

No. 753,093.

PATENTED FEB. 23, 1904.

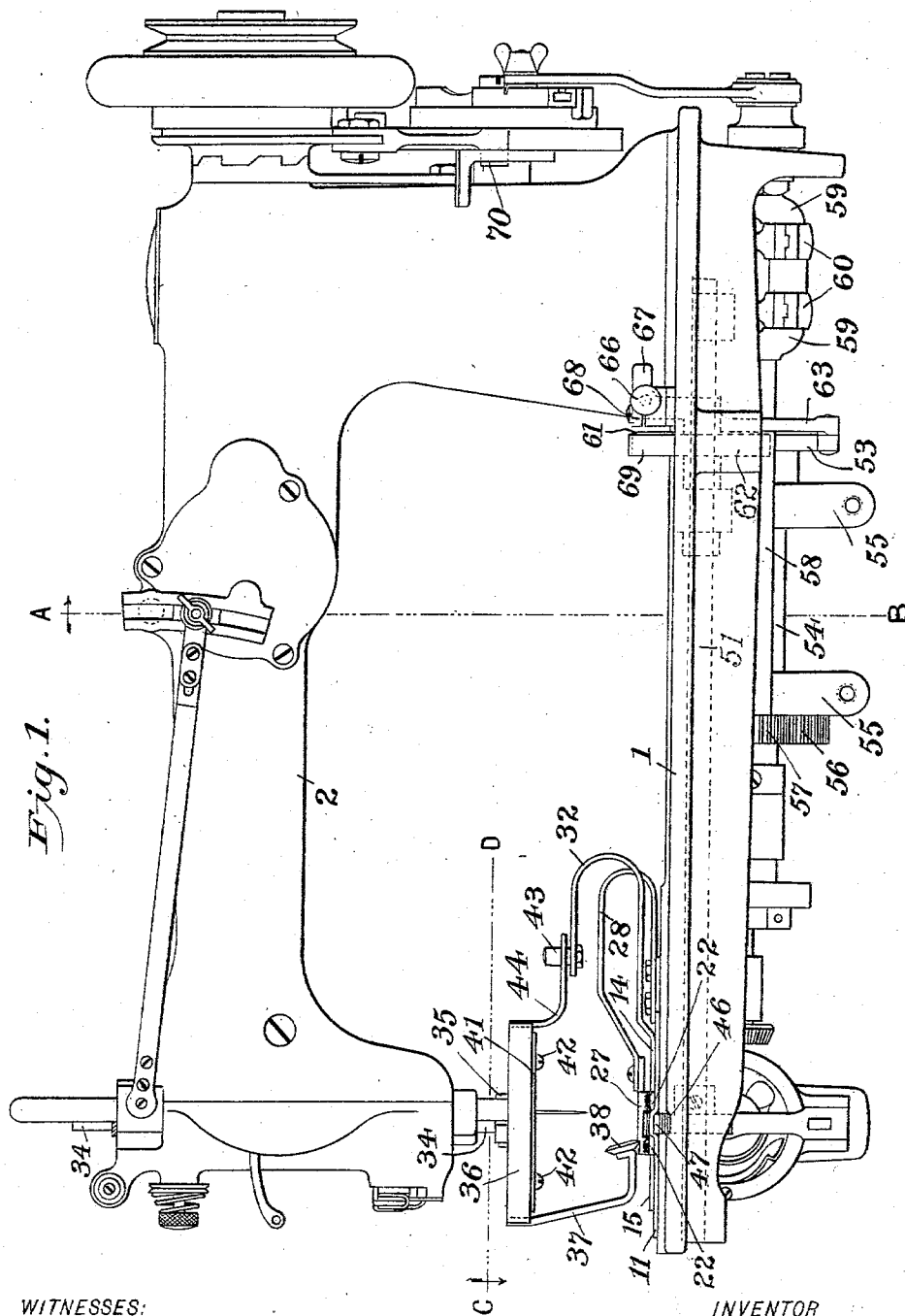
D. NOBLE.

## BUTTONHOLE SEWING MACHINE.

APPLICATION FILED OCT. 25, 1902.

NO MODEL.

5 SHEETS—SHEET 1.



*Fig. 1.*

WITNESSES:

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Ada B. Briggs.

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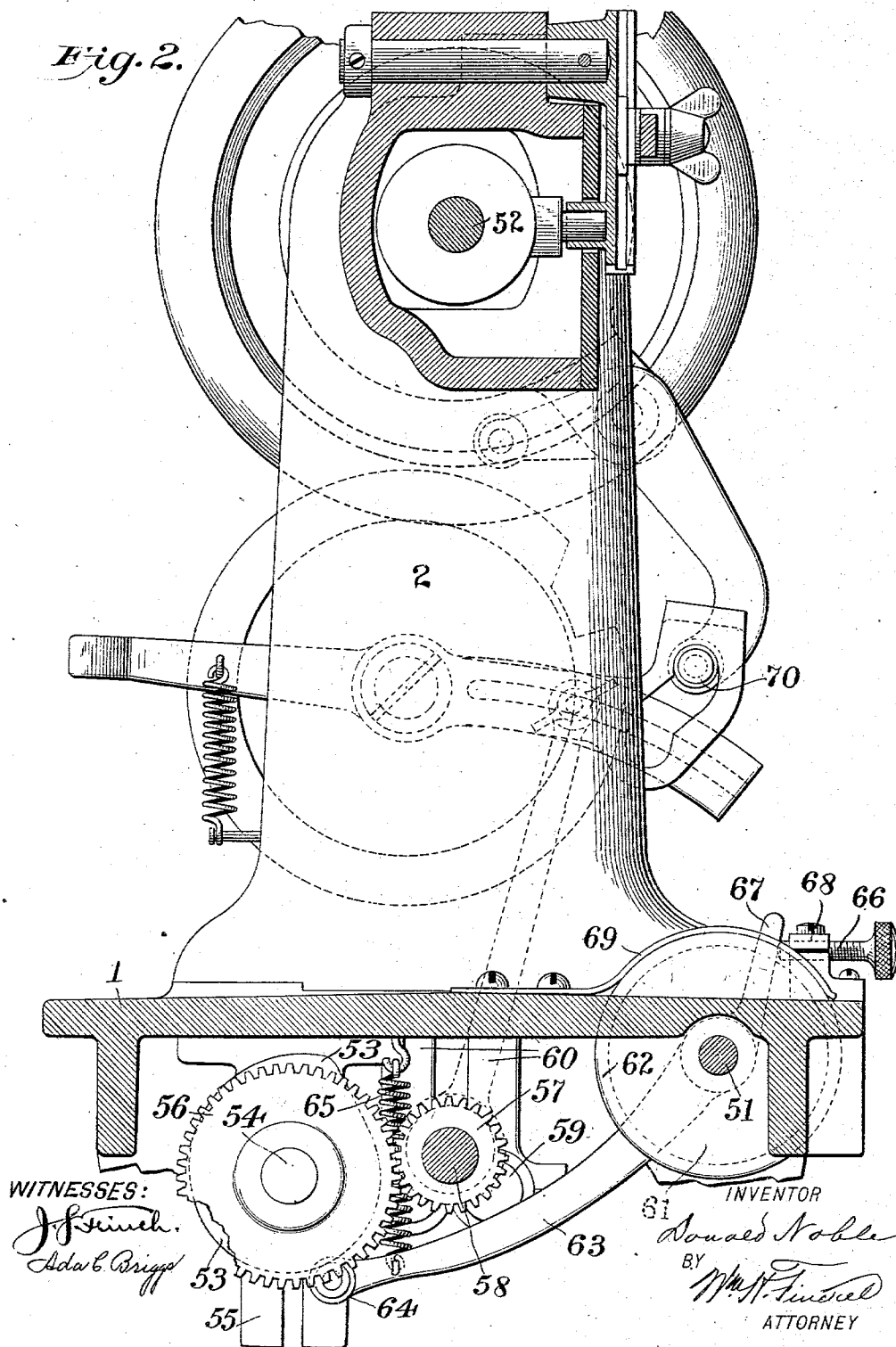
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BUTTONHOLE SEWING MACHINE.

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5 SHEETS—SHEET 2.

Fig. 2.



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5 SHEETS—SHEET 3.

Fig. 4.

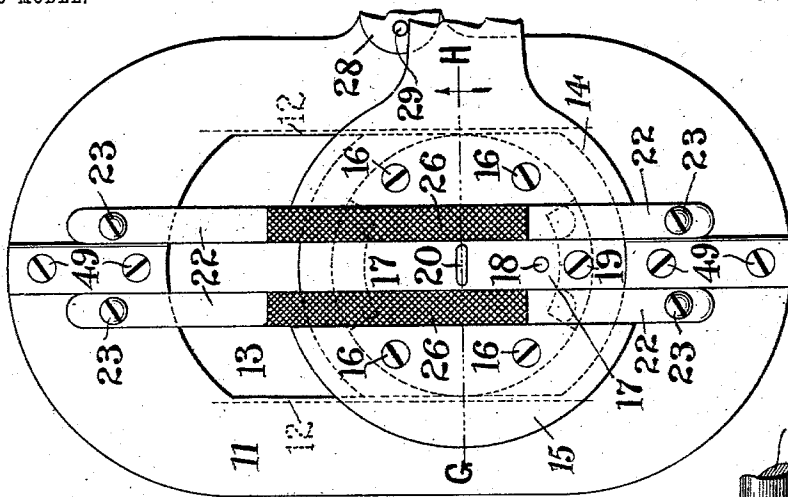
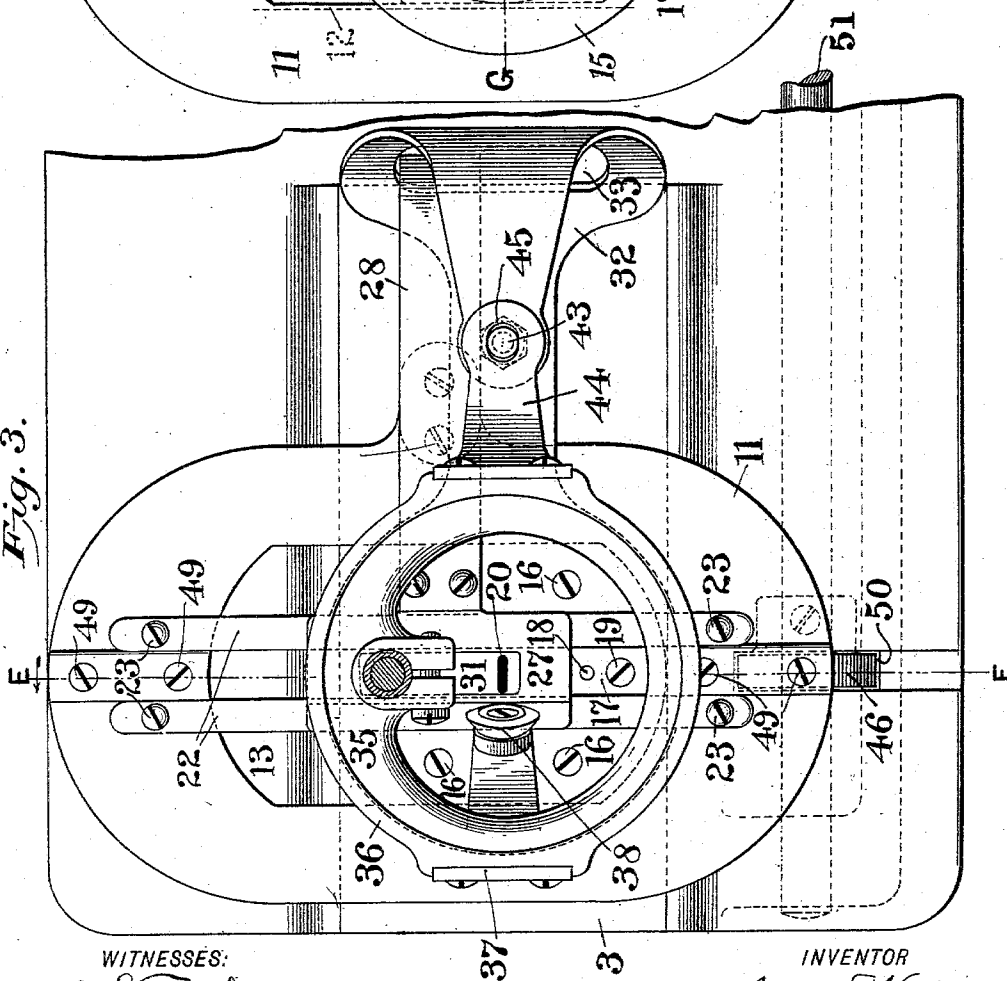


Fig. 3.



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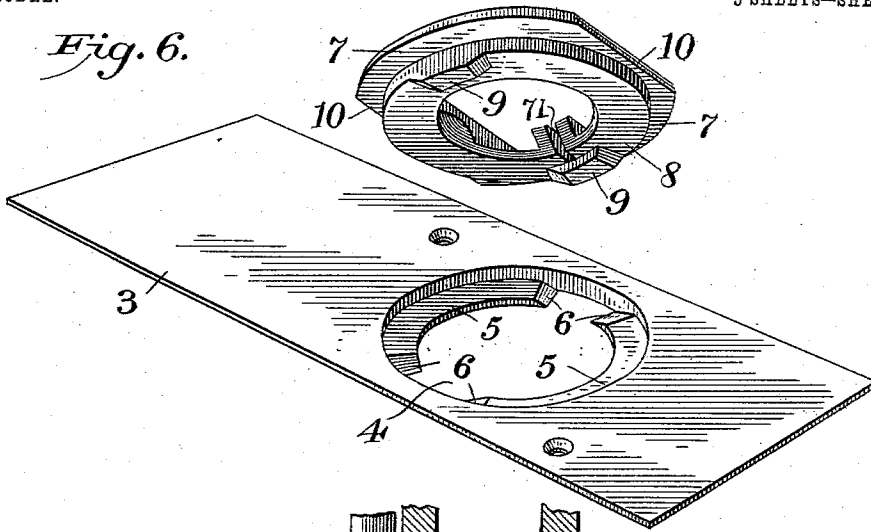
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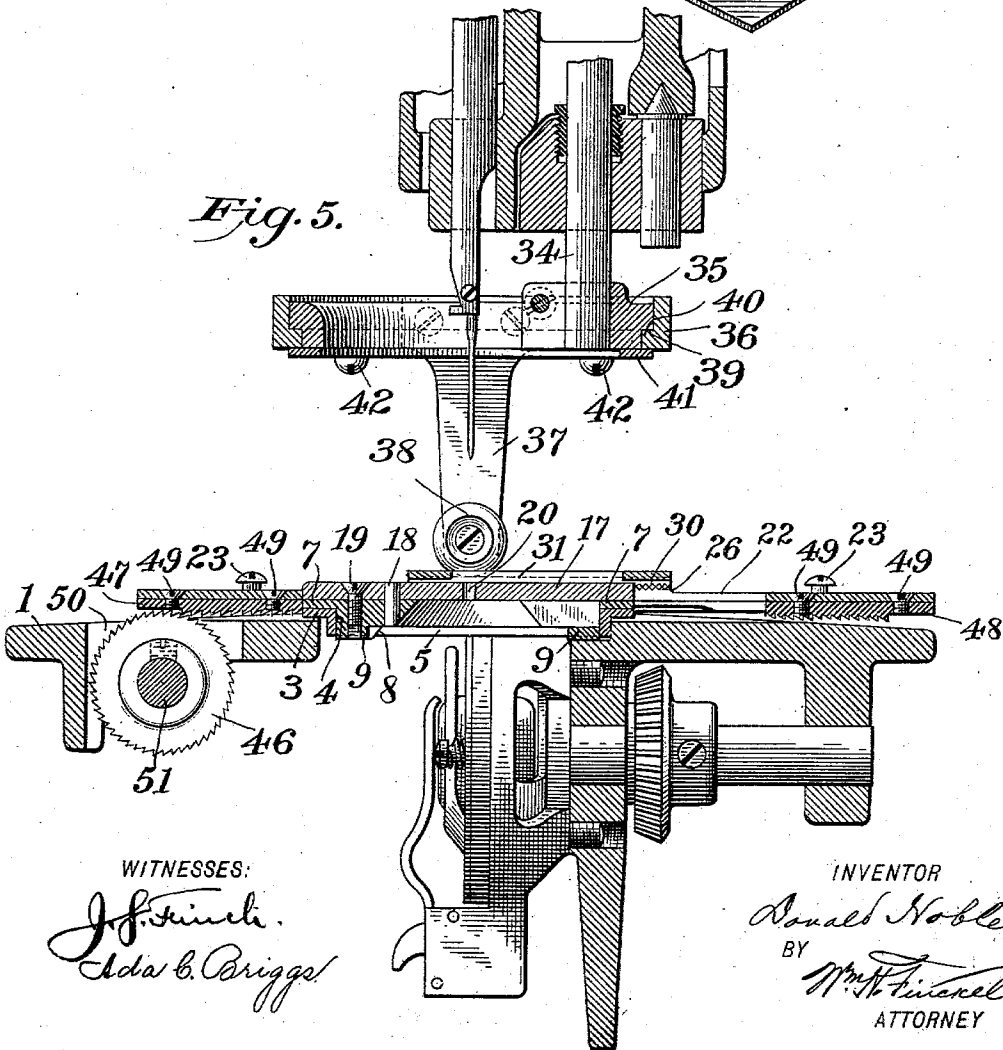
NO MODEL.

5 SHEETS—SHEET 4.

*Fig. 6.*



*Fig. 5.*



WITNESSES:

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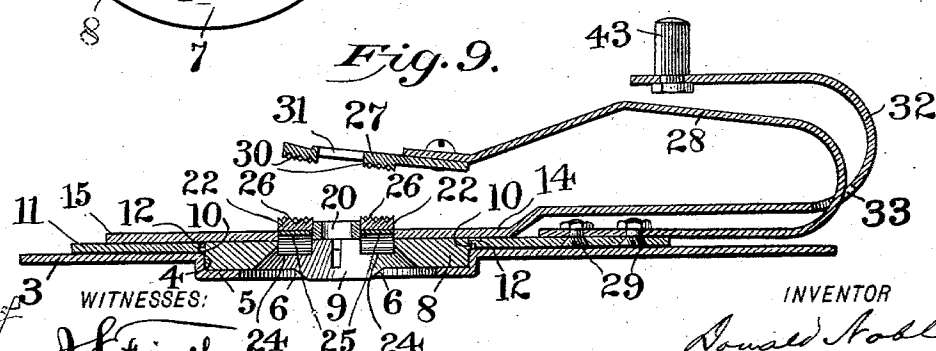
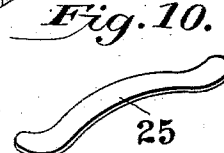
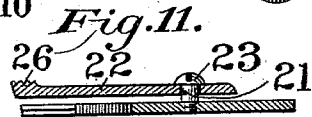
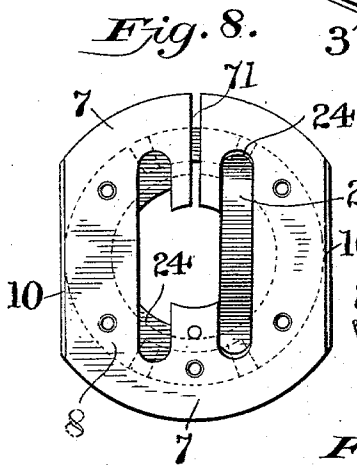
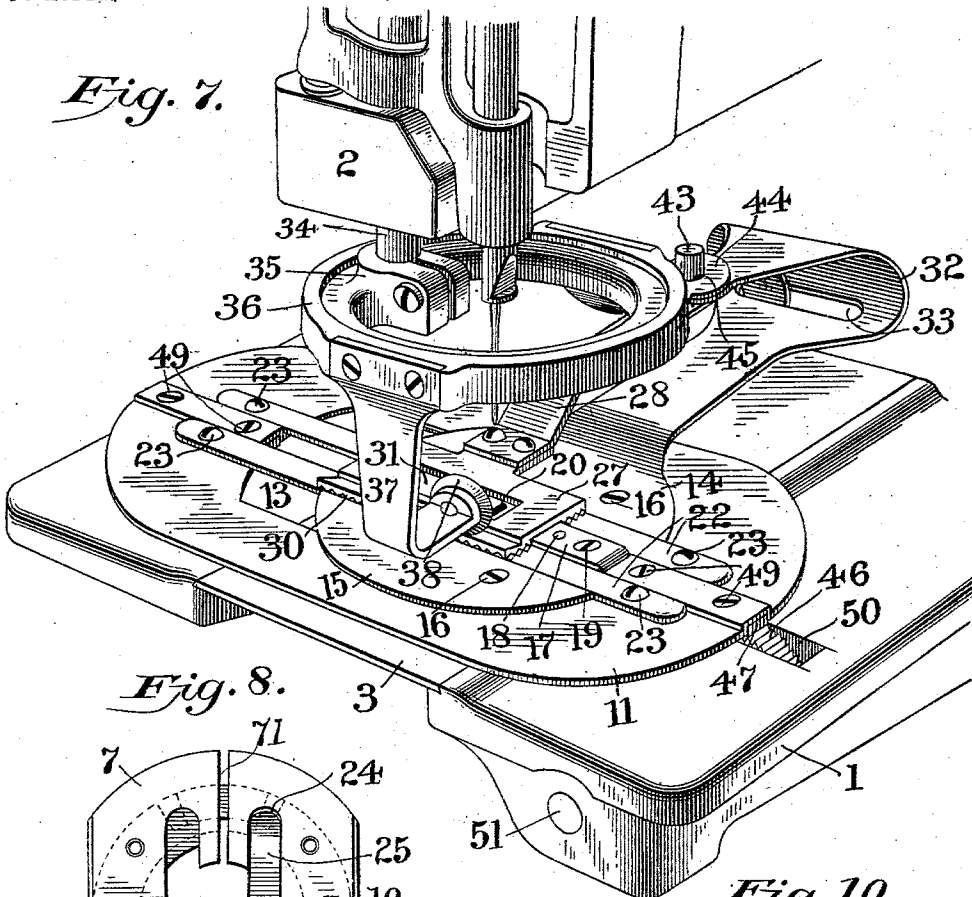
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BUTTONHOLE SEWING MACHINE.  
APPLICATION FILED OCT. 25, 1902.

NO MODEL.

5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

DONALD NOBLE, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO WHEELER & WILSON MANUFACTURING COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

## BUTTONHOLE-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,093, dated February 23, 1904.

Application filed October 25, 1902. Serial No. 128,784. (No model.)

*To all whom it may concern:*

Be it known that I, DONALD NOBLE, a subject of the King of Great Britain, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented a certain new and useful Improvement in Buttonhole-Sewing Machines, of which the following is a full, clear, and exact description.

This invention relates to buttonhole-sewing machines, and has especial reference to the mechanism for clamping the work and presenting it to the action of the stitch-forming mechanism.

The object of the invention is to provide a clamping mechanism which will enable the work to be turned manually end for end without altering the proper position of the seam with respect to the stitch-forming mechanism, thereby securing a feed movement in one direction only instead of resorting to the common expedient of traversing the respective sides of a buttonhole in opposite directions and also insuring great uniformity of production.

The invention consists of a depressible cloth-clamp slidably mounted within a turn-table and adapted to be moved by hand in order to turn the work end for end, and thus present opposite sides of the buttonhole-slit alternately to the stitch-forming mechanism while being fed in a single direction.

The invention further consists in certain novel features of construction, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation of a buttonhole-sewing machine equipped with the improved cloth-clamp. Fig. 2 is a vertical cross-section taken in the plane indicated by the line A B, Fig. 1. Fig. 3 is a horizontal section taken in the plane indicated by the line C D, Fig. 1. Fig. 4 is a detail plan view of the cloth-feeding slide and turn-table, the upper portion of the cloth-clamp being broken away. Fig. 5 is a sectional elevation taken in the plane indicated

by the line E F, Fig. 3. Fig. 6 is a perspective view of the turn-table and cover-plate within which the turn-table is mounted when in operative position, looking, respectively, at the under side of said turn-table and the upper side of said plate. Fig. 7 is a perspective view of the front end of a machine, illustrating the improved cloth-clamp in operative connection with the cloth-feeding mechanism. Fig. 8 is a detail plan view of the turn-table detached. Fig. 9 is a sectional elevation of the turn-table, &c., taken in the plane indicated by the line G H, Fig. 4. Fig. 10 is a perspective view of one of the springs for lifting the feed-slides. Fig. 11 is a detail section of the feed-bar fastening.

The type of machine to which the improvements are applied, as shown in the accompanying drawings, is the well-known Wheeler & Wilson zigzag or overseaming machine, in which the needle-carrier is vibrated transversely to the feed of the material; but the improvement is applicable to any approved form of sewing-machine provided with means for forming overseam-stitches.

1 is the usual frame or bed-plate, surmounted by the overhanging arm 2.

3 is a cover-plate secured in position on the bed-plate in any desired manner and provided with a circular opening 4, having at its bottom an inwardly-extending flange or ledge 5, constructed with cam-surfaces 6.

The turn-table comprises a horizontal flange 7 and an annular boss 8, which latter is adapted to fit within opening 4 and rest upon its ledge 5, and it is provided with depending beveled projections 9, adapted to cooperate with the cam-surfaces 6 for a purpose presently explained. The flange 7 of said turn-table is slabbed off upon opposite sides and rabbeted to form parallel ways 10, upon which is fitted the feed-slide 11, the latter having undercut inside edges 12 (see Fig. 9) to correspond with said parallel ways 10. The feed-slide 11 has an elongated opening 13 of a width corresponding with the slabbed portion of the turn-table, the sides of said opening being rabbeted to correspond with the

parallel ways 10, formed on said turn-table, and said slide is held in position on the turn-table by two keeper-plates 14 15, secured in place by screws 16.

5 17 is the throat-plate, which is centrally located upon the turn-table 5 and is secured in position thereon by means of a dowel-pin 18 and screw 19 and provided with a suitably-shaped needle-aperture 20.

10 Upon opposite sides of the throat-plate and adjacent thereto are two feed-bars 22, secured at their respective ends to the feed-slide 11 by shouldered screws 23, which pass through holes 21, Fig. 11, made therefor in said bars.

15 The length of the shouldered portion of the screws 23 somewhat exceeds the thickness of the feed-bars, (see Fig. 11,) so that the latter are capable of a limited vertical movement on said screws, and seated in pockets 24, formed in the turn-table directly beneath said feed-bars, are springs 25, which press upwardly against said bars to hold the latter in elevated position, as shown in Figs. 8 and 9. When

25 26 of said bars are approximately flush with the upper surface of the throat-plate, but when depressed against the resiliency of the springs 25 by the clamping mechanism in gripping the material said bars will be somewhat lower than the level of the upper surface of the throat-plate, as will be explained.

The keeper-plates 14 15 besides holding the feed-slide 11 in position on the turn-table also by their inner straight edges adjacent to 35 the feed-bars serve to strengthen and guide said feed-bars in their movements.

27 is the cloth-clamp, secured on the end of a lifting-spring 28, made fast to the feed-slide 11 by screws 29. Said clamp is provided on 40 its under side with knurled surfaces 30, similar to the knurled surfaces 26 on the feed-bars and for a like purpose, and has an oblong opening 31, to which access is had to the material.

45 32 is the operating-handle of approximately U shape in side elevation and preferably formed integral with the keeper-plate 14. This operating-handle is provided with an elongated slot 33 near its outer extremity, 50 through which passes the lifting-spring 28, which carries the cloth-clamp, so that the sliding movements of said clamp and feed-slide 11, by which it is carried, will not be interfered with by said handle, as will be readily understood by reference to Figs. 7 and 9.

55 34 is a spring-pressed presser-bar mounted within the end of the overhanging arm 2 in the usual or any approved manner, and 35 is a presser-carrier secured rigidly on the lower end of said presser-bar. Journaled circumferentially around said presser-carrier after the manner of a swivel is a presser-carrier ring 36, to which is rigidly secured a presser-foot 37, provided at its lower extremity with 65 a presser-roller 38, which bears upon the up-

per surface of the cloth-clamp 27. Said presser-carrier 35 is undercut circumferentially, as shown at 39, Fig. 5, to properly correspond with an annular shoulder 40, formed on said carrier-ring 36, so that a proper bearing is afforded to withstand the pressure exerted by the presser-bar, (see Fig. 5,) and said carrier-ring is held against displacement by a keeper-ring 41, secured to the under side of the presser-carrier by screws 42. 75

43 is a stud on the inwardly-extending end of the operating-handle 32, which is engaged by an L-shaped arm 44, rigid with the presser-carrier ring 36. Said arm 44 is provided with a perforation 45, within which said stud projects, whereby the turn-table and its adjuncts are locked with the presser-carrier ring. as regards rotary movement, while at the same time said ring and presser connections are free to be raised by lifting the presser-bar in 85 the usual manner in order to insert and remove the material.

The feeding movements of the slide 11 are effected by a gear-wheel 46, adapted to mesh alternately with rack-bars 47 48, secured to 90 the under side of said feed-slide and at opposite ends thereof by screws 49. Said gear-wheel 46 projects through an opening 50 in the bed-plate 1 and is tight on a horizontal feed-shaft 51, suitably journaled beneath said 95 bed-plate and operatively connected with the driving-shaft. The movement of the feed-shaft 51 may be communicated from the driving-shaft 52 in any suitable manner, but I prefer to employ for this purpose the construction following. 100

53 is a cam tight on a short counter-shaft 54, suitably journaled in bearings formed in a bracket 55 beneath the bed-plate. (See Figs. 1 and 2.) 56 57 are intermeshing spur-gears 105 mounted, respectively, upon said counter-shaft 54 and the usual hook driving-shaft 58. The shaft 58 is connected in the usual or any suitable manner with the driving-shaft 52, journaled in the overhanging arm 2, in the present instance quartering cranks 59 and link connections 60 common to the well-known Wheeler & Wilson zigzag sewing-machine being employed. 110

61 is a clutch of any suitable or approved 115 construction loose on the shaft 51 and adapted to coöperate with a clutch-disk 62 tight on said shaft, whereby the latter is given an intermittent rotation. Formed rigid with said clutch is a lever 63, provided at its outer end 120 with a roller 64, which tracks upon the feed-cam 53. The outward movement only of said lever 63 in a direction away from the feed-cam 53 is effective in causing the rotation of said feed-shaft 51, the inward movement, 125 which is effected by a spring 65, serving only to position the said lever and clutch for the succeeding feed movement, which will be greater or less, according to the location of the stitch-regulating screw 66 with respect to the 130

heel end 67 of said lever. Said stitch-regulating screw 66 is tapped within a block 68, rigid on the bed-plate, and by advancing said screw against the heel end 67 of said lever the movement of the latter toward the cam will be decreased and the length of stitch accordingly shortened, and vice versa, as will be readily understood by reference to Fig. 2.

The proportions of the spur-gears 56 57 are such that the feed-shaft 51 will be intermittently actuated at each alternate revolution of the driving-shaft 52, which is the usual feeding action in forming the buttonhole-stitch.

69 is a brake-strap secured to the bed-plate and bearing upon the periphery of the clutch-disk 62 for the purpose of preventing the latter from overthrowing.

The machine to which the improved clamping mechanism is shown applied preferably is equipped with a counting stop-motion mechanism 70, such as set forth in Letters Patent of the United States No. 656,852, August 28, 1900, whereby the number of stitches in either side of the buttonhole may be accurately determined; but notwithstanding the great utility of such a device in connection with the improved clamping mechanism it is to be understood that the invention is not limited in this respect, since excellent work may be done without the aid of such device.

The operation is as follows: As shown in the drawings, the feed-slide 11 is at the termination of its feed movement. In this position the material is introduced between the knurled surfaces of the feed-bars and clamp, respectively, the latter having been raised by lifting the presser-bar in the usual way, the spring 28, by which the clamp is carried, causing the latter to follow up the presser-roller 38 simultaneously with the lifting movements. The material is then clamped by lowering the presser-bar, the spring element of which is of sufficient strength to overcome the action of the spring 28 and force the clamp down upon the material. The springs 25 beneath the feed-bars 22 also yield beneath this pressure, thus forcing said bars below the level of the throat-plate and causing the material to be tightly stretched across the latter. The buttonhole may be cut either before or after inserting the material beneath the clamp, after which the clamping mechanism is swung around one-half of a complete turn, which is effected by the operator grasping the handle 32 and moving the same to the desired position previous to starting the stitching mechanism. At the commencement of this turning movement as the turn-table starts to revolve within the well 4 the beveled projections 9 cam against the incline 6 and raise the turn-table and parts carried thereby. The upward movement thus obtained will serve to lift the rack-bars 47 48 away from the gear-wheel 46 and clear of the bed-plate. When the turn-

table has been moved a half-revolution, the projections 9 will again register with the inclines 6, thereby causing the turn-table to sink within the well 4 and lowering the adjacent rack-bar 47 or 48 into engagement with the gear-wheel 46. The beveled projections 9 and inclines 6 not only serve to lift the rack-bars away from the feed gear-wheel, but also act as a means to correctly position the turn-table preparatory to the feeding movements of the slide, as will be readily understood. The opening 13 in the feed-slide is of sufficient length to accommodate the feed of said slide for the largest size buttonhole likely to be required. After the material has been placed in position and the turn-table given a semirotation, as previously described, the machine is started and one side of the buttonhole-slit overseamed. At the conclusion of the overseaming of one side of the figure the machine is brought to a standstill and the clamp and turn-table are again turned half around by means of the handle 32, and the remaining side of the figure is then overseamed similarly to the previous side. During the overseaming of the buttonhole the material is fed by the clamp and feed-bars lengthwise over the throat-plate, such movement being of course effected by the feed-slide 11, the rack-bars 47 48, carried thereon, being alternately brought into operative connection with the feed-gear 46 for the respective sides of the buttonhole by the rotation of the turn-table. The effect of the feeding movement upon the slide 11 is to cause the latter to be shifted alternately to opposite sides of the turn-table, as will be readily understood. During the operation of turning the clamp around the presser-foot 37 and ring 36, by which it is carried, rotate simultaneously with said clamp by reason of the connection between said ring and operating-handle 32, and the pressure exerted by said foot is constantly maintained upon the material, thereby guarding against any slipping of the latter between the gripping-surfaces.

The turn-table is shown as having a slot or groove 71 (see Figs. 5 and 8) to afford proper clearance for the knife or cutter when such turn-table is used in a combined buttonhole cutting and sewing machine.

What I claim is—

1. In a buttonhole-sewing machine, a stitch-forming mechanism, a cloth-clamp, a feed-slide upon which the cloth-clamp is fixed, a turn-table upon which said feed-slide is slidably mounted, said turn-table capable of being turned to reverse the feed-slide and to present opposite sides of a buttonhole-slit to the action of the stitch-forming mechanism, and a one-way-feeding mechanism for said feed-slide, in combination with a presser-bar, provided with a presser mounted to rotate in a horizontal plane and adapted to cooperate with said cloth-clamp, substantially as described.

2. In a buttonhole-sewing machine, a stitch-

forming mechanism, a cloth-clamp, a feed-slide upon which the cloth-clamp is fixed, a turn-table upon which said feed-slide is slidably mounted, said turn-table capable of manual turning to reverse the feed-slide and to present opposite sides of the buttonhole-slit to the action of the stitch-forming mechanism, and a one-way-feeding mechanism for said feed-slide, in combination with a presser-bar provided with a presser, and means to turn said presser with said cloth-clamp when said clamp is turned to present opposite sides of the buttonhole-slit to the action of the stitch-forming mechanism, substantially as described.

3. In a buttonhole-sewing machine, a stitch-forming mechanism, a cloth-clamp, a feed-slide carrying the cloth-clamp, a turn-table upon which said feed-slide is slidably mounted, said turn-table capable of manual turning to turn the feed-slide end for end and thus present opposite sides of the buttonhole-slit to the action of the stitch-forming mechanism, and a one-way-feeding mechanism for said feed-slide, in combination with a presser-bar having a rotating table presser and provided with an annular bearing for guiding the movements of the presser substantially concentric with the rotary movements of the cloth-clamp when said clamp is actuated to present opposite sides of the buttonhole to the action of the stitch-forming mechanism, substantially as described.

4. In a buttonhole-sewing machine, a stitch-forming mechanism, a cloth clamping and feeding mechanism, including a cloth-clamp and a feed-slide carrying said clamp, a turn-table with which said clamping and feeding mechanism is slidably connected and capable of manual reversal to present opposite sides of the buttonhole to the action of the stitch-forming mechanism, and means to actuate said feed-slide forwardly in the line of feed, in combination with a presser-bar provided with an an-

nular carrier operatively connected with said clamping and feeding mechanism for partaking of the rotary movement of the latter when actuated to present opposite sides of the buttonhole to the action of the stitch-forming mechanism, substantially as described.

5. In a buttonhole-sewing machine, the combination of a stitch-forming mechanism, a cloth clamping and feeding mechanism, including a feed-slide provided with rack-bars at opposite ends, a turn-table upon which the clamping and feeding mechanism is slidably mounted, a gear-wheel to engage said rack-bars alternately as they are presented to it, a presser-bar and presser, and a stationary plate in which the turn-table is mounted, provided with cam portions for effecting vertical movements of the cloth clamping and feeding mechanism to disengage and reengage the rack-bars and gear-wheel when the turn-table is rotated to present opposite sides of the buttonhole to the action of the stitch-forming mechanism, substantially as described.

6. In a buttonhole-sewing machine, a stitch-forming mechanism, a feed-slide, a turn-table connected therewith, a cloth-clamp carried by said slide, means to impart a right-line movement to said slide in one direction only, and means to rotate the turn-table and with it the slide while the cloth is clamped in position and thus turn the feed-slide and cloth end for end, combined with a presser-bar, a ring-track carried by it and a presser-foot mounted upon said ring and rotatably connected with the feed-slide.

In testimony whereof I have hereunto set my hand this 22d day of October, A. D. 1902.

DONALD NOBLE.

Witnesses:

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C. N. WORTHEN.