

[54] **VACUUM STRIPPER**

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[52] U.S. Cl. 15/306 A

[51] Int. Cl. A47I 5/38

[58] Field of Search 15/306 A, 306 R,
15/303; 28/62; 34/92

[56] **References Cited**

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Primary Examiner—John Petrakes

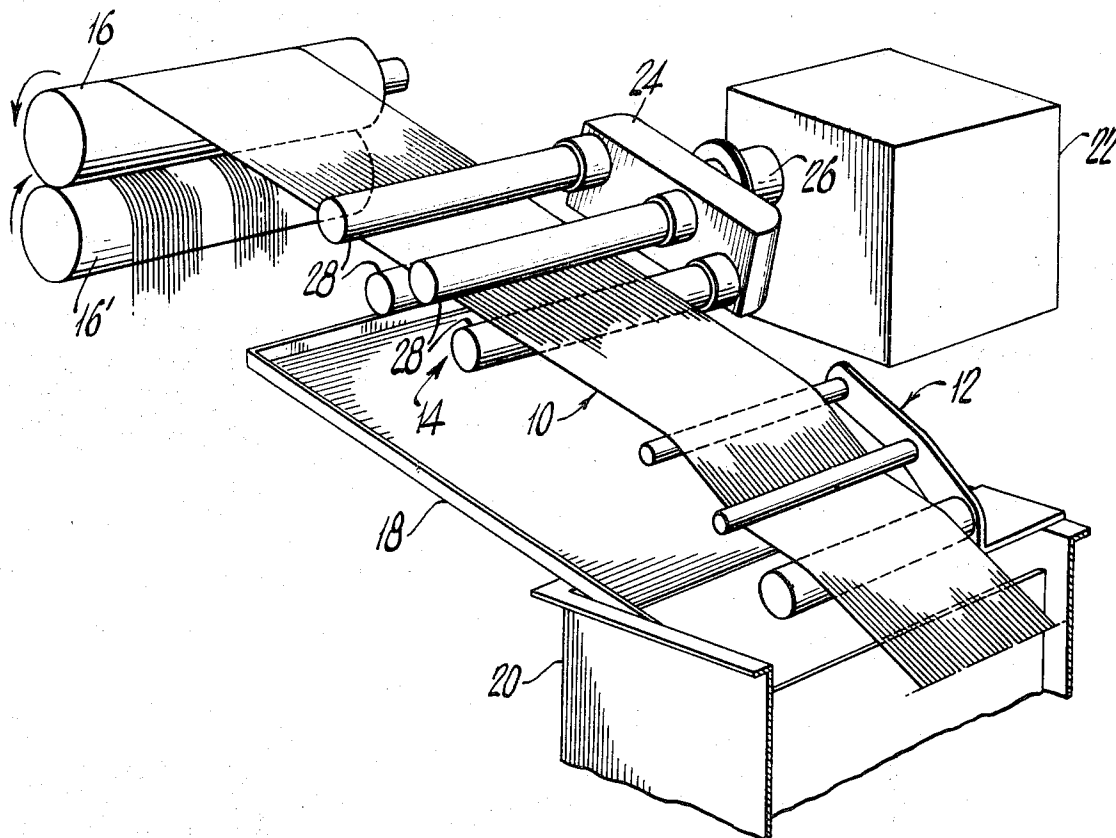
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[57] **ABSTRACT**

A vacuum stripper for removing excessive moisture from quenched extruded thermoplastic yarn ends which comprises a vacuum source, a manifold communicating with said vacuum source, and a plurality of vacuum tubes disposed above and below the path of movement of said yarn ends, communicating with said manifold, the vacuum tubes having openings over which the yarn ends pass for removing the moisture therefrom.

9 Claims, 4 Drawing Figures



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SHEET 1 OF 2

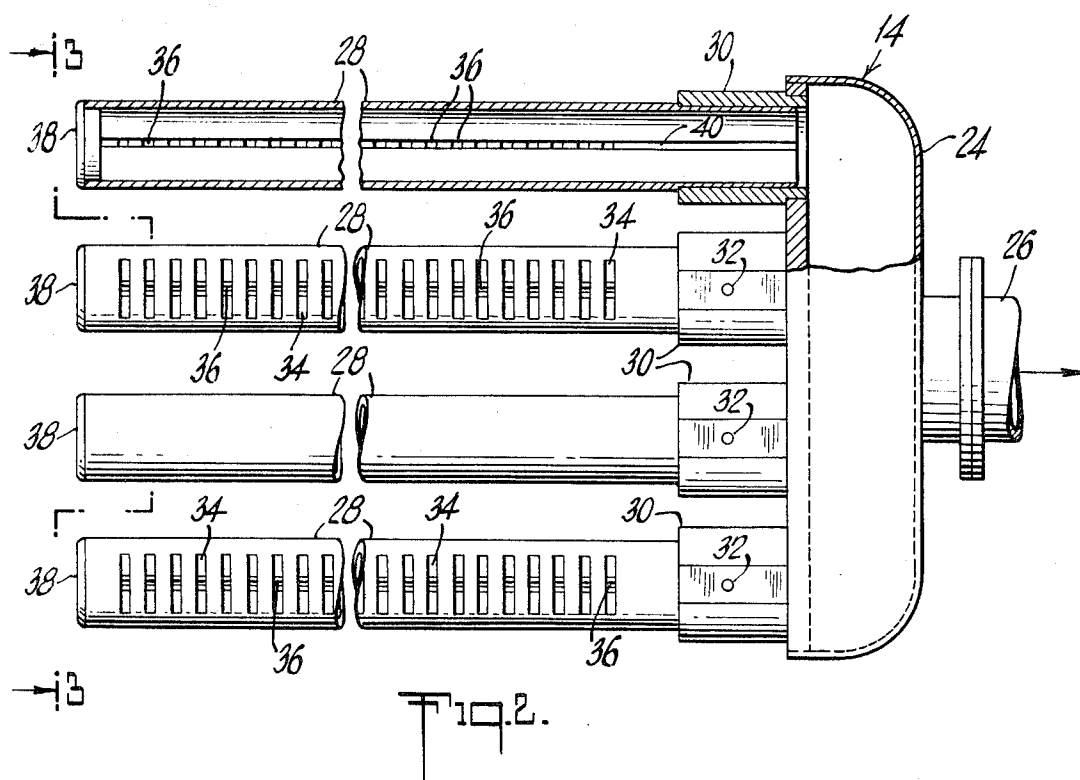
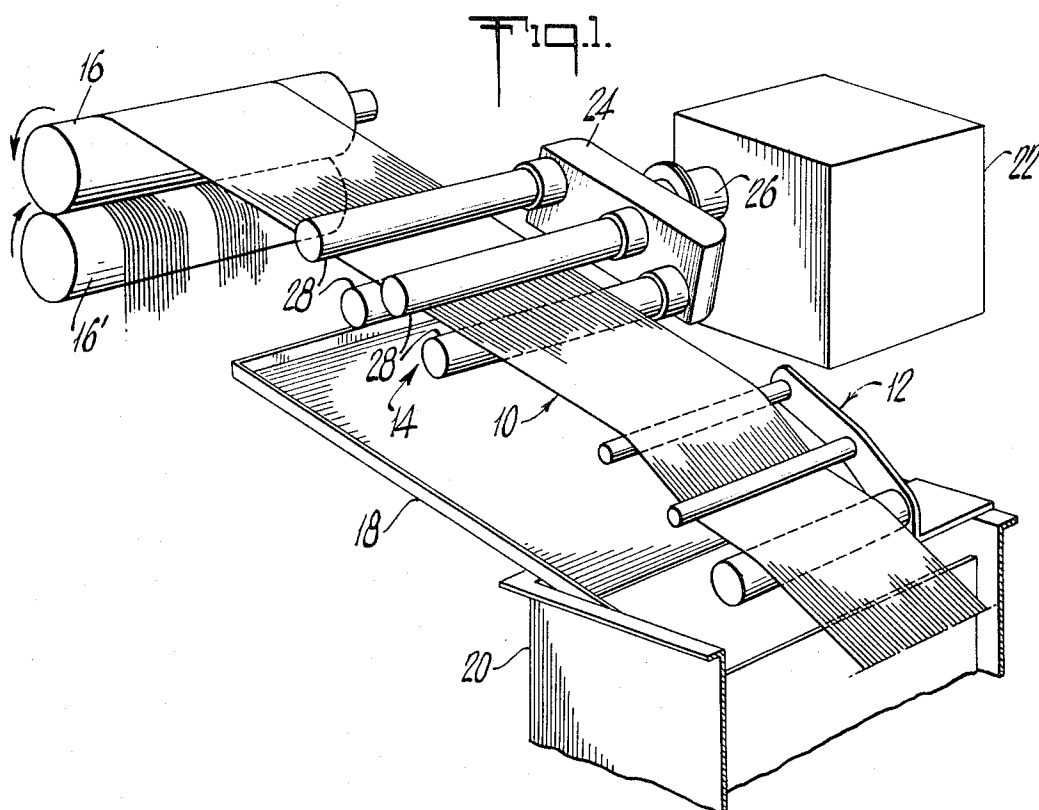


Fig. 3.

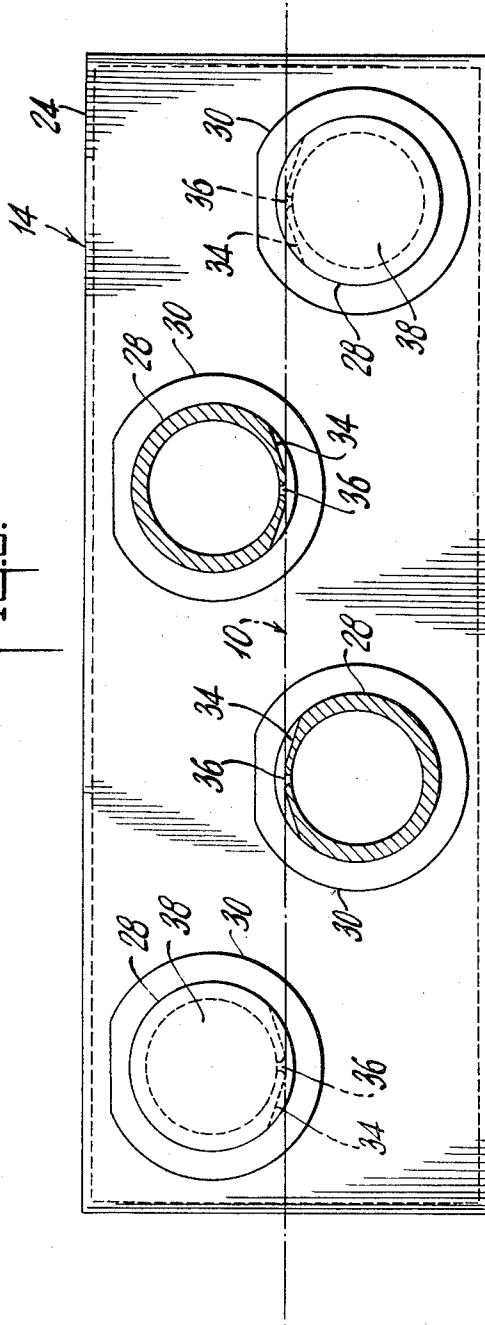
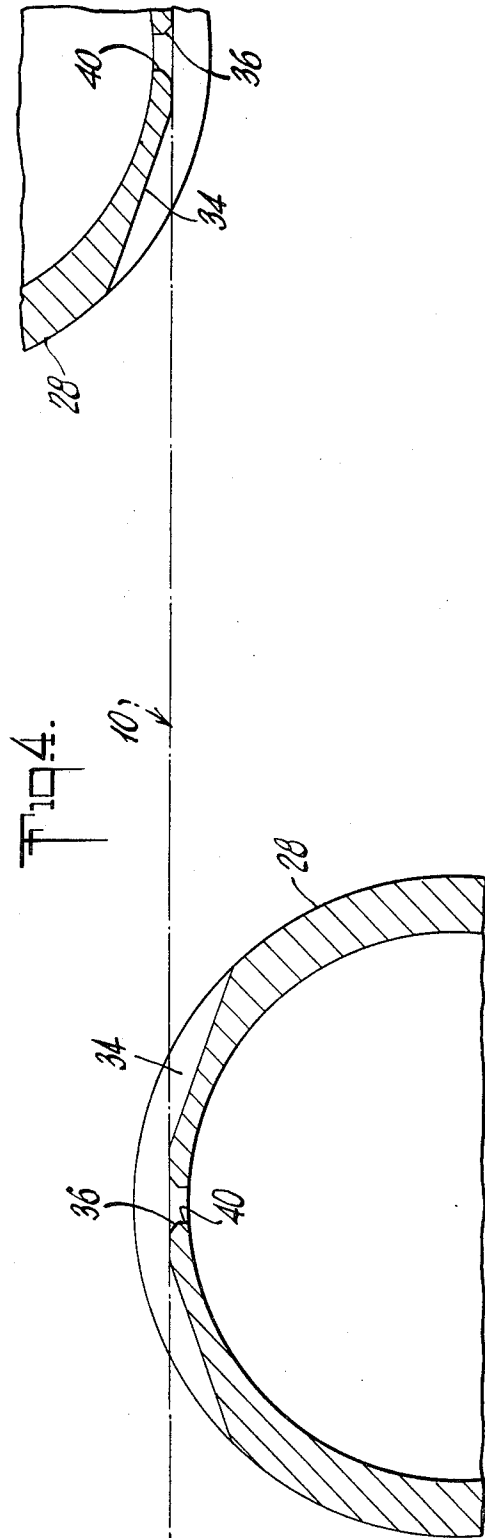


Fig. 4.



VACUUM STRIPPER

The present invention relates generally to vacuum strippers for removing excessive moisture from previously quenched, extruded thermoplastic yarn ends. More particularly, the present invention relates to improvements in such vacuum strippers which make them more effective for their intended purposes.

Vacuum strippers of the type herein described are generally well known in the field of spinning thermoplastic yarn ends. The vacuum strippers heretofore utilized for removing excessive moisture from previously quenched thermoplastic yarn ends following their extrusion through spinnerets, although adequate, do present several problems in need of correction, particularly when used for multifilament yarn ends. The first problem relates generally to a lack of uniformity in end-to-end (i.e., each yarn end compared with the other yarn ends) dryness of the yarn ends. Another problem relates to the lack of precise controllability of attenuation of the thermoplastic yarn ends in the quench tank due to drag or friction on the yarn ends. The drag on the yarn ends is increased by use of the vacuum strippers by the diversion of the yarn ends from their normal path of movement, and by the extent of contact of the yarn ends with the surface area of the vacuum tubes. It has additionally been found that excessive drag on the yarn ends has an adverse effect on the quality of the final product.

It is, therefore, a primary object of the present invention to provide an improved vacuum stripper for removing excessive moisture from previously quenched thermoplastic yarn ends which results in a more uniform end-to-end dryness of the yarn ends and greater controllability of the attenuation of the yarn ends resulting in a product of higher quality.

The vacuum stripper of the present invention comprises a vacuum source, a manifold communicating with said vacuum source, and a plurality of vacuum tubes disposed above and below the path of movement of said yarn ends communicating with said manifold, said vacuum tubes having openings over which said yarn ends pass for removing moisture therefrom. The arrangement of the vacuum tubes with respect to the path of movement of the yarn ends is such that the yarn ends are not diverted from their normal path of movement. In addition, the yarn ends contact the vacuum tubes tangentially at the openings to thereby limit the amount of surface contact of the yarn ends with the vacuum tubes.

The present invention will be described and understood more readily when considered with the accompanying drawings, in which:

FIG. 1 is a perspective view of the vacuum stripper of the present invention in operation;

FIG. 2 is a plan view of the vacuum stripper of the present invention with a portion thereof partly broken away;

FIG. 3 is a partial cross-sectional view of the vacuum stripper of the present invention, taken along section line 3—3 of FIG. 2; and

FIG. 4 is a detailed view of a portion of the vacuum stripper of FIG. 3.

Referring now to the drawings, in FIG. 1 there is shown extruded thermoplastic multifilament yarn ends, generally designated 10, emerging from a quench bath (not shown) and passing through first a wiper and ten-

sion bar assembly, designated 12, a vacuum stripper, designated 14, and then to a pair of driven nip rollers 16, 16', passing over the uppermost thereof 16 and through the nip defined by rollers 16, 16'; the rollers 16 and 16', the directions of the respective driven rotations of which are indicated by arrows, serve to advance the yarn ends. Drip pan 18 and drain tank 20 are provided for collecting the droplets of excessive moisture falling from yarn ends 10.

Vacuum stripper 14 basically comprises a vacuum source 22, a manifold 24 connected to the vacuum source by means of pipe 26, and vacuum tubes 28 connected to manifold 24.

As clearly seen in FIG. 2, the vacuum tubes 28 are connected to manifold 24 by means of sleeves 30 having set screws 32 for positioning the vacuum tubes. Each vacuum tube 28 is provided with a series of grooves 34 which expose openings 36 in the vacuum tubes. Caps 38 are provided at the free ends of vacuum tubes 28 to insure positive vacuum inside the tubes. The openings 36 are formed in the vacuum tubes 28 by cutting a longitudinal keyhole slot 40 in the interior wall of the tube and then cutting the grooves 34 to intersect the longitudinal slot 40 to thereby expose openings 36.

As clearly seen in FIGS. 3 and 4, the vacuum tubes 28 are positioned above and below the yarn ends 10 which pass through the grooves 34 and tangentially contact the openings 36 in the tubes. The grooves 34 are cut into the vacuum tubes 28 angularly with respect to the openings 36 to thereby permit the minimum amount of surface area to contact the yarn ends 10. It has been found that by thus minimizing the contact surface, the resulting yarn is of a better quality than heretofore obtained.

As best seen in FIG. 1, the vacuum tubes 28 are so positioned with respect to the path of movement of the yarn ends 10 that the yarn ends follow a straight path between the wiper and tension bar assembly 12 and the drying roller 16 which has the effect of further decreasing the drag on the yarn ends 10.

A result of decreasing the drag on the yarn ends 10 as described above is that greater controllability in the attenuation of the thermoplastic yarn ends following extrusion through the spinneret is achieved.

It is understood that the foregoing general and detailed descriptions are exemplary and explanatory of the present invention and are not to be interpreted as restrictive of the scope of the following claims.

What is claimed is:

1. A vacuum stripper for removing excessive moisture from previously quenched, extruded thermoplastic yarn ends comprising a vacuum source, a manifold communicating with said vacuum source, and a plurality of vacuum tubes disposed above and below the path of movement of said yarn ends and communicating with said manifold, said vacuum tubes having openings over which said yarn ends pass tangentially for removing the moisture therefrom, said vacuum tubes being arranged to permit said yarn ends to pass without diverting their path of movement.

2. The vacuum stripper as defined in claim 1, wherein said vacuum tubes include a groove for each yarn end for guiding the yarn ends over the openings of said vacuum tubes, and the number of openings in said vacuum tubes correspond to the number of grooves therein.

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3. A vacuum stripper for removing excess moisture from a yarn end passing between a pair of spaced machine elements, comprising a vacuum source, vacuum tube means disposed between said machine elements, a vacuum opening in said tube means over which said yarn end is passed, said yarn end contacting the marginal edges of the tube defining said opening and said tube means being positioned relatively to said machine elements to establish a substantially straight yarn end path between those elements whereby drag on said yarn is reduced over that of conventional strippers.

4. A vacuum stripper as claimed in claim 3 wherein said tube means comprises at least two spaced tube elements each having vacuum openings therein over which said yarn end is passed.

5. A vacuum stripper as claimed in claim 4 wherein said tube means comprises at least one tube element on each side of said yarn end path.

6. A vacuum stripper as claimed in claim 3 wherein said tube means comprises at least one tube element having a plurality of vacuum openings therein and guide means associated therewith for guiding each of a plurality of yarn ends to a corresponding one of said openings.

7. A vacuum stripper as claimed in claim 6 wherein said tube element has an axially extending groove

formed in its inner surface and said guide means are constituted by transverse grooves in the outer surface of the tube, the bases of said transverse grooves intersect the axial groove to form said vacuum openings.

8. A vacuum stripper as claimed in claim 7 wherein portions of the base of said transverse grooves on opposite sides of said openings are mutually inclined so that the marginal edges of said openings are raised and the contact area of said yarn with said marginal edges is small whereby drag on said yarn ends is reduced.

9. A vacuum stripper for removing excess moisture from a plurality of yarn ends passing between spaced machine elements comprising a vacuum source, a header connected to said source, a plurality of spaced vacuum tubes between said elements, extending from said header transversely of said yarn ends and at least one such tube on each side of a straight yarn path between said machine elements, each of said tubes having a plurality of vacuum openings in its surface and each having guide means associated therewith for guiding each yarn end to a corresponding one of the openings in each tube whereby the yarn ends pass over the openings contacting the marginal edges defining said openings and follow a substantially straight path between said machine elements.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,751,756

Dated August 14, 1973

Inventor(s) JOSEPH W. ARNETT, JR.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, line 55, column 2, after "tubes" insert
--at least one of which is--.

Claim 1, line 55, column 2, after "and" insert --at least
one of which is disposed--.

Signed and sealed this 23rd day of April 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents