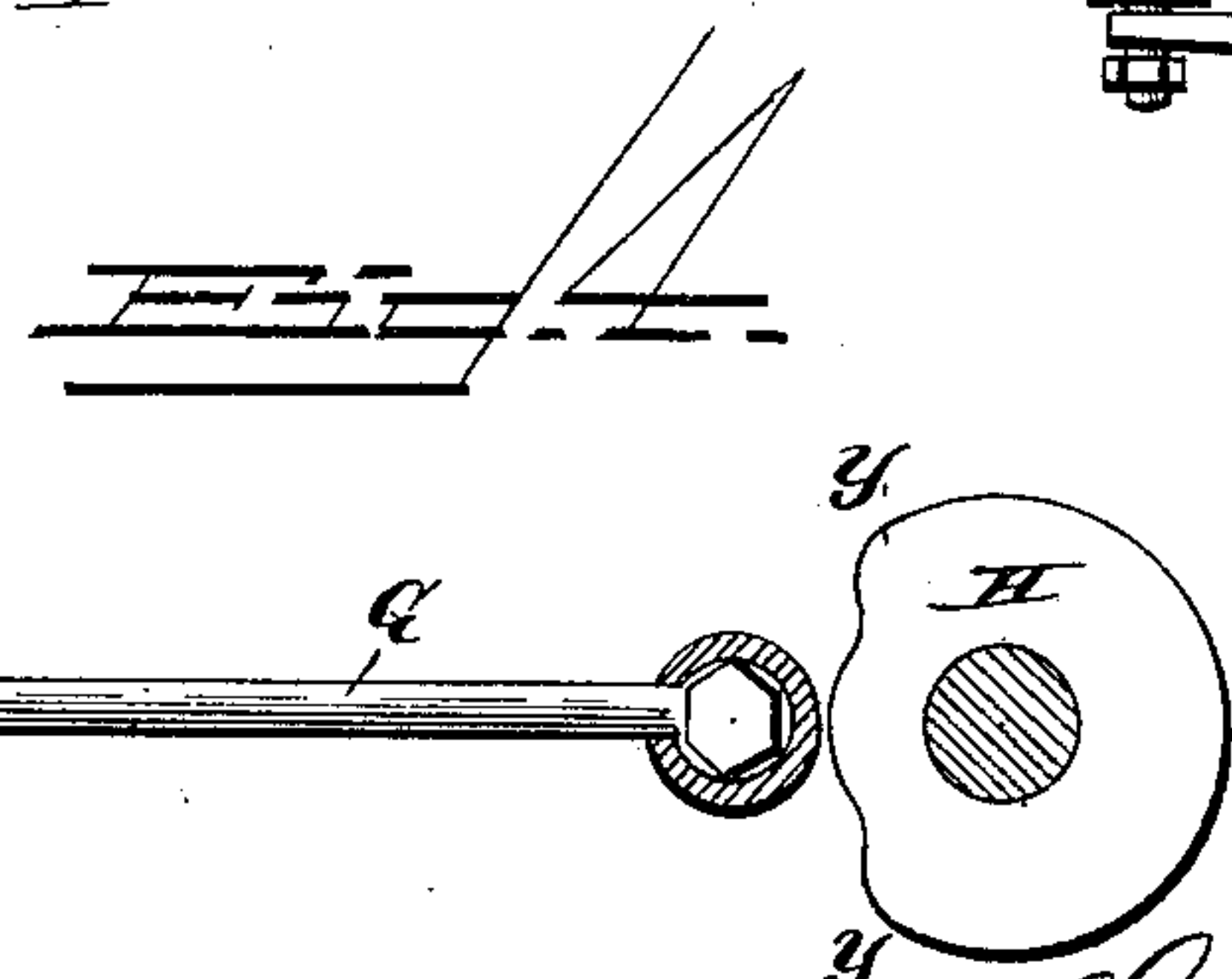
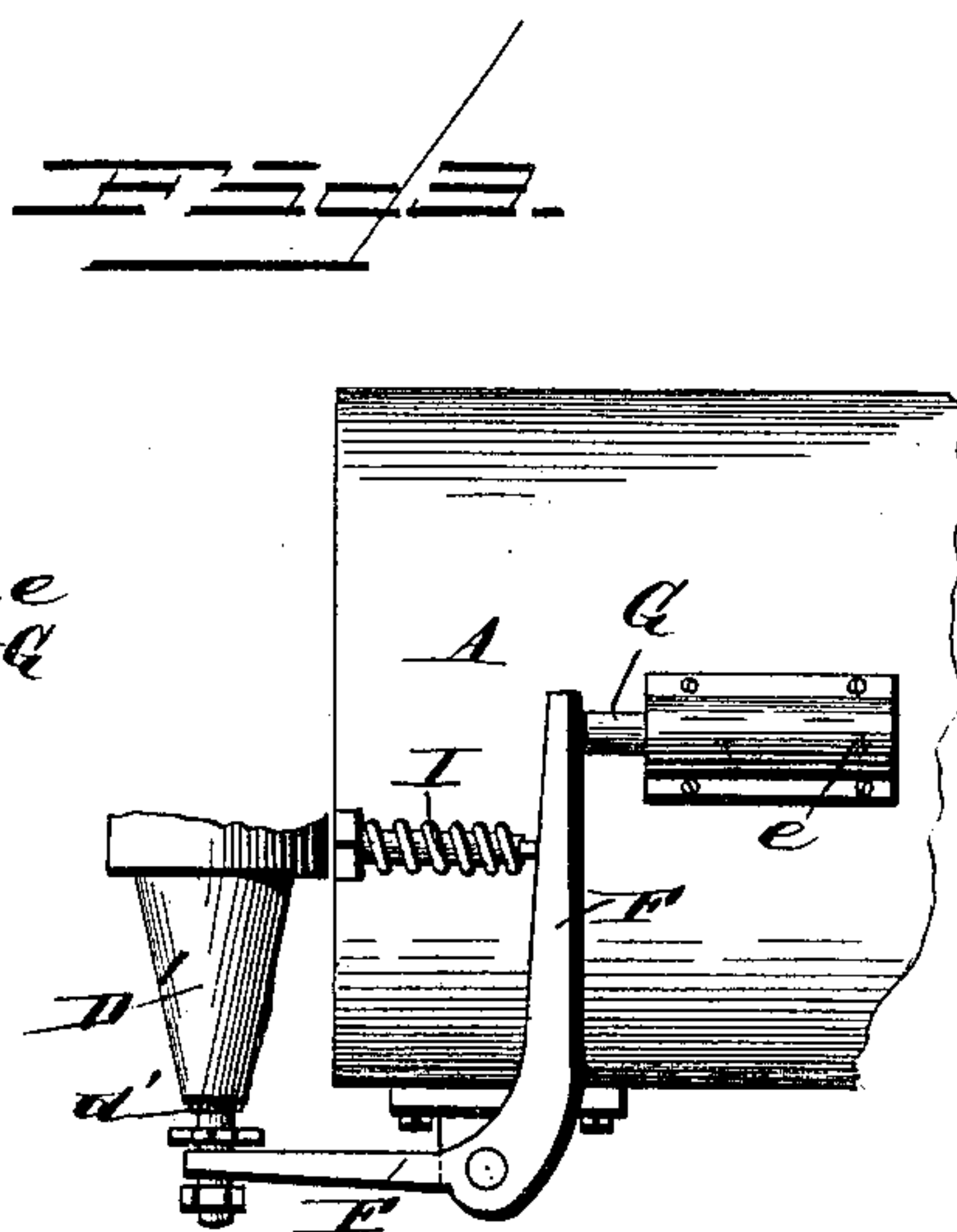
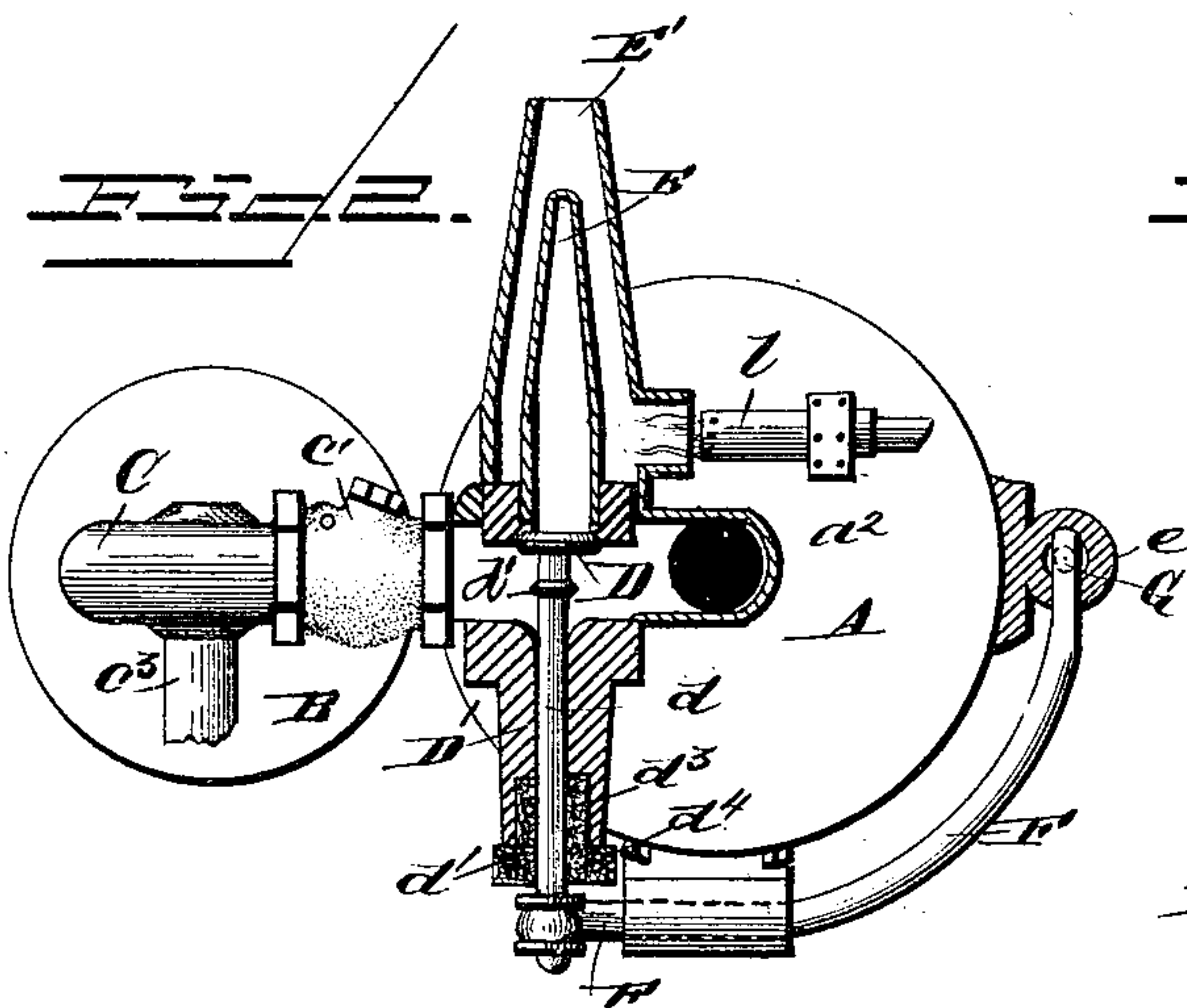
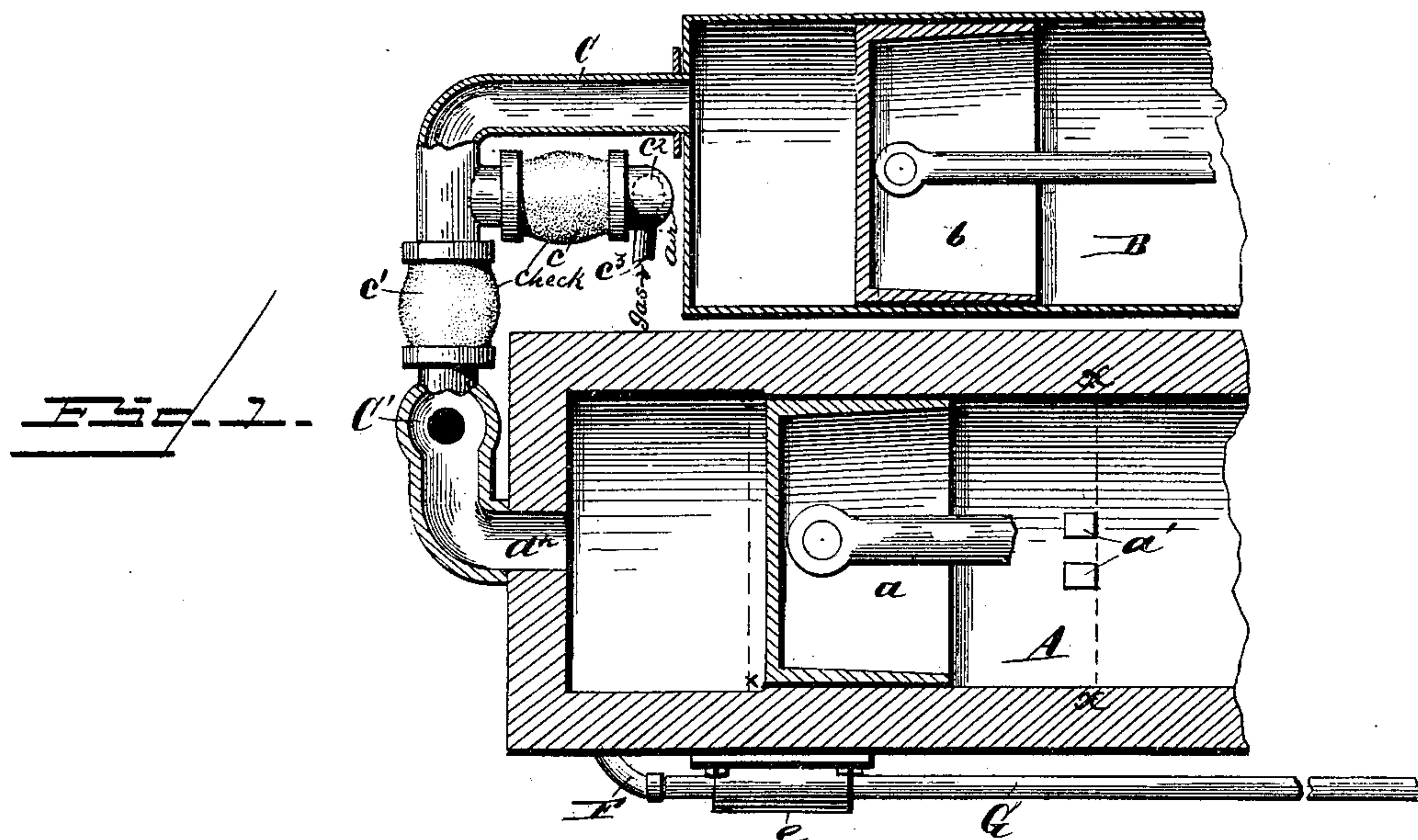


(No Model.)

L. C. & B. PARKER.
GAS OR HYDROCARBON VAPOR ENGINE.

No. 405,795.

Patented June 25, 1889.



Witnesses,
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UNITED STATES PATENT OFFICE.

LEWIS C. PARKER AND BEAUMONT PARKER, OF KANSAS CITY, MISSOURI.

GAS OR HYDROCARBON-VAPOR ENGINE.

SPECIFICATION forming part of Letters Patent No. 405,795, dated June 25, 1889.

Application filed February 11, 1889. Serial No. 299,382. (No model.)

To all whom it may concern:

Be it known that we, LEWIS C. PARKER and BEAUMONT PARKER, citizens of the United States of America, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Gas or Hydrocarbon-Vapor Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention is directed to certain improvements in gas or hydrocarbon-vapor engines; and it consists of the detailed construction and combination of parts, which will be more fully disclosed in the following description and illustration, in which—

Figure 1 is a horizontal section of the power-cylinder and charging-cylinder of a gas or hydrocarbon-vapor engine, partly broken away, with our improvement applied thereto. Figs. 2, 3, and 4 are detail views thereof.

In the embodiment of our invention we employ the power-cylinder A and the charging-cylinder B of a gas or hydrocarbon engine. The cylinder A, as usual, is provided with a piston *a* and exhaust-ports *a'* *a'*, the dotted line *xx* indicating the limit of the inner stroke of the piston. In like manner the cylinder B is provided with a piston *b*, and has a pipe or tube connection C with the power-cylinder A. In the pipe or tube connection C, about midway between the two cylinders, is the check-valve *c'*, and intermediately of the check-valve and the port *a'*, or the point of connection between the pipe or tube *c* and the cylinder A, is the ignition-chamber C', while *c* is the commingled gas and air chamber, situated in that arm or portion of the tube or pipe C adjacent to the charging-cylinder, and which is provided with an automatic check-valve. The latter chamber is provided with an air-inlet *c*² and a gas-inlet *c*³, which is controlled by any suitable governor. (Not shown.) The ignition-chamber C' is provided with a heating-tube E, inclosed by an open-ended hood or thimble E', into which the flame for heating the tube E is injected from a Bunsen burner *l* or other heating medium.

D is a valve for opening and closing the open lower end of the tube E, the stem *d* of which passes transversely through the tube

or pipe connection C and through a vertical guide tube or casting D' applied to the latter. The valve-stem *d* is provided with an enlargement or packing *d'*, which is slightly flanged and beveled to enable it to fit gas-tight into a corresponding cavity or depression *d*³ around the inner end of the passage or bore of the guide tube or casting D'. This is to prevent the ignited combustible mixture or the flame therefrom having access to or reaching through the said bore or passage of the guide tube or casting and burning or destroying the outer packing *d*⁴ upon the valve-stem.

F is an angular lever, which is hung in a bearing or box secured to the outer side of the cylinder A, one arm of which is applied to or has connection with the outer end of the stem *d* of the valve D, while its other arm is acted upon by the cam-rod G, actuated by the cam H upon the crank-shaft of the engine, said cam-rod being suitably guided by a box applied to the cylinder-casing, as at *e*. A spring I, suitably disposed upon the side of power-cylinder casing and pressing upon one arm of the lever F, normally holds the ignition-valve D to its seat in the open end of the tube E, thus keeping the latter closed.

The cam H actuates the valve D so as to hold it off its seat—the lower end of the tube E open—during the power-stroke and a part of the compressing operation. The valve closes during the travel of the roll on the cam-rod from *y* to *y* on the cam, the products of combustion thus being allowed to pass out with the exhaust.

The operation is as follows: Assuming a charge to be in the compression-space *a*³ and the piston *a* is about to begin its return-stroke, the rod G, by the action of the cam H, presses the lever F, causing the removal of the valve D from its seat. The compressed combustible mixture now enters or rushes into the heated tube E, and, instantly igniting, will ignite the charge in the chamber C', producing an explosion, the effect of which will be exerted, through the port *a*² and the space *a*³, upon and impart to the power-piston its outstroke. The piston *b* is now just about midway of its outstroke, drawing in its charge of air and gas through the pipes *c*² *c*³ and past the valve *c*, as indicated by the incoming arrows. As the

power-piston *a* uncovers the ports *a' a'*, the products of combustion pass out (through a pipe not shown) beyond the ports *a' a'*, and during the time the ports are uncovered the
5 charge is being forced into the cylinder A by piston *b* via the passage or opening C, ready to be compressed by the piston *a* of the power-cylinder and fired as it reaches the dotted line *x x*.

10 Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a gas or hydrocarbon-vapor engine, the combination, with the power-cylinder, the
15 charging-cylinder, and their pistons, of the pipe or tube connection between them having an arm provided with an air-inlet and a gas-inlet and an automatic check-valve, said pipe or tube connection itself having a check-valve,
20 the ignition-chamber provided with a valve seated in the lower open end of the heating-tube of said chamber, all arranged in the said tube or pipe connection, and means for operating said valve, substantially as and for the
25 purpose specified.

2. In a gas or hydrocarbon-vapor engine, the combination of the power-cylinder, the

charging-cylinder, and their pistons, the pipe or tube connection between said cylinders, said pipe or tube connection having an arm 30 provided with an automatic check-valve and a gas-inlet and air-inlet, the additional check-valve also supplied to said pipe or tube connection, and the ignition-chamber having a heating-tube and a valve seating in the lower
35 open end of said tube and having its stem extending through a guide-tube and provided inward from said valves with an enlargement or packing adapted to seat itself gas-tight around the inner end of the valve-stem guide-
40 passage, the angle-lever having one arm acting upon the stem of the ignition-valve and its other arm acted upon by a cam-actuated rod, and the spring acting upon said angled lever to normally hold the ignition-valve
45 closed, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

LEWIS C. PARKER.
BEAUMONT PARKER.

Witnesses:

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L. M. HUGHES.