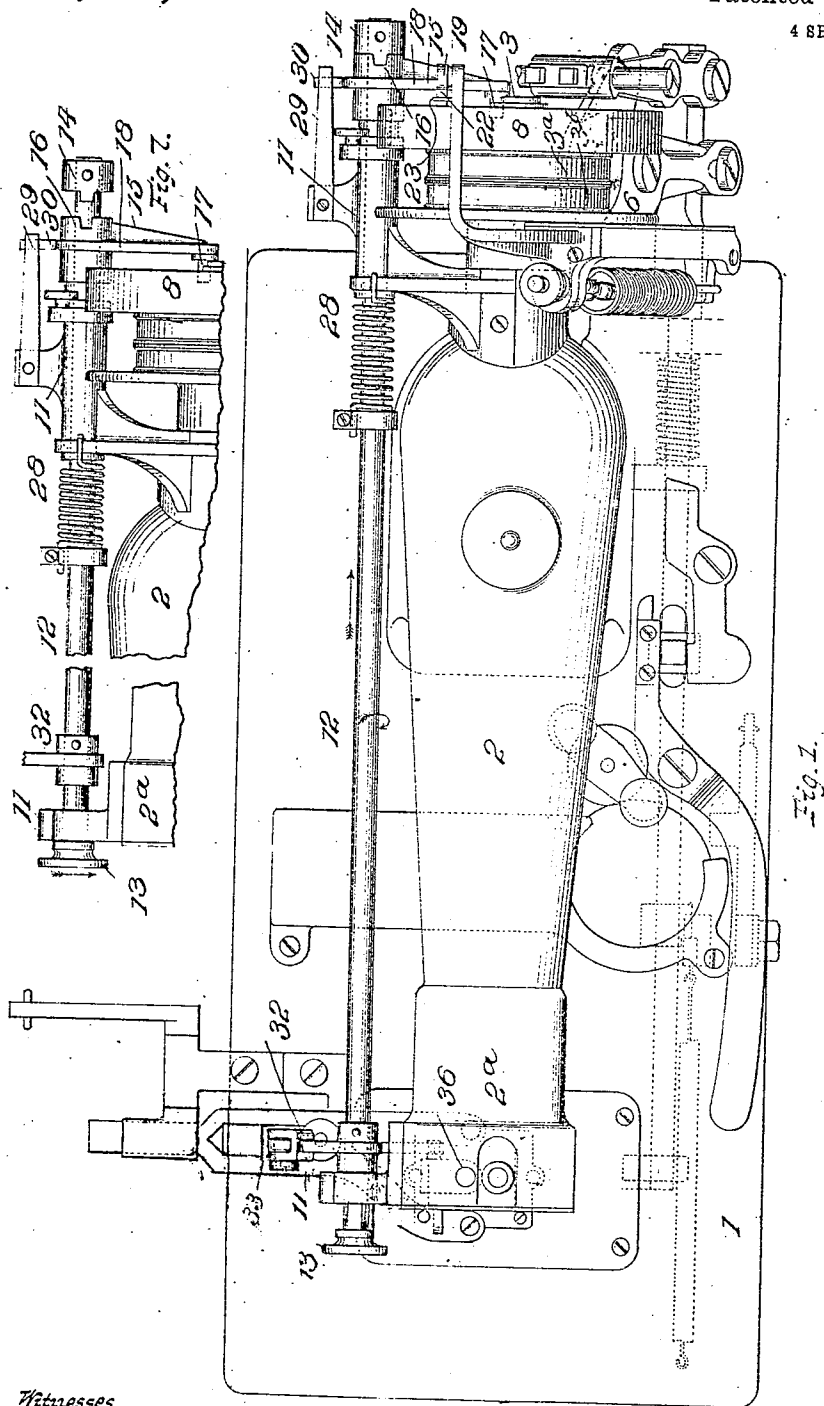


H. C. MILLER.
 BUTTONHOLE MACHINE.
 APPLICATION FILED FEB. 11, 1905

1,038,411.

Patented Sept. 10, 1912.

4 SHEETS—SHEET 1.



Witnesses.

G. R. Thomas
 Louis H. Schmidt

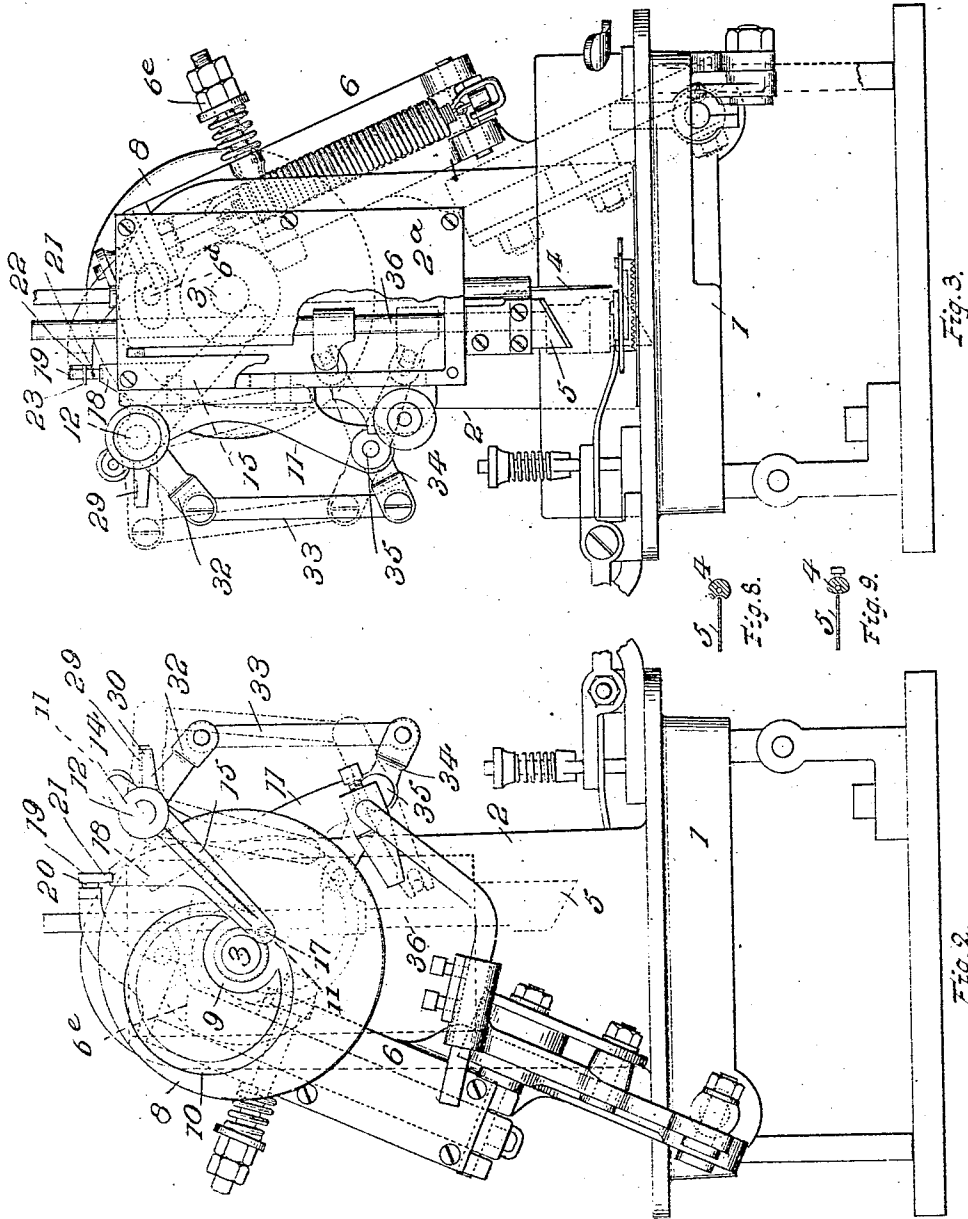
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4 SHEETS—SHEET 2.

1,038,411.



Witnesses.

Louis H. Schmitt

Chas. Morris

Inventor.

H. C. Miller

W. Miller 1174.

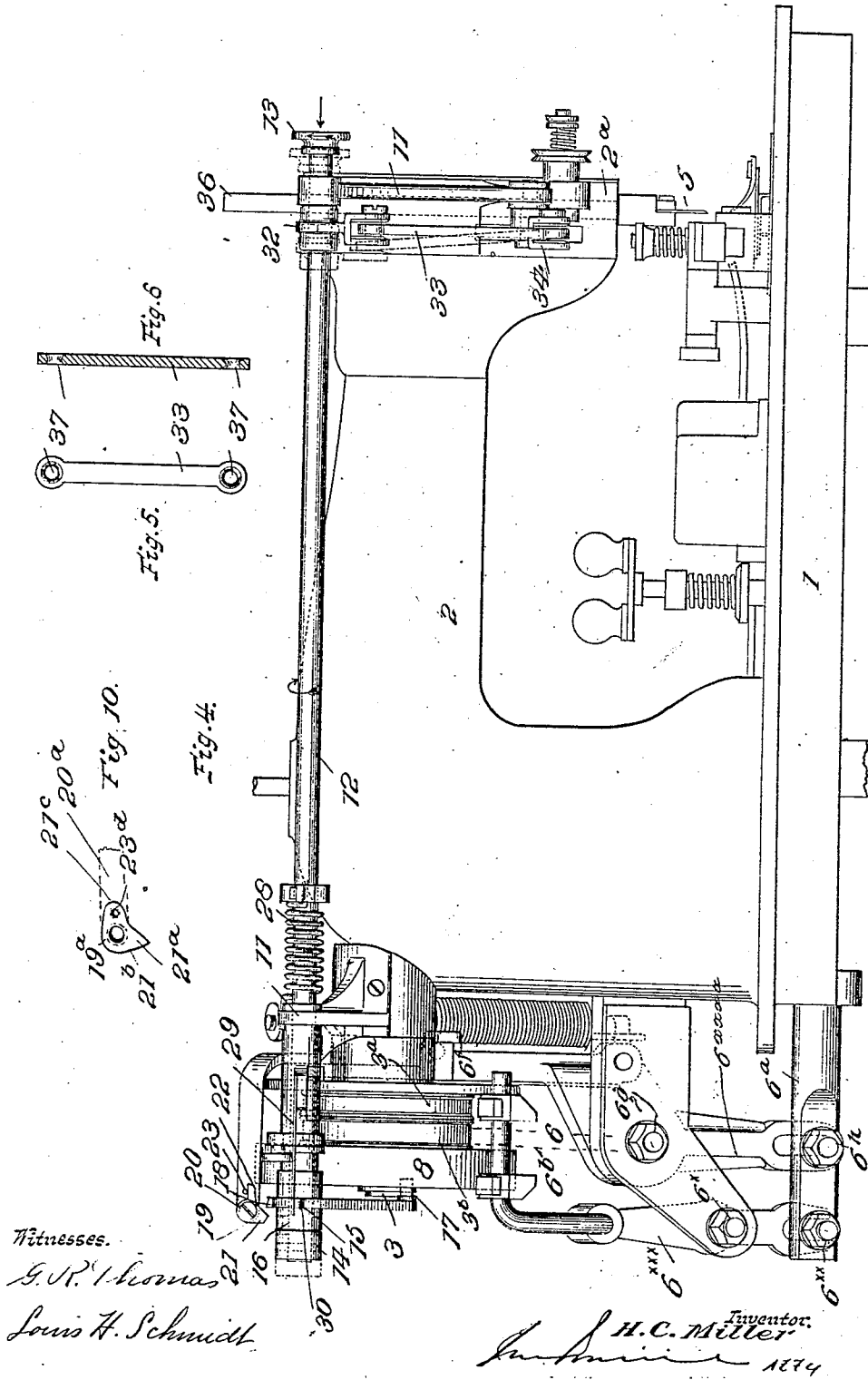
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4 SHEETS—SHEET 4.

Fig. 11.

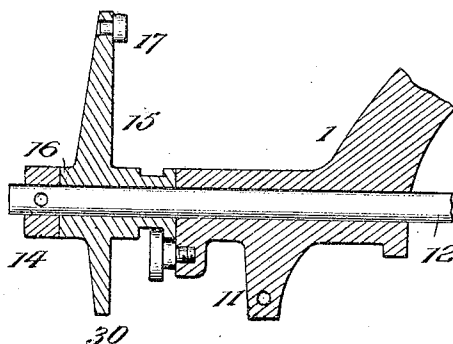
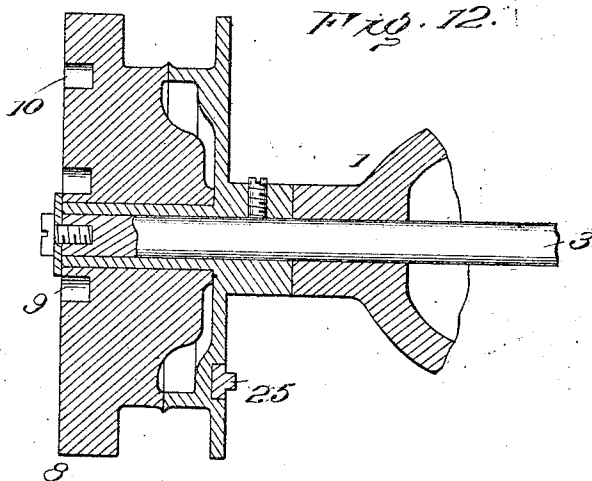


Fig. 12.



Witnesses

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UNITED STATES PATENT OFFICE.

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BUTTONHOLE-MACHINE.

1,038,411.

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed February 11, 1905. Serial No. 245,320.

To all whom it may concern:

Be it known that I, HENRY C. MILLER, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, have invented new and useful Improvements in Buttonhole-Machines, of which the following is a specification.

This invention relates to improvements in button hole machines.

Button hole machines now in use, employ essentially stitching mechanism, cutting mechanism, stop mechanism, and means for operating said mechanisms; the button hole being cut at different periods according to the particular make of machine.

It is well known in this art that certain button hole machines cut the button hole before the stitching mechanism commences to operate, while in others the cut is made before the stitches are made, and again for severing any fibers that may cross the first cut, caused by the stitching. Other makes of machines cut just before the last stitch, and others at the time the last stitch is completed. In all these machines known to me the cutting mechanism is operated by the stitching mechanism, and inasmuch as high speed is essential, great strain is placed on the delicately adjusted stitching mechanism when the cutter is thrown into action. Furthermore with the machines mentioned, if the operator desires to examine the button hole stitches without cutting, it can be only accomplished by throwing out the automatic cutting mechanism, and after inspection of the stitching and the cut is to be made, the operator must adjust the machine about where the cutting is to occur, and start the stitching mechanism. This arrangement of parts causes considerable difficulty in retaining the exact relative location of the cutting blade, due to the constant jarring and frequent binding of the stopping means.

According to my invention, I employ stitch forming mechanism, a cutting blade and means connecting the same, but in addition I provide means for automatically operating the cutting blade by the mechanism for operating the stitch forming mechanism, and arrange said means whereby the operator may disconnect the cutting blade and operate the same independent of the stitch forming mechanism. This means for independently operating the cutting blade being

so related, that the operator at will disengages it and by manipulating a device, throws the blade operating means in operative relation to the power which forces the blade down to sever the fabric before or after the stitching operation. By this mechanism I can operate the cutting blade without damaging the fabric, inasmuch as the feeding device is always stationary as the machine is stopped when the cutting operation occurs.

My invention therefore constitutes broadly mechanism by means of which the cutting operation and stitching operation may be automatically operated, or the cutting blade operated by power independently of the stitching mechanism, means being provided whereby the cut of the button hole may be made before or after the stitching, according to the character of the work, and as may be desired by the operator. To this end I have provided specific structures, the parts being so assembled that the connecting or disconnecting of the two sets of mechanisms do not jar or disturb the intricate and delicate parts employed in the sewing machine.

Other objects and advantages will be hereinafter referred to and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view of a button hole machine, with my improvements applied thereto. Fig. 2 is an end view looking from the right. Fig. 3 is a similar view from the left, parts being broken away. Fig. 4 is a side elevation. Figs. 5 and 6 are detail views of a link connection employed between the cutting blade and the operating means. Fig. 7 is a detail plan view of the cutting blade operating mechanism. Fig. 8 is a detail horizontal section taken through the cutting blade and the needle bar. Fig. 9 is a similar view showing a slightly modified form. Fig. 10 is a detail view of a modified form of operating dog. Fig. 11 is a detail section on the line 11-11, Fig. 2. Fig. 12 is a sectional view of the means for transmitting power to the cutting mechanism.

The numeral 1 indicates a sewing machine bed; 2 the standard having a head 2^a; 3 the power shaft with fast and loose pulleys 3^a and 3^b; 4 the needle bar; 5 the cutting blade, and 6 the stopping device.

The stopping device consists of an operating bar 6^a belt shifter 6^{xxx} pivoted at 6^x and connected to bar 6^a at 6^{xx}; stopping

lever 6^{xxx}; cushioning devices 6^e mounted in a casing 6^f of stopping lever which is pivoted at 6^g, and pivoted to the bar 6^a at 6^h; and a projection 6^d on the fast pulley 3^a. It will be noted that the pivots 6^x and 6^s are located at different distances from the connections 6^{xx} and 6^h of bar 6^a, so that when the stopping devices are operated the belt shifter 6^{xxx} will throw the belt 6^b from the fast to the loose pulley before the cushions 6^e reach the path of the projection 6^d. And in starting the machine the cushions 6^e will be thrown out of engagement with the projection before the belt 6^b is on the fast pulley.

My invention is applicable to any form of sewing machine, and in the drawing I have shown a stopping device, described and claimed in an application filed and executed of even date, Serial No. 245,319. While the stopping device is herein shown, I desire it to be distinctly understood that the present invention is in no way limited to this particular construction, it being shown as a matter of convenience.

Loosely mounted on the shaft 3, and formed with the loose pulley is a disk 8, which acts as a balance wheel, and in its outer face, and concentric with said shaft 3 is what I shall term a neutral groove 9, and eccentric with and merging into groove 9 is a second and enlarged cam groove 10.

Mounted in bearings 11 on the standard 2 is a shaft 12 having fastened to its end adjacent the head 2^a, a knob 13, and at its opposite end a clutch member 14. Supported loosely on the shaft and adjacent the clutch member is an arm 15, formed with a clutch member 16, which cooperates with the clutch member 14, and at its inner free end the arm is provided with a pin 17, adapted to travel in the grooves 9 and 10. Projecting upwardly from the arm 15, is a web or extension 18, which is in the plane of a dog 19, mounted on an extension of the stopping device 6. The dog 19 is pivoted to the extension at 20 and has a depending engaging portion 21 and an arm 22, contacting with a rigid pin 23. When the stopping device is moved to start the sewing machine, the dog swings on its pivot and rides over the extension 18, and then assumes its normal position by gravity, (or by pressure if desired), but when the stopping device is reversed, the dog backs up against the pin 23 and forces the arm 15 downwardly and its pin 17 away from the center of shaft 2, for a purpose to be described.

In Fig. 10, I have shown a different form of dog which consists of a depending portion 21^a having a right and left hand bevel 21^b, and an arm 21^c provided with an opening coincident with the opening in which the pin 23 engages and through which a pin 23^d passes to render the dog rigid with the extension 20^a. With this form of dog the

arm 15 is depressed when the stopping device is moved to and from operative position.

A coiled spring 28 on shaft 12, has one end engaging the bearing 11, and its opposite end a collar fast on the shaft, the function of the spring being to normally keep the cutter bar 36 up in its highest position and it further serves to force shaft 12 toward the head 2^a to cause the two clutch members to engage. A supplemental spring 29 extends from a projection on bearing 11, and it bears on an extension 30 of arm 15. This spring 29 serves to normally force the pin 17 toward the center of the power shaft, as in pressing in the knob to throw the automatic cutting mechanism out of action, as shown in Fig. 7, this spring holds the pin in the neutral groove 9, to insure the registering of the clutch members when pressure on the knob is released.

A bifurcated arm 32 is fastened to the shaft 12 adjacent the standard head and it is connected by a link 33 with a bifurcated arm 34 pivoted at 35, the inner end of the arm being bifurcated and engaging a pin on the bar 36 carrying the cutting blade 5. The openings 37 of the link 33, through which the fastening screws pass, are rounded, as shown in Figs. 5 and 6, and the spaces between the bifurcated ends of the levers 32 and 34 are slightly wider than the width of the link so that the latter may rock laterally as shown in dotted lines in Fig. 4.

When the machine is operated to sew button holes the cutting blade is connected to automatically sever the fabric between the stitches after the stitching operation is finished, the parts being in the position shown in Figs. 1 and 4. The spring 28 forces the clutch member 14 toward the clutch member 16, which couples the arm 15 to the shaft 12. During the period of forming the stitches, the pin 17 travels in the neutral groove 9, the springs 28 and 29 in the meantime holding the cutting blade up.

After the last stitch is formed the bar 6^a is automatically operated to throw the belt 6^b from the fast to the loose pulley slightly in advance of the engagement of projection 6^d with the cushion 6^e. As the extension 20^a of the stopping device 6 is moved toward the left, the dog 19 engages the web 18 and tends to force the pin 17 away from the center of the power shaft and as the latter is positively driven by belt 6^b, said pin will be guided into the cam groove 10 which rocks the arm 15, hence the shaft 12 and its connected parts, and the knife is depressed as shown in dotted lines in Fig. 2. The pressure of the dog on the arm is relieved as the arm 15 is depressed by the gradually increasing cam formation of the groove 10 and the power having been transmitted to the loose pulley, the cutting blade is re-

turned by the action of said cam to its normal position.

Should the operator desire to inspect the stitches before the cut is made, the knob and its shaft 12 are pressed toward the arm 15 against the tension of spring 28, whereupon the clutch members are separated, (see Fig. 7), and the motion imparted to the arm 15, when the stopping device is thrown, is not transferred to the shaft 12. After the operator observes the stitches, and is satisfied with their condition and desires to complete the button hole by severing the fabric pressure on the knob is released and it is turned toward the right sufficiently to overcome the tension of springs 28 and 29, to throw pin 17 toward cam groove 10, which imparts motion to the cutting mechanism, without affecting the stitching mechanism.

On certain work, an imitation hand worked button hole is often desired, and in working it is necessary that a cut be made before and after the stitching operation, and to accommodate my improvements to this condition, the dog 19 is removed and dog 19^a is substituted. As before stated the movement of the extension 20^a in either direction, causes the dog to contact with the web 18, therefore when the stopping device is operated, the arm 15, is depressed which results in imparting motion to the cutting blade and a cut is made preceding the stitches, and when the stitches are completed and the movement of the stopping device is reversed the blade is again operated and any fiber or lint left between the stitches is cut out which leaves a clear cut button hole.

By arranging the cutting mechanism so that it can be either automatically operated in combination with stitching mechanism, or independently thereof by power, considerable is added to the merits and consequent work of the machine. The cutting blade may be manipulated to cut the fabric, wholly irrespective of the stitching mechanism, so that in the event the operator finds a button hole having perfect stitches and a defective cut, it is only necessary to grasp the knob and turn it to bring the pin 17 into the cam groove 10 of disk 8, which is now being revolved and the cutting blade is depressed. This is quite important, because of the fact that when working on certain fabric with machines now in use if a defective cut is formed, it can only be recut by using the stitching mechanism in combination with the cutting mechanism, which results in producing double stitching, consequently second grade work.

There are numerous causes and conditions which make it essential that the cutting blade of a button hole machine be operated at any time before or after the stitching of a button hole, irrespective of the

stitching mechanism, and it is equally essential that the stitching mechanism and the cutting blade be coupled so as to be operated in sequence automatically, all of said conditions being fully provided for in my present machine.

From the foregoing description it is evident I have devised and organized mechanism permitting of the performance of these two most important operations.

While I have described what may be regarded as the preferred form of my invention, I do not desire to be limited to the specific details set forth, as it is evident to one skilled in the art that the cutting blade may be operated by connecting it with compound mechanism with the cloth clamp lifting mechanism.

What I claim as new is:

1. A sewing machine including a power means, a stitching mechanism, a cutting mechanism, means for automatically causing successive operations of said mechanisms by the power means, and manually operable means to shift the cutting mechanism within the influence of the power means to insure its normal operation without successive operation of the stitching mechanism.

2. A sewing machine, comprising stitching mechanism, and cutting mechanism, means for operating the stitching mechanism and cutting mechanism including power transmitting mechanism and a trip device operated by the power transmitting mechanism for causing the stitching mechanism and cutting mechanism to operate in a continuous cycle of movement, and manual means for operating the trip to cause the power transmitting mechanism to independently operate the cutting mechanism.

3. A sewing machine including a stitching mechanism, an operating means therefor, a cutting mechanism including a normally inoperative member, means for operating said cutting mechanism, automatic means to position the normally inoperative member in the normal operation of the machine, and means for manually operating said member to cause it to be positioned to be operated by the cutter operating mechanism.

4. A sewing machine including a power means, a stitching mechanism, a cutting mechanism including a normally inoperative member, an operating means for each of said mechanisms, the member being automatically operated during the transfer of the power means from one operating means to the other, and means for manually controlling the member to remove the cutting mechanism from the influence of its operating means at any stage in the operation of the machine.

5. In combination, a buttonhole machine having stitching mechanism and cutting

mechanism, power mechanism including fast and loose elements, power transmitting means, a cam carried by the loose element for operating the cutting mechanism, stopping mechanism having a trip, said stopping mechanism shifting the power transmitting means from one element to the other and stopping the stitching mechanism and the trip operating to cause the cam to actuate the cutting mechanism independently of the stitching mechanism while the latter is at rest.

6. In combination, a buttonhole machine having stitching mechanism and cutting mechanism, fast and loose elements, a cam, stopping mechanism to shift the power from one element to the other, an extension on the stopping mechanism, a connection between the cam and the cutting mechanism, said connection being in the path of movement of the extension, whereby to throw said connection in the path of the cam, and means for manually operating the connection to operate the cutting mechanism independently of the stitching mechanism.

7. In combination, a buttonhole machine having stitching mechanism and cutting mechanism, operating means normally connecting the stitching and cutting mechanisms to cause them to operate in a cycle of movement including power mechanism and means for shifting the latter to operate either the stitching mechanism or the cutting mechanism, and manually operated means for controlling the power mechanism to operate the cutting mechanism without starting the stitching mechanism.

8. In combination, a buttonhole machine having stitching and cutting mechanism operating means including fast and loose elements, a trip adjacent thereto, trip operating means and power shifting mechanism, stopping mechanism operatively connected with the power shifting mechanism, the trip being in the path of movement of the stopping mechanism to be struck thereby to place said trip in position with its operating means to effect the operation of the cutting mechanism.

9. In a buttonhole machine, the combination with power mechanism, stitching mechanism and cutting mechanism including a connection with the power mechanism to cause a successive cycle of operation of said latter two mechanisms, means for starting the power mechanism to cause said cycle of operation, and means for manually moving the connection in the path of the power mechanism to operate the cutting mechanism by said power mechanism before or after the operation of the stitching mechanisms.

10. In combination, a buttonhole machine having stitching mechanism and a cutting blade, power mechanism, a connection be-

tween the cutting blade and the power mechanism, said connection comprising a spring pressed shaft, a clutch and an arm, the latter receiving motion from the power mechanism to operate the cutting blade, the shaft being slidably mounted to permit manual disengagement of the clutch to prevent the power mechanism from operating the cutting blade in the normal operation of the parts.

11. In a buttonhole machine, the combination with stitching mechanism and cutting mechanism, operating means including power transmitting mechanism for causing successive operation of the stitching and cutting mechanisms, and means for manually controlling the power transmitting mechanism to operate either the stitching or cutting mechanisms without successive operation of said mechanisms.

12. In a buttonhole machine, the combination with stitching mechanism and cutting mechanism, operating means for said mechanisms including power transmitting means, said operating means normally causing the stitching and cutting mechanisms to operate in a cycle of movement, and means to interrupt the cycle of operation that either the stitching or cutting mechanism may be operated independent of the other.

13. In combination, a buttonhole machine having stitching mechanism and a cutting blade, power operating mechanism, stopping mechanism, and means operating in conjunction with the power operating mechanism for operating the cutting blade to produce a cut at each operation of the stopping mechanism, said means for operating the cutter including a cam and trip the stitching mechanism being at rest during the cutting operation and manual means for controlling the operation of the cutting blade.

14. In combination, a buttonhole machine having stitching mechanism and cutting means, power operating means, a connection between the cutting means and the power means, and means to manually shift said connection into operative connection with the power operating means to operate the cutting means independently of subsequent or preceding operation of the stitching mechanism, the stitching mechanism being at rest during the operation of the cutting means and independent means for starting the power mechanism to cause a successive cycle of operation of the stitching and cutting mechanisms.

15. In a buttonhole sewing machine, the combination with stitching mechanism and cutting mechanism, operating means including power transmitting mechanism for causing the stitching and cutting mechanisms to operate successively, and manually

operated means for breaking the successive operation of the stitching and cutting mechanisms, said manual means being connected to the operating means so that the cutting mechanism may be operated independent of the stitching mechanism.

16. A sewing machine including a power means having a cam, a stitching mechanism, a cutting mechanism, means for automatically causing successive operations of said mechanisms by the power means; and manually operable means to shift the cutting mechanism within the influence of the cam of the power means to insure its normal operation without successive operation of the stitching mechanism.

17. In combination, a buttonhole machine

having stitching mechanism and a cutting blade, power operating mechanism and means operating in conjunction with the power operating mechanism for operating the cutting blade to produce a cut before and after the operation of the stitching mechanism, said stitching mechanism being at rest during the cutting operation and manual means for controlling the operation of the cutting blade.

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

HENRY C. MILLER.

Witnesses:

WM. B. PALMER,

K. V. HICKS.