June 2, 1936. J. E. KIEFFER 2,042,470

INDENTED SHOCK ABSORBING CUSHIONING OR PACKING PAPER

Filed Feb. 26, 1934

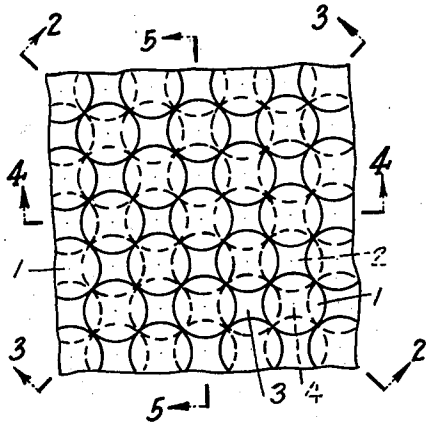


FIG. 1

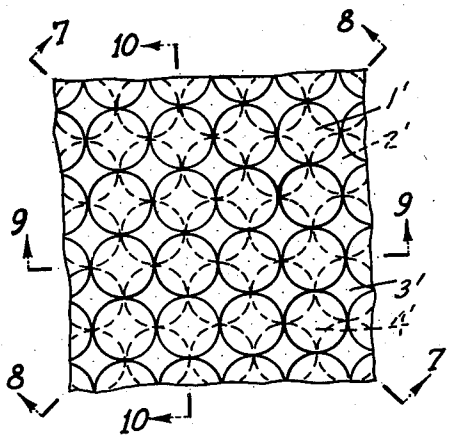


FIG. 6

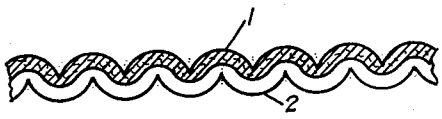


FIG. 2

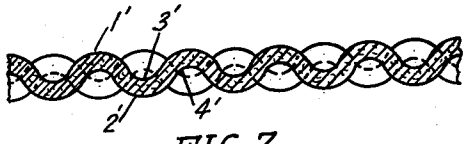


FIG. 7



FIG. 3

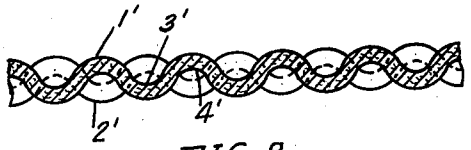


FIG. 8

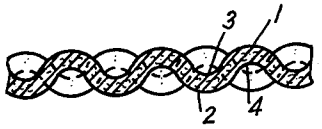


FIG. 4

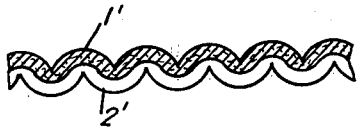


FIG. 9

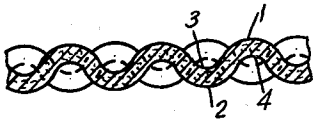


FIG. 5

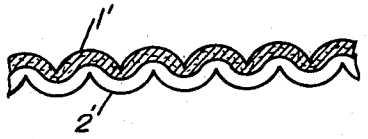


FIG. 10

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INDENTED SHOCK ABSORBING CUSHIONING OR PACKING PAPER

John E. Kieffer, Ewing, Ind.

Application February 26, 1934, Serial No. 713,067

1 Claim. (Cl. 154—55)

The present invention relates to shock absorbing cushioning or packing paper of the type which is provided on one or both of its surfaces with a multiplicity of more or less closely spaced hollow protuberances or indentations as distinguished from corrugations. Such paper is particularly adapted for wrapping and protecting fragile articles such as glassware.

In my prior patent (Patent No. 1,780,526 dated November 4, 1930) I have disclosed a material of this type in which the protuberances have been molded into the paper after it has been completely formed and after a substantial portion of its water content had been removed without materially decreasing its plasticity or causing the fibers to set in their usual substantially flat condition, and prior to the final conditioning and setting of the fibers of the paper. By molding the protuberances in this manner I have found it possible to produce deeper indentations than had been made by prior processes and to impart to the product a previously unequalled rubber-like resiliency normal to its surface.

This invention constitutes an improvement over the invention disclosed in my prior patent and has for its principal object the production of a shock absorbing material having a deeper indentation than had been previously considered possible without disrupting the fibers and which in addition to an exceptionally high resiliency and springiness has an extraordinary flexibility in all directions, which enables it to be rolled in any direction.

In its very essence, the invention consists in arranging the protuberances so that they are in substantial contact along two intersecting lines. The two lines may advantageously be the length and width of the material or the two diagonals.

The inventive idea involved is capable of receiving a variety of mechanical expressions, two of which, for the purpose of illustrating the invention, are shown in the accompanying drawing, wherein:

Figure 1 is an enlarged plan view of one side of a small portion of material made according to the teaching of the present invention, the circles in solid lines indicating the protuberances on the upper surface, the circles in dotted lines indicating the protuberances on the lower surface and the identations being indicated by the spaces between the circles;

Figure 2 is a cross-section taken along line 2—2 of Figure 1;

Figure 3 is a cross-section taken along line 3—3 of Figure 1;

Figure 4 is a cross-section taken along line 4—4 of Figure 1;

Figure 5 is a cross-section taken along line 5—5 of Figure 1;

Figure 6 is a plan view similar to Figure 1 of a modified form of material;

Figure 7 is a cross-section taken along line 7—7 of Figure 6;

Figure 8 is a cross-section taken along line 8—8 of Figure 6;

Figure 9 is a cross-section taken along line 9—9 of Figure 6;

Figure 10 is a cross-section taken along line 10—10 of Figure 6.

In the embodiment illustrated in Figures 1 to 5 inclusive, the protuberances on the upper surface are denoted by the numeral 1 while those on the lower surface are designated by the numeral 2. The indentations on the upper surface are denoted by the numeral 3 while the character 4 denotes the indentations on the underside. The protuberances on each of the surfaces are in substantial contact along the lines 2—2 and 3—3 while along the lines 4—4 and 5—5 they alternate with the indentations. The lines 2—2 and 3—3 are the diagonals of the sheet.

In the embodiment shown in Figures 6 to 10 inclusive, the protuberances on the upper surface are designated as 1', the protuberances on the lower surface are denoted as 2' and the two sets of indentations are indicated by the characters 3' and 4' respectively. It is to be noted that the protuberances in this modification are in substantial contact along the length and width of the sheet and that along the diagonals they are separated by the indentations.

By arranging the protuberances and indentations as above described, it is possible to make them deeper. In fact, the depth can be made as great as the width without disrupting the fiber. To obtain the best results the protuberances and indentations should be molded into the semi-plastic sheet according to the teachings of my prior patent. The combination of the herein described arrangement of protuberances and the method of producing them before the fibers of the sheet have finally set produces a packing material of unexcelled cushioning capacity.

The protuberances are illustrated as being substantially semi-spherical in form, but it is to be understood that they may take other polyhedral shapes without sacrificing any of the advantages of the invention.

The term "paper" in this specification is used

in its ordinary sense in the art; namely, as a sheet material formed by papermaking methods from an aqueous suspension of fibrous material such as cellulose and/or asbestos which may be admixed with other vegetable, animal or mineral fibers to impart to the product other desirable properties.

I claim:

As an article of manufacture, a shock absorbing cushioning or packing paper provided on both sides with a multiplicity of contacting lines of globular protuberances, all of said protuberances being substantially identical in form and size, the protuberances on each side forming hollow indentations on the other side, there being substantially no flat surfaces on either side of the paper.

JOHN E. KIEFFER.