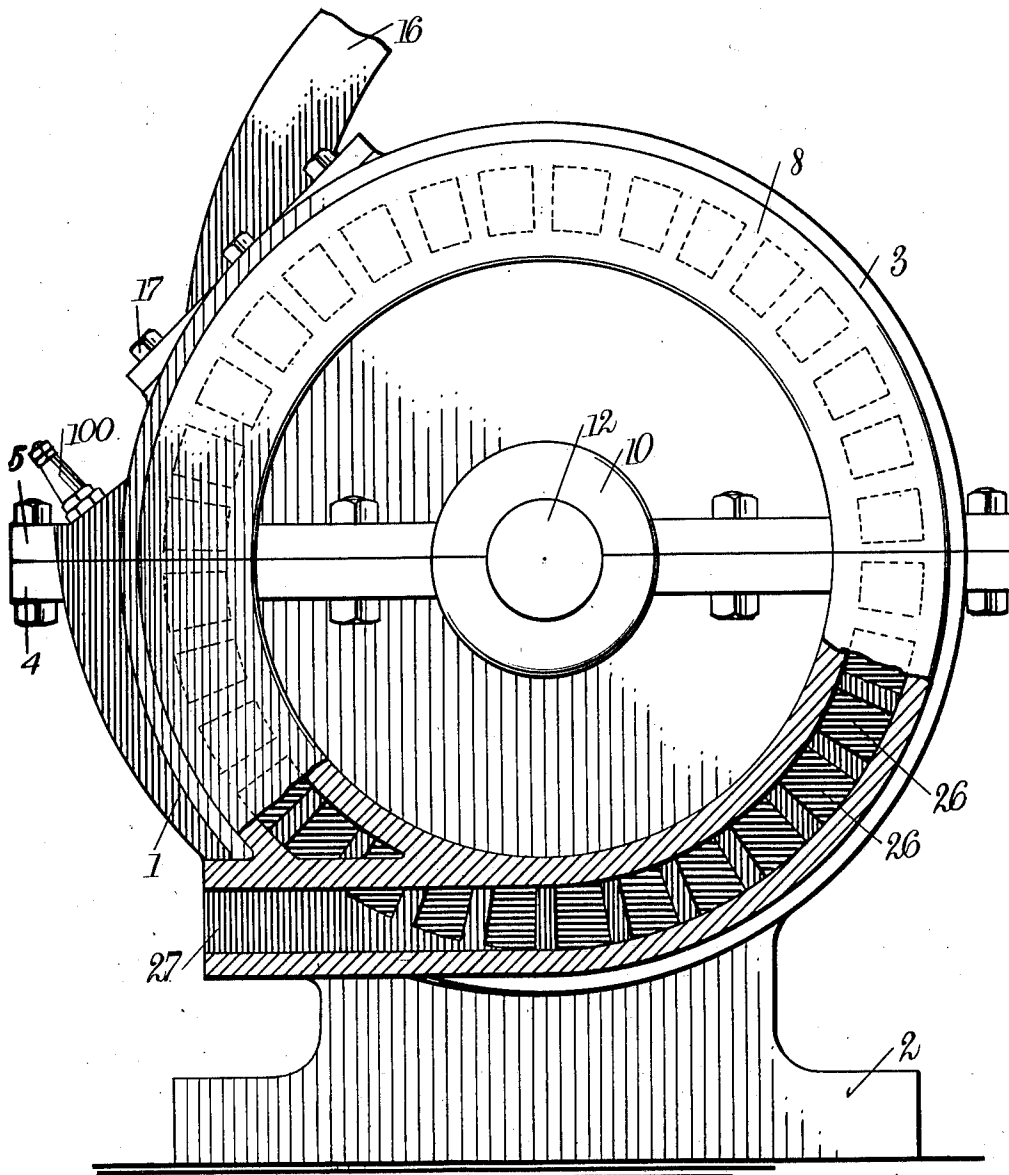


C. F. HIGH.
EXHAUST MOTOR.
APPLICATION FILED AUG. 5, 1911.

1,040,199.

Patented Oct. 1, 1912.

4 SHEETS—SHEET 1.



WITNESSES
John A. Bergstrom
L. J. Gallagher

Fig. 1

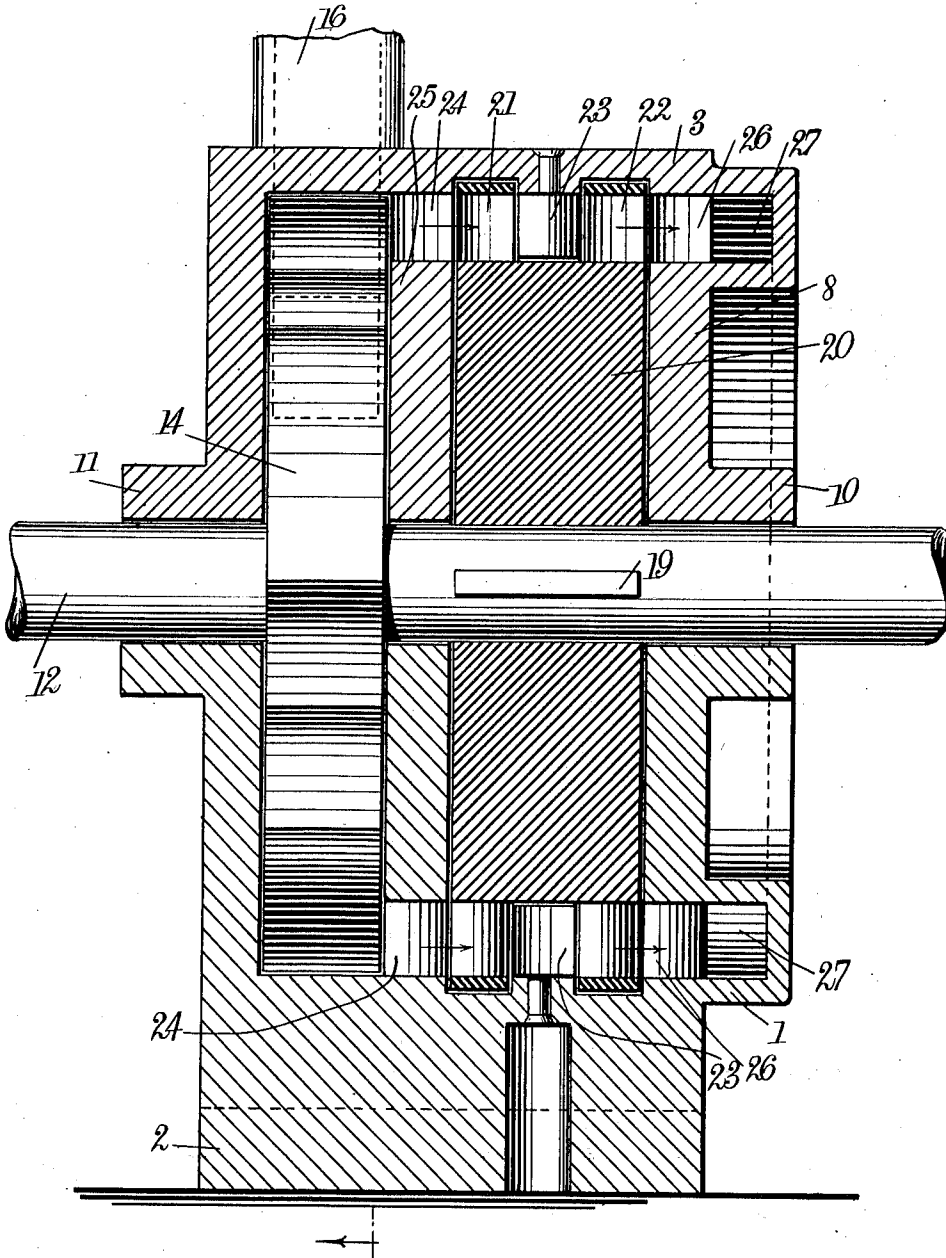
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4 SHEETS—SHEET 2.



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Fig. 2

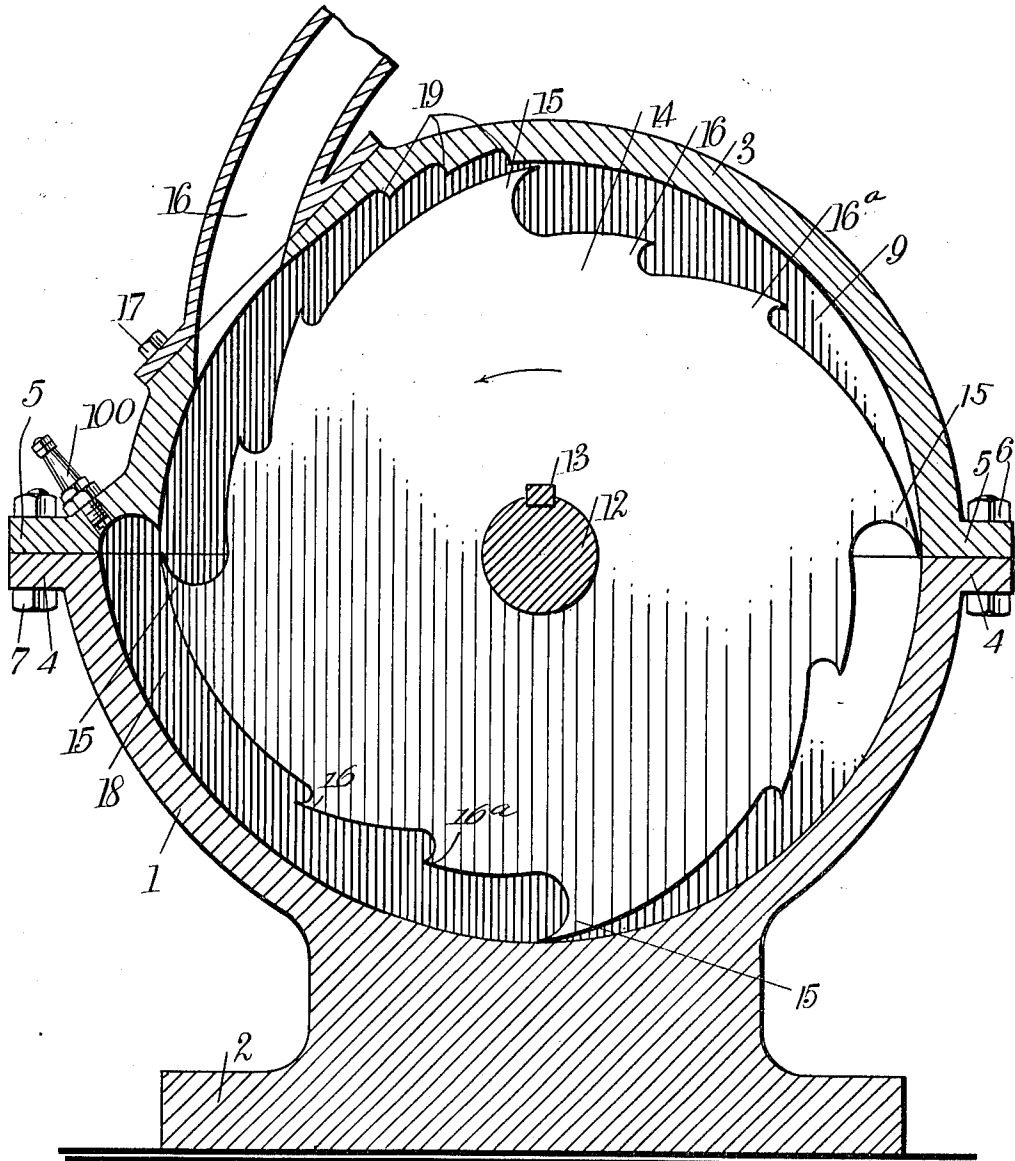
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4 SHEETS—SHEET 3.



WITNESSES
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Fig. 3

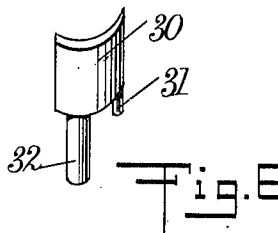
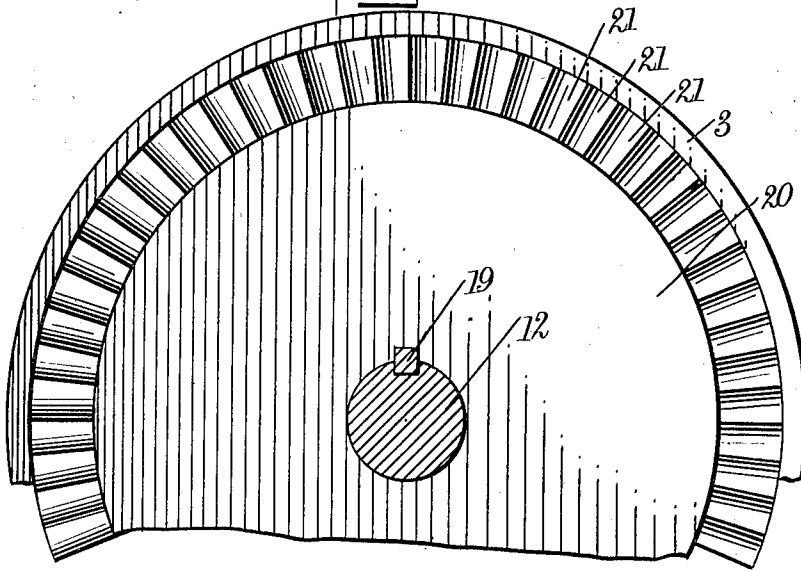
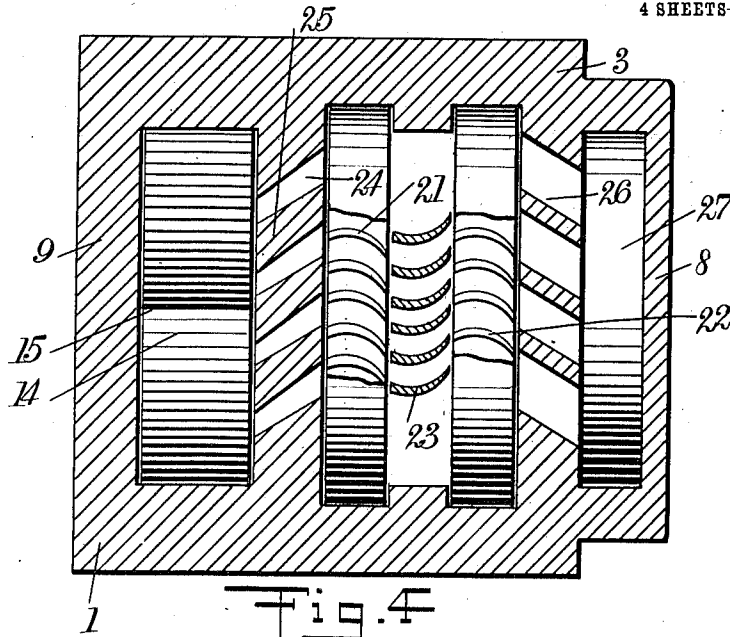
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C. F. HIGH.
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APPLICATION FILED AUG. 5, 1911.

1,040,199.

Patented Oct. 1, 1912.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CARL F. HIGH, OF NEW WASHINGTON, OHIO.

EXHAUST-MOTOR.

1,040,199.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed August 5, 1911. Serial No. 642,441.

To all whom it may concern:

Be it known that I, CARL F. HIGH, a citizen of the United States, and a resident of New Washington, in the county of Crawford and State of Ohio, have invented a new and Improved Exhaust-Motor, of which the following is a full, clear, and exact description.

My invention relates generally to motors and more particularly involves a new and useful construction adapted to be actuated by exhaust gases which have heretofore been lost.

The principal object of my invention is to provide a motor of new and improved construction whereby the power of an engine may be increased and the operation thereof rendered more efficient by taking care of the exhaust from this engine and utilizing the power present therein.

A further object of the invention is to provide a motor of new and improved construction which will, in addition to utilizing the power and exhaust gases, also act in the nature of a muffler, thereby doing away with the unpleasant noise generally accompanying some engines.

A further object of the invention is to provide a motor of new and improved construction which by being actuated by the exhaust gases of an engine will give a more perfect balance to the engine whereby the vibration is lessened and the same more evenly balanced.

A further object of the invention is to provide a motor which is adapted to be driven by the combustion of suitable vapors.

My device embodies a suitable casing having a chamber therein within which a wheel having a serrated periphery rotates, being actuated by the exhaust gases or vapors from an engine, these same gases or vapors passing on into other chambers where they actuate vanes or blades on rotatable members, the vapors or gases finally leaving the motor at a pressure which is very low, whereby the power available in the exhaust gases or vapors is utilized.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is an end view of the motor

partly in section; Fig. 2 is a vertical sectional view thereof; Fig. 3 is a vertical sectional view at 90° to the sectional view of Fig. 2; Fig. 4 is a partial sectional view showing diagrammatically the arrangement of the chambers and the movable elements therein; Fig. 5 is a side view of one of the fixed plates with the blades around its periphery; Fig. 6 is a perspective view of one of the fixed blades.

My invention comprises a lower casing 1 having a suitable support 2 thereon, there being an upper casing 3, the casing members being provided with longitudinally extending flanges 4, 5, engaging each other and held together by any suitable means such as bolts 6, 7. The casing members are closed by end pieces 8, 9, of any desired construction, the central portion of the end pieces forming bearings 10, 11, for a suitable shaft 12. The casing members with the end pieces thereon form in effect a hollow cylinder through the intermediate portion of which the shaft 12 extends. Adjacent one end of the shaft and secured thereon by any means such as a key 13 is a wheel 14 having a number of serrations around its periphery, certain of these serrations being diametrically opposite each other and being spaced apart a distance substantially equal to the inner diameter of the chamber. Other serrations 16, 16^a, are formed on the periphery of the wheel intermediate of the aforementioned serrations 15, all of these serrations forming pockets whereby the velocity of the gas impinging thereon may turn the wheel 14. It will be noted that the wheel is divided into quarters, the edge portion of each quarter being provided with a plurality of teeth whereby it results that the distance between the inside of the chamber in which the wheel revolves and the portion of each quarter between the serrations 15 is varying; the utility of such a structure is apparent inasmuch as substantially two quarters of the wheel 14 and the teeth on these quarters are accessible to the entering gases.

Referring particularly to Fig. 3 of the drawings it is to be noted that the chamber in which the wheel 14 turns communicates with a suitable pipe or outlet 16 which is secured to the casing by any suitable means such as bolts 17, this pipe or outlet being

always adjacent some of the serrations or pockets 15, 16; it is also to be noted that this pipe or outlet communicates directly with substantially one-half of the chamber in which the wheel 14 turns, the inner wall of the chamber carried by the lower casing 1 being offset adjacent one side in order to form a pocket 18. The curvature of the inside of the lower portion 1 of the casing where the pocket 18 is formed is such that it conforms substantially with the circle drawn from the center of the shaft and on which circle the outer ends of the teeth 16, 16^a, lie; by such construction the entering gases are allowed to impinge upon all of the teeth on the periphery of the wheel so that the maximum torque may be obtained. The inner wall of the upper casing member 3 is provided with a number of pockets 19, the purpose of which is to change the direction of the gases or vapors entering the interior of the casing through the pipe 16 and direct them toward the pockets 15, 16, on the wheel 14 in order to rotate it.

Secured to the shaft by any suitable means such as a key 19 and within the casing members 1, 3, is another moving wheel 20 having a plurality of vanes or buckets 21, 22, formed on its periphery, the vanes being separated from each other a suitable distance along the intermediate portion of the periphery of the wheel in order to permit a plurality of fixed vanes or buckets 23 carried by the casing members 1, 3, to be positioned intermediate the moving vanes 21, 22. That portion of the interior of the chamber in which the wheel 14 turns, which portion is included between the teeth on the right hand side of the device shown in Fig. 3, communicates with the movable vanes 21 on the wheel 20, through passages 24 formed in the fixed portion 25 which is positioned between the wheels 14 and 20. The vanes or buckets 22 which are mounted on the periphery of the wheel 20 communicate with a plurality of openings 26 positioned around the interior of the end piece 8, these openings communicating with an exhaust 27 also carried by this end piece.

The shaft 12 is adapted to be fixed to the shaft of the engine from which it takes the exhaust vapors or gases or the shaft may be engaged with suitable machines which are to be actuated if so desired.

The operation of the device may be described as follows: The engine being started, the gases or vapors therefrom enter the pipe or outlet 16 at exhaust pressure and with some velocity, thereupon coming into engagement with the pockets in the periphery of the wheel 14 whereby this wheel is turned, the gases or vapors being retained between the pockets and the side wall of the lower casing member 1 until they come adjacent the openings 24 in the fixed plate 25, whence

they pass through and engage the vanes or buckets 21 on the wheel 20, also on the shaft 12. The velocity of the gases as they impinge on the vanes or buckets causes the wheel to turn, the gases on leaving the vanes having their direction changed by the fixed vanes or buckets 23 whence they pass on and come into engagement with the vanes or buckets 22 also carried by the wheel 20; after engaging these vanes or buckets the gases pass through the openings 26 in the end piece 8 whence they pass out to the atmosphere if so desired through the exhaust 27. The pressure and velocity of the exhaust gases of the engine are utilized to actuate the wheels 14 and 20, thereby turning the shaft 12; due to the numerous parts with which these gases come into contact and in actuating which they give up their pressure and velocity, the gases exhausting from this motor will be substantially at atmospheric pressure and the exhaust will be noiseless whereby the device, in addition to utilizing the power which is present in these exhaust gases, also does away with the disagreeable noise of exhaustion and serves the purposes of a muffler.

The device is suited for actuation by the explosion of gaseous mixtures if so desired and to this end I have shown a spark plug 100 in Fig. 3 positioned adjacent the pipe or inlet 16 so that if any suitable means are connected to this pipe in order to regulate the supply of gas this supply may be exploded within the chamber in which the wheel 14 turns, thereby driving this wheel; after turning the wheel the exploded gases will pass on and come into engagement with the vanes or buckets on the moving wheel 20 where they give up more of their energy.

The particular form of vanes or blades, fixed or revolving, may be of any desired size and the conformation thereof will be such as is best suited to the purpose; in Fig. 6 I have shown a perspective of a suitable form of fixed vane which comprises the vane or blade proper 30 having a tip 31 thereon which engages in a suitable opening in the casing, together with a leg or stem 32 passing through a hole in the casing in order to accurately and securely hold the vane in position.

My device is adapted for use with engines of any kind and is equally well adapted to engines having a plurality of cylinders, the ratio, however, of the different parts of the device being determined largely by the engine with which it is to be used. That portion of the chamber within which the wheel 14 turns and which lies to the left of a vertical plane passing through the center of this chamber may be of the same volume as the portion of the cylinder which is exhausting therein through the pipe 16, or it may be a fractional part of such volume. Each

set of blades or vanes whether moving or fixed includes more volume than the preceding set whereby the gas is allowed further expansion as it passes through succeeding sets until the last one is reached and the gas is allowed to expand and discharge at substantially atmospheric pressure.

From a consideration of the operation of the motor it will also be observed that the greatest pressure on the rotary elements occurs midway of the ignition points of the cylinders, the exhaust of which actuates the motor, whereby the vibration of the engine is practically neutralized.

Various changes may be made in the shape and size as well as the strength of the different parts of the motor in order to adapt it to engines of different makes and powers without departing from the spirit and scope of the invention as defined in the following claims.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:—

1. A device of the class described comprising a casing, a chamber within the casing, a wheel in the chamber, the interior of the chamber being substantially circular, one side of the chamber being offset to form a pocket, a plurality of serrations on the periphery of the said wheel, some of the said serrations being at a greater distance from the center of rotation than the others, the said serrations which lie at such greater distance engaging the inside of the said chamber, whereby a plurality of pockets extending through 180° are provided.

2. A device of the class described comprising a casing, a chamber within the casing, a wheel in the chamber, the casing being substantially circular in outline, one side of the chamber being provided with a pocket, an outlet adjacent the pocket, a plurality of pockets on the periphery of the said wheel, some of the pockets being at greater distances from the center of rotation than the other pockets, the outer peripheral portions of the wheel adjacent the pockets lying at such greater distances being in engagement with the inside of the chamber through a distance of substantially 180° , the said outlet being adapted to receive suitable vapors or gases, the vapors or gases engaging the pockets on the wheel adjacent the outlet and the said pocket of the chamber.

3. A device of the class described comprising a casing, a chamber within the casing, a wheel in the chamber, the casing being substantially circular in outline, one side of the said chamber being provided with a pocket, each quarter of the wheel being provided with a plurality of pockets, diametrical points of the wheel being adapted for engagement with the inside of the said chamber through a distance of substantially

180° whereby such engagement provides closed spaces between the said serrations and the inside of the casing as the wheel turns.

4. A device of the class described comprising a casing, a chamber within the casing, the chamber being substantially circular in outline, one side of the chamber being provided with a pocket, an outlet communicating with the chamber, a wheel within the chamber and rotatably mounted in position, the wheel being provided into four quarters and each quarter being provided with a plurality of pockets, opposite quarter points of the wheel being spaced apart a distance substantially equal to the diameter of the chamber whereby some of the quarter points always engage the inside of the said chamber as the wheel turns through a certain angle, that portion of the wheel opposite the pocket in the chamber being in communication with the said outlet whereby gases or vapors entering therein may engage the serrations on substantially one-half of the wheel.

5. A device of the class described comprising a cylindrical casing, a wheel rotatably mounted within the casing, the interior of the casing on one side thereof being provided with a pocket which extends through substantially 90° , the said wheel being provided with a plurality of serrations on its periphery, the serrations included within each 90° of the wheel being unequally spaced from the center thereof, the said serrations lying at the 90° points being in engagement with the inside of the casing as the wheel turns through an angle of substantially 180° , the said pocket in the casing communicating with the space included between the serrations adjacent thereto and the inside of the casing, an outlet carried by the casing and communicating with the space adjacent the said pocket whereby entering gases may engage substantially one-half of the serrations on the said wheel and turn the same.

6. A device of the class described comprising a casing, a shaft rotatably mounted therein, the ends of the shaft extending without the casing, a plurality of chambers within the casing, an intake at one end thereof and an exhaust at the other end, a plurality of wheels carried by the said shaft and positioned within the said chambers, one of the said members being provided with a number of pockets suitably spaced about its periphery, the wheel being divided substantially into quarters, the serrations lying at the quarter points being distant from the center of the shaft an amount equal to substantially the radius of the said chamber whereby, as the wheel turns, some of the serrations will engage the inner wall thereof, the other wheel having a number of blades positioned around its periphery, to

gether with openings between the chamber
containing the first wheel and the second
wheel, and other openings between the
chamber containing the second wheel and
5 the exhaust whereby a continuous passage
for gases or vapors is afforded through the
said casing.

In testimony whereof I have signed my
name to this specification in the presence
of two subscribing witnesses.

CARL F. HIGH.

Witnesses:

A. F. LANTZER,
A. J. VIKTOR.