June 6, 1933. C. HOOGENDORN 1,912,980

WATERPROOF HOUSING FOR SPARK PLUGS

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Fig. 1.

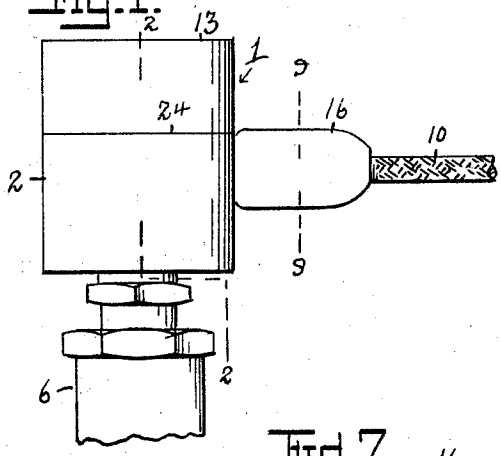


Fig. 2.

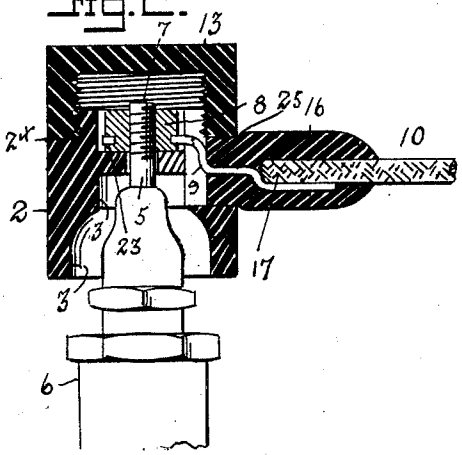


Fig. 7.



Fig. 8.

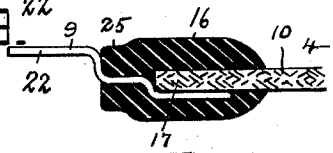


Fig. 3.

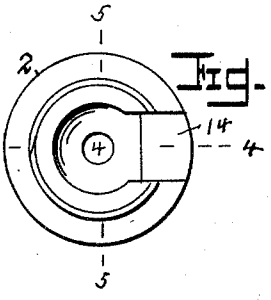


Fig. 6.

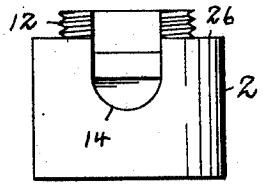


Fig. 9.

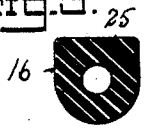


Fig. 4.

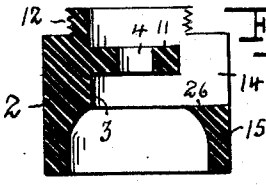
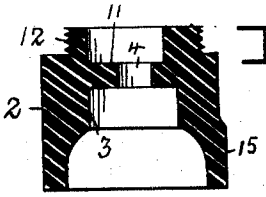


Fig. 5.



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Fig. 10.

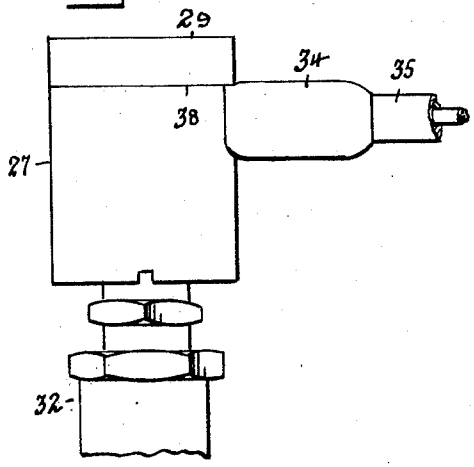


Fig. 11.

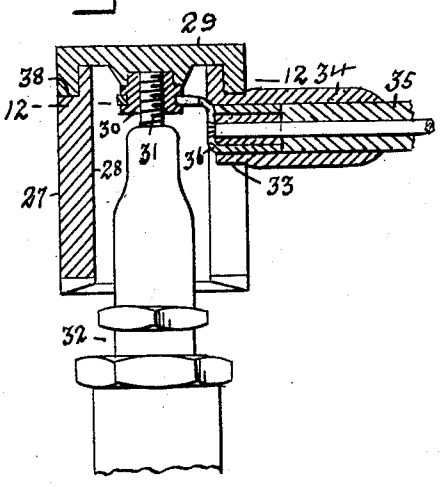


Fig. 12.

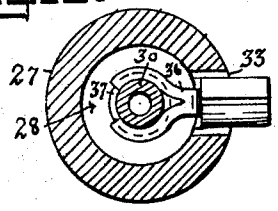
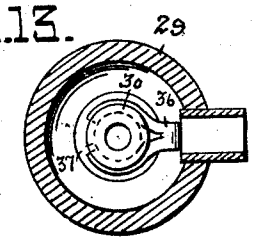


Fig. 13.



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Fig. 14.

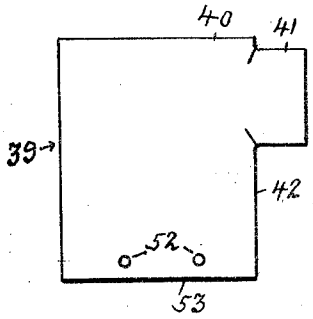


Fig. 16.

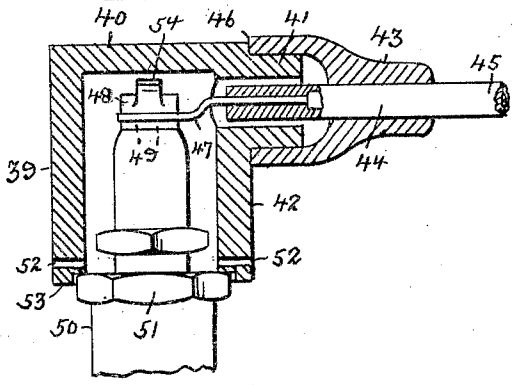


Fig. 15.

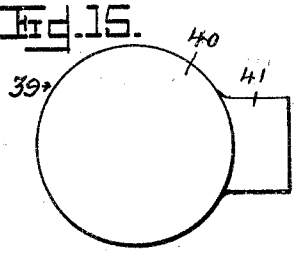


Fig. 21.

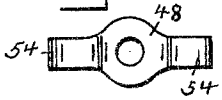


Fig. 17.

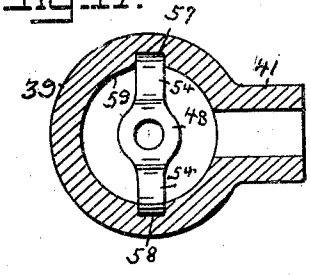


Fig. 20.

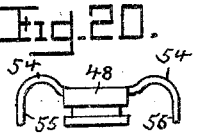


Fig. 18.

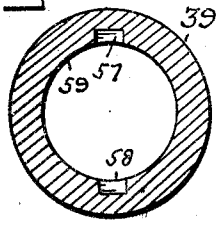
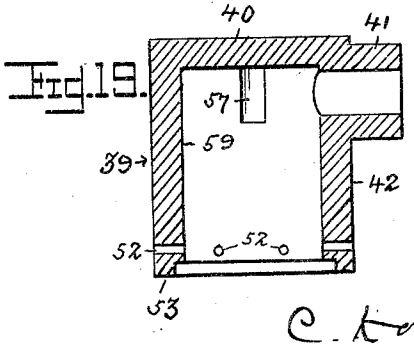


Fig. 19.



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INVENTOR.

BY George W. Dodd

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Patented June 6, 1933 1,912,980

UNITED STATES PATENT OFFICE

CORNELIUS HOOGENDORN, OF SEATTLE, WASHINGTON

WATERPROOF HOUSING FOR SPARK PLUGS

Application filed February 20, 1930. Serial No. 430,077.

This invention relates to improvements in waterproof housings for spark plugs, and has for its object to provide means whereby spark plug connections may be kept free of rain water, spray water or cloud moisture.

A further object of the invention is to provide means for preventing rain water from reaching the connections between a spark plug and conductor wire in automobiles, boats or aeroplanes or other places where spark plugs are used for igniting internal combustion engines.

With the above and such other objects in view as may hereinafter more fully appear, I have invented the device shown in the accompanying drawings in which:

Figure 1 is an elevational view of a spark plug housing formed according to my invention;

Figure 2 is a section on line 2—2 thereof;

Figure 3 is a top plan view of a base member;

Figure 4 is a section on line 4—4 thereof;

Figure 5 is a section on line 5—5 of Figure 3;

Figure 6 is an elevational view of a housing the cover being removed;

Figure 7 is an enlarged detail sectional elevational view of a conductor connection;

Figure 8 is a similar view, taken at right angles thereto;

Figure 9 is a section on line 9—9 of Figure 1;

Figure 10 is a view similar to Figure 1, of a modification;

Figure 11 is a vertical sectional view thereof;

Figure 12 is a section on line 12—12 thereof;

Figure 13 is a bottom plan view of the cap of Figure 10, showing a conductor connection attached to the spark plug nut carried by said cap;

Figure 14 is an elevational view of another form of the invention;

Figure 15 is a top plan view thereof;

Figure 16 is a vertical sectional view of Figure 15;

Figure 17 is a horizontal section on the upper part of Figure 14;

Figure 18 is a horizontal section on the lower part of Figure 14;

Figure 19 is a section, similar to Figure 16, shown removed from the spark plug; and

Figure 20 is a side elevational view of a spark plug nut and spring clip carrying the same.

Figure 21 is a plan elevation of the spark plug nut and spring clip carrying the same.

Like reference characters indicate like parts throughout the following specification, and in the several views in the drawings in which: 1 indicates a waterproof housing for spark plugs which comprises a hollow base 2, having a horizontal wall 3, with a central aperture 4, through which the screw terminal 5 of the spark plug 6 projects and upon the upper end 7 of which screw the nut 8 for holding the terminal clip 9 of the conductor wire 10 is screwed, said screw being screwed down tightly upon the upper surface 11 of the wall 3. The member 2 is provided with a reduced screw threaded extension 12, upon which the cap 13 is screwed to effectually close the housing 1. The member 2 is provided with a U-shaped aperture 14 which extends entirely through the thickened wall 15 forming the upper part of the housing and also through the threaded flange 12 in order to receive the U-shaped soft rubber bushing 16 frictionally held upon the end 17 of the rubber covered conductor cable 10.

Fixed to the terminal 9 of the conductor wire 10 is an offset spring clip 20 formed of a conductor metal, said member 20 comprising a pair of spaced apart arms 21 and 22 adapted to springingly engage around the neck 23 of the nut 8.

From the above description it will be seen that the housing 1, is held to the spark plug 6 by means of the spark plug screw 5 and nut 8 and that due to the cap 13 and U-shaped bushing 16 the interior of said housing will be water and moisture proof, the lower edge 24 of the cap 8 seating flat upon the horizontal surface 25 of the member 16, and as it is screwed down pressing out the bushing

16 to make it tightly engage the walls 26 surrounding the aperture 14.

In Figures 10 to 13 I show a modification of the invention in which 27 is a housing having a straight cylindrical opening 28 there-through, and a cap 29 from which depends a nut 30 for the screw terminal 31 of the spark plug 32. The member 27 is provided with an aperture 33 to receive the bushing 34 of the conductor 35 the clip 36 of said conductor being in line with and engaging the neck 37 of the nut 30. The cap 29 in this case is mounted to the member 27 by means of a slip joint connection 38 between the members 27 and 29 thus permitting the member 29 to rotate upon the member 27 until the nut 30 is drawn down sufficiently tight upon the spark plug, it being understood that the clip 36 is also rotatably mounted upon the neck 37 of the member 30.

In Figures 14 to 20 I show a further modification of the invention which consists of a housing 39 having an integrally formed top wall 40 and a reduced tubular projection 41 extending from the side wall 42 of the housing. In this form of the invention the soft rubber nipple 43 mounted on the end 44 of the conductor 45 is enlarged at its outer end 46 for frictional engagement with the tubular extension 41 whereby the clip 47 of the terminal 44 may engage the nut 48 on the screw 40 of the spark plug 50. In this form of the invention the diameter of the housing 39 is such as to seat upon the nut 51 of the spark plug apertures 52 being provided in the lower edge 53 of the member 39 as vents for any moisture to seep through.

This housing 39 may be secured in any desired manner to the spark plug, as for instance by a clip or other wires. In this form of the invention the nut 48 is carried by a spring clip 54 having right angular vertical arms 55 and 56 which are slidably mounted in the opposing vertical grooves 57 and 58 in the interior of the side wall 59 of said housing 39. This spring clip 54 with its arms 55 and 56 seated in said grooves 57 and 58, holds the housing 39 in proper position upon the upper end of the spark plug.

Having described my invention that which I claim to be new and desire to procure by Letters Patent is:

1. A waterproof housing for spark plugs comprising a shell, means for holding the shell mounted upon the upper end of a spark plug, said shell having an aperture and a watertight connection for said aperture between a conductor terminal and the interior of said housing, said housing having a removable cap, said cap being screw threaded on said shell to bind said connection.

2. A waterproof housing for spark plugs comprising a shell, means for holding the shell mounted upon the upper end of a spark plug, said shell having an aperture and a watertight connection for said aperture between a conductor terminal and the interior of said housing, said housing having a removable cap, said cap being screw threaded on said shell to bind said connection, said shell having a horizontal wall through which the screw of a spark plug projects.

3. The combination claimed in claim 2, said means comprising a nut for said screw.

4. The combination claimed in claim 2, said means comprising a nut for said screw, said nut being a terminal binder for said conductor to said spark plug.

5. The combination claimed in claim 2, said means comprising a nut for said screw, said nut being a terminal binder for said conductor to said spark plug, said shell having a U-shaped aperture to receive said connection.

6. The combination claimed in claim 2, said means comprising a nut for said screw, said nut being a terminal binder for said conductor to said spark plug, said shell having a U-shaped aperture to receive said connection, said connection consisting of a soft rubber bushing.

7. The combination claimed in claim 2, said means comprising a nut for said screw, said nut being a terminal binder for said conductor to said spark plug, said shell having a U-shaped aperture to receive said connection, said connection consisting of a soft rubber bushing, said bushing being U-shaped and having a flat side for engagement with said cap.

8. In a spark plug housing an aperture for a conductor wire, a soft rubber plug on the terminal of the wire, and means for compressing the plug in the aperture to effectually seal the same, said housing having a removable cap, said cap forming the means.

In testimony whereof I affix my signature.

CORNELIUS HOOGENDORN.