Jan. 5, 1943. J. C. VIAN 2,307,173

ELECTRICAL SCOREBOARD

Filed July 9, 1940 2 Sheets-Sheet 1

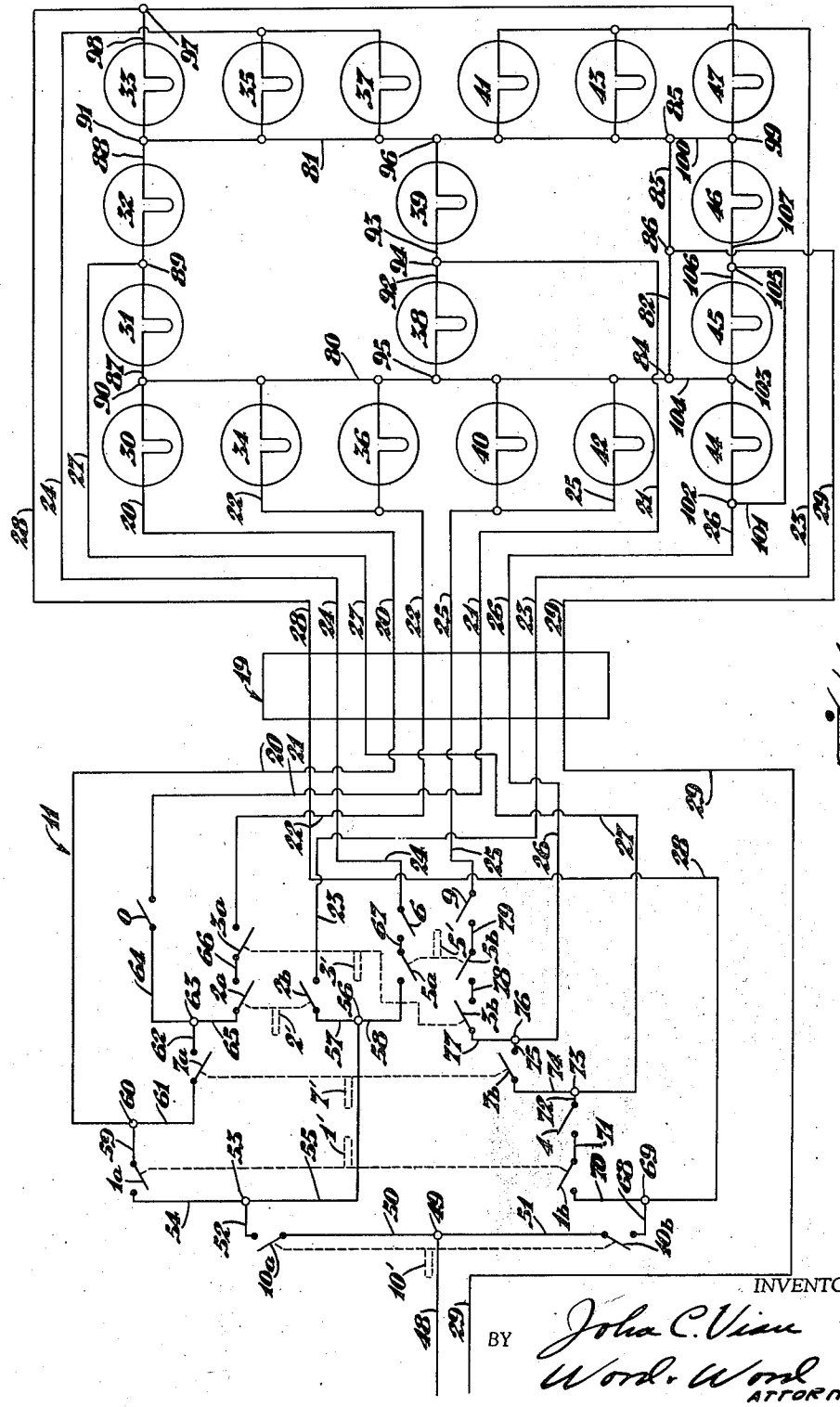


Fig. 1.

INVENTOR.

BY John C. Vian
Wood, Word
ATTORNEYS

Jan. 5, 1943. J. C. VIAN 2,307,173

ELECTRICAL SCOREBOARD

Filed July 9, 1940 2 Sheets-Sheet 2

Fig. 2

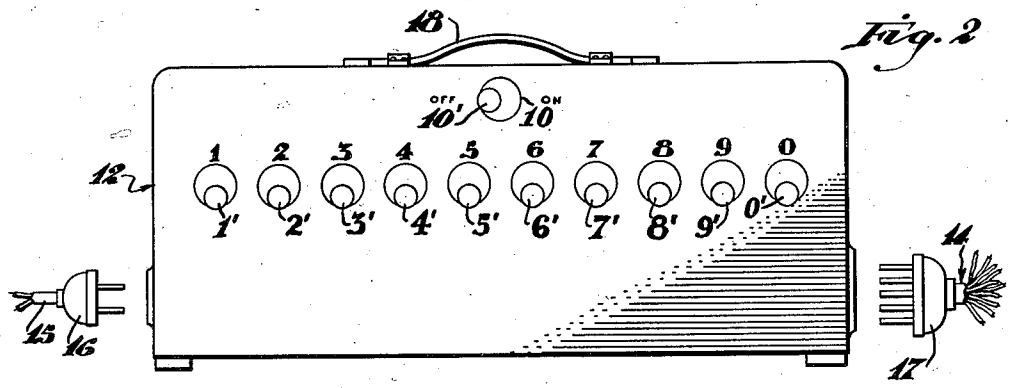


Fig. 3

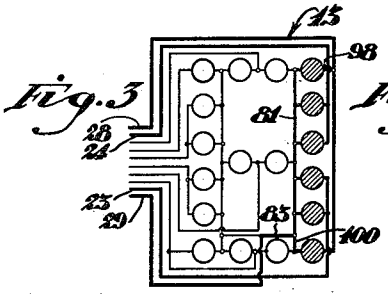


Fig. 4

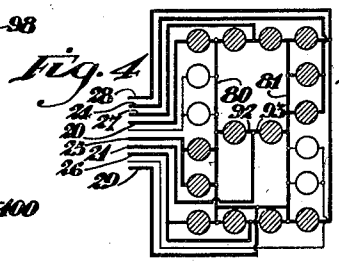


Fig. 5

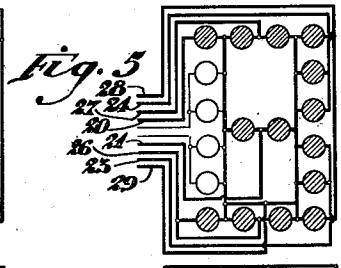


Fig. 6

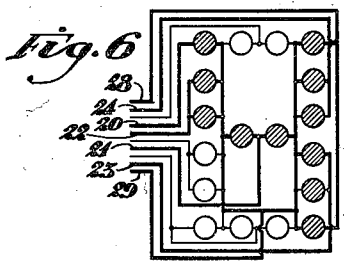


Fig. 7

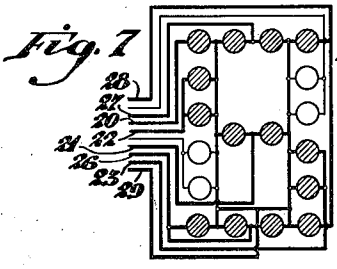


Fig. 8

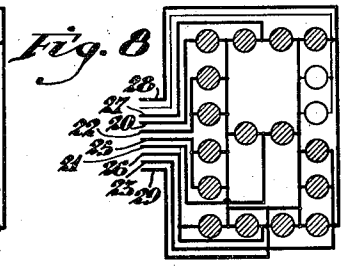


Fig. 9

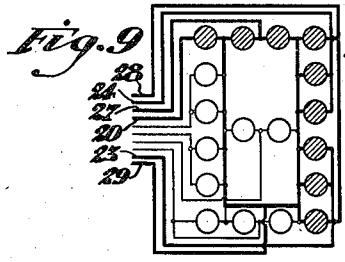


Fig. 10

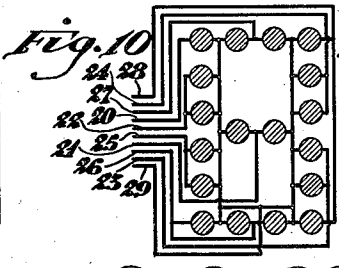


Fig. 11

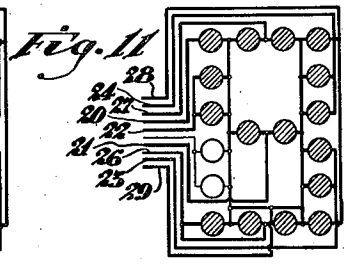
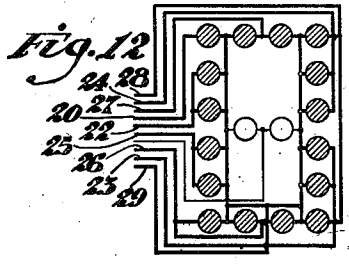


Fig. 12



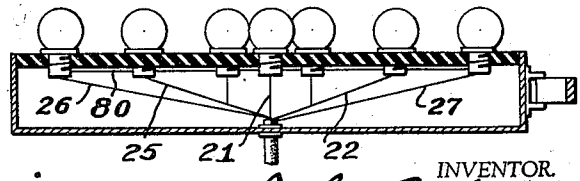


Fig. 13

INVENTOR.

John C. Vian

BY

Wood & Wood

ATTORNEYS

Patented Jan. 5, 1943 2,307,173

UNITED STATES PATENT OFFICE

2,307,173

ELECTRICAL SCOREBOARD

John C. Vian, Lebanon, Ohio

Application July 9, 1940, Serial No. 344,553

3 Claims. (Cl. 177—346)

This invention relates to an electrical scoreboard or indicator for displaying numbers or signals. The invention also is directed to an electrical circuit arrangement for selecting and controlling the display of the numbers or signals from a remote location.

While devices of this general type have been available in the past, the principal object of the present invention has been to provide separate portable interchangeable units each capable of displaying a number from 0 to 9. Each such portable unit is provided with an independent switch circuit and control therefor and the units therefore may be arranged in patterns or groups determined in accordance with the nature of the information or signal to be exhibited. For example, the devices are intended to be utilized by high schools and colleges for scoring athletic events, the individual units being grouped in one suitable arrangement for displaying football scores, in another arrangement for basketball and still another for scoring track events or other sports. Being portable, the group of units is transported to the playing field at the time of the event, then stored until next needed. This feature is of considerable practical importance. A conventional scoreboard of the type heretofore employed is costly and elaborate; so expensive in fact, by virtue of the necessity for weatherproofing the housing for the apparatus, that many high schools and even colleges do not have the funds necessary for facilities. The present units are individually and collectively inexpensive and therefore have already found extensive usage.

The object of the invention also has been to provide scoring units in which the signals are displayed by means of prearranged groupings of incandescent lamps. The lamps are energized through a circuit arrangement, and the illumination of them in predetermined "figuregrams" or patterns is controlled by the manipulation of switches on a simple panelboard.

A further objection of the invention has been to provide a circuit for selecting and controlling the display of signals in a simple and efficient manner. In this respect, the invention contemplates a circuit including a switch for each digit to be displayed upon the panelboard; the switches, for example, are marked 1 to 0. If a 5 is to be displayed then the switch corresponding to the digit 5 on the panelboard is actuated and if next a 7 is to be displayed this switch is likewise operated after 5 is turned to its initial position.

Other objects and features of the invention will be apparent from the following description of the typical embodiment of the invention which is illustrated in the drawings.

In the drawings:

Figure 1 is a circuit diagram showing the interconnection of the group of lights in the display unit with the group of controlled switches on the panelboard.

Figure 2 is a diagram illustrating the switchboard.

Figures 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 illustrate respectively the lamps of the group which are energized in the delineation of the figures 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0.

Figure 13 is a cross sectional view showing the construction of one of the portable units.

As previously described the lamps of each portable signal unit are arranged in a group or bank and predetermined members of this group or bank are energized for the display of the signals. The lamps of the group or bank are arranged in the form of a horizontally extending rectangle with a row of lamps extending across this horizontal rectangle approximately intermediate the top and bottom rows of lamps. For convenience the pattern of the lamps may be described as a rectangular figure 8. In the preferred embodiment there are eighteen lamps.

The next feature of the invention which is of importance in obtaining a simple switching circuit is predicated upon the concept of selectively deenergizing selected groups of lamps from the total number for the display of signals other than the figure 8. Otherwise expressed, at the beginning of each signalling period all of the lamps are energized and an 8 figuregram is displayed. The successive groups of lamps are deenergized upon actuation of the respective switches other than the 8 switch so that the process of the control is a subtractive one. In the past it has been proposed to use a plurality of switches for controlling a plurality of lamps in certain groupings but each switch was employed for making a circuit to a certain group of lamps forming a letter independently of each other switch and circuit. The complexity of such an arrangement is avoided in the present apparatus.

The scoring unit which is illustrated in the drawings comprises a controlling circuit which is housed in a portable box 12, a panel circuit 13 of eighteen lights arranged in the form of a rectangular figure eight and a ten-wire conducting cable 14 which interconnects the control circuit and the panel circuit. A two-wire cable 15, having a plug 16 at its one end for quick attach-

ment into the control circuit 11, provides operating current for the unit. The ten-wire conducting cable 14 has a ten-point plug 17 for making connection into the control circuit. Cable 14 also may have a ten-point plug at its other end (not shown) for connection into the panel circuit 13. A handle 18 is provided for the box which houses the control circuit so that it may be transported easily.

The control circuit is operated through eleven toggle switches. Ten of the toggle switches control the signals which appear on the light panel. For the sake of convenience, those are indicated on the drawings by the digits which they control, that is, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0. The other toggle switch 10 is a master switch and breaks the entire circuit from the source of current. The operating levers or handles for switches 1 to 0 and 10 are 1' to 0' and 10' respectively.

Referring to Figure 1 of the drawings, toggle 1 is a double pole switch and its two poles are indicated by the numbers 1*a* and 1*b*. The dotted line interconnecting 1*a* and 1*b* represents a common operating mechanism which is actuated by the switch lever 1'. Toggle 2 is also a double pole switch having poles 2*a* and 2*b*. Similarly, toggle 3 has poles 3*a* and 3*b*. The dotted lines interconnecting poles 2*a* and 2*b* and 3*a* and 3*b* respectively represent common operating mechanisms for these double pole switches which respectively are operated by the switch handles 2' and 3'. Toggle 4 is a single pole switch and, for clarity, its pole will also be indicated by 4. Toggle 5 is a double switch having poles 5*a* and 5*b*, interconnected by a common operating mechanism represented by the dotted line and controlled by the switch handle 5'. Toggle 6 is a single pole switch and its pole is indicated at 6. Toggle 7 is a double pole switch having poles 7*a* and 7*b*, which are interconnected by the common operating mechanism shown by the dotted line which in turn is controlled by the switch handle 7'. Since the digit 8 is formed when all of the 18 lights of the panel are on, toggle 8 is a dead switch having no connection in the circuit. The toggle is provided so that no confusion arises from its absence, in the case of a novice operator. Toggles 9 and 0 are both single pole switches, their poles being indicated, respectively, by 9 and 0.

In Figure 1 the circuit at the left is the control circuit 11. The box-like figure between the two circuits, indicated at 19, represents the ten-wire conducting cable 14 with its two plugs. The circuit at the right represents the panel circuit with its lights. For identification the ten lead wires in the conducting cable are numbered 20, 21, 22, 23, 24, 25, 26, 27, 28, and 29, lead 29 being the common return. The lights on the panel are numbered, starting at the top left 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, and 47, respectively.

The switches in the circuit are arranged to break the contacts to those lights that are not a part of the desired digit signal. In other words, the double pole switch operated by the handle 1' controls the formation of digit 1, this switch thus breaks the circuit to all rights except those necessary to form a figure 1. So, when all digit switches are off, and the master switch is on, the digit 8 will be shown.

In the control circuit a lead 48 from the source of power divides at point 49 into leads 50 and 51 which go to poles 10*a* and 10*b* of toggle switch 10 respectively. The other lead from the source of power extends through to the common lead or wire 29 of the ten-wire conducting cable 14 and for simplicity will bear its reference character 29.

Now tracing the leads from pole 1*a* to the ten-wire conducting cable 14, a lead 52, from pole 10*a*, divides at point 53, one lead 54 going to pole 1*a* of toggle 1 and the other 55 going to dividing point 56. Two leads 57 and 58 extend from point 56.

From pole 1*a*, a lead 59 divides at point 60; one lead 61 going to pole 7*a* and the other, being wire 20 of the ten wire conductor, goes to the cable 14, as represented by the box 19. A lead 62 from pole 7*a* divides at point 63 into leads 64 and 65, lead 64 going to pole 0. From pole 0 the wire 21 extends to the cable 14. Lead 65 connects point 63 to pole 2*a*. The other side of pole 2*a* is connected to pole 3*a* by a lead 66. Wire 22 of the cable 14 extends from the other side of pole 3*a*.

From point 56, the two leads 57 and 58 go to poles 2*b* and 5*a*, respectively. The other side of pole 2*b* is connected to wire 23 of the ten-wire conducting cable 14 while a lead 67 extends from the other side of pole 5*a* to connect it to pole 6. The other side of pole 6 is connected to wire 24 of cable 14.

From pole 10*b* of switch 10 a lead 68 extends to a point 69. Point 69 is connected through a lead 70 to pole 1*b* on the one side and on the other side to the cable 14 through wire 28. From pole 1*b* a lead 71 extends to pole 4 which is connected at its other side by a lead 72 to a dividing point 73. One lead from point 73 is the wire 27 of the cable 14, the other is a lead 74 which connects it to pole 7*b* of switch 7. A lead 75, from the other side of the pole 7*b* goes to a point 76 where it divides into a lead 77 and wire 26 of cable 14. Lead 77 extends from point 76 to pole 3*b*. Pole 3*b* is connected to pole 5*b* by a lead 78 and pole 5*b* is connected to pole 9 by a lead 79. The other side of the pole 9 is connected to wire 25 of the ten-wire conducting cable.

In the diagram of the circuit of the panel lights (Figure 1) two lines 80 and 81, running parallel to each other, are in connection with the common return wire 29 through leads 82 and 83 respectively. For identification, the joint between leads 80 and 82 will be numbered 84 and the joint between leads 81 and 83 will be numbered 85. The point where leads 82 and 83 join return 29 will be numbered 86.

Two lines 87 and 88 joined at point 89 connect the other ends of parallel leads 80 and 81 as at points 90 and 91, respectively. Light 31 is connected into line 87 and light 32 is connected into line 88. Between the two ends of the parallel lines two leads 92 and 93, joined at joint 94, are connected to the lines 80 and 81 at points 95 and 96, respectively.

All lights, with the exception of light 30, are connected in parallel circuits, light 30 being connected in series with wire 20, through point 90, lead 80, point 84, lead 82 and point 86 to the common return wire 29.

Lights 31 and 32 are in a parallel circuit from wire 27 to point 89 where the circuit divides into wires 87 and 88, and so through the two points 90 and 91, the two parallel leads 80 and 81, the points 84 and 85, leads 82 and 83 to connecting points 86, to return 29.

Lights 33 and 47, the only two lights that are on for every digit, are in a parallel circuit from lead 28. At point 97, on lead 28, a dividing lead

98 goes through light 33, point 91, lead 81 to point 85. From point 97, lead 28 extends through light 47 to a point 99. From point 99 a lead 100 connects to point 85. From point 85 the parallel circuit for lights 33 and 47 is completed through lead 83, point 86, and return 29.

Panel lights 34 and 36 are connected across from wire 22 to lead 80 and so to return 29 through point 84, lead 82 and point 86.

Lights 35 and 37 are connected across wire 24 and lead 81 to form a parallel circuit which has its return through lead 81, point 85, lead 83, point 86 to wire 29.

The circuit furnishing current to lights 38 and 39 comes through wire 21 and divides at point 94 into leads 92 and 93 which go through lights 38 and 39 respectively to points 95 and 96, through the parallel leads 80 and 81 to points 84 and 85, leads 82 and 83 to join return 29 at point 86.

Lights 41 and 43 are connected across to lead 81 from wire 23 to establish a circuit through point 85, lead 83 and point 86 to return 29.

Light 40 and 42 are connected across from line 25 to line 80 and so through point 84, line 82 and point 86 to return 86.

Lights 44, 45 and 46 are in a circuit from wire 26 which comprises a lead 101 that divides from wire 26 at point 102 and goes through light 44 to point 103, a lead 104 to point 84, lead 82 and point 86 to return 29. Wire 26 goes to a point 105 to divide into leads 106 and 107 respectively. Light 45 is on lead 106 which connects point 105 to point 103. Lead 107 goes through light 46 to point 99 and so to the return 29 through lead 100, point 85, lead 83 and point 86.

In summary, wire 20 controls light 30; wire 21 controls lights 38 and 39; wire 22 controls lights 34 and 36; wire 23 controls lights 41 and 43; wire 24 controls lights 35 and 37; wire 25 controls lights 40 and 42; wire 26 controls lights 44, 45 and 46; wire 27 controls lights 31 and 32; and wire 28 controls lights 33 and 47. Wire 29 is common to all.

Figures 3 to 12, of the drawings, illustrate the digits 1 to 0, inclusive, and show, by heavier lines, which wires are energized to light each digit.

Operation

As stated before, the circuit is arranged to turn out those lights which are not a part of the desired digit when the control toggle for that particular digit is thrown. The panel of lights, arranged in the form of a rectangular figure eight, provides all of the lights necessary to form any of the ten digits. By turning certain of the lights out, the operation can form any one of the digits at will. It is to be observed that only one switch, with the exception of switch 10, is left manipulated at any time.

To deenergize those lights necessary to leave the digit 1 showing, the operator throws toggle 1 by operating handle 1' to break the controlling circuit at poles 1*a* and 1*b*. This cuts out wires 20, 21, 22, 25, 26, and 27, breaking the circuit to lights 30, 31, 32, 34, 36, 38, 39, 40, 42, 44, 45, 46, leaving lamps 33, 35, 37, 41, 43 and 47 energized through wires 28, 24, 23 and 29 (Figure 3).

Digit 2 is lighted by operating handle 2' to break the circuit at poles 2*a* and 2*b*. This deenergizes wires 22 and 23 cutting out lights 34, 36, 41 and 43 (Figure 4).

Digit 3 is formed by throwing handle 3' to cut out wires 22 and 25 at poles 3*a* and 3*b*, deenergizing lights 34, 36, 40 and 42 (Figure 5).

Digit 4 is lighted when wires 27, 25, and 26 are cut from the circuit by operating handle 4' which breaks the current at pole 4 (Figure 6).

Digit 5 is formed by throwing handle 5' to break the current to lights 35, 37, 40 and 42 from wires 24 and 25 at poles 5*a* and 5*b* (Figure 7).

Digit 6 is lighted by operating handle 6' to break pole 6 to cut out wire 24 and deenergize lights 35 and 37 (Figure 8).

Digit 7 is lighted when poles 7*a* and 7*b* are broken by operating handle 7' to cut out wires 21, 22, 25 and 26 and deenergize lights 34, 36, 38, 39, 40, 42, 44, 45 and 46 (Figure 9).

Digit 8 is formed when all of the lights are on, so toggle 8 is a dead switch and is not connected into the circuit (Figure 10).

Digit 9 is formed by the deenergization of lights 40 and 42 through pole 9 and wire 25 by operating handle 9' (Figure 11).

Digit 0 is formed when handle 0' is thrown to break the current to wire 21 at pole 0 and so to deenergize lights 38 and 39 (Figure 12).

Having described my invention, I claim:

1. An electrical scoreboard unit comprising a source of energy, a plurality of incandescent lamps arranged in the form of a figure 8, circuit means which is common to the lamps and the source of energy, including a plurality of branch circuits to said lamps and switch means in said branch circuits for selectively deenergizing predetermined electric lamps of said plurality, whereby the lamps remaining energized display figures from 0 to 9 upon actuation of said switch means respectively.

2. A unit for an electric scoreboard, which comprises a housing having a panel, a plurality of electric lamps arranged upon said panel in the form of a figure 8, circuit means which is common to said electric lamps including branch circuits to said lamps arranged in groups, which lamps in said groups form numerals from zero to 9 when they are energized, a source of energy for said circuit means, said circuit means being arranged to energize all of said branch circuits upon being supplied with electric energy, and a plurality of switches in said branch circuits each for selectively deenergizing a predetermined branch in such manner that the lamps in the branches undeenergized display figures from 0 to 9, respectively.

3. A scoreboard device comprising a panel, a plurality of electric lights arranged upon the panel, all of the lights arranged upon the panel for display of a figure 8 when they are illuminated, a second panel containing a plurality of switches respectively designating figures from 0 to 9, a main circuit and branch circuits common to the main circuit and to groups of electric lights of said plurality, the certain groups of electric lights controlled by said switches being arranged relative to the other groups of electric lights of said plurality, whereby the lights remaining illuminated after actuation of said switches, respectively, form figures from 0 to 9 inclusive.

JOHN C. VIAN.