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APPARATUS FOR CUTTING FIBERS

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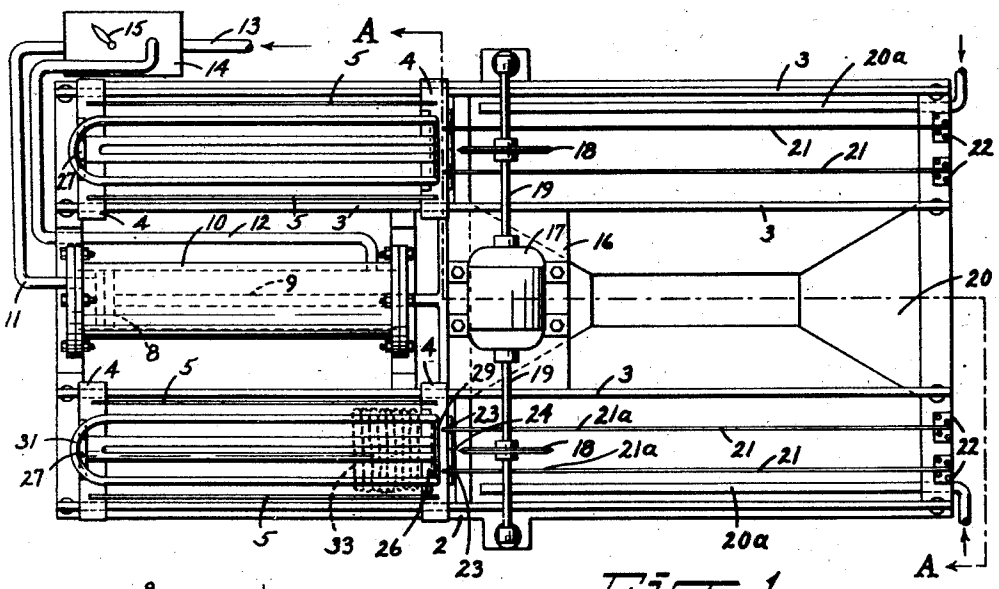


Fig. 1

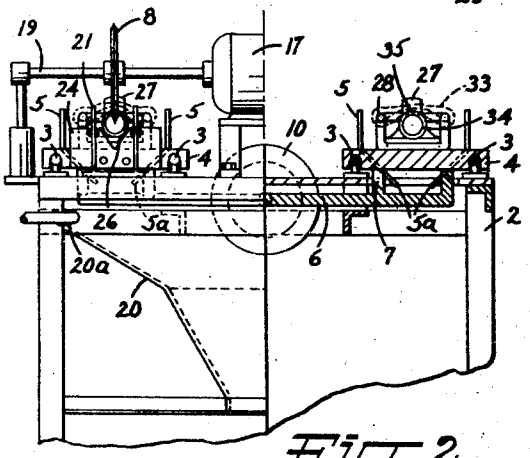


Fig. 2

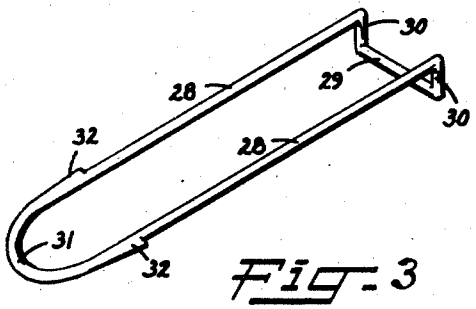


Fig. 3

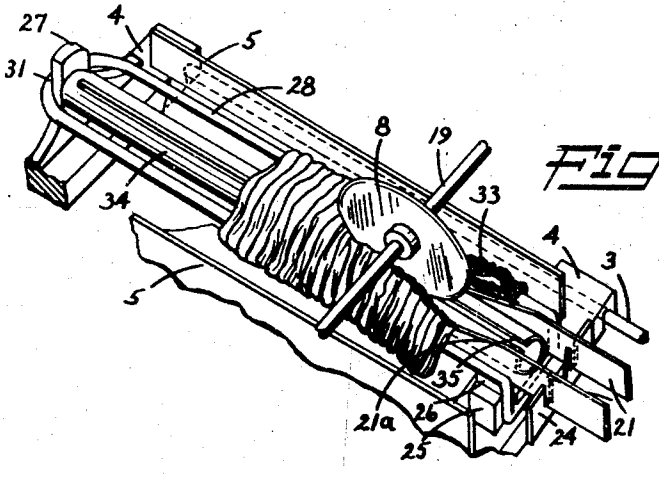


Fig. 4

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## APPARATUS FOR CUTTING FIBERS

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13 Claims. (Cl. 164—76)

1

This invention relates to apparatus for cutting filamentary materials in the form of wound loops, coils, skeins, hanks, waste laps from godets, thread-storage, thread-advancing reels and like thread-drawing rolls or drums.

The principal object of the present invention is to provide an improved form of cutting apparatus for filamentary material to handle such material in the form of wound coils or the like while assuring that cutting to uniform lengths is obtained. Further objects and advantages of the invention will be apparent from the drawing and the description thereof hereinafter.

In the drawing, which is illustrative of the invention—

Figure 1 is a plan view of the apparatus,

Figure 2 is a composite end elevation and transverse sectional view, taken on line A—A of Figure 1,

Figure 3 is a perspective view of a coil holder, and

Figure 4 is a perspective view showing the operation of the cutting device.

In general, the invention provides for the supporting of the filamentary coils by suitable means extending therethrough. This supporting means for the coils and the cutting means is then given relative motion to effect cutting of the series of coils carried thereby. Deflecting means is provided for facilitating the discharge of the cut fiber clumps from the supporting means into a chute or other discharge channel which may advantageously be provided with a liquid spray to facilitate opening of the fibers if desired. The fibers whether treated with liquid or not may then be deposited upon a conveyor or into a sluice trough for delivery to a suitable collecting device or to subsequent treating devices.

Referring more particularly to the drawing, the machine comprises a supporting framework or platform 2 which is provided at its top with two pairs of rails 3 which may be of rods, as shown, or of tubes having circular or rectangular cross section, circular being shown. Upon each pair of rods there rests a carriage comprising end member 4 and lateral members 5. As will be observed more particularly from Figure 2, the lateral members 5 have upright wall portions above the end members 4 and inwardly sloping portions 5a extending below the end members 4 of the carriage. These carriages are connected together by means of a transverse rod 6 having upwardly extending posts 7 secured to one end member 4 of each carriage. The carriages are reciprocated by means of the piston 8 connected

2

to the rod 6 by means of the rod 9. The piston 8 may be operated in a hydraulic or pneumatic cylinder 10 having suitable connections 11 and 12 with a hydraulic supply line 13 by means of a conventional controlling valve 14. A hand lever 15 serves to operate the valve 14 and hence the piston 8 in conventional fashion. The frame 2 supports a platform 16 carrying the motor 17 for driving the rotating cutters 18 carried upon the shafts 19.

As shown in Figure 1, the carriages are in their loading position ready to be moved to the right under the knives. A hopper or discharge chute 20 is provided beneath that portion of the device including the cutting station and beyond, as viewed to the right of Figure 1. In the upper portion of the hopper, spray pipes 20a may be provided to facilitate the discharge of the cut fiber clumps. On each side of the knife 18, there is provided a deflecting member 21. These members are secured to the upper portion of the framework at their right end indicated by reference character 22. They are otherwise free and project beyond the knives into slots 23 of plate 24 secured to the foremost of the end members 4 of each carriage.

The foremost end member 4 of each carriage is also provided with a block 25 over which there is a plate 26. Plate 26 overhangs the block 25 in the direction toward the knives. The rear end member 4 of each carriage carries an upright post 27.

Figure 3 particularly shows the holder for the filamentary coils which comprises two longitudinal members 28 connected together at one end by the transverse member 29 which is offset from the plane of the members 28 by means of the bent portions 30. The other ends are preferably connected by means of an outwardly convex member 31 and for purposes more particularly described hereinafter, the ends of the members 28 adjacent the convex member 31 are preferably provided with tapered ridges 32. It is clear that the holder may be made of separate parts connected together by bolts or by welding, or it may be made in a single piece by casting or the like.

As shown in Figures 1, 2 and 4, the transverse member 29 hooks under the overhanging portion of plate 26 and the convex end 31 fits around the upwardly projecting post 27 on the other end member 4 of the carriage. The coils of filamentary material are indicated in dotted lines at 33. Means is provided to tension the coils by taking up their slack between the members 28. As shown, a tubular member 34 is provided for

this purpose. This tubular member is disposed between the members 28 and is slotted at 35 to allow passage of the cutting knife 8 as indicated at the left of Figure 2. Instead of providing a slotted tube, separate members spaced apart laterally may be provided to tension the coils while providing a passage therebetween for the knife.

The operation of the device is as follows: The holders shown in Figure 3 may be provided wherever coils of filamentary material occur or are to be supplied. For example, in an artificial filament spinning factory, several of these devices may be provided adjacent each spinning machine, so that the coils of material formed by the lapping of godets during lacing up or doffing operations can be immediately placed upon these holders. They are put upon the holders simply by slipping the coils over the convex end at 31. When ridges 32 are provided, they distend the inner windings and assure that the coil is rendered compact at least at the interior thereof, so that after passage beyond the ridges, the coil falls upon the topmost of other coils placed thereon. The dimensions of the holder may be predetermined in accordance with the dimensions of the coil or coils to be handled, so that after they are placed about rods 28 of the holder they are either under slight tension or preferably have a small amount of slack therein. After the coils have piled up on a given holder until it is full, which is attained when the coils are in proximity to the shoulders formed by the ridges 32, the loaded holders may be trucked to the machine shown in Figures 1 and 2 where an operator places one of the holders in position on the carriage by hooking the member 29 under the plate 26 and the end 31 over the post 27. He then operates lever 15 to cause the carriage to be moved under the knife 18. This severs the coils across their middle and as the cut coils or clumps pass beyond the cutting stage, they are elevated by the gradually rising portion 21*a* of the upper surface of the deflectors 21. This facilitates the falling of the cut clumps from the rods 28. They fall into the chute or hopper 20 which may be provided with a liquid, such as water, to facilitate opening up and to wash out acids and the like. Over the chute, the fibers are discharged onto a conveyor or into a trough (not shown) for transfer to subsequent stages of operation.

Additional knives may be provided upon the shaft 19 to effect cutting of the coils into a greater number of pieces than two as shown. Thus, a knife may be placed on each side of each knife 18 so that the additional knives would cut the clumps between the adjacent rod 28 and the tensioning means 34, thereby cutting the coil into four parts. The invention provides for an efficient cutting of wound coils or loops of filamentary material, whether such coils are in a wet or dry condition. Cutting is effected so that uniform lengths of fibers are obtained and tensioning means is provided to minimize tearing and incidental abrasive action during the cutting operation.

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

We claim:

1. Apparatus for cutting filamentary coils comprising means extending through the coils for supporting them as collapsed loops, means for tensioning the collapsed loops longitudinally of the filaments thereof, cutting means and means for imparting relative motion to the supporting means and cutting means to effect operative engagement of the cutting means transversely of the coils.



2. Apparatus for cutting filamentary coils comprising two laterally spaced longitudinally extending members projecting through the coils for supporting them as collapsed loops, means for tensioning the collapsed loops longitudinally of the filaments thereof, cutting means, and means for imparting relative motion to the supporting members and cutting means to effect operative engagement of the cutting means transversely of the coils between the members.

3. Apparatus for cutting filamentary coils comprising two laterally spaced members extending longitudinally through the coils for supporting them as collapsed loops, means extending longitudinally intermediate the two members for tensioning the collapsed loops longitudinally of the filaments thereof, cutting means, and means for imparting relative motion to the supporting means and cutting means to effect operative engagement of the cutting means transversely of the coils between the members.

4. Apparatus for cutting filamentary coils comprising cutting means, a carriage reciprocable with respect to said cutting means, two laterally spaced members adapted to receive the coils looped thereabout, said members being carried by the carriage and arranged thereon so that they extend longitudinally in the direction of reciprocation of the carriage and are disposed on opposite sides of the cutting means, and means for reciprocating the carriage.

5. Apparatus for cutting filamentary coils comprising cutting means, a carriage reciprocable with respect to said cutting means, two laterally spaced members adapted to receive the coils looped thereabout, said members being carried by the carriage and arranged thereon so that they extend longitudinally in the direction of reciprocation of the carriage and are disposed on opposite sides of the cutting means, means extending longitudinally of the carriage between the two members for tensioning the coils, and means for reciprocating the carriage.

6. Apparatus for cutting filamentary coils comprising cutting means, a carriage reciprocable with respect to said cutting means, two laterally spaced members adapted to receive the coils looped thereabout, said members being carried by the carriage and arranged thereon so that they extend longitudinally in the direction of reciprocation of the carriage and are disposed on opposite sides of the cutting means, a longitudinally slotted member extending longitudinally of the carriage in the direction of its reciprocation with a slot thereof in alignment with the cutting means for tensioning the coils and to cooperate with the cutting means to facilitate cutting thereof, and means for reciprocating the carriage.

7. Apparatus for cutting filamentary coils comprising cutting means, a carriage reciprocable with respect to said cutting means, two laterally spaced members adapted to receive the coils looped thereabout, said members being carried by the carriage and arranged thereon so that they extend in the direction of reciprocation of the carriage and are disposed on opposite sides of the cutting means, means extending longitudinally of the carriage between the two members for tensioning the coils, stationary deflecting members positioned adjacent the cutting means

and extending beyond the cutting situation to elevate the cut portions of the coils, and means for reciprocating the carriage.

8. A device for supporting filamentary coils comprising two laterally spaced longitudinal members, and an intermediate longitudinal member having a longitudinal slot and arranged to tension the coil between the first two members.

9. A device for supporting filamentary coils comprising two laterally spaced longitudinal members, said members being rigidly connected adjacent one end by a transverse member offset from the plane of the longitudinal members.

10. A device for supporting filamentary coils comprising two laterally spaced longitudinal members, said members being rigidly connected adjacent one end by a transverse member offset from the plane of the longitudinal members, said longitudinal members being connected at their other end by an outwardly convex member.

11. A device for supporting filamentary coils comprising two laterally spaced longitudinal members, said members being rigidly connected adjacent one end by a transverse member offset from the plane of the longitudinal members, said longitudinal members being connected at their other end by an outwardly convex member, tapered ridges extending a substantial distance along the longitudinal members from their connection with the convex end member.

12. A device for supporting filamentary coils comprising two laterally spaced approximately parallel longitudinal members adapted to receive the coils thereabout, tensioning means approximately parallel to the longitudinal members and disposed therebetween to distort the filamentary coils from the plane of the longitudinal members.



13. A device for supporting filamentary coils comprising two laterally spaced longitudinal members, means disposed between said two members for tensioning coils of filamentary material looped about said members, said tensioning means being provided with a longitudinal passage approximately parallel to the longitudinal supporting members.

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