

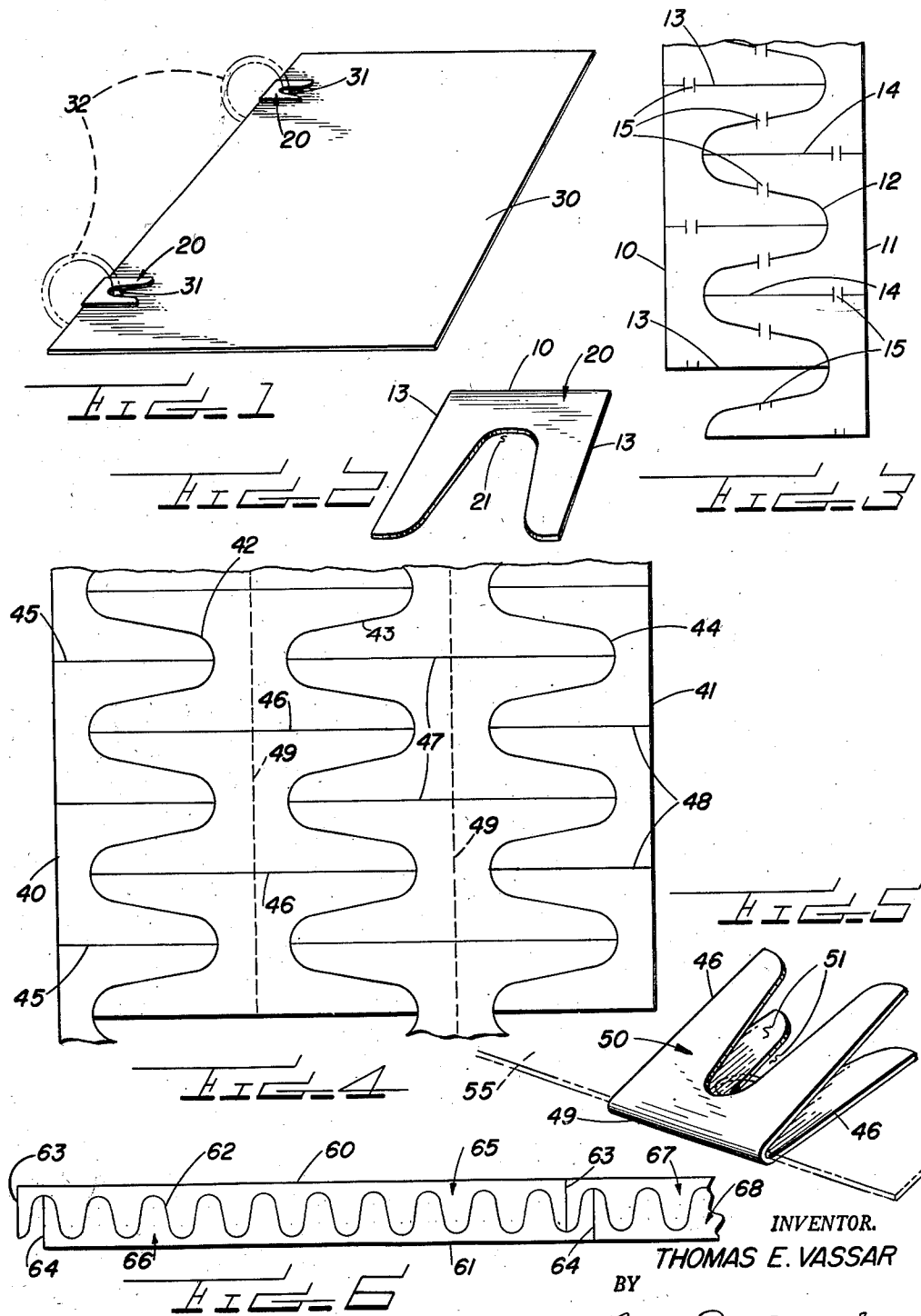
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PATCH REINFORCEMENT

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PATCH REINFORCEMENT

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This invention is concerned with a reinforcement for preventing the tearing of sheet materials adjacent apertures therein provided for the passage of a securing or other elements which exert tearing or wearing effects upon the edges of the apertures.

A feature is the provision of patch reinforcements of shapes which permit rapid and economical forming in and separation from a strip of material.

Another feature of the invention is the provision of a patch reinforcement which can be applied to a perforated sheet employed in a loose-leaf binder without removal of the sheet from the binder.

A further feature resides in the method of cutting a strip of material to provide patch reinforcements without wastage of material.

With these and other features as objects in view, as will appear in the course of the following description and claims, an illustrative form of practice is shown on the accompanying drawings, in which:

Figure 1 shows a couple of the patch reinforcements applied to a loose-leaf sheet.

Figure 2 shows a single patch reinforcement.

Figure 3 shows the lay-out and cutting to provide individual patch reinforcements from a strip of fabric.

Figure 4 is a view of a portion of a strip of sheet, indicating a modified arrangement.

Figure 5 is a view corresponding to Figure 2, showing a double patch reinforcement.

Figure 6 is a view of a strip cut for providing a further modification of arrangement.

Sheets have been perforated to receive securing elements; and, during extensive service, the sheets are deformed or torn adjacent the perforations. The practice has heretofore been to reinforce the sheet adjacent such perforations by rings of fabric which are cemented or otherwise applied to the sheet. It is necessary to remove the sheet from the securing element in order to apply the rings; and the manufacture of the rings represents a considerable loss because the central disks and also the "frames" of the fabric between the individual rings must be discarded.

In accordance with the preferred form of the present invention, a wide strip of fabric is weakened or cut by three series of lines, one of which serves to split it into narrower widths, a second is wavy or sinuous with a general direction parallel to the edges, and the third series comprises two groups of parallel lines each extending from one edge of the narrow strip to the most remote part of the sinuous line on said strip.

In Figure 3, the general strip of fabric is cut along lines providing the parallel edges 10, 11. A sinuous or wavy line 12 is followed by a second cut; and the two groups 13, 14 of parallel lines

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extend individually from one edge 10 or 11 to the most remote part of the sinuous line 12; that is, each cut or weakening by these parallel lines extends from a re-entrant part of the wavy line and in the illustrated form passes through the center of curvature of the arcuate portion providing the re-entrant or remote part. It will be noted that these various cuts may be made simultaneously or successively. This arrangement forms the strip into individual patches having projections, with the adjacent projections of two patches being formed in the notch of an opposite patch. The cuts need not be complete, that is, small bridges 15 may be left whereby the product remains integral while permitting easy detachment and separation of the individual reinforcement by breaking the bridges connecting it to adjacent pieces.

The individual reinforcements 20 thus made are illustrated in Figure 2, as having straight edges at three sides 13, 13, 10, and a re-entrant notch 21 at the fourth side provided by a symmetrically curved line connecting the parallel edges; this notch by design being of a bottom diameter appropriate to the use intended, and its rim joining the outer edges 13, 13 substantially at right angles.

The loose-leaf sheet 30 of Figure 1 has the perforations 31 for the securing elements 32, indicated in dotted lines as the separable arch pieces of a loose-leaf binder. Each of the perforations 31 is reinforced by a patch 20 which is positioned between the hole and the adjacent or inner edge of the sheet. It will be noted that the patches may be applied without removing the sheet from the binder, as its open notch 21 permits slipping it into position around the element 32.

In the form shown in Figure 4, a strip having the parallel edges 40, 41 is cut by the wavy lines 42, 43, 44 and by the groups of parallel lines 45, 46, 47, 48. The wavy lines have the same distance from crest to crest, corresponding to the intended length of the single patch along the length of the sheet to be reinforced; the alternate wavy lines have their maximum leftward extensions opposite the rightward maximum extensions of the intervening lines. The lines 45, 48 extending from the edges 40, 41 terminate at the adjacent wavy lines 42, 44 at the most remote parts of these lines, to form single patches 20 as shown in Figure 2. The lines 46, 47 pass between the most remote parts of adjacent wavy lines 42, 43 and 43, 44, and provide double patches (Figure 5). In manufacture, it is preferred to press or score the strip along median lines 49 midway between the wavy lines, to form a hinging line for bending the double patches into the shape 50 shown in Figure 5. Such a double patch can be engaged over the edge of

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the sheet 55, and attached thereto to reinforce the same at both faces.

A further form, useful with spiral wire or comb-type securing elements is shown in Figure 6, in which a strip having the edges 60, 61 is cut with a wavy line 62, and the cuts 63, 64 extend from alternate edges each to a most remote point of the wavy line 62. Upon separation, the patches 65, 66, 67, 68 each provide reinforcement for the edge of a sheet which is secured by closely-spaced multiple elements: the spacing of adjacent notches formed by the wavy line 62 corresponds to the spacing of the securing elements. For example, a commercially available stenographer's notebook has sheets 6 x 9 inches, with a spiral wire securing element having a patch between turns of one-fifth inch: for such a book, the patches 65, 66, 67, 68 are each six inches long, with the notches spaced one-fifth of an inch apart and having the bottom of the notch formed as a circular arc of about $\frac{3}{64}$ inch radius.

It is presently preferred to make the reinforcements of strong cloth, which may be provided in webs coated at one side with a suitable water-remoistening glue, so that the operation of applying comprises wetting this surface of the patch, locating it, and pressing it into adherent relation to the sheet. Other materials and means of securing the same can be substituted: as primary points of this invention are in the making and provision of a multiplicity of such reinforcements from sheet material without waste, and with the individual reinforcements shaped to receive the binder post or other securing element and to extend beyond the same in reinforcing positions while permitting insertion and attachment without removal of the basic sheet from the securing element preparatory to applying the reinforcement. Thus, the reinforcements may be employed in lieu of annular pieces as eyelets or grommets for paper, cloth, etc.; and secured by various means such as remoistening glues, hot cements, stitching, etc.

The method of manufacture and the shape of the patch avoid any waste of material, as compared with losses of 20 to 25 per cent in making annular patches. Further, the applied patch gives greater strength than an annular patch having the same area of material because its projections extend over the usual lines of tear for loose-leaf sheets, and because these projections extend beyond the position of the outer periphery of an annular patch.

It is obvious that the illustrative shape and employment are not restrictive, and that the device may be made and used in many ways.

I claim:

1. A group of patch reinforcements of flexible fabric, each having a re-entrant notch therein for receiving the binder element, each individual reinforcement having spaced projections separated by said notch, said group constituting a connected strip having two straight parallel edges with a wavy weakening line extending in the same general direction as said edges and located between two rows of reinforcements extending along said strip, parts of the wavy line being located remote from said one edge and other parts being remote from the other edge, a first group of weakening lines extending individually from said one edge to a part of the wavy line most remote from said one edge and located between the patch reinforcements of a first row, and a second

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group of weakening lines extending individually from the other edge to a part of the wavy line most remote from said other edge and located between patch reinforcements of a second row, two adjacent patch reinforcements in first row having projections located in the notch provided in a patch reinforcement of the second row and the notch of a patch reinforcement of the first row having located therein projections of two patch reinforcements of the second row, the patch reinforcements being separably connected across said weakening lines.

2. A group of patch reinforcements as in claim 1, in which the weakening lines are partly cut through and in which each patch is connected to all adjacent patches by small tearable bridges interrupting the cut lines.

3. A group of patch reinforcements of flexible fabric, each having a re-entrant notch therein for receiving the binder element, each individual reinforcement having spaced projections separated by said notch, said group constituting a connected strip having a straight edge with a wavy weakening line extending in the same general direction as said edge and located between two rows of patch reinforcements extending along said strip with a first row located adjacent said straight edge, parts of the wavy line being near said straight edge and other parts being more remote from said straight edge, a first group of parallel weakening lines extending individually from said straight edge to a part of the wavy line most remote from said straight edge and located between patch reinforcements of the first row, and a second group of parallel weakening lines extending individually from a part of the wavy line most adjacent said straight edge in a direction away from said edge and located between patch reinforcements of the other row, two adjacent patch reinforcements in said first row having projections located in the notch provided in a patch reinforcement of the other row and the notch of a patch reinforcement in said first row having located therein projections of two patch reinforcements of the other row, the patch reinforcements being separably connected across said weakening lines.

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