

April 8, 1924.

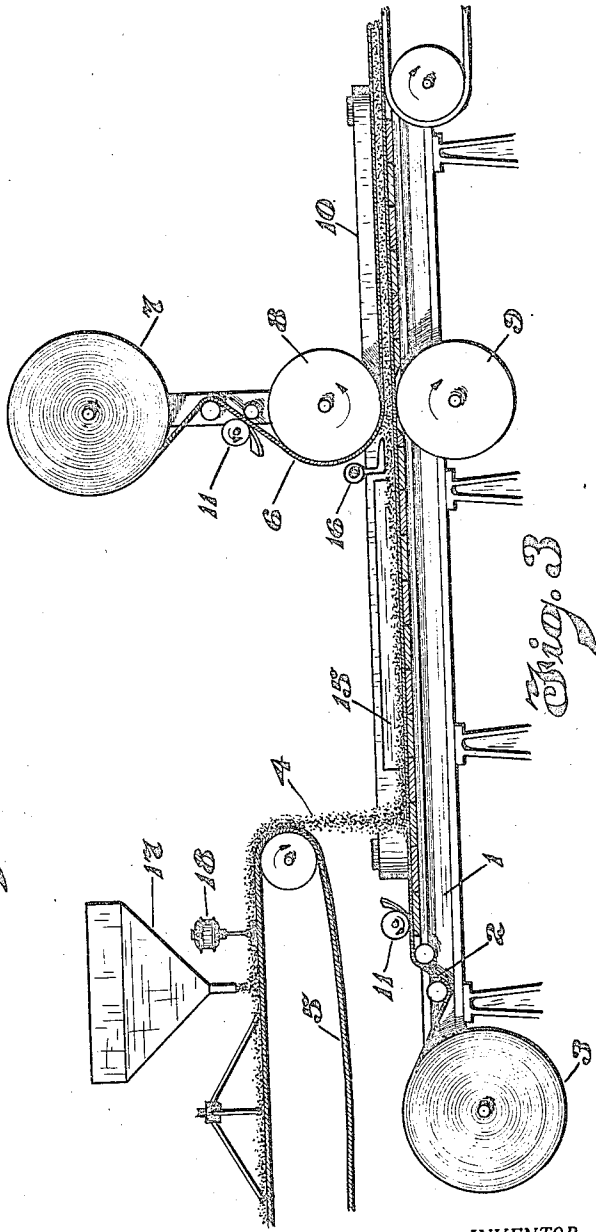
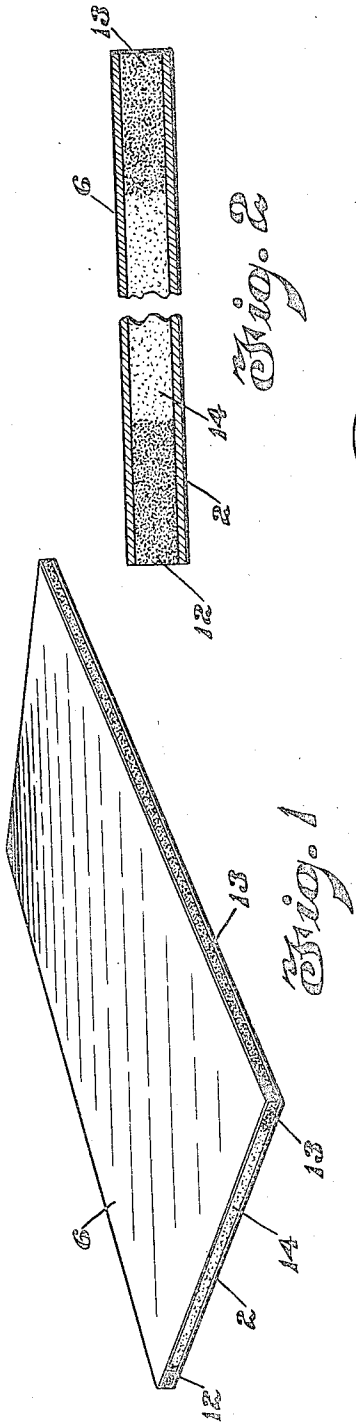
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H. E. BROOKBY

MACHINE AND METHOD FOR MAKING HARDENED EDGED PLASTER BOARD

Filed Sept. 25, 1922

2 Sheets-Sheet 1



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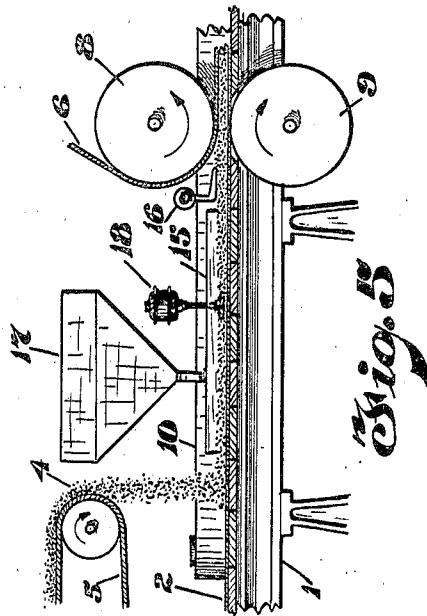
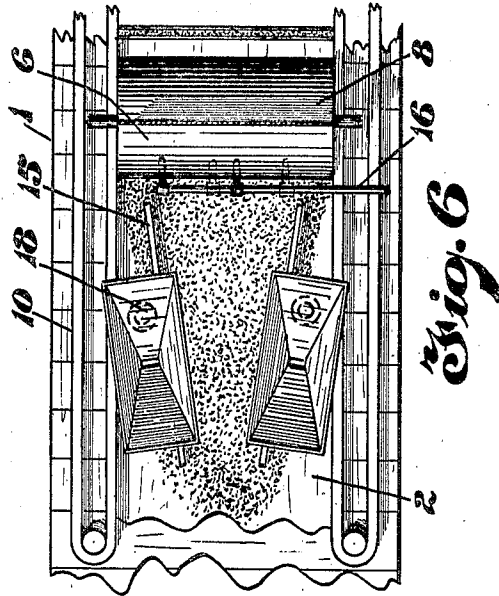
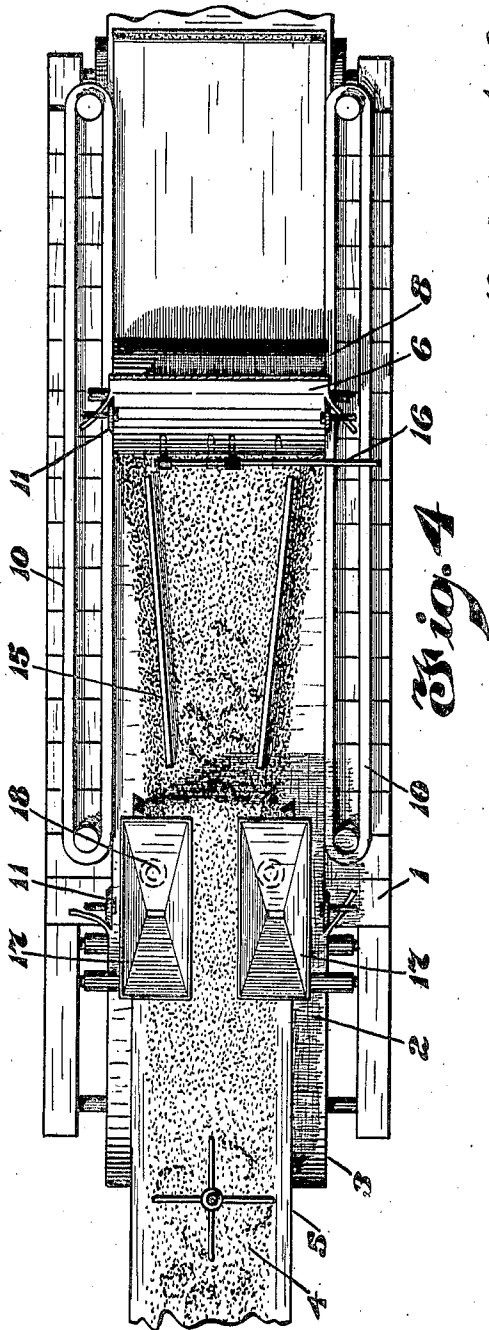
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UNITED STATES PATENT OFFICE.

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MACHINE AND METHOD FOR MAKING HARDENED-EDGED PLASTER BOARD.

Application filed September 25, 1922. Serial No. 590,362.

To all whom it may concern:

Be it known that I, HARRY E. BROOKBY, a citizen of the United States, residing at Evanston, in the county of Cook and State of Illinois, have invented new and useful Improvements in Machines and Methods for Making Hardened-Edged Plaster Board, of which the following is a specification.

This invention relates to improvements in the production of building materials and more particularly to a machine and method for making hardened edged plaster board.

Plaster board, comprising a body of plaster, with or without aggregates, having a fibrous covering on the opposite flat sides, has been used for many years in the building trades as a substitute for wooden laths and as such was nailed to the studding of the building and finished with a complete coat of wall plaster to produce a wall surface ready for decorations, as is customary in dwellings and other buildings. Such plaster board at first was made by applying a layer of the body in a plastic state upon a bottom cover sheet and then applying a top cover sheet which sheets bonded to the body as the plastic mass set. When plaster board of this type was made by mechanical means it was found that the body while plastic exuded at the edges and means were devised for maintaining the body within the cover sheets so as to have a full squared edge. At first this was accomplished by trimming or sawing the board a short distance from the original edges after it had been formed while the body was in a semiplastic state. This produced a full squared edge but was expensive and the body at the edges exposed so that the covering sheets were liable to become detached and peel during transportation and the handling necessary before erection. To overcome these disadvantages, the bound edge plaster board was developed in which one sheet was wider than the other and was folded about the edges and attached on the opposite side to the opposite sheet. This formed a covered edge and insured its protection against disfigurement caused by the body crumbling, cracking or otherwise becoming detached from the margins of the cover sheets and falling out along the edges. Special machines are required to produce this covered edge plaster board using different widths of paper and special mecha-

nism for folding the wider sheet over the edge.

It is an object of this invention to produce a plaster board having an open or raw edge that will possess the advantages of the bound, covered or folded edge by a method that will decrease the cost in material and employ a machine of simple operation with less parts that require watching than the machines used to produce the bound or covered edge plaster board.

With these and other objects in view, the preferred form of machine employed in the preferred method set forth herein to produce this improved plaster board is illustrated on the accompanying sheets of drawing and it is to be understood that minor detail changes may be made therein without departing from the scope of the invention.

Figure 1 is a view in perspective of this improved board.

Figure 2 is a view in transverse section, with parts broken away, taken through this board.

Figure 3 is a view of the machine partly in side elevation and partly in longitudinal vertical section.

Figure 4 is a top plan view of Figure 3.

Figure 5 is a view similar to Figure 3, of a modified form of machine.

Figure 6 is a view similar to Figure 4, of said modified form of machine.

The production of an open or raw edged plaster board which possesses the more permanent full squared edged qualities of the covered edge plaster board is accomplished in accordance with this invention by making the edges of the plastic mineral core or body much stronger than the main body of the board and much tougher so that it will stand more abuse on these edges without harm.

In carrying out this invention the ordinary calcined gypsum, light aggregate or fibre, and water are mixed as usual except that before the mixed plastic mass goes through the board forming mechanism, a determined amount of the plastic mass is diverted from the main mass of the mixture to the outside six to nine inches of the board along each edge and during this diversion and before passing through the forming mechanism, this portion of the plastic mass is mixed with a colloidal gummy body that has the property of hardening and toughening gypsum plastic masses when set and

dried out. The particular gummy colloidal matter may be added either as a dry powder to the plastic mass at this stage or as a solution to the partially mixed and segregated or diverted portions of the plastic core. By this means the core of the formed board is divided into three portions, the strip on each side of hardened and toughened plaster and the intermediate portion of normal plaster, so that the edges will stand more abuse than the main body of the untreated core and thus protection is produced in an economical manner for the expensive colloidal matter is applied only at the edges where the protection is mostly needed.

Since it is customary in this art to manufacture plaster wallboard continuously on a machine which advances a bottom cover sheet, depositing the material forming the body of the board in a plastic condition upon this sheet, applying a fibrous upper cover sheet upon the plastic body, with means for moulding or retaining the plastic body between the cover sheets at the edge, and then transporting the board so formed upon a conveyor of sufficient length to allow the plastic body to partially set, bond to the cover sheets and become hard enough to allow of the cutting of the strip of board so formed in equal lengths, remove the cut portions from the end of the conveyor and transport to the drying kilns, it is only necessary to illustrate and describe the wet or board forming end of such a machine, as this invention relates only to the method and means of forming a particular type of plaster wall board.

As shown in Figures 3 and 4, the machine for carrying out this invention comprises a flat table 1 over which a fibrous bottom cover sheet 2 is advanced from a roll 3 preferably supported below the table. As this bottom sheet advances along the table the material 4 forming the body of the board is deposited thereon in a plastic state, preferably from a belt conveyor 5. The fibrous top cover sheet 6 is applied over the surface of the plastic mass, from a roll 7 supported above the table preferably by passing this sheet about the pressure or forming roll 8. This forming roll 8 is of same width as the finished board and is supported above the table in such a manner that it will impart the desired thickness to the board formed by the passage of the plastic body between the two cover sheets thereunder. If desired, a corresponding pressure roll 9 may be mounted on the table directly under the upper forming roll to co-act therewith in forming the board. As the bottom cover sheet lies flat on the table throughout its width, and as the top cover sheet is applied flat throughout its width upon the upper surface of the plastic mass, means must be provided to prevent

the plastic body from overflowing the edges of the bottom cover sheet as it advances and carries the plastic body toward the forming roll, also to retain the plastic body between the two cover sheets after the board has been formed and until the body has had time to set sufficiently to maintain the conformation of a squared edge. There are various means known in this art for maintaining or moulding the edges of plaster board constructed in this manner. In this case, vertical belts 10 are illustrated which travel at the same rate as the formed board along each edge of the bottom cover sheet as it advances toward the forming roll and thereafter along each edge of the formed board which belts pass over vertical pulleys arranged to maintain the moulding belts against the edges of the cover sheets and thereby prevent the body of the board while plastic from overflowing the cover sheet and oozing out at the edges of the formed board.

Since fibrous cover sheets of the character employed in plaster wallboard manufacture are affected by climatic and temperature changes in the roll to such an extent that different portions of the same sheet vary in width as much as $\frac{3}{8}$ " at times and as in applying the sheets to the machine there is a certain amount of weaving, both of which would prevent the accurate alignment of the edges on the same side of the board directly one above the other, it is preferable to trim each cover sheet the exact width of the board desired by cutters or rotating knives 11 just before the cover sheets pass on to the table and forming roll respectively.

Since it is contemplated by this invention to treat the plastic mass in such a manner that the edges 12 and 13 of the board will be harder and tougher than the intermediate body portion 14, it is necessary to add and mix the necessary ingredients to the plastic body before it passes through the board forming mechanism, and it therefore becomes necessary to segregate the portions of the plastic masses which ultimately form the edges of the finished board as the mass advances on the bottom cover sheet toward the forming roll and this is preferably accomplished by providing angularly disposed dams or guide plates 15 supported above the table a sufficient distance to allow the bottom sheet to pass thereunder and arranged so as to engage the outer portion of the plastic mass when first deposited upon the bottom sheet and deflect a portion from each side as it advances toward the forming roll so that these portions will be separated from the intermediate body portion and comprise the edges of the board when formed. These angularly disposed plates are clearly illustrated in Figures 3, 4,

5 and 6. The plastic body in machines of this character naturally dams up in front of the forming roll and it is customary to provide transversely reciprocating spreaders 16, as illustrated, which in this case will insure the distribution of the plastic mass at the intermediate portion of the board and insure its combining with the adjacent portions of the segregated or deflected plastic masses at the edges of the board.

The ingredients employed for producing the toughened or hardened edge portions of the body of the board are preferably sulphite cellulose, pitch, gum arabic, or gum tragacanth, or gum tragasole, or any similar colloidal gummy body that has the property of hardening and toughening gypsum plastic masses when set and dried out and as above stated may be employed in either a dry powdered state or in solution. Figures 3 and 4 illustrate one manner of applying these ingredients upon the conveyor on which the plastic body is mixed before it is deposited upon the bottom cover sheet and from which it is seen that a hopper or receptacle 17 is provided above each side of the conveyor adapted to discharge the toughening or hardening substance, in either powdered form or in solution, to the edges of the plastic mass on the conveyor. To insure a proper and uniform intermingling between these ingredients and plastic body, it is preferable to provide mixing discs 18, or other devices, between the discharge openings of these hoppers and discharge end of the conveyor so that when the plastic mass is deposited upon the bottom sheet the outer edges will be thoroughly mixed with the ingredients and the deflecting plates are so arranged that after the mass is deposited on the bottom sheet they will separate the mixed edge portions from the intermediate body and deflect these mixed portions to the edges of the board as it passes under the forming roll.

If desired the ingredients may be added to the plastic mass after it has been deposited on the bottom cover sheet, as illustrated in Figures 5 and 6, by placing the discharge hoppers 17 above the table so as to discharge their contents on the segregated portions of the plastic mass between the guide plates and respective edges of the bottom sheet and in this case, it is also preferable to provide mixing devices 18 between the hopper and the forming roll to insure a proper intermingling of ingredients with the plastic body before it passes under the forming roll.

What I claim is:

1. The method for producing plaster board having a composition body and upper and lower cover sheets, comprising the depositing of the body in a plastic mass upon the lower cover sheet, applying the top

cover sheet thereover, and mixing with portions of the plastic mass that form the edges of the board before the application of the upper cover sheet with substances to harden and toughen said edges when set.

2. The method for producing plaster board having a plaster body and upper and lower fibrous cover sheets comprising the depositing of the body in a plastic mass upon the lower cover sheet, incorporating a gummy colloid in the edges of the plastic mass forming the edges of the board, and applying the upper cover sheet.

3. The method for producing plastic board having a plaster body and upper and lower fibrous cover sheets comprising the depositing of the body in a plastic mass upon the lower cover sheet, incorporating a substance in the edges of the plastic mass forming the edges of the board, and applying the upper cover sheet.

4. The method for producing plaster board having a plaster body and upper and lower cover sheets, comprising the depositing of the body in a plastic mass upon the lower cover sheet, incorporating in the edge portions of the plastic mass a gummy colloid, diverting said portions to the edges of the board, and applying the upper cover sheet thereover.

5. The method for producing plaster board having a plaster body and upper and lower cover sheets, comprising the depositing of the body in a plastic mass upon the lower cover sheet, incorporating in the edge portions of the plastic mass a substance, diverting said portions to the edges of the board, and applying the upper cover sheet thereover.

6. The method for producing plaster board having a body with upper and lower fibrous cover sheets bonded to the flat sides thereof, comprising the advancing of the lower cover sheet, depositing the body in a plastic mass upon the lower cover sheet, mixing a gummy colloid with the portions of the plastic mass that form the edges of the board to render the edges when set harder and tougher than the intermediate body portion, applying an upper cover sheet, and passing the plastic mass between the cover sheets through a board forming device.

7. The method for producing plaster board having a body with upper and lower cover sheets bonded to the flat sides thereof, comprising the advancing of the lower cover sheet, depositing the body in a plastic mass thereon, incorporating a gummy colloid in the edges of the plastic mass, diverting the portions with the incorporated addition towards the edges of the cover sheet, applying the upper cover sheet, and passing the plastic mass between the cover sheets through a board forming device.

8. A method for producing plaster board

- having a body with upper and lower fibrous cover sheets bonded to the flat sides thereof, comprising the advancing of the lower cover sheet, depositing the body in a plastic mass thereon, incorporating a gummy colloid in the edges of the plastic mass, diverting the portions with the incorporated addition towards the edges of the cover sheet, applying the upper cover sheet, passing the plastic mass between the cover sheets through a board forming device, and retaining the plastic body between the cover sheets at the edges until the mass has set.
9. A machine for producing plaster board having a composition body with upper and lower cover sheets, comprising means for advancing the lower cover sheet, means for depositing the body in a plastic mass upon the cover sheet as it advances, means for applying the top cover sheet over the plastic mass, a board forming roll under which the plastic mass between the cover sheets passes, and means for incorporating in the plastic mass that forms the edges of the board before it passes beneath the forming roll ingredients that render the edges of the set board harder and tougher than the intermediate portion of the body.
10. A machine for producing plaster board having a plaster body and cover sheets on the flat faces thereof comprising means for advancing a lower cover sheet, means for depositing the plaster body in a plastic mass thereon as it advances, means for incorporating a gummy colloid in the edge portions of the plastic mass, means for applying an upper cover sheet thereover, and a board forming means through which the plastic mass and cover sheets pass with the colloid incorporated portions at the edges of the board.
11. A plaster board forming machine comprising means for advancing lower cover sheet, means for depositing a plaster body portion thereon in a plastic mass, means for depositing a gummy colloid on portions of the plastic mass, means for mixing the colloid therewith, means for diverting the said mixed portions to the edges of the cover sheet, means for applying an upper cover sheet thereover, and a board forming means through which the plastic mass and cover sheets pass.
12. A plaster board forming machine comprising means for advancing a lower cover sheet, means for depositing the plaster body thereon in a plastic mass, means for applying the upper cover sheet thereover, means through which the plastic mass and cover sheets pass to form the board, means arranged on each side of the cover sheets for retaining the plaster mass upon the lower sheet as it advances and between the two sheets after they have passed the board forming means, means for depositing a gummy colloid upon portions of the plastic mass, means for mixing and incorporating the colloid with the plastic mass, and means above the lower cover sheet for diverting the portions with the mixed colloid towards the edges of the said sheet as it advances towards the board forming means.

HARRY E. BROOKBY.