May 9, 1933. E. A. ROCKWELL 1,907,672

SYSTEM OF FEEDING FUEL BY MEANS OF IMPULSES

Filed Sept. 3, 1927

Fig. 1.

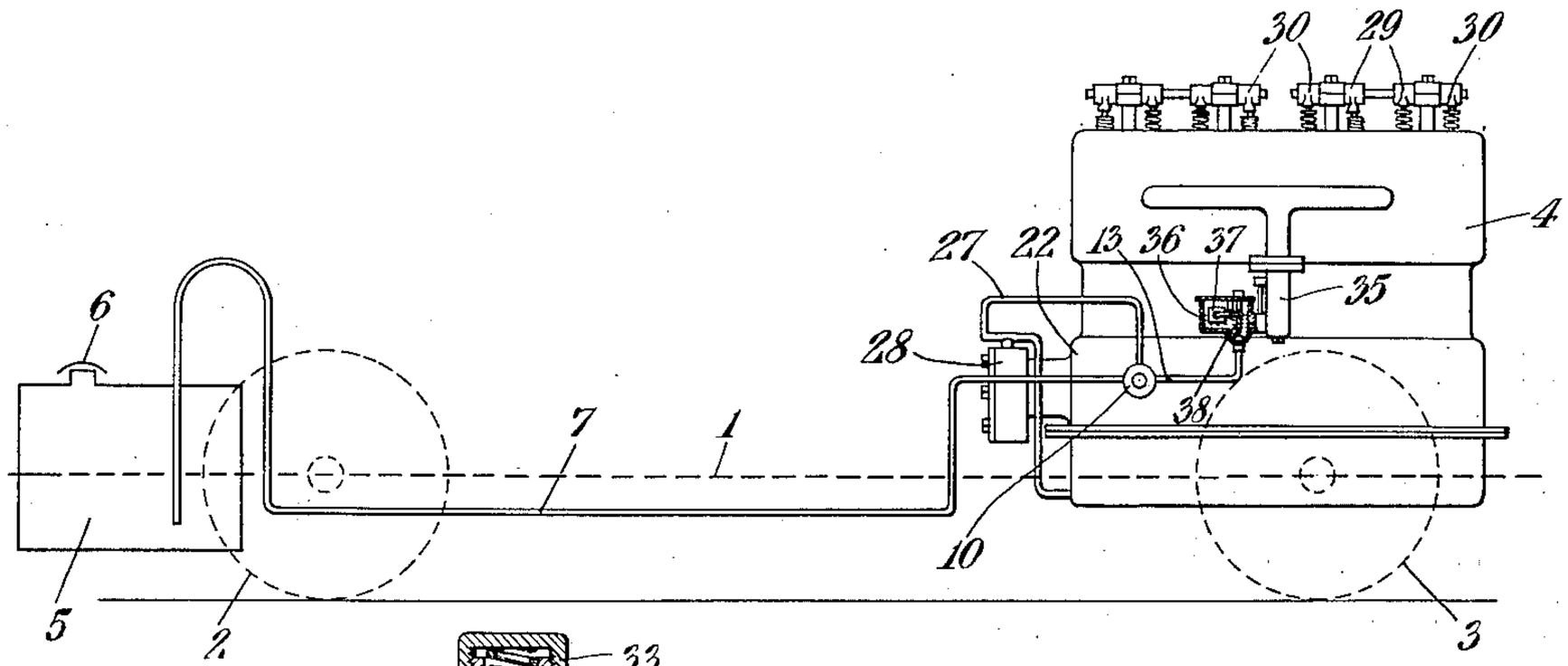


Fig. 2.

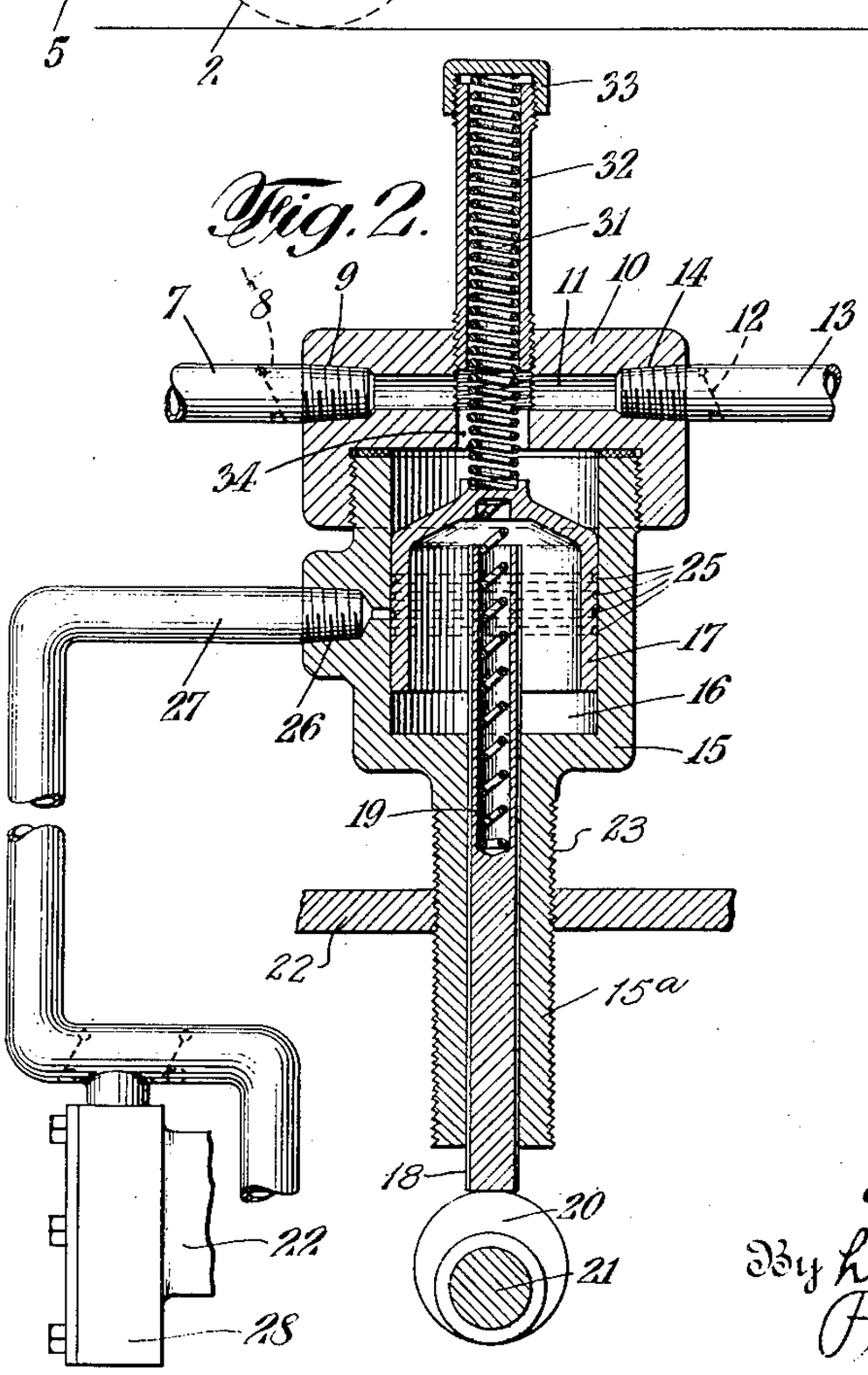
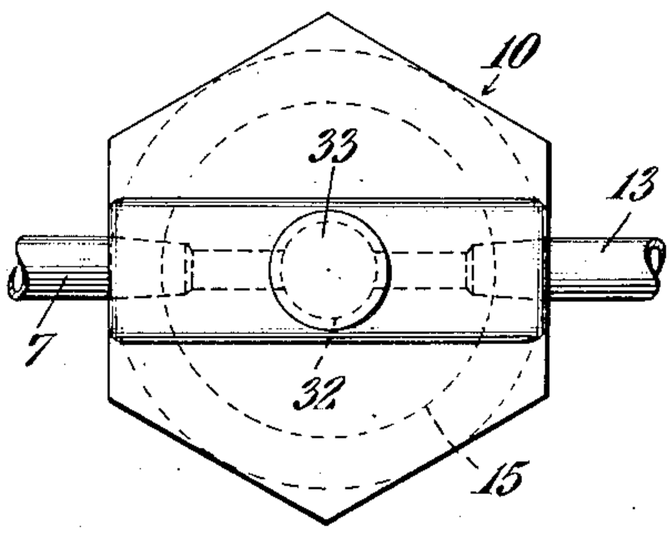


Fig. 3



Inventor
Edward A. Rockwell
By his Attorneys
Prindle, Wright, Neal & Beam

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UNITED STATES PATENT OFFICE

EDWARD A. ROCKWELL, OF FOREST HILLS, NEW YORK

SYSTEM OF FEEDING FUEL BY MEANS OF IMPULSES

Application filed September 3, 1927. Serial No. 217,423.

My invention relates particularly to impulse devices for feeding fuel, but has application especially to feeding fuel to internal combustion engines, and particularly automobiles.

The object of my invention is to provide an impulse mechanism for providing a fuel feed in an advantageous manner, and particularly so that there will be pressure limitations on the impulse applied in feeding the fuel while at the same time the fuel will be consumed independently of the pressure applied in the fuel feeding means. A further object is to provide a dependable fuel feeding device of this character which cannot readily get out of order. Still another object is to utilize a piston in connection with the above type of apparatus, which is effectively sealed against the passage of gasoline around the periphery of the same by the use of a liquid sealing device in which the sealing liquid is maintained under pressure, Further objects of my invention will appear from the detailed description of the same hereinafter.

While my invention is capable of embodiment in many different forms, for the purpose of illustration I have shown only one form of the same in the accompanying drawing, in which—

Figure 1 is a diagrammatic representation of an apparatus made in accordance with my invention;

Figure 2 is a vertical section through the impulser therein; and

Figure 3 is a plan view of the same.

In the drawing, I have shown my invention as applied to an automobile comprising, as shown diagrammatically in Figure 1, a chassis 1 having wheels 2 and 3 at the rear and front thereof, an engine 4 at the front of the same, and a fuel tank 5 at the rear thereof provided with a removable cover 6. A gasoline supply pipe 7 leads from the fuel tank 5 to an inlet valve 8 located in a port 9 provided in a main casting 10 of the impulser which has therein a transverse passageway 11 leading to an outlet valve 12 in a pipe 13 secured in a port 14 connecting with said chamber 11. Screw-threaded in the underside of the main casting 10 there is a cylinder 15 having a piston chamber 16 therein in which a piston 17 is adapted to reciprocate. The forward movement of the piston 17 is secured by the movement of a plunger rod 18 in the cylinder 15, said rod having in its interior a spring 19, the other end of which rests against the face of the piston 17. The cylinder, 15, has an exteriorly threaded stem, 15ª, through which the rod, 18, extends, and from which said rod protrudes for thrusting its protruding end against a cam 20 carried by one of the engine shafts 21. The engine shaft 21 is located in the main frame 22 of the engine which has a screw-threaded aperture, 23, at which the cylinder, 15, of the pumping device is mounted on the engine frame by screwing the threaded stem, 15ª, into said threaded aperture, 23; and it will be noted that this manner of mounting the pumping device on the engine frame or casing makes it possible to predetermine the pressure exerted by the spring, 19, on the impulser piston, 17, by the distance to which the stem, 15ª, is screwed through the pump casing. It will be noted, furthermore, that the escape of gasoline around the outside of the piston 17 is prevented by providing an oil seal under pressure. For this purpose the piston 17 has a plurality of annular channels 25 around the same adapted to receive the oil under pressure through a port 26 in the side of the cylinder 15, which communicates by a pipe 27 with an oil pump 28 of the usual type carried by internal combustion engines for distributing the lubricating oil therein. The pump 28 is carried by a part of the main frame 19 of the engine and is provided with the usual inlet and outlet valves.

The forward pump impulse is, therefore, secured by the movement of the rod 18 with the intervention of the spring 19, the strength of which provides a maximum limit on the force with which the gasoline is supplied, although it will be understood that this force is not always reached in the pumping stroke. The stroke of the piston 17 in the opposite direction is secured by means

of a spring 31 carried in a cylinder 32 screw-threaded in the casting 10 and having a removable cap 33 holding the spring in place at one end, while the other end rests against the face of the piston 17. This spring 31 also serves to cause the plunger 18 to follow the cam 20 at all times. It will be noted that the spring 31 passes through a port 34 which leads from the passageway 7 to the cylinder 16. The gasoline which is thus forced out of the passageway 11 through the valve 12 in the pipe 13 is thus conveyed to a carburetor 35 attached to the engine 4 and having located in advance of the same a float chamber 36 having a float 37 therein for operating a pin valve 38 adapted to maintain a constant level of gasoline in the chamber 36 by closing off the supply of the same to the carburetor 35 when the said level has been reached.

In the operation of my invention, it will be understood that gasoline is raised from the tank 5 by the impulses of the spring-controlled piston 17 which is kept sealed at all times by the pressure of the oil around the same so as to prevent the escape of gasoline, inasmuch as the oil is at a higher pressure than the gasoline. The forward stroke of the piston 17 is secured by means of the plunger 18, which operates against the cam 20, but the maximum available pressure, which, however, is not always reached, is secured by the intervention of the spring 19 between the rod 18 and the piston 17. The stroke in the other direction is produced by the force of the spring 31 which draws the gasoline into the passageway 11 preparatory to the same being forced outwardly through the pipe 13. The gasoline which is fed to the pipe 13 is led into the float chamber 36 of the carburetor and thence from the float chamber to a spraying or atomizing device where the consumption of the fuel takes place irrespective of any pressure applied to the fuel in the pipe 13.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

I claim:

1. In combination with an internal combustion engine including an engine casing, an engine driven cam on a shaft within said casing adjacent an aperture thereof, a pumping mechanism for supplying the engine with fuel comprising an impulser, actuating means therefor comprising a plunger, a spring for yieldingly transmitting the thrust of the plunger to the impulser, a pump casing in which the plunger is mounted, a stem extending from said pump casing in the direction of reciprocation of the impulser and adapted for intrusion into the aperture of the engine casing, said plunger extending through and protruding from the end of said casing stem for thrust engagement with the engine driven cam, the stem of the pump casing and the aperture in the engine casing being screw-threaded for mounting the pump casing on the engine casing by screwing the stem into the engine casing whereby the pressure transmitted by the spring to the impulser may be predetermined in mounting the pump casing on the engine casing.

2. In combination with an internal combustion engine including an engine casing, an engine driven cam within said casing adjacent an aperture thereof, a pump mechanism for supplying the engine with fuel comprising a cylinder, a pump piston therein, a plunger for actuating the piston, operating connections from the plunger to the piston, said cylinder being designed to be mounted on the engine casing with the plunger extending into the engine casing for thrust actuation by the engine driven cam, said piston being peripherally grooved for receiving lubricant packing and a connection from the cylinder to lubricant circulating means of the motor for delivering lubricant to said piston.

3. In combination with an internal combustion engine including an engine casing, an engine driven cam within said casing adjacent an aperture thereof, a pump mechanism for supplying the engine with fuel comprising a cylinder, a piston therein, a plunger for actuating the piston, operating connections from the plunger to the piston, said cylinder being designed to be mounted on the engine casing for thrust engagement of the plunger with the engine driven cam and a connection from the cylinder to lubricant circulating means of the engine for delivering lubricant to said piston.

In testimony that I claim the foregoing, I have hereunto set my hand this 23rd day of August, 1927.

EDWARD A. ROCKWELL.