Oct. 17, 1961 J. A. TOMLINSON 3,004,878

METHOD OF PRODUCING FIBROUS GLASS BUILDING BOARDS AND PRODUCT

Filed Aug. 16, 1957 3 Sheets-Sheet 1

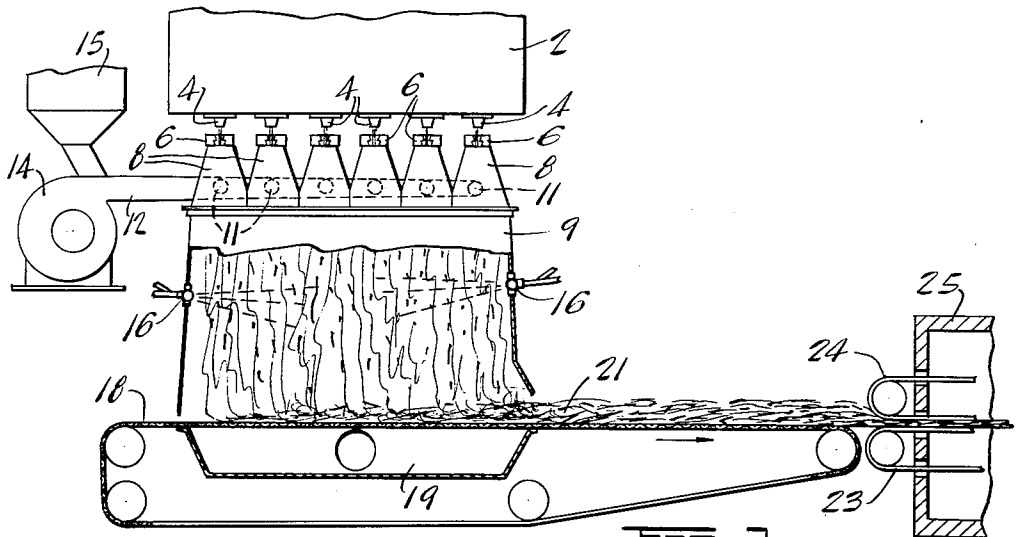


FIG-1-

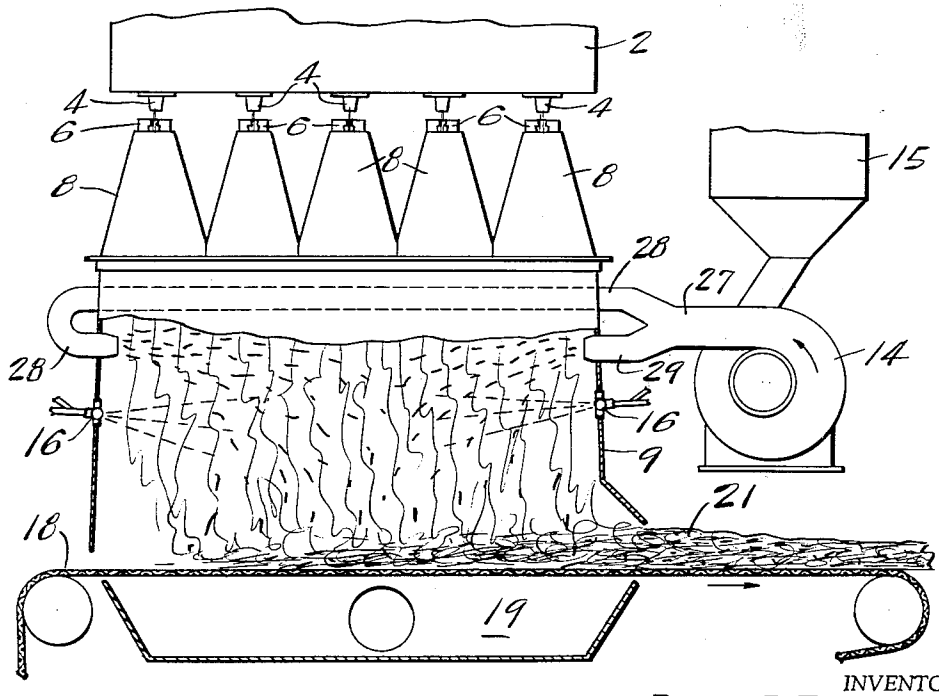


FIG-2-

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METHOD OF PRODUCING FIBROUS GLASS BUILDING BOARDS AND PRODUCT

Filed Aug. 16, 1957 3 Sheets-Sheet 2

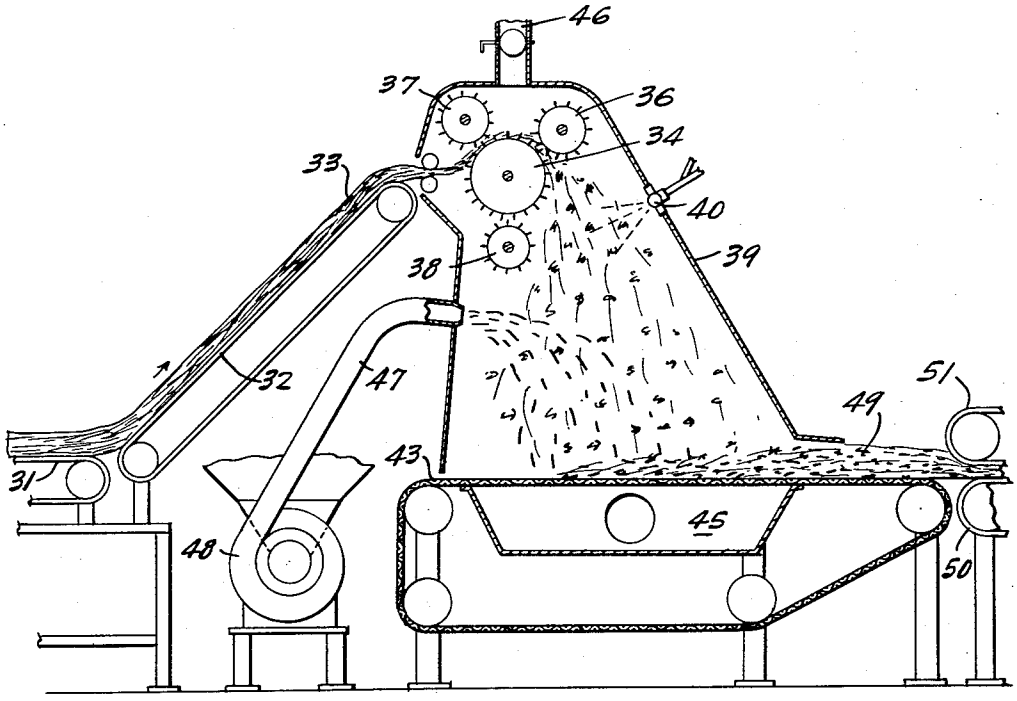


FIG-3-

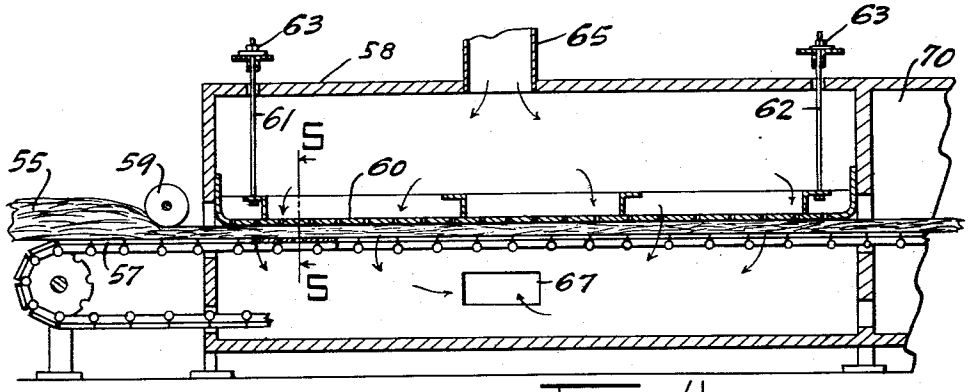


FIG-4-

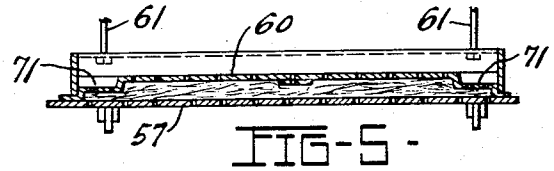


FIG-5-

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METHOD OF PRODUCING FIBROUS GLASS BUILDING BOARDS AND PRODUCT

Filed Aug. 16, 1957 3 Sheets-Sheet 3

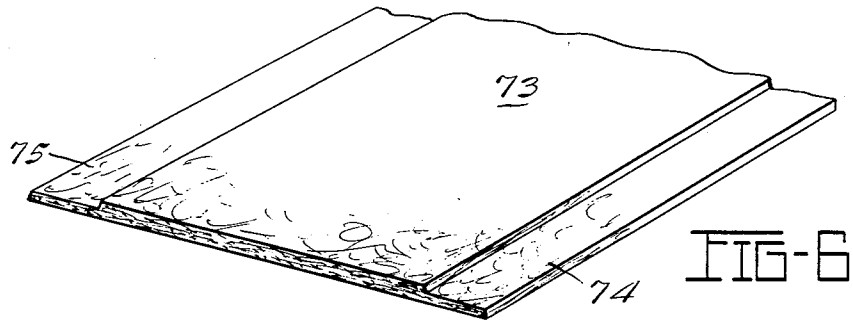


FIG-6-

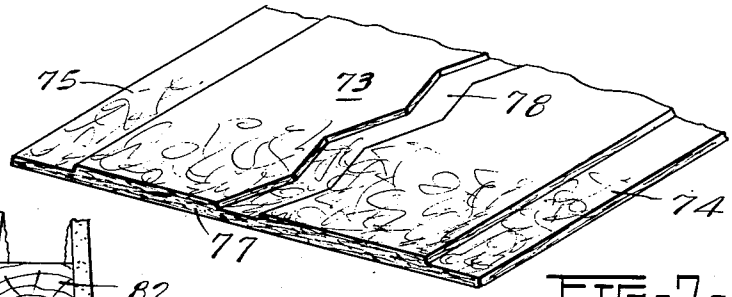


FIG-7-

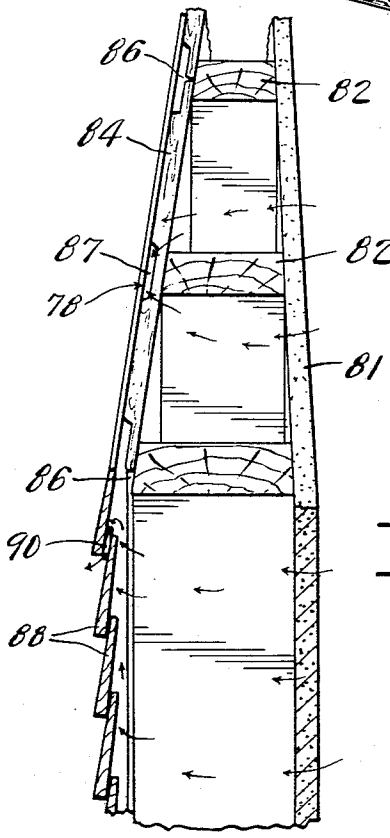


FIG-8-

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3,004,878

METHOD OF PRODUCING FIBROUS GLASS BUILDING BOARDS AND PRODUCT

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Filed Aug. 16, 1957, Ser. No. 678,586
5 Claims. (Cl. 154—45.9)

This invention relates to building boards having fibrous glass as a principal constituent, and particularly to such boards used for the sheathing of walls and pitched roofs.

Fibrous building boards, made of processed wood, bagasse, newsprint and other materials, have become increasingly common sheathing materials. Most are porous enough to have insulating value while sufficiently rigid to withstand handling as well as to provide moderate nail-holding power. Because of the low density of the organic fibers they are closely compacted to give the board weight and sturdiness. Consequently, the voids or air spaces in such boards account for only ten to thirty percent of their total volume.

In contrast to organic fiber boards, more than eighty percent of the volume of compressed fibrous glass boards usually consists of minute air spaces. This makes them more porous and superior as heat insulators.

Sheathing boards are applied in frame construction against the outer sides of wall studs or upon the rafters of a pitched roof. The exterior finish of the wall is generally wood siding nailed through the sheathing board to the wall studding but may be shingles secured upon furring strips or a brick veneer anchored through the sheathing to the studs. The roof may also be variously finished over the sheathing board with wood shingles or slate laid upon lath or furring strips, asphalt shingles or roll roofing.

Building elements, including sheathing boards are, of course, more or less subject to damage from moisture. In spite of the long-held belief that rain and fog are the source of water reaching the interior of walls and roofs, it is now recognized that moisture problems arise mainly from within buildings. The warm air within a dwelling can hold a large amount of water and usually does because of the water vapor released by washing, cooking, laundering and other household activities. Several gallons of water may be introduced into the air of a small home each day from such sources.

Through adequate ventilation in winter and air movement through open windows and doors in summer, this water vapor is carried away. If such an outlet is not provided, the pressure of the warm vapor will force the vapor through walls and ceilings toward attic, wall spaces and the outside atmosphere where the vapor pressure is lower. Many materials considered impervious to air will thus permit the passage of water vapor. As long as the vapor is free to continue its normal expansive flow it will not condense, even in severe winter weather, when chilled to the dew point temperature within the wall structure but will continue to move until dispersed in still colder air.

While a general recommendation is to place a vapor seal in the form of a sheeting or coating at or adjacent to the warm side of the walls or pitched roofs of dwellings in order to prevent access thereto of household moisture, in some climates or conditions such a vapor barrier is not advisable, and may also be omitted as an economic measure in many localities.

Where the siding or other outer wall covering is vapor tight, either because of its basic nature or due to an impervious paint coating, water vapor generated within the dwelling and forcing its way through the inner layers of

the wall structure to the siding is stopped there, and if the temperature of the siding is sufficiently lower than that inside of the dwelling, the vapor is condensed on the inner surface of or within the siding. The resulting dampness, which is likely to remain for a long period, has a rotting effect upon the wood siding and adjoining studs, and when vaporized by higher outside temperatures may cause blistering and peeling in the outer coating of paint.

When the siding strips or other outer structural materials are not tightly assembled or venting ports therethrough exist whether or not intentionally provided, the lack of resistance to the movement of water vapor permits the vapor to continue its travel to the outside atmosphere. As previously stated, this takes place even though the dew or saturation point resides within the wall structure. This exterior dissipation of the water vapor is, of course, most desirable as it prevents the development of dampness within the walls.

Sheathing boards of glass fibers, because of their large content of air spaces is quite readily permeable to water vapor and allows the water vapor to reach and pass through a vented exterior layer of siding or other material to the atmosphere.

In contrast, a relatively compact organic fiber board sheathing, while no heavier than a fibrous glass board, has far fewer air spaces or voids and tends to resist the flow of water vapor. This resistance, coupled with a lowering of temperature to the dew point within or adjacent to the sheathing, condenses the vapor, and the resulting water is then absorbed and held in the board whether or not the outer wall surface is vented.

This water retained by the organic fiber board may remain for an indefinite period, the length of which depends upon how soon the outside temperature rises and the degree of vapor permeability possessed by the adjacent wall structure, both interiorly and exteriorly of the board.

Meanwhile, because of the high thermal conductivity of water, the heat insulating value of the area of the board holding water is practically eliminated. In addition, the water, due to the resulting swelling of the fibers and their reduced cohesive properties, has a severe weakening effect on the strength of the board. The dampness further promotes rotting and mildew in the board as well as in adjoining materials susceptible to such damage.

Where the outer layer of the wall constitutes a vapor seal, this precipitation and retention of water within the sheathing board is advantageous as it is inclined to prevent water condensation on the interior side of the siding or other surfacing materials and to curtail the draining of water down to the wall footing members.

The prime object of this invention is to provide a fibrous glass building board which has this water holding virtue of organic boards and which also is structurally strong, dimensionally stable, readily permeable to water vapor, and capable of temporarily holding water of condensation without losing its capacity as a heat insulator.

A further object of this invention is to provide a sheathing board composed of fibrous glass and organic fibers which contains a high quantity of voids or small air pockets to make the board effective as a heat insulator and to present low resistance to water vapor movement.

Another object of the invention is a sheathing board which will temporarily store condensed water but is resistant to the weakening or other deteriorating effects of moisture.

An additional object is a fibrous glass sheathing board in which the glass fibers are bound together and which has a component of organic fibers dispersed among the glass fibers.

A further object of the invention is to provide a building board of glass and organic fibrous material which is firmly held together by a binding agent disposed principally between glass fibers and by the felting properties of the organic fibers.

A still further important object of this invention is to provide a sheathing board with channels in its exterior face to serve as paths reaching venting areas in the exterior wall covering and hence to the outside atmosphere for water vapor moving outwardly from the interior of the dwelling.

An additional object is to provide a fibrous sheathing board with compacted portions which increase the nail holding and racking strength of the board.

Another object is the provision of methods for producing fibrous glass building boards having characteristics set forth in the preceding objects.

In view of the outstanding properties of fibrous glass including its great strength, inertness to weathering agents, and high insulating character, it would appear illogical to combine it in a building board with wood or other organic fibers which are inferior in those qualities.

The purpose of this invention, however, is achieved by effecting this unnatural combination of materials in a building board in a manner whereby the undesirable attributes of a board compounded entirely of organic fibers are excluded.

A principal feature of the invention is the utilization of a comparatively low quantity of the organic fibers as compared to the total volume of the finished board. For example, one formula which produces a board of the desired high air content involves two parts by weight of fibrous glass to one part of organic fibers in a board having an overall density of sixteen pounds per cubic foot.

However, the proportion of glass fibers to organic fibers may vary through a wide range within the concept and practice of this invention. Even a board having six parts by weight of glass fibers to one of organic fibers possesses the beneficial properties for which the execution of the invention is intended. Also, a building board containing as much as one part by weight of the organic fibers to one of glass fibers will have the desired advantageous features, even though the unfavorable characteristics of the organic material will be much more in evidence with such an increase in the proportion of the organic fiber component.

In the production of a standard fibrous glass board, fine threads or filaments of molten glass are drawn down from a series of multi-ported bushings by high pressure steam or air. A downwardly flaring pipe section or spout receives the fibers formed from each bushing and directs them into a hood. As many as eighteen bushings may thus feed glass fibers into a common hood. The bushings may be in a double row and the hood elongated and rectangular in cross section with its longer dimension in line with the rows of bushings and with a conveyor traveling across its lower end upon which the fibers accumulate in pack form. From the end walls of the hood strong blasts of an atomized binder solution are driven into the falling fibers, and the binder particles are adhered to the fibers as the latter fall and collect upon the conveyor.

In fabricating a board according to this invention, the organic fibers may be introduced by air blowers into the hood at several points or added in smaller air streams to each bushing spout. Either arrangement provides adequate distribution of the organic fibers throughout the final board product.

Contrary to the quite logical view that the fibers should be added in dry form, an important discovery of this invention is that the organic fibers should be wet when introduced into the glass fiber forming hood. If dry they absorb and are coated with the glass fiber binder to an extent where they become practically water repellent instead of water absorbent, the latter being the main quality for which their presence is desired. Further, the binder is comparatively expensive and the amount thus taken up by the organic fiber would seriously add to the production cost.

When wet, the organic fibers are inclined to repel the binder particles and thus the latter are more disposed to attach themselves to the glass fibers. Even so, there is an objectionable amount of the binder lost within the mass of organic fibers when the latter are added in the fiber glass forming hood, and the preferred procedure of the invention is to first produce a binder-impregnated pack of glass fibers in the regular way utilizing a lesser quantity of binder. Then the pack, uncured or preferably slightly cured, is torn in a reform unit into tufts and clumps, and the organic fibers are mixed with the thus disintegrated glass fiber mass before it is reassembled and reformed into a unitary pack or blanket. Additional binder may be added if desired during this reforming operation.

The binder introduced into the original glass fiber forming hood, with the above arrangement, is entirely deposited upon the glass fibers and remains quite completely attached to them when the mass is separated into tufts and clumps by the reform unit. With this effective use, the amount of the binder may be reduced as much as fifty percent and the factory cost of the cured board cut twenty percent or more.

If the organic fibers are wet when then added they will not absorb the binder with which they come in contact and therefore do not draw too much of the binder away from its proper glass fiber binding function. In a wet condition, the organic fibers have a much better felting action and thus become more completely tied to each other and the glass fibers.

There are advantages in having the organic fibers in a less wet form when introduced at the reform station than when added at the glass fiber forming hood, since the newly formed pack may be cured more readily with less moisture to be evaporated in the curing process. Also, the binder diluting effect of the water of the organic fibers is lessened, although the diluting action is minimized by a preceding partial cure of the binder, advancing it from its water soluble stage. While some additional binder will be taken up by drier organic fibers, it is not here too serious an economic factor and is far less than that incorporated in the organic fibers when they are injected into the glass fiber forming hood.

Another feature of the invention is a building board with indented edges or depressed channels running vertically in its outer face. Such more closely compacted edges or areas are produced by having downwardly projecting ridges or plateaus in the upper compression member in the curing oven. The resulting more compacted areas not only add strength and nail-holding power to the board but also provide vertical venting paths by which expanding water vapor may reach escape ports in the outer wall surfacing material.

The various methods referred to for producing building boards according to this invention are described in more detail hereafter in connection with the accompanying drawings in which:

FIGURE 1 is a longitudinal, vertical section of a glass wool or fibrous glass web production line adapted to produce a building board according to this invention;

FIGURE 2 is a similar view of the same equipment but in which the organic fibers are introduced into the main glass fiber forming hood instead of into the spouts leading into the hood;

FIGURE 3 is a longitudinal, vertical section of a reforming unit in which a fibrous glass web impregnated with binder is torn into small pieces, and organic fibers are mixed therewith prior to the reassembly of the pieces back to web form;

FIGURE 4 is a vertical section of a curing oven in

which the pack of fibrous glass and organic fibers is compressed and set in board form;

FIGURE 5 is a cross section taken on the line 5—5 of FIGURE 4 showing the shape of the compressing skid plate by which the edges of the board are compacted to a greater degree than is the center portion of the board;

FIGURE 6 is a perspective view of part of a board produced by the skid plate of FIGURES 4 and 5;

FIGURE 7 is a perspective illustration of a board with a centrally located zigzag channel and compacted edges molded under a compression conveyor flight having complementary projections; and

FIGURE 8 is a perspective section of a wall showing the installation of a board of the design of that of FIGURE 7 as a sheathing member.

Referring to the drawings in more detail, the glass and organic fiber pack production line illustrated in FIGURE 1 includes the forehearth **2** of a glass melting tank. Fine streams of glass are discharged from orifices in bushings **4**. The molten threads of glass are drawn downwardly and attenuated into fibers by the blast of air or steam jets from manifolds **6**. These fibers are preferably between fifteen and fifty hundred thousandths of an inch in diameter.

Below each bushing is a guiding spout **8**. All of the spouts lead into a common hood **9**. In the arrangement illustrated, wet organic fibers, preferably shredded redwood or fir, are blown into each spout **8** from a branch line **11** of a main delivery piping **12**. An air blower **14** furnishes the pressure for driving the air borne wood fibers into the spouts from a feeding bin **15**. These fibers may be utilized in the wet state as discharged by an Asplund defibrator.

From the ends of the hood through spray nozzles **16** a glass fiber binder, preferably a phenol formaldehyde solution extended with twenty percent vinsol, a rosin suspension, is discharged into the falling fibers. The binder may be used in sufficient amount to constitute eight and one half percent by weight of the final board. The fibers, with the intermixed binder, collect in a pack upon the foraminous conveyor **18** travelling across the bottom of hood **9**.

A suction chamber **19** below the conveyor assists the gathering of the fibers upon the conveyor by drawing air downwardly therethrough. The fibrous pack or web **21** thus formed may have a width of four feet and a thickness of four to six inches, the latter being governed by the speed of the conveyor and the fiber production rate.

The pack is carried by conveyor **18** to a second conveyor **23** upon which it is compressed to the desired ultimate thickness of one half or three quarters of an inch by an upper conveyor flight **24**, or alternately by a stationary skid plate. While the pack is under compression the binder is set by the application of curing heat in the oven **25**.

After the permanently compacted pack has passed through oven **25**, it is cut and trimmed according to the dimensions desired in the final building board product. With the proportion of glass fibers to wood fibers at two to one by weight and a content of eight and a half percent of binder by weight, the building board may have a density of sixteen pounds per cubic foot with minute air spaces or voids accounting for close to seventy five percent of the total mass or volume. However, a lower content of wood fibers is preferred to minimize their blocking and laminating effects.

The apparatus shown in FIGURE 2 is similar to that of FIGURE 1 except for the arrangement whereby the wet wood fibers are introduced into the hood instead of into the individual spouts. The blower **14** directs the wood fibers into a main piping **27** which is divided into branches **28** and **29** which lead separately to opposite ends of the hood **9**. With this apparatus the distribution of the wood fibers in the collected pack is quite satisfactory although not as thorough as with the apparatus of FIGURE 1.

While the building boards produced by the equipment of FIGURES 1 and 2 possess the desired qualities, a rather excessive amount of binder is utilized since a large proportion of it is buried in the wood fiber component. The binder serves little purpose in connection with the wood fibers since they are inclined to mat or felt together, particularly when wet, and to attach themselves to the glass fibers without the aid of any cohesive agent. This waste of binder is greater than would be expected in view of the bulk of the wood fibers, their specific gravity being around .4 and accordingly much lower than that of the glass fibers.

An arrangement permitting a substantial saving in the quantity of binder material is illustrated in FIGURE 3. In this method a glass fiber pack impregnated with binder is formed in the normal manner in a glass wool forming line and is delivered by a conveyor **31** to the upperly inclined conveyor **32**. This angled conveyor **32** feeds the uncured, or partially cured, pack into a reforming unit in which there is a main roller **34** covered with projecting spikes **35**. This roller revolves clockwise as viewed in FIGURE 3. Adjacent to the roller **34** are smaller rollers **36** and **37** likewise having spikes around their peripheral surfaces. The rollers **36** and **37** turn in the opposite direction to that of roller **34** and their spikes intermesh with the spikes of the large roller.

Through the cooperative action of these three rollers the pack of fibrous glass is torn into clumps and tufts and discharged downwardly within hood **39**. A cleaning roller **38** positioned below roller **34**, also rotating clockwise has spikes which remove glass fibers clinging to the spikes of roller **34**. If deired a supplemental quantity of binder may be introduced into hood **39** through nozzle **40**.

The clumps and tufts of glass fibers are collected and reassembled into a pack on conveyor **43** with the assistance of air movement through the conveyor into suction chamber **45**. This flow of air may be controlled by a damper in air inlet **46**. Wood fibers are discharged into the hood **39** through piping **47** under the drive of a blower **48**. The wood fibers are interspersed among the falling clumps of fibrous glass and become a part of the reformed pack.

These wood fibers may be in the same wet state as those introduced directly into the glass forming hood or spouts of the apparatus shown in FIGURES 1 and 2. However, in order that the water carried by the wood fibers does not adversely affect the binder with which the glass fibers are impregnated by dilution, in case the binder has not been brought to an insoluble state, it is preferred that the wood fibers here introduced carry a smaller amount of moisture. Also, the less water incorporated with the wood fibers, the more quickly and more completely may the curing of the pack be completed. Nevertheless, the wood fibers should be wet enough to interfelt and to have felting action with adjacent glass fibers. This is particularly desirable where the wood fiber component is high and more of the ultimate strength of the board must be derived from this constituent.

The resulting pack **49** is delivered to a receiving conveyor **50** and carried thereby under a compression upper flight **51**. While compressed it is transported through a curing oven for complete setting of the binder component and establishment of the pack in a permanently compacted form.

In FIGURE 4 a special curing oven is shown in which a stationary skid plate is utilized instead of an upper conveyor flight for compressing the glass fiber and wood fiber pack. As illustrated, the pack **55** arrives from the forming apparatus and is delivered to a conveyor **57** by which it is carried through the oven **58**. A pre-compression roller **59** reduces the pack thickness and prepares it for entry beneath the skid plate **60**. The latter is

mounted upon rods **61** and **62**, the height of which is adjustable through nuts **63**.

High temperature air is delivered to the oven through inlet **65** and passes through the perforated skid plate into and through the pack. This heated air brings the resinous binder with which the pack is impregnated to at least a semi-cured, set stage. After passing through the pack, the air is exhausted through outlet **67**.

With the binder cured to the point where it holds the glass and wood fiber mass to its compressed thickness, the final curing may be accomplished in a subsequent chamber **70** where the heated air has direct access to the pack without any intervening upper flight or skid plate.

The skid plate **60** is preferably formed with depressed edges **71** as may be seen in the cross section of FIGURE 5. Through this design, the edges of the pack and of the building board which is made therefrom are highly condensed. They are thus stronger than the edges of a board having the same thickness throughout its area. These depressed edges also have the added advantage of providing water vapor escape passages, when the boards are mounted with the compacted edges in a vertical position, by which water vapor may reach venting openings in the outer covering of the wall, whether of siding or of other surfacing material.

A partial perspective view of a building board with condensed edge portions produced by the apparatus of FIGURES 4 and 5 is shown in FIGURE 6. Bordering its main body section **73** are the strengthened edge strips **74** and **75**. By having downwardly offset shoulders on the ends of individual cross panels of an upper conveyor compression flight, a board may be produced of the skid formed design illustrated in FIGURE 6.

By shaping the compression conveyor cross panels with angularly directed ridges, in addition to shouldered ends, a board **77**, as perspectively illustrated in FIGURE 7, may be produced with one or more centered zigzag channels such as **78** and condensed edge strips **74** and **75**. Such an angular channel improves the racking strength of the board by diagonal bracing as well as furnishes another path for expanding water vapor. It also provides an additional area of extra nail holding capacity. A conveyor panel of a single design may be utilized in assembling an upper compression flight for producing such boards by turning alternate panels endwise.

A portion of a wall incorporating a board such as that illustrated in FIGURE 7 is shown in perspective in FIGURE 8. Both a horizontal and vertical section of the wall are included in this view. The interior of the wall is faced with a gypsum board **81** set against two by four studs **82**. Nailed to outside edges of the studs is a sheathing board **84** having compacted vertical edges **86** and a centered vertical channel **87**. The board is secured to the studs by nails through the compacted sections. The exterior surface of the wall comprises lapped siding **88** nailed through the sheathing board to the studs.

Water vapor generated within the dwelling follows the paths indicated by arrows through the permeable gypsum board and across the air space between the studs. It then travels through the porous sheathing board to reach the vertical venting channels provided in its exterior surface. If there are natural cracks between the siding strips the vapor readily passes to the outside atmosphere. In case the siding is closely installed, small wedges **90** may be driven between adjacent siding strips along the top and bottom of the wall to provide vapor exit openings. As mentioned earlier, this escape of the water vapor will occur even though the outside temperature is sufficiently low to establish a dew or saturation point within the sheathing board or the siding.

In case accidental or purposely arranged vapor exhaust outlets do not exist, and the outside surfacing material constitutes a substantial vapor barrier, there will be condensation of water on the inner surface of the siding. This water will run into the sheathing where it is held by the absorbent wood fibers. However, because of the high porosity of this fibrous glass and wood board, and the dispersal of the wood fibers therethrough, the moisture will be quick to evaporate and diffuse on a subsequent rise of temperature. This is in marked contrast with the slow dissipation of water vapor from a closely packed all-organic fiber board. It should here be again pointed out that the higher resistance of the organic board causes the vapor to condense whether or not there is free passage for the vapor beyond the exterior side of the board.

Because of the strong network of bonded fiber glass and the non-continuous distribution of wood fibers, the building board of this invention is not weakened materially by the absorbed water and its thermal insulating capacity is not seriously impaired.

In addition to redwood and fir fibers specifically referred to herein, other wood and organic fibers are equally adaptable to this invention. Soft wood fibers in general, such as pine and spruce, would be satisfactory as would be bagasse, fibers prepared from sugar cane.

Although the description has been restricted to fibrous glass, the coarser mineral fibers of rock and slag wood may be used as the main constituent, even though, as is well known, their qualities are below those of standard glass fibers.

Also, while the building board of this invention is of prime value as a wall or roof sheathing, its mertitable features are advantageous when the board is used for other purposes.

Should it be desired to increase the resistance of the board to the movement of water vapor, when there is an inadequate outlet for vapor beyond the board, a semi-pervious coating of gypsum may be applied to the interior surface of the board. Through this extra resistance, the action of the board will be similar to that of an all organic board causing precipitation of water therein in advance of outer wall surfacing material.

The proportion of glass fibers to organic fibers may vary, in boards coming within the province of this invention, throughout a wide range. Various considerations may affect the determination of the relative amounts of the two types of fibers to include.

Should dimensional stability, long lasting immunity to weathering, superior insulating properties be of utmost concern, the glass fiber content should be increased. If cost is important or in case a heavier bodied or more closely knit board is preferred, the organic fiber share may be made more dominant. In the first case the binding together of the glass fibers is relied upon for the primary strength of the board with the wood fibers spaced compartively sparsely therethrough.

In the latter composition, the strength of the board is to a greater extent derived from the more continuous formation of intervening wood fibers. A larger quantity of wood fibers may be better introduced where the mixing is accomplished in the glass fiber forming hood. Likewise, longer wood fibers are favored in the hood mixing system. When the organic fibers are added in a reform unit, a lower quantity and shorter fibers are desirable in order that they more easily penetrate the glass fiber clumps and do not form layers over the clumps.

Whatever ratio of constituents are utilized in following the precepts of this invention, the resulting building board product has high porosity and insulating capacity. While permitting the passage of water vapor, it retains the ability to store water of condensation. Due to its comparatively open structure it releases condensed water rapidly, and because of the qualities of the fibrous glass it is little affected by the presence of moisture. Through the more highly compacted sections the board of this invention has areas of special strength and they also provide escape paths for expanding water vapor. This not only lessens the possibility of damage to the board itself from retained water, but also acts to protect adjacent structural members from this source of trouble.

From the foregoing it may be perceived that ample means and methods have been provided for realizing the objects of the invention. At the same time it will be understood that numerous changes may be made in materials and methods without departing from the spirit of this invention and the scope of the appended claims.

I claim:

1. A fibrous pack from which a building board is produced including substantially dry glass fibers, dispersed particles of a heat settable binder, said binder having a strong affinity for the dry glass fibers, and coarse, unbeaten and unslurried, shredded wood fibers interspersed among the glass fibers, said wood fibers being wet but carrying insufficient water to materially wet the glass fibers.

2. A fibrous pack according to claim 1 in which most of the glass fibers are in loose binder-impregnated clumps and the wood fibers are binder-free and are disposed generally exteriorly of the clumps.

3. A method of producing a fibrous building board which comprises creating a web of glass fibers impregnated with an uncured binder, tearing the web into clumps and letting the clumps fall upon a collecting surface, interspersing coarse, wet wood fibers among the clumps of the web as they fall upon the collecting surface, said wet wood fibers being free of an excess of water, compressing the resulting mixed mass of glass fiber clumps and wood fibers and curing the binder while the mass is compressed.

4. A method of producing a fibrous building board which comprises mixing and massing comparatively dry glass fibers, coarse, wet, wood fibers and a binding agent, said wood fibers carrying an insufficient quantity of water to materially wet the dry glass fibers, compressing the resulting mass of fibers, impregnated with the binding agent, and applying heat while the mass is compressed to set the binding agent and simultaneously drive the moisture from the wet wood fibers, the evaporation of the water from the wood fibers blocking the adhesion of the binding agent to the wood fibers.

5. A building board composed of evenly distributed bonded glass fibers and loosely incorporated coarse wood fibers and having a hard impermeable binding agent, said binding agent being attached to the glass fibers and having a minimum attachment to the wood fibers, whereby the surfaces of the wood fibers are largely uncoated with the binding agent and hence are capable of readily absorbing moisture, the proportion by weight of the glass fibers to the wood fibers being between one and six parts of the glass fibers to one part of the wood fibers.

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1,996,082	Powell	Apr. 2, 1935
2,288,072	Collins	June 30, 1942
2,639,759	Simison	May 26, 1953
2,658,848	Labino	Nov. 10, 1953
2,702,241	Hawley	Feb. 15, 1955
2,772,603	Waggoner	Dec. 4, 1956