Feb. 1, 1966 R. I. BUCKALTER 3,232,256

FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 1

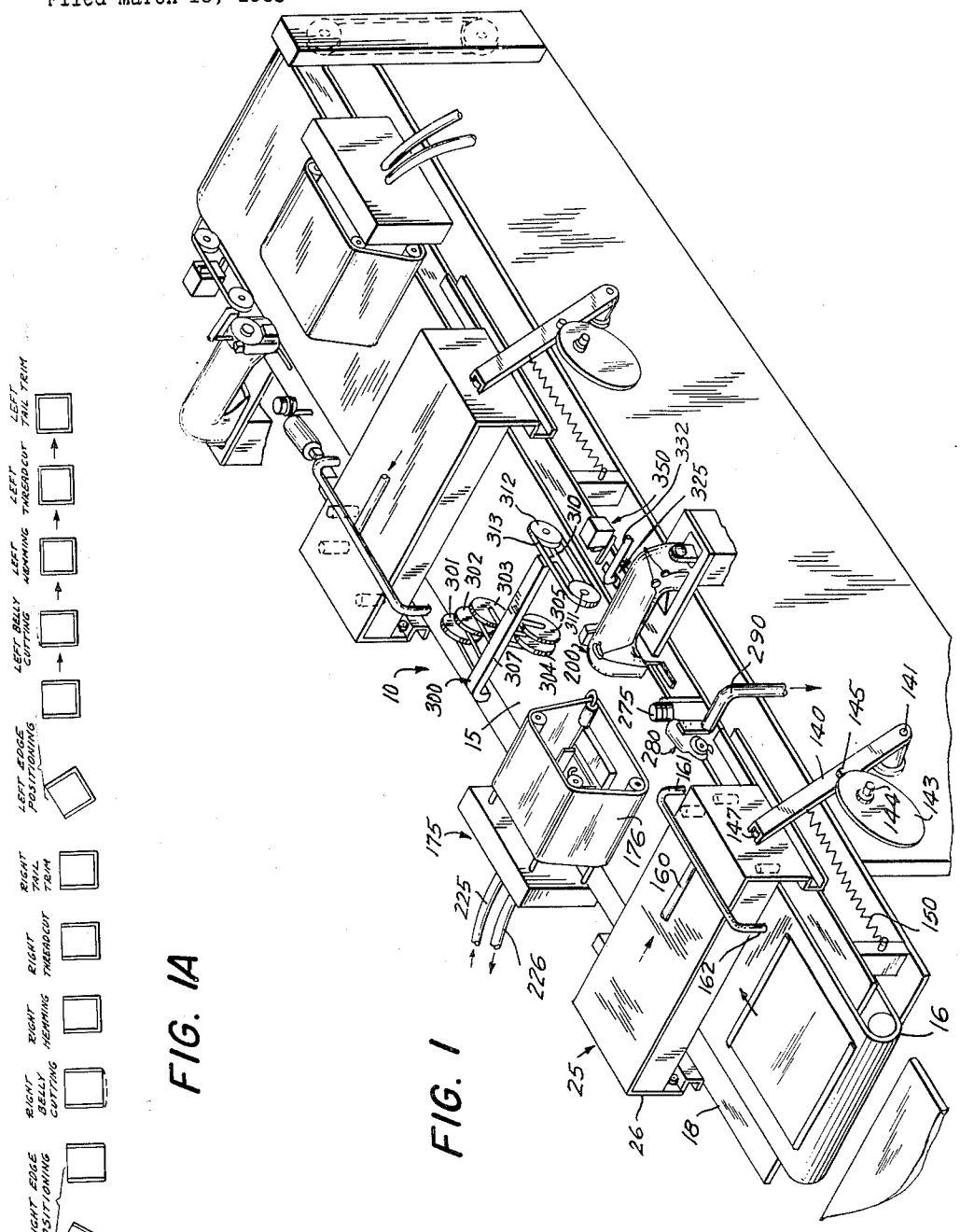


FIG. 1




FIG. 1A

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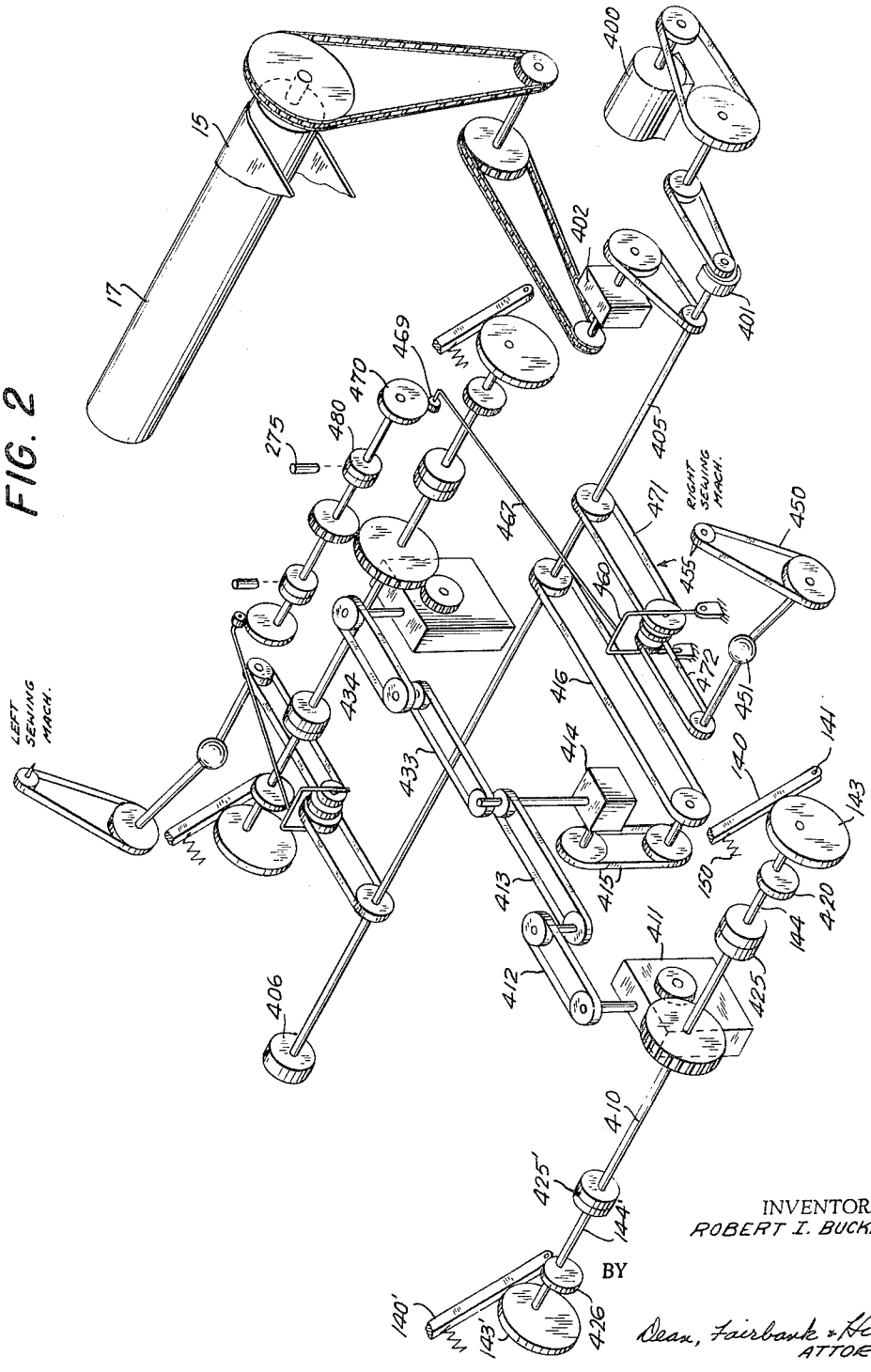
FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 2

FIG. 2

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FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 3

FIG. 4

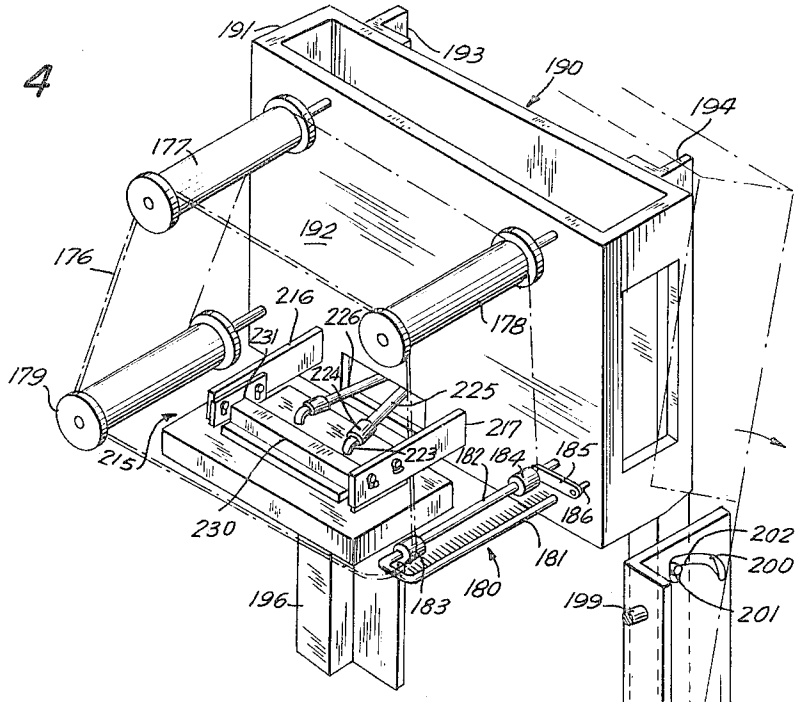
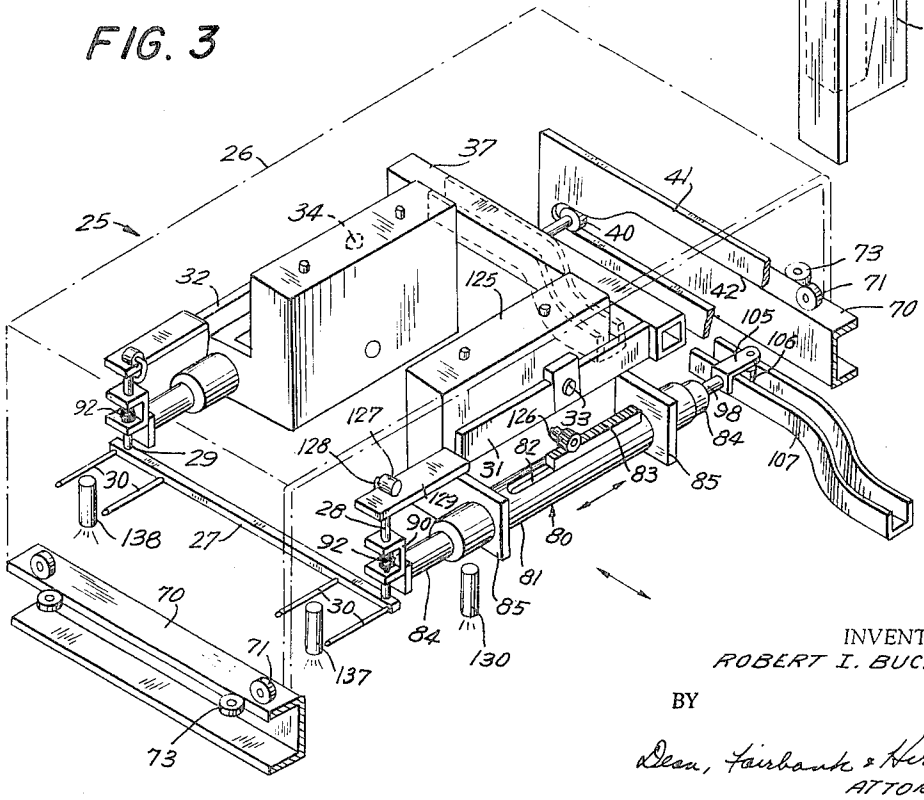



FIG. 3

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FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 4

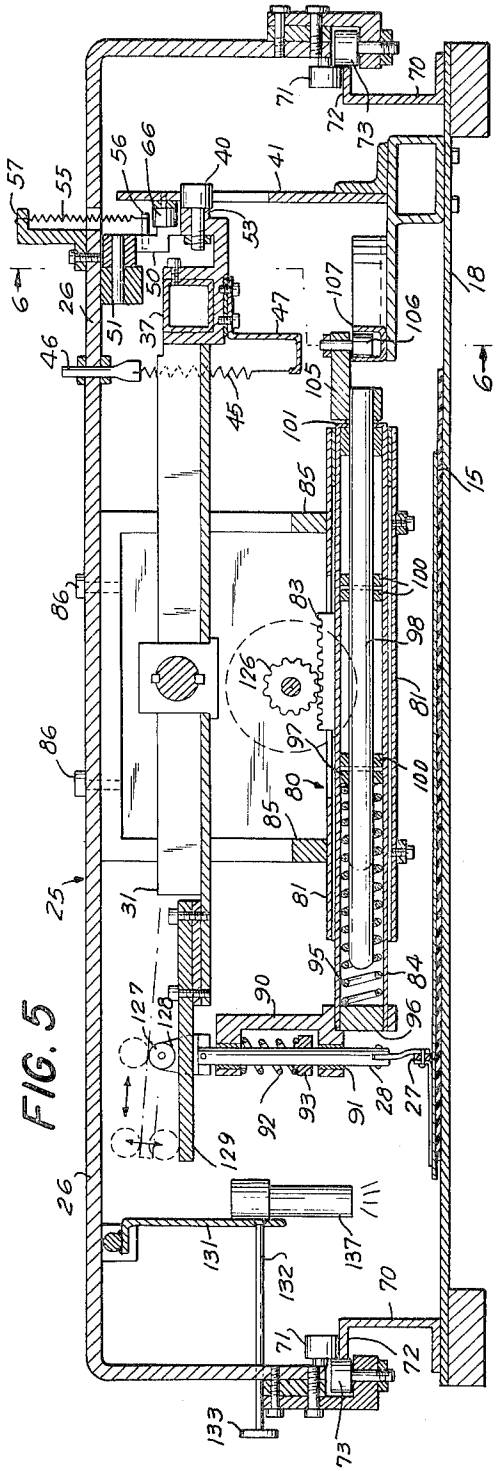

FIG. 5

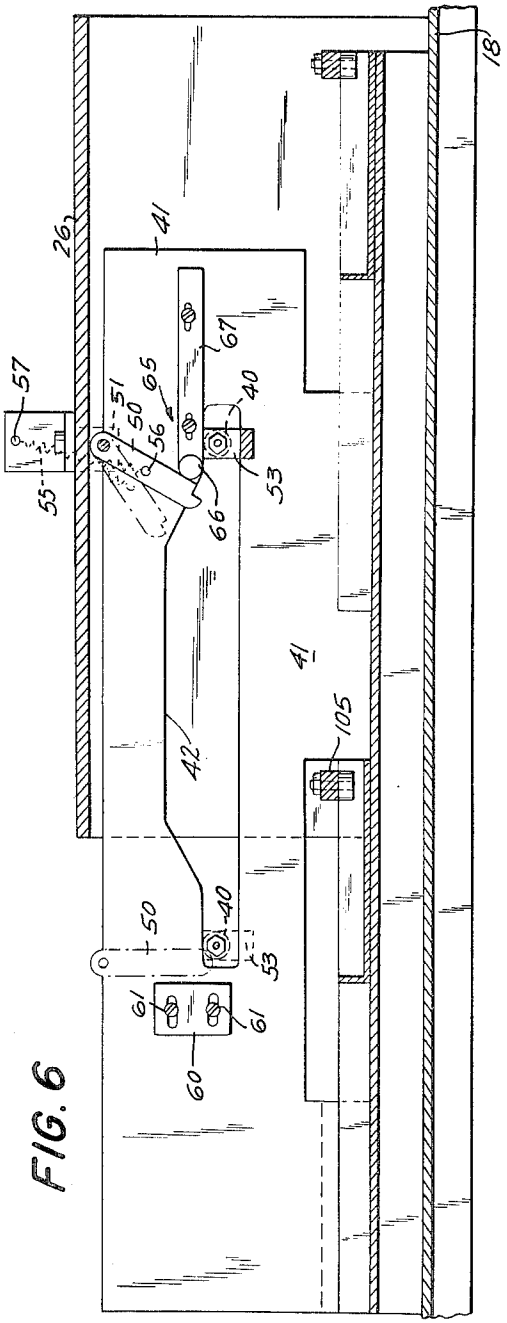

FIG. 6

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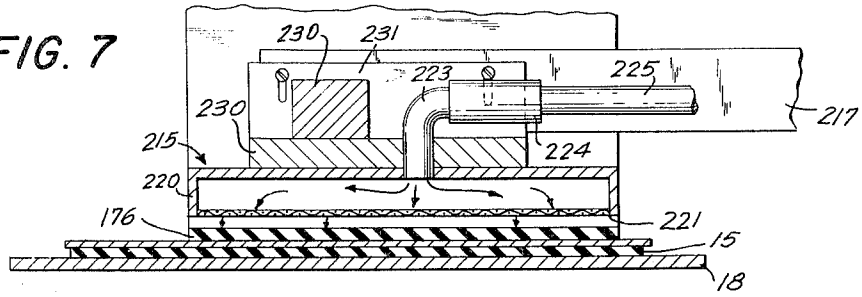
FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 5

FIG. 7



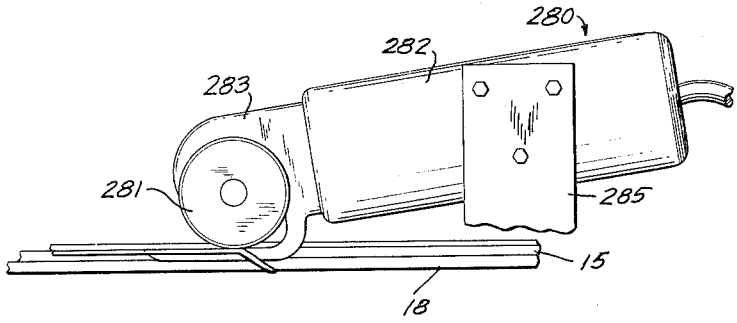




FIG. 8

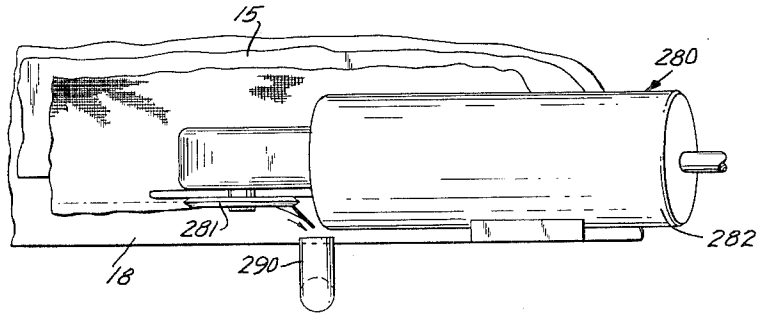



FIG. 9

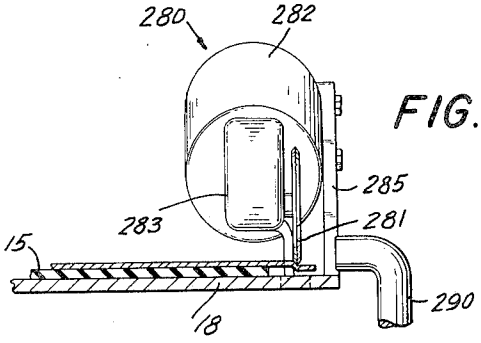



FIG. 10

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Feb. 1, 1966 R. I. BUCKALTER 3,232,256

FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 6

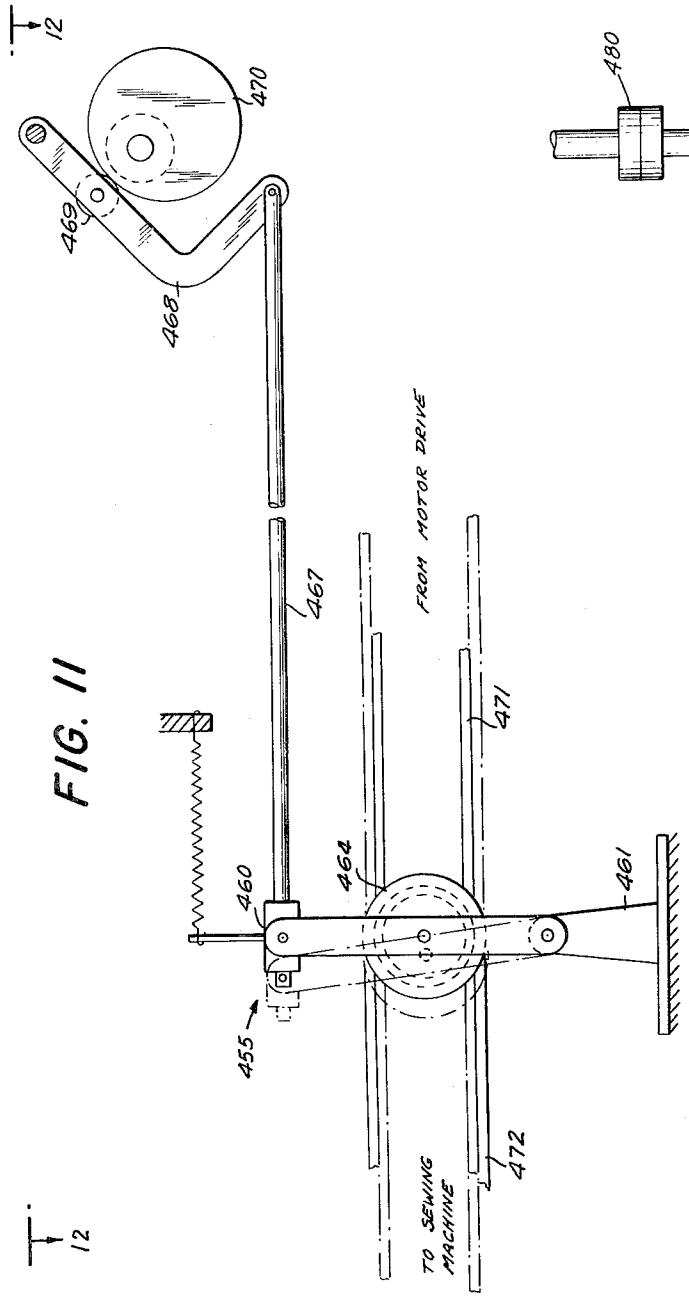


FIG. 11

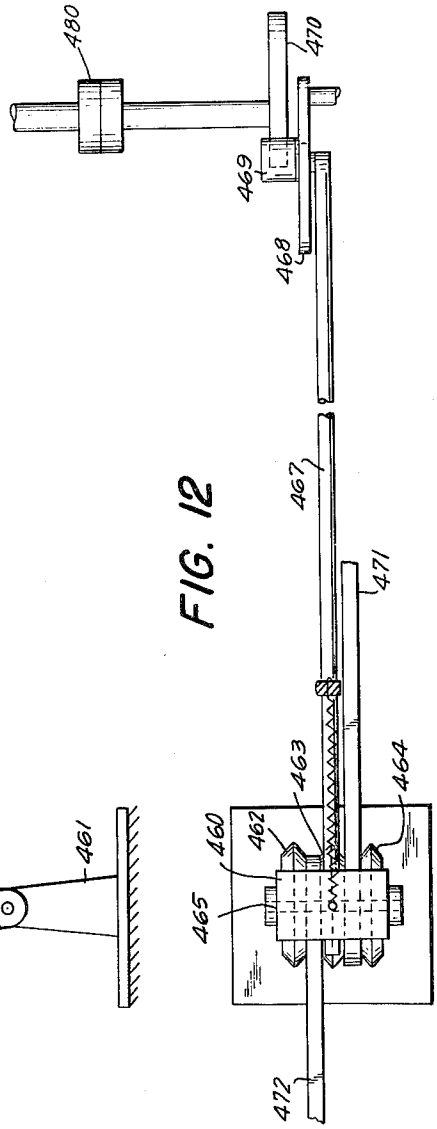


FIG. 12

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FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 7

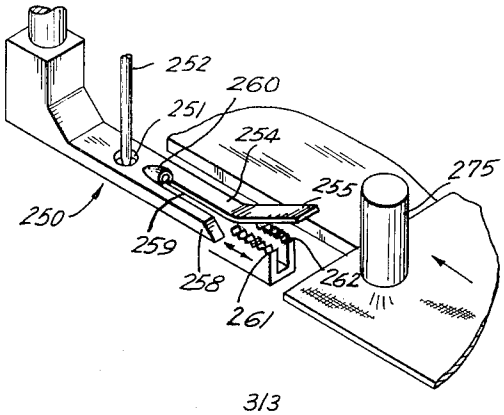


FIG. 13

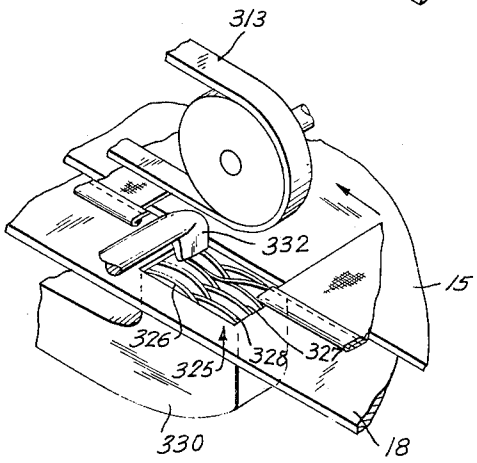


FIG. 14

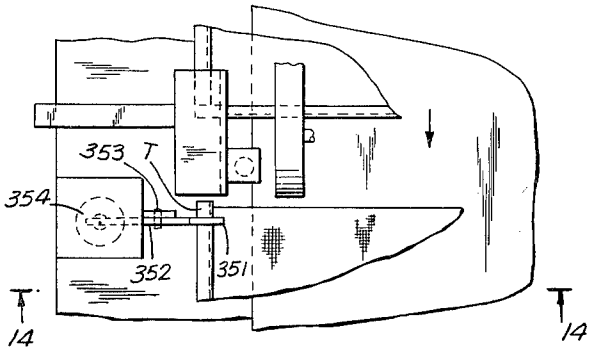


FIG. 15

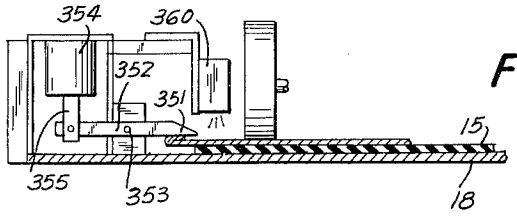


FIG. 16

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# FABRIC POSITIONING AND SEWING APPARATUS

Filed March 15, 1963 8 Sheets-Sheet 8

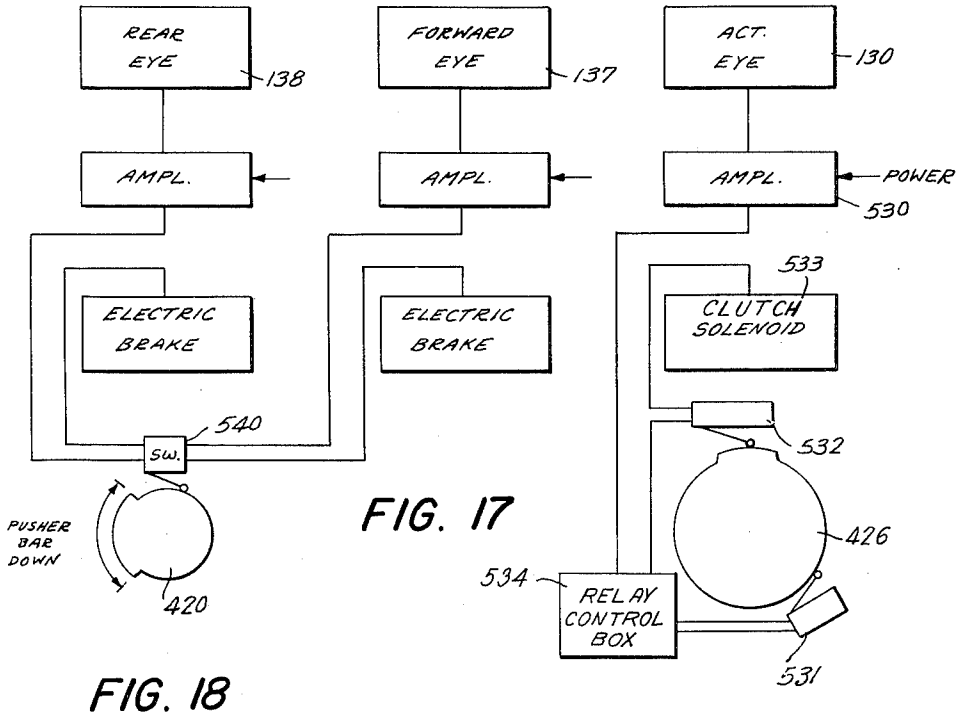


FIG. 17

FIG. 18

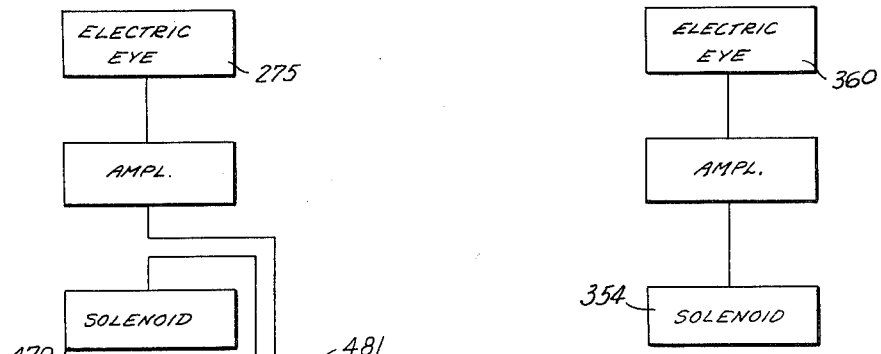


FIG. 19

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United States Patent Office

3,232,256

Patented Feb. 1, 1966



3,232,256

# FABRIC POSITIONING AND SEWING APPARATUS

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Filed Mar. 15, 1963, Ser. No. 265,427
15 Claims. (Cl. 112—2)

This invention relates to the art of fabric positioning and sewing apparatus, and more particularly to apparatus for forming handkerchiefs, or the like rectangular fabric items having the edges thereof hemstitched.

In the handkerchief making industry, bolts of cloth slightly wider than the width of the desired handkerchief to be formed are fed through sewing machines which hemstitch the opposite edges of the bolt of cloth. Thereafter the bolt is cut to provide a plurality of rectangles of desired configuration, usually a square, such as is utilized in forming a handkerchief. These cut rectangular pieces of cloth, with two opposite sides thereof hemstitched, are conventionally manually fed by an operator to a hemstitching sewing machine first to hem one of the unfinished edges of the rectangle and thereafter to hem the other unfinished edge, with the corners being finished by a trimmer. Such operation is extremely time-consuming due to the handling involved and in addition the fabric often becomes dirty due to such excessive handling. Where the rectangular piece of fabric which is stretchable and wrinkleable, is automatically fed to a sewing machine first to have one of the unfinished edges sewn and then to another sewing machine to have the other unfinished edge sewn, and the rectangular piece of fabric is not properly positioned with respect to such sewing machines due to wrinkles in or bunching of such fabric, improper stitching or sewing of such unfinished edges will result. Additionally, since four edges, adjacent ones of which are perpendicular to each other must be formed, the positioning problem is extremely difficult.

It is accordingly among the primary objects of this invention to provide improved handkerchief making apparatus, in which the necessary sewing steps are performed substantially automatically in desired sequence, with no handling.

Another object of the invention is to provide improved handkerchief making apparatus minimizing the required care of the apparatus by a sewing machine operator.

A further object of the invention is to provide handkerchief making apparatus in which the edge of the cloth to be sewn into a handkerchief is automatically positioned with respect to a hemstitching sewing machine.

It is also an object of the invention to provide improved means for automatically feeding cloth to be sewn into handkerchiefs through a hemstitching sewing machine without the cloth being bunched or stretched to provide desired uniformity of the finished article and to minimize rejects.

Another object of the invention is to provide means automatically trimming an edge to be hemmed prior to feeding of the cloth to a hemstitching machine.

A further object of the invention is to provide means for automatically cutting the stitch forming thread after the hem is sewn.

Another object is to provide means automatically trimming the end of the sewn hem to finish the corners of the formed handkerchief.

According to the invention, these and other objects of the invention, which will be made hereafter more apparent are achieved by provision of an endless belt conveyer over which rectangular, preferably square pieces of cloth are adapted to be fed. The pieces of cloth to be formed into a handkerchief are cut from a bolt having its two



opposed edges previously hemstitched. These pieces of cloth are positioned on the conveyer belt with the previously hemstitched edges arranged transversely to the direction of movement of the belt. Mounted over the belt for movement in the same direction and at the same speed as the belt, for a limited distance, are edge positioning means. The edge positioning means include a carriage movably mounted above the belt. Supported by the carriage is a pusher bar for movement against the cloth on the conveyer. Vertical movement means supported by the positioning means carriage are coupled to the pusher bar for forcing it down against the cloth; and front and rear lateral shift means are mounted by the positioning carriage for moving either the front or rear of the pusher bar a limited distance determined by the amount of reorientation required of the piece of cloth to insure that the passage of the oriented edge of the cloth through the hemstitching sewing machine will provide a straight hem in desired relationship to the previously formed hems. The degree of movement of the pusher bar affected by the lateral shift means is limited by sensing means, preferably in the form of electric eyes which respond to the presence of the cloth at a desired locus. In order to eliminate the possibility of a convexity or "belly" in the edge of the cloth due to inaccurate cutting of the rectangle of cloth from the bolt, a cutter knife is positioned adjacent the edge of the moving conveyer belt to shear off any part of the cloth extending beyond the line between the limiting positions of the front and rear lateral shift means. The oriented and trimmed piece of cloth on the conveyer belt is then fed beneath a hold-down serving to smooth the cloth on the conveyer belt and maintain same in desired position while the cloth is fed through the hemstitching sewing machine. A further straightener is arranged above the belt to insure that the cloth will lie smoothly against the belt surface, and the piece of cloth which now has three of its sides hemstitched is fed past a trimmer comb which cuts off the chain of stitches produced by the hemmer sewing machine. The conveyer belt then feeds the cloth to second positioning means serving to orient the unsewn edge of the cloth with respect to a second hemstitching machine. Similar hold-down, trimming, and tail cutting operations as previously described are performed.

An important feature of the invention resides in the fact that a single unsewn edge of the cloth to be formed into a handkerchief is oriented at a time, thus minimizing the factors to be considered were both unsewn edges hemmed simultaneously.

Another feature of the invention resides in the novel hold-down employed for maintaining the square of cloth in desired position with respect to the sewing machine heads so as to insure desired smoothening of the cloth without exerting any disruptive forces thereon.

In the accompanying drawings in which is shown a preferred embodiment of the several features of the invention, as applied to the making of handkerchiefs,

FIG. 1 is a schematic perspective view looking down on the novel automatic handkerchief making equipment,

FIG. 1*a* is a schematic flow chart illustrating the various positions of the cloth as it is being fabricated into a handkerchief by the equipment shown in FIG. 1,

FIG. 2 is a diagrammatic perspective illustration of the drive trains for the various components of the handkerchief making apparatus shown in FIG. 1,

FIG. 3 is a partial perspective view, with parts broken away, of the positioning means employed for orienting each edge of the cloth to insure its proper feeding by the conveyer with respect to the hemstitching sewing machine, the right edge positioning means seen to the left in FIG. 1 being shown,

FIG. 4 is a partial perspective view, with parts broken away, of the hold-down mechanism employed for insuring smooth feeding of the cloth along the conveyer belt, the hold-down shown to the left in FIG. 1 being shown,

FIG. 5 is an enlarged cross sectional view through the positioning mechanism showing the pusher bar, and the mechanism actuating the pusher bar to engage the cloth and orient it in desired position,

FIG. 6 is a cross sectional view taken on line 6—6 of FIG. 5, showing the details of the cam mechanism for effecting movement of the rocker arm acting on the pusher bar to move it up and down, showing the latch and stop mounted for use of the positioning mechanism on the left edge of the cloth as viewed in FIG. 1,

FIG. 7 is an enlarged detail view through the pneumatic head of the hold-down mechanism shown in FIG. 4,

FIG. 8 is an elevational view of the belly trimming cloth cutter in elevation,

FIG. 9 is a top plan view looking down at the cloth cutter of FIG. 8 showing the vacuum waste removal,

FIG. 10 is an end view of the cloth cutter of FIGS. 8 and 9,

FIG. 11 is a schematic view of the speedup mechanism employed for increasing the speed of the sewing machine at the beginning of the sewing operation to insure desired cloth tension along the line of stitching during hem formation,

FIG. 12 is a top plan view of the speedup mechanism shown in FIG. 11,

FIG. 13 is a partial detail perspective view of the improved hemming foot applied to the sewing machine,

FIG. 14 is a partial detail perspective view of the thread trimming combs employed for severing the chain of stitches produced by the sewing machine at the end of a formed hem,

FIG. 15 is a top plan view of the hem tail cutter employed for trimming the ends of the hems formed on the handkerchief,

FIG. 16 is an elevational view of the hem tail cutter of FIG. 15 taken on a cross section on line 14—14 of FIG. 15,

FIG. 17 is a schematic circuit diagram of the control circuit regulating the action of the positioning mechanism,

FIG. 18 is a schematic circuit diagram showing the control for the speedup mechanism of the sewing machine, and

FIG. 19 is a schematic circuit diagram of the control circuit for energizing the hem tail cutting knife.

Referring now more particularly to the drawings, like numerals in the various figures will be employed to designate like parts.

As shown in the drawings, the novel handkerchief forming apparatus **10** comprises a conveyer belt **15**, of the endless conveyer type, trained to ride over idler end roller **16** and driven roller **17** (see FIG. 2). A supporting table **18**, appropriately supported in conventional fashion is arranged beneath the top surface of the belt **15** between end rollers **16** and **17**.

Slidably mounted over the conveyer belt **15** for movement along the direction of movement of the belt are two edge positioning devices **25**, as best shown in FIGS. 1, 3, 5 and 6. A right edge device is first shown to the left in FIG. 1, and a second left edge device, identical to right edge device, but having its components arranged to engage the left edge of the cloth, is positioned further along the belt. Edge positioning device **25** is formed with a box-like housing carriage **26** (see FIGS. 3 and 5). A pusher bar **27** is supported on vertically movable plungers **28** and **29**. Hold down feet **30** are secured to the pusher bar at spaced distances therealong. Plunger **28** is at the front of the bar **27** (as viewed in FIG. 3), while plunger **29** is at the rear of the bar **27**. Both front plunger **28** and rear plunger **29** are secured respectively to a front rocker arm **31**, and a rear rocker arm **32**. (It will be understood that the adjectives "front" and "rear" are here employed with reference to FIG. 3.) Rocker arms **31** and **32** are pivoted respectively at their centers on pivots **33** and **34** respectively. At the end of the rocker arms **31** and **32**, on the side of their pivots opposite to that to which plungers **28** and **29** are secured, a coupling bar **37** of a box-like configuration is mounted.



Secured to coupling bar **37** at approximately the center thereof between front and rear rocker arms **31** and **32** is a roller type cam follower **40** movable along the cam surfaces **42** of fixed cam plate **41** supported on table **18** at the side of belt **15**. Upward biasing spring **45**, as best shown in FIG. 5, is extended between spring anchoring pin **46** in the top wall of carriage **26** and spring anchor **47** secured to coupling bar **37**. Spring **45** biases coupling bar **37** upwardly to constrain cam follower **40** to bear against the upper cam surface **42** of cam **41**.

A latch **50**, as best shown in FIG. 6, is pivotally secured to pivot bracket **51** on carriage **26** for engagement with the support bracket **53** of cam follower **40** to maintain same in a downward position away from upper cam surface **42** during engagement of the latch **50** with bracket **53**.

A latch spring **55** is extended between spring anchoring pin **56** on latch **50** which is in line with the pivot point of the latch. The other end of spring **55** is anchored to carriage mounted spring anchoring bracket **57** at a point in line with the pivot point of bracket **50**. As a result of this in line positioning of the spring anchoring points with respect to the pivot point of the latch **50**, it will be apparent to those skilled in the art (from a consideration of FIG. 6) that a dead center position prevails when the spring **55** is oriented to extend in line with the latch pivot point, which condition prevails when the latch is in a neutral orientation. However, should the latch be moved to either side of the neutral, to the left as viewed in FIG. 6, the latch **50** will be tripped to move upwardly to a limiting position shown in dot-dash at the right in FIG. 6. Secured to fixed cam plate **41** is a stop block **60** adjustably positioned by means of screws **61** to engage latch **50** and move same to a position against roller cam bracket **53** when the roller cam is in its lowest position, at the end of the movement of the positioning means. A latch release **65** including roller **66** secured on adjustably positioned release bar **67** is similarly secured to fixed cam plate **41** at the point on the cam plate adjacent the beginning of the movement of the positioning means **25**.

As shown in FIG. 6, latch release **65** engages the latch **50** to trip same out of engagement with roller cam **40** at the commencement of movement of the positioning device **25**.

It will be understood by those skilled in the art that movement of the positioning device housing carriage **26** along tracks **70** may readily be accomplished by means of vertical support roller **71** arranged to ride on upper flange **72** of track **70** while aligning roller **73** serves to align the positioning device **25** with respect to track **70**, as best shown in FIG. 5. As a result of the movement of positioning device **25**, cam roller **40** will move to the left as viewed in FIG. 6 to ride upwardly along the upper cam surface **42** of cam plate **41**, free of latch **50** and urged upwardly by spring **55**. At the end of the movement of the roller cam **40** along the cam surface, stop **60** will move latch **50** into engagement with the roller cam bracket **53** as shown in phantom to the left in FIG. 6 to effect engagement between the latch **50** and the roller cam **40**. Thereafter, upon return of the housing carriage **26** of positioning device **25** to the position shown in solid line in FIG. 6, the roller **40** will be maintained in a downward position, pivoting the rocker arm **31** to displace the pusher bar **27** upwardly from the material.

Lateral shifting of the pusher bar **27** to effect desired orientation of the cloth on the conveyor belt **15** is obtained by means of lateral shift piston assembly **80** as

best shown in FIGS. 3 and 5. Piston assembly **80** comprises a fixed outer housing sleeve **81** of a cylindrical configuration provided with a slot **82** in the upper surface thereof. Extending through slot **82** for longitudinal movement therein is rack **83** coupled to inner cylinder **84** for movement therewith. Inner cylinder **84** moves telescopically within outer sleeve **81** and is coupled at one end to pusher bar **27**. Outer cylinder sleeve **81** is fixedly supported with respect to carriage **26** by bracket arms **85** welded or otherwise secured to the sleeve **81** and coupled via bolt **86** to the top of housing carriage **26**. The coupling of inner cylinder **84** to pusher bar **27** is accomplished as best shown in FIGS. 3 and 5 by means of bracket **90** containing slide bushings **91** which slidably accommodate vertically reciprocating plungers **28**. Spring **92** is mounted between the upper and lower arms of bracket **90** and has its lower end fixed by means of collar **93** to plunger **28** and its upper end secured to the upper arm of bracket **90** so as to provide a cushioned coupling between the plunger **28** and the lateral shift piston assembly **89**.

Within inner cylinder **84**, an override spring **95** bears against a plug **96** closing off one end of inner cylinder **84** and a collar **97** secured to piston **98**. Piston **98** is slidably mounted for movement within inner cylinder **84** by means of piston bushings **100**, arranged at spaced intervals within inner cylinder **84**. One end of piston **98** extends outwardly through a preferably sealed end **101** of inner cylinder **84**. Secured to the free end of piston **98** is a bracket **105** supporting following roller **106** for movement in S track **107**.

The S track as best shown in FIG. 3, engages the roller **106** so that upon movement of the carriage **26** along tracks **70**, the piston will be moved to the left as shown in FIG. 3.

The movement of the piston **98**, though fixed by the contours of the S track **107**, does not produce the same amount of movement in pusher bar **27**. This is accomplished by means of electric brake **125** of a conventional type which limits the possible rotation of pinion **126** in engagement with the rack **83**. So long as the brake **125** is not energized, pinion **126** is free to rotate. However, upon energization of brake **125**, pinion **126** is maintained in a fixed position, thus preventing movement of rack **83** secured to inner cylinder **84**, which is in turn connected to pusher bar **27**. Since the rack **83** cannot move, it will be understood that pusher **27** can no longer move, notwithstanding the fact that piston rod **98** is still being moved by the motion of the roller **106** along the S track **107**. The additional movement of the piston **98** with respect to the outer housing **81** is accommodated by means of override spring **95**. It is of course apparent that S track **107** is fixedly mounted with cam plate **41** on table **18** as best shown in FIG. 5.

When the rocker arm **31** has been lifted by the movement of cam follower **40** to a lower part of cam surface **42**, the pusher bar **27** will be lifted from contact with the cloth. At this time the brake **125** is de-energized permitting override spring **95** to extend, moving the pusher bar to its limiting outward position. This movement of pusher bar **27** when it is in the raised position is guided by means of plunger roller **127** mounted on bracket **128**, riding on slideway **129** at the end of rocker arm **31**, as best shown in FIG. 5.

Supported on edge positioning carriage housing **26** are sensing means, preferably in the form of electric eyes. An actuating eye **130** is supported at the front of the carriage to sense the reflection of light from a black line on the conveyer **15**. Adjustably supported on bracket **131** which may be moved by means of adjusting screw **132** having knurled knob **133** extending outwardly from the housing as viewed to the left in FIG. 6, are forward and rear orienting eyes **137** and **138** respectively arranged adjacent the path of movement of the front and rear pusher bars as viewed in FIG. 3 to control movement of pusher bar **27**, as will be hereinafter described.

Movement of the carriage **26** along the conveyer is effected by means of carriage driving arm **140** as best shown in FIG. 1. It will be noted that a corresponding drive arm **140'** is located on the opposite side of the belt **15** (see FIG. 2). Driving arm **140** is pivoted at its lower end at **141** for movement against cam **143**. Cam **143** is eccentrically mounted on driven shaft **144** to engage pin **145** on arm **140**. Arm **140** is of a channel shaped configuration engaging a pin **147**, extending outwardly from the housing **26**. Spring **150** biases pusher arm **140** against eccentric cam **143**.

An air hose **160** is coupled to front nozzle **161** and rear nozzle **162** to direct air downwardly on the edge of a piece of cloth to be positioned.

Arranged above conveyer belt **15**, downstream of the positioning device **25** (with respect to the flow of material along the conveyer belt) is a hold down **175**.

Hold down **175**, as best shown in FIGS. 1 and 4 comprises an endless belt **176**, trained to ride over idler rollers **177**, **178** and **179** arranged respectively at the upper two corners of the belt which is trained along a trapezoidal path of travel, while idler roller **179** is at one of the lower corners of the path of travel. At the opposite lower corner of the path of travel of the belt **176** a static eliminating assembly **180** is provided, as best shown to the lower right in FIG. 4. Static eliminating assembly **180** comprises an electrically conductive brush **181**, the bristles of which are arranged in surface contact with the belt **176**. Brush **181** is electrically connected to the chassis of the equipment which is grounded in conventional fashion. Brush **181** is formed with a return bend arm **182** supporting belt idler rolls **183** and **184**. The static eliminator assembly **180** is supported by pivot link **185** pivotally anchored at **186** to the front wall of the hold down supporting framework **190**.

Hold down supporting framework **190** is formed with a box-like frame **191** having a front wall **192** which rotatably supports the spindles of the idler rolls **177**, **178** and **179**. Box frame **191** is secured to angle bars **193** and **194** which extend downwardly between pivot plates **196** and **197** respectively as shown at the lower portion of FIG. 4. Pivot plates **196** and **197** are preferably constituted by the upstanding legs of an angle bar, the shorter leg of which is adapted for securement to table **18** in conventional fashion by means of rivets, screws or the like fastening members **199**. Pivot plates **196** and **197** are formed with arcuate slots **200** having a seating notch **201** at one end thereof. Extending into this arcuate slot **200** is a slide pin **202** secured to uprights **193** and **194**. The lower end of uprights **193** and **194** may be pivoted at their lower ends to pivot plates **196** and **197**, but such pivoting is not necessary as will be made hereinafter more apparent.

A plenum weight assembly **215**, as best shown in FIGS. 4 and 7 is supported over the lower flight of idler belt **176** by means of supporting arms **216** and **217** secured to box frame **191**. Supported by the arms **216** and **217** is a plenum chamber **220** having a screen **221** at the bottom surface thereof and substantially closed on the sides and top wall thereof. Air hose **223** is coupled by a connector **224** to air supply duct **225**. A suction duct **226**, as shown in FIGS. 1 and 4 is similarly connected to plenum chamber **220**. A weight bar **230** is preferably arranged over the top surface of plenum chamber **220**, and adjustable mounting plates **231** are employed for securing the plenum assembly to the supporting arms **216**, **217**.

During normal operations, the hold down is oriented as illustrated in solid lines in FIG. 4 with air flow directed into the plenum chamber via duct **225** to depress belt **176** against the top surface of belt **15** as viewed in FIG. 7. When adjustment is desired, the suction duct **226** is energized, while duct **225** is shut and the entire assembly

is lifted to release pin **202** from notch **201** permitting movement of the assembly to the dot-dash line orientation shown in FIG. 4. At this time it is preferable to reverse the direction of air flow into the plenum chamber so as to create a vacuum in the plenum chamber **220** thereby preventing disturbance of the surface of belt **15** by the movement of belt **176** laterally thereof.

Mounted on table **18** across from hold down **175** is a hemstitching sewing machine **200** as shown in FIG. 1. It will be understood by those skilled in the art that the description of the formation of a right hem, prior to the formation of a left hem is not to be taken as a limitation, since obviously one skilled in the art may readily reverse the process to form a left hem prior to the formation of the right hem. In the formation of a right hem as the first handkerchief forming step, a sewing machine of conventional type such, for example, as the Union Special machine is provided with a hemstitching attachment as illustrated in FIG. 13. This attachment comprises a presser foot **250** formed with a needle aperture **251** permitting he passage therethrough of a needle **252** of conventional type. The foot **250** is provided with an elongated pickup tine **254** having an entry tip **255**. A ramp tine **258** is spaced from pickup tine **254** to form a guiding slot **259**. At the end of the guiding slot **259** a hem forming curler **260** is secured serving to fold the cloth passing along ramp tine **258** over pickup tine **254** prior to its contact by needle **252**. Dogs **261** and **262** are arranged to contact the underside of pickup tine **254** to feed the material therealong. It is found that a length of between one and one-eighth and one and one-quarter inches are required for these tines **254** and **258**, in order to effect desired automatic hemming operation.

Mounted in line with the path of travel of the cloth square into the foot **250** are speedup controlling sensing means **275** (see FIGS. 1, 13 and 18) here shown in the form of an electric eye which will be hereinafter more fully described.

Mounted upstream (of the path of travel of the cloth square to be formed into handkerchiefs along belt **15**) is a continuously operating belly trimming cutter **280** as best shown in FIGS. 1, 8, 9 and 10. Cutter **280** is employed to eliminate any undesired convexity or "belly" in the rectangle of cloth to be hemmed. The cutter **280** is provided with a circular knife blade **281** mounted over table **18** and aligned with the desired edge of the rectangle of cloth as positioned by the positoning device **25**. It will be understood that this desired positioning of the edge of the cloth is slightly beyond the line of travel of the stitches formed by needle **252** so that the material necessary to form the hem will be provided. Knife **281** is driven by motor **282** via transmission **283** in conventional fashion. A supporting bracket **285** secured to table **18** supports the cutter **280**. A vacuum nozzle **290** is supported on table **18** immediately adjacent the downstream end of cutter **281**, and the nozzle **290** is coupled to a vacuum source so as to pick up any material cut by the cutter **281** from the handkerchief.

Mounted downstream of the hemstitching sewing machine, over belt **15** is a straightener assembly **300**, as best shown in FIGS. 1 and 14. Straightener assembly **300** includes a plurality of spaced spreader discs **301**, **302**, **303**, **304** and **305**. Spreader discs **301–305** are mounted on supporting arms which are adjustably secured to bracket **307** extending transversely of belt **15** as best viewed in FIG. 1. Spreader rolls **301–305** rest loosely on the surface of belt **15** and by virtue of the spaced contacts with the handkerchief carried by the belt, serve to straighten the handkerchief on the surface of belt **15** as will be understood by those skilled in the art. A cross bar **310** on arm **307**, as best shown in FIG. 1, pivotally supports friction rolls **311** and **312** over which edge guide belt **313** is trained. Belt **313** frictionally contacts belt **15** or any handkerchief supported on belt **15** so that the edge of the handkerchief beneath friction belt **313** is positively guided in its movements beneath the belt **313**.



Adjacent friction belt **313**, at the side of belt **15** is a thread trimmer assembly **325**, as best shown in FIGS. 1 and 14. Trimmer assembly 325 comprises a pair of relatively laterally reciprocating sets of shearing teeth **326** and **327** of the type conventionally encountered on barbers' trimmers. These teeth **326** and **327** are mounted beneath aperture **328** formed in table **18**, as best shown in FIG. 14. A suction duct **330** is arranged beneath teeth **326** and **327** to pick up any material cut by the trimmer teeth and a blower nozzle **332** is arranged above table **18** above teeth **326** and **327** to deflect the trimmed thread downwardly betwen the relatively reciprocating sets of teeth.

A tail knife assembly **350** is arranged adjacent friction belt **313** at the side of belt **15** so as to cut off any tail of material remaining after a given hem has been formed. In forming the hem on the handkerchief, a tail T as best shown in FIG. 15 often results at the corner of a piece of cloth being formed into the handkerchief, and as is apparent, it is desirable to remove this tail T. This is accomplished in the herein disclosed embodiment of the invention by providing a tail cutter **350**, as best shown in FIGS. 1, 15 and 16, arranged downstream of the trimmer **325**. Thus, as the piece of cloth being carried by conveyer belt **15** is fed from the hemstitching sewing machine, the chain of thread is first cut by trimmer 325, and thereafter the hemmed edge is fed past tail cutter **350**. Tail cutter **350** comprises knife **351**, pivoted on the end of first class lever **352** which is mounted on pivot **353**. The opposite end of lever **352** is arranged for coupling to the armature of solenoid **354**. The armature of solenoid **354** is normally in a downward position as shown in FIG. 16. Upon energization of the solenoid **354**, the armature **355** is drawn upwardly causing knife blade **351** to move downwardly against the tail T to sever same. Energization of the solenoid **354** is accomplished by arranging the sensing device in the form of a tail sensing electric eye **360** mounted over the path of travel of the handkerchief so as to energize the solenoid when the handkerchief has passed beneath the electric eye.

As will be apparent from a consideration of FIG. 1, it will be observed that a right hand positioning device **25** has been described, arranged adjacent the infeed end of conveyer **15**, along with an associated hold down **175**, belly cutter **280**, thread trimmer **325**, and right hand hemming machine **200**, including right hand hemming foot **250**. An identical series of components arranged to form the left hand hem of the handkerchief is arranged on the downstream of the conveyer as viewed in FIG. 1.

The operation of these components is coordinated by means of drive mechanism illustrated in FIG. 2. As shown in FIG. 2, a drive motor **400** is coupled by appropriate belts and pulleys through an electric clutch **401** and transmission **402** to conveyer drive roll **17** which has been previously described as arranged at the downstream or outfeed end of the conveyer as shown in FIG. 1. Extending from electric clutch **401** is main drive shaft **405**, the rotation of which is controlled by electric brake **406** arranged on the left hand side of the apparatus as shown in FIGS. 1 and 2.

The drive to the right edge positioning means is provided by means of positioning means drive shaft **410** which is drivingly coupled by a transmission train **411**, belts **412** and **413**, bevel gear box **414** and belts **415** and **416** to main drive shaft **405**. Arranged at the right hand end of edge positioning device driven shaft **144** is an edge control cycle switch cam **420**, and a positioning device drive cam **143**. Cam **143**, as previously described, contacts cam follower pin **145** on drive arm **140**. A single revolution clutch **425** couples edge positioning drive shaft **410** to driven shaft **144**. It will be understood by those skilled in the art that the single revolution clutch, though shown schematically in FIG. 2 as two members may be

incorporated into a single unitary housing. Carriage actuating switch cam 426 along with a second drive cam 143' are arranged on the left hand side of shaft 410 as viewed in FIG. 2.

Driven simultaneously with left hand positioning device 25, is a right hand positioning device located downstream as shown in FIG. 1. This secondary drive is coordinated with the above-described drive by means of belts 433, 434 coupled to bevel gear box 414, as is apparent from the aforedescribed drive train, it will be understood that the positioning carriages are driven subject to the actuation of single revolution clutches on the edge positioning drive shafts.

The hemstitching sewing machines 200 are driven by a drive belt 450 (the right hand hemstitcher here being described), which is coupled by a universal joint 451 to main drive shaft 405 through speed control mechanism 455 as shown in greater detail in FIGS. 11 and 12. Speed control mechanism 455 includes a yoke 460 pivotally mounted on base 461 and rotatably supporting three wedge shaped rolls 462, 463 and 464. Center roll 463 is loosely mounted for lateral shifting on roll shaft 465 as best shown in FIG. 12. Yoke 460 is coupled by a connecting rod 467 to bell crank lever 468 supporting cam following roller 469 in contact with speed-up cam 470. Driving belt 471 extends between center roll 463, side roll 464 and main drive shaft 405, while driven belt 472 extends between center roll 463 and roll 462. As will be apparent from a consideration of the drawings, movement of yoke 460 to the left as viewed in the drawings will cause driving belt 471 to move downwardly along the wedge surfaces between center roll 463 and roll 464 thus reducing the effective diameter of rolls 463 and 464 with respect to belt 471 and hence increasing the diametral ratios between drive shaft 405 and shaft 465 which increases the speed of rotation of roll shaft 465, assuming that shaft 405 continues to rotate at the same speed. This increase in speed is further magnified by virtue of the fact that driven belt 472 rides up along the wedge surfaces between center roll 463 and outer roll 462, thus effectively increasing the diametral ratio between shaft 465 and the shaft containing the universal joint 451 as shown in FIG. 1. This increase in speed is initiated in order to insure proper tensioning of the material as the hem is being started. It is found that if the sewing machine pulls with a limited tension on the material as the hem is being formed, any tendency of bunching between stitches is eliminated, as will become hereinafter more apparent.

Control of the operation of the aforedescribed components is attained by means of appropriate control circuitry such as shown schematically in block diagram in FIGS. 17, 18 and 19.

Thus, operation of the edge positioning means 25 is initiated by the sensing means in the form of electric eyes 130. Edge positioning actuating electric eye 130, as previously noted, is aligned with a black strip on the conveyer surface. When a handkerchief is placed on the conveyer, the light reflected from the black strip becomes considerably more intense due to the relatively light color of the handkerchief, usually white. This reflected light energizes electric eye 130 to produce a signal (see FIG. 17). This reflected light energizes electric eye 130 to produce a signal that energizes single revolution clutch solenoid 533 in the following manner. Switch 532 is normally open and is closed by the action of the raised lobe of cam 426 which occurs when carriage 25 is at its initial position. Switch 531 is normally open and is closed by contact with the raised lobe of cam 426. When the edge control carriage 26 is in its normal start position, cam 426 is in such position as to operate switch 532 and close its contacts. When eye 130 receives a white signal and edge control carriage 26 is in its initial start position, the clutch solenoid 533 is energized and single revolution clutch 425, 425' turns cam 426, which resets the relays in relay control box 534 for the next cycle. The relay control box 534 contains two latching relays plus a power relay that requires the electric eye 130 to see black before white so that actuating eye 130 will not be energized unless definitely separate pieces of cloth are present on the conveyer. Thus, when the electric eye 130 detects the presence of a piece of cloth on the conveyer belt 15, if the carriage 26 is in its initial position and if eye 130 has first seen black, solenoid 533 is energized causing engagement of the clutch plates of single revolution clutch 425, 425' to permit the edge positioning carriage 26 to be driven by driving arms 140. Clutch 425, 425' effects operative engagement between drive shaft 410 and driven shafts 144, 144' during only a single cycle of rotation of the cam 426, as will be apparent to those skilled in the art.

Control of the operation of the edge positioning pusher bar 27 is accomplished by means of electric eyes 137 and 138 respectively. Edge control cam 426 is rotated as the result of the rotation of shaft 144. Upon rotation of cam 420, normally open switch 540 is closed during the cycle of contact of the high portion of cam 420 with the switch arm as shown schematically in FIG. 17. When switch 540 is closed, the action of electric eyes 137 and 138 is brought into play by permitting coupling of the circuits of the electric eyes 137, 138 with the electric brakes 125. A black band is arranged on the table 18 adjacent the edge of the conveyer belt, and the reflection of light from the black band is perceived by the electric eyes 137 and 138.

When the edge positioning carriage 26 beings to move, the pusher bar 27 will be depressed against the cloth sensed by the actuating eye 130 due to the rocking of arm 131 produced by cam plate 41 (see FIG. 3). As the pusher bar 27 contacts the cloth, the movement of roller 106 in S track 107 shifts the pusher bar 27 laterally. This lateral shift is limited by the electric brakes 125. When forward eye 137 senses the presence of cloth beneath it, electric brake 125 controlling the front part of busher bar 127 is energized limiting movement of the front part of the pusher bar. Similarly, when rear eye 138 senses the presence of cloth beneath it, the signal output of the rear eye is transmitted via its amplifier to the rear electric brake stopping the motion of the rear of the pusher bar 27.

Control of the operation of the speedup mechanism is accomplished as indicated in FIG. 18. Here an electric eye 275, as shown arranged adjacent the path of travel of the cloth upstream of the hemstitching sewing machines 200 is provided. When electric eye 275, which also is arranged to normally scan a black area, senses the presence of a lighter surface beneath it such as would be produced by the presence of a piece of cloth covering the black line, the speedup mechanism 455 is actuated. This is accomplished, as shown schematically in FIG. 18, by feeding the signal of the electric eye 275 to solenoid 479 which energizes single revolution clutch 480 to impart rotation to cam 470, as shown in FIG. 2. The rotation of cam 470 produces the speedup heretofore described. Clutch 480 is a single revolution type and is reset through relay control 481 by the closing of normally open contacts of switch 485 actuated by the raised lobe of cam 470.

Control of operation of the tail cutter 350 is similarly accomplished by means of an electric eye 360 as best shown in FIGS. 16 and 19 which is amplifier coupled to solenoid 354 to effect desired operation of the cutting knife 351, as heretofore described.

It will be apparent to those skilled in the art that a single description has been given of positioning device 25, hold down 175, belly cutter 280, and tail cutter 350. In the illustrated embodiment of the invention each of these components will, however, be duplicated, since the invention is intended for use for forming two opposed hems on a piece of cloth.

In use, a conveyer belt is set up of a span sufficient to accommodate all of the aforedescribed components in

an arrangement which is illustrated schematically in FIG. 1. Adequate spacing between the components is of course provided to permit the cloth to pass between the operative components without the action of one component on the cloth interfering with the operation of another component. The conveyer belt **15** is formed with a black line extending longitudinally along its length aligned with an electric eye **130** at the front of each positioning carriage. Similarly, a black line is formed at the side of the conveyer belt on table **18**. The electric eyes utilized as sensing means are provided with their own light source, the output of which is intended to be reflected back to the sensing eye. In the described arrangement, it will be understood by those skilled in the art that where the light emitted by the associated electric eye strikes the black surface, the amount of reflection will be considerably less than when a lighter surface such as produced by the cloth of a handkerchief or the like is passed over the black surface.

Squares of cloth to be formed into handkerchiefs are preferably cut from bolts of cloth which have their opposed edges hemmed. Thus, a square of cloth having two opposed hemmed edges is provided which requires the hemming of the other two opposed edges prior to the formation of the handkerchief. This may be most readily accomplished by utilization of the herein disclosed equipment. The square of cloth is positioned on the conveyer belt **15** with the previously hemmed edges arranged transversely to the path of travel of the conveyer belt. When the leading edge of the cloth passes beneath actuating electric eye **130**, the light reflected from the surface of the relatively light cloth will energize the circuit shown schematically to the right in FIG. 17. Upon energization of this circuit, the carriage **26** of positioning device **25** will be driven by means of driving arm **140** to move along the path of travel of the conveyer belt. The speed of movement of carriage **26** is equal to the speed of movement of the belt. This coordination of speeds of movement is accomplished by utilizing appropriate gear and belt ratios in the drive mechanism shown in FIG. 2 plus correct cam configuration. As positioning carriage **26** moves along with the cloth on the belt, cam follower roll **40** moves along cam surface **42** in fixed cam plate **41**, as best shown in FIG. 3. This movement of the cam follower roll **40** is constrained against the top surface **42** of the cam plate **41** by means of spring **45**, which levers rocker arm **31** to depress pusher bar **27** down against the surface of the cloth as best shown in FIG. 5. As the pusher bar **27** contacts the cloth, the movement of roll **106** in S track **107** laterally shifts the pusher bar, to the right as shown at the left in FIG. 1. This lateral shifting is limited by electric eyes **137** and **138**. As previously noted, electric eyes **137** and **138** are arranged to sense the reflection from a black surface on table **18**. When the handkerchief cloth is forced by the pusher bar **27** to a position beneath the electric eyes **137, 138**, the intensity of light sensed by these electric eyes generates a signal which in turn is employed to energize brakes **125**. Energization of brakes **125** immediately stops the movement of pusher bar **27** until the cam follower **40** has moved the pusher bar out of contact with the cloth. At this time it will be understood by those skilled in the art that the cloth is oriented in desired position to permit hemming.

In the illustrated embodiment of the invention, a belly cutting knife **280** is provided to insure desired linearity of the edge of the cloth to be formed into a hem. Since the cutting of the cloth from the bolt often produces a convexity or "belly" which would produce an undesired bulkiness in the hem, the passage of this edge to be hemmed beneath the knife blade **281**, as best shown in FIGS. 8–10, will result in a trimming of any undesired excess of material. The material trimmed is sucked into vacuum conduit **290** as best shown in FIG. 9.

The trimmed and oriented cloth is then fed beneath hold down **190** as best seen in FIGS. 1 and 4, and simultaneously engaged by the feed dogs of the hemstitching sewing machine.

As the edge to be hemmed approaches the hemstitching sewing machine, speedup electric eye **275** senses the presence of the cloth and energizes the speedup to increase the rate of operation of the sewing machine so as to insure formation of a smooth hem in the fashion heretofore described.

Speedup control electric eye **275** positioned in the path of travel downstream of the belly cutter **280**, as best shown in FIG. 1, senses the approach of a handkerchief to the sewing machine **200**. As a result of this sensing, solenoid **479** is energized as indicated in FIG. 18 to actuate single revolution clutch **480** (see FIG. 2) to drive speedup control cam **470**. The rotation of cam **470** effects a speedup of operation of the sewing machine **200** via the linkage **455**. Simultaneously with the speedup of the sewing machine **200**, the leading edge of the handkerchief to be hemmed approaches entry tip **255** of pickup tine **254** of the hemming machine pressure foot **250** as shown in FIG. 13. The feed dogs **261** and **262** which, as previously described, have been increased in length over that conventionally found on a hemstitching sewing machine and have engaged the leading edge of the cloth and since the sewing machine is operating at a speed producing a relatively faster rate of movement of the cloth through the machine than is normally provided by the movement of the cloth on the conveyer belt **15**, a slight tension will be produced in the edge of the cloth as it is being fed through the sewing machine **200**. Curler **260** brings the free positioned edge of the cloth up over itself, whence it is engaged beneath tine **254** by the reciprocation of needle **252** which forms the desired hemstitch immediately beneath the end of the tines **254** and **258** as viewed in FIG. 13.

As the hemmed edge of cloth leaves the sewing machine, while it is still being held down by friction belt **313**, the thread forming the chain of stitches, which is as is apparent relatively lighter in weight than the cloth itself, is blown down between trimmer comb teeth **326** and **327** and severed from its source in the sewing machine.

In its passage beneath the edge guide belt **313** the formed hem moves beneath electric eye **360** controlling the operation of tail cutter **350**. It will be noted that electric eye **360** which normally scans a black area adjacent to belt **15** is aligned with the belt at a point on the handkerchief beyond the line of the hem, as best shown in FIG. 16. Thus, electric eye **360** senses the normally desired end of the handkerchief. In order to insure that the hem does not extend beyond this normally desired end, the electric eye is arranged in the circuit to energize the solenoid **354** to move cutting knife **351** so that it chops off any tail of a hem in substantial alignment with the desired end of the handkerchief.

During the passage of the handkerchief past the belly knife **280**, and the sewing machine **200**, it is securely held in position with respect to the conveyer belt by means of hold down **175**, operating as aforedescribed, and as best shown in FIG. 1. As is understood by those skilled in the art, any static electricity accumulating on the surface of the belt **176** is eliminated by means of static electric eliminator **180** as best shown in FIG. 4. As previously described, idler belt **176** of hold down **175** is maintained in contact with the cloth on belt **15** by means of the air pressure built up in plenum chamber **270** and weight **230**. During periods of required adjustment, the hold down assembly **175** may be removed from contact with the belt in the fashion previously described and illustrated in FIG. 4.

After one previously unhemmed edge of the cloth has been sewn as described, the cloth continues its movement from the tail cutter **350** associated with the first sewing machine **200** and the above-described sequencee of operation is reinstituted with respect to a duplicate set of components shown downstream with respect to conveyer belt

15. Thus, a second edge positioning device, this time oriented to position the left hand edge of the cloth as viewed in the drawings is arranged to engage the cloth and position its edge along a desired line of travel. The conveyer belt 15 then carries the cloth along to permit duplicates of the aforedescribed equipment to effect hemming of the opposite edge in the sequence described.

It will be seen from the above disclosure, that an integrated synchronized continuous apparatus has been provided serving to automatically hemstitch a rectangle of cloth to form a desired article of manufacture such as a handkerchief or the like. The apparatus as described is intended for use in heming opposite edges of a rectangle of cloth, but it will be apparent to those skilled in the art that by employing the teachings of the instant invention, as many edges of the cloth as are desired, may be hemmed, sewn or otherwise stitched.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. Equipment for forming hemstitched rectangular articles of manufacture such as tablecloths and handkerchiefs having at least one unhemmed edge, said equipment comprising conveyer means having a surface upon which a rectangle of cloth geometrically similar to the shape of that of the desired article of manufacture may be placed, positioning means mounted over said conveyer means adapted to engage an unhemmed edge of the cloth to position same in an orientation such that the unhemmed edge of the cloth extends slightly beyond the edge of the conveyer means, means to drive said positioning means independently of the movement of said cloth by said conveyer means, hemstitching means arranged in the path of travel of the unhemmed edge of cloth, said hemstitching means being oriented to extend along the edge of the conveyer means and hold down means cooperating with said conveyer means to engage the cloth placed on the conveyer means while the hemstitching means operates upon said cloth.

2. Equipment as in claim 1 in which speedup means are associated with said hemstitching means to increase the relative speed of the edge of the cloth to be hemmed through the hemstitching means with respect to that portion of the cloth held down on the conveyer means, whereby a slight tensioning of the sewn portion of the cloth will be produced to eliminate bunching of the hemmed portion.

3. Equipment as in claim 1 in which belly cutting means are arranged between said positioning means and said hemstitching means along the path of travel of the oriented edge of the cloth to cut off any convexity of the cloth along its edge to be stitched.

4. Equipment as in claim 1 in which tail cutting means are arranged adjacent the conveyer means downstream of the hemstitching means, said tail cutting means adapted to sever the cloth at the desired end of a hemstitched edge to provide a finished effect.

5. Equipment as in claim 1 in which said hold down means comprise idler means movable over the top surface of said conveyer means, at the same rate of speed as said conveyer means to sandwich the cloth placed on said conveyer means and maintain same in a secure position.

6. Handkerchief making means comprising conveyer means on which a rectangle of cloth hemmed on two sides thereof is adapted to be placed with the hemmed sides of the cloth extending transverse to the direction of travel of the conveyer means, edge positioning means reciprocably mounted over said conveyer means for movement therealong, said edge positioning means being adapted to engage a right hand unhemmed edge of the cloth to orient same to a position extending over the edge of said conveyer means, hemstitching means in the path of travel of the oriented edge of the cloth extending over the edge of the conveyer means, said hemstitching means being adapted to engage the oriented edge of the cloth and forming a hem therein, hold down means cooperating with said conveyer means to hold the cloth in desired position on the conveyer means as the cloth is fed through the hemstitching means, left edge positioning means reciprocably mounted over said conveyer means, said left edge positioning means being adapted to engage said cloth to orient the left unhemmed edge thereof in a position extending over the left edge of the conveyer means, hemstitching means positioned adjacent the left edge of the conveyer means adapted to engage the oriented left edge of the cloth to form a hem, and hold down means positioned over said conveyer means opposite said last named hemstitching means adapted to engage the cloth to maintain same in secure position on said conveyer means as the cloth is fed through said last named hemstitching means.

7. A method for forming handkerchiefs, said method comprising the steps of cutting a rectangle of cloth slightly larger in area than that of the desired handkerchief to be formed with a shape geometrically similar to that of the handkerchief, the difference in area between the cut piece of cloth and the handkerchief being equal to that which will be taken up in the formation of desired hems, placing the cut piece of cloth on a conveyer belt, clamping the piece of cloth and then effecting movement of the cloth so that an edge thereof to be hemmed extends over the side of the conveyer belt, releasing the clamping means while feeding the positioned edge of cloth on the conveyer belt through a hemstitching sewing machine while simultaneously holding down the cloth on the conveyer belt as it is being fed through the hemstitching sewing machine, and cutting the thread of the sewing machine as the hemmed edge of cloth leaves the machine.

8. A method as in claim 7 in which a cutting step is performed on the positioned edge of the cloth prior to the step of feeding the cloth through a hemstitching machine, said cutting step being performed by feeding the positioned edge of cloth past cutting means arranged adjacent the path of travel of the edge of positioned cloth extending over the edge of the conveyer belt before the leading edge of the positioned cloth reaches the hemstitching sewing machine, said cutting means trimming any convexity in the positioned edge of the cloth.

9. A method for forming a rectangular segment of cloth with hemstitched edges such as a tablecloth and handkerchief, said method comprising the steps of cutting from a bolt of cloth having opposite edges hemstitched, rectangles of cloth geometrically similar in shape to that of the desired finished product, placing the cut pieces of cloth on a conveyer belt with opposed hemstitched ends thereof extending transversely to the path of travel of the conveyer belt, clamping the piece of cloth against the conveyer belt adacent one unhemmed edge thereof and then effecting movement of the cloth so that such unhemmed edge will extend over the edge of the conveyer belt, feeding the unhemmed positioned edge of cloth on the conveyer belt through a hemstitching sewing machine, while simultaneously holding down the cloth on the conveyer belt as it is being fed through the hemstitching sewing machine, severing the thread foming the hemstitching from the sewing machine source, then clamping the piece of cloth against the conveyer belt adjacent the other unhemmed edge thereof and effecting movement of the cloth so that said other unhemmed edge will extend over the opposite edge of the conveyer belt, feeding this newly positioned edge

through a hemstitching sewing machine, and severing the hemstitching threads from its source in the sewing machine, whereby all edges of the cloth carried by the conveyer belt will now be hemstitched.

10. Handkerchief making apparatus comprising a conveyer belt on which a rectangle of cloth is adapted to be placed, an edge positioning carriage reciprocably mounted over said conveyer to travel thereover for a fixed limited distance, a pusher bar carried by said carriage, a mounting on said carriage supporting said pusher bar for vertical movement against said conveyer, lateral shifting means coupled to said pusher bar to effect limited lateral movement thereof, a hemstitching sewing machine aligned at a spaced distance from the edge of said conveyer belt between the edge of the conveyer belt and the limit of movement effected by said pusher bar, and a thread trimmer for severing the thread employed in effecting the hemming of the cloth.

11. Apparatus as in claim 10 in which said mounting supporting said pusher bar for vertical movement with respect to said carriage comprises a rocker arm pivoted as a first class lever in said carriage, one end of said lever being coupled to said pusher bar, and the other end of said lever being coupled to a cam following roller and a fixed cam plate guiding said roller to effect levering of said rocker arm upon movement of said carriage along with said conveyer belt.

12. Apparatus as in claim 10 in which said lateral shifting means comprises a piston assembly, a cam follower at one end of said piston assembly, a coupling between the other end of said piston assembly and said pusher bar, a cam fixedly supported adjacent said conveyer belt, said cam effecting lateral movement of said piston assembly upon movement of said carriage, and a brake limiting the lateral movement of said piston assembly.

13. Apparatus as in claim 10 in which a hold down is provided over said conveyer belt adapted to engage any cloth positioned thereon as it is moving through said hemstitching sewing machine, said hold down comprising an idler belt, idler rollers supporting said idler belt, and an air plenum over said idler belt.

14. Handkerchief making apparatus comprising a conveyer belt on which a rectangle of cloth hemmed on two sides thereof is adapted to be placed with the hemmed sides of the cloth extending transverse to the direction of travel of the belt, right edge positioning means slidably mounted over said belt for movement therealong, a pusher bar mounted on said positioning means adapted to move against such cloth, downward forcing means on said positioning means adapted to move said pusher bar down against the cloth on said conveyer, front lateral shift means on said positioning means shifting the front of said pusher bar laterally, rear lateral shift means on said positioning means shifting the rear of said pusher bar laterally, limiting means coupled to said front and rear lateral shift means to limit the movement of the pusher bar when it is in a downward position, an idler hold down belt above said conveyer belt adapted to maintaining the positioned cloth thereon, an air plenum chamber above said idler belt, a sewing machine having a hemmer attachment arranged adjacent the edge of said belt and adapted to engage the cloth thereon after it has been positioned and to form a hem in the oriented right hand edge of the cloth, said sewing machine arranged adjacent said hold down means, and thread cutting means adjacent said belt downstream of said sewing machine to sever the thread forming the hem.

15. Equipment for forming hemstitched rectangular articles of manufacture such as table cloths and handkerchiefs, said equipment comprising conveyer means having a surface upon which a rectangle of cloth geometrically similar to that of the shape the desired article of manufacture may be placed, positioning means mounted over said conveyer means, said positioning means comprising carriage means reciprocably mounted to ride along with said conveyer means for a limited portion of the movement thereof, pusher means on said carriage means adapted to engage the cloth adjacent an unhemmed edge thereof to orient such unhemmed edge so that it extends slightly beyond the edge of the conveyer means and lateral shift means on said carriage means moving said pusher means laterally after engagement of the cloth to effect such desired orientation of the edge thereof, hemstitching means arranged in the path of travel of the unhemmed edge of cloth, said hemstitching means being oriented to extend along the edge of the conveyer means and hold down means cooperating with said conveyer means to engage the cloth placed on the conveyer means while the hemstitching means operates upon said cloth.

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