United States Patent

[11] 3,624,675

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[54] **FELTING NEEDLE**
9 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** ..... **28/4 N**
[51] **Int. Cl.** **D04h 18/00**
[50] **Field of Search** ..... 28/4 N; 66/116; 112/222; 85/21; 163/5

[56] **References Cited**
UNITED STATES PATENTS

2,327,416	8/1943	Foster	28/4 N
3,353,243	11/1967	Foster	28/4 N

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ABSTRACT: A felting needle constructed in the form of an elongated body having a shank portion and a barbed portion. The barbed portion has a plurality of barbs and terminates in a pointed end. A V-shaped or U-shaped circumferential indentation is provided somewhere along the length of the shank portion to define the weakest structural location along the length of the elongated body, which is called the fracture point.

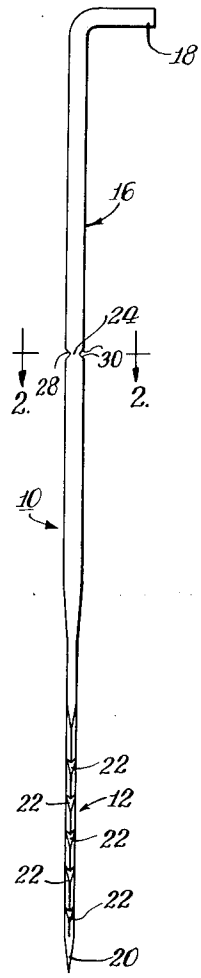


Fig. 1.

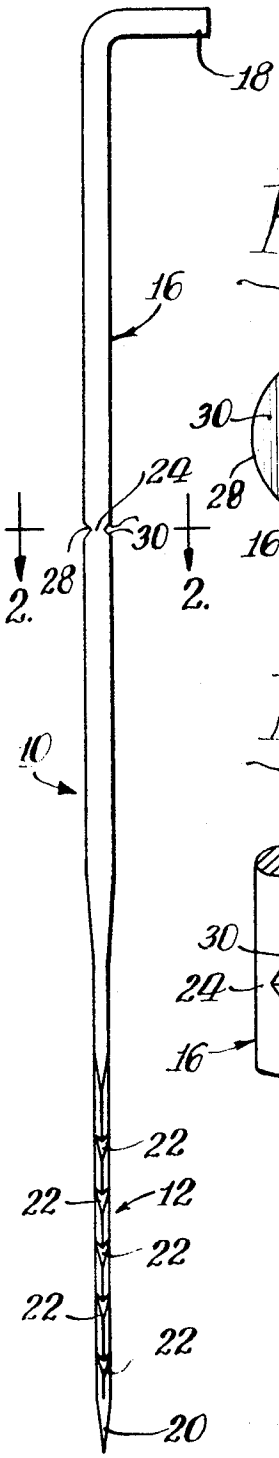


Fig. 2.

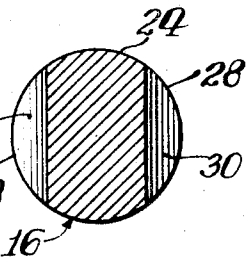


Fig. 3.

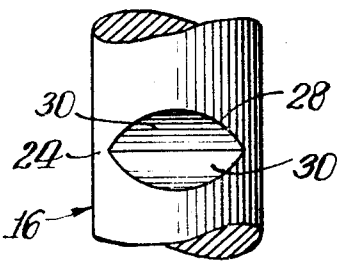


Fig. 4.

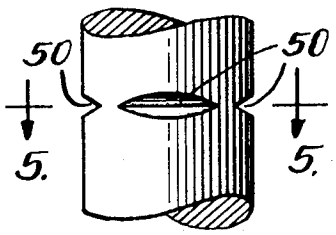


Fig. 5.

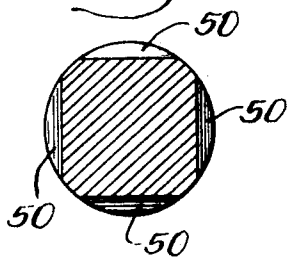


Fig. 6.

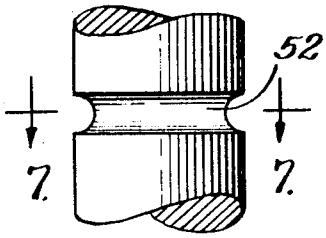


Fig. 7.

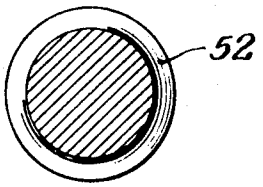


Fig. 8.

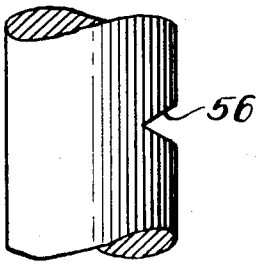
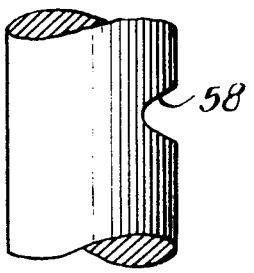


Fig. 9.



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FELTING NEEDLE

BACKGROUND OF THE INVENTION

My present invention relates to improvements in felting needles.

In commercial felting machines, a needle board or plates carrying a large number of needles is reciprocated at a large rate to drive the needles into a fibrous material to cause interlacing and compacting of the loose fibrous material. A typical needle loom would drive a needle board having 12,000 needles at a reciprocation rate of 600 r.p.m. If during the machines operation one or more of these needles become bent or broken at a point in the barbed section where the stud end of the needle continued to contact the material it will mark the surface and leave streaks which make the fabric unmarketable. Furthermore, it is necessary that the felting machine be stopped so that the defective needles can be replaced.

SUMMARY OF THE INVENTION

This invention relates to an improved construction which eliminates damage caused by a bent or broken needle.

The principle of the invention is to form a localized stress or fracture point in a felting needle located above the barbed portion, at which point the needle will always break when subjected to a greater than normal strain.

The fracture point should preferably be located in substantially a single plain cross section of the needle body portion. It would be located in the needle body portion above the barbed portion a distance so that in operation the fracture point never would penetrate the needle fabric.

The fracture point can be specified as to extent and characteristics. These are determined exactly by the degree of fracture potential desired in a particular needle application.

Basically the fracture point is a series or one or more notches or a continuous circumferential groove around the needle body. The notch or groove would be V-shaped for high-fracture potential. They would be U-shaped for a tougher more moderate fracture potential.

Generally needles with finer gauge blades or barbed portions which are very flexible require a higher fracture potential. More rugged coarse gauge blades with barbed portion which are stiffer require the tougher fracture potential.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of this invention reference should be made to the accompanying drawing, in which:

FIG. **1** is an elevational view of a felting needle illustrating the first embodiment of the present invention;

FIG. **2** is a cross-sectional view taken along the line **2–2** of FIG. **1**;

FIG. **3** is an enlarged partial side view of FIG. **1** illustrating a V-shaped indentation.

FIG. **4** is an enlarged partial side view of a second embodiment of this invention;

FIG. **5** is a cross-sectional view taken along the line **5—5** of FIG. **4**;

FIG. **6** is an enlarged partial view of a third embodiment of this invention;

FIG. **7** is a cross-sectional view taken along the line **7—7** of FIG. **6**; and

FIGS. **8** and **9** are, respectively, enlarged partial views of the third and fourth embodiments of this invention.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring now to FIG. **1**, there is shown a felting needle incorporating the principles of my invention which comprises an elongated body **10** having a barbed portion **12** and a shank portion **16**.

The upper end **18** of the shank portion **16** is bent at a 90° angle relative to the rest of the needle **10** for clamping between a base member and a clamping member of a conventional needle board. As already mentioned, a felting needle board is adapted to carry a large number of felting needles in the order of 12,000 needles.

The barbed portion **12** terminates into a point **20** at its lower end to facilitate penetration of the fibrous material to be compacted. A plurality of barbs **22**, which may be of any desired size and configuration, are formed along the length of barbed portion **12**.

Felting needles constructed in accordance with the principles of my invention may be made of any ordinary or conventional needle stock having the necessary mechanical strength, for example, steel wire. The felting needle of my invention could be readily formed from round steel wire stock from which a suitable length is cut to provide an elongated body portion.

The novelty of this invention resides in adding to a felting needle a fracture point somewhere between the upper end **18** of the needle and the barbed portion **12**. In the first embodiments (FIGS. **1–3**), the fracture point **24** is located approximately midway along shank portion **16**. As depicted in FIGS. **2** and **3**, the fracture point **24** is formed by two diagonally opposite V-shaped indentations or notches **28**. The sides **30** of notches **28** diverge outwardly at an approximate 60° angle.

The fracture point **24** is defined as the weakest structural position along the length of felting needle **10**, which will break upon the transmittal of any significant resistive force exerted against the barbed portion as the felting needle is driven vertically downward. Consequently, if one of the needles in a needle board becomes bent during a needling operation, the barbed portion of the needle will strike the stripper plate as it is driven downward and cause the needle **10** to break at fracture point **24**. The bent needle will break off before it penetrates the fibrous material below the stripper plate and thereby avoid damaging the material.

The loss of one or more needles from a needle board carrying thousands during the needle punching will not noticeably affect the resulting product. The broken off portions can be readily picked up by using a magnetic device.

SECOND EMBODIMENT

Referring to FIGS. **4** and **5**, there is shown a second manner of providing a fracture point somewhere in the shank portion of a felting needle comprising four V-shaped notches **50** equally spaced about the circumference of the shank portion. The V-shaped notch provides a high-fracture potential and would be used with the finer gauge needles due to their inherent large flexibility.

THIRD EMBODIMENT

Referring to FIGS. **6** and **7**, there is depicted another fracture point means that could be formed in any conventional felting needle somewhere along its shank portion, comprising a circumferential U-shaped groove **52**. As previously mentioned a U-shaped fracture point means is used on coarse gauge felting needles because of their inherent stiffer characteristics.

It will be appreciated that groove **52** shown in FIGS. **6** and **7** could be V-shaped to provide a moderate fracture potential.

FOURTH AND FIFTH EMBODIMENTS

There is shown in FIGS. **8** and **9**, two additional fracture point means for a felting needle. Their location could be anywhere along the shank portion at a distance above the barbed portion to prevent the fracture point from penetrating the needle fabric.

In FIG. **8** the fracture point means comprises a single V-shaped indentation **56**. Similarly in FIG. **9**, the fracture point means comprises a single U-shaped indentation **58**.

From the foregoing description of five embodiments it can be seen that the principle of my invention can be utilized in a large variety of ways. All that is necessary is to form a localized stress or fracture point somewhere along the length of a

felting needle's shank portion at a distance above the barbed portion so that the fracture point would never penetrate the needle fabric during operation of the felting machine.

While there has been shown and described preferred embodiments of the invention, it will be understood that various other body cross-sectional configurations may be employed.

I claim:

1. A felting needle constructed as an elongated body having a pointed end and at least one barb adjacent said pointed end, the improvement comprising a fracture point means between the other end of said elongated body and said at least one barb for providing the weakest structural location along the length of said elongated body, whereby any significant impact stress exerted against said pointed end will cause said elongated body to break off at said weakest structural location.

2. A felting needle as defined in claim 1, wherein said fracture point means includes a pair of diametrically opposite V-shaped indentations.

3. A felting needle as defined in claim 1, wherein said fracture point means comprises a continuous circumferential groove formed transversely to the longitudinal axis of said elongated body.

4. A felting needle as defined in claim 3, wherein said circumferential groove is U-shaped.

5. A felting needle as defined in claim 1, wherein said fracture point means includes at least one notch formed transversely to the longitudinal axis of said elongated body.

6. A felting needle as defined in claim 5, wherein said at least one notch is V-shaped.

7. A felting needle as defined in claim 5, wherein said needle is U-shaped.

8. A felting needle as defined in claim 1, wherein said fracture point means comprises four equally spaced notches around the circumference of said elongated body.

9. A felting needle as defined in claim 8, wherein said four equally spaced notches are V-shaped.

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