United States Patent

Tone

[15] **3,668,980**

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[54] **METHOD AND APPARATUS FOR MANUFACTURING APERTURE CARDS**

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[52] **U.S. Cl.** .....**93/1 R,** 156/209
[51] **Int. Cl.** **B31d**
[58] **Field of Search** .....93/1 R; 156/209

[56] **References Cited**

UNITED STATES PATENTS

3,212,412 10/1965 Langan et al.....93/1 R

Primary Examiner—Bernard Stickney
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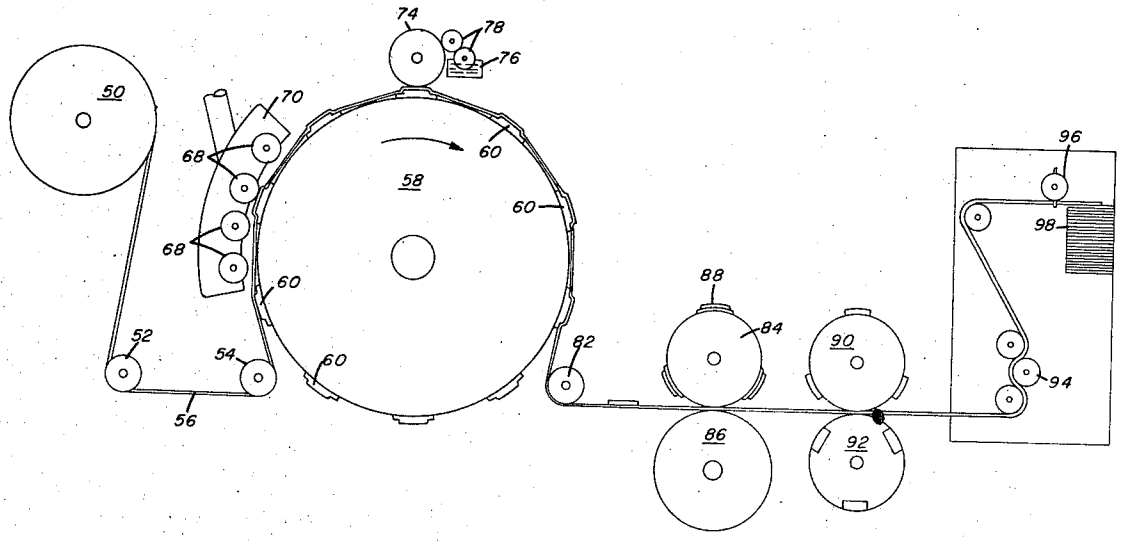
[57] **ABSTRACT**

Apparatus for producing an aperture record card from a substantially continuous web of cardstock of predetermined thickness, each of the record cards having a shouldered aperture arranged to receive a film chip over the aperture. The apparatus comprises the combination of means for supplying a substantially continuous web of the cardstock and for conveying the web along a predetermined path. Means is arranged to emboss the web as it is moved along the path, for example about a rotating embossing drum, to raise a portion thereof above the surface of the surrounding web. The embossing means is arranged to raise the center portion higher than the peripheral portion of the web being embossed. A grinding means is spaced from one surface of the web along the path, i.e. peripherally about the drum, downstream from the embossing means and is spaced from the drum a distance greater than the thickness of the web but less than the height of both portions of the embossed surface of the web above the drum surface. The grinding means is arranged to form a rectangular ground area on the raised surface of the web. Means is arranged downstream from the grinding means to apply a layer of a fluid-impermeable material, such as molten thermoplastic, to the ground area of the web to seal and protect the surface of the web. Means is arranged to deemboss the ground area, and means is arranged to form an aperture through the web in the ground area.

28 Claims, 6 Drawing Figures



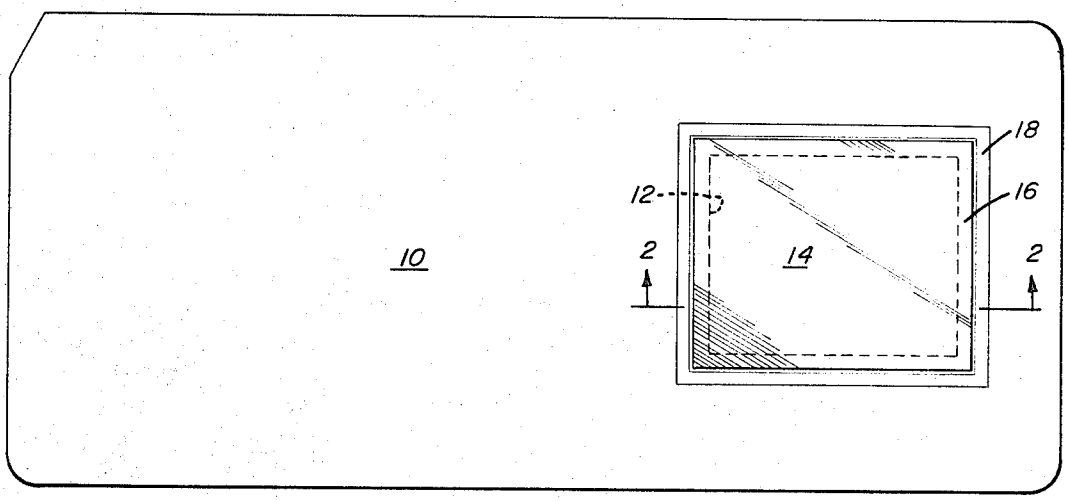


FIG. 1

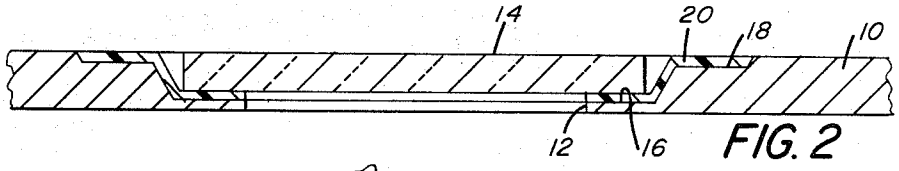


FIG. 2

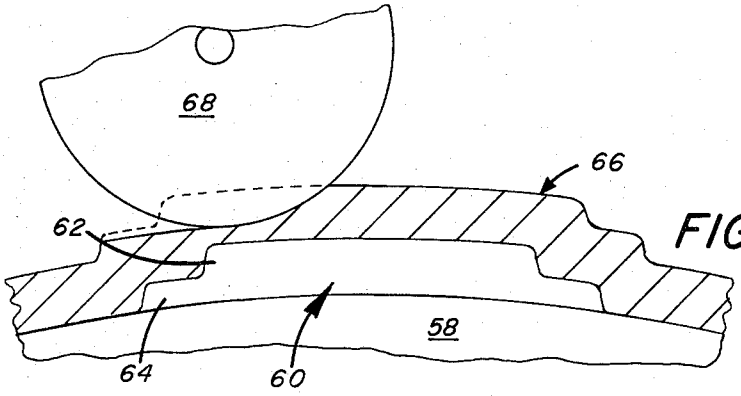


FIG. 4

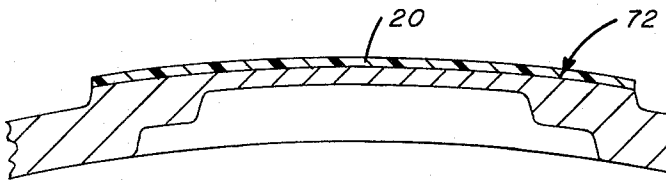


FIG. 5

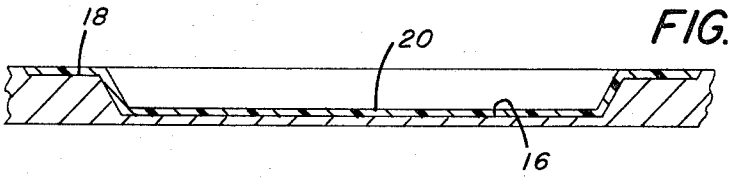


FIG. 6

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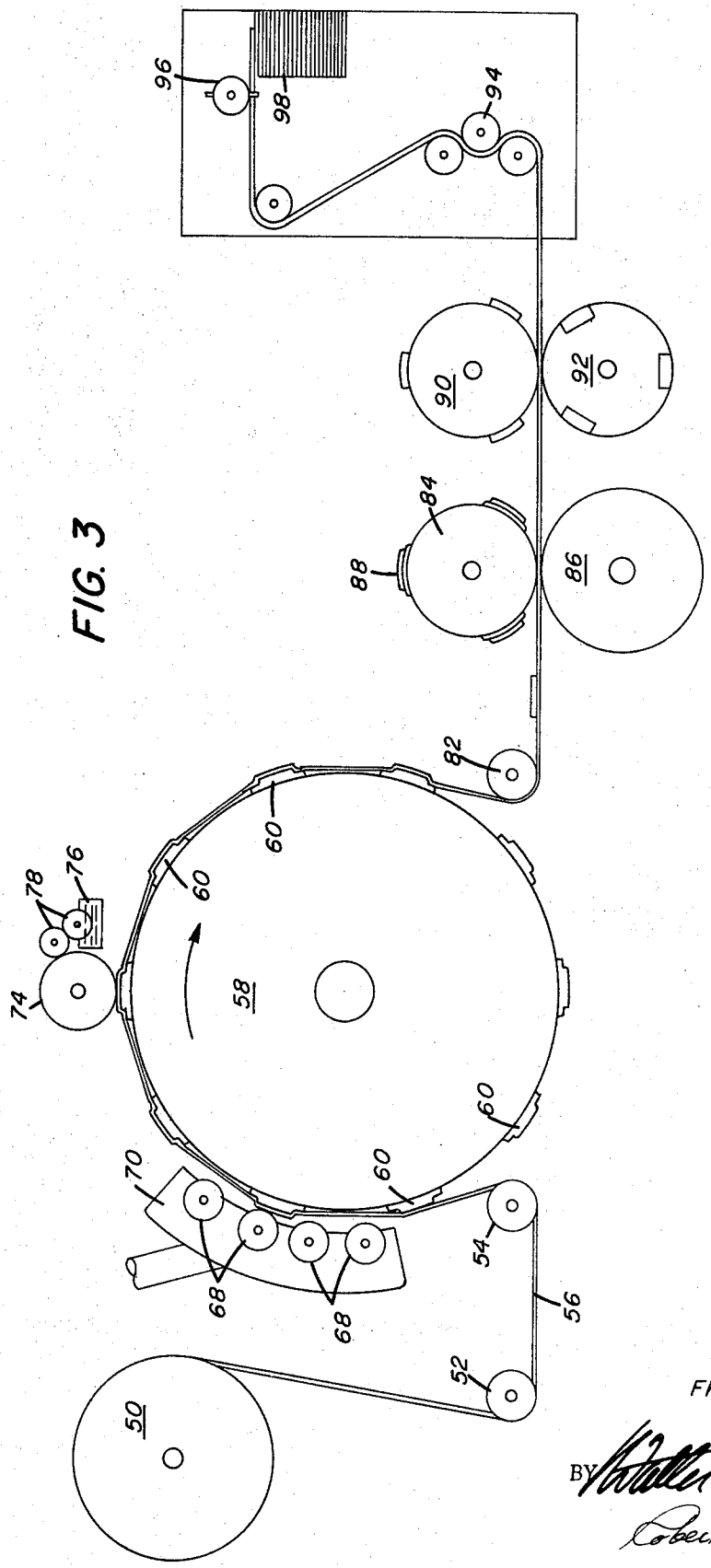

FIG. 3

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METHOD AND APPARATUS FOR MANUFACTURING APERTURE CARDS

BACKGROUND OF THE INVENTION

The present invention is directed to a method and apparatus for manufacturing record cards which are used in card-controlled tabulating machines, information retrieval systems and the like, and more particularly, it relates to a method and apparatus for making record cards of the type wherein a paper body is laminated with photographic film or paper, stencil tissue or some other laminar material, such cards being generally referred to as "aperture cards" from the fact that the paper body of the card usually contains an aperture through which a record-bearing portion of the laminar material may be viewed. More specifically, the present invention is useful in making record cards having a frame of microfilm secured over the aperture in the card, whereby each card may contain a picture record of the data encoded on the card. The film or other inserts mounted in such cards may be conveniently classified and sorted mechanically as to subject matter in a manner understood in the art, as well as viewed, examined, indexed, and filed.

Heretofore, aperture cards have been manufactured by providing a standard tabulating card with an aperture and means for holding the film therein. Generally the card has been supplied to the customer with a blank aperture or with a cover sheet filling the aperture. The customer then prepared the microfilm to be mounted in the aperture, processed the entire reel of microfilm, and then cut the individual frames therefrom and mounted them in the pre-apertured tabulating card, after having removed the cover sheet, if necessary. Various forms of apparatus have been developed and utilized to mount the film frames in the aperture cards, ranging from simple, nearly manual insertion of the film in the aperture card, to sophisticated, automatic equipment for inserting the film.

However, it has been found that many users of such aperture cards find it undesirable to mount film pieces in the aperture card in the foregoing manner. It is often undesirable to separate the microfilm copy of the information from the original data, as is necessary in processing the microfilm in reel form, before the individual frame of microfilm is mounted in the aperture card and the requisite tabulating information is encoded onto the card. As a result, apparatus has been developed which utilize aperture cards containing the unexposed film already mounted in the aperture. This apparatus is arranged to expose the film, develop the image thereon and dispense the finished card for encoding purposes while the original document is still at hand. As a result, it has become necessary to provide large quantities of aperture cards containing the unexposed film for utilization in such apparatus.

Various card formats and means of retaining film in the aperture have been devised. Some cards utilize a thin film frame or carrier sheet which is attached at the outer edge to the card at the periphery of the aperture and at the inner edge to the periphery of the film. Other cards have utilized a shoulder formed by skiving the edge of the aperture to provide a section of card substantially thinner than the normal thickness thereof to which the film may be attached. It has been found that the skived aperture card is more economical to produce than the carrier sheet card; however, the carrier sheet aperture card has certain performance advantages over the skived aperture card. The carrier sheet card contains no ground fibrous surface which has been found to be a source of dirt that can obscure the microfilm image or collect in the optics of the card viewer. Moreover, the carrier sheet card permits processing the film while mounted in the card without harming the water-damageable fibrous cardstock from which most aperture cards are formed. This is possible because the carrier sheet provides an area to which a processing head can be sealed to process the entire film surface while preventing contact of the processing solution with the surface of the card.

Because of the expense of the carrier sheet mount, attempts have been made to process film mounted in skived aperture

cards. These attempts have been somewhat successful, but are still less than completely satisfactory. One such processing method utilizes a processing head that engages the outer periphery of the film in the skived aperture to prevent the processing solutions from coming into contact with the cardstock. While this method solves the problem of damaging the aperture card with film processing solutions, it has created additional problems affecting the acceptance of the system. The processing head must contact the emulsion surface of the film which is soft and easily damaged, especially before processing. As a result, the processing head seal may adhere to the emulsion and upon removal pull a small piece of emulsion with it. Upon processing the film in the next aperture card, the emulsion picked up previously by the processing head seal surface may prevent complete sealing with the new film whereby the card surface can be exposed to the harmful effects of the processing solutions. It has also been found that such adherence between the emulsion and the processing head seal can result in significant portions of the emulsion being peeled from the film support, wasting the entire aperture card and reducing the production rates possible. Furthermore, it has been found that such an arrangement leaves a border of unprocessed emulsion about the periphery of the film which, because it has not been processed, has a significantly softer surface than that of a processed emulsion. This unprocessed border has been found to provide dirt problems in subsequent viewing of the film due to the fact that the unprocessed emulsion can flake off during handling and can obscure the image on the remainder of the film and can foul the optics of the aperture card reader. Still further, there is a possibility that the unprocessed emulsion border can retain chemicals that deleteriously affect the archival qualities of the image.

It will thus be appreciated that a method and apparatus for high speed, economic, and substantially automatic production of aperture cards having a cost substantially equal to skived aperture cards and less than carrier sheet aperture cards, while having the performance advantages equal to or better than carrier sheet aperture cards would be extremely desirable and would provide the card user with such cards in the necessary volume and at the requisite low cost.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides apparatus for producing an aperture record card from a substantially continuous web of cardstock of predetermined thickness, each of the record cards having a shouldered aperture arranged to receive a film chip over the aperture. The apparatus comprises the combination of means for supplying a substantially continuous web of the cardstock and means for conveying the web along a predetermined path. Means is arranged to emboss the web as it is moved along the path to raise a portion thereof above the surface of the surrounding web. Grinding means is disposed along the path downstream from the embossing means and is spaced from the conveying means a distance greater than the thickness of the web but less than the height of the embossed surface of the web from the conveying means. The grinding means is arranged to form a ground area on the raised surface of the web. Means is arranged downstream from the grinding means to apply a layer of a fluid-impermeable material to the ground area of said web. Means is arranged to de-emboss the ground area, and means is arranged to form an aperture through the web in said ground area.

Further, the present invention includes means to cut the web into a plurality of record cards each containing a shouldered aperture therein. Also, the conveying means includes a rotating drum having a plurality of embossing dies on the outer surface thereof with means arranged to cause the web to be embossed by the dies as the web is supplied to said drum. Such embossing means may include means for supplying a vacuum to the outer surface of the drum which vacuum is arranged to hold the web in close contact with the outer surface of the drum and to draw the web into embossing relationship

with the dies. The embossing means may include roller means disposed in corresponding relationship with the outer surface of the drum and arranged to emboss the web over the dies thereon.

More specifically, the present invention provides apparatus including embossing means arranged to raise a first portion of the web above the surface of the surrounding web a distance just less than the thickness of the web and a second portion of the web surrounding and contiguous with said first portion a distance substantially less than the thickness of the web. The grinding means is arranged to remove a portion of the first and second embossed portions of the web to form a rectangular ground area spaced above the surface of the surrounding web.

Still further, the present invention provides a fluid-impermeable material applying means which includes a printing means such as a gravure roll for applying the material on the ground area.

In addition, the present invention provides a method of producing an aperture record having a shouldered aperture arranged to receive a film chip over said aperture. The method comprises the steps of supplying a substantially continuous web of cardstock and conveying the web along a predetermined path. The web is embossed as it is moved along the path to raise a portion thereof above the surface of the surrounding web. One surface of the web is ground as it is moved along said path after it has been embossed to form a substantially rectangular ground area on one surface of the web. A layer of a fluid-impermeable material is applied to the ground area of the web, the ground area is de-embossed, and an aperture is formed through the web in the ground area.

The various features of novelty which characterize the present invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and the specific objects obtained by its use, reference should be had to the accompanying drawings and descriptive matter in which a preferred embodiment of the present invention is illustrated and described.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the front surface of a film record card to be manufactured according to a preferred embodiment of the present invention;

FIG. 2 is a greatly enlarged cross-sectional view through the aperture area taken along the line 2—2 of FIG. 1;

FIG. 3 is a schematic elevation of a preferred embodiment of aperture card manufacturing apparatus according to the present invention;

FIG. 4 is an enlarged cross-sectional view through the embossed web at the grinding station;

FIG. 5 is an enlarged cross-sectional view through the embossed, ground, and coated web; and

FIG. 6 is an enlarged cross-sectional view through the de-embossed web before it is apertured.

DESCRIPTION OF A PREFERRED EMBODIMENT

A film record card, or aperture card, to be manufactured by the method and apparatus of the present invention is illustrated in FIGS. 1 and 2 and comprises a tabulating card **10** of a configuration well known in the art and generally formed of a fibrous, paper-like, cardstock. An aperture **12** is formed through the card at one end thereof in a position substantially similar to aperture cards of the prior art. A film chip **14**, having dimensions greater than the dimensions of the aperture **12**, is disposed therein and is secured to the card in a manner to be described more completely hereinbelow. The card is provided with an area **16** in one face thereof recessed about the aperture **12** to a depth at least as great as the thickness of the film **14**, see FIG. 2. This recess **16** is formed with outer dimensions greater than the outer dimensions of the film **14**. A second recessed area **18** is formed in the same face of the card and extends about and is contiguous with the periphery of the first recessed area **16**. This second recessed area **18** has a depth substantially less than the thickness of the film **14** and outer dimensions substantially larger than the dimensions of the film, e.g. one-fourth inch greater on each side, substantially as disclosed in copending application Ser. No. 60,491, filed simultaneously herewith and entitled "Film Record Card."

A thin layer **20** of a fluid-impermeable material, such as a thermoplastic film, is coated or printed on substantially the entire surface of the recessed areas **16** and **18** and the transitional shoulder **17** therebetween. This layer protects the fibrous card material from the adverse effects of being exposed to photographic processing solutions while at the same time securing the film **14** in the recessed area **16** over the aperture **12**. The layer of fluid-impermeable material has a thickness substantially equal to, or just less than, the depth of recessed area **18** whereby no portion of the top surface of the layer extends above the normal surface of the card.

Apparatus for producing the foregoing aperture card is illustrated schematically in FIG. 3 and comprises means, i.e. feed roll **50**, for supplying a substantially continuous web **56** of cardstock having a width substantially equal to the width of the aperture card to a conveying means for moving the web along a predetermined path past a plurality of operation-performing stations to produce the aperture card of the preferred embodiment. The preferred conveying means comprises guide rollers **52** and **54** which direct the web **56** onto the outer surface of a relatively large diameter rotating drum **58**. The drum is provided with a plurality of spaced male die members **60** on the outer periphery thereof. The die members **60** are spaced about the periphery a distance substantially equal to the length of the aperture card. Vacuum supply means, not shown, is provided for supplying vacuum to at least a portion of the peripheral surface of the drum **58** to draw the web into close contact therewith and to cause the portion of the web engaging the die members **60** to be embossed thereby.

As illustrated in FIG. 4, each die member **60** is provided with a first, substantially rectangular, central portion **62** which extends above the drum surface a distance substantially equal to the thickness of the web. Each die member **60** is also provided with a second, substantially rectangular, peripheral portion **64** surrounding and contiguous with the first portion **62**, which second portion extends above the surface of the drum a distance less than the first portion. The first embossed portion has a length and width substantially equal, or slightly larger than the dimensions of the film **14** to be mounted over the aperture **12** in the completed card. Accordingly, as the web **56** is embossed over the die members **60**, the outer surface of the web **66** (FIG. 4) is raised above the surface of remainder of the web to two different elevations.

A plurality of grinding wheels **68** are disposed adjacent the periphery of drum **58** and are arranged to grind, skive, or abrade the portions of web **56** which are embossed over the die members **60** and raised above the surface of the surrounding web, substantially as illustrated in FIG. 4. An exhaust hood **70** is provided around the grinding wheels **68** to remove the card material ground from the web. The grinding wheels **68** are spaced above the peripheral surface of the drum a distance greater than the thickness of the cardstock but less than the height of the two embossed portions whereby a substantially rectangular ground area is formed on the raised portion of the cardstock as illustrated at **72** in FIG. 5. While the grinding wheel **68** is illustrated in FIG. 4 as removing the entire amount of card material at one time, it will be appreciated that preferably each grinding wheel removes only a small portion of the card material until the desired thickness is reached. Moreover, while four such grinding wheels are illustrated, a greater or smaller number may be used depending upon the particular requirements. The ground surface **72** preferrably extends above the surface of remainder of the cardstock surface as illustrated in FIG. 5. After grinding, the cardstock is provided with a central relatively thin portion and a second peripheral portion surrounding the first portion and having a thickness greater than a first portion but less than the original thickness of the cardstock.

A gravure printing roll **74** is disposed adjacent the periphery of the drum **58** downstream from the grinding rolls **68** and is supplied with a material which will form a fluid-impermeable layer when it is applied to the card, such as a thermoplastic material. This material may be coated either in molten form or in an evaporable solution from a supply **76** via rolls **78** in a manner well known in the art. The gravure roll **74** is arranged to apply a continuous, thin layer **20** of the thermoplastic material to the ground surface **72** of the embossed portion of the web, as shown in FIG. **5**. Inasmuch as the ground surface **72** is raised above the surrounding surface of the web of cardstock it is relatively simple to gravure print the fluid-impermeable material only to the ground area without coating the adjacent portions of the card. Preferrably, the thickness of the fluid-impermeable layer is substantially equal to the amount of cardstock removed from the second, peripheral raised portion of the web.

The web of cardstock material **56** is conveyed further around the periphery of the drum to a takeoff roll **82** which strips the embossed, coated web from the dies **60**. The distance between the gravure roll **74** and the stripping roll **82** is preferrably sufficient to permit the layer of fluid-impermeable material to set. However, if it is necessary to use higher production rates and web speeds than is necessary to permit the fluid-impermeable material to dry before removal from the dies, roll **82** can be replaced by a pair of edge rolls which only engage the edge of the web without contacting the fluid-impermeable material at that point. After being removed from drum **58** the embossed coated web, having a cross-section in the embossed region substantially as shown in FIG. **5**, is fed between a pair of de-embossing rolls **84** and **86** which operate in synchronism with the drum **58**. Roll **86** is substantially cylindrical and provides support to the web as it is de-embossed. Roll **84** is provided with a plurality of male de-embossing dies **88** having a configuration substantially identical to dies **60** on drum **58**. Dies **88** engage the coated embossed portion of the web to de-emboss it to return the unground surface of the web substantially to the original plane of the web, creating a coated, recessed area in the opposite surface, as illustrated in FIG. **6**, to form a nest area in which a piece of film can be positioned. Thereafter, the web is fed between a rotating punch and die means **90** and **92** which is arranged to form the aperture **12** in the central portion of the recessed area of the web.

The web is then supplied to a printing means **94**, of a type well known in the art, which prints the desired information on the surface of the card and then to a cutter or chopper roll **96** which cuts the web into a plurality of individual record cards each containing an aperture substantially in the center of a coated recessed area. The individual cards are then stacked in a container **98** for transfer to a film mounting apparatus, not shown.

The present invention thus provides apparatus for producing blank aperture cards ready to accept a piece of unexposed film in the coated, depressed area over the aperture therein. While it is feasible to connect the present card-forming apparatus to apparatus for mounting the film in the card to form a continuous, in-line system, it has been found that separating the present apparatus from a film mounter provides certain advantages over an in-line system. With the use of separate apparatus for preparing the cards and for mounting the film, the card making apparatus can be operated in the light with the convenience, safety, and simplicity attendant thereto; only the film mounter need be operated in darkness to prevent fogging the unexposed film. The two separate apparatus can be operated independently with no requirement that the speed of production be identical. Also, the difficulties of achieving the necessary registration are minimized by performing most of the operation in the light and by mounting the pieces of film into individual cards supplied from a container rather than mounting the film in the moving web before the cards are cut apart.

It will be appreciated that while a preferred embodiment of the present invention has been described hereinabove, many alternatives to the present aperture card manufacturing apparatus and method are possible. For example, while the preferred embodiment for embossing the web over the dies **60** on the periphery of drum **58** has been set forth as utilizing a vacuum source communicating with the outer periphery of the drum to draw the web over the dies, the web can be embossed over the dies by maintaining sufficient tension in the web supply that it is embossed by the dies as it is cinched onto the surface of the drum. Further, the web can be embossed by utilizing a resilient roller member engaging the outer surface of the web as it contacts the dies. Still further, the web can be embossed onto the dies by utilizing a mating die member to force the web over the die on the drum periphery.

Similarly, while a gravure printing roll having a cylindrical printing surface has been disclosed for applying the layer of fluid-impermeable material to the ground embossed area, whereby the entire ground area is coated, it is equally satisfactory to utilize a gravure roll arranged to apply a layer of the fluid-impermeable material only at the periphery of the ground embossed area so that the fluid-impermeable material is not to be wasted when the aperture is subsequently formed through the web. Printing and coating methods other than gravure printing can also be employed to apply the layer of fluid-impermeable material to the web. It is also possible to apply the fluid-impermeable material by spraying the ground embossed area of the web.

The preferred embodiment discloses the use of a thermoplastic film for the fluid-impermeable layer on the card. Such a thermoplastic film is particularly advantageous in that, while it both seals the ground surface of the web and protects the card surface from the damaging effects of photographic processing solutions, it also functions as a thermoplastic adhesive to secure the film in the recessed area over the aperture. Moreover, the thermoplastic material can be applied simply and effectively by the foregoing methods in a one-step operation. However, should it be desirable to utilize other materials for the fluid-impermeable layer, e.g. a thermo-setting plastic, lacquers, etc, it may be desirable to utilize two or more coating or printing steps to apply the layer (or layers) to the card. It may also be desirable or necessary to apply an additional, separate layer of adhesive material to the central portion of the ground embossed area to secure the film in the recessed area of the card.

The present invention can be modified to incorporate a single roll over which the embossed coated web is passed for de-embossing. The roll is supplied with a source of vacuum to draw the embossed area back to the final configuration without contacting the coated surface. Still further, in some instances it may be necessary to utilize a heated de-embossing die to de-emboss the web without breaking the layer of fluid-impermeable material.

While the present invention has been described as providing a method and apparatus for manufacturing an aperture card wherein the web is coated and de-embossed before the aperture is formed therethrough, thus providing cleaner aperture edges with fewer fibers extending into the aperture area, it is contemplated that the aperture can be formed through the card before the fluid-impermeable material is coated thereon or before the web is de-embossed.

It will thus be seen that the present invention provides a method and apparatus for the high-speed, substantially automatic production of aperture cards having a finished cost significantly less than carrier sheet cards and yet with superior performance characteristics. Moreover, the present invention provides apparatus for producing a card wherein the film recess is formed by skiving with the resulting cost advantage and yet provides a card in which there are no loose fibers to obscure the film image or the viewer optics.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

I claim:

1. Apparatus for producing an aperture record card from a substantially continuous web of cardstock of predetermined thickness, each of said record cards having a shouldered aperture arranged to receive a film chip over said aperture, said apparatus comprising the combination of means for supplying a substantially continuous web of said cardstock, means for conveying said web along a predetermined path, means arranged to emboss said web as it is moved along said path to raise a portion thereo above the surface of the surrounding web, grinding means spaced from one surface of said web along said path downstream from said embossing means, said grinding means spaced from said conveying means a distance greater than said thickness of the web but less than the height of the embossed surface of the web from said conveying means, said grinding means arranged to form a ground area on said one surface of said web, means arranged downstream from said grinding means to apply a layer of a fluid-impermeable material to the ground area of said web, and means downstream from said fluid-impermeable material applying means arranged to de-emboss said ground area and to form an aperture through said web in said ground area.

2. The invention according to claim 1 including means to cut said web into a plurality of record cards each containing a shouldered aperture therein.

3. The invention according to claim 1 wherein said conveying means includes a rotating drum having a plurality of embossing dies on the outer surface thereof, and means arranged to cause said web to be embossed by said dies as the web is supplied to said drum.

4. The invention according to claim 3 wherein said rotating drum is provided with means for supplying vacuum to the outer surface thereof which is arranged to hold the web in close contact with the outer surface of the drum and to draw the web into embossing relationship with said dies.

5. The invention according to claim 4 wherein said embossing dies extend above the surface of the drum.

6. The invention according to claim 3 wherein roller means is disposed in corresponding relationship with the outer surface of the drum and is arranged to emboss said web over the dies thereon.

7. The invention according to claim 3 wherein mating die members are arranged in cooperating relationship with the die members on the outer surface of the rotating drum and are arranged to emboss said web thereon.

8. The invention according to claim 7 wherein said die members on the outer surface of said rotating drum are male die members and the mating die members are female die members whereby a portion of the web is raised above the surface of the surrounding web.

9. The invention according to claim 1 wherein said embossing means is arranged to raise a first portion of the web above the surface of the surrounding web a distance just less than the thickness of the web and a second portion of the web surrounding said first portion a distance substantially less than the thickness of the web.

10. The invention according to claim 9 wherein said second raised portion is contiguous with said first raised portion.

11. The invention according to claim 9 wherein said grinding means is arranged to remove a portion of said first and second embossed portions of said web and to form a ground area spaced above the surface of the surrounding web.

12. The invention according to claim 1 wherein said fluid-impermeable material applying means includes means for printing said material on said ground area.

13. The invention according to claim 12 wherein said material is applied only to said ground area.

14. The invention according to claim 12 wherein said printing means includes a gravure roll for applying said material to said ground area.

15. The invention according to claim 14 wherein said gravure roll has a cylindrical surface that prints said material on the entire ground area.

16. The invention according to claim 14 wherein said gravure roll is arranged to print said material only on a selected portion of said ground area.

17. Apparatus for producing an aperture record card from a substantially continuous web of cardstock of predetermined thickness, each of said record cards having a shouldered aperture arranged to receive a film chip over said aperture, said apparatus comprising the combination of means for supplying a substantially continuous web of said cardstock, means for conveying said web along a predetermined path, means arranged to emboss said web as it is moved along said path to raise a portion thereof above the surface of the surrounding web, grinding means spaced from one surface of said web along said path downstream from said embossing means, said grinding means spaced from said conveying means a distance greater than said thickness of the web but less than the height of the embossed surface of the web from said conveying means, said grinding means arranged to form a ground area on said one surface of said web, means arranged downstream from said grinding means to apply a layer of a fluid-impermeable material to the ground area of said web, and means arranged to de-emboss said ground area and to form an aperture through said web in said ground area, said conveying means including a rotating drum having a plurality of embossing dies on the outer surface thereof, said embossing dies being each arranged to raise a first portion of the web above the surface of said drum a distance just less than the thickness of the web and a second portion of the web surrounding said first portion a distance substantially less than the thickness of said web.

18. The invention according to claim 17 wherein said second raised portion is contiguous with said first raised portion.

19. The invention according to claim 17 wherein said grinding means is arranged to remove a portion of said first and second embossed portions of said web and to form a ground area spaced above the surface of the surrounding web.

20. The invention according to claim 17 wherein said fluid-impermeable material applying means includes means for printing said material on said ground area.

21. The invention according to claim 20 wherein said printing means includes a gravure roll for applying said material to said ground area.

22. The invention according to claim 20 wherein said de-embossing means is arranged to de-emboss said web after said material has been printed on said ground area and after said web has been removed from said dies on said drum.

23. The invention according to claim 17 wherein said web is embossed in said first portion a distance at least as great as the thickness of said film chip and in the second portion a distance substantially less than the thickness of said film chip.

24. The invention according to claim 23 wherein the second portion is embossed a distance at least as great as the thickness of said layer of fluid-impermeable material.

25. The invention according to claim 23 wherein said de-embossing means is arranged to de-emboss said web after said material has been printed on said ground area and after said web has been removed from said dies on said drum.

26. The invention according to claim 25 wherein said aperture forming means is comprised of a mating punch and die arranged to form an aperture through said first portion of said de-embossed coated ground area.

27. The invention according to claim 26 wherein said punch and die is arranged to form said aperture substantially in the center of said coated ground area.

28. Apparatus for producing an aperture record card from a substantially continuous web of fibrous cardstock, each of said record cards having a shouldered aperture arranged to receive a film chip over said aperture, said apparatus comprising the combination of a rotating drum having a plurality of embossing dies on the outer periphery thereof extending above the surface of the drum, said die means arranged to raise a first portion of the web above the surface of the surrounding web a distance at least as great as the thickness of said film chip and

a second portion of the web surrounding and contiguous with said first portion a distance substantially less than the thickness of said film chip, means for supplying a substantially continuous web of cardstock onto the surface of said drum, means including vacuum supply means extending through at least a portion of the drum surface for embossing said cardstock on said dies to raise a portion thereof above the surface of the surrounding cardstock, grinding means including a plurality of grinding wheels spaced above the outer surface of said drum a distance greater than the thickness of the cardstock but less than the height of the embossed surface of the cardstock, said grinding means arranged to form a substantially rectangular ground area on said raised portion of said cardstock, said ground area being substantially equidistant from the surface of said drum, printing means including a substantially cylindrical gravure roll disposed adjacent said drum and arranged to coat a substantially uniform layer of fluid-impervious material on the ground area of said cardstock, means arranged to remove said coated ground cardstock from said drum, means downstream of said drum arranged to de-emboss said coated ground area, punch and die means disposed downstream of said de-embossing means arranged to perforate an aperture substantially in the center of said de-embossed coated ground area, and means arranged to cut said web into a plurality of individual record cards each containing an aperture substantially in the center of a coated ground area.

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