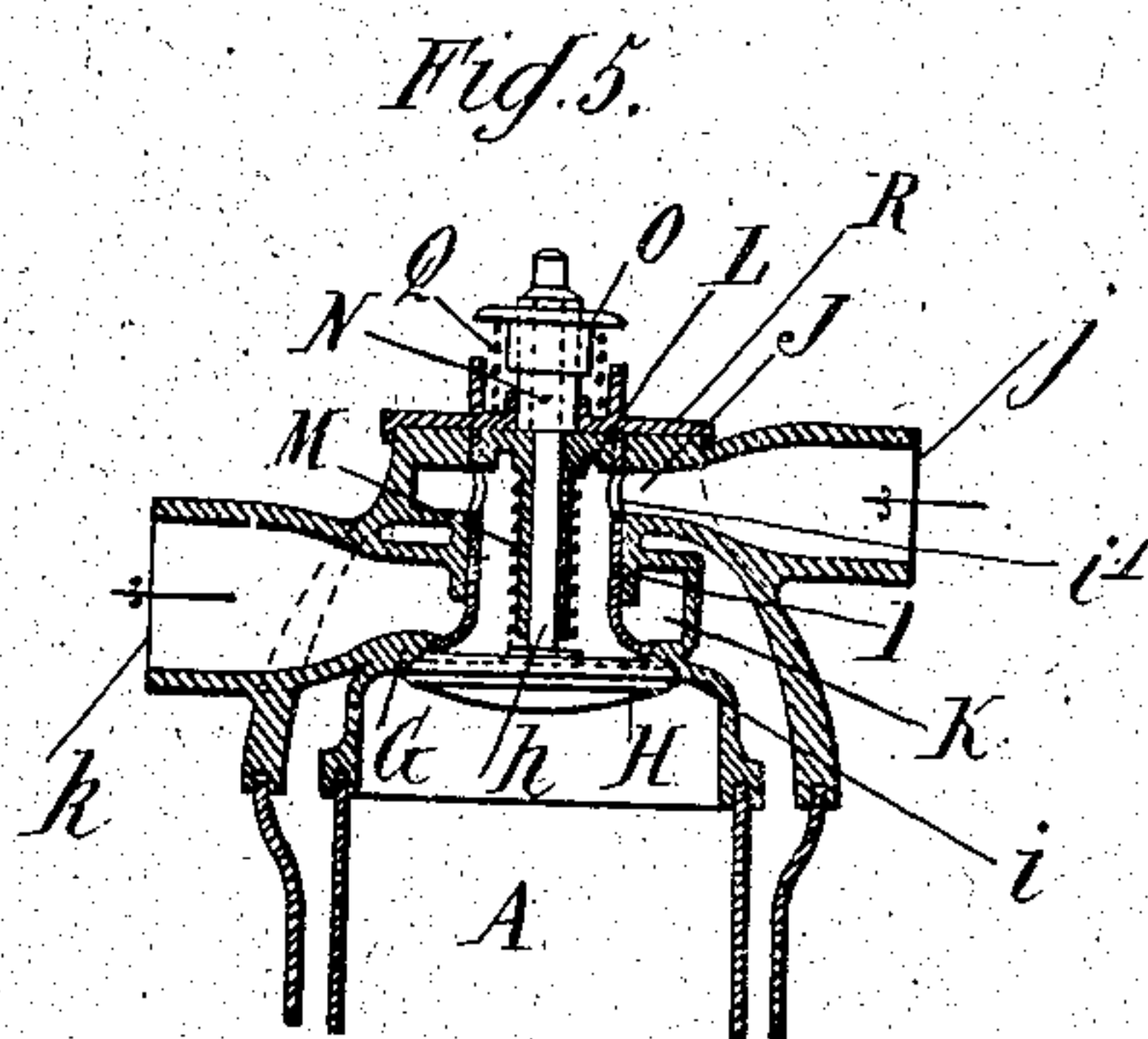
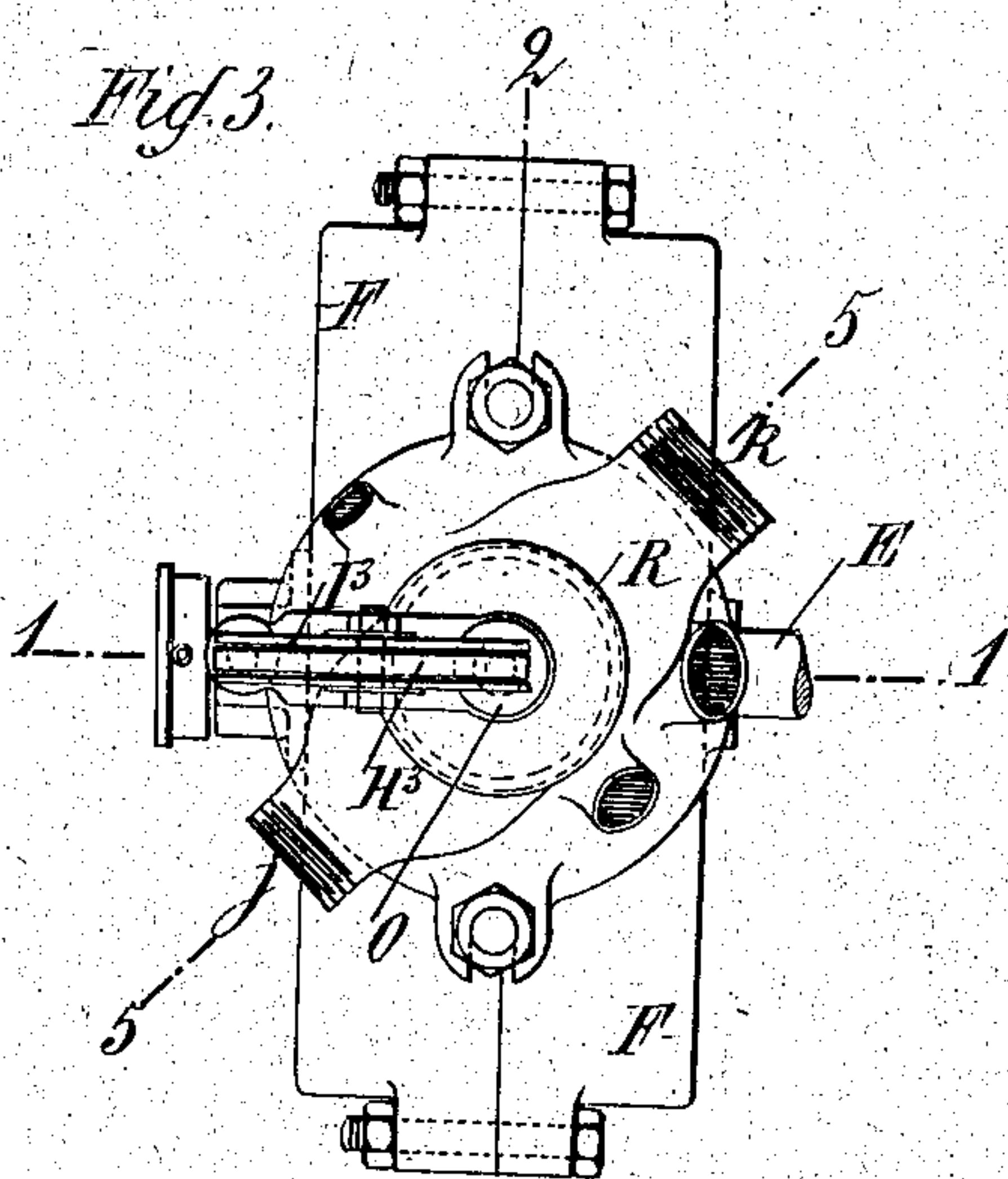
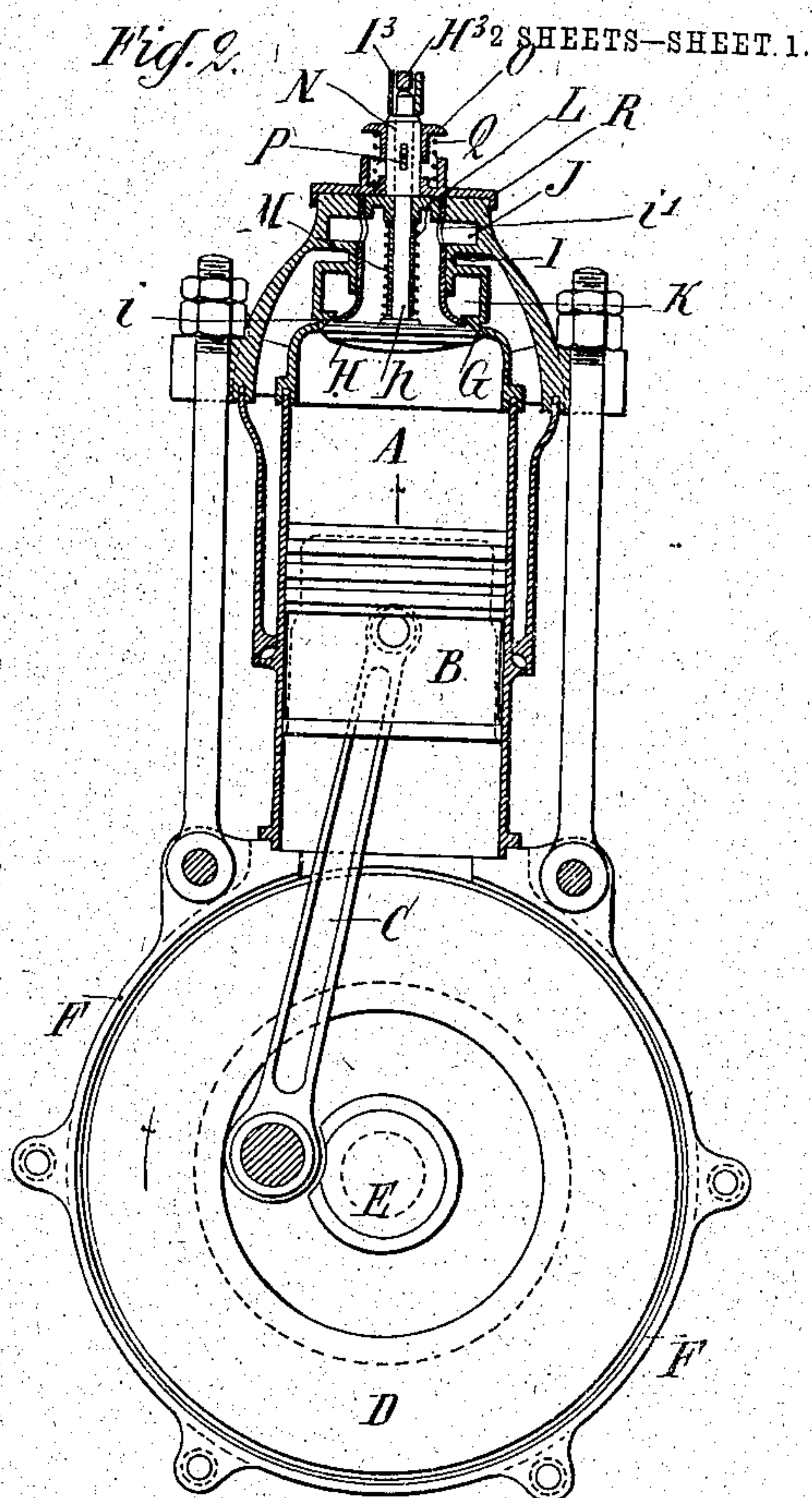
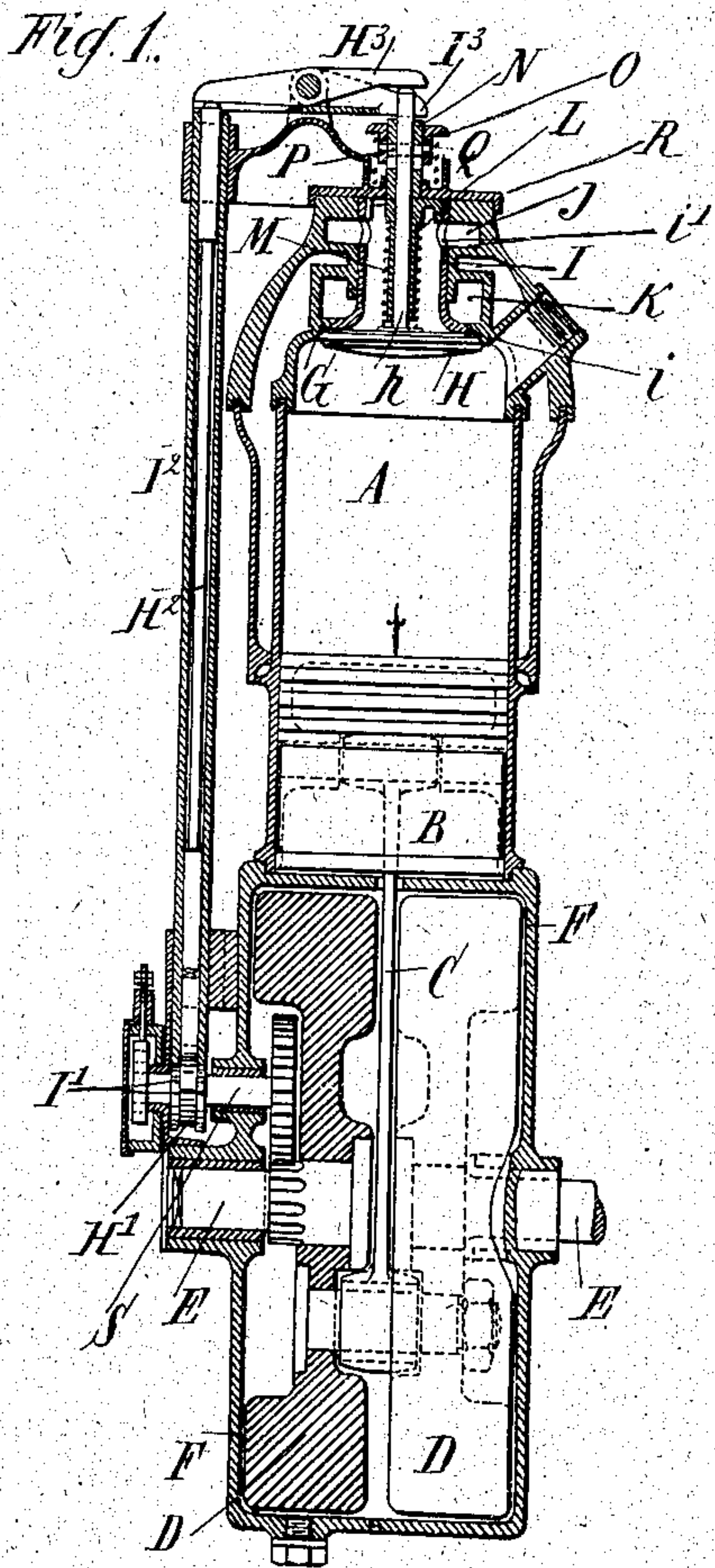


No. 815,779.

PATENTED MAR. 20, 1906.

L. P. A. A. BAILLEUL.
VALVE GEAR FOR EXPLOSION ENGINES.

APPLICATION FILED SEPT. 27, 1904.



WITNESSES:
B. W. Wright,
E. W. Collins

INVENTOR
Louis Pierre Alexandre Alphonse Bailleul
BY
Howson and Howson
HIS ATTORNEYS.

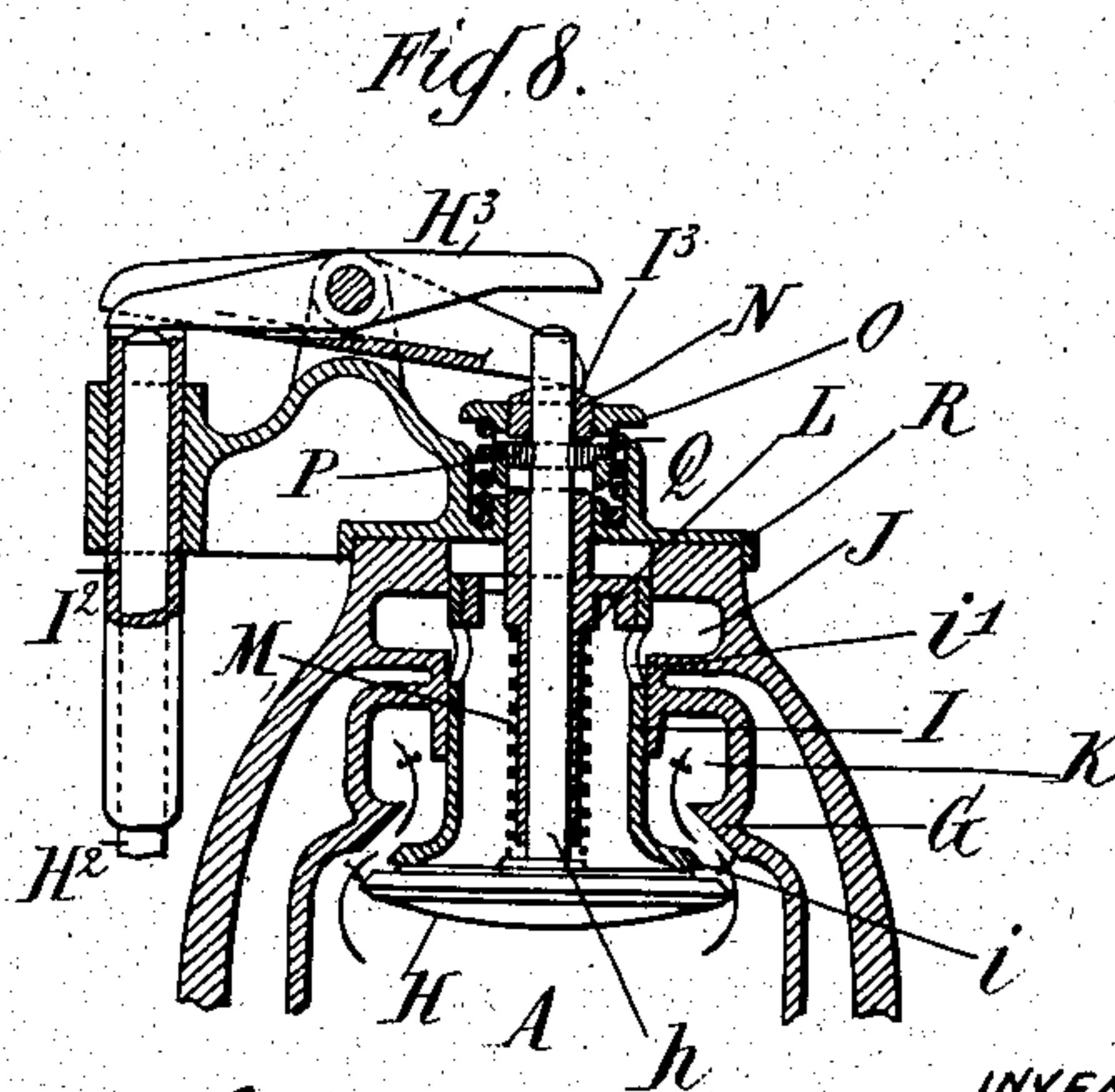
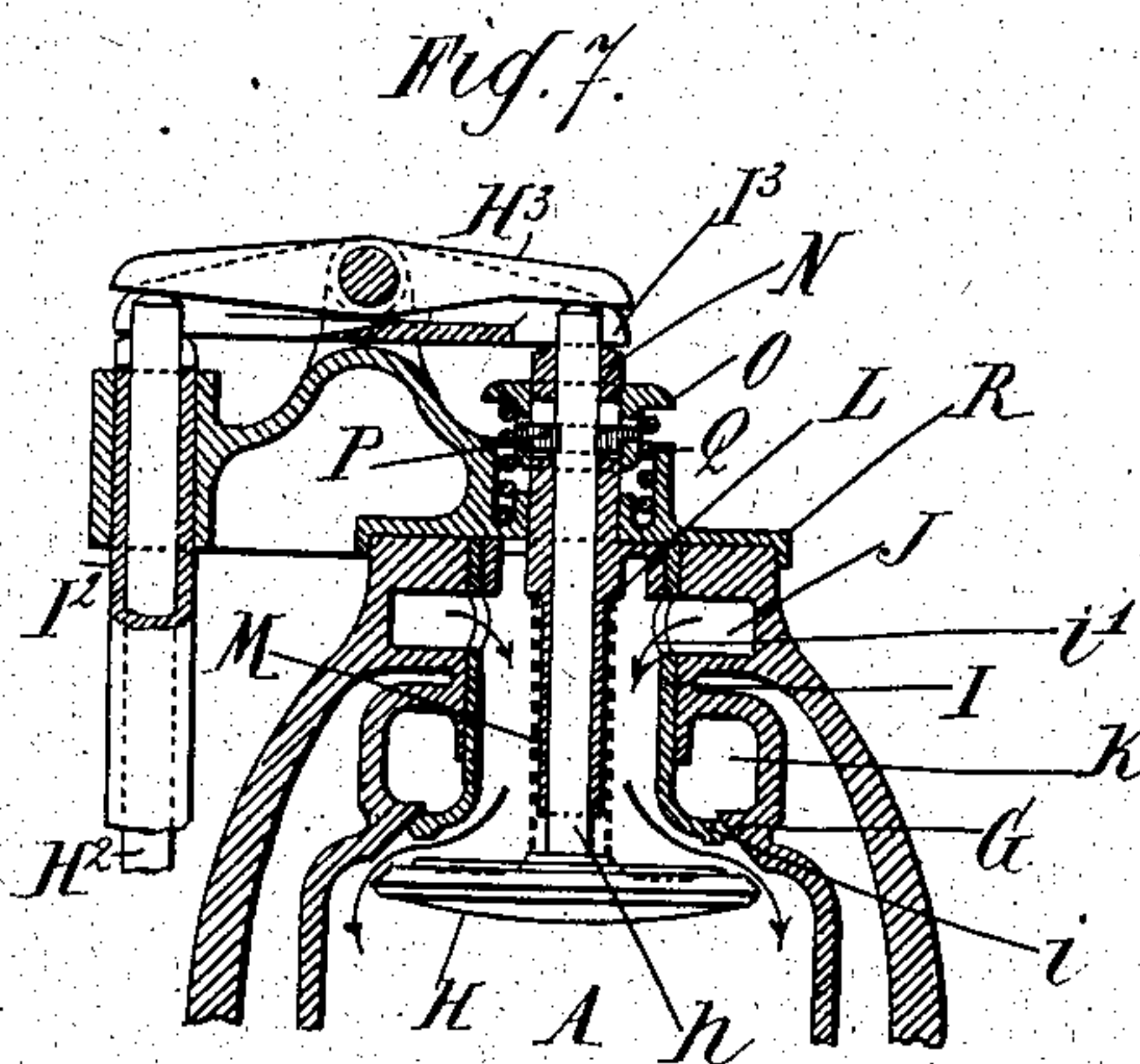
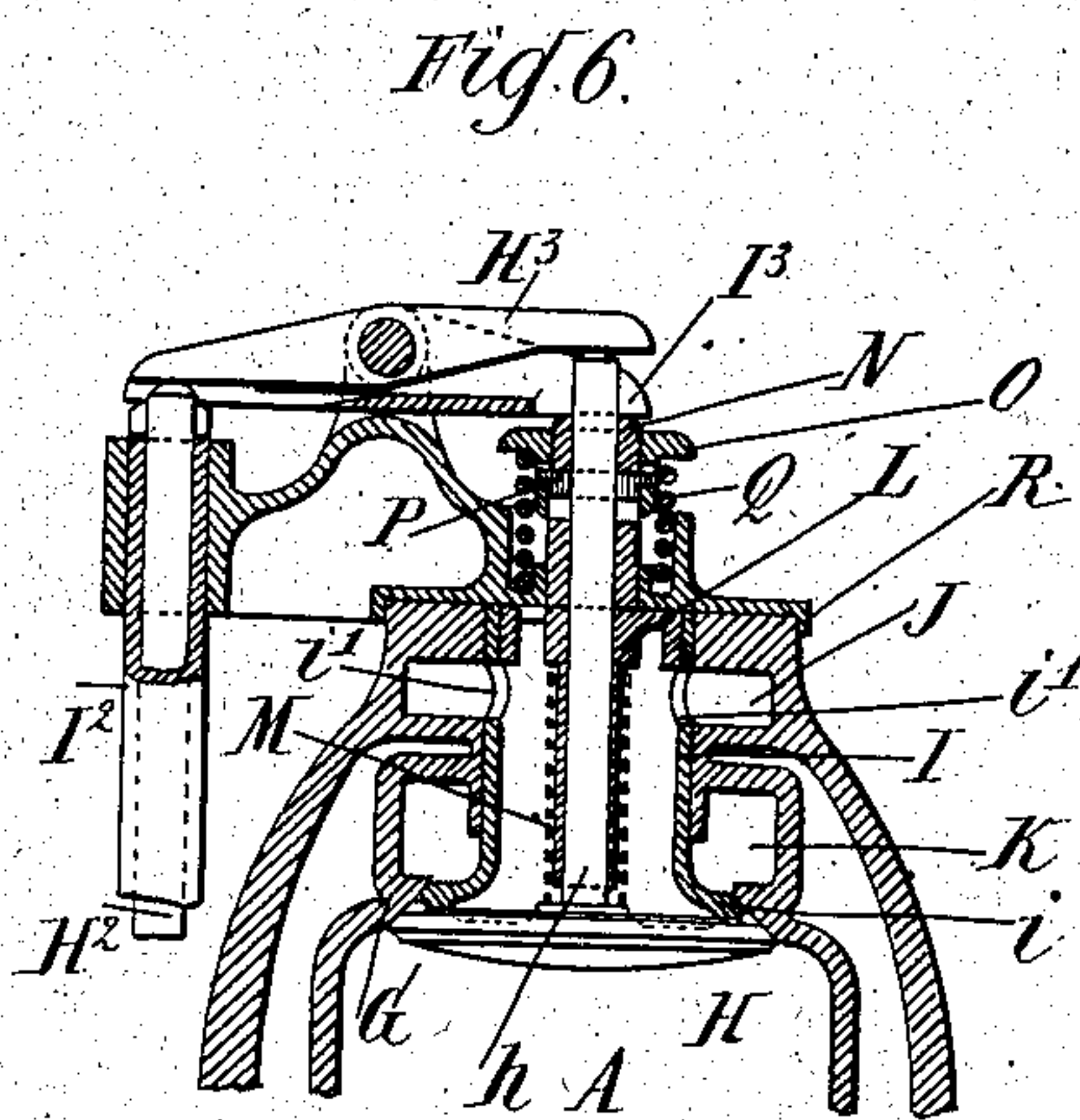
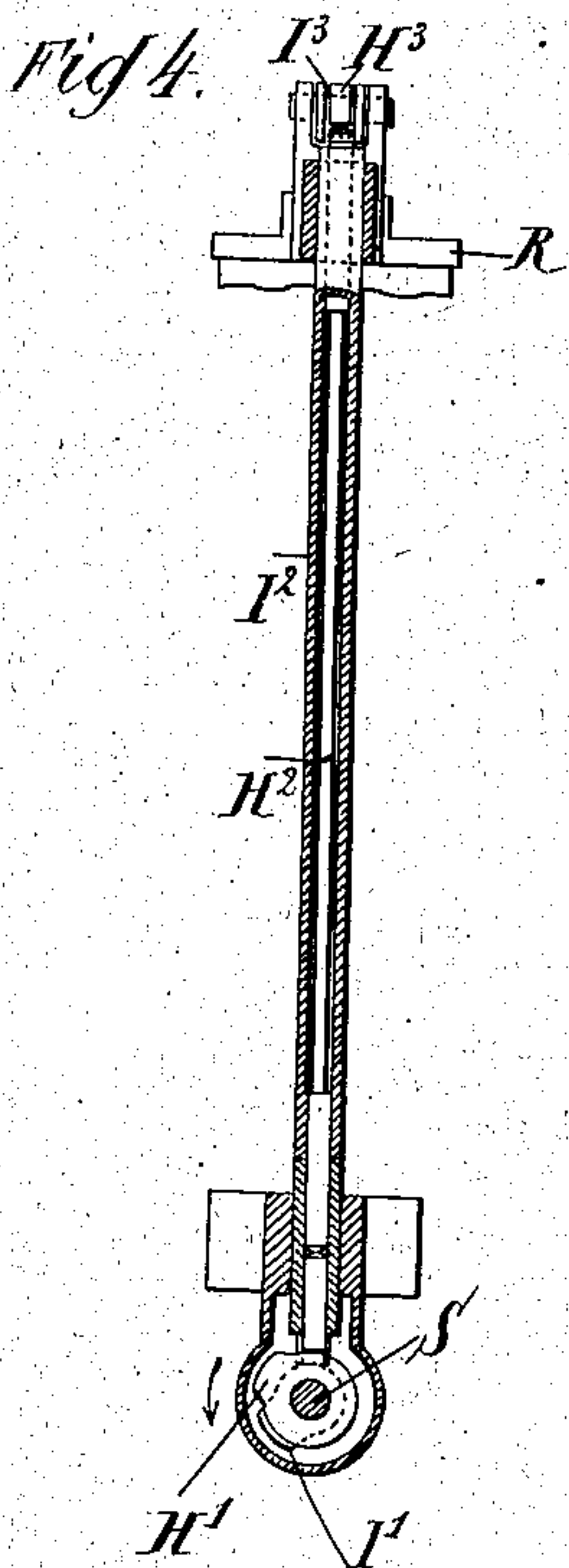
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

LOUIS PIERRE ALEXANDRE ALPHONSE BAILLEUL, OF PARIS, FRANCE.

VALVE-GEAR FOR EXPLOSION-ENGINES.

No. 815,779.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed September 27, 1904. Serial No. 226,178.

To all whom it may concern:

Be it known that I, LOUIS PIERRE ALEXANDRE ALPHONSE BAILLEUL, constructor, a citizen of the French Republic, residing at 37 Rue d'Amsterdam, Paris, France, have invented a certain new and useful Valve-Gear for Explosion-Engines, of which the following is a full, clear, and exact description, and for which letters patent have been granted to me in France, dated October 1, 1903, and in Great Britain, dated October 1, 1903.

This invention relates to an explosion-engine which works on the four-stroke cycle and is characterized by the fact that the inlet-valve and the exhaust-valve, both mechanically operated, are united at a single point and occupy the place of only a single valve. This arrangement diminishes the encumbrances or bulk of the engine and allows of an exhaust-outlet of large bore, which favors the attaining of high speeds.

A description of the invention is given hereinafter with reference to the annexed drawings, in which—

Figures 1 and 2 show this engine in two vertical sections at right angles one to the other on lines 1 1 and 2 2 of Fig. 3. Fig. 3 is a plan view. Fig. 4 is a detail view relative to the operating of the double valve. Fig. 5 is a vertical section on line 5 5 of Fig. 3 of only the upper part of the engine. Figs. 6, 7, and 8 are detail views, on a larger scale, showing the different stages of working of the double valve.

The engine shown is of the type which comprises a chamber inclosing the crank-shaft and the fly-wheels. This type, commonly used for high-speed engines, is shown, of course, only as an example for the description of the invention.

A is the cylinder in which the piston B travels, joined by a connecting-rod C to the fly-wheels D, which, with the shaft E, form the crank-shaft revolving in the closed case or chamber F. In the bottom or head of the cylinder there is formed an opening limited by a seating G, in which is seated the double valve, inlet and exhaust. This portion of the engine comprises two valves H and I. The one, H, is an ordinary inlet-valve which enters into the seat G to only such an extent, considering the truncated cone-surface which forms this seat, that it occupies but the part adjacent to the base. This valve H is fast to a stem *h*. The valve I, which will be

termed the "exhaust-valve," (although, as will be hereinafter seen, the exhaust-valve is in reality formed of the two valves H I moving together,) is composed of a cylindrical sleeve or casing bell-mouthed at *i*. This part *i* bears upon the truncated conical seat G above the portion on which is seated the induction-valve H. This sleeve-valve can slide with slight friction in a bearing formed in the head of the cylinder and is provided in its length with openings *i'*, which when it is in a state of rest coincide with an annular opening J, extending through the wall of its cylindrical bearing. This opening J forms the outlet from the pipe *j*, through which the gaseous mixture reaches the engine. The exhaust-pipe ends in an annular space K and opens around the seat G above the portion *i* of the sleeve-valve I. The valve I is fast to a socket L, in which is guided the stem *h* of the inlet-valve H. A spring M is interposed between the upper part of this socket L and the body of the valve H. Upon the top of the socket L rests another socket N, fitting freely around the stem *h*. Upon this socket N is secured a ring O, which is connected thereto by a cotter P, passing through the stem *h*. This cotter P connects in an unchanging manner the ring O and the stem *h*; but its bearing in the socket N is formed by an oblong slot which permits to the socket N a certain amount of vertical movement independently of the stem *h*. The ring O is subject to the action of a spring Q, which bears on a plate R, which is fixed upon the head of the cylinder and at its lower face serves as an abutment for the sleeve-valve I.

The working of the two valves H and I is effected by two cams H' and I', keyed upon the usual half-speed shaft S, driven from the crank-shaft. One of the cams I' is duplicated and formed as two identical cams placed one on each side of the cam H'. The central cam H' operates a rod H², which by means of a rocking lever H³ acts upon the stem *h* of the inlet-valve. The double cam I' acts upon a tube I², fitting freely about the rod H² and by means of a double rocking lever I³ operates the sleeve N and by means of the latter the sleeve-valve I.

The working of this engine is as follows: The cams H' and I' are arranged in such a manner as to operate the valve H and the valve I as they would operate two separate valves in a four-stroke engine. Induction is

effected by the cam H' , which by means of
 the rod H^2 and the lever H^3 , acting upon the
 stem h , causes the opening of the inlet-valve
 H. This movement takes place without act-
 5 ing on the valve I, because the cotter P, fast
 to the stem h and to the ring O, can descend
 in the slot of the socket N without acting
 thereon, Fig. 7. By this movement the
 spring O is compressed, and the latter will at
 10 the end of the operation bring back the inlet-
 valve H into the closed position. During
 the opening of the valve H the spring M
 bears upon the head of the latter for the pur-
 pose of maintaining the valve I in its seat.
 15 The valve I being immovable or motionless,
 the gas passing out from the opening J of the
 inlet-pipe passes through the openings i' , the
 interior of the sleeve-valve I, and enters into
 the cylinder by passing through the opened
 20 valve H, Fig. 7. When the cam I' acts, it
 causes, by means of the tube I^2 , the lever I^3 ,
 and the socket N, the lowering of the sleeve-
 valve I, which moves the valve H, with its
 stem h , the cotter P, and the ring O, com-
 25 pressing the spring Q. The two valves H
 and I then form only a single exhaust-valve,
 and the burned gases can enter the annular
 chamber K and from there the exhaust-pipe,
 Fig. 8. At the end of the operation of cam
 30 I' the spring Q brings back into the closed
 position the two valves H and I, still held to-
 gether. It will be noted that the sleeve-
 valve I is concentric with the stem of the in-
 let-valve and that gas is admitted into the
 35 cylinder through the port afforded by the
 space between the bell-mouth of the sleeve-

valve and the head of the inlet-valve while only the inlet-valve is open.

This arrangement of engine, in addition to
 the lessening of encumbrances which it pro- 40
 vides, enables the construction of the cylin-
 der to be simplified. It also provides a
 large opening for both the exhaust and the
 incoming gases, which is favorable to the at-
 taining of high speeds. It also keeps the 45
 valves in good condition, since they are alter-
 nately in contact with the hot exhaust-gases
 and the cold incoming gas.

Having thus described my invention, what
 I claim as such, and desire to secure by Let- 50
 ters Patent, is—

Valve-gear for explosion-engine, compris-
 ing inlet and exhaust valves, said valves be-
 ing superposed and having a common seat, a 55
 sleeve for the exhaust-valve concentric with
 the stem of the inlet-valve, and means for
 working these valves whereby at the induc-
 tion-stroke the inlet-valve opens alone and
 the gas enters through the interior of the
 sleeve of the exhaust-valve, which at the 60
 time remains closed to the exhaust, and at
 the exhaust-stroke the two valves, held one
 against the other, move together, thereupon
 exposing the exhaust-outlet.

In testimony whereof I have signed my 65
 name to this specification in the presence of
 two subscribing witnesses.

LOUIS PIERRE ALEXANDRE

ALPHONSE BAILLEUL.

Witnesses:

GUSTAVE DUMONT,
 JOHN BAKER.