No. 626,122. Patented May 30, 1899.

A. WINTON.

SPEED REGULATOR FOR EXPLOSIVE ENGINES.

(Application filed July 27, 1898.)

(No Model.)

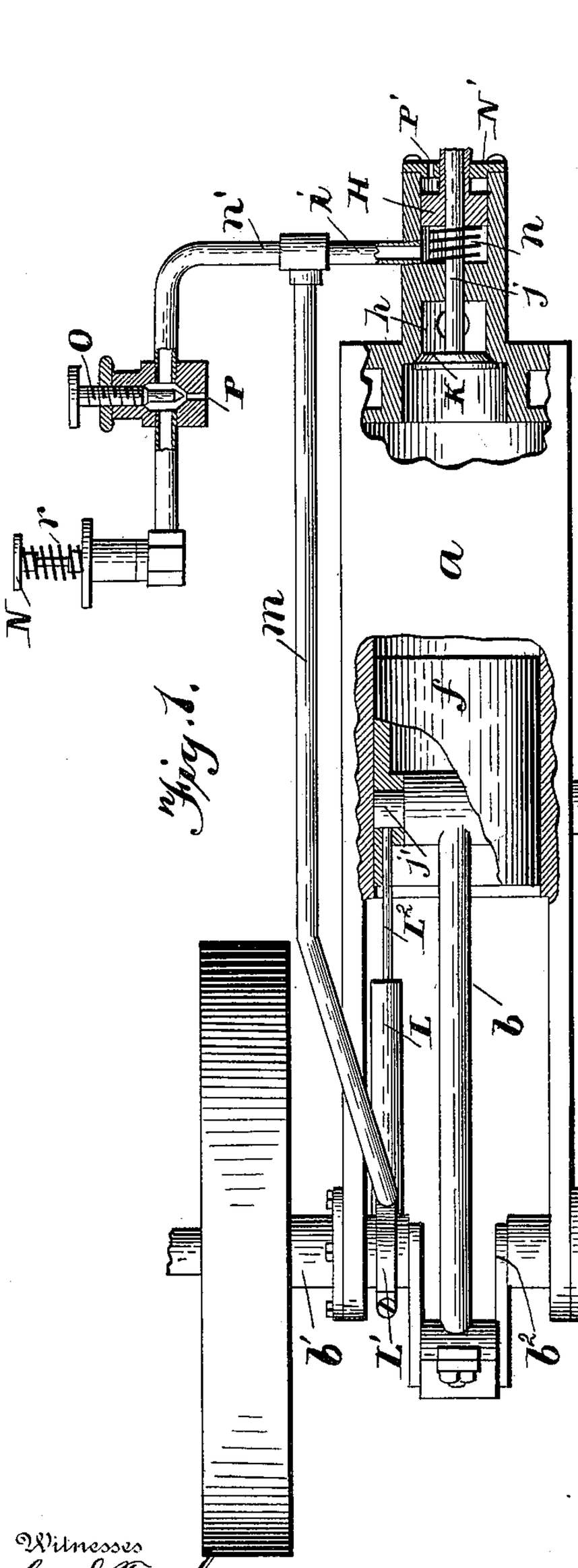

Fig. 1.

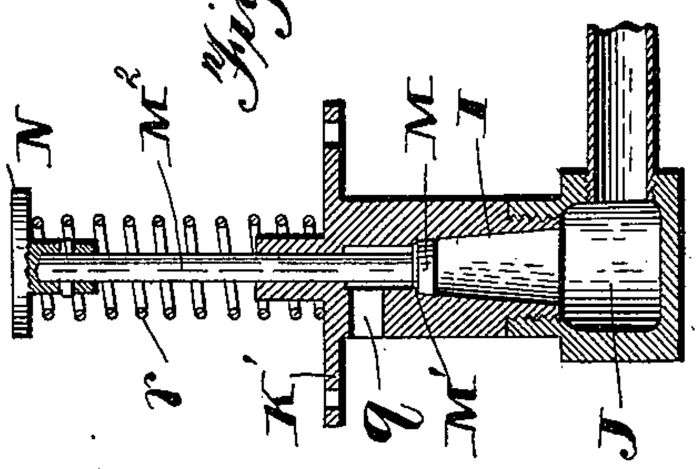

Fig. 4.

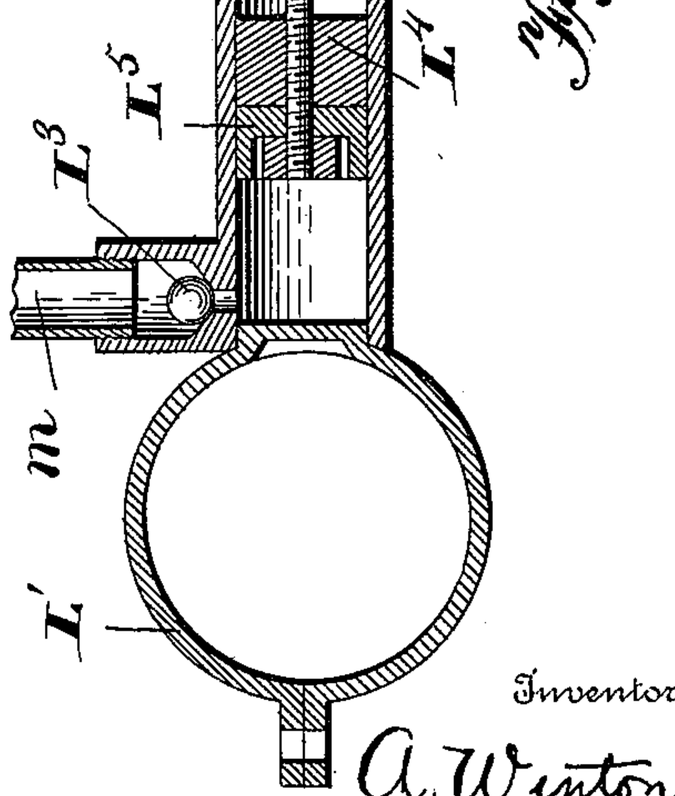

Fig. 2.

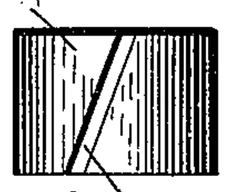

Fig. 3.

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UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

SPEED-REGULATOR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 626,122, dated May 30, 1899.

Application filed July 27, 1898. Serial No. 687,022. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WINTON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Speed-Regulators for Explosive-Engines, of which the following is a specification.

My invention relates to improvements in speed-regulators for explosive-engines, and pertains particularly to that class of engines using gasolene as the means of generating an explosive compound, though it is adapted to be used in connection with other forms of explosive-engines.

My present invention pertains to improvements in respect to the means for regulating the amount of explosive mixture admitted to the explosion-chamber, wherein a pressure-producing device is used for controlling the explosive-inlet valve.

In the accompanying drawings, Figure 1 is a top view, partly in section, of an engine embodying my invention. Fig. 2 is a detached enlarged longitudinal sectional view of the pressure-producing device. Fig. 3 is a detached side view of the piston of the pressure-producing device. Fig. 4 is an enlarged sectional view of the valve M and its seat.

Referring now to the drawings, *a* is a cylinder provided with a piston *f*, to which is connected the pitman *b*, the opposite end of the pitman being connected with the drive-shaft crank b^2 of the drive-shaft *b'*. The cylinder is provided with an explosive-inlet port controlled by the valve K, which is provided with a stem *j*, passing longitudinally through a cylinder *h*, the outer end of the stem being provided with a piston H within the said cylinder, and communicating with this cylinder to cause pressure upon the said piston is a pressure-supply pipe *i*. A pressure-producing device is in communication with this supply-pipe and is here shown in the form of a pump. The cylinder L of the pump has at one end a strap L', adapted to clamp the crank-shaft journal, which is its only support. The piston-rod L^2 is connected to the pump L and to the pitman-box *j'* of the piston *f*, and the pump-piston consists of a metallic piston L^4, having groove or grooves *k'*, which extend at an angle, as shown in Fig. 3, and a rubber or leather cup L^5 at a point inside of the metallic piston L^4. In operation when the piston is drawn outward air passes through the grooves of the piston L^4 and the leather cup L^5, which is moderately loose within the cylinder when the piston is moving outward, fits the cylinder tight when moving inward, owing to the pressure of air spreading the cup therein. This piston, while provided with the grooves extending at an angle, has a perfectly smooth round bearing-surface, which does not cut or wear the cylinder, as a longitudinal groove or grooves would do. Owing to this construction a very simple and yet exceedingly efficient piston is provided for the pressure-producing device. The supply-pipe *m* has one end connected with the inner end of the pump and its opposite end connected with the pressure-supply pipe *i* and is provided with a check-valve L^3, preferably at the upper side of the cylinder L, the said check-valve consisting of the ordinary ball-valve, which is well known and needs no particular description here.

In operation the pressure-supply device L supplies pressure against the piston H of the explosive-inlet valve, whereby the valve K is held to its seat with more or less force, according to the pressure upon the piston H, and the pressure upon the piston is of course according to the speed of the engine, and therefore the speed of the pump or pressure-producing device, as will be readily understood. A spring *n* is preferably provided for normally holding the explosive-inlet valve to its seat and the parts in their normal operative position.

The invention is especially intended and adapted for use in connection with motor-vehicles, and for the purpose of regulating the speed of the engine an escape for this purpose is provided and means for regulating the escape. A pipe *n'* extends from the supply-pipe *i* to a convenient point in the vehicle, preferably near the floor or bottom thereof just in front of the driver's seat. This pipe is provided with an escape-opening P and a governing-valve O, here shown in the form of a thumb-screw carrying a needle-valve. By regulating the amount of escape through this opening P the engine can be governed to run at one uniform speed, owing to the fact that the pressure upon the piston holds the explosive-inlet valve to its seat ac-

cording to the pressure against the piston H, and the pressure regulates the distance the valve shall open through the suction of the engine-piston *f*, and thereby the amount of explosive mixture admitted to the cylinder is accordingly regulated. Therefore the adjustment of the regulating-valve O will cause the engine to run at a uniform speed. For the purpose, however, of increasing the speed of the engine above its regulated speed I provide another and preferably larger pressure-escape *q*, which is regulated by a button N, held to its seat through the medium of a spring *r*. This button is preferably in the floor of the vehicle and, as before stated, just in front of the driver's seat, where it can be regulated by the pressure of his foot. However, it may be placed in any other position desired and operated by hand or by the foot without departing from the spirit of my invention.

The valve M and its seat M′ are of a peculiar construction, whereby a gradual opening or escape is provided under downward pressure upon the button, which is connected with the valve through the medium of a stem M^2. Attention is directed to the seat, which consists of an elongated tapered opening I, in which the valve M moves longitudinally. The lower portion of this opening communicates with a chamber J, into which the valve moves when at its limit of downward movement and is carried upward into the tapering opening through the medium of the spring before mentioned. The escape-opening *q* is at a point above the upper movement of the valve M, whereby a slight downward pressure upon the button will open the valve very slightly, owing to the tapered elongated opening in which it moves, and the opening gradually increases as the valve moves downward until the valve reaches its lower end, when the opening is entirely free for the escape of the pressure. This arrangement is found to be exceedingly valuable in a motor-vehicle when applied to the combination herein shown and described for regulating the speed thereof in that it prevents a sudden opening of the escape and permits a gradual opening thereof, so that the speed of the engine is gradually increased or decreased as the valve is moved within its elongated tapering seat. The upper end of this elongated tapering seat or tube is provided with a laterally-projecting flange K′, provided with openings by means of which it is secured to the under side of the bottom of the vehicle, an opening being provided in the bottom through which the valve-stem projects and carries at its upper end the button before referred to.

When it is desired to increase the speed of the engine, pressure is placed upon the valve-stem or button, which permits a gradual increase of the escape of the pressure therethrough to the escape-opening *q*, thus releasing the pressure upon the piston H and therefore permitting the inlet-port valve to open farther, admitting a larger charge of the explosive mixture, and consequently increasing the speed of the engine.

To prevent the annoying clicking sound from the seating of the inlet-port valve, especially when the engine is running at high speed, I provide a dash-pot or air-pressure at the end of the cylinder *h* by extending the cylinder beyond the piston H and providing it with a cap N′. This cap N′ is provided with a passage or passages P′, whereby when the valve is being seated a cushion is provided therefor which prevents it from having that clicking sound and also prevents wear upon the valve and its seat.

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

1. An explosive-engine comprising an explosion-chamber, an explosive-inlet valve, a pressure-actuated member connected with said valve, a pressure-producing device in communication with the pressure-actuated member, a pressure-escape for said pressure communication, an endwise-moving valve controlling said escape, and a spring for holding the valve normally closed, whereby the valve is adapted to be controlled by the downward pressure of the foot or hand, substantially as described.

2. In an explosive-engine an explosion-chamber, an explosive-inlet valve, a pressure-actuated member connected with said valve, a pressure-producing device in communication with said pressure-actuated member, a pressure-escape comprising an elongated tapering valve-seat having an escape-opening, and a valve situated within said seat and of a length less than the length of the elongated seat, substantially as described.

3. In an explosive-engine the combination of an explosive-inlet port, an explosive-inlet valve therefor, a pressure-actuated member connected with said valve, a pressure-producing device in communication with the said pressure-actuated member, an elongated valve-seat having its enlarged end in communication with the pressure communication and an escape at its small end, and a valve longitudinally movable within the elongated seat in a direction toward the enlarged end of the seat, substantially as described.

4. An explosive-engine comprising an explosive-chamber having an explosive-inlet port, a valve therefor, a pressure-actuated member connected with said valve, a pressure-producing device in communication with said pressure-actuated member, an escape for said pressure, a governing-valve therefor to regulate the engine to a given speed, a second escape, and a valve for controlling the said second escape and thus varying the speed of the engine, substantially as described.

5. In an explosive-engine, an explosive-chamber, an explosive-inlet port, a valve therefor having a pressure-actuated member connected therewith, a pump having one end

surrounding the drive-shaft of the engine, a piston for the pump having its projecting end connected directly with the engine-piston, and a communication between the pump and the said pressure-actuated member, substantially as described.

6. In an explosive-engine the cylinder, a piston therefor, the cylinder having an explosive-inlet port, a valve therefor, a pressure-actuated member connected with said valve, a pump situated in a line with the engine-piston, a pump-piston having a rod connected directly with the engine-piston, the pump-piston having a yielding cup at its inner end and provided with an angularly-arranged groove at a point outside of the yielding cup, and a communication between the pump and said pressure-actuated member, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALEXANDER WINTON.

Witnesses:
THOS. HENDERSON,
GEO. H. BROWN.