J. A. MILLER.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JULY 6, 1916. RENEWED NOV. 2, 1918.

1,310,668.

Patented July 22, 1919.

2 SHEETS—SHEET 1.

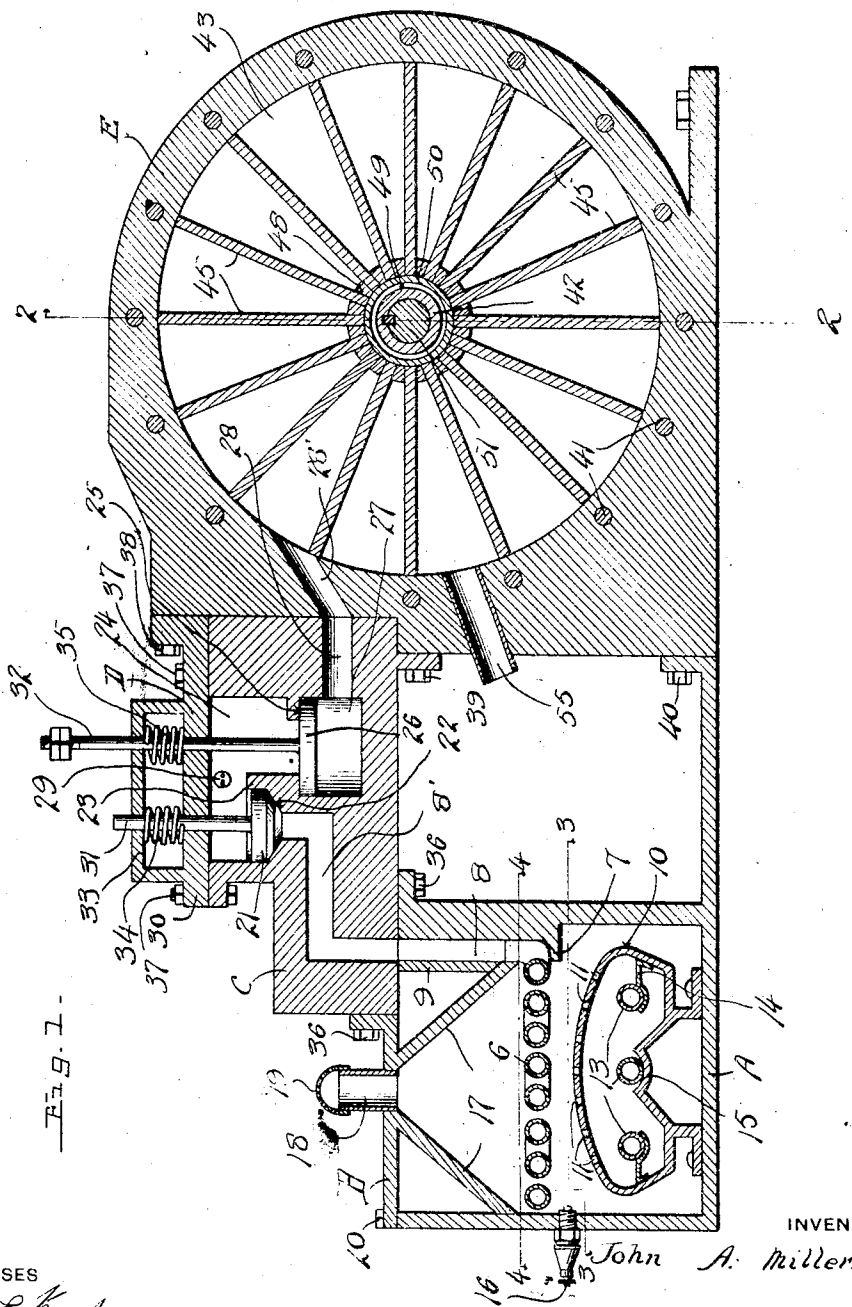


Fig. 1.

INVENTOR

John A. Miller.

WITNESSES

Chas. E. Kemper

M. C. Jones

BY Richard B. Owen.

ATTORNEY

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Fig. 2.

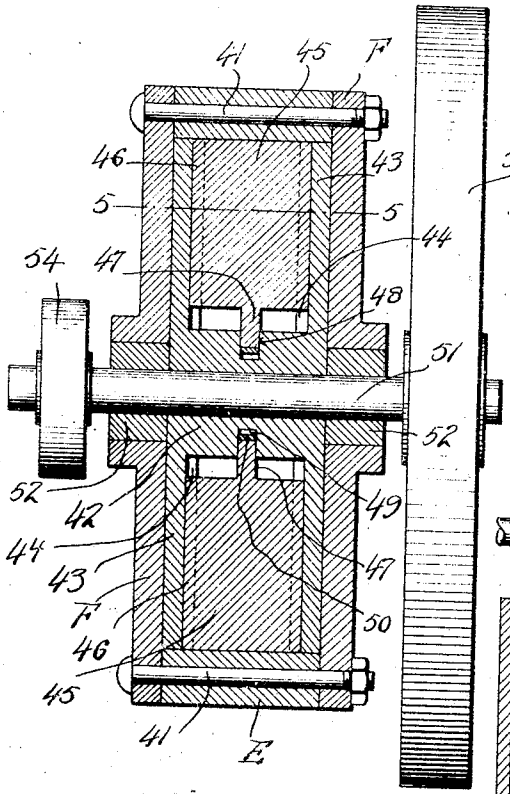


Fig. 3.

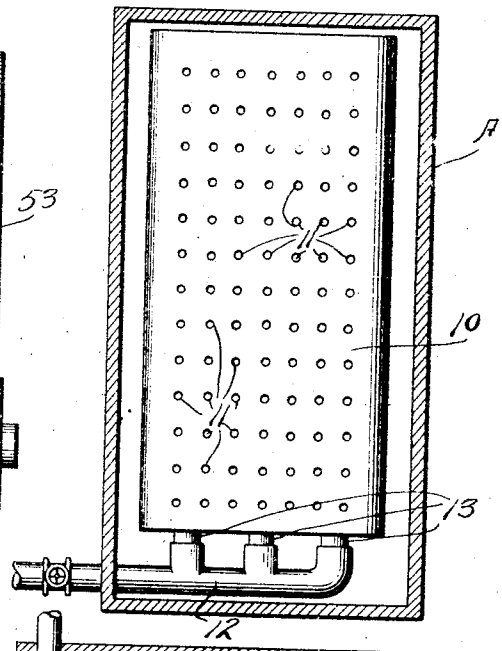


Fig. 4.

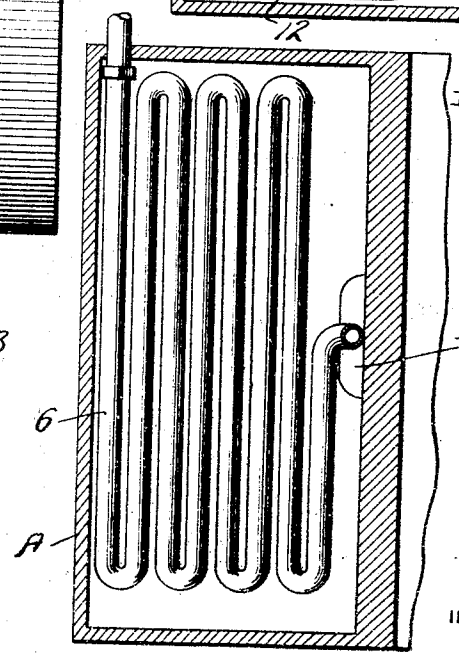
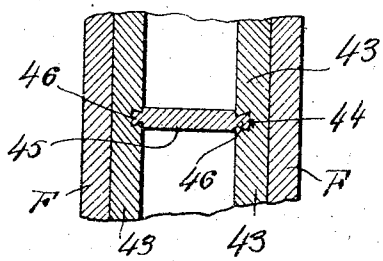


Fig. 5.



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ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN A. MILLER, OF DOW CITY, IOWA.

INTERNAL-COMBUSTION ENGINE.

1,310,668. Specification of Letters Patent. Patented July 22, 1919.

Application filed July 6, 1916, Serial No. 107,818. Renewed November 2, 1918. Serial No. 260,918.

To all whom it may concern:

Be it known that I, JOHN A. MILLER, a citizen of the United States, residing at Dow City, in the county of Crawford and State of Iowa, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to a motor particularly designed to use crude oil as the power medium and it generally aims to provide a novel means to vaporize the oil, confine and explode the gas or volatile fuel, and admit the expanding gas to the means operating to drive the power shaft.

I particularly aim to provide a valve means operable by the pressure of the volatile fuel to open and admit the volatile fuel to a combustion chamber and a valve means operable to permit escape of the fuel from the combustion chamber to the power shaft driving means as a result of combustion and expansion of the fuel while in the combustion chamber.

Further I aim to provide a device of the construction hereinafter set forth possessing the additional objects and advantages to be pointed out in relation thereto as the description progresses and which is to be taken in connection with accompanying drawings.

In said drawings:

Figure 1 is a longitudinal sectional view through my improved motor;

Fig. 2 is a vertical transverse sectional view, taken substantially on the line 2—2 of Fig. 1 through the entire motor;

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a cross sectional view on the line 4—4 of Fig. 1; and

Fig. 5 is a cross sectional view on the line 5—5 of Fig. 2 through a complete rotor blade.

Referring specifically to the drawings, a suitable casing or housing to support and contain the various parts is provided and is preferably formed in a plurality of sections advisably from cast metal but manufactured in any approved manner. Said casing or housing may comprise a fuel superheating section A, a closure or chimney section B therefor, a combustion section C, a closure section for the combustion section D, a rotor containing section E and side walls or closure plates F for the rotor section.

While any suitable combustible fuel of an explosive nature may be used, yet the present engine or motor is designed to be operated particularly by means of crude oil which flows from any suitable source into and through the pipe or coil 6 which is supported in a side wall of section A and on a lug 7 of the said section. The coil 6 communicates with a passageway 8 formed intermediate a wall 9 of section B and a side wall of the section A. Crude oil while within the coil 6 is superheated so that it will emerge from the coil into the passageway 8 as a gas or in a volatile state. Any suitable means may be employed to superheat the oil for instance the burner shown which has a hollow casing 10 provided with perforations 11 in its top for the escape of gas which is preferably supplied to the interior thereof through the means of a supply conduit 12 and branches 13 thereof. Two of the branches 13 are supported by means of brackets 14 from the casing 10 while the other branch rests on an arcuate support 15 forming part of the casing 10. Gas supplied through pipes 12 and 13 passes into the burner casing and emerges therefrom through the openings or orifices 11 and is then ignited by a spark produced by the closing of an electric circuit in any suitable manner through a spark plug 16 mounted in a side wall of casing A. The flame produced acts on the coil 6 and superheats the oil therein while the surplus heat and smoke is deflected upwardly by means of stack or chimney walls 17 integral with and depending from section B and leading to a short stack 18 covered by a perforated hood 19. Sections A and B are detachably connected together as by means of bolts or screws as at 20.

The passageway 8 communicates with a passageway 8′ provided in the section C and is normally closed by means of a valve 21 engageable with a valve seat at 22 of the section C. The valve 21 in its movement is guided by a wall 23 which terminates short of the section D so that the fuel passing the valve 21 will enter a combustion chamber 24 provided in the section C and closed by the section D. The outlet of the combustion chamber which is at a valve seat 25 is normally closed by means of a valve 26 which slides in a valve chamber 27 and which communicates with passageways 28 and 28′ provided respectively in the sections C and E. A spark plug 29 is mounted in the wall of

section C forming the side wall of the combustion chamber 24. Section E has a closure plate 30 for the chamber 24 and valve stems 31 and 32 of the valves 21 and 26 respectively, are slidably mounted in said plate 30 and as well in an arch 33 rising from the plate at 30. Intermediate the top of the arch 33 and the plate 30 coil springs 34 and 35 for the valve stems 31 and 32 respectively are provided. The spring 34 at its lowest extremity is connected to the valve stem 31 and at its upper extremity abuts the arch 33 so as to normally maintain the valve 21 seated and urge it toward its seat. The spring 35 on the other hand is connected at its upper extremity to the stem 32 and at its lower extremity bears on the plate 30 and thus tends to raise the valve 26 and restore it to its seat 25 after depression.

Set screws or bolts 36 may be utilized to secure the sections A and B to section D while set screws or bolts 37 may serve to detachably connect the sections C and E together and set screws or bolts 38, 39 and 40, may be used to effectively detachably connect the sections D, C and A to the section E. The side walls F are detachably secured to the section E by means of bolts 41.

Within the section E intermediate the side walls F a suitable form of rotor is provided. This rotor may comprise a hub 42 preferably integral with disk like sides 43 provided with radially disposed dove tail grooves 44 in which slide blades 45 by means of ribs 46 of dove tailed cross section, disposed in the grooves. Each blade 45 has a spoke 47 integral with it and mounted in a socket 48 of the hub. The sockets communicate with an annular recess 49 in which a suitable spring, for instance a ring 50 is disposed, and which bears against the inner ends of the spokes 47 and urges the blade 45 outwardly and the ends thereof into effective wiping relation with the annular wall of the rotor chamber. The hub 42 is keyed to a shaft 51 which is journaled in bushings 52 carried by the plates F and on which shaft a fly wheel 53 is preferably mounted. Power from the shaft 51 may be transmitted in any suitable manner and by way of example I have shown a pulley 54 keyed to the shaft and over which a belt may be trained which is also trained over the pulley of the mechanism driven from the shaft.

In operation, the crude oil passing through the coil 6 is superheated or vaporized by the action of the burner mechanism below it. This mechanism as stated supplies gaseous fuel to the interior of the casing 10 and which emerges through the orifices 11 thereof and is ignited by a spark produced upon the closing of an electric circuit through the spark plug 16. If the fuel used will readily vaporize, as does gasolene, the superheating mechanism need not be operated. Gaseous fuel emerges from the coil 6 into the passageways 8 and 8′ and when of sufficient pressure forces the valve 21 upwardly against the tension of its spring 34 and enters the combustion chamber 24. At suitable intervals the electric circuit through the spark plug 29 is closed so that sparks are produced which ignite and explode the charges of gaseous fuel within the combustion chamber 24. As a result of the explosion of the gases and their expansion, valve 26 is depressed so that the products of explosion may bypass it into the conduits 28 and 28′ and thence into the rotor chamber so as to act by impingement against the blades 45 and thus turn the rotor and the shaft 51 from which power may be transmitted. The gas after spending its force in the rotor chamber escapes therefrom through an exhaust pipe 55 leading to the atmosphere and disposed in the section E. It will be realized that the supply of crude oil is continuous and that therefore successive charges are supplied to the combustion chamber 24 and ignited so that successive volumes of expanding gases are liberated in the rotor chamber to impinge against the rotor and thus keep it in continuous rotation.

Since merely the preferred embodiment of the invention has been illustrated and described, it is to be understood that changes in the details of construction may be resorted to within the spirit and scope of the invention.

I claim:

1. An internal combustion engine having a casing section, provided with a combustion chamber having a top opening, a closure member for said opening, means to supply fuel to the combustion chamber, a valve operable through pressure of the fuel for admission into the combustion chamber, a valve at the outlet end of the combustion chamber, operable solely by explosion and expansion of the gases and controlling the outlet of the products of combustion, said valves having stems extending across the combustion chamber and slidably mounted in said member, means on the exterior of said member engaging said valves to urge said valves in opposite directions to their seat, and means operable by the products of combustion.

2. An internal combustion engine having a casing section provided with a combustion chamber open at its top, a closure member for said combustion chamber secured to said section, said member having an arch thereon, means to supply fuel to the combustion chamber, a valve operable through pressure of the fuel to control the admission of the fuel into the combustion chamber, a guide wall for said valve terminating short of said member, a valve serving as a closure for the said chamber at its outlet end, means

providing a seat for said valve, said section having a chamber for said valve, said section also having a conduit in communication with said valve chamber, said valves having stems slidably mounted in said member and in said arch, springs surrounding and connected to the stems and one stem abutting said arch and the other stem abutting said member to normally maintain the valves in engagement with their seats, the second mentioned valve being operable through explosion and expansion of the gases in the combustion chamber to permit escape of the products through the conduit, and means operable by the products of combustion.

3. An internal combustion engine having a superheating chamber, a retort therein, a burner below the retort, means to supply fuel to the burner, means to ignite fuel issuing from the burner to produce a flame to heat the retort, chimney means above the retort, said casing having a passageway to which the retort leads, a valve seat at the end of said passageway, said casing having a combustion chamber open at its top, a closure member for said chamber, a guide wall rising from said valve seat and terminating short of said closure member, a valve in engagement with said seat, said wall terminating short of said member, said valve being movable upwardly to disengage its seat, a valve seat at the outlet end of said chamber, a valve closing said seat and depressible to disengage it, said casing having a chamber in which said last mentioned valve is mounted, said casing also having a rotor chamber and conduit means connecting the same with said valve chamber, means to explode gases in the combustion chamber, each of said valves having a stem rising and slidably mounted through said member, said member having an arch, said valve stems also being slidably mounted in said arch, springs surrounding said stem and fastened thereto beneath said arch, a rotor in said rotor chamber, and means for the escape of exhaust products from said rotor chamber.

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

JOHN A. MILLER.

Witnesses:
W. J. BEVERNESS,
H. G. MCQUEEN.