

No. 628,448.

Patented July 11, 1899.

C. O. CARLSON.  
IGNITER FOR GAS ENGINES.

(Application filed May 7, 1898.)

(No Model.)

2 Sheets—Sheet 1.

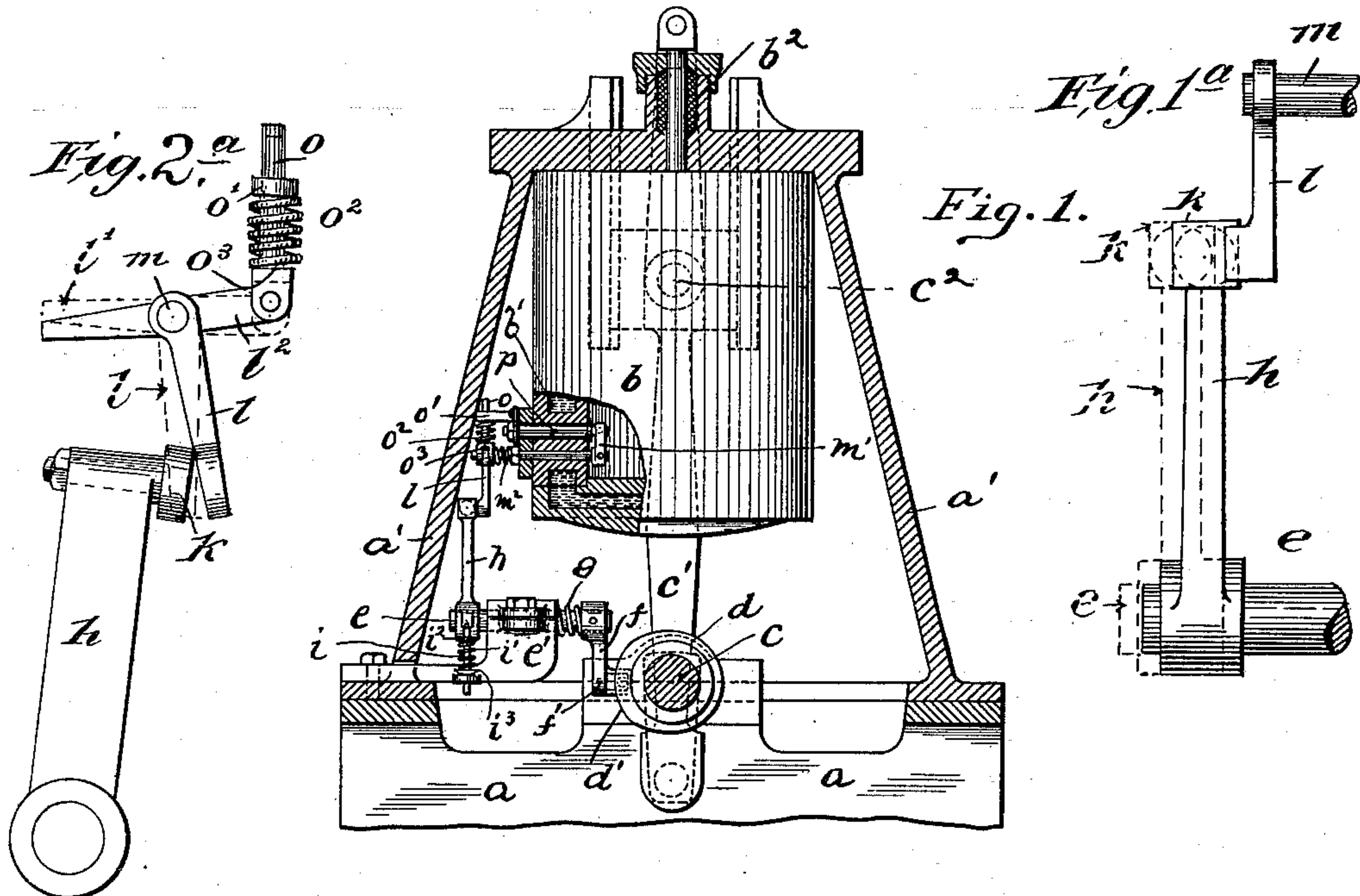
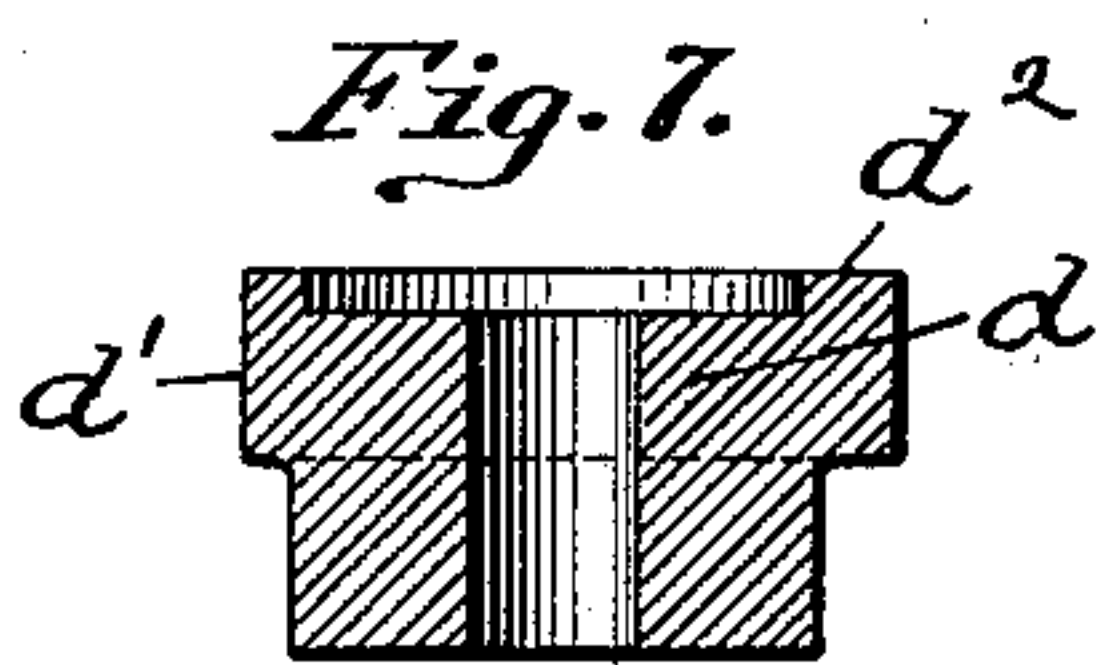
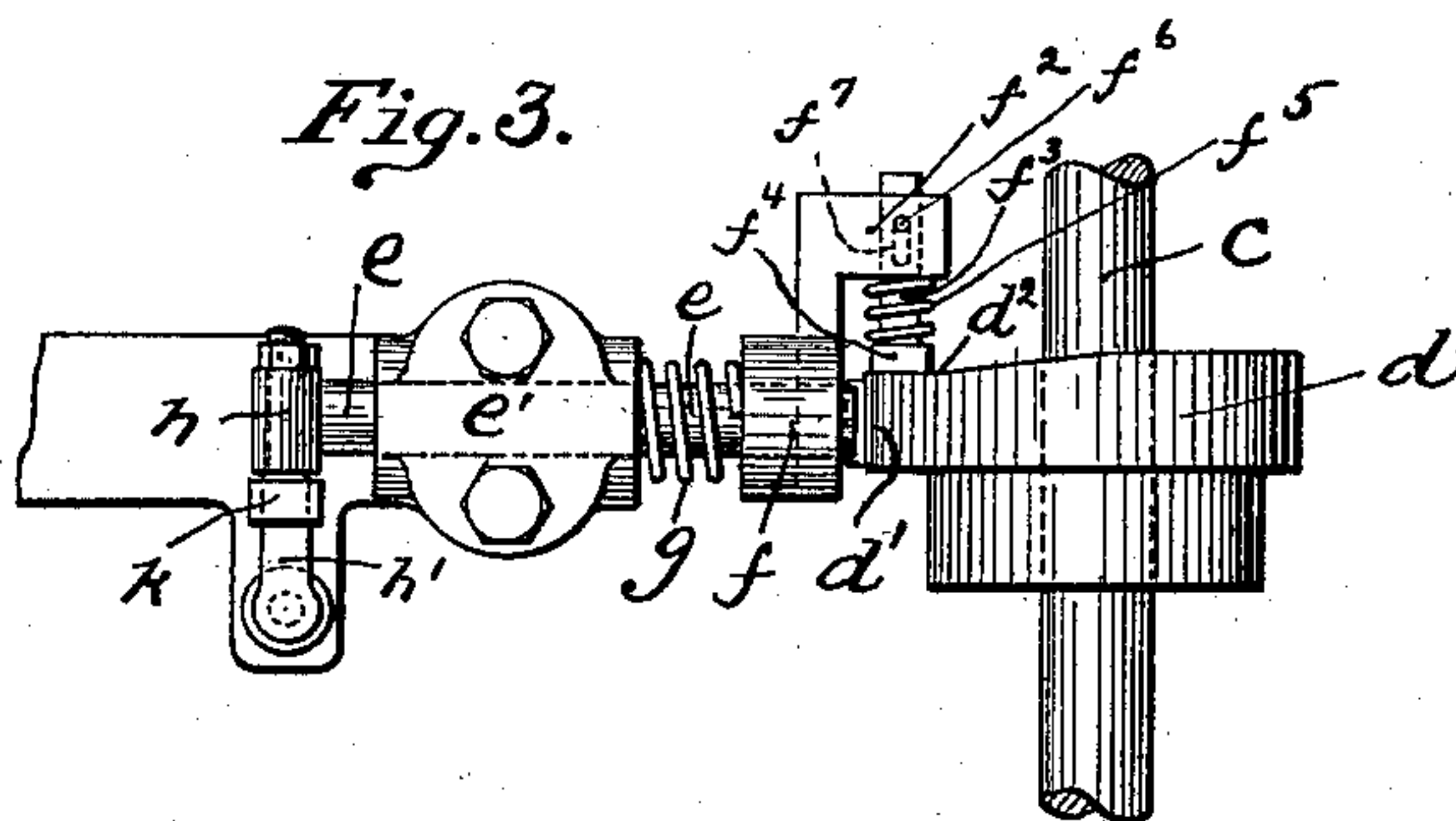
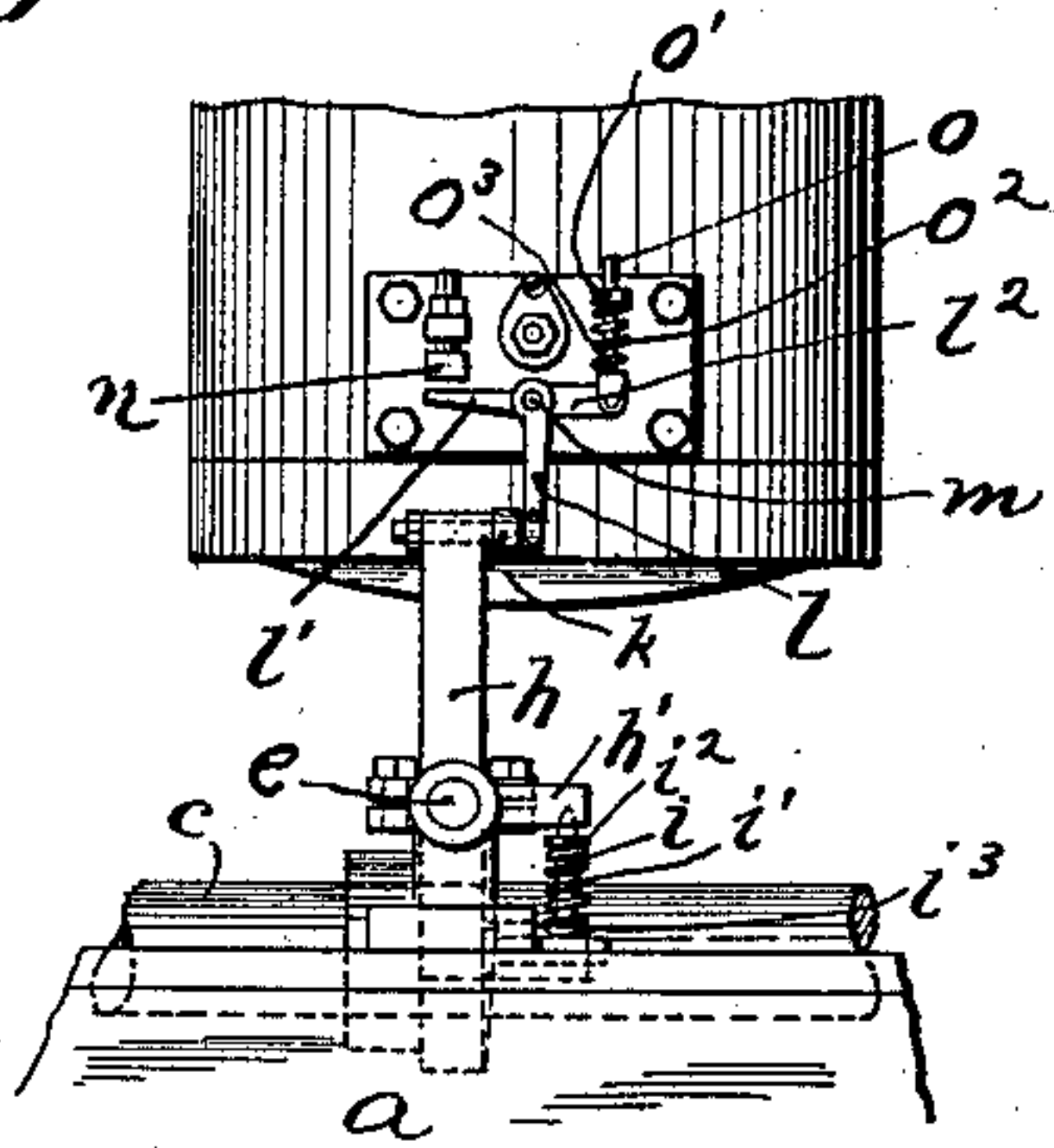
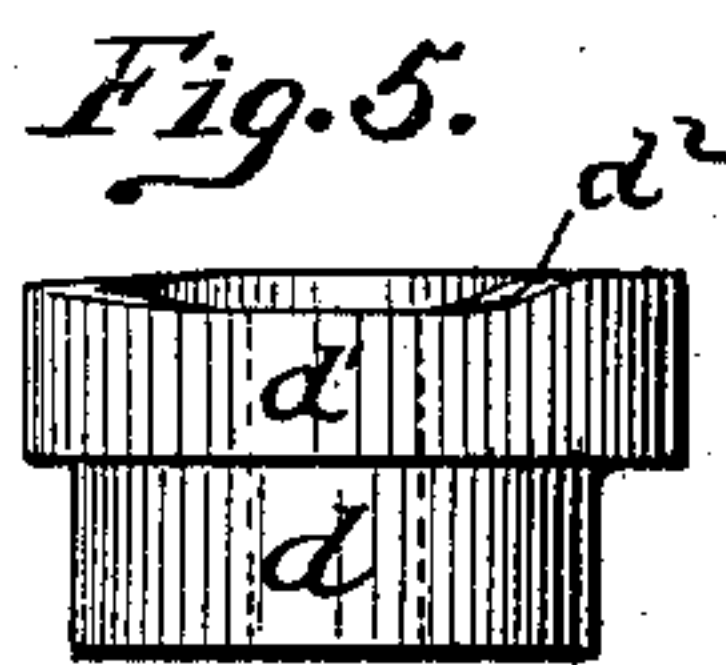
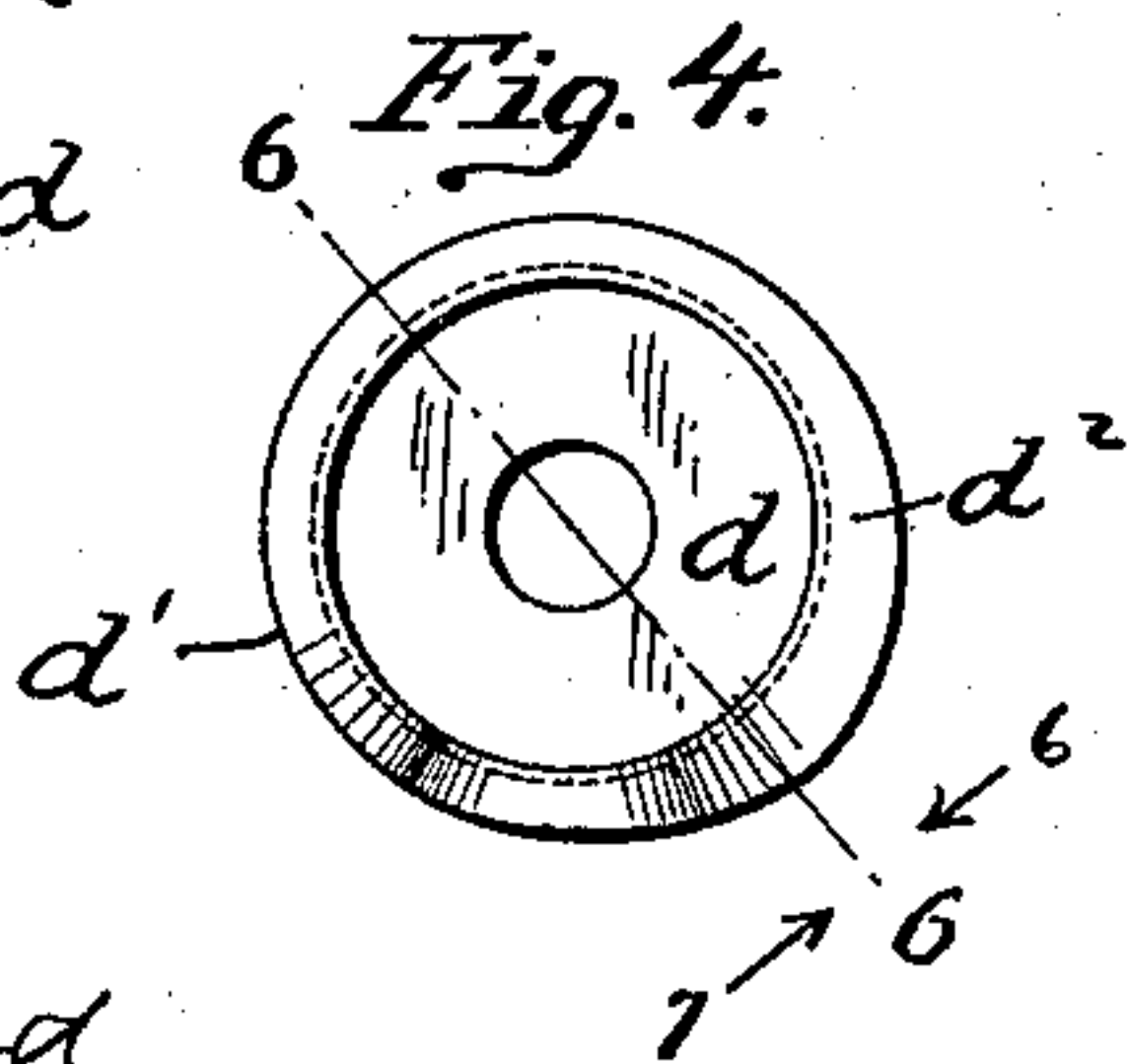


Fig. 2.



Witnesses:  
Water Samariss  
P. C. Raymond



Inventor:  
Charles O. Carlson  
By Kay O. Lott  
Attorneys.

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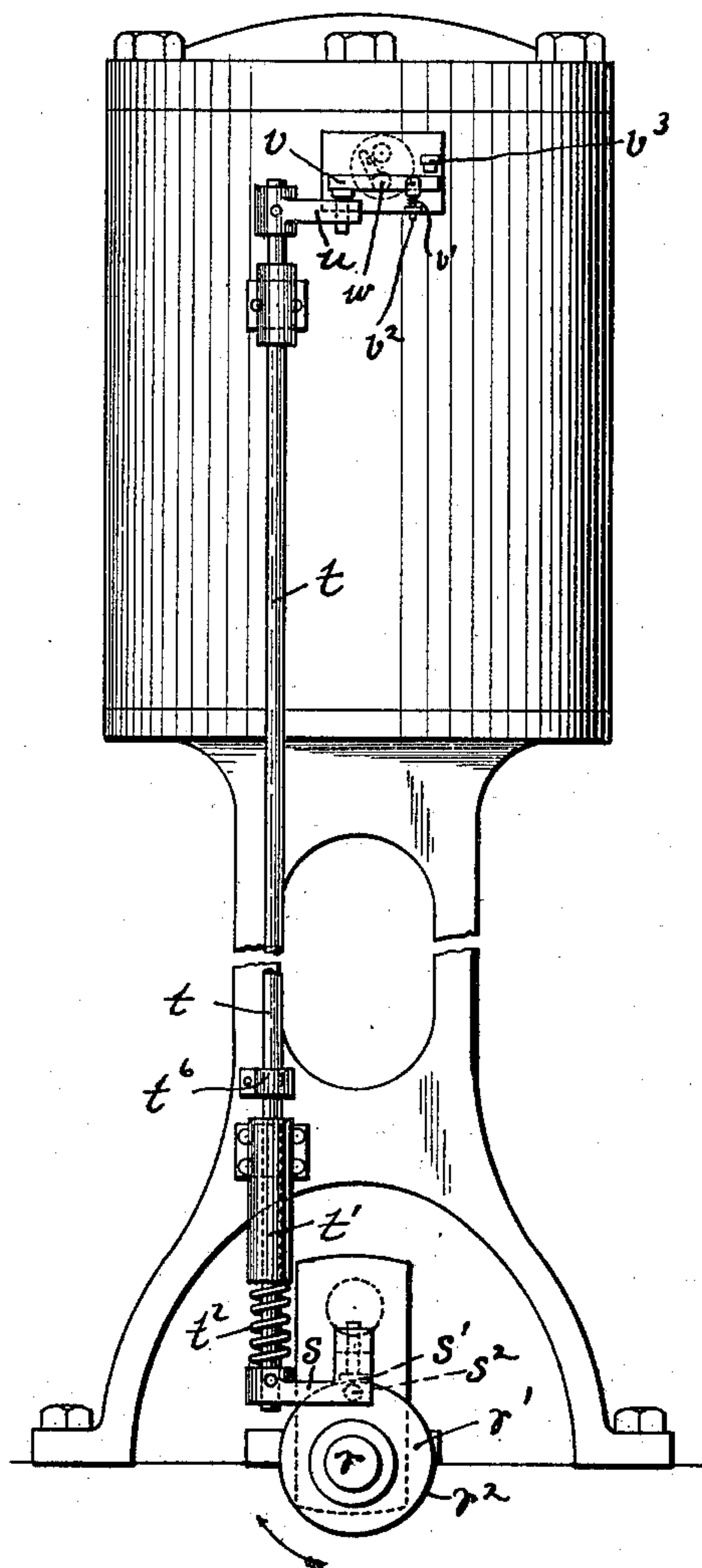


Fig. 8.

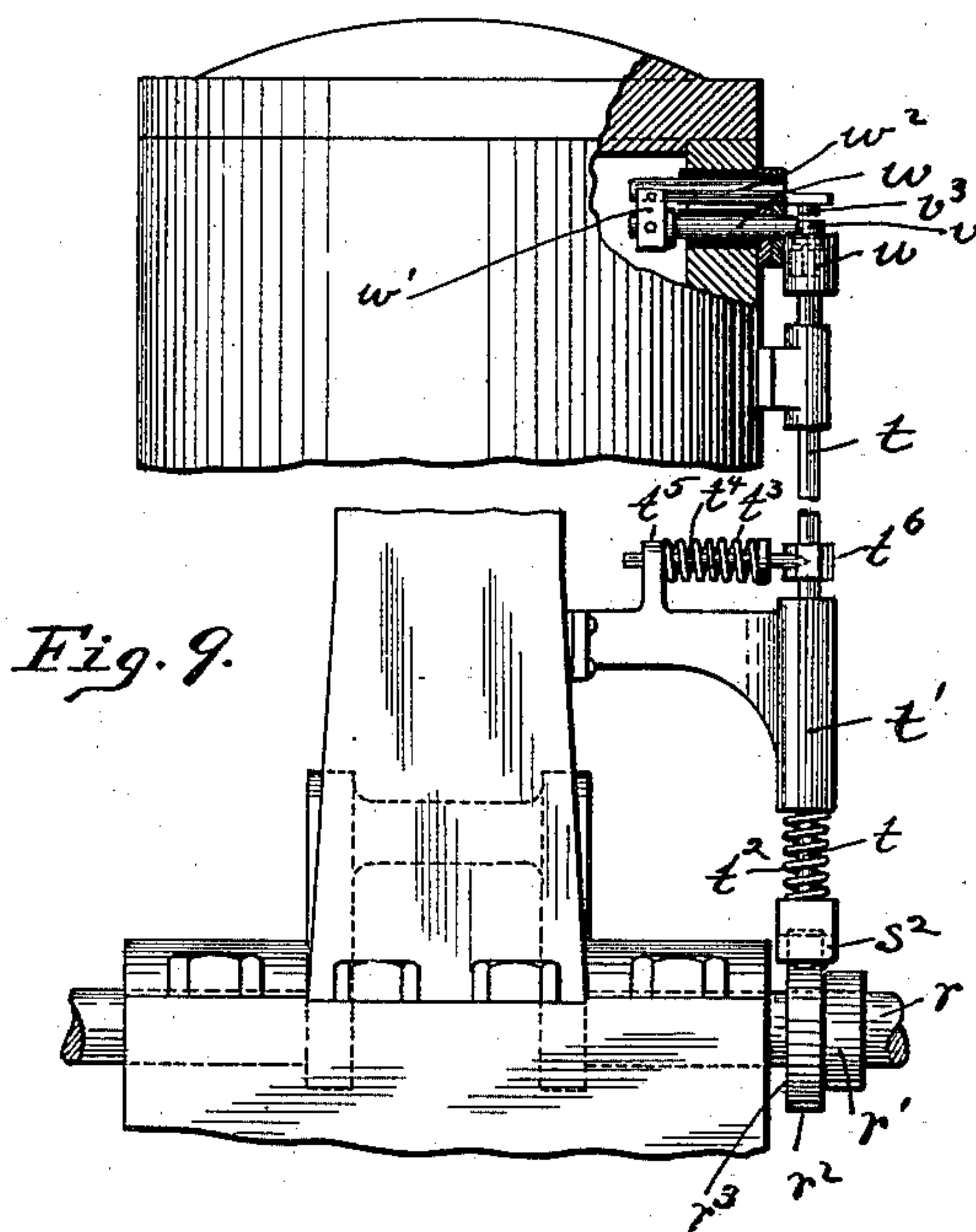


Fig. 9.

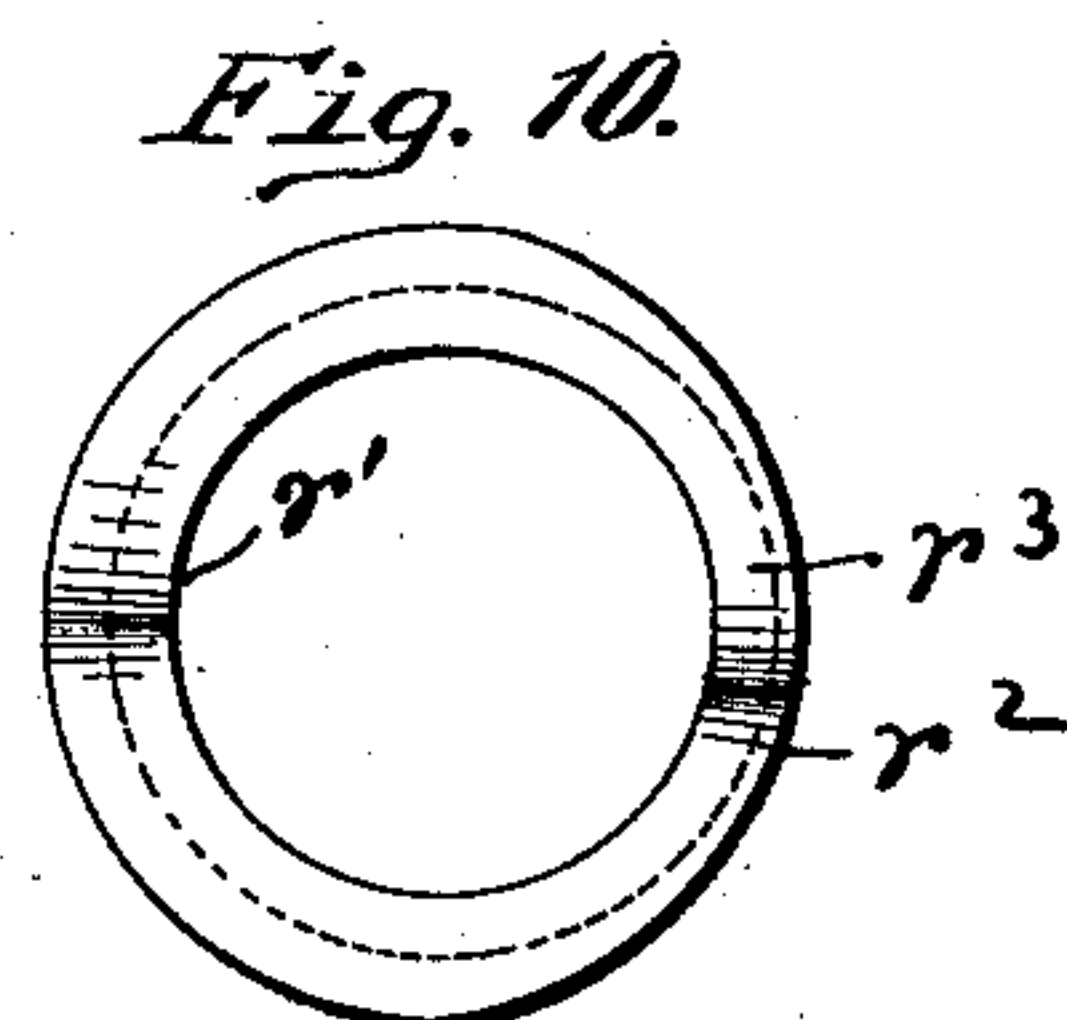


Fig. 10.



Fig. 11.

Witnesses:

Walter Samaras  
J. C. Raymond

Inventor:

Charles O. Carlson  
By Kay & Lottum  
Attorneys.



# UNITED STATES PATENT OFFICE.

CHARLES O. CARLSON, OF NEW YORK, N. Y., ASSIGNOR TO THE MAXWELL  
WYETH & COMPANY, OF SAME PLACE.

## IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 628,448, dated July 11, 1899.

Application filed May 7, 1898. Serial No. 679,971. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES O. CARLSON, a resident of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Igniters for Gas-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to electric igniters for gas-engines.

The object of my invention is to provide a simple and durable form of electric igniter which will be positive in its action, so that there is no liability of the engine missing fire or its speed being affected thereby.

To these ends my invention comprises the novel construction hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a view of the lower portion of an inverted type of gas-engine of any suitable construction with my improved igniter applied thereto, the parts being partly shown in section. Fig. 1<sup>a</sup> is a detail view showing an enlarged front view of the tripping mechanism. Fig. 2<sup>a</sup> is an enlarged side view of the tripping mechanism. Fig. 2 is a side view. Fig. 3 is a plan view, enlarged, of the cam and its immediate connections. Fig. 4 is a face view of the cam. Fig. 5 is a side view. Fig. 6 is a section on line 6-6, Fig. 4, looking in direction of arrow 6. Fig. 7 is a like view looking in direction of arrow 7. Fig. 8 is a modified form of my invention as applied to a regular vertical or horizontal engine. Fig. 9 is a side view of same, the cylinder being partly broken away. Figs. 10 and 11 are views of the cam.

Like letters of reference indicate like parts in each view.

The letter *a* designates the engine-bed, to which is bolted the frame *a'*, which supports the cylinder *b*. This cylinder *b* is surrounded with the customary water-jacket *b'* and has a stuffing-box *b<sup>2</sup>*, a suitable piston, and the proper connections therefor, none of which form any part of my invention and which do not call for a detailed description.

A shaft *c*, journaled in suitable bearings, is operated by the pitman *c'*, connected to the cross-head *c<sup>2</sup>*, (shown in dotted lines,) which works in suitable guides on the outside of the cylinder. Mounted on the shaft *c* is the cam *d*, which has two cam-faces *d'* *d<sup>2</sup>*. The cam-face *d'* is on the periphery of the cam, while the cam-face *d<sup>2</sup>* is formed on the side of said cam. In this manner I provide a double cam which can impart movement in two directions.

Mounted in suitable bearings *e'* is the shaft *e*, said shaft not only being free to turn or rock in its bearings, but having also a longitudinal movement therein. Secured to the outer end of the shaft *e* is the rocker-arm *f*, the lower end *f'* of which is in contact with the peripheral cam-face *d'*. A spring *g*, interposed between the bearing *e'* and the rocker-arm *f*, provides for this constant contact between said arm and the cam-face *d'*. The rocker-arm *f* has the horizontal extension *f<sup>2</sup>* extending out from the lower end thereof, said extension having the bolt or pin *f<sup>3</sup>*, whose head *f<sup>4</sup>* is held in contact with the cam-face *d<sup>2</sup>* by means of the spring *f<sup>5</sup>*. A stud *f<sup>6</sup>* on the bolt *f<sup>3</sup>* engages a slot *f<sup>7</sup>* in the extension *f<sup>2</sup>* to permit of the movement of the bolt.

Rigidly secured to the inner end of the shaft *e* is the tripping-arm *h*, said arm having the projection *h'*. A rod *i*, resting with its lower end in a seat in the frame, has its upper end fitting in a recess in the projection *h'*. A spring *i'* is interposed between the fixed collar *i<sup>2</sup>* on the rod *i* and the movable washer *i<sup>3</sup>*. By this construction the projection *h'* is normally held up in a horizontal position, and thus acts to hold the extension *f<sup>2</sup>* of the rocker-arm *f* in contact with the side cam-face *d<sup>2</sup>*. The lower face of the washer *i<sup>3</sup>* is rounded to permit of its adjusting itself to the movement of the arm *h* and projection *h'*.

At the upper end of the tripping-arm *h* is the trip *k*, which is adapted to come in contact with and operate the lever *l*. This lever *l* is secured to the outer end of the shaft *m*, which passes through the walls of the cylinder and has the electrode *m'* at the inner end thereof. A spring *m<sup>2</sup>* is interposed between the lever *l* and the cylinder to allow said lever to yield slightly in case it be necessary in bringing the arm *h* into position back of said



lever, as will more fully hereinafter appear. The lever  $l$  has the arm  $l'$ , adapted to engage the stop  $n$  when the electrodes are not in contact, and also the arm  $l''$ , to which is pivoted the rod  $o$ . This rod  $o$  passes through the guide  $o'$ , and a spring  $o^2$  is interposed between said guide and a shoulder  $o^3$  on said rod. The action of this spring is to hold the arm  $l'$  normally in contact with the stop  $n$  and the electrode  $m'$  out of engagement with the stationary electrode  $p$ .

The operation of my improved igniter when in use is as follows: With the parts in the position shown in Fig. 1 the trip  $k$  has just tripped the lever  $l$  and allowed said lever to resume its normal position. This movement of the lever has broken the contact formed between the electrodes, and a spark has just occurred to cause an explosion in the cylinder. The highest point on the cam-face  $d'$  is now in contact with the lower end  $f'$  of the rocker-arm  $f$ , so that the shaft  $e$  is forced back to throw the upper end of tripping-arm  $h$  beyond the lever  $l$ . In the meantime the lowest point of the side cam-face  $d^2$  is in contact with the extension  $f^2$  of the rocker-arm. Now as the shaft  $e$  continues to revolve the lowest point on the cam-face  $d'$  comes into contact with the lower end  $f'$  of rocker-arm  $f$ . This relieves the pressure on the shaft  $e$ , and as the spring  $g$  returns said shaft to its normal position the trip  $k$  at the upper end of the tripping-arm  $h$  passes back of the lever  $l$ , as shown in Figs. 1<sup>a</sup> and 2<sup>a</sup>. Just as soon as the highest point of the cam-face  $d'$  passes beyond the lower end of the rocker-arm to produce the above result the high part of the side cam-face  $d^2$  begins to move in contact with the extension  $f^2$  of the rocker-arm. This causes the rocker-arm to rock to one side, and through the shaft  $e$  the tripping-arm  $h$ , carrying the trip  $k$ , is moved. The trip  $k$  advances into contact with the lever  $l$  and by its further movement throws said lever over in such position as to bring the electrode  $m'$  into contact with the electrode  $p$ . These electrodes remain in contact until the highest point of the peripheral cam-face  $d'$  reaches the lower end  $f'$  of the rocker-arm  $f$ , whereupon the trip  $k$  is forced away from the lever  $l$  and said lever springs back to its normal position with a quick positive movement, causing the electrodes to break and create a strong spark to ignite the gas in the cylinder and cause the explosion of same. By this quick sudden tripping of the lever  $l$  when the electrodes are in contact the separation is so rapid that a positive and powerful spark is obtained just at the desired instant, so as to positively ignite the whole charge each time.

In Figs. 8, 9, &c., I have illustrated a modified form of my invention as applied to the ordinary upright or horizontal type of engines. The shaft  $r$  has the cam  $r'$  thereon, which has the peripheral cam-face  $r^2$  and the side cam-face  $r^3$ . The cam-face  $r^2$  engages the extension  $s'$  on the arm  $s$ , said arm being

secured to the vertical shaft  $t$ . The cam-face  $r^3$  engages the lower end  $s^2$  of the arm  $s$ . The shaft  $t$  is journaled in bearings  $t'$  and is not only free to turn therein, but is also free to move longitudinally therein. A spring  $t^2$ , interposed between the bearing and the arm  $s$ , acts to normally force the shaft  $t$  down with the extension  $s'$  in contact with the periphery  $r^2$  of the cam  $r'$ , while the spring  $t^3$  on the rod  $t^4$  acts to force the arm  $s$  into contact with the side cam-face  $r^3$ . The rod  $t^4$  is supported in the guide  $t^5$ , the outer end of said rod fitting in a seat in the collar  $t^6$  on the shaft  $t$ , said seat being off the center of said collar, and thus acting to resist the turning of said shaft by the action of the cam-face  $r^3$ , as will more fully hereinafter appear. At the upper end of the shaft  $t$  is the trip  $u$ , which is adapted to engage the lever  $v$ . This lever  $v$  is secured to the shaft  $w$ , which enters the cylinder and which has the electrode  $w'$  secured thereto. A spring  $v'$  on the bolt  $v^2$  acts to force said lever normally up at one end against the stop  $v^3$ , so that the electrode  $w'$  will normally be out of contact with the stationary electrode  $w^2$ .

The operation of the modified form of my invention is as follows: The highest point of the peripheral cam-face  $r^2$ , coming around into contact with the extension  $s'$  of the arm  $s$ , will act to elevate the shaft  $t$ , and the trip  $u$  will raise the adjacent end of the lever  $v$  sufficiently to bring the electrode  $w'$  into contact with the electrode  $w^2$ ; but just when the highest point on the cam-face  $r^2$  is in contact with the extension  $s'$  of the arm  $s$  the high part of the side cam-face  $r^3$  comes into contact with the arm  $s$  and by its movement gives a turn to the shaft  $t$ . This throws the trip  $u$  suddenly free from the lever  $v$ , and the spring  $v'$  immediately acts to separate the electrodes and create a spark. As the shaft  $r$  continues to revolve the operation just described is repeated, each revolution of said shaft producing a powerful and positive spark which will always insure the explosion of the gas.

I do not wish to limit myself to the exact construction illustrated and described in the above forms of my invention, as this may be varied and changed without departing from the spirit of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric igniter for gas-engines, the combination of a shaft, a cam on said shaft, said cam having a peripheral cam-face and a side cam-face, a rotary and longitudinally-movable shaft, said cam having said cam-faces in operative relation with said movable shaft, electrodes, and connections between said movable shaft and said electrodes, whereby contact is made and broken.

2. In an electric igniter for gas-engines, the combination of a shaft, a cam on said shaft, said cam having a peripheral cam-face and a side cam-face, electrodes, tripping mechanism adapted to make and break contact with said



electrodes, a rotary and longitudinally-movable shaft, said cam having said cam-faces in operative relation with said movable shaft, connections between said movable shaft and  
5 said tripping mechanism, substantially as set forth.

3. In an electric igniter for gas-engines, the combination of a shaft, a cam on said shaft, said cam having a peripheral cam-face and a  
10 side cam-face, electrodes, a lever connected to one of said electrodes, a rotary and longitudinally-movable shaft, a trip in the path of said lever carried by said last-mentioned shaft, said cam having its cam-faces in oper-  
15 ative relation with said movable shaft, substantially as set forth.

4. In an electric igniter for gas-engines, the combination of a shaft, a cam on said shaft, said cam having a peripheral cam-face and a  
20 side cam-face, electrodes, a lever connected to one of said electrodes, a rotary and longitudinally-movable shaft, a trip in the path

of said lever carried by said last-mentioned shaft, a rocker-arm on said shaft, said cam having its cam-faces in operative contact with  
25 said rocker-arm, substantially as set forth.

5. In an electric igniter for gas-engines, the combination of a shaft, a cam on said shaft, said cam having a peripheral cam-face and a  
30 side cam-face, electrodes, a lever connected to one of said electrodes, a rotary and longitudinally-movable shaft, a tripping-arm on said last-mentioned shaft, a trip on said arm in the path of said lever, a rocker-arm on said  
35 last-mentioned shaft, said cam having its faces in operative contact with said rocker-arm, substantially as set forth.

In testimony whereof I, the said CHARLES O. CARLSON, have hereunto set my hand.

CHARLES O. CARLSON.

Witnesses:

CHRIST WEST,  
SAMUEL LORING.