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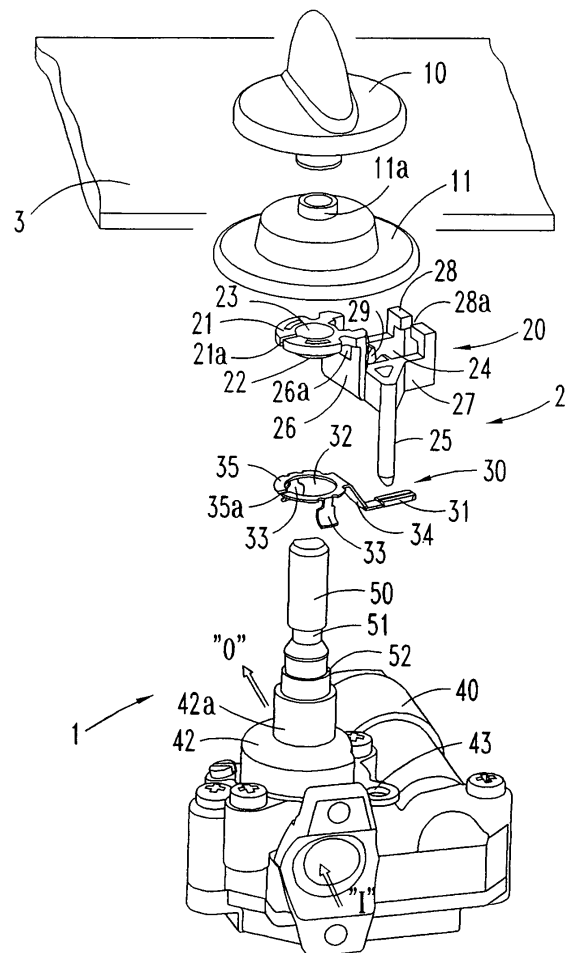
(71) Applicant: **Coprecitec, S.L.**  
**20550 Aretxabaleta (Gipuzkoa) (ES)**

(72) Inventor: **Mutiloa, Amaia Salbide**  
**20600 Eibar (Gipuzkoa) (ES)**

(74) Representative: **Igartua, Ismael**  
**Apartado 213**  
**(Dpto. Propiedad Industrial)**  
**20500 Mondragon (Gipuzkoa) (ES)**

(54) **Rotary gas tap with an electric switch**

(57) The rotary gas tap (1) installed in a cooker has, assembled on its operating shaft (50), an electric switch (2) covered with a protective cap (11). The shaft (50) of the rotary gas tap effects a translation for the closing and opening of the switch (2), which is formed by a metallic plate-contactor (30) fitted into an insulating casing-support (20) fixed concentric to the tap shaft (50), and displaceable axially with it. The plate-contactor (30) bears at least one elastic tab (33) as an electric contact for its closing against an "electric mass" of the metallic body (40) of the tap. The only connection terminal (31) extended in a radial position is connected to a voltage signal (Vs) wire originating from the control unit of the cooker.



**FIG. 1**

## Description

**[0001]** The present invention relates to a rotary-type, flow-regulating gas tap provided with an electric switch assembled on the shaft of the tap for the ignition of the corresponding burner in a cooker or domestic stove.

### PRIOR ART

**[0002]** Rotary-type gas taps of the type described above are known, wherein prior to the rotation of the shaft for the opening of the gas flow, the switch is pressed in order to activate an electric ignition circuit, by means of depressing the tap knob and the subsequent axial displacement of the shaft.

**[0003]** US-6,541,721 B1 and its equivalent ES-2225191-T3 disclose a rotary gas tap adapted to a domestic cooker, provided with an electric ignition switch, which comprises two electric contact plates inside a closed insulating box of the switch assembled on the tap shaft. The moving contact plate or contactor has an elastic tab that is pressed onto the fixed contact plate by the pushing of the control knob and the subsequent movement of the tap shaft. The switch's two electric terminals, which project out of its insulating box, are thus connected. An insulating control bar is attached to the shaft to prevent the switch from being affected when the shaft rotates to regulate the gas flow. The switch inside the insulating box also includes a spring for the return of the moving plate to its initial disconnection position. This known rotary gas tap with an electric switch requires two contact plates connected to the external electric connection terminals for the respective electric poles of the switch, capable of conducting an electric power current for the ignition circuit. Known switches also need a closed insulating box to house in their interior the two elastic plates in addition to said additional pieces.

**[0004]** EP-1103747-A discloses a rotary gas tap provided with an electric ignition switch that shows a cap of a flexible material covering the switch to prevent kitchen waste and dirt from getting into its electric contacts.

### DISCLOSURE OF THE INVENTION

**[0005]** It is an object of this invention to provide a rotary gas tap that has, assembled on its operating shaft, an electric single-contact switch with a single connection terminal for conducting a voltage signal enabling an electronic ignition and control module of the corresponding burner in a cooker or domestic stove, wherein said single contact of the electric switch is connected electrically to a metallic surface of the tap body constituted as the "mass" of the electronic module.

**[0006]** The rotary tap of the invention is provided with a rotary gas-regulating shaft, and is also capable of a translation movement for the operating of a safety valve incorporated into the tap, and also for the pushing of a plate-contactor of the electric switch. The operating of

the plane-contactor is effected by a depressing of the shaft and the subsequent displacement of the plate-contactor provided with one or more elastic tabs that connect to a metallic part of the tap body. The connection terminal attached to the plate-contactor is connected by an electric wire to the electronic module, conducting a voltage signal of insignificant power, as a result of which strong electrical contacts are not necessary. Thus, the plate-contactor and its connection terminal can be moved axially with the displacement of the tap shaft, until said single signal conductor closes on the metallic body of the tap as an electric "mass" connection.

**[0007]** The invention provides an electric switch assembled on the rotary tap, of simple construction as it effects the switching of only one voltage signal conductor, and does not need a complete box electrically insulated for the parts of the switch, but only a protective cap attached to the operating shaft. Nor does the inventive switch need two strong contact plates such as the switches of the prior art, sufficing as components of the switch a plate-contactor with a single contact and an electric insulating support of the switch, with a protective cap covering the plate-contactor.

### DESCRIPTION OF THE DRAWINGS

#### [0008]

Fig. 1 is an exploded perspective view of a rotary gas tap with an electric switch assembled on the operating shaft of the tap.

Fig. 2 is a partial cross-sectional view of the tap of Fig. 1, showing the electric switch in the "open" position.

Fig. 3 is a partial cross-sectional view of the tap of Fig. 1, showing the electric switch in the "closed" position.

Fig. 4 is a sectional view of the switch assembled on the tap according to section IV-IV of Fig. 2.

Fig. 5 is an elevational view of the electric switch assembled on the tap of Fig. 2.

### DETAILED DISCLOSURE OF THE INVENTION

**[0009]** With reference to Figs. 1-5, a preferred embodiment of the gas tap 1 provided with an electric switch 2, is assembled on a control panel 3 of a flat domestic cooker hob, wherein the gas tap 1 is of the type with a rotary operating shaft 50 with a conical regulating member and a thermo-electric safety valve incorporated into a conduit, and operated by means of an axial displacement of the operating shaft 50. The gas tap 1 comprises a tap body 40 with an input "I" and an output "O" of the flow regulated by the rotation of a control knob 10 attached to the op-

erating shaft 50, and a metallic tap cover 42 provided with a metallic tubular member 42a that guides the movements of rotation and translation of said operating shaft 50. The electric switch 2 is assembled concentrically to the operating shaft 50, between the control panel 3 of the cooker and the tap body 40. A protective cap 11 covers the electric switch 2 from the waste and dirt on the cooker hob.

**[0010]** The electric switch 2 comprises a plate-contactor 30 formed by an elastic metallic sheet, and provided with two elastic contact tabs 33 and a single external connection terminal 31, and a casing-support 20 made of insulating material, and formed by a pushing means 21, a positioning means 25 in the form of a rod for the angular positioning of the casing-support 20 around the operating shaft 50, and a cavity 24 for the housing of the connection terminal 31.

**[0011]** The plate-contactor 30 is formed by a ring-shaped body 35 with the connection terminal 31 extended radially from the periphery and the two elastic contact tabs 33 extended transversally from the periphery and diametrically opposed in order to embrace the tubular member 42a of the cover 42 of the tap body, effecting a contact pressure on its cylindrical surface. The connection terminal 31 is connected to the ring-shaped body 35 by means of a flexible member 34 inclined in relation to the plane that forms the ring-shaped body 35. The plate-contactor 30 has a central orifice 32 with an expansion opening 35a in the ring-shaped body, through which it is fitted under pressure on a tubular projection 22 in the insulating pushing means 21, the plate-contactor 30 thus being fixed under pressure, for its subsequent joint assembly on the tap operating shaft 50.

**[0012]** The insulating casing-support 20 is formed by said pushing means 21 and its tubular projection 22, and also with a straight support wall 26 extended to one side from the periphery of the pushing means 21, and other two radial walls 27 projecting from the support wall 26, between which they configure said housing cavity 24 for the connection terminal 31. The positioning means 25 extends in an axial direction a specific length "L" (Fig. 2), adjacent to the pushing means 21. The end of the positioning means 25 is inserted into an ear 43 of the metallic tap cover 42, blocking the rotation of the casing-support 20 and the metallic plate-contactor 30.

**[0013]** Fig. 2 shows the electric switch 2 in the "open" state, the control knob 10 and the operating shaft 50 being extended in the rest position. Here the contact tabs 33 are separated from the tubular member 42a of the tap cover 42. Fig. 3 shows the electric switch in the "closed" state. Here the operating shaft 50 is retracted inside the tap body 40, and the contact tabs 33 are embracing the tubular member 42a, connecting the connection terminal 31 to the electric mass of the gas tap 1 and the cooker.

**[0014]** The pushing means 21 and its tubular projection 22 have a central opening 23 with an expansion groove 21a for its fitting under pressure on the tap operating shaft 50, being kept here in a fixed position in relation to

the tap body 40, 42, with the assistance of a diameter step 52 on the tap operating shaft 50, against which the tubular projection 22 of the pushing means 21 makes a positioning stop (Fig. 2 and 4). In order to effect the closing of the electric switch 2, the control knob 10 and the operating shaft 50 are displaced inside the tap 1 by a stroke "A" (shown in Fig. 2) of, for example, 2,5 mm, the end of said stroke "A" being delimited by a magnetic group incorporated into the tap 40 (not shown in figures).

**[0015]** The plate-contactor 30 is assembled on the casing-support 20 in the following way: the connection terminal 31 is introduced first of all (Fig. 1) through a window 26a in the support wall 26 of the casing-support 20; secondly (Fig. 4) the ring-shaped body 35 of the plate-contactor 30 is fitted through its central orifice 32 into the tubular projection 22 of the insulating pushing means 21, with the assistance of the intermediate flexible member 34 of the plate-contactor 20; next (Fig. 5) the connection terminal 31 is fitted under pressure in an opening 29 in the form of the V-shaped channel of the cavity 24 on the side opposite to the pushing means 21. In this opening 29 is fitted the connection terminal 31 in profile, while the intermediate flexible member 34 remains supported on an inclined surface 29a of the cavity 24 (Fig. 4).

**[0016]** The connection terminal 31 thus remains in a fixed position inside the casing support 20 in order to receive a female "fast-on" connection terminal 15 of a conductor wire of a voltage signal Vs. The radial walls 27 that delimit the cavity 24 in the casing-support 20 have above them a retention means 28, a structure in the form of an arch, with an opening in the middle 28a, through which is positioned the connection terminal 31 in a fixed position on the opening 29, and the structure 28 also enables the introduction of the female "fast-on" connection terminal 15 from the outside of the gas tap 1 and its retention connected inside the cavity 24.

**[0017]** The protective cap 11 is in the form of a substantially cylindrical hat and made of a flexible material, being assembled on the tap operating shaft 50 last of all, behind the control panel 3. The protective cap 11 has a narrow neck 11a that is fixed on a throat 51 of the operating shaft 50 to form an airtight seal, and is displaced with the operating shaft 50 accompanying the plate-contactor 30 and its casing-support 20.

## Claims

1. Rotary gas tap for the regulation of a flow adapted to a cooker or domestic stove, having an electric switch (2) for the activation of the ignition of the corresponding burner, wherein the electric switch (2) is assembled on the operating shaft (50) of the tap covered with a protective means (11) behind a control panel (3) of the apparatus, and the operating shaft (50) being capable of both movements of rotation for the regulation of the flow and translation for the closing and opening of the switch (2), **characterised in**

**that** said electric switch (2) is formed by a metallic plate-contactor (30) fitted into an insulating casing-support (20) of the electric switch (2), which is fixed to the operating shaft (50), both parts of the electric switch (2) being displaceable axially with said operating shaft (50) for the operating of the electric switch (2), and the metallic plate-contactor (30) is provided with a single connection terminal (31) in a housing (24) in the insulating casing-support (20), as a result of which the connection terminal (31) is connected to a voltage signal (Vs) wire originating from the cooker control unit, the electric switch (2) closing against an "electric mass" of the metallic body of the tap (40,42) through at least one elastic projection (33) of the metallic plate-contactor (30).

2. Rotary gas tap with an electric switch (2) according to claim 1, wherein the tap body (40) incorporates a cover (42) guiding the movements of the operating shaft (50), and said plate-contactor (30) is formed by a body (35) fixed to said insulating casing-support (20) concentric to the operating shaft (50) of the gas tap, and said elastic contact projection (33) comprises at least one tab (33) extended in an axial direction making an electrical connection (33) with the gas tap cover (42).
3. Rotary gas tap with an electric switch (2) according to claim 1, wherein said metallic plate-contactor (30) fitted into said insulating casing-support (20) is guided by the latter in the axial displacement of the electric switch (2), and is formed by a contactor body (35) fitted into a pushing means (21,22) in the insulating casing support (20) both concentric with the operating shaft (50), and said elastic contact projection (33) comprises at least one tab (33) extended in an axial direction from the contactor body (35).
4. Rotary gas tap with an electric switch (2) according to claim 1, wherein said insulating casing-support (20) is formed by a pushing means (21,22) provided with a central opening (23) for its fixing around the operating shaft (50), and said metallic plate-contactor (30) is formed by a ring-shaped body (35) surrounding said pushing means (21,22) fixed concentric to the operating shaft (50) and said elastic contact projection (33) comprises at least one tab (33) extended axially from the periphery of the ring-shaped body (35).
5. Rotary gas tap with an electric switch (2) according to claim 1, wherein said metallic plate-contactor (30) is formed by a ring-shaped body (35) fitted into the insulating casing-support (20) concentric to the operating shaft (50), and from the periphery of the ring-shaped body (35) the connection terminal (31) extends radially through an intermediate flexible member (34), which is assembled in a housing cavity (24)

in the insulating casing support (20), and said elastic contact projection (33) comprises at least one tab (33) extended axially outside the insulating casing-support (20).

6. Rotary gas tap with an electric switch (2) according to claim 1, wherein said insulating casing-support (20) is formed by a pushing means (21,22) concentric to the tap shaft (50), which guides the displacement of the metallic plate-contactor (30), a housing cavity (24) for the connection terminal (31) extended radially from the pushing means (21,22), and a positioning means (25) adjacent to the pushing means (21,22) extended in an axial direction, which is inserted into the tap body (40,42) for the blocking of the rotation of the electric switch (2) when the tap operating shaft (50) is rotated for the regulation of the gas flow.
7. Rotary gas tap with an electric switch (2) according to claim 1, wherein said insulating casing-support (20) is formed by a pushing means (21,22) provided with a central opening (23) for its fixing around the operating shaft (50), and said metallic plate-contactor (30) is fitted into said pushing means (21,22) keeping said terminal connection (31) extended radially and housed in a cavity (24) of the insulating casing-support (20), which is provided with a retention means (28) of an external connector (15) of said voltage signal (Vs) wire connected therein.

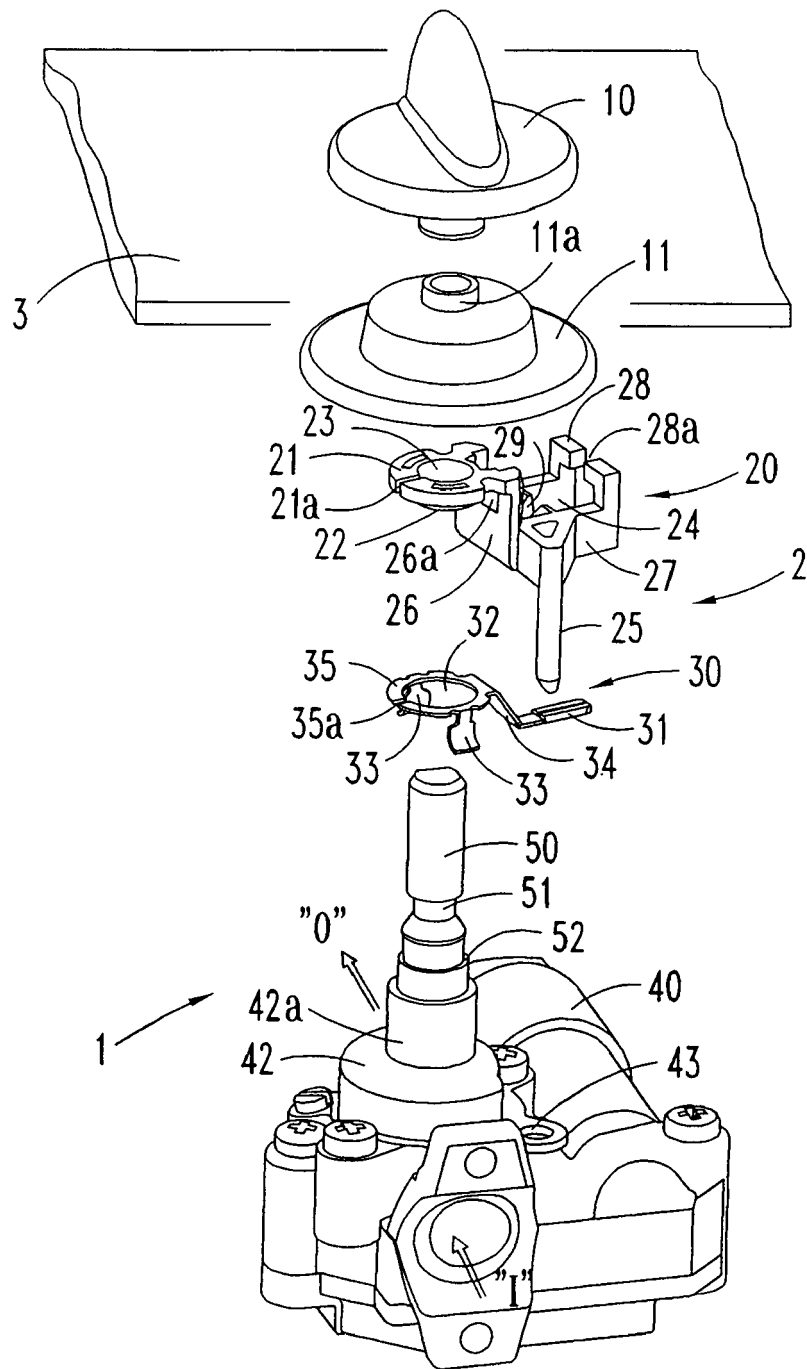


FIG. 1

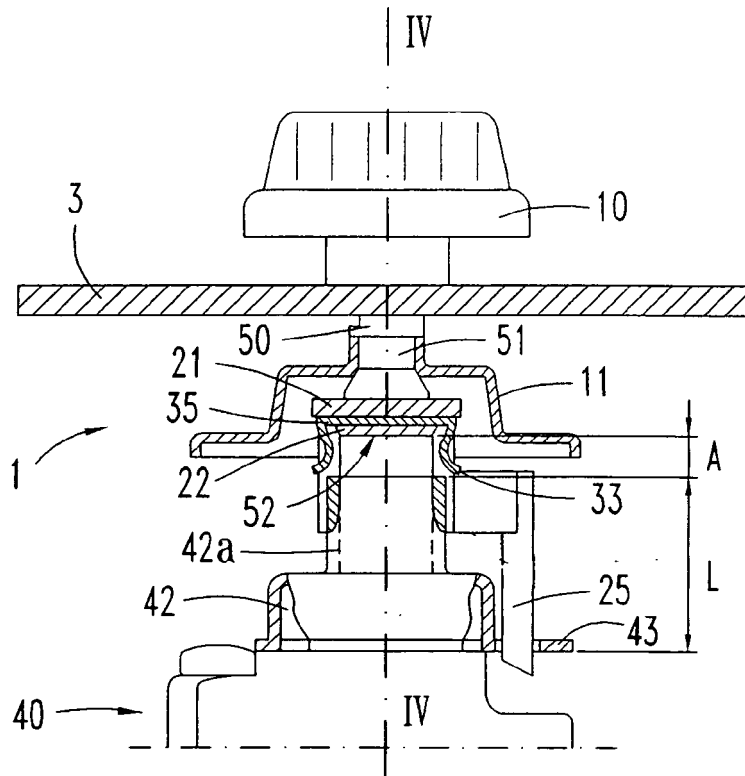


FIG. 2

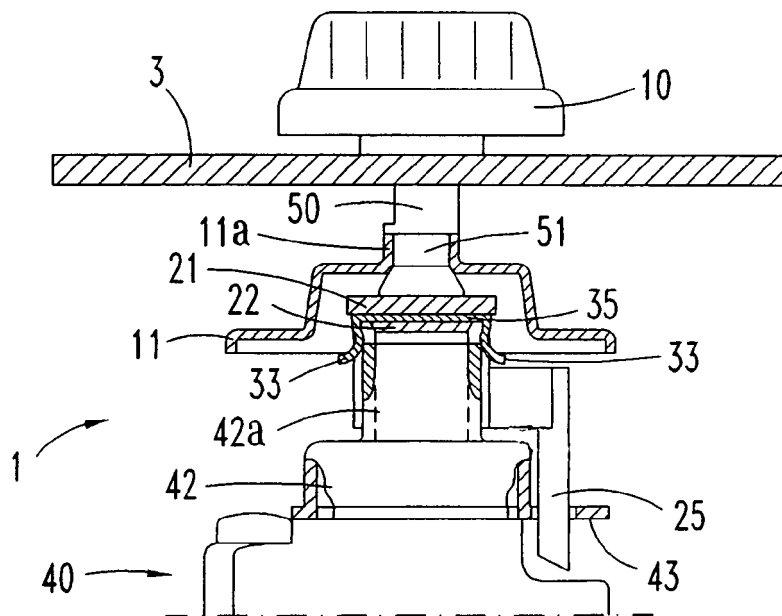


FIG. 3

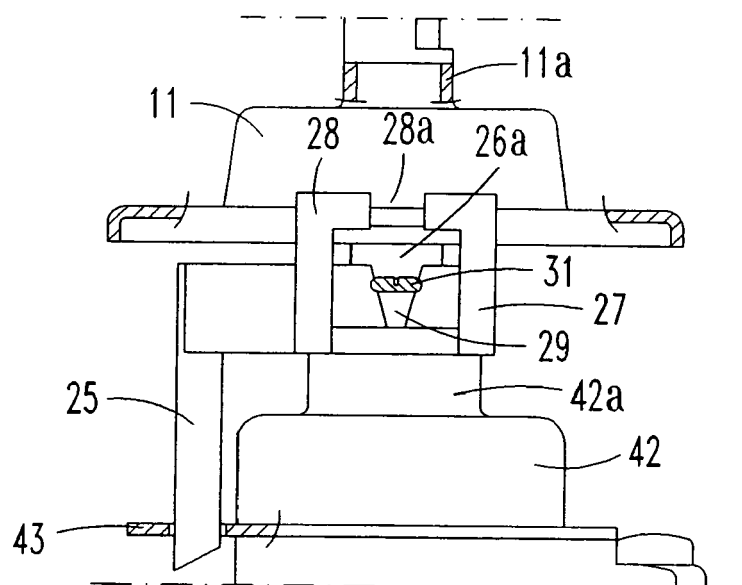


FIG. 5

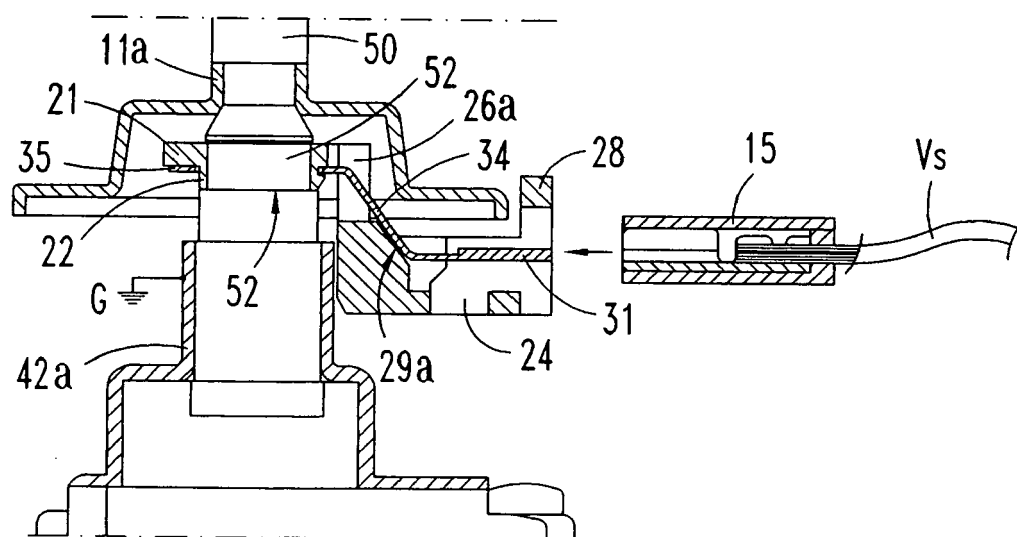


FIG. 4

**REFERENCES CITED IN THE DESCRIPTION**

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