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COMPLETE SPECIFICATION

(54)

IMPROVEMENTS IN THE MANUFACTURE OF PLASTERBOARD

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Price

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The present invention relates to the manufacture of plasterboard, and more particularly to the formation of a sheet covering at the edges of cut or damaged board.

5 In the conventional production of plaster or gypsum board, a slurry of gypsum plaster is cast between covering sheets, commonly of paper. The paper in contact with the casting table or surface, which forms the face of the board and is commonly known as the 'cream' paper from its usual colour, has its lateral edges folded upwards to enclose the
10 cast slurry and then inwards over the edge of the formed slurry. The paper which is laid on top of the slurry, and which is commonly known as the 'grey' paper, is laid over the inwardly turned edges of the cream paper and adhered thereto. The lateral edges of the board are thus completely
15 enclosed by the lining papers, which serves to protect and strengthen the edges and to restrict absorption of water.

In this specification the terms 'facing sheet' and 'backing sheet' will be used for convenience in a broad functional sense as indicating the relationship a particular
20 sheet has to the board as a whole and to its production, and thus correspond respectively to the 'cream paper' and 'grey paper'. However, it will be understood that the lining sheets can be of any desired colour and that, for particular end uses, sheets of materials other than paper,
25 may be preferred.

When a board is cut longitudinally the cut edge has inadequate protection from the lining sheets. Thus, where boards are attached to studs with screws or nails posi-

tioned near a cut edge, the gypsum core tends to shatter under the impact of the driven screw or nail and to break off and fall away, whereas it would normally be retained and held in position by the covered edges. Moreover, cut or damaged edges, if brought into contact with moisture, tend to absorb moisture directly into the gypsum core of the board with consequent swelling and weakening of the edge region. These effects are particularly undesirable when the board is to be used in so-called 'dry' constructions in which the joints between adjacent boards are filled with moist joining compounds. The resulting swelling at the board edges throws the joint into prominence, which is the opposite of the effect intended by the use of this jointing technique. In dry construction there is increasing interest in the use of boards of narrow width, which gives a system of greater dimensional flexibility, but, depending on the length of production runs, narrow width board cannot always economically be formed as such on conventional board-making plant, ^{but} can, however, conveniently be cut to width from conventional wide board. Problems will arise whenever narrow boards are made by cutting wider board, because the cut edges will have reduced strength and will be susceptible to the presence of moisture in jointing or decorating.

The present invention now provides a method and apparatus by which a sheet-covered edge can be formed at the edges of cut or damaged plasterboard, so that the strength and resistance to damage of the edges concerned is restored.

According to this invention, the core of the board to be treated is cut back along an edge thereof to a

desired line and the backing sheet is cut back to the same extent; the outer surface of the backing sheet and the exposed inner surface of the now projecting part of the facing sheet are thinned along their respective edge regions; 5 and the projecting part of the facing sheet is folded over the cut edge of the core and turned over and adhesively bonded to the thinned edge of the backing sheet. The inner surface of the facing sheet, especially where the sheet is of paper, is preferably scored along the line of the cut 10 edge of the core to a sharp and regular fold.

Further according to the invention there is provided apparatus for forming a covered edge on a cut edge of plaster-board comprising a flat bed over which the board can be advanced, a first cutter adjacent to the bed and adapted to 15 make a horizontal cut in the edge of the board at a height above the bed equal to the thickness of the facing sheet, a second cutter adjacent to the bed and spaced from the first cutter in the direction of advance of the board along the bed and adapted to remove from the board the portion of the 20 core and the backing sheet overlying the said horizontal cut, means for thinning the outer surface of the backing sheet and the inner surface of the facing sheet along their respective edge regions, means for applying adhesive to at least one of the sheet surfaces to be bonded, and folding 25 guides alongside the bed to fold the edge region of the facing sheet upwards and inwards to bond it to the edge region of the backing sheet. The first cutter is preferably preceded by a cutter which trims the edge of the

advancing board accurately to the appropriate width before reconstitution of the lined edge is begun. The apparatus is preferably also provided with means for advancing the board at constant speed along the bed.

5 * From the foregoing it will be apparent that the invention provides a plasterboard along at least one edge of which the facing sheet is folded over the edge surface of the core and over the edge portion of the backing sheet, the overlapping portions of the lining sheets being thinner than
10 the main portions of the sheets and the facing sheet being adhesively bonded on top of the backing sheet. In this the board differs from conventional board, where the backing sheet is bonded at the lateral edges on top of the over-
folded edges of the facing sheet.

15 The thinning of the edge portions of the two sheets, which ensures that the reconstituted edge is not undesirably bulky on its rear surface, and the scoring of the inner surface of the facing sheet, especially where this is of paper, can advantageously be carried out at the same station
20 as the second cutter. In the preferred apparatus, the second cutter includes a rotary cutting blade mounted on a horizontal axis and spaced from the bed sufficiently to permit cutting of the backing sheet and the core and partial cutting through the thickness (scoring) of the facing sheet,
25 and auxiliary blades rotating about the same axis as the rotary blade and respectively spaced from the bed to remove part only of the thickness of the facing sheet as it passes along the bed and of the backing sheet on the upper surface

of the board.

The adhesive employed to bond the sheets together is preferably a hot melt adhesive, since this gives a virtually instant bond and facilitates handling of the board after the edge treatment.

The invention can be used to make covered-edge board of narrower widths from previously formed, sheet covered gypsum board. Apart from the economical manufacture of narrow board from standard width board, it is also possible to make use of damaged board which might otherwise be scrap. Furthermore, the invention makes it possible to produce gypsum tiles having fully covered edges on all four sides, as compared with conventional cut lengths of plasterboard, which have lined edges only at the longitudinal edges. A further advantage of the invention is that it can be employed to give edges of greater accuracy than is usually achieved in casting board, so that the resulting panels and tiles can be fitted more closely together in dry constructions to give very fine joints which may need no filling before decoration.

The invention will now be described in greater detail, by way of example, with reference to the accompanying drawings in which :

Fig. 1A - E shows in diagrammatic cross section five stages in the manufacture of a paper-edged board in accordance with this invention;

Fig. 2 is a general side elevation of apparatus according to this invention for making a paper edge on gypsum board; and

Fig. 3 is an enlarged detailed cross section along the line 3 - 3 in Fig. 2.

5 In Fig. 1A there is shown a gypsum board which has been cut longitudinally into a working piece 10a of the desired width and a remainder 10b. The original board was fully paper-covered and had finished edges at which the thin edges of the grey paper 11 was laid over and adhered to the inturned edges of the cream paper 12.

10 In the second stage of the process, shown in Fig. 1B, the core 13 of the workpiece 10a is cut back or rebated at 14, immediately above the cream paper, leaving an edge portion 12a of the latter projecting. In the third stage, the unwanted portion of the core and the grey paper are removed, to leave a board which has the final desired width less the thickness of the cream paper. At the same time the inner surface of the cream paper is scored at the base 15 of the projecting portion 12a, and the edges of the same portion and of the grey paper are thinned at 12b and 11b respectively.

20 In the following stage, shown in Fig. 1D, a band or bead of hot melt adhesive is applied at 16 to the upper surface of the projecting portion 12a of the cream paper. In the final stage, shown in Fig. 1E, the cream paper is folded up against the edge of the core and the edge 12b is folded over on top of the thinned edge 11b of the grey paper. At the same time the adhesive is caused to flow round the edge of the board by the pressure on the paper and secures the paper 12 to the edge of the core and the

edge of the grey paper.

Suitable apparatus for performing the invention is shown in Figs. 2 and 3. In this apparatus a bed, for example a flat table, 20 is provided along which a length of plaster-board to be treated can be advanced. It is desirable that means should be provided for advancing the board at constant speed by a positive drive; any suitable mechanism can be used, and the drive is here omitted from the drawing for the sake of clarity. At the entrance to the machine, an electrically driven circular cutter 21 is fitted to cut the incoming board to the desired working width, which is somewhat wider than the finished width of the cut board. If desired, this preliminary cut can be carried out elsewhere, as it is not necessary in every case to provide such a cutter on the apparatus of this invention.

Further along the bed is arranged an electrically driven circular cutter 22 which, unlike the first-mentioned cutter 21, operates in the horizontal plane and rotates about a vertical axis. The blade 23 of the cutter 22 is set at a distance above the bed 20 equal to the thickness of the cream paper of the board to be processed (so as to make a cut as shown at 14 in Fig. 1B) and for this reason is preferably adjustable. At a later point in the path of the board is a further cutter 24 which includes blades to perform the various operations shown in Fig. 1C. The cutters 22 and 24 are preferably provided with a dust collection box 25 or hood which is connected by ducts to a dust extractor.

The cutter 24 is best seen in Fig. 3, and includes a circular cutting blade 26 rotating in a vertical plane, which severs the unwanted portion of the core of the board and the grey paper and scores the inner surface of the cream paper to facilitate folding. For this purpose the height of this blade above the bed is preferably adjustable. A guide or diverter 27 is mounted near the blade 26 to lead off the severed portion of the core. Auxiliary blades or scrapers 28, which may be adjustably mounted on the face of the blade 26, engage the upper surface of the grey paper of the board and thin it to about half its original thickness. A further rotary blade 29, mounted skew on the same axis as the blade 26 to have a swash motion, engages the exposed inner surface of the cream paper, lying on the bed, and thins its edge region to about half its original thickness.

Next along the bed 20 is mounted a dust collector 31, which is a preferred fitting and serves to remove dust particles from the board before the adhesion stages. An adhesive applicator 32 follows which, if a hot melt adhesive is used, is connected by lines 33 to a heated adhesive supply and pressure vessel. The next length of the bed 20 is provided with folding guides to engage the edge of the cream paper of the advancing board and turn it upwards and inwards over the edge of the grey paper. The folding guides 34 are preferably spring loaded, as indicated by the springs 35.

The cutters 21, 22 and 24, the air nozzle 31, adhesive applicator 32 and folding guides 34 are all

arranged along one side of the bed 20. Along the opposite side of the bed is preferably arranged a guide 36 or series of guides to ensure that boards passing through the apparatus keep accurately to the prescribed path and emerge at the
5 desired width. Such guides are preferably adjustable so that the machine can handle boards of various widths.

WHAT WE CLAIM IS:-

1. A process for forming a covered edge on plasterboard comprising a gypsum core encased between a facing sheet and a backing sheet, which process comprises:-

5 removing the core of the board and backing sheet to a desired line, leaving a part of the facing sheet projecting therefrom;

thinning the outer surface of the backing sheet and exposed inner surface of the projecting part of the facing sheet along their respective edge regions; and

10 folding the projecting part of the facing sheet over the cut edge of the core and turning it over and adhesively bonding it to the thinned edge of the backing sheet.

2. A process according to claim 1 wherein the inner surface of the facing sheet is scored along the line of the cut edge of the core before folding it over the cut edge whereby a sharp and regular fold is obtained.

3. A process according to claim 1 or 2 wherein the facing sheet and the backing sheet are of paper.

4. A process according to any preceding claim wherein a hot-melt adhesive is used in adhesively bonding the thinned edges of the facing and backing sheets.

5. Apparatus for forming a covered edge on plasterboard having a gypsum core, a facing sheet and a backing sheet, which apparatus comprises:-

25 a flat bed over which the board can be advanced;

a first cutter adjacent to the bed and adapted to make a horizontal cut in the edge of the board at a height above the bed equal to the thickness of the facing sheet;

a second cutter adjacent to the bed and spaced from the first cutter in the direction of advance of the board over the bed and adapted to remove from the board the portion of the core and the backing sheet overlying the horizontal cut;

means for thinning the outer surface of the backing sheet and for thinning the inner surface of the facing sheet along their respective edge regions;

means for applying adhesive to at least one of the surfaces to be bonded; and

folding guides alongside the bed to fold the edge region of the facing sheet upwards and inwards to bond it to the edge region of the backing sheet.

6. Apparatus according to claim 5 wherein the first cutter is preceded by a further cutter adapted to trim the edge of the advancing board to the width corresponding to the desired width of the finished board.

7. Apparatus according to claim 5 or 6 including means for advancing the board at substantially constant speed along the bed.

8. Apparatus according to any of claims 5 to 7 including means for scoring the inner surface of the facing sheet along the line of the cut core before the folding guides.

9. Apparatus according to claim 8 wherein the second cutter includes a rotary cutting blade mounted on a horizontal axis and spaced from the bed sufficiently to permit cutting of the backing sheet and of the core and scoring of the inner surface of the facing sheet.

10. Apparatus according to claim 9 including auxiliary blades rotating about the same axis as the said rotary blade and

respectively spaced from the bed to remove part only of the thickness of the facing sheet as it passes over the bed and of the backing sheet on the upper surface of the board.

5 11. Plasterboard comprising a gypsum core encased between a facing sheet and a backing sheet and having at least one edge along which the facing sheet is folded over the edge surface of the core and over the edge portion of the backing sheet, the over-lapping portions of the facing and backing sheet, being thinner than the main portions of the sheets and the
10 facing sheet being adhesively bonded to the backing sheet.

12. Plasterboard according to claim 11 wherein the facing and backing sheets are of paper.

13. Plasterboard according to claim 11 or 12 wherein the facing sheet is adhesively bonded to the edge of the core over
15 which it is folded.

14. A process for forming a covered edge on plasterboard substantially as herein described with reference to the accompanying drawings.

15. Apparatus for forming a covered edge on plasterboard
20 substantially as herein described with reference to the accompanying drawings.

16 Plasterboard substantially as herein described with reference to the accompanying drawings.

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AGENTS FOR THE APPLICANTS.

FIG. 1A

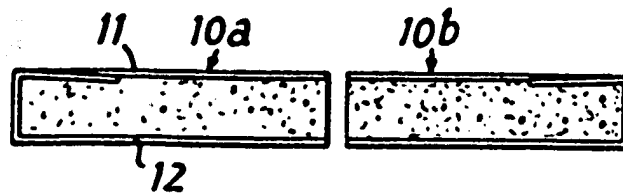


FIG. 1B

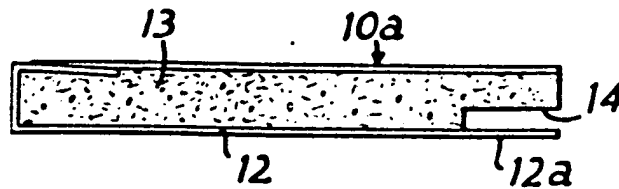


FIG. 1C

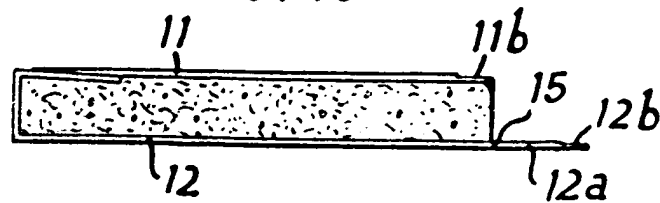


FIG. 1D

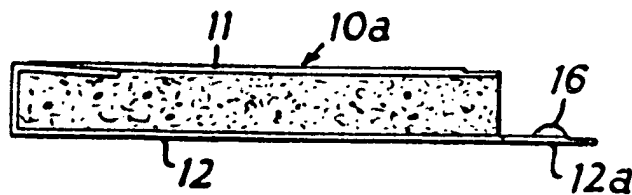
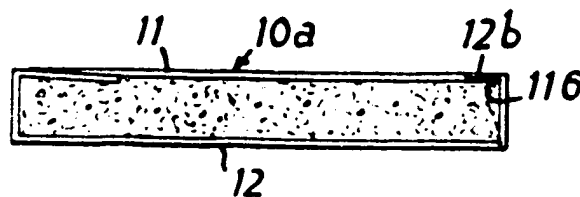


FIG. 1E



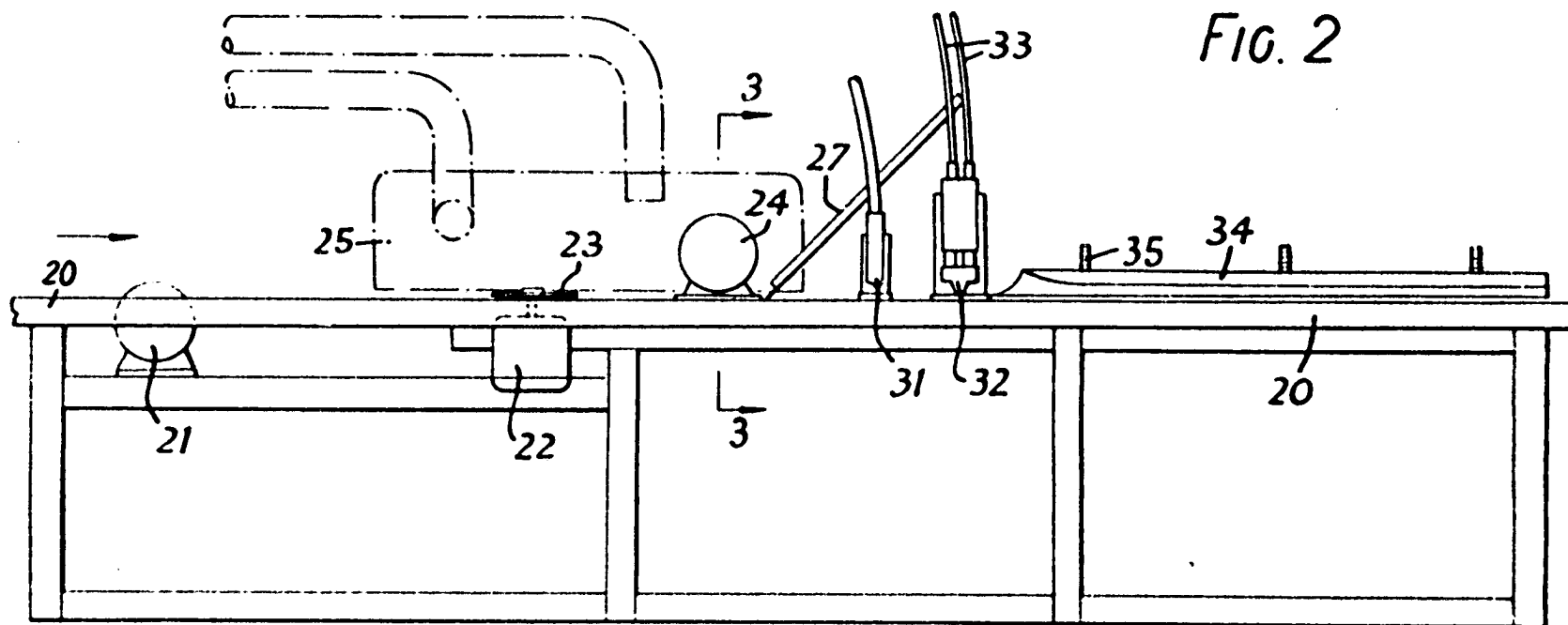


FIG. 3

