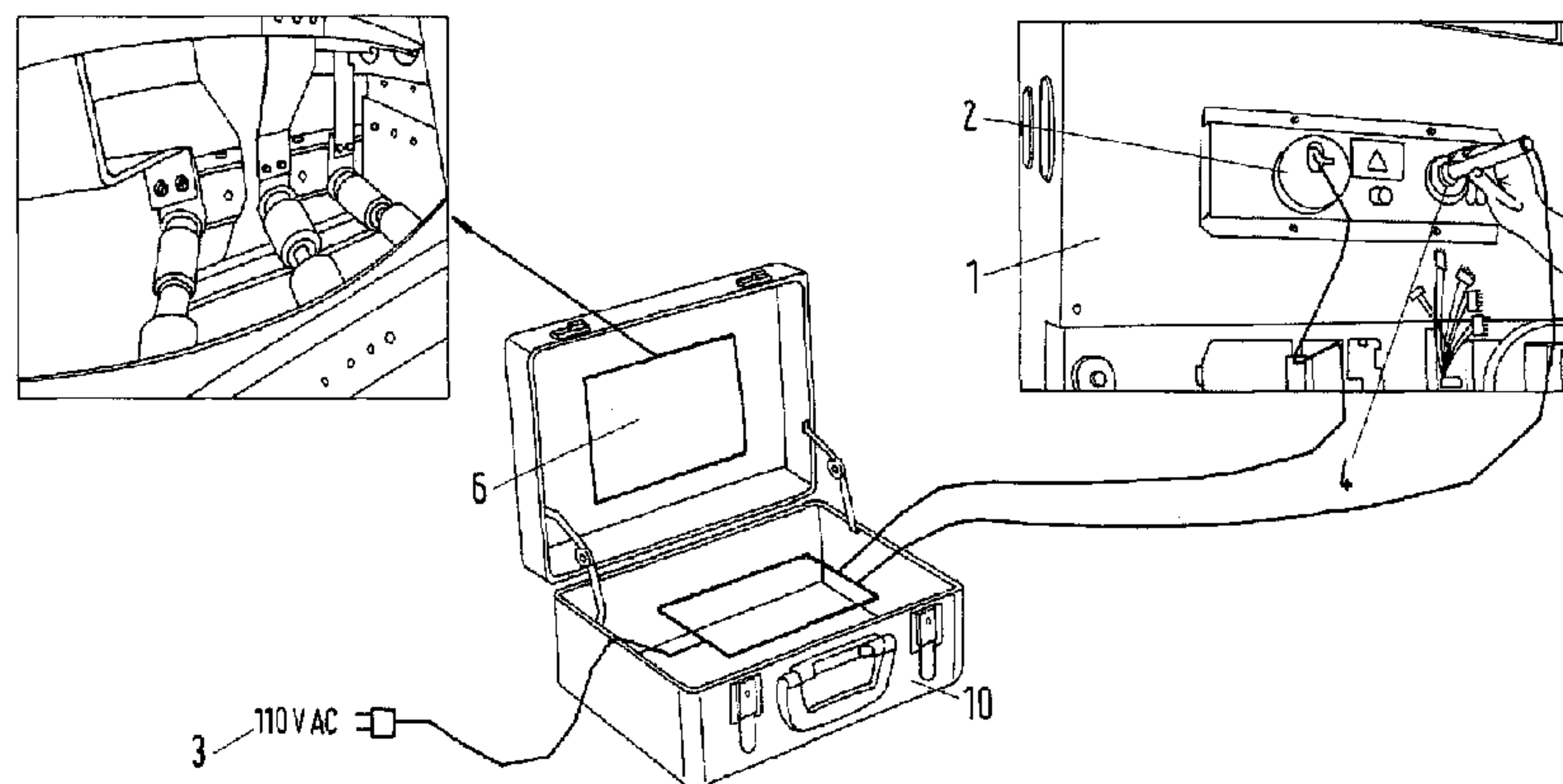




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(54) Titre : DISPOSITIF DE COMMUTATION A ISOLATION GAZEUSE ET SYSTEME DE CAMERA POUR UN
CONTROLE OPTIQUE D'UNE POSITION DE COMMUTATION DANS LE DISPOSITIF DE COMMUTATION
(54) Title: GAS INSULATED SWITCHING DEVICE AND CAMERA SYSTEM FOR OPTICAL CHECK OF SWITCHING
POSITION IN THE SWITCHING DEVICE



(57) **Abrégé/Abstract:**

The invention relates to a gas insulated switching device with a gastight housing, wherein switching means are mounted in the housing, provided with an optical window on which an external camera can be positioned outside the housing on a support element in such, that the contacts and/or the contact positions of a switch or of switches can be displayed by this camera on a display screen, and with a switchable light source, which is illuminating the aforesaid area the camera is focused on to display the contact positions of a switch or switches, as well as a camera system for that, according to the preamble of claims 1 and 6. In order to use a camera system in a easier and cost effective way, considering, that direct optical control of specific switch positions are not desired oftenly, the invention is, that the camera is a portable camera which is positionable only temporarily, and the support element as well as the camera itself are provided with complementary means for the temporarily positioning of the portable camera to the support.

ABSTRACT

The invention relates to a gas insulated switching device with a gastight housing, wherein switching means are mounted in the housing, provided with an optical window on which an external camera can be positioned outside the housing on a support element such that the contacts and/or the contact positions of a switch/switches can be displayed by this camera on a display screen, and with a switchable light source which illuminates the aforesaid area the camera is focused on to display the contact positions of a switch or switches. To provide a simple and cost effective solution considering that direct optical control of specific switch positions are not desired often, the invention also provides a portable camera that is temporarily positionable, and the support element and the camera are provided with complementary means for the temporarily positioning of the portable camera to the support.

5 **Gas insulated switching device and camera system for optical check of
switching position in the switching device**

The invention relates to a gas insulated switching device with a gastight housing,
wherein switching means are mounted in the housing, provided with an optical
10 window on which an external camera can be positioned outside the housing on a
support element in such, that the contacts and/or the contact positions of a switch
or of switches can be displayed by this camera on a display screen, and with a
switchable light source, which illuminates the aforesaid area the camera is
focused on to display the contact positions of a switch or switches. The invention
15 also relates to a camera system.

A switchgear with a camera system adapted to the switchgear housing, in order to
make the position of the internal of the switches visible, is shown in CA 2 274 854
C. In this state of the art, the camera is fixed directly to the housing of switchgear,
20 in order to be a fixed installed part of the switchgear. The resulting disadvantage
is, that for each switchgear panel a separate camera is needed.

So it is an object of the invention, to use a camera system in an easier and cost
effective way, considering, that direct optical control of specific switch positions
25 are not desired often.

Based on that, some embodiments of the invention provide a portable camera
which is positionable only temporarily, and the support element as well as the
camera itself are provided with complementary means for the temporarily
30 positioning of the portable camera to the support.

According to an aspect of the present invention there is provided a gas insulated
switching device with a gastight housing, wherein switching means are mounted in
the housing, the switching device comprising:

an optical window on which an external camera is positioned outside the housing on a support element such that contacts, or contact positions, or both, of a switch or of switches are displayed by the camera on a display screen; and
a switchable light source which illuminates an area the camera is focused
5 on to display the contact positions of the switch or switches,
wherein the camera is a portable camera which is positionable only temporarily, and wherein the support element and the camera are provided with complementary means for the temporary positioning of the portable camera to the support element, and
10 wherein an attachable adapter for the camera can be fixed temporarily by magnetic means.

In some embodiments the complementary means comprise complementary magnetic elements, such that the portable camera is attached to the support
15 element temporarily in an optically centered, precalibrated optical and mechanical position, in order to make the contacts, or the contact positions, or both, of the switch or of the switches visible on the display screen.

In some embodiments the complementary means on the support element of the
20 switching device housing comprise magnetic rings, with interacting mechanical guiding pins and holes for a temporary and centered predetermined reproducible positioning of the portable camera in the optically centered, precalibrated optical and mechanical position.

25 In some embodiments the gas insulated switching device further comprises a support element for the light source, wherein the support element for the camera and the support element for the light source each comprise an adapter element with magnetic elements near each adapter element's periphery, and each adapter
element further comprising a centering ring for adaption of the camera lens.

30 In some embodiments the complementary means on the support element of the switching device housing are bayonet cap elements, for a temporary and centered predetermined reproducible positioning of the portable camera in the optically centered, precalibrated optical and mechanical position.

In some embodiments the light source is implemented in a separate adapter which is also portable and is attached to a window in the housing of the switching device.

- 5 According to another aspect of the present invention there is provided a camera system for optical check of switching position in a gas insulating switching device as described herein, wherein the camera is a portable camera which is temporarily attached to a support element of the housing of the switching device or a panel of the switching device.

10

In some embodiments the camera system further comprises a portable display.

In some embodiments the portable camera system, or the light source, or both, is transportable in a carrying case, and wherein the display is mounted directly in the

15

carrying case.

- 2 -

“Temporarily” means for the time, when the observation of the contact position is required.

5 So important for the invention is, that the camera is not a part of the switchgear, but separated from that. So with that, in difference to the mentioned state of the art, one single camera can be used for several switch gears, because it is portable.

10 In a further embodiment, the support element and the camera are provided with complementary magnetic elements, in such, that the portable camera can be attached to the support temporarily in the aforesaid optically centered, precalibrated optical and mechanical position, in order to make the contacts and/or the contact positions of the switch or of the switches visible on a display screen.

15 “Optically centered” includes also the meaning focused to the elements which are important to observe, like the contact pieces, or indicating elements of the contact pieces fixed to the contact piece, by which the contact position can be observed.

20 In an advantageous embodiment, the complementary support elements on the support of the switching device housing are magnetic rings or elements, with interacting mechanical guiding pins and holes for a temporarily and centered predetermined reproducible positioning of the portable camera in the aforesaid position.

The support element is provided as an adapter element, with magnetic elements near its peripherie, and with a centering ring for the camera lens adaption.

25 In an alternative also advantageous embodiment, the complementary support elements on the support of the switching device housing are bayonet cap elements, for a temporarily and centered predetermined reproducible positioning of the portable camera in the aforesaid position.

30 To the invention concerns directly a Camera system for temporarily adaption to a gasinsulated switching device or a switchgear panel.

The camera is a portable camera which can be temporarily attached to a support

- 3 -

element of a switchgear housing of the panel.

In a further advantageous embodiment, the camera system also includes or is connectable to a portable display.

5

So the portable observation system consist of camera, display, light source, power supply, cables and an transport box for this equipment.

10 In a final embodiment the portable camera system is transported in a carrying case, and that the display is mounted directly in the carrying case.

By this, only one camera system is need for several switchgear panels.

The invention is shown in the figures.

15

Figure 1: Camera system in use at a medium voltage switchgear housing

Figure 2. Adapter

20 Figure 1 shows a housing of a gas insulated medium voltage switchgear 1, with defined windows in the housing, where the light source 4 as well as the camera 1 can be attached temporarily, that means when needed for a sure observation of the switching contacts position of the disconnecter or earthing switch inside the switchgear housing. Therefore an attachable adapter 7, like also shown in figure 2, for the light source 4 as
25 well as a further attachable adapter for the camera 2 can be fixed temporarily by magnetic means. The contours of each adapter and each window are provided complementary, so that the camera and the light source can be attached in a self-adjusting way, in order to be focused to the contact positions which have to displayed. Both, camera and light source are attachable externally to the housing. Camera and
30 light source are not a fixed part of the switchgear housing of the panel, but interchangeable and therefore portable.

- 4 -

So the camera 2 and the light source 4 can be attached to the windows of the switchgear housing 1. Light source 4 and camera 2 are electrically connected with a power source which is implemented for example in the portable case 10, where also the display 6 is located. Camera and light source are activated by the electronic means
5 inside the case 10.

The display 6 is integrated into the upper part of the openable case 10.

The case is inside in such a way portioned, that also the portable camera and the portable light can be transported after the use.

So the complete system includes also the aforesaid case, in order to have fully
10 transportable system.

Figure 2 shows the adapter 7. This adapter 7 is provided with magnet elements near the Peripherie, in order to attach this adapter as a support for the light source, in this case for example LED-elements 9 integrated into the inner opening of the adapter 7.
15

For the camera 2, the adapter 7 is the same, except of the integrated light source. This adapter is the aforesaid support for the camera.

As fixation means are here used magnetic elements 8, but also fixation means by bayonet-elements are possible.
20

25

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A gas insulated switching device with a gastight housing, wherein switching means are mounted in the housing, the switching device comprising:
 - an optical window on which an external camera is positioned outside the housing on a support element such that contacts, or contact positions, or both, of a switch or of switches are displayed by the camera on a display screen; and
 - a switchable light source which illuminates an area the camera is focused on to display the contact positions of the switch or switches,
 - wherein the camera is a portable camera which is positionable only temporarily, and wherein the support element and the camera are provided with complementary means for the temporary positioning of the portable camera to the support element, and
 - wherein an attachable adapter for the camera can be fixed temporarily by magnetic means.
2. The gas insulated switching device according to claim 1, wherein the complementary means comprise complementary magnetic elements, such that the portable camera is attached to the support element temporarily in an optically centered, precalibrated optical and mechanical position, in order to make the contacts, or the contact positions, or both, of the switch or of the switches visible on the display screen.
3. The gas insulated switching device according to claim 2, wherein the complementary means on the support element of the switching device housing comprise magnetic rings, with interacting mechanical guiding pins and holes for a temporary and centered predetermined reproducible positioning of the portable camera in the optically centered, precalibrated optical and mechanical position.
4. The gas insulated switching device according to claim 1 or 2 or 3, further comprising a support element for the light source, wherein the support element for the camera and the support element for the light source each comprise an adapter element with magnetic elements near each adapter element's periphery, and each adapter element further comprising a centering ring for adaption of the camera lens.

5. The gas insulated switching device according to claim 2, wherein the complementary means on the support element of the switching device housing are bayonet cap elements, for a temporary and centered predetermined reproducible positioning of the portable camera in the optically centered, precalibrated optical and mechanical position.
6. The gas insulated switching device according to anyone of claims 1 to 5, wherein the light source is implemented in a separate adapter which is also portable and is attached to a window in the housing of the switching device.
7. A camera system for optical check of switching position in a gas insulating switching device as defined in any one of claims 1 to 6, wherein the camera is a portable camera which is temporarily attached to a support element of the housing of the switching device or a panel of the switching device.
8. The camera system according to claim 7, further comprises a portable display.
9. The camera system according to claim 8, wherein the portable camera system, or the light source, or both, is transportable in a carrying case, and wherein the display is mounted directly in the carrying case.

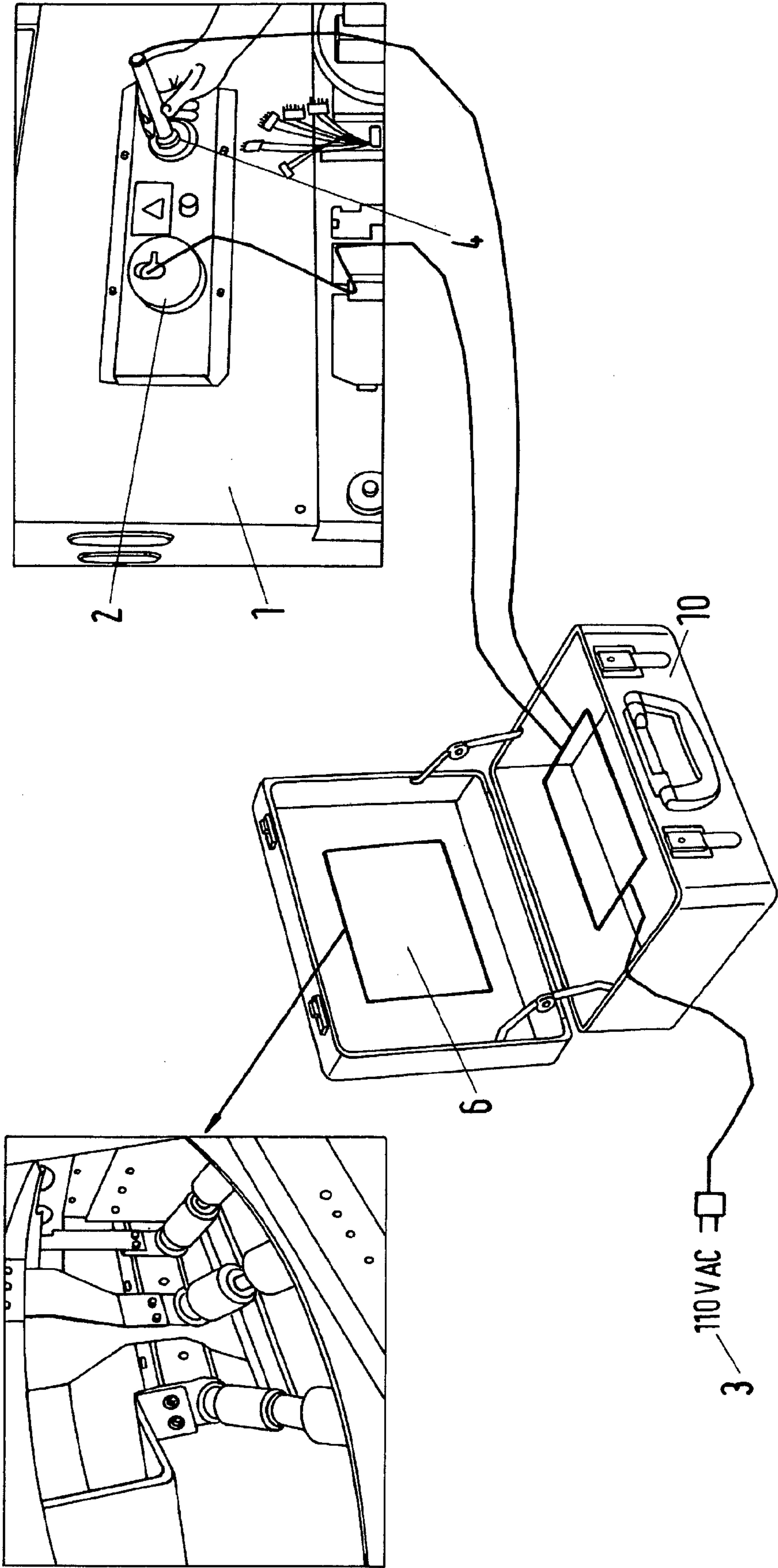


Fig.1

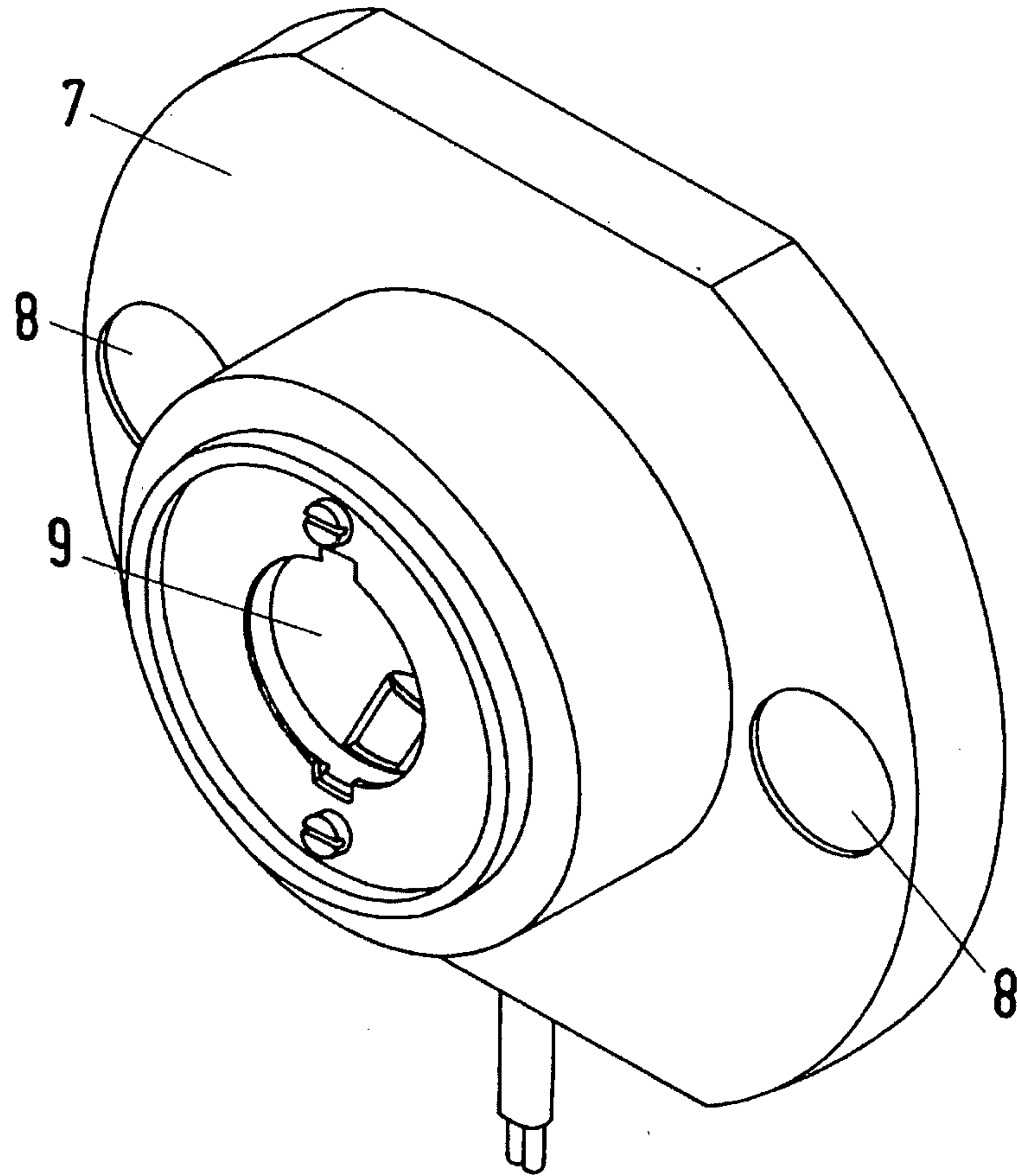


Fig.2

