June 15, 1943. R. G. QUINN 2,321,937

COATED PRODUCT AND METHOD OF MAKING SAME

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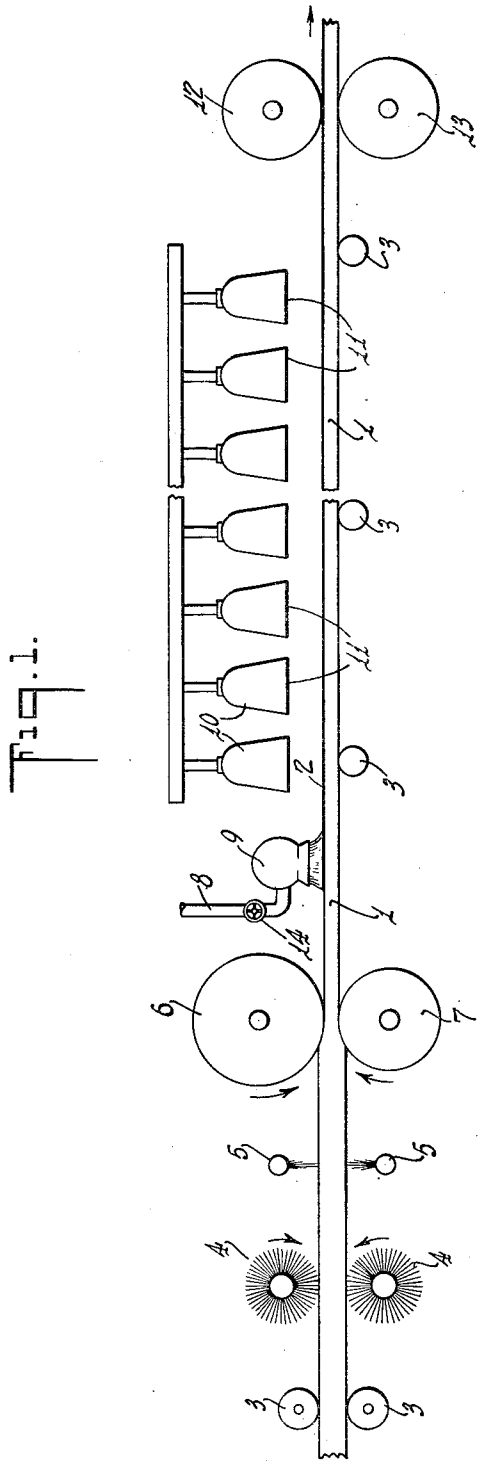


Fig. 1.

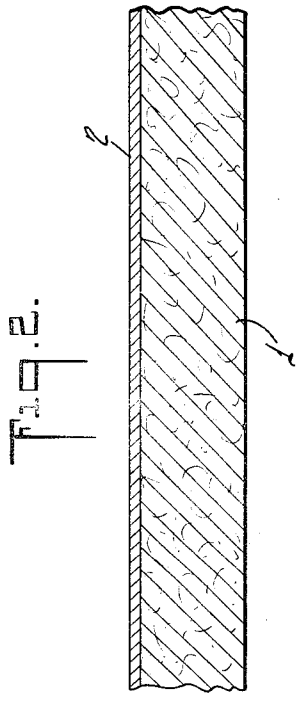


Fig. 2.

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COATED PRODUCT AND METHOD OF MAKING SAME

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1 Claim. (Cl. 117—93)

This invention relates to a coated product and its method of manufacture, and more particularly to a product that includes a fibrous composition coated with synthetic resins set up by means of radiation and the process of making the same.

It is an object of this invention to provide an improved process for the coating of articles.

It is a further object to provide an improved coating for fibre board.

It is a still further object to provide a means for drying coated fibre board in a shorter length of time and more uniformly than has hitherto been done.

Other objects and advantages will appear from the following drawing and description.

In the drawing which illustrates the more important features of the invention and wherein like reference characters designate like parts:

Fig. I is a diagrammatic side elevation view of an apparatus for carrying out the process of the invention; and

Fig. II is an enlarged sectional view of a product embodying the invention.

The present invention contemplates the application of a resinous coating to fibre board. In the preferred embodiment the fibre board is ironed in the usual manner and the surface is coated with a resinous paint by conventional means. It is then passed under infra-red ray lamps and the resins in the coating, being sensitive to such rays, are set up and hardened. The fibre board is then finished in the usual way.

The process, in detail, is carried out by forming a fibrous web in the conventional manner by felting on any suitable board-making machine from the usual slurry of pulped wood or other fibres and water. Any agents that are desired to be incorporated into the board may be added to the pulp mixture, or may be added later to the board itself. Such agents may be for the purpose of rendering the finished board waterproof, insect-proof, fungi-proof, fireproof or combinations of these and other purposes. Furthermore, other agents, as synthetic resins, etc., may be added at this time to render the finished board more hard and dense.

The fibres are preferably wood fibres, although any vegetable fibre, such as bagasse, corn, etc., may be used. Where wood is used, it is disintegrated into fibres in any of several usual ways: by being broken down by means of a slasher-grinder; by being saturated with steam and water under pressure and then exploded by releasing the pressure; or by use of ordinary chemical processes of separation.

After the fibres are felted into a web of usual thickness, the web is pressed, rolled, and dried into finished uncoated fibre board. Referring now to Fig. I, in the preferred embodiment of this invention the uncoated fibre board is conveyed from the forming operations by conveyor rolls 3. The board 1 is passed between one or more pairs of revolving brushes 4, which are preferably turning in a direction opposite to that of the board 1, and the dust and loose fibres are removed from the board.

The board 1 is passed between moisteners 5 which apply a thin film of water to both surfaces of the board. Preferably, the moisteners 5 are sprays, although any conventional means may be used. The board, slightly moistened, passes between one or more hot ironing rolls 6 and 7 which smooth the surfaces as they are dried. The top surface is dried more completely than the bottom surface, this being done by keeping the upper rolls 6 at a higher temperature or by having more rolls above. The rolls may be heated in any of the conventional ways, as by steam, gas or oil burners, etc. Preferably the lower surface of the board 1 is only partly dried and is damp as it leaves the ironing roll 7.

The board 1 is carried along conveyor rolls 3 and passes beneath the coating sprayer 9, which is fed by feed pipe 8 in the usual manner. The sprayer may be adjusted, by the valve 14, to the speed of the conveyor means so that the desired thickness of coating is obtained. The coating is deposited on the board 1 evenly so as to form the coating layer 2 (see Fig. II). The smooth and somewhat densified upper surface of the board 1 absorbs the coating slowly and to a sufficient extent only to bond the coating 2 to the fibre board 1. The preferable method of applying the paint coating is by one or more sprayers, as indicated, although other conventional means, such as applicator rolls, may be used.

The coating is a water-vehicle paint that contains resins sensitive to the action of infra-red rays. It is preferably comprised of binder, filler, extender, pigment, plasticizer and water. The binder is preferably urea formaldehyde used either alone or with an alpha protein. The pigment is any one or more of the usual types, such as cadmium sulphide, iron oxides and the like. The extender may comprise lithopone, talc or diatomaceous earth. The filler is preferably clay. The plasticizer may be China-wood oil, urea or the like. A coating that has been used effec-

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tively is one containing by weight approximately 7 parts of binder, 1 part of pigment, 25 parts of extender, 3 parts of filler, 1 part of plasticizer and 63 parts of water.

The coated fibre board is conveyed by rolls 3 underneath a bank of infra-red ray lamps 11. The lamps 11 are housed in a number of reflectors 10, preferably gold plated, which are set about 5 inches above the board 1. Preferably there are 24 banks of lamps, 6 lamps to the bank, with approximately 75% of them in use when the board 1 is moving at the rate of 30 lineal feet per minute. By this process the coating 2 is dried to approximately 60% dryness and when it is later ironed by roll 12, the coating will not be doctored off, but will be smoothed and hardened.

It should be noted that the above describes the preferred embodiment of this feature of my invention, but I in no way wish to limit my invention to such. To one skilled in the art the above arrangement could be varied and yet not lose its effectiveness. For example, a change may be made in any one of the above factors if a corresponding one is made in one or more of the other factors. If, for example, the source of infra-red ray is greater than as given above, the board 1 should travel faster or the lamps 11 be located at a further distance from board 1. While the infra-red ray lamps may be closer to or farther away from the coated surface of the board, depending upon the other factors in the operation, such as the speed of the board, number of lamps in use, etc., yet it will be seen that in order to secure an efficient operation the lamps should be located adjacent to and in close relationship with the coated surface of the board.

The use of infra-red ray lamps is an important feature of my invention. One of the particular advantages that is obtained is the speed and convenience with which the coating 2 on board 1 is dried. With the board 1 traveling at a rate of 30 lineal feet per minute, an ordinary convection dryer would have to be some 50 to 80 feet long in order to so dry the coating 2 that it would not be doctored off by ironing roll 12. With the use of infra-red ray lamps, this result is accomplished in the space of from 8 to 12 feet, or within a time limit of about 16–24 seconds. Furthermore, the infra-red ray lamps give a uniform dryness over the entire width of board, which is important when considered with the final ironing step and the appearance of the finished board. If the coating is not dried sufficiently throughout the entire width of the board, it will be doctored off by roll 12 at the undried portions. If, on the other hand, portions of the coating are dried too much, the coating will not be smoothed and hardened by roll 12. In any case, spottiness in the degree of dryness of the coating will give an undesirable product. My invention permits the board to be partially dried before application of the heated press rolls to complete the drying.

The instant control over the source of heat is also important when a new batch of coating is tapped. This batch may or may not be the same as the prior batch and if not, the heating and drying system must be quickly adjusted to remedy this, as the coating 2 must be at a certain stage of dryness when it reaches the ironing roll 12. With a convection dryer, usually heated by steam, this must be done slowly, which results in a lowered speed of operation.

An important function of the infra-red rays is that of setting up and hardening certain resins that may be used either in the board itself, or, preferably, in the coating of the board. The infra-red ray has a peculiar power of causing certain resins to react when exposed to the ray. It is believed that the setting up and hardening is due in part to the polymerization of certain of the resins. When, for example, urea and paraformaldehyde are present in the coating, they will react under the action of the infra-red ray by polymerization of the urea-formaldehyde complex, it is believed, and will form a water-insoluble resin, which constitutes an important element in the finished coating. Other resins will similarly set up and harden if employed. Where such resins are used with an ordinary water-insoluble paint, the infra-red ray lamps perform the double function of drying the paint by evaporation or oxidation of the solvent, and will, at the same time, set up and harden the resins present. Consequently, the process is very considerably shortened in both the space and time of operations.

While the above preferred embodiment of my invention specifically states the use of infra-red ray lamps, it should be noted that my invention in its broadest concept is nowise limited to such a use. The great advantages in the drying operation are accomplished by the feature of drying by radiation rather than by convection. Hence any means of radiation would accomplish this result. The added advantage of setting up and hardening the resins at the same time is accomplished by the use of a source of radiation to which resins are sensitive.

After leaving the infra-red ray lamps, the board 1 passes between rolls 12 and 13. These are ironing rolls that smooth and harden the coating and the board. After being so ironed, the board is inspected and handled for shipment.

The above detailed description has been given to illustrate a preferred embodiment of the invention, that is, the coating of fibre board. However, the process will apply to any coating operation where equivalent problems have been encountered and similar results are desired. In the coating of any article there is a need for convenience in and control of the drying operation, coupled with the further need for the setting up of the coating in the drying operation when sensitive resins are used. Consequently, it will be seen that advantages given by the invention may be utilized by such coating operation.

While the above process has been set out in detail for the purpose of illustration, it will be understood that many changes and modifications may be made without departing from the spirit and scope of this invention.

I claim:

A process for producing coated fiber board comprising, continuously advancing the board in a straight path while pre-sealing the fiber board, applying to a surface of the board an aqueous paint dispersion coating, said paint incorporating approximately 7% by weight of bonding agents including ureaformaldehyde and protein, and approximately 1% plasticizer, rapidly drying and setting the coating to approximately 60% dryness by exposing the coated surface of the advancing board to infra red radiation emitted from a source that is spaced from, but adjacent to, the coated surface, and completing the drying and hardening operation by hot ironing to smooth said coating.

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