Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 1

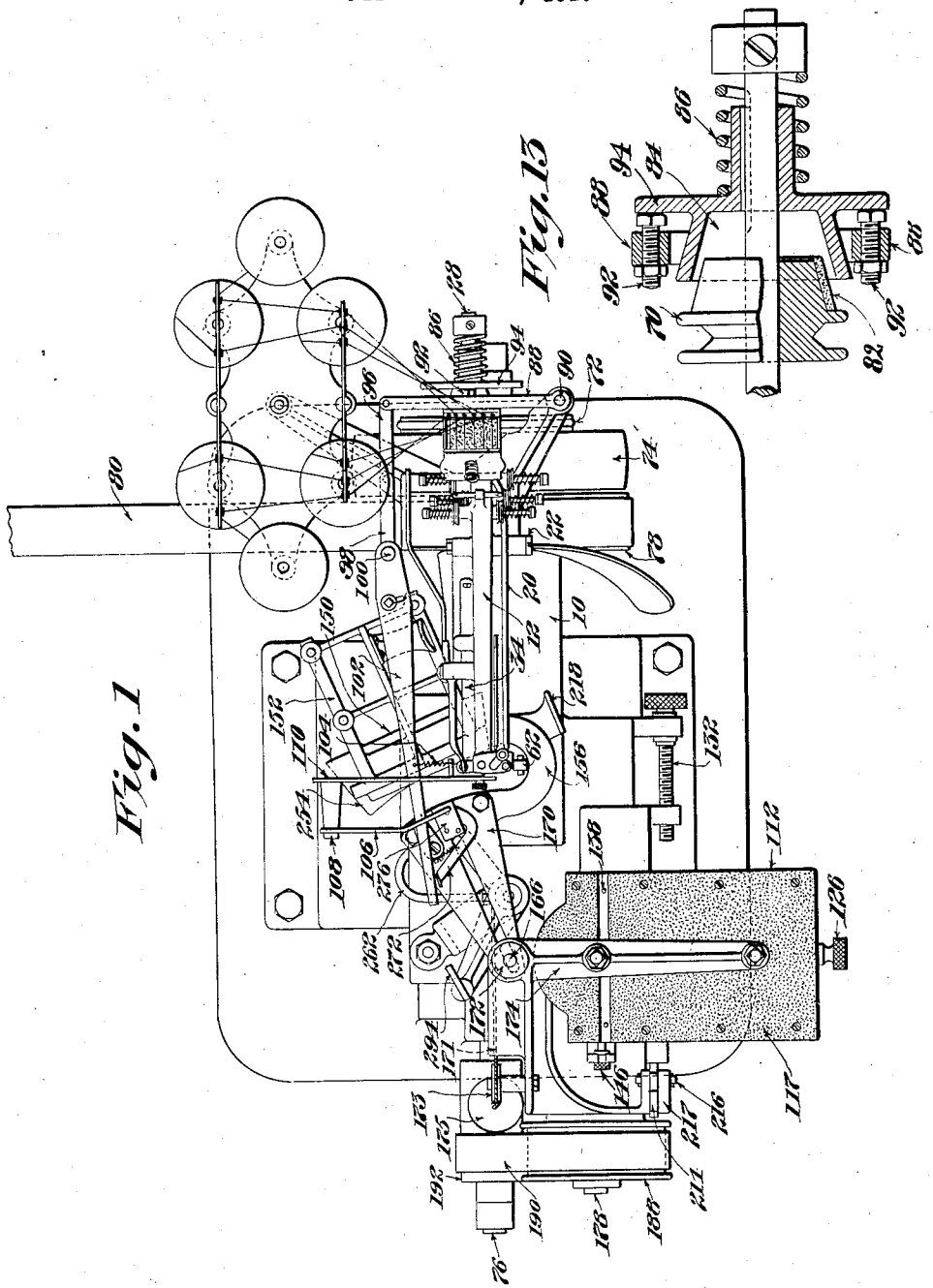


Fig. 1

Fig. 15

Inventor
Benjamin F. Mayo

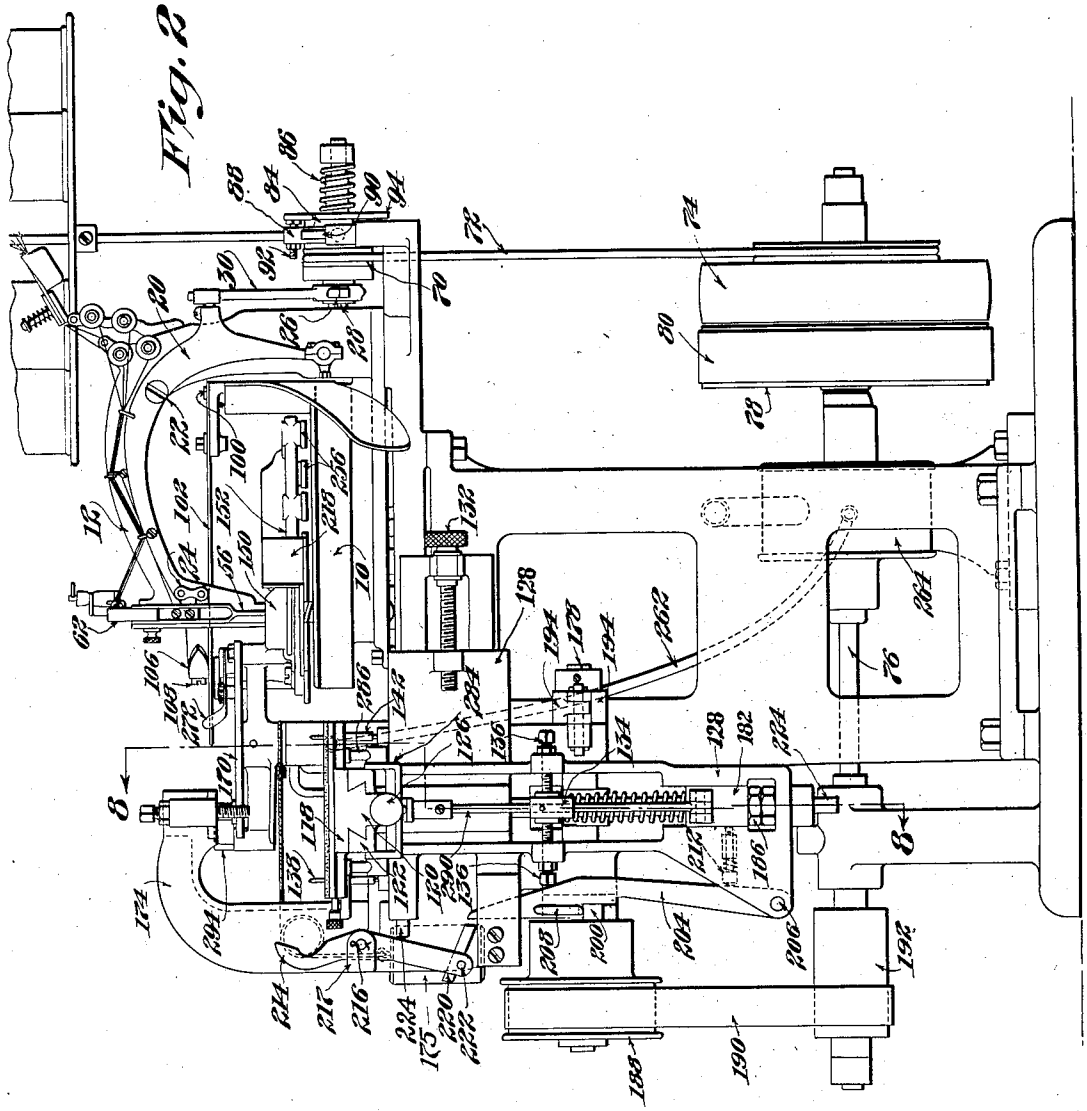
Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 2

Fig. 2



Inventor
Benjamin F. Mayo.

Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 3

Fig. 3

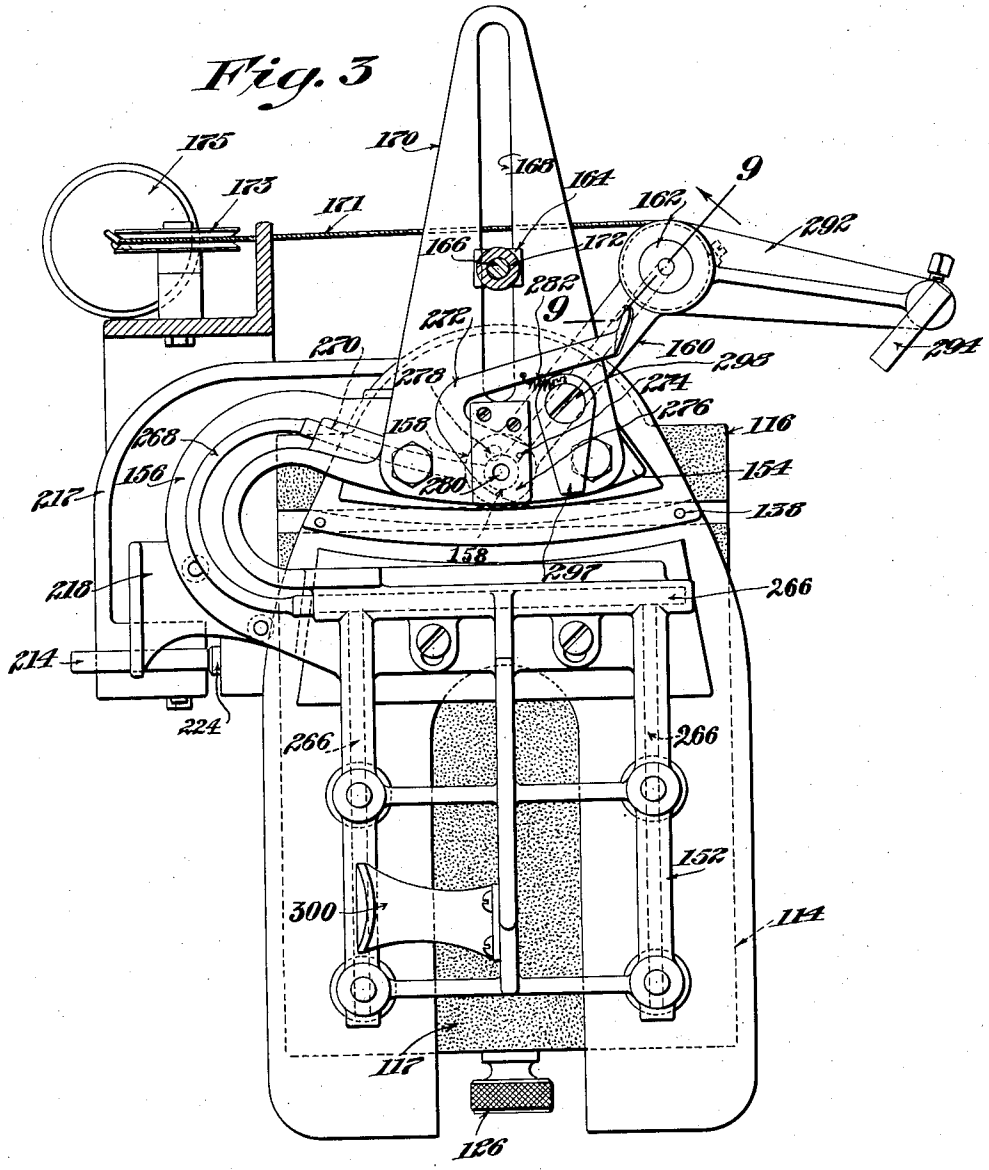
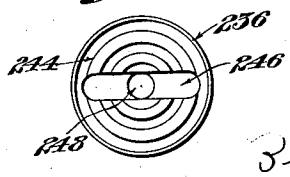


Fig. 12



Inventor

Benjamin F. Mayo

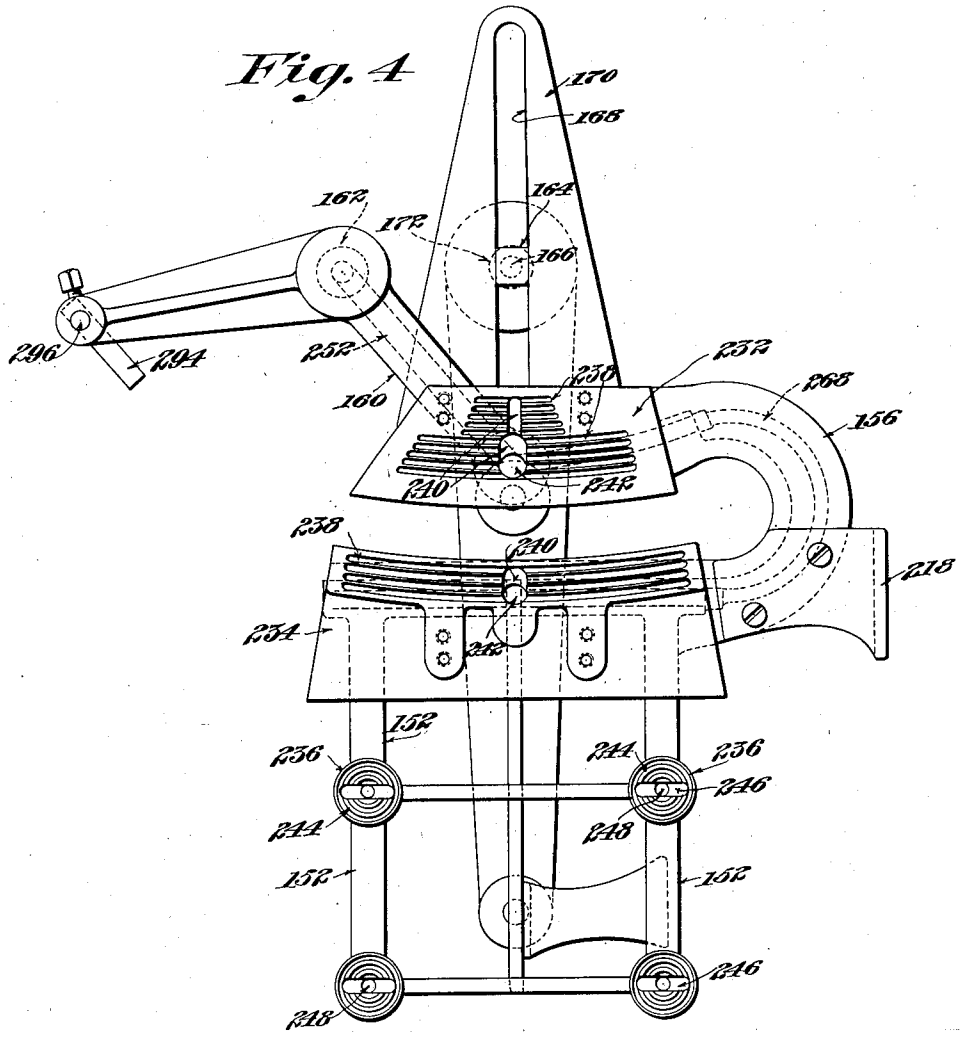
Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 4

Fig. 4



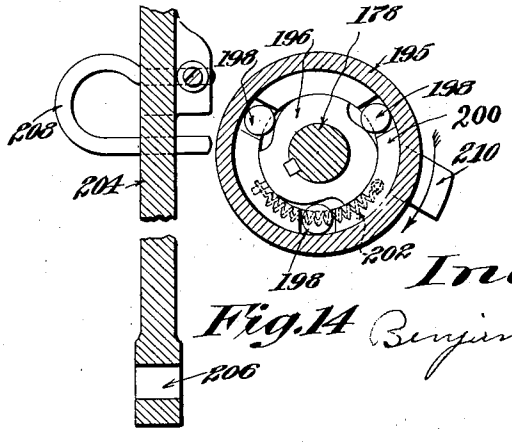


Fig. 14

Inventor

Benjamin F. Mayo

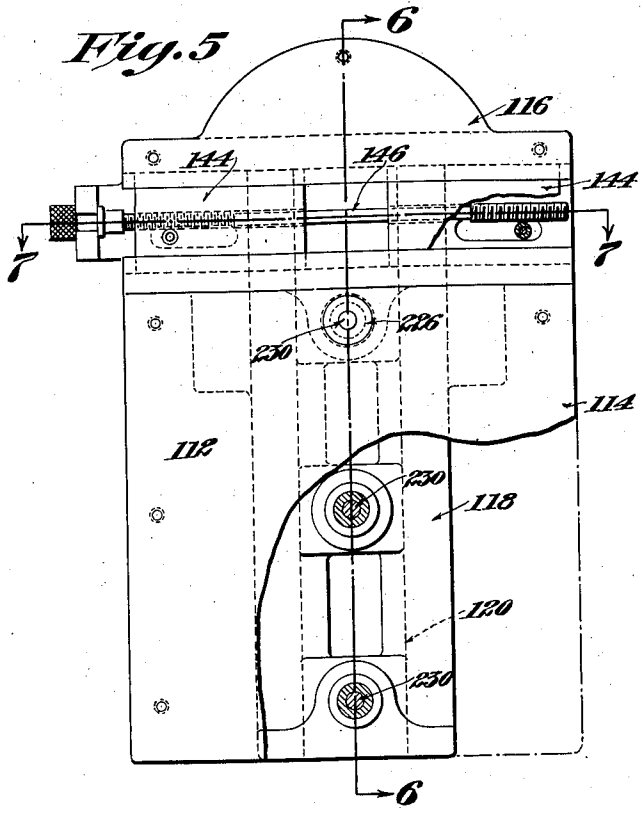
Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 5

Fig. 5



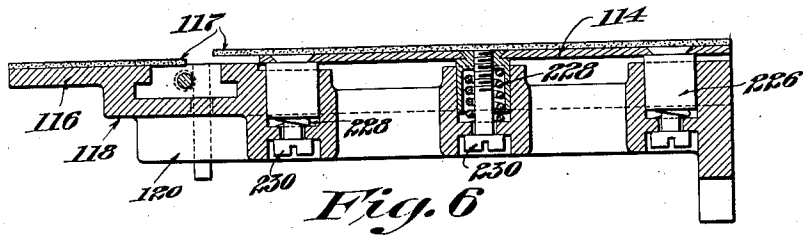


Fig. 6

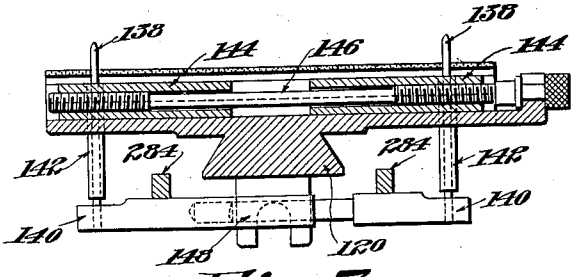


Fig. 7

Inventor

Benjamin F. Mayo

Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 6

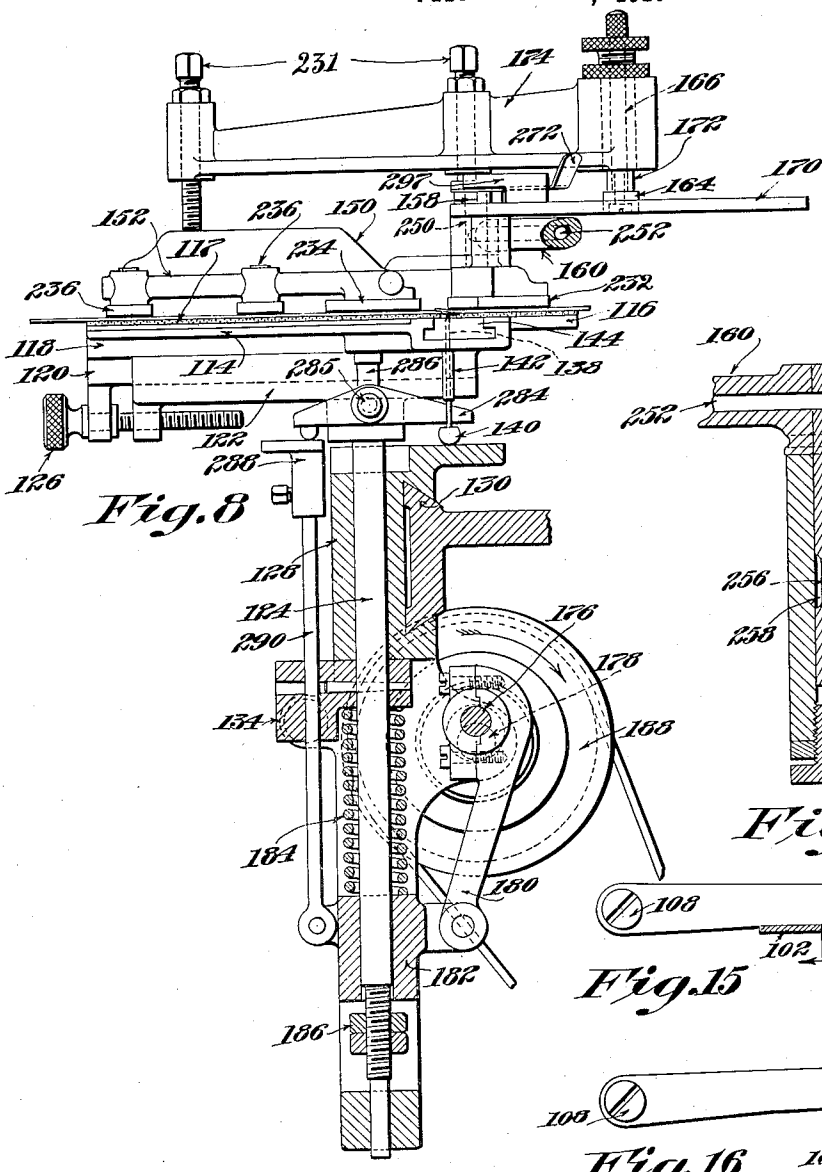


Fig. 8

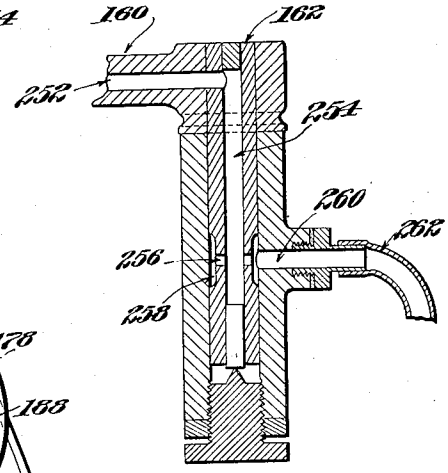


Fig. 9

Fig. 15

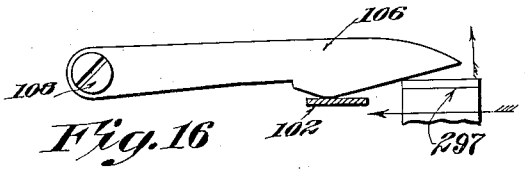


Fig. 16

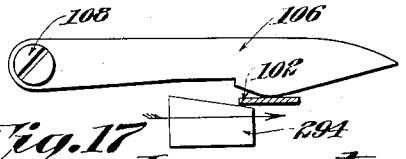


Fig. 17

Inventor

Benjamin F. Mayo

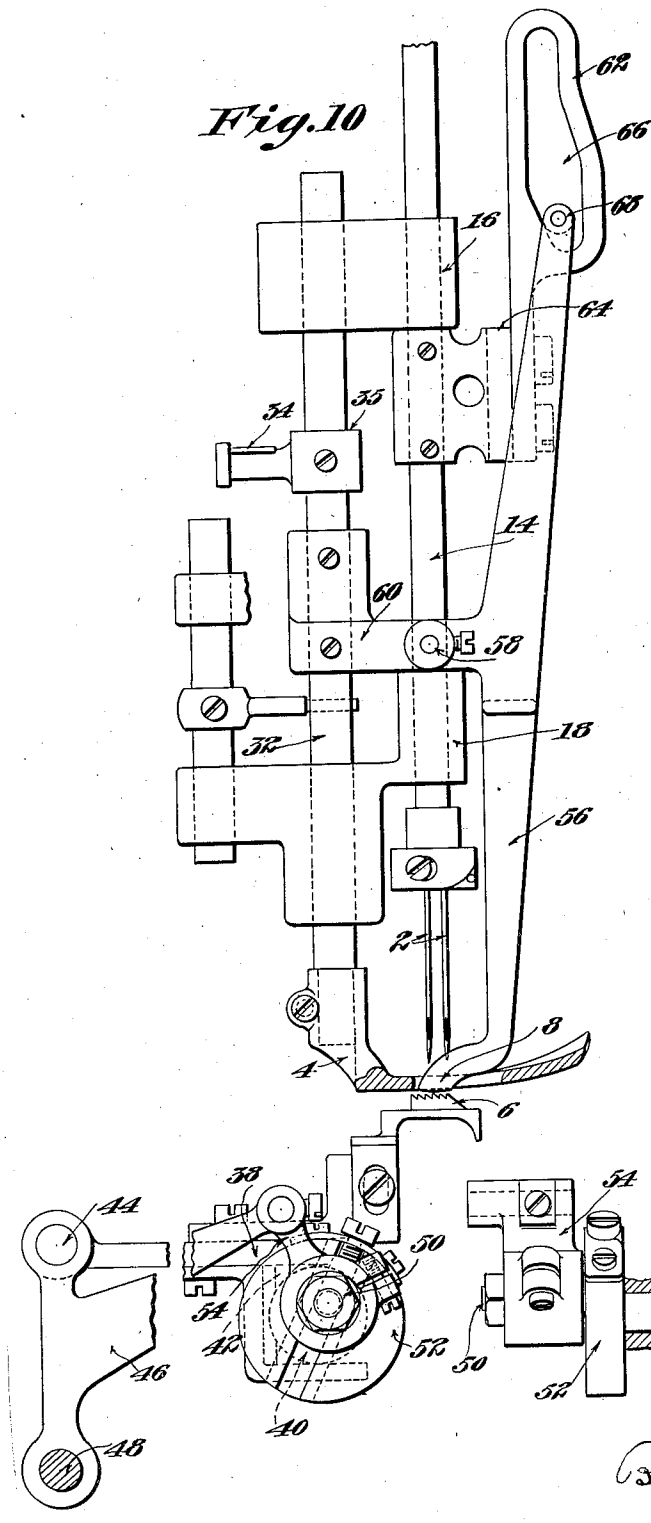
Jan. 12, 1926. 1,569,232

B. F. MAYO

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL

Filed Feb. 14, 1919 7 Sheets-Sheet 7

Fig. 10



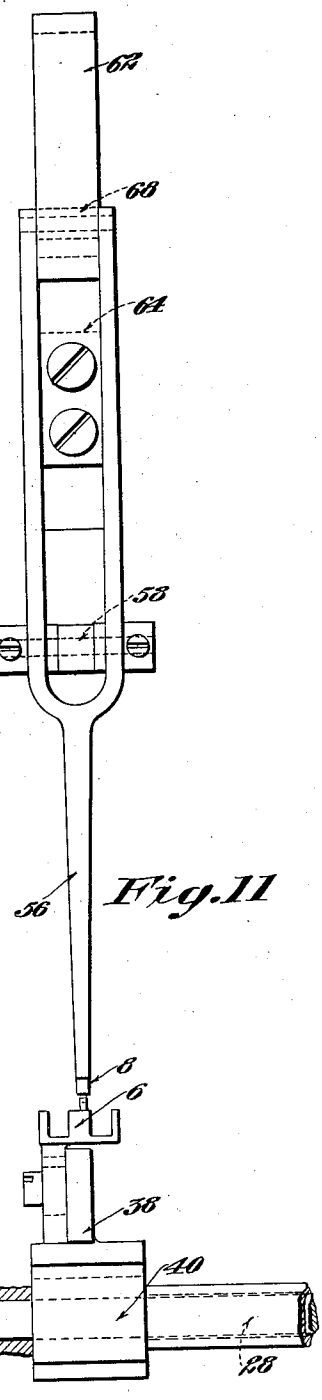


Fig. 11

Inventor

Benjamin F. Mayo

Patented Jan. 12, 1926. 1,569,232

UNITED STATES PATENT OFFICE.

BENJAMIN F. MAYO, OF SALEM, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MACHINE FOR OPERATING ON PIECES OF SHEET MATERIAL.

Application filed February 14, 1919. Serial No. 277,083.

To all whom it may concern:

Be it known that I, BENJAMIN F. MAYO, a citizen of the United States, residing at Salem, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Operating on Pieces of Sheet Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to the manufacture of shoes.

One object of the invention is to insure the accurate positioning of parts of a shoe with relation to each other and with relation to a support or carrier by which they are presented to a mechanism for performing an operation thereon so that a uniformly accurate relation between the different parts, and also between the parts and the operating mechanism during the operation of the operating mechanism thereon, is secured, with a resulting uniformity in the product resulting from such operation. To this end the parts to be operated on are each provided with positioning surfaces at predetermined points, so shaped and arranged that they may be utilized to control the position of said parts with relation to each other and to locate the parts in a predetermined position on the support which determines the relation between the parts and the operating mechanism during its operation thereon. Positioning members adapted to cooperate with the positioning surfaces are arranged in pre-determined relation to the support when in position to receive the parts so that by bringing the positioning surfaces into register with the positioning members the parts may be accurately positioned with relation to each other and also accurately positioned on the support.

The invention is especially designed for assembling two parts of a shoe upper in predetermined relations and securing the same together. In assembling and stitching together the parts of an upper the correct appearance of the finished shoe requires that the parts shall be accurately located in predetermined relative positions and permanently secured together in such positions and also that the seam be accurately located in a predetermined relation to the edge of one or both of the parts. Ordinarily the parts of the upper are assembled on the work support or table of the sewing machine, are located by the operator in predetermined relations by the use of gaging marks on one or both of the parts and are placed in such relations beneath the presser foot of the machine in position to start the seam. During the sewing operation the parts are held in position at the point of operation by the clamping action of the work support and presser foot and are grasped at one or more points in advance of the operating point and held in proper relation and guided by the operator to properly locate the seam. The positioning and securing of the parts together in this manner requires much skill and care and results in the expenditure of relatively considerable labor and time, the attention of the operator being required throughout the operation. Furthermore, the operation is often unskillfully or carelessly performed and the appearance of the finished work is thereby greatly impaired.

The present invention enables the parts of the upper to be accurately located in the proper relations, presented in such relations to the securing mechanism, and guided during the securing operation with the exercise of very little skill or care on the part of the operator and with the least possible expenditure of labor and time. The invention is not limited, however, to this particular operation, but certain features thereof may be employed to advantage for assembling and securing together other shoe parts or the parts of other articles. Also certain features of the invention may be utilized with advantage for performing certain operations upon single pieces of sheet material.

In the machine which is illustrative of the preferred form of the invention the positioning members are in the form of gage pins which cooperate with positioning surfaces on the parts in the form of gaging perforations or holes arranged to register when the parts are in proper relation to each other and to be impaled on the pins.

The gage pins are associated with a work supporting table upon which they definitely and uniformly locate the work and from which the work is transferred to a carrier having, at the time of transfer, a definite relation to the table so that the work is definitely and uniformly located on the carrier. This carrier forms a support which determines the relation between the parts of the upper and the operating mechanism during its operation thereon. The mechanism for transferring the work from the table to the carrier acts automatically and is thrown into operation upon movement of the carrier into receiving position. The transfer is effected by relative movement of the table and carrier to bring the work on the table into engagement with the carrier and the gage pins remain in the gage holes of the work during the transfer to prevent displacement of the work.

The various features of the invention will be understood from the accompanying drawings illustrating the invention in the best form thus far devised by the inventor and the following detailed description of the constructions therein shown.

In the drawings Figure 1 is a plan view of a machine embodying the invention; Fig. 2 is a view in front elevation of the machine; Fig. 3 is a detail plan view illustrating the assembling table, the carrier and certain associated parts; Fig. 4 is a detail underside plan view illustrating the carrier; Fig. 5 is a plan view partly broken away and partly in section of the assembling table; Fig. 6 is a sectional view of the assembling table taken substantially on the line 6—6 of Fig. 5; Fig. 7 is a sectional view of the assembling table taken substantially on the line 7—7 of Fig. 5; Fig. 8 is a sectional view of a portion of the machine taken substantially on the line 8—8 of Fig. 2; Fig. 9 is a detail sectional view of the carrier mechanism taken substantially on the line 9—9 of Fig. 3; Fig. 10 is a view in side elevation partly in section illustrating certain parts of the sewing mechanism; Fig. 11 is a view in front elevation of certain parts of the mechanism shown in Fig. 10; Fig. 12 is a detail underside plan view illustrating one of the nozzles of the suction mechanism; Fig. 13 is a detail view partly in front elevation and partly in section illustrating the main driving clutch of the machine; Fig. 14 is a detail view partly in side elevation and partly in section illustrating a one revolution clutch forming part of the assembling table actuating mechanism; and Figs. 15, 16 and 17 are similar views in side elevation partly in section illustrating in different positions certain parts of the mechanism for controlling the main driving clutch.

The machine illustrated in the drawings is especially designed to be employed in stitching together a toe cap or tip and a vamp.

The sewing mechanism of the machine illustrated in the drawing, with the exception of the devices for feeding the work, is of well known construction. The sewing mechanism comprises vertically reciprocating, straight eyed needles 2, a presser foot 4, a feed dog 6, and a feed foot 8. The machine is also provided with a work table 10 and with an overhanging arm 12 formed with bearings in which the needle bar and the presser bar slide.

The needles 2 are secured to the lower end of a needle bar 14 mounted to slide vertically in bearings formed in projecting portions 16 and 18 of the overhanging arm 12. The needle bar is reciprocated by means of a lever 20 pivoted at 22 on the overhanging arm 12 and connected at its left hand end to the needle bar by means of a link 24. The lever 20 is actuated from an eccentric 26 mounted on the main shaft 28 of the machine through an eccentric rod 30.

The presser foot 4 is secured to the lower end of a presser bar 32 mounted to slide vertically in bearings also formed in the projecting portions 16 and 18 of the overhanging arm 12. The presser foot is constantly pressed yieldingly into engagement with the work by means of a leaf spring 34, engaging a stud projecting from the block 35 secured to the presser bar.

The feeding devices of the machine are especially constructed to prevent the work from wrinkling as it is fed by said devices, and to secure a positive feed of both of the parts to be stitched together.

The feed dog 6 which is arranged to engage the underside of the work is secured to a carrier 38 the forward portion of which has the form of a yoke embracing an eccentric 40 secured to the main shaft 28 of the machine, and is moved vertically from said eccentric through bearing blocks 42 interposed between the eccentric and the arms of the carrier as shown in Fig. 10. The rear end of the carrier 38 is pivotally connected at 44 with the upper end of a lever 46 pivoted at its lower end upon a stud 48. The lever 46 is actuated to impart forward and rearward movements to the carrier 38 by means of a crank 50 projecting from a disk 52 secured to the left hand end of the main shaft 28 and a link or pitman 54 connecting the crank with a forwardly extending arm on said lever. Through the action of the mechanism described the feed dog is raised, lowered, advanced and retracted in the well known manner to feed the work through the machine.

The feed foot 8 is arranged to project through a slot in the presser foot 4 so as to engage the work on the upper side there-

of at a point opposite the feed dog, is constantly pressed yieldingly into engagement with the work and is advanced and retracted in timed relation to the advancing and retracting movements of the feed dog to assist in feeding the work. In the construction shown the feed foot is mounted on the lower end of a feed foot lever 56 pivoted at 58 upon an arm formed on a block 60 secured to the presser bar 32. Through the connection between the feed foot lever and the presser bar the lever is constantly pressed yieldingly into engagement with the work by the action of the presser foot spring 34 and is free to accommodate itself with the presser foot to variations in the thickness of the work. With this construction as the feed dog is lifted to cause the work to be gripped between the dog and the lower end of the feed foot, the feed foot is lifted slightly and the presser foot is lifted therewith, thereby relieving the pressure of the presser foot on the work and allowing the work to be fed forward readily between the presser foot and the work table by the cooperative action of the feed dog and feed foot. The feed foot lever is actuated to advance and retract the feed foot in timed relation to the movements of the feed dog by means of a cam plate 62 secured to a block 64 mounted on the needle bar, the cam plate having a cam slot 66 in which engages a cam roll 68 mounted on the upper end of the feed foot lever. The cam slot in the cam plate 62 is so formed that as the needle bar is lifted the feed foot lever is actuated to advance the feed foot, and that as the needle bar is depressed the lever is actuated to retract the feed foot.

With the above construction the feed dog and the feed foot will engage respectively the overlapping or superposed portions of two parts to be stitched together, will produce a positive feeding movement of both of the parts in a reliable manner and will have no tendency to wrinkle the stock during their feeding movement. It will be noted from an inspection of Figs. 10 and 11 that both the feed dog and feed foot are comparatively narrow and that the lower end of the feed foot is rounded so that the stock can swing readily as it is fed by these devices.

The main shaft 28 of the sewing mechanism is driven by means of a pulley 70 loosely mounted on the shaft and a belt 72 passing about the pulley and about a grooved flange formed on a pulley 74 secured to a driving shaft 76 mounted in bearings in the base of the machine. The shaft is constantly driven from a suitable power shaft by means of a belt 80 shown running on the loose pulley 78.

To enable the main shaft 28 of the sewing mechanism to be started and stopped at suitable times, a friction clutch is provided for connecting the pulley 70 with the shaft. The driving member of the clutch is indicated at 82 and is mounted on the pulley 70. The driven member of the clutch is indicated at 84 and is mounted on the shaft to rotate with the shaft but is movable longitudinally of the shaft into and out of engagement with the driving member of the clutch. The driven member of the clutch is acted upon by a coiled spring 86 which tends to force the driven clutch member into engagement with the driving clutch member. The engagement of the members of the clutch is controlled by a lever 88 pivoted at 90 to an arm on the frame of the machine and carrying abutment screws 92 the heads of which are arranged to engage a flange 94 on the driven member of the clutch. The clutch lever 88 is actuated to control the engagement of the clutch by means of a toggle comprising a link 96 and an arm 98 secured to the lower end of a rock shaft 100 mounted in a bearing in the frame. When the toggle is straightened the clutch lever 88 is held by the toggle in its outer position and the driven clutch member is held out of engagement with the driving clutch member by the engagement of the abutment screws 92 with the flange 94. To the upper end of the rock shaft 100 is adjustably secured a clutch controlling arm 102 which is acted upon by a coiled spring 104, tending to swing the same forwardly. With this construction the engagement of the driven member of the clutch 84 with the driving clutch member is controlled by the position of the arm 102. When the clutch controlling arm 102 is in its forward position, the toggle is straightened as shown in Fig. 1. When the clutch controlling arm 102 is swung rearwardly from its forward position the toggle is broken and the clutch lever 88 is swung to the left allowing the driven clutch member to be moved into engagement with the driving clutch member by the action of the coiled spring 86. The clutch controlling arm 102 is held in its rearward position during the sewing operation by means of a latch 106 pivoted on a stud 108 mounted on the rear end of a plate 110 secured at its forward end to the frame of the machine.

The machine is provided with a work supporting table, indicated as a whole at 112, upon which the parts of the upper are assembled before being applied to the carrier. The table comprises a forward or outer section 114 for the reception of the vamp and an inner or rear section 116 for the reception of the tip, each provided with a covering of felt or other suitable fabric as indicated at 117. The table is mounted for forward and rearward adjustment and also for adjustment angularly relatively to the carrier to

adjust the position in which the assembled parts of the upper are applied to the carrier and also is adjustable laterally with the carrier. The carrier when in position to receive the parts of the upper is located above the table and the table is mounted for vertical movement to transfer the parts of the upper assembled on the table to the carrier. The table is carried by a forwardly and rearwardly movable slide 118 formed with a dove-tailed rib or tenon 120 engaging in a guide in a support 122 fixed to the upper end of a shaft 124. An adjusting screw 126 is provided to adjust the slide 118 and to hold the same in adjusted position. The shaft 124 is mounted to slide longitudinally in bearings in a laterally movable slide 128 provided with a dove-tailed groove in which engages a dove-tailed rib or tenon 130 formed on the frame of the machine. The slide 128 is adjusted and held in adjusted position by means of an adjusting screw 132. The adjustment of the slide 128 serves to adjust the movement of the carrier and also to adjust the table laterally so that the carrier is always located in central relation to the table when the parts are transferred from the table to the carrier, as will be fully explained hereinafter. The mounting of the support 122 upon the shaft 124 enables the support to be adjusted about the axis of the shaft to adjust the assembling table angularly. In order to adjust the support and assembling table and hold the same in adjusted position, a block 134 is pinned to the shaft 124 as shown in Fig. 8, and abutment screws 136 threaded into spaced arms on the slide 128 are arranged to engage the opposite sides of the block as shown in Fig. 2.

To enable the parts of the upper to be readily and accurately located in the proper positions with relation to each other and placed in predetermined positions on the assembling table, a pair of gage pins 138 for insertion in holes made at predetermined points in the parts of the upper are provided, these pins being arranged to project above the assembling table when the table is in position to receive the parts of the upper. In the present construction these gage pins are arranged to engage in perforations made in the forward marginal portion of the vamp and the rear marginal portion of the toe cap near the lateral edges thereof. To accommodate differences in the distances between the perforations made in the parts of the upper such as occur in the parts of uppers of different sizes, the gage pins are mounted so that they may be adjusted toward and from each other. In the illustrated construction, the gage pins are respectively mounted upon supporting bars 140 normally resting upon the frame of the machine as shown in Fig. 8. The gage pins are slidably engaged in tubes 142 secured in slide blocks 144 mounted to slide in a transverse guide groove in the slide 118, the tubes projecting downwardly through slots in said slide. The gage pins are adjusted toward and from each other by adjusting the slide blocks 144 toward and from each other in the guide groove in the slide. The slide blocks are adjusted in this manner by means of a rotatable rod 146 having its opposite ends formed with right and left hand screw threads and threaded into the respective slide blocks. The supporting bars 140 have a telescopic connection as shown in Fig. 7 and indicated at 148 in said figure to hold the bars from turning about the gage pins.

The carrier for carrying the parts of the upper past the stitch forming mechanism and for guiding the same during the stitching of the parts together is indicated as a whole at 150. The carrier comprises an outer portion 152 having a skeleton structure for carrying the vamp, an inner portion 154 for carrying the tip spaced from the outer portion 152, and a curved arm 156 connecting these two portions. Fig. 3 shows the positions which the vamp and tip occupy when applied to the carrier.

The forward edge of the vamp and the rear edge of the tip ordinarily are cut on approximately circular arcs which are located in concentric relation when the parts are assembled in proper relative positions and in stitching the parts together the seam or seams are formed through the overlapping portions thereof along lines substantially parallel with these edges. The radii of these arcs vary between wide limits in the uppers of shoes of different sizes and also vary to a considerable degree in different classes or styles of shoes of the same size. In the present machine the carrier is so mounted and controlled that with a carrier of relatively light and compact construction the parts of uppers the arcuate edges of which having the longest radii actually occurring in shoe manufacture, as well as those in which these edges have the shortest radii may be sewn. Furthermore, the adjustment of the movement of the carrier for uppers in which the radii of these edges vary between the extreme limits may be quickly and easily effected.

In the illustrated construction the carrier is pivotally mounted at 158 upon a supporting arm or link 160 fixed to the upper end of a stud 162 mounted to turn in a bearing in the frame of the machine. The carrier is guided during its swinging movement by means of a block 164 pivoted on the lower end of a stud 166 and engaging in a slot 168 in a plate 170 secured to the body of the carrier. The stud 166 thus forms a variable or shifting fulcrum for the carrier and the position of the carrier relative

to said fulcrum is controlled by the supporting arm 160. The stud 166 is mounted in a sleeve 172 threaded into an overhanging arm 174 formed on the slide 128 (see Figs. 1 and 2). The pivot of the supporting arm 160 is located between the stud 166 and the stitch forming mechanism, and the axis of the stud and the axis about which the supporting arm swings are preferably arranged so that a horizontal line intersecting these axes will pass through the stitch forming mechanism. With this construction as the carrier is swung past the stitch forming mechanism this mechanism will describe an approximately circular arc on the parts of the upper supported on the carrier. The radius of this arc may be adjusted by adjusting the stud 166 about which the carrier swings toward and from the stud 162. The parts are constructed and arranged so that the horizontal line intersecting the axis of the stud 166 and that of the stud 162 and passing through the stitch forming mechanism is substantially parallel with the direction of movement of the slide 128. The stud 166 may be adjusted toward and from the stud 162 by adjusting the slide 128.

It will be noted that with a carrier mounted and controlled as above described the parts of uppers the centers of the arcuate edges of which fall far beyond the limits of the carrier may be carried and guided properly with relation to the stitch forming devices. Also, the movement of the carrier may be adjusted for the parts of uppers in which the radii of the arcuate edges vary between the extreme limits by a relatively short adjustment of the pivot stud 166.

The carrier 150 is arranged to be swung into a position over the assembling table 112 to receive the parts of the upper from the table as shown in Fig. 3, a suitable stop determining the position of the carrier relative to the table. The carrier is mounted in a vertical position such that when it is swung over the table it is located somewhat above the table out of contact with the parts of the upper. As the carrier is swung into receiving position above the assembling table, the table is elevated to place the parts of the upper in contact with the carrier. The parts of the upper are then held in engagement with the carrier by suction mechanism associated therewith, and the assembling table is lowered to its orginial position. The table is raised and lowered in the manner described by the vertical movement of the shaft 124 in its bearings in the slide 128. The mechanism for moving the shaft vertically to raise and lower the table comprises a crank 176 formed on a shaft 178 mounted in bearings in the frame and a pitman 180 connecting the crank with a block 182 mounted to slide on the shaft 124. The shaft 124 is elevated by the vertical movement of the block 182 through a coiled spring 184 surrounding the shaft 124 and interposed between the block 182 and the block 134. During its downward movement the block 182 engages a nut 186 threaded on the lower end of the shaft 124, thereby depressing the shaft and the assembling table. The shaft 178 is driven by means of a pulley 188 loosely mounted on the outer end of the shaft and continuously rotated by means of a belt 190 passing about the same and about a pulley 192 mounted on the driving shaft 76. The shaft 178 is normally held stationary by means of a pair of pivotally mounted, friction shoes 194 arranged to engage the shaft. When the carrier, however, is swung into receiving position over the assembling table the shaft 178 is clutched to the pulley 188 by means of a roll or Horton clutch and is driven from the pulley through a single revolution to elevate and depress the assembling table. When the shaft has described a single revolution the clutch is thrown out and the shaft again comes to rest. The clutch for connecting the pulley 188 with the shaft 178 is of well known construction and comprises a driving member 195 carried by the pulley, a driven member 196 carried by the shaft, a series of clutch rolls 198, a clutch controlling member 200 and a clutch engaging spring 202. The engagement and disengagement of the clutch is controlled by means of a controlling lever 204 pivoted at 206 on the lower portion of the slide 128 and carrying adjacent its upper end a buffer spring 208 bent in a loop and having its lower end arranged to engage a projection 210 on the clutch controlling member 200. The controlling lever 204 is normally held by means of a spring pressed plunger 212 in an angular position such that the projection 210 on the clutch controlling member 200 rests against the lower end of the buffer spring 208 thereby holding the clutch out of operation. The lower end of the buffer spring is carried out of operative engagement with the projection 210 to throw the clutch into operation by swinging the controlling lever to the right.

The controlling lever 204 is swung out of acting position to cause the engagement of the roll clutch by means of a tripping lever 214 pivoted at 216 on an arm 217 on the support 122, the upper end of which tripping lever is arranged to be engaged by an arm or bracket 218 projecting laterally from the carrier. A dog 220 for engagement with the upper end of the controlling lever 204 is pivoted at 222 on the lower end of the tripping lever 214 and is normally held by gravity with its right hand end in position to engage the controlling lever. The downward movement of the right hand end of the dog, however, is limited by the engagement

of the dog with a suitable stop shoulder formed on the tripping lever. As the carrier is swung into receiving position over the assembling table, the upper end of the tripping lever 214 is engaged by the bracket 218 and the tripping lever is actuated to swing the lower end thereof to the right, thereby carrying the dog 220 into engagement with the upper end of the controlling lever 204 and swinging the latter lever to the right to disengage the end of the spring buffer 208 from the projection 210 on the clutch controlling member 200, thereby throwing the roll clutch into operation.

When the assembling table is elevated to transfer the parts of the upper from the table to the carrier the upward movement of the tripping lever 214 carries the dog 220 above the upper end of the controlling lever 204, thereby releasing the latter lever and allowing the same to be swung back to its initial position by the action of the spring pressed plunger 212 so that it will engage the projection on the clutch controlling member and cause the disengagement of the roll clutch when the shaft 178 has described a single revolution. As the assembling table is depressed the under side of the dog 220 engages the upper end of the controlling lever 204, and the right hand end of the dog is swung upwardly relatively to the tripping lever. When the carrier 150 is released, and starts to swing to the right to carry the parts of the upper toward the stitch forming devices, the tripping lever is restored to its initial position by means of a spring pressed plunger 224. During this movement of the tripping lever the dog 220 is carried to the left past the upper end of the controlling lever 204 and the right hand end of the dog drops down into acting position, as shown in Fig. 2.

The throw of the crank 176 is somewhat greater than that required to lift the table to bring the parts of the upper into contact with the carrier, the spring 184 being compressed by the upward movement of the block 182 after the upward movement of the table is limited by the engagement of the parts of the upper with the carrier. With this construction the table when elevated to bring the upper into contact with the carrier will accommodate itself to uppers of different thicknesses.

In order to enable the tip and the vamp to be brought firmly into contact with the carrier when these parts of the upper are of different thicknesses, the outer or vamp supporting section 114 of the assembling table is located slightly above the inner or tip supporting section 116 for supporting the tip, and is yieldingly mounted. In the illustrated construction the vamp supporting section of the table is mounted upon hollow cylindrical guide studs or sleeves 226 arranged to slide vertically in guides in the slide 118, and is normally held in elevated position slightly above the tip supporting section by means of coiled springs 228. The upward movement of the section 114 of the table under the action of the coiled springs 228 is limited by means of stop screws 230. With this construction as the assembling table is elevated to bring the parts of the upper into engagement with the carrier, the vamp resting upon the section 114 of the table is first engaged with the carrier, and the table continues to move upwardly compressing the coiled springs 228 until the tip is firmly engaged with the carrier.

To support the carrier against the thrust of the table as the table is elevated, abutment screws 231 are threaded into a forwardly projecting extension on the overhanging arm 174.

The suction mechanism for holding the parts of the upper in position on the carrier comprises a suction plate 232 mounted on the inner portion 154 of the carrier to hold the tip in position, and a suction plate 234, and a series of suction disks 236 mounted on the outer portion 152 of the carrier to hold the vamp in position. Each of the suction plates 232 and 234 is formed upon its under side with a series of parallel grooves 238, with a relatively transverse groove 240 intersecting the parallel grooves, and with an opening 242 communicating with the latter groove as shown in Fig. 4. Each of the suction disks is formed upon its under side with a series of concentric grooves 244. with a transverse groove 246 intersecting the concentric grooves, and with an opening 248 communicating with the latter groove. The opening 242 in the plate 232 forms a continuation of a passageway 250 (Fig. 8) formed by a longitudinal bore in the stud 158. The passageway 250 communicates by means of a slot in the stud 158 with one end of a passageway 252 extending longitudinally through the supporting arm 160, and the latter passageway is connected at its other end with a longitudinal bore 254 in the stud 162 which is closed at its upper and lower ends by means of pins driven therein. The stud 162 is formed with a series of radial openings 256 leading from the central bore in the stud to a shallow groove 258 formed in the periphery of the stud. The groove 258 communicates through a passageway 260 in the frame with one end of a flexible pipe 262 the other end of which is connected with a suction fan 264 driven from the driving shaft 76. The opening 242 in the suction plate 234, and the openings 248 in the suction disks communicate with passageways 266 formed in the outer portion of the carrier. These passageways are

connected by means of a curved pipe 268, a passageway 270 in the carrier, and a transverse bore in the stud 158 with the longitudinal bore in said stud. The upper end of the longitudinal bore in the stud 158 is normally closed by means of a lever 272 pivoted at 274 on the carrier between the plate 170 and a block 276 secured to the carrier.

The suction mechanism is controlled by the lever 272 so that a suction force is produced at the suction plates and nozzles to hold the parts of the upper in position on the carrier when the carrier is in receiving position over the assembling table and during the movement of the carrier past the stitch forming mechanism, and that the suction action at the suction plates and nozzles is relieved when the parts of the upper have been carried past the stitch forming mechanism allowing said parts to drop from the carrier. To this end the lever 272 is formed with an opening 278 adapted to be brought into registration with the upper end of the longitudinal bore in the stud 158 and the block 276 is formed with an opening 280 located immediately above the upper end of said bore. The lever 272 is normally held in position to close the upper end of the longitudinal bore in the stud 158 by means of a coiled spring 282. The lever 272 is formed with an up-turned end which is carried into engagement with the end of the clutch controlling arm 102 by the movement of the carrier just after the completion of the seam, and the suction controlling lever 272 is thus swung about its pivot to bring the opening 278 therein into registration with the longitudinal bore in the stud 158, thereby relieving the suction at the suction plates and nozzles.

When the parts of the upper are brought into engagement with the suction plates and disks of the carrier by the upward movement of the assembling table, the suction mechanism then being in operation, the parts of the upper will be held in position on the carrier by the suction action when the assembling table descends. When the assembling table is elevated to bring the parts of the upper into engagement with the carrier, the gage pins 138 are elevated therewith so that they remain in engagement in the openings in the parts of the upper until the parts contact with the carrier to hold the same from displacement. Before the assembling table starts to descend, however, the gage pins are withdrawn from the parts of the upper so that they will have no tendency to draw the parts of the upper away from the carrier during the downward movement of the table. The gage pins are elevated with the assembling table through the frictional engagement of the tubes 142 with the pins.

The mechanism for withdrawing the gage pins comprises a lever 284 having the shape of a yoke embracing the support 122 and pivotally supported at 285 upon arms 286 projecting downwardly from the slide 118. The rearwardly extending arms of the lever 284 are located above the bars 140 upon which the gage pins are mounted, as shown clearly in Figs. 7 and 8. The cross bar at the forward end of the lever 284 is adapted to be engaged by a block 288 secured to the upper end of a rod 290 mounted to slide longitudinally in the block 134 and pivotally connected at its lower end with the block 182. With this construction, during the first part of the upward movement of the block 182 by which the assembling table is elevated to bring the parts of the upper into engagement with the carrier, the lever 284 rises with the table and the block 288 and is not actuated by the block, the gage pins being carried upwardly with the table. When the upward movement of the table is arrested by the engagement of the parts of the upper with the carrier, the block 182 continues its upward movement independently of the shaft 124, the rod 290 and the block 288 are elevated therewith, and the lever 284 is actuated to depress the gage pins below the upper surface of the assembling table.

The movement of the tripping lever 214 produced by the engagement of the bracket 218 therewith as the carrier is swung into receiving position over the assembling table is limited by the engagement of said lever with a suitable stop face formed on the arm 217, and said lever acts as a stop to limit the movement of the carrier and thereby determine the receiving position of the carrier relative to the assembling table. By the forward and rearward adjustment of the assembling table, the parts assembled thereon may be adjusted with relation to the carrier to properly locate the seam with any adjustment of the slide 128 and to locate the seam or seams at any desired distances from the rear edge of the tip. By the angular adjustment of the table produced by the adjustment of the shaft 124, the seam or seams may be located accurately in parallel relation to this edge. By the lateral adjustment of the slide 128, not only is the stud 166 adjusted to adjust the movement of the carrier, but the assembling table and the tripping lever 214 are adjusted with said stud. The result is that the carrier is centralized with relation to the assembling table when its movement is arrested by the tripping lever, regardless of the adjusted position of the stud 166.

Upon the release of the carrier by the operator after the parts of the upper have been applied thereto, the carrier is swung rearwardly from its position over the as-

sembling table to present the parts of the upper to the stitch forming mechanism and carry said parts past this mechanism by automatically acting means. In the illustrated construction this means comprises a cable 171 secured at one end to the central portion or hub of the arm 160 and extending therefrom over a pulley 173 supported on the frame of the machine and a weight 175 secured to the other end of the cable.

This mechanism for swinging the carrier produces a rapid movement of the carrier from work receiving position to present the parts to the stitch forming mechanism and to carry the parts away from said mechanism when the seam is completed and allows the movement of the work and carrier to be controlled by the work engaging feeding devices during the sewing operation.

In the present machine the clutch controlling arm 102 is swung rearwardly to cause the engagement of the members of the main driving clutch as the carrier is swung rearwardly from upper receiving position to present the parts of the upper to the stitch forming mechanism. To this end an actuating arm 292 is secured to and preferably formed integral with the carrier supporting arm 160, and a plate or block 294 mounted on a stud 296 is secured on the outer end of the actuating arm in position to engage the clutch controlling lever as the carrier is swung from upper receiving position toward the stitch forming mechanism. Through the engagement of the block 294 with the end of the clutch controlling arm 102, said arm is swung rearwardly to cause the engagement of the members of the main driving clutch just before the parts of the upper are presented to the stitch forming mechanism by the movement of the carrier. The clutch controlling arm is held in its rearward position during the sewing of the seam by means of the latch 106. As the parts of the upper are carried past the stitch forming mechanism by the swinging movement of the carrier, the latch 106 is released from the clutch controlling arm allowing the arm to be actuated by the spring 104 to disengage the members of the main driving clutch. The latch 106 is disengaged from the clutch controlling arm by means of a trip plate 297 secured to the carrier and arranged to engage the under edge of the forward end of the latch. The trip plate 297 is secured to the carrier by means of a screw 298 and may be adjusted to time the disengagement of the latch 106 from the clutch controlling arm relative to the movement of the carrier by adjusting the plate angularly about the screw.

To enable the block 294 to pass the clutch controlling arm 102 during the swinging movement of the carrier from its rearward position shown in Fig. 1 to its forward or upper receiving position its upper edge is inclined so as to engage the under side of the clutch controlling arm and lift the same during this movement of the carrier, the clutch controlling arm being preferably made of sheet metal so that it will bend readily and allow the block to pass beneath the same. Fig. 15 illustrates the manner in which the clutch controlling arm is engaged by the block 294 during the rearward movement of the carrier and the manner in which the arm is held by the latch. Fig. 16 illustrates the manner in which the latch is lifted out of acting position by the engagement of the tripping block 297 therewith. Fig. 17 illustrates the manner in which the clutch controlling arm is engaged by the block 294 during the forward movement of the carrier.

In operation starting with the parts of the machine in the position shown in Figs. 1 and 2, a vamp and a tip are first assembled on the table 112 and are located in the proper relation with their adjacent edges overlapping by inserting the gaging pins 138 in the perforations formed therein. The operator then grasps an arm 300 secured to the carrier and swings the carrier forwardly over the assembling table until its movement is arrested by its engagement with the tripping lever 214. As the carrier is swung into position over the table the suction mechanism is rendered active through the release of the lever 272 from the clutch controlling arm 102. By the actuation of the tripping lever, the roll clutch by which vertical movement is imparted to the table is thrown into operation. The table is elevated, thereby bringing the parts of the upper into contact with the carrier, and then descends leaving the parts held in engagement with the carrier by the suction mechanism. The operator then releases the carrier and the carrier is swung rearwardly by the action of the weight 175 to present the parts to the stitch forming mechanism. Just before the parts are presented to the stitch forming mechanism, the block 294 engages the clutch controlling arm 102 and swings the same rearwardly thereby engaging the friction clutch through which the sewing mechanism is driven. The arm 102 is held in its rearward position until the sewing operation is completed by the latch 106. At the completion of the sewing operation the forward end of the latch is engaged by the block 297 and lifted, thereby releasing the arm 102 and allowing the same to swing forwardly under the action of the spring 104 to disengage said friction clutch. The suction mechanism is rendered inactive at the completion of the sewing operation through the engagement of the lever 272 with the clutch controlling arm 102 allowing the parts of the upper to fall from the carrier. While a tip and a vamp are being stitched together another tip and

vamp may be assembled on the assembling table and the operation repeated in the manner described.

Having explained the nature and object of the invention, and having specifically described a machine embodying the invention in its preferred form, what is claimed is:

1. A machine of the class described having, in combination, securing mechanism, a movable carrier arranged to support pieces of sheet material with their marginal portions overlapping and their body portions extending in opposite directions from their overlapping portions, and means for controlling the movement of the carrier to cause the same to move in a predetermined and definite path relatively to the securing mechanism from the position remote from the securing mechanism in which the pieces are applied to the carrier to present the pieces to the securing mechanism and to guide the same during the securing operation so that the fastenings will be inserted through the overlapping portions of said pieces in predetermined relation to the edges of said portions.

2. A machine of the class described having, in combination, securing mechanism, a movable work carrier, gaging devices arranged to locate pieces of sheet material in predetermined relative positions with their marginal portions overlapping and their body portions extending in opposite directions from their overlapping portions, and to locate said pieces in predetermined positions with relation to the carrier, and means for controlling the movement of the carrier to cause the same to move in a predetermined and definite path relatively to the securing mechanism from the position remote from the securing mechanism in which the pieces are applied to the carrier to present the pieces to the securing mechanism and to guide the same during the securing operation so that the fastenings will be inserted through the overlapping portions of said pieces in predetermined relation to the edges of said portions.

3. A machine of the class described having, in combination, stitch forming mechanism, gaging devices for determining the relative positions of a vamp and a toe cap preparatory to securing said parts together, a movable carrier arranged to support the vamp and toe cap in assembled relation, and means for controlling the movement of the carrier to cause the same to move in a predetermined and definite path from the position remote from the stitch forming mechanism in which the parts are applied thereto to present the parts to the stitch forming mechanism, and to guide the same during the sewing operation.

4. A machine of the class described having, in combination, means for operating on the work, a movable work carrier, and means for supporting and controlling the carrier comprising a link of fixed length pivoted at one end upon a fixed pivot and pivotally connected at its other end with the carrier, and means for controlling the movement of the carrier about its pivotal connection with the link.

5. A machine of the class described having, in combination, means for operating on the work, a movable work carrier, a variable fulcrum for the carrier, and a link pivoted at one end upon a pivot having a fixed relation to the fulcrum of the carrier and pivotally connected at its other end with the carrier.

6. A machine of the class described having, in combination, means for operating on the work, a movable work carrier, a link pivoted at one end upon a fixed pivot and pivotally connetced at its other end with the carrier, and a fulcrum for the carrier having a fixed relation to the pivot of the link and a variable relation to the carrier substantially in a straight line passing through the axis of the pivotal connection between the link and the carrier.

7. A machine of the class described having, in combination, means for operating on the work, a movable work carrier, a link pivoted at one end upon a fixed pivot and pivotally connected at its other end with the carrier, a fulcrum for the carrier having a fixed relation to the pivot of the link and a variable relation to the carrier, and means whereby said fulcrum and the pivot of the link may be relatively adjusted.

8. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work carrier movable to position and guide the assembled pieces relatively to the operating means, and suction mechanism for holding the pieces in proper relation to each other on the carrier during the operation thereon.

9. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work carrier movable to position and guide the assembled pieces relatively to the operating means, suction mechanism for holding the pieces in proper relation to each other on the carrier during the operation thereon, and means for controlling the suction mechanism from the movement of the carrier.

10. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work carrier movable to position and guide the assembled pieces relatively to the operating means, suction mechanism for

holding the pieces in proper relation to each other on the carrier during the operation thereon, and means for rendering the suction mechanism active and inactive.

11. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work carrier movable to position and guide the assembled pieces relatively to the operating means, suction mechanism for holding the pieces in proper relation to each other on the carrier during the operation thereon, and means for rendering the suction mechanism active when the carrier is moved into work receiving position and for rendering said mechanism inactive when the operation is completed.

12. A machine of the class described having, in combination, means for operating on the work, a work supporting table, a carrier adapted to receive the work from the table and movable to guide the work relatively to the operating means during the operation, and mechanism acting to cause the carrier to take the work from the table.

13. A machine of the class described having, in combination, means for operating on the work, a work supporting table, gaging devices for locating the work in a predetermined position on the table, a carrier adapted to receive the work from the table and movable to guide the work relatively to the operating means during the operation, and mechanism acting to cause the carrier to take the work from the table.

14. A machine of the class described having, in combination, means for operating on the work, a work supporting table for supporting a plurality of assembled pieces of sheet material, a carrier adapted to receive the assembled pieces from the table and retain them in proper relation to each other during the operation of the operating means thereon and supported for movement in a fixed path from the table to the operating means to guide the work relatively to the operating means during the operation, and mechanism operating to cause the carrier to take the assembled pieces of work from the table.

15. A machine of the class described having, in combination, means for operating on the work, a work supporting table, a work carrier arranged to guide the work relatively to the operating means during the operation movable into receiving position over the table, and means for moving relatively the table and carrier toward each other to transfer the work from the table to the carrier.

16. A machine of the class described having, in combination, means for operating on the work, a work suporting table, gages normally projecting above the table, a work carrier adapted to receive the work from the table and movable to guide the same relatively to the operating means during the operation, and automatically acting means for withdrawing the gages from operating position.

17. A machine of the class described having, in combination, means for operating on a plurality of pieces of sheet material, a work supporting table provided with gages for relatively positioning the pieces, a work carrier adapted to receive the pieces from the table and movable to guide them relatively to the operating means during the operation, and means acting automatically to transfer the pieces from the table to the carrier upon moving the carrier into receiving position.

18. A machine of this class described having, in combination, means for operating on the work, a movably mounted work supporting table, gaging devices for locating the work in a predetermined position on the table movable with the table, a carrier adapted to receive the work from the table and movable to guide the work relatively to the operating means during the operation, and means for adjusting the table to adjust the position in which the work is applied to the carrier.

19. A machine of the class described having, in combination, means for operating on the work, an adjustable work supporting table, a movable carrier for guiding the work relatively to the operating means during the operation adapted to receive the work from the table, and a device for controlling the movement of the carrier mounted for adjustment with the table.

20. A machine of the class described having, in combination, means for operating on the work, work engaging feeding devices associated therewith, a movable carrier for guiding the work relatively to the operating means during the operation, and automatic means for moving the carrier from a position remote from the operating means to present the work to the operating means and to carry the work away from said operating means arranged to permit the feeding movement of the work to be controlled by said feeding devices during the operation.

21. A machine of the class described having, in combination, stitch forming mechanism, gage pins for insertion in holes made at predetermined points in a vamp and a toe cap to locate said parts in predetermined relative positions preparatory to securing the same together, a movable carrier arranged to support the vamp and toe cap in assembled relation, and means for controlling the movement of the carrier to cause the same to move in a predetermined and definite path from work receiving position re-

mote from the stitch forming mechanism to present the parts to the stitch forming mechanism and to guide the same during the sewing operation so as to locate the seam along a line substantially parallel with the rear edge of the toe cap.

22. A machine of the class described having, in combination, stitch forming mechanism, gaging devices for determining the relative positions of a vamp and a toe cap preparatory to securing said parts together, a movable carrier for guiding the parts relatively to the stitch forming mechanism during the sewing operation, suction mechanism arranged to hold the vamp and toe cap in assembled relation on the carrier, and means for controlling the movement of the carrier.

23. A machine of the class described having, in combination, stitch forming mechanism, a work supporting table adapted to receive a toe cap and a vamp, gages for locating the toe cap and vamp in predetermined positions with relation to each other and to the table, a movable carrier for guiding the work relatively to the stitch forming mechanism during the sewing operation arranged and operated to take the toe cap and vamp from the table and to support the same in assembled relation, and means for controlling the movement of the carrier.

24. A machine of the class described having, in combination, means for operating on the work, a work supporting table, work positioning gages associated with the table, a work carrier adapted to receive the work from the table and movable to guide the same relatively to the operating means during the operation, means for relatively moving the table and carrier to bring the work supported on the table into contact with the carrier, and means for maintaining the gages in operating position until the work is applied to the carrier and for then withdrawing the gages from operating position.

25. A machine of the class described having, in combination, means for operating on the work, a work supporting table, a movable carrier adapted to receive the work from the table and to guide the work relatively to the operating means during the operation, means for moving relatively the table and carrier to bring the work supported on the table into engagement with the carrier, gages associated with the table and normally projecting above the upper surface thereof, and means for maintaining the gages in operating position until the work is brought into engagement with the carrier and for withdrawing the gages from operating position while the work is held by the table in contact with the carrier.

26. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work carrier, suction mechanism for holding the assembled pieces in proper relation to each other on the carrier during the operation thereon, and means for controlling the suction from the movement of the carrier.

27. A machine of the class described having, in combination, means for operating on a plurality of assembled pieces of sheet material, a work supporting table provided with means for relatively positioning the assembled pieces, a work carrier adapted to receive said assembled pieces from the table and movable into work receiving relation to the table, and means acting automatically to transfer the assembled pieces from the table to the carrier upon movement of the carrier into receiving position.

28. A machine of the class described having, in combination, means for operating on the work, a movably mounted work-supporting table, gaging devices for locating the work in a predetermined position on the table movable with the table, a carrier adapted to receive the work from the table, and means for adjusting the table to adjust the position in which the work is applied to the carrier.

29. A machine of the class described having, in combination, means for operating on the work, a movably mounted work-supporting table, gaging devices for locating the work in a predetermined position on the table movable with the table, a carrier adapted to receive the work from the table, and means for adjusting the position in which the work is applied to the carrier.

30. A machine of the class described having, in combination, means for operating on the work, an adjustable work-supporting table, a carrier adapted to receive the work from the table, and a device for controlling the movement of the carrier mounted and adjusted with the table.

31. A machine of the class described having, in combination, means for operating on the work, work engaging feeding devices associated therewith, a movable carrier, and means acting to move the carrier from a position remote from the operating means to present the work to the operating means and to carry the work away from said operating means arranged to permit the feeding movement of the work to be controlled by said feeding devices during the operation.

32. A machine of the class described having, in combination, means for operating on the work, means for supporting the work, means acting to transfer the work from the supporting means to the operating means arranged to control the work during the operation thereon, and mechanism for actuating said last means in a direction to feed the work during the operation on the work.

33. A machine of the class described having, in combination, operating means, a support for articles to be operated on, means acting to take an article from the support and present it to the operating means arranged to control the article during the operation thereon, and means for relatively moving the article and operating means to transfer the point of operation along the article.

34. A machine of the class described having, in combination, operating means, a support for articles to be operated on, a carrier, mechanism operating to cause the carrier to take an article from the support, transfer it to the operating means and retain its hold thereon during the operation of the operating means, and mechanism for relatively feeding the article and operating means to transfer the point of operation along the article.

35. A machine of the class described having, in combination, operating means, a support for articles to be operated upon, a carrier arranged to receive the articles from the support and transfer the same to the operating means movable to guide the articles relatively to the operating means during the operation thereon, and mechanism operating to transfer the articles from the support to the carrier.

36. A machine of the class described having, in combination, means for operating on the work, a support for the articles to be operated upon, a carrier arranged to receive the articles from the support and transfer the same to the operating means operating to control the path of movement of the articles during the operation thereon, and means relatively moving the support and the carrier to transfer the articles from the support to the carrier.

37. A machine of the class described having, in combination, operating means, a support for articles to be operated upon, a carrier arranged to receive the articles from the support and transfer the same to the operating means arranged to control the articles during the operation thereon, and means for moving the articles to transfer the point of operation along the same, and mechanism operating to cause the carrier to take the articles from the support.

38. A machine of the class described having, in combination, operating means, a support for the work, a carrier arranged to receive the work from the support and transfer the same to the operating means arranged to control the work during the operation thereon, mechanism operating to cause the carrier to take the articles from the support, and means for imparting work feeding movements to the carrier.

39. In a machine of the class described the combination of a carrier, means acting to place on the carrier in predetermined relation to each other parts of a shoe upper to be stitched together, and a stitching mechanism for stitching said parts together.

40. In a machine of the class described a sewing mechanism, a carrier adapted to support vamp and toe tip blanks in assembled relation with their edges overlapping, mechanism operating to move the carrier to present the assembled blanks to the sewing mechanism, and mechanism for relatively moving the sewing mechanism and assembled blanks to sew a seam along the overlapping edges of the blanks.

41. In a machine of the class described a carrier, means for placing on the carrier the parts to be secured together, gages for determining the position of the parts with relation to each other and to the carrier, means for disengaging the gages, means for securing the parts together, and means for holding the parts in assembled relation after the disengagement of the gages.

42. In a machine of the class described means for operating on parts of a shoe upper, a work supporting table, means for relatively positioning the parts of the shoe upper on the table, a carrier adapted to take the assembled parts from the table supported for movement from the table to the operating means.

43. In a machine of the class described sewing mechanism, a work supporting table, means for relatively positioning parts of a shoe upper on the table, a carrier supported for movement from the table to the sewing mechanism, and means acting to transfer the parts from the table to the carrier.

44. A work positioning and holding device for machines for inserting fasteners in the parts of the upper of a shoe to secure the same together having, in combination, a work support and gaging tools having a predetermined relation to each other and to the work support and arranged to project above said support for engagement in gaging marks previously formed at predetermined points in each of the parts to be relatively positioned adjacent the line along which the fasteners are to be inserted to locate the parts in proper relation to each other and to said support along this line.

45. A work positioning and holding device for machines for inserting fasteners in the parts of the upper of a shoe having, in combination, a work support, gaging pins having a predetermined relation to each other and to the work support arranged to project above said support for engagement in gaging perforations previously formed at predetermined points in each of the parts to be relatively positioned adjacent the line along which the fasteners

are to be inserted to locate the parts in proper positions with relation to each other and to said support along this line, and to hold the parts extended to their proper lateral dimensions.

46. A method of relatively positioning two parts of the upper of a shoe and securing the same together, which comprises providing each of said parts with positioning surfaces shaped to locate predetermined points in said parts, thereafter placing said parts on a movable support and locating the same in predetermined relation to each other and to said support by locating the positioning surfaces of different parts in predetermined relative positions and also in predetermined positions with relation to said support, and while holding the parts in the positions in which they are thus assembled on the support presenting the same to fastener inserting mechanism.

47. A method of relatively positioning two parts of the upper of a shoe and securing the same together which consists in making gaging perforations in each of said parts at predetermined points, thereafter placing said parts on a movable support, locating said parts in predetermined positions with relation to each other and to said support by inserting gaging tools in said perforations, securing said parts temporarily to said support in the positions in which they are thus assembled, and guiding said support in a predetermined path with relation to fastener inserting mechanism.

48. That improvement in methods of making shoes which consists in providing two parts of an upper each with positioning surfaces at predetermined points shaped and arranged to control the location of said parts and thereafter utilizing said surfaces to control the position of said parts with relation to each other and to a support upon which the parts are maintained in such relation while an operation is being performed thereon.

49. That improvement in methods of making shoes which consists in providing a part of an upper with a plurality of gaging holes, thereafter locating said parts in a predetermined position on a movable support by impaling the parts in said holes, and moving said support to present the said part to mechanism for operating thereon.

50. In a machine for assembling and securing together parts of a shoe upper, the combination of gages engaging positioning surfaces previously formed at predetermined points on each of the parts shaped and arranged to control the location of the parts by engagement with the gages, means for securing said parts together, and means for maintaining the parts in the relative positions determined by the gages and positioning surfaces and for presenting them to the securing means.

51. In a machine for assembling and securing together parts of a shoe upper, a plurality of gages each engaging previously formed perforations in each of the parts and determining the relative positions of the parts by said engagement, means for securing the parts together, and means for maintaining the parts in the relative positions determined by the gages and positioning perforations and for presenting them to the securing means.

52. In a machine for assembling and securing together parts of a shoe upper, gages engaging previously formed positioning surfaces on each part located in predetermined relation both to the contour of said part and to like positioning surfaces on the other part and determining the relation of the parts to each other by said engagement, means for securing the parts together, and means for maintaining the parts in their relative positions determined by the gages and positioning surfaces and for presenting them to the securing means.

53. In a machine for assembling and securing together parts of a shoe upper, gage pins entering corresponding holes previously formed in the tip and vamp and fixing their relative positions.

54. In a machine for assembling and securing together parts of a shoe upper, securing mechanism, a carrier by which the parts are presented to the securing mechanism, gages arranged in predetermined relation to the carrier when in position to receive the parts, and engaging positioning surfaces previously formed at predetermined points on each part shaped and arranged to determine by their engagement with the gages the position of the parts with relation to each other and to the carrier.

55. In a machine for assembling the vamp and toe tip of a shoe, gage pins arranged to engage holes previously formed in the rear marginal portion of the cap near its lateral edges and corresponding holes previously formed in the vamp and to fix their relative positions.

BENJAMIN F. MAYO.