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Saunders

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[54] **MOUNTING OF ROTARY SPLIT SLITTING KNIVES**

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[52] **U.S. Cl.** **83/665,** 83/675, 83/698, 83/838

[51] **Int. Cl.** **B26d 1/12,** B23d 35/00

[58] **Field of Search** 83/663, 664, 665, 675, 83/676, 698, 838

[56] **References Cited**

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[57] **ABSTRACT**

A split rotary slitting knife removably mounted to a split annular head is positioned so that the diametrically opposed joints between head portions are angularly offset from the joints where the cutting portions of the blade sections abut. The ends of each of the blade sections extend across both of the head joints for proper alignment of the blade sections.

6 Claims, 4 Drawing Figures

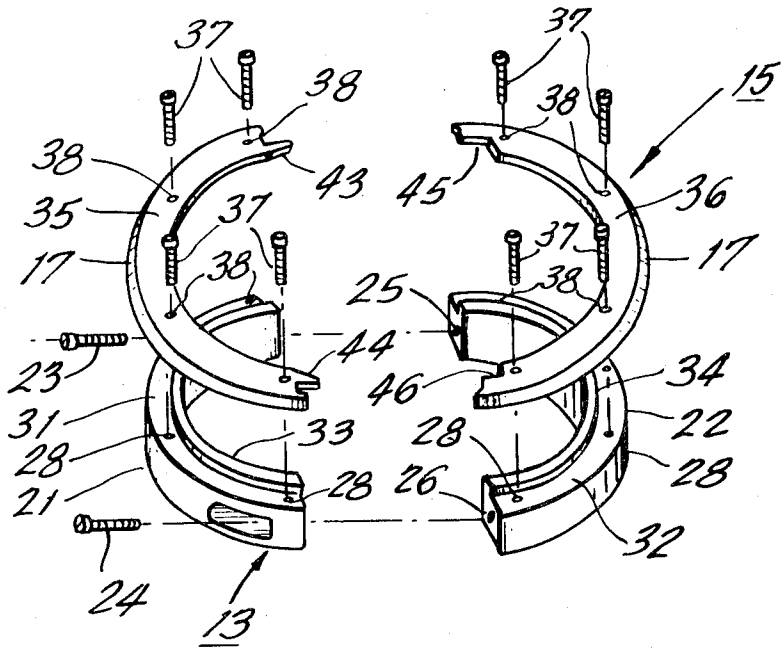


FIG. 1.

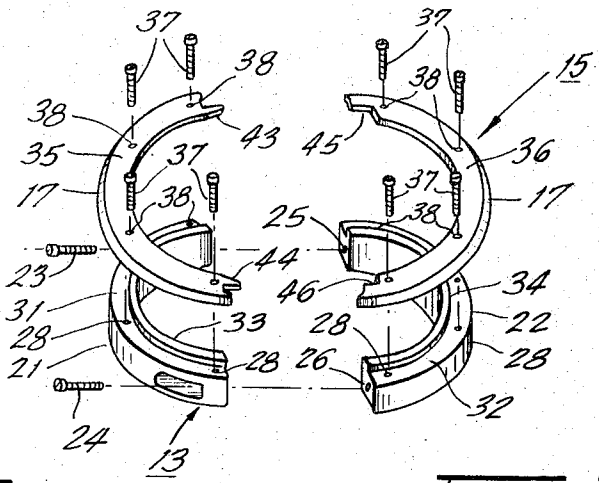


FIG. 3.

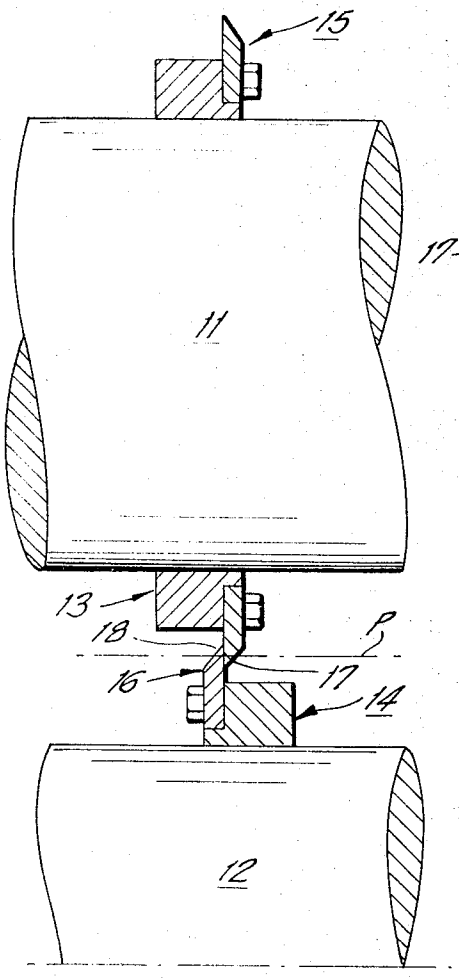
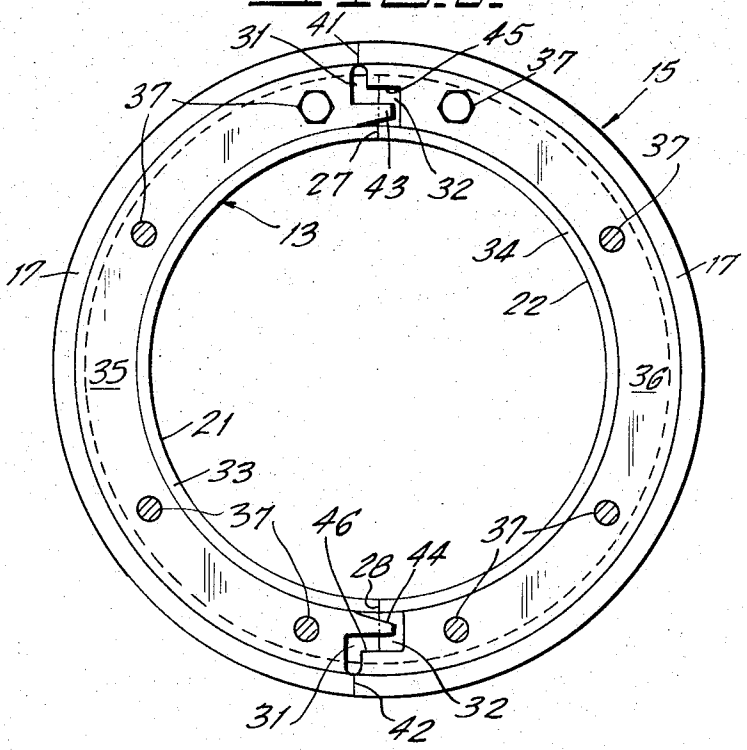


FIG. 2.



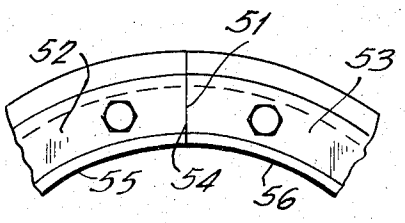


FIG. 4.
(PRIOR ART)

MOUNTING OF ROTARY SPLIT SLITTING KNIVES

This invention relates to knives in general and more particularly relates to rotary knives for longitudinally slitting web material.

In the production of double-faced corrugated board, a corrugated web sandwiched between two flat liner webs is bonded thereto to form a relatively stiff composite web, typically from 85 inches to 105 inches wide. The composite web passes through slitting apparatus which includes sets of opposed cooperating annular knives transversely positioned to trim the edges of the relatively wide web and also slit the web longitudinally into two or more relatively narrow composite webs that are fed to a cutoff means which transversely cuts the relatively narrow webs into sheets of corrugated board.

Since the slitter blades must be repositioned very often, each annular blade is split and is mounted to a split annular head which is clamped to a drive shaft in a manner which permits the clamping forces to be relaxed so that the head with the blade thereon may be transversely positioned with respect to the longitudinal axis of the web to be cut. Relatively rapid wear of the blade requires that it be split to facilitate changing thereof.

In accordance with the prior art, the two splits in the annular blade are aligned with the splits in the head. Unfortunately, this permits misalignment between the cooperating head sections of the annular blade, and because of the engagement between cooperating knives, misaligned knife sections often chip thereby resulting in poor quality slitting and shortened life for the blade sections.

To significantly reduce, if not entirely eliminate, misalignment of split knife sections, the instant invention provides a construction in which the joints between the split knife sections are angularly offset with respect to the joints between the split head sections. Further, each end of each blade section is constructed so that a portion thereof bridges a joint between sections of the split head. It appears that because the blade splits and the head splits do not coincide, as they do in the prior art, there is improved alignment between slitting surfaces of the split knife sections.

Accordingly, a primary object of the instant invention is to provide an improved construction for a split annular knife mounted to a split annular head.

Another object is to provide slitter knife sections mounted to split head sections in a manner such that knife joints are angularly displaced from the head joints.

Still another object is to provide split knives and heads of this type in which portions at each end of each of the split knife sections extend across a split at the boundary between head sections.

These objects as well as other objects of this invention will become readily apparent after reading the following description of the accompanying drawings in which:

FIG. 1 is an exploded perspective of a split annular slitter blade and head therefor.

FIG. 2 is a side elevation of the elements of FIG. 1 in assembled positions.

FIG. 3 is a fragmentary cross-section taken in a plane extending through the diameters of an upper and lower slitter shaft.

FIG. 4 is a side elevation of a prior art slitter knife mounted to a split annular head.

Now referring to the figures. A rotary slitter includes upper and lower driven shafts **11, 12** mounting annular heads **13, 14,** respectively, which carry the respective annular knives **15, 16.** The board being slit travels along path P extending parallel to the longitudinal axes of shafts **11, 12** and through the engaged cutting edge areas **17, 18** of the respective knives **15, 16.** The web travels in a direction perpendicular to the plane wherein the longitudinal axes of shafts **11, 12** are disposed.

Since heads **13, 14** are of identical construction and blades **15, 16** are of identical construction, for the sake of brevity only the constructions of head **13** and blade **15** will be described in detail. With particular reference to FIGS. **1** and **2,** it is seen that head **13** is constructed ot two arcuate portions **21, 22,** each 180° in length, with their ends held in abutting relationship by clamping screws **23, 24** that pass through clearance apertures (not shown) in head portion **21** that are received by threaded apertures **25, 26** in head portion **22** so that the splits or joints **27, 28** where the ends of head portions **21, 22** abut are diametrically opposed. As is well known to the art, the tightening of screws **23, 24** clamp head **13** in a selected position along the length of shaft **11.** Tongue and groove means (not shown) may be provided in the abutting surfaces of head portions **21, 22.**

Each of the head portions **21, 22** is provided with a plurality of threaded apertures **28** extending inward from their respective flat mounting surfaces **31, 32** respectively. Arcuate shoulders **33, 34** along the board boundaries of the respective subassemblies **31, 32** serve to partially position arcuate blade sections **35, 36** constituting split blade **15.** Screws **37** pass through clearance apertures **38** in blade section **35, 36** and are received by apertures **28** to clamp blade section **35** against head surface **31** and clamp blade section **36** against head section **32.** The ends of arcuate cutting edges **17** along the outer edges thereof at blade sections **35, 36** abut at joints **41, 42,** respectively.

Blade section **35** includes extensions **43, 44** at opposite ends thereof which project across blade joints **41, 42** and extend across head joints **27, 28.** The ends of blade section **36** at the inner portions thereof are provided with notches **45, 46** which receive the respective extensions **43, 44,** and end portions of blade section **36** bridge joints **27, 28.** Thus, blade joints **41, 42** are angularly offset from head joints **27, 28.**

The misalignment of blade joints **41, 42** with respect to head joints **27, 28** and the constructions of blade sections **35, 36** so that the ends thereof extend across both head joints **27, 28** result in improved alignment between the cutting edges **17, 17** of blades sections **35, 36.** This is in contrast to the prior art (FIG. **4**) in which the joint **51** between split blade sections **52, 53** is aligned with joint **54** between split head portion **55, 56.**

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now become apparent to those skilled in the art. Therefore, this invention is to be lim-

ited not by the specific disclosure herein, but only by the appended claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. An assembly including an annular head selectively mountable along the length of a drive shaft and an annular blade removably mounted to said head; said head including first and second separable arcuate portions mated at the ends thereof at first and second head joints; said blade including a circular cutting edge along the outer edge thereof; said blade also including first and second arcuate sections having, respectively, first and second parts of said cutting edge mated at the ends thereof at first and second blade joints whereat the ends of the cutting edge parts abut; said blade joints being angularly displaced from said head joints; in the vicinity of each of said blade joints one of said blade sections having an end projection bridging the head joint adjacent thereto, and the other of said blade sections having an end notch to receive the end projection.

2. An assembly as set forth in claim **1** in which the head joints are located at diametrically opposed positions.

3. An assembly as set forth in claim **2** in which both of the end projections are provided by said first section, and both of said notches are provided by said second section.

4. An assembly as set forth in claim **2** in which the blade joints are both positioned on the same side of a line extending between the head joints.

5. An assembly as set forth in claim **4** in which both of the end projections are provided by said first section, and both of said notches are provided by said second section.

6. An assembly as set forth in claim **5** in which the blade abuts a generally flat surface of the head.

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