March 28, 1950 C. R. WALKER 2,502,113

INDENTED PAPER PAD

Original Filed Dec. 5, 1945

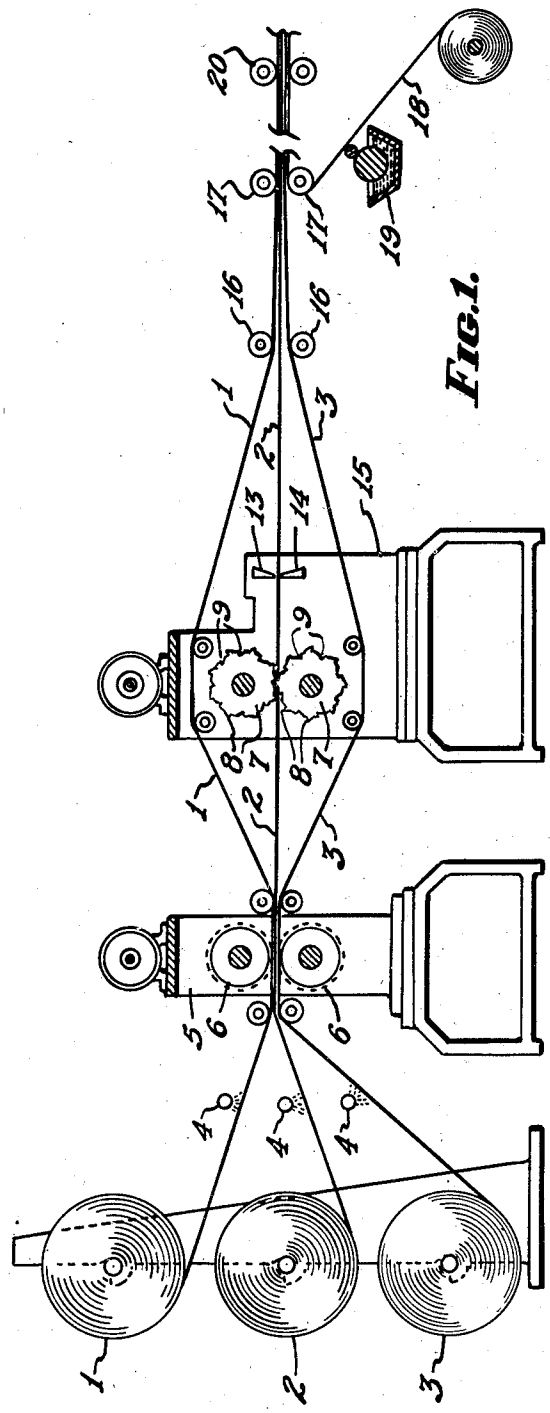


FIG. 1.

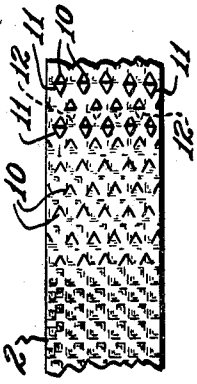


FIG. 2.

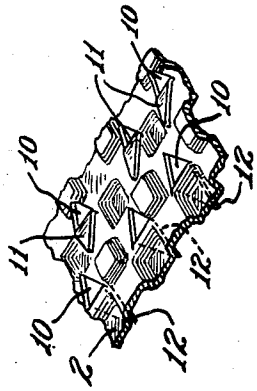


FIG. 3.

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INDENTED PAPER PAD

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4 Claims. (Cl. 154—54)

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The present invention relates to pads or assemblies formed from indented paper strips so arranged that the plies do not nest. In the manufacture of indented paper a sheet of paper board or heavy paper is passed between a pair of rolls which have patterned surfaces which interengage to form a large number of relatively small projections and indentations on the sheet. In one practice, paper webs formed and dried are moistened with a steam from a jet applied to the webs shortly before passing between the rolls, and the rolls heated to set the indentation. This application is a division of my application Serial No. 632,823 filed December 5, 1945, in the United States Patent Office.

It is important where padding is being formed from two or more pieces of indented paper that the pattern of indentations do not mesh with each other, as if this takes place the cushioning effect of the indentations is substantially lost. One of the advantages of my new pad is that in making up the padding from a series of webs of indented paper, I can avoid rolling the paper webs onto rolls after being indented and then unreeling the paper for the purpose of combining it with other webs in making the padding. This is because the making of a neat roll from paper web requires fairly tight coiling and this results in crushing down the indentations, particularly as freshly indented.

A peculiarity which has been noted in the practice of forming indented paper, particularly with patterns which have sharply angled walls of the indentations, is that to obtain a sharp and high indentation on a single sheet of the normal type of paper used in making padding, the indenting rolls must be brought so close together that they tend to rip and tear the paper. This is due in part to the fact that in indenting of paper the material in many patterns of indentation must flow in order to form up, as distinguished from pure corrugation of paper in which the material forming the bends is mainly accumulated from the length of the web being corrugated, thus shortening the over-all length of the corrugated web as compared to the original material.

When, however, more than one web of paper is passed through indenting rolls at the same time, the indentation pattern forming projections on the rolls do not tend to tear and split the paper probably because the adjustment of the rolls together is not so close and because the several webs protect each other after the fashion of a cushion. A difficulty with forming

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several indented webs in a passage through the same set of indenting rolls is that the pattern is the same and hence the indented webs will mesh, and not form a fully cushioned pad directly from the indenter.

One of the advantages of my novel padding is that I may form multiple thickness padding of indented paper by a practice in which all webs are indented by a passage together through a single set of indenting rolls, and in which certain of the webs are further treated continuously to avoid nesting. In this way the reeling of an already indented web is not required, and among other things the webs can be furnished continuously to a wrapping machine which wraps the set of webs into a continuous pad which can be cut into lengths as desired. Where more than two layers are to be combined in a pad only alternate webs will normally be treated to avoid nesting. I will describe the practice of making my padding by referring to the making of a three thickness pad since this will explain methods of productions and structures which include various thicknesses.

I have illustrated partially diagrammatically in the drawings, an arrangement of apparatus which will accomplish the ends noted, although it should be particularly noted that the product may be made in other ways either in whole or in part.

In the drawings:

Figure 1 is a partially diagrammatic side elevation of a mechanical arrangement for carrying out my practice.

Figure 2 is a plan view of the central webs in several stages of treatment.

Figure 3 is a large view of a portion of the central web as completed before combining with the two outer webs to form a pad.

The illustrated practice is supplied with three rolls of paper 1, 2 and 3, suitable for indenting. The webs are drawn past steam jets 4, and into the indenting machine 5. This machine is equipped with a pair of driven indenting rolls 6, 6, which engage all three webs of the paper at the same time, thus indenting them.

There is also provided a stand of driven rolls 7 through which the central web (still marked 2) is caused to pass. These rolls are provided with alternate teeth 8 and pockets 9 which mesh with each other and are so conformed as to cut V-shaped, or they may be U or other shaped patterns 10, in the web and push the liberated tongues 11 and 12, out of the plane of the web. The shape of the tongues is not essential and is subject to choice or convenience. There may

be a set of tongues 11, in the web followed by a set of tongues 12, and since the rolls are so cut, the tongues 11 will project somewhat from the top surface of the web and the tongues 12 will project slightly from the bottom surface of the web. Also, by a suitable cutting of the tongue forming rolls alternate tongues in the transverse rows may be so struck as to project alternately at the top and bottom of the webs. Other patterns may, of course, be used.

The web then passes between a pair of blades 13, 14, in another stand 15, which blades engage the projecting tongues at each side of the web and fold them back against the web. This folding back need only be sufficient for the angles of the tongues to be lagging with respect to the direction of feed of the web, and the particular top and bottom projection of the tongues will regulate which ones are laid back on the top and which are laid back on the bottom of this central sheet.

The two outer webs (still marked 1 and 3) are guided by means of suitable guide rolls so as to pass through the stand above and below the rolls 7 and above and below the fold back blades 11, 12.

The three webs meet between rolls 16 and 17, and at 17 may be met with a sheet of wrapping paper 18, which is supplied with adhesive streams by the appliance 19. Rolls 16 and 17 will be guide rolls, normally, rather than feed rolls.

In the drawings the wrapping machine has not been shown except for the feed rolls 20 which draw the assembled wrapped webs through the wrapping apparatus and incidentally draw the three webs forming the filling of the pad from the driven rolls 6 and 7.

The tongues on both sides of the central web will fold entirely back and form sufficient layer to keep the otherwise nestable sheets from nesting together, as the assembly of layers is completed.

Instead of drawing the webs along from the feed rolls of a wrapping machine, a cementing machine could be used in which case silicate or some other adhesive would be imposed on the several webs and the operation will be to cement them together with a view to forming unwrapped pads, packing partition pieces, etc. At any rate the feed rolls engage the assembled webs which mitigate crushing of the fresh indentations in whatever device is used to form assemblies of the three webs. There may be additional webs on the outside of the three web assembly, or other "sandwiches" of non-nesting type secured together with the three layer assembly, which may be wrapped or unwrapped, adhesively joined or stapled or taped together, or simply left as unsecured assemblies. Where five webs are indented together then the second and fourth webs may be formed with the tongues. Where but two webs are used, which is not preferred, the tongues to prevent nesting will best be cut in one of the webs only, the tongue cutting roll being arranged to deflect the tongues alike and a single blade 13 will turn all tongues back so as to lie on the surface of the web which meets the other web. In the three web form such a treatment could be given to the two outer webs in which case the tongues would lie on the inner faces of the two outer webs.

I have been able to indent up to six webs at a time in a pair of indenting rolls. The difficulty lies in separating the webs after indenting. The tongue treatment can be adapted in various ways as will be evident without further comment.

To make a product such as I have described, it is not necessary that conjoint indenting be followed along with the tongue slitting and folding operation. Also similarly indented webs made separately and supplied to the pad forming machine from rolls may be used, which would result in eliminating the common indenting step of the mechanism described. Also the product could be formed from rolls of paper by using separate indenting rolls for any or all of the webs of paper, operated in proper timing with the tongue forming apparatus.

The present application covers the product of my invention irrespective of its mode of manufacture. Among other things it will enable the maker of indented paper to use up supplies intended for other purposes into desirable pads, when it happens that all have the same indentation. Furthermore the turning of tongues as in my pads, may be of advantage in adding to the thickness of pads formed of paper of non-nesting indentation in the several plies.

Having thus described the invention, what is claimed as new and is desired to be covered by Letters Patent is:

1. A cushioning paper pad comprising a plurality of layers of identically indented paper webs, and tongues cut in at least one of the webs, and folded to overlie the indentations thereof, thus serving as a spacer to prevent nesting.

2. A cushioning paper pad comprising at least three layers of identically indented paper, at least one intervening layer having tongues which are cut therein and folded to position to lie some over the indentations on one face of said middle layer and some over the indentations on the other face of the middle layer, for the purpose described.

3. A cushioning paper pad comprising a plurality of layers of indented paper, and tongues cut in at least one of the webs and folded to overlie the indentations thereof, thus serving as a spacer.

4. A cushioning paper pad comprising at least three layers of indented paper, at least one intervening layer having tongues which are cut therein and folded to position to lie some over the indentations on one face of said middle layer and some over the indentations on the other face of the middle layer, for the purpose described.

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