Nov. 26, 1968 M. I. PORT ET AL 3,413,176

EDGE SEALING DEVICE FOR PILE FABRICS

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Fig. 1.

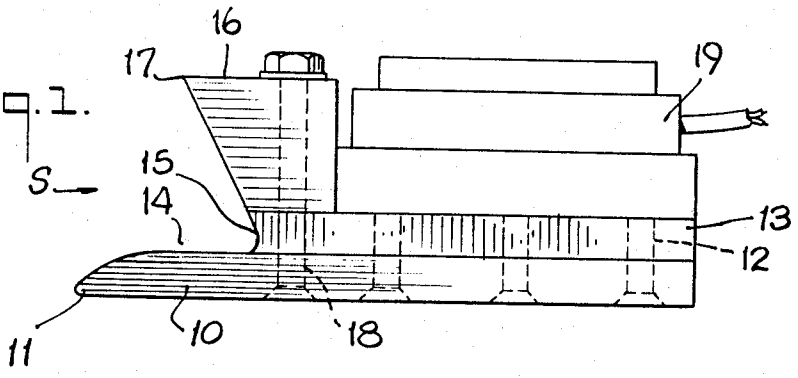


Fig. 2.

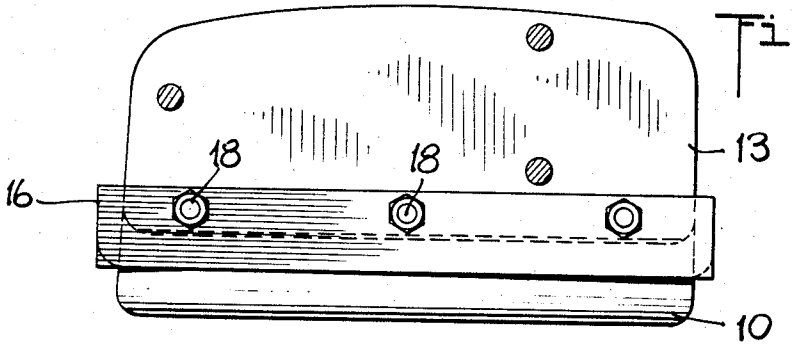


Fig. 3.

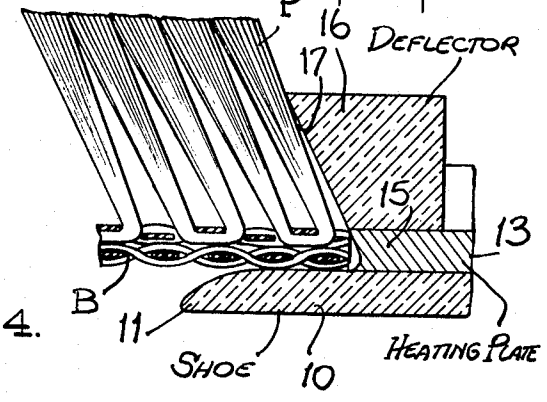
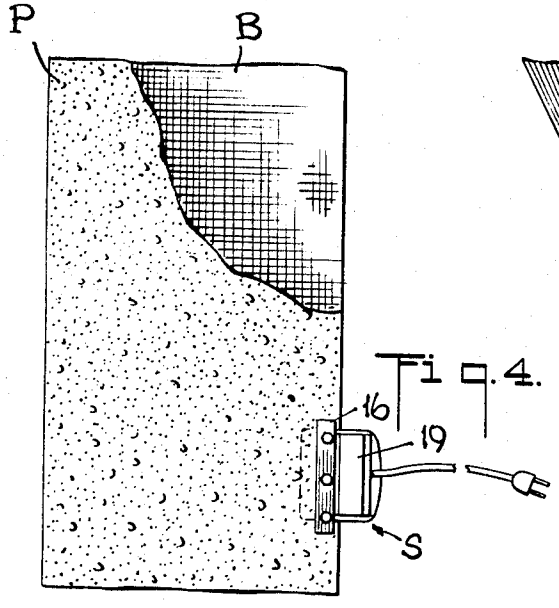


Fig. 4.



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EDGE SEALING DEVICE FOR PILE FABRICS

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ABSTRACT OF THE DISCLOSURE

An edge-sealing device for fusing the cut edge of a pile fabric having a backing of woven synthetic thermoplastic material, the device being provided with a heating plate which is secured to a sole plate and set back from the leading edge thereof to define a ledge for accommodating the margin of the fabric. The heating plate is provided with a heated edge which faces the ledge to engage the cut edge of the backing, a deflecting bar being mounted above the heating plate to displace the pile of the fabric away from the cut edge thereof, thereby facilitating intimate contact between the cut edge and the heated edge.

This invention relates generally to edge-sealing devices for pile fabrics, and more particularly to a device adapted to impart a selvage to the cut edge of a tufted carpet of the type in which the pile yarns are tufted on a backing formed of synthetic thermoplastic material.

In the manufacturing of tufted fabrics, such as carpets and rugs, a woven backing is advanced through a needle tufting machine, the pile yarns being borne on a bank of reciprocating needles which extend transversely across the backing web and pierce the backing material. As the needles are withdrawn, looper members serve to hold the inserted yarns, thereby forming on the moving backing, row upon row of pile loops which project above the backing face. In the completed fabric, the crests of the exposed loops remain joined or they are severed, depending on whether a long-loop pile or a cut-pile fabric is desired. The pile is anchored by connecting loops which are buried in the backing.

In recent years, in order to improve the quality of tufted fabrics, it has become the practice to make use of backings formed of flat or ribbon-like synthetic plastic yarns, rather than the conventional round or twisted yarns of jute, cotton or kraftcord. Among the materials used for this purpose are polypropylene, polyethylene, and other thermoplastic synthetic materials.

Since the backing is formed of woven flat synthetic yarns, when the fabric is cut, occasionally the backing may unravel or fray at the cut edges thereof.

To overcome this condition, attempts have been made to form a selvage by the application of adhesive to the cut edge of the backing, but this type of buttering operation has not been too satisfactory, for the resultant selvage lacks sufficient strength for purposes of seaming. Moreover, the use of adhesives, unless very carefully applied, may soil the pile at the cut edge of the carpet.

Accordingly, it is the main object of this invention to provide a device for sealing the edge of a pile fabric having a woven thermoplastic backing to prevent unravelling thereof and to impart thereto a selvage of relatively high strength.

More particularly, it is an object of this invention to provide an edge sealing tool of the above-described type which acts only on the backing material and which deflects the pile tufts thereon, the tool acting not merely to arerst fraying of the backing by fusing the cut ends of the backing yarns, but also to bind the tufts.

Yet another object of the invention is to provide an edge sealing tool which is of inexpensive design and which lends itself to continuous large-scale operations.

Briefly stated, these objects are accomplished by a tool constituted by a heating plate superposed on a shoe which is insertable under the pile fabric to be processed, a ledge being formed by the upper face of the shoe and the active edge of the heating plate, whereby when the margin of the fabric lies on the ledge, the cut edge of the backing engages an active edge of the heating plate, a deflecting bar being mounted directly above the heating plate to displace the pile yarns and to facilitate intimate contact between the active edge of the heating plate and the cut edge of the backing.

For a better understanding of the invention, as well as other objects and further features thereof, reference is made to the following detailed description to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is an end view of an edge sealing tool in accordance with the invention;

FIG. 2 is a plan view of the tool, with the heater element removed;

FIG. 3 is an enlarged view showing the operative relationship between the edge of the pile fabric and the tool; and

FIG. 4 illustrates how the tool is used in practice.

Referring now to the drawings, and more particularly to FIGS. 1 and 2, an edge sealing device in accordance with the invention, designated by letter S, is constituted by a flat shoe or sole plate **10** of generally rectangular form, the shoe being preferably made of a metal or composite material having good structural properties but relatively poor thermal conductivity, such as hard asbestos or Transite. The projecting front edge **11** of the shoe is chamfered to facilitate its insertion under the backing of a pile fabric.

Superposed on the shoe and secured thereto by bolts **12** is a heating plate **13**, also rectangular in form, but of lesser width than the shoe to define a ledge **14**. The active edge **15** of the heating plate is concavely grooved to form a channel to accommodate the cut edge of the backing to be sealed when the margin of the fabric rests on the ledge. The plate **13** is made of a material having a high degree of thermal conductivity, such as bronze, aluminum or copper.

Mounted above the heating plate **13** is a deflecting bar **16** having a leading edge **17**, the leading edge of the bar projecting forwardly over the ledge **14** and being inclined inwardly to merge with the active edge **15** of the heating plate. The deflecting bar is secured to both the heating plate **13** and the shoe **10** by bolts **18**. The deflecting bar **16** is formed of a material such as Transite having a low thermal conductivity.

Attached to the heating plate **13** behind the deflecting bar **16** is a heating element **19** which is preferably electrically-operated and thermostatically controlled, whereby the amount of heat produced at the active edge **15** is adjusted to a value sufficient to plasticize the cut edge of the woven backing being processed, but insufficient to volatilize this material.

As shown in FIGS. 3 and 4, the tool in accordance with the invention is used in conjunction with the cut edge of a tufted pile fabric having a woven backing B of thermoplastic material, with pile loops P tufted therein. In practice, backing B may be constituted by a single, thermoplastic woven backing or by primary and secondary backings, both formed of synthetic plastic material. However, in the event one of the two backings is of natural material, such as jute, the tool will have no adverse effect on the jute, but will edge-seal only the thermoplastic layer.

The shoe **10** is inserted under the backing whereby the margin of the pile fabric rests on the ledge **14** and the

cut edge of the backing engages the heated active edge **15** of the heating plate **13**. The inclined edge **17** of the deflecting bar **16** engages the upwardly-projecting pile yarns P, and as shown in FIG. 3, causes them to lean away from the edge of the backing to prevent heating thereof and damage thereto. Thus the deflecting plate makes it possible to bring the cut edge of the backing into intimate contact with the heated active edge **15**.

The tool S, as shown in FIG. 4, may in practice be run along the edge of the pile fabric at a rate sufficient to allow heat to be imparted to the cut edges of the backing, causing the cut ends of the synthetic backing yarn to fuse and thereby form a selvage which locks in and anchors the tufts of the fabric to the backing, as well as providing a strong bead for facilitating seaming of this edge to the adjacent edge of another section of the pile fabric.

On a production scale, one may fixedly install the tool S on a table or platen disposed adjacent to a cutting machine and run the pile fabric therealong to seal the cut edge before the fabric is wound on a roll.

While there has been shown and described a preferred embodiment of edge-sealing device for pile fabrics in accordance with the invention, it will be appreciated that many changes and modifications may be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims. For example, when treating a rug having a pile formed of highly sensitive material, such as nylon, the heat transferred to the deflector bar may be sufficient to damage the pile. In this situation, it may be necessary to attach radiating fins to the bar, or bore holes therein, to dissipate excess heat. Alternatively, the bar may be provided with a spaced baffle plate which is thermally isolated therefrom and which is pivoted to the bar, so that it may be retracted when not in use.

What we claim is:

1. An edge sealing device for fusing the cut ends of a pile fabric having a backing of woven synthetic thermoplastic material, said device comprising a sole plate, a heating plate secured to said sole plate and set back from the leading edge of said sole plate to define a ledge for accommodating the margin of the fabric, said heating plate having a heated edge facing said ledge to engage the cut edge of the backing, and a deflecting bar mounted above said heating plate to displace the pile of said fabric away from the cut edge thereof and thereby facilitate intimate contact between the cut edge and the heated edge.

2. An edge sealing device for fusing the cut ends of a pile fabric having a backing of woven synthetic thermoplastic material, said device comprising a sole plate, a heating plate secured to said sole plate and set back from the leading edge of said sole plate to define a ledge for accommodating the margin of the fabric, said heating plate having a heated edge facing said ledge to engage the cut edge of the backing, and a deflecting bar mounted above said heating plate to displace the pile of said fabric away from said backing, and a heating element mounted on said heating plate behind said bar.

3. A device as set forth in claim **2**, wherein said heated edge is concavely formed to accommodate said cut edge.

4. A device as set forth in claim **2**, wherein said plate is formed of a metallic material having high thermal conductivity, and said bar and said sole plate are formed of a non-metallic material having relatively low thermal conductivity.

5. A device as set forth in claim **2** wherein said heating element is thermostatically controlled to impart sufficient heat to said heated edge to fuse the cut ends of the backing.

6. An edge sealing device for fusing the cut ends of a pile fabric having a backing of woven synthetic thermoplastic material, said device comprising a sole plate, a heating plate secured to said sole plate and set back from the leading edge of said sole plate to define a ledge for accommodating the margin of the fabric, said heating plate having a concavely curved heated edge facing said ledge to engage the cut edge of the backing, a deflecting bar mounted above said heating plate and projecting over said ledge, said bar being inclined inwardly to merge with said heated edge thereby to displace the pile of the fabric away from the cut edge of said backing to facilitate intimate contact between the cut edge and the heated edge, and a heater element mounted on said plate behind said bar.

References Cited

UNITED STATES PATENTS

2,466,802	4/1949	Fossa et al.	156—497
2,609,316	9/1952	Fichtner	156—583
3,087,846	4/1963	Soltis	156—88
3,213,265	10/1965	Campbell	156—583

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