C. D. HIGGINS.

WARMING DEVICE FOR CARBURETORS.

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1,424,567. Patented Aug. 1, 1922.

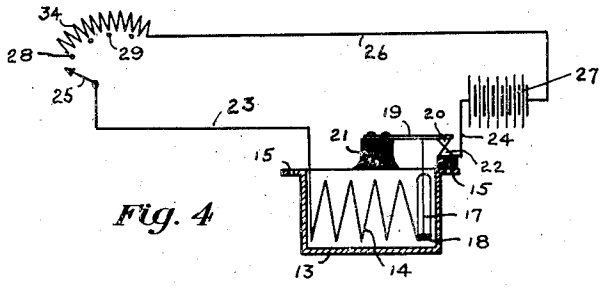


Fig. 4

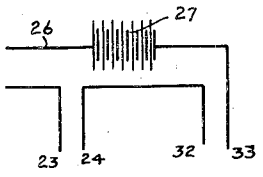


Fig. 5

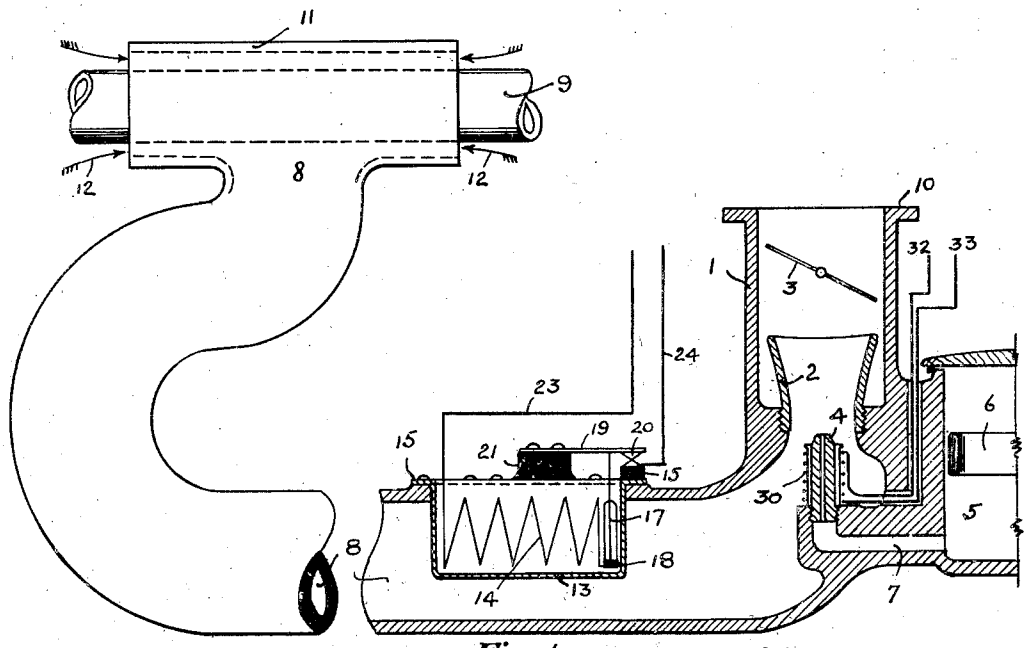


Fig. 1

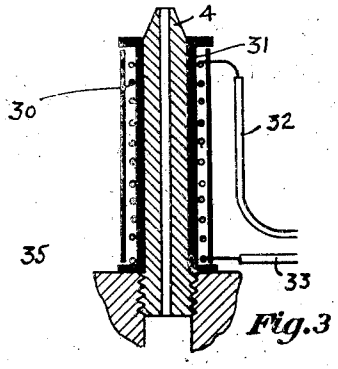


Fig. 3

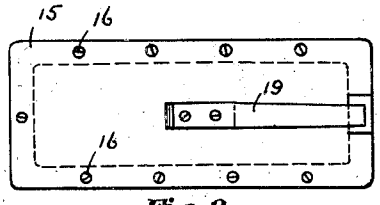


Fig. 2

Inventor
Charles D. Higgins
By Miller & Henry
Attorneys

UNITED STATES PATENT OFFICE.

CHARLES D. HIGGINS, OF BERKELEY, CALIFORNIA.

WARMING DEVICE FOR CARBURETORS.

1,424,567. Specification of Letters Patent. Patented Aug. 1, 1922.

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To all whom it may concern:

Be it known that I, CHARLES D. HIGGINS, a citizen of the United States, and resident of Berkeley, Alameda County, California, have invented new and useful Improvements in Warming Devices for Carburetors, of which the following is a specification.

My invention has for its object means by which a mixture furnished through a carburetor is warmed to a sufficient degree to secure an efficient explosion therefrom and is particularly applicable in use with internal explosion engines. This I accomplish by warming either the air flowing into and through the carburetor or the hydrocarbon, as gasoline, with which the air is to be mixed, or both, by introducing a heating unit comprising an electrical resistance wire suitably located and in combination with the carburetor parts, and then energizing the said resistance by an electrical current of sufficient intensity, whereby the air, or gasoline or their mixture flowing by the said coil is prewarmed so that it takes up and more readily vaporizes the gasoline than heretofore.

I prefer to employ in combination with the said heating unit a suitable switch and a controlling resistance in series therewith whereby the degree of energization of the heating unit may be readily controlled, as from the dashboard of an automobile.

It is well known that where the air and gasoline are cold the volatilization of the hydrocarbon oil, as distillate or gasoline, is not sufficiently rapid to meet the requirements of starting an engine supplied from said carburetor, whereas by my invention one or both of the constituents of the said mixture are prewarmed to a sufficient degree to effect a highly efficient explosive mixture flowing into the engine, thus enabling the starting of the engine more readily than heretofore. I also employ an automatic cut-out which may be adjusted in advance to automatically interrupt the energizing current which is flowing in the said heating unit when the heat of the said unit becomes excessive. By my invention the mixture flowing to the engine is first warmed, and then after the engine is in operation the heat generated by the engine may be employed to warm the air flowing into the carburetor and the increase in the temperature of the air so supplied is now employed to automatically interrupt the flow of electricity through the resistance wire to thus automatically prevent the excessive use of electric current.

By referring to the accompanying drawings my invention will be made clear.

Fig. 1 illustrates a simple form of carburetor in cross section equipped with the device of my invention and showing diagrammatically thereon the connections for air supply to the carburetor and the manner in which this air is warmed when the engine is in operation and showing my resistance coil as located in the air supply duct for prewarming the air initially and also the application of my invention about the gasoline nozzle.

Fig. 2 is a plan view of a portion of Fig. 1.

Fig. 3 is a detail of the gasoline nozzle and heating unit or resistance coil of Fig. 1.

Fig. 4 is a diagrammatic showing of the connections for operating the resistance.

Fig. 5 is a diagrammatic showing of certain of the connections in one adaptation of my invention.

Throughout the figures similar numerals refer to identical parts.

A simple form of carburetor body is shown by the numeral 1 in which is the throat piece or tube 2, the controlling throttle 3, the gasoline nozzle 4, the gasoline supply chamber 5 containing the float 6 and duct 7. The air inlet passage to the carburetor is indicated at 8, which air inlet I prefer to connect around the muffler 9 or discharge pipe from an engine and through which the gases of combustion after they are used in the engine are discharged in the well known way. It is to be understood that the carburetor is connected at 10 with an internal explosive engine of well known type not shown and that said engine discharges its gases through the muffle pipe 9. At 11 I employ a concentric pipe external to 9 and spaced therefrom so that air may freely enter between the inside wall of 11 and the outside wall of 9 and thereafter pass through the passage 8 to the carburetor throat piece 2. When the engine is first started and all of the parts are cold the air flowing into the carburetor, as indicated by the arrows 12, 12, will be cold until it contacts with the heat generating resistance sheath or cell 13 mounted in the path of the air and within

the passage 8. The walls of this cell warm the said air which then proceeds to the throat piece of the carburetor and more readily vaporizes the gasoline received from the nozzle 4. Within the cell 13 I wind the resistance wire 14 which is properly insulated between the several windings and between the walls of the cell in any well known way. The cell 13 I prefer to form with flanges 15, 15 so that when installed in an opening, preferably of elongated slot form, in the passage 8 it may be readily secured in such position as by the screws 16, 16. I also prefer to form in combination with the said resistance wire a thermostat wire 17 fixed at its lower end in the insulating block 18 and having its upper end connected with the switch arm 19 which latter is mounted on the insulating block 21 carried on the cover 15, the arm 19 carries the contact 20 adapted to operate with the contact 22 also carried on an insulated block. Current is supplied to the resistance coil 14 through the circuit wire 23 said resistance 14, said thermostat wire 17, said contacts 20 and 22, back through the second circuit connection 24.

Referring particularly to Fig. 4 I have shown a rheostat or variable resistance at 34 and a contacting lever therefor at 25 in circuit with the main battery supply 26 from the source of electrical energy 27. The other circuit connection is made through the wire 23. It will now be seen that if the switch arm 25 is in the neutral position shown in full line of Fig. 4 no current will flow through the heating unit 14. On the other hand, if contact is made at 28 the smallest amount of current will flow through the wire 14 because of the high resistance interposed by the coil 34. The switch arm may now be advanced to any other position as 29 when most of the series resistance being cut out a considerable current will flow through the wire 14 heating the said resistance and the walls of the cell 13 and therefore the air flowing thereby in the passage 8; which warm air will take up and quickly vaporize the gasoline from the nozzle 4, and a more efficient explosive mixture will be obtained enabling the engine connected with the carburetor at 10 to quickly start. The operation of the engine will now cause the discharge of hot gas through the muffler pipe 9, the exterior walls of which will warm the air now flowing in at 12 and raise the heat of the air flowing into the passage 8. This increased temperature will now cause expansion of the thermostat 17 and the separation of the contacts 20 and 22 and thus interrupt all further current as long as the hot gases from the engine adequately warm the inflowing air.

At 30 I have shown an auxiliary coil of resistance wire wound about the gasoline nozzle 4 by which the said nozzle, and therefore the gasoline flowing therethrough, may also be warmed. This resistance wire is wound upon an insulated support as 31 and is energized through the connections 32 and 33 and which I prefer to connect in series with the resistance coil 14 as indicated in the wiring diagram at Fig. 5. It will be noted that no contact is made or broken within the range of any possible explosive mixture so that any possibility of explosion from a spark is avoided. Also in some forms of carburetors it may be necessary to employ both the coils 14 and 30 whereas in other types the resistance in the air passage as the coil 14 may be sufficient, or in still others the coil 30 may be employed to warm both the air flowing by it on the outside through the passage 8 and to warm the gasoline flowing through the inside of said coil as through the nozzle 4 or in still others the warming of the gasoline alone by the coil 30 may be sufficient in such latter case the said coil may advantageously be enclosed in a spool or heat insulating cover 35 and I desire to be understood as claiming all such variations.

I claim:

1. In a carburetor a gasoline duct, an air inlet passage, an electrical resistance interposed in said passage and around said duct, a source of electricity, a switch and energizing connections whereby the gasoline flowing in said duct and the air flowing in said passage are heated by said resistance and before they commingle.

2. A carburetor and elements as set forth in claim 1 and a thermostat in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

3. A carburetor and elements as set forth in claim 1 and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator.

4. In a carburetor, an air inlet passage, an electrical resistance interposed in said passage, a source of electricity, a switch and energizing connections whereby said resistance may be heated by the flow of electricity therethrough on depressing said switch, and wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are

passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage.

5. In a carburetor, an air inlet passage, an electrical resistance interposed in said passage, a source of electricity, a switch and energizing connections whereby said resistance may be heated by the flow of electricity therethrough on depressing said switch, and wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

6. In a carburetor, an air inlet passage, an electrical resistance interposed in said passage, a source of electricity, a switch and energizing connections whereby said resistance may be heated by the flow of electricity therethrough on depressing said switch, and wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator.

7. In a carburetor, an air inlet passage, an electrical resistance interposed in said passage, a source of electricity, a switch and energizing connections whereby said resistance may be heated by the flow of electricity therethrough on depressing said switch, and wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

8. In a carburetor, elements as set forth in claim 1 wherein said resistance is disposed around a gasoline inlet to said carburetor whereby said resistance is adapted to warm also the gasoline flowing therethrough.

9. In a carburetor, elements as set forth in claim 1 wherein said resistance is disposed around a gasoline inlet whereby said resistance is adapted to warm the gasoline flowing therethrough, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

10. In a carburetor, elements as set forth in claim 1 wherein said resistance is disposed around a gasoline inlet whereby said resistance is adapted to warm the gasoline flowing therethrough, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connection whereby the current is interrupted when a certain predetermined temperature is exceeded, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator.

11. In a carburetor elements as set forth in claim 1 wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage.

12. In a carburetor elements as set forth in claim 1 wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

13. In a carburetor elements as set forth in claim 1 wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections

are sealed from said passage, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator.

14. In a carburetor elements as set forth in claim 1 wherein said resistance is embedded in insulation and inclosed within a sheath having a top through which said connections are passed to said resistance and said sheath is inserted through a wall of said passage leaving its top exposed outside thereof whereby all energized connections are sealed from said passage, and a rheostat interposed in series in the circuit and having a plurality of taps with any of which said switch is adapted to contact at the selection of the operator, and a thermostat element in said passage and extending through the walls thereof and constructed and adapted to separate a pair of contacts interposed in said connections whereby the current is interrupted when a certain predetermined temperature is exceeded.

CHARLES D. HIGGINS.