May 31, 1966 W. L. SPICER 3,253,360

MEANS AND TECHNIQUES FOR UNITIZING INFORMATION

Filed Jan. 9, 1961

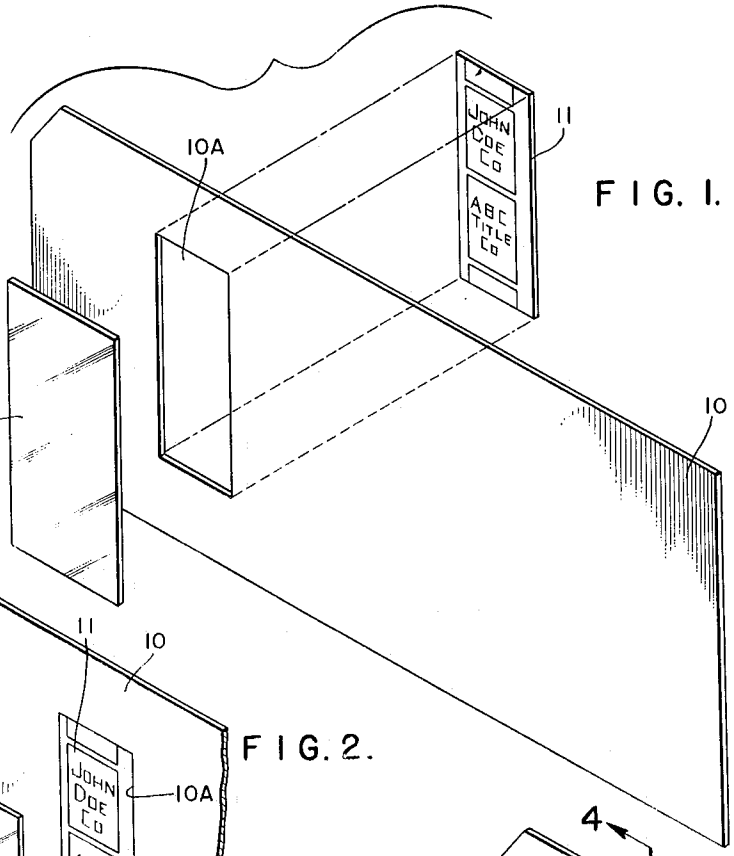


FIG. 1.

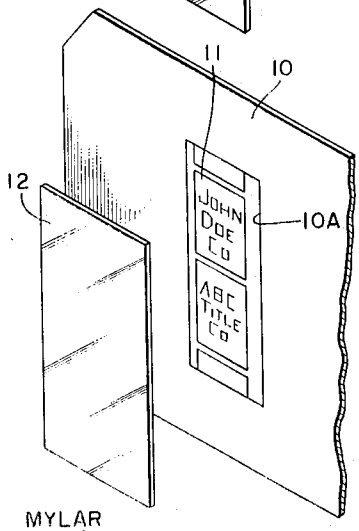


FIG. 2.

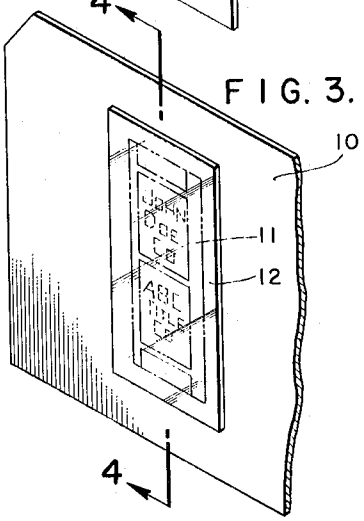


FIG. 3.

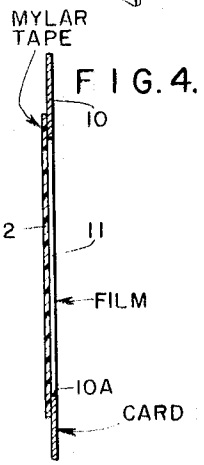


FIG. 4.

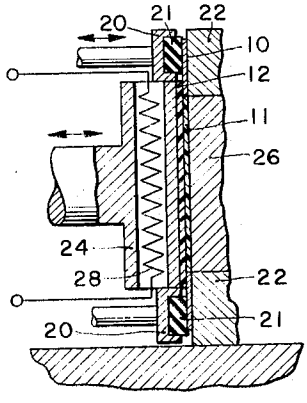


FIG. 5.

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MEANS AND TECHNIQUES FOR UNITIZING INFORMATION

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The present invention relates to an improved unitized record card and the method of making the same, such card being particularly useful in record systems where photographic information is correlated with information on a card which mounts a photographic film.

An object of the present invention is to provide means and techniques whereby a more practical and improved assembly results having new advantages.

In general, the present invention involves aperturing a mounting card such as the well known so-called IBM-type card and affixing a photographic strip within the apertured portion of the card using a new element to affix the strip to the card. A machine for accomplishing these purposese using the improved element is described and claimed in the copending application of John J. Heydon et al., Serial No. 64,482 filed October 24, 1960, and assigned to the present assignee.

Generally this new bonding element involves a thermosetting material having coated on one side thereof a thermoplastic material which, when heated in contact with the card and film strip, bonds itself to such card and film strip to achieve a new assembly wherein the bonding element is in direct and intimate contact with all available adjacent surface portions of the emulsion side of the film to preclude entrapped moisture or air between the same from deteriorating the film while at the same time the thermosetting material preserves the film strip against mechanical damage which might otherwise result from abrasion.

A specific object of the present invention is therefore to provide a novel record card having the advantages indicated in the previous paragraph and to provide the method whereby such novel card results.

Another specific object of the present invention is to provide an arrangement of this character wherein heat may be applied for these purposes not only to marginal edges of the bonding element and film strip but to the entire surface area of the bonding element to ensure nontrapping of deleterious moisture and air.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view showing elements of the new record card embodying features of the present invention.

FIGURE 2 is another perspective view illustrating one of the assembly operations.

FIGURE 3 illustrates the assembled record card.

FIGURE 4 is a section taken on line 4—4 of FIGURE 3.

FIGURE 5 illustrates the bonding operation.

The elements of the record card illustrated include a card **10** of the so-called IBM-type of calendered or like paper or cardboard with a rectangular apertured portion or window **10A** formed therein, a photographic film strip **11** of cellulose acetate placed in such apertured portion **10A** and a bonding element or strip **12** which bonds the film strip to the card.

The bonding element **12** is a thermosetting material having coated on one side thereof a thermoplastic material. The thermosetting material may be of the type sold under the name Mylar which is considered as being a Dupont polyester film or polyethylene terephthalate and the same is coated on one side with polyethylene. Mylar so coated may be purchased from various sources and is considered to be a thermosetting material coated with a thermoplastic polyethylene material. The photographic film strip is of conventional type and is considered to be of cellulose acetate or thermoplastic material generally. The bonding element or tape **12** is sufficiently thin so as not to increase the overall thickness of the card to such an extent as to interfere with tolerances of electronic data processing machines.

In the bonding operation illustrated in FIGURE 5, wherein a movable rectangularly-apertured pressure plate **20** having a rectangularly-shaped elastic pressure pad **21** of rubber recessed therein, is used to clamp the card **10** against a relatively stationary abutment or clamping member **22** during the time the bonding element or tape **12** is being pressed against both the marginal peripheral edge defining the card apertured portion **10A** and the entire available adjacent surface area of the emulsion side of the film strip **11** by the heated movable pad **24**, it has been observed that the bonding tape in the production of its function is more dependent on temperature than on pressure in that only a relatively slight amount of pressure just sufficient to produce contact between the bonding tape, on the one hand, and the card and photographic film, on the other hand, is required while the tape **12** is in a heated condition. During this operation the non-emulsion side of the film strip **11** is backed by a relatively stationary rectangularly-shaped backing block **26**, which is an air chuck as described in the above-mentioned copending application, to produce a suction for assuring maintenance of the film strip within the card apertured portion **10A** prior to movement of the heated pad **24** containing and heated by one or more electric heating elements **28**.

The heat and pressure applied by pad **24** is sufficient to assure against the development of air pockets, bubbles or fogging in the thermal bond. The heating pad **24** may be maintained at a constant temperature of 250° Fahrenheit although it is estimated that the actual bonding occurs at a temperature of from approximately 225° to 235° Fahrenheit.

While cellulose acetate film has been mentioned as one specific example, other films of different materials may be used with are thermoplastic or thermoplastic in nature to obtain bonding. Also, depending on conditions, the particular method used, a greater amount of pressure may be required for other thermoplastic materials.

In those instances where contact printing of the mounted microfilm is not contemplated, it is preferred that the

emulsion side of the microfilm be immediately adjacent the Mylar thermosetting strip **12**; and when contact printing is contemplated, the non-emulsion side of the microfilm lies immediately adjacent the Mylar thermosetting strip so that the emulsion side of the microfilm may contact the emulsion of "copy type" film during the exposure process. "Copy type" microfilm as referred to above has reference to film used for duplicating original or silver emulsion film which, for example, may be exposed by ultraviolet light and developed by heat and/or direct chemical action by direct processing. Types of this character may be of the type commercially sold under the names Diazo and Technifax (dye emulsion type film).

Also, film like Kalfax film may be bonded to and around the periphery of the apertured portion of a card when sufficient thermoplastic material is provided in such film for mounting original or similar copy type film. The Kalfax film referred to above involves generally putting an emulsion over a thermosetting material like Mylar with such emulsion being carried in a plastic vehicle. This plastic vehicle, if in sufficient quantity, may be used for bonding to a card as indicated above.

It will be seen from the above description that an assembly may be produced in which the emulsion side of microfilm is protected against moisture and atmospheric conditions. Further, the thermosetting portion of the Mylar tape presents a tough wear- and abrasive-resistant surface which is not subject to be torn. Also, there is a strong permanent bond between the Mylar and microfilm; this bond, however, while being permanent in regular use of the assembly, is such that once a microfilm is bonded to the Mylar tape, the film may subsequently be peeled therefrom and a second microfilm bonded to the same Mylar tape under those conditions in use where it is desirable to change the microfilm. In other words, the Mylar tape may be used again and again for bonding to different microfilm. On the other hand, the bond between the Mylar tape and card is such that an attempt to peel the Mylar tape from the card results in tearing of fibers from the card so that the card may not be used again. Thus, the bond between the Mylar tape and the card is of more permanent character than the bond between the Mylar tape and the film.

Further, it will be noted that since the Mylar tape is heat-sensitive as distinct from pressure-sensitive, the Mylar tape requires no protection such as that which may be provided by an auxiliary cover sheet in those instances where there is a considerable lapse of time between bonding of the Mylar tape to the card, on the one hand, and subsequent bonding of the microfilm to the Mylar tape. In other words, the assembly, considering the card and Mylar tape alone, has an indefinite shelf life and there is no sticking between cards when a stack of the same is prepared for subsequent use.

Further, the Mylar tape, even though it has a thermoplastic coating on one side, is thin so that it does not interfere with successful handling in electronic data-processing machines. For these purposes the Mylar tape may have a thickness of from one-thousandth to four-thousandths of an inch (.001" to .004"). It is preferable, however, that the Mylar tape be as thin as possible so as to minimize light diffusion during those times when the mounted microfilm is being projected or being used in contact printing so as to not seriously impair the resolution of the photographed, projected or printed image. A thin Mylar film is particularly desirable in contact printing when a point light source is used as a source of illumination.

While it is preferred that the Mylar tape as applied to the card be fully rectangular or square, the same in some instances may be windowed such that light projected through the film need not pass through the Mylar tape. It is preferred that no such window, however, be provided in those instances where protection of the emulsion side of the film is desired as mentioned above and particularly

so in those instances where the microfilm has been developed using a hypo solution and it is desired to prevent further change in the silver halide content of the microfilm as a result of any further action of residual hypo which may be on the developed microfilm. By protecting the silver halide side of the film against moisture and atmospheric conditions, any further chemical action between any residual hypo and the silver halides is substantially prevented. For this latter purpose all entire adjacent surface areas between the microfilm and the tape are in direct and intimate contact without any entrapped moisture or air between the same, the same being accomplished as a result of heat and slight pressure being applied to the entire outer surface of the Mylar tape during the time that the microfilm is bonded to the tape.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A record card comprising a card having an apertured portion therein, film strip in said apertured portion, a bonding element of thermosetting material coated on one side with a thermoplastic material, the thermoplastic material being bonded to both the peripheral edge of the card defining said apertured portion and one side of said film strip.

2. A record card as set forth in claim **1** in which said one side of said film is the emulsion side of a photographic film.

3. A record card comprising an apertured card, a photographic film in said aperture of said card and a combination thermosetting and thermoplastic material, said thermoplastic material being carried by said thermosetting material, the latter serving as a thermally nonconductive element, said thermoplastic material being bonded to said film and card to retain said film in said apertured portion.

4. A record card as set forth in claim **3** in which said thermosetting portion of said material is exposed to provide a wear-resistant surface and the thermoplastic portion of said material contacts and bonds to all available adjacent surface portions of said film.

5. A record card as set forth in claim **4** in which said adjacent surface of the film is the emulsion side of the film.

6. A record card comprising a card having an apertured portion therein, a film strip in said apertured portion, a bonding element of dimensionally stable material of poor thermal conductivity coated on one side with a temperature activated adhesive, said temperature activated adhesive being bonded to both the peripheral edge of the card defining said apertured portion and one side of said film strip, said material of poor thermal conductivity being stable at the temperature required to activate said temperature activated adhesive as an adhesive for achieving bonding to said card and said film strip.

7. A record card as se forth in claim **6** in which said bonding element is transparent.

8. A record card as set forth in claim **6** in which said bonding element is windowed so as to extend only partially into said card apertured portion.

9. A record card comprising a card having an apertured portion therein, a film strip in said apertured portion, a bonding element of dimensionally stable material of poor thermal conductivity affixed to said card and having a portion thereof coated with a temperature activated adhesive, said temperature activated adhesive being bonded to a portion of said film strip, said material of poor thermal conductivity being stable at the temperature required to activate said temperature activated adhesive as an adhesive for achieving bonding to said film strip.

10. A record card comprising a card having an apertured portion therein, a bonding element of dimensionally stable material of poor thermal conductivity coated on one side with a temperature activated adhesive, a first portion of said temperature activated adhesive being bonded to the peripheral edge of the card defining said apertured portion, a second portion of said temperature activated adhesive being exposed within the confines of said apertured portion for bonding of a film strip thereto, said material of poor thermal conductivity being dimensionally stable at the temperature required to activate said temperature activated adhesive as an adhesive for achieving bonding to said film strip.

11. A record card as set forth in claim 6 in which said film strip is releasably secured to said bonding element with the bond between said adhesive and said bonding element being greater than the bond between said adhesive and said film strip and such that said film strip may be peeled from said bonding element at room temperature with substantially all of the said adhesive layer remaining on said bonding element, leaving said card and said bonding element intact and reusable for subsequent bonding of a like kind of film strip to said bonding element.

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