W. EDDINGTON.

OIL MOTOR.

APPLICATION FILED JULY 21, 1919.

1,331,559.

Patented Feb. 24, 1920.

4 SHEETS—SHEET 1.

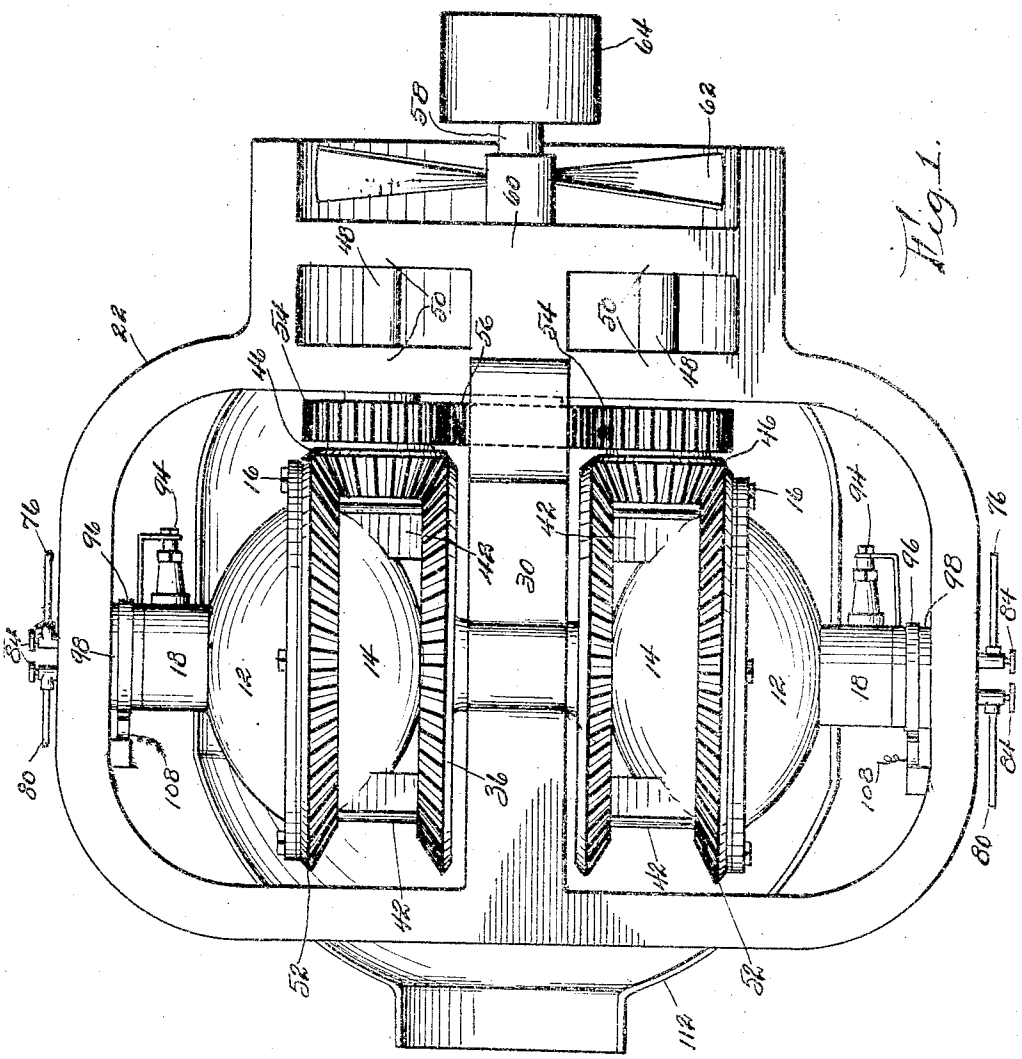


Fig. 1.

Witness:

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his ATTORNEY

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4 SHEETS—SHEET 2.

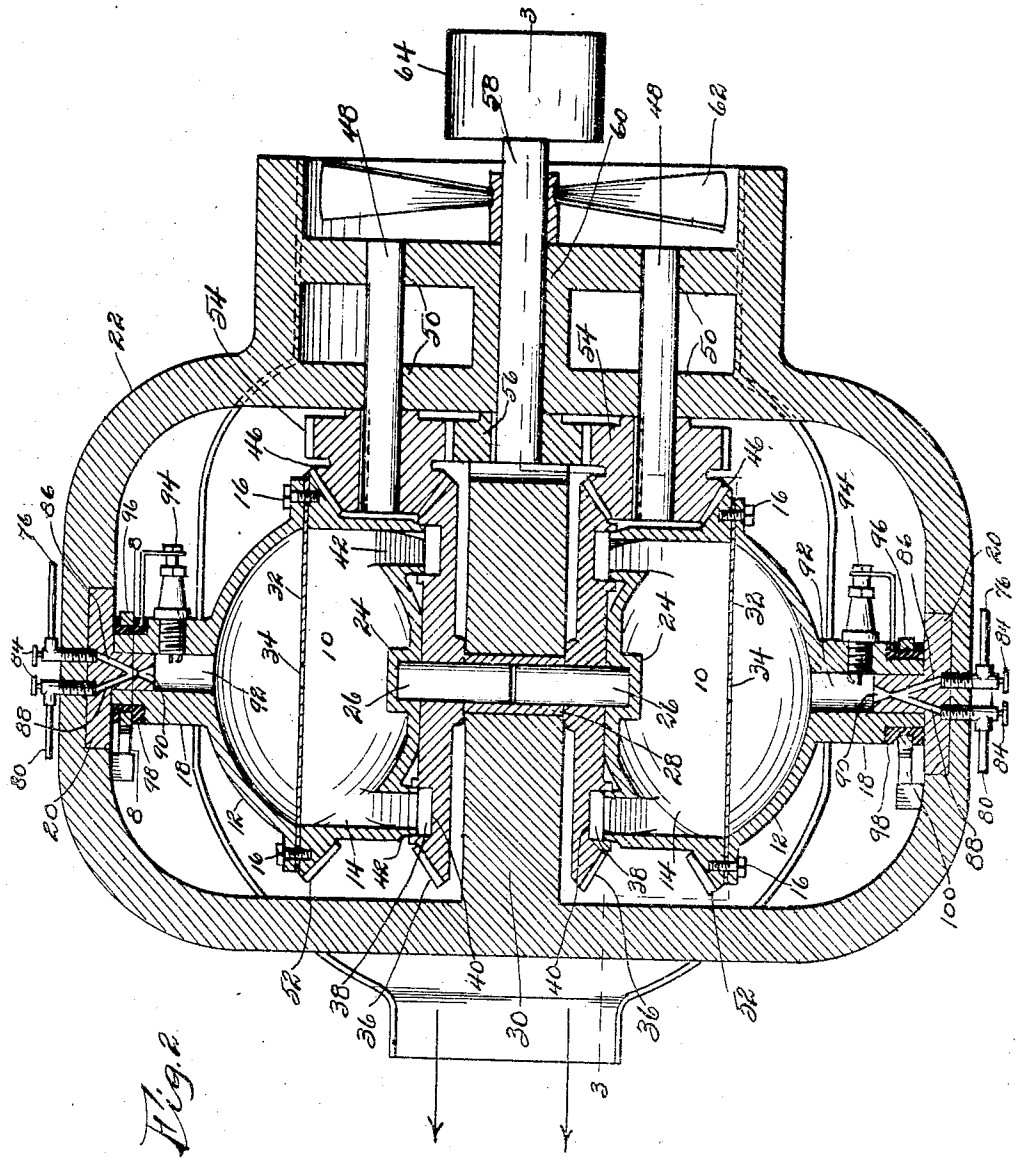


Fig. 2.

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4 SHEETS—SHEET 3.

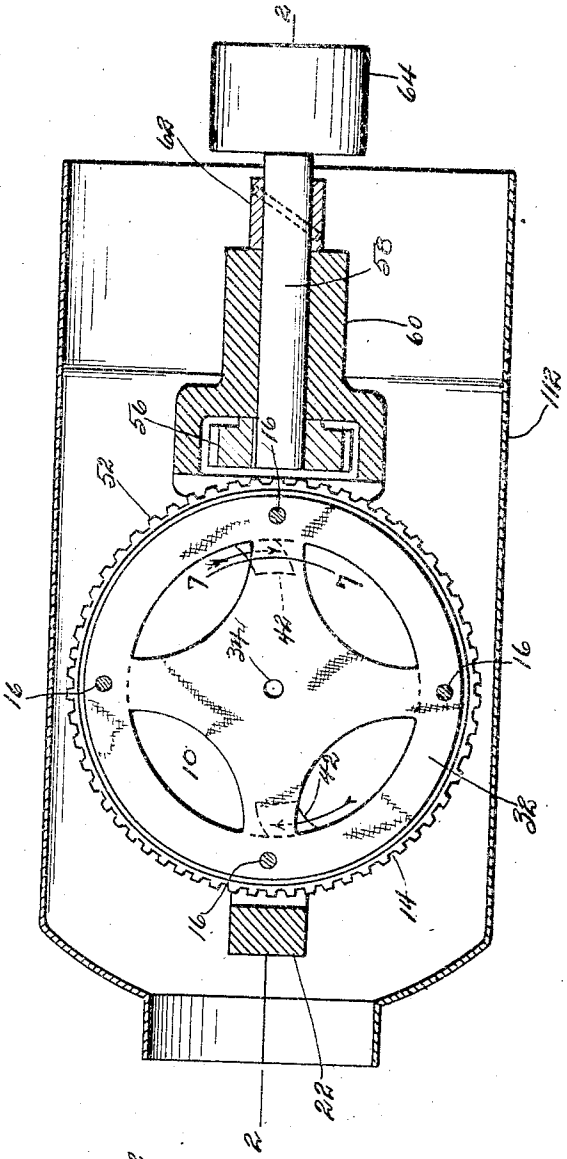


Fig. 3.

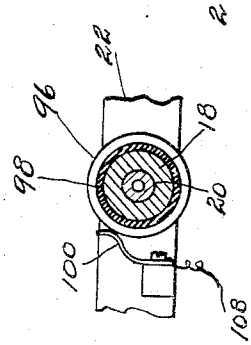


Fig. 8.

Witness:

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OIL MOTOR.

APPLICATION FILED JULY 21, 1919.

1,331,559.

Patented Feb. 24, 1920.

4 SHEETS—SHEET 4.

Fig 4.

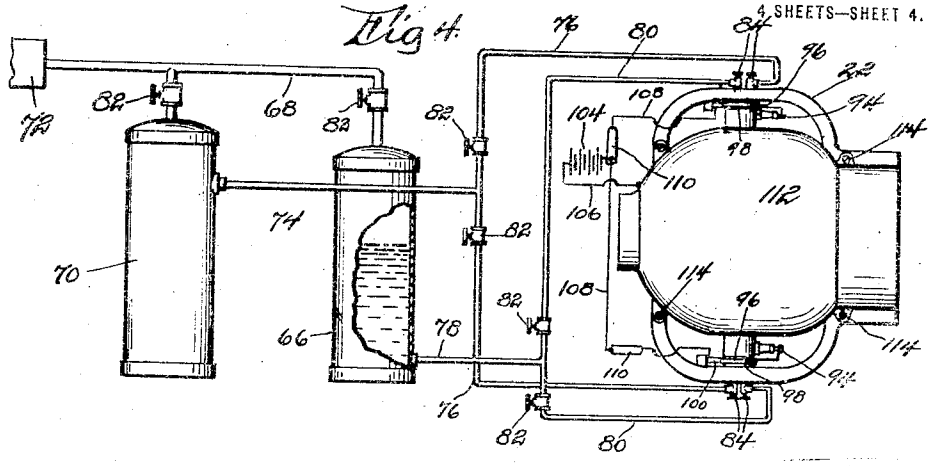
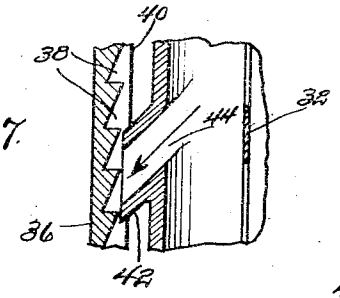


Fig. 7.



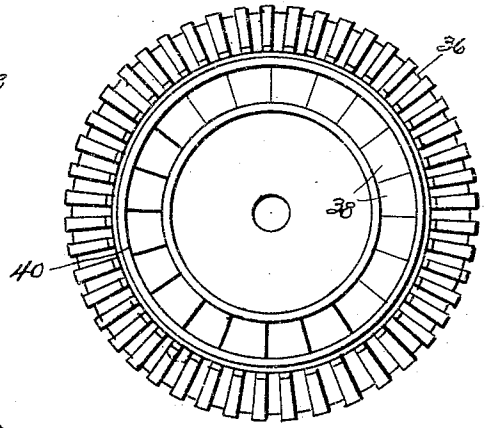
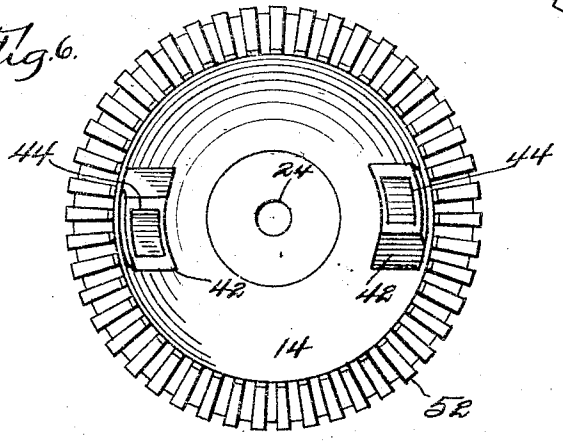


Fig. 5.

Fig. 6.



Witness:

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UNITED STATES PATENT OFFICE.

WILLIAM EDDINGTON, OF DANVILLE, ILLINOIS.

OIL-MOTOR.

1,331,559. Specification of Letters Patent. Patented Feb. 24, 1920.

Application filed July 21, 1919. Serial No. 312,163.

To all whom it may concern:

Be it known that I, WILLIAM EDDINGTON, a citizen of the United States, and resident of Danville, county of Vermilion, State of Illinois, have invented certain new and useful Improvements in Oil-Motors, of which the following is a complete specification.

The present invention relates to internal combustion motors and aims to provide an improved construction of this character in which a liquid fuel is sprayed under pressure into the combustion chamber of the motor and a more or less continuous combustion is maintained for actuating the motor under the expansive action of the gas.

In carrying out the invention, I provide a motor comprising a rotary combustion chamber associated with a rotary drive element mounted coaxially with the combustion chamber and so arranged that the expansive action of the gas is exerted to impart opposite rotary movements to said combustion chamber and associated drive element.

It is further sought to provide a multiple motor construction comprising units of the type described and coöperatively arranged to effect a continuous driving action to a common drive shaft.

With these and various other minor objects in view, as will appear in the course of the following detailed specification, I will now describe the invention with reference to the accompanying drawings wherein one form of construction is illustrated for embodying the proposed improvements, after which the particular novel features therein will be set forth and defined in the appended claims.

In the drawings—

Figure 1 is a plan view of a motor construction embodying the present features of improvement, the upper housing section of the motor being removed;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 3;

Fig. 3 is an irregular vertical sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a diagrammatic view of the motor and its air and oil and electric connections,—the motor being turned to show the same in plan view;

Fig. 5 is a face view of one of the beveled gear wheels;

Fig. 6 is an interior face view of one of the sections of which the combustion chambers are formed;

Fig. 7 is a detail sectional view taken on the line 7—7 of Fig. 3; and

Fig. 8 is a detail sectional view taken on the line 8—8 of Fig. 2.

Referring now to the said drawings in detail, these illustrate the improved construction as comprising a pair of rotary combustion chambers 10 (Fig. 2) each made up of concave sections 12, 14, approaching a semi-spherical form, secured together by means of cap screws 16. The outer sections 12 are formed with hollow hub portions 18 journaled on trunnion blocks 20 mounted in the ends of a bearing frame 22, while the inner sections 14 having bearing portions 24 supported on trunnions 26 which are mounted in a bushing 28 fitted in the transverse portion 30 of the bearing frame 22. An asbestos screen 32 of spider form and having a central aperture 34, (as shown in Fig. 3), is clamped between each pair of sections 12 and 14.

Also mounted on each of the trunnions 26 between each inner section 14 and the transverse portion 30 of the frame 22 is a bevel gear wheel 36, one face of which is formed with a series of impact recesses or pockets 38 at the base of an annular channel 40 located just inside the toothed periphery of each gear wheel (see Figs. 5 and 7). On the other hand, each inner section 14 is formed with a pair of angularly extending lugs 42 adapted to freely travel in the channel 40 of the corresponding gear wheel 36, each lug being provided with a gas outlet passage 44 adapted to direct jets of gas from the corresponding combustion chamber 10 into the series of recesses or pockets 38. The structure of the said recesses or pockets 38 and the angular relation of the passages 44 are oppositely arranged in the two combustion chambers 10, since it is the purpose to drive the two units of the motor in opposite directions, as will be readily understood.

The bevel gear wheels 36 each mesh with a bevel pinion 46 carried by a shaft 48 mounted in bearings 50 provided by the frame 22, and each of the inner sections 14 of the combustion chambers is also formed with a bevel gear rim or flange 52 meshing on the opposite side of the corresponding bevel pinion 46. Each bevel pinion 46 is formed with a plain pinion portion 54, and

these pinions 54 are in mesh with opposite sides of a pinion 56 which is keyed to a main shaft 58 carried in a central bearing 60 in the frame 22, this shaft 58 being suitably equipped with a fan 62 and a belt pulley 64.

The means for supplying a suitable combustible mixture to the combustion chambers 10 comprises, in the illustrated construction, an oil tank 66 which is connected by a pipe 68 with an air pressure tank 70, in which an appropriate pressure may be maintained by means of any suitable type of pump 72 (see Fig. 4). The air tank 70 is provided with a pipe 74 having branches 76 leading to each of the combustion chambers 10, and the oil tank 66 is similarly provided with a pipe 78 having branches 80 leading to each of said chambers 10, all of the aforesaid pipes and their branches being equipped with suitable regulating valves 82. Each pair of branch pipes 76 and 80 is fitted with a pair of valves 84 provided with threaded shanks for attachment to the opposite ends of the bearing frame 22, the inner ends of said shanks projecting into the trunnion blocks 20 where the valve passages are brought into register with inwardly converging oil and air ducts 86 and 88. Each pair of these ducts discharge jointly into a flaring nozzle passage 90 which communicates through the axial passage 92 in the corresponding hub portion 18 leading into one of the combustion chambers 10. A suitable spark plug 94 is carried by each of the hub portions 18 with its contacts positioned in the corresponding passage 92, each spark plug having a rotary contact terminal 96 provided with an insulating collar 98 embracing the corresponding hub portion 18. An insulated brush contact element 100 carried by the frame 22 engages each of the rotary terminals 96, said contacts 100 being made parts of an electric circuit which includes a battery 104 having at one side a conductor 106 (see Fig. 4) connected with the framework of the motor, and at its other side having conductors 108 leading to the spark plugs and provided with suitable circuit making and breaking devices 110 of any desired type for interrupting the current through the spark plugs.

Upper and lower housing sections 112 attached by screws 114 to opposite sides of the bearing frame 22 are provided for the purpose of inclosing the motor parts from above and below.

In the operation of the above described construction, the oil is admitted from the tank 66 through the pipe 78 and branch pipes 80 to the combustion chambers, and in view of the connections between said tank and the air tank 70 it is apparent that the pressure therein is equalized, and the oil is fed under this pressure into the nozzle passages 90, from which the oil is sprayed into the combustion chambers. The spark plugs 94 are provided for ignition purposes to start the combustion operation, and the presence of the screens 32 of asbestos material forms a fire cushion the action of which is to promote the combustion and sustain the same, keeping the combustion continuous and even entirely across the chambers 10. If deemed advisable, the interior faces of said chambers might be entirely lined with asbestos material for thus promoting the combustion of the fuel therein. The arrangement of the lugs 42 providing the gas outlet passages 44 is such as to form gas pressure jets whereby the heated and expanding gas is directed in jets against the shoulders of the gas recesses or impact pockets 38 of the gear wheel 36, as indicated by the arrows in Figs. 3 and 7, and the impact of these jets produces opposite rotary movements of each combustion chamber and its corresponding gear wheel 36, the channels 40 serving to confine the gas as much as possible until it has exerted substantially its full force against the impact shoulders of said gas recesses or pockets. The effect of this rotation is to rotate the bevel pinions 46 in opposite directions and correspondingly rotate the pinions 54, whereby a continuous drive is transmitted to the intermediate pinion 56 and shaft 58, thus effecting rotation of the belt pulley 64 and the fan 62. The action of the fan 62 serves to expel the exhaust gas from around the motor parts and out through the opposite end of the housing, as indicated by the arrows in Fig. 2, and thus tends to keep down the temperature of the motor. Of course if desired the action of the said fan may be reversed to expel the exhaust gases in the opposite direction, and further, these heated exhaust gases may be easily directed against the air tank 70 for the purpose of increasing the pressure therein by expansion of the air. By means of the various valve connections, the action of the motor may be readily controlled and regulated, and it is of course apparent that at any time one side of the motor may be at once cut off and rendered inoperative, and thus only one side or unit of the motor be continued in operation.

It will thus be apparent that I have devised an efficient and yet comparatively simple arrangement and construction for accomplishing the desired objects of the invention, and while I have illustrated and described one practical form of construction for embodying the same I desire to reserve the right to make such formal changes or modifications as may fairly fall within the scope of the appended claims.

What I claim is:

1. A motor of the character described comprising a hollow rotary member providing a combustion chamber, means for feeding

the fuel into said chamber and maintaining combustion of said fuel, and a gear wheel mounted coaxially with said member and provided with an annular channel facing said member and a series of gas pockets arranged in said channel, said rotary member being provided with one or more projections operating in said channel and formed with outlet passages arranged to discharge at an incline into said gas pockets and thereby produce opposite rotary movements of said rotary member and gear wheel.

2. A motor of the character described comprising a hollow rotary member providing a combustion chamber, means for feeding the fuel into said chamber and maintaining combustion of said fuel, a bevel gear wheel mounted coaxially with said member and provided with a series of gas pockets facing said member, said rotary member being formed with one or more gas outlet passages arranged to discharge at an incline into said gas pockets and thereby produce opposite rotary movements of said rotary member and gear wheel, and a bevel pinion meshing on one side with said gear wheel, said rotary member being also formed with a bevel gear portion meshing on the opposite side of said bevel pinion.

3. A motor of the character described comprising a hollow sectional rotary member providing a combustion chamber, means for feeding the fuel into one side of said chamber and igniting said fuel, a skeleton fire screen embraced between the sections of said member and positioned centrally in said chamber, and a gear wheel mounted coaxially with said member and formed with a series of gas pockets facing the opposite side of said member, said rotary member being formed with one or more gas outlet passages arranged to discharge at an incline into said gas pockets and thereby produce opposite rotary movements of said rotary member and gear wheel.

4. A motor of the character described comprising a hollow rotary member providing a combustion chamber, separate ducts arranged to feed oil and air at equal pressures into said chamber and provided with a nozzle passage communicating therewith, means for maintaining combustion of the fuel in said chamber, and a gear wheel mounted coaxially with said rotary member and formed with a series of gas pockets facing said member, said rotary member being formed with one or more gas outlet passages arranged to discharge at an incline into said gas pockets and thereby produce opposite rotary movements of said rotary member and gear wheel.

5. A motor of the character described comprising a pair of hollow rotary members providing combustion chambers having means for feeding the fuel thereinto and maintaining combustion of said fuel, a bevel gear wheel mounted coaxially with each of said members and formed with a series of gas pockets facing the same, each of said rotary members being formed with one or more gas outlet passages arranged to discharge at an angle into said gas pockets and thereby produce opposite rotary movements of the corresponding rotary members and gear wheels, a bevel pinion geared on opposite sides with one of said gear wheels and a bevel gear portion formed on the corresponding rotary member, and a main shaft provided with gearing driven from said bevel pinions.

6. A motor of the character described comprising a pair of hollow rotary members providing combustion chambers having means for feeding the fuel thereinto and for maintaining combustion of said fuel, a bevel gear wheel mounted coaxially with each of said members and formed with a series of gas pockets facing the same, each of said rotary members being formed a bevel gear portion and also with one or more gas outlet passages arranged to discharge at an angle into said gas pockets and thereby produce opposite rotary movements of the corresponding rotary members and gear wheels, a bevel pinion geared on opposite sides with the gear portion of each rotary member and the corresponding gear wheel, a main shaft provided with gearing driven from said bevel pinions, a housing open at both its ends and inclosing said rotary members, and a fan driven by said main shaft and operating to expel the gases from said housing.

In witness whereof I hereto affix my signature.

WILLIAM EDDINGTON.