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(12) # EUROPEAN PATENT APPLICATION

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(54) **File reinforcements.**

(57) A file reinforcement used to reinforce the edges of a hole in a document is formed of sheet plastics material. The inner edge 12, which is aligned with the hole in the document, and the outer edge 11, which defines the periphery of the reinforcement, are both formed with an increased thickness compared to the remainder of the reinforcement. The increased thickness edges of the reinforcement are formed by the application of heat and high frequency welding radiation. This increased thickness provides added resistance to tearing where it is needed most. There is also disclosed a file reinforcement which is polygonal rather than the conventional circular shape, and the preferred shape is square.

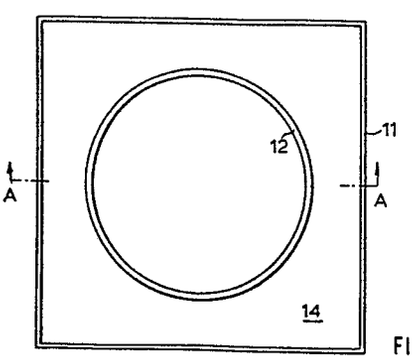

FIG.1.

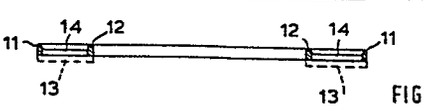

FIG.2.

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FILE REINFORCEMENTS

This invention relates to reinforcements, which comprise reinforcements for holes in sheets, the reinforcement being stuck to the sheet around the hole to reinforce the sheet against tearing from the hole. Holes are often punched in sheets to be secured in a file provided with a ring binder, the rings passing through holes in the sheets.

Known forms of file reinforcements include gummed linen washers and self-adhesive vinyl washers. Such reinforcements are manufactured by cutting around the outer perimeter and punching out the central aperture.

Since tearing of the sheet, and of the reinforcement if it is not strong enough, occurs from the edge of the central aperture, the edge of the central aperture should provide the maximum resistance to tearing. The known forms of file reinforcement are uniform, so that there is no region which provides greater resistance to tearing than any other.

According to the present invention, there is provided a file reinforcement manufactured from sheet plastics material on a high-frequency welding machine. The use of a welding machine to cut out the central aperture and to define the outer perimeter of the reinforcement causes raised inner and outer edges to be formed in the reinforcement, and these edges provide increased resistance to tearing.

A preferred reinforcement is formed from a pair of plastic sheets, the high frequency welding machine laminating the two sheets together as well as defining the inner and outer edges of the reinforcement. In this arrangement, one of the sheets may be provided with a self-adhesive material for sticking the reinforcement to the sheet to be reinforced.

The reinforcement is preferably made from a sheet

or sheets of vinyl plastics material.

The conventional shape of file reinforcements is annular. According to another aspect of the invention, there is provided a file reinforcement which has an edge which is other than circular, for example, triangular, rectangular or polygonal. Such non-circular shapes may be useful to reinforce the sheet against tearing in a particular direction.

In some instances, a split is required in the reinforcement to enable it to be fitted to a sheet already having a fastening member passing through its hole. Although the split is an inherent source of weakness in the reinforcement, the manufacture by high-frequency welding according to the present invention causes the edges of the split to be raised and so strengthens the reinforcement.

Examples of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a plan and Figure 2 a section of a square file reinforcement,

Figure 3 is a diagram of apparatus for mass producing the file reinforcement of Figure 1, and

Figure 4 is a plan of a triangular reinforcement.

Figure 1 shows a plan of a file reinforcement 10 of preferred shape. It has a square external edge 11 and a circular internal edge 12 defining a central aperture. The two edges are of increased thickness compared to the remainder of the sheet, typically of double thickness as is shown in the section of Figure 2. The remainder of the sheet 14 is typically 0.0075 to 0.0127 cm in thickness.

The central aperture is typically 6mm in diameter and the external edges about 15mm long. The width of the raised edge is about 0.3mm. The drawings are not to scale.

The reinforcement is mass-produced from a matrix arrangement on a sheet of vinyl plastics material. The apparatus of Figure 3 is arranged to form a laminated reinforcement, a white opaque vinyl plastics base sheet 13 being added to the clear sheet 14 of the reinforcement already described. The base sheet 13 is indicated in dashed lines in Figure 2 and has on its lower side a pressure sensitive adhesive coating protected by a backing sheet. The sheet 14 is supplied on a reel 21 and the sheet 13 on a reel 22. The two sheets are brought into contact over a roller 23 and passed into a welding device 24 which applies heat at about 90° to 110°C and high frequency radiation to the sheet in a square grid pattern to define the outer edges of the reinforcements and a pattern of central rings within each square of the grid to define the inner edges. The head can be moved in synchronism with the sheets or the sheet can be held stationary under the head while the heat and radiation takes place.

As can be seen in Figure 2 the intermediate region between the edges 11 and 12 is uniform in thickness, so that the material migrates inwards from the boundary between adjacent reinforcements in the grid pattern to form the outer edge of increased thickness and it also migrates radially outwards from the material within the inner edges so that the individual reinforcements can be easily separated from each other and the waste material in the central aperture can be easily removed. The high frequency radiation also causes lamination of the two sheets 13 and 14.

The matrix then passes to a longitudinal slitter 25 where the matrix is cut into a plurality of strips of reinforcements which are then coiled at 26 and packaged.

Figure 4 shows an alternative shape of reinforcement. This time the polygonal shape of the reinforcement is triangular with 45° and 90° angles. This shape leads to as efficient use of materials as the square shape of Figures 1 and 2, since two such triangles can be placed with their hypoteneuses 35 together to form a square. The additional dimension of the reinforcement between the central aperture 31 and each 45° corner 32 gives additional resistance to tearing in those directions. As described above the external edge 33 and the internal edge 34 are of double thickness, caused by the welding heat and radiation.

It is possible to form a slit in the reinforcement leading from the central aperture to the external edge by adjusting the pattern on the welding head to form two closely spaced raised edges defining the slit. The migration of the sheet away from the line of the slit to form the two raised edges causes the slit to be formed in the sheet. The reinforcement can then be slipped into position around a fastener and although the slit weakens the reinforcement, it is arranged in the direction of least likely stress so that the document is still adequately reinforced.

In one aspect the present reinforcement gives improved performance due to the inner and outer edges being of increased thickness. In another aspect, the reinforcement gives improved performance due to its polygonal shape. The two aspects combined give even better performance.

Claims:

1. A file reinforcement comprising a sheet of self adhesive vinyl plastics material formed with an increased thickness around all its edges 11, 12.

2. A reinforcement as claimed in claim 1 wherein the increased thickness is boubled the normal thickness.

3. A reinforcement as claimed in claim 1 or claim 2 wherein the outer edge 11 is polygonal.

4. A reinforcement as claimed in claim 3 wherein the outer edge 11 is rectangular.

5. A reinforcement as claimed in claim 4 wherein the outer edge 11 is square.

6. A reinforcement as claimed in any one of claims 1 to 5 wherein the inner edge 12 defines a closed curve.

7. A reinforcement as claimed in any one of claims 1 to 6 wherein the sheet plastics material is a laminate including a sheet material 13 which is self adhesive on an exterior side of the laminate.

8. A reinforcement as claimed in claim 7 wherein one sheet 13 of the laminate is opaque.

9. A method of forming a file reinforcement comprising applying heat and high frequency welding radiation to selected parts of a sheet of plastics material to cause material to migrate to the inner and outer edges 11, 12 of the reinforcement so that the edges have increased thickness compared to the remainder of the reinforcement.

10. A method as claimed in claim 9 comprising placing together two sheets of plastics material and

laminating them by said high frequency welding.

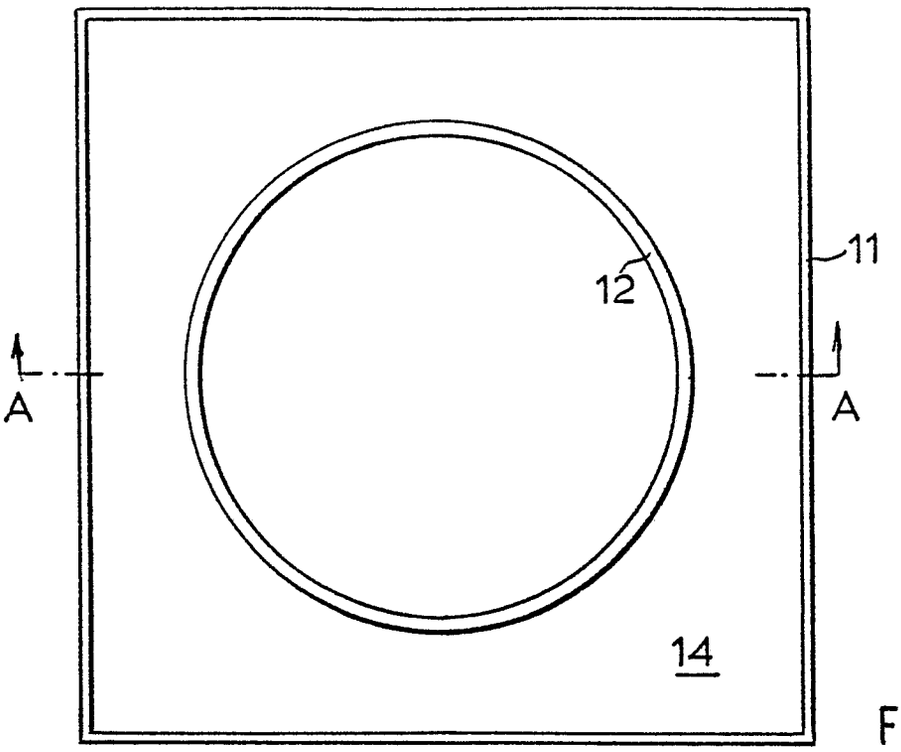

FIG.1.

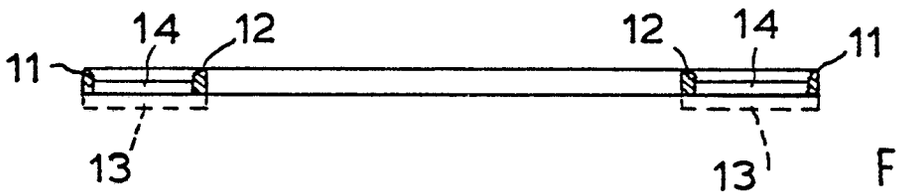

FIG.2.

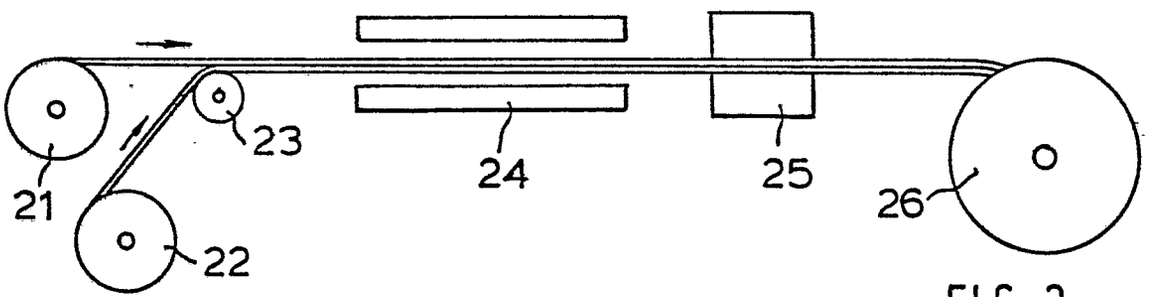

FIG.3.

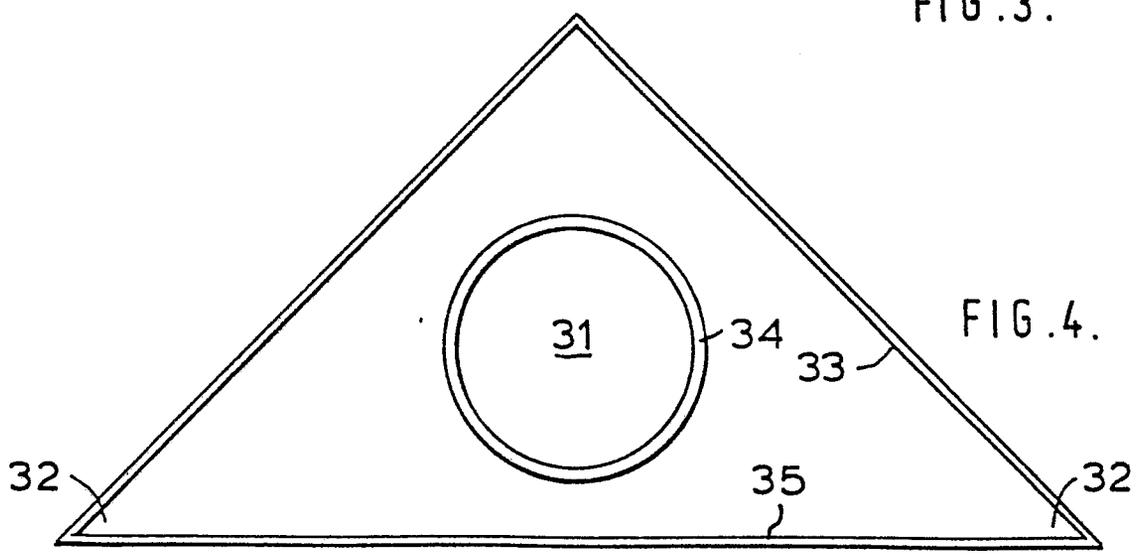

FIG.4.

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EUROPEAN SEARCH REPORT

Application number
EP 82 30 2787

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	GB-A-1 601 593 (MARCUS) * Page 1, lines 70-92; page 2, lines 9-15; figures 1,2 *	1,4,6, 7	B 42 F 3/00
Y	FR-A-2 091 479 (STEVENS et al.) * Page 1, lines 25-34; page 3, lines 6-36; page 4, line 34; figures 1,3 * & US - A - 3 763 582	1,8	
A	FR-A-1 079 900 (DORET) * Abstract; figure 1 *	1,2	
A	US-A-3 315 683 (RODRIGUEZ) * Figure 1 *	5	
A	US-A-3 473 195 (MORIN) * Whole document *	9	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	DE-A-2 512 573 (SIEMENS) * Page 1, line 1 - page 2, line 13 *	9,10	B 42 F B 29 C G 09 F B 43 M
A	US-A-3 925 584 (SUZUKI et al.) * Column 1, line 57 - column 2, line 66 *	10	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18-08-1982	LUTZ C.H.A.

CATEGORY OF CITED DOCUMENTS

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