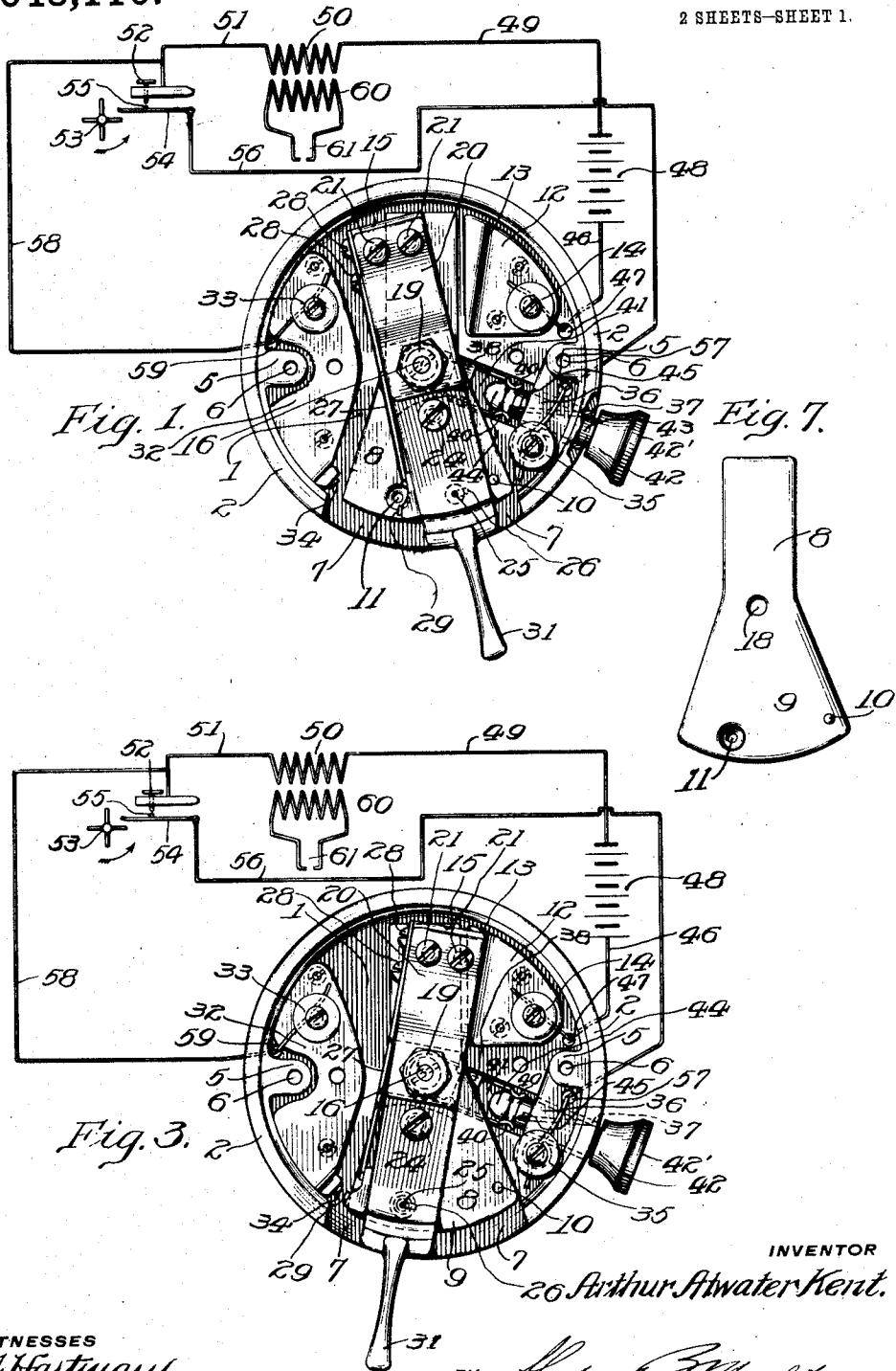


A. A. KENT.
 COMBINED SWITCH AND STARTING DEVICE.
 APPLICATION FILED FEB. 25, 1908.

1,043,110.

Patented Nov. 5, 1912.

2 SHEETS—SHEET 1.



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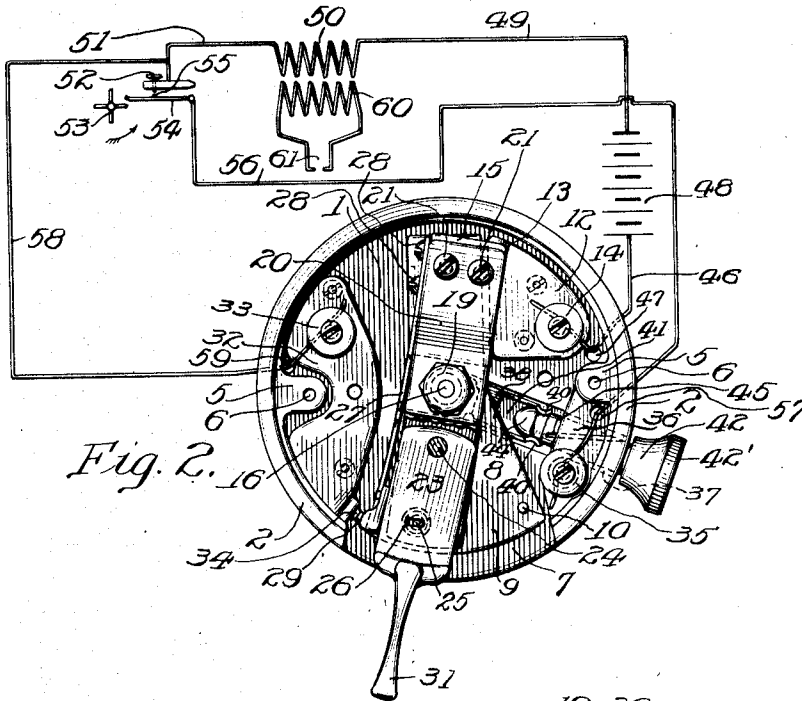


Fig. 2.

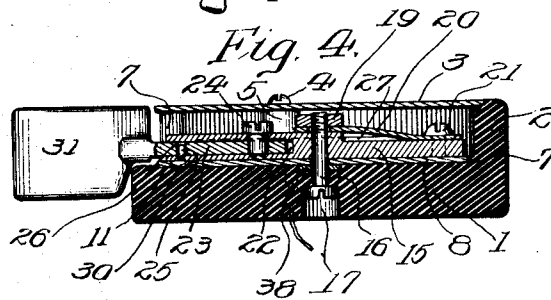


Fig. 4.

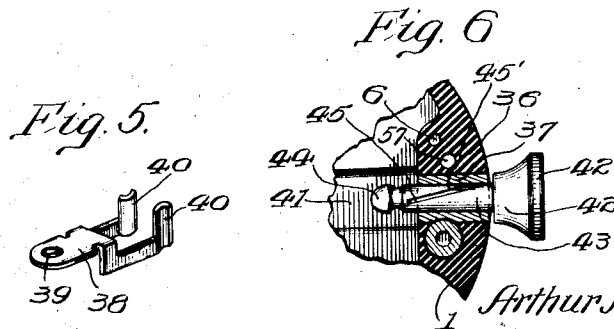


Fig. 5.

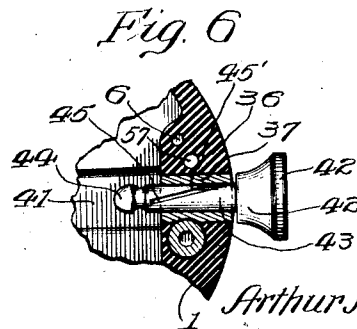


Fig. 6.

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ARTHUR ATWATER KENT, OF PHILADELPHIA, PENNSYLVANIA.

COMBINED SWITCH AND STARTING DEVICE.

1,043,110.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed February 25, 1908. Serial No. 417,718.

To all whom it may concern:

Be it known that I, ARTHUR ATWATER KENT, a citizen of the United States, and a resident of Philadelphia, county of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Combined Switches and Starting Devices, of which the following is a full, clear, and exact disclosure.

My invention relates to combined electrical switches and starting devices, and especially to that class of devices which are used on the sparking circuits of combustion engines for automobiles, motor-boats, etc., although my invention is applicable to many other uses and purposes, and is not to be construed as limited to any one of the forms or embodiments of my invention which I have described below as illustrative of my invention.

My invention consists of a circuit closing device adapted to control or connect or open or close a plurality of electrical circuits by means of a single hand-operated member which by its motion in one direction is adapted to close a plurality of circuits, and when released, cuts out one or more of the circuits which it previously closed.

My invention is especially applicable to the controlling of sparking circuits of multiple-cylinder internal combustion engines in which each cylinder is put at the proper time by a distributor into circuit with a contact device or timer for the purpose of causing a spark in the proper cylinder. In such circuits it is usual to have a contact device or timer mechanically connected with the crank shaft of the engine, and the said device is operated thereby to intermittently make and break the circuit at the proper time. After the engine has been once started the circuit is automatically and intermittently opened and closed through the said contact device or timer. The difficulty with such systems has been that after the engine has stopped, some special provision has to be made to make the first spark to explode the charge in the proper cylinder, inasmuch as, when the engine is stopped, the circuit is usually broken at the time. It is further necessary to provide a switch for the primary of the sparking circuit to prevent waste of the current in the primary circuit whenever the timer happens to hold said circuit closed when the engine is stopped.

By my invention a single device may be used to cause the first spark and to open and close the circuit.

The objects of my invention are to provide a simple, inexpensive, and durable device for opening and closing one or a plurality of circuits; to close a starting circuit, and a sparking circuit simultaneously or consecutively; to construct a combined switch and starting device so that the circuits may be controlled by a single hand or mechanically operated movable member; to operate the said device so that the movement which closes the switch also closes a second or starting circuit; to cause the device to automatically cut out all but one circuit as soon as the movable or operating member of the switch is released after the switch is closed; and to cause the said movable or switch-operating member after the main current has been closed to automatically move to a position out of engagement with all contacts with the switch except those through which the main current is closed.

Other objects of my invention will appear in the specification below.

In the drawings, forming a part of this specification, and in which the same reference characters are used to refer to the same parts throughout the various views, Figure 1 is a plan view, with the cover removed, of my combined switch and starting device, connected with an electrical circuit containing a mechanical contact device or timer, an induction coil and a battery, the parts being in the position they occupy when the circuit through the timer is broken. Fig. 2 is like view of the same with the circuits closed through and also around the timer, a part of the switch member being shown broken away to expose the starter. Fig. 3 is a view similar to Fig. 1 with the parts in the relative position they assume when the handle is released after having been moved to the positions shown in Fig. 2. Fig. 4 is a sectional view taken longitudinally of the main switching member. Fig. 5 is a perspective view of a detail of construction. Fig. 6 is plan view, partly in section, of the plug for cutting the switch contacts into the main circuit. Fig. 7 is plan view of a detail of construction.

My combined switch and starting device consists of a casing having a base portion

of suitable insulating material and side walls 2 extending upwardly therefrom and adapted to support a cover or plate 3 in any suitable way as by screws 4 passing through said cover 3 into lugs 5—5 having tapped holes 6—6. The side walls 2 are cut away as at 7 to allow the operating handle to extend outside the casing as shown in the various figures and as will be further explained below.

Rigidly fastened to the base 1 is a metallic or other conductive plate 8 extending substantially diametrically across the said base 1 and one end 9 of said plate is preferably widened, the said end being provided on one side with a rigid stop pin 10, and on the other side with a countersunk hole 11 as shown in Fig. 7. Also fastened to the base 1 and adjacent, but out of contact with the narrower end of the plate 8 is the stationary switch contact consisting of a plate 12 of metal or other suitable conductive material, having its side nearest the said plate 8 beveled downwardly as at 13 so as to allow the movable switch-contact to slide smoothly over it, and the said plate 12 is further provided with a binding post 14.

The main movable switch member consists of a metallic bar 15 pivoted to swing on a screw 16 passing through the hole 17 in the base 1, through the hole 18 in the plate 8 and through the bar 15. The end of said screw 16 is provided with a nut 19. To the inner end and in the top of the said bar 15, a leaf spring 20 is secured by screws 21—21 and the free end of said spring extends under the nut 19 and tends to hold the said bar 15 firmly but yieldingly against the plate 8. The opposite end of the said bar 15 is split as at 22 to receive a lever 23 fitted within the split or channel 22 and mounted to swing about the screw 24 as a center. The motion of said lever 23 is limited, however, by a pin 25 secured to the bar 15 and passing through an elongated slot 26 in the said lever 23. A leaf spring 27 is also secured to the side of the said bar 15 by screws 28—28 and its free end, pressing against the lever 23 normally holds said lever in the relative position to the bar 15 as shown in Figs. 1 and 3. Said lever 23 is of conductive material and is provided with a platinum contact point 29. I preferably make the head 30 of the pin 25 rounded and locate it and the countersunk hole 11 at the same distance from the pivot screw 16, so that when the bar 15 is swung to bring the head over the said hole 11, the spring 15 will force the head 30 into said hole 11 and the bar 15 will be swung no farther than the position shown in Figs. 2 and 3. The outer end of the lever 23 extends through the cut away portion 7 of the walls 2 of the casing and terminates in a handle or finger piece 31. Also fixed to

the base 1, adjacent on one side of the widened end 9 of the plate 8, but out of contact therewith, is a plate 32 of conductive material and provided with a suitable binding post 33 and a stationary platinum contact-point 34 adapted to cooperate with the contact point 29 when the bar 15 and lever 23 are swung to the position shown in Fig. 3.

I have shown the plate 8 as electrically connected to the binding-post 35 in the following manner. The wall 2 of the casing is thickened as at 36 and a metallic bushing 37 is tightly fitted within a suitable hole therein, the said bushing making a good contact with the said binding-post 35. Under the plate 8 and held tightly against the same, is a connecting piece 38; having on one end a hole 39 through which the screw 16 passes and by which it is securely held. The connecting piece is provided with a pair of resilient arms 40—40 which are positioned in a suitable channel 41 in the base 1.

A plug 42 having a button or handle 42' and a stem 43 is adapted to be slid, at will, into and out of the bushing 37 and the end of said stem is provided with the usual knob 44, adapted to be forced between the resilient arms 40—40 of the connecting piece 38. Heretofore it has been usual to split the stem of the plug axially for substantially its whole length. Such construction, however, I have found to be very unsatisfactory inasmuch as the slot in the plug was liable to come opposite the arms 40—40 of the connecting piece 38, with the result that a poor electrical connection was made between the knob and the said arms, and further because the stem would not fit tightly within the bushing 37 and a poor connection was made at that point. I therefore provide the stem with an oblique cut or kerf 45 opening near the button or handle and terminating adjacent the groove forming the knob 44. The knob 44 is thus left intact and without any objectionable slot to interfere with the connection between the knob and the arms 40—40. The said kerf or cut 45 is then spread slightly so that the stem 43 will be pressed by the tongue 45' firmly against the bushing 37 and a good electrical connection established between the same.

Before describing the operation of my combined switch and starting device I will show how it may be connected up with the sparking circuit of a combustion engine. From the contact plate 12 and binding post 14 a lead 46 passes through a suitable hole 47 in the base 1, to the battery 48, or other suitable source of electrical energy, thence through lead 49 to the primary winding 50 of the induction coil and by lead 51 to the stationary contact point 52 of a mechanical contact device or timer which is diagrammatically shown as comprising a ratchet wheel 53, connected in any suitable manner to be

rotated from the crank shaft of the engine (not shown) which ratchet wheel when put in motion in the direction of the arrow, engages a resilient contact arm 54 carrying contact point 55 and intermittently makes and breaks the circuit between the said contact points 52 and 55. From the arm 54 a lead 56 extends to the binding post 35 through a suitable hole 57 in the base 1 of the casing. From the binding post 33 a lead 58 passing through a hole 59 is also connected to the stationary contact point 52 of the timer.

The secondary winding 60 of the induction coil is shown as having its terminals connected to a spark plug 61.

The operation of my device is as follows: When stopped the parts are in the positions shown in Fig. 1, the handle 31 to the right, the bar 15 against the stop pin 10 and out of contact with the switch-contact 12 and the contact-points 52 and 55 of the timer also out of engagement. To start the engines, that is to say to close the circuit and cause the first spark in the spark plug 61 the handle 31 is pressed to the left. This causes the lever 23 to turn on its pivot 24, against the tension of the spring 27 until the other end of the elongated slot 26 engages the pin 25, when the bar 15 is carried along with the lever 23 and its inner end rides up over the beveled end 13 of the contact 12 and closes the circuit through the switch. As long as the contact-points 52 and 55 are separated no current can flow through the coil 50. As the handle 31 is pressed farther to the left the contact point 29 on the lever 23 engages the contact 34 on the plate 32 and the current flows from battery 48 lead 49 coil 50, lead 51, lead 58, plate 32, contact points 34, 29, bar 15, plate 12, and lead 46 back to battery 48.

At the same time that the contact points 29 and 34 engage the rounded head 30 of the pin 25 will register with the countersunk hole 11 in the plate 8 and will be thrust into it under the action of the spring 20 thus locking the bar 15 in the position shown in Figs. 2 and 3. As soon as the handle 31 is released, however, the spring 27 swings the lever 23 back to the position shown in Fig. 3 thus separating the platinum contacts 29 and 34 and causing a spark in the plug 61. This spark causes the first explosion in the engine which begins to turn and consequently rotate the ratchet wheel 53, making and breaking the circuit at the contact points 52 and 55 of the timer.

The operation of my device would be slightly different if the tension of the spring 27 were sufficiently great to carry the bar 15 with the lever 23 when the handle 31 is pressed to the left, in which case the lever 23 would not turn on its pivot 24 until the head 30 of the pin 25 was forced into the countersunk hole 11 of the plate 8 and the bar 15 locked

in the position shown in Fig. 2. Then a further pressure on the handle 31 would cause the lever 23 to swing on its pivot 24, and the contact points 29 and 34 brought together.

It is, of course, obvious that if the first spark failed to start the engine, the contacts 29 and 34 could be brought together and thus separated as often as desired until the engine begins to run steadily.

The plug 42 is usually removed when the handle is swung to the right, as in Fig. 1 so as to prevent any unauthorized person from starting the engine by pressing the handle 31 to the left.

Although I have illustrated one of the uses to which my invention may be put, I do not wish to be construed as being limited solely to this embodiment thereof, since many changes may be made in construction without departing from the spirit of my invention so long as they fall within the scope of the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. In a sparking circuit the combination of a timer for making and breaking the circuit to cause a spark, a main switch member for opening and closing the circuit through said timer, a secondary switch member actuated with said main switch member in closing the circuit for closing the circuit around said timer, and means for automatically breaking the circuit around said timer as soon as the said main switch member is released, the circuit through said main switch member remaining closed.

2. In a combined switch and starting device the combination of a timer, movable means to close the circuit through said timer, and to hold said circuit so closed, means carried by said movable means to close the circuit around said timer and means to hold said circuit around said timer open whenever the pressure exerted against said means to close said circuit around said timer is removed.

3. In a combined switch and starting device the combination of a timer, manually movable main switching means to open and close the circuit through said timer, supplemental switching means operated with said main switching means in closing the circuit to close said circuit around said timer, and means to automatically break the circuit around said timer at the instant said main switching means are released, the circuit remaining closed through said main switching means and said timer.

4. In a combined switch and starting device, a sparking circuit, a timer, a handle, and means operatively connected with said handle to break the circuit when the handle is moved in one direction and to close circuit.

through and also around said timer when said handle is moved in the opposite direction.

5 5. In a sparking circuit, a timer, a handle, means operatively connected with said handle to break the circuit when the handle is moved in one direction and to close the circuit through and also around said timer when the same is moved in the opposite direction and means for moving said handle to break said circuit around the timer when the handle is released after having been swung in the direction to close said circuit through the timer.

15 6. In a sparking circuit, a timer, a movable circuit closing member, a stationary contact cooperating therewith, a lead around said timer, a contact connected with said lead and located adjacent movable member and a yielding lever mounted on said circuit closing member to move said member and to engage said second mentioned contact when the circuit is closed through said movable member and first mentioned contact.

25 7. In a sparking circuit the combination with a contact device for making and breaking the circuit to cause a spark, of a starting circuit around said contact device, means to substantially simultaneously close said circuit through said contact device and said

starting circuit around said device and means to automatically break the circuit around said timer operative upon the release of said means to close the circuit through said timer and without breaking the circuit through said timer. 35

8. In a sparking circuit the combination with a contact device of a circuit through said contact device and a circuit around said contact device and a switch to close both circuits substantially simultaneously by the movement of said switch in one direction. 40

9. In a sparking circuit a combined switch and starting device comprising a timer, movable means to open and close a circuit through said timer, means mounted upon said movable means and carried thereby to close said circuit around said timer and means to hold said circuit around said timer broken whenever the pressure exerted against said means to close said circuit around said timer is removed. 50

In witness whereof I have hereunto set my hand and seal this 19th day of February, 55 A. D., 1908.

ARTHUR ATWATER KENT. [L. S.]

Witnesses:

ALSTON B. MOULTON,
ALEXANDER PARK.