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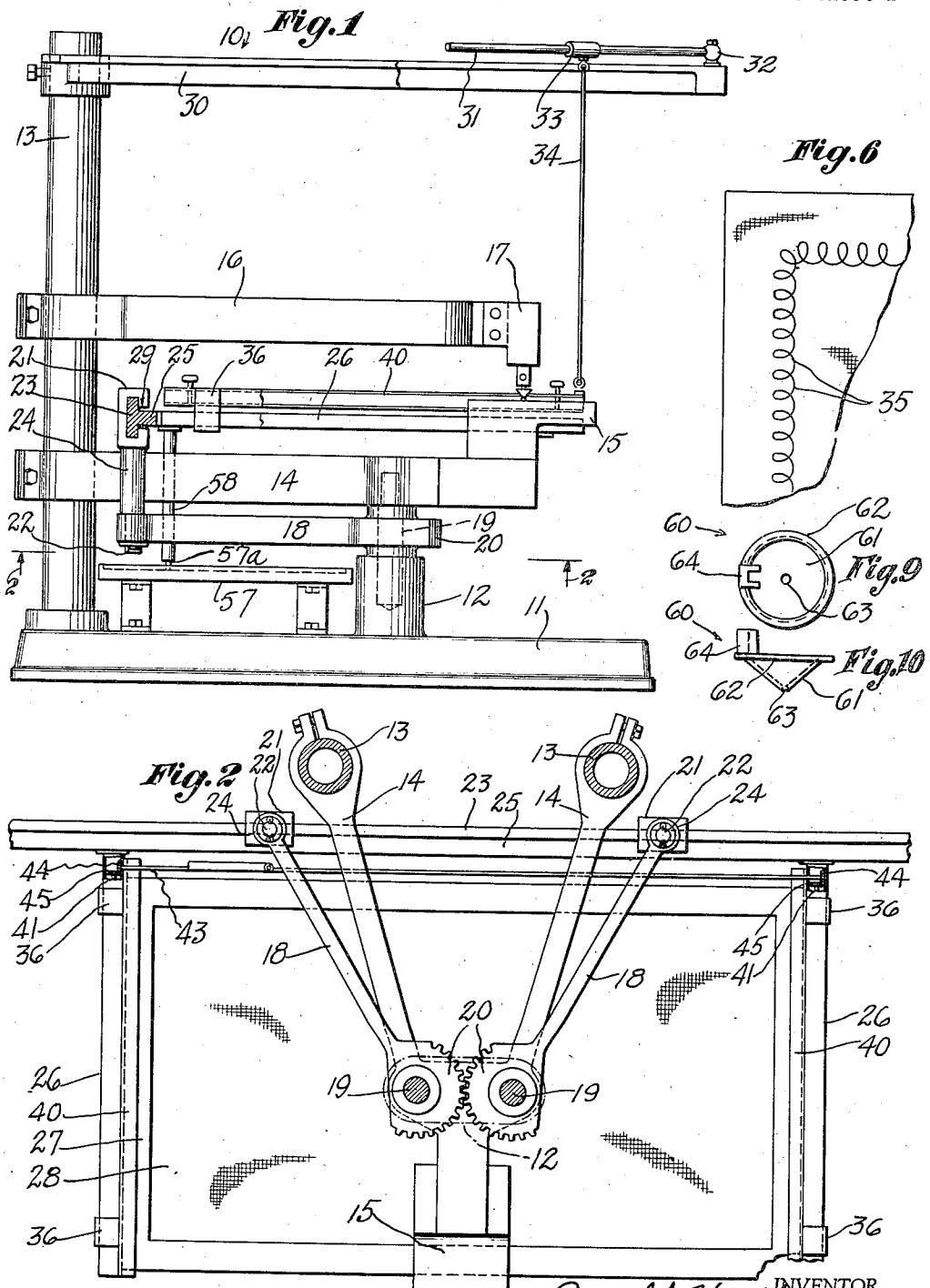
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2,139,019

COMFORTER QUILTING MACHINE

Filed April 1, 1937

2 Sheets-Sheet 1



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Fig. 3

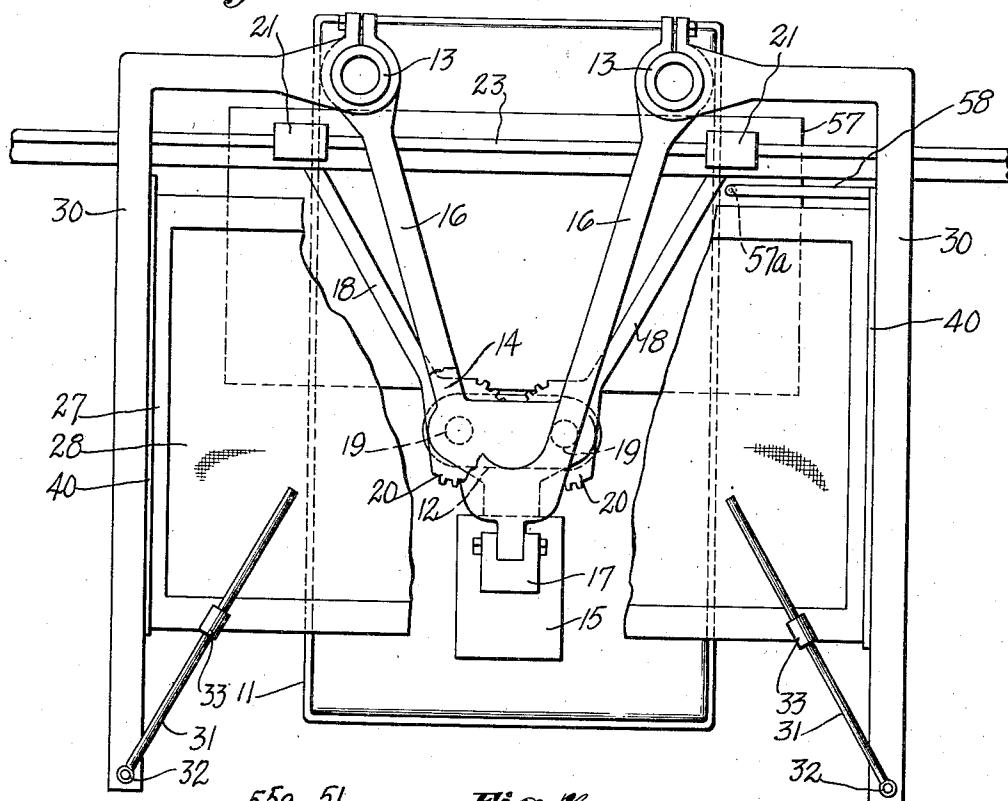


Fig. 7

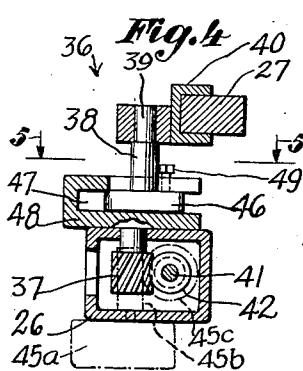
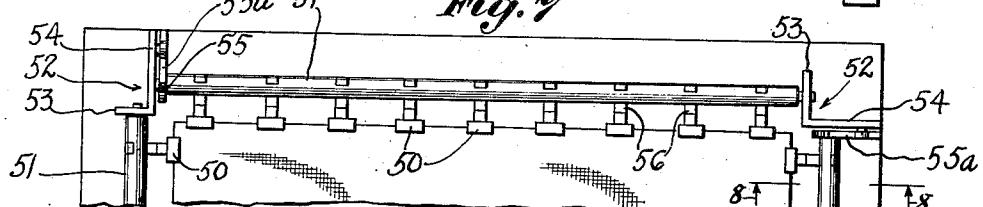


Fig. 5

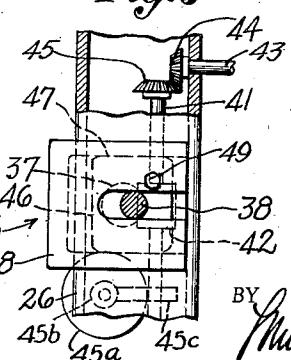


Fig. 8, 53

51 52 55 55a 54

56 50 84 54

55a 54

56 50 51 52 55 55a 54

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UNITED STATES PATENT OFFICE

2,139,019

COMFORTER QUILTING MACHINE

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13 Claims. (Cl. 112—118)

This invention relates to apparatus such as quilting machines.

One object of this invention is to provide an apparatus of this type which shall permit universal movement along a plane by a means that is light in weight and improved in construction so as to require relatively little power.

An important result of the invention is that designs can be formed in comforters and the like according to a more intricate pattern, or one involving curves of very small size. Heretofore, such designs could not be readily formed because the comforter supporting frame tended to overrun due to its momentum, so that quantity production required the use of patterns having large design elements.

Another object of the invention is the provision of an apparatus as set forth wherein a comforter support is carried by a longitudinally movable rail that can be laterally moved by carrier arms swingable toward and away from each other, and being always so spaced as to afford stabilized support for the rail at relatively widely spaced points.

A supplemental advantage is that a compact standard may support both of the arms, whose friction can be reduced to a minimum as by simple thrust bearings.

Coordinated with the arms referred to, only a single rail member is used, this representing in fact the most simplified and lightest construction.

To realize the object of a large range movement of a comforter frame with stabilized support for the carrier arms, the frame is arranged in an improved manner for movement past or through certain openings of the carrier arms.

An object of the invention being to maintain equal angular movement of the carrier arms, the same may be directly intergeared in an improved manner.

Another object of the invention is the provision of overhead means in association with a comforter frame having a one line support, as at the rail, to afford added support and eliminate vibration of the frame.

Another object of the invention is to provide an improved frame for rigidly uniformly holding and stretching a comforter for the stitching operation, with adjustable means rapidly operative.

Another object of the invention is to provide means for sewing designs in a series of very small circles instead of lineally.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the inven-

tion consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawings, wherein like parts are designated by the same reference characters throughout the several views.

In the drawings:

Figure 1 is a view in side elevation with parts in section showing an apparatus embodying the invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a top plan view of the apparatus, with parts removed.

Fig. 4 is an enlarged sectional view of the eccentric drive.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a fragmentary plan view of a comforter made with the aid of the eccentric drive.

Fig. 7 is a fragmentary plan view of a frame embodying the invention and showing part of a comforter therein.

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

Fig. 9 is a top plan view of a presser foot embodying a feature of the invention.

Fig. 10 is a view in side elevation thereof.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawings, therefore, are submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawings, 10 denotes an apparatus embodying the invention. The same may include a base plate 11. Substantially centrally fixed thereto is a standard 12, while at one end of the base plate, a pair of spaced vertical standards 13 are fixed thereon. A forked cantilever beam 14 may be rigidly mounted on the standards 13 so as to extend in a forward direction, to support at its free end the table portion 15 of a sewing machine. A similar beam 16 at a higher elevation may support the sewing machine head 17 that cooperates with the portion 15. Any suitable drive, not shown, is used to operate and manipulate the sewing machine.

Mounted between the standard 12 and the beam 55

14 are a pair of arms 18 of equal length movable about vertical pivots or shafts 19 that are journaled in the standard 12 and in the beam 14, so as to add rigidity to the latter. Moreover, the 5 arms 18 directly, or with the interposition of suitable bearings, may serve as spacers between the standard 12 and the beam 14. Each of the arms 18 may have an integral segmental gear 20 concentric with its pivot, these gears being directly interengaged so that said arms may move at equal angles toward and away from each other so as to constantly form isosceles triangles.

At the free rear ends of the arms 18 are mounted carriers 21, pivotally connected at 22 to the 15 individual arms 18. These carriers are adapted to slidably support a rail member 23, so that the latter is freely longitudinally movable. Moreover, said rail member is transversely movable by moving the carrier arms 21 toward and away 20 from each other.

The rail member 23 is desirably positioned above the beam 14. Hence the carriers 21 include portions 24 which extend downward into connection with the arms 14. In this manner, the connections 24 are adapted to act as stop portions by abutment against the intermediate beam 14 to thus limit the relative movement of the arms 18 toward each other. Hence the carriers 21 are always sufficiently spaced for 30 a stabilized support of the rail 23.

Rigidly connected to the rail member as at 25 is a device or frame which may include a pair of frame arms 26 that extend forwardly therefrom, and which are adapted to support a frame 35 27 for a comforter 28. In order to permit ample movement of the comforter relative to the sewing machine 15, 17, the carriers 21 are formed with openings 29 through which the arms 26 may freely move without obstruction.

40 In order to afford support for the arms 26 at their free ends and avoid possible vibration thereof, an overhead suspension means is provided adapted for universal movement. Thus a pair of angular arms 30 extend sideways and forward from the standards 13, and each having at its free end a rail 31 pivotally connected thereto at 32. A carrier 33 rides along said rail, and a wire 34 connects the carrier with an end of an arm 26 or with the adjacent part of the 45 frame 27. Upon moving the frame 27, the suspension means, which is light in weight, follows the movements directly.

If it be desired to produce a design as shown in Fig. 6, wherein the usual lineal lines of stitching are replaced by ornamental intersecting circles 35, a device may be used which will now be described. According to this device the frame 27 may be constantly rotated independently of the arms 26, and while following its normal 50 movements. For example, a series of devices 36 may be disposed adjacent to the corners of the frame 27. The arms 26 may be hollow as shown in Figs. 4 and 5, to house a worm gear 37 to which is connected an eccentric shaft 38. Journalled on the latter at 39 is a channel member 40 that may 55 extend along each arm 26. Thus there are two devices 36 connecting each channel member with each arm 26. The frame 27 may be slid into the opposed channel members 40 and suitably secured therein.

In order to synchronously rotate all of the eccentric members 36, any suitable drive may be provided. For instance, a shaft 41 may extend 60 interiorly of each arm 26, and having worm gears 42 for engaging each worm wheel 37. The shafts 75

41 in the different arms may be interconnected by a cross shaft 43 having end bevel gears 44 engaged with bevel gears 45 at the end of each shaft 41. To assure similar movement in the different eccentrics, the bevel gear connections may be suitably arranged as shown in Fig. 2. Any suitable source of power, such as an electric motor 45a mounted on an arm 26 may rotate one of the shafts 41 or 43. For instance, the motor may have a worm 45b which rotates a worm wheel 45c fixed on a shaft 41.

To provide for adjustability in the degree of eccentricity of the member 38, each device 36 may comprise an elongated slide plate 46 fixed to the eccentric 38 and slidably in an open ended 15 guideway 47 of a casing 48 that is fixed to the worm gear 37. The casing 48 may have a conventional flange that overlies the plate 46 to retain the same, and it may also have the usual graduation marks, and a set screw 49 to releasably lock the plate 46 as set according to the graduation marks. Thus a smooth, vibration free operation is obtained. In this manner all of the devices 36 may be accurately set to like adjustment. If the eccentric 38 is set in alignment with the worm gear 37, no eccentric motion will occur. However, if rotation of the eccentric is stopped, the devices 36 will function as simple rigid connectors, with the design for the comforter lineally sewn in the usual manner. 30

A comforter frame, such as 27 is generally oblong and rigid, and carries a series of clips 50 spaced along the sides and ends thereof for releasable marginal attachment to the comforter 28. In tensioning the latter, it has been customary to individually set and reset the clips. To avoid this labor, I mount a shaft 51 on each side and end of the frame 27. At each set of adjacent shaft ends a bracket 52 is secured to the frame, each bracket having a short arm 53 and a long arm 54, each shaft 51 being journaled in a short arm of one bracket and in a long arm of another bracket. Each shaft 51 has a ratchet wheel 55 fixed to an end thereof adjacent to a long arm 54, and a spring pressed pawl 55a co-operating with the ratchet wheel being mounted on said long arm. Interconnecting the clips 50 with the shaft 51 are strips or flexible elements 56 adapted to be wound upon the latter. Hence the different shafts 51 may be successively manually grasped and turned to tension the comforter uniformly in all directions, with the elements 55, 55a releasably locking the respective shafts. Thus the comforter can be quickly brought to a perfectly stretched condition for the 55 stitching operations. It will be understood that the frame 27 may now be secured in the channels 40 and the machine 10 operated to produce the required design of stitching.

The machine 10 may be actuated according 60 to any suitable pattern, by a pantograph or the like. In my machine, I prefer to use a plate 57 positioned wherever desired and which is grooved according to the required design. A follower pin 57a is carried by an arm 58 that is 65 secured, for instance, to the rail member 23, so that the frame 27 shall accurately follow the pattern of the plate 57.

Figs. 9 and 10 show a novel presser foot which I have devised for the stitching of down quilts, 70 in such manner as to tend to work the down away from the line of stitching, while permitting the comforter to be universally moved with respect to the needle. The presser foot 60 includes a shell 61 of inverted conical form and having an 75

annular marginal lip 62. At the apex of the shell is an opening 63 through which the needle is reciprocable in normal sewing operation. The presser foot includes an element 64 whereby it may be secured to a usual presser foot bar.

In operation, the circular form of the presser foot 60 is universally operative in all directions for working the down, and the tapering form serves to work the down to a greater degree as the axis of the needle is approached. The lip 62 adds in holding the comforter down on the sewing machine table and so as to present a smooth surface to the needle.

I claim:

1. An apparatus including a rail member movable longitudinally thereof, means supporting said member for movement at right angles to said path, said means comprising a pair of pivoted arms, means interconnecting said arms to cause them to swing about their pivots toward and away from each other at constantly equal angles with the rail member, the free ends of said arms having carriers pivotally connected thereto, said rail member being mounted on said carriers for said longitudinal movement, and a device connected to the rail member to move therewith, said carriers having openings to permit said device to move past said carriers along said openings, whereby said device is movable only longitudinally of the rail member and at right angles thereto. 15

2. An apparatus including a plurality of members, one of said members being constrained for movement along a straight path, means interengaging said members, including a plurality of arms pivoted on one of the members, said arms forming equal opposite angles with the other member, the latter being elongated in the direction of said path, means providing pivotal lost motion connection between the free ends of the arms and the elongated member, and a device connected to the elongated member for movement therewith in the longitudinal direction of the elongated member and at right angles thereto. 30

3. An apparatus including a base, a plurality of arms pivotally mounted at one end on the base, carriers pivotally mounted on the individual arms at the other end thereof, a rail member slidably carried by said carriers, said arms being of equal length and converging toward each other in a direction away from the rail member, means to constrain the arms to move at like equal angles with respect to the rail member, and a device mounted on the rail member for movement therewith. 45

4. An apparatus including a base, a plurality of arms pivotally mounted at one end on the base, carriers pivotally mounted on the individual arms at the other end thereof, a rail member slidably carried by said carriers, said arms being of equal length and converging with each other toward the pivot ends thereof, gear elements individually fixed to the arms in concentric relation to the first named pivots, said gears being interengaged to cause the arms to move at like equal angles with respect to the rail member, and a device fixed to the rail member for movement therewith. 60

5. An apparatus including a base, a plurality of arms pivotally mounted at one end on the base, carriers pivotally mounted on the individual arms at the other end thereof, a rail member slidably carried by said carriers, said arms being of equal length and extending toward each other

away from the rail member, gear elements individually fixed to the arms in concentric relation to the first named pivots, said gears being interengaged to cause the arms to move at like equal angles with respect to the rail member, and a device fixed to the rail member for movement therewith, said device being in the nature of a frame having means for supporting a comforter, said frame member being connected to the rail member, and the said carriers having openings so that the frame member is movable past the carriers to allow full range of movement for the frame. 5

6. An apparatus including a base, a plurality of arms pivotally mounted at one end on the base, carriers pivotally mounted on the individual arms at the other end thereof, a rail member slidably carried by said carriers, said arms being of equal length and serving to constantly form a portion of an isosceles triangle with the rail member, a frame having means for supporting a comforter, said frame being mounted on the rail member to move therewith, said carriers having openings to permit the passage of said frame, and said arms being coordinated with each other for limited angular movement toward each other so that the arms always diverge toward the rail member to support the latter at widely spaced points. 10

7. An apparatus including a rail member movable longitudinally thereof, means supporting said member for movement at right angles to said path, said means comprising a pair of pivoted arms, means interconnecting said arms to cause them to swing about their pivots toward and away from each other at constantly equal angles with the rail member, the free ends of said arms having carriers pivotally connected thereto, said rail member being mounted on said carriers for said longitudinal movement, and bars connected to the rail member at right angles thereto, said carriers having openings to permit said bars to move past said carriers along said openings, and universally movable means elevated above said bars and connected to the otherwise free ends of the bars for supporting the same without obstructing access to said apparatus. 20

8. An apparatus including a base plate, a relatively central standard thereon, arms pivotally mounted on said standard, means on the standard interconnecting said arms for equal angular movements thereof toward and away from each other, said arms having limited angular movement so that the free ends thereof are always 30

55

in substantially spaced relation to each other, carriers pivotally mounted on said arms at the free ends thereof, a rail member carried by said carriers for longitudinal movement, said rail member being movable at an angle to its length 60

upon relative angular movement of said arms, bars fixedly connected to the rail member at an angle thereto, the carriers having openings for movement of bars relative to the carriers, a cantilever support mounted on the base plate at one 65

end thereof, a relatively small sewing machine table mounted on the free end of the cantilever support, the latter being reenforcingly engaged with said standard, the cantilever support being intermediate of the connections of said bars with 70

the rail member, with the said arms being below the cantilever support and the bars being above the same. 75

9. An apparatus including a base, a plurality of arms pivotally mounted adjacent to each other

at one end of the base, an elongated means mounted on the arms at the other end thereof, means to constrain said arms to move at equal opposite angles with respect to the elongated means, and a device mounted on said elongated means, whereby said device is movable longitudinally of the elongated means and at right angles thereto.

10. An apparatus including a member, a plurality of arms pivoted on one end of the member, an elongated means engaged with the arms at the other end thereof, means coacting with the arms to constrain the same to move at equal opposite angles with the elongated means, said 15 elongated means being adapted for longitudinal movement, said elongated means being movable at right angles to the longitudinal path thereof on movement of said arms toward and away from each other, and a device associated with 20 the longitudinal means for movement along said path and at right angles thereto.

11. An apparatus including a member, a plurality of arms pivoted on one end of the member, an elongated means pivotally engaged with 25 the arms at the other end thereof, said elongated means being adapted for longitudinal movement, means constraining the arms to move at equal opposite angles with respect to the elongated means, said elongated means being movable at 30 right angles to the longitudinal path of movement thereof by movement of the arms toward and away from each other, and a device mounted

on the elongated means for movement along said longitudinal path and at right angles thereto.

12. An apparatus including a base, a plurality of arms pivotally mounted adjacent to each other at one end on the base, an elongated means 5 mounted on the arms at the other end thereof, means interengaging said arms adjacent to their pivot points to constrain said arms to move at equal opposite angles with respect to the elongated means, and a device mounted on said elongated means, whereby said device is movable longitudinally of the elongated means and at right angles thereto.

13. An apparatus including a base, arms pivotally mounted on said base, means on the base 10 interconnecting said arms for equal angular movement of said arms in opposite directions, a rail member mounted on said arms at the free ends thereof and adapted for longitudinal motion, said rail member being movable at an angle 15 to its length upon relative angular movement of the arms, a cantilever support mounted on the base in spaced relation to the pivotal mounting of said arms, a sewing machine table mounted 20 on the cantilever support at the free end thereof and being reenforcingly engaged with the base adjacent to the pivotal mounting of the arms, said arms being disposed above the base and below the cantilever support, and said rail member 25 being disposed above the cantilever support, and means above the latter for mounting a frame on the rail member.

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