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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING STRUCTURAL INSULATING BOARDS OF EXPLODED LIGNO-CELLULOSE FIBER.

No Drawing. Application filed June 19, 1925. Serial No. 38,356.

My invention consists of a process of making structural insulating board of ligno-cellulose fiber exploded from high pressure.

The first step in the process of making the insulating board is the fibration of the ligno-cellulose material, preferably wood, such as waste trimmings, slabs and the like from saw mills, for example.

The step of fibration is accomplished by discharging ligno-cellulose material, such as wood for example, taken in its natural state, except reduced to chips of about the size ordinarily made use of in chemical digesters for paper manufacture, from a gun having a restricted valved outlet or outlets, and in which gun said material is subjected for a part of a minute, a sufficient time to secure penetration, to heated gas, preferably steam, at a pressure in excess of 275 pounds per square inch, and preferably in the neighborhood of 800 to 1000 pounds per square inch, the discharge being progressively accomplished through the restricted outlet or outlets, and the wood being exploded on discharge into a very highly subdivided, fibrous state. Such fibration of ligno-cellulose material is disclosed, and generically claimed in my prior copending application Serial No. 739,748, filed September 24, 1924. The present application is directed to the production of insulating board of such fibrated ligno-cellulose material.

In order to make structural insulating board of low specific gravity and good structural strength, it is desirable to have a graduated mixture of fine and coarser fibers or bundles of fibers. With wood exploded by my system these results are accomplished very closely, it only being necessary in some cases to subject the exploded fibrous material to some slight additional refining or hydrating, as by beating, in order to give the resilience, strength and low specific gravity required in a structural insulating board.

Fiber produced by such exploding is especially well adapted for the production of structural insulating board, and may be made for example from waste wood from saw mills and other wood making plants, the fibrous division so obtained providing the necessary characteristics for making such fiber well adapted for the production of structural insulating board, and for insuring that every part of the wood is put into a desirable fibrated form for such purpose, including not only the woody material proper, but also the knots, bark and the cambium layer, and substantially every portion of the tree.

The exploded ligno-cellulose fiber obtained in the manner described is immersed in water and flowed on to a screen and formed into a thick sheet. The formation water is preferably hot, as for example at a temperature of about 180° F., and the exhaust heat from the gun is preferably made use of for keeping the formation water hot. The use of hot water for the formation of the sheet is advantageous in that more effective felting can thereby be accomplished. The fiber sheet, saturated with water, as it comes from the forming medium, is pressed, preferably by passing through rolls, to squeeze out all the water which can be removed in this way, and is then permitted to expand, and is dried, and upon being dried and cut to suitable size, is ready for use. In order to increase the resistance to moisture, suitable sizes such as customary in manufacture of paper may be used.

Insulating board produced in accordance with my invention from explosion fibrated wood is of good strength and stiffness, has good nail holding qualities and is of relatively high tensile strength. In this way valuable structural and insulating board material is obtained from ligno-cellulose material, cheaply available in many forms, and in particular the refuse from lumber and woodworking mills, instead of being allowed to go to waste, as by being burned to get rid of it, is conserved and converted into products of high value and usefulness.

Cognate subject-matter not claimed herein is embraced in my companion copending applications as follows: Ser. No. 57,251 filed Sept. 18, 1925; Ser. No. 57,252, filed Sept. 18, 1925; Ser. No. 90,167, filed Feb. 23, 1926; Ser. No. 91,447, filed March 1, 1926.

I claim:

1. The process of making structural insulating board, which consists in exploding ligno-cellulose material from pressures in excess of 275# per square inch, whereby fibrated material of graduated fineness is obtained well adapted for the production of

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insulating board, forming into sheet form in hot water, passing through press rolls and drying.

2. The process of making structural insulating board, which consists in exploding ligno-cellulose material from pressures in excess of 800# per square inch, whereby fibrated material of graduated fineness is obtained well adapted for the production of insulating board, forming into sheet form in hot water, passing through press rolls and drying.

3. The process of making structural insulating board, which consists in exploding ligno-cellulose material from pressures of approximately 800# to 1000# per square inch, whereby fibrated material of graduated fineness is obtained well adapted for the production of insulating board, forming into sheet form in hot water, passing through press rolls and drying.

In testimony whereof, I have signed my name hereto.

WILLIAM H. MASON.

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