

No. 713,584.

Patented Nov. 18, 1902.

E. B. ALLEN.

THREAD CONTROLLING DEVICE FOR SEWING MACHINES.

(Application filed Mar. 31, 1902.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.

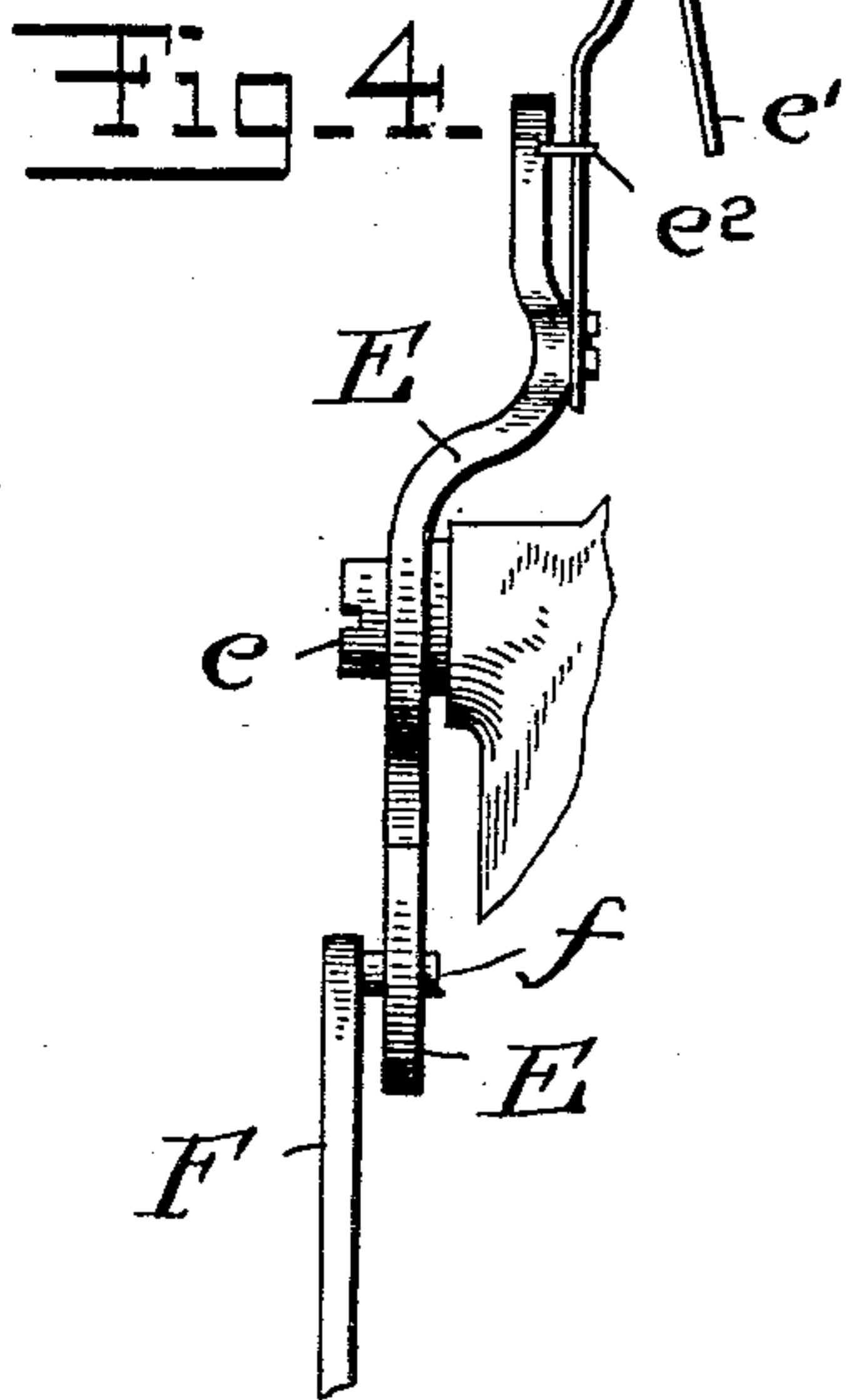
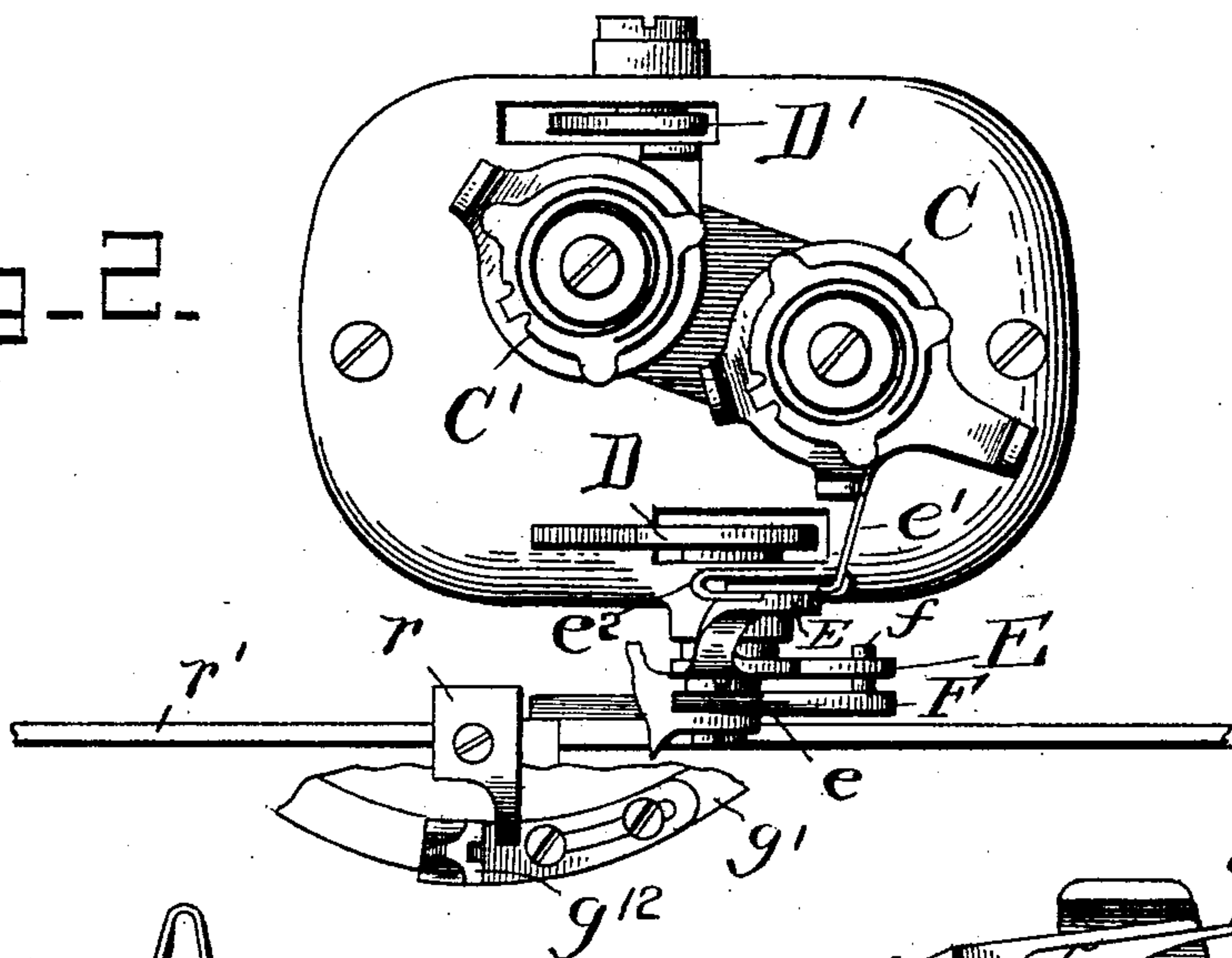


Fig. 5.

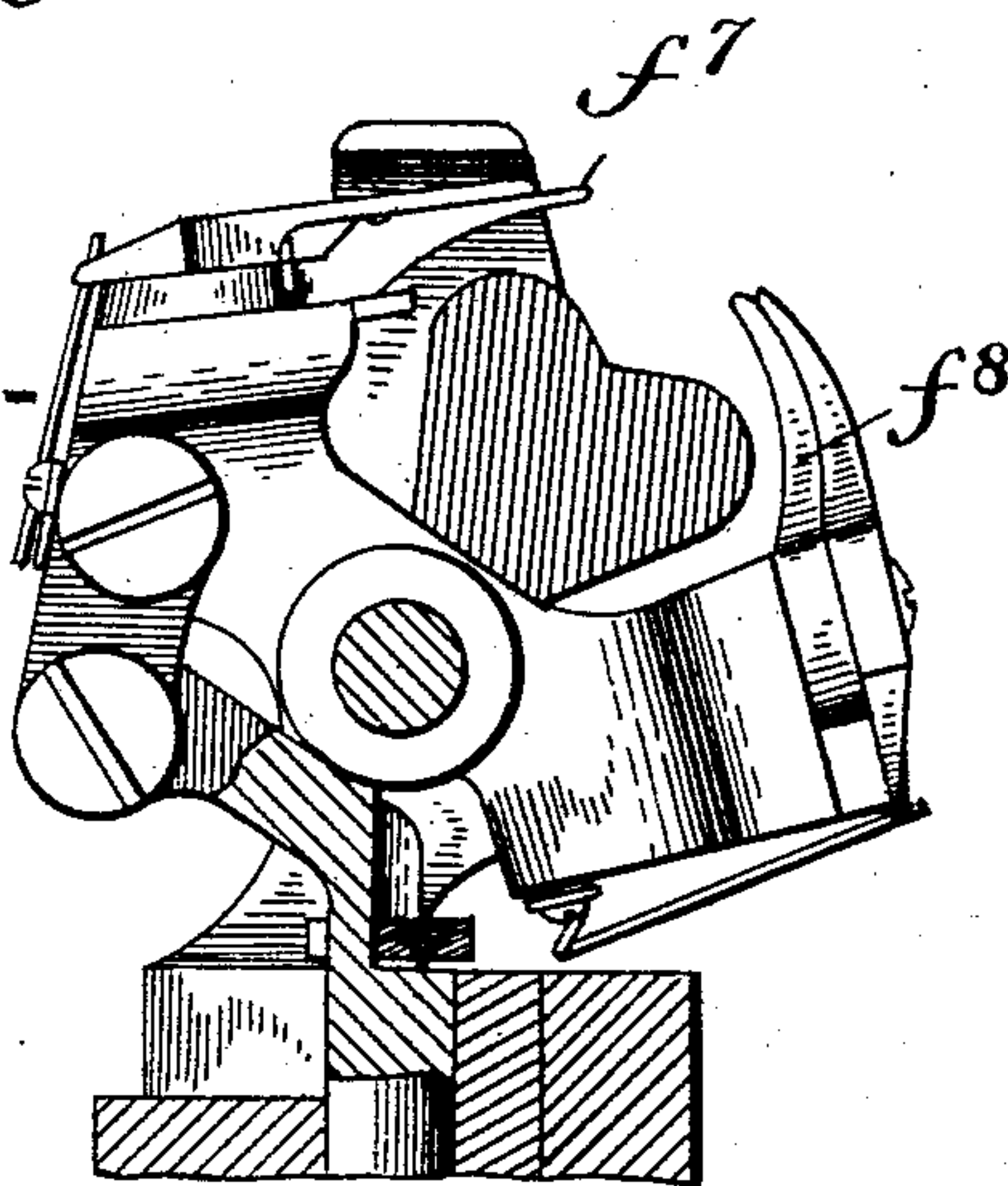
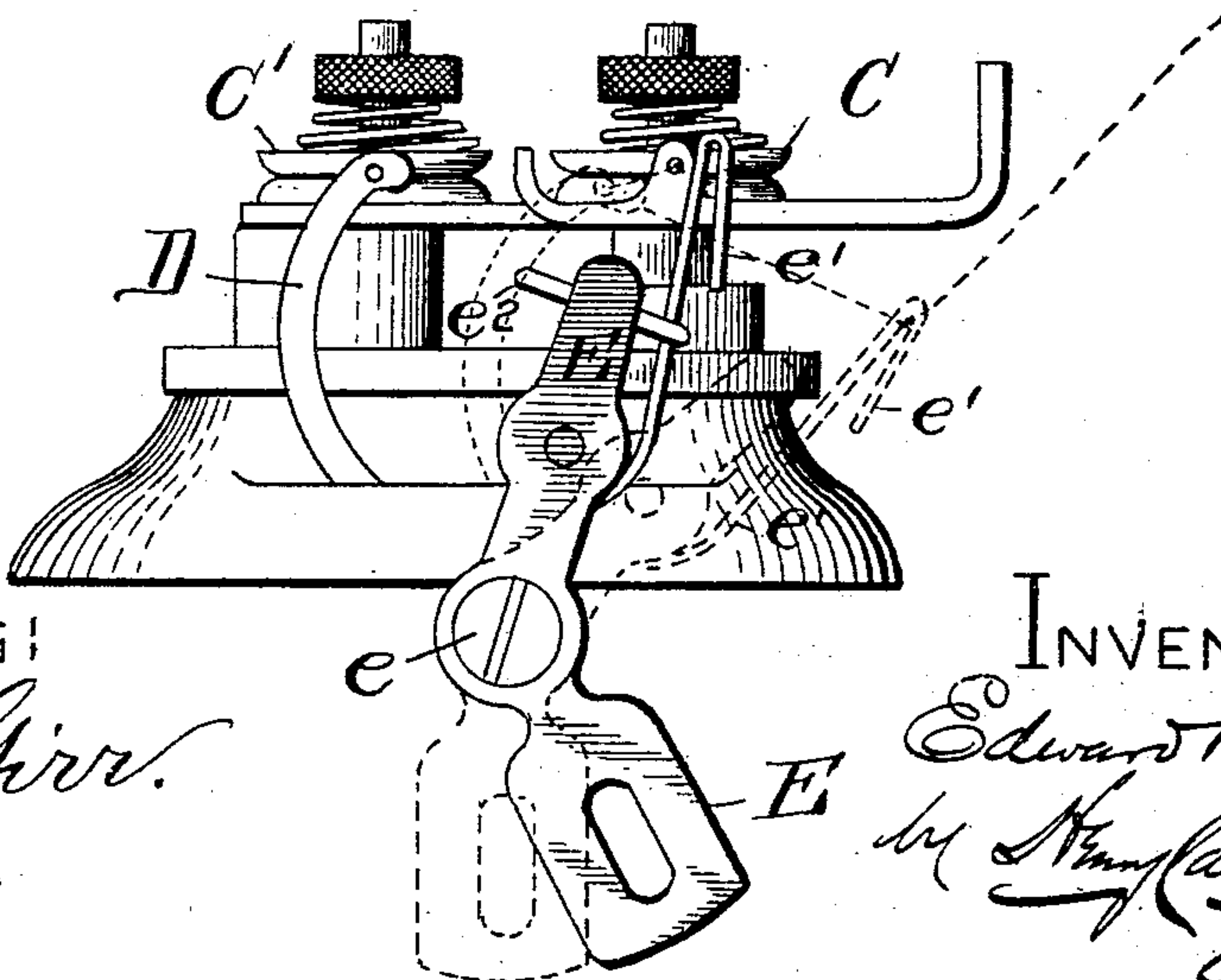


Fig. 3.



WITNESSES:

J. B. McGirr.
C. M. Sweeney.

INVENTOR:

Edward B. Allen
by *Wm. Calvert*
Att'y

UNITED STATES PATENT OFFICE.

EDWARD B. ALLEN, OF ELIZABETH, NEW JERSEY, ASSIGNOR TO
THE SINGER MANUFACTURING COMPANY, A CORPORATION OF
NEW JERSEY.

THREAD-CONTROLLING DEVICE FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 713,584, dated November 18, 1902.

Application filed March 31, 1902. Serial No. 100,760. (No model.)

To all whom it may concern:

Be it known that I, EDWARD B. ALLEN, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Thread-Controlling Devices for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 In many buttonhole-stitching machines now in use the stitch-forming mechanisms so operate that a loop of needle-thread (usually the thread of the depth-stitch needle) is engaged by a looper beneath the work-plate at
15 the time when the machine is stopped at the completion of a buttonhole, so that when the work is shifted for the purpose of stitching the next buttonhole a doubled length or section of needle-thread will extend from one
20 buttonhole to another on the lower side of the work in addition to a single length or section of looper-thread, and when the needle thread or threads running between the buttonholes on the upper side of the work are trimmed
25 off loose ends or "whiskers" are liable to or do appear on the under side of the work. Even if the depth-stitch thread be cut by an automatic or other thread-cutter, which severs the needle thread or threads close to the
30 upper side of the work before the latter is shifted for a new buttonhole, the thread comprised in the loop around the looper and equaling in length the distance from the work above the throat-plate down to and around
35 the looper and back to the work will still remain as a loose end or whisker at each buttonhole, which is objectionable.

This invention has for its object to avoid the objection referred to by providing means
40 for preventing the needle-thread from forming a loop to be engaged or entered by the looper at the time when the last half-formed stitch of a buttonhole would otherwise be made, so that there will be no loop of needle-
45 thread beneath the work or beneath the throat-plate when the machine is stopped and the work is shifted for the next buttonhole, and thus no needle-thread will extend between the buttonholes on the lower or inner
50 side of the work. This object is effected by

providing an automatic mechanism which will place such extra stress on the needle-thread as will take up all the slack thread between the tension device and the eye of the needle after the last complete stitch of a buttonhole has been formed in such a manner that
55 no loop can be thrown out by the needle to be entered by the looper at the moment the machine is to be stopped previously to shifting the work for the next buttonhole, and
60 thus at the time the work is shifted there will be no loose needle-thread below the work and no needle-thread will extend between the buttonholes on the lower side of the completed
65 work. In other words, the invention provides an automatic loop-robbing device for a particularly-timed stitch or needle descent in the cycle of operations necessary for working a buttonhole or group of stitches on an auto-
70 matic machine, the automatic loop-robbing device being preferably of such construction as to serve also as a thread-slackening device to draw sufficient needle-thread through the
75 tension device to reach from one buttonhole to the next above the work when the work is shifted.

In the accompanying drawings, Figure 1 is a side view of a buttonhole-stitching machine embodying the present invention. Fig. 2 is a detail plan view illustrative of the loop-robbing device, and Fig. 3 a detail side view of the same. Fig. 4 is a detail view looking from the right of Fig. 3, and Fig. 5 is a detail sectional side view illustrating looping devices in connection with which the present invention may be employed.

Referring to the drawings, A denotes a base, rigid with which is a work-support A', said base being provided with a standard A², with which a movable stitch-frame B has preferably a double pivotal connection, as in the machine fully shown and described in my United States application, Serial No. 24,679, filed July 24, 1900. It will be understood, of course, that the present invention is not confined to
95 any particular construction of automatic buttonhole or other sewing machine and that its present illustration is merely intended to show one form of machine in connection with which it may be employed. The stitch-form- 100

ing devices of the machine herein shown comprise out-of-time depth-stitch and slit or edge needles d d' and thread-carrying and non-thread-carrying loopers f^7 and f^8 , all mounted
 5 for periodical rotary movements about the eyes of the buttonholes, as in the machine shown in my application above referred to; but it will of course be understood that in utilizing the present invention in connection
 10 with a machine for working eyed buttonholes either the work or the stitch-forming devices may be periodically rotated to stitch the eyes of the buttonholes, and it will also be understood that the invention is equally applicable
 15 to machines for working straight buttonholes, eyelets, barring or staying or sewing on buttons, or other machines for forming separated groups of stitches of any kind and employing stitch-forming mechanisms comprising loop-
 20 ers and forming chain-stitch (in contradistinction to lock-stitch) seams.

The present machine is shown as being provided with tension devices C and C' and take-up devices or arms D and D' for the threads
 25 of the two upper needles employed; but if the present invention were to be applied on a machine having a lower slit needle the thread-controlling devices for said lower needle would preferably be differently located than
 30 at the top of the arm of stitch-frame, as herein shown. Placed conveniently adjacent to the tension device C and take-up device D for the depth-stitch needle d is a lever E, having its fulcrum on the screw or stud e and preferably
 35 having a slotted lower arm engaged by a pin or lug f at the upper end of a lever F, controlled by a spring f' , which normally holds said lever F in the position shown in full lines in Fig. 1.

P denotes the clutch-controlling or stop-motion lever of the machine embraced by my application hereinbefore referred to, and to which lever is attached the rear end of a rod r' , having a lug or projection r to be engaged
 45 by a tripping lug or projection g^{12} on the rotating cam-wheel g' , which controls the rotating movements of the stitch-forming devices, the engagement of the said tripping lug or projection g^{12} with the said lug or pro-
 50 jection r serving to operate the clutch-controlling stop-motion lever P, so as to stop the machine at the completion of a buttonhole, and as the said lug or projection r is so arranged that its upper part will engage the
 55 lower end of the lever F said lever will be operated to actuate the lever E at the instant just before the machine is stopped.

The upper arm of the lever E is provided with a thread-controller, preferably in the
 60 form of a spring-wire looped arm e' , arranged to act on the thread between the tension device C and the needle and also preferably between the take-up arm or device D and the needle, although this last-mentioned point is
 65 not essential. The spring thread-controlling arm e' extends upward through a loop e^2 on the upper arm of the lever E and which loop

e^2 serves to limit the movements of the spring-arm e' relative to the lever E in both directions.

The operation of the loop-robbing device is as follows: When the rod r' , controlling the stop-motion lever P, is shifted to the right, Fig. 1, to stop the machine at the completion of a buttonhole, the levers F and E are
 75 moved from the positions shown in full lines to the positions denoted by dotted lines in Figs. 1 and 3, causing the spring thread-controlling arm e' , connected with said lever E, to so act on the thread running to the
 80 depth-stitch needle d as to take up all the slack of said thread and to put the said thread under such tension as will prevent said needle at this time from throwing out a loop to be entered by the non-thread-carrying looper
 85 f^8 , so that said needle-thread will not at what would be the stitch next after the last stitch of a completed buttonhole be detained beneath the throat-plate of the machine. From this it results that when the work is shifted
 90 from a position for forming one buttonhole or one group of stitches to another there will be no needle-thread on the lower side of the work between the separated groups of
 95 stitches, thereby not only obviating the present existing objection to the presence of the useless and unsightly surplus thread where it is not wanted, but resulting in a considerable saving of the relatively costly silk needle-thread usually employed in stitching but-
 100 tonholes.

The lever E, when operated, as above described, to take up all the slack thread between the tension device and the needle, is preferably given a movement of sufficient
 105 range or extent not only to take up all the slack referred to, but also to draw through the tension device sufficient slack thread to extend from one buttonhole or separated group of stitches to another on the upper side of the
 110 work, and thus obviates the necessity for drawing or pulling out this requisite slack thread manually or for providing a special slack-thread-drawing device for this purpose, it being understood that the tension will be
 115 automatically released, as is usual, prior to the time when the extra slack referred to is drawn through the tension device. In performing its double functions referred to the lever E is at one time given sufficient move-
 120 ment to effect the results stated; but after having taken up all the slack thread the spring-arm e' engaging the threads yields, owing to its pressure on the thread, and is under sufficient stress or tension, so that as
 125 soon as the tension of this tension device is released the stress of the spring-arm e' acts to draw through the said device the slack thread necessary to extend to the next buttonhole or group of stitches by utilizing the
 130 stored-up power due to the stress or tension under which the said spring-arm is placed.

This invention is not to be understood as being limited to the particular mechanism or

the special means herein shown and described for preventing the looper from engaging or entering a loop of needle-thread at the needle descent or stroke occurring just
 5 next or after the completion of a group of a predetermined number of stitches, as this result may be accomplished in other ways than that hereinbefore described, as by automatically throwing either the needle or the looper
 10 slightly out of time with its normally cooperating complementary stitch-forming element at the particular stroke of the needle referred to or by automatically moving the looper sidewise slightly at the needle-stroke
 15 referred to, so as to cause said looper to avoid the needle-loop formed at that time.

Having thus described my invention, I claim and desire to secure by Letters Patent—

20 1. In a sewing-machine for forming separated groups of stitches, the combination with a stitch-forming mechanism comprising a needle and a cooperating looper, of automatic means for preventing the needle-thread from
 25 being detained beneath the throat-plate at the needle-stroke occurring next after the completion of a group of stitches.

30 2. In a sewing-machine for forming separated groups of stitches, the combination with a stitch-forming mechanism comprising a needle and a cooperating looper, of an automatic loop-robbing device for preventing the needle-thread from being detained beneath the throat-plate by the looper at the end of the
 35 completion of a group of stitches.

40 3. In a sewing-machine for forming separated groups each comprising a predetermined number of stitches, the combination with a needle and a cooperating looper, of a stop-motion mechanism for controlling the number of stitches for each group of stitches, and an automatic loop-robbing device operated from and controlled by said stop-motion mechanism.

45 4. In a sewing-machine for forming separated groups of stitches, the combination with a stitch-forming mechanism comprising a needle

and a cooperating looper, of a slack-controlling and thread-drawing lever having a spring-arm or yielding resilient portion, and
 50 automatic means for causing said lever to take up the slack needle-thread at the end of the completion of a group of predetermined number of stitches, said lever having a range of movement greater than is necessary to control the slack thread to be taken up so that
 55 said spring-arm or yielding resilient portion of said thread-controlling lever will be placed under tension, thereby storing up power in said arm or resilient portion to be utilized,
 60 without further movement of said arm, to draw slack thread from the tension device, when the normal tension on the thread is released.

5. In a sewing-machine for forming separated groups of stitches, the combination with a stitch-forming mechanism comprising a needle and a cooperating looper, of the needle-thread-controlling lever E provided with the spring-arm *e'*, the stop-motion or clutch-controlling lever P and connections between said
 70 levers E and P whereby the former will be operated by the latter when the machine is stopped.

6. In a sewing-machine for forming separated groups of stitches, the combination with a stitch-forming mechanism comprising a needle and a cooperating looper, of the needle-thread-controlling lever E provided with the spring-arm *e'*, the stop-motion or clutch-controlling lever P, the rod or bar *r'* provided with a lug or projection, and the lever F operatively connected with the said lever E and arranged to be engaged by the said lug or projection of the rod or bar *r'* to operate said
 80 lever E to cause it to take up the slack of the needle-thread when the machine is stopped.

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

EDWARD B. ALLEN.

Witnesses:

HENRY J. MILLER,

HENRY A. KORNEMANN.