United States Patent [19]

Crowley

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[54] **READ HEAD ASSEMBLY FOR CARD READER**

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[73] Assignee: **AMP Incorporated,** Harrisburg, Pa.

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[52] **U.S. Cl.** ..... **235/61.11 C,** 200/46

[51] **Int. Cl.** **G06r 7/06**

[58] **Field of Search** ..... 235/61.11 A, 61.11 B, 235/61.11 C, 61.11 D; 200/46

[56] **References Cited**

UNITED STATES PATENTS

3,513,299	5/1970	Loose	235/61.11 A
3,492,447	1/1970	McFadden	235/61.11 A

FOREIGN PATENTS OR APPLICATIONS

1,217,804	12/1959	France	235/61.11 C

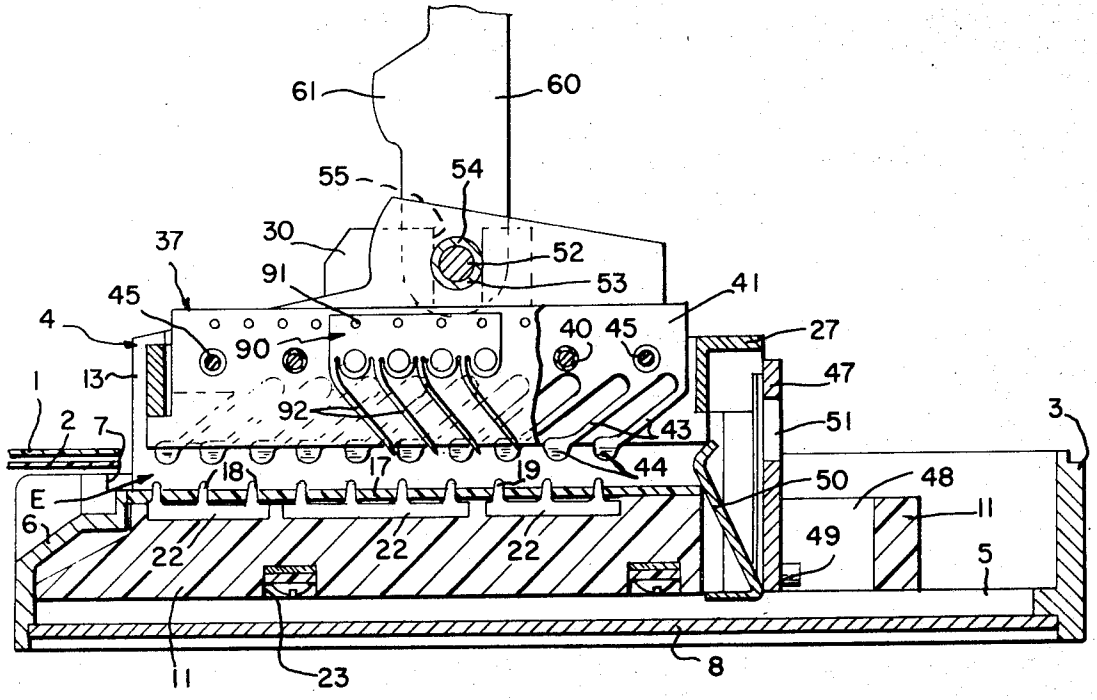
Primary Examiner—Thomas A. Robinson

Attorney—William J. Keating, Ronald D. Grefe, Gerald K. Kita, Frederick W. Raring and Jay L. Seitchik

[57] **ABSTRACT**

The disclosure relates to a card reader head assembly which comprises stationary and movable contact members between which is provided a card receiving area in which a data card or cards are to be disposed. The movable contact members are provided with contact fingers disposed in an insulating block with the contact members forming plate means having leg members extending outwardly at an acute angle with respect to the plate means and contact feet at the free ends of the leg members. The contact feet are disposed in alinement with respective contact elements on the stationary contact means. A holding device is provided which includes a plurality of fingers positioned on the movable contact means adjacent the contact members and sloping in a direction opposite to the contact members. Operating means is connected to the movable contact means to move same toward the stationary contact means with the edges of the contact feet wipingly engaging respective contact elements of the stationary contact means and the contact feet and leg members being movable in the same containing plate means.

9 Claims, 2 Drawing Figures



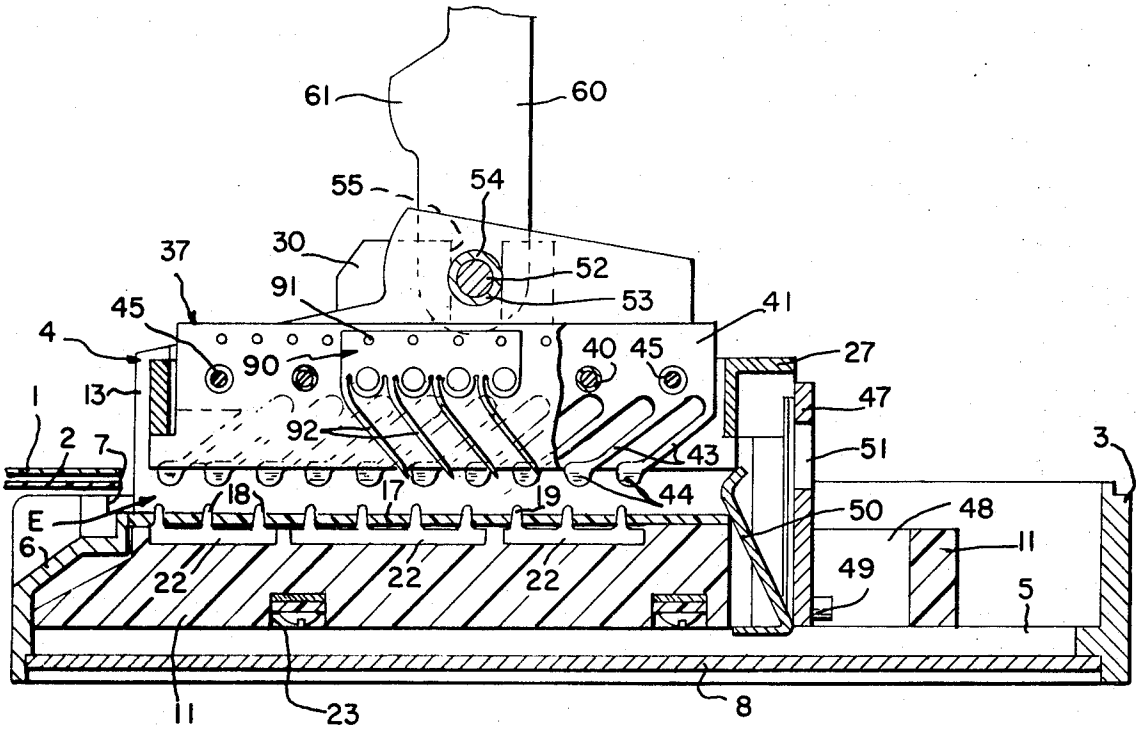

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FIG 1

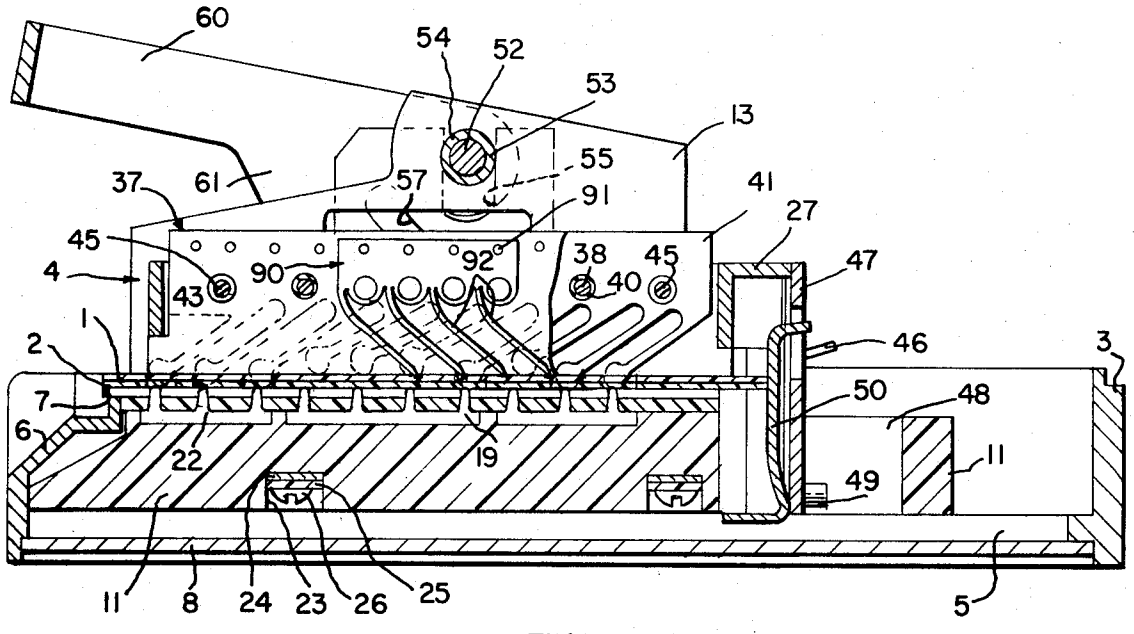

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FIG 2

READ HEAD ASSEMBLY FOR CARD READER

BACKGROUND OF THE INVENTION

This invention relates to a head assembly for a card reader and, more specifically, to a card reader head assembly of the type to read information on cards of the credit card variety and the like.

Credit cards having coded information thereon are being used in an ever increasing number in today's business and other areas. A few of the fields in which these cards are utilized are accounting, identification, credit capability, process control, etc. In some of the above described uses, wherein security becomes a problem, a double card system is used wherein two cards are utilized, one atop the other, whereby, if one card is lost, it has no individual utility.

Problems have been encountered in the double card system and, to a lesser degree in the single card system due to card movement while the contact members of a read head assembly slide over the card during operation of the reader. Card movement of as little as 1/32 of an inch is found to cause reading errors by lifting contacts out of the holes in the card.

SUMMARY OF THE INVENTION

The present invention is directed to an improved reader head for a card reader wherein stationary and movable contact members cooperate in reading a data card placed in the card receiving area. The movable contact members are mounted in an insulating block and include contact fingers, while the contact members define plate means having leg members extending outwardly at an acute angle therefrom and contact feet at the free ends of the leg members which are aligned with the stationary contact elements. A card retaining or holding means is provided which comprises a plurality of retention fingers positioned on the movable contact means adjacent the contact members and sloping in a direction opposite thereto. The mode of operation of the said card holding means is described subsequently.

One of the primary objects of this invention is to provide a card reader to read out the coded information on a credit card or cards in a reliable and effective manner.

It is a further object of this invention to provide a card reader having a removable contact block which includes movable contact members and means to prevent card movement.

It is a further object of this invention to provide fingers on the read head assembly of a card reader to prevent card movement caused by contact movement over the cards during the reading operation.

The above objects and other objects and attainments of the present invention will become apparent to those skilled in the art after consideration of the following preferred embodiment thereof which is provided by way of example and not by way of limitation, wherein:

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view showing the card reader in its normally inoperative position prior to insertion of a card within its card receiving area; and

FIG. 2 is a view as in FIG. 1 showing the card reader in its operative position reading out information from a card positioned in the card receiving area.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The foregoing objects of the present invention are accomplished through the provision of a card reader having a stationary portion having spaced contact members in the form of rails which are in alinement with an entrance through which a card is to be inserted. A carriage is movably mounted relative to the portion carrying the rails. Movable contact members are carried by the carriage in corresponding relationship with respect to the rails and the movable contact members are guided in their movement when engaging respective rails. The carriage is guided in its movement relative to the portion carrying the rails and guide and operating means are associated with the carriage to cause the movable contact members to wipingly engage the rails while under the influence of pressure. Ejection means can be provided in the card reader in order to readily eject the card from the reader after the coded information carried by the card has been read out therefrom.

The above is fully set forth in the U.S. Pat. to Loose No. (3,513,299) which patent is incorporated herein in its entirety by reference. The present invention, constituting an improvement to the read head assembly of the Loose patent or of similar devices, comprises the mounting of plural retention fingers on the read head assembly with the retention fingers having relatively sharp end portions for gripping the card, the retention fingers sloping in a direction reverse to the slope of the contact members and/or the direction of movement of the contact members over a card being read.

Referring now to FIG. **1**, there is shown a side view of a read head assembly for use in card readers and the like with the assembly in the inoperative condition. It is to be understood that though the assembly is shown herein specifically as a replacement for the read head assembly of the above mentioned U.S. Pat. No. 3,513,299 to Loose, and specifically for the assembly of FIGS. **8***a* and **8***b* thereof, the invention herein can be used with virtually any read head assembly having spring type contact fingers of the kind set forth in said Loose patent or the like. The card reader includes an entrance E for receiving a single card **1** or a pair of cards **1** and **2** as is shown in FIG. **1**. The entrance E is formed between the base member **3** and a cover member **4** of the card reader. Base **3** is a box shaped member having a partially open bottom and a recess **6** in the front wall defining part of entrance E. Recess **6** is in communication with a recessed area **7** in the center part of the front wall of base **3**. The remaining elements set forth by character references in FIGS. **1** and **2** are identical to the corresponding character references in the above-identified Loose patent and are structurally identical thereto.

Cards **1** and **2** are inserted in the same manner as described in the above-mentioned Loose patent. These cards are placed into the entrance E as shown in FIG. **1** and will be located in reading position as shown in FIG. **2** but prior to operation of the reader as shown in FIG. **1**. The cards **1** and **2** will be positioned below the contact members **44** as shown in FIG. **1**. Upon closing of the reader in order to read the contents of the cards **1** and **2** in the manner described in the above mentioned Loose patent, it can be seen that the leg members **43** and contact feet **44** at the ends thereof are slanted in leftwardly and downwardly direction and,

upon closure, will ride over the top of the topmost card 1 in the case when two cards are used. This movement of the contact feet over the card 1 will cause the card 1 to move toward the left, thereby causing misalinement of the card 1 relative to the card 2 and providing erroneous readings. In order to overcome this problem the read head assembly of the Loose patent has been modified by the addition thereto of a holding device 90 which is secured to the side of the read head assembly by means of rivets 91 or the like and has a plurality of downwardly sloping fingers 92 which slope in a direction opposite to the slope of the contact feet 44 and leg members 43 as shown in FIG. 1 and generally in a direction opposite to the direction of slide of the contact feet 44 over the card 1. The tips of the fingers 92 are relatively sharp in order to be able to dig into the card 1 being read. In addition, the fingers 92 may be slightly resilient.

It can be seen that, in operation, as the leg members 43 and contact feet 44 come down during operation and contact the card 1, the force applied to the card 1 by the feet 44 is toward the left. This movement is compensated for by the fingers 92 which dig into the card and prevent movement thereof toward the left. In this manner, as the read head assembly is closed as shown in FIG. 2, cards 1 and 2 remain in constant position relative to each other due to the rightwise force applied to the card 1 by the fingers 92. In this manner, slippage of the cards 1 and 2 relative to each other is prevented.

It should also be noted that in the case of one card, removal of such card or of the top card in the two card system can also be prevented by use of the fingers 92 and associated structure as described hereinabove. It should also be noted that the fingers 92 contact the card 1 in a region thereof beyond the area wherein apertures are formed in the card, thereby preventing any possibility of card mutilation or the like. It should be understood that though the invention herein has been described with respect to the head assembly of the above-mentioned Loose patent, the invention can also be utilized in other similar type read head assemblies. Accordingly, the invention herein is considered to be of broader scope than that of the preferred embodiment described.

Though the invention has been described with respect to a specific preferred embodiment thereof, many variations and modifications thereof will immediately become apparent to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible in view of the prior art to include all such variations and modifications.

What is claimed is:

1. A read head assembly for a card reader which comprises a first carrier member having contact surface means disposed thereon, a second carrier member relatively movable toward and away from said first carrier member, at least one spring connector means carried by said second carrier member, said spring connector means including a plurality of leg members having contact feet at the tip portions thereof, said contact feet moving in a predetermined direction over a card during a reading operation in a plane substantially parallel to said first carrier member and projecting finger means secured to said second carrier member and engaging said card for preventing card movement due to movement of said contact feet over said card.

2. A read head assembly as set forth in claim 1 wherein said means secured includes at least one finger extending downwardly from said first carrier and outwardly in a direction opposite to the direction of movement of said contact feet over said card.

3. A read head assembly as set forth in claim 2 wherein said fingers have a substantially pointed end portion.

4. A read head assembly as set forth in claim 1 wherein said leg members are resilient and extend downwardly and outwardly in said predetermined direction.

5. A read head assembly as set forth in claim 2 wherein said leg members are resilient and extend downwardly and outwardly in said predetermined direction.

6. A read head assembly as set forth in claim 3 wherein said leg members are resilient and extend downwardly and outwardly in said predetermined direction.

7. A read head assembly as set forth in claim 6 wherein said fingers are positioned adjacent an edge of said first carrier member, the end portions of Said fingers extending downwardly to substantially the same line as said contact feet when said contact feet and leg members have no force applied thereto.

8. A read head assembly as set forth in claim 2 wherein said fingers are positioned adjacent an edge of said first carrier member, the end portions of said fingers extending downwardly to substantially the same line as said contact feet when said contact feet and leg members have no force applied thereto.

9. A read head assembly as set forth in claim 4 wherein said fingers are positioned adjacent an edge of said first carrier member, the end portions of said fingers extending downwardly to substantially the same level as said contact feet when said contact feet and leg members have no force applied thereto.

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