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E. SOMMER
APPARATUS FOR THE AUTOMATIC QUILTING OF ARTICLES OF MATERIAL ESPECIALLY COLLARS
Filed Dec. 28, 1939

Serial No.
311,428

5 Sheets-Sheet 1

Fig. 1

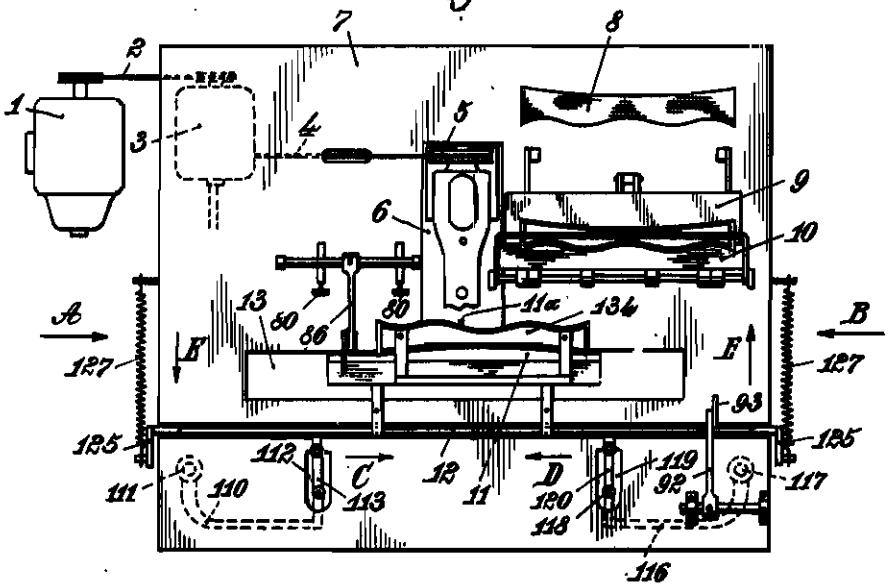

Fig. 2

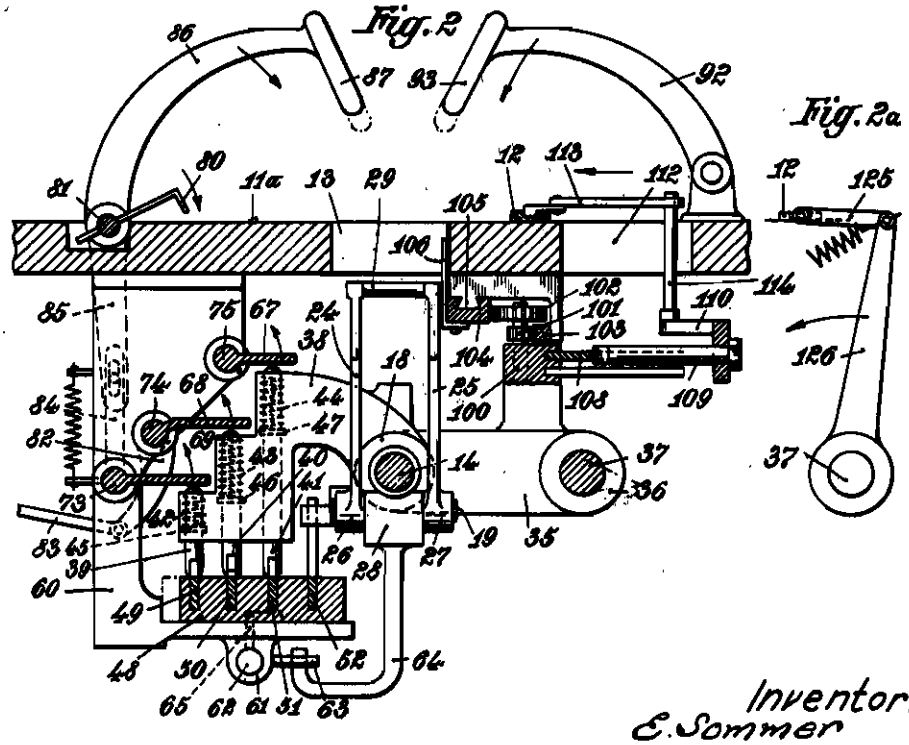

Fig. 2a

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5 Sheets-Sheet 2

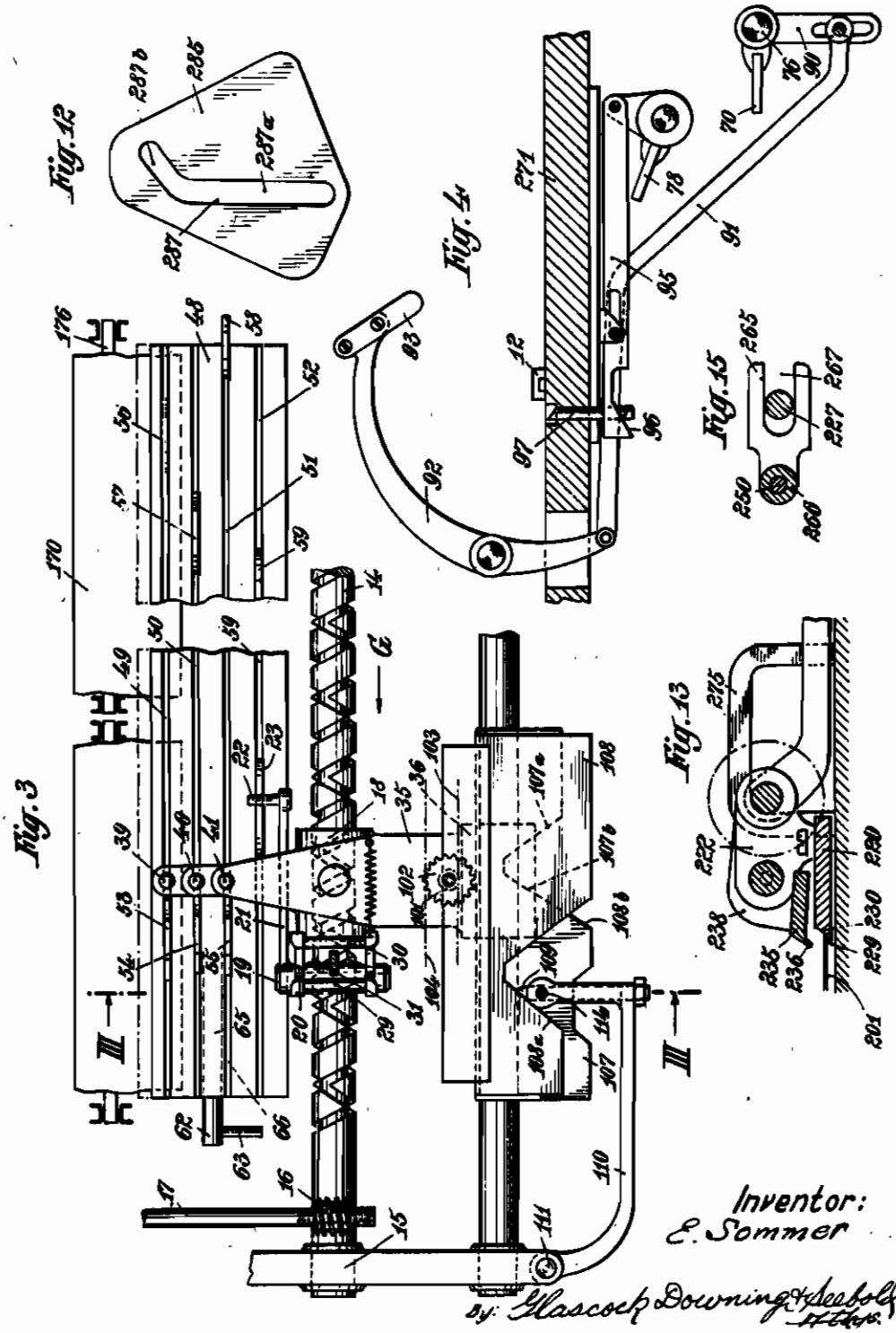

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Fig. 6

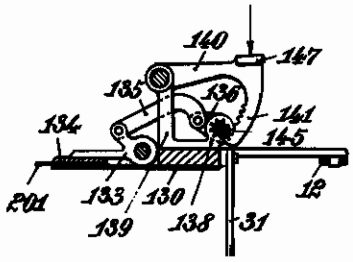

Fig. 7

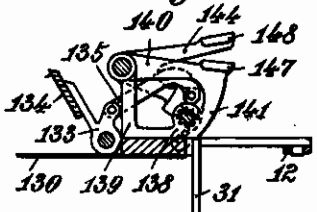

Fig. 8

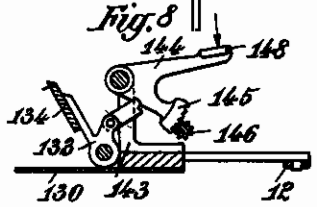

Fig. 5

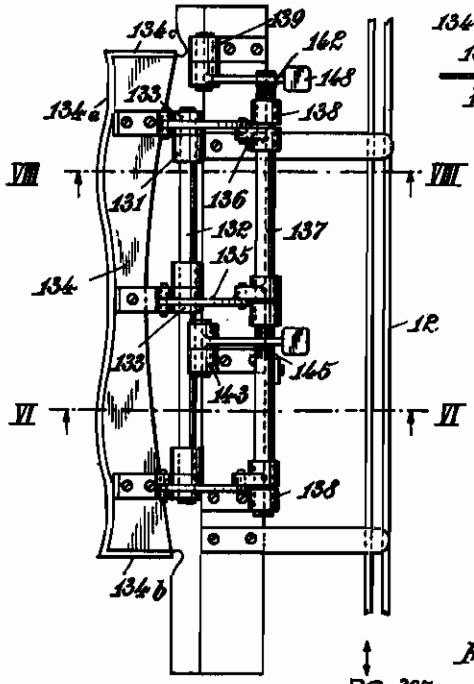

Fig. 11

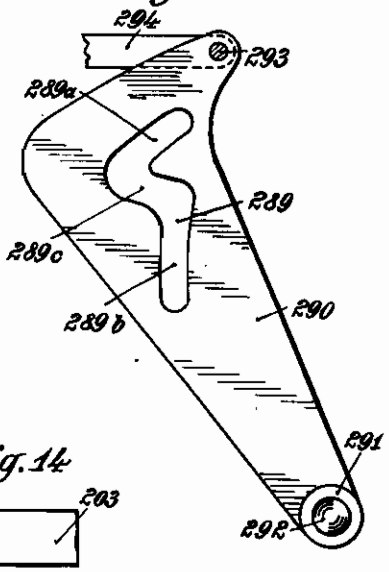

Fig. 14

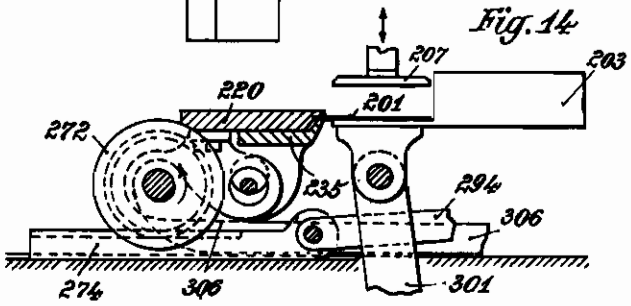

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Fig. 10

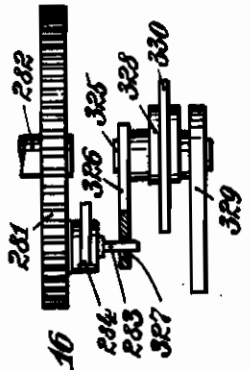

Fig. 9

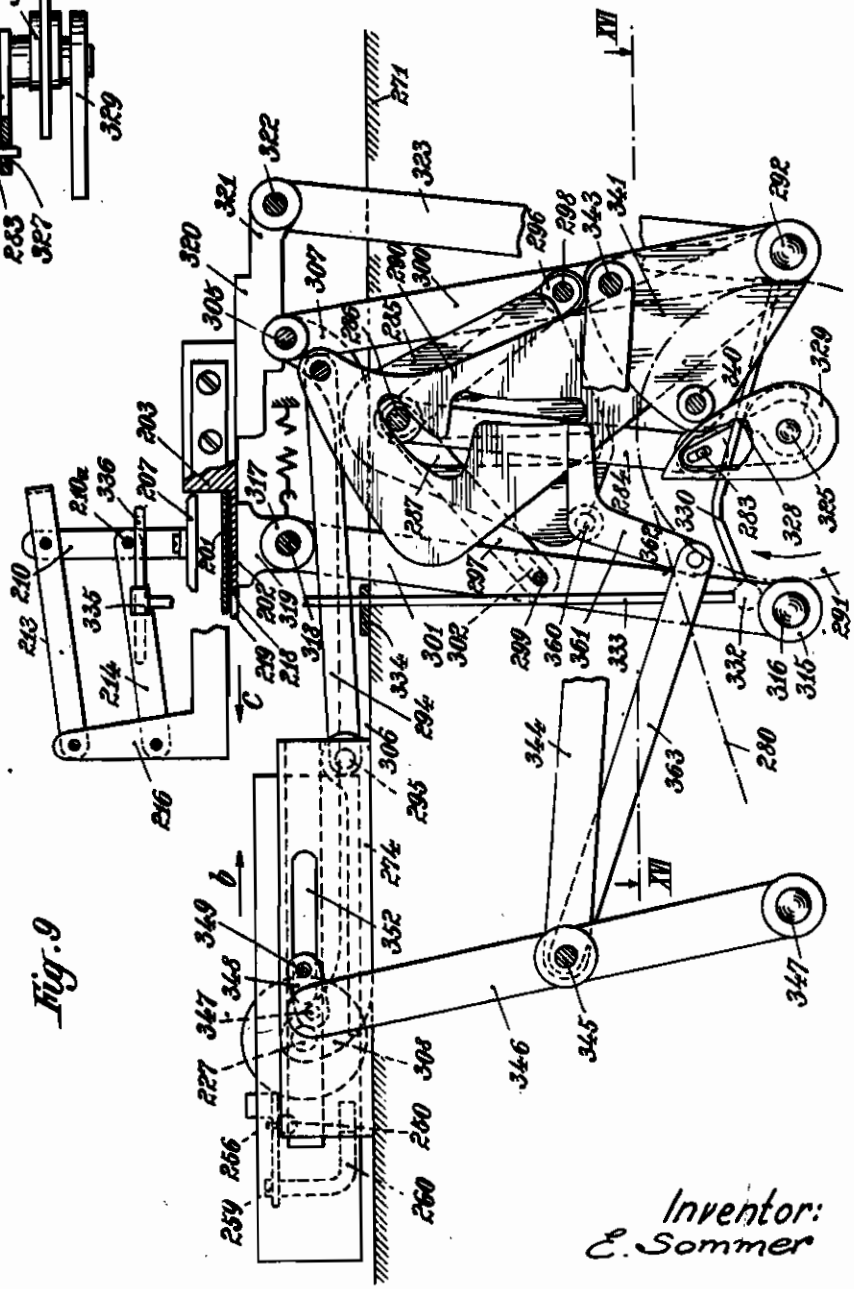

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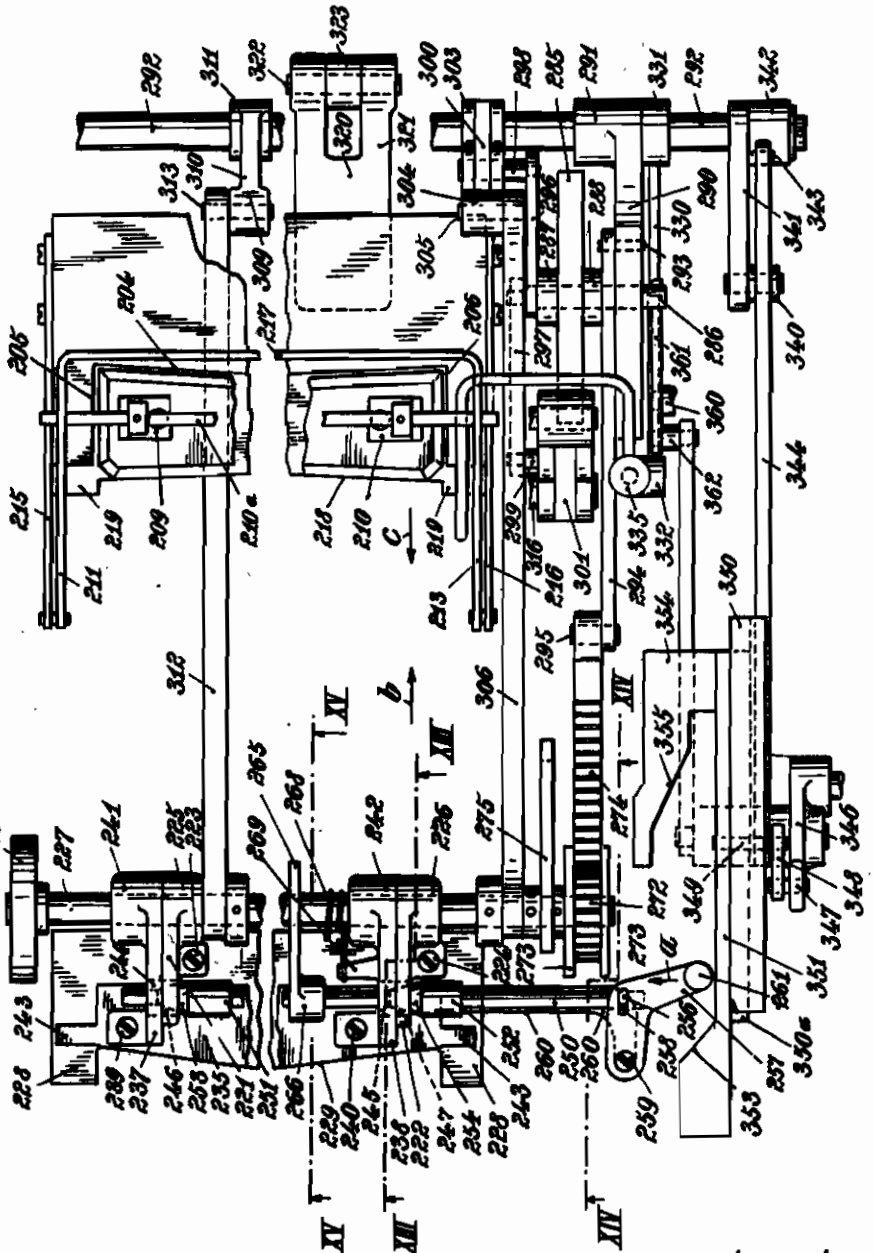
Fig. 10



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Published May 11, 1943 Serial No. 311,428

ALIEN PROPERTY CUSTODIAN

APPARATUS FOR THE AUTOMATIC QUILTING OF ARTICLES OF MATERIAL ESPECIALLY COLLARS

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Application filed December 28, 1939

The invention relates to an apparatus for the automatic quilting of articles of material and is characterized thereby, that an article of material is clamped in a clamping carriage so that a uniform portion of the edges to be quilted of the article of material projects beyond the clamping plate of the clamping carriage. With this object in view the clamping plates are shaped according to the contours of the collar to be quilted at those points at which the piece of material has to project beyond the edge. The clamping carriage is resiliently pressed against a stop arranged just in front of the stitch hole of a sewing-machine, in that the lower clamping-plate bears against this stop. The carriage is at the same time positively moved in longitudinal direction by a driving mechanism, so that the front edge of the clamping plate moves along the stop and a quilted seam is produced by the sewing in accurate distance from the edge of the material.

In order to be able to carry out in one continuous sewing proceeding also the transverse seams, which generally extend at right angles or even at an actute angle to the main seam, a transverse movement is imparted to the clamping carriage by means of curved guides.

A spindle with reversing screw threads is provided for the positive movement of the clamping carriage, a nut having a pin engaging in this screw thread is positively moved to and fro on the spindle.

In order that for the production of the transverse seams the uniformly pushing forward movement of the nut can be disengaged, the nut is not connected directly with the clamping carriage but through the intermediary of a bell crank lever, which at its angle is oscillatably mounted on the nut by a transversely extending bolt, one end of the bolt being guided by a curved guide whereas the other end engages by a catch in the clamping carriage. By super-position of the uniformly progressing movement of the nut and of the oscillating movement of the bell crank lever the necessary aboslute movement relative to the machine frame can be imparted during the sewing of the transverse seam to the upper end of the bell crank lever and thereby to the carriage.

The invention provides further arrangements for holding fresh parts of material which have still to be quilted and also arrangements which place the parts of material on to the clamping carriage and adjust them on this carriage, so that absolutely uniform quilted seams are produced on all edges.

Particulars of the devices will be explained hereinafter with reference to the accompanying drawings, in which a form of construction of the invention is illustrated by way of example.

Fig. 1 shows diagrammatically a top plan view of the automatic machine in the scale 1:10.

Fig. 2 is an end view of part of the machine shown in Fig. 1 viewed in the direction of the arrow A in the scale 1:4,

Fig. 3 shows in elevation a part of the spindle, the nut head and the curved guide in the scale 1:4,

Fig. 4 shows in end view a part of the automatic machine viewed in the direction of the arrow B with the locking arrangement for the carriage guide and the releasing arm for closing the clamping device of the carriage,

Fig. 5 shows the carriage in top plan view,

Fig. 6 is a cross section on line VI—VI of Fig. 5,

Fig. 7 is an end view of the carriage as shown in Fig. 5, the clamping plate being opened,

Fig. 8 is a cross-section on line VIII—VIII of Fig. 5,

Fig. 9 shows in side elevation the driving mechanism for the holder of the material and for the reversing device,

Fig. 10 is a top plan view of Fig. 9,

Fig. 11 shows in side elevation the oscillatable disc for driving the rack of the reversing device,

Fig. 12 shows in side elevation another curved guide for guiding the middle anchor pin,

Fig. 13 shows in a section on line XIII—XIII of Fig. 10 the reversing device with clamping device opened,

Fig. 14 shows the same device as Fig. 13 but in the position in which the reversing device is ready to grip a part of material from the holder and in section on line XIV—XIV of Fig. 10.

Fig. 15 shows a guide lever for the releasing mechanism of the clamping device in section on line XV—XV of Fig. 10,

Fig. 16 shows in top plan view the chain wheel and the cam gears on the section line XVI—XVI of Fig. 9.

The automatic machine consists of a driving engine 1 which by a chain 2 drives a gear 3, from which through a transmission shaft 4 a sewing machine 5 of usual construction is driven, the base plate 6 of this machine being embedded in the plate 7 of the machine frame, so that the surfaces of the plates 6 and 7 are in the same plane. Blanks of collar piled up in a pile 8 are singly placed on a holder 9 which will be particularly described hereafter and from which they are taken at the suitable moment in an absolutely automatic manner by a reversing device 10 and

conveyed to the clamping device of a carriage 11.

The carriage 11 is guided by means of arms in a guide rail 12 in both directions of movement C and D. The frame plate 7 of the machine is cut out at 13 at the point where the carriage is located.

A spindle 14 with oppositely directed screw-thread grooves is arranged parallel to the rectangular aperture 13. This spindle 14 is journalled at both ends of the machine in arms 15 and rotated from the driving gear 3 through the intermediary of a worm gear 16 and of a shaft 17. A nut 18 on the spindle 14 engages into the screw-threads of spindle 14 by a catch, not shown in Fig. 3, so that at the rotation of the spindle a to- and fro-movement is imparted to nut 18.

At one side of the nut 18 a bell-crank lever 20 is oscillatably mounted on a bolt 19 extending transversely to the spindle 14, the lower horizontal arm 21 of this bell crank lever having at its end a guide pin 22 adapted to move along a curved guide 23 during the movement of the nut. The upper arm of lever 20 is double fork-shaped. Two fork arms 24, 25 have hub parts 26, 27 which engage from both sides on a bracket 28. The upper portion of each arm 24, 25 is again forked. The fork arms 24, 26 are connected by rods 29, 30 extending transversely to the spindle 14. An arm 31 fixed on the carriage 11 engages between these guide rods.

A slidable sleeve 38 is fixed by means of an arm 35 on the nut 18 and guided on a guide rod 37 extending parallel to the spindle 14. A jib 38 is also fixed on nut 18 and carries in three parallel bores indexing pins 39, 40, 41 pressed into the lower position by springs 42, 43, 44 acting each against a stop. These stops 45, 46, 47 are arranged so that the indexing pins in their inoperative position can still move freely just above a guide plate 48.

The guide plate 48 is arranged parallel to the spindle 14 and has in its upper surface four grooves 49, 50, 51, 52 extending in longitudinal direction. Cams 53, 54, 55, 56, 57, 58 and 23 are arranged in these grooves. The functions of these cams will be explained in the description of the operation of the machine. The guide plate 48 is fixed at both ends on the machine frame by jibs 60, so that it is shiftable by means of grooves and springs transversely to the longitudinal direction. In brackets 61 fixed on the jibs 60 a push rod 62 is mounted adapted shiftable parallel to the longitudinal direction of the guide rod. At each end of this push rod horizontal pins 63 are fixed against which, when the nut is moving, an abutment arm 64 strikes alternately and thus shifts the rod actually in the one or other direction each time when the nut arrives in the extreme position. By two vertical pins 65 engaging in oblique slits 66 of the guide plate 48, this guide plate is moved to and fro transversely to the longitudinal direction.

Above the step-shaped bordering of the jib 38 two rows of oscillatable plates 67, 68, 69, 70, 71, 72 are mounted stepwise by means of oscillatable shafts 73, 74, 75 and 76, 77, 78 which shafts are actually oscillated by the indexing pins.

The oscillatable plate 67 moves, through the intermediary of a lever system not shown in the drawing, grippers 68 which are oscillatably mounted on a shaft 81 and serve for automatically removing the blanks which have been sewn. The plate 68 controls through a lever system 82, 83 in a manner known per se and not illustrated in the drawing the disengager for stopping the sewing machine. The plate 68 controls through the intermediary of a lever system 84, 85 an oscillatable arm 88 which has a nose 87 serving for opening the clamping plate of the carriage.

The plate 70 of the oscillatable plates arranged on the other half of the machine controls, as shown in Fig. 4, through the intermediary of a lever 80, 81 a second oscillatable arm 82, whose nose 83 serves for closing the clamping plate on the carriage. By the lower plate 77 the gear for engaging the sewing machine is actuated, and by the oscillatable plate 78 a bolt 87 is controlled through a slide 85 having an inclined surface 86, said bolt locking the guide bar 12 at the suitable moment.

On the arm 35 of nut 18 a gear element consisting of pinions 101 and 102 is rotatably mounted on a vertical pin 100 (Fig. 2). The lower pinion 101 meshes with a rack 103 fixed on the machine frame on a certain length parallel to the longitudinal direction of the spindle, whereas the pinion 102 meshes with a rack 104 which is shiftable on a dovetailed guide bar 105 extending from the lower surface of the machine plate. An upwardly extending finger 106 is fixed on rack 104 and adapted to slide along one of the edges of the opening 13 in the plate of the machine frame. When the two pinions rotate, the finger 106 is according to the ratio of transmission moved rapidly and in a substantially shorter time over the stroke length than the nut 18. The finger 106 engages at certain positions behind a corresponding finger of the carriage and serves for rapidly returning the carriage.

On the arm 35 of nut 18 two curve plates 107, 108 are fixed parallel the one above the other. In the cam groove of the upper plate 108 engages a guide pin 109 which is mounted on an arm 110 which is mounted by a pin 111 in the machine frame so that this pin can oscillate.

A corresponding guide pin 115 is arranged as shown in Fig. 2 on the other side of the machine frame on an arm 116 oscillatable about a pin 117 and carrying a vertical pin 118 which extends upwards through an oblong hole 119 and is connected by a link 120 with the guide rail 12. The two oscillatable arms 110 and 116 are of similar shape. They differ merely in that the guide pin 115 is situated lower than the guide pin 109 and consequently engages in the cam groove of the lower plate 107 when this plate at the to and fro movement of the nut head is in the right hand position.

The guide pin 109 has a vertical pin 114 which extends through an oblong hole 112 of the machine plate and is connected by a link 113 with the guide rail 12.

The guide rail 12 is connected at both ends by links 125 of the levers 126 oscillatable on the guide rod 37. Springs 127 engage on the rail 12 for shifting this rail in the direction of the arrow E (Fig. 1).

The carriage consists of a base plate 130 on which, as shown in Figs. 5, 6, 7 and 8, an axle 132 is rotatably mounted by means of bearing bodies 131. On this axle 132 three other bearing bodies 133 carry an oscillatable stretching plate 134. The bearing bodies 133 are connected with levers 136 by links 135, these levers being keyed on a control shaft 137. This control shaft 137 is connected through the intermediary of bearing bodies 138 with the base plate 130. The base plate 138 carries at one end a toothed segment 141 on a hook-shaped lever 140 attached to a

bearing body 138, this toothed segment meshing with teeth 142 on the control shaft 137.

Approximately in the middle of the base plate a bell crank lever 144 (Fig. 8) is fixed on a bearing body 143 and acts through a toothed segment 145 on a pinion 146 in the inner side of the shaft. The levers 140 and 144 have flat faces 147 and 148 onto which the noses 87 and 93 respectively of the oscillatable levers press in each extreme position, to thus open or close the stretching plate 134 by simple turning movement.

With reference to Fig. 1 the movement of the carriage 11 will be described.

It is assumed that this carriage is in its inoperative position on the right hand side of Fig. 1. In this position of the carriage, the reversing device 10 is in its oscillating position. At the end of this oscillating movement the reversing device has deposited the blank 201 onto the base plate 130 of the carriage, an accurate depositing on the base plate and especially an adjusting relative to the edge 134*a* being ensured in that the blank is securely held by means of the clamping plate owing to the positive guiding through the intermediary of the levers 300 and 306, so that a certain, uniform strip of the blank projects beyond this edge. The same is valid for the side edges 134*b* and 134*c* over which the blank projects at similar width. Needle pins are provided on the clamping plate 134 at the three edges 134*a*, 134*b*, 134*c* for securely holding, these pins engaging into the fabric when the clamping plate is lowered. To prevent damaging of the needle points holes are made in the base plate 130 at the points opposite the needle pins.

After the reversing device has placed the blank 201 onto the carriage, the nose 93 strikes against the press plate 148 and folds down the clamping plate 134, so that the blank is securely held. This movement is carried out by oscillating of the plate 70 (Fig. 4) by the cam 56 which lifts the indexing pin 39. In this position the nut 18 moves in the direction of the arrow G (Fig. 3). The guide pin 109 then moves along the edge 107*a* (Fig. 3), so that the carriage is moved in the direction of the arrow E in the prepared position for the transverse seam along the edge 134*b*. At the moment when the guide pin has attained the apex of the angle between the guide faces 107*a* and 107*b*, the needle of the sewing machine is at the rear end of the edge 134*b*. At this moment the indexing pin 40 encounters the cam 57, whereby the sewing machine is started. When the movement of the guide pin continues along the guide face 167*b* the transverse seam 134*a* is sewn.

In order that the carriage, in spite of the uniform continuous movement of nut 18, cannot carry out any longitudinal movements, the pin 22 of the bell-crank lever moves on the curved guide edge 59, which is shaped so that on the rods 29, 30 on which the catch 31 of the carriage engages the longitudinal movements of the nut are equalized by a corresponding relative movement to the right, so that the catches 31 remain at rest relatively to the machine frame.

At the moment when the sewing machine needle has arrived in the corner between the edges 134*b*, 134*a*, the pin 22 arrives on an essentially horizontal portion 59*a* of the curve, so that then a movement of the carriage in longitudinal direction takes place. The carriage is then guided after the manner of a copying stencil by a nose 11*a* arranged in front of the stitching hole on the stitching plate, in that the front curved edge of the base plate 130 comes to bear against this nose under the action of spring 127. During this stencil-sewing none of the pins 109 comes into touch with any of the curved guides 107 or 108.

The edge 134*a* having been sewn, the nut 18 has been moved into the left hand position, so that now the left guide pin 109 comes into engagement with the corresponding cam plate 108 and slides along the guide edge 108*a*. The transverse seam 134*c* is sewn. When the needle of the sewing machine has arrived on the rear end of edge 134*c*, also the indexing pins 39, 40, 41 have got on the curved guides 53, 54, 55, so that at the same time the sewing machine is stopped by the middle plate 68, the clamping plate 134 of the carriage 11 is opened by the nose 87 through the oscillatable plate 69, and the grippers 80 are closed, so that the completely sewn collar is securely held in the machine plate.

The guide pin 109 moves then along the guide edge 108*b* of the curved guide and conducts the carriage in the direction of the arrow H into the inoperative position, so that the catch 31 comes out from between the prongs 29, 30 of fork 20 and gets behind the nose 106 of rack 104 which then returns the carriage into the initial position.

In order that during the return movement the indexing pins do not encounter the cams, an arm 64 has in the left hand dead point position pushed towards the right the push rod 62 and at this occasion shifts towards the rear the guide plate 46 by half the distance between two guide grooves, so that the three indexing pins can freely move backwards between the grooves without encountering the cams.

After the carriage has arrived in the right hand dead point position, the catch 106 is again disengaged from the rack. In this disengaged state a new blank is inserted. After the carriage has again carried out the reversing movement in the direction of the arrow B, the indexing pin 31 first encounters the cam 58 and disengages through the plate 78 the locking bolt 97 of the guide bar 12, so that the guide bar can be controlled by the cam plate 107 in lateral transverse movement.

In order that at a rapid idle stroke the rail 12 is not guided by the springs 127 on the stop nose, a locking bolt 97 is provided in plate 7 of the machine frame.

From a pile 6 of blanks stamped according to the desired shape of collar one blank 201 is laid into the indented portion 202 of a base plate 203 (Figs. 9 and 10) of a table 8, and adjusted thereby that it bears on the rear edge 204 as well as at the lateral edges 205 and 206.

Above the indented portion 202 a pressing plate 207 is arranged which corresponds as regards shape to the outer edge 208 of the blank 201, and which is dimensioned in width so that a narrow uniform portion of the blank projects from under the press plate 207. The press plate 207 is oscillatably mounted on pins, not shown in the drawing, by means of two supports 209 and 210 and of parallelogram links 213, 214 on jibs 215, 216. The angular jibs 215, 216 are fixed on the two end sides of base plate 203. The upper links 211 and 213 of the parallelogram links are extended to beyond the pins on the supports 209 and 210 and connected the one with the other by a transverse part 217 in order to increase the stability of the machine.

The device 9 for holding the blanks is coor-

dinated to a reversing device 10 which will be hereinafter described in detail.

It consists of a reversing plate 220 (Fig. 14) which is fixed on two arms 221, 222 by means of screws 223 and 224, one end of the arms 221 and 222 being enlarged to form jibs 225, 226 by means of which the reversing plate 220 is oscillatably mounted on a shaft 227. The reversing plate 220 has at its front end two projecting tongs 228. The boundary line of the front edge 229 of the reversing plate 220 corresponds to the mirror-reflected boundary line of the front edge 218 of base plate 203 and has also an inwardly curved shoulder 230 (Fig. 13).

In the front portion of the reversing plate 220 a clamping plate 235 is arranged, the front edge of which corresponds to the shape of the front edge 229 of the reversing plate 220. The downwardly directed nose 236 of plate 239 can engage into the inwardly curved shoulder 230 of the reversing plate 220 (Fig. 13). This construction of the reversing plate and of its clamping plate serves to grip the blank 201 which before the tongues are closed can be pushed against the rear vertical wall of the inwardly curved front edge 230.

The clamping plate 235 is fixed by screws 239 and 240 on two arms 237, 238 which carry at one end hubs 241, 242, by means of which the clamping plate 235 is oscillatably mounted on the rocking shaft 227. Narrow tongues 243 projecting in the direction of the axle 227 and situated approximately at the height of the tongues 228 of the reversing plate 220 are further provided on both ends of the clamping plate 235.

In the arms of the reversing plate 220 as well as of the clamping plate 235 circular apertures 244, 245, 245, 247 are provided which are mutually displaced so that they vertically register when the clamping plate is in the opened position (Fig. 13), but only partly overlap in the closed position (Fig. 14). Into these apertures a rod 210 engages which extends almost over the whole reversing device parallel to the axle 227, said rod having in the region of the two pairs of holes 244, 246 and 245, 247 pistons 251, 252 with conical portions 253, 254 merging into the rod.

A cross pin 256 of rod 250 (Fig. 9) engages in an oblong hole 258 (Fig. 10) arranged transversely to the longitudinal axis of rod 250 in a bell-crank lever 257. This lever 257 is fixed by means of a screw 259 at the end of the upper arm on a several times angularly bent jib 260, on one end of which the reversing plate 220 is fixed. The lower arm of lever 257 has at its end a guide pin 261. On the rod 250 a fork 265 is fixed between the arms 221 and 233 by means of its widened hub 266, so that its fork-shaped end 267 engages over the axle 227 (Fig. 15).

To hold the clamping plate 235 in closed position a spiral spring 268 is wound around shaft 227 and connected with one end on the reversing plate 220 and with the other end on an extension 268 of the arm 245 with such tension, that the clamping plate in the closed position is pressed at a certain tension with its nose 236 into the indentation 230 of the reversing plate 220.

The axle 227 is rollably mounted at one end by a roller 270 on the plate 271 of the machine frame (Fig. 10). At the other end of shaft 227 a spur wheel 272 is keyed which has two guide discs 273. The spur wheel 272 serves to roll shaft 227 on a rack 274. A guide bow 275 (Figs. 10 and 13) is provided for guiding the spur wheel 272 and for preventing the same from disengaging from rack 274, the inner horizontal edge of this bow serving to guide shaft 227 during the downward rolling.

The hereinafter described curve- and lever-drive serves for the mutual movement of the blank holder and of the reversing device.

A sprocket wheel 281 is turned at a low number of revolutions about its axis 282 from the main drive of the machine through the intermediary of suitable transmission gears not shown in the drawing and of a chain 280. A connecting lever 284 is hingedly connected with a cramp pin 283 eccentric to the pivot axle 282 and grips from below with its fork-shaped end over a guide plate 285 (Fig. 12) and its pin 286 connecting the two ends of a fork-shaped arm 287, 288 engages in a slot 287 of this guide plate 285. This slot is composed of a longer lower vertical portion 287*a* and of an upper short inclined portion 287*b* arranged at an angle. The guide disc 285 is rigidly mounted on the machine frame in a manner not shown in the drawing.

The pin 286 is extended at both ends to beyond the two ends 287, 288 of the lever and engages with one end into a guide slot 289 in an oscillatable plate 290, said slot being bent off at an angle several times, and a hub 291 of this plate is mounted on a shaft 292 so that the plate can freely oscillate about this shaft. The guide slot 289 has an upper oblique portion 289*a*, a lower portion 289*b* extending almost in vertical direction, and a middle portion 289*c* which extends almost in horizontal direction and connects the upper and lower portions. The oscillatable plate 290 is connected at its upper end by means of a pin 293 with a fish plate 294 hinged on a rack 274 by a pin 295.

At the other end of the pin 286 two links 296, 297 are scissors-like arranged, their other ends carrying pins 298, 299 which are fixed on two oscillatable levers 300, 301 approximately at the middle of the same. The link 297 has in its lower end an oblong hole 302 so that it can not only oscillate relative to pin 299 but also be shifted by the distance of the oblong hole.

The lever 300, mounted by its lower hub 303 so that it can freely oscillate on the shaft 292, carries at its upper end on a hub 304 over a pin 305 a push-rod 308 which at both ends has outwardly directed slight bends 307, 308. The other end of the push rod 306 is fixed on shaft 227. A steering rod 312 extending parallel to the push rod 308 for the uniform guiding is hinged at the one end on the rocker shaft and at the other end by a pin 313 on the upper hub 309 of a two-armed lever 310, the lower hub 311 of which is mounted on the shaft 292 so that it can freely turn.

The two-armed lever 301 can freely oscillate about a shaft 316 by means of its lower hub 315 and carries on its upper hub 317, through the intermediary of a pin 318, a bearing body 319 which is fixed near one of the ends of the base plate 203 of the holder 9. A second lever, not shown in the drawing, is oscillatably mounted parallel to lever 301 in such a distance from this lever and oscillatable about shaft 316, that its upper end can engage near the other end of the base plate 203 with a bearing part. A bearing body 320 is fixed on the rear end of the base plate 203 and bent towards the rear and connected by means of a fork 321 and of a pin 322 with the oscillatable lever 323, the lower end of which is oscillatable about shaft 292. In this manner the holder is shifted parallel to itself during the

oscillating movement of the levers **301** and **323**.

A crank lever **326** (Fig. 16) is keyed on the short shaft **325** parallelly arranged to shaft **262**, said crank lever engaging by means of an oblong hole **327** in the tapered end of the crank pin **283**. Two cams **328**, **329** are further keyed on shaft **325** and mutually displaced, which cams are shaped in manner shown in Fig. 9. A rod **330** rests on cam **328**, one end of this rod being fixed to a ring **331** and is oscillatable about the shaft **292**. A ring-shaped body **332** is fixed on the other end of rod **330** and carries a vertical push rod **333** and is guided in a guide **334** on the machine frame **271**. The push rod **333** has a head **335** which carries a U-shaped bow **336**, one arm of said bow engaging under the oscillatable rod **210***a*. This bow serves for the automatic lifting of the clamping plate **207**.

The cam disc **326** (Figs. 9 and 16) can come into engagement with a roller **340** mounted on a pin of a sector disc **341** so that it can easily rotate. The sector disc **341** has a hub **342** by means of which it is mounted on the shaft **292** so that it can freely oscillate. On an other pin **343** a pull rod **344** is hinged which is hingedly connected on a middle pin **345** of a two-armed lever **346** which is oscillatably mounted at its lower end on a shaft **347**. On the upper end of lever **346** a short link **348** is fixed pivotably about a pin **347**, said link having a pin **349** engaging in a guiding aggregate (Fig. 10). This aggregate consists of a guide frame **358** fixed on the machine frame **271** and carrying in a dovetailed guide **350***a* a guide carriage **351**, in which the pin **349** is fixed. The pin **345** can carry out a horizontal movement in an oblong hole **352** in frame **350**. The guiding carriage **351** has at one end a guide face **353** extending approximately at an angle of 45°, said guide face exerting upon a guide pin **261** during the movements of the carriage **351** a pressure in the direction of the arrow *a* (Fig. 10). Another guide face **355** arranged on a hook-shaped guide element **354** can exert under certain conditions a pressure on the pin **261** from the other side during the movement of the carriage **351** in the direction of the arrow C, this direction being opposite to the direction of the arrow *a*, in order to return in this manner the rod **250** into the original position.

A bell-crank lever **361** is oscillatably mounted on a pivot pin **360** arranged on the machine frame (Fig. 9), the end of the horizontal arm of this lever being adapted to strike at its downward movement against the pin **286**, so that the lever is oscillated. The end of the other lever arm is connected by a pin **362** and a link **363** with the pin **345** of lever **346**.

The operation of the device for carrying the blanks in connection with the reversing device is as follows:

After a blank **201** has been laid into the indentation **202** of base plate **203** and adjusted by being pushed against the edges **204**, **205**, **206**, which is effected during the running of the machine and when the reversing device **10** is in its lower position, as shown in Figs. 10 and 3, the cam **328** has been turned by continuous rotation of spur wheel **281** so that it moves away from the rod **310**, so that rod **330** descends and the bow **326** liberates the rod **210***a*, so that the plate **207** descends and, by gravity, assisted if desired by a spring attached to the links **213** and **214**, clamps the blank **201** between the plates **207** and **203**.

When the rotation of spur wheel **281** continues, the crank pin **283** moves to beyond the upper dead point position, so that by link **284** the pin **286** is moved downwards in the oblique portion **287***b* of the slot **287**. As the portion **287***b* of the slot forms a curve around the link pin **298**, the lever **300** is not yet oscillated. Also the lever **301** is not yet oscillated at this downward movement of pin **288**, as the lever **297**, by means of the oblong hole **302**, slides along pin **299**. The oblong hole **302** and the portion **287***b* of the slot are of such length that the pin **299** moves through the oblong hole **302** during the same time as the pin **209** moves through the portion **287***b* of the slot.

If, when the movement continues, the pin **286** engages into the vertical portion **287***a* of the slot, the levers **300** and **301** are simultaneously opened like scissors during the whole downward movement of the pin **286** in the slot portion **287***a*. Hereby on the one hand the reversing device is moved through link **306** of lever **300** in the direction of the arrow B (Fig. 9), and at the same time the spur wheel **272** rolls on rack **274** in simultaneously oscillating the reversing device. The lever **301**, which during this operation is oscillated in opposite direction, moves the holding device in opposite direction, that is in the direction of the arrow C.

During the downward movement of pin **286**, the oscillatable plate **290** is at first not moved, as the portion **289***a* of the groove registers with the groove **287***b* (Fig. 10). Only when the pin **286** strikes against the lower end of the horizontal groove portion **209***c*, an oscillation in anticlockwise direction is exerted upon the oscillatable plate **290** wherefrom results, through the intermediary of the link **294**, a shifting in left hand direction of the rack **274** in the direction of the arrow C. The speeds of the links **306** and **294**, as they are oppositely directed, are thereby added, so that the relative rolling movement between spur wheel and rack is accordingly increased and also the oscillating movement.

If the pin **206** engages in the lower groove portion **289***b*, the oscillating movement of the plate **290** stops and therewith also the shifting of rack **274**.

When the pin **286** strikes against the lower guide face of the slot portion **289***c*, the oscillatable disc **290** shifts rack **274**, whereby the oscillating movement of the reversing device is accelerated.

On a comparatively long portion of the lower slot portion **287***a* the oscillating movement of the levers **301** and **300** is only very little for two reasons: The links **296**, **297** are then in a more or less stretched position, whereby comparatively great vertical movements of the pin **286** cause only little horizontal movements of the pins **298**, **299**. On the other hand the crank pin **283** is near the lower dead point position, so that for this reason alone the vertical speed of the pin **299** is little.

During this period of rest of the levers **301** and **300** and consequently also of the holder and of the reversing device the corresponding curvature of the lower slot portion **289***b* of the oscillating plate **290** ensures that the rack **276** carries out such a slight shifting movement, that the tongues **28** of the reversing device can softly bear on to the tongues **29** of the holder (Fig. 10). During this movement the front projecting edge of the blank has engaged into the indentation **330** of the reversing plate **320**.

The pin **286** then encounters the lever **261** and

shifts, through the intermediary of the link **263** and of the two-armed lever **346**, the curved guide **354** in the direction of the arrow C, so that the guide face **355** slides along pin **361** and shifts the rod **350** in the direction opposite to the direction of the arrow A, so that by the rod the device is closed.

Shortly hereafter the clamping plate **107** is lifted by the cam **328** (Fig. 9) through the intermediary of the push rod **333** and of the bow **336**.

After the crank pin **383** has again moved upwards to beyond the lower dead point position, the holder and the reversing device are moved the one away from the other at the upward movement of the pin **386**, slowly at the beginning and then more rapidly, the blank clamped in the reversing device with its front edge being oscillated at the same time. This oscillating movement is accelerated when the pin **86** strikes against the upper end of the slot portion **288c** by oscillation of plate **289** in clockwise direction.

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