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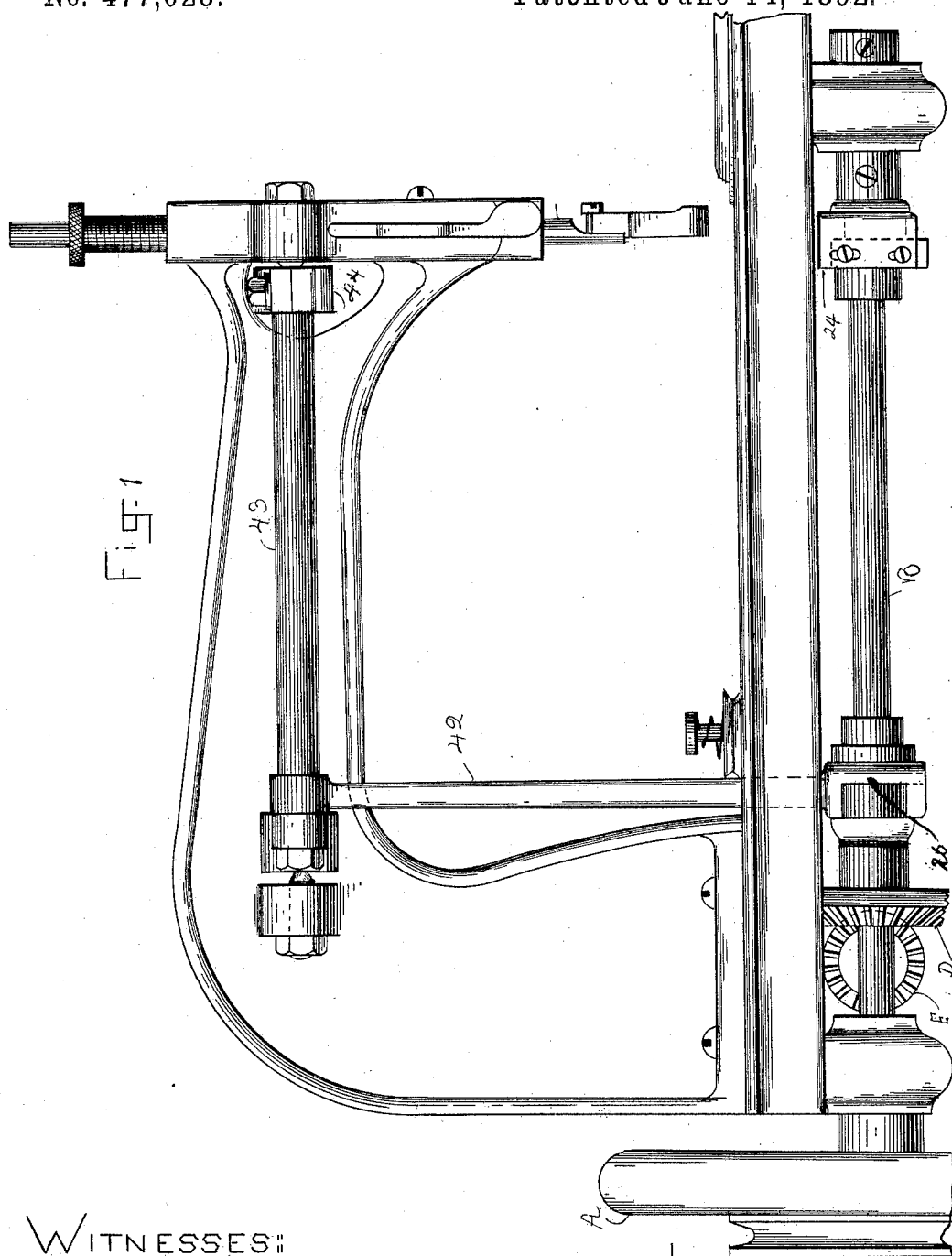
4 Sheets—Sheet 1.

R. W. THOMSON & E. M. PHELPS.

SEWING MACHINE FOR FINISHING BUTTONHOLE PIECES.

No. 477,028.

Patented June 14, 1892.



WITNESSES:

D. L. Puro
E. E. Hamill

INVENTORS:

R. W. Thomson

and
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(No Model.)

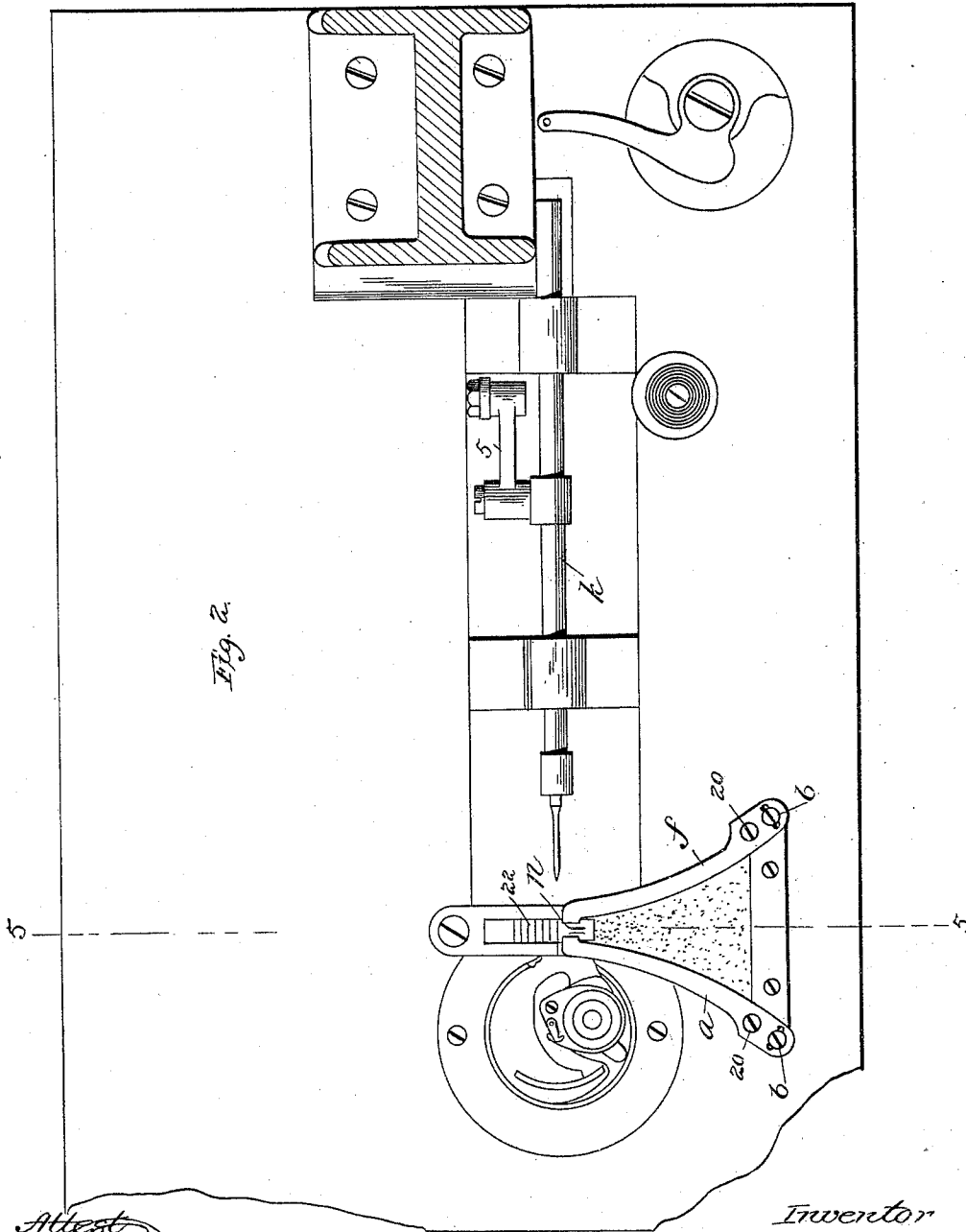
4 Sheets—Sheet 2.

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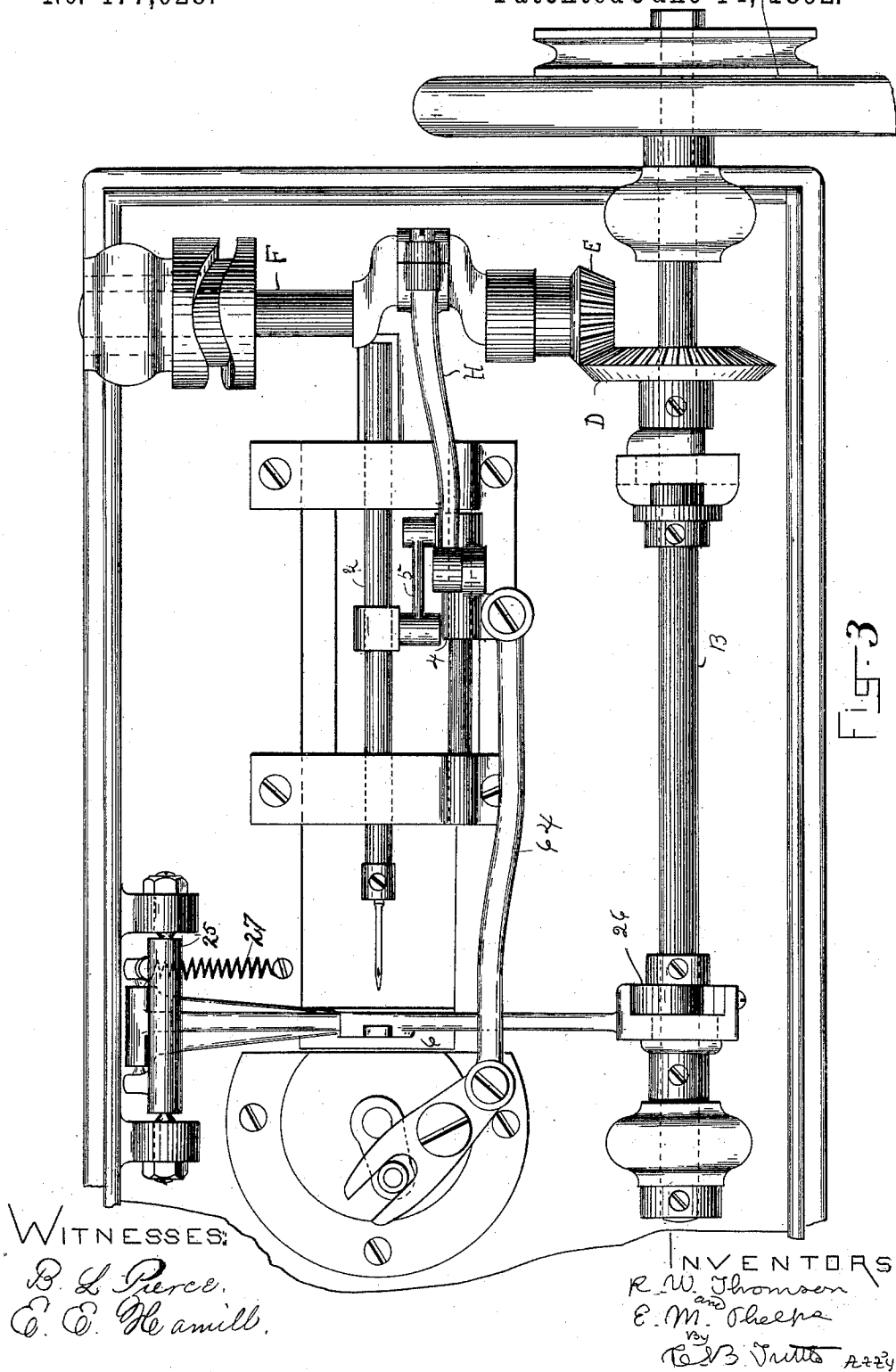
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R. W. Thomson
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64 Wm. Spear
ATTY.

(No Model.)

4 Sheets—Sheet 3.

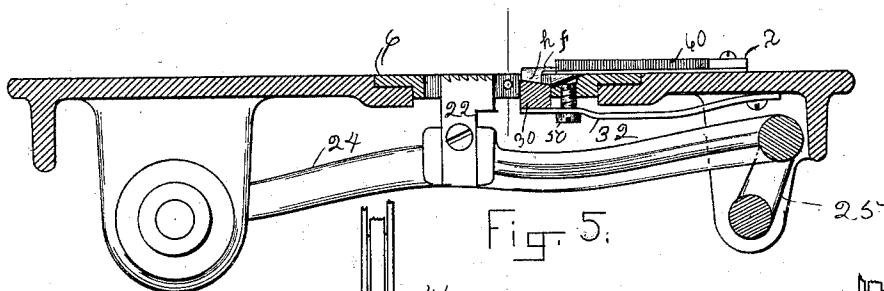
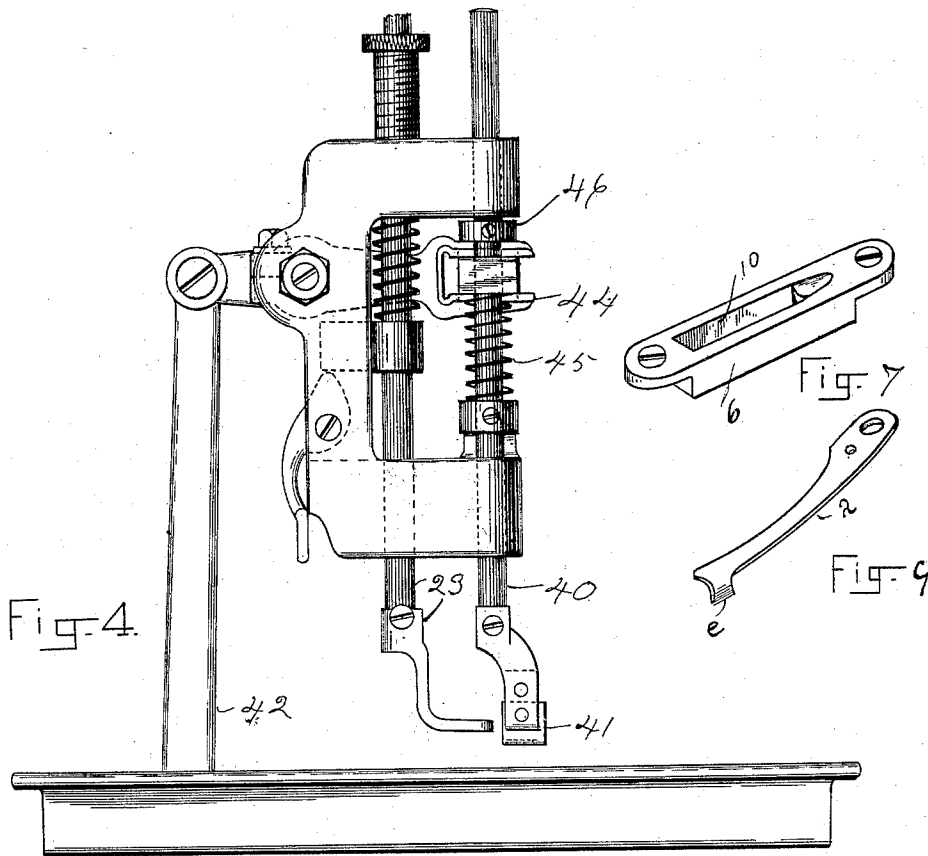
R. W. THOMSON & E. M. PHELPS.
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R. W. THOMSON & E. M. PHELPS.
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Fig. 6.

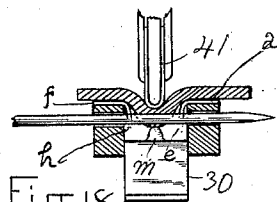


Fig. 8.

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UNITED STATES PATENT OFFICE.

ROBERT W. THOMSON AND EUGENE M. PHELPS, OF LYNN, MASSACHUSETTS,
ASSIGNORS TO THE HAND METHOD FINISHING MACHINE COMPANY, OF
NASHUA, NEW HAMPSHIRE.

SEWING-MACHINE FOR FINISHING BUTTONHOLE-PIECES.

SPECIFICATION forming part of Letters Patent No. 477,028, dated June 14, 1892.

Application filed July 2, 1888. Serial No. 278,826. (No model.)

To all whom it may concern:

Be it known that we, ROBERT W. THOMSON and EUGENE M. PHELPS, of Lynn, in the county of Essex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Finishing Buttonhole-Pieces and the Like, of which the following, taken in connection with the accompanying drawings, is a specification.

10 This invention relates to machines for finishing buttonhole-pieces, and it is represented herein and in the drawings as embodied in a machine which forms an overseaming stitch, the thread-stitches of which enter and emerge
15 from the buttonhole-piece material on the under side of the material without passing through so as to appear on the top or face side thereof and overlie and tie down to the material of the buttonhole-piece the bar-cord
20 and thrum ends of thread employed in overseaming the buttonhole edges.

In the drawings, Figure 1 is a side elevation of a machine embodying this invention. Fig. 2 is a plan top view of a machine with
25 the presser-foot arm and its supported mechanism removed. Fig. 3 is a plan view looking upward at the bottom or under part of the machine. Fig. 4 is an end elevation of a machine in which the arm, presser-foot, and operating-levers therefor are represented. Fig.
30 5 is an elevation of a section on line 5 5 of Fig. 2. Figs. 6 and 7 are details to be referred to and described hereinafter. Fig. 8 is a detail sectional view showing the material as
35 pressed down by the former and engaged by the needle. Fig. 9 is a detail perspective view of the work-support *e* and its spring-supporting lever.

The driving-wheel A is fixed upon the shaft
40 B, which shaft is journaled in hangers attached to the machine bed-plate, as shown. Said shaft B is made to revolve by any suitable driving power applied to the wheel A, and on said shaft B is a beveled gear D, that
45 meshes with a similarly-beveled gear E to impart revolving motion to the shaft F. Said shaft F operates the pitman H, Fig. 3, which communicates with and reciprocates the carriage 4. The needle-bar K is also journaled

in hangers or other suitable bearings, preferably as shown in Figs. 2 and 3, and receives reciprocating endwise movements from the carriage 4 through a pitman 5 and connections, as represented. The needle-bar is located to
50 vibrate in a plane parallel to and nearly even with the machine bed-plate. In connection with the needle a shuttle mechanism is employed, preferably such as is known in the art as a "rotary oscillating shuttle mechanism" and found in the Singer zigzag and other machines. Said shuttle mechanism is located in
55 the machine relatively to the needle-bar and other parts, as fully represented in Figs. 2 and 3. Operating motion is imparted thereto by a pitman 64, arranged as shown in Fig. 3. Between the needle-bar and shuttle mechanism
60 is a groove extending through the bed-plate of the machine, across which the needle is made to travel in order to reach the shuttle mechanism and into which groove the material is depressed in order to be penetrated by the
65 needle. For convenience in manufacture, this groove is preferably formed in a block, (see Fig. 7,) which block is detachable from the machine-plate, but permits of combination therewith, as fully represented in Fig. 5. The
70 walls of said block operate to overlie the wrought edges of the machine-bed and give desirable form to the groove 10. Said walls, as represented, are projected below the needle-path plane and are provided with an opening
75 to allow passage for the needle, and this construction gives the most satisfactory results, but to a successful operation of the machine it is not necessary that the walls be projected
80 below the plane of the needle-path.

In operation the material is placed upon the machine bed-plate and bent downwardly in the groove 10 with its bottom face below the plane of the needle-path while the needle
85 is made to pass through the bend of the material, as shown in Fig. 8. To this end a former is employed to bear upon and bend downwardly the material. Said former 41 is supported in alignment with the groove 10, to permit movement toward and from needle-path. To that end the former is fixed upon
90 or formed integral with the rod 40, which rod

is supported in the machine-arm and permits endwise movements in its supporting-bearings. Between the former and the shaft B are connections by which the former is lifted and depressed. Said connections comprise a cam on the shaft B, Fig. 1, a cam-lever 42, adapted to engage said cam and extend upwardly through the machine bed-plate, a rocking lever supported in bearings on the machine-arm having the extension 43 engaged with the cam-link 42 and the obversely projected extension 44, which embraces the rod 40 between the collar 46 and the top end of a spiral spring 45, which spring surrounds the rod 40, and bears its bottom end against a collar fixed adjustably on the rod. The collar 46 is fixed to the rod 40, in order that it may be engaged by an upward movement of the extension 44, in order to lift the former. The spring 45 is extended upwardly along the rod 40, in order to be engaged by a downward movement of the lever-extension 44 to depress the former. The lever-extension 44 embraces the rod 40, but has no connection therewith, except by engagement with the collar 46 and the spring 45. The downward movement of the former 41, it is noted, is, by this arrangement, effected through the agency of the coil-spring 45, and thereby yielding quality is imparted to the downward movement of the former, which preserves the material from being crushed or unduly jammed and marred by the former. The extreme downward movement of the former is limited by the spring-supporting collar coming into engagement with the machine-arm, after which the further downward movement of the lever-extension 44 is taken up by the spring 45. Said collar is fixed adjustably on the rod 40 to the end that the limit of downward movement permitted by the former may be varied as required to adapt the machine for working materials of varying thicknesses. The former, it will be understood, is depressed and lifted alternately, a complete reciprocation being effected during each complete revolution of the shaft B.

In Fig. 8 of the drawings the material is represented lying upon the machine-bed plate with a portion thereof depressed below the needle-path, receiving the needle-thrust. It will be observed that the former 41 is depressed upon and bending the material below the needle-path, while the material on either side of the former is supported above the plane of the needle-path by work-supporting guides *e h*. Said work-supporting guides *e h* are arranged with a space *n* between them for receiving the material and are supported to permit movements toward and from each other in order to enlarge the said space and also to permit movements toward and from the plane of the needle-path in order to yieldingly strain the material about the former 41. By preference the work-supporting guides are constructed and supported independently of the walls which circumscribe the throat-groove 10. The guide *e* is provided with a spring-supporting lever

a, Fig. 9, and the guide *h* is similarly provided with a spring-supporting lever *f*. Said levers are secured by screws 20 20 to the machine-bed, and by loosening these screws the levers may be adjusted toward and from each other, so as to make the space *n* of any desired size normally, and from such normal size the space is enlarged and reduced automatically by the yielding and contracting of the spring-supporting levers *a f*. This adjustment of the levers is permitted by having their rear ends formed with elongated openings, through which pass the binding-screws *b b*, and when the screws are loosened, together with the screws 20, the levers may be moved laterally, pivoting on the screws 20, and then be fixed in any desired position by tightening the screws. By this arrangement we obtain a yielding pressure upon the material, adapt the machine to work on buttonhole-pieces of varying thicknesses, and maintain a tensional strain upon the material under all circumstances, whereby the material is sharply bent around the former and a uniformity secured in the structure of the machine-stitches.

The work-supporting guides *e h*, being movable toward and from the plane of the needle-path, operate not only to strain and thereby sharpen the bend of the material about the bottom edge of the former 41, but follow upwardly the uplifting movement of the former and co-operate in lifting the bend of the material above the plane of the needle-path.

On the machine-bed plate between the levers *a f* is a thrum-combing device 60. Said device consists of a piece of pileated fabric material, preferably a camel's-hair pile. Its purpose is to engage and comb the thrum ends into lines extending along the under face of the material at right angles, or approximately so, across the needle-path to the end that said thrums may be overlaid and drawn together progressively by means of the finishing-stitches.

As a feeding mechanism we employ a feed-bar 22 and a co-operating presser-foot 23. Said presser-foot is located in the arm of the machine above the feed-bar, as represented in Fig. 4. The feed-bar 22 is supported on a lever 24 in position to operate in the groove 10. Said lever 24 engages one end with a rocking frame 25, Fig. 3, and with its opposite end embraces a cam on the shaft B. (See Figs. 3 and 5.) Said connections impart from the shaft B the necessary movements to the feed-block 22. The first movement of the feed-block is downward to allow the material to be depressed between the work-supporting guides *e h* for receiving the needle-thrust, and during the taking of the stitch thus through the bend of the material the feed-block is drawn backward by means of spring 27. The block is then lifted and supported above the plane of the needle-path while a stitch is taken beneath the material over the stay-cord and thrum ends. The feed-block then moves

the material one step forward and again descends to permit depressing and stitching through the material, as before.

It is observed that the former and the feed mechanisms derive motion, primarily, from the shaft B, while the stitch-forming mechanisms derive motion, primarily, from the shaft F. In the finishing of buttonhole-pieces a stitch is formed in the material and the next stitch is formed outside of the material over the stay-cord and thrum ends. This necessitates two operations of the stitching devices to one operation of the former and feed mechanisms. In order to provide these movements, we employ a gear E one-half the diameter of gear D to thereby obtain two revolutions of the shaft F to each complete revolution of the shaft D. In case, however, it were desirable to stitch through the material every time, a gear should be employed in place of the gear E with a diameter equal to the one in place of gear D.

In finishing buttonhole-pieces the feed-block, as described and represented in the machine here presented, is made to co-operate in lifting the material out of the space between the work-supporting guides and above the needle-path during the formation of a stitch outside the stay-cord and thrums.

In alignment with the space *n*, between the work-supporting guides and beneath the plane of the needle-path, is represented a block 30, having on its top face a central rib *m*. Said block has a supporting spring-arm 32, by which, being secured to the machine bed-plate, as represented, supports the block in such manner as to permit movements from a point below to a point above the plane of the needle-path. A screw 50, secured in the block 6, extends through a hole in the spring-arm 32, and by reason of its flanged head operates as a stop to limit the downward movement of the block 30, and is adjustable by turning in the block 6, so as to vary the limit of downward movement of block 30 in relation to the plane of the needle-path. The spring 32 is arranged to support the block 30 normally above the plane of the needle-path, but yields to permit the block 30 being depressed below said plane. The depressing movement is effected by reason of the former 41 moving downwardly upon the material, and thus continuing and depressing said block. The material being in this operation made to bear upon the rib *m* is supported by the rib, and the distance by which the stitching-thread is embodied in the material may be determined by how much the said rib *m* is depressed below the plane of the needle-path. Said rib is smoothly finished, and has a comparatively sharp upper edge face to the end that the stay-cord and thrum ends may not find bearings thereupon, but, on the contrary, be thereby guided to one or the other side of said rib, at which places the block 30 is recessed. By this arrangement the rib invariably finds contact with the bottom surface of

the material, and a more uniform series of stitches is thus insured.

We are aware that this particular construction is not essential to the practical operation of the machine, but in certain grades and classes of work we have found it most desirable.

It will be understood that as the former 41 is lifted the spring 32 operates to carry upwardly the block 30 and its bearing-rib *m* to a point above the plane of the needle-path in order to lift the material and support the thrums on the face thereof above the plane of the needle-path, to thereby enable the needle to form a stitch outside of the material over the stay-cord and thrums.

We claim—

1. In a machine for finishing buttonhole-pieces, the following instrumentalities in combination, viz: an eye-pointed thread-carrying needle, complementary stitch-forming devices, and devices to actuate the same, a bed or cloth plate provided with a slot or throat, work-supporting guides depending in said throat and arranged with a space between them for receiving the material, a reciprocating former or work-bender to bend the material between the work-supporting guides and below the needle-path, co-operating devices to lift said material above the needle-path to enable the needle at one thrust to enter and pass out from the material disposed between said work-supporting guides at the same side and between the right face of the material and the stay-cord and thrum ends, the needle at another thrust passing the material outside the stay-cord and thrum ends and making a stitch to cross and hold the stay-cord and thrum ends in place.

2. In a machine for finishing buttonhole-pieces, the following instrumentalities in combination, viz: an eye-pointed thread-carrying needle, complementary stitch-forming devices, and devices to actuate the same, a bed or cloth plate provided with a slot or throat, work-supporting guides depending in said throat and arranged with a space between them for receiving the material, a reciprocating former or work-bender to bend the material between the work-supporting guides and below the needle-path, co-operating devices to lift said material above the needle-path to enable the needle at one thrust to enter and pass out from the material disposed between said work-supporting guides at the same side and between the right face of the material and the stay-cord and thrum ends, the needle at another thrust passing the material outside the stay-cord and thrum ends and making a stitch to cross and hold the stay-cord and thrum ends in place, and an adjustable stop disposed in said throat to limit the movement of the material below the needle-path.

3. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides arranged with a space between them for re-

ceiving the material and movable for enlarging or contracting said space, a former supported to permit movement toward and from the needle-path, and operating means to depress the former upon the material in order to bend the material between the work-supporting guides and below the needle-path, substantially as described.

4. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides arranged with a space between them for receiving the material, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between the work-supporting guides and below the needle-path, said work-supporting guides being movable toward and from each other and also toward and from the needle-path for straining and sharpening the bend of the material, substantially as described.

5. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides adjustable to and from each other and arranged with a space between them for receiving the material, a former supported to permit movement toward and from the needle-path, and operating means to depress the former upon the material in order to bend the material between the work-supporting guides and below the needle-path, substantially as described.

6. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, spring-supported guides arranged with a space between them for receiving the material and movable for enlarging and contracting said space, a former supported to permit movement from and toward the needle-path, and operating means including a spring interposed between said former and its actuator to depress the former upon the material in order to bend the material between the guides and below the needle-path, substantially as described.

7. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, a grooved throat-plate having in its walls an opening, through which said needle is made to operate, work-supporting guides independent of the throat-plate groove for supporting the material in the throat-plate groove arranged with a space between them for receiving the material, a former supported to permit movement toward and from the needle-path, and operating means to depress the former upon the material in order to bend the material between the work-supporting guides and below the needle-path, substantially as described.

8. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides for supporting the material above the needle-

path arranged with a space between them for receiving the material, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between the work-supporting guides and below the needle-path, and a co-operating work-support to act upon and support the material below the needle-path and adjustable toward and from the needle-path, substantially as described.

9. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides for supporting the material above the plane of the needle-path arranged with a space between them for receiving the material, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between the said guides and below the needle-path, and a co-operating work-support to act upon and support the material below the plane of the needle-path, said lower support being recessed, as described, to receive the bar-cord and thrum ends of a buttonhole-piece, substantially as described.

10. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides for supporting the material above the plane of the needle-path arranged with a space between them for receiving the material, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between the said guides and below the needle-path, and a co-operating spring-supported work-support to act upon and support the material below the plane of the needle-path and movable from a point below to a point above the needle-path in order to lift and support the material above the needle-path, substantially as described.

11. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, work-supporting guides for supporting the material above the plane of the needle-path arranged with a space between them for receiving the material, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between the said guides and below the needle-path to thereby enable a stitch to be made through the bent material and to lift and support the former above the plane of the needle-path during the formation of the next stitch, and independent lift mechanism to lift and support the material above the plane of the needle-path during the formation of said next stitch to thereby enable said stitch to be taken outside of the material, substantially as described.

12. In combination, a sewing-machine stitch-

forming mechanism including a reciprocating perforating-needle, work-supporting guides arranged with a space between them for receiving the material, a former supported to permit movement toward and from the needle-path, a lever connected with said former, and operating means to move said lever in order to lift and depress the former, substantially as described.

10 13. In combination, a sewing-machine stitch-forming mechanism including an eye-pointed thread-carrying needle, the guides *e h*, and their spring-levers *a f*, a former supported to permit movement from and toward the needle-path, and operating means to depress the former upon the material in order to bend the material between said guides and below the needle-path, substantially as described.

20 14. In combination, a sewing-machine stitch-forming mechanism including a reciprocating perforating-needle, the described work-supporting guides and former and thrum-comb, composed of pileated fibrous material, substantially as described.

25 15. A pileated thrum comb or gatherer to gather or arrange during a relative movement of the buttonhole-piece and comb the loose thrums and stay-cord along the under side of a buttonhole-piece in position to be bound or secured thereto, combined with means to effect said relative movement and with devices

to bind or secure the said thrums and stay-cord while so gathered or positioned to the under side of said buttonhole-piece without changing or affecting the face side thereof. 35

16. In a machine of the character described, the former 41, the supporting-rod 40, operating-lever extension 44, collar 46, and coil-spring 45, combined with a collar on the rod 40 to stop the downward movement thereof and stitch-forming mechanism including a reciprocating perforating-needle and throat-groove, substantially as described. 40

17. A thrum comb or gatherer comprising a mass of upstanding projections or spires to gather or arrange during a relative movement of the buttonhole-piece and comb the loose thrums and stay-cord along the under side of the buttonhole-piece in position to be bound or secured thereto, combined with means to effect said relative movement and with devices to bind or secure said thrums and stay-cord while so gathered or positioned to the under side of said buttonhole-piece without changing or affecting the right or face side thereof. 55

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