

F. A. READ.
 BUTTONHOLE SEWING MACHINE.
 APPLICATION FILED AUG. 5, 1911.

1,048,210.

Patented Dec. 24, 1912.

2 SHEETS—SHEET 1.

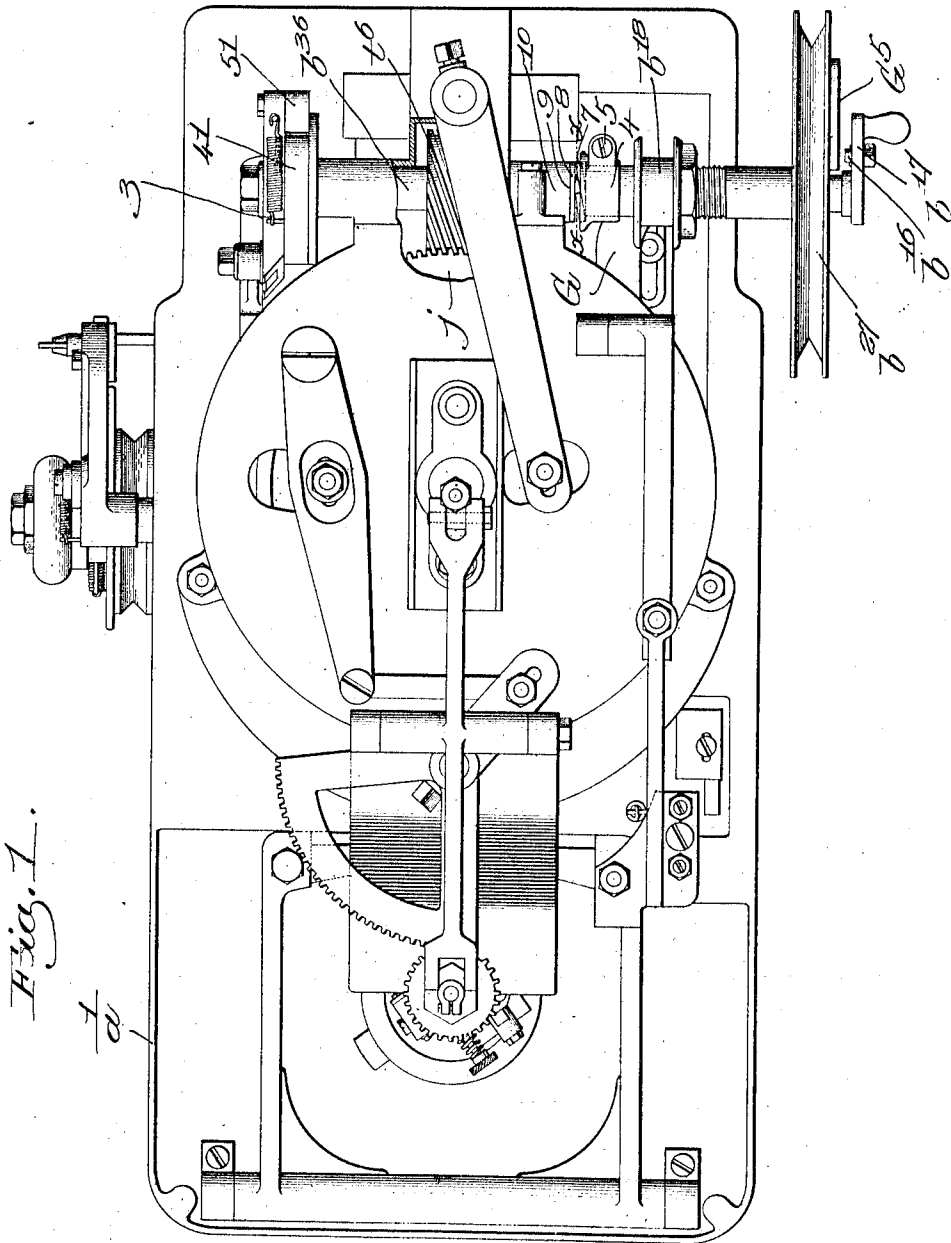
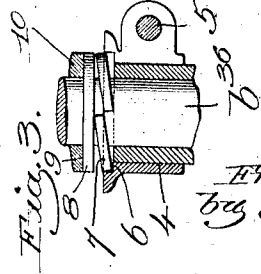
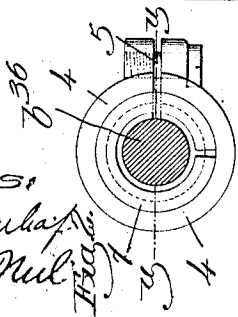


Fig. 1.

1/2



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 attys.

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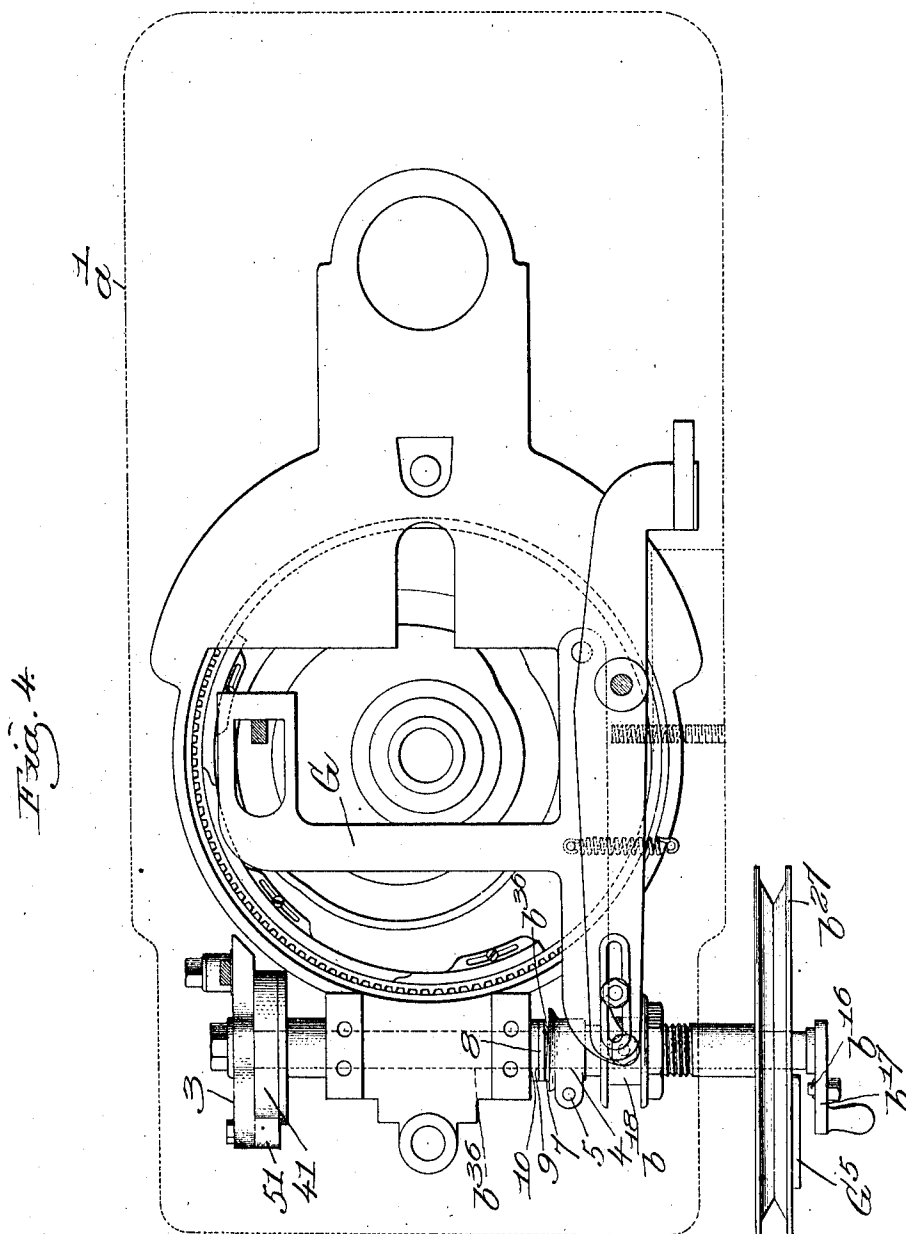


Fig. 4.

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Fig. 5.



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UNITED STATES PATENT OFFICE.

FRED A. READ, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE REECE BUTTON HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

BUTTONHOLE-SEWING MACHINE.

1,048,210.

Specification of Letters Patent.

Patented Dec. 24, 1912.

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To all whom it may concern:

Be it known that I, FRED A. READ, a citizen of the United States, residing at Lynn, county of Essex, and State of Massachusetts, have invented an Improvement in Buttonhole-Sewing Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to buttonhole sewing machines of the type shown in Patent No. 655,637, dated August 7, 1900, and has particular reference to a mechanism for controlling the movements of the feed shaft which drives the feed cam.

In machines of the above type the feed shaft is operated at different times in the formation of the buttonhole from each of two different driving mechanisms, one of which operates to give the shaft a rapid rotary movement thereby to bring the work into position for the needle to operate thereon, and the other of which gives the shaft a slower intermittent rotary movement thereby to feed the work during the stitching of the buttonhole. The fast movement of the shaft is derived from a rapidly-rotating pulley loosely mounted thereon, but adapted to be clutched thereto and unclutched therefrom at the proper times by an automatically-actuated clutch mechanism. The slow intermittent feeding movement of the feed shaft is derived from a pawl and ratchet mechanism which is actuated at the proper times.

In the operation of the sewing machine the work is first clamped in position, and then the rapidly-rotating pulley is clutched to the feed shaft thereby to give the latter a quick feeding movement to bring the work into position under the needle. When the work has reached this point said pulley is disconnected from the feed shaft and the pawl-and-ratchet feed mechanism is set in operation thereby to give the work the slower intermittent feeding movement during the stitching of the buttonhole.

It is desirable that the feed shaft and the feed cam which it operates should be brought to rest at the time that the rapidly-rotating pulley is disconnected therefrom and before the pawl and ratchet feed mechanism is set in operation, but with the sewing machines as heretofore made it has been difficult to secure this end owing to the mo-

mentum of the moving parts. Moreover, even when the rapidly-rotating pulley is unclutched from the feed shaft and the latter is being operated by the pawl-and-ratchet mechanism, there is oftentimes sufficient friction between said pulley and the shaft so that the rapid rotation of the pulley tends to augment the driving movement of the pawl-and-ratchet mechanism, and to cause the shaft to run ahead of the said mechanism, said pulley operating to give a slight turning movement to said shaft during each intermission in the operation of the pawl and ratchet. Whenever this happens the feed cam is operated faster than it was intended to be, and if such increased speed of the feed shaft occurs during the stitching of the last half or side of the buttonhole, as is not infrequently the case, the stitches on said side will be more widely separated than on the other side, thus producing the undesirable result of a buttonhole with a less number of stitches on one side than on the other.

My present invention aims to provide a simple arrangement for controlling the operation of the feed shaft so as to prevent the undesirable results above described from occurring.

In the drawings wherein I have illustrated a selected embodiment of my invention, Figure 1 is an underside view of a sewing machine such as shown in said Patent No. 655,637 with my improvements applied thereto; Fig. 2 is an enlarged section on the line $x-x$, Fig. 1; Fig. 3 is a section on the line $y-y$, Fig. 2; Fig. 4 is a view similar to Fig. 6 of said Patent No. 655,637, but showing my improvements; Fig. 5 is a perspective view of part of the brake device.

In the drawings a' indicates the bed of the sewing machine and b^{30} is the feed shaft provided with the usual worm i^0 which meshes with and operates the feed cam j . This shaft b^{30} has loosely mounted thereon the pulley b^{27} which is provided with a hub carrying a grooved collar b^{18} that is operated by the clutch-controlling lever G . The pulley has rigid therewith a projection G^5 which is adapted to engage a pin b^{16} carried by a handle b^{17} fast on the feed shaft b^{30} so that movement of the pulley longitudinally of the shaft will bring the projection G^5 into engagement with the pin b^{16} and thus clutch the pulley to the shaft. At the opposite end of the feed shaft b^{30} is a feed

mechanism designated generally at 3 and which includes an oscillatory pawl 51 operating on an internally-toothed ring 41 which is geared to the shaft b^{36} , all as shown and described in said Patent No. 655,637. This feed mechanism 3 is called into play at the proper time and operates to give the shaft b^{36} a slower intermittent rotary movement during the stitching operation.

10 In the operation of the device when the machine is first started the buttonhole is cut by usual mechanism and the pulley b^{27} is then clutched to the feed shaft b^{36} thereby to give said shaft a rapid rotation which moves the stitch-frame and feeds the work into position for the stitching operation with a quick movement. When the work is in proper position for the stitching operation the pulley b^{27} is unclutched from the feed shaft and the pawl-and-ratchet feed mechanism 3 is brought into play to give the shaft the requisite slow intermittent movement for stitching purposes. The parts thus far described are or may be all as shown in said Patent No. 655,637 and form no part of the present invention, and reference may be had to said patent for a more complete description of the operation thereof.

As stated above it is desirable that the feed shaft b^{36} and the feed cam should be brought to rest instantly at the time that the driving pulley b^{27} is unclutched from the feed shaft in order that the intermittent pawl-and-ratchet feed mechanism 3 may operate properly to give the feed shaft its intermittent feeding movement during the stitching operation. This is frequently a somewhat difficult accomplishment, and moreover, as stated above, even when the pulley b^{27} is running loose on the feed shaft b^{36} it frequently happens that at certain points in the stitching operation there will be sufficient friction between the pulley and the shaft so that the latter will be fed forward by the pulley, thus causing the feed shaft to run ahead of the pawl-and-ratchet feed mechanism and producing the undesirable result of a button-hole in which the stitches are not evenly spaced. In order to overcome this difficulty, I have provided a novel brake arrangement which is applied to the feed shaft b^{36} and which operates to prevent said shaft from running ahead of the pawl-and-ratchet feed mechanism 3, and also operates to bring the shaft to rest instantly that the pulley b^{27} is unclutched therefrom.

In carrying out my invention I apply to said shaft b^{36} or to a sleeve fast thereon a collar 4 which may be clamped to the shaft in any suitable way as by making said collar a split collar, as seen in Fig. 2, it being provided with a clamping screw 5 by means of

which it may be clamped firmly to the shaft b^{36} . This collar is provided with a recess 6 in one end in which is received a split spring washer 7. This washer 7 bears against a plain washer 8 which sets against a shoulder 9 formed on the cam casing 10 through which the shaft b^{36} extends. The collar 4 will be set up against the shoulder 9 with more or less pressure, and as a result the spring washer 7 will provide a constant friction between the collar which rotates with the shaft and the stationary shoulder 9, said friction acting as a brake or drag on the shaft b^{36} . I find in practice that this friction is sufficient to prevent the shaft b^{36} from over-running when the pulley b^{27} is disconnected at the end of the quick feeding movement and also that it is sufficient to prevent the pulley b^{27} from augmenting the action of the feed mechanism 3, and it thereby prevents any increase of speed in the feed shaft b^{36} during the stitching of the buttonhole due to the action of the pulley b^{27} . With my improvement on the sewing machine the stitches in the buttonhole will be formed uniformly with the same number on each side thereof.

Having fully described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a buttonhole sewing machine, the combination with a frame having a shoulder, of a feed shaft, a feed cam operated thereby, two separate driving mechanisms for operating said feed shaft, one of which is adapted to drive the shaft faster than the other, a collar fast on the shaft but adjustable longitudinally thereof, and a resilient friction washer confined between the collar and said shoulder and operating to prevent over-running of the feed shaft.

2. In a buttonhole sewing machine, the combination with a frame having a shoulder, of a feed shaft, a feed cam operated thereby, means to operate the driving shaft at two different speeds, a recessed collar fast on said shaft adjacent said shoulder, a washer mounted on the shaft and bearing against said shoulder, and a split spring washer occupying the recess of the collar and engaging the first-named washer, said washers providing a sufficient frictional resistance to prevent the overrunning of the feed shaft.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRED A. READ.

Witnesses:

LOUIS C. SMITH,
BERTHA F. HEUSER.