

No. 671,359.

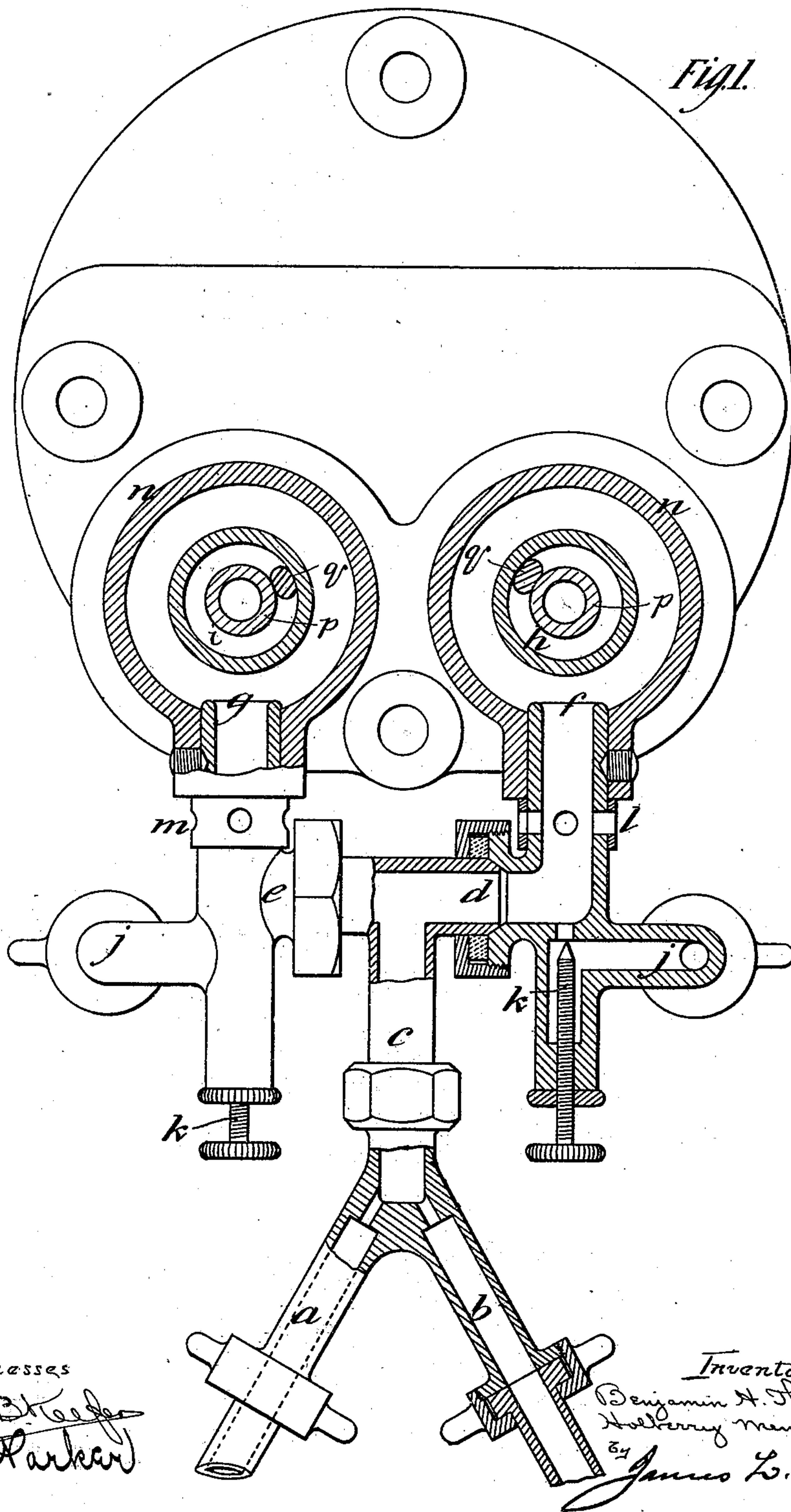
Patented Apr. 2, 1901.

B. H. THWAITE & H. MENSFORTH.  
INCANDESCENT IGNITING DEVICE FOR GAS ENGINES.

(Application filed Nov. 30, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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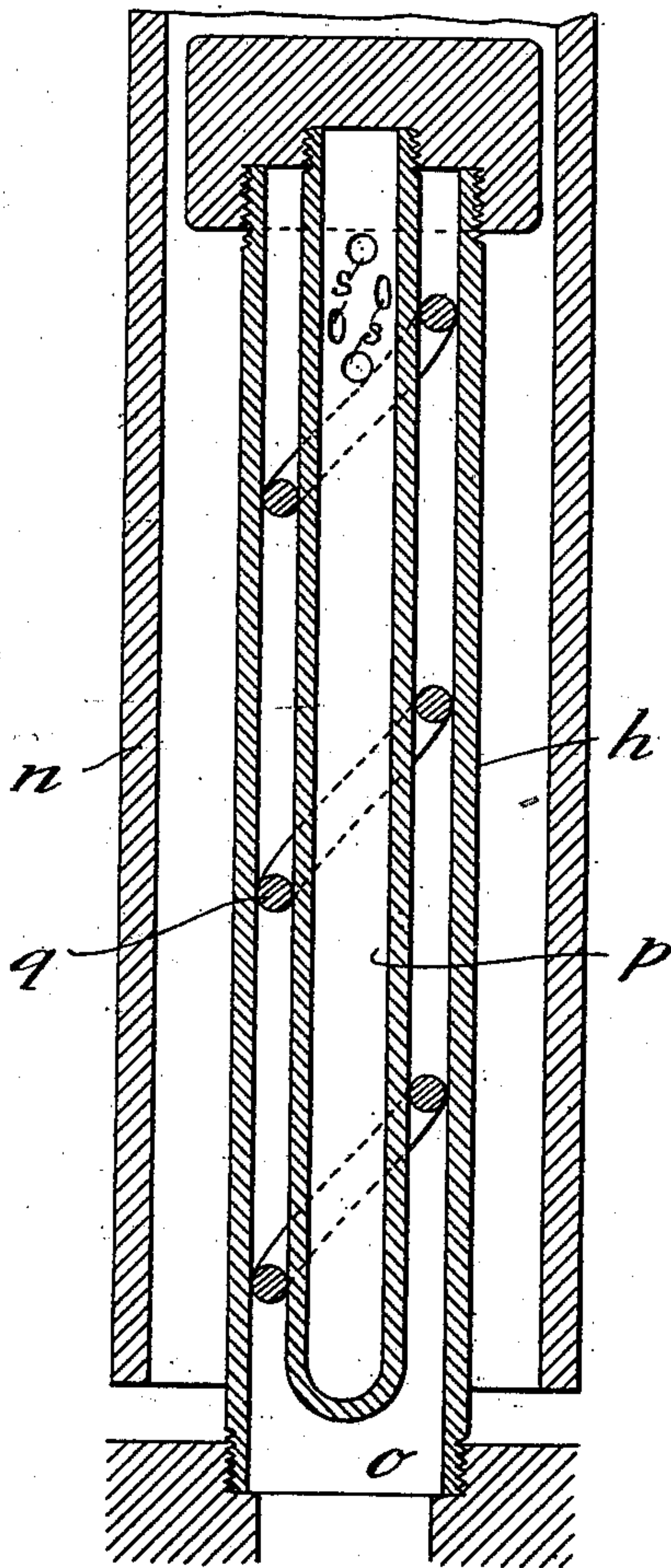
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(No Model.)

(Application filed Nov. 30, 1900.)

2 Sheets—Sheet 2.

Fig. 2.



Witnesses

*W. B. Keefe*  
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Inventors

*Benjamin H. Thwaite*  
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*James L. Norris*  
*att'y*



# UNITED STATES PATENT OFFICE.

BENJAMIN H. THWAITE, OF LONDON, AND HOLBERRY MENSFORTH, OF  
BRADFORD, ENGLAND, ASSIGNORS TO THE BLAST FURNACE POWER  
SYNDICATE, LIMITED, OF LONDON, ENGLAND.

## INCANDESCENT IGNITING DEVICE FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 671,359, dated April 2, 1901.

Application filed November 30, 1900. Serial No. 38,226. (No model.)

*To all whom it may concern:*

Be it known that we, BENJAMIN HOW-  
ARTH THWAITE, residing at 29 Great George  
street, Westminster, in the city of London,  
5 and HOLBERRY MENSFORTH, residing at 82  
Wheatly Mount, Bradford, in the county of  
York, England, citizens of England, have in-  
vented a certain new and useful Improved  
Gas-Engine Igniting Apparatus, (for which  
10 we have applied for a patent in Great Britain,  
dated May 4, 1900, No. 8,278,) of which the  
following is a specification.

This invention relates to an improved ap-  
paratus for igniting gas-engine charges, this  
15 apparatus being especially adapted for use in  
engines supplied with gas of low combusti-  
bility—such, for instance, as the gases which  
come from blast-furnaces. We effect the ig-  
nition in the known manner by admitting a  
20 portion of the compressed cylinder charge  
into a heated tube, and we employ for heat-  
ing the tube apparatus constructed and op-  
erating as we shall describe, referring to the  
accompanying drawings.

25 Figure 1 is an elevation, partly sectional, of  
apparatus according to our invention for heat-  
ing a pair of ignition-tubes. Fig. 2 is a ver-  
tical section of one of the ignition-tubes.

30 *a* is one branch of a breeches-pipe, by which  
gas is supplied. *b*, the other branch, supplies  
air under pressure, such as the air for the  
furnace-blast. The jet of air from *b* by ejec-  
tor action draws gas from *a*, and the mixture  
35 of air and gas passes by the pipe *c* and  
branches *d e* to burner-nozzles *f* and *g*, where  
it burns, its flame playing on the igniting-  
tubes *h i*.

In order to supply gas from another source  
and air from the atmosphere when air from  
40 the blast and gas from the furnace are not  
available, we make at each side of the appa-  
ratus a connection *j* to a pipe supplying gas  
under pressure, of which by a regulating  
screw-valve *k* we admit a jet into the branch  
45 *d* on the one side and *e* on the other side.  
Through the sides of the branches leading to  
the nozzles *f* and *g* we make holes covered by  
a sleeve *l* on the one side and *m* on the other,  
the sleeve having holes which when the sleeve

is turned into one position coincide with the 50  
holes through the pipe, so that when the  
sleeves are so turned air enters by the holes  
and mixes with the gas. When the gas and  
air are supplied by the pipes *a* and *b*, the  
sleeves *l* and *m* are turned so as to close the 55  
holes for air, and the valves *k* are closed to  
stop supply of gas.

Each of the ignition-tubes *h* and *i* is placed  
within a casing *n*, in which the flame plays  
around the tube, and within the tube *h* or *i*, 60  
which is open at *o* to the cylinder, there is an  
inner tube *p*, of smaller diameter. This inner  
tube is closed at both ends, but is perforated  
with holes *s* most numerous toward the end  
farthest from the opening *o*, and in the an- 65  
nular space surrounding the tube *p* there are  
several convolutions of a helically-twisted  
wire *q*. When the ignition-valve is opened, a  
portion of the compressed combustible charge  
passes from the cylinder by the opening *o* into 70  
the annular space between the tubes, forcing  
the products of previous combustion through  
the perforations *s* into the inner tube, while it  
is caused by the wire *q* to take a lengthened  
helical course within the tube *h* or *i*, exposed 75  
to its heat, so that it becomes ignited and  
communicates flame to the cylinder charge.

Having thus described the nature of this  
invention and the best means we know for  
carrying the same into practical effect, we 80  
claim—

1. In an igniter for gas-engines, the combi-  
nation with an igniting-tube closed at one end  
and communicating at its other end with the  
engine-cylinder, of an inner tube arranged 85  
concentrically within the igniting-tube and  
closed at both ends, said inner tube being  
perforated at the end farthest removed from  
the cylinder, and a helical wire disposed about  
the inner tube between the walls of the latter 90  
and the igniter-tube, the convolutions of the  
wire being separated from one another to  
form a spiral passage, substantially as de-  
scribed.

2. In an igniter for gas-engines, the combi- 95  
nation with an igniting-tube closed at one end  
and communicating at its other end with the  
engine-cylinder, of an inner tube arranged

concentrically within the igniting-tube and  
closed at both ends, said inner tube being  
perforated at the end farthest removed from  
the cylinder, a helical wire disposed about  
5 the inner tube between the walls of the latter  
and the igniter-tube, the convolutions of the  
wire being separated from one another to  
form a spiral passage, an open-ended tube  
arranged concentrically around the igniter-  
10 tube, and means for injecting a mixture of  
compressed air and gas between the outer

tube and igniter-tube, substantially as de-  
scribed.

In testimony whereof we have hereunto set  
our hands in presence of two subscribing wit- 15  
nesses.

B. H. THWAITE.  
H. MENSFORTH.

Witnesses:

GERALD L. SMITH,  
EDWARD GARDNER.