

United States Patent

O'Neal

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[54] MORTISE GROOVE KNIFE

[72] Inventor: John E. O'Neal, Indianapolis, Ind.

[73] Assignee: John J. Cotton, Indianapolis, Ind. a part interest

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Primary Examiner—Theron E. Condon

Assistant Examiner—J. C. Peters

Attorney—Woodard, Weikart, Emhardt & Naughton

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[58] Field of Search.....30/1, 25, 121, 165, 278, 279, 30/280; 144/76, 79, 113; 30/305, 316; 145/24, 119, 122

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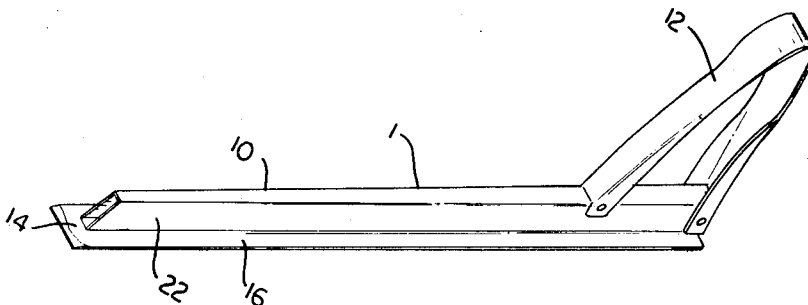
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ABSTRACT

This invention is concerned with a mortise knife. More specifically, this invention is concerned with a mortise groove knife which is capable of cutting an elongated slot in porous materials which incorporate a skin. The knife of this invention generally comprises an elongated channel which is attached to a flat guide section wherein the width of said channel generally increases as the distance from the cutting edge increases.

6 Claims, 4 Drawing Figures



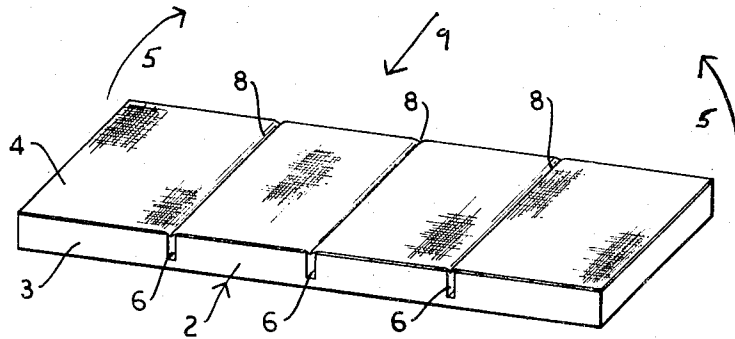


Fig. 1.

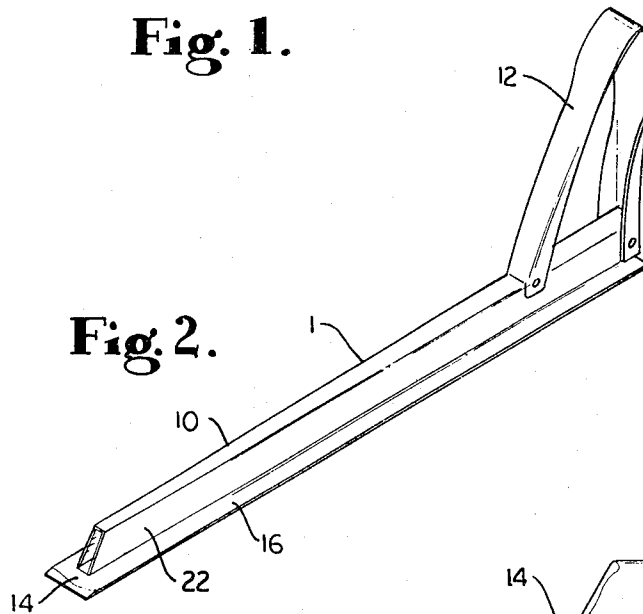


Fig. 2.

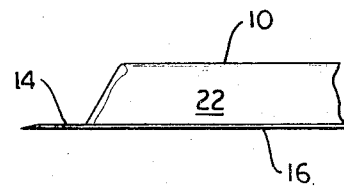


Fig. 3.

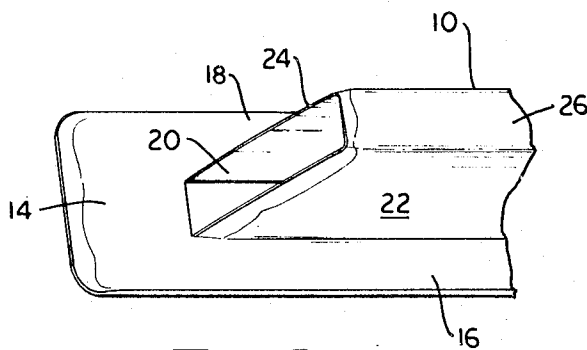


Fig. 4.

INVENTOR
JOHN E. O'NEAL
BY
Woodard, Wakeant, Emhardt & Naughton
Attorneys

MORTISE GROOVE KNIFE

BACKGROUND OF THE INVENTION

Mortise grooves have been known for many centuries as a means for allowing sheet material to assume an arcuate shape. A mortise could generally be defined as a longitudinal slot or groove which is cut into a sheet material in such a fashion as to allow the sheet material to assume an arcuate shape. Generally mortise grooves proceed approximately one-half way through the thickness of the sheet material in question.

In recent years the construction industry has started to utilize many composite materials. Among these new materials are composite sheets which are formed from compacted fiber glass. These sheet materials, due to the insulating properties of the fiber glass component thereof are very desirable in insulating environments. For example, rigid forms of these materials are useful in the formation of heating duct work. Because such forms of these materials are not very flexible, before a sheet of such material can be bent into an arcuate shape, mortise grooves must be cut therein.

The above-described composite materials often contain skins which are adhered to the sheet material substrate. These skins generally enhance the esthetic and cleaning properties of the composite material in question. These skins are generally secured to the fibrous substrate by means of an appropriate adhesive. In accordance with this invention, mortise grooves can be cut under the skin without puncturing the skin.

SUMMARY OF THE INVENTION

This invention relates to a mortise groove cutting knife which is capable of cutting an elongated slot in a sheet material which incorporates a skin, without disturbing the skin. The knife of this invention is of such a construction that the cut segment is easily removed when the knife is withdrawn.

The primary object of this invention is a superior mortise groove knife.

Another object of this invention is a mortise groove knife which is capable of cutting flush to a skin which is contained on a sheet material without puncturing said skin.

Still another object of this invention is a mortise groove knife which is capable of withdrawing a cut section of material.

Another object of this invention is a mortise groove knife which is simple to operate and which can be manufactured cheaply.

Finally the objects of this invention include all the other novel features which will be obvious from the specification and claims at hand.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a section of sheet material having mortise grooves cut therein in accordance with this invention;

FIG. 2 is a perspective view of the mortise groove cutting knife of this invention;

FIG. 3 is a side view of the cutting edges of the mortise groove cutting knife of this invention;

FIG. 4 is a perspective view of the cutting edges of the mortise groove knife of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, it can be seen that composite sheet 2 has the plurality of mortise grooves 6 cut therein. Composite sheet 2 consists of a compacted layer of fiber glass 3 and a vinyl skin 4. In this instance, skin 4 consists of a vinyl sheet of approximately 3 mils thickness. It is to be noted however, that this invention is useful in connection with any manner of composite sheet having a skin which is analogous to skin 4. Examples of other materials which are suitable for use as skins are for example sheet polyethylene, sheet polypropylene, etc. Generally sheet 4 improves the esthetic qualities of composite sheet 2 and likewise improves the cleaning properties of com-

posite 2. If sheet 4 were not utilized, dirt would become embedded into porous fiber glass substrate 3 in such a fashion that composite sheet 2 would become unsightly in appearance.

Mortise grooves 6 are cut under skin 4 to facilitate formation of an arc therein, as by moving the ends upwardly toward each other as indicated by arrows 5, for example. Such a form is useful at the inside of a duct turn. As a result of cutting mortise grooves 6, scores 8 may be formed. Score 8 is a relaxing of the tension of skin 4 in the immediate vicinity of mortise groove 6 which is possible due to the fact that support has been withdrawn from the underside of skin 4 in the vicinity of mortise groove 6.

Referring to FIG. 2, 3 and 4, it can be seen that the mortise groove cutting knife of this invention incorporates a central elongated channel 10 having sides 22 and 24 and a top section 26. Channel 10 is secured to a flat base 16 in such a fashion that aperture 20 is formed by the walls of channel 10. The width of channel 10 is approximately one half that of base 16.

Base 16 incorporates a forward section 14, the leading edge of which is sharpened. The leading edge of channel 10 is slightly inclined toward the leading edge of section 14 and all three sides of the U-shaped section are sharpened. While channel 10 can be inclined at any convenient angle it is preferable that channel 10 be inclined at approximately 45°.

The mortise groove knife of this invention likewise incorporates a handle 12 of various possible configurations to facilitate its usage.

In use on a sheet of material as shown in FIG. 1, the knife is inverted from the position shown in FIG. 2, i.e., the base blade 16 is above the channel blade 10. The leading edge of guide blade 16 is biased against the underside of skin 4 as knife 1 is pushed into sheet 2 in the direction of arrow 9. The sharpened section of the leading edge 14 generally breaks the adhesive bond between skin 4 and fiber glass layer 3. After this adhesive bond is broken the sharpened edges of channel 10 proceed to cut mortise grooves 6. An elongated section of fiber glass composite 3 is formed in channel 10 during the cutting of mortise grooves 6.

When composite material of the type as discussed above, and in particular fiber glass composites, are cut, these materials have a tendency to expand after being cut. In order to put this property to good advantage, channel 10 as it proceeds from the vicinity of leading edge 14 to handle 12 increases in width. The purpose of this increase in width is to allow the elongated section of composite sheet 2 to expand internally in channel 10. That is, to its natural resiliency, the elongated section tends to expand against walls 22, 24 and 26 of channel 10 in such a fashion that said elongated section is biased in aperture 20 of channel 10. When the cut is complete, knife 1 is withdrawn. Because of this internal expansion in channel 10 the cut segment of sheet 2 does not have a tendency to remain in sheet 2 when the mortise knife of this invention is withdrawn therefrom. That is, due to the natural resilient expansion tendency the cut segment of sheet 2 is securely biased in groove 10 and hence remains in the mortise groove knife 1 when it is withdrawn.

The mortise groove knife in accordance with this invention can be any convenient length. However, it is preferred that the distance from the cutting edge of channel 10 to the leading edge of handle 12 be approximately one-half the width of the sheet that is being cut. With this arrangement a cut across the width of a sheet can be made in two passes, one pass from each side. In this manner, a cut can be made across the full width of a sheet of material without necessitating a mortise groove knife 1 which is awkward due to its length.

I claim:

1. A mortise groove-cutting knife comprising: a handle, an elongated flat base guideblade connected to said handle, and an elongated channel blade attached to said guideblade and wherein the width of said channel blade is less than the width of said guideblade, and the leading edges of said elongated channel blade and base guideblade are sharpened.

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2. The mortise groove-cutting knife of claim 1 wherein the leading edge of said elongated channel blade is positioned slightly back from the leading edge of said flat base blade.

3. The mortise groove-cutting knife of claim 1 wherein attached to one end of said knife is said handle.

4. The mortise groove-cutting knife of claim 1 wherein said channel blade has a U-shaped cross section and a transverse internal dimension of said channel blade increases as the distance from the leading edge of said channel blade increases, wherein the width of said U-shaped channel blade is approximately one-half the width of said elongated flat base blade and the leading edge of said channel blade is inclined at

an angle of approximately 45° relative to said base blade.

5. The mortise groove-cutting knife of claim 1 wherein said channel blade has a U-shaped cross section and the internal width of the channel blade is substantially less than the width of said base blade and increases as the distance from the leading edge of said channel blade increases.

6. The mortise groove-cutting knife of claim 2 wherein said channel blade has a U-shaped cross section and the internal width of the channel blade increases as the distance from the leading edge of said channel blade increases.

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