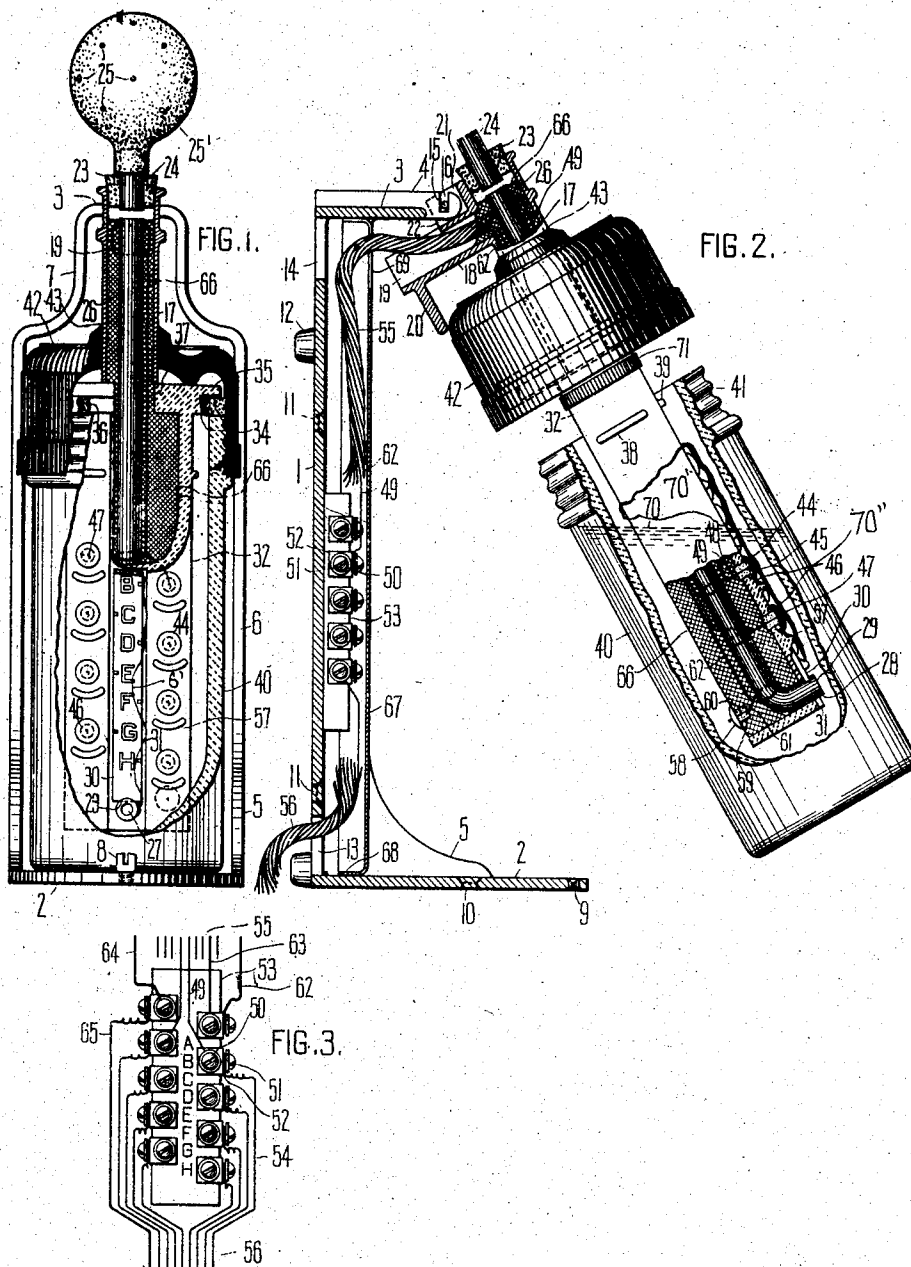


No. 839,291.

PATENTED DEC. 25, 1906.

F. B. HERZOG.
ELECTRIC SIGNALING APPARATUS AND CIRCUIT.
APPLICATION FILED JAN. 24, 1900.



WITNESSES.

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ELECTRIC SIGNALING APPARATUS AND CIRCUIT.

No. 839,291.

Specification of Letters Patent.

Patented Dec. 25, 1906.

Application filed January 24, 1900. Serial No. 2,613.

To all whom it may concern:

Be it known that I, FELIX BENEDICT HERZOG, Ph. D., a citizen of the United States, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Electric Signaling Apparatus and Circuits, of which the following is a specification.

The present invention covers several improvements on my Patent No. 596,774, of January 4, 1898.

The main improvements are directed to making a simpler, cheaper, and more compact annunciator or recording instrument adapted for use in place of ordinary magnetic or other indicators on ordinary circuits. In the form embodied herein it comprises a base fitted with electrodes and adapted to be supported in a transparent jar of electrolytic fluid, all so arranged that when a circuit is closed at a distant point one of these electrodes suitably connected with the circuit-closing instrument at such distant point will be changed in appearance so as to be visible through the jar and so serve as an annunciator. This change in appearance may be caused by a deposit, as of iodine from a salt (potassium iodide) decomposed by the passage of the current, or it may be caused by an aggregation of bubbles of gas as well as by other means.

My invention also comprises a special solution for use with such an instrument.

In the drawings, Figure 1 is a front, and Fig. 2 is a side, view of an embodiment of this invention, Fig. 3 showing a detail—i. e., the junction-board.

The annunciator is constructed as follows: The base 32 is a hollow column of opal glass having no back and having a flange-head 35, adapted to support the base from the rim of the jar 40, within which it is inserted when the apparatus is operating. A groove on the flange-top admits a soft-rubber ring gasket or packing 34 36, serving to make a better and water-tight fit between the rim of the jar and the flange of the base. The flange has an opening 37, through which the wires and blow-tube emerge. The front of the base is pierced for each outlet, and a soft-rubber plug 46 is fitted into each hole. Through each such plug passes a fine platinum wire 48, and on the outer end thereof a knot or turn 47 serves to hold in place a cushion 45 of inert material—as glass, rubber, celluloid, &c.—

and over this a disk 44 of platinum, the latter being adjusted so that sufficient pressure or other contact extends between it and the knot on the platinum wire to insure a good electrical connection. The inner end of the wire is soldered or otherwise fastened to a wire 49 of cheaper material, as copper, and this may be anchored by a turn around the blower-tube 26 and then carried upward through the hole 37 in the flange-head, thence through the elbow 17 and its extension 18, the several similar wires being advantageously twisted into a cable 55. This cable terminates in a suitable junction-board 53, preferably bearing a suitable connecting-plate and its screws for each line. As shown, each such plate is made angular with one screw 51 at one face 52 for connection to the line 54, leading to the distant button, and another screw 50 at the other face connecting to the wire leading to the corresponding tip in the tank, as already described. After the wires have been properly connected within the base this is filled with a filling of cement, as wax and rosin, so as to keep the fluid from the connections. This cement thus forms the fourth side or back of the tank. This cement is also permitted to flow into the elbow, this serving both to insulate and protect the wires more thoroughly and to bind together these wires, the base, and the elbow. The various disks placed on the front of the base ordinarily are used for connection with the line-wires, while the connection for the negative wire or common return may often be more advantageously made at the back, as here shown, the corresponding parts being numbered 58 59 60 61, while the negative wire is 62, and its external connection 65 may lead to a suitable bell, (not shown,) but which would be looped in between wires 63 and 64.

In order to locate the index numbers or letters in proper proximity to the corresponding disks and at the same time provide a convenient form of changing them when desired, suitable names, here shown as letters, are etched or otherwise placed on a strip of glass 30, fitted into a suitable recess 31 in the center of the face of the base and supported in a suitable manner, as in the notch 29, cut in the top of the projecting angle of the blow-tube 26, the upper end being held in place by a rubber band 71. Suitable flanges 38 39, formed on the base, prevent this band from slipping down. In order to enable air to be

blown into the tank to hasten the disappearance of the stain by agitating the liquid, a blow-tube 26 is provided, terminating below in the angular projection 28 with opening 27 and ending above in the air-bulb 25', fitted with a valve, or, preferably, as shown, with a number of small vent-holes 25, so placed that the fingers of the operator cannot close all simultaneously, (whereby a suction would result.) To prevent danger of breaking the main tube, this is preferably not carried to the top; but an air-space 66 is provided, formed by the top of the cement filling (in the elbow) and the bottom of the stopper 23, which is fitted with projecting neck 24, upon which the bulb is fixed. For use under ordinary conditions the rubber gasket 34 is not air-tight, thus permitting air to be expelled when the bulb is pressed.

In order to hold together the jar and the base, a suitable locking-piece is provided, as the screw-cap 42, adjusted to screw onto the neck 41 of the jar, with the top 43 fitting against the elbow 17. The upper side of the cap is arranged to press upon the flange-head when the cap is screwed down; but the cap is not fitted permanently to either the elbow or the flange-head.

The elbow is adapted, in addition to the functions described, to support the annunciator as follows: An extension 16 carries a pin 15, adapted to fit in a slot in an extension 21 of arm 4, projecting out horizontally from the top of a bracket-piece 1. A flange 3, developing into walls 7 and 6, forms a box to protect the cables 55 and 56 and junction-board 53, while a front plate 67, turned into a flange 68, protects these parts from any chance spraying of the solution in the jar, a hole 69 admitting the cable 55. A bottom extension 2 is fitted with screw-holes 10, by which the bracket may be screwed to a table or shelf, while holes 11 in the back are for use when the device is to be screwed to the wall. The extension 2 swells out into the side pieces 5 to prevent lateral motion of the jar. The extension 18 of the elbow also forms the channel 19 for supporting the cable 55 and carries a lug 20 to hold the plate 67 in place and has formed on it the piece 22 to guide the cable 55 when the bottom of the jar is swung forward for the purpose of enabling the jar to be detached for the purpose of connecting up the junction-box, removing the cap for manipulation of the liquid, or repairs to the base or disks, &c. The parts are all so proportioned that after the jar is swung forward the cap may be screwed loose and lifted with the base, the angle of necessary motion being such that the fluid cannot spill. A screw 8, fitting in hole 9, keeps the jar from forward motion. Holes 13 14 permit the external wires to be led to the junction-board from above or below, according to the direction of their run, while lugs 12 are adapted to

hold the bracket from the wall far enough to permit the external wires to be hidden behind the bracket. The platinum disks may advantageously be located so that they alternate, as shown, whereby a narrow number-strip may be made to hold large-sized numbers in sequence in one line.

A further improvement consists in covering the electrode disks or tips with a close-fitting sheet of textile material of a dark color and in substituting cheaper material than platinum for the tips and in making the solution so that a very heavy deposit of gas-bubbles of minute size will form the indication. I have discovered that the degree of brilliancy or visibility as well as the permanence of the mass of bubbles after cessation of the current depends largely upon the relative small size of the individual bubbles, and this varies with the character of the ingredients. I therefore add to a decomposable liquid, as water, substances which will decrease the size of the bubbles, increase the number thereof, or in any other way increase the visibility of the indication. Various substances which increase the viscosity or conductivity will also act to so increase the visibility, and I have found that of such substances many gums act advantageously, and I have found that gum-arabic gives an excellently brilliant grouping. By arranging over the disks as a group a piece of black silk of medium closeness of weave, as shown by 70', I obtain a black background for the bubbles which will impart form or be visible from the front, although the electrodes are directly behind it. This arrangement works at its best when the negative electrode is at some angular distance from the positive. I prefer silk only for solutions by which it is not affected. I have also modified this arrangement by covering buttons individually, as in 70". One of the points in this general form of annunciator is that the base may be manufactured independently of the jar as a separate piece of merchandise. The base may of course be made to rest on the bottom of the jar or upon a projection therein or it may be suspended from the wires directly from the elbow-piece.

I have found that ordinary porcelain will in time be affected by the action of the fluid, whereas opal glass will not be so affected and is white enough to contrast well with the iodine stain. For the negative disk I may substitute a wire leading out from below—as, for instance, from the hole through which the blow-tube projects and then upward between the rows of disks, as in 6', whereby the bubbles of gas formed during action will not sweep away the iodine deposited on the positive poles, and the current required will be comparatively small, because the pole is at about the same distance from all of the negative disks.

A further improvement in the buttons of the sheet-platinum type consists in forming the support of inert material, as rubber, of sheet stock convex by pressure, thus making a button which shall appear solid, whereas it is really made of foil so thin that it could not stand the strain of the pull which the wire must exercise upon it in order to insure good contact therewith.

10 The jar form described is for small annunciators an improvement over the clamped cell form of my patents because no leakage can take place as the result of carelessness in screwing up nor is there any danger of breakage as the result of uneven pressure in clamping on a glass in the cell form.

What I claim is—

1. An annunciator comprising a base which carries electrodes, their connecting-wires and means for protecting the latter from the solution, and a vessel containing solution and arranged and adapted to have the base immersed therein below the level of the wires.

25 2. An annunciator-base comprising a hollow column, electrodes and wires mounted thereon together with means for keeping the column immersed in solution contained in a transparent jar and means for protecting the wires from the electrolyte.

3. An annunciator comprising a base arranged and adapted to hold electrodes on its front; side walls to the base, means for leading the connecting-wires vertically, and means for protecting all the circuits beyond the electrodes from the fluid.

4. In combination, the jar, the base, with its electrodes, a locking device as a cap for joining these, and a passage through the cap for the outgoing wires.

5. An indicating device comprising an electrode, a covering of textile material, an electrolytic solution within which it is immersed, and a negative electrode, all coöperating so that gas-bubbles will be located over the textile.

6. A solution for an electrolytic annunciator comprising a gum, dissolved in the fluid used.

50 7. An annunciator comprising a transparent jar, a base immersed therein, and serving to support a series of electrodes representing the outgoing lines, each electrode comprising a button of conducting material covered by a dark fabric, the said base also bearing ledges projecting between adjacent electrodes, all combined with an electrolyte adapted to deposit visible bubbles of gas upon an operated electrode.

60 8. In a chemical annunciator, the operated disks arranged with projections from the base, above their plane and constructed and adapted to coöperate therewith, the projections corresponding to several disks being integrally formed.

9. In a chemical annunciator, the operated disks arranged in a vertical line with projections from the base between them; the parts being so constructed and arranged that the projections remain in place independently of their respective disks and the projections extend beyond the plane of the disks.

10. A support for a chemical annunciator combined with the annunciator proper, means for attaching them together, guiding and locking devices constructed and acting to insure such attachment in a fixed relation, and leading-in wires arranged and adapted by length and flexibility thereof to permit of detachment of the annunciator without removal of the support.

11. A chemical annunciator comprising a jar, together with operative parts immersed therein and movable in relation thereto and combined with a blow-tube connected to the latter.

12. A chemical annunciator comprising a vertically-arranged row of disks and a vertical blow-tube, together with a base arranged to support both of these elements.

13. In a chemical annunciator, a vertical row of disks, a base supporting them, a blow-tube supported by the base and located behind the disks, and an orifice for the same below the disks.

14. In a chemical annunciator a support for a positive and a negative terminal, the positive terminal arranged upon one face of the support, together with the negative upon the other face.

15. In a chemical annunciator, a disk of inert material formed into proper shape, together with a thin covering-plate of conducting material, conforming thereto, and a connection passing from the plate through to the back of the inert material and acting to attach the disk and plate to a supporting-base.

16. In a chemical annunciator, a containing-jar and an insertible element comprising a base, suitable terminals and connections, together with a fastening device adapted to coordinate these parts.

17. A chemical annunciator comprising disks, a base arranged and adapted to serve as an abutment for the disks, orifices for the disk-wires, and projections extending from the base farther than the disks and formed integrally with the base.

18. A chemical annunciator comprising a tank having a transparent face, together with a base arranged to carry the operative disks and means for inserting the base from the top of the tank, and adjustments for supporting it within the tank from the top.

19. An indicating device comprising an electrode, a covering for the same made of non-conducting material having interstices, an electrolytic solution within which the electrode and covering are immersed in com-

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bination with an electrode of opposite pole also in the solution and all coöperating so that gas-bubbles formed at the passage of the current will be located over the covering.

5 20. An indicating device comprising an electrode for the same of color contrasting with that of the bubbles specified hereinafter and made of a non-conducting material, an electrolytic solution within which the cover
10 is immersed in combination with an opposite electrode also immersed and all coöperating so that gas-bubbles produced by the action of the current will be visible in contrast to the covering.

15 21. An indicating device comprising an electrode, a covering for the same attached thereto and made of non-conducting material and constructed to admit of electrolytic

action between the electrode and the solution. 20

22. An annunciator comprising a transparent jar, an insertible base bearing disks of conducting substance with a covering of non-conducting material pervious to the current, conducting-wires from the disks and through 25 the base, means for insulating them from the base, together with a solution composed of a conducting electrolyte, to which has been added a substance for the purpose of affecting the visibility of bubbles of gas produced 30 by the electrolytic action.

Dated New York, January 23, 1900.

F. BÉNÉDICT HERZOG.

Witnesses:

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