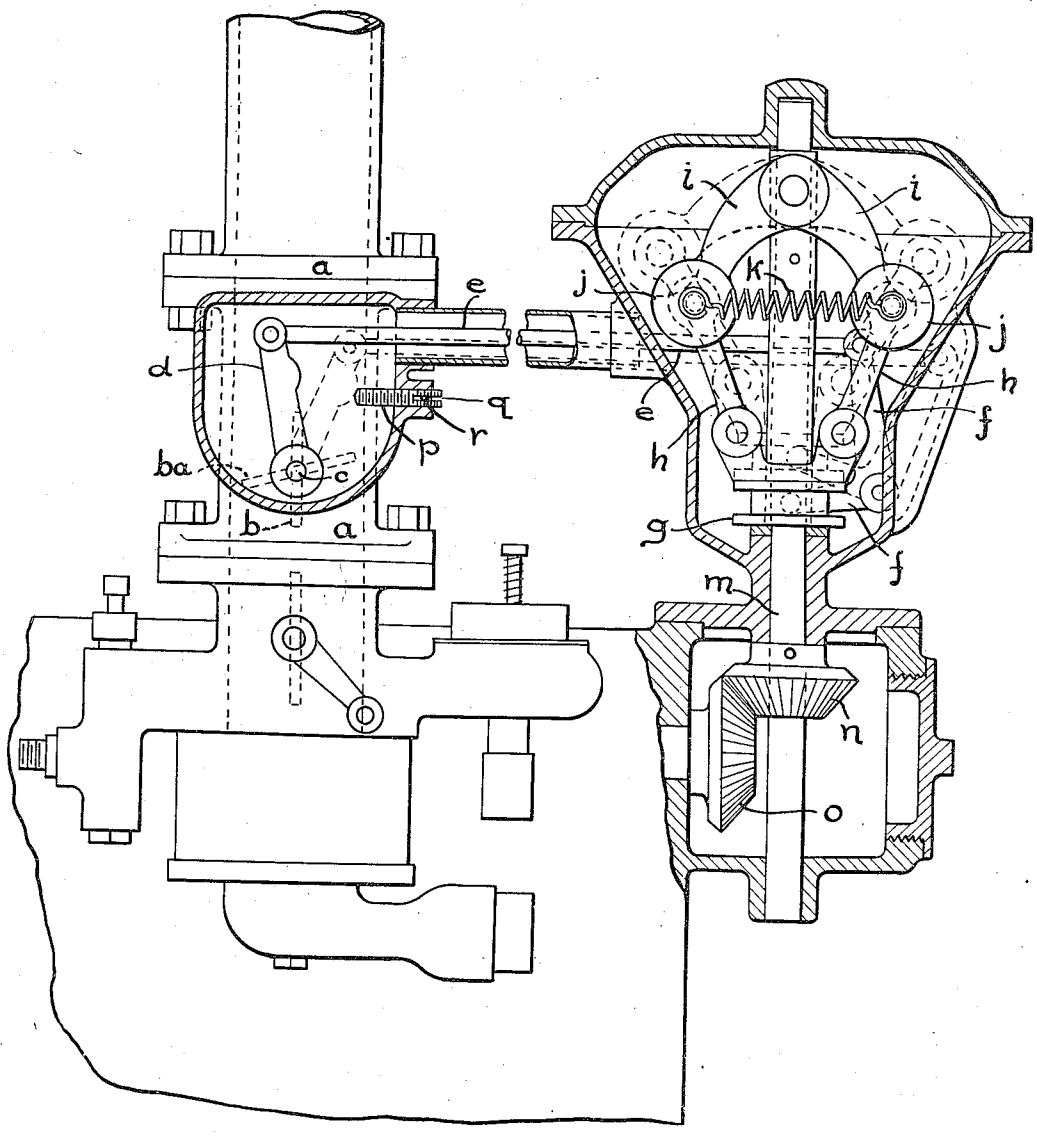
L. C. FREEMAN.

GOVERNOR FOR EXPLOSION ENGINES.

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1,162,047.

Patented Nov. 30, 1915.



WITNESSES

Robert N. Van Dalsen

Virginia C. Spratt.

INVENTOR

Lowell C. Freeman

BY

Ralgemond A. Parker

ATTORNEY

UNITED STATES PATENT OFFICE.

LOWELL C. FREEMAN, OF DETROIT, MICHIGAN.

GOVERNOR FOR EXPLOSION-ENGINES.

1,162,047. Specification of Letters Patent. Patented Nov. 30, 1915.

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To all whom it may concern:

Be it known that I, LOWELL C. FREEMAN, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Governors for Explosion Engines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to governors for explosion engines and a special object of my improvements is to provide an improved governor to be used with such engines on automobiles, and especially on commercial vehicles. I accomplish this object in the device illustrated in the accompanying drawings in which the figure is an elevation partly in section of an apparatus embodying my invention, the connection with the engine being indicated.

a is an intake passage to the engine.

b is a throttle valve adapted to control the area of the opening through the passage *a*. This is of a usual type.

c is the shaft upon which the valve *b* is secured and with which it turns to contract or enlarge the area of the passage to the engine.

d is a lever arm by which the shaft *c* is turned.

e is a connecting rod, one end of which is pivoted to the outer end of the arm *d* and the other end to one arm of a bell-crank lever *f*.

m is a shaft, pivoted in a vertical bearing and provided with a bevel gear wheel *n* pinned thereon.

o is a bevel gear wheel, its teeth engaging the teeth of the gear wheel *n*. The wheel *o* is secured rigidly upon a shaft communicating with the engine so as to have an angular velocity proportional to the speed of the engine.

g, is a grooved sleeve upon the shaft *m* adapted to slide longitudinally of said shaft. One arm of the bell-crank lever *f* engages in the groove of the sleeve *g* so that said bell-crank lever shall be rocked when the sleeve *g* is raised, the rocking of said lever in this direction acting through the connecting rod *e* and lever arm *d* to turn the throttle valve *b* toward its closed position.

i, *i* are lever arms pivoted at their adjacent ends to the shaft *m* so that they shall rotate with said shaft, said lever arm being adapted to swing about their pivots in a plane through, or parallel to, the axis of the shaft *m*.

j, *j* are governor-balls upon the outer ends of the arms *i*, *i* adapted to act by centrifugal force to turn said arms outward about their pivots upon the shaft *m*.

h, *h* are links pivoted to the outer ends of the lever arms *i i* and to the sleeve *g*.

k, is a spring acting to draw the weights *j*, *j* toward each other and to resist the centrifugal force thereof.

p, is a set-screw, the inner end of which is interposed in the path of travel of the lever arm *d* so as to limit the travel of said arm. The set-screw *p* is slotted at its outer end.

r is a pin adapted to pass through the slot *q* and hold the set-screw *p* in an adjusted position.

The operation of the above described device is as follows: The parts are so designed that before the engine has reached the predetermined speed, the centrifugal force of the weights *j*, *j* shall be counteracted by the spring *k* and the throttle valve *b* will be held in its wide open position. When the engine has reached such predetermined speed the centrifugal force of the weights *j*, *j* overcomes the tension of the spring *k* and the balls fly outward drawing the lever arm *d* into engagement with the end of the set-screw *p*, in which position the throttle valve *b* has reached the position *ba* indicated in dotted lines in which the area of the opening through the passage *a* is contracted so that the speed of the engine will be thereby limited to the predetermined value—say such speed as will drive a commercial or motor truck, under the most favorable conditions, at the rate of fifteen miles an hour. As soon as the speed falls a little below this for any cause the balls *j*, *j* are at once retracted to their first position in which the throttle valve is fully open.

It will be noticed that in this apparatus the throttle valve is at once closed to a predetermined extent and at once opened to its widest extent and that there are no intermediate positions in which the motion of the valve stops. Thus the acceleration of the engine or the vehicle is a maximum and constant, and when it has reached its re-

quired velocity, the area of the intake passage is at once adjusted to these conditions. Thus the full power of the engine is exerted when it is required for driving the vehicle and for accelerating the same, and as soon as the desired speed is attained that part of the engine-power which was required for acceleration is dispensed with, leaving the engine adapted to supply the power for driving the vehicle only. Of course the usual non-automatic controlling apparatus may also be used.

With this apparatus two positions of the throttle valve are specially contemplated, one in which the intake passage is fully opened and the other where such passage is partly closed to adjust it to the predetermined speed, therefore a carbureter especially adapted to these two conditions may be used, that is a carbureter that will give the best mixture with a wide open passage and with the passage closed to the extent contemplated.

What I claim is:—

1. The combination with a vehicle of an internal combustion engine having an intake passage, a throttle valve adapted to be adjusted to leave said intake passage wide open or to close said passage to a degree that shall maintain a required maximum speed of the engine under predetermined conditions, a governor apparatus directly connected to said valve to actuate the same at said engine speed, said governor apparatus being arranged so that the actuating force thereof shall always exceed the resisting force at and above said engine speed, and means for limiting the motion of said valve toward its closed position to a point that shall effect the closure of the intake passage to the required degree.

2. The combination with a vehicle of an internal combustion engine having an intake passage, a throttle valve adapted to be adjusted to leave said intake passage wide open or to close said passage to a degree that shall maintain a required maximum speed of the engine under predetermined conditions, and a centrifugal governor apparatus having a spring, said apparatus being directly connected to said valve to actuate the same, said governor apparatus being so arranged that the centrifugal force shall always exceed the resisting force of its spring during its actuating movement.

In testimony whereof, I sign this specification in the presence of two witnesses.

LOWELL C. FREEMAN.

Witnesses:

AGNES M. HIPKINS,

ELLIOTT J. STODDARD.