

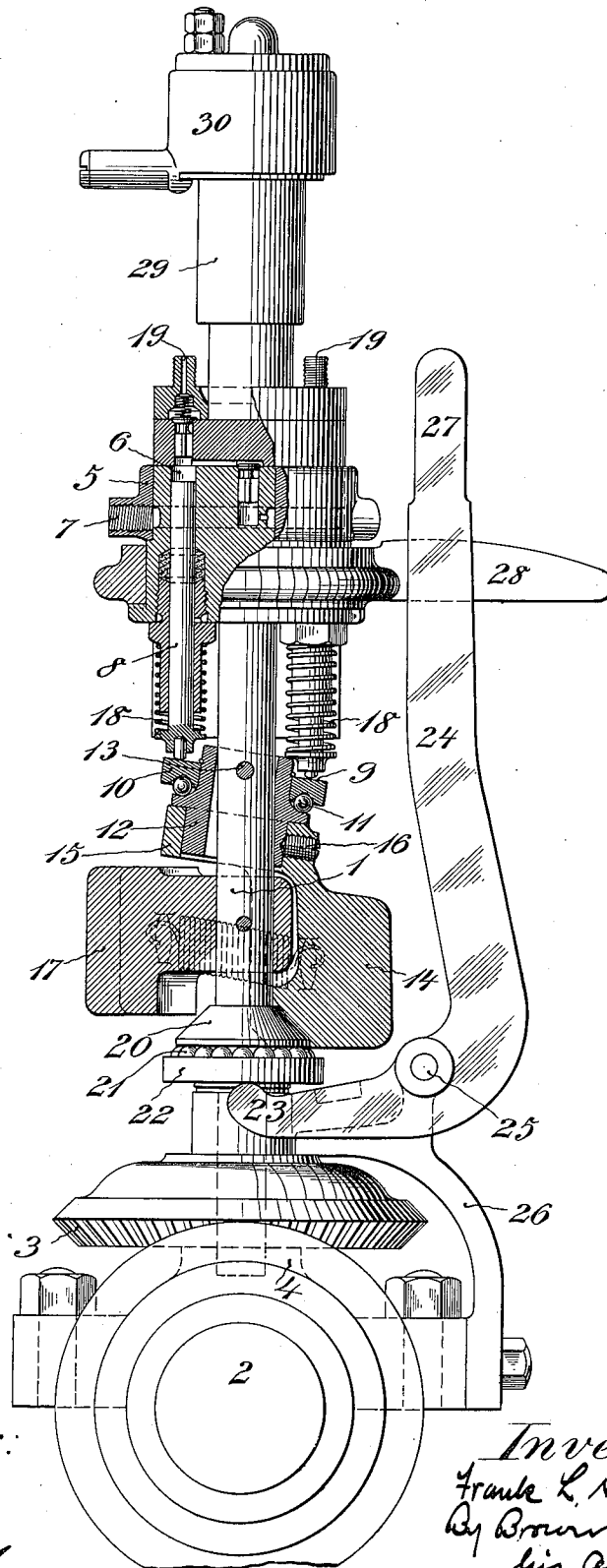
F. L. NICHOLS.

GOVERNOR.

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962,163.

Patented June 21, 1910.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANK L. NICHOLS, OF STAMFORD, CONNECTICUT, ASSIGNOR TO NICHOLS QUADRUPLE-TRACTION VEHICLE AND POWER COMPANY, OF STAMFORD, CONNECTICUT, A CORPORATION OF NEW YORK.

GOVERNOR.

962,163.

Specification of Letters Patent. Patented June 21, 1910.

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To all whom it may concern:

Be it known that I, FRANK L. NICHOLS, a citizen of the United States, and resident of Stamford, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Governors, of which the following is a specification.

My invention relates to a governor and more particularly to a governor for use in connection with hydrocarbon engines with a view of providing a simple, effective and accurate means for regulating the flow of fuel to the combustion chamber.

A practical embodiment of my invention is represented in the accompanying drawing which shows the governor in elevation partly in section.

The shaft of the governor is denoted by 1. It is connected with and driven by the engine shaft 2 through suitable bevel gears 3 and 4, the former on the governor shaft 1 and the latter on the engine shaft 2. Surrounding the governor shaft 1 is a housing 5 within which two or more pumps 6 are located, the several pump cylinders being fed from a common chamber or conduit within the casing 5, the said chamber or conduit being supplied with fuel through an inlet opening 7. It is intended that the plungers 8 of the several pumps shall be arranged symmetrically with respect to the axis of the governor shaft 1. That is, when there are two pumps, they shall be 180° apart or directly opposite each other; when there are three they shall be 120° apart and when four, 90° apart and so on. These plungers 8 project downwardly from the casing 5 and their lower ends rest upon the upper face 9 of an annular ring 10 supported by means of ball bearings 11 on a sleeve 12 which embraces the governor shaft 1 and is allowed a tilting motion thereon. The sleeve 12 is pivotally secured to the shaft by means of a pintle 13 and has secured to its lower end, a counterbalance weight 14. In the present instance, the counterbalance weight is secured to the sleeve by means of an annular socket 15 in its upper end which receives the lower end of the sleeve 12, a set screw 16 serving to hold the weight fast to the sleeve. A weight 17 is also secured to the shaft 1 directly opposite the weight 14 for the purpose of counterbalancing it. The plungers 8 are held with their lower ends in contact with the surface 9 of the ring 10 by means

of springs 18. Each pump within the housing 5 has its own outlet 19 through which the fuel is conducted by means of suitable tubes, not shown, to the respective cylinders. Below the weights 14 and 17 there is located a vertically sliding sleeve 20 having its upper end beveled and supported on ball bearings 21 resting on a gland 22 which, in turn, rests on the end 23 of a bell crank lever 24 fulcrumed at 25 on a suitable bracket 26. The bell crank lever 24 is provided with a handle 27 by means of which it is manually operated along an arc 28 to limit the rocking movement of the weight 14.

The adjustment is so made that when the lever 24 is in the position shown and the weight 14 in its lowermost position, the plungers 8, as the tilted sleeve revolves beneath them, will consecutively operate to pump a maximum quantity of fuel. If the lever 24 be drawn outwardly by the handle 27 and the weight 14 thereby raised, it will change the tilt of the sleeve 12 and thereby decrease the throw of the plungers as the tilted sleeve revolves beneath them and in this manner the pumps may be set to pump the maximum quantity required when the engine is running at normal speed. As the engine reaches a speed higher than that desired, the weight 14 will be thrown outwardly, bringing the sleeve 12 into a position with its axis in harmony with the axis of the governor shaft, *i. e.*, with no tilt and when in this position the plungers will not be reciprocated during the rotary movement of the shaft and no fuel will be fed. As the engine slows down to its desired speed, fuel will be gradually fed and the more slowly the engine operates the greater will be the feed, the governor thus serving to maintain the rate at which the engine operates at approximately the desired number of revolutions per minute.

The top of the governor shaft is also conveniently provided with a commutator sleeve 29, which, in conjunction with the insulated plates 30 surrounding it, serves the purpose of timing the explosions.

What I claim is:—

1. The combination with an engine shaft and a governor shaft driven thereby, of pumps surrounding the governor shaft, a tilting sleeve pivoted to the governor shaft and spring-actuated pump plungers for actuating the pumps, the said pump plungers

resting on a bearing on the tilting sleeve for operating them.

2. The combination with a governor shaft arranged to be driven by the engine shaft, of a group of pumps arranged concentrically about the governor shaft, a tilting sleeve on which the pump plungers rest and a counterbalance weight for rocking the sleeve as the shaft rotates to vary the throw of the plungers.

3. The combination with a governor shaft driven by an engine shaft, of a group of pumps arranged concentric with the axis of the governor shaft, a tilting sleeve controlled in its tilt by a counterbalance weight, the sleeve forming a primary support for the plungers of the pumps and means for limiting the throw of the counterbalance weight to determine the maximum action of the pumps.

4. The combination with a governor shaft driven by an engine shaft, of a group of pumps surrounding the governor shaft, a tilting sleeve pivoted to the governor shaft and provided with a weight for tilting it, the said tilting sleeve forming a primary support for the plungers of the pumps, a sliding sleeve on the shaft for limiting the throw of the weight and a lever for manu-

ally controlling the movement of the sliding sleeve and hence the throw of the weight.

5. The combination with a governor shaft, of a group of pumps arranged around the shaft, a common inlet for admitting the fluid to the pumps, separate outlets one for each pump, a tilting sleeve pivoted to the governor shaft, a ring seated on the sleeve and forming an immediate bearing for the pump plungers, a counterbalance weight for tilting the sleeve and means for limiting the maximum throw of the counterbalance weight.

6. The combination with a governor shaft provided with a sparking commutator, of a group of fuel feed pumps arranged around the shaft, means for operating the governor shaft from the engine shaft, a tilting sleeve pivoted to the governor shaft for determining the reciprocating movement of the pump plungers and means for adjusting the maximum tilt of the sleeve.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 2 day of Nov. 1908.

FRANK L. NICHOLS.

Witnesses:

PERCY HARTWRIGHT,
GEORGE B. GISBORNE.