March 7, 1967 N. L. FIELD III, ETAL 3,308,250

SLIDE SELECTOR SWITCH

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FIG. 1

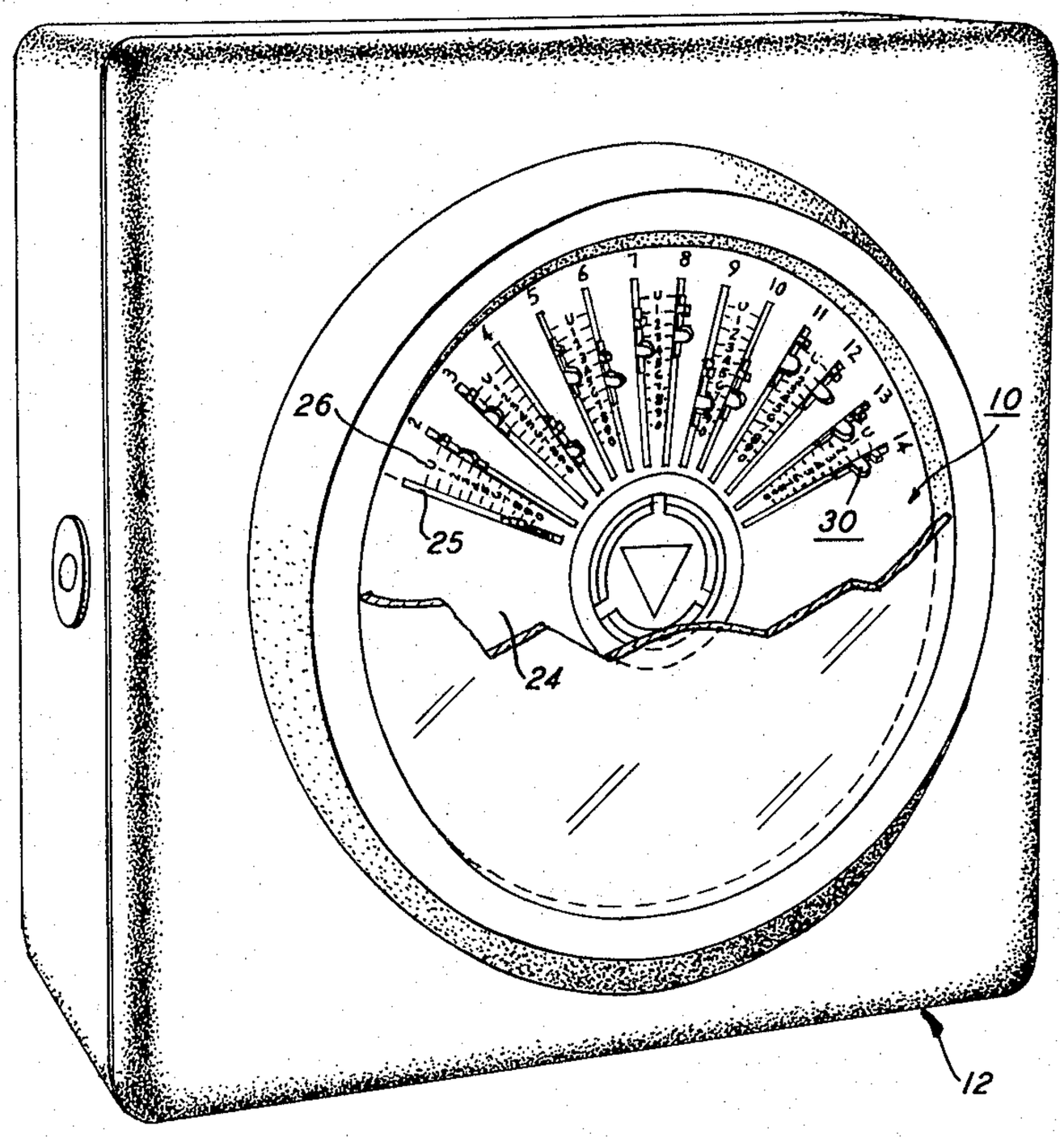

FIG. 2

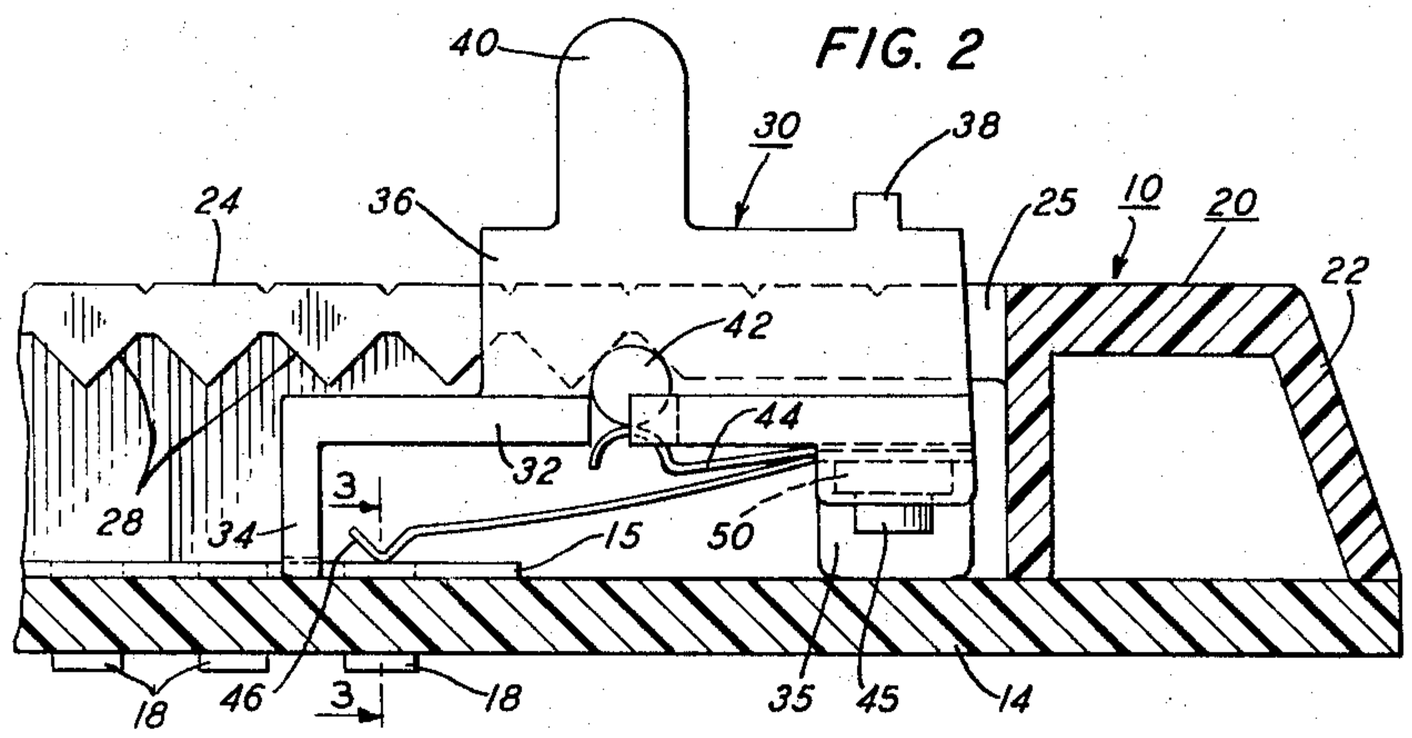

FIG. 3

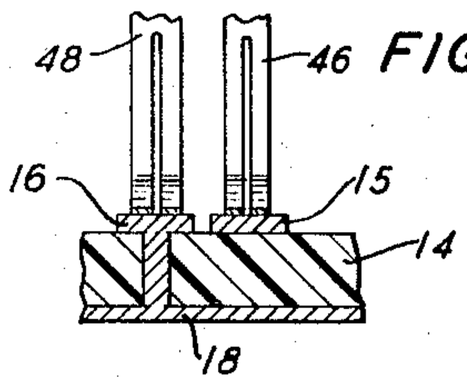

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FIG. 4

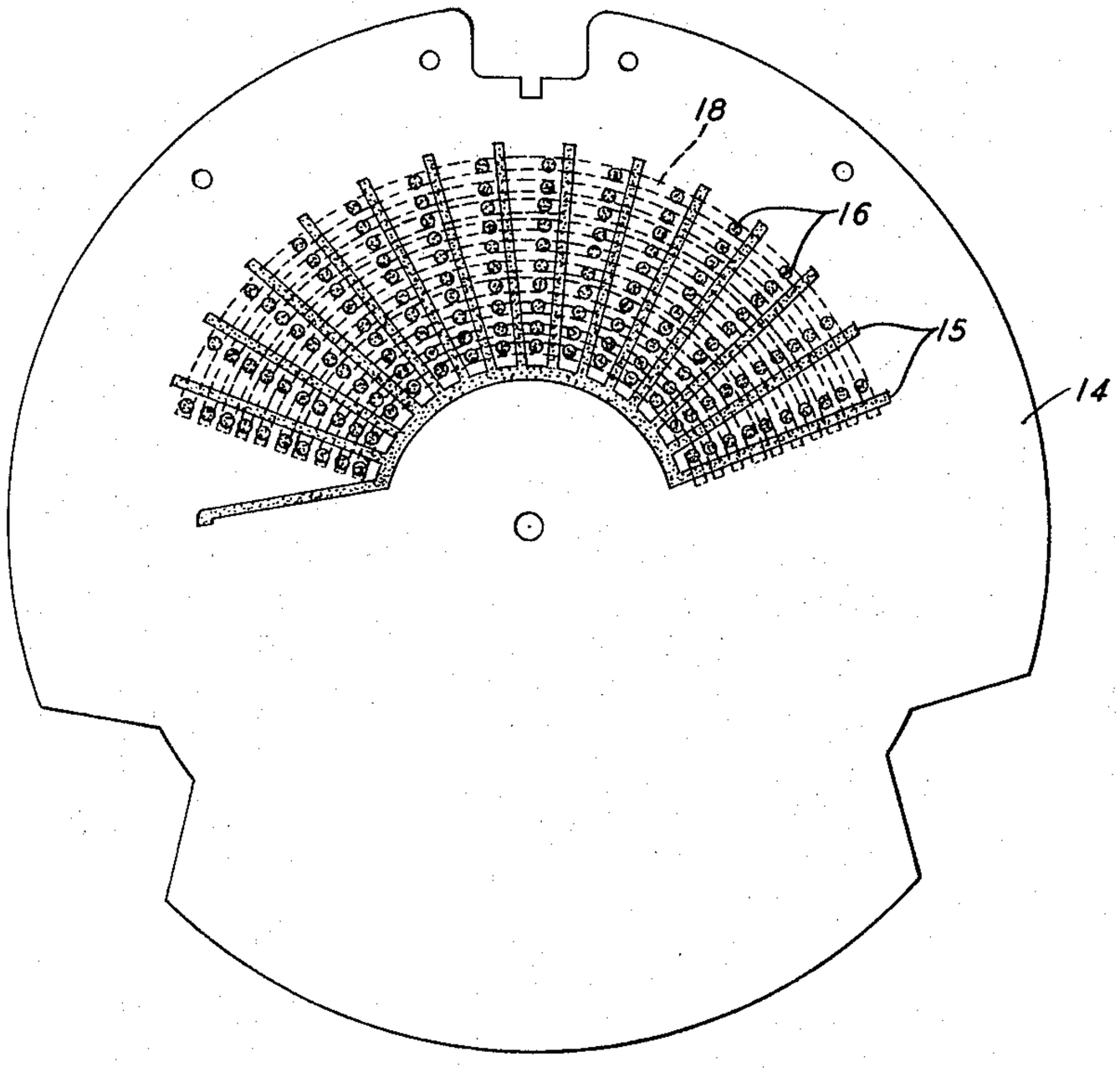
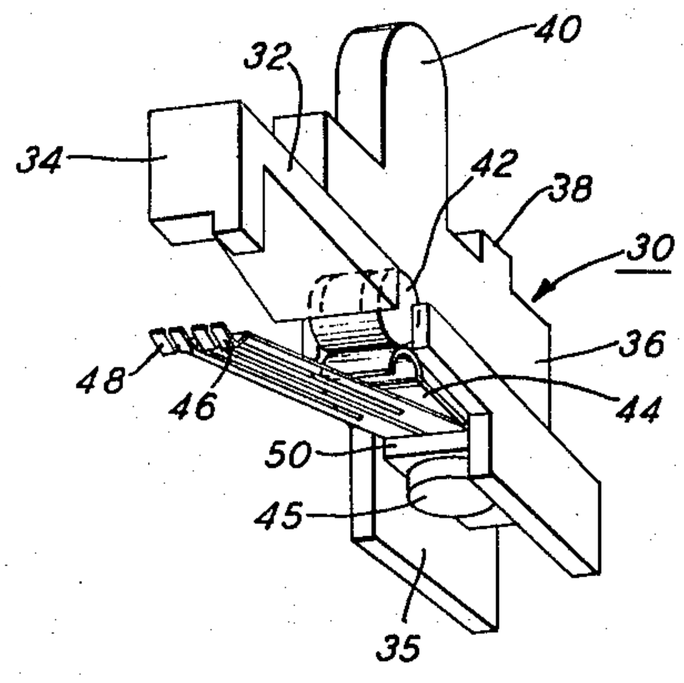


FIG. 5



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SLIDE SELECTOR SWITCH

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6 Claims. (Cl. 200—16)

This invention relates to switches having reciprocal contacts and particularly to switches including a slidable displaceable member that is selectively positionable in a plurality of positions to connect particular pairs of conductors in accordance with the position selected. Such a switch is herein referred to as a slide selector switch.

An object of this invention is to provide a slide selector switch that is positive in operation yet compact in design.

This and other objects of this invention are achieved in an illustrative embodiment thereof wherein the slide selector switch comprises a printed circuit board having a plurality of spaced strip conductors and a like plurality of groups of spaced island conductors on the upper surface thereof. Each group of island conductors is located along a line that is adjacent to and extends parallel to an individual strip conductor. In addition, each island conductor is connected through the board to the underside thereof.

Overlying the board is a face plate having a plurality of slots therein that are equal in number to and in registration with the strip conductors. A selector is positioned in each slot and slidably displaceable along the length thereof. Each selector includes first and second contacts electrically connected to one another and biased toward the board. The first contact engages the associated strip conductor while the second contact engages the line along which the adjacent group of island conductors extend, and thus each selector is positionable to connect the associated strip conductor to any one of the island conductors adjacent thereto.

A complete understanding of the invention and of these and other features and advantages thereof may be gained from consideration of the following detailed description which in conjunction with the accompanying drawing discloses one embodiment of the invention. It is to be expressly understood, however, that the drawing and description are not to be construed as defining the limits of the invention.

In the drawing:

FIG. 1 is a perspective view of a preset dial telephone employing the slide selector switch of this invention;

FIG. 2 is an enlarged sectional view showing a selector and the portion of the face plate and printed circuit board with which it interacts;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is a top view of the printed circuit board; and

FIG. 5 is a perspective view of a selector.

Referring to the drawing and FIG. 1 in particular, in the embodiment of the slide selector switch herein disclosed, the switch is employed in a preset dial **10** of a telephone **12** to select the number to be called by the telephone.

As shown in FIGS. 2, 3, and 4, the switch comprises a printed circuit board **14** having a plurality of strip conductors **15** and island conductors **16** on the upper surface thereof. The strip conductors **15**, which are elongated conductive paths, are spaced from one another, and in the present embodiment extend radially from an arcuate common conductor at the center of the board. The island conductors **16**, which are abbreviated conductive paths,

are spaced from one another and from the strip conductors **15**.

The island conductors **16** are formed in groups of equal numbers with equal spacing between the island conductors in each group, and each group is located adjacent to and along a line extending parallel to an individual strip conductor **15**. In addition, each individual island conductor **16** is connected through the printed circuit board **14** to an individual conductor **18** on the underside of the board, the conductors **18** extending transverse to the strip conductors **15**. In the present embodiment, the corresponding island conductors **16** in each group are located along a common radius and thus the conductors **18** to which they are connected extend along this radius.

Referring now to FIGS. 1 and 2, a cover **20** is mounted on the printed circuit board **14**, the cover comprising a skirt **22** that rests on the board and a face plate **24** that overlies and is spaced from the board. The face plate **24** has a pluraltiy of identical slots **25** therein that are equal in number to the strip conductors **15** and each slot extends parallel to and is in registration with an individual strip conductor and its adjacent group of island conductors **16**.

The upper surface of the face plate **24** has a group of indicia **26** equally spaced along the length of each slot **25**. Each group of indicia **26** in the present embodiment is impressed into the surface and consists of the letter U and the digits 1 through 0 together with lines extending therefrom to the edges of the adjacent slots **25**. The under surface of the face plate **24** has a group of V-shaped notches **28** equally spaced along the length of and on both sides of each slot **25**, and the notches abut one another to form a saw tooth profile.

The number of indicia **26** in each group of indicium is the same as the number of notches **28** in each group of notches. In addition, the spacing between the individual indicium **26** in each group of indicium is the same as the spacing between the individual notches **28** in each group of notches, and this is the same as the spacing between the individual island conductors **16** in each group of conductors. Thus there is a correspondence between the indicium **26**, notches **28**, and island conductors **16** associated wtih each slot **25** and this correspondence provides a particular spatial relationship therebetween that will be hereinafter referred to.

A selector **30** is associated with each slot **25**, and since the selectors are all identical and they have the same relationship with the printed circuit board **14** and the face plate **24**, a description of a single selector **30** suffices to describe the rest.

As shown in FIGS. 2, 4, and 5, the selector **30** includes a base **32** having a forward leg **34** and a rearward leg **35** depending therefrom, the legs resting on the printed circuit board **14** and supporting the base just underneath the face plate **24**. The base **32** further has a ridge **36** upstanding therefrom that extends into the associated slot **25**. The slot **25** is of greater width than the ridge **36** but of lesser width than the base **32** and thus the selector **30** is captured between the printed circuit board **14** and the face plate **24** and is restrained to move along the length of the slot. Furthermore, since the slot **25** is in registration with an individual strip conductor **15** and its adjacent group of island conductors **16**, the selector **30** moves along the length of the conductors.

A boss **38** and a tab **40** extend upward from the ridge **36**, the boss extending just above and the tab extending significantly above the upper surface of the face plate **24**. The tab **40** is used to displace the selector **30** along the length of the slot **25**, while the boss **38** serves as a marker that is aligned with the indicia **26** for the selection of a particular position.

A cylindrical detent **42** is accommodated by a recess

in the underside of the base **32** and extends laterally beyond each side of the ridge **36** into juxtaposition with the notches **28** on each side of the slot **25**. A cantilever spring member **44**, which has one end thereof mounted on a post **45** depending from the underside of the base **32** and the other end thereof contiguous with the underside of the detent **42**, biases the detent upward against the notches **28**. This biased engagement of the cylindrical detent **42** against the saw tooth configuration of the notches **28** results in the position of the selector **30** being unstable except when the detent is seated in a notch. Thus, the location of the selector **30** along the length of the slot **25** is limited to these spaced discrete positions.

A pair of cantilever bifurcated contact members **46** and **48**, which also have one end thereof mounted on the post **45** depending from the base **32**, have the free ends thereof biased toward the printed circuit board **14**. The contact member **46** engages the strip conductor **15** while the contact member **48** engages the line along which the adjacent island conductors **16** lie. The contact members **46** and **48** are electrically connected to one another, they being advantageously formed as an integral element, and consequently when the contact member **48** engages an island conductor **16**, the island conductor is electrically connected to the strip conductor **15**.

The contacting surface of the contact member **48**, the notch engaging surface of the detent **42**, and the boss **38** have the same spatial relationship as the island conductors **16**, the notches **28**, and the indicia **26**. Hence when the detent **42** is seated in a notch **28**, the boss **38** is automatically aligned with the indicium **26** associated with the notch and the contact member **48** is automatically positioned in engagement with the island conductor **16** associated with the indicium.

The base **32**, legs **34** and **35**, ridge **36**, boss **38**, tab **40**, and post **45** of the selector **30** are all advantageously formed as an integral unit from a dielectric material. The detent **42** is advantageously formed from a material having self-lubricating properties and the spring member **44** and contact members **46** and **48** are advantageously mounted on the post **45** by swaging the post over a washer **50**.

Although a specific embodiment of the invention has been shown and described, it will be understood that it is but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. A slide selector switch comprising:

a board having an insulated strip conductor and a group of insulated island conductors on the upper surface thereof, the island conductors being spaced from one another and from the strip conductor and being located along a line extending parallel to the strip conductor, each individual island conductor being connected through the board to a conductor extending transverse to the strip conductor, the transverse conductor extending along the underside of the board;

a face plate overlying the board and spaced therefrom, the face plate having a slot therein extending parallel to and in general registration with the strip and island conductors;

a selector positioned in the slot of the face plate and movable along the length thereof, the selector including a pair of spaced contacts electrically connected to one another and biased toward the board, a first contact engaging the strip conductor and the second contact engaging the line along which the group of island conductors extend, whereby the selector is positionable to connect the strip conductor to any one of the island conductors.

2. A slide selector switch comprising:

a dielectric board having a plurality of spaced strip conductors and a like plurality of groups of spaced island conductors on the upper surface thereof, each group of island conductors being located adjacent to and along a line extending parallel to an individual strip conductor, the island conductors in each group being equal in number and each individual island conductor being connected through the board to the underside thereof;

a face plate overlying the board and spaced therefrom, the face plate having a plurality of slots therein equal in number to, extending parallel to, and in general registration with the strip conductors and their adjacent group of island conductors;

a selector positioned in each slot of the face plate and movable along the length thereof, each selector including a first and a second contact electrically connected to one another and biased toward the board, the first contact engaging a strip conductor and the second contact engaging the line along which the adjacent group of island conductors extend, each selector further including a base portion having a pair of spaced legs depending therefrom that rest on the board and locate the base just underneath the face plate, the base further having a ridge upstanding therefrom that extends into the slot with which the selector is associated, the ridge being of lesser width and the base being of greater width than the slot.

3. A slide selector switch as in claim **2** wherein the ridge has a tab and a boss upstanding therefrom and extending above the upper surface of the face plate, the upper surface of the face plate having indicia spaced along the length of each slot, and each selector being positionable by means of the tab so that the boss is in alignment with one of the indicium.

4. A slide selector switch as in claim **6** wherein the face plate has V-shaped notches on the underside thereof spaced along the length and on both sides of each slot, the notches and indicia along each slot being equal in number, and each selector has a detent biased against the notches, the interaction between the detent and the notches limiting the location of each selector to particular discrete positions that facilitate the placement of the second contact of each selector in engagement with one of the island conductors associated therewith and the interaction between the detent and the notches automatically positioning the boss in alignment with one of the indicium.

5. A slide selector switch as in claim **4** wherein each detent comprises a cylindrical member positioned within a groove in the base and the ridge of its associated selector, the detent extending laterally beyond each side of the ridge and being biased upward by a cantilever spring member.

6. A slide selector switch as in claim **2** wherein each island conductor is connected through the board to a conductor extending transverse to the strip conductor adjacent to the island conductor.

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