

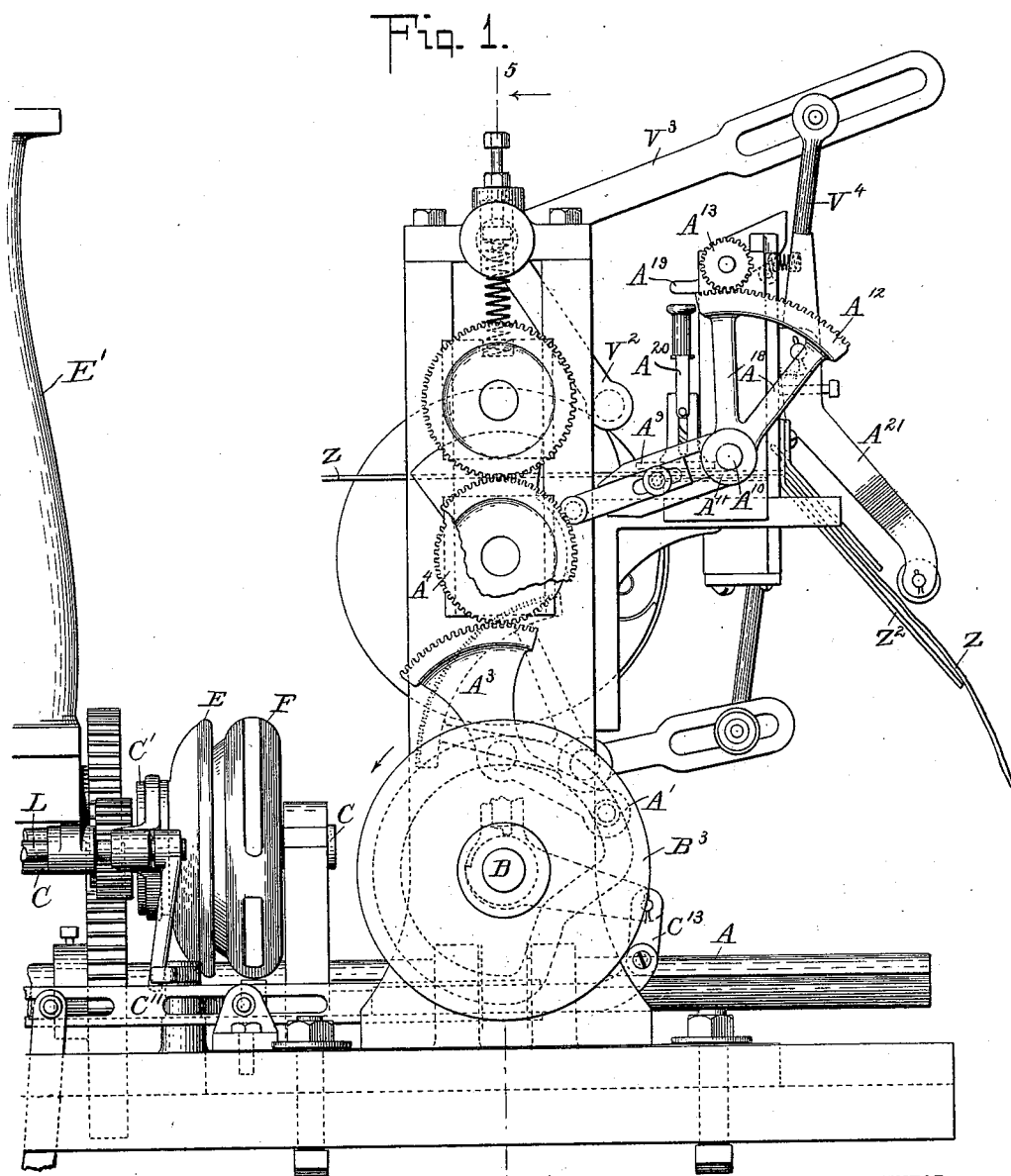
(No Model.)

8 Sheets—Sheet 1.

J. SCHWARZ.  
BUTTONHOLE SEWING MACHINE.

No. 594,290.

Patented Nov. 23, 1897.



WITNESSES:

*W. B. Shepherd,*  
*Geo. E. Mues,*

INVENTOR

*Jacob Schwarz,*

BY

*Breen & Smith*

ATTORNEYS

(No Model.)

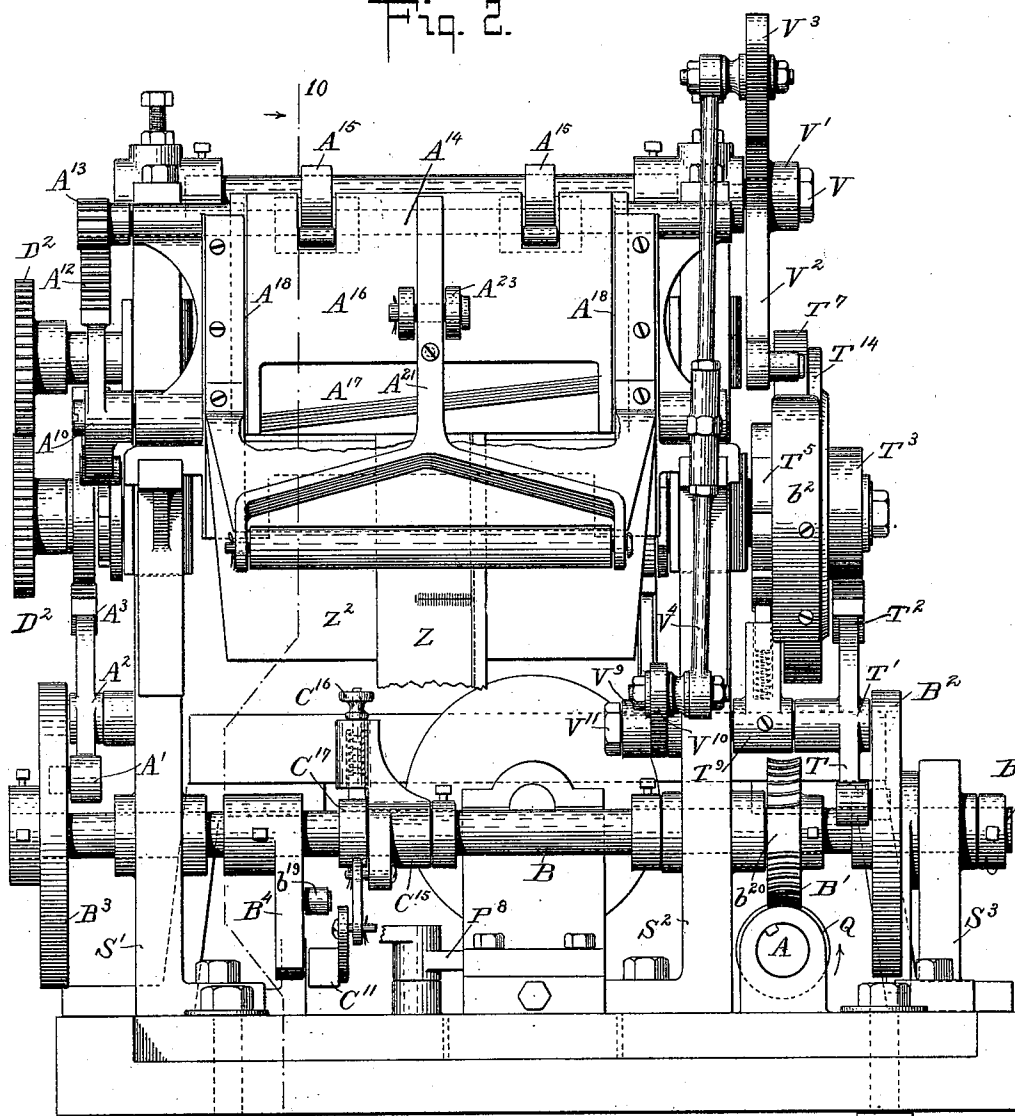
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J. SCHWARZ.  
BUTTONHOLE SEWING MACHINE.

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Fig. 2.



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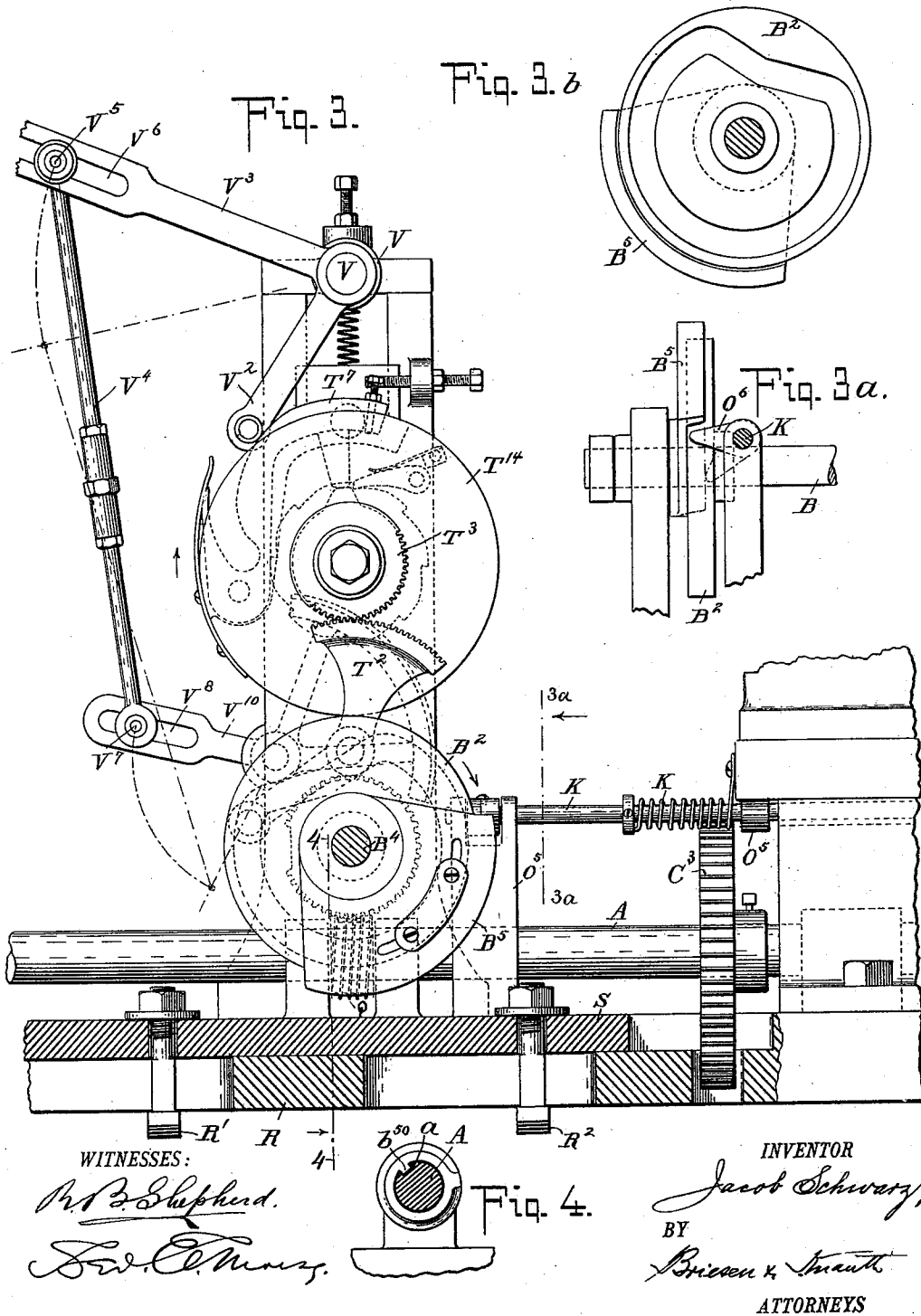
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J. SCHWARZ.  
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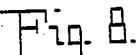
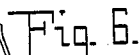
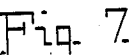
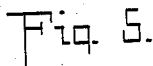
Patented Nov. 23, 1897.



8 Sheets—Sheet 4.

No. 594,290.

Patented Nov. 23, 1897.



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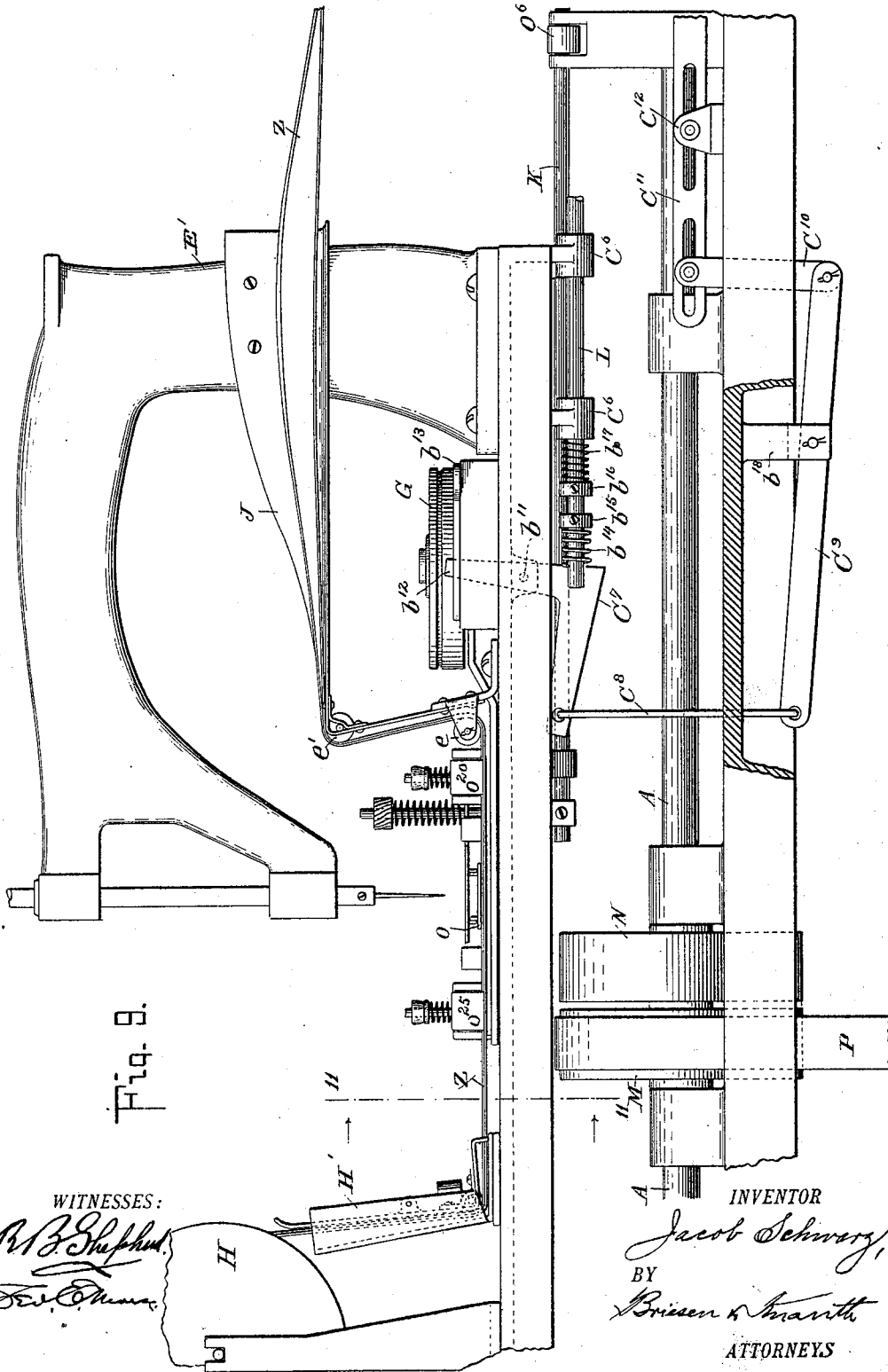
(No Model.)

8 Sheets—Sheet 5.

J. SCHWARZ.  
BUTTONHOLE SEWING MACHINE.

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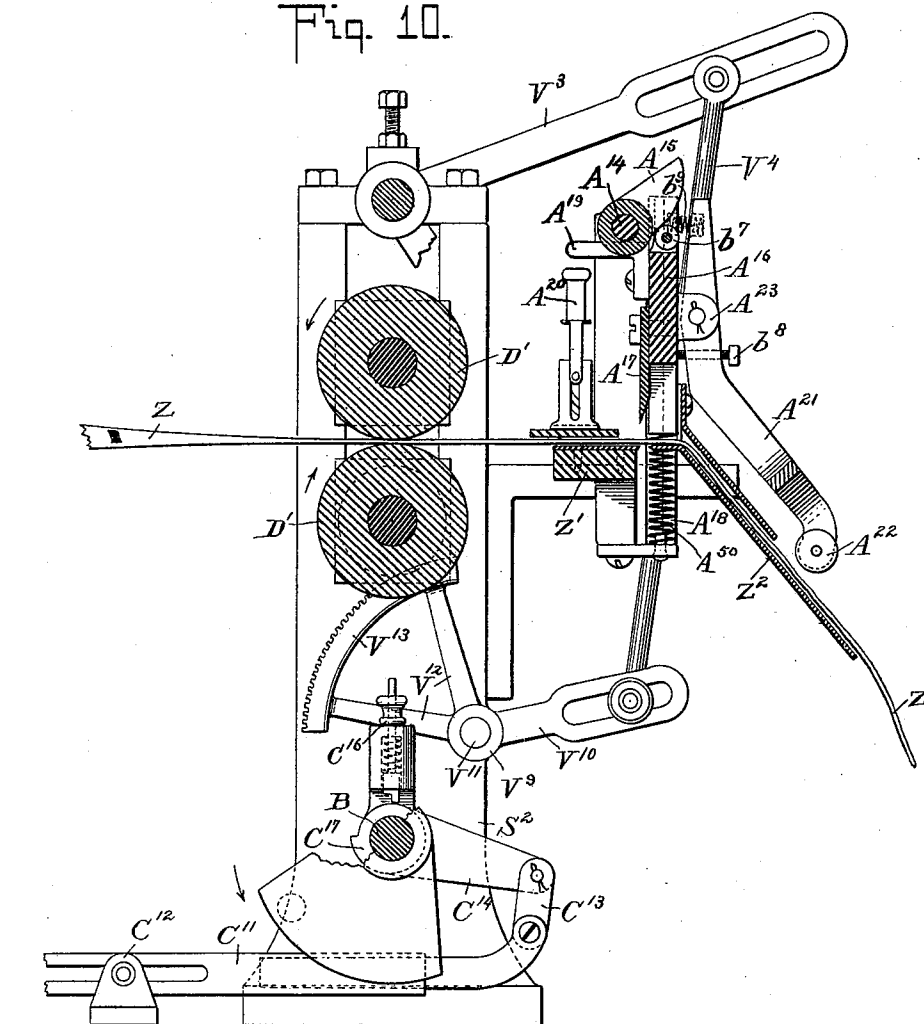
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Patented Nov. 23, 1897.

Fig. 10.



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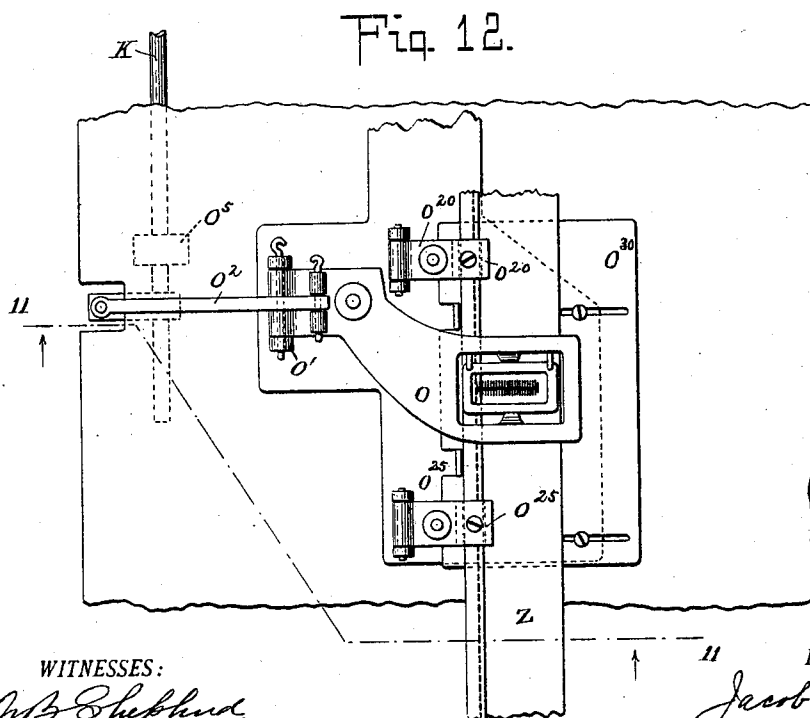
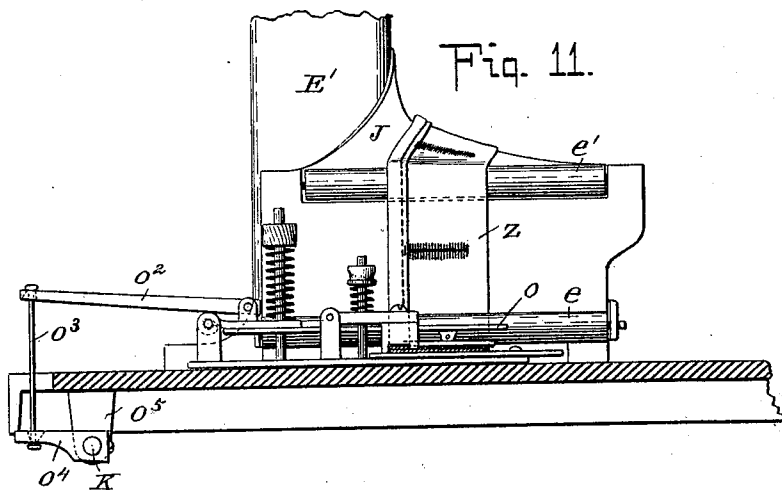
(No Model.)

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J. SCHWARZ.  
BUTTONHOLE SEWING MACHINE.

No. 594,290.

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(No Model.)

8 Sheets—Sheet 8.

J. SCHWARZ.  
BUTTONHOLE SEWING MACHINE.

No. 594,290.

Patented Nov. 23, 1897.

Fig. 15

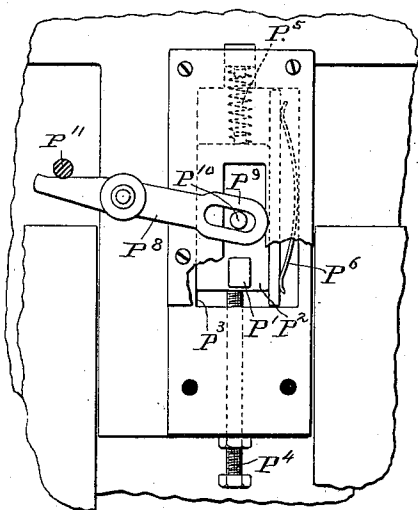


Fig. 14.

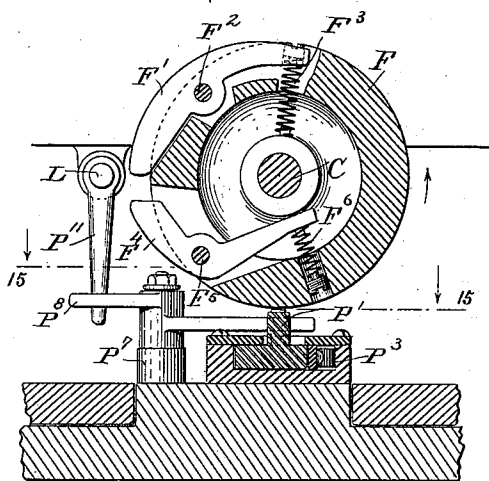
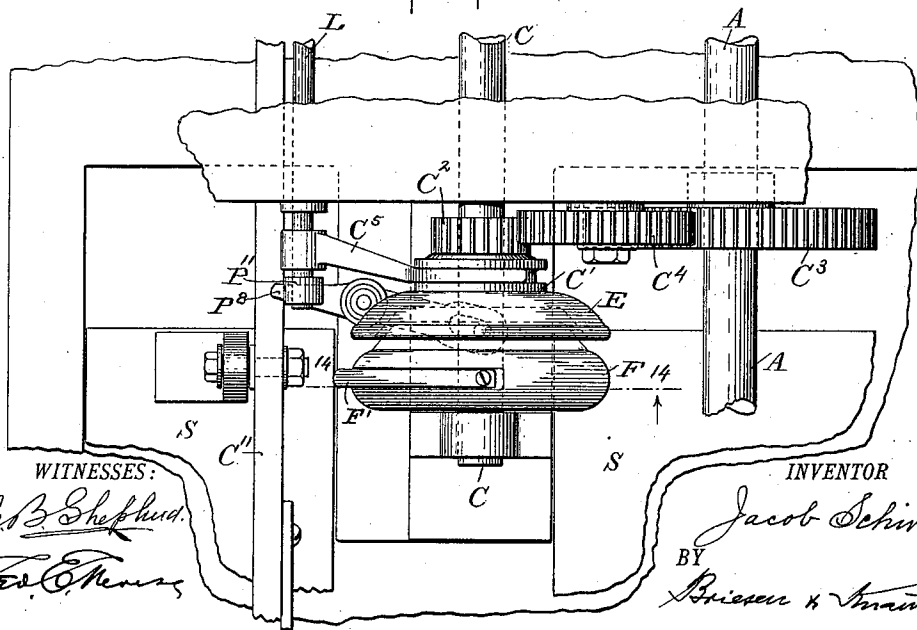


Fig. 13.



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# UNITED STATES PATENT OFFICE.

JACOB SCHWARZ, OF NEW YORK, N. Y.

## BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 594,290, dated November 23, 1897.

Application filed August 7, 1894. Serial No. 519,648. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB SCHWARZ, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Feeding Mechanism for Buttonhole-Sewing Machines, of which the following is a specification.

My invention relates to feeding mechanism for buttonhole-sewing machines, and has for its object to produce a feed mechanism for this class of machines which will feed a strip through the machine, will properly space the buttonholes on the strip, and will sever and mark the strip, all of which will more fully hereinafter appear.

To this end my invention consists in the mechanism hereinafter claimed, which will feed a strip to a buttonhole-sewing machine step by step and which can be readily attached to existing machines, so as to be operated from the sewing-machine proper, or which can be separately operated, if desired.

In the drawings forming part hereof, Figure 1 is a side elevation, partly broken away, of a feeding mechanism embodying my invention. Fig. 2 is an end elevation thereof. Fig. 3 is a side elevation thereof, taken from the side opposite to the elevation shown in Fig. 1. Fig. 3<sup>a</sup> is a broken-away detail view, partly in section, of the tripping mechanism which operates to lift the presser-foot of the sewing-machine, the section being taken on line 3<sup>a</sup> 3<sup>a</sup> of Fig. 3, looking in the direction of the arrow. Fig. 3<sup>b</sup> is a detail face view of a tripping device for actuating the tripping mechanism which operates the presser-foot. Fig. 4 is a section of the main driving-shaft, taken on line 4 4 of Fig. 3, showing a method of adjustably securing the worm (hereinafter more fully referred to) upon the said main driving-shaft. Fig. 5 is a broken-away vertical transverse sectional view of the feeding mechanism, taken on line 5 5 of Fig. 1 and looking in the direction of the arrow. Fig. 6 is a detail sectional view of mechanism for actuating a spacing device for the feed-rollers, the same being partly in section and the section being taken on line 6 6 of Fig. 5. Fig. 7 is a broken-away detail view of the mechanism for actuating the knife for severing the buttonhole-strip, the same being

partly in section and the section being taken on line 7 7 of Fig. 5. Fig. 8 is a sectional detail view of a feeding mechanism for the feed-rollers coöperating with the spacing device shown in Fig. 6, the section being taken on line 8 8 of Fig. 5. Fig. 9 is a side elevation of the sewing-machine proper, showing also portions of the connections between the sewing-machine and the feeding mechanism for the strip. Fig. 10 is a vertical section of the feeding mechanism for the strip on line 10 10 of Fig. 2, being designed more especially to illustrate the marking and severing mechanism. Fig. 11 is a fragmentary front elevation, partly in section, of the sewing-machine proper, exhibiting the mechanism for raising and lowering the presser-foot, the section being taken on line 11 11 of Figs. 9 and 12. Fig. 12 is a plan view of the same. Fig. 13 is a plan view of the clutch mechanism intervening between the driving-shaft of the sewing-machine proper and the main driving-shaft A of the machine. Fig. 14 is a section through the clutch on line 14 14 of Fig. 13, looking in the direction of the arrow, the same being designed to exhibit the stop or arresting mechanism; and Fig. 15 is a plan view of the stop mechanism shown in section in Fig. 14.

In the drawings, A is the main driving-shaft, to which power is communicated by the belt P, which may be shifted to engage with fast or loose pulleys M N, mounted on the shaft A. Mounted upon this shaft A is a worm Q. (See Fig. 3.) This worm communicates motion from the shaft A to the feeding mechanism for the strip, and as the feeding mechanism is required to be adjustable with respect to the position of the sewing-machine proper the worm Q is mounted upon the shaft in such manner as to allow the shaft to slide through it. This I have shown in the drawings as accomplished by means of a keyway *a* in the shaft and a spline *b*<sup>50</sup> on the worm, (see Fig. 4,) but it will be obvious that various other methods of permitting the shaft and the worm to be adjustable with respect to each other may be employed. Mounted upon a suitable bed-plate R and adjustable thereon is a sliding bed S, (see Fig. 2,) upon which is carried standards S', S<sup>2</sup>, and S<sup>3</sup>, which serve to support some of the parts of the feed-

ing mechanism. This sliding bed S is adapted to be moved with respect to the bed-plate R and is held in its adjusted position by means of clamping-screws R' R<sup>2</sup>. In these standards is carried the main cam-shaft B of the feeding mechanism. Motion is communicated to this main cam-shaft B by means of a mutilated pinion B', carried thereon and meshing with the worm Q of the main driving-shaft. Mounted also upon the cam-shaft B is a cam B<sup>2</sup>, with which engages a lever T, carried on a hub T', mounted upon a stud T<sup>9</sup>, carried by the standard S<sup>2</sup>. Mounted also upon this hub T' is a sector T<sup>2</sup>, which meshes with a mutilated pinion T<sup>3</sup>, carried by a sleeve T<sup>4</sup> (see Fig. 5) on the standard S<sup>2</sup>. To this mutilated pinion T<sup>3</sup> is rigidly connected (or made integral therewith) a disk-cam T<sup>14</sup>, which is carried on the same sleeve T<sup>4</sup> as the pinion T<sup>3</sup>. Hung also upon the sleeve T<sup>4</sup> is a ratchet-wheel T<sup>5</sup>, (see Fig. 5,) to which is rigidly connected a cam-wheel T<sup>6</sup>. Mounted upon the cam-disk T<sup>14</sup> is a pawl b, which is held in engagement with the ratchet by means of a spring b' or by gravity. Mounted also upon the cam-disk T<sup>14</sup> is a pivoted cam-lever T<sup>7</sup>, which may be provided with a toe T<sup>8</sup> for cooperation with the cam-wheel T<sup>6</sup> and with an adjustable stop T<sup>20</sup>, which serves as a stop to limit the movement of the toe T<sup>8</sup> toward the center of the cam-disk T<sup>14</sup>, so as to regulate the throw given to the feeding-rollers by the cam-lever T<sup>7</sup>. This cam-lever T<sup>7</sup> may be provided with a spring b<sup>2</sup> for holding the same in position. This disk T<sup>14</sup>, with its movable cam-lever T<sup>7</sup> and cam-wheel T<sup>6</sup>, constitutes an expansible cam device. It will be observed that the disk T<sup>14</sup> and the lever T<sup>7</sup> constitute an adjustable cam device operated upon by automatic cam-adjusting mechanism—to wit, the cam-wheel T<sup>6</sup> and its operating parts. Mounted on some stationary part of the frame—such, for instance, as the stud T<sup>9</sup>—is a spring-stop T<sup>10</sup>, which coöperates with the ratchet T<sup>5</sup>, so as to lock the ratchet from rotating in the direction of the arrow, Fig. 6, and to permit rotation of the ratchet in a contrariwise direction.

Carried upon shafts D D are feed-rollers D' D'. These rollers serve to grip the buttonhole-strip and feed it through the machine, as will be more fully hereinafter set forth. One end of one of these shafts D D is carried in a bearing T<sup>10</sup>, which is prolonged to form the sleeve T<sup>4</sup>, upon which the disk T<sup>14</sup> is carried.

Mounted upon a stud V on the standard S<sup>2</sup> (see Fig. 3) is a bell-crank lever V', one arm of which, V<sup>2</sup>, coöperates with the cam-lever T<sup>7</sup>, carried by the disk T<sup>14</sup>. The other arm V<sup>3</sup> of this lever is connected with a pitman V<sup>4</sup> in such a manner that the pitman may be adjusted from and toward the pivot of the bell-crank lever V', such as by means of a pin V<sup>5</sup>, connected to the pitman, and the slot V<sup>6</sup> in the arm V<sup>3</sup>. Connected to the lower end of this pitman V<sup>4</sup>, by any suitable adjustable

connection, such as a pin V<sup>7</sup> and slot V<sup>8</sup>, is a lever V<sup>10</sup>. This lever (see Figs. 2 and 10) is mounted upon a hub V<sup>9</sup>, carried by a stud V<sup>11</sup>, mounted on the standard S<sup>2</sup>. Mounted also upon the hub V<sup>9</sup> (see Figs. 10 and 8) are arms V<sup>12</sup>, upon which are carried a sector V<sup>13</sup>, which coöperates with a pinion V<sup>14</sup>, provided with a flange V<sup>20</sup>, loosely mounted upon an adjustable bushing V<sup>15</sup> (see Fig. 5) on the shaft D of the roller D'. Connected rigidly to the shaft D of the roller D' is a ratchet V<sup>16</sup>, (see Figs. 5 and 8,) and coöperating therewith is a pawl b<sup>4</sup>, carried by the flange V<sup>20</sup> of pinion V<sup>14</sup>, and serving to rotate the ratchet and with it the shaft D when the pinion V<sup>14</sup> is rotated in the direction of the arrow in Fig. 8. The rollers D' D' are geared to revolve simultaneously by means of gears D<sup>2</sup> D<sup>2</sup>, carried by the shafts D D and meshing with each other.

The operation of the parts of my device just described is as follows: Motion is communicated to the main driving-shaft A by means of the belt P or other suitable means, and is thence communicated by means of the worm Q and mutilated pinion B' to the main cam-shaft B. The rotation of the main cam-shaft B serves, by means of the cam B<sup>2</sup>, to swing the lever T and with it the sector T<sup>2</sup>, one rotation of the cam B<sup>2</sup> rocking the sector back and forth one complete oscillation. The sector T<sup>2</sup> communicates an intermittent swing, first in one direction and then in the other, to the pinion T<sup>3</sup> and its joined disk T<sup>14</sup>. When the sector swings so as to turn the disk T<sup>14</sup> in the direction of the arrow in Fig. 6, the pawl b will travel over the ratchet T<sup>5</sup> without producing any motion thereof, and in the normal operation of the machine this will be to the extent of one tooth of the ratchet. When, now, the sector turns the disk T<sup>14</sup> in a direction contrary to that of the arrow of Fig. 6, the pawl b will engage the ratchet T<sup>5</sup> and turn the same in the normal operation of the machine the distance of one tooth, and at the same time the cam-lever T<sup>7</sup> will rock the arm V<sup>2</sup> and with it the arm V<sup>3</sup>, which will pull upon the pitman V<sup>4</sup>, thus rocking the arm V<sup>12</sup> of the bell-crank lever and swinging the sector V<sup>13</sup>, turning the ratchet V<sup>16</sup>. As the disk T<sup>14</sup> makes one complete oscillation, the lever V<sup>2</sup> will cause its connected pitman to make one complete reciprocation up and down, thus rocking the lever V<sup>10</sup> and its connected sector V<sup>13</sup> one complete oscillation back and forth. When, now, during the oscillation of the sector V<sup>13</sup> the pinion V<sup>14</sup> is rotated in a direction contrary to that of the arrow in Fig. 8, the pawl b<sup>4</sup> will rattle over the teeth of the ratchet V<sup>16</sup> without producing any motion thereof, but when the sector V<sup>13</sup> turns the pinion V<sup>14</sup> in the direction of the arrow in Fig. 8 the pawl b<sup>4</sup> will engage the ratchet V<sup>16</sup> and carry the same with it the extent of the rotation of the pinion V<sup>14</sup>. Now as the ratchet V<sup>16</sup> is fast upon the shaft of one of the rollers D' the movements thereof will cause the roller to re-

volve, revolving also the other roller which is geared therewith and feeding forward the buttonhole-strip the extent of the movement of the two rollers, which extent of movement can be adjusted for different lengths of bands by adjusting the various adjustable parts heretofore described.

In the manipulation of certain buttonhole-strips it is sometimes necessary to produce step-by-step feeds of varying lengths. This may be efficiently done by conforming the cam-wheel  $T^6$  to produce the desired result, as will now be explained.

In the present instance it is desirable to feed the buttonhole-strip forward by seven steps of equal length and by an eighth step of greater length than any of the preceding steps. This is, in the present instance, accomplished in the following manner: The toe  $T^8$  of the cam-lever  $T^7$  rests upon the periphery of the cam-wheel  $T^6$ , and during the greater portion of the rotation of the cam-wheel will remain at a constant distance from the center of said cam-wheel. It will be remembered, however, that the ratchet  $T^5$ , which is joined rigidly to the cam-wheel  $T^6$ , will be stepped around with respect to the disk  $T^{14}$  by the oscillatory movement thereof and will once in every revolution bring the cam or projection  $b^5$  under the toe  $T^8$  of the cam-lever, thus swinging the cam-lever on its pivot and moving its working surface farther away from the center of the disk  $T^{14}$ . This working surface being, as aforesaid, now farther away from the center of rotation of the disk  $T^{14}$  will produce a greater excursion of the extremity of the lever  $V^2$ , consequently imparting to the pitman  $V^4$  a reciprocating movement of greater extent than before, which movement will be communicated to the sector  $V^{13}$ , pinion  $V^{14}$ , and ratchet  $V^{16}$  in the same manner as before, but to a greater extent, corresponding to the greater extent of movement of the sector  $V^{13}$ . Hence the rollers will receive a motion of greater extent than the other seven motions imparted to them by the oscillations of the disk  $T^{14}$  during one complete revolution of the cam-wheel and its connected ratchet.

It is desirable that some means should be provided for automatically severing the buttonhole-strip at the desired points as the same is fed forward by the rollers. This means will now be described.

Referring now particularly to Figs. 1, 2, 5, and 10, it will be observed that the buttonhole-strip  $Z$ , after leaving the sewing-machine proper, (see Fig. 9,) passes between the feeding-rollers  $D'$   $D'$ , by which it is fed forward, thence over the table  $Z'$  and through the depending chute  $Z^2$ . Mounted also upon the main cam-shaft  $B$  is a cam  $B^3$ , which cooperates with a lever  $A'$ , mounted on a hub  $A^2$ , journaled on a stud  $A^{30}$ , carried by the standard  $S'$  of the machine. (See Fig. 5.) Carried also by the hub  $A^2$  is a sector  $A^3$ , which cooperates with a toothed disk  $A^4$ , carried loosely

upon a nut  $A^{28}$ , connected to an extension  $A^{29}$  of the bearing  $A^7$  by means of a screw-thread. A ratchet-wheel  $A^5$ , formed integral with a cam-wheel  $A^6$ , is also carried upon the extension  $A^{29}$  of the bearing  $A^7$  and is held in frictional contact with said bearing by a spring-washer  $A^8$ , interposed between the nut  $A^{28}$  and the ratchet-wheel  $A^5$ . By this construction a movement of the lower shaft  $D$  in no way affects the independent movement of the ratchet  $A^5$ , &c., and the nut  $A^{28}$  forms a means for regulating the tension on the spring-washer  $A^8$ . Carried by an extension of the disk  $A^4$  is a pawl  $b^6$ , which engages with the ratchet  $A^5$ , so that when the disk  $A^4$  is turned to the left in Fig. 7 it will carry with it the ratchet  $A^5$  and its connected cam-wheel, but when the disk is turned in the opposite direction in Fig. 7 the pawl will slide over the teeth of the ratchet and will produce no motion thereof. Mounted in proximity to the cam-wheel  $A^6$  in such a position as to cooperate therewith is a lever  $A^9$ , adjustable as regards to its length, which lever is carried by a hub  $A^{11}$ , which is mounted on the stud  $A^{10}$ . (See Fig. 1.) Carried also by the hub  $A^{11}$  is a toothed sector  $A^{12}$ , which cooperates with a pinion  $A^{13}$ , carried upon a rock-shaft  $A^{14}$ , upon which is mounted cams  $A^{15}$ . These cams  $A^{15}$  cooperate with a knife-bar  $A^{16}$ , which is preferably provided with antifricition-rollers  $b^7$  to receive the impact of the cams. Carried by the knife-bar  $A^{16}$  is a knife  $A^{17}$ , (see Figs. 2 and 10,) which cooperates with the edge of the table  $Z'$  to sever the buttonhole-strip. This knife-bar  $A^{16}$  may be mounted in suitable guides  $A^{18}$  and is preferably supported on springs  $A^{20}$ , as shown in Fig. 10, in order that the knife may be automatically restored to its initial position after operation. This knife and its operating mechanism constitute a band-severing or strip-dividing mechanism. Carried also by the knife-bar  $A^{16}$  is a suitable projection  $A^{19}$ , which when the knife-bar is depressed operates a stamp  $A^{20}$  or strip-marking mechanism or mark to stamp the buttonhole-strip. Carried also by the knife-bar is a suitable stretcher, preferably of the form shown, (see Figs. 1, 2, and 10,) which consists of a bifurcated bar  $A^{21}$ , carrying a roller  $A^{22}$ , pivoted in a bracket  $A^{23}$ , carried by the knife-bar, and provided with an adjusting-screw  $b^8$  and a spring  $b^9$  for holding the same in its adjusted position. The operation of these several described parts is as follows:

Rotation of the main cam-shaft  $B$  will cause the lever  $A'$  to oscillate, thereby oscillating the sector  $A^3$ , and imparting an intermittent swing to the toothed disk  $A^4$ . This intermittent swing of the disk  $A^4$  will produce a step-by-step rotation of the ratchet  $A^5$  and its connected cam-wheel  $A^6$ . Once in every revolution the cam-wheel  $A^6$  will bring its projection  $b^{10}$  in contact with the lever  $A^9$ , which will rock the lever and its connected sector  $A^{12}$  and rotate the pinion  $A^{13}$ , thus rocking the shaft  $A^{14}$  and depressing the knife-bar

A<sup>16</sup> by means of cams A<sup>15</sup>. This depression of the knife-bar will have the effect of causing the roller A<sup>22</sup> of the stretcher to traverse the lip of the chute Z<sup>2</sup>, (see Figs. 2 and 10,) which, as the buttonhole-strip is firmly held between the rollers D' D', will stretch the same taut, so that as the knife-bar continues its excursion the knife A<sup>17</sup> will readily sever the strip at the desired place.

It will of course be understood that the point of severance of the buttonhole-strip may be at any desired point or points in its length, the position of which will be regulated by the character of the pawl-and-ratchet mechanism and the cam which operates the knife. In the present instance it is desired to sever the buttonhole-strip into short lengths containing eight buttonholes. So, therefore, the ratchet is stepped around eight steps to each complete revolution and the knife operated by the cam once in each revolution of the ratchet. Moreover, in the present case the cam is so related to the other moving parts that as the strip is fed forward by seven equal steps and an eighth step of greater length than the preceding seven the knife is brought down after the eighth or long step and severs the strip. This will produce short lengths of band having eight buttonholes, which bands may be used for waistbands or which may be made up into waistbands, if desired. I would again point out, however, that inasmuch as spacing a number of buttonholes to a band is optional so also the severing of the band is likewise optional, and consequently by varying the relation and the character of the parts bands of varying character may be produced.

Having described the feeding, cutting, and stamping devices for the buttonhole-strip, I will now proceed to describe the connections between these devices and the buttonhole-sewing machine proper by which the feeding and cutting of the strip are regulated so as not to interfere with the proper working of the buttonhole by the buttonhole-sewing machine.

I will proceed to describe the starting mechanism employed by me for starting the sewing-machine after each strip-feeding movement has been accomplished.

Referring particularly to Figs. 1, 9, 10, and 13, E' represents the buttonhole-sewing machine, and C the main driving-shaft thereof. This driving-shaft has thereon a sleeve C', to which is rigidly connected a pinion C<sup>2</sup>, which is geared with the pinion C<sup>3</sup> on the main driving-shaft A by means of suitable intermediate gearing, such as the gear C<sup>4</sup>. The sleeve C' is carried loosely on the shaft C and has rigidly connected therewith one member E of a clutch, the other member of which, F, is rigidly carried upon the shaft C, so that when the two members E F of the clutch are brought into engagement the shaft C will be driven, and when the two members of the clutch are separated the shaft C will be idle. The shift-

able member E of the clutch is shifted by means of the arm C<sup>5</sup> on the shifting-rod L. This shifting-rod is carried in suitable brackets C<sup>6</sup> C<sup>6</sup> and is provided with a bifurcated end, in which fits the bell-crank lever C<sup>7</sup>, pivoted at b<sup>11</sup>, (see Fig. 9,) and whose upper end b<sup>12</sup> coöperates with a catch b<sup>13</sup> under control of the buttonhole-working attachment G, as will hereinafter be more fully set forth. Bearing against the bell-crank lever C<sup>7</sup> and surrounding the shifting-rod L is a spring b<sup>14</sup>, which bears against a collar b<sup>15</sup> on the shifting-rod. Surrounding the shifting-rod and confined between a collar b<sup>16</sup> thereon and the bracket C<sup>6</sup> is a restoring-spring b<sup>17</sup>, which is weaker than the spring b<sup>14</sup>, serving merely to restore the shifting-rod to its initial position after the same has been released, as will be more fully set forth. Connected to the free end of the bell-crank C<sup>7</sup> is a link C<sup>8</sup>, which is connected to one end of a lever C<sup>9</sup>, pivoted in a bracket b<sup>18</sup>, and whose free end is connected by a link C<sup>10</sup> with a rod C<sup>11</sup>, which is swiveled in a bearing C<sup>12</sup> and connected at its free end to a link C<sup>13</sup>, which is in turn connected to an arm C<sup>14</sup>, carried by a hub C<sup>15</sup>, (see Figs. 2 and 10,) hung loosely upon the main cam-shaft B. Mounted also upon this hub C<sup>15</sup> is a detent C<sup>16</sup>, which coöperates with a notched collar C<sup>17</sup>, mounted rigidly upon the main cam-shaft B. Mounted also upon the shaft B is a cam B<sup>4</sup>, which is provided with the roller b<sup>19</sup>, which coöperates with the rod C<sup>11</sup> to rock the same to start the sewing-machine after each strip-feeding movement, as will be more fully hereinafter described.

Before proceeding to describe the detailed operation of these parts last hereinafter mentioned, I will have it understood that the un-toothed portion b<sup>20</sup> of the pinion B' is so located and proportioned as to be brought into such relation with the worm Q as to stop the motion of the main cam-shaft B as each buttonhole is finished.

We will suppose the parts to be in the position which they assume when the buttonhole is being worked—that is to say, in the position shown in the figures. The buttonhole-strip comes from the roll H (see Fig. 9) through the guide and tension device H', under the presser-foot O of the reciprocating work-clamp, over the guiding devices or rollers e e', over the guide J, and thence to the feed-rollers. The presser-foot is dropped upon the strip, thus closing the work-clamp, as will be more fully hereinafter described, and the buttonhole is worked by the needle of the machine, the buttonhole attachment G serving to reciprocate the work-clamp to manipulate the strip to form the buttonhole in any ordinary manner. Meantime and during the working of the buttonhole the bell-crank lever C<sup>7</sup> is held by the catch b<sup>13</sup> of the buttonhole attachment G in the position shown. When now the buttonhole is completely worked, the catch b<sup>13</sup> is automatically withdrawn by the buttonhole attachment G, the

spring  $b^{17}$  swinging the bell-crank lever on its pivot and by means of the shifting-rod shifting the movable member E of the clutch to stop the sewing-machine. At this particular moment of time the untoothed portion of the wheel B' is brought next to the worm Q, and the teeth of the collar C<sup>17</sup> are in position to be engaged by the detent C<sup>16</sup>. Now as the rod C<sup>11</sup> is rocked by the movement of the lever C<sup>7</sup> the arm C<sup>14</sup> will be rocked in the direction of the arrow in Fig. 10, carrying with it the hub C<sup>15</sup> and detent C<sup>16</sup>, which engages with the toothed wheel C<sup>17</sup>, rotating the shaft B, which rotation is just sufficient to cause the pinion B' to be carried around far enough to bring the toothed portion thereof in engagement with the worm Q. Now the shaft A on which the worm Q is carried being constantly in rotation the pinion B' and its shaft B will be rotated, carrying on the operations which have been before described for feeding, stamping, and cutting off the buttonhole-strip and at the proper time bringing the roller  $b^{19}$  of the cam B<sup>4</sup> in contact with the pivoted rod C<sup>11</sup>, depressing the end of the pivoted rod C<sup>11</sup> which is farthest from the sewing-machine, thus causing the opposite end thereof to pull upon the link C<sup>10</sup> to rock the lever C<sup>9</sup> to cause the same to pull upon the link C<sup>8</sup> to rock the bell-crank lever C<sup>7</sup> on its pivot to thereby shift the shifting-rod L and the movable member E of the clutch into engagement with its counterpart F to thereby start the sewing-machine, the catch  $b^{13}$  falling into engagement with the end  $b^{12}$  of the lever C<sup>7</sup> to hold the same in the position to which it has been thrown, when the operation which has just been described will be repeated, and when the buttonhole has been finished the catch  $b^{13}$  will be thrown as before by the buttonhole attachment G, and the feeding of the strip will again take place.

It will of course be obvious that during the operation of feeding the strip it will be necessary that some means be adopted for holding the presser-foot O elevated in order that the strip may move freely over the table of the sewing-machine. This may be variously accomplished, but the mechanism which I prefer to use is as follows: The strip is guided by the guides O<sup>20</sup> and O<sup>25</sup>, cooperating with the plate O<sup>30</sup>, which guides and plate constitute the lower members of the reciprocating work-clamp, the presser-foot being the upper movable member, and the presser-foot O (see Fig. 12) is pivoted in a bracket O' on the plate O<sup>30</sup>, which is connected to the buttonhole-working attachment G in the usual manner and has connected thereto a lever O<sup>2</sup>. This lever has connected to its free end a headed link O<sup>3</sup>, (see Fig. 11,) passing through a conical aperture in the said end, so as to allow the lever O<sup>2</sup> to vibrate in all directions during the working of the buttonhole, which link in turn is similarly connected to an arm O<sup>4</sup>, which is mounted upon a rock-shaft K and adjustable longitudinally thereon. This rock-shaft is mounted in suitable bearings O<sup>5</sup> and

carries at its free end a projection O<sup>6</sup>, (see Figs. 3 and 3<sup>a</sup>,) which is normally in the path of an adjustable cam-plate B<sup>5</sup>, carried upon the cam B<sup>2</sup>. This cam-plate is adjustable with respect to the circumference of the cam B<sup>2</sup> and is so arranged and proportioned as to cooperate with the projection O<sup>6</sup> to rock the shaft K and by its connected mechanism hold the presser-foot elevated during a predetermined time. The rock-shaft K and its connected presser-foot are restored to position by a spring K', connected to the rock-shaft.

Upon consideration it will be obvious that it is desirable, in order to insure the accurate working of the various cooperating devices of my invention, that the needle should be brought to some fixed initial position at the commencement of the working of each buttonhole. This may be most efficiently done by regulating the ultimate position of the driving-shaft of the sewing-machine by stopping the same at a fixed point in its rotation. This may be most efficiently done by means of a stop operated from some of the moving parts of the sewing-machine or feeding mechanism. This stopping device I have shown (see Figs. 13, 14, and 15) as a stud P', which may be moved into the path of suitable yielding stops carried by the shaft C and shown in the present instance as mounted upon the clutch member F. The stop F' is carried by the clutch member F by a pivotal connection, such as the pivot F<sup>2</sup>, and is held in position by a spring F<sup>3</sup>, which abuts against a part of the clutch member F. Carried also by the clutch F is a spring-pressed friction-lever F<sup>4</sup>, which is pivoted at F<sup>5</sup> and held in position by a spring F<sup>6</sup>, carried by a fixed part of the clutch member F. The stud P' is carried by a sliding plate P<sup>2</sup>, which slides in ways P<sup>3</sup> and which is adjustable by means of a thumb-screw P<sup>4</sup>. This sliding plate P<sup>2</sup> is provided with a spring P<sup>5</sup> to assist in restoring it to position when it has been moved longitudinally and also with a spring P<sup>6</sup> to allow for a slight lateral movement. Mounted upon an upright stud P<sup>7</sup> is a lever P<sup>8</sup>, having a slotted end P<sup>9</sup>, which fits over a pin P<sup>10</sup> on the sliding plate P<sup>2</sup>. Abutting against the free end of this lever P<sup>8</sup> is a depending projection P<sup>11</sup>, carried by the shifting-rod L, which operates the clutch. When now the shifting-rod L has been moved forward to cause the clutch to couple the shaft C to the shaft A, the depending projection P<sup>11</sup> will rock the lever P<sup>8</sup> and will move the stud P' out of the path of the stop F' on the clutch, but when the shifting-rod has been withdrawn by the action of the buttonhole attachment to separate the members of the clutch the spring P<sup>5</sup> will slide the plate P<sup>2</sup> forward, so that the stud P' will come into the path of the lever F<sup>4</sup> and stop F'. The lever F<sup>4</sup> upon striking the stud P' will be rocked and the friction of the working face of the lever F<sup>4</sup> upon the stud will check the speed of the rotating shaft C. As soon as the stud escapes from the lever F<sup>4</sup> it will strike against

the end of the stop F', which will be rocked against the tension of its spring and will bring the shaft C to rest, the stud P' being allowed by the spring P<sup>6</sup> to yield laterally in order  
 5 that it may not be broken by the impact of the stop and that the shaft C may be brought to rest without too great a shock.

It will thus be seen that the shaft of the sewing-machine will be brought to the same  
 10 initial position after each buttonhole has been made, and the efficient working of the apparatus thus facilitated.

Having fully and in detail described the mechanism which I have devised for carrying  
 15 out my invention, I would state right here that I will have it distinctly understood that I do not limit myself to the precise construction, arrangement, or interaction of the devices; but I wish to include such devices as  
 20 may be justly regarded as equivalent devices and structures in view of the state of the prior art, for it is obvious that instead of employing the precise devices and means for carrying out the functions described herein  
 25 other and analogous means will readily suggest themselves to those who may desire to enjoy the fruits of my invention; so, therefore, while I have in positive terms described various devices I would have it distinctly  
 30 understood that I do not thereby specifically limit myself to the devices thus described, but that other and analogous devices may be used without departing from the spirit of my invention.

Before proceeding to specify my claims of invention I would also have it understood that wherever in the claims I have used the term "buttonhole-sewing machine" I mean  
 35 to thereby include a buttonhole-feed mechanism, such being an essential part of a buttonhole-sewing machine.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a shaft as A, a buttonhole-sewing machine, a feeding device for  
 45 a buttonhole-strip, comprising feeding-rollers, means for positively connecting the shaft A with the buttonhole-sewing machine, means for positively connecting the feeding device  
 50 with the shaft A, and a reciprocally-operated connection between the two last-mentioned means for engaging either the buttonhole-sewing machine or the feeding device with the shaft A, substantially as described.

2. The combination with a buttonhole-sewing machine, of means for feeding a buttonhole-strip, the same consisting of gripping-rollers, intermittently-operated moving devices for rotating the gripping-rollers, and  
 60 means for communicating motion from the moving devices to the gripping-rollers, and means for intermittently moving the moving devices, substantially as described.

3. The combination with a buttonhole-sewing machine, of a buttonhole-strip-feeding mechanism, the same consisting of gripping  
 65 feeding-rolls for moving the buttonhole-strip,

intermittently-operated moving devices for communicating motion to the rolls, and means  
 70 for intermittently operating the moving devices together with a starting device for the feeding mechanism actuated by the buttonhole-sewing machine upon the completion of each buttonhole, the said starting device being independent of the mechanism for moving  
 75 the feeding-rolls, substantially as described.

4. The combination with a buttonhole-sewing machine, of a buttonhole-strip-feeding mechanism, the same consisting of feeding-rollers for gripping and moving the strip, an  
 80 intermittently-moving cam-piece, and means for communicating an intermittent movement from the cam-piece to the feeding-rolls, together with a starting device for the feeding mechanism actuated by the buttonhole-sewing machine on the completion of each  
 85 buttonhole, the said starting device being independent of the mechanism for moving the feeding-rollers, substantially as described.

5. The combination with a buttonhole-sewing machine, of a feeding device for the buttonhole-strip consisting of engaging devices for engaging and moving the buttonhole-strip, step-by-step devices for moving the  
 95 engaging devices step by step and mechanism for actuating the step-by-step devices, a cutting device for severing the buttonhole-strip, means for rendering the feeding device inactive while the buttonhole is being worked, and a connection between the sewing-machine and the feeding device for causing the feeding device to be actuated upon the completion of a buttonhole, substantially as described.

6. The combination with a buttonhole-sewing machine, of a feeding device for the buttonhole-strip consisting of engaging devices for engaging and moving the buttonhole-strip, step-by-step devices for communicating an  
 110 intermittent movement to the engaging devices for the buttonhole-strip, mechanism for actuating the step-by-step devices, a cutting device for severing the buttonhole-strip actuated by the mechanism for actuating the  
 115 step-by-step devices, means for rendering the feeding device inactive while the buttonhole is being worked, and a connection between the sewing-machine and the feeding device for causing the feeding device to be actuated  
 120 upon the completion of a buttonhole, substantially as described.

7. The combination with a buttonhole-sewing machine, of a feeding device for a buttonhole-strip, feeding-rolls for moving the buttonhole-strip, step-by-step mechanism for communicating a step-by-step motion to the feeding-rolls and mechanism for actuating the step-by-step mechanism, a cutting device for severing the buttonhole-strip operated by  
 125 the mechanism for actuating the step-by-step mechanism, means for rendering the feeding device inactive while the buttonhole is being worked, and a connection between the sewing-

ing-machine and the feeding device for causing the feeding device to be actuated upon the completion of a buttonhole, substantially as described.

5 8. The combination with a buttonhole-sewing machine, of a feeding device for feeding the buttonhole-strip comprising feeding-rolls and moving mechanism therefor, a stop device for stopping the motion of the feeding  
10 devices, and a starting device for the feeding mechanism actuated by the sewing-machine upon the completion of each buttonhole, the said starting device operating independently of the feeding mechanism, substantially as  
15 described.

9. The combination with a buttonhole-sewing machine, of step-by-step feeding devices for moving a buttonhole-strip comprising feeding-rolls and moving mechanism therefor, a stop for the feeding devices, and a  
20 starting device for the feeding mechanism actuated by the sewing-machine upon the completion of each buttonhole, the said starting device operating independently of the feeding  
25 mechanism, substantially as described.

10. The combination with a sewing-machine, of feeding devices for feeding the buttonhole-strip, a mutilated pinion for communicating motion to the feeding devices from  
30 the driving-shaft, whereby when the gap in the mutilated pinion comes in proximity to its operating mechanism the feeding devices will be stopped, and a connection between the sewing-machine and the feeding devices  
35 for engaging the mutilated pinion with its operating mechanism, substantially as described.

11. The combination with a buttonhole-sewing machine, of feeding devices for moving a buttonhole-strip, means for communicating motion thereto consisting of a worm and a mutilated pinion, with a connection between the sewing-machine and the pinion for  
40 engaging the pinion with the worm at a predetermined time, substantially as described.

12. The combination of a buttonhole-sewing machine, a feeding device for feeding a buttonhole-strip, a connection between the feeding device and the presser-foot of the sewing-machine to lift the presser-foot at predetermined times, and a cutter operated from the feeding device at predetermined times to sever the strip, substantially as described.

13. The combination of a buttonhole-sewing machine, a feeding device for a buttonhole-strip, the said feeding device being provided with a cam for raising the presser-foot of the sewing-machine at predetermined periods, and a cutter operated from the feeding  
50 device at predetermined times to sever the strip, substantially as described.

14. In a feeding mechanism, the combination of feeding-rolls, a ratchet rigidly carried by one of the rolls so as to move the rolls when  
65 actuated, a pinion loosely mounted upon the axis of the said roll, actuating means between said pinion and said ratchet, a sector engag-

ing with the pinion, an intermittently-moving cam device, and means for communicating an intermittent motion to the sector from  
70 the cam device, substantially as described.

15. In a feeding device, the combination of feeding-rolls, a ratchet carried by one of the rolls, a pinion also carried by one of the rolls and provided with a pawl for engaging with  
75 the ratchet, a sector meshing with the pinion, an intermittently-moving cam device and means for communicating motion from the cam device to the sector, substantially as described.  
80

16. The combination with a buttonhole-sewing machine of a feeding device for the buttonhole-strip comprising feeding-rolls for engaging the strip, means for communicating intermittent movements of equal length to  
85 the said rolls, and means for causing the said rolls to receive at predetermined times a greater range of movement than any of the preceding equal intermittent movements, substantially as described.  
90

17. The combination in a feeding device, of feeding-rolls, an expansible cam device, means for communicating motion from the said cam device to the feeding-rolls, and a cam mechanism for expanding the cam device  
95 to cause the cam device at predetermined times to give a longer throw to the mechanism for communicating motion to the feeding-rolls, substantially as described.

18. In a feeding device, the combination of  
100 feeding-rollers, a pinion carried by one of the rollers coöperating with pawl-and-ratchet mechanism also carried by one of the rollers, moving mechanism for communicating motion to the pawl-and-ratchet mechanism, and  
105 a cam device for communicating motion to the moving mechanism, the said cam device consisting of a disk, a cam-lever carried thereby, pawl-and-ratchet mechanism and a cam device for coöperating with the cam-lever at predetermined periods to rock the cam-lever and thereby expand the cam, substantially as described.

19. The combination in a feeding device, of feeding-rolls, moving mechanism for communicating motion thereto, an expansible cam device for imparting throws of various lengths to the moving mechanism for the feeding-rollers and means for expanding the cam device, substantially as described.  
120

20. The combination with a buttonhole-sewing machine, of a feeding device for feeding a buttonhole-strip, adjusting mechanism for adjusting the feeding devices with respect to the sewing-machine, means for rendering the feeding device inactive while the buttonhole is being worked, and a connection between the sewing-machine and the feeding device for causing the feeding device to be actuated upon the completion of a buttonhole, substantially as described.  
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21. In a feeding and band-severing device for buttonhole-sewing machines, the combination with a knife-bar mounted in suitable

guides and carrying a knife, of a stretcher actuated by the knife-bar and feeding-rolls for feeding a buttonhole-strip, substantially as described.

22. In a feeding and band-severing device for buttonhole-sewing machines, the combination with a knife-bar carrying a knife and provided with a pivoted stretcher, of feeding-rolls for feeding a buttonhole-strip, together with means for moving the knife-bar, substantially as described.

23. A feeding and band-severing device for buttonhole-sewing machines comprising a feeding device for the buttonhole-strip provided with a main cam-shaft, step-by-step mechanism operated from the main cam-shaft and serving to operate a cam, together with a knife and operating mechanism therefor actuated at predetermined intervals by the cam of the step-by-step device, substantially as described.

24. The combination in a feeding device for a buttonhole-strip, of a main cam-shaft, a sector operated from the main cam-shaft, a toothed disk engaging with the sector and provided with a pawl-and-ratchet mechanism, a cam device, and a knife for severing the strip operated by the cam device, substantially as described.

25. The combination of a buttonhole-sewing machine, a knife-bar mounted in suitable guides, a rock-shaft provided with cams engaging with the knife-bar, a step-by-step feeding device for the buttonhole-strip, and a connection between the step-by-step feeding device and the rock-shaft for actuating the rock-shaft at predetermined periods, and means for propelling the step-by-step device, substantially as described.

26. The combination of a buttonhole-sewing machine, feeding-rolls for advancing the work step by step, a chute, a knife-bar carrying a knife, and a stretcher carried by the knife-bar and cooperating with the chute to stretch the strip before the same is severed, substantially as described.

27. The combination in a feeding device, and band severing and marking device for use with buttonhole-sewing machines, of intermittently-operated feeding-rolls, a knife-bar provided with a knife, a stamp and means for operating the stamp, together with mechanism for moving the knife-bar at predetermined times, substantially as described.

28. The combination with a knife-bar provided with a knife, of a stretcher pivoted on the knife-bar, the same consisting of a forked bar A<sup>21</sup> provided with a roller A<sup>22</sup> and with a spring, substantially as described.

29. The combination in a strip-feeding device for buttonhole-sewing machines, of a driving-shaft A provided with a worm, a mutilated pinion engaging with the worm and serving to communicate motion from the shaft A to the main cam-shaft of the mechanism, a notched collar upon the main cam-shaft with which cooperates a detent carried

by a collar on the main cam-shaft, and a connection between the sewing-machine and the detent to move the same to engage with the notched collar to rotate the main cam-shaft at predetermined periods, substantially as described.

30. The combination with a buttonhole-sewing machine, of a feeding mechanism for a buttonhole-strip provided with a main cam-shaft, a connection between the sewing-machine and the main cam-shaft to turn the latter at predetermined periods, and a cam upon the main cam-shaft for actuating the aforesaid connection to start the sewing-machine, substantially as described.

31. The combination of a buttonhole-sewing machine provided with a presser-foot, a feeding mechanism for the buttonhole-strip adjustable with relation to the sewing-machine and provided with a cam, a rock-shaft cooperating with the cam, and an adjustable connection between the rock-shaft and the presser-foot, substantially as described.

32. The combination, with a buttonhole-sewing machine having a presser-foot, of a rock-shaft connected with the presser-foot and provided with a projection, a feeding mechanism for a buttonhole-strip, and a cam on the feeding mechanism cooperating with the projection and serving to rock the shaft in one direction, whereby the presser-foot may be lifted at predetermined times, substantially as described.

33. The combination with a buttonhole-sewing machine, of a feeding device for feeding a buttonhole-strip, comprising feeding-rolls and moving mechanism therefor, a driving-shaft A, a connection between the shaft A and the feeding device, a clutch for connecting the shaft C of the sewing-machine with the shaft A whereby the shaft C may be driven, a connection between the sewing-machine and the clutch constituting a shifting mechanism therefor, a connection between the feeding mechanism and the buttonhole-sewing machine adapted to operate the shifting mechanism, the said connection being adapted for engagement with a catch, and means for releasing the catch from the buttonhole attachment whereby the buttonhole-sewing machine may be started by the movement of the feeding mechanism and stopped by the movement of the buttonhole attachment upon the completion of a buttonhole, substantially as described.

34. The combination of a buttonhole-sewing machine, a feeding mechanism for a buttonhole-strip comprising feeding-rolls, a driving-shaft, and an automatically-operated connection between the sewing-machine and the feeding mechanism for alternately connecting the driving-shaft with the sewing-machine and with the feeding mechanism, substantially as described.

35. The combination of a disk provided with a pivoted cam-lever, a pawl carried by the disk, a ratchet adapted for engagement

with the pawl, a cam device carried by the ratchet and provided with one or more projections for engaging with the cam-lever to rock the same at predetermined periods, substantially as described.

36. The combination of a disk  $T^{14}$ , a cam-lever  $T^7$  pivoted thereto and provided with a toe  $T^8$ , a pawl  $b$  pivoted to the disk, a ratchet  $T^5$  mounted in proximity to the disk and free to revolve, a cam-piece  $T^6$  arranged to move with the ratchet and to engage with the toe  $T^8$  at predetermined periods to rock the same, substantially as described.

37. In a stop mechanism for buttonhole-sewing machines, the combination of a rotating shaft provided with a disk, a yielding stop upon the disk and with a spring-pressed friction device, together with a movable abutment engaging with the stop and friction device to arrest the motion of the shaft, substantially as described.

38. In a stop mechanism, the combination of a rotating shaft provided with a disk, a lever pivoted to the disk, a spring bearing upon and cushioning the pivoted lever, a friction-lever also pivoted to the disk and having a spring for holding the same under tension, together with a movable abutment in the path of the levers and engaging with the said levers to stop the shaft, substantially as described.

39. In a stop mechanism, the combination of a disk, a spring-pressed stop-lever pivoted to the disk and constituting a yielding stop, a spring-pressed friction-lever also pivoted to the disk, together with a movable abutment adapted to engage with the levers to stop the rotation of the disk and means for moving the abutment, substantially as described.

40. In a stop mechanism, the combination of a disk, a pivoted spring-pressed lever carried thereby and constituting a yielding stop, of a spring-pressed friction-lever carried also by the disk, and a yielding abutment with which the levers are adapted to engage to stop the rotation of the shaft, substantially as described.

41. The combination with a buttonhole-sewing machine, of a feeding mechanism for feeding a buttonhole-strip, a stop mechanism for the sewing-machine, the same consisting of a disk carried by a rotating part of the sewing-machine mechanism, the said disk being provided with a spring-pressed pivoted lever constituting a yielding stop and a spring-pressed friction-lever, and an abutment with which the levers are adapted to engage, together with a shifting device, for the abutment, the same being operated from the feeding mechanism, substantially as described.

42. The combination with a buttonhole-sewing machine having a reciprocating work-clamp, of a strip-guiding device or guide fixed with respect to the work-clamp, over which guide the strip runs to the work-clamp, a ten-

sion device in advance of the buttonhole-sewing machine to maintain a constant tension on the strip, a strip-feeding mechanism beyond the buttonhole-sewing machine and connecting mechanism whereby the strip-feeding mechanism is operated when the buttonhole-sewing machine is at rest and the strip-feeding mechanism is arrested when the buttonhole-sewing machine is in operation.

43. The combination with a buttonhole-sewing machine, of a supporting strip-feeding roll, another strip-feeding roll resting thereon, and operating mechanism connecting the said supporting-roll with the buttonhole-sewing machine whereby the strip-feeding rolls are revolved when the buttonhole-sewing machine is at rest and the strip-drawing rolls are arrested when the buttonhole-sewing machine is in operation.

44. The combination with a buttonhole-sewing machine, of a work-clamp located at the point where the needle operates, suitable guides for conducting to said clamp a strip of material of indefinite length, mechanism for automatically and intermittently feeding said strip through said clamp, mechanism actuated by the strip-feeding mechanism for automatically and intermittently opening and closing the work-clamp, and mechanism actuated by the strip-feeding mechanism for starting the buttonhole-sewing machine at each cessation of the movement of the strip, substantially as described.

45. The combination with a continuously-rotating shaft A, of a buttonhole-sewing mechanism comprising a spring-closed work-clamp and connected with the shaft A by clutch-gearing, a shaft B positively geared with the shaft A, a cam on said shaft B operating to open the work-clamp of the sewing mechanism, a second cam on said shaft B operating the starting mechanism of the sewing-machine, and a third cam on said shaft B operating intermittently a strip-feeding mechanism, substantially as described.

46. The combination with a buttonhole-sewing machine having a spring-closed work-clamp at the point where the needle operates, of a rotating shaft geared with said machine, a pair of feed-rolls for feeding a strip of material through the sewing-machine, a cam on said shaft adapted to operate said feed-rolls intermittently, and other cams on said shaft for respectively starting the sewing-machine and opening the work-clamp, in synchronism with the movement of the feed-rolls, substantially as described.

47. The combination with a buttonhole-sewing machine, comprising a spring-closed work-clamp, of a rotating shaft geared with said machine, a cam on said shaft, a rigid connection between said cam and the work-clamp whereby the cam operates to open said clamp at regular intervals, a strip-feed mechanism operated by said shaft at the intervals when the clamp is open, and a cam on said

shaft operating to start the sewing-machine at the close of each feeding movement, substantially as described.

48. The combination, with a buttonhole-sewing machine including means for starting the same, a work-clamp and means for driving the sewing-machine, of a strip-feeding mechanism, cams  $B^2$   $B^4$   $B^5$  operating in unison with the said means for driving the sewing-machine, and operating connections between said cams  $B^2$   $B^4$   $B^5$  and the strip-feeding mechanism, the means for starting the machine and the work-clamp, respectively.

49. The combination of a sewing-machine, means for stopping the same, and strip-feeding mechanism actuated by a cam operating in harmony with the sewing-machine, and means for adjusting said cam.

50. The combination, with a sewing-machine, its stop mechanism, and a strip-feeding mechanism, operated by an adjustable cam device operating in harmony with the sewing-machine, of an automatic cam-adjusting mechanism operating in harmony with the sewing-machine.

51. The combination with the sewing-machine and the cooperating strip-feeding mechanism operated by a cam provided with an adjustable part, of another cam mounted on the first-named cam for controlling said adjustable part.

52. The combination, with a buttonhole-sewing machine, including mechanism for

working a buttonhole of a strip-feeding mechanism cooperating therewith to advance a continuous strip of fabric through the work-clamp of the machine intermittently after the stitching of each buttonhole, together with a strip-dividing mechanism and mechanism for operating the same only after a predetermined series of successive feeding and buttonhole-stitching operations.

53. The combination, with a sewing-machine and a strip-feeding mechanism, of a strip-dividing mechanism, a cam operating in harmony with the strip-feeding mechanism, a cam to operate the strip-dividing mechanism, and a ratchet-gear between said cams.

54. The combination, with a strip-feeding mechanism and a strip-marking device or stamp, of cams for actuating the strip-marking device operating in harmony with the strip-feeding mechanism, and a ratchet-gear between said cams.

55. The combination of a buttonhole-sewing machine, including means for working a buttonhole, a strip-feeding mechanism operating intermittently with the buttonhole-sewing machine and a strip-marking device operating intermittently with the strip-feeding mechanism.

JACOB SCHWARZ.

Witnesses:

CHAS. E. SMITH,  
GEO. E. MORSE.