Jan. 21, 1964 B. L. CHAMBERS 3,118,403

SEWING MACHINE ATTACHMENT

Filed Nov. 14, 1961 2 Sheets-Sheet 1

Fig. 1

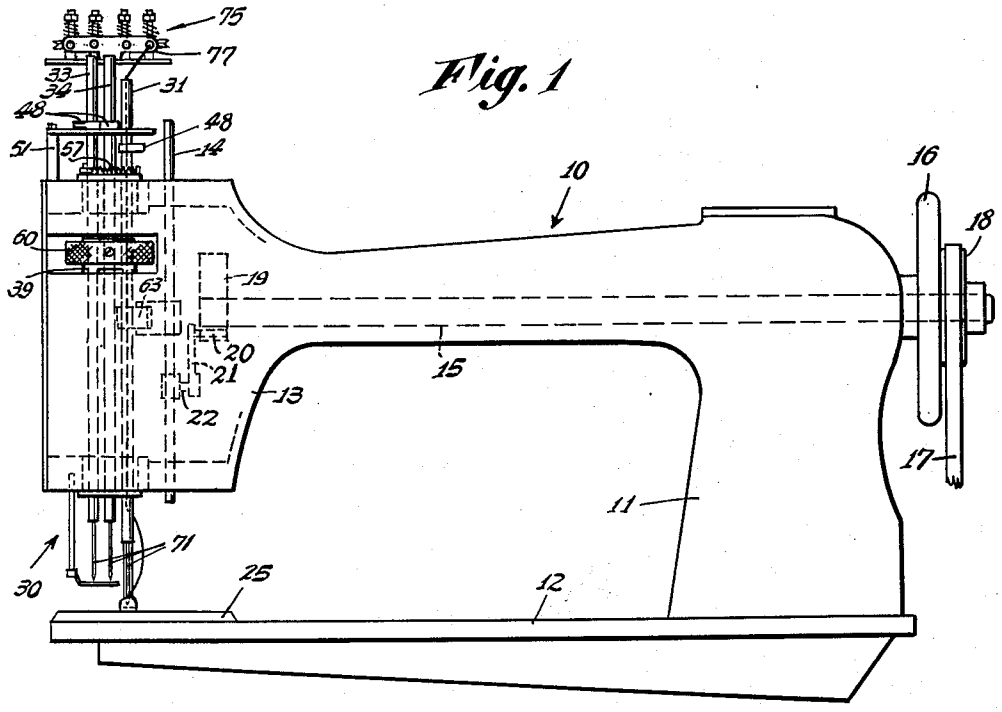
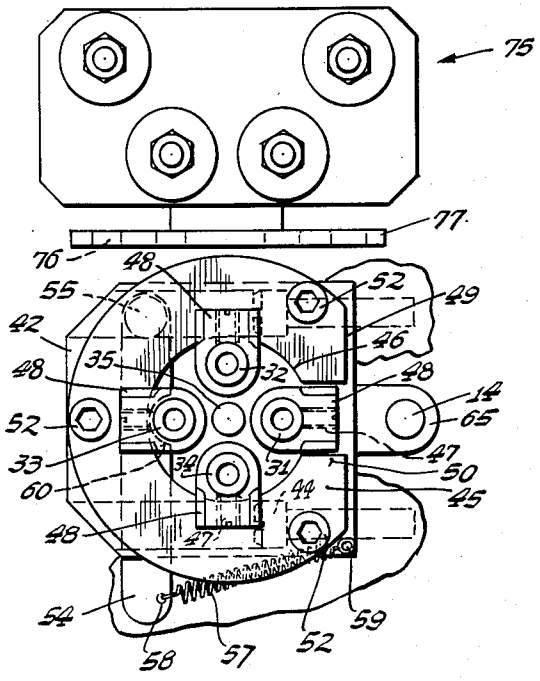


Fig. 3



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Fig. 2

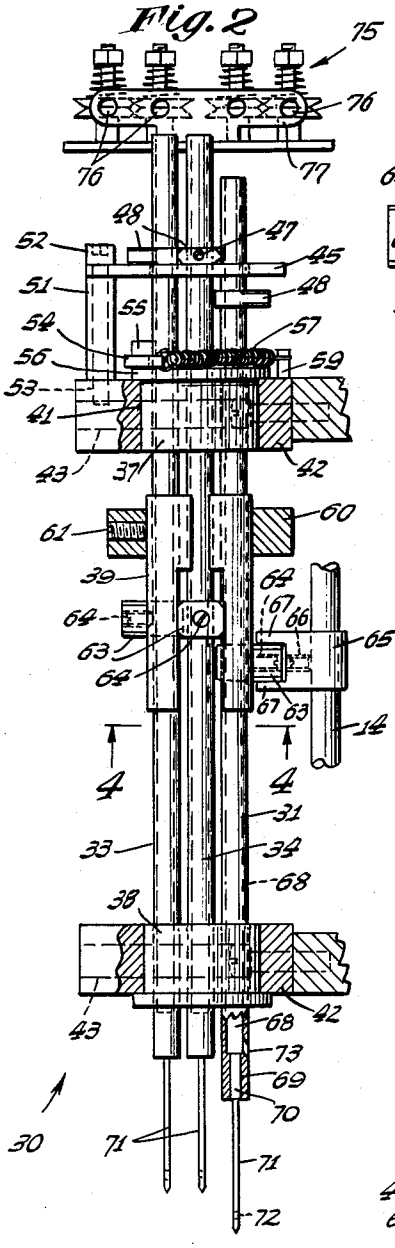


Fig. 4

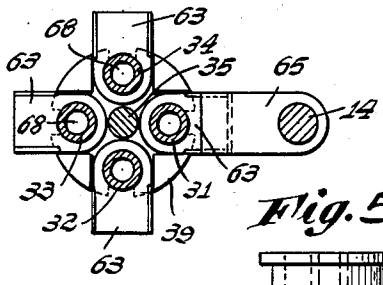


Fig. 5

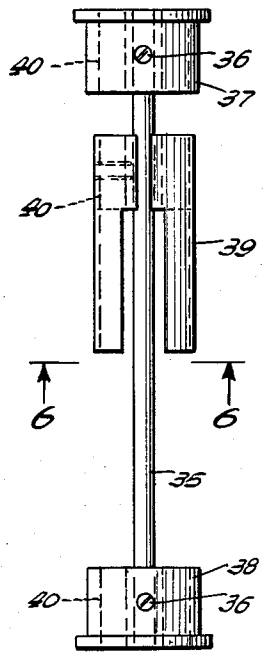
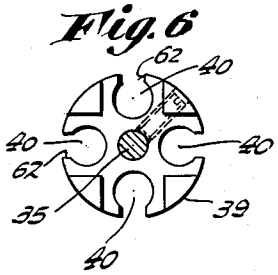


Fig. 6



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3,118,403

SEWING MACHINE ATTACHMENT

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Filed Nov. 14, 1961, Ser. No. 152,238
3 Claims. (Cl. 112—79)

This invention relates to sewing machines, and more particularly to sewing machines of the class generally known as tufting or candlewick machines, wherein the tufting of the threads is performed by a looper and thread cutting mechanism located below the face plate over which the material moves as it is being stitched by a needle and thread located above the material and reciprocated to pass through the material and effect the stitching. A machine of this class is a single needle type designed primarily for sewing and mending tufted designs on bedspreads or other tufted fabric articles which are made on machines of another class using yarns of different types and of different colors and, hence, it is necessary to rethread the machine for each change to a different yarn or a yarn of different color, obviously making the operation laborious and time consuming.

It is an object of the present invention to obviate the foregoing disadvantages and to provide an attachment for a sewing machine of the class referred to adapted to provide for the selective use of any one of a plurality of needles threaded with different yarns or yarns of different colors, or both.

Another object of the invention is to provide an attachment, as aforesaid, adapted to be mounted for use with a single-needle machine of the class referred to with a minimum amount of modification of said machine.

A further object of the invention is to provide a multiple-needle attachment adapted for use on a single-needle tufting machine, which is of relatively simple manufacture yet accurate in its operation both as to needle selection and sewing function.

Still another object of the invention is to provide an attachment for a single-needle machine of the class referred to, wherein a plurality of needles are contained therein for the instant selection of one or other of the needles, as desired, merely by effecting a manual adjustment to move a selected needle into operative position.

Other objects and the many features of the present invention will be apparent to one skilled in the art from a study of the accompanying drawings and the detailed description thereof which follows.

In the accompanying drawings, the invention has been shown merely by way of example and in preferred form and obviously many variations and modifications may be made therein and in its mode of operation which will still be comprised within its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are set forth in the appended claims.

Referring to the drawings,

FIG. 1 is a side elevation of the sewing head support of a single-needle machine, with the present invention incorporated therein;

FIG. 2 is a side elevation of the sewing attachment according to the present invention, partly in section and partly broken away, to show the construction thereof;

FIG. 3 is a top plan view of the attachment shown in FIG. 2;

FIG. 4 is a transverse section, taken on the line 4—4 of FIG. 2, looking in the direction of the arrows;

FIG. 5 is a side elevation of the needle bar guide forming part of the attachment; and

FIG. 6 is a transverse section, taken on the line 6—6 of FIG. 5, looking in the direction of the arrows.

As shown in FIG. 1, the general class of sewing machine referred to has a cross arm 10 supported by a stock 11 in overlying spaced relation to a bed plate 12, the arm 10 being formed at its free end laterally of the stock 11 with a sewing head 13 in which is mounted the usual, single needle bar 14. A main shaft 15 is mounted in the arm 10 to be rotated either by hand through the medium of a hand wheel 16, or by power transmitted thereto from a source of energy through a belt 17 running over a pulley 18 mounted on and keyed to the main shaft 15. In the region of the sewing head 13, the drive shaft 15 has an eccentric 19 fixed thereto and equipped with a pin 20 and crank arm 21 which is secured to a driving lug 22 fixed to the needle bar 14. Thus, as the shaft 15 is rotated it turns the eccentric 19 to reciprocate the needle bar 14 through the crank arm 21, the needle bar making one full reciprocation for each complete rotation of the shaft 15. The base plate 12 supports a face plate 25 over which the material to be stitched passes as it is fed beneath the needle bar 14, the latter normally being equipped with the usual needle and presser foot, neither of which are shown in the drawings since they are removed in modifying the machine to accommodate the attachment of the present invention. Because the tufting mechanism and its operating connections do not form a part of the present invention they have not been shown in the drawings, but it is pointed out that such mechanism is usually mounted on the base plate 12 below the face plate 25. It is also pointed out that in adapting the ordinary single-needle tufting machine to accommodate the attachment of the present invetnion, the tufting mechanism is shifted a short distance, to the left in FIG. 1, to move it from its usual position beneath the needle bar 14 and locate it beneath the attachment.

In the embodiment shown in the drawings, the invention provides an attachment 30 comprising four needle bars 31, 32, 33 and 34, reciprocally mounted in a support or frame structure formed by a central supporting rod 35 to the opposite ends of which there are adjustably secured, as by set screws 36, an upper flanged plug guide 37, a lower flanged plug guide 38 and an intermediate guide 39, each of which is formed with four bored and reamed apertures 40 arranged in vertical alignment to accommodate one of the needle bars 31–34 in free sliding arrangement therein. The flanged plug guides 37 and 38 are adapted to be rotatably fitted in apertures 41 formed in upper and lower brackets 42 which support the attachment on the sewing head 13, thus in effect providing a needle bar turret. Each of the brackets 42 is formed with a drill hole 43 to accommodate a bolt 44 (FIG. 3), the threaded ends of which are screwed into drilled and tapped bores formed in the front face of the head 13 as a part of the modification thereof to adapt the attachment 30 to the machine.

As already stated, the needle bars 31–34 have a sliding fit in the apertures 40 formed in the guides 37, 38 and 39, and in order to support them in idle position there is provided an idler plate 45 (FIG. 3) formed with a central aperture 46 of sufficiently large diameter to encircle the cluster of needle bars, and each needle bar has adjustably secured thereto, each by a set screw 47, a lug 48 which extends laterally therefrom to overlie the top surface of the plate 45. The edge of the plate 45 is adapted for location adjacent the sewing head 13 by being formed to provide a flat edge portion 49, and about midway of the length of the portion 49 the plate 45 is cut away to provide a slot 50 of slightly greater width than that of the lug 48 so that the latter may freely pass therethrough. The idler plate 45 is mounted in spaced relation above the upper bracket 42 by three tubular spacers 51 through each of which a bolt 52 extends and is secured in drilled and threaded bores formed in the

top surface of the upper bracket 42, as at 53 (FIG. 2). Mounted in the space between the upper bracket 42 and the idler plate 45 is a needle bar latch 54 pivoted at one end on the smooth shank of a cap screw 55 fastened to the upper bracket 42, the latch 54 being supported above the top surface of the upper bracket 42 by a spacer element 56. The latch 54 is normally held in operative position by a tension spring 57 having one end secured to the free end of the latch, as at 58, and its opposite end attached to a pin 59 projecting upwardly from the upper bracket 42. Intermediate its ends, the latch 54 is formed in its inner side edge with an arcuate recess 60 adapted to partially surround any one of the needle bars 31–34; and when in engagement with one of the needle bars, the oppositely located needle bar is positively located in operative position. For example, in the drawings the needle bars 31–34 are shown as being mounted in pairs on diagonals taken through the aperture 46 of the idler plate 45 which extend at right angles to one another. Thus, when the latch 54 is operatively engaged with the needle bar 33 (FIG. 3), the needle bar 31 is in operative position and its lug 48 is in position for movement through the aperture 50 in the idler plate 45. Held under tension by the spring 57, the latch 54 also performs the function of locking the turret to prevent its rotation and thus maintain the selected needle bar in operative position.

The intermediate bar guide 39 has a knurled disc 60 secured to its upper end by a set screw 61 (FIG. 2) and when the latch 54 is released, i.e. pushed counterclockwise against the tension of the spring 57 to disengage the recess 60 from the needle bar with which it is then associated, the entire needle bar assembly or turret may be rotated by manually turning the disc 60, and the disc 60 may be turned in either direction in selecting the desired one of the needle bars 31–34. It will be noted that the guide 39 is formed with four vertically extending slots 62, and each needle bar is equipped with a lug 63, fastened thereto by a set screw 64, which is adapted to ride freely in a respective one of the slots 62.

Each of the lugs 63 comprises an element of the driving connection for reciprocating the needle bar to which it is secured, the complementary driving element comprising a yoke 65 secured to the regular machine needle bar 14 by a set screw 66. Thus, the lug 63 of the needle bar in operative position engages between arms 67 of the yoke 65 and the reciprocating movement of the regular needle bar 14 is transmitted through the yoke 65 and lug 64 to the operative one of the needle bars 31–34, the other three needle bars remaining idle and being supported in a position substantially at the top of their reciprocating stroke by the lugs 48 which rest upon the idler plate 45.

Each of the needle bars 31–34 is formed with a bore 68 extending from its top end to a point just short of its lower end where it is formed with a restricted bore 69 adapted to receive and hold a base portion 70 of a needle 71 formed, as usual, with an eyelet 72 near its pointed end. Immediately above the restricted bore 69, the wall of the needle bar is perforated to provide an escape port 73 for the thread or yarn which is adapted to extend through the bore 68 of the needle bar and out through the escape port 73, whereby its free end is available for threading through the needle eyelet 72 (see FIG. 1).

The thread or yarn for use with the embodiment of the invention shown in the drawings is fed from four separate cones (not shown), the yarn from each cone leading to one of four tension devices 75 and thence through a respective opening 76 in a guide plate 77 suitably mounted in position above the upper ends of the needle bars 31–34 for rotation with the turret as one of the needle bars is selected for operation. The tension devices 75 are well known and, therefore, it is believed that a detailed description of their structure is unnecessary.

In the operation of the attachment, let it be assumed that four different colors of yarn are to be employed. The yarn from each cone is fed therefrom and threaded through one of the tensioning devices 75, the respective guide opening 76 therefor, down through the bore 68 of the respective needle bar, and out through the escape port 73 therein for threading through the eyelet 72 of the needle 71 carried by that particular needle bar. When all of the needles are threaded, assume that the needle bar 31 is to be selected and it is not, at the time, in operative position. Lateral pressure on the needle bar latch 54 is exerted to move it counterclockwise against the tension of the spring 57 until the latch swings clear of the needle bar with which it is then associated. By rotating the disc 60, the turret of needle bars may be rotated, the flanged guides 37 and 38 turning relatively to their respective brackets 42 until such time as the needle bar 31 occupies the position shown in FIG. 3. The latch 54 is then permitted to return under the influence of the spring 57 to bring the recess 60 thereof into engagement with the needle bar 33, at which time the recess 60 causes the needle bar 33 to center therein and thus locate the needle bar 31 in correct operative position and lock the turret to maintain the needle bar 31 in position with the lug 48 thereon in alignment with the slot 50 in the idler plate 45. At the time that the needle bar 31 completes its movement into operative position, the driving lug 63 thereon moves into position between the arms 67 of the complementary driving lug or yoke 65 on the machine needle bar 14. Thereafter, rotation of the main shaft 15 of the machine effects the reciprocation of the needle bar 14, which in turn reciprocates the needle bar 31 in unison therewith. At any time that it is desired to select another of the needle bars 32, 33 or 34, the needle bar 31 is raised to its uppermost position by rotation of the hand wheel 16 and the yarn is cut at a point between the needle 71 and the material being stitched to release it from the latter, whereupon the latch 54 is released and the turret of needle bars rotated in one direction or the other through the medium of the disc 60 to bring another selected needle bar into operative position.

Thus it will be seen that the present invention provides an attachment for a sewing machine which adapts it for use, particularly in connection with the sewing of tufted materials, in the mending or sewing of designs on materials where different yarns or yarns of different colors are called for. It is simple in its form and operation, and mode of attachment, and its time-saving efficiency is outstanding.

As stated heretofore, a preferred embodiment of the invention has been shown and described and modifications and variations thereof may occur to those skilled in the art. It is to be understood, therefore, that the appended claims are not to be construed as limited to the embodiment of the invention shown herein, nor are they to be interpreted as limited to any particular form or embodiment of the invention except as limitations may be expressly set forth therein.

Having thus described my invention, what I claim is:

1. A needle turret attachment for use in a sewing machine comprising a central supporting rod, upper, lower and intermediate guide members connected to said supporting rod in vertically spaced alignment thereon, each of said guide members being provided with a plurality of aligned bores, a needle bar reciprocally mounted in each of said aligned bores to define a needle bar cluster, an idler plate spaced above said upper guide member, said idler plate having a central aperture encircling the cluster of needle bars and a laterally extending slot in communication with said aperture, a laterally extending lug connected to each of said needles, said lug being adapted to be received in said slot when placed in alignment therewith, the arrangement being such that all but the selected needle is maintained in an inoperative position by said idler plate, means connected to said intermediate guide member for effecting manual selection of the respective

needle bars, means for latching and holding said attachment in selected position, said latching means including a latching bar which is positively held into latching engagement with said needle bar cluster, means for detachably connecting the selected needle to the driving mechanism of a sewing machine, and yarn tensioning and guide means operatively associated with each of said needle bars, said tensioning and guide means being disposed exteriorly of their respective cooperating needle bars.

2. In a sewing machine including mechanism operative to effect vertical reciprocation of a regular needle bar, the improvement of a needle turret attachment comprising:

(*a*) a central supporting rod,

(*b*) a plurality of separate, distinct and readily detachable guide members connected to said supporting rod,

(*c*) said guide members including an upper guide member, a lower guide member, and an intermediate guide member, said guide members being coaxially supported on said rod in vertically spaced alignment,

(*d*) each of said guide members having a plurality of circumferentially spaced bores extending therethrough and the corresponding bores of the respective guide members being disposed in axial alignment,

(*e*) upper and lower bracket means for rotatably supporting said upper and lower guide members respectively onto said sewing machine,

(*f*) a plurality of auxiliary tubular needle bars, said auxiliary needle bars being reciprocally mounted in the aligned bores of said guide members to define a needle bar cluster,

(*g*) an idler plate connected in spaced relationship above said upper guide member,

(*h*) said idler plate having a central aperture encircling said cluster of needle bars and said plate having a lateral slot communicating with said aperture,

(*i*) an idler lug connected to each of said auxiliary needle bars for supporting its respective needle bar in inoperative positon on said plate, each of said lugs being adapted to pass through said slot when an idler lug of a given needle bar is placed in alignment therewith whereby all but the selected needle bar is maintained in an inoperative position thereby,

(*j*) a selector ring fixed to said intermediate guide member for effecting manual selection of the respective auxiliary needle bar to operative position,

(*k*) means for latching and locking said attachment in a selected needle bar position,

(*l*) said latter means including a latch bar pivotally mounted at one end of said upper bracket means,

(*m*) said latch bar having an arcuate recess to frictionally engage an inoperative needle bar disposed opposite the selected operative needle bar,

(*n*) a spring means connected to the free end of said latch bar for normally urging said latch bar into operative holding and locking position,

(*o*) readily releasable means for engaging the selected needle bar into operative driving relationship with the regular needle bar of the sewing machine,

(*p*) said releasable means including a driving lug connected to each of said auxiliary needle bars,

(*q*) a mating yoke connected to the regular needle bar of the sewing machine, said driving lug being readily received between the arms of said yoke,

(*r*) said intermediate guide member having a series of elongated slots therein for reciprocally receiving the driving lug of the respective auxiliary needle bars during the operation of said machine,

(*s*) and a yarn tensioning and guide means operatively associated with each of said auxiliary needle bars, said yarn tensioning and guide means being positioned above and exteriorly of the respective auxiliary needle bars.

3. A needle turret attachment comprising:

(*a*) a central supporting rod,

(*b*) a plurality of separate, distinct and readily detachable guide members connected to said supporting rod,

(*c*) said guide members including an upper guide member, a lower guide member, and an intermediate guide member, said guide members being coaxially supported on said rod in vertically spaced alignment,

(*d*) each of said guide members having a plurality of circumferentially spaced bores extending therethrough and the corresponding bores of the respective guide members being disposed in axial alignment,

(*e*) upper and lower bracket means for rotatably supporting said upper and lower guide members respectively onto said sewing machine,

(*f*) a plurality of auxiliary tubular needle bars, each of said tubular auxiliary needle bars being reciprocally mounted in the aligned bores of said guide members to define a needle bar cluster,

(*g*) an idler plate connected in spaced relationship above said upper guide member,

(*h*) said idler plate having a central aperture encircling said cluster of needle bars and said plate having a lateral slot communicating with said aperture,

(*i*) an idler lug connected to each of said auxiliary needle bars for supporting its respective needle bar in inoperative position on said plate, each of said lugs being adapted to pass through said slot when an idler lug of a given needle bar is placed in alignment therewith whereby all but the selected needle bar is maintained in an inoperative position thereby,

(*j*) a selector ring fixed to said intermediate guide member for effecting manual selection of the respective auxiliary needle bar to operative position,

(*k*) means for latching and locking said attachment in a selected needle bar position,

(*l*) said latter means including a latch bar pivotally mounted at one end of said upper bracket means,

(*m*) said latch bar having an arcuate recess to frictionally engage an inoperative needle bar disposed opposite the selected operative needle bar,

(*n*) a spring means connected to the free end of said latch bar for normally urging said latch bar in operative holding and locking position,

(*o*) readily releasable means adaptable for engaging the selected needle bar into operative relationship with the driving mechanism of the sewing machine,

(*p*) said releasable means including a driving lug connected to each of said auxiliary needle bars,

(*q*) said driving lug being adapted to be readily received between the arms of a mating yoke connected to the regular needle bar of the sewing machine,

(*r*) said intermediate guide member having a series of elongated slots therein for reciprocally receiving the driving lug of the respective auxiliary needle bars,

(*s*) and a yarn tensioning and guide means operatively associated with each of said auxiliary needle bars, said yarn tensioning and guide means being positioned above and exteriorly of the respective auxiliary needle bars.

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