

No. 608,409.

Patented Aug. 2, 1898.

J. LIZOTTE.

IGNITING MECHANISM FOR EXPLOSIVE ENGINES.

(Application filed Nov. 17, 1897.)

(No Model.)

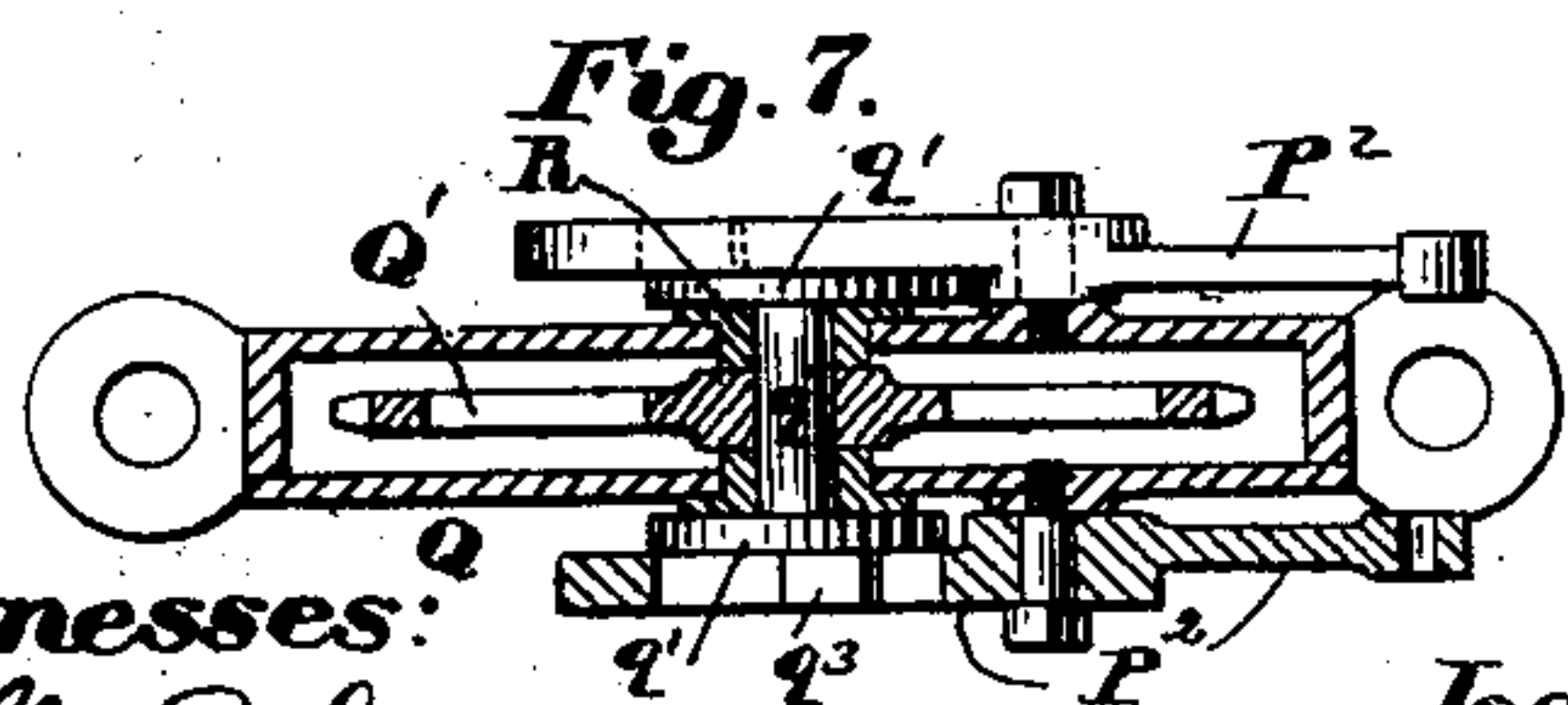
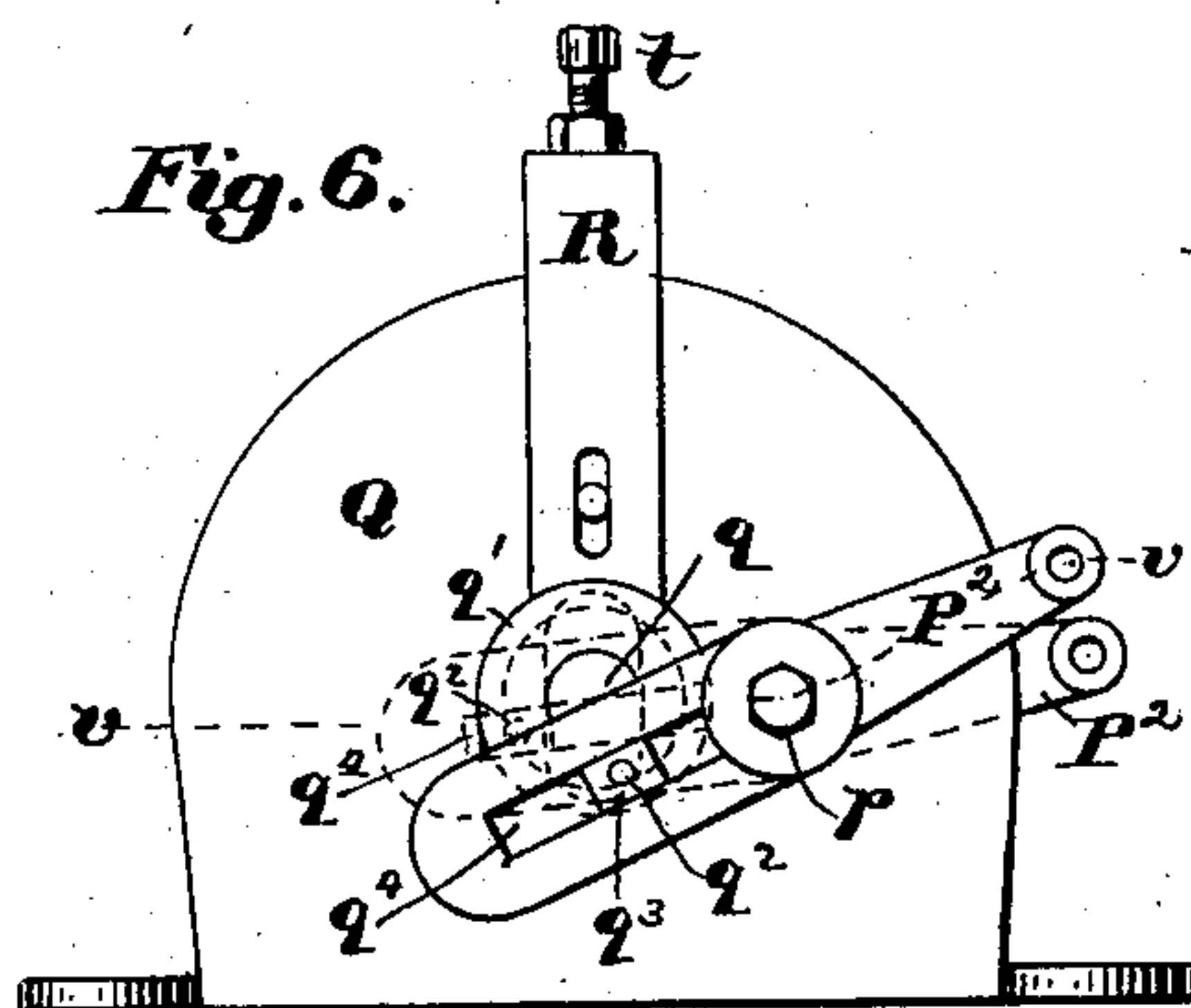
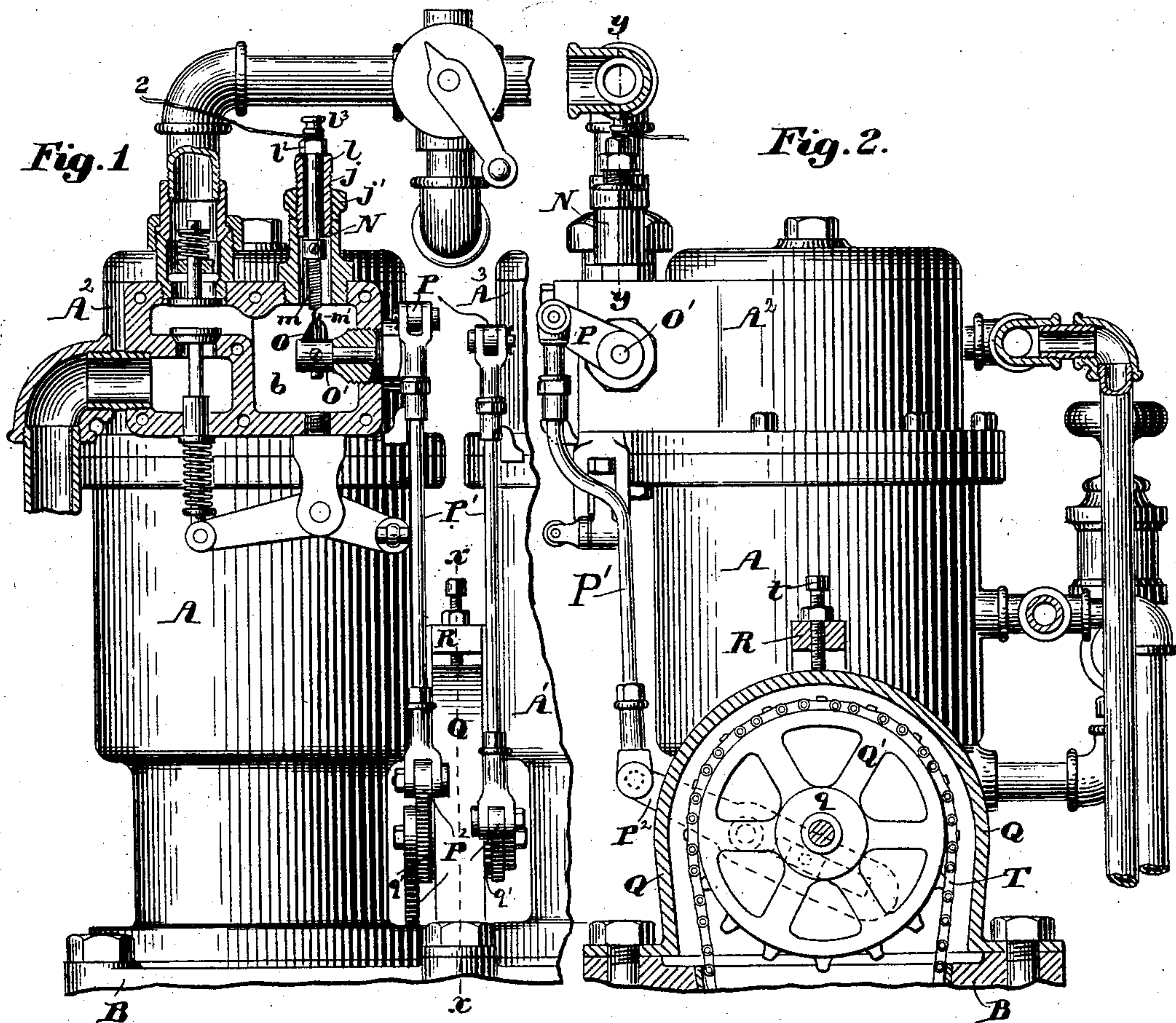


Fig. 5. Fig. 4.

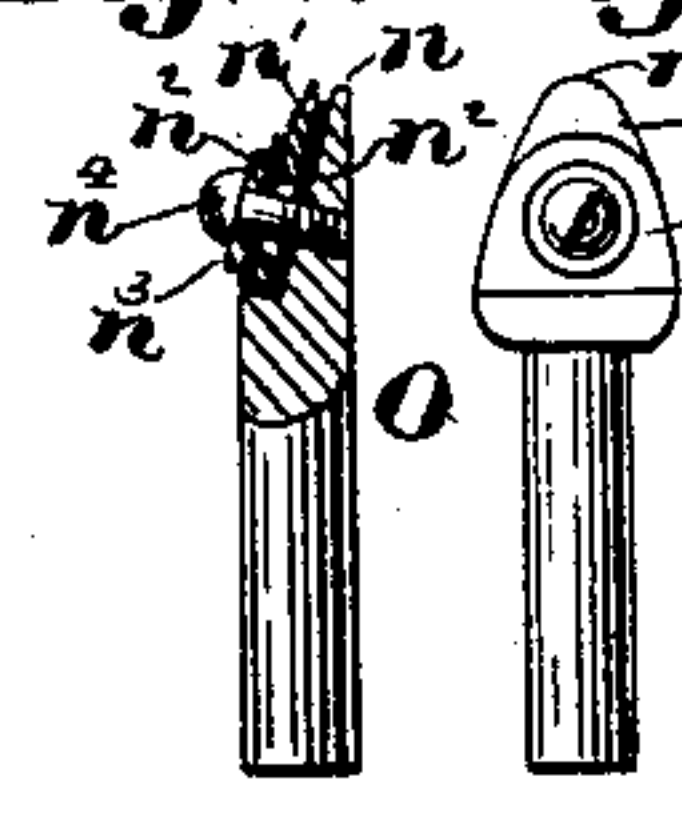
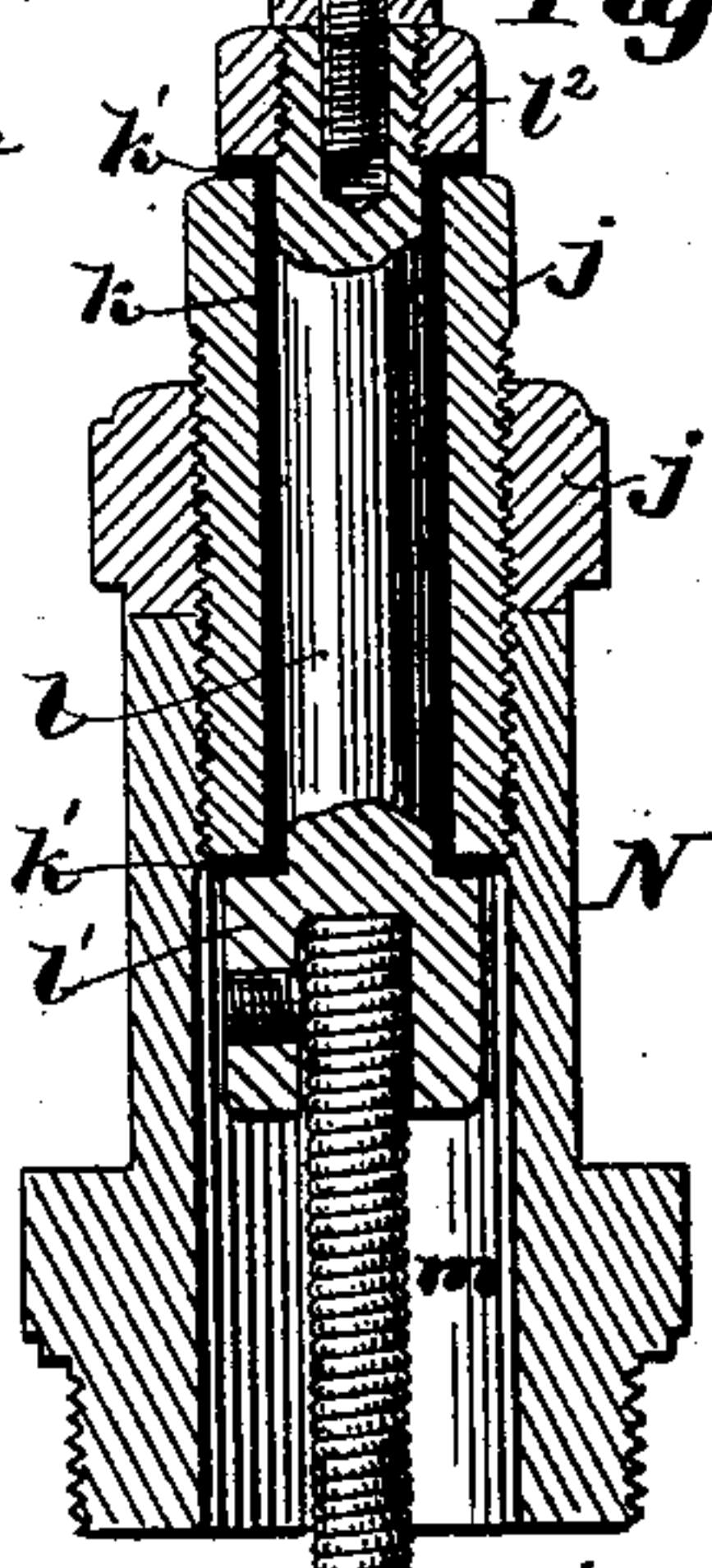


Fig. 3.



Witnesses:  
Walter E. Lombard.  
William E. Davis

Inventor:  
Joseph Lizotte,  
by N. C. Lombard Atty.



# UNITED STATES PATENT OFFICE.

JOSEPH LIZOTTE, OF QUINCY, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO  
MELLEN N. BRAY, OF BOSTON, MASSACHUSETTS.

## IGNITING MECHANISM FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 608,409, dated August 2, 1898.

Original application filed June 28, 1897, Serial No. 642,569. Divided and this application filed November 17, 1897. Serial No. 658,800. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH LIZOTTE, of Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Igniting Mechanism for Explosive-Engines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to igniting mechanisms for explosive-engines and is a division of another application of mine for a patent for a gas-engine, filed June 28, 1897, Serial No. 642,569; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the accompanying drawings and to the claim hereto appended and in which my invention is clearly pointed out.

Figure 1 of the drawings is a sectional front elevation, broken away, of so much of an explosive-engine as is necessary to illustrate my invention. Fig. 2 is a sectional elevation, the cutting-plane being on line  $x x$  on Fig. 1 and looking toward the left of said figure. Fig. 3 is a sectional elevation of one of the upper electrodes and its supporting devices, the cutting-plane being on line  $y y$  on Fig. 2. Figs. 4 and 5 are respectively an elevation and a sectional elevation of one of the lower or oscillating electrodes. Fig. 6 is an elevation of the crank-shaft, cranks, and levers for operating the oscillating electrode and the exhaust-valves of the engine; and Fig. 7 is a sectional plan of the same, the cutting-plane being on line  $v v$  on Fig. 6.

In the drawings, A and A' are the two cylinders, mounted upon the table or plate B, which in turn is supported upon suitable columns set in a bed-plate substantially as in my prior application, though said bed-plate and columns are not shown in the drawings of this application, and A<sup>2</sup> and A<sup>3</sup> are the cylinder-heads, having formed therein the explosion-chamber  $b$ , substantially as in my said prior application before cited.

The arrangement of the explosion-chamber relative to and its connection with the cylinder of the engine, the means for mixing a suitable quantity of air with the gas and then ad-

mitting said air and gas to the explosive-chamber, and exhausting the products of the explosion from the cylinder may be such as are shown and described in my before-cited application or of any other well-known construction, my present application being confined to the igniting mechanism for producing the explosions.

The upper wall of the explosion-chamber  $b$  has a threaded opening therein in which is screwed the tubular and internally-threaded hub N, in which is adjustably screwed the sleeve  $j$ , provided with the check-nut  $j'$  and having fitted thereto, but insulated therefrom by the insulating-bushing  $k$  and flanges  $k'$ , the stem  $l$ , provided at its lower end with the head  $l'$  and at its upper end with binding-nut  $l^2$ , by which it is firmly secured in said sleeve  $j$ , as shown in Fig. 3. A wire 2 is firmly clamped in contact with said stem  $l$  by the thumb-screw  $l^3$ , and the opposite end thereof is connected to one pole of a suitable battery or other source of electric energy, (not shown,) the opposite pole of which is connected to any fixed metallic portion of the machine.

The head  $l'$  of the stem  $l$  has firmly secured in a socket therein the closely-wound spiral spring  $m$ , which depends therefrom and has formed at its lower end the loop  $m'$ , which serves as one of the electrodes or contact-points of the circuit-closing devices, the other contact-point being the electrode O, set in a diametrical socket in the oscillating shaft O', mounted in the side wall of the explosion-chamber  $b$ , as shown in Fig. 1.

The contact end of the electrode O is made up of the metal portion  $n$ , formed integral with the shank, the separate metal piece  $n'$ , and the insulating material  $n^2$ , inserted between the metal portions  $n$  and  $n'$  and extending between the lower end of the piece  $n'$  and the shank O and upward outside of said piece  $n'$ , the parts being secured together by the washer  $n^3$  and screw  $n^4$ , as shown in Fig. 5.

When the upper end of the electrode O is oscillated toward the front of the explosion-chamber, the portion  $n$  comes in contact with the loop  $m'$  of the spring-electrode  $m$  to close the circuit, and when said contact is broken



by the continued movement of the electrode O in the same direction a spark is produced and the gas is ignited. When the motion of said electrode O is reversed and its upper end is moved toward the rear, the metal piece  $n'$  comes in contact with the loop  $m'$ , but no circuit is closed for the reason that the piece  $n'$  is completely insulated, and as a consequence no spark is produced when the contact between said piece  $n'$  and the loop  $m'$  is broken.

The hole through the metal piece  $n'$  for the passage of the screw  $n^4$  is made considerably larger than the shank of said screw, so as to insulate it therefrom, as shown in Fig. 5.

The shaft O' has firmly secured upon its outer end the radius-arm P, to the movable end of which is pivoted one end of the connecting-rod P', the opposite end of which is pivoted to the front end of the lever P<sup>2</sup>, which is fulcrumed upon a stud  $p$ , set in the side of the segmental casing Q, which is supported upon the plate B above the central pair of columns (not shown) and between the two cylinders A and A', as shown.

The casing Q incloses the sprocket-wheel Q', mounted upon the shaft  $q$ , fitted to bearings carried by the lower ends of the two arms of the forked yoke R and projecting through slots in the sides of said casing, said shaft having secured upon each end thereof outside of said casing a crank-disk  $q'$ , in which is set a crank-pin  $q^2$ , upon which is loosely fitted a block  $q^3$ , which in turn is fitted to and movable endwise in a longitudinal slot  $q^4$ , cut through the rear arm of the lever P<sup>2</sup>, as shown in Figs. 6 and 7.

The sprocket-wheel Q' is rotated by the chain T, to which motion is imparted by a sprocket-wheel on the main crank-shaft hav-

ing a diameter equal to just one-half the diameter of the sprocket-wheel Q', as shown and described in my before-cited application, whereby the shaft  $q$  makes one revolution to two revolutions of the main crank-shaft. (Not shown.)

The shaft  $q$  may be adjusted vertically by the set-screw  $t$ , threaded in the upper end of the yoke R and bearing upon the top of the casing Q for the purpose of adjusting the distance between the sprocket-wheels to the length of the chain T.

The operation of my invention will be readily understood from the foregoing without further explanation here.

The parts herein claimed are shown and described, but not claimed, in my before-cited application, of which this application is a division.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

The oscillating electrode O, the contact end of which is composed of the portion  $n$  integral with the main body or shank, the metal plate  $n'$ , the insulating material  $n^2$ , the metal washer  $n^3$  and the screw  $n^4$  insulated from the plate  $n'$ , in combination with a normally stationary but yieldable electrode arranged to be intermittently contacted by said electrode O; and means for imparting an oscillating motion to said electrode O.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 15th day of November, A. D. 1897.

JOSEPH LIZOTTE.

Witnesses:

N. C. LOMBARD,  
GEORGE H. BROWN.