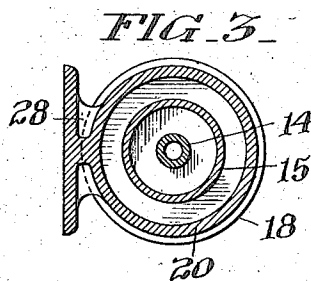
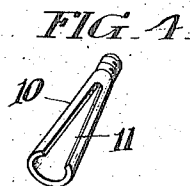
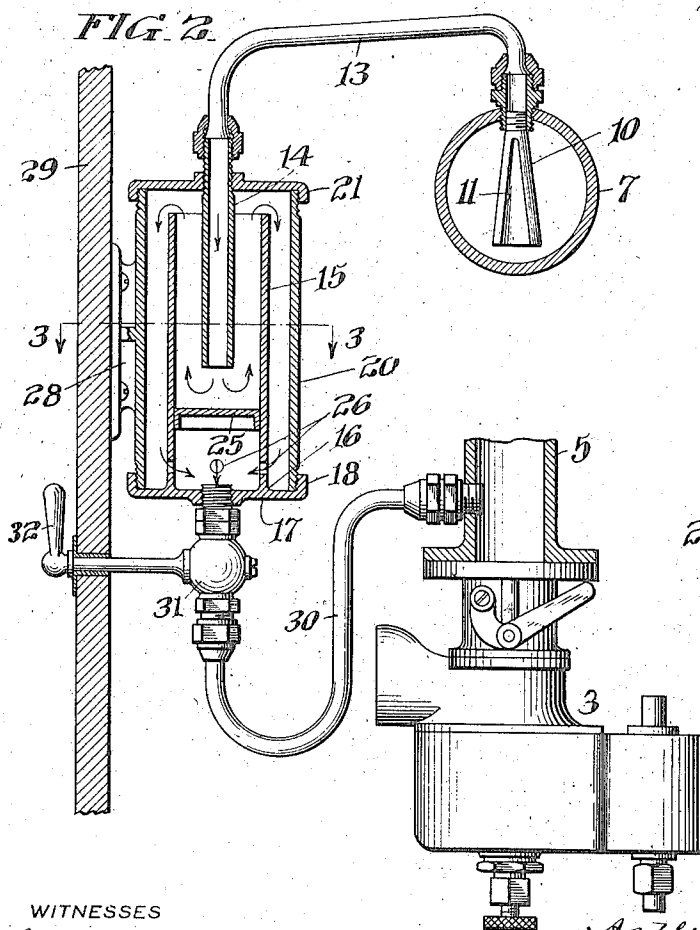


1,128,830.

FIG. 1. A detailed cross-sectional view of a mechanical device, likely a pump or engine. The device features a central horizontal shaft (2) passing through a series of four vertical cylinders (6). A large flywheel (1) is attached to the left end of the shaft. A control panel on the right side includes a large handwheel (30) and several smaller components labeled 28, 32, 21, 13, and 29. The entire assembly is housed within a rectangular frame (1). The label 'FIG. 1.' is prominently displayed at the top center.



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ASTLEY W. WHARTON, OF PHILADELPHIA, PENNSYLVANIA.

ECONOMIZER FOR INTERNAL-COMBUSTION ENGINES.

1,128,830.

Specification of Letters Patent.

Patented Feb. 16, 1915.

Application filed December 17, 1913. Serial No. 807,193.

To all whom it may concern:

Be it known that I, ASTLEY W. WHARTON, a citizen of the United States, and a resident of the city of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented a certain new and useful Economizer for Internal-Combustion Engines, of which the following is a specification.

My invention has for some of its objects to provide means adapted for attachment to internal combustion engines for decreasing the amount of fuel consumed by such engines and thereby decreasing the cost of operation of the same; for decreasing the amount of carbonaceous deposit upon the interior surfaces thereof; and for increasing the efficiency of the same.

Other objects and advantages of my invention will be referred to in the detailed description thereof which follows or will be apparent therefrom.

One form of construction embodying my invention is illustrated in the accompanying drawing, but it should be understood that said invention is susceptible of embodiment in other forms of construction than that shown, and, therefore, that I am not limited to the details of construction as illustrated.

In the accompanying drawing:—Figure 1 is a top plan view of the front portion of an automobile with parts removed to show in top plan an internal combustion engine with the device or attachment embodying my invention associated therewith; Fig. 2 is a view showing in longitudinal section and elevation the device embodying my invention and also how the same is connected with other parts of the structure illustrated in Fig. 1; Fig. 3 is a transverse section on the line 3—3 of Fig. 2; and Fig. 4 is a perspective view of a receiving nozzle constituting a part of my device which is situated within the exhaust pipe.

Before proceeding to a detailed description of the construction illustrated in the drawings it will be noted that while I have shown my invention applied to or in use in connection with an internal combustion engine situated upon an automobile for propelling the same, it should be understood that this is merely for convenience of illustration and description and that the same may be applied to internal combustion engines wherever and in whatever way used;

and it should also be further noted that I do not desire that the principle of my invention shall be limited to the exact purposes and uses herein illustrated and described but desire that it shall be understood that such invention may be used and advantageously applied in connection with many other apparatus wherein incomplete combustion is being effected.

Referring now to the drawings, 1 designates the front portion of the underframe of an automobile upon which is supported a four cylinder internal combustion engine 2 to which my invention has been applied.

The carbureter is of any known construction and is designated as a whole by the reference numeral 3.

4 designates an intake manifold with which the carbureter is connected by means of an intake pipe 5 in known manner. The manifold 4 is connected to the interior of the several cylinders of the engine by branch pipes 6 in known manner.

7 designates an exhaust pipe having connection in known manner with the several cylinders of the engine.

It will be remembered that in engines of this character the pistons in the cylinders operate to draw the fuel, consisting of a mixture of inflammable material (such as oil) and air, from the carbureter into the engine cylinder or cylinders, in which the gaseous mixture is exploded to drive the pistons and is exhausted from the cylinders through the exhaust pipe 7.

My invention comprehends and includes means for returning portions of these exhaust gases to the engine cylinder or cylinders. As illustrated these gases are returned to the intake pipe 5 where they are mixed with the portions of other fuel therein and the mixture thus formed is drawn into the cylinder or cylinders of the engine and exploded in the usual manner.

Although in the specific construction illustrated I have shown the exhaust gases as being returned to the intake pipe 5 I desire it to be understood that such gases may be introduced directly into the carbureter or into some part of the fuel channel or conduit before the same reaches the carbureter or directly to the engine cylinder or cylinders.

As one form of means for effecting return

of the exhaust gases from the exhaust pipe 7 to the engine, I have provided a flaring receiving or intake nozzle 10 which extends into the exhaust pipe 7 and which is provided with an elongated A-shaped opening 11 in one side thereof which opening faces in a direction opposite to that in which the exhaust gases are flowing. The said receiving or intake nozzle is connected by means of a pipe 13 with a short open-ended pipe 14, the open end of which terminates interiorly of an open-ended tubular member 15 which is connected integrally or otherwise at 16 to a plate 17 which is flanged at its outer edges as shown at 18. The inner side of this annular flange is screw-threaded whereby one end of a tubular member 20 may have screw-threaded connection therewith as shown. The opposite end of said screw-threaded tubular member 20 is closed by means of the cap 21 whereby a closed chamber is formed. The open-ended pipe 14 passes into the chamber formed by the tubular member 20 and the plates 17 and 21 through the said plate 21.

It will be noted that the open-ended tubular member 14 extends into the tubular member 15 a little more than half the length of the latter. 25 designates a plate extending transversely of the tubular member 15 to close the same which plate is situated relatively near the open end of the tubular part 14. Any other suitable closing means may be substituted for the plate 25. The external diameter of the pipe 14 is considerably less than the internal diameter of the tubular part 15 whereby considerable free space extends around the said pipe 14 within the tubular member 15. The tubular member 15 is provided with a series of holes or perforations 26 at points near its connection to the plate 17.

It may be noted at this point that the tubular member 20 is secured by means of a bracket 28 to the dash board 29 of the automobile body. It will be understood, however, that any other suitable means may be provided for supporting such tubular member.

The construction just described, including the chamber and the open ended pipes 14 and 15 therein, acts not only to retard the speed of the flow of gases from the exhaust channel but also causes condensation of such condensable portions of the vapors as may be present, such as water vapor.

30 designates a pipe connected at one end to the intake pipe intermediate the carbureter 3 and the manifold 4 and at the other end to the plate 17 which closes one end of the tubular member 20. The said pipe 30 is provided with a valve at 31 which is operated by means of a handle 32 which is situated upon the inside of the dash board

29 in convenient position to be operated by the chauffeur or other person operating and controlling the engine. By adjusting the valve 31 the amount of exhaust gases which are permitted to be drawn from the exhaust pipe and returned to the intake pipe to be there mixed and intermingled with fresh gaseous fuel mixture and to be drawn thence into the cylinder of the engine and re-used is controlled.

The gases which are withdrawn from the exhaust pipe are discharged from the pipe 14 against the closure 25. They then travel in reverse direction, as shown by the arrows, and escape from the open end of the tubular member 15 into the chamber 20 and then the direction of travel is again reversed, the gases finally passing out through the holes or perforations 26 and thence to the engine. By causing the gases to travel a tortuous passage as thus described, they are considerably cooled and furthermore the speed with which they are introduced or projected into the intake pipe or other part of the apparatus is decreased to such an extent that their introduction thereinto does not affect in any manner the introduction of the explosive mixture of air and gases into the engine cylinder. When a device embodying my invention is employed, the mixture of gases which is introduced into the engine cylinder or cylinders is considerably warmed and I have found that as a result ignition takes place much more easily.

I have also found by actual experience in the operation of automobiles that by the employment of a device embodying my invention in connection with an internal combustion engine a very material and substantial reduction in the amount of oil or gasoline required has been effected and I have further found that by the employment of my device a material decrease in the amount of carbonaceous deposits upon the internal surface of the engine cylinder or cylinders has been effected. By the employment of my device and by reason of the results thereby accomplished, as above stated, the cost of operation of such engines is materially and substantially reduced.

I claim:—

1. A bypass for conducting gases from the exhaust channel of an internal combustion engine to the intake channel of said engine, said bypass including a closed chamber having therein a member, one of the ends of which is open, the said open end occupying a position near one end of said chamber and the said open-ended member having means extending transversely thereof to close the same, and the said open-ended member also having perforations therein below the said transverse closure.

2. A pipe having communication with an exhaust channel from an internal combus-

tion engine, a closed chamber having an open-ended member therein, said open-ended member having a closure intermediate its ends, the said pipe terminating in the said open-ended member within the said chamber at a point adjacent to the transversely extending closure therein, and a second pipe having communication with the said chamber at a point opposite to that at which the first-named pipe is connected, the said second-named pipe having connection with the said internal combustion engine.

3. In combination, an internal combustion engine, an intake channel for supplying fuel to said engine, and an exhaust channel for conveying exhaust gases from said engine, a conduit having connection with the said exhaust channel and said intake channel for returning a portion of the exhaust gases from the said exhaust channel to the intake channel, means in said exhaust channel for deflecting gases therefrom into said conduit, and means interposed in said conduit for causing the said gases to travel a tortuous passage.

4. A bypass for conducting gases from the exhaust channel of an internal combustion engine to the intake channel of such engine said bypass including a closed chamber, a member therein secured at one end to the said chamber and the other end being open, and the said member being provided with a closure intermediate its ends and also being provided with openings between said closure and the end which is connected to said chamber, a pipe extending into said chamber and terminating adjacent to said closure, and a pipe communicating with said chamber at a point within the region of the said member.

5. A bypass for conducting gases from the exhaust channel of an internal combustion engine to the intake channel of such engine said bypass including a cylindrical chamber closed at its opposite ends, and a tubular member secured at one end to one end of the said chamber and the other end thereof being open and situated adjacent to the opposite closed end of said chamber, the said tubular member being of less diameter than the internal diameter of the said cylindrical chamber whereby an angular space is provided between said member and said chamber and the said tubular member being provided with a closure situated intermediate its ends and also being provided with holes situated between the said closure and the end thereof which is connected to the end of said chamber.

6. A bypass for conducting gases from the exhaust channel of an internal combustion engine to the intake channel of such engine said bypass including a cylindrical chamber closed at its opposite ends, a tubular member secured at one end to one end of the said chamber and the other end thereof being

open and situated adjacent to the opposite closed end of said chamber, the said tubular member being of less diameter than the internal diameter of the said cylindrical chamber whereby an annular space is provided between said member and said chamber and the said tubular member being provided with a closure situated intermediate its ends and also being provided with holes situated between the said closure and the end thereof which is connected to the end of said chamber, a pipe having connection at one end with the exhaust channel from a combustion chamber and terminating at the other end in the said tubular member at a point adjacent to the said closure, and a second pipe having connection at one end with the opposite end of said chamber and with the interior of said tubular member below the said closure therein, the other end of the said pipe having connection with the intake for supplying fuel to said combustion chamber.

7. In combination, an exhaust chamber for conveying hot exhaust gases from an internal combustion engine, an inlet passageway for conveying fuel to said engine, a conduit having connection with said channel and with said inlet passageway for conveying hot exhaust gases from the former to the latter, and a nozzle situated in and extending transversely of said channel and having an opening in one side and extending longitudinally thereof, said opening facing in a direction opposite to that in which the gases are traveling in said channel.

8. In combination, an exhaust channel for conveying hot exhaust gases from an internal combustion engine, an inlet passageway for conveying fuel to said engine, a conduit having connection with said channel and with said inlet passageway for conveying hot exhaust gases from the former to the latter, and a flaring cone-shaped nozzle situated in and extending transversely of said channel and having an A-shaped opening in one side and extending longitudinally thereof, said opening facing in a direction opposite to that in which the gases are traveling in said channel, whereby portions of the gases traveling in said channel are collected by said nozzle and directed into said conduit.

9. In combination, an exhaust channel for conveying hot exhaust gases from an internal combustion engine, an inlet passageway for conveying fuel to said engine, a conduit having connection with said channel and with said inlet passageway for conveying hot exhaust gases from the former to the latter, the said conduit including means for retarding the flow of the hot gases through the said conduit and for condensing portions thereof, and a nozzle situated in and extending transversely of the said exhaust

channel and being provided with an A-shaped opening in one side thereof, which opening faces in a direction opposite to that in which the hot gases are traveling in the
5 exhaust channel whereby portions of the said gases are collected and directed into the said conduit.

In testimony that I claim the foregoing as my invention, I have hereunto signed my name this 15th day of December, A. D. 1913. 10

ASTLEY W. WHARTON.

In the presence of—

CARRIE E. KLEINFELDER,
CYRUS N. ANDERSON.