Jan. 1, 1963 L. C. ZONKER 3,071,186

MOUNTING BRACKET FOR HEAT EXCHANGERS AND THE LIKE

Filed July 30, 1959 2 Sheets-Sheet 1

FIG. 1.

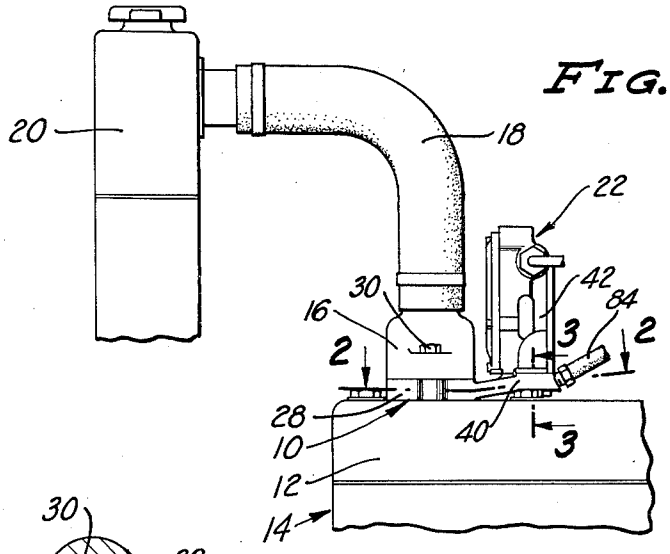


FIG. 2.

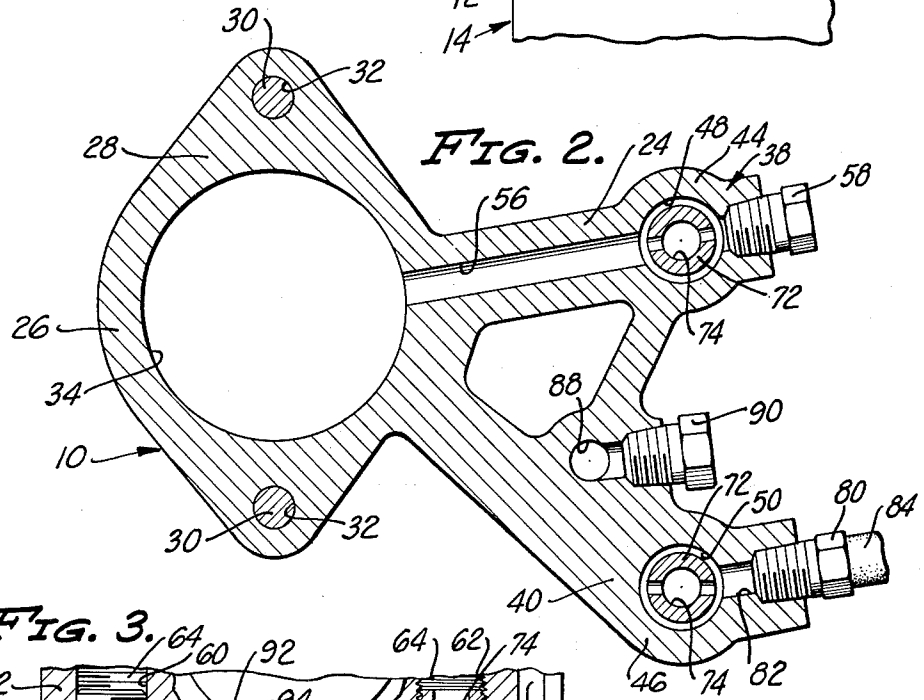
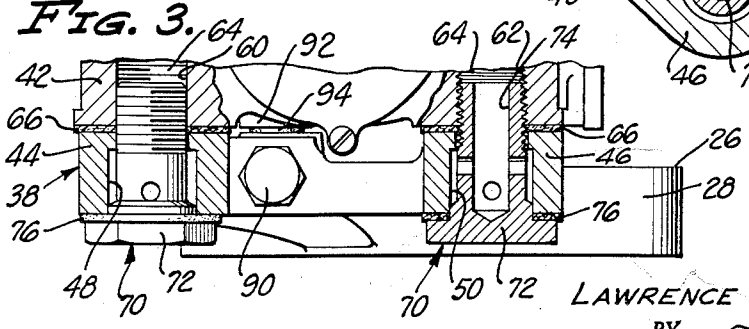


FIG. 3.



INVENTOR.
LAWRENCE C. ZONKER
BY
Thomas P. Mahoney
ATTORNEY

Jan. 1, 1963 L. C. ZONKER 3,071,186

MOUNTING BRACKET FOR HEAT EXCHANGERS AND THE LIKE

Filed July 30, 1959 2 Sheets-Sheet 2

FIG. 4.

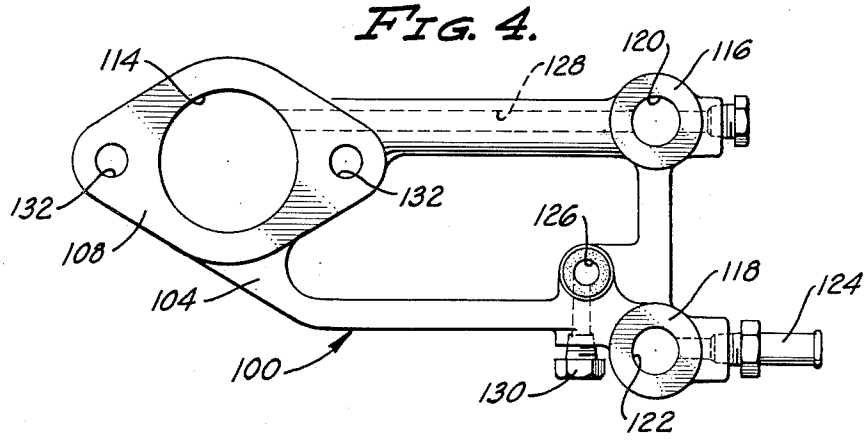


FIG. 5.

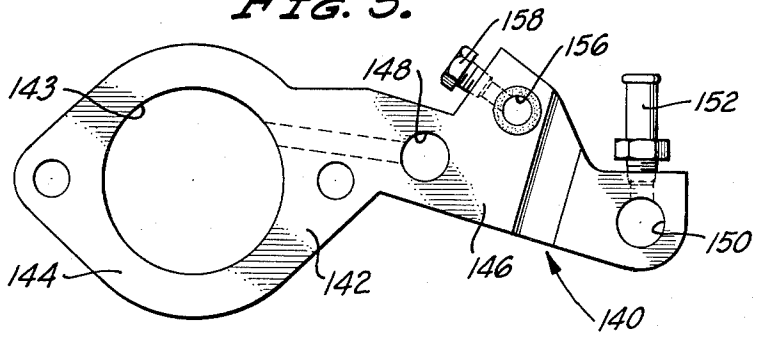
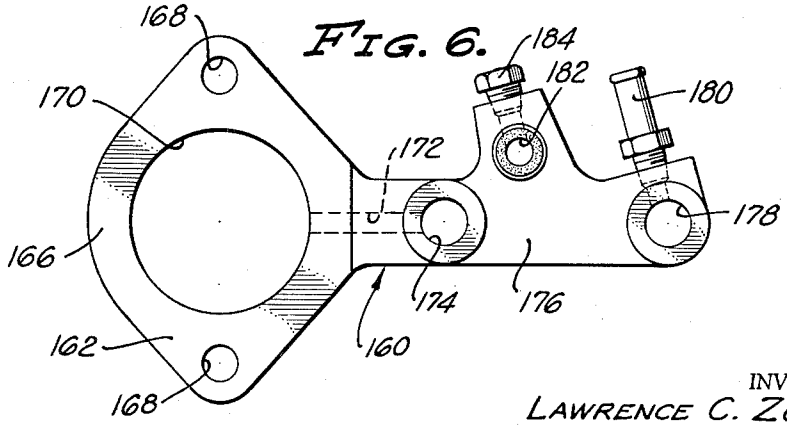


FIG. 6.



INVENTOR.
LAWRENCE C. ZONKER
BY
Thomas F. Maloney
ATTORNEY

United States Patent Office 3,071,186 Patented Jan. 1, 1963

3,071,186

MOUNTING BRACKET FOR HEAT EXCHANGERS AND THE LIKE

Lawrence C. Zonker, Los Angeles, Calif., assignor to Beam Products Manufacturing Co., Los Angeles, Calif., a corporation of California

Filed July 30, 1959, Ser. No. 830,611
2 Claims. (Cl. 165—67)

This invention relates to a mounting bracket for heat exchangers and the like and, more particularly, to a mounting bracket whereby heat exchanger fluid is adapted to be conveyed through the bracket to the heat exchanger itself, thus permitting the bracket to serve the dual functions of a heat exchanger fluid conduit and a bracket for physically mounting the heat exchanger in operative relationship with an engine or other mechanicm with which it is associated.

In describing the construction and mode of operation of the various embodiments of the mounting bracket of my invention hereinbelow, particular reference will be made to the utilization of the mounting bracket as a means whereby a heat exchanger adapted to cause the vaporization of liquefied petroleum gas may be connected in fluid communication with a source of heat exchanger fluid and mounted in operative relationship with an engine which is cooled by said heat exchanger fluid. However, it will be apparent to those skilled in the art that the concepts inherent in the invention may be applied with equal cogency to mounting brackets adapted to mount a wide variety of different types of mechanisms wherein the need arises to establish fluid communication with a source of fluid and to physically mount the mechanisms in juxtaposition to said source.

In the conventional practice of utilizing heat exchangers of the character referred to immediately hereinabove, the heat exchanger is mounted on the head or other portion of an internal combustion engine by means of a separate mounting bracket and is connected to the cooling system of the engine by means of separate inlet and outlet lines which conduct the fluid to and from the heat exchanger to cause the heat to be extracted from the coolant in the cooling system, which constitutes the heat exchanger fluid, in order to accomplish the vaporization of the liquefied petroleum gas flowing through the heat exchanger.

It is, therefore, an object of my invention to provide a mounting bracket for a heat exchanger which serves both to establish fluid communication between the cooling system of the internal combustion engine with which the heat exchanger is associated and to physically support the heat exchanger in operative relationship with said engine.

Another object of my invention is the provision of a bracket for a heat exchanger which includes a unitary, elongated body having a flow passage therein adapted to be placed in communication with the supply of heat exchanger fluid and which includes mounting pad means adapted to support a heat exchanger on said bracket, said mounting pad means including a fluid outlet port connected to the flow passage by means of a fluid bore interposed between said port and said flow passage. In this manner, it is possible to eliminate the necessity for the provision of a separate molnting bracket and separate connections to establish fluid communication between the cooling system of the internal combustion engine and the heat exchanger.

A further object of my invention is the provision of a bracket of the aforementioned character which is incorporated in an elongated, unitary body and which has a flange on one portion adapted to be interposed between

the head and return hose to the radiator of an internal combustion engine. The flange encompasses a flow passage which is maintained in communication with a heat exchanger mounted upon a second portion of the body by means of a bypass bore interposed between the flow passage and the second portion of the body.

By the provision of a mounting bracket constructed in accordance with the teachings of the invention, it is possible to eliminate the separate mounting brackets and the dual hose connections customarily necessary in mounting heat exchangers in operative relationship with internal combustion engines. Thus, considerable economies in both materials and labor result from the utilization of the teachings of the invention.

Other objects and advantages of the invention will be apparent from the following specification and the accompanying drawings, which are for the purpose of illustration only and in which:

FIG. 1 is a fragmentary, side elevational view showing a mounting bracket constructed in accordance with the teachings of my invention and utilized to mount a heat exchanger in operative relationship with an internal combustion engine;

FIG. 2 is a transverse, sectional view taken on the broken line 2—2 of FIG. 1;

FIG. 3 is an enlarged, fragmentary, sectional view taken on the broken line 3—3 of FIG. 1;

FIG. 4 is a top plan view of an alternative embodiment of the invention;

FIG. 5 is a top plan view of yet another alternative embodiment of my invention; and

FIG. 6 is a top plan view of another alternative embodiment of my invention.

Referring to the drawings and particularly to FIGS. 1–3 thereof, I show a mounting bracket 10 constructed in accordance with the teachings of my invention and adapted to be interposed between the head 12 of an internal combustion engine 14 and the thermostat housing 16 constituting the operative connection between the cooling system of the engine 14 and the return hose 18 to the radiator 20. The water or other coolant in the cooling system of the internal combustion engine 14 is referred to hereinafter as the heat exchange fluid since it is utilized as heat exchange medium to vaporize, or partially vaporize, liquefied petroleum gas flowing through a heat exchanger 22.

The bracket 10 is incorporated in a unitary, elongated body 24 which is preferably fabricated by the aluminum sand casting process and which includes a first portion 26 incorporating a flange 28 adapted to be interposed between the top of the head 12 of the engine 14 and the thermostat housing 16. Bolts 30, which are somewhat longer than the original equipment bolts, pass through the thermostat housing 16 and registering openings 32 in the flange 28 to secure the thermostat housing 16 and the flange 28 in juxtaposition to the coolant outlet opening, not shown, provided in the head 12.

The flange 28 encompasses a vertically oriented flow passage 34 which permits the upward flow of coolant through the flange 28 and into the return hose 18 to the radiator 20. In this manner the bracket 10 is fixedly secured in operative relationship with the internal combustion engine 14.

Mounting pad means 38 is provided on the second portion 40 of the bracket 10 and is adapted to support the housing 42 of the heat exchanger 22 in operative relationship with the bracket 10. The mounting pad means 38 is constituted by mounting pads 44 and 46 which are disposed in spaced relationship with each other and which, respectively, have an outlet port 48 and a return port 50 associated therewith.

The outlet port 48 is placed in communication with the flow passage 34 by means of a horizontally oriented, fluid bypass bore 56. The outlet port 48 is disposed intermediate the extremities of said bore and the end thereof is closed by means of a plug 58. The heat exchanger 22 is provided with a fluid inlet opening 60 and a fluid outlet opening 62 and said openings are threaded, as at 64, adjacent the lower extremities thereof. The surfaces of the housing 42 adjacent the inlet and outlet openings 60 and 62 are adapted to be juxtaposed to the mounting pads 44 and 46 so that the flow of heat exchanger fluid may pass through the outlet port 48 into the inlet opening 60 of the heat exchanger and may flow outwardly from the outlet opening 62 to the return port 50.

Gaskets 66 are interposed between the adjacent surfaces of the housing 42 and the mounting pads 44 and 46 to prevent fluid leakage between said surfaces. In order to maintain the housing 42 of the heat exchanger 22 in operative relationship with the mounting pads 44 and 46, fastening means 70 are provided which are constituted by bolts 72 having fluid passages 74 in the shanks thereof disposed in communication with the respective outlet and return ports 48 and 50. In addition, the threaded extremities of the bolts 72 engage the threads 64 in the inlet and outlet openings 60 and 62 of the heat exchanger 22 to fasten the heat exchanger 22 securely upon the bracket 10. Gaskets 76 are interposed between the heads of the bolts 72 and the undersides of the mounting pads 44 and 46 to prevent leakage therebetween.

A return fitting 80 communicates with a bore 82 which terminates at the return port 50 and said fitting is adapted to be connected by means of a hose 84 to the suction side of the water pump, not shown, associated with the internal combustion engine 14. The second portion 40 of the mounting bracket 10 includes an oil sump 88 which may be drained by the removal of a plug 90 from operative relationship therewith. The oil sump is adapted to receive oil drained from an oil drainage port 92 intermediate the inlet and outlet openings 60 and 62 of the heat exchanger 22. A gasket 94 is interposed between the oil drainage port 92 and the sump 88 to prevent leakage of oil therebetween.

When the internal combustion engine 14 is operating, heat exchange fluid flows through the flow passage 34 and is bypassed through the bore 56 to the outlet port 48 whence it flows through the passage 74 in the bolt 72 to serve as a heat exchange medium for vaporizing the liquefied petroleum gas in the heat exchanger 22. The heat exchange fluid flows out of the outlet opening 62 from the heat exchanger 22 and into the return port 50 through the passage 74 in the bolt 72. The fitting 80 conveys the spent heat exchange fluid through the hose 84 to the suction side of the pump, not shown.

As previously indicated, the thermostat, not shown, depends downwardly from the thermostat housing 16 into the fluid passage 34 and controls the return of the coolant to the radiator 20 through the return hose 18. Excess oil drains into the sump 88 and can be removed therefrom by unthreading the plug 90.

The bracket 100 shown in FIG. 4 of the drawings is incorporated in an elongated body 104 having a flange 108 at one extremity thereof which incorporates a flow passage 114 adapted to be interposed between the thermostat housing 16 and the head 12 of the engine 14. Mounting pads 116 and 118 respectively incorporate outlet and return ports 120 and 122. A return fitting 124 is associated with the return port 122 to permit the heat exchange fluid to be returned to the suction side of the pump, not shown.

An oil sump 126 functions to receive oil from an oil drain provided on the heat exchanger associated with the mounting bracket 100. A bypass bore 128 is adapted to cause heat exchange fluid to be bypassed from the flow passage 114 to the outlet port 120 and, thence, to the inlet opening of an associated heat exchanger. A plug 130 prevents leakage of drainage oil from the oil sump 126. It will be noted that the flange 108 incorporates mounting openings 132 and is oriented in parallelism with the bypass bore 128. Therefore, the bracket 100 is adapted to mount the associated heat exchanger to one side of rather than rearwardly of the thermostat housing 16, as is the case with the bracket 10 previously discussed hereinabove.

A bracket 140 constituting another embodiment of the invention is shown in FIG. 5 of the drawing as including a unitary body 142 having a flange 144 at one extremity and a mounting pad 146 at its other extremity. A flow passage 143 is encompassed by the flange 144. The bracket 140 is considerably shorter and more compact than the previously discussed embodiments of the invention and includes an outlet port 148 and a return port 150 formed in the mounting pad 146. A return fitting 152 is associated with the return port 150 to return heat exchange fluid to the suction side of the pump, not shown. An oil sump 156 closed off by a plug 158 is adapted to be juxtaposed to the oil drain of the heat exchanger to be associated with the bracket 140.

A bracket 160 constituting another alternative embodiment of the invention is shown in FIG. 6 of the drawings as embodied in the form of a unitary structure 162 having a flange 166 at one extremity thereof. The flange 166 incorporates mounting openings 168 and encompasses a flow passage 170. The flow passage 170 is connected by a bypass bore 172 to an outlet port 174 formed in a mounting pad 176. A return port 178 is provided in the mounting pad 176 and has a return fitting 180 associated therewith. An oil sump 182 is provided which is closed off by a plug 184.

The embodiments of the invention discussed hereinabove illustrate the basic concept of providing a mounting bracket which incorporates means to supply a heat exchange fluid to an associated heat exchanger. The individual brackets are designed to accommodate heat exchangers of different configurations and to permit the heat exchangers to be mounted on different engines and in different orientations with respect to various engines.

While all the embodiments discussed hereinabove illustrate the concept of providing a return port in the body of the bracket, certain heat exchangers do not have an outlet opening which is in the lower extremity of the housing and with heat exchangers of this character only one port is provided in the bracket, namely the outlet port which is juxtaposable to the inlet opening of the heat exchanger. In such cases the return hose is directly connected to the housing of the heat exchanger.

Moreover, in a few instances, the bracket and, more particularly, the flange provided thereoupon is not mounted directly to the engine head but is interposed in the return hose to the radiator. In such cases the basic configuration and function of the bracket is the same, that is, a flange is provided at one extremity for communication with the fluid flow and mounting pad means are provided at the other extremity of the bracket for engagement with the heat exchanger mounted thereupon.

In any event, a mounting bracket is provided by my invention, which serves the dual purposes of establishing fluid flow to the heat exchanger and of physically mounting the heat exchanger on an associated engine or other object. Thus, the extensive lines and separate brackets previously utilized are eliminated with consequent economies in manufacture and installation of heat exchangers.

I claim:

1. In a heat exchanger system, the combination of: a heat exchanger having a housing with a base incorporating fluid inlet and outlet openings; a line containing heat exchange fluid; an elongated bracket body having a flow passage in one extremity thereof interposed in said line and having a heat exchanger mount upon the other extremity thereof for supporting a heat exchanger in

spaced relaionship with said line, said mount incorporating fluid outlet and return ports in communication, respectively, with the fluid inlet and outlet openings in said base, said body having a bore operatively connecting said flow passage and outlet port; and fastening means in said ports engageable with said base to maintain said exchanger in supported relationship with said mount, said fastening means incorporating fluid passages establishing fluid communication between said ports and said openings.

2. In a heat exchanger system, the combination of: a heat exchanger having a housing with a base incorporating fluid inlet and outlet openings; a line containing heat exchange fluid; an elongated substantially flat bracket body having a mounting flange at one extremity incorporating a vertical flow passage therein, said flange being inserted in said line, said body having a heat exchanger mount at the other extremity thereof for supporting said housing, said mount incorporating fluid and return ports therein communicating, respectively, with the inlet and outlet openings in said base, said body having a fluid bore operatively connecting said flow passage

and outlet port; and fastening means in said mount engageable with said base to secure said housing in supported relationship with said mount, said fastening means having fluid passages therein in communication with said ports to transmit heat exchange fluid from said ports into said openings.

References Cited in the file of this patent

UNITED STATES PATENTS

1,703,527	Henshall	Feb. 26, 1929
1,840,519	McKinley	Jan. 12, 1932
1,975,863	Otwell	Oct. 9, 1934
1,977,809	Sutter	Oct. 23, 1934
2,044,455	Witzel	June 16, 1936
2,179,702	Saunders et al.	Nov. 14, 1939
2,215,337	Silverstein	Sept. 17, 1940
2,236,889	Booth	Apr. 1, 1941
2,809,810	Carrol et al.	Oct. 15, 1957
2,864,355	Woodworth	Dec. 16, 1958

FOREIGN PATENTS

884,014	France	July 30, 1943