Dec. 27, 1932. G. L. WESTCOTT 1,892,592

TUFTING MACHINE

Filed April 20, 1932

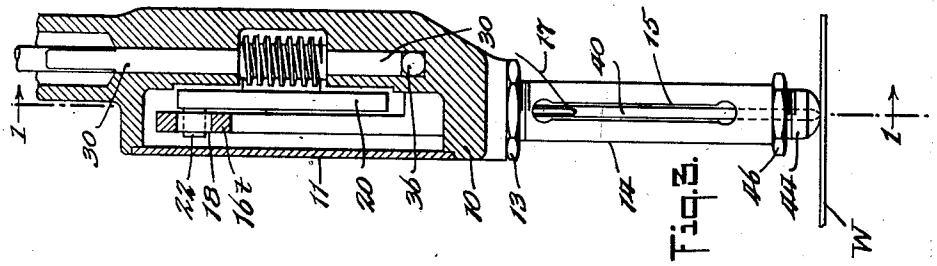

Fig. 3.

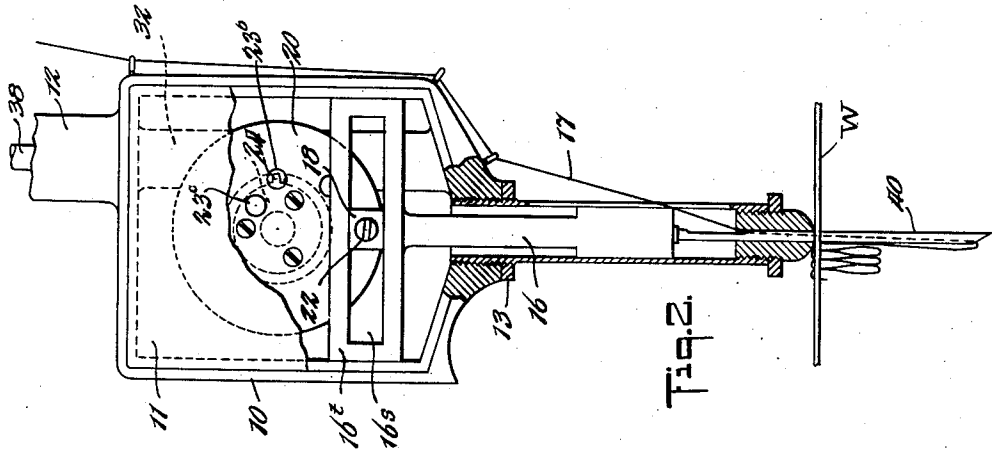

Fig. 2.

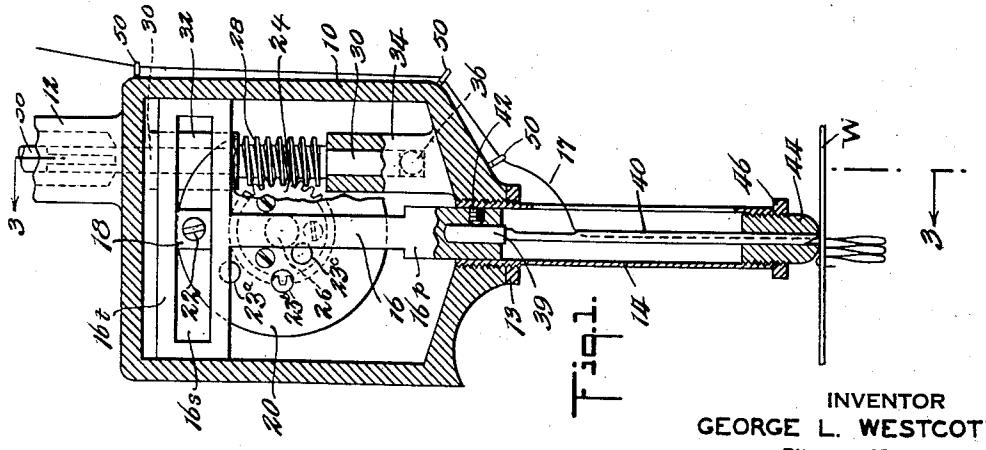

Fig. 1.

INVENTOR
GEORGE L. WESTCOTT
BY HIS ATTORNEYS
Howson and Howson

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UNITED STATES PATENT OFFICE

GEORGE L. WESTCOTT, OF DALTON, GEORGIA, ASSIGNOR TO "CABIN CRAFTS", OF DALTON, GEORGIA, A CORPORATION OF GEORGIA

TUFTING MACHINE

Application filed April 20, 1932. Serial No. 606,424.

This invention relates to tufting machines which are particularly adapted for use in making tufted designs upon a woven fabric.

It is an object of my invention to provide an improved means for operating the needle of the machine by power which is delivered to the machine through a flexible shaft or a like coupling.

Another object of my invention is to provide a machine of the above type which is light and portable and easily guided in following the contours of an intricate design.

Another object is to provide a machine of the above type with means to vary the length of stroke of the needle.

Another object is to provide a machine of the above type with adjustment means to adapt the machine to the use of needles of various lengths and of various lengths of stroke.

Other objects and advantages of my invention will appear as it is described in connection with the accompanying drawing:—

In the drawing:—

Figure 1 is an elevational sectional view of a machine constructed according to the principles of my invention, with the section taken along line 1—1 of Figure 3.

Figure 2 is an elevational view partly in section of the machine shown in Figure 1 but showing the parts in a different position.

Figure 3 is a side elevational view partly in section of the machine shown in Figure 1, the section being taken along line 3—3 of Figure 1.

Referring to the drawing the machine comprises a hollow substantially rectangular casing 10 which preferably is made of cast aluminum to make a light construction. The casing is provided with a hollow cylindrical boss 12 at its upper end, positioned near one side of the casing. The casing 10 is hollow and has a threaded opening in the center of the lower end in which is threaded a hollow tube 14. A lock nut 13 is provided to secure the tube in the desired position as it is screwed into the casing 10. Within the casing there is a T shaped plunger 16, the transverse portion 16*t* of which extends from one side wall of the casing to the other and is guided in its sliding movement by said side walls. The transverse portion 16*t* is provided with a slot 16*s* in which moves a rectangular block 18 which is pivotally mounted upon a rotatable disc 20 by means of a pin 22 projecting laterally from said disc. This pin may have a screw head and have screw threaded engagement with the disc, the thread being left handed if the disc rotates clockwise and vice versa, in order to keep the pin screwed tight. Although I have shown, and found to be satisfactory, a rectangular block, the invention is not limited to that shape, but other shaped blocks may also be used successfully. The distance of the pin from the center of the disc 20 may be changed by screwing the pin in one of the holes 23*a*, 23*b*, or 23*c* which are bored in the disc at different distances nearer the center of the disc than the hole in which the pin is engaged, as shown in the drawing. By this construction, the travel of the plunger 16 may be varied as will hereinafter more fully appear.

The disc 20 is secured to and compelled to rotate with a spur gear 24 which is mounted upon a shaft 26 which is journalled in one side of the casing. The spur gear has helically cut teeth to engage with a helical or worm gear 28 formed on a shaft 30 journalled in bearing bosses 32, 34 extending down from the top and up from the bottom of the casing respectively. A ball bearing 36 is provided in the bearing boss 34 beneath the lower end of the worm gear shaft to reduce friction. The upper end of the worm gear shaft is slotted for connection to a flexible shaft 38 which may be driven by a small portable motor (not shown) which may be conveniently located in relation to the work W upon which it is desired to use the tufting machine. The lower part 16*p* of the plunger 16 is made cylindrical so as to have a sliding fit within the inside of the tube 14. In the lower end of the plunger a socket 39 is provided for a hollow tufting needle 40 which may be secured in the socket by means of a set screw 42. Needles of various sizes and lengths may be used in my machine provided their ends are formed to fit in the socket of the plunger.

In the lower end of the tube 14 there is

provided a needle guide 44 comprising a centrally bored plug having threaded engagement with the interior of the tube 14 and secured permanently thereto by means of a lock nut 46. This needle guide may be replaced in case a thicker or thinner needle is substituted in the machine. By means of the threaded engagement of this needle guide and the threaded engagement of the tube 14 with the casing 10, the distance the needle may project, when it is reciprocated by the mechanism just described, may be varied to suit the requirements of any particular piece of work.

A flat cover plate 11 is secured over the open side of the casing to protect the operating mechanism and prevent the operator's hands from coming in contact with the moving parts.

From the foregoing, the operation of the machine will be clear. The flexible shaft 38 drives the worm gear 28 which in turn drives the spur gear 24 at a reduced speed and this spur gear causes the disc 20 and the plug 18 pivotally mounted thereon to rotate, which causes the plunger 16 to reciprocate with simple harmonic motion. Each time the plunger extends the needle from the tube through the cloth or work upon which the machine is being used, a loop of yarn is pushed through the cloth or fabric to a predetermined degree and upon the return stroke the needle withdraws from the fabric W leaving a tuft of yarn in its place. As the machine is moved along, a series of tufts is left by the operation of the needle.

A series of eyes 50 or a tube or tubes may be provided on the outside of the casing to guide the yarn through a slot 15 in the tube 14 and another slot in the upper end of the needle through which the yarn 17 is threaded as heretofore.

It should be noted that in case it is desired to make short tufts, this may be accomplished by shortening the stroke of the needle, by placing the pin 22 in one of the holes 23*a*, 23*b*, or 23*c*. When this is done it is desirable to have the needle end draw up flush with the end of the plug 44 and therefore the plug may be screwed farther out of the tube 14, being secured in the new position by the lock nut 46, as before. In some cases it may also be necessary to use the adjustment of the plug 44 and also the adjustment of the tube 14 in casing 10, to compensate for the decreased stroke.

In other cases the limit of adjustment possible with the plug 44 and tube 14 may be insufficient to entirely compensate for the shortened stroke so that the needle would not withdraw into the plug far enough to pull the yarn or thread through the work W. In that case a shorter needle may be used. A shorter needle will be just long enough to avoid the necessity of adjustments of the tube 14 and plug 44, if the length of the needle is reduced one half the difference in stroke. Otherwise the shorter needle may require a minor adjustment of the tube 14 and plug 44.

Thus the construction I have made provides for a large variety of adjustments to suit the requirements of many kinds of work. From the foregoing it will be seen that I have provided a tufting machine which is of rugged construction though it may be inexpensively made and will be dependable, durable and adaptable in use.

I claim:—

1. In a tufting machine, a portable casing, means at one end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with and driven by said helical gear, a pivotally mounted block rotated about the axis of said spur gear, a rectilinearly movable plunger having a transverse slot in one end thereof, said block engaging the walls of said slot to cause movement of said plunger, and a needle secured in said plunger and reciprocated thereby.

2. In a tufting machine, a portable casing, a tube at one end thereof having threaded engagement with said casing for varying the extension of said tube from said casing, means at the other end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with and driven by said helical gear, a pivotally mounted block rotated about the axis of said spur gear, a rectilinearly movable plunger having a transverse slot in one end thereof, said block engaging the walls of said slot to cause movement of said plunger, and a needle secured in said plunger and reciprocated to project from and withdraw into said tube.

3. In a tufting machine, a portable casing, a tube at one end thereof having threaded engagement with said casing for varying the extension of said tube from said casing, means at the other end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with and driven by said helical gear, a pivotally mounted block rotated about the axis of said spur gear, a rectilinearly movable plunger having a transverse slot in one end thereof, said block engaging the walls of said slot to cause movement of said plunger, and a needle secured in said plunger and reciprocated to project from and withdraw into said tube, and a needle guide at the outer end of said tube having threaded engagement with said tube.

4. In a tufting machine, a portable casing, means at one end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with and driven by said helical gear, a member secured to and

rotatable with said gear, a block pivotally mounted on said member, a rectilinearly movable plunger having a transverse slot in one end thereof, said block engaging the walls of said slot to cause movement of said plunger, a needle in said plunger, a tube having an adjustable connection at one end with said casing and having a needle guide in the other end adjustably connected with said tube, whereby the extension of said needle from said tube may be varied.

5. In a tufting machine, a portable casing, means at one end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with said helical gear, a pivotally mounted block movable about the axis of said spur gear, a reciprocating plunger having a slot in one end for said block whereby said plunger is reciprocated, a needle mounted in said plunger, a tubular member having an adjustable connection with said casing whereby the extension of said needle from said tubular member may be varied.

6. In a tufting machine, a portable casing, means at one end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with said helical gear, a pivotally mounted block movable about the axis of said spur gear, a reciprocating plunger having a slot in one end for said block whereby said plunger is reciprocated, a needle mounted in said plunger, a tubular member having an adjustable connection with said casing, and a needle guide in the outer end of said tubular member and having an adjustable connection therewith whereby the extension of said needle from said tubular member may be varied.

7. In a tufting machine, a portable casing, means at one end of said casing for connection with a flexible driving device, a helical gear adapted to be driven by said driving device, a spur gear engaged with and driven by said helical gear, a pivotally mounted block rotated about the axis of said spur gear, a rectilinearly movable plunger having a slidable connection with said spur gear, and a needle carried by said plunger.

8. In a tufting machine, a portable casing, a power driven rotating member, a rectilinearly movable plunger, pin and slot connecting means between said plunger and member, means to vary the position of said pin with respect to the axis of said member, a tube adjustably connected with said casing and a needle extending through said tube and moved by said plunger.

9. In a tufting machine, a portable casing, a power driven rotating member, a rectilinearly movable plunger, pin and slot connecting means between said plunger and member, means to vary the position of said pin with respect to the axis of said member, a tube adjustably connected with said casing, a needle extending through said tube and moved by said plunger and a needle guide at the end of said tube adjustably connected with the tube.

In testimony whereof I have signed my name to this specification.

GEORGE L. WESTCOTT.