J. G. WILLET.

PUMP.

APPLICATION FILED MAY 11, 1906.

957,451. **Patented May 10, 1910.**

Fig. 1.

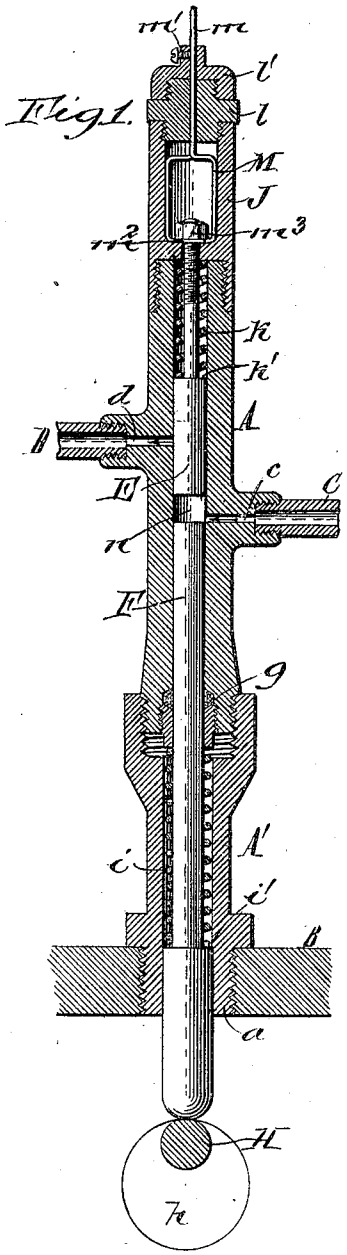

Fig. 2.

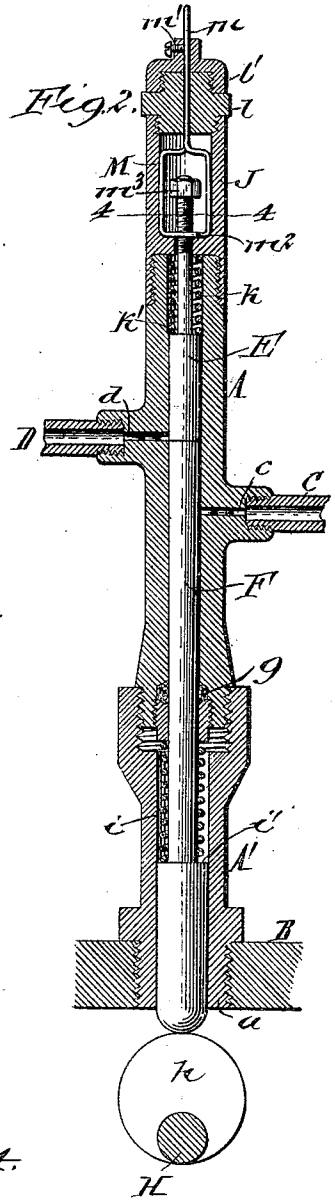

Fig. 3

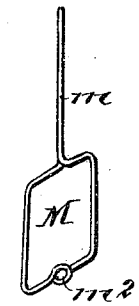

Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN G. WILLET, OF BUFFALO, NEW YORK, ASSIGNOR OF EIGHTEEN ONE-HUNDREDTHS TO ISIDORE MICHAEL, EIGHTEEN ONE-HUNDREDTHS TO EDWARD MICHAEL, EIGHTEEN ONE-HUNDREDTHS TO CLARK L. INGHAM, AND EIGHTEEN ONE-HUNDREDTHS TO ELGOOD C. LUFKIN, OF BUFFALO, NEW YORK.

PUMP.

957,451. Specification of Letters Patent. **Patented May 10, 1910.**

Application filed May 11, 1906. Serial No. 316,292.

To all whom it may concern:

Be it known that I, JOHN G. WILLET, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Pumps, of which the following is a specification.

This invention relates to a pump designed more especially for feeding predetermined charges of oil or other liquid hydrocarbon fuel to a gas engine for producing proper explosive mixture, but the same is also useful for other purposes.

The principal object of my invention is to provide a simple, compact and inexpensive pump of this kind which is not liable to get out of order.

A further object is to so construct the pump that it can be readily adjusted to deliver greater or less charges of oil to suit different-sized engines, or other requirements.

In the accompanying drawings: Figures 1 and 2 are sectional elevations of the pump, showing different positions of the plungers. Fig. 3 is a perspective view of the loop for adjusting the upper plunger. Fig. 4 is a cross section in line 4—4, Fig. 2.

Similar letters of reference indicate corresponding parts in the several views.

A is the barrel of the pump, preferably provided at its lower end with a tubular extension A^1 which is connected therewith by a screw threaded joint, as shown, said extension having a screw threaded stem *a* by which the pump is secured to a suitable support B.

c is an inlet leading into the pump barrel and connected with an oil supply pipe C, and *d* is an outlet leading from the barrel at a point beyond or out of line with the inlet and connected with a delivery pipe D which leads to a gas engine or other desired point of discharge. In the preferred construction shown in the drawings, the inlet and the outlet are located on opposite sides of the barrel.

E, F indicate a pair of plungers both arranged in the barrel A and adapted to receive a charge of oil between their opposing ends. The plunger F passes through a stuffing box *g* at the lower end of the barrel and through the extension A^1, the lower end of said plunger bearing against the face of a rotary cam *h* which effects its upward stroke. This cam is mounted on a shaft H, which is suitably geared with the crank shaft of the gas engine when the pump is used in that connection. The downward or return stroke of the lower plunger is effected by a spring *i* surrounding it between a shoulder i^1 thereof and the stuffing box *g*.

The upper plunger E has a reduced upper portion which passes loosely through an opening formed in the bottom of a chamber or tubular housing J secured to the upper end of the pump barrel. *k* is a spring applied to the upper plunger between its shoulder k^1 and the closed bottom of the chamber J and tending to depress said plunger. The chamber J is closed at its upper end by a screw plug *l* having a fixed cap l^1.

One of the plungers E, F is preferably adjustable toward and from the other for varying the size of the oil-receiving space or chamber between the opposing ends of the plungers. In the construction shown in the drawings, the upper plunger is adjustable, and the adjusting device consists of a vertically-sliding loop M arranged in the chamber J, and connected with the reduced upper end of the plunger. The loop is provided at its upper end with a stem *m* passing centrally through the plug *l* and cap l^1 and adjustably clamped in the latter by a set screw m^1. The lower cross bar of the loop M has an eye m^2 which loosely encircles the upper end of the plunger E below a nut or head m^3 applied to its upper end. The upper end of said plunger is free to slide upwardly through this eye, but its downward movement is limited by the nut m^3 striking the eye.

The plungers are so arranged that they act also as valves for controlling the inlet and outlet *c*, *d*, respectively, the lower plunger opening or uncovering the inlet when the upper plunger closes the outlet, as shown in Fig. 1, and vice versa.

The operation of the pump is as follows: When the upper plunger is in its lowest or foremost position, Fig. 1, it covers the outlet *d* and its lower end terminates short of the inlet *c*, its actuating spring *k* being relaxed. When the lower plunger is at the extremity of its backward or return stroke, its upper

end is below or flush with the lower side of the inlet, as shown in Fig. 1. In this position of the plungers, a space or chamber *n* is thus left between their opposing ends into which oil flows from the feed pipe C, the space being completely filled by the non-compressible body of oil which transmits the movement of the lower plunger to the upper one. On the forward or upward stroke of the lower plunger, produced by the rotary cam *h*, said plunger closes the inlet *c* and moves said charge of oil and the upper plunger in the same direction, thus compressing the actuating spring *k* of the upper plunger as well as the return spring *i* of the lower plunger. As soon as the upper plunger in its ascent uncovers the outlet *d*, the oil is released from the space *n* and forcibly expelled through the outlet and the delivery pipe D by the upper plunger which receives a quick downward impulse by the reaction of its spring. Considering the functions performed by the two plungers, the lower one may be appropriately termed the transferring plunger and the upper one the expelling plunger. The stroke of the transferring plunger is such that it advances to the lower side of the outlet *d* whereby the two plungers finally meet opposite the outlet and completely expel the charge of oil, as shown in Fig. 2. On the downward or return stroke of the transferring plunger, produced by its spring *i*, both plungers descend together until the expelling plunger reaches the position shown in Fig. 1, when it is arrested by its stop nut m^3, while the transferring plunger continues to descend until it uncovers the inlet *c*, when another charge of oil enters between the separated plungers and the above described operation is repeated.

By adjusting the expelling plunger up or down, as hereinbefore described, the oil receiving space *n* between the plungers is increased or diminished in capacity, enabling a greater or less predetermined quantity of oil to be delivered by the pump according to the size of the engine to be supplied. As the plungers also serve as valves for controlling the inlet *c* and the outlet *d* the construction of the pump is correspondingly simplified and its cost reduced.

I claim as my invention:

1. A pump comprising a barrel having an inlet and an outlet, transferring and expelling plungers arranged in the barrel and adapted to receive a charge of liquid between their opposing ends, an adjusting loop connected with the rear end of the expelling plunger and having a stem, a clamping device for said stem, and means for actuating said plungers, substantially as set forth.

2. A pump comprising a barrel having an inlet and an outlet, transferring and expelling plungers arranged in the barrel and adapted to receive a charge of liquid between their opposing ends, a housing arranged at the end of the barrel, an adjusting loop arranged in said housing and having an eye in which the rear end of the expelling plunger slides and a stem passing through the outer end of said housing, means for retaining said eye upon the plunger, and a clamping device mounted on said housing and engaging said stem, substantially as set forth.

3. In a pump, a piston chamber provided with an inlet and an outlet port located apart from each other, an upper and a lower piston opposed to each other and operating in timed relation, means for moving one of said pistons from a position uncovering the inlet port to a position near the outlet port, and means for regulating the nearest approach of the other of said pistons to the inlet port.

4. In a pump, a piston chamber provided with an inlet and an outlet port located apart from each other, two opposing pistons, one a forcing piston and the other a yieldable piston, means for moving the forcing piston from a position uncovering the inlet port to a position near the outlet port, said yieldable piston tending to approach said inlet port, and adjusting means for regulating the nearest approach of the yieldable piston to said inlet port.

5. In a pump, a piston chamber provided with an inlet and an outlet port located apart from each other, two opposing pistons, one a forcing piston and the other a yieldable piston, means for moving the forcing piston from a position uncovering the inlet port to a position near the outlet port, said yieldable piston tending to approach said inlet port, a stop for limiting the movement of said yieldable piston toward the inlet port, and means for adjusting the yieldable piston with reference to said stop.

Witness my hand this 9th day of May, 1906.

JOHN G. WILLET.

Witnesses:
C. F. GEYER,
E. M. GRAHAM.