Feb. 13, 1962 H. R. PALMER ETAL 3,020,836

STENCIL APERTURE TABULATING CARD

Filed Dec. 27, 1960 3 Sheets-Sheet 1

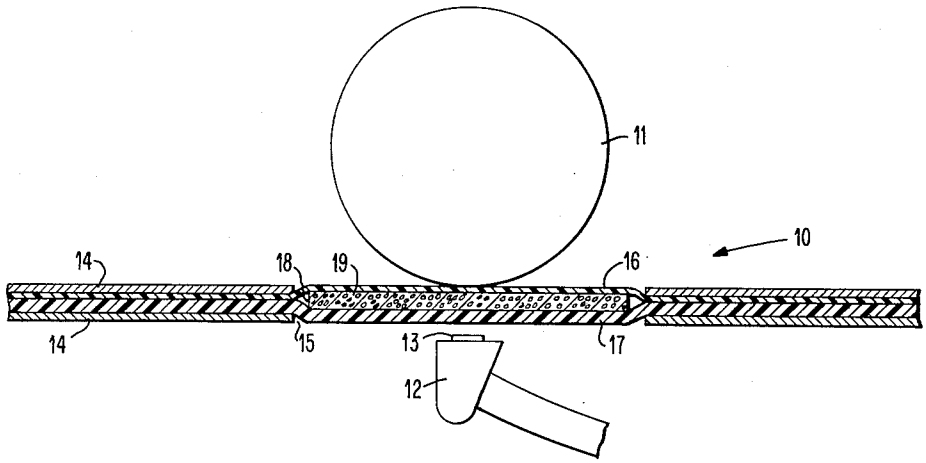


FIG. 1

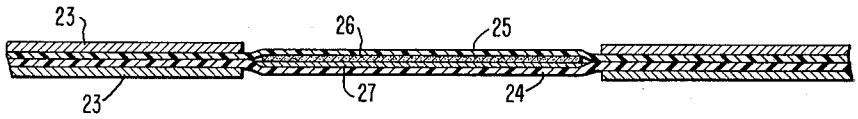


FIG. 2

INVENTORS
MERLE P. PRATER
HARRY R. PALMER

BY G. R. Gugger
AGENT

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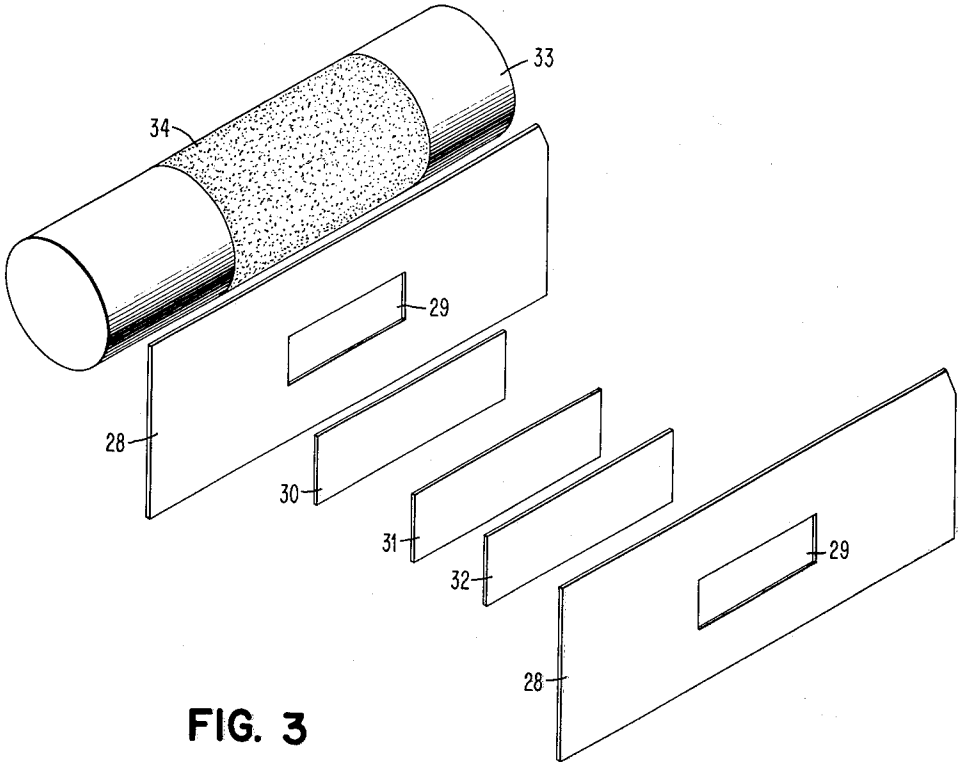


FIG. 3

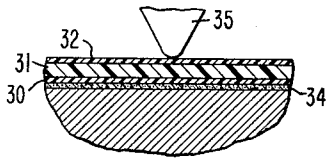


FIG. 4a

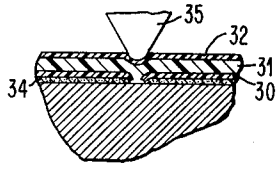


FIG. 4b

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STENCIL APERTURE TABULATING CARD
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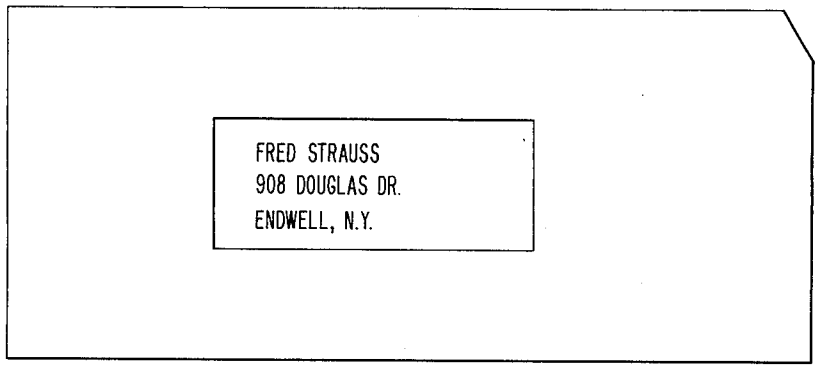


FIG. 5

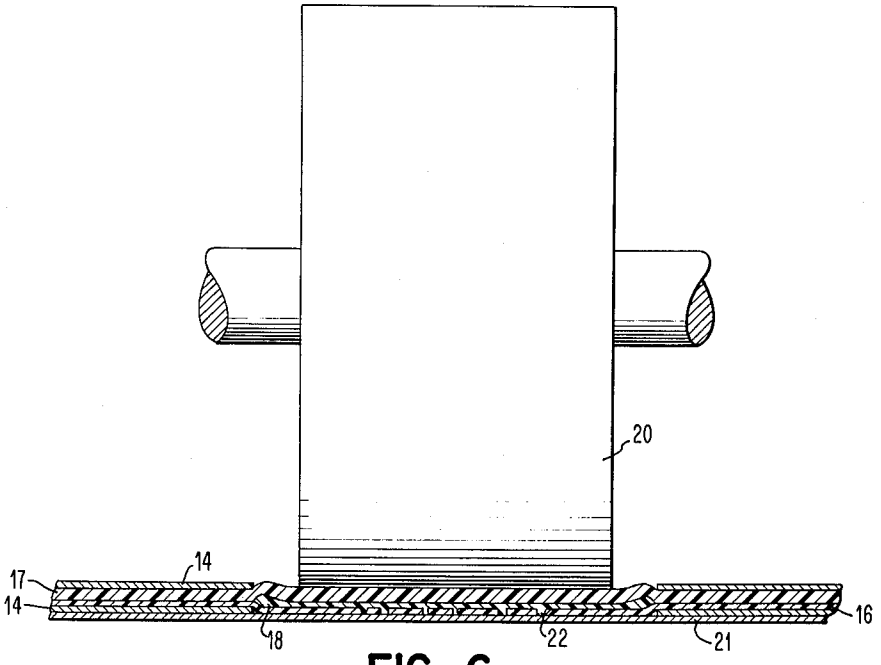


FIG. 6

United States Patent Office 3,020,836 Patented Feb. 13, 1962

3,020,836

STENCIL APERTURE TABULATING CARD

Harry R. Palmer and Merle P. Prater, Vestal, N.Y., assignors to International Business Machines Corporation, New York, N.Y., a corporation of New York

Filed Dec. 27, 1960, Ser. No. 78,717
7 Claims. (Cl. 101—125)

This invention relates to a stencil aperture tabulating card and more particularly to a stencil aperture tabulating card which includes a self-contained ink supply.

In connection with data processing equipment of the type which employs tabulating cards, there has been a demand for an improved stencil tabulating card which may be conveniently intermixed with regular tabulating cards and processed through the well-known tabulating card machines to provide additional new and useful applications for the machines. For example, a desired application is to employ a standard well-known card collating machine which is provided with a pressure roll type print station installed at the merge station. The improved stencil aperture cards are placed in the secondary feed and conventional bank checks in the primary feed can be matched by account number and the name and address printed on the checks.

In accordance with one embodiment of the present invention, a stencil aperture tabulating card is provided which includes a self-contained ink supply and internal means for cutting the stencil area in response to pressure imposed by, for example, the type faces of a typewriter. The tabulating card has the usual frame with a central window. The frame may be made up of two layers and secured between these layers and disposed in the window area is a laminated unit which includes outer layers of plastic sheet and an intermediate ink supply contained in a thin cellular matrix. Associated with the inking sheet is a uniform filling of glass beads of appropriate size for perforating one of said outer plastic sheets. The outside plastic layers may be of different thicknesses and strength and in this regard the back layer preferably is thinner and less tough than the front layer. To cut a stencil on the stencil aperture tabulating card, the card is put into a typewriter, or other impact printing device, and the ribbon of the typewriter is put aside for the cutting operation. The type faces are brought down against the front sheet and the localized pressure applied in each instance causes the small glass beads which receive that pressure to cut through the back less tougher sheet in accordance with the type pattern. The minute holes cut in the back sheet are large in relation to the cell structure of the ink material and thus in essence are self-sealing by virtue of decreased capillarity until the tabulating card is put to printing use and is subjected to a printing pressure against a sheet which is to receive a printed impression. Under the pressure of printing, the small apertures in the back plastic sheet allow ink to be delivered outside the card and onto the available surface for printing. When the printing pressure is relieved, the capillary action of the cellular matrix will prevent any further flow of ink through the apertures to prevent leakage when the stencil is not subject to pressure. As a result of the above improved stencil construction, it has been found that exceptionally good printing impressions may be obtained and that the transfer process is carried out very clearly since leakage of the self-contained ink supply is effectively prevented.

It has also been found that variations in the construction of the present stencil card may be made which will also contribute to a transfer operation which will give printing impressions of outstanding quality. For example, the center sheet of glass bead and ink filled cellular plastic material may be replaced by a sheet of ink impregnated sandpaper such that when the stencil is cut in the typewriter, a plurality of minute perforations are formed in the thin backing plastic sheet by the projecting granules of sand. When the stencil card is subjected to pressure then, the ink contained in the impregnated sandpaper will be forced to pass through these minute perforations formed by the typefaces to carry out the print transfer.

Still another variation which has been found to be quite economical and which will give extremely good results is to make the center sheet of the stencil out of ink impregnated cellular plastic material without any glass bead filling. The stencil is then cut in a typewriter having a platen which is covered with a beaded back-up sheet for producing the minute perforations when struck by the type-face.

Accordingly, a principle object of the present invention is to provide an improved stencil aperture card which includes a self-contained and self-sealing ink supply.

Another object of the present invention is to provide an improved stencil aperture card having a self-contained ink supply and including means for producing minute apertures in the stencil when the stencil is subjected to pressure.

Still another object of the present invention is to provide a stencil aperture tabulating card having a self-contained and self-sealing ink supply and which is adapted for processing through standard card tabulating machines for special printing applications.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a sectional view showing a stencil card constructed in accordance with the principles of the present invention and the means for forming a character therein.

FIG. 2 is a sectional view showing another embodiment of a stencil card constructed in accordance with the principles of the present invention.

FIG. 3 shows another embodiment of a stencil card and is a perspective view of the assembly parts in separated disclosure and in the order of the built-up card.

FIGS. 4*a* and 4*b* are partial sectional views illustrating the manner of cutting the stencil card of FIG. 3.

FIG. 5 is a view illustrating a typical stencil aperture card.

FIG. 6 is a sectional view showing the manner in which printing is effected when the stencil card is subjected to pressure.

Referring for the present to FIG. 1 which illustrates a preferred embodiment of the invention, the reference character **10** designates generally a stencil card which embodies the invention, the stencil card **10** being shown in connection with a typewriter platen **11** and a typewriter hammer **12** having a type slug **13** adapted to cut the stencil.

The stencil card assembly **10** comprises a pair of outer sheets of thin tabulating card stock **14** with each of said sheets being provided with a central cutout window portion or aperture **15**. The sheets **14** form the framework for the aperture and they have secured between them, by suitable adhesive means, a back face sheet **16** and a front face sheet **17** of plastic film. The back film sheet **16** is preferably thinner and less stronger than the front film sheet **17**, said back film sheet having a thickness in the order of .00025 inch while the front film sheet has a thickness of .0005 inch. The two film sheets extend through the aperture portion of the card to form, in effect, two window panes in between which is secured a matrix

of ink filled cellular plastic **18** having embedded therein a plurality of small glass beads **19**. The matrix **18** is confined within the boundaries of the window portion of the card and is combined with the front and back plastic sheets to make up the laminated print transfer stencil portion of the card. The portions of the plastic film sheets **16** and **17** which extend beyond the apertured window area are suitably connected to each other by adhesive means as well as being connected to the card stock framework to provide an integrated stencil card assembly. The total thickness of the stencil aperture area would be less than the thickness of the tabulating card. The back and front sheets **16** and **17** may be of any suitable plastic film or may be wax impregnated sheets commonly found in printing stencils. As one example, "Mylar" material may be satisfactorily used.

"Mylar" is a commercially available highly durable transparent water-repellent film of polyethylene terephthalate resin. It is characterized by outstanding strength, electrical properties and chemical inertness and it may be used from 60 to 150 degrees centigrade because of its inherent thermal stability. It is available in thicknesses from .00025 inch to .0075 inch and has proven to be extremely useful for the present stencil application. Matrix **18** may be of any suitable porous plastic material which will retain a supply of ink. For example, a matrix constructed of "Porelon" material has proven quite satisfactory in the present stencil. "Porelon" is a commercially available solid substance having an interconnected network of open spaces, wherein the open spaces are of microscopic proportions. It is referred to as a "micro reticulated structure" and it is a highly porous plastic resin, the microscopic pores of which may be filled with ink or other liquid. For a detailed explanation of the manufacture and properties of "Porelon" material, reference should be made to U.S. Patent 2,777,824, issued January 15, 1957.

As illustrated in FIG. 1, to cut the stencil on the above stencil aperture tabulating card, the card is put into a typewriter and the ribbon of the typewriter is put aside for the cutting operation. The type faces **13** are brought against the front plastic sheet **17** and the localized pressure applied in each instance causes the small glass beads **19** which receive that pressure to cut through the thinner and less tough back plastic sheet **16** in accordance with the type pattern. The type face will not penetrate through the thicker front sheet **17**. A feature of the present invention resides in the fact that the cuts in the back plastic sheet are self-sealing against the ink supply available from the cellular matrix inking layer until the tabulating card is put to printing use and is subjected to a printing pressure against a sheet which is to receive a printed impression. It was found that the desired self-sealing action could be obtained because the capillary pull of the cellular plastic material proved to be greater than the pull caused by the small holes in the plastic film material thereby insuring a non-leaking ink supply.

Illustrated in FIG. 5 is a stencil aperture tabulating card which has been cut and which is ready for printing use. Referring to FIG. 6, there is illustrated the method of effecting a print transfer. The cut stencil aperture tabulating card may be fed in a suitable record card tabulating machine and passed between a pressure roller **20** and the print receiving sheet **21**. Under the pressure of the roller, ink from the porous matrix **18** is allowed to pass through the small cuts or apertures **22** in the back plastic film sheet **16** and be deposited on the printing surface of sheet **21**. When the stencil passes beyond the roller and the pressure is relieved, the ink is no longer capable of flowing through the apertures **22** due to the capillary pull exerted by the small cell structure of the ink matrix **18**. There is thus produced a very clean printing process similar to a gravure process and hundreds of printing impressions may be made from one stencil before the stencil would have to be remade.

In FIG. 2 there is shown another embodiment of a stencil aperture card embodying the principles of the present invention. As before, the two outer sheets of tabulating card stock **23** each have a central window portion and provide the framework for retaining the front and back plastic film sheets **24** and **25**. However, in this case, the film sheets both have a thickness of .00025 inch with the front sheet being less tougher than the back and they have positioned between them and within the boundaries of the window area a sheet of porous sandpaper **26** and a supply of ink **27** which adjoins the roughened side of the sandpaper. The striking of a type face against the front film sheet **24** will cause the desired minute perforations to be made in the film by the protruding granules of sand in the sandpaper backing. Upon the application of printing pressure to the back of the stencil, the minute perforations in the plastic film will allow the forced ink to pass through to effect a print transfer and upon removal of the printing pressure, the viscosity of the ink is sufficient to prevent any leakage of ink through said perforations.

Still another embodiment of the improved stencil aperture tabulating card is shown in FIG. 3. As shown, the card assembly comprises the two outer sheets of thin card stock **28** each having the central window portion **29**. Secured in between the sheets **28** are a back sheet of plastic film **30**, a cellular matrix **31** containing a supply of ink, and a front sheet of plastic film **32**. This stencil is cut on a typewriter, the platen **33** of which is provided with a beaded back-up sheet **34**. As shown in FIGS. *4a* and *4b*, the type face **35** is directed against the front sheet **32** of the stencil which causes the beaded back-up sheet to produce the necessary minute apertures **36** in the back film sheet **30**. Printing is again effected by the application of pressure to the stencil and upon the removal of such pressure, the capillary pull of the cellular matrix material will effectively prevent leakage of ink.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A stencil aperture tabulating card adapted for conversion into a printing stencil by the impact of type thereon which comprises in assembly a pair of outer sheets of thin card stock, each of said sheets having an apertured window portion, a pair of inner sheets of plastic film secured to the inner faces of said card stock sheets and extending across the apertured portions thereof to form a stencil area defined by the boundary of said apertured portions, a sheet of highly porous ink filled plastic resin secured between said film sheets and within the boundary of said stencil area, and a plurality of small glass beads imbedded in said ink filled sheet for effecting internal cutting of said stencil area under the impact of type thereon.

2. A stencil aperture tabulating card as defined in claim 1 wherein one of said film sheets is of lesser strength and thickness than the other, said glass beads serving to produce minute perforations in said film sheet of lesser thickness when the film sheet of greater thickness is subjected to the impact of type.

3. A stencil aperture tabulating card adapted for conversion into a printing stencil by the impact of type thereon which comprises in assembly a pair of outer sheets of thin card stock, each of said sheets having an apertured window portion, a pair of inner film sheets of plastic film secured to the inner faces of said card stock sheets and extending across the apertured portions thereof to form a stencil area defined by the boundary of said apertured portions, a sheet of ink filled cellular plastic secured between said film sheets and within the boundary of said apertured portions, and a plurality of small glass beads

imbedded in said ink filled sheet for producing minute perforations in one of said film sheets when said stencil area is subjected to the impact of type, said ink filled cellular plastic sheet having a greater capillary pull than the pull caused by said minute perforations in the plastic film sheet to insure a non-leaking ink supply.

4. A stencil aperture tabulating card adapted for conversion into a printing stencil by the impact of type thereon which comprises in assembly a pair of outer sheets of thin card stock, each of said sheets having an apertured window portion, a pair of inner film sheets of polyethylene terephthalate resin secured to the inner faces of said card stock sheets and extending across the apertured portions thereof to form a stencil area defined by the boundary of said apertured portions, one of said film sheets having less strength than the other, a matrix of ink filled cellular plastic secured between said film sheets and within the boundary of said apertured portions, and a plurality of small glass beads imbedded in said ink filled matrix for producing minute perforations in said film sheet having lesser strength when said stencil area is subjected to the impact of type, said ink filled cellular plastic matrix having a greater capillary pull than the pull caused by said minute perforations in the polyethylene terephthalate resin sheet to insure a non-leaking ink supply.

5. A stencil aperture tabulating card adapted for conversion into a printing stencil by the impact of type thereon which comprises in assembly a pair of outer sheets of thin card stock, each of said sheets having an apertured window portion, a pair of inner film sheets of plastic secured to the inner faces of said stock sheets and extending across the apertured portions thereof to form a stencil

area defined by the boundary of said apertured portions, and a sheet of ink impregnated sandpaper secured between said film sheets and within the boundary of said stencil area, the granules of sand on said sandpaper being effective to produce minute perforations in one of said film sheets when said stencil area is subjected to the impact of type, and said ink having sufficient viscosity so that leakage through said perforations is normally prevented.

6. A stencil aperture tabulating card adapted for conversion into a printing stencil by the impact of type against the stencil portion of same and a beaded back-up member which comprises in assembly a pair of outer sheets of thin card stock, each of said sheets having an apertured window portion, a pair of inner film sheets of plastic secured to the inner faces of said card stock sheets and extending across the apertured portions thereof to form a stencil area defined by the boundary of said apertured portions, and a sheet of ink filled cellular plastic secured between said film sheets and within the boundary of said stencil area, the beaded back-up member being effective to produce minute perforations in one of said film sheets when said stencil area is subjected to the impact of type, and said ink filled cellular sheet having a greater capillary pull than the pull caused by said minute perforations in the plastic film sheet to insure a non-leaking ink supply.

7. A stencil aperture tabulating card as defined in claim 6 and characterized by said inner film sheets taking the form of a polyethylene terephthalate resin.

No references cited.