# BOOK OF DETACHABLE REPOSITIONABLE SHEETS

## Technical Field

The present invention relates to paper sheets of the type having pressure-sensitive adhesive on their rear sides by which the sheets can be adhered to a substrate, to bound stacks of such sheets, and to methods for making and using bound stacks of such sheets.

## Background Art

A well known note pad comprises a stack of paper sheets, each having a narrow strip of low-peel pressure-sensitive adhesive adjacent one edge on its rear side by which the sheets can be temporarily adhered to substrates such as documents or other articles (often for message-bearing purposes), by which strip of adhesive the sheets are adhered together in the pad. In one pad configuration, all of the strips of adhesive are along one side of the note pad, whereas in another pad configuration the adhesive strip on each successive sheet in the pad is along the opposite side of the pad as is illustrated in U.S. Patent No. 4,416,392. Note pads in both of these configurations are currently being marketed under the trademark "Post-it" by Minnesota Mining and Manufacturing Company, St. Paul, Minnesota. Some such note pads have printed indicia (e.g., a printed message and/or picture and/or decoration) on each sheet.

U.S. Patent No. 5,382,055 describes a method, and a sheet assembly used in that method, by which an individual or a small custom printing company can economically prepare a small amount of notes or note pads having pressure-sensitive adhesive on a rear surface and custom indicia (e.g., printed messages and/or decorations and/or pictures and/or indicia that make the notes usable as flags, labels or forms) on the front surfaces of all or some of the sheets that is applied by using conventional printing means including electrophotography through laser printers, conventional office copiers, lithography, flexography, or the like.

That method for making custom printed notes or note pads utilized one or more novel sheet assemblies, each of which had first and second sheets and layers of pressure-sensitive adhesive in a predetermined pattern on the rear major surface of each of the sheets that contact and are releasably adhered to the rear surface of the other sheet only in nonadhesive bearing areas. Indicia was printed on the front major surfaces of the sheets using conventional printing means of the type described above. The sheets could then either be separated along predetermined planes normal to and extending across the major surfaces of the sheets to form the custom printed notes, or the sheets of a plurality of such printed sheet assemblies could be separated, stacked to adhere the layers of pressure-sensitive adhesive on the rear surfaces of the sheets to the front surfaces of other sheets in the stack with the layers of adhesive on the sheets in a predetermined orientation with respect to each other; and the stacked sheets could be separated along predetermined planes normal to and extending across the major surfaces of the sheets to form the custom printed note pads.

Disclosure of the Invention

The present invention is a book comprising a plurality of the sheet assemblies described above that each comprise first and second sheets, and layers of pressure-sensitive adhesive in a predetermined pattern on the rear surfaces of each of the sheets, which pattern of pressure-sensitive adhesive on the rear major surface of each of the sheets contacts and is releasably adhered to the rear major surface of the other sheet only in nonadhesive areas. The sheet assemblies are disposed in a stack, and means are provided for binding together corresponding ones of the peripheral edges of the sheet assemblies.

The means for binding together the peripheral edges of the sheet assemblies in the stack could be any of the known means for binding sheets into a stack, such as staples, rivets, stitching, etc. Preferably, however, that means is a layer of padding compound by which the sheet assemblies are releasably adhered together in the stack. The use of padding compound for such binding allows the sheet assemblies to be moved relative to each other in the manner of the pages in a book

without damaging the sheet assemblies or separating them from the binding, while allowing the sheet assemblies to be easily separated from the binding for uses such as those described above and in greater detail in U.S. Patent No. 5,382,055.

The book can advantageously be used a coloring book, in which case graphics adapted to be colored are printed on the front surfaces of at least some of the sheets. A person using the coloring book can then color the graphics on one of the sheets in one of the sheet assemblies in the book and then separate that colored sheet from the binding material and from the other sheet of the sheet assembly and adhere the separated colored sheet to a substrate on which it is to be displayed. Alternatively, that person can separate a sheet he or she wishes to color from one of the sheet assemblies and the binding material and then adhere the separated sheet to a substrate during the coloring process, after which it can be removed from that substrate and adhered to a different substrate on which the colored sheet is to be displayed. (e.g., on a refrigerator).

Other uses of the book could include, among others, having the sheets of the sheet assemblies printed (1) to provide a calendar, or (2) to provide signs (e.g., "For Sale, " "Garage Sale," etc.) or labels, in which case the sheets may or may not be adapted to have additional information such as a phone number or address added to them prior to use, or (3) to provide a pages of the type where some information is printed on the pages and other information is to be filled in by the user of the book (e.g., a workbook or form book), or (4) to provide business cards or coupons. The book can also have blank sheets on which information can be manually printed so that the sheets can be removed and used in brainstorming or planning sessions or to form storyboards or the like. Additionally, the books could contain sheets of polymeric material that could be transparent so that they could be removed and used as protective sheets over other surfaces or documents, or that could be printed and/or adapted to be written on in the manners and for similar purposes to those described above.

If desired, the sheets of at least some of the sheet assemblies in the book can be attached together along adjacent peripheral edges (e.g., top edges or side edges), which attachment can be a fold that allows the sheets to provide portions of a larger

sheet when they are separated from the binding and each other and are unfolded. Alternatively such attached sheets can have a path of weakness (e.g., a deep crease or perforations) along their joined peripheral edges along which the sheets can be separated, as may be desirable if the sheets of a sheet assembly are to be printed after the sheet assembly is removed from the binding.

Also, in each sheet assembly a portion of the first sheet adjacent one of its edges can extend past the adjacent edge of said second sheet to facilitate manual separation of the sheets in the sheet assembly.

The book can include covers disposed on opposite sides of the stack of sheet assemblies and attached thereto by the means for binding, at least one of which covers can have a release coating on at least one of its surfaces to facilitate adhering one of the sheets thereto for display and/or storage purposes after that sheet is removed from one of the sheet assemblies in the book. Alternatively, or in addition, the book can include at least one support sheet that is attached to the stack of sheet assemblies by the means for binding and is adapted to have one of the sheets releasably adhered thereto for display and/or storage purposes after that sheet is removed from one of the sheet assemblies.

The adhesive used in the layers of pressure-sensitive adhesive can be a low-tack pressure-sensitive adhesive (e.g., comprising tacky, elastomeric copolymer microspheres) in which case the nonadhesive bearing areas on the rear surfaces of the sheets to which the layers of adhesive are adhered in the sheet assemblies can be free of release coating; or a conventional more aggressive pressure-sensitive adhesive can be used in which case the sheet assembly can include a release coating on those nonadhesive bearing areas to afford separation of the sheets of the sheet assembly.

The sheets in the sheet assembly can be of any conventional material (e.g., conventional, bond, or clay-coated paper, opaque or translucent polymeric material, or the carbonless paper sold under the trademark "Scotchmark" by Minnesota Mining and Manufacturing Company, St. Paul, Minnesota which is paper containing structures such as micro-encapsulated chemicals that will form an image on the paper when pressure is applied to the paper so that, for example, the capsules are

broken by the pressure to release the image forming chemical). Also, the sheets may be adapted to be divided into smaller segments along paths of weakness (e.g., scores or perforations) such that only a portion of one of the sheets can be removed and adhered to another substrate.

Brief Description of Drawing

The present invention will be further described with reference to the accompanying drawing wherein like reference numerals refer to like parts in the several views, and wherein:

Figure 1 is a bottom end view of a book according to the present invention in which portions are enlarged to show detail

Figure 2 is a vertical edge view of the book of Figure 1 in which portions are enlarged to show detail and coatings of adhesive normally releasably adhered to the adjacent page are shown separated from that page;

Figure 3 is a sectional view taken approximately along line 3-3 of Figure 2;

Figure 4 is a sectional view taken approximately along line 4-4 of Figure 2; and

Figure 5 is a schematic view of a method according to the present invention for making and using a coloring book.

Detailed Description

Referring now to Figures 1 through 4 of the drawing, there is illustrated a coloring book according to the present invention, generally designated by the reference numeral 10.

Generally, the coloring book 10 comprises a plurality of sheet assemblies 11a, 11b, and 11c having peripheral edges. Only the three sheet assemblies 11a, 11b, and 11c are illustrated, and each has a slightly different structure. Typically the book would contain many more than three sheet assemblies, and all of the sheet assemblies in one book might have the same structure. Each of the sheet assemblies 11a, 11b, or 11c comprises first and second sheets 12 and 13 each having major front and rear surfaces 14 and 15, and spaced strips or layers 16 of pressure-

sensitive adhesive in a predetermined pattern on the rear surface 15 of each of the sheets 12 and 13. The layers 16 of pressure-sensitive adhesive in the predetermined pattern on the rear surface 15 of each of the sheets 12 or 13 contacts and releasably adheres to the rear surface 15 of the other sheet 12 or 13 in each sheet assembly 11a, 11b, or 11c only in nonadhesive bearing areas of that rear surface 15 (such contact and adhesion is illustrated in Figure 1, but is not illustrated in Figure 2 where the layers 16 are shown separated from the sheet to which they are normally releasably adhered to illustrate their location on each sheet 12 and 13). The sheet assemblies 11a, 11b, and 11c are disposed in a stack with their peripheral edges generally in alignment, and means in the form of a layer 18 of padding compound is provided for binding together corresponding ones of the peripheral edges of the sheet assemblies 11a, 11b, and 11c.

As illustrated, the book 10 includes the optional feature of front and rear covers 20 and 21 having opposite major surfaces that may be slightly larger than, but generally correspond in size to the major surfaces of the sheet assemblies 11a, 11b, and 11c. The covers 20 and 21 are disposed on opposite sides of the stack of sheet assemblies 11a, 11b, and 11c and have peripheral edges attached to the stack of sheet assemblies by the layer 18 of padding compound. A release coating 22 may be provided on some or all (as illustrated, one) of the surfaces of the covers 20 to facilitate adhering one of the sheets 12 or 13 thereto after that sheet is removed from one of the sheet assemblies 11a, 11b, or 11c, as may be desirable for display and/or storage of that sheet 12 or 13. A suitable release material for the coating 22 is a 20 percent solids solution of the release coating described in Example 1 of European Patent Application Publication number 0,618, 509A1 dated January 5, 1994, modified so that the composition is KF2001/MA/MAA/MAA 25/50/20/5 dispersed in 2-butanone.

As an alternative to the rear cover 21 illustrated, a rear cover could be provided that has a width at right angles to the layer 18 of padding compound that is twice the width of the sheet assemblies 11a, 11b and 11c, and that is folded in half along a line parallel to its edge adhered to the layer 18 of padding compound, with its distal portion positioned adjacent the sheet assemblies 11a, 11b, and 11c. That

distal portion could then be positioned adjacent the inner surface of the front cover 20 so that it wraps around and protects the distal edges of the sheet assemblies 11a, 11b and/or 11c, or could be inserted between any of the sheet assemblies 11a, 11b and/or 11c.

The book 10 further includes the optional feature of support sheets 24 (two are illustrated, however any number could be provided) having opposite major surfaces generally corresponding in size to the major surfaces of the sheet assemblies 11a, 11b, and 11c. Each of the support sheets 24 has a peripheral edge attached to the stack of sheet assemblies 11 a, 11b, and 11c by the layer 18 of padding compound, and has a coating such as the coating 22 described above, or is otherwise adapted to have one of the sheets 12 or 13 releasably adhered thereto after that sheet 12 or 13 is removed from one of said sheet assemblies 11a, 11b, or 11c as may also be desirable for storage and or display of that sheet 12 or 13 in addition to the display and/or storage afforded by the cover 20.

As is seen in Figure 4, the book 10 includes graphics 25 adapted to be colored on the front surfaces 14 of the sheets 12 or 13 of the sheet assemblies 11a, 11b, and 11c, which graphics would typically be different on each sheet 12 or 13.

The sheets 12 and 13 are generally of flat, flexible material including, but not limited to, plain or bond paper, clay coated paper, or layers of polymeric materials. The major surfaces of the sheets 12 and 13 can be of any size, one desirable size being about eight and one half inches by eleven inches.

Also, while the sheets 12 and 13 of the sheet assemblies can be entirely separate and attached together only by the layers of adhesive 16 as is illustrated by the sheet assembly 11a, optionally, as illustrated by the sheet assemblies 11b and 11c, the sheets 12 and 13 of each sheet assembly 11b or 11c can be attached together along adjacent peripheral edges 26 (See Figure 2) and 28 (see Figure 1) respectively. The sheets 12 and 13 can be folded along their joined peripheral edges 26 or 28 so that the sheets 12 and 13 in the sheet assembly 11b or 11c can be separated and unfolded to provide a double width sheet compared to the individual sheets 12 and 13. Alternatively, the sheets 12 and 13 of the sheet assemblies 11b and 11c can have paths of weakness along their joined peripheral edges 26 and 28

along which paths of weakness the sheets 12 and 13 can easily be separated. By "Path of weakness" we mean any weakening of the sheet material along a line that permits the sheets to fold or tear apart along that line while providing sufficient integrity so that the sheets do not separate along that line before they are intentionally separated. A suitable path of weakness can be provided by forming spaced perforations through the sheet, crushing the sheet, chemical treatment to reduce the thickness and/or the strength of the sheet, grooves formed by control-depth cuts, or the like.

Also, as illustrated in Figure 2, a portion 30 of each of the first sheets 12 adjacent one edge of the first sheet 12 in each sheet assembly 11a, 11b, or 11c extends past the adjacent edge of the second sheet 13 in that sheet assembly 11a, 11b, or 11c to provide means along one of its peripheral edges that facilitates manual separation of the sheets 12 and 13 in that sheet assembly 11a, 11b, or 11c by allowing a person to more easily engage and separate the edges of those sheets with his fingers.

If desired or needed to facilitate release of the layers 16 of adhesive, the sheet assemblies 11a, 11b and 11c illustrated in Figures 1 and 2 could have release coatings on the nonadhesive bearing areas of the rear surfaces 15 of the sheets 12 and 13, which release coatings could be in strips opposed to, parallel to, and slightly wider than the strips or layers 16 of adhesive, so that with the rear surfaces 15 of the sheets 12 and 13 face to face as illustrated in Figures 1 and 2, the layers 16 of adhesive will contact and will be generally centered on the release coatings.

Referring now to Figure 5 there is schematically illustrated a method according to the present invention for making and using the coloring book 10 illustrated in Figures 1 through 4. That method comprises the steps of (1) providing a plurality of the sheet assemblies 11a, 11b and/or 11c illustrated in Figures 1 through 3 and described above, which can be done by conventional paper handling and adhesive coating methods, (2) printing graphics adapted to be colored on the front surfaces 14 of the sheets 12 and 13 in the sheet assemblies 11a, 11b and 11c, which could be done by use of a conventional printing device 30 or, alternatively, for the sheet assemblies 11b and 11c, by using an office copy machine for which

there has been prepared an appropriate pattern sheet to be copied, (3) binding together corresponding ones of the peripheral edges of the sheet assemblies, which can be done using the "Padder" 32 and method described below, (4) coloring the graphics on one of the sheets, which as illustrated is being done manually by a person 34 while the sheet 12 or 13 is in the book 10, (5) separating the thus colored sheet 12 or 13 from the binding material 18, and (6) adhering the separated colored sheet 12 or 13 to a substrate 36 (e.g., the side of a refrigerator) to display it using the layers 16 of adhesive on its rear surface.

Alternatively, though not illustrated, the sheet 12 or 13 taken from the book 10 could be colored after, rather than before, it is separated from the book 10, in which case that separated sheet 12 or 13 could be adhered to a surface (e.g., a table top) while it was being colored, and then removed and adhered to the substrate 36.

The preferred method for binding the sheets assemblies 11a, 11b, and/or 11c, and any covers 20 and 21 and support sheets 24 that may be included into the book 10 includes using a hot melt padding compound such as that commercially designated "Glue Fast" hot melt padding compound, part No. GF5023C, commercially available from Glue Fast Equipment Co., Inc., Carlstadt, NJ. That padding compound can be applied to form the layer 18 by using the device commercially designated the "Kansa Corporation Padder, Model # KP-2824" commercially available from Kansa Corporation, Emporia, KS. The sheet assemblies 11a, 11b and/or 11b are compiled, along with any covers 20 and 21 and support sheets 24 to be included in the book 10 and are then fed into that padder which applies the layer 18 of padding compound along corresponding peripheral edges of the sheet assemblies 11a, 11b, and/or 11c , covers 20 and 21 and support sheets 24 to bind them together. Alternatively, the padding compound commercially designated "3M Latex Padding Compound, 3M I.D. # 98-0439-6211-1" commercially available from Minnesota Mining and Manufacturing Company, St. Paul, MN, may be used to bind the sheet assemblies 11a, 11b and or 11b and any covers 20 and 21 and support sheets 24 into the book 10 by stacking them, clamping them together with a C-clamp, and brushing multiple layers of the padding compound onto their peripheral edges along one side of the stack using a regular

paint brush, while allowing about 20 minute drying time between layers. The number of such layers necessary to bind the book 10 will depend on the thickness of the stack. Three to four layers of this compound has been found sufficient for a book 10 having a thickness of about one quarter inch.

The present invention has now been described with reference to one embodiment that illustrates many possible variations. It will be apparent to those skilled in the art that many changes can be made in the embodiment described without departing from the scope of the present invention. For example, as indicated above, the sheets could be printed with many different things other than graphics for a coloring book, or may have no printing at all, and the sheets could be of many different materials. Thus the scope of the present invention should not be limited to the methods and structures described in this application, but only by the methods and structures described by the language of the claims and the equivalents of those methods and structures.

Claims:

1. A book comprising:

a plurality of sheet assemblies having peripheral edges and each comprising first and second sheets each having major front and rear surfaces, and layers of pressure-sensitive adhesive in a predetermined pattern on the rear surface of each of said sheets, said pattern of pressure-sensitive adhesive on the rear major surface of each of said sheets contacting and being releasably adhered to the rear major surface of the other sheet only in nonadhesive areas, said sheet assemblies being disposed in a stack with said peripheral edges generally in alignment; and

means for binding together corresponding ones of said peripheral edges of said sheet assemblies.

2. A book according to claim 1 further including covers having opposite major surfaces generally corresponding in size to the major surfaces of said sheet assemblies, said covers being disposed on opposite sides of said stack of sheet assemblies and having peripheral edges attached to said stack of sheet assemblies by said means for binding.

3. A book according to claim 2 including a release coating on at least one of said surfaces of at least one of said covers to facilitate adhering one of said sheets thereto after the sheet is removed from one of said sheet assemblies.

4. A book according to claim 1 further including at least one support sheet having opposite major surfaces generally corresponding in size to the major surfaces of said sheet assemblies, said support sheet having a peripheral edge attached to said stack of sheet assemblies by said means for binding, and being adapted to have one of said sheets releasably adhered thereto after the sheet is removed from one of said sheet assemblies.

5. A book according to claim 1 wherein said adhesive is a low-tack pressure-sensitive adhesive and said nonadhesive bearing areas are free of release coating.

6. A book according to claim 5 wherein said low-tack pressure-sensitive adhesive comprises tacky, elastomeric copolymer microspheres.

7. A book according to claim 1 further including a release coating on said nonadhesive bearing areas.

8. A book according to claim 1 wherein said sheets of at least some of said sheet assemblies are attached together along adjacent peripheral edges.

9. A sheet assembly according to claim 1 wherein said sheets are attached along adjacent peripheral edges and have a path of weakness along said joined peripheral edges along which the sheets can be separated.

10. A book according to claim 1 further including graphics adapted to be colored on the front surfaces of at least some of said sheets.

11. A book according to claim 1 wherein said means for binding together corresponding ones of said peripheral edges of said sheet assemblies comprises a layer of padding compound by which said sheet assemblies are releasably adhered together in said stack.

12. A book according to claim 1 wherein said means for binding together corresponding ones of said peripheral edges of said sheet assemblies comprises a layer of padding compound by which said sheet assemblies are releasably adhered together in said stack.

13. A book according to claim 1 further including indicia on the front surfaces of at least some of said sheets.

14. A book according to claim 1 wherein at least some of said sheets are of polymeric material.

15. A method for making a book comprising the steps of:

providing a plurality of first and second sheets each having major front and rear surfaces, and layers of pressure-sensitive adhesive in predetermined patterns on the rear surfaces of the sheets;

releasably adhering the layers of pressure-sensitive adhesive on the rear surfaces of the first sheets to the rear surfaces of the second sheets and the layers of pressure sensitive adhesive on the rear surfaces of the second sheets to the rear surfaces of the first sheets only in nonadhesive bearing areas to form a plurality of sheet assemblies having peripheral edges; and

binding together corresponding ones of said peripheral edges of said sheet assemblies.

16. A method according to claim 15 further including steps for using the book comprising:

separating one of said sheets from the binding material; and

adhering the separated one of said sheets to a substrate.

17. A method according to claim 15 further including the step of printing graphics on the front surfaces of the sheets.

18. A method according to claim 15 further including the step of manually applying indicia on the front surfaces of the sheets.

19. A method according to claim 15 further including the step of printing graphics adapted to be colored on the front surfaces of the sheets so that said book is a coloring book.

20. A method according to claim 19 further including steps for using the coloring book comprising:

coloring the graphics on one of said sheets

separating said one of said sheets from the binding material; and

adhering the separated one of said sheets to a substrate.

21. A method according to claim 20 wherein said coloring step is performed before said adhering step.

22. A method according to claim 20 wherein said coloring step is performed after said adhering step.