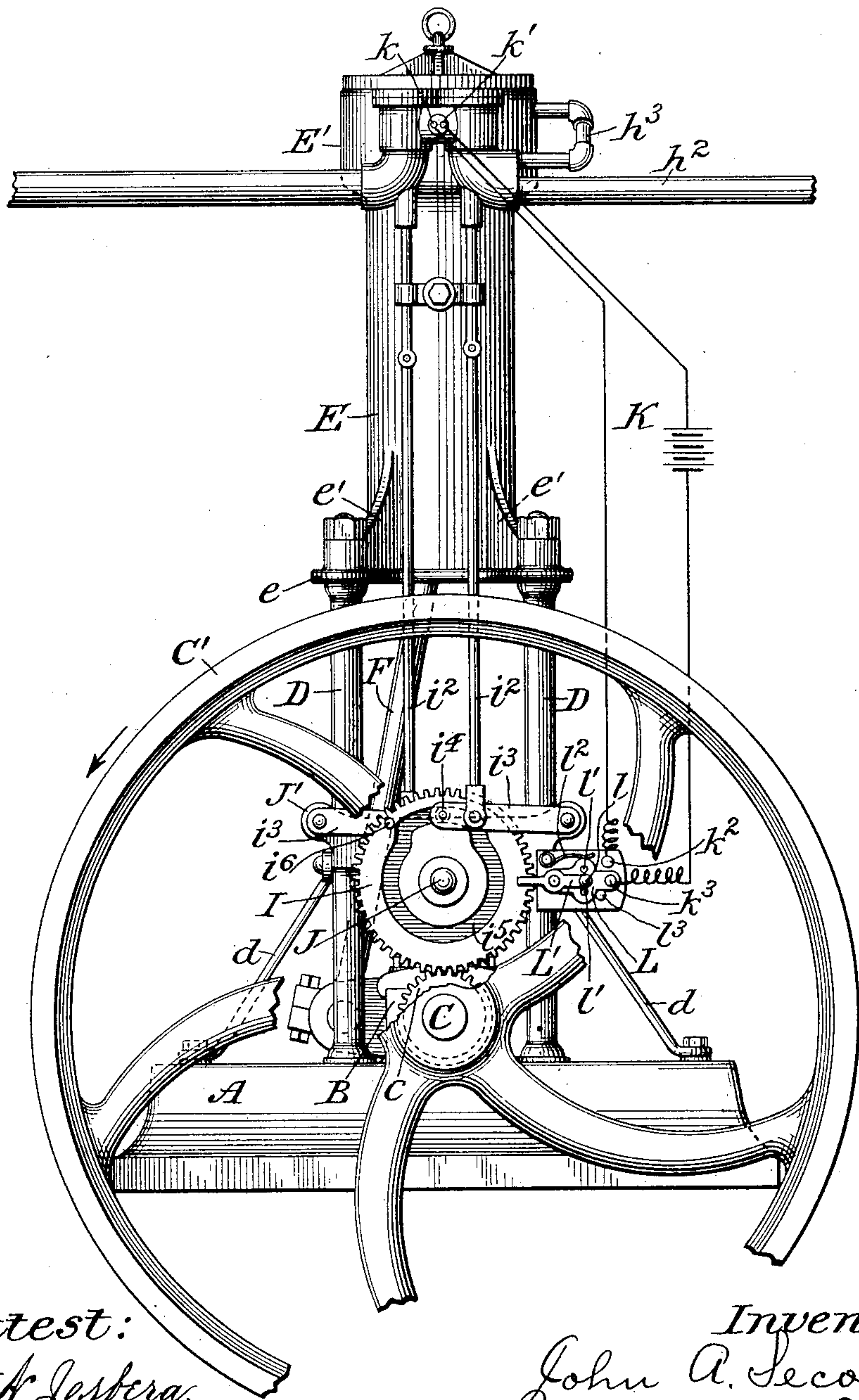


(No Model.)

J. A. SECOR.
EXPLOSIVE ENGINE.

No. 602,477.

Patented Apr. 19, 1898.



Attest:
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UNITED STATES PATENT OFFICE.

JOHN A. SECOR, OF BROOKLYN, NEW YORK.

EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 602,477, dated April 19, 1898.

Application filed April 13, 1897. Serial No. 631,987. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. SECOR, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

10 This invention relates to engines of that class in which the propulsive force is derived from the explosion of a gas or gaseous mixture in rear of the piston; and it has for its object to overcome in some measure the difficulty of starting engines of this class.

15 The various features of invention will be more fully described hereinafter with reference to the accompanying drawing, in which they are illustrated.

20 In the drawing the figure is a side elevation of an engine to which my improvements are applied, the fly-wheel being partly broken away to show parts behind it.

25 The engine is represented as supported upon a bed-plate or pedestal A, the pillow blocks or bearings B B, in which the crank-shaft C is mounted, being supported directly thereon or forming a part of one integral casting therewith. Four posts or standards D D support the cylinder E at a suitable distance above the pedestal to afford room for the necessary play of the piston-rod F, the said standards being braced by rods d d , which are bolted to said standards and to the bed-plate A, which is oblong in plan. At its lower end the cylinder E has a flange e to receive the upper ends of the standards D D, webs e' being cast with the cylinder to stiffen the flange at the four corners. This construction affords a very rigid frame without undue weight.

35 The inlet-port and the outlet-port, both controlled by valves, as hereinafter described, communicate with the cylinder through a common port. Air is conducted to the inlet-port from any suitable source through a pipe h^2 , and a second pipe h^3 conducts the oil-vapor to said pipe h^2 , so that when the port h is opened and the air is admitted the vapor will be mingled with it and carried by it into the cylinder to form the explosive mixture.

40 The valves which control the ports h and

h' , respectively, may be operated by any suitable or well-known means. I have represented each valve-stem as connected by a link i^2 with a corresponding lever i^3 , which has a pin and roller i^4 entering a cam-groove i^5 in one side or the other of a gear I. The latter is mounted upon a stud J, secured to a cross-bar J', fixed to two of the standards D, and is engaged and driven by a pinion c on the crank-shaft C.

It is well understood that in the operation of engines of this class the ignition of each charge takes place at the instant when the piston is at the extreme limit of its rearward movement and that in starting up it sometimes happens that the explosion takes place before the crank has passed the dead-center, so that the crank-shaft is driven in a direction contrary to that intended. As the engine is usually started by seizing the fly-wheel C' with the hands and giving it one or two turns in the desired direction, this impulse in the opposite direction is liable to cause injury to the operator and is generally objectionable. I have therefore sought to provide means whereby the ignition shall be delayed slightly in starting up and may be made to occur at the proper time after the engine has been well started. It will be obvious that many different mechanical devices may be employed for this purpose. I have illustrated in the drawing one convenient and practical form, which I will presently describe. An electric circuit K is represented diagrammatically in the drawing, having its electrodes k k' within the cylinder. The circuit is represented as normally open at k^2 k^3 , one leg of the circuit being connected to a suitable contact k^2 and the other being connected to another, k^3 , which is carried by a switch L, mounted in proximity to some moving part of the engine—as, for example, the cam-gear I. A finger L' is pivotally mounted upon or with the switch L and is adapted, at one end, to engage the switch L, as by means of a knob l on the finger and depressions l' in the switch, while its other end projects into the path of a pin i^6 on the cam-gear I. A spring l^2 holds the switch normally against a stop l^3 , with the circuit open at k^2 k^3 . Before starting the engine the finger L' is turned upon the switch L, so that its outer

end shall be lowered and therefore struck by the pin i^6 on the cam-gear I later than it would otherwise be struck. When the finger is struck by the pin, the switch is shifted to
5 close the circuit and ignite the charge. Therefore if the striking of the finger and the shifting of the switch are delayed relatively to the movement of the piston, as already described, the ignition of the charge will be correspond-
10 ingly delayed, so that it shall take place after the crank has passed the dead-center in its forward movement. After the engine has been fairly started the finger L' may be shifted back to its normal or desired position with
15 respect to the switch, so as to cause the circuit to be closed earlier and the ignition of the charge to take place earlier or at such time as the operation of the engine may prove to be most desirable.

20 The mode of operation of the engine herein described is substantially the same in general as that of other engines of the same class ex-

cept as indicated herein and need not be described more particularly.

It will be understood that I do not intend 25 to limit my invention to the precise details of construction and arrangement shown in the drawing except as pointed out in the claim.

I claim as my invention—

In an explosive-engine, the combination 30 with a cylinder, piston, crank-shaft and connections, of an electric igniter having a normally open circuit, a switch to close said circuit and a finger pivoted upon said switch and movable to a limited extent with respect 35 thereto, said finger projecting into the path of the moving part of the engine.

This specification signed and witnessed this 12th day of April, A. D. 1897.

JOHN A. SECOR.

In presence of—

W. B. GREELEY,
F. M. EGGLESTON.