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2,540,895

VISIBLE INDICATOR FOR ELECTRIC APPARATUS

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Figure 1

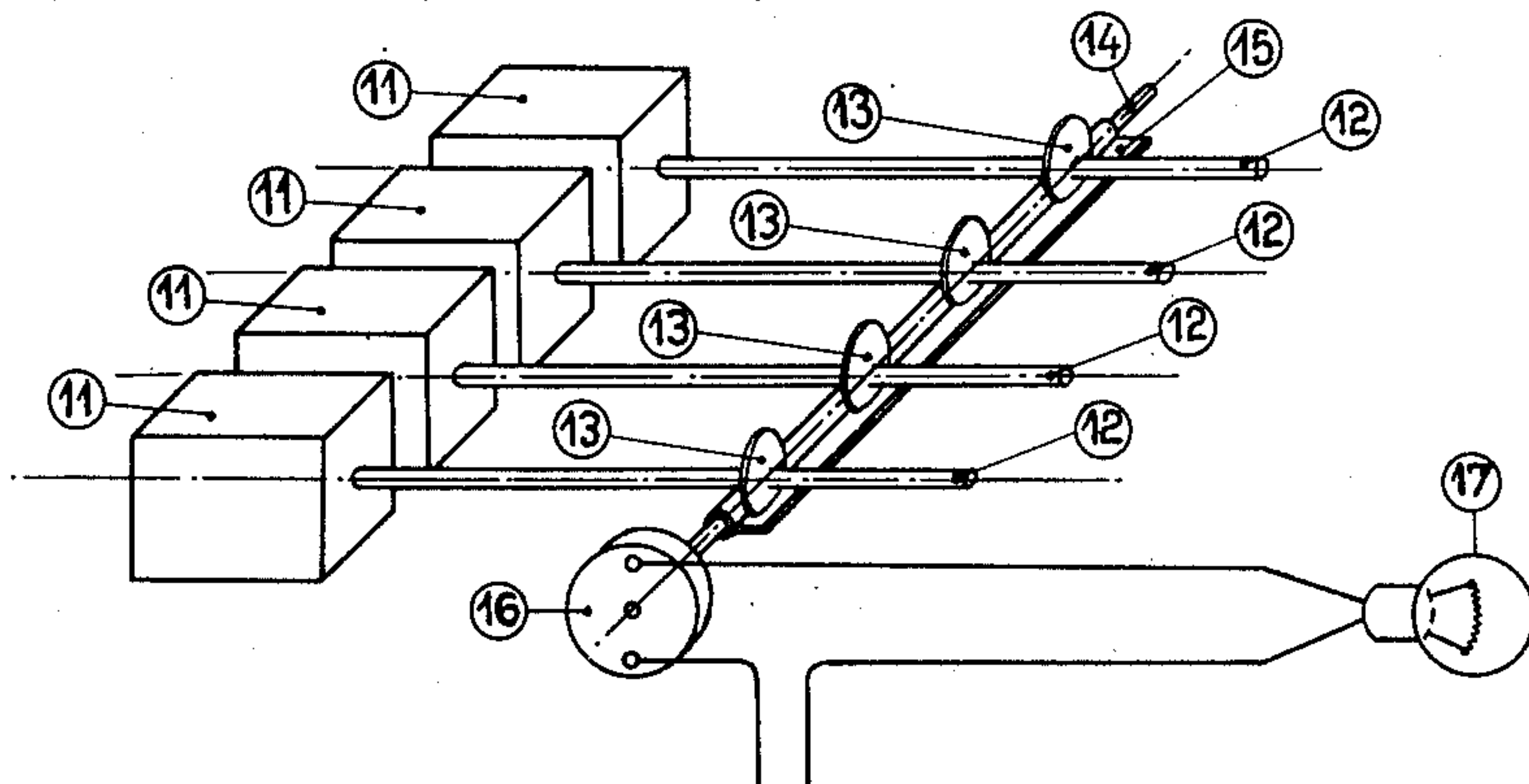


Figure 2

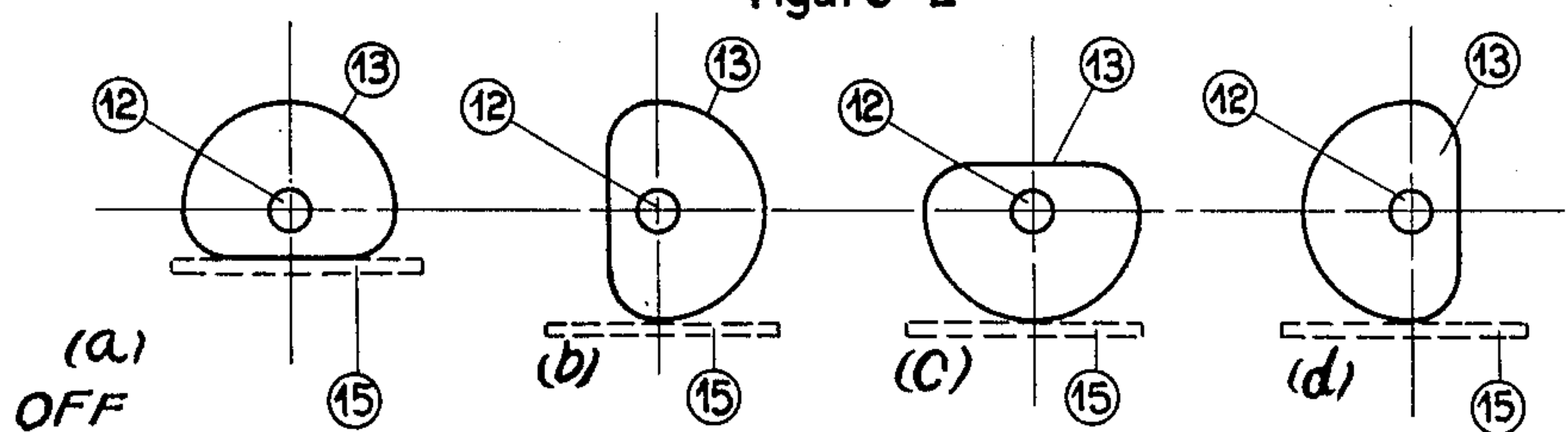


Figure 3

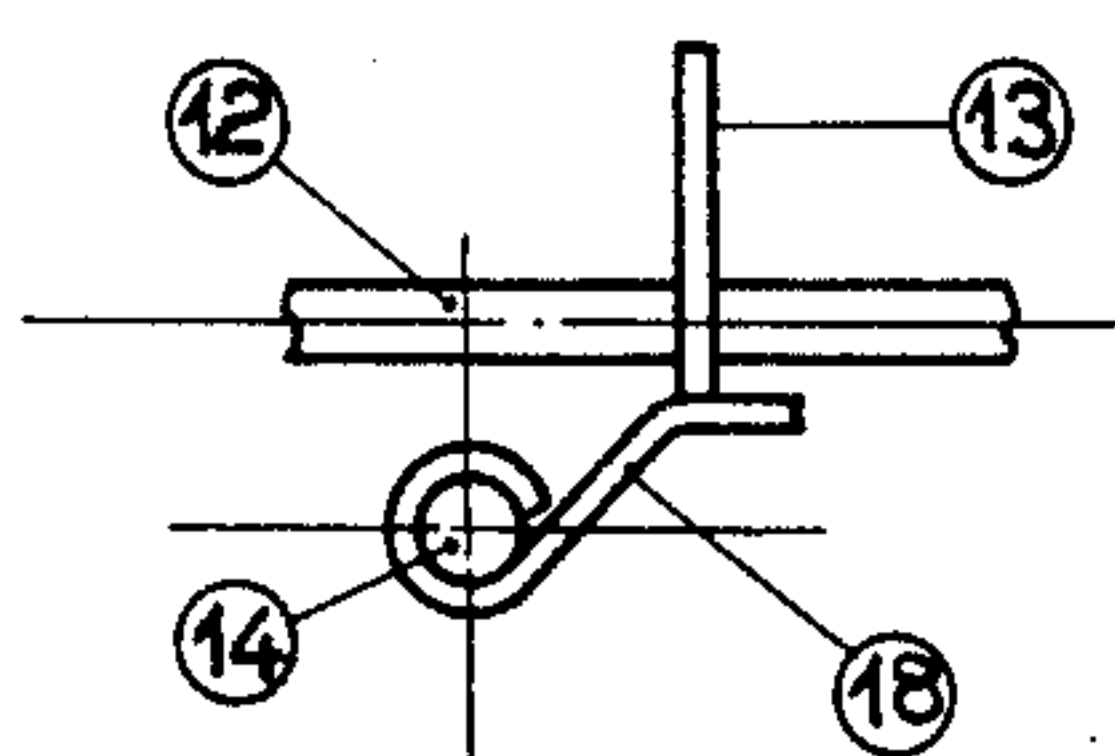


Figure 4

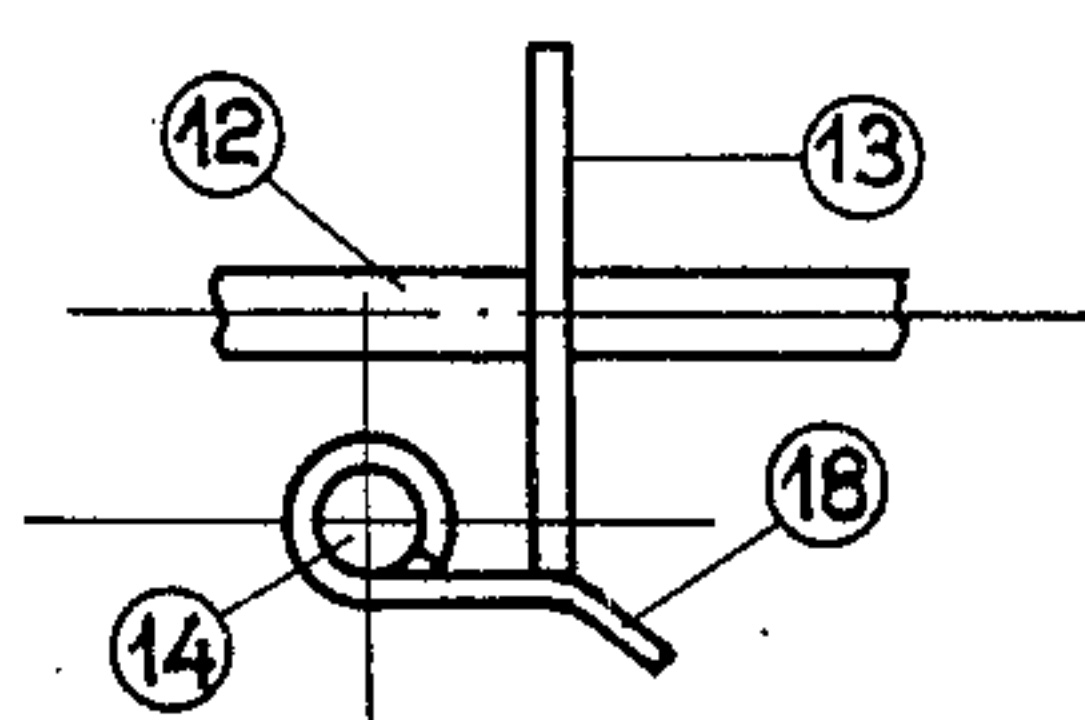


Figure 5

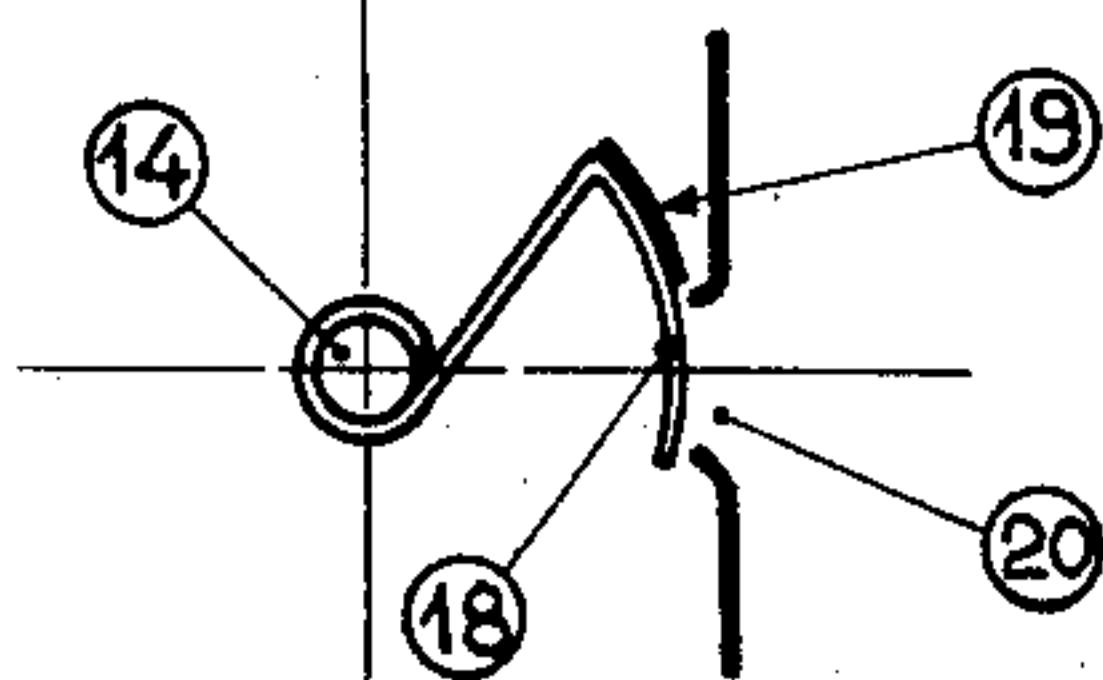
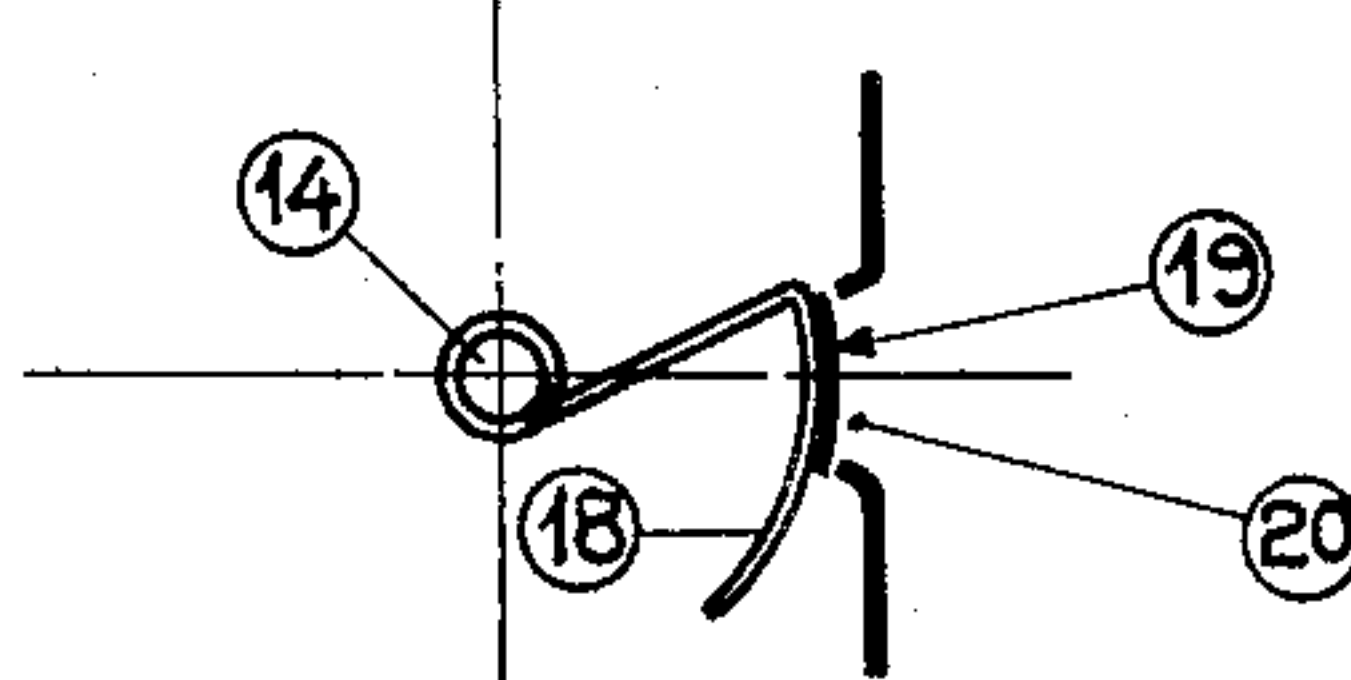


Figure 6



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VISIBLE INDICATOR FOR ELECTRIC APPARATUS

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3 Claims. (Cl. 200—5)

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The present invention relates to indicating devices for any kind of electrical apparatus, but in particular devices serving to indicate the energization of at least one of the circuits of electrical heating apparatus, such as cookers and furnaces, comprising a number of switches or interrupters.

The practical purpose of a warning indicator is to avoid the condition where one or more of the circuits remains needlessly turned on due to carelessness; and to achieve this object the employment of one indicator only is sufficient.

Up to the present time all the proposed systems for utilising indicators have been controlled entirely by electrical means.

Thus, the switches may be provided with auxiliary contacts connected in parallel, which however necessitates the use of special switches which are expensive. If use is made of the main supply current traversing the supply conductors of the apparatus, one may employ the following alternatives:

The operation of a neon lamp energized by a special transformer, but the luminous intensity of such a lamp is too small to arrest the attention of the user.

The operation of a signalling relay released when the intensity of current in the apparatus falls below a certain value and capable of supporting the total power load. The construction of such relays is delicate and expensive.

The energization of a low pressure lamp from a transformer the magnetic circuit of which is saturated by a minimum intensity of current but is capable of supporting the total power load, such transformers are of delicate construction, are expensive, and are sensitive to appreciable increases of temperature.

The direct connection of the indicator to the output contacts of the switch with appropriate parallel connection of the contacts, which does not however satisfy the officially specified standards for the double-pole interruption of each switch.

The present invention seeks to remedy these various drawbacks.

The present invention has for its object to provide a control system for a single indicator in electrical apparatus comprising a plurality of circuits each of which is controlled by a separate switch having at least two positions. The system may be arranged so that a mechanical connection maintains the indicator in a given position, e. g. in the "off" position only if all the switches are also in a given position, e. g. in

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the "off" position. Such a system is of particular advantage for electrical heating apparatus.

The present invention will be better understood from the following description with reference to the accompanying drawings which show by way of example two different modes of realising the present invention.

Figure 1 is a diagrammatic perspective view of a system according to the present invention comprising controlling cams and a signalling lamp.

Figure 2 shows the various different positions assumed by a cam in the system according to Figure 1.

Figure 3 is a partial view of a modified system analogous to that shown in Figure 1, but employing a movable mechanical signalling vane, the electrical heating apparatus in question being assumed to be in the non-energized condition.

Figure 4 shows the position of the system according to Figure 3 in the case where the electrical heating apparatus is energized.

Figures 5 and 6 show the two different positions occupied by the vane corresponding respectively to Figures 3 and 4.

As represented in Figure 1, the electrical apparatus the functioning of which is to be observed comprises four rotary switches 11 arranged on parallel shafts 12; each switch is supposed to provide for three "on" positions and one "off" position. On each of the shafts 12 and in a common plane perpendicular to these shafts are mounted cams 13 of which the profile is indicated in Figure 2.

Below the cams and in a plane slightly to the rear of and parallel to that of the cams, is disposed a rotatable shaft 14, the movement of which is limited by a restoring spring, not shown in the drawings, to which shaft is secured an element 15 in the form of a plate co-operating with the various cams.

The shaft 14 is also the shaft of the controlling element for the signalling indicator, which in this case is a switch 16 in circuit with a lamp 17 connected to the mains; the shaft 14 will close the switch 16 when the plate 15 is in its lower position and will open the switch when the plate is in its upper position.

In Figure 2 are shown the four possible positions of each cam 13 and the corresponding positions of the plate 15. In the position shown on the left, the cam is in the position corresponding to the "off" position of a switch 11 and the plate is raised; for all the other po-

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sitions ("on" positions) of a switch the plate is depressed.

The switch 16 itself may be provided with a restoring spring intended to urge the plate 15 into its upper position when all the switches 11 are in the "off" position.

It is immediately seen that so long as at least one switch 11 is in one of its "on" positions, the switch 16 is closed and the lamp 17 is lighted; the latter is not extinguished until all the switches 11 are in the "off" position.

Various modifications of the system above described may be adopted, for example the shaft 14 may act indirectly on the switch 16 which may be of any type, for example a mercury bulb. If the shafts 12 of the switches are not all parallel, the system is nevertheless applicable, thus in the case of four switches with shafts in parallel pairs, a switch 16 is controlled by each group of two parallel shafts and the two switches will be mounted connected in parallel in the signalling circuit. The lamp will only be extinguished if both switches 16 are open.

Furthermore the profile of the cam may itself be modified while giving a similar result.

Figures 3 to 6 show a simplification of the system according to Figure 1, employing a movable indicator vane 18 located behind an opening 20; the indicator target may be colored, for example white on its lower surface and provided with a red zone at 19, and is actuated by the shaft 14 which carries the plate 15. The system and the warning device are in this case purely mechanical.

I claim:

1. In a single condition indicating multiple switch electrical apparatus, a plurality of rotary switches each having an actuating spindle and having an off position and at least one on position, said switches being mounted with said spindles coplanar and parallel, a plurality of similar cams fixedly mounted coplanarly respec-

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tively on said spindles, and common indicator control means comprising a shaft mounted rotatably transversely of said spindles and adjacent said cams, and further comprising a rigid cam following plate fixedly mounted radially on said shaft and non-yieldingly engageable with all said cams, and also comprising a control member carried on said shaft and adapted to actuate an external control for controlling a signal, each of said cams having a single minimum radius off dwell corresponding to the off position of its switch, and said off dwells occupying the same angular position when all said switches are turned off and when engaged by said plate causing said indicator control means including said plate to assume a determined off position, each of said cams having over the rest of its circumference a contour of radius which is markedly greater than the radius of said off dwell and which when engaged by said plate causes said indicator control means including said plate to assume a determined on position which is different from its off position.

2. Apparatus according to claim 1, said control member including an electrical switch and being adapted to control an electrical circuit.

3. Apparatus according to claim 1, said control member including a visual signal actuating device arranged to directly mechanically actuate a mechanically displaceable external signal operator.

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