July 30, 1963 K. J. MacFARLIN 3,099,241

EXHAUST GAS DISSIPATING APPARATUS

Filed Jan. 22, 1962

FIG. 1

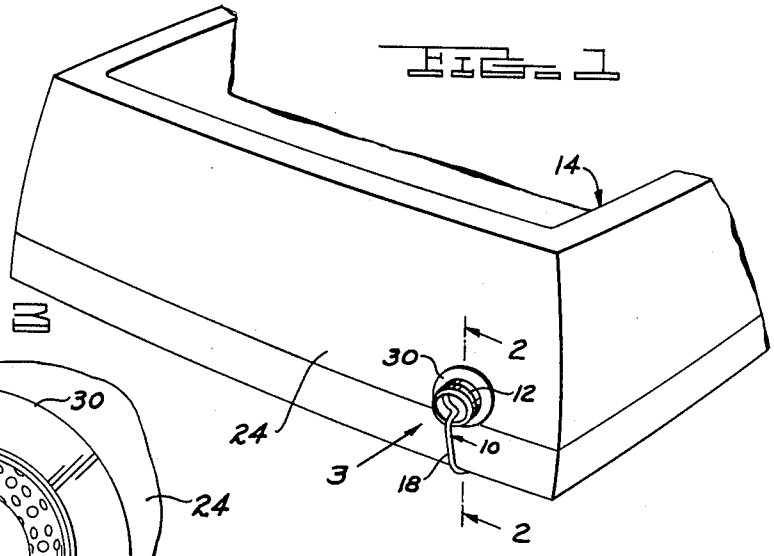


FIG. 3

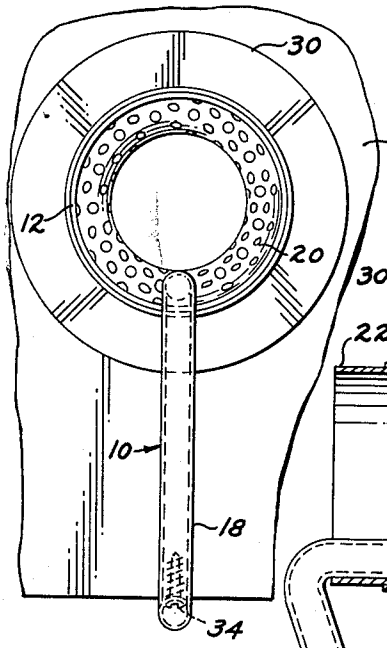


FIG. 2

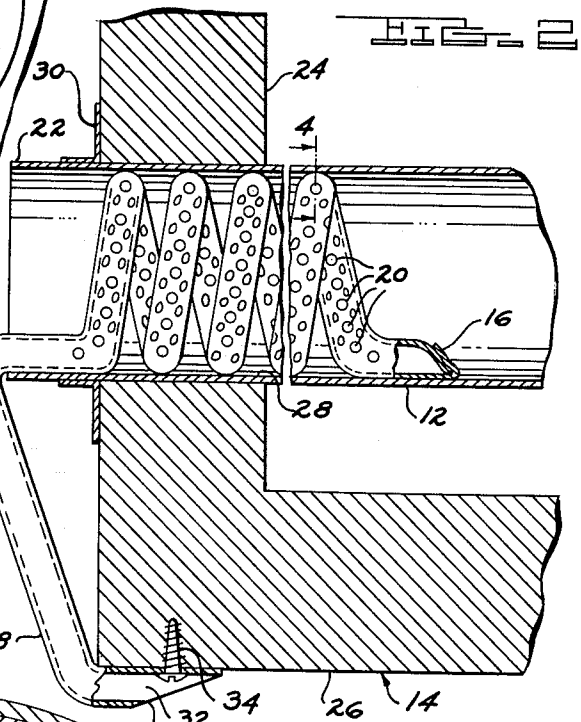
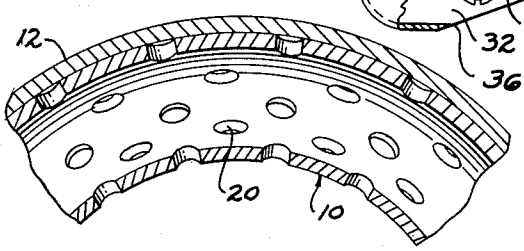


FIG. 4



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EXHAUST GAS DISSIPATING APPARATUS

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The invention relates to boats and refers more specifically to apparatus for dissipating boat engine exhaust noise and heat.

Prior apparatus for dissipating the noise and heat of boat engine exhausts have been unsatisfactory in that they required special muffler constructions or elements which were difficult or impossible to integrate with existing exhaust installations. Further, the prior structures sometimes required providing additional openings through the hull of a boat further increasing their undesirability and often were supported by the structure boat members so that they transferred much of the heat of the exhaust to the boat structure. Prior structures for dissipating the noise and heat of engine exhausts which have not been subject to the above indicated deficiencies have been relatively ineffective and unreliable.

It is therefore one of the objects of the present invention to provide improved means for dissipating boat engine exhaust noise and heat.

It is another object of the present invention to provide means for spraying water directly into the exhaust gases of a boat engine for cooling the exhaust gases.

Another object is to provide apparatus for creating movement of the exhaust gases of a boat engine to break up the gases and thus reduce the noise produced thereby.

Another object is to provide means for dissipating boat engine exhaust noise and heat comprising a tube placed in the boat exhaust pipe having openings therein through which water may be forced into the exhaust pipe and means for forcing water through the tube and into the exhaust pipe.

Another object is to provide means for dissipating boat engine exhaust noise and heat as set forth above wherein the tube is in the form of a helical coil having an outside diameter substantially equal to the inside diameter of the exhaust pipe whereby the exhaust gases are caused to move in a spiral path so that the noise created thereby is further dissipated.

Another object is to provide means for dissipating boat engine exhaust noise and heat as set forth above wherein the end of the tube within the exhaust pipe is closed and the other end of the tube is open and extends out of the end of the exhaust pipe and beneath the boat where it is secured in a position to receive water therein on forward movement of the boat.

Another object is to provide apparatus for dissipating boat engine exhaust noise and heat which is simple in construction, economical to manufacture and efficient in use.

Other objects and features of the invention will become apparent as the description proceeds, especially when taken in conjunction with the accompanying drawings, illustrating a preferred embodiment of the invention, wherein:

FIGURE 1 is a partial perspective view of a boat having the boat engine exhaust noise and heat dissipating apparatus of the invention installed thereon.

FIGURE 2 is a partial section view of the boat and boat engine exhaust noise and heat dissipating apparatus of the invention shown in FIGURE 1, taken substantially on the line 2—2 in FIGURE 1.

FIGURE 3 is an end view of the exhaust pipe of the boat illustrated in FIGURE 1 taken in the direction of arrow 3 and showing the boat engine exhaust noise and heat dissipating means of the invention installed therein.

FIGURE 4 is a partial section view of the boat exhaust pipe and the boat engine exhaust noise and heat dissipating means of the invention taken substantially on the line 4—4 in FIGURE 2.

With particular reference to the drawings one embodiment of the invention will now be disclosed in detail.

As shown best in FIGURE 2 the invention comprises a coiled hollow tube 10 inserted in the exhaust pipe 12 of a boat 14. The end 16 of the tube 10 is closed while the end 18 of the tube is open, secured to the bottom 26 of the boat 14 and pointed in the direction of forward movement of the boat. The tube 10 is provided with openings 20 in the individual convolutions thereof.

Thus, in operation as the boat moves forward water is forced through the tube 10 and out of the openings 20 into the exhaust pipe 12. Thus, exhaust gases proceeding through the exhaust pipe 12 toward the end 22 thereof are subjected to a water spray for cooling. Further, the helical configuration of the tube 10 causes the exhaust gases to swirl or move in a helical path whereby the exhaust gases are broken up and the noises caused thereby dissipated.

More specifically, the boat 14 which is partially shown in FIGURE 1, includes a hull having the transom 24 and a bottom 26. In the usual manner the exhaust pipe 12 from an inboard boat propulsion engine is extended through the opening 28 in the transom to permit exhausting the engine combustion gases substantially at the boat water line. The fitting 30 is provided to secure the exhaust pipe 12 within the opening 28 in the usual manner.

With such normal constructions the engine exhaust gases are permitted to proceed directly through the exhaust pipe 12 and are emitted from the end 22 thereof producing noise. In addition, considerable heat is present in the exhaust gases which is often transferred to the structure of the boat before the exhaust gases are emitted from the end 22 of the exhaust pipe 12. Both the noise and heat transferred to the boat structure are objectionable. Thus, in accordance with the invention the hollow tube 10 has been provided to dissipate both the heat and noise of the engine exhaust gases.

The tube 10 as shown best in FIGURE 2, may be a three-eighth inch copper tubing for the usual exhaust pipe which is between one and one-half to three inches in diameter. The tube 10 is coiled so that the outside diameter thereof is the same as the internal diameter of the exhaust pipe with the coils being spaced apart approximately one inch. Such coiled construction on the inner surface of the exhaust pipe will tend to produce a swirling or helical movement of the exhaust gases so that they are broken up as they travel through the exhaust pipe 12 whereby the noise created thereby on their being emitted from end 22 of the exhaust pipe 12 is greatly diminished. Further, the coiling of the tubing 10 permits rigid installation of the tubing 10 within the exhaust pipe 12 so that objectionable vibration thereof and therefore objectionable rattling and premature failure of the tubing in use is prevented.

Further, the individual convolutions of the tube 10 are provided with a plurality of relatively small openings therethrough through which water may be forced to produce a water spray within the exhaust pipe whereby the exhaust gases are cooled to reduce the heat transferred to the boat structure and further dissipate the noise produced on emission of the exhaust gases from the end 22 of the exhaust pipe 12. The openings 20 may be for example .032" in diameter and there may be five holes spaced a quarter of an inch apart around the circumference of the tube with one quarter of an inch spacing between the openings longitudinally of the tubing. Thus, with the end 16 of the tube closed as previously indicated water forced into the tube 10 will be caused to pass through the openings 20 in a spray within the exhaust pipe 12

to dissipate the heat and noise of the engine exhaust gases.

As indicated above, the end 18 of the tube 10 extends out of the end 22 of the exhaust pipe 12 and is bent so that the opening 32 faces in the direction of forward movement of the boat 14. The end 18 of the tube 10 is then secured to the bottom 26 of the boat 14 by convenient means such as the screw 34 and is provided with bevel 36 which makes approximately a twenty-five degree angle with the bottom 26 of the boat 14.

Thus, in overall operation as the boat 14 moves in a forward direction water under a pressure depending on the speed of the boat 14 will enter the bevelled open end 18 of the tube 10 and will be forced into the coiled portion of the tube 10 and out through the openings 20 therein. The exhaust gases of the boat 14 will thus be dissipated due to a water spray being provided within the exhaust pipe 12 and in addition will be given a swirling motion as indicated above due to the helical configuration of the portion of the tube 10 within the exhaust pipe 12. The boat engine exhaust gases will therefore be cooled and the noise created thereby substantially dissipated.

Thus it will be noted that in accordance with the invention there is provided extremely simple, economical and efficient apparatus for dissipating boat engine exhaust heat and noise. Further, it will be readily recognized that the apparatus provided in accordance with the invention may be quickly and easily installed on either new or existing boats.

While one embodiment of the present invention has been specifically disclosed, it will be understood that other embodiments and modifications thereof are contemplated. It is therefore the intention to include all embodiments and modifications of the invention which are defined by the appended claims within the scope of the invention.

What I claim as my invention is:

1. In combination with a boat having an exhaust pipe, a helical tube positioned within the exhaust pipe having a plurality of openings therein through which water may be passed from the tube into the exhaust pipe and means for passing water through the tube and out of the openings into the exhaust pipe whereby the noise and heat of the exhaust gases are dissipated.

2. Structure as claimed in claim 1 wherein the end of the tube within the exhaust pipe is closed and the other end of the tube is open and pointed in the direction of forward movement of the boat to provide said means for passing water through the tube and out of the openings into the exhaust pipe.

3. Structure as set forth in claim 2 wherein the open end of the tube is secured to the bottom of the boat and is bevelled at approximately twenty-five degrees to the bottom of the boat.

4. Structure as set forth in claim 1 wherein the tube is approximately three-eighths of an inch in diameter, the openings are approximately .032" in diameter, five openings are provided around the circumference of the tube and openings are spaced approximately every quarter of an inch axially of the tube.

5. Structure as set forth in claim 1 wherein the individual convolutions of the helical tube are spaced approximately one inch longitudinally of the exhaust pipe.

6. In combination with a boat having an exhaust pipe, a tube positioned within and surrounded by the exhaust pipe having a plurality of openings therein through which water may be passed from the tube into the exhaust pipe and means for passing water through the tube and out of the openings into the exhaust pipe whereby the noise and heat of the exhaust gases are dissipated.

7. Structure as set forth in claim 6 wherein the end of the tube within the exhaust pipe is closed and the other end of the tube is open and pointed in the direction of forward movement of the boat to provide said means for passing water through the tube and out of the openings into the exhaust pipe.

8. In combination a pipe for passing noise and heated gases, a tube positioned within the pipe having a plurality of openings therein through which liquids may be passed through the tube into the pipe and means for passing a liquid through the tube and out of the openings into the pipe whereby noise and heat of the gases are dissipated.

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