(No Model.)

J. M. OLINGER.

GASOLINE INJECTOR.

No. 541,874. Patented July 2, 1895.

Fig 1

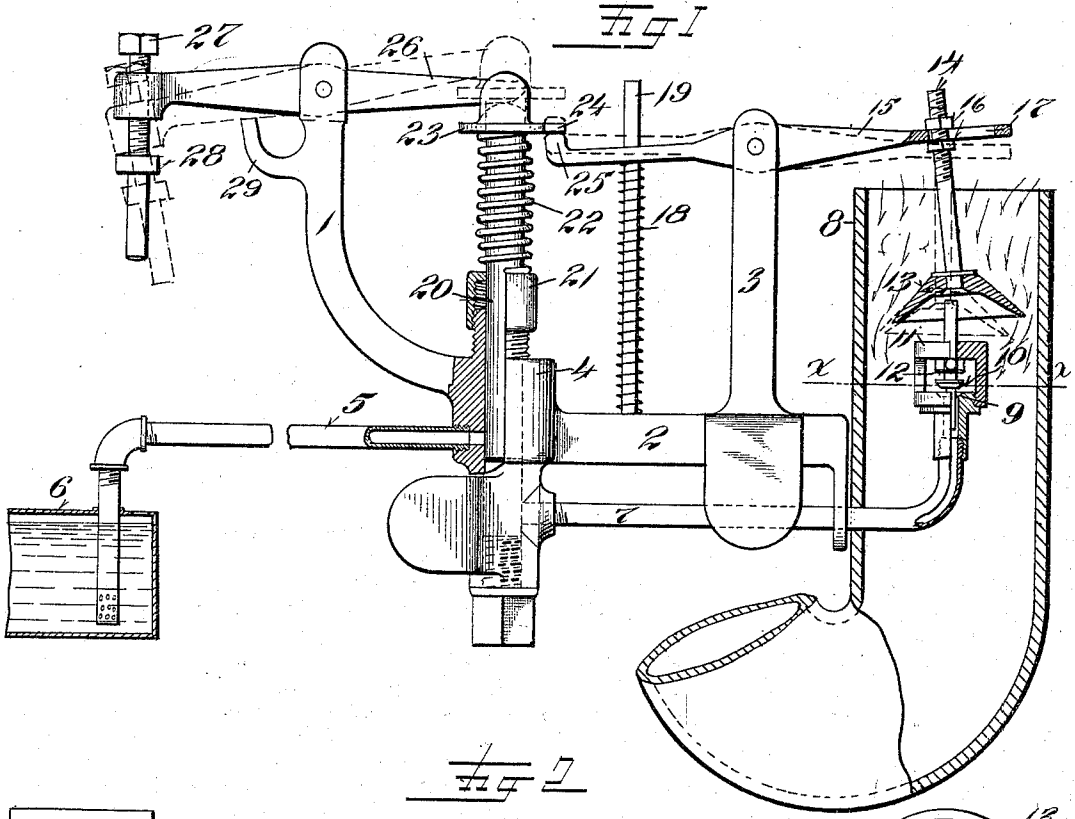


Fig 2

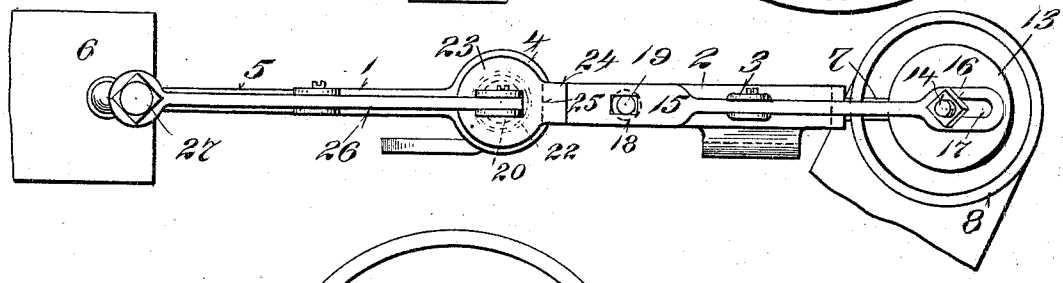
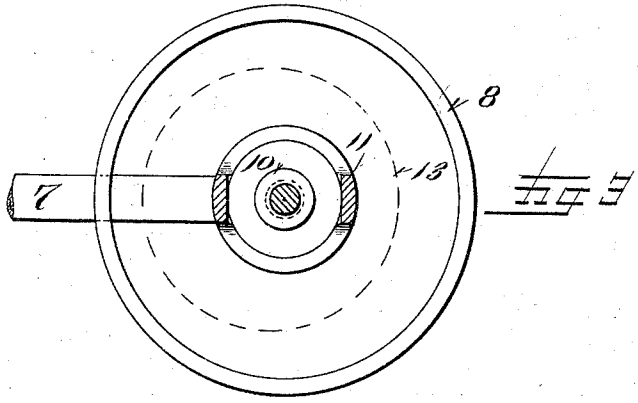


Fig 3



Witnesses
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UNITED STATES PATENT OFFICE.

JACOB M. OLINGER, OF VIENNA CROSS ROADS, OHIO.

GASOLINE-INJECTOR.

SPECIFICATION forming part of Letters Patent No. 541,874, dated July 2, 1895.

Application filed October 5, 1894. Serial No 524,973. (No model.)

To all whom it may concern:

Be it known that I, JACOB M. OLINGER, a citizen of the United States, residing at Vienna Cross Roads, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Gasoline-Injectors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in gasoline injectors for gasoline engines.

The objects of the invention are, first, to provide a pump which will deliver quantities of gasoline to the mixing chamber of varying quantities according to the load and speed of the engine and in which the piston cuts off communication with the gasoline tank during the time the gasoline is being forced into the mixing chamber; second, to keep the communication with the tank cut off until after the valve in the mixing chamber is closed so as to prevent the possibility of what is known as flooding, and, third, to provide an improved arrangement of valve and hood in connection with the mixing chamber.

In the accompanying drawings on which like reference numerals indicate corresponding parts, Figure 1 is a partial side elevation and sectional view of my improved injector; Fig. 2, a plan view of the injector; and Fig. 3, a horizontal sectional view of the mixing chamber showing the valve in plan and the hood in dotted lines, the section being taken on the line *x x*, of Fig. 1.

The numerals 1, 2 and 3 designate what may be termed the frame, which is adapted in practice to be attached to the engine or engine body at some suitable point. A cylinder 4 is formed with the frame. A pipe 5 enters this cylinder at one side and below the piston when it is at its upper limit. This pipe leads to a gasoline tank 6 located at any convenient place or distance with respect to the engine but in a plane below the entrance of the pipe 5 into the cylinder so that the gasoline cannot flow into the cylinder. Below the pipe 5 and on the opposite side of the cylinder a pipe 7 enters it and extends into the mixing chamber 8 which latter, in the present instance, is in the form of a pipe whose upper end is open for the free admission or circulation of air, and whose other end opens into the explosive chamber or chest of the engine. Of course, a suitable check-valve of any ordinary type is interposed between this chamber 8 and the engine explosion chest to prevent back action.

The pipe 7 terminates in a valve seat 9 which is supplied with a check valve 10 whose stem is guided in the orifice below the seat and in a yoke 11 screwed to the pipe 7. An adjustable collar 12 held by a set screw on the stem of the valve 10 acts to limit the lift of the valve by coming in contact with the yoke 11. A hood 13 is suspended in the mixing chamber 8 and over this valve and performs two functions: First, it normally rests upon the valve stem and acts to keep it forcibly down in its seat to absolutely prevent air from being drawn into the pipe 7 and thence into the cylinder 4 on the up-stroke of the piston, which, if it entered would prevent the formation of a vacuum or partial vacuum sufficient to cause the gasoline to enter the cylinder. This hood, however, releases the stem of the valve 10 at the proper time as will hereinafter appear. The second function of the hood is to narrow the space in the mixing chamber 8 through which the air is drawn by the engine piston on its out-stroke in taking in the charge. By so reducing this throat or air passage the air is caused to form a stronger current and thus to more effectually impinge against the spray of gasoline which is at that time being ejected from the pipe 7 past the valve 10. The rod 14 supports the hood 13 and is adjustably connected with a lever 15 by nuts 16 which can be run up or down on the rod to adjust the hood to the proper place with respect to the stem of the valve 10. The rod 14 passes through a slot 17 so as to be adjusted to bring the head into the proper place. The lever 15 is pivoted in the branch 3 of the frame and is actuated by a spiral spring 18, fitting a rod 19, supported by the part 2 of the frame and passing through a slot in the lever. Thus the valve 10 is normally held to its seat by the hood.

At 20 is shown the piston of the pump which enters the cylinder through a suitable stuffing box 21 and is normally elevated by a spiral spring 22 fitting the piston and pressing at

one end against the stuffing box and at the other against a plate 23 fitted to the piston. This plate has a projection 24 adapted to engage the part 25 of the lever 15 when the piston is depressed. The parts are so located that the piston crosses the mouth of the pipe 5 above the contact between the parts 24 and 25, and hence the valve 10 is not allowed to be raised from its seat until after communication is cut off between the cylinder and tank. On the up-stroke of the piston the valve 10 is again engaged by the hood and held positively down at or before the piston recedes from across the mouth of the pipe 5.

A trip arm 26 engages the upper end of the piston at one end and at the other carries a set-screw 27 which forms an adjustable contact piece with the tappet pin 28 which is operated in any desired manner by some moving part of the engine so as to have a regular movement of certain and uniform distance, but which is under such control of the governor that when the engine is running too fast it will not be actuated at all. This mechanism has nothing to do with my invention and hence is not illustrated, the whole point being that the trip-arm 26 shall be regularly and uniformly vibrated but subject to omissions when the engine is running too high. A stop 29 on this branch limits the movement of the trip arm 26 in one direction so that the piston can not be raised beyond a certain point by the spring 22.

The operation of my injector will be understood from the following remarks taken in connection with the preceding description: The piston is permitted to rise by the action of the spring 22 resulting in supplying the cylinder with gasoline from the tank. On the return stroke of the piston the pipe 5 is cut off and the gasoline forced through the pipe 7 during which operation the hood is lifted from the stem of the valve 10 and the latter allowed to rise from its seat and the gasoline to escape in a fine film or spray, being delivered outward by the conical form of the valve 10 as indicated. These operations are so timed with respect to the movements of the engine piston that the latter is now making an outstroke and drawing air into the mixing chamber 8 which, meeting with the gasoline intermingles with it and absorbs it and thence passes in this combined form into the explosion chest of the engine. Thus it will be understood that with my injector the piston has a uniform stroke, draws in the same, or substantially the same quantity of gasoline each time, positively ejects it into the mixing chamber and that all communication with the gasoline tank is always cut off either by the piston standing across the mouth of the pipe 5, or when this is not the case by the valve 10 being seated and positively held.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a gasoline injector, the combination with a tank, a cylinder and piston, a pipe from the tank entering the cylinder at a point intersected by the piston in its ejecting stroke, a mixing chamber adapted to take in air and to communicate with the engine cylinder, a pipe leading from the pump into said chamber, a valve in said pipe, and means to hold the valve closed but allow it to open when the piston intersects the tank-pipe opening, and means to actuate the piston.

2. In a gasoline injector, the combination with a tank, a cylinder and piston in a higher plane, a pipe from the tank entering the cylinder at a point intersected by the piston in its ejecting stroke, a mixing chamber adapted to take in air and to communicate with the engine cylinder, a pipe leading from the pump into said chamber, a valve in said pipe, and means to hold the valve closed but allow it to open when the piston intersects the tank-pipe opening, and means to actuate the piston.

3. In a gasoline injector, the combination with a tank, a cylinder and piston, a pipe from the tank to the cylinder crossed by the piston in its ejecting stroke, a spring to operate the piston in one direction, and a trip arm to operate it in the other, and a mixing chamber, a pipe leading from the cylinder into said chamber, a valve in said pipe and device to hold the valve seated, a lever to actuate said device and a projection on the piston to actuate the lever at the proper time.

4. In a gasoline injector, the combination with a cylinder, a piston, a spring to give the piston its out-stroke, a pivoted trip-arm to give it its in-stroke, and a projection on the piston, of a mixing chamber open at one end and adapted at the other to communicate with the engine explosion chest, a pipe leading from the cylinder into said chamber, a valve in said pipe, a yoke to limit its movement, a hood suspended within the chamber and adapted to normally hold the valve seated, a lever connected to the hood, a spring acting on the lever, the lever being adapted to be operated by the projection on the piston.

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

JACOB M. OLINGER.

Witnesses:
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