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A. P. J. VOIGT ET AL

MANIFOLD

Filed June 21, 1926

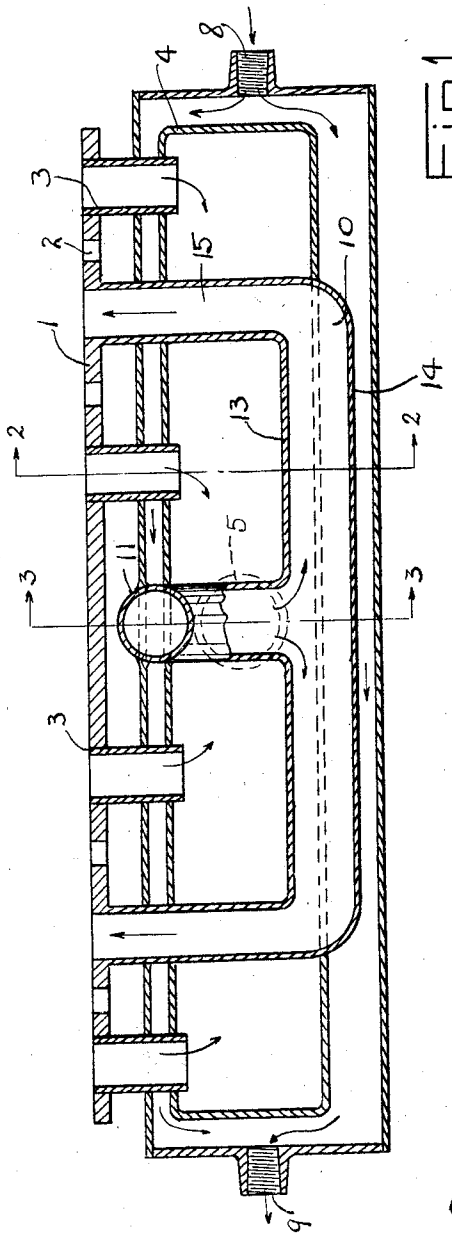


Fig 1

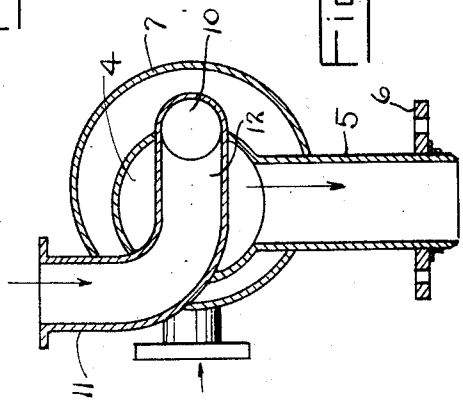


Fig 3

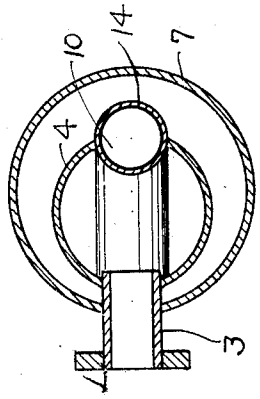


Fig 2

Albert P. J. Voigt
Knud W. Linde

Inventor

By Jesse R. Stone

Attorney

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UNITED STATES PATENT OFFICE.

ALBERT P. J. VOIGT AND KNUD W. LINDE, OF GALVESTON, TEXAS.

MANIFOLD.

Application filed June 21, 1926. Serial No. 117,369.

Our invention relates to an improvement in manifolds to be used upon internal combustion engines, and more particularly upon marine engines or tractors.

In internal combustion engines of the type employed in the smaller form of marine engine, it has been found necessary to preheat the combustible mixture which is fed to the cylinders of the engine. It is not possible to obtain the proper temperature of the combustible mixture, however, if the gas is conducted to the cylinders by way of the exhaust manifold of the engine alone, due to the fact that the gases may be heated too highly. We have, therefore, formed a type of manifold wherein the gases may be preheated without danger of being raised to an excessive high temperature.

We also desire that the exhaust manifold be cooled not only by contact with the pipes conducting the entering gases, but also by a water jacket arranged to entirely enclose the said exhaust manifolds.

Referring to the drawing herewith, wherein one embodiment of the invention is shown, Fig. 1 is a central horizontal section through a manifold embodying our invention. Fig. 2 is a vertical section on the plane 2—2 of Fig. 1, and Fig. 3 is a similar section on the plane 3—3 of Fig. 1. Like numerals of reference are employed to designate like parts in all the views.

In the type of internal combustion engine above indicated, the manifold may be mounted upon a supporting plate 1, which is secured to the side wall of the engine. This plate is adapted to be supported by bolts passing through openings 2, shown in the said plate. There are extending through this plate a plurality of exhaust ports 3, and in the present installation, we have shown four of these ports as adapted to be used in a four-cylinder engine, one port leading to each cylinder thereof. These exhaust ports all extend into a manifold 4, which is approximately cylindrical in shape, and receives the gas from the pipes 3 and delivers it to a central exhaust pipe 5, leading from the lower side of said manifold approximately midway between the ends thereof. This exhaust manifold is shown as passing through a plate 6 by means of which it may be supported so as to direct the gas to the usual exhaust muffler, not shown.

The exhaust manifold 4 is ordinarily highly heated by the exhaust gases from the cylinders, and we have arranged to surround the body of the manifold by a water jacket. This is formed by enclosing the manifold within a cylindrical container 7 having an inlet opening 8 at one end and an outlet opening 9 at the opposite end, allowing the circulation of cooling water therethrough from the engine in the usual manner. The said water jacket 7 has openings therein to allow the passage therethrough of the exhaust pipes 3, leading to the manifold, and the outlet pipe 5, leading from the manifold, it being understood that a fluid-tight connection between the said pipes and the body of the water jacket is provided.

The inlet manifold, shown at 10, is positioned partly within and partly without the exhaust manifold, the gas from the carburetor enters through an upwardly directed pipe 11, which carries the gas downwardly, and then laterally, as shown at 12, to the horizontally arranged body 10 of the manifold. This portion of the manifold is as shown in Figs. 2 and 3, partly within the exhaust manifold on the side indicated at 13, and partly without the manifold on the side indicated at 14. At the ends of the manifold, the two inwardly directed branches 15 serve to conduct the gas to the cylinders of the engine, each arm 15 being adapted to feed two of the cylinders in the usual manner.

It will be noted that the inlet manifold is adapted to be heated on its inner side and along branch arms 15 thereof, so that the gas passing through the same to the cylinders will be heated. The portion of the manifold indicated at the side 14, however, projects into the water jacket so that the circulation of the cooling water around the same will equalize the temperature of the entering gas, so that it will not reach an excessively high temperature.

By this arrangement, the exhaust manifold will be prevented from getting excessively hot, and the gases leading to the cylinders of the engine will be heated to the desired temperature without danger of excessive preheating. This effect is greatly to be desired, in that engines of this character will not perform satisfactorily under all conditions without the arrangement for heating the gas to a temperature sufficient to cause a ready combustion thereof in the cylinders of the engine. Without the water jacket and the contact thereof with the inlet manifold, the temperature of the gas may reach a dan-

gerous point, but with the construction as disclosed and shown in the drawing, a moderately heated combustible mixture will be fed to the cylinders so that an efficient and reliable operation of the engine may be obtained. The particular construction and positioning of the cylinders relative to each other and to the water jacket constitute the important features of our invention.

Having thus described the invention, what we claim as new and desire to protect by Letters Patent is:

In a device of the character described, a supporting plate for attachment to an internal combustion engine, an exhaust manifold mounted thereon and having connection with the cylinders of said engine, a cylindrical water jacket surrounding said exhaust manifold, an inlet manifold within said water jacket and connected with said engine, said inlet manifold lying partly within said exhaust manifold and partly within said water jacket, whereby the temperature of said inlet manifold may be regulated.

In testimony whereof we hereunto affix our signatures June, A. D. 1926.

KNUD W. LINDE.
ALBERT P. J. VOIGT.