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C. R. KRONE

ELECTRICAL SWITCH

Filed March 29, 1923

Fig. 1.

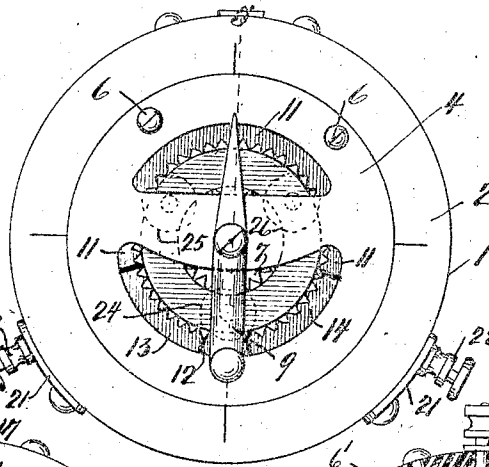


Fig. 2.

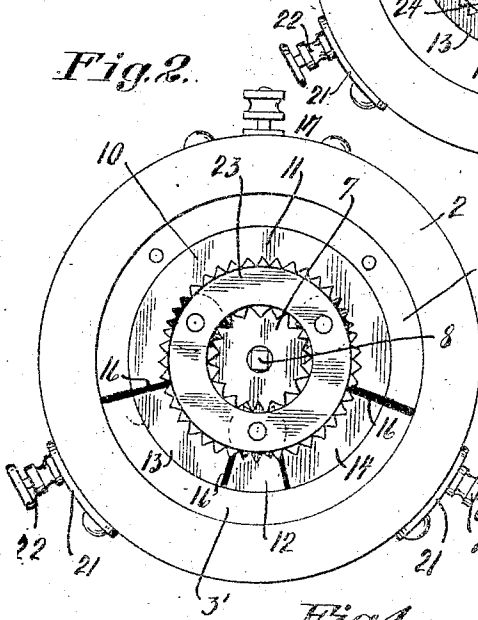


Fig. 3.

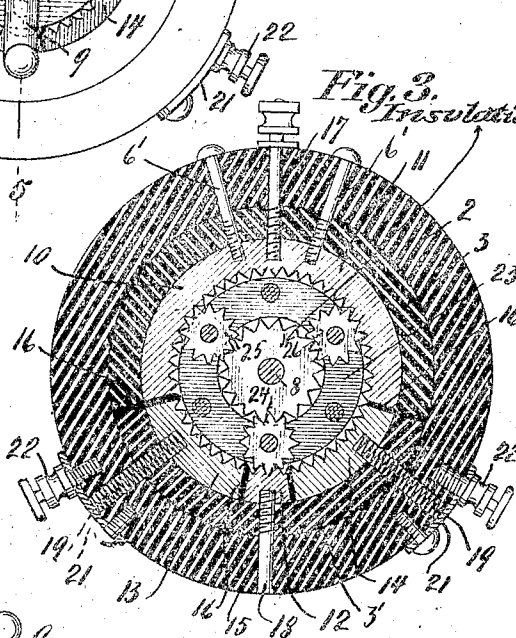


Fig. 4.

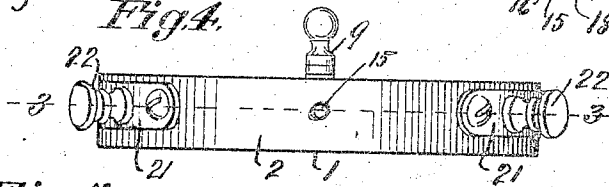
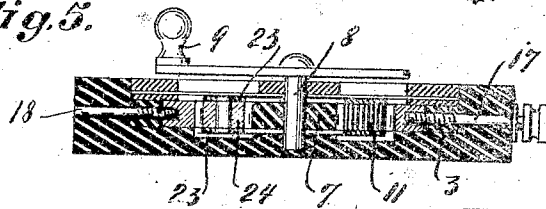


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL SWITCH.

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To all whom it may concern:

Be it known that I, CARL RUDOLPH KRONE, a citizen of the United States, and a resident of Oakland, county of Alameda, and State of California, have invented a new and useful Electrical Switch, of which the following is a specification.

The present invention relates to improvements in electrical switches and its particular object is to provide a switch particularly adapted for giving direction indicating signals in connection with motor vehicles. While designed for this purpose, it may, however, be used in many different ways and would be particularly adapted for advertising signs and the like calling for a continuous change in the arrangement of individual lights. It is proposed in the present invention to use a planetary system for establishing electrical connections between various contacts. Further objects and advantages of my invention will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawing in which Figure 1 shows a plan view of my switch, Figure 2 a plan view with the cover removed; Figure 3 a horizontal section through the same taken along line 3—3 of Figure 4; Figure 4 a side view of my planetary switch; and Figure 5 a vertical section through the same taken along line 5—5 of Figure 1. While I have shown only the preferred form of the invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

My planetary switch (1) comprises a case (2) preferably cylindrical in form and made of bakelite or some similar insulating material, provided interiorly with a concentrically arranged retaining ring separated into the two segments (3) and (3') and adapted to have a lid (4) secured thereto by means of screws (6) so that the lid is substantially flush with the top of the case. The center of the case is occupied by a drive gear (7) made of bakelite or some similar insulating material and secured on a central pin (8) adapted to be rotated by means of a handle (9) provided on the outside of the case.

Arranged concentrically with the drive gear and in spaced relation thereto is an

internal gear (10) divided, in the preferred form shown in the drawing, in four sections (11), (12), (13) and (14). Section (11) is permanently secured by means of screws (6') to ring segment (3) and case (2) exteriorly; sections (12), (13), and (14) are permanently secured to the ring segment (3') and held against rotation by the pin (18) also permanently secured thereto. The pin (18) is mounted with freedom of radial motion in the perforation (15) of case (2) and conveys freedom of parallel motion to all points of segment (3') and sections (12), (13) and (14). The springs (19) are so arranged that when acting together upon sections (13) and (14) the force resultant acts in the same plane and parallel to the radial motion of the pin (18). I have in my planetary switch provided both factors absolutely necessary, namely, uniform pressure in uniform direction of application. The section (11) is the largest one and occupies more than one-half of the whole internal gear, while the section (12) is the smallest one and is arranged diametrically opposite to the central portion of section (11). The sections (13) and (14) are interposed between the sections (11) and (12) on opposite sides of the latter. All four sections are insulated from one another as shown at (16), preferably by an air gap. The large section (11) is connected with a source of electrical energy by means of the binding post (17) extending through the case into the said section. This section (11) will be referred to as the live section. The section (12) does not communicate with any part of an electrical circuit and may, therefore, be referred to as the dead section. The two sections (13) and (14) hereinafter referred to as the contact sections, make contact through springs (19) with plates (21) which latter are in metallic connection with binding posts (22), which latter form parts of two different light circuits.

Between the drive gear (7) and the internal gear (9) are provided, between metallic plates (23), three pinions (24), (25) and (26) mounted with freedom of revolving motion and equi-distant from one another. It will be seen that when the drive gear (7) is rotated by means of the handle (9) the pinions revolve between the two gears and will establish electrical con-

nections between the different sections of the internal gear due to the fact that the three pinions are electrically connected by means of the retaining rings (23). In the position shown in Figure 3, the pinions (25) and (26) engage the live section (11), while the pinion (24) engages the dead section (12). Since the latter forms no part of an electrical circuit, no current flows and the switch may be said to be in neutral. If the drive gear (7) is turned to the right the two pinions (25) and (26) remain in contact with the live section (11) while the pinion (24) engages with the contact section (13), thereby closing the circuit of one light. If turned to the left the pinion (24) makes similar contact with the section (14) and thereby closes the circuit actuating the second light. If turned slightly further, either to the right or to the left sufficiently to bring the handle in reversed position one of the pinions (25) or (26) shall occupy its position central as to the live section (11), the other pinions contact both sections (13) and (14) actuating both circuits and lighting both lights. When rotated continuously sequences of no light, one light, both lights, other light, no light result, one sequence to each complete turn of the drive gear (7) is the rate of the sequences. Each complete turn of the drive gear corresponds to three complete turns of each pinion and only two of the pinions make two actuating contacts each, reducing the friction contact wear to a minimum. An evident further advantage is due to the superior, yes almost perfect balance of movable parts in stable equilibrium, which no outside movement or jolting disturbs, provided the two arms of the handle (9) and (41) are balanced in length and weight. The natural gear friction assisted by the uniform, parallel pressure of the springs (19) resists all casual and most accidental rotary impulses applied to the central pin (8) while the intended impulse of the fingers of the operator is easily and smoothly obeyed—leaving, at the end of it, all parts and all contacts just where the impulse placed them.

Observing that sections (11), (12), (13) and (14) are originally parts of an internal gear so constructed that its 48 teeth are, portion for portion, points of true and complete circles said sections having been separated one from the other by division in radial planes, observing also that these sections are permanently mounted upon two segments of a true and complete retaining ring it follows that they provide a true and complete race for the pinions travelling upon them in their ordered course and that only at the two points where the movable segment meets the immovable segment may exist theoretically a displacement of the respective portion of said race, which is

compensated in my construction by the directive and yielding action of the pin (18) in conjunction with the springs (19) resulting in practically uniform, smooth and undisturbed rotation of the pinions producing uniform, smooth and undisturbed contacts with the contact sections and preventing fusing at the contact points. Furthermore observing that section (11) is by far the longest and that two pinions are in contact with it most of the time and that it is in contact with one pinion all the time it follows that fusing need not occur at any point of contact of any pinion with the live section (11).

For the preferred form of my invention the teeth number 48:24:12 making a diameter ration of 4:2:1 because the four main points of the compass seem eligible as to a vehicle direction indicator which demands forward, backward, right and left course signals and therefore four main, true signaling positions of the operating lever.

For other forms such as applied in construction of recording speedometers or of "flashers" in display electric light signs or of automatic controllers or where other electro-dynamic currents are to be shunted the above mentioned elements of construction may be multiplied within certain limits. For example there may be 60 teeth to the internal gear, 36 teeth to the drive gear and 12 teeth to each pinion with corresponding changes in the number of pinions and of contact sections. In this case there would be a maximum of five primary positions of the control-lever. It is sufficient to indicate the possibility without going too far afield in these specifications.

I claim:

1. A planetary electric switch comprising a drive gear, an internal gear mounted concentrically therewith comprising a live section, an oppositely arranged dead section and two interposed contact sections insulated from one another, and a plurality of pinions mounted revolvably between the two gears adapted to selectively engage the live section and either contact section, the live section and both contact sections and the live section and the dead section.

2. A planetary electric switch comprising a drive gear, an internal gear mounted concentrically therewith comprising a live section, an oppositely arranged dead section and two interposed contact sections insulated from one another, and a plurality of pinions mounted revolvably between the two gears adapted to selectively engage the live section and either contact section, the live section and both contact sections and the live section and the dead section, the contact sections being mounted with freedom of radial motion and having yielding means

associated therewith for producing a close contact between the different contact elements.

3. A planetary electric switch comprising a cylindrical casing of insulating material, a drive gear mounted therein, an internal gear mounted concentrically with the drive gear comprising a live section, an oppositely arranged dead section and two interposed contact sections insulated from one another, a plurality of pinions mounted revolvably between the two gears adapted to selectively engage the live section and either contact section, the live section and both contact sections and the live section and the dead section, and a handle for rotating the drive gear.

4. A planetary electric switch comprising a cylindrical casing of insulating mate-

rial, a drive gear mounted therein, an internal gear mounted concentrically with the drive gear comprising a live section, an oppositely arranged dead section and two interposed contact sections insulated from one another, a plurality of pinions mounted revolvably between the two gears adapted to selectively engage the live section and either contact section, the live section and both contact sections and the live section and the dead section, and a handle for rotating the drive gear, the contact sections being mounted with freedom of radial motion and having springs associated therewith for producing a close contact between the different contact elements and for conducting a current to the outside of the casing.

CARL RUDOLPH KRONE.