

No. 819,116.

PATENTED MAY 1, 1906.

H. AUSTIN.

VALVE AND IGNITION MECHANISM FOR INTERNAL COMBUSTION ENGINES

APPLICATION FILED MAR. 5, 1904.

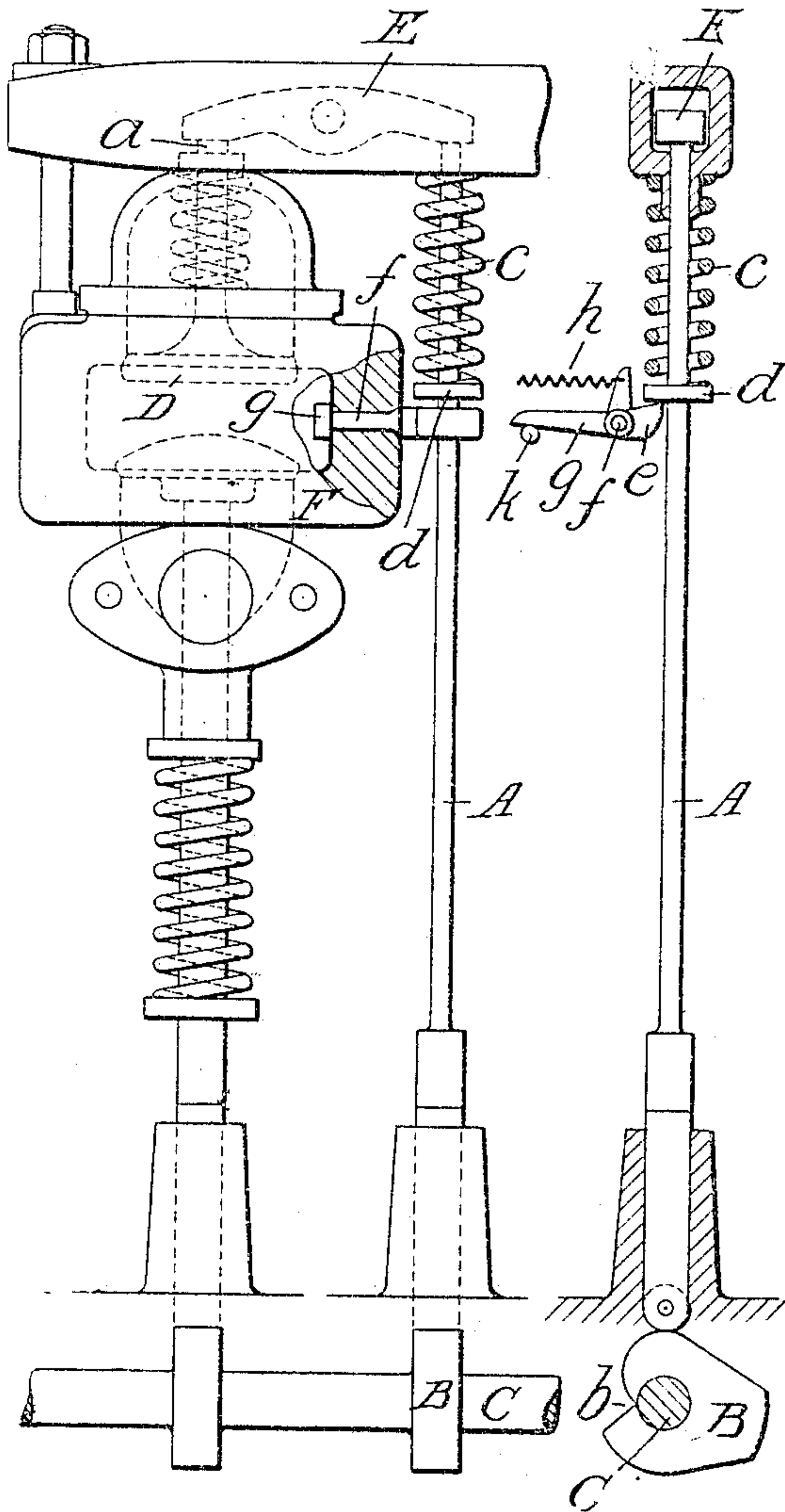


Fig. 1.

Fig. 2.

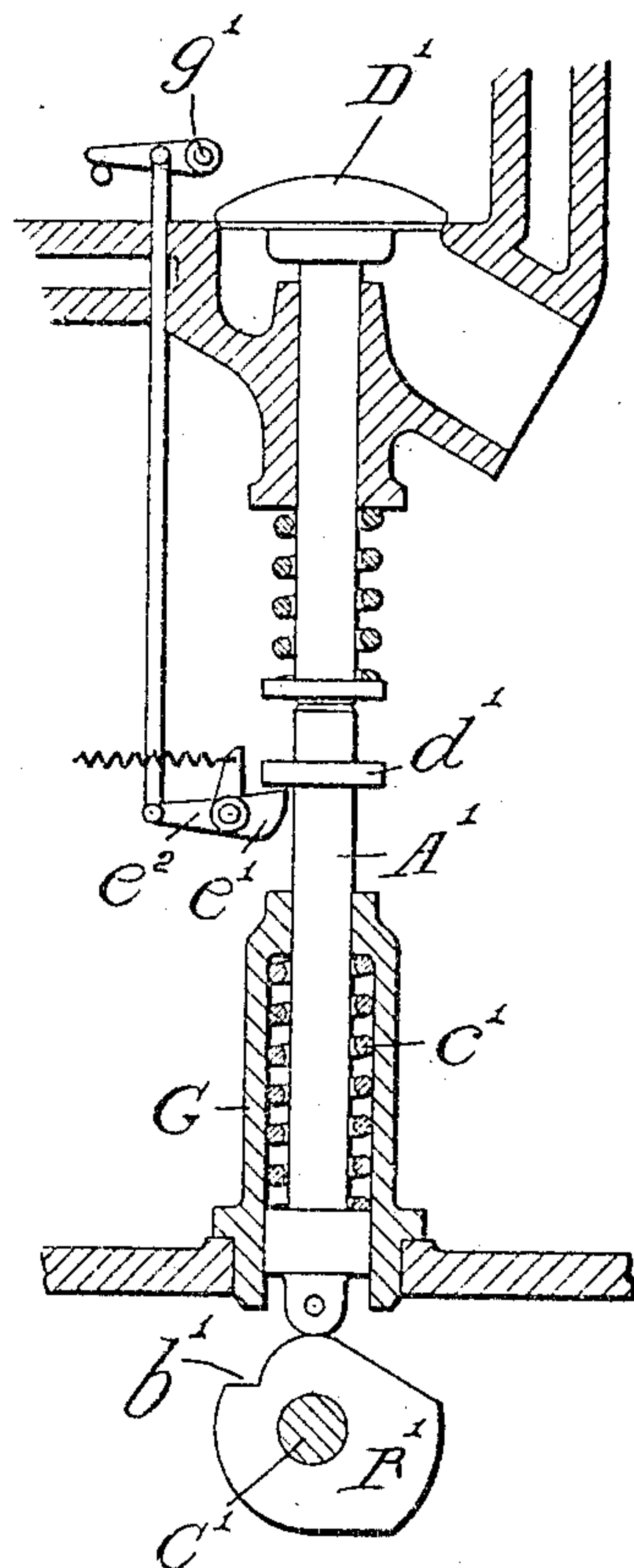


Fig. 3.

Witnesses:

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VALVE AND IGNITION MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

No. 819,116.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed March 5, 1904. Serial No. 196,721.

To all whom it may concern:

Be it known that I, HERBERT AUSTIN, en-
gineer, a subject of the King of Great Britain,
residing at Berwood Grove, Chester Road, in
the city of Birmingham, England, have in-
vented certain new and useful improvements
in Valve and Ignition Mechanism for Internal-
Combustion Engines, of which the following
is a specification.

This invention has for its object to combine
with means such as those usually or fre-
quently employed for mechanically operat-
ing the inlet-valve or the exhaust-valve of an
internal-combustion engine means for ignit-
ing the charge (drawn into the motor-cylin-
der) through the medium of a low-tension
current or circuit, the purpose in view being
simplicity and economy in construction.

Broadly describing this invention, the cam
which operates the inlet-valve or the ex-
haust-valve through the medium of a rod,
such as in the manner commonly or fre-
quently employed, is adapted to insure a fur-
ther movement of the rod in the direction it
has moved in allowing the valve to close, and
this movement is utilized in connection with
the operation of the make-and-break contact-
piece of the igniter.

In carrying out this invention the cam is
formed with a depression or recess which,
when the charge is ready for ignition, is in
such position as to allow the rod to move
nearer to the cam-axis than it has been moved
in allowing the valve to close.

In the drawings herewith, which illustrate
my invention, Figure 1 shows in elevation
mechanism by which the inlet and exhaust
valves of an internal-combustion engine are
operated from a revolving counter-shaft
and shows also mechanism by which the ig-
niter-arm is operated from the rod of the in-
let-valve. Fig. 2 is an elevation taken at
right angles to Fig. 1, showing the cam and
rod through the medium of which the inlet-
valve is operated and the means by which
the same are utilized in operating the make-
and-break arm of the igniter; and Fig. 3 is a
view corresponding to Fig. 2, showing the ap-
plication of the invention in connection with
the exhaust-valve.

Referring, first, to the form of the inven-
tion shown by Figs. 1 and 2, A is the valve-
rod, through the medium of which a cam B

on the counter-shaft C of the engine opens
the inlet-valve D, the upper or outer end of
the rod pressing for such purpose against one
end of a lever E to press the other end of such
lever against the upper or outer end of the
valve-spindle a, all of which (except as to the
special formation of the cam) is of the char-
acter of mechanism heretofore commonly
employed for the purpose. According to
this invention, however, the cam B is formed
with a depression or recess b, which just as
the charge is ready for ignition comes into
position to allow the rod A, which has of
course already moved sufficiently toward the
axis of the cam to have allowed the inlet-
valve to close, to approach still nearer to such
axis, being impelled in such direction, as be-
fore, by the spring c. A tappet d around the
rod A, and which may conveniently be, as
shown, the collar which receives the thrust
of the lower or inner end of the spring c,
presses, as the rod moves into the depression
b of the cam, against an arm e, fixed on a pro-
jecting end of a spindle f, which passes
through the side of the combustion-chamber
F and carries the contact making and break-
ing arm g. The arm e is held in its normal
position by a spring h, which presses the arm
g upon or against the terminal i.

Referring now to the form of the inven-
tion illustrated by Fig. 3, the valve-rod A',
through the medium of which the exhaust-
valve D' is opened by a cam B' on the
counter-shaft C', is pressed in a downward or
inward direction toward the axis of the cam
by a spiral spring c' within a box or hollow
pillar G, through which the rod is a sliding
fit. In this case also the cam B' is formed
with a depression b' to allow of the further
downward or inward movement of the rod A'
after the valve D' has closed, and the rod has
a tappet or collar d', which, as the rod moves
inward after the valve has closed, operates
the igniter through the medium of an arm e'.
A backward extension e' of this arm is shown
as connected by means of a rod with an arm
on the outer end of the igniter-spindle g', so
that when the arm e' is moved by the tappet
d' an igniting spark will be produced.

It must be understood that the counter-
shaft which carries the cam rotates at only
one-half the speed of the engine-shaft, as is
common in this class of engines, and by util-

izing this half-speed shaft a plain single cam may be employed. It will be noted that the rod which opens the valve, which latter may be the inlet-valve of the engine, is moving
5 in the proper direction to permit said valve to close when it breaks the sparking circuit, and the special recess in the cam assures that this circuit shall not be broken until after the said valve shall have closed.

10 Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An internal-combustion engine, having a valve to be opened, a rod, slidable in guides,
15 for opening the said valve, the guides for the rod, a cam for operating said rod to open the valve, said cam having in its operative edge a special recess, a spring which holds said rod in operative relation with the cam, a later-
20 ally-projecting part on the said slidable rod, a fixed electric contact, a movable electric contact, a spring which holds said contacts normally in touch with each other, a movable contact-actuating arm in the path of said

lateral projection on the rod and adapted to
25 be actuated thereby when the spring on the rod moves the end of the latter into the recess in the cam to produce a spark between the contacts when said movable arm is actuated.

2. An internal-combustion engine, having
30 a valve to be opened, a rod A for opening said valve, a cam B for operating said rod to open the valve, said cam having a recess *b*, a spring *c* which holds said rod pressed up to the cam, a projecting part *d* on said rod, a
35 rocking spindle *f*, in the wall of the combustion-chamber, an arm *e* on said spindle in the path of the part *d*, a fixed contact *k*, a contact-arm *g* on the spindle *f*, and a spring *h*
40 which keeps the contacts normally in touch substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name, this 24th day of February, 1904, in the presence of two subscribing witnesses.

HERBERT AUSTIN.

Witnesses:

STEPHEN WATKINS,
E. HARKER.