

April 17, 1945.

B. M. JONES

2,373,896

DRYING AND CONDITIONING APPARATUS

Filed Dec. 4, 1942

2 Sheets-Sheet 1

Fig. 1.

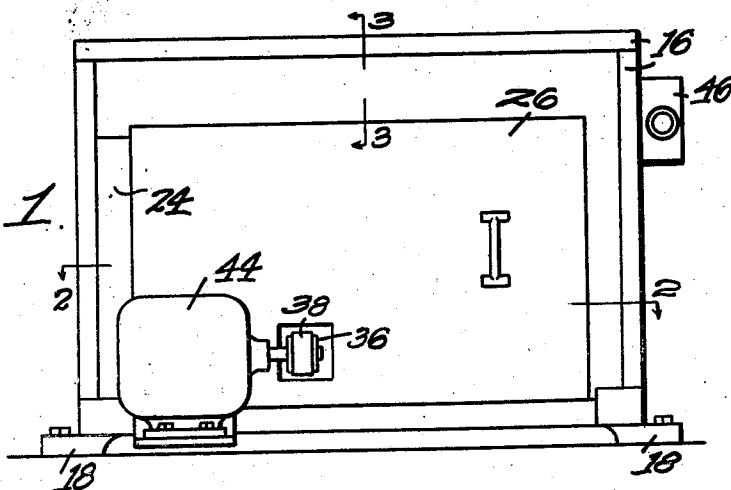


Fig. 2.

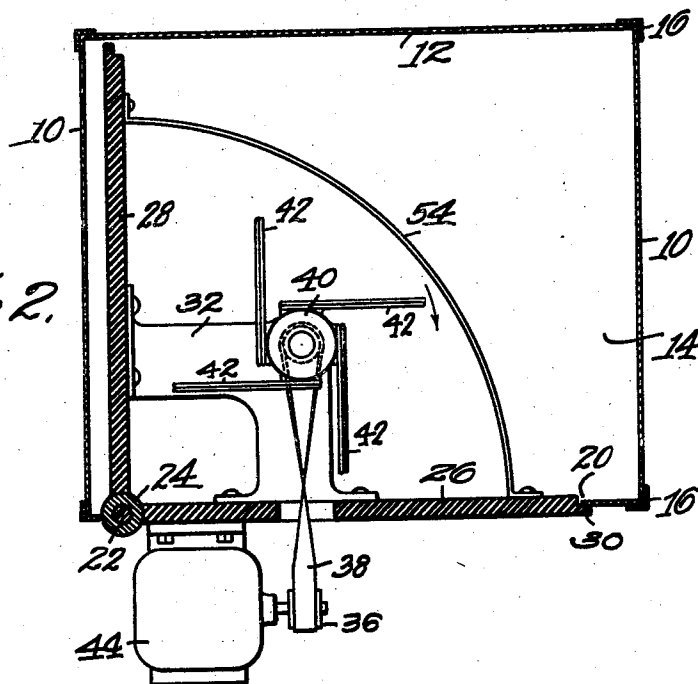
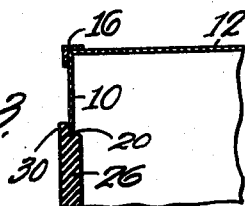


Fig. 3.



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2 Sheets-Sheet 2

Fig. 4

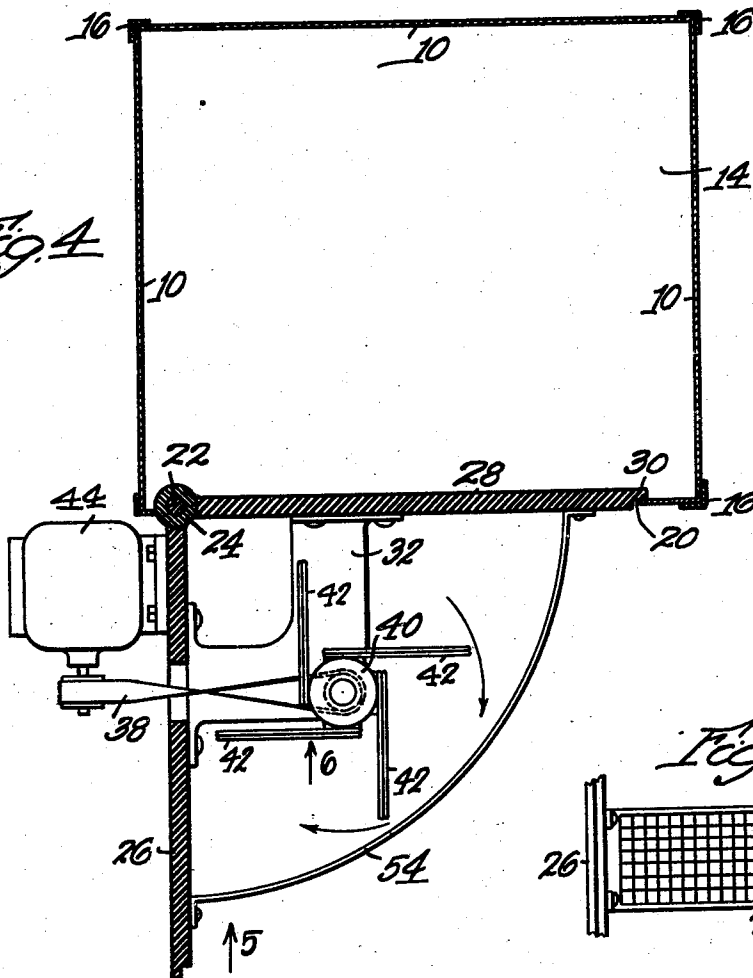


Fig. 5

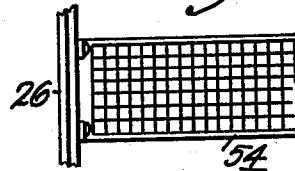
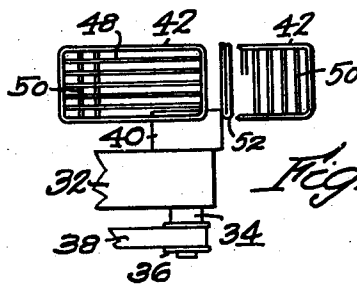


Fig. 6

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UNITED STATES PATENT OFFICE

2,373,896

DRYING AND CONDITIONING APPARATUS

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Application December 4, 1942, Serial No. 467,849

10 Claims. (Cl. 34—58)

This invention relates to quick drying and conditioning devices which are especially although not exclusively adapted to the rapid drying and conditioning of textile samples for comparison purposes during the dyeing operation. The present invention may also be utilized for drying, humidifying, etc. in many other arts and industries.

When dyeing large batches of cloth, yarns, etc., the operator must take samples from the batch at intervals, in order to determine whether the dyeing operation has proceeded long enough to obtain the color or shade desired. The samples must be completely dried and brought into balance with the atmosphere or room humidity, so that the true color or shade of the sample can be determined. The longer the period of time spent in drying and conditioning the sample, the more error in final color or shade of the entire batch is made, since the material being dyed has naturally been in the dye solution that much longer than the dry sample, and therefore the batch has absorbed more dye than the dry sample.

Hence it is clear that speed in drying and conditioning the sample is greatly desired, since the quicker the sample can be used for comparison, the less error in matching colors is made, and a truer shade obtained.

Heretofore it has been the practice to locate the sample stationarily and to blow or circulate heated air about it with a "hair drier" until it is dry, then wave the sample in the air, by hand, for about ten to twenty minutes until the heat has left it. At this point the sample is in dried and conditioned state for matching, but at least twenty or thirty minutes has elapsed, and meanwhile the batch being dyed has absorbed that much more dye. Another method is to merely hold the sample over a steam pipe or other heat radiator until the sample is dry and then to wave it around in the air as before. Either of these methods will take from ten to twenty minutes with the detriments referred to.

Objects of the invention include the provision of an apparatus obviating the difficulties abovementioned by reducing the drying and conditioning time to about one minute for light fabrics and to three and one-half minutes for the heaviest fabrics such as thirty-four ounce Army Meltons, with corresponding times for other fabrics and yarns; the provision of a high-speed drier and conditioner which may be manufactured in a small portable self-contained unit or which may be applied to existing dye kettle housings or other heated enclosures or which may

be built into the housings at the factory; the provision of a high-speed mechanical drier and conditioner mounted on a movable support for selective location in or out of a heated enclosure whereby the samples take advantage of a high-speed movement in the heated atmosphere to become dry extremely quickly and then may be instantly located in a room atmosphere to be air-conditioned in such atmosphere, also at high speed, without the necessity of touching the sample at all but by merely moving the support to the exterior of the enclosure.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is a view in front elevation of a device embodying the invention;

Fig. 2 is a section on line 2—2 of Fig. 1 and showing the device in drying position;

Fig. 3 is a section on line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 2 but showing the device in conditioning position;

Fig. 5 is a view showing a guard construction and looking in the direction of arrow 5 in Fig. 4, and

Fig. 6 is a detail view of the sample holding vanes looking in the direction of arrow 6 in Fig. 4.

It has been elected to show the present invention as associated with a portable box-like enclosure having side walls 10, top 12, and bottom 14, all connected together by means of a framework 16; and if desired this enclosure may be mounted on feet 18 which may be bolted to a table, floor, or wall of a machine housing, or other support. It is to be understood however that this invention does not depend upon the housing illustrated, but it may be associated with any housing or enclosure of whatever description or for any purpose desired. It is contemplated for instance that the mechanism comprising the present invention may be mounted directly on the casing or housing of an industrial machine such as for instance casings or housings for dye vats and other machinery.

In any case, the enclosure is provided with an opening as at 20 for the movable reception of a support mounting a drying and conditioning device so that the latter may be moved within the enclosure as shown in Fig. 2 or it may be extended therefrom to lie outside the confines of the enclosure as shown in Fig. 4.

As here illustrated, a hinge pintle 22 is mounted on the enclosure adjacent one edge of opening 20 and this pintle swingably mounts a boss or

the like 24. Boss 24 is provided with a pair of fixed arms or doors 26 and 28 which are of a size to close opening 20 and overlap the same at its edges 30, so that opening 20 may be closed selectively by either door 26 or 28.

Bracket 32 of any desired configuration is mounted between doors 26 and 28 and is supported thereon for unitary and bodily movement therewith. Bracket 32 rotatably mounts a shaft 34 which is equipped with a pulley 36 so that it may be rotated by means of a belt 38. Shaft 34 supports a rotor or spider 40 for rotation therewith and this rotor in turn mounts a series of vanes 42. These vanes are mounted on the rotor in a non-radial relation thereto as is clearly shown in Figs. 2 and 4 and the rotation of the shaft 34 will be in a direction to rotate the vanes as a unit in the direction of the arrows in these figures whereby the vanes will tend to prevent air from slipping past the ends thereof, thus crowding the air inwardly and providing for the largest possible amount of air to be forced through the vanes for a purpose to be described.

A motor 44 is mounted in any convenient way on door 26 for swinging movement therewith and the motor is used to drive belt 38 and therefore the vanes at a high speed, whether the drying device is located interiorly or exteriorly of the enclosure. The enclosure itself will be heated, as by electric elements, not shown, for which a control box 48 is provided, or the enclosure may be heated by steam or hot air. In cases where the device is applied directly to a dye vat housing or the like, the heat in the dye liquor may be used if convenient to supply the heat which is desired in drying the samples. In any case, it is preferred that the drier and conditioner have selective access to a heated and a room temperature atmosphere.

Vanes 42 assume many different forms but in the present case it is considered preferable to form each vane of a pair of screens, one screen having horizontal rods 46 and the other screen being provided with vertical rods 50. These two elements are designed to be clamped together to hold a cloth sample therebetween, see Fig. 6, and one way of clamping the separate screen elements of each vane together is by connecting the vanes along an edge as at 52 in a resilient relation, so that the screen elements may be spread apart, the sample inserted, and upon release of the elements they will snap together to hold the sample therebetween. A guard screen 54 may be secured to arms 26, 28 to partially enclose the vanes and rotor.

It will be seen from the above description that the drying device may be swung outwardly of the enclosure as shown in Fig. 4, in which position the wet samples may be inserted in the vanes. The device is then swung inwardly of the enclosure to the position of Fig. 2, in which position the opening 20 is completely closed by door 26 as seen in Figs. 1 and 2. The motor is then started to rotate the vanes at a high speed in the heated atmosphere within the enclosure and in a few seconds the samples will be dry. When the samples are dry, the device is swung outwardly of the enclosure, in which position door 28 completely closes opening 20, to prevent escape of the atmosphere within the enclosure so that the samples may continue to rotate at a high speed at room temperature and humidity whereby the samples will be cooled and conditioned to the atmospheric conditions of the room. This operation takes but a few seconds and by

the time the samples have cooled they will conform to the conditions desired by the operator so that exact comparison may be made to show the degree of progress of dyeing of the batch from which the sample was taken. It will be clear that this invention provides an extremely fast drying and conditioning apparatus which prevents escape of heat in the enclosure whether the device is being used to dry or to condition the samples, and the conditioning operation takes place without influence of heat within the enclosure. If desired the entire enclosure may be made of heat resistant material and it is preferable to incorporate heat insulating material in the doors 26, 28, both for avoiding heat on the samples during the air conditioning operation and to protect the motor.

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 claims, but what I claim is:

1. In a device of the class described, a housing, and means forming an aperture in the housing, a support mounted on the housing for selective movement substantially into and out of the housing through the aperture, a drier on the support, means to operate said drier, said drier comprising a rotor, vanes on the rotor for holding material, said drier operating means being effected to pass said material rapidly through the air both inside and outside of the housing.

2. In a device of the class described, a housing, means forming an aperture therein, a support, means mounting the support for selective movement substantially to housed condition in the housing and to substantially extended condition out of the housing, a drier on the support, said drier comprising a rotor, vanes for supporting material to be dried, said vanes being mounted on the rotor for movement therewith and means to rotate the rotor, said last named means being operable in either housed or extended condition of the support.

3. In a device of the class described, a housing having an opening in a wall thereof, a support mounted on the housing for movement substantially thereinto and out of the same, a pair of spaced doors forming a part of the support, one door closing the opening when the support is substantially out of the housing and the other door closing the opening when the support is substantially in the housing, means effective for drying purposes mounted on the support between the doors for movement therewith, said means comprising a rotor, generally tangentially arranged, vanes for supporting material to be dried, said vanes being mounted on the rotor and a motor to rotate the same.

4. In a drying and conditioning apparatus, a housing, an opening in the housing, a pair of angularly spaced doors fixed together and mounted for swinging movement on the housing, a support on the doors, a rotary shaft on the support, a series of vanes on the shaft, and a motor mounted on one door for rotating the shaft and vanes, said doors, support, and motor being movable together between positions wherein either door closes the opening.

5. In combination with a housing having an opening therein, an attachment adapted to be mounted on the housing in position to be moved substantially into or out of the housing through the opening, a drier on the attachment, said drier comprising a shaft, separate material holding devices mounted on the shaft for rotative movement

relative to the attachment when the shaft is rotated, and means to rotate the shaft.

6. For use with a heated enclosure, a support adapted to be mounted on the enclosure, said support having means for moving the same into or outside of said enclosure, a sample drying device on the support, said device comprising a vaned rotatable sample holder, said vanes maintaining samples substantially at right angles to the direction of movement of the holder on the support, and means to rotate the holder on the support.

7. In a drying and conditioning apparatus, a housing, said housing having a wall provided with an opening, a pair of doors fixed together in generally spaced relation, a support connecting the doors, means for movably mounting the doors and support as a unit on the housing, a shaft, a series of material supporting vanes on the shaft and a motor for rotating the shaft and vanes; said shaft, vanes and motor being mounted on the unit, said doors, support, motor, and shaft being movable together as a unit between positions wherein either door closes the opening.

8. In a drying and conditioning apparatus, a housing, an opening in the housing, a pair of doors, said doors being connected together by a

5 bracket, a shaft on the bracket, a series of vanes for supporting material to be dried, said vanes being mounted on the shaft, a motor mounted on one door and adapted to rotate the shaft, said doors, bracket, motor, and shaft being movable together as a unit between positions wherein either door closes the opening.

10 9. An apparatus as recited in claim 7 wherein the vanes are tangentially located with respect to the shaft and extend forwardly in the direction of rotation thereof.

15 10. A drying and conditioning apparatus adapted to be mounted on the wall of a housing for textile treating apparatus and comprising a pair of spaced doors fixed together and mounted for movement in and out of the housing, a rotary shaft and a motor mounted on the doors, a series of vanes for carrying material to be dried, said vanes being mounted on the shaft, said support and shaft being movable together between positions wherein either door will close the housing, said motor being so located as to be externally located relative to the housing in both positions of the support.

20 25
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