Sept. 27, 1938. A. H. DE VOE 2,131,250

SEWING MACHINE

Filed Sept. 11, 1934 4 Sheets-Sheet 1

Fig.1.

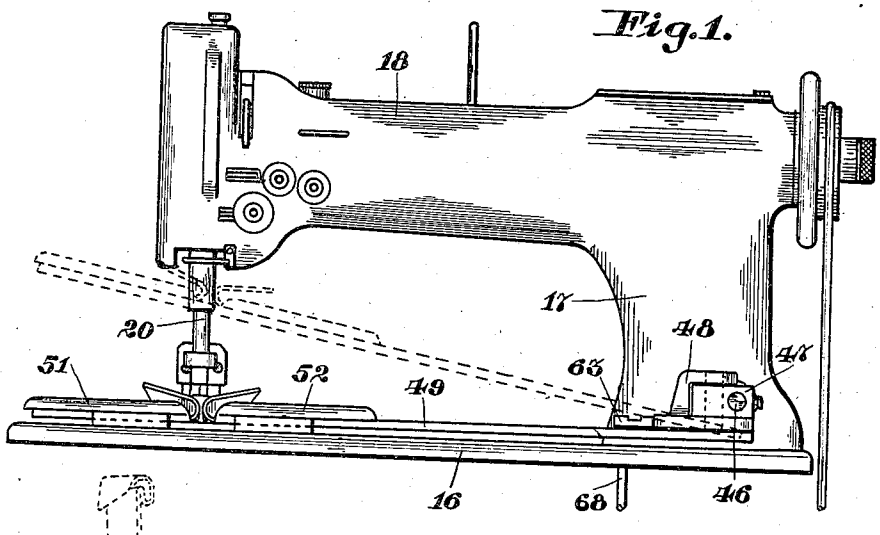
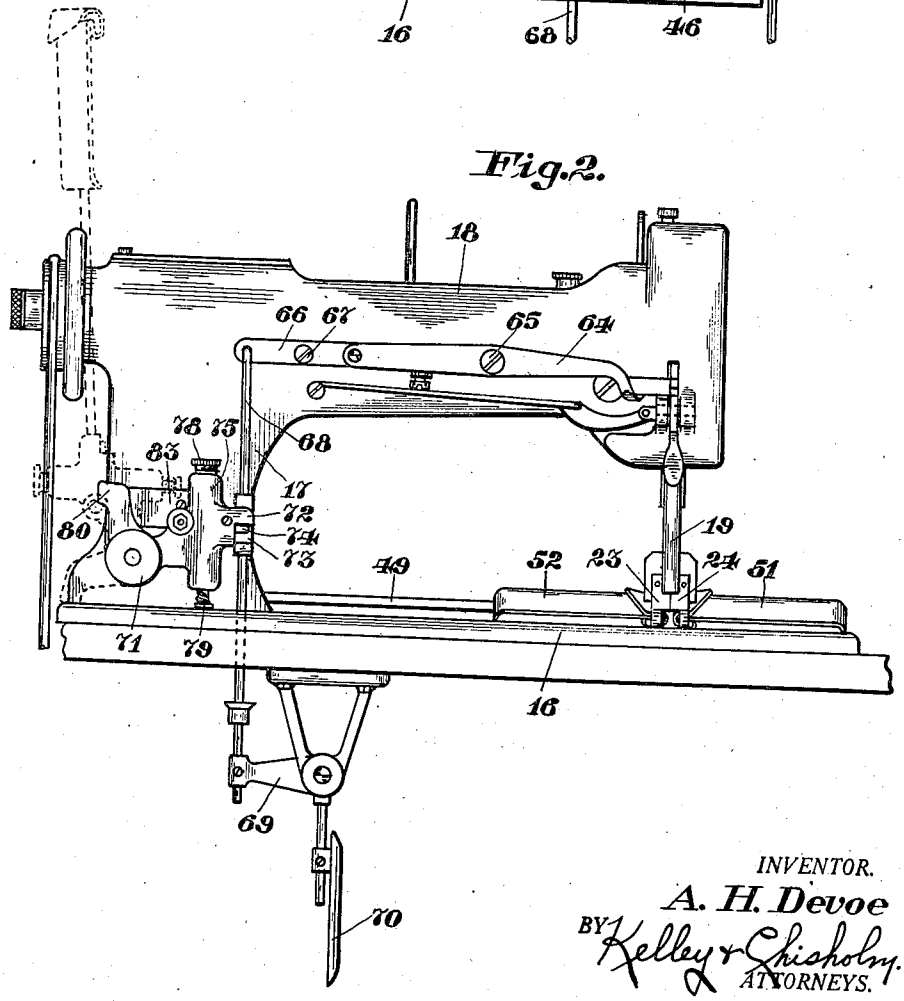


Fig.2.



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Sept. 27, 1938. A. H. DE VOE 2,131,250

SEWING MACHINE

Filed Sept. 11, 1934 4 Sheets-Sheet 2

Fig. 3.

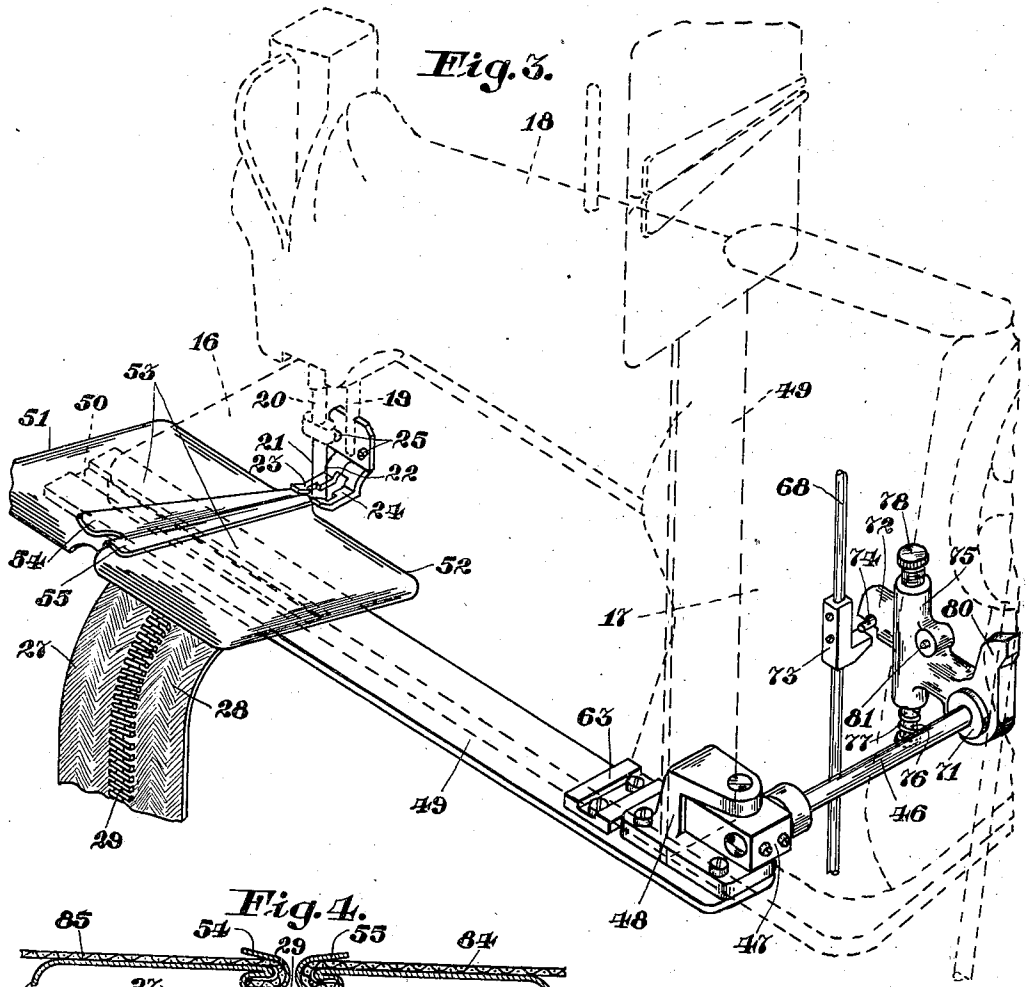


Fig. 4.

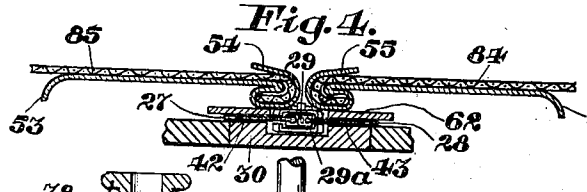


Fig. 5.

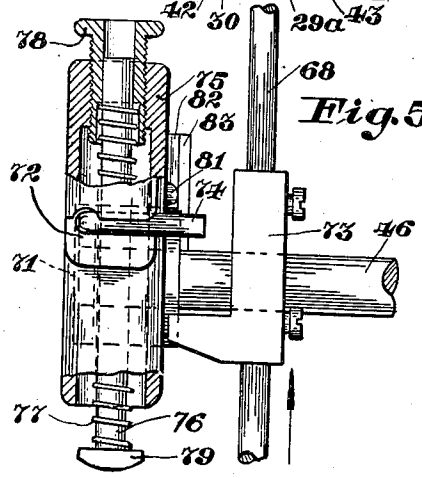
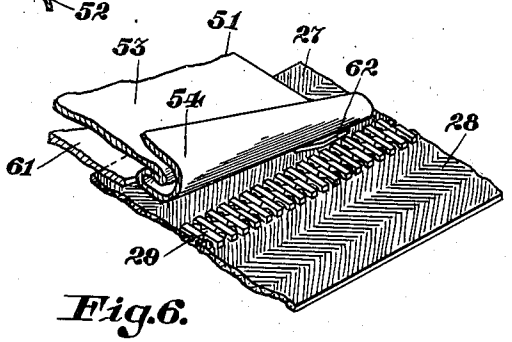


Fig. 6.



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Sept. 27, 1938. A. H. DE VOE 2,131,250

SEWING MACHINE

Filed Sept. 11, 1934 4 Sheets-Sheet 3

Fig.7.

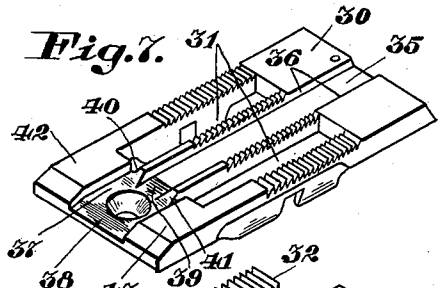


Fig.8.

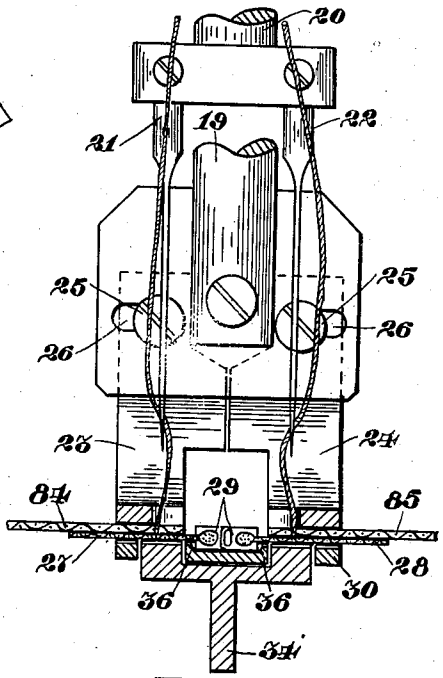


Fig.9.

Fig.10.

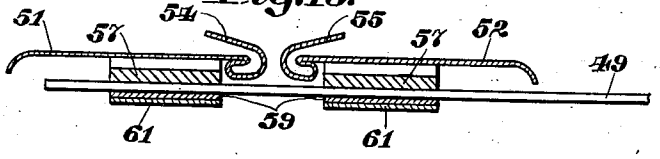


Fig.11.

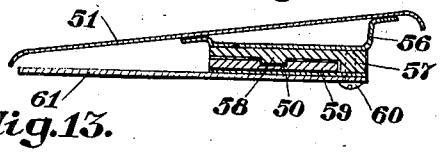


Fig.12.

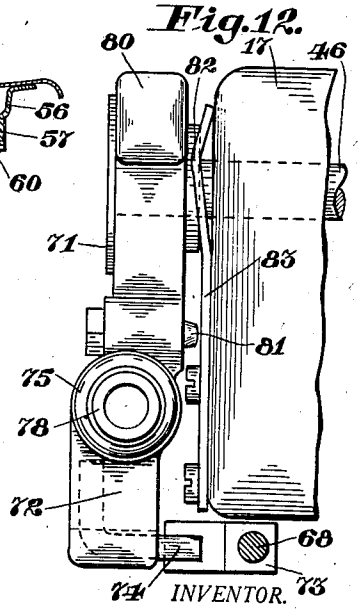
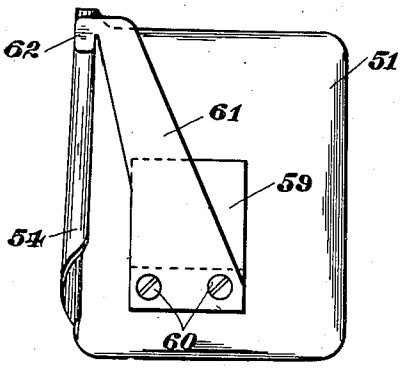


Fig.13.



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Sept. 27, 1938. A. H. DE VOE 2,131,250

SEWING MACHINE

Filed Sept. 11, 1934 4 Sheets-Sheet 4

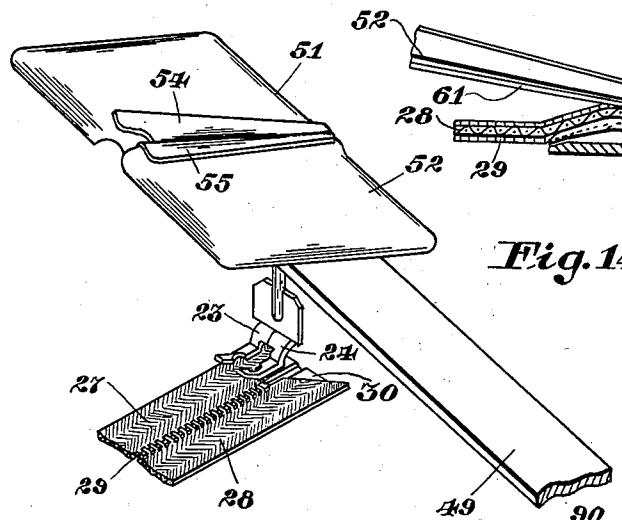


Fig. 14

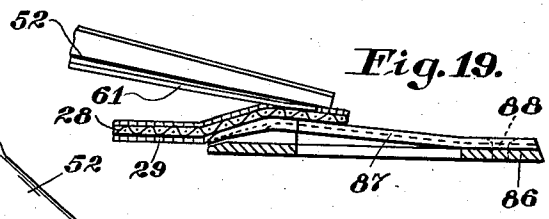


Fig. 19.

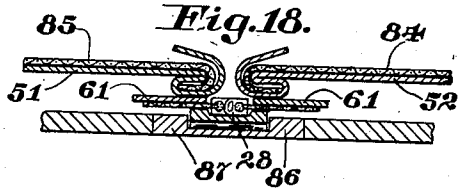


Fig. 18.

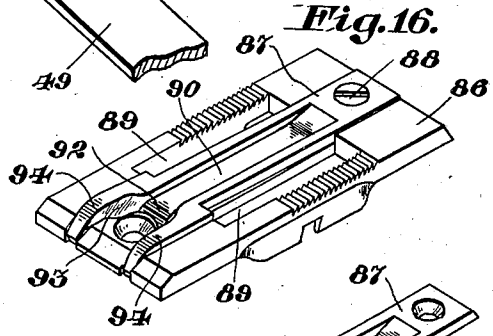


Fig. 16.

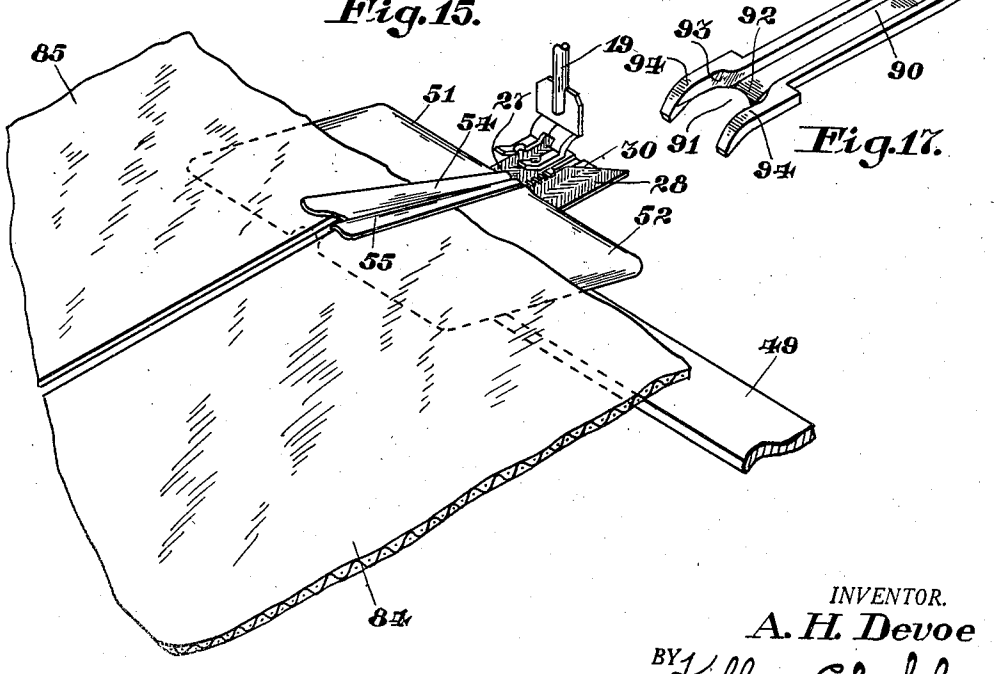


Fig. 15.

Fig. 17.

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Patented Sept. 27, 1938 2,131,250

UNITED STATES PATENT OFFICE

2,131,250

SEWING MACHINE

Albert Harrison De Voe, Westfield, N. J., assignor to Talon, Inc., a corporation of Pennsylvania

Application September 11, 1934, Serial No. 743,561

16 Claims. (Cl. 112—136)

This invention relates to sewing machines. The principal object of the invention is to provide an improved sewing machine for attaching slide fasteners to the edges of various articles such as hand bags, and all kinds of garments.

More specifically the objects of the invention are to provide a machine for attaching slide fasteners which will produce regular and uniform work; to facilitate handling and guiding of the fastener strips and the work by the operator; to provide a machine which can be easily adjusted to accommodate different lengths of fastener strips; and to permit a complete slide fastener to be sewed in place on both sides at the same time.

An investigation of sewing machines now used for sewing slide fastener strips in hand bags and garments shows that the machines now available for the purpose turn out a product which does not have the regular and uniform appearance that the articles worked upon should have. For example, the row of stitches through the fastener strip will vary sometimes in distance from the metal elements of the fastener, and also vary in distance from the edge of the article. In operation, there was found no satisfactory combination of means for guiding and applying tension to the fastener strip with separate means for guiding the work. The operators try to place the fastener in position under the work guides by a long pointed tool as best they can, and always with considerable difficulty and waste of time.

In carrying out my invention to meet the need which was found to exist, I have adopted in general a standard form of sewing machine which, in some instances, may be a single needle machine, and in other instances, it may be a double needle machine. The machine may vary as to character of feed as, for instance, in heavy articles, a needle feed machine is necessary, where for light articles, it would not be necessary.

I have so constructed a throat plate and presser foot that the machine can readily be accommodated to the different widths of metal elements in slide fasteners. The throat plate also has certain other features of construction which are important in the centralizing and tensioning of the fastener strips.

A feature of my invention is in the mounting of work guides for directing the work to the stitch forming mechanism over the fastener strip, and in co-relating the operation of the work guides with the presser foot lifting mechanism, so that the operator can elevate the work guides and have both hands free to place the fastener in position under the presser foot, then lower the work guides, which are provided with means for holding the fastener in position while, at the same time, maintaining the presser foot elevated sufficiently to enable the work to be inserted through the guides to sewing position.

The invention will be more clearly understood from the accompanying description of one embodiment, taken in connection with the accompanying drawings. In these drawings:

Fig. 1 is a front elevation view of a standard sewing machine head equipped with my invention;

Fig. 2 is a rear elevation view of the same machine;

Fig. 3 is a perspective phantom-like view showing the work guides and their operating mechanism;

Fig. 4 is a cross-section through the forward end of the work guides and the entrance end of the throat plate, showing the fastener strips and work in position;

Fig. 5 is a detail side elevation view of the work guide control mechanism;

Fig. 6 is a detail view showing the cooperation of the guides with the fastener strip;

Figs. 7 and 8 are detail perspective views of the throat plate and feed dog, respectively;

Fig. 9 is a vertical cross-section through the stitch forming mechanism;

Fig. 10 is a cross-section through the work guides;

Fig. 11 is a cross-section through the work guides taken at right angles to the section of Fig. 10;

Fig. 12 is a detail view looking from the top of the machine, showing the bracket and retaining device;

Fig. 13 is a bottom plan view of one of the work guides;

Fig. 14 is a schematic view showing the position of the parts for inserting the fastener strips;

Fig. 15 is a schematic view showing the position of the parts for inserting the work;

Fig. 16 is a perspective view of a throat plate of modified form;

Fig. 17 is a separate perspective view of the guide insert on the throat plate;

Fig. 18 is a cross-section through the modified throat plate and associated parts; and

Fig. 19 is a longitudinal cross-section through the modified form of throat plate and associated parts.

The machine illustrated is of a well-known commercial type having the usual work bed 16, and an overhanging arm consisting of the up-

right portion 17, and overhanging portion 18. The machine has the standard mechanical driving parts, and stitch forming mechanism, including a presser foot bar 19, and needle bar 20, carried by the overhanging portion of the arm. The presser foot bar has the usual spring for applying pressure which is adjustable by the standard adjustment nut or screw.

In the machine illustrated, the needle bar is fitted with two laterally spaced needles 21, 22, so that both sides of a complete slide fastener may be sewed in the garment at the same time. Instead of the usual single piece presser foot, I have devised a two piece presser foot consisting of the pieces 23, 24, which are secured to the presser foot bar by screws 25, passing through elongated holes 26 in a suitable rectangular plate which is in turn secured to the presser foot bar. The elongated holes permit a certain degree of lateral adjustment of the presser foot pieces so that the spacing can be narrowed or widened to accommodate different widths of metal on the slide fastener strips.

The slide fastener strips are indicated at various places by the numerals 27, 28, and the strip of metal parts of the slide fastener is designated by the numeral 29. In the illustrations, there are two such fastener strips and a slider 29a which appears in Fig. 4, but it will be understood that most features of my invention are useful also in machines adapted to sew only a single fastener strip to the work.

Referring now to Figs. 7, 8 and 9, the throat plate 30 has openings 31 through which the serrated portions 32, 33 of the feed dog 34 operate. The actuation of the feed dog is by standard parts which are not shown. The throat plate has a channel 35 extending throughout its length to accommodate the passage of the metal parts of the slide fastener strips. The side walls 36 of the channel are inclined as shown more clearly in Fig. 9, so that the series of metal fastener elements will be centered in the channel by the pressure of the presser foot and the action of the feed dog. At the entrance end of the throat plate is a wider channel 37 having a sloping entrance 38 and an inclined surface 39 leading to the channel 35. The inclined surfaces 40, 41 lead to the upper surface of the throat plate and serve to guide the slider through the mechanism. The wider channel 37 is for the purpose of allowing the slider to enter whereby the stitching may come as close as possible to the slider while the fastener strip is definitely centered by the inclined wall 36. On opposite sides of the channel 37 at the forward end of the throat plate are smoothing surfaces 42, 43, over which the fabric parts of the slide fastener slide in their passage through the machine. In Fig. 9 is seen the needle bar 20 carrying two needles 21, 22.

The machine illustrated is of the type having a needle feed wherein the needles move with the feed dog in order to insure that all of the parts of the work may be fed along together. Journalled in the upright portion 17 is a shaft 46, having secured thereto a block 47 at the front end. A bracket 48 is mounted for limited swinging movement in a horizontal plane on the block 47 and carries the work guide arm 49 which extends out over the work bed 16 to a position in front of the presser foot. The arm 49 is rectangular in cross-section and has a groove 50 in its top surface near its free end. A pair of work guides 51, 52 are adjustably mounted on the end of the arm 49. The work guides may be of any known form with smooth work carrying surfaces 53, and an edge guide of any desired form to accommodate any particular kind of work. In the illustration, the work guides are provided with edge folders 54, 55 which fold the edge of the work as it passes to the presser foot. The work guides are held on the supporting arm 49 by brackets 56 (see Fig. 11), carrying a block 57 which block has a tongue 58 adapted to fit into groove 50. A spring friction plate 59 is secured in position by set screws 60 to bear against the bottom flat surface of the arm. By reason of this construction, the work guides may be slipped in turn onto the end of the arm and pushed by hand to the desired position. They are frictionally retained in that position until it is again desired to remove or adjust them.

My machine embodies means for holding the fastener strips in position while the work is being inserted and for applying tension thereto independently of the tension on the work. For this purpose plates 61 are secured in position against the spring plates 59 by the same set screws 60. Each of these plates has a presser element 62 adjacent the end of the work guides so as to press against the parts of the slide fastener strips directly over the smoothing surfaces 42, 43 of the throat plate. The supporting arm 49 carries an abutment block 63 so as to abut against the upright standard 17 and position the ends of the work guides properly adjacent the presser foot.

The devices for manipulating the work guides will now be described. The machine carries a standard form of presser foot lifting mechanism which includes a lever 64 pivoted at 65, a lever 66, pivoted at 67, and a vertically movable link 68 extending through the work bed of the machine and connected underneath the work bed to a bell crank lever 69. The depending arm of the lever 69 carries a plate or pad 70 for operation by the knee of the operator. The shaft 46 extends through the rear side of the machine and has attached thereto, a bracket 71 (see Fig. 3). This bracket has an arm 72 extending to a position alongside the link 68. An abutment block 73 is adjustably mounted on the vertical link 68 and a cooperating pin 74 is attached to the arm 72. This pin is pivoted in the arm so that it can be swung downwardly out of the way (as shown in dotted lines in Fig. 5). The arm 72 has formed integrally therewith, a vertical cylinder 75 which carries counterbalancing rod 76 and spring 77. The rod 76 slides vertically through the spring and through the adjustment nut 78, in which the end of the spring is fixed. By turning the nut 78, an adjustment of the spring can be secured so as to cause the rod 76 to project to the desired point for the proper counterbalancing action. The end of the rod 76 carries a head 79 with a curved bottom surface for cooperating with the work bed surface of the machine.

The arm 49 supporting the work guides can be swung to a substantially vertical position, (as shown in dotted lines in Figs. 2 and 3). It is stopped in that position by the arm 80 integrally attached to the bracket 71 which strikes against the bed plate when the arm is swung to the vertical position. The arm is retained from falling in the opposite direction by a pin 81 on the bracket which rides up over a cam surface 82 on the spring plate 83, which is secured in a suitable position to the upright standard.

The operation of the machine will now be

readily understood in view of the above description. In the use of the machine, the operator will place the knee against the kneed pad 70, and lift the presser foot. Due to the lost motion connection formed by the pin 74, and block 73, the presser foot will be lifted before the work guides are lifted. However, a further movement of the knee lift will cause the arm 49 to be swung upwardly to the position indicated in dotted lines in Fig. 1, and also in Fig. 14. The operator can then place the fastener strips 27, 28 in proper position under the presser foot because she can place her hands easily under the lifted work guides. After the fastener strips are in proper position, she then allows the knee lift to move in the reverse direction until the work guides drop against the fastener strips. This will tend to hold the fastener strips in position so that the operator may use both hands for placing the work 84, 85, which may be the edges of a garment, hand bag or any other article. These edges are placed in position adjacent the edge folders 54 and 55, and since the presser foot is still sufficiently lifted, the work may be put in the proper position for sewing. The knee lift is next released allowing the presser foot to come against the work. By adjusting the counterbalancing screw 78, the effective weight of the work guides may be decreased so that the knee lift may be more easily operated. Furthermore, this will adjust the pressure of the pressure elements 62 against the fastener strips, so as to adjust the tension on the fastener strips independently of the tension on the work. This tension on the fastener strips is a decided advantage since the fastener strips are not crowded against the work by the feed dog, and a uniform, straight application is secured.

The limited horizontal swinging movement of the arm 49, which is permitted by its pivotal connection to the block 47, is an advantage since the work guides would easily cover up the opening to the bobbins, but they may be readily uncovered by swinging the arm outwardly.

The abutment block 63 serves always to position the work guides correctly for feeding the work to the needles. By swinging the arm to the vertical position, the operator can have free access to the entire work bed.

The modified form of throat plate shown in Figs. 16 to 19 inclusive, has the further advantage that the fastener tape is definitely controlled up until the time it reaches the needles by means of a resilient guide and friction member in the throat plate. In Fig. 16 the modified form of throat plate is illustrated at 86 and has a guide insert 87 attached to the plate by screw 88 and extends throughout the length of the throat plate between the feed dog slots 89.

As shown on an exaggerated scale in Fig. 19, the guide insert extends upwardly on a slight incline so that its forward end is yieldable so that it will exert a continuous pressure on the fastener strip passing over it.

In the guide insert there is a guideway 90 for the fastener chain and at the forward end of the insert, there is a wider preliminary guideway 91, which is sufficiently wide to receive the slider. The guideway 91 merges into the guideway 90 by the inclined surface 92 in the center, and at the sides there are further inclined surfaces 93 to guide the slider to the upper surface of the insert.

On opposite sides of the preliminary guideway, there are friction surfaces 94 which, as seen in Fig. 16, bear directly on the under side of the fastener tapes on each side of the fastener chain. The fastener tape is meanwhile pressed against the friction surfaces by the tension plates 61, as shown very clearly in Figs. 18 and 19.

While I have shown and described in this application, one embodiment which my invention may assume in practice, this embodiment is merely for the purpose of illustration and description, and various other forms may be devised within the scope of my invention as defined in the appended claims.

What I claim as my invention is:

1. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, presser foot lifting mechanism, and operating means for said lifting mechanism, of means for guiding a fastener strip to the stitch forming mechanism, movable work guides for directing the work to the stitch forming mechanism, elevating means for said work guides connected to said operating means, for operation thereby.

2. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of means for guiding a fastener strip to the stitch forming mechanism, work guides for directing the work to the stitch forming mechanism when they are in operative position adjacent said presser foot, a common support for said work guides, mechanism for lifting said support, and common operating means for said presser foot lifting mechanism and said work guide support lifting mechanism for operating the same in correlation whereby after an initial lift of said presser foot said work guides will be lifted a sufficient distance above the work bed to allow access of the operator's hand under the work guides to place a fastener strip under said presser foot, and on a reverse movement to drop said work guides against said fastener strip while maintaining said presser foot elevated.

3. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of means for guiding a fastener strip to the stitch forming mechanism, a movable work guide for directing work over said fastener strip to the stitch forming mechanism when said work guides are adjacent said presser foot, a movable support for said work guide movable horizontally a sufficient distance to clear the presser foot and movable vertically to clear the work bed, and operating means for said presser foot lifting mechanism, said operating means having a lost motion connection with said movable work guide support whereby said support will be movable by said operating means after an initial movement of said presser foot.

4. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feed-

ing member, a presser foot carried by said arm, and presser foot lifting mechanism, of a throat plate under said presser foot having a guide channel for a fastener strip, work guides for directing the work to the stitch forming mechanism over the fastener strip when the work guides are in position adjacent the presser foot, an arm pivoted to said upright portion on which said work guides are mounted, means for swinging said arm to elevate said work guides a sufficient distance to allow access of the operator's hands under the work guides to the presser foot for placing fastener strips in position, a common operating means for said presser foot lifting mechanism and said arm swinging mechanism including a lost motion connection between said swinging arm and the presser foot lifting mechanism whereby an initial movement of said operating means will lift said presser foot, and continued movement of the operating means will further elevate the presser foot and swing said arm to elevated position.

5. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of a throat plate under said presser foot having a guide channel for a fastener strip, work guides for directing the work to the stitch forming mechanism over the fastener strip when the work guides are in position adjacent the presser foot, an arm pivoted to said upright portion on which said work guides are mounted, means for swinging said arm to elevate said work guides a sufficient distance to allow access of the operator's hands under the work guides to the presser foot for placing the fastener strip in position, a common operating means for said presser foot lifting mechanism and said arm swinging mechanism including a lost motion connection between said swinging arm and the presser foot lifting mechanism whereby an initial movement of said operating means will lift the presser foot and continued movement of the operating means will further elevate the presser foot and swing said arm to an elevated position higher than said presser foot, said arm being swingable by hand independently of said operating means to substantially a vertical position for entirely clearing the work bed, and means for retaining said arm in said vertical position.

6. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of a throat plate having a channel for guiding a fastener strip to the stitch forming mechanism, a work guide movably supported for directing the work over the fastener strip to the stitch forming mechanism when the work guide is in lowered position, said work guide being movable away from said presser foot to allow access to said fastener strip, and a presser element on the under side of said work guide for contact with said fastener strip to apply tension thereto.

7. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of a throat plate having a channel for guiding fastener strips to the stitch forming mechanism, movable work guides supported over said fastener strips when the work guides are in lowered position, and presser elements having friction surfaces on the underside of said work guides adapted to bear against said fastener strip to apply tension thereto, and means for adjusting the pressure of said presser elements on said fastener strip.

8. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of means for guiding fastener strips to the stitch forming mechanism, movable work guides for directing the work over said fastener strips to the stitch forming mechanism, an arm on which said work guides are adjustably mounted, a shaft pivoted in said upright portion from which said arm extends, a bracket on the end of said shaft opposite said arm, and an adjustable counterbalancing spring carried by said bracket for adjusting the effective weight of said work guides and arm.

9. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of an arm pivotally mounted in the upright portion and extending over the work bed when the arm is in lowered position, and movable work guides adjustable independently of each other along said arm, and means for frictionally retaining said work guides in adjusted position on said arm.

10. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of vertically movable work guides supported in front of said presser foot and having presser elements on the undersides thereof adapted to apply tension on a fastener strip being fed to the stitch forming mechanism under said work guides, common operating means for said presser foot lifting mechanism and said work guides and independent adjustments for said presser foot mechanism and said work guides so as to vary independently the pressure of said presser foot and said presser elements.

11. In a sewing machine having stitch forming mechanism, means for guiding to said stitch forming mechanism a fastener strip which consists of a flexible tape and a series of fastener elements attached thereto, said means including a throat plate having a guide channel for receiving and guiding the fastener elements, said channel having inclined side walls for centralizing the fastener elements therein, a wider and deeper channel at the front portion of said throat plate communicating with said first channel, and an inclined approach from said wider channel to said first channel, and inclined sur-

faces leading from said wider channel to the upper surface of said throat plate.

12. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of a throat plate having a channel for guiding a fastener strip to said stitch forming mechanism, said throat plate having a pair of smoothing surfaces at its forward end on opposite sides of said channel, and presser foot elements independent of said presser foot for pressing a fastener strip against said smoothing surfaces.

13. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of means for guiding a fastener strip to the stitch forming mechanism, work guides for guiding the work over said fastener strip to the stitch forming mechanism, and means on said work guides for applying tension only on said fastener strip.

14. The combination with a sewing machine having a work supporting bed, an arm having an upright portion and an overhanging portion extending over the bed, stitch forming mechanism including a reciprocating needle bar, a work feeding member, a presser foot carried by said arm, and presser foot lifting mechanism, of means for guiding a fastener strip to said stitch forming mechanism, an arm pivoted in said upright portion to swing vertically in front of said presser foot and overhanging portion, work guides adjustably mounted on said arm for directing the work to the stitch forming mechanism over said fastener strips, said presser foot lifting mechanism including a vertically movable link, an abutment block mounted on said link, and means providing a lost motion connection between said abutment block and swinging arm whereby after an initial lift of said presser foot, said arm will be swung upwardly to elevate the work guides, and means for interrupting the connection between said block and swinging arm to allow said presser foot to be operated independently of the work bed.

15. In a sewing machine having a presser foot, stitch forming mechanism, and a throat plate beneath the presser foot, said throat plate having feed dog slots, a guide insert between said feed dog slots and having a guideway for a fastener chain, said insert having a vertically yieldable portion with friction surfaces on either side of the guideway at the forward end adapted to bear against the under surfaces of a fastener tape being fed through the guide.

16. In a sewing machine having stitch forming mechanism, means for guiding to said stitch forming mechanism a fastener strip which consists of a flexible tape and a series of fastener elements attached thereto, said means including a throat plate having a guide channel for receiving and guiding the fastener elements, a wider and deeper channel at the front portion of said throat plate communicating with said first channel, and an inclined approach from said wider channel to said first channel, and inclined surfaces leading from said wider channel to the upper surface of said throat plate.

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