

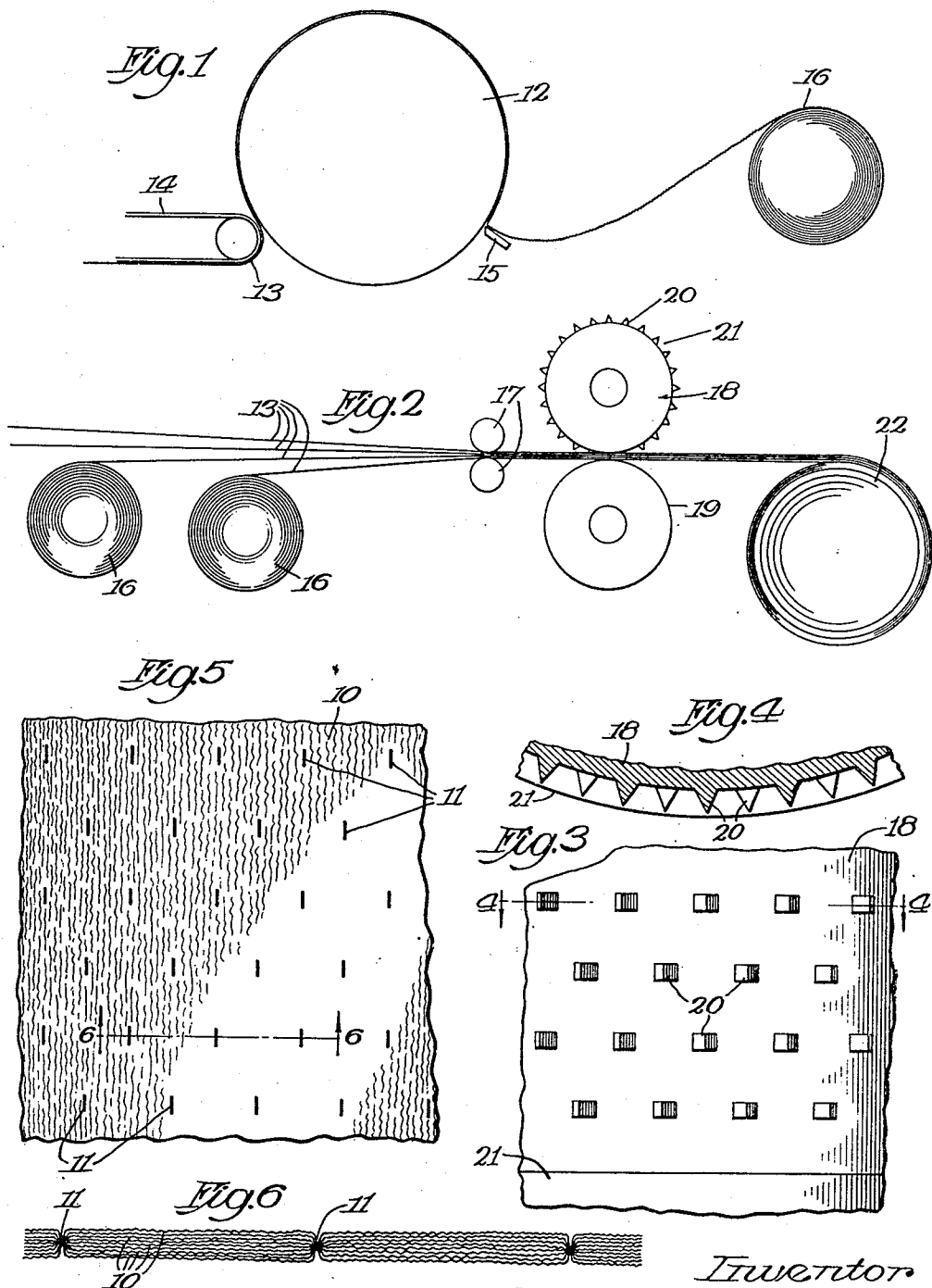
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WADDING

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WADDING

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This invention relates to improvements in wadding and has reference more particularly to improvements in wadding consisting of fibrous material which may be bound together by means of embossing. The invention is particularly adapted for employment in connection with wadding made of creped tissue paper wherein a plurality of plies of such paper are superposed, one upon another, to form the desired wadding thickness.

The main objects of the invention are to provide wadding in which component plies or sheets are united in such a way that the character of the wadding is in no material degree hardened, stiffened or otherwise altered; to provide wadding wherein the component parts are united substantially automatically as an incident to the formation of the wadding and without the employment of extra materials, such as adhesives or complicated mechanism; to provide integrated wadding which will retain its normally soft, fluffy character and its normal, substantially smooth surface condition; and in general, it is the object of the invention to provide improved wadding of the character indicated.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawing, wherein the improved wadding is illustrated, together with a schematic illustration of the method of making the wadding.

In the drawing:

Figs. 1 and 2 are diagrammatic illustrations showing the method of producing the wadding.

Fig. 3 is a fragmentary plan of an embossing roll used in the production of the improved wadding.

Fig. 4 is a section on the line 4—4 of Fig. 3. Fig. 5 is a fragmentary elevation of a section of wadding embodying the invention, and

Fig. 6 is a section on the line 6—6 of Fig. 5.

The wadding illustrated in Figs. 5 and 6 comprises a plurality of plies 10 of creped tissue paper which are superposed one upon another to form a multi-ply wadding sheet of the desired thickness. The creping in the superposed sheets all extends in the same direction so that the wadding has a definite grain which is substantially parallel throughout the wadding.

The superposed creped tissue sheets are, according to the present invention, united by means of small embossed portions indicated at 11, such portions being distributed substantially uniformly over the area of the wadding. As indicated in Figs. 5 and 6, the embossed portions 11 are of

relatively elongated but very narrow proportions so that they approximate short lines of embossing.

The wadding may conveniently be produced in the manner illustrated in Figs. 1 and 2. In Fig. 1, a conventional drying cylinder is indicated at 12 to which a web of wet paper 13 is delivered by a felt 14. A doctor blade 15 removes the web of paper 13 from the drying roll, thereby incidentally creping the same transversely of the length of the web as indicated. The web is wound into a roll indicated at 16.

A plurality of rolls such as 16, of the creped tissue paper are next mounted on suitable supports to permit rotation of the rolls and withdrawal of the webs therefrom. The webs 13 from the supply rolls 16 are brought into relatively superposed relationship and passed between a pair of rolls 17 which serve to lightly press the superposed sheets together. The pressure exerted by the rolls 17 is only sufficient to cause light face to face contact of the superposed sheets so that the normal thickness and softness of the superposed sheets are not materially reduced.

From the roll pair 17, the superposed plies of creped tissue paper are directed between upper and lower embossing rolls 18 and 19, respectively. The lower embossing roll 19 is preferably a smooth-surfaced cylinder and the upper roll 18 is preferably in the form of a cylinder having a plurality of wedge-shaped, relatively sharp-edged, more or less triangular teeth 20 radiating therefrom. The ends of the embossing roll 18 are preferably provided with smooth-surfaced, narrow bands 21 which are adapted to engage the surface of the lower roll 19 to thereby support the upper roll and prevent jamming of the points of the teeth 20 against the surface of the lower roll 19. However, it will be observed that the teeth 20 may be so formed as to very closely approach the surface of the roller 19. The roll 18 is also preferably mounted in freely vertically movable bearings so that the weight of the upper roll may be utilized to provide all or part of the desired embossing pressure.

In one typical mechanism for producing embossed wadding according to this invention, the embossing rolls may be approximately 16 inches in diameter and about 72 inches long. The narrow supporting bands such as 21 on the upper roll may then be about 2 inches wide. Of course, the embossing rollers may be of larger or smaller dimensions than those stated and may be made in accordance with the width of the paper webs

which are embossed or to correspond with other elements of mechanism used in the production of the embossed wadding.

As indicated in Fig. 3, the teeth 20 are preferably arranged in circumferential rows and adjacent rows are in staggered relation. Also, the teeth 20 are, in this instance, formed so that their points are formed by the sides or faces defining approximately a six-degree angle. The angular relationship of the faces of the teeth may, of course, be varied, but the stated angle appears to be practical and durable.

When the wadding issues from the embossing rolls 18 and 19, it is directed to suitable cutting mechanism or it may be rolled into a supply roll such as indicated at 22.

It will be observed that the direction of the edges of the embossing teeth 20 is substantially parallel with the direction of creping in the superposed sheets. Because of such parallel relationship, and because the embossed portions are line-like in form, such depressions in the wadding as are necessarily incident to the wedge-shaped teeth used in effecting the embossing are also of very small area.

The small embossing area has the further advantage of making it possible to get a high pressure per unit of embossing to thereby obtain adequate ply adhesion requiring or producing a high total pressure.

Because of the normal resiliency of the wadding material, the wadding material on opposite sides of the embossed portions 11, tends to expand and fill in the depression space incident to the shape of the embossing teeth. This is desirable especially where the wadding is to be used in the formation of padded surfaces which should be finished smooth and free from depressions or irregularities.

Although the embossing teeth 20 enter the wadding from one side and extend almost completely through the wadding, the embossed portions tend to become centered intermediate the thickness of the wadding, substantially as indicated in Fig. 6. The inherent resiliency of the material permits of the embossing as explained, without incidental cutting or tearing the plies, and such resiliency causes the embossed portions to be centered as explained.

Another advantage incident to embossing as explained above, is the fact that there is no substantial or material width of embossed area which, if employed, would have a decided tendency to pull down material and reduce the bulk and possibly in some cases to break or tear the material transversely of the direction of the creping. It will be understood that creped tissue paper is somewhat stiffened transversely of its creping so that embossing pressure applied in any shape of area which extends crosswise of the creping would have the destructive effect mentioned.

Wadding embodying the embossed arrangement explained may be used for various padding purposes and when used in places where it is covered with a finishing material, such as cloth or leather, for example on the inside of an automobile door, the absence of depression areas incident to the embossing results in a desirable, smooth finish on the inside of such door.

The embossed portions, although without material area crosswise of the creping, serve to effectively unite the superposed plies so as to facilitate handling thereof and employment for various commercial purposes. The reason for

adherence of the superposed plies in the embossed portions appears to be an intermingling of the fibres forming the creped tissue sheets so that there is, in effect, a welding together of the plies.

By way of example, the embossed portions may be approximately $\frac{1}{4}$ of an inch long, and spaced apart approximately $1\frac{1}{4}$ inches in the direction of the lines of embossing and approximately 2 inches transversely of said lines. These proportions have been found to afford satisfactory ply adhesion without materially detracting from the smoothness of the wadding surface or otherwise impairing the wadding.

Changes in the described arrangement may be made without departing from the spirit of the invention, the scope of which should be determined by reference to the following claims, the same being construed as broadly as possible consistent with the state of the art.

I claim:

1. Wadding comprising a plurality of plies of creped tissue superposed to form the desired wadding thickness, and means uniting said plies comprising a plurality of spaced, embossed portions of relatively small area which are so proportioned and so arranged that said embossed wadding is of substantially uniform thickness throughout its entire area.

2. Wadding comprising a plurality of plies of creped tissue superposed to form the desired wadding thickness, and means uniting said plies comprising a plurality of recessed, line-like, embossed portions, which are spaced from each other and which are so arranged and so proportioned that said wadding is of substantially uniform thickness throughout its entire area.

3. Wadding comprising a plurality of plies of creped tissue paper superposed to form the desired wadding thickness, and means for uniting said plies comprising a plurality of relatively spaced, embossed portions of such relatively long but narrow proportions that the wadding material on opposite sides of said embossed portions substantially fills in depression spaces normally formed on the face of such wadding incident to embossing thereof.

4. Wadding comprising a plurality of plies of creped tissue superposed to form the desired wadding thickness, the superposed plies being arranged with the creping therein disposed in substantially parallel relation, and means for uniting said plies comprising a plurality of relatively small, elongated, embossed portions which are spaced from each other and which extend generally parallel with the creping in the plies, the arrangement and proportions of said embossed portions being such that said wadding is of substantially uniform thickness throughout its entire area.

5. Wadding comprising a plurality of plies of creped tissue paper superposed to form the desired wadding thickness, the plies being joined together by a multiplicity of line-like embossings which extend parallel with the direction of creping in the wadding, said embossings being recessed relative to the surfaces of the wadding and the wadding material faces on opposite sides of said embossings being disposed in such proximity to each other that the thickness of the wadding is maintained substantially uniform throughout substantially the entire area of the wadding.

6. A multi-ply wadding comprising a plurality of plies of relatively thin tissue superposed to

form the desired wadding thickness, and means for joining said plies of tissue to each other including a plurality of completely separated, relatively widely spaced, embossed portions of such relatively long but narrow proportions that the wadding material on opposite sides of said depressed portions substantially fills the depression spaces normally formed in such wadding incident to the embossing thereof.

- 10 7. A multi-ply wadding consisting of a plurality of plies of relatively thin, creped tissue superposed to form the desired wadding thickness, the superposed plies being arranged with

the creping therein disposed in generally parallel relation, and means for joining said plies to each other including a multiplicity of completely separated, line-like embossings of small area which extend generally parallel to the direction of the creping in said plies, said embossings being recessed relative to the surfaces of said wadding, and the faces of the ply material on opposite sides of said embossings being disposed in such close proximity to each other that the thickness of the wadding is maintained substantially uniform throughout the entire area thereof.

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