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A. J. KOEHLER

MEANS FOR WASHING GASES

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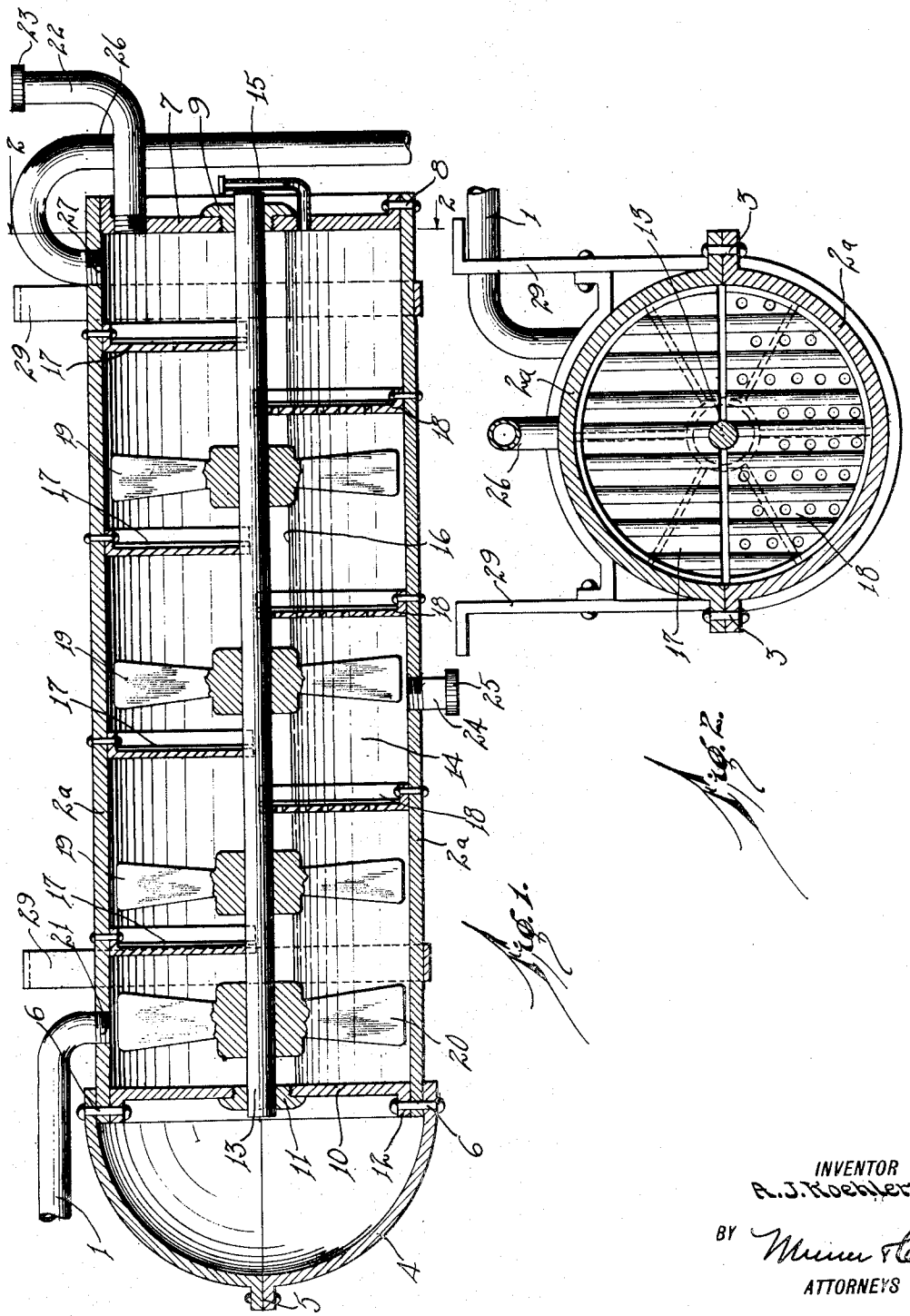


Fig. 2.

Fig. 1.

INVENTOR
A. J. Koehler
BY Munn & Co.
ATTORNEYS

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ANTHONY J. KOEHLER, OF CHICAGO, ILLINOIS.

MEANS FOR WASHING GASES.

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To all whom it may concern:

Be it known that I, ANTHONY J. KOEHLER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Means for Washing Gases, of which the following is a full, clear, and exact description.

My invention relates to improvements in means for washing exhaust gases in internal combustion engines, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a means for washing gases in which the exhaust gases are passed through a reservoir of highly agitated water or other liquid solvent so that the poisonous contents of the gases may be absorbed by the water.

A further object of my invention is to provide a means for washing gases in which the particles of carbon and solid products of combustion are absorbed, thereby precluding the occurrence of smoke clouds at the outlet manifold.

A further object of my invention is to provide a means for washing gases in which a plurality of paddle wheels are employed for agitating water contained in a suitable reservoir, the paddle wheels being actuated by the impact of the exhaust gases for the driving paddle.

A further object of my invention is to provide a means for washing gases in which means is provided for preventing the accumulation of the water in the reservoir at one end thereof and in which a shower of water is created in the reservoir, thus exposing a large quantity of the water surface to the exhaust gases at the end of the condenser.

A further object of my invention is to provide a device of the character described that is compact in form, in which back pressure is relatively slight, and which is thoroughly practical for the purpose intended.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a sectional view of an embodiment of my invention, and

Figure 2 is a sectional view along the line 2—2 of Figure 1.

In carrying out my invention, I make use of the ordinary type of internal combustion engine in which the products of combustion are conducted through an exhaust manifold 1 from the cylinders of the engine to a point where the gases are liberated. Ordinarily, these gases if liberated through a muffler which is intended solely for the purpose of absorbing the sound of the explosions in the cylinders, the poisonous products of combustion, together with clouds of carbon, are permitted to be blown out through the muffler and delivery opening. In my present invention, I do more than merely eliminate the sound of the explosion, by accomplishing the absorption of the poisonous ingredients of the gases, and also by absorption of the carbon particles. This is done by the provision of a substantially cylindrical reservoir consisting of two parts 2^a and 2^b split longitudinally and riveted to one another at 3 (see Figure 2). One end of the cylindrical member 2^a—2^b is closed by a substantially hemispherical shell 4 consisting of two parts riveted to one another at 5. The shell 4 is arranged to fit snugly over the open end of the cylindrical member 2^a—2^b and is riveted in place by means of rivets 6.

The opposite end of the cylindrical member 2^a—2^b is closed by means of a metal plate 7 securely riveted to the inner wall of the cylindrical member by means of rivets 8. The plate 7 has centrally located therein a bronze bearing 9.

A second plate 10, similar in construction to the plate 7 and having a bronze bearing 11 in axial alinement with the bearing 8, is disposed in the opposite end of the cylindrical member 2^a—2^b and is securely held in place also by means of the rivets 6 which extend through the hemispherical shell, the side walls of the cylindrical member, and through outwardly extending flanges 12 of the plate 10.

A shaft 13 is rotatably mounted in the bearings 9 and 11. The purpose for providing bronze bearings is so that these bearings will not be damaged by the high temperatures of the exhaust gases and by the water 14 which is contained in the reservoir.

A gauge glass 15 is fixed to the plate 7 below the water line 16 of the water 14 (when at rest) so that the level of the water

in the reservoir may be ascertained from an inspection through the glass 15. It should be noted that the normal level of the water in the reservoir is slightly below the shaft 13.

A plurality of semi-circular corrugated partitions 17, spaced at equal distances from one another, are disposed in the upper half of the reservoir. The exact configuration of these partition members may be more clearly seen in Figure 2. In the present embodiment of my invention I employ four such partitions.

Three corrugated and perforated semi-circular partition members 18 are disposed in the lower half of the cylindrical reservoir and are staggered laterally with respect to the partition walls 17.

Three paddle wheels 19, having their outer ends in close proximity with the inner wall of the reservoir, are disposed upon the shaft 13 at equally spaced intervals from one another and between adjacent sides of the partition walls 17 and 18, respectively.

A fourth paddle wheel 20, slightly heavier than the paddle wheels 19, is disposed at the forward end of the shaft 13 immediately below the port 21 which is connected directly with the exhaust manifold 1 of the internal combustion engine (not shown).

Means for filling the cylindrical reservoir with water is provided in a filling tube 22 disposed at the rearward end of the condenser and having a cap 23 thereupon which may be removed when the reservoir is to be filled. A drain plug 24 is disposed in the lower wall of the cylindrical reservoir substantially at its mid point, and is also provided with a cap 25 by means of which the water in the reservoir may be drained by removal of the cap.

A delivery pipe 26, communicating with the interior of the cylindrical reservoir at its upper and rearward end 27, is arranged to be supported so that its outer end or outlet is in a convenient place at the rear portion of the motor vehicle.

A pair of supporting brackets 29 are provided for securely fixing the device upon the under wall of the motor vehicle.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. Let us assume that a motor vehicle on which my improved means for washing gases is employed, has been run for some time in a garage and that the owner of the vehicle is conducting certain repair work which may only be accomplished while the motor is in operation. It is well known that many vehicle owners do not realize the danger of carbon monoxide poison due to the presence of monoxide gases in the products of combustion. This gas is odorless and deadly. If the motor vehicle is of the ordinary type and the gases are not absorbed by a proper medium provided for the absorption of gases, the breathing of the air in the garage may cause severe illness or even death of the owner or workman.

In the present case, however, in which my improved means for washing gases is in use, the poisonous carbon monoxide gas, together with certain other harmful gases present in the products of combustion, will enter the device through the exhaust manifold, and the port 21, and impact of these gases upon the relatively heavy paddle wheel 20, will cause the paddle wheel to turn rapidly. This in turn will drive the shaft 13 and cause the movement of each of the paddle wheels 19. The result will be that the water 14 in the reservoir will be greatly agitated. As the water is agitated, it will be thrown upwardly against the corrugated sides of the partition 17 and will fall back in a shower to the bottom of the reservoir.

A rapid churning of the water at the bottom of the reservoir will be constantly maintained and as the gases pass through the reservoir on their way to the delivery tube 26, the poisonous ingredients, as well as the solid particles of the products of combustion, will be absorbed by the water and only steam and washed gases will be emitted through the delivery tube 26.

The movement of the gases between the partition walls 17 and 18 will also eliminate the sound from the explosion of the fuel in the cylinders in precisely the same manner as the ordinary type of muffler in which the sound waves are caused to pass through a zig-zag path.

One of the principal advantages in having the partitions 17 and 18 corrugated is so that a relatively large surface is provided over which the water may be splashed, thereby greatly increasing the exposed surface of the water to the exhaust gases. The purpose of the perforations in the partitions 18 is to permit the draining of the water from the reservoir and to provide for the establishment of a uniform level of the water 14 throughout the reservoir.

A further and most important time at which my improved condenser is of untold benefit to the vehicle driver is at times when the motor vehicle is necessarily throttled down as in waiting for a traffic signal at a crowded crossing. As the engine of the motor vehicle is idling, the accumulation of oil in the cylinders is often high and the fuel in the mixing chamber is permitted to accumulate in larger quantities than necessary. Such idling of the engine invariably causes the production of great clouds of carbon and gases when the engine is started upon the proper signal by the traffic officer. It does not take many vehicles upon a bou-