United States Patent [19]

Summers

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[45] **June 26, 1973**

[54] **CARD ACTUATED CONTROL SYSTEM FOR DISPLAY SIGNS**

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[21] Appl. No.: **166,514**

[52] U.S. Cl. ..... **340/339,** 40/52 A, 40/130 L, 200/46, 235/61.11 C

[51] **Int. Cl.** **G08b 5/36**

[58] **Field of Search** ..... 340/339; 40/52 A, 40/125 E, 130 D, 130 E, 130 L; 235/61.11 C; 200/46

[56] **References Cited**

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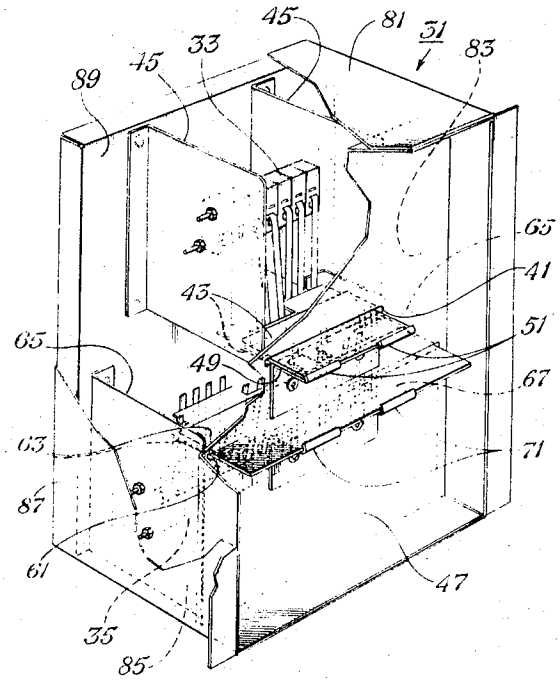
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[57] **ABSTRACT**

A bank of electro-mechanical switches for controlling a bank of lights of a display sign for displaying a selected number. The bank of electro-mechanical switches is controlled by a card having notches formed in a selected sequence in its leading edge. By moving the card to a control position, selected ones of the switches are moved to actuate selected ones of the lights to form the selected number. The card is guided by a slot and held in place by a porch supported by the chassis box in which the bank of electro-mechanical switches is mounted. In the embodiment disclosed, two banks of switches are employed to control two banks of lights to form a selected number comprising two digits.

6 Claims, 7 Drawing Figures



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2 Sheets-Sheet 1

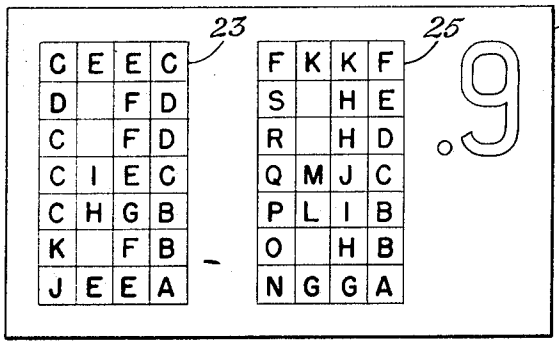


Fig. 1

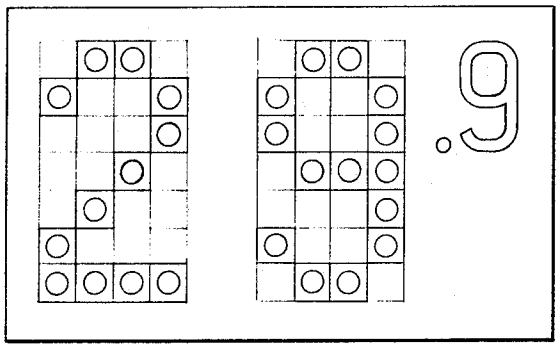


Fig. 2

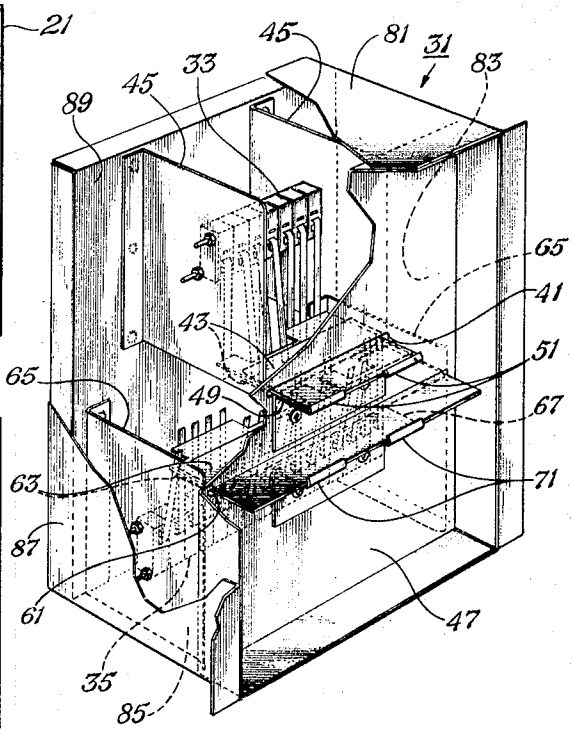


Fig. 3

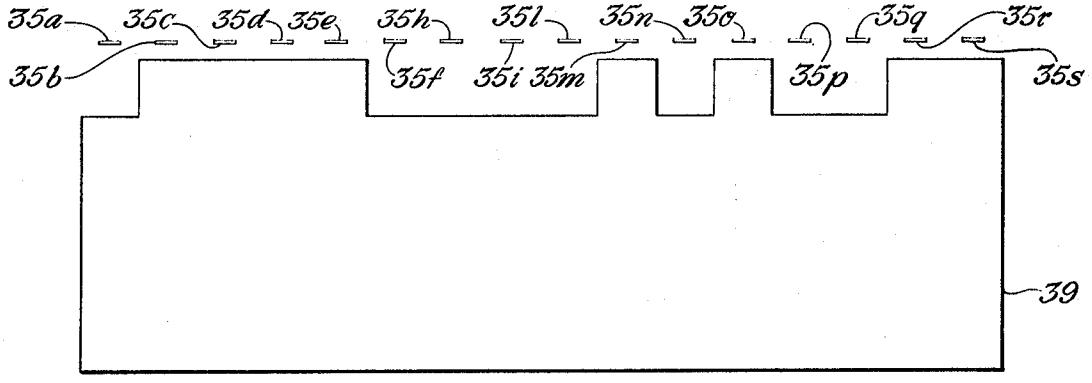


Fig. 7

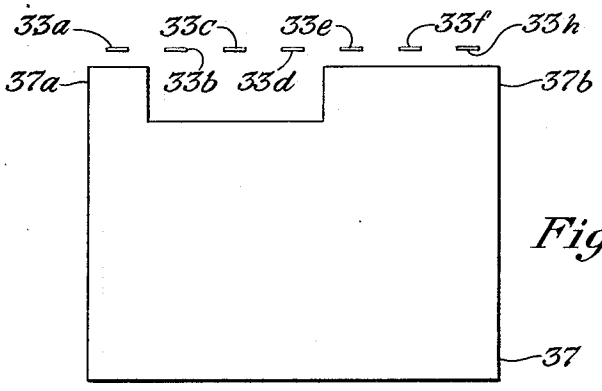


Fig. 5

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2 Sheets-Sheet 2

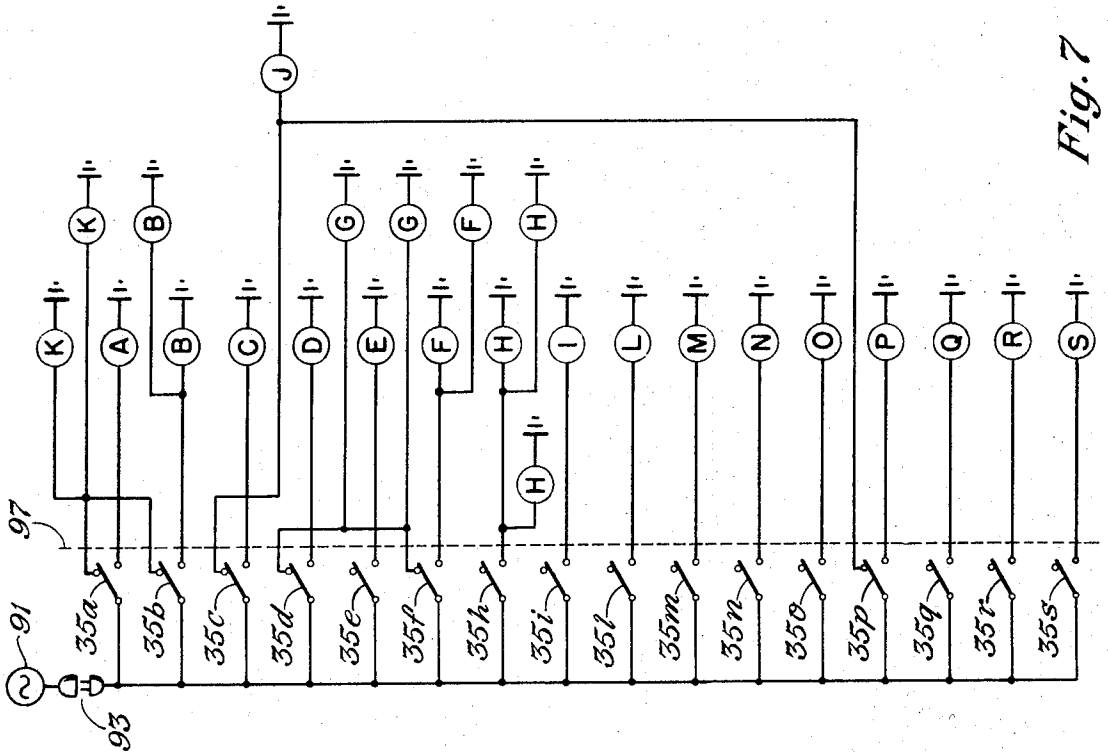


Fig. 7

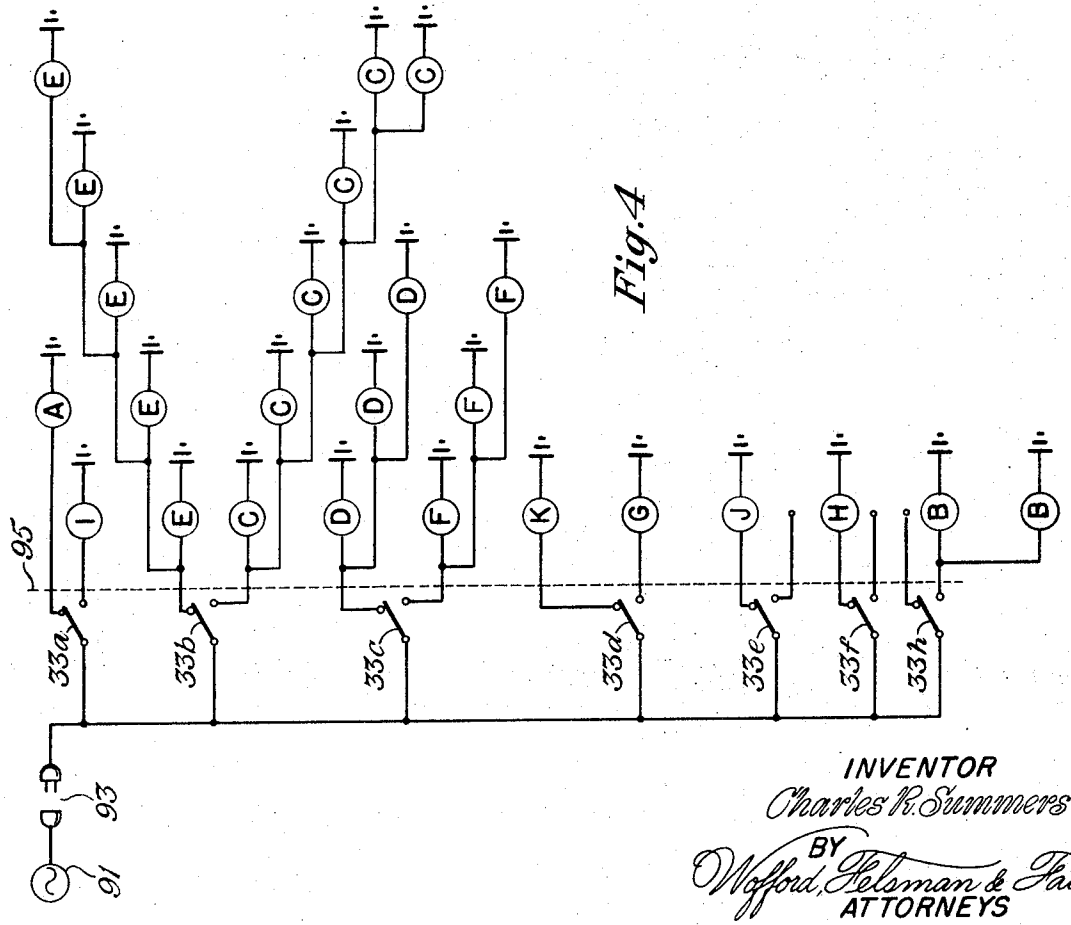


Fig. 4

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CARD ACTUATED CONTROL SYSTEM FOR DISPLAY SIGNS

BACKGROUND OF THE INVENTION

In the advertising field, commercial establishments, such as gasoline service stations, have employed display signs formed by light banks and controlled by electronic circuitry to vary the digits of the numbers to be displayed by the signs. The electronic control circuitry previously employed, however, is complicated and very expensive.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a control system for a light bank of a display sign and which is inexpensive but yet efficient and reliable. The control system comprises a chassis box having a bank of electro-mechanical switches supported in a chassis box to be moved in a selected manner by a notched card when moved to a control position. The card has protrusions in its leading edge in a selected sequence to move selected ones of the switches to actuate selected ones of the lights of the light bank to form a selected number. Means is provided for guiding the card to its control position and for holding the card in its control position. In the embodiment disclosed, the guide comprises a slot formed through the forward wall of the chassis box while the holding means comprises a porch extending from the slot. The porch is formed by a plate extending from the forward wall and having projecting edge means for holding the card in its control position.

In a further aspect, two banks of switches are employed for controlling two banks of lights of the display sign to display a number comprising two digits. The first switch bank and light bank controls and displays the first digit, while the second switch bank and light bank controls and displays the second digit. The lights of the first bank are coupled together in a manner whereby a predetermined digit normally is displayed when there is no card inserted in the slot associated with the first switch bank. A preformed card inserted in the slot of the first switch bank, however, will move selected ones of the switches of the first bank to display a different digit on he first bank of lights. The second bank of lights normally displays no digit with no card in the slot associated with the second switch bank. A selected digit may be displayed by the second bank of lights by inserting into the slot of the second switch bank a card having selected notches formed in its leading edge.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates two banks of lights of a display sign;

FIG. 2 illustrates the banks of lights actuated to display a selected number comprising two digits;

FIG. 3 illustrates a chassis box having two banks of electrical switches and two slots and porches respectively for guiding and holding control cards to be inserted into the slots for actuating selected switches;

FIG. 4 illustrates an electrical schematic of the first light bank and the first bank of switches;

FIG. 5 illustrates a control card for the first bank of switches;

FIG. 6 illustrates an electrical schematic of the second bank of lights and the second bank of electrical switches; and

FIG. 7 illustrates a control card for the second bank of switches.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2, there is illustrated a display sign **21**, which in the present embodiment, is employed for displaying the cost of a gallon of gasoline. The sign comprises a first bank of lights **23** for displaying the tens digit and a second bank of lights **25** for displaying the units digit of a selected number. Each bank is a 4×7 light bank with three lights missing. It has been found that these lights are not needed to display the digits desired. In FIG. **1**, each square in each light bank represents an electric light (except for the three missing lights of each bank) and is labeled by a capital letter of the alphabet. As will be described subsequently, the lights in each bank having the same alphabetical letters are coupled together in parallel. As illustrated on the right of the sign, the figures .9 are permanently displayed either by being painted on the sign or with a string of lights not illustrated.

Referring to FIG. **2**, the control system for controlling the light banks comprises a chassis box **31** having a first bank of electro-mechanical switches **33** and a second bank of electro-mechanical switches **35**. Switch bank **33** controls light bank **23**, while switch bank **35** controls light bank **25**. The electro-mechanical switches in one embodiment are spring biased double throw microswitches having their control or lever arms biased in an outward position. In one embodiment switch bank **33** comprises seven switches, **33***a*, **33***b*, **33***c*, **33***d*, **33***e*, **33***f*, and **33***h*, (See FIG. 4). Switch bank **35** comprises 16 switches, **35***a*, **35***b*, **35***c*, **35***d*, **35***e*, **35***f*, **35***h*, **35***i*, **35***l*, **35***m*, **35***n*, **35***o*, **35***p*, **35***q*, **35***r*, and **35***s*, (See FIG. 7). The switches of each bank are located whereby they may be moved from their normal preset condition to a second position by the protrusions on the leading edges of cards **37** and **39** respectively and illustrated in FIGS. **5** and **7**. These cards each have notches formed in a selected sequence in their leading edge whereby the resulting protrusions may move selected switches of each bank. Movement of the selected switches will control selected lights of the respective light banks to display the desired number.

Supported by the chassis box and in front of each switch bank are upper and lower guides for guiding the cards to control positions whereby their protrusion will move selected ones of the switches to actuate selected ones of the lights of each light bank. As illustrated in FIG. **3** the upper guide comprises a slot **41** formed by two parallel backward extending plates **43**, and also by two forward extending guide plates **45**. The slot **41** extends through a forward wall **47** of the chassis box. Extending forward from wall **47** is a porch comprising a plate **49** having upward projecting edges **51**. A card is inserted into the slot **41** and pushed to the control position whereby its leading edge may actuate selected ones of the switches. The back of the card then is slipped behind the projecting edge **51** which is rounded for holding the card in its control position. Similarly, the lower guide comprises a slot **61** formed by two parallel backward extending plates **63** and also by two forward extending guide plates **65**. This slot also extends through the forward wall **47** and has extending therefrom a porch comprising a forward extending plate **67** having upward projecting edges **71** which holds the

card in place after it has been inserted into the slot and into the control position to actuate selected ones of the switches of the switch bank 35. In FIG. 3 two cards are illustrated as located in the two slots and held in place by the corresponding porches.

In the embodiment disclosed, the chassis box 31 comprises an open-ended box formed by the forward wall 47 and four side walls 81, 83, 85, and 87. This open-ended box supports the backward extending slot plates 43 and 63 and the forward extending porches for holding the cards in place. Slot plates 43 and 63 are welded to the back of wall 47 while the porches are secured to the front of the wall 47 by machine screws extending through lower transverse plates integral with plates 49 and 67 respectively. The bank of the open-ended box comprises a back wall 89 which supports the switch banks 33 and 35 and also supports the guide plates 45 and 65. The back wall, including the switch banks and the guide plates 45 and 65, are slipped into the open end of the open-ended box to form the complete chassis control box.

Referring to FIGS. 4 and 6, the electrical schematic for the two switch banks and light banks will be described. A 115 volt a.c. power source 91 supplies power to the lights by way of the switch banks 33 and 35. Male and female connectors, illustrated at 93, are provided for releasably coupling the power source 91 to the switch banks 33 and 35. Suitable male and female connectors illustrated by dotted lines 95 and 97 also are provided for releasably coupling the light banks 23 and 25 to the switch banks 33 and 35 respectively.

As mentioned previously, the lights designated by the same alphabetical letters of each light bank are wired together in parallel. This is done to minimize the number of switches required to control each light bank. In this respect, seven switches control the 25 lights of light bank 23 while 16 switches control the 25 lights of light bank 25. More switches are employed for the light bank 25 in order to obtain a greater variation in the number of different digits which may be displayed.

The lights of the first light bank are wired together whereby the switches of the first switch bank in their normal preset condition (with no card in slot 41) will provide current flow to lights D, E, H, K, J, and A to form the digit 2 for the tens digit, illustrated in FIG. 2. With the wiring diagram of FIG. 4, different programmed control cards may be formed to override the digit 2 to form 3 other digits, 1, 3, and 4. A control card for displaying the digit 3, when inserted in the slot 41 of the first switch bank is illustrated in FIG. 5. This Figure also illustrates the relationship of the switches of switch bank 33 to the leading edge of the card. Protrusions 37*a* and 37*b* are located to move switch 33*a* and switches 33*e*, 33*f*, and 33*h* to their other positions when the card is inserted in slot 41 to its control position. Power thus will be supplied to lights E, D, I, K, and B to form the digit 3. The cards 37 may be programmed to form different sequences of notches and protrusions in their leading edges to form the digits 1 and 4.

Referring to FIG. 6, a number of the lights of the second light bank also are wired together in parallel to minimize the number of switches. The lights designated by the same alphabetical letters are wired together in parallel. With the wiring diagram illustrated, there will be no digit displayed by the second light bank when the second bank of switches are in their normal preset condition (with no card in the slot 61). They may be actuated or moved, however, to display the digits 0 through 9 by inserting the appropriate notched card into the slot 61. FIG. 7 illustrates a notched card which will form the digit 9 when inserted into the slot 61. This figure also illustrates the relationship of the switches of the switch bank 35 to the leading edge of the card. When this card is inserted into its control position, switches 35*b*, 35*c*, 35*d*, 35*e*, 35*m*, 35*o*, 35*r*, and 35*s*, will be moved to their other positions. Electrical power will be applied from power source 91 to the lights K,S,R, M, J, D, E, C, B, G, and 0 to display the digit 9 by the second lamp bank. The cards 39 may be programmed to form different sequences of notches and protrusions in their leading edges for forming the digits 0 through 8. Thus it can be understood that the operator of a gasoline service station may readily change the indicated cost of gasoline by merely inserting different programmed cards into the slots provided in the chassis box. Moreover the switches of each switch bank are inexpensive commercially available electro-mechanical switches which have a very long lifetime expectancy.

The cards 37 and 39 may be made of stiff plastic or cardboard.

Although not illustrated, it is to be understood that each sign 21 may have similar light banks 23 and 25 on its opposite side to obtain the same presentation. The two light banks 23 will be coupled together in parallel and to the switch bank 33 by way of the connector 95. Similarly the two light banks 25 will be coupled together in parallel and to the switch bank 35 by way of connector 97.

In one embodiment the lights of each bank 23 and 25 are of the incandescent type rated at from 15–30 watts.

Although the embodiment disclosed is employed for displaying digits for numbers, it is to be understood that letters, symbols, etc. also may be displayed.

I claim:

1. A system for displaying a selected number, comprising:
   - a chassis box having a bank of electro-mechanical switches,
   - a bank of lights forming a display sign to be coupled to a source of power by way of said bank of electro-mechanical switches,
   - a card having means for moving a plurality of selected ones of the switches when moved to a control position to actuate a plurality of selected ones of the lights to form a selected number for display purposes, and
   - a guide for guiding the card to the control position and for maintaining it in its control position.

2. The system of claim 1 wherein:
   - said guide comprises a slot to allow a card to be inserted therein,
   - the card has a plurality of protrusions along its leading edge in a selected sequence to move a plurality of selected switches when inserted into said slot and moved to said control position.

3. A system for displaying a selected number, comprising:
   - a chassis box having a bank of electro-mechanical switches,
   - a bank of lights to be coupled to a source of power by way of said bank of switches in a manner to normally actuate selected ones of said lights to normally form a given number,

a card having protrusions along its leading edge in a selected sequence for moving selected ones of the switches when moved to a control position to actuate selected ones of the lights to form a different number, and

means for guiding and holding the card in its control position.

4. The system of claim 3 comprising:

a second bank of electro-mechanical switches,

a second bank of lights to be coupled to a source of power by way of said second bank of switches,

a different card having protrusions formed along its leading edge in a selected sequence to move selected ones of the electro-mechanical switches of said second bank of switches when moved to a control position to actuate selected ones of said second bank of lights to form a selected number, and

means for guiding the different card to its control position and maintaining said different card in its control position.

5. A system for forming a selected number, comprising:

a chassis box having a bank of electro-mechanical switches located to be moved by a selected sequence of protrusions formed on the leading edge of a card when moved to a the control position,

means for guiding and holding a card in its control position, and

a bank of lights in combination with said chassis box to be coupled to a source of power by way of said bank of said electro-mechanical switches,

a plurality of said lights being coupled together in parallel whereby a given switch when moved will actuate a plurality of lights simultaneously to form said selected number,

said number of switches being less than the number of lights of said bank.

6. A system for displaying different values of a two digit number comprising:

a first bank of lights for displaying the tens digit of said selected number,

a second bank of lights for displaying the units digit of said selected number,

a first bank of electro-mechanical switches biased in a preset condition and to be coupled to a power source and to said bank of lights,

said first bank of lights being coupled together in a manner normally to display a selected digit when coupled to a power source by way of said first bank of switches in their preset condition,

said first bank of switches being supported to be moved in a selected manner by a preformed member when moved to a control position to activate selected ones of the lights of the first bank of lights to display a different selected digit,

a second bank of electro-mechanical switches biased in a preset condition and to be coupled to a power source and to said second bank of lights,

said second bank of lights being coupled together in a manner to allow its lights to be in an inactive state when coupled to a power source by way of said second bank of switches in their preset condition,

said second bank of switches being supported to be moved in a selected manner by a preformed member when moved to a control position to activate selected ones of the lights of said second bank of lights to display a selected digit.

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