Oct. 5, 1943. R. C. PARKES 2,331,042

DRYING APPARATUS FOR CLOTH AND THE LIKE

Filed Dec. 20, 1941 2 Sheets-Sheet 1

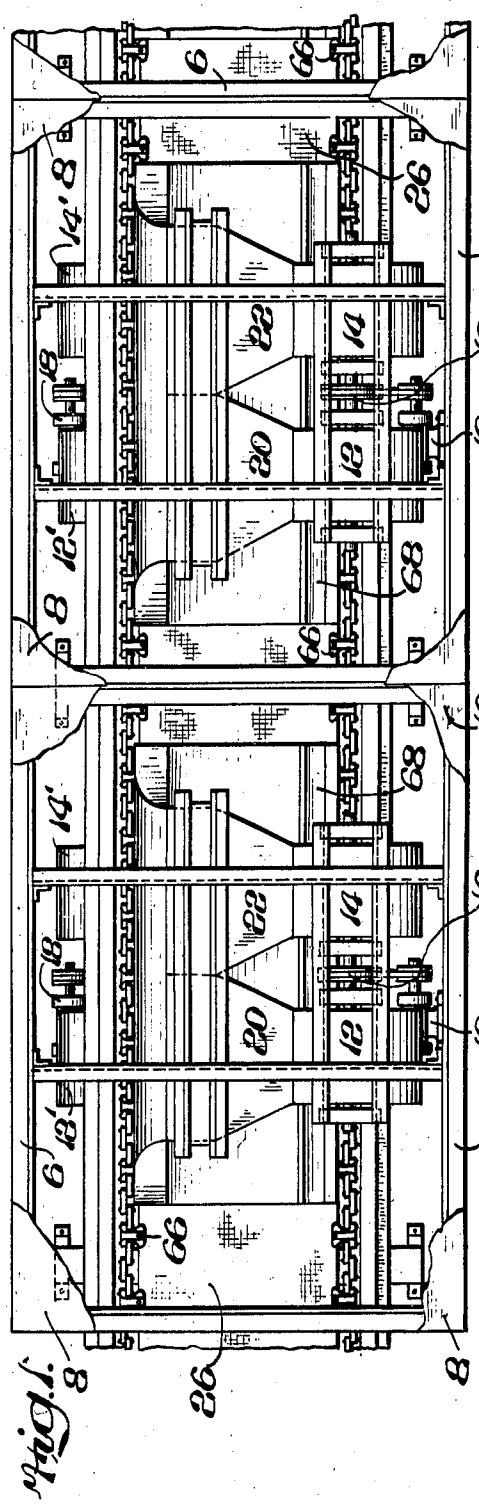


Fig. 1.

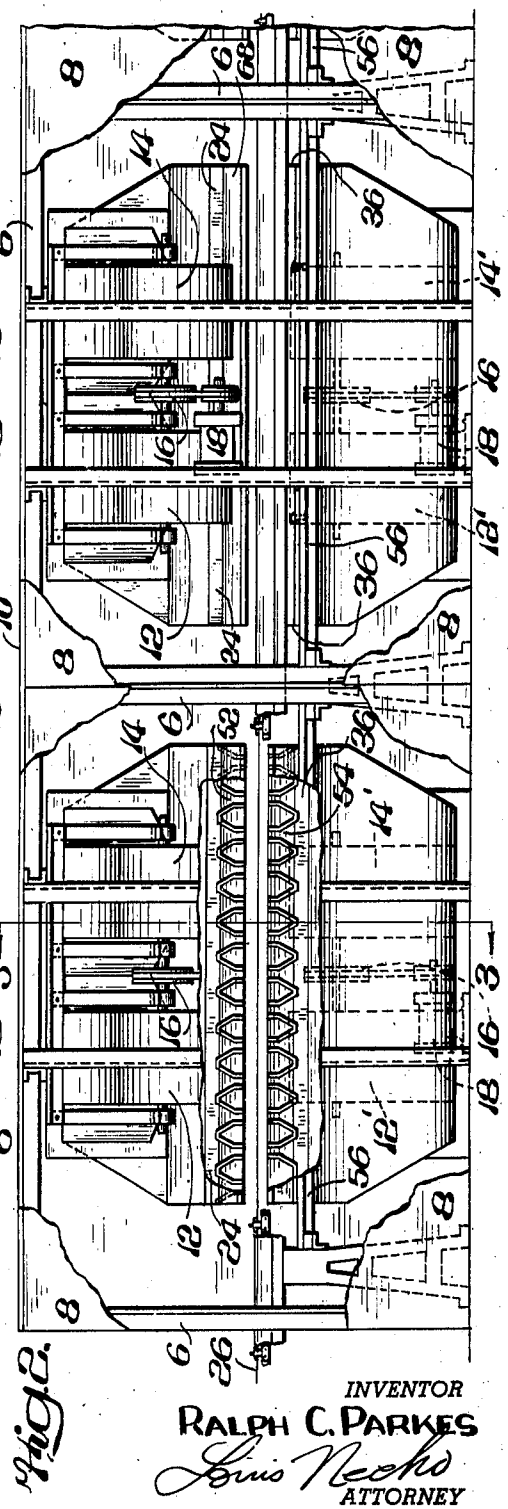


Fig. 2.

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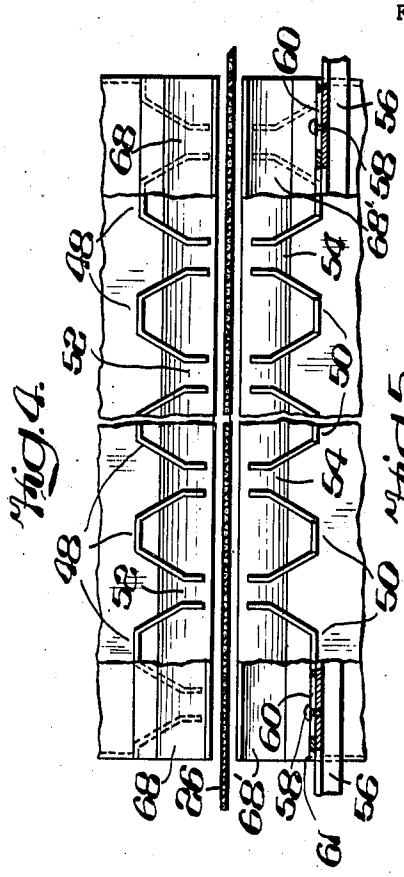


Fig. 4.

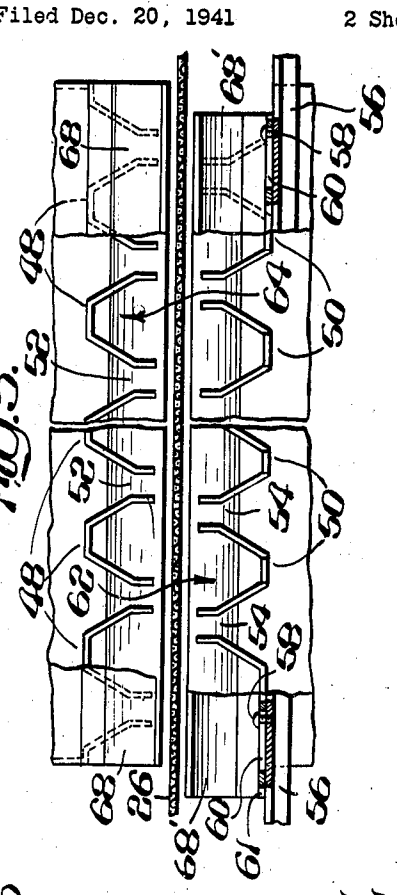


Fig. 5.

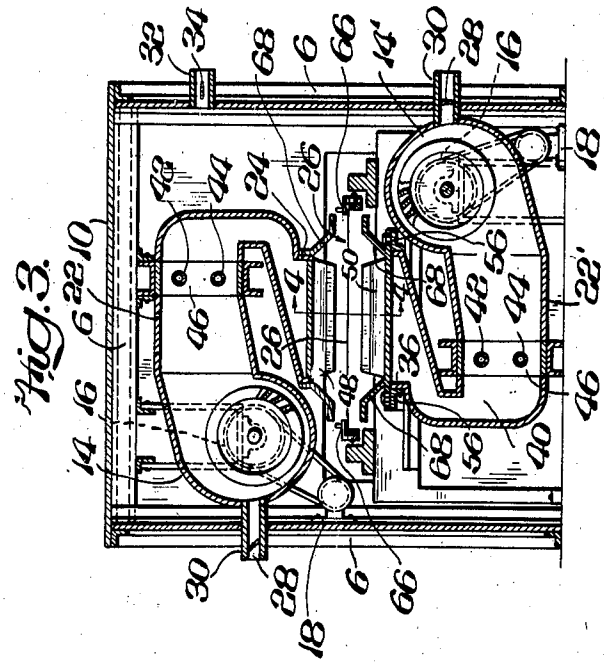


Fig. 3.

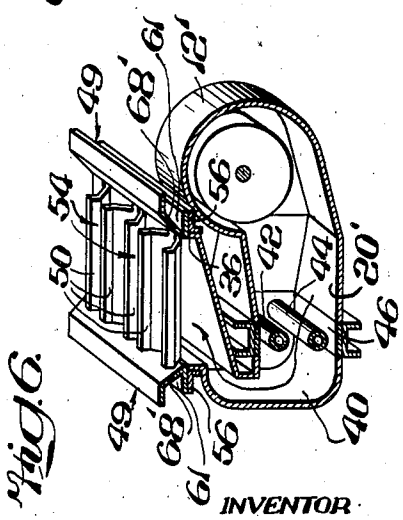


Fig. 6.

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DRYING APPARATUS FOR CLOTH AND THE LIKE

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Application December 20, 1941, Serial No. 423,799

4 Claims. (Cl. 34—160)

In the drying of cloth, paper or other web it has been the practice to build a generally elongated chamber having means at the feed and delivery ends thereof for propelling the cloth or other web to be treated through the chamber, such cloth traveling either in a straight line or in the form of loops, or otherwise, and providing means for supplying hot air and directing it against the web during its travel through the drying chamber.

In order to permit the web to be dried, enough dwell must be allowed in the drying chamber and for this reason it is necessary to make the drying chamber relatively long, and in order to provide a sufficient volume of hot air it has been the practice to mount at a point exterior to the chamber—and most generally on the top thereof—a relatively large fan or blower with relatively large heating units and large ducts leading from the blower housing to the drying chamber. This practice was disadvantageous in that it greatly increased the overall height of the drying apparatus thus resulting in waste of space, and in that the air was hottest and most efficient at about the center of the drying chamber where the main volume of hot air was introduced, and still further in that in order to attain sufficient volume it was necessary greatly to increase the speed of the blower to increase the rate of flow of hot air into the drying chamber. These latter features result in non-uniform drying in subjecting the fabric to the violence of rapidly flowing air thus resulting in distortion of substantial fabrics which presented sufficient resistance or in damage to more delicate fabrics.

It is therefore the object of my invention to eliminate the foregoing disadvantages and to provide means for distributing the hot air uniformly and at multiple points throughout the drying chamber, said means being completely enclosed within any given drying chamber without increasing the overall dimensions thereof, and a further object of the invention is to construct an adjustable apparatus by means of which the hot air can be blown through the fabric or parallel to the surfaces thereof, the distribution and direction of the hot air being such that no undue pressure is exerted on one side, or at any point on one side of the web being dried thus preventing distortion.

In the accompanying drawings:

Fig. 1 represents a fragmentary top plan view of an apparatus embodying my invention, certain parts being broken away to show internal construction.

Fig. 2 represents a side elevation of Fig. 1.

Fig. 3 represents a section on line 3—3 of Fig. 2.

Fig. 4 represents a section on line 4—4 of Fig. 3.

Fig. 5 represents a view similar to Fig. 4 showing the apparatus in a different position.

Fig. 6 represents a fragmentary, sectional, perspective view showing details of construction.

Referring to the drawings in which like reference characters indicate like parts, 6 designates in general the framework or the various supports which carry the casing 8. As seen from Figs. 1 and 2, in which only a portion of a conventional drying chamber is shown, the drying chamber is substantially rectangular and is rather elongated. In lieu of placing the blower for the hot air on the top 10 of the drying chamber, and in lieu of using one such very large blower to supply air to the entire drying chamber, I utilize a plurality of upper, relatively small blowers 12 and 14 driven from the common pulley 16 which in turn is driven by the single motor 18. The blowers 12 and 14 are provided with the ducts 20 and 22 which merge to form a single nozzle 24 which opens downwardly against the upper surface of the cloth 26 to be dried. 28 designates a fresh air inlet which may be regulated by the valve 30 and which communicates with the blower housing of each of the blowers 12 and 14. 32 designates an exhaust outlet controlled by the valve 34 so that the flow of air into and out of the drying chamber may be controlled. Below the cloth 26 and opening against the underside thereof is another nozzle 21 which is formed by the combined discharge ends of the ducts 20' and 22' of the lower blowers 12' and 14'. 42 and 44 designate suitable heating elements carried by the brackets 46 and disposed within the ducts of the upper and lower blowers for heating the air blown therethrough. Within the upper nozzle 24 are built in and enclosed the deflectors 48 which are preferably of the shape shown in cross section but which may obviously be made of other shapes, as may be desired. The upper deflectors 48 are suitably spaced to provide nozzles or jets 52 therebetween as best seen in Figs. 4 and 6. The upper nozzle 24 and its deflectors 48, being a continuation of or secured to the discharge ends of the nozzles 12 and 14, are stationary. To the lower stationary nozzle 36 are secured the side rails 56 on which are slidably mounted the channels 49 which carry and enclose the lower deflectors 50. The sliding movement of the channels 49 (and the deflectors 50 carried thereby) is limited by the pin 58 projecting from the rails 56 and engaging the slot 60 formed in the lower members 61 of the channels 49. As shown in Fig. 4, the upper and lower deflectors 48 and 50 are in vertical registration and hence the nozzles 52 and 54 are likewise in vertical registration. This results in balancing the pressure of the air emanating from the nozzles 52 and 54 in opposite directions to neutralize the impact of the air jets on the upper and lower surfaces of the fabric 26. When the fabric 26 is dense so that it presents substantial

resistance, the balance of the air pressure by the registration of the nozzles 52 and 54 prevents distortion of the fabric while the latter is still wet and thus insures the drying of the fabric in a flat and straight condition. It will be noted that the air emanating from the jets 52 and 54, due to the balancing of the pressures in opposite directions, will be compelled to travel parallel to the upper and lower surfaces of the web 26 thus insuring efficient drying without penetration of the air through the fabric. When the web or fabric 26 to be dried is not of a hard or dense texture and is open, such as lace or the like, there is no danger of the fabric being distorted by air pressure and, when such fabric is being dried, the channels 49 and the deflectors 50 are moved longitudinally of the fabric into the position shown in Fig. 5 in which the nozzles 52 and 54 are out of registration so that the air blown through the nozzles 52 will travel in the direction of the arrow 62 while the air blown through the nozzles 54 travels in the direction of the arrow 64, or through the fabric in opposite directions. In order to insure thorough drying of the selvedge of the fabric, which is engaged by the tenterhooks or the like 66, the upper nozzle is provided with the outwardly flared walls 68 while the vertical walls of the channels 49 cooperating with the lower nozzle 36 are also flared outwardly as at 68' (see Fig. 5) thus deflecting enough air to the margin of the web 26. It will be understood that the lower pair of blowers 12' and 14' are driven by a duplication of the mechanism described in connection with the upper blowers 12 and 14.

It will thus be seen that by utilizing a plurality of relatively small blowers, which can be enclosed in the space now available within conventional drying chambers, it will be unnecessary to increase the overall height of the drying chamber or to mount a blower on top of the drying chamber which, in order to have the capacity, must be relatively large. As a result of my construction, I apply uniform amounts of air heated to the same degree to the entire surface of the fabric as distinguished from the construction in which a relatively large blower is disposed substantially centrally of the drying chamber and by means of which no uniform distribution of air or heat is possible. Furthermore, with the use of a single central blower it was necessary to heat the air to a relatively higher degree than would be necessary in my construction. A very important feature of my invention is blowing the relatively moderate amounts of air on the upper and lower surfaces of the fabric simultaneously thus effecting the same degree of dryness which can be obtained only by a much larger and much hotter volume of air. Likewise, the provision of the lower, movable deflectors serves a most important purpose in balancing the air pressure to prevent distortion of the fabric and to provide surface drying or penetration drying as desired.

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

1. An apparatus of the character stated comprising a drying chamber, means for propelling a web to be dried through said chamber at a point intermediate the top and bottom thereof, a plurality of pairs of blowers disposed in vertical registration above and below said web, means for driving each of said pairs of blowers, ducts extending from each of said pairs of blowers towards the opposite faces of said web, upper and lower oppositely disposed and outwardly flaring nozzles at the ends of the ducts of said upper and lower blowers, deflectors mounted in said nozzles, means for fixedly mounting the nozzles on one side of the web, means for slidably mounting the nozzles on the other side of the web for longitudinal adjustment thereof in a path parallel to the path of the web whereby said upper and lower nozzles may be brought into or out of partial or total vertical registration to produce surface or penertation drying of said web at will and means for adjusting said nozzles.

2. An apparatus of the character stated comprising a drying chamber, means for propelling a web to be dried through said chamber at a point intermediate the top and bottom thereof, a plurality of pairs of blowers disposed in vertical registration above and below said web, means for driving each of said pairs of blowers, ducts extending from each of said pairs of blowers towards the opposite faces of said web, upper and lower oppositely opening and outwardly flaring nozzles at the ends of the ducts of said upper and lower blowers, deflectors mounted in said nozzles, means for fixedly mounting the upper of said nozzles, means for slidably mounting the lower of said nozzles for longitudinal adjustment in a path parallel to the path of said web whereby the deflectors in said upper and lower nozzles may be brought into or out of partial or total vertical registration, and means for adjusting said lower nozzles.

3. An apparatus of the character stated comprising a drying chamber, means for propelling a web to be dried through said chamber at a point intermediate the top and bottom thereof, a plurality of pairs of blowers disposed on opposite sides of said web, means for driving each of said pairs of blowers, ducts extending from each of said pairs of blowers towards the opposite faces of said web, oppositely disposed and outwardly flaring nozzles at the ends of the ducts of said blowers, deflectors mounted in said nozzles, and means for slidably mounting the nozzles on one side of said web for movement relative to the nozzles on the opposite side of said web, in a path substantially parallel to the path of travel of said web, whereby said oppositely disposed nozzles may be brought into or out of partial or total registration to produce surface or penetration drying of said web at will, and means for adjusting said slidably mounted nozzles.

4. An apparatus of the character stated comprising a drying chamber, means for propelling the web to be dried through said chamber at a point intermediate the top and bottom thereof, a plurality of pairs of blowers disposed in vertical registration above and below said web, means for driving each of said pairs of blowers, ducts extending from each of said pairs of blowers towards the opposite faces of said web, upper and lower oppositely disposed and outwardly flaring nozzles at the ends of the ducts of said upper and lower blowers, deflectors mounted in said nozzles, and means for mounting the nozzles on one side of said web in movable relationship to said web, comprising tracks disposed on one side of said web and means for slidably mounting said last-mentioned nozzles on said tracks, whereby said upper and lower nozzles may be brought into or out of partial or total vertical registration to produce surface or penetration drying of said web at will.

RALPH C. PARKES.