No. 638,440. Patented Dec. 5, 1899.

E. BRILLIÉ.

COMBINED DISTRIBUTER AND REGULATOR FOR EXPLOSIVE ENGINES.

(Application filed Jan. 11, 1899.)

(No Model.)

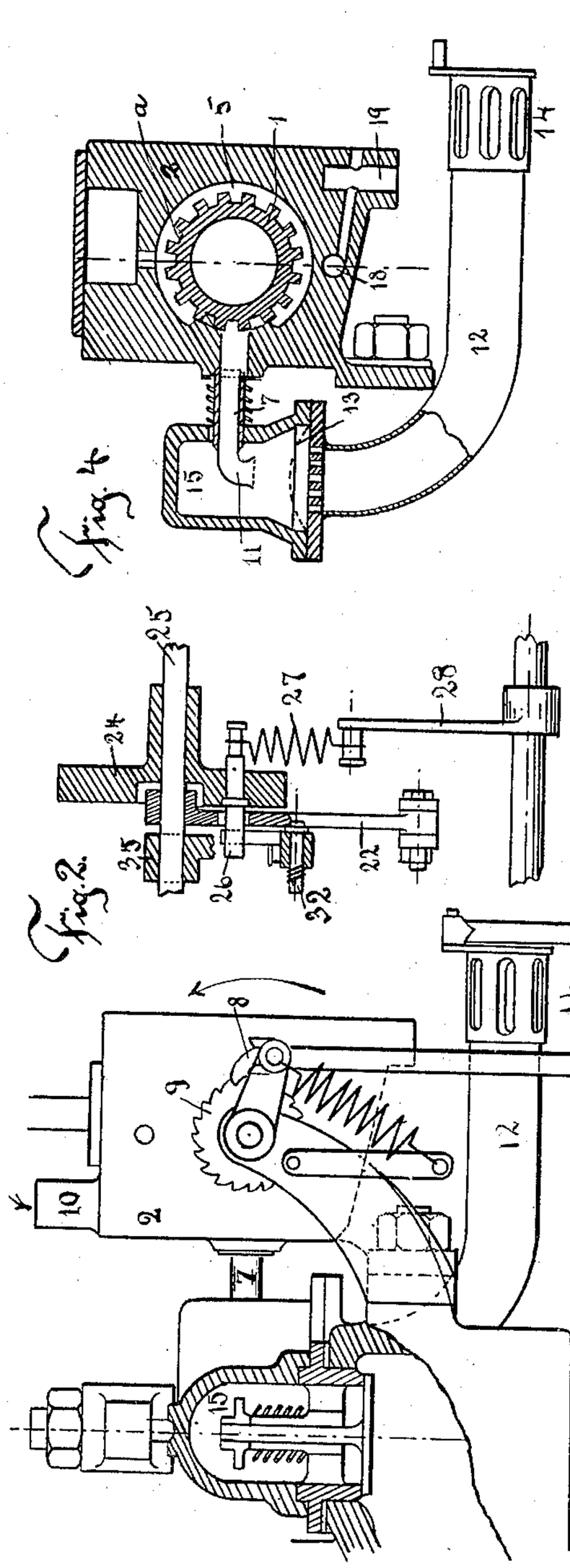

Fig. 1.

Fig. 2.

Fig. 4.

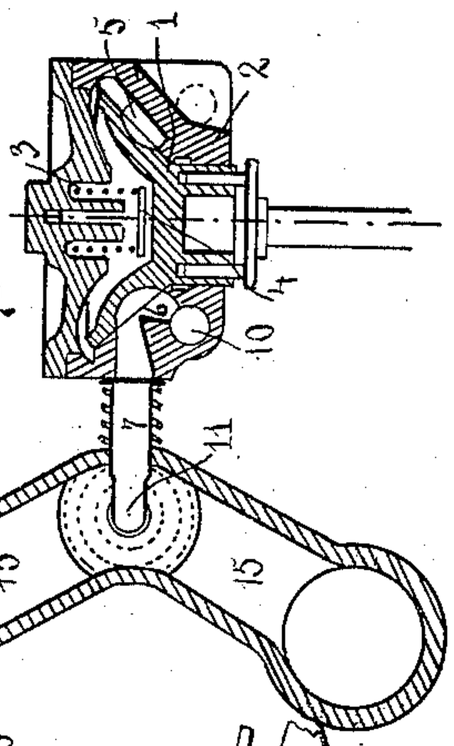

Fig. 5.

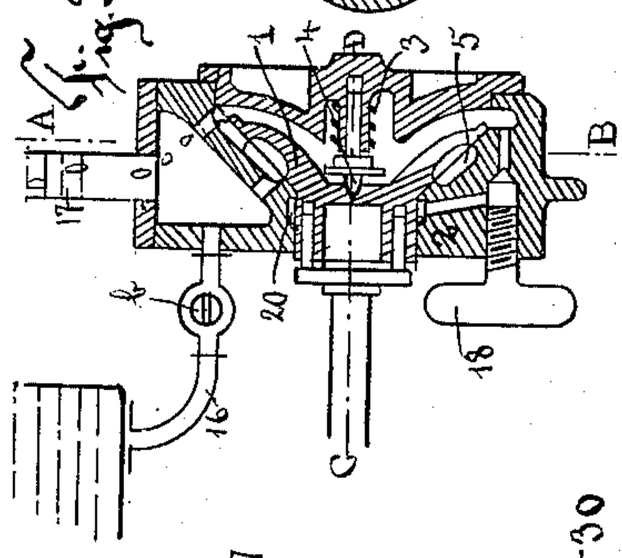

Fig. 3.

WITNESSES

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EUGENE BRILLIÉ, OF PARIS, FRANCE.

COMBINED DISTRIBUTER AND REGULATOR FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 638,440, dated December 5, 1899.

Application filed January 11, 1899. Serial No. 701,859. (No model.)

To all whom it may concern:

Be it known that I, EUGENE BRILLIÉ, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in a Combined Distributer and Regulator for Explosive-Engines, (for which I have obtained a patent in France, No. 279,077, dated June 21, 1898;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an inertia-regulator for explosive-engines; and its object is to provide a means whereby a uniform speed of the engine is insured independent of resistance and which can be readily controlled by the attendant.

The invention also contemplates means for automatically regulating the supply of liquid fuel to be evaporated into the volume necessary for each explosion.

Other objects and features of a minor nature will disclose themselves in the course of the following description and by reference to the accompanying drawings, forming part of this specification, which illustrate a preferred form of my combined regulator and distributer.

In said drawings, Figure 1 is an elevation, partly in section, showing the general arrangement of the coacting elements. Fig. 2 is a cross-section through the axis of the regulator. Figs. 3, 4, and 5 illustrate rectangular sections of the distributer. Fig. 3 is a longitudinal section through the distributer. Fig. 4 is a section on line A B of Fig. 3, and Fig. 5 is a section on line C D of Fig. 3.

Similar numerals and letters of reference denote like parts throughout the several views.

A valve 1, preferably of conical shape, is seated in a casing 2, where it finds a bearing on a spring-pressed center point 4, carrying a coil-spring 3. The valve is provided circumferentially with cells or depressions *a*, placed equidistant from each other and which at a certain fraction of a revolution of the valve are fed from a circular canal 5, filled with oil or other liquid fuel. The casing 2 is further provided with an air-supply conduit 6 and with a conduit 7, leading to the aspirating-chamber of the engine. The rotation of the valve is effected by a ratchet 8, actuating a ratchet-wheel 9, the ratchet receiving its motion from a regulator, to be presently described, which acts in case of excessive speed of the engine to paralyze the movements of the ratchet, and in consequence the rotation of the valve 1, thus stopping for the time the supply of fuel to the engine, the number of teeth of the wheel 9 coinciding with the number of cells of valve 1. Air is supplied to the distributer through a vertical conduit 10, which may communicate with a hot-air source, if desired.

The valve 1 turns in the direction of the arrow, Fig. 1. At the moment when an empty cell registers with the conduits 6 7 the aspiration of the engine produces through these conduits an inrush of air, which forces the liquid forward into the cell. The pulverized mixture brought into the chamber of aspiration by the conduit 7 is passed through a sieve 11 and directed to come into contact with the current of air passing through the conduit 12. The stirring up or perturbation produced by two currents arriving from opposite directions produces a complete vaporization of the liquid and gives an explosive mixture as homogeneous as possible. A wire gauze 13 or other screen may be placed between these two conduits, so that the small drops of liquid may be retained and their complete vaporization accomplished. The air which enters at 12 is regulated by a register or a clock-valve 14, which is designed to produce in the chamber 15 at the moment of aspiration a sufficient depression to cause the entrance of sufficient air from the conduits 6 7.

The fuel enters the distributer through a conduit 16, furnished with a cock *b*. At 17 is provided a vertical tube for the escape of the air-bubbles emitted from the cells in replenishing them.

At 18 is situated a clearing-valve, which permits communication between the distributer and the clearing-conduit 19.

The cone of the valve 1, toward the side into which the motive fluid moves, projects in the form of a cylinder where it engages the catches. This cylindrical part is surrounded

by a slot 20, provided in the casing, adapted to draw off any drippings that may accumulate in the conduit 19.

The catch arrangement which actuates the valve 1 receives its motion from a rod 21, moved by a regulator. This regulator consists of a lever 22, which receives an oscillatory motion from a cam mounted on the driveshaft 23. A cylindrical weight 24, mounted loosely on the spindle 25 of the lever 22, has a projection 26, which passes with a certain play in a slot in the lever 22 or between two stationary pins in the lever. The weight is actuated by a spring 27, the tension and obliquity of which can be varied by means of a lever 28, keyed to a hand-lever 29, which is placed on the reversing guide or rack 30 31. A bell-crank lever 32, moving around an axis 33, is mounted on the lever 22, actuated by a spring *c*, which tends to pull the upper arm against the projection 26. This bell-crank lever operates with its end 34, which is forked, to catch the projection of a lever 35, mounted on the spindle 25, and the oscillation of which causes the working of the catch arrangement through the rod 21. At 36 is placed a stop, which limits the lower course of travel of the lever, which is controlled by the spring through the medium of the rod 21.

The apparatus operates as follows: The hand-lever 29 being secured in one of its positions in the teeth of the sector 30 31 which corresponds with the speed desired, the spring 27 tends to draw the projection 26 against the right side of the opening in the lever 22. While this contact is maintained the oscillation of the lever is integrally transmitted to the combination consisting of the lever 22, the weight 24, the bell-crank lever 32, the lever 35, and the catch arrangement 8 and 9. Under these conditions at each revolution an empty cell is brought before the conduits 6 7 and a moment afterward the liquid is drawn in by the aspiration of the engine. If the speed tends to become excessive, the efforts of inertia of the weight 24 increase. This weight tends to be thrown out and to bring out of contact the projection 26 and the right-hand side of the lever 22 at the moment that the lower part of that lever is to the left—that is, at the moment that the end of the bell-crank lever is separated from the lever 35 by the action of the stop 36. This displacement relative to the weight 24 in connection with the lever 22, makes the bell-crank lever 32 oscillate around its spindle 33, and the moment afterward, the lever 22 will be pushed to the right, and the end 34 of the bell-crank lever, being raised, will avoid the projection or finger of the lever 35. The lever 35 rendered thus inactive, the rotation of the valve 1 will be arrested and the engine will run by the speed acquired. If that speed is slightly diminished, the efforts of inertia of the weight 24 being less the combination will start afresh, as before described, to operate the ratchet arrangement, and in consequence the distribution of the liquid is resumed.

In modifying the position of the lever 29 the action of the spring 27 is also modified, and in consequence the speed of the engine.

To stop the engine, it is sufficient to bring the lever 29 back toward the end 30 of the sector 30 31 in such a manner that the spring 27 brings the projection 26 toward the left and so that the bell-crank lever finds itself lifted up permanently.

It is evident that the admission of air through the conduit 12 must be regulated so that the depression in the chamber is sufficient to draw in the air through the conduits 6 7.

The register 14 will be opened more according as the speed of the engine increases. To automatically regulate this condition, I connect the register 14 by a rod 37 with the hand-lever 29, so as to establish a free correlation between speed dependent on each position of the lever and the corresponding section of the register. This system of distribution is also applicable as well with two-phase and four-phase engines, single or with two cylinders to give a stroke at each revolution. In the latter case the conduit 7 discharges into an aspirating-chamber common to both cylinders. This is the case in Fig. 5.

According to an engine giving one impulse per revolution or one impulse with two revolutions the lever 22 will oscillate once at every one or two revolutions, as the case may be. The shaft 23 will then, according to circumstance, be the motive shaft itself or a shaft of half that speed.

The same regulator may be employed with other distributers than the one described—with distributers worked by a pump or by a compressor, for instance, or with any other volumetric distributer as long as they are fed with liquids. In a gas-engine it may be employed as the admission-valve for the gas. Finally it may be employed in all explosive-engines to act on the escape-valve in opening that valve or keeping it shut, according to whether the speed tends to decrease or to increase. This opening can be accomplished by the end of lever 35 or by any other suitable intermediary.

It is evident that various changes may be made in the forms, constructions, and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not limit myself to the construction disclosed, but consider myself entitled to all such changes as fall within the spirit and scope of my invention.

What I claim is—

1. In an explosive-engine fed by a revoluble distributer, as described, in combination, a regulating device for controlling said distributer, comprising spindle 25, the heavy weight 24 loosely mounted thereupon, slotted lever 22 mounted upon said spindle; eccentric mechanism connecting said lever with the

drive-shaft; the spring-pressed bell-crank lever 32 mounted upon lever 22 and bearing against a projection of the weight 24, extending through the slot of said lever, said projection; the lever 35, the operating-lever 29 and intermediate mechanism connecting said levers and the distributer for actuating the same, substantially as described.

2. As an improvement in explosive-engines, a combined distributer and regulator, consisting of the valve 1, the casing 2 in which said valve is seated, the canal 5, and means for automatically and successively bringing said valve into register with the fuel-supply and for admitting a current of air to pulverize the liquid, embodying an oscillating heavy body, eccentric mechanism for actuating the same, operated by the drive-shaft, a spring tensioning said body, whereby the weight of the same is equilibrated, a hand-lever for adjusting the potency of said spring, a ratchet mechanism for the distributer, and mechanism for transmitting motion from said oscillating body upon the ratchet device, as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE BRILLIÉ.

Witnesses:
EUGÉNE BLANC,
EDWARD P. MACLEAN.