

C. W. AVERY & F. E. SEARLE.  
 STARTING HEATER FOR CARBURETERS.  
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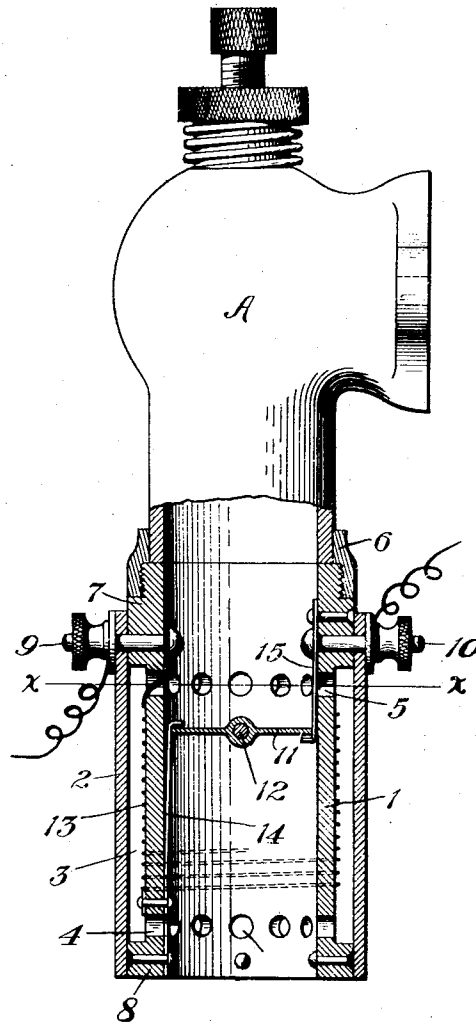


Fig. 1.

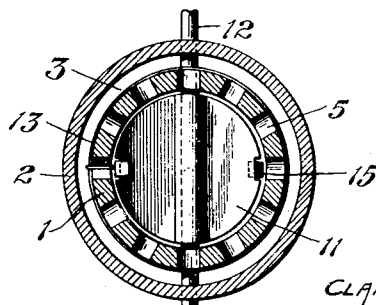


Fig. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

CLARENCE W. AVERY AND FREDERICK E. SEARLE, OF DETROIT, MICHIGAN.

## STARTING-HEATER FOR CARBURETERS.

998,945.

Specification of Letters Patent.

Patented July 25, 1911.

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*To all whom it may concern:*

Be it known that we, CLARENCE W. AVERY and FREDERICK E. SEARLE, citizens of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Starting-Heaters for Carbureters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to means for starting explosive engines in cold weather when, by reason of the low temperature, the gasoline in the carbureter will not vaporize sufficiently to supply the engine with an explosive mixture.

To this end the invention consists in an electric heating attachment to the carbureter adapted to supply the same with heated air whenever the emergency arises, all as more fully described hereinafter and shown in the accompanying drawings in which—

Figure 1 is a central longitudinal section through the heater showing it as attached to the air inlet of a carbureter; and Fig. 2 is a cross-section of Fig. 1 on line  $x-x$ .

Referring to the drawings, A represents the air inlet of a carbureter of known form for supplying explosive vapor to an engine.

The heater consists of an inner tube 1 and an outer surrounding tube 2 forming an annular air space 3 between the tubes which is provided with air inlets 4 and outlets 5. The tubes are of fiber, porcelain or other suitable insulating material and the inner tube has an interior diameter corresponding to that of the air inlet of the carbureter; it is provided with suitable means such as the coupling sleeve 6 for attaching it to the air inlet of the carbureter.

The outer tube is preferably spaced from the inner tube by means of shoulders 7 and 8 formed on the inner tube and it is held in position thereon by the binding posts 9 and 10.

The inner tube is provided with a damper 11 controlling the passage of air through it by means of a suitable connection (not shown) with its stem 12 whereby the operator can manipulate it from a distance if desired.

The inner tube has wound upon it a suitable heating coil 13 one terminal of which is in electrical connection with the inner end of the binding post 9 and the other end of

which is connected to a contact spring 14 adapted to form electrical connections with the metallic damper 11. Another contact spring 15 is adapted to form electrical connection with the damper and complete the electrical circuit from one binding post to the other by way of the heating coil. The contact springs are suitably secured to the wall of the inner tube and are provided with stops for the damper.

In practice the heater being connected with a source of electricity such as the storage battery usually carried on a car, it will be seen that whenever the use of the heater is required for starting, the closing of the damper 11 will close the heating circuit through the coil, at the same time the passage of cold air into the carbureter is cut off and the only entrance of air is through the annular space 3 which forms a by-pass for the air around the damper tube. The air in its passage through the space thus becomes heated and passes in this condition through the carbureter into the engine in the usual manner, and being heated it forms a rich mixture most suitable for starting. The use of the heater may then be discontinued as soon as the engine is in usual running condition by opening the damper 11.

The device forms a wholly independent unit of the carbureter primarily adapted for use on vehicles using gasoline as the motive power. Such vehicles being usually equipped with an electric storage battery the device may be permanently attached to the carbureter and thus be always on hand when an emergency arises. It is equally well adapted for use in garages as part of the equipment thereof and to this end the garage may be especially wired for connection with the device at the different stalls.

What we claim as our invention is:—

1. An electric starting heater for carbureters comprising an open ended inner tube, a valve in said tube for cutting off the passage of air therethrough, an outer tube spaced from the inner tube and forming a by-pass for air around the valve, a heating coil in said by-pass, and electrical connections adapted to close the electric circuit through the heating coil simultaneous with closing the valve.

2. An electric starting heater for carbureters comprising an open-ended inner tube conforming to the air inlet of the carbureter, a valve in said tube for cutting off the pas-

sage of air therethrough, an outer surrounding tube forming an annular by-pass for air around the valve, and electric connections for the heating coil controlled by the movement of the valve.

3. An electric heater for carbureters comprising an open-ended inner tube conforming to the air inlet of the carbureter and adapted to be attached thereto, a damper in said tube for cutting off the passage of air therethrough, a heating coil upon said inner tube, an outer tube surrounding the coil and forming a by-pass for air around the damper, and contact springs in the inner tube coöperating with the damper to connect the coil in circuit with a source of electricity.

4. The combination with a carbureter, of an electric starting heater comprising an open ended tube attached to the air intake of the carbureter and forming a prolongation thereof, a valve in said tube for cutting off the air supply to the carbureter, an air chamber around the tube and communicating therewith to form a by-pass for air around the valve, a heating coil in said chamber and electrical connections for connecting said coil in circuit with a source of electricity.

5. In an electric heater for carbureters, the combination with a tube adapted to form the main intake for air for the carbureter, of a valve in said tube adapted to cut off the direct passage of air therethrough, an indirect permanently open air passage heading into said tube beyond the valve and an electric heating coil in said passage.

6. In an electric heater for carbureters, the combination with a tube adapted to form the main intake for air into the carbureter, of a valve in said tube adapted to cut off the passage of air therethrough, an independent air passage leading into said tube beyond

the cut-off point of the valve, a heating coil in said passage, and an electric switch for connecting the same in circuit with a source of electric supply, the valve forming the movable element of the switch.

7. In an electric starting heater for carbureters, the combination with a tube adapted to form the main air intake for the carbureter and the heating coil thereon inclosed in a separate air passage, of an electric circuit connecting said coil with a source of electricity, said circuit including a damper in the tube adapted to cut off the passage of air therethrough, and contact springs with which said damper electrically connects in the closed positions of the damper.

8. An electric starting heater for carbureters, comprising an inner tube provided at one end with means for attaching it to the air intake of a carbureter and forming a part thereof, a damper in said tube adapted to cut off the passage of air therethrough by manually operating the same, a heating coil upon said tube, an outer tube inclosing said coil and forming a by-passage for air communicating with the inner tube at a point beyond the damper, a binding post securing the outer tube in position upon the inner tube, and contact springs in the inner tube adapted to electrically connect with the damper in the closed position thereof and connect the same in circuit with the binding posts.

In testimony whereof we affix our signatures in presence of two witnesses.

CLARENCE W. AVERY.  
FREDERICK E. SEARLE.

Witnesses.

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L. E. FLANDERS.