United States Patent [19]

Mascolo, deceased

[11] **3,857,192**

[45] **Dec. 31, 1974**

[54] **DISPLAY DEVICE**

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[21] Appl. No.: **340,327**

[52] **U.S. Cl.** ..... **40/158 R**

[51] **Int. Cl.** **G09f 1/10**

[58] **Field of Search** ..... 40/158 R, 125 A, 158 B, 40/104.18

[56] **References Cited**

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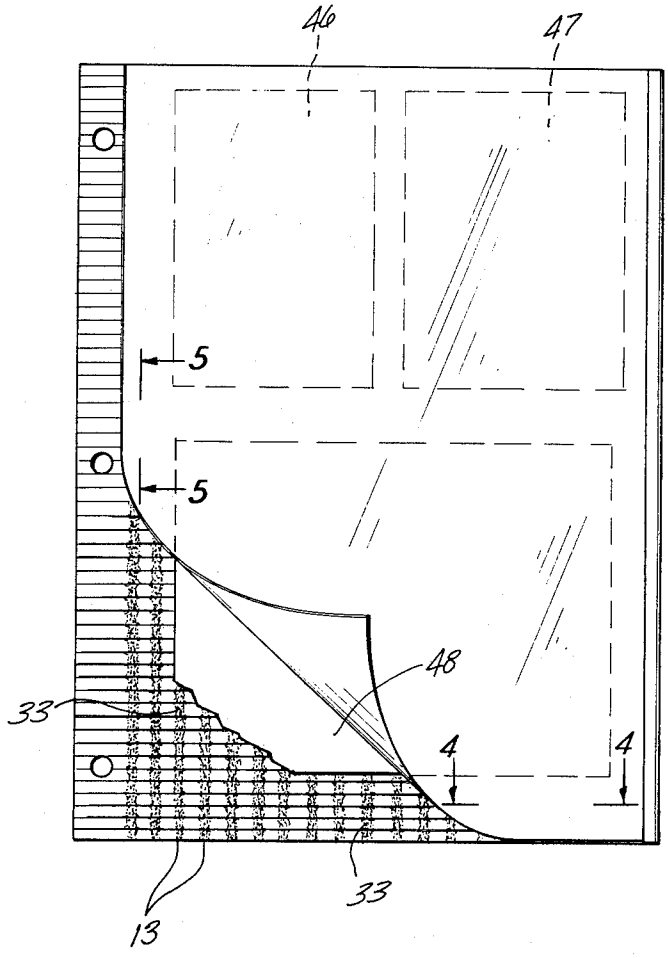
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Assistant Examiner—Wenceslao J. Contreras
Attorney, Agent, or Firm—Robert H. Bachman

[57] **ABSTRACT**

A display device including a backing sheet and a co-operating transparent, flexible protective cover for releasably mounting mementos such as pictures, news-clippings, postcards and similar articles, and a method of manufacturing said device.

8 Claims, 6 Drawing Figures



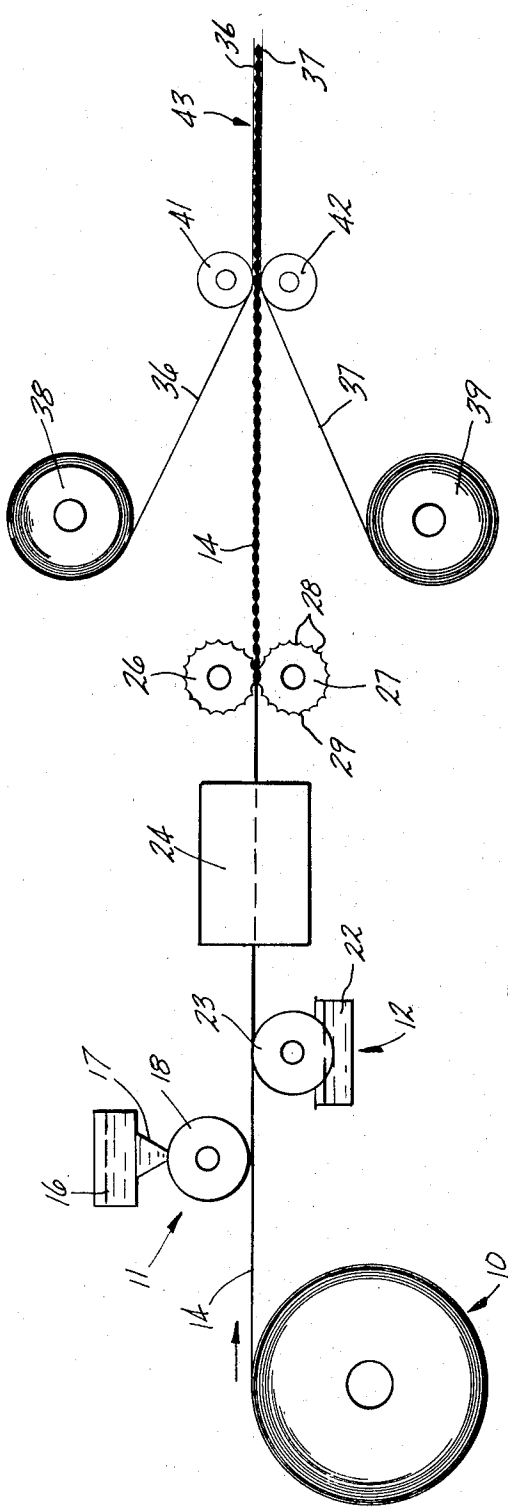

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FIG - 1

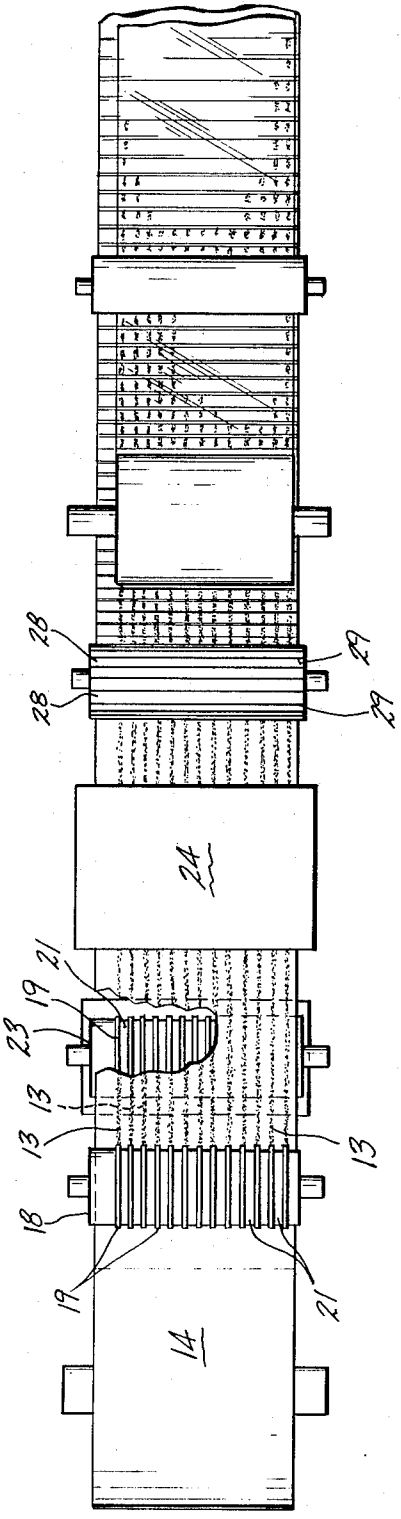

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FIG - 2

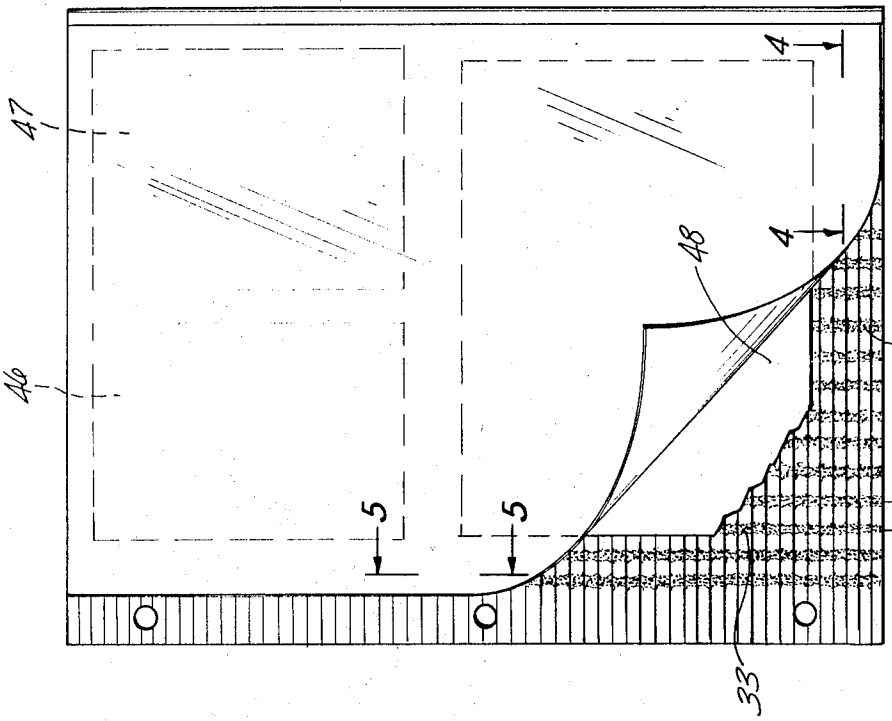


FIG-3

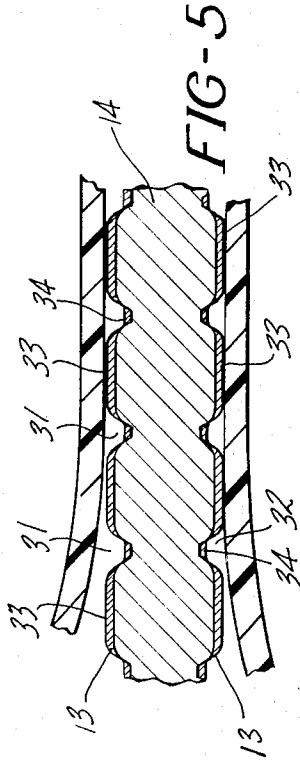


FIG-5

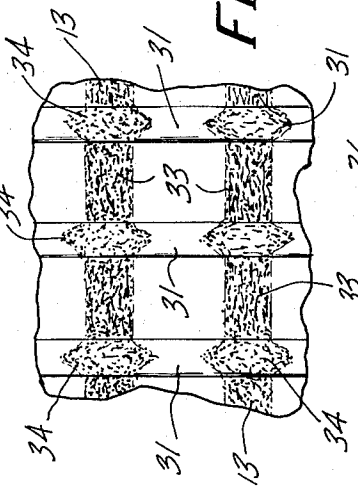


FIG-6

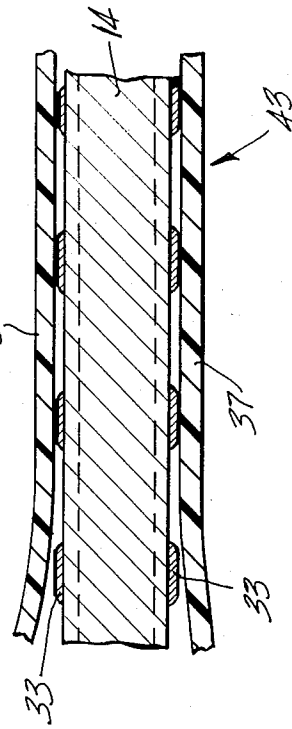


FIG-4

DISPLAY DEVICE

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to display devices of the type having a releasable transparent film fixed to a backing board by means of a pressure sensitive adhesive useful to mount items such as pictures, newsclippings, name cards and similar articles.

The invention also relates to a method of fabricating a display device so as to render the protective film releasable from the backing board by manually peeling the film from the board in virtually any direction without risking mutilation or deformation of the board, film or pressure sensitive adhesive.

The terms "board" or "backing board" as used herein, are intended to include paper board, paper sheet or plastic sheet.

2. Description of the Prior Art

Relative prior art devices and processes are disclosed and described in U.S. Pat. Nos. 3,581,423 and 3,670,434 and in references cited in said patents.

In prior art devices, particularly those in which the pressure sensitive adhesive has been laid down on the backing board in a pattern generally defining continuous spaced generally parallel lines, it is necessary that the user initiate the transparent film peeling operation in a particular direction, i.e. in a direction which is generally parallel or at least in a direction which forms an acute angle with the lines of adhesive in order to avoid deformation of the protective film or to avoid picking up the adhesive from the board thereby marring or detracting from the transparency of the film.

In prior art devices this problem is frequently solved by using relatively heavy gauge expensive films.

SUMMARY OF THE INVENTION

Accordingly, it is a particular object of the present invention to provide a novel display device including a sheet of board and a cooperating sheet of the flexible, thin, transparent film releasably attached to the board by means of pressure sensitive adhesive where the film can be peeled manually from the board from any direction without risk of damage to the transparent film, the board or the adhesive.

It is a further object of the invention to provide a display device of the class described which is operative without damage when utilizing very thin transparent films, i.e. having a thickness ranging from 0.0015 to 0.005 inches.

Another object of the invention is a provision of a display device including a layer of board, a pattern of pressure sensitive adhesive disposed on the board and at least one cooperating releasable layer of thin, flexible transparent film where the film can be released and reapplied to the board without causing the board to curl or to take up an arcuate set when in the composite condition.

Stated otherwise, there is no limitation to the number of times that the film may be manually released and reapplied to the board, nor is there any limited direction from which peeling is initiated in releasing the film from the board.

A representative embodiment of the display device of the present invention may comprise a base sheet or board, at least one layer of thin, flexible, transparent film and pressure sensitive adhesive carried by the board for releasably retaining said film compositely with the board, said pressure sensitive adhesive being dispersed on the board so as to define a plurality of operative adhesive points or dots and plurality of inoperative adhesive points or dots.

A process embracing certain features of the invention and operable to produce the novel display device may comprise the steps of continuously advancing a sheet of paper board, applying to the surface of the board pressure sensitive adhesive in continuous lines generally parallel to the direction of advance of the board, drying the board and the adhesive to eliminate volatiles and unnecessary solvents, continuously deforming the board and the adhesive to create a plurality of depressions or grooves in the board and in the adhesive lines so that said grooves intersect said continuous lines of adhesive, said deforming steps being effective to create a group of offset adhesive points or dots on the surface of the board, a first group of which are co-planar and operative, and a second offset group of which are co-planar and inoperative.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advances of the present invention will become more apparent after an examination of the following specification when read in conjunction with the appended drawings, in which:

FIG. **1** is a side elevation of apparatus operable to practice the process steps to produce the display device of the present invention;

FIG. **2** is a plan view of FIG. **1**;

FIG. **3** is a plan view of the display device with the flexible film partially released or peeled from the board;

FIG. **4** is a vertical section of a portion of the display device of FIG. **3**, somewhat enlarged, along the line indicated by the numerals **4—4**;

FIG. **5** is a similar section of the display device as viewed along the line labelled **5—5** in FIG. **3**;

FIG. **6** is a plan view, somewhat enlarged, of a segment of the board showing in detail the disposition of adhesive and the appearance of the board after the grooving step.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings and in particular FIGS. **1** and **2** reference numeral **10** denotes a supply of paper board, paper sheet or plastic sheet advancing in the direction shown by the arrow through adhesive applicators **11** and **12** operable to apply continuous parallel lines **13—13** of pressure sensitive adhesive to the top and bottom sides of board **14**.

In conventional fashion adhesive pot **16** transfers adhesive to smooth roll **17** which in turn transfers adhesive to mating roll **18** and thence to the board **14**.

As is most apparent in FIG. **2**, roll **18** is formed with a plurality of lands **19** with intervening grooves **21** effective to lay down or print continuous lines of adhesive **13—13**.

Adhesive pot **22** transfers adhesive to grooved roll **23** in similar fashion to produce continuous lines of adhesive on the bottom side of board **14**.

The reference numeral **24** denotes a heating or drying station which operates to eliminate undesirable volatiles and liquids from the adhesive to bond the adhesive to the board and to render the adhesive pressure sensitive in well-known fashion.

Thereafter the board **14** traverses between a pair of nip rolls **26–27**; each roll **26–27** is formed with lands **28—28** and intervening grooves **29—29** both of which extend generally parallel to the axes of the nip rolls effective to deform the top and bottom sides of the board **14** and the corresponding glue lines **13—13** effective to form grooves **31—31** and **32—32** intersecting lines of adhesive as is most apparent in FIGS. **5** and **6.**

As a result of the grooving step each surface of board **14** is formed with operative groups of adhesive points **33** and offset inoperative glue points **34.** Note that the operative adhesive points **33—33** of a given side of the board **14** are generally co-planar and the inoperative adhesive points **34—34** are also co-planar but offset.

The virtue in practicing the grooving step after the application and curing of the adhesive resides in the ability to control the disposition of the adhesive to create interruptions in the glue lines and avoiding uncontrolled flow of expensive adhesive which would otherwise occur if the adhesive were applied after the grooving step.

Thereafter thin, flexible transparent film **36–37** supplied by rolls **38** and **39** are married to or combined with grooved board **14** as the board and film pass through nip rolls **41** and **42** to create a composite structure indicated generally by the reference numeral **43.** The composite structure comprises two layers of flexible film **36** and **37** with the board **14** sandwiched between the film and releasably adhered by the pressure sensitive adhesive.

As is well-known in the art, the composite structure may thereafter be continuously cut and perforated in any fashion or to any dimension desired utilizing conventional machinery and process steps.

Referring now in detail to FIGS. **3, 4, 5** and **6** note that grooves **31—31** intersect adhesive lines **13—13** to create a group of operative adhesive points **33—33** which are co-planar and their plane is offset from a plane defined by a group of inoperative, co-planar adhesive points **34—34.**

Note further that the grooving step accomplished by the serrated nip rolls **26–27** effects a controlled and uniform spread of adhesive within the grooves **31—31** to develop a controlled pattern of operative adhesive points, and more particularly, a controlled pattern of inoperative adhesive points as is most apparent in FIG. **6.**

Thus, the display device of the present invention offers a uniform dispersion of adhesive because of the checkerboard nature of the developed pattern making it possible to peel the releasable film from the board from virtually any direction with no risk of damage to the board, adhesive or film. The film can be peeled and re-applied repeatedly, as desired, in the course of arranging items such as the photos **46, 47** and **48** on the display device.

The process steps of the invention, practiced in the sequence recited, facilitate use of high speed production machinery while affording ideal control of adhesive spread in that the grooving step occurs after the adhesive is cured.

In summary, the device and process of the present invention have the following advantages:

1. High speed production.
2. Multi-directional film peeling.
3. No risk of deformation of film.
4. No pick-up of adhesive by film.
5. No stretching or creasing of film.
6. Unlimited repetitive release and re-application of film relative to board.
7. No danger of rendering board arcuate upon manual re-application of film.

In a given side of board it is preferred that the area covered by adhesive range from 25 to 35% of the total area of the board and that the total area of operative adhesive points range from 75 to 85% of the area covered by adhesive.

Obviously, the display device and the method of manufacture contemplate using both sides of a given board.

What is claimed is:

1. A composite sheet consisting essentially of a layer of board having two sides and at least one layer of flexible, transparent film, said film being releasably adhered to a first side of the board by a plurality of lines of pressure sensitive adhesive, said lines of adhesive being intersected by a plurality of grooves formed in the board and formed in the adhesive lines effective to create a plurality of operative adhesive points and a plurality of inoperative adhesive points, wherein the operative adhesive points are co-planar in a first plane and the inoperative adhesive points are co-planar within a second plane offset from the first plane, and wherein said inoperative adhesive points form a controlled and uniform spread of adhesive within said grooves extending beyond said operative adhesive points and said operative adhesive points form a controlled and uniform pattern.

2. The composite sheet of claim **1** in which the operative and inoperative adhesive points define a checkerboard pattern.

3. The composite sheet of claim **1** in which the board area covered by adhesive ranges from 25 to 35% of the total board area.

4. The composite sheet of claim **1** in which the total area of the operative adhesive points ranges from 75 to 85% of the total board area covered by adhesive.

5. The composite sheet of claim **1** in which both sides of the board are formed with operative adhesive points and inoperative adhesive points.

6. The composite sheet of claim **5** wherein a layer of said film is releasably adhered to both sides of the board by said adhesive.

7. The composite sheet of claim **1** in which the grooves intersect the adhesive lines at right angles.

8. The composite sheet of claim **1** wherein said film has a thickness from 0.0015 to 0.005 inch.

* * * * *