C. F. HIGH.

EXHAUST MOTOR.

APPLICATION FILED JUNE 26, 1912.

1,048,311.

Patented Dec. 24, 1912.

4 SHEETS—SHEET 1.

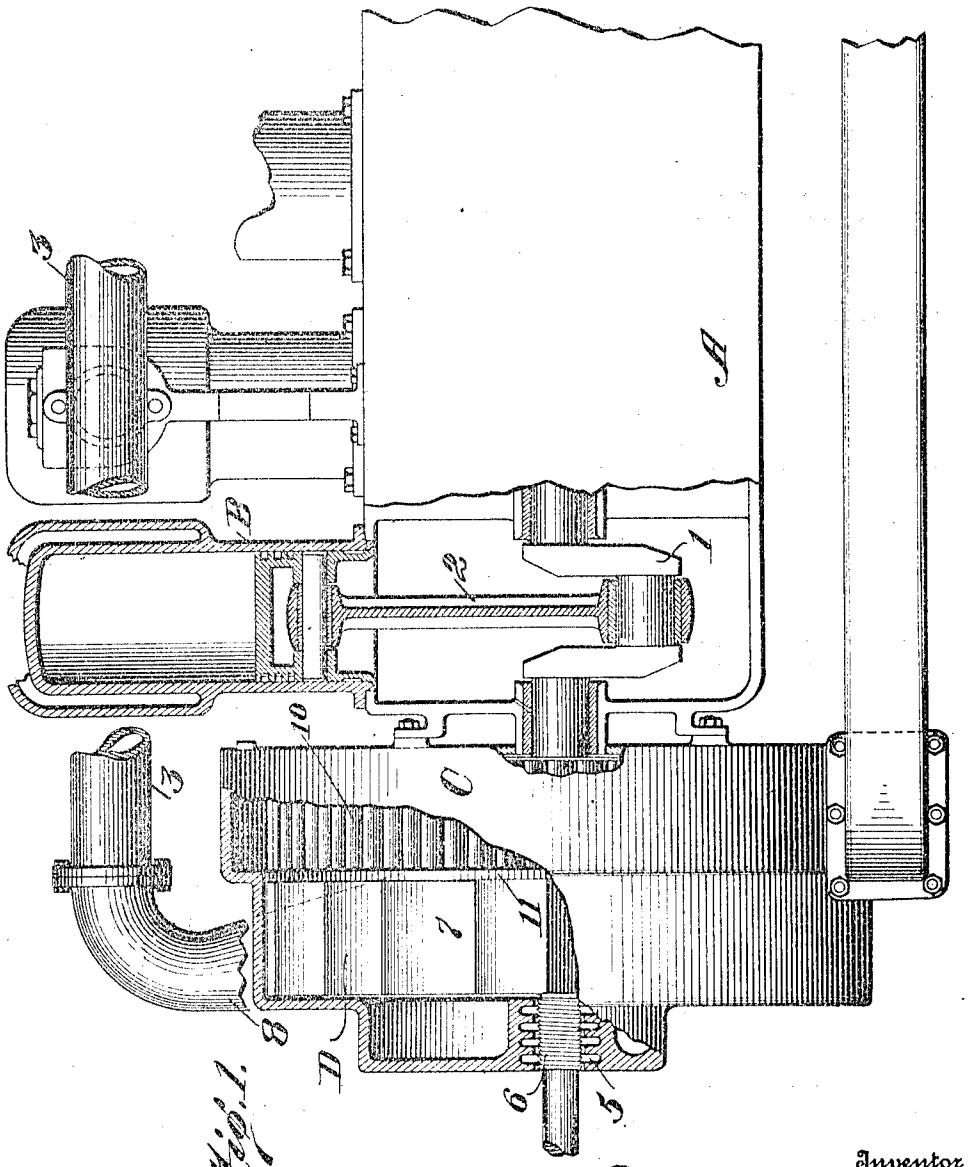

Fig. 1.

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4 SHEETS-SHEET 2.

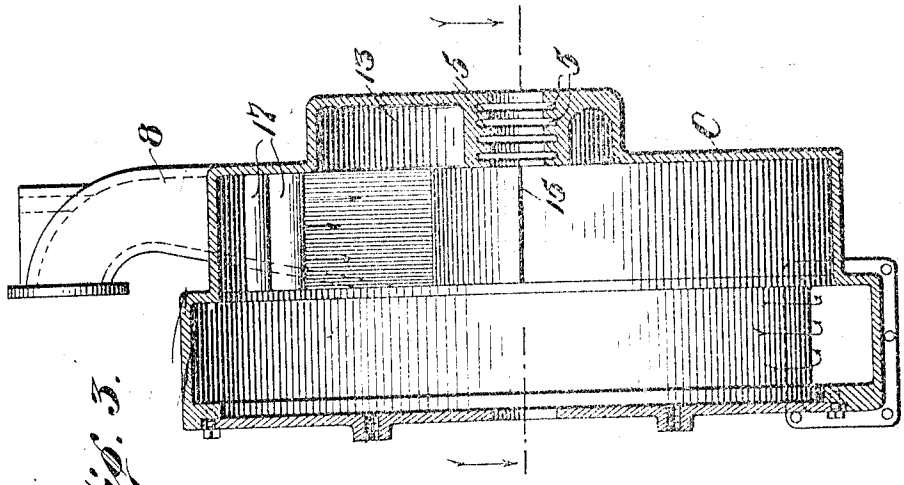

Fig. 3.

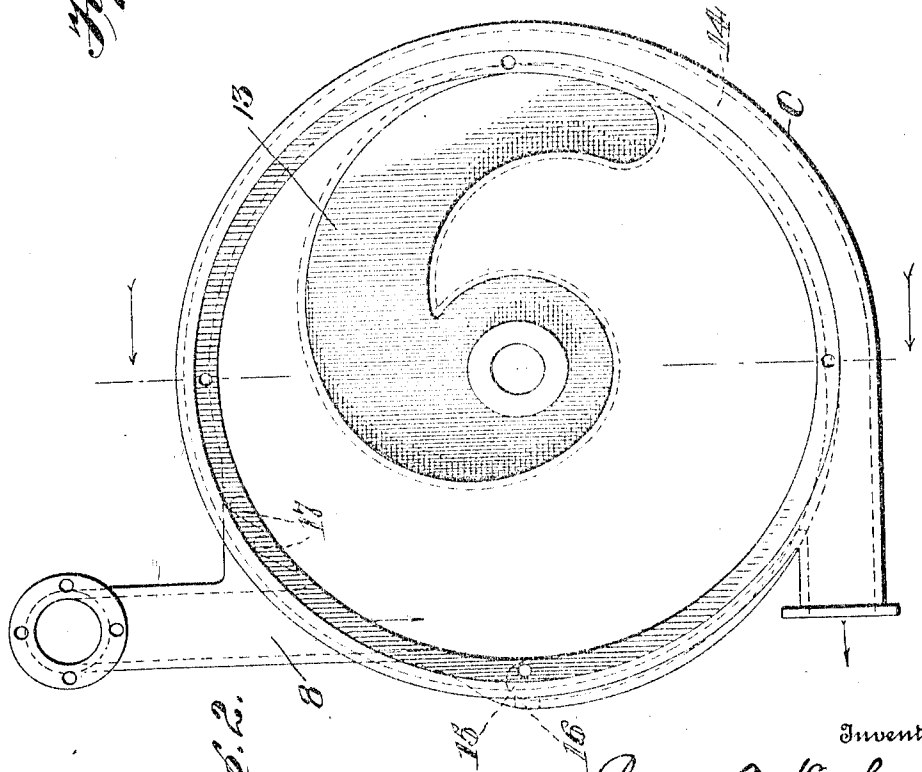

Fig. 2.

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4 SHEETS—SHEET 3.

Fig. 4.

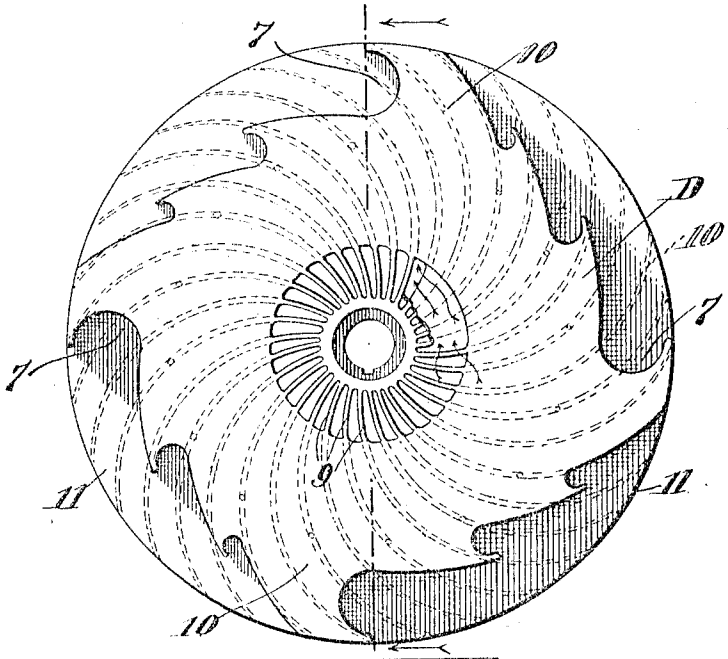
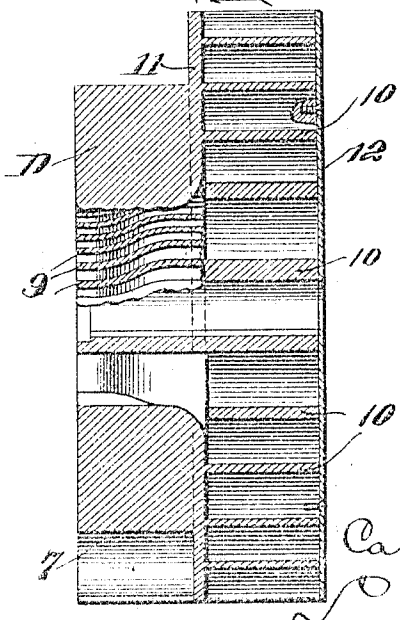


Fig. 5.



Witnesses

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4 SHEETS—SHEET 4.

Fig. 6.

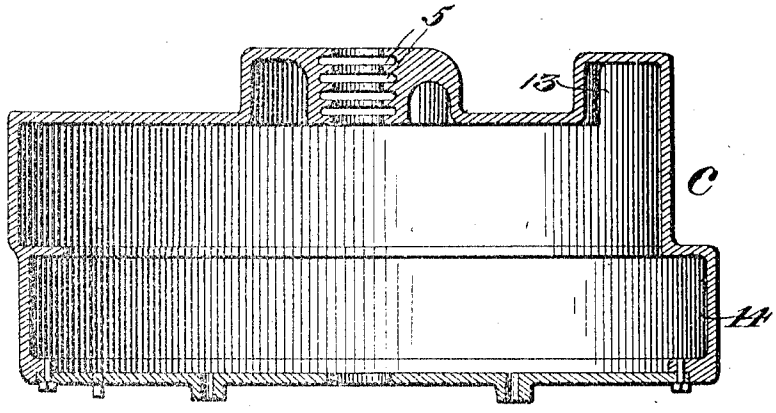
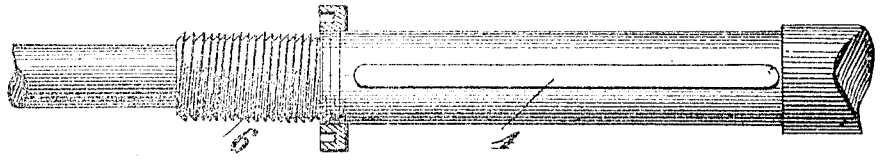


Fig. 7.



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UNITED STATES PATENT OFFICE.

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EXHAUST-MOTOR.

1,048,311. Specification of Letters Patent. Patented Dec. 24, 1912.

Application filed June 26, 1912. Serial No. 706,029.

To all whom it may concern:

Be it known that I, CARL F. HIGH, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Exhaust-Motors, of which the following is a specification.

My invention relates to an improvement in exhaust motors and the object is to substitute a motor for the fly wheel of an engine and to use the exhaust gases from the engine cylinders for operating the motor. While the motor performs all of the functions of a fly wheel, its object is to assist in carrying the cranks over the dead center and this is accomplished by the impulse imparted to the motor by the exhaust gas. In this manner the danger of tripping the engine is overcome because the motor will receive the exhaust from the cylinder and the pressure of the gas will be sufficient to carry the cranks over against compression as the high pressure exhaust, due to high mean effective pressure, is increasing the turning power of the motor and giving power or aid in the turning of the pistons against the compression and therefore the more overload that is placed upon the cylinders, the higher the exhaust pressure and velocity and, these acting upon the rotor, which is at a low peripheral speed, the pull is increased.

The invention consists in certain novel features of construction and combinations of parts which will be hereinafter more fully described, illustrated and claimed.

In the accompanying drawings—Figure 1 is a view in elevation and partly in section showing the manner of connecting the invention to an engine and its relation thereto; Fig. 2 is a view in side elevation of a casing with the cover or one end plate removed; Fig. 3 is a vertical sectional view of the casing; Fig. 4 is a view in side elevation of the rotor; Fig. 5 is a vertical sectional view of the rotor; Fig. 6 is a sectional view taken at an angle of 90 degrees from the section shown in Fig. 3. Fig. 7 is a detail view of the crank shaft extension upon which the motor is mounted.

A represents the crank case of a gas engine, and 1 is the crank shaft to which cranks 2 are connected.

B represents the cylinders to which an exhaust pipe 3 is connected.

C represents the motor casing, and mounted in the casing is a rotor D. The rotor D is mounted on an extension of the crank shaft 1 and is fastened to the shaft by a spline 4.

Surrounding the shaft 1 where it passes through the casing is an air packing 5 for preventing the gas leaking. The shaft at this point is provided with a left handed thread 6, which, due to its rotation, causes the gas to be fed back into the chamber or casing when any gas due to expansion should enter the threads.

The rotor D is provided on its outer surface with pockets 7. These pockets are preferably arranged in series of three, there being first a large pocket, the next one being smaller and the last smaller than the second, and the periphery of the rotor is made up in the formation of these pockets which receive the exhaust from cylinders of the gas engine through an outlet opening 8 in the casing C.

Formed between the hub of the rotor and the periphery thereof are vanes 9 and connected to the rear edges of the vanes are blades 10, 10. An annular flange 11 prevents the gas from passing from the pockets 7 into or against the blades 10. The blades 10 are preferably curved and extend to the periphery of the rotor. Connected to the blades along the rear side of the rotor is a disk 12, the disk being securely fastened to the blades so that it is carried with the blades during their rotation and forms a means whereby the gas is caused to act upon the blades for causing the rotor to rotate.

The casing C is provided with an exhaust discharge race 13 which extends and is formed, in one end of the casing from the center and around the hub of the rotor to the outer wall thereof. The race is in the form of a conduit formed in the wall or end of the casing and becomes larger as it runs inward from the periphery of the casing toward the center and around the hub. The rotor receiving the exhaust gases from the gas engine through the opening 8 into the pockets 7 of the rotor said gases are discharged from the pockets of the rotor into the conduit or race and thence pass through the rotor between the vanes 9 where the gas will again act upon these vanes and cause or produce a rotary action and the gas will pass between these vanes and against the blades 10, traveling toward

the periphery of the blades and imparting a propelling action which assists in causing the rotor to rotate. The gas is discharged from these blades into the conduit or channel 14 formed in the wall or periphery of the casing through which it is discharged to the outer air.

Formed in the wall of the casing and below the exhaust inlet is an offset portion forming an expansion trap 15 and its object is to assist in taking care of the volume of the intake and to equalize the pressure in the buckets or pockets. An opening 16 is formed in the wall of the casing leading to the trap for allowing a certain amount of the gas to be discharged against a fan (not shown), the fan being the type used on motors for cooling purposes. This opening can be closed if the fan is not used or it is not desired to operate it by means of the opening.

With an apparatus of this character the exhaust gases from an engine can be conducted to the casing of the apparatus where the gases will enter the buckets or pockets 7 of the rotor and the gas may cause the rotor to be rotated and the gas escapes from the pockets through the conduit which leads to the center of the casing where the gas will pass through the hub of the rotor acting upon vanes and blades carried by the rotor whereby the gas will again act upon the rotor for causing it to rotate, and each impulse stroke of a cylinder of the gas engine is followed by an impulse on the rotor by the exhausted gas acting upon it. After the gas has done its work on the rotor, it is carried through the conduit where it is exhausted from the bucket where it gains velocity by virtue of its expansion. This velocity gives impulse to the vanes 9 which are set at an angle to the rotor hub and after the gas has passed over the vanes it enters at the base of the receding diverging blades where the remaining expansion drives the gas outward and the reaction assists in turning the rotor, and as there is no external pressure on the back or open side, the entire pressure is forward and this helps in turning the rotor. Thus the movement gained by the first impulse and all subsequent work done on the rotor due to expansion, creates power which can be added directly to the power of the cylinders. Furthermore, with this apparatus there will be no exhaust detonation as the gas is expanded during its entire course through the motor. It is broken up by the rotor and blended into a constant pressure in the exhaust receiver. The contact of the gas with the motor casing allows the casing to radiate off a certain amount of the heat, thus reducing the volume and pressure.

In the inner wall of the casing and adjacent to the inlet opening 8 are a plurality of pockets 17, the purpose of which is to change the direction of the gases or vapors entering the casing and cause them to be directed toward the pockets 7 of the rotor.

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

1. In an exhaust motor, the combination with a casing having an exhaust inlet, of a rotor rotatably mounted in the casing having pockets formed in the periphery thereof adapted to receive the exhaust gases as they are delivered to the casing for imparting a rotary movement to the rotor, blades connected to the rotor, a conduit in which the exhaust gases are delivered after they have acted upon the rotor, and a passage formed in the rotor whereby the gases pass from the conduit to the rotor and against the blades for imparting additional power to the rotor.

2. In an exhaust motor, the combination with a casing having an exhaust inlet, of a rotor having pockets in the periphery thereof adapted to receive the exhaust gases as they are delivered to the casing for imparting a rotary movement to the rotor, vanes formed in the body of the rotor forming passages therethrough, blades connected to the vanes and to the rotor, and means conducting the gases after they have acted upon the rotor against the vanes and thence against the blades for imparting power to the rotor.

3. The combination with engine cylinders and crank shaft, of a casing mounted on the crank shaft, means connecting the casing with the exhausts of the cylinders, a rotor mounted in the casing and fastened to the crank shaft for forming the fly wheel of the engine, said rotor having pockets in the periphery thereof receiving the exhaust gases from the engine as they are delivered to the casing for imparting a rotary motion to the rotor, blades connected to the rotor, and means for conducting the gases to the blades after the gases have acted upon the rotor for imparting additional power to the rotor.

4. In the exhaust motor, the combination with a casing having a conduit formed in one wall thereof, leading from the periphery to the center of the casing, of a rotor rotatably mounted in the casing, means on the rotor against which the incoming gases impinge causing the rotation of the rotor, blades connected to the rotor, and a passage formed in the rotor for conducting the gases from the conduit to the blades whereby an additional power is imparted to the rotor.

5. In an exhaust motor, the combination with a casing having an inlet and outlet opening for the exhaust gases, a rotor rotatably mounted therein, means on the rotor against which the exhaust gases impinge for rotating the rotor, a conduit formed in an end of the casing extending from the periphery to the center thereof for the reception of the gases after they have acted upon

the rotor, tangential vanes formed in the body of the rotor and curved blades connected to said vanes and rotor extending from the center of the rotor to the periphery thereof, said vanes and blades adapted to receive the exhaust gases from the conduit for imparting additional power to the rotor.

In testimony whereof I affix my signature, in the presence of two witnesses.

CARL F. HIGH.

Witnesses:
IRVING E. BACKUS,
R. J. DOLPH.