March 8, 1966 J. HINKO ETAL 3,238,904

MULTI-NEEDLE EMBROIDERY MACHINES

Filed May 24, 1962 4 Sheets-Sheet 1

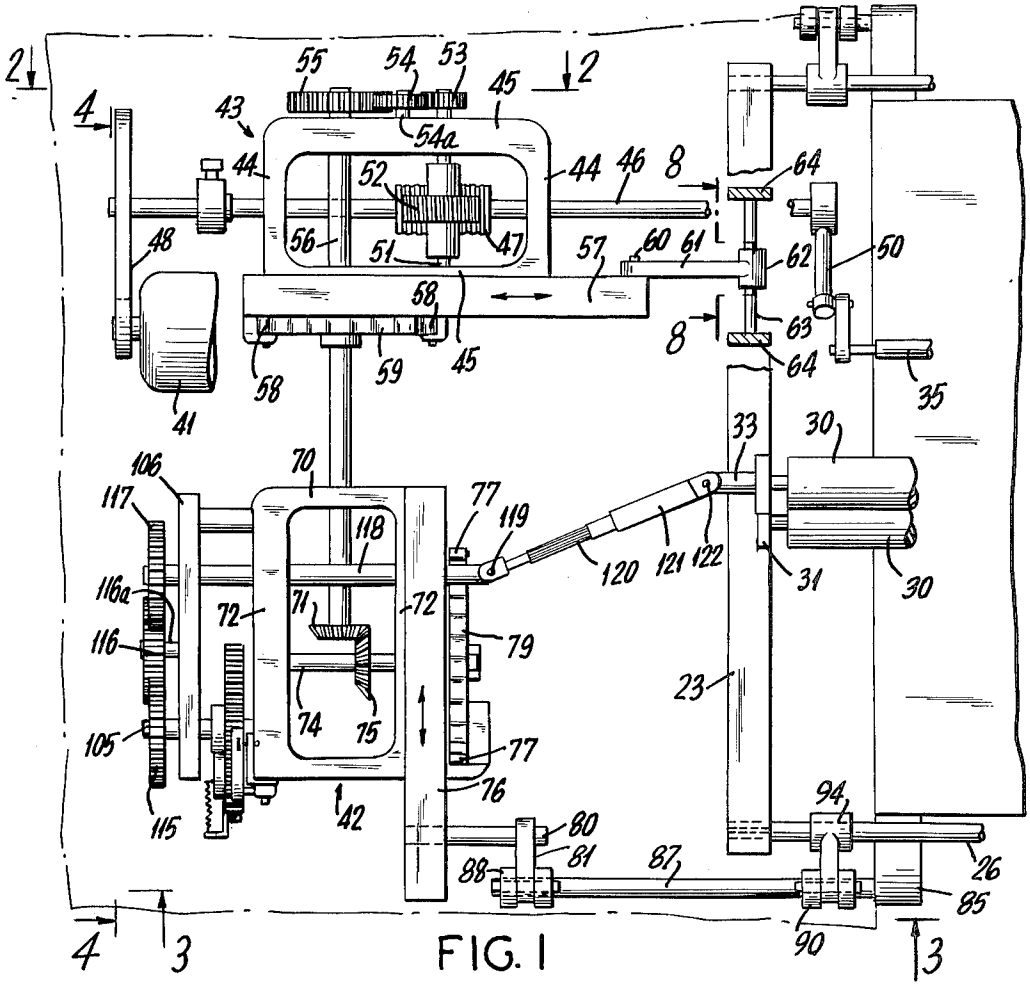


FIG. 1

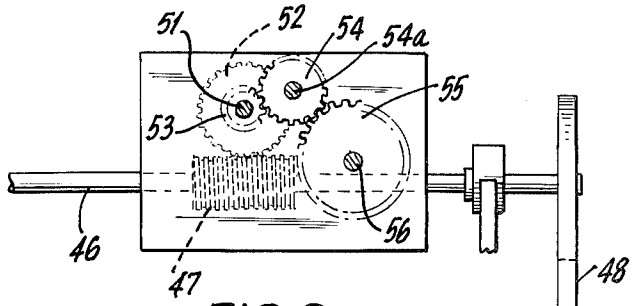


FIG. 2

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Filed May 24, 1962 4 Sheets-Sheet 2

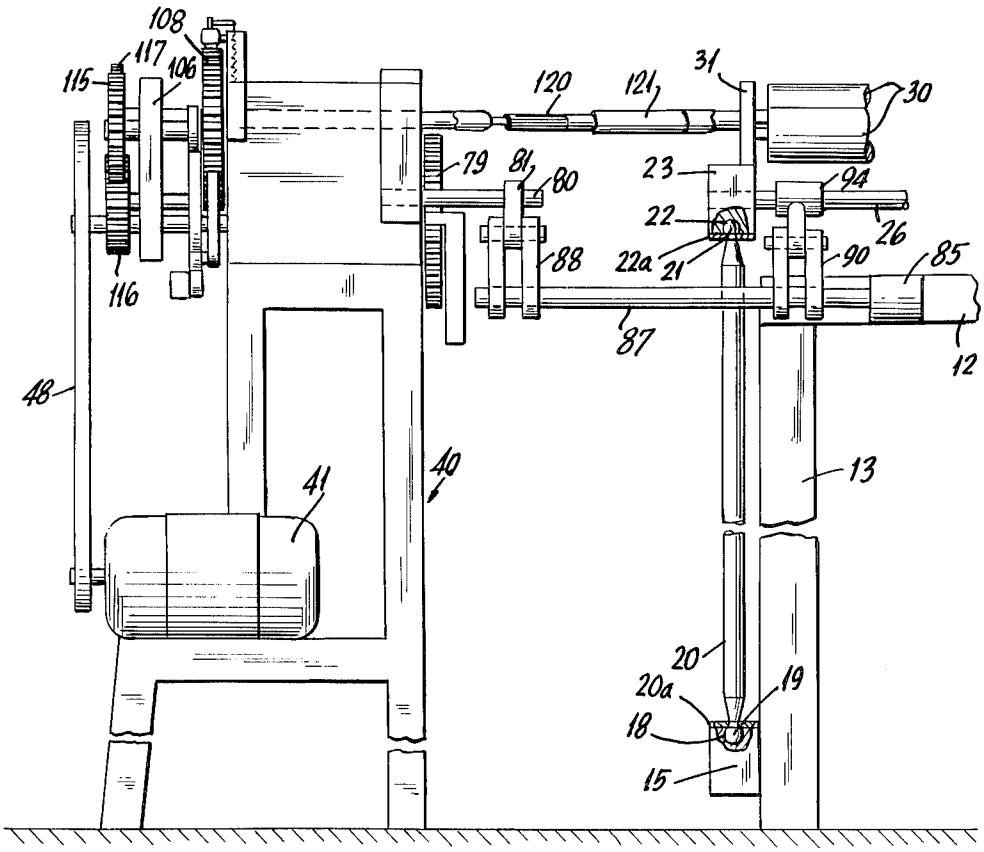


FIG. 3

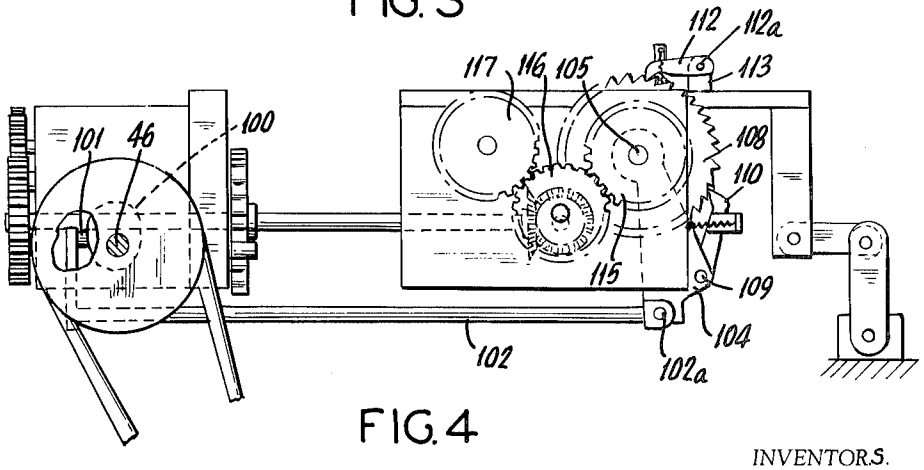


FIG. 4

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MULTI-NEEDLE EMBROIDERY MACHINES

Filed May 24, 1962 4 Sheets-Sheet 3

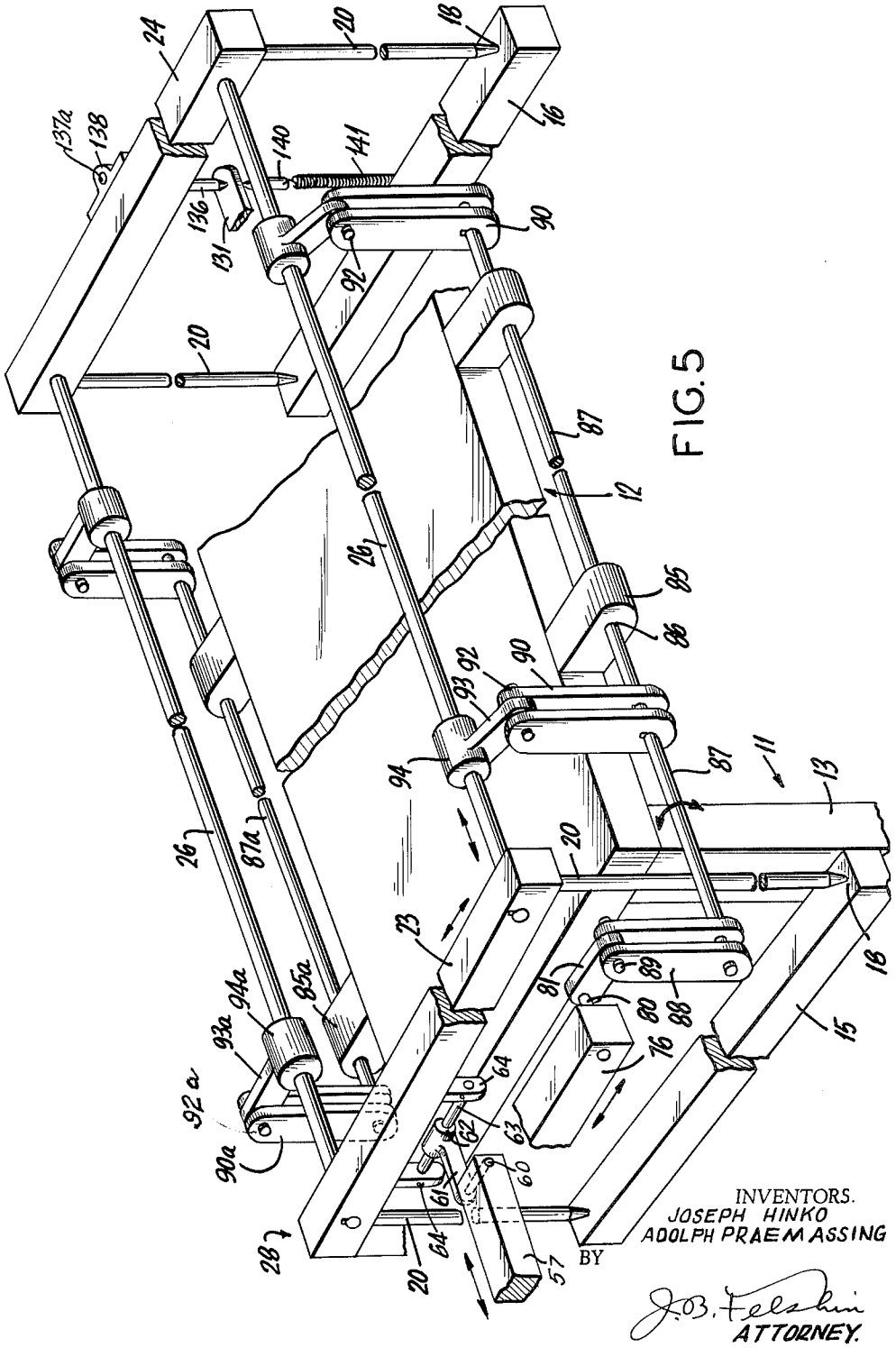


FIG. 5

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MULTI-NEEDLE EMBROIDERY MACHINES

Filed May 24, 1962 4 Sheets-Sheet 4

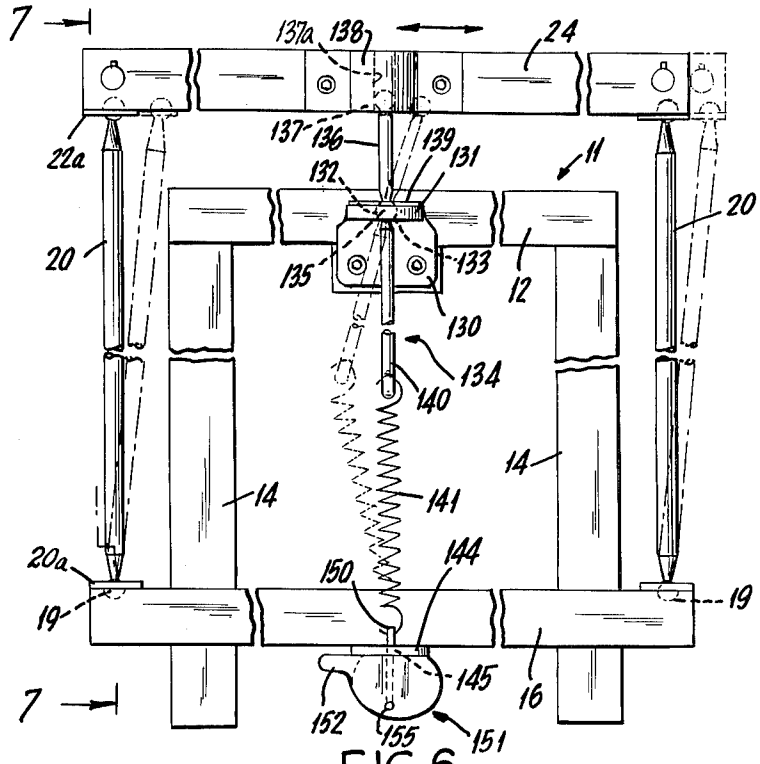


FIG. 6

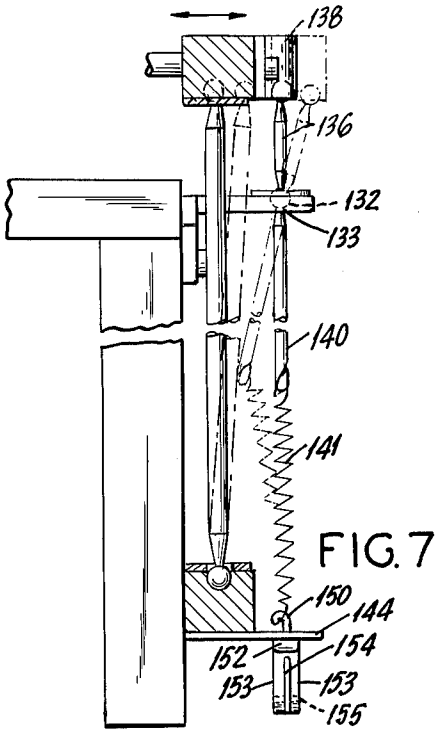


FIG. 7

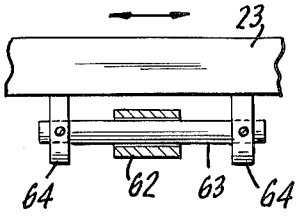


FIG. 8

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United States Patent Office 3,238,904 Patented Mar. 8, 1966

3,238,904

MULTI-NEEDLE EMBROIDERY MACHINES

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Filed May 24, 1962, Ser. No. 197,385
6 Claims. (Cl. 112—118)

This invention relates to multi-needle embroidery machines.

One object of this invention is to provide in a highly improved machine of the character described, means to permit the cloth supporting carriage to have greater movement longitudinally as well as transversely, relative to the fixed support on which the needle actuating mechanism of the machine is mounted.

Another object of this invention is to provide in a machine of the character described, means to bias the carriage to normal position from any position to which it is moved.

Yet another object of this invention is to provide a strong, rugged and durable machine of the character described which shall be relatively inexpensive to manufacture, which shall be smooth and positive in operation, which will permit a greater variety of embroidery designs and which shall yet be practical and efficient to a high degree in use.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts, which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

In the accompanying drawings in which is shown an illustrative embodiment of this invention,

FIG. 1 is a top plan view of one end of a machine embodying the invention;

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is one end view of the machine of FIG. 1;

FIG. 4 is a cross-sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is a perspective view of the machine with parts broken away and in cross-section;

FIG. 6 is an opposite end view of the machine of FIG. 1;

FIG. 7 is a cross-sectional view taken on line 7—7 of FIG. 6; and

FIG. 8 is a cross-sectional view taken on line 8—8 of FIG. 1.

Referring now in detail to the drawing, **10** designates a multi-needle embroidery machine embodying the invention. Multi-needle embroidery machines are well known in which a carriage supporting cloth or other sheet material to be stitched, is moved both longitudinally and transversely while the material is fed step by step and multi-needle mechanisms mounted on a fixed support stitch the cloth, with provision to stop the movement of the carriage while the needles go down into the cloth or other material to be stitched, so as not to bend or break the needles.

One difficulty with prior machines of this kind has been that the stroke of the carriage, both longitudinally and transversely, has been relatively short. As will appear hereinafter the carriage herein has considerable stroke due to certain changes and improvements made in prior machines.

The machine **10** comprises a stand, frame, table or support **11** having a table top **12** supported on corner legs **13** at one end and on corner legs **14** at the opposite end.

Legs **13** are interconnected by a horizontal cross-brace **15** while legs **14** are interconnected by a horizontal cross-brace **16**.

The multi-needle stitching mechanism (not shown) is supported on the frame **11**. It may be of usual construction.

The ends of cross-braces **15** and **16** are formed with ball sockets **18** receiving balls **19** at the lower end of universal connector rods **20**. Hold down plates **20***a* keep the balls **19** in sockets **18**. Rods **20** extend upwardly to a level above the level of table top **12**. Connector rods **20** have balls **21** at their upper ends received in ball sockets **22** in a pair of transverse horizontal, parallel, coplanar cross-bars **23** and **24**. Hold down plates **22***a* keep the balls **21** in their sockets **22**. Said cross-bars **23**, **24** are interconnected by a pair of parallel, longitudinal rods **26** fixed to said cross-bar in any suitable manner, thereby forming a horizontal carriage **28**.

Due to the universal joints between the rods **20**, the carriage **28** and the cross-braces **15**, **16**, said carriage may move longitudinally and transversely simultaneously. Cloth or other sheet material, or padding material to be stitched, may be fed by means of rollers **30** mounted on the frame **28**, by means of well known bracket means **31**. One of the rollers has a shaft **33** which is driven or rotated in the manner hereinafter explained. The means for interconnecting the rollers **30** for simultaneous feeding of the material to be stitched, is not shown since it is well known.

It will be noted that the cross-braces **15**, **16** are near the lower ends of the legs **13**, **14** respectively, whereby to permit considerable movement of the frame **28** in any horizontal plane due to the length of the connector rods.

Means is provided to move the carriage **28** as well as to rotate the rollers **30** and operate the needle mechanism (indicated by numeral **35**). To this end, there is provided a second stand **40** which may be fixed to stand **11** if desired. Stand **40** is located beyond one end of stand **11** and supports a motor **41** at a lower level, a box **42** at a higher level, and a second box **43** at right angles to and spaced from box **42**, both boxes being located above table top **12** and beyond one end thereof.

Box **43** has a pair of end vertical transverse walls **44** connected by longitudinal vertical walls **45**. Walls **44** support a rotary shaft **46** carrying a worm **47** within the box. Worm **47** may have larger feed angle or helical tooth portions, and smaller no-feed angle or circular tooth portions. Shaft **46** carries a pulley belted to motor **41** by belt **48**. Shaft **46** is connected by an eccentric connection **50** to oscillate the needle mechanism **35** in the well known manner.

Journalled in walls **45** is a cross-shaft **51** carrying a worm wheel **52** meshing with worm **47**, thereby imparting an intermittent rotation to shaft **51** for the purpose hereinafter appearing. Shaft **51** carries pinion **53** which meshes with pinion **54** on shaft **54***a*, journalled on one wall **45**, and which in turn meshes with another pinion **55** on a shaft **56** located above shaft **46**, and which is journalled in walls **45** of box **43**. Slidably mounted on suitable tracks on the other wall **45** of box **43**, is a slider **57** carrying followers **58**. On shaft **56** is a cam **59** disposed between and engaging the followers. As shaft **56** rotates, the cam **59** reciprocates the slider **57**.

Pivoted to slider **57** on pin **60** is a link **61** carrying a sleeve **62** slidable on a shaft **63** supported on brackets **64** fixed to the underside of bar **23**. As slider **57** reciprocates, link **61** will reciprocate the frame **28**, while allowing transverse movement of the frame. Such movement is permitted because sleeve **62** slidably receives the shaft **63**.

Shaft **56** is also journalled in one of the end walls **70** of box **42**, and carries a bevel gear **71**. End walls **70** are interconnected by transverse walls **72**. Journalled in walls **72** is a shaft **74** carrying a bevel gear **75** meshing with gear **71**. Slidably mounted on one wall **72** of the box is a slider **76** which reciprocates on suitable tracks,

in a direction at right angles to the direction of sliding movement of slider **57**. Slider **76** carries followers **77**. Shaft **74** carries a cam **79** disposed between said followers **77**. As cam **79** rotates, the slider **76** will reciprocate transversely.

Fixed to slider **76** is a pin **80**. Pivoted to pin **80** is a link **81**. Fixed to the table top **12** are lugs or projections **85** formed with horizontal, aligned bores **86**. Extending through said bores **86** is a horizontal rotary, non-slidable shaft **87** fixed to links **88**, which extend upwardly and are pivoted at their upper ends by pivot pin **89** to the outer end of link **81**. Link **81** has one end sandwiched between links **88**. It will now be observed that as slider **76** reciprocates, shaft **87** will oscillate about its axis.

Fixed to shaft **87** are spaced pairs of spaced arms **90** extending upwardly and carrying at their upper ends, pins **92**. Sandwiched between each pair of arms **90** and pivoted to pin **92** is a link **93** extending inwardly and being provided at its inner end with a sleeve **94** through which slidably extends one of the longitudinal rods **26**.

Lugs **85***a* extend from the opposite side edge of table top **12**. Journalled in said lugs is a longitudinal shaft **87***a* to which are fixed arms **90***a* carrying pins **92***a* at their upper ends.

Pivoted to pins **92***a* are links **93***a* provided with sleeves **94***a* through which the other longitudinal rod **26** slidably passes.

It will now be understood that as slider **76** is reciprocated and shaft **87** oscillated, arms **90** will reciprocate the carriage **28** transversely, while allowing longitudinal movement of the carriage. This latter movement is permitted because rods **26** may slide in sleeves **94** **94***a*. Arms **90***a* will oscillate with the oscillation of arms **90** to balance the movement of the carriage.

Means is provided to intermittently rotate shaft **33** in the same direction, as the carriage is reciprocated longitudinally and transversely.

To this end shaft **46** carries a cam **100** which engages lug **101** on a connector **102** pivoted as at **102***a* to the lower end of a crank **104** pivoted in a shaft **105** journalled on wall **106** fixed to one wall **72** of box **42**, in spaced parallel relation thereto. Thus, as shaft **46** rotates, crank **104** will oscillate about shaft **105**. On said shaft is a ratchet wheel **108**. Pivoted to crank **104**, as at **109** is a pawl **110** engaging the ratchet wheel **108** and spring pressed thereagainst. Oscillation of crank **104** will hence cause step by step advance of ratchet wheel **108**. A pawl **112** pivoted as at **112***a* to bracket **113** on the box **42** is spring pressed against the ratchet wheel and prevents back rotation of the ratchet wheel.

Fxed to the ratchet wheel **108** for rotation therewith is a pinion **115** meshing with a pinion **116**, fixed on a shaft **116***a* journalled in wall **106**. Pinion **116** meshes with pinion **117** fixed on a shaft **118** journalled in box **42**. Shaft **118** is connected by a universal joint **119** to an externally ribbed rod **120** slidably engaging the ribs of an internally ribbed sleeve **121** which in turn is connected by a universal joint **122** to said shaft **33**.

Means is provided to bias the carriage to a normal position, from any position to which it is moved. To this end, the far end of table top **12** is provided with a bracket **130** having a horizontal portion **131** formed with a ball socket **132** in its upper side and with an opening **133** connecting the socket with the underside of said portion. A rod **134** has an intermediate ball portion **135** within said socket, and is provided with an upwardly extending portion **136** having a ball **137** slidable in a vertical hole **137***a* in a bracket **138** fixed to said bar **24**. A hold down plate **139** fixed to portion **131** of bracket **130** serves to hold the ball **135** in its socket **132**. Said rod **134** has a portion **140** extending down from ball **135**.

A coil tension spring **141** is connected at its upper end to the lower end of rod portion **140**.

Attached to the underside of cross-brace **16** is a horizontal plate **144** formed with an opening **145**. Attached to the lower end of spring **141** is a pin **150** passing down through opening **145**. A cam plate **151** has a handle **152** from which extends a pair of spaced, parallel similar cam plate portions **153** forming a slot or space **154** therebetween. Fixed to the plate portions **153** and traversing the slot **154**, is a pin **155** to which the lower end of pin **150** is pivoted. The pull of spring **141** may be tensioned by rotating the cam **151** by means of handle **152**. As the cam is rotated, the pin **150** is pulled down to tension the spring.

It will now be understood that either longitudinal or transverse movement of the carriage will cause the rod **134** to rotate about the ball portion **135** thereof, thereby tensioning the spring **141** which hence biases the carriage back to a predetermined normal position longitudinally and transversely.

It will thus be seen that there is provided an apparatus in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. In combination, a stand, a carriage for supporting rolls of material to be stitched, rods having universal connections at their lower ends to the stand and at their upper ends to said carriage, and means on the stand to move said carriage longitudinally and transversely of said stand, and spring means connected to the stand and controlled by movement of the carriage, to bias said carriage back to a normal predetermined position longitudinally and transversely relative to said stand said biasing means comprising a rod having an intermediate universal connection with the stand, and having a universal connection at its upper end with the carriage, and spring means connecting the lower end of the rod to the stand.

2. In combination, a stand, a carriage above the stand, connector means having universal connections at their lower ends with the lower end of the stand at their upper ends with the carriage, and means on the stand to move the carriage in its plane longitudinally and transversely of the stand, said moving means comprising a first slider slidably mounted on said stand, means to reciprocate the first slider transversely of the stand, a longitudinal shaft, means on the stand to support said shaft for oscillation, an arm fixed to said shaft, a first link pivoted to the slider and to said arm, another arm fixed to the shaft, a second link pivoted to said arm and having a longitudinal sliding connection with said carriage, a second slider slidably mounted on said stand, means to reciprocate the second slider longitudinally of said stand, and a third link pivoted to said second slider and having a transverse sliding connection to said carriage.

3. In combination, a stand comprising a table top, pairs of legs supporting the ends of said table top, cross-braces attached to said pairs of legs, adjacent their lower ends, pairs of rods having universal connections at their lower ends with the cross-braces, a carriage located above the table top, said rods having universal connections at their upper ends with the carriage, means to reciprocate the carriage longitudinally, and means to reciprocate the carriage transversely.

4. The combination of claim **3**, a rod having universal connections to the stand and to the carriage, and a spring connecting the lower end of the last rod to the stand.

5. The combination of claim 4, and means to adjust the tension of said spring.

6. The combination of claim 3, said means to reciprocate the carriage longitudinally comprising a first slider, means on the stand to reciprocate the first slider longitudinally of and on the stand, and means pivoted to said slider and having a transverse sliding connection with the carriage, said means to reciprocate the carriage transversely comprising a second slider, means on the stand to reciprocate said second slider transversely of and on the stand, and means connected to said second slider and having longitudinal sliding connection to said carriage.

References Cited by the Examiner

UNITED STATES PATENTS

2,501,240	3/1950	Schwartz	112—118
2,684,651	7/1954	Bihaly	112—118 X
2,707,446	5/1955	McCutchen	112—118 X
2,939,419	6/1960	Slinn	112—118 X
3,001,489	9/1961	Bond	112—118 X

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