Dec. 11, 1956 G. DOWNING 2,773,588

TOW ROLL

Filed May 7, 1954

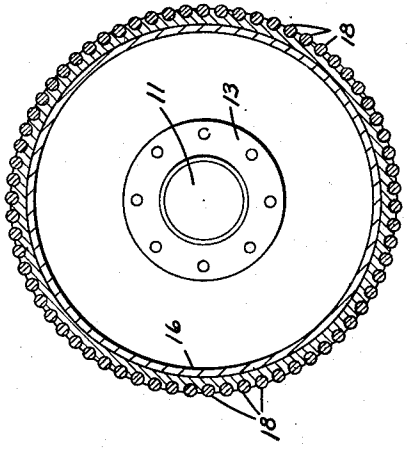


Fig. 2

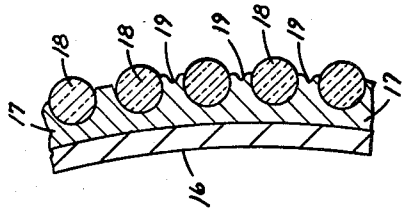


Fig. 3

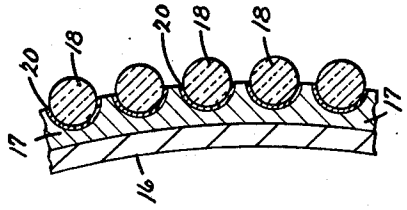


Fig. 4

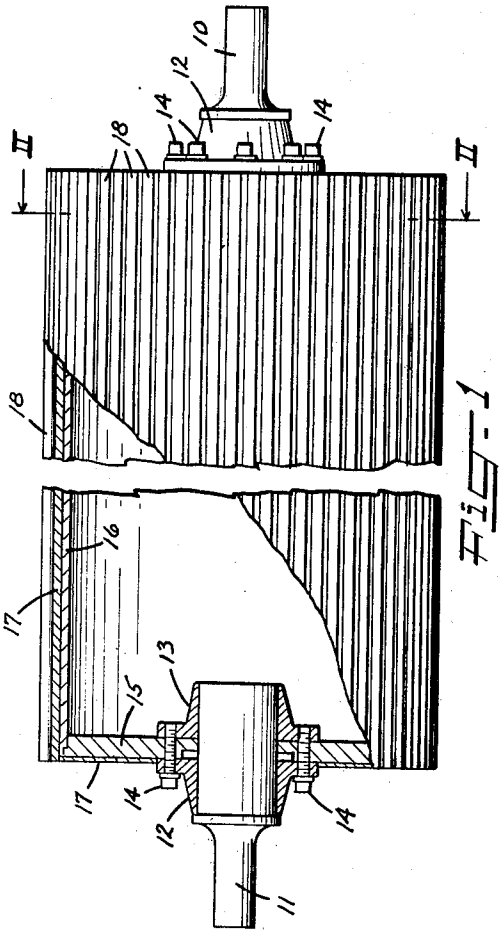


Fig. 1

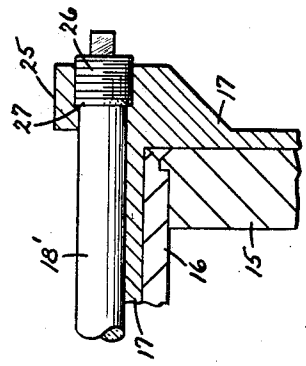


Fig. 5

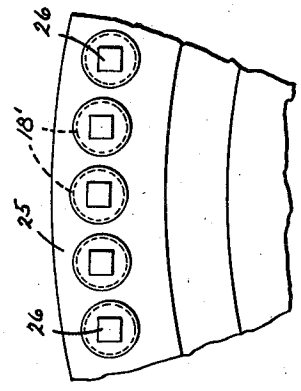


Fig. 6

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2,773,588

TOW ROLL

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7 Claims. (Cl. 203—355)

This invention relates to yarn-treating apparatus and, more particularly, to a roll for the processing of tow comprised of textile strands and filaments.

In the processing of yarn strands and filaments and especially such filaments in the form of tow, it is customary to pass the tow over corrugated rolls which ordinarily have a lead clad or coated surface. Such a protective surface is necessary due to the corrosive nature of the liquids used in the treating process. It has been found that corrugated rolls having merely a lead surface wear very quickly, which in turn requires frequent interruption for replacement, cleaning, etc. Due to the build-up of sulphur adjacent the tow track over the roll, considerable damage to filaments is frequently caused.

A primary object of the present invention is to overcome the above disadvantages by providing a corrugated roll which is simple to manufacture and which greatly increases the life of lead covered tow rolls of the type described.

A further object of the invention is to provide a corrugated tow roll having an especially hard, long-wearing and smooth surface which will not be affected by yarn-treating liquids.

A further object of the invention is to provide a corrugated tow roll having a plurality of glass elements embedded in the surface thereof to provide the corrugations.

Further objects will be apparent from the specification and drawings in which:

Figure 1 is a side view partly broken away of an improved tow roll constructed in accordance with the present invention;

Figure 2 is a section as seen at II—II of Figure 1;

Figure 3 is an enlarged fragmentary sectional view of the periphery of the roll shown in Figure 2;

Figure 4 is a view similar to Figure 3 showing a modified manner of securing the glass rods in the surface of the roll;

Figure 5 shows a further modification with regard to the rod securing means; and

Figure 6 is an end view of the structure of Figure 5.

The invention comprises essentially the provision of a roll having a lead surface which is grooved to receive a plurality of glass elements, preferably rods, secured across the face of the roll parallel to the axis thereof. In one form of the invention, the rods are secured in the surface of the lead by means of a swaging or rolling action to expand the lead partially around the periphery of the rods. In another form, an adhesive, either with or without a cushion, may be employed to hold the rods in the lead surface; and in a third form the rods are retained by means of threaded plugs which compress the individual glass elements between opposite axially spaced lead rims on the roll.

Referring more particularly to the drawings, a corrugated roll, constructed in accordance with the present invention, comprises a pair of stub shafts **10** and **11**, either of which may be supplied with driving means (not shown) in accordance with conventional practice. The construction of each end of the roll is the same so that it is considered necessary to describe only the left-hand end shown sectioned in Figure 1. The stub shaft **11** is welded to a flange **12** which is bolted to an inner flange **13** by means of cap screws **14, 14** extending through the end plate **15**. Flange **13** is welded to end plate **15** so that the stub shaft and flange **12** may be removed when desired. The roll shell **16** is welded to the end plates **15** around the periphery of the roll as shown clearly in Figure 5. The periphery of the shell **16**, as well as the outside of the end plates, is covered with a lead coating **17**, which on the shell **16** is of substantial thickness.

In the preferred embodiment, I cut a plurality of parallel grooves in the coating **17** in a planer or other suitable machine. These grooves are of proper size and shape to accommodate a plurality of glass elements **18, 18** which extend above the surface of the lead coating **17** slightly less than 180°. It will be understood that the cross-sectional shape of the glass elements may be round, square or any other desired configuration which may lend itself to satisfactory locking in the lead. However, I have found that inexpensive glass rods of circular cross-section perform very satisfactorily when they are embedded slightly more than 180° in the grooves. The grooves in the lead coating are conveniently formed by setting up the roll in a planer, either with or without a suitable fixture. After the grooves are cut to the proper depth, the glass elements are installed in the grooves and pressed therein by means of a roller positioned on the planer tool post. Either simultaneously or in a subsequent operation, the rods are anchored by means of a bead roller located to run between adjacent rods and to expand the lead circumferentially between such adjacent rods as shown at **19, 19** in Figure 3. This operation securely keys the rods into the lead coating and effectively provides a satisfactory and long-lasting roll.

Figure 4 illustrates an alternate manner of securing the glass elements, such as rods, to the lead periphery of the roll. In this case, lead coating is likewise cut or scarfed to a shape slightly larger than that of the glass elements. An adhesive **20, 20**, either with or without a thin sheet or strip which serves as a cushion for the glass elements, is utilized in this form to retain the rods in place.

In the form shown in Figure 5, the lead coating on the roll is shaped to provide annular flanges or rims **25** which extend radially outwardly at each end of the roll surface. Each rim is suitably drilled and tapped to accommodate the glass rods or elements **18'**, and the elements are retained in the rims by means of threaded lead plugs **26, 26**. If desired, a gasket **27** may be interposed between the ends of the glass rods and the plugs **26**. The construction shown in Figures 5 and 6, although somewhat more expensive than that shown in Figures 3 and 4, provides considerably greater length of service and freedom from any possibility that the glass elements may become detached from the surface of the roll.

Having thus described my invention, I claim:

1. A corrugated roll for processing yarn filaments such as tow and the like comprising a cylindrical member, journal means for said member, a lead coating on the periphery of said member, and a plurality of elongated glass elements anchored in said coating to form axially extending corrugations around said periphery.

2. Apparatus in accordance with claim 1 in which the elements are rods embedded in the lead coating and in which the coating is expanded partially around the rods to anchor the rods in the coating.

3. Apparatus in accordance with claim 1 in which the anchoring means comprises an adhesive.

4. Apparatus in accordance with claim 1 having a cushion between the coating and the glass elements.

5. Apparatus in accordance with claim 1 in which the anchoring means comprises at least one annular flange around the periphery of the shell, and a threaded plug in said flange to retain the glass element.

6. Apparatus in accordance with claim 5 in which the flange is an integral part of the lead coating.

7. Apparatus in accordance with claim 1 in which the lead coating is expanded more than 180° circumferentially around the rods.

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