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B. C. BECKMAN ET AL

1,979,819

PROCESS OF MAKING FELT, PAPER, AND THE LIKE

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2 Sheets-Sheet 1

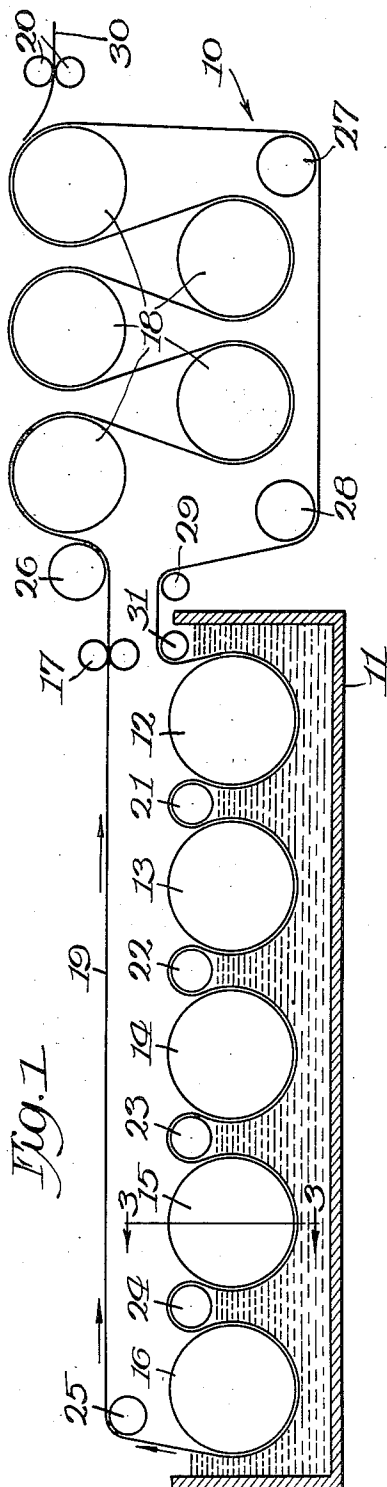
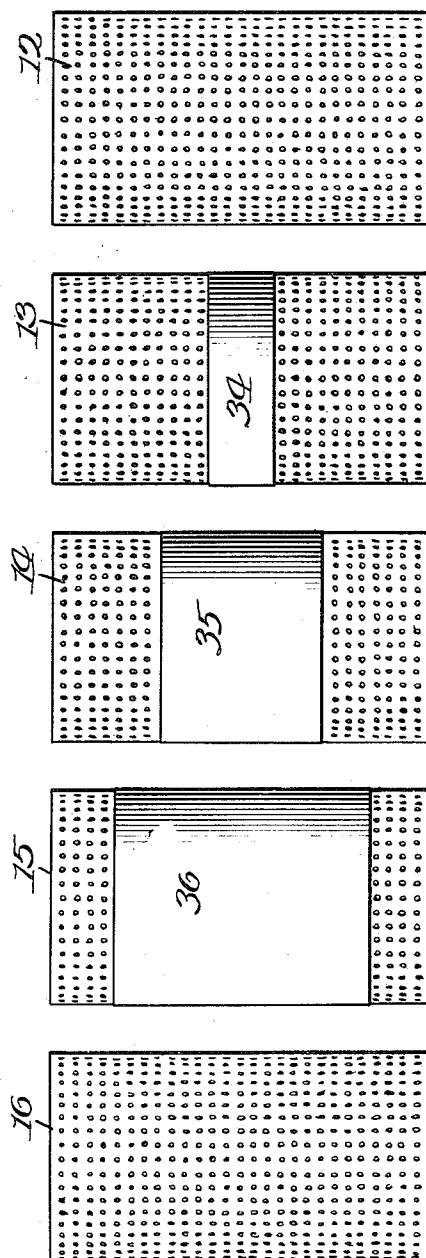


Fig. 2



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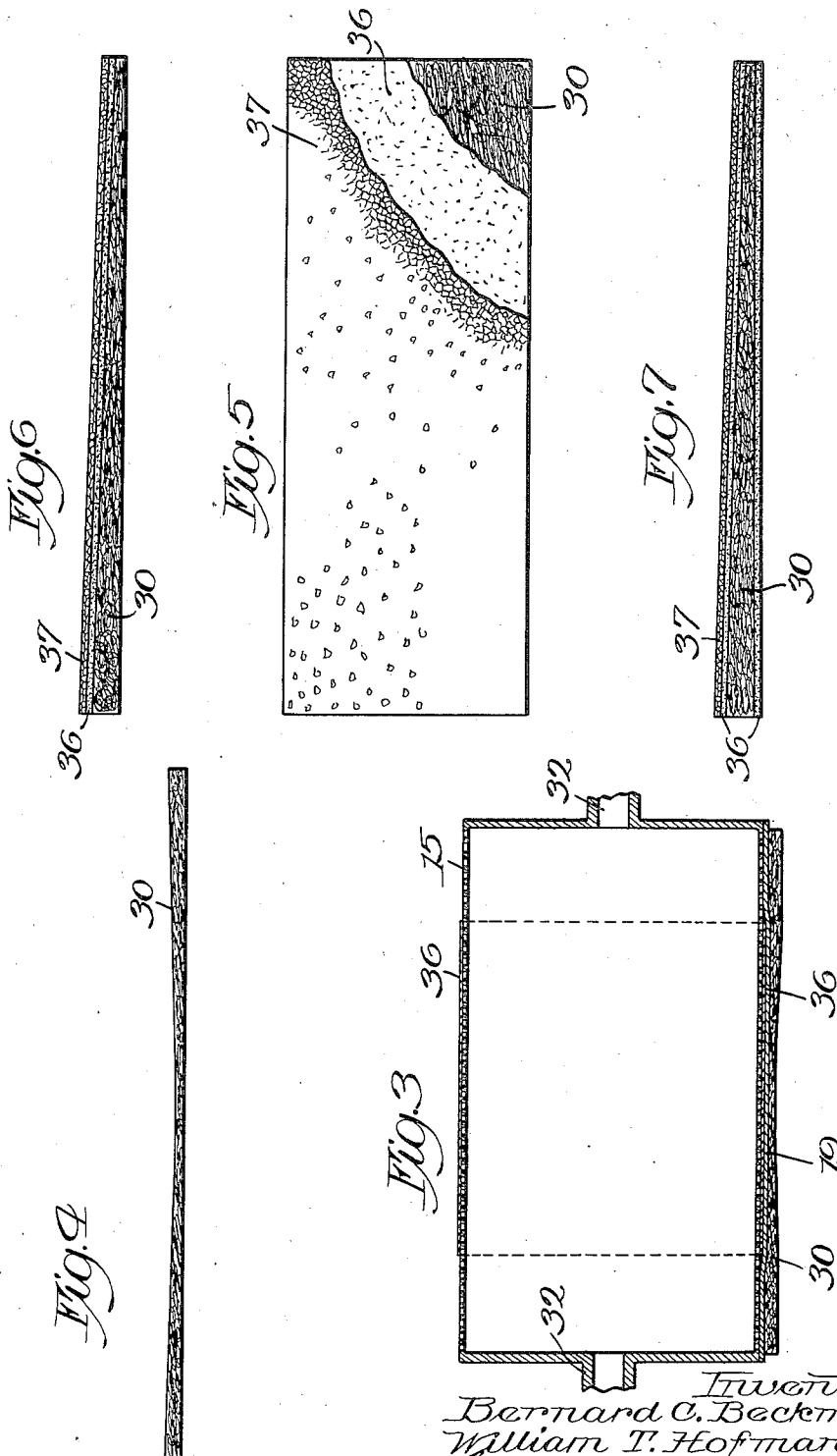
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UNITED STATES PATENT OFFICE

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PROCESS OF MAKING FELT, PAPER, AND
THE LIKE

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Application November 4, 1927, Serial No. 231,031

8 Claims. (Cl. 92—42)

This invention relates to the fabrication of sheets of fibrous material, as felt, paper, and the like.

One object of the invention is the provision of a process for making sheets of paper, felt, and the like of variable thickness transversely of the sheet.

Another object of the invention is the provision of a new and improved tapered shingle wherein the felt portion of the shingle is tapered to form the contour of the shingle.

Other objects of the invention are the provision of a new and improved method of fabricating sheets of felt, paper, and the like, that is simple, inexpensive to practice, and that is efficient in the production of the resulting product.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a longitudinal vertical section of an apparatus for practicing the invention shown more or less diagrammatically;

Fig. 2 is a plan view of the perforated rolls, parts being omitted for the sake of clearness;

Fig. 3 is a vertical longitudinal section of one of the rolls, on the line 3—3 of Fig. 1;

Fig. 4 is a transverse section of the sheet or web produced by the apparatus shown in Fig. 1;

Fig. 5 is a plan view of a shingle made from a web or sheet produced as a result of practicing the process;

Fig. 6 is a vertical longitudinal section of a shingle made from the web or sheet; and

Fig. 7 is a longitudinal section of a modified form of shingle.

In the construction of numerous different types of articles fabricated from felt, paper, or other fibrous material, such as shingles, various containers and the like, it is often desirable that said sheets or webs be made of varying thickness transversely thereof.

In Fig. 1 is shown more or less diagrammatically one form of apparatus for practicing the process.

Referring now to the drawings, wherein is shown one form of apparatus for carrying out the process, and which is by way of example only, the reference character 10 designates generally a paper or felt-making machine of the usual or any well known construction, and comprises a receptacle 11, into which the fluid paper or felt stock is continually being pumped, as is usual in such constructions. One or more

perforated rolls are rotatably mounted in said receptacle. As shown, a plurality of rolls 12, 13, 14, 15 and 16 are employed. The number of rolls may be increased or diminished as necessary or desirable.

Each roll has its periphery perforated with a large number of openings, in the usual manner.

A pair of squeezing rolls are shown at 17, and at 18 are shown a plurality of drying rolls. An endless or foraminous carrier or blanket 19, extending about all of said rolls, is caused to travel in the direction of the arrows in a manner well known in the art. Idler rollers 21, 22, 23 and 24 are preferably employed between the perforated rolls for holding the carrier in contact with the greater portion of the periphery of said rolls. Other idlers 25, 26, 27, 28, 29 and 31 guide the endless carrier in its travel about the rolls, and into and out of the vat or receptacle. Other rolls 20 remove the strip or web 30 from the carrier 19 in the usual manner.

The rollers are hollow, and when the apparatus is in operation air and water are continually being pumped from the interior thereof through the hollow axis 32 at one or both ends thereof, in a manner well known in the art.

Since the apparatus thus far described is of the usual or any well known construction, it is not thought necessary to further illustrate or describe the same.

As paper or felt sheets or webs are made at present with this type of apparatus, the paper pulp or felt stock or fiber, mixed with water to make it fluid, is continuously pumped into the vat or receptacle 11, and as the air and water is pumped from the perforated cylinders the mixture tends to flow into the cylinders. The water passes through the endless carrier 19 into the cylinders, leaving the paper or felt fiber adhering to the endless carrier, thereby forming the strip or web 30 (see Fig. 3). After passing about the perforated rolls the endless belt carrying the strip or web is passed between squeezing rolls 17, where the water is pressed out, and then around the drying rolls, after which it is removed from the endless belt by the rolls 20 in the usual manner.

In order to vary the thickness of the fibrous sheet or web transversely thereof, means are provided for preventing the deposit of the fibrous material on certain portions of the carrier or endless belt as the same moves about the perforated roll or rolls. Any suitable means, as providing the peripheries of the cylinders with impervious portions, may be employed for this purpose. A slight variation in the size of

the perforations in the rolls will also change the cross-sectional contour of the strip.

However, one manner of accomplishing this function is shown on the drawings, and consists in placing an impervious band about one or more of the perforated rolls in the zone where it is desired that the thickness of the paper strip or felt web shall be reduced. The use of bands for this purpose is preferred, because they may be readily removed or changed as desired.

As one example of how the bands may be arranged there is shown an arrangement in Fig. 2 for manufacturing a felt web which may be cut up to form a felt body for making tapered composition shingles.

The first and last rolls 12 and 16, respectively, are not modified, but the rolls 13, 14 and 15 have impervious bands 34, 35 and 36, of gradually increasing widths extending about the central portions thereof.

During the operation of the apparatus fibrous material will be deposited on the carrier or endless belt across its entire width as it passes about the rolls 12 and 16. None of the fibrous material will adhere to the carrier or endless belt opposite to the bands, as the web moves about the rolls containing those bands. As a result of this arrangement of the impervious bands about the perforated rolls, the web or strip 30 will be tapered inwardly from the side edges, as clearly shown in Fig. 4.

The shape of the cross-section of the web or strip will depend on the arrangement, number and width of the bands employed, as well as on the number of rolls used. While only one band is shown on each roll, it is understood that as many bands as desired may be employed on each roll, and that will depend on the desired cross-sectional shape of the web or strip.

In the manufacture of tapered composition shingles it is the common practice to employ felt of uniform thickness and secure the taper by varying the thickness of the coat of bituminous material applied to the surface of the shingle. It has also been proposed to comminute and thoroughly mix the comminuted or fibrous material with the bituminous material, and then mould or form tapered shingles from this coherent mass; but both of these methods are costly because of the unnecessary amount of bituminous material employed. So far as we are aware no one has proposed to make shingles by employing tapered felt.

According to the present method the felt sheet or strip 30 is treated in exactly the same manner in making shingles as in the usual method of making them of uniform thickness throughout their lengths. That is, the strip 30 is impregnated with a waterproof material, as a bituminous compound, after which a layer 36 of waterproof material, as a bituminous compound, is applied to one or both sides thereof. A layer 37 of grit, such as gravel or ground slate, or the like, is embedded in the layer 36. The strip 30 is severed longitudinally along the center line and transversely at predetermined distances apart, to form shingles of suitable widths. The severing of the strip may be done before or after, or at any intermediate time during, the treatment of the strip.

In Fig. 7 is shown a slightly modified form of shingle from that shown in Fig. 6, in that the layer of bituminous material 36 is applied to both sides of the shingle.

While we have shown a felt strip 30 that is peculiarly adapted for making composition shingles, it is understood that strips having different cross-sectional contour may be employed for various and sundry purposes. It is also understood that by employing longer rolls and properly arranging the impervious bands thereon, webs wide enough to form three or more shingles, instead of the two as shown, may be employed,—it being only necessary that the length of the shingles extend transversely of the web.

We claim as our invention—

1. A process of fabricating a web of fibrous or felt material having thick edges and tapering toward the center line of said web, for forming composition shingles, which consists in preparing a mixture of water and finely divided fibrous material, causing said material to be deposited by suction on a foraminous carrier in the form of a web and progressively blocking deposition on the carrier from the center of the web outward to provide uniform tapering from the edges toward the center line of the web.

2. A process of fabricating a web of fibrous or felt material which comprises preparing a mixture of water and finely divided fibrous material and depositing progressively narrower layers of said fibrous material on a foraminous carrier, so that the outer edges of said layers are substantially co-terminous whereby to form a web tapering from the edges toward the center line thereof.

3. A process of fabricating a web of fibrous felt which comprises, preparing an aqueous stock of the fibrous material, depositing a series of layers of said fibrous material on a foraminous carrier, the first and last layers of said series being of greatest width and the intermediate layers being progressively narrower than said first layer, the outer edges of said layers being substantially co-terminous whereby to form a web tapering from the edges toward the center line thereof.

4. As an article of manufacture a wet felted tapered sheet of fibrous material thickest along its lateral margins and thinnest along its longitudinal median line.

5. As an article of manufacture a wet felted tapered multiple ply sheet of fibrous material, the outer plies being of the greatest width and the intermediate plies being of progressively narrower widths.

6. As an article of manufacture a wet felted tapered multiple ply sheet of fibrous material, the outer plies of said sheet being of the greatest width and the intermediate plies being of progressively narrower widths, the outer edges of all said plies being co-terminous.

7. As an article of manufacture a wet felted tapered multiple sheet of fibrous material, the outer plies being of equal width and of a width greater than that of the intermediate plies, and the intermediate plies being of progressively narrower width.

8. As an article of manufacture a tapered multiple ply sheet of felted fibrous material, the outer plies of said sheet being of equal width and of a width greater than that of the intermediate plies, and the intermediate plies being of progressively narrower width, the outer edges of all said plies being co-terminous.

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