

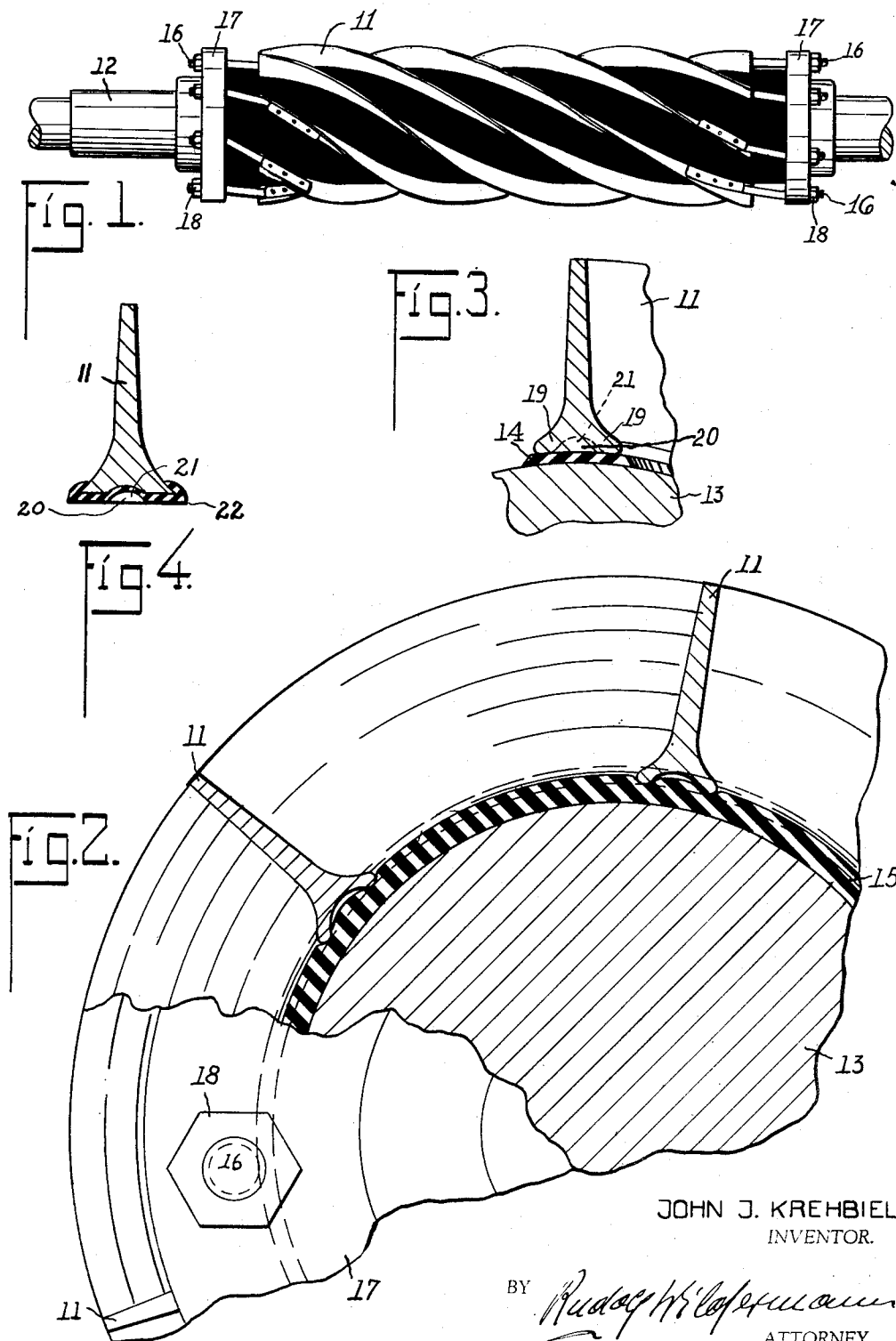
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ROTARY KNIFE

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ROTARY KNIFE

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9 Claims. (Cl. 146—106)

This invention concerns a rotary knife and more particularly a type of such a knife which is a composite of cutting or shearing blades.

Such type of knife ordinarily comprises a shaft, a section of or on said shaft being a rigid, tubular or solid wood or metal mandril. Upon the mandril are mounted the blades, e. g. by being screwed thereunto, wedged, dovetailed, or strapped. In the last instance suitable tie means, e. g. tie rods reacting upon flanges, heads or rims may be provided at opposite ends of the mandril; and the blades are tensioned and extend between these tie means, preferably along a helical path, so that they are strapped and forced onto the mandril by the tension applied by the tie means to said blades.

An inherent difficulty is encountered in connection with such blades, as well as with different mountings of ledger blades. The stresses to which the blades are exposed when the rotary knife is idle and stand still are entirely different from, and in many instances just opposite to the stresses set up therein and on at the high speed of revolution at which such knives are commonly used. The centripetal component of the force applied to the blade in mounting it, in order to retain it on the mandril, is directly opposed by the centrifugal force radially tensioning the blade away from the mandril, when it rotates at high speed. Such forces cause shattering or knocking, shifting, straining and even cracking of the blade on the rotating knife. While it is realized, that such contrary forces occurring in connection with the blades of a rotary knife cannot be completely eliminated, it is the object of this invention to offset such forces in part, or to offset the detrimental effects of such contrarily acting forces.

In accordance with another object of this invention means are provided for which may produce a centripetal force, which force not only opposes the centrifugal force of the blade of the rotating knife, but which also increases substantially in keeping with the increase of such centrifugal force.

Other objects of this invention will be more clearly recognized from the following exemplary description thereof, which description is however to be interpreted as purely illustrative and not as limitative.

Instead of providing a rigid mounting for the blade, this invention provides for a flexible mounting, or for a flexible and preferably resilient cushion interposed between the blade and

the rigid backing, or the blade or the mounting may provide for such flexibility or elasticity at or near the point of plane where the former abuts upon the latter.

5 In accordance with this invention the desired cushioning reaction may also be provided for pneumatically, e. g. by interposing a sealed, hollow compartment with one or more yieldable walls at or near the place of abutment of the blade upon the mandril. Such a compartment 10 may be arranged to be enlargeable, i. e. under the application of the abovementioned centrifugal force, and will then react, under the pressure of the atmosphere, the force retaining the blade upon the mandril increasing in keeping with the rarefaction of the gaseous contents of the compartment.

In the accompanying, illustrative drawing:

Fig. 1 is a side elevation of a rotating knife.

20 Fig. 2 is an enlarged fragmentary and partly cross-sectioned end view.

Fig. 3 illustrates a modification by way of a detail view.

Fig. 4 is the cross-section of a modified blade.

25 Similar numerals refer to similar parts throughout the various views:

Flexible, preferably resilient material is to be used for the padding of this invention, for instance felt or rubber, the latter more in particular, where additional pneumatic effects are 30 to be obtained.

In a simple example of this invention, the pad shaft 12 of the rotating knife is provided with a larger portion 13, which is a core or mandril.

35 This core 13 may be covered with a padding consisting of longitudinal or transverse strips, Fig. 3 showing for instance a rubber strip 14 aligned along a helical path underneath the base of the correspondingly curved blade 11.

40 Fig. 2 shows a solid covering 15 on the mandril, such covering being for instance made of rubber, and being applied to the mandril as a tubing slipped thereover, or being vulcanized thereonto and preferably ground to concentricity 45 thereafter.

The blades 11 are suitably strapped onto the mandril, for instance by tie rods 16 extending from the ends thereof. The rods 16 extend through flanges 17 provided at the ends of the mandril 13 and may be drawn tight by nuts 18.

50 The blades 11 may have any of the customary shapes known in connection with shearing blades. For purposes of a balanced effect the exemplary showing of the drawing shows a symmetrical, bipedal form, in which the two legs 19 may be 55

executed thin enough in order to provide for a certain yielding resiliency.

When an additional, pneumatic reaction is desired, a groove 21 provided underneath the blades 11 between the forked legs 19 may be closed at the ends, and also at intermediate points, by partitions 20. Between such partitions 20 the groove will therefore form sealed compartments, more particularly if the padding 14 or 15 is made of rubber. Originally, i. e. when the blade 11 is strapped onto the mandril, the air is compressed, the surplus air leaking out slowly, so that there is substantially atmospheric pressure in such compartment, when the blade is put to use. However, when the blades are forced out by the centrifugal force of high speed of rotation of the rotating knife, the atmosphere of said compartment will become rarified, applying suction to the blades 11, whereafter the blades are stabilized and adhere to the mandril by reason of the resultant centripetal force.

The resilient mounting of this invention has hereinabove been explained as applied to or as part of the mandril. It may of course also be associated with the blade, such blade together with the resilient mounting being then applied, as a unit, to a mandril, e. g. a mandril with a hard and rigid surface. The resilient mounting, e. g. the rubber 22 of Fig. 4 may be strapped onto the blade, or formed and baked or vulcanized onto or around the base of the blade 11.

Having thus described my invention by way of some modifications, I do not wish to be limited thereby, except as the state of the art and the appended claims may require, for it is obvious that various modifications and changes may be made in the form of embodiment of my invention, without departing from the spirit and scope thereof.

What I claim is:

1. In a rotary knife, a rigid core, a rubber padding on said core, a helical blade, and tie means reacting substantially in the direction of the axis of the knife and strapping said blade onto said core, said padding being interposed to the length of the blade between said blade and the said core.

2. In a rotary knife, a rigid core, resilient padding on said core, a bipedal, helical blade, and tie means strapping said blade endwise onto said core, said padding being interposed to the length

of the blade between the feet of said blade and the said core.

3. In a rotary knife, a rigid core, resilient padding on said core, a bipedal, helical blade, cross partitions depending between the feet of said blade, and tie rods strapping said blade onto said core, said padding being interposed between the feet and cross partitions of said blade and the said core.

4. In a rotary knife, a rigid core, resilient padding on said core, a helical blade, and tie means at the ends of said blade only and strapping said blade onto said core, said padding being interposed between said blade and the said core throughout the length of said blade.

5. In a rotary knife, a rigid core, resilient padding enveloping said core, a bipedal helical blade, and tie rods strapping said blade onto said core, said padding being interposed between and relatively spacing the feet of said blade and the said core.

6. In a rotary knife, a rigid core, resilient padding enveloping said core, a bipedal helical blade, longitudinally spaced cross partitions extending between the feet of said blade and surrounding a cavity in said blade together with said feet, and tie means endwise applied to and strapping said blade onto said core, said padding being interposed between and relatively spacing the feet and cross partitions of said blade and the said core and being adapted to be engaged by suction in said cavity.

7. In a rotary knife, a rigid core, resilient padding enveloping and vulcanized onto said core, a helically wound blade, and tie means endwise applied to and strapping said blade onto said core, said padding being interposed between said blade and the said core throughout the length of the blade.

8. In a rotary knife, a rigid core, resilient padding enveloping and ground concentric with said core, and a helically disposed blade strapped onto and resting upon said core by way of said padding.

9. In a rotary knife, a rubber covered core, and a helical blade with a bottom face shaped to fit said core, said bottom face having a central recess and extending as a margin around said recess.

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