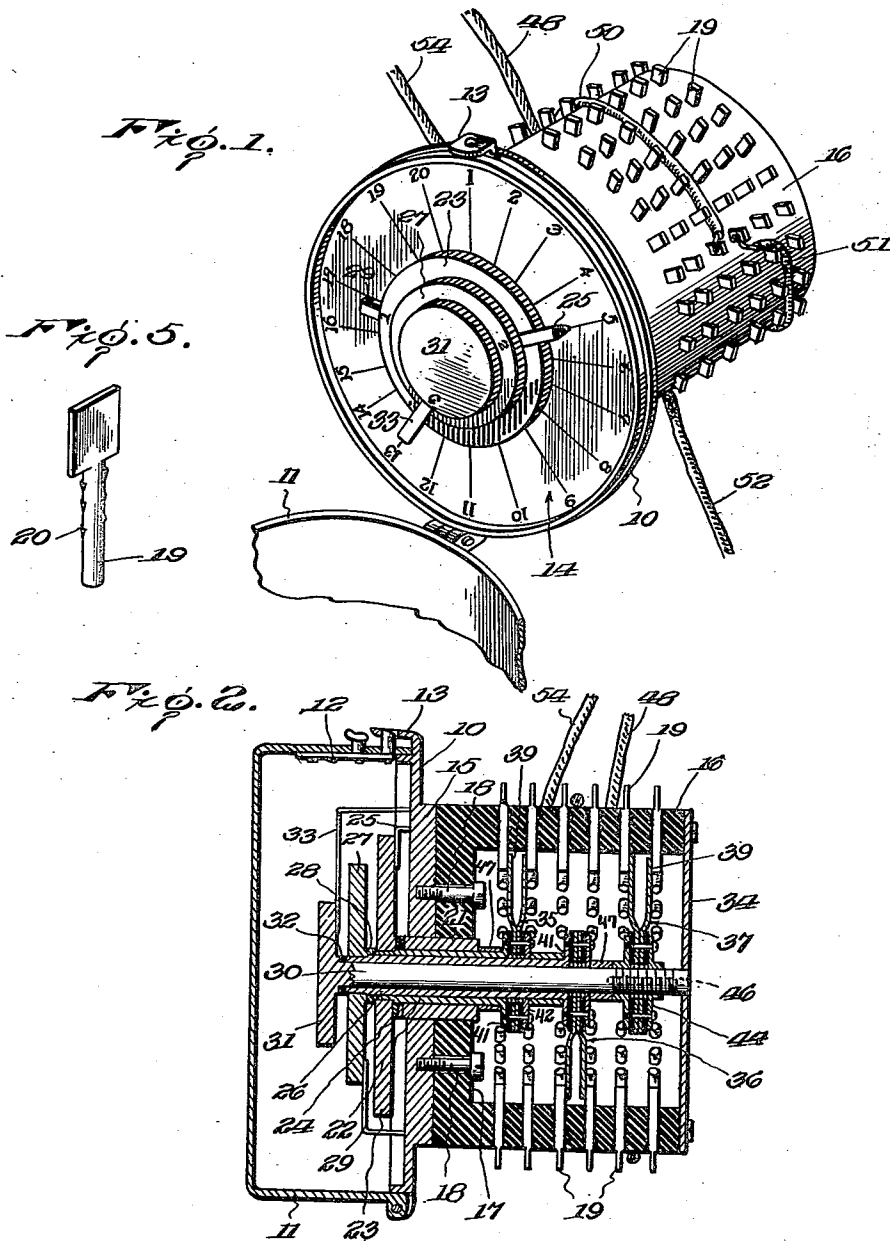


D. B. BEAVERS.
IGNITION SWITCH.
APPLICATION FILED FEB. 24, 1920.

1,405,260.

Patented Jan. 31, 1922.
2 SHEETS—SHEET 1.



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FIG. 3.

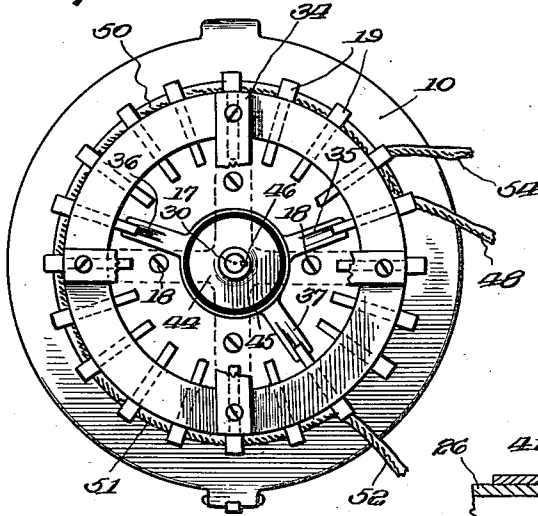


FIG. 4.

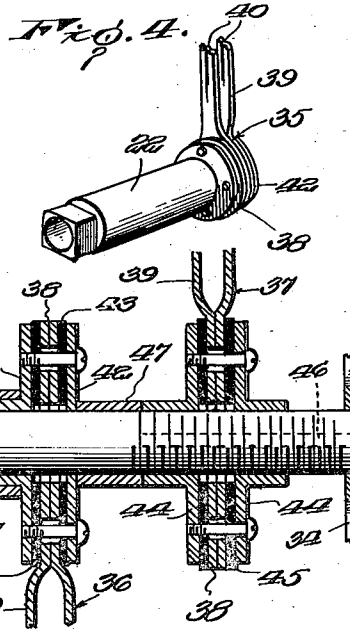


FIG. 6.

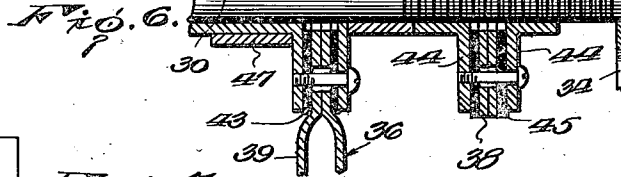
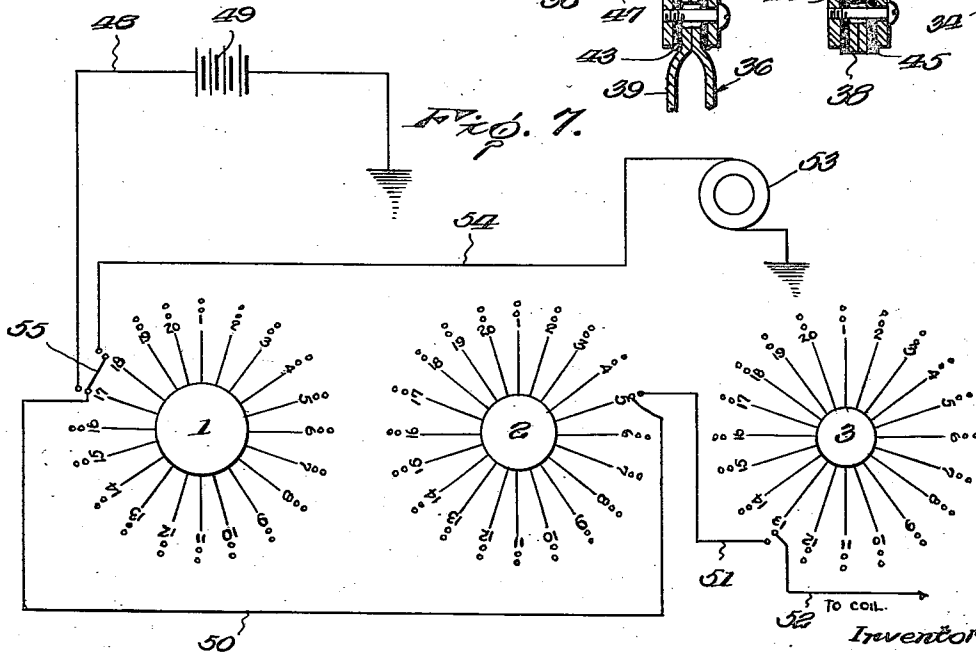


FIG. 7.



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UNITED STATES PATENT OFFICE.

DALRIDGE BERNARD BEAVERS, OF WASHINGTON, DISTRICT OF COLUMBIA.

IGNITION SWITCH.

1,405,260.

Specification of Letters Patent.

Patented Jan. 31, 1922.

Application filed February 24, 1920. Serial No. 360,922.

To all whom it may concern:

Be it known that I, DALRIDGE BERNARD BEAVERS, citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Ignition Switches, of which the following is a specification.

This invention relates to an improved permutation ignition switch for motor vehicles and has as one of its principal objects to provide a device of this character which may be readily operated to break the ignition circuit of a vehicle engine and wherein, when so operated, it will be practically impossible, unless the proper combination is known, to manipulate the device for again closing the circuit.

The invention has as a further object to provide a device wherein a great variety of combinations may be had so as to minimize the possibility of any two of the devices being operable to close a circuit by the same combination.

A still further object of the invention is to provide a switch which may be employed for controlling both a generator circuit and a battery circuit.

And the invention has as a still further object to provide a switch adapted for use in connection with substantially any conventional type of motor vehicle.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a perspective view of my improved permutation switch, the front cover of the device being shown open.

Figure 2 is a longitudinal sectional view taken through the device,

Figure 3 is a rear elevation of the device,

Figure 4 is a detail perspective view showing one of the brushes employed and its shaft,

Figure 5 is a detail of one of the contacts of the device,

Figure 6 is an enlarged fragmentary section more clearly illustrating the construction of the brushes, and

Figure 7 is a diagrammatic view showing the wiring of the device.

In carrying the invention into effect, I employ a preferably annular head plate 10 to which is swingingly connected a cover 11 normally held closed by a spring latch 12 coacting with a keeper 13 upon the plate. Upon the front face of the plate is formed

a dial 14 having graduations numbered, in the present instance from 1 to 20 inclusive. Upon the rear side of the plate is formed an annular boss or thickened portion 15 and mounted upon this boss is a drum or cylinder 16 having an inner end wall 17, the outer end of the drum being open. The drum may be formed of wood, fiber or other approved insulating material, and fitted through the end wall 17 thereof are cap screws 18 threaded into the boss 15 for firmly securing the drum to the head plate, it being observed that the screws are inaccessible from the forward side of said plate. Mounted upon the drum is a plurality of contacts 19, one of which is shown in detail in Figure 5. As there illustrated, each of said contacts is formed with a cylindrical body surmounted by a flattened head, the body being provided with spurs 20 immediately beneath the head. The contacts are, as particularly shown in Figure 2, fitted through the wall of the drum so that the heads thereof lie at the outer side of the drum while the inner end portions of said contacts project within the drum, the spurs 20 coacting with the drum wall for firmly securing the contacts against displacement. As particularly brought out in Figure 1, the contacts are arranged in rows extending longitudinally of the drum and alining with the graduations upon the dial 14 of the head plate. Thus, the rows of contacts are respectively identified by these numbers and shall accordingly be hereinafter referred to by such numbers. In the present instance, I have shown the use of twenty rows of contacts to correspond to the number of graduations upon the dial. However, I do not wish to be limited in this regard since, as will be appreciated as the description proceeds, the number of rows of contacts employed may be varied as desired and, of course, the number of graduations upon the dial will be varied accordingly.

Formed axially through the head plate 10 and through the end wall 17 of the drum are registering openings and fitted through said openings is a bushing 21 of suitable insulating material. Rotatable within the bushing is a hollow shaft 22 squared at its outer end to receive a turning disc 23 spaced from the bushing by suitable washers 24 and having a pointer 25 projecting radially beyond its periphery. Telescoping within the shaft 22 is a second hollow shaft 26 somewhat longer

than the first shaft and squared at its outer end to receive a turning disc 27 spaced from the disc 23 by a washer 28 and having a pointer 29 projecting from its periphery. Fitted through the shaft 26 is a shaft 30 upon the outer end of which is formed a turning disc 31 spaced from the disc 27 by a washer 32 and having a pointer 33 projecting from its periphery. As will be observed, the discs 23, 27 and 31 are of graduated diameter, the disc 23 being the largest and the disc 31 the smallest. Journaling the shaft at its inner end is a spider 34 screwed or otherwise secured to the inner end of the drum 16. Each of the shafts 22, 26 and 30 carries a contact brush, the several brushes being indicated at 35, 36 and 37 respectively. These brushes are respectively formed of companion contact members each comprising an apertured disc 38 from which extends a radial resilient contact finger 39. The discs are abutted in registering relation so that the fingers also register and, as will be observed, said fingers diverge toward their free ends. Formed in the outer end portions of the fingers at their outer sides are medial radial channels or grooves 40 and the side margins of the outer end portions of each of the fingers are, from said grooves respectively, bent laterally inward toward the other finger. Upon the inner ends of the shafts 22 and 26 are radial flanges 41 and mating with these flanges are clamping rings 42. Overlying the discs of the contact members of the brushes 35 and 36 are washers 43 and engaged through the rings, the discs, washers and said flanges are rivets or other approved fastening devices securing each of the brushes to turn with its shaft. The contact members of the brush 37 are similarly secured between flanged collars 44, washers 45 of suitable insulating material being interposed between the flanges of said collars and the discs of the members. The collars are threaded upon the inner end portion of the shaft 30 for connecting the brush thereto and locking said collars to turn with the shaft is a key 46 which will thus also serve to lock the shaft 30 against retraction. Tampering with the device will accordingly be rendered extremely difficult. Sleever or washers 47 upon the shafts serve to maintain the several brushes in proper spaced relation. As will now be readily appreciated, the disc 23 may be turned for rotating the brush 35 to engage the outermost pair of contacts in each of the rows of contacts selectively. In like manner, the disc 27 may be turned for rotating the brush 36 to engage the intermediate pair of contacts in each of said rows selectively and similarly, the disc 31 may be turned for rotating the brush 37 to engage the outermost pair of contacts in each of said rows selectively. Consequently, the discs may be manipulated for positioning the brushes to close a circuit through a pair of

contacts in each of the rows. In this connection, it will be observed that the free end portions of the contact fingers 40 of each of the brushes are arranged to ride over the contacts therebetween and as each pair of fingers is moved to engage between a pair of contacts, the pair of fingers will be pressed or flexed inwardly toward each other while the contacts will seat within the grooves 40 of said fingers. Thus, efficient electrical engagement will be had between the fingers and the contacts while as each pair of fingers is moved to engage between a pair of contacts slight resistance to the continued rotation of the respective brushes will, due to the seating of the contacts in the grooves of the fingers, be offered, so that no difficulty will be experienced, when rotating the turning discs, in properly positioning the brushes to coact with the contacts. Further, as each pair of fingers is shifted between a pair of contacts, a clicking sound will be produced, this feature also tending to facilitate the desired positioning of the brushes.

In Figure 7 of the drawings, I have shown the manner in which my improved switch may be interposed in an ignition circuit. In this figure, the discs 23, 27 and 31 have been diagrammatically illustrated and are numbered 1, 2 and 3, since said discs will preferably be so numbered in practice, the largest disc being numbered 1 and the smallest numbered 3. The dial 14 is also diagrammatically illustrated in connection with each disc as are also the pairs of contacts of the several rows with which the brushes associated with the respective discs are arranged to cooperate, the innermost pairs of contacts of said rows being shown in connection with the disc 1, the intermediate pairs of contacts of said rows being shown in connection with the disc 2, and the outermost pairs of contacts of the rows being shown in connection with the disc 3. A typical wiring in connection with the switch is illustrated. A wire 48 leads from a battery 49 and is connected to the outer end of one contact of the innermost pair in row seventeen of said contacts. In this connection it will be observed that the flat heads of the contacts provide a convenient means whereby circuit wires may be soldered or otherwise electrically connected therewith. Leading from the outer end of the other contact of said pair is a wire 50 which is connected to one contact of the intermediate pair of contacts in row five. From the other contact of the latter pair leads a wire 51 which is connected to one contact of the outermost pair in row thirteen of said contacts and connected to the other contact of such pair is a wire 52 which may be led to the induction coils of the vehicle engine ignition system. Thus, as will now be appreciated, by rotating disc 1 until its pointer is

opposite the graduation 17 of the dial 14, the brush 35 will close the circuit through the first pair of contacts. Similarly, by rotating the disc 2 until its pointer is opposite the graduation 5 of the dial, the circuit will be closed through the second pair of contacts and finally by rotating the disc 3 until its pointer is opposite the graduation 13 of the dial, the circuit will be closed through the third pair of contacts and the current thus permitted to flow from the battery to the induction coils of the system. To break the circuit it is simply necessary to change the position of any one of the discs or, if preferred, two of the discs or all three of them may be moved. In any event, it will be seen that the circuit will be broken, making it practically impossible for anyone, except they know the proper combination, to manipulate the discs for again closing the circuit. I accordingly provide a highly effective device for the purpose set forth and a device which, when operated to break the ignition circuit, will serve as an effective lock for preventing unauthorized use of the vehicle. As will be perceived, the circuit wires may, in the present instance, be connected to any one of twenty different pairs of contacts or the innermost pairs of contacts of all of the rows. Likewise, the circuit wires may be attached to any one of the twenty intermediate pairs of contacts and similarly said wires may be attached to any one of the twenty different pairs of outermost contacts. Thus, a great number of different combinations may be had; to be exact, a total of eight thousand combinations being possible. Accordingly no one combination will often be repeated. As will be observed, the wires 50 and 51 are carried around the drum between the contact heads. The heads of the contacts will thus serve as guides for retaining these wires in position as well as tending to prevent their accidental displacement.

In any instance where a vehicle is equipped with a generator as well as a battery, the present device may be employed to control both circuits. In Figure 7, a generator is diagrammatically illustrated at 53. A wire 54 is led from the generator and is connected, as typically shown in the present instance, to one contact of the innermost pair in row 18 of said contacts while a wire 55 is extended between the other contact of said pair and that contact of the innermost pair in row 17 to which the wire 50 is connected. Accordingly, after the vehicle motor has been started on the battery, the disc 1 may be turned until the brush 35 closes the circuit between said pair of contacts in row 18 when current will flow from the generator to the coils.

While I have shown and described my improved switch as a device particularly de-

signed for use in connection with motor vehicles, still, as will be appreciated, the device is well adapted for use in various other situations, such for instance, as a switch for controlling the locking of safety deposit boxes or a switch for governing various electrically controlled locks. I do not, therefore, wish to be limited in this regard but reserve the right to such adaptations and modifications of the invention as may fall within the spirit of the appended claims.

Having thus described the invention, what is claimed as new is:

1. A device of the character described including a drum, a plurality of contacts projecting through the wall of the drum and provided with means to coact with said wall for securing the contacts against displacement, and independently rotatable brushes movable within the drum to coact with said contacts for closing a circuit there-through.

2. A device of the character described including a drum, a plurality of contacts projecting through the wall of the drum and provided with spurs engaging said wall for securing the contacts against displacement, and independently rotatable brushes movable within the drum to coact with said contacts for closing a circuit therethrough.

3. A device of the character described including a drum, a plurality of contacts having cylindrical body portions projected through the wall of the drum and surmounted by flattened heads exposed exteriorly of the drum to provide circuit wire terminals, and independently rotatable brushes movable within the drum to coact with said contacts for closing a circuit therethrough.

4. A device of the character described including a drum, a plurality of contacts carried thereby arranged in rows, the contacts of each row being insulated with respect to each other and disposed in pairs, and independently rotatable brushes movable within the drum to each selectively coact with an individual pair of contacts in each row for closing a circuit therethrough.

5. A device of the character described including a drum, a plurality of contacts carried thereby and providing guides for circuit wires arranged about the drum exteriorly thereof, and independently rotatable brushes movable within the drum to coact with said contacts for closing a circuit there-through.

6. A device of the character described including a drum, a plurality of contacts carried thereby, telescopic shafts journaled within the drum, brushes carried by the inner end portions of said shafts respectively and independently rotatable for closing a circuit through said contacts, the brush of the innermost shaft being threaded thereon, turning discs carried by the outer end

portions of said shafts respectively, the disc of the innermost shaft being permanently fixed thereto, and means coacting between said brush and the innermost shaft for locking said brush against counter-rotation whereby to lock all of the shafts and the disc of the outermost shaft in assembled relation.

7. In a device of the character described,
10 the combination of a drum of insulating ma-

terial, a plurality of contacts projecting through the wall of the drum and insulated thereby with respect to each other, said contacts being arranged in rows, and independently rotatable brushes movable within the drum to engage an individual two of the contacts in each row for bridging a circuit therethrough.

In testimony whereof I affix my signature.
DALRIDGE BERNARD BEAVERS.