Oct. 7, 1952 L. BAKER 2,612,711

CARD STRUCTURE AND METHOD OF MAKING SAME

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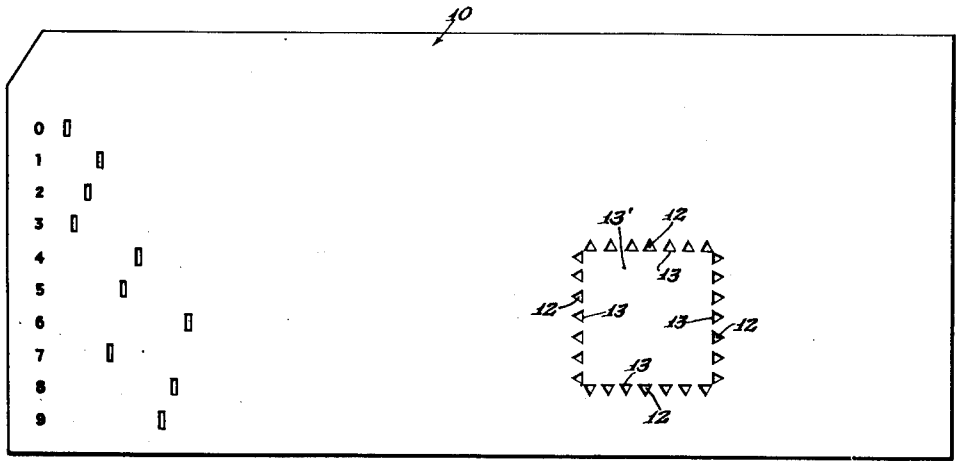


FIG. 1.

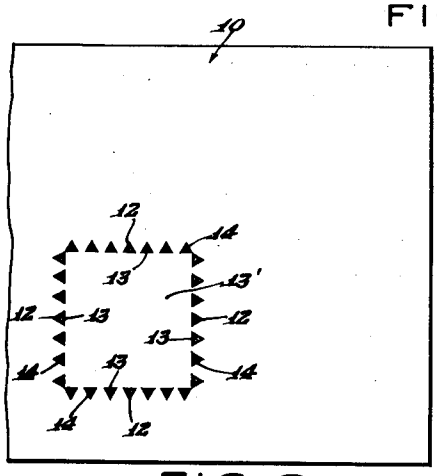


FIG. 2.

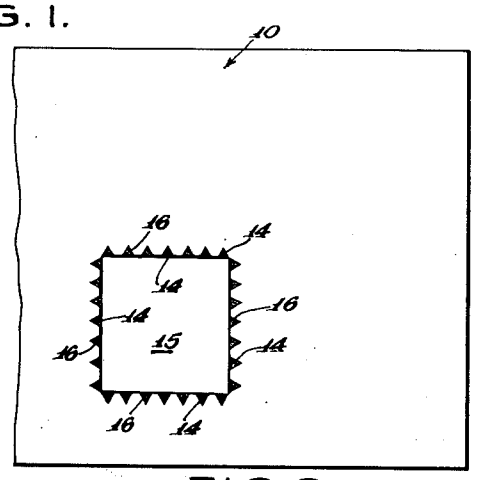


FIG. 3.

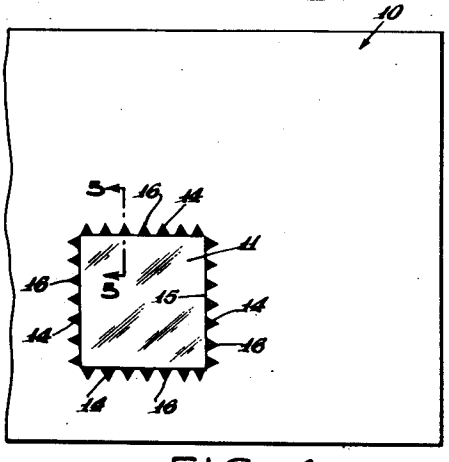


FIG. 4.

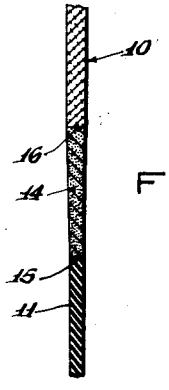


FIG. 5.

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CARD STRUCTURE AND METHOD OF MAKING SAME

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11 Claims. (Cl. 40—158)

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This invention relates to a card structure and the method of making the same.

One of the objects of the present invention is to provide a novel construction wherein a record sheet or insert, such as a micro-film, photograph or the like, is mounted in a statistical or other record or catalogue card, whereby the same may be conveniently filed and indexed, classified and sorted as to subject matter, projected and viewed, or otherwise employed.

Heretofore, it has been proposed to mount film sections or other transparencies for filing, classifying, sorting and other purposes by employing a card having an aperture therein to receive the film section, and adhesively securing said film section to a transparent or opaque adhesive coated sheet which is secured to one surface of the card and extends across the aperture. In the case of an opaque adhesive sheet the latter is provided with an opening smaller than the card aperture to expose a portion of the film section and permit light to be transmitted therethrough. It also has been proposed to employ a transparent or translucent adhesive sheet having an opening therein smaller than the card aperture to facilitate the transmission of light through the film section, and to utilize a card having an aperture therein and an embossed recess in one surface thereof surrounding said aperture, in which recess the film or adhesive sheet may be placed and secured so that the outer surface of said film or sheet is even with or slightly below the surface of the card.

These prior structures have the disadvantages that they are expensive and difficult to manufacture and require expensive machinery; and there is no assurance that the embossed recess in the card will remain its original depth to maintain the film or adhesive sheet therein below the surface of the card for sufficiently long periods regardless of weather and storage conditions. Inserts which project beyond the surface of the cards are apt to be torn from said cards in the handling thereof, and they interfere with the proper filing of the cards and proper machine or other handling of the same for perforating or punching, classifying and sorting, projecting and viewing, or other purposes. Additionally, a portion of useful film area is lost when an opaque or died-out adhesive sheet is employed due to the rim of said sheet projecting inside the aperture of the card.

It is accordingly another object of the invention to overcome the above mentioned disadvantages by providing an improved and simple structure which may be easily and inexpensively produced and wherein the film or other record sheet is secured within an aperture in a card without the aid of an adhesive coated sheet or an embossed recess in said card.

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Another object is to provide a record or other card structure having a film section or other record bearing strip mounted in an aperture therein in a novel manner, whereby said card is satisfactory with respect to machine handling and may be employed in connection with known and existing record card handling machines.

Another object is to provide a novel card structure having an aperture therein and a transparency, such as micro-film, secured within said aperture solely by an adhesive.

A further object is to provide a novel method of mounting a film section or other record bearing strip in a record or other card, whereby the card structure is not only materially simplified, but may be made in quantities and supplied to users thereof in a prepared form ready for mounting of the film section therein in a relatively simple manner.

A still further object is to provide for use in mounting a transparency, such as micro-film, a record or other card structure having a series of openings therein arranged in a closed pattern conforming to the peripheral contour of the film, each of said openings containing a quantity of an adhesive substance in a dry non-tacky non-flowable solid state.

Another object is to mount a transparency, such as micro-film, in a record or other card structure by providing the latter, around an aperture therein for receiving said transparency, with a series of spaced notches which open into said aperture and are filled with an activatable adhesive substance in a dry non-tacky non-flowable solid state, activating said adhesive substance and simultaneously applying pressure thereon to cause the same to flow from said notches into bonding contact with the peripheral edge of the transparency disposed within said aperture.

The above and further objects and novel features of the present invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is for the purpose of illustration only and is not intended as a definition of the limits of the invention.

In the drawing, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a face view of one form of card embodying the present invention and showing the same in its first stage of development;

Fig. 2 is a fragmentary face view of said card and showing the same in its second stage of development;

Fig. 3 is a view similar to Fig. 2, but showing the card in its third stage of development;

Fig. 4 is a view similar to Figs. 2 and 3, but showing the card in its final stage of development with the transparency or micro-film mounted therein; and

Fig. 5 is an enlarged fragmentary section on the line 5—5 of Fig. 4.

The present invention is herein illustrated and described as embodied in a statistical or tabulating card of the IBM type whereby transparencies, such as micro-films, affixed to such cards may be machine classified as to subject matter in accordance with a particular code by perforations in said cards as well understood in the tabulating machine art, and automatically sorted under the control of said perforations in known and existing IBM record card sorting machines. However, this is to be considered as illustrative only of one form of card with which the present invention may be used because it may also be embodied in marginally punched cards of the McBee type and commercially known as "Keysort" cards, as well as in other forms of record and catalogue cards, and ordinary cards for various purposes. The invention also comprehends the mounting of photographs, as well as other opaque, translucent and transparent sheets.

Referring to the drawing, 10 indicates an oblong single ply card which is formed of cardboard or heavy relatively stiff paper material. In the illustrated embodiment, card 10 is of the same shape and size in all dimensions as the cards commonly employed in connection with known IBM statistical, tabulating and record card sorting systems and machines, but it is repeated that said card may be of any desired type, shape and size. In preparing card 10 for mounting therein of a record bearing sheet or insert 11 (Figs. 4 and 5) which, in the illustrated embodiment is a single plate of picture-carrying micro-film, said card, as shown in Fig. 1, is first provided at a selected position with a series of holes or openings 12 which are arranged in a closed pattern conforming to the peripheral contour of the film or insert 11. In the illustrated embodiment, the holes 12 are in the shape of an equilateral triangle and they are so arranged in a square pattern with a side 13 of each hole facing inwardly that the portion 13' of the card 10 confined by the aligned sides 13 is square the same as the film or insert 11 and is substantially the same size as said film or insert, two of said holes at each corner of said pattern being in close proximity to each other. It will be understood that the pattern of openings 12 may be varied as desired to conform to the peripheral contour of more than one plate of micro-film or of other types and shapes of inserts. Additionally, the openings 12 may be round, square, oblong or any other shape. In the event round openings are employed, said openings should be arranged in a pattern such that the centers thereof define an outline conforming to the size and peripheral contour of the insert, as will appear hereafter.

The triangular openings 12 or other openings of a selected shape may be formed in card 10 in one operation or in repeated operations by a punch and die device suitably constructed for this purpose.

As shown in Fig. 2, after the openings 12 are formed in card 10 as described, said openings are filled with a suitable activatable adhesive substance 14 in a dry non-tacky non-flowable solid state. In the illustrated embodiment, the adhesive substance 14 is of the type which requires the use of heat to render the same plastic and to activate it to adhesiveness, but other compressible adhesives activated by a solvent for example may also be employed. The adhesive substance 14 may be introduced into the openings 12 by placing a ribbon of said dry non-tacky solid adhesive on the card 10 and over said openings, and then dieing-out therefrom bits of a corresponding size and shape and forcing the same into the openings 12 under a light pressure sufficient to cause said bits of adhesive to spread out and cling to the walls of said openings. This may be accomplished by placing the card 10 with the ribbon-adhesive thereon on an imperforate backing-plate and employing a die-punch the same as or similar to the punch for forming the openings 12 in the card. The adhesive substance 14 may also be introduced into the openings 12 by employing a plunger unit operating withing a reservoir containing a supply of said adhesive made plastic by heat, and forcing quantities of said plastic adhesive into the openings 12. The plastic adhesive introduced into the openings 12 will thereafter set to a dry non-tacky non-flowable solid adhering to the walls of the openings. The card 10 prepared as thus far described and shown in Fig. 2 may be made in quantities and supplied in this prepared form to users thereof for subsequent mounting of the micro-film 11 or other insert therein, as hereinafter described.

After the adhesive substance 14 has been introduced into the openings 12 as previously described, the portion 13' of card 10 confined by the sides 13 of the adhesive-filled openings 12 is died-out, as shown in Fig. 3, directly along said sides, whereupon a square aperture 15 of the same shape and substantially of the same size as the film or insert 11 is formed in said card, and the adhesive-filled holes 12 are transformed into adhesive-filled V-shaped notches 16 opening into said aperture. It will be noted that by virtue of the adhesive-filled notches 16, the adhesive substance 14 constitutes a major portion of the surrounding wall of aperture 15. The dieing-out of the aperture 15 may be effected by a suitable punch and die unit of the proper shape and size. The card 10 prepared as thus far described and shown in Fig. 3 may also be supplied in this further prepared form to users thereof for subsequent mounting of the film or other insert therein.

For convenience in handling and filing of the cards 10, and to insure effective handling of said cards in record card punching, tabulating and sorting machines, as well as in other card handling machines, the thickness of the film or insert should not exceed the thickness of the card and said film or insert should not project beyond opposite plane surfaces of said card. In the illustrated embodiment, the card 10 is of a thickness greater than the thickness of the film or insert 11, said card, like the tabulating cards in actual commercial use, being approximately .0075 of an inch thick, and said film being approximately .005 of an inch thick. When the thickness of the film 11 or other insert is less than the thickness of card 10, said film or insert may be set inwardly from both

faces of the card, as in the illustrated embodiment, thereby protecting both surfaces of the film or insert against injurious abrasive action, and at the same time insuring that both faces of the card are flush or flat and completely lacking of any projections.

There now remains the mounting of the film or insert 11 in the aperture 15 of card 10 and the securing of said film to said card, as shown in Figs. 4, 5 of the drawing. The film 11 is died-out or cut from a roll thereof to the same size and shape of the aperture 15 so that when said film is inserted in said aperture the resulting fit will virtually be card to film. The film 11 is placed within the aperture 15 and located centrally between the opposite plane surfaces of the card 10. The portion only of card 10 surrounding the aperture 15 and inserted film 11 and containing the adhesive-filled notches 16 is then subjected to heat and pressure sufficiently to cause the adhesive substance 14 to become plastic and flow from the notches 16 into adhering contact with the peripheral edges of the film 11, and to symmetrically compress or gradually taper opposite sides of said surrounding card portion to the thickness of the film 11. When the plastic adhesive substance 14 cools at normal room temperature, it sets to a dry non-tacky non-flowable solid adhering to both card and film, thus bonding the latter to the card.

The dieing-out of the film 11 or other insert may be effected by the same punch and die unit for forming the aperture 15 in the card 10 since the film or insert and the aperture are the same in shape and in size. The bonding of the film 11 or other insert to the card may be effected by a separate mechanism suitably constructed and having a movable presser member for the film or insert associated with a fixed card and film backing-plate, said presser member being surrounded by and insulated from a heated rim or flange for heating the adhesive substance and compressing the latter and the card. The dieing-out of the film 11 or other insert, the inserting of said film or insert into the aperture in the card, and the bonding of the film or insert to the card, may all be effected by a single mechanism suitably constructed and having a movable punch associated with a suitable die and a card and film backing-plate and surrounded by and insulated from a heated rim or flange, said punch acting to die-out the film and insert it in the aperture, and said rim or flange acting to thereafter heat the adhesive substance and compress the latter and the card.

It will thus be apparent that the film 11 or other insert is secured within the aperture 15 of card 10 solely by the adhesive substance 14 which is wholly confined between the opposite plane surfaces of the card and surrounds the aperture 15. By virtue of this simple mounting of the film or insert the complete card structure is materially simplified and it is inexpensive to manufacture. There is no loss of useful film area, the need of a separate adhesive coated sheet and an embossed recess therefor in the card are entirely eliminated, and there are no projections on either surface of the card that might interfere with the proper handling thereof.

It will also be apparent that the novel construction of the card enables the mounting of micro-films and other inserts in apertures of the same size, and the use of a quantity of adhesive substance sufficient to insure a good bond between the film or insert and the card without said adhesive substance overlapping the film or insert.

Additionally, the novel construction of the card provides a mount which may be made and stocked in quantities and supplied to users thereof as prepared mounts for subsequent use thereby as needed for mounting micro-film and other inserts for various purposes.

A further advantage of the improved construction is that the film or insert 11 may be removed from the card without injuring the film or insert or the card. This may be accomplished by simply cutting or dieing-out the film or insert from the card by means of the same punch and die unit used to form the aperture in the card. Accordingly, a film or other insert may be removed from one card and inserted in another card, and other films or the like may be substituted for the insert originally mounted in the card.

Although only one embodiment of the invention has been described in the foregoing specification and illustrated in the accompanying drawing, it is to be understood that the same is not limited to said embodiment or to the particular type of card or insert disclosed. Various changes may be made in the structure, as well as in the mode of manufacture and manner of use, some of which have been mentioned in the foregoing specification, without departing from the spirit and scope of the invention, as will now be clear to those skilled in the art. For example, the micro-film or insert 11 may be slightly smaller than the aperture 15 in the card 10 so that the adhesive substance 14 will also flow and set between the peripheral edges of the insert and the adjacent walls of said aperture constituted by the lands between adjacent notches 16. Additionally, instead of locating the micro-film or insert 11 centrally between the opposite plane surfaces of card 10 and symmetrically compressing opposite sides of said card to reduce the portion thereof surrounding the insert to the thickness of the latter, the insert may be located with its upper or lower surface flush wih the upper or lower surface of the card and one surface only of said card compressed to the thickness of the insert. Further, the card and insert may both be of the same thickness, if desired.

What is claimed is:

1. An article of manufacture, comprising a flat member, such as a card, of a uniform thickness having an aperture therein of a predetermined size and shape and surrounded by a plurality of notches formed in said card and opening into said aperture, and an activatable adhesive substance wholly within each of said notches and confined between the opposite plane surfaces of said card, said adhesive substance being in a dry non-tacky non-flowable state.

2. An article of manufacture, comprising a card having a four-sided aperture therein of a predetermined size and surrounded by a plurality of notches formed in said card and opening into said aperture, the notches adjacent the corners of said aperture being interconnected, and an activatable adhesive substance in each of said notches, said adhesive substance being in a dry non-tacky non-flowable state.

3. An article of manufacture adapted for use in mounting an insert, comprising a card having an aperture therein of the same shape and sub-

stantially the same size as said insert and surrounded by a plurality of notches formed in said card and opening into said aperture, and an activatable adhesive substance in each of said notches, said adhesive substance being in a dry non-tacky solid state.

4. An article of the character described, comprising a card having an aperture therein and a plurality of openings spaced around said aperture and communicating with the latter, an insert positioned in said aperture, the thickness of said insert being not greater than the thickness of said card, and an adhesive substance in each of said openings for securing said insert in position.

5. An article of the character described, comprising a card having an aperture therein and a plurality of openings spaced around said aperture and communicating with the latter, an insert positioned in said aperture, the thickness of said insert being not greater than the thickness of said card, and means in said openings and having an affinity to the materials of said card and said insert for securing the latter within said aperture.

6. An article of the character described, comprising a card of a uniform thickness having an aperture therein and a plurality of notches spaced around said aperture and opening into the latter, an insert of a thickness less than the thickness of said card wholly positioned within and closely fitting said aperture, said card having the marginal portion thereof immediately surrounding and defining said aperture compressed to the thickness of said insert, and an adhesive substance in each of said notches for securing said insert to said card.

7. An article of the character described, comprising a card of a uniform thickness having an aperture therein and a plurality of notches spaced around said aperture and opening into the latter, an insert of a thickness less than the thickness of said card positioned within said aperture centrally between the opposite plane surfaces of said card, said insert being substantially of the same size and shape as said aperture and said card having the portion thereof immediately surrounding said aperture and containing said notches symmetrically tapered at opposite sides thereof to the thickness of said insert, and an adhesive substance in each of said notches and set to a dry non-tacky non-flowable solid for securing said insert to said card.

8. The method of mounting an insert, such as a micro-film or the like, which comprises forming in a card an aperture surrounded by a plurality of notches containing an adhesive substance in a dry non-tacky non-flowable state, positioning said insert in said aperture, actuating said adhesive substance and simultaneously applying pressure thereto to cause the same to flow from said notches into contact with the peripheral edge of said insert and bond the latter to said card.

9. The method of mounting an insert, such as a micro-film or the like, which comprises forming in a card an aperture surrounded by a plurality of notches containing an adhesive substance in a dry non-tacky solid state, positioning said insert in said aperture, applying heat and pressure to said adhesive substance to activate it and cause the same to become plastic and flow from said notches into contact with the peripheral edge of said insert, and then permitting said adhesive substance to set.

10. The method of making an article comprising an insert mounted in an apertured card, which comprises forming in the card a plurality of openings in a closed pattern defining a portion of said card of the same shape and substantially the same size as said insert, inserting a quantity of an adhesive substance in a dry non-tacky non-flowable state in each of said openings, removing said card portion to form an aperture surrounded by a plurality of notches having said adhesive substance therein, positioning said insert in said aperture, activating said adhesive substance and simultaneously applying pressure thereto to cause the same to flow from said notches into contact with the peripheral edge of said insert and bond the latter to said card.

11. The method of making an article comprising an insert mounted in an apertured card of a thickness greater than the thickness of said insert, which comprises forming in the card a plurality of openings in a closed pattern defining a portion of said card of the same shape and substantially the same size as said insert, inserting a quantity of an adhesive substance in each of said openings in a dry non-tacky non-flowable state, removing said card portion to form an aperture surrounded by a plurality of notches having said adhesive substance therein, positioning said insert in said aperture centrally between the opposite plane surfaces of said card, applying pressure to the marginal portion of said card immediately surrounding said aperture and simultaneously activating said adhesive substance to compress said marginal portion to the thickness of said insert and to cause said adhesive substance to flow from said notches into contact with the peripheral edge of said insert and bond the latter to said card.

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