Nov. 12, 1940. E. A. MORTON 2,221,716

MANUFACTURE AND PRODUCTION OF STAPLE FIBER

Filed Feb. 24, 1939

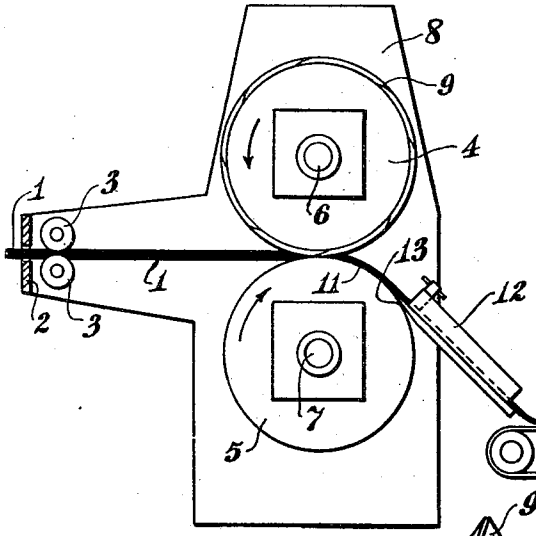


Fig. 1.

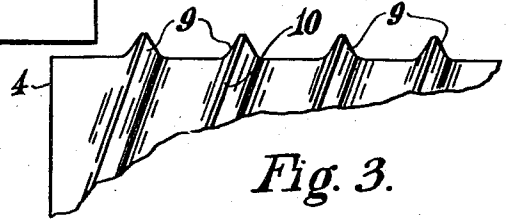


Fig. 3.

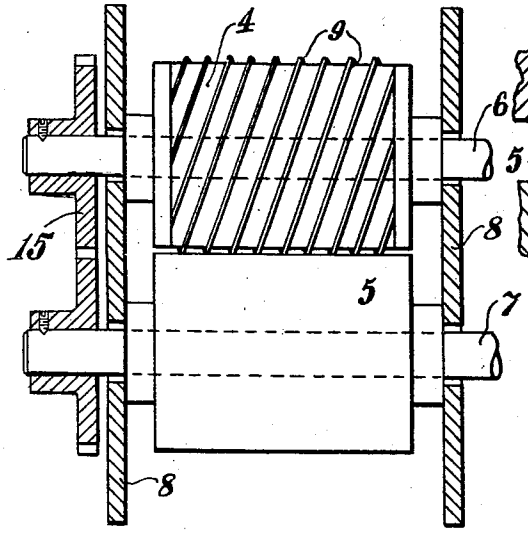


Fig. 2.

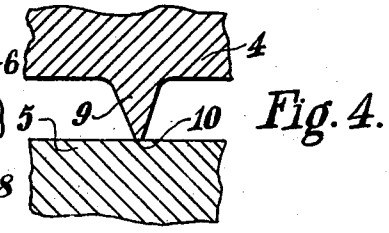


Fig. 4.

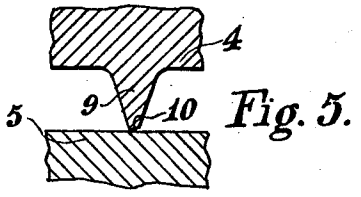


Fig. 5.

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Patented Nov. 12, 1940 2,221,716

UNITED STATES PATENT OFFICE

2,221,716

MANUFACTURE AND PRODUCTION OF STAPLE FIBER

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Application February 24, 1939, Serial No. 258,322
In Great Britain February 26, 1938

1 Claim. (Cl. 164—17)

This invention relates to the manufacture and production of staple fiber from a band, rope, bundle or tow of continuous artificial threads, filaments or the like, hereinafter referred to as a tow.

According to the present invention the apparatus for the production of staple fiber from a tow of artificial threads, filaments or the like comprises two hard non-resilient rollers, rigidly positioned so as to form a nip which grips the tow, and rotating so that the tow is progressed through the said nip, one of the rollers having a smooth surface and the other having ridges protruding from its otherwise smooth surface, which ridges touch the smooth surface of the other roller so as to cut completely through the tow and the rotation of the rollers being such that the linear speed of the tips of the protruding ridges on the one roller is substantially the same as the peripheral speed of the other roller.

Each ridge is preferably V-shaped, the tip of the V, however, being ground so as to form a surface which is parallel or inclined to the surface of the other roller. The ridges are preferably provided on the upper roller and can be arranged either parallel to the axis of the roller, or obliquely thereto. In both cases the distance between adjacent ridges, measured round the circumference of the roller, is the same as the length of staple fiber required.

The rollers are preferably made of hardened steel and may be of similar or different diameter. They are preferably driven by gear wheels but, however, they are driven and whatever their respective diameters, it is essential that the peripheral speed of the smooth roller should be substantially the same as the linear speed of the flattened tips of the ridges of the other roller. The two rollers must be so positioned that the ridges on the one roller touch the smooth surface of the other roller so that the tow is cut through completely by each ridge. The depth of the ridges must be such that the tow is flattened out and gripped by the rollers, so that as they rotate it is progressed through the nip between them.

Although the apparatus may be used to produce masses of staple fiber which must subsequently be passed through a carding machine before spinning into the form of a continuous thread it is preferably used to produce a coherent continuous tow of staple fiber which does not need carding but can be led by means of a funnel or other suitable conveyor to any desired after-treatment such as drawing out, for example in a gill box of the type used in the treatment of natural fibers, for example wool.

The accompanying diagrammatic drawing illustrates one arrangement of apparatus according to the present invention for producing a continuous coherent tow of staple fiber from a tow of continuous filaments produced by the extrusion of viscose into a coagulating bath.

Figure 1 is a side view in section of the apparatus.

Figure 2 is an end view of the rollers.

Figure 3 is an enlarged view of part of the ridged roller and Figures 4 and 5 are enlarged views of nips with ridges of different shapes.

The tow of continuous filaments 1 is led through a guide 2 and tension rollers 3 to a pair of hard steel rollers 4 and 5 mounted on axles 6 and 7 respectively in a frame-work 8. The upper roller 4 is provided with a number of parallel helical ridges 9 which touch the smooth surface of the lower roller 5. The ridges are of such depth that the nip between the two rollers is much narrower than the thickness of the tow 1.

They are V-shaped in cross-section, but are slightly flattened at the tip 10 of the V 9 to form edges as in Figure 4, or Figure 5. The rollers are driven in opposite directions by gear wheels 15 so that the linear speed of the tips 10 of the ridges 9 is the same as the peripheral speed of the roller 5. The rollers 3 are driven, also by means not shewn, at a peripheral speed slower than that of the roller 5 and the ridges 9, so that the tow 1 is under tension between the rollers 3 and the cutting rollers. The tow of staple fiber 11 is much flatter as it leaves the nip between the rollers 4 and 5 than the tow of continuous filaments 1. It is removed from the lower roller 5 by means of a funnel 12 provided with an acute angled edge 13 fitted against the roller 5. From this funnel 12 the tow is led away by means of a conveyor belt 14 to further treatment.

What I claim is:

A process for the production of staple fiber from a tow of continuous filaments which comprises passing the tow of filaments between the cylindrical surfaces of two hard non-resilient rigidly mounted rollers, 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, and progressing the tow between the rollers by rotating them at substantially equal peripheral speeds, whereupon the filaments are cut into staple fibers by spiral cutting ridges on one of the said rollers which touch the surface of the other roller in the nip.

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