Nov. 20, 1928. 1,692,498

W. S. GATES

DRYING APPARATUS

Filed Dec. 7, 1925. 2 Sheets-Sheet 1

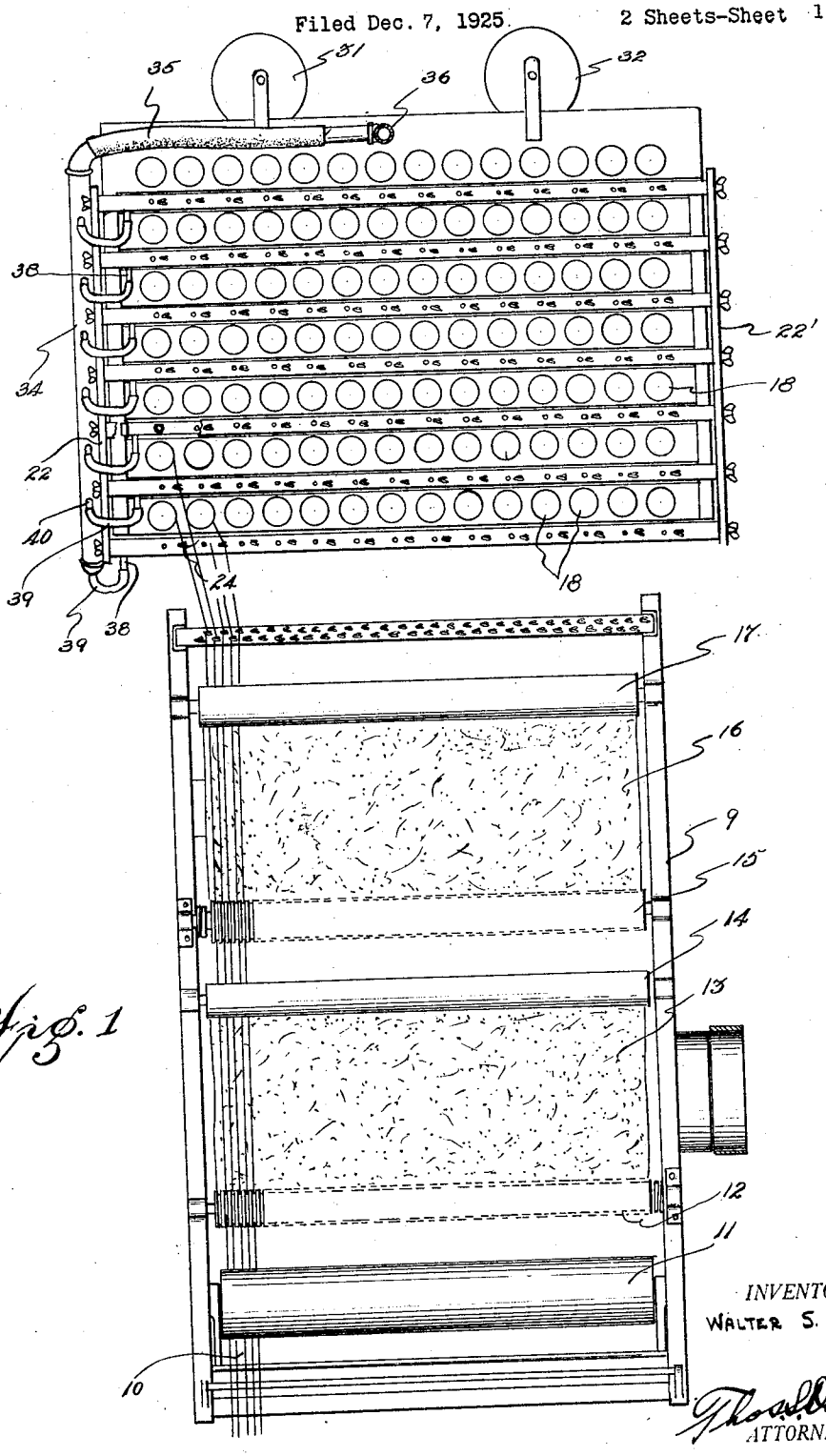


Fig. 1

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Fig. 2

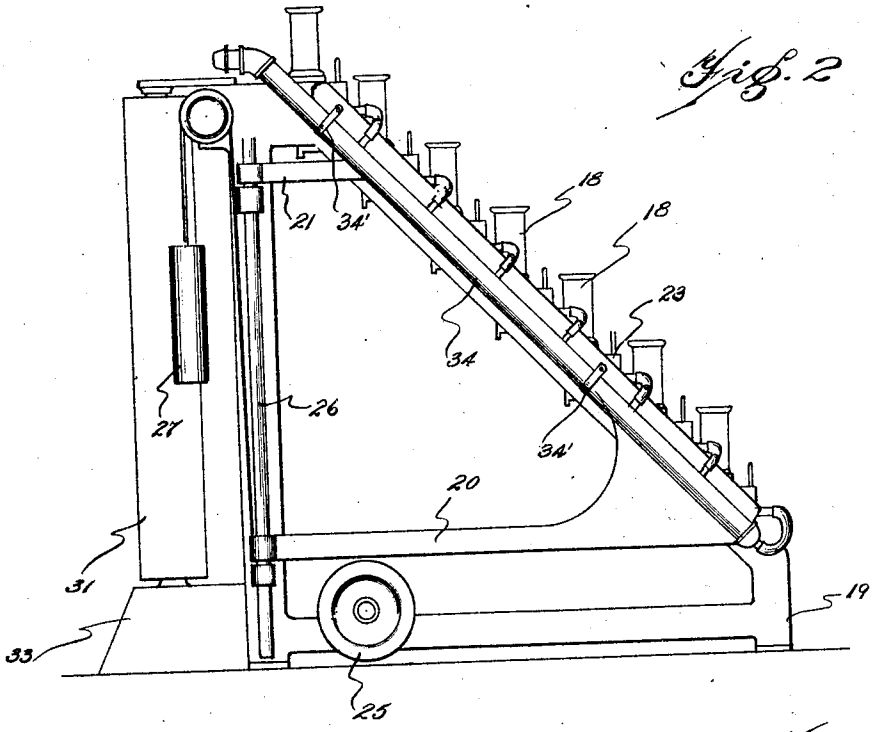


Fig. 4

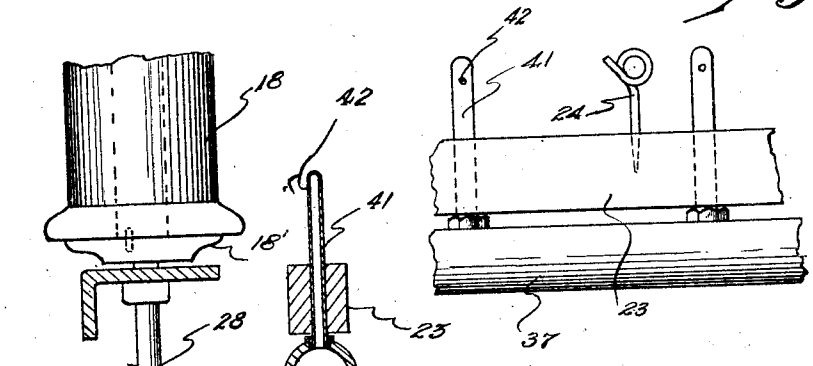
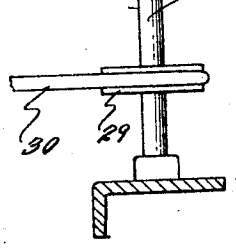


Fig. 3



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UNITED STATES PATENT OFFICE.

WALTER S. GATES, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL CABLE CORPORATION, A CORPORATION OF NEW JERSEY.

DRYING APPARATUS.

Application filed December 7, 1925. Serial No. 73,681.

My invention relates to a drying apparatus useful in effecting a drying of thread, yarn and the like, and particularly adapted for use for effecting the drying of thread, yarn and the like after it has gone through the glazing or dressing process.

In the manufacture of thread, yarn and the like it is customary to put it through either a glazing or a dressing process for purposes well known to the trade. The thread in passing through this glazing or dressing process becomes moistened and it is desirable that the moisture be removed to a certain degree preliminary to the winding of the thread, yarn or the like into that form in which it is sold commercially.

In the present application I have shown the invention used in connection with the manufacture of thread. The application and use of the invention however will be the same in the manufacture of yarn, twine or other similar material, as will appear from the description set out herein.

In passing the thread through the glazing or dressing process it is carried from a creel to a dresser which usually embodies a size box or reservoir containing the dressing or glazing material. After passing from the reservoir or size box it is brought into contact with squeezing rolls and a series of brushes at a suitable temperature. These brushes or other cleaning and polishing and drying agents are of various numbers depending upon the type of machine with which used and in the drawings I have shown a two-brush dresser. The brushes serve to remove from the surface of the thread the excess dressing or glazing material adhering thereto and also serve to lay the projecting fibers and to polish the thread and to wipe it dry so as to remove to a certain extent the moisture therefrom. From the dresser the thread goes to the take-up frame where in the case of thread it is wound upon spools.

Experience has shown that when the thread passes above certain speeds the dresser does not remove a sufficient amount of moisture from it and that after being wound upon the spool this excess moisture which still remains in the thread is a detriment to the life and appearance of the thread, and its presence is undesirable for obvious commercial reasons. It has been proven from experience that the center of the thread no matter how small it may be, will under certain circumstances when passing from the dresser contain an excessive moisture core even when the outside surface feels sufficiently dry and that after winding upon the spool this moisture escapes to the outer surface of the thread causing the disadvantages mentioned.

The present invention is intended to provide means for removing from the thread this excess moisture which is contained at the central axis of the thread and it is an object of the present invention to provide means which will obviate the objectionable features noted and to increase the speed of production or to avoid retarding the speed of production.

It is another object of the present invention to provide a mechanism for changing the atmosphere surrounding the thread so as to assist evaporation and permit the drying of the core of the thread to the extent desired.

In this industry with the machines as now used it is difficult to gauge the amount of work to be produced by a machine as the machine cannot be run at the same rate of speed regardless of the atmospheric conditions. When the atmosphere is excessively humid the machine must be slowed up in order to permit a longer period of travel from the reservoir or size box to the spool upon which it is wound in order that the proper amount of evaporation may take place. Since the speed of the machine is dependent to a certain extent upon the humidity of the atmosphere the speed at which the machine may be run may vary at different periods of the day. The speed of the machine is also on account of the reasons mentioned dependent to a certain extent upon the temperature as well as humidity of the room in which the work is being carried on and at the locations where the thread is passing.

The present invention has a further object the increasing of the efficiency of the present machines in the industry and the

lessening to a large extent of the dependence of the speed of the machine upon atmospheric conditions and the temperature in which the process is carried out.

It is another object of the present invention to remove from around the thread saturated atmosphere and bring into contact with the material less humid atmosphere for the purpose of assisting evaporation.

It is another object of the invention to provide means for directing a flow of air upon the thread when passing to the take-up machine.

Other objects will appear hereinafter.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood from a reference to the accompanying drawings, which form a part of the specification and in which,

Fig. 1 is a top plan view of a dresser and take-up machine with which the invention is used.

Fig. 2 is a side elevational view of the take-up machine showing the invention applied.

Fig. 3 is a sectional view taken on substantially line 3—3 of Fig. 1.

Fig. 4 is a fragmentary view taken on substantially line 4—4 of Fig. 1.

There is illustrated in Fig. 1 a dresser comprising a frame 9 upon which is mounted a size box 10 and rollers 11 between which the thread 11′ passes. This thread then passes over the roller 12 and over the brush 13, thence under the roller 14 and over 15 over the brush 16 and under the roller 17 through spacing hooks and to the take-up stand upon which are mounted a plurality of spools 18. The mechanism is of a well known type and the brushes as well as rollers 11 are rotated in the well known manner. The take-up for the dresser is constructed in a well known manner and comprises a supporting frame 19 upon which at opposite sides is mounted the vertical reciprocating frame having horizontally extending arms 20 and 21 which project outwardly from the diagonally extending rail 22.

In Fig. 1 the diagonally extending rail 22′ is shown at the opposite side of the take-up for the dresser. Connecting these rails 22 and 22′ are guide bars 23 projecting upwardly from each of which at spaced intervals are guide hooks 24 through which the thread or yarn is passed in its travel from the dresser to the spools 18. Suitable mechanism is provided for rotating the spools 18 in counterclockwise direction and inasmuch as this mechanism forms no part of the present invention and is well known in the art its detail structure is not shown.

As shown in Fig. 2 a gear wheel 25 is suitably driven for effecting the reciprocation of these rails 22 and 22′—the arms 20 and 21 sliding vertically upwardly and downwardly with the guide post 26—counter-weights 27 assisting to steady these rails in this movement.

As shown in Fig. 3 a spindle 28 which carries the whirl 29 is suitably driven by the belt 30 for effecting a rotation of the partially filled spool 18, which rests on collar 18′. Belt drums 31 and 32 connect in the housing 33 with suitable mechanisms for effecting the desired operation. Extending preferably parallel to the diagonally extending rail 22 and suitably connected thereto by hangers 34′ is a header 34 which connects by means of the flexible pipe or hose 35 and the pipe 36 to a suitable source of compressed air. This air may be preheated or not as desired. Positioned beneath the guide bars 23 and supported in any suitable manner so as to move in unison with these guide bars 23 are auxiliary headers 37. Means are provided for controlling the amount of air and its pressure as it comes to the machine.

As shown in Fig. 1 the lowermost auxiliary header 37 is connected by a suitable nipple 38 and the flexible coupling 39 to the end of the header 34. Each of the auxiliary headers 37 positioned under the other guide bars 23 is connected by means of nipples 38 and 40 and the flexible connection to the header 34. These guide bars move vertically for effecting a distribution of the thread or yarn which is passing through the guide hooks 34 onto the rotating spools 18 and it is apparent that since the auxiliary headers 37 move in unison with the guide bars 23 these auxiliary headers 37 reciprocate vertically relatively to the spools 18.

Communicating with each of the auxiliary headers 37 and projecting upwardly therefrom through the guide bars 23 are nozzles 41, each of which is provided adjacent its upper end with an opening 42 preferably faced in the direction of the spools 18.

All the air carrying parts are preferably designed to give approximately uniform dryness of the thread opposite each opening by the use of certain sized openings at certain locations although regulation could be arranged for at the nozzles only or at the auxiliary headers. It will be noted from the drawings that the thread traveling to the upper layers of spools travels through the atmosphere a greater distance than the thread traveling to the lower layer of spools so that the thread wound on the upper layer of spools has more opportunity to dry than the thread traveling to the lower layers of spools. The openings 42 in the nozzles for the lower layers of spools are larger than the openings 42 for the nozzles directed toward the upper layers of spools.

The construction is such that as the thread which is passing through the guide hooks

34 is being wound upon the spools 18 and the compressed air is forced through the headers 34 and the auxiliary headers 37 a small jet of air will be playing upon the thread wound upon the spool and if desired upon the strand of thread being wound upon the spool so that the evaporation of the moisture in the threading is assisted and hastened. It is evident that the atmosphere surrounding the spools and the thread wound thereon is continuously renewed so that the surrounding of the spools with a saturated atmosphere is prevented so long as the air issuing from the nozzles 41 is not of a saturated nature.

With a device of this kind the advantages enumerated above are obtained and the machine under ordinary conditions is permitted to operate at a constant speed. Of course the temperature of the room in which the work is being done, the humidity of the atmosphere in the room still has some effect upon the speed with which the machine may be operated but this can be controlled easily by properly treating the air issuing from the nozzles 41.

It is believed obvious that instead of blowing a current of air upon the thread the action may be reversed and the nozzles used for drawing from around the spools the air so that the atmosphere surrounding the thread on the spools is being continuously changed. The preferred form however is as already described and as illustrated.

With the invention applied to a machine as shown and operated as described the gloss and polish of the material will be preserved as well as the outside dryness so that an improvement in the appearance of the material generally is effected at the same time operating at desired speeds.

In the specification and in the claims it is understood where the word thread is used that this is synonymous with thread, yarn, twine or other suitable material with which the invention may be used. It is also to be noted that the words "in the glazing or dressing process" have been used, and in this connection I wish it understood that by this phrase I mean at any step in the operation, so that the material may be operated upon at any point between the size box and the take-up stand, or after it has reached the take-up stand.

While I have illustrated and described the preferred form of constuction I do not wish to limit myself to the precise forms of construction shown but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A device of the class described adapted for effecting the drying of a plurality of threads consisting of a header having a plurality of emitting outlets each adapted for emitting a current of air directed against one of said threads.

2. A device of the class described adapted for use in drying a plurality of threads comprising a header, and a plurality of nozzles on said header each adapted for directing a jet of air against one of said threads.

3. A device of the class described adapted for use with a take-up machine as described having a plurality of vertically movable guide bars, comprising: a header communicating with a source of air supply; and means movable in unison with said guide bars for conducting a flow of air from said header in a predetermined location.

4. A device of the class described adapted for use with a take-up machine as described having a plurality of vertically movable guide bars, comprising: a header communicating with a suitable source of air supply, conduits communicating with said header and extending parallel to and movable in unison with said guide bars; and a plurality of means on each of said conduits for conducting a current of air from said conduits at a predetermined location and in a predetermined direction.

5. A device of the class described adapted for use with a take-up machine as described having a plurality of vertically movable guide bars comprising, a diagonally extending header communicating with a suitable source of air supply; a plurality of conduits each positioned parallel to and movable in unison with one of said guide bars; flexible means for connecting each of said conduits in communication with said header; and nozzles communicating with each of said conduits and projecting above said guide bars, each of said nozzles being provided with an emission orifice at one side adapted for directing a current of air against a thread, said header and said conduits being movable vertically in unison with said guide bars.

6. A drying apparatus of the class described adapted for use with a take-up machine having a plurality of vertically movable guide bars and a plurality of winding means each adapted for winding thread comprising: a header connected with a suitable source of air supply; and a plurality of means communicating with said header for directing a current of air against each of said winding means for effecting a drying of the thread being wound thereon.

7. A drying apparatus of the class described adapted for use with a take-up machine having a plurality of winding means and a plurality of vertically reciprocating guide bars comprising: a vertically movable header; flexible means for connecting said

header to a suitable source of air supply; a plurality of conduits one positioned parallel to and adjacent each of said guide bars; means for connecting each of said conduits in communication with said header; and a plurality of nozzles communicating with each of said conduits and projecting vertically upwardly therefrom, each being provided with an orifice at one side for directing a current of air against and around each of said winding means.

In testimony whereof, I have signed the foregoing.

WALTER S. GATES.