May 10, 1938. C. H. H. RODANET 2,117,213

ELECTRIC SWITCH WITH MANOMETRIC CONTROL

Filed July 30, 1936 2 Sheets-Sheet 1

Fig. 1.

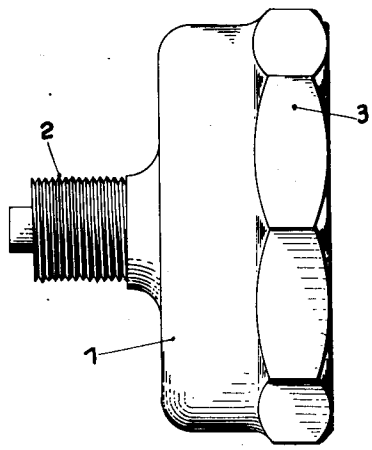


Fig. 2.

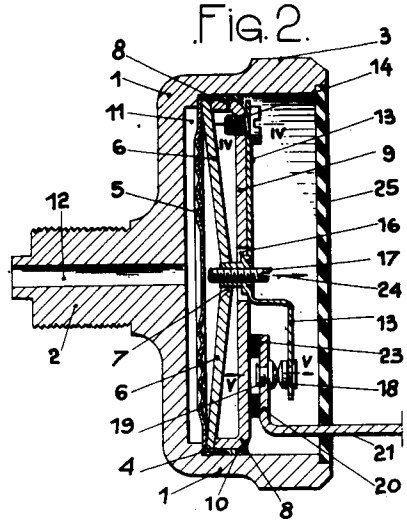


Fig. 4.

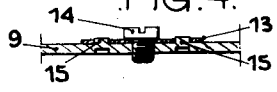


Fig. 5.

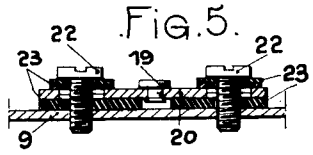
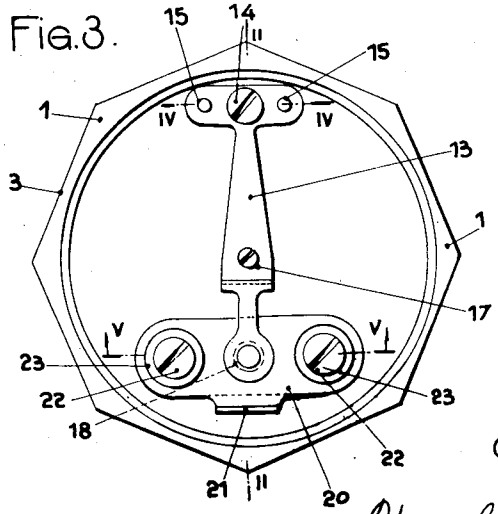


Fig. 3.



INVENTOR:
CHARLES HILAIRE
HENRI RODANET
BY Haseltine, Lake & Co.
ATTORNEYS

May 10, 1938. C. H. H. RODANET 2,117,213

ELECTRIC SWITCH WITH MANOMETRIC CONTROL

Filed July 30, 1936 2 Sheets-Sheet 2

Fig. 6.

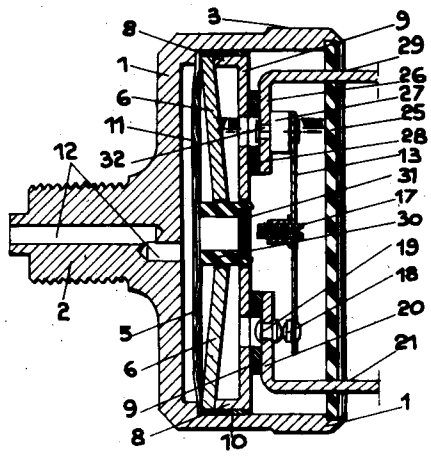


Fig. 7

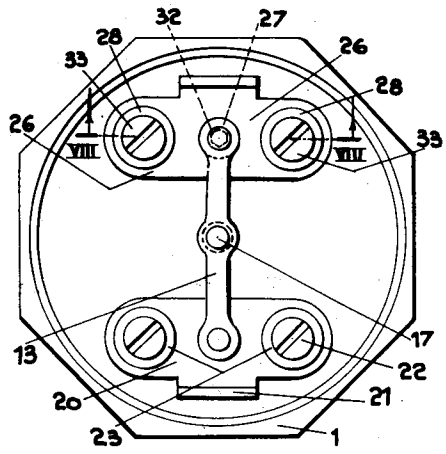
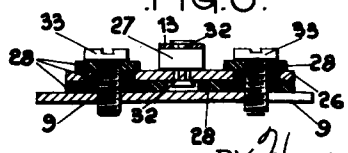


Fig. 8.



INVENTOR:
CHARLES HILAIRE
HENRI RODANET
BY Haseltine, Lake & Co.
ATTORNEYS

Patented May 10, 1938 2,117,213

UNITED STATES PATENT OFFICE

2,117,213

ELECTRIC SWITCH WITH MANOMETRIC CONTROL

Charles Hilaire Henri Rodanet, Neuilly-sur-Seine, France, assignor to Société Anonyme: Etablissements Ed. Jaeger, Lavallois-Perret, France

Application July 30, 1936, Serial No. 93,423
In France June 18, 1936

2 Claims. (Cl. 200—83)

This invention relates to an electric switch with manometric control, and is particularly characterized by the fact that the fluid, which by pressure controls the operation of the switch, acts on a flexible diaphragm capable, upon being distorted, of acting on the movable contact of the electric switch.

The main object of the present invention is to have a switch control provided with a flexible diaphragm mounted in a fluid-tight manner within a casing in which are also arranged the contacts of the switch, and which may also be secured, at its periphery, on a rigid disc of substantially conical shape and on the periphery of which bears the bent down edge or flange of another disc on which are mounted the fixed and movable contacts of the switch.

It is also an object to have the flexible diaphragm and the two mentioned discs welded within the casing so as to constitute, opposite said diaphragm, a fluid-tight space connected, by a conduit or the like, to the source of fluid under pressure.

A further object is to have a movable contact of the switch constituted by a flexible blade secured, at one of its ends, to the disc having the bent down edge or flange, and provided, at its other end, with a contact piece, a finger, mounted on this blade, passing through both rigid discs, preferably at their center, so as to be capable of coming directly or indirectly in contact with the flexible diaphragm when the latter becomes distorted under the influence of the pressure of the fluid, and the mentioned finger may be adjustably mounted on said flexible blade carrying the movable contact of the switch.

It is also an object to have the fixed contact piece mounted on the disc having a bent down edge and suitably electrically insulated therefrom, while the flexible blade may be mounted on the disc having a bent down edge, but electrically insulated therefrom, and to have the rear portion of the casing closed by a small plate of insulating material through which the connecting tongue or tongues pass which are respectively connected to the fixed contact piece and eventually to the flexible blade carrying the movable contact piece.

The present invention further relates to a number of particular features which will appear from the following description with reference to the accompanying drawings, given by way of example only, in which:

Fig. 1 is a side view of a form of construction of an improved apparatus according to the invention.

Fig. 2 is a diametral section made according to line II—II of Fig. 3.

Fig. 3 is an elevation of Fig. 1, the cover plate being removed.

Fig. 4 is a partial section made according to line IV—IV of Figs. 2 and 3.

Fig. 5 is a partial section made according to line V—V of Figs. 2 and 3.

Fig. 6 is a diametral section similar to Fig. 2, showing a constructional modification of an improved apparatus according to the invention.

Fig. 7 is an elevation of Fig. 6, the cover plate being removed.

Fig. 8 is a partial section made according to line VIII—VIII of Figs. 6 and 7.

The improved electric switch with manometric control according to the invention and illustrated in Figs. 1 to 5, is composed of a metallic casing 1 of substantially cylindrical shape and terminating, on its rear face, in an axial cylindrical screw threaded projection 2 serving to secure the apparatus on a suitable support (not shown), as well as to connect the said apparatus to the pressure fluid conduit. The casing is provided, on its periphery, with a part 3 in the shape of a nut having eight sides, or the like, facilitating the fitting up of said apparatus.

The cylindrical interior of the casing 1 is so made as to constitute a shoulder 4 on which rests, once assembled, the resilient diaphragm 5 of the manometric box. This manometric box, inserted substantially without play within the casing 1, is constituted by the flexible diaphragm 5 connected at its periphery to a rigid frustum-shaped disc 6 having at its center a perforation 7. On this disc 6 bears the bent down edge 8 of a metal disc 9 on which the contacts are mounted as will be described later on.

In order to ensure perfect fluid-tightness between the manometric box, disc 9 and casing 1, these various parts are peripherally welded together as shown at 10 in Fig. 2. The fluid-tight chamber 11, formed between the diaphragm 5 and the rear wall of the casing 1, communicates, through an axial perforation 12, with the pressure fluid piping, or the like, connected to the screw-threaded projection 2 by any suitable means.

On the disc 9 and at its upper part is secured, by means of a screw 14 or the like, the conducting flexible blade 13 constituting the movable contact of the switch. In order to avoid lateral pivotal movement of the flexible blade 13, the

latter is provided, on either side of the screw 16, with two perforations which fit over two corresponding studs 15 formed or secured on disc 8. In a convenient embodiment, these two studs 15 are obtained by upsetting said disc (Fig. 4).

Opposite the central perforations 7 and 10 respectively provided in the discs 6 and 9 is secured, on blade 13, a finger or rod 17 which passes through these perforations so as to come in contact with the diaphragm 5 when the latter becomes distorted under the action of the pressure of the fluid contained in the space 11. In the embodiment illustrated and in order to allow of adjusting the length of the projecting finger 17, the latter consists of a screw threaded rod screwed in a nut or the like rendered rigid, by welding for instance, with the blade 13. But it is obvious that this finger 17 might be a simple rod riveted in a perforation of the blade 13.

At the free end of blade 13 is secured a contact piece 18 which normally bears upon a fixed contact piece 19 secured, by any suitable means, on disc 9, but electrically insulated therefrom. In the embodiment illustrated, this fixed contact piece 19 is riveted on a conducting flange 20 having a suitable connecting tongue 21. This conducting flange 20 is secured on disc 9 by means of two screws 22, members and washers 23, made of insulating material, ensuring electric insulation, on the one hand, between the flange 20 and, on the other hand, between the screws 22 and disc 9 (Fig. 5).

At its rear part, the casing 1 is closed by a disc 25, of insulating material, which is preferably beaded in said casing 1, a perforation being provided in this disc for the passage of the connecting tongue 21.

It will be easily understood that when the pressure of the fluid, such as a liquid, contained in the space 11, exceeds a certain value, the diaphragm 5 bulges or is distorted and comes into contact with the finger 13 so as to move it in the direction of the arrow 24, thus breaking the contact between contact pieces 18 and 19. On the other hand when this pressure falls below the value chosen upon adjustment, the contact pieces 18 and 19 are in contact and the connecting tongue 21 rigid with the flange 20 is connected to earth through the tongue 13 and through the entire apparatus.

In the constructional modification illustrated in Figs. 6 to 8, the same reference numbers designate the same parts as in the form of construction illustrated in Figs. 1 to 5. This modification particularly differs from the form of construction shown in Figs. 1 to 5 by the fact that the flexible blade 13 is electrically insulated from the disc 9 which has a bent down edge or flange. For that purpose, said flexible blade 13 is secured, at its upper part, to a conducting flange 26, by means of a rivet 27, or the like. In order to prevent said blade 13 from laterally pivoting, the rivet 27 and the perforations 32 respectively provided in the flange 26 and blade 13, and in which this rivet fits, are of prismatic shape. The flange 26 is secured on the disc 9 in the same way as the flange 20 by means of two screws 33, members and washers 28, of insulating material, ensuring electrical insulation, on the one hand, between the flange 26, and, on the other hand, between the screws 33 and disc 9 (Fig. 6). The conducting flange 26 is rigid with a suitable connecting tongue 29 which passes through a perforation provided in the disc 25 made of insulating material. In order that the screw 17, or the like, should be insulated from the diaphragm 5, when the latter comes in contact with said screw 17 owing to a pressure exerted on this diaphragm, between the screw 17 and the diaphragm 5 is interposed an insulating member which may consist of a socket 30, the end of which, opposite the screw 17, has an insulating disc 31 preferably beaded in said end of socket 30. This member 30—31 is free in the axial direction and is suitably guided in the central perforations 7 and 10 respectively provided in discs 6 and 9.

Such apparatus are utilizable in all cases in which it is necessary to close an electric circuit when the pressure of the fluid controlled by the manometric device falls below a certain value, and these contact apparatus are particularly utilizable for indicating the lack of supply of lubricating oil to an internal combustion engine; in this case, they are perfectly applicable to the device described in the French Patent No. 794,303 of November 19, 1934.

The present invention is not limited to the forms of construction described above and illustrated, but it extends to all those utilizing the features above set forth and adapted to produce the desired result, within the scope of the appended claims.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a pressure operated switch, a casing having an open end and so shaped as to have near its back wall a shoulder, a flexible diaphragm bearing at its periphery on said shoulder for forming a fluid-tight chamber between said diaphragm and said back wall of the casing, a rigid frustum-shaped disc resting on the periphery of said flexible diaphragm and having a perforation at its center, a cup-shaped member resting by its bent down edge on said disc and also having at its center a perforation located opposite the perforation of said disc, the casing, diaphragm, disc and cup being connected together in a fluid-tight manner by welding, a flexible blade secured, by one of its ends, on said cup, a movable contact mounted at the free end of said flexible blade, a stationary contact mounted on said cup so as to be electrically insulated therefrom and with which said movable contact normally engages, means passing through the perforations of the disc and of the cup and placed between said flexible blade and said flexible diaphragm, so that when the latter becomes distorted, it moves the movable contact away from the stationary contact by said means, a cover fitted on the open end of said casing for enclosing the various members contained in the latter.

2. In a pressure operated switch, a casing having an open end and so shaped as to have near its back wall a shoulder, a threaded tubular projection provided on said back wall of the casing and adapted to be connected to a piping supplying the fluid under pressure, a flexible diaphragm bearing at its periphery on said shoulder for forming a fluid-tight chamber between said diaphragm and said back wall of the casing, a rigid frustum-shaped disc resting on the periphery of said flexible diaphragm and having a perforation at its center, a cup-shaped member resting by its bent down edge on said disc and also having at its center a perforation located opposite the perforation of said disc, the casing, diaphragm, disc and cup being connected together in a fluid-tight manner by welding, a flexible metal blade se-

cured, by one of its ends, on said cup and which is electrically insulated therefrom, a movable contact mounted at the free end of said flexible blade, a stationary contact mounted on said cup so as to be electrically insulated therefrom and with which said movable contact normally engages, a first metallic connection member connected to said stationary contact, a second metallic connection member connected to said flexible blade, an adjustable screw mounted on said flexible blade, an insulated socket guided in the axial perforations of the disc and of the cup and interposed between said flexible diaphragm and the end of said adjustable screw, so that when said diaphragm distorts, said movable and stationary contacts are moved apart, a cover fitted on the open end of said casing for enclosing the various members contained in the latter, said cover having two holes for the passage of said first and second metallic connection members.

CHARLES HILAIRE HENRI RODANET.