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PINCH-ROLL ASSEMBLY

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This invention relates to a new and novel pinch-roll assembly, and more particularly to such an assembly which includes a removable driven roll and a support therefor which is self-aligning with the driving roll of the pinch-roll set. The pinch-roll assembly of this invention is especially suitable for use in apparatus for the production of continuous-filament synthetic yarn, e. g., yarn formed of a polymer of acrylonitrile, and more particularly in apparatus such as is described, and is illustrated in Fig. 3 of the drawing, of Cresswell and Wixon Patent No. 2,556,735, dated July 3, 1951.

As described in the aforementioned Cresswell et al. patent, a heat-treated fiber is prevented from slipping as it passes over a godet by means of a pinch roll mounted in a roll support located at the forward end of an arm which is pivotally mounted at its other end. On this arm is slidably mounted a weight which can be held in position at any point on the arm by tightening a screw. By adjusting the position of the weight on the arm, the pressure or pinch applied to the heat-treated fiber as it passes between the pinch roll and the godet can be varied as desired or as conditions may require. To prevent or minimize damage to the fiber, it is desirable that the pinch roll (driven roll) have a softer surface, e. g., a rubber surface, than the driving roll or godet. However, in operation, wear occurs on this softer surface of the pinch roll so that the roll tapers to one side or the other. The present invention is a solution to this problem.

The novel features of the invention are set forth in the appended claims. The invention itself will be understood more readily from the more detailed description of a preferred embodiment of the invention and from the accompanying drawing wherein

Fig. 1 is a side view of the pinch-roll assembly, the broken lines indicating the position of a portion of the apparatus when the assembly is not in use;

Fig. 2 is a view taken along the line 2—2 of Fig. 1 and illustrating a suitable clip for holding the pinch roll and accompanying structure in a raised position when not in use;

Fig. 3 is a perspective view of portions of the apparatus shown in Figs. 1 and 4; and

Fig. 4 is a top plan view, partly in section, of a portion of the apparatus shown in Fig. 1.

Referring to the drawing, the pinch-roll assembly there illustrated comprises a driving roll 10 attached to a shaft 12, which in operation of the assembly is driven by suitable means (not shown). The driving roll 10 is made of polished steel or other suitable wear-resistant material. The pinch upon the continuous-filament yarn 14, e. g., a continuous-filament polyacrylonitrile yarn, is effected by means of the pinch or driven roll 16 which is adapted to rest upon the driving roll 10 and to be driven thereby. The driven roll 16, which in the drawing is shown as an upper roll, has a surface which normally is subjected to wear (e. g., a surface formed of natural or synthetic rubber or other suitable plastic or resilient material) when it contacts the driving roll 10 during use. Thus, the roll 16 may be formed of a cot or layer 18 of rubber or similar material, which is adhesively bonded or otherwise suitably fastened to a steel or other metallic base portion 20 of the roll.

The pinch or driven roll 16 is axially supported (i. e., it is supported along its horizontal axis) by means of a shaft 21 in a horizontal frame or support 22. This may be done, for example as illustrated, by means of the roller bearing assemblies indicated generally at 24 and 26 and each of which comprises roller bearings, a moving bearing sleeve and a dead ring or stationary bearing sleeve. The horizontal frame or support 22 is connected to the forward end of a pivoted supporting arm 28 by means of a swivel joint 30 that enables the pinch or driven roll 16 to align itself with the driving roll 10 when wear occurs on the surface of the roll 16. The roll 16 is positioned within the sides of the horizontal frame 22 which is provided with apertured side sections 32 and 34 and through the apertures of which passes the shaft 21 that supports the roll 16. The frame or support 22 also is provided with a rear section 36 which is connected to the forward end of the pivoted supporting arm 28 by means of the swivel joint 30.

The frame or support 22 advantageously may be extended as shown to form the handle 38, thereby facilitating the movement of the roll 16 and connecting parts to a raised position as illustrated in Fig. 1. The spring clamp 40 attached to the support 42 detachably holds the arm 28, and forward parts connected thereto, in a raised position when the pinch-roll assembly is not in use.

The pinch-roll assembly of this invention provides a driven roll (pinch roll) which is free to align itself with a harder surfaced driving roll when wear occurs on the softer surfaces of the driving roll and, in the absence of this self-aligning feature, causing the latter to wear to a taper on one or another of the sides, the practical advantages that will be immediately apparent to those skilled in the art. It also provides a convenient means of swinging the pinch roll out of the way, without removing the roll from the assembly when placing the unit in operation, for example in the production of continuous-filament synthetic yarn which is to be treated (e. g., by heating) while in a relaxed state.

We claim:

1. A pinch-roll assembly comprising a driving roll and a driven roll adapted to rest upon said driving roll and to be driven thereby, said driven roll having a surface which is relatively resilient and is softer than the surface of the driving roll which it contacts during use; a horizontal support which axially supports said driven roll; a pivoted supporting arm for moving said horizontal support and axially supported driven roll out of position when not in use; and a swivel joint connecting said horizontal support and the forward end of said supporting arm, said joint enabling the said driven roll to align itself parallel to the said driving roll and to maintain this alignment during use of the said pinch-roll assembly.

2. A pinch-roll assembly comprising a driving roll; a shaft, said shaft supporting a driven roll adapted to rest upon said driving roll and to be driven thereby, and said driven roll having a resilient surface which is softer than the surface of the driving roll which it contacts during use; a horizontal frame or support said shaft and driven roll, the latter being positioned within the sides of the said frame; a pivoted supporting arm for moving said driven roll and frame out of position when not in use; and a swivel joint connecting said frame and the forward end of said supporting arm, said joint enabling the said driving roll to align itself parallel to the said driving roll and to maintain this alignment during use of the said pinch-roll assembly.
3. In apparatus for the production of continuous-filament synthetic yarn, a pinch-roll assembly comprising: a driving roll; a shaft; a rubber-covered driven roll which is axially supported by said shaft and which is adapted to rest upon said driving roll and to be driven thereby, the surface of said driven roll being softer than that of said driving roll; a horizontal frame which has apertured side sections and which axially supports said shaft and driven roll, the latter being positioned within the sides of the said frame; a pivoted supporting arm for moving said driven roll and frame out of position when not in use; and a swivel joint connecting the rear section of said frame and the forward end of said supporting arm, said joint enabling the said driven roll to align itself parallel to the said driving roll and to maintain this alignment during use of the said pinch roll assembly.

4. A pinch-roll assembly comprising: a driving roll; a shaft; a rubber-covered driven roll which is axially supported by said shaft and which is adapted to rest upon said driving roll and to be driven thereby; a horizontal frame which has apertured side sections and which axially supports said shaft and driven roll, the latter being positioned within the sides of the said frame; a pivoted supporting arm for moving said driven roll and frame out of position when not in use and being so positioned and pivoted that it can be raised upwardly from normal operating position; and a swivel joint connecting the rear section of said frame and the forward end of said supporting arm.

5. A pinch-roll assembly comprising: a driving roll; a shaft; a rubber-covered driven roll which is axially supported by said shaft and which is adapted to rest upon said driving roll and to be driven thereby; a horizontal frame which has apertured side sections and which axially supports said shaft and driven roll, the latter being positioned within the sides of the said frame; a pivoted supporting arm for moving said driven roll and frame out of position when not in use and being so positioned and pivoted that it can be raised upwardly from normal operating position; a swivel joint connecting the rear section of said frame and the forward end of said supporting arm; and means for detachably holding said pivoted supporting arm, and forward parts connected thereto, in a raised position when the said pinch-roll assembly is not in use.