# United States Patent [19]

**Zeutschel**

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[54] **MICROFORM POSITIONING APPARATUS**


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[73] Assignee: **NCR Corporation,** Dayton, Ohio



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[30] **Foreign Application Priority Data**

Aug. 14, 1972 Germany ..... 2234052

[52] **U.S. Cl.** ..... **353/27,** 353/78

[51] **Int. Cl.** ..... **G03b 21/11,** G03b 23/08

[58] **Field of Search** ..... 353/27, 26, 25, 22–27, 353/78; 355/53



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*Attorney, Agent, or Firm*—J. T. Cavender; Wilbert Hawk, Jr.; George J. Muckenthaler



[57] **ABSTRACT**

A microform carrier has at least one elongated projection, or a series of aligned projections, cooperable with a recess or groove in a bar or rail extending in the "X" direction for permitting unrestricted movement of the microform along a line in said direction. Alternatively, the carrier may include a plurality of projections in matrix fashion corresponding to columns and rows of images on the microform to permit incremental positioning of the microform in the Y direction while permitting slidable movement in the X direction to observe a desired image. Conversely, the projections may be formed on the bar or rail and a series of recesses may be provided in the carrier to obtain the control and movement of the carrier and of the microform for viewing the desired image.


**6 Claims, 12 Drawing Figures**

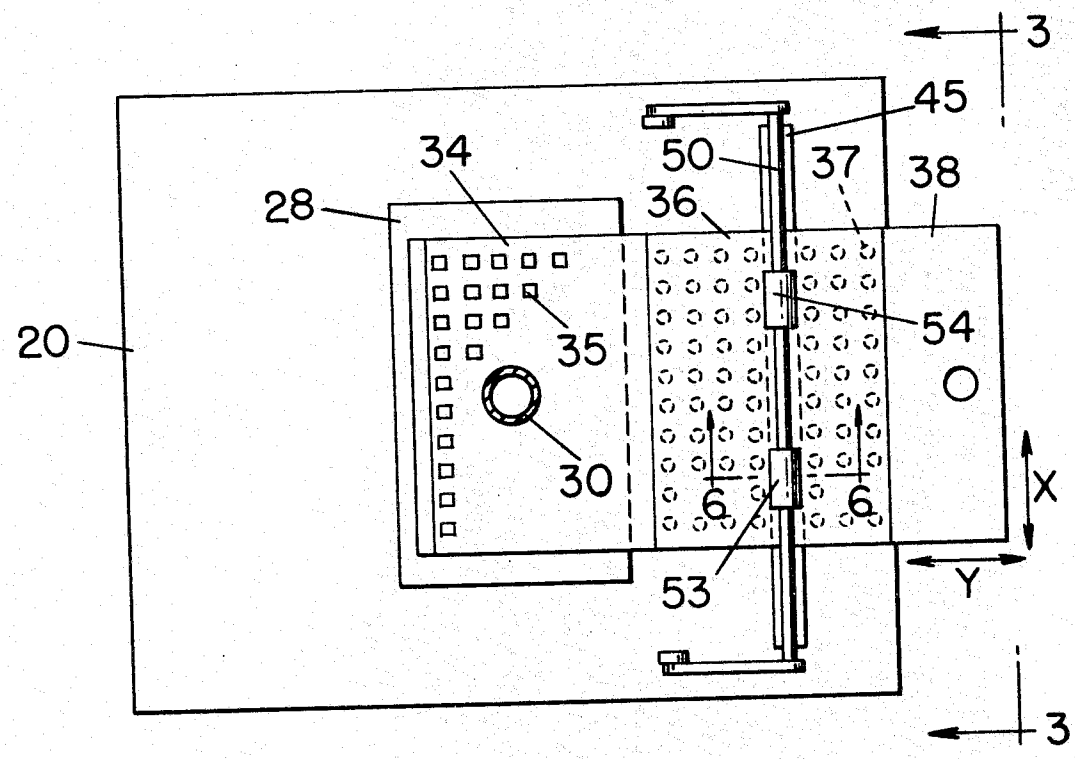


FIG. 1

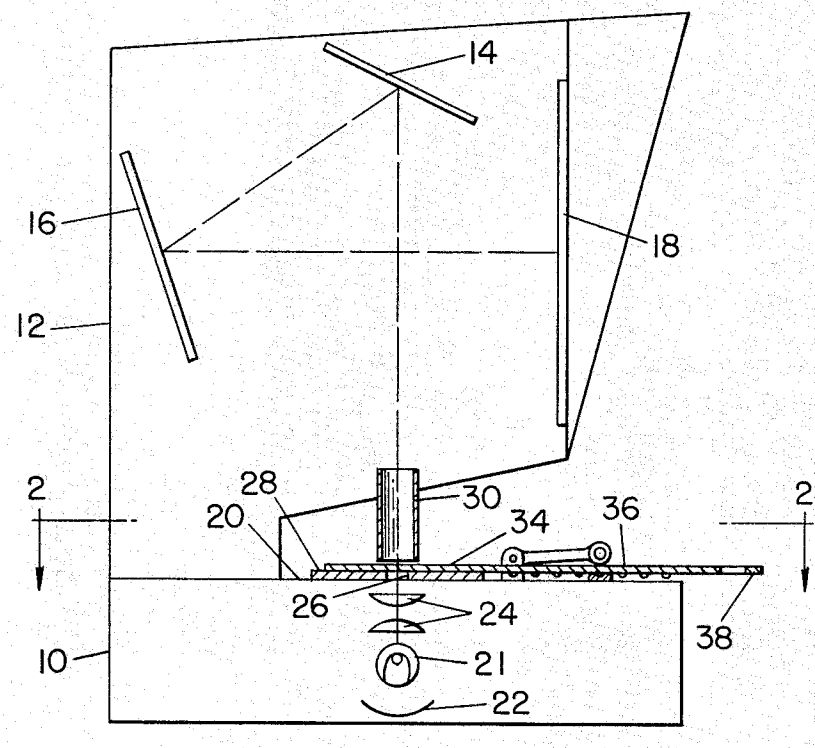



FIG. 2

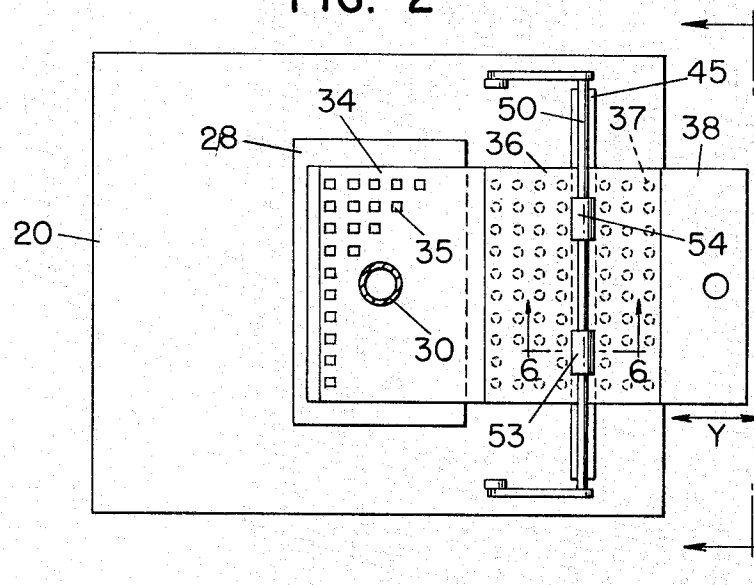



FIG. 3

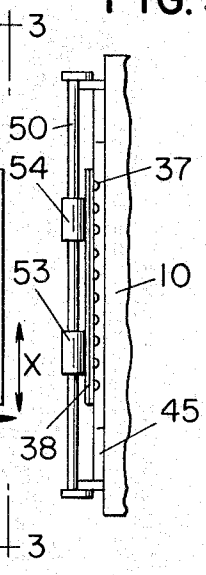


FIG. 4

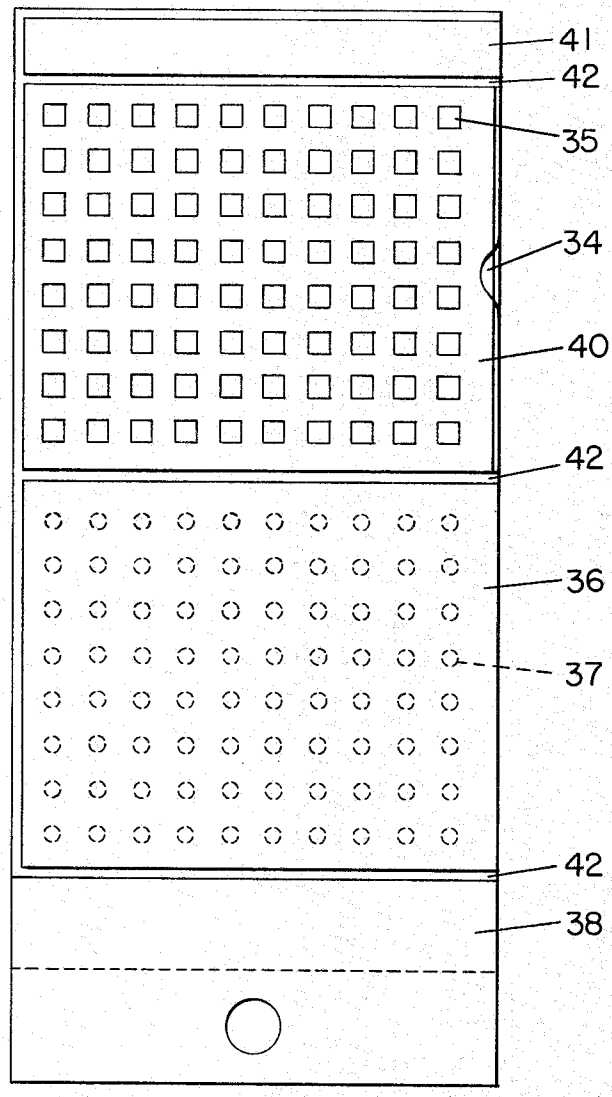



FIG. 5

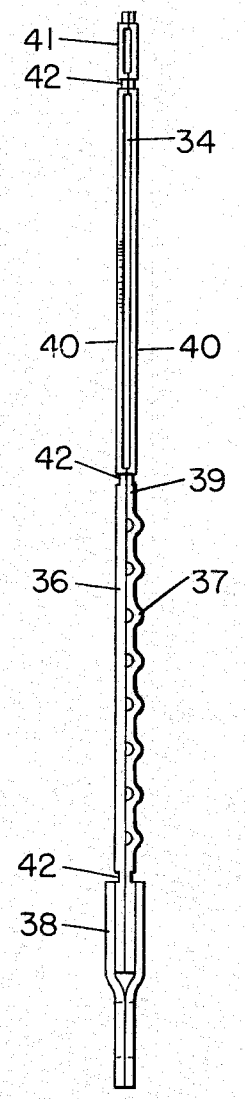



FIG. 6

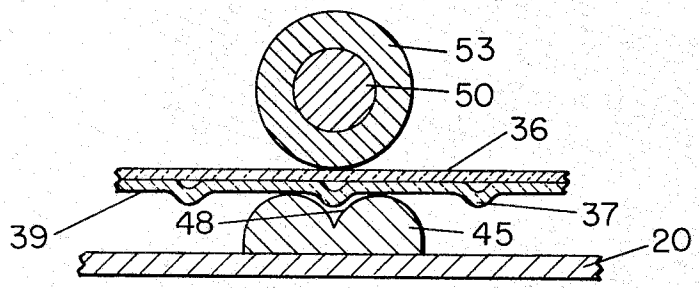


FIG. 7

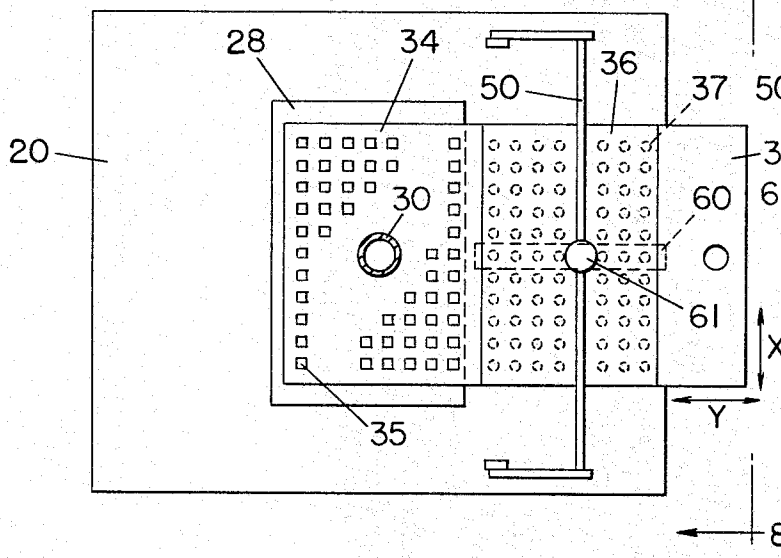



FIG. 8

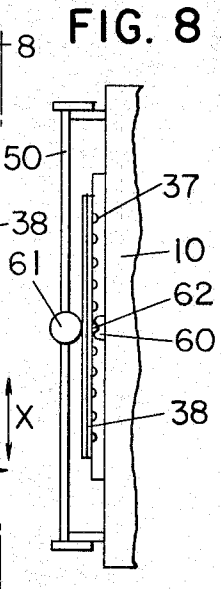



FIG. 9

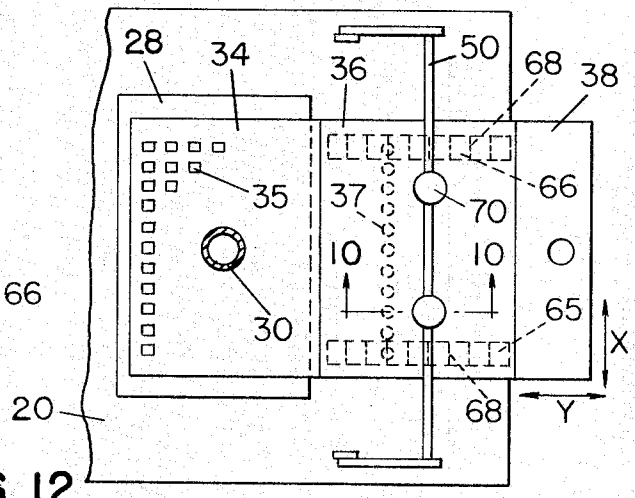



FIG. 10

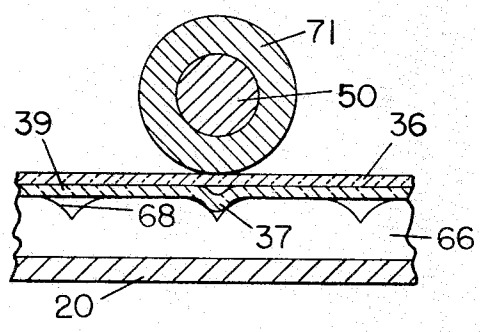



FIG. 11

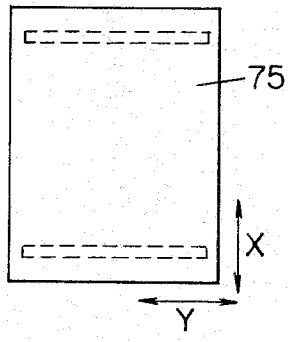
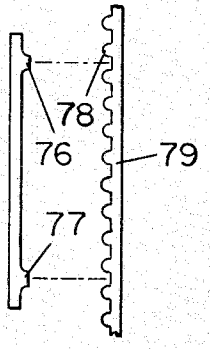



FIG. 12



# MICROFORM POSITIONING APPARATUS

## BACKGROUND OF THE INVENTION

As is well known, a microform reader includes a light source, an optical system for magnifying a microimage and for projecting the enlarged image onto a screen for viewing thereof, and a microform carrier for positioning the microimage desired to be viewed. The microform holder or carrier has generally included a lower glass plate, secured to a framework, and an upper glass plate, pivotable along the rear edge thereof and operable to receive a microform between the plates, the carrier being movable in both X and Y-directions to enable a certain microimage to be rapidly selected for projection onto the screen. The microimages are arranged on a card or fiche in rows and columns, and the microfiche holder is positioned on a table between the light source and the projection lens assembly and is slidable across the table by the operator to the desired microimage position. Upon reaching a new position, it is necessary to insure that the microform remain in precise alignment in the X and Y-direction, and it is often necessary to refocus the image in such new position.

While the use of such glass plates, both for containing the microform therebetween and for providing a convenient means of positioning the microform in relation to the projection lens assembly, has been an extremely successful concept in the microform reader industry, it is desirable to reduce the overall cost of the microform units and at the same time to provide a positioning device which assures retention of a desired microimage in a precise position to to be viewed.

## SUMMARY OF THE INVENTION

The present invention relates to microform readers and more particularly to microform positioning apparatus which includes a series of projections cooperating with a plurality of recesses to position and to retain position of the microform in a desired location. The microform positioning apparatus includes a carrier which has at least one papillaary or fin-like projection, or it may have recess (which projection or recess may also be referred to as positioning marks) respectively cooperating with a corresponding recess or a projection of the table or frame on the reader in a manner so as to enable an arrested position of a particular image desired to be viewed, and wherein the projection and/ or recess corresponds to the location and arrangement of a microimage on the card or fiche.

The structure of the present invention eliminates the need for microfiche carrying glass plates, now in common usage, and hereby provides a microfiche carrier or holder which comprises several portions, one of which relates to the microform itself, another of which is the positioning portion secured to the microform, and a third portion utilized as a manipulator or handle for manually moving the carrier across the table of the reader. The positioning portion of the carrier, in a preferred design, comprises a flat sheet or plate having a plurality of projections on the underside thereof, and arranged in a row and column matrix corresponding to the rows and columns of microimages on the microfiche.

A bar or rail extends across and is secured to the table of the reader and such bar includes a groove in the top portion therealong for receiving a row of the projections of the positioning portion of the microform carrier. When a row of the projections are seated in the groove, the carrier is arrested from movement in the Y-direction, but is freely slidable in the X-direction under urging on the part of the operator.

When it is desired to move the carrier in the Y-direction, the positioning portion is lifted slightly by means of the handle portion to free the row of projections from the lateral groove and then such positioning portion is moved to the desired row position where a different row of projections are received by the groove. After the desired microimage row is attained, the carrier may be slidably moved in the X-direction to obtain the desired microimage column and therefore the desired microimage to be read.

For sliding of the microimage carrier in the Y-direction and arresting of the carrier in the X-direction, the bar or rail can be turned **90°** and similar motions by the operator are used to position the carrier in the desired location.

In view of the above discussion, the principal object of the present invention is to provide microform positioning apparatus which eliminates the use of commonly used transparent plates for containing the microform.

Another object of the present invention is to provide microform positioning apparatus of low cost and simple design.

An additional object of the present invention is to provide a microform positioner or carrier which readily slides in one direction and which assures arresting of movement in the other direction.

A further object of the present invention is to provide a microform positioner or carrier which permits visual indication of the location of the microimages, but which also permits registering of the arresting points covered during travel of the carrier from one position to another.

Additional advantages and features of the present invention will become apparent and fully understood from a reading of the following description taken together with the annexed drawings, in which:

FIG. **1** is a diagrammatic view of a microform reader incorporating the subject matter of the present invention;

FIG. **2** is a plan view of the microform positioning apparatus taken along the plane **2—2** of FIG. **1**;

FIG. **3** is a view taken along the plane **3—3** of FIG. **2**;

FIG. **4** is an enlarged plan view of the microform positioner;

FIG. **5** is a side elevational view of the positioner shown in FIG. **4**;

FIG. **6** is an enlarged sectional view taken on the plane **6—6** of FIG. **2**;

FIG. **7** is a plan view similar to FIG. **2** but showing a modification thereof;

FIG. **8** is a view taken along the plane **8—8** of FIG. **7**;

FIG. **9** is a plan view of a further modification of the microform positioner;

FIG. **10** is an enlarged sectional view taken on the plane **10—10** of FIG. **9**;

FIG. **11** is a plan view of another modification of the microform positioner; and

FIG. **12** is a side elevational view of the positioner of FIG. **11**.

Referring now to FIG. 1, which shows a diagrammatic form a side elevation of a microform reader incorporating the positioning apparatus of the present invention, a base 10 supports an enclosure 12 containing mirrors 14 and 16 for projecting an image onto a screen 18. The base 10 has a top or table 20 under which is disposed a light source 21, a concave reflector 22, and a condensing lens system 24 for directing the light beam through an opening or aperture 26 in a bearing plate 28 on the table 20. The light beam is directed through a projection lens assembly 30 suitably supported from the enclosure 12 and which assembly rides on the surface of the bearing plate 28, or slightly above the surface when a microform is inserted, it being sufficient to say that the projection lens is spring-loaded so as to provide a slight downward force on the microform and thereby maintain the lens in proper focus. As is well known, the light beam picks up the microimage and the projection of the image is directed to the mirrors for deflection of such image onto the screen for viewing or reading by the operator.

The microform positioner includes several portions, one of which is a carrier for the microimages and, in the preferred case, is in the form of a card or fiche inserted into an envelope (to be more fully explained) attached to a positioning portion, in turn, secured to a handle portion. In FIG. 2 is shown a plan view of the positioning apparatus with the microfiche 34 containing microimages 35 arranged in columns and rows in well-known manner. Adjacent the microfiche 34 is the positioning portion in the form of a plate member 36 having adhered thereto a formed member 39 (FIGS. 5 and 6) with papillary-like embossed projections 37, see also FIG. 3, on the underside thereof, such projections being arranged in columns and rows corresponding to the columns and rows of the microimages 35. The handle portion 38 of the positioning apparatus is secured to the plate member 36 to enable moving of the positioning portion and of the microfiche to various desired locations.

A particular construction of the microform positioner, (see FIGS. 4 and 5), includes the microform 34 enclosed in an envelope 40 of transparent material, the envelope being secured along one side thereof, as by a welding seam 42, to the plate member 36 and to the formed member 39. These latter members may be of plastic material having characteristics of desired rigidity in the case of plate member 36, and of desired deformability in the case of the member 39 for ease of stamping or molding the projections 37 on one side thereof. The handle portion 38 is secured to the members 36 and 39 as by welding seam 42 along their common side. Additionally, a nameplate or instruction plate 41 may be inserted in a formed pocket adjacent the microform envelope 40.

Referring back to FIGS. 2 and 3, a bar or rail 45 of a height approximating- that of plate 28 extends substantially across the table 20 and is secured, by suitable means thereto, in the X-direction, the bar having a groove 48 (see FIG. 6) disposed lengthwise thereof for receiving a plurality of projections 37. It is thus seen that when a row of such projections is seated in the groove 48, the microform positioner is retained in one location in the Y-direction, but is easily movable by sliding in the X-direction. To provide for such retention in the Y-direction, a pivotable bail 50 having pressure rollers 53, 54 journaled thereon is placed in position above the positioner portion 36, 37 and over the rail 45. When it is desired to move the positioner in the Y-direction a slight pressure on the handle portion 38 is usually sufficient to move such positioner to another row of projections. Of course, it may be desirable to lift the positioner against the downward force of rollers 53, 54 when moving across several rows of projections, however, the number of rows of projections and, therefore the number of rows of microimages can be counted or otherwise registered, without visual observation thereof, by sensing the rows of projections in jumping from one row to a distal row. The microform positioner is easily slidable in the X-direction but requires a slight force to be moved in the Y-direction, thereby eliminating undesired and unintentional sliding in the Y-direction. With such manner of retaining the microform in the Y-direction, there is no means provided for arresting movement of the positioner in the X-direction, however, the operator can readily observe on the screen 18 the position of certain microimages and can adjust the location of the positioner to obtain the desired image of a column of such images.

A modification of the invention is shown in FIGS. 7 and 8, wherein the table 20 supports the bearing plate 28 across which the microform envelope 40 moves under the projection lens assembly 30. The positioner portion 36, 39, (FIG. 5) with projections 37, is secured to the envelope 40 along one side thereof and has the handle portion 38 along the other side, as fully described hereinabove. In the modified construction, a rail or bar 60 is secured to the table and extends in the Y-direction along a central location of the table, the rail having a groove 62 therealong for reception of a column of projections 37. The bail 50 is provided with a pressure member in the nature of a ball 61 journaled on the bail to thereby cause a slight downward force over the groove 62 to retain the positioner in a desired location. It is thus seen that in this modification, the microform positioner is easily slidable in th Y-direction but is arrested in its movement in the X-direction and requires a slight effort to move the positioner from one column of projections to another.

A further modification of the invention is shown in FIGS. 9 and 10, wherein the table 20 supports the bearing plate 28 across which the microform envelope 40 moves under the projection lens assembly 30. The positioner portion 36, 39, with projections 37, is secured to the envelope 40 and has the handle portion 38, as described above. In this construction a pair of rails 65, 66 are secured to the table and extend in the Y-direction along the sides of the positioner portion, each of the rails having a plurality of grooves 68 extending across the rail in the X-direction, for reception of a row of the projections 37. The grooves 68 are disposed and equally spaced along the length of the rails 65, 66 to arrest movement of the microform in the Y-direction while permitting slidable movement in the X-direction. The bail 50 is provided with pressure balls 70 and 71 journaled on the bail to thereby cause a slight downward force over the positioner portion and onto the rails to retain the microform in a desired location. Although FIG. 9 shows the balls 70 and 71 offset from the rails 65 and 66, this is for clarification purposes, as is the offset of the row of projections 37 from under the bail 50 which is shown in FIG. 10 to be directly over such row. It is thus seen that a single row of the projections 37 extend across the positioner and seat in the

grooves **68** in one location of the microform. Again, when it is desired to relocate the microform in the Y-direction, the positioner is caused to move or jump from one groove to another and to be arrestd thereby. The microform positioner is free to be easily slidable in the X-direction along the groove **68** in either rail **65** or **66.**

Additionally, the row of projections **37** illustrated in FIG. **9** could be substituted by a single fin-like projection extending across the member **39** and on the underside thereof. A different arrangement of such fin-like projection is illustrated in FIGS. **11** and **12** wherein a positioner memberr **75** in the nature of a solid piece of plastic material is formed with a pair of fin-like bars **76,** 77 on the underside thereof to mate with grooves **78** in a corresponding member **79** on the table **20.** In this arrangement the positioner is meant to be arrestable in the X-direction and easily slidable in the Y-direction. Of course, the bars **76, 77** could be formed **90** degrees from that shown for arresting the positioner in the Y-direction.

Further modifications can be conceived wherein the microform is not placed within an envelope but is directly attached to a single plate having a matrix of projections corresponding to the rows and columns of microimages and positionable in the X or the Y direction. Additionally, the table **20** could carry a bearing plate under the positioner portion, such plate having a plurality of recesses therein arranged in matrix fashion and having connecting grooves therebetween for receiving of bars or rails formed on the underside of the positioner portion. This arrangement is similar to that shown in FIG. **12,** but with slight modifications to implement the connecting grooves. It is also possible to arrange the positioning marks, whether projections or recesses, directly on the microform or microfiche wherein such marks could be located between the microimages and be received by corresponding marks in the bearing plate **28.**

It is thus seen that herein shown and described is a microform positioning apparatus of low cost and of simple design to provide arresting of the microform in a desired location, while permitting ease of movement to another location. The invention eliminates the need for the upper and the lower plates now commonly used for retaining the microform and also the complex carrier structure for moving the microform in the X and Y-directions. The apparatus enables the accomplishment of the objects and advantages mentioned above, and while several embodiments of the invention have been disclosed herein, certain other variations may occur to those skilled in the art. It is contemplated that all such variations, not departing from the spirit and scope of the invention hereof, are to be construed in accordance with the following claims.

What is claimed is:

**1.** Apparatus for positioning a microform in a reader, comprising a

plate member connected with and carrying said microform in planar extended relationship thereto, said plate member including a plurality of embossed projections in an arrangement corresponding to images on the microform, and an

elongated member secured to said reader and having a groove therealong operably associated to receive a plurality of said projections for arresting movement of said plate member in one direction and for permitting sliding movement in the other direction.

**2.** The apparatus of claim **1** wherein said elongated member is a rail having a groove therealong disposed for receiving said projections for arresting movement of said plate member in a direction normal to that of the elongated member.

**3.** The apparatus of claim **1** including a pair of elongated members secured to said reader and having a plurality of grooves disposed in a direction corresponding to that for receiving a plurality of projections of said member for arresting movement thereof.

**4.** In a reader, means for positioning a selected image from a plurality thereof on a microform, said means comprising a

plate member positioned in planar extended relationship with and connected to the microform, said member having a plurality of embossed projections arranged in matrix manner on one side thereof and corresponding to the images on the microform, and an

elongated member connected to the reader and having a groove therealong operably associated with and receiving a plurality of projections for retaining position of said plate member in one direction and for permitting sliding thereof in the other direction to enable selection and viewing of said image.

**5.** In the reader of claim **4** wherein said elongated member is a rail disposed in a direction for arresting movement of said plate member in a direction normal to that of said rail.

**6.** Apparatus in a reader for positioning a microform having microimages thereon, said apparatus comprising a

plate member secured to and carrying said microform in abutting planar extended manner and having a plurality of embossed projections on one side thereof and dispsoed in an arrangement corresponding to that of the microimages, and a

rail member secured to the reader and having a groove therealong operably associated with said plate member for receiving a plurality of projections for arresting movement of said microform in the X or the Y-direction.

* * * * *