May 6, 1941. R. H. BRADWELL 2,241,113

CHENILLE TUFTING MACHINE

Filed Nov. 1, 1937 2 Sheets-Sheet 1

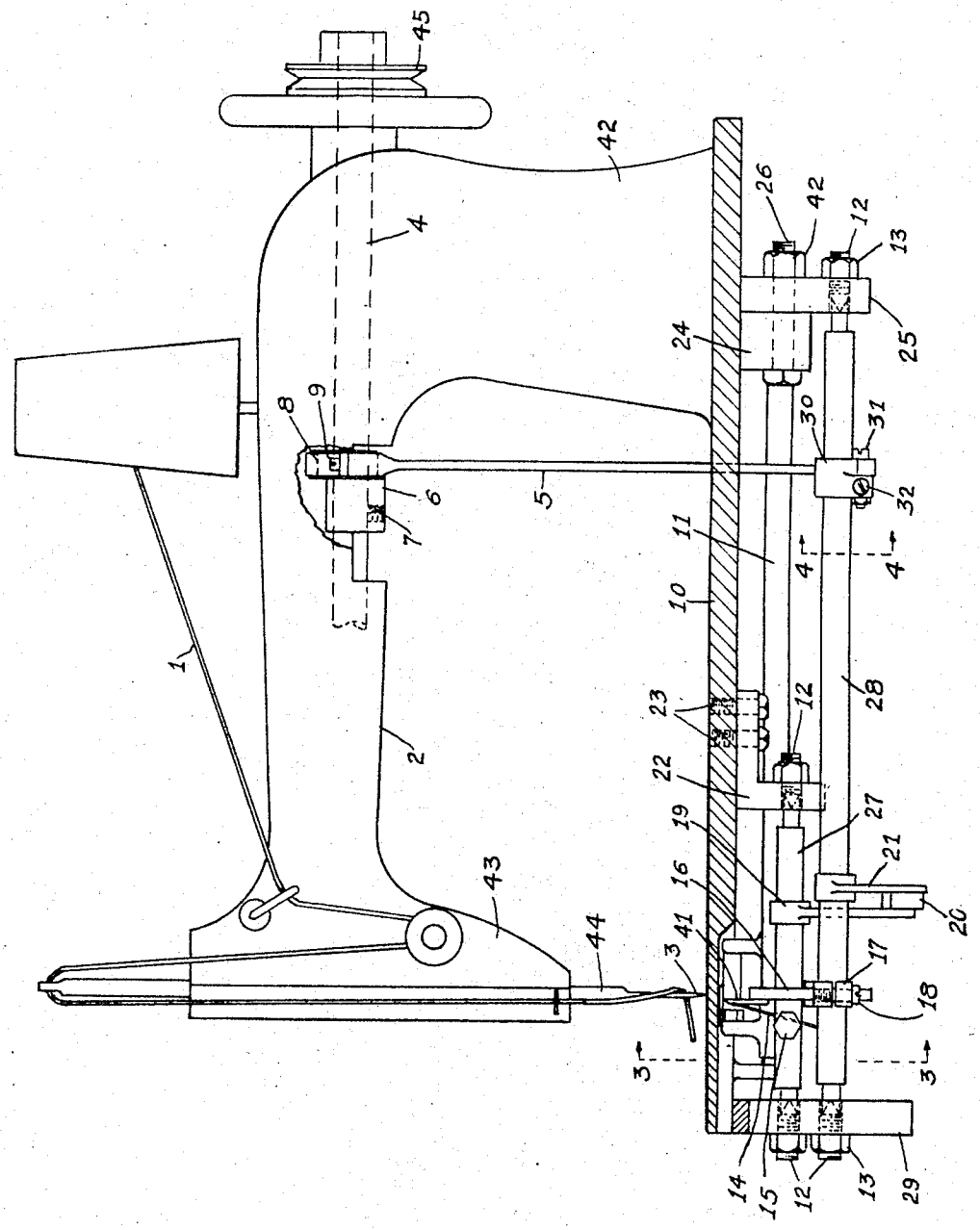


FIG. 1.

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CHENILLE TUFTING MACHINE

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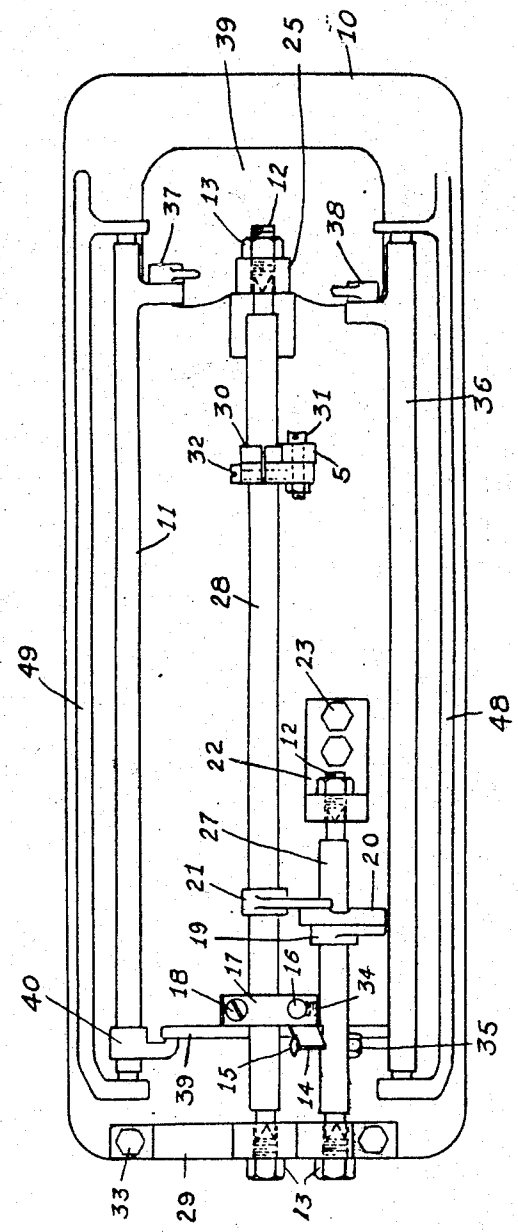


FIG. 2.

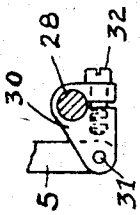


FIG. 4.

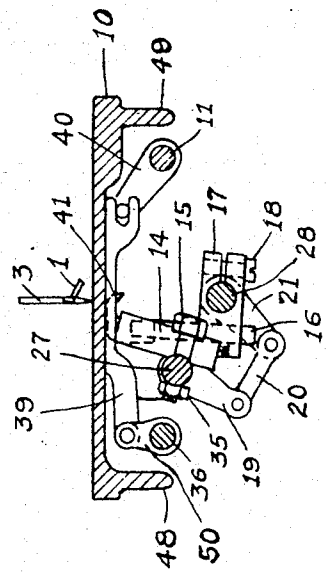


FIG. 3.

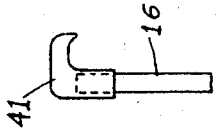


FIG. 5.

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Patented May 6, 1941

2,241,113

UNITED STATES PATENT OFFICE

2,241,113

CHENILLE TUFTING MACHINE

Robbie H. Bradwell, Dalton, Ga., assignor to Polly Prentiss, Inc., Sumter, S. C., a corporation of South Carolina

Application November 1, 1937, Serial No. 172,165

3 Claims. (Cl. 112—79)

My invention relates to sewing machines and more particularly to tufting attachments for sewing machines for making tufted bed spreads, rugs, etc.

In the prior art it has been the practice to pass a needle carrying a strand of yarn downwardly through fabric. Then as the needle starts its upward travel, slack is developed in the loop of yarn through which a finger or moving looper having a hook adjacent its end is passed to prevent it from being pulled back up through the fabric, and finally the loop is severed by a cutting edge.

The cutter generally takes the form of a pivoted blade mounted on the moving finger or looper which passes through and holds the loops. The moving finger generally carries a cutter blade pivoted thereto and to a fixed element. The cutter blade cooperates with the moving finger or a cutting edge thereon, and is moved in response to the movement of the finger to clip the loops. After these cutter blades have been used for a short time they become dull, and it is necessary to remove and sharpen them. In such an arrangement it is necessary to dismantle the whole tufting attachment to remove a blade, thereby removing the machine from operation for long periods. The finger and cutter blade are often operated from the feed dog shafts, placing great strains upon them, and often causing them to operate improperly and inefficiently in moving the fabric through the machine. Examples of such machine are disclosed in Boyce 1,963,349, Schmiedel, 2,027,054, Maples 1,963,441, Kalbach 1,832,636 and others.

In many instances the finger slides across the plane of the path of the needles at substantially right angles thereto. This necessitates the use of much more structure than is usually necessary when the finger simply moves in an arc. The form construction is disclosed in such patents as Boyce, supra, and Maples, supra.

There has been some attempt in the prior art to correct these defects by separately mounting the cutter from the looper or moving finger. Such a construction is shown in Keeney, 1,855,916. The finger or looper, however, is slotted and receives the cutter which severs the loops. It will be noted too, that both the cutter and the looper are operated from the feed dog shafts, placing great strain upon them, and the structure is even more complex than those employing a cutter blade pivoted to the finger.

Applicant with a knowledge of all of these defects in and objections to the prior art has for an object of his invention the provision of a tufting machine having the ordinary reciprocating needle, feed dogs, and driving shaft, with the addition of a moving finger for catching the loop and holding it, the finger being pivoted directly to a supplementary shaft which is driven from the main shaft of the machine; also a moving cutter mounted on a second supplemental shaft and which cooperates with the finger to sever the loops.

Applicant has as another object of his invention the substitution of supplemental shafts for operating the finger and cutter whereby to relieve the feed dog shafts of this strain, and permitting them to operate efficiently.

Applicant has as a further object of his invention the provision of a very simple and efficient means for operating the looper finger and cutter by joining them directly to supplemental reciprocating shafts.

Other objects and advantages of my invention will appear in the following specification and accompanying drawings and the novel features of the invention will be particularly pointed out in the annexed claims.

In the drawings Figure 1 is a front elevation of my improved machine, partly in section. Figure 2 is a plan view of the bottom of the machine. Figure 3 is a cross-sectional view taken along the line 3—3 of Figure 1. Figure 4 is a detail of the driving connection for the supplemental shaft. Figure 5 is a detail of the finger or looper.

Referring to the drawings in detail, 10 designates the usual bed plate of a sewing machine upon which is mounted the usual upright 42 having an arm 2 which terminates in the usual head 43, and carrying the usual reciprocating needle bar 44 in which is mounted the conventional tufting needle 3. The regular horizontal main shaft 4 is journaled in the upright 42 and the head 43 is adapted to be driven through the pulley 45 by the conventional belt or other means. A portion of the wall of the arm 2 is cut away and a cam carrying collar 6 is secured to shaft 4 by means of a set screw 7. The arm 5 is operated by the eccentric carried by the collar 6, it having a portion 8 disposed about said collar, and being held in place by screw 9. The opposite end of the arm 5 is pivoted at 31 to a collar 30, which is in turn mounted on a supplemental or drive shaft 28 by means of a screw 32.

The drive shaft 28 which extends substantially the length of the table is mounted beneath the table 10 in standards 29, 25 by the usual cone end set screws 12, 46. Mounted on the shaft

28 beneath the throat plate and adjacent the needle is a finger or looper 41, having a hook adjacent one end and an intermediate cutting edge. The finger 41 being mounted on member 16 which is in turn secured to collar 17 by set screw 33. Collar 17 is rigidly mounted on shaft 28 by screw 18.

Adjacent the first supplemental shaft 28, and running substantially parallel thereto, is a second supplemental shaft 27 which is shorter than the first. Shaft 27 is mounted in standards 29, 22 which are secured to the under side of the bed plate 10 by bolts 23, 33. Set screws 12, 47 have cone shaped ends for mounting supplemental shaft 27 in standards 22, 29.

Mounted on corresponding portions of supplemental shafts 28, 27 are arms 21, 19 and bridging these arms is a link 20.

Beneath the throat plate and adjacent the reciprocating needle 3 is a cutter blade rigidly secured to supplemental shaft 27 by means of a slotted bolt 15 which passes through the shaft and is secured in place by a nut 35. When the nut is loosened the cutter 14 is freely slidable in the slot of the bolt 15, and as the nut 35 is tightened the cutter 14 is pressed tightly against shaft 27 by bolt head 15 to retain it in position.

On either side of the bed plate 10 and projecting downwardly from the lower surface are flanges 48, 49. Journaled in flange 49 is oscillating shaft 11 driven from the main shaft through a pivotal connection 37 at one end. The opposite end, adjacent the throat plate of the machine, acts to move the feed dogs 39 in one direction through a link 40.

Journaled in flange 48 is oscillating shaft 36 driven from the main shaft by a pivotal connection 38. The opposite end of the shaft 36 carries the feed dog 39 and is attached to link 50, operating the feed dogs in one direction.

The supplemental rock shaft 28 is arranged between the rock shafts 11 and 36 of the work feed means and is driven separately from the same. The looper 41 is mounted upon the supplemental rock shaft 28 to turn therewith, and the cutter 14 is carried by the second supplemental rock shaft 27. The cranks 19 and 21 and link 20 cause the rock shaft 28 to turn the rock shaft 27 so that these supplemental rock shafts simultaneously turn in the same direction. The cutter 14 has slidable engagement with the looper 41 for shearing action therewith. It is thus seen that the rock shaft 28 and the cutter 14 are turned counter-clockwise when viewed from one side of the looper and clockwise when viewed from the opposite side of the looper.

The operation of the machine is somewhat as follows:

When the shaft 4 is revolved, the needle bar 44 and the needle 3 are reciprocated through the throat plate (not shown) in the usual manner. As the needle travels to the bottom of its stroke, it draws a loop of yarn 1 through the fabric, located on the upper surface of table 10 (not shown) in the usual manner.

As the needle 3 starts its upward travel leaving the fabric which it has pierced, slack is developed in the loop of yarn. At this instant finger 41 moves into the loop and across the plane of travel of the needle, catching the loop as the needle moves upward and holding it inside the hook. The movement of the finger 41 is in response to the action of the arm 5. The eccentric carried by collar 6 rotates with shaft 4 causing arm 5 to reciprocate thereby acting through collar 30 to oscillate shaft 28. Since moving finger 41 is mounted on shaft 28 by collar 17, this oscillation causes the finger 41 to move back and forth across the plane of the path of the needle 3 in an arc. In order to reduce the curvature of the arc, finger 41 is spaced from shaft 28 by means of adjustable extension 16, which may also be employed to vary the length of the loops.

As the needle travels further upward the loop is drawn tight about the finger which accommodates more than a single loop. The finger 41 then moves back towards its original position and a cutter 14 acts to cut some but not all of the loops on the finger. The cutter blade 14 moves in a slight arc and cooperates with moving finger 41 to clip the loops thereon.

As shaft 28 oscillates in response to movement of reciprocating arm 5, it carries with it arm 21 which acts through link 20 and arm 19 to impart an oscillating movement to supplemental shaft 27, causing it to rotate blade 14 into and out of engagement with finger 41 to clip the loops of yarn.

When the needle 3 reaches its highest position the finger 41 will have begun backward movement out of the plane of the path of the needle, and cutter blade 14 will have begun the clipping of a loop on finger 41.

The needle 3 again moves downwardly and the finger 41 moves to its extremity away from the plane of the path of the needle as the cutter 14 completes the clipping of a loop thereon. As the needle reaches its lower extremity and begins to rise, slack is again developed in the loop of yarn formed by the needle and the moving finger again moves out close to the needle 3 and passes through the loop of yarn as the cutter 14 is swung away from the finger. This process is repeated continuously as the piles are formed.

During this operation the feed dogs operate to move the fabric across the table 10 in a well known manner which is not believed to be necessary to describe.

Having thus described my invention, I claim:

1. In a tufting machine, a reciprocatory needle to carry the yarn through the fabric and produce a loop, work feed means, means to actuate the work feed means, a rock shaft separate from the work feed means, a looper bodily mounted upon the rock shaft to turn therewith for movement toward and from the needle, a movable cutter mounted independently of the looper and having slidable engagement with the looper to produce a shearing action therewith, and means operated by the rock shaft to move the cutter.

2. In a tufting machine, a reciprocatory needle to carry the yarn through the fabric and produce a loop, work feed means, means to actuate the work feed means including rock shafts, a supplemental rock shaft separate from the first named rock shafts, a looper bodily mounted upon the supplemental rock shaft to turn therewith and movable toward and from the needle, a second supplemental rock shaft, a cutter mounted upon the second supplemental rock shaft and separately mounted from the looper and having slidable engagement with the looper to produce a shearing action therewith, driving connecting means between the first and second named supplemental rock shafts so that the first named supplemental rock shaft turns the second named supplemental rock shaft in the same di-

rection with it, and means to operate the first named supplemental rock shaft.

3. In a tufting machine, a reciprocatory needle to carry the yarn through the fabric and produce a loop, work feed means, means to actuate the work feed means including rock shafts, a supplemental rock shaft arranged between the first named rock shafts, a looper mounted upon the supplemental rock shaft to turn therewith and movable toward and from the needle, a pivoted cutter mounted separately from the looper and slidably engaging the looper for having a shearing action therewith, a crank connected with the pivoted cutter to move it, a crank connected with the supplemental rock shaft, a link connecting said cranks, and means to move the supplemental rock shaft.

ROBBIE H. BRADWELL.