D. NOBLE & J. S. FINCH.

PURLING DEVICE FOR BUTTONHOLE SEWING MACHINES.

APPLICATION FILED DEC. 19, 1906.

920,625.

Patented May 4, 1909.

2 SHEETS—SHEET 1.

Fig. 2.

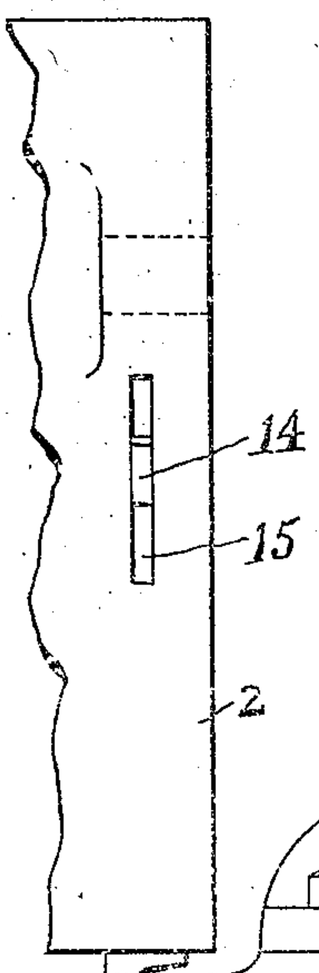

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 5.

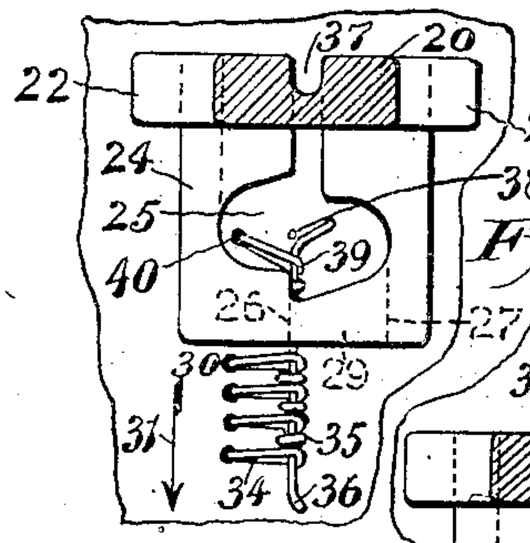


Fig. 3.

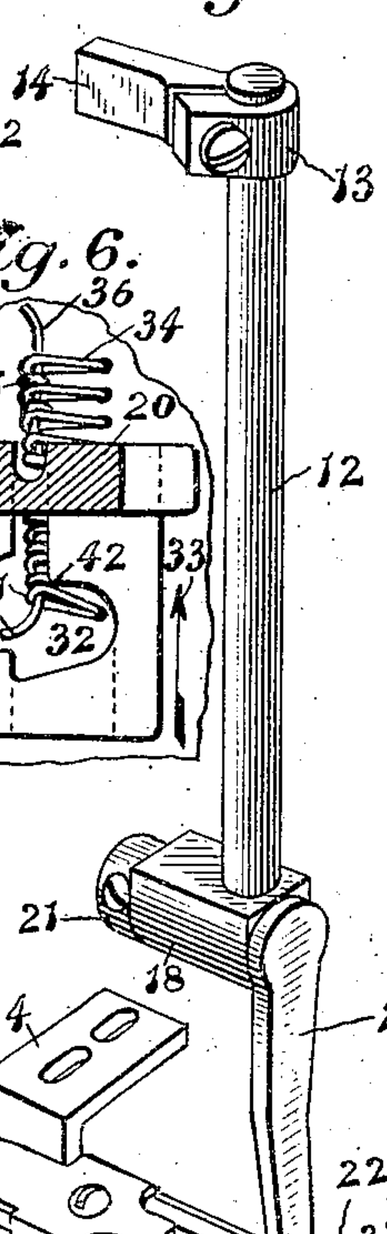


Fig. 6.

Fig. 8.

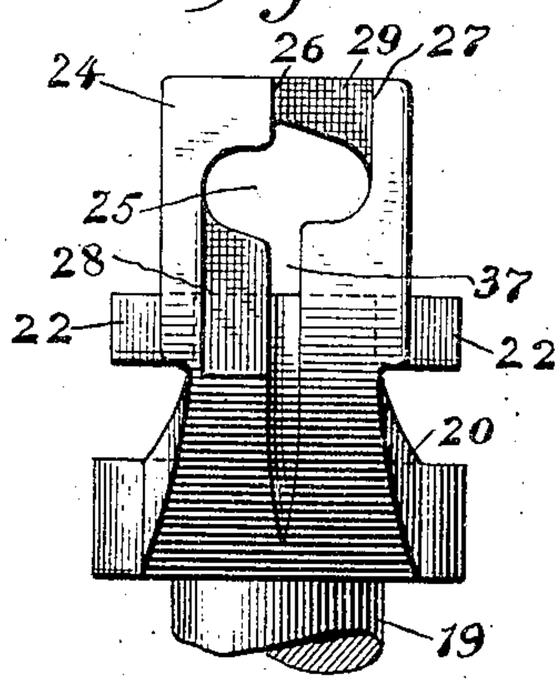


Fig. 7.

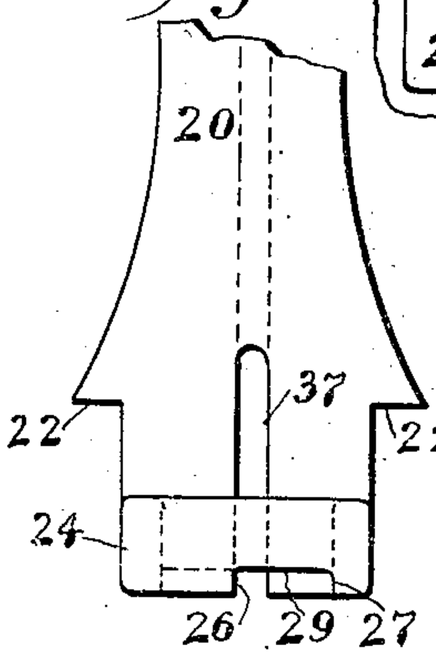


Fig. 9.

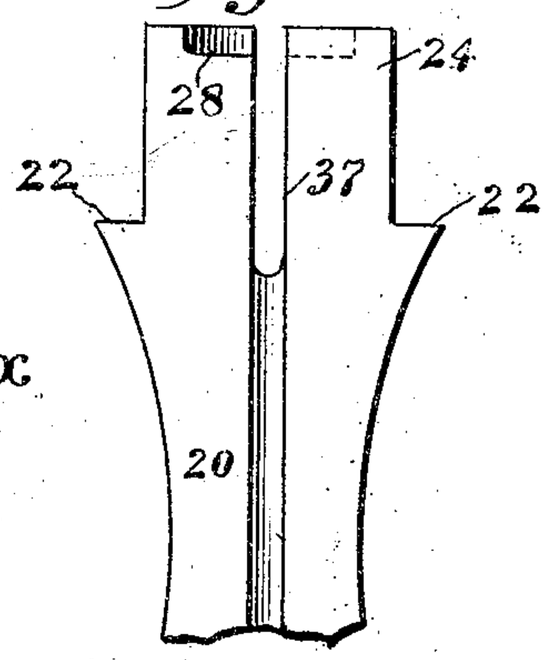


Fig. 10.

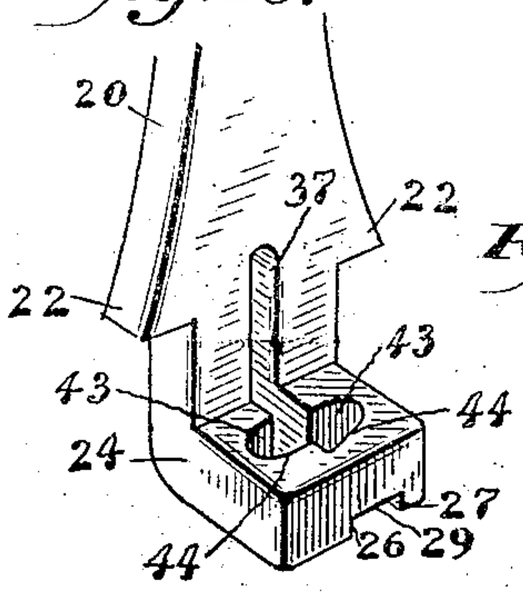


Fig. 4.

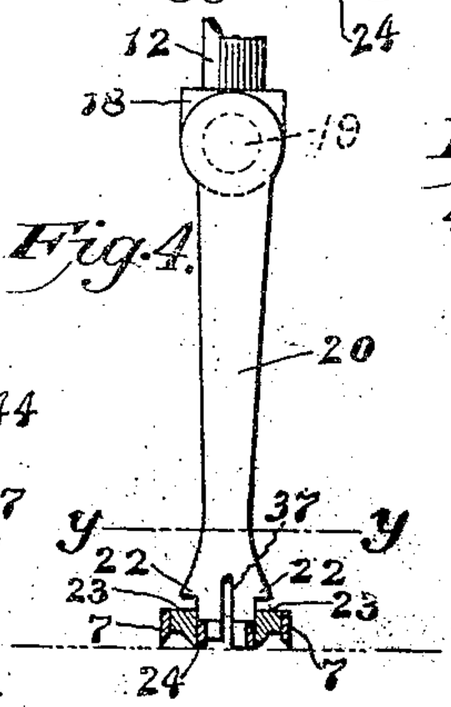
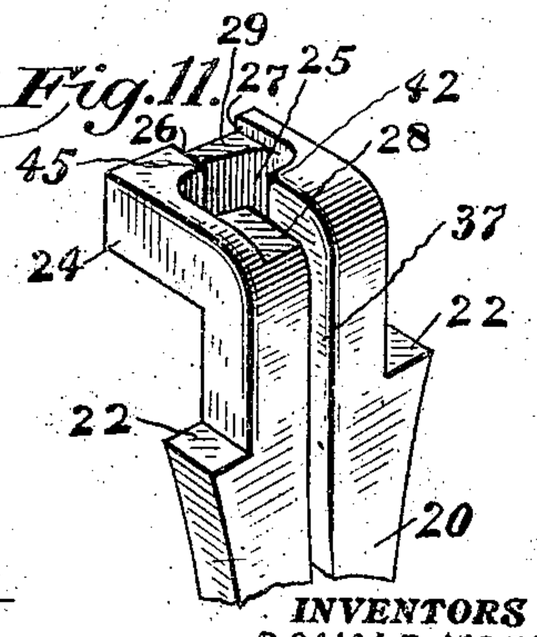


Fig. 11.



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UNITED STATES PATENT OFFICE.

DONALD NOBLE AND JOHN S. FINCH, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE SINGER MANUFACTURING COMPANY, A CORPORATION OF NEW JERSEY.

PURLING DEVICE FOR BUTTONHOLE-SEWING MACHINES.

No. 920,625. Specification of Letters Patent. Patented May 4, 1909.

Application filed December 19, 1906. Serial No. 348,620.

To all whom it may concern:

Be it known that we, DONALD NOBLE, a subject of the King of Great Britain, and JOHN S. FINCH, a citizen of the United States, residents of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Purling Devices for Buttonhole-Sewing Machines, of which the following is a specification.

Our invention relates to certain new and useful improvements in sewing machines for making buttonholes and has especial reference to the means employed for effecting purl stitching.

Our invention is especially adapted for use in connection with buttonhole sewing machines wherein it is desired to form and position the so-called "purl stitching" on the opposite edges of the buttonhole slit, thereby giving to the finished buttonhole the appearance of hand overseaming. It is well understood that purl stitching is effected by positioning the locks of the sewing threads in an unbroken line.

Our invention consists in equipping such a machine with a purling device comprising a purling foot provided with a needle opening and adapted to rest upon the material within the space inclosed by the cloth-gripping presser, and so arranged and constructed as to partake of all the motions of the latter, except the feed movements lengthwise of the buttonhole, and provided with walls for engaging the lock of the sewing threads as such lock is set or tightened by the action of the take-up for the formation of the stitch.

In the accompanying drawings which form a part of this specification and in which like parts are similarly designated throughout the several views, Figure 1 is an end elevation of a buttonhole sewing machine equipped with our improvement. Fig. 2 is a rear side elevation of a portion of the front end of the overhanging arm illustrating, particularly in connection with Fig. 1, how the purling device is held against turning. Fig. 3 is a detail perspective view of a portion of the cloth clamp, together with our improved purling device and its connections, detached from the machine. Fig. 4 is a sectional elevation, partially broken, taken on the line X, X, of Fig. 3. Fig. 5 is an enlarged horizontal section or plan view taken on the line Y, Y, of Fig. 4. Fig. 6 is a view similar to Fig. 5, but illustrating the stitch formation on the opposite or right hand side of the buttonhole. Fig. 7 is an enlarged front edge elevation of the purling foot, as seen from the bottom edge of Fig. 5. Fig. 8 is an enlarged bottom view of the purling foot. Fig. 9 is an enlarged rear elevation of the purling foot, as seen from the bottom edge of Fig. 8. Fig. 10 is an enlarged detail perspective of the purling foot as viewed from the top side thereof. Fig. 11 is an enlarged detail perspective view of the purling foot, as seen when inverted.

In describing our improvements, only such limited reference will be made to the usual well-known parts of the buttonhole sewing machine as is deemed necessary for a proper understanding of our invention.

1 is the base of the machine surmounted by the usual overhanging arm 2.

3 is the throat-plate and 4 and 5 are the upper and lower members, respectively, of the cloth-clamp, which clamp is mounted upon the cloth clamp slide 6, the latter being actuated in the usual or any approved manner to present the material to the action of the stitch-forming mechanism. The cloth-clamp member 4 is provided with a suitable cloth-gripping presser 7 and with the usual opening 8 through which the needle 9 passes in forming the stitch. Secured in the end of the overhanging arm 2, directly back of the needle-bar 10, is a bushing 11 within which is slidably mounted a presser-bar 12, to the upper end of which latter is secured a collar 13 having formed thereon an arm 14 projecting within a vertical slot 15 cut in the rear of the arm 2, by means of which said presser-bar is held against turning in the bushing within which it slides.

16 is a coil spring, one end of which is secured to the underside of the collar 13, while the other end is secured at 17 within the hollow end of the arm 2, by means of which said presser-bar and parts carried thereby are pressed resiliently downward to engage the material.

Formed on the lower end of the presser-bar 12 is a horizontally disposed socket 18 within which is pivoted a short shaft 19 formed on the upper end of an arm 20, a collar 21 on the end of said shaft serving to hold the latter in position within the socket. Projecting lat-

erally from the sides of the arm 20, near the bottom thereof, are lugs 22, 22, adapted to engage the parallel edges 23, 23 of the cloth-clamp member 4, whereby when the latter is raised to adjust the material, the arm 20 will also be lifted, as will be readily understood. The arm 20 is provided at its lower end with a purling foot 24 which also acts as a cloth-presser, and is of approximately the same width as the opening 8 in the cloth-gripping presser 7, said foot depending within said opening 8 to engage the material, and as the cloth-clamp is vibrated transversely to the length of the opening in said clamp, the foot 24 will also partake of such vibration, as will be apparent by reference to Figs. 1, 3 and 4.

The needle aperture 25 in the purling foot 24, which, of course, is in proper alinement with the needle, is of a peculiar shape, being wide enough to accommodate the lateral vibrations of the cloth-clamp for overseaming both sides of the buttonhole. The foot 24 is provided with walls 26, 27, against which the locks of the overseam stitches are held when the take-up is actuated to tighten or set the stitch. The bottom of the foot 24 is chamfered or relieved, as shown at 28, 29, so that only a portion of such surface will bear upon the material when forming the stitches.

In the formation of the side overseam stitches, supposing that the overseaming of the left hand side 30 is first presented to the action of the stitch-forming mechanism, the material will be fed in the direction indicated by the arrow 31; while in overseaming the second or right hand side 32, the material will be fed in the opposite direction, as indicated by the arrow 33. As is well known, this peculiar form of overseam for buttonholes is composed of alternate long and short loops of bobbin thread, the locks of which are drawn by the upper thread to form an unbroken line, the long loops being indicated by 34, the short loops by 35, and the upper thread by 36. As shown in Figs. 5 and 6, the long loops are drawn at a somewhat acute angle, but the setting or tightening of the succeeding stitch which is a short loop, causes the long loops to be positioned as seen in the other portions of these figures. The slot 37, made at the rear of the foot 24, provides for the use of a knife for cutting the buttonhole slit, as clearly shown in the drawings.

Referring more particularly to Figs. 5 and 6, the walls 26, 27 are arranged on opposite sides of the longitudinal center of the buttonhole slit and on opposite sides of a line intersecting the line of vertical movements of the needle and transversely to the line of feed. Supposing the overseaming to have progressed as illustrated in Fig. 5, wherein the needle is ready to descend through the buttonhole slit at 38 in the formation of an edge stitch, as the needle is moving to its highest position in the formation of such edge stitch, the cloth-clamp is vibrated to the right to position the material for the next subsequent stitch, which is a depth stitch, and at the same time the clamp has advanced the material in the direction indicated by the arrow 31, to a position which brings the stitch-forming position 38 to the position previously occupied by stitch 39, or in contact with wall 26. It is to be observed that the overseaming stitch 40 leads from the depth stitch to the line of edge stitches, and is drawn to such position by the take-up before the needle descends to form the edge stitch positioned at 38, and during the time that the take-up is returning to its lowest position and again to the position for setting the edge stitch at 38, the overseam stitch 40 lies loosely upon the material. The formation and tightening of the edge stitch anchors the inner end of the long overseam stitch and positions such overseam stitch at right angles to the buttonhole slit, as illustrated by stitches 34 and 35; and such stitch formation and feed are continued to the finishing of the side overseaming, thus positioning the lock of each edge stitch opposite of the wall 26 before the take-up sets or tightens the succeeding edge stitch.

When overseaming the right hand side of the buttonhole, as represented by Fig. 6, the purl is controlled by the wall 27 in the same manner as the wall 26 controls the left hand side of the overseaming, Fig. 5. In Fig. 5 the edge stitch 39 is advanced farther than the corresponding stitch 41, (Fig. 6) to illustrate that when using a very fine feed, as fine as is practical for general manufacturing, the feed movement will carry the stitch 41 only slightly beyond the corner 42. The walls 43, 43 are offset from the walls 44, 44 a distance only slightly greater than the diameter of the needle; and in actual construction, the purling foot is only about one-fourth of an inch wide, outside measurement. To better facilitate the feeding of the overseam stitches beneath the purling foot, the corners 42 and 45, at their lower ends, are slightly beveled, see Fig. 11. The chamfering or cutting away of the underside of the foot as at 28, 29 is done, as previously stated, to give less bearing surface, so that the lower edge of the walls 26, 27 will bear more directly upon the material. 46 is the clamp-closing lever pivoted on the post 47 and formed with a cam portion 48 which bears upon a spring washer 49 mounted upon the post 47, which latter is secured in the cloth-clamp slide 6. The post 47 is provided with a spring 50 which acts to raise the clamp member 4 when the cam portion 48 is moved out of engagement with the spring washer 49, which adjustment may consist of manual or automatic means, such, for instance, as is illustrated and described in

our patent application for "Buttonhole sewing machine", filed under even date herewith, which application comprises the construction of buttonhole sewing machine to which our present invention is applied, and to which reference may be had for a more definite understanding of such features of construction as are herein shown but not described. Providing the arm 20 with two oppositely arranged lugs 22, 22 instead of one, while desirable, is not essential, as such lugs are at all times in vertical alinement with the upper surface of the member 4; accordingly, one lug could be made to answer the purpose.

What we claim is:—

In a purling device for buttonhole sewing machines, a cloth-clamp provided with a cloth-gripping presser having an opening through which the edges of the buttonhole are overseamed, a purling foot depending within said opening to engage the material, a needle opening in said foot formed with oppositely arranged offset lock-guiding walls for the respective sides of the buttonhole, against which the locks of the sewing threads are positioned upon the material and held in line, a resiliently mounted presser-bar, to the lower end of which is pivoted an arm to move transversely to the line of feed, and upon the lower end of which said foot is formed.

Signed at Bridgeport, in the county of Fairfield, and State of Connecticut, this 18th day of December, A. D. 1906.

DONALD NOBLE.
JOHN S. FINCH.

Witnesses:
A. K. WILLIAMS, Jr.,
W. G. MARKS.