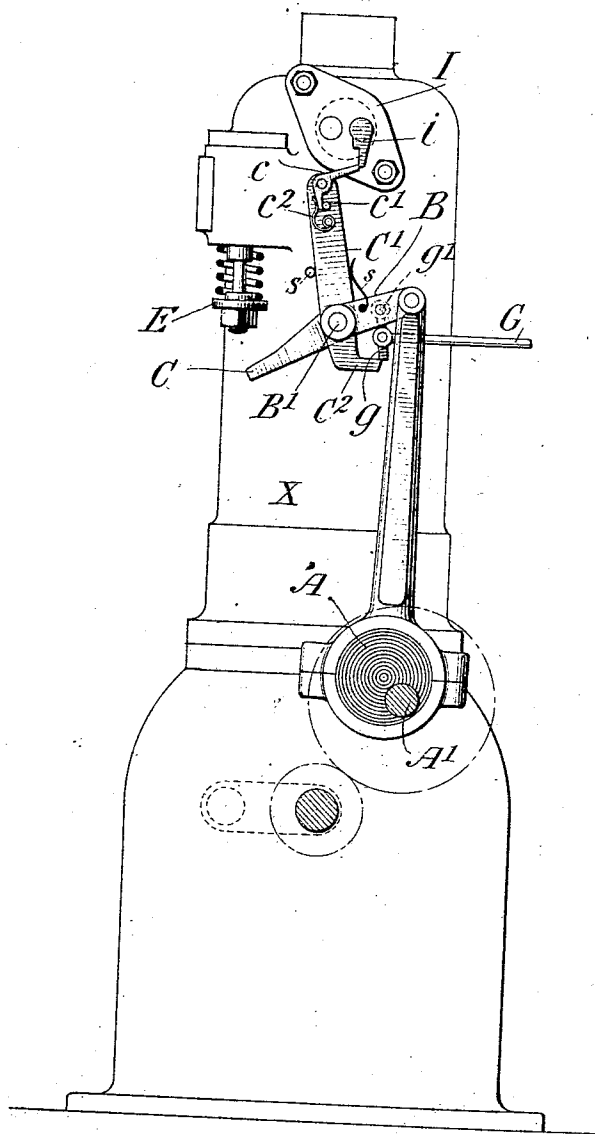


(No Model.)

J. SALTAR, Jr.
INTERNAL COMBUSTION ENGINE.

No. 564,766.

Patented July 28, 1896.



WITNESSES:

C. E. Ashley
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UNITED STATES PATENT OFFICE.

JOHN SALTAR, JR., OF CHICAGO, ILLINOIS, ASSIGNOR TO THE OTTO GAS
ENGINE WORKS, OF PHILADELPHIA, PENNSYLVANIA.

INTERNAL-COMBUSTION ENGINE.

SPECIFICATION forming part of Letters Patent No. 564,766, dated July 28, 1896.

Application filed November 15, 1895. Serial No. 589,080. (No model.)

To all whom it may concern:

Be it known that I, JOHN SALTAR, JR., a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to that class of engines in which a gaseous mixture drawn into a cylinder is exploded by a suitable ignition device. Such engines are usually four-cycle engines, but may be made double-acting, and my invention hereinafter described is not limited to a characteristic type in this regard.

Heretofore the explosive mixture in the cylinder has been ignited by a device for producing an electric discharge or spark, by a jet of flame, or by a highly-heated ignition-tube exposed to the explosive mixture compressed in the cylinder. My invention is not limited to either type of engine in this regard.

Heretofore it has been proposed to govern the speed of an internal-combustion engine by controlling the action of the ignition device by any suitable governor mechanism. Thus in the patent of Winand, No. 507,315, an electric-spark igniter device is shown whose circuit is interrupted by the governor when the engine exceeds the desired speed, the opening of the circuit preventing the ignition of the explosive mixture in the cylinder. The patent of Otto, No. 433,813, shows a governor mechanism acting to close communication between the cylinder and the ignition-tube when the desired speed of the engine is exceeded, the explosion of the mixture within the cylinder being thereby prevented. This patent of Otto also shows an arrangement for preventing or suspending the action of the exhaust-valve at a time when the ignition device is prevented from effecting the explosion of the mixture within the cylinder, such control of the exhaust-valve being dependent upon the pressure within the cylinder; that is to say, in the normal running of the engine the device for operating the exhaust-valve engages and opens it at the proper time, but when the desired speed of the engine is exceeded and the ignition of the charge is prevented the

relatively lower pressure in the cylinder at that time will prevent the engagement of the exhaust-valve-operating device with the exhaust-valve, and the exhaust-valve remains closed. The unexploded mixture is therefore retained in the cylinder, and is alternately compressed and expanded by the following strokes of the piston until the speed has been so reduced as to permit the usual ignition of the charge, and then the relatively high pressure in the cylinder will effect the proper opening of the exhaust-valve.

My invention consists in an improved organization of instrumentalities, comprising a governor of suitable character, an ignition device, an exhaust-valve, and means controlled by the governor for simultaneously preventing or suspending the action of the ignition device and the opening of the exhaust-valve when the desired speed of the engine is exceeded.

In the case of an electrical igniter the governor may open the circuit exterior to the electrodes or the separable contacts where the electric spark is generated, or the separation of movement of such electrodes may, by the governor, be prevented or suspended. Where the ignition of the charge is effected by exposing a highly-heated ignition-tube or other highly-heated surface to the compressed explosive mixture in the cylinder, the action of the governor may be such as to occlude from the mixture the heated surface, and where a jet of flame to which the explosive mixture is exposed is employed the governor may act to occlude the flame, or to prevent its development in cases where intermittently-developed flame jets are used; or the operation may be otherwise than above indicated, depending upon the special style of ignition device.

I have above suggested the usual kinds of ignition devices that have generally been used. As above stated, the exhaust-valve may be of the usual type, or it may of course be of any special type. It is quite apparent that in practice various styles of governors, ignition devices, and exhaust-valve mechanisms may be employed, and that the device or mechanism operatively connecting the governor and the ignition device and exhaust-

valve may be varied and adapted to particular makes or styles of internal-combustion engines. The desirable features and advantages incident to placing the ignition device and exhaust-valve both under the control of the governor will be appreciated by those skilled in the art.

In the accompanying drawing, which is an elevation of a vertical internal-combustion engine, I have shown my invention embodied in a practical and efficient form.

An eccentric A on a shaft geared to half the speed of the crank-shaft A' is pivotally connected to a link B, fulcrumed on a pin or shaft B'. A lever having three arms is also fulcrumed on this pin and is provided with a back-stop S and a spring s, mounted on the link B, that tends to press the three-armed lever against the stop. One arm, C, controls or actuates the exhaust-valve E at proper times, another, C', controls or actuates the electric ignition device I, and another, C'', is engaged by the hit-or-miss device of a governor of any suitable type, of which G is the controlling arm or bar. The arm C' carries a pawl c, normally held against a pin c' by a spring c'', and the free end of the pawl is adapted to normally operate the movable part i of the electric igniter I. The movement of the part i may effect the separation of the electrodes to produce the spark to ignite the explosive mixture in the cylinder X, or may otherwise affect the circuit of the igniter to render it effectual. The end of the governor-rod G is pivoted to a pendent pin g, pivoted at g' to the link B and whose lower end engages or misses the end of the lever-arm C'', according to whether the governor-rod is sufficiently far to the left or not.

In the operation of the engine at or below the desired speed the pin g engages the arm C'' and the three-armed lever is moved with the link B and shaft B'. The pawl on the arm C' then effects the operation of the ignition device at the proper time, and by the

continued movement of the parts the arm C strikes the stem of the exhaust-valve and opens the valve. The explosive mixture is drawn into the cylinder as usual, the inlet-valve not being shown. When, owing to an increased speed of the engine, the governor-rod G is drawn to the right and the pin g disengages the end of the arm C'', the lever C C' C'' does not move with the link B and the arms C C' respectively fail to effect the ignition of the charge in the cylinder and the opening of the exhaust-valve.

As the general details of construction and operation of engines of this general class are well known, further illustration and description are deemed unnecessary.

I claim as my invention—

1. In an internal-combustion engine, the combination of an ignition device, an exhaust-valve, a governor and means controlled by the governor for preventing or suspending the action of both the ignition device and exhaust-valve when the desired speed of the engine is exceeded, substantially as set forth.

2. In an internal-combustion engine, the combination of an ignition device, an exhaust-valve, a governor, and mechanism operatively connecting the governor both with the ignition device and exhaust-valve, such mechanism comprising a movable device normally controlled by the governor to effect the timely operation of the ignition device and exhaust-valve, and a device for disengaging the governor from said movable device to prevent or suspend the operation of the ignition device and exhaust-valve when the desired speed of the engine is exceeded, substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

JOHN SALTAR, JR.

Witnesses:

PAUL A. N. WINAND,
ADOLF LUETHY.