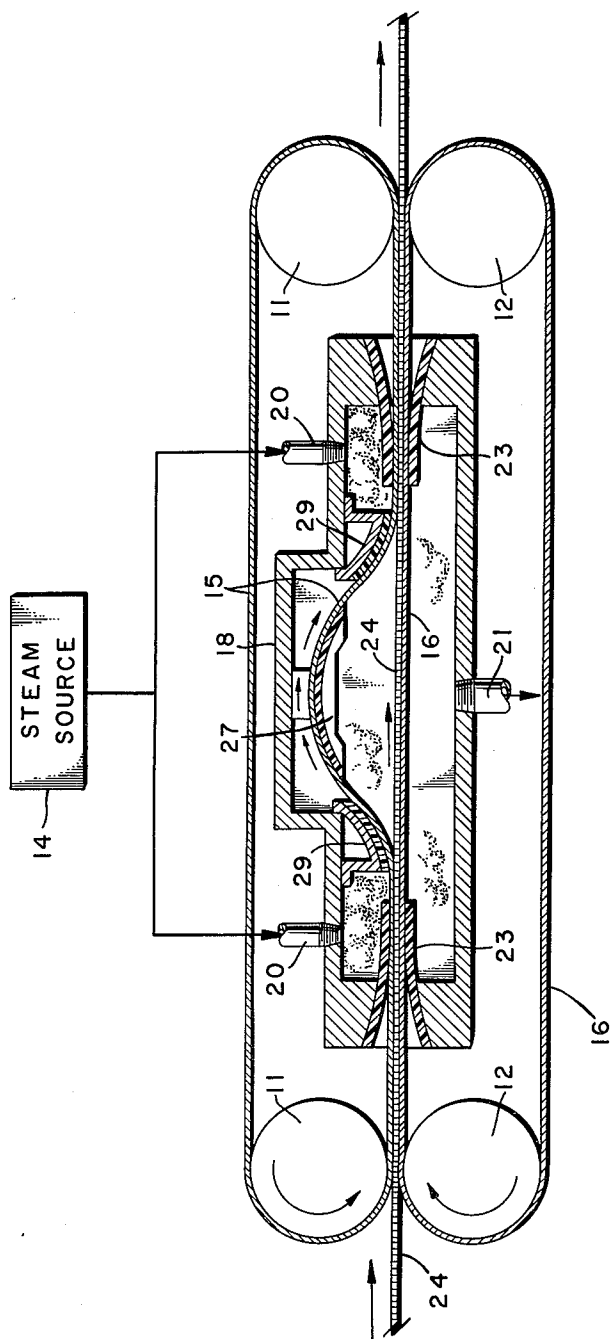


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J. P. RICHESON
ANNEALING APPARATUS
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INVENTOR.
JAMES P. RICHESON
BY *Robert L. Brady*
ATTORNEY

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ANNEALING APPARATUS

James P. Richeson, Decatur, Ala., assignor, by mesne assignments, to Monsanto Chemical Company, a corporation of Delaware

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5 Claims. (Cl. 18—1)

This invention relates to annealing apparatus and more particularly to apparatus for continuously annealing a moving filament.

In the textile field it is often necessary to anneal or heat treat filaments. This treatment is usually carried out at a pressure well above atmospheric. Because of leakage and other problems, most of such treatments are batch operations, i.e., a large quantity of the filament is sealed in a container and steam or other heating medium applied. The batch system has the disadvantage of expense, slowness and general inconvenience.

The most desirable type of annealer is the continuous type, where the filament merely moves through the annealer and is annealed in the process. The disadvantage of this type of annealer is that it is almost impossible to seal the annealing chamber to prevent steam leakage around the moving filaments or tow. In one type of continuous annealer a pair of belts are positioned face-to-face with the tow therebetween, the belts carrying the tow through the annealing chamber. One of the disadvantages of this arrangement is that the belts prevent the steam in the chamber from reaching to all parts of the tow. With this problem in mind, one of the objects of this invention is to provide a novel and improved continuous annealer.

Another object of this invention is to provide a continuous tow annealer wherein a pair of belts carry the tow through an annealing chamber.

A further object of this invention is to provide a continuous-belt tow annealer wherein the tow is separated from one of the belts in the annealing chamber to thereby expose the tow to the annealing medium.

Still another object of this invention is to provide a continuous annealer wherein a pair of belts carrying a tow through an annealing chamber are opened in the chamber to expose the tow to an annealing medium.

A still further object of this invention is to provide a continuous annealer having a guide inside an annealing chamber for separating a pair of belts carrying a tow through the chamber.

One embodiment of the present invention contemplates a continuous annealer wherein a pair of continuous belts cooperate to carry a tow through an annealing chamber, the tow being held between the belts. A curved guide or separator mounted inside the chamber deflects the upper belt away from the lower belt to expose the tow to an annealing medium in the chamber. Seals at opposite ends of the chamber prevent leakage of the annealing medium past the belts.

Other objects and advantages of the invention will become apparent when the following detailed description is read in conjunction with the appended drawing, in which the single FIGURE is a cross sectional view of one embodiment of the invention showing the construction of the annealing chamber and the belt separator.

Referring now in detail to the drawing, a plurality of rolls 11 and 12 are shown carrying a pair of flat, endless belts 15 and 16, the rolls 11 carrying the belt 15 and the rolls 12 carrying the belt 16. The rolls are positioned in such a manner that adjacent spans of the belts 15 and 16 are positioned against each other in a face-to-face relationship.

The engaging spans of the belts 15 and 16 extend

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through an annealing chamber 18 into which steam is admitted from a source 14 through inlet tubes 20. Condensate is removed from the chamber 18 through a tube 21.

Seals 23 of a well known type at each end of the chamber 18 engage the belts 15 and 16 to prevent leakage of steam from the chamber. A tow 24 of thermoplastic filaments to be annealed is carried along a path through the chamber 18 between the belts 15 and 16.

In order to expose the tow 24 to the steam in the chamber 18, a guide or separator 27 mounted in the chamber separates the belt 15 from the belt 16. The guide 27, which is spaced from the path of the tow, is curved for easy movement of the belt 15 thereacross, the convex surface of the guide facing away from the tow path. A pair of curved guides 29 positioned on opposite sides of the guide 27 engage the deflected portion of the belt 15 to prevent a separation of the belts 15 and 16 at the seals 23, the convex surfaces of the guides 29 facing the tow path. Without the guides 29, the action of the deflecting guide 27 might separate the belts 15 and 16 at the seals 23 and allow steam to leak from the chamber 18.

The annealer of the present invention provides an efficient, fast annealing of a continuous tow. The separation of the belts inside the chamber allows the steam to fully penetrate and anneal the tow. Of course, this apparatus can readily be used for numerous other operations, such as dyesetting, etc.

It is to be understood that the embodiment disclosed herein may be altered or modified and that numerous other embodiments may be contemplated which will fall within the spirit and scope of the invention.

What is claimed is:

1. A continuous annealer, comprising an annealing chamber having openings at the opposite sides thereof, a pair of continuous belts extending through the openings in the chamber in face-to-face relationship for holding a filament therebetween and carrying said filaments through the chamber, and a guide inside the chamber for separating the belts to expose the filament.

2. A continuous annealer, comprising an annealing chamber having openings at the opposite sides thereof, a pair of endless belts extending through said openings and said chamber in face-to-face relationship for holding a filament therebetween and carrying said filament through said chamber, means at the openings for sealing said openings, a guide mounted in the chamber for separating the belts to expose the filament, and means for moving the belts.

3. A continuous annealer, comprising an annealing chamber having openings in the opposite ends thereof, a pair of endless belts having contiguous spans passing through the openings and the chamber for holding a filament therebetween and carrying said filament through said chamber, means for admitting annealing medium to the chamber, means at said openings for preventing leakage of the annealing medium through the openings past the belts, and a guide mounted in the chamber for separating the belts to expose the filament.

4. A continuous annealer, comprising an annealing chamber having openings in the opposite ends thereof, a pair of belts extending through the openings and the chamber, said belts being positioned in face-to-face relationship for holding a filament therebetween and carrying said filament along a path through the chamber, means for admitting an annealing medium to the chamber, means for sealing the openings to prevent leakage of said annealing medium therethrough, and a guide mounted in the chamber at a point spaced laterally from said path for separating the belts to expose the filament to the annealing medium.

5. A continuous annealer, comprising a chamber hav-

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ing openings at the opposite ends thereof, a pair of endless belts having spans extending through the openings and the chamber, said spans engaging each other in a facing relationship for holding a filament therebetween and carrying said filament along a path through the chamber, means for driving the belts, means at the openings in the chamber for sealing said openings, a first guide mounted in the chamber and having a convex guide surface facing away from said path for deflecting one of said belts away from said path to expose the filament, and a pair of second guides mounted on opposite sides of the

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first guide and having convex guide surfaces facing said path to deflect said one belt toward said path.

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