Jan. 31, 1939. C. C. WALTERS 2,145,281

PROCESSING REEL

Filed Feb. 18, 1935

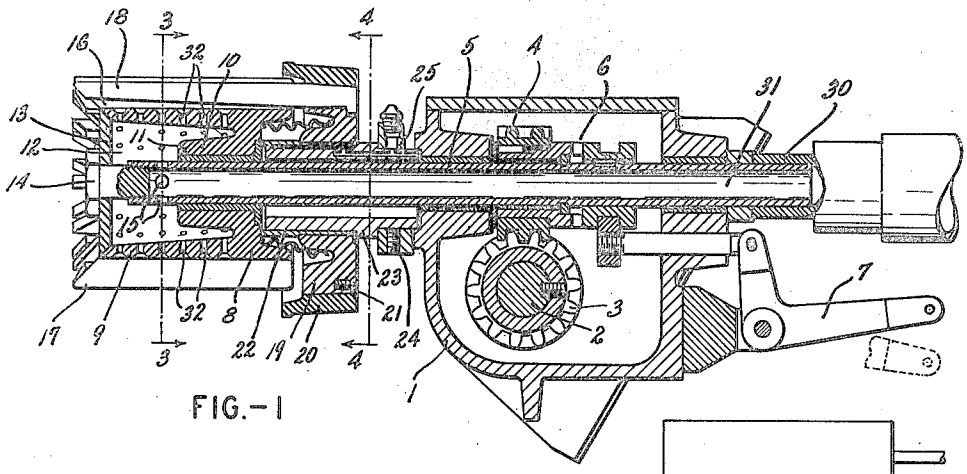

FIG.-1

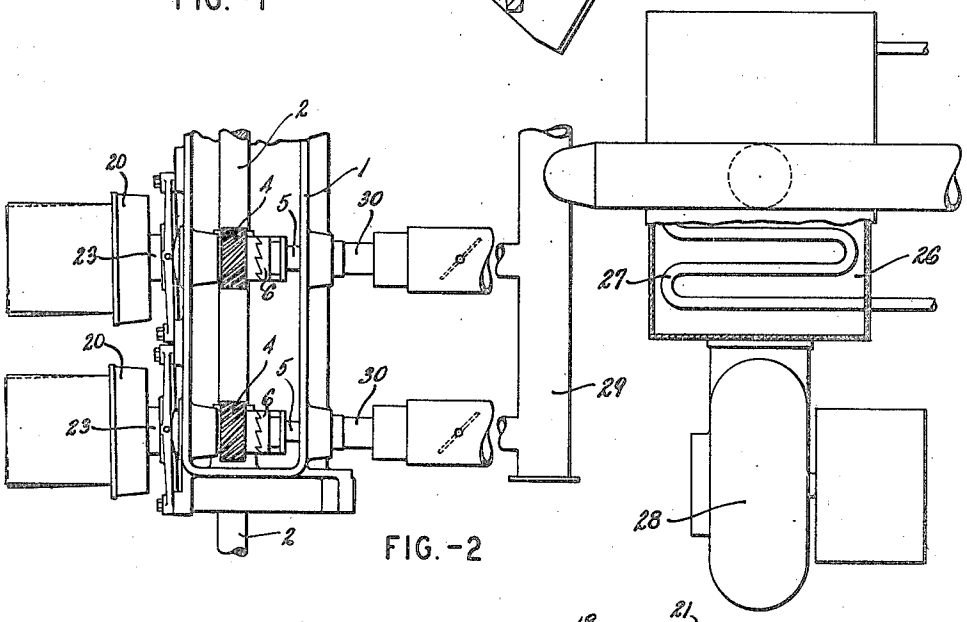

FIG.-2

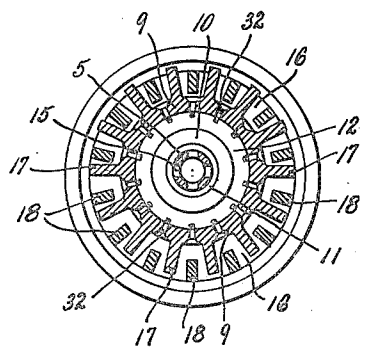

FIG.-3

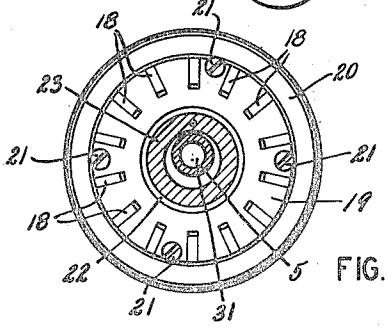

FIG.-4

INVENTOR
CLARENCE C. WALTERS
BY Charles C. Kenneth
ATTORNEY

Patented Jan. 31, 1939

2,145,281

# UNITED STATES PATENT OFFICE

2,145,281

## PROCESSING REEL

Clarence C. Walters, Cleveland, Ohio, assignor to Industrial Rayon Corporation, Cleveland, Ohio, a corporation of Delaware

Application February 18, 1935, Serial No. 7,112

8 Claims. (Cl. 68—198)

This invention relates to reels for use in the production and/or processing of thread or the like, as, for example, multiple filament artificial silk thread.

An object of the invention is to provide a simple and improved reel of the thread-storage, thread-advancing type in which thread or the like led to the reel is wound upon it in the form of a series of spaced helical turns capable of being advanced along the reel from its thread-receiving to its thread-discharge end, the discharged thread or the like being led or conducted thence to another reel or reels or to a take-up or collecting device or the like, and of which the parts are constructed and arranged in such a manner as to enable it to deliver to or draw through the thread or the like a current of fluid medium such as hot air for drying purposes, or some other gas for either physical or chemical treatment, or a suitable liquid.

Another object of the invention is to provide a thread-storage, thread-advancing reel of cantilever form with a hollow driving shaft by means of which a treating medium can be conducted to or withdrawn from the inside of the reel in order that such treating medium may be distributed to, upon or over the thread or the like being treated. A further object of the invention is to provide a thread-storage, thread-advancing reel in which the reel members are of hollow cage form providing an internal cavity to which fluid treating medium is conducted in connection with its distribution to the thread or the like. Still a further object of the invention is to provide an improved reel of the character described in which a drying medium, such as air or an inert gas, is conducted to or from the reel through its hollow driving shaft.

Further objects of the invention are in part obvious and in part will appear more in detail hereinafter.

In the drawing, which represents one suitable embodiment of the invention, Fig. 1 is a longitudinal sectional elevation through the reel axis. Fig. 2 is a plan corresponding to Fig. 1 and showing the connection of the hot air conduits. Fig. 3 is a cross section on the line 3—3, Fig. 1. Fig. 4 is a detail sectional elevation on the line 4—4, Fig. 1. Like reference characters refer to the parts in all four figures.

While the reel forming the subject matter of the present invention is adapted for use in or in connection with the treating of any thread-like article, wet or dry, and may, among other things, be employed in connection with any of the various processes of making or treating artificial silk thread, it has for purposes of illustration been shown in the drawing in the manner in which it is used in connection with and as a part of an organized machine for the continuous processing of multiple filament artificial silk thread by the viscose process, a machine which is more fully described, shown and claimed in a copending application, filed of even date herewith, by Walter F. Knebusch and Alden H. Burkholder, for "Manufacture of artificial silk", Serial No. 7,114, to which reference may be had for a more complete description of the entire machine, if desired.

Since the invention relates particularly to the means for supplying the treating medium to the thread or the like, the form of the reel itself is not controlling. It may be any form of thread-storage, thread-advancing reel, that is, any reel which continuously receives thread or the like, forms it into a plurality of helical turns which are advanced along said reel as it rotates, and permits the thread or the like to be continuously discharged from the reel by the same motion or operation which winds it. For convenience in illustration the reel has been shown as of the same form shown, described and claimed in an application for "Thread treating apparatus", filed of even date herewith by Walter F. Knebusch, Serial No. 7,116, to which reference may be had for a more complete description, if desired.

As shown in the drawing, 1 represents a suitable gear casing of hollow form designed to enclose the gears for driving a plurality, say five, of reels. In said casing is journalled a driving or operating shaft 2 which, at intervals along its length, is provided with spiral gears 3, one for each reel, each of said spiral gears meshing with and driving a spiral gear 4 rotatable loosely upon a hollow shaft 5. The spiral gear 4 is capable of being brought into driving connection with said shaft by operation of a clutch indicated generally at 6, the movable clutch member being operated in any suitable manner, as by a lever 7. Shaft 5 is journalled in opposite walls of the gear casing, projecting from one side thereof, where its projecting portion both supports and drives the thread-storage thread-advancing reel now to be described.

The reel includes a concentric reel member 8, shown as of generally cylindrical form, having a hollow body 9 provided with a hub 10 within which is a sleeve 11 keyed or otherwise secured to rotate with the shaft 5. The inner end of the chamber 12 of the body is closed by the hub 10, its outer end being closed in any suitable manner, as by a disk like cap 13 held in place by a cap

screw 14 threaded into the end of the shaft 5. The latter is provided with a plurality, four being shown, of ports or openings 15 providing communication from the channel within the shaft to the chamber 12.

The outer cylindrical body portion 3 of the concentric reel member is provided with a series of longitudinally extending slots or recesses 16 separated by bars 17. In the recesses 16 lie the bars 18 of a second or eccentric reel member. Said member comprises inner and outer ring-like members 19, 20, respectively externally and internally tapered and secured together by screws 21 which, when screwed up to the home position, securely clamp between the inner and outer rings the bars 18. Inner member 19 is provided with a central sleeve 22 journalled upon a tubular member 23 suitably attached, as by the set screw 24, to a supporting member 25 adjustably mounted in proper position upon the front wall of the gear casing 1.

The concentric reel member 3 is so called because it is generally cylindrical in form and is mounted upon the shaft 5 in such position that the axis of said concentric reel member coincides with the axis of shaft 5. It is therefore symmetrical with said axis and rotates upon both its own axis and that of the shaft. The eccentric reel member is so called because, while it is also of generally cylindrical form, the axis of its cylinder is concentric with the axis of member 23, which is so mounted in fixed position upon the gear casing that its axis is both slightly offset from and slightly askew or inclined with relation to the axis of shaft 5.

Each of the concentric and eccentric reel members described is rigid in the sense that all of its parts are fixed and immovable with reference to the axis about which it rotates during reel operation.

In this reel, rotation of the shaft 5, by the gearing and through the clutch aforesaid, drives the concentric reel member, which, through bars 17, 18, drives the eccentric reel member, so that both turn. The offset and askew relation of the axes of the two reel members causes the thread or the like led to the reel to be wound upon it as a series of spaced helical turns which progress bodily endwise along the reel to its discharge end. The reel, of course, is rotated in that direction which causes the turns of thread or the like to advance along the reel away from that end where it is driven, or toward the left in Fig. 1.

As described, the reel as a whole is open ended in the sense that it is both supported and driven from one end only, namely, the end from which shaft 5 is driven.

Any suitable treating medium may be conducted to the thread or the like to be treated for moistening, softening or heating purposes, for drying or the like, or for chemical treatment. In no sense of limitation, but solely for purposes of illustration, the drawing shows an arrangement for supplying hot air for drying purposes. The mechanism includes a suitable source of hot air, such as a chamber 26 provided with heating means, such as an electric heater or the steam coils 27 shown, over which air is passed by any suitable means, such as the pump or blower 28. The heated air is distributed by conduits 29 to all reels to be heated, at each of which the supply conduits terminate in a non-rotatable connecting member 30 which either enters or surrounds and closely fits the shaft 5.

Air thus delivered to the channel 31 in the shaft passes to the chamber 12 through the ports 15 and thence radially outwardly through a series of small ports or openings 32 distributed along the length of the bottoms of the recesses 16. These radial ports or openings are distributed over the entire length and circumference of the reel and are of relatively small size so that drying air passes outwardly through each of them and is thus delivered in a stream across the turns of thread or the like progressing along the cylindrical periphery of the reel as a whole.

Of course, the same source of treating medium may be used in parallel for supplying any number of reels.

With this arrangement the reel as a whole may be of the same general form used for the wet treatment of thread or the like, as described more fully in said application of Walter F. Knebusch and Alden H. Burkholder, and therefore may be in relatively small and compact form, nevertheless any suitable treating medium, such as hot air or any other gas, or a liquid, may be delivered through the rotating drive shaft directly into the interior of the reel itself for distribution over the thread or the like traveling on the reel for treating the same. By reversing the connections to pump 28, of course, the fluid may be caused to flow in the opposite direction, to wit, past the thread or the like, through openings 32 and through channel 31 to the pump. The construction is simple, affords ready access to chamber 12 for cleaning or repairs, and is efficient in operation.

It is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty reside in the invention.

What I claim is:

1. Reel mechanism comprising a projecting shaft; a unitary thread-storage, thread-advancing reel of cantilever form mounted on said projecting shaft, said thread-storage, thread-advancing reel embodying driving and driven reel members; a chambered body adapted to rotate with said reel; means closing the ends of said chambered body; and means for admitting fluid to the interior of said chambered body.

2. Reel mechanism comprising a generally cylindrical thread-storage, thread-advancing reel of cantilever form; means for supporting said reel from one end thereof only, the other end of the reel being unobstructed; a chamber disposed within said reel having a closed end adjacent the unobstructed end thereof; and means for admitting fluid to said chamber from the supported end of said reel.

3. Reel mechanism comprising a rotatable set of spaced bar members; a second rotatable set of spaced bar members alternating with the bar members of the first mentioned set; a body containing a chamber having closed ends disposed within and adapted to rotate with one of said sets of bar members; openings in said body connecting said chamber with the spaces between the bar members of the set in which said body is disposed; and means for admitting fluid to said chamber.

4. Apparatus for treating thread or the like comprising a frame; a rotatable shaft journalled in said frame; a first generally cylindrical set of rigidly mounted, spaced bar members adapted to rotate with said shaft; a second generally cylindrical set of rigidly mounted bar members alternating with the bar members of said first set, said first and second sets of bar members defining a structure having one end unobstructed; means

closing the outer end of said first set of bar members; means for rotatably mounting said second set of bar members on said frame in offset and inclined relation to said first set of bar members; and means for admitting a treating medium through said shaft to the interior of the structure defined by said sets of bar members.

5. Apparatus for treating thread or the like comprising a frame; a rotatable shaft journalled in said frame; a rigid set of spaced bar members mounted for rotation with said shaft; a second rigid set of bar members alternating with the bar members of said first set, said first and second sets of bar members defining a structure having one end unobstructed; means for rotatably mounting said second set of bar members on said frame in offset and inclined relation to said first set of bar members; a chambered body mounted within the perphery of said first set of bar members for rotation therewith; and means for admitting a treating medium to the interior of said chambered body.

6. Reel mechanism comprising a unitary thread-storage, thread-advancing reel supported and driven from one end only, the other end of said reel being unobstructed; means closing the unobstructed end of said reel; and means supplying a treating medium to the interior of said reel from the end from which it is driven.

7. Reel mechanism comprising a rotatable shaft; a first generally cylindrical set of bar members adapted to rotate with said shaft; a second generally cylindrical set of bar members alternating with the bar members of said first set, said first and second sets of bar members defining a structure having one end unobstructed; means closing the outer end of said first set of bar members; and means supplying a treating medium to the interior of the structure defined by said sets of bar members.

8. Reel mechanism comprising a rotatable shaft; a first cage member mounted concentrically of said shaft; a second cage member mounted eccentrically of said shaft, said first and second cage members cooperating to define a structure having one end unobstructed; means closing the outer end of one of said cage members; and means supplying a treating medium to the interior of the structure defined by said cage members.

CLARENCE C. WALTERS.