June 30, 1936. D. SILBERMAN 2,045,805

MACHINE FOR ATTACHING SNAP FASTENERS

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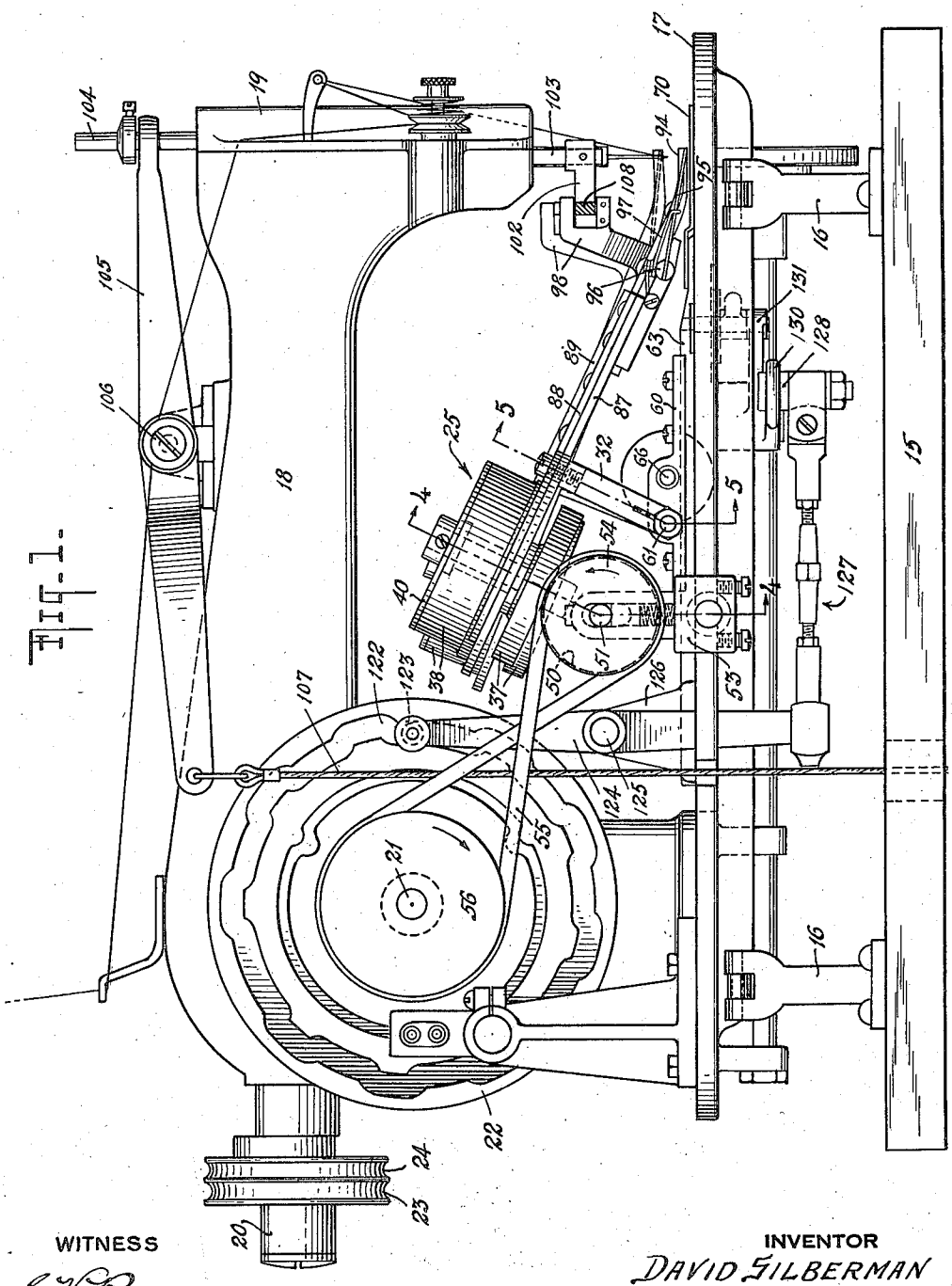


Fig. 1.

WITNESS

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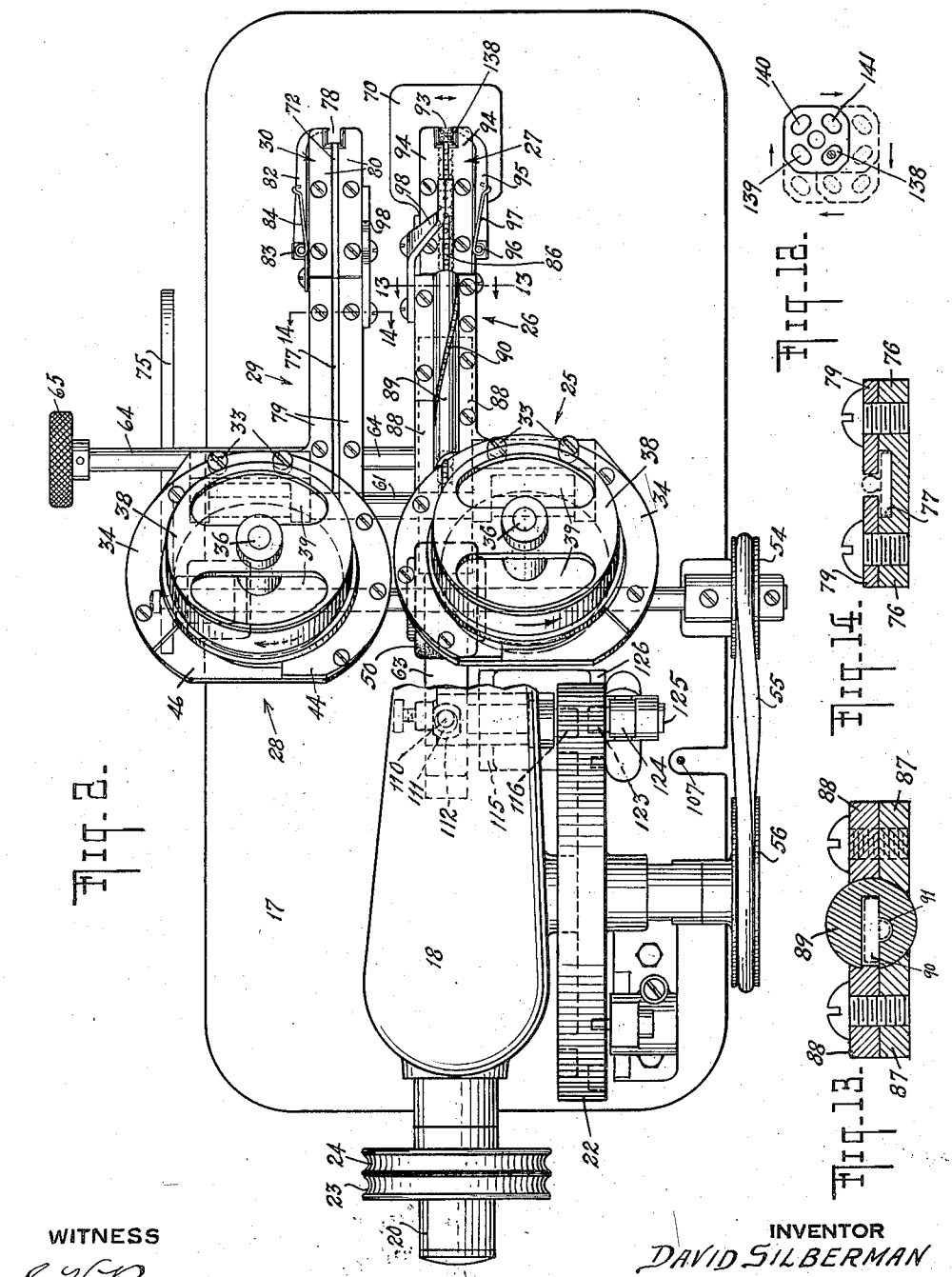


Fig. 12.

Fig. 12a.

Fig. 14.

Fig. 13.

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MACHINE FOR ATTACHING SNAP FASTENERS

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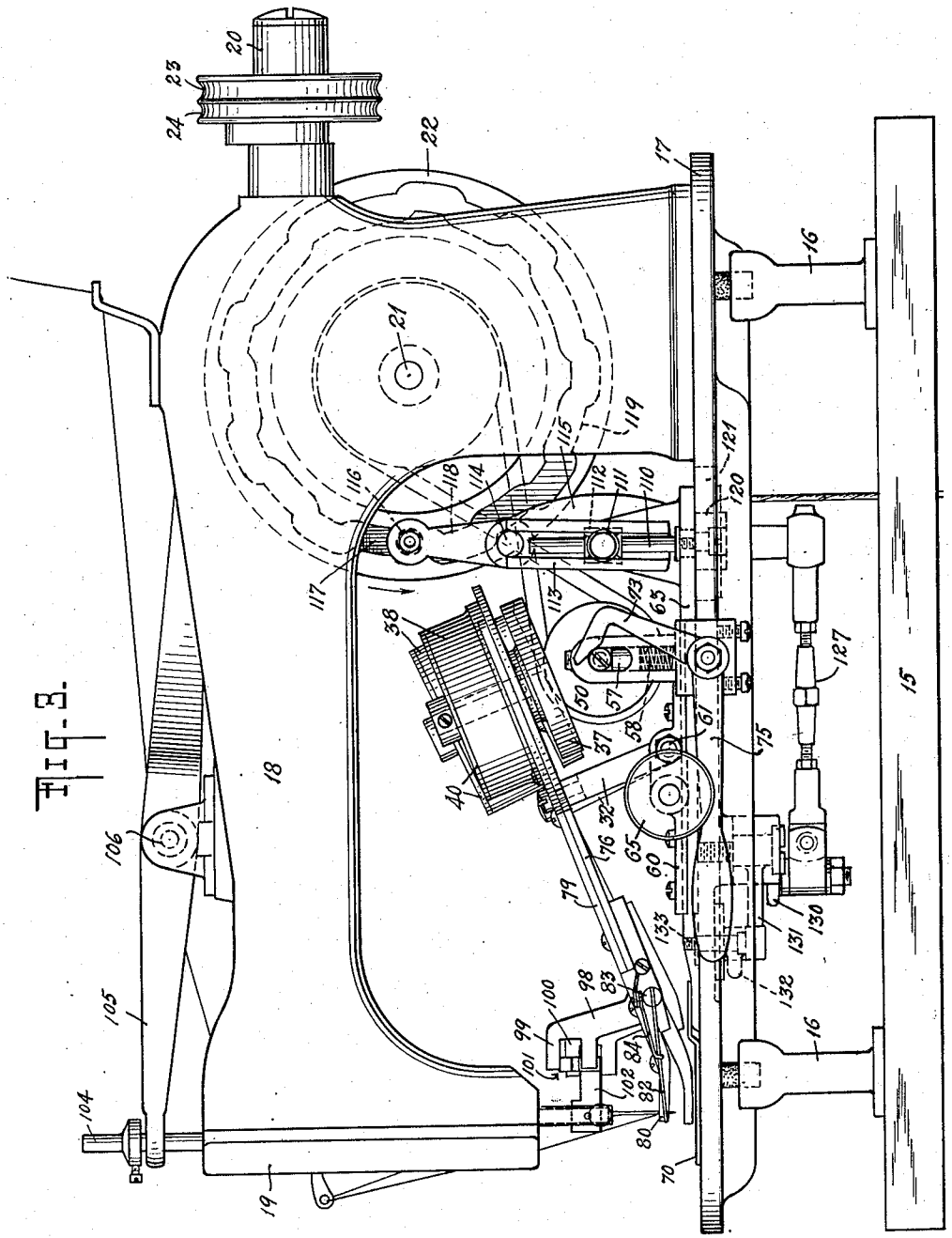


FIG. 5.

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MACHINE FOR ATTACHING SNAP FASTENERS

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Fig. 4.

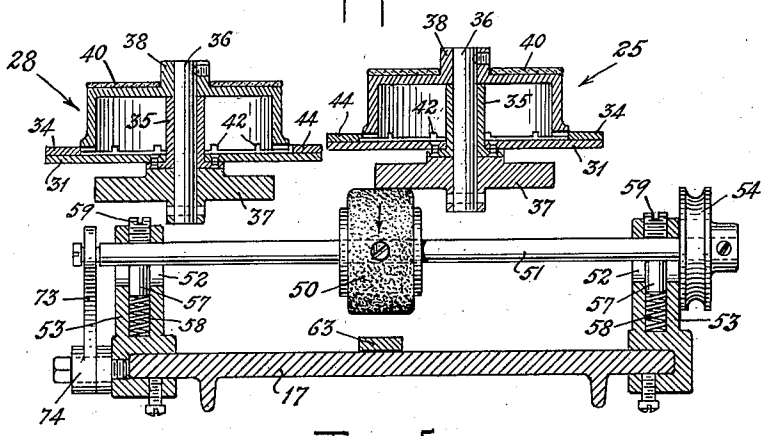


Fig. 5.

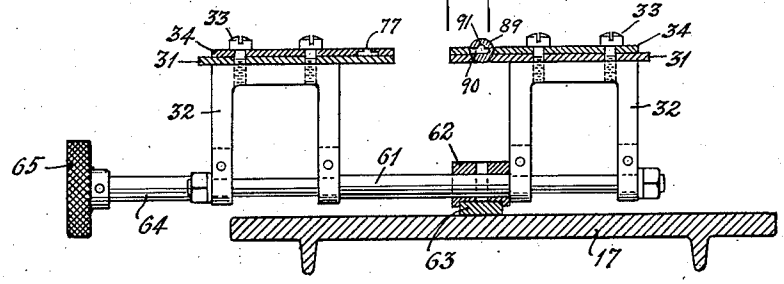
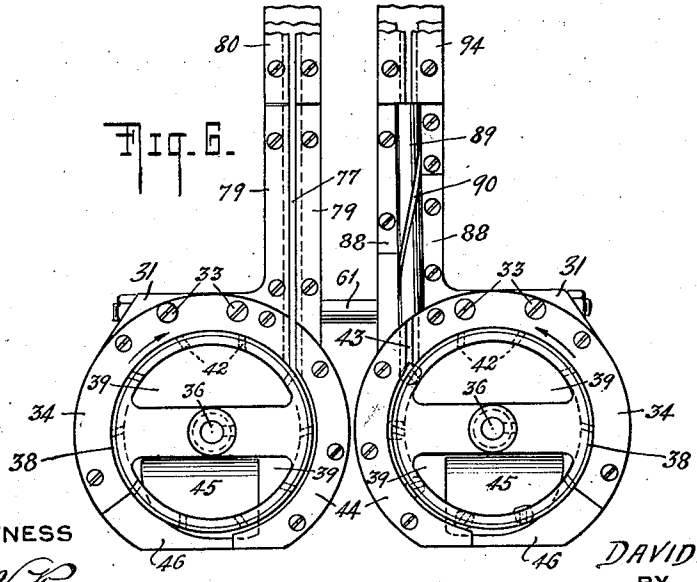


Fig. 6.



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MACHINE FOR ATTACHING SNAP FASTENERS

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Fig. 7.

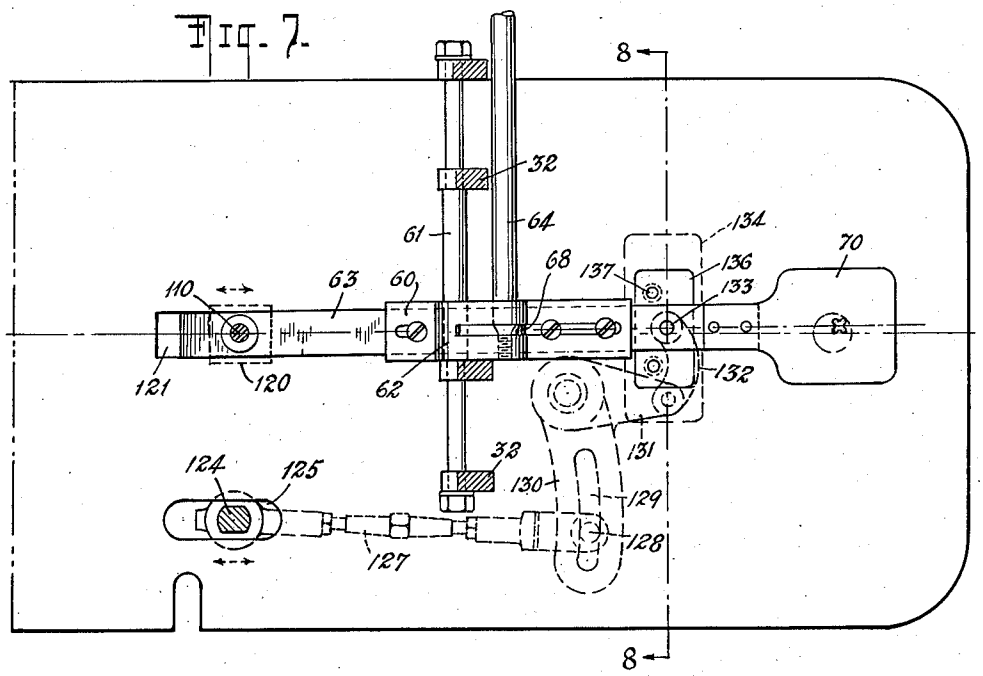


Fig. 8.

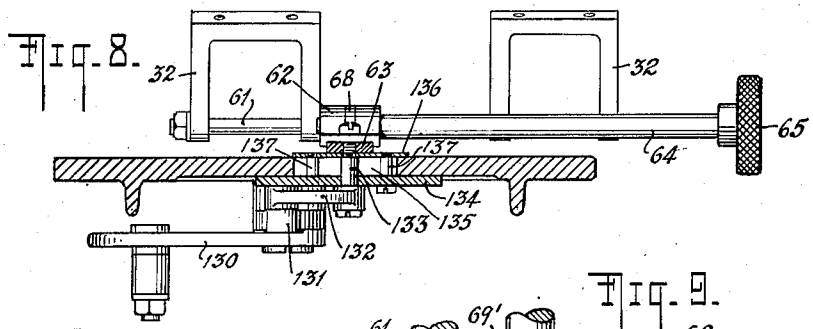


Fig. 9.

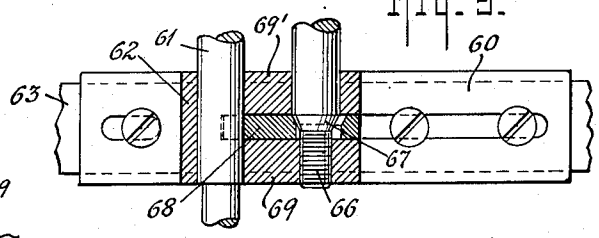


Fig. 11.

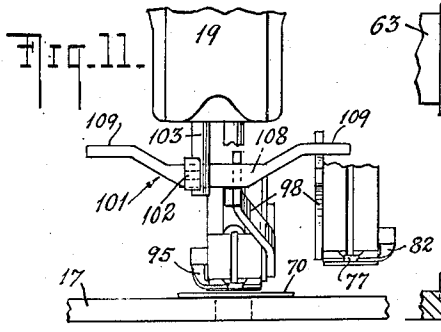
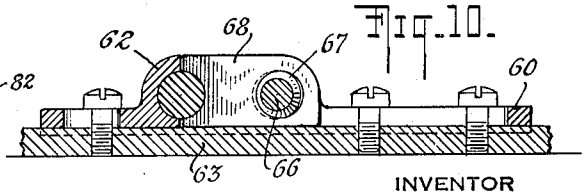


Fig. 10.



WITNESS

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Patented June 30, 1936 2,045,805

UNITED STATES PATENT OFFICE

2,045,805

MACHINE FOR ATTACHING SNAP FASTENERS

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Application March 2, 1936, Serial No. 66,510

19 Claims. (Cl. 112—106)

This invention relates generally to machines for sewing fastener elements onto fabric, or the like, and more particularly to the feeding and positioning apparatus of such machines.

The invention has for its principal object the provision of apparatus for feeding snap fasteners to the sewing mechanism of a machine of the indicated type and for effecting the location of each fastener in sewing relation with the needle of the sewing mechanism during the operation of the machine. Another object of the invention is to provide a feeding and positioning apparatus for snap fasteners which may be readily incorporated in button attaching machines of conventional type without material change in such machines and may be driven in timed relation thereto from the usual operating parts thereof. A further object of the invention is to provide a feeding mechanism which will function as a unit during the operation of the machine. A still further object of the invention is to provide a novel means for feeding the snap fasteners directly from a hopper to the sewing mechanism of the machine in correct position to be sewed to the fabric. It is also an object of the invention to provide a feeding unit which will correctly feed male or female snap fasteners during the operation of the machine.

Other objects and advantages of the invention, as well as the novel details in the construction, arrangement and combination of the parts, will become more apparent from a study of the following description when taken in connection with the accompanying drawings, in which Fig. 1 is a side elevation of a sewing machine embodying the invention; Fig. 2 is a top view of the mechanism shown in Fig. 1, with the head portion of the sewing mechanism removed to more clearly show the feeding mechanism; Fig. 3 is a side elevation of the machine shown in Fig. 1, but viewed from the opposite direction; Fig. 4 is a section taken along line 4—4 of Fig. 1; Fig. 5 is a section taken along line 5—5 of Fig. 1; Fig. 6 is a top plan view of the hoppers and feeding chutes; Fig. 7 is a plan view of a portion of the mechanism for vibrating the hoppers and chutes during the sewing operation; Fig. 8 is a section taken along line 8—8 of Fig. 7; Fig. 9 is an enlarged detailed view, partially in section, illustrating the means for locking the hoppers and chutes in position; Fig. 10 is a vertical section of the mechanism shown in Fig. 9; Fig. 11 is a front elevation of the forward ends of the feeding chutes and the means for supporting them on the head of the machine; Fig. 12 is a diagrammatic view, illustrating the several positions of a snap fastener during the sewing operation; Fig. 13 is a section taken along line 13—13 of Fig. 2 and Fig. 14 is a section taken along line 14—14 of Fig. 2.

In order that the construction and operation of the invention may be readily comprehended, it will be first explained that each snap fastener consists of two parts, a male member and a female member, the male member being provided with an upright head portion adapted to fit into a downwardly extending recessed portion provided in the female member and the base portion of each of the members being usually provided with four holes through which pass the stitches of the sewing thread that fastens them to the fabric. The male members of the fasteners are attached in a row to one side of an opening in a garment or to a stringer for subsequent attachment to one side of an opening in a garment and the female members are attached in a row to the other side of the opening in the garment in opposite relation to the male members so that they may interlock, or to a stringer in the same spaced relation as the male members and such stringer attached to the other side of the opening in the garment so that the female members will properly function with the male members on the opposite stringer.

For the purposes of illustration, the snap fastener feeding apparatus embodying my invention is shown in the drawings in connection with a button sewing machine of a conventional type, but it will be understood that the apparatus of the present invention may be incorporated with other forms of sewing machines, such changes being made in the manner of attaching and driving the apparatus as may be necessary to accommodate the same to the particular machine used. As shown in Figs. 1, 2 and 3 of the drawings, the button machine illustrated includes a base or table 15 upon which is secured legs 16 for supporting a bed plate member 17. Mounted upon the bed plate member 17 is an arm 18 having a head 19 in which the needle-supporting bar reciprocates, a main shaft 20 and a transverse shaft 21 which is connected to the main shaft of the machine so as to revolve in unison therewith. A disc 22 provided with cam grooves on both faces is fixedly secured to the shaft 21 and is timed so as to revolve one-third of a revolution for each fastener sewed on by the sewing machine. A belt operated from a motor (not shown) runs normally on an idler pulley 23 on the main shaft and may be shifted by a treadle-operated yoke (not shown) to a pulley 24 fixed to said

shaft for reciprocating the needle bar and normally operating conventional cooperating elements of the sewing machine.

The snap fasteners which are to be attached by the sewing machine come from a pair of hoppers or magazines, the female fasteners being fed from the hopper which is indicated generally by the numeral 25, down through a spiral chute 26 to a presser foot 27 and the male fasteners being fed from the hopper which is indicated generally by the numeral 28, down through the chute 29 to a presser foot 30. As will appear more clearly in Figs. 4 to 6, the hoppers 25 and 28, each include a substantially circular bottom plate portion 31 mounted upon the bridging portion of an inverted U-shaped support 32 and secured thereto by bolts 33 which extend through such bottom plate and an arcuately-shaped plate 34 seated on the outer forward peripheral edge portion of the bottom plate 31. Each of the bottom plates 31, supports a flanged hub member 35 which extends upwardly through a centrally disposed opening provided in the bottom plate, the flange of said member being securely fastened to the underside of the bottom plate, as by rivets. A stub shaft 36 extends through each hub member 35, said shafts 36 having friction discs 37 fastened to their lower projecting ends and inverted cup-shaped casings secured to their upper projecting ends, the hubs 35 functioning as spacer members between the friction discs 37 and the casings 38. The top surface of each casing 38 is provided with openings 39, through which the snap fasteners are fed during the operation of the machine and which are normally closed by a removable cover plate 40. The lower edges of the casings 38 are spaced from the bottom plates 31 a sufficient amount to enable the body portions of the snap fasteners to readily slide therebetween during the rotation of the casings and are so arranged with relation to the arcuately-shaped plates 34 that such annular spaces are closed along those portions of the bottom plates which are covered by the plates 34, as shown in Figs. 4 and 6. As the body portions of the female fasteners are usually thicker than those of the male fasteners, the spacing between the casing and bottom plate of the hopper 25 is slightly greater than the spacing between such parts in the hopper 28. The spacing in either hopper, however, is not sufficiently great to permit the head portion of the male fastener or the recessed portion of the female fastener to pass between the plate 31 and the lower edge of the casing 38, but angularly disposed slots or notches 42, which verge away from the direction of rotation of the casings 38, are provided at regularly spaced intervals along the lower edge portions of the casings 38 for the purpose of permitting the head portions of the male fasteners and the recessed portions of the female fasteners to pass through the casings.

It will be seen that with the above described construction of the hoppers, the male and female fasteners are enabled at regular intervals to pass outwardly from the interior of the rotating hoppers between the plates 31 and the casings 38 with the head portions of the male fasteners and the recessed portions of the female fasteners in upright position, the body portion of such fasteners passing between the lower edges of the casings 38 and the top surfaces of the plates 31 and the head or recessed portion thereof passing out through the slots 42 in the casings 38. The fasteners picked up by the casings 38, which are arranged to rotate in the directions indicated in Fig. 6, are maintained between the bottom edges of such casings and the bottom plates 31 by the arcuately-shaped plates 34 until brought to a discharge passage 43 formed between the plates 34 and the arcuately-shaped plates 44, into which they are successively discharged. The spaced abutting edges of each set of plates 34 and 44 are notched on their undersides to provide two opposed flanges beneath which the body portions of the fasteners pass, the upstanding head or recessed portion of such fasteners passing between the spaced ends of each pair of plates. The arcuately-shaped plates 44, which are fastened on the inner peripheral edge portions of the bottom plates 31, are narrower than the plates 34 so that their inner edges are spaced from the outer peripheral edges of the casings 38. This construction, together with the obtuse edges of the plates 44 at the entrances to the passages 43 and the direction of the slots 42, prevents jamming of the fasteners while being fed into such passages and, when the passages 43 are filled with fasteners, enables those fasteners in the slots 42 to move onward with the rotating covers 38 without exerting pressure on the fasteners filling the passages 43. The two plates 34 and 44 on each cover plate 31 are connected at their rear ends by a third plate 46, which is substantially narrower than the plate 44 where it connects with the latter to provide a space outside the casing 38 at this portion of the hopper sufficiently wide to enable any excess fasteners which have been carried along by the casing 38 to drop into a depressed portion or well 45 provided in the bottom plate 31.

Rotational movement is imparted to the hopper which is in position to deliver fasteners to the sewing mechanism, by a friction roller 50, which engages with the underside of the friction discs 37 provided on such hopper. As shown in Fig. 4, the friction roller 50 is fixedly mounted on a shaft 51 whose outer ends extend through vertically disposed elongated openings 52 provided in the hollow standards 53 secured to the bed plate 17. A pulley 54 is secured to one end of the shaft 51 and is connected by a belt 55 to a driving pulley 56 secured to the outer end of the shaft 21, as shown in Figs. 1 and 2. Those portions of the shaft which extend through the standards 53 are seated on the upper surfaces of vertically movable elements 57 supported by springs 58 disposed in the lower ends of the recesses of the standards and adapted to yieldably hold the ends of the shaft 51 against the upper ends of the elongated slots 52. By this arrangement, the outer peripheral surface of the roller 50 is held in close frictional contact with the disc 37 so that slippage therebetween is prevented. Set screws 59 may be provided in the standards 53 to vary the uppermost position of the shaft 51 in the slots 52 and consequently the position of the roller 50 with respect to the friction disc 37.

The hoppers are moved into and out of engagement with the driving roller 50 by shifting the supports 32. As shown in Fig. 5, the legs of the inverted U-shaped supports 32 are pivotally attached at their lower ends to the reduced end portions of a rod 61 which extends through and is supported by a block 62 integrally formed on the upper side of a channel member 60. As shown in Figs. 1 and 9, the channel member 60 is adjustably secured to the upper side of a plate 63 which extends longitudinally of the bed plate 17 and rests on the upper surface thereof. As shown in Figs. 8 to 10, the rod 61 is locked in position in the block 62 by a rod 64 provided at its

outer end with a knurled head 65 and at its inner end with a screw-threaded reduced portion 66 which threadedly engages with the wall 69 of the block 62. Intermediate the body of the rod 64 and its threaded end portion 66, there is provided a frusto-conically shaped section 67 adapted to engage a key 68 positioned in the slot between the walls 69 and 69' of the block 62 and intermediate the rods 61 and 64 and to force such key against the enlarged central portion of the rod 61 which extends through said block, thereby frictionally securing the rod 61 in position on the block 62.

It will be seen from the above that when either of the hoppers 25 and 28 are to be moved into engagement with the driving roller 50, the rod 64 is unscrewed so as to remove the pressure on the key 68, thereby releasing the frictional grip of such key on the rod 61 and then manually shifting the rod 61, together with the pivoted supports 32 and the hoppers 25 and 28, sidewise so as to bring the desired hopper over the driving roller 50. As the peripheral surface of the friction roller 50 is normally positioned above the under surface of the friction disc 37 of the hopper that is being brought into position so that the roller 50 will prevent such hopper from moving completely into operative position, means are provided for removing the roller 50 from the path of the turret being moved into position. As shown in Figs. 3 and 4, this means comprises an arm 73 provided with a cammed outer end which engages with one end of the shaft 51 and is adapted to depress the same against the tension of the springs 58 in the standards 53 when the arm 73 is moved in a counter-clockwise direction, as viewed in Fig. 3. The arm 73 is pivotally supported at 74 on the bed plate 17 and has integrally formed therewith an operating handle 75, so arranged that when it is depressed by the operator of the machine, the lever or arm 73 will exert downward pressure on the end of the shaft 51, depressing the same and thereby lowering the driving roller 50 a sufficient amount to enable the friction disc 37 of the hopper being brought into position, to move without interference with the roller 50. When the hopper is in proper position, the handle 75 is released by the operator, thereby releasing the pressure on the springs 58 which function to push the shaft 51 and the roller 50 upwardly until the latter engages with the under side of the friction disc 37 on such hopper, as shown in Fig. 4.

The chute 29 which feeds the male fasteners from the hopper 28 to the presser foot 30 includes an extension 76 which is integrally formed with the plate 31 of the hopper 28 at its upper end and inclines downwardly towards the front of the machine. The extension 76 is provided with a channel 77 which extends throughout its length, the upper rear end of such channel communicating with the passage 43 in the hopper 28 into which the male fasteners are fed in upright position, as before explained, and the lower front end of such channel communicating with an aligned channel 72 provided in the base plate of the presser foot 30. The channels 77 and 72 are of sufficient width and depth to accommodate the body portion of a male snap fastener. The extension 76 and the base plate of the presser foot 30 are secured together by a pair of filler plates 79 which are bolted to the upper surfaces of such members and are arranged in spaced relation over the channels 77 and 72 to provide a slot of sufficient width to enable the heads of the male fasteners to extend therethrough. A pair of filler plates 80 whose upper ends abut against the lower ends of the plates 79 are disposed on the base plate of the presser foot 30 in alignment with the filler plates 79 so as to form a continuation of the slot between the plates 79 and are secured to the upper surfaces of such base plate by screws. As shown in Fig. 3, the outer front end portions of the base plate of the presser foot 30 and the filler plates 80 are bent so that they are disposed substantially parallel with the upper surface of the bed plate 17. The said portion of said base plate is provided with a rectangularly shaped notch 78 over which the male fasteners fed down the channels 77 and 72 come to rest in position to be sewn by the machine to the fabric material and the lower end portions of the plates 80 are notched on their inner sides so as to expose the body of the snap fastener seated over the notch 78 to the needle in the sewing machine. The snap fasteners fed to the presser foot 30 are retained in proper position over the notch 78 by the hooked outer end of a finger 82 which extends between the base plate of the presser foot 30 and the outer filler plate 80, as shown in Fig. 11. The hooked finger 82 is pivotally supported on the presser foot 30 at 83 and is yieldably held in position to stop the outward movement of the snap fasteners by a spring member 84.

It will be seen from the foregoing that as the hopper 28 is operated, the male fasteners discharged into the passage 43 in the hopper are fed down the channels 77 and 72 in the chute 29 and the presser foot 30, respectively, such channels being maintained substantially full of fasteners with the lowermost fastener resting against the hooked end of the finger 82 in proper position over the notch 78 to be sewn to the fabric material by the machine. The tension of the spring member 84 is sufficiently weak to enable the operator to remove the fastener from the presser foot after it has been sewn to the fabric, by pulling outwardly on the fabric, thereby causing the finger 82 to rotate outwardly about its pivot 83 against the tension of such spring. As soon as the sewn fastener is removed, the finger 82 swings back into position under the tension of spring 84 to stop the downwardly moving column of fasteners and retain the next fastener in position to be sewn.

The chute 26 which feeds the female fasteners from the hopper 25 to the presser foot 27 also includes a downwardly inclined extension integrally formed at its upper end with the bottom plate 31 of the hopper 25, but instead of being provided with a channel as is the male chute, such extension is slotted lengthwise to provide two spaced supporting arms 87, whose inner sides are beveled to form a cradle for a cylindrical rod 89. As shown in Figs. 2 and 13, the rod 89 is provided with a spirally formed channel or slot 90 which communicates at its upper end with the passage 43 in the hopper 25 into which the female fasteners are fed with the centrally disposed recessed portions thereof in inverted or upright position, as before explained, and at its lower end with the upper end of a channel 86 provided in the base plate of the presser foot 27. The spiralled slot 90 which is provided along one wall thereof with a groove 91 adapted to receive the centrally disposed recessed portions of the female fasteners, receives the fasteners with the recessed portions thereof in inverted position, as

shown in Fig. 5, and then turns them over during their passage therethrough so that they are discharged into the channel 86 with the recessed portions thereof projecting downwardly, in proper position for the sewing operation. As in the case of the male chute, filler plates 88 are provided for securing the arms 87 of the extension and the base plate of the presser foot 27 together, such plates also serving to maintain the rod 89 in position on the arms 87.

The presser foot 27 secured to the lower end of the female chute 26 is substantially similar in construction to the presser foot 30 of the male chute and includes a rectangular notch 93, notched filler plates 94, a hooked finger 95 to retain the column of fasteners and properly position the last fastener over the notch 93 for the sewing operation, a pivotal support 96 for the finger 95 and a spring member 97 for normally holding the hooked end of the finger 95 in position at the end of the presser foot to function as a stop, but sufficiently yieldable to enable the operator to readily pull the sewn fastener from the presser foot. The bottom surface of the channel 86 in the base plate of the female presser foot, however, is provided with a groove extending along its length to accommodate the recessed portions of the female fastener elements which are fed into such channel from the spiral chute with such portions projecting downwardly, as above explained.

As will be seen in Figs. 1 and 3, the presser foot 27 associated with the hopper 25 and the chute 26, and the presser foot 30 associated with the hopper 28 and the chute 29 normally tend to rest upon the upper surface of the plate 17 due to the manner in which their associated chutes and hoppers are arranged on the pivoted supporting brackets 32 and the upward pressure of the friction roller 50 under the tension of the springs 58. For lifting the presser foot members 27 and 30, there is provided on each a bracket 98 which is secured at its base to the inner side of the presser foot and inclines upwardly to the front of the machine, the upper end thereof being provided with a pair of horizontally disposed vertically spaced extensions 99 forming a rectangularly shaped slot 100 therebetween. Disposed in the slots 100 of the brackets 98 is a transverse yoke member 101 formed on the outer end of a bracket 102 which is fastened to the lower end of a rod 103 extending up into the head 19 of the machine. The rod 103 is suitably connected to a rod 104 which projects through the top of the head 19 and is connected to a lever 105 pivotally mounted on a bearing 106 supported on the upper surface of the arm 18. The other end of the lever 105 is connected to a foot treadle on the machine (not shown) by means of a rope 107.

It will be seen from the above, that when the rod 104 is lifted by the lever 105 due to depression of the treadle on the machine, the rod 103 is lifted, thereby lifting the yoke member 101 which in turn lifts the presser foot members 27 and 30 through the brackets 98, pivoting the associated hoppers and chutes and their supporting brackets 32 about the rod 61. When the pressure on the treadle is released, the pressure foot members move downwardly toward the plate 17. The yoke member 101, however, is so formed that it prevents the presser foot members from contacting with the plate 17. As shown more clearly in Fig. 11, the yoke member 101 comprises a central portion 108 having a depth substantially equal to the depth of the slots 100 in the upper ends of the brackets 98 and two outwardly extending arms 109 of reduced depth, each arm being inclined upwardly and outwardly away from the central portion 108 and then extending horizontally outward. When a feeding unit is in position to feed snap fasteners to the sewing mechanism, as is the case of the female feeding unit comprising hopper 25, chute 26 and presser foot 27, the extensions 99 of the bracket 98 thereof engage with the central portion 108 of the yoke member, the latter being so arranged with respect to such parts that the presser foot 27 is held slightly above the work plate 70 secured on the front end of the longitudinally extending plate 63. The other feeding unit which is in inoperative position, in the drawings the male feeding unit, is so positioned that the bracket 98 thereof engages wth the raised horizontal portion of one of the arms 109 which holds the unit in tilted position so that the presser foot thereof is out of the way of the work being fed to the sewing mechanism. When the units are shifted, as hereinbefore described, the upper extension 99 of the bracket 98 on one unit will ride up the inclined portion of an arm 109 and out on the horizontal portion thereof, thereby placing the presser foot of such unit in inoperative position and the upper extension 99 of the bracket 98 on the other unit will ride inwardly on the other arm 109 into position to feed fastener elements to the sewing mechanism.

During the sewing operation the two hoppers 25 and 28 with their associated chutes and presser foot members are moved as a unit to successively position the several holes of the snap fastener being sewed, in the path of the reciprocating needle of the machine. Backward and forward motion is imparted to the male and female feeding units through the longitudinal plate 63 which is suitably connected to a cam groove 117 provided in the inner surface of the cam disc 22. As shown in Fig. 3, the plate 63 is provided on its rear end with an upwardly extending vertically disposed rod 110, having an adjustable sleeve member 111 which is secured in proper position on such rod by means of a set screw. The sleeve member 111 is positioned within a second sleeve 112, adapted to slidably move in a guideway formed on a vertically disposed arm 113. The arm 113 is pivotally supported intermediate its ends upon a stud 114 provided on the upper end of a standard or supporting bracket 115 mounted on the upper surface of the bed plate 17. The upper end of the arm 113 is provided with a cam roller 116 adapted to engage with the cam groove 117 provided in the inner surface of the cam disc 22. It will be apparent that every time an outwardly projecting portion 118 of the cam groove 117 comes into engagement with the roller 116, the upper portion of the arm 113 will be forced toward the front of the machine, thereby rotating the arm in a counter-clockwise direction, as viewed in Fig. 3, on the stud 114 and causing the guideway formed on the lower portion of such arm to oscillate to the rear of the machine. The rearward movement of such guideway forces the rod 110 rearwardly, through the sleeve connections 111 and 112, thereby moving the plate 63 together with the feeding units mounted thereon towards the rear of the machine. When the roller 116 rides off the portion 118 of the cam groove 117 and onto an inwardly projecting portion 119 provided on the outer side thereof, the arm 113 will be rotated in a clockwise direction to force the plate 63 and the feeding units supported

thereby to the front of the machine. Sidewise movement of the plate 63 during its reciprocating motion is prevented by a block 120 which is pivotally attached to the underside of the plate 63 at a point beneath the rod 110 and adapted to slidably move in a longitudinally extending slot or guideway 121 provided in the bed plate 17.

Oscillating motion is imparted to the plate 63 by the cam groove 122 provided in the outer surface of the cam disc 22. As shown in Fig. 1, a cam roller 123 adapted to ride in said groove 122 is rotatably mounted on the upper end of a vertically disposed lever member 124 which is pivotally supported intermediate its ends on a stub shaft 125 provided on a support 126 mounted on the upper surface of the bed plate 17. The lower end of the lever 124 is connected to one end of an adjustable connecting rod 127. The other end of the rod 127 is provided with an upwardly extending pin 128 adapted to project through an arcuately shaped slot 129 provided in the horizontally disposed arm 130 of a bell crank lever. The other arm 131 of the bell crank lever is connected to one end of an arcuately formed link 132, whose other end is rotatably supported on the head of a vertically disposed stud 133 which (see Figs. 7 and 8) extends upwardly through a sliding plate 134, and through slot 135 in the bed plate 17 and is connected at its upper end to a sliding plate 136 and to the forward end of the plate 63. Accordingly, as the lever 124 is oscillated back and forth by the cam groove 122 during the operation of the machine, the reciprocating motion of the lower end of such lever is transmitted through the connecting rod 127, pin 128, arms 130 and 131 of the bell crank lever, link 132 and stud 133, to the forward end of the plate 63, causing it to oscillate about its point of attachment with the block 120. The two plates 134 and 136 which are fastened to each other by the bolts 137 and to the plate 63 by the stud 133 and the work plate 70, secured to the forward end of the plate 63, shift forwardly and backwardly and sideways with the plate 63.

The cam grooves 117 and 122 on the inner and outer faces, respectively, of the cam disc 22 are so arranged and timed that the presser foot of the feeding unit which is in operative relation with the sewing mechanism of the machine and consequently the fastener element held in the notched end of such presser foot is moved in a rectangular path so that the holes of such fastener are brought successively beneath the sewing needle while the latter moves in a constant path, as shown in Fig. 12. Assuming that the several parts of the machine are positioned and arranged so that the snap fastener held by the presser foot of the feeding unit in operative relation with the sewing mechanism has its hole 138 in alignment with the path of the sewing needle at the start of the sewing operation, then the cycle of operations is as follows when viewed from the front of the machine or from the right of Figs. 2 and 12. On the first downward movement of the needle a stitch is made in the fabric to which the fastener is being secured through the hole 138. The outer cam groove 122 then functions through the parts which connect it with the plate 63 to move the latter to the left about its point of attachment with the block 120, thereby shifting the feeding units mounted on the plate 63 and the snap fastener in the end of the presser foot 27 of the female feeding unit which is in operative relation with the sewing mechanism, to the left so that the hole 139 of such fastener comes into the path of the sewing needle. When the needle has completed the stitch through the hole 139 of the fastener, the inner cam groove 117 functions through the parts which connect it with the rear end of the plate 63 to move the latter and the feeding units mounted thereon bodily to the rear so that the hole 140 comes into the path of the sewing needle. On completion of the stitch through the hole 140, the outer cam groove 122 again functions to shift the plate 63 and the feeding units to the right so that the hole 141 of the snap fastener is aligned with the sewing needle. When the needle completes the stitch through the hole 141, the inner cam groove 117 again functions to shift the several parts forwardly so that the hole 138 is again presented to the sewing needle. This cycle is repeated by the machine once it has been set in operation, until the fastener has been secured by three rows of stitches, the last stitching operation taking place through the hole 141 of the snap fastener. On the last half turn of the machine, while the needle is in its upward position, the sliding plate 63 is moved forwardly by the inner cam groove 117 to bring the needle over the starting hole 138 of the fastener. The operator then removes the fastener by pulling the fabric towards him with sufficient force to overcome the tension of the spring 97, thereby removing the hooked end of the stop member 95 from the end of the channel in the presser foot 27. As soon as the sewn fastener has been removed, the hooked end of the stop member 95 snaps back into position under the tension of the spring 97 to stop the downwardly moving column of snap fasteners in the chute 26 and presser foot 27 and to position the last element for the next sewing operation of the machine. When a row of female fastener elements has been sewed to one side of the opening in the garment or to a stringer and it is desired to attach a row of male elements to the other side of the garment opening or the male stringer, the male feeding unit is shifted into operative relation with the sewing mechanism and the driving roller 50 for feeding the snap fasteners from the male hopper, as hereinbefore described and the male snap fasteners sewn to the fabric in the manner above explained.

While I have shown and described a preferred embodiment of my invention, it will be evident that various changes in the construction and arrangement of the parts may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener elements to the sewing mechanism including a hopper for supplying fastener elements, a chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, and means for moving said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle.

2. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for de-

livering the fastener elements to the sewing mechanism including a hopper for supplying fastener elements, an inclined chute fastened at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a support for said feeding unit and means for moving said support and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle.

3. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener elements to the sewing mechanism including a hopper for supplying the fastener elements, a chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a movable plate, means for supporting said feeding unit on said plate and mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle.

4. In a machine for sewing non-circular snap fasteners to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the snap fasteners to the sewing mechanism including a hopper for supplying the snap fasteners, a chute connected at its upper end to said hopper for conveying the snap fasteners supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the snap fasteners delivered by said chute in proper relation with the needle of the sewing mechanism, said presser foot member comprising a base plate provided with a channel which communicates at its upper end with the discharge end of the chute and is provided at its lower end with a notch over which the end snap fastener is positioned during the sewing operation, means carried by said presser foot member for properly positioning the end snap fastener over said notch and mechanism operatively connected to said feeding unit for moving the latter as a whole during the operation of the machine to bring the holes of the end snap fastener in said presser foot member successively into the path of the sewing needle.

5. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener elements to the sewing mechanism including a rotatable hopper for supplying the fastener elements, an inclined chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a movable plate, means for supporting said feeding unit on said plate, mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle, and means for rotating said hopper during the operation of the machine to provide for a continuous supply of the fastener elements.

6. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener elements to the sewing mechanism including a hopper for supplying the fastener elements, a chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a movable plate, means for supporting said feeding unit on said plate, and mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle, said mechanism including means for reciprocating said plate forwardly and backwardly on the machine and means for oscillating said plate transversely of the machine in timed relation with said reciprocating means.

7. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener elements to the sewing mechanism including a hopper for supplying the fastener elements, an inclined chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a movable plate extending lengthwise of the machine and arranged to be pivoted about its rear end, means for supporting said feeding unit on said plate and mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener element in said presser foot member successively into the path of the sewing needle, said mechanism including means connected to the rear end of said plate for reciprocating the latter in the direction of its length and means connected to the forward end of said plate for oscillating said plate transversely of its length, said reciprocating and oscillating means being timed to function alternately.

8. In a machine for sewing fastener elements to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the fastener element to the sewing mechanism including a rotary hopper for supplying the fastener elements, an inclined chute connected at its upper end to said hopper for conveying the fastener elements supplied by the hopper and a presser foot member attached to the lower end of said chute for positioning the fastener elements delivered by said chute in proper relation with the needle of the sewing mechanism, a movable plate, means for pivotally supporting said feeder unit on said plate, mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end fastener ele-

ment in said presser foot member successively into the path of the sewing needle, means for rotating said hopper during the operation of the machine and a removable stop in said presser foot for holding the fastener elements in said chute and presser foot back in a column and to position the end fastener element in proper relation with the sewing mechanism, said stop being yieldingly removable from the path of the column of fasteners to enable the sewn fastener to be removed from the presser foot member.

9. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the snap fasteners to the sewing mechanism including a rotary hopper for supplying the snap fasteners, an inclined chute connected at its upper end to said hopper and a presser foot member attached to the lower end of said chute for positioning the snap fasteners in proper relation with the needle of the sewing mechanism, said hopper comprising a stationary bottom plate, a rotary inverted cup-shaped casing positioned above said bottom plate, the bottom peripheral edge of said casing being spaced from said bottom plate to enable the body portions of the snap fasteners to slide therebetween during the rotation of said casing and being provided with spaced recesses to enable the centrally disposed projecting portions of the snap fasteners to pass through said casing, and a channel provided in said hopper adapted to receive the snap fasteners picked up by said casing and convey them to the upper end of said chute, a movable plate, means for supporting said feeder unit on said plate and mechanism connected to said plate for moving the same and said feeding unit as a whole during the operation of the machine to bring the holes of the end snap fastener in said presser foot member successively into the path of the sewing needle.

10. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the snap fasteners to the sewing mechanism including a hopper, an inclined chute connected at its upper end to said hopper and a presser foot member attached to the lower end of said chute for positioning the snap fasteners in proper relation with the needle of the sewing mechanism, said hopper comprising a rotary distributor for successively delivering snap fasteners with their centrally disposed projecting portions in upright position to the upper end of said chute, and means for moving said hopper, chute and presser foot member as a unit during the operation of the machine to bring the holes of the end snap fastener in said presser foot member successively into the path of the sewing needle.

11. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a feeding unit for delivering the snap fasteners to the sewing mechanism including a hopper, an inclined chute connected at its upper end to said hopper and a presser foot member attached to the lower end of said chute for positioning the snap fasteners in proper relation with the needle of the sewing mechanism, said hopper comprising a rotary distributor for successively delivering snap fasteners with their centrally disposed projecting portions in upright position to the upper end of said chute and said chute being spirally shaped and adapted to deliver the snap fasteners to said presser foot member with their centrally disposed projecting portions in inverted position, and means for moving said hopper, chute and presser foot member as a unit during the operation of the machine to bring the holes of the end snap fastener in said presser foot member successively into the path of the sewing needle.

12. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, means operable to bring either said male or female feeding unit into operable relation with said sewing mechanism, and mechanism for moving at least that feeding unit which is in operable relation with the sewing mechanism to bring the holes of the end snap fastener in the presser foot member of the operably positioned unit successively into the path of the sewing needle.

13. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, supporting means for said male and female feeding units adapted to be shifted to bring either unit into operable relation with said sewing mechanism, mechanism for moving at least that feeding unit which in operable relation with the sewing mechanism to bring the holes of the end snap fastener in the presser foot member of the operably positioned unit successively into the path of the sewing needle and means for holding the presser foot of the inoperative unit out of the path of the material being fed to the machine.

14. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, supporting means for said male and female feeding units mounted on said plate and arranged to be shifted to bring either unit into operable relation with said sewing mechanism, and mechanism connected to said plate and adapted to move the latter and said feeding units as a whole to bring the holes of the end snap fastener in the presser foot of the operably positioned unit successively into the path of the sewing needle.

15. In a machine for sewing snap fasteners to material, the combination of sewing mechanism

including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, supporting means for said male and female feeding units mounted on said plate, said units being arranged to be moved with relation to said plate to bring either unit into operative association with said sewing mechanism, means for locking said units in position on the machine, and mechanism connected to said plate and adapted to move the latter and said feeding units as a whole to bring the holes of the end snap fastener element in the presser foot of the operatively positioned unit successively into the path of the sewing needle.

16. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, supporting means for said male and female feeding units mounted on said plate, said units being arranged to be moved with relation to said plate to bring either unit into operative association with said sewing mechanism, mechanism connected to said plate and adapted to move the latter and said feeding units as a whole to bring the holes of the end snap fastener in the presser foot of the operatively positioned unit successively into the path of the sewing needle, and driving means adapted to engage with the hopper of the operatively positioned unit and to rotate the same for feeding snap fastener elements to the sewing mechanism.

17. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, supporting means for said male and female feeding units mounted on said plate, said units being arranged to be moved with relation to said plate to bring either unit into operative association with said sewing mechanism, positioning means associated with said units for maintaining the presser foot of the operatively positioned unit in proper relation with the sewing needle and for holding the presser foot of the inoperative unit out of the path of the work and mechanism connected to said movable plate and adapted to move the latter and said feeding units as a whole to bring the holes of the end snap fastener element in the presser foot of the operatively positioned unit successively into the path of the sewing needle.

18. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, pivotal supporting means for said male and female feeding units mounted on said plate and arranged to be shifted to bring either unit into operable relation with said sewing mechanism, positioning means operatively associated with said units for pivoting the unit being brought into operable relation with the sewing mechanism so that its presser foot member is properly positioned with respect to the sewing needle and for pivoting the unit being placed in inoperative position to remove the presser foot member thereof from the path of the work and mechanism connected to said movable plate and adapted to move the latter and said pivoted feeding units as a whole to bring the holes of the end snap fastener element in the presser foot of the operatively positioned unit successively into the path of the sewing needle.

19. In a machine for sewing snap fasteners to material, the combination of sewing mechanism including a needle, a pair of spaced feeding units each including a hopper, an inclined chute connected at its upper end to the hopper and a presser foot member attached to the lower end of the chute, one of said units being adapted to deliver male snap fastener elements to the sewing mechanism in correct position for attachment to the material and the other of said units being adapted to deliver female snap fastener elements to the sewing mechanism in correct position for attachment to the material, a movable plate, supporting means for said units mounted on said plate, said units being arranged to be moved with relation to said plate to bring either unit into operative association with said sewing mechanism, positioning means adapted to bring the presser foot of the operatively positioned unit into proper relation with the sewing needle and to remove the presser foot of the inoperative unit out of the path of the work, disconnectable driving means adapted to engage with the hopper of the operatively positioned unit and to rotate the same for feeding snap fasteners to the sewing mechanism and mechanism connected to said plate and adapted to move the latter and said feeding units as a whole to bring the holes of the end snap fastener element in the presser foot of the operatively positioned unit successively into the path of the sewing needle.

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