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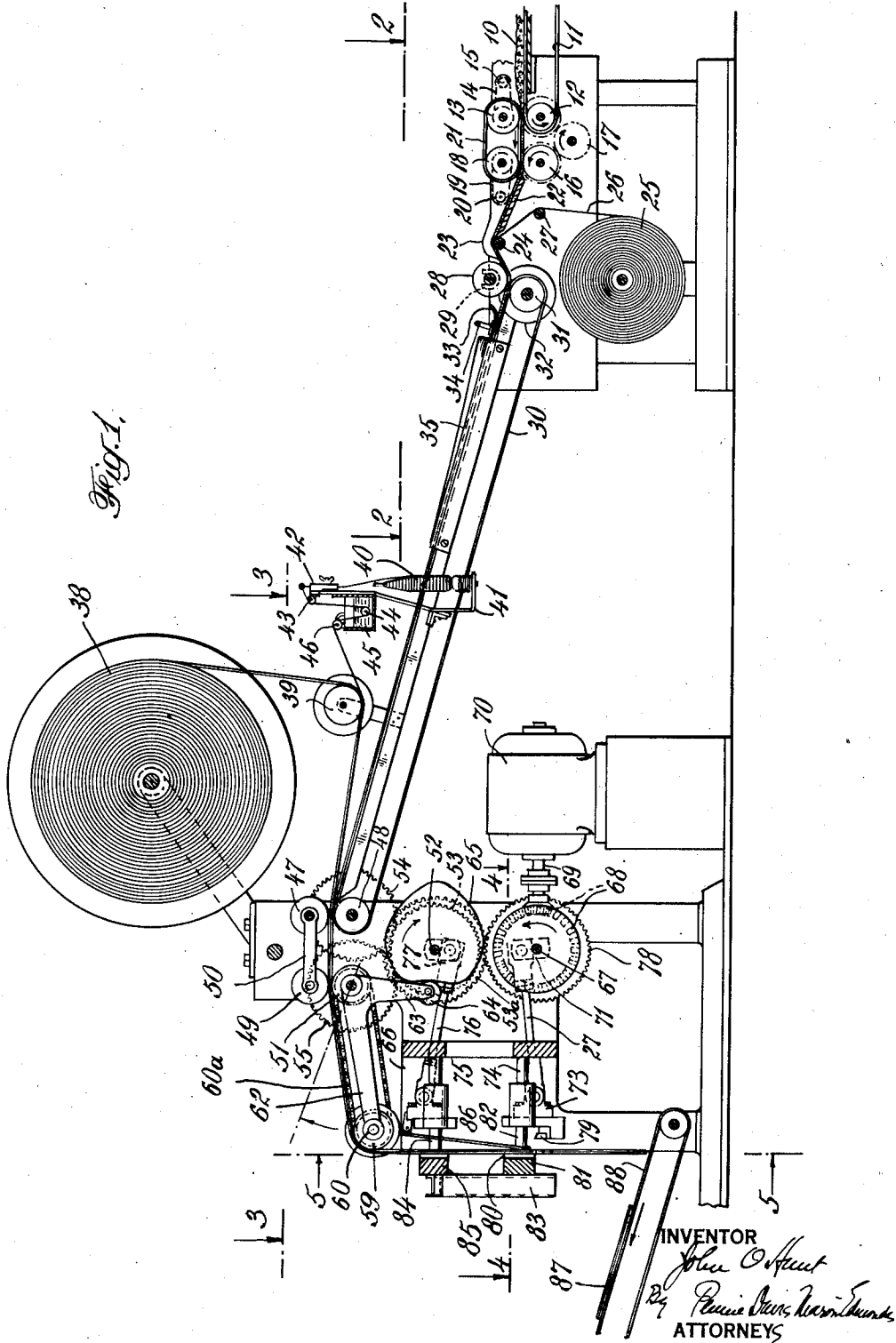
J. O. HUNT

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METHOD AND APPARATUS FOR MAKING ABSORBENT PADS

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3 Sheets-Sheet 1



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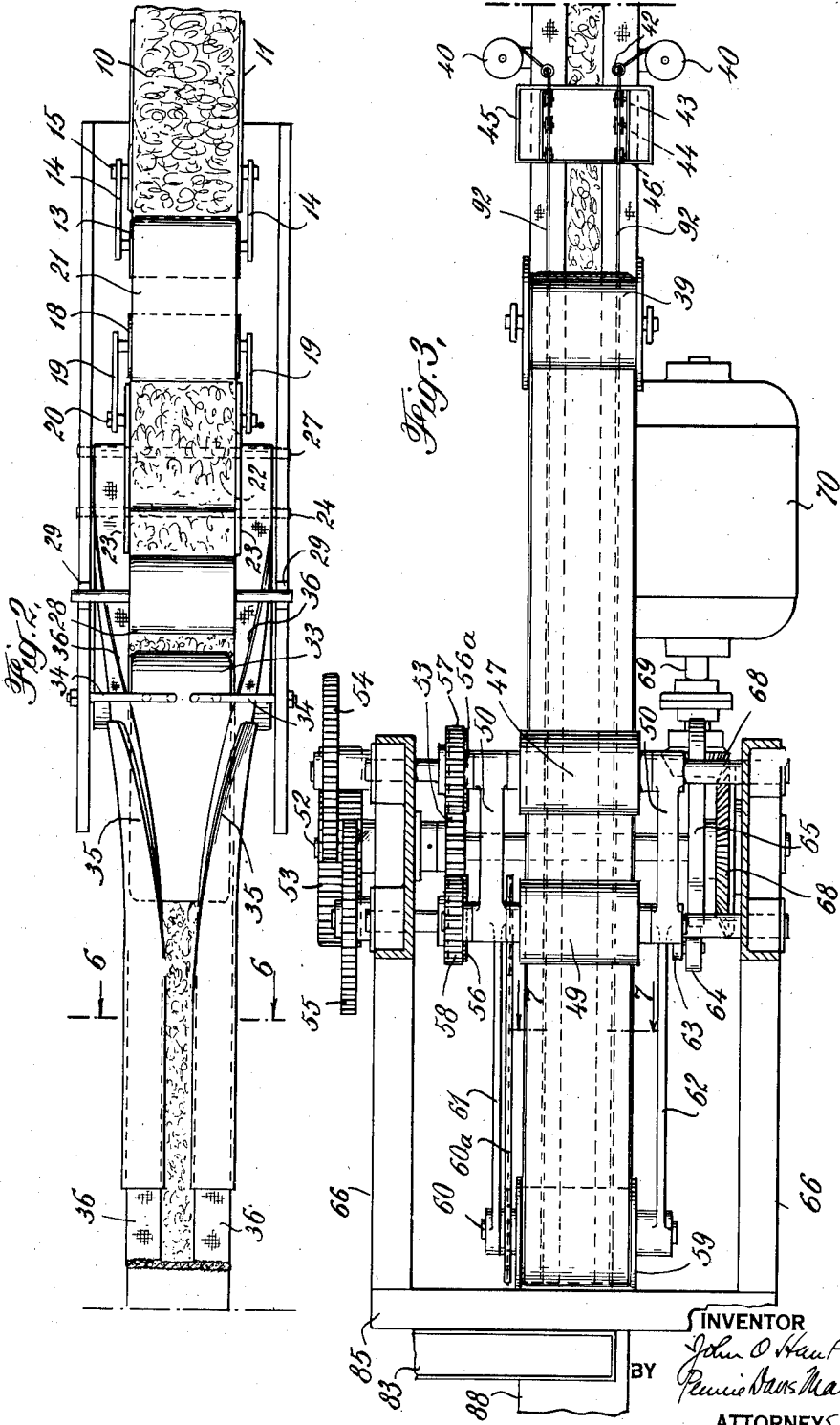
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METHOD AND APPARATUS FOR MAKING ABSORBENT PADS

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3 Sheets-Sheet 2



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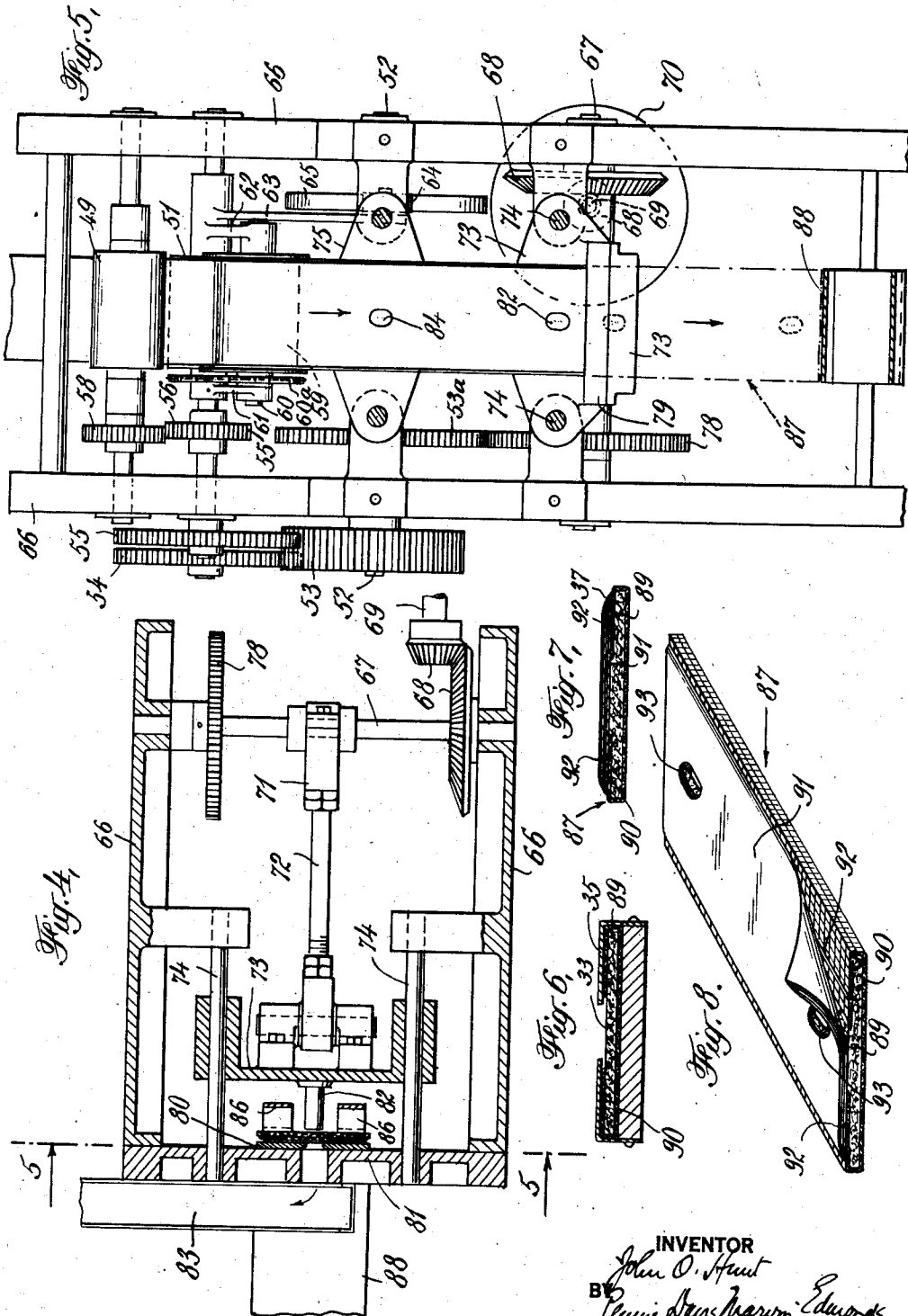
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METHOD AND APPARATUS FOR MAKING ABSORBENT PADS

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3 Sheets-Sheet 3



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METHOD AND APPARATUS FOR MAKING ABSORBENT PADS

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Application January 6, 1942, Serial No. 425,773

11 Claims. (Cl. 154—29)

This invention relates to the manufacture of absorbent pads for hygienic use and is concerned more particularly with a novel method and apparatus by which such pads can be produced rapidly and at low cost. An example of an absorbent pad which can be readily manufactured by the method and apparatus of the invention is that disclosed in my co-pending application Serial No. 425,774, filed January 6, 1942, and the use of the invention in the production of the pad of that application will be illustrated and described in detail for purposes of explanation.

The absorbent pad referred to comprises a pair of layers of absorbent material of different kinds secured together by means which in no way impairs the flexibility of the pad or interferes with its disposal. One layer includes a web of loose fibrous material, such as cotton fibres, and one of its faces is covered with a sheet of open mesh fabric, such as gauze. The sheet is wider than the web and its lateral edges extend around the lateral edges of the web and lie against the other face thereof. The second layer is made of a plurality of sheets of cellulosic material, which preferably have lateral edges adhering to one another and one of the sheets, preferably that exposed on the outer face of the layer, may be treated to be water-repellent. The layers are secured together by lines of adhesive extending lengthwise of the pad and uniting the inturned edges of the fabric sheet to the opposed surface of the second layer. Preferably, the adhesive is carried by threads interposed between the layers.

In the manufacture of the pad by the method and apparatus of the invention, a web of loose fibrous material of a width appropriate for a single pad is advanced lengthwise and a sheet of fabric of proper width is applied to one face thereof. As the web and sheet advance, the projecting lateral edges of the sheet are turned in over the other face of the web. The assembled sheets of indefinite length forming the second layer are drawn from a supply and lines of adhesive are applied to one face thereof inward from the lateral edges. The second layer is then applied to the face of the first layer in such manner that the lines of adhesive make contact with the inturned edges of the gauze and by application of pressure, the layers are affixed to one another. The assembled layers are next cut into proper lengths for pads and, if desired, openings are simultaneously punched through each pad near its ends to facilitate attachment of the pad to a holder.

For a better understanding of the invention,

reference may be had to the accompanying drawings in which

Fig. 1 is a view in side elevation of a form of apparatus embodying the invention and suitable for practicing the new method;

Fig. 2 is a plan view of that portion of the apparatus shown in Fig. 1, as is indicated by the arrows 2—2;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view on the line 6—6 of Fig. 2;

Fig. 7 is a sectional view on the line 7—7 of Fig. 3; and

Fig. 8 is a view in perspective of a completed pad produced by the new method and apparatus, a part of the pad being partly removed to show the construction.

In the practice of the new method by the apparatus illustrated in the drawings, a web of fibrous material of appropriate width and in loose uncompressed condition is advanced from a source of supply by means of a belt 11 trained about roll 12. When cotton is employed for the loose fibrous material, it may be supplied from the end of a card delivering a fleece which is picked up and carried off by belt 11. The web 10 passes beneath a roll 13 lying above roll 12 and mounted in the ends of swinging arms 14 pivoted on studs 15. Beyond roll 12 is a roll 16 in fixed bearings, and rolls 12 and 16 are driven by a gear 17 on a driven shaft which meshes with gears on the shafts of rolls 12 and 16. Above roll 16 is a roll 18 mounted in arms 19 pivoted on studs 20 and a belt 21 is trained about rolls 13 and 18. The loose fibrous material advanced by the belt 11 is compressed between rolls 12 and 13 and between rolls 16 and 18 and then travels up a plate 22 between side guide plates 23 and over a small roll 24.

A roll 25 of open mesh fabric, such as gauze, is mounted near roll 24 and the sheet of fabric 26 is led from the roll around a guide rod 27 and over roll 24 beneath the web. The sheet is wider than the web and is so guided with relation thereto that the lateral edges of the sheet project equal amounts beyond the lateral edges of the web.

The sheet and web pass from roll 24 beneath a roll 28 on a shaft mounted in open top bearings 29, roll 28 resting on top of a belt 30 trained

about a roll 31 having edge flanges 32. The sheet and web are carried along with belt 32 beneath a presser plate 33 held in place by arms 34 secured to a suitable part of the framework of the apparatus. The arms overhang folding devices 35 of appropriate shape to turn the lateral edges of the sheet inward around the edges of the web to lie against the top surface of the latter, the edges thus infolded being indicated at 36.

The second layer of the pad is made up of a plurality of sheets of absorbent cellulosic material, preferably of wood cellulose wadding, although other materials such as creped paper may also be used. A strip of assembled sheets cut from a web by a score cutting operation which causes the lateral edges of the sheets to be united, as indicated at 37, is drawn from a roll 38 in a suitable mounting and passes beneath a flanged guide roll 39 mounted for rotation above belt 30. The under surface of the strip is secured to the opposed face of the first layer by lines of adhesive and, for this purpose, a pair of strands of yarn or thread of appropriate size are used. The strands are drawn from bobbins 40 mounted on supports 41 secured to the frame of the machine and each thread is passed from its bobbin through a tensioning device 42 and then over a guide rod 43 adjacent the device and beneath a similar rod 44 lying within a vessel 45 containing adhesive. The thread passes outwardly from the adhesive over a guide rod 46 and beneath roll 39, the threads being supplied in such manner that each thread presses against the surface of the strip forming the second layer at a distance inwardly from its lateral edges.

The strip with the threads in place then passes between an upper roller 47, which is mounted on a shaft in fixed bearings and lies above roller 48 about which belt 30 is trained. Roller 47 is in such relation to the surface of the belt that it applies a slight compression to the two layers of the pad. The assembled layers pass from rolls 47, 48 beneath a roll 49 mounted in swinging arms 50 pivoted on the shaft of roll 47, roll 49 pressing the layers against a roller 51 on a shaft in fixed bearings. Driven shaft 52 beneath rolls 48, 51 carries a wide face gear 53 meshing with gears 54, 55 on the shafts of rolls 48, 51, respectively, and the shafts of rolls 48, 51 carry gears 56, 56a which mesh with gears 57, 58 on the shafts of rolls 47, 49, respectively.

The pad strip of indefinite length issuing from between rolls 49, 51 passes around a flanged roll 59 on a shaft 60 carried in the end arms 61, 62 mounted for pivotal movement on the shaft of roll 51, shaft 60 being driven through a chain 60a from the shaft of roll 51. Arm 62 is one arm of a bell crank, the other 63 of which carries a roller 64 at its end bearing against cam 65 on shaft 52. The rotation of the cam causes the bell crank to swing so that shaft 60 carrying roller 59 is alternately raised and lowered. In its rising movement roller 59 travels at the same rate as the pad strip issuing from rollers 49, 51 and thus that portion of the pad strip beyond roll 59 does not advance lengthwise during the time the roll is rising. This stoppage of the movement of the pad strip is provided in order that unit pads of appropriate length may be cut from the pad strip.

The mechanism for cutting the unit pads is mounted in frame members 66 at the end of the

apparatus and includes a shaft 67 connected through bevel gearing 68 to the shaft 69 of a motor 70. Mounted on shaft 67 is a crank 71 connected by a pitman 72 to a slide 73 movable on horizontal guide rods 74 mounted in frame members 66. A similar slide 75 is mounted on upper guide rods and driven through a pitman 76 by a crank 77 on shaft 52. Shaft 52 is driven by a gear 78 on shaft 67 which meshes with gear 43a fast on shaft 52.

The lower slide 73 is provided with a knife blade 79 which cooperates with the face of a plate 80 mounted on a crossbar 81 of the framework to sever the pad strip with a shear cut as the slide is advanced toward the plate. Slide 73 is also provided with a punch 82 which cooperates with an opening in plate 80 to cut a piece of material from the strip and force it through an opening in the frame member behind the plate into a receptacle 83. Slide 75 is similarly provided with a punch 84 which cooperates with a plate mounted on a frame member 85 to punch out a similar piece of material from the strip and discharge it into the receptacle. A pair of spring fingers 86 mounted on slide 75 have free ends which engage the pad strip and hold the strip to free it from the punches and knives after the punching and cutting operation. The pads 87 severed from the pad strip fall upon a conveyor belt 88 and are carried away.

One of the pads produced by the use of the invention is illustrated in Fig. 8 and, as there shown, it consists of a layer 89 of loose fibrous material enclosed within a sheet 90 of gauze. The lateral edges of the sheet are turned over the lateral edges of the web to lie against its upper surface and a second layer 91 made up of sheets of cellulosic material is affixed to the first layer by strands 92 carrying adhesive which are interposed between the inturned edges of the sheet and the opposed surface of layer 91. The layer 89 is somewhat wider than layer 91 so that the lateral edges of layer 91 lie inward from the lateral edges of layer 89. Through the pad at opposite ends are openings 93 which permit the pad to be mounted in a holder and secured together by snap fastener elements which are interengaged through the openings. It will be understood, of course, that the openings may be omitted, if desired.

I claim:

1. A method of making absorbent pads which comprises applying to one face of a web of loose fibrous material a sheet wider than the web with the lateral edges of the sheet projecting beyond the adjacent edges of the web, folding the lateral edges of the sheet around the adjacent edges of the web and against the other face thereof placing a layer of a different absorbent material in juxtaposition to said other face of the web and with one face of the layer opposed to said face of the web, applying lines of adhesive to one of said opposed faces throughout the length thereof before said faces are brought into final opposed position, and pressing the layers together to cause the adhesive to secure the second layer to the inturned edges of the sheet.

2. A method of making absorbent pads which comprises applying to one face of a web of loose fibrous material a sheet wider than the web with the lateral edges of the sheet projecting beyond the adjacent edges of the web, folding the lateral edges of the sheet around the adjacent edges

of the web and against the other face thereof, placing a layer of a different absorbent material in juxtaposition to said other face of the web and with one face of the layer opposed to said face of the web, interposing an adhesive-coated strand between each inturned edge of the sheet and the opposed face of the second layer to extend lengthwise of said face before said faces are brought into final opposed position, and pressing the layers together to cause the strands to adhere to the surfaces between which they lie.

3. A method of making absorbent pads which comprises advancing a web of loose fibrous material in the direction of its length, applying to one face of the advancing web a sheet wider than the web with the lateral edges of the sheet projecting beyond the lateral edges of the web, folding the lateral edges of the sheet around the adjacent edges of the web and against the other face of the web, advancing a layer of a different absorbent material along the path of the web and at the same rate, the second layer having one face opposed to the face of the web against which the inturned edges of the sheet lie, applying lines of adhesive to said opposed face of the second layer throughout the length thereof before said faces are brought into final opposed position, said lines of adhesive overlying the inturned edges of the sheet, and pressing the layers together to cause the lines of adhesive to unite said opposed faces.

4. A method of making absorbent pads which comprises advancing a web of loose fibrous material in the direction of its length, applying to one face of the advancing web a sheet wider than the web with the lateral edges of the sheet projecting beyond the lateral edges of the web, folding the lateral edges of the sheet around the adjacent edges of the web and against the other face of the web, advancing a layer of a different absorbent material along the path of the web and at the same rate, the second layer having one face opposed to the face of the web against which the inturned edges of the sheet lie, applying adhesive-coated strands to said opposed face of the second layer before said faces are brought into final opposed position, said strands extending lengthwise of said face and overlying the inturned edges of the sheet, and pressing the layers against the strands to cause the adhesive thereon to unite the layers.

5. A method of making absorbent pads which comprises advancing a web of loose fibrous material in the direction of its length, applying to one face of the advancing web a sheet wider than the web with the lateral edges of the sheet projecting beyond the lateral edges of the web, folding the lateral edges of the sheet around the adjacent edges of the web and against the other face of the web, advancing a layer of a different absorbent material along the path of the web and at the same rate, the second layer having one face opposed to the face of the web against which the inturned edges of the sheet lie, applying lines of adhesive to one of said opposed faces lengthwise thereof before said faces are brought into final opposed position, pressing the layers to form a pad strip, and severing unit pads from the pad strip.

6. A method of making absorbent pads which comprises advancing a web of loose fibrous material in the direction of its length, applying to one face of the advancing web a sheet wider than the web with the lateral edges of the sheet pro-

jecting beyond the lateral edges of the web, folding the lateral edges of the sheet around the adjacent edges of the web and against the other face of the web, advancing a layer of a different absorbent material along the path of the web and at the same rate, the second layer having one face opposed to the face of the web against which the inturned edges of the sheet lie, applying lines of adhesive to one of said opposed faces lengthwise thereof, pressing the layers together to form a pad strip, intermittently stopping the movement of the end of the pad strip, and, during the periods of rest of the strip, severing unit pads therefrom.

7. An apparatus for making absorbent pads which comprises means for advancing a web of loose fibrous material, means for applying to one face of the advancing web a sheet of fabric wider than the web, the lateral edges of the sheet projecting beyond the adjacent edges of the web, means for turning the lateral edges of the sheet around the lateral edges of the web and against the other face thereof, means for advancing a strip of a different fibrous material along the path of the web and at the same rate, with one face of the strip opposed to the face of the web against which the inturned edges of the sheet lie, means for applying longitudinal lines of adhesive to one of said opposed faces, means for compressing the sheet and web to form a pad strip, and means for severing unit pads from the end of the pad strip.

8. An apparatus for making absorbent pads which comprises means for advancing a web of loose fibrous material, means for applying to one face of the advancing web a sheet of fabric wider than the web, the lateral edges of the sheet projecting beyond the adjacent edges of the web, means for turning the lateral edges of the sheet around the lateral edges of the web and against the other face thereof, means for advancing a strip of a different fibrous material along the path of the web and at the same rate, with one face of the strip opposed to the face of the web against which the inturned edges of the sheet lie, means for introducing a pair of adhesive-coated strands between said opposed faces to overlie the inturned edges of the sheet, means for pressing the strip and web against the strands to cause the adhesive thereon to unite the strip and web into a pad strip, and means for severing unit pads from the end of the pad strip.

9. An apparatus for making absorbent pads which comprises means for advancing a web of loose fibrous material from a supply of such material and subjecting the advancing web to compression, means for applying to one face of the web a sheet of fabric wider than the web with the lateral edges of the sheet projecting outwardly beyond the adjacent edges of the web, folding devices for turning the projecting edges of the sheet around the adjacent edges of the web and against the other face thereof, means for drawing from a supply a strip of a different fibrous material and advancing the strip along the path of the web with one face of the strip opposed to the face of the web against which the inturned edges of the sheet lie, means for advancing adhesive-coated strands in the direction of movement of the strip and applying said strands against said opposed face of the strip lengthwise thereof and inward from the lateral edges of the strip, means for pressing the strip and web together to cause the adhesive on the strands to unite the strip and web and thereby

form a pad strip, and means for severing unit pads from the end of the pad strip.

10. An apparatus for making absorbent pads which comprises means for advancing a web of loose fibrous material from a supply of such material and subjecting the advancing web to compression, means for applying to one face of the web a sheet of fabric wider than the web with the lateral edges of the sheet projecting outwardly beyond the adjacent edges of the web, folding devices for turning the projecting edges of the sheet around the adjacent edges of the web and against the other face thereof, means for drawing from a supply a strip of a different fibrous material and advancing the strip along the path of the web with one face of the strip opposed to the face of the web against which the inturned edges of the sheet lie, means for advancing adhesive-coated strands in the direction of movement of the strip and applying said strands against said opposed face of the strip lengthwise thereof and inward from the lateral edges of the strip, means for pressing the strip and web together to cause the adhesive on the strands to unite the strip and web and thereby form a pad strip, means for severing unit pads from the end of the pad strip, and means between the severing means and the pad strip forming means for increasing the length of the path of the pad strip between said means to cause the end of the pad strip to remain at rest during the severing operation.

11. An apparatus for making absorbent pads which comprises means for advancing a web of loose fibrous material from a supply of such material and subjecting the advancing web to compression, means for applying to one face of the web a sheet of fabric wider than the web with the lateral edges of the sheet projecting outwardly beyond the adjacent edges of the web, folding devices for turning the projecting edges of the sheet around the adjacent edges of the web and against the other face thereof, means for drawing from a supply a strip of a different fibrous material and advancing the strip along the path of the web with one face of the strip opposed to the face of the web against which the inturned edges of the sheet lie, means for advancing adhesive-coated strands in the direction of movement of the strip and applying said strands against said opposed face of the strip lengthwise thereof and inward from the lateral edges of the strip, means for pressing the strip and web together to cause the adhesive on the strands to unite the strip and web and thereby form a pad strip, means for forming openings through the pad strip in pairs, and means for severing the pad strip between pairs of openings to form unit pads, each having a pair of openings through it near its opposite ends.

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