P. A. C. SUAU.

INTAKE PIPE OR MANIFOLD FOR INTERNAL COMBUSTION ENGINES OR THE LIKE.

APPLICATION FILED APR. 27, 1918.

1,326,378. Patented Dec. 30, 1919.

Fig. 1.

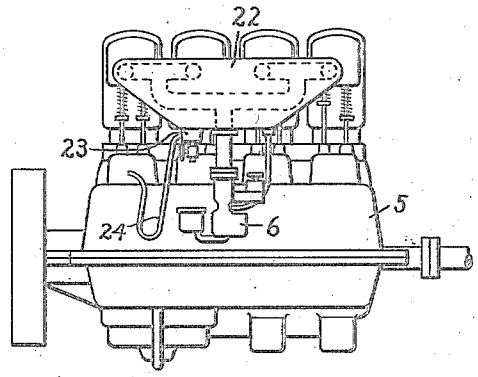
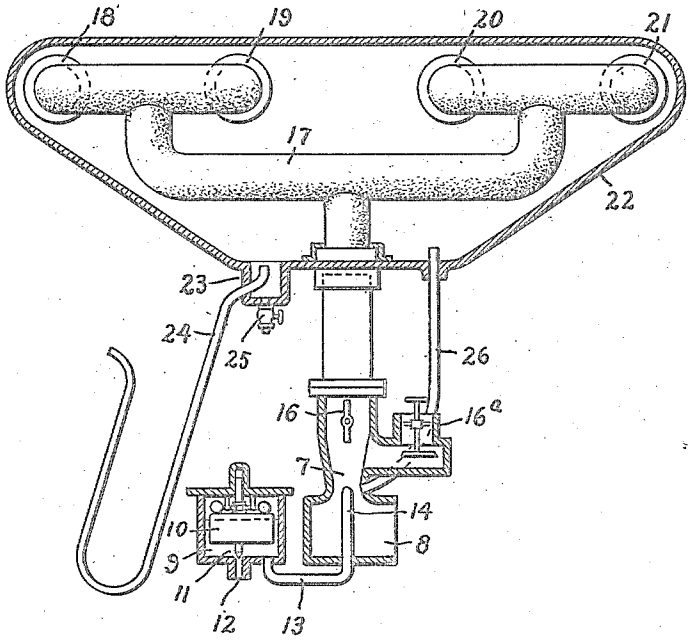


Fig. 2



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INTAKE-PIPE OR MANIFOLD FOR INTERNAL-COMBUSTION ENGINES OR THE LIKE.

1,326,378. Specification of Letters Patent. Patented Dec. 30, 1919.

Application filed April 27, 1913. Serial No. 231,151.

To all whom it may concern:

Be it known that I, PETER A. C. SUAU, a citizen of the United States, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Intake-Pipes or Manifolds for Internal-Combustion Engines or the like, of which the following is a specification.

The present invention relates to intake pipes or manifolds, such as are used, for example, in connection with internal combustion engines to convey a mixture of fuel and air from a carbureter to the cylinder or cylinders of the engine. The invention is particularly applicable for use with engines intended to operate on heavier liquid hydrocarbon fuels, such as kerosene, although it will be understood it is not necessarily limited thereto.

One of the principal difficulties met with in connection with the use of heavier fuels is to obtain a complete breaking up of the liquid fuel into very fine particles resembling a fine mist, and an intimate uniform mixture of it with the air, so that when the mixture enters the engine cylinder or cylinders, a complete burning of it will take place. In fact, with ordinary carbureters there is almost sure to be a greater or less number of large particles of fuel which are carried out from the mixing chamber of the carbureter itself, or are formed by condensation while the mixture is passed through the intake pipe or manifold, and it is well known that if such large particles of fuel get into the engine cylinder or cylinders, they are incompletely burned, and as a result carbon is deposited on the cylinder walls and the piston head, and a black smoky exhaust is produced.

The object of my invention is to provide an improved intake pipe or manifold in which any large particles of fuel which occur in the mixture as it leaves the mixing chamber of the carbureter or which may be formed due to condensation of the mixture while the mixture is passing through the manifold will be separated out and prevented from entering the cylinder or cylinders of the engine.

For consideration of what I believe to be novel, and my invention, attention is directed to the following specification and the claims appended thereto.

In the drawing, Figure 1 is a diagrammatic view of an internal combustion engine with my improved intake pipe or manifold applied thereto, and Fig. 2 is an enlarged view partly in section of a carbureter and manifold.

Referring to the drawing, 5 indicates an internal combustion engine here shown as a multi-cylinder engine, and 6 a carbureter which may be of any suitable type. In the present instance, a carbureter of the well-known float feed type is illustrated. It comprises a Venturi shaped mixing tube 7 to which air is admitted by a conduit 8, and a float chamber 9 in which a constant level of fuel is maintained by the float 10, which controls a valve 11 located in the fuel supply conduit 12. The float chamber 9 is connected to the throat of the Venturi tube by a conduit 13, which terminates in a nozzle 14. 16 indicates a throttle valve which may be operated in any suitable manner, and 16ª an auxiliary air inlet. The operation of a carbureter as just described is well understood and needs no detailed description, and it will be further understood that this carbureter is to be taken as typical of any desired carbureter structure.

Now, according to my invention, I connect the outlet or mixing chamber of the carbureter to the intake or intakes of the engine cylinder or cylinders by means of an intake pipe or manifold formed wholly or in part of a suitable material capable of absorbing any particles of liquid fuel which may be brought into contact with it. Preferably for this material I use a suitable porous substance, such as clay, and I prefer to construct the entire intake pipe or manifold of it. I may, however, construct only a portion of the intake pipe or manifold, or only certain of the walls or parts of the walls of the absorbing material, if found desirable. In the present instance, I have shown the entire intake pipe or manifold constructed of a porous material, the same being indicated by the numeral 17. The openings to the cylinders are indicated at 18, 19, 20 and 21, and it will be noted that the length of the passage through the manifold from the carbureter to each cylinder opening is the same, and that in each instance the passage has several bends, so that the mixture in flowing through the manifold must follow a circuitous route, its direction being changed one or more times. By this arrangement when the mixture is flowing

through the manifold, the larger particles of fuel will be brought into engagement with the inner walls of the manifold and be absorbed by it. Surrounding the manifold is a casing 22 for catching the particles of fuel which pass through the porous wall of the manifold. It may have any suitable contour, and is provided at its lower portion with a sump 23 into which fuel runs and from which it may be drained by a pipe 24. The pipe 24 may lead to any suitable point, such, for example, as the supply tank which supplies hydrocarbon to the carbureter. The end of pipe 24 which is located in sump 23 is preferably above the bottom of it, so that any water or moisture which collects in the same will not be drained away by pipe 24, thus escaping with the fuel. In the bottom of the sump is a petcock 25 by means of which any water which collects can be drained off.

In order to make the seepage of fuel through the pores of the intake pipe positive, I preferably make the surrounding case 22 very tight and maintain a partial vacuum therein. To this end, I connect the interior of the casing to a region of lower pressure, as the throat of the Venturi tube 7 by a pipe 26, which pipe projects well within and above the bottom of the casing 22, so no fuel will run down it. By this arrangement the suction of the engine will maintain a pressure within the casing 22 equal to that found at the throat of the Venturi tube 7, and as this pressure is less than that in manifold 17, there is established a pressure difference between the inside and outside of the manifold 17 which causes fuel particles to pass through the porous falls into casing 22.

With the above described arrangement, any liquid particles of hydrocarbon carried along by the air in its passage from the carbureter to the engine cylinder or cylinders, will be brought into contact with the inner surface of the manifold which will absorb the same. These particles will eventually seep through the manifold wall and drop down into the casing 22, from which they are drained away by pipe 24. Due to the circuitous route through which the hydrocarbon mixture must flow in passing through the manifold, all particles of liquid hydrocarbon fuel are quite certain at one point or another to be brought into contact with the inner wall of the manifold, thus insuring that they will be separated out from the mixture.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The combination with an apparatus which utilizes a mixture of hydrocarbon fuel and air, and a carbureter of a conduit formed at least in part of porous material which conveys the mixture from the carbureter to the apparatus, whereby particles of the fuel will be absorbed by said porous material and prevented from reaching the apparatus.

2. The combination with an apparatus which utilizes a mixture of hydrocarbon fuel and air, and a carbureter of a conduit which conveys the mixture from the carbureter to the apparatus, said conduit being formed at least in part of a substance which will absorb particles of fuel.

3. The combination with an apparatus which utilizes a mixture of hydrocarbon fuel and air, and a carbureter, of a conduit which conveys the mixture from the carbureter to the apparatus, said conduit being formed of porous material and having one or more bends.

4. The combination with an internal combustion engine and a carbureter, of a manifold formed of porous material which connects the one to the other, and a casing surrounding the manifold for catching any fluid which passes through said material.

5. The combination with an internal combustion engine and a carbureter, of a manifold formed of porous material which connects the one to the other, a casing surrounding the manifold for catching any fluid which passes through said material, and means for maintaining a vacuum in said casing.

6. The combination with an internal combustion engine and a carbureter having a throat, of an intake pipe of porous material which connects said carbureter to the engine, a casing surrounding the intake pipe for catching any fluid which passes through its walls, and a pipe connecting the interior of said casing to the throat of the carbureter, whereby the suction of the engine will maintain a vacuum in said casing.

7. An intake pipe for an internal combustion engine, said pipe being formed of a porous material.

8. The combination with an internal combustion engine and a carbureter having a throat, of an intake pipe of porous material which connects said carbureter to the engine, a casing surrounding the intake pipe for catching any fluid which passes through its walls, a pipe connecting the interior of said casing to the throat of the carbureter, whereby the suction of the engine will maintain a vacuum in said casing, and means for draining liquid from said casing.

9. The combination with an apparatus

which utilizes a mixture of hydrocarbon fuel and air, and a carbureter, of a conduit formed at least in part of porous material which conveys the mixture from the carbureter to the apparatus, and a casing surrounding the conduit for catching any fluid which passes through said material.

10. The combination with an apparatus which utilizes a mixture of hydrocarbon fuel and air, and a carbureter, of a conduit formed at least in part of porous material which conveys the mixture from the carbureter to the apparatus, a casing surrounding the conduit for catching any fluid which passes through said material, and means for maintaining a vacuum in said casing.

In witness whereof, I have hereunto set my hand this 16th day of April, 1918.

PETER A. C. SUAU.