B. M. BANCROFT.

STARTER FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED NOV. 10, 1919.

1,435,888. Patented Nov. 14, 1922.

Fig. 1.

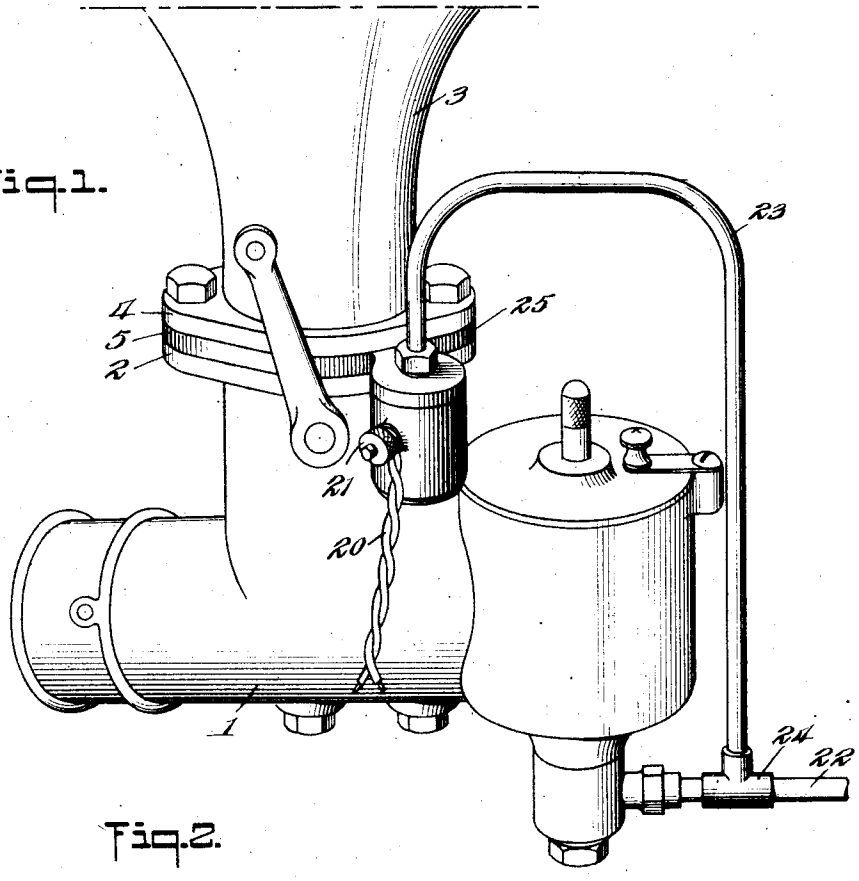
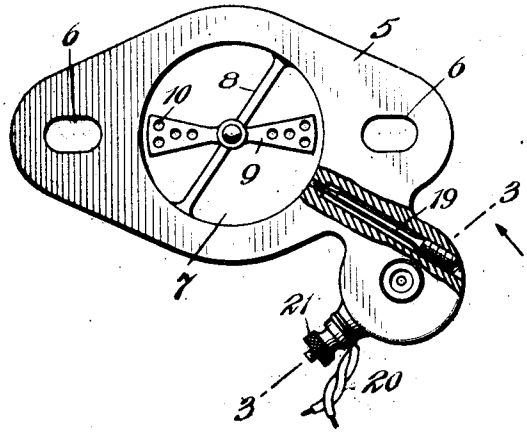


Fig. 2.



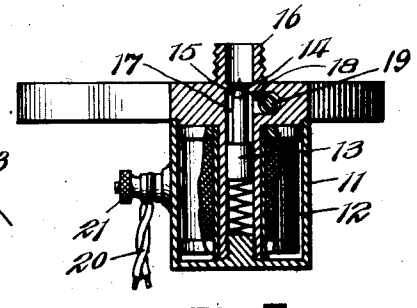


Fig. 3.

WITNESSES:

INVENTOR

Benjamin M. Bancroft

By William J. Jones

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UNITED STATES PATENT OFFICE.

BENJAMIN M. BANCROFT, OF NEW YORK, N. Y., ASSIGNOR TO BERNARD D. THORNER, OF NEW YORK, N. Y.

STARTER FOR INTERNAL-COMBUSTION ENGINES.

Application filed November 10, 1919. Serial No. 337,073.

To all whom it may concern:

Be it known that I, BENJAMIN M. BANCROFT, a citizen of the United States, residing at 210 West 107th Street, New York city, have invented certain new and useful Improvements in Starters for Internal-Combustion Engines, of which the following is a specification.

My invention relates to starters for internal combustion engines.

The object of the invention is to provide an auxiliary starter operating in conjunction with the conventional type of primary electric starter whereby the primary electric starter is relieved of considerable strain and a better combustible mixture is obtained.

In the drawings, Fig. 1 is a perspective view, illustrating the application of the invention to a standard form of carburetor.

Fig. 2 is a top plan view partly broken away, of the auxiliary starter removed.

Fig. 3 is a transverse vertical sectional elevation taken along line 3—3 of Fig. 2.

Referring more specifically to the drawings: 1 designates a standard type of carburetor and having the usual flanged top 2. 3 is the intake having a similar flange bottom 4.

Between the flange 2 of the carburetor and the flange 4 of the intake, I interpose a gasket 5. This gasket is preferably formed in such manner as to be readily installed between various forms and makes of carburetors and intakes and with this end in view, the slots 6 at diametrically opposite sides of the gasket are elongated in order that castings of a similar type and dimensions may be accommodated to a great variety of fittings. The central part of the gasket has a circular opening 7 which is designed essentially for the passage of the combustible mixture. Extending transversely of the opening and preferably constructed as an integral part of the body of the gasket is a support 8 upon which is rotatably mounted a deflecting mixing element in the shape of a small fan 9. While I have shown this fan as consisting of two blades, it will be understood that the number of blades may be varied in accordance with any particular requirements without departing from the spirit of the invention. In any event, each blade is provided with a series of small perforations 10 for the purpose of securing a thorough breaking-up of the fuel, as will be presently more fully explained.

To one side of the opening 7 and slightly removed from the body portion of the gasket, I mount a casing 11 containing a solenoid 12, a yieldable armature or core 13, the outer end of the latter being fastened into a valve 14 which rests against seat 15 at the base of the tubular extension 16. A passage 17, extending vertically at the upper extremity of the casing 12 communicates with an elongated passage 18 which extends horizontally and opens in the side wall of the circular opening 7. The latter passage is preferably provided with a needle valve 19 through the medium of which desired adjustments may be obtained, and the solenoid 12 is connected with the battery circuit through the wire 20 and binding post 21, the circuit being completed through grounding through the motor.

The tubular extension 16 of the casing 11 is connected to the fuel line 22 by means of a short length of small copper tubing 23 and a T-union 24.

In operation, when the electric or primary starter is energized, the motor is "turned over." Simultaneously a suction is produced in the throat of the carburetor, and this suction serves to rapidly rotate the mixing fan or element 9 carried in the circular opening 7 of the gasket. Concurrently, the core 13, having the valve 14 therewith, is caused, by the action of the solenoid, to recede from its seat 15, whereupon raw fuel is drawn through the tubing 23, passages 17 and 18 and forcibly impinged against the blades 9 of the mixing element. An increment in the speed of the fan is immediately produced with the result that the raw fuel is thoroughly broken up before it passes through the intake into the motor. And while the fuel is thoroughly mixed at this point, it should be understood that the resultant mixture is considerably richer than would ordinarily obtain in the absence of my attachment, in fact, the mixture is sufficiently rich to start the motor almost instantly, even though it may be exceedingly cold. The point to bear in mind in this connection is that, with the incorporation of my attachment, the motor is started on the first or second turn of the primary starter, thus relieving the primary starter from strain

and the starting system from the waste of electrical energy.

Another point that should be borne in mind is that as soon as the motor, equipped with my device, has been started, the spring-actuated valve 14, operating conjunctively with the primary electrical starter automatically closes and thereby shuts off the further supply of liquid fuel. The mixing device, however, continues to rotate, being manifestly operated by the normal flow of the combustible mixture through the throat of the carburetor, thus functioning to carburet the fuel and air more thoroughly. In other words, my improved attachment serves in a dual capacity—it not only provides for instantaneous starting of the motor, but it serves to produce a still better admixture of the fuel and air which pass from the carburetor.

Still another improved feature is that after the needle valve 19 has been set to feed the desired quantity of liquid fuel, this feed is subject to control by the appropriate manipulation of the throttle. If the throttle is open the speed of the mixing device will not be so great. If the throttle is closed, the vacuum is increased and the mixing element will rotate at a maximum speed.

What I claim is:—

1. A combined primer and fuel mixer for internal combustion engines equipped with a starting mechanism, comprising a gasket-like member located between the carburetor and the fuel intake, and provided with an opening permitting the passage of the carburetted fuel therethrough, an extension fixed to said member, a liquid fuel conduit passing through said extension and the body of said member and discharging into said opening, a deflector in said opening located in line with the discharge end of said conduit, an electrically operated valve in said extension adapted to control the supply of fuel to said conduit, and means whereby the said valve is actuated by the actuation of said starting mechanism, substantially as described.

2. A primer and fuel mixing device for internal combustion engines comprising a gasket-like member located between the carburetor and intake and provided with an opening for the passage of the carburetted fuel therethrough, an extension fixed to said member, a liquid fuel conduit passing through said extension and the body of said member and discharging into said opening, a deflector in said opening located in line with the discharge end of said conduit, a valve adapted to control the flow of fuel through said conduit, a solenoid carried by said extension and adapted to actuate said valve, and means for energizing and de-energizing said solenoid.

3. An automatic primer and fuel mixer for internal combustion engines equipped with an electric starting mechanism, comprising a gasket-like member positioned between the carburetor and the intake and provided with an opening permitting the passage of carburetted fuel, in combination with an extension of said member, a liquid fuel conduit extending through said extension and the body of said member, and leading into said opening, an electrically influenced valve positioned to control the flow of fuel through said conduit, a deflector in said opening in line with the discharge end of said conduit, a solenoid carried by said extension and positioned to exert its influence upon said valve, and means connecting the solenoid in circuit with said starting mechanism, whereby actuation of the latter will actuate the former to operate said valve, and means for restoring said valve to its original position upon deenergization of said solenoid, substantially as described.

4. A primer and fuel mixing device for internal combustion engines, comprising a gasket-like member located between the carburetor and the intake, and provided with an opening for the passage of carburetted fuel, an extension of said member, a fuel conduit passing through said extension and the body of said member and discharging into said opening, a deflector in said opening in line with the discharge end of said conduit, a housing carried by said extension, a valve carried by said housing and extending into said conduit to regulate the flow of fuel therethrough, and a solenoid in said housing adapted to control said valve.

5. A primer and fuel mixing device for internal combustion engines, comprising a gasket-like member located between the carburetor and the intake, and provided with an opening for the passage of carburetted air, an extension of said member, a fuel conduit passing through said extension and the body of said member and discharging into said opening, a deflector in said opening in line with the discharge end of said conduit, a manually operable valve positioned to control the discharge of fuel into said opening, a housing carried by said extension, an electrically operated valve mounted within said housing and extending into said conduit to control the amount of fuel flowing thereinto, a solenoid carried by said housing and positioned to control said electrically-operated valve, and means for energizing and de-energizing said solenoid.

6. A unit for use in connection with a primer and fuel mixer for internal combustion engines, comprising a metallic casting gasket-like configuration provided with an opening permitting the passage of carburetted fuel flowing from the carburetor to the intake, and an extension cast integrally with said casting, said casting and extension

being provided with a liquid fuel conduit discharging into said opening, a deflector in said opening in line with the discharge end of said conduit, and with a valve seat at the egress end of said conduit and another valve seat at the inlet end of said conduit, substantially as and for the purposes set forth.

7. The combination with a carburetor, an intake, and an electrically operated starting mechanism of an internal combustion engine, the carburetor and intake each being provided with a flange and each flange having bolt openings, of a device comprising a gasket-like member, an extension thereof and a housing, said member having the same configuration as said flanges, being flush therewith, and further provided with bolt openings registering with the bolt openings in the flanges of the carburetor and intake, and a deflector in the center of said member, bolts for connecting the flanges and member together, the housing and member having a passage therebetween directed towards said mixing element, a conduit connected with the housing and a source of fuel supply, and means within said housing for automatically introducing a supply of liquid fuel against said deflector upon actuation of said starting mechanism.

In testimony whereof, I have signed my name to this specification in the presence of a subscribing witness, this 5th day of November, 1919.

BENJAMIN M. BANCROFT.

Witness:
G. FRITCH.