

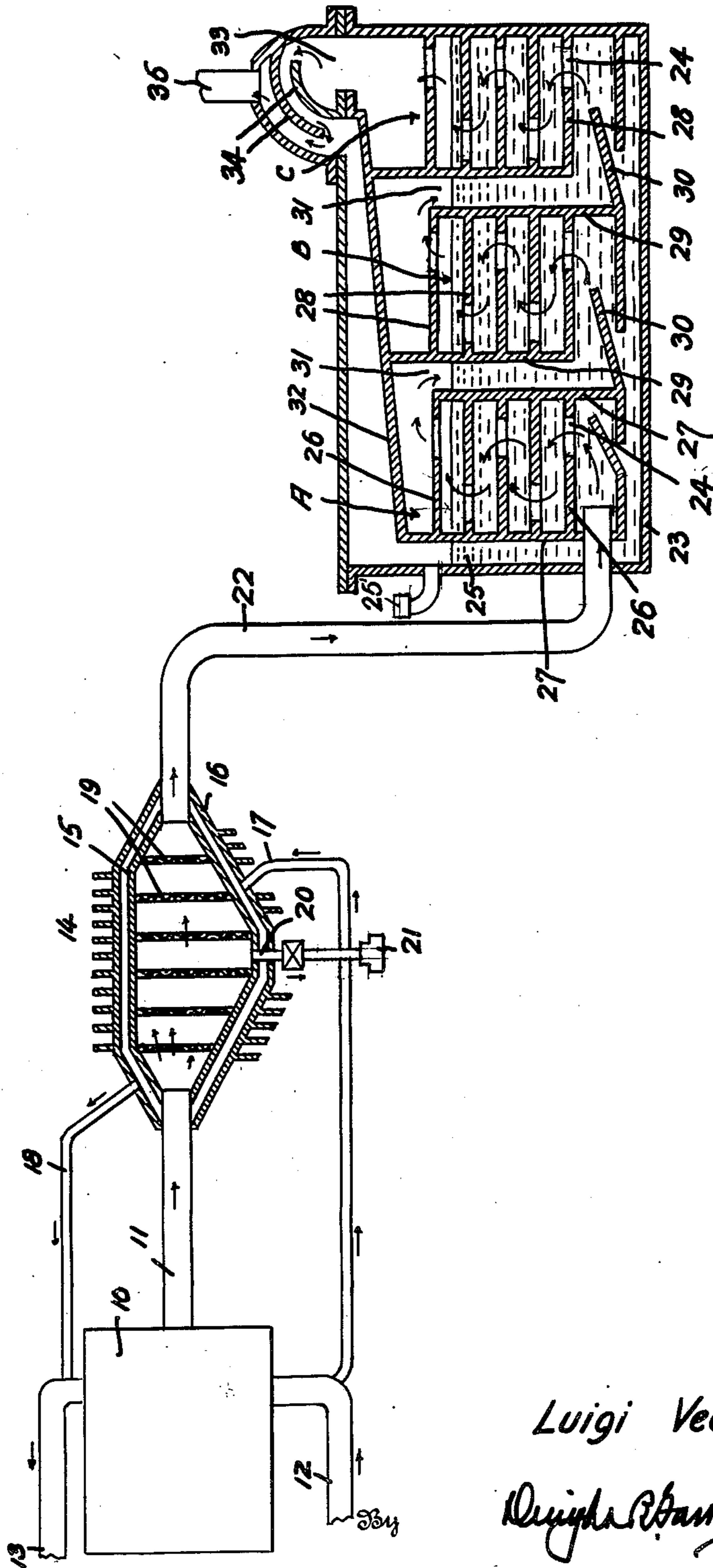
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APPARATUS FOR ELIMINATING TOXIC GASES FROM EXHAUST FUMES

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APPARATUS FOR ELIMINATING TOXIC GASES FROM EXHAUST FUMES

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1 Claim. (Cl. 60-29)

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This invention is an apparatus for eliminating toxic or lethal gases in the exhaust fumes of internal combustion engines, the primary object of which is to provide an improved and simplified apparatus by which the exhaust fumes are primarily relieved of vapor condensate and then purified and relieved of toxic gases before being liberated to the atmosphere.

The apparatus is of simplified construction and is designed in such manner as to be readily applicable to internal combustion motors for first removing vapor condensate from the fumes, and then acting upon the effluent gases in such manner as to rid them of toxic fumes.

A further object of the invention is to provide an apparatus of simplified construction for effectively carrying out the removal of water or other liquids from the exhaust gases, and for operating upon the effluent or exhaust gases in such manner as to effectively rid them of objectionable or toxic gases with a minimum waste or deterioration of the absorbing solution employed, as well as with a minimum of back pressure in the exhaust pipe of the engine.

With the foregoing objects in view, together with others which will appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts, as well as the successive steps employed, all as will be described more fully hereinafter, illustrated in the drawing, and particularly pointed out in the claim.

In the drawing, the figure is a diagram, parts in section, illustrating a preferred form of the apparatus of the present invention.

Referring now to the drawing, the internal combustion engine is represented diagrammatically at 10, and the pipe for leading the exhaust gases from the said motor is represented at 11. The cooling water inlet for the motor is indicated at 12, while the return conduit for the cooling system is indicated at 13.

In carrying the invention into effect, a condenser 14 is attached to the exhaust pipe 11. This condenser may be of well known construction and may be air or liquid cooled or a combination of both. For the purposes of illustration this condenser is of the liquid cooled type and includes an enlarged airtight casing 15 sealed as indicated to the discharge end of the exhaust pipe 11, and surrounded by a cooling water jacket represented at 16, equipped with cooling fins as shown. It is preferred that the entire casing 15 be enclosed by the water jacket in order that cooling fluid from the inlet pipe 12 may enter the

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water jacket through the conduit 17 to entirely enclose the casing 15 and pass from the jacket to the cooling water return pipe 13 through the conduit 18.

The exhaust condenser chamber has arranged therein in spaced relationship a series of baffles preferably of reticulate or foraminous construction. These baffles may consist of metallic plates or screens 19 arranged in spaced relationship to one another throughout the length of the chamber 15 and through which the gases pass from the exhaust pipe 11 to the far end of the chamber. As these gases usually contain an appreciable amount of vapor, it is desirable that such vapor be removed from the gases, and as the hot gases contact the relatively cold walls of the chamber 15, condensation takes place and the condensate gravitates from the chamber 15 through the lead 20 to an aspirator of conventional form, indicated at 21, and there removed from the system.

From the discharge end of the condenser 14 the gases pass through a pipe 22 to the lower end of a closed housing 23. This housing is partly filled as through a capped inlet port 25' with a suitable absorbing or purifying solution represented at 25, and the discharge end of the pipe 22 is disposed below the liquid level of this solution.

Arranged within the housing 23 and directly above the discharge end of the pipe 22 is a closed chamber A including a plurality of spaced horizontally disposed baffles 26. These baffles are supported between vertically disposed chamber ends 27, the lower terminals of which are disposed below the liquid level of the absorbing solution. The plates 26 may take the form of foraminous elements or apertured members, through the openings in which the liberated gases escaping from beneath the liquid level of the absorbing solution may pass. As shown in the drawing, each baffle 26 is provided near one end with an opening 24, and the plates are assembled with the openings in alternate relationship so that the up-travelling gases take a tortuous course through the absorbing solution, as indicated by the arrows. During the passage of the fumes through the openings in these plates or screens, the gases are relieved of such of the absorbing solution as they may attempt to carry with them. A similar series of horizontally disposed baffle plates 28 is arranged within a second closed chamber B, which plates are supported by the upright end members 29, while a third closed chamber C is similarly equipped with horizontally

spaced baffle plates 28, all having openings 24 arranged identically with corresponding baffle plates of chamber A.

The lower portions of the chambers A and B are provided with upwardly inclined deflector plates 30 disposed above the bottom of the housing as shown, each having its free end projecting into the lower part of the succeeding chamber to assist in maintaining a constant level of the solution.

The chambers A, B and C are separated from one another by passages 31, through which the gases must pass in a downward direction from one chamber to the succeeding chambers in travelling through the housing. A cover plate 32 overlies the chambers and it will be noted that the cover plate acts as a drain return plate and is inclined downwardly toward the first chamber and is connected to the frontal partition 27 of said first chamber.

Disposed above the chamber C is a passage 33 over which are a series of arcuate baffles indicated at 34. These baffles extend alternately into the passage above the chamber C as shown, so that the fumes in escaping to the outlet 35 must pass in a sinuous or tortuous course, as shown by the arrows, before reaching the said discharge outlet.

The gases entering the chamber 15 are rid of vapor before entering the housing 23, after which the gases are brought into intimate contact with the solution and the toxic or objectionable fumes are relieved therefrom. As the gases rise, they take a sinuous or tortuous course through each of the chambers A-B-C before reaching the discharge outlet, and in so doing are alternately relieved of any absorbing liquid which might be carried in suspension, and brought into contact with the absorbing solution so as to further assure the gases of being thoroughly washed or rid of the objectionable fumes. Such of the travelling fumes as may carry some of the absorbing solution with them are further rid of the solution thus carried by being brought into intimate contact with the baffles 34, and the condensation of the solution thus effected is saved and drains back into the chamber across the inclined drain return plate or wall 32.

No mention is made herein of the specific absorbing medium relied upon to bring about a thorough washing of the gases to relieve them of the disturbing or objectionable fumes. The chemical constituent of this solution may vary according to the needs or according to the type of fumes to be washed as well as the nature of the fume to be dissolved. It is sufficient for the present disclosure that the solution be a liquid capable of neutralizing carbon monoxide or other toxic or lethal gases which ordinarily emanate from the exhaust pipe of internal combustion engines, wherein such gases are always present where incomplete combustion of hydrocarbon fuel exists.

By cooling the gases when they first emanate

from the exhaust pipe, the water vapor in the gases is condensed and removed from the system. This step is important in that vapor or condensation is prevented from being carried into the absorbing chamber for possible dilution of the absorbing liquid therein. By subsequently treating the gases by the process and with the apparatus described, it is apparent that the fumes emanating from the discharge pipe 35 will be rendered harmless as well as smoke-free or colorless.

I claim:

An apparatus for treating gases from the exhaust of an internal combustion engine comprising: an external housing having a front end wall, a rear end wall, top, bottom and sides; a series of spaced chambers in the housing, each chamber including a frontal, vertical partition member and a plurality of horizontally disposed, spaced, apertured members, each of said chambers being spaced from the top and bottom of the housing, the first of said chambers having its frontal partition member spaced from the front end wall of the housing; an inlet port in the lower portion of each frontal partition member for admitting gas therinto; a gas supply conduit communicating with the inlet port in the lower portion of the first of said chambers; a body of liquid within the housing and said chambers; a port in the bottom of each chamber for admitting liquid therinto from within the housing; a gas discharge port in the top of the housing adjacent the rear end wall; a drain return plate within the upper part of the housing above said chambers, said plate being downwardly inclined toward and connected to the frontal partition of the first of said chambers; and a gas outlet port in said plate in communication with the last said chamber in said series, whereby gas admitted through the supply conduit will pass upwardly through each of said chambers and downwardly between the spaced chambers, and liquid entrained in gas discharged from the last chamber will drain along said return plate to the body of liquid in the housing.

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