Jan. 30, 1945. J. P. TARBOX 2,368,386

METHOD OF AND DEVICE FOR TREATING THREADS AND THE LIKE

Original Filed March 15, 1941 2 Sheets-Sheet 1

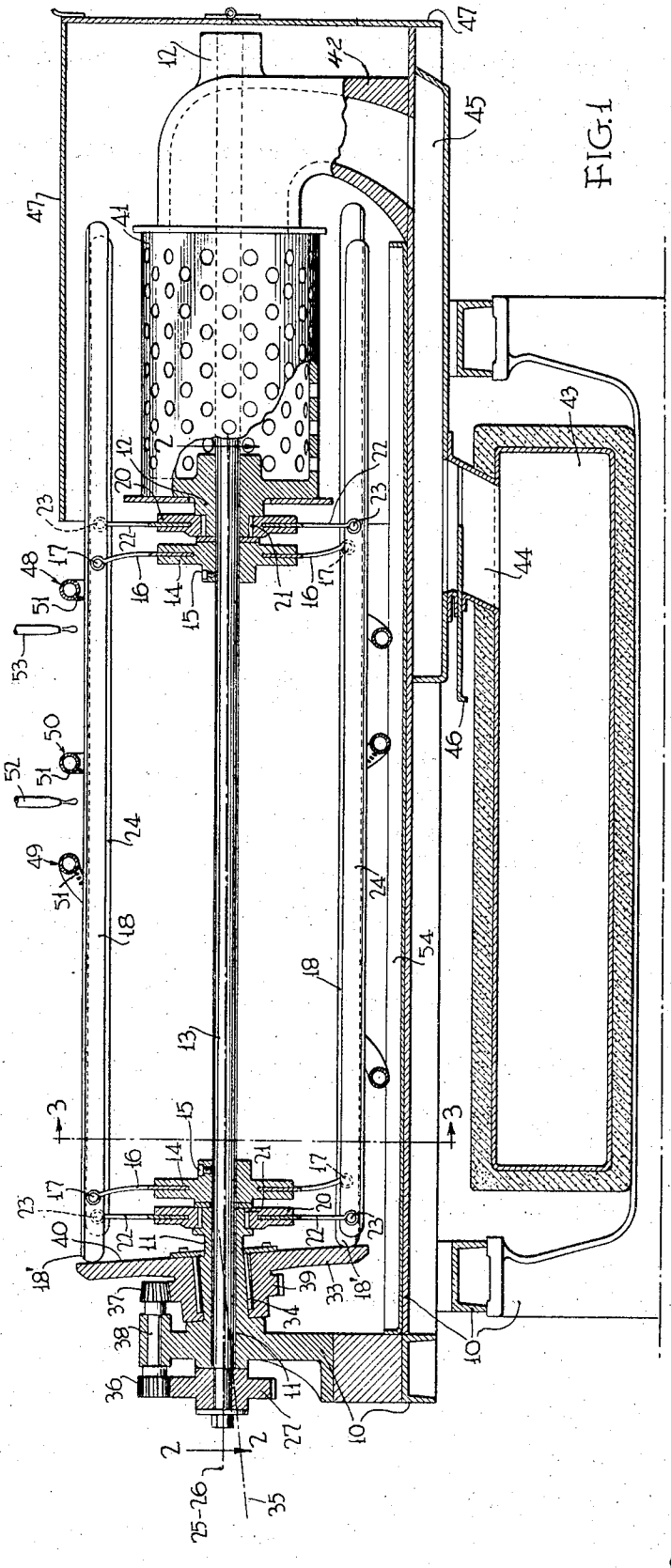


FIG. 1

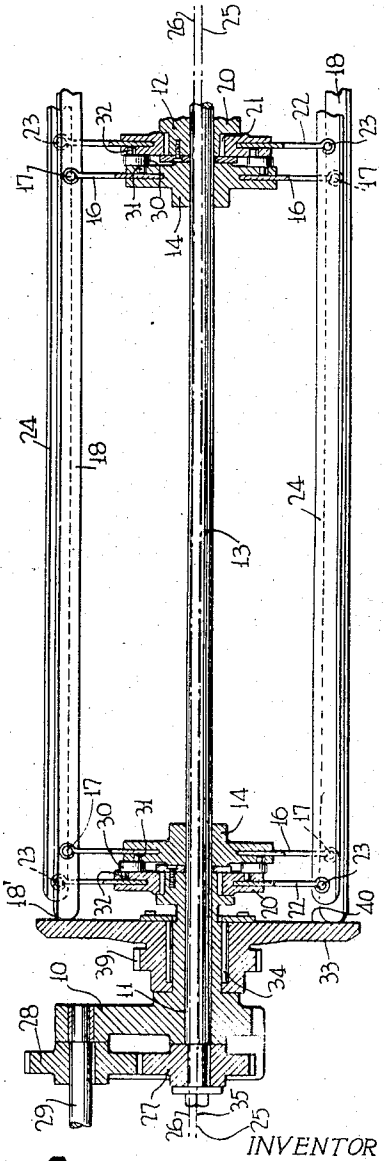


FIG. 2

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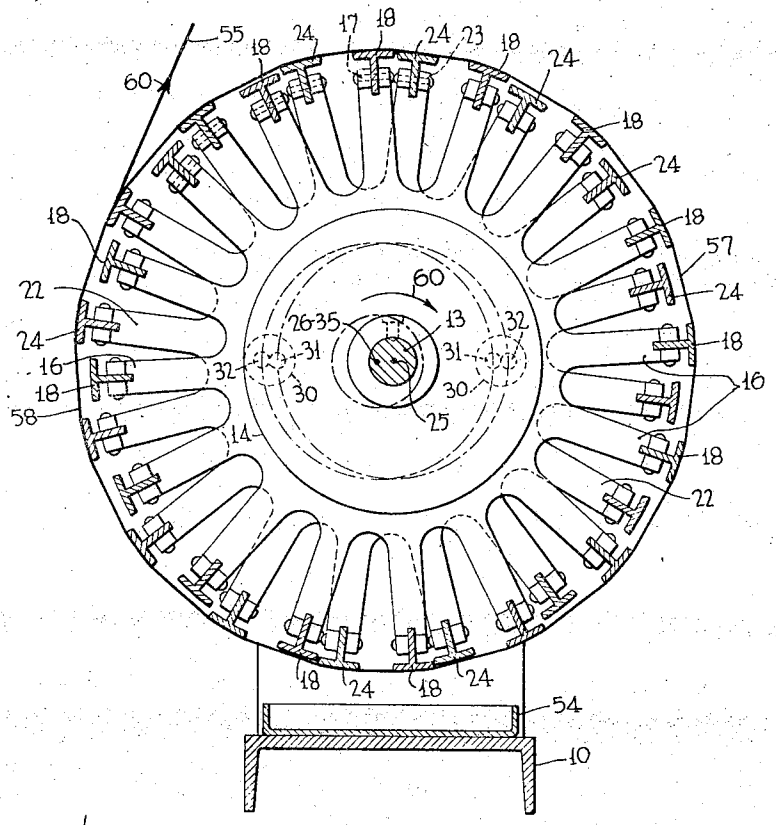
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FIG.3



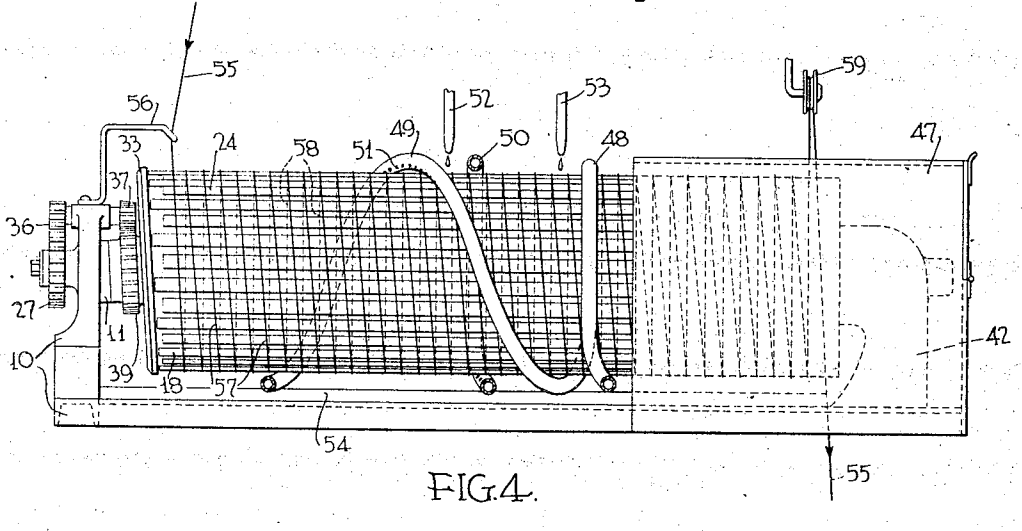
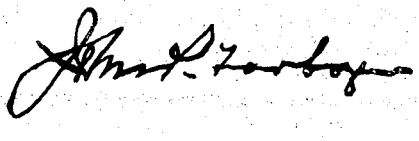


FIG.4.

INVENTOR!



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UNITED STATES PATENT OFFICE

2,368,386

METHOD OF AND DEVICE FOR TREATING THREADS AND THE LIKE

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Original application March 15, 1941, Serial No. 383,628. Divided and this application September 18, 1941, Serial No. 411,312

5 Claims. (Cl. 8—151)

The invention relates to a method of and a device for treating threads, filaments and the like. More particularly, the invention relates to the creation of a counterflow between a treating fluid or fluids and the filament or the like.

Among the objects of the invention is a device of the type referred to, which is simple and rugged in construction.

The desired flow between the treating fluid or fluids and the thread or the like, is achieved according to the invention mainly by means of a current or currents of air or gas.

Further objects, features and advantages of the invention will become apparent from the following description of one embodiment of the invention when read together with the attached drawings:

In the drawings,

Figure 1 is a diagrammatic vertical section through a reel according to one embodiment of the invention;

Figure 2 is a fragmentary horizontal section along line 2—2 of Figure 1;

Figure 3 is a vertical cross-section along line 3—3 of Figure 1; and

Figure 4 is a fragmentary side elevation at a smaller scale of the reel shown in Figure 1.

The numeral 10 designates a rigid supporting structure. This structure is provided with a bearing portion 11 at one end and with a pair of bearing portions 12 at and near to the other end. A shaft 13 is rotatably supported in said bearing portions. A pair of hub members 14 are rigidly connected such as by screws 15 to the shaft 13, and each of the hub members is provided with generally radially extending spokes 16. The spokes 16 are of resilient material such as steel, and are journalled by their outer free ends at 17 to bars 18, which latter extend generally parallel to the shaft 13. The bars 18 form together a generally cylindrical cage. The normal form of the spokes 16 is about that shown in the upper part of Figure 1, while the spokes are under stress in the form shown in Figure 1, below the shaft 13, and in Figure 2.

A second pair of hub members 20 are rotatably supported on the outside of the supporting portion 11 and of the one supporting portion 12 by means of antifriction bearings 21. The members 20 are likewise provided with radially extending spokes 22 which are connected at 23 to a second set of bars 24. The bars 24 form together a second generally cylindrical cage. The spokes 22 need not be of resilient material but these spokes and the connections 23 may be rigid.

The axis 25 of the shaft 13 and the axis of rotation 26 of the hub members 20 are arranged parallel to but spaced from each other in the plane of Figure 2. As the outer diameter of the individual cages formed, respectively, by the bars 18 and 24 is about the same, the eccentricity of the axes 25 and 26 results in a projection of the bars 18 outwardly beyond the bars 24 for about half the circumference of the entire drum structure, whereas, for the other half of the circumference, the bars 24 project outwardly beyond the bars 18.

The shaft 13 is connected through gears 27, 28 and a shaft 29 to a source of power which is not shown. The hub members 14 and 20 are connected by means of discs 30, which latter are provided with pins 31 and 32. Each pin 31 engages one hub member 14, and the appertaining pin 32 the adjacent hub member 20. The distance between the axes of the pins 31 and 32 is equal to the eccentricity of the axes 25 and 26 of the two individual cages. A pair of such driving members 30 between each two adjacent hub members 14 and 20 is shown in the embodiment, but any number of such driving members will serve the purpose.

A disc member 33 is rotatably supported such as by an antifriction bearing 34 on the supporting member 11. The axis of rotation 35 of this disc member is inclined to the axis 25 of the shaft 13, and the two axes 25 and 35 are arranged in the same vertical plane, as indicated in Figures 1 and 2. The disc member 33 is driven with the same speed as the shaft 13 by means of pinions 36 and 37 being rigidly connected to the ends of a rotatably supported shaft 38, the pinion 36 engaging the gear wheel 27 and the pinion 37 engaging a toothed wheel 39 connected to disc member 33. The dimensions of the gears 27, 36, 37 and 39 are such that the shaft 13 and the disc member 33 rotate in unison. The rounded off ends 18' of the bars 18 are pressed against the surface 40 of the member 33 under the action of the resilient spokes 16.

The two bearings 12 are supported by a hollow structure 41, 42, the portion 41 being perforated so as to allow the passage of drying air from its interior. The drying air is supplied to the structure 41, 42 from a conduit 43 over a passage 44, 45, the effective cross-section of which may be regulated by a valve 46. The ends of the bars 18 and 24 extend beyond the inner bearing member 12 so as to surround the portion 41. These extended ends of the bars and the structure 41 are enclosed in a casing 47.

A pipe extends in a generally circular loop **48** and a generally helical loop **49** around the drum formed by the bars **18** and **24**. A second pipe **50** likewise extends around a portion of the drum between the loops **48** and **49** of the other pipe. The two pipes are connected to a source of compressed air or gas and are provided with nozzles indicated at **51** through which the compressed air or gas is blown against the surface of the drum and toward the left-hand end of the drum.

52 and **53** are nozzles through which treating fluids are dripped or sprayed upon the circumference of the drum, and **54** is a basin for collecting the fluid after it drips or runs off the drum.

55 is a thread, filament or the like which, after passing a guide **56**, is wound upon the drum. On one-half of the circumference of the drum, the thread is supported by the bars **18** in half circular windings **57**, which are inclined to the axes **25, 26**, whereas, on the other half of the circumference of the drum, the thread is supported by the bars **24** on half circular windings **58** which extend perpendicular to said axes. At the other end of the drum, the thread is led away over a guiding roll **59**.

In operation, the thread or the like **55** is continuously fed at one end wound upon and moved along the drum in windings **57, 58**. The treating fluid which would, of course, have the tendency to run straight down along the windings to the collecting basin or trough **54** and to be partly carried along with the thread toward the take-off end of the drum, is forced by the currents of air or gas emanating from the pipes **48, 49** and **50** to move in the opposite direction, that is, in counterflow to the direction of the movement of the thread. Such counterflow is highly desirable for an effective treatment of the thread or the like.

The new device and the method of its operation are applicable for many treatments of filaments or the like such as for the aftertreatment of freshly spun artificial fibres in any known process, for instance, the cuprammonium or viscose process.

The reel is such as claimed in my copending application Serial No. 383,628, "Rayon spinning cage," filed March 15, 1941, of which this application is a division.

The invention is, of course, not restricted to the specific embodiment shown in the application, but the invention is liable to many different embodiments, all of which are intended to be covered by the spirit of the language of the attached claims.

What is claimed is:

1. In a method of applying a comparatively thin layer of a treating liquid to a filamentary material while the latter is continuously moved in one direction by winding and axially advancing it on a generally horizontally disposed thread-advancing device having a thread-bearing periphery, the step of subjecting a substantial portion of the treating liquid on the filamentary material to an arcuate stream of a gaseous medium extending around a substantial portion of the thread-bearing periphery of said thread-advancing device, said stream being directed against the direction of travel of said filamentary material on said thread-advancing device in the zone of the application of said liquid, thereby causing a counterflow of said liquid with respect to said filamentary material.

2. In a method of subjecting a filamentary material to a treating liquid while said filamentary material is wound and axially advanced on a generally horizontally arranged reel, the step of directing a stream of a gaseous medium generally circular in cross-section against the liquid-covered filamentary material and toward the receiving end of the reel, the said gaseous stream and the reel being substantially concentric.

3. In a method of applying a comparatively thin layer of a treating liquid to a filamentary material while the latter is continuously moved in one direction by winding and axially advancing it on a substantially horizontally disposed reel having a thread-bearing periphery, the step of subjecting the treating liquid on the filamentary material in the zone of application of said liquid to a plurality of arcuate streams of a gaseous medium extending around a substantial portion of the thread-bearing periphery of said reel so as to influence the movement of said liquid with respect to said filamentary material, the different streams being brought into contact with the filamentary material in regions which are spaced from each other in the axial direction of the reel.

4. A device for treating a filamentary material comprising a reel having a thread-bearing periphery upon which the filamentary material is wound and axially advanced in generally helical turns, means for applying a treating liquid to the filamentary material, conduits for a gaseous medium adjacent to said means for applying liquid, said conduits having portions extending around a major extent of the thread-bearing periphery of said reel, said portions having outlets disposed around said major extent and near to the circumferential surface of said reel, said outlets being arranged so as to adapt them to direct a stream of a gaseous medium against said surface and toward one end of said reel so as to impart a desired movement to said liquid with respect to said filamentary material and said reel.

5. In a device according to claim 4, the conduits for directing the stream of a gaseous medium against the surface of the reel having some of said portions of elongated form extending around the reel generally in the form of a helix, said outlets being arranged along the length of said conduit portions.

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