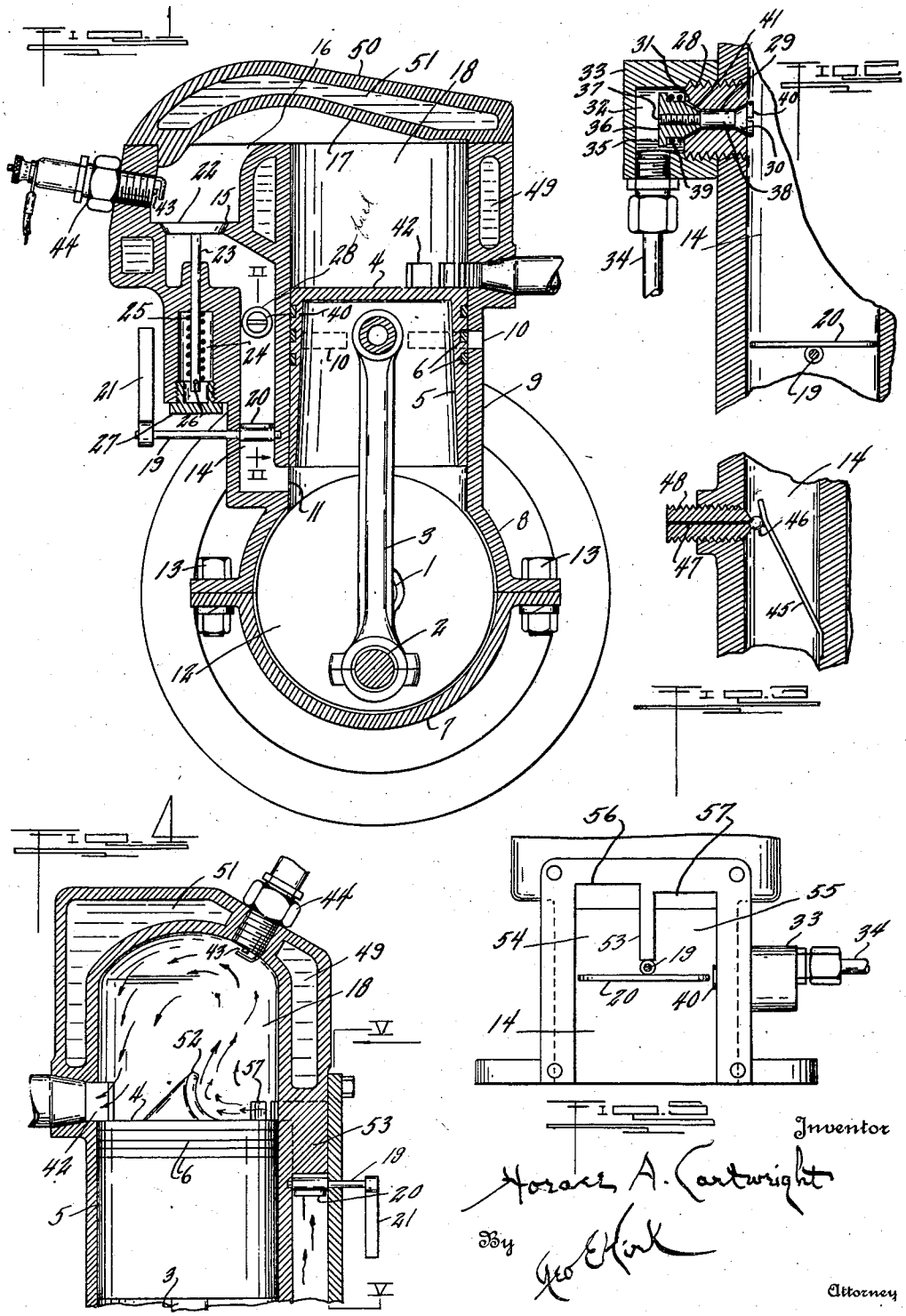
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INTERNAL COMBUSTION MOTOR

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INTERNAL-COMBUSTION MOTOR

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This invention relates to features of air and gas mixing for supply to an internal combustion motor.

This invention has utility when incorporated in a motor of the so-called two cycle type.

Referring to the drawings:

Fig. 1 is a section through the piston and cylinder of a motor embodying features of the invention;

Fig. 2 is a section on the line II—II, Fig. 1, looking in the direction of the arrow;

Fig. 3 is a fragmentary view of a fuel supply inlet valve of a different type from that shown in Fig. 2;

Fig. 4 is a view of the motor wherein the fuel intake valve is a port controlled by the piston; and

Fig. 5 is a view on the line V—V, Fig. 4.

Internal combustion motor having shaft 1 is shown with disk having crank pin 2 from which extends connecting rod 3 to piston having head 4 and skirt 5 equipped with piston rings 6. This connecting rod and crank are shown as operating in a crank case comprising concave section 7 and companion section 8 merging into cylinder 9 for the piston 4, 5. This cylinder 9 is shown as provided with intake ports 10 and outlet port 11 from compression chamber 12 as formed by the sections 7, 8, and the cylinder 9, upon 24 where helical compression spring 25 acts against pin 26 through this stem 23 for normally holding the valve 22 in closed position at the seat 15. Plug 27 closes the chamber 24. This normally closed valve 22 isolates compression chamber 16 and cylinder portion 18 from the by-pass or way 14.

In this way 14, between the valve provided by the throttle 20 and the valve provided by the poppet 22, is the fuel supply. This fuel supply is shown as comprising a plug 28 having opening 29 therethrough terminating in flare seat 30 toward the way 14 and flare seat 31 toward chamber 32 in head 33 mounted on the plug 28. This head 33 has fuel supply duct 34 in communication therewith for supply of say liquid fuel, as gasolene, to the chamber 32.

Coacting between the plug 28 and flange 35 of nut 36 on threaded stem 37 of pin 38 is spring 39 tending normally to hold bevel head 40 of the pin 38 against the seat 30. The nut 36 has bevel portion 41 normally urged by the spring 39 away from seating position as to the bevel seat 31. However, as there is drop in pressure in the way 14, by lowering of pressure in compression chamber 12 upon the outward stroke of the piston 4, 5, this spring 39 may be so adjusted as then to permit unseating of the head 40 to allow discharge of fuel from the way 29. The un-

ply for passing to the compression chamber and cylinder. As the piston 4, 5, reverses its travel to effect compression in the cylinder 18, the poppet valve 22 is seated. A timed firing occurs in compression chamber 16 by spark generated at spark gap 43 of spark plug 44.

This device is adaptable as a single or multiple cylinder motor, whether upright or horizontal or any desired position. The features of ignition and lubrication may be adapted to the conditions of use and whether or not a single or multiple cylinder motor. However, in the two cycle type of motor as herein disclosed, with crank case compression chamber, there is at all times flow of fresh air as entering the port 10 opened by the piston 4, 5, which air is not a carrier of fuel. This means, that there is in this crank case compressor, absence of fuel say of a gasolene type which might tend to thin the lubricant and thus detract from lubrication efficiency in the bearings in the crank case, as well as in the region of the piston skirt.

Instead of the fuel supply valve having its control spring outside the way 14, such may be varied as shown in Fig. 3 to have spring 45 mounted in way 14 with seat ball 46 carried by the spring to be held in position for normally closing duct 47 in bushing 48 so that fuel supply in the duct 47 may be normally kept from flowing into the way 14. As there is draft of air from the crank case 12 toward the compression chamber 16, such draft acting upon the broad leaf spring 45, as approximating the transverse dimension of the duct 14, acts to enlarge the clearance between the free end of the spring 45 and the bushing 48, thus opening the duct 47 by moving the ball 46 clear thereof. This means that the spring 45 directs this rushing air past the port of the duct 47 for vaporizing the fuel as such fuel passes on past open valve 22 and into the compression chamber 16.

In this device of Fig. 1, the section 8, 9, is shown as having water cooling chamber 49 therein, while head 50 for the cylinder 18, which provides the slant way 17 to the compression chamber extension section 16 also has water chamber 51. This section 50, as a cylinder head, has the wall 17 direct the inrushing fuel and air as a moving strata for effective scavenging of the cylinder 18. Upon seating of the valve 22, there is, in the region of the spark plug 44, insured a fuel carrying air for effective ignition so that as combustion is propagated therefrom, there may be at all times efficient operation of the motor which is an important factor for ease in starting and for operation either with light charges or in idling.

In Fig. 4, the piston 4, 5, is shown as having directing vane 52 for creating a swirl in the cylinder 18 toward the spark plug 44, in the scavenging travel of the intake fuel and air flow toward the exhaust 42. In this instance, throttle arm 21 upon throttle pin 19 carries throttle 20 in passage 14, which passage is provided with partition 53 on the side thereof away from the compression chamber 12, so that independent ways 54, 55, are formed. The way 54 is somewhat longer than the way 55 and accordingly provides port 56 as intake into the cylinder 18 opened by the operation of the piston 4, 5, before port 57 is opened. Since fuel supply is admitted only through the port 57, this means that fresh air, not carrying fuel, may first enter the cylinder 18, and as directed by the vane 52, effect partial scavenging of exhaust gas through the exhaust port 42 before there is supply of air as carrying fuel from fuel supply valve. This means that the fuel laden air as following its straight air supply does not have a tendency to blow out the exhaust, and there is resultant efficient scavenging with a retention of the fuel in the cylinder 18 for use of all of such fuel in the firing operation.

In the disclosure herein, for a two cycle motor, there is a simple construction of light weight; low cost of operation due to its efficiency with quietness and smoothness for running. The port area to the compression chamber is such that even at high speeds there may be adequate supply of fresh air to travel by the way of by-pass 14 to the cylinder 18.

What is claimed and it is desired to secure by Letters Patent is:

1. A motor comprising a piston, a cylinder on one side thereof, a compression chamber on the other side thereof, there being a way between the chamber and cylinder, a throttle in said way, an additional valve toward the cylinder from said throttle, and a fuel supply in said way between the throttle and the additional valve, and means normally holding said additional valve closed.

2. A motor comprising a piston, a cylinder on one side thereof, a compression chamber on the other side thereof, there being a way between the chamber and cylinder, a valve maintaining said way normally closed, a fuel supply for said way, and closure means for said supply effective in closed position independently of said valve.

3. A motor comprising a piston, a cylinder on one side thereof having ports, a compression chamber on the other side thereof, said piston in its travel providing port control sequence to the compression chamber and therefrom by way of the ports of the cylinder, there being a way between the chamber and cylinder, a fuel supply in said way, a normally self-closing check valve on one side of the supply, and a throttle on the other side of said supply.

4. A motor comprising a piston, a cylinder on one side thereof having ports, a compression chamber on the other side thereof, said piston in its travel providing port control se-

quence to the compression chamber and therefrom by way of the ports of the cylinder, there being along one side of the cylinder a way between the chamber and cylinder parallel to the cylinder, a fuel supply in said way, a normally self-closing check valve on the side of the supply toward the cylinder, there being a chamber toward the cylinder from the check valve which chamber is of less cross section than said cylinder, and a throttle on the side of the supply toward the chamber.

5. A motor comprising a piston, a cylinder on one side thereof, a compression chamber on the other side thereof, there being a way between the chamber and cylinder, a throttle in said way, a fuel supply in said way, a first check valve between the fuel supply and way, a normally closed second check valve between the first check valve and cylinder, and means for adjusting the throttle for thereby varying the fuel supply.

In witness whereof I affix my signature.

HORACE A. CARTWRIGHT.