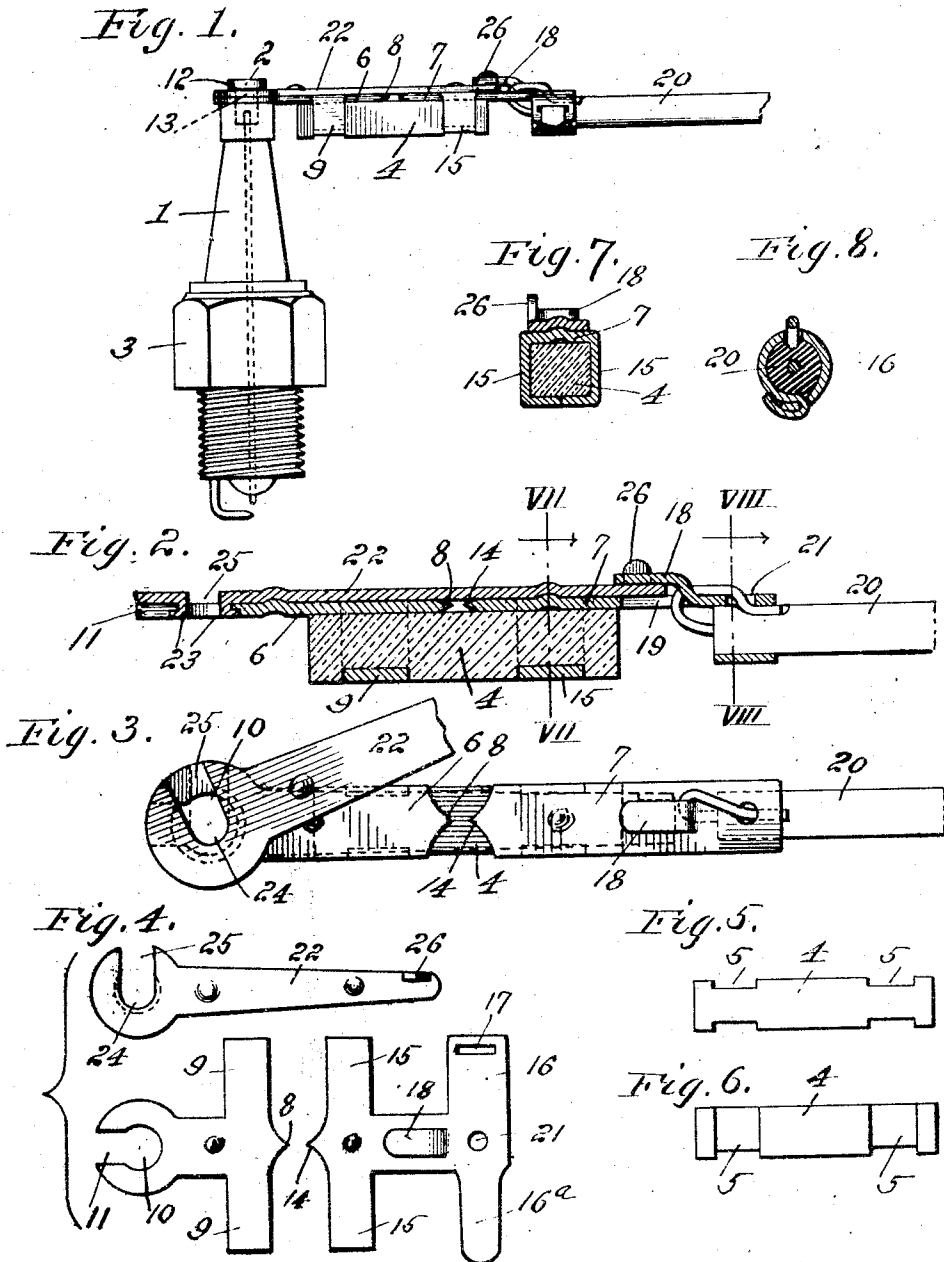


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 TERMINAL CONNECTOR FOR SPARK PLUGS FOR EXPLOSIVE ENGINES FOR AUTOMOBILES
 AND OTHER USES.

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1,062,629.



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UNITED STATES PATENT OFFICE.

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TERMINAL CONNECTOR FOR SPARK-PLUGS FOR EXPLOSIVE-ENGINES FOR AUTOMOBILES AND OTHER USES.

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Specification of Letters Patent.

Patented May 27, 1913.

Application filed January 11, 1910. Serial No. 537,581.

To all whom it may concern:

Be it known that I, CHARLES W. BECK, a citizen of the United States, and resident of Rockville Center, county of Nassau, and State of New York, have invented certain new and useful Improvements in Terminal Connectors for Spark-Plugs for Explosive-Engines for Automobiles and other Uses, of which the following is a complete specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a side elevation of the spark plug showing my improved terminal connector in position; Fig. 2 a longitudinal vertical sectional view of the connector; Fig. 3 a plan view showing the terminal switch open; Fig. 4 a detail plan view of the metal parts of the connector detached; Fig. 5 a plan view of the insulating block; Fig. 6 a side elevation thereof; Fig. 7 a detail cross sectional view taken on the line VII—VII of Fig. 2; and Fig. 8 a similar view on line VIII—VIII of Fig. 2.

In the use of the ordinary spark plug connecting means it is extremely difficult to determine whether or not the plug is sparking properly. It is the common practice to disconnect one terminal wire from the plug and hold the end thereof close to the other terminal wire or to the other portion of the plug. In testing a spark plug in this manner it requires two attendants or operators, one to hold the terminal wire and the other to crank the engine.

It is the main object of this invention to provide a terminal connector of simple form by means of which it may be readily determined whether or not any particular plug is sparking. This is accomplished by providing a terminal with a switch device and a pair of supplemental visible sparking points so that by opening the switch a spark will be visible between the supplemental sparking points if the spark plug is working properly. It will therefore be seen that in order to test any particular spark plug it will only be necessary to open the terminal switch and to observe the supplemental sparking points when cranking the engine. It is manifest that any one of the spark-plugs may be tested without detaching the terminal connector from the spark plug.

Another object of the invention is to pro-

vide a simple means for detachably connecting one of the terminal wires to the post terminal of a spark plug.

Referring to the various parts by numerals 1 designates the spark plug which may be of any suitable construction formed with the usual post terminal 2 and the binding nut terminal 3, each of which is connected to one of the sparking points.

The terminal connector consists of an elongated insulating block 4 formed of any suitable material. This block is rectangular in transverse section, as indicated in Fig. 7, and is formed near its ends with the shallow transverse grooves 5. The block is flat on its upper surface, as shown clearly in Fig. 6. Secured to this insulating block are the contact plates 6 and 7, said plates lying on the upper surface of the block. The plate 6 is provided at its inner end with a supplemental sparking point 8 and with the two securing straps 9, said straps fitting one of the grooves 5, and being adapted to be bent around the insulating block and to hold the plate 6 in position thereon. The plate 6 at its outer end is formed with an aperture 10 having a contracted entrance slot 11, said slot extending longitudinally of the plate as shown clearly in Fig. 4. The object of providing the aperture and the contracted entrance is to permit the plate to be connected to the post terminal 2, the slot 11 being of sufficient width to permit the plate to be slid under the button 12 on the stem 13 of the terminal, the aperture 10 being smaller than the button 12 to prevent the upward withdrawal of the plate from the terminal button. The plate 7 on the other end of the insulating block is provided with a supplemental sparking point 14, and with straps 15 which fit in the adjoining groove 5 in the insulating block, and are adapted to be bent around said block to secure the plate thereto. The supplemental sparking points 8 and 14 lie close together so that a spark will be visible between them upon the closing of the electric circuit. The plate 7 is formed with a connecting lug 18, said lug being stamped upwardly from the main body of the plate, thereby forming an aperture 19. The terminal wire 20 is adapted to be connected to the plate 7 by means of the strap 16. Said strap is bent around the in-

insulation on the terminal wire and the reduced end 16* is passed through the slot 17 and then bent back upon itself to securely hold the wire to the plate, as indicated in Fig. 8. The stripped or uninsulated end of the wire is passed upwardly through the aperture 19 around the connecting lug 18 and then through an aperture 21 in the plate 7, said wire terminating between the plate 7 and the insulation around the wire as clearly shown in Fig. 2 of the drawings.

To detachably secure the device to the post terminal 2 of the spark plug and to serve as a switch bar for bridging the gap between the supplemental sparking points, a terminal switch and lock 22 is provided. This switch is formed with a flange 23 which passes through the aperture 10 and is bent under, as shown in Fig. 2, to secure said switch plate to the plate 6 so that it may be rotated thereon. The switch and lock plate is provided with an aperture 24 and the entrance slot 25, said slot being arranged transversely of the switch plate so that it will lie at right angles to the slot 11 when the main body of the switch plate is parallel with the main part of the plate 6. By giving the switch plate a quarter turn so that its main body will be at right angles to the longitudinal line of the plate 6, the entrance slots 25 and 11 will register, and the entire device may be slid under the button 12 of the spark plug. When the stem 13 of the spark plug is in the apertures 10 and 24 the switch plate may be rotated to bring the body portion thereof into engagement with the connecting lug 18, thereby placing the entrance slots at right angles to each other and securely locking the connector to the terminal 2 and bridging the gap between the supplemental sparking points 8 and 14. The switch plate is provided with an upstanding finger piece 26 which is adapted to engage the connecting lug 18, the end of the switch plate fitting under said lug, as shown clearly in Fig. 2. The plates 6 and 7 are provided with the upwardly projecting locking lugs which are formed by stamping the metal upwardly, and the switch plate is provided with corresponding recesses in its under side so that when the switch plate is swung to its closed position the projections on the plates 6 and 7 will snap into the depressions in the under side of the switch plate and serve to lock the switch plate in position against accidental displacement. It will thus be seen that by moving the switch plate outwardly about an eighth of a revolution, or just sufficiently to disconnect said switch from the plate 7, the circuit from the terminal wire to the terminal 2 will be interrupted, a gap being formed between the supplemental sparking points 8 and 14. As these points are visible it may be readily noted whether or not a spark is formed be-

tween them when the engine is cranked or otherwise operated. By opening any one of the terminal switches it may be readily noted whether or not the spark plug is operating properly, and to disconnect the terminal wire from the spark plug, it is only necessary to turn the switch plate at right angles to the main body of the connector to thereby bring into register the entrance slots 11 and 25. By reason of the relative location of the slots 25 and 11, it is manifest that the switch lever 22 may be turned sufficiently to uncover the sparking gap without releasing the connector from the spark plug. This is important as it is desirable to provide means for maintaining the connector locked to the spark plug while the sparking gap is open.

From the foregoing it is manifest that I provide a very simple terminal connector for spark plugs which may be readily and cheaply manufactured; which will form an efficient connector, and which will provide a pair of visible sparking points, by means of which, and the terminal switch, the operation of the connected spark plug may be readily tested.

It will, of course, be understood that in the use of the term "plate," I do not wish to be limited to the exact form of contact plates shown in the drawing, said term being used in its broad sense and including any form of contact device.

It will, of course, be understood that the switch and locking plate 22 may be pivoted to the contact plate 6 in any suitable manner, and I desire it understood that I do not wish to be limited to the exact form of the pivot shown.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A terminal connector comprising a metal part adapted to be connected to the end of a terminal wire, a metal part adapted to be connected to a spark plug, a switch pivotally mounted on said latter part and formed with means to engage a spark plug terminal, said means being adapted to lock said part to a spark plug, each of said parts being provided with a supplemental sparking point, means for insulating said parts from each other, the switch plate in its locking position bridging the gap between the sparking points and electrically connecting the terminal wire to the spark plug.

2. A terminal connector comprising a block of insulation, two contacts connected thereto at opposite ends and separated from each other, each of said contacts being formed with a supplemental sparking point, a sparking gap being formed between said points, a movable switch carried by one of said contacts and formed with means to detachably lock one contact to a spark plug, means carried by the other contact for con-

necting it to a terminal wire, the switch device in its locking position bridging the space between the contacts and electrically connecting the terminal wire to the spark plug.

3. A terminal connector comprising a block of insulating material, two connector plates secured thereto, and insulated from each other, means carried by one of said plates for connecting it to a terminal wire, and rotatable means carried by the other plate to detachably connect it to a spark plug, said means in its locked position electrically connecting the terminal wire to the spark plug.

4. A terminal connector comprising a contact part adapted to be connected to a terminal wire, a contact part adapted to be connected to a spark plug, each of said parts being formed with a supplemental sparking point, a block of insulation for supporting and insulating said parts from each other, and movable means for bridging the gap between said points and electrically connecting the terminal wire to the spark plug.

5. A terminal connector comprising a block of insulating material formed with transverse grooves therein, a pair of contact plates formed with bendable straps adapted to fit the grooves in said block, each of said plates being formed with a supplemental sparking point, one of said plates being formed with means for attaching it to a terminal wire, the other plate being provided with an aperture and an entrance slot, a rotatable switch plate mounted on the latter contact plate and provided with an aperture and a contracted entrance slot, the aperture registering with the corresponding aperture in the contact plate and the entrance slot lying normally at right angles to the entrance slot in the contact plate, the main body of the switch device bridging the gap between the sparking points and electrically connecting the terminal wire with a spark plug when said device is in its locked position and its entrance slot is at right angles to the entrance slot on the contact plate.

6. A terminal connector comprising a block of insulating material, two connector plates secured thereto and insulated from each other, means carried by one of said plates for connecting it to a terminal wire, and a movable device carried by the other plate, said device being formed with means to detachably lock it to a spark plug terminal, said device in its locked position bridging the space between the connector plates and electrically connecting the terminal wire to the spark plug.

7. A terminal connector comprising a block of insulating material, two connector plates secured thereto and insulated from each other, a pivoted device carried by one of said plates, said device being formed at

one end with means for engaging the terminal of a spark plug, and at its other end with means for bridging the space between the two connector plates whereby when said device is in its locked position it will electrically connect the two plates together, one of said plates being formed with means to connect it to a terminal wire.

8. A terminal connector comprising a block of insulating material, two connector plates secured thereto and insulated from each other, a sparking gap being formed between said plates, and a movable device carried by one of said plates, said device being formed with means to detachably lock it to a spark plug terminal, and with means to bridge the gap between the two connector plates when said device is in its locked position, whereby when said device is in engagement with a spark plug terminal the gap between the two connector plates will be bridged by a conductor in engagement with both of the connector plates.

9. A terminal connector comprising a block of insulating material, two connector plates secured thereto and insulated from each other, a spark gap being arranged between said plates, one of said connector plates being formed with an aperture near one end adapted to receive a terminal of a spark plug, a locking device mounted on said plate and formed with a slot therein adapted to receive the spark plug terminal and formed with means to bridge the gap between the connector plates when said device is in locking engagement with the spark plug terminal whereby the connector may be locked to a spark plug and the space between the connector plates will be bridged by the locking device.

10. A terminal connector comprising a block of insulating material, two connector plates secured thereto and insulated from each other, a spark gap being formed between said plates, one of said plates being formed with a slot open at one end and adapted to receive a spark plug terminal, a pivoted locking device carried by said plate and formed with a slot adapted to engage the spark plug terminal and to lie in its locked position at substantially right angles to the slot in the connector plate, said locking device being also provided with means to bridge the space between the connector plates when said device is in its locked position, whereby when the connector is locked to a spark plug terminal current may flow through the bridging and locking devices to said terminal.

11. A terminal connector comprising a block of insulating material, a pair of contact plates formed with bendable strips adapted to be bent around said insulating material to connect the plates thereto, a spark gap being arranged between said

plates, one of said plates being formed with means for attaching it to a terminal wire, the other plate being provided at its free end with a slot to receive the terminal of a spark plug, a rotatable switch plate mounted on the latter contact plate and provided with a slot adapted to engage the spark plug terminal and in its locked position to lie at substantially right angles to the slot in the contact plate, a portion of the switch device bridging the gap between the contact plates when said switch device is in its locked position, whereby when the switch device is in locking engagement with the spark plug terminal it will bridge the contact plates and current may flow across said gap through said switch plate.

12. A terminal connector comprising a contact part to be connected to a terminal wire, a contact part to be connected to a

spark plug, means for supporting said parts and insulating them from each other, said parts being separated to form a spark gap between them, a movable bridging and circuit closing device to electrically connect the two contact parts across the sparking gap and provided with means to lock the connector to a spark plug terminal when said bridging piece electrically connects the two contact parts, said bridge piece being so mounted that it may be moved away from the spark gap without unlocking the terminal from the spark plug.

-- In testimony whereof I hereunto affix my signature in the presence of two witnesses this 31st day of December 1909.

CHARLES W. BECK.

Witnesses:

WM. R. DAVIS,

R. T. SMITH.