SWITCH DEVICES FOR THE LAMPS OF ELECTRIC NEWSPAPERS

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Abstract: The present invention relates to switch devices for the lamps of electric newspapers. In electric newspapers, which term also includes arrangements to be used for example for advertising purposes, a lamp panel is used which may be placed, for example, on the roof of a building, on a wall, inside a building below a ceiling, or upon a counter. Each lamp panel comprises a plurality of lamp rows each comprising a number of electric lamps. The lamps of the lamp panel are turned on and turned off by means of a switch device comprising a contact panel provided with a group of contact members for each lamp row of the lamp panel, and each contact member is connected to a corresponding lamp in the corresponding lamp row and thereby to one pole of a current supply. Normally, the contact members of each contact group are arranged on a line in the same manner as the lamps of the lamp panel. The contact members are actuated by symbol units and are connected thereto. Each symbol unit is, at least on the side facing the contact panel, provided with a symbol such as a letter, a number, and advertising figure or a like figure, and it is these symbols which act on the contact members. Thus, each symbol will, when facing the contact panel, act on one or more contact members in one or more contact groups of the contact panel, depending on the symbol, and will thereby turn on the corresponding lamps in the lamp panel so that a figure corresponding to the shape of the symbol appears in lights on the lamp panel. As the symbol unit is passed along the contact panel the corresponding figure in light will travel across the lamp panel.

In hitherto normally used switch devices for electric newspapers, each contact member of the contact panel is designed as a heavy switch, which when closed connects the corresponding lamp with the other pole of the current supply. Each symbol unit consists of a metal block in the upper side of which the symbol is formed, and these blocks are interconnected to form a chain which is passed along the contact panel. Such a switch device is very expensive not only to manufacture but also to use, takes up much space and is difficult to operate.

A more simple switch device has also been proposed, in which symbols, made from sheet metal, are used, which symbols are arranged on a relatively thick band of electric insulating material, for example made from rubber or fiber material, which band is on its reverse side provided with a metallic strip. In such a device each contact member constitutes the one pole of a switch, the other pole of which is constituted by the symbols which have to be connected to the metallic strip on the reverse side of the band, which metallic strip is connected to the other pole of the current supply. To obtain the electric connection between each sheet metal symbol and the metallic strip, each symbol is attached to the band by means of at least two rivets, which also pass through the metallic strip.

A contact panel to be used in such a switch device may be more simple than the corresponding contact panels in the normally used switch devices, and also the band and the sheet metal symbols are cheaper than the correspond-
FIGURE 4 is a circuit diagram illustrating the connection between the contact members of a row of contact members of the switch device, a corresponding row of electric lamps in a lamp panel of an electric newspaper, and the poles of a current supply.

The device shown comprises a box-shaped frame 12 made from angle iron which is on all sides, at the bottom and the greatest part of its upper side (at the front end thereof, the left end in FIGURE 1) encased in plates 14 to form a box. The box is divided by means of a transverse wall 15 into a band box 16 at the front end of the frame and a service box 17 at the rear end of the frame 12. At the top rear of the frame 12, a bracket 18 is provided at each side, which brackets together support a shaft 20 extending between them. A wheel 22 provided with a drum-like rim 24 is rotatably mounted on the shaft 20 and is in its circumferential surface provided with a low groove 26 having side walls 32 and a bottom 30, see FIGURE 2.

Around the greater part of the drum 24 is disposed a band 28 of paper, plastic foil, textile material or another thin, relatively strong electric insulating material, the ends of which 28 are interconnected, for example by being pasted together or by means of tape, to form an endless band. The width of the band is approximately the same as the width of the groove 26 so that when the band engages the groove bottom 30 it is guided laterally by the groove side walls 32.

The greater part of the band 28 is stored in zig-zag fashion within the band box 16. An arched guide plate 31 is fastened on the top edge of the transverse wall 15. By this guide plate 31 the band 28 from the bottom of the band box 16 is led to the lower side of a guide roller 35 rotatably mounted on a shaft 33 within the service box 17. From the guide roller 35 the band 28 passes a band guide 34 secured to the frame 12 within the service box 17 and provided with a groove 36 corresponding to the groove 26 of the drum 24. The band guide 34 is so disposed that the bottom of the groove 36 extends tangentially towards the bottom 30 of the drum groove 26. The band 28 is passed through the groove 36 between the bottom thereof and a brake plate 38 also engaging the groove 36. The brake plate 38, which has an outwardly curved region 39 at each end, is mounted on a pin 52 slidably within a hollow screw 42 and provided with an adjusting head 44. The screw 42 is screwed through one leg 40 of a yoke 48, the other leg 50 of which is attached to the upwardly-facing reverse side of the band guide 34. Between the inner end of the screw 42 and the brake plate 38 a helical spring 46 is inserted urging the brake plate 38 towards the bottom of the groove 36 with a pressure which can be set by screwing the bolt 42 farther in or out of the yoke leg 40.

From the band guide 34 the band 28 is carried around the major part of drum 24, and then between two transport rollers 54 and 56. The roller 54 is secured to a shaft 58 mounted in bearings on the brackets 18. Outside one of the brackets 18, a driving wheel 62, for example a belt pulley or a chain wheel, is secured to the shaft 58. The driving wheel 62 is connected, by means of a belt or chain 64, with a corresponding driving wheel 66 of an electric motor 68 mounted on a supporting frame 70 outside the frame 12, but connected thereto.

The roller 56 is secured to a shaft 72 rotatably mounted in bearings 74 mounted on the frame 12 so as to be sidable in the longitudinal direction thereof and guided by guides 76 secured to the frame 12. Each guide 76 is provided with a pressure spring 78 by which the bearings 74, and thus the roller 56, are urged toward the roller 54. The pressure of each spring 78 can be adjusted by means of a wing screw 80.

When the motor 68 preferably having an adjustable rotary speed, is driven for clockwise rotation of the roller 54, FIGURE 1, the band 28 will be drawn by the rollers 54 and 56 from the drum 24, and pushed over a guide plate 84 secured to the frame 12 at the upper end of the band box 16. From guide plate 84, the band 28 moves down towards the bottom of the band box 16 where it is deposited in zig-zag-like slings.

Due to the action of the brake formed by the guide 34 and the brake plate 38, the band 28 is, when driven by the rollers 54 and 56, pressed tightly against the bottom 30 of the drum groove 26 and the drum rotates the drum 24.

At a short distance from the rim of the drum 24 an arched rail 86 is arranged which is connected to the frame 12 by means of supporting rods 88. A number of contact blocks 105 (in the embodiment shown, seven such blocks) are arranged close to each other between the two rails 86 and are secured to the rails 86 by means of bolts 92.

Each block 90 is made of an electric insulating material such as plastic, and contains a number (for example twenty rows, or groups) of lamp contact members 94. Thus the contact panel formed by the blocks 90 contains in all one hundred and forty rows (seven times twenty) of lamp contact members 94. The associated lamp panel of the electric newspaper thus comprises one hundred and sixty optically extending rows of lamps corresponding thereto.

As appears from FIGURE 2, showing a single row of lamp contact members 94, each row comprises nine lamp contact members 94 corresponding to nine lamps in a respective vertical row 96 of lamps 128, see FIGURE 4. The row of contact members shown in FIGURE 2 comprises besides the said lamp contact members 94 a further return contact member 98 at one end (in FIGURE 2 at the left end) of the row, which contact member 98 apart from its function corresponds exactly to the lamp contact members 94.

Each contact member 94 and 98 comprises a contact pin 100 mounted at its lower end and axially displaceably arranged in a bore 102 in the block 90. At the upper end 104 of the bore 102 a hollow contact housing 106 is fastened. The contact pin 100 is arranged at the lower end of a thin spindle 108 which with a very small play is passed up through a corresponding passage 110 in the lower end of the contact housing 106 and into the cavity of the latter. At its upper end the spindle 108 is provided with a stop member 112. The contact pin 100 is pressed towards the bottom 30 of the drum 24 by means of a pressure spring 103 inserted between the lower end of the contact housing 106 and the upper end of the pin 100. On the top end of each contact housing 106 a connecting ring 114 is arranged. To the connecting ring 114 of each lamp contact member 94 an insulated electric wire 116 is attached, for example by soldering. The ring 114 is fastened to the housing 106 by means of a screw 118 screwed into the housing. The cavity of each housing 106 is filled with mercury which, since the passage 110 has a diameter only slightly larger than the diameter of the spindle 100, can not ooze out of the housing and which ensures that an electric connection is always provided between the contact pin 100 and the corresponding connecting ring 114 independent of longitudinal displacements of the contact pin 100.

As appears from FIGURE 4, the mutually independent wires 116 are assembled into a cable 126 leading to the corresponding row 96 of lamps 128 of the lamp panel.

To the connecting ring 114 of the return contact member 98, one end of a short electric wire 122 is connected, the other end of which is connected to a contact rail 124 which is enclosed by an insulating member 126 and is arranged on the left rail 86, FIGURE 2.

As appears from FIGURE 4, in the lamp panel each wire 116 is connected to one pole of a corresponding electric lamp 128, the other pole of which is connected to a connecting wire 130 common to all the lamps 128 of the row 96. This connecting wire 130 is connected to a connecting rail 132 common to all lamp rows of the lamp panel and which by means of a wire 134 is connected to...
one pole 136 of a current supply. The other pole 138 of the current supply is connected by means of a wire 140 to the contact rail 124 and thus to all the return contact members 98 of the contact panel.

As appears from FIGURE 3, the upper side of the band 28 is provided with a number of contact pins 142. FIGURE 3 shows the symbols in the form of letters forming the name "FIGARO," but the symbols may have many other shapes such as numbers or advertising figures.

Each symbol 142 is produced from metal foil, such as copper foil, which need only have a thickness of about 0.0005" and which on its lower side is provided with an adhesive coating so that each symbol, when pressed against the band 28, adheres thereto. The symbols 142 are produced separately and stored on shelves having a chamber for each of the different figures, since a great number of symbols of each type normally are necessary. Before use the adhesive coating of the symbols is in a known manner protected by a paper or plastic foil which is removed before the symbols are affixed to the band 28.

At the one end (in FIGURE 3 at the upper end) each symbol 142 is provided outside the figure-forming part of the symbol with a contact strip 144 extending in the longitudinal direction of the band 28, which strip 144 extends, when the symbol is placed on the band 28, in the longitudinal direction of the latter. The band 28 is provided at a short distance from one edge (in FIGURE 3, the right edge) of the strip 144, which extends along a guideline 146 on the upper edge. FIGURE 3 of the contact strip 144 is placed when the symbol 142 is affixed to the band 28. By this arrangement it is not only obtained that the symbol 142 will assume the correct position on the band 28, but also that when the band 28 supported by the bottom of the groove 26 of the drum 24 is moved past the contact panel, the contact strip 144 will move past the return contact members 98 and only past the latter. This appears from FIGURE 3 where the paths which the contact pins 100 of the contact members 94 and 98 will follow are shown by dotted lines.

The length of each contact strip 144 is, as appears from FIGURE 3, greater than the greatest dimension in the band's longitudinal direction of the associated symbol 142, so that the contact strip 144 extends beyond the front edge of the symbol itself and backwards beyond the rearmost edge of the symbol itself. Consequently, when a symbol 142 approaches any of the contact rows in the panel, during the feeding of the band 28 past the contact panel the return contact member 98 of the row will engage the contact strip 144 before any of the lamp contact members 94 of the contact row gets into engagement with the symbol. Since the lamp contact members 94 are said to be the last contact member of a row leaving the metal surface formed by the symbol 142. When then a symbol moves up under a contact row, first the contact member 98 connects the symbol to the pole 138 of the current supply, and as soon as one of the lamp contact members 94 thereafter comes into engagement with the symbol 142, a circuit will be formed from the pole 138 through the return contact member 98 to the contact strip 144, from there through the symbol 142 to the lamp contact member 94, through the corresponding lamp 128 of the associated vertical lamp row 96 of the lamp panel, and from there back to the second pole 136 of the current supply, as appears from FIGURE 4. In the position shown in FIGURE 4, for a symbol 142 consisting of the letters A, the fourth and the seventh lamp contact members 94 being engaged from the bottom up, it may be seen that sometime been in engagement with the symbol 142 and the eighth lamp contact 94 has just come into engagement with the symbol. Correspondingly, the fourth, seventh and eighth lamps 128 in the lamp row have been lighted.

The mutual distance between the direct contact rows of the contact panel will as a rule be the same as the mutual distance between the lamp contact members 94 of each contact row, and when a symbol 142 moves past the contact panel, it will at any time turn on such lamps in the lamp panel as will reproduce the symbol, which passes in light across the lamp panel in time with the movement of the symbol past the contact panel.

From FIGURE 3, it will appear that when the front edge of the letter R approaches a contact row, contact will be closed simultaneously by all the nine lamp contact members 94, the current flowing through the contact strip 144 will then be nine times as great as the current through each lamp 128 and thus through each lamp contact member 94. Consequently, it is of importance that, owing to the length of the contact strip 144, the return contact member 98 be in engagement with the contact strip 144 before any of the lamp contact members 94 gets into engagement with the symbol 142 itself. This prevents formation of sparks at the contact pin 100 of the return contact member 98, which sparks would be unavoidable if the pin 100 got into engagement with, or left, the contact strip 144 at the same time as the lamp contact pin 100. Due to the relatively high current flow, pin 100 of the return contact member would be burnt, as well as the contact strip 144. This would cause the destruction of symbol 142 and prevent operation of the electric newspaper.

From FIGURE 3 it will further appear that certain symbols, for example the A and R opposite the strip 144 have legs disposed at a distance from each other. To support the latter during the placing of the symbol on band 28, these legs are interconnected at their ends opposite the strip 144 by a further stiffening strip 148. Strip 148 is located outside of the zone of the symbol 142 which can come into engagement with any of the lamp contact members 94. Otherwise all the symbols 142 are, irrespective of whether they have stiffening strips 148 or not, given the same height, and along the lower edge of the band 28 (FIGURE 3.) a further guiding line 150 is provided, which, like the guiding line 146, facilitates placing of the symbol on the band.

If desired, each symbol may be provided with another contact strip corresponding to the contact strip 144 at the lower end of the symbol, and each row of contact members may include a further return contact member similar to contact 98 at the other end of the row.

A special advantage which is obtained by using a band 28 of the type illustrated, where each symbol 142 directly closes the circuit between the lamp contact members 94 and the return contact member 98, is that it is easy to undertake an amendment of the text on the band, since the text to be changed may be cut away from the band and replaced by a piece of band containing the new text. The ends of the new section are glued to the respective ends formed by the cut so that an endless band is again formed. The portion of the text which was cut away may, if desired, be kept and later used at another place in the band or in a new band.

As various changes may be made in the form, construction and arrangements of parts herein without departing from the scope and spirit of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a switch device for the lamps of an electric newspaper, which newspaper includes a lamp panel and a current supply, the combination of a frame, a contact panel arranged in said frame, said contact panel comprising a contact pin displacably arranged in said contact panel, means for urging each said contact pin towards said supporting surface, each said group of contact
members comprising a number of lamp contact members each adapted to be connected through a corresponding lamp in the lamp panel of the electric newspaper to one pole of a current supply, a flexible band made of electrically insulating material, means on said frame for moving said band across said supporting surface, at least one symbol made of sheet metal arranged on said band on the side thereof adapted to face said contact panel, each said symbol including a figure-forming portion and at least one separate contact strip at an end of said portion, said contact strip extending in the longitudinal direction of said band, said lamp contact members being arranged to contact said figure-forming portions of said symbols, each said group of contact members further comprising at least one return contact member arranged to engage said contact strips of said symbols, each said return contact member being connected to a return conductor adapted to be connected to the other pole of the current supply.

2. In a switch device as defined in claim 1, said supporting member being a drum rotatably mounted in said frame, said drum being provided on its circumferential surface with a guide groove having the same width as said band, said contact panel being arched and surrounding a portion of said drum.

3. In a switch device as defined in claim 1, each said symbol being made of metal foil.

4. In a switch device as defined in claim 3, said metal foil being copper foil.

5. In a switch device as defined in claim 1, each said symbol being provided with an adhesive coating on its reverse side and attached to said band by means of said adhesive coating.

6. In a switch device as defined in claim 1, said contact strip of each symbol having such a length that during the movement of the symbol past any of said contact groups the said return contact member of the group engages said contact strip before the first one of said lamp contact members of the group engages the said figure-forming portion of the symbol, and does not get out of engagement with said contact strip until the last one of said lamp contact members of the group has got out of engagement with the symbol.

7. A symbol to be used in switch devices for the lamps of electric newspapers, said symbol being made of metal foil, said symbol comprising a figure-forming portion having a longitudinal direction, a height direction transverse to the longitudinal direction, an upper end, and a lower end, at least one separate contact strip at an end of said figure-forming portion, said contact strip extending in said longitudinal direction of said portion, and means for securing said symbol to a flexible band.

8. A symbol as defined in claim 7, said metal foil being copper.

9. A symbol as defined in claim 7, said symbol having a front side and a reverse side, said means for securing being an adhesive coating provided on said reverse side.

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