INTERCHANGEABLE UNIT LUMINOUS GASEOUS SIGN

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INVENTOR.

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ATTORNEYS.
My invention relates to an interchangeable unit luminous gaseous sign and may be characterized as an improvement upon the sign described and claimed in my copending application, Serial No. 91,081, filed July 17, 1936.

One of the main objects of my invention is to provide a new type of luminous gaseous sign in which a portable supporting frame and individual character units are so arranged that the entire sign can be easily and quickly assembled and installed anywhere with safety at any time and by anyone without previous experience and without the use of tools, and a sign that can be changed expeditiously and at will by virtue of the interchangeability of the individual sign units.

It is also an object of my invention to provide a sign unit of sturdy construction wherein the fragile luminous gaseous tube is well shielded or protected and thus not subject readily to breakage or damage due to handling and exposure in installation, packing, shipping, or in use; also, an individual sign unit composed of few parts and adapted to be applied to and removed from the sign with facility, and a sign unit in which the luminous gaseous tube is held firmly to an individual frame for the tube.

Another object is to provide an interchangeable luminous gaseous sign in which the supporting frame and sign units may be manufactured economically on a quantity basis, and thus sold more cheaply, thereby improving and enlarging greatly the present field for luminous gaseous signs.

Another object is to provide the trade with a sign which, under factory production methods, may be manufactured as a standard product of higher quality, greater uniformity, and longer display life as compared with present signs "custom built" in various sign shops.

Another object is to provide a luminous gaseous sign for which both the supporting frame and the individual units may be carried in stock by the manufacturer or dealer, this capable of being supplied immediately upon demand, whether for initial installation, extensions, or replacements.

Another object is to provide a luminous gaseous sign in which the component parts of the supporting frame as well as of the individual units are interchangeable, thus adding greatly to its economy when salvage, replacement, and repair values are taken into consideration.

The improved interchangeable unit luminous gaseous sign of my present invention may be displayed advantageously by merchandising, entertainment, and other establishments, anywhere on the premises, so as instantly to call attention to special events and attractions; can be moved safely and readily from place to place at any time by anyone; can be safely and easily removed by anyone conveniently, and safely packed and stored away until needed again as in cases of seasonal advertising, or else readily and safely shipped to another location; its wording can be changed easily and safely by anyone at any time, and the color combination of the various characters can be controlled at will; and, by virtue of the interchangeability of the component parts of the sign unit, a multiplicity of color effects can be readily obtained by various combinations of background panels and luminous characters set in such panels.

Further objects and advantages of my invention will appear from the following detailed description taken in connection with the accompanying drawings, in which:

Figure 1 is a somewhat diagrammatic view showing the set-up of a typical sign employing the features of the present invention;

Figure 2 is a front elevation of one of the individual interchangeable units;

Figure 3 is a sectional view through one of the individual interchangeable units and the supporting frame, taken substantially on the line 3—3 of Figure 1;

Figure 4 is a fragmentary detail section taken on the line 4—4 of Figure 2;

Figure 5 is a fragmentary sectional view similar to Figure 3, but on a somewhat enlarged scale and showing another form of electrode housing and mounting therefor;

Figure 6 is a fragmentary sectional view showing a preferred arrangement for a short circuit connector and a form of duplex electrode housing therefor;

Figure 7 is a sectional view similar to Figure 5, showing another form of electrode housing structure; and

Figure 8 is a fragmentary detail view showing a single form of electrode housing for attachment to the top of the supporting frame.

With reference now to the drawings, the luminous gaseous sign of my present invention comprises generally a supporting frame 10 within which are disposed electrode housings 11 arranged in pairs to receive the electrodes 12 of individual sign units 13 and the terminals 14 of short circuit connectors or blanks 15. Each unit 13 preferably has a letter, numeral, figure, punct-
uation mark, or other suitable character, and these units and the blanks 15 are interchangeable to provide any desired display, each pair of housings 11 being adapted selectively to receive the electrodes 12 of the various units 13 and the terminals 14 of the blanks 15 to connect the various units 13 to the base 23, where blanks 15 are employed, also connecting said blanks in series or continuous circuit relation with the source of current.

In Figure 1 is shown schematically a transformer 16 upon which is placed the frame 20, wherein supports the individual sign units. The transformer 16 has input leads 17 which can be plugged, by means of a suitable connector 18, into any suitable electric outlet, and it also has output leads 19. When supported on top of the transformer 16 as shown, the supporting frame 10 may be secured in position by means of lugs 20 fitting into clamps 21 attached to the casing of the transformer 16.

The supporting frame 10 comprises a casing 22, preferably of metal, and a base 23, also preferably of metal, the casing 22 and base 23 being secured together along the affluting flanges 24 by means of bolts 25, or in any other suitable manner. Openings 26 and 27 may be provided in the top of the casing 22 and in the base 23, respectively, as shown in Figure 6, to serve as ventilation means for carrying off heat generated when the sign is in operation.

While the illustrated embodiment of the invention shows the frame 10 as provided with six pairs of electrode housings 11, it is to be understood that one pair or any desired number of pairs of electrode housings is contemplated within the scope of the present invention. Moreover, the letters H, O, R, N, with one blank 15 at each end as shown in Figure 1, is merely illustrative. If the word is a six letter word for example, no blanks 15 need be employed, or with a two letter word and a three letter word in combination, one blank may be arranged between the two words.

The electrode housings 11, which may be formed of porcelain, "Pyrex," or other insulating material, may be fastened to the frame 10 in any suitable manner. In Figures 1 and 3, these housings 11 are bolted at 30 to the base 23 through holes in lugs 31 formed integral with the lower ends of the housings 11. The two end housings have side openings at 34 (Figure 1) for admittance of the feed conductors or output leads 19 by means of which the terminals of the end housings 11 are connected to the feed conductors 19. The other electrode housings have similar side openings 34 for admittance of jumper wires or leads 35 by means of which the terminal of one housing of each pair of housings is connected to the terminal of the adjacent housing of the next pair of housings. Each housing 11 has an opening 36 in the bottom thereof for admittance of and access to the binding screws or posts for securing the feed conductors and jumper wires to the terminals of the respective housings as more fully shown and described in connection with Figures 5 and 7. Openings at 38 permit of the escape of heat generated by the operation of the sign.

The metal lugs 40 (Figure 3), to which the conductors 19 and leads 35 are connected in the manner shown more in detail in connection with Figures 5 and 7, are integrally connected to metallic cup-like terminals 41 for contacting the electrodes 12 of the luminous gaseous tubes 42 upon insertion of said electrodes into the ele-

trode housings. The ends of the casing 22 are closed by covers 45 which may be secured to the casing 22 or base 23, or to both, by any suitable means. Conductors 19 pass through insulating bushings 48 in the base 23, although it is to be understood that these conductors may pass through the top of the casing 22 should the entire sign be suspended from above by means thereof for admittance of and access to the binding screws or posts for Securing the feed conductors and jumper wires.

Each pair of housings 11 is spaced to correspond with the electrode spacing of the units 13 and the terminals of the blanks or short circuit connectors 15, and the leads 35 and other conductors are all properly insulated. Thus it will be observed that the entire system of wiring and outlets is compactly and completely enclosed within the supporting frame and is thereby made secure from damage and is safe to be handled by anyone without risk of accidental contact, and is thus capable of being placed safely anywhere where it can be advantageously. All unsightly structural features are concealed within the frame, and this frame may be finished attractively as desired. The supporting frame may be built in any other suitable manner—for example, with the base and sides in one piece and a suitable section for the top.

Each interchangeable sign unit 13 comprises a frame or panel 50 pressed out of metal, or otherwise formed of metal or any other suitable material, box-like in shape, with the front open, and preferably with rounded edges and corners as shown. The bottom of each frame or panel 50 has two substantially circular openings 51 spaced to correspond or register with the electrodes 12 of the respective sign units 13 and with the electrode housings 11 in the supporting frame. Each of the units 13, as shown in the drawings, has a luminous gaseous tube 42 bent into shape to form a letter, numeral, figure, punctuation mark, or other suitable character, and terminates in the two parallel electrodes 12 which extend through the opening most ad-

jacent ends of the tube electrodes 12 are preferably clad by metal caps 52 for contacting the terminals 41 in the electrode housings 11 when the units are inserted into the supporting frame. The tube is set into the box-like frame or panel 50 and thereby shielded and protected at the back as well as at the top bottom and sides there-
by. At the same time the inside of the back wall of the panel or frame 50 forms a background for the tube. This background may be colored or ornamented to provide any desired effect, and the tubes 42 may employ any desired luminous gas, such as neon, helium, argon, or the like, and metallic vapors or other suitable means to give any desired color or characteristics, or any desired combination of colors or characteristics. The tube electrodes 12 of each unit are held in firm fixed position to the bottom of the unit so that the tube and panel or frame of each unit constitutes a firm, unitary, and interchangeable structure. This is accomplished by providing each electrode with a split bushing 56 comprising a pair of semi-cylindrical bushing members of insulating material. Each half of each bush-

ing 56 consists of a flanged portion 57 which bears against the rim 58 around the openings 51.
and a stem portion 59 grooved internally to fit tightly about the tube electrodes 12 and thread-
ed externally for threaded engagement with the correspondingly threaded shank 60 of a clamping sleeve 61 preferably of metal, although it may be formed of other suitable material. When thread-
ed upon the bushing members to the position shown in Figures 2 and 3, the sleeve 61 clamps the bushing members into firm gripping engage-
ment with the electrode 12. At the same time, the rim 58 of the frame or panel 50 is clamped between the flanged portions 57 of the split bush-
ing and the flange 64 at the upper end of the sleeve 61, thus securing the luminous tube firmly to the shielding panel with the electrodes pro-
jecting from the bottom of the panel.

If desired, to insure further rigidity, a ring washer (not shown) may be inserted between the flange 64 of the sleeve 61 and the rim 58 of the panel 50.

The shapes of the stem portions 59 of the split bushings and of the threaded portions of the sleeve 61 may be made slightly conical, with the smaller ends at the bottom as indicated more clearly in Figure 7 in order to assure pos-
tive gripping between the bushings and the electrodes. In addition, the lower ends of the sleeves 61 may be made to contact the inside of upstanding flanges 68 formed about the open-
ings 69 in the top of the casing 22 to afford another point of support for each sign unit on the casing 22. This improves the alignment and stability of the respective units when in position on the supporting frame and with the electrodes 12 extending through the openings 69 and into engagement with the terminals of the electrode housings 11.

A guard 72 may be provided for protecting the luminous tube 42 from damage from frontal exposure. As shown more clearly in connection with the third from the left unit of Figure 1 and in Figure 4, this guard 72 may be made up of two sets of wired 73 substantially perpendicular to one another, welded together or otherwise connected at their intersections at 74, and held clamp-like in a spring 75 fitting in a groove 76 formed in the panel 50 along its sides and at its top. The spring 75 may be of U-shaped formation, having its open end point-
ing downwardly toward the electrodes, and this spring can be readily inserted into and removed from the retaining groove 76 by drawing the depending legs of the U together.

As shown in Figure 4, a cover 80 may be pro-
vided for protecting the glass tube 42 from damage in storing and shipment. This cover 80 has flanges 82 along two sides and along the top preferably without any flange along the bottom, and these side and top flanges have grooves 83 which slide over ribs 84 on the sides of the frame or panel 13 and into engagement with a corresponding rib in the top of the frame or panel. Any other suitable means for securing the guard and the cover removably to the frame or panel 50 may be employed.

There are also indicated in Figure 2 annular groove-like recesses 66 in the caps 52 on elec-
trodes 12. These grooves 66 are adapted to engage clips 87 shown more clearly in Figure 5, with the object of securing the unit more firmly in the housing and also to obtain electric contact at that point should that ar-
rangeme be preferable.

The electrode housing 11' shown in Figure 76

5 is secured to the base 23' by a screw flange 90 instead of being bolted to the base as in Figures 1 and 3. The housing 11' is of insulating mate-
rial as previously described, and at its lower end has an integral flange 91 which engages one side of the rim of the opening 92 in the base 23'. The screw flange or sleeve 90, threaded upon the housing 11' into clamping engagement with the other side of the rim of the opening in the base 23' secures the electrode housing firmly and, at the same time, detachably to the supporting frame. Ventilating openings are shown at 94 as in Figure 3, and the housing 11' has side openings 95 for admittance of the jumper or feed conductors, and an opening 96 in its bottom for access to the binding post 97.

Binding post or screw 97 secures the conductor 98 which may be a feed conductor or jumper conductor to metal lug 59 provided at its upper end, as in Figure 3, with an integral metal cup-
like terminal 100 for electric contact with the electrode of the tube. With the lug or terminal 99, which corresponds with the lug or terminal 40 in Figure 3, formed as shown, it may be molded in place in the housing 11', although any other desired manner of disposing it within the housing may be employed. The spring clip attachments shown at 87 may be electric terminals as well, or simply mechanical means for engaging more firmly the electrodes through the metal caps 52 to hold the unit securely in position in the housing.

In Figure 7 the electrode housing 11' is se-
cured to the base 23' by bolts or the like en-
gaging through openings 105 as in Figure 3, and the tube 42' with its frame or panel 50' corresponds with the previous embodiment of the invention. In this case, however, the upper end of the insulating housing 11' has a bell mouth 106 which substantially eliminates acciden-
tial impact of and possible consequent damage to the glass electrodes. This safety arrangement is accomplished by widening the upper part of the receiving end of the electrode housing as shown at 106 to provide a socket 107 for ad-
mission freely of the split bushing 56', with or without the shank of the screw flange 61'. By making the distance a from the end of the bush-
ing to the end of the electrode sufficiently less than the distance b from the base of the bell mouth to the top of the flange 68', the possi-
ability of injurious contact between the contacting terminal 92' or spring contact 87' is ob-
viated. In other respects the details of the bell mouth housing are similar to those already described.

The electrode housing shown in Figure 6 is of the duplex suspended type in which a single receptacle engages both electrodes of the lumi-

nous tube or both terminals 14' of the short circuit connector or blank 18'. The single re-
ceptacle which is formed of insulation and is indicated at 110 has lugs 112 by means of which it is bolted to the top of the casing 22. A single recess 114 at each end provides easy access to the binding posts 115 for securing the conductors 116, which may be feed or jumper conductors, to the binding posts 117. The duplex housing may, of course, be arranged to be secured to the base 23 if desired.

The blank connector 15' comprises a suitable conductor 120 with terminals 121 to engage ter-
minals 122 and/or spring clips 123. The part 15' of the blank connector is shown of such shape as to form a harmonious continuation of
the projecting flanges 125 formed about the opening 126 in the top of the casing 22. Similarly, web 128 is indicated spreading out gradually to conform with the generally cylindrical shape of the housings proper, as well as to reduce the total weight of the housing.

In Figure 8 I have shown a single suspended electrode housing indicating more or less diagrammatically at 130 and bolted or otherwise secured to flanges 132 to the top of the supporting frame or casing of the sign. It will now be apparent from the foregoing description that I have provided a totally enclosed group of paired spaced electrode housings or sockets, only two per sign unit, and serially interconnecting the sign units and blank connectors selectively as desired to present a simple, positive, compact, and safe assembly. Moreover, each sign unit comprises its luminous gaseous tube and a frame or panel, and the electrodes of the tube are firmly and tightly gripped to the frame or panel of the unit to provide a firm unitary assembly. With this arrangement, all vibratory or other stresses incident to handling, shipping, storing, and installing are transferred to the electrode collars, gripping the tubes rigidly at their least vulnerable points, and these stresses are thence transferred to the infinitely more resistant casing, for example by contact of the electrode collars therewith or by other cooperation therebetween.

Other types of electrode housings than those shown in the drawings may be employed within the scope of the present invention. Moreover, it is to be understood that two or more supporting frames, together with their units, may be set alongside one another or above one another to form any wording or combination of characters as desired.

I do not intend to be limited to the precise details shown or described.

I claim:

1. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets in series circuit relation, said frame having openings in register with said sockets, interchangeable sign units each comprising a panel and a luminous gaseous tube having electrodes extending from said panel and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets.

2. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, and interchangeably connecting said pairs of sockets together by interchangeably connecting said pairs of sockets together by interchangeable sign units adapted for insertion through said openings and selectively into direct engagement with said sockets.

3. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, interchangeable sign units each comprising a panel and a luminous gaseous tube firmly secured thereto by clamping means and constituting with said last frame a structure for application to and removal from the supporting frame as a unit, said electrodes extending from the sign unit frame and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets.

4. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, interchangeable sign units each comprising a panel and a luminous gaseous tube having electrodes extending from the panel and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets, and means firmly securing the tube to the panel for application to and removal from said supporting frame as a unit, said means cooperating with said supporting frame when the sign unit is applied thereto to provide alignment and stability for the unit when in place on said frame.

5. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, interchangeable sign units each comprising a panel and a luminous gaseous tube having electrodes extending from the panel and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets, and means firmly securing the tube to the panel for application to and removal from said supporting frame as a unit, said means cooperating with said supporting frame when the sign unit is applied thereto to provide alignment and stability for the unit when in place on said frame.

6. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, and means firmly attaching said tube to said last frame and cooperative with said supporting frame to provide alignment and stability for the unit when in place on said supporting frame.

7. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in the top thereof in register with said sockets, and interconnecting extending from the sign unit frame and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets.

8. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets together, said frame having openings in register with said sockets, and means firmly attaching said tube to said last frame and cooperative with said supporting frame to provide alignment and stability for the unit when in place on said supporting frame.
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In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets in series circuit relation, said frame having openings in register with said sockets, interchangeable sign units having the electrode terminals of the gaseous tube in a plane parallel with the plane of the character and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into engagement with said sockets directly and without the aid of intermediate contacting means, and a transformer disposed externally of said supporting frame and having its high voltage terminals connected to the end sockets.

9. In a luminous gaseous tube sign, a supporting frame comprising an enclosure consisting of a casing part and a base part rigidly secured together, a plurality of sockets arranged in pairs within said enclosure and rigidly secured to one of said enclosure parts, one of said enclosure parts having openings in register with said sockets, conductors connecting adjacent sockets of adjacent pairs of sockets in series circuit relation, and interchangeable sign units having the electrode terminals of the gaseous tube in a plane parallel with the plane of the character and spaced in accordance with the spacing of said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets.

10. An interchangeable unit for luminous gaseous tube signs, said unit comprising a shielding panel, a luminous gaseous tube terminating in a pair of electrodes, and means cooperating with the tube electrodes and independent of the circuit connection for the tube for firmly clamping said tube and panel together into a rigid unitary structure.

11. An interchangeable unit for luminous gaseous tube signs, said unit comprising a box-like casing having a pair of openings, a luminous gaseous tube set into said panel and terminating in a pair of electrodes extending through said openings, split insulating bushings grooved internally to embrace the tube electrodes and having flanges cooperating with one side of the tube electrodes and independent of the circuit connection for the tube for firmly clamping said tube and panel together, a wire guard in front of the gaseous tube and detachably engageable with said panel, said panel having a projecting rib, and a cover having a flange for sliding engagement with the projecting rib on the panel.

17. An interchangeable unit for luminous gaseous tube signs, said unit comprising a shielding panel, a luminous gaseous tube terminating in a pair of electrodes, means for firmly clamping said tube and panel together, a wire guard in front of the gaseous tube and detachably engageable with said panel, said panel having a projecting rib, and a cover having a flange for sliding engagement with said projecting rib on the panel.

18. An interchangeable unit for luminous gaseous tube signs, said unit comprising a box-like casing, a luminous gaseous tube secured therein, said panel being grooved, and a wire guard comprising a generally U-shaped spring comprising two sets of wires arranged generally perpendicularly to one another and fastened together at their intersections, said spring being capable of being sprung into the groove in said panel.

19. An interchangeable unit for luminous gaseous tube signs, said unit comprising a box-like shielding panel having projecting ribs, a luminous gaseous tube secured in said panel, and a cover having flanges grooved for sliding engagement with the projecting ribs on the panel.

20. In a luminous gaseous tube sign, a supporting frame, interchangeable sign units having luminous gaseous tubes provided with electrodes and adapted for application to said frame, a duplex insulating housing of unitary character rigidly secured to said frame and having a pair of openings extending therethrough, electrode terminals mounted in said openings intermediate the ends thereof and adapted for receiving the electrodes of said interchangeable units upon insertion of said electrodes into said openings from one end of the insulating housing, and means within said openings and coaxial with said tube electrodes for connecting lead conductors to said electrodes terminals.

25. In a luminous gaseous tube sign, a supporting frame, interchangeable sign units having luminous gaseous tubes provided with electrodes and adapted for application to said frame, a duplex insulating housing of unitary character rigidly secured to said frame and having a pair of openings extending therethrough, electrode terminals mounted in said openings intermediate the ends thereof and adapted for receiving the electrodes of said interchangeable units upon insertion of said electrodes into said openings from one end of the insulating housing, and means within said openings and coaxial with said tube electrodes for connecting lead conductors to said electrodes terminals.
said sockets and adapted for insertion through said openings and selectively into direct engagement with said sockets.

20. In a luminous gaseous tube sign, a supporting frame comprising a casing, a plurality of sockets arranged in pairs within said casing, conductors connecting adjacent sockets of adjacent pairs of sockets in series circuit relation, said frame having openings in register with said sockets and interchangeable sign units having gaseous tubes formed into characters and provided with electrode terminals spaced in accordance with the spacing of said sockets and disposed parallel with the planes of the characters formed by said tubes for insertion through said openings and selectively into direct engagement with said sockets.

21. An interchangeable unit for luminous gaseous tube signs, said unit comprising a shielding panel, a luminous gaseous tube terminating in a pair of electrodes, and means cooperating with the tube electrodes and independent of the circuit connections for the tube for firmly clamping said tube and panel together into a rigid unitary structure, said structure being capable of easy disassembly and replacement of any constituent part or parts without injury or destruction of the unit or the remaining parts.

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