Dec. 12, 1950 J. BLUMFIELD 2,533,420

TUFTING MACHINE

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FIG. 1.

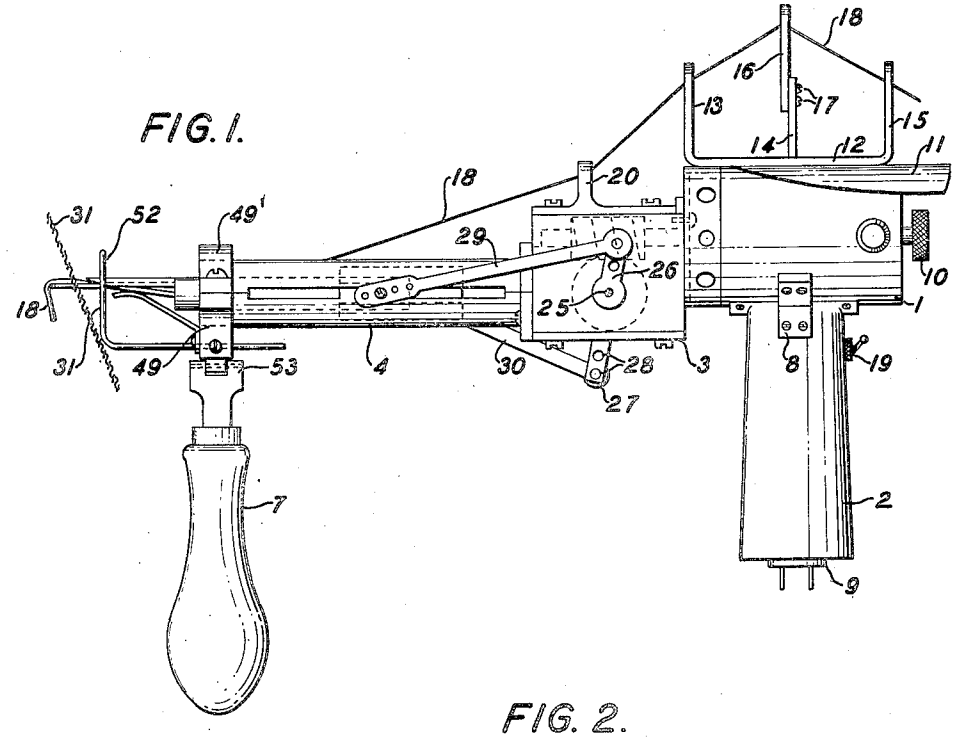
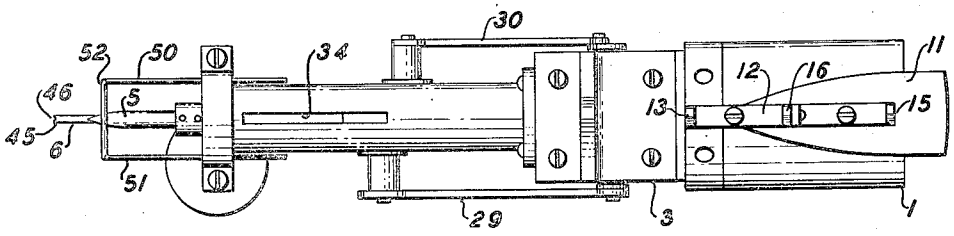


FIG. 2.



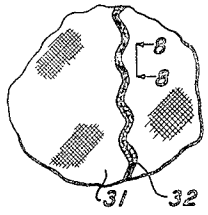


FIG. 7.

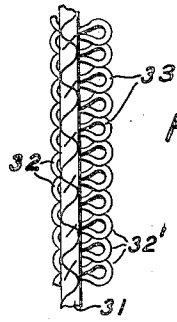


FIG. 8.

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FIG. 3.

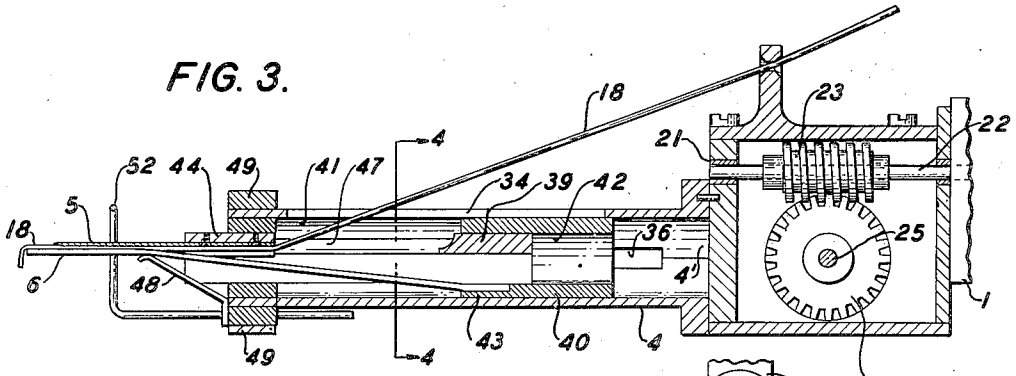


FIG. 5.

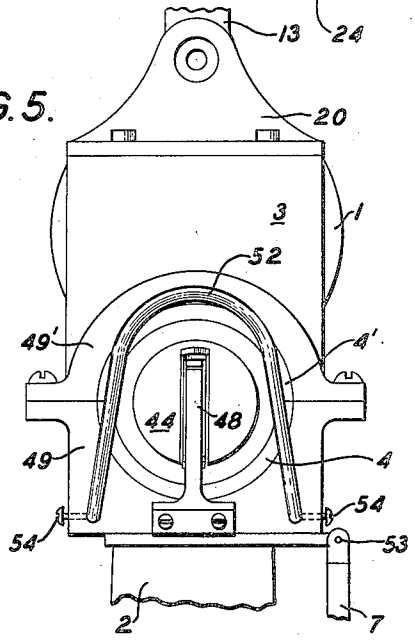
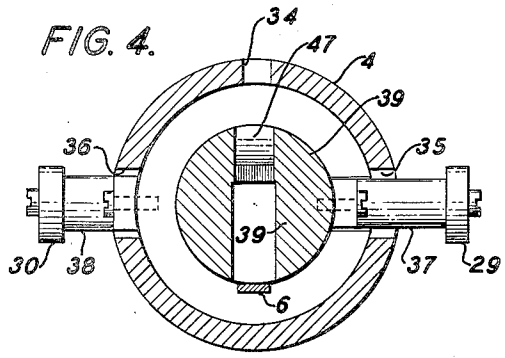


FIG. 4.



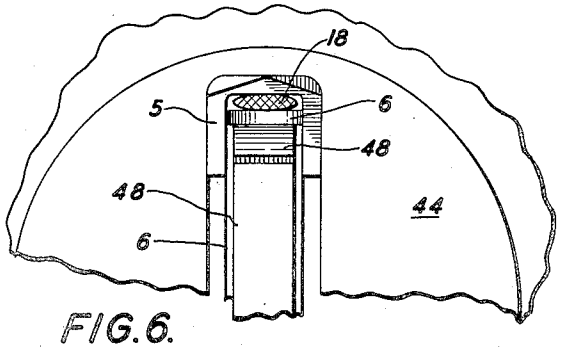


FIG. 6.

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TUFTING MACHINE

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Application November 24, 1947, Serial No. 787,746

2 Claims. (Cl. 112—80)

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This invention relates to a portable mechanism for making designs in rug base material and also for making the main body or nap portions of rugs and carpets and the like. So far as known, there are no portable hand type machines for making rugs which can be easily handled and merely glided over the rug base material in order to form any desired design or to entirely fill the base with one or any number of colors and various types and kinds of thread and yarn materials. The machine of this invention is entirely automatic in operation in forming tufts and the like in rug base materials as it is only necessary to shift the machine over the surface being worked.

One of the principal objects of this invention is to present a new and novel rug making machine that is light in weight, sturdy in construction, including but relatively few moving parts, and a machine which is economical to make and manufacture.

Another object is to provide a rug making machine which is constructed to give long and dependable service, a machine that is not complicated to use and one that can be employed by non-skilled operators to make all kinds of patterns and designs easily and quickly.

Other objects, advantages and features of this invention will appear from a perusal of the accompanying drawings, the subjoined detailed description, the preamble of this specification, and the appended claims.

Applicant is now about to describe one of the preferable forms of his invention in order to teach one how to make and use the same, but it is to be understood that the drawings and description thereof are not to limit the invention in any sense whatsoever except as specifically limited by the appended claims.

In the drawings:

Figure 1 is a side elevational view of the rug maker showing the thread or yarn threaded thereon,

Figure 2 is a top plan view,

Figure 3 is a longitudinal sectional view,

Figure 4 is a cross section view taken substantially along the line 4—4 of Fig. 3 (enlarged scale),

Figure 5 is a front elevational view of the machine, shown on a large scale,

Figure 6 is a greatly enlarged elevational view of the needle-like stems with the yarn being shown therebetween,

Figure 7 is a plan view of a portion of the base cloth shown on the reverse side thereof,

Figure 8 is an enlarged sectional view taken substantially along line 8—8 of Fig. 7.

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One of the preferred forms of this invention is illustrated in the drawings and constitutes the following major structural parts: the electric motor unit 1 with its hand grip means 2, the gear reduction unit 3 with its crank arms, the reciprocating and guide mechanism unit 4 with its projecting needle-like stems 5 and 6, and the front pivoted handle means 7. The handle means or rear hand grip element 2 is fixed to the bottom of the motor casing by bolts or any other suitable means and may be braced at each side thereof as by employing the bracing members 8. Any typical slow speed electric motor may be employed which is adapted for connection to the ordinary lighting circuit of an electrical system. The rear handle has a suitable hollow place therein to accommodate two insulated electrical conductors which carry current to the motor from the male connector part of an attachment plug means shown at 9, which plug is rigidly attached to the lower end of this handle. The armature shaft of the motor has an extended part 10 including a knurled knob so that the armature can be rotated by the operator's fingers so as to set the stems 5 and 6 in their proper position before actual work is commenced.

Mounted on the top of the motor shell or casing there is a shield 11 which is fixed to the motor casing and over this shield there is a yoke 12 which is attached thereto; extending upwardly from this yoke are the end members 13 and 15 and the intermediate member 14, this latter member having an adjustable arm 16 extending above it to which it is attached by the bolts 17. The arm 16 has a plurality of threaded bores therethrough and any two of which are adapted to receive the bolts 17 so that the arm can be elevated or lowered by selecting the proper pair of bores. The arm 16 and the end members 13 and 15 have suitable thread or yarn eyelets or openings at their top ends to accommodate the cotton or woolen yarn 18, as shown. Different colored strands or yarns may be employed and worked together by the needle-like stems should this be desired whenever multi-colored tufts are wanted. A toggle type electric switch 19 is provided for controlling the current to the motor 1.

The forward end of the motor casing has attached thereto, as by bolts or welding, the reduction gear box or unit 3. The top of this unit supports the upstanding arm 20 which also has an eyelet or opening at its top to accommodate the single, double or triple stranded yarn 18. This unit has the bearing 21 in its forward vertical wall in which is journalled an extended shaft portion

22 from the motor, and this shaft is preferably integral with the shaft of the motor but need not be should it be desired to employ a coupler. This shaft 22 has keyed thereon a worm 23 which is in mesh with a worm wheel or gear 24 that is keyed to a shaft 25, which shaft 25 is journalled in the side walls of the casing and is extended on both sides of the casing in order to receive the crank members 26 and 27 which are keyed thereto. These crank arms 26 and 27 may be of any suitable length and provided with the plurality of holes 28 so that the action of their respective crank rods 29 and 30 can be varied to suit the particular work desired, that is, vary the thrust distance of the stems attached thereto and hence the tuft on the opposite side of the work piece, for instance, the monk's cloth shown in Fig. 7, which cloth shows but a single line of weaving 32 on the rear side and the single line of tufts 33 on the front side which can be seen in Fig. 7 and indicated by 32'. The tufts shown are very short ones but the machine can easily make long ones and provide a very deep pile. The needle 5, as shown, has side flanges depending from the top thereof to provide a track for the under needle 6, but the needle 5 may be a tube back of its point in order to make sure that the yarn will always be caught by the needle 6.

Fixed to the forward side of the reduction unit 3 there is the cantilever-like beam or arm 4 which has the top elongated slot 34 for accommodating the thread or yarn, and the two opposite slots 35 and 36 which accommodate the side projecting wrist pins 37 and 38 and provide a guided path for their reciprocation. The pin 37 is rigidly connected to the core or inner plunger element 39 and the pin 38 is connected to a sleeve-like plunger element 40 which reciprocates in the cylindrical bore 41 or the arm 4. The plunger 39 reciprocates within the bore 42 of the sleeve 40, and has fixed to a recessed part thereof the rear portion of the push stem 6 at 43. A recessed forward portion 44 of the inner plunger 39 has fixed thereto the needle stem 5. This stem 5 has a point and the sides of the needle are flanged or concaved to provide a guide track for needle 6. The stem 6 has the pair of spaced points 45—46, see Fig. 2, which act as guards and guides for the thread or yarn 18. When two or three strings or strands of yarn are employed, these points may be spaced farther apart and/or made longer. The inner core-like type plunger has an elongated slot 47 to provide a passage for the thread or yarn. The bottom stem 6 is held snug against the concaved surface of the other stem 5 by the band type or ribbon spring 48. The forward end of the arm or beam has the end member 49 which has a top cap 49' and a central bore to accommodate the stems 5 and 6 and allow for their movement. The bottom portion of this end member is provided with a pair of spaced bores to receive the straight portions 50 and 51 of the curved or inverted U-shaped wire frame or stepper 52. The front handle 7 is pivoted at 53 to the end member 49 so that the machine can be easily turned at the corner portions of the work without it being necessary to change hands while the work is being done.

Operation

To operate the device, a ball or spool of thread or yarn is first provided (not shown) and one end thereof threaded through the eyes or arms 15, 16, 13 and 20 in the order named and then the end of the yarn is passed through the slot 34 and slot 47 and worked forwardly between the stems 5 and 6; enough yarn end is allowed to hang from the stem ends to provide for the first loop of yarn when the machine is started. The female plug of a portable flexible cord from some source of suitable electrical current is of course connected to the male plug 9 so that the motor will run when the switch 19 is pushed to the on position.

The operator grasps the handle 2 in his right hand and the handle 7 in his left hand and then places the stem ends through the material to be worked at a starting point of some design in the base cloth. The stems are pushed entirely through the material until the stepper 52 is against the cloth. Should a short tuft be desired, the connecting rod 30 is pivoted to the crank 27 in one of the holes or bores 28 which is nearest the shaft 25 and the stepper 52 is adjusted to its proper position by resetting the screws 54.

When the machine is so arranged as mentioned above, the current is turned on and the machine moved along the lines of the design and the length of the stitches governed by the slant of the machine, for instance, note the surface indicated at 31 in Fig. 1, and also note the angle at 31'. The greater this angle at 31', the longer will be the stitches providing the machine is shifted along the cloth 31 at a uniform rate of speed.

Obviously, the machine of this invention can be useful in forming tufts and the like in fabrics of all kinds such as, for instance, drapes, upholsteries, portières etc.

It is, of course, understood that various changes and modifications may be made in the details of form, style, design, and construction of the whole or any part of the specifically described embodiment of this invention without departing from the spirit thereof; such changes and modifications being within the scope of the following claims.

I claim:

1. In a machine for making yarn loops in fabrics in order to form a piled rug and the like, the machine having an electric motor with a shaft extending therefrom and a gear reduction means connected with the motor where the shaft extends, the gear reduction means having a worm gear mounted upon a cross shaft, a worm keyed to the motor shaft and in mesh with the worm gear, said cross shaft extending on either side of the worm gear and each end thereof having a crank keyed thereto, a hollow cantilever beam extending from the gear reduction means, a pair of telescoping plungers within the cantilever beam, a needle guide at the distal end of the cantilever beam and a pair of reciprocable needle stems mounted therein and extending forwardly from the distal end of the cantilever beam, means connecting each needle stem to its respective aforementioned plunger, and rod means connecting each plunger to one of said cranks, said cranks being set substantially 180 degrees apart so that the plungers reciprocate in opposite directions.

2. In a portable machine for making yarn loops in base fabrics in order to form a piled rug, the machine having an electric motor with a shaft extending therefrom and a gear reduction means connected with the motor where the shaft terminates, the gear reduction means having a worm gear mounted upon a cross shaft, a worm keyed to the motor shaft and in mesh with the worm gear, said cross shaft extending on opposite sides

of the worm gear and each end thereof provided with a crank keyed thereto, a hollow cantilever beam extending from the gear reduction means and supported thereby, a pair of telescoping plungers within the cantilever beam, a needle guide at the distal end of the cantilever beam and a pair of reciprocable needle stems mounted therein and extending forwardly from the distal end of the cantilever beam, means connecting each needle stem to its respective aforementioned plunger, rod means connecting each plunger to one of said cranks, said cranks being set substantially 180 degrees apart so that the plungers reciprocate in opposite directions, and a guide and guard means adjustably attached to the distal end of the beam with means surrounding the greater vertical portion of the needle stems.

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