Jan. 26, 1943. R. A. NEVINGER 2,309,205

ELECTRIC INDICATING MECHANISM

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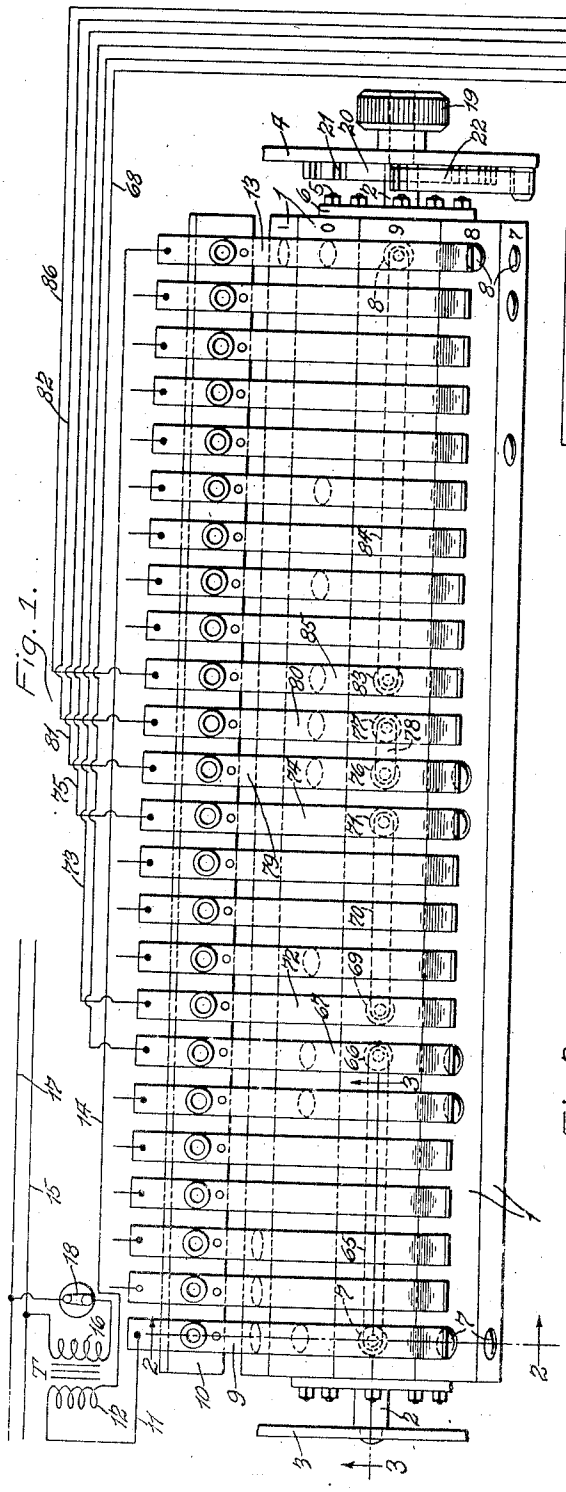


Fig. 1.

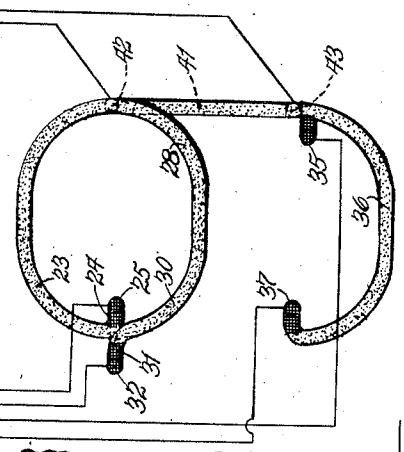


Fig. 3.

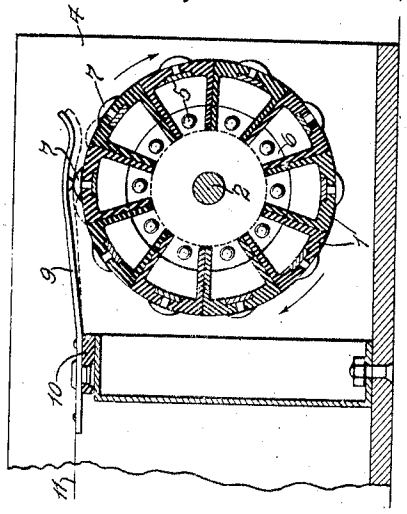


Fig. 2.

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ELECTRIC INDICATING MECHANISM

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Fig. 4.

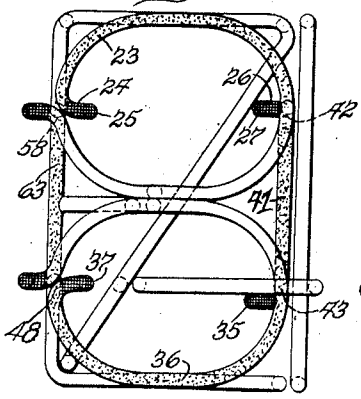


Fig. 5.

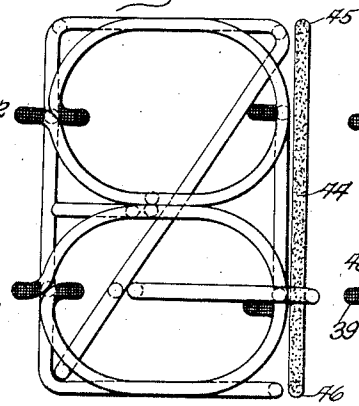


Fig. 6.

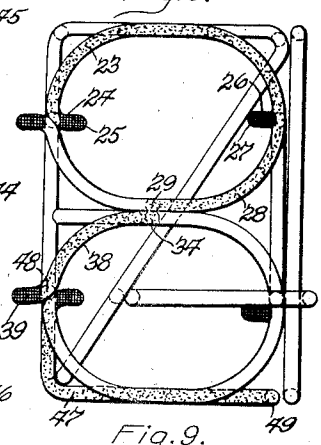


Fig. 7.

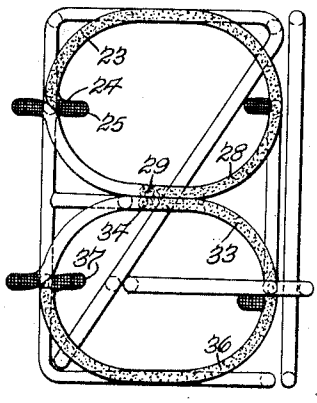


Fig. 8.

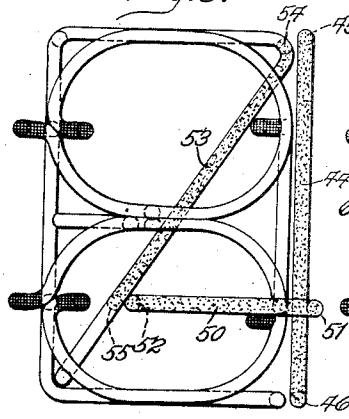


Fig. 9.

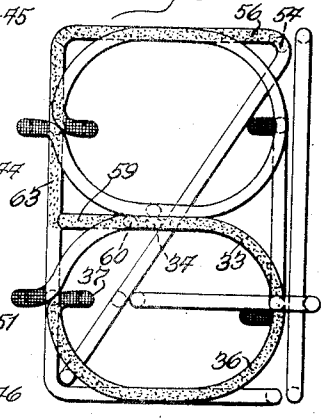


Fig. 10.

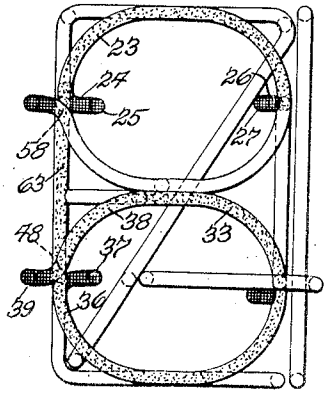


Fig. 11.

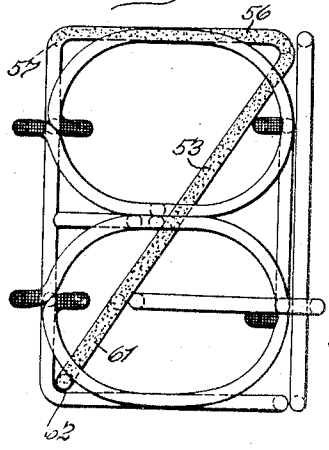
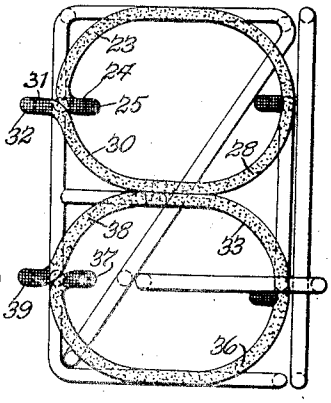


Fig. 12.



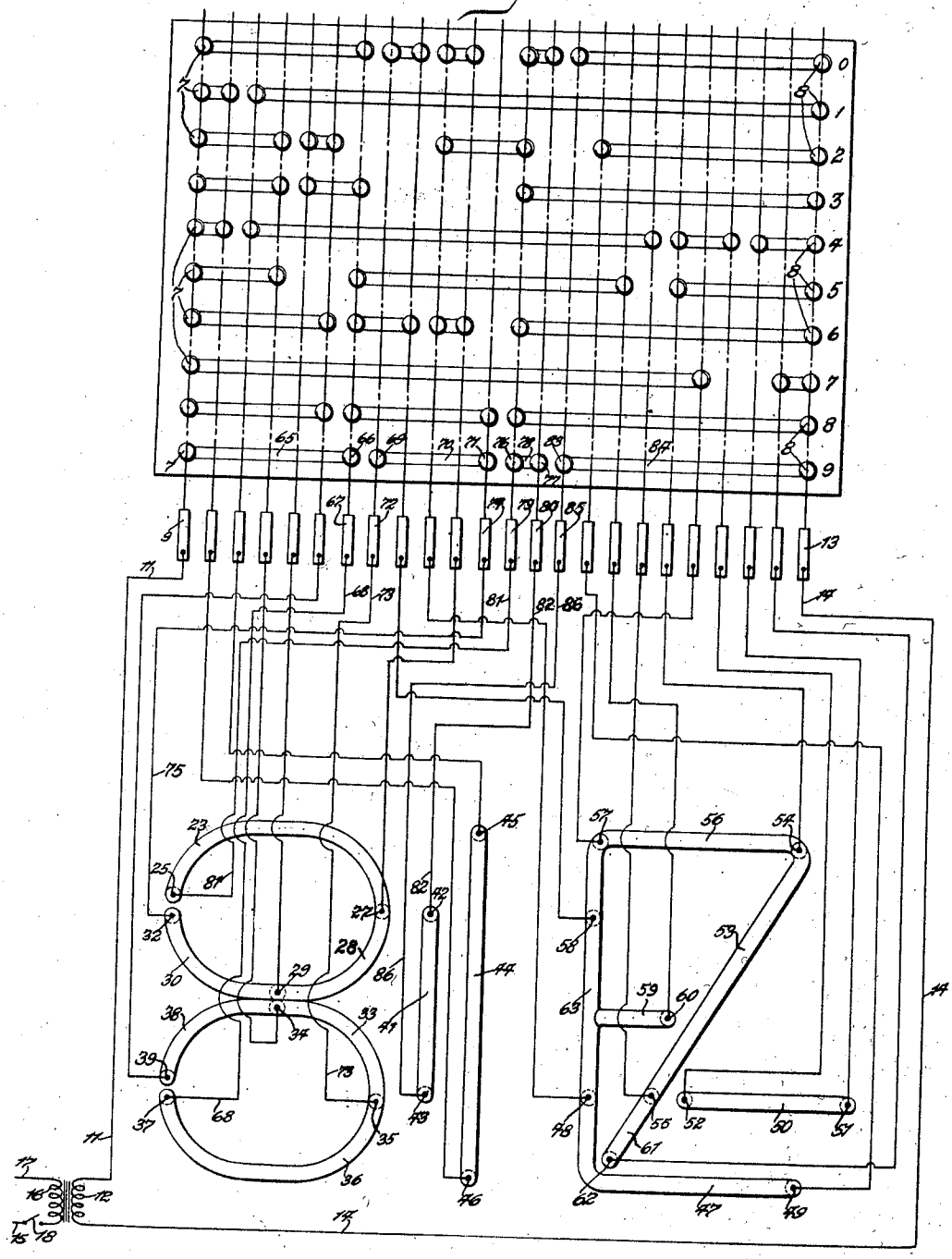
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ELECTRIC INDICATING MECHANISM

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Fig. 13.



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Patented Jan. 26, 1943

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UNITED STATES PATENT OFFICE

2,309,205

ELECTRIC INDICATING MECHANISM

Ralph A. Nevinger, Greenville, Ill.

Application March 1, 1940, Serial No. 321,664

2 Claims. (Cl. 177—346)

This invention relates to electric indicating mechanism; and has special reference to mechanism adapted for use to indicate the scores in sports games, prices and fluctuations of prices of merchandise, etc., and for various other uses.

Objects of the invention are to provide an improved electric indicating mechanism comprising a rotary support for series of electrical contacts having electrical connection in a novel cooperative relationship to adapt them for use in the device; to provide a series of brushes for engaging different contacts in the respective series when said support is rotated to positions for that purpose; to provide a plurality of neon tubes or the like for electrical control by energy supplied thereto through the switches comprising said contacts and brushes; and to provide means in connection with said tubes whereby different portions of the different tubes may be electrically energized under control of said switches to form different characters or digits to indicate scores in sports games, prices and fluctuations of prices of merchandise, etc.

Another object of the invention is to provide an electric indicating mechanism including a rotary support having series of pairs of contacts thereon with electrical connections on the support between the contacts of each pair of contacts, a series of brushes mounted in cooperative relation with said contacts whereby, when said support is turned to different adjusted positions, an electrical circuit may be closed through said contacts and brushes to a set of novel indicating devices whereby different parts of the indicating devices may be used as parts of numerical digits.

Another object of the invention is to provide an electric indicating mechanism having a series of neon tubes arranged in a relationship to form all of the ten numeral digits by electrically energizing different parts of said tubes to form the different digits, and preventing electrical energization of the unused parts of the respective tubes.

Another object of the invention is to provide an electric indicating mechanism of the character and of the type last above mentioned in which the electrical energy is communicated directly to master parts of a variable electric switch mechanism from the secondary of a transformer.

Various other objects and advantages will appear from the following description, reference being made to the annexed drawings, in which—

Fig. 1 is a plan view of an embodiment of the invention illustrating the manner of forming the digit "9" by use of cooperating parts of the neon tubes.

Fig. 2 is a transverse sectional view of the switch mechanism on the line 2—2 of Fig. 1.

Fig. 3 is a longitudinal sectional view of the switch mechanism approximately on the line 3—3 of Fig. 1.

Figs. 4 to 12, inclusive, are views of a series of neon tubes arranged in a novel relationship and combined with electrodes in a novel manner so that operation of the switch mechanism will energize proper parts of said tubes in a manner to indicate the nine digits from "0" (Fig. 4) to "8" (Fig. 12), inclusive, the parts for forming the digit "9" being shown in Fig. 1.

Fig. 13 shows a development of the surface of the cylinder having the electrical connections thereon, the brushes, and the wiring from the brushes to the tubes which are also shown as a developed arrangement.

In the specific embodiment of the invention shown, a rotary support in the form of a cylinder comprising a series of ten elongated segments 1, preferably composed of electrically non-conductive material, is attached to a shaft 2 journalled for rotation in supports 3 and 4. Instead of making the segments 1 of insulating material, the contacts carried thereby may be otherwise insulated from each other. As shown, removable and replaceable fasteners 5 secure the ends of the segments 1 between flanges 6 rigid with the shaft 2. A contact 7 is attached to one end of each of the segments 1; and a similar series of contacts 8 is attached to the opposite ends of said segments. In the specific arrangement shown, there are ten contacts 7 and ten cooperating contacts 8. The contacts 7 are spaced equidistant circumferentially from each other, as are the contacts 8. A resilient brush 9 attached to an insulating support 10 has electrical connection 11 with one end of a secondary 12 of a transformer T; and a similar resilient brush 13 likewise mounted on the insulating support 10 has electrical connection 14 with the opposite end of said secondary 12. An electrical conductor 15 is connected with one end of the primary 16 of the transformer T, and a cooperating conductor 17 may be electrically connected with the opposite end of the primary 16 through a switch 18.

The shaft 2 is rotative in order to place any selected ones of the contacts 7 and 8 in cooperative relation to the brushes 9 and 13, respectively. As shown, one end of said shaft has a knob 19 attached thereto, by manual operation

of which the shaft 2 and the contact carrying cylinder may be rotated. However, other means may be provided for rotating the shaft 2 and the contact carrying cylinder, as desired. A disc 20 is attached to the shaft 2 and formed with a circumferential series of notches 21 for engagement with a pawl 22 pivotally supported on the support 4 to stop and yieldingly retain the shaft 2 and the contact carrying cylinder in the different positions to which they are turned to engage the respective contacts 7 and 8 with their cooperating brushes 9 and 13.

The specific neon tube assembly shown is arranged so that different tubes or different sections of certain tubes may be optionally used and electrically energized to form the ten digits, while the unused portions of tubes or sections of tubes remain unenergized, and therefore dark and unilluminated.

An oval neon tube comprises an upper curved translucent section 23 having an opaque end portion 24 connected with an electrode 25, an opaque portion 26 connected with an electrode 27, a curved translucent portion 28 in continuation of the part 23, and also in communication with the electrode 27, and an electrode 29 connected to the opposite end of the tube portion 28 and to an adjacent end of a similar curved portion 30 which has its opposite end connected through a dark or unilluminated portion 31 with an electrode 32.

A lower oval neon tube comprises a curved translucent section 33 having one end connected with a dark or unilluminated electrode 34 and its opposite end connected with a dark or unilluminated electrode 35 from which a translucent tube portion 36 extends to a dark or unilluminated connection with an electrode 37. A curved extension 38 extends from electrical communication with the electrode 34 to connection with a dark or unilluminated electrode 39.

A neon tube 41 has its ends connected with electrodes 42 and 43 adjacent to the electrodes 27 and 35, respectively, so that, when the entire upper oval comprising the tube portions 23, 38 and 30, the tube 41, and the lower curved tube section 36, are illuminated, the digit "9" is displayed, all other parts of the tube assembly remaining dark or unilluminated.

Another portion of the tube assembly for forming the remaining digits comprises an elongated translucent neon tube 44 having its ends electrically connected with electrodes 45 and 46. The tube 44 is used for forming the digit "1" and also for forming the staff of the digit "4", as hereinafter explained.

The digit "2" in the specific form of the invention shown is formed by illuminating the tube sections 23, 28 and 38, and the angular tube section 47 extending from an electrode 48 to an electrode 49 (Fig. 6).

The digit "3" is formed by illuminating the tube sections 23, 28, 33 and 36 and leaving the remaining tube sections unilluminated (Fig. 7).

The digit "4" is formed by illuminating the vertical tube 44, a horizontal tube 50 extending across the tube 44 from connection with an electrode 51 to connection with an electrode 52, the latter of which is located adjacent to an inclined tube section 53 extending from an electrode 54 adjacent to the electrode 45 to an electrode 55 adjacent to the electrode 52. The remainder of the tube of which the section 53 is a part and the other tube elements in the assembly are left unilluminated or dark when the tubes 44 and 50 and the tube section 53 are illuminated to form the digit "4" (Fig. 8)

The digit "5" is formed by illuminating a horizontal tube section 56 extending from connection with the tube section 53 at the electrode 54 across to an electrode 57, and thence downwardly across an electrode 58 to connection with a tube arm 59 extending to an electrode 60 adjacent to the electrode 34, and by illuminating the tube sections 33 and 36 and leaving the remainder of the tube assembly unilluminated or dark (Fig. 9).

The digit "6" is formed by illuminating the tube sections 23, 63, 33, 36 and 38 and leaving the remainder of the tube assembly unilluminated or dark (Fig. 10).

The digit "7" is formed by illuminating the tube sections 56 and 53 and a tube extension 61 of the tube section 53 extending from the electrode 55 to an end electrode 62, and leaving the remainder of the tube assembly unilluminated or dark (Fig. 11).

The digit "8" is formed by illuminating the tube sections 23, 28, 30, 33, 36 and 38, and leaving the remainder of the tube assembly unilluminated (Fig. 12).

The character or digit "0" is formed by illuminating the upper arcuate tube section 23, the lower arcuate tube section 36, the connecting tube 41 which extends from one end of the tube section 23 to the subjacent end of the tube section 36, and by illuminating a translucent neon tube section 63 analogous to the tube section 41 and extending from the electrode 58 to the electrode 48 near the subjacent end of the lower arcuate tube section 36, and leaving the remainder of the tube assembly unilluminated or dark.

The respective electrodes in connection with these tube sections are electrically connected to cooperating contacts mounted on the rotary contact carrier. A description of the illustrated connections for forming the digit "9" (Fig. 1) is considered sufficient to afford an understanding of the connections for forming the remaining digits As shown, one of the contacts 7 on the "9" segment 1 of the rotary contact carrier has electrical connection 65 with a contact member 66 which is engaged by a brush 67 when the brush 9 engages the contact 7 with which said contact 66 is electrically connected. A wire 68 forms electrical connection from the brush 67 to the electrode 37.

A contact 69 has electrical connection 70 with a contact 71 on the "9" segment 1 of the rotary contact carrier. A brush 72 attached to the insulated support 10 engages the contact 69 when the brushes 9 and 67 engage the contacts 7 and 66, and has electrical connection 73 with the electrode 35. The brush 74 simultaneously engages the contact 71 and has electrical connection 75 with the electrode 32. A pair of electrodes 76 and 77 have electrical connection 78 and are simultaneously engaged by brushes 79 and 80, respectively. The brush 79 has electrical connection 81 with the electrode 25, and the brush 80 has electrical connection 82 with the electrode 42. A contact 83 on the "9" segment 1 of the rotary contact carrier has electrical connection 84 with the contact 8 on the same segment, and is engaged by a brush 85 at the same time that the brushes 9, 13, 67, 72, 74, 79 and 80 engage their respective contacts on said segment. The brush 85 has electrical connection 86 with the electrode 43 at the opposite

end of the tube 41 from the electrode 42. In this manner, when said brushes engage their respective contact members on the "9" segment 1 of the rotary contact carrier, the tube sections 23, 28, 30, 41 and 36 are illuminated or electrically energized to form the digit "9," leaving all of the remaining tube elements of the assembly unilluminated or dark.

It should be understood that the proper electrodes in connection with the tube assembly are electrically connected with corresponding brushes attached to the insulated support 10 and shown in Fig. 1 to form the remaining selected digits when the contact carrier is turned to proper position to engage the contact members on the different digital segments thereof with said brushes. In each instance, the neon tube portions that are to be illuminated or energized are electrically connected with the opposite ends of the secondary 12 of the transformer while the opposite ends of the primary 16 of the transformer are connected with the wires 15 and 17, respectively. Supply of electrical energy for operating the device is controlled by the switch 18.

From the foregoing description and the annexed drawings, it is apparent that my tube assembly for forming the various digits for any useful or desired purpose comprises only two superimposed banks of tubes. The tubes and tube sections are of different lengths and, therefore, are characterized by differentials of resistance which are neutralized or controlled efficiently by my improved switch mechanism. For instance, the tubes 41, 44 and 50 which are of different lengths and their respective electrical connections, and other tubes and tube sections and their respective electrical connections, are characterized by differentials of resistance. These differentials of resistance are complementary throughout, so that approximately uniform illumination or lighting effect is obtained in all uses of the device. As a consequence, the device has a very wide range of utility; may be manufactured and sold at permissible cost; and may be viewed from different angles or positions without greatly varying the symmetrical appearance of the tube arrangement. Viewed from practically any angle, the tubes appear to be in substantially the same plane and not greatly offset from each other.

I am aware that the construction and arrangement of the rotary contact carrier may be widely varied without departure from the principle of this portion of the invention. For instance, the rotary contact carrier may be of other forms than cylindrical so long as rotation of the contact carriers to different adjusted positions places the different contacts or pairs of contacts thereon in cooperative relationship with the brushes and with the master brushes 9 and 13 or their equivalents. So, also, the arrangement of the tubes may be varied to form digits of different shapes or to form other letters than the character "0", which is common to the alphabet and to the Arabic numerals. I contemplate these and such other variations in the construction, form and operation of the device as may be needed to adapt the invention for its intended various uses.

I claim:

1. An electric indicating mechanism comprising a plurality of tube elements provided with electrode terminals, electrical connections from said respective terminals, an elongated cylinder supported for optional rotation to different adjusted positions about its longitudinal axis, series of contacts attached to said cylinder complementary to said electrodes, two circumferential series of relatively insulated master contacts attached to said cylinder for movement thereby to different adjusted positions when said cylinder is rotated to said adjusted positions about said longitudinal axis and each master contact having electrical connection with one contact of said first series of contacts and being insulated from all others of said contacts, two master brushes each having electrical connection with a source of electrical energy for engaging the respective contacts of said two series of contacts, and brushes attached to said respective connections for electrically connecting said terminals in series with said respective master contacts for energizing selected ones of said tube elements when said cylinder is rotated to different adjusted positions about its longitudinal axis as aforesaid.

2. An electric indicating mechanism comprising a plurality of tube elements provided with electrode terminals, electrical connections from said respective terminals, an elongated cylinder supported for optional rotation to different selected positions about its longitudinal axis, circumferential contacts attached to said cylinder, pairs of circumferential contacts attached to said cylinder and having the two contacts of each pair in electrical connection with each other and insulated from said first named contacts, two circumferential series of relatively insulated master contacts attached to said cylinder and having electrical connection respectively with said first named contacts and being insulated from all other contacts, electrical means for selectively connecting said master contacts respectively with a source of electrical energy in the different selected positions of said cylinder about its longitudinal axis as aforesaid, and brushes attached to said respective connections for electrically connecting said terminals selectively in series with said first contacts and said pairs of contacts in the different selected positions of said cylinder about its longitudinal axis in which selected ones of said master contacts are connected with a source of electrical energy as aforesaid while all other master contacts remain insulated from said source, whereby selected ones of said elements may be energized.

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