

No. 687,084.

Patented Nov. 19, 1901.

A. TOURAND.
EXPLOSION ENGINE.

(Application filed Apr. 23, 1900.)

(No Model.)

FIG. 1.

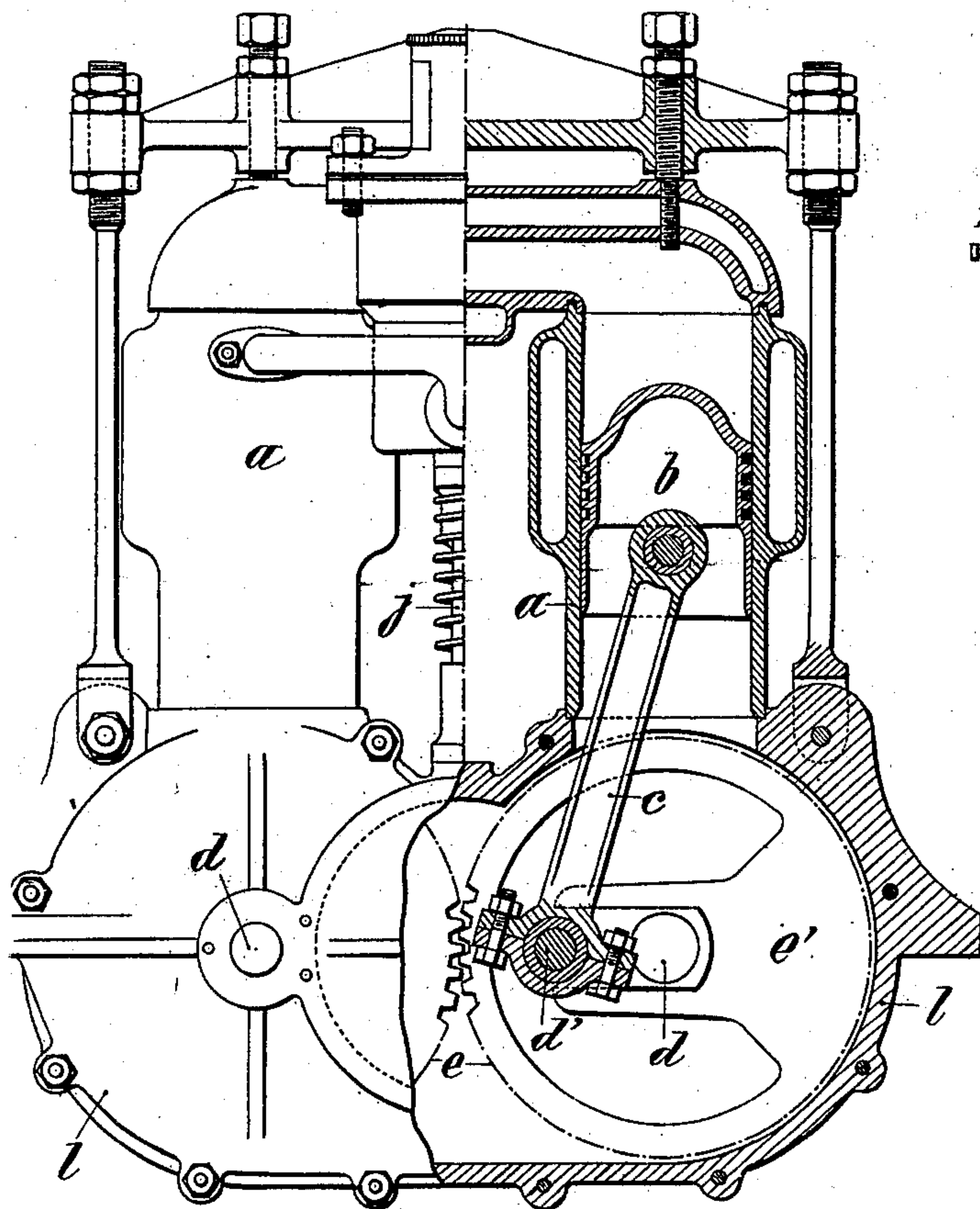


FIG. 3.

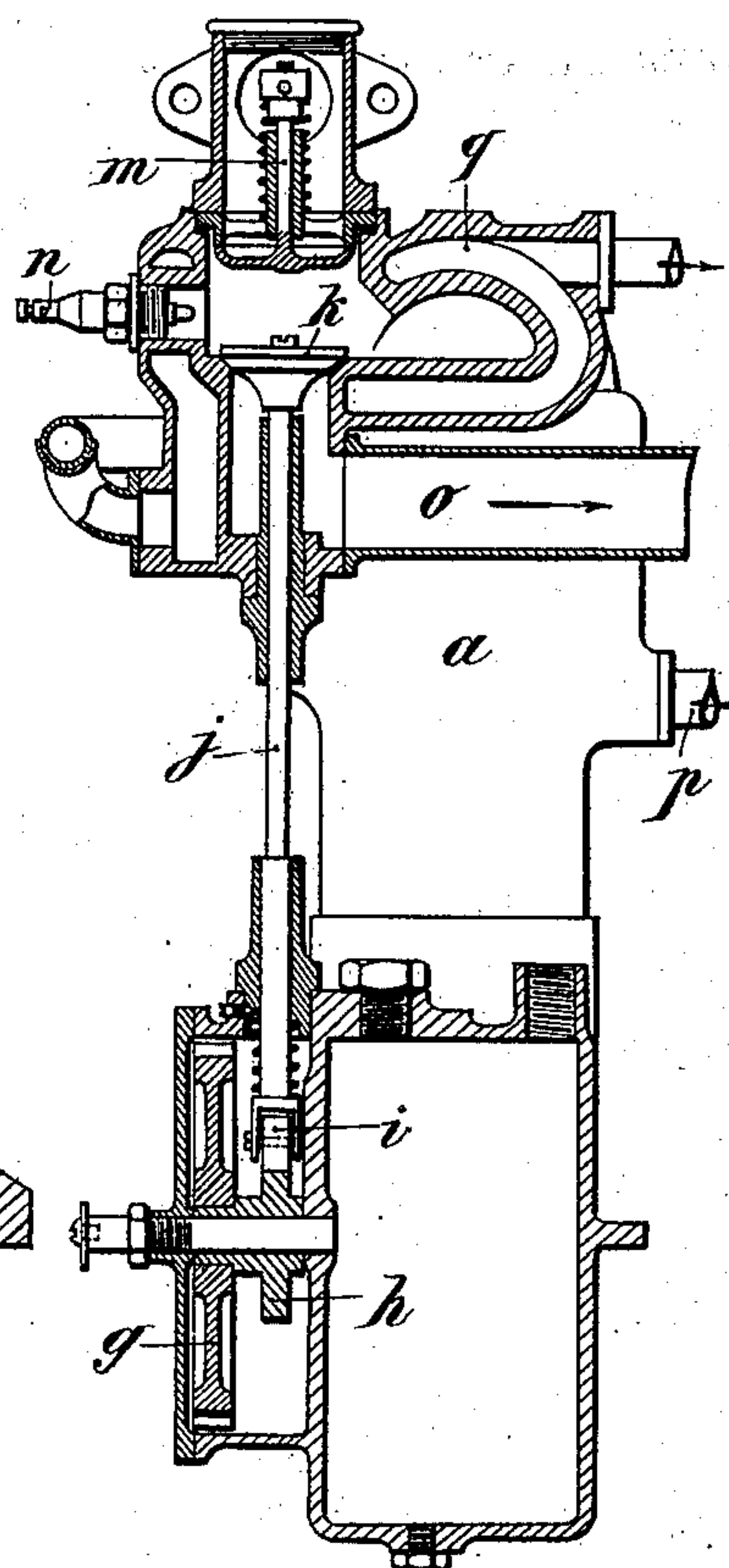


FIG. 2.

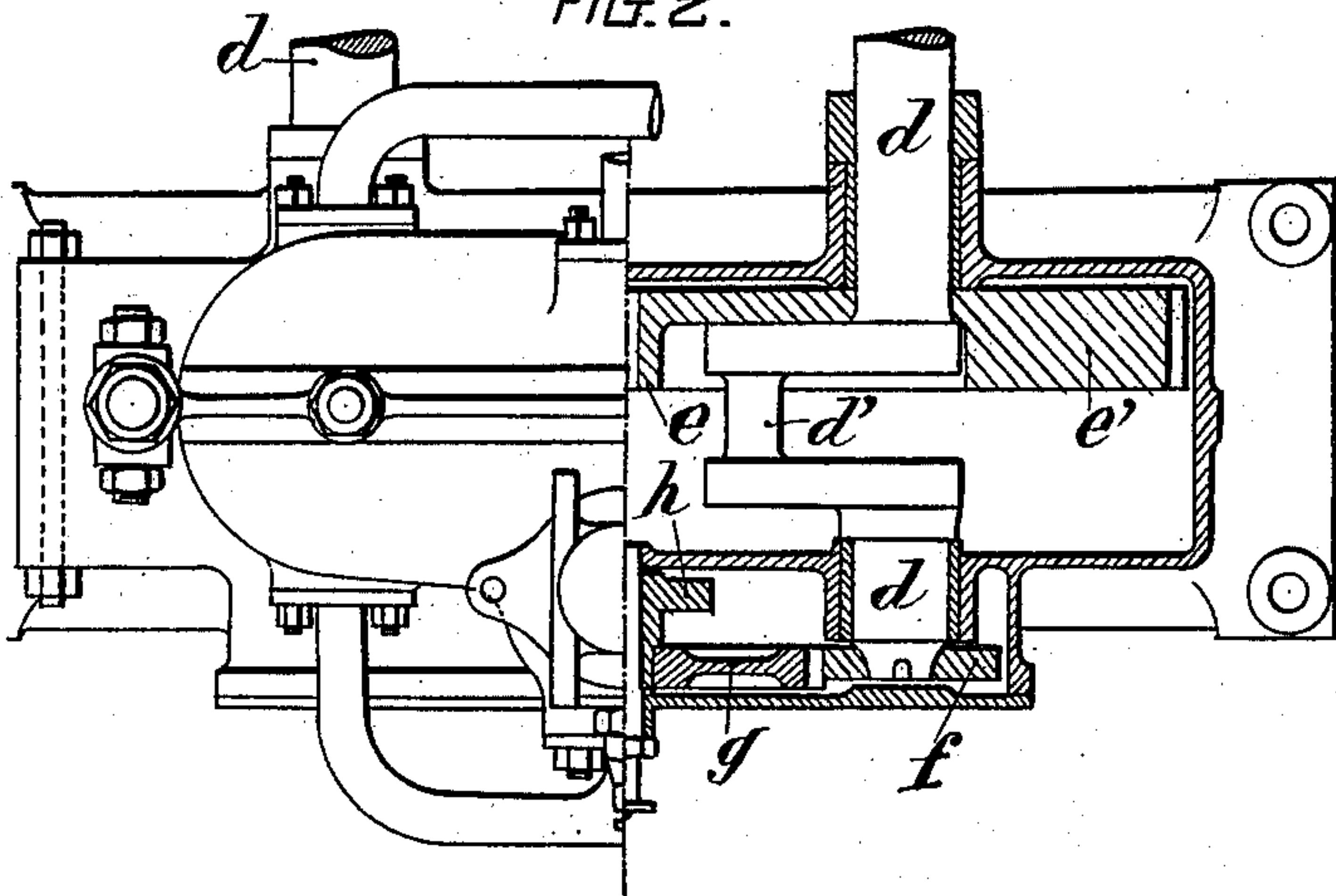
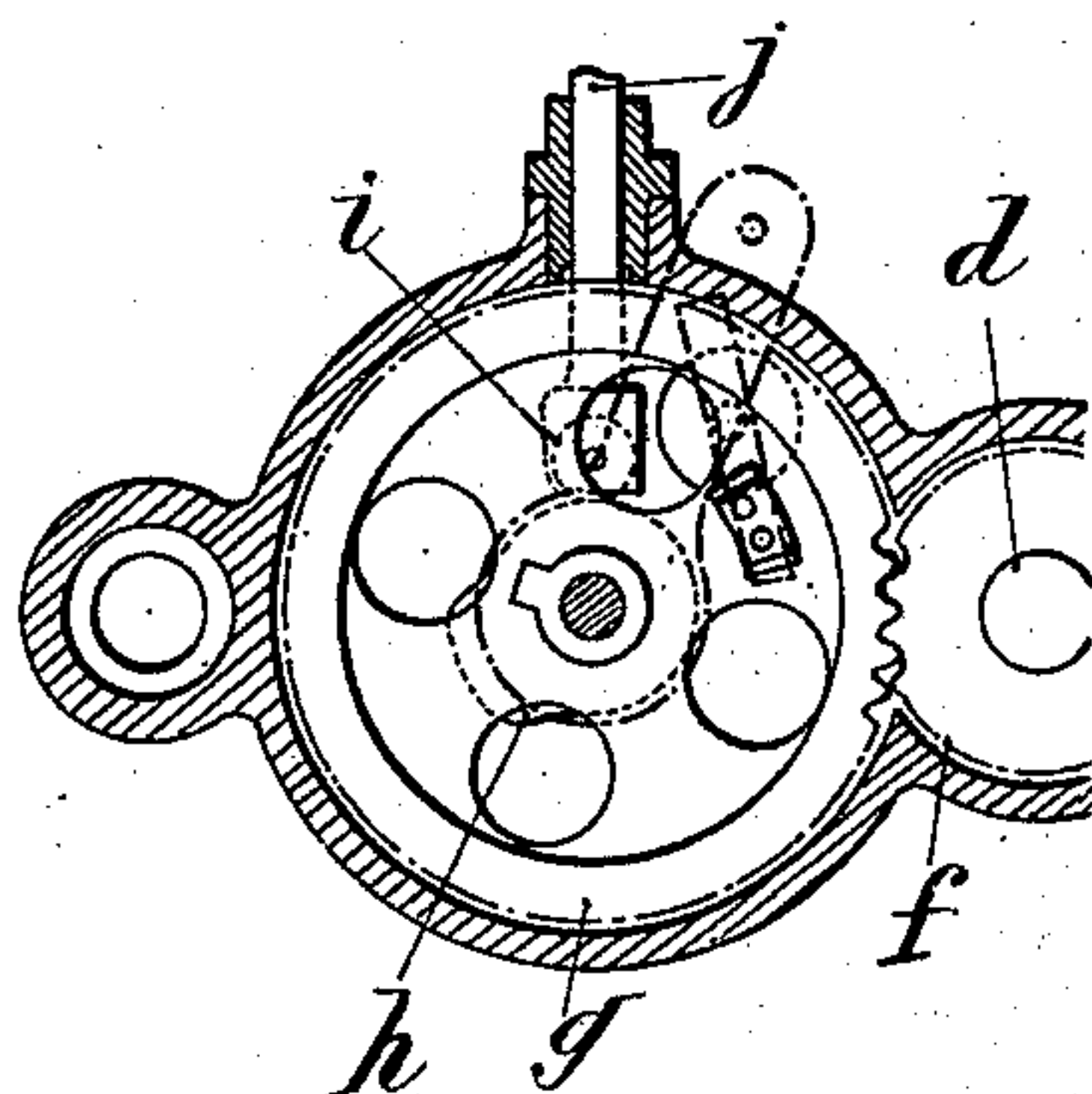


FIG. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR TOURAND, OF HAVRE, FRANCE.

EXPLOSION-ENGINE.

SPECIFICATION forming part of Letters Patent No. 687,084, dated November 19, 1901.

Application filed April 23, 1900. Serial No. 13,966. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR TOURAND, a citizen of the French Republic, and a resident of 34 Rue Dicquemare, in the city of Havre, Republic of France, have invented an Improved Explosion-Engine, of which the following is a full, clear, and exact description.

This invention relates to improvements in explosion-motors in view of avoiding the jars which are communicated by such motors to motor-cars, boats, and other devices to which they may be applied.

My new and improved motor is composed of two cylinders connected together and within which two pistons are moved in the same direction and operate two fly-wheels which gear together, motion being transmitted to the driven part by one of the shafts upon which such fly-wheels are respectively carried.

I will now proceed to describe my invention, with reference to the accompanying drawings, in which—

Figure 1 shows in elevation, partly in section, my improved motor. Fig. 2 is a corresponding plan thereof, partly in section. Fig. 3 is a sectional side view made through the axis of the engine. Fig. 4 shows separately the device which is adapted to operate the exhaust-valve.

In all the figures the same letters of reference denote like parts.

As shown in the drawings, my improved motor comprises two cylinders *a*, provided with an explosion-chamber common to both cylinders. Two pistons *b* move equally and in the same direction within said cylinders. Both pistons are provided with connecting-rods *c*, driving shafts *d* by means of crank-pins *d'*, said pins being set in diametrically opposite relation to their respective shafts. Each of the two shafts *d* sets in motion a fly-wheel *e*, which carries teeth on its circumference, so as to be able to gear with the other fly-wheel and to turn in the opposite direction thereto. These toothed wheels have weights *e'*, which are adapted to counterbalance the weight of the pistons and of the connecting-rods. One of the shafts *d* carries a pinion *f*, which gears with a toothed wheel *g*, operating a cam *h*, which lifts in proper time

the exhaust-valve *k* by means of a roller *i* and of a rod *j*. The fly-wheels *e* are inclosed in a case *l*, which forms part of the frame. The parts which are adapted to be driven are arranged upon one of the two shafts. External fly-wheels may be keyed upon the shafts *d* for increasing the stored energy.

The other parts of the motor are as follows: *m* is the inlet-valve of the carbureted mixture; *n*, the igniter; *o*, the exhaust; *p*, the inlet-port for the water used for cooling; *q*, the outlet-port for the cooling water.

The forms, details, accessories, materials, and sizes of my improved motor may of course vary without departing from the principle of my invention.

I claim—

1. An engine, comprising two cylinders having working chambers connected at one end forming a common explosion-chamber, so that the working periods will be simultaneous in both cylinders, pistons held to reciprocate in said cylinders and arranged to move in the same direction at the same time, parallel shafts, rods connecting said pistons with cranks on the said shaft, a fly-wheel on each shaft, the fly-wheels being weighted to counterbalance the weight of the pistons and the connecting-rods, and a gear connection between said shafts by which they are compelled to move in unison in opposite directions.

2. An engine, comprising two cylinders having a common explosion-chamber, an inlet for the explosive mixture and an exhaust, pistons arranged to reciprocate in the cylinders and move in the same direction at the same time, shafts driven by said pistons, a fly-wheel on each shaft, a gear connection between the fly-wheels, a pinion on one of said shafts, a gear-wheel meshing with said pinion, a cam actuated by the movement of the gear-wheel, and an exhaust-valve controlled by the cam.

The foregoing specification of my improved explosion-engine signed by me this 15th day of March, 1900.

ARTHUR TOURAND.

Witnesses:

M. CAPLET,

A. A. HARMANGE.