March 4, 1941. H. ASHTON ET AL 2,234,105

MANUFACTURE AND PRODUCTION OF STAPLE FIBER

Filed Oct. 9, 1940 2 Sheets-Sheet 1

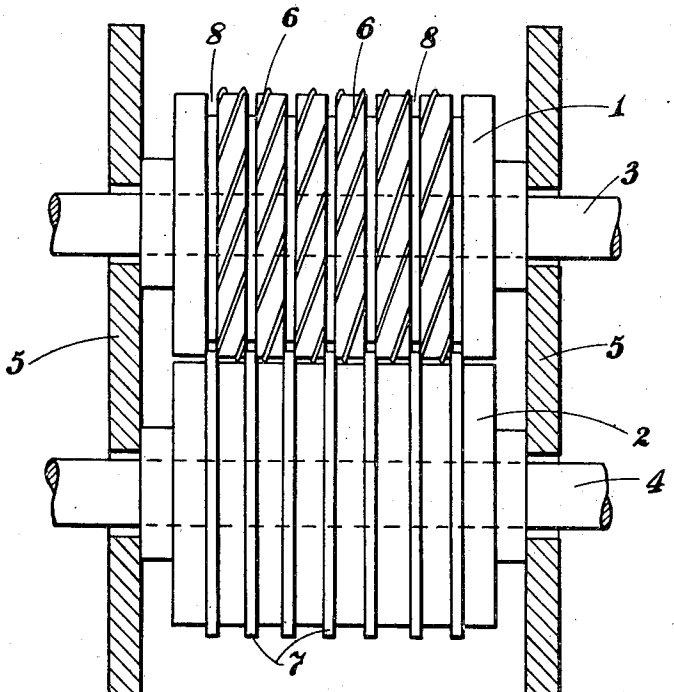


Fig. 1.

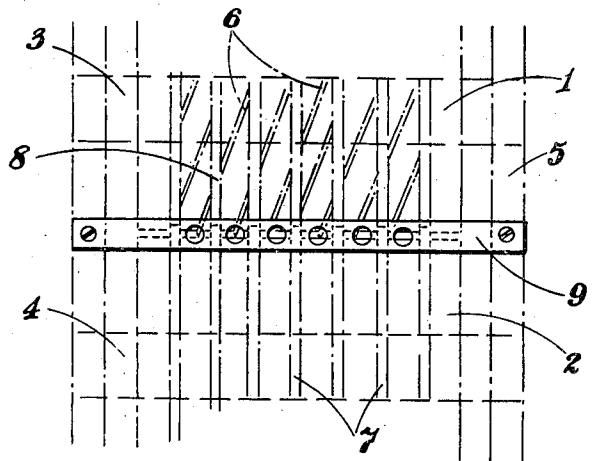


Fig. 2.

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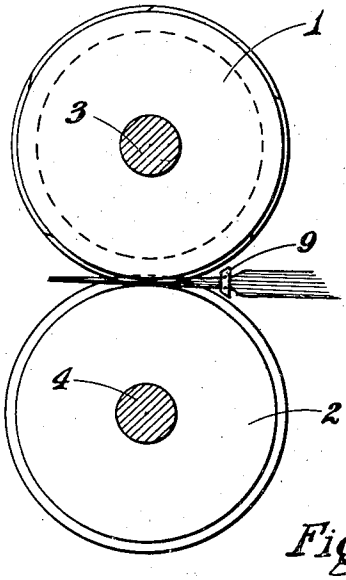


Fig. 3.

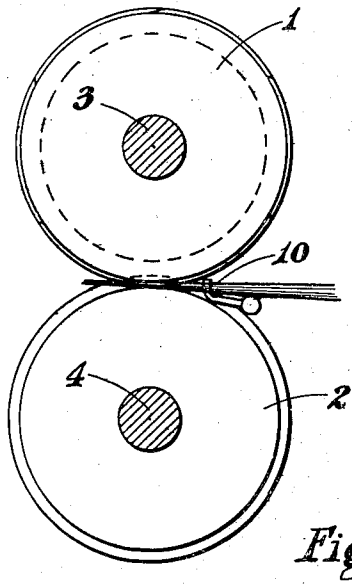


Fig. 4.

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Patented Mar. 4, 1941

2,234,105

UNITED STATES PATENT OFFICE

2,234,105

MANUFACTURE AND PRODUCTION OF STAPLE FIBER

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Application October 9, 1940, Serial No. 360,508
In Great Britain October 21, 1939

6 Claims. (Cl. 164—66)

In United States Patent No. 2,221,716, there is described apparatus for the production of staple fiber from a tow of artificial threads, filaments or the like which comprises two hard non-resilient rollers, one of which has a smooth cylindrical surface and the other helical ridges protruding from its cylindrical surface, means for supporting the said rollers in fixed positions to form a nip between their cylindrical surfaces and means for rotating them so that the linear speed of the tips of the ridges is substantially the same as the peripheral speed of the other roller, the thickness of the tow and the distance between the cylindrical surfaces of the rollers being arranged so that the ridges on the one roller touch the surface of the other roller in the nip and thereby cut the tow, and so that the tow is flattened out and gripped by the cylindrical surfaces of the rollers and is thereby progressed through the nip at a speed substantially the same as the peripheral speed of the rollers.

We have now found that in such apparatus improvements are obtained if members are provided for confining the flattened tow, or tows, within a limited space in the nip between the two rollers. If a number of tows are passed side by side through the same pair of cutting rollers two such members may be used one at each end of the nip at the outer side of the two outermost tows, although we generally prefer to provide in addition further members in order to confine each tow separately. The said confining members are in the form of circumferential ridges provided on one of the rollers, each ridge being made of such dimensions that it fits closely into a corresponding circumferential slot in the other roller. The distance between the members is so arranged that when the tow is compressed as it passes through the nip it completely fills the box-like space between the two rollers above and below it and the two members on either side of it. The possibility of the filaments at the outer sides of each tow being insecurely gripped is thereby avoided. Each tow is evenly gripped across the whole of its width so that it is completely and efficiently cut by the ridges on the cutting roller. Guiding members are provided immediately before the nip of the cutting rollers for guiding the tow or tows in such a manner that none of their constituent filaments is allowed to enter the slots.

The accompanying diagrammatic drawings show apparatus according to the present invention although the invention is not limited to the apparatus shown.

Figure 1 is a front elevation of a pair of rollers designed to cut 6 tows, the tow guiding means before the nip being omitted for the sake of clarity; Figure 2 shows in detail the tow guiding means omitted from Figure 1; Figure 3 is a side view of the rollers and the tow guiding means of Figure 2; while Figure 4 is a side view of the rollers and an alternative tow guiding device.

A pair of hard steel rollers 1 and 2 are mounted on axles 3 and 4 respectively in a framework 5. Each roller is positively driven by means not shown in the drawings. The upper roller 1 is provided with a number of helical parallel ridges 6 which touch the smooth surface of the lower roller 2. The distance between the cylindrical surfaces of the two rollers is about a sixth of the diameter of the tow as it is delivered to the rollers for cutting. The lower roller 2 is provided with seven parallel circumferential ridges 7 which fit into corresponding circumferential slots 8 on the roller 1. Immediately before the nip a guiding member is placed which may consist as in Figures 2 and 3 of a perforated bar 9 screwed on to the framework 5, or as in Figure 4 of a row of pegs 10. Each tow passes through a hole in the bar or the space between two pegs. Each hole or space is narrower than the distance between adjacent ridges 7, so that none of the filaments of the tow is allowed to enter the slots 8. As each tow is progressed through the nip it completely fills the box-like space bounded by the cylindrical surfaces of the two rollers and the ridges 7 on both sides of it, so that cutting of every filament is ensured.

What we claim is:

1. Apparatus for the production of staple fiber from a tow of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tow of filaments is passed, the thickness of the loose tow of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tow is flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine the flattened tow

within a limited space in the nip and guiding means arranged immediately before the nip in order to prevent the filaments constituting the tow from entering the said circumferential slots.

2. Apparatus for the production of staple fiber from a number of tows of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tows of filaments are passed, the thickness of the loose tows of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tows are flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine each of the flattened tows separately within a limited space in the nip and guiding means arranged immediately before the nip in order to prevent the filaments constituting the tows from entering the said circumferential slots.

3. Apparatus for the production of staple fiber from a tow of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tow of filaments is passed, the thickness of the loose tow of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tow is flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine the flattened tow within a limited space in the nip and guiding means arranged immediately before the nip comprising a perforated bar, the perforation of which is narrower than the distance between the circumferential ridges.

4. Apparatus for the production of staple fiber from a number of tows of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tows of filaments are passed, the thickness of the loose tows of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tows are flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine each of the flattened tows separately within a limited space in the nip and a bar arranged immediately before the nip, said bar being provided with perforations each of which is adapted to guide one tow into the nip and is narrower than the distance between adjacent circumferential ridges.

5. Apparatus for the production of staple fiber from a tow of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tow of filaments is passed, the thickness of the loose tow of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tow is flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine the flattened tow within a limited space in the nip and guiding means comprising pegs adapted to guide the tow into a portion of the nip which is narrower than the distance between the circumferential ridges.

6. Apparatus for the production of staple fiber from a number of tows of artificial threads, filaments or the like which comprises two hard, non-resilient, rigidly mounted rollers between the cylindrical surfaces of which the tows of filaments are passed, the thickness of the loose tows of filaments being considerably greater than the distance between the said cylindrical surfaces in the nip between the rollers so that the tows are flattened out and gripped in the nip, one of the said rollers being provided on its cylindrical surface with spiral cutting ridges which touch the surface of the other roller in the nip and one of the said rollers being provided with circumferential ridges which fit into corresponding circumferential slots in the other roller and confine each of the flattened tows separately within a limited space in the nip and a row of pegs each pair of which is adapted to guide one tow into a portion of the nip which is narrower than the distance between adjacent circumferential ridges.

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