July 9, 1940. W. RODENACKER ET AL 2,207,383

APPARATUS FOR PRODUCING RAYON STAPLE FIBERS FROM CONTINUOUS RAYON FILAMENTS

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Fig. 1

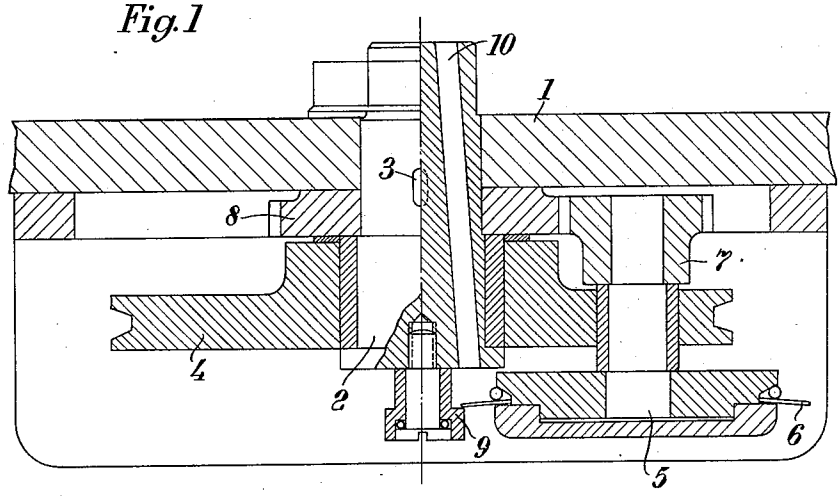


Fig. 2

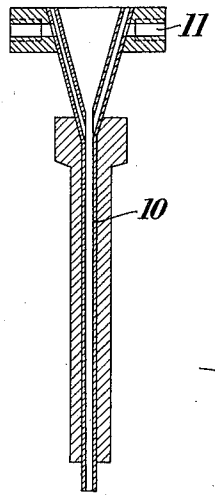
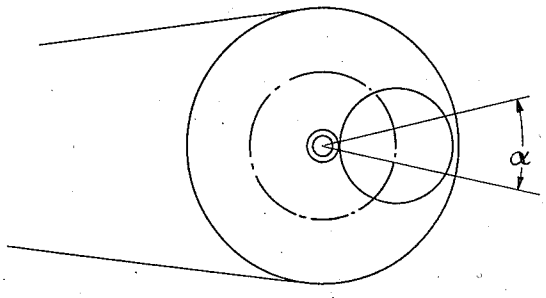


Fig. 3



Inventors
Wolf Rodenacker
Emil Baumann

By Their Attorneys
Ruth and Goslin

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Fig. 4 Fig. 5 Fig. 6

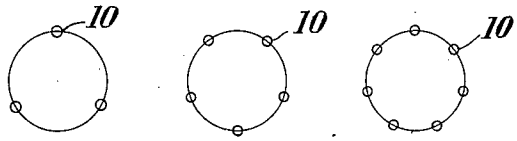
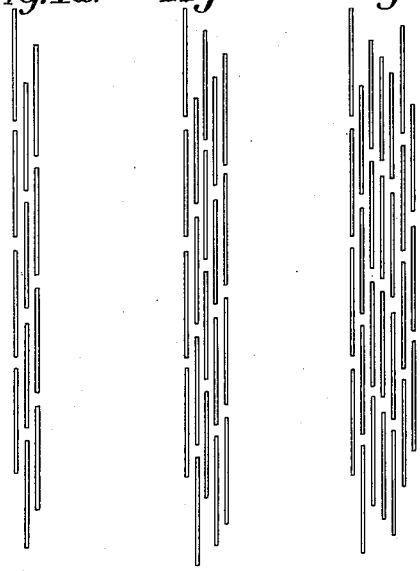


Fig. 4a. Fig. 5a. Fig 6a.



Inventors
Wolf Rodenacker
Emil Baumann

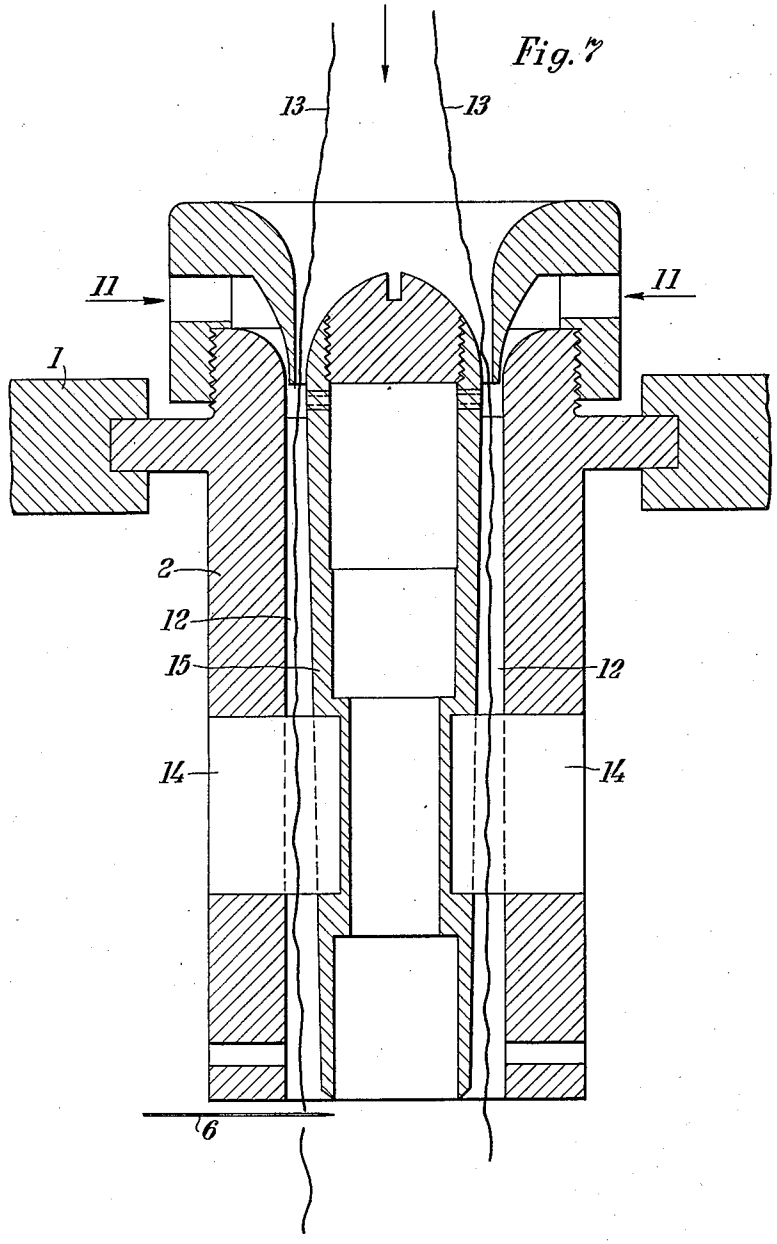
By Their Attorneys
Hinds and Goslin

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Fig. 7



Inventors
Wolf Rodenacker
Emil Baumann

By Their Attorneys
Hutz and Jolin

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APPARATUS FOR PRODUCING RAYON STAPLE FIBERS FROM CONTINUOUS RAYON FILAMENTS

Wolf Rodenacker and Emil Baumann, Wolfen, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort - on - the - Main, Germany

Application December 29, 1938, Serial No. 248,216
In Germany January 6, 1938

3 Claims. (Cl. 164—60)

This invention relates to an apparatus for producing rayon staple fibers from continuous rayon filaments.

Continuous bundles of artificial silk filaments are usually cut into staple length by a straight bladed knife which cuts the fibers, held in any desired manner, perpendicular to their length by impact. It has also been proposed to use revolving knives, which have the advantage of facilitating the cutting and of being easily manufactured and renewed (see for example U. S. Patent No. 1,895,246).

An object of the present invention is the provision of novel means for cutting continuous rayon filaments.

An additional object resides in an apparatus for the production of rayon staple fibers which is simple and reliable in construction and operation.

A further object resides in the provision of a cutting means of the character referred to, which is capable of converting a bundle of filaments directly into a staple fiber sliver or roving.

Reference is made to the accompanying drawings in which

Fig. 1 is a diagrammatic view of the apparatus in vertical section.

Fig. 2 is a diagrammatic longitudinal section through one of the leading channels for the endless filaments.

Fig. 3 is a diagrammatical plan view of the pulley and knife with its driving means.

Figures 4, 5, and 6 and 4*a*, 5*a*, and 6*a* show diagrammatically the introduction of the bundles of filaments and the arrangement of the staple length in the sliver leaving the cutting device.

Figure 7 shows a vertical section of the core 2 in an enlarged scale having an annular duct therein instead of a plurality of borings.

The cutting apparatus comprises one or more revolving knives which perform a cyclical, preferably a planetary, motion relatively to the direction of motion of the fibers. By this means is obtained a combination of the advantages of both the known methods of cutting, an impact cut being made by revolving knives.

A bolt 2 prevented from rotating by a key 3 is fixed in a base plate 1. A pulley 4 driven by a belt or toothed wheel rotates on the fixed bolt 2. One or more shafts 5, each of which carries a circular knife 6 at one end and a toothed wheel 7 at the other, is or are mounted in the pulley 4. The toothed wheel 7 engages in the toothed wheel 8 which is fixed to the bolt 2, so that the shaft 5 carrying the knife is rotated by rotation of the pulley 4, but in a direction opposite thereto. The knife 6 cuts against an edge 9 which is rotated by friction. The knife may be a simple circular knife. The filaments are fed through one or more borings 10 or an annular duct (12 in Fig. 7). In this case the inner core 15 of bolt 2 may be supported by interconnecting members 14 (Fig. 7). The bundles of filaments (13 in Fig. 7) are conveyed by rollers, belts or their own weight. The uncut bundle of filaments may be assisted in its passage through the boring 10 (Figure 1 or conduit 12 in Fig. 7) by air pressure from side channels 11 in Figures 2 and 7.

In Figure 3, with uniform rotation, the angle α corresponds with the time during which the guide 10 for the continuous filaments is covered by the knives and the bundle of filaments stopped in the boring 10. This time can be shortened by altering the diameter of the knife or by an eccentric drive, for example by elliptical wheels or by rotating double crank guides. To obtain a longer cut the knife disc is disposed towards the tangential plane of the cutting helix. The angle of the tangential plane is determined by the speed at which the bundle of fibers is conveyed, and the speed of rotation of the disc 4.

Figures 4, 5, and 6 and 4*a*, 5*a*, and 6*a* show diagrammatically the distribution of the staples in the resulting sliver if 3, 5 and 7 endless bundles of filaments are fed to the cutting device. In order to obtain the displacement of staple shown in Figure 6, two knives are necessary as will be easily understood. The cut fibers are conveyed away either by free fall or by conveyor belts or rollers which (and herein resides one of the chief advantages of the apparatus shown in the drawings) can be placed within the usual staple length in proximity of the knives. By a helical cut or an alternating cut in, e. g., 2 or 3 displaced guiding channels 10, the fibers reach the conveyor belt with their staple lengths displaced with respect to each other. The resultant fleece or sliver can then be led to an apparatus for combining the fibers into a roving.

We claim:

1. Apparatus for producing rayon staple fibers from continuous rayon filaments, said apparatus comprising a core having a plurality of borings therein extending throughout said core in its longitudinal direction, and constituting guiding channels for bundles of continuous artificial filaments, a rotatable disc arranged coaxially on said

core, said disc being operatively connected with driving means capable of causing rotation of said disc, at least one shaft rotatably mounted on said disc carrying at its end a circular cutting implement, said shaft being so arranged on said disc that said cutting implement covers the openings of said guiding channels successively upon rotation, means being provided to impart to said cutting implement a rotation in a direction contrary to the sense of rotation of said rotatable disc.

2. Apparatus for producing rayon staple fibers from continuous rayon filaments, said apparatus comprising a core having an annular duct therein extending throughout said core in its longitudinal direction, and constituting a guiding channel for bundles of continuous artificial filaments, a rotatable disc arranged coaxially on said core, said disc being operatively connected with driving means capable of causing rotation of said disc, at least one shaft rotatably mounted on said disc carying at its end a circular cutting implement, said shaft being so arranged on said disc that said cutting implement covers the opening of said annular duct and cuts the bundle of filaments issuing therefrom along a helical line upon rotation, means being provided to impart to said cutting implement a rotation in a direction contrary to the sense of rotation of said rotatable disc.

3. Apparatus for producing rayon staple fibers from continuous rayon filaments, said apparatus comprising a core having at least one guiding channel therein extending throughout said core in its longitudinal direction, a rotatable disc arranged coaxiallly on said core, said disc being operatively connected with driving means capable of causing rotation of said disc, at least one shaft rotatably mounted on said disc carrying at its end a circular cutting implement, said shaft being so arranged on said disc that said cutting implement coveres the opening of said guiding channel upon rotation, means being provided to impart to said cutting implement a rotation in a direction contrary to the sense of rotation of said rotatable disc.

WOLF RODENACKER.
EMIL BAUMANN.