

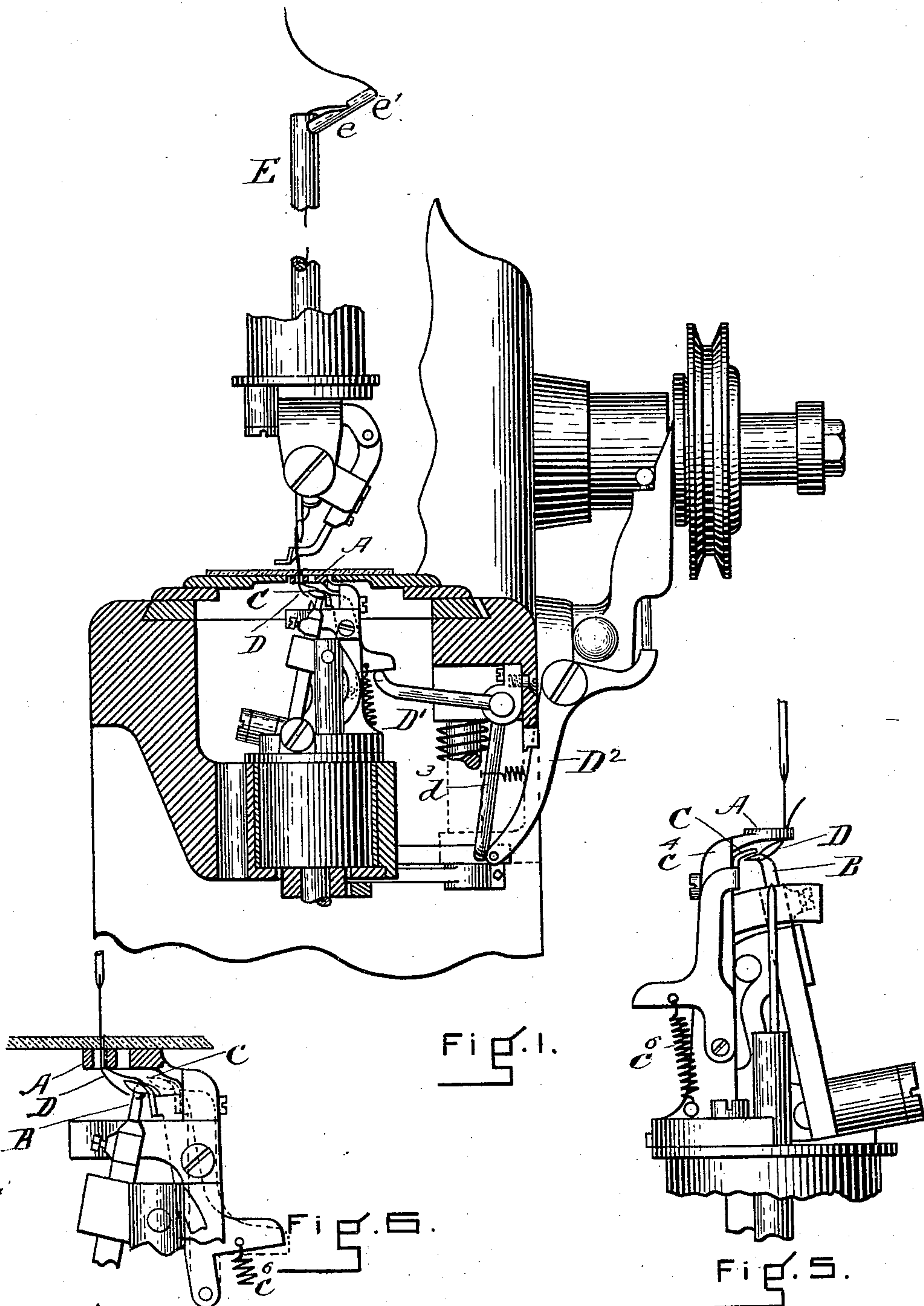
(No Model.)

2 Sheets—Sheet 1.

C. A. DAHL.
SEWING MACHINE.

No. 521,308.

Patented June 12, 1894.



WITNESSES.
J. M. Dolan
J. H. Cummings

INVENTOR.
Charles A. Dahl
by his Attys
Clarke & Raymond

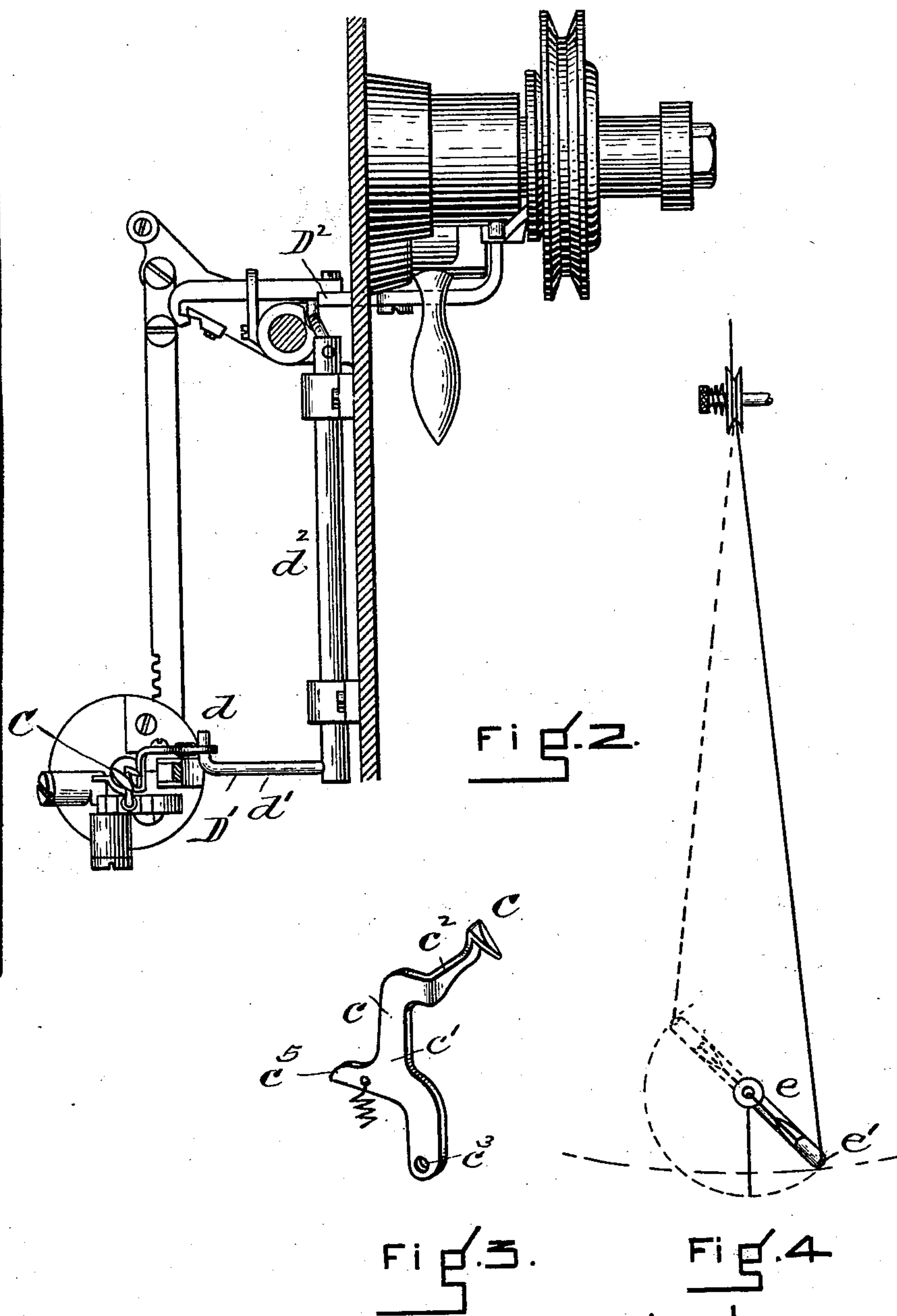
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Charles A. Dahl
by his Attorney
Charles H. Raymond

UNITED STATES PATENT OFFICE.

CHARLES AXEL DAHL, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GLOBE
BUTTON-HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, AND
OF KITTERY, MAINE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 521,308, dated June 12, 1894.

Application filed July 3, 1893. Serial No. 479,439. (No model.)

To all whom it may concern:

Be it known that I, CHARLES AXEL DAHL, a subject of Oscar II, King of Sweden and Norway, now residing in Lynn, in the county of Essex, in the State of Massachusetts, have invented a new and useful Improvement in Sewing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention is especially adapted for use in button-hole sewing machines. With such machines as now operated, it is necessary for the operator after the stitching of each button-hole, to draw the thread through the upper needle sufficiently to permit it to be cut by a knife or scissors, and this requires two operations, namely, the drawing action of the thread by the operator and the subsequent cutting action. This causes delay in the operation of the machine and waste of thread. Delay, because of the two motions required, which makes it impossible for the operator to keep the machine running practically continuously by simply moving the work from one position to another; and waste, because a much longer piece of thread is drawn from the needle than is necessary either for properly holding the last stitch of the last button hole sewed or for beginning the first stitch of the new button hole, the waste being perhaps evenly divided between the two button-holes, and often amounting to from two inches to three or four, and in a machine adapted to do many thousands of button holes, it is obvious that a saving of from two to four inches of thread a hole, particularly if it be silk thread, is quite a desideratum.

My invention is designed to overcome these defects by rendering the drawing and cutting actions of the operator unnecessary and saving the thread which has heretofore been lost and permitting the machine to be run very nearly continuously, the machine stopping simply for the purpose of permitting the work to be moved in the clamps sufficiently to take out of position a finished button-hole and place in position the section of the material in which the next button-hole is to be formed, the machine then being immediately started

without further manipulation on the part of the operator.

I have represented my invention as applied to the button hole sewing machine known as the "Globe;" but I would not be understood as confining it to that particular type of machine. It is represented as carried into effect by means of a cutter which is caused to be automatically actuated to cut the needle thread below the work immediately upon the completion of the last stitch of the button hole, and also by means of a thread drawing device which draws the upper needle thread slightly after it has been severed, but sufficiently to remove its free or cut end from the work, but not from the eye of the needle, as it is desirable on account of the tension which the work exerts upon the thread to cause it to be drawn from the work by an action other than that of the needle, for if the thread after it is cut, remains in the work or material, it may not readily become detached therefrom by the action of the needle alone, and may if not so detached cause the needle to be deflected from its proper course at the beginning of the sewing of the next stitch. This thread drawing device also serves another useful purpose to which reference will hereinafter be made.

In the drawings, Figure 1 is a view, partly in section, and partly in elevation of the parts of a Globe machine with which my device is intimately associated. Fig. 2 is a view principally in plan of many of these devices. Fig. 3 is a view in perspective of the thread cutter and its stock. Fig. 4 is a view in plan of the thread drawer. Fig. 5 is a view in elevation enlarged to further illustrate the operation of the thread cutter. Fig. 6 is a view in elevation enlarged of many of the devices shown in Fig. 1 and in the same position.

The thread cutter may be located at any point below the under surface of the work, where it will act to sever the upper needle thread without cutting the thread of the lower needle; and I here state that I do not confine myself to the exact position of the cutter, thus placed below the work, and have for the purposes of convenience and the employment of the actuating devices herein specified located it immediately below the

throat or button of the machine and at one side thereof, or upon the side toward which the loop of the upper needle thread is carried by the loop taker or carrier. See Fig. 5, where A is the throat plate or button.

B is the loop carrier, C the thread cutter, and D the loop. The cutter C preferably is made integral with the stock or arm c which actuates it, and it and the arm for the purpose of adapting it to the machine in question, are preferably shaped substantially as represented in Fig. 3; that is, there is a vertical section c' from the upper end of which extends the horizontal section c^2 slightly bent upward at its outer end where it forms the base or inner end of the knife extension. The arm is pivoted at c^3 to the bracket c^4 which supports the throat or button, and it has a lateral branch or extension c^5 , to which one end of the withdrawing spring c^6 is fastened, and which also provides the foot with which the end of an operating lever or actuating part comes into contact when the stitching devices have been moved into a certain position.

In a machine of the Globe organization, the stitch forming devices are held from rotation during the stitching of one side of the button hole, are rotated a half revolution during the stitching of the eye, and are held from rotation in their new position during the stitching of the other side of the button hole, and when the stitching devices have reached the end of their half rotation, the foot c^5 has been moved into a position above the bent end d of the operating lever D' . This lever, however, is not moved or operated to cause the cutter to be actuated until after the sewing of the last stitch, when it is set in action, and before the stitching devices have commenced to turn backward to their normal position it delivers a quick movement to the lever c and causes the cutter C to be moved quickly across one side of the thread loop D, and when the loop has been spread by the spreader and moved toward the cutter.

To insure the prompt action of the cutter and its operating lever D' , the lever may be actuated by the mechanism which trips or releases the springs which automatically turn backward the stitching devices. This mechanism is fully described in Patent No. 450,950, dated April 21, 1891, and I will simply here say that the lever D^2 which forms a portion of such mechanism and which receives its impulse only upon the stopping of the machine, is utilized to also move the lever D' , the said lever being a rock lever and having the arm d' at its front end, the shaft d^2 and the arm d^3 at its rear end, the lower end of which rests against the lower end of the lever D^2 , being held against the same by a spring or in any other desirable way. See Fig. 1. The movement of the lever D^2 therefore to unlatch the stitching devices at the same time causes the operation of the lever D' and the actuation of the cutter and the severing of the needle

thread, and the cutter is immediately restored to its normal or inoperative position as the foot c^5 immediately rides off the end d of the lever, as the stitch forming devices are being returned to their initial position. During this turning movement of the stitching devices the needle thread is drawn upward sufficiently to disengage its cut end from the work in which it is, of course, when cut, and the rotation of the stitch forming devices is utilized to effect this drawing back action upon the thread as follows: The upper needle bar E, which is like that of said patent, and is hollow to provide a channel for the feeding of the needle thread to the eye of the needle has extending from its upper end horizontally a thread holder e , through a hole e' in the outer end of which the thread is led to the hole in the needle bar.

When the stitch forming devices are in their initial position, the thread holder occupies the position represented in dotted lines Fig. 4, and at the end of the rotation of the stitch forming devices, in stitching the eye, it occupies the position represented by full lines in Fig. 4, in which position it remains until the release of the stitch forming devices, after the stitching of the last side of the button hole.

It will be understood, of course, that the thread is being drawn by the outer end of the holder horizontally from the spool during its forward rotation till after it passes the center, and as the thread is immediately clamped upon the spool side as the machine stops, it follows that the holder turning backward to the dotted position represented in Fig. 4, will draw the thread upward from the needle and work.

As this type of machine is ordinarily provided with a thread clamp which operates as above, it has not been deemed necessary to illustrate the same or further describe its operation here.

The thread requires to be drawn comparatively little to disengage its lower end from the work as it is cut quite closely to it. I would say, however, that I do not limit myself to this especial means for exerting a back pull or draft upon the needle thread at the time indicated; but may use in lieu thereof any device for so acting upon the thread.

It will be seen that by the return of the holder to its normal position, and without releasing the thread clamp, the upper thread is slackened at a point near the needle, and so that upon the beginning of the stitching operation upon a new button-hole enough slack thread is provided for the immediate beginning of the stitch forming operation, so that the holder not only acts to draw the cut end of the upper needle thread from the stock or fabric, but also provides slack thread for the next operation of the needle.

The operation of the device is as follows: The machine starts with the thread cutter in inoperative position and removed from the

path or line of movement of the other parts. It is represented as carried by the under stitching devices, although not of necessity confined to such a position. The stitching first takes place along one side of the button hole to the enlarged or eyed end, and then around such end, the stitching devices turning and by such action moving the cutter into a position to be actuated by a device which is set in operation at the stopping of the machine, and at the same time moving the upper needle thread to a position which permits it to be withdrawn by a return action of its holding or guiding device. The stitching of the eye is followed by the stitching of the other side of the button-hole, and at the end thereof, the machine automatically stops, and by said stopping action, the mechanism which imparts movement to the cutter, is actuated causing the cutter to sever the upper needle thread under the work and before the stitching devices have been turned or rotated backward; and this is followed immediately by the return movement of the stitching devices, and such movement causes the lower end of the upper needle thread to be drawn from the fabric or work, and the machine, when the stitching devices have reached their normal or initial position, is thus in condition to immediately begin operation upon the next button-hole, there being no upper needle thread to be cut or drawn, and the only thing necessary being to move the work sufficiently to bring the place in which the next button hole is to be cut and sewed in proper relation to the clamps, when the machine may be started to cut and sew the next buttonhole in order. This, as I have above shown, expedites the operation of the machine by doing away with two movements by the operator previously required, and also effects a material saving in thread.

The devices for rotating or turning backward the stitching devices at the completion of their sewing operation are similar to those described in the Reed and Dahl patent, No. 450,950, and in Fig. 2 I have shown a portion of said mechanism; namely, the rack bar which engages a pinion (not shown) upon the lower turning barrel. I do not, however, confine myself to this particular means for returning the stitch forming devices.

I would say that the invention is not necessarily confined to button-hole sewing machines but may be used upon any machine arranged to sew a predetermined number of stitches and then stop.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a button-hole sewing machine having means by which it is adapted to stitch a predetermined number of stitches in forming and stitching the button-hole, a thread cutter arranged below the upper surface of the clamp plate, in combination with means comprising a part of the operating mechanism of the ma-

chine, whereby the cutter is automatically actuated to sever the upper needle thread below the work and instantly after the completion of the stitching operation of the machine, as and for the purposes described. 70

2. In a button-hole sewing machine adapted to stitch a pre-determined number of stitches in forming or stitching the button-hole, the combination of the upper needle-thread looper or carrier located below the clamp-plate and adapted to automatically carry the upper needle-thread into line with the movement of a thread cutter and an automatically actuated thread cutter arranged below the upper surface of the clamp-plate and operated at the completion of the operation of the stitching devices to sever the upper needle thread below the work and while engaged by the thread looper or carrier, as and for the purposes described. 80 85

3. In a buttonhole sewing machine adapted to stitch a predetermined number of stitches in forming or stitching the buttonhole, the combination of an upper reciprocating eye-pointed needle, a lower reciprocating eye-pointed needle, a throat through which the upper-needle thread and the lower-needle thread are passed in the act of forming the stitches, the upper-needle thread-looper or thread-carrier B arranged below the said throat and adapted to carry the upper-needle thread laterally from it, and an automatic upper-needle thread cutter C, arranged below the surface of the clamp-plate and actuated at the completion of the stitching operation of the machine to sever the upper-needle thread while engaged by the said carrier or looper B, as and for the purposes described. 90 95 100 105

4. In a buttonhole sewing machine adapted to stitch a predetermined number of stitches in forming or stitching a buttonhole, an upper-needle thread cutter arranged below the upper surface of the clamp-plate and in combination with the clamp-plate, and with automatic means for actuating the same to cut the upper-needle thread below the upper surface of the said clamp-plate and connected with an operative part of the sewing machine for positively moving the cutter in one direction at the end of the stitching operation of the machine, and a spring for moving it in the reverse direction, as and for the purposes described. 110 115 120

5. In a button-hole sewing machine adapted to stitch a pre-determined number of stitches in forming or stitching the button-hole, a thread cutter below the upper surface of the clamp-plate for severing the upper needle thread below the work, carried by a moving part of the stitch forming devices of the machine, in combination with means entirely free from manual control for automatically actuating the cutter upon the completion of the stitching operation of the machine, as and for the purposes described. 125 130

6. In a button-hole sewing machine adapted to stitch a pre-determined number of stitches

in forming or stitching the button-hole, the combination of a thread cutter located below the upper surface of the clamp plate, a rotary or traveling support below the clamp-plate to
 5 which said cutter is attached and means entirely free from manual control at one side of the machine for actuating said cutter when it is brought into operative relation thereto
 10 support, as and for the purposes described.

7. In a sewing machine of the character specified, the combination of the stopping lever provided with a movable rod, a rotary clutch pin or projection, a cutter for severing
 15 the upper needle thread and intermediate devices between the rod and the cutter adapted to be actuated by the pin striking the rod simultaneously with the action of the said stop lever in stopping the machine, as and
 20 for the purposes described.

8. In a button-hole sewing machine of the character specified, the combination of the stitch forming mechanism, a thread cutting device comprising the lever c pivoted at c^3 to
 25 a standard c^4 and having the stock c' , horizontal arm c^2 , and knife C integral with the arm and stock the said stock, arm and knife being shaped substantially as specified and means for actuating the thread cutter at the
 30 completion of the stitching operation, substantially as described.

9. In a sewing machine of the character specified, the combination of the bracket c^4 adapted to be rotated with the under section
 35 of the stitch forming devices, the lever c pivoted thereto, carrying the knife or thread cutter C , the arm or extension c^5 and the rock lever D' , the end of which is in operative relation to the arm c^5 when the stitching devices
 40 have been turned, and means for actuating the rock lever at the completion of the stitching operation of the machine, substantially as described.

10. The combination, in a sewing machine

of the character specified, of the stitch forming devices rotated in one direction during the stitching of the eye of a button-hole and adapted to be released upon the completion of the stitching of the button-hole to be returned to their normal position, an upper-
 45 thread cutter C carried by said rotating devices and moved by their rotation into operative relation with an actuating device, a lever D^2 actuated by the stopping devices of the machine and communicating motion to the
 55 mechanism releasing the rotary stitching devices, and to intermediate mechanism actuating the cutter, substantially as described.

11. In a sewing machine of the character specified, the combination of a cutter arranged
 60 below the work means whereby it is actuated to cut the upper thread upon the completion of the stitching operation of the machine and an upper thread drawer to draw the thread from the work after it has been cut, as and
 65 for the purposes described.

12. In a buttonhole sewing machine adapted to stitch a predetermined number of stitches in forming or stitching the button-hole, the combination of stitch forming devices employing an upper needle and a lower needle,
 70 an upper-needle thread cutter arranged below the upper surface of the clamp-plate of the machine connected with a part of the operative mechanism of the machine to be automatically actuated thereby to sever the upper-needle thread below the work and instantly after the completion of the stitching operation of the machine, and a thread drawer
 75 to draw the cut upper-needle thread out of the fabric, and also thread from the spool to provide slack thread for the next operation of the needle in stitching the next buttonhole, substantially as described.

CHARLES AXEL DAHL.

Witnesses:

F. F. RAYMOND, 2d,
 J. M. DOLAN.