

May 18, 1926.

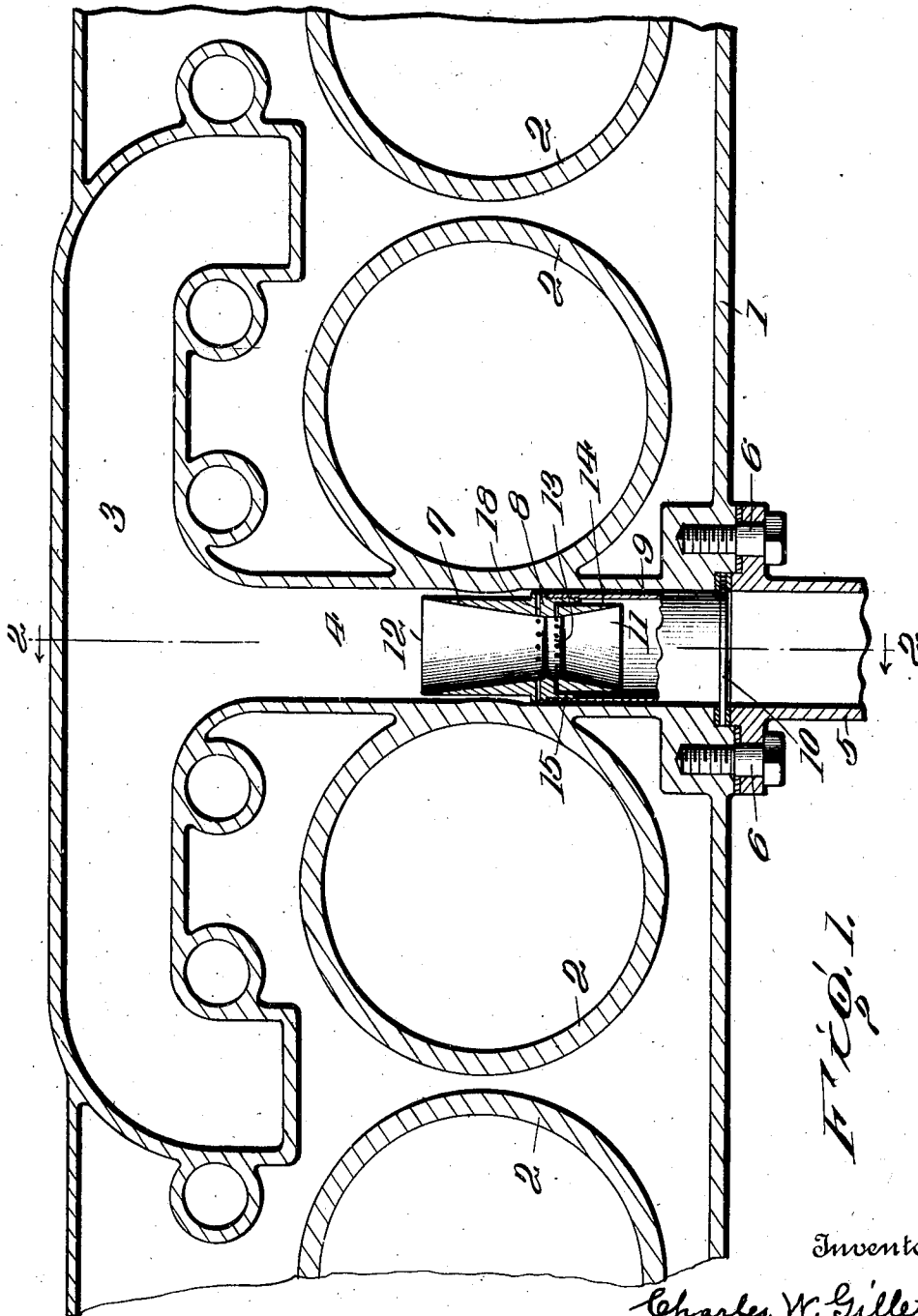
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ATOMIZER FOR INTERNAL COMBUSTION ENGINES

Filed March 4, 1922

2 Sheets-Sheet 1



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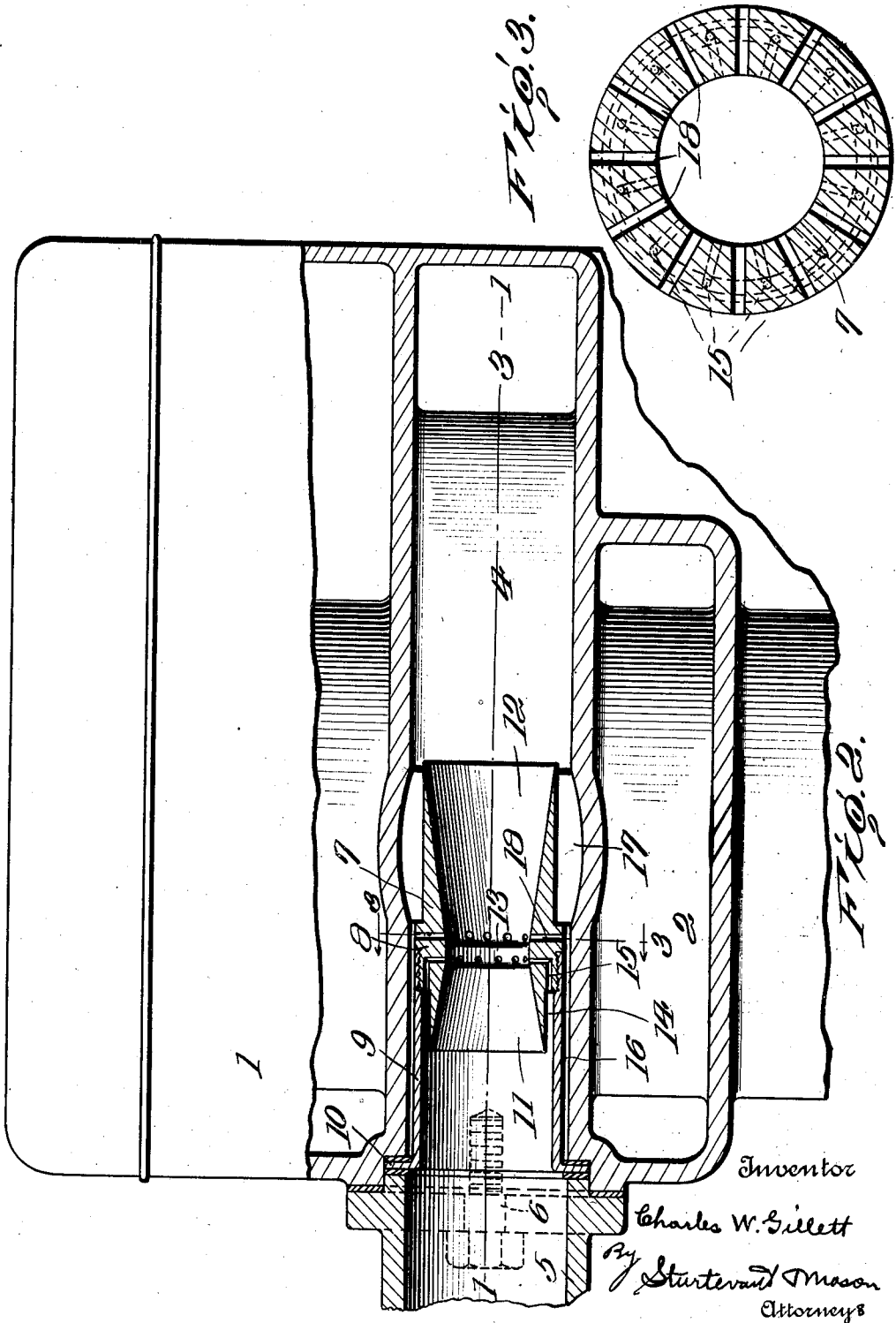
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# UNITED STATES PATENT OFFICE.

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## ATOMIZER FOR INTERNAL-COMBUSTION ENGINES.

Application filed March 4, 1922. Serial No. 541,244.

The invention relates to new and useful improvements in atomizers for internal combustion engines, and more particularly to an atomizing means located between the carburetor and the engine cylinders.

It is well-known that in the present-day liquid fuel that is handled by the carburetor of an internal combustion engine, there are in the charge units that will immediately vaporize when they come in contact with the air. There are also units that, while they do not vaporize, they are atomized fine enough to be carried into the engine; there are power units that cannot be used in their present form, and it is this unit of the charge that causes a large majority of the engine trouble commonly known as "carbon deposit" either on valves, valve seats or spark plugs, which deposit, if it becomes heavy enough causes the well-known "knocking" or preignition.

An object of the present invention is to provide an atomizer located well within the manifold of the engine, which is constructed so as to break up and atomize these heavy fuel units, and thus transform the same into units to be utilized for power.

A further object of the invention is to provide an atomizer of the above type which is so constructed as not only to gather in the heavy fuel units clinging to the entrance portion of the manifold, but which also gathers in the heavy fuel units clinging to the walls of the manifold beyond the atomizer, thus insuring that all of the heavy fuel units passing into the manifold will be subjected to a terrific turbulence which results in such complete atomizing of the same that they may be readily utilized for power purposes.

A still further object of the invention is to provide an atomizer of the above type which is formed with a supporting sleeve so that said atomizer may be introduced into the manifold passage of an engine without requiring reconstruction thereof and supported well within the entrance portion of the manifold passage.

These and other objects will in part be obvious and will in part be hereinafter more fully disclosed.

In the drawings, which show by way of illustration one embodiment of the invention:—

Figure 1 is a horizontal sectional view

through the upper portion of the engine and through my improved atomizer, showing the construction of the same, taken on the line 1—1 of Fig. 2;

Fig. 2 is a vertical sectional view on the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view through the atomizer at the central portion thereof, taken on the line 3—3 of Fig. 2.

The invention is directed broadly to an atomizer for breaking up and atomizing the heavy fuel units which pass along with the fuel charge as it enters the engine, which heavy fuel units, if not further atomized, cling to the walls of the manifold and to the spark plug and valves, thus forming "carbon deposits".

In carrying out the invention, I have provided an atomizer which is disposed well within the entrance portion of the manifold passage leading from the fuel supply pipe to the cylinders. Said atomizer is in the form of a Venturi tube and is supported by a sleeve which extends into the entrance portion of the manifold, said sleeve being provided with a flange or hilt whereby it may be clamped to the engine by the same means heretofore used for clamping the supply pipe to the engine block, so that the entire atomizer is supported by said sleeve and at a point well within the entrance passage of the manifold without requiring any special reconstruction of the engine parts. The sleeve is so connected to the atomizer that there is an annular channel or sump all about the entrance end of the atomizer, and ports or passages extend from this annular channel or sump through the atomizer opening at the inside thereof at a point adjacent the throat of the atomizer. The portion of the atomizer beyond the throat is also slightly smaller in diameter than the passage of the manifold in which it is placed so that a recess or annular channel is formed about the extended portion of the atomizer, and passages or ports connecting with this annular channel extend through the atomizer opening at the inner side of the same at points adjacent the narrow throat portion of the atomizer. The depression or vacuum in the throat of the atomizer operating through these ports will suck or draw in the heavy particles of fuel clinging to the walls of the manifold passage.

Referring more in detail to the drawings, I have shown the invention as applied to an engine including a block 1 provided with cylinders 2—2. Leading to the cylinders is a manifold 3 and said manifold has an entrance passage 4 opening at the outer face of the engine block. A supply pipe 5 is connected to the block by means of bolts 6—6 so that the supply pipe delivers its fuel to the manifold passage 4. This supply pipe 5 leads from the carburetor and is of the well-known construction. As the fuel passes from the carburetor, certain of the units will be immediately vaporized when they come into contact with the air and to such an extent that they will pass through into the engine and can be readily ignited and utilized for power purposes. There are other heavier fuel units which are atomized sufficiently to be carried in suspension by the charge into the engine, and these heavier fuel units are the ones which cause so much engine trouble, as above noted. My improved atomizer is for the purpose of taking care of and further atomizing these heavier fuel units so that they may be readily ignited and used for power purposes.

My improved atomizer consists of a body portion 7 which is formed with a central enlargement 8 having a screw-thread which is adapted to be threaded into a supporting sleeve 9. This supporting sleeve 9 is formed with a flange or hilt 10. This supporting sleeve of the atomizer is first inserted in the manifold passage 4, after which the supply pipe is connected to the engine block, and the supply pipe bearing against the hilt or flange of the sleeve will firmly support said sleeve 9.

Said atomizer is formed with an inwardly tapering passage 11 and an outwardly tapering passage 12 which meet at 13 to form a restricted or narrowed throat so that said atomizer is in effect in the form of a Venturi tube and the gases passing through into the engine, as they pass through said throat, form a terrific point of turbulence. The receiving end of the atomizer is cut-away so as to form an annular channel or recess 14. Spaced ports or passages 15 extend inwardly from this channel or recess 14 to a point adjacent the throat and thence radially, opening at the inner face of the throat.

The sleeve 9 is preferably of such size so as to be spaced from the wall of the passage 4, thus forming an annular channel 16 between the sleeve and the wall of the manifold. This annular channel is open at the right hand end, as viewed in Fig. 2, and, therefore, leads into an annular channel 17 extending about the discharge end of the atomizer. There are radial ports or passages 18 which lead from the channel 16 to

the interior of the throat of the atomizer.

As the fuel gas passes into the sleeve 9, some of these heavier particles of fuel which are carried in suspension will drop by gravity onto the walls of the sleeve 9 and will be rolled or carried along said walls into the channel 14. The passage of the gases through the narrow restricted throat of the atomizer will cause a depression or vacuum which, in turn, will be transmitted through the ports or passages 15, and these heavier fuel units will, therefore, be drawn into the channel 14 and through the passages 15 and delivered into the intruding mixture at the terrific point of turbulence. Some of these heavier fuel units passing to the atomizer will cling to the wall of the manifold at the right of the atomizer, as viewed in Fig. 2. The ports or passages 18 will cause more or less of a vacuum in the channel 17, and this will draw back into said channel some of these heavier fuel units and discharge the same through the passage or ports 18 into the rapidly moving fuel.

This passing of these heavier fuel units through the ports and into the fuel mixture at the point where they are moving with such turbulence will break up or atomize said heavier fuel units to a further extent, and this atomizing will be to such an extent that the fuel units thus broken up will readily ignite and can be used for fuel purposes. Again, some of the heavier fuel units will cling to the walls of the manifold to be drawn back into the channel 17 and pass into the ports 18, so that this continued passing of these heavier fuel units back into the atomizer and delivering the same into the fuel stream at this most terrific point of turbulence will effectively break up the heavier fuel units so that practically all of the fuel passing through the engine will be so highly atomized that it will readily ignite and thus can be used for power purposes.

It is obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having thus described the invention, what is claimed as new is:—

1. The combination of an internal combustion engine having a cylinder, an intake manifold and a carburetor attached thereto, of an atomizer located at a distance well within the said manifold, said atomizer having a restricted throat and means for supporting said atomizer so as to provide an annular channel extending about each end of said atomizer, said channels being separated from each other, said atomizer having a plurality of liquid fuel atomizing passages leading from the respective channels to the said restricted throat of the atomizer.

2. The combination of an internal combustion engine having a cylinder, an intake manifold and a carburetor attached thereto, a sleeve with an atomizer attached thereto, said sleeve and atomizer being positioned well within said intake manifold and located so as to form annular channels between the inner wall of said sleeve and the outside wall of the atomizer at the entrance end thereof, and also an annular channel between the inner wall of the intake manifold and the outside wall of the atomizer at the discharge end thereof, said atomizer having a plurality of passages leading from the annular channels to the inner wall of the atomizer whereby liquid fuel accumulating in said annular channels is drawn into the atomizer.

3. The combination of an internal combustion engine having a cylinder, an intake manifold and a carburetor attached thereto, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold, and an atomizer located at the inner end of said sleeve, and spaced therefrom to form an annular channel and passages leading from said channel to the interior of said atomizer.

4. The combination of an internal combustion engine having an intake manifold, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold, an atomizer located at the inner end of said sleeve, said atomizer having a restricted throat between its ends, and means for connecting said atomizer to said sleeve at a point between the ends of said atomizer and so as to form separated channels surrounding the opposite ends of the atomizer, and passages leading from the respective channels to the restricted throat.

5. The combination of an internal combustion engine having an intake manifold, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold, an atomizer located at the inner end of said sleeve, said atomizer having a threaded connection with said sleeve at a point between the ends of the atomizer, the receiving end of said atomizer being within and spaced from the sleeve to form a channel, the outer wall of which is in line with the inner wall of the sleeve, said atomizer having passages leading from said channel to said restricted throat.

6. The combination of an internal combustion engine having an intake manifold, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into

the entrance end of said manifold, an atomizer located at the inner end of said sleeve, said atomizer having a connection with said sleeve, the receiving end of said atomizer being within and spaced from the sleeve to form a channel, the outer wall of which is in line with the inner wall of the sleeve, said atomizer having passages leading from said channel to said restricted throat.

7. The combination of an internal combustion engine having an intake manifold and a carburetor, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold between the carburetor and the engine, an atomizer located at the inner end of said sleeve, said atomizer having connection with said sleeve, the delivering end of the atomizer extending beyond the sleeve and spaced from the walls of the entrance portion of the manifold to form a channel, the outer wall of which is the wall of the manifold, and passages leading from said channel to said restricted throat.

8. The combination of an internal combustion engine having an intake manifold, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold, an atomizer located at the inner end of said sleeve, said atomizer having a threaded connection with said sleeve at a point between the ends of the atomizer, the delivering end of the atomizer extending beyond the sleeve and spaced from the walls of the entrance portion of the manifold to form a channel, the outer wall of which is the wall of the manifold, and passages leading from said channel to said restricted throat.

9. The combination of an internal combustion engine having an intake manifold, a sleeve having supporting means at its outer end, said sleeve being adapted to extend into the entrance end of said manifold, an atomizer located at the inner end of said sleeve, said sleeve having a threaded connection with said atomizer at a point between its ends whereby said atomizer extends into and beyond the end of said sleeve, a portion of the atomizer at its receiving end being spaced from the sleeve to form a channel, the outer wall of which is formed by the sleeve, and a portion of said atomizer at the delivering end being spaced from the wall of the manifold to form a channel, said atomizer having passages leading from the respective passages to the restricted throat of the atomizer.

In testimony whereof, I affix my signature.  
CHARLES W. GILLET.