Aug. 2, 1955 P. BROWN 2,714,570

CUSHIONED WRAPPING MATERIAL

Filed Nov. 3, 1951

FIG. 1

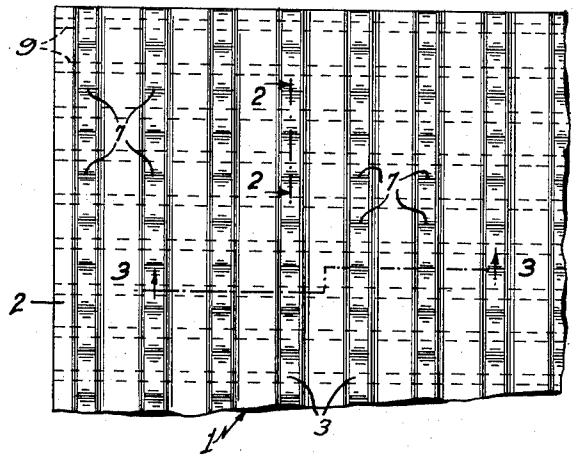



FIG. 2

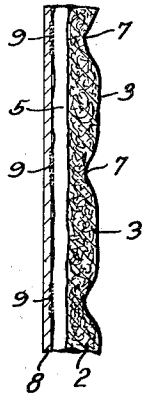



FIG. 3

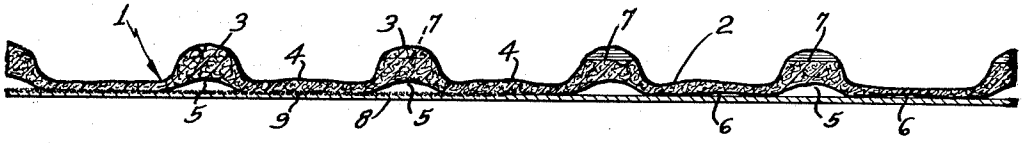



FIG. 4

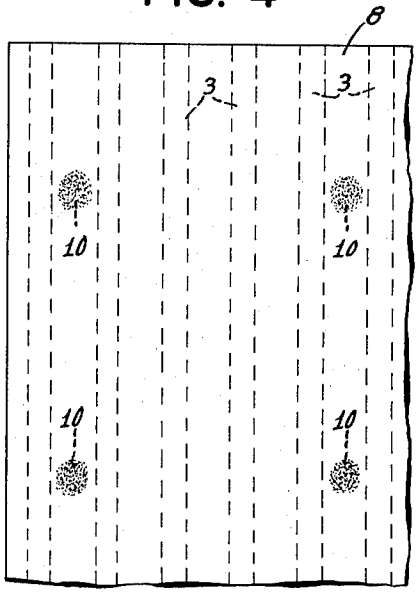
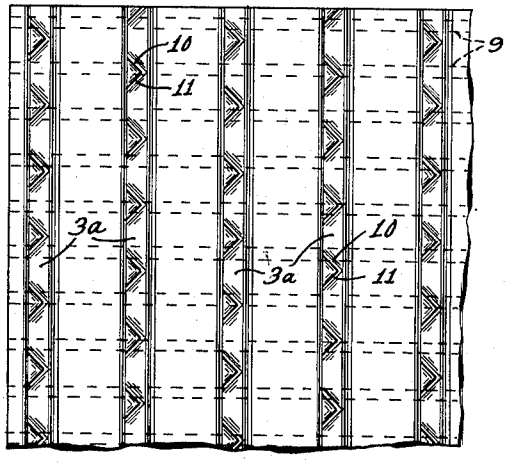



FIG. 5




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2,714,570

# CUSHIONED WRAPPING MATERIAL

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Application November 3, 1951, Serial No. 254,693

1 Claim. (Cl. 154—55)

This invention relates to cushioned wrapping materials for use in packing fragile articles for shipment or storage and is a specific improvement in the packaging material disclosed in the patent to E. L. Perry No. 2,209,537.

In packing articles such as glassware, china, objects of art, etc., various types of sheet material of a more or less soft nature have heretofore been proposed. The available wrapping material, however, is objectionable for one reason or another, such as cost and insufficient softness and resiliency to give the cushioning effect desired.

The object of the present invention is to provide a cushioned wrapping material which is composed in large measure of fibrous stock which has been reclaimed, more particularly used paper pulp, the wrapping material consequently being low in cost, at the same time, however, possessing remarkable cushioning properties in addition to unusual strength.

Another object of the invention is to provide a cushioned wrapping material which, when wrapped about an article such as a glass bottle or bowl, for example, and secured by means of twine or adhesive paper tape, will provide sufficient protection for ordinary shipment either with or without a box or carton.

A further object of the invention is to provide a cushioned wrapping material of the sort just referred to which is sufficiently low in cost so that it can be used by the yard from a roll like ordinary wrapping paper, and therefore is available for use by department stores, and the like, in preparing articles for delivery.

In the accompanying drawings I have illustrated my improved cushioned wrapping material in the form of a flat sheet, together with one modification thereof.

In these drawings,

Fig. 1 is a fragmentary plan view showing the improved wrapping material;

Fig. 2 is a detail section on line 2—2 of Fig. 1;

Fig. 3 is another detail section taken on line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 1 looking from the opposite side of the sheet; and

Fig. 5 is a view similar to Fig. 1 of a modified form of the packing material.

Referring to these drawings, 1 indicates generally the form of the improved wrapping material illustrated in Figs. 1–4 which comprises a sheet 2 of molded corrugated paper similar to that disclosed in the Perry patent above mentioned but without the backing sheet therein described. This sheet is formed by molding the pulp directly into a corrugated sheet in accordance with the procedure set forth in Perry Patent No. 2,221,200.

The molded corrugated sheet 2 is formed with a series of spaced parallel ribs 3 of molded felted pulp connected by intervening portions 4 also of molded pulp, which join the base portions of the ribs and which are flexible and thinner than the ribs 3. The face of the sheet opposite ribs 3, as shown, is not smooth but presents a rough air-dried finish with shallow grooves 5 underlying the



ribs 3. Although the intervening portions or strips 4 are nearly flat on both sides and are of substanitally uniform thickness they are slightly convex in the direction of the ribs 3, and they are also slightly dished on the opposite side between the ribs as indicated at 6.

Because of the flexibility of the intermediate portions 4, the molded sheet 1 can be readily folded along lines parallel with the ribs 3. A wrapping material, however, must be flexible in at least two directions in order to permit it to conform to irregular surfaces, and in order to render corrugated sheet 1 foldable along lines transverse to ribs 3, that is in such a manner as to bend or curve these ribs, the ribs 3 are scored with a series of spaced parallel score lines or indentations 7 extending transversely of the ribs.

These score lines may be formed in the corrugated sheet on the molding machine in the manner illustrated in the co-pending application of Eugene L. Perry, Serial No. 100,702, now Patent No. 2,668,786, but the score lines are preferably formed in the finished sheet by running the corrugated sheet through scoring rollers having scoring knives spaced the desired distance apart. The finished sheet may be advantageously scored by the use of the apparatus disclosed in my co-pending application, Serial No. 254,691, now Patent No. 2,680,996, filed contemporaneously herewith. The scoring knives preferably have a narrow flat edge so as to form at the bottom of each scoring 7 a narrow flat surface as shown in Fig. 2. These narrow flat surfaces at the bottoms of the scorings form the narrowest portions of the scorings since, as may be seen in Fig. 2, they gradually widen as they merge into the straight portions of the ribs 3 between the scorings.

The scorings extend to less than the thickness of ribs 3 and preferably to about one-half of their thickness. Wide scorings of this character permit the finished sheet to be bent lengthwise of the ribs to a very considerable extent before resistance to further bending is produced by contact of the opposite sides of the V-shaped scoring notches. The presence of these score lines does not lessen the protection afforded by the packing sheet when wrapped about a frangible article but serves to facilitate folding the ends of the sheet along lines transverse to the ribs 3.

The molded sheet or board 1, since it has a rough air-dried surface, does not have an acceptable appearance for use as a wrapping material, and in order to overcome this difficulty without increasing the flexibility and the resilient character of the sheet 1, I apply to the surface of sheet 1 opposite the corrugated side, in other words, to the relatively flat side of the sheet, a backing sheet 8 of thin paper having a smooth outer surface. This sheet is secured to the molded corrugated sheet 1 by cementing the two together in limited areas separated or spaced apart from one another.

These cementing areas preferably comprise stripes 9 of adhesive extending in spaced parallel relation crosswise with respect to the direction of the ribs 3. Such stripes or lines of adhesive usually are interrupted lengthwise by the shallow grooves 5 (Fig. 3), and moreover, the over-all roughness and irregularity of the surface of the corrugated sheet 2 may itself interrupt the continuity of the adhesive so that each stripe may tend to become a series of spots, the limited areas of connection between the corrugated sheet 2 and the smooth sheet 1 thus becoming separated from one another lengthwise as well as crosswise of the sheet. The width of these adhesive stripes 9, and the amount of their separation or spacing from one another are so chosen as to prevent the backing sheet 8 from increasing substantially the flexibility of the composite material, and at the same time unite the two sheets to such an extent that they will not separate from one another in use. Although the application of the adhesive in a series of stripes amounts substantially to

applying it in spots, the application may, if desired, be made in spots **10** uniformly separated in both directions of the sheet, as shown for example in Fig. 4. Any suitable cement which does not significantly harden or stiffen the paper may be used. A casine glue such as widely used in the manufacture of coated paper is satisfactory.

The use of a thin backing sheet **8**, causing it to adhere to corrugated sheet **1** by limited areas of adhesive separated from one another instead of coating the entire contacting surfaces with cement, does not impair the flexible and cushioning properties of the corrugated molded sheet **1** and at the same time provides a cushioned wrapping sheet material which greatly reduces the percentage of broken articles and has a smooth exterior surface which imparts a neat appearance to any article wrapped therewith.

With the improved packing material the surfaces of the articles are in contact only with the crowns of the corrugated ribs **3** which are of molded loosely felted material and provide cushioning qualities which will prevent breakage of frangible articles of glassware such as light bulbs, goblets, drinking glasses and the like.

The modified form of cushioned packing material shown in Fig. 5 is similar to that described above, except for the scoring of the ribs **3** of the corrugated sheet **1**. Instead of providing score lines which are at right angles to the ribs as in Fig. 1, the ribs **3***a* are provided with double score lines **10** and **11**. These score lines are at right angles to each other, but each series of score lines is arranged at an angle of 45° to the direction of the ribs **3***a*. Consequently, assuming for example that the sheet shown in Fig. 5 is square, it can be readily folded along either diagonal line from one opposite corner to the other. It is not essential that the score lines **10** and **11** cross each other on each of the ribs, but it is important that the series of diagonal score lines **10** and **11** of the ribs be in line with one another, and, similarly, as to the series of score lines **11**. The two series of score lines **10** and **11** can be easily produced by a scoring roll having two series of helically arranged knives which cross each other at right angles as shown in the above-mentioned co-pending application.

The wrapping material of this invention is readily produced in one continuous operation by means of the apparatus disclosed in my co-pending application, Serial No. 254,691, now Patent No. 2,680,996, in which the backing sheet **8** is applied to the web from the molding machine as it leaves the dryer, and then is passed through the scoring rolls and wound upon a take-up roll.

I claim:

As a new article of manufacture, a flexible sheet of corrugated packing material comprising a sheet having on one side parallel ribs built up of loosely felted pulp, said ribs being substantially thicker than the portions of the sheet intermediate the ribs which are also of loosely felted pulp, shallow grooves on the reverse side of the sheet underlying said ribs leaving parallel strips having non-flat surfaces on said reverse side between said grooves, scorings extending transversely of said ribs and to a depth less than the thickness of said ribs and insufficient to form protrusions on said reverse side of the sheet, said scorings having substantially flat narrow bottom surfaces, and a flexible reinforcing sheet cemented to separate area portions of said non-flat inter-groove strips.

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