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TOW SEAL FOR TREATING CHAMBERS

Filed April 15, 1966

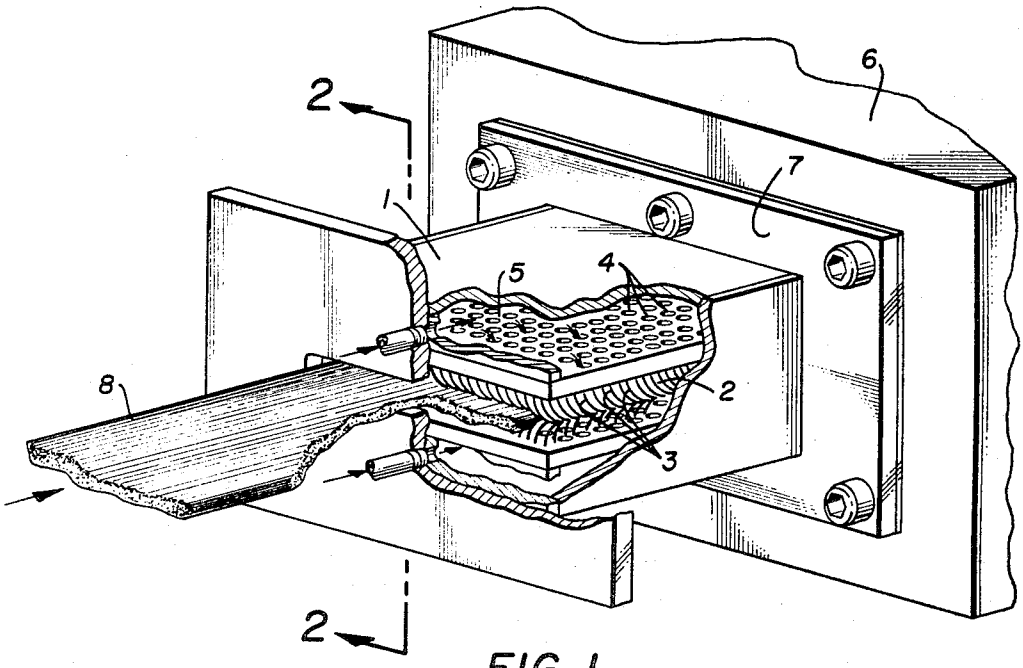

FIG. 1.

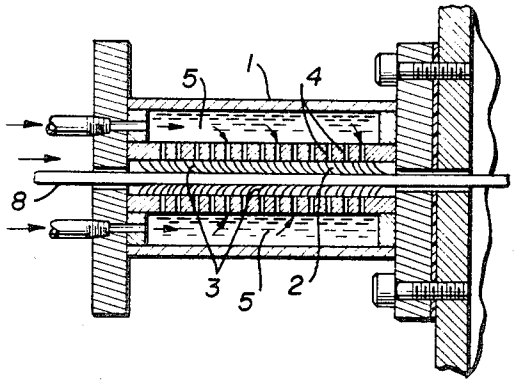

FIG. 2.

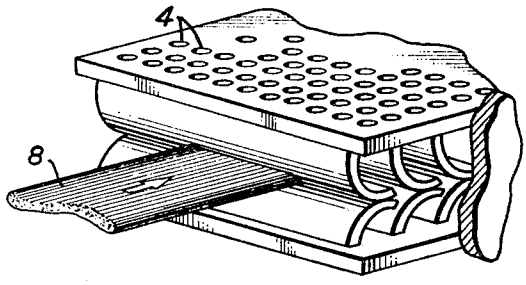

FIG. 3.

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TOW SEAL FOR TREATING CHAMBERS

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ABSTRACT OF THE DISCLOSURE

A tow seal, for processing textile yarns, having perforate walls defining a main passage therebetween open via the perforate walls to a fluid pressure chamber, and filled with flat, flexible bristles.

Tow seals are used in conjunction with steam treating or annealing chambers in processing continuous acrylonitrile tows. Tow treating chambers employ a seal at the point of tow entrance thereto and exit therefrom. It has been a problem in the use of tow treating chambers to provide seals that permit substantially unrestricted passage of tow materials therethrough, that do not damage the tow, and that provide an effective seal or lock to the escape of gases from treating chambers.

It is an object of this invention to provide a novel tow seal structure.

Another object of the invention is to provide, for use with tow treating chambers, a seal structure that is simple in design having no rotary or reciprocating elements.

Another object of the invention is to provide a tow seal structure combining flexible sealing means and condensation means.

The novel tow seal, in brief, comprises a chambered housing with a main passage extending therethrough. A plurality of flexible, opposedly arranged sealing means line the main passage and define a tow path therethrough. Preferably, the sealing means are swept or angled in the intended direction of movement of a tow through the main passage. The seal housing has at least one fluid chamber defined therein with an opening thereto adapted for connection to a source of fluid under pressure. A plurality of passages connect the fluid chamber to the main passage and when fluid under pressure is delivered to the fluid chamber the fluid flows into the main passage and condenses gases escaping from a treating chamber to which the seal is normally attached.

A better understanding of the invention will be gained by reference to the detailed description that follows and to the accompanying drawing.

In the drawing:

FIGURE 1 is a perspective view, with walls broken away, of the novel tow seal,

FIGURE 2 is a cross-sectional view taken through 2—2 of FIG. 1 showing a tow extending through the bristled main passage of the novel tow seal, and

FIGURE 3 is a perspective view of a part of the tow seal, with parts broken away, showing the sealing means in the form of flexible resillient flaps.

Referring to the drawing, FIGS. 1 and 2, the illustrated tow seal embodying the invention comprises a housing 1 having a main passage 2 extending therethrough.

Main passage 2 is filled with opposedly arranged flexible filaments or bristles 3 embedded at one end thereof in the wall defining passage 2 and extending into the center of passage 2. Preferably, bristles 3 are flat and are provided with a given sweep or angle in a direction corresponding to the direction of intended travel of a tow through the main passage 2. The ends or tips of the bristles 3 define a tow path through passage 2.

Different arrangements and sizes of bristles 3 may be used. They may be short in length so that their ends do not meet but define an opening. The opening defined by the bristles 3, however, should be smaller than the size of the tow to be passed therethrough so that the bristles engage the tow and close off the opening. They may be longer so as to extend beyond the central axis of passage 2 and they may be opposingly staggered so as to interleaf. Preferably, bristles 3 are flat and angled and meet in juxtaposed relation substantially along the axis of the seal passage. They may be manufactured of metallic, plastic, or other material best suited to the fluids being used.

Sealing means in the form of flexible flaps, as shown in FIGURE 3, may be used.

Main passage 2 is connected, through a plurality of orifices, pores, or passages 4 formed in the housing, to at least one fluid chamber 5 also defined in housing 1. The embodiment shown is provided with upper and lower fluid chambers 5.

In operation, assume that the novel tow seal is connected to an annealer or stream conditioner 6, by flange or other conventional means 7, with an entrance in the steam conditioner 6 being aligned with the main passage 2. A continuous moving tow 8 is laced through the bristled main passage 2 (with a lacing rod or similar implement), then extended through steam conditioner 6 and through another tow seal positioned at the exit side of the steam conditioner 6 (not shown). As the tow travels through the bristled main passage, the tow engages the flexible bristiles and flexes them in the direction of movement of the tow. Bristles 3 provide a barrier to the escape of gas from conditioner 6.

Water under pressure is then delivered to fluid chambers 5. The water jets into main passage 2 via passages 4. Steam seeping from the steam conditioner 6 into main passage 2 will be condensed by the water sprayed into the main passage 2. The lower side of the wall defining main passage 2 may be sloped and provided with grooves to drain condensate either to the steam conditioner 6 or to the outside.

Variations and modifications of structure from the illustrated novel tow seal are expected to be covered within the spirit of the invention and the scope of the following claim.

I claim:

1. A tow seal for processing textile yarns comprising,
a housing having oppositely spaced upper and lower perforated walls defining a main passage therebetween, said lower wall being slanted for drainage of fluid,
fluid pressure chamber means defined in said housing and communicating with said main passage via said perforated walls to provide a fluid spray thereto,
means for connecting said fluid pressure chamber to a source of pressurized fluid,
flat, flexible bristle means attached to said perforated walls and extending inwardly into said passage to provide a bristle-filled yarn path.

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