June 2, 1942. G. V. ÖHOLM 2,284,838

METHOD FOR DRYING POROUS WALLBOARDS

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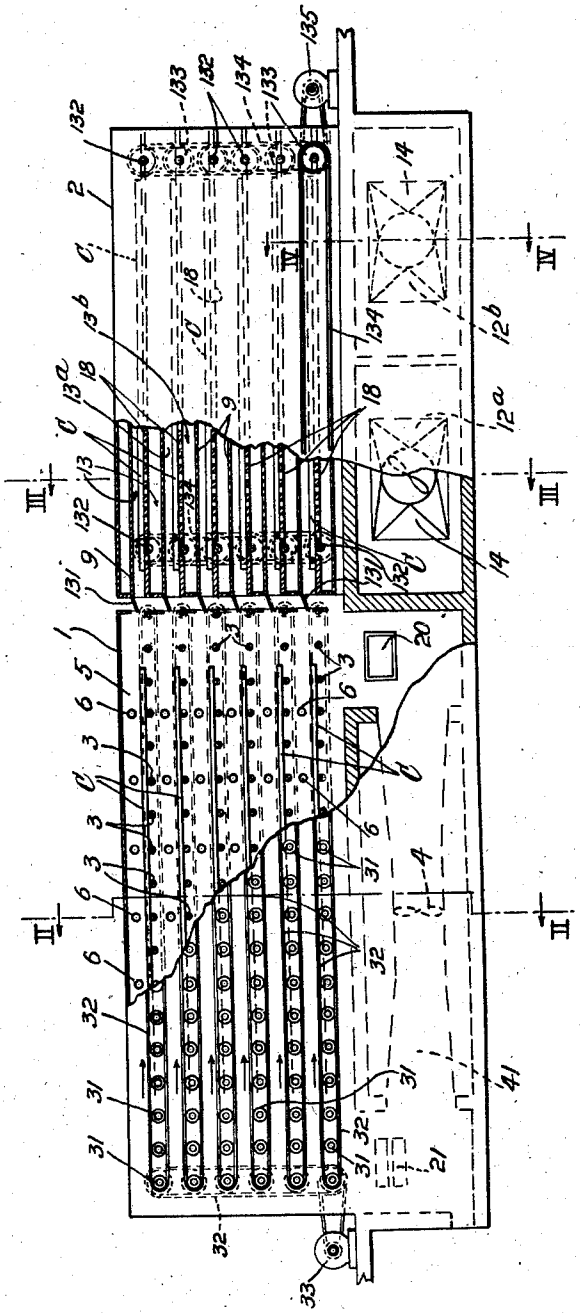


Fig. 1.

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Fig. 5.

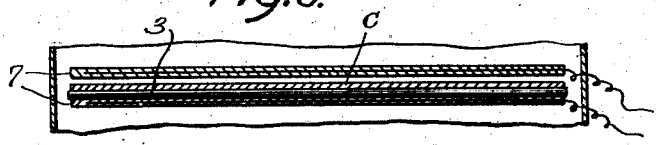


Fig. 2.

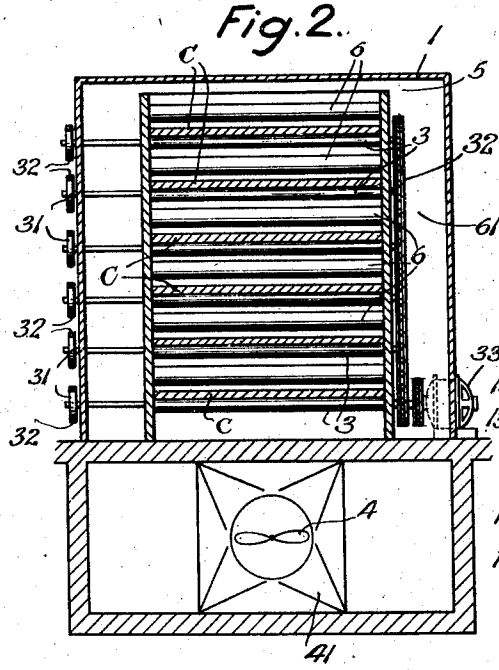


Fig. 3.

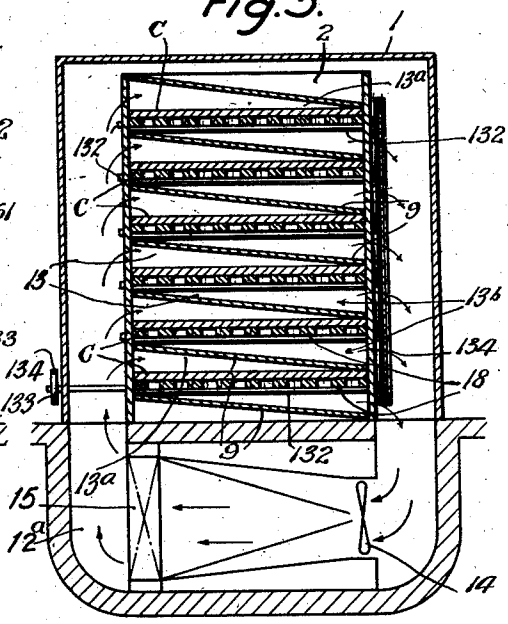
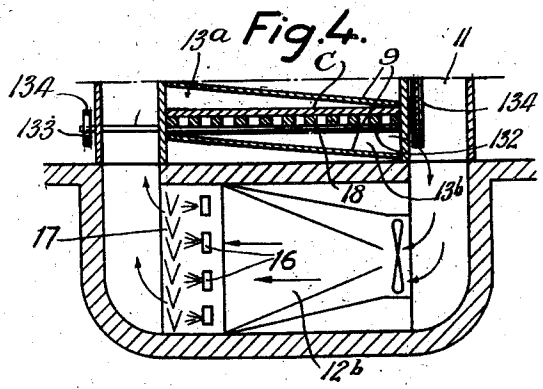


Fig. 4.



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METHOD FOR DRYING POROUS WALLBOARDS

Gustav Valdemar Öholm, Stockholm, Sweden

Application January 8, 1938, Serial No. 184,013
In Sweden January 11, 1937

1 Claim. (Cl. 34—18)

The present invention relates to a method for drying porous wall boards.

One object of the invention is to provide a method for drying porous wall boards whereby the drying is effected rapidly and uniformly.

Another object of the invention is to devise a drying method in which the wall boards are dried rapidly with a relatively small expense of energy.

Still another object of the invention is to dry wet porous wall boards rapidly without any danger of the boards becoming deformed or their pores being closed during the drying operation.

The above mentioned and other objects which will appear more clearly as the specification proceeds, are accomplished according to the present invention, in the manner set forth in the following detailed description and defined in the appended claim.

According to the invention, the drying operation is carried out in two steps. The first part of the drying is effected by supplying heat exclusively to the surfaces of the boards without substantially heating the interior thereof until sufficient water has been removed from the pores of the board to substantially reduce the resistance to the flow of air through said pores, and the drying is subsequently completed by passing drying air through the pores from one surface of the board to the opposite surface thereof.

A complete rapid drying of a porous wall board can be accomplished only, if drying air is passed through the pores of the board to remove the water contained in such pores. However, if the boards are to be dried exclusively by forcing drying air through their pores, an exorbitant amount of energy must be expanded, because the wet board offers a very high resistance to an air current to be passed through its pores.

Applicant found that the magnitude of this resistance depends to a substantial degree upon the water content of the board and decreases as the water content is reduced.

By providing a drying method in which, during the first part of the drying, heat is supplied exclusively to the surfaces of the board, and, subsequently, an air current is passed through the pores of the board from one surface to the opposite surface thereof, applicant effects a rapid, uniform and complete drying of the boards with a minimum expense of energy. Moreover, in applicant's drying method, the pores of the board are kept open, so that the boards, after completion of the drying operation, may be rapidly cooled by passing cold air through the pores. If the cooling air is moistened in any suitable manner, the dried boards may be given any desided moisture content to prevent subsequent shrinkage or swelling of the boards.

In order to make the invention more fully understood, a drying apparatus for carrying out the drying method according to the invention is illustratively exemplified in the accompanying drawings in which:

Fig. 1 is a vertical longitudinal section through the drying apparatus, some parts being shown in side elevation.

Figs. 2, 3 and 4 are substantially transverse sections taken, respectively, on lines II—II, III—III and IV—IV of Fig. 1, and

Fig. 5 is a partial longitudinal section illustrating a modification of the heating elements in the left-hand portion of the device shown in Fig. 1.

Referring now to the figures and first to Figs. 1 and 2, the drying apparatus is divided into two housings 1 and 2. The housing 1 serves for sweeping the surfaces of the boards C with hot air, and, in the housing 2, a drying medium is passed through the pores of the boards C.

The boards C are introduced into the drying chamber 5 of the housing 1, at the left hand end thereof, for instance by hand. The boards C are supported in and passed through the chamber 5 by means of rollers 3 driven through pulleys 31 and belts 32 from a motor 33. Drying air is circulated in longitudinal direction through the chamber 5 and through a return duct 41 disposed below the chamber 5 by means of a fan 4 arranged in the duct 41. Intake openings 20 for fresh air and exhaust openings 21 for moist air are provided in the side walls of the housing 1. Heat is supplied to the surfaces of the boards C in the form of hot air discharged from perforated pipes 6 connected to a hot air manifold 61.

Instead of using hot air, the surfaces of the boards C may be swept with drying heat radiating from electrically heated plates 7 arranged immediately below and in spaced relationship above the rollers 3 supporting the boards C, as shown in Fig. 5.

In the housing 2, the boards are supported on perforated sheet metal screens 18 which permit the passing of drying air through the boards. As seen in Figs. 3 and 4, transversely inclined partitions 9 are arranged in the housing 2 to form a plurality of separate, transversely inclined, superposed drying compartments 13, each being subdivided by means of one of the screens

18 into two half-compartments 13a and 13b communicating with each other through the perforations of the screen. Each compartment 13 can be closed by means of flap doors provided at its opposite ends, only the flap doors 131 at the left hand entrance ends of the compartments 13 being visible in Fig. 1.

The boards C are moved into and discharged from the compartments 13 by means of transverse rollers 132 disposed adjacent the entrance and the exit, respectively, of each compartment and driven through pulleys 133 and belts 134 from a motor 135.

The drying air circulates transversely through the compartments 13 in the direction indicated by the arrows in Fig. 3 and passes from one side of the housing 2, where it is guided upwardly in a manifold 10, into the half compartments 13a, then downwards through the boards C and screens 18 into the half compartments 13b and into a manifold 11 on the opposite side of the housing 2 where it is led downwardly into the return ducts 12a, 12b disposed below the drying compartments 13.

Each of the return ducts 12a and 12b has arranged therein a fan 14 and a heating device 15 which heats the circulating air.

The housing 2 may also be used for cooling the boards, and, for this purpose, the air portion passing through the duct 12b at the discharge end of the housing 2 may be given a suitable low temperature.

Additionally, the humidity of the air within the housing 2 may be varied by means of water spraying nozzles 16 and humidifying surfaces 17 in the duct 12b (see Fig. 4).

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

A method of drying porous wall boards, in two steps, consisting in effecting the first part of the drying by supplying heat exclusively to the surfaces of the boards without substantially heating the interior thereof until sufficient water has been removed from the pores of the board to substantially reduce the resistance to the flow of air through said pores and subsequently completing the drying by passing drying air through said pores from one surface of the board to the opposite surface thereof.

GUSTAV VALDEMAR ÖHOLM.