J. SCHUMACHER.

MACHINE FOR MAKING PLASTER BOARD.

APPLICATION FILED JAN. 23, 1919.

1,351,264.

Patented Aug. 31, 1920.

3 SHEETS—SHEET 1.

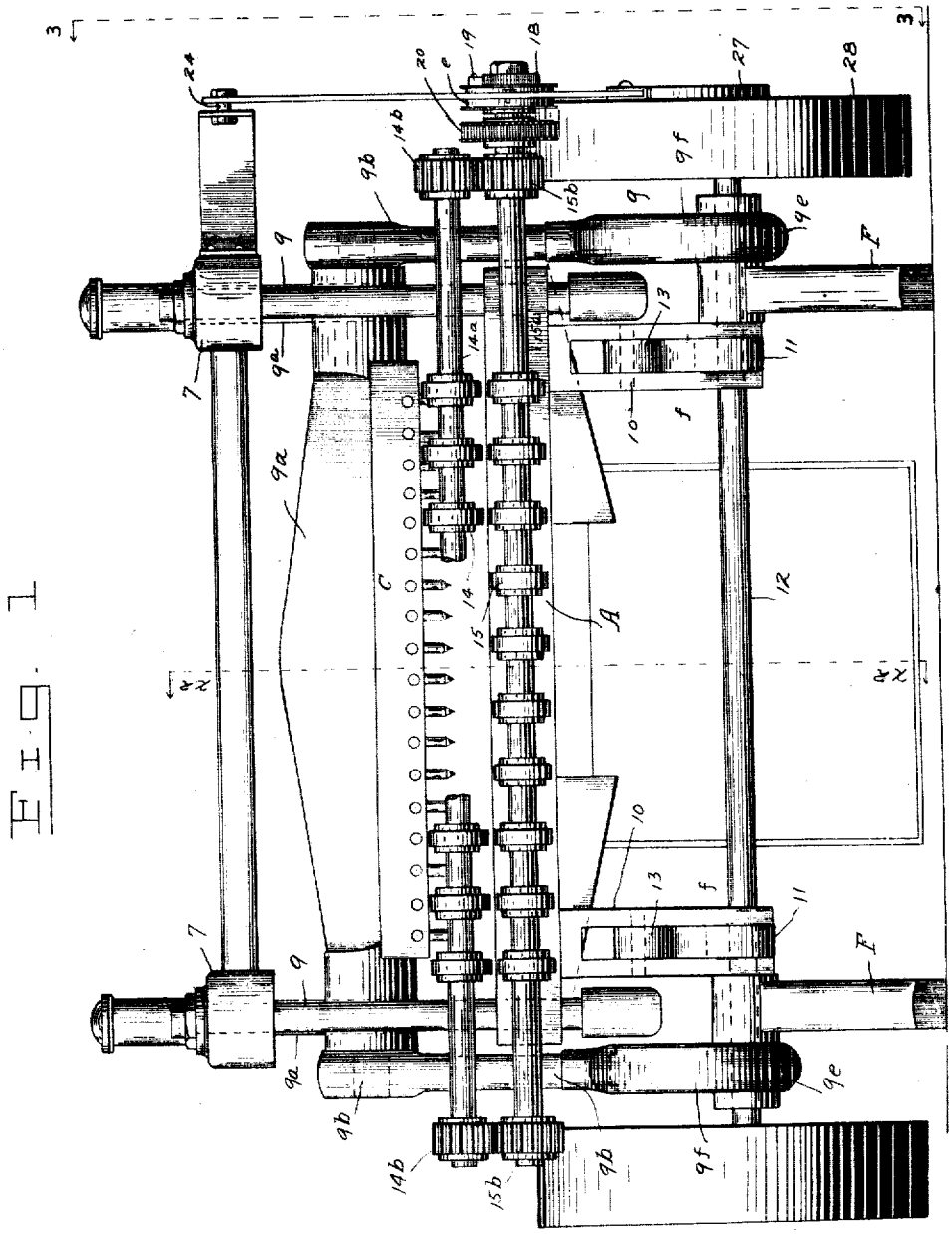


Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 3

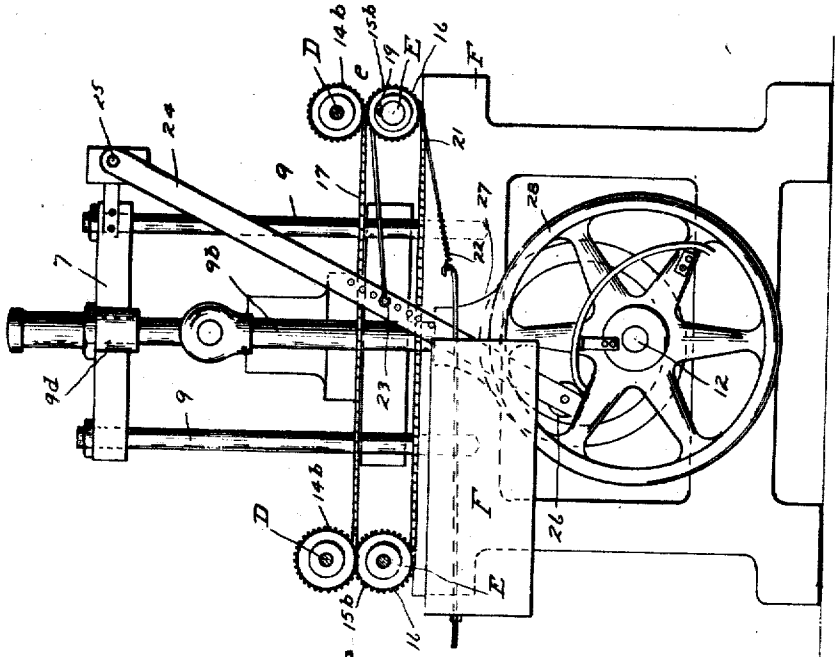
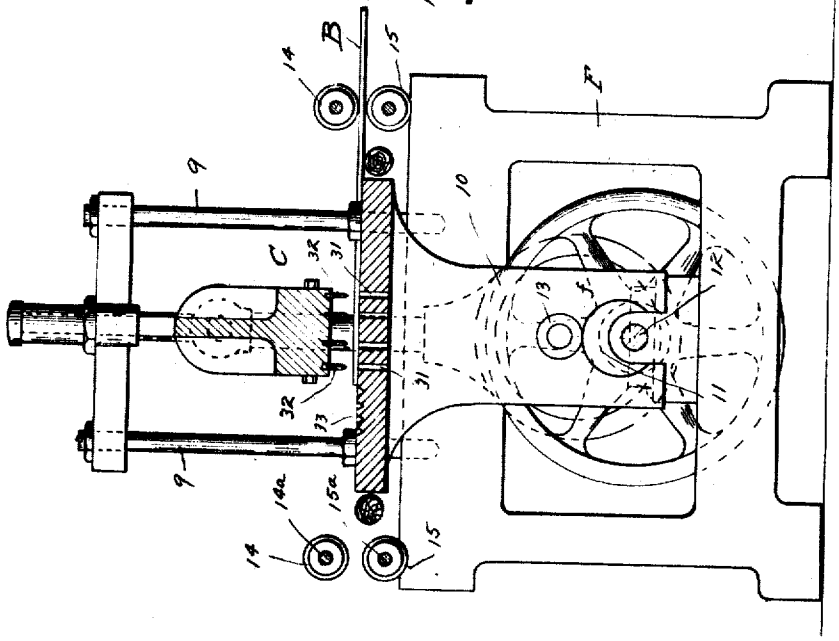


Fig. 2



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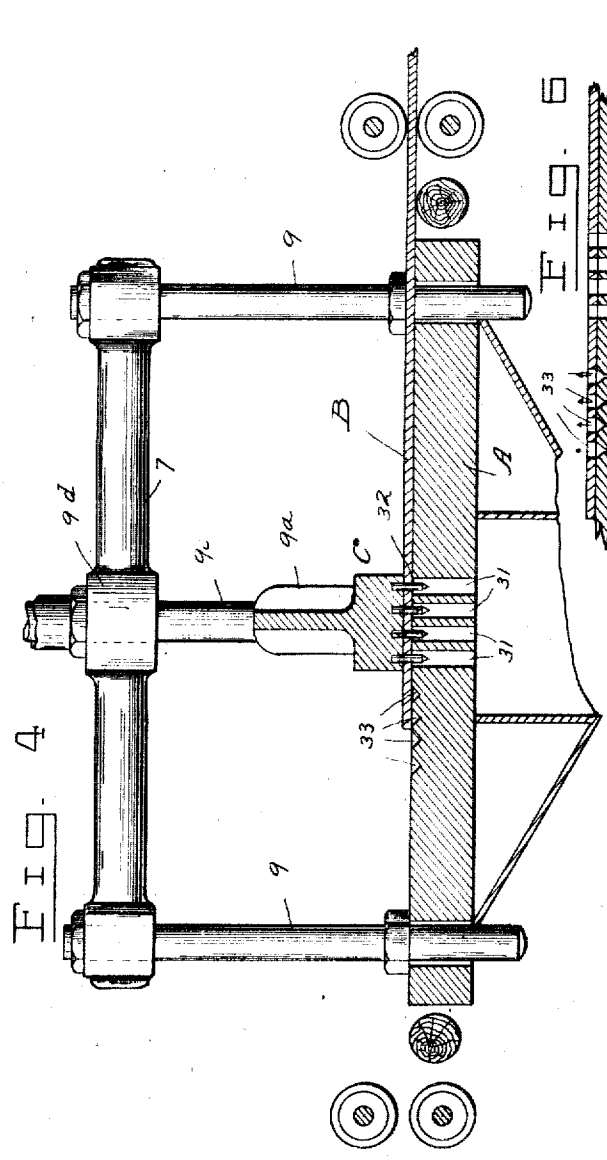


Fig. 4

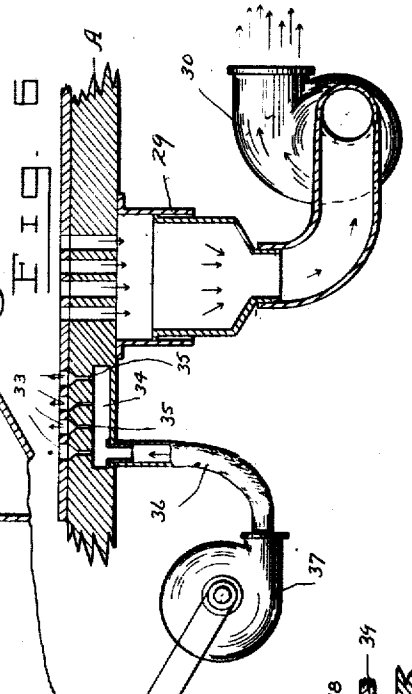


Fig. 6

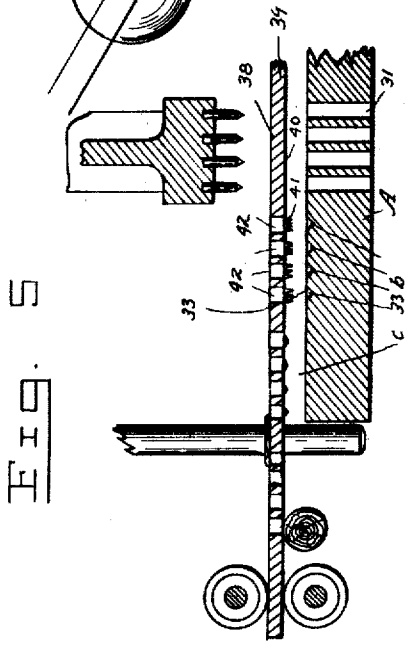


Fig. 5

Inventor,
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UNITED STATES PATENT OFFICE.

JOHN SCHUMACHER, OF LOS ANGELES, CALIFORNIA.

MACHINE FOR MAKING PLASTER-BOARD.

1,351,264. Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed January 23, 1919. Serial No. 272,765.

To all whom it may concern:

Be it known that I, JOHN SCHUMACHER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Machines for Making Plaster-Board, of which the following is a specification.

This invention relates to machines for making plasterboard, and more particularly to apparatus for perforating sheets of plasterboard so that it may form the function of lath in holding and supporting plaster or wall material; the perforations or openings in the plasterboard accommodating invasions of such plaster or wall material to "key" or bind or interlock the plaster or wall material to the plasterboard. In another application for Letters Patent filed by Joseph E. Schumacher on October 9th, 1917, for apparatus for manufacturing plasterboard, Serial No. 195,661, and allowed November 12th, 1918, and resulting in Letters Patent issued December 3rd, 1918, Serial No. 1,286,802, is disclosed a combination of features capable of perforating plasterboard, either under the direction and operation of hand or machinery. Likewise, in said Letters Patent, the plasterboard product resultant upon such perforation operation is disclosed.

The present invention has to do with machines for turning out such perforated plasterboard, and utilizing the invention disclosed and claimed in said Letters Patent.

The invention has for its objects the provision of a suitable machine of the general character stated which will be superior in point of relative simplicity and inexpensiveness considered conjointly with positiveness and reliability in operation, convenience in use and control, reliability and speed in action and durability, and which will be generally superior in efficiency and serviceability.

Essential and particular objects to be attained in the operation of a machine of this character will be readily gleaned from reference to said issued Letters Patent, and, briefly, it may be pointed out that in order to prepare plasterboard for service and use, particularly in that it may properly support and sustain a plaster coating or wall material applied to it, the plasterboard must be punctured so as to properly receive the intruding wall material or plaster, and produce the most efficient inter-lock of the board and wall material. To this end, in dealing with plasterboard consisting, as it usually does, in the best forms, of hardened plastic material having surface sheets of paper or the like, it is found preferable to puncture the board clear through, but not to remove or tear away the paper sheet which is at the side of the plasterboard which ultimately will be farthest removed from the point of invasion by the wall material. It is desirable to leave the paper at the perforation punctured or broken, but not torn away, so that it may eventually take the form of overlapping fingers or tongues of paper which will to a certain extent seal up one end of the perforation, and thus prevent an over-invasion of the perforation by wall material, also serving to interlock with the invading tongue or key of wall material and cause a strong binding inter-relation between the wall material and the board, and also to approximately cover up the outer end or free end of the key or tongue of wall material and prevent its discoloration by dust and other particles which tends to produce a dark appearance upon the wall or ceiling surface in registering with such key or tongue. Thus, in practising the invention, I provide a combination of die members and punches, or a single die and punch, which will, in operation, produce a true and clean perforation of one surfacing of the paper on the plasterboard, which will produce a clean and cleared hole through the plasterboard body, and which will merely rupture and not tear away or remove the paper at the other face of the board.

The present invention consists in the novel and useful provision, formation, combination, inter-relation and relative arrangement and association of parts, members and features, all as hereinafter described, shown in the drawings, and finally pointed out in claims.

In the drawings:

Figure 1 is a front elevation, partly broken away, of a machine for making or finishing plasterboard constructed and organized to embody the invention;

Fig. 2 is a detail longitudinal sectional view of the same, taken upon the line x^2—x^2, Fig. 1;

Fig. 3 is an end elevation of the machine looking in the direction of the large arrow "3" at the right hand end of Fig. 1;

Fig. 4 is an enlarged view of a portion of the showing in Fig. 2;

Fig. 5 is a fragmentary view similar to Fig. 4, illustrating the results of further steps in the operation of the machine than that illustrated in Fig. 4; and

Fig. 6 is a fragmentary view similar to Fig. 4 showing a modified form of construction and organization.

Corresponding parts in all the figures are designated by the same reference characters.

Referring with particularity to the drawings, the improved machine therein shown comprises in the main a bed plate A across which sheets of plasterboard B are successively passed, and at and upon which bed plate such plasterboard is subjected to several operations including that of a punch member C, and those of such bed plate, which is provided with recessed formations *b* and a flat formation *c*, to which the plasterboard sheets are successively advanced, and by which the tongue or fingers of paper or facing at one face of the plasterboard B are so affected or bent back toward the plane of the respective surfacing as to bring them into close relation to substantially seal the respective ends of the perforation which they overlie. The plasterboard is advanced across the bed plate A by two opposed series of rollers, D and E, respectively, which are intermittently actuated through operating means *d*. The bed plate A is mounted to be vertically reciprocated, by actuating means *f*, and the punch member C is vertically reciprocated by actuating means *g*. It will be understood that the bed plate is mounted in a suitable frame F, having suitable members to support, guide and accommodate the working features of the machine, and which need not be discussed in detail, as they will be apparent from the drawing and their construction would readily suggest itself to any person skilled in the art. The punch member C is guided in cross heads 7 supported by uprights 9. The punch member is mounted upon a beam 9^a which ranges transversely of the machine and at its ends is received loosely in connecting rods 9^b and guided by vertical rods 9^c playing in bearings 9^d in the arms 7. The connecting rods 9^b carry at their lower ends each an eccentric strap 9^e applied to a separate eccentric 9^f upon the main shaft 12, at the respective ends thereof, whereby rotation of such main shaft causes vertical reciprocation of the punch member C. The bed plate is mounted upon vertical forked end supports 10, each of which straddles a cam 11 including in the operating means *f* and which is fast upon a main shaft 12 journaled in the frame. A roller 13 is mounted in connection with each of the supports 10 and co-acts with the respective cams 11, so that upon rotation of the shaft 12 the bed plate is reciprocated vertically. The members D and E comprise separate series of rollers 14 and 15 fixed respectively upon transverse shafts 14^a and 15^a which are journaled in the frame F and provided at both ends with inter-meshing gears 14^b and 15^b so that such shafts with their rollers turn oppositely to grip and advance the plasterboard sheets B across the bed plate A toward the front of the machine. Preferably the two series of rollers 14 and 15, with corresponding shafts D and E, are duplicated at the rear of the machine, so that the plasterboard is gripped and forced forwardly across the bed plate by such supplemental rollers, thus assisting the draw or pull of the rollers 14 and 15 at the front of the machine. Likewise, these rear shafts D and E have intermeshing gears 14^b and 15^b corresponding to the corresponding forward shafts.

The means *e* for operating the shafts 14^a and 15^a, with their rollers, comprise a sprocket wheel 16 fast upon the lower forward shaft E and a sprocket wheel 16 fast upon the lower rear shaft E. The sprocket wheels 16 are rotatably united by a sprocket chain 17, so that the two forward shafts D and E are suitably rotated in unison with the two rear shafts D and E. In order to so rotate these shafts the means *e* includes a ratchet wheel 18 fast upon the lower rear shaft E and a pawl 19 pivoted upon a loose pulley 20 centered upon the rear shaft E. Passed about such pulley 20 is a strap or band 21, one end of which is connected by a tension take-up 22 with the frame F, and the other end of which is adjustably connected, by a pin and hole connection 23, with a swinging arm 24 pivoted at its upper end, as at 25, in connection with one of the arms 7. This arm 24 is provided at its lower end with a roller 26 which co-acts with a cam member 27 mounted upon a fly wheel 28 which, in turn, is fixed upon the main shaft 12. As the cam member 27 performs, it rocks the arm 24 which puts the belt or band or strap 21 under strain at one end, causing the pulley 20 to perform a part rotation and thus causing the pawl 19 to impart a part rotation to the ratchet wheel 18 fast upon the shaft E.

Referring to the form of construction shown in Fig. 6, the bed plate A is shown at right at its bottom with telescopic tubing 29 to one end of which is applied a power fan 30 which serves to suck from the openings 31 in the bed plate, which openings receive the punch fingers 32 upon the punch member C, any accumulated dirt, punchings or accumulations incident to the punching operation, thus thoroughly scavenging such

openings, which are shown as of greater diameter than the outside diameter of the punch fingers or prongs 32.

The bed plate A is provided with a series of recesses 33, in its upper surface, and these recesses are arranged just forward of the die holes 31 in the bed plate A. And forward of such series of recesses 33 the bed plate is provided with a flat or plane upper surface. The plasterboard after its perforation passes successively over these portions of the top of the bed plate, for reasons hereinafter to be set forth, and in order to scavenge such recesses 33 and remove therefrom any possible accumulations of punchings or dirt or substance which might gather, I provide, as shown in Fig. 6, a scavenging chamber 34 in the bed plate A with which register ducts 35 in the bed plate, such ducts in turn opening at their upper ends into the recesses 33. Telescopic piping 36 extends from said scavenging chamber 34 to a power blower 37 whereby air currents may be forced through the scavenging chamber 34 and the ducts 35 and partly through the recesses 33 to clear such recesses of any accumulations.

In the operation of the machine, the plasterboard is advanced across the bed plate A by the two double series of rollers D and E, at rear and front of the machine, such rollers being intermittently turned by the means e, including the sprocket chains 17, sprocket wheels 16, arm 24, cam 27, strap 21, pulley 20, pawl 19 thereon, and ratchet wheel 18 on the rear shaft E. After each intermittent advance of the plasterboard, the bed plate A, with its die openings 31, is raised by the means f, including the cams 11 and rollers 13, and is brought into the position shown in the drawings. Thereupon the means g, including the eccentrics 9^d and straps 9^e thereof, and connecting rods 9^b, cause the punch member C to be lowered and its punch fingers or prongs 32 to be passed through and perforate the plasterboard, so as to cleanly cut away the upper surfacing sheet 38, cut a clean hole through the body 39 of the plasterboard, and disrupt the lower surfacing 40 so as to turn the fingers of such covering downwardly, as at 41. Thereupon the bed plate A is lowered by the operating means f and the punch member C is elevated by the means g, and the rollers D and E again advance the punctured plasterboard, until the punctures 42 therein are brought over the recesses 33 in the bed plate A. Thereupon the operating means f elevate the bed plate A and the fingers 41 of the lower plasterboard covering 40 are engaged by the bed plate at the recess 33 therein and turned or bent inwardly and upwardly into overlapping relation so as to approximately seal or cover the lower orifices of the holes 42. Now means g operate to produce another punching operation through fresh portions of the plasterboard B. A continuation of these operations brings the plasterboard over from the recesses 33 in the surface portions b of the bed plate onto the smooth flat surface portions c of the bed plate so that such returned or partly folding fingers 41 of the lower covering of the plasterboard are more effectively flattened out or restored to the plane in which such punctured portion of the covering originally extended. These successive operations are clearly indicated in Fig. 5, the fingers being finally folded up approximately flat as at the extreme left of this figure.

It is manifest that many changes and variations may be made in practising the invention, in departure from the specific disclosure of the foregoing description, and the drawing.

Having thus disclosed my invention, I claim and desire to secure by Letters Patent:

1. A machine for perforating plaster board and like products of that type which comprise a plastic filler interposed between cover sheets, including a die member, a punch member mounted for coöperation with the die member to form openings through the plaster board and leave one of the cover sheets in a torn condition at the openings, means for advancing the plaster board between the die member and punch member, and means for subsequently restoring the torn portions of the said cover sheet to substantially their original positions.

2. A machine for perforating plaster board and like products of that type which comprise a plastic filler interposed between the cover sheets, including a die member, a punch member mounted for coöperation with the die member to form openings in the plaster board and leave one of the cover sheets in a torn condition at the opening, means for advancing the plaster board between the die member and punch member, and pneumatic means for removing dust and debris from the openings.

3. A machine for perforating plaster board and the like, including a die member, a coöperating punch member, means for intermittently advancing the plaster board between the die member and the punch member, and means for causing the die member and punch member to operate upon the plaster board during the periods when the same is at rest, the die member being formed with a recessed surface portion over which the plaster board is advanced after being punctured, and also with a flat surface portion over which the plaster board is advanced subsequent to its movement over such recessed portion.

4. A machine for perforating plaster board and the like of that type which comprises a plastic filler interposed between cover sheets, including a die member, a

punch member mounted for coöperation with the die member to form openings through the plaster board and leave one of the cover sheets in a torn condition at the openings, means for advancing the plaster board between the die member and punch member, and means in the path of the plaster board for restoring the torn portions of the cover sheet to substantially their original positions.

5. A machine of the character disclosed, comprising means for advancing plasterboard, a die member over which it is advanced, and a punch member for perforating the plasterboard, the die member being provided with a recessed surface portion over which the plasterboard is advanced after being punctured; means being provided for withdrawing from said recessed portion of said die member any accumulations of punchings or the like.

6. A machine of the character disclosed, comprising means for advancing plasterboard, a die member over which it is advanced, and a punch member for perforating the plasterboard, the die member being provided with a recessed surface portion over which the plasterboard is advanced after being punctured; means being provided for withdrawing from said recessed portion of said die member any accumulations of punchings or the like; said last named means comprising a device for passing air currents through said recessed portion of the die member.

7. A machine of the character disclosed, comprising means for advancing plasterboard, a die member over which it is advanced, and a punch member for perforating the plasterboard, the die member being provided with a recessed surface portion over which the plasterboard is advanced after being punctured; means being provided for scavenging the die member both at the punch receiving portion and the recessed portion thereof.

8. A machine for perforating plaster board and the like of that type which comprises a plastic filler interposed between cover sheets, including a die member, a punch member mounted for coöperation with the die member to form openings in the plaster board and leave one of the cover sheets in a torn condition at the opening, means for advancing the plaster board between the die member and punch member, pneumatic means for removing dust and debris from the openings, and means in the path of the plaster board for restoring the torn portions of the cover sheet to substantially their original positions.

9. In a machine of the character disclosed, means for punching a perforation through a sheet of plasterboard comprising body material and a surface covering and whereby the surface covering is disrupted but not detached, and means for folding inwardly over one end of the perforation the ruptured portion of such covering; said last named means comprising a plate over which the plasterboard is passed and which is provided with a recessed portion and with a plane portion.

10. In a machine of the character disclosed, a die member, a punch member, and means for advancing plasterboard over the die member; said means comprising co-acting shafts provided with rollers adapted to grip and move the plasterboard, a drive shaft, a swinging arm, a cam upon the drive shaft for oscillating the said arm, a pulley loose upon one of said first mentioned shafts, and a ratchet fast upon the same shaft and with which a pawl carried by said pulley coöperates, and said pawl.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN SCHUMACHER.

Witnesses:
RAYMOND IVES BLAKESLEE,
EDNA TURNER.