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YARN HUMIDIFIER

Filed March 28, 1932

Fig. 1.

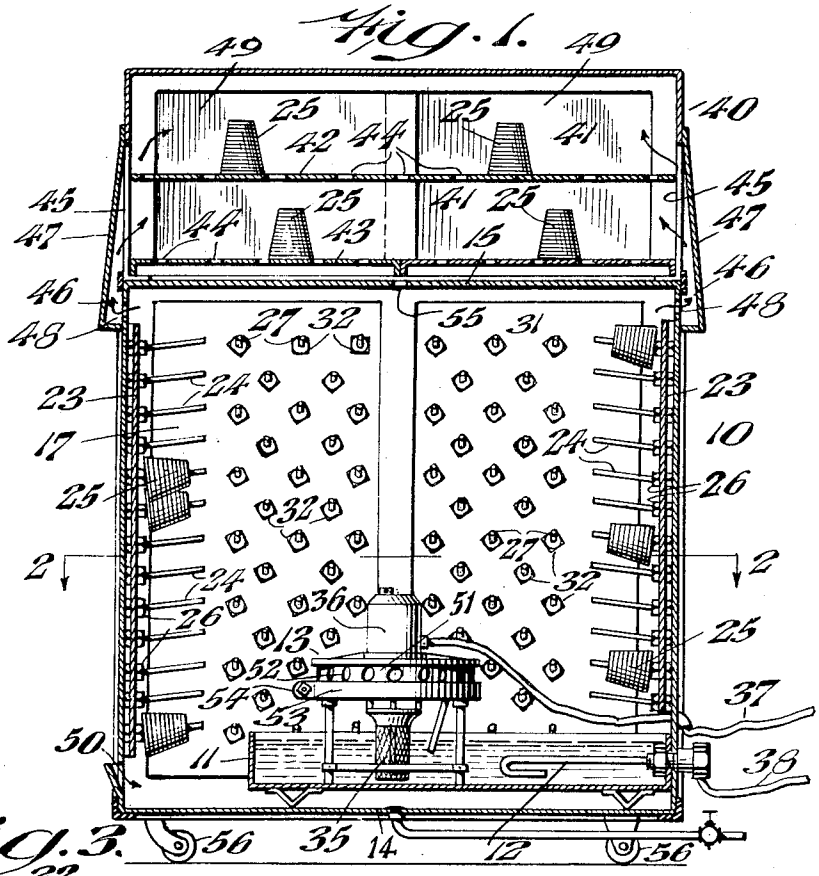


Fig. 3.

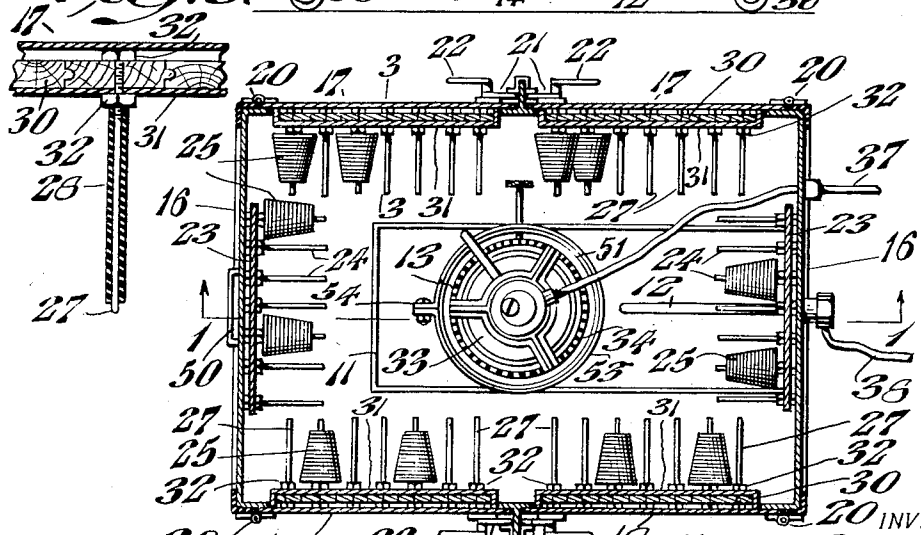


Fig. 2.

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YARN HUMIDIFIER

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2 Claims. (Cl. 28—58)

The present invention relates to the conditioning of yarn for knitting and other purposes and more particularly to an apparatus for heating, humidifying, and maintaining silk in the form of cones in a proper moistened condition ready for use.

In the fabrication of wearing apparel and other goods and particularly by the process of knitting it is essential that the twist of the yarn threads not only be maintained while feeding to the knitting machine but also all such threads should be uniform as to moisture. Failure to deliver properly twisted threads and properly moistened threads results in noticeable variations in the fabric and such variations become so apparent after dyeing of the fabric as to render the fabric defective and cause it to be thrown away or treated as seconds. As one means of moistening yarns and attempting to keep them in condition for delivery to a knitting machine, it has been proposed to utilize moistening boxes containing water and in which boxes the cones of yarn are placed and the respective threads from this yarn then led directly to the knitting machine. In the case of a full fashioned machine, due to its extreme length, it has been found necessary in order to obtain any practical results to equip such a machine with eight or ten of these boxes strung along the length of the machine and each box serving to supply one unit of the machine. Such boxes are well illustrated in the patent to Amon, No. 1,760,032, and to a certain extent serve to maintain the cone yarns in a humidified atmosphere. One of the difficulties with moistening boxes of this type is that the water in the supply reservoirs, which are relatively shallow, evaporates quickly and unless constantly watched soon becomes empty of water and yarn more or less dry is fed from the box and into the fabric before the failure of the moisture supply is noticed. Also each box is generally filled with a supply of cones to last for a day or more and it therefore becomes extremely difficult to keep track of the number of yarn cones distributed to the knitters and the loss due to misplaced and appropriated cones is a very serious factor. Also equipping the full fashioned machine with the number of boxes required makes them a very costly accessory to a knitting machine.

Some of the objects of the present invention are to provide an improved apparatus for conditioning cones of yarn for use in knitting or like fabric forming mechanisms; to provide an apparatus which in use makes it unnecessary to employ separate moistening boxes at each machine where the knitting operation is carried out; to provide a storage cabinet for cones of yarn wherein provision is made for storing a large number of cones, subjecting such cones to an atmosphere so treated that all cones are maintained in a uniform condition as to temperature and moisture; to provide a storage cabinet for conditioning cones of yarn which will serve as a dispensing means from which cones are removed and given to a knitter only when the machine is ready for a particular cone and this construction permits each cone to be checked and its whereabouts known at any particular moment; to provide a conditioning apparatus which is relatively inexpensive and which as one unit is capable of serving and supplying a large number of knitting machines, even though such machines be of the full fashioned type; to provide a novel means for supplying a heated vapor to a receptacle wherein a plurality of cones of yarn are arranged and exposed equally in all parts through the effects of such vapor; to provide a combined heating and humidifying apparatus for conditioning cones of yarn and employing in conjunction therewith a storage space wherein conditioned yarn is kept and maintained in its conditioned state; to provide a conditioning cabinet for cones of yarn wherein provision is made for ready access to all cones mounted therein; and to provide other improvements as will hereinafter appear.

In the accompanying drawing Fig. 1 represents a sectional elevation of a yarn conditioning apparatus embodying one form of the present invention, the section being taken on line 1—1 of Fig. 2; Fig. 2 represents a section on line 2—2 of Fig. 1; and Fig. 3 represents a detailed section on line 3—3 of Fig. 2.

Referring to the drawing one form of the present invention consists generally of a cabinet 10, a tank or receptacle 11 for water, a heating element 12, and a spray unit 13. The cabinet 10 is preferably, but not necessarily, formed of sheet metal which is connected together to provide a bottom 14, a top 15, and two end walls 16 while leaving the two opposite sides open but in this instance arranged to be closed respectively by two pairs of doors 17 and 18. These doors are hinged respectively at the four corners of the cabinet 10 as indicated at 20 so that the doors of each pair swing toward the middle of the side and can be interlocked by suitable latch members 21 operated by the respective handles 22. The construction is such that when the doors are closed the cabinet 10 forms a relatively tightly closed chamber while if the doors are open access

can be had to the chamber for the full width of the two sides and from top to bottom.

For supporting cones of silk or cones of other material within the cabinet 10 in such a manner that any cone can be conveniently reached and removed, the two end walls 16 removably support respectively two panels 23 each of which has its exposed face studded with elongated pins 24 in such staggered formation as will permit the mounting of a maximum number of yarn cones 25 without interference one with another. Each pin 24 has a threaded end by which it is fastened to its panel by nuts 26 to project from the face thereof preferably at a slight angle to the face so that the natural tendency of the cones is to stay in supported position. Like pins 27 are mounted upon the inner faces of the doors 17 and 18 in staggered relation and upwardly inclined to give proper supporting position. All of the pins 24 and 27 are preferably covered by protecting sleeves 28 of rubber or other material to directly seat the respective cones. As here shown the inner faces of all the doors are lined with a layer of wood panelling 30 of tongue and groove construction which is enclosed in a cover housing 31 to which the pins 27 are attached by a thread and nuts 32.

For the purpose of providing a supply of moisture inside of the cabinet 10, the tank 11 is provided and in the preferred form this is in the shape of a shallow rectangular receptacle fixedly attached to one stationary wall of the cabinet and extending well across the central portion of the chamber formed by the cabinet. This tank is arranged to be filled with water as its contents become depleted and this is easily accomplished by opening a door at one side or other of the cabinet and pouring the new supply of water into the tank 11. This water is arranged to be converted into a fine spray, or mist, or vapor, by means of a suitable unit 13 which as here shown is in the form of a rotatable plate 33 having its outer periphery adjacent a circumferentially arranged row of closely spaced baffles 34 forming between them a plurality of fine discharge apertures to which the water is drawn by the centrifugal action of the rotating plate. A strainer 35 is attached to the bottom of the unit 13 and is normally submerged in the water in the tank 11 so that the action of the electrically operated rotary pump 36 is to draw the water vertically upward and discharge it upon the rotating plate 33. The pump motor receives its current from a suitable source by way of conductors 37 extending into the cabinet at a convenient location. Preferably an annular casing 51 encircles the periphery of the baffles 34 and as this casing is open at its upper end, it serves to direct the discharging mist or vapor upwardly into the cabinet 10. This casing 51 is provided with a plurality of discharge openings 52 which are circumferentially arranged and laterally disposed so that some of the discharging vapor can pass radially outward to insure the bottom of the supporting cones being moistened to the same degree as are the tops of these cones by the return spray from the upwardly discharged mist. In order to regulate the amount of water which exists by way of the outlets 52, an encircling band 53 is arranged to be secured to the casing 51 and by moving this axially along the casing the area of the discharge openings 52 can be regulated according to requirements. This band 53 is of circular form having its meeting ends connected by an adjusting bolt 54, or like device, by which the band 53 can be tightened in place upon the casing or loosened to change its regulating position. As here shown the band 53 is in such a position that all of the openings 52 are entirely uncovered but as already pointed out a loosening of the clamping means 54 will enable the band 53 to be moved relative to the casing 51 and fix it in a new position to reduce the amount of water vapor discharged therethrough.

In order to maintain the water at an efficient and desired temperature for treating the silk upon the cones 25, the heating element 12 is fixedly mounted through a side wall of the cabinet and a side of the tank 11, so that the heating bar is submerged within the supply of water in the tank 11. Current is led to the bar 12 by the conductors 38 from a suitable source and it will be understood that the degree of heat delivered to the bar 12 is thermostatically regulated so as to maintain a substantially constant temperature of the water.

One feature of the present invention is the provision of a storage space for cones of silk which have been subjected to the conditioning treatment within the cabinet and to that end the cabinet 10 is provided with a supplemental casing 40 which is attached to the top 15 and forms an upper extension of the cabinet while preserving the symmetrical appearance of the whole assembly. This casing 40 forms a chamber 41 which as here shown is subdivided by two parallel horizontal partitions 42 and 43 each of which is formed with perforations 44 to allow circulation of moist air within the compartment 41 and about the cones 25 which are placed therein for storage until used. The ends of the casing 40 are provided with openings 45 which communicate respectively with air passages 46 formed by outwardly diverging conduits 47 which extend below the upper portion of the chamber formed by the casing 10 and below apertures 48 through the end walls of the casing 10 in order to provide means of communication between the interior of the casing 10 and the passages 46. Access to the compartment 41 is had by providing the sides thereof with slidable doors 49. Thus since the heated vapor rises within the casing 10, it can find its way laterally through the apertures 48 and thence upwardly through the passages 46 into the chamber 41 to circulate about the storage cones and maintain them in the same moist condition as when removed from the treating chamber below. Inlets 50 are preferably provided near the bottom of the cabinet 10 for the admission of fresh outside air.

In connection with the partition 43 it will be noted that this, as here shown, is in the form of two inverted trays which fit snugly within the casing 41 adjacent to the bottom thereof and are thus made removable so that the casing can be readily cleaned when necessary. Also the top 15 of the cabinet 10 has a drain outlet 55 which allows any collected moisture to run back into the main treating chamber.

It will now be apparent that a complete unitary conditioning cabinet has been provided for the treating and storage of cones of silk, or any other yarn, or threads, which is so arranged and constructed as to support a large number of articles, all of which are so distributed as to be subjected to a uniform treatment by the conditioned air in the chamber. This air is maintained in a predetermined heated and moistened state such that the cones of silk are not deleteriously affected by too much saturation and that

saturation to which each is subjected is not only uniform about the entire area of the cones, but is of that degree necessary to give the best results from the treated yarn. Furthermore it will be seen that the treated air in the cabinet 10 can rise and circulate into an upper storage compartment in which previously treated yarns are placed for future use so that these can be maintained in the same condition as when taken from the main treating chamber. While the device of the present invention is generally located in one place convenient to access by the knitters and may be considered as a fixed treating cabinet, it is here shown provided with supporting wheels 56 which make it relatively easy to wheel from one room to another or from one storage place to another.

While only a single form is shown in which this invention may be embodied, it is to be understood that the invention is not limited to any specific construction, but might be applied to various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus described our invention, we claim:

1. A self-contained yarn treating apparatus comprising a cabinet mounted on rollers for wheeling from one place to another, an open top receptacle mounted within said cabinet for holding a supply of water, a pump having an inlet located in said water and an outlet arranged substantially centrally of the interior of said cabinet, means associated with said outlet for converting the discharged water into a mist, a heater element submerged within the water in said receptacle for maintaining a predetermined temperature of said water, means to gain access to the interior of said cabinet, and supports for yarn cones encircling the space into which said mist is discharged from said pump.

2. A self-contained yarn treating apparatus comprising a cabinet mounted on rollers for wheeling from one place to another, an open top receptacle mounted within said cabinet for holding a supply of water, a pump having an inlet located in said water and an outlet arranged substantially centrally of the interior of said cabinet, means associated with said outlet for converting the discharged water into a mist, a heater element submerged within the water in said receptacle for maintaining a predetermined temperature of said water, means to gain access to the interior of said cabinet, supports for yarn cones encircling the space into which said mist is discharged from said pump, and a cone storage compartment provided in the upper portion of said cabinet and communicating with the spray chamber of said cabinet.

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