(No Model.) 2 Sheets—Sheet 1.

W. RANDEL.

BUTTON HOLE SEWING MACHINE.

No. 363,678. Patented May 24, 1887.

Fig. 1.

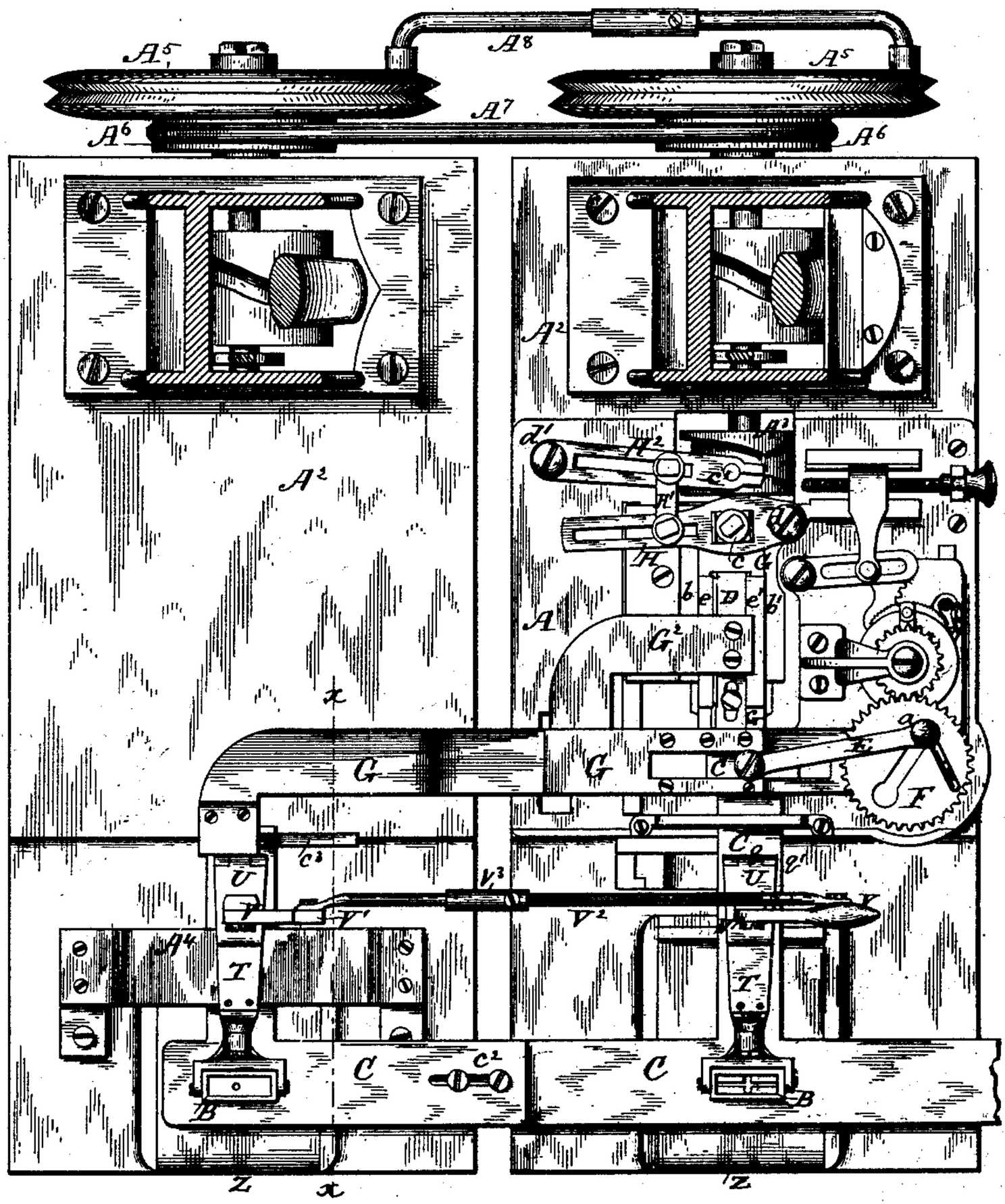
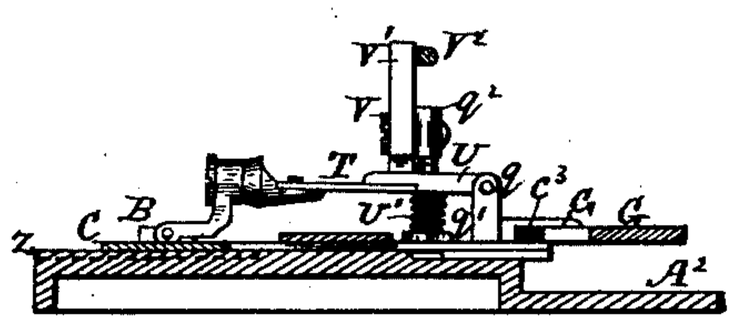


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

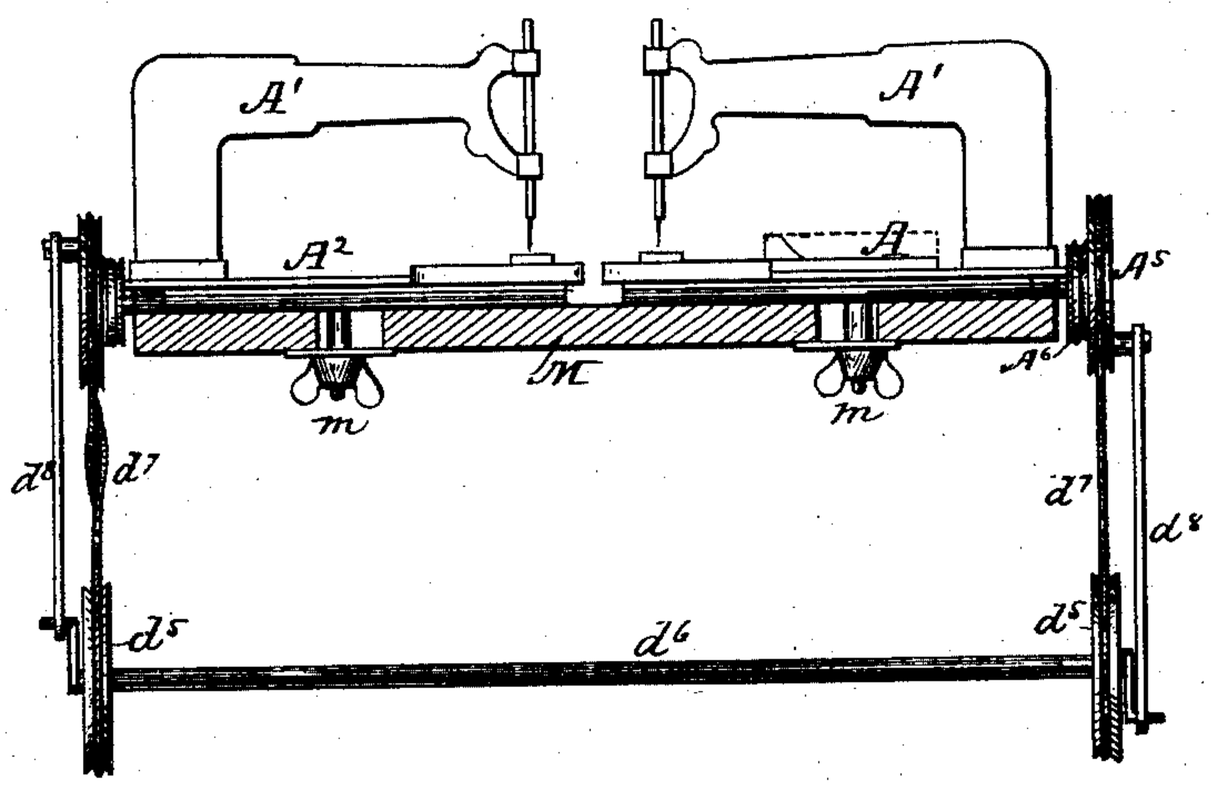


Fig. 6.

Fig. 4.

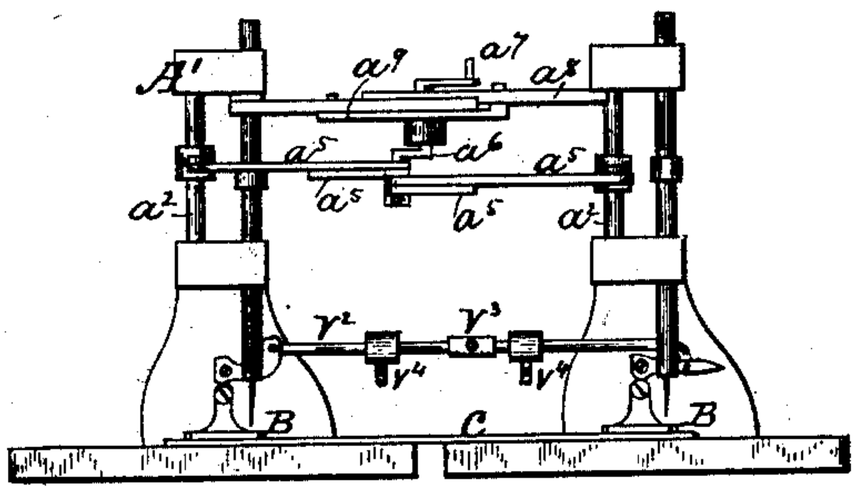
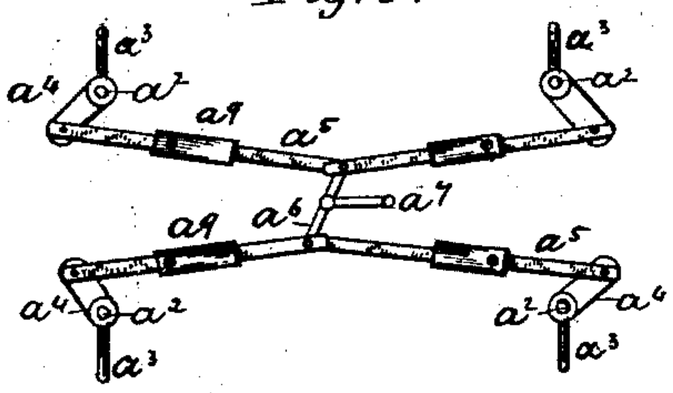
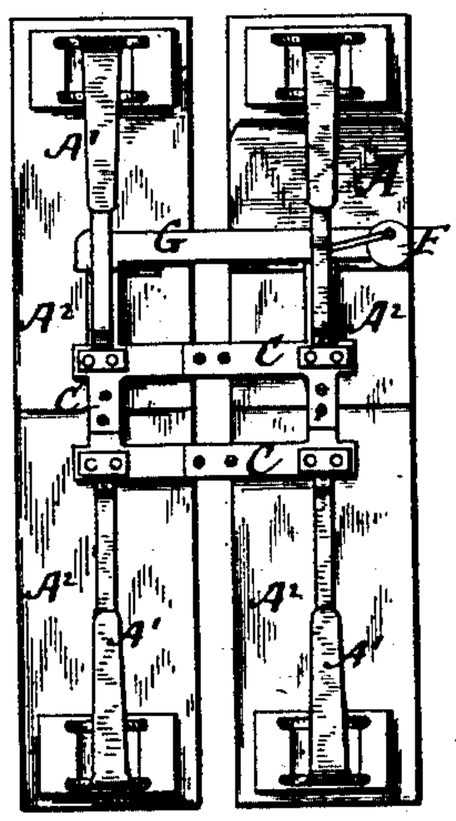


Fig. 7.

Fig. 5.





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UNITED STATES PATENT OFFICE.

WILLIAM RANDEL, OF TROY, NEW YORK.

BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 363,678, dated May 24, 1887.

Application filed October 18, 1886. Serial No. 216,530. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM RANDEL, a citizen of the United States, residing at Troy, in the county of Rensselaer, State of New York, have invented certain new and useful Improvements in Button-Hole Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my improvement is to combine with a sewing-machine carrying a button-hole attachment secured thereto one or more plain sewing-machines placed alongside of the button-hole sewing-machine, and by connecting their cloth-feeding mechanism with the button-hole attachment of the first cause the cloth-feeding mechanism of all the machines connected to work in unison with the cloth-feeding mechanism of the button-hole attachment, or of the machine carrying it, and thereby permitting two, three, or more button-holes to be produced at the same time from plain sewing-machines, without incurring the expense of as many button-hole attachments and of as many operators to control them—in other words, accomplishing three or four times the same amount of work in the same space of time without materially increasing the expense. I accomplish these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents in top view two sewing-machines having their needle-arms and elevated frames thereof broken away and removed to clearly exhibit their connections, the right-hand machine carrying a button-hole attachment secured thereto and the left-hand machine provided with a horizontal presser-foot and cloth-plate connected with the other and with its button-hole attachment. Fig. 2 is a vertical section on line *x x* of Fig. 1. Fig. 3 is a side view intended to show diagrammatically the means to unite and operate four machines in unison under the control of a single button-hole attachment. Fig. 4 is a front view of two sewing-machines to which are attached the means for releasing simultaneously and by one movement of the operator the tension on the thread of four connected sewing-machines, and also simultaneously operating the presser-foot of each. Fig. 5 is a plan view, detached, of the thread-drawing and tension-releasing means. Fig. 6 represents, on a small scale in plan, three sewing-machines connected together to form simultaneously three button-holes on a collar, the central machine carrying a button-hole attachment connected with the cloth-feeding mechanism of the three machines. Fig. 7 is a similar plan of four sewing-machines connected together to form simultaneously the four button-holes of a cuff, one of the machines carrying a button-hole attachment connected with the cloth-feeding mechanism of the four machines.

As many of the patented button-hole attachments found on the market could be used in connection with my invention, I will only briefly describe the main operative parts of one, taking, for example, the button-hole attachment fully shown in Patent No. 252,052, of January 10, 1882, and using the same letters of reference, (so far as the description will extend,) there will be no difficulty in understanding the whole construction of the attachment.

In the drawings, A is the bed-plate, which supports the other parts of the button-hole attachment. It is secured by any suitable means to the frame or bed-plate A^2 of a sewing-machine under the head A′, so that the feed-foot B can bear properly upon the work-plate Z of the machine.

The foot B is mounted upon the feed-bar C, which is formed to slide to and fro parallel to the lengthwise direction of the opening through the part B upon the guide-plate D, and the feed-bar is connected by a pitman, E, to a crank-pin, *a*, radially adjustable on the rotary crank-wheel F, so that by the rotation of the latter step by step the feed-bar will be moved step by step to and fro a distance regulated by the distance of the crank-pin from the center of the crank-wheel. Any suitable known equivalent for the pitman E can be used for imparting to and fro movements to the feed-bar from the crank-wheel.

G is a plate which is connected with the guide-plate D, and supported by ways *b b′* on the base A, so as to be movable to and fro and give reciprocating motion to the feed-bar C, to form the over-edge stitches in a direction transverse to that in which the feed-bar is

moved to and fro in or on its guide-plate D, and the plate G is connected by a self-adjusting stud, *c*, with a lever, H, which is pivoted at *d* to the plate A, and is adjustably connected by a link, H′, with a lever, H^2, that is pivoted at *d′* to the base-plate, and has a cam-follower, *c′*, which is formed to engage with a suitable driving-cam, A^3, on the sewing-machine.

The guide-plate D is supported by ways *e e′* on the transversely-reciprocating plate G, and is also connected with the latter by a lever engaging with a cam fast on the crank-wheel F, which is carried by the plate G, whereby the plate D and feed-bar C, with its feed-foot B, are suitably reciprocated.

The foot B is mounted upon one end of a leaf-spring, T, which is fastened at its other end to an arm, U, that is hinged at *q* to a raised part, *q′*, of the feed-bar C, and V is a cam journaled upon a stud, q^2, that is fast on or a part of the feed-bar, and extends through and above a perforation through the arm U, so that by turning down the cam V by means of its handle V′, that cam will then bear upon and force down the rigid arm U, and thereby, through the spring T, press the foot B with an elastic pressure upon the button-hole work on the work-supporting plate Z of the sewing-machine. A spring, U′, serves to elevate the arm U when the cam V is turned up. A bridge, A^4, has its ends secured to the bed-plate A^2, and bears lightly upon the feed-bar C, to prevent it from rising up when the goods are clamped and the needle goes up.

In my improvement the handles V′ of the cam-levers V are united by a connecting-rod, V^2, provided with a sleeve, V^3, as clearly shown in Fig. 1, so that its length can be regulated according to the distance the two sewing-machines are secured apart, (for different length of cuffs or collars, as the case may be.)

If four machines are used, the handles of the cam-levers can be retained in pairs by the rods V^2, and said rods be again connected by a spider or rods, V^4, Fig. 4, so as to be all acted upon by one movement of the operator.

To connect the feed mechanism of a plain sewing-machine (unprovided with an ordinary presser-foot) with the feed mechanism of the button-hole attachment carried by the plate A, the feed-bar C is extended beyond the bed-plate A^2 of the machine carrying said attachment, and is adjustably connected at c^2 with the feed-bar C of the adjoining machine or machines, and this under the control of the crank-wheel F produces the small feed for the zigzag stitch of a button-hole, the long-stitch feed of said zigzag being produced by the plate G, connected with the guide-plate D. Said plate G is also extended beyond the bed-plate A^2, and up to a point in the rear of the foot B of the adjoining sewing machine or machines, where it rests upon and engages with a track, c^3, projecting upward from the feed-bar C, and thus backs up, stiffens, and controls one motion of said bar C without interfering with its other motion. An angular brace, G^2, having one end secured to the guide-plate D and the other to the plate G, is placed in the rear of said plate to increase its rigidity and the steadiness of its motion.

The front portion of the feed-bar C is made in two or more lengths, (according to the number of sewing-machines used,) and said lengths are made adjustable upon each other at c^2 to permit changes of distance between the sewing-machines. When four machines are used, as shown in Fig. 7, the fore and aft portions of the feed-bars C are also adjustable for the same purpose.

To pull and slack thread simultaneously on, for example, four machines when the four button-holes are completed, each machine is provided with a vertical shaft, a^2, placed in the bearings usually occupied by the presser-foot rod of ordinary sewing-machines, and each shaft is provided with a radial arm, a^3, that occupies a position nearly in contact with the thread passing from the tension device to the take-up and the eye of the needle, so that when said arm a^3 makes a quarter-revolution it pulls a sufficient amount of thread from the upper spool and tension device to cause the machine to start and sew properly upon the next piece of work placed under its presser-foot. Each shaft a^2 is also provided with a radial arm, a^4, that is united by means of a connecting-rod, a^5, with a crank, a^6, that is controlled by a handle, a^7. This crank is supported and properly retained by a brace or plate, a^8, secured to the heads of one or more of the machines. The length of the brace a^8 and of the connecting-rods a^5 can be adjusted by means of sleeves a^9, or other well-known means.

To connect two, three, or four machines, so that they will work in unison and will produce the same number of stitches, they are united as follows: For example, if two machines only are used, as shown in Fig. 1, there is secured upon the driving-shaft of each a large pulley, A^5, and a small pulley, A^6. One of the pulleys A^5 is connected with the motor and the small pulleys are united by a belt, A^7; but to prevent the belt from slipping upon one of the small pulleys, the large pulleys are also united by a connecting-rod, A^8, that is made adjustable in length to permit changes of relative position of the machine. When three machines are used in a row, as shown in Fig. 6, the large pulleys of two adjacent machines are united by a belt, besides a connecting-rod, as A^8. When four machines are used simultaneously, as shown in Figs. 3 and 7, one of the pulleys A^5 of two oppositely-facing machines is united by means of a connecting-rod, d^8, to a counter-shaft or crank-shaft, d^6, extending under the machines, and said crank-shaft carries two pulleys, d^5, with belts d^7, to give steadiness to the motion transmitted by the connecting-rods d^8. One of the belts d^7 at one end of the crank-shaft is a straight belt, while at the opposite end it is a crossed belt to give the proper direction of motion to the four ma-

chines. These machines are adjustably secured upon a table, M, and are retained either by a clamping-screw, *m*, as used upon the tail-block of a lathe, or they may be mounted upon sliding carriages controlled by long horizontal screws, each provided with a handle.

As large factories may use a large number of machines connected in series, as above described, upon the same size cuffs or other garments, the relative position of the machines may not require to be changed during many weeks or months, and separate sizes of feed-bars C and of connecting-rods may be employed in place of having these parts regulable.

I have used in the above description the terms "plain sewing-machine" and "button-hole sewing-machine." To prevent any misunderstanding of these terms, I will state that by "plain sewing-machine" I mean a machine organized with the necessary stitch-forming, feed, take-up, and tension mechanism, and by "button-hole sewing-machine" I mean a machine organized with not only the above means, but also including the necessary cloth-clamp and means for giving the same an intermittently vibrating and reciprocating movement. I have also mentioned the terms "a button-hole sewing-machine" and "a plain sewing-machine provided with a button-hole attachment." These terms are regarded as synonymous, and only one of them will be used in the claims.

Having now fully described my invention, I claim—

1. The combination of a button-hole sewing-machine, (that is, a machine organized with not only the necessary stitch-forming, feed, take-up, and tension mechanism, but also including the necessary cloth-clamp and means for giving the same an intermittently vibrating and reciprocating movement,) and a plain sewing-machine, (that is, a machine organized with the necessary stitch-forming, feed, take-up, and tension mechanisms,) with connecting means, whereby said plain sewing-machine is caused to produce button-holes under the control of the button-hole sewing-machine, substantially as and for the purpose described.

2. The combination of a plain sewing-machine with a button-hole sewing-machine having its feed-bar C and transversely-reciprocating plate G extending over both machines, and means, as described, to connect the driving-pulleys of said machines, for the purpose set forth.

3. The combination of a plain sewing-machine, and a button-hole sewing-machine having its feed-bar and transversely-reciprocating plate extending over both machines, with means, as described, for connecting their driving-pulleys, and connecting-rods uniting the handles of their presser-feet, substantially as and for the purpose described.

4. The combination of a plain sewing-machine, and a button-hole sewing-machine having its feed-bar and transversely-reciprocating plate extending over both machines, with means, substantially as described, whereby the threads of both machines are simultaneously pulled and slackened under the control of a handle, substantially as set forth.

5. The combination of a plain sewing-machine, adjustably secured upon a table or platform, and a button-hole sewing-machine secured upon said table, each machine having pulleys A^5 and A^6, with a counter-shaft, d^6, its pulleys d^5 and belts d^7 at each end, and connecting-rods d^8 parallel with said belts, substantially as and for the purpose described.

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

WILLIAM RANDEL.

Witnesses:

JNO. W. CIPPERLY,

THEO. E. HASLEHURST.