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Granitz

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[54] **SLIDE SELECTOR SWITCH ASSEMBLY**

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

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[52] **U.S. Cl.** ..... **200/16 C,** 200/5 A, 200/153 LA

[51] **Int. Cl.** **H01c 15/02**

[58] **Field of Search** ..... 200/5 A, 5 R, 16 R, 200/16 C, 16 D, 166 SD, 153 LA

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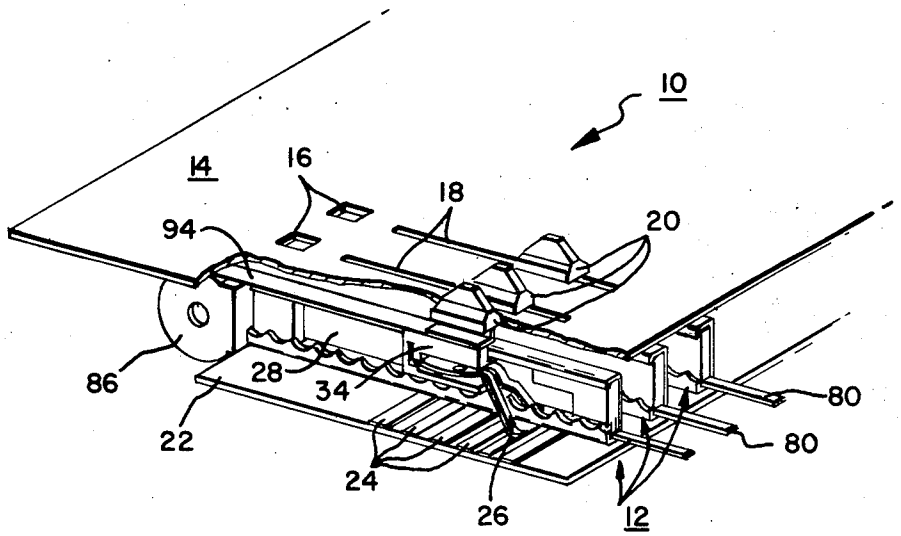
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Assistant Examiner—Gerald P. Tolin
Attorney—William J. Keating, Gerald K. Kita et al.

[57] **ABSTRACT**

A mechanical slide selector switch assembly is described which includes a plurality of slide switches having contacts designed to selectively engage a plurality of conductive strips printed on a board of insulating material. Each individual slide switch includes a ball bearing detent assembly which renders the slide switch more reliable and less susceptible to wear. The ball bearing detent assembly lifts the sliding switch contacts away from the printed conductive strips as the contacts are moved from one position to another, and thereby reduces contact wear and erosion of the printed conductive strips. Each slide switch also includes a digital position readout assembly including a flexible tape with numerals printed on it.

16 Claims, 4 Drawing Figures



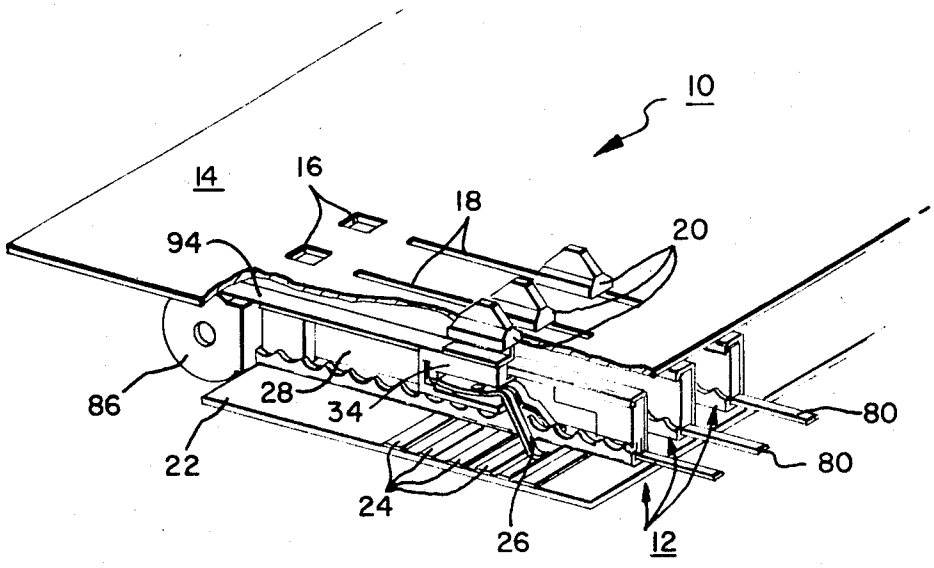

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FIG 1

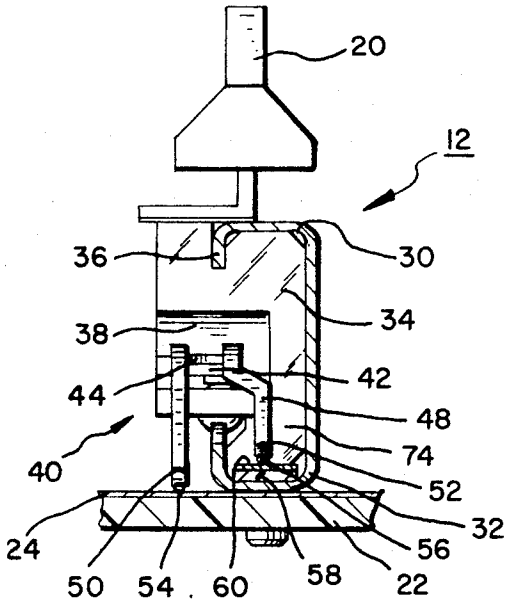

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FIG 2

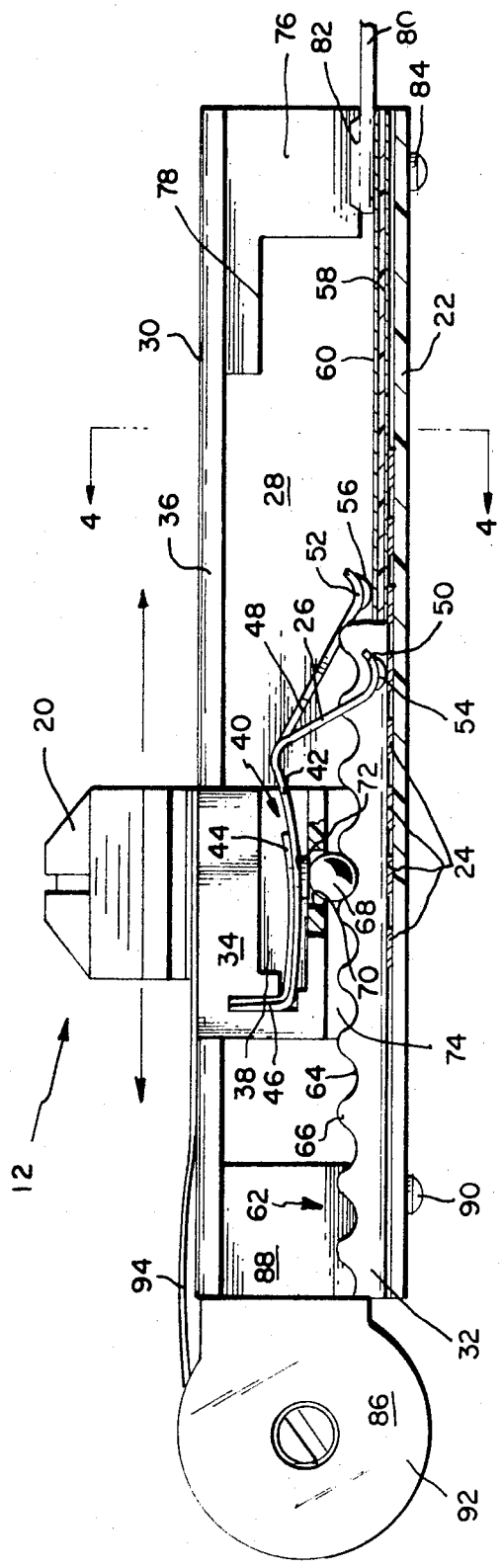

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FIG. 4

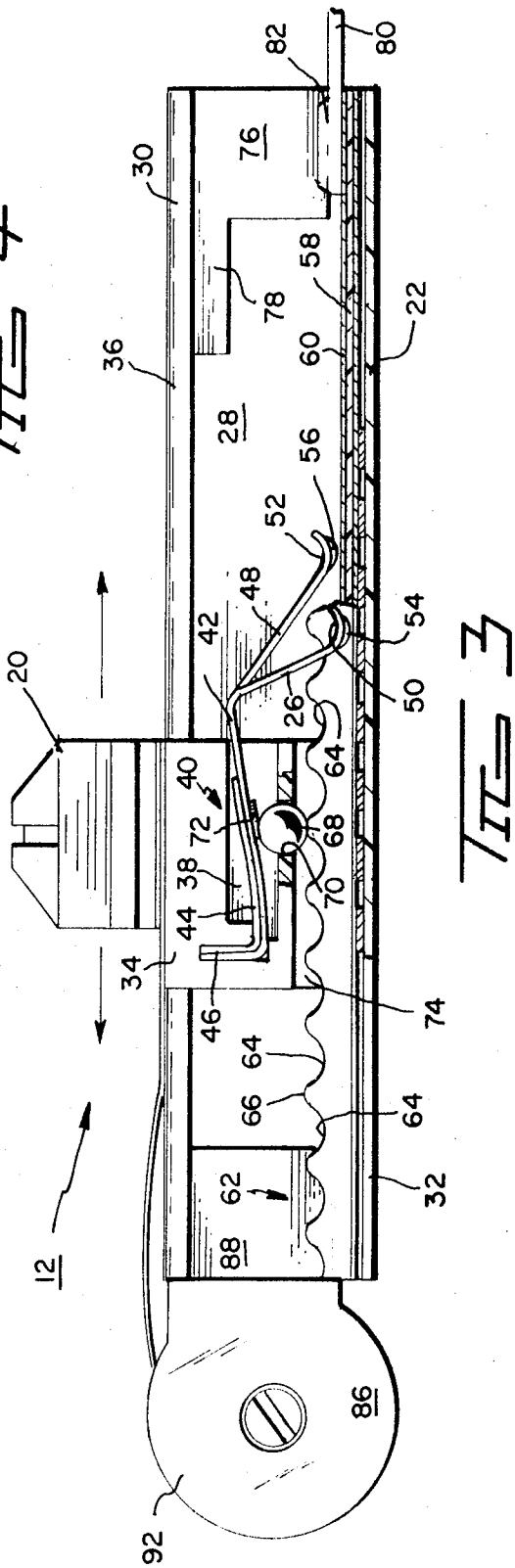

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FIG. 3

SLIDE SELECTOR SWITCH ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field Of The Invention

This invention relates generally to mechanical switch assemblies, and more particularly to a mechanical switch assembly including a plurality of slide switches, and to the structure of the individual slide switches themselves.

2. Description Of The Prior Art

Numerous slide switch assemblies are known in the prior art, such as those disclosed in U.S. Pat. No. 3,205,319 to Anderson et al. and U.S. Pat. No. 3,582,578 to Lockard. Both of these patents disclose devices in which a plurality of slide switches are employed in a matrix-like configuration to provide an electrical readout indicative of the positions or coordinates of a plurality of sliding contact switches. In general, switch assemblies of the type described in these patents include a printed circuit board on which a plurality of spaced, parallel conductive strips are imprinted. A plurality of slide switches are oriented perpendicular to the conductive strips on the printed circuit board, and include a first contact for slidably engaging the individual conductive strips on the printed circuit board. They also include a second contact which is generally in continuous engagement with a conductor or conductive strip associated with the slide switch itself, and which is oriented perpendicular to the conductive strips on the printed circuit board. A detent assembly is generally provided so that each of the slide switches can be positioned only at points where one of its contacts is in engagement with one of the conductive strips on the printed circuit board.

Unfortunately, slide switches of the type described above create substantial wear problems. For example, as the sliding contacts are wiped across the printed conductive strips time after time, small areas of the conductive strips are eroded, which can eventually cause an open circuit to occur. In addition, since the printed conductive strips are often positioned relatively close to one another, conductive material scraped from the various conductive strips by the sliding contacts may eventually bridge the gap between various pairs of conductive strips, thereby causing a short circuit to occur. Furthermore, the detent assembly may also deteriorate, due to the friction caused by poor quality bearing surfaces, causing the slide switch to stick, or otherwise become mechanically inoperative.

SUMMARY OF THE INVENTION

Accordingly, one object of this invention is to provide a novel slide selector switch assembly.

Another object of this invention is to provide a novel selector slide switch assembly which is reliable and inexpensive to produce.

Yet another object of this invention is to provide a novel slide selector switch assembly which greatly reduces the amount of wear caused by contacts sliding over printed conductive strips.

A still further object of this invention is to provide a slide selector switch assembly including a highly durable and wear resistant detent assembly.

Another object of this invention is to provide a slide switch having a novel detent and contact assembly.

Yet another object of this invention is to provide a slide switch of especially durable and wear resistant characteristics.

A still further object of this invention is to provide a slide switch which is durable, provides a digital readout, is wear resistant, and yet is inexpensive to produce and relatively simple to assemble.

Briefly these and other objects of the invention are achieved by producing a slide selector switch assembly from a plurality of individual slide switches, each of which includes a ball bearing detent, a pair of resilient contacts, and a single, printed conductor, normally engaged by one of the contacts. Each slide switch is positioned perpendicular to a plurality of spaced conductive strips on a printed circuit board, which are selectively engaged by the other contact. The ball bearing detent assembly causes the contacts of the slide switch to be lifted away from both the printed conductor within the slide switch itself and from the conductive strips of the printed circuit board as the contacts are moved from one position to another. Thus, the contacts do not continuously slide across the various printed conductors, thereby reducing wear to both the contacts and the printed conductors.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

FIG. **1** is a partially cut-away perspective view of a preferred embodiment of the slide selector switch assembly in the instant invention;

FIG. **2** is a partially cut-away side view of the slide switch structure of the present invention, showing the contacts in their normal operative position;

FIG. **3** is a partially cut-away side view of the apparatus illustrated in FIG. **2**, illustrating the movement of the contacts as the switch assembly is moved between detent positions; and,

FIG. **4** is a cut-away end view taken along the lines **4** — **4** of the apparatus illustrated in FIG. **2**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical of corresponding parts throughout the several views, and more particularly to FIG. **1** thereof, the slide selector switch assembly of the present invention is illustrated generally by the numeral **10**. As is apparent from FIG. **1**, the slide selector switch assembly **10** includes a plurality of individual slide switches **12**. Although only three individual slide switches **12** are represented in FIG. **1**, it will be apparent to those skilled in the art that any number of slide switches **12** may be included in the slide selector switch assembly **10**. In addition, although only a single row of slide switches **12** is illustrated, it will also be apparent to those skilled in the art that multiple parallel rows of slide switches **12** may be included in the slide selector switch assembly **10**, if desired. The purpose of the slide selector switch assembly **10** may be, for example, to provide both visual and electrical digital readouts indicative of manually selected numerical values. For example, the slide selector switch assembly **10** may

be useful in various types of accounting and credit card purchase registering devices.

The slide selector switch assembly **10** includes a top or cover panel **14**, which may be constructed of a suitable material such as aluminium, steel sheet, or a suitable plastic. A plurality of apertures **16** are punched or drilled through the top panel **14** to permit inspection of visual readout attachments associated with each of the slide switches **12**. A plurality of elongated apertures **18** are also provided in the top panel **14** to allow slide switch actuators **20** to be mounted above the top panel **14** in an easily accessible position. It will, of course, be apparent to those skilled in the art that one aperture **16** and one aperture **18** must be provided in the top panel **14** for each slide switch **12** included in the slide selector switch assembly **10**.

A printed circuit board **22** is mounted below the individual slide switches **12**, and forms the bottom panel of the slide selector switch assembly **10**. On one surface of the printed circuit board **22** are located a plurality of printed conductive strips **24** thereby providing a plurality of conductor paths. The printed conductive strips preferably extend for the entire length of the slide selector switch assembly **10** and are relatively closely spaced and oriented parallel to one another. The printed conductive strips are intended to be selectively engaged by a contact **26**, carried by each of the slide switches **12**.

Referring now to FIGS. **2–4**, the specific structure of each of the slide switches **12** is illustrated in more detail. Each slide switch **12** is constructed of a basic framework **28**, which may be constructed either of metal or of a suitable plastic material. The invention does not require that the framework **28** be of conductive material, and therefore, where metal is used to construct the framework **28**, only the structural properties of the metal need be considered, and its current conducting properties may be ignored. If metal is used, it may be coated partially or completely with an insulating layer of paint, or plastic material. The framework **28** is an elongated metal sheet formed with a generally C-shaped in cross-sectional configuration, defining a track as illustrated more clearly in FIG. **4**. This C-shaped configuration of the framework **28** provides an upper channel portion **30** and a lower channel portion **32**. A contact carrier block or carriage **34** slides in the upper channel portion **30** of the framework or track **28**. As is shown more clearly in FIG. **4**, a depending edge **36** of upper channel portion **30** is positioned in a groove in the upper portion of contact carrier block or carriage **34**. Thus, the depending edge **36** of the upper channel portion **30** holds the contact carrier block or carriage **34** inside the channel portion of framework **28**. The contact carrier block or carriage **34** includes an open channel **38** in which a contact assembly **40** is movably mounted. The contact assembly **40** includes a contact body **42** of highly conductive metal, and a leaf spring **44**, which is juxtaposed to the contact body **42** and biases the contact body **42** toward the lower channel portion **32** of framework **28**. The contact body **42** and leaf spring **44** are friction fitted into a slot **46** in the rear portion of contact carrier block **34**, and are thereby securely fixed to the contact carrier block. Previously mentioned contact **26** and a second contact **48** are formed integral with the contact body **42**. However, the contacts **26** and **48** are separated from one another and are of the same length, although they are bent at different angles with respect to contact body **42**. The ends of the contacts **26** and **48** are bent upperwardly to form foot portions **50** and **52**, respectively. Each foot portion is then punched or deformed slightly to form a depending heel portion **54** and **56**, respectively. The heel portions **54** and **56** are the only portions of the contact assembly **40** which actually engage the printed conductive strips used with the slide switch assembly. The heel portions **54** and **56** help to insure a positive contact between the contact assembly **40** and the conductive strips, such as **24**, while minimizing wear to the conductive strips and to the contact assembly.

A narrow strip of printed circuit board material **58** is positioned within the lower channel portion **32** of framework **28**. A layer of conductive material **60** is printed on the narrow strip **58** of printed circuit board material by conventional methods to provide a conductor path. The layer of conductive material **60** extends for substantially the entire active length of the slide switch **12**, and is the conductor engaged by contact **48**. As was described hereinabove, the layer of conductive material **60** is, like the slide switch **12** itself, oriented perpendicular to the plural printed conductive strips **24** on the printed circuit board **22**.

The detent mechanism of the slide switch **12** includes a scalloped upper edge **62** of the lower channel portion **32** of framework **28**. As is clearly shown in FIGS. **2** and **3**, the scalloped edge **62** of the framework **28** includes a series of stable detent points or grooves **64** separated from one another by a plurality of unstable points, projections or peaks **66**. A ball bearing **68**, having substantially the same radius as the stable detent points or grooves **64**, is provided to cooperate with the scalloped edge **62** of framework **28**. The ball bearing **68** is movably positioned in a bore or aperture **70** which communicates between the bottom of contact carrier block **34** and the open channel portion **38** of the contact carrier block. A disk of insulating material **72**, having substantially the same diameter as the bore **70** is coupled to the underside of the contact assembly **40** above the open bore **70**. Thus, the leaf spring **44** resiliently biases the insulating disk **72** toward the interior of bore **70**. Accordingly, when the slide switch **12** is assembled, the ball bearing **68** is positioned within the bore **70**, and the insulating disk **72** is biased into engagement with the ball bearing **68** by the biasing force of leaf spring **44** and by the biasing force exerted by resilient contact body **42**. Thus, the biasing force acting on ball bearing **68** tends to retain the ball bearing in one of the stable detent points or grooves **64**, and simultaneously forces the contact carrier block or carriage upward, maintaining it in position in the upper channel portion **30** of framework **28**. Thus, although contact carrier block or carriage **34** includes a lower or depending portion **74**, which is positioned within the lower channel portion **32** of framework **28**, the lower portion **74** does not engage or slide upon conductive layer **60**. The lower portion **74** of contact carrier block or carriage **34** serves primarily as a guide member for the contact carrier block, and does not impose any wear on the conductive layer **60**.

The ball bearing detent assembly, and the biasing assembly described above provide numerous advantages. For example, the use of a ball bearing greatly reduces the friction incurred in operating the slide switch and detent assembly. In addition, the ball bearing itself is of a very hard steel material, and is therefore highly resis-

tant to mechanical wear or deformation. Accordingly, the use of a ball bearing improves the mechanical operation of the slide switch, and reduces the likelihood of mechanical failure due to wear or jammed parts. In addition, the biasing arrangement applies a strong biasing force to the detent assembly while it supplies only a much weaker biasing force to the contacts **26** and **48**. This is due to the fact that the entire resilient biasing force of leaf spring **44** is applied to ball bearing **68**, while the resilient biasing force of leaf spring **44** applied to the contacts **26** and **48** is modified by the fact that the contact body **42** and the contacts **26** and **48** extend far beyond the end of leaf spring **44**. In fact, the biasing force which actually exists at the heel portions **54** and **56** of contacts **26** and **48** is little more than the biasing force which is exerted by the resiliency of the material of the contact body **42** acting alone. Thus, the biasing structure of the present invention provides a relatively firm detent biasing force, while providing only a relatively light contact biasing force. This feature improves the mechanical operation of the device, by providing a firm, positive detent motion, yet minimizes the wear to the printed conductors or conductor paths and contact structure of the device.

An end block **76** of insulating material is mounted at one end of the framework **28** to prevent the contact carrier block or carriage **34** from being moved beyond the end of the switch framework. The end block **76** is preferably mounted inside the upper and lower channel portions **30** and **32** of the framework **28**. The end block **76** includes an arm portion **78** which extends along the interior of the upper channel portion **30** into the path of the contact carrier block or carriage **34**. The arm **78** serves to engage the upper portion of the contact carrier block or carriage **34** to prevent further motion of the contact carrier block toward the end block **76**. Thus, by suitably adjusting the length of the arm **78**, the extent of travel of the contact carrier block or carriage **34** can be limited. However, the arm **78** must have a length which is at least sufficient to stop motion of the contact carrier block or carriage **34** before contact **48** engages end block **76**, in order to prevent the contact **48** from being bent.

A terminal structure **80**, which may be formed of any suitable conductive material, is positioned between the lower portion of end block **76** and the upper surface of the layer **60** of conductive material. The terminal structure **80** preferably includes upstanding ears **82** which engage opposite sides of the bottom portion of end block **76**. A screw or other suitable fastening means **84** passes through openings in the lower channel portion **32** of framework **28**, the narrow strip of printed circuit board material **58** which is positioned within the lower channel portion **32**, the layer **60** of conductive material on the strip **58** and the terminal structure **80**, and into an aperture in the end block **76**. If a screw is used, the aperture in the end block **76** is internally threaded so that the screw may be threaded into the end block, securing the end block **76**, the contact **80** and the narrow strip of printed circuit board material **58** in place. Clearly, other types of fasteners, such as rivets, may be used, as will be clear to those skilled in the art.

A tape carrier **86** is mounted to the end of framework **28** opposite that at which end block **76** is mounted. The tape carrier **86**, which may be constructed entirely of a suitable plastic material, for example, includes a mounting block portion **88** which is of a suitable size to permit it to be inserted into the upper and lower channel portions **30** and **32** of the framework **28**. A screw **90**, or other suitable fastening means, is inserted through apertures formed in the framework **28** and in the narrow strip of printed circuit board material **58**, and is threaded or otherwise fastened into the mounting block **88**, fixing the mounting block in position. In addition to providing a means for holding the tape carrier **86** to the framework **28**, the mounting block **88** also acts as a stop to prevent the contact carrier block **34** from being moved out of the framework **28**. The tape carrier **86** also includes a cylindrical portion **92**, having a cylindrical internal bore. A flexible tape **94**, which may be formed of a suitable plastic material for example, is normally coiled within the cylindrical portion **92** of tape carrier **86**. One end of the tape **94** is coupled to the slide switch actuator **20**, for movement therewith. Thus, as the slide switch is actuated by movement of actuator **20**, the tape **94** is withdrawn from the tape carrier **86**. Suitable coded markings, such as conventional numerals or letters are preferably imprinted on the tape **94** at regular intervals, so that the tape provides a visual digital readout of the position of the switch contacts. The nature of both the tape **94** and the tape carrier **86** are such that the tape feeds itself into the carrier **86** when the switch actuator **20** is moved in one direction, and is extracted from the tape carrier **86** when the switch actuator **20** is moved in the opposite direction.

Attention is now directed to FIGS. **2** and **3**, in which the unique operation of the detent mechanism described hereinabove is illustrated in more detail. In FIG. **2**, the ball bearing **68** of the detent mechanism is shown resting in a stable position in one of the grooves **64**. In this position, the heel **54** of the contact **26** is in engagement with one of conductive strips **24**, and the heel **56** of contact **48** is in engagement with the conductive layer **60**. As the switch actuator **20** is moved, the contact carrier block or carriage **34** which is coupled to it is, of course, also moved. This causes the ball bearing **68** of the detent mechanism to rise out of the groove **64** in which it was positioned, and eventually reach an unstable point or peak **66** of the scalloped edge **32**, as illustrated in FIG. **3**. It will be understood, that the ball bearing **68** does not rest in the unstable position illustrated in FIG. **3**, but moves quickly into another stable position **64**. Thus, the rounded shape of the peaks **66** causes the ball bearing to essentially "jump" from one stable position **64** to the next. However, as the ball bearing **68** rises from a groove **64** toward a peak **66**, it pushes against the lower surface of insulating disk **72**, thereby counteracting the resilient biasing force of leaf spring **44**, and raising or resiliently deflecting the contact body **42**. This motion causes the heels **54** and **56** of the contacts **26** and **48** to be lifted out of engagement with the printed conductive strips **24** and **60**, respectively. The heel portions **54** and **56** of the contacts **26** and **48** thus remain out of engagement with the printed conductive strips **24** and **60** as the slide switch is moved to its next position. At the next position, the ball bearing drops into a groove **64**, and the heel **64** of the contact **26** then engages another one of the printed conductive strips **24**, while the heel **56** of the contact **48** simply engages another portion of the conductive strip or layer **50**. The significant aspect of this motion resides in the fact that the contacts do not simply slide from one position to another, but are resil-

iently deflected and thereby lifted away from the printed conductive strips and are then allowed to resiliently deflect to positions lowered to reengage the printed conductive strips when the slide switch has reached another position. Accordingly, the contacts do not simply slide across the printed conductive layers, and therefore do not tend to abrade them, or wear them out. Thus, the detent motion of the present invention tends to prolong the life of the slide switch substantially, and tends to prevent electrical failures of the slide switch, caused, for example, by short circuiting between the printed conductive strips **24**, or open circuiting caused by erosion of the printed conductive strips **24**. In addition, wear along the layer **60** of the conductive material is reduced substantially by the motion of the detent assembly of the present invention.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein. Accordingly,

What is claimed as new and desired to be secured by letters patent of the United States is:

1. In a slide switch assembly having a terminal strip, a plurality of spaced electrical conductor paths, track means extending generally transversely of said conductor paths, and a carriage carried by and displaceable along said track means, said carriage being provided with a contact means having a first resilient electrical contact and a second resilient electrical contact, with the first electrical contact electrically engageable on the terminal strip and with the second electrical contact electrically engageable successively in turn on each of the plurality of spaced electrical conductor paths upon displacement of said carriage along said track means, thereby to complete an electrical circuit between said terminal strip and any selected one of the plurality of spaced electrical conductor paths, the improvement comprising: a series of spaced projections provided along said track means, and detent means carried on said carriage, said detent means being displaceable along said track means and successively engageable on said projections upon displacement of said carriage along said track means, said detent means upon successive engagement with each of said projections being displaced against said contact means and thereby resiliently deflecting both said first and said second contacts respectively from said terminal strip and a corresponding one of said conductor paths to prevent excessive sliding displacement of said first and said second contacts slidably against said terminal strip and said corresponding one of said conductor paths, said detent means upon displacement of said carriage along said track means being successively in registration on positions each of which are located along said track means and adjacent to a respective one of said projections, said detent means upon successive registration with each said positions adjacent to said projections being displaced in a direction substantially away from said contact means to allow resilient deflection of said contact means together with said first and said second contacts into respective electrical engagement with said terminal strip and a corresponding one of said conductor paths, whereby said first and said second contacts are biased into and out of engagement with said terminal strip and a corresponding one of said conductor paths as said detent means is displaced along said track means.

2. The structure as recited in claim **1**, wherein, said detent means is a spherical ball bearing received movably in an aperture provided in said carriage, said contact means is on said carriage adjacent one end of said aperture and resiliently biases said spherical ball bearing into continuous engagement with said track means, said ball bearing thereby being retained in said aperture and between said contact means and said track means.

3. The structure as recited in claim **1**, wherein, said track means comprises an elongated metal sheet, with an edge of said metal sheet being provided with a generally scalloped configuration comprising said spaced projections over which said detent means is displaceable, said sheet being formed with a generally C-shaped cross sectional configuration to provide opposed channel portions receiving therebetween said carriage, said carriage being displaceable along said track means while between said opposed channel portions.

4. The structure as recited in claim **3**, wherein, said detent means is a spherical ball bearing received movably in an aperture provided in said carriage, said contact means is on said carriage adjacent one end of said aperture and resiliently biases said spherical ball bearing into engagement with said track means, said ball bearing thereby being retained in said aperture and between said contact means and said track means.

5. The structure as recited in claim **4**, wherein said detent means is a metal spherical ball bearing, and further including: an insert of electrical insulation material interposed between said contact means and said metal spherical ball bearing to prevent conduction of electricity from said contact means through said metal spherical ball bearing.

6. The structure as recited in claim **1**, wherein, at least one of either of said contact means, said detent means and said track means includes a surface thereof comprised of electrical insulation material preventing conduction of electricity from said contact means through said detent means and through said track means.

7. The structure as recited in claim **1**, wherein said track means is fabricated from metal which is provided thereover with a surface of electrical insulation material.

8. The structure as recited in claim **1**, wherein, said contact means has at least a portion provided thereover with a surface of electrical insulation material which is interposed between said contact means and said detent means to electrically insulate said contact means from said detent means.

9. The structure as recited in claim **8**, wherein said track means is fabricated from metal provided thereover with a coating of a dielectric material.

10. A switch assembly for completing at least one electrical circuit between a first conductor and at least one conductor path selected from a plurality of conductor paths, comprising: a base, a plurality of spaced electrical conductor paths affixed to said base, a generally stationary supporting member mounted on said switch assembly in a fixed position relative to said base, a carriage mounted on said supporting member for displacement along said supporting member, a resilient and electrically conducting spring connected to said carriage for displacement therewith, said carriage having a portion provided with an aperture, detent means

received in said aperture, said supporting member having a portion provided with a plurality of spaced projections thereon and a plurality of relatively recessed portions, each relatively recessed portion being adjacent one of said projections, said spring overlying said detent means and continuously resiliently biasing said detent means into continuous engagement with said supporting member portion which is provided with said projections thereon, said spring having an electrically conducting contact portion displaceable successively over said electrical conductor paths for electrical engagement successively in turn on each of said electrical conductor paths as said carriage is displaced along said supporting member, said detent means being displaceable together with said carriage along said supporting member for successive registration of said detent means with said projections and said relatively recessed portions of said supporting member, said detent means upon registration with each of said projections being deflected thereby against said spring to resiliently deflect said contact portion of said spring in a direction generally away from said base, said detent means upon registration with each of said relatively recessed portions of said supporting member being biased in a direction away from said spring to allow resilient deflection of said spring and said contact portion of said spring toward said base and into electrical engagement with a corresponding electrical conductor path, whereby as said contact portion of said spring is displaceable successively over said conductor paths said contact portion is allowed to deflect toward said conductor paths for successive electrical engagement in turn with each of said conductor paths, and with said contact portion being deflected away from said base to disengage said contact portion from a corresponding conductor path, and electrical terminal means electrically connected to said spring for making an electrical connection externally of said switch assembly, whereby said spring completes an electrical circuit between said terminal means and each of said conductor paths successively in turn as said carriage is displaced along said supporting member.

11. The structure as recited in claim **10**, wherein, said supporting member includes an elongated track, with said carriage being slidably displaceable along said track.

12. The structure as recited in claim **11**, wherein, said track is fabricated from an elongated metal sheet having the edges thereof formed to a generally C-shaped cross sectional configuration defining opposed channel portions, with said carriage being slidably retained substantially between said opposed channel portions, and one of said edges of said elongated metal sheet is provided with both said projections and said relatively recessed portions over which said detent means is displaceable.

13. The structure as recited in claim **12**, wherein, said detent means is a spherical ball bearing, and said spring is provided thereon with a quantity of electrical insulation material disposed between said spring and said ball bearing to prevent electrical conduction between said spring and said ball bearing.

14. The structure as recited in claim **12**, wherein, said terminal means includes an elongated terminal strip, said spring includes a second contact portion displaceable over said terminal strip for electrical engagement therewith as said carriage is displaceable over said supporting member, said detent means upon engagement with each of said projections being biased by each of said projections against said spring to resiliently deflect said spring and said second contact portion of said spring in a direction generally away from said terminal strip, said detent means upon registration with each of said relatively recessed portions being biased thereby generally away from said spring and said second contact portion of said spring to allow resilient deflection of said second contact portion of said spring toward said terminal strip and into electrical engagement therewith, whereby as said second contact portion of said spring is displaceable over said terminal strip, said second contact portion alternatively is deflected away from said terminal strip and allowed to deflect toward said terminal strip for electrical engagement therewith.

15. A slide switch, comprising: a base having a plurality of spaced electrical conductor paths; an elongated track mounted on said base; said track being fabricated from an elongated metal sheet having opposed edges thereof formed to a generally C-shaped cross sectional configuration defining opposed channel portions extending along said elongated track; one of said opposed edges having thereon a series of projections and a relatively recessed portion adjacent a corresponding projection, one of said channel portions receiving an elongated electrical terminal in strip form; a carriage of dielectric material mounted between said opposed channel portions and being slidably displaceable along said track;

an electrically conducting and resiliently deflectable spring mounted on said carriage and having a first electrical contact for displacement over each of said electrical conductor paths in turn upon displacement of said carriage along said track; said electrically conducting spring also including a second electrically conducting contact for displacement over said electrical terminal in strip form; said carriage further including a ball bearing received in an aperture portion of said carriage; said ball bearing being located between said electrically conducting spring and said track; with said electrically conducting spring resiliently biasing said ball bearing continuously against said one of said opposed edges which is provided with said series of projections and relatively recessed portions; said ball bearing being displaceable over and successively engaging said series of projections and relatively recessed portions upon displacement of said carriage along said track; said ball bearing upon engaging each of said projections being biased against said spring to resiliently deflect said spring and said first and said second contacts generally away from said base and said terminal in strip form, thereby disengaging said first contact from electrical engagement with a corresponding electrical conductor path and disengaging said second contact from electrical engagement with said terminal of strip form; and said ball bearing upon engaging each of said relatively recessed portions being biased thereby generally away from said spring to allow resilient deflection of said spring and said first and said second contacts generally toward said base and said terminal in strip form, thereby allowing resilient deflection of said first contact into electrical engagement with a corresponding electrical conductor path and also allowing resilient deflec-

tion of said second contact into electrical engagement with said terminal of strip form; whereby as said first and said second contacts are displaced over said plurality of conductor paths and said terminal of strip form, said first and said second contacts are successively deflected first out of electrical engagement and then into electrical engagement with corresponding electrical circuit paths and said terminal in strip form in order to complete an electrical circuit path between said terminal in strip form and each of said electrical conductor paths in turn.

16. The structure as recited in claim **15**, and further including: at least one fastener for securing together said base, said track and said terminal in strip form.

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