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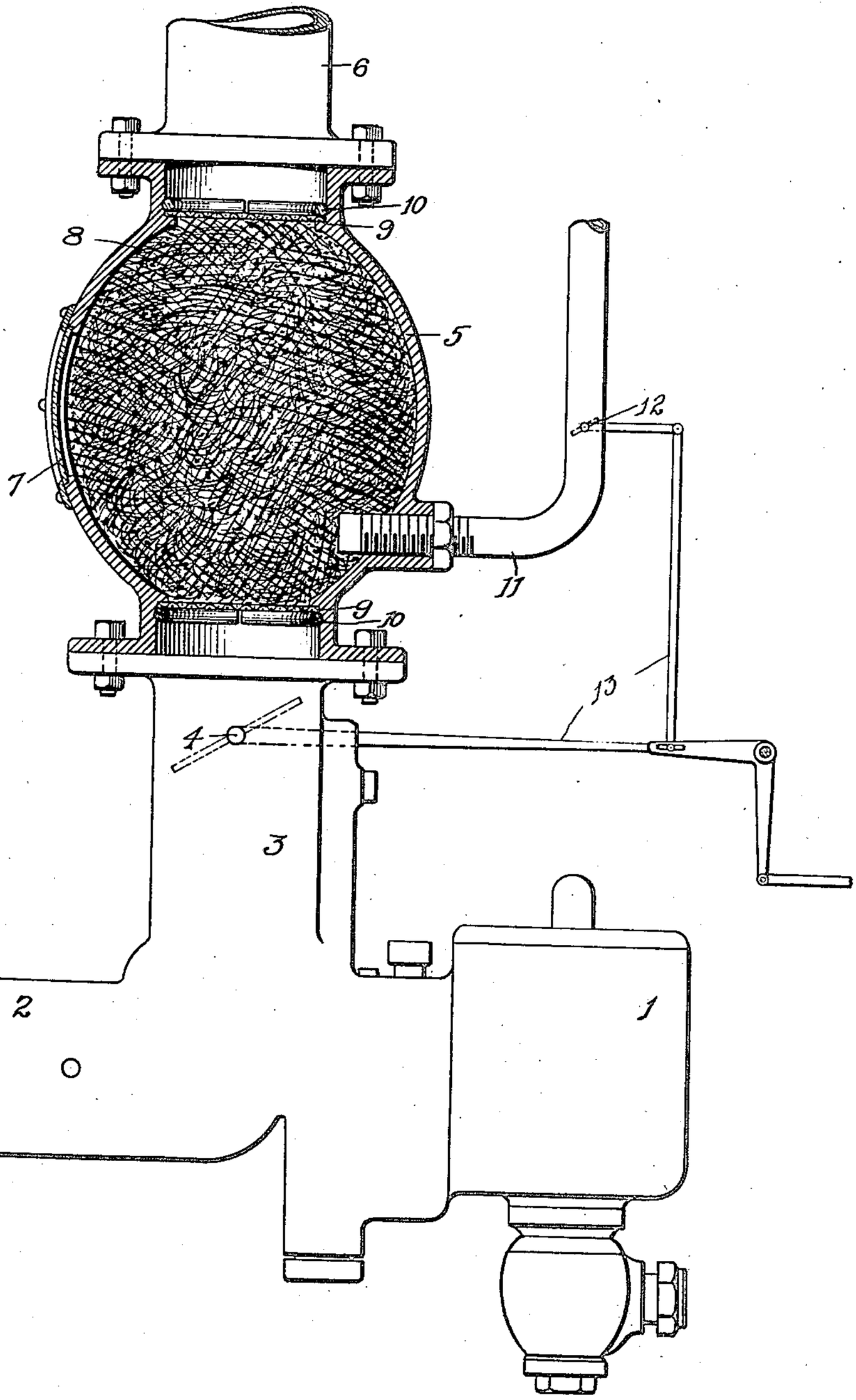
E. G. BALLENGER.
VAPORIZER.
FILED MAY 21, 1920.

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# UNITED STATES PATENT OFFICE.

EDGAR GARRISON BALLENGER, OF ATLANTA, GEORGIA.

## VAPORIZER.

Application filed May 21, 1920. Serial No. 383,079.

*To all whom it may concern:*

Be it known that I, EDGAR G. BALLENGER, a citizen of the United States, and resident of Atlanta, in the county of Fulton and State of Georgia, have invented a new and Improved Vaporizer, of which the following is a full, clear, and exact description.

My invention relates to a vaporizer, and aims to provide a device of this character, whereby a better fuel mixture will be produced.

It is well appreciated that the present grade of gasoline fuel now placed upon the market, is not readily subject to vaporization, and in view of the fact that gasoline serves as a motive force for internal combustion engines of the gasoline type, this has resulted in a general lowering of efficiency of this type of engine, in that carbon deposits have come into being in the composition chamber, and further, less than one half of the mixture introduced into the conventional engine cylinder has been consumed during the explosion stroke.

With this in mind numerous devices have been placed upon the market, which have sought to overcome the defects presented in the vaporization of fuel, the most noteworthy of the same being an attachment to the exhaust pipe whereby hot air may be drawn into the carburetor, and a further device known as the "hot spot" manifold in which the intake ducts have been entirely enclosed within the exhaust pipe of an engine whereby to heat the mixture entering the cylinders to a high degree, insuring a fine vaporization of the fuel charge, and a consequential increase in efficiency of operation.

All of these devices have presented defects in that the introduction of heated air alone does not produce a sufficiently vaporized mixture to permit of a maximum efficiency of operation, and the great difficulty experienced in connection with the "hot spot" manifold has been presented in that the mixture is heated to a high degree upon the engine running at high speeds at which time the force of suction will insure a fairly efficient mixture in any instance, but when the engine is turning at a slow speed, the heating of the mixture will be negligible due to the fact that but a small amount of exhaust gases are produced.

With this in mind I have constructed a vaporizer by means of which a uniformly efficient mixture will be produced at all times, which vaporizer will serve to insure a minute sub-dividing and breaking up of the particles of the mixture for a perfect vaporization of the same.

A further object of my invention is the construction of a vaporizer by means of which the mixture will be heated in an extremely efficient manner so that a fluid embodying high explosive qualities will be produced.

Reference is had to the attached sheet of drawings as illustrating one practical embodiment of my invention and in which drawing the figure illustrates a sectional view of a vaporizer constructed in accordance with my invention, such vaporizer having associated with it a carburetor and intake manifold.

In this figure the reference numeral 1 indicates a carburetor of any desired type, with which is associated an air inlet 2, the mixture produced by these members passing into any convenient inlet pipe 3, the flow of mixture through the said pipe being controlled by means of a throttle valve 4.

My improved type of vaporizer now conveniently includes a casing 5 preferably of greater cross section than the inlet pipe 3 and intake manifold 6, for a purpose hereinafter more fully specified, which casing is conveniently formed with an opening, normally closed by any suitable type of door 7 through which access may be had to the interior of the same.

The casing 5 is filled with any suitable substance presenting a series of narrow interstices such as steel wool 8, which substance may be held within the casing by any suitable means such as wire mesh 9 retained in position by means of a conveniently extending ring 10 terminating in a groove formed in the inner face of the end portion of the casing.

A tube 11 has one of its ends projecting into the casing, its opposite end being in communication with the exhaust pipe of the engine, and serves to permit the introduction of a certain amount of the highly heated products of combustion into the casing 5.

It will now be appreciated that the mixture will be produced in the usual manner, and will pass upwardly through the pipe 3 due to the suction existent in the intake manifold 6. In passing through the mass of steel wool or other substance 8, the mixture

will be minutely subdivided by virtue of the narrow interstices presented in this substance. This, as will readily be appreciated, serves to produce a most desirable type of mixture in that the particles of the same will be evenly distributed throughout the entire fuel charge.

A more combustible mixture is formed by virtue of the exhaust gases which are conducted into the casing 5 and it will be understood that any tendency on the part of the mixture to become ignited due to the introduction of these gases will be effectually counter-acted by virtue of the smothering action exerted by the substance 8. Also by providing a valve 12 of any desired type and conveniently connecting the same by means of linkage such as 13 to move synchronously with the throttle valve 4, the exhaust gases will always be introduced into the mixture in proportion to the flow of the latter.

It will further be understood, that by virtue of providing a casing 5 of greater cross sectional area than either of the members 3 and 6, that no thinning or retarding of the mixture will result due to the impediment presented by the substance 8 in view of the fact that the mixture has a larger passage through which to move.

It will be appreciated that in certain instances it might be advantageous to entirely dispense with the substance 8, and to merely permit the preheating of the mixture by means of the exhaust gases introduced in the manner indicated.

Obviously numerous modifications of structure might be resorted to without departing from the scope of my claim, which is—

A vaporizer including in combination with fuel-mixture producing and consuming elements and an intake manifold extending therebetween, of a pipe extending between the exhaust outlet of the consuming element and said intake manifold for permitting the introduction of a certain part of the highly heated products of combustion into said intake manifold, and a mass of material presenting narrow interstices arranged within said intake manifold in the path of flow of said fuel mixture and adjacent the point of connection of said pipe with the same.

EDGAR GARRISON BALLENGER.