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H. A. KULJIAN
THREAD PROCESSING REEL HAVING LIQUID
APPLYING AND LIQUID REMOVING MEANS

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2 SHEETS--SHEET 1

Fig. 1.

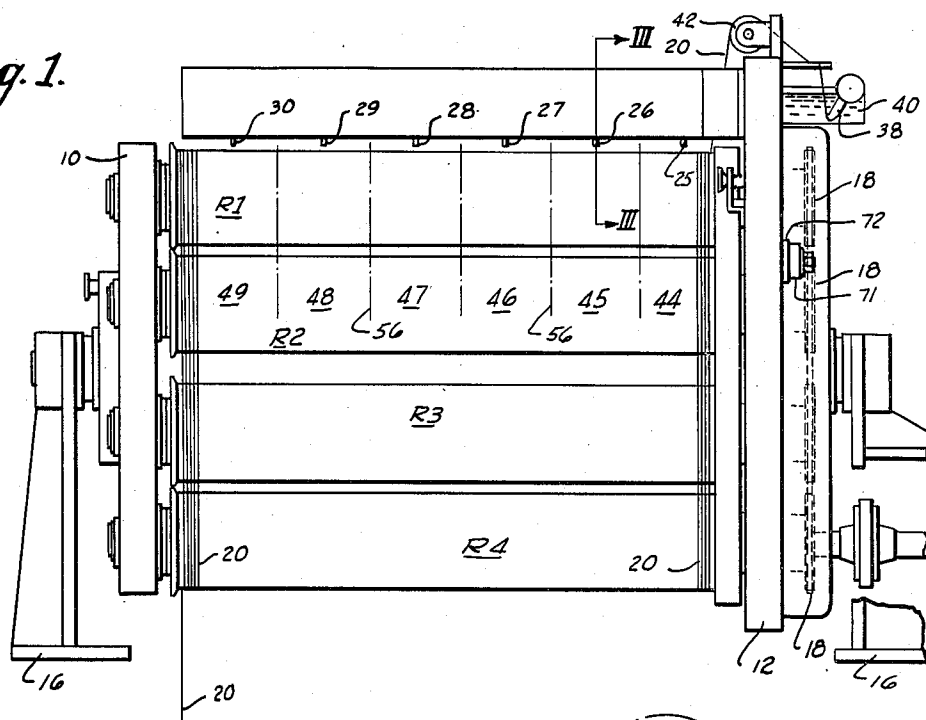


Fig. 8.

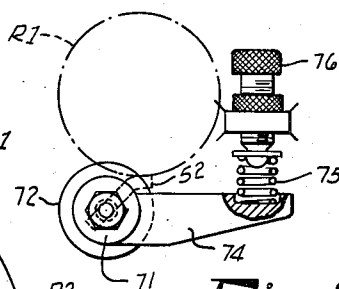
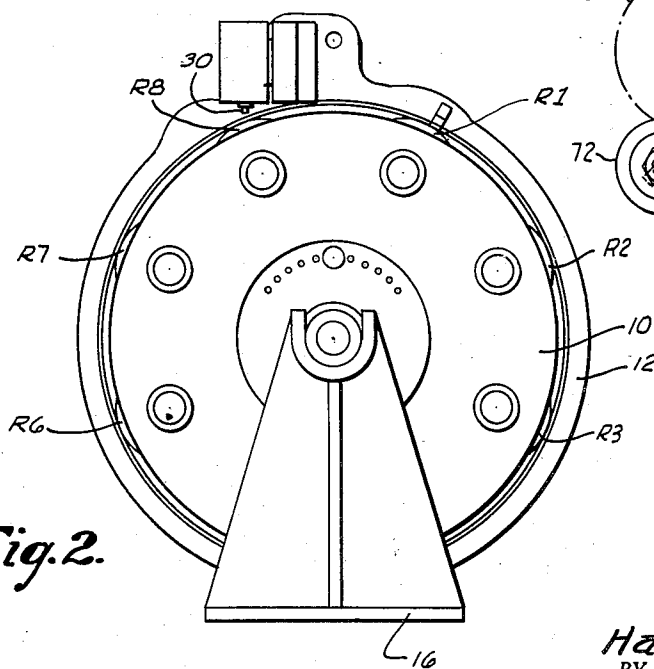


Fig. 2.



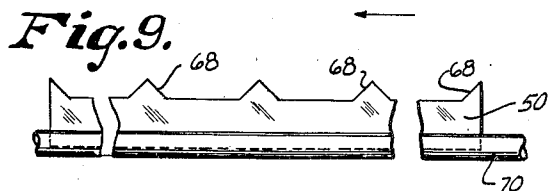
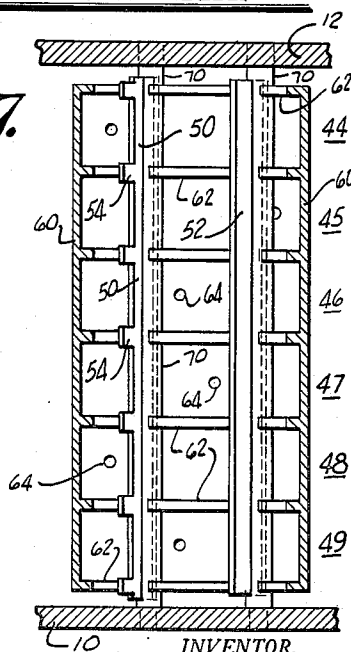
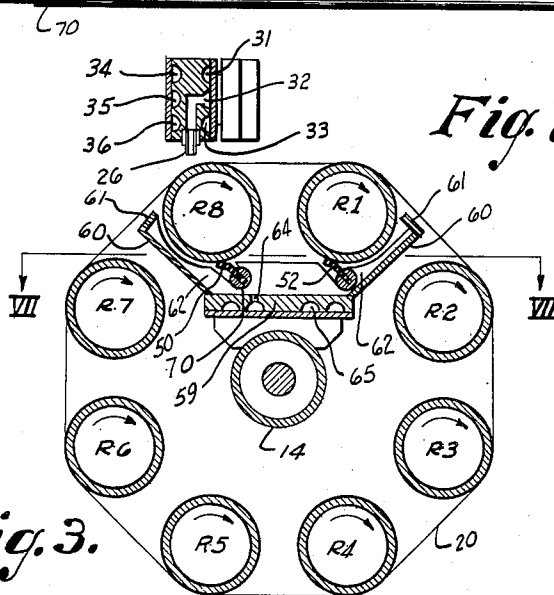
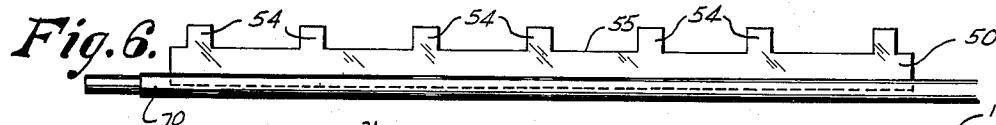
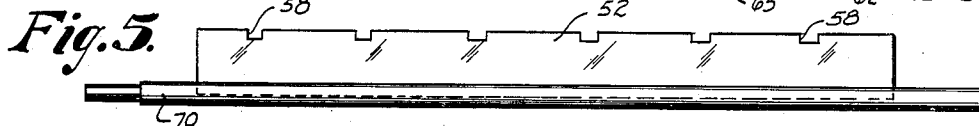
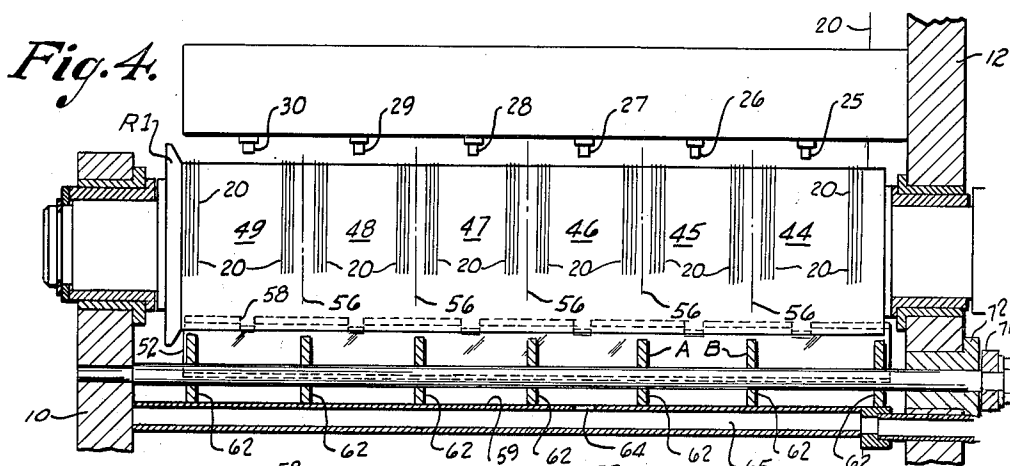
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2 SHEETS--SHEET 2



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THREAD PROCESSING REEL HAVING LIQUID APPLYING AND LIQUID REMOVING MEANS

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8 Claims. (Cl. 68—205)

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My invention relates to an apparatus which can be used for continuous manufacture of synthetic thread or for continuous processing of synthetic or non-synthetic thread.

One object of the invention is to produce an improved apparatus of the type set forth.

Apparatus of the type referred to includes a thread advancing device and means for applying water and different chemicals in liquid form to various portions of a thread as the thread advances helically longitudinally of the thread advancing device. The thread advancing device includes a plurality of skewed rolls and the water and other liquids are applied to the thread as it moves over one of said rolls.

In the interest of efficient regeneration or processing of the thread, it is desirable that the various liquids, which are applied to different portions of the thread be prevented from intermingling as much as possible. Furthermore, the chemicals used in treating a thread are rather expensive and if they can be collected in sufficiently strong concentrations, they can be reclaimed for use over again.

It is therefore a further object of my invention to produce improved means for preventing intermingling of the various liquids and for removing said liquids separately and in the highest possible concentrations.

These and other advantages are attained by my invention as set forth in the following specification and is shown in the accompanying drawings in which

Fig. 1 is a fragmentary side elevational view of an apparatus embodying my invention.

Fig. 2 is a left hand end elevational view of the apparatus shown in Fig. 1.

Fig. 3 is a fragmentary section on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary, enlarged view, partly in section and partly in elevation showing certain details of construction.

Figs. 5 and 6 are elevational views of the right and left hand wipers which are shown in Fig. 3 and which embody my invention.

Fig. 7 is a section on line 7—7 of Fig. 3.

Fig. 8 shows how the wipers are adjusted.

Fig. 9 shows a modified form of wiper.

The apparatus illustrated includes a plurality of rolls R1, R2, R3, R4, R5, R6, R7 and R8 which are preferably hollow and which are preferably formed of glass, ceramic or other corrosion resisting material. The ends of the rolls are journaled in end plates 10 and 12 which are carried by a center post 14 which is supported by suitable pedestals 16. The rolls R1 to R8 are rotated about their respective axes by gears 18, driven by a

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motor or other source of power, not shown, and have their axes skewed with respect to the axis of the post 14 or other common central axis, so that a thread 20 wound about the right hand end of the thread advancing device, as viewed in Fig. 1, will move, in the form of helix circumscribing all of the rolls, toward the left hand end of the device.

As the thread moves longitudinally of the thread-advancing device, it is subjected to water and treatment by various liquids which are supplied by a plurality of spaced nozzles or valves 25, 26, 27, 28, 29 and 30, to corresponding spaced zones on the roll R3. The different liquids are supplied, from sources not shown, to conduits or channels 31, 32, 33, 34, 35 and 36 which lead, respectively to the nozzles or valves 25 to 30. See Figs. 1 and 3.

In the case of the manufacture of synthetic thread, the desired solution is extruded from a spinnerette 38 into a coagulating bath 40 and the freshly formed filament 20 is passed over one or more godet wheels 42 before it is wound about the right hand end of the thread advancing device. If an already manufactured thread or filament is to be processed, it is fed onto the thread advancing device, from a source of supply not shown.

The structure of the thread advancing device and the manner in which the treating liquids are applied do not form part of the present invention and are therefore not described in detail.

The valves 25 to 30 deliver various liquids such as water, acids, alkali, soap or other washes, etc. to the spaced zones 44, 45, 46, 47, 48 and 49 therebeneath which zones have, for convenience, been marked off by broken lines 50 in Fig. 1. By this means as the thread passes through the successive zones, it will be subjected to the action of the various liquids constantly supplied to said zones by the valves 25—30.

Of necessity, the liquids are supplied to said zones in greater quantities than the thread can absorb or carry, and such excess liquids tend to be thrown off by centrifugal force and tend to creep along the roll so that the liquid supplied to one zone will dilute or contaminate the liquid supplied to adjacent zones. This is obviously undesirable.

According to my invention, I provide for minimizing the intermingling of the liquids, for removing excess liquids to minimize the tendency of said liquids to be thrown off by centrifugal force, and for collecting the various liquids thus removed separately so that such liquids may be reconcentrated and used over again.

To this end, I provide a wiper 50 adapted to

act on roll R8 and a wiper 52 adapted to act on the roll R1. These wipers are made of rubber, felt or any other flexible, resilient material which acts as a squeegee so as to effect a wiping action on the adjacent surfaces of the rolls. It will be noted the wipers 50 and 52 act on the inner surfaces of the rolls R8 and R1, respectively, and that they do not touch the thread itself. While only one wiper 50 and one wiper 52 are shown, it is to be understood that additional wipers of either type can be associated with some of the other rolls.

As best seen from Fig. 6, the free, or effective edge of the wiper 50 is so cut out as to form spaced tongues 54 which are adapted to effect a wiping action on corresponding spaced portions of the roll R8, and recessed portions 55 therebetween which do not come in contact with the roll. The tongues 54 are so spaced as to act upon the surface of the roll R8 at the points designated by the broken lines 56 or on either side of the points at which the liquids are discharged from the valves.

By removing excess liquids at, or near, the limits of the zones, the wiping action of the tongues 54 serves to reduce the total amount of liquid in each zone and, hence, the tendency of various liquids to flow from one zone to an adjacent zone and this prevents or reduces contamination or dilution of the liquid supplied to one zone by the liquids supplied to adjacent zones. Also, reducing the amount of liquid lessens the tendency of such liquids to be thrown off by centrifugal force.

The wiper 52 may have a continuous wiping edge or its edge may be provided with notches 58 corresponding to the centers of the zones 44-49 and to the centers of the recessed portions 55 of the wiper 50. See Figs. 5 and 6. The wiper 52 is intended to complete removal of excess liquids and the notches 58 are intended to leave some liquid in the center of each zone so as to insure satisfactory regeneration or processing of the thread. In other words, in order to make sure of thorough initial saturation of the thread in each zone, the excess liquids are at first removed only by the tongues 54 and only from areas intermediate the various zones, and all of the excess liquid over and above that which is carried by the thread is removed by the continuous edge of wiper 50 except for the small amounts which remain on the rolls when the edge of the wiper 50 is provided with the notches 58. When the notches 58 are present, the liquids left on areas corresponding to the centers of the various zones will spread out and be absorbed or carried by the thread as it moves axially of the thread advancing device and from roll R8 to roll R1 and around the other rolls back to roll R1.

It is thus clear that the wipers 50 and 52 by removing some of the liquids, serve to minimize the tendency of the liquids to be thrown off by centrifugal force; that the tongues 54 on the wiper 50 tend to prevent or reduce intermingling of the liquids on roll R8; and that the notches 58 on the edge of wiper 52 insure that some liquid will remain in each zone on roll R1.

In order to segregate the various liquids removed from rolls R8 and R1, a trough is placed below these rolls and partitions are provided in said trough to define separate compartments for receiving the various liquids. As best shown in Figs. 3 and 7, the trough includes a bottom 59 and inclined sides 60 having splash guards 61. Partitions 62 extend transversely of the trough

so as to define as many compartments as there are zones. Each compartment is provided with a drain hole 64 which leads to a disposal outlet 65 leading to reclamation or storage facilities not shown.

The liquids wiped off by the wipers 50 and 52 run down the sides of the wipers and are shed by the partitions 62 into the compartments formed by said partitions. For example, the liquid supplied to zone 45 on roll R8 will be wiped off at the limits of said zone by the corresponding tongues 54 of wiper 50 and will be wiped off roll R1 by the corresponding portion of wiper 52 and this liquid will be shed by the juxtaposed walls A and B of adjacent partitions into the compartment defined by said walls.

If desired the tongues 58 of wiper 50 may be tapered as shown in Fig. 9 so as to provide inclined liquid shedding surfaces 68.

As best shown in Fig. 3, each of the wipers 50 and 52 is mounted in a longitudinal slot formed in a rod or shaft 70 which seats in registering notches formed in the partitions 62. The shafts 70 are detachably mounted and may be pulled out by removing nut 71 and bushing 72. See Fig. 4. By this means, the wipers may be replaced without dismantling any other parts of the apparatus.

The wipers 50 and 52 are adjustable so as to vary the pressure with which these wipers contact the rolls R8 and R1. To that end any suitable means may be used and in Fig. 8 I have shown one form of adjusting means which includes a rocker arm 74 carried by one or by both ends of the shafts 70, a spring 75 for biasing the wiper against the roll and an adjustment screw 76 for varying the pressure exerted on the rocker arm and hence the contact pressure of the wiper against the roll.

By the arrangement described, large quantities of the treating liquids are collected separately and in relatively high concentrations, the tendency of liquids to be thrown off by centrifugal force is reduced by reducing the amount of liquid on the rolls and enough liquid is left properly to treat the thread. Also, the adjustability of the wipers permits of accurate control of the thickness of the film remaining on the rolls and the detachable mounting of the wipers permits easy and rapid replacement of the wipers.

What I claim is:

1. Apparatus for manufacturing or for processing thread, said apparatus including at least a first elongated roll and a second elongated roll disposed side by side with the thread passing over both of said rolls successively, means for rotating said rolls, valve means for supplying various liquids to longitudinally spaced-zones of said first roll, a plurality of wipers for wiping longitudinally spaced, relatively narrow areas on the adjacent surface of said first roll, said areas being located between said zones, and an elongated wiper having its edge in contact with an adjacent portion of said second roll.

2. The structure recited in claim 1 together with means for holding said wipers against said rolls with a predetermined pressure to predetermine the amount of liquid left on said rolls.

3. The structure recited in claim 2 in which said last mentioned means exerts a constant predetermined following pressure against said wipers whereby said wipers continue to act on said rolls with the same pressure regardless of wear on the part of the rolls or on the part of the wipers.

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4. The structure recited in claim 2 in which said last mentioned means includes springs, means for adjusting the tension of the springs and means for transmitting the action of the springs to said wipers, respectively.

5. Apparatus for manufacturing or for processing thread including at least a first elongated roll and a second elongated roll disposed side by side with the thread passing, successively, over predetermined surface areas of both of said rolls, means for rotating said rolls, means for applying various liquids to predetermined zones on said first roll, and wiping means for minimizing intermingling of said various liquids, said wiping means including an elongated element disposed adjacent the lower portion of said first roll, and a plurality of tongues projecting from an edge of said element and contacting portions of the surface of said first roll between said zones.

6. The structure recited in claim 5 in which said tongues are of flexible, resilient material.

7. The structure recited in claim 5 in which the tongues taper in the direction of the roll.

8. Apparatus for manufacturing or for processing thread including at least a first elongated roll and a second elongated roll disposed side by side with the thread passing, successively, over

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predetermined surface areas of both of said rolls, means for rotating said rolls, means for supplying various liquids to predetermined zones on said first roll, and an elongated, flexible, resilient element with its edge contacting the surface of said second roll, there being notches formed in the edge of said element in registration with the central portions of said zones.

HARRY A. KULJIAN.

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