

Dec. 9, 1947.

A. E. CHARLES

2,432,469

TUFTING MACHINE

Filed March 10, 1947

2 Sheets-Sheet 1

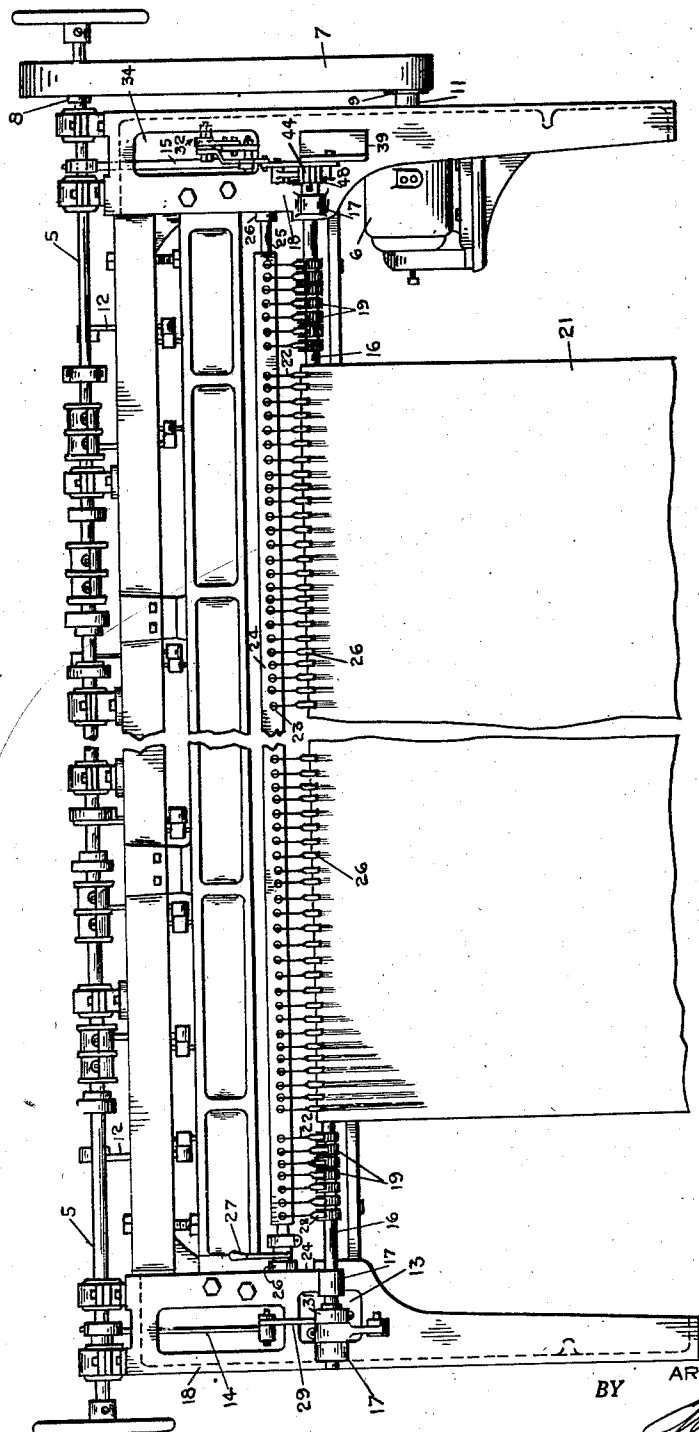


Fig. 1

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2 Sheets-Sheet 2

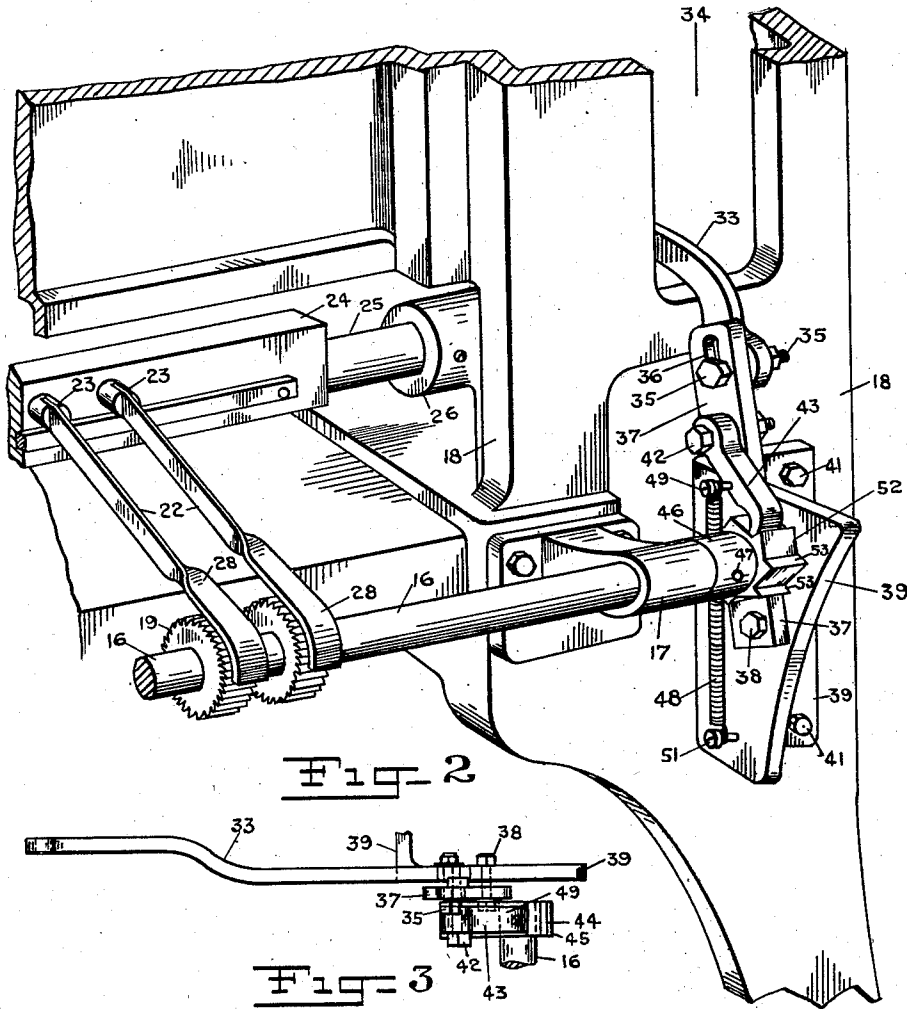


Fig-2

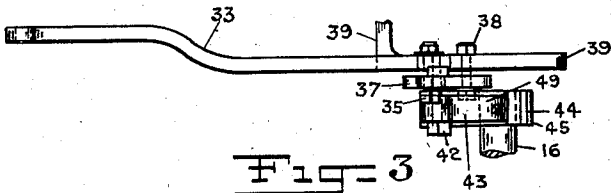


Fig-3

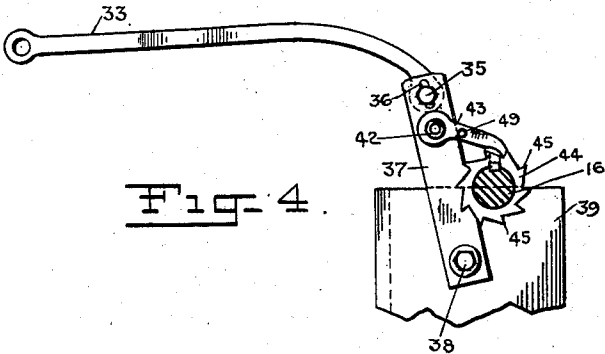


Fig-4

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TUFTING MACHINE

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4 Claims. (Cl. 112-79)

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This invention relates to a process and machine for producing tufts on a base material, and relates more particularly to a novel process and machine for simultaneously producing a plurality of tufts on a web of textile fabric, which tufts may be spaced from each other a predetermined distance.

In Patent No. 2,335,487 to Cobble et al. there is shown and described a multiple needle tufting machine which is designed to produce in single operation up to over two hundred stitches, or tufts, running laterally of the machine. By omitting certain of the needles on said machine, the lateral spacing of the tufts is easily arranged. It is an important object of this invention to provide a novel and relatively simple means for longitudinally spacing the tufts which may be formed of one or more stitches.

Another object of this invention is to provide auxiliary drive means for the feed shaft of a multiple needle tufting machine so that, at a predetermined interval in the normal feed of the fabric web, the rate of the fabric web feed is momentarily increased whereby a space of predetermined extent is formed between the tufts being formed longitudinally of the fabric web, without effecting the normal reciprocation of the needle bank.

A further object of this invention is a novel process for the producing on a base comprising a web of textile fabric a plurality of tufts in spaced relationship.

Other objects and advantages of this invention, together with certain details of construction and combinations of parts, will appear from the following detailed description and will be pointed out in the appended claims.

In the drawings wherein a preferred embodiment of my invention is shown,

Fig. 1 is a rear elevational view of a multiple needle tufting machine modified in accordance with my invention;

Fig. 2 is a fragmentary view, on an enlarged scale, of the rear of a multiple needle tufting machine, showing my novel auxiliary drive means for the web feed shaft;

Fig. 3 is a top view of details of auxiliary drive means; and

Fig. 4 is a side view thereof.

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Like reference numerals indicate like parts throughout the several views of the drawings.

Since the multiple needle tufting machine to which my novel auxiliary drive means is attached is fully shown and described in the above-mentioned Cobble et al. patent, I will describe this well-known mechanism only to such extent as is necessary properly to disclose the present invention.

Referring to Fig. 1 of the drawings, the multiple needle tufting machine is shown as comprising a drive shaft 5 which is driven by a motor 6 through a belt 7 connecting a pulley 8 fixed to the drive shaft 5 and a pulley 9 carried by motor shaft 11. The drive shaft 5 actuates the needle bar of the machine; the fabric web feed mechanism, generally indicated by reference numeral 13, through a connecting rod 14; and the looping and loop cutting mechanisms of the machine through a connecting rod 15.

More specifically, the feed mechanism comprises a shaft 16 which is journaled in bearings 17 attached to the framework 18 of the machine. Along the shaft 16 are fixed in any desired order a plurality of serrated or toothed discs 19 over which the fabric web 21 being tufted is trained after it is fed past the needle bank. For holding the fabric web against the serrated discs 19 there is provided a gripper 22, one for each disc, which is removably mounted in a suitable slotted holder 23, carried on a bar 24 extending substantially across the width of the machine. The bar 24 is fixed to a rod 25 rotatably mounted in bearings 26 on the framework 18 of the machine. A handle 27 is fixed to rod 25 and is adapted to lift simultaneously all of the grippers 22 relative to the serrated discs 19. The gripper comprises a finger 28, preferably of resilient metal, which is bent so that it may conform to the curvature of the periphery of the disc 19 and partially surround said periphery. Operatively connected to rod 14 is a rocker arm 29 which is attached to a clutch mechanism 31 which is adapted to move the serrated discs, and thereby the fabric web, a stitch length, usually about one-sixteenth of an inch. Rocker arm 29 reciprocates continuously to cause clutch 31 to rotate shaft 15 intermittently to feed the fabric web while the needle bank is in raised position. Thus the stitches or loops will be equally spaced and rela-

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tively close together to form a tuft of the desired number of stitches or loops which may be two, three, four or more, depending upon the size of the tuft desired.

When the tuft of predetermined number of stitches or loops is completed, the fabric web is fed past the needle bank a greater amount than is caused to be fed by the clutch 31, thereby providing a space between the tufts, this space being about three-eighths of an inch but which may be greater or less as desired. To effect the variation in the feed of the fabric web, I have provided an auxiliary feed mechanism which may be readily attached to a multiple needle tufting machine with little or no modification of the elements thereof as will hereinafter appear.

To the connecting rod 15, which normally operates the looping and loop cutting mechanisms of the multiple needle tufting machine above identified, is attached a bracket structure generally indicated by reference numeral 32 (see Fig. 1). Pivotally mounted on said bracket structure 32 is one end of a bent arm 33 which extends through an opening 34 in the framework 18 of the machine.

The other end of bent arm 33 is pivotally mounted on a bolt 35 adjustably held in a slot 36 in a lever arm 37. The lever arm is pivotally mounted on a bolt 38 fixed to an angular bracket 39 attached, as by screw bolts 41, to framework 18 of the machine.

The lever arm 37 carries a bolt 42 on which is pivotally mounted a pawl 43 which cooperates with a ratchet wheel 44 having teeth 45 of predetermined size for a purpose hereinafter set forth. The ratchet wheel is mounted, as by means of a collar 46 and set screw 47, on the end of feed shaft 16 remote from the end on which clutch 31 is mounted. A spring 48 attached at one end to a pin 49 carried by pawl 43 and at its other end to a pin 51 fixed to bracket 39 serves to maintain pawl 43 in contact with the ratchet wheel 44.

In describing the operation of the multiple needle tufting machine as modified in accordance with my invention, it will be assumed that each tuft is composed of four stitches or loops. As in the normal operation of the machine, the connecting rod 14 causes rocker arm 29 to reciprocate and each stroke of said rocker arm away from the machine causes clutch 31 to turn feed shaft 16 and the serrated discs 19 mounted thereon a sufficient distance to move the fabric web 21 a stitch length. As modified, the ratchet wheel 44 is also rotated by the turning of feed shaft 16. At the same time and at the same periodicity as the reciprocation of rocker arm 29, bent arm 33 is caused to reciprocate by connecting rod 15, thus causing lever arm 37 and pawl 43 to reciprocate. However, the ratchet wheel teeth 45 are of such size that on the four turns of the feed shaft 16, wherein each turn moves the fabric web a stitch length, the pawl 43 moves on the top surface 52 of a tooth of the ratchet wheel without affecting the normal turning, i. e., feeding, movement of the feed shaft. On the fourth stroke of the rocker arm, the feed shaft moves the ratchet wheel so that the pawl on its forward reciprocation stroke strikes the end surface 53 of the tooth to move the ratchet wheel. The feed shaft has thus superimposed upon it an auxiliary feeding movement, which movement is at a greater rate of speed than the normal intermittent stitch length movement effected by the movement of the clutch by the rocker arm 29.

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The extent of the auxiliary feeding movement effected by the movement of the ratchet wheel by the pawl may be varied or adjusted by changing the size of the teeth of the ratchet wheel and/or by adjusting the position of the bolt 35 in the slot 36 in the lever arm 37.

The embodiment of my invention shown and described herein is to be considered merely as illustrative, as my invention is susceptible to variation, modification and change within the spirit and scope of the appended claims.

What is claimed is:

1. In a machine for forming in a web of material tufts composed of a predetermined number of stitches or loops by a plurality of needles reciprocated by the main shaft and wherein the web is fed progressively through said machine a distance of a stitch length at a time by means including a feed shaft intermittently rotated by a connecting rod operatively connected to said main shaft, means for spacing said tufts comprising separate means fixed to said feed shaft and a connecting rod operatively connected to said main shaft for operating said means fixed to said feed shaft to rotate said feed shaft at spaced intervals at a faster rate of speed than it is normally rotated.

2. In a machine for forming in a web of material tufts composed of a predetermined number of stitches or loops by a plurality of needles reciprocated by the main shaft and wherein the web is fed progressively through said machine a distance of a stitch length at a time by means including a feed shaft intermittently rotated by a connecting rod operatively connected to said main shaft, means for spacing said tufts comprising a ratchet wheel fixed to said feed shaft, a pawl for moving said ratchet wheel and a connecting rod operatively connected to said main shaft and to said pawl for reciprocating said pawl to move said ratchet wheel to rotate said feed shaft at spaced intervals at a rate of speed faster than it is normally rotated.

3. In a machine for forming in a web of material tufts composed of a predetermined number of stitches or loops by a plurality of needles reciprocated by the main shaft and wherein the web is fed progressively through said machine a distance of a stitch length at a time by means including a feed shaft intermittently rotated by a clutch operated by a connecting rod operatively connected to said main shaft, means for spacing said tufts comprising a ratchet wheel fixed to said feed shaft, a pawl for moving said ratchet wheel and a connecting rod operatively connected to said main shaft and to said pawl for reciprocating said pawl to move said ratchet wheel to rotate said feed shaft at spaced intervals at a faster rate of speed than it is rotated by said clutch.

4. In a machine for forming in a web of material tufts composed of a predetermined number of stitches or loops by a plurality of needles reciprocated by the main shaft and wherein the web is fed progressively through said machine a distance of a stitch length at a time by means including a feed shaft intermittently rotated by a clutch operated by a connecting rod operatively connected to said main shaft, means for spacing said tufts comprising a ratchet wheel, having a plurality of teeth each having a flat surface and an end face at an angle to said surface, fixed to said feed shaft, a pawl for moving said ratchet wheel and a connecting rod operatively connected to said main shaft and to said pawl for reciprocating said pawl to move said ratchet wheel to rotate said feed shaft at spaced intervals at a faster rate of speed than it is rotated by said clutch.

cating said pawl to move said ratchet wheel to rotate said feed shaft at spaced intervals at a faster rate of speed than it is rotated by said clutch, the construction and arrangement being such that an end face of a tooth is moved into path of said reciprocating pawl only after a predetermined number of web feeding movements of said clutch.

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