

No. 639,160.

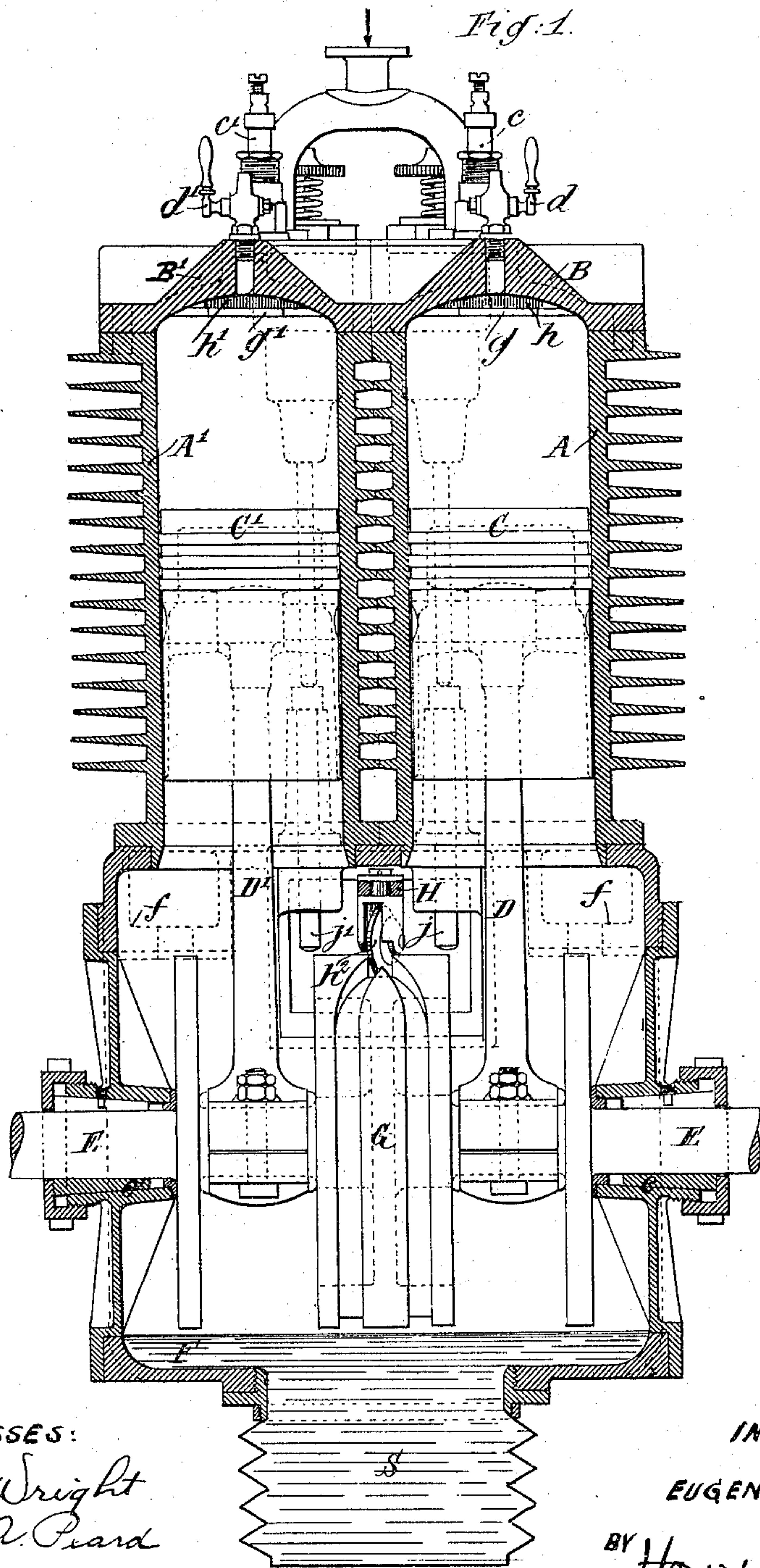
Patented Dec. 12, 1899.

E. FESSARD.
EXPLOSION MOTOR.

(Application filed Jan. 31, 1899.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:
P. W. Wright
Chas. A. Peard

INVENTOR
EUGENE FESSARD
BY *Howson and Howson*
HIS ATTORNEYS.

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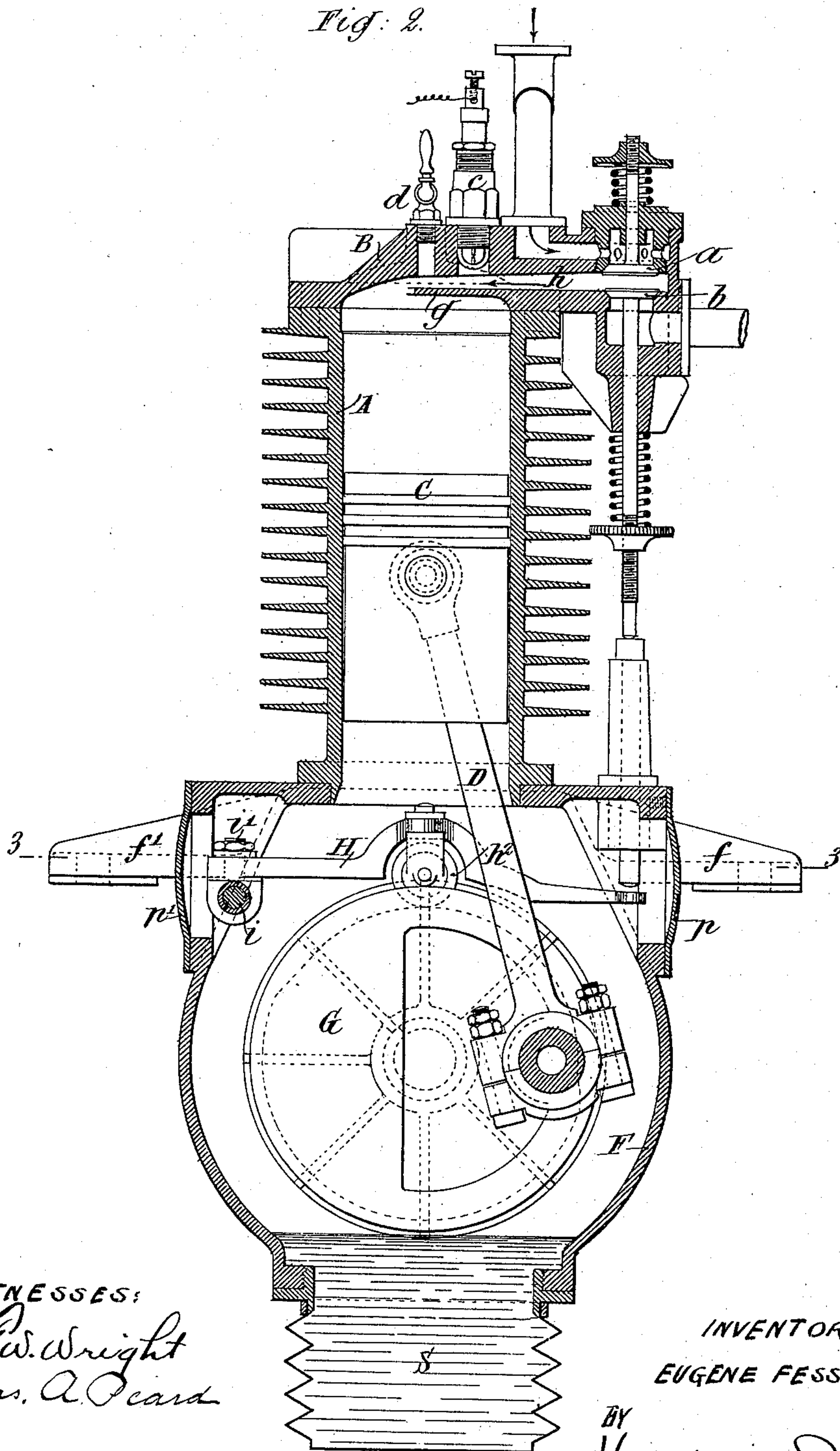
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Fig. 2.



WITNESSES:

P. W. Wright
Chas. A. O'card

INVENTOR

EUGENE FESSARD

BY

Howell and Howell
HIS ATTORNEYS.

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Fig. 3.

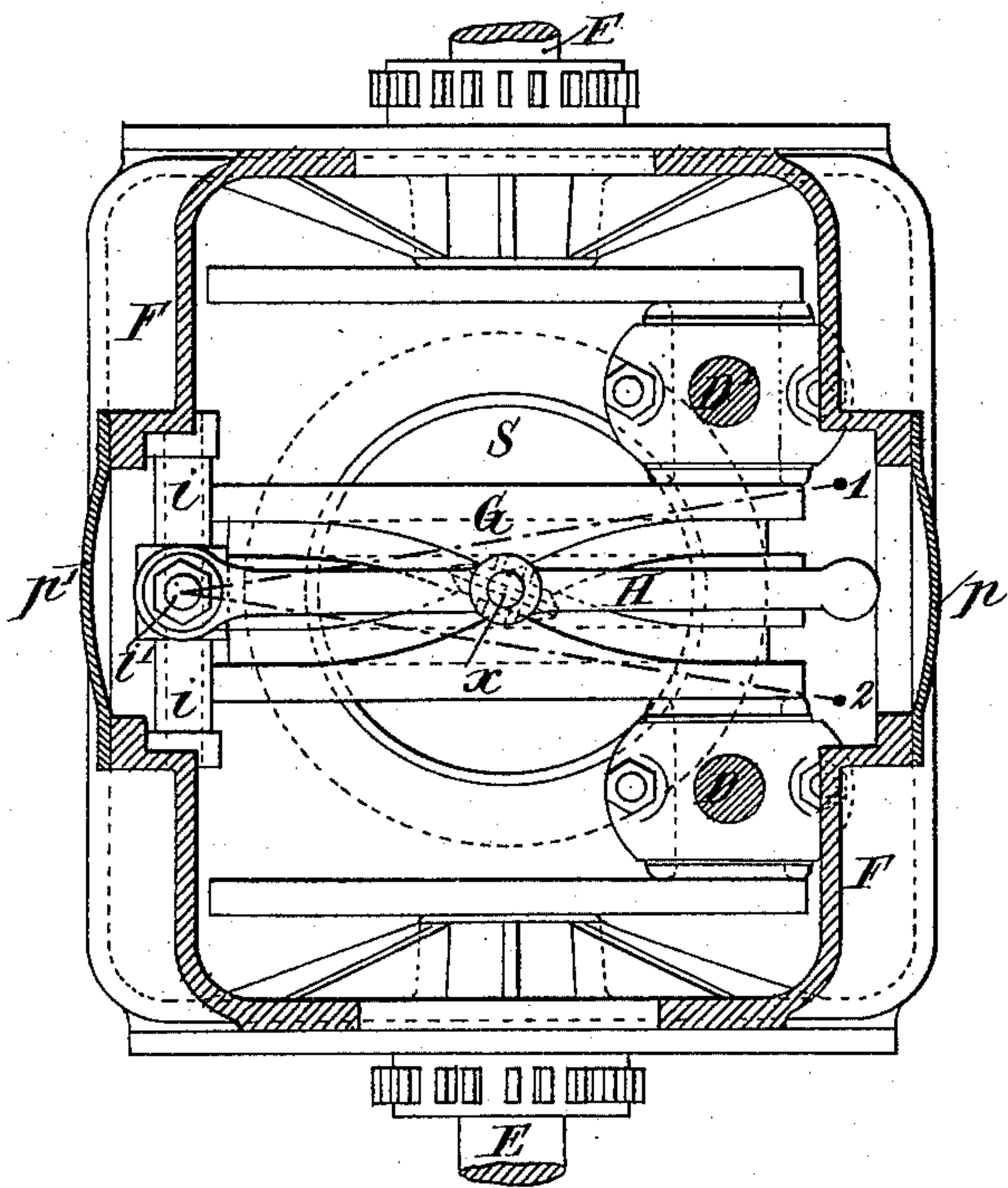
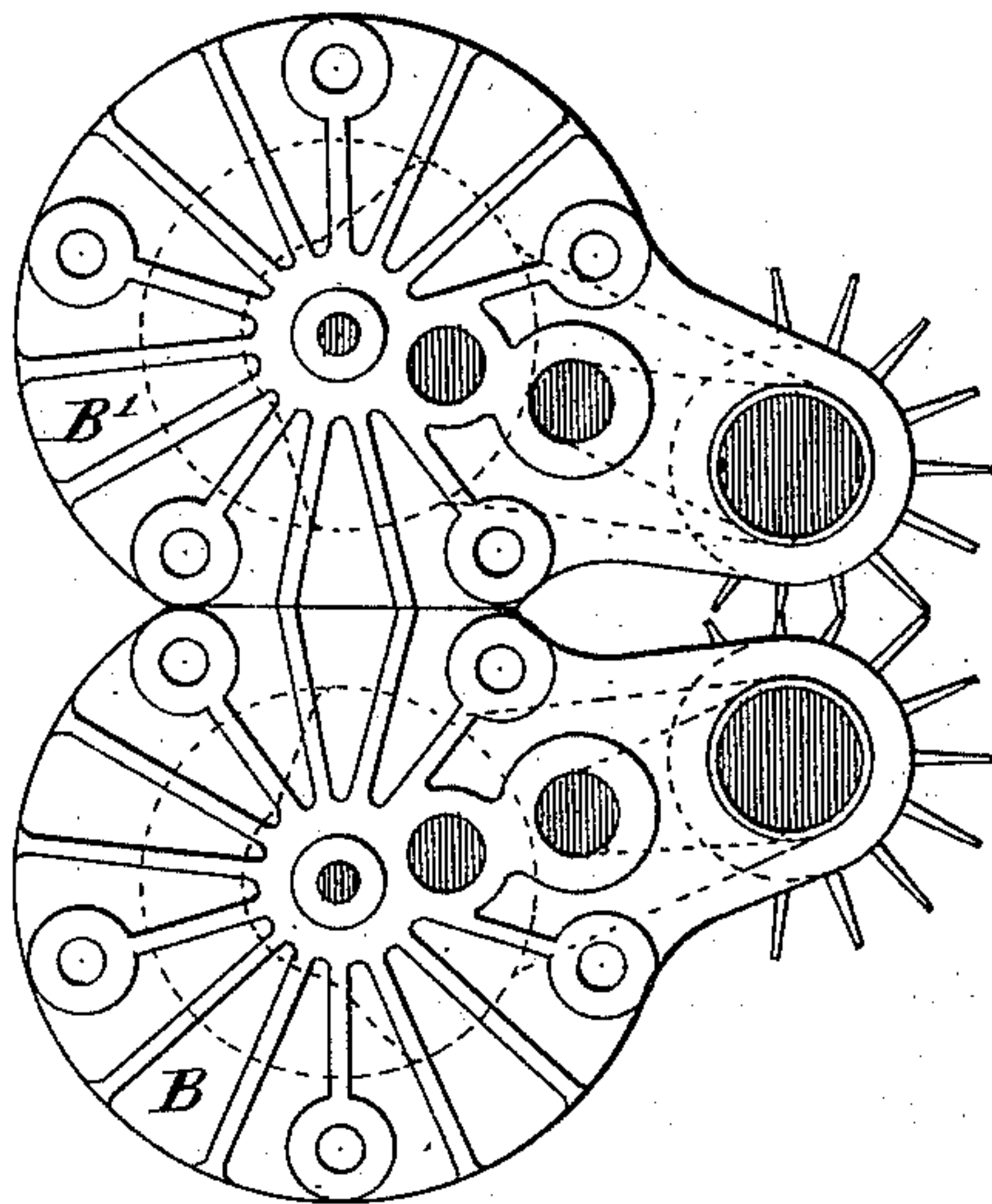


Fig. 4.



WITNESSES:

P. W. Wright.
Chas. A. Peard

INVENTOR

EUGENE FESSARD

BY

Howland & Howland

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE.

EUGÈNE FESSARD, OF POISSY, FRANCE.

EXPLOSION-MOTOR.

SPECIFICATION forming part of Letters Patent No. 639,160, dated December 12, 1899.

Application filed January 31, 1899. Serial No. 703,998. (No model.)

To all whom it may concern:

Be it known that I, EUGÈNE FESSARD, a citizen of the Republic of France, residing in Poissy, Seine-et-Oise, France, have invented certain Improvements in Explosion-Motors, of which the following is a specification.

This invention relates to improvements in gas or hydrocarbon explosion-motors with the object of insuring their operation.

In order that my invention may be readily and clearly understood, I will now describe it with reference to the accompanying drawings, in which—

Figure 1 is a vertical section through a two-cylinder motor to which my invention has been applied. Fig. 2 is a vertical section taken at right angles to that in Fig. 1 and passing along the axis of one of the two cylinders. Fig. 3 is a horizontal section taken upon the line 3 3 of Fig. 1. Fig. 4 is a plan view, as seen from above, of the end of the two cylinders of the motor.

A and A' are the two cylinders, which are surmounted by the cylinder ends B and B', each of which comprises an admission-valve *a*, an exhaust-valve *b*, an ignition device *c*, and a starting-cock *d*.

C and C' are the pistons, connected by connecting-rods D and D' to the single crank of the driving-shaft E, which is carried by bearings *e* and *e'*, fixed upon the lid of a gear case or envelop F, upon which are fixed the cylinders A and A' and which is provided with lugs *f f'* for mounting the motor. At the upper portion of each cylinder is provided a partition-membrane *g*, compelling the fresh gas admitted by the valve *a* to force before it when suction takes place the burned gases which may be within the cylinder and not permitting it to mingle with them in the admission-pipe *h*. It follows that the ignition of the gas takes place under the best possible conditions.

The main feature of my present invention consists in the construction adopted for operating the exhaust-valves. This operating mechanism consists of a cam G, which is rigidly attached to the crank of the driving-shaft E between the two connecting-rods D and D' and having as center of rotation the axis of the said shaft itself. This cam provides two

paths intersecting at a single point *x*. Its construction presents no peculiarity and is well known. Above this cam is arranged a lever H, provided with a rotating roller *h²*, engaged in its groove in the form of the figure 8. This lever is jointed upon the casing F by means of two perpendicular pivots *i i'*, which enable it to follow, by means of its roller *h²*, the various reliefs of the cam and the 8-shaped configuration. It follows from this that there is imparted to the lever both a vertical and a horizontal displacement at the same time. This horizontal movement transports the free extremity of the lever H from 1 to 2, and it is in each of these positions that it is submitted to vertical movement. Upon the right hand of these points 1 and 2 are the rods *j* and *j'* of the exhaust-valves, which, as is apparent, are alternately submitted to the action of the cam G, which serves to lift them every second revolution in order to effect the exhaust. It will be noticed that while one of the cylinders is in the exhaust stage the other cylinder is in the compression stage and that the two pistons, although receiving contrary impulses, act in unison and produce a uniform driving action. It will also be noticed that the casing F is provided with two small cover-plates *p p'*, which when removed enable the lever H to be inspected and, if necessary, dismounted.

The casing F is combined with a bellows S, formed of leather after the manner of a forge-bellows and of a suitably-undulated metal sheet. This bellows is acted upon by the pressures and reduction of pressure which take place within the casing—that is to say, it becomes inflated or deflated in accordance with the direction of the stroke of the pistons. In these conditions the oil with which the casing F is partially filled is isolated from the alternate compressions of the air contained within the said casing and has no tendency to escape into the atmosphere, as is ordinarily the case. Leakage of oil is thus obviated, whereby a considerable economy is effected in the cost of running the motor.

It is obvious that my invention applies equally well to one-cylinder motors and that the arrangement will be the same as regards the 8-shaped cam, because it is only neces-

sary to raise the valve every second revolution in any case. In this case the lever is raised in space at one of the two revolutions.

I claim as my invention—

5 1. The combination with an exhaust-valve and rod connected thereto, of a lever for operating the valve, free at the valve end and mounted on a universal joint at the other end and a controlling-cam operating upon the lever between its ends and so formed as to give
10 the lever in succession a lateral and a vertical movement.

2. An explosion-motor having two cylinders, a shaft, a cam with 8-shaped grooves on
15 said shaft, exhaust-valves, rods to said valves,

in combination with a lever universally mounted at one end, adapted to act upon the valve-rods at the other end and itself acted upon by the cam to cause it to move upwardly and horizontally, to effect the opening of the exhaust-valves alternately and create a perfect cycle of operations, substantially as described. 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 25

EUGÈNE FESSARD.

Witnesses:

LEON FRANCKEN,

EDWARD P. MACLEAN.