

Nov. 22, 1966

V. V. VORONIN ETAL

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Filed July 17, 1964

5 Sheets-Sheet 1

FIG. 1a

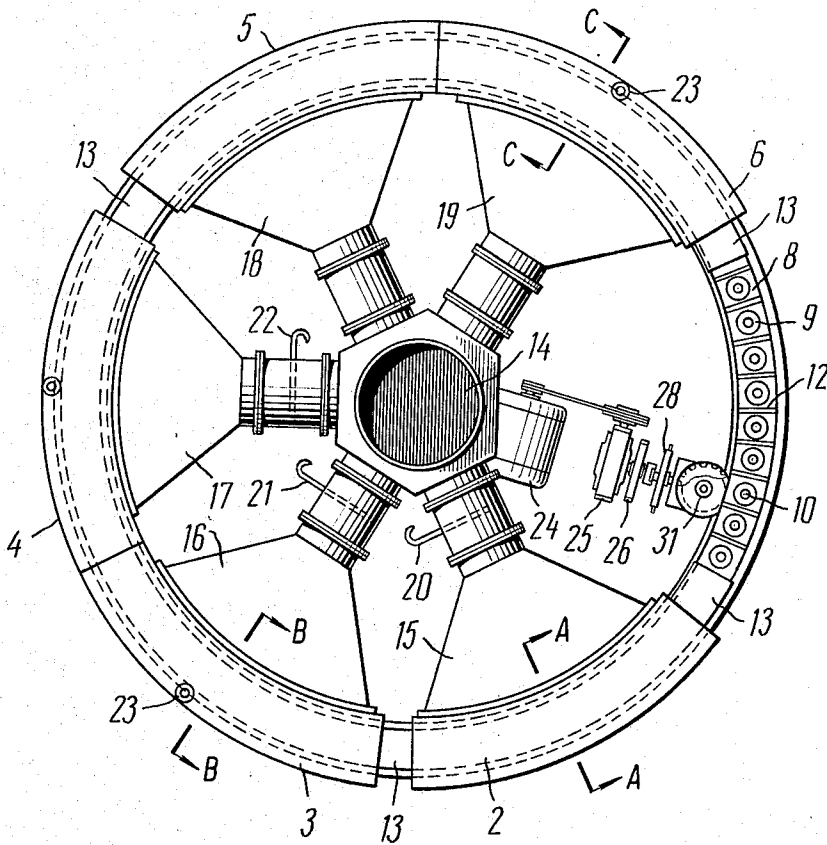
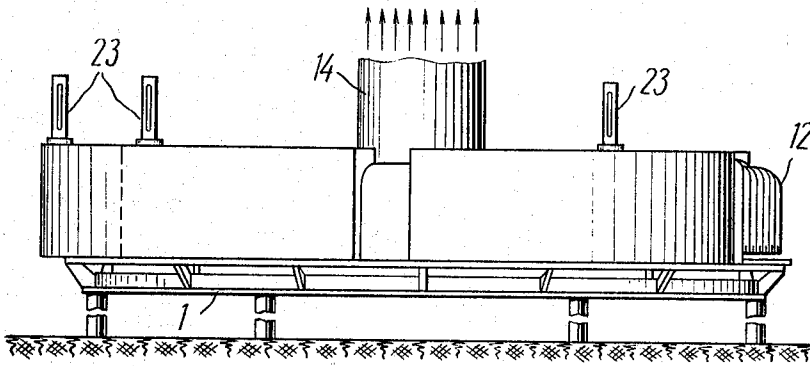


FIG. 1

Nov. 22, 1966 V. V. VORONIN ETAL

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Filed July 17, 1964

5 Sheets-Sheet 2

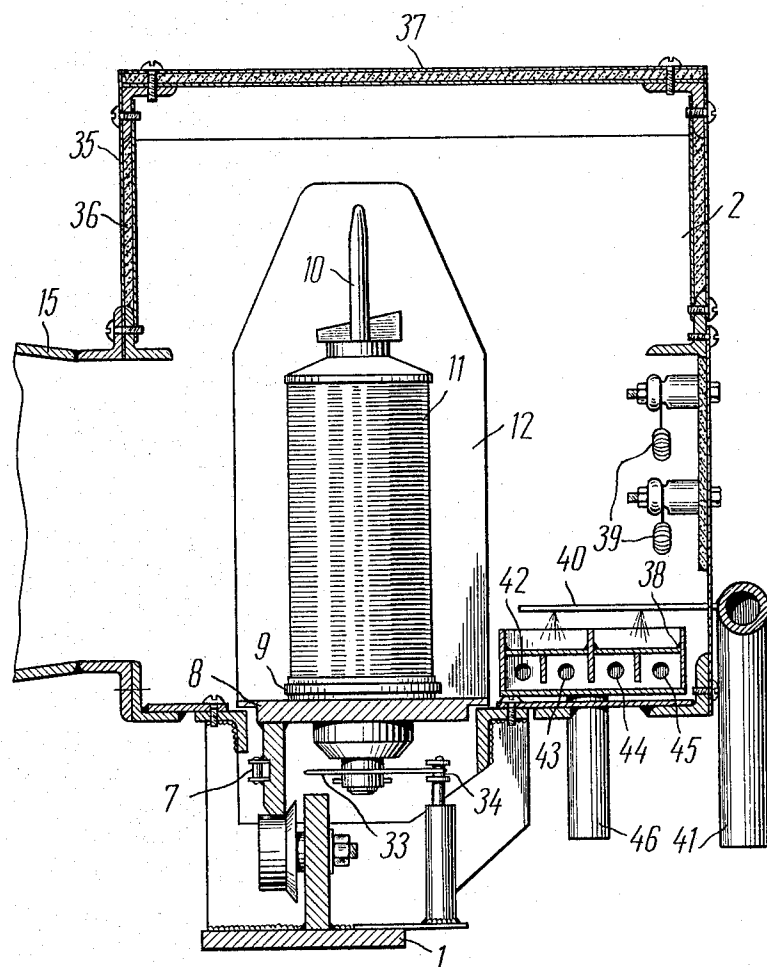


FIG. 2

Nov. 22, 1966

V. V. VORONIN ETAL

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Filed July 17, 1964

5 Sheets-Sheet 3

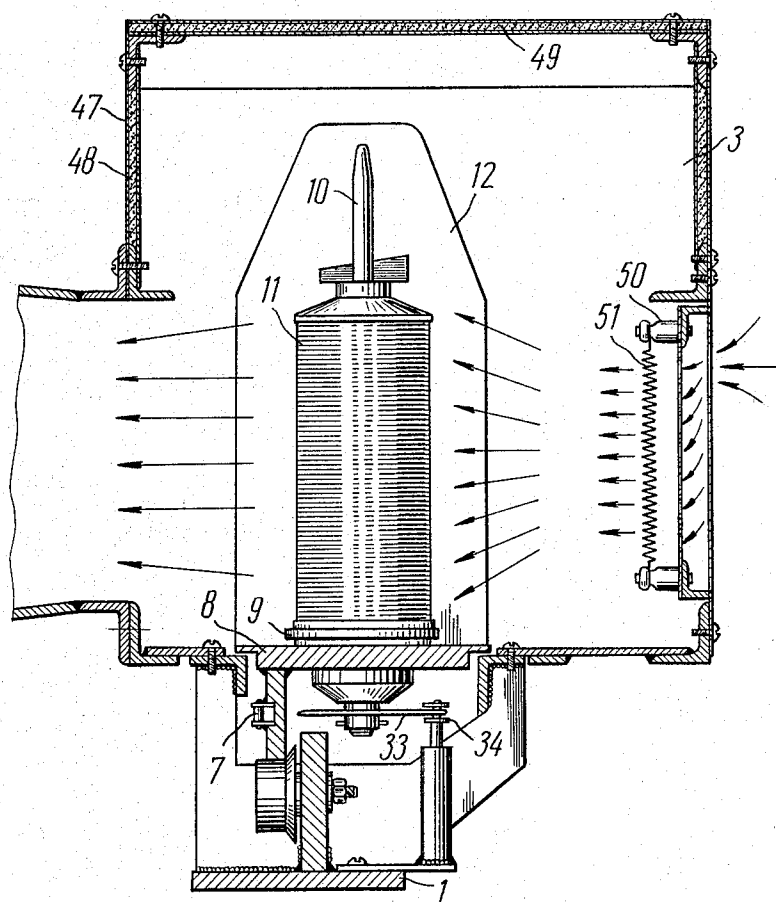


FIG. 3

Nov. 22, 1966

V. V. VORONIN ETAL

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Filed July 17, 1964

5 Sheets-Sheet 4

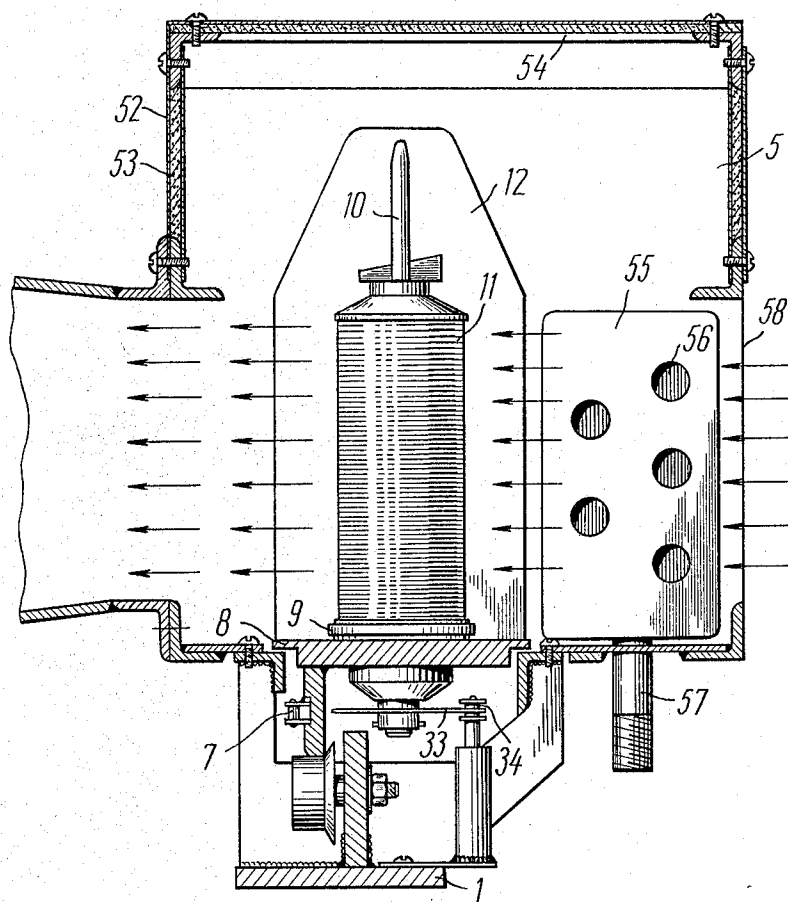


FIG. 4

Nov. 22, 1966

V. V. VORONIN ETAL

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Filed July 17, 1964

5 Sheets-Sheet 5

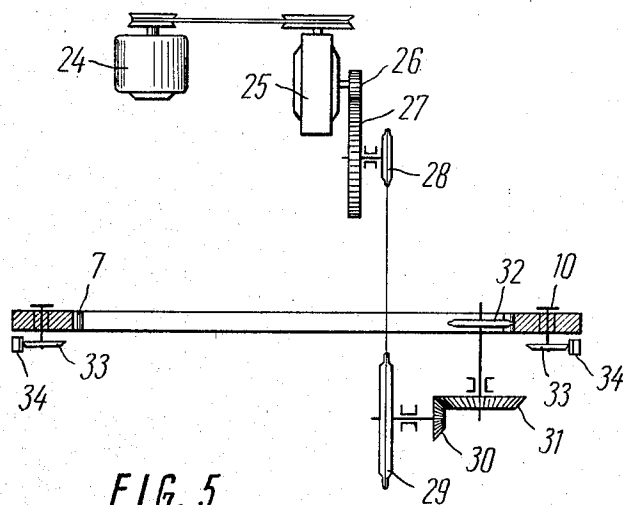


FIG 6a

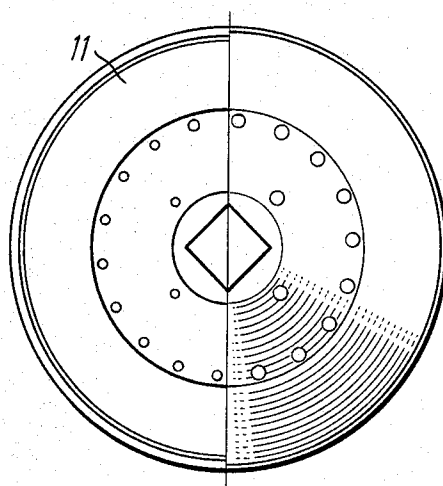


FIG. 6

1

3,286,320

UNIT FOR THE HEAT TREATMENT OF YARN WOUND ON BOBBINS

Vasily Vasiljevich Voronin, Konstantin Vasiljevich Panov, Vasily Nikiforovich Mikhailik, Igor Alexandrovich Kokolevsky, Dmitry Trofimovich Pekov, Sergei Nickolaevich Fedorov, Petr Dmitrievich Zorin, Victor Nikiforovich Solomin, and Vasily Vasiljevich Pomolotov, all of Moscow, U.S.S.R., assignors to Kruzhevnaja Gardinno-Tulevaja Fabrika im. E. Teljmana
Filed July 17, 1964, Ser. No. 383,445
3 Claims. (Cl. 28—58)

The present invention relates to bobbins for machines producing lace fabrics, and more particularly to units for the treatment of yarn wound on bobbins.

It is common practice to perform heat treatment of yarn on bobbins in machines producing lace fabrics by successive manual loading and unloading of the bobbins in the steaming, drying and cooling chambers. This process of treatment is time-consuming, and requires a large production area and considerable hand labor for loading and unloading the bobbins.

Moreover, during the above treatment the processing conditions in the chambers, i.e. temperature and humidity are unstable, which results in low quality of the processed yarn.

These drawbacks can be eliminated by means of a unit comprising steaming, drying and cooling chambers mounted on a common frame and connected with each other, a conveyor for transporting the bobbins through all the chambers, a pipeline for supplying air in each chamber and a conveyor drive formed as a horizontal endless chain with supporting platforms and disks, each disk having an aperture for the mounting of an axle and a bobbin, said disks being freely mounted to rotate about their axles, which permits the bobbins to be treated by the surrounding medium from all sides.

An object of the present invention is to ensure continuous processing of the bobbins.

Another object of the invention is to reduce the time required for the treatment.

An important further object of the invention is to improve the quality of produced yarn.

Still another object of the invention is to provide stable processing conditions.

In accordance with the aforementioned and other objects, the present invention is directed to an embodiment of a processing unit, modifications and variations of which may be made without departing from the spirit and scope of the invention.

For a better understanding of the invention an embodiment thereof will be described with reference to annexed drawings, wherein:

FIGURES 1 and 1a illustrate in plan elevation, respectively, the unit for heat treatment of yarn wound on bobbins for use in machines for producing lace fabrics;

FIG. 2 is a sectional view of a steaming chamber taken along line AA of FIG. 1;

FIG. 3 is a sectional view of a drying chamber taken along line BB of FIG. 1;

FIG. 4 is a sectional view of a cooling chamber taken along line CC of FIG. 1;

FIG. 5 diagrammatically illustrates the conveyor drive; FIGURES 6 and 6a illustrate in plan and elevation, respectively, the bobbin on which the yarn is wound.

On an annular frame 1 (FIG. 1) are mounted in sequence according to the intended operations, a steaming chamber 2, two drying chambers 3 and 4 and two cooling chambers 5 and 6.

For the feed of the bobbins there is provided a horizontal endless chain 7 mounted on frame 1 (FIG. 2),

2

said frame bearing supporting platforms 8 with disks 9, each having an opening for mounting an axle 10 with a previously set bobbin 11 as is shown in FIG. 6. Supporting platforms 8 are separated from each other by partitions 12. All chambers at the places of their communication with each other are connected by an additional casing 13 (FIG. 1) having the same shape as partitions 12, said casing together with said partitions providing good isolation between chambers.

Air supply to the chambers is provided by an air duct 14 arranged on the frame in the center of the unit and connected at one end with a fan (not shown in the drawing) and at the other end through branch pipes 15, 16, 17, 18 and 19 with chambers 2, 3, 4, 5, and 6. For the purpose of controlling air supply in the branch pipes there are provided slides 20, 21 and 22. Temperature control is effected by means of a thermometer 23 installed in each chamber. Chain 7 (FIG. 5) is driven from electric motor 24 through reducer 25, spur gears 26 and 27, chain transmission 28 and 29, bevel gears 30 and 31 and sprocket 32. The motion of chain 7 causes disks 9 (FIG. 2) to be turned by means of sprocket 33 and chain 34, mounted on frame 1. The disk rotation ensures processing of bobbins 11 from all sides.

Steaming chamber 2 is made of sheet member 35, between the sheets of which is placed a layer of insulating material 36. At the top of the chamber is provided a removable cover 37, and fixed to the interior surface of the chamber is exhaust pipe 15. The chamber is provided with an evaporator 38 and a heater 39. The evaporator is formed as a compartment extending through the whole chamber. Above the evaporator are disposed small pipes 40 from which water is supplied into the evaporator. These pipes are connected with pipe 41. Water is heated by electric coils 42, 43, 44 and 45. The excess water formed at the engagement and disengagement of the unit is discharged through pipe 46.

Drying chamber 3 (FIG. 3) is made of iron sheets 47 (FIG. 3) between which is placed heat insulating material 48. At the top of chamber 3 is a removable cover 49. Mounted on the side wall of the chamber are heat insulating rollers 50 supporting electric heating coil 51 in FIG. 3. The flow in chamber 3 is indicated by arrows.

Chamber 4 (FIG. 1) is similar in design to chamber 3. Cooling chamber 5 (FIG. 4) is made of iron sheets 52 between which is placed heat insulating material 53. At the top of chamber 5 is a removable cover 54. Through the whole length of the chamber runs a radiator composed of fins 55 and water tubes 56. The water is supplied from a pipe 57. The chamber is provided with an air vent 58 in FIG. 4. The direction of the air flow is shown by arrows.

Chamber 6 is similar in design to chamber 5.

The unit operates as follows.

In the course of a period of 20–25 minutes the following temperature conditions are established in the chambers:

- (a) 130 to 140° C. in steaming chamber 2,
- (b) 200 to 220° C. in drying chambers 3 and 4,
- (c) 25 to 35° C. in cooling chambers 5 and 6.

When these temperatures are reached, motor 24 (FIG. 5) is engaged and drives chain 7 through reducer 25, gears 26, 27, chain transmission 28, 29, bevel gears 30, 31 and sprocket 32.

Bobbins 11 are advanced through all the chambers together with chain 7 (FIGS. 1, 2), said bobbins having been previously mounted on axles 10 which in turn are mounted in disk 9 of supporting platform 8. The bobbins pass consecutively through steaming chamber 2, the two drying chambers 3 and 4 and two cooling chambers 5 and 6. In steaming chamber 2 the bobbins are humidified with steam for 7 minutes.

3

In drying chambers 3 and 4 the yarn is dried with heated air for 14 minutes.

In cooling chambers 5 and 6 the bobbins remain for 14 minutes.

The whole processing cycle is completed in 40 minutes.

When the bobbins come out of cooling chamber 6 they are removed from supporting platforms 8, and the latter are loaded with new bobbins, after which the whole cycle is repeated.

Thus the whole process of bobbin treatment is effected continuously in the unit.

What we claim is:

1. A unit for the heat treatment of yarn wound on bobbins for producing lace fabrics, comprising a frame, a steaming chamber, at least one drying and at least one cooling chamber, said chambers being interconnected in sequence and mounted on said frame; means arranged on said frame for transporting the bobbins through all the chambers and insuring a continuous processing of said bobbins; means mounted on said frame for interconnecting said chambers to permit passage of said bobbins while insuring isolation between said chambers; means mounted on said frame for supplying air to said chambers, and drive means for said means for transporting the bobbins through the chambers.

2. A unit for the heat treatment of yarn wound on bobbins for producing lace fabrics, comprising a frame, a steaming chamber, at least one drying and at least one cooling chamber, said chambers being interconnected in sequence and mounted on said frame; a horizontal end-

4

less chain mounted on said frame passing through all the chambers and adapted for transporting the bobbins; supporting platforms mounted on said chain each including a rotating disk with an opening for the installation of a bobbin; drive means for said chain supported on said frame; means mounted on the frame and coupled to said drive means for rotating said disks; means mounted on said frame for supplying air into said chambers, and means mounted on said frame for interconnecting the chambers to permit passage of said bobbins therebetween while insuring isolation of the chambers so that stable process conditions are maintained therein.

3. A unit as claimed in claim 2, comprising partitions arranged on said supporting platforms separating said platforms from each other; said means interconnecting the chambers comprising additional casings mounted on the frame and joining the chambers together, said casing having a shape similar to the shape of said partitions, said casing together with the partitions insuring the isolation of the chambers.

References Cited by the Examiner

UNITED STATES PATENTS

2,421,334	5/1947	Kline et al.	57—157
2,962,857	12/1960	Wood et al.	57—157

MERVIN STEIN, *Primary Examiner*.

DONALD W. PARKER, *Examiner*.

L. K. RIMRODT, *Assistant Examiner*.