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PRODUCTION OF PLASTER BOARD

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Fig.1.

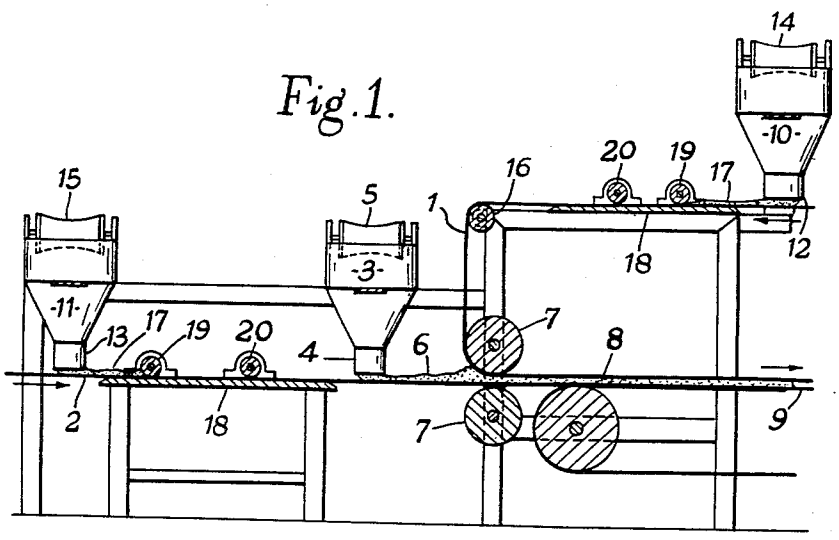



Fig.2.

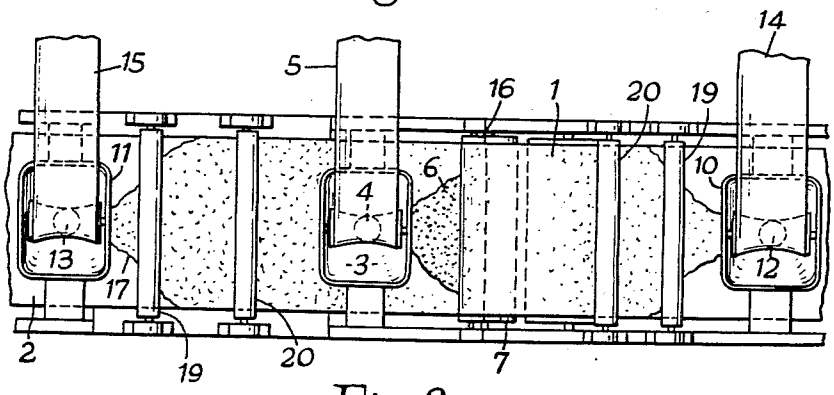



Fig.3.




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# PRODUCTION OF PLASTER BOARD

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2 Claims. (Cl. 154—1.2)

The present invention relates to the production of plaster board, that is to say building boards comprising a core of gypsum plaster lined on at least one and usually both faces with paper liners bonded to the plaster core.

The usual practice in the production of such boards is to feed and distribute a water-setting slurry of plaster of Paris between two sheets or strips of paper drawn continuously between a pair of rollers arranged one above the other and spaced apart by a distance corresponding to the thickness of the board to be produced, and moving the formed plaster and paper sandwich on a conveyor for a period during which the plaster takes a set, and thereafter passing it through a heating and drying chamber usually after dividing the sandwich into desired lengths.

If attempts are made to apply two sheets of paper in the manner described above, to a core-forming slurry of neat plaster, or of plaster containing usual additions such as from agents used to reduce the weight of the boards, setting accelerators and the like, the bond produced between the plaster core and the paper in boards so produced is ineffective, the paper being readily parted from the set core.

In order therefore to obtain a satisfactory bond between the core and the paper it is the present practice to embody in the core-forming plaster slurry an adhesive usually of the nature of a starch, so that adhesion between the paper and the core is achieved. The need for such adhesives, however, involves a substantial addition to the cost of production of the board.

It has now been found that a very strong bond is obtained by first coating the paper sheet or sheets with a very thin layer of plaster on the surface thereof which is to be engaged with the core-forming plaster and thereafter bringing the thin coated surface or surfaces into contact with the core-forming plaster.

A very strong bond is obtained between the thin plaster layer and the paper even with no starch or other adhesive present in the plaster used to form the thin layer, and the thin layer when subsequently applied to the core-forming plaster combines therewith to form a homogeneous mass.

In some cases a small proportion of starch, gum or other adhesive may be embodied in the plaster used to form the thin layer, but the use of such an adhesive in the core-forming plaster is unnecessary.

It will thus be seen that the need for starch or other adhesive is wholly or largely eliminated by the use of the present invention.

The invention accordingly consists in a method of producing a plaster board, paper lined on one or both surfaces thereof, said method including the step of applying a thin layer of plaster to the surface of the paper-liner sheet or sheets intended to engage the core-forming plaster, as a preliminary to bringing the paper-liner sheet or sheets into engagement with the core-forming plaster slurry.

The preliminary thin coating layer of plaster may be formed by pouring on and distributing over the paper sheet a cream obtained by pre-mixing plaster and water,



distribution or spreading being effected for example by drawing the paper over a flat smooth table and below a roller mounted above the table.

Good results have been obtained making use of a solution of plaster in water and comprising as an example 70 parts by weight of water to 100 parts by weight of neat plaster and such a cream may be spread by the use of upper lightly loaded chromium plated or other smooth surfaced spreading rollers to provide a thin plaster layer on the paper sheet of a few, e.g. seven, thousandths of an inch thick. In some cases however, two or more spreading rollers may be used in succession and the first of said rollers may be provided with surface projections e.g. left and right hand helical ridges to effect the preliminary spreading of the plaster cream.

The thus coated paper sheets may at any time, that is to say before or after the thin plaster coating has wholly set, be used in the production of the plaster board by bringing the thin-coated surface or surfaces into contact with the core-forming plaster slurry.

A lower or higher proportion of plaster than that named above can be used but with a higher proportion of plaster the spreading of the plaster cream to produce an even thin layer becomes more difficult.

The improved method of producing plaster board is well adapted to be carried out as a continuous process and an apparatus for carrying out such a continuous process as applied to the production of plaster board paper lined on both sides, is illustrated by way of example in the accompanying drawing in which Fig. 1 is a view in side elevation of the part of the plaster board-forming apparatus relevant to the present invention, Fig. 2 is a plan view of the part of the apparatus shown in Fig. 1 and Fig. 3 shows a detail.

Referring to the drawings, **1** and **2** represent two continuous webs of liner paper drawn off from supply reels (not shown) and intended to form the upper and lower surface liners respectively of the plaster boards to be produced.

Core plaster slurry is delivered in well known manner on to the lower moving paper liner **2** by way of a chute **3** having an outlet **4** disposed over the centre of the paper web **2**. The core plaster slurry is supplied continuously to the chute **3** from a suitable source (not shown), by means of an endless travelling band **5**.

The web **2** with the core slurry thereon as indicated by **6** passes from below the chute **3** between a pair of rolls **7** together with the upper liner web **1** and the spacing of the rolls **7** is selected in accordance with the thickness of the plaster board to be produced.

The rate of feed of the core plaster slurry from the chute **3** is selected in relation to the speed of movement of the paper webs **1** and **2** so that the squeeze of the rolls **7** will cause the core slurry **6** to spread with uniform thickness over a width corresponding to that of the required plaster board product.

The formed sandwich indicated at **8** in Fig. 1, of core plaster **6** and paper webs **1** and **2** pass from the rolls **7** onto an endless conveyor **9** on which it remains until it is set to an extent to permit it to be cut into lengths and handled for subsequent treatment such as heating to complete the set, all in well known manner.

In accordance with the present invention two further delivery chutes **10** and **11** are mounted in positions in which the respective paper webs **1** and **2** are required to pass beneath the outlets **12** and **13** thereof before reaching the point of application to the core plaster **6**.

The plaster cream is supplied to the two chutes **10** and **11** from a source or sources (not shown) by means of endless conveyors **14** and **15**, and is delivered from the outlets **12** and **13** of the chutes **10** and **11** on to the longitudinal centres of those surfaces of the moving webs **1**

and 2 which are to be applied to the core-forming plaster slurry 6. Since in the case of the upper web 1 the side of the web which is to engage the core-forming plaster slurry 6 is ultimately the underside of that web, the said upper web 1 is led around a guide roller 16 which in conjunction with the upper of the two squeeze rollers 7, effects a reversal of the web 1, and the chute 10 supplying the plaster cream to the upper web 1 is located at a point preceding the guide roller 16 as shown in the drawings when the side of the web 1 to which the plaster cream is to be applied is for the time being uppermost.

The paper webs 1 and 2 with the plaster cream indicated by 17, thereon pass over tables 18 having flat smooth surfaces and beneath a roller, or in the case illustrated, two rollers 19 and 20 in succession mounted above the surfaces of the tables 18 and resting by their own weight or lightly loaded, upon the moving paper webs whereby the plaster cream is distributed or spread over the whole width of the webs 1 and 2.

The distance of travel of the webs 1 and 2 between the chutes 10 and 11 delivering the plaster cream and the chute 3 delivering the core-plaster slurry need only be sufficient to enable the plaster cream 17 to be effectively spread over the width of the paper webs before engagement is made with the core-plaster slurry 6.

In some cases the spreading roller or some or all of the spreading rollers for the plaster cream may with advantage be provided with relief projections on the surface thereof. Such a roller is illustrated by way of example in Fig. 3, the roller here shown being provided with right and left hand helically arranged ridges of small depth.

The core-forming plaster used in the formation of plaster board usually contains setting accelerators and the setting time for neat plaster as usually employed for the formation of the preliminary coating cream according to the present invention is long by comparison.

The slow setting of the neat plaster of the cream before it comes into contact with the core-forming plaster, however, presents no inconvenience but affords time for better absorption or penetration of the neat plaster of the cream into the paper webs before the recrystallisation takes place.

After the preliminary thin coating of plaster on the webs has been brought into contact with the core-forming plaster the early setting of the latter in itself induces an acceleration of the setting of the plaster of the preliminary thin coating.

What is claimed is:

1. A method of producing plaster board which is paper-lined on both faces thereof, said method including the steps of pouring on one face of each paper-liner sheet a cream-like mixture of neat plaster and water, subjecting the said poured mixture to spreading under light pressure to form on the liner sheets very thin layers of plaster cream of uniform thickness of the order of seven thousandths of an inch thick, and thereafter



when said paper sheets have become at least partially impregnated with said cream-like mixture, bringing the paper-liner sheets bearing the very thin layers into spaced parallel relation at a point spaced from the point of pouring of the cream-like mixture of neat plaster and with the coated faces of said sheets facing each other, and feeding a slurry of core-forming plaster between said sheets at the point where they are brought into parallel relation.

2. Apparatus for the continuous production of plaster board formed of a plaster core paper-lined on both surfaces, comprising a first chute for delivering core-forming plaster slurry onto a lower liner-paper web, a pair of squeezing and spreading rolls between which the said lower liner-paper web with the core-plaster thereon together with an upper liner-paper web are passed to form a sandwich of core-plaster between two liner-papers constituting the plaster board, two further chutes positioned one above each web at points preceding the entry of the two webs and the core-forming plaster slurry between the said squeezing and spreading rolls, a supply of a cream-like mixture of neat plaster in water feeding each of said two further chutes, and at least one spreading roller located between each one of the said two further chutes and said first chute and having rolling contact with said webs under light pressure for spreading the mixture of neat plaster and water from the said two further chutes into thin layers of uniform thickness across the width of the liner-paper webs before said webs come into contact with core-forming plaster slurry, said mixture-applying chutes being positioned in advance of said squeezing rolls a distance to ensure at least partial impregnation of said sheets by said cream mixture upon reaching said squeezing rolls, a smooth-surfaced table arranged beneath each web and supporting said webs after they leave the said two further chutes, the spreading roller associated with each one of the said two further chutes being mounted above the respective smooth-surfaced table for cooperation therewith in spreading the cream mixture of plaster deposited on the related liner-paper web prior to movement of said webs between said pair of squeezing and spreading rolls to form a sandwich, at least one spreading roll associated with the two further chutes being provided on opposite end portions thereof with left-hand and right-hand helical ridges respectively, said ridges constituting relief projections which assist in spreading the neat plaster and water mixture laterally from the central zone of each web.

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