W. D. KIMBALL AND A. E. RIDEOUT.

TAPE APPLYING MACHINE.

APPLICATION FILED JAN. 30, 1918. RENEWED SEPT. 18, 1922.

1,434,212. Patented Oct. 31, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

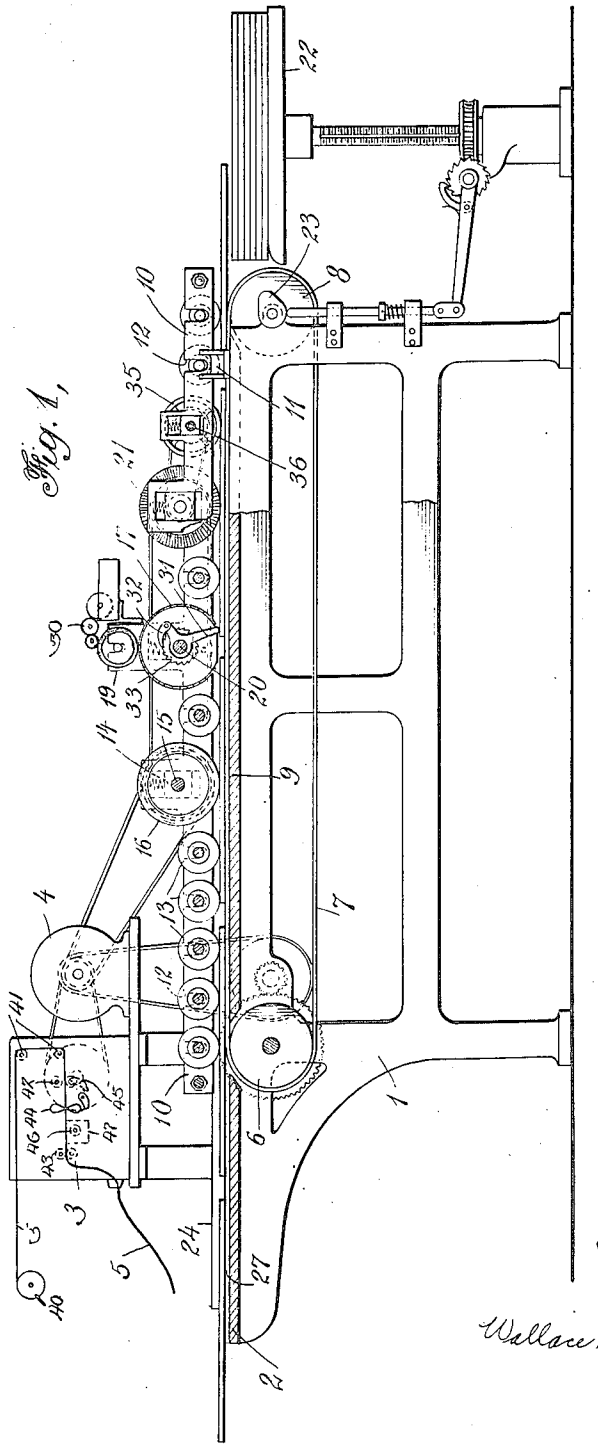
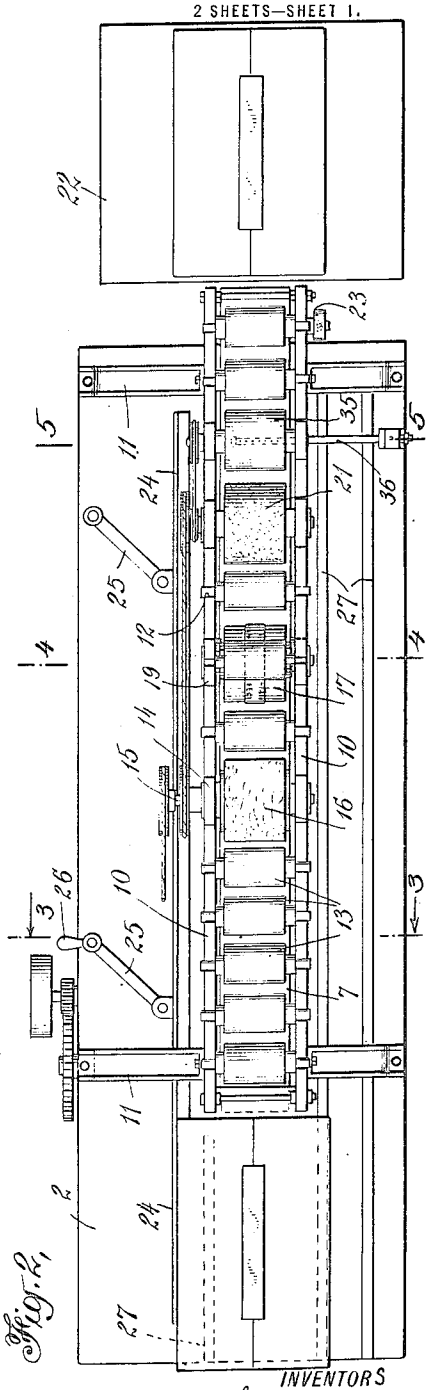


Fig. 2.



INVENTORS

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2 SHEETS—SHEET 2.

Fig. 3,

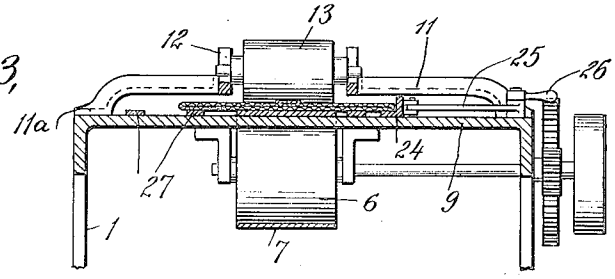


Fig. 4,

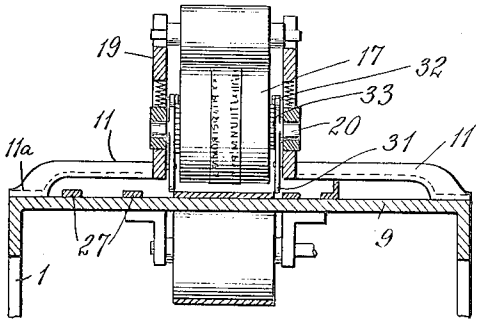


Fig. 5,

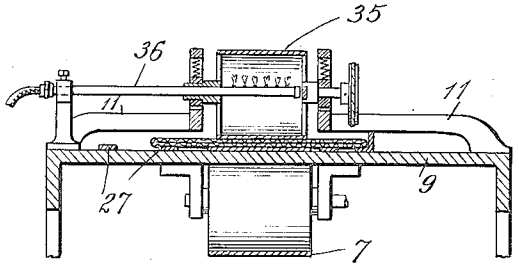


Fig. 7,

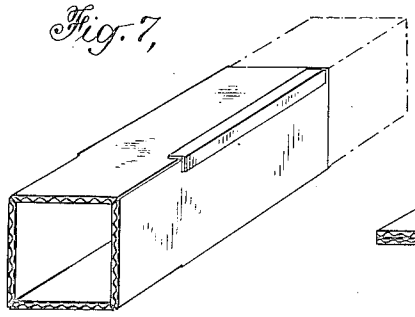


Fig. 6,

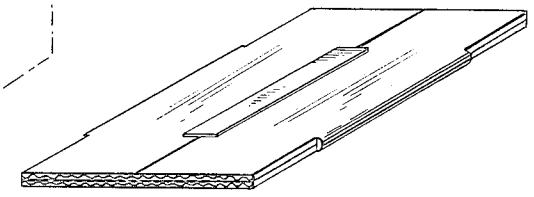
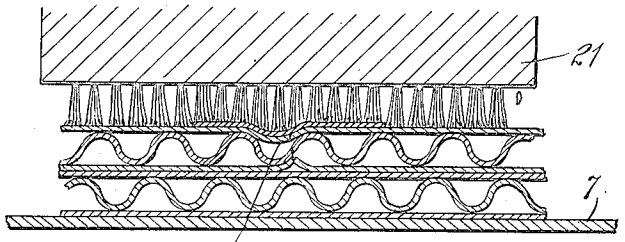


Fig. 8.



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UNITED STATES PATENT OFFICE

HARRY C. RAYNES, OF PORTSMOUTH, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BEMIS INDUSTRIES, INCORPORATED, OF BOSTON, MASSACHUSETTS, A CORPORATION OF DELAWARE

WALL BOARD

Application filed September 10, 1926. Serial No. 134,663.

This invention relates to a wall board or fibre board and to a process by which it may advantageously be made.

Among the objects of the invention are to provide a wall board which may serve as a basis for paint or varnish which may be applied directly thereto without the necessity of additional sizing or other finish; to provide a wall board which may without change be used as a basis for plaster, or, if desired, for both purposes, one side being plastered and the other finished with paint or varnish; to provide a simple and comparatively inexpensive process for making such an improved board; and in general to improve on wall boards and processes used in their manufacture. Other objects and advantages of this invention will be apparent as the description proceeds and will be more particularly pointed out in the appended claims.

Various features of the invention are illustrated in the accompanying drawings, in which:

Fig. 1 shows diagrammatically an apparatus in which the process above referred to may be carried out; and

Fig. 2 shows an enlarged sectional view of the fibre board produced by the process.

The wall board or fibre board which is produced by the process of my invention may be made from a great number of varied raw materials such, for example, as vegetable fibres, straw, trimmings, waste from saw mills, waste from cotton mills, waste from rag or wood fibre paper mills, unmerchantable stumpage, municipal waste, such as cloth, paper, wood or other fibres, waste from lumbering operations, such as slashings, and any other fibres of this general nature. These various raw materials are fed preferably by a handling and sorting conveyor into a reducing mill which may be of the ball, tumbler, "hog," or any other desired type in which the material may be preliminarily comminuted. From the reducing mill the material way be fed by a collecting conveyor to a shredder or refining mill in which the material may be further comminuted, any suitable form of apparatus being employed for the purpose, such as a plug or fly bar drum refiner or a whirl beater for example.

The various kinds of fibres so prepared are then preferably taken to a precipitation system where they may be separated according to their different specific gravities, the differentiation being accentuated if desired by a chemical treatment of the fibres in the mixing conveyor. In this precipitation tank the heavy material will be separated out to a large extent and the soft wood fibres separated from the hard wood fibres. The hard wood fibres from the precipitation tank are then preferably directed to steaming kiers where they may be impregnated with sodium silicate and with sulphate of alumina forming an insoluble alumina silicate in or on the fibres. The soft wood fibres are preferably separately directed to a chest or tank where they may be subjected to chemical treatment by means of alumina sulphate and copper oleate, for example. The hard and soft wood fibres are then preferably combined together and mixed with the proper proportion of wood, waste paper or rag pulp. The mixed pulp may then be subjected to a final chemical treatment to attain fire and moisture resisting properties. The pulp so made is then taken to the apparatus forming the basis of this invention, made into fibre board and finally dried. The method by which this is accomplished may be best described with reference to Fig. 1 of the drawings.

The pulp to be used is fed into a head box 1 from which it is preferably passed between baffles 2, 3 and 4 into a chest or vat 5 from which the material is withdrawn in the form of a sheet in a manner to be more fully described. The bottom of the vat 5 is closed by an inclined wire screen 6 extending from side to side thereof and is preferably supported by means of end rollers or drums 7 and 8. The roller 8 in this case is shown vertically adjustable, which may be accomplished by mounting it in the bearings 9 which are slidable in guides 10. The bearing block 9 may be forced upwardly by a suitable spring 11 whereby the corresponding end of the screen may be re-

tained in position. The tension of the screen 6 may be adjusted by means of an idler drum 12 suitably supported for rotation in bearing blocks 13 which may be slidably mounted in the guide members 14 and forced upwardly into contact with the screen by means of springs 15. The upper run of the screen 6 may be suitably supported by or on table rolls 16 so as to be substantially flat over the whole area of its upper run. A tilted pan 17 may be placed under the upper portion of the screen 6 within the loop thereof and extending thereunder with its ends closely adjacent to the drums 7 and 8 so as to catch the water, fine fibres and valuable chemicals dissolved therein which pass through the wire screen as the pulp is deposited thereon. This pan may be provided with a suitable drain or opening 18 through which the material may be conducted away or lead to any suitable tank or holding means.

During the movement of the screen 6 the longer fibres are deposited thereon and form a mat which travels with the screen over the roller 8 at which it comes into contact with a mat of fibres delivered by a second screen upon the cylindrical drum 19.

A substantial part of the side of the vat 5 adjacent to the lower end of the inclined screen 6 is taken up by the large cylindrical drum 19 which extends from side to side of the vat and is covered on its outside with a wire screen preferably of substantially the same mesh as the screen 6. Suitable means such as a pipe (not shown) may be provided within the drum for carrying away the water and other material which pass through it as the pulp is deposited on its outer peripheral surface. The drum 19 may be mounted for rotation in any suitable way, but is preferably mounted so as yieldingly to press against the screen 6 so that the pulp layer or mat deposited thereon will be pressed into engagement with the mat deposited on the screen 6.

To prevent the escape of water from the inside to the outside of the drum 19 at the part thereof on the outside of vat 5, a doctor or mask 20 is provided which is substantially tangent to the drum at its lower portion and is spaced slightly away therefrom except at this portion, at which it forms a wedge 21 between the drum and the fibre board or pulpy mass and serves to remove the latter from the drum. This doctor or mask may be supported, for example, by being fastened all or a part of the way to the sides of the vat 5. The pulpy mass or unfinished fibre board which is pressed in passing between the cylinder mold 19 and the roll 8 is formed into a semi-solid sheet and is delivered therefrom onto a table 22 which is preferably sloped downwardly from the roll 8 and delivers the pulp mass or sheet to one or more pairs of squeeze rolls 24 and 25, and from thence to one or more pairs of press rolls 26—27. The press rolls may be of any suitable form, being either solid or perforated. One or more endless felts may be employed, if desired passing around the squeeze and press rolls.

From the press rolls the fibre sheet is preferably passed through a vacuum box 28 which may be provided at its inlet 29 and outlet 30 with suitable roller gates so as to maintain as high a vacuum as possible within the box. The vacuum box may be provided with a pair of rolls 47, 48 over which is passed an endless wire or felt sheet 31 which serves to support the fibre mass or sheet during its passage through the vacuum box. The upper run of the wire or felt sheet may be supported in any suitable manner as by means of table rolls 32, for example. In order to exhaust the air from the vacuum box it may be connected to a suction pump 33 adapted to maintain a sufficiently high vacuum and suitable heating means such as steam heating coils may be employed so that the vapor pressure of the water in the fiber mass at the temperature within the device will cause a considerable proportion of the water to be vaporized and carried from the fibre mass, the temperature being regulated as desired according to the nature of the particular material being treated. By this means the water in the interstices of the fibre or a large portion thereof will be removed, although it is probable that the water within the fibres themselves will not be removed in any substantial amount.

The fibre mass issuing from the exit 30 of the vacuum box 28 is preferably carried along over an endless belt 34 supported at its ends by drums or rollers 35 and 36 and at its upper central portion by table rolls 37. A suitable box or hopper 38 is preferably provided for distributing a mass of fine fibres through an aperture 39 in its lower portion by means of which a surface layer of finer fibres is formed on the sheet. It is to be understood that the hopper 38 may be placed ahead of the vacuum box 28 if desired whereby the vacuum will serve to make a better bond between the layers and whereby the base sheet will not contain all the water received through the formation of the fine fibre sheet on the top of it. In order to form the upper layer a very fine texture pulp, or other mass of liquid or dry ingredients, is fed into the box 38 and is deposited through the aperture 39 onto the upper surface of the fibre mass. Due to the fact that the water has been withdrawn from the interstices of the mass, the fine pulp will be distributed over the surface of the base material and penetrate therein as indicated in Fig. 2 of the drawings, the

heavy pulp layer being designated by the numeral 40 and the fine pulp layer by the numeral 41. The composite board which is thus formed is then passed through the rolls 42 and 43 which effect a squeezing of the mass and a pressing together of the layers thereof to form a substantially integral board. The rolls 42 and 43 besides serving to thoroughly unite the pulp portions serve also to attain the desired form of surface on each side of the sheet. The top roll 42 is preferably smooth whereby a calendering action is produced giving the upper surface on which the fine pulp 41 has been deposited a smooth finish. The bottom roll 43 is preferably knurled or formed with a design, whereby the lower surface of the board is roughened or may be impressed with any suitable design, marking or lettering. An endless felt may be used on the press roll 42, if desired, so that the newly formed fine fibre sheet portion will not be crushed.

The board is then preferably passed under a suitable cutting device 45 so as to form the desired lengths, and is then carried by a conveyor 46 to a suitable drying kiln (not shown) where any remaining moisture may be removed.

It will be seen that I have provided a composite board having a smooth surface on one side, which is adapted to receive paint or varnish without the necessity of the use of excessive sizing, and which is roughened on the other side and has comparatively large pores therein, whereby it is enabled to receive and hold plaster or other binding material.

I desire to have it understood that I do not wish to be limited to the specific embodiment of the invention or the specific process here shown and described except as defined in the appended claims. It is to be understood that the sequence of operations above set forth constitutes the preferred mode of carrying on my method, but the exact sequence need not be followed, such, for example as the order of applying the fine top coating mixture and that various changes or modifications may be made in both the product and the method set forth, as will be apparent to those skilled in the art, without departing from the spirit or scope of the invention.

I claim:

1. A fibre board composed of two substantially integral layers, one of said layers being of fine fibres having its outer surface calendered, whereby it is adapted to receive paint and varnish without the necessity of excessive sizing, and the other layer being of comparatively coarse fibres having its outer surface roughened and having open interstices between its fibres, whereby it is adapted to receive and retain plaster.

2. A fibre board composed of a layer of comparatively coarse fibres, a second layer of comparatively fine fibres intimately associated with the first layer and partially filling the pores thereof, the second layer being calendered on the outside and being of such fine texture that paint and varnish may be applied directly thereto, the opposite side being roughened and having a comparatively open texture so that plaster may be retained thereon.

3. A fiber board comprising matted ligneous fibers, the major portion of the thickness of the board comprising an insulating layer of coarse fibers, and a face layer of fine fibers merging into and integrated with the layer of coarse fibers, the coarse fiber layer being exposed upon one side of the board to provide a rough porous surface, and the fine fiber layer being calendered to afford a smooth finished surface.

Signed by me at Portsmouth, New Hampshire, this eighth day of September, 1926.

HARRY C. RAYNES.