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METHOD OF MAKING FIBROUS LUMBER AND INSULATING MATERIAL

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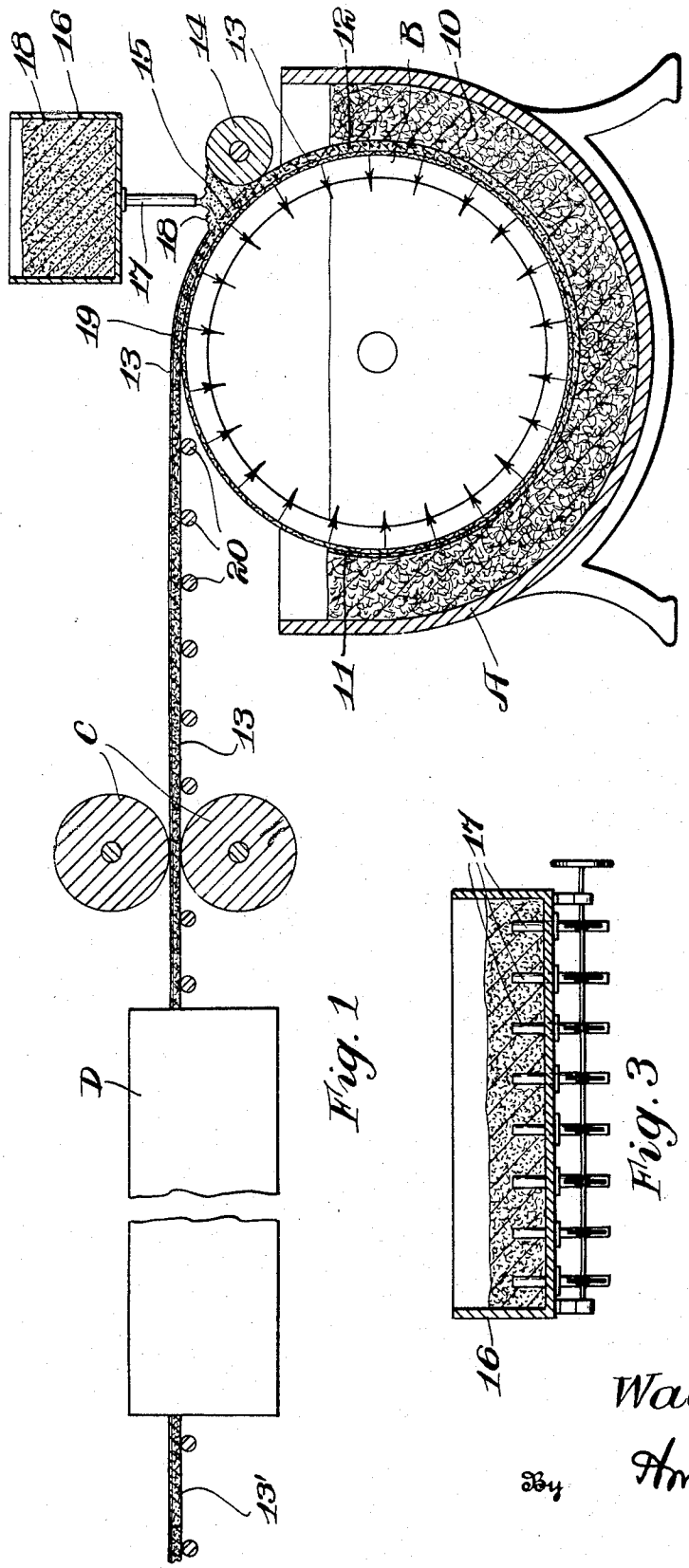


Fig. 1

Fig. 3

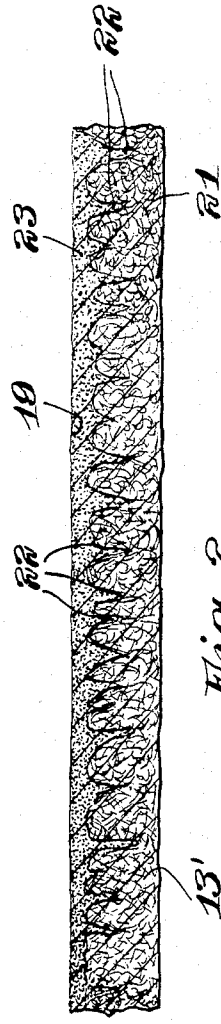


Fig. 2

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METHOD OF MAKING FIBROUS LUMBER AND INSULATING MATERIAL

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13 Claims. (Cl. 92—41)

My invention relates to the method of making fibrous lumber and insulating material and is designed to apply to the surface of the sheet of fibrous material, such as artificial lumber and the like, a coating or filling material at a point between the formation of the sheet and the dryer while the sheet is still wet.

The method may be carried out by a forming machine which consists of a vat in which a screened vacuum revolving cylinder is partly submerged and the pulp is deposited upon its surface being removed as a formed mat. If pulp is finely ground and deposited in a thin layer upon the surface of the mat formed, it will combine, by an interlocking of fibres with the mat, which, after drying will produce a smooth filled surface which is very desirable for painting, etc., as well as appearance. This method provides a denser surface to the mat which is an integral part therewith owing to the method of making the fibrous lumber and insulating material.

It is a feature of the method to provide a means of making fibrous lumber and insulating material by applying the finely ground pulp which may be of the same character as the body of the mat in forming, or the finely ground pulp surface may be of a mineral and/or chemicals for making the finished product more fire resisting, more waterproof, rot-proof, insect-proof, etc.

A means of carrying out the method consists in placing a roll, preferably a soft resilient one, against the moving surface and introducing the liquid containing the surface application material between this roll and the surface in such a manner that the roll will act as a dam or obstruction to leakage, thereby forming a pond or body of the liquid upon the surface of the mat. The porosity of the mat will permit the liquid to penetrate into it while the solids in the liquid will remain upon the top surface of the mat which acts as a sieve. The vacuum within the cylinder or in the vacuum box supplies the suction and draws the liquid into the mat and virtually through it when required, it being obvious that the forming machine may be adjusted accordingly.

The method further includes a means of making fibrous sheet material of the character set forth and wherein the liquid dam on the surface during the forming of the same may contain soluble salts or other liquids for insect poisoning, fire-proofing, etc., and remaining in the board or sheet after drying. By carrying out the method in this manner, virtually after the sheet is formed, saves the great dilution losses when the salts or chemicals are introduced in the stock before most of the water or moisture is removed.

The method may also be carried out by applying the liquid to the surface of the mat by floating it on over a weir close to the surface and to distribute the supply uniformly to the weir box would require the use of a number of pipes with valves. The pipes which penetrate the bottom of the supply box could be adjustable vertically to increase or decrease the head on their openings so that each pipe would discharge the same amount.

The foregoing is simply to assist in describing the means of carrying out the method which will be more fully set forth.

In the drawing forming part of the specification:

Figure 1 is a diagrammatic side view of a rotary vat, conveyor, dryer; and means for damming the finely divided fibres or substance to be applied to the surface in the forming of the mat, shown merely for the purpose of assisting in describing the method.

Figure 2 is a diagrammatic cross sectional view of the fibrous lumber and insulating material.

Figure 3 is a diagrammatic illustration of another device for applying the liquid with the finely divided fibrous particles or substance to the surface of the mat by means of a container in which the finely divided fibres or material may be floated and caused to drain through suitable adjustable openings, this container being positioned over the weir in any suitable manner.

The drawing is only for the purpose of assisting in describing the method. The method consists in making fibrous lumber or sheet material such as insulating sheets and in providing a sheet of fibrous material with a body portion made up of larger fibrous material or of a more porous nature, whereas the surface of the same is formed of finely divided particles or fibres which are adapted to be drawn into and interengaged with the fibres of the body, so that the surface, which will be of a more dense nature and having a comparatively smooth outer face, will become an integral virtually inseparable part of the sheet and not in the form of a mere layer on the outer surface of the finished sheet.

With this method I am able to provide a sheet formed of other fibres or any other fibrous material where the body is formed onto a surface and is built up to the desired thickness and then while the body sheet or mat is wet, I provide a weir or dam which is kept filled with finely ground or divided material of various natures, so as to permit the forming machine to cause a certain

amount of this material to be adhered to and drawn virtually into the body with the most finely divided particles on the outer surface.

In making sheet material by my method the heavier fibres are collected together to make up the body of the mat in the forming of the same. Then, after the weir applies the finer material to the surface of the virtually formed sheet, which is the last step of the process of making the same and which includes adhering of the fibres which are of a finely divided nature, the very finest particles will be on the outside or surface of the sheet. This gives a fine smooth texture or surface to the outside of the sheet by my method.

The drawing illustrates the pulp vat A which may be of any suitable nature in which the perforated drum B is adapted to be rotated, while the pulp 10 is caused to flow into the vat A. As the drum B rotates the pulp will begin to build up on the surface of the same, beginning at the point 11 and continuing around to the point 12, where the formed mat 13 continues on the drum and passes under the soft roller 14.

The roller 14 is positioned in relation to the surface of the mat 13 to provide a dam or weir 15 which is adapted to be filled from the supply tank 16 through suitable tubes 17, or other suitable means, so as to supply the fine pulp to the weir 15. Then as the mat 13 is carried from the weir 15, it is formed with a smooth surface coating 19. As the mat 13 travels from the roll drum B it is carried by the rollers 20 or any other suitable conveyor through the press rolls C and then into the dryer D. The mat then emerges in the dry finished board 13' from the dryer D.

An enlarged detail section of the dry board or mat 13' is illustrated in Figure 2 which shows the body portion 21 of the mat, which is formed of coarser fibres such as are contained in the pulp fibre 10 in the vat A, and which are formed on the drum B in the method of making the finished fibre board 13'. The finer smooth surface coating 19 is more clearly illustrated in this figure and it will be noted that the fibres of this coating extend down into the body 21 in fine root-like veins 22, some of which extend deeply into the body 21, while others penetrate to a lesser extent. The extreme outer surface or portion such as 23, of the smooth surface coating 19 will be formed of the most finely divided particles and therefore form a very smooth and highly desirable finished surface on the outside of the finished board 13'.

With this method the smooth finishing coat 19 is applied to the outer surface of the body before the fibres of the body are dry or have become set in their formation in making the formed mat which forms the body of the finished sheet 13'. Then by applying the smooth surface coating of the fine pulp through the weir or dam 15 and regulating the suction through the mat 13, a smooth finishing surface is applied as an integral part of the body 13 which is interwoven into the body and therefore becomes a definite part thereof. This method accomplishes a very desirable result for insulating board and other similar materials and it will be apparent that different materials may be used for the finishing surface 19 which may include a fire-proof surfacing, a moisture-proof surfacing, or insecticide surfacing, depending upon the material employed for the surfacing coat. I have found my method to be practical and to accomplish the results which are very desirable and which have not been done heretofore insofar as I know.

In accordance with the patent statutes I have described the principles of my method and the invention is within the scope of the following claims.

I claim:

1. The method of making fibrous lumber and insulating material consisting in gathering comparatively coarse fibrous pulp made into a mat, then running the mat from the forming vat under a dam of finely divided pulp while the mat is still moist, and causing a suction through the mat while passing under the dam to form a smooth outer surface on the mat passing under the dam.

2. The method of making fibrous lumber and insulating material consisting in building up a mat of pulp fibres and passing the mat while being formed beneath a dam of finely divided pulp just prior to removing the mat from the forming means to form a smooth outer surface on the mat.

3. The method of making fibrous sheet material consisting in building up a mat of pulp fibre to the desired thickness, then passing the damp mat through a dam of finely divided pulp and causing a suction to be maintained through the mat until it has passed through the dam of finely divided pulp, after which the mat is passed between pressing rollers and a dryer to provide a fibrous sheet material with a comparatively smooth surface integrally formed therewith.

4. The method of making a continuous sheet of fibrous material consisting in building up the body of the sheet with a mat formed of comparatively coarse fibres, then passing the mat formed of the desired thickness through a dam of varying sized particles and causing the particles in the dam to be drawn into the mat in a manner to root and deposit the particles from the dam to the mat with the finer particles in the dam built up on the outer surface of the mat and the larger particles rooted into the body of the mat and then pressing the sides of the mat together and passing it through a dryer.

5. The method of forming fibrous lumber and insulating material consisting in forming the body portion of the same of pulp fibre of a comparatively coarse nature, then passing the formed body under a dam of finely divided particles of fire resisting material, maintaining a suction through the body while passing under the dam of finely divided fire resisting material, and then pressing the body together and passing it through a dryer.

6. The method of forming sheet lumber and insulating material consisting in forming the body of the sheet by building up a mat to the desired thickness of comparatively coarse fibres drawn by a vacuum which collects the fibres to build up the body of the sheet, then passing the built up body which is formed of the coarse fibres through a dam of finely divided fire-proof material, while the vacuum is maintained against the body of the sheet, after which the sheet is pressed together and passed through a dryer, said finely divided material forming a fire-proof surface on the finished sheet.

7. The method of making sheet insulating board consisting in forming the body of the sheet of fibre pulp by drawing the fibres together into a mat of the thickness desired by a vacuum and before the mat leaves the vacuum, passing the same through a dam having finely divided mineral particles suspended therein, so that the vacuum will draw the same onto the surface of the

mat, then passing the mat through pressure and a dryer.

8. The method of making insulating sheet material consisting in forming a mat-like body portion of coarse pulp vegetable fibres of a non-metallic nature, then passing the mat sheet through a dam of suspended finely divided mineral particles and maintaining a vacuum oppositely disposed to the dam, and then drying the sheet to form an insulating body with a fireproof and weather resisting surface formed thereon.

9. The method of forming a sheet of insulating material consisting in forming the body thereof of pulp fibres by a vacuum, then passing the formed sheet through a dam of finely divided particles chemically treated and pressing the sheet together and drying it to form an insulating sheet with a rot and insect-proof surface formed thereon.

10. A device for making sheet material consisting in a vat adapted to receive fibrous pulp material in liquid suspension, a vacuum cylinder rotatably mounted within said vat, a dam roller positioned outside of said vat adapted to engage with the sheet formed on said vacuum cylinder which is formed of the fibrous material gathered by said cylinder in said vat in the rotation of said cylinder, and means for discharging a solution of finely divided fibres and material to form a dam thereof against said dam roller, the vacuum from said cylinder causing the material suspended in the dam to be drawn toward and caused to adhere to the surface of the sheet coming off of said cylinder, means for pressing the sides of the sheet together, and dryer means for drying the same to form the finished sheet.

11. An apparatus for forming insulating sheet material including, a vat, a vacuum cylinder rotatable in said vat, a sheet adapted to be formed on said cylinder in the rotation thereof, a dam roller positioned adjacent said cylinder in a manner to press against said sheet as it is carried out of the vat, and means for discharging a surface material against said dam roller and said sheet at a point in relation to said vacuum cylinder to cause the vacuum thereof to draw particles suspended in the dam in a manner to be adhered to the surface of the sheet to form a smooth outer surface thereon.

12. A sheet-forming device including, a vat for receiving fibrous pulp material in suspension, a vacuum cylinder rotatably positioned and operated in said vat in a manner to build up a sheet of material in the rotation of the vat, means for carrying the formed sheet away from said cylinder, means for drying the sheet and means for forming a dam of finely divided material on the surface of the sheet after it has been carried out of said vat and before the same is removed from said cylinder and while the vacuum of said cylinder is in operation oppositely disposed to the dam to form an integral surface which is adapted to be rooted into the body of the sheet and having a smooth finish which extends over the outer surface of the sheet formed in said device.

13. A device for forming sheet material including, means for building up a mat-like body of fibrous material of a comparatively coarse nature and means for forming a dam through which the built up body of the sheet material is adapted to pass, said dam having a nature to deposit finely divided particles to the surface of the sheet whereby the finished sheet may be formed with a smooth outer surface which is integrally woven to the body of the sheet.

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