

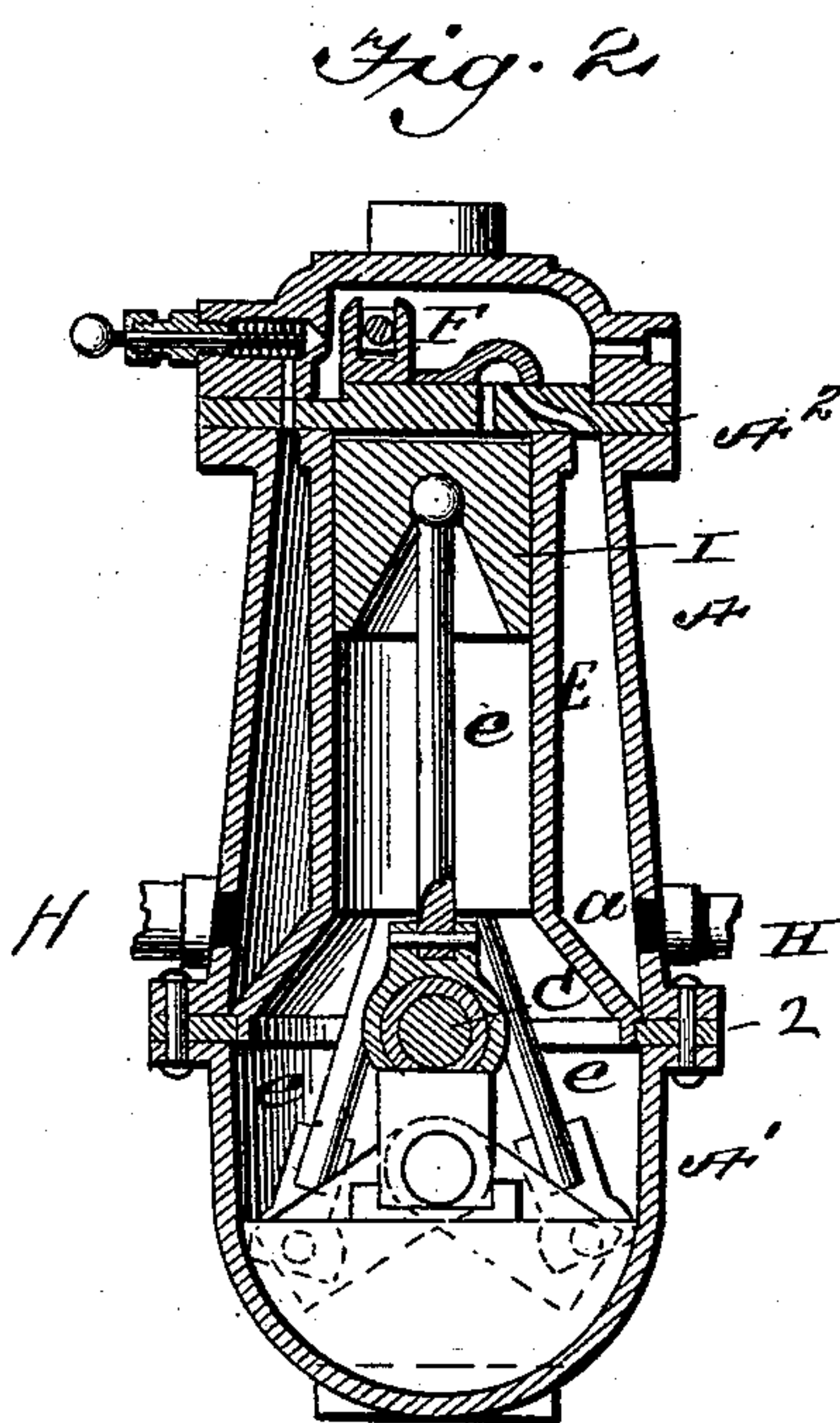
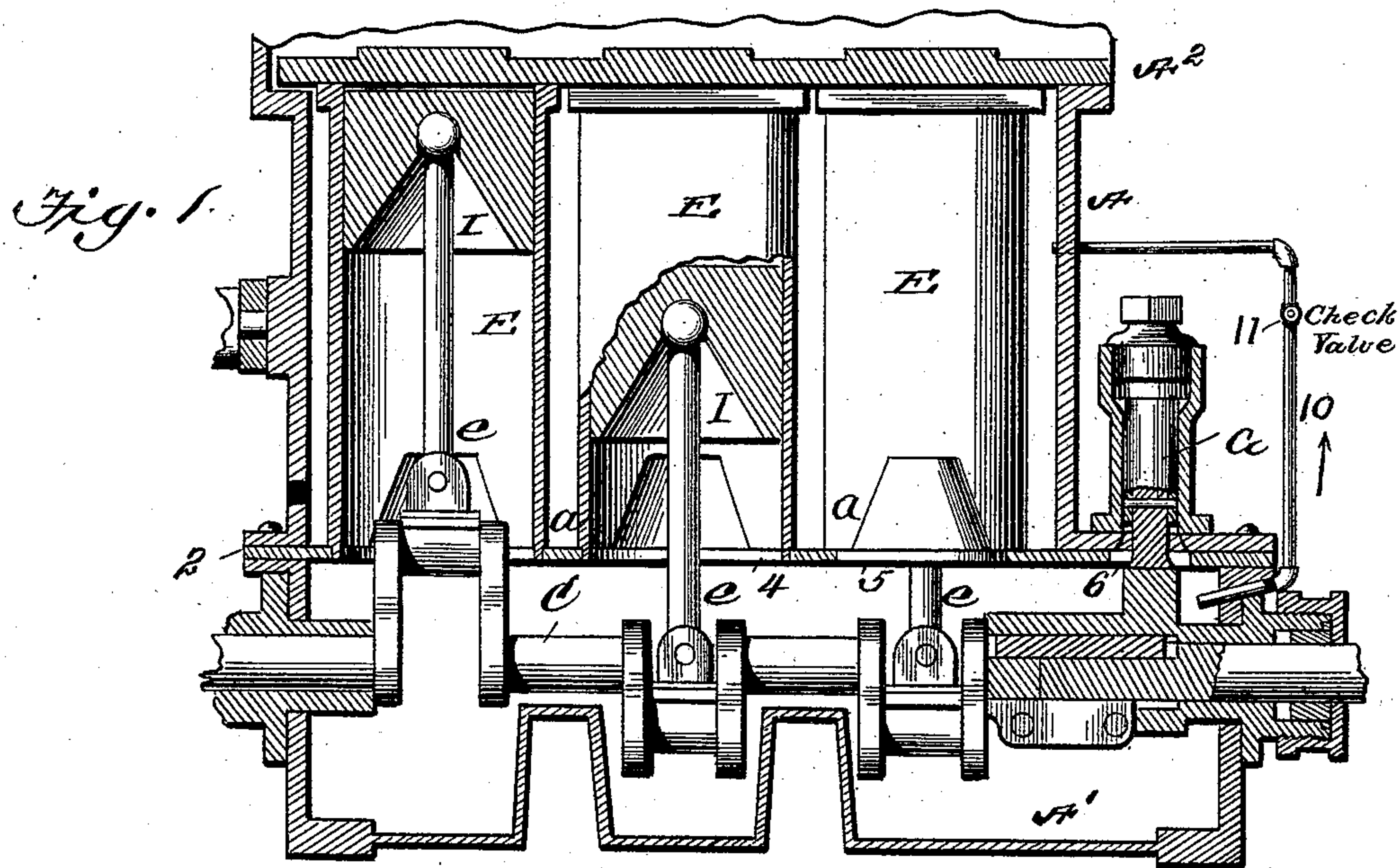
(No Model.)

2 Sheets—Sheet 1.

A. R. HOLMES.  
GAS ENGINE.

No. 540,490.

Patented June 4, 1895.



Witnesses

*John M. ...*  
*E. R. Davies*

Inventor

*A. R. Holmes*

By *W. A. Bartlett*

Attorney

(No Model.)

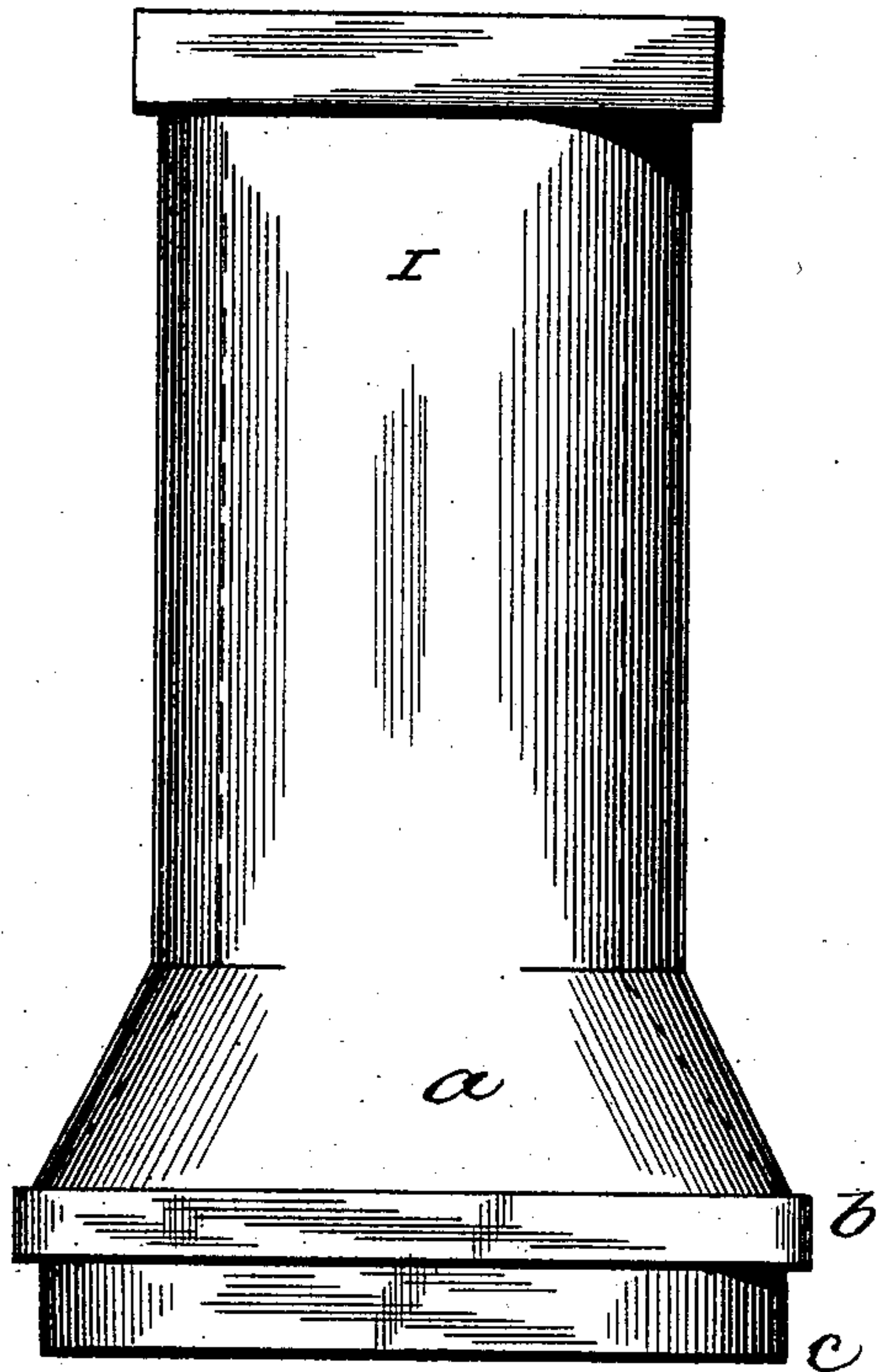
2 Sheets—Sheet 2.

A. R. HOLMES.  
GAS ENGINE.

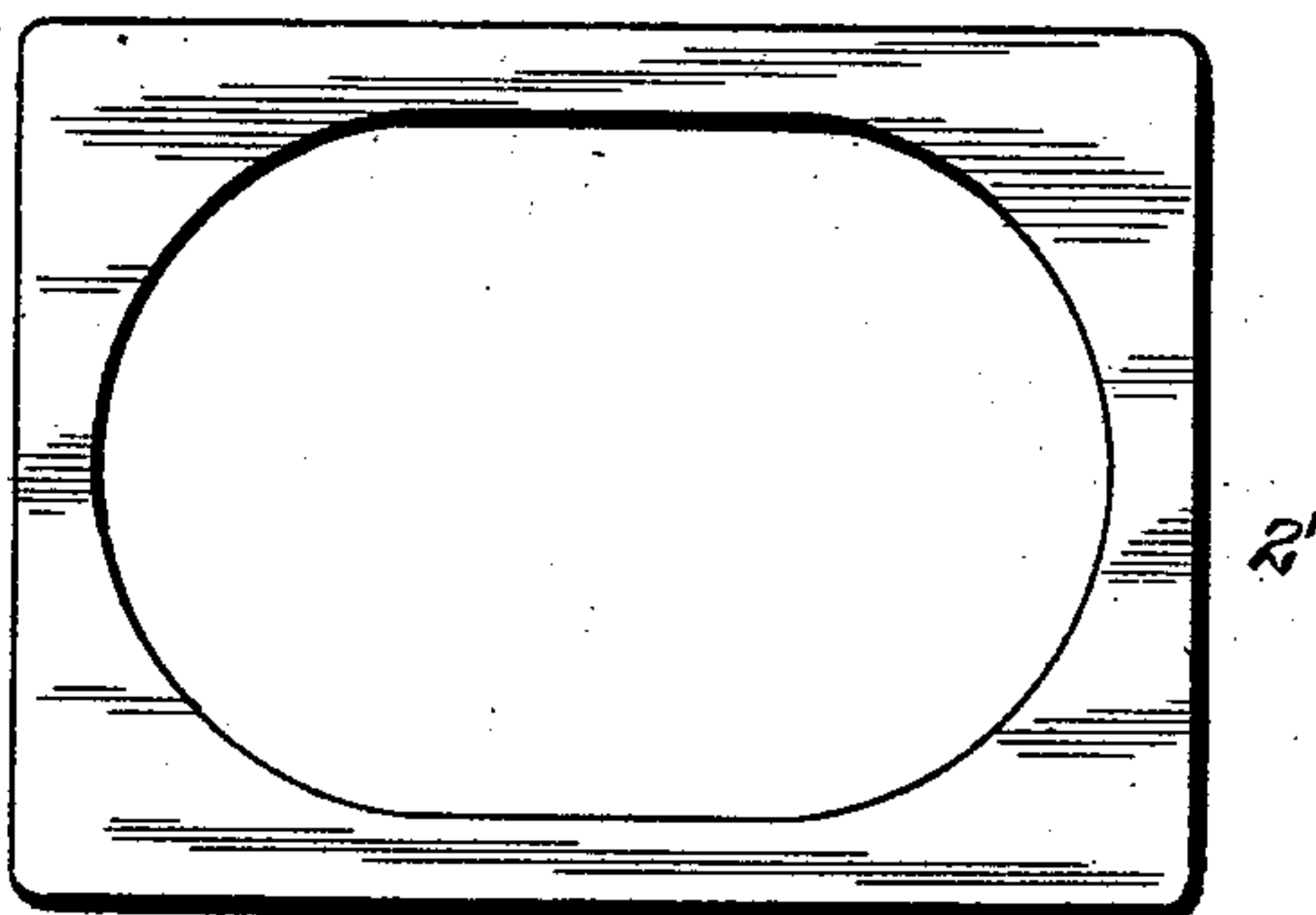
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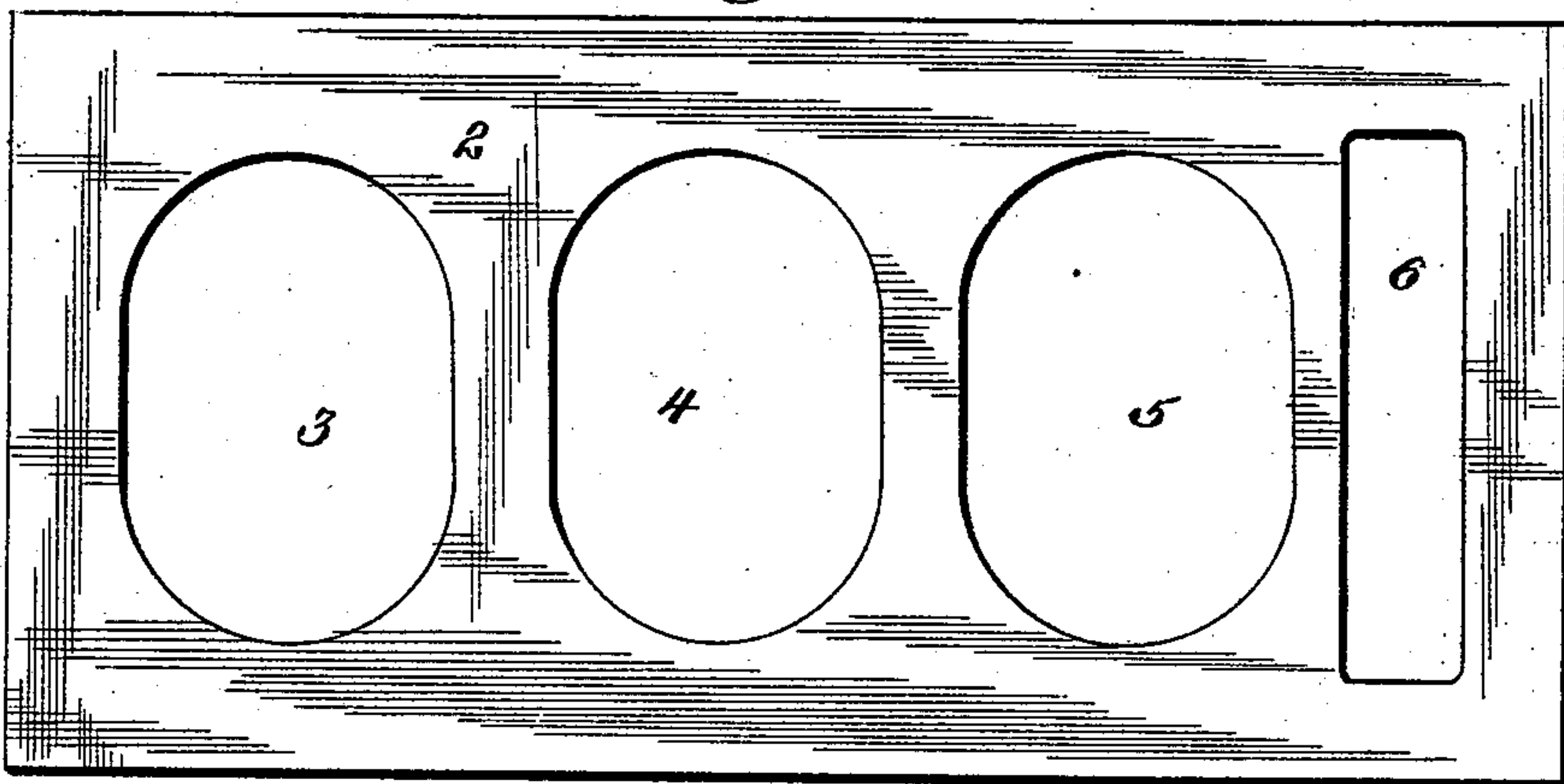
*Fig. 3*



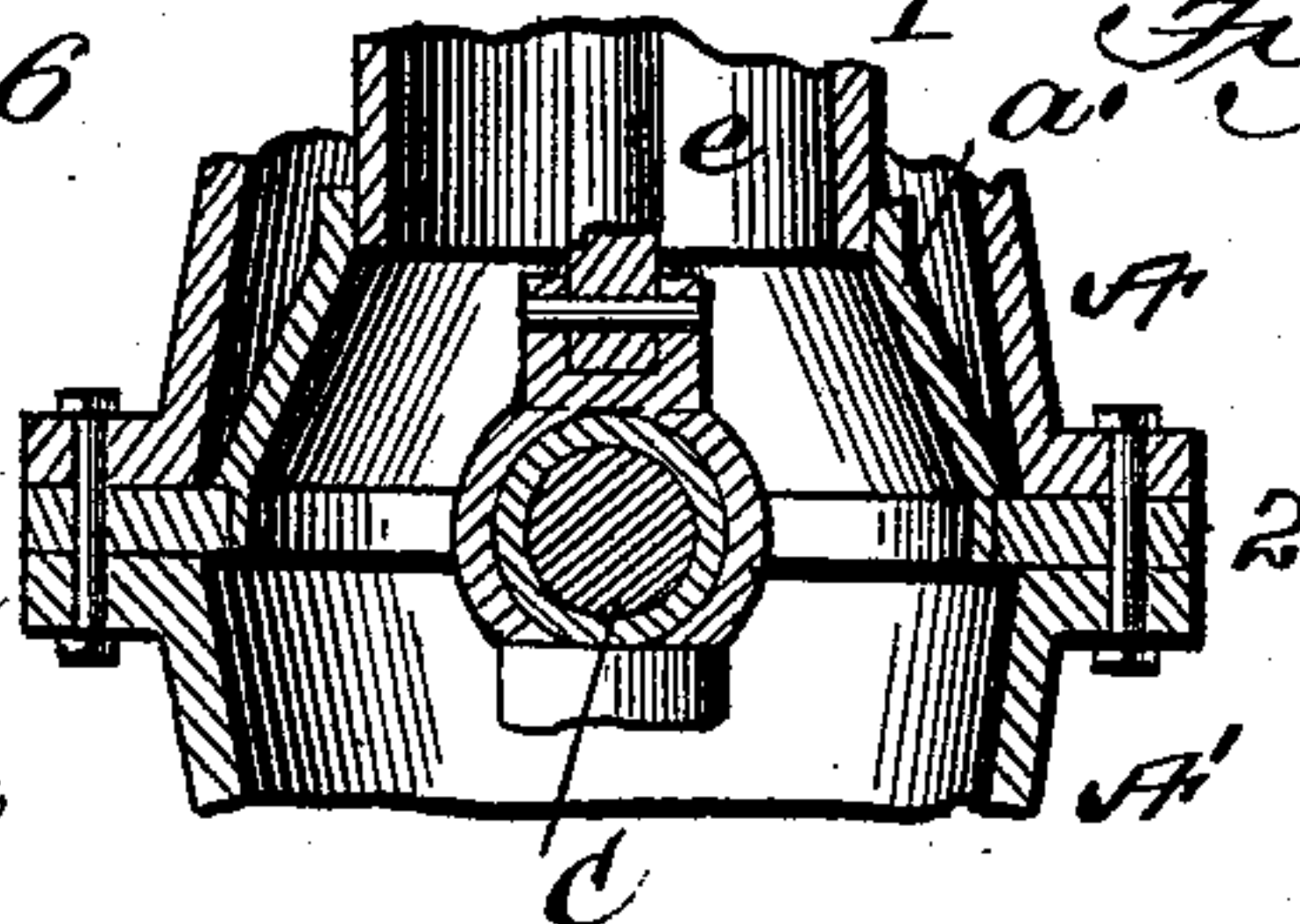
*Fig. 4*



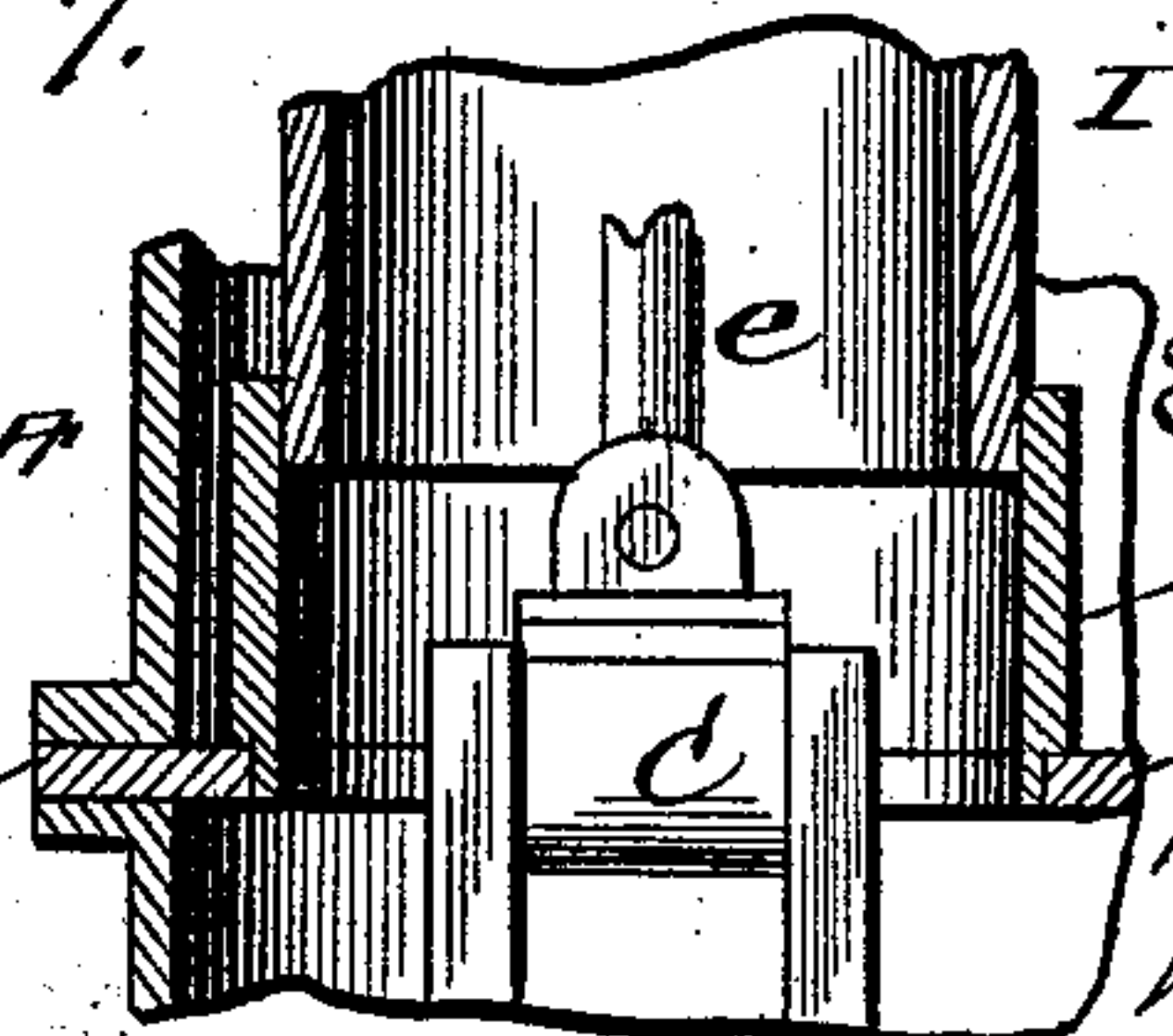
*Fig. 5*



*Fig. 6*



*Fig. 7*



Witnesses

*John Smith*  
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# UNITED STATES PATENT OFFICE.

ALEXANDER R. HOLMES, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
HARRY E. WOOD, OF SAME PLACE.

## GAS-ENGINE.

SPECIFICATION forming part of Letters Patent No. 540,490, dated June 4, 1895.

Application filed March 13, 1895. Serial No. 541,557. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER R. HOLMES, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in gas engines, and is specially intended to apply to the engine patented to F. W. Ofeldt, No. 356,419, dated January 28, 1887.

The object of the invention is to so improve the engine above referred to that the escaping gas from the engine cylinders may be retained within the casing, and yet excluded from the bearings, so that lubrication may be maintained in a more perfect manner, also to provide for gas escape from the crank shaft chamber.

For a general understanding of the engine, reference is made to the above patent.

Only so much of the engine is herein illustrated as is believed to be necessary to give a clear understanding of the improvement.

Figure 1 is a broken vertical central section of the engine, showing one cylinder in section, one partly broken, and one in elevation, and showing some of the connections in section and some in elevation, as will be apparent to one skilled in this art. Fig. 2 is a broken vertical transverse section centrally through the casing and one of the cylinders, it being immaterial which cylinder. Fig. 3 is an enlarged elevation of one of the cylinders, taken in the same direction as Fig. 2. Fig. 4 is a plan of the base-plate for supporting the cylinder and stopping off the gas from the lower part of the casing. Fig. 5 is a plan of a single base-plate for supporting all three cylinders. Fig. 6 is a vertical section in one direction, and Fig. 7 a vertical section at right angles thereto, of the lower part of the casing and the stop-off slightly modified.

A denotes the hollow frame or box-shaped casing which incloses the engine, its lower portion A' being somewhat in the shape of a trough, and being secured to the part A by bolts or other suitable means. The valve seats are on the part A' of the inclosing casing.

The main shaft C is arranged in the trough in the lower part of the casing, passing through stuffing boxes at the ends. The main shaft C has three cranks, and to each crank a pitman —e— is connected, the pitman being connected to a piston, I. Each piston moves in a vertical cylinder E, which is open at the bottom, and receives its gas supply through the plate A' by means of a slide valve F. The exhaust is also governed by said slide valve F, and the gas after having performed its duty on the single acting pistons, is permitted to escape into the recess or chamber between the cylinders E and casing A. The gas is conducted from the casing A back to the tank, through passages H. The pump G is operated from the main crank shaft. All these parts are old, and are described in the patent referred to.

In the engine described in the patent, the cylinders are open at the bottom, and are connected to the casing only at the top. The gas within the casing is free to enter the crank shaft chamber, and the hot gas soon burns out any lubricant, and melts the babbitt bearings, so that the engine depends for lubrication on the condensed oil or gas and the bearings are imperfect.

In my improvement, about to be described, I stop off the gas from the crank shaft chamber, by a plate 2, and by extension of the cylinders. The plate 2 has openings 3, 4, 5, for the passage of the pitman and crank rods, and an opening 6 for the pump rod. The plate 2 may be secured between the sections A and A' of the casing, or be otherwise secured in any suitable manner.

The cylinders I are brought down to the plate 2 by means of skirts or extensions. As indicated in Figs. 1, 2, and 3, these extensions —a— are flared in one direction, to give room for the play of the cranks, while in the other direction, or at the proximate sides of the cylinders, the skirts are a direct continuation of the cylinder walls. The lower edge of each cylinder skirt will have a flange —b— to rest on plate 2, and may have a rib —c— to enter the opening in the plate 2. The plate and cylinder skirts will be firmly secured together to form gas tight joints. By this con-



struction the exhaust gas from the casing is prevented from entering the lower ends of the cylinders, while permitted to freely circulate around the bodies of the cylinders. The cylinders are also firmly supported in position. Plate 2 may be made in sections, as indicated at 2' Fig. 4.

By the modification shown in Figs. 6 and 7, the skirts or extensions —a'— are made separate from the cylinders I, and inclose said cylinders at their lower ends. In other respects these skirts resemble those already described.

Skilled mechanics will understand that various forms may be given to the skirts, and that tight joints may be made and the parts firmly secured together by means well known in the art.

As the plate 2 and the cylinder skirts form a stop off by which the gas is prevented from entering the crank shaft chamber, the bearings in this chamber may be supplied with any usual lubricant. I prefer to supply a considerable amount of lubricating oil, which remains inclosed in the crank shaft chamber, and lubricates the bearings for a long time.

To prevent the escape of any small quantity of gas which may enter the crank shaft chamber around the pistons, I provide a pipe 10, leading from the crank shaft chamber back to the chamber between the cylinders and casing. This pipe 10 is provided with a check valve 11, which permits the passage of gas upward, but not downward. The gas, if any, will thus be carried from the crank shaft

chamber to the exhaust at such times as there is little pressure in the casing.

The exhaust passages H are connected to the casing near the bottom of the space between the cylinders and casing, so that any accumulation of oil from the condensation of gas in the chamber around the cylinders will be carried off with the exhaust.

By the construction above set forth the engine is much increased in efficiency, and very perfect lubrication is effected, which has before been difficult or impracticable.

What I claim is—

1. In a gas engine of the character described, the inclosing casing, the cylinders connected thereto and exhausting into said casing as described, and the stop off plate and cylinder skirts forming a partition by which the gas is excluded from the inclosed crank shaft chamber, the specified elements combined substantially as described.

2. In a gas engine of the character described, having the outer casing, the inclosed cylinders, and the stop off partition as set forth, a gas escape passage leading from the crank shaft chamber to the chamber between the cylinders and casing and provided with a check valve, all combined substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER R. HOLMES.

Witnesses:

W. A. BARTLETT,

CHARLES L. DU BOIS.