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H. PETERREINS

ELECTRIC MULTIPLE-WAY SWITCH

Filed Nov. 10, 1939

Serial No.
303,854

2 Sheets-Sheet 1

Fig.1

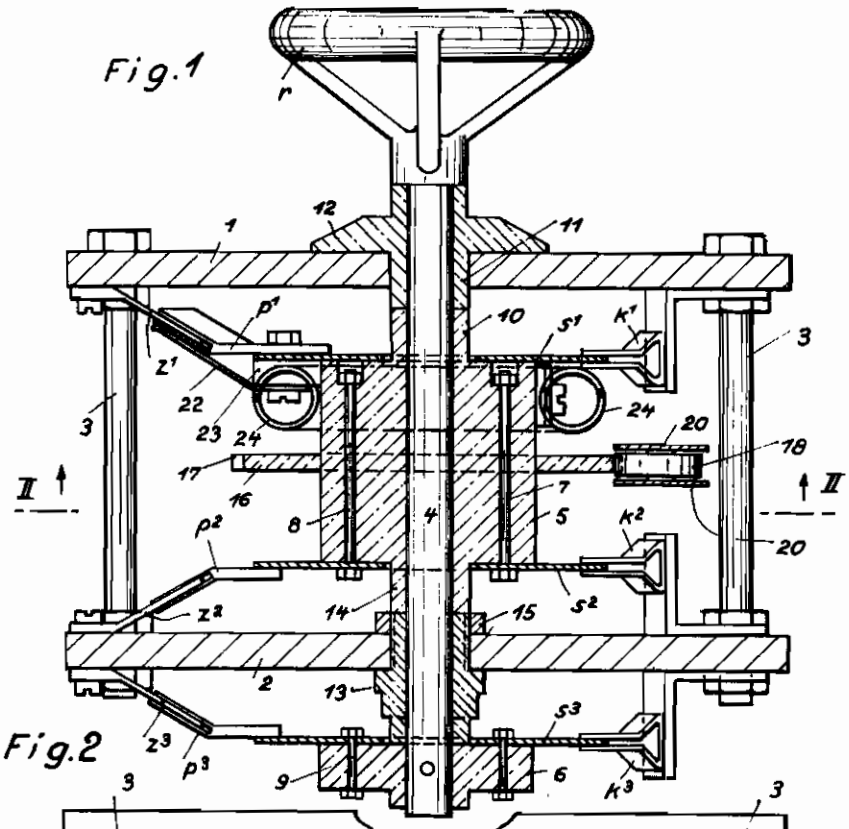

Fig.2

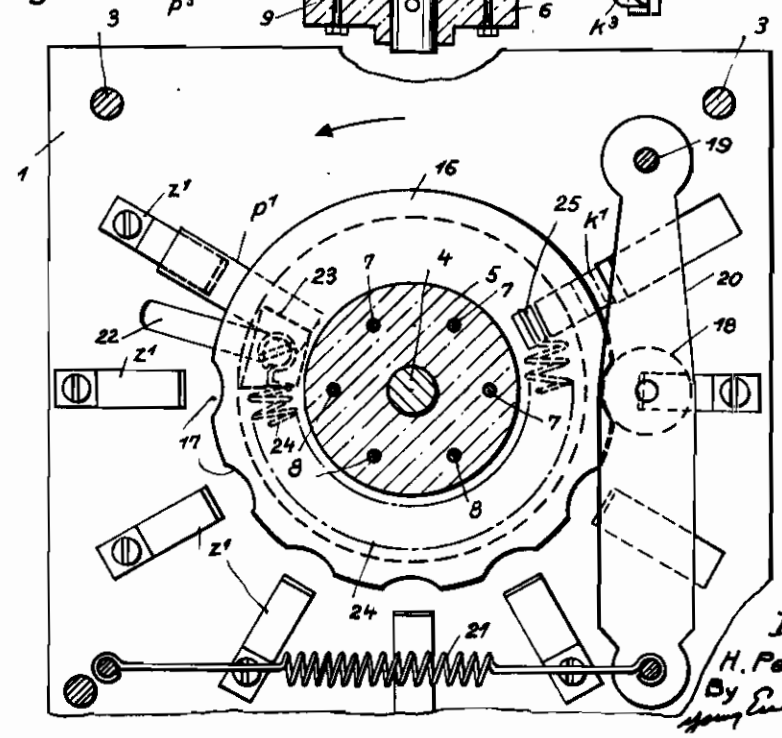

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Fig. 3

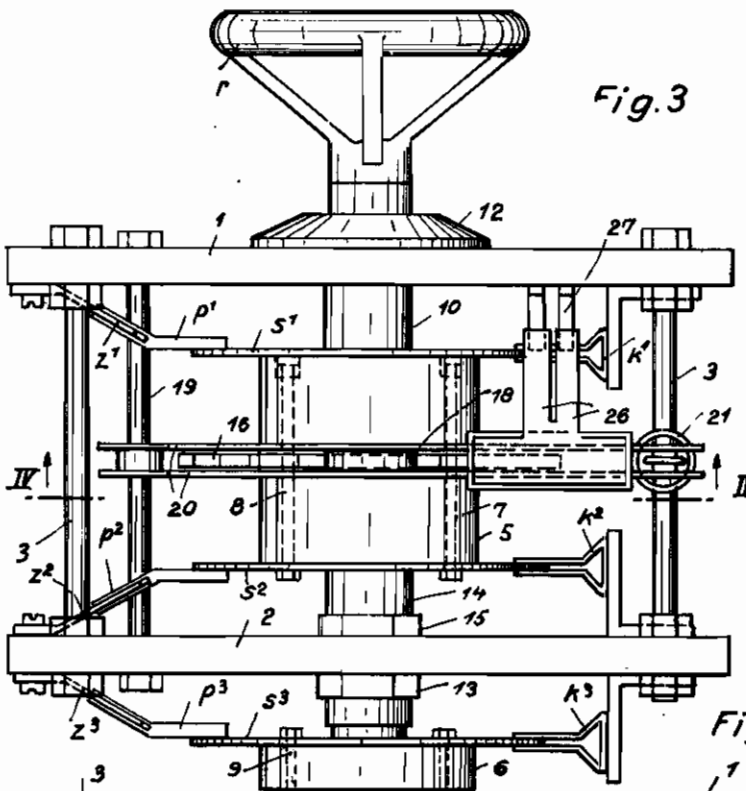
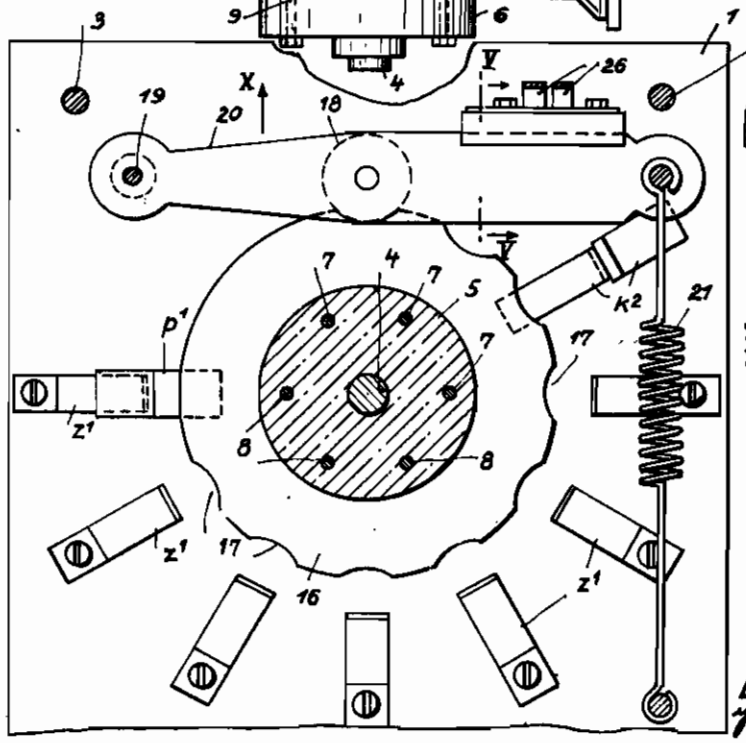


Fig. 4



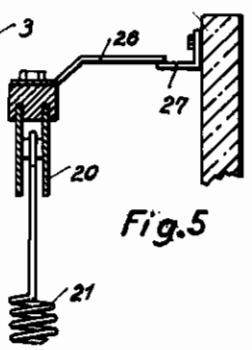


Fig. 5

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ALIEN PROPERTY CUSTODIAN

ELECTRIC MULTIPLE-WAY SWITCH

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Application filed November 10, 1939

The invention relates to an electric multiple-way switch and has for its purpose a construction which avoids the undesired sparking and enables a proportionally small construction without large air clearances between the metal parts. It has further for its purpose to provide such a multiple-way switch also with a particular device for increasing the security against sparking during the switching operation. Further the multiple-way switch is fitted with a device which disconnects electric apparatus (relays or the like) being in circuit with the switch during the switching operation. The new switch can be used according to requirement for the one or the other purpose.

The invention is shown by way of example in the annexed drawings in which

Fig. 1 is a longitudinal section across the switch,

Fig. 2 is a section on line II—II of the Fig. 1 seen in the direction of the arrow,

Fig. 3 is a rear view of a further form of execution,

Fig. 4 is a section on line IV—IV of the Fig. 3 and

Fig. 5 is a partial section on line V—V of the Fig. 3.

The drawing shows a three-pole switch. The invention may be realised in multiple-polar switches as well as in unipolar switches.

The switch casing consists of the top plate 1 and the base plate 2 which are connected with each other by bolts 3 and arranged at distance from each other. The axle 4 is situated in these plates 1 and 2 made of insulating material and can be turned by means of a hand-wheel r.

On the plates 1 and 2 contact terminals k^1, k^2 and k^3 for the current supply are fixed. Between the spring tongues of these terminals slide the disks s^1, s^2 and s^3 being turned by aid of the axle 4 and made of conducting material.

Each of the disks s^1, s^2 and s^3 is provided with a forked terminal p^1, p^2 and p^3 consisting of two tongues elastic towards each other. These forked terminals p^1, p^2 and p^3 coact with the contact tongues z^1, z^2 and z^3 which are bent angular and arranged on the insulating plates 1 and 2, as indicated by the drawing. Several of the contact tongues z^1 as well as several of the contact tongues z^2 and several of the contact tongues z^3 are arranged radially on the plates 1 and 2 respectively around the axle 4 in a circle and that in a number corresponding to the plurality of the switch steps. The contact tongues z^1 are illustrated in Fig. 2. The tongues z^2 and z^3 are arranged above and underneath the plate 2 in the same manner.

In turning the axle 4 and also in turning the disks s^1, s^2 and s^3 the forked terminal p^1 is brought into contact with all the attached contact tongues z^1 one after the other as well as the forked terminal p^2 with the contact tongues z^2 and the forked terminal p^3 with the contact tongues z^3.

The axle 4 is surrounded by a sleeve made of insulating material. In the example shown in the drawing the sleeves 5 and 6 serve to receive the switch members s^1, p^1 and s^2, p^2 and s^3, p^3 respectively. The disks s^1, s^2 and s^3 are fixed accordingly on the side surface of a flange of the sleeves 5 and 6.

The screws 7 serve for fastening the disk s^1, the skewed screws 8 for fastening the disk s^2 and the screws 9 for fastening the disk s^3.

It is not necessary to arrange the disks s^1 and s^2 on the same sleeve but according to circumstances two insulating sleeves may be provided.

On the upper collar 10 of the sleeve 5 adjoins the sleeve 11 serving for bearing the axle in the plate 1 and supports against the plate 1 by means of a flange-like edge part 12. A corresponding sleeve 13 adjoins the lower collar 14 of the sleeve 5. This sleeve 13 can be screwed tight by the nut 15 consisting also of insulating material, so that for all sleeves a good fastening and a good tightening is secured.

On the sleeve 5 is also fixed the disk 16 consisting of insulating material and provided with notches, grooves 17 or the like. In these cavities a guide roller 18 engages which is supported by a lever 20 swinging around the pivot 19 and consisting of parallel flat bars, as shown in the example of execution. This lever 20 is influenced by a spring 21 which has the tendency to engage permanently the roller 18 with the cavity in which it just is. This locking device serves to secure the snap movement. By this device an unvoluntary loosening of the connected stop is reliably avoided.

It is possible to provide further intermediate sleeves for high tension switches which fill the clearance between the sleeve 5 and the plate 1 or the clearance between the sleeves 5 and 6 and the plate 2 respectively so that any sparking can be avoided reliably.

In any circumstances the axle 4 can be also constructed of insulating material, for instance of synthetic-press-material. In this case it is of a special advantage to construct the axle

with one of the sleeves, for instance with the sleeve 5 in one piece.

According to a further feature a contact member is intersected before the forked terminal p^1 serving for leading the current away. Said contact member serves as initial step and consists of the slider 22 being arranged on the disk s^1. This slider is placed in such a manner that it reaches accordingly the contact point z^1 of the next step before the forked terminal p^1 leaves the contact point of the proceding step. The slider is fixed on the disk s^1 by aid of a small socket 23 made on insulating material and connected with the current supply terminal k^1 by aid of the spiral 24 acting as a resistance, the terminal 25 and the disk s^1.

The resistance 24 being connected on the one side with the terminal 25 and on the other side with the socket 23 is arranged around the circumference of the sleeve 5.

The same device of initial step is provided for the disks s^2 and s^3. This device is not illustrated in the drawing by reason of clearness.

In moving the switch from one step to an other the initial step member 22 reaches the contact point of the next step before the forked terminal p^1 leaves the contact point of the preceding step. Thereby a weak current flow takes place through the resistance 24, the slider 22 and the contact point of the next step. Therefore no sparking occurs. When the forked terminal p^1 then comes into contact with the contact point of the next step the slider 22 leaves this contact point and remains during the adjusted connection between this and the following contact point. The normal current flow now takes place through the disk s^1 and the forked terminal p^1.

The multiple-way switch may also be provided with a device which disconnects during the switch operation such electrical apparatus (relays or the like) which are connected with the switch. Such a device is shown in Figs. 3–5.

The lever 20 carries a contact member 26 coacting with a counter contact 27 which may be placed on a suitable point of the casing of the switch, for instance on the top plate 1 and is connected in circuit of an apparatus put in circuit of the switch, for instance a relay, switch gear or the like. In switching, i. e. in turning the disks s^1, s^2 and s^3 and 16 the lever 20 is moved in direction of the arrow x before it is possible for the roller 18 to engage with the notch 17. Thereby the contact member 26 is released from the counter contact 27, while both these contacts touch in the switch position of the switch. Therefore the connection 26 and 27 is interrupted during the switch operation, i. e. during the time in which the forked terminals p^1, p^2 and p^3 are moved towards the next corresponding contact tongues z^1, z^2 and z^3, so that the apparatus being connected in circuit with the contact 27 is interrupted.

If both the devices, the initial step device 22, 23, 24 and 25 as well as the disconnecting device 26, 27 are provided the switch represents a universal apparatus. It may be used according to requirements.

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