

H. J. CARRIGAN.
ELECTRIC SWITCH.
APPLICATION FILED AUG. 9, 1909.

996,615.

Patented July 4, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

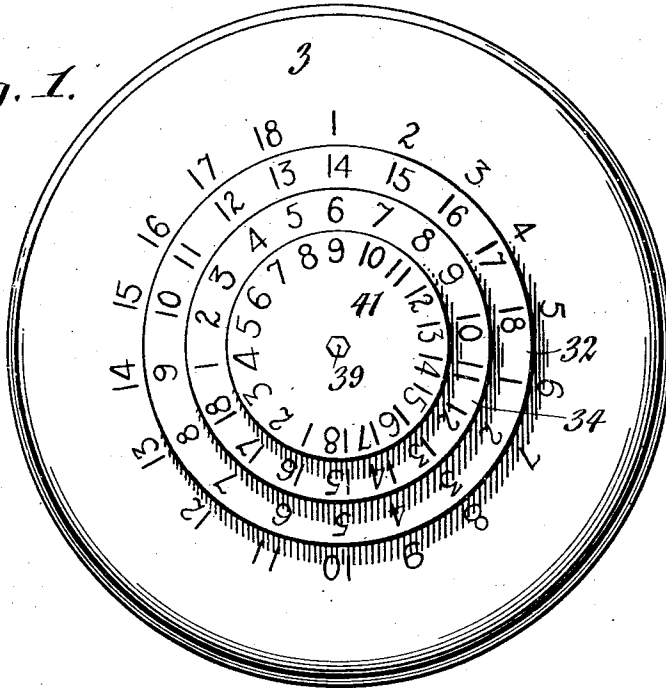
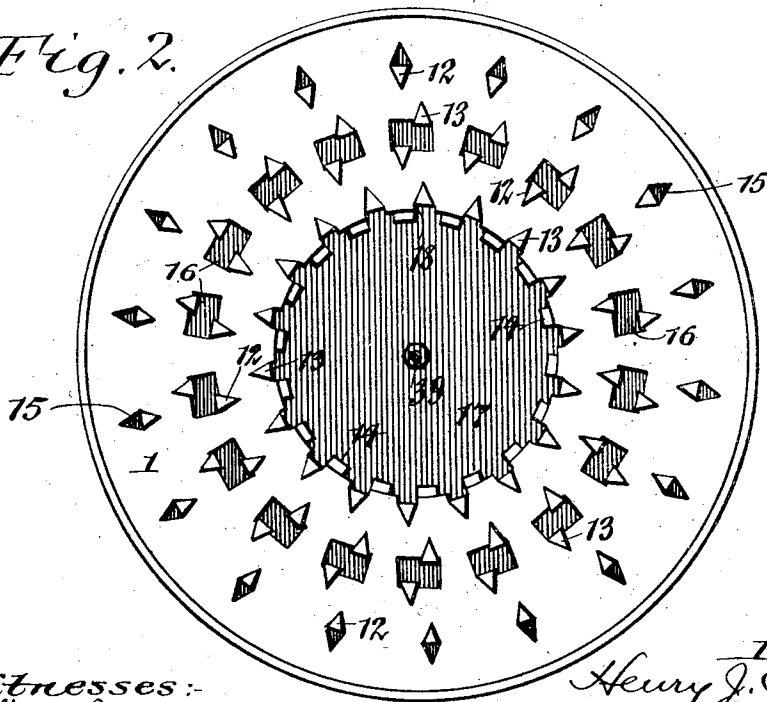


Fig. 2.



Witnesses:
Walter H. Popp.
Richard Sumner.

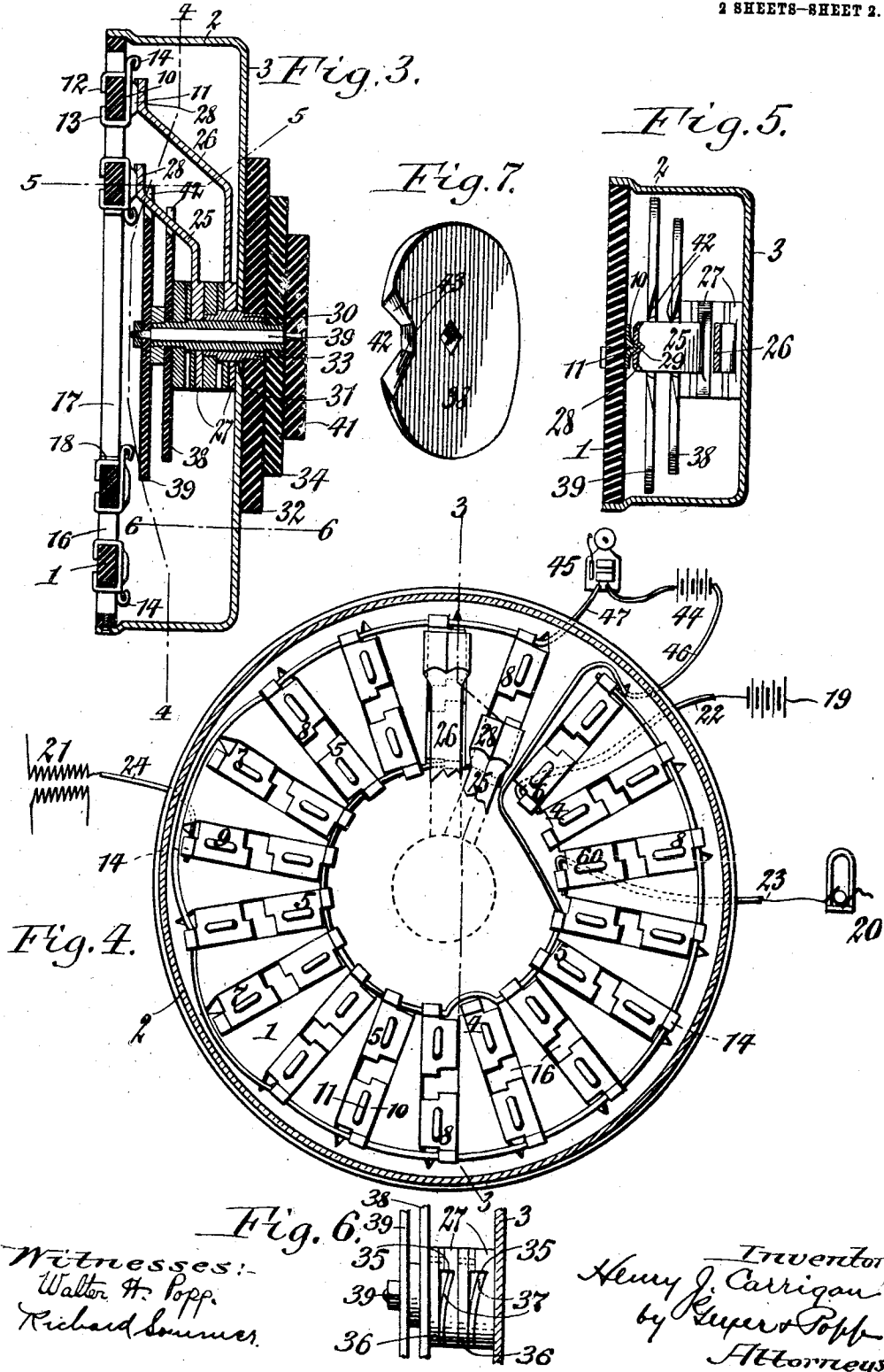
Inventor
Henry J. Carrigan
by Reyer Popp
Attorneys.

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Witnesses:
Walter H. Popp.
Richard Sommer.

Inventor
Henry J. Carrigan
by *Rupert Popp*
Attorneys

UNITED STATES PATENT OFFICE.

HENRY J. CARRIGAN, OF BUFFALO, NEW YORK, ASSIGNOR TO AUTO SAFETY SPECIALTY COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC SWITCH.

996,615.

Specification of Letters Patent.

Patented July 4, 1911.

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To all whom it may concern:

Be it known that I, HENRY J. CARRIGAN, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Electric Switches, of which the following is a specification.

This invention relates to a combination electric switch which is provided with a plurality of contacts some of which are active and others inactive so that the electric circuit can only be closed when the proper contacts are in engagement, the remaining contacts being in reserve for changing the combination of the electric switch when it is desirable to do so.

A switch of this character is particularly desirable for controlling the electric ignition system of hydrocarbon engines which drive automobiles or motor boats for the purpose of preventing illicit use of the same but this switch may also be used for controlling other electric circuits.

It is the object of this invention to provide a switch of this character which will permit the person in possession of the combination to readily place the different members of the switch in such position that the electric circuit will be closed but which when out of register renders it exceedingly difficult, if not impossible, for one not acquainted with the proper combination to place the parts of the switch again in such position as will effect a closing of the electric circuit.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a front elevation of my improved electric switch. Fig. 2 is a rear elevation of the same. Fig. 3 is a vertical longitudinal section in line 3—3, Fig. 4. Fig. 4 is a vertical transverse section in line 4—4, Fig. 3. Figs. 5 and 6 are fragmentary longitudinal sections taken in the correspondingly numbered lines in Fig. 3. Fig. 7 is a perspective view of one of the baffles whereby one of the movable contacts may be moved out of engagement from the stationary contacts.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents the back or base of the switch which is preferably of circular form and constructed of fiber, rubber or other suitable insulating material. In front of this base is arranged a cap having a cylindrical body

2 which is secured at its rear edge to the edge of the base while its front end is closed by a flat head, 3, thus forming together with the base a casing or housing in which are arranged the concealed and inaccessible parts of the switch. On the front side of the base the same is provided with an inner annular row of fixed switch contacts 4, 5, 6, 60, and an outer annular row of movable switch contacts 7, 8, 9, said rows being arranged concentrically with each other and with the axis of the casing. Each of these switch contacts is preferably constructed from a single piece of sheet metal and comprises a flat contact plate 10 provided on its central portion with a forwardly embossed locking projection 11, two fastening lugs 12, 13 arranged at the inner and outer edges of the contact plate and a wiring lug 14 arranged at one edge of the contact plate. Each of these contacts is fastened to the front side of the base by passing its fastening lugs rearwardly through openings in the base and clenching or bending the rear ends thereof against the rear side of the base so as to hold the contact plate firmly against the front side of the base. As shown in Figs. 2, 3 and 4 the base is provided with an annular row of outer openings 15 which receive the outer lugs of the outer row of fixed contacts, an intermediate annular row of openings 16 which receive the inner fastening lugs of the outer fixed contacts and the outer fastening lugs of the inner row of contacts, and a central opening 17 having its bore provided with an annular row of notches 18 which receive the inner fastening lugs of the inner row of fixed contacts.

In the case of an automobile or motor boat which is driven by a hydrocarbon engine having an electric ignition system which permits of employing either a battery or a magneto two of the contacts in one of the annular rows are connected respectively with a battery 19 and a magneto 20 and one of the contacts in the other row is connected with a spark coil 21 and means are provided whereby the spark coil contact may be connected either with the battery contact or the magneto contact according as to whether it is desired to operate the igniter by a current derived from the battery or the magneto. As shown in Fig. 4 the battery and magneto are connected respectively by wires 22, 23 with the two contacts 6, 60, in

the inner row while the spark coil is connected by means of a wire 24 with the contact 9 in the outer row. The connection between each of these wires and the respective contact is preferably effected by bending or clenching the wiring lug 14 of the respective contact around the wire which is to be connected therewith, as shown in Figs. 3 and 4. For convenience the wiring lugs of the outer contacts are arranged on the outer ends thereof while the wiring lugs of the inner contacts are arranged at the inner ends thereof, as shown in the drawings.

25, 26 represent two movable contacts preferably of sheet metal which are rotatable concentrically with reference to each other and the two rows of fixed contacts on the base and which are electrically connected and adapted to engage respectively with the inner and outer rows of fixed contacts. These movable contacts are preferably constructed in the form of arms, the inner or rear arm 25 being comparatively short while the outer or front arm 26 is longer. Each of these contact arms preferably has a hub 27 at its inner end and a contact finger 28 at its outer end and inclines rearwardly and outwardly from its hub to its finger. On its rear face the contact finger is provided with a forwardly indented locking recess 29 which is adapted to engage with the locking projection 11 of one or the other contact of the respective row for positively interlocking the movable contact arm and the respective stationary contact when the same are brought into proper alinement with each other.

As the contact arm moves over one of the stationary contacts it is sprung slightly away from the latter in riding upon the projection thereof but when the recess of the contact arm comes into line with the projection of the contact plate the resilience of the arm again returns the same to its normal rearward position and holds the same reliably in its interlocked position relatively to the fixed contact. Upon turning the outer contact arm so that it engages with the active contact 9 in the outer row and also turning the inner contact arm so that it engages either the active battery contact 6 or the active magneto contact 60 of the inner row, the electric circuit will be closed through the coil and battery or through the coil and magneto, as the case may be, and thereby permit the ignition mechanism of the engine to operate. The outer contact arm is mounted with its hub on the rear part of a tubular outer shaft 30 which is journaled in a bearing opening 31 formed centrally in the front wall or head of the casing and turned by means of a finger piece or disk 32 secured to this shaft in front of the head of the casing. The inner

of an intermediate tubular shaft 33 which is journaled within the outer tubular shaft 30 and provided at its front or outer end with a finger piece or disk 34 for turning the same. The outer and intermediate hollow shafts are preferably coupled with their respective contact arms in such manner that these arms are compelled to turn forwardly with their respective shafts but the latter are free to turn backwardly independently of their contact arms, thereby rendering it possible to leave the finger pieces or disks 32, 34 in such position that any one attempting to discover the combination of the switch will be deceived, thus frustrating his designs. The preferred form of coupling for thus connecting each of the hollow adjusting shafts with its respective contact arm, shown in Fig. 6, is constructed in the form of a ratchet mechanism and consists in mounting the hub of the contact arm loosely on its companion hollow shaft and providing the rear side of the same with a clutch shoulder 35 facing in one direction, and mounting a collar 36 on the respective hollow shaft so that the same is compelled to rotate therewith, and providing the front side of this collar with a spring pawl or dog 37 which is adapted to engage with the shoulder 35 on the hub of the contact arm upon turning the respective adjusting shaft forwardly, but which trips past said shoulder upon turning this shaft in the opposite direction. It follows from this construction that when the dog of the respective adjusting shaft engages with the shoulder of the companion contact arm then these parts are compelled to turn together in one direction while upon turning this shaft in the opposite direction the contact arm remains at rest and the shaft moves independently thereof.

The contact arms, their shafts and the coupling collars are all constructed of metal so that they are in electrical connection with each other and cause the electric circuit to be completed when the fingers of these contact arms are engaged with the proper stationary contacts. The finger pieces or disks 32, 34, whereby these arms and their shafts are turned are, however, preferably made of rubber, fiber or other insulating material. The disk or finger piece 34 of the intermediate adjusting shaft is made of somewhat smaller diameter than the finger piece of the outer adjusting shaft for convenience in manipulating the same. The marginal parts of the finger pieces or disks 32, 34 of the outer or intermediate shafts and the adjacent part of the head of the casing are provided with dials consisting preferably of annular rows of numbers or other guide marks whereby these disks may be set or turned to a predetermined position for bringing the contact arms into engagement

with the proper stationary contact plates and closing the electric circuit through the switch.

In order to further foil any attempt by 5 an unauthorized party to close the electric circuit through the switch who is not in possession of the combination, one or more baffles, preferably of insulating material, are provided which hold one or the other 10 of the contact arms out of engagement from the companion row of fixed contacts excepting when this arm is opposite the proper fixed contact and even then holds this contact arm out of engagement with the proper 15 fixed contact if the means for actuating this arm are not in a certain position relative thereto. The preferred means for carrying this into effect consists in employing two baffle disks 38, 39 of different diameters, the 20 smaller baffle 38 being arranged in front of the larger baffle 39. The front baffle 38 is secured to the inner or rear end of the hollow intermediate shaft while the rear baffle 39 is secured to the inner or rear end of a 25 central shaft 40 which is arranged within the intermediate shaft and provided at its front or outer end with a finger piece or disk 41 preferably of fiber or other similar material. This last mentioned finger piece 30 is arranged in front of the intermediate finger piece and is preferably of smaller diameter and provided on its marginal part with an annular row of dial numbers, characters or marks which enable the central shaft 35 and the parts mounted thereon to be readily shifted to a predetermined position relative to the intermediate and outer finger pieces or disks for closing the switch. Each of the baffle disks is provided in its periphery 40 with a notch or recess 42 the sides of which are beveled, so that the same form cams or wedges 43. When the dog of the intermediate hollow shaft is in engagement with the shoulder on the hub of the inner contact 45 arm the notch of the front baffle disk 38 is in line with the inner contact arm, and if at this time the rear or inner baffle disk 39 has also been turned so as to bring its notch in line with the notch of the front 50 baffle disk, then the inner contact arm will be free and spring forwardly in these coinciding notches and engage its finger with the contact plate of the inner row, as shown in Figs. 3 and 5. Upon turning the front 55 baffle disk backwardly or turning the rear baffle disk forwardly or backwardly, the inner contact arm will be deflected forwardly out of engagement with the corresponding stationary contact by reason of the engagement 60 of the cam faces of one or the other of the baffle disks with the contact arm. While thus disengaged from the stationary contact the contact arm is in engagement with the periphery of the unnotched peripheral 65 portion of either one or the other

baffle disk, thereby preventing closing of the electric circuit at this time notwithstanding that this contact arm may be opposite the proper active contact of the inner row and the outer contact arm in engagement with 70 the active contact of the outer row.

From the foregoing it will be seen that a person not conversant with the proper combination of the contacts to which the terminal 75 wires are connected will be practically unable to close the circuit of the ignition system by means of this switch, thus rendering impossible the theft and unlawful use of automobiles and motor boats by unauthorized persons as is now frequently the 80 case.

Means are provided for giving an alarm when an attempt is made by a person, not familiar with the switch, to close the same and operate the automobile or motor boat, 85 thereby notifying persons near at hand of such tampering and also frightening the offender. The preferred means for this purpose consists in electrically connecting one 90 or more of the contacts in the outer row and one or more contacts in the inner row with opposite ends of a signal or alarm circuit containing a battery 44 and an electric 95 alarm bell or gong 45, the contacts selected for this purpose being some of those which are not in use for closing the circuit of the electrical ignition system. As shown in Fig. 4 the desired stationary contacts 5, 8, which 100 are to be used in connection with the alarm device are connected with wires 46, 47 leading to the alarm battery and bell by clenching or bending the wiring lugs 14 of these contacts around their respective wires. Some 105 of the inactive contacts in the inner and outer rows, as for instance the contacts 4, 7, are wholly idle and not connected with either the ignition system or the alarm system. These last mentioned contacts are utilized by the owner or lawful operator, who is in 110 possession of the combination, as neutral or safe landing places with which the contact arms may be engaged when the circuit of the switch is opened, and thus avoid ringing of the alarm bell unnecessarily.

It will be noted that my improved electric 115 switch provides numerous difficulties and pitfalls which are encountered by a person attempting to set the switch who is not familiar with the proper combination thus operating as a strong preventive or deterrent 120 against the unlawful use by unscrupulous persons of motor vehicles or motor boats which are left unguarded in the public highways or elsewhere.

If the combination of the switch should 125 become known to persons who are liable to tamper with the same or if for other reasons it is desirable to change the combination of the switch this can be readily done by changing the connection between one or more of 130

the wires 22, 23, 24 from the fixed contact plates with which they are connected, to another contact plate or plates selected for this purpose, this change being readily and easily effected without the necessity of employing special tools for this purpose.

I claim as my invention:

1. An electric switch comprising an annular row of fixed contacts, a rotatable contact arm adapted to engage with one or another of said fixed contacts, and a rotatable baffle provided with a cam whereby said contact arm may be disengaged from said fixed contact.

2. An electric switch comprising an annular row of fixed contacts, a rotatable contact arm adapted to engage with one or another of said fixed contacts, and a circular rotatable baffle having a recess which receives said arm and permits the same to project into engagement with said fixed contact and a cam at the side of said recess whereby upon rotating said baffle and arm one relatively to the other said arm will be moved to the unrecessed periphery of said baffle and disengaged from said fixed contact.

3. An electric switch comprising an annular row of fixed contacts, a rotatable contact arm adapted to engage one or another of said fixed contacts, a shaft on which said arm is loosely mounted, means for compelling said arm to move with said shaft in one direction but permitting the shaft to move independently of the arm in the opposite direction, and a baffle mounted on said shaft and operating to disengage said arm from the fixed contact upon turning the shaft independently of the arm.

4. An electric switch comprising an annular row of fixed contacts, a rotatable contact arm adapted to engage one or another

of said fixed contacts, a shaft on which said arm is loosely mounted, means for compelling said arm to move with said shaft in one direction but permitting the shaft to move independently of the arm in the opposite direction, a baffle mounted on said shaft and operating to disengage said arm from the fixed contact upon turning the shaft independently of the arm and another baffle movable independently of the first mentioned baffle and operating to control the engagement and disengagement of the arm and fixed contact.

5. An electric switch comprising an annular row of fixed contacts, a rotatable contact arm adapted to engage one or another of said fixed contacts, a shaft on which said arm is loosely mounted, means for compelling said arm to move with said shaft in one direction but permitting the shaft to move independently of the arm in the opposite direction, a baffle mounted on said shaft and operating to disengage said arm from the fixed contact upon turning the shaft independently of the arm, another baffle rotatable independently of the first mentioned baffle and provided with a recess through which the contact arm may project into engagement with said fixed contact and a cam at the side of said recess which operates to disengage said contact arm from said fixed contact upon turning the last mentioned baffle, and a central shaft arranged within the first mentioned shaft and carrying the last mentioned baffle.

Witness my hand this 6th day of August, 1909.

HENRY J. CARRIGAN.

Witnesses:

THEO. L. POPP,
ANNA HEIGIS.