Aug. 14, 1951 J. BRUSSELL 2,563,916

MULTIPLE NEEDLE SEWING MACHINE

Filed Feb. 13, 1947 2 Sheets-Sheet 1

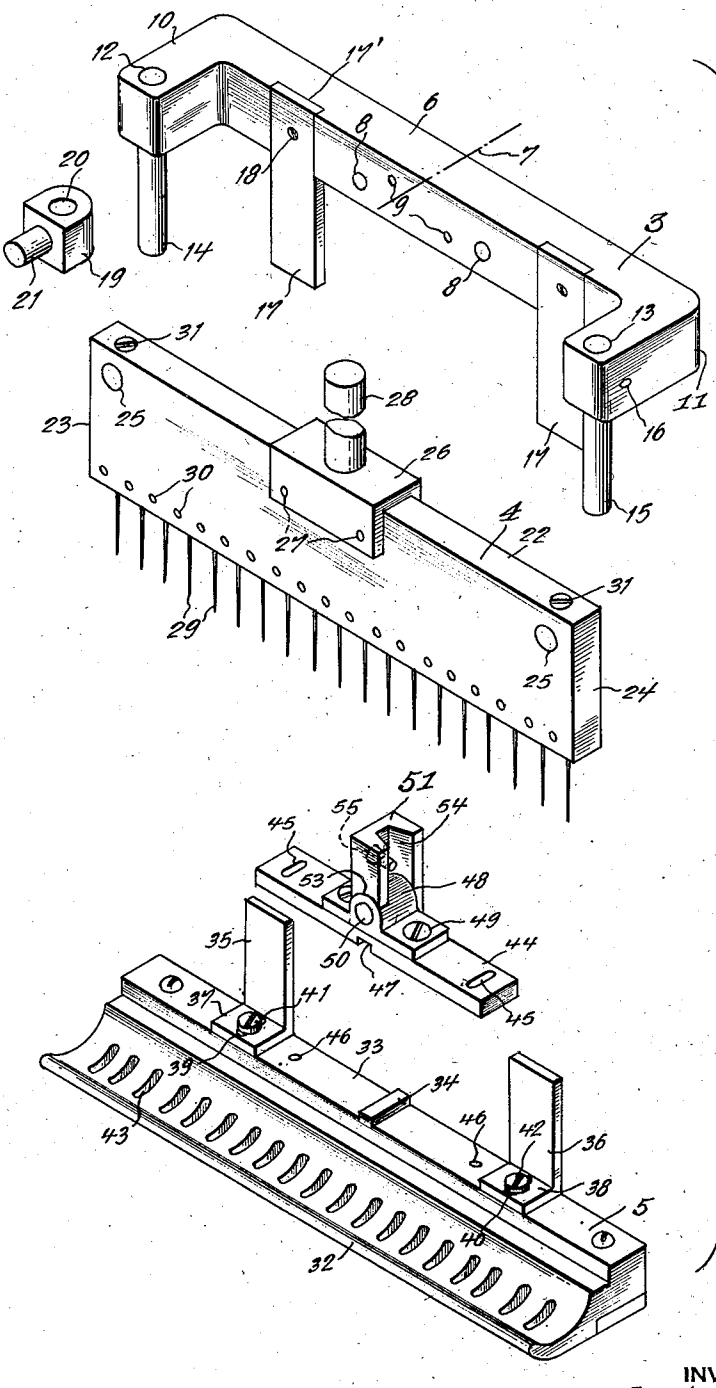


Fig. 1

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Fig. 2

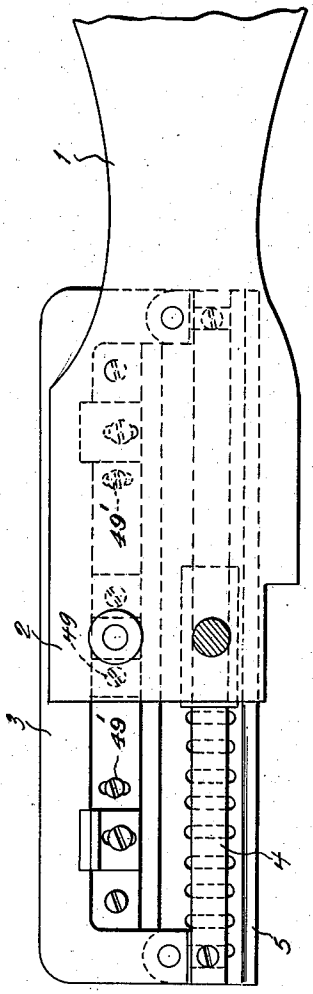
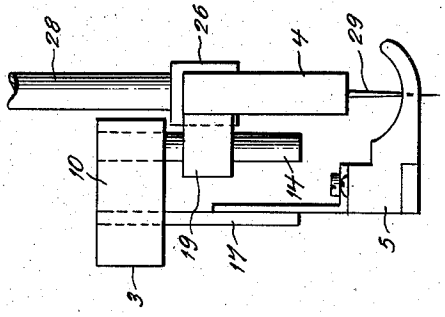


Fig. 3



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MULTIPLE NEEDLE SEWING MACHINE

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11 Claims. (Cl. 112—163)

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The present application is directed to sewing machines, more particularly to a structure applicable to multiple needle machines, wherein a plurality of needles and associated mechanisms are provided in order to form a plurality of parallel stitches in fabric.

Devices of this kind are old in the art and constitute the subject matter of applicant's prior Patent No. 2,159,252, issued May 23, 1939. This patent describes and claims a structure which is adaptable for providing means whereby a relatively large number of needles may be operated in a sewing machine simultaneously, and the structure includes means for coordinating the movements of the several elements necessary for the operation. Such a structure has found considerable use in practice and has been found eminently satisfactory. However, in commercial operations the tendency has been towards machines having higher speeds and it is common in the art to use sewing machines having a speed of 2000 R. P. M. In applying mechanism for multiple needle operation to a machine of this kind, great stresses are produced on the mechanism and there is a tendency for the same to wear out in a relatively short time.

It is therefore among the objects of the present invention to provide a mechanism for a multiple needle sewing machine which is simple in construction and sturdy in operation and which can withstand high speed operation for long periods of time.

It is also among the objects of the present invention to provide a mechanism which is capable of attachment to the arm of a sewing machine and which provides means for guiding and keeping in alinement the multiple needle clamp and presser foot.

It is still further among the objects of the present invention to provide a multiple needle mechanism which includes means whereby various adjustments of the elements may be made to insure proper alinement thereof and effective operation.

In practicing the present invention, there is provided a needle clamp which is relatively wide and is adapted to carry a plurality of needles in alinement. The needle clamp may be of any desired width sufficient to carry the desired number of needles. There is also provided a presser foot located below the needle clamp and of approximately the same width as said clamp, having a series of openings usually in the form of slots, corresponding to the number and position of the needles in the needle clamp. Both the presser foot and the needle clamp are operative

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by means of mechanism contained in the machine head and operated from the main shaft thereof.

The invention further contemplates the provision of a bracket which is secured to the back of the sewing head and is preferably of U-shape with the base being attached at a central point to the sewing head and the legs thereof extending forwardly at opposite sides of said head. The needle clamp extends across the face of the bracket with the ends thereof adjacent to the ends of the legs of said bracket. Cooperative means are provided so as to hold the needle clamp in a closely adjusted position with respect to the bracket while still permitting free vertical movement of said clamp. This is accomplished by a pair of pins fixed in the ends of said legs and extending vertically downward. Bushings fit over said pins and are fixed in adjusted positions in suitable openings in the ends of the needle clamp. Means for adjusting the relative positions of the clamp and legs is provided.

In some cases, and particularly where a large number of needles are used, it is desirable and often necessary to provide means for stabilizing the position and movement of the presser foot. In such case, there are provided downwardly extending flat members in the base of the bracket and corresponding upwardly extending members on the presser foot so that said sets of members are in contact and provide a guiding means whereby the presser foot is prevented from turning out of alinement. Means for adjusting the relative positions of the guiding members are provided and such guiding means is so arranged that it allows a pivoted movement of the presser foot, to accommodate variations in thickness of fabric as it passes under the presser foot in the sewing operation.

In the accompanying drawings constituting a part hereof, and in which like reference characters indicate like parts,

Fig. 1 is an enlarged exploded view of the mechanism constituting the present invention, the parts being shown in their approximate relative positions;

Fig. 2 is a fragmentary top plan view of a portion of a sewing machine head and arm, showing the mechanism in its assembled position, and

Fig. 3 is an end elevational view of the assembly of Fig. 2, some parts being omitted for clearness.

The sewing machine has usually an arm 1, only a part of which is shown, and the head 2 containing the mechanism for opearting the sewing

instrumentalities, such mechanism not being shown herein.

A bracket 3 is attached to the rear portion of the lower end of head 2 and has forwardly extending legs. In front thereof is a relatively wide needle clamp 4 and a presser foot 5 is positioned underneath the same.

The bracket consists of a base 6 having on opposite sides of centerline 7 thereof a pair of openings 8 providing means whereby set screws or the like may be passed from the rear of base 6 through openings 8 and into the rear portion of head 2 in order to hold the bracket in fixed position relative thereto. Relatively small openings 9 are provided on opposite sides of centerline 7 and dowel pins are fixed in openings 9, said pins being adapted to enter corresponding openings in the back of head 2, whereby the horizontal position of the bracket is maintained at all times.

Legs 10 and 11 extend forwardly from the ends of base 6 and have vertical openings 12 and 13 formed in the ends thereof. Guide pins 14 and 15 preferably of hardened steel are press-fitted into openings 12 and 13, respectively. In order to insure the fixed positions of guide pins 14 and 15, set screws 16 are provided in legs 10 and 11 to bear against said pins.

In some cases, particularly where the bracket is of relatively great width, there are provided presser foot guides. These consist of spaced flat plates or bars 17 fitted into recesses 17' and in base 6, and usually symmetrically spaced on opposite sides of centerline 7. Screws 18 passing through the same hold presser foot guides 17 in fixed position. Generally the faces thereof are flush with the inner face of base 6.

A pair of guide bushings 19 have vertical openings 20 therein adapted to be fitted over guide pins 14 and 15 with a sliding fit. Horizontal projections 21 extending from the forward faces of bushings 19 provide means for attaching said bushings to the needle clamp.

The needle clamp consists of a relatively long flat bar 22, the ends 23 and 24 of which are approximately in alinement with the outer faces of the legs 10 and 11, respectively. The inner face of clamp 22 is closely adjacent to the ends of said legs. A pair of horizontal openings 25 at ends 23 and 24 of clamp 22 are adapted to accommodate projections 21. Set screws 31 in the top of clamp 22 are adapted to bear against projections 21 to fix the same in adjusted positions. Said screws 31 allow adjustment of the position of the needle clamp relative to the presser foot so that a perfect alinement thereof may be obtained by loosening said screws to position the clamp at the proper point and then tightening the same. An inverted U-shaped yoke 26 fits over the top of clamp 22 at its transverse centerline and is held relative to said clamp by bolts, rivets, screws or the like 27. Needle bar 28 is fixed to the top of yoke 26 and enters head 2, being connected to the operating elements for the same. A plurality of needles 29 are adapted to be inserted in small openings in the under side of needle clamp 22 and a series of set screws 30 are adapted to clamp the needles in their respective positions.

The presser foot consists essentially of a relatively wide bar 32 commensurate in length with the length of needle clamp 22. The rear portion 33 thereof is provided with a transverse ridge 34. Guide contact members 35 and 36 constituting flat angle members have transverse bases 37 and 28, respectively. Slots 39 and 40 in said bases are

adapted to accommodate set screws 41 and 42, respectively, whereby said guide contacts may be secured to presser foot base 33 in adjusted positions. A series of transverse slots 43 in the front of the presser foot provides openings for needles 29 to pass through during the sewing operations.

Flat plate 44 has a pair of transverse slots 45 near the ends thereof and a transverse recess 47 on the underside thereof. Slots 45 are adapted to fit over openings 46 in base 33 and recess 47 is adapted to fit over raised portion 34 of base 33. Suitable screws are passed through slots 45 and are threaded into openings 46 to hold plate 44 in adjusted position on the presser foot. A block 48 is fixed to plate 44 by screws 49.

Block 51 of the form shown in Fig. 1, has an opening along in the rear thereof (not shown). Pivot pin 50 passing through block 48 extends into said opening. Arched portion 53 of block 51 allows pivoted movement of block 48 about pin 50. A wedge-shaped opening 54 at the rear is intended to hold presser bar (not shown), by means of taper-headed screw 55 passing through a tapered opening in block 51 and threaded into said presser bar.

In assembling the several elements, bracket 3 is fitted onto the rear face of the lower end of head 2 by the aforesaid dowel pins fixed in openings 9 and screws passing through openings 8. Bushings 19 are fitted over guide pins 14 and 15 and needle clamp 22 is placed in position with projections 21 entering openings 25. Set screws 31 are loosened and needle clamp 22 is shifted until needles 29 are properly alined with openings 43 of the presser foot, whereupon the set screws are tightened to firmly grip projections 21. In such cases where it is desirable or necessary to steady the presser foot or to avoid vibratory movements thereof, guide contact members 35 and 36 are attached to the presser foot with screws 41 and 42 loosened. The presser foot is properly alined with respect to the rest of the mechanism and then guide contacts 35 and 36 are shifted until they are substantially in contact with the front faces of presser foot guides 17, whereupon set screws 41 and 42 are tightened. In obtaining the aforesaid alinement, the screws 49' in plate 44 passing through slots 45 may be used for adjustment purposes.

Such a mechanism has been found to be very sturdy in its operation and it may be used on sewing machines having very high speeds without undue vibration taking place. Operation thereof for long periods of time have proven satisfactory and there is no substantial wearing out of any essential parts even after such long operation. The mechanism is simple and may be readily produced by normally skilled machinists at reasonable cost.

Although the invention has been described setting forth a single specific embodiment thereof, various changes in the details of the construction of the invention may be made within the principles herein set forth.

For instance, in place of dowel pins in openings 9, other means for insuring the horizontal positioning of the bracket may be provided, as for example, there may be a recess in the inner face of base 6 which accommodates the lower end of head 2.

In some cases, such means may be entirely omitted. The bracket may be of considerably different shape than that shown in the drawings, it being essential that there be members present at the proper position to hold the guide pins.

Legs 10 and 11 may in some cases be omitted and said pins fixed in the ends of base 6. In such case, bushings 19 are modified so that projections 21 or their equivalents extend forwardly a sufficient distance so as to be held in openings 25. The shape and size of the needle clamp and the means for mounting the same in the sewing machine may be considerably altered from the specific device shown. Also, the means for mounting the presser foot and the configuration thereof may be greatly varied. The mechanism may be designed to accommodate a small number of needles, say from 6 to 12, or may be made to accommodate a relatively large number of needles, say up to 36 to 48. The materials of construction may be any of those suitable for the purpose but applicant as a matter of convenience prefers to use steel parts or parts made from various alloys.

These and other changes in the details of the invention may be made within the spirit thereof and the invention is therefore to be broadly construed and not to be limited except by the character of the claims appended hereto.

I claim:

1. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp.

2. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, said bracket having a base and a pair of legs at the ends thereof at an angle to said base, guide pins adjacent the ends of the legs of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp.

3. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, said bracket having a base and a pair of legs at the ends thereof at an angle to said base, guide pins adjacent the ends of the legs of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, said base adapted to be secured to the back of said head and said legs extending forwardly at opposite sides of said head.

4. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, a presser foot below said clamp and commensurate in length therewith, downwardly extending spaced presser foot guides on said bracket, and guide contact members extending upwardly from said presser foot adapted to slide in contact with said presser foot guides.

5. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably

mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, a presser foot below said clamp and commensurate in length therewith, downwardly extending spaced presser foot guides on said bracket, and guide contact members extending upwardly from said presser foot adapted to slide in contact with said presser foot guides, said cooperating members and guides being located laterally of the transverse centerline of said bracket and presser foot.

6. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, a presser foot below said clamp and commensurate in length therewith, downwardly extending spaced presser foot guides on said bracket, and guide contact members extending upwardly from said presser foot adapted to slide in contact with said presser foot guides, said cooperating members and guides having flat contact areas of substantial extent.

7. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, a presser foot below said clamp and commensurate in length therewith, downwardly extending spaced presser foot guides on said bracket, and guide contact members extending upwardly from said presser foot adapted to slide in contact with said presser foot guides, said cooperating members and guides being located laterally of the transverse centerline of said bracket and presser foot, said members being adjustable transversely of said presser foot.

8. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, a presser foot below said clamp and commensurate in length therewith, downwardly extending spaced presser foot guides on said bracket, and guide contact members extending upwardly from said presser foot adapted to slide in contact with said presser foot guides, a presser foot bar attachment, said presser foot being connected thereto for transverse horizontal adjustment.

9. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings having forwardly extending projections, openings in the ends of said clamp, whereby said projections are secured to said needle clamp.

10. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, guide pins adjacent the ends of said bracket and extending vertically

downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings having forwardly extending projections, openings in the ends of said clamp, whereby said projections are secured to said needle clamp, and means for adjusting the position of said projections relative to said clamp.

11. In a multiple needle sewing machine, a horizontal bracket adapted to be attached to the head of said machine, said bracket having a base and a pair of legs at the ends thereof at an angle to said base, guide pins adjacent the ends of the legs of said bracket and extending vertically downward and fixed in said bracket, bushings slidably mounted on said pins, a needle clamp for a plurality of needles between said pins, said bushings being secured to said needle clamp, the ends of said clamp being forwardly of and adjacent to the ends of said legs.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,159,252	Brussell	May 23, 1939
2,335,487	Cobble et al.	Nov. 30, 1943
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