C. W. UTZMAN.

METHOD OF MANUFACTURING PLASTER BOARD.

APPLICATION FILED JUNE 26, 1911.

1,029,328.

Patented June 11, 1912.

2 SHEETS—SHEET 1.

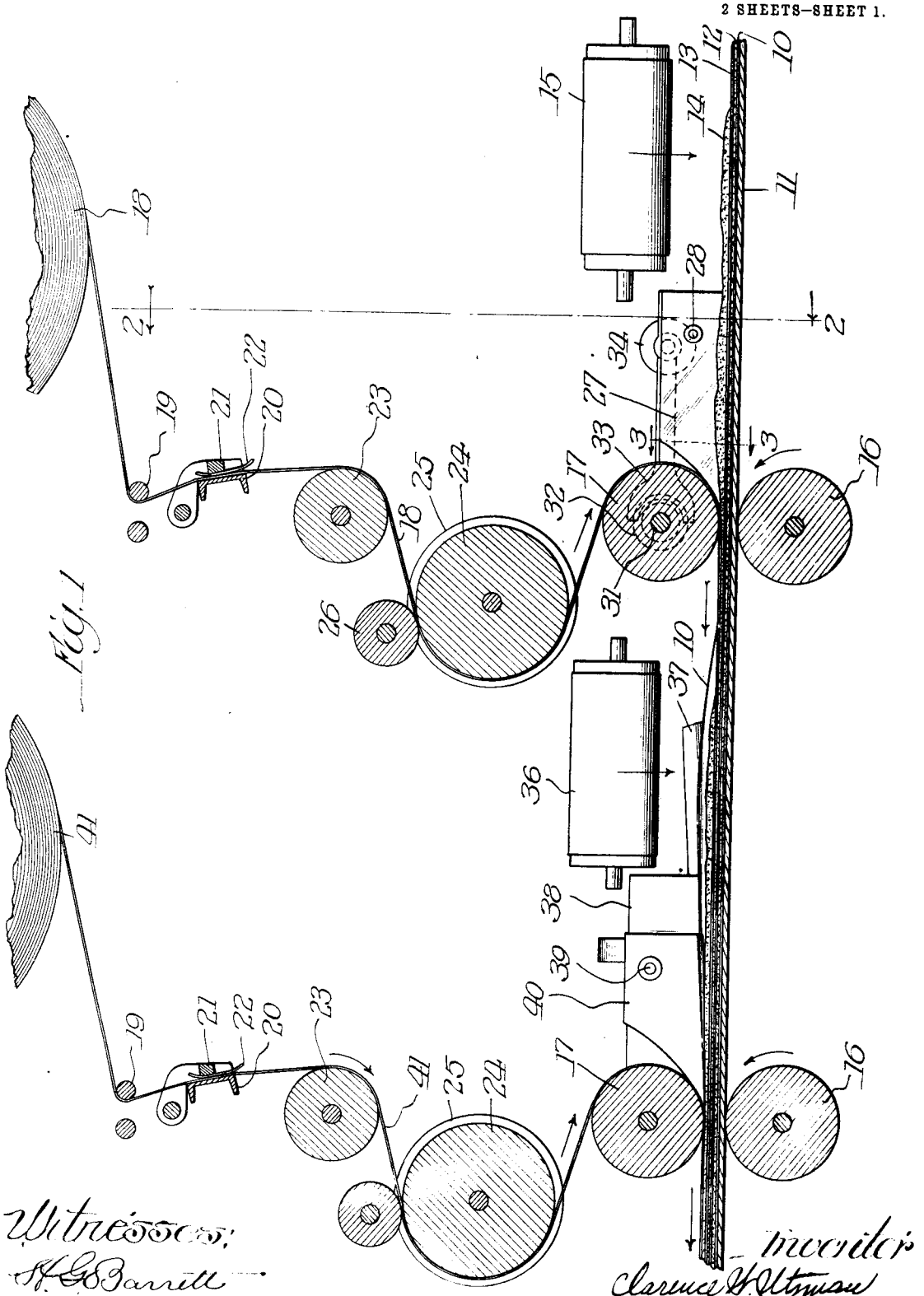

Fig. 1

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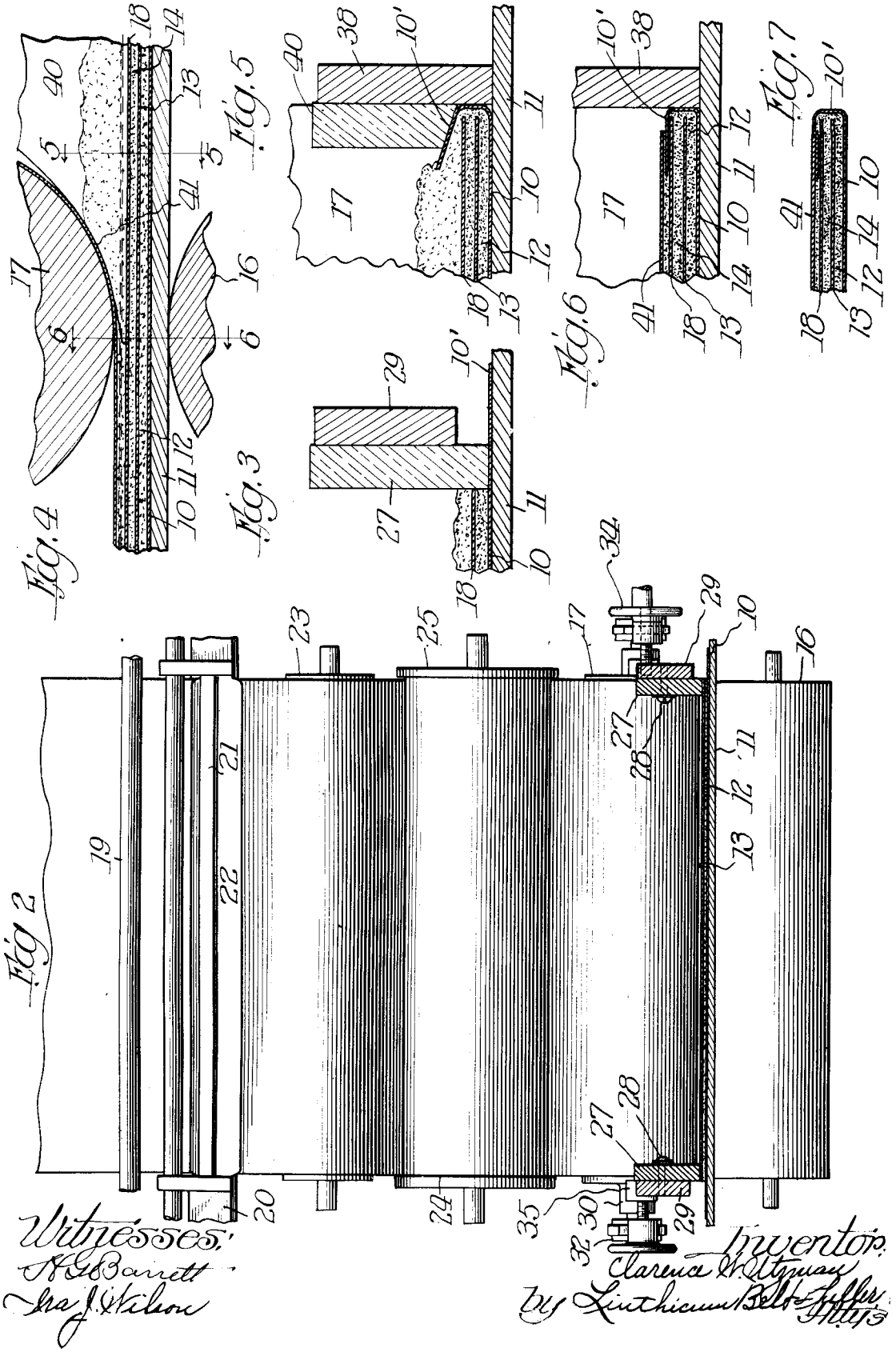

UNITED STATES PATENT OFFICE.

CLARENCE W. UTZMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE UNITED STATES GYPSUM COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

METHOD OF MANUFACTURING PLASTER-BOARD.

1,029,328. Specification of Letters Patent. Patented June 11, 1912.

Application filed June 26, 1911. Serial No. 635,284.

To all whom it may concern:

Be it known that I, CLARENCE W. UTZMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of Manufacturing Plaster-Board, of which the following is a specification.

This invention relates to the method of making plaster board and aims to produce a board which shall be more durable than any plaster board heretofore made and which will give better results and more satisfactory service in use and which will better withstand the handling to which all plaster board is necessarily subjected.

Plaster board of various kinds have been made prior to my invention, some of which have been made in molds and others of which have been made by a continuous process consisting in applying alternate layers of plaster and paper or other fibrous material upon a traveling base sheet. The mold method of making plaster board is objectionable, however, for the reason that the size of each slab of board is necessarily limited and, furthermore, for the reason that this method of making boards is a slow tedious and expensive operation. In the continuous method of making plaster board it has been the practice to superimpose the alternate layers of plaster and paper and then to trim the edges of the board leaving the raw edges of the plaster and the raw edges of the paper at each side of the board. The paper or covering material in this construction is very easily torn and the edges of the board are readily chipped or broken so that after repeated handlings the boards when ready for use are usually mutilated to a considerable extent.

My present invention aims to obviate the disadvantages of the boards previously employed and to construct a board, the edges of which will be entirely inclosed by a sheet of covering material and in which there will be no free or exposed edges of covering material which will be liable to be torn, loosened or peeled back in the handling of the board.

My invention will be best understood from the following description when taken in connection with the accompanying drawings illustrating diagrammatically the manner of finishing the plaster board in accordance with the principles of this invention.

The drawings show, in a general way, one type of machine which may be employed in manufacturing this novel and improved board.

Referring to the drawings—Figure 1 is a fragmentary longitudinal sectional view of a machine employed for carrying out my improved method. Fig. 2 is an elevation on the line 2—2 of Fig. 1. Fig. 3 is an enlarged sectional view taken on the line 3—3 of Fig. 1. Fig. 4 is an enlarged sectional view showing the operation of the guard and compression rollers shown at the left in Fig. 1. Fig. 5 is a sectional elevation taken on the line 5—5 of Fig. 4. Fig. 6 is a sectional elevation taken on the line 6—6 of Fig. 4; and Fig. 7 is a transverse sectional view of a portion of a piece of completed plaster board.

The plaster board in the present instance is made by spreading a layer of plaster or other plastic hardening material on the top surface of a bottom sheet of paper fabric or the like and then building up the board to the desired thickness by superimposing alternate layers of fibrous material and plastic material. In carrying out my invention, the lower covering sheet 10 which may be of paper, cloth or other fibrous material, is advanced through the machine by an endless carrier 11 or other suitable mechanism. This carrier is preferably in the form of a wide belt upon which the sheet 10 is spread and, as the sheet is carried along, a quantity of plaster or other plastic material 12 is fed onto the upper surface of the sheet. Suitable mechanism is employed to spread this material evenly over the covering sheet and to prevent the plastic material from approaching the edges of the covering sheet, so that a portion of the sheet will project on each side of the plastic material.

As many layers of plastic material and fibrous material may be employed as is re-

quired by the thickness of the plaster board to be made; and, since each of the mechanisms for spreading the plastic material and applying a layer of fibrous material, except the last one, are alike, I deem it necessary to show on the drawings only one of such mechanisms which is shown at the right in Fig. 1. Referring to this figure, it will be seen that a layer 12 of plastic material has been superimposed upon the lower covering sheet 10 and a layer of fibrous material 13 has been disposed over the layer of plastic material 12 before the conveyer reached the mechanism which is illustrated in this figure. Another layer of plastic material 14 is now disposed upon the sheet of fibrous material 13 by a conveyer 15 or any other suitable mechanism. This plastic material as shown, is delivered and discharged upon the center of the sheet 13 and must be evenly spread over the surface of the sheet and also prevented from overflowing the projecting portions of the lower covering sheet 10 which are subsequently to be utilized for inclosing the edges of the board, as will be hereinafter described. The carrier or conveyer travels over rollers 16 and under the compression rollers 17, as shown.

In order to produce a plaster board having smooth even edges it is necessary to accurately aline the edges of the alternate layers of plastic material and fibrous material and to effect this alinement I have provided devices which accurately guide the paper or fibrous materials so that it is delivered to the compression rollers 17 in proper relation to bring the edges of the superimposed intermediate sheets in exact alinement one with the other. The paper or other fibrous material comes in the form of a roll 18 which is mounted in any suitable manner above the conveyer, as shown. The paper, however is not evenly disposed in the rolls, some of the edges projecting beyond the ends of the rolls farther than others and, it therefore becomes necessary to rectify and aline the paper strip or sheet before it is delivered to the compression roller. The paper is accordingly led over a rod 19, then through a device 20 provided with end pieces 21 spaced apart the exact width of the paper and the inner faces of the end pieces being accurately adjusted with respect to the machine. Springs 22 are also provided which press against the paper and tend to smooth out any wrinkles which may be present in the paper as it is fed along. The paper is next fed over an idle roll 23 and thence over a master roll 24 provided at each end with a flange 25, and finally is delivered over the compression rollers 17. The master roll 24 is preferably rotated at slower speed than the paper travels so that the frictional engagement between this roll and the paper will cause the paper to be moved endwise on the roll by the flanges 25 and thereby accurately alined before it is delivered to the compression roller. An idler 26 is also preferably employed in connection with the master roll 24 to assist in alining the paper. It will thus be apparent that each sheet of paper is delivered to its compression roller in exactly the proper position transversely of the machine so that the edges of each of the intermediate sheets will be disposed exactly in alinement to thereby produce a smooth edged board. It is also essential that the edges of each layer of plastic material be accurately formed and to accomplish this result I have provided a guard 27 which is pivotally mounted at 28 upon a frame 29 which has a forwardly projecting arm provided with a collar 30, as shown in Fig. 2, loosely mounted on the shaft 31 of the compression roller 17. It will be evident that the frame 29 is capable of an up and down movement relatively to the shaft and also that the guard 27 is capable of an oscillatory movement relatively to the frame. The guard is adapted to rest upon the lower covering sheet 10 and its smooth lower edge resting closely against this covering sheet prevents the plastic material from flowing beneath the guard, thereby leaving a portion of the covering exposed on each side of the plastic material. The guard is preferably made of glass, aluminum, or some other substance to which plaster will not adhere, and its forward end is ground to fit closely beneath the compression roller 17 and to prevent the escape of the plastic material except at the top of the guard which is ground down to permit a limited quantity of plaster to escape to cover the side edges of the intermediate paper sheets. A pair of guards 27 is disposed adjacent each of the compression rollers 17 and in order that these guards may be adjusted laterally of the machine in the making of boards of various widths, I have provided a grooved collar 32 fixed upon the shaft 31 at each end thereof, and in the groove of each of these collars there is fitted the forked end of an arm 33 which projects rearwardly and accommodates at its outer end an adjusting screw 34, the inner end of which engages in a socket 35 provided in the frame 29. It will thus be apparent that by adjusting the hand-screw 34, the frame 29 and the guard 27 may be moved inwardly or outwardly laterally of the machine.

After the requisite number of layers of plastic material and fibrous material have been superimposed in the manner described, a top layer of plastic material is delivered upon the upper face of the last sheet of fibrous material from a conveyer or carrier 36, (Fig. 1). It is desirable to fold the pro-

truding edge 10′ of the lower sheet of covering material 10 over onto this upper layer of plastic material and, in order to accomplish this result, I have provided pick-ups 37 which engage the protruding edges of the lower covering and gradually turn them upwardly and then inwardly as the covering moves along. The pick-ups project rearwardly from the dam 38 and to the inner face of this dam there is pivoted at 39 a folder and guard 40, the forward end of which is elevated as shown, so that the inturned edge 10′ will be gradually folded down over the upper layer of plastic material. Referring to Fig. 5 it will be seen that the lower edge of the guard is beveled and, it will be evident that as the conveyer travels along carrying the partially completed board with it, the inturned edge 10′ will be gradually compressed into the upper layer of plastic material. The rear end of the guard 40 is ground to a point as shown in Fig. 4, to fit closely against the roller 17 and prevent the escape of plastic material between the roller and the guard. The extreme point of the guard, however, is tapered away as indicated at 41, so that the requisite amount of plastic material is permitted to escape or ooze over this point and spread over the inner edge of the inturned portion 10′. The guard, however, is so shaped that only a small quantity of plastic material is permitted to spread over the upper face of the inturned edge 10′ and the plastic material is prevented from flowing to the edge of the board, but is confined to the inner edge of the inturned portion 10′. During the folding in of the edge portion 10′ the dam 38 assists in forming a smooth edge on the board and in making a board of uniform width throughout its length. The top sheet of covering material 41 is narrower than the intermediate sheets and the edges of this upper sheet extend over the inturned edges 10′ of the lower sheet a distance equal to the distance that the plastic material was permitted to overflow the inner edges of said inturned portions. When the upper covering sheet 41 is now applied and pressed down by the compression rollers 17 its edges will be spaced from the edges of the board and held down or sealed by the plastic material spread over the upper surface of the inturned portions 10′. After the upper layer of covering material has been applied, the board is preferably passed between a finishing pair of compression rollers which compress the board and force the upper sheet of covering material down into the plastic material so that it lies substantially flush with the top of the board, as shown in Fig. 7.

It will be evident from the foregoing that the completed plaster board is inclosed on both sides and both edges and that the edges of the top sheet of covering material are spaced from the corners of the board so that they will not be caught and peeled back during the handling of the board and, furthermore, these edges are securely fastened or sealed down by the plastic material disposed over the inturned edges 10′. It will be manifest that the guards prevent the plastic material from overflowing onto the outer surface of the board so that no plaster is visible on the outside of the board and a perfectly smooth surface is presented. The board is strong and durable, no exposed plaster is presented and, by reason of the fact that all portions of the board are inclosed, a uniform absorption of moisture from the finished plaster applied to the wall at the joints between the plaster board and over their entire surfaces, will take place. The side edges of the plaster board are straight and true, they require no cutting or trimming, consequently, resulting in a saving of paper, plaster and labor. The completed board presents a finished and pleasing appearance and the edges are smooth to handle and are strong to nail to.

While I have shown and described in detail my improved board and its preferred method of manufacture, it will be obvious that various minor mechanical changes may be resorted to without departing from the spirit or sacrificing any of the material advantages of the invention.

I claim:

1. The method of making plaster board which consists in advancing a bottom sheet of covering material, superimposing upon said sheet alternate layers of plastic material and fibrous material, holding the plastic material away from the edges of the covering material so as to leave a portion of said material exposed at each side of said layers, folding the exposed edge portions of said covering material over onto the upper surface of the upper layer of plastic material, applying a separate sheet of covering material over the upper surface of plastic material, said upper sheet being of a width sufficient to partially cover the inturned edges of said bottom sheet, applying pressure to said upper sheet to cause the plastic material to flow between the edges of said sheet and the inturned portions of the bottom sheet, and preventing said plastic material from escaping at the edges of said upper sheet.

2. The method of making plaster board which consists in advancing a bottom sheet of covering material, superimposing upon the upper face of said sheet alternate layers of plastic material and fibrous material, folding the edges of said bottom sheet over on to the upper face of the top layer of plas-

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tic material, applying a separate top sheet of covering material to the top surface of the upper layer and over the inner edges of the inturned portions of the bottom sheet so as to leave a part of said inturned portions exposed at the top of the board and applying pressure to the top layer of covering material until its upper surface lies flush with the exposed surfaces of said inturned portions.

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