

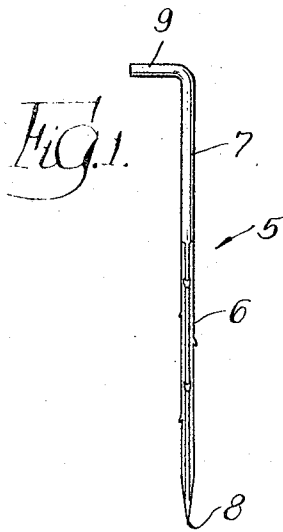
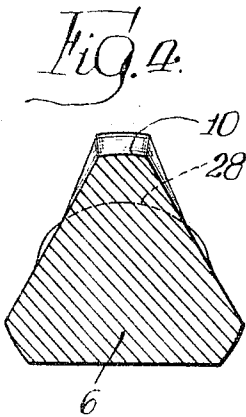
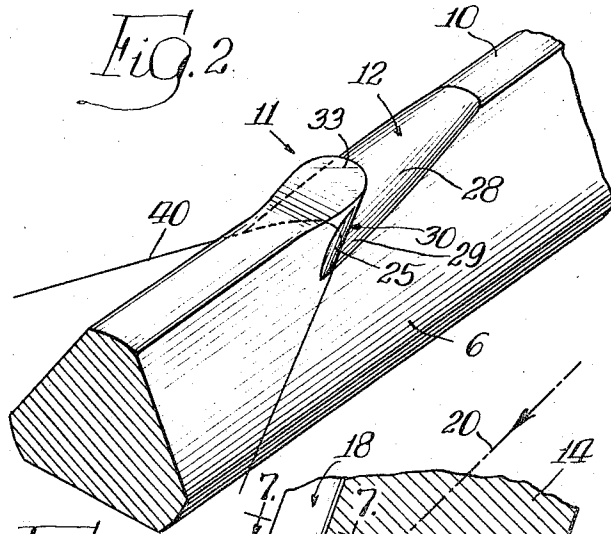
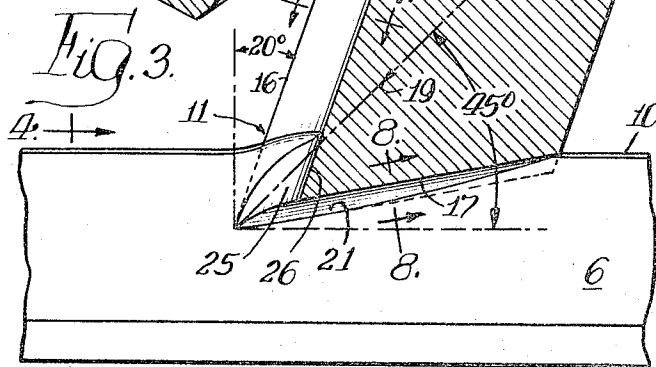
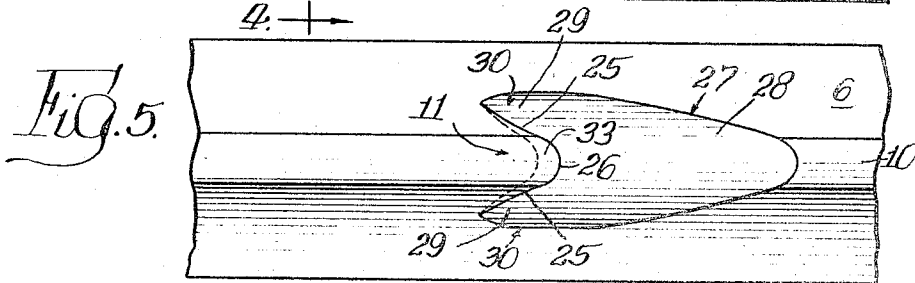
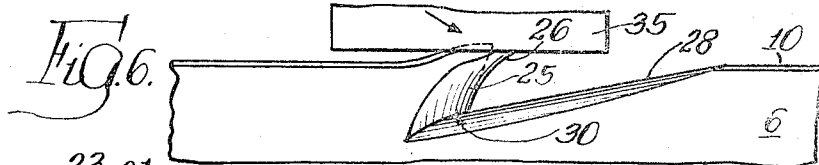
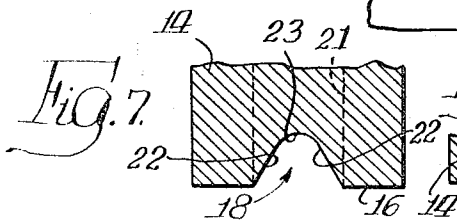
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FELTING NEEDLE

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FELTING NEEDLE

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The present invention relates to improvements in felting needles.

It is common practice in the art today to provide felting needles with one or more spurs in the body portions thereof and in which portions of the spurs for engaging fibers to be interlaced comprise intersecting surfaces presenting a sharp edge or flat fiber engaging surfaces bounded by sharp corner edges. These known felting needles in the past functioned reasonably satisfactorily but with the development of high speed needle looms these known forms of felting needles cause undesirable cutting or breaking of fibers, and further in most instances the recesses at the spurs are unsatisfactory in providing sufficient access of fibers to the spurs for efficient operation of the needle looms.

Accordingly, it is an object of the present invention to provide a felting needle with one or more spurs which have fiber engaging surfaces for interlacing fibers with little or no cutting or breaking of the fibers.

A further object is to provide a felting needle as last noted in which a recess for the spur provides for ready access of fibers to the spur rendering the felting needle efficient for use in high speed needle looms.

The above and other objects and advantages of my invention will appear from the following detail description of a preferred embodiment of my invention.

Now in order to acquaint those skilled in the art with the manner of constructing and utilizing felting needles in accordance with the present invention, I shall describe below in connection with the accompanying drawings certain preferred embodiments of the invention.

In the drawings.

FIGURE 1 is an elevational view of one form of felting needle of my present invention fabricated as described herein below;

FIGURE 2 is a greatly enlarged perspective view of a portion of the body of the needle of FIGURE 1 showing the improved spur of the present invention.

FIGURE 3 is a side elevational view illustrating the manner in which a spur in accordance with the present invention is struck into the body portion of the felting needle;

FIGURE 4 is a detail sectional view taken substantially on the line 4-4 of FIGURE 3 looking in a direction indicated by the arrows;

FIGURE 5 is a plan view of a portion of the body of a felting needle and showing the improved spur of the present invention;

FIGURE 6 is a side elevational view showing the manner in which the kick-up of the spur shown in FIGURE 5 may be controlled;

FIGURE 7 is a detail cross-sectional view taken along the line 7-7 at the leading edge of the die shown in FIGURE 3 looking in the direction indicated by the arrows; and

FIGURE 8 is a detail cross-sectional view taken along the line 8-8 at the base edge of the die shown in FIGURE 3 looking in the direction indicated by the arrows.

Referring now to FIGURES 1 and 2 of the drawing, I have shown a felting needle 5 constructed in accordance with my invention which comprises a body portion 6 and a shank portion 7. The lower end of the body portion 6 is pointed as at 8 to facilitate penetration of fibrous material to be compacted in a known and conventional manner. The upper end portion of the needle may be bent substantially at right angles to the shank portion 7 to provide

a securing element or ear 9 for clamping between a base member and a clamping member of a conventional needle plate. As is well known, such a needle plate is adapted to support a plurality of felting needles, such as shown in FIGURE 1, which in reciprocation of the plate in the felting machine effects the interlacing and compacting of loose fibrous materials.

It is preferable in practicing my present invention to provide a felting needle having a salient angled body portion, that is a body portion having intersecting surfaces providing an edge, such as shown at 10, in FIGURE 2 of sufficient longitudinal extent for a spur 11 and associated recess 12. Typically for such purpose the body portion 6 may be of polygonal cross section such as of conventional triangular cross section currently employed in the art and as illustrated in the fragmentary portion of the body 6 of the needle shown in FIGURE 2. A body portion of triangular cross-section provides three edges at which spurs may be formed and in practicing my invention a single spur and recess may be formed in one or more such edges or a plurality of spurs may be provided in the edges as desired.

As shown in FIGURE 2, a portion of the material of the body of the needle in the corner edge 10 is displaced to form the recess 12 and such displaced material shaped into a barb 11 above the recess.

Referring now to FIGURE 3 the recess 12 and the spur 11 are formed in the edge 10 by a spur forming tool 14 having a leading edge 16 and a base edge 17. A concave groove 18 extends inwardly from and lengthwise of the leading edge 16 of the tool. A concave groove 21 extends inwardly of and lengthwise of base edge 17. The tool 14 may, by way of example, be applied to edge 10 of the body of the needle in the direction indicated by the arrow 19 and along the line 20 at an angle of 45° to the edge of the body portion and in a lengthwise direction of the body away from the pointed end thereof. The leading edge 16 of the tool 14 may, again by way of example, extend at an angle of 20° to a line perpendicular to the edge 10 of the body. Application of tool 14 in the manner described displaces material in edge 10 diagonally inwardly and laterally of the body 6 in forming the spur 11 and recess 12. The groove 18 of tool 14 as best seen in FIGURE 7 is defined by side walls 22-22 converging toward each other from opposite sides of the tool and at their inner ends are joined by a curved end wall 23. The mouth of the groove 18 is preferably slightly wider than the width of edge 10 of the body portion. The groove 21 is defined by a smooth concave surface 24. The surfaces of the grooves 18 and 21 are preferably highly polished serving to provide the material or fiber engaging surface of spur 11 with a like surface.

In the application of tool 14 to the edge 10 of the body of the felting needle, in the manner above described, the spur 11 is formed to extend laterally outwardly of the body portion with a fiber or material engaging surface projecting downwardly or toward the pointed end of the needle. The spur 11 is defined by downwardly converging lateral side surfaces 25-25 formed by the sides 22-22 of tool 14 and joined by a convex material engaging surface 26 conforming to the concave surface 23 of the tool 14. In applying the tool 14 to the edge 10 of the needle body, a greater portion of the material is displaced lengthwise of the needle body away from the pointed end thereof and a lesser portion inwardly and laterally outwardly at the inner end of the recess 12 so that the inner end of the recess is slightly wider than the width of edge 10.

In the foregoing application of tool 14 to the edge 10 of the body of the needle it will be seen that the recess 12 is defined by a bottom wall 27 of convex configuration transversely of the body of the needle formed by

groove 21 of tool 14 having a first convex surface portion 28 extending diagonally inwardly and upwardly or toward the spur, and second convex surface portions 29—29 lying laterally outwardly of the side walls 25 of the spur 11 to provide a throat, indicated generally at 30, extending obliquely from the side walls of the spur around the body of the needle. Also, as viewed in FIGURE 3, the spur 11 has an outwardly projecting surface 33 lying laterally outwardly of the surface of edge 10 of the body of the needle. If desired, the outer end of the surface 33 of spur 11 may be engaged by a flattening die, such as shown at 35 in FIGURE 6, to control the kick-up desired for the spur of the needle, and impart an arcuate configuration to the convex material engaging surface 26 as best seen in FIGURE 6.

Referring now to FIGURE 2 there is shown in a single fiber 40 and by the relationship of the fiber with respect to the recess 12 and spur 11 of the felting needle in the operation of the latter in interlacing fibers. It will be seen that the fiber 40 lies in the throat 30 and extends around the convex working surface 26 of the spur and obliquely around the body of the needle. This relationship is important in that assuming, for example, should one end of the fiber 40 be anchored and the other end free, the fiber in downward movement of the needle in interlacing direction may freely slide or move on the material engaging surface 26 thus avoiding cutting or breaking of the fiber. Further, the throat 30 provides for greater access of fibers to the spur.

A significant structural feature of the present invention is in the provision of a material or fiber engaging surface, such as at 26, connecting the laterally inwardly and downwardly projecting surfaces 25 of the spur to eliminate any shearing or chopping effect of the spur in engaging and interlacing fibers. A further structural feature resides in the spur and recess being defined by rounded surfaces offering little fiber resistance for interlacing the fibers smoothly and without turbulence.

While I have shown and described what I consider to be a preferred embodiment of the felting needle of the present invention, it will be understood that various modifications may be made therein without departing from the spirit and scope of the invention.

I claim:

1. As a new article of manufacture, a felting needle comprising a body portion and a spur having a convex material engaging surface at its lower end formed between downwardly converging lateral surfaces of the spur.

2. As a new article of manufacture, a felting needle comprising a body portion and a spur having a convex material engaging surface at its lower end formed between lateral surfaces of the spur.

3. As a new article of manufacture, a felting needle comprising a salient angled body portion provided with a spur having a convex material engaging surface at its lower end formed between lateral surfaces of the spur.

4. As a new article of manufacture, a felting needle comprising a body portion and a downwardly inclined spur having a convex and arcuate material engaging surface at its lower end formed between lateral surfaces of the spur.

5. As a new article of manufacture a felting needle comprising a body portion, a recess in said body portion, a spur at said recess, said recess being defined by a bottom wall having a first portion thereof extending diagonally inwardly of said body portion and toward said spur, said bottom wall having second portions thereof lying laterally at the sides of said spur and together with said first portion defining a throat extending obliquely from said side walls of said spur around said body portion, and said bottom wall being of convex configuration transversely of said body portion.

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