Dec. 1, 1931. F. W. HARNEY 1,834,309

MACHINE FOR MAKING INSULATING BATS

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Fig. 1

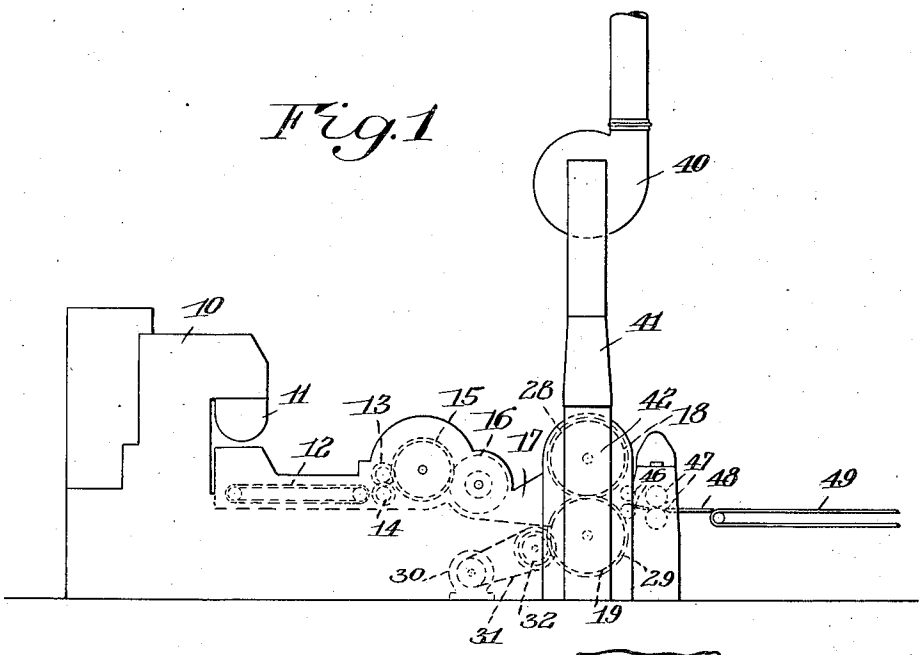


Fig. 2

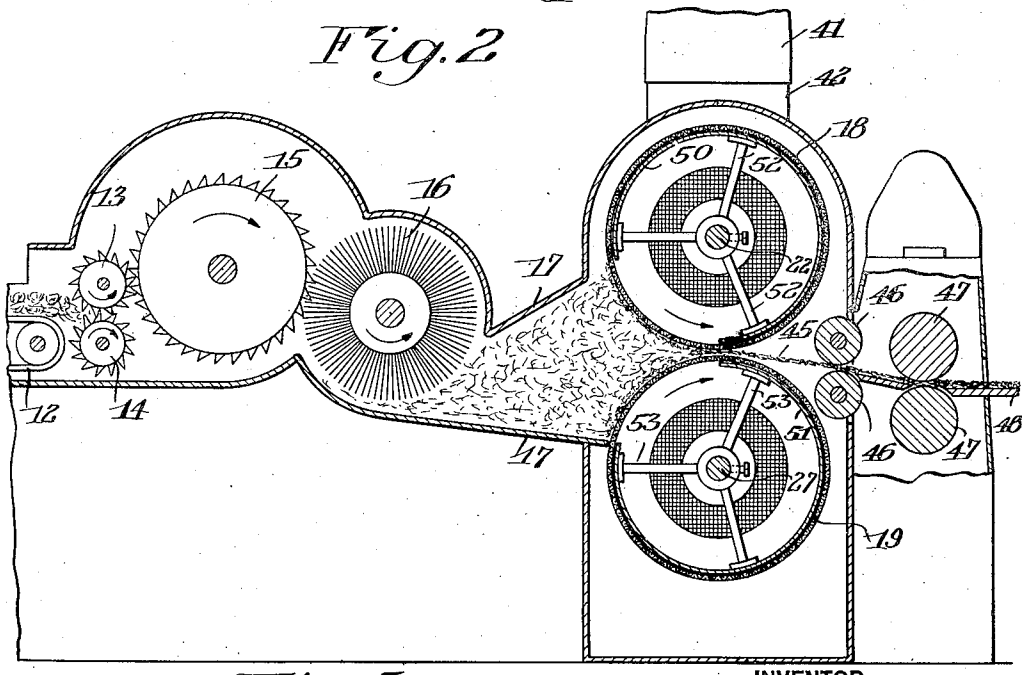
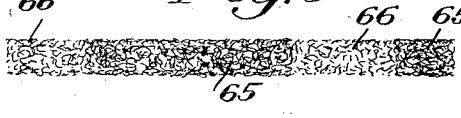


Fig. 5



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Fig. 3

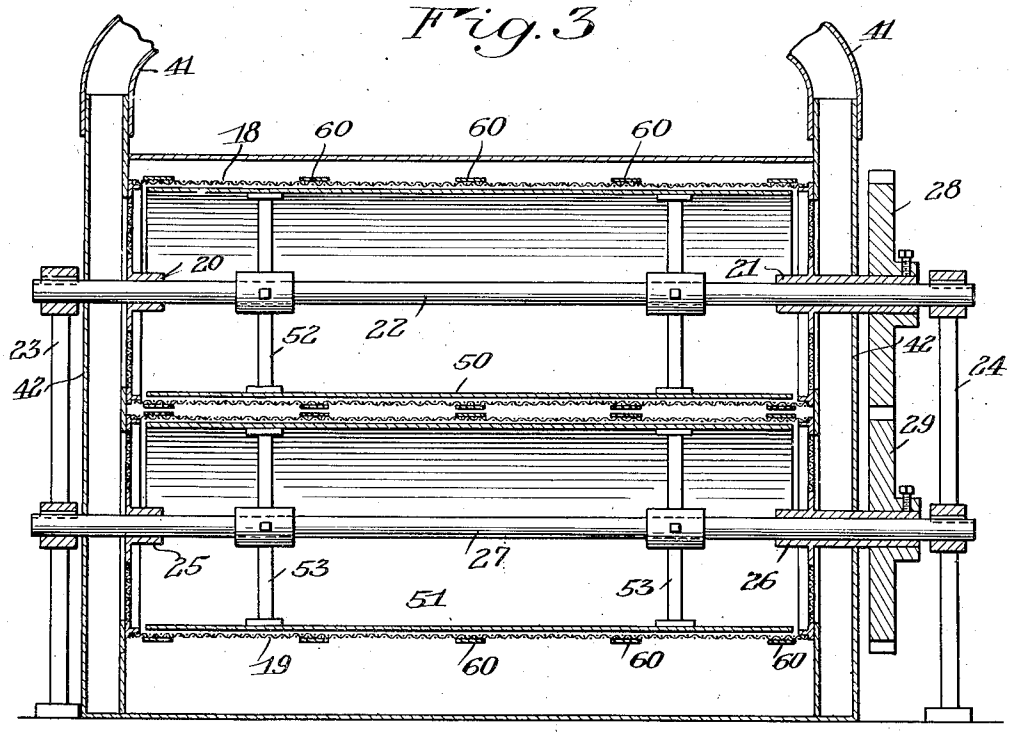


Fig. 4

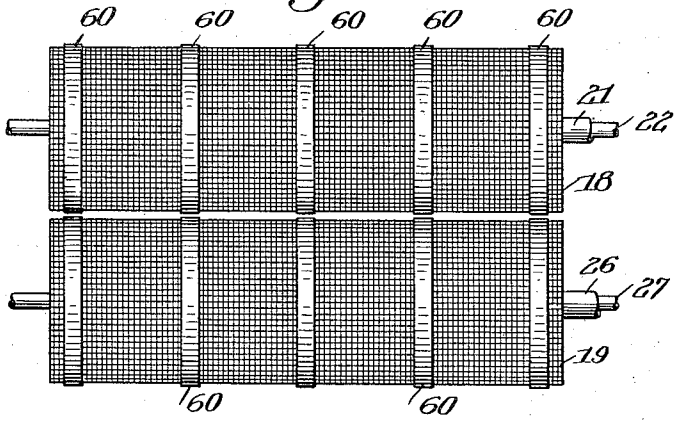
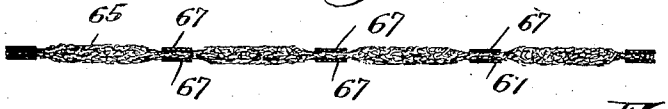


Fig. 6



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UNITED STATES PATENT OFFICE

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MACHINE FOR MAKING INSULATING BATS

Application filed February 8, 1930. Serial No. 427,029.

This invention relates to a machine for making insulating bats, such as bats of fibrous material which, when placed between liner sheets of paper or the like, are suitable for insulating the walls of houses to reduce the flow of heat therethrough, and for other purposes. The completed bats may be conveniently placed upon the market in the form of strips of the proper width to be nailed or otherwise secured between the studding of walls. It is found in practice that the nailing of a bat to the studding or the like may be done much more easily if the marginal edges of the bat are thinner than the relatively thicker central portion of the bat. Making the edges comparatively thin also permits them to be turned easily to the proper angle relatively to the central portion.

It is an object of the present invention to provide simple and efficient apparatus for making a bat with the desired thin edge effect. It is also an object to provide thin edge producing means in a form which may be applied easily to existing bat making machines, as well as to those hereafter constructed.

In making insulating bats, it is frequently desirable and economical to construct what might be termed a multiple width bat having a width of two or more times the width of a single commercial bat. Then this multiple width bat may be slitted or cut longitudinally to subdivide it into a plurality of single bats of the desired commercial width.

It is another object of the present invention to provide means which will be effective in the construction of a multiple width bat to form the bat in such a way that when it is later cut into a plurality of commercial width bats, such bats will each have the desired thin edges.

A further object of the invention is the provision of a bat forming machine by which bats may be produced having at any desired points or portions less material per unit of area than at other points or portions.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully explained, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Fig. 1 is a schematic side elevation of part of a bat forming machine according to the present invention;

Fig. 2 is a vertical section taken substantially centrally through part of the apparatus shown in Fig. 1;

Fig. 3 is an axial vertical section through the forming rolls of the machine, showing a preferred embodiment of the invention applied thereto;

Fig. 4 is an elevation of the forming rollers with other parts of the machine removed, illustrating a preferred embodiment of the invention;

Fig. 5 is a diagrammatic cross-section through a portion of a bat made on the present machine, and

Fig. 6 is a cross-section through such a bat after the longitudinal strips or tapes have been applied thereto.

Similar reference numerals throughout the several views indicate the same parts.

Referring now to Figs. 1 and 2 of the drawings, there is shown a bat making machine embodying a casing 10 having any suitable mechanism therein for delivering fibrous material to a weighing pan 11. The fibrous material may be of any desired kind, such as jute, cotton, hair, or any other material, or a mixture of two or more materials, and the fibres may be previously treated or untreated as may be desired.

From the weighing pan 11 the fibres drop upon the conveyer 12 which delivers them to a picker having rotating picking elements 13, 14, and 15. The doffer 16, which may be in the nature of a brush, removes the picked fibres from the element 15 and delivers them into the casing portion 17 in the form of a loose and fluffy mass of fibres. Whether or not the fibres have previously been treated chemically or otherwise, they are at this point preferably in a relatively dry condition, since dry fibres will make satisfactory bats, whereas any considerable amount of moisture in the fibres at this point of the machine is apt to result in matting of the fibres

to form a dense bat rather than the light fluffy or flocculent bat which is desired.

The loose fibres are delivered from the casing portions 17 to the exterior of a pair of forming or condenser rollers. The upper forming roller has a cylindrical portion 18 of foraminous, pervious or perforated material, while the lower roller has a similar cylindrical portion 19. The portions 18 and 19 of the rollers may conveniently be made of wire netting or screening or the like.

The portion 18 of the upper roller is mounted upon sleeves 20 and 21 rotatable upon a shaft 22 fixed in brackets 23 and 24, while the portion 19 of the lower roller is similarly mounted on sleeves 25 and 26 rotatable upon a shaft 27 fixed in the same brackets. A gear 28 mounted on the sleeve 21 meshes with the gear 29 mounted on the sleeve 26, so that when one of the rollers is driven, the other rotates concomitantly with it.

The rollers may be driven in any suitable manner, as by a motor 30 driving a belt 31 which drives a pinion 32 meshing with the gear 29.

A partial vacuum is created within both of the forming rollers by any suitable means, such as by a blower 40, the intake portion of which is connected by conduits 41 to suction chambers 42 at the ends of the forming rollers. in the manner best shown in Fig. 3.

The partial vacuum within the rollers creates a suction through the foraminous or pervious material 18 and 19, which tends to draw the loose fibrous material within the casing portion 17 against the periphery of the rollers and deposits it in a layer on the rollers. As the rollers rotate, the layers of fibres thus deposited issue from the rollers in the form of a bat of loosely associated fibrous material, as indicated at 45 in Fig. 2. This bat is fed forwardly by two pairs of feed rolls 46 and 47 onto a short table 48 from which the bat is delivered to a conveyer 49 carrying it forward for further manufacturing operations.

If it is desired to limit the effect of the suction or partial vacuum within the rollers 18 and 19 to that portion of the periphery of each roller which is adjacent the mass of fibres being fed thereto, this may be done by employing a baffle 50 in the upper roller and a corresponding baffle 51 in the lower roller, which baffles may be mounted on spiders 52 and 53 respectively, on the shafts 22 and 27 respectively. It is found that under some circumstances, however, the apparatus functions satisfactorily without these baffles, and at times they may be entirely omitted.

When using apparatus of the kind above described, it is found that the bat issuing from the forming rollers is of substantially uniform thickness and density throughout the width thereof. As has been explained above, however, it is desirable to produce a bat having edges which are thinner than the main central portion of the bat, so that these relatively thin edges may be conveniently turned to any desired angle relative to the central portion and may be conveniently nailed or otherwise affixed to the studding or framework of a building.

According to the present invention, the desired thin edge effect may be produced by reducing the perviousness of the forming rollers at appropriate points, so that less fibres per unit of area are deposited upon the forming rollers at such points than at other points. Portions of the forming rollers may be rendered entirely impervious to the passage of air through such portions, or the perviousness of portions may simply be reduced so that less suction is produced through such portions than at other portions. In either case, the result will be that less fibres per unit of area are deposited on such portions of the rollers than on the other portions, and if the portions of the forming rollers which are thus rendered less pervious or entirely impervious be properly chosen, a bat having the desired thin edges may be produced.

According to a preferred embodiment of the invention, the forming rollers are rendered impervious along a plurality of zones each extending circumferentially around the rollers. This may be done by suitably lagging the rollers as by securing strips of substantially impervious material around the rollers at the desired points, either internally or externally of the pervious material constituting the periphery of the rollers. In the embodiment illustrated in Figs. 3 and 4, external strips 60 are illustrated extending around the rollers, which strips may be of metal or of other material such as fabric secured by suitable adhesive to the rollers 18 and 19. In the latter case the adhesive used to attach the fabric to the screen fills up the pores of the fabric sufficiently so as to render it practically impervious to suction for the purposes of the present invention.

The lagging 60 has been exaggerated in thickness in the drawings for the sake of clearness. In actual use, the lagging is preferably relatively thin and does not project substantially from the surface of the screen or netting which constitutes the periphery of the rollers.

It has been mentioned above that insulating bats may be formed conveniently and economically in multiple widths, later being slitted longitudinally so as to subdivide them into a plurality of bats of the desired single or commericial width. In the embodiment illustrated in Figs. 3 and 4, forming rollers are shown for making the bat of multiple width, the bat being intended to be slitted later to form four single with bats. Accordingly, lagging 60 is provided on the

forming rollers at a plurality of points spaced axially along the rollers, such points corresponding to the points at which the multiple bat will later be slitted. Thus the lagging is located at the portions of the multiple bat which later become the edges of the single bats, and in this way less fibres are deposited per unit of area on those portions of the multiple bat which will later become the edges of the commercial bats.

When the bat issues from the forming rollers 18 and 19, it will be found to be of substantially uniform thickness throughout the entire width thereof, as illustrated diagrammatically in Fig. 5. Those portions of the issuing bat which are in alinement with the lagging 60 on the rollers, however, although of substantially the same thickness as the other portions, will have substantially less fibres per unit of surface area of the bat and be of less density than those portions intermediate the lagging. This is illustrated diagrammatically in the cross-section shown in Fig. 5, in which the numeral 65 refers to the main portion of the bat formed intermediate the lagging 60, while the numeral 66 illustrates the portions of less density formed in alinement with the lagging 60, because of the reduction or suppression of the suction by the lagging at these points.

After the fibrous bat is formed by the apparatus described above, it preferably has strips or tapes of paper or the like secured thereto longitudinally at points corresponding to the edges of the single width commercial bats. Such strips are preferably placed in pairs on opposite sides of the bat and sewn to each other through the bat. A diagrammatic cross-section of a bat with the strips applied thereto is illustrated in Fig. 6 of the drawings, in which the strips are denoted by the numeral 67. These strips are applied in alinement with the portions 66 of the bat which are of less density. The action of the sewing machine in sewing the strips to each other through the bat, together with the action of supplementary compressing rollers if desired, results in compressing the fibrous material along these lines of less density. Because the density of the fibrous structure is comparatively small along these lines, the material remains compressed after the strips are sewn and has little tendency to expand again to its original thickness. Thus the bat remains comparatively thin along the lines at which the strips 67 have been applied although the central portion 65 of the bat is relatively thick. This thin edge effect is illustrated clearly in Fig. 6.

Liner sheets of paper or the like are applied to the top and bottom of the bat after the strips 67 have been secured thereto, and then the bat is slitted longitudinally along the centers of the strips 67 to subdivide it into the final single width commercial bats, each of which will have the desired relatively thin edges.

Although the lagging 60 has been described as being applied to the forming rollers at points which will result in less density of fibres at the edges of the commercial bats, yet it is obvious that if less density is desired at any other point than the edges, it may be produced by providing lagging at corresponding points on the forming rollers. Likewise if it is desired to produce a bat having less density at spaced points rather than in continuous strips along the bat, the lagging may be applied to the forming rollers at circumferentially spaced points rather than in a continuous circumferential zone.

It will be seen that the present invention may be applied comparatively easily to existing bat making machines as well as to those hereafter constructed. The lagging 60 may be easily attached to forming rollers or screens of existing machines without making any other substantial changes in the mechanism.

While one embodiment of the invention has been disclosed, it is to be understood that the inventive idea may be carried out in a number of ways. This application is therefore not to be limited to the precise details disclosed, but is intended to cover all variations and modifications thereof falling within the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. The method of making insulating material for walls of buildings and the like, which comprises delivering a mass of loose fibers to a rotating condenser provided with a circumferential band so that less fibers per unit of area will be deposited on said condenser in alinement with said band than at other points, removing said fibers from said rotating condenser in the form of a web of loosely felted fibers having less fibers per unit of area along a line in alinement with said band, applying strips of sheet material to opposite sides of said web in alinement with said line of less fibers per unit of area, stitching through said strips and the intervening web, and applying a liner of sheet material to each side of said web.

2. The method of making insulating material for walls of buildings and the like, which comprises delivering a mass of loose fibers to a rotating condenser provided with a plurality of axially spaced circumferential bands so that less fibers per unit of area will be deposited on said condenser in alinement with said bands than at other points, removing said fibers from said rotating condenser in the form of a web of loosely felted fibers having less fibers per unit of area along lines in alinement with said bands, applying strips of sheet material to opposite sides of said web in alinement with each of said lines of

less fibers per unit of area, stitching through said strips and the intervening web, and applying a liner of sheet material to each side of said web over said strips.

3. The method of making insulating material for walls of buildings and the like, which comprises delivering a mass of loose fibers to a rotating condenser provided with a plurality of axially spaced circumferential bands so that less fibers per unit of area will be deposited on said condenser in alinement with said bands than at other points, removing said fibers from said rotating condenser in the form of a web of loosely felted fibers having less fibers per unit of area along lines in alinement with said bands, applying strips of sheet material to opposite sides of said web in alinement with each of said lines of less fibers per unit of area, stitching through said strips and the intervening web, applying a liner of sheet material to each side of said web over said strips, and slitting said web longitudinally in alinement with one of said lines of less fibers per unit of area, to subdivide it into a plurality of pieces of insulating material having edges thinner than the main central portions thereof.

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