June 20, 1933. M. D. FITZGERALD 1,915,221

APPARATUS FOR LAMINATING MATERIALS

Filed July 23, 1932

Fig. 5.

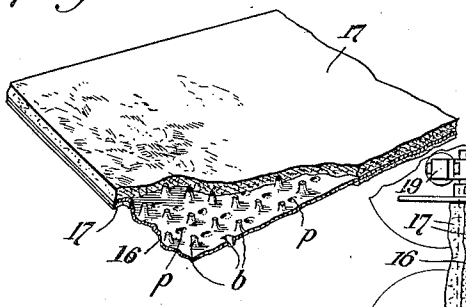


Fig. 2.

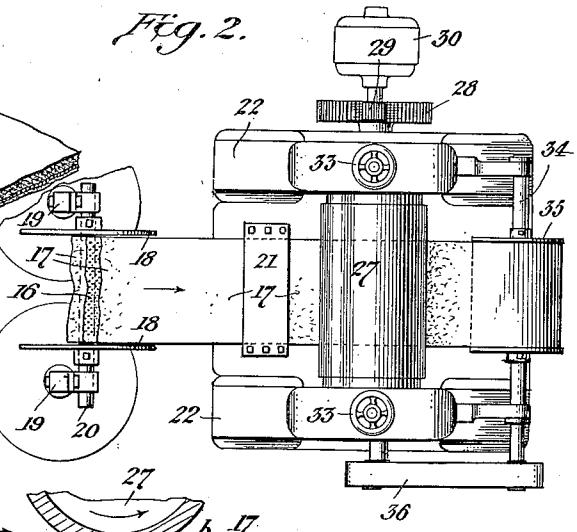


Fig. 3.

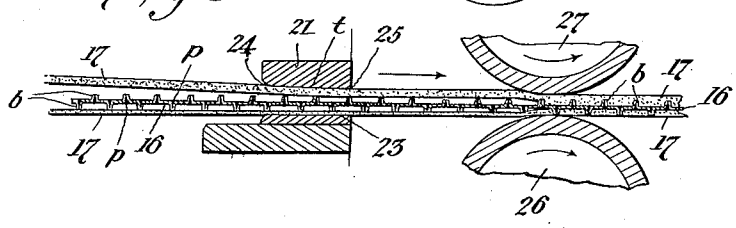
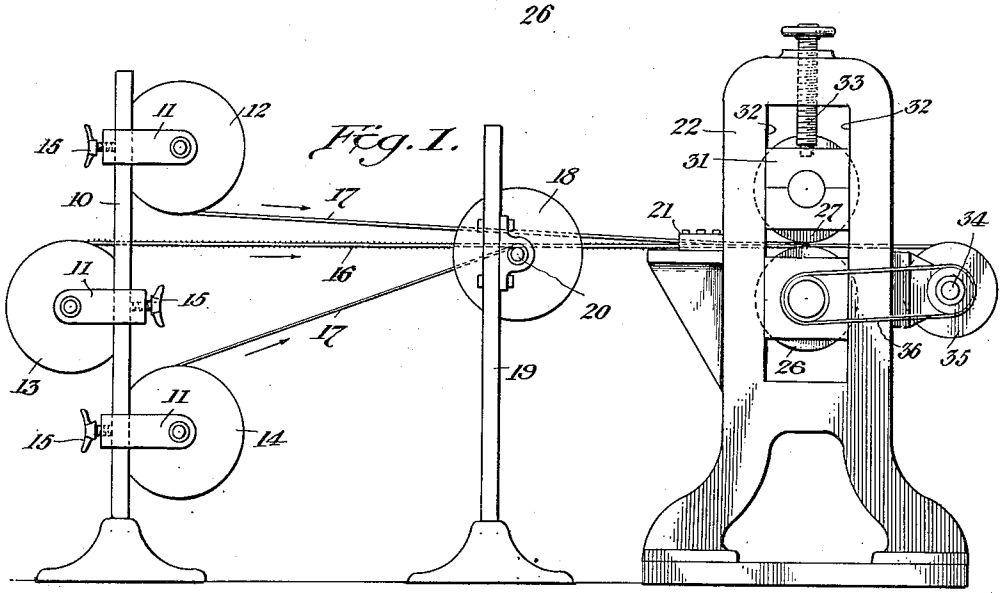


Fig. 1.



Inventor,

Martin D. Fitzgerald.

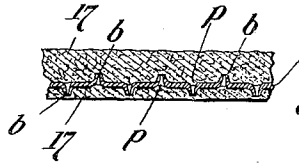


Fig. 4.

By Sturtevant Mason & Porter

Attorneys

Patented June 20, 1933 1,915,221

UNITED STATES PATENT OFFICE

MARTIN D. FITZGERALD, OF TORRINGTON, CONNECTICUT, ASSIGNOR TO THE FITZGERALD MFG. COMPANY, OF TORRINGTON, CONNECTICUT, A CORPORATION OF CONNECTICUT

APPARATUS FOR LAMINATING MATERIALS

Application filed July 23, 1932. Serial No. 624,267.

The present invention is the method and means for laminating prick-punched sheet metal of the kind shown and described in my co-pending application Serial No. 623,637 filed July 20, 1932, wherein a sheet of material, preferably metal, is closely perforated throughout its area and the edges of the perforations having laterally extending burrs or tangs. Such prick-punched sheet material has a number of uses, among which is that it may be incorporated in belting structures, and gaskets for engines.

The present invention has for its object the provision of a very simple and economical means and method for laminating the face or faces of said prick-punched metal with other sheet materials, such as, leather, rubber, asbestos and the like, and which apparatus or means is very durable and efficacious in operation.

For the purposes of the present disclosure, the prick-punched sheet metal is shown as being laminated on opposite sides with sheet asbestos, forming a laminated product suitable for gaskets.

The method of the present invention is performed by feeding prick-punched sheet metal from a continuous supply simultaneously with sheets of asbestos, or other suitable material with which it is to be laminated, also from continuous supplies, one sheet of asbestos being arranged on each side of the face of the prick-punched metal. These three laminæ are aligned with respect to each other and brought into face-to-face contact and subjected to a rolling pressure, or, in other words, the pressure from rotating surfaces which forces the asbestos upon the surface of the interposed prick-punched metal in such a manner that the burrs or tangs on opposite sides of the prick-punched metal, or on one side, as the case may be, is forced to penetrate the surface of the adjacent laminæ and to extend for a distance into the body thereof, whereby the sheet material of the respective laminæ are united into a unitary structure and the resultant product supplied in continuous form. One means for performing the above described method is shown in the accompanied drawing, in which:

Figure 1 is a side elevation of the apparatus;

Figure 2 is a top plan view of the pressing unit of the apparatus shown in Figure 1;

Figure 3 is an enlarged longitudinal sectional view taken through the pressure rollers and assembling guide of the apparatus and showing the manner in which the material is acted upon;

Figure 4 is a fragmentary sectional view through a portion of the resultant product; and

Figure 5 is a perspective view of the resultant product, partly broken away in order to illustrate the internal construction thereof.

In particular reference to the drawing, a rack 10 is provided, of any suitable construction, carrying suitable supports 11 upon which are rotatably mounted reels 12, 13 and 14 of sheet material, which is to be assembled into a unitary construction. These supports 11 may be adjustable by any suitable means, such as clamp screws 15, for changing their position on the rack 10.

The intermediate reel 13 carries the perforated sheet metal 16, which is formed with a plurality of closely associated perforations P, said perforations having their edges projecting from opposite sides of the sheet material 16 to form burrs or tangs, *b*. These burrs or tangs may extend from opposite sides of the sheet 16 in any suitable order or manner. However, as shown particularly in Figures 4 and 5, the burrs of alternate perforations extend in opposite directions.

The reels 12 and 14 carry sheet material of any suitable kind or construction which may be pressed against the faces of the perforated sheet 16 and have the burrs or tangs *b* thereof extend or penetrate thereinto. However, for the purposes of the present showing, the reels 12 and 14 carry sheets of asbestos 17, which are led from their respective reels between a pair of spaced edge guides 18 supported on a standard 19. These edge guides preferably take the form of plates or discs supported on a shaft or arbor 20 and are adjustable along the length of the arbor so as to be spaced or separated one from the other a

distance equal to the width of said sheets 16 and 17.

These plates, therefore, bring the sheets 16 and 17 to edge-to-edge alignment, from which they pass to a gathering guide 21 mounted on the frame 22 of the pressing unit. This gathering guide is positioned in advance of the pressure rolls 26 and 27 and comprises preferably a plate or other similar member providing a restricted passage 23 of the width of the sheets 16 and 17 and of a height equal approximately to the thickness of the two asbestos sheets 17 and the "over-all" thickness of the sheets 16. The forward edge of the guide opening 24 diverges outwardly, as particularly shown in Figure 3, so as to present smooth surfaces over which the asbestos sheets 17 may pass. The top surface *t* of the opening 23 is inclined downwardly from the edge 24 to its rear edge 25, so as to gradually bring the sheets 16 and 17 into facial contact with the burrs of the intermediate perforated metal sheet 16.

From the guide 21 the assembled sheets of material pass in contacting relation to the pressure rolls 26 and 27, between which said sheets pass. These pressure rolls are mounted in the frame 22, the roll 26 being stationarily mounted and having a pinion 28 on one end of its shaft connected with a reducing gear 29 of a motor 30. The roller 27 is mounted on bearings 31 slidable in a vertical bearing guideway 32 on the frame, and is held in adjusted position by the screw 33, which is connected with the bearing block and the top of the frame 22, as clearly shown in Figure 1. Thus, the rolls 26 and 27 may be adjusted to provide the proper clearance therebetween, according to the thickness of the sheets 16 and 17. In practice, this adjustment is such that the clearance between the rollers is sufficient to accommodate the thickness of the sheet 16 and the sheet 17, so that the latter may be pressed into tight contacting engagement with the surfaces of the perforated sheet 16 and the burrs *b* thereon will penetrate and extend into the body of the sheet 17 without deforming or mashing the burrs *b*. Manifestly, in view of the screw adjustment 33, the roller 27 may be adjusted to a nicety to obtain the proper clearance desired. At the rear end of the compression unit, is mounted a rotatable shaft or beam 34, which will receive and rotate a winding reel 35 mounted thereon. The shaft or beam 34 is preferably rotated by a belt drive 36 from the roller 26. From the above, it will be seen that by the present method and apparatus the laminating of a prick-punched sheet metal may be accomplished with great facility and at a high speed of production while at the same time assuring uniform perfection in the resultant product.

What is claimed is:

1. An apparatus of the kind described comprising a rack, supporting reels of sheet material and from which the said material is drawn, spaced edge guide means arranged to engage the edges of the said sheets for aligning the same edge to edge, and a gathering guide means for bringing the adjacent surfaces of said sheets into contact, a pair of pressure rollers between which said associated sheets may be passed and moved into intimate contact one with the other to form a unitary laminated structure, and means for rotating said pressure rollers, a winding beam rotatably supported and having a drive connection from said pressure rollers to receive said lamination from said rollers.

2. An apparatus of the kind described comprising a rack, supporting reels of sheet material and from which the said material is drawn, spaced edge guide means arranged to engage the edges of the said sheets for aligning the same edge to edge, said edge guide means comprising spaced plates adjustably mounted on an arbor, and a gathering guide means for bringing the adjacent surfaces of said sheets into contact, and a pair of pressure rollers between which said associated sheets may be passed and are moved into intimate contact one with the other to form a unitary laminated structure.

In testimony whereof, I affix my signature.

MARTIN D. FITZGERALD.