

April 29, 1958

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2,832,301

ALTERNATE NEEDLE TUFTING MACHINE

Filed Dec. 17, 1956

3 Sheets-Sheet 1

Fig. 1

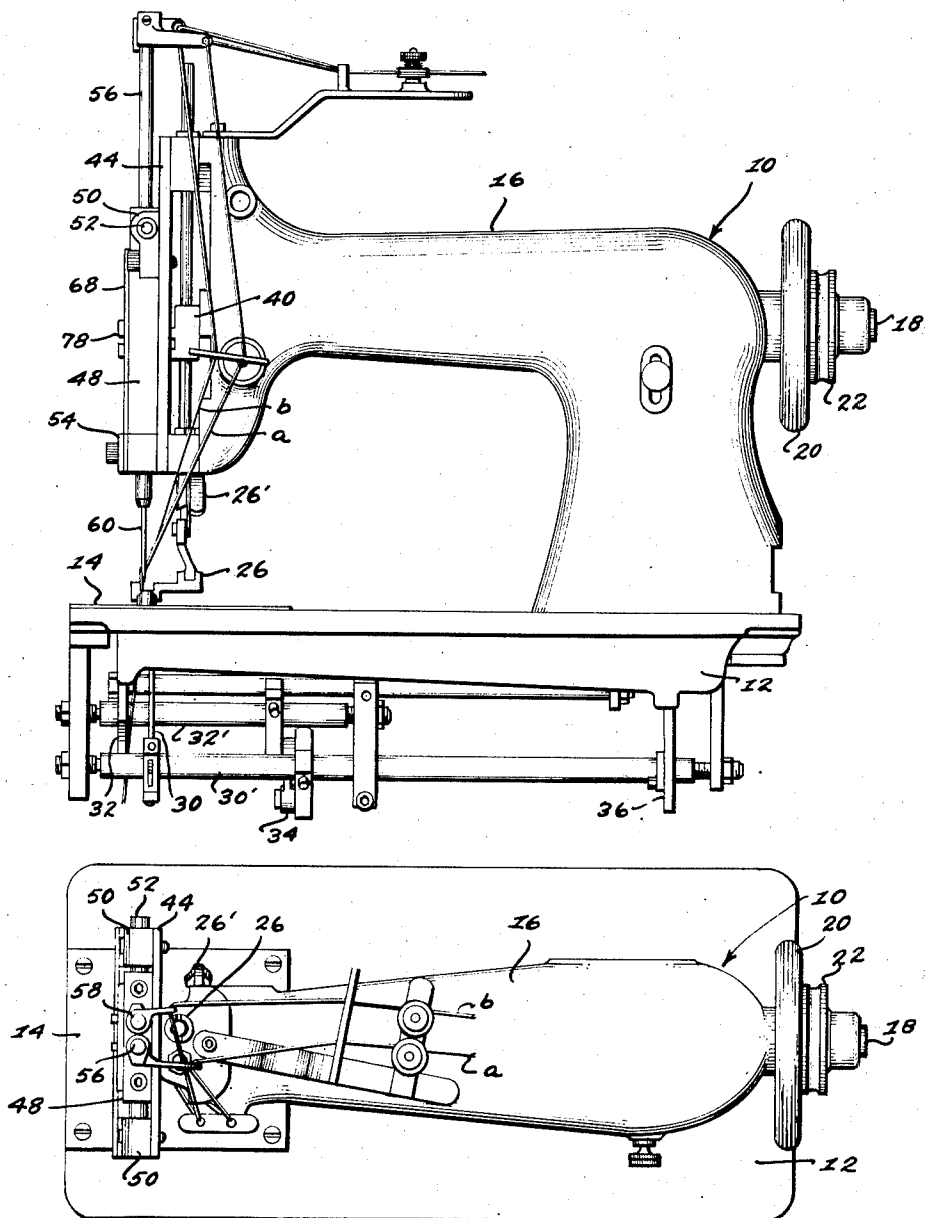


Fig. 2

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Fig. 3

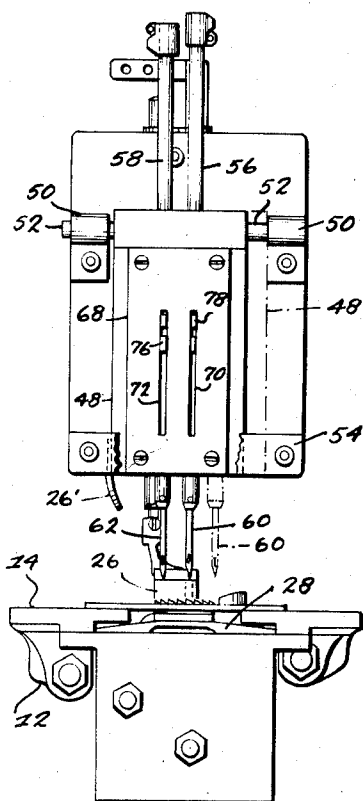


Fig. 4

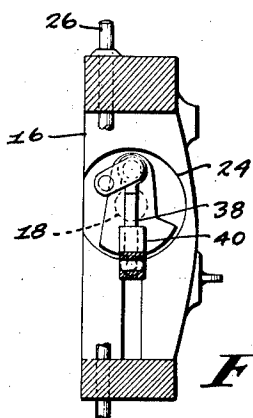
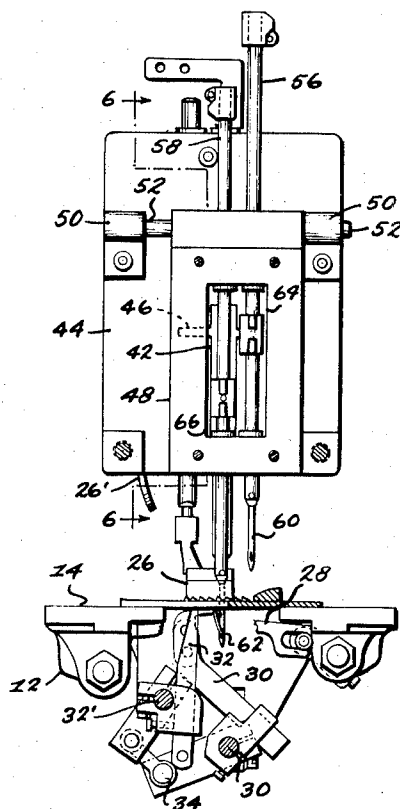


Fig. 5

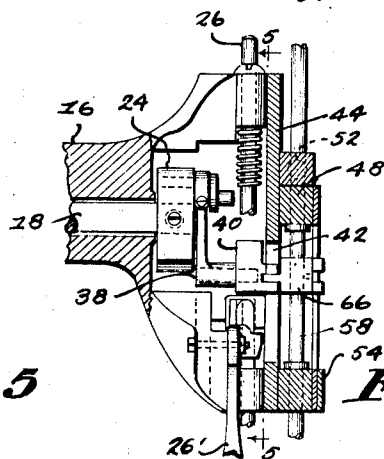


Fig. 6

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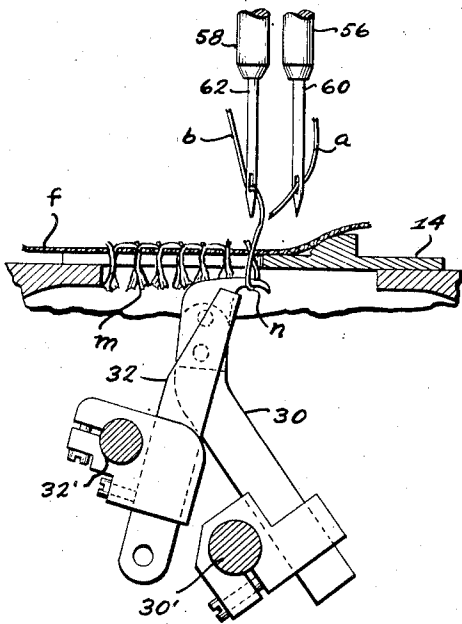


Fig. 7

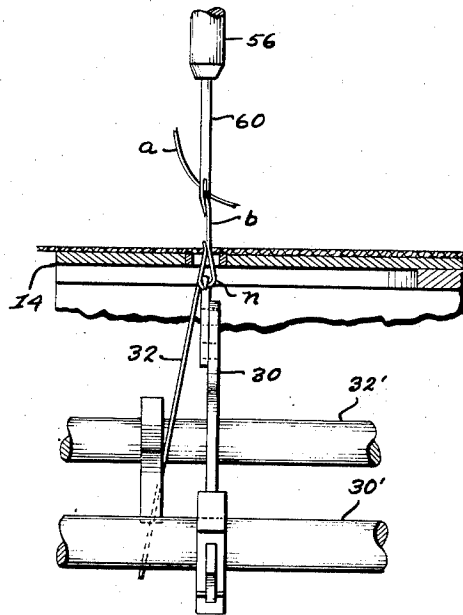


Fig. 8

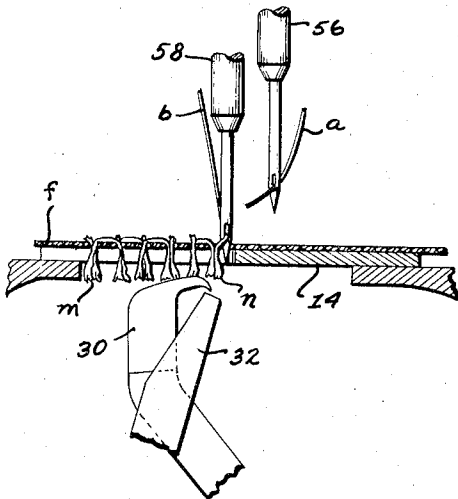


Fig. 9

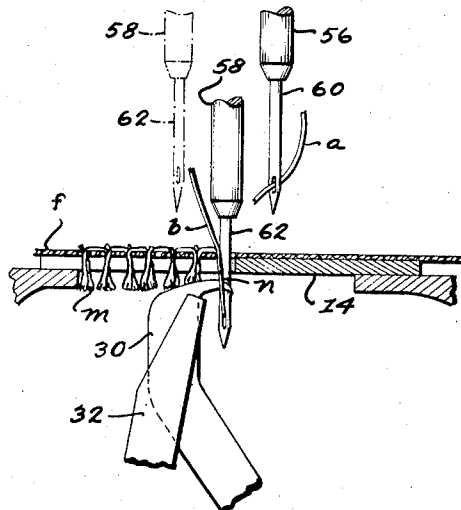


Fig. 10

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ALTERNATE NEEDLE TUFTING MACHINE

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Application December 17, 1956, Serial No. 628,589

5 Claims. (Cl. 112-79)

This invention relates to tufting machines of the type arranged for inserting tuft loops in a fabric base, and more particularly to a tufting machine of this sort arranged uniquely for pattern work through selective use of a plurality of alternate needles to insert tuft loops of different colored yarns.

Briefly described, the present invention is characterized by the arrangement of a plurality of tuft loop inserting needles on a laterally shiftable head member so that any one of the needles may be selectively operated upon lateral shifting of this head member to dispose the particular needle selectively for such operation. As a result of this arrangement, when different colored yarns are supplied to the respective needles they may be readily selected alternatively to insert tuft loops of the different colors in a base fabric according to a particular pattern desired, while continuing the tufting of the base fabric on the same machine and without substantial interruption in changing from tuft loops of one color to another.

The present invention is described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of a tufting machine embodying the present invention;

Fig. 2 is a top plan view corresponding to Fig. 1;

Fig. 3 is an end view as seen from the left in Fig. 1, with the laterally shiftable head member shown in full lines at its left hand shifted position, and with the right hand shifted position thereof indicated in broken lines;

Fig. 4 is a generally corresponding end elevation, with the laterally shiftable head member shown in its right hand shifted position, with the operative needle shown downwardly extended to insert a tuft loop, and with the lower portion of the machine broken away to illustrate the arrangement of the other tuft forming elements;

Fig. 5 is a sectional detail taken substantially on the line 5-5 in Fig. 6;

Fig. 6 is a sectional detail taken substantially on the line 6-6 in Fig. 4;

Fig. 7 is a fragmentary detail corresponding generally to Fig. 4 but showing the extended needle in Fig. 4 returned to its raised position after inserting a tuft loop;

Fig. 8 is a right side detail corresponding generally to Fig. 7;

Fig. 9 is a further fragmentary detail corresponding generally to Fig. 7 but showing the commencement of a succeeding tuft inserting operation with the same needle; and

Fig. 10 is a further similar fragmentary detail showing the inserted tuft loop being taken from the operative needle by the related tuft forming elements, with the retracted position of this needle indicated in dotted lines as it would appear upon shifting to inoperative position for insertion of the next tuft loop by the other needle shown.

Referring now in detail to the drawings, and more particularly at first to Figs. 1 and 2, the illustrated embodiment of the present invention comprises a tufting head

of conventional form, as indicated generally by the reference numeral 10, having a base portion 12 which extends forwardly to form a work support at 14, and having a supporting arm portion 16 in which a drive shaft 18 is journaled (compare Fig. 6). The drive shaft 18 is fitted with the usual hand wheel 20 and drive pulley 22 at its rear end, and is arranged at its forward end in the usual manner to carry a crank mechanism 24 (see Figs. 5 and 6), although this crank mechanism is specially arranged to provide for selective operation of the plural pattern forming needles according to the present invention, as is described further below. The tufting head 10 also has a presser foot 26 arranged thereon that may be raised and lowered by a lever control arm 26' in the conventional manner for pressing work (such as a fabric base *f*, as seen in Figs. 7 to 10) downwardly on the work support 14 so that the work may be moved transversely across the work support 14 during the tufting operation by conventional work feeding means such as is indicated fragmentarily in Figs. 3 and 4, at 28.

The downward insertion of different colored tufting yarns *a* and *b* results in forming respective pile tufts *m* and *n* at the lower face of the fabric base *f* (see Figs. 7 to 10), which are originally disposed as loops that are taken beneath the fabric base *f* and held against withdrawal by a looper element 30, in relation to which a knife element 32 operates in the illustrated embodiment to cut these loops so that the tufts *m* and *n* become so-called chenille ends, although loopers might otherwise be arranged in conventional form to maintain the tufts *m* and *n* as loops if desired. The looper element 30 and knife element 32 are arranged in the tufting head 10 on rock shafts 30' and 32' that are connected for related operation through a linkage system at 34 and that are actuated from the tufting head drive shaft 18 through a suitable connection therewith as indicated at 36.

According to the present invention, the crank mechanism 24 incorporates a pitman 38 that carries a grooved block member 40 at its extending end arranged for reciprocation in a vertical slot 42 formed in a head or plate member 44 fixed at the forward end of the supporting arm portion 16 of the tufting head 10. This fixed head member 44 also has an intersecting horizontal slot 46 formed therein. The crank mechanism 24 is conventionally arranged for stopping with the grooved block member 40 disposed at the upper reach of its reciprocating stroke (as illustrated in Fig. 6), and the horizontal slot 46 in the fixed head member 44 is formed in alignment with the groove in the block member 40 at this stopped disposition.

The fixed head member 44 is also arranged according to the present invention to carry a laterally shiftable head member 48 at its forward face, the fixed head member 44 being fitted for this purpose with upper slide bearings 50 arranged to receive slide rods 52 extending at each side of the laterally shiftable head member 48, and with a lower containing guide bar 54. The laterally shiftable head member 48 is in turn arranged to carry a plurality of needle bars 56 and 58 in parallel spaced relation for axial reciprocation. Each of these needle bars 56 and 58 is fitted at its lower end in the usual manner with needles 60 and 62 for having the respective tufting yarns *a* and *b* trained thereto, and each of the needle bars 56 and 58 further has laterally extending lug members 64 and 66 fixed thereon intermediate their length so as to be disposed for operation within the laterally shiftable head member 48. These lug members 64 and 66 extend laterally from the needle bars 56 and 58 in transverse relation with respect to the shifting direction of the laterally shiftable head member 48 and are shaped for alternative disposition within the horizontal slot 46 in the fixed head member 44, or for engagement with the grooved block member 40

of the crank mechanism 24 to reciprocate therewith within the vertical slot 42 in the fixed head member 44. The laterally shiftable head member 48 is further fitted with a cover plate 68 in which a plurality of vertical slots 70 and 72 are formed corresponding in number with the number of needle bars 56 and 58 and aligned therewith so that further projections from the needle lug members 64 and 66, as indicated at 74 and 76, may be arranged to ride in these aligned slots 70 and 72 and thereby key the needle bars 56 and 58 against rotation about the reciprocating axes thereof.

As a result of this arrangement, any one of the needle bars 56 and 58 may be selectively engaged for operating reciprocation by the crank mechanism 24 upon shifting of the laterally shiftable head member 48 to dispose one of these needle bars 56 or 58 selectively at the vertical slot 42 in the fixed head member 44 so that the lug member 64 or 66 thereon is engaged with the grooved block 40 of the crank mechanism 24, whereupon the remaining needle bar 58 or 56 is automatically held inactive by a resulting disposition of the lug member 66 or 64 thereon within the horizontal slot 46 of the fixed head member 44. The selected needle bar 56 or 58 will continue in this operative engagement with the crank mechanism 24 until the laterally shiftable head member 48 is purposely shifted to dispose another needle bar 58 or 56 for operation, which shifting may be accomplished readily whenever the crank mechanism 24 is stopped.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. In a tufting machine, a plurality of needle bars carrying tuft loop inserting needles, a laterally shiftable head member supporting said needle bars in parallel spaced relation for reciprocation transversely of the direction in which said head member is laterally shiftable, a driving crank means adjacent said head member, and means for selectively engaging any one of said needle bars with said crank means for reciprocation thereby upon lateral shifting of said head member to dispose one of said needle bars selectively for such engagement.

2. In a tufting machine, a plurality of needle bars carrying tuft loop inserting needles, a laterally shiftable head member supporting said needle bars in parallel spaced relation for reciprocation transversely of the direction in which said head member is laterally shiftable, a lug member fixed on each of said needle bars intermediate the length thereof, a driving crank means adjacent said head

member including a pitman having a grooved block at the extending end thereof, and means for guiding said lug members into engagement alternatively with said grooved block member upon lateral shifting of said head member.

3. In a tufting machine, a fixed head member, a laterally shiftable head member carried on said fixed head member, a plurality of needle bars slidably mounted on said laterally shiftable head member in parallel spaced relation for axial reciprocation transversely of the direction in which said head member is laterally shiftable, a laterally extending lug member fixed on each of said needle bars intermediate the length thereof, intersecting horizontal and vertical slots formed in said fixed head member for allowing disposition of said laterally extending lug member therethrough transversely with respect to the shifting direction of said laterally shiftable head member, a driving crank means including a pitman having a block member at the extending end thereof disposed for reciprocation in said vertical slot and grooved for selective engagement by said lug members, whereby any one of said needle bars may be selectively engaged for reciprocation by said crank means upon shifting of said laterally shiftable head member to dispose one of said needle bars selectively at said vertical slot for such engagement, and whereby the remaining needle bars are held inactive by resulting disposition of the lug member thereon within said horizontal slot.

4. In a tufting machine, the structure defined in claim 3 and further characterized in that said driving crank means is arranged for stopping with said block member disposed at one end of its reciprocating stroke, and said horizontal slot is formed in alignment with the lug member engaging groove in said block member at said stopped disposition.

5. In a tufting machine, the structure defined in claim 3 and further characterized in that said laterally shiftable head member is formed with a corresponding plurality of slots aligned with said reciprocable needle bars, and said needle bars have projections arranged thereon to ride in said aligned slots and thereby key said needle bars against rotation about the reciprocating axes thereof.

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