United States Patent [19]

Smolen

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[54] **ARTICLE FOR APPLYING REGISTER OR INDEX MARKS AND METHOD OF USING THE SAME**

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[21] Appl. No.: **525,074**

[52] **U.S. Cl.** **156/234;** 96/43; 101/DIG. 12; 156/235; 156/239; 156/240; 156/247; 156/254; 427/147; 427/152; 428/198; 428/201; 428/204; 428/343; 428/354; 428/914

[51] **Int. Cl.**[2]... **B32B 3/16;** B41M 3/12; B44C 1/16

[58] **Field of Search** ..... 96/43 CL; 101/DIG. 12; 117/3.1-3.6; 156/234, 235, 239, 240, 247, 254; 161/167, 406, 406 T, 413, 148

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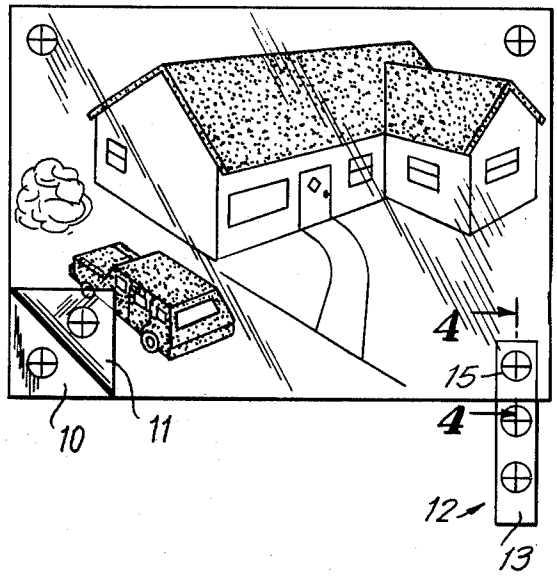
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[57] **ABSTRACT**

The present invention relates to an article for applying register or index marks to superimposed sheets in precise registration on the sheets. More specifically, the article comprises a carrier sheet, the opposed surfaces of which have been provided with one or more pairs of register or index marks, the marks of each pair being precisely aligned on the opposite faces of the carrier sheet. The marks are preferably composed of dry transfer indicia, known per se. The invention relates further to a method of applying the indicia to superimposed sheets.

5 Claims, 8 Drawing Figures



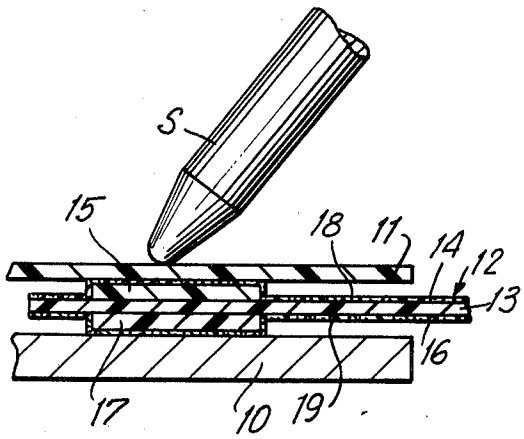


FIG. 1

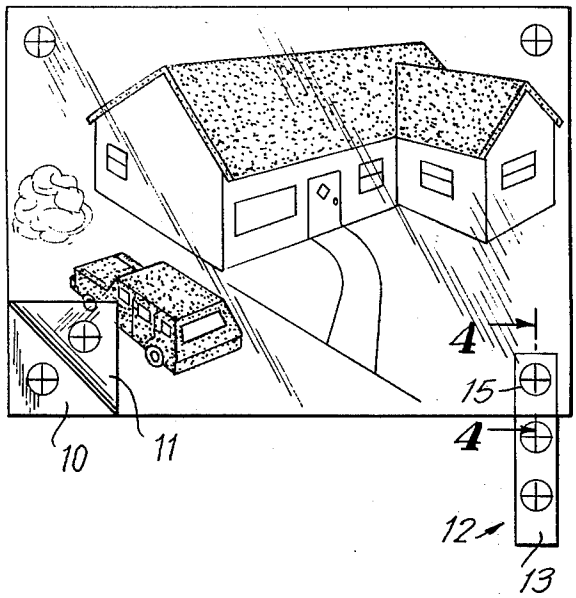


FIG. 2

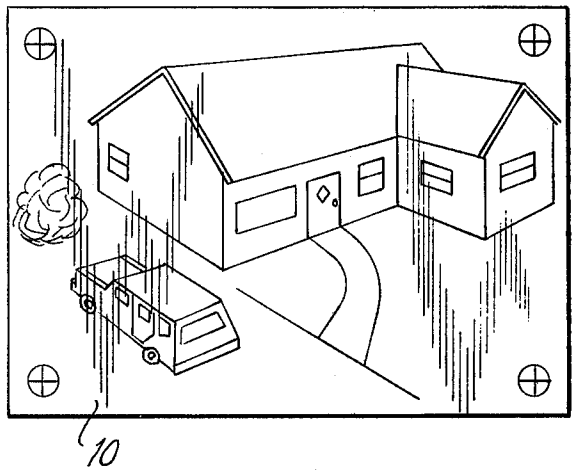


FIG. 4

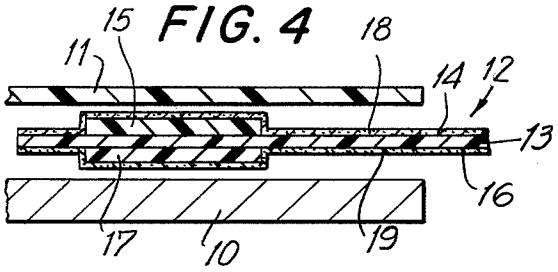


FIG. 3

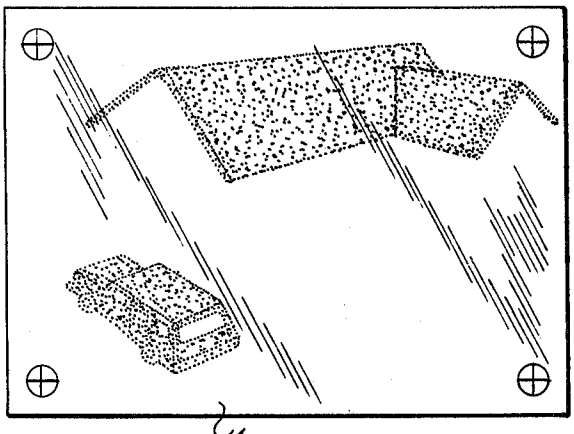


FIG. 5

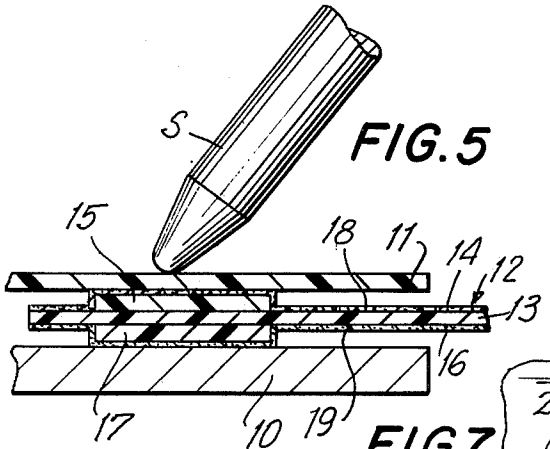


FIG. 7

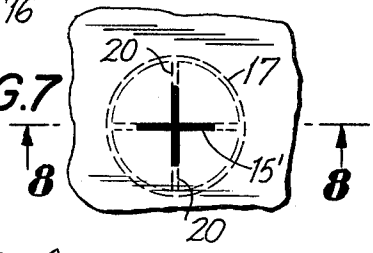


FIG. 8

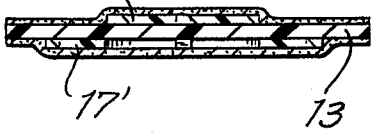
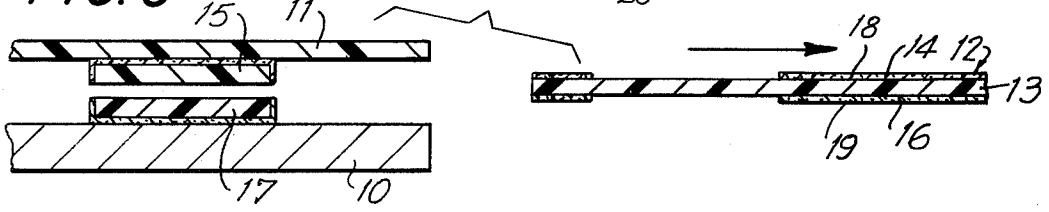


FIG. 6



ARTICLE FOR APPLYING REGISTER OR INDEX MARKS AND METHOD OF USING THE SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention is directed to an article for affixing register marks to superimposed sheets in precise registry on the sheets.

2. The Prior Art

In certain fields of engineering, architecture, illustration, design and engraving, artistic and like representations are frequently made on two or more superimposed sheets while the same are in fixed position relative to each other, portions of the design executed on one sheet bearing a predetermined positional relationship to other portions of the design on a superimposed sheet.

By way of example, in the making of a two color engraving, portions of the engraving to appear in one color may be drawn on an underlying sheet. Thereafter a transparent sheet is fixed in position over the underlying sheet and other portions of the design are executed on the transparent sheet at selected positions with respect to the underlying sheet. The outlines of a house, for example, may be drawn on the under sheet and a roof, to be reproduced in a different color, may be drawn on the transparent covering sheet.

According to standard practice, the sheets are thereafter separated and first and second engraving plates made therefrom, which plates are used to form sequential images in the production of the finished two color representation. Obviously, the images formed by the printing mechanism must be precisely located relative to each other to prevent objectionable fringing, blurring and the like.

In order to assure the desired registration, the images must be accurately located with respect to the individual plates. In order to facilitate such location, the present practice calls for the artist or designer, after completion of the design on the underlay and on the overlaid transparent sheet or sheets, to place aligned index marks on the successive sheets. The sheets are then separated and photographed. In order to establish between the photographs or the engravings formed therefrom a positional relationship corresponding to that of the sheets when overlaid, use is made of the index marks appearing on the photographs since it is far easier to align the index marks than to attempt to align the images without the benefit of such marks.

Heretofore, the positioning of index marks on the sheets has proven to be a time-consuming operation and has introduced substantial inaccuracies into the finished product. The method customarily employed has been to mark an under layer with a plurality of index marks, typically by the use of a dry transfer method, the marks of course being applied to areas not carrying significant elements of the design. Thereafter, to apply registering index marks to a superimposed transparent sheet bearing other design components, it has been necessary meticulously to align a second transfer sheet over the transparent sheet in such manner that an index mark of the transfer sheet is as close as possible in registry with an index mark of the under layer. The transfer sheet is then activated to cause a mark to be deposited on the transparent layer.

It will be readily recognized that positioning the secondary index mark with the requisite accuracy is a laborious operation, especially considering the fact that the transfer sheets are not completely transparent but tend to be translucent. Since it is typical to apply four or more index marks to each sheet, the delicate and time-consuming positioning process is multiplied many fold.

Additionally, errors in positioning occur notwithstanding the most meticulous attention to detail.

SUMMARY

The present invention may be summarized as relating to an article for placing index marks in precise registration on superimposed sheets with a minimal expenditure of time.

The invention more particularly comprises a carrier or transfer sheet, the opposed faces of which bear index or register marks printed in precise alignment with each other. The register marks are preferably of the dry transfer type which are released from the transfer sheet to the sheet engaging the register mark in response to pressures such as, for example, may be supplied by rubbing a stylus across the surface of the sheets.

The article is used by simply placing the carrier sheet having register marks on its opposed faces between two properly positioned superimposed sheets, and rubbing the uppermost sheet, whereby an index mark is transferred downwardly to the under sheet and upwardly to the upper sheet, the transferred marks of course retaining the precise alignment which they possessed on the carrier or transfer sheet.

The procedure is merely repeated until the required number of index or register marks have been applied.

Where more than two sheets must be aligned, the procedure is repeated between successive pairs of sheets to be marked.

It is accordingly an object of the invention to provide an article for transferring register marks in precisely aligned position on superimposed sheets.

A further object of the invention is the provision of a transfer article comprising a carrier sheet having on its upper and lower surfaces one or more pairs of precisely registering index marks whereby a pair of registering marks may be simultaneously transferred, respectively, upwardly to an overlying sheet and downwardly to an underlying sheet.

A further object of the invention is the provision of a method for applying index marks to a pair of superimposed sheets without the necessity for manually aligning the mark of an upper sheet with the mark formed on a lower sheet.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, reference is made to the accompanying drawings, forming a part hereof, in which:

FIG. 1 is a plan view of a composite design, portions of which are formed on an underlay and portions of which are formed on a superimposed sheet;

FIGS. 2 and 3 are plan views, respectively, of the underlay sheet and the overlay sheet, depicting individually the design components formed on each of the sheets;

FIG. 4 is a magnified section taken on the line 4—4 of FIG. 1;

FIG. 5 is a section similar to FIG. 4 showing the position of the parts in the course of transfer;

FIG. 6 is a view similar to FIG. 5 at a further stage of the transfer process;

FIGS. 7 and 8 are, respectively, fragmentary plan and sectional views of an embodiment of the invention.

Turning now to the drawings, in FIG. 1 there is shown, by way of example, a composite scene, parts of which have been reproduced on a base sheet 10 and other parts of which have been produced on a transparent overlay sheet 11, such as an acetate sheet. In the formation of the composite design, a sketch or other artistic representation is typically executed on the base sheet 10.

The overlay sheet 11 is thereafter taped or otherwise fixed in position over the base sheet, whereupon additional drawings may be made on the sheet 11, with the base sheet 10 fully visible therethrough. Thus, as will be evident from comparing FIGS. 2 and 3, outlines of the house and automobile components are seen in the base sheet of FIG. 2, whereas in FIG. 3 portions of the roof and automobile, which are to appear in contrasting color, are shown as they would appear after the acetate sheet has been removed from the base sheet.

In the practice of a number of reproduction processes, details of which need not be mentioned since they are well known, the sheets must be separated, individually photographed, and thereafter the photographs, engravings, plates or the like formed from the photographs accurately positioned relative to each other for subsequent manufacturing steps.

As noted above, it is conventional to apply to the individual sheets register marks which greatly facilitate the subsequent location of the reproductions of the sheets. The difficulties of accurately locating register marks on succesive sheets to ensure their subsequent precise superimposition have been discussed in detail. The present invention achieves location of register marks on successive sheets in an extremely simple manner.

In accordance with the invention, there is provided a transfer sheet 12 comprising a carrier 13 bearing on its upper surface 14 a first register mark 15, and on its under surface 16 a second register mark 17, the register marks 15 and 17 being mechanically imprinted or otherwise applied to the carrier 13 in precise registry with each other. The register marks 15 and 17 preferably comprise dry transfer indicia.

Since the formation of dry transfer sheets is known per se, as for example in accordance with U.S. Pat. Nos. 1470,066; 2233,791; 2235,514; 2408,147; 3013,917; 3212,913; 3275,465; 3294,612, and perhaps others, a detailed description of the transfer sheet and method of fabricating the same is not believed necessary. It is sufficient to note that the faces 14 and 16 of the carrier sheet 13 are typically coated with a release agent, such as Quillon; that the indicia 15 and 17 are imprinted over the Quillon surface, said indicia typically being formed of opaque film forming materials having a light bonded affinity for the release coated surfaces of the carrier.

Thereafter, thin layers 18, 19 of adhesive, preferably of the low tack, pressure activated type, are disposed over the surfaces 14, 16 of the carrier and over the film forming the indicia 15, 17. It is the nature of the adhesive layers 18, 19, which may comprise microcrystalline wax, that they have an initial low tack whereby they may be moved relative to the surface to which the adhesive contact is to be effected without sticking to the surface, the adhesive being activated to effect a tenacious bond by burnishing.

In FIGS. 4 and 5, the transfer device 12 is shown positioned between the base sheet 10 and the transparent overlay 11. As shown in FIG. 5, a stylus S is rubbed back and forth across the surface of the overlay sheet 11, whereby the transfer sheet is compressed between the sheets 10 and 11, a work surface (not shown) underlying the base sheet 10. Manipulation of the stylus S activates the adhesive layers 18, 19 in registry with the indicia 15 and 17 (the stylus S having been rubbed across the surfaces preferably in approximate registry with the indicia). As a result of activation of the adhesive layers, a firm bond is formed between the adhesive and the sheets 10 and 11.

The adhesive material is selected to be strongly adherent to the sheets 10 and 11 and to the indicia 15 and 17. Since the indicia are only lightly bonded to the release coated carrier 13, the indicia 15, 17 become attached to the sheets 10, 11, respectively, release of the indicia from the carrier being effected as a result of preferred adhesion to the sheets 10, 11 (wherein the bond between the adhesive and the sheets 10 and 11 is stronger than the connection between the indicia and carrier) or as a result of rupture of the bond between the indicia and carrier in the course of burnishing.

As seen in FIG. 6, after rubbing, the transfer sheet 12 may be removed, leaving indicia 15 and 17 precisely superimposed on sheets 10 and 11, respectively.

It will be readily recognized that the transfer sheet may be comprised of a multiplicity of superimposed pairs of transferrable indicia which may be applied to the superimposed sheets as required.

In accordance with a modification of the invention shown in FIGS. 7 and 8, wherein like parts have been given like reference numerals, the indicia appearing on opposite faces of the carrier sheet are not identical but are related.

As shown in FIG. 7, the indicium 15′ on the upper faces of the carrier sheet 13 comprises an "X", whereas the indicium 17′ (shown in dash lines) comprises a circle having inwardly extending radial bars 20 leading into the arms of the X.

After activation of the transfer by the stylus, the X will clearly appear on the upper or transparent sheet and the circle and bars will clearly appear on the under layer, whereby, following subsequent manufacturing steps, the sheets bearing the indicia may be positionally coordinated by aligning the X and the bars.

The embodiment of FIGS. 7 and 8 has the advantage that, upon operation of the stylus, only a single layer of the opaque film forming material is sandwiched between the over layer sheet 11 and the base sheet 10, as opposed to double layers of film forming indicia in the embodiment of FIGS. 1 to 6.

From the foregoing description it will be evident that there is provided a transfer article adapted simultaneously to deposit on two superimposed, prepositioned sheets, register marks or indicia which will enable the sheets or photographs or engravings formed from the sheets to be readily positionally coordinated.

The invention contemplates the possibility of providing still a further transfer sheet layer carrying further indicium or indicia which register with the indicia of the first transfer sheet, whereby a double layered transfer sheet may be interposed between three sheets which must be subsequently relocated, i.e. a base sheet and two transparent over layers, whereby utilization of the stylus may simultaneously deposit indicia on three

sheets. By proper coordination of the indicia of the two transfer layers, the marks formed on all three sheets may be in precise registry.

Having thus described the invention and illustrated its use, what is claimed as new and is desired to be secured by Letters Patent is:

1. An article for applying index marks in precise alignment on a superimposed pair of receiver sheets comprising, in combination, a carrier sheet, the opposed surfaces of which have high release properties, a first index mark on the front face of said sheet, a second index mark on the rear face of said sheet, said first and second index marks being disposed in precise coordinated position with each other and being comprised of coherent, solid, opaque films releasably bonded to said sheet, and pellucid adhesive layers on said front and rear surfaces, said layers covering at least said index marks and areas of said surfaces surrounding said marks, said adhesive being of the type having an initial low tack which is rendered highly adherent responsive to localized high pressure, the bond between said adhesive and said index marks being substantially greater than the bond between said marks and said carrier sheet, whereby when said article is disposed between two superimposed receiver sheets and the area of said sheets in registry with said index marks of said article is subjected to localized pressures, said index marks are transferred from said carrier sheet to the facing surfaces of said receiver sheets.

2. An article in accordance with claim 1 wherein said carrier sheet is pellucid.

3. An article in accordance with claim 2 wherein said coordinated index marks, when superimposed, define together an integral pattern, elements of said pattern being formed by one said index mark, and other elements of said mark being formed by the other said mark.

4. The method of applying to each of two superimposed sheets, at least one of which is pellucid, an index mark, said marks being disposed in precise registry, comprising the steps of interposing between said superimposed sheets a transfer sheet having on the opposed surfaces thereof pressure releasable index marks, said marks on said transfer sheet being in precise registration, and thereafter subjecting said superimposed sheets, with said transfer sheets therebetween, to localize pressures, thereby to cause said index marks to be released from said carrier and adhesively connected to said superimposed sheets in the same relative positional relationship which they occupied on said transfer sheet.

5. An article for applying index marks in precise alignment on a superimposed pair of receiver sheets comprising, in combination, a carrier sheet, a first index mark on said sheet, first adhesive means on said sheet for operatively connecting said first index mark to a said receiving sheet, a release coat on said carrier sheet, a second index mark in precise registry with said first index mark and releasibly bonded to said release coat, said second index mark comprising a coherent, solid, opaque film, second adhesive means covering said second index mark and portions of said release coat surrounding said mark, said second adhesive means being of the type having an initial low tack which is rendered highly adherent responsive to localized high pressure, the bond between said second adhesive means and said second index mark being substantially greater than the bond between said second index mark and said release coat, whereby when said article is disposed between two superimposed receiver sheets and the area of said sheets in registry with said index marks is subjected to localized high pressure, said first mark is secured to one said receiver sheet by said first adhesive means and said second mark is released from said coat and secured to said other receiver means by said second adhesive means.

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