B. P. SWYERS.

SWITCH FOR ELECTRIC CIRCUITS.

APPLICATION FILED JAN. 27, 1914.

1,201,384.

Patented Oct. 17, 1916.

2 SHEETS—SHEET 1.

FIG. 1.

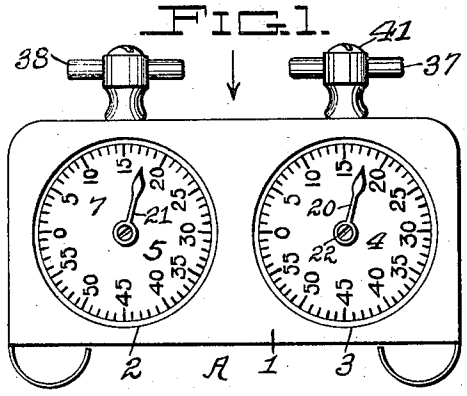


FIG. 2.

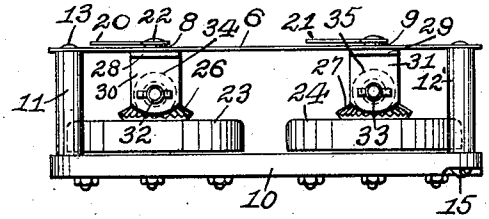


FIG. 3.

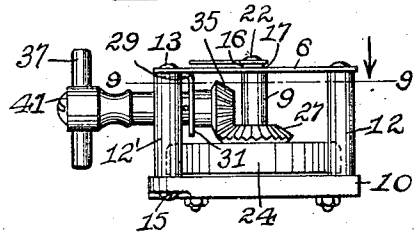


FIG. 4

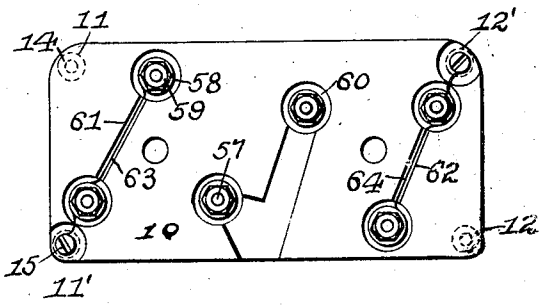


FIG. 5.

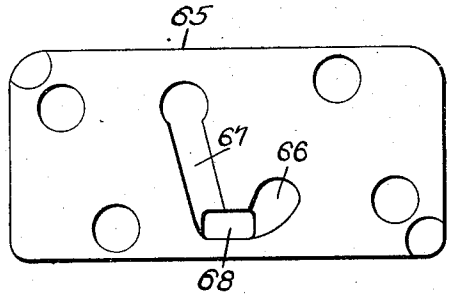
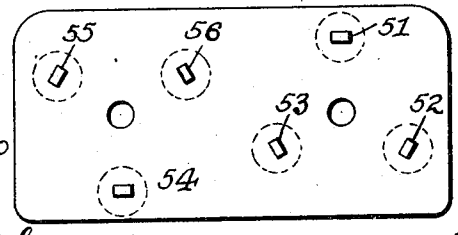


FIG. 6.



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2 SHEETS—SHEET 2.

FIG. 7.

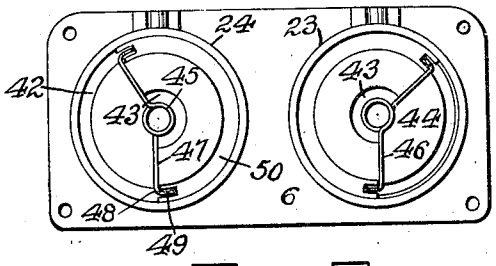


FIG. 8.

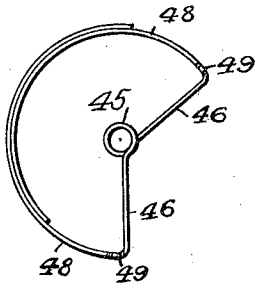


FIG. 9.

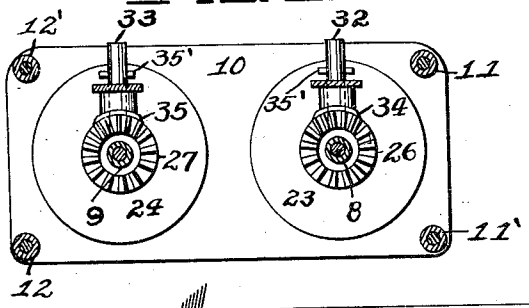


FIG. 10.

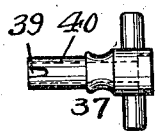


FIG. 11.

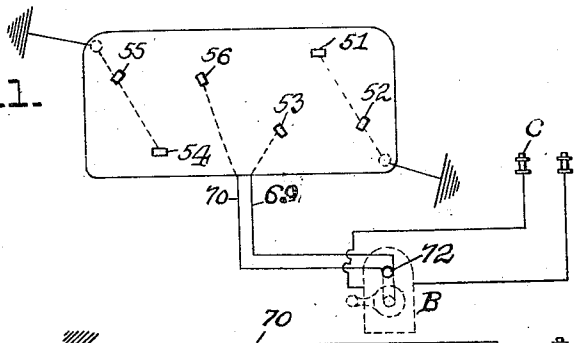
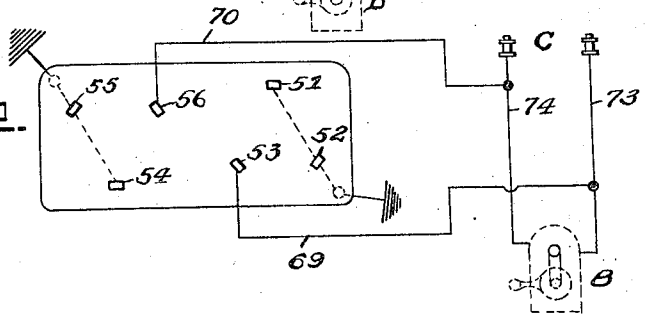


FIG. 12.



Witnesses:

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By J. W. Cooke,

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UNITED STATES PATENT OFFICE.

BRICE P. SWYERS, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO MOTORS LOCK COMPANY OF AMERICA, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF DELAWARE.

SWITCH FOR ELECTRIC CIRCUITS.

1,201,384. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed January 27, 1914. Serial No. 814,656.

To all whom it may concern:

Be it known that I, BRICE P. SWYERS, a citizen of the United States, and resident of Pittsburgh, Southside, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Switches for Electric Circuits; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to switches and more particularly to switches which are designed for use with circuits of a high tension nature, such as the circuits of motor cycles, magnetos, etc.

The object of my invention is to provide a cheap, simple and efficient form of switch or electric lock for high tension circuits and particularly for motor cycle circuits wherein the mechanism of the same cannot be started unless the person operating knows how to manipulate the switch.

A further object of my invention is to provide a switch or lock for high tension circuits which can only be operated by a person familiar with the combination employed.

A still further object of my invention is to provide a double switch or lock for high tension circuits wherein the magneto supplying current to the same will be doubly shunted to ground and to operate the switch controlling the same the person must be familiar with the combinations employed in both shunts before the ground can be removed and the current utilized for starting the mechanism.

My invention consists, generally stated, in the novel arrangement, construction and combination of parts as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct, use, operate and install my improved switch or lock for high tension circuits, I will describe the same more fully referring to the accompanying drawings, in which:—

Figure 1 is a top plan view of the switch showing the double combination feature. Fig. 2 is a side view of device with the casing and cover plate removed and looking in the direction of the arrow in Fig. 1. Fig. 3 is an end view of the same. Fig. 4 is a bottom plan view of the lock with the casing and cover plate removed. Fig. 5 is a top plan view of the cover plate. Fig. 6 is a top plan view of the bottom plate showing the position of the contacts. Fig. 7 is a bottom plan view of the rotary disks as attached to the upper plate. Fig. 8 is an enlarged plan view of the spring contact employed in the rotary disk. Fig. 9 is a sectional view of the switch on the line 9—9 of Fig. 3 looking in the direction of the arrow and with the operating members removed. Fig. 10 is a side view of the operating member employed: Fig. 11 is a diagrammatic view of the connections between my improved lock and an ordinary magneto used for supplying the spark to a motor cycle engine. Fig. 12 is a familiar view showing a different system of connections.

Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing my improved switch A consists of a casing 1 which is formed of any suitable material such as pressed or bent metal and has two circular openings 2 and 3 in the upper face of the same for viewing the indicator dials 4 and 5 on the upper face of the upper plate 6. Between such plate 6 and the upper face of said casing a glass or other transparent plate 7 rests to prevent the exposure of the dials 4 and 5. The lower end of the casing 1 is made in any desired shape for being securely mounted on any mechanism and the shape of casing shown in the accompanying drawings is designed for use with a motor cycle of one particular type but any form may be used.

A pair of shafts 8 and 9 extend through the upper plate 6 and a lower plate 10 while such plates are spaced apart by means of small standards 11, 11′, 12 and 12′ at the corners of the same. These standards 11, 11′, 12 and 12′ are secured to the upper plate 6 by means of screws 13 passing through said plates and into the same and the lower plate 10 is secured to the standards 11 and 12 by screws 14 passing through the same and into said standards but said lower plate is secured to the standards 11′ and 12′ by screws 15 which form binding posts as later explained.

The shafts 8 and 9 have a reduced portion 16 at their upper ends for passing through holes 17 in the upper plate 6 and these holes are located in the center of the dials 4 and 5 which are graduated in any suitable manner. The shafts 8 and 9 are provided with hands 20 and 21 respectively which are firmly secured to the upper ends of said shafts by screws 22 in order to insure of said hands turning with said shafts and the outer ends of such hands are slightly within the periphery of the dials 4 and 5 so that said hands when turned with the shafts will indicate locations on the graduated dials.

On each of the shafts 8 and 9 are rotary disks 23 and 24 respectively which are keyed to said shafts by suitable means so as to insure their turning with the same and immediately above said disks on said shafts are bevel gears 26 and 27 respectively which are also secured to said shaft by suitable keys.

Secured to the under face of the upper plate 6 and directly in line with the shafts 8 and 9 are brackets 28 and 29 which carry bearings 30 and 31 for shafts 32 and 33 respectively. These shafts 32 and 33 are provided with bevel gears 34 and 35 for meshing with the bevel gears 26 and 27 respectively on the shafts 8 and 9 while longitudinal movements of said shafts 32 and 33 is overcome by means of pins 35′ extending through the same and against the bearings 30 and 31.

The casing 1 is provided with holes at the ends of the shafts 32 and 33 and operating members 37 and 38 respectively enter said holes and fit over said shafts for turning the same. These operating members 37 and 38 have a groove 39 at the end of their barrel portions 40 and these grooves fit over the pin 35′ so as to virtually key said shafts and operating members together while said members are prevented from leaving said shafts by screws 41 passing through the same and into the ends of said shafts.

The lower faces of the rotary disks 23 and 24 are provided with annular slots 42 and with recesses 43 around the holes which fit over the shafts 8 and 9, while a third segment 44 of the material included between said slot and recess is cut out to a depth equal to the depth of the said recess but said slot is of greater depth than said recess and cut out segment.

Fitting around the shafts 8 and 9 and located within the recesses 43 on the under face of the rotary disks 23 and 24 are spiral springs 45 which have two outwardly extending arms 46 and 46′ which lie within the cut out segment 44 and rest against the side faces 47 and 47′ formed by said cut-out segment, and said arms have each a curved portion 48 and 48′ respectively continuing out from the ends of the same for fitting within the annular slot 42 between the side faces 47 and 47′ of the portion not included in said cut out segment. The curved portions 48 and 48′ of the spring 45 are each curved on the same radius as the radius of the annular slot 42 and said curved portions are provided at a position immediately beyond the outwardly extending arms 46 and 46′ with a raised portion or contact 49 and 49′ respectively as hereinafter explained.

That part of the annular slot 42 included between the side faces 47 and 47′ beyond the cut out segment 44 is covered by a metal plate 50 of some conducting material at about the center of its depth and such plate is adapted to make contact with the curved portions 48 and 48′ of the spring 45 at all times while said plate will always restrain the spring 45 and prevent the same from leaving said slot.

The upper face of the lower plate 10 is provided with three contacts 51, 52 and 53, and 54, 55 and 56 respectively for each of the rotary disks 23 and 24 and these contacts are raised slightly above the upper face of said plate for the purpose of engaging the plate 50 and the raised portions or contacts 49 and 49′ of the spring 45 at suitable intervals as hereinafter described. These contacts 51, 52 and 53 for use with the rotary disk 23 and the contacts 54, 55 and 56 for use with the rotary disk 24 are so located that they extend slightly into the annular slot 42 of their respective disk, and are held in position by screws 57 formed integral with said contacts and having small washers 58 and nuts 59 thereon for holding the said contacts tightly against the said plate. These washers 58 and nuts 59 rest in counter sunk holes 60 while between the said holes below the terminals 51 and 52 below the rotary disk 23 and between the said holes below the terminals 54 and 55 below the rotary disk 24 grooves 61 and 62 respectively extend and these grooves are for the purpose of passing wires 63 and 64 between the respective screws 57 on said contacts and to the screws 15 at the corners of the lower plate 10 so that the wires 63 and 64 will be grounded through the standards 11′ and 12′ and through the respective parts of the switch to the frame of the machine.

The cover plate 65 fits over the lower face of the lower plate 10 and is properly recessed to provide for the extending nuts and screws 57 and 59 and is also recessed from each of the said screws under the contacts 53 and 56 and said recesses 66 and 67 extend to an opening 68 in said cover plate so that wires 69 and 70 may be connected to said screws and passed through said recesses and opening in order to wire the said lock into the electric circuit. The cover plate is secured in the casing 1 by means of small screws passing through the sides of said casing and into the edges of said plate.

The operation of my improved switch device or electric lock can best be understood by considering the same in connection with Fig. 11 which shows the connections between an ordinary motor cycle and my improved device. The wires 69 and 70 after leaving the opening 68 in the cover plate 65 run to and are connected with the distributer post 72 of the magneto B. The contacts 51 and 52 below the disk 23 and the contacts 54 and 55 below the disk 24 since they are connected together and then to ground by the wires 63 and 64 respectively form two complete circuits or shunts to ground with the wires 69 and 70 so long as there is some connection of the contacts 53 and 56 with the wires 63 and 64 respectively. When it is desired to start the engine of the motor cycle the operator, knowing the combination employed, turns the operating member 37 so as to rotate the shaft 8 and rotary disk 23 through the medium of the bevel gears 34 and 26 and shaft 32. The disk 23 is rotated in the direction of the arrow in Fig. 9. Consider the contact portion 49′ between the contacts 51 and 52 and the contact portion 49 between the contacts 52 and 53. As the disk 23 is rotated in the direction of the arrow the contact portion 49′ engages the contact 52 and the contact portion 49 engages the contact 53. The contact portion 49′ will readily pass over the contact 52 as the arm 46 is resting firmly against the side face 47′ and the pressure exerted thereby in the turning of the disk 23 will cause the said contact portion to be depressed sufficiently to pass over said contact. The contact portion 49, however, will bear firmly against the contact 53 and will be held thereby so that the arm 46 will be drawn away from the side face 47 and the contact portion 49′ will approach the contact portion 49. The contact portion 49 will thus be held by the contact 53 until the contact portion 49′ bears against it and exerts sufficient pressure to depress it slightly, whereupon it springs around and the arm 46 again rests against the side face 47 of the disk 23. At this point the contact portions 49 and 49′ are resting on different sides of the contact 53 with the contact portion 49′ engaging therewith. During the rotation of the disk 23 the hand 20 has been turning and the operator knows when the contacts are in the above described position as the hand will be pointing to a known number. As soon as the hand is thus set the disk 23 is rotated a short distance in the reverse direction, so that the contact portions 49 and 49′ will be about midway between the contacts 51 and 53 and 53 and 52 respectively, and the contact 53 will be disengaged from any connecting part except the wire 69 so that the ground connection will be broken and the current from the magneto B utilized for supplying the necessary spark to the spark plugs C.

The positions of the several contacts need not be understood by the operator as all he will be required to know is the combination of numbers for opening the ground circuits and the hands on the dials will indicate different combinations of numbers in each individual lock.

Fig. 12 shows another manner of connecting the lock into the circuit wherein the wires 69 and 70 will be connected to the wires 73 and 74 respectively leading to the spark plug C, but in this case each of the disks 23 and 24 with their coöperating parts will control one of the spark plugs C so that one cylinder of the engine may be operating and one shunt down.

It will readily be seen that with my improved switch or lock the owners of motor cycles will be safeguarded against theft of the same as it is impossible to operate the engine without knowing the combination of the lock. It will also be seen that that portion of the upper face of the lower plate 10 immediately below the annular slot 42 may be serrated in order to click against the raised portions 49 and 49′ of the spring 45 or another part so as to confuse any person tampering with the same.

Various modifications and changes in the design, construction, operation, application and manner of connecting my improved switch may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In a permutation switch, a series of electrically connected fixed contacts, an arc shaped contact member rotatable thereover, an independent fixed contact, and spring contact means associated with said contact member adapted, on rotation thereof, to be held in engagement with the independent contact, until said member is moved to a predetermined position.

2. A switch including a plurality of fixed contacts, certain of said contacts being permanently electrically connected, a segmental contact member movable over the fixed contacts, and contact means movable with the segmental contact and between the terminals thereof, said segmental contacts and said last mentioned means being adapted to electrically connect all the contacts, except when said contact means is moved to a predetermined position.

3. A switch including a plurality of fixed contacts, certain of said contacts being permanently electrically connected, a segmental contact member movable over the fixed contacts, and yieldable contact means movable with the segmental contact and between the terminals thereof, said segmental contacts

and said last mentioned means being adapted to electrically connect all the contacts, except when said yieldable contact means are moved to a predetermined position.

4. A switch including a plurality of fixed contacts, certain of said contacts being permanently connected, a segmental contact member rotatable over said fixed contacts, and a yieldable contact member movable between the terminals of the segmental contact, said yieldable contact being also movable with and controlled by said segmental contact, and said yieldable and segmental contacts being adapted to connect all of said fixed contacts, except when said yieldable contact member is moved to a predetermined position.

5. In a permutation switch, a series of electrically connected fixed contacts, an arc shaped contact member rotatable thereover, an independent fixed contact, spring contact means associated with said contact member adapted, on rotation thereof, to be held in engagement with the independent contact, until said member is moved to a predetermined position, and means for indicating said predetermined position.

6. An electric switch including a series of fixed contacts, a segmental contact rotatable over the fixed contacts, a yieldable contact movable with and between the terminals of the segmental contact for connecting the segmental contact with any contact located between its terminals during a partial revolution of the segmental contact, means for releasing the yieldable contact from engagement with any one of the fixed contacts upon the movement of the segmental contact a certain distance with respect thereto, and means for indicating the position of said yieldable contact.

7. An electric switch including a plurality of fixed contacts, a segmental contact movable over the fixed contacts, a double arm yieldable contact member movable with the segmental contact and engageable with any of the fixed contacts which may be located between terminals of the segmental contact, means for releasing said yieldable contact from any one of said fixed contacts at a predetermined point in the rotation of the segmental contact, and means for indicating the position of said yieldable contact.

In testimony whereof I, the said BRICE P. SWYERS, have hereunto set my hand.

BRICE P. SWYERS.

Witnesses:
T. B. HUMPHRIES,
J. N. COOKE.