

[54] **WRIST WATCH WITH A
DIAL-ILLUMINATING DEVICE**

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240/6.43**

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[58] Field of Search **58/23 BA, 50 R, 53,
58/88 W, 88 SC, 88 WC, 90 R; 240/6.43**

[56] **References Cited**

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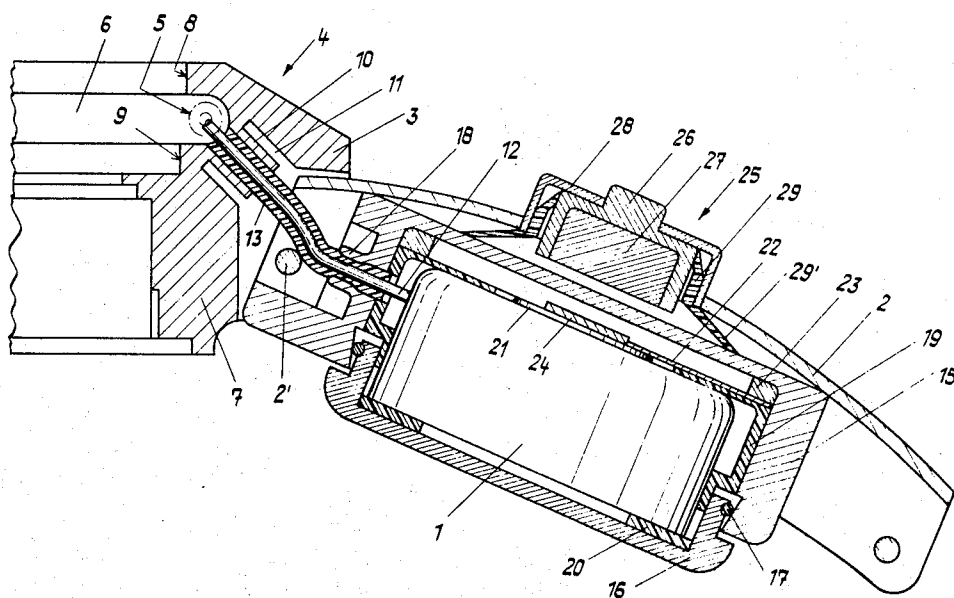
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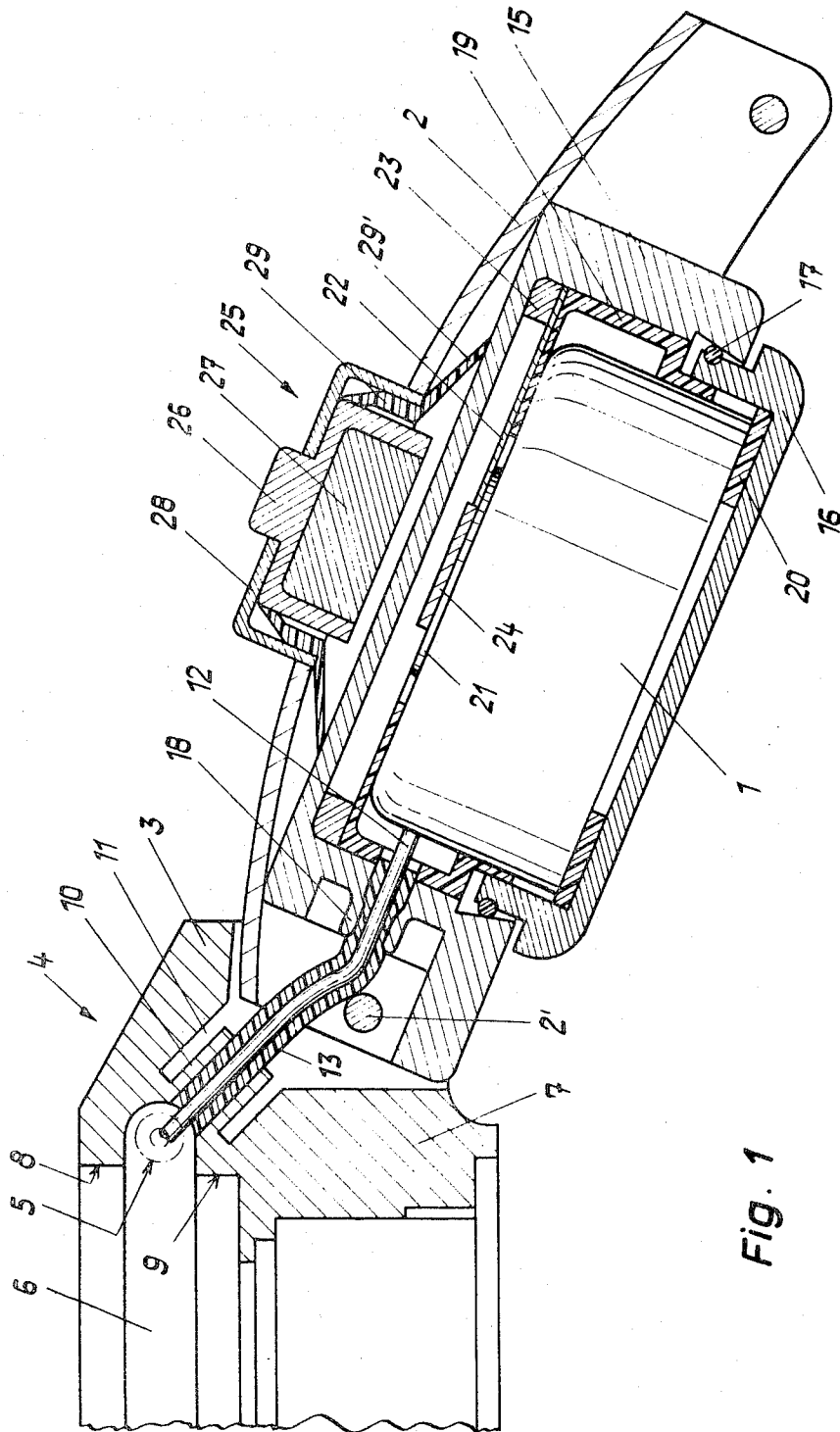
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Attorney—Richard K. Stevens

[57] **ABSTRACT**

In a wrist watch comprising a pivotally mounted bracelet element housing an electric storage cell supplying a miniature bulb for illuminating the dial, the bulb is housed in a recess between two glass-retaining snap grooves in the watch case, said recess communicating with the exterior via a bore in a tubular projection on the watch case. A sheathed conducting lead connecting the bulb to the cell passes through and is constricted in said projection by ductile deformation of the metal thereof to form a watertight fit, and is likewise constricted in a similar projection on the cell casing. The bracelet element also includes contact means for closing and opening the electric circuit of the bulb.

5 Claims, 6 Drawing Figures





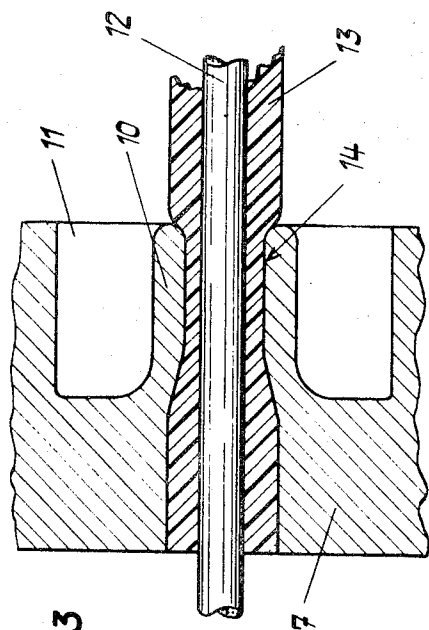


Fig. 3

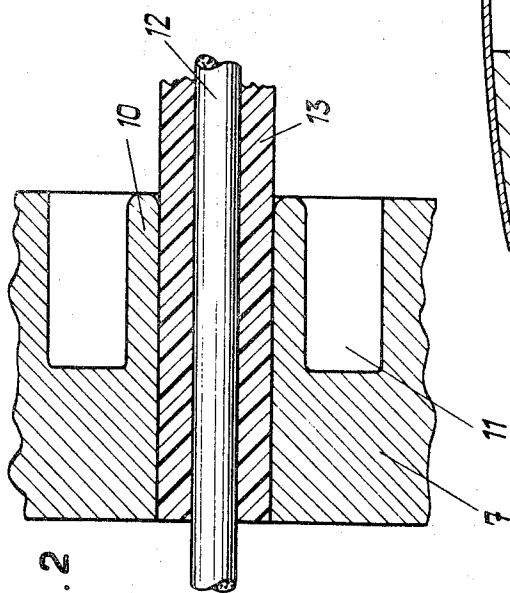


Fig. 2

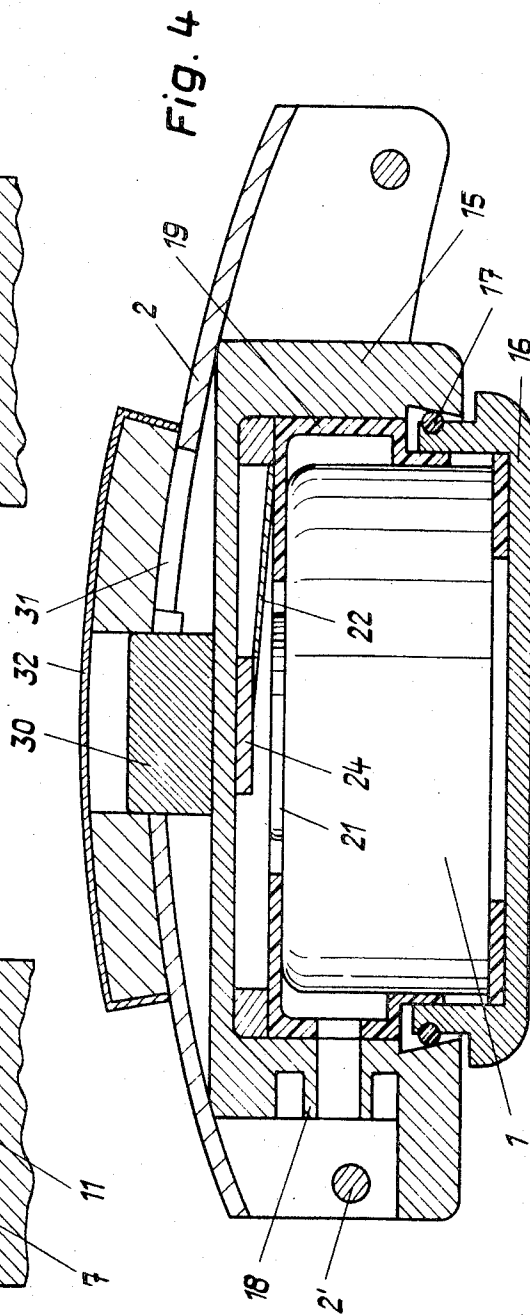
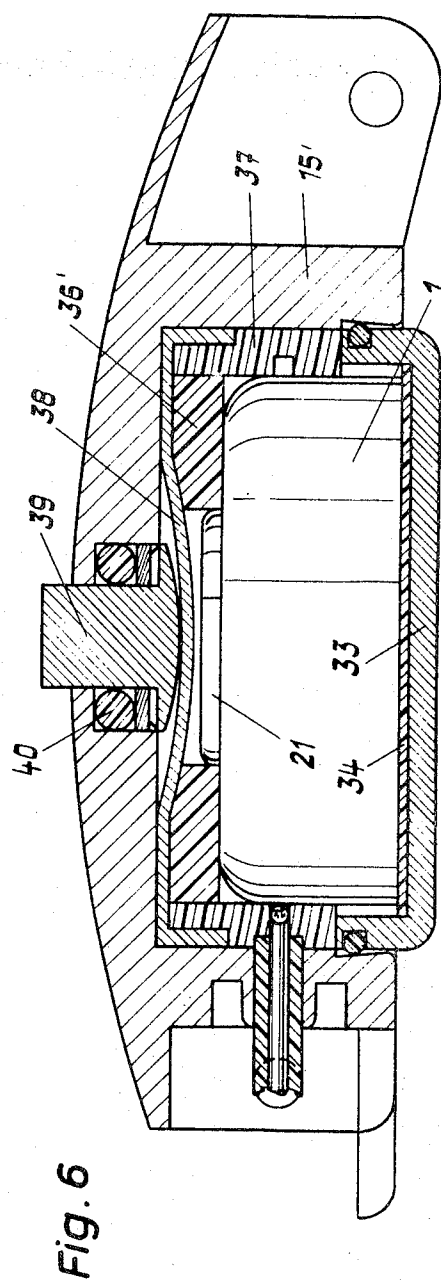
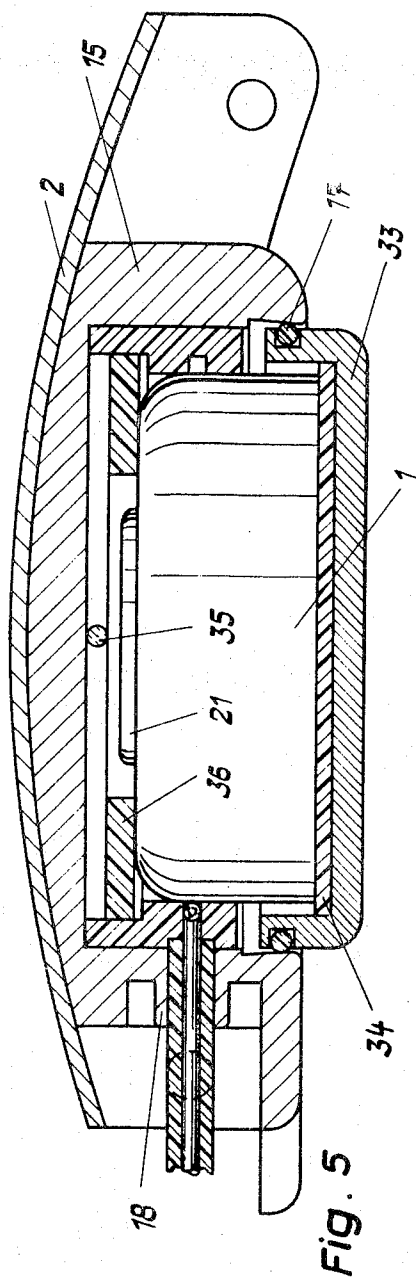


Fig. 4



WRIST WATCH WITH A DIAL-ILLUMINATING DEVICE

The invention relates to wrist watches of the type including dial illuminating means.

Many known wrist watches of the above type include a miniature electric storage cell disposed in a bracelet element pivotally mounted on horns of the watch case, and a miniature electric bulb housed in a recess in the case middle. However, none of these watches have been found to operate satisfactorily, either in respect of water-tightness between the cell(s) and the watch movement, or in respect of control of the illumination.

An object of the invention is to provide a wrist watch of the indicated type which can be simply and rationally manufactured, which has a sufficient water-tightness to enable use thereof in underwater diving, and which has a particularly simple control of the illumination.

According to the invention, in a wrist watch of the indicated type the bulb-receiving recess is provided between two glass receiving snap grooves in the watch case and communicates with the exterior by a tubular projection adapted to grip the sheath of an electrical conducting lead passing through the projection by ductile deformation of the metal of the projection. The cell-containing bracelet element includes a metallic casing provided with a tubular projection similar to that of the watch case and also adapted to be shaped by ductile deformation of the metal thereof to grip said insulating sheath the conducting lead of which comes into contact with the cell. Said bracelet element also comprises contact means for closing and opening the electric circuit of the bulb, one pole of which is connected to ground and the other to the conducting lead passing through the tubular protuberances of the cell casing and the watch case.

An embodiment of the invention and variations of this embodiment will now be specifically described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a large scale partial cross-section through the watch case and bracelet element of said embodiment;

FIGS. 2 and 3 are partial cross-sectional views showing a detail of FIG. 1 on an enlarged scale, before and after mounting; and

FIGS. 4 to 6 are cross-sections of varied bracelet elements.

The wrist watch of FIG. 1 is provided with a dial-illuminating device including a miniature electric cell 1 disposed in a bracelet element 2 connected by a pin 2' to horns 3 of the watch case designated generally by reference numeral 4, and only a part of which is shown. A schematically shown miniature electric bulb 5 is housed in a recess 6 provided in the middle 7 of case 4 between two glass-retaining snap grooves 8 and 9.

Recess 6 communicates with the exterior, i.e., the space between horns 3, by means of a tubular projection 10 shown on an enlarged scale in FIG. 2. This projection 10 is formed in the middle 7 by forming therein an annular recess 11. An electrically conducting lead 12 with an insulating sheath 13 passes through the inner bore of projection 10. To ensure a good water-tight fit, the projection 10 is shaped by ductile deformation of its metal by means of a tool (not shown), so that it grips

about sheath 13 which is constricted as shown at 14 in FIG. 3.

The bracelet element 2 includes a casing 15 in a non-magnetic metal, for example brass, in which is housed an electric storage cell 1. Casing 15 is closed by a removable bottom cover 16 with an intermediate O-ring 17 providing a water-tight joint and preventing water from penetrating into casing 15. A tubular projection 18, similar to projection 10 of case 4, is provided in the casing 15 on the side thereof towards the joining pin 2'. This tubular projection 18' is similarly shaped about the insulating sheath 13 to ensure a water-tight fit by constriction of sheath 13 in the bore of the projection. A bared end of the conducting lead 12 contacts one of the poles of cell 1 formed by the outer cover thereof.

The bracelet element 2 also includes an insert 19 of electrically insulating material surrounding cell 1, an insulating washer also being disposed between the cover 16 and cell 1. The cell is thus electrically insulated from the metal casing 15 and its other pole 21 is accessible through an opening provided for this purpose in the insert 19. A blade 22, for example in hard laminated grey gold, serves as a spring and as a lead conductor to ground, i.e., to the casing 15 and watch case 4. For this purpose, blade 22 is fixed to casing 15 by a ring 23. A contact-forming plate 24 in soft iron of zero remanence is fixed at the free end of resilient blade 22 which tends to elastically apply said contact 24 against the pole 21 of cell 1 to close the electric circuit of bulb 5.

A magnetic control member, designated generally by reference numeral 25, serves to attract the soft iron contact 24 to open the circuit of bulb 5. This control member 25 includes a central button 26 provided with a permanent magnet 27, a push-piece 28 surrounding button 26, and an elastic part 29 with a skirt-like membrane 29', for example in synthetic plastic material, which serves as a return spring for button 26 and push-piece 28. When the central button 26 with its magnet 27 is manually depressed until it contacts casing 15, the magnet 27 attracts the contact 24 and thus opens the circuit of bulb 5. The push button is normally held in this position by the upper edge of part 29 which engages over a shoulder of button 26. To close the circuit in order to illuminate bulb 5, the user presses on the push-piece 28 which by moving in causes the elastic part 29 to slide over and grip the wall of button 26, then releases the push-piece 28. Part 29, by means of membrane 29', returns the push-piece 28 to its initial position (as shown), driving with it the central button 26. The magnetic attraction of magnet 27 on contact 24 is thus sufficiently reduced so that the contact 24 is once more applied by its spring blade 22 against the pole 21 of the cell, thus closing the circuit of bulb 5, which lights up the bulb.

In FIG. 4, the same reference numerals designate the same members as in FIG. 1. In this variation, the soft iron contact 24 is attracted by a permanent magnet 30 able to slide over the casing 15 in an opening 31 provided in the bracelet element 2. A push-piece 32 slidably mounted on element 2 is connected to the magnet 30 so that by moving the push-piece 32 towards the right of FIG. 4, the magnet 30 is also moved in relation to the position shown. The magnetic attraction ceases when the magnet 30 is sufficiently spaced apart from the original position that the blade 24 is returned by the spring blade 22 against the pole 21 of cell 1 thus closing

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the circuit of bulb 5 of a watch as shown in FIG. 1. Thus, by moving the push-piece 32 towards the right, the bulb lights up and by moving the push-piece 32 towards the left back to the position shown, the bulb 5 is switched off.

In the variation of FIG. 5, the contact means for placing the bulb 5 into or out of circuit include push-piece formed by the bottom cover 33 which is slidably mounted in the casing 15 for cell 1. The push-piece 33 is provided with an inner layer 34 of insulating material fixed to the cell 1. A contact 35 fixed on casing 15 is disposed facing the pole 21 of cell 1. An elastic washer 36 retains the cell 1 in the position shown in which it is spaced apart from contact 35. By pushing down the push-piece 33 against the elastic force of washer 36, the pole 21 comes to bear against the contact 35 thus closing the electrical circuit of bulb 5 which lights up. Upon release of the push-piece 33, the elastic washer 36 returns the cell 1 and push-piece 33 to its initial position, as shown, and which corresponds to the switched off position of bulb 5.

In the variation of FIG. 6, a casing 15' housing cell 1 forms the bracelet element, rather than being a separate part connected to a bracelet element as in the previous examples. The cell 1 is insulated from the inside of casing 15' by a ring 37 of insulating material, an insulating layer 34 fixed on the bottom cover 33, and a relatively thick insulating washer 36'. A resilient metal member 38 is inserted between the inside of casing 15' and the washer 36', this member 38 forming a mobile contact. A push button 39 is mounted in a housing provided in the outer face of casing 15', with an O-ring 40 providing a water-tight joint. By pressing on push button 39, the resilient member 38 is pressed against the pole 21 of cell 1 and closes the electric circuit of bulb 5 which lights up. Upon releasing the push button 39, the resilient member returns the push button to its original position and opens the circuit.

What is claimed is:

1. In a wrist watch with a dial illuminating device, comprising a watch case, a bracelet element pivotally mounted on the watch case, means in said bracelet element for housing at least one electrical storage cell, and a miniature electric bulb housed in a recess in the watch case, the combination of: said bulb-receiving recess being provided between two glass-receiving snap grooves in the watch case, said recess communicating with the exterior of the watch case through a bore of a first tubular projection of ductile metal on the watch case; a conducting lead in an insulating sheath passing through said bore of the first projection and being fluid-tightly gripped therein by a deformed portion of the first projection; said bracelet element including a me-

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tallic casing for housing said at least one cell, said casing including a second tubular projection similar to said first tubular projection, said conducting lead and sheath also passing through and being gripped in the bore of the second projection by a deformed portion thereof with said conducting lead contacting a cell in said casing; and said bracelet element additionally comprising contact means for selectively closing and opening the electrical supply circuit for said bulb which includes a first grounded pole of the bulb and a second pole of the bulb connected to said conducting lead passing through said first and second projections.

2. Wrist watch according to claim 1, comprising a non-magnetic metallic casing for said at least one cell, means for electrically insulating a cell in said casing from said casing, a spring blade fixed to said casing, a soft iron contact on said blade, said blade forming means for elastically urging said contact towards one pole of a cell in said casing to close said electric circuit of the bulb, and magnetic control means cooperating with said contact to selectively magnetically attract said contact away from said pole to open said circuit.

3. Wrist watch according to claim 2, in which said magnetic control means includes a central button provided with a permanent magnet normally exerting a magnetic attraction on said soft iron contact to open said bulb circuit, a push-piece surrounding said button, and an elastic return part disposed between the button and push-piece so that by pushing in the push-piece said elastic part slides on the central button and upon releasing said push-piece said elastic part returns the push-piece to its initial position driving with it the central button and thus cutting off the magnetic attraction on the soft iron contact which closes said circuit.

4. Wrist watch according to claim 1, in which said magnetic control means includes a push-piece slidably mounted on said bracelet element and a magnet disposed between the push-piece and said casing for the cell, said magnet being movable by the push-piece from a first position in which it attracts said soft iron contact thus opening said bulb circuit to a second position in which said magnetic attraction ceases and said soft iron contact is returned by the spring blade to contact said pole of said cell and close said bulb circuit.

5. Wrist watch according to claim 1, in which said contact means include a push-piece formed by a bottom cover of said casing, said bottom cover being slidably mounted with a cell in said casing from a first position in which said cell is spaced apart from a contact fixed to said case to a second position in which said cell bears against said contact to close said bulb circuit.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,783,604 Dated January 8, 1974

Inventor(s) Florent BRIGLIANO, Ernest VOGT, Edmond MARMOUND

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading of the Patent, please correct the spelling of the Assignee:

From: "PR Societe de Revision, Traitement de l'Information et Recouvrement S.A."

To: -- RR Societe de Revision, Traitement de l'Information et Recouvrement S.A. --

Signed and sealed this 9th day of July 1974.

(SEAL)
Attest:

McCOY M.GIBSON, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents

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