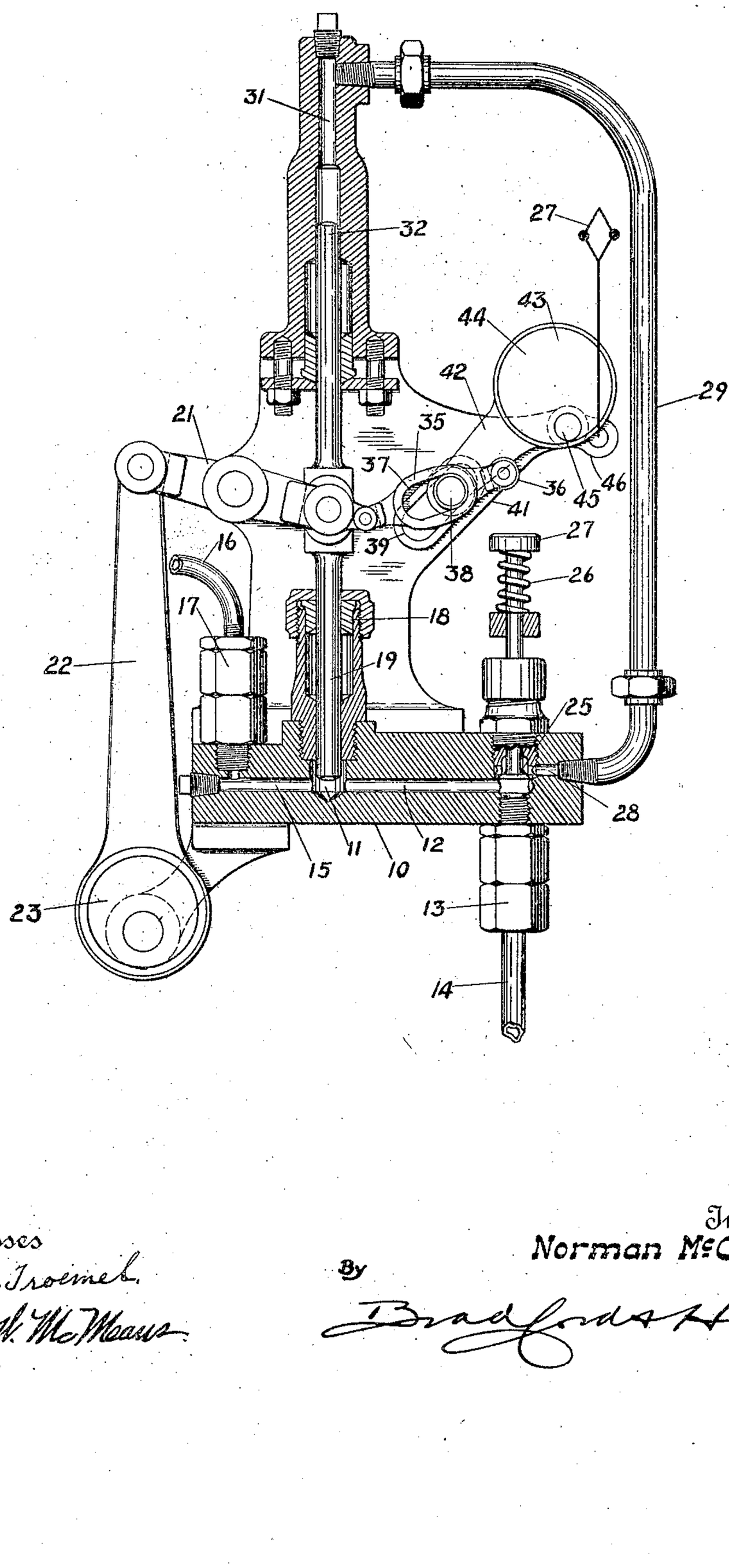
N. McCARTY.

GOVERNED PUMP.

APPLICATION FILED FEB. 4, 1909.

929,101. Patented July 27, 1909.



Witnesses
Walter Troemel.
Thomas H. McManus.

Inventor
Norman McCarty.
By Bradford & Hood.
Attorneys

UNITED STATES PATENT OFFICE.

NORMAN McCARTY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO ATLAS ENGINE WORKS, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA.

GOVERNED P

No. 929,101. Specification of Letters Patent. Patented July 27, 1909.

Application filed February 4, 1909. Serial No. 476,045.

To all whom it may concern:

Be it known that I, NORMAN McCARTY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Governed Pumps, of which the following is a specification.

The object of my invention is to produce a pump mechanism having a uniform stroke, to deliver graduated quantities of fuel, the amount of delivery being determined by a suitable governing mechanism, and any excess, at any particular stroke, being accommodated within a closed overflow chamber the volume of which varies with the stroke of the piston.

The accompanying drawing is a vertical axial section of an embodiment of my invention.

In the drawing, 10 indicates a main pump body having a pump chamber 11 into which leads a supply passage 12, a suitable inwardly-opening check-valve 13 being arranged between the said supply passage and the supply pipe 14. Leading from chamber 11 is a discharge passage 15 communicating with a discharge pipe 16, a suitable outwardly-opening check-valve 17 being placed therebetween. The discharge pipe 16 is intended to deliver to the atomizer of an internal combustion engine within which is maintained a high pressure, as is usual in such types of engines, although the apparatus can of course be used in other ways. Projected into chamber 11, through a suitable packing gland 18, is a pump piston 19 adapted to be reciprocated by any suitable means, such for instance as lever 21, arm 22 and eccentric 23, and preferably in uniform strokes.

Leading from chamber 11 is an inwardly opening excess valve 25 which is normally yieldingly held closed by means of a spring 26, a head 27 being secured to the upper end of the stem of valve 25. Leading from chamber 11 at a point beyond valve 25 is a passage 28 which communicates, through pipe 29, with a chamber 31 within which is fitted the upper end 32 of piston 19.

In order to operate valve 25 I provide a lever 35 which is connected at one end to lever 21 and at the opposite end is provided with a roller 36 adapted to be brought into engagement with head 27 to act against spring 26. Lever 35 is provided with a longitudinal slot 37 into which is projected the pivot pin 38 and said pivot pin is also extended into a slot 39 formed in the stationary bracket 41. Pin 38 is carried by an arm 42 forming part of the strap 43 surrounding eccentric 44, and said eccentric 44 is carried by a rock shaft 45 having an arm 46 to which is connected a speed controlled governor shown diagrammatically at 27.

Supposing the chamber 11 and passages 28 and 29 and chamber 31 to be filled with oil and the parts in the positions shown in the drawing, the operation is as follows:— The first up-stroke of piston 19 will draw in an amount of oil into chamber 11 equal to the displacement of the piston but chamber 31 and its connecting passages, being filled with oil, the oil to supply the enlarged chamber 11 will be forced from chamber 31 through valve 25 into chamber 11. On the down stroke of piston 19 this amount of oil will be discharged through pipe 16 and a partial vacuum will be created in chamber 31, because, the pin 38 being in the position shown, roller 36 will only barely touch head 27 and valve 25 will not open. The next upstroke of piston 19 will again create a vacuum within chamber 11 which will be filled this time from the supply pipe 14 and on the next down stroke of the piston the previous amount of inflow will be discharged through pipe 16. This is the condition of operation when the engine is operating under full load and therefore requiring the full supply of fuel deliverable by the pump. As the load on the engine decreases, shaft 45 will be rocked so as to shift pin 38 downward in slot 39 so that, before the piston 19 has finished its up-stroke, roller 36 will engage head 27 and open valve 25 so that, at the beginning of the next down stroke of the piston 19, the initial outflow from chamber 11 will be through valve 25 into pipe 29 and chamber 31 instead of out through the discharge pipe 16, and this preliminary discharge will continue until the roller 36 has been withdrawn from head 27 and valve 25 has closed, whereupon the further downward movement of piston 19 operates to produce a discharge through pipe 16. By shifting pin 38 to its extreme at the lower end of slot 39, valve 25 will be kept open during the entire time of the downward or displacing stroke of piston 19 so that there will be no

discharge through pipe 16. Whenever the adjustment of pin 38 is such as to cause the opening of valve 25 by means of lever 35, there will be an inflow from supply pipe 14 only equal to the immediately-previous amount of discharge through pipe 16 and there will also be an outward and inward flow through valve 25, equal in volume to the difference between the possible maximum discharge of the apparatus and the actual discharge on the previous discharge stroke. At the same time pressures are practically balanced at all times upon piston 19 and there is never any material resistance to movement of pin 38, so that the governor may be very sensitive.

I claim as my invention:—

1. The combination, in a fuel pump having a main chamber a valved inlet pipe, and a valved outlet pipe, of a displacing plunger projectable into said chamber, a compensating plunger carried thereby, a cylinder in which said compensating plunger is fitted, a connection between the pump chamber and said cylinder, a valve mounted in said connection, means for opening and closing said valve in synchronism with the movement of the displacing plunger.

2. The combination, in a fuel pump having a main chamber, a valved inlet pipe, and a valved outlet pipe, of a displacing plunger projectable into said chamber, a compensating plunger carried thereby, a cylinder in which said compensating plunger is fitted, a connection between the pump chamber and said cylinder, a valve mounted in said connection, and means for opening and closing said valve in synchronism with the movement of the displacing plunger, and means for varying the open period of said valve.

3. The combination, in a fuel pump having a main chamber, a valved inlet pipe, and a valved outlet pipe, of a displacing plunger projectable into said chamber, a compensating plunger carried thereby, a cylinder in which said compensating plunger is fitted, a connection between the pump chamber and said cylinder, a valve mounted in said connection, and means for opening and closing said valve in synchronism with the movement of the displacing plunger, and speed controlled means for varying the open period of said valve.

4. The combination, in a fuel pump having a main chamber, a valved inlet pipe, and a valved outlet pipe, of a displacing plunger mounted in said chamber, a compensating chamber, means associated with said compensating chamber and with the displacing plunger for increasing and decreasing the receptivity of said compensating chamber, a connection between the pump chamber and compensating chamber, and means for variably controlling the said connection.

5. The combination, in a fuel pump having a main chamber, a valved inlet pipe, and a valved outlet pipe, of a displacing plunger mounted in said chamber, a compensating chamber, means associated with said compensating chamber and with the displacing plunger for increasing and decreasing the receptivity of said compensating chamber, a connection between the pump chamber and compensating chamber, a valve in said connection, and means connected with the displacing plunger for controlling said valve.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this twenty-ninth day of January, A. D. one thousand nine hundred and nine.

NORMAN McCARTY. [L. S.]

Witnesses:

ARTHUR M. HOOD,

THOMAS W. McMEANS.