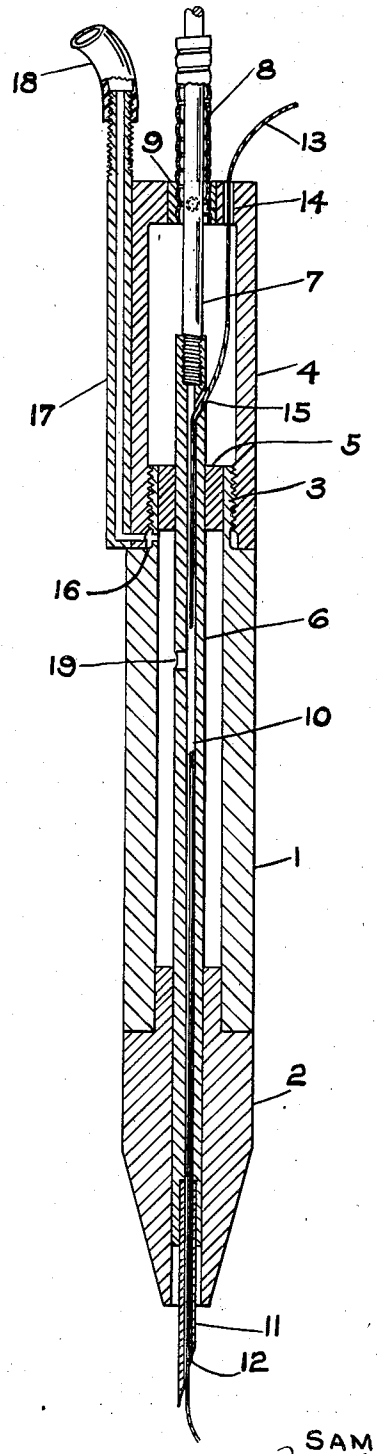
June 10, 1947. S. P. PARKER 2,422,126

TUFTING DEVICE

Filed July 9, 1946



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Patented June 10, 1947

2,422,126

UNITED STATES PATENT OFFICE

2,422,126

TUFTING DEVICE

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Application July 9, 1946, Serial No. 682,377

6 Claims. (Cl. 112—80)

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This invention relates to devices for the insertion of tufts on fabrics for decorative and other purposes and is concerned more particularly with a novel manually controlled tufting instrument of the type that is sometimes referred to as an "embroidery pencil" and includes a power driven reciprocating needle for inserting the tuft yarn. The new pencil affords advantages over prior similar implements in that it includes means for insuring an even feed of the yarn through the needle, so that the inserted loops are uniform in length and defects in the finished product in the form of irregularities in the tufted areas are thereby avoided.

In embroidery pencils, in which a hollow needle having its free end cut off at an angle is employed and the tuft yarn is fed lengthwise through the needle, the yarn must feed freely through the needle and become slack and released from the end of the needle, when the latter is retracted, if even loops are to be produced. It has been found, however, that in such embroidery pencils as now made, the twist in the yarn sometimes causes the yarn to kink and hug the edge of the end opening of the needle, so that when the needle starts its movement out of the fabric, the yarn that has passed through the fabric moves back with the needle. Whenever this happens, the length of the inserted loop is shortened and, since the return movement of the yarn with the needle is not the result of positive action, the loops inserted in a fabric by such a pencil may vary considerably in length.

The present invention is directed to the provision of a novel embroidery pencil, in which means are provided for insuring that the yarn will feed freely through the needle and the difficulties arising from the yarn kinking and returning with the needle as the latter is retracted, are avoided. In the new pencil, the needle used is hollow and it is cut off at an angle at its free end to provide a point. The yarn is supplied to the needle to the rear of the pointed end and passes lengthwise through the needle. To insure that the yarn will feed freely and not hug the free end of the needle, air under pressure is supplied to the interior of the needle and the air travels lengthwise through the needle and escapes at the free end of the latter. As the needle is returned after completing its insertion stroke, the air escaping from the needle frees the yarn from the end of the needle and prevents the yarn from being drawn back with the needle and the inserted loop thereby shortened.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which the single figure is a view in longitudinal section of one form of the new embroidery pencil.

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The pencil illustrated in the drawing comprises a hollow casing 1, which is closed at one end by an elongated tip 2 having a central passage therethrough. At its other end, the casing terminates in a threaded neck 3, on which is mounted a hollow cap 4. A bearing 5 is mounted within the neck 3 and a needle bar 6 extends through the bearing and through the central bore of the tip 2. The needle bar is driven in any suitable way as, for example, by threaded attachment to one end of a flexible shaft 7, which extends through an opening in the end of cap 4 and is driven by any suitable means. The shaft is enclosed within the flexible casing 8, which may extend into and be mounted in a bushing 9 within the opening in the cap, through which shaft 7 enters the cap.

The needle bar 6 has a lengthwise passage 10 and a hollow needle 11 is mounted at the end of the bar opposite to that attached to shaft 7. The free end of the needle is cut off at an angle, as indicated at 12, and the interior of the needle is in communication with the passage 10 through the bar. The yarn 13 may be supplied to the needle in any convenient manner and, in the pencil illustrated, the yarn passes through an opening 14 through the cap, through the interior of the cap, and through an opening 15 in the wall of the needle bar into the passage 10. The yarn passes through passage 10 and through the interior of the needle to project at the pointed end of the needle.

The wall of the casing 1 is provided with a passage 16, to which leads a tube 17 mounted on the outside of cap 4. The tube 17 projects above the end of the cap and may be connected by a hose 18 to a source of air under pressure. The air supplied through the hose and tube enters the interior of the casing and thence enters the passage 10 through the needle bar through an opening 19 in that part of the needle bar lying within the casing. The air travels lengthwise through the passage and part of the air escapes through the open end of the needle.

In the operation of the new pencil, the free end of tip 2 is placed upon the fabric with the needle retracted and lying above the point where the tuft loop is to be inserted and, when the needle bar moves down, the needle is forced through the fabric and carries the yarn 13 with it. Air is being supplied to the interior of the needle bar and escaping through the pointed end of the nee-

dle and, when the needle begins to move back, any tendency of the inserted yarn to hug the beveled edge at the pointed end of the needle, as the result of kinking of the yarn, and to move back with the needle is prevented by the escaping air. Each inserted loop of yarn, accordingly, has a length determined by the extent to which the needle penetrates the fabric, and there is no variation in the length of the loops resulting from the return of the inserted yarn with the needle, when the latter is retracted.

I claim:

1. An embroidery pencil which comprises a casing, a needle bar mounted within the casing for reciprocation lengthwise thereof, a hollow needle attached to the bar and having a free end projectable out of one end of the casing upon reciprocation of the bar, a passage through the wall of the casing for supplying yarn to the needle to pass therethrough and out the free end of the needle, and means for supplying air under pressure to the interior of the needle to pass therethrough and escape at the free end of the needle.

2. An embroidery pencil which comprises a casing, a needle bar mounted within the casing for reciprocation lengthwise thereof, the needle bar having a lengthwise passage therethrough, a hollow needle attached to the bar with its interior in communication with said passage, the needle having a free end projectable out of one end of the casing upon reciprocation of the bar, a passage through the wall of the casing through which yarn may be supplied to the needle to pass therethrough and out the free end thereof, and means for introducing air under pressure into the passage through the bar to pass therethrough and through the needle to escape at the free end of the latter.

3. An embroidery pencil which comprises a casing, a hollow needle bar mounted within the casing for reciprocation lengthwise thereof, the needle bar having an opening through its wall to the interior thereof, a hollow needle attached to the needle bar and having a free end projectable out of one end of the casing upon reciprocation of the bar, the interior of the needle being in communication with the interior of the bar, and means for supplying air under pressure to the interior of the casing, the air passing through the bar and needle and escaping out the free end of the needle.

4. In an embroidery pencil, the combination of a hollow needle having a pointed end, means for reciprocating the needle endwise, and means for supplying air under pressure to the interior of the needle for escape at the pointed end thereof.

5. In an embroidery pencil, the combination of a hollow reciprocable needle bar, a hollow needle mounted on the bar with its interior in communication with the interior of the bar, the needle having a free pointed end, and means for supplying air under pressure to the interior of the bar to pass therethrough and through the needle to escape at the free end of the needle.

6. In an embroidery pencil, the combination of a reciprocable needle bar, a hollow needle mounted on the bar and having a free pointed end, the bar having a lengthwise passage through which yarn may be conducted to pass through the needle and out the free end thereof, the bar having an opening through its wall into the passage between the ends of the passage, and means for supplying air under pressure through the opening into the passage, the air flowing through the passage and needle to escape at the free end of the needle.

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