W. P. HAMMOND AND E. Q. MOSES.

ILLUMINATED SIGN.

APPLICATION FILED APR. 30, 1915.

1,346,493. **Patented July 13, 1920.**

3 SHEETS—SHEET 1.

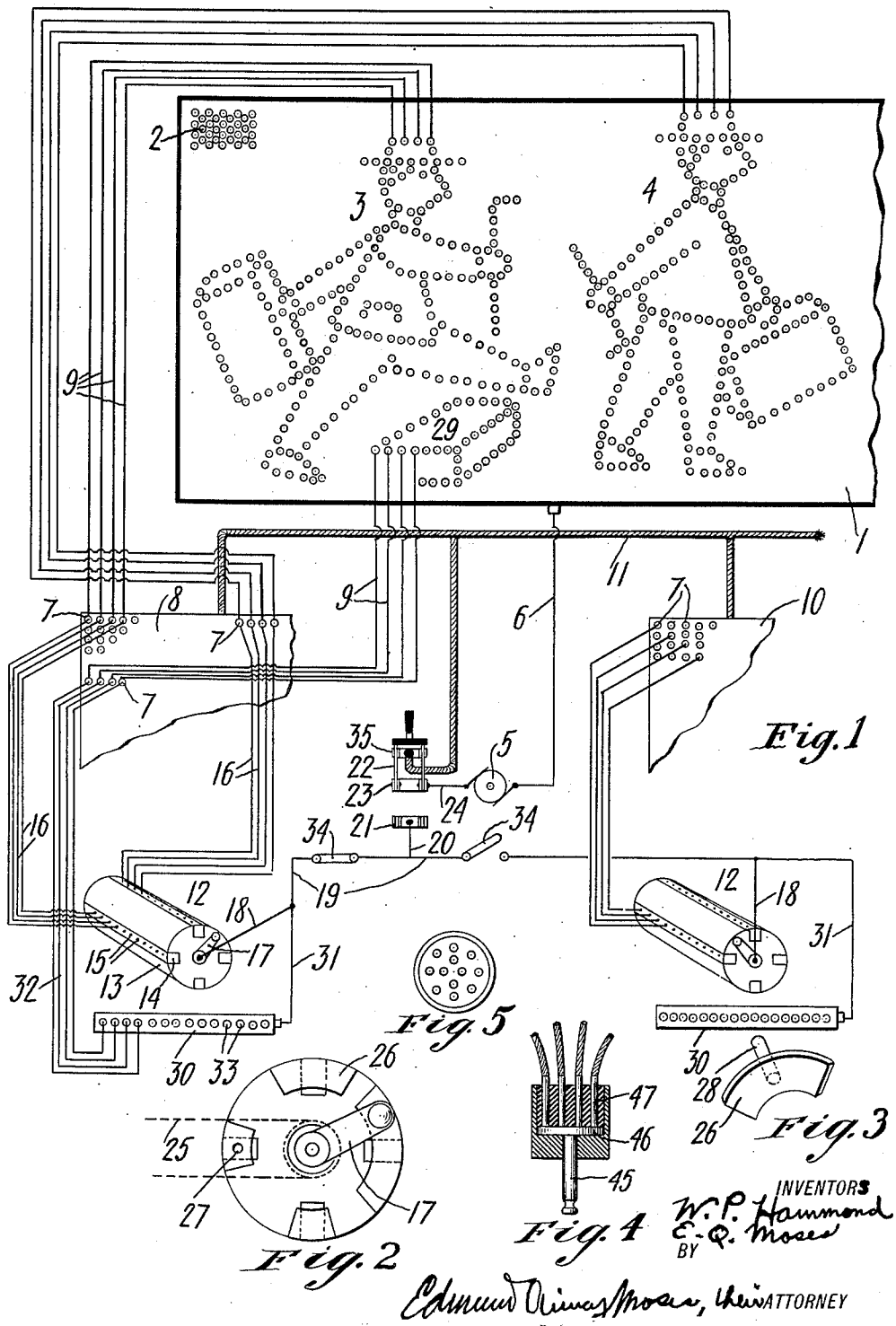


Fig. 1

Fig. 5

Fig. 3

Fig. 2

Fig. 4

INVENTORS

W. P. Hammond

E. Q. Moses

BY

Edmund Quincy Moses, their ATTORNEY

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3 SHEETS—SHEET 2.

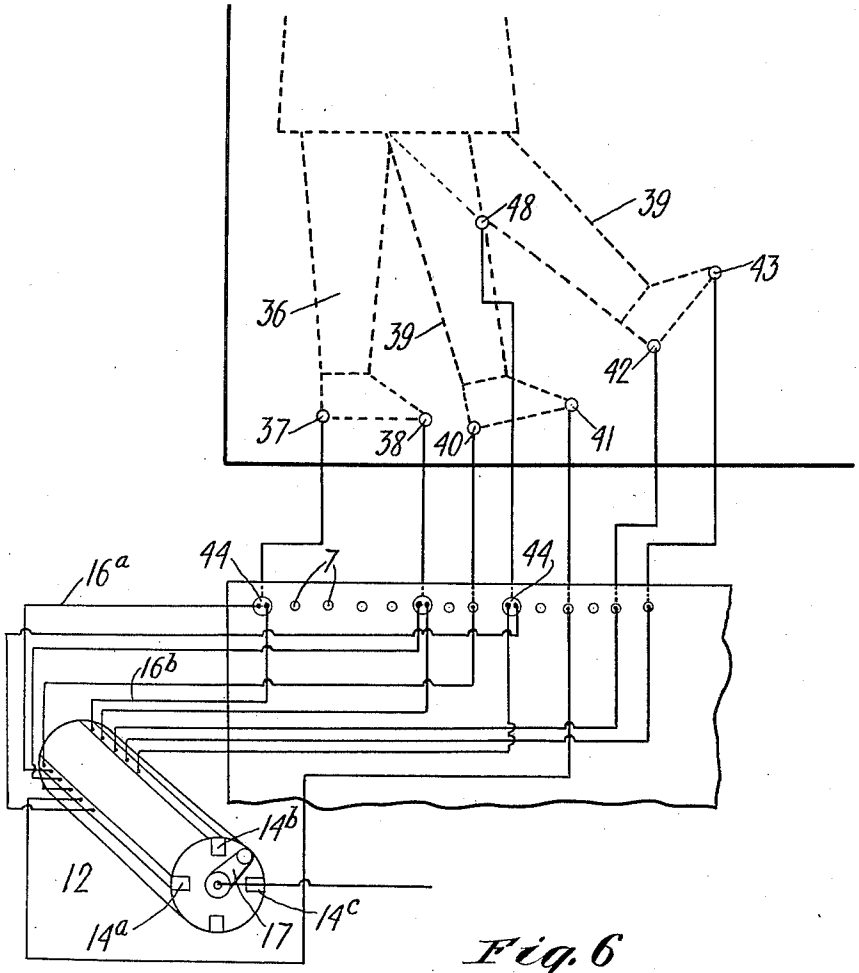


Fig. 6

INVENTORS

W. P. Hammond

E. Q. Moses

BY

Edmund Quincy Moses

their

ATTORNEY

W. P. HAMMOND AND E. Q. MOSES.

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3 SHEETS—SHEET 3.

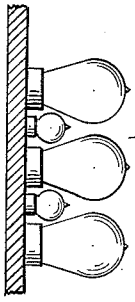


Fig. 12

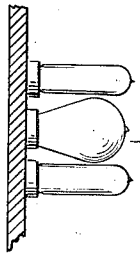


Fig. 13

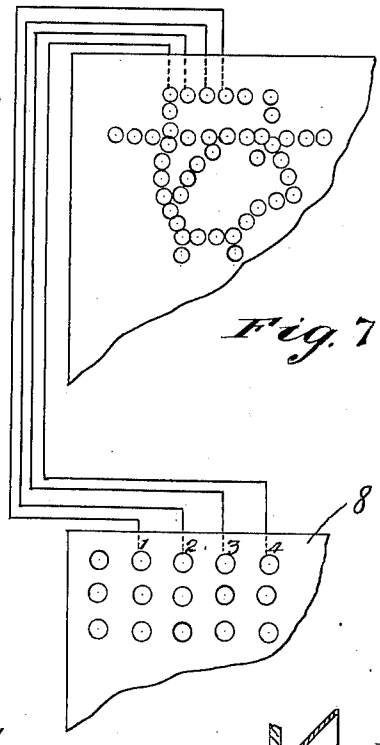


Fig. 7

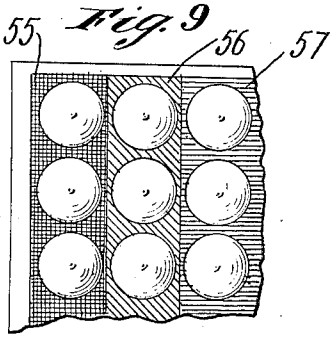


Fig. 9

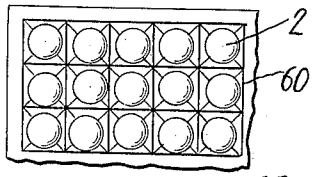


Fig. 10

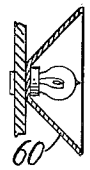
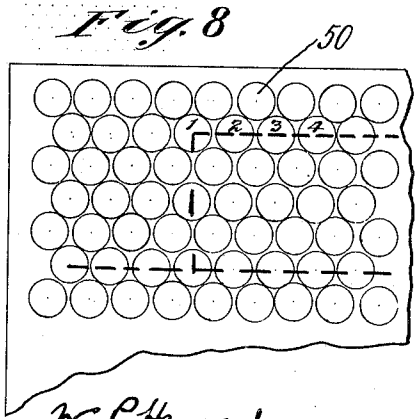


Fig. 11

Fig. 8



W. P. Hammond Inventors

E. Q. Moses

By their Attorney

Edmund Quincy Moses

UNITED STATES PATENT OFFICE.

WILLIAM P. HAMMOND, OF PASSAIC, NEW JERSEY, AND EDMUND QUINCY MOSES, OF NEW YORK, N. Y.

ILLUMINATED SIGN.

1,346,493. Specification of Letters Patent. Patented July 13, 1920.

Application filed April 30, 1915. Serial No. 25,085.

To all whom it may concern:

Be it known that we, WILLIAM P. HAMMOND and EDMUND QUINCY MOSES, citizens of the United States, and residents, respectively, of Passaic, New Jersey, and New York, New York, have invented certain new and useful Improvements in Illuminated Signs, of which the following is a specification.

This invention relates to signs for advertising or display purposes in which a figure or design is caused to appear, as upon a display board, preferably in illuminated outline.

More particularly the present invention provides means by which any desired design may be shown upon the board, and different designs shown in rapid succession, and in which a figure may be caused to appear in successive positions upon different parts of the board so as to produce the appearance of an object in motion, or what is commonly termed a "moving picture." In accordance with our invention it is possible to show a number of different designs, each of which may comprise a series of moving pictures upon the board without in any way changing or modifying the structure of the board, or the arrangement of the lights thereon, thus making it possible to show a series of different complete pictures or advertisements in rapid succession.

In the accompanying drawings, which show an approved embodiment of our invention, Figure 1 is a diagrammatic view showing a part of a sign board with the circuits leading therefrom to the plug board, parts of two of which are illustrated connected in multiple, the switches for each of said plug boards being illustrated diagrammatically. Fig. 2 is an end view of one of the flasher switches. Fig. 3 is a detailed perspective view of one of the removable switch contacts. Fig. 4 is a longitudinal section, and Fig. 5 is a plan view of a multiple socket plug box. Fig. 6 is a diagrammatic view showing the manner of arranging the circuits in order to secure certain effects in producing a moving picture upon the sign. Fig. 7 is a diagrammatic view showing a part of the sign board and a part of the plug board and the connecting circuits. Figs. 8, 9 and 10 are front views of portions of sign boards showing different arrangements of the lights thereon. Fig. 11 is a sectional view through one of the lights and its reflector of the construction shown in Fig. 10. Figs. 12 and 13 are sectionally detailed views showing different arrangements of lights.

Referring to the drawings in detail, the numeral 1 designates a display board that may be of any suitable nature and dimensions, depending upon the use to which it is to be put, and the location in which it is to be employed. This board is preferably completely covered with a series of lights or areas capable of individual illumination, as indicated at 2. The drawing shows only a fragment of the board so covered, but it is to be understood that the entire board may and preferably will be studded with lights in this manner. In other words, the board comprises practically a solid bank of lights or of areas capable of illumination. By illuminating selected lights in this bank, any desired figure or design may be made to appear upon the board and by illuminating in rapid succession selected groups of lights, a figure may be made to appear to move upon or across the board. This has been indicated in Fig. 1 where two successive positions of the same figure are indicated and designated by the numerals 3 and 4, respectively. It is to be understood that these two figures are not simultaneously illuminated, but that the figure marked 3 first is shown and then put out, after which the figure marked 4 is immediately lighted up giving the effect of a figure in motion walking from the position marked 3 to the position marked 4. Obviously these successive positions may be as numerous and as close together as is desired or necessary to produce the desired impression of motion. The means for illuminating the desired lights to form any given figure are as follows:

The circuit through each light must be capable of separate closure so that any desired light or lights may be illuminated, and for this purpose one terminal of each light is preferably grounded to the board in any suitable or well-known manner, the ground being connected to one pole of the generator 5, or other suitable source of current, by means of the wire 6. The other terminal of each light is connected to a corresponding jack or socket 7, formed in a plug board 8, by means of a wire 9. The

plug board 8 has a number of jacks or sockets corresponding to the number of lights or illuminated areas on the sign board 1. The arrangement of the jacks and sockets on the plug board 8 preferably corresponds with the arrangement of the lights on the sign board, although this is not essential so long as the arrangement is such that each jack may be identified with its light on the sign board. The connection between the lights and jacks is preferably a permanent one. A plurality of identical plug boards, the corresponding jacks of which are connected in multiple in the manner of the well-known multiple telephone switch-board, are preferably employed for a purpose which will be hereinafter set forth. A portion of a second plug board is shown in Fig. 1, being indicated by the numeral 10 and having formed therein a plurality of jacks or sockets 7 which are wired in multiple with the jacks or sockets on the board 8, the connecting wires being shown as formed into the cable 11.

The cable 11 is shown as continuing past the board 10 where it may be connected to any number of additional plug boards as may be desired. Each plug board has associated with it a switch or flasher 12. This flasher may be of any suitable construction, but, as shown, comprises a stationary drum of insulating material 13, in which are set a plurality of stationary contact bars 14, the number of contact bars as provided being equal to the maximum number of successive positions which it is desired to show upon the board for the production of one complete moving picture. Each contact bar is provided with means for connecting it with a number of jacks equal to the maximum number of lights which it is necessary to illuminate in illustrating any one position of the moving picture. In producing the moving picture effect it is necessary to illuminate at one time but a small fraction of the lights upon the board, and, therefore, the connections between the plug board and any one contact bar 14 need be only a fraction of the number of lights upon the board. For example, the total number of lights upon the board may be several thousand, while the number of lights necessary to produce any particular figure may be, say, one hundred. In such case each contact bar 14 need have but one hundred connecting points 15. The connecting points 15 may be sockets into which plugs on the leads 16 are inserted, or the leads 16 may be permanently or otherwise attached to the bar 14 at points 15. The leads 16 at their free ends are provided with plugs or other suitable means of connection which are capable of being inserted into the jacks or sockets 7 of the plug boards 8.

As stated, the number of switch bars 14 is equal to the number of different positions which it is desired to show for a given moving picture, the leads connecting with the first contact bar being plugged into the jacks on the plug board corresponding with the lights on the sign board which must be illuminated to produce the first position of the desired picture. The leads from the second contact bar are plugged into jacks corresponding with the lights of the second position, and so on, until all the lights necessary to produce all the successive positions of the given picture have been connected through their corresponding jacks with the appropriate contact bars of the switch. The switch 12 has a movable switch arm 17 which is preferably arranged to move upon a pivot and have its free end brought into contact with the ends of the contact bars 14 in succession. The pivoted end of the arm 17 is connected by means of wires 18, 19 and 20 with one contact 21 of a two-way main switch 22, the central contact 23 of which is connected by means of a wire 24 with the generator or other sources of current 5.

It will be seen that when the switch 22 is engaged with the contact 21, and the switch arm 17 is engaged with one of the contact bars 14, a circuit will be closed through the generator, switch 22, the switch arm 17 and connecting wires, a contact bar 14, the group of leads leading from such contact bar, the jacks into which such leads are inserted, the wires 9 leading from such jacks to the corresponding lights on the board, the board 1, the ground wire 6 and back to the generator. Thus a group of lights upon the board will be illuminated showing a given position of the figure corresponding to the first contact bar 14. If, now, the arm 17 is turned about its pivot, it will move off the first contact bar 14, thus breaking the circuit through the first group of lights, and will engage the second contact bar 14 and illuminate the second group of lights representing the next position of the moving figure. Thus by rotating the arm 17 so as to cause it to sweep over all of the contact bars 14 in succession, all of the successive positions producing the moving picture will be illuminated, one after the other, and the desired effect produced. By rotating the arm 17 at proper speed, it will be seen that any desired rapidity of the illumination of the successive positions may be secured. The arm 17 may be moved by hand or by power as by means of a belt or chain 25, indicated in Fig. 2, and leading from any suitable source of power, (not shown). As illustrated, only four contact bars 14 are provided, but obviously there may be as many of these contact bars as are necessary, depending upon the number of positions which it is desired to use. The construction of the switch 12 is also similarly shown diagrammatically, and the

arrangement and specific mode of operation of the contact members may be modified in any suitable manner.

Figs. 2 and 3 show a construction by which the stationary contacts of the switch may be varied in length so as to produce the desired period of illumination for each position of the picture without requiring a variation in the speed of movement of the contact arm 17. This result is accomplished by providing the contact bars 14 with removable contact pieces 26 of suitable lengths, these pieces being provided with means for connecting them with the bars 14. For example, the bars may have sockets 27 in their ends in which fit dowels 27 on the contact pieces 26. By selecting contact pieces of suitable lengths it will be seen that any desired period of illumination for the lights of a group connected with the particular contact bar may be secured. With this arrangement the arm 17 may, if desired, be rotated continuously at a fixed speed, thereby illuminating the positions successively and each for the desired period, the picture being repeated over and over again for each complete rotation of the arm 17, if that is the desired way of showing the picture.

If it is desired to show, in connection with a moving picture of a figure, some stationary object, such as an article of furniture, or such as the block indicated by the numeral 29, in Fig. 1, that result may be accomplished by providing a supplemental contact bar 30 permanently connected in the circuit by means of a wire 31. Leads 32 connect the contact points or sockets 33 of the bar 30 with the desired jacks on the board 8, which correspond with the lights forming the stationary article 29. With this arrangement it will be seen that the article 29 will remain continuously illuminated during the showing of the picture, while the separate positions or figures constituting the moving elements of the picture, are successively illuminated and put out by the movement of the switch arm 17.

Where it is desired to show different complete pictures or advertisements upon the board interchangeably, then a plurality of plug boards are provided connected in multiple as described, each of these boards being provided with its own switch 12, fixed contact 30 and connecting wires as already described. Any number of these plug boards and associated switches can be employed, depending upon the number of different complete pictures or advertisements which it is desired to have ready to display. In the circuit leading from the main switch 22 to each of the switches 12 is preferably arranged a switch 34 so that all but one of the plug boards and associated switches may be cut out.

The object of the two-way main switch 22 is to permit the entire bank of lights constituting the sign to be illuminated simultaneously when desired, so as to cause a brilliant display for the purpose of attracting attention. For example, before showing the advertisements represented by one of the switches 12, the operator can swing the switch 22 away from the contact 21 and into engagement with the contact 35, which is connected to wires from the cable 11 which contains wires leading to each of the lights on the sign board. In this way the entire bank of lights is illuminated. After illuminating the entire board this way for a moment the operator swings the switch 22 back into engagement with the contact 21, closes the switch 34 and starts the operation of the switch arm 17, thus showing the successive positions or figures forming the first picture or advertisement. When this has been completely shown or repeated the desired number of times the operator opens the first switch 34 and closes the second switch 34, and then starts the switch arm 17 of the second switch 12 into operation, thus displaying an entirely different moving picture or advertisement. If desired, the operator may swing over the switch 22 between the successive exhibitions so as to attract attention by illuminating the entire sign board momentarily.

In some cases it may be necessary to show one part of a figure stationary in successive positions of the figure, while another part is indicated in different positions so as to represent motion. For this purpose certain lights on the board will have to be illuminated in each of several successive positions. The same thing will occur where a given light forms a part of two different positions in a given picture. To accomplish this the arrangement shown in Figs. 4, 5 and 6 may be employed.

Referring to Fig. 6, it may be assumed that in the first two positions of the figure, the leg 36 remains stationary, the heel and toe lights being indicated at 37 and 38, respectively, while the leg 39 moved from a position in which the heel and toe are formed by lights 40 and 41 to a position in which the heel and toe are formed by lights 42 and 43. It will be seen that the lights 37 and 38 must be illuminated for both of these positions. The contact bar 14^a of the switch 12 corresponds with the first of these positions while the contact bar 14^b corresponds with the second position. It is necessary to connect the lights 37 and 38 with both of these contact bars, while the lights 40 and 41 are connected only with the bar 14^a and the lights 42 and 43 only with the contact bar 14^b. This may be conveniently accomplished by using a multiple socket plug 44, such as is shown in detail in Figs. 4 and 5. This multiple connection may be

of any suitable construction, but that illustrated comprises a plug 45 adapted to be inserted in one of the jacks or sockets 7 of the plug board, this plug 45 being connected to a body 46 to which are attached a plurality of jacks or sockets 47. A lead 16^a from the bar 14^a will be inserted into one of the sockets 47 while a lead 16^b from the bar 14^b will be inserted into a second socket 47, the plug 45 of the connector 44 being inserted into the jack 7 of the plug board 8 corresponding to the light 37. Thus the light 37 will be illuminated whether the switch arm 17 is in contact with the bar 14^a or the bar 14^b. In the same way, if the light 37 is to be illuminated in three positions of the figure, a lead from the contact bar 14^c will be inserted into a third socket 47 in the connector 44. Connectors having different numbers of sockets may be provided, the maximum number of sockets for any of the connectors being equal to the number of contact bars 14. In this way it will be seen that it is possible to illuminate a certain light, or lights, for every position of the figure. Any number of connectors 44 may be employed, depending upon the number of lights which it is necessary to illuminate in more than one position.

It will be seen that a condition may arise where it is necessary to illuminate a light in more than one position under other circumstances than that of a certain light indicating a stationery part of the figure. For example, the light 48 in Fig. 6 requires to be illuminated in both the first and second positions. In the first position it represents a light forming a part of the outline of the front of the leg 39, while in the second position it forms a part of the outline of the back of the leg 39. It will be illuminated in each position, however, by the use of one of the multiple connectors 44. It will be seen that this condition will occur whenever there is an intersection of the outlines of different positions where the successive positions overlap.

Fig. 8 shows a fragment of a board which may be conveniently used for laying out a picture. As shown, this chart has marked or printed on it a series of circles 50 arranged in the same relation as the lights on the sign board and equally numbered as such lights. The artist preparing the layout of the picture traces on this chart a diagram of the figures to be represented, as indicated in heavy dotted lines. The circles which the lines of this diagram cross indicate the lights to be illuminated in order to produce the desired outline. Each circle may conveniently be designated by a reference number in which case the jacks on the board 8 would be similarly numbered as indicated in Fig. 7.

The operator, in plugging up the board preparatory to showing the picture, would, therefore, plug into the jacks having numbers corresponding to the numbers of the marked circles on the chart. In this way the operator could readily plug up the board 8 correctly, regardless of whether the arrangement of the jacks on the board corresponded with the arrangement of the lights on the signboard, or not. If the arrangement of the jacks strictly corresponded with the arrangement of the lights, however, it would be possible for the operator to tell whether or not his picture was correctly plugged merely by the appearance of the board 8.

Fig. 9 shows a construction of the signboard with different colored zones, 55, 56 and 57, these zones being repeated in succession all over the board. By lighting up the lights in the different zones, contrasting colored effects are produced.

Fig. 10 shows a modified construction of the board in which each light 2 is surrounded by a polygonal reflector 60, the outlines of the reflectors being such as to completely cover the surface of the board. When lights are illuminated the entire area of the surrounding reflector appears bright so that by lighting contiguous lights a solid or continuous illuminated surface is produced as distinguished from a surface or line composed of separate spots as is the case where lights without reflectors are used.

Fig. 12 shows an arrangement of lights for the board in which large lamps alternate with small lamps. With this construction the lamps may be placed very close together so as to cover the board practically solid. Moreover by using combinations of large lamps and small lamps, different degrees of brightness for different parts of a figure may be produced, thereby producing the effect of shading. Furthermore, some of the lights may be of one color and some of another. For example, all the large lights white and the small lights red, in which case, by forming a figure partly with white lights and partly with red lights, contrasting color effects may be produced. Obviously, the lights may be assorted colors so that any desired color combination can be effected.

Fig. 13 shows an arrangement of lights adapted to produce similar effects, the small lights being of elongated shape. Obviously our invention is not limited to any specific arrangement of lights and illuminated areas.

The mode of operation of the invention may be varied to suit the particular details of construction employed, and the conditions under which the invention is to be utilized. If the embodiment of the invention is one intended for out-door advertising the sign board will preferably be of as large dimensions as possible and will be

mounted in some conspicuous space—for instance, on top of a building. All of the mechanism except the sign board will preferably be located at some suitable point within the building. It will be seen that the wiring from the sign board to the plug board 8 is preferably permanent so that the pictures to be displayed may be changed without necessitating any change in the sign board or the performance of any operation outside of the building.

In preparing the apparatus for exhibition the different pictures will first be laid out in some suitable manner as upon boards such as indicated in Fig. 8, which will be given to the operator; the operator will then take the leads from the first of the contact bars 14 and plug the same into jacks corresponding with the lights to be illuminated to form the first position of the figure. He will then take the leads from the second contact bar and plug them into the jacks corresponding to the second position of the figure. Where the same lights are used in succeeding positions, he will insert multiple connectors in the manner shown in Fig. 6. He will continue in this way until all of the positions are plugged. The stationary objects which are to be illuminated continuously throughout the picture are plugged from the fixed contact 30 to the corresponding jacks on the plug board. The operator will then go to the second plug board and following the diagram indicating the second complete picture or advertisement to be shown, will plug the successive positions from the different contact bars of the second switch 12 to the proper jacks on the second plug board to produce the desired positions for the second picture. Obviously, it makes no difference whether some of the same lights are to be illuminated in the second picture as the first, as, while one plug board is in use, all of the others are cut out. The operator may proceed in this manner to set up as many complete pictures as there are plug boards. All this may be done in the day time when the board is not in use. When the time comes for displaying the advertisement the operator closes one of the switches 34 and starts the corresponding switch arm 17 in rotation. The first advertisement or moving picture is then displayed upon the board and repeated as many times as desired. The other pictures which have been set up on the different plug boards may then be displayed in such order and for such periods of time as the operator sees fit. When it is necessary to change a picture set up on one of the plug boards, it is simply necessary to pull out the plugs and rearrange them in such a way as to produce the new picture or advertisement. Obviously, the leads from any of the contact bars may, when desired, be so arranged as to produce reading matter instead of a picture, and by utilizing a long contact member for the contact bar, or by temporarily stopping the movement of the arm 17, the reading matter or picture, as the case may be, may be displayed for as long a period of time as is desired. By providing a sufficient number of contact bars 14 and by operating the arm 17 rapidly, the successive pictures may be caused to follow each other as quickly as is necessary to produce a moving picture of any required rapidity of action and continuity of movement.

Thus it will be seen that the sign of our invention is universal, so to speak, and can be made to show any desired picture or design. It can also be made to show illuminated figures having the effect of a moving picture, or to show such figures in combination with fixed objects. As many different advertisements or announcements may be shown as the capacity of the apparatus will permit, and these announcements or advertisements may be changed from time to time without great labor and without requiring any change in the apparatus other than the mere shifting of plugs from one set of jacks to another. In other words, the operation is no more complicated than that of plugging in a number of different calls on a telephone switch board.

In the claims we have referred to a sign comprising a bank of lamps. We wish this expression to be understood as generic and as referring to any arrangement of lights or areas capable of illumination to produce figures or designs of any character.

Where we have referred in the claims to a plug board or to a plug board having jacks, we do not wish to be limited to any specific construction of board or of separatable connector, but intend to cover any arrangement by which a plurality of contact members connected with lamps is provided, in which separable connection can be made with the contacts corresponding to the different lamps.

By referring to jacks and plugs we do not intend to limit ourselves to any specific arrangement or construction of separable connection. The same is true with reference to leads, switch contacts and multiple socket plugs.

While we have illustrated and described certain specific embodiments of our invention we realize that it is susceptible of wide application and various modifications, and we desire to cover the principle of our invention broadly and not to be limited to the precise construction set forth.

Having thus described our invention we claim:

1. An illuminated display sign comprising the combination with a bank of lamps,

of a plug board having a plurality of jacks, each jack being permanently connected in circuit with a lamp, a multiple contact switch, and means for connecting the contacts of the switch with groups of jacks.

2. In an illuminated sign, the combination with a bank of lamps, of a plug board having a plurality of jacks, each jack being permanently connected in circuit with one of the lamps, a switch comprising a plurality of contact bars and a contact arm, one terminal of each of said lamps being grounded, a connection between said ground and said contact arm, a plurality of leads connected to each of said contact bars, each of said leads being provided at its free end with a plug adapted to be inserted in any of the jacks of said plug board.

3. An illuminated display sign comprising the combination with a bank of lamps, of a plug board having a plurality of jacks, each of which is connected in the circuit of one of said lamps, a switch, and interchangeable means for connecting the contacts of said switch so as to close the circuit through any desired group or groups of jacks on said plug board.

4. An illuminated display sign comprising the combination with a bank of lamps, of a plurality of plug boards connected in multiple, corresponding jacks on each of said plug boards being connected in circuit with the same lamp in said bank of lamps.

5. An illuminated display sign comprising the combination with a bank of lamps, of a plurality of plug boards connected in multiple, each board having a plurality of jacks, corresponding jacks in the different boards being connected in circuit with the same lamp in said bank of lamps, a multiple contact switch associated with each board and means for connecting the contacts of said switches with any desired jacks in said board.

6. An illuminated display sign comprising the combination with a bank of lamps, of a plurality of plug boards connected in multiple, each of said boards having a plurality of jacks, corresponding jacks in the different boards being connected to the same lamp in said bank, each of said boards having a switch associated therein, each of said switches comprising a plurality of stationary contact bars and a movable contact arm adapted to contact successively with said bars, and leads connected with each of said bars and adapted to be plugged into the jacks of the corresponding plug board.

7. In an illuminated sign, the combination with a bank of lamps, one terminal of each of which is grounded, of a plurality of plug boards connected in multiple, corresponding jacks in each of said boards being connected in circuit with one terminal of the same light in said bank, a multiple contact switch associated with each of said boards, leads connected to the stationary contacts of said switch and adapted to be plugged into any of the jacks of the corresponding board, and circuit completing connections from the movable contacts of said switches to the grounded terminals of said lamps, and means for cutting in or out said boards and switches.

8. In an illuminated sign, the combination with a bank of lamps, one terminal of each of which is grounded, of a plurality of plug boards connected in multiple, corresponding jacks in each of said boards connected in circuit with one terminal of the same light in said bank, a multiple contact switch associated with each of said boards, leads connected to the stationary contacts of said switch and adapted to be plugged into any of the jacks of the corresponding board, and circuit completing connections from the movable contacts of said switches to the grounded terminals of said lamps, means for cutting in or out said boards and switches, and means for simultaneously closing the circuits of all of the lamps in said bank.

9. In an illuminated sign, the combination with a bank of lamps, of means for successively closing the circuits of selected groups of lamps of said bank to produce the effect of a motion picture and separate means for maintaining the circuits through a selected group of lamps of said bank closed during the illumination of successive groups of lamps forming the changing part of the picture, any of the lamps of said bank being capable of inclusion in either of said groups.

10. An illuminated display sign comprising the combination with a bank of lamps of a multiple contact switch, and means for interchangeably connecting any contact of said switch in circuit with any lamp or group of lamps.

11. An illuminated display sign comprising the combination with a bank of lamps of a multiple contact switch, a plurality of leads connected with each contact of said switch, and means for interchangeably establishing an electrical connection between any of said leads and any of said lamps.

12. In an illuminated sign, the combination with a bank of lamps, of means for successively closing the circuits of groups of lamps arranged to form successive positions of a moving picture and means for closing the circuit of the same lamp in successive positions where such lamp is to be illuminated for more than one position of the picture.

13. In an illuminated sign, the combination with a bank of lamps, of a plug board having a series of jacks, each permanently connected in circuit with one of said lamps,

a multiple contact switch, and means for connecting one or more of the contacts of said switch with any jack.

14. In an illuminated sign, the combination with a bank of lamps, of a plug board having a plurality of jacks, each connected in circuit with one of said lamps, a multiple contact switch, leads connected with the contacts of said switch and adapted to be plugged into any of said jacks and multiple socket connectors adapted to be plugged into said jacks and adapted to have leads from different switch contacts plugged into the sockets thereof.

WILLIAM P. HAMMOND.
EDMUND QUINCY MOSES.