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D. B. WICKER
ROTARY DISK CUTTER
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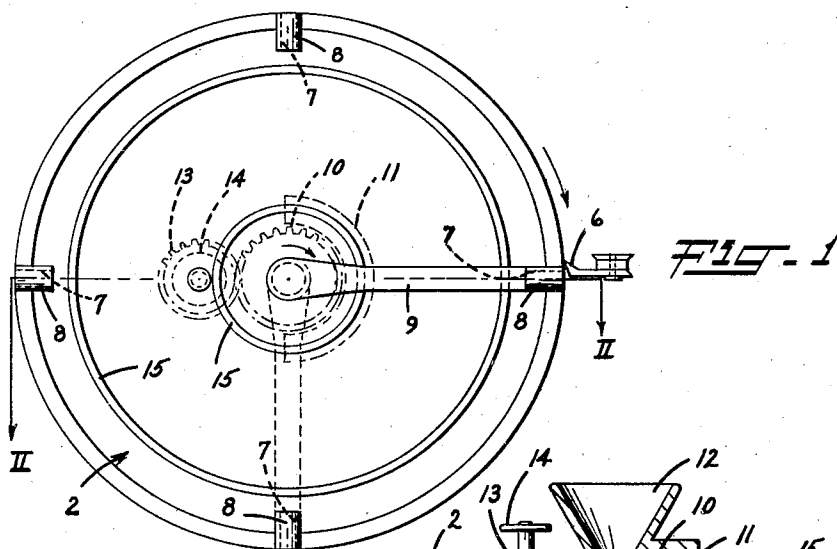
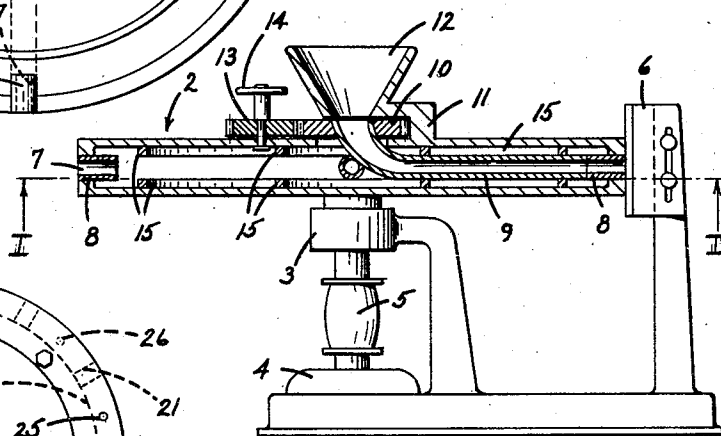
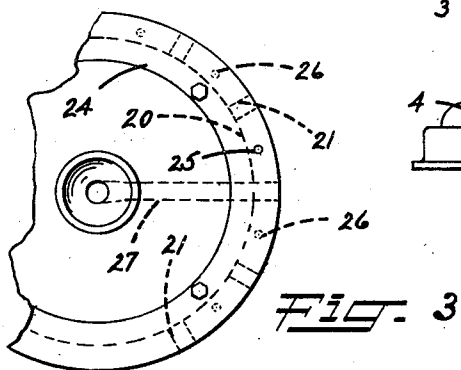
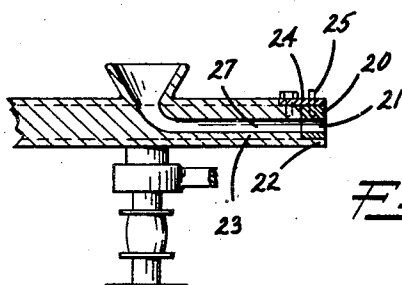


FIG. 4

INVENTOR.
Dan B. Wicker
BY
Carl A. Castellano
Atty.

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ROTARY DISK CUTTER

Dan B. Wicker, Dunbar, W. Va., assignor to American Viscose Corporation, Wilmington, Del., a corporation of Delaware

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5 Claims. (Cl. 164—34)

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This invention relates to devices for cutting continuous bundles of filaments to discontinuous lengths for the production of staple fiber. It is particularly concerned with improvements in the type of cutter, the basic form of which is shown in U. S. Patent 1,723,998, comprising a rotating disk having a radial passage for feeding the filamentary material radially outward from the periphery of the disk and one form or another of cutting implement, such as a stationary or moving knife which engages the disk periphery at least during cutting intervals.

Because of the corrosiveness of the filaments when they are still acid-laden, such as yarns or tows of freshly spun artificial filaments from viscose and the like, or because of the abrasiveness of the filaments when they contain pigments or other fine particles for coloring, delustering, or like effects, or in some cases, because of the wear resulting from a combination of these factors, the face of the bore or opening of the radial passage must be frequently reconditioned or, when bushings are used, they must be replaced frequently, with resulting losses of time and labor because of the stoppages.

It is an object of the present invention to reduce the losses occasioned by stoppages by providing an improved mounting for the parts defining the radial passage which makes it possible to quickly rearrange the parts so that fresh surfaces are positioned for cooperating with the knife during the cutting operation. Other objects and advantages will be apparent from the drawing and the description thereof hereinafter.

In the drawing which is illustrative of preferred embodiments of the invention,

Figure 1 is a horizontal section of a preferred embodiment looking up from beneath, taken on line I—I of Figure 2,

Figure 2 is a vertical section taken on line II—II of Figure 1,

Figure 3 is a plan view of a modification, and

Figure 4 is a section taken on line IV—IV of Figure 3.

As shown in Figures 1 and 2, the disk 2, rotated in suitable bearings 3 and 4 by pulley 5 cooperates with a stationary knife 6. Other forms of knives may be used, such as those that are movable into and out of the path of the filaments projecting from the disk to effect cutting at less frequency than the rotation of the disk, as in U. S. Patent No. 2,339,766; also those that move in a concentric circle about the disk but at a different rate than the disk, as in U. S. Patent No. 2,278,662; and also those that intermittently move out

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of contact with the disk so that they make contact only around the stage of the actual cutting, as in U. S. Patent No. 2,339,765. The important fact of all the cutting devices with which the invention is concerned is that the knife or knives thereof engage the periphery of the disk at least during the cutting interval of the revolution of the disk.

The disk 2 has a plurality of radial passages 7 opening through the external periphery of the disk. These passages may be defined merely by the peripheral surface of suitable bores drilled in and extending radially inward from their openings in the periphery of the disk. Preferably, however, the passages 7 are defined by the inside wall of bushings 8, as shown. That portion of the surface of the passage 7 adjacent its opening in the disk periphery against which the knife forces the filament bundle undergoes severe wear, from corrosion or abrasion or both.

A conduit or channel 9 having a curved portion is rotatably mounted so that its opening at one end is at all times disposed to receive filamentary material approaching in a substantially axial direction and the opening at the other end may be in substantial alignment with any one of the passages 7. A gear 10 may be fixedly secured to the generally axially directed end of the channel 9. As shown, the gear 10 rests upon the upper surface of disk 2 and is adapted to move within an arcuate guideway extending part way around its circumference and formed within the bracket 11 projecting from the top surface of the disk 2 and carrying a funnel 12 which serves to guide the continuous filamentary material into the channel 9. A gear 13 meshes with gear 10 and a wheel 14 may be provided to facilitate manual adjustment of the position of channel 9. Suitable spring-pressed detents may be provided in the gear 10 to cooperate with appropriately positioned recesses in the top surface of disk 2 to assist in alignment of the channel 9 with any one of the passages 7. Alternatively, indicia on the gear 10 and disk 2 may be provided for this purpose. The weight of channel 9 and bracket 11 are preferably balanced with the weights of gear 13 and wheel 14 to produce of minimum of vibration during rotation. Annular ridges 15 may also be provided to guide and support the channel 9 when its radially extending portion is not as deep as the space between the inside faces of the disk 2.

During operation of the device, the filamentary material enters the funnel 12 and passes through channel 9 and the aligned passage 7, and the por-

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tion of the material fed radially out from the disk is cut each time that passage 7 passes the knife. When that passage begins to show evidence of excessive wear, the device is stopped momentarily, the material is withdrawn sufficiently to be free of the passage 7 and then channel 9 is rotated to alignment with another of the passages 7. The cutter is then started and the shift of channel 9 to a fresh passage 7 is repeated at intervals as necessary.

Any number of radial passages 7 may be provided in a single disk. The channel 9 may be made of porcelain, Alsimag, or of metals having low abrasion and friction toward the materials to be cut while the bushings 8, when such are used, may be made of any material adapted to serve best as a cutting or shear member in cooperation with the knife, regardless of any abrasive action it may have on the filamentary material being cut. This is especially true when the bushings are made relatively short and the channel 9 comparatively long, as shown. The feeding action may be that resulting from centrifugal force caused by rapid rotation of the disk or it may be effected by introducing a jet of fluid, such as air or water, into the funnel 12, or it may be effected by a combination of these forces.

In Figures 3 and 4, a modification is shown in which an annular peripheral block 20 provided with radial passages 21 is mounted rotatably or slidably upon a shoulder or flange 22 of the cutter disc 23. An annular plate 24 is secured to one face of the disc to retain the ring 20 in position. A registry pin 25 is arranged to fit through a suitable perforation in the plate 24 and engage any one of a plurality of registry perforations 26 within the ring 20, thereby to retain the ring with a selected one of its passages 21 in alignment with the radial passage 27 of the rotatable cutter disc.

It is to be understood that changes and variations may be made without departing from the spirit and scope of my invention as defined by the appended claims.

I claim:

1. A device for cutting continuous filamentary material to discontinuous lengths comprising a knife and a rotating member having a plurality of radial passages opening into the periphery of the member and against a portion of the surface of one of said passages the knife engages the material being cut, a channel within the device having a bent portion and having one end directed generally axially of the device and the other end generally radially therein, the channel and the member being mounted for relative rotation about substantially the axis of the member.

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2. A device for cutting continuous filamentary material to discontinuous lengths comprising a knife and a rotating member having a plurality of radial passages opening into the periphery of the member and against a portion of the surface of one of said passages the knife engages the material being cut, a channel within the device having a bent portion and having one end directed generally axially of the device and the other end generally radially therein, the channel being rotatable relative to the disk about substantially the axis of the disk, and means on the disk for rotating the channel selectively into alignment with the radial passages.

3. A device for cutting continuous filamentary material to discontinuous lengths comprising a knife and a rotating disk having a plurality of radial passages defined by bushings each opening into the periphery of the disk and against a portion of the surface of one of said bushings the knife engages the material being cut, a channel within the disk having a bent portion and having one end directed generally axially of the disk and the other end generally radially therein, the channel being rotatable relative to the disk about substantially the axis of the disk, and means on the disk for rotating the channel selectively into alignment with the bushings.

4. A device for cutting continuous filamentary material to discontinuous lengths comprising a knife and a rotating member having a plurality of radial passages opening into the periphery of the member and against a portion of the surface of one of said passages the knife engages the material being cut, said rotating member being annular, a rotatable support for the annular member, a channel within the rotatable support having a bent portion and having one end directed generally axially of the support and the other end generally radially therein, the annular member being rotatable with respect to the support for bringing the channel selectively into alignment with the radial passages thereof.

5. A device for cutting continuous filamentary material to discontinuous lengths comprising a knife and a rotating disc having a plurality of radial passages opening into the periphery of the disc and against a portion of the surface of one of said passages the knife engages the material being cut, a channel within the disc having a bent portion and having one end directed generally axially of the disc and the other end generally radially therein, the channel being rotatable relative to the disc about substantially the axis of the disc, and means on the disc for rotating the channel selectively into alignment with the radial passages.

DAN B. WICKER.