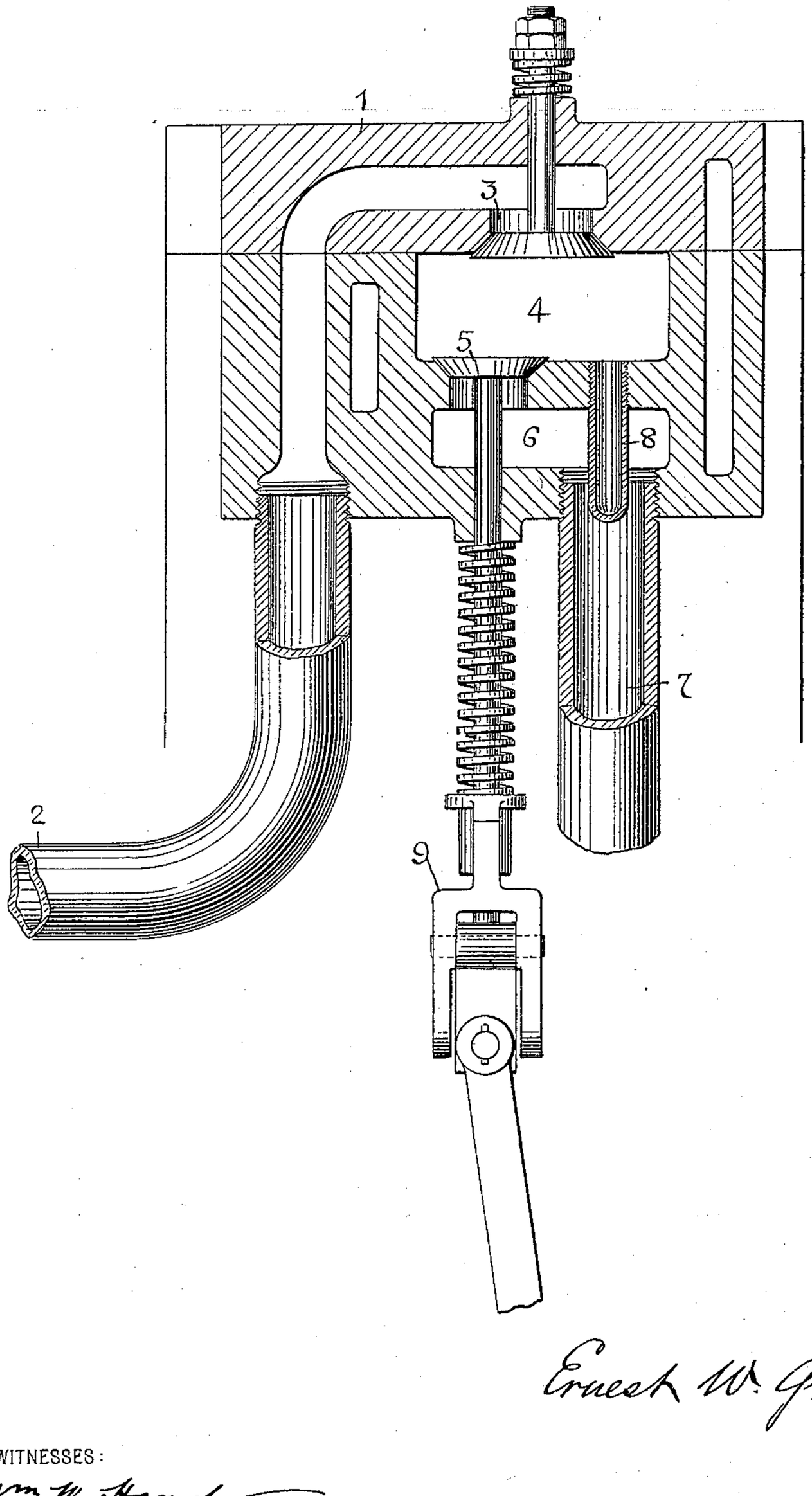
No. 622,892. Patented Apr. 11, 1899.

E. W. GRAEF.

INCANDESCENT TUBE IGNITER FOR GAS ENGINES.

(Application filed June 23, 1898.)

(No Model.)



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ERNEST W. GRAEF, OF BALTIMORE, MARYLAND.

INCANDESCENT TUBE-IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 622,892, dated April 11, 1899.

Application filed June 23, 1898. Serial No. 684,234. (No model.)

To all whom it may concern:

Be it known that I, ERNEST W. GRAEF, a citizen of the United States of America, and a resident of Baltimore, Maryland, have invented certain new and useful Improvements in Incandescent Tube-Igniters for Gas-Engines, of which the following is a specification.

My invention relates to a gas-engine, and has for its object to apply an automatic igniting device for igniting the gas in the combustion-chamber.

It consists of a thimble inserted into the wall of the combustion-chamber and projecting through that wall into the exhaust-chamber, the interior of the thimble being in communication with the combustion-chamber and the exterior of which is exposed to contact with the exhaust-flame by which it is heated.

The drawing is a vertical section of the combustion-chamber, showing the inlet and exhaust valves and the automatic igniting-thimble inserted in the wall of the combustion-chamber and projecting through the wall into the exhaust-chamber.

Referring to the drawing, 1 is a valve-chest; 2, a gas-supply pipe; 3, an inlet-valve; 4, a combustion-chamber within the valve-chest; 5, an exhaust-valve; 6, an exhaust-chamber; 7, an exhaust-pipe.

8 is a thimble inserted in the wall of the combustion-chamber, projecting through that wall into the exhaust-chamber. The open end of the thimble is open to the combustion-chamber and the closed end is in the exhaust-chamber.

9 is a mechanism for operating the exhaust-valve. (Not shown because unnecessary to this case.) The combustion-chamber is connected in the usual manner with the cylinder of a gas-engine and the exhaust-valve-operating mechanism is connected in any usual manner with the crank of the engine. The valve-chest is supplied with any form of electric or gas igniting mechanism for its initial operation, the purpose of the present device being to continue its operation after once started. It is incapable of initiating the operation. Any electrical or gas apparatus for causing the first one or two explosions may be employed, and therefore for the sake of simplicity they have been omitted.

The operation of the device is as follows: As the engine is turned over gas will be drawn into the combustion-chamber and exploded by the action of the electrical or other igniter. The motion of the piston will cause the exhaust-valve to open and the exploded burning gas will pass out through the exhaust-chamber, surround the thimble 8, and heat it to the temperature of the exhaust. This will be continued until the thimble 8, has been heated by the exhaust-flame to a temperature sufficient to explode the incoming gas. The electrical or other igniter may then be thrown out of action and the explosion of the gas will continue automatically under the influence of the heat imparted to the thimble 8 by the exhaust-flame. The heat imparted to the thimble 8 by the exhaust-gas is sufficient to ignite the inflowing gas as soon as it enters the combustion-chamber; but I find that this does not occur, and I have concluded that the failure to so ignite the inflowing explosive gas is due to the fact that only the lower end of the thimble is heated to a minimum temperature, while the interior of the thimble after an exhaust is filled with gas which has already exploded from the last charge. Hence the fresh explosive gas which enters the combustion-chamber does not come in contact with the highly-heated part of the thimble until the return of the piston, when the gas contained in the combustion-chamber and the cylinder is compressed by the piston, and the gas in the thimble is also compressed under the explosive gas which is above it until the explosive gas is brought into contact with the highly-heated part of the thimble, when an explosion will occur. It is also probable that the compression of the gas in the combustion-chamber also increases its temperature and aids the combustion.

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

An automatic igniter for gas-engines, which consists of a thimble inserted in the wall of the combustion-chamber, the interior of which is in communication with said chamber and the exterior of which projects into the exhaust-chamber, substantially as described.

Signed by me, at Baltimore, Maryland, this 4th day of June, 1898.

ERNEST W. GRAEF.

Witnesses:
GEORGE KENT,
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