J. J. COCHRAN.

MIXER.

APPLICATION FILED APR. 4, 1919.

1,305,064. Patented May 27, 1919.

Fig. 1.

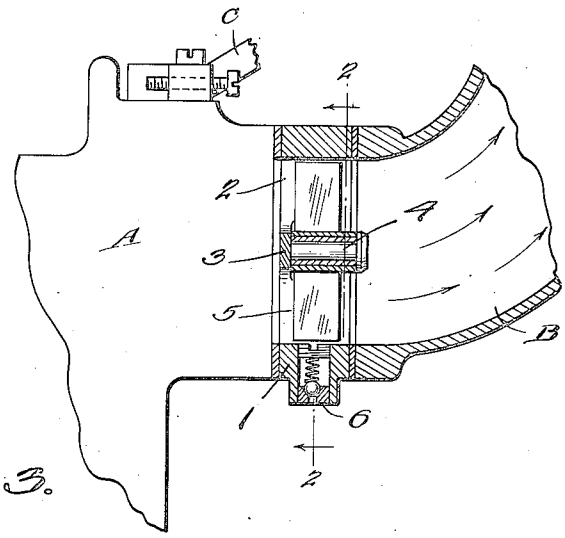


Fig. 3.

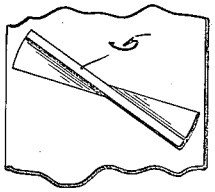
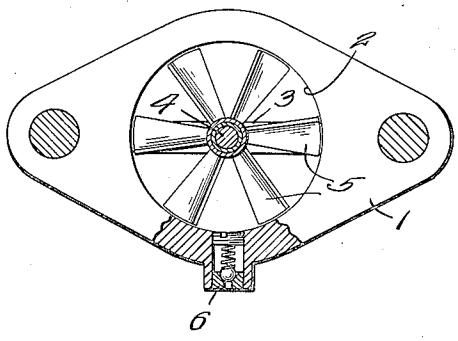


Fig. 2.



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UNITED STATES PATENT OFFICE.

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MIXER.

1,305,064. Specification of Letters Patent. Patented May 27, 1919.

Application filed April 4, 1919. Serial No. 287,540.

To all whom it may concern:

Be it known that I, JOHN J. COCHRAN, a citizen of the United States of America, a resident of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Mixers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a means for supplying explosive mixture to internal combustion engines and through the medium of which I provide for the delivery of the explosive mixture in a purely vaporous or gaseous form, the said means providing against the delivery of liquid hydrocarbons to the intake leading from the carbureter to the engine cylinders. My explosive mixture supply means further provides for a complete mixture of hydrocarbon vapors and air, and the delivery of such mixture in a uniform condition to the engine cylinders.

Figure 1 is an enlarged side elevation partly in section of a fragment of a carbureter, the intake pipe leading therefrom and the parts of my fuel supplying means directly associated with said carbureter and intake pipe.

Fig. 2 is an enlarged cross section taken on line 2—2, Fig. 1.

Fig. 3 is an enlarged end view of one of the blades of the fan wheel in my fuel supplying means.

A designates a fragment of a carbureter and B an intake pipe leading to the cylinders of an internal combustion engine. The carbureter A is provided with the usual throttle lever C. The parts thus far described are common to internal combustion engines in general and no invention for said parts, *per se*, is herein claimed.

1 designates a tubular body interposed between the carbureter A and intake pipe B and having air-tight connection with said members. This body is provided with an aperture 2 providing communication between the carbureter and the intake pipe and through which the mixture to supply the cylinders of the engine is drawn. The aperture 2 being slightly larger in diameter than the internal diameter of said intake pipe. A cross piece 3, spanning the aperture in the body 1 serves to support an arbor 4 located centrally of said aperture and extending longitudinally thereof. A fan wheel 5 rotatably mounted on said arbor has blades extending into close proximity with the wall of the aperture 2.

The blades of the fan are arranged in angular relation to the axis of said fan wheel to insure rotation of said fan wheel by the passage therethrough of the vapors from the carbureter to the intake pipe. That is to say, I have found that it is a requisite part of my invention that the blades have an angularity of approximately 15° at the hub with respect to the axis of the fan wheel and approximately 35° at the periphery of the blades. These blades are spaced relatively wide apart and provide a passageway of approximately 40 per cent. of the total opening in said tubular member for the vapors passing to the cylinders of the engine. By this means I do not obstruct enough area to prevent the free passage of the moving vapors through said tubular member. By making the blades of relatively large depth I accomplish the beating up and thorough commingling of the vapors passing through said fan. The peripheries of these blades are in close proximity to the internal wall of the aperture 2 so that all the vapors entering the intake pipe B are necessarily subjected to the beating and mixing action of the blades of the fan wheel 5.

By virtue of the angular relation of the blades, as above described, to the axis of the fan wheel, varying from approximately 15° at the hub to approximately 35° at the periphery, the vapors are so acted upon by said blades as to precipitate and return to the carbureter any liquid carried in suspension by said vapors. This action is also facilitated by the depth of the blades which thereby tend to act upon all the vapors passing through said fan.

When an internal combustion engine equipped with the parts thus far described is in use, the suction in the intake pipe B acts to rotate the fan wheel 5 and said fan wheel, due to the angular shape of its blades serves the triple function of breaking up the hydrocarbon vapors drawn into the aperture 2, thoroughly mixing the vapors of the hydrocarbons and the air passing through the carbureter therewith, and acts to restrain the liquid in the hydrocarbons from entering the intake pipe; consequently the mixture which passes through the intake pipe is

one composed of hydrocarbon vapors and air only commingled, and is one susceptible of more complete combustion when it enters the engine cylinders and by which the engine may be more perfectly operated than it can be where the mixture is in a liquid or partially liquid state.

6 designates a check valve in the tubular body 2 and which is normally closed but is adapted to open to supply additional air from the atmosphere to the aperture 2 and the intake pipe B whenever the engine requires a supply of vapor additional to that supplied by the carbureter alone.

The herein-described means for supplying explosive mixture or fuel to internal combustion engines provides for the delivery of a more perfect explosive mixture due to the thorough mixing operation and the retardation of the liquid hydrocarbons; it therefore enables the engine to be furnished with an increase of vapor with better combustion and with a lessening of the amount of carbon produced. Due to the more perfect mixture the engine may be started more easily.

I claim:

The combination with the carbureter and intake pipe of an internal combustion engine, of a tubular member interposed between said carbureter and intake pipe, a fan wheel in said tubular member, the blades of which at their periphery are in close proximity to the internal wall of said tubular member, said blades having an angularity with respect to the axis of said fan wheel of approximately 15° at the hub to approximately 35° at the periphery, said blades being spaced apart to provide approximately 40 per cent. of unrestricted passageway from said carbureter to said intake pipe and said blades having a depth providing an area whereby the hydrocarbon laden vapors passing from the carbureter to the intake pipe are all acted upon by said blades for mixing said vapors and retarding any liquid hydrocarbon carried by said vapors and preventing said liquid hydrocarbon from entering said intake pipe.

In testimony whereof I affix my signature.

JOHN J. COCHRAN.