

Nov. 20, 1951

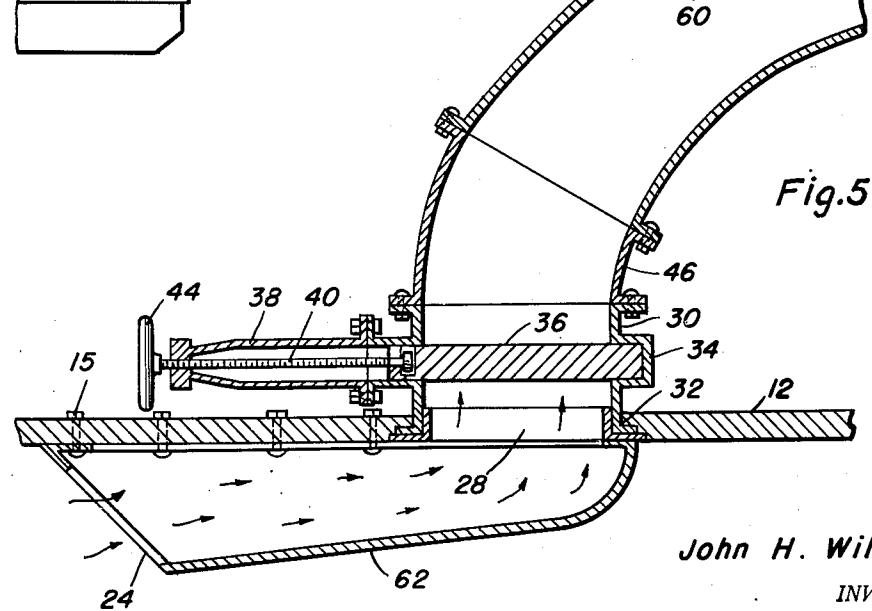
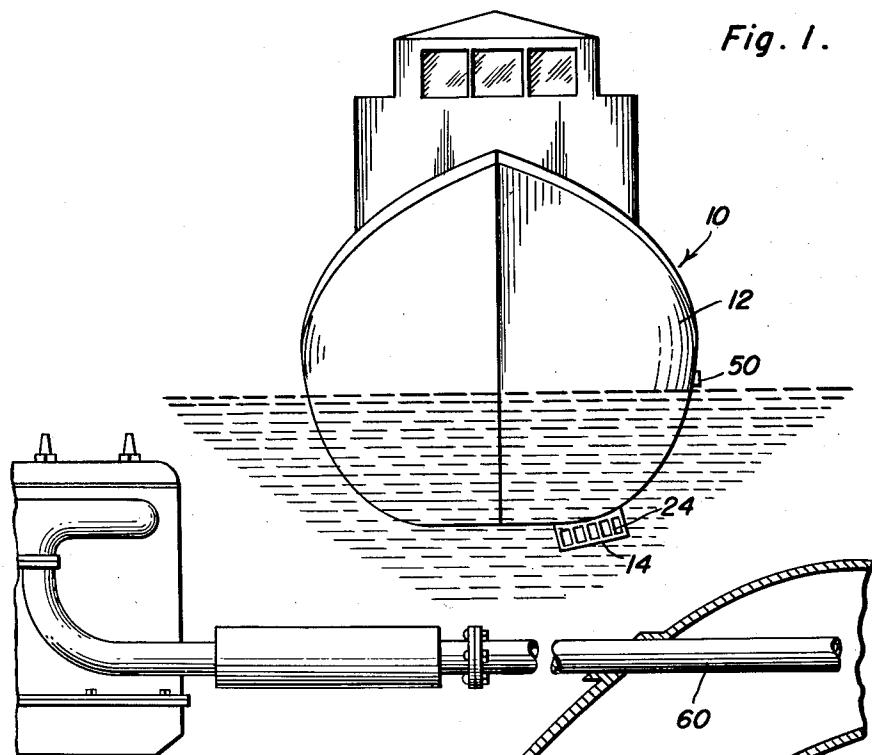
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2,575,698

VACUUM EXHAUST

Filed March 19, 1948

2 SHEETS—SHEET 1



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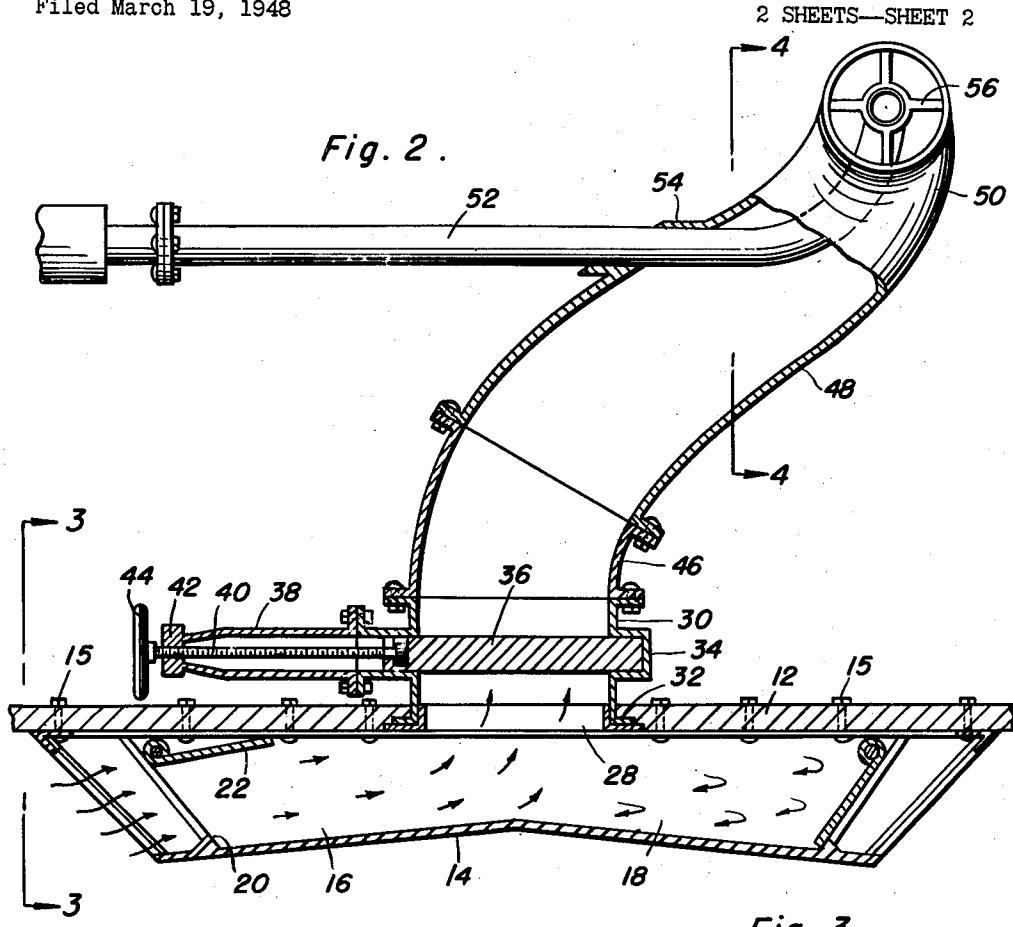
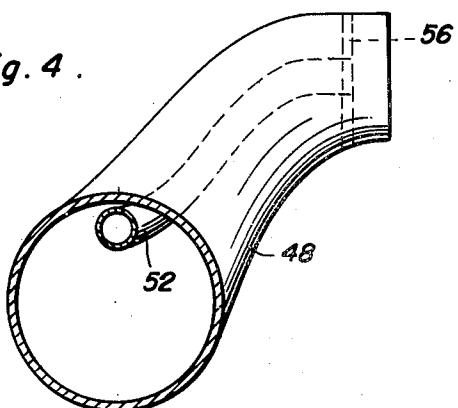


Fig. 4.



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## UNITED STATES PATENT OFFICE

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## VACUUM EXHAUST

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3 Claims. (Cl. 115—0.5)

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This invention relates to novel and useful improvements in means and apparatus for treating exhaust normally produced in the operation of a conventional internal combustion engine, external combustion engine or the like.

An object of this invention is to direct a stream of liquid or other fluid about the egress portion of a conventional exhaust pipe normally associated with power operated boats and the like.

Another object of this invention is to selectively control the flow of liquid as to quantity and velocity.

A further object of this invention is to support the exhaust pipe of a boat within a conduit and to communicate the conduit with a liquid scoop attached to a convenient portion of a boat.

Another purpose of this invention is to regulate the inflow of liquid into the same conduit by means of a swinging valve positioned in a water scoop or housing.

Another purpose of this invention is to direct the exhaust normally associated with boats in such a way as to substantially obviate harmful and undesired odors within the boat.

Another purpose of this invention is to increase the efficiency of the engine within the boat by means of cooling the exhaust and also by means of reducing the back pressure of the engine in supplying a steady flow of liquid at a speed greater than the egress of exhaust, adjacent the egression point of the exhaust from the conventional exhaust pipe.

Another object of this invention is to supply an extremely simplified device for use in association with boats and the like, serving the purposes set forth subsequently and above.

Ancillary objects and features of novelty will become apparent to those skilled in the art, in following the description of the preferred forms of the invention, illustrated in the accompanying drawings, wherein:

Figure 1 is a front view of a boat having one form of the invention associated therewith;

Figure 2 is an elevational view of one form of the invention, portions being shown in section to illustrate details of construction;

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 2 and in the direction of the arrows;

Figure 4 is a sectional view taken on the line 4—4 of Figure 2 and in the direction of the arrows, and;

Figure 5 is a sectional view illustrating a second form of the invention.

This invention has been developed to provide a device for the purpose of increasing engine efficiency and also for preventing or substantially obviating undesired fumes and odors from entering the passenger carrying portions of a boat.

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A conventional boat is illustrated and generally indicated at 10. This boat includes the usual hull 12 and other pertinent portions. Fixed to a convenient portion of the said boat, preferably adjacent the lowest extremity thereof, is a housing 14. This housing may be attached by means of conventional bolts 15, rivets, suitable brackets or the like. It will be noted that the preferred configuration of the housing in this form of the invention includes a pair of inwardly tapering scoops 16 and 18 respectively having an integrally formed stop 20 adjacent each end thereof.

A flat valve 22 is pivotally associated with the housing and journaled therein, being permitted to swing only a selected distance when it will strike either the stop 20 or the upper portion of the housing. Inspection of Figure 2 clearly discloses two of such valves, one being positioned within the said scoop 16 while the other is positioned in the said scoop 18.

Means for straining the incoming fluid is provided at each end of the said scoop or housing 14. The preferred means consists of a grate 24 being attached by suitable screws 26 or the like. This, of course, renders the grate detachable in order that it may be removed if found desirable or may be replaced by one having larger or smaller apertures or opening therein.

A collar 28 is supplied at an opening in the said housing 14 and has a section 30 of a conduit secured thereto. This section may be attached through the medium of a lap joint as indicated at 32.

A recessed portion 34 is supplied in the section 30 and has a slider valve 36 positioned therein. A cage 38 is associated with the section 30 opposite the said recessed portion 34 wherein the said slider valve or valve plate 36 may be selectively positioned. By sliding the valve plate 36 back and forth across the same section 30, the rate and quantity of flow therethrough may be selectively regulated. The flow is produced due to the forward travel of the boat to which it is attached, the said housing 14 being submerged.

In order to regulate the valve plate 36 selectively, a threaded shank 40 is rotatably journaled therein and received in a suitable internally threaded boss 42 secured to the said valve plate recipient 38. A suitable knob or handle 44 may be fixed to the said threaded shank 40 for manual actuation purposes.

A second curved section 46 is attached to the said section 30 in order to further lengthen the conduit and of course, suitable rivets, bolts or the like may be used in connecting the sections. A third section 48 having a gooseneck portion 50 which is passed through the hull (Figure 1), is attached to the said section 46 and tapers toward the end portion thereof. The conventional

exhaust pipe 52 extends within the said section 48 and is supported by means of the boss 54, either attached to or formed integral with the said section 48.

Means for supporting the terminal portion of the exhaust pipe 52 adjacent but not at the terminal portion of the said section 48 is supplied. The preferred means consists of a web 56 immovably positioned therein with the exhaust pipe 52 rigidly associated therewith. It will be noted that the exhaust pipe 52 is curved in order to accommodate various requirements and considerations of the invention. This curve is supplied in order to direct the exhaust toward the rear portion of the boat and further, the terminal portion of the said gooseneck element 48 is just at the water line in order that water rushing through the housing 14 and through the curved conduit may admix with the said exhaust in order to maintain it within the liquid for a short duration while the boat is moving steadily away from that particular locality. Of course, a small amount of the exhaust gas is retained in the water and the remainder of the exhaust gas requires some time to bubble through the liquid medium. This permits the boat or the like to be moved to another location more distant from the fumes than it would ordinarily be.

Referring now to Figure 5, a second form of the invention is illustrated. This form may be used wherein straight or substantially straight exhaust pipes are supplied. The differentiating features of this embodiment of the invention include the absence of the curved terminal 50 of the gooseneck section or element and the substantially straight, conventional exhaust pipe 60 for use in association therewith.

Another differentiating feature is the actual configuration of the housing 62 utilizing only half of the housing illustrated in Figure 2. This housing has the general configuration of only one scoop such as 16 and therefore, does not require the services and utility of the pivoted valves 22 and the stops 20 therefor. The scoop or housing 62 may have the grate 24 associated therewith in order to strain the liquid before it proceeds through the apparatus thereby preventing clogging or the like.

The remainder of the structure is identical to that disclosed and described in connection with the first form of the invention. It will be noted that this second form of the invention can and is used only in association with boats which travel in a single direction. The form of the invention illustrated in Figure 2 may well be subjected for use in association with ferries and the like which generally travel in a forward and backward direction about equally in distance.

In operation of the device shown in Figure 5, the engine of the boat is actuated. Exhaust flows as normal through the exhaust pipe 60. This flow is aided by the suction created by the water rushing through the conduit 48 (see Figure 2). The water is controlled by the valve shown in Figure 5, the control being as to quantity of water flow through the scoop 62.

As disclosed in Figure 2, the conduit 48 narrows to the point of egress of the liquid and at the place where the exhaust pipe 52 terminates.

In operation of the form of the invention shown in Figure 2 the distinction is that the valves 22 are operated. When one valve is down as shown in this figure, the liquid is allowed to

enter the scoop or housing for passage into the conduit 48. When the boat is operated in the reverse direction, as a ferry boat in operation, said one valve 22 is closed and the other is open.

Having described the invention what is claimed as new is:

1. In combination with the hull of a boat and an exhaust pipe from the engine of said boat, a device for enhancing the flow of exhaust gases through said exhaust pipe comprising a housing with means for attaching said housing to the exterior of said hull, said housing having openings at the front and rear ends thereof, a first valve carried by said housing and controlling one of said openings and a second valve carried by said housing and controlling the other of said openings, a conduit attached in communication with said housing intermediate the ends thereof to conduct liquid from said housing, said exhaust pipe extending into and located concentrically within a portion of said conduit and having its open end arranged to deliver engine exhaust gases in the same direction as the direction of flow of fluid through said conduit so that the passage of fluid through said conduit assists in discharging exhaust gases from said exhaust pipe.

2. The combination of claim 1 and a control valve in said conduit, and a web disposed in said conduit supporting the exhaust pipe in concentric relation with said conduit.

3. In combination with the hull of a boat and an exhaust pipe from the engine of said boat, a device for enhancing the flow of exhaust gases through said exhaust pipe, said device comprising a housing with means for attaching said housing to the exterior of said hull, said housing having a front opening, said housing having a discharge opening spaced from said front opening, a conduit attached in communication with said discharge opening, a valve carried by said conduit and arranged to control the passage of water through said housing and said conduit, said exhaust pipe extending into and located concentrically within a portion of said conduit and having its open end arranged to deliver engine exhaust gases in the same direction as the direction of flow of water through said conduit so that the passage of water through said conduit assists in discharging exhaust gases from said exhaust pipe, and means carried by said conduit to support said exhaust pipe within said conduit.

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