Nov. 28, 1933. W. D. VAN DYKE 1,937,257

TURFING MEANS

Original Filed April 25, 1931

Fig. 1.

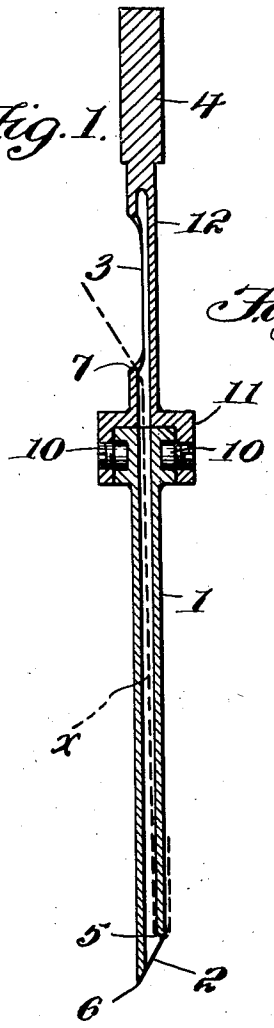


Fig. 2.

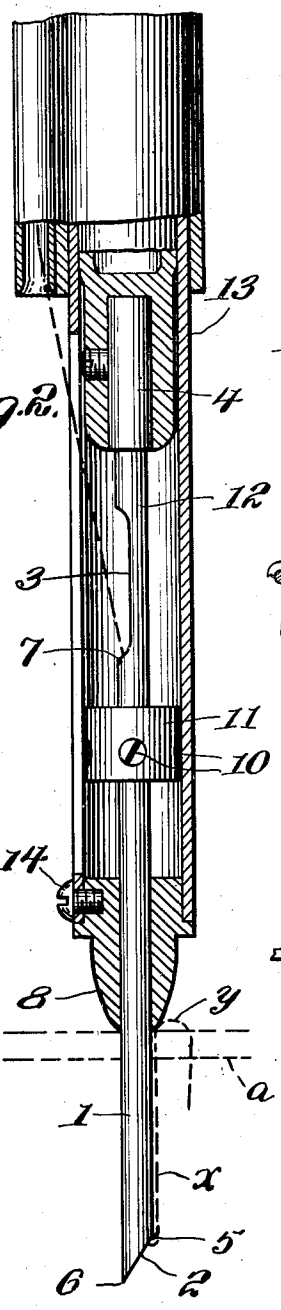


Fig. 3.

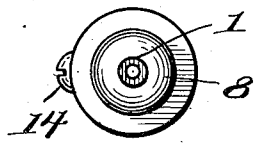


Fig. 4.

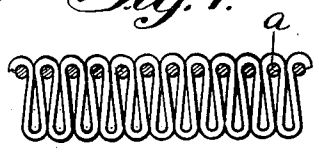
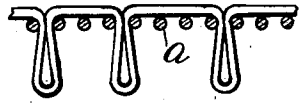


Fig. 5.



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TURFING MEANS

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Application April 25, 1931, Serial No. 532,973
Renewed April 1, 1933

7 Claims. (Cl. 112—80)

The invention relates to turfing apparatus and concerns particularly the construction of the needle which carries the thread into the fabric.

The invention also concerns the means for mounting the needle in place and also the form of presser foot.

In the drawing

Figure 1 is a sectional view of the needle.

Fig. 2 is a view of the needle, the presser foot, and the means for mounting the needle in place.

Fig. 3 is a bottom plan view of the needle and presser foot.

Fig. 4 illustrates a sectional view of the fabric with the tufts in place according to my invention.

Fig. 5 shows a tufted fabric illustrative of an objection which is present under methods other than my own.

In this drawing the needle is shown at 1, consisting of a tubular member having its lower end bevelled upwardly as indicated at 2. The tube has a slot at 3 in its side for the entrance of the thread, and at its upper end it has a solid shank portion 4. The thread passes in the direction indicated by the dotted line *x* through the eye or slot 3 thence down through the tube and around the lower edge 5 of the rear wall of the tube and thence upwardly along the rear side of the tube to the point at *y* where it emerges from the foundation fabric which is indicated diagrammatically at *a*. When the tube is cut at its lower end at the inclination indicated in the drawing a point is provided at 6 on the leading side of the needle for penetrating the fabric. The feeding of the thread takes place on the downstroke of the needle. That is to say, each time the needle penetrates the fabric on its downstroke it draws from the supply the required length of thread for making the tuft. In this action the thread draws or runs over the lower edge of the rear wall, i. e., the edge 5 at the top of the inclined lower end of the tube. I specially form this edge to avoid abrasion or cutting of the thread by making it blunt and free from sharp edges which would tend to wear or cut the thread and preferably this edge is rounded.

I also round the edge 7 at the lower end of the entrance slot.

The presser foot 8 which is designed to bear on the fabric is of special formation. It is adjacent the needle and its bearing face which engages the fabric is inclined upwardly and outwardly relative to the needle. In the particular form shown this presser foot is of the same shape all the way round the needle so that no matter in what position the needle may be rotatively related to the presser foot there will always be a part of the presser foot inclining upwardly and outwardly in relation to the needle. The needle is mounted so that it may turn about its axis. For this purpose its upper end or shank is provided with a circumferential groove which receives pins or screws 10 from a socket member 11, which is at the lower end of a rod 12. This rod is operated by any suitable means so that reciprocating movement is imparted to the needle and at the same time the needle may rotate about its own axis. By this swivel capacity the needle will adjust itself during the operation of the tool upon the goods so that no matter in which direction the tool moves over the goods the point of the needle will always be at the front of the appliance. This is due to the fact that the thread engaging the rear wall of the needle at its lower edge, being looped about the same, will act to maintain this part of the needle as the trailing part of the needle whichever direction it may be moving. The instrument will make straight or curved lines according to the direction in which it is moved, and in any event the presser foot will always present a like upwardly inclined surface at the rear of the needle.

A casing or frame member 13 carries the presser foot and needle operating mechanism.

The presser foot is secured to the casing by a screw 14.

The presser foot bears on the fabric and particularly its trailing portion, that is, the portion in rear of the needle according to its direction of travel. The instrument is inclined backwardly when in operation with the point of the needle in advance, and it has the capacity of advancing along the fabric by its own action.

In carrying on the work according to my process the tufts are bound tightly in place by the threads of the foundation fabric so that they will not become disengaged therefrom and will not pull out under ordinary use or strain.

By reference to Figure 5 it will be seen that the tufts, instead of conforming substantially in number to the meshes of the foundation so that each mesh substantially is occupied by a tuft, are distributed over the foundation with a number of unoccupied meshes in between. So that if a tuft is subjected to strain tending to pull it from the fabric the threads of the free meshes in between the tufts can yield or close, one towards or upon another and thus the mesh or opening occupied by the particular tuft subjected to strain can

open up sufficiently to allow the head of the loop of the tuft to slip out therefrom.

By reference to Figure 4, however, it will be seen that the tufts are so spaced apart that substantially each mesh of the fabric is occupied by a tuft so that each mesh is backed up by the adjacent tufts and fabric threads and the threads of the fabric holding any particular tufts will be held against separation and thus they will maintain their grip upon the tufts to hold them against pulling out, it being noted that the tufts are in the form of loops and therefore present enlarged head portions which materially tend to maintain the loops against pulling out. To produce this result I employ a needle of a diameter according to the size of the meshes of the fabric in which the tufts are inserted. That is to say, a fine needle is used for a fine mesh fabric and a coarse needle for a coarse mesh fabric.

The needle will seek the openings between the threads and will move step by step along the fabric in accordance with the size of the mesh. If a fine needle were used with a coarse fabric the needle is liable to puncture the thread. The foundation fabric is of ordinary weave with warp and weft threads. In the operation the tufts are designed to occupy each mesh of the fabric. It may happen, however, that here and there a mesh may be skipped but substantially there are as many tufts as meshes.

The presser foot illustrated performs a novel function because of its association with the reciprocating needle having its lower end face inclined upwardly and rearwardly. As the needle penetrates the foundation fabric, its inclined lower end face has a cam action against the fabric tending to urge the needle in a forward direction. That portion of the presser foot lying in front of the needle immediately juxtaposed thereto and bearing upon the fabric immediately adjacent the point of penetration, receives this forward pressure, the result being that the whole instrument is urged forwardly, the needle meanwhile being sustained against deflection relative to the rest of the instrument. The part of the presser foot lying in front of the needle extends down substantially to the level of the rear part, sustains the needle against forward deflection, and receives the forward thrust. The entire presser foot partakes of the forward urge, and thus the rear part of the presser foot with upwardly and outwardly extending rear face is caused to assume a position relative to the last inserted loop so that the downward pressure of the instrument on the fabric produces a camming action upon the fabric of the upwardly and outwardly extending rear face of this part of the presser foot, which likewise tends to urge the instrument in a forward direction. The presser foot by extending around the needle sustains it against deflection in any direction. The features just mentioned are particularly desirable in the use of small calibre needles.

I claim:

1. In combination, a hollow turfing needle, means for reciprocating the same having a swivel connection therewith to allow the needle to turn about its axis, said needle having a bevelled lower end and a presser foot surrounding the needle, said presser foot tapering towards its lower end, the diameter of the lower end of the presser foot being substantially the same as the diameter of the needle, substantially as described.

2. In combination, a tubular turfing needle, driving means having a swivel connection with the needle to allow said needle to rotate on its axis, said needle having a bevelled lower end providing a point at one side of the tube for penetrating the fabric, and a presser foot through which the needle passes centrally, said presser foot presenting an upwardly and outwardly inclined surface at all points around the needle, substantially as described.

3. A turfing apparatus having a hollow reciprocating needle through which the thread passes, said needle having its lower end inclined upwardly and rearwardly, a presser foot having a portion in rear of the needle and a portion lying in front of the needle and extending down to substantially the same level with the rear portion, said presser foot guiding the needle and sustaining it against deflection forwardly or rearwardly, and a casing to which the presser foot is attached, said casing carrying within it means for reciprocating the needle in relation to said casing and presser foot.

4. A turfing appliance comprising a hollow reciprocating needle the lower end of which is inclined upwardly and rearwardly, at which inclined end the thread emerges, and a presser foot guiding the needle and sustaining it against deflection forwardly or rearwardly, said presser foot having a portion at the front of the needle and a portion at the rear thereof, said rear portion having a rear face which extends upwardly and outwardly relative to the needle, a casing to which the presser foot is attached and within which needle operating mechanism is located.

5. A turfing appliance comprising a reciprocating needle having a guideway extending longitudinally thereof for the passage of the thread, said needle having its penetrating point at the front thereof with an upward and rearward incline back of said point and extending therefrom, a frame member in relation to which the needle reciprocates, and a presser foot fixed to said frame member and in relation to which the needle reciprocates, said presser foot surrounding and guiding the needle and immediately juxtaposed thereto and bearing on the fabric at all points around the needle immediately adjacent and around the spot where the needle passes through the fabric, while the needle reciprocates.

6. A turfing appliance according to claim 5 in which said presser foot at the rear of the needle has its rear face extending upwardly and outwardly relative to said needle, substantially as described.

7. A turfing appliance having a reciprocating turfing needle, a presser foot surrounding guiding and sustaining the needle against displacement in all directions and bearing on the fabric at all points about the needle and by contact therewith transmitting the propelling force directly to the needle at its point of penetration into the fabric and a frame member supporting said presser foot independently of the needle and its operating means.

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