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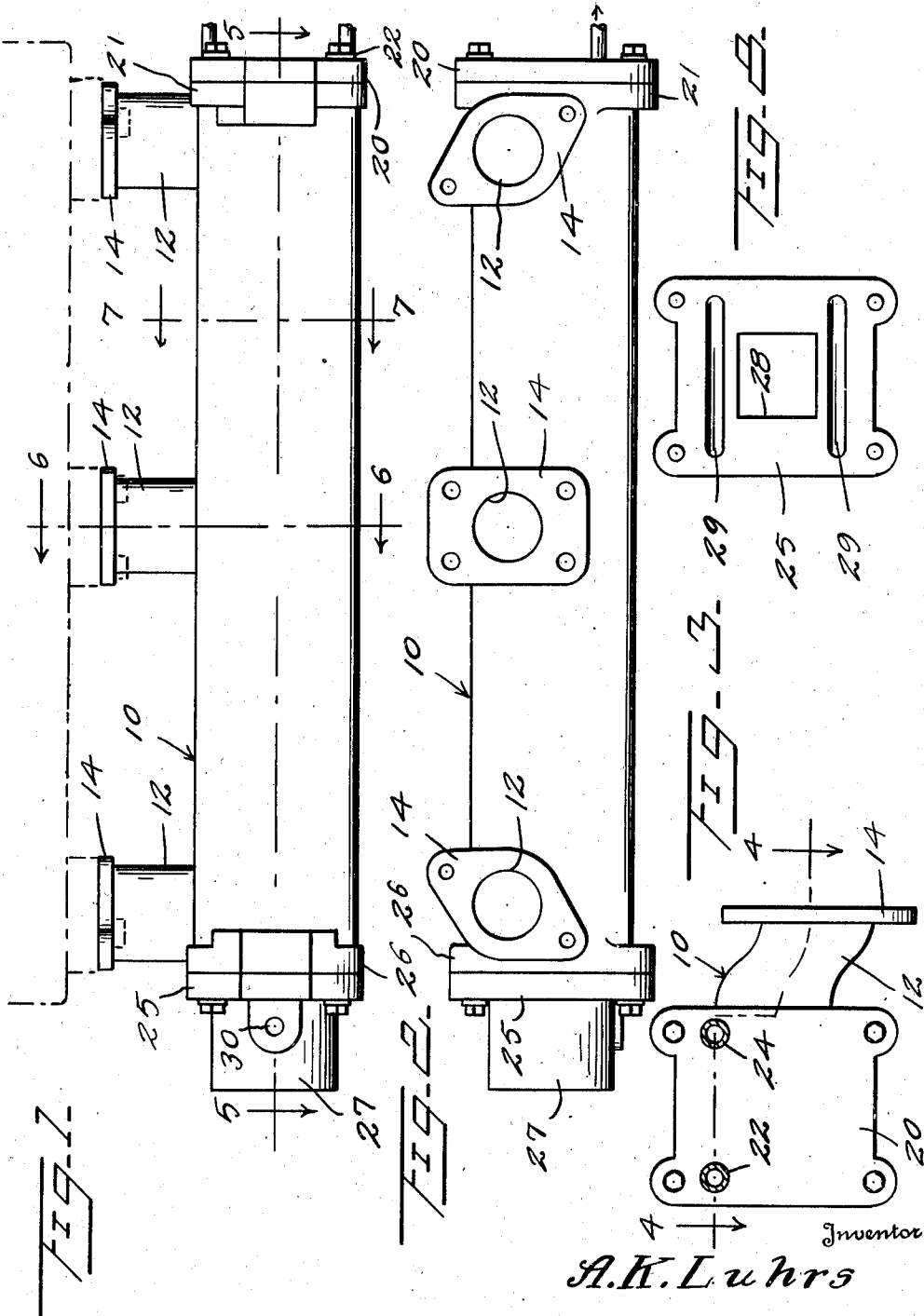
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CONTROLLED TEMPERATURE MANIFOLD

Filed Oct. 7, 1946

2 Sheets-Sheet 1



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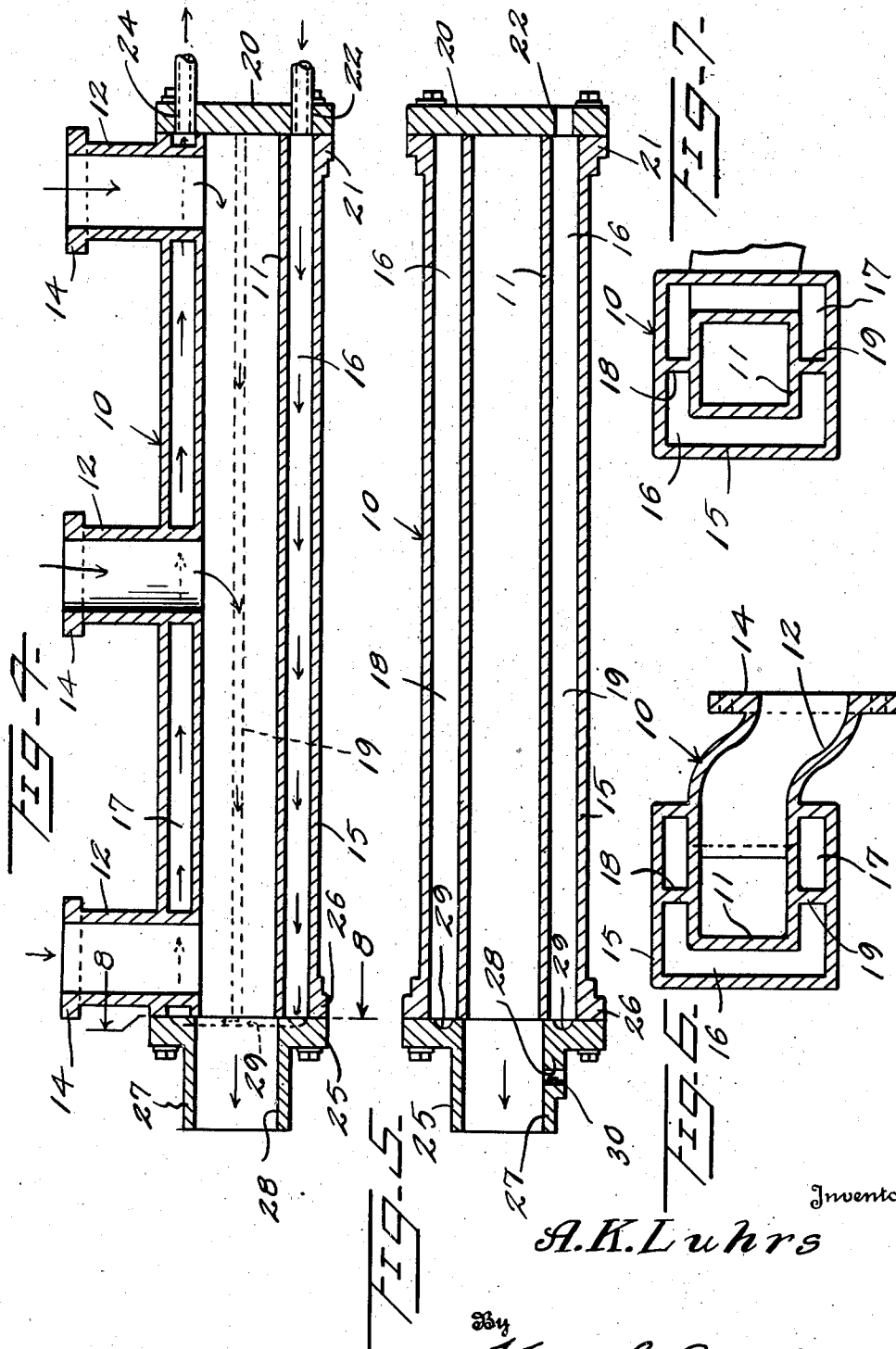
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UNITED STATES PATENT OFFICE

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CONTROLLED TEMPERATURE MANIFOLD

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to John Roehrich, Hackensack, N. J.

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1 Claim. (Cl. 257—241)

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This invention relates to manifolds for internal combustion engines, and is particularly adapted to manifolds, exhaust or combustion exhaust and intake for marine engines, and conversions to marine engines.

It is an object of this invention to provide a water or liquid cooled manifold wherein the chamber is completely surrounded by the cooling jacket to provide for a more complete and efficient cooling of the chamber.

Another object of this invention is to provide an improved liquid cooled manifold having an inlet passage and an outlet passage about the exhaust chamber whereby a continuous passage is provided to permit circulation of the coolant throughout the cooling packet thereby eliminating the possibility of dead spots or steam pockets in the manifold.

Still another object of this invention is to provide a controlled temperature exhaust manifold by providing a cooling jacket about the exhaust gas chamber wherein the amount of fluid passing through the cooling jacket is in direct proportion to the engine speed, whereby the engine temperature will be maintained at a constant degree of heat, a prime consideration for efficient engine performance.

A further object of this invention is to provide a liquid cooled manifold having a coolant jacket completely about the exhaust gas chamber, the coolant jacket being divided longitudinally thereof into an inlet passage and an outlet passage and having a removable end plate formed with grooves or passages communicating between the inlet and outlet passages, the grooves in the end plate being of a restricted size whereby any sediment in the coolant will be deposited in the restricted grooves whence it may be readily removed upon the removal of the end plate.

Another object of this invention is to use the heat of the exhaust gases which is drawn off by the liquid in the cooling jackets to warm this liquid to the proper temperature before passing into the cylinder block. As the liquid cools the manifold it absorbs the heat and accomplishes this action. This causes the engine to run at a normal temperature and also permits the temperature to reach this point much faster than former methods. The cracking of cylinder blocks caused by cold water entering a hot block is also eliminated by this system.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the

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drawings and specifications, and then more particularly pointed out in the appended claim.

In the drawings,

Figure 1 is a top plan view of my manifold,

Figure 2 is a side elevation thereof,

Figure 3 is a front end view,

Figure 4 is a longitudinal section taken on the line 4—4 of Figure 3,

Figure 5 is a longitudinal section taken on the line 5—5 of Figure 1,

Figure 6 is a transverse section taken on the line 6—6 of Figure 1,

Figure 7 is a transverse section taken on the line 7—7 of Figure 1,

Figure 8 is a front elevation of the rear end plate taken on the line 8—8 of Figure 4.

Referring to the drawings, the numeral 10

designates generally an exhaust manifold for a marine engine or other internal combustion engine wherein it is desired to provide a cooling

jacket for the exhaust manifold. The exhaust manifold 10 is particularly designed to provide

circulation of a coolant liquid about the exhaust chamber for holding the temperature thereof at

a relatively constant heat at the various engine speeds. The exhaust manifold 10 constructed

according to an embodiment of my invention is constructed with an elongated tubular exhaust

gas chamber 11, which may be made of any suitable metal having both ends thereof open. Ex-

haust gas inlet ports 12 open into the exhaust gas chamber 11 intermediate the length thereof for

conducting the hot exhaust gases from the engine to the manifold 10. The ports 12 may be of a

more or less conventional construction and configuration, having flanges 14 or one long single

flange on the free ends thereof for bolting the manifold 10 on the engine. The number of

flanges may vary from one to as many as may be necessary dependent entirely upon the type of

engine they are to be used on. The exhaust gases pass through the ports 14 and into the ex-

haust gas chamber 11 when the engine is in operation. One end of the exhaust chamber 11

will be closed by a cover plate to be more particularly described hereinafter so that the gas

in the chamber 11 will pass from the manifold 10 at the open end thereof out through any suitable muffler or other exhaust pipe.

For greater engine efficiency in marine engines and others, it is desirable to cool the exhaust

manifold to a certain desired level with water or other suitable liquid coolant. To provide for

such liquid cooling of the manifold 10, I have provided a water jacket 15 for completely surround-

ing the manifold 10.

ing the exhaust gas chamber 11. The cooling jacket 15 is formed of an elongated tube about the exhaust chamber 11 spaced therefrom along the length thereof. The jacket 15 is fixed to the ports 12 at the points where the ports 12 extend from the chamber 11 and must pass through the jacket 15, and is open at both ends. The coolant jacket 15 is divided into a pair of longitudinal chambers or passages 16 and 17 by upper and lower longitudinal walls 18 and 19 respectively, between the exhaust chamber 11 and cooling jacket 15.

The front end of the manifold 10 is closed with a front cover plate 20, which is bolted to the flange 21 on the front end of the jacket 15 for closing the front end of the manifold 10, and a seal is provided between the exhaust chamber 11 and the cooling liquid in the passages 16 and 17. The front end plate 20 is provided with an inlet opening or port 22 which opens into the outer chamber or passage 16 whereby liquid may be introduced into the manifold 10 from the water pumps of the engine. An outlet port 24 is provided in the cover 20 in the opposite side from the port 22 and opens into the passage 17 whereby the coolant may be transferred from the manifold 10 after it has passed through the length of the chambers 16 and 17 to the cylinder block.

In order to connect the chambers 16 and 17 and to close the rear end of the jacket 15, a rear cover plate 25 is secured to the flange 26 on the rear end of the manifold 10. The rear cover 25 is formed with a rearwardly extending nipple 27 to which an exhaust pipe may be attached, and is formed with an opening 28 therethrough for the passage of the exhaust gases from the chamber 11. The cover 25 is further formed with a pair of transverse grooves 29, one above and one below the opening 28, intermediate the width thereof, whereby liquid in the passage 16 may pass into the chamber 17 and the coolant is circulated through the manifold 10. The nipple 27 is formed with an opening 30 on the top side thereof to provide an outlet for water, from the cylinder block. The object of this is to discharge the water back to its original source and make use of this discharge to keep the exhaust pipe from getting too hot. The water is discharged directly into the exhaust outlet chamber and is blown out the exhaust pipe by the exhaust pressure.

In the use and operation of this manifold 10, water or other suitable coolant is pumped into the chamber 16 from the engine driven water pump, and circulates through the grooves 29 and chamber 17 whence it is let out through the port 24. The cooling effect of the liquid is dependent upon the amount of liquid in the chambers 16 and 17, so the desired temperature of the exhaust gas in the chamber 11 must be determined and the

size of the jacket 15 constructed to suit the volume of liquid required. This volume is determined by the temperature desired and the capacity of the pump. When the size of jacket 15 is determined, the exhaust temperature will remain substantially constant since the increase in exhaust temperature at increased engine speed is compensated by the increase of the pump speed and the subsequent increase in the flow of the liquid in the jacket 15.

The flow of liquid in chamber 16 is a straight line until it reaches the end plate 25 where it is turned at right angles into the grooves 29. Liquid returns in chamber 17 and flows through outlet 24. The area of the grooves 29 is considerably less than that of the passage 16 so a restriction is caused in the flow at the same point as the change in direction. Such a restriction in the flow will cause any sediment in the liquid to be deposited at this point, and as the cover 25 is readily removable, the sediment may be removed periodically with little trouble.

I do not mean to confine myself to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claim.

What I claim is—

An exhaust gas manifold comprising an elongated tubular exhaust gas chamber, exhaust gas inlet ports on said exhaust chamber, a cooling jacket about said exhaust chamber and spaced therefrom, a longitudinally extending wall on opposite sides of said exhaust chamber between said exhaust chamber and said cooling jacket providing a cooling inlet and outlet passage, an end cover plate for one end of said manifold formed with an inlet and outlet port communicating with said inlet and outlet passages respectively, a second end cover plate for said manifold, said second cover plate formed with a central opening registering with an end of said exhaust chamber providing an outlet for the exhaust gas, said second plate formed with transverse groove communicating between said inlet and outlet passages, a peripheral flange about said cooling jacket at each end thereof, and means engaging said cover plates and said flanges for securing said plates selectively at either end of said manifold.

ARTHUR KENWOOD LUHRS.

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The following references are of record in the file of this patent:

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