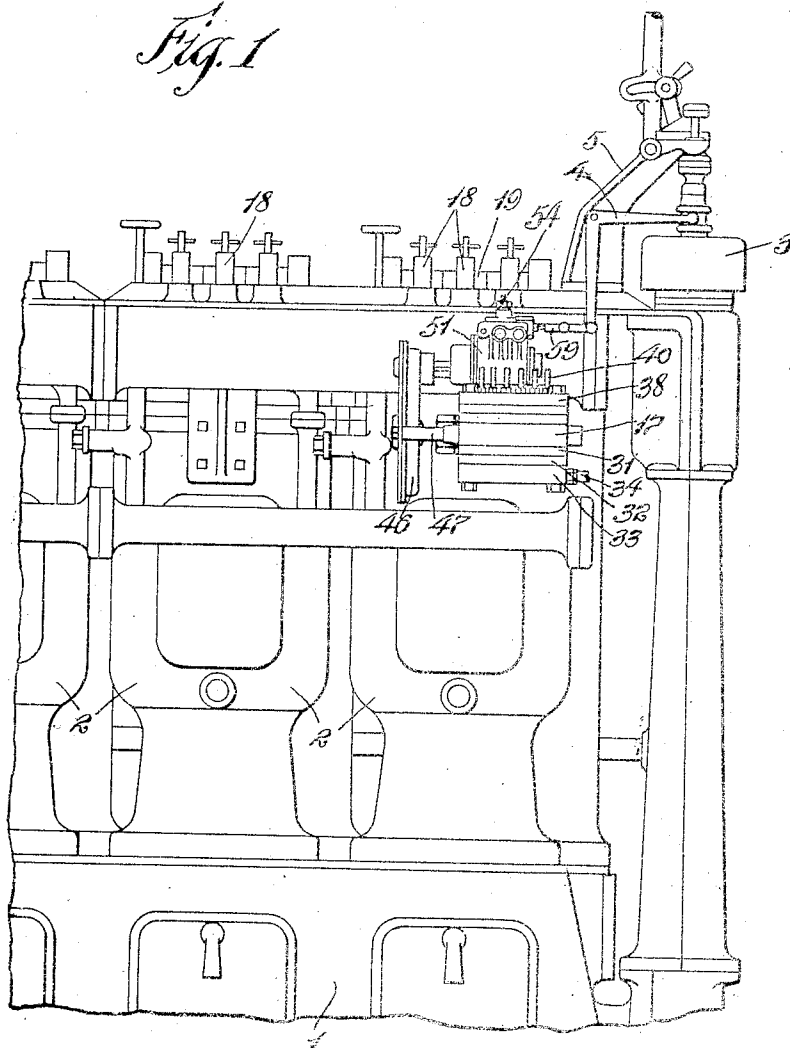


1,267,728.

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FUEL FEEDING MECHANISM.
APPLICATION FILED MAR. 29, 1917.

Patented May 28, 1918.
3 SHEETS—SHEET 1.

Fig. 1

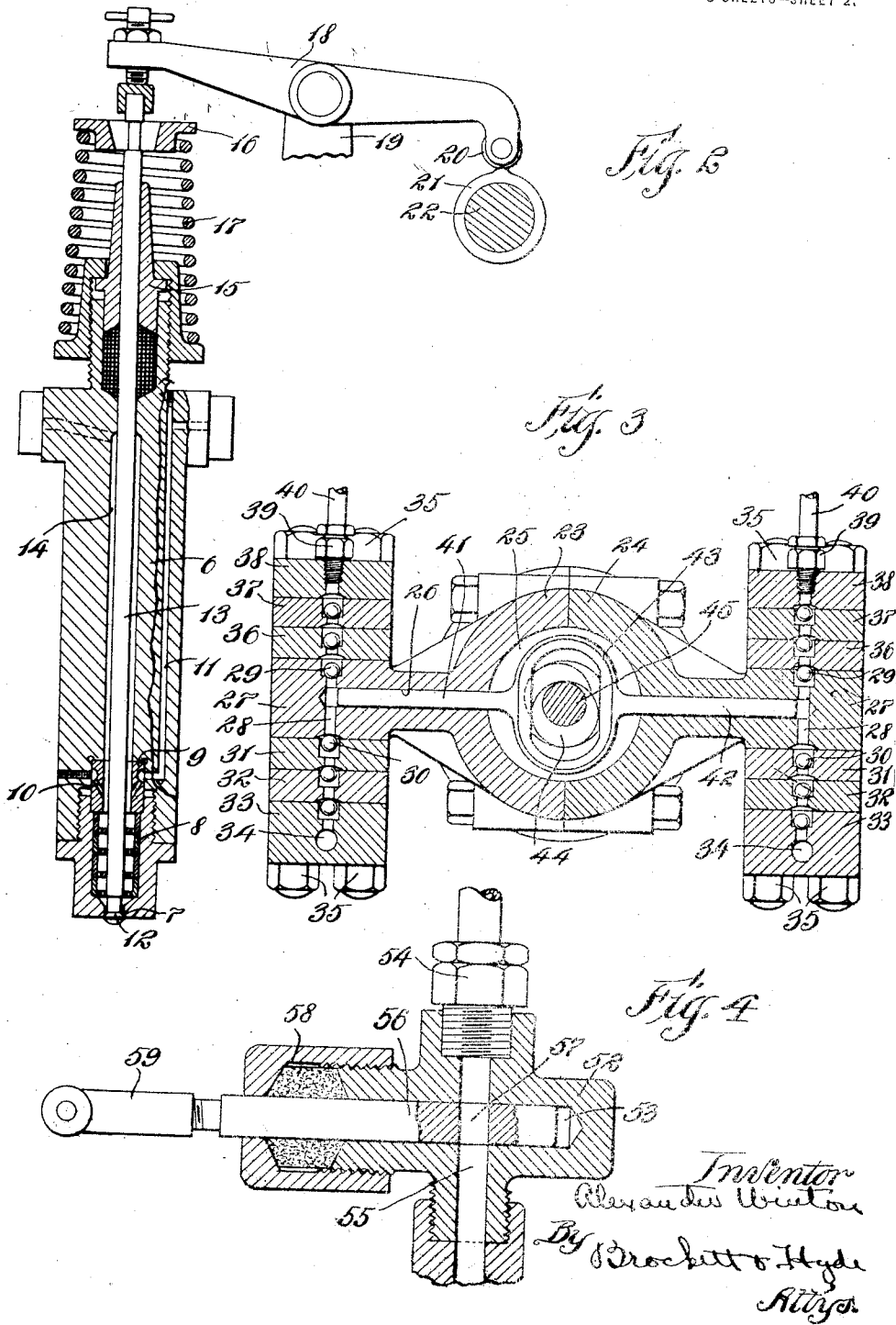


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3 SHEETS—SHEET 3.

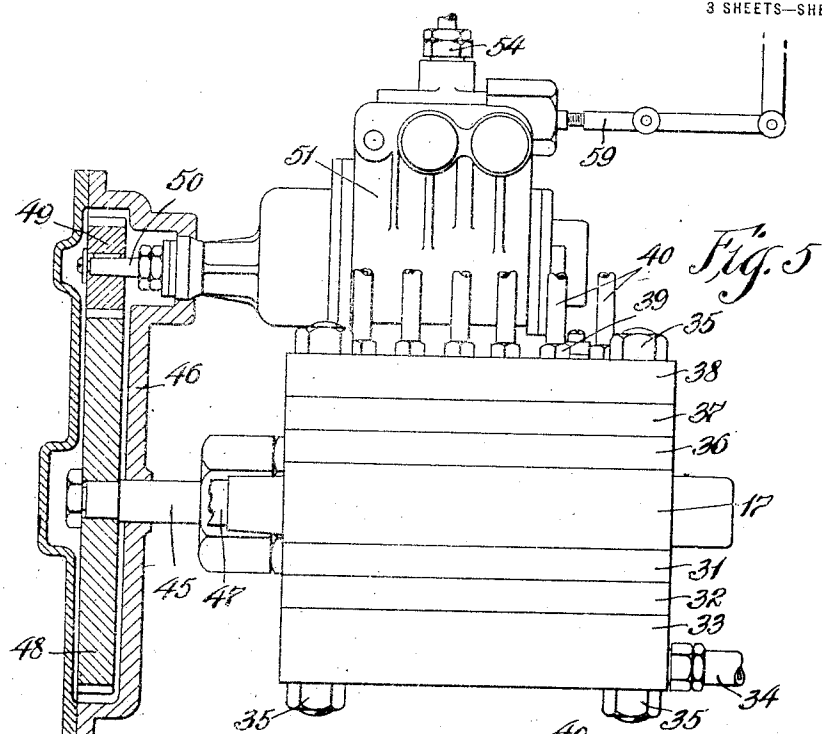


Fig. 5

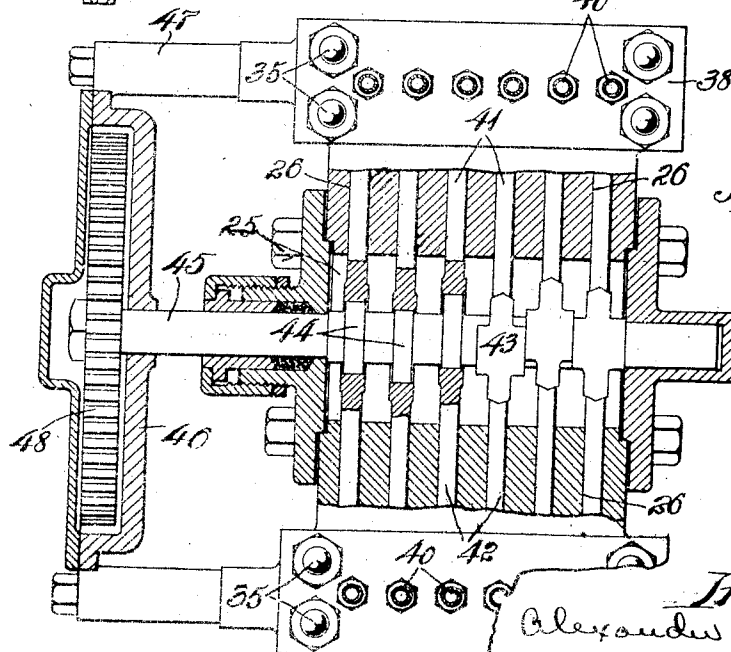


Fig. 6

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UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF LAKEWOOD, OHIO.

FUEL-FEEDING MECHANISM.

1,267,728.

Specification of Letters Patent.

Patented May 28, 1918.

Application filed March 29, 1917. Serial No. 158,272.

To all whom it may concern:

Be it known that I, ALEXANDER WINTON, a citizen of the United States, residing at Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fuel-Feeding Mechanism, of which the following is a specification.

This invention relates to internal combustion motors and particularly to the fuel feeding mechanism therefor.

In supplying fuel to internal combustion motors it has been customary to employ an injecting device with means for either controlling the stroke or controlling the amount injected by using a constant stroke injecting device and by-passing a portion of the charge or cutting off the supply of fuel on the receiving stroke to limit the amount passing to the injecting device in a proper amount for the charge. The last named device is the most effective, so far as the applicant has been able to ascertain, but even in this case, in some installations, the pump seems to inject too great an amount of fuel for the proper amount of charge when the governor is checking the speed as when the motor builds up under a release of the load. It would be very difficult to point out just why this occurs but it does nevertheless and the present device has been evolved for the purpose of meeting this objection and overcoming it.

The present invention in its specific form shown comprises a fuel injecting device such as a pump, there being one for each cylinder, and these pumps are connected directly to the supply and operate with constant full stroke to receive the fuel from the supply and lead it to the injection valves so that so far as the injecting pumps are concerned, they would force a full charge of fuel at every stroke toward the cylinder. The amount of the charge or the means for determining this factor is controlled by utilizing a separate or independent motor means such as an air engine which drives the fuel pump and which is governed in so far as its speed is concerned, by the governor of the main motor or engine. In other words, the inlet valves of the engine are operated in the usual manner and the volume of fuel injected is determined in amount by the quantity of fuel which passes the valve due to the speed at which the pump is operated.

The invention may be further briefly sum-

marized as consisting in the construction and combination of parts hereinafter set forth in the following drawings, description and claims.

Referring to the drawings, Figure 1 is a side elevation of an internal combustion motor provided with my improved feeding device; Fig. 2 is a detailed sectional view showing the injection valve with its operating rocker and cam; Fig. 3 is a sectional view through the injection device and taken on a line through one of the double pump structures and their valve mechanism; Fig. 4 is a detailed view of the air valve for controlling the air motor; Fig. 5 is a side elevation of the device with the gear casing broken away to show the gearing between the air motor and the injecting device; and Fig. 6 is a top plan view of the device with portions broken away.

In the arrangement shown 1 represents the crank case of an internal combustion motor adapted to support the several cylinders 2, each of which has a piston, not shown, and suitable main inlet and exhaust valve mechanism of any preferred form, but not being of any importance, so far as the present invention is concerned. The engine is also provided with a suitable governor 3 of any preferred type adapted to actuate the bell crank lever 4 mounted upon a support 5 and having one of its arms connected to the governor and the other to the injecting motor valve structure which will be described.

Each of the cylinders is provided with an injecting valve device of any preferred form but preferably of the form shown in my prior application, Serial No. 876,971 filed Dec. 12, 1914. It is unnecessary to fully describe this valve in view of its complete disclosure in the former application but it comprises in the main a casing 6 having a valve seat 7 at its lower end and suitable chambers for receiving mixing devices 8 and a mixing block 9 which is provided with ports 10 connected with the fuel inlet 11. Engaging the valve seat is an injection valve 12 arranged on the lower end of a valve stem 13 which passes up through the air inlet opening 14 and out through a stuffing box structure 15 at the top where it receives a spring thrust washer 16 adapted to be moved upward in the usual manner by the spring 17. This valve stem is engaged by one end of a rocker lever 18 supported on

suitable bracket 19 mounted on the engine. The other end of this rocker lever 18 is provided with a friction roller 20 engaging the fuel inlet cam 21 mounted upon a cam shaft 22 driven by the engine in any preferred manner, but in step so that the fuel inlet valve is opened at the proper point in the cycle of operations of the engine. There is one of these inlet valve devices for each cylinder, and it is obvious that they will be timed properly throughout the engine.

The fuel injection mechanism, which forms the specific subject matter of this application, comprises a main pump body supported by the engine in any preferred manner and comprises two halves 23 and 24. These two halves are so formed that they provide an eccentric chamber 25 at the center with laterally extending bores or pump barrels 26 extending in opposite directions from this crank or eccentric chamber. Each of these barrels extends outward to a valve body 27 preferably integral with the corresponding half portion of the pump body and each of these valve bodies is provided with a port 28 connected to the end of the corresponding pump barrel and receiving a discharge valve 29. The lower end of this port communicates with an inlet check valve 30 arranged in a block 31 and this check valve communicates with the corresponding check valve in a similar block 32 which in turn communicates with a similar structure arranged in a main inlet block 33 connected to a suitable source of fuel supply through a port 34. These blocks are held in place by suitable bolts 35. Above the discharge valve 29 are similar check valve blocks 36 and 37 and above these there is a discharge connection block 38 receiving several discharge connections 39 which in turn receive discharge pipes 40 leading to the several cylinders.

There is a pump for every cylinder and they are arranged in a manner so that the pump barrels of any two cylinders oppose each other.

Each pair of opposing pump barrels receives a pump plunger structure comprising pump plungers 41 and 42 connected by a scotch yoke structure 43 and each of these yokes receives an eccentric 44 arranged upon an eccentric shaft 45 extending through the chamber 25 mounted in suitable bearings in the body and extended beyond the same to a point where it enters a gear casing 46 supported upon suitable posts 47 secured to the pump body. Within this casing is a main driving gear 48 which meshes with the driving pinion 49 mounted upon a shaft 50 which is driven by and preferably forms a part of an air motor 51 of any preferred type capable of being controlled by a throttle valve arranged in a line connected to it. Since the detailed structure of this air motor forms no

part of the invention it is deemed unnecessary to describe it in detail or show it other than in a conventional way. The controlling throttle valve, however, is shown in Fig. 4 and it comprises the casing 52 having a valve opening 53 therein connected to an air supply connection 54 leading to any source of fluid pressure, and a discharge opening 55 leading to the motor. Within the valve opening 53 is the slide valve 56 having an opening 57 therein adapted to be brought in registry with the inlet opening and the discharge opening. The stem of this valve passes through a stuffing box structure 58 and is connected to a clevis 59 in turn connected to the bell crank lever 4 under the control of the governor of the engine.

The device operates in the following manner:—

Assuming that the engine inlet valves are properly timed and that the rest of the engine mechanism is in operative condition and that the engine is started by any of the well known devices or instrumentalities for that purpose the governor of the engine or main motor, through its connection with the throttle or controlling valve of the fluid injection motor, opens this control valve admitting fluid pressure to the motor. Thereupon the injection device is operated and fuel is supplied in a quantity, according to the speed of the injection motor, to the several injection valves which admit the fuel to the proper cylinder at the proper time.

Having described my invention, I claim:—

1. In an internal combustion motor, a cylinder, a piston, a governing device for the motor and fuel feeding mechanism under the control thereof and comprising a fuel injecting device, fuel inlet mechanism for the cylinder, and motor means for actuating the fuel injecting device and controlled by said governing device for the internal combustion motor.

2. In an internal combustion motor, a cylinder, a piston, fuel injecting valve therefor, a governor for said internal combustion motor, and fuel injecting mechanism comprising an injecting device, and independent motor means for actuating the same and controlled in its operation by said governor.

3. In an internal combustion motor, a cylinder, a piston, fuel injecting valve therefor, a governor for said internal combustion motor, and fuel injecting mechanism comprising an injecting device, an independent motor for actuating the injecting device, and connections between said motor and said governor whereby the operation of said independent motor is controlled thereby.

4. In an internal combustion motor, a cylinder, a piston, fuel injecting valve therefor, a governor for said internal combustion motor, and fuel injecting mechanism comprising an injecting device, an independent mo-

tor for actuating the injecting device, a controlling device for said independent motor, and connections between said controlling device and the main motor governor.

5 5. In an internal combustion motor, a cylinder, a piston, fuel injecting valve therefor, a governor for said internal combustion motor, and fuel injecting mechanism comprising an injecting device, a fluid pressure motor for actuating said injecting device, and means actuated by the main motor governor for controlling said fluid pressure motor.

6. In an internal combustion motor, a cylinder, a piston, fuel injecting valve therefor, a governor for said internal combustion motor, and fuel injecting mechanism comprising an injecting device, a fluid pressure motor for actuating said injecting device, a controlling valve for said fluid pressure motor, and connections between said controlling valve and said main motor governor. 15 20

In testimony whereof I affix my signature.

ALEXANDER WINTON.