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COMPOSITION BOARD

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This invention relates to the manufacture of composite boards, designed for covering and finishing the walls of buildings, and other uses, and has particular reference to a heat and moisture resisting product, and the method of economically producing the same.

The primary object of the process is the production of single ply boards or sheets by the use of but two ingredients, one mineral, the other vegetable, in which the predominating constituent comprises powdered mica that yields highly efficient heat-resisting and sound-deadening qualities, and with which is incorporated a relatively small proportion of shredded wood fiber that naturally has a very low heat resistance.

It may be stated here, that in the manufacture of this particular type of board, the usual thick felting of the fibers is not desired, for the reason that it would require more fibers in proportion to the mica binder and filler than is contemplated, without even approximating the high heat and moisture resistance which the ratios of the two basic ingredients insure.

The process may be initiated by taking about 250 pounds of the shredded wood fiber, which is preferably fed together with a suitable amount of water into an ordinary stock-chest to be primarily beaten and agitated in order to separate all of the matted fibers, and then admixing with the wet fibers about 750 pounds of mica which has been ground to suitable fineness.

The fiber and the mica contents of the boards may be derived respectively from paper-mill and saw-mill waste, and a waste resulting from the manufacture of sheet mica, both of which materials may be obtained at very low cost. This basic mixture may next be run through any suitable refiner; or the fibers may be refined alone, and afterwards combined with the mica, and agitated until a homogeneous 3% stock is obtained. This stock, owing to the presence of three parts powdered mica to one part fibers, produces boards that will withstand 1700 to 2000 degrees F., without consuming or breaching the boards, but instead only discoloring their exposed surfaces. The stock is next preferably run through a Fourdrinier machine and formed into a continuous strip which may be cut as it leaves the machine, into boards or sheets of various dimensions; or the stock may be delivered to an ordinary shaping or molding machine where it may be pressed into sheets of uniform size and thickness.

The next step in the process consists of passing the sheets, which ordinarily contain from 50 to 60 percent moisture, to a drying press (not shown), which may comprise upper and lower platens, whose common temperature may vary from 300 to 400 degrees F., and wherein the sheets may be compacted by pressure that may range from 250 to 1000 pounds per square inch. The top or the working surface of the base member of the press may be simply plane and is usually covered with wire gauze, in order to let the water drain off during the pressing. The uppermost platen may have a plane polished bottom surface, to give a smooth glazed finish to the top sides of the sheets.

It has been found that 25% of shredded wood fibers to 75% of the powdered mica produce an extremely tough and rigid board, which owing to the high temperature of the press and the presence of 50% to 60% of moisture in the sheets when they enter the press, effect such a bonding of the fibers as to enable the boards to withstand relatively great tensile strains in all directions without distorting or rendering the boards liable to fracture or disintegrate. The percentage of the shredded fibers to the mass of powdered mica while producing a strong and uniform bonding of the said ingredients, yet the fiber content is preferably so low as to prevent the usual matting or felting of the fibers, even when the thickness of the boards is greatly reduced by the extreme pressure. This non-matting of the fibers, as compared with the usual practice in the manufacture of fibrous wall board, for example, not only greatly lowers the fire hazard by the employment of fewer fibers, but also saves a considerable amount of fibers, which are more expensive and require more treatment than the mica. This will be better appreciated when it is understood that the wet sheets or boards upon entering the drying press are substantially double the thickness of the dried and finished boards, and although this great reduction in the thickness brings the fibers into more intimate relationship and produces a rugged, dense and inelastic product that retains its normal plane condition because the fibers are substantially evenly though more or less sparsely distributed throughout the breadth and depth of the boards, the ingredients apparently become as thoroughly bonded as in the present day products that are usually made with less pressure and a greater percentage of the combustible content. By subjecting the boards to the extremely high pressure referred to, the finely ground mica fills all of the interstices between and virtually maintains the separated

state of the fibers. This is rendered possible because the high moisture content and the extreme heat of the press, aided more or less by pitch or other inherent qualities of the fiber, transform the powdered mica into a paste, which when finally compressed, dried and baked, effects the close adhesion of the two basic ingredients and produces boards which are practically as solid and dense as the logs from which the shredded product is derived. These characteristics are clearly noticeable at the end of the pressing intervals which usually continue from fifteen to twenty minutes. Furthermore, the subjection of the relatively small amount of fibers to the high pressure brings the fibers into such intimate relationship that fewer fibers effect substantially the same or even greater reinforcing than obtained in the majority of fibrous insulating boards in common use, wherein the fiber content and therefore the fire hazard is greater.

The boards or sheets produced by the foregoing process are inelastic to a relatively high degree, and the high pressure and high temperature of the drier when taken with the duration of the pressing intervals which practically bakes and permanently sets the mica obviates the common danger of the boards warping, either while they are in storage or after they are applied to walls of buildings, or other uses. This desirable result is accomplished mainly by the disparity between the mica content, which does not absorb moisture to an appreciable extent, and the fiber content, that has a relatively great affinity for moisure, which if absorbed by the boards after they are thoroughly dried and hardened would tend to soften and therefore render the boards flexible and liable to warp. Another reason why the boards will not warp is that the fibers are so thoroughly embedded in the non-absorbent mica paste that they are effectually shielded from atmospheric moisture, and are therefore rendered substantially waterproof by an inherent quality of the mica, namely, its relatively low absorbent nature. The boards may, however, be waterproofed by incorporating with the basic ingredients any suitable chemical, such as "Montan Wax" or "Gilsonite"; or the waterproofing may be effected by the use of any of the well-known gums or resins commonly used for the purpose.

The wood fiber is the only ingredient of the present composition that may be destroyed by fire, unless its temperature approximates 3500° F., the melting point of mica, so that the relatively great reduction in the combustible fiber content renders the heat resistance of the boards correspondingly greater.

Wall or other boards produced by the herein described process may be painted, plastered, covered with paper, or otherwise decorated, without requiring additional sizing.

A high grade heat-resisting composite board may be produced by substituting vermiculite of the "Zonolite" variety for the pulverized mica.

No drawings are submitted in the instant case, for the reason that all of the instrumentalities referred to are well-known and need no particular description nor illustration.

Having thus described our invention, what we claim, is—

1. A wall board composed of a homogeneous mixture containing 25% by weight of shredded wood fiber and about 75% by weight of pulverized mica.

2. A composite board made from 3% stock containing about 25% by weight of shredded wood and about 75% by weight of powdered mica compacted and dried by pressure in excess of 250 pounds at a sustained heat ranging from 300° to 400° F.

3. An inflexible heat and moisture resisting board composed of about 25% of shredded wood fiber, and about 75% pulverized mica refined, compacted and hardened by pressure above 250 pounds at a temperature of 300° to 400° F.

4. A process for producing fireproof and waterproof composition boards which consists of agitating in water shredded wood to separate the matted fibers, then mixing about 25% by weight of the separated fibers with about 75% by weight of pulverized mica until a homogeneous substantially 3% stock is obtained, reducing the stock to sheets that contain 50 to 60 percent moisture, applying to the sheets pressure in excess of 250 pounds per square inch in a temperature between 300° to 450° F., until the sheets are thoroughly dried, hardened and rendered inelastic.

5. The method of making composite wall boards which consists of beating with water about 25% shredded wood to separate all matted fibers admixing with the fibers about 75% pulverized mica, forming this mixture into boards having a moisture content of 50 to 60 percent, subjecting the wet boards to pressure ranging from 500 to 750 pounds per square inch and a temperature between 300° to 400° F. for 15 to 20 minutes to dry and render the boards hard and inelastic to prevent warping.

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