P. WACHTEL.

ARRANGEMENT FOR PURIFYING AND RENDERING ODORLESS THE EXHAUST GASES OF INTERNAL COMBUSTION ENGINES AND THE LIKE.

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1,402,814.

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Fig. 1

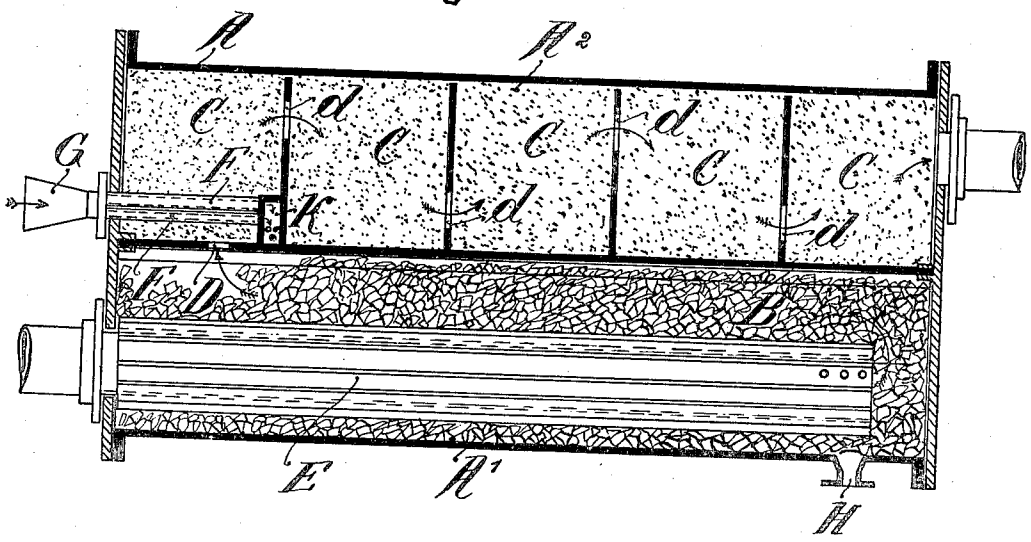
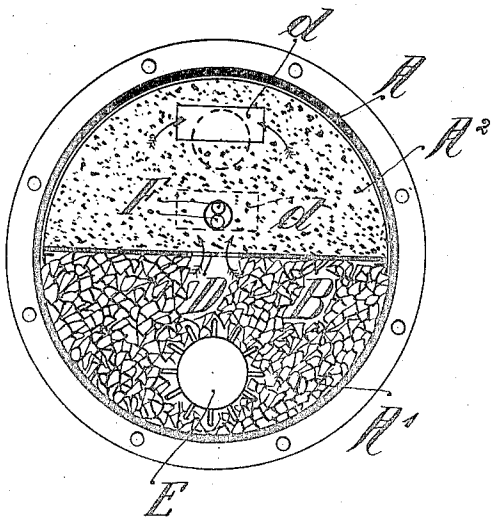



Fig. 2




Inventor
P. Wachtel
by C. Dittmar
Attorney

# UNITED STATES PATENT OFFICE.

PHILIPP WACHTEL, OF FRANKFORT-ON-THE-MAIN, GERMANY, ASSIGNOR TO WILHELM SCHMIDDING, A FIRM, OF KÖLN-MANNSFELD, GERMAN REPUBLIC.

## ARRANGEMENT FOR PURIFYING AND RENDERING ODORLESS THE EXHAUST GASES OF INTERNAL-COMBUSTION ENGINES AND THE LIKE.

1,402,814. Specification of Letters Patent. Patented Jan. 10, 1922.

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*To all whom it may concern:*

Be it known that I, PHILIPP WACHTEL, a citizen of the German Republic, and residing at 5 Gutzkowstrasse, Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in an Arrangement for Purifying and Rendering Odorless the Exhaust Gases of Internal-Combustion Engines and the like, of which the following is a statement.

The present invention relates to an arrangement for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, in particular with automobiles.

Numerous apparatus have already been suggested for the purpose stated which generally were based on the principle of conducting the burnt gases ejected through containers provided with chambers. The idea of conducting the exhaust gases through a hollow body is obvious, on the one hand for reducing the noise caused by them, on the other hand to purify the gases passing through the various chambers. Heretofore, however, and in particular as regards automobiles, no such apparatus have been disclosed which have proved fully satisfactory. The reason for this may be sought in the fact that the method hitherto employed for purifying these exhaust gases was one-sided only, as the gases, consisting of the burnt gases and residues of the oil were conducted through the same chambers. This method showed the disadvantage that the oil particles carried along in the gases completely coated the purifying materials in the said chambers with a film of oil, whereby the effect which was expected from these materials became negative.

The essential idea of the present invention resides in the oil particles being carried along in the gases and first separated from the combustion gases. This object is obtained by means of a preliminary cleaner whilst the purifying proper of the exhaust gases is carried out in a separate chamber, subdivided into a plurality of sub-chambers and disposed above the preliminary cleaner. This method has by experiments been proved to be particularly satisfactory and it has been found that the heavy oil particles are readily deposited by heated coke as they are kept in a liquid state, and that the volatile gasoline gases separate therefrom. Only after this process has been completed the gasoline gases can be cleaned and rendered odorless by means of a separate apparatus subdivided into a plurality of chambers.

A considerable improvement over other known arrangements consists in the supply of fresh air into the interior of the apparatus. This fresh air, however, is introduced only into the gas purifying chamber and condensed there. The water particles are carried on into the various chambers so as to keep the purifying materials, such as spagnum and other porous substances, permanently moist and capable of absorbing the combustion gases which have been freed from the oil residues.

In the accompanying drawing Fig. 1 is a longitudinal section,

Fig. 2 a transverse section through the apparatus forming the subject matter of the present invention.

The apparatus consists of a container A, preferably of cylindrical section and containing two sections $A^1$ and $A^2$, separated from each other by a partition B. The exhaust gases are, after leaving the motor conducted through a webbed steel pipe E into the lower oil-removing chamber, which is filled with small pieces of very porous coke. By means of the webbed steel pipe E the coke will be evenly heated so as to adapt it to separate and absorb the oil particles from the exhaust gases. The absorbed oil particles, which are in a very liquid state, may from time to time be drawn off through the tap H. The exhaust gases, after having thus been freed of the burnt oil, pass through the opening D in the partition B into the upper, gas-purifying chamber $A^2$, which is subdivided into a plurality of chambers, which communicate through openings *d*. These openings are staggered with respect to each other, so that the gases, while passing through the chambers, are forced to fully utilize the purifying material in the chambers. In order that the latter, consisting of spagnum or the like, should not be dried up by the heat, it is very important that this material be constantly kept moist. This is obtained thereby that a funnel G is provided at the front cover of the apparatus A, viz.

in the direction of travel, so as to suck in fresh air. From this funnel the air is conducted through pipes F into the first chamber *c*. At the inner edge of the pipes F is disposed a water pocket K, which reaches down to the bottom of the partition B. The air sucked in through the funnel is forced in the water pocket toward the heated bottom of the partition B, where it condenses, and the water particles thus produced will be carried along by the current of gas and be absorbed by the purifying material. The gases eventually emerge in form of white vapor and absolutely odorless through the last chamber C into the atmosphere.

The essential feature of the invention consists, as will be apparent from the foregoing description, in the fact that the apparatus is composed of the two separate parts, in which quite different processes are carried out, namely in chamber $A^1$ the absorbing of the oil, and in chamber $A^2$ the actual purifying of the gases. Both parts of the apparatus cooperate in producing the final object desired. After 6 to 8 weeks the apparatus should be cleaned and the fillings be renewed. For this purpose the rear lid is detached, and the whole interior system of chambers may then be drawn out, cleaned and refilled. For facilitating its removal the partition B is guided in rebates.

I claim:

1. Means for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, consisting of an oblong container, said container divided by a horizontal partition into two compartments, the lower compartment filled with a material, such as small pieces of very porous coke, adapted to absorb the oil contained in the exhaust gases, the upper compartment subdivided into a plurality of chambers, said chambers filled with material adapted to purify the gases passing therethrough, means for separating the oil from the gases, means for keeping the material constantly moist, and means for conducting the exhaust gases coming from the motor first through the lower chamber and thereafter through the chambers of the upper compartment through a staggered course.

2. Means for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, consisting of an oblong container divided by a horizontal partition into a lower and an upper compartment, the lower compartment filled with small pieces of very porous coke or the like, a webbed radiator tube conducted through said lower compartment, the upper compartment subdivided into a plurality of chambers filled with gas purifying material, means for separating the oil from the gases, means for keeping the material constantly moist, and means for conducting the exhaust gases coming from the motor through said radiator pipe and the lower compartment and thereupon through the several chambers of the upper compartment through a staggered course.

3. Means for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, consisting of an oblong container divided by a horizontal partition into a lower and an upper compartment, the lower compartment filled with small pieces of very porous coke or the like, a radiator tube conducted through said lower compartment, the upper compartment subdivided into a plurality of chambers filled with gas purifying material, means for separating the oil from the gases, and means for conducting the exhaust gases coming from the motor through said radiator pipe and the lower compartment and thereupon through the several chambers of the upper compartment, and means for sucking fresh air into the said upper compartment, a water pocket through which the fresh air is forced and condensing the moisture of said fresh air in the path of the current of gases.

4. Means for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, consisting of an oblong container divided by a horizontal partition into a lower and an upper compartment, the lower compartment filled with small pieces of very porous coke or the like, a radiator tube conducted through said lower compartment, the upper compartment subdivided into a plurality of chambers filled with gas purifying material, means for separating the oil from the gases, means for conducting the exhaust gases coming from the motor through said radiator pipe and the lower compartment and thereupon through the several chambers of the upper compartment, intended for use on a motor vehicle, a funnel opening in the direction of travel, adapted to suck in fresh air, means for conducting said fresh air into the said upper compartment, and means, such as a water pocket, through which the fresh air is forced for condensing the moisture contained in said fresh air in the path of the current of gas.

5. Means for purifying and rendering odorless the exhaust gases of internal combustion engines and the like, consisting of an oblong container divided by a horizontal partition into a lower and an upper compartment, the lower compartment filled with small pieces of very porous coke or the like, a radiator tube conducted through said lower compartment, the upper compartment subdivided into a plurality of chambers filled with gas purifying material, means for conducting the exhaust gases coming from the motor through said radiator pipe and the lower compartment and thereupon

through the several chambers of the upper compartment, and means for sucking fresh air into the said upper compartment and condensing the moisture of said fresh air in the path of the current of gases, a water jacket through which the fresh air is forced, the said partition together with the chambers of the upper compartment arranged to be drawn out from the container, after a lid on the latter has been removed.

In witness whereof I have hereunto set my hand in presence of two witnesses.

PHILIPP WACHTEL.

Witnesses:

WILHELM HELPICH,
GOTTFRIED MARTIN.