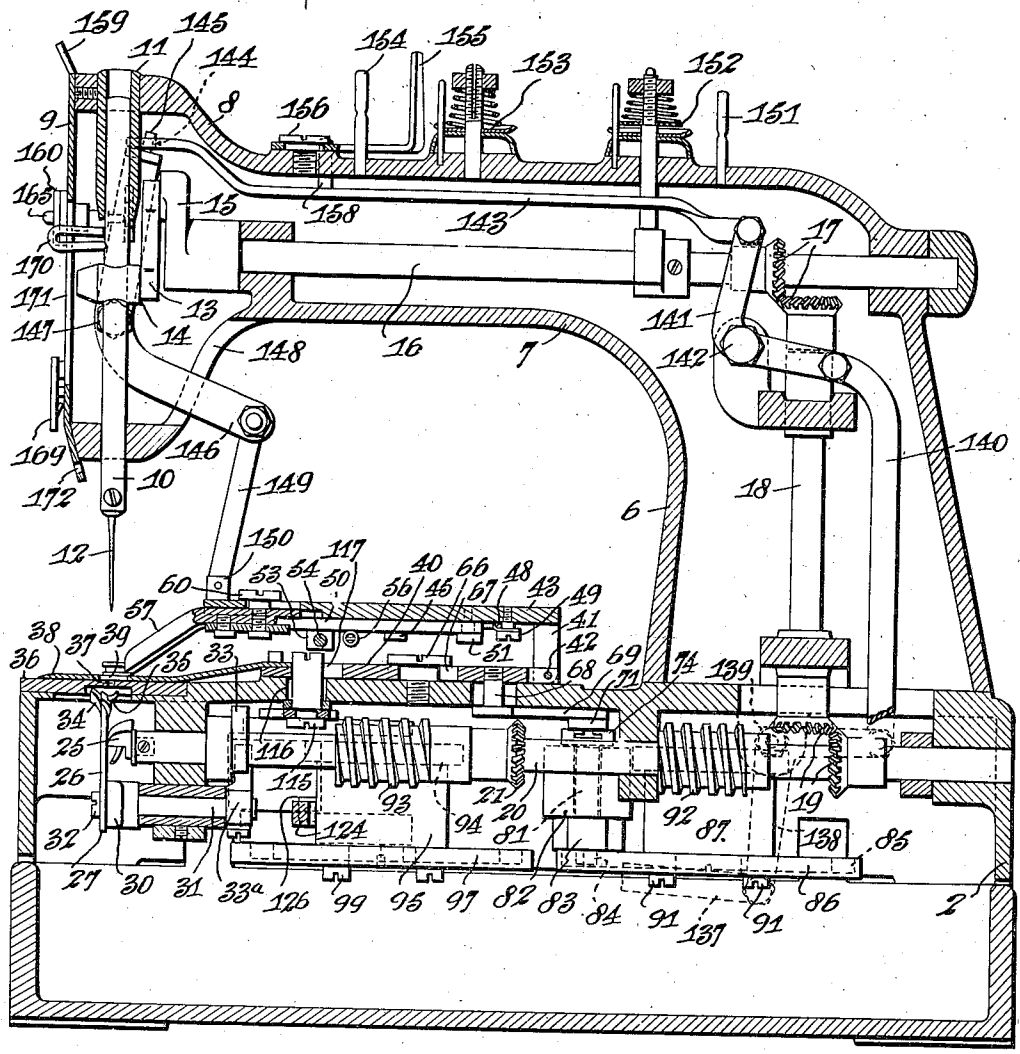
Inventor
William T. Maxant
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Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

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Fig. 6.



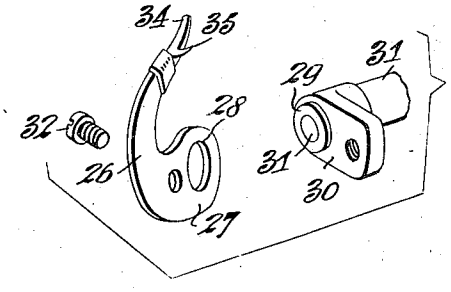


Fig. 7.

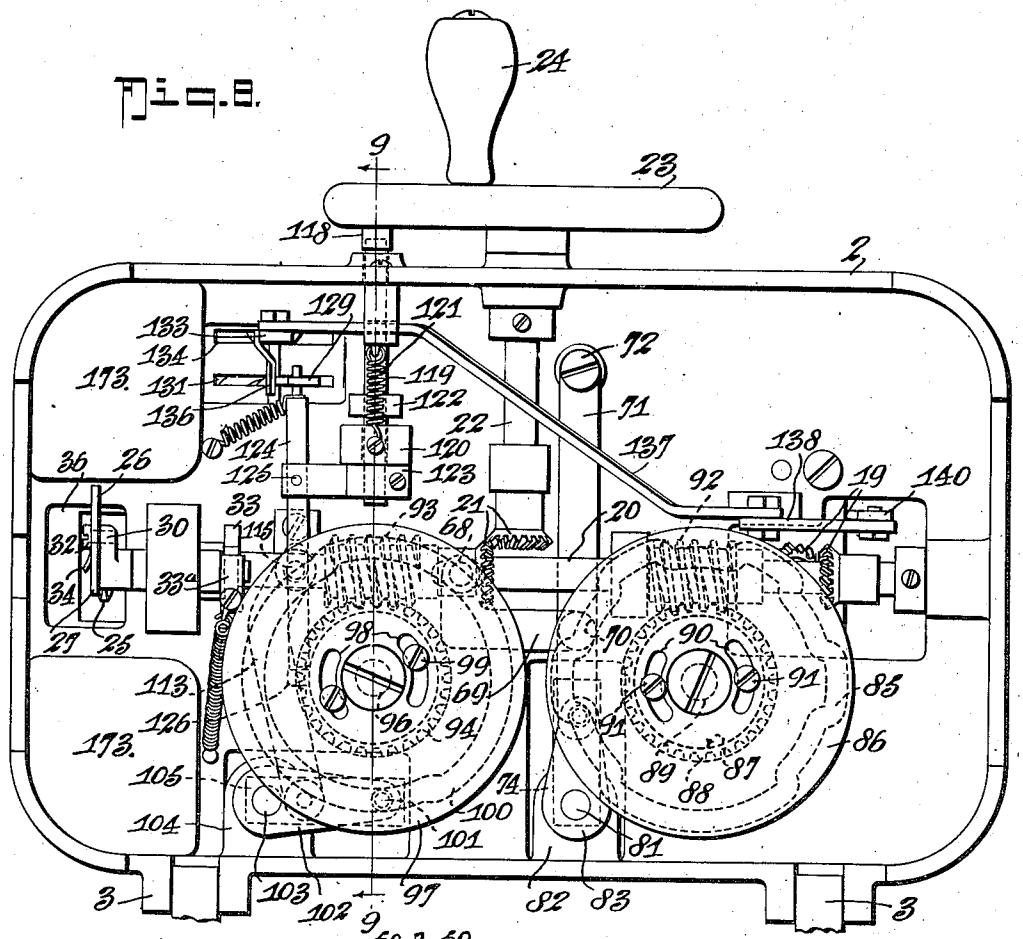
Inventor
William T. Maxant
By Cyrus A. Kehr & Swecker
his Attorneys

Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

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Fig. 8.



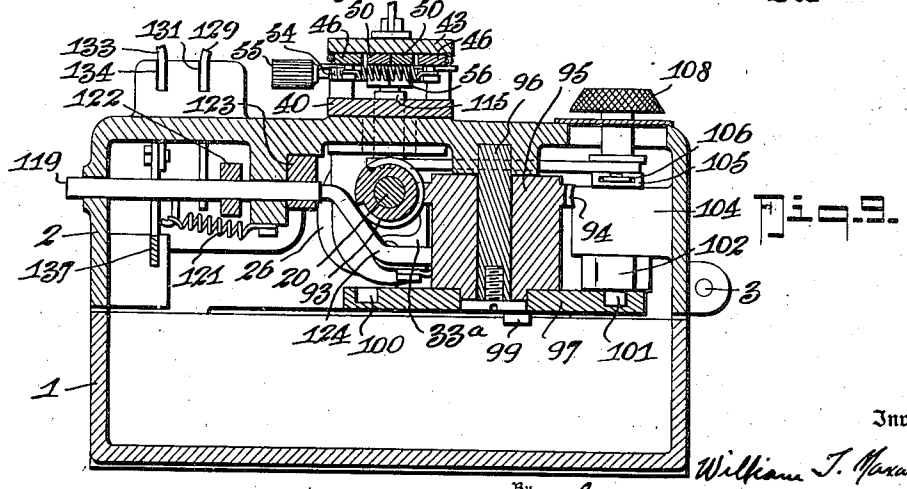


Fig. 9.

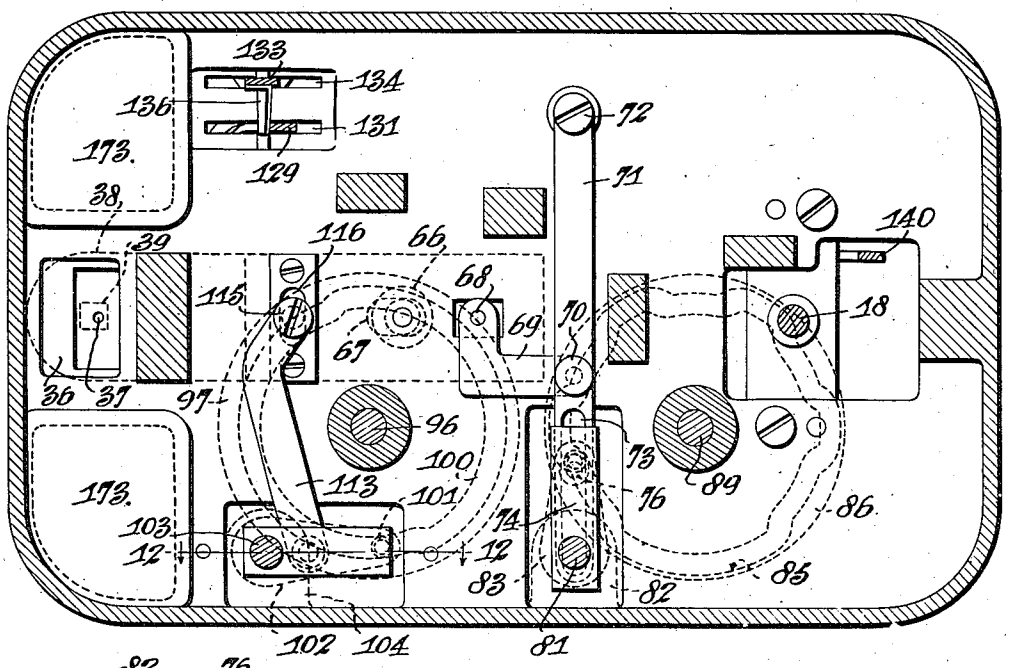
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William T. Maxant
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Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

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Fig. 10.



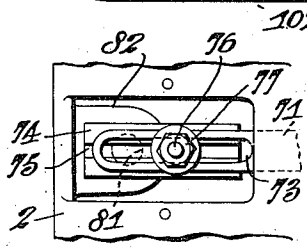


Fig. 11.

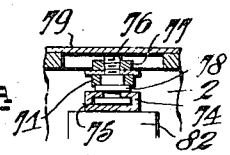


Fig. 11A.

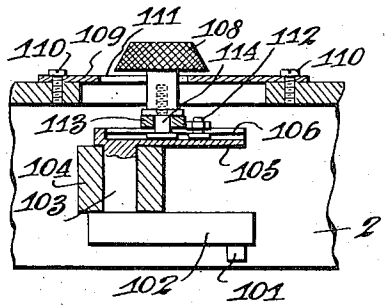


Fig. 12.

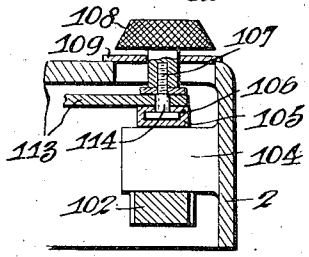


Fig. 13.

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BUTTON SEWING MACHINE

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Fig. 14.

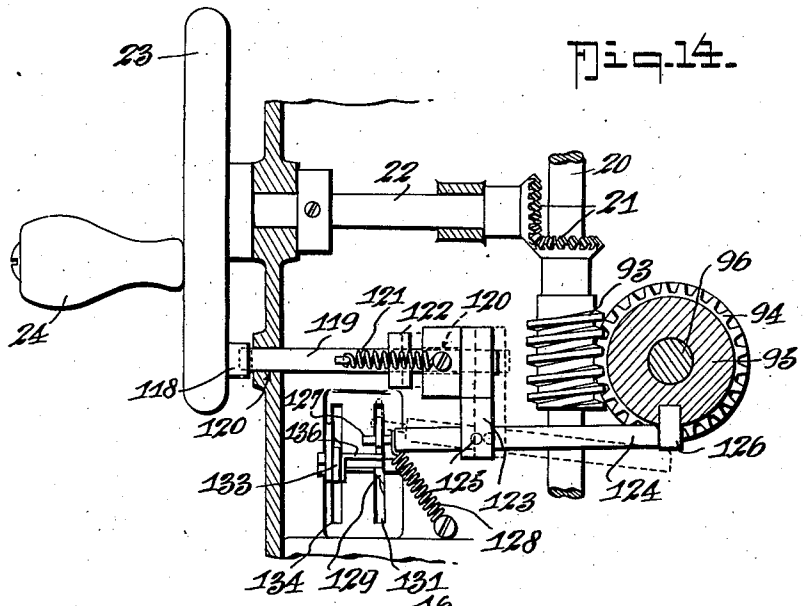


Fig. 15.

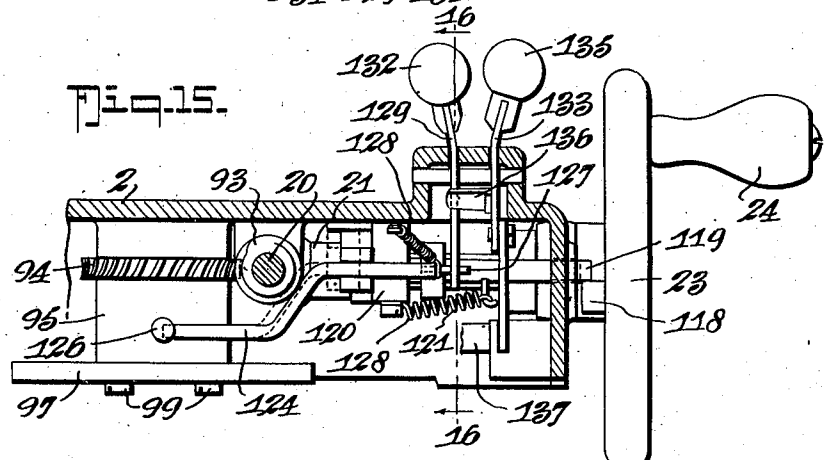
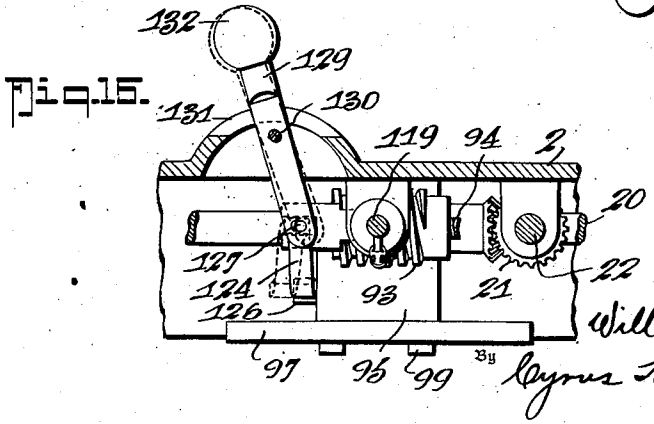


Fig. 16.



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Aug. 28, 1945. W. T. MAXANT 2,383,875

BUTTON SEWING MACHINE

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Fig. 17.

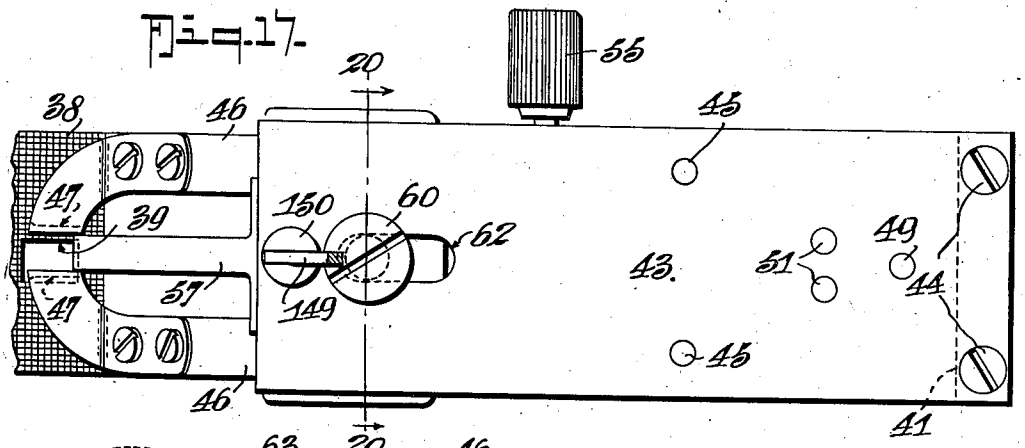


Fig. 18.

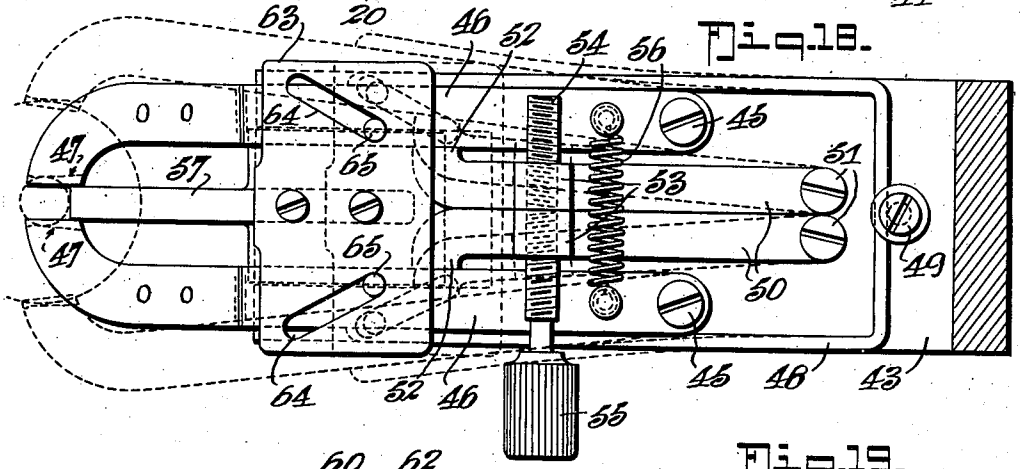


Fig. 19.

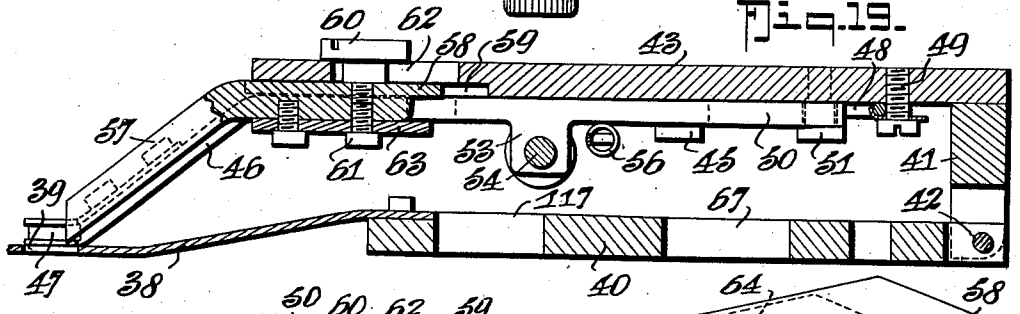


Fig. 20.

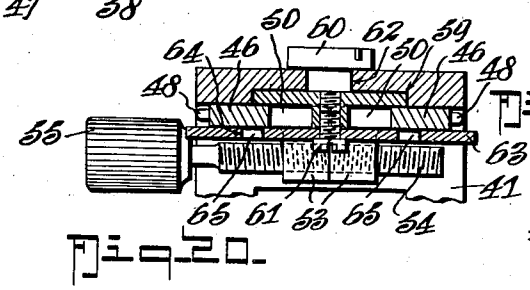
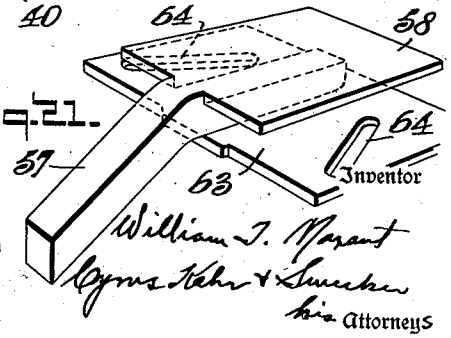


Fig. 21.



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Patented Aug. 28, 1945

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UNITED STATES PATENT OFFICE

2,383,875

BUTTON SEWING MACHINE

William T. Maxant, Ayer, Mass.

Application May 20, 1940, Serial No. 336,248

18 Claims. (Cl. 112—112)

This invention relates to an improvement in button sewing machines of the character used for sewing buttons on work of various kinds, particularly cloth and various articles of clothing.

The principal object of the invention is to improve machines of this character, to simplify their construction, reduce the cost of manufacture, while yet providing for the efficiency and effective application of buttons, either of the two-hole or four-hole type, to work, by the manual actuation of the machine by the operator.

The principal improved features of the machine are the following:

First: Hidden control segments for the button clamp mounted within the frame of the machine below the top level thereof, where said segments are protected by covers which are removable for adjustment of the segments therethrough but which keep the segments free from dust, dirt, and other foreign matter, and yet present a neat appearance to the machine.

Second: An improved button clamp which is constructed for ready adjustment to accommodate buttons of different sizes as desired.

Third: Button clamp lifting mechanism which coordinates the raising and lowering of the button clamp with the control of the thread clamp and the thread slack lever, whereby one operation of this mechanism operates all three elements, and the mechanism is operated through the standard and arm of the machine where it is effectively protected thereby.

Fourth: Improved and efficient stop motion for the machine acting on a gear attached to the drive shaft and on the hand wheel providing for the effective control of the machine at the end of the sewing operation, which is nevertheless released for repeat operation by a handle or lever which operates through the top of the base frame.

Fifth: Operation of the machine from a head-on position made possible by the location of the hand wheel at one side of the machine instead of at the end thereof, with its shaft arranged at right angles to the hook or drive shaft and geared thereto, which makes possible better vision by the operator at the point of sewing and more efficient movement of the material through the machine.

Sixth: A thread finger which is removable for ready replacement in the event of breakage without the necessity for removal of the entire rock shaft and its associated mechanism in the event of breakage of the finger.

Seventh: A flange attached to the thread finger to keep the needle from deflecting from the point of the looper.

Many other improved features are incorporated in the machine relating to the various operating parts of the mechanism, the assembly thereof and the manner of handling the work in the operation.

These features are incorporated in a preferred embodiment of the invention illustrated in the accompanying drawings in which—

Fig. 1 is a side elevation of the improved sewing machine;

Fig. 2 is a detail vertical sectional view through a portion of the sewing head and thread clamp;

Fig. 3 is a detail horizontal sectional view through the thread clamp;

Fig. 4 is a front end elevation of the button sewing machine;

Fig. 5 is a top plan view thereof;

Fig. 6 is a longitudinal vertical sectional view therethrough with parts in elevation;

Fig. 7 is a disassembled perspective view of the thread finger and its mounting;

Fig. 8 is a bottom plan view of the base frame and operating mechanism;

Fig. 9 is a vertical sectional view therethrough substantially on the line 9—9 of Fig. 8;

Fig. 10 is a horizontal plan sectional view of the cam operating mechanism for the button clamp;

Fig. 11 is a detail plan view of a portion of the button clamp actuating means;

Fig. 11a is a detail cross section therethrough;

Fig. 12 is a detail vertical sectional view through the adjusting means for the swinging movement of the button clamp, substantially on the line 12—12 of Fig. 10;

Fig. 13 is a similar view at right angles thereto;

Fig. 14 is a detail horizontal sectional view in bottom plan with parts in elevation, of the machine stop motion.

Fig. 15 is a vertical sectional view therethrough;

Fig. 16 is a similar view at right angles thereto, substantially on the line 16—16 of Fig. 15;

Fig. 17 is a top plan view of the button clamp removed;

Fig. 18 is a horizontal sectional view therethrough;

Fig. 19 is a vertical sectional view therethrough;

Fig. 20 is a cross sectional view therethrough, substantially on the line 20—20 of Fig. 17; and

Fig. 21 is a detached perspective view of the button stop member and its supporting plate.

Referring to the drawings in detail, the machine is designed for manual operation and is

adapted to be supported on a table, workbench, or the like, for which purpose it is provided with a supporting machine bed designated generally by the numeral 1. Mounted on the machine bed 1 is a hollow base 2 connected therewith by pivots 3 (Figs. 4 and 5) for swinging movement of the base frame 2 away from the machine bed 1, to gain access to the operating parts of the machine housed within said base frame. Normally the base frame is held in a closed position on the machine bed 1, by a removable screw or pin 4 which extends through an orifice in one side of the base frame 2 into a lug 5 attached to the machine bed 1, and extending upwardly within the base frame 2.

The base frame 2 has mounted on one end thereof an upstanding standard portion 6 of a sewing machine arm, from the upper end of which standard 6 extends the lateral arm portion 7, carrying at the free end thereof the usual sewing head 8. These parts comprising the standard 6, arm portion 7 and sewing head 8 are preferably cast integral, and either secured rigidly to the base frame 2, or cast integral therewith. The outer side of the sewing head 8 is usually open, but closed by a cover plate 9.

As shown in Fig. 6, the sewing head 8 has the usual needle bar 10, mounted therein in a guide sleeve 11 for reciprocating movement, carrying a needle 12 at the lower end thereof.

For the purpose of reciprocating the needle bar 10 axially thereof, a link 13 (Fig. 6) has one end thereof pivotally connected at 14 with the needle bar 10, while the opposite end thereof is pivotally connected with a crank arm 15 mounted on the forward end of a shaft 16 that extends lengthwise in the arm portion 7 and is journaled in bearings therein and in the standard 6. The shaft 16 is connected through bevel gearing 17 with the upper end of a vertical shaft 18 extending through and journaled in bearings in the arm 6, for rotating said shaft 16 to cause reciprocating movement of the needle bar. The lower end of the shaft 18 is connected through bevel gearing 19 with a drive shaft 20 that extends horizontally in the base frame 2 and is journaled in bearings therein. The drive shaft 20 is connected through bevel gearing 21 (Fig. 8) with a jack shaft 22, extending at right angles thereto through a side of the base frame 2, within which said jack shaft is journaled. A hand wheel 23 is fixed to the outer end of the jack shaft 22, externally of the base frame 2, as shown in Figs. 1, 4, 5 and 9, and said hand wheel 23 is provided with a projecting handle 24 thereon in position to be grasped by the operator at one side of the machine to rotate the hand wheel 23 and operate the drive shaft 20 and the several parts of the machine to accomplish the sewing operation.

The forward end of the drive shaft 20 carries the usual rotary looper 25 (Fig. 6) positioned below the top face of the base frame 2 in position to cooperate with the needle 12 upon reciprocating movement of the needle bar 10 to catch and retain the thread carried downwardly by the needle through the button and the material to which it is applied. Cooperating with the looper 25 and the needle 12 is a thread finger 26, shown in detail in Fig. 7. This thread finger, as shown, consists of a hook-shaped element having a hub portion 27 with an orifice 28 therein adapted to fit over a projection 29 on one side of a bracket 30 fixed on a rock shaft 31. The hub portion 27 of the thread finger is detachably secured to the bracket 30 by a set screw 32 that extends through the thread finger and into the bracket, upon the removal of which set screw the thread finger may be readily removed from the bracket 30 for replacement upon breakage or otherwise. The rock shaft 31 is operated in suitably timed relation by the drive shaft 20 which has a cam 33 thereon acting against a follower 33a on the rock shaft 31 and yieldingly pressed thereagainst. The free end of the thread finger 26 is provided with a laterally deflected beveled flange 34 having a prong 35 on one side thereof in position to take the thread loop and hold it in proper position for the needle to pass therethrough on its downward stroke, the needle passing down just back of the prong 35. Said flange 34 and prong 35 are formed integral with the thread finger 26.

The thread finger 26 not only holds the thread out of the way of the descending needle, but it also pushes the thread ahead of the looper 25, so the new loop is pushed through the preceding loop, thus making a chain stitch. The thread finger 26 has the prong 35 thereon to catch the thread at the eye of the needle, while the old loop slides over the hump or back of the thread finger. If the prong 35 should break off, due to tangled threads, the thread finger can be replaced readily, even by an inexperienced operator, without disturbing the timed relation of the machine.

Button clamp

Mounted in the top face of the base frame 2 is a plate 36 rigidly secured thereto, as shown in Figs. 4 and 6, and having an orifice 37 therein for passage of the needle downwardly through the base frame. Bearing upon the plate 36 is a cloth plate 38, having an enlarged throat 39 therein through which the needle may pass in different adjusted positions of the cloth plate 38. The plate 38 is adapted to receive and hold the cloth, garment, or other work to which the buttons are to be applied and is movable with the buttons in shifting the latter to move the holes thereof successively into registry with the needle.

For this purpose, the cloth plate 38 has its opposite end secured to a base plate 40 of a button clamp, shown in detail in Figs. 17 to 21, and which button clamp is adapted to receive and hold the buttons in proper position to be stitched onto the work and to move the same with the work to bring the holes in the buttons into proper registry with the needle. For this purpose, the base plate 40 is slidably mounted on the top surface of the base frame 2 for both longitudinal and swinging movement as hereinafter described.

At the back end of the base plate 40 is mounted an upright support 41 pivotally connected with said base plate by a pin 42 for rocking movement of the support relative thereto. A clamping plate 43 has one end seated upon the support 41 and secured thereto by screws 44, while the opposite end of said clamping plate 43 extends forwardly over the base plate 40 and the cloth plate 38. Pivotally secured at 45 to the underside of the clamping plate 43 is a pair of button clamping jaws 46 that extend lengthwise of the clamping plate 43 substantially in parallel relation and have downturned forward ends provided with button seats 47 therein in opposed relation to slidably receive and hold the buttons in proper position for passage of the needle through the holes thereof. The clamping jaws 46 are adapted for swinging movement toward and from each other and normally are pressed inward by a spring 48, shown as formed of a single strip of spring wire, having its ends bearing against the outer sides of the clamp-

ing jaws 46 tending to hold said jaws tightly pressed against a button inserted in the button seats 47. The spring 48 is anchored intermediate the ends thereof by a screw 49 to the underside of the clamping plate 43. It is also desirable to limit the closing movement of the jaws 46 to accommodate buttons of different sizes, and yet permitting them to be pushed therebetween without requiring a separate opening movement to insert the desired button between the button seats 47. For this purpose, provision is made for positively spreading the clamping jaws 46 a predetermined distance apart by a pair of levers 50, each having one end pivotally supported at 51 on the underside of the clamping plate 43, while its opposite end is turned laterally at 52 against the inner side of the corresponding clamping jaw 46. The levers 50 are provided with lugs 53 thereon through which a screw 54 extends and has respectively right-hand and left-hand threads on opposite end portions thereof arranged for engagement with the lugs 53, so that upon rotation of the screw by its enlarged thumb head 55, the levers 50 are positively moved toward or from each other to accomplish a spreading or closing movement of the clamping jaws 46. A coiled spring 56 is connected between the clamping jaws 46 to supplement the spring 48 and tending to draw said jaws together and hold them against the out-turned ends 52 of the levers 50 in retracted positions as far as permitted by said levers. Thus it will be evident that upon turning the screw 54, the clamping jaws 46 may be spread apart to accommodate buttons of different sizes or drawn together under the influence of the springs 48 and 56, as indicated in the full line and dot line positions, respectively, in Fig. 18.

Mounted between the engaging elements 47 of the clamping jaws 46 is a button stop 57, which is adapted to be moved lengthwise upon adjustment of the clamping jaws 46, according to the different sized buttons to be received therebetween. This button stop 57 is in the form of a depending arm rigidly secured to or integral with a supporting plate 58, slidably mounted in a guide 59 in the underside of the clamping plate 43 and held therein by a large headed nut 60 on a screw 61, passing through the arm 57 and plate 58, which nut 60 has a hub portion slidably received in a slot 62 in the clamping plate 43 for guiding the longitudinal movement of the depending stop arm 57. For causing said longitudinal movement of the arm 57 corresponding with the spreading or closing movement of the clamping jaws 46, a plate 63 is secured to the underside of the arm 57 and has diverging slots 64 therein receiving pins 65 attached to the clamping jaws 46, whereby opening or closing movement of the clamping jaws causes longitudinal sliding movement of the plate 63 and the arm 57 connected therewith.

Button clamp actuation

Provision is made for vibrating the button clamp and the cloth plate 38, both longitudinally and transversely relative to the needle between successive strokes thereof when it is desired to sew four-hole buttons to the cloth, or longitudinally only when it is desired to sew two-hole buttons thereon, so that the stitches will be caused to pass through the holes of the button and into the cloth in a predetermined number of needle strokes. For four-hole buttons, the button should be shifted so as to present the holes of one pair and then the holes of the other alternatively in the path of the needle, so that the total number of stitches will be divided between the holes of each pair and between the respective pairs during the stitching cycle. For this purpose, the base plate 40 is mounted for sliding and swinging movement relative to the top surface of the base frame 2, but guided by a screw 66, extending through a slot 67 in said base plate 40.

For providing longitudinal movement for the button clamp and cloth plate 38, a pin 68 is connected with the base plate 40 of the button clamp and extends through the top of the base frame 2, as shown in Figs. 6 and 10. A link 69 has one end connected with the pin 68 and the opposite end pivoted at 70 to a lever 71 intermediate the ends of said lever, as shown in Fig. 10. The lever 71 extends transversely of the base frame 2, and one end of said lever is pivoted at 72 to the underside of the top of the base frame 2, while the opposite end of said lever is provided with a slot 73 therein. Said slotted end of the lever 71 is arranged in overlying relation with a rock arm or crank segment 74, having an undercut groove 75 in the upper face thereof.

A bolt 76 has the head thereof received in the undercut groove 75 of the rock arm 74, which bolt 76 extends upwardly through the groove and the slot 73 in the lever 71, having a nut 77 thereon for tightening said bolt and for holding the same against relative longitudinal displacement in the slot 73 and groove 75. A spacer 78 is provided on the bolt separating the lever 71 from the rock arm 74 for freedom of relative turning movement thereof and to provide a pivotal connection therebetween, even when the nut 77 is tightened, which tightening action serves to hold the pivot point in a set position relative to these parts. Upon loosening the nut, the pivot formed by the bolt 76, may be shifted lengthwise of the slot 73, thereby changing the effective length of throat of the rock arm 74 to vary the movement of the link 69 and button clamp for different adjusted positions of the pivot bolt 76.

Thus, by moving the pivot bolt 76 inwardly relative to the lever 71 (toward the pivot point thereof), the effective length of the rock arm 74 is increased to increase the stroke of the link 69, while movement of the pivot bolt 76 in the opposite direction shortens the length of the stroke. This adjustment may be made to accommodate for the spacing of the holes in different sized buttons. The location of this pivot just beneath the top of the base frame provides for ready accessibility thereof for making this adjustment when desired.

A cover plate 79 (Fig. 5) is arranged over the adjustable portion of the operating means just described and removably held in place by screws 80 to provide for ready removal thereof when desired. This will be necessary only when there is to be a change in buttons having holes differently spaced from each other, but when the pivot bolt 76 is adjusted to a set position, it will remain in place and properly regulate the lengthwise shifting of the button clamp to move the holes in the buttons into proper registry with the needle between successive strokes thereof.

The rock arm 74 is mounted on a stub shaft 81 journaled in a bracket 82, rigidly fixed to the inner side of the base frame 2. The lower end of the stub shaft 81 has an arm 83 fixed thereon carrying a pin 84 which extends into a cam groove 85 formed in a disc 86, as shown in Figs. 6, 8 and 10. The disc 86 is rigidly secured to the hub 87 of a worm gear 88 journaled on a pin 89, rigidly fixed to the top of the base frame 2.

Slots 90 are formed in the disc 86 and receive set screws 91 that extend through the slots into the hub 87 for adjusting the position of the disc 86 and its cam groove 85 to operate the button clamp in properly timed relation. The worm wheel 88 meshes with a worm 92 secured to the drive shaft 20.

The drive shaft 20 also carries a second worm 93 (Fig. 8) which meshes with a worm gear 94, having an elongated hub 95 journaled on a pin 96, rigidly fixed to the cover of the base frame 2, as shown in Fig. 10. The hub 95 also carries a cam disc 97 adjustably mounted thereon by slots 98 and set screws 99 that extend through the slots into the hub 95 for adjusting the position of the cam disc 97 relative thereto, as may be desired to operate the cam disc in properly timed relation. The cam disc 97 is provided with a cam groove 100 therein receiving a pin 101 on an arm 102 which is secured to the lower end of a stub shaft 103, journaled in a bracket 104, rigidly fixed to the inner side of the base frame 2, beside the bracket 82 described above.

The upper end of the stub shaft 103 has rigidly secured thereto a laterally extending rock arm or crank segment 105 (Fig. 12) provided with an undercut cam groove 106 therein. A pivot bolt 107 has the head thereof received in the groove 106 for sliding movement lengthwise thereof and extends upwardly therefrom with a thumb nut 108, threaded on said bolt 107. The rock arm 105 is also located beneath an opening in the top of the base frame 2 which opening is normally covered by a plate 109, removably held in place by screws 110 for removal of the plate to gain access to the control segments therebelow. A slot 111 is formed in the cover plate 109 through which a portion of the thumb nut 108 extends. The pivot bolt 107 is adjustable lengthwise of the groove 106 between the closed end thereof and an abutment 112, shown as a clamping bolt engaging in the groove and adjustable lengthwise thereof to regulate the length of adjustment of the pivot bolt 107, in an outward direction, said pivot bolt being adjustable inwardly to a position coaxially with the stub shaft 103.

As shown in Figs. 10, 12 and 13, a link 113 has one end thereof pivotally connected with the rock arm 105 by the bolt 107, with a bushing 114, surrounding the bolt for pivotal movement of the link thereon, even when the thumb nut 108 is tightened to hold the bolt in a firmly clamped position in the groove 106. The opposite end of the link 113 is fixed to a pin 115 extending through a slot 116 in the top of the base frame 2 and into a slot 117, extending lengthwise in the base plate 40 of the button clamp. Thus rotation of the cam disc 97 will cause swinging movement of the rock arm 105 and when the pivot bolt 107 is out of axial alignment with the stub shaft 103, this will impart reciprocating movement to the link 113, thereby oscillating the button clamp transversely about its pivot 66 to shift the button from side to side in obtaining proper registry of the holes therein with the needle.

The cam discs 86 and 97 have the grooves 85 and 100, respectively, properly shaped with suitable dwells and shoulders, to impart the respective movements to the button clamp, so as to present first one pair of holes in the button in registry with the needle during operating movements thereof for a predetermined number of needle strokes and then to shift the button by action of the cam disc 97, so as to present the other pair of holes in positions to receive the needle, and then to shift the button back to its initial position just before the completion of the stitching for final attachment to the fabric, which movements occur in properly timed relation with the operation of the needle and the other parts of the machine by reason of the operation of the cam discs directly from the drive shaft 20. Any desired adjustment of the cam discs may be made by the screw and slot connections of the discs with the gear hubs to adjust the timing thereof. When the pivot bolt 107 is shifted into axial alignment with the stub shaft 103, the rotation of the cam disc 97 will not impart any movement to the link 113, and the button clamp will be reciprocated lengthwise while held against lateral oscillating movement for stitching a two-hole button to the material. The grooves of the cams are so formed as to cause the needle to descend twice into the same hole of the button at the completion of the stitching cycle to produce a button knotting stroke.

Stop motion

At the completion of the button stitching cycle, provision is made for automatically stopping the machine with the needle elevated or withdrawn from the button to permit ready removal of the material and button from the machine. For this purpose, the hand wheel 23 is provided with an inwardly extending stop pin 118 in position to be engaged by a sliding bolt 119 (Figs. 8, 14 and 15) mounted in bearings 120 in the base frame 2. A coiled spring 121 is connected with one of the bearings 120 and with the bolt 119 tending to hold said bolt in a retracted position as indicated in dotted lines in Fig. 14, where it is withdrawn out of the path of movement of the stop pin 118 and an abutment 122 is secured on the bolt 119 in position to engage a side of the bearing 120 and limit the inward movement of the bolt relative thereto.

The inner end of the bolt 119 is rigidly secured to a yoke 123 which extends laterally therefrom and receives therein a lever 124 which is pivoted in the yoke at 125, intermediate the ends of said lever. One end of the lever extends in position to be engaged by a pin 126, rigidly fixed to the hub 95, while the opposite end of said lever has a reduced portion 127, with which a coiled spring 128 is connected, which coiled spring normally tends to swing the lever 124 to the full line position shown in Fig. 14, in which the inner end thereof is in position to be engaged by the pin 126 on the hub 95. Thus, the hub 95 may be rotated through a complete revolution by a turning movement of the hand wheel 23, during which said hand wheel will be turned through several revolutions but at the completion of the single revolution of the hub 95, its pin 126 will engage the inner end of the lever 124 and move said lever lengthwise bodily to thereby slide the bolt 119 outwardly from the base frame 2 into the path of the stop pin 118 and thus limit the turning movement of the hand wheel 23 and of the operating shaft 20. These parts are arranged so that the operating shaft is stopped when the needle is in its elevated position withdrawn from the button and cloth.

For releasing the bolt 119, a hand lever 129 is provided as shown in Fig. 16, which hand lever is pivoted at 130 and extends through a slot 131 in the top of the base frame 2, being provided with a knob 132 on the upper end thereof. The

lower end of the hand lever 129 engages pivotally with the reduced end 127 of the lever 124, the connection being loose to permit lengthwise movement of said reduced end through an orifice in the hand lever 129 to accommodate for the lengthwise movement of the lever 124. The hand lever 129 may be moved to swing the lever 124 from the full line position in Fig. 14, to the dotted line position therein, upon which swinging movement the spring 128 is arranged to pull inwardly on said lever 124 to carry its inner end partially over the end of the pin 126 and thus release it from engagement by the pin which is facilitated by the inward pull of the coiled spring 121, which acts to withdraw the bolt 119 inwardly, out of the path of the stop pin 118.

To recapitulate, with the lever bar 124 in the full-line position in Fig. 14, the rotation of the gear 94 by the hand wheel 23 causes the movement of the pin 126 into contact with the end of the lever bar 124, moving the latter endwise to the left in Fig. 14. The lever bar 124 is connected by the block 123 with the bolt 119. Thus, the aforesaid movement of the lever bar 124 pushes the bolt 119 forward so that its outer end projects into the path of the stop pin 118 on the hand wheel, thereby blocking further rotation of the hand wheel.

When the operation of the machine is thus blocked, a forward pull on the lever 129 will swing the lever bar 124 on its pivot 125 to disengage the end of said lever bar 124 from the pin 126. The spring 121 acting on the bolt 119 tends to move the same, and also the lever bar 124, endwise to the dotted line position in Fig. 14, when the lever bar is thus released by the pin 126. This action causes the lever bar 124 to overlie the end of the pin 126, bearing thereagainst. In this position, the bolt 119 remains out of blocking position, and the machine may be operated then by the hand wheel through another revolution. As the pin 126 rotates from under the lever bar 124, the spring 128 will act to move the free end of the lever bar 124 back against the hub 95 of the gear where it will be in position for re-engagement by the pin 126 upon completion of said revolution, repeating the stop action as described.

Button clamp raising and lowering mechanism

Provision is made for the manual raising and lowering of the button clamp away from the cloth plate 38 at the completion of the stitching operation and for lowering the clamp thereon before stitching, at the will of the operator. For this purpose, a second handle lever 133 is pivotally mounted on the pin 130, beside the hand lever 129, projecting up through a slot 134 in the top of the base frame 2, with a knob 135 on the upper end of said lever, as shown in Figs. 1 and 5.

The handle lever 133 is moved to the left in Fig. 1, for raising the button clamp at the end of the sewing cycle, after the hand wheel 23 has been stopped by the bolt 119. An arm 136 is secured to the handle lever 133 and projects laterally in overlapping relation with the shank of the handle lever 129 in position to move said handle lever and release the bolt 119 when the handle lever 133 is moved counter-clockwise in Fig. 1, to raise the button clamp. This enables the operator to accomplish both actions by one operation and leaves the machine for immediate operation upon the insertion of another button and the lowering of the button clamp. However, it is still possible for the operator to release the bolt 119 to repeat the sewing cycle on the same button, if desired, without raising the button clamp.

The handle lever 133 manipulates the button clamp through linkage that extends through the base frame 2 and upwardly through the standard 6, arm 7 and sewing head 8, as shown in Figs. 1 and 6, thus effectively confining this mechanism within the machine and simplifying this operation. The lower end of the handle lever 133 is connected with a link 137, extending to a bell-crank lever 138 pivoted in the base frame 2 at 139. The opposite side of the bell-crank lever 138 is connected through a link 140 that extends upwardly in the standard 6 to a bell-crank lever 141 pivoted at 142 at the upper end of said standard. The bell crank lever 141 is connected with one end of a link 143, the opposite end of which link 143 is provided with an enlarged orifice 144, loosely receiving a pin 145. The pin 145 is mounted on the upper end of a lever 146 extending upwardly in the sewing head 8 and pivotally supported at 147 therein, the lower end of which lever 146 projects through a slot 148 at the inner side of the sewing head 8. A link 149 connects the lower end of the lever 146 with a post 150 rigidly mounted on the clamping plate 43 of the button clamp.

The pivotal connections between the parts of this linkage enable the swinging movement of the handle lever 133 to transmit raising or lowering movement to the link 149 and post 150 for thereby raising and lowering the button clamp before or after the sewing cycle.

Thread supplying mechanism

The machine is provided preferably with a thread stand at or adjacent the back end thereof for holding a thread spool from which thread may be fed to the needle during the sewing operation.

As shown, the thread is fed through an eye in a post 151 on the top of the arm 7, thence through the usual intermittent thread tension 152, and a fixed thread tension 153, both mounted on the arm 7. A post 154 is also mounted on the arm 7 spaced from the tension 153 with an eye therein through which the thread passes to the needle.

Intermediate the thread tension 153 and the post 154 is an upstanding pull-off arm 155 pivotally supported at 156 on the top of the machine arm 7 and having a bell crank arm portion 157, extending laterally from said pivot, as shown in Fig. 5, beside an upstanding pin 158 attached to the link 143 (Fig. 6). The pin 158 is arranged within the arms of the bifurcation forming the bell crank lever that supports the pull-off arm 155, in position to bear against said arms alternately upon lengthwise movement of the link 143, to move the pull-off arm 155 alternately in opposite directions upon raising or lowering movement of the button clamp.

After passing around the pull-off arm 155 and through the post 154, the thread extends through an eyelet 159 at the upper end of the plate 9, thence downwardly to a thread clamp supported on said plate, as shown in Figs. 2 and 3.

This thread clamp comprises a body portion 160 having a vertical opening 161 therethrough for the downward passage of the thread. The thread clamp body 160 is provided with a hub 162 in which is slidably mounted a clamping member 163 having a clamping face 164 normally disposed at the inner side of the opening 161 in position to coact with the opposite side of said

opening to apply a clamping action to the thread passing therethrough, when said clamping member 163 is pressed outwardly. A pin 165 is attached to the clamping member and guided in the body 160 to coact with the hub 162 for maintaining the clamping member in proper position. The clamping member 163 has a pin 166 slidably mounted in the inner side thereof with a coiled spring 167 interposed between said pin 166 and the clamping member 163, normally tending to press said pin 166 in an inward direction relative thereto. The pin 166 is arranged in position to be engaged by a lateral abutment 168 carried on a side of the lever 146.

Thus, swinging movement of the lever 146 to raise the button clamp will apply pressure through the pin 166 and spring 167 to the clamping member 163 for clamping the thread between the face 164 and the opposite side of the thread opening 161, thereby holding the thread securely. The parts are so arranged that this clamping action will occur just when the button clamp is started in an upward direction so that the continued raising movement thereof will cause a breakage of the thread after the knotting stroke has been made, to release the sewed button so that it may be removed from the machine ready for another operation.

Simultaneously with the raising of the button clamp, the same motion of the operator will cause movement of the thread pull-off arm 155 in a counter clockwise direction in Fig. 5, to pull thread through the tensions, so as to provide sufficient length of thread to start a succeeding sewing operation without danger of the thread being pulled back through the needle eye which might cause unthreading thereof during the initial sewing strokes.

From the thread clamp passageway 161, the thread extends around a thread guide 169 on the face plate 9, thence through an eyelet 170, secured to the needle bar 10 and extending through a slot 171 in the face plate 9, as shown in Figs. 4 and 6. From the eyelet 170, the thread extends downward through an orifice 172 in the face plate 9, thence to the eye of the sewing needle 12.

Operation

Before commencing the sewing operation, it is necessary for the operator to make necessary adjustments according to whether a two-hole button of a four-hole button is to be sewed onto the material, which variation may be made readily by sliding movement of the thumb nut 108, as indicated in Fig. 12, into or out of axial alignment with the stub shaft 103, to regulate the lateral oscillation of the button clamp during operation of the machine or to hold it in a central position against lateral oscillation. The extent of lateral oscillation for a four-hole button may be varied according to the position of the pivot bolt 107, which regulates the effective length of the rock arm 105. Similarly the length of throw of the button clamp longitudinally is varied by adjusting the position of the pivot bolt 76 (Fig. 11), which adjustment may be made readily upon removal of the cover plate 79.

Before starting the sewing operation, the material is placed beneath the button clamp upon the cloth plate 38 when the button clamp is in an elevated position. The button is then inserted into the clamping jaws 46, and the handle lever 133 is moved in a clockwise direction in Fig. 1 to lower the button clamp onto the work. The linkage connected with the handle lever 133 also functions during said lowering movement to release the thread clamp at 164 and to return the thread pull-off arm 155 to an idle position.

The hand wheel 23 is then rotated by the operator (the bolt 119 having been previously withdrawn upon the raising movement of the button clamp), the drive shaft 20 is operated to accomplish the stitching of the button to the material, in the usual way. The needle is manipulated a predetermined number of stitches placed alternately through the holes of the button as the button is shifted by movement of the thread clamp by one or both of the cam discs 86 and 97. With a four-hole button, a predetermined number of stitches are placed alternately through one pair of holes in the button, then the button is moved automatically to present the other pair of holes and the stitching is continued until just before the completion of the stitching cycle when the button is shifted back to the first pair of holes, the needle taking two strokes through one hole at the completion of the cycle to provide the knotting stroke.

The complete sewing cycle involves rotation of the hand wheel 23 through a sufficient number of turns to rotate the cam discs 86 and 97 through one revolution, whereupon the pin 126 on the hub of the worm gear 94 shifts the sliding bolt 119 into the path of the stop pin 118, attached to the hand wheel 23 and stops the sewing operation just after the knotting stitch has been formed and with the needle raised to an elevated position out of the work and button.

Thereafter, the operator merely pulls forward on the handle lever 133, first to clamp the thread at the thread clamp face 164 and then to raise the button clamp, breaking the thread, as well as manipulating the pull-off arm 155. The work may then be removed or shifted to another position ready for the sewing of another button.

Button pockets are preferably provided at 173, cast directly in the top of the base frame 2, and located at the front end of the machine on both sides of the button clamp for ready access by the operator.

I claim:

1. In a hand operated button sewing machine, the combination of an elongated hollow base, a hollow standard projecting upwardly from one end of the base and from the upper end of which extends a hollow arm having a needle head above the opposite end of the base, an elongated button clamp extending lengthwise of the base and having an operative portion beneath the head, a needle operatively supported in the head, needle operating means extending through the standard and arm, a drive shaft in the base operatively connected with said operating means, a jack shaft having a driving connection with the drive shaft and extending transversely of the base in a position between the standard and head, and a hand crank mounted on the jack shaft for convenient arm reach of an operator facing lengthwise of the base at the head end of the machine.

2. In a button sewing machine, the combination of a base, a hollow standard and lateral arm portion carried by the base, sewing means mounted in the arm portion, a button clamp mounted on the base for raising and lowering movements relative thereto, linkage extending through the base, standard and arm and operatively connected with the button clamp for raising and

lowering said clamp, and a hand lever pivotally mounted in the base and having an actuating portion thereof extending through the top of said base externally of the standard to a point above the base and having another portion thereof connected with said linkage for actuating the same.

3. In a button sewing machine, the combination of a base, a hollow standard and lateral arm portion carried by the base, sewing means mounted in the arm portion, a button clamp mounted on the base for raising and lowering movements realtive thereto, means extending from the base through the standard and arm portion and operatively connected with the button clamp for raising and lowering said clamp, and a hand lever pivotally mounted in the base and having an actuating portion thereof extending through the top of said base externally of the standard adjacent the sewing means to a point above the base and having another portion thereof connected with said raising and lowering means for actuating said means.

4. In a button sewing machine, the combination of a base, a hollow standard and arm carried by the base, sewing means carried by the arm, a button clamp mounted on the base for raising and lowering movements relative thereto, means extending from the base through the standard and arm and operatively connected with the button clamp for raising and lowering said clamp, said base having a slot therein adjacent the button clamp, and a hand lever pivotally mounted in the base and projecting upwardly through said slot to a point above the base for manipulation from over the base at a point adjacent the button clamp, said hand lever being connected with the raising and lowering means.

5. In a button sewing machine, the combination of a base, a hollow standard and arm carried by the base, sewing means carried by the arm, a button clamp mounted on the base for raising and lowering movements relative thereto, means extending from the base through the standard and arm and operatively connected with the button clamp for raising and lowering said clamp, and a hand lever upstanding from the base and pivoted thereon, said lever being connected with the raising and lowering means.

6. In a button sewing machine, the combination of a base, a hollow standard and arm carried by the base, sewing means carried by the arm, a button clamp mounted on the base for raising and lowering movements relative thereto, means extending from the base through the standard and arm and operatively connected with the button clamp for raising and lowering said clamp, and a hand lever upstanding from the upper surface of the base adjacent the button clamp and being pivoted to the base for swinging movement, said lever being connected with the raising and lowering means for manipulating the latter.

7. In a button sewing machine, the combination of a base, a hollow standard and arm carried by the base, said arm having a hollow head at the free end thereof, sewing means carried by the head, a button clamp mounted on the base for raising and lowering movements relative thereto, said head having a slot in a side thereof, a lever pivotally mounted in the head with an end extending through said slot, a link connecting said end of the lever with the button clamp for raising and lowering the same, and actuating means connected with said lever and extending through the standard and arm.

8. In a sewing machine, the combination of a base having a slot in the top thereof, work-holding means mounted on the base for raising and lowering movements relative thereto, a lever pivotally mounted in the base with an actuating portion thereof extending upwardly thereof through said slot in the base in upstanding relation within convenient arm reach from the work-holding means and arranged for manual actuation, and means connecting said lever with the work-holding means for raising and lowering said means upon actuation of the lever.

9. In a sewing machine, the combination of a base supporting an arm having a sewing head thereon, work-holding means mounted beneath the arm for raising and lowering movements relative thereto, means extending through the arm and head for raising and lowering said work-holding means, a lever upstanding from the upper surface of the base and pivoted thereon, said lever being operatively connected with said raising and lowering means for manipulating the latter, a thread tension, a thread clamp, a thread pull-off between said clamp and tension, and means for actuating said clamp and pull-off by the raising and lowering means.

10. In a sewing machine, the combination of an arm having a sewing head thereon, work-holding means mounted beneath the arm for raising and lowering movements relative thereto, means extending through the arm and head for raising and lowering said work-holding means, a thread tension mounted on the arm, a thread clamp mounted on the sewing head, a thread pull-off mounted on the arm between the clamp and tension, and means within the head and arm operatively connected with the raising and lowering means for actuating said clamp and pull-off to draw thread through the tension when the work-holding means is raised.

11. In a button sewing machine, the combination of a base, a standard mounted on the base and carrying an arm, a sewing head carried by the arm, sewing means carried by the head, a button clamp mounted on the base, a thread clamp mounted on the sewing head, a thread tension mounted on the arm, a thread pull-off mounted on the arm between the clamp and tension, means extending through the standard and arm and operatively connected with the button clamp for raising and lowering the latter, and means for actuating said thread clamp and pull-off by said raising and lowering means.

12. In a button sewing machine, the combination of a base, a standard mounted on the base and carrying an arm, a sewing head carried by the arm, sewing means carried by the head, a button clamp mounted on the base, a thread clamp mounted on the sewing head, a thread tension mounted on the arm, a thread pull-off mounted on the arm between the clamp and tension, means extending through the standard and arm and operatively connected with the button clamp for raising and lowering the latter, means for actuating said thread clamp and pull-off by said raising and lowering means, and a lever pivotally mounted on the base and operatively connected with the raising and lowering means for actuating the latter, said lever being arranged in upstanding relation above the base adjacent the button clamp.

13. In a button sewing machine, the combination of a base, an upstanding standard and arm mounted on the base, said arm supporting a sewing head, sewing instrumentalities carried by the head and including a needle, a button clamp

mounted on the base beneath the arm for raising and lowering movements relative thereto, a thread tension mounted on the arm, a thread clamp mounted on the head through which the thread passes to the needle, a bell-crank member pivotally mounted on the arm and having an upstanding thread pull-off carried thereby, linkage extending from the base through the standard and arm and having an operative connection with the button clamp for raising and lowering said clamp, an upstanding pin connected with the linkage and extending in position to actuate the bell-crank upon actuation of the linkage, and means for operating the thread clamp by actuation of the linkage.

14. In a button sewing machine, the combination of a base, a button clamp, and means for moving said clamp in directions substantially at right angles to each other, comprising a pair of links extending substantially at right angles to each other and each pivoted at one end to the button clamp, a lever pivotally connected intermediate the ends thereof with one of the links, said lever having one end thereof pivotally supported, stub shafts having arms extending laterally therefrom, pivots connecting an end portion of the lever and an end portion of the other link with the respective arms, said pivots being adjustable lengthwise of the arms to vary the extent of actuating movements of the links, said pivots being mounted within the base beneath the top thereof, said base having openings in the top thereof over the pivots for access thereto to adjust said pivots, at least one of said pivots having adjusting means thereon extending through the top of the base, and means or actuating the stub shafts.

15. In a button sewing machine, the combination of a base, a button clamp mounted on the base, and means for moving said clamp in directions substantially at right angles to each other, comprising a pair of links arranged substantially at right angles to each other and each pivotally connected at one end with the button clamp, a lever pivotally connected intermediate its ends with one of the links, stub shafts journaled in the base and having offset arms, pivots connecting said arms respectively with the lever and the other link and adjustable lengthwise of the arms to vary the extent of movement of the links thereby, said pivots being arranged beneath the top of the base, said base having openings therein over the pivots for gaining access thereto to adjust the pivots, cover plates for said opening and detachably connected with the base, the pivot for the second-mentioned link having an adjusting device extending through the cover plate thereof for manual adjustment of said pivot, and means for actuating the stub shafts.

16. In a button sewing machine, the combination of a base, a button clamp mounted on the base, and means for moving said clamp in directions substantially at right angles to each other, comprising a pair of links arranged substantially at right angles to each other and each pivotally connected at one end with the button clamp, a lever pivotally connected intermediate its ends with one of the links, stub shafts journaled in the base and having offset arms, pivots connecting said arms respectively with the lever and the other link and adjustable lengthwise of the arms to vary the extent of movement of the links thereby, said pivots being arranged beneath the top of the base, said base having openings therein over the pivots for gaining access thereto to adjust the pivots, cover plates for said opening and detachably connected with the base, the pivot for the second-mentioned link having an adjusting device extending through the cover plate thereof for manual adjustment of said pivot, a pair of cams arranged in side-by-side relation and operatively connected with the stub shafts for actuating the same, and a drive shaft geared respectively to the cams for actuating the same.

17. A thread clamp comprising a body having a thread passageway therethrough, a clamping member slidably mounted in the body and coacting therewith to clamp a thread extending through the passageway, a pin having telescopic connections with the clamping member, and a spring interposed between the pin and the clamping member.

18. A button clamp comprising a support, a pair of button clamping jaws pivotally mounted on the support, resilient means normally tending to move the jaws toward each other, a pair of levers pivoted to the support and bearing laterally against the jaws in opposed relation to the resilient means and in position for moving said jaws, and a screw member having opposite end portions thereof screw-threaded in different directions and having said portions connected respectively with the levers for moving said levers and thereby causing opening or closing movements of the jaws upon rotation of the screw.

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