

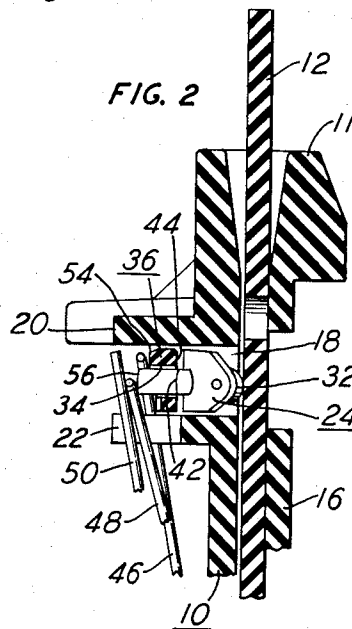
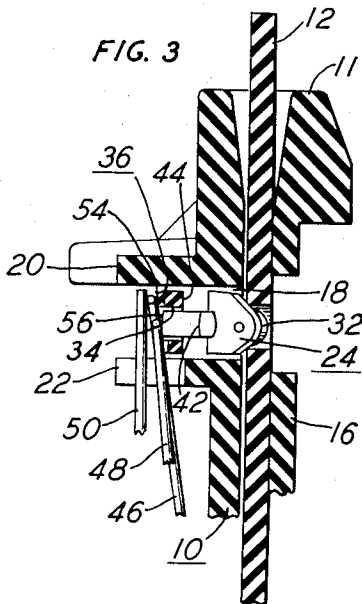
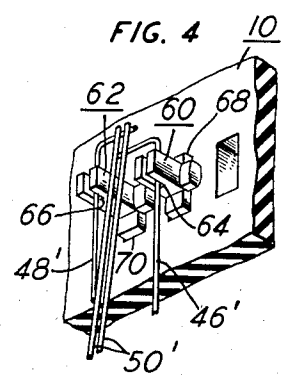
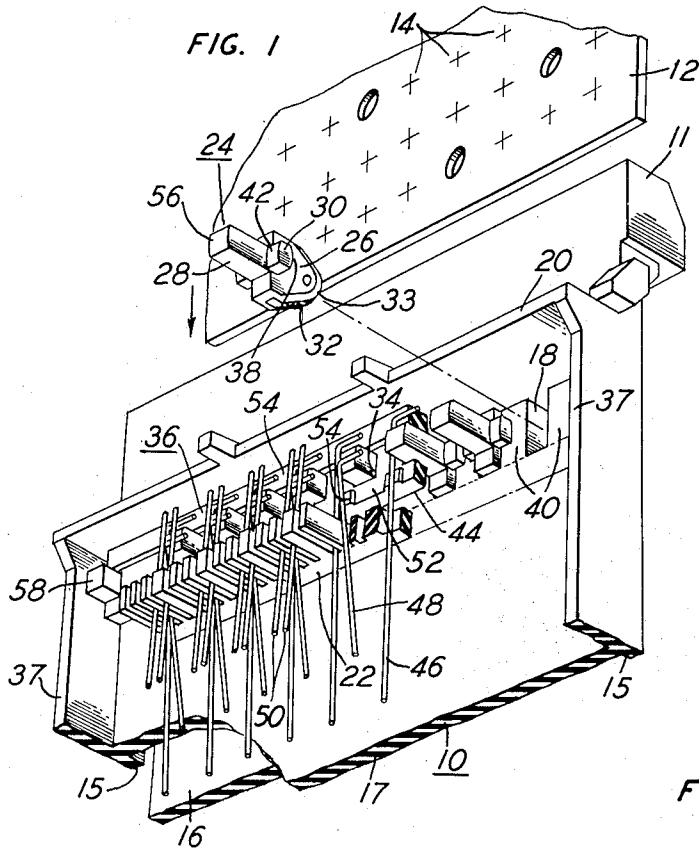
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WEB ACTUATED SWITCH

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1

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WEB ACTUATED SWITCH

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This invention relates to switches and particularly to switches operated responsive to the presence of coding on a web moving relative to the switches.

Information is commonly stored on a web having a plurality of rows of spaced index positions by perforating particular index positions within each row, the information stored being directly related to the particular index position or positions within a row that are perforated. The information is then retrieved from the web by passing it through a reading device that scans the web, detects the presence of the perforations, and translates the stored information.

The perforations in the web are commonly sensed in the reading device by means of a gang of electric brushes, the perforated web passing between the brushes and conductors underlying the brushes. The individual brushes are aligned with the index position locations of the web, and when a perforation moves beneath a brush, the brush reaches through the perforation and makes contact with the conductor on the other side of the web.

The disadvantage of such a sensing arrangement is that if the web carries any contaminants, such as lint or dirt, the contaminants tend to collect on the brushes and may result in failure of a brush to make contact when a perforation appears below the brush.

In addition, as the brushes are current carrying members, should a conductive body, rather than a nonconductive web be inadvertently inserted into the sensing device, serious damage to the device may result.

Furthermore, because the brushes make sliding contact with the web, the pressure that the brushes may exert against the web is limited, since too high a contact pressure could result in the friction between the brushes and the web impeding the movement of the web and scratching or tearing the surface of the web.

Moreover, the brushes are fixed members and therefore a small misalignment between the brushes and the perforations may result in the brushes not making contact through the perforations.

An object of this invention is to provide an encoded web responsive switch that does not suffer from the aforementioned disadvantages.

This and other objects of this invention are achieved in an illustrative embodiment thereof wherein the switch comprises a dielectric separator that accommodates the encoded web along the front side thereof and has a plurality of contact members situated on the back side thereof. The separator has a row of apertures therein that lie in a line transverse to the direction of the movement of the web, the apertures being in register with the index position locations on the web.

A dielectric sensing member is situated in each aperture, and each sensing member is independently movable normal to the web between a first position wherein it rests on the surface of the web and a second position wherein it is situated in a perforation in the web. Each sensing member includes a roller at the front end thereof for making rolling contact with the web. Each sensing member further includes portions, situated on the back side of the separator, for engaging a datum bar common to all sensing members. The datum bar merely rests on the engaging portions of the sensing members, and thus the sensing members are individually movable relative to

2

the datum bar. Because there are at least two sensing members in a first position at all times, the datum bar is maintained a substantially constant distance from the web.

Three contact members are associated with each sensing member; a stationary contact member, a moving contact member, and a transferring contact member. The stationary contact member rests on and biases the datum bar toward the engaging portions of the sensing member, the stationary contact member being maintained a substantially constant distance from the web by the datum bar. The moving contact member rests on the back end of the sensing member and biases the sensing member against the web, the moving contact member moving with the sensing member when it moves between its first and its second position. The transferring contact member extends behind both the stationary and the moving contact members and is biased toward the web.

When a sensing member is resting on a nonperforated portion of the web and therefore is in its first position, the moving contact member is spaced a greater distance from the web than the stationary contact member, and the transferring contact member thus engages the moving contact member. When, however, a perforation passes in front of the sensing member and the bias of the moving contact member moves the sensing member into the perforation, thereby placing the sensing member in its second position, the moving contact member is closer to the web than the stationary contact member, and the transferring contact member engages the stationary contact member. As the sensing member moves from its first to its second position, the transferring contact member moves with the moving contact member until the transferring contact member is arrested by its engagement with the stationary contact member, making contact therewith. The moving contact member continues its forward movement with the sensing member, and thus immediately thereafter it breaks contact with the transferring contact member.

Thus a feature of this invention resides in the contact members being isolated and insulated from the web by dielectric sensing members and a dielectric separator, thereby eliminating the possibility of the contact members being contaminated by dirt on the web or the device with which the switch is associated being damaged by a conductive body coming into contact with the contact members.

Another feature of this invention resides in the sensing members having wheels for making rolling contact with the web, thereby permitting the use of high contact pressures between the sensing members and the web without fear of abrading the surface or interfering with the movement of the web.

A further feature of this invention resides in the sensing members being movable relative to the contact members associated therewith, thereby allowing the sensing members to move into perforations in the web that are slightly misaligned.

A still further feature of this invention resides in the datum bar being supported by the sensing members at a substantially constant distance from and parallel to the surface of the web, thereby making the switch insensitive to web thickness.

Still another feature of this invention resides in the separation between contact members being automatically determined by the dimensions of the sensing members and the datum bar, thereby eliminating the costly operation of adjusting contact separation by bending the contact members.

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 taken in conjunction with the accompanying drawing wherein two embodiments of the invention are illustrated. It is to be expressly understood, however, that the drawing is for the purposes of illustration and description and is not to be construed as defining the limits of the invention.

In the drawing:

FIG. 1 is a perspective view of a first embodiment of the switch with some parts broken away and moved out of position for greater clarity;

FIG. 2 is a sectional view of the switch showing the positions of a single grouping of contact members when the sensing member associated therewith is situated on a nonperforated portion of the web;

FIG. 3 is a view similar to FIG. 2 except showing the positions of the contact members when the sensing member associated therewith is situated in a perforation in the web; and

FIG. 4 is a fragmentary perspective view of a second embodiment of the switch.

Referring now to the drawings and particularly to FIG. 1, the switch comprises a dielectric separator 10 having an entryway 11 for receiving an encoded web 12. The web includes a plurality of parallel rows of spaced index positions 14, and information is coded on the web by perforating one or more index positions in each row. The entryway 11 in conjunction with a pair of side guide rails 15 and a guide wall 16 direct the web along a front surface 17 of the separator and direct the rows of index positions on the web transverse to a row of apertures 18 in the separator, only the aperture at the far right being clearly visible. The number of apertures 18 is equal to the number of index positions 14 in each row, and when the web is moving along the front of the separator, the apertures lie in a line parallel to the rows of index positions, and the individual apertures are in register with the individual index positions in each row. The top and bottom surfaces of the apertures 18 are respectively extended rearwardly by means of a shelf 20 and a comb 22 projecting from the back side of the separator.

A dielectric sensing member 24 is accommodated by each aperture 18 in the separator 10. Each sensing member comprises a head 26, a shaft 28 that extends rearwardly from the head, and an arm 30 that extends laterally at the junction of the head and the shaft. Each sensing member is positioned with the head thereof extending through one of the apertures and with the arm and shaft thereof located on the back side of the separator.

The head 26 of each sensing member 24 tapers to a blunt point at the front end thereof and is bifurcated, and a wheel 32 is situated between and journaled in the bifurcations, the wheel being located so that a small portion of the wheel extends to the fore of the head. The axis of rotation of the wheel extends parallel to the plane of the separator 10 and transverse to the length of the guide rails 15. Hence, the wheel is adapted to make rolling contact with the facing surface of the web as the web moves along the front of the separator, the front of the wheel providing the sensing member with a web engaging surface 33.

The shafts 28 of the sensing members 24 are respectively accommodated by apertures 34 in a dielectric datum bar 36 that is positioned over the shafts, the datum bar being situated between the shelf 20 and the comb 22. The height of the datum bar is slightly less than the distance between the shelf and the comb, and the length of the bar is slightly less than the distance between a pair of side walls 37. In addition, the apertures 34 in the datum bar are slightly larger than the shafts 28 of the sensing members. Thus the datum bar is movable relative to both the separator 10 and the individual sensing members, but the motion of the datum bar is substantially limited to moving perpendicular to the plane of the

separator and thereby perpendicular to the plane of the web 12.

The apertures 18 in the separator 10 are slightly larger than the largest dimensions of the heads 26 of the sensing members 24, and consequently the individual sensing members are movable relative to the separator. The apertures in the separator in conjunction with the shelf 20 and the comb 22 interact with the heads of the sensing members and the apertures 34 in the datum bar 36 interact with the shafts 28 of the sensing members to tend to limit the movement of the sensing members to a direction perpendicular to the plane of the separator. However, due to the taper of the heads, they advantageously have a preselected amount of freedom of movement parallel to the plane of the separator. This movement of the heads results in the sensing members pivoting about their shafts at the point of intersection of the shafts with the datum bar.

The arms 30 of the sensing members 24 are located intermediate the datum bar 36 and the rear surface of the separator 10, and the distance between the ends of the arms is greater than the width of the apertures 18 in the separator and the apertures 34 in the datum bar. As a consequence, the front surfaces of the arms provide the sensing members with separator engaging surfaces 38 that cooperate with sensing member engaging surfaces 40 on the separator to limit the forward movement of the sensing members. Furthermore, the rear surfaces of the arms provide the sensing members with datum bar engaging surfaces 42 that cooperate with a sensing member engaging surface 44 on the datum bar to deflect the datum bar rearwardly when the sensing members are deflected rearwardly. The separator engaging surfaces 38 and the datum bar engaging surfaces 42 curve convexly so as not to interfere with the above-mentioned freedom of movement when either of the surfaces are in engagement with the surfaces cooperating therewith.

The sensing member engaging surface 44 of the datum bar 36 is biased toward the datum bar engaging surfaces 42 of the sensing members 24 and the separator engaging surfaces 38 of the sensing members are biased toward the sensing member engaging surfaces 40 of the separator 10 by a plurality of groupings of cantilever wire spring contact members. An individual grouping of contact members is associated with each sensing member, and each grouping comprises a stationary contact member 46, a moving contact member 48, and a transferring contact member 50. The stationary contact member 46 of each grouping is biased against positions protruding from a rear surface 52 of the datum bar, the rearward surface of the protruding portions providing the datum bar with contact engaging surfaces 54. The moving contact member 48 of each grouping is spaced from the stationary contact member and is biased against the rear surface of the shaft 28 of the sensing member with which it is associated, the rear surface of the shaft providing the sensing member with a contact engaging surface 56. The transferring contact member 50 of each grouping is situated to the rear of both the stationary contact member and the moving contact member and is biased theretoward, the transferring contact member being bifurcated to increase the reliability and reduce the noise of the switch.

The lower ends (not shown) of the contact members are secured in their proper position by any well known means such as being potted in a dielectric material, while the upper unsecured ends of the contact members are maintained in the proper transfer spatial relationship by the comb 22. The teeth of the comb besides maintaining the spacing between contact members serve to limit the movement of the contact members to a direction perpendicular to the plane of the separator.

For this embodiment of the switch to perform in the intended manner, certain relationships must exist between the various elements of the switch. First, the distance between the web engaging surface 33 and the

51

separator engaging surface 38 of each sensing member 24 is greater than the distance between the front surface 17 and the sensing member engaging surfaces 40 of the separator 10, whereby when the separator engaging surface 38 of the sensing member rests against the sensing member engaging surfaces 40 of the separator, the front end of the sensing member protrudes beyond the front surface of the separator. Each sensing member is thereby in a position to be deflected rearwardly by the movement of a web 12 along the front of the separator and to move into a perforation in the web when such appears therebefore.

Second, the distance between the datum bar engaging surface 42 and the contact engaging surface 56 of each sensing member 24 is greater than the distance between the sensing member engaging surface 44 and the contact engaging surface 54 of the datum bar 36, whereby when the sensing member engaging surface 44 of the datum bar rests on the datum bar engaging surface of a sensing member, the contact engaging surface 54 of the datum bar is forward of the contact engaging surface 56 of the sensing member.

Third, the distance between the contact engaging surface 56 of the sensing member 24 and the contact engaging surface 54 of the datum bar 36 when the datum bar is in the above position is less than the distance moved by the sensing member when it moves from the surface of an encoded web 12 into a perforation in the web. Finally, the distance between the contact engaging surface 56 of the sensing member and the rear surface 52 of the datum bar when the datum bar is in the above position is slightly greater than the distance moved by the sensing member when it moves from the surface of the encoded web into a perforation in the web.

Turning now to FIG. 2, as a web 12 is moved through the entryway 11 and into the space between the guide wall 16 and the separator 10, the sensing members 24 are deflected rearwardly by the web. As a consequence, the moving contact members 48 resting on the contact engaging surfaces 56 of the sensing members are deflected rearwardly. In addition, the stationary contact members 46, which rest on the contact engaging surfaces 54 of the datum bar 36 and bias the sensing member engaging surface 44 of the datum bar against the datum bar engaging surfaces 42 of the sensing members, are also deflected rearwardly. Since in this position the contact engaging surfaces 54 of the datum bar are forward of the contact engaging surfaces 56 of the sensing members, the stationary contact members 46 are forward of the moving contact members 48 and the transferring contact members 50 thereby engage the moving contact members.

When a perforation in the web 12 moves into the proximity of a sensing member 24 and the lower edge of the perforation moves past the center of the wheel 32, the bias of the moving contact member 48 acting on the sensing member causes the sensing member to tilt upward and commence to move into the perforation before the perforation is directly before it. As the sensing member moves into the perforation, the moving contact member 48 in engagement with the sensing member and the transferring contact member 50 in engagement with the moving contact member move with the sensing member. The stationary contact member 46 in engagement with the datum bar, on the other hand, does not move since the sensing members 24 not having a perforation therebefore maintain the datum bar a constant distance from the facing surface of the web.

The transferring contact member 50 moves with the moving contact member 48 until the motion of the transferring contact member is arrested by its engagement with the stationary contact member 46 and for an instant the transferring contact member 50 is in engagement with both the moving contact member 48 and the stationary contact member 46. Immediately thereafter, however,

6

the moving contact member 48 breaks with the transferring contact member, since the moving contact member continues to follow the forward motion of the sensing member. And when, as shown in FIG. 3, the sensing member is fully positioned in the perforation in the web, the moving contact member 48 is positioned forward of the stationary contact member 46 and the transferring contact member 50 is therefore in engagement with the stationary contact member.

As the web 12 continues its movement, the sensing member 24 positioned in the perforation tends to remain in the perforation, the sensing member following the movement of the web as long as it is able and thereby extending the period of time during which the transferring contact member 50 is in engagement with the stationary contact member 46 and out of engagement with the moving contact member 48. Subsequently, the upper edge of the perforation engages the wheel 32 of the sensing member and commences to deflect the sensing member rearwardly. The moving contact member 48 is, consequently, also moved rearwardly and eventually the sensing member moves the moving contact member into engagement with the transferring contact member 50. Momentarily, the transferring contact member is again in engagement with both the moving contact member and the stationary contact member 46 but immediately thereafter the moving contact member lifts the transferring contact member off of the stationary contact member and moves it a spaced distance therefrom.

It is seen that since not all the sensing members 24 detect and move into perforations in the web 12 at one time, there is a plurality of sensing members resting on the facing surface of the web at all times. These sensing members maintain the datum bar 36 and thereby the stationary contact members 46 at a constant distance from and parallel to the surface of the web. Therefore as long as the perforations in the web are substantially the same size, whereby the sensing members and thereby the moving contact members 48 move a substantially constant distance forward upon the movement of the sensing members into a perforation, the thickness of the web may vary and the web may be warped longitudinally without affecting the gaps between the contact members.

It may be found desirable, depending upon the manner in which information is coded on the web 12, to provide one or more sensing members 58, one of which is seen at the upper left of FIG. 1, situated in apertures in the separator 10 that are in line with the apertures 18 in the separator but are not in register with index positions 14 on the web. These sensing members 58 always ride on the facing surface of the web, and therefore serve to support the datum bar 36 and prevent it from assuming a nonparallel position relative to the facing surface of the web should several sensing members 24 at one end of the datum bar move into perforations in the web all at one time.

Referring now to FIG. 4, in a second embodiment of the invention the stationary contact members 46' and the moving contact members 48' are provided with individual dielectric sensing members 60 and 62, respectively, the transferring contact member 50' overlying both the stationary and the moving contact members. The middle and front portions of the sensing members 60 and 62 are the same as the sensing members 24 but the back portions are modified in that they are slotted for accommodating the contact members, the stationary contact member 46' resting on a contact engaging surface 64 of the sensing member 60 and the moving contact member 48' resting on a contact engaging surface 66 of the sensing member 62.

The sensing members 60 and 62 respectively extend through apertures 68 and 70 in a separator 10'. The apertures 68 and 70 are both in a line parallel to the rows of index positions in the web, but the apertures 68 are in register with the spaces between the index positions while the apertures 70 are in register with the index posi-

tions themselves. The sensing member 69, therefore, always rides on the surface of the web, and the stationary contact member 46' associated therewith is thereby spaced a constant distance from the surface of the web. The sensing member 62, on the other hand, moves between a first position wherein it is resting on the facing surface of the web and a second position wherein it is situated in a perforation in the web, and the moving contact member 48' associated with the sensing member 62 moves therewith.

The contact engaging surface 64 is spaced a smaller distance from the front end of the sensing member 60 than the contact engaging surface 66 is spaced from the front end of the sensing member 62. In addition, the distance between the contact engaging surface 64 and the contact engaging surface 66 when both the sensing members 60 and 62 are resting on the facing surface of a web is less than the distance moved by the sensing member 62 when it moves from the facing surface of a web into a perforation in the web.

In the operation of the second embodiment, when both sensing members 60 and 62 are positioned on the surface of the web, the moving contact member 48' is spaced a greater distance from the surface than the stationary contact member 46' and the transferring contact member 50' therefore engages the moving contact member.

As the sensing member 62 moves into an aperture, the moving contact member 48' and the transferring contact member 50' move therewith. The movement of the transferring contact member 50', however, is arrested upon its engagement with the stationary contact member 46'. Momentarily the transferring contact member 50' engages both the stationary contact member 46' and the moving contact member 48', but since the sensing member 62 continues its forward movement, the moving contact member 48' moves away from the transferring contact member 50' to a position where it is spaced closer to the surface of the web than the stationary contact member 46', leaving the transferring contact member 50' in engagement with the stationary contact member.

Upon the sensing member 62 moving out of a perforation, the moving contact member 48' is deflected rearwardly into engagement with the transferring contact member 50'. Again for an instant the transferring contact member 50' is in engagement with both the stationary contact member 46' and the moving contact member 48', but then the rearward movement of the sensing member 62 causes the moving contact member 48' to lift the transferring contact member 50' off of the stationary contact member 46' and the transferring contact member 50' is again in engagement with only the moving contact member.

In this embodiment, since the position of the stationary contact member is determined by its own individual sensing member which is in close proximity to the sensing member associated with the moving contact member, the gaps between the contact members in addition to being unaffected by web thickness and longitudinal warp are also unaffected by transverse warp.

It is to be expressly understood that the switch of this invention performs equally well in any orientation and terms "overlying," "upper," "on," and so forth appearing in the claims are employed to establish relative positions between the elements of the switch and do not limit the switch to any particular orientation.

What is claimed is:

1. A switch actuatable responsive to coding on a web moving relative to the switch comprising:

three contact members adapted to overlie the web;
the first contact member being situated a substantially constant distance from the upper surface of the web;
the second contact member being movable between a first and a second position responsive to the presence of coding on the web, the second contact member in its first position being spaced a greater distance

from the upper surface of the web than the first contact member and in its second position being spaced a shorter distance from the upper surface of the web than the first contact member;

and the third contact member overlying both the first and the second contact members and being biased theretoward, the third contact member engaging the second contact member when it is in its first position and following the second contact member as the second contact member moves from its first to its second position, the movement of the third contact member being arrested by its engagement with the first contact member whereupon the third contact member makes with the first contact member and immediately thereafter breaks with the second contact member as the second contact member continues its movement toward its second position.

2. A switch as in claim 1 further including sensing means for maintaining the first contact member a substantially constant distance from the upper surface of the web and actuating the second contact member responsive to the presence of coding on the web, the sensing means being situated intermediate the contact members and the web and including portions engaging the upper surface of the web.

3. A switch as in claim 1 further including a first sensing member situated intermediate the first contact member and the web and engaging an uncoded portion of the web, the first sensing member maintaining the first contact member a substantially constant distance from and electrically insulating the first contact member from the surface of the web.

4. A switch as in claim 3 further including a second sensing member situated intermediate the second contact member and the web and engaging an uncoded portion of the web, the second sensing member moving the second contact member between its first and second position responsive to the presence of coding in the web.

5. A switch as in claim 4 wherein the first and the second contact members respectively bias the first and the second sensing members into engagement with the web.

6. A switch as in claim 4 wherein the first and the second sensing members comprise means for respectively electrically insulating the first and the second contact members from the web.

7. A switch as in claim 4 wherein the first and the second sensing members include means for making rolling contact with the surface of the web.

8. A switch as in claim 4 wherein the lower ends of the sensing members are tapered and are movable in a direction parallel to the plane of the web.

9. A switch as in claim 4 further including a separator intermediate the contact members and the web, the separator having apertures therein through which the first and the second sensing members extend, the separator including means for generally directing the movement of the sensing members and the movement of the contact members perpendicular to the plane of the web.

10. A switch actuatable responsive to coding on a web moving relative to the switch comprising:

a plurality of groupings of contact members adapted to overlie the web, each grouping comprising a stationary contact member, a movable contact member, and a transferring contact member overlying both the stationary contact member and the moving contact member and being biased theretoward; and means intermediate the groupings of contact members and the web, the intermediate means including means for maintaining the stationary contact members a substantially constant distance from the upper surface of the web and means for moving the moving contact member between a first and a second position responsive to the presence of coding on the web, the moving contact member in its first position being

9

spaced a greater distance from the upper surface of the web and the stationary contact member and in its second position being spaced a shorter distance from the upper surface of the web than the stationary contact member.

11. A switch actuatable responsive to coding on an encoded web moving relative to the switch comprising:

a plurality of sensing members adapted to overlie the web, each of the sensing members being independently movable between a first and a second position responsive to the presence of coding on the web, and each sensing member having a datum means engaging surface intermediate the lower and upper ends thereof and a contact engaging surface at the upper end thereof;

datum means overlying the sensing members, the datum means having a sensing member engaging surface at the lower end thereof, the sensing member engaging surface resting on the datum means engaging surfaces of two or more of the sensing members, the datum means further having a contact engaging surface at the upper end thereof, the distance between the sensing member engaging surface and the contact engaging surface of the datum means being less than the distance between the datum means engaging surfaces and the contact engaging surfaces of the sensing members, whereby when the sensing member engaging surface of the datum means rests on the datum means engaging surface of a sensing member the contact engaging surface of the datum means is below the contact engaging surface of the sensing member, the distance between the contact engaging surface of the datum means and the contact engaging surface of the sensing member being less than the distance between the first and the second positions of the sensing members;

a first contact member associated with each sensing member, the first contact member engaging the contact engaging surface of the datum means and biasing the datum means toward the datum means engaging surface of the sensing member;

and a second contact member associated with each sensing member, the second contact member overlying the contact engaging surface of the sensing member and the first contact member and being biased theretoward.

12. A switch actuatable responsive to coding on an encoded web moving relative to the switch comprising:

a plurality of sensing members adapted to overlie the web, each of the sensing members being independently movable between a first and a second position responsive to the presence of coding on the web, and each sensing member having a datum means engaging surface intermediate the lower and upper ends thereof and a contact engaging surface at the upper end thereof;

datum means overlying the sensing members, the datum means having a sensing member engaging surface at the lower end thereof, the sensing member engaging surface resting on the datum means engaging surfaces of two or more of the sensing members, the datum means further having a contact engaging surface at the upper end thereof, the distance between the sensing member engaging surface and the contact engaging surface of the datum means being less than the distance between the datum means engaging surfaces and the contact engaging surfaces of the sensing members, whereby when the sensing member engaging surface of the datum means rests on the datum means engaging surface of a sensing member the contact engaging surface of the datum means is below the contact engaging surface of the sensing member, the distance between the contact engaging surface of the datum means and the contact engaging surface of the sensing member being

10

less than the distance between the first and the second positions of the sensing members;

a first contact member associated with each sensing member, the first contact member engaging the contact engaging surface of the sensing member and biasing the sensing member toward its second position;

and a second contact member associated with each sensing member, the second contact member overlying the contact engaging surface of the datum means and the first contact member and being biased theretoward.

13. A switch actuatable responsive to coding on an encoded web moving relative to the switch comprising:

a plurality of sensing members adapted to overlie the web, each of the sensing members being independently movable between a first and a second position responsive to the presence of coding on the web, and each sensing member having a datum means engaging surface intermediate the lower and upper ends thereof and a contact engaging surface at the upper end thereof;

datum means overlying the sensing members, the datum means having a sensing member engaging surface at the lower end thereof, the sensing member engaging surface resting on the datum means engaging surfaces of two or more of the sensing members, the datum means further having a contact engaging surface at the upper end thereof, the distance between the sensing member engaging surface and the contact engaging surface of the datum means being less than the distance between the datum means engaging surfaces and the contact engaging surfaces of the sensing members, whereby when the sensing member engaging surface of the datum means rests on the datum means engaging surface of a sensing member the contact engaging surface of the datum means is below the contact engaging surface of the sensing member, the distance between the contact engaging surface of the datum means and the contact engaging surface of the sensing member being less than the distance between the first and the second positions of the sensing members;

a stationary contact member associated with each sensing member, the stationary contact member engaging the contact engaging surface of the datum means and biasing the datum means toward the datum means engaging surface of the sensing member;

a moving contact member associated with each sensing member, the moving contact member engaging the contact engaging surface of the sensing member and biasing the sensing member toward its second position;

and a transferring contact member associated with each sensing member, the transferring contact member overlying both the stationary and the moving contact members and being biased theretoward.

14. A switch as in claim 13 wherein the lower ends of the sensing members include means for making rolling contact with the web.

15. A switch as in claim 13 wherein the sensing members and the datum means comprise means for electrically insulating the stationary and the moving contact members from each other and from the surface of the web.

16. A switch as in claim 15 further including a dielectric separator intermediate the contact members and the web, the separator having apertures therein through which the sensing members extend, the apertures being of a size to permit some movement of the sensing members parallel to the plane of the separator.

17. A switch as in claim 16 wherein the sensing members include separator engaging surfaces intermediate the lower and upper ends thereof and the upper side of the separator includes a sensing member engaging surface, the separator engaging surface of the sensing member and the sensing member engaging surfaces of the separa-

11

tor cooperating to limit the movement of the sensing members through the apertures in the separator, the distance between the lower ends and the separator engaging surfaces of the sensing members being greater than the depth of the apertures in the separator.

18. A switch as in claim 16 wherein the separator includes means for generally directing the movement of the sensing members and the contact members perpendicular to the plane of the web.

19. A switch as in claim 13 further including auxiliary sensing means for maintaining the bar and thereby the stationary contact members a substantially constant distance from the facing surface of the web.

20. A switch actuatable responsive to perforations in an encoded web moving relative to the switch comprising:

a plurality of dielectric sensing members adapted to overlie the web, each of the sensing members being independently movable between a first and a second position responsive to the presence of perforations in the web and each sensing member including a head portion at the lower end thereof, a shaft at the upper end thereof, and a laterally extending arm at the junction of the shaft with the head;

a dielectric datum bar overlying the sensing members and having spaced apertures therein through which the shafts of the sensing members extend, the bottom surface of the datum bar resting on the lateral arms

12

of two or more of the sensing members, the datum bar having a ridge at the upper end thereof, the distance between the bottom surface of the bar and the ridge of the bar being less than the distance between the laterally extending arms and the upper end of the shaft whereby when the bar rests on the laterally extending arms of a sensing member the ridge of the bar is below the upper end of the shaft, the distance between the ridge of the bar and the upper end of the shaft being less than the distance between the first and the second positions of the sensing members;

a stationary contact member associated with each sensing member, the stationary contact member engaging the ridge of the bar and biasing the bar toward the laterally extending arms of the sensing member;

a moving contact member associated with each sensing member, the moving contact member engaging the upper end of the shaft of the sensing member and biasing the sensing member toward its second position;

and a transferring contact member associated with each sensing member, the transferring contact member overlying both the stationary and the moving contact members and being biased theretoward.

No references cited.