May 9, 1939. W. H. WILSON 2,157,975

HUMIDIFYING APPARATUS FOR THE TREATMENT OF WOOL YARN

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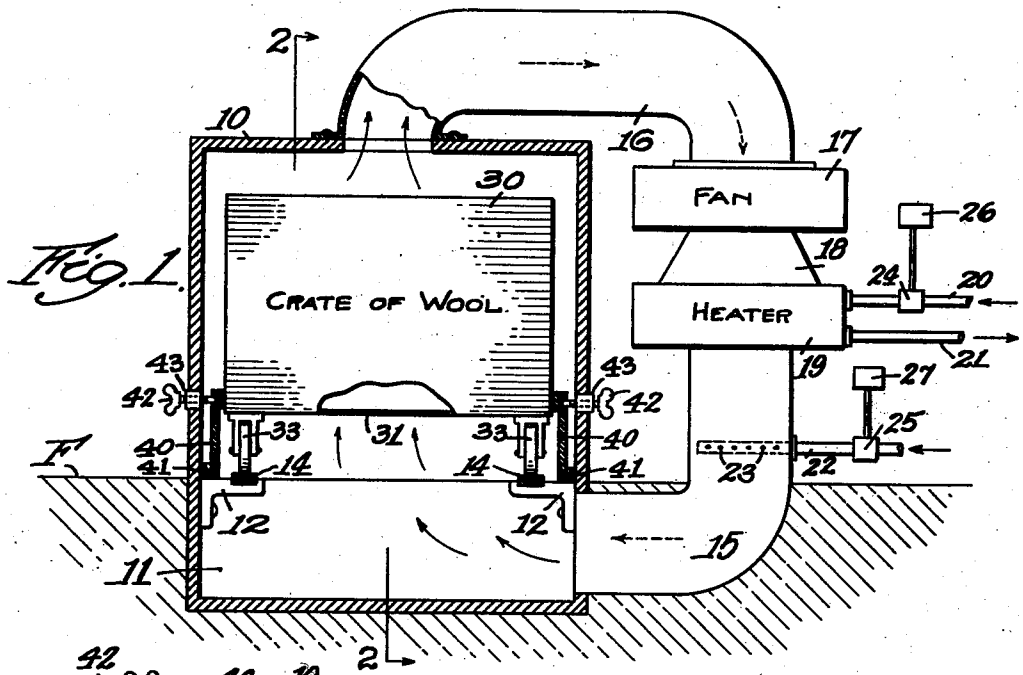


Fig. 1.

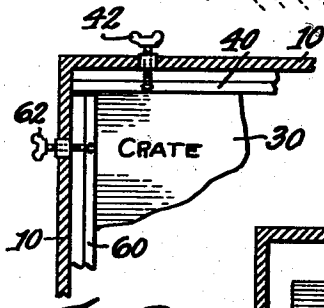


Fig. 3.

Fig. 2.

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HUMIDIFYING APPARATUS FOR THE TREATMENT OF WOOL YARN

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1 Claim. (Cl. 68—5)

This invention relates particularly to the treatment of wool and worsted yarn. After such yarn is spun and twisted, it is necessary to set the twist, which is usually accomplished by subjecting the twisted yarn to a humidifying or steaming operation.

It has been the common practice to place the yarn in a closed chamber and to then inject steam into the chamber. Eventually the steam would penetrate the yarn packages, but the process was very slow and the yarn was not uniformly treated. Neither could the temperature nor the degree of humidity used in the process be satisfactorily controlled.

It is the general object of my invention to provide improved apparatus for setting the twist in wool or worsted yarn, which apparatus preferably includes means for controlling both the temperature and the humidity, and also includes means for effecting a d nite circulation of the humidified air and for directing the air through the yarn packages.

A further object of the invention is to provide an improved method of setting the twist in wool or worsted yarn.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claim.

Apparatus embodying my invention and suitable for carrying out my improved process is shown in the drawing, in which

Fig. 1 is a side elevation, partly in section, of my improved apparatus;

Fig. 2 is a sectional end elevation, taken along the line 2—2 of Fig. 1; and

Fig. 3 is a detail sectional plan view, taken along the line 3—3 in Fig. 2.

Referring to the drawing, I have shown a humidifying chamber 10 which may desirably be formed of inner and outer walls of sheet metal, separated by heat-insulating material. The chamber 10 is preferably so located that its lower portion 11 is below the floor level F. Angle irons or brackets 12 are secured to opposite sides of the chamber 10 and support grooved rails 14 extending lengthwise of the chamber at the floor level.

An air duct 15 of substantial capacity enters the lower portion 11 of the chamber 10, and a second air duct 16 connects the upper portion of the chamber 10 to a fan 17. The fan 17 is joined by a connection 18 to an indirect air heater 19, to the lower portion of which the air duct 15 is in turn connected.

Inlet and outlet steam pipes 20 and 21 are provided for the heater 19, and a steam pipe 22 extends into the air duct 15 and is provided with perforations 23 within the air duct. Valves 24 and 25 control the flow of steam through the pipes 20 and 22.

When the apparatus is in use, heated and humidified air is forced down through the duct 15 to the lower portion 11 of the chamber 10. The cooler and drier air is removed from the upper portion of the chamber 10 through the air duct 16 by the fan 17, and is warmed by the heater 19 and humidified by the injection of additional steam through the pipe 22 before the air is returned to the chamber 10.

The temperature and degree of humidity may be controlled by suitable hand adjustment of the valves 24 and 25. These valves may also be automatically controlled by regulating devices commonly used for such purposes and which are indicated diagrammatically at 26 and 27.

The yarn packages to be treated are placed in an open crate or carriage 30 having a perforated bottom 31. This crate 30 is preferably mounted on wheels or rolls 33, adapted to run in the grooved rails 14 and to be guided thereby.

It is desired that all of the heated and humidified air should be forced to travel upward through the perforated bottom 31 of the crate, rather than around the outside of the crate, and accordingly I provide means for sealing the crate 30 in the chamber 10.

Baffle boards 40 are mounted on hinge strips 41 at each side of the chamber and are provided with a plurality of adjusting screws 42 threaded in bushings 43 set into the side walls of the chamber. After the crate 30 is in position, the screws 42 may be turned to force the offset upper edge portions of the baffle plates 40 against the sides of the crate 30.

The open end of the chamber may be closed by a door 50 (Fig. 2), hinged at 51 and secured in closed position in any convenient manner, as by clamping bolts 52. A sealing strip 54 may be provided on the inside of the door 50, which strip will be substantially equal in length to the width of the crate 30. A third baffle plate 60 may be mounted on a hinge strip 61 at the inner end of the chamber 10, and may be adjusted against the inner end of the crate 30 by one or more clamping screws 62. The plate 60 is of a length substantially equal to the width of the crate 30, so that it may swing between the ends of the side baffle plates 40, as indicated in Fig. 3.

While the sealing means shown and described is satisfactory for its intended purpose, it will

be understood that other suitable arrangements may be made for preventing circulation around the sides of the crate. It will also be understood that the chamber 10 may be made of increased size, so that yarn packages in a plurality of crates may be treated at the same time.

The method of using my improved humidifying apparatus in the treatment of yarn will be readily understood. After the wool or worsted yarn is spun and twisted, packages of the yarn are placed in the crate 30. The crate is then rolled into the chamber 10, which is thereafter closed, and the baffle plates are adjusted. The fan 17 is then started, and the valves 24 and 25 are adjusted so that a stream of heated and humidified air is forced into the lower portion of the casing and is made to pass upward through the crate 30 and out of the top of the casing. This partially cooled and dried air is then supplied with additional heat in the heater 19 and is brought up to the desired degree of humidity by the injection of additional steam through the pipe 22, after which the air is returned to the chamber 10 for further utility.

By the use of this improved method and apparatus, the moisture very quickly penetrates to the very center of each yarn package, the yarn is uniformly humidified, and the twist in the yarn is effectively set throughout all of the yarn packages and throughout every portion of each package. Furthermore, the time of the operation is very greatly reduced.

It has been found by actual test that the cost of yarn treatment by my improved method and apparatus is only about one-fourth of the cost under the old method of injecting live steam into a closed chamber.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claim, but what I claim is:

Humidifying apparatus for setting twist in wool yarn which comprises a chamber, means to support a crate of yarn packages therein, said crate having a perforated bottom, means to supply heated and humidified air to the lower part of said chamber, a fan to remove said air from the top of said chamber, sealing means to guide said air upward through said crate only, and means to reheat and rehumidify said air, said sealing means forming a barrier between the lower part of said chamber into which heated and humidified air is delivered and the upper part of said chamber from which said air is withdrawn for recirculation.

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