(No Model.) 2 Sheets—Sheet 1.

J. LANDRY & G. BEYROUX.

MOTOR POWER ENGINE.

No. 529,330. Patented Nov. 13, 1894.

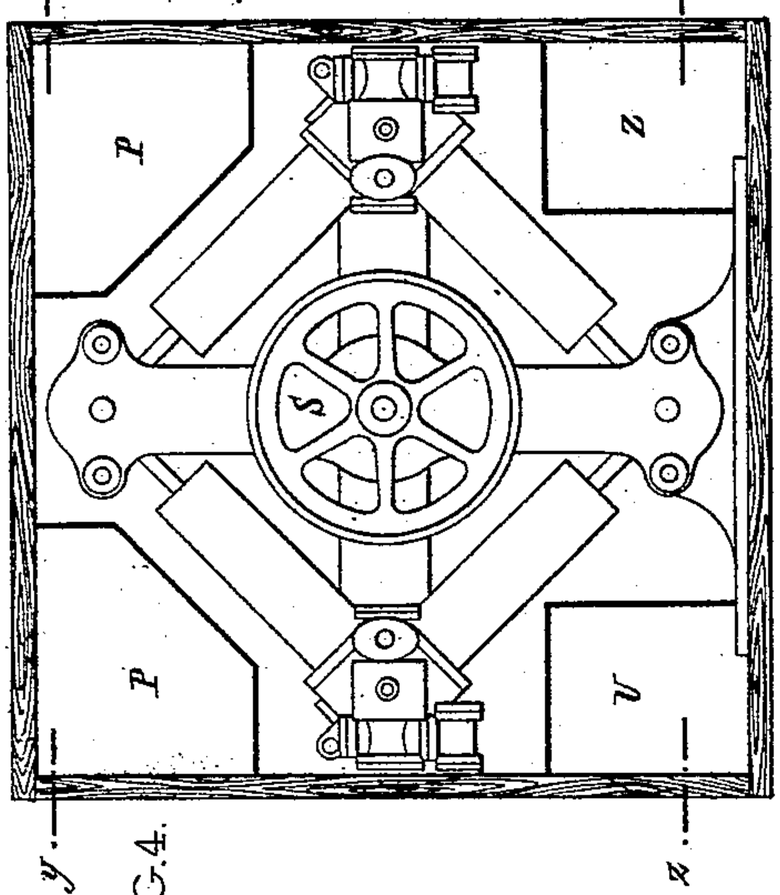

FIG. 4.

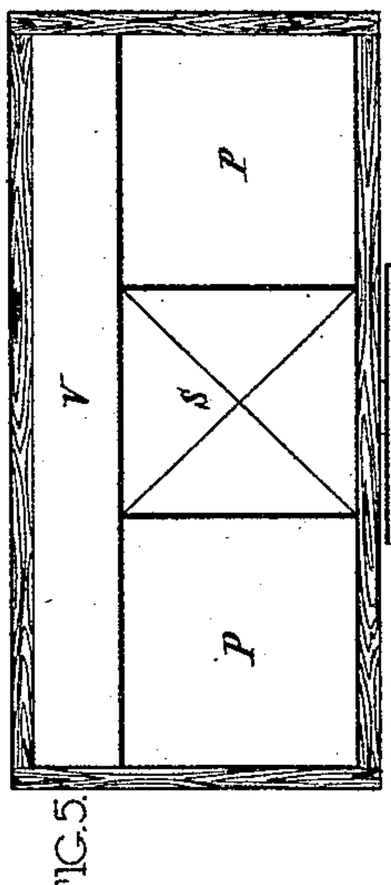

FIG. 5.

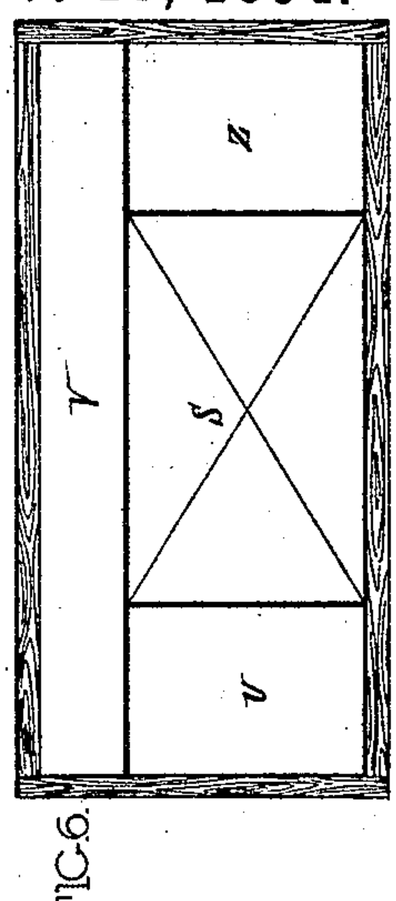

FIG. 6.

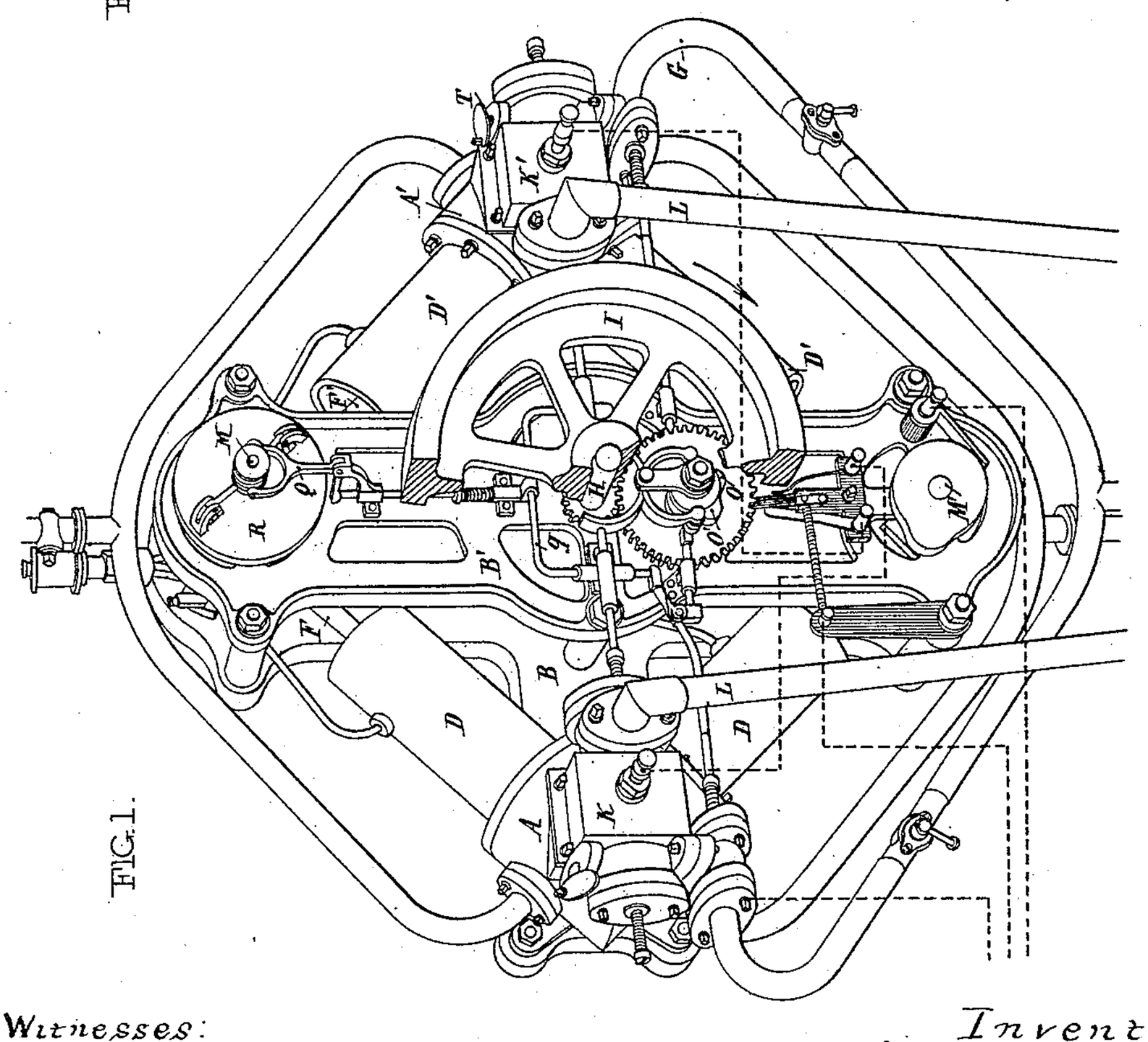

FIG. 1.

Witnesses:
Thomas Durant
Wallace Mundorff.

Inventors:
Justin Landry and
Gabriel Beyroux
by Church & Church
their Attys

(No Model.)

2 Sheets—Sheet 2.

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FIG. 3.

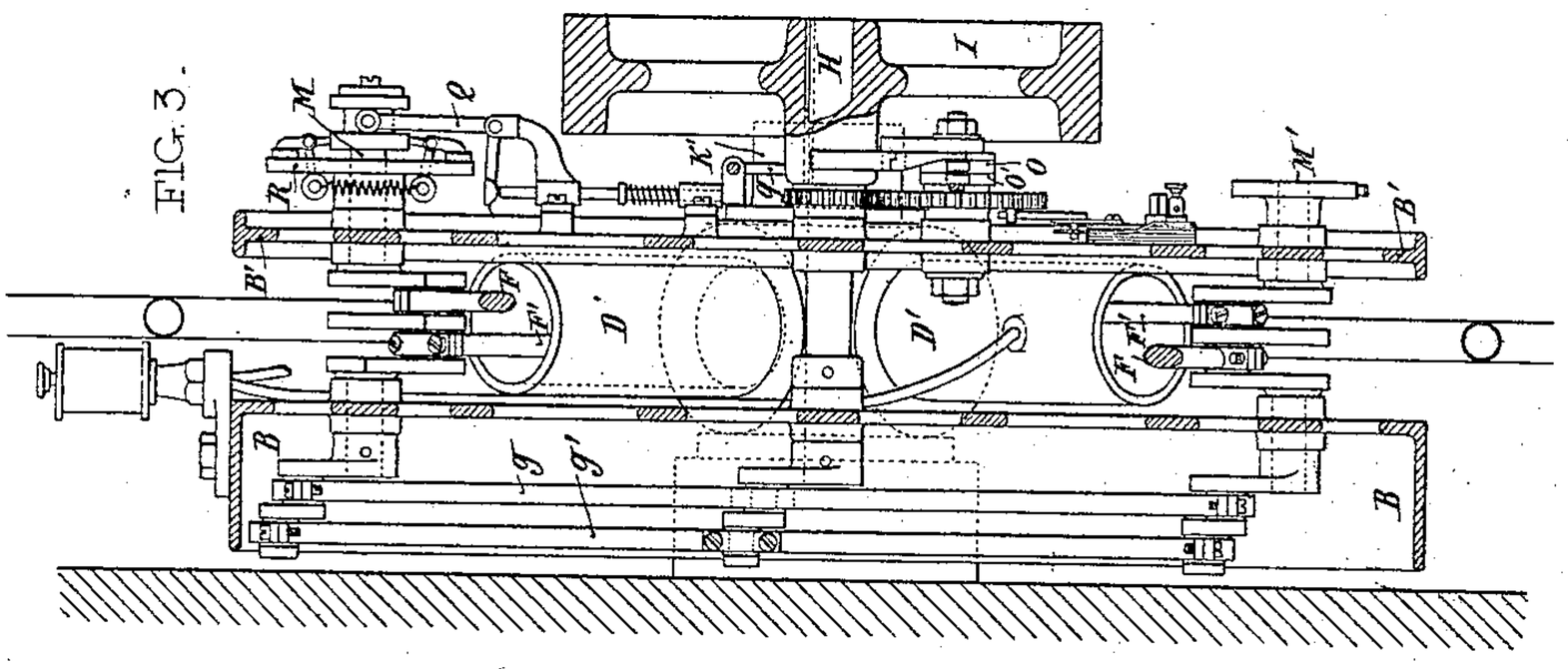
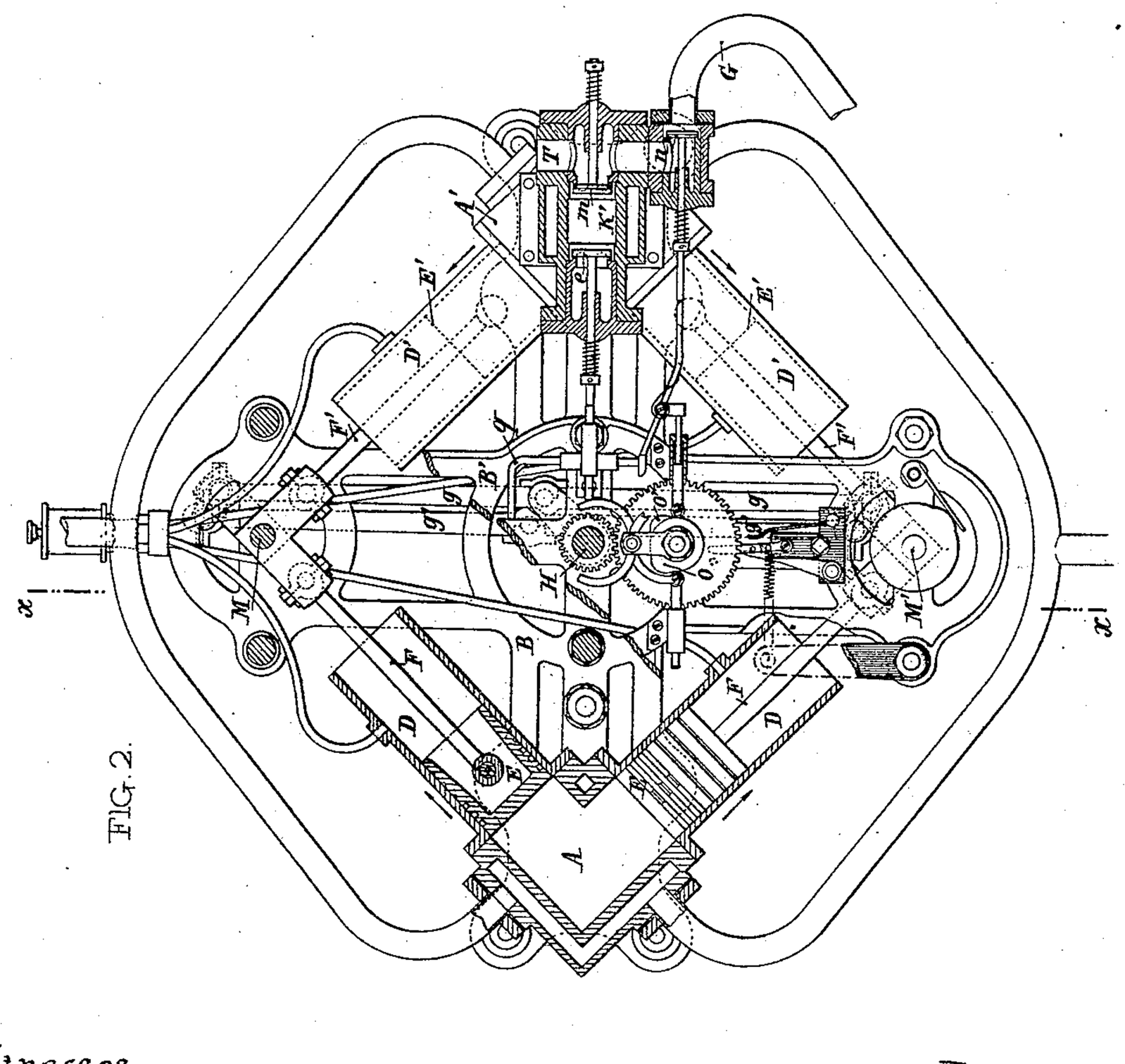


FIG. 2.



Witnesses.
Thomas Durant
Wallace Murdock.

Inventors:
Justin Landry and
Gabriel Beyroux
by Church & Church
their Attys

UNITED STATES PATENT OFFICE.

JUSTIN LANDRY AND GABRIEL BEYROUX, OF PARIS, FRANCE, ASSIGNORS OF ONE-THIRD TO RENAUD. MARQUIS DE MONTAIGNAC, OF SAME PLACE.

MOTOR-POWER ENGINE.

SPECIFICATION forming part of Letters Patent No. 529,330, dated November 13, 1894.

Application filed June 18, 1894. Serial No. 514,958. (No model.) Patented in France February 2, 1894, No. 236,001.

To all whom it may concern:

Be it known that we, JUSTIN LANDRY and GABRIEL BEYROUX, citizens of the Republic of France, residing at Paris, France, have invented certain new and useful Improvements in or Relating to Motor-Power Engines, (for which we have obtained Letters Patent in France, No. 236,001, dated February 2, 1894,) of which the following is a specification.

This invention relates to a new motive-power engine, differing from all such motors at present used or known; first by the combination on a single frame, of two identical and symmetrical engines co-operating to transmit their power to the fly-wheel shaft; and secondly, by the use of two explosion chambers common to four cylinders which form with one another an angle variable from zero to one hundred and eighty degrees.

For the clearer comprehension of the nature of our invention we have illustrated it on the accompanying drawings.

Figure 1 is a general view in perspective of the motor arranged to be fixed against a wall. Fig. 2 is a vertical section of the motor, half in the axial plane of the cylinders (on the left) and half in the central plane of distributing slide-valves (on the right). Fig. 3 is a vertical section on the line *x*—*x* of Fig. 2. Fig. 4 represents our new motor mounted on a support and fixed in a box or case. Fig. 5 is a diagram showing a horizontal section on the line *y*—*y* of Fig. 4. Fig. 6 is a similar design on line *z*—*z* of Fig. 4.

Our improved motor consists of four cylinders D D and D′ D′, coupled in pairs, and each couple respectively forming an angle which may vary from zero to one hundred and eighty degrees, but which we have shown as ninety degrees only by way of example, in the accompanying drawings.

The cylinders D D are united by the explosion chamber A which has water circulating about it; and the similar chamber A′ connects the other two similarly coupled cylinders D′ D′. The said explosion chambers are bolted to the frame B in such manner that the relative positions of the four cylinders are invariable, in respect of the general arrangement of the motor. The cylinders on the left D D are each provided with a plunger-piston E and a connecting rod F, and similarly those on the right with corresponding parts E′ F′. These four pistons co-operate through their connecting-rods to impart rotary motion to two crank-shafts M and M′ connected with the central shaft H carrying the fly-wheel I either by endless or pitch chains, or by connecting rods *g* and *g′* the latter not exactly coincident in their action so as to obviate any dead-point.

The frame of the machine may be in two parts B and B′ connected by cross-bars, and carrying all the parts.

The system of distribution may be any variation of the type known as four cycles or epochs, and is illustrated here in a particular manner only by way of example, for the purpose of enabling the working of the motor to be better understood. K and K′ are the distributing valve-boxes, with water circulation, and they may be affixed to any part of the explosion chambers A and A′.

Each distribution valve-box K K′ is provided with an explosive-mixture admission valve *m*, a valve *n* for the admission of the gas supplied by the pipe G, and an exhaust valve *e* communicating with the ontlet-pipe for the combustion products from the explosion chamber. The valves *n* and *e* are controlled or operated by cams *o* and *o′* driven through spur-wheels by the fly-wheel driving shaft.

R is the regulator or governor controlling the gas-admission by means of the fork Q and the rods *q*.

The ignition may be effected by electricity, as shown in the drawings, or other suitable known means may be employed for the purpose.

The working of the motor is exceedingly simple. The connecting-rods of the pistons E and E′ are connected together in pairs through cranks set at right angles to each other on the shafts M and M′, as shown in Fig. 2. The pistons E E therefore work together under the influence of their common explosion chamber A; and in a similar way the pistons E′ E′ are jointly operated by the explosions in their common chamber A′. This motor having four cycles or epochs, the distribution takes place as follows: The several

parts being in the positions shown in Fig. 2, and the engine being supposed to be running normally, the pistons E′ on the right make their outer stroke in the direction shown by the arrows in Fig. 2, and create a vacuum in the explosion chamber A′. At this juncture the valve *n* opens and the gas either hydrogen or a hydro-carburet after becoming mixed with the air entering through the orifice T, is drawn in through the valve *m*. During this period the explosion has taken place in the chamber A on the left, and the two pistons (E) have been driven outward in the direction shown by their arrows, communicating to the two pistons E′ the force necessary for them to draw in the gaseous mixture in the manner previously described. The four pistons thus arrive at the open end of their cylinders and at once make their return-stroke toward their respective explosion-chambers. The two pistons E′ compress the gaseous mixture which they drew in during the preceding period while the pistons E expel the combustion products of the explosion through the escape or exhaust valve which opens to give them an outlet. The pistons E′ having completed their return-stroke, the explosion in its turn takes place of the compressed gaseous mixture in their chamber A′, the four pistons are again driven outward, the pistons E drawing into A the gaseous mixture which when ignited or exploded will provide the motive power for the following period.

The before described motor may be inclosed in a box or case made either of wood or sheet-metal as shown in Figs. 4, 5, and 6. When common gas is employed as a motive-agent the said box or case, besides the engine itself may contain a water-cistern, a pocket, a waste-water reservoir, and suitable means of ignition. When petroleum is employed there may be provided in the case besides the motor S, a carburetor Z, oil-reservoirs P, batteries and induction-coils U and a water-cistern V, all as shown in Figs. 4, 5, and 6.

We claim—

1. A motive power engine comprising two pairs of cylinders symmetrically mounted upon one and the same frame the cylinders of each pair placed at an angle one to the other and having a common explosion chamber; in such manner that their pistons are driven outward simultaneously and complete in succession all the periods of a motor with four cycles or epochs for the purpose of transmitting the common movement to a fly-wheel located between the four cylinders in the axial line of symmetry of the engine the periods of inspiration compression explosion and exhaust of the two cylinders at one side of that axial line alternating with the same periods of the two cylinders at the other side thereof so as to obtain an explosion for each revolution of the said fly-wheel.

2. In a motive power engine the combination with a central fly-wheel or driving shaft of two pairs of cylinders each cylinder at an angle to its companion and one explosion chamber common to both cylinders of each pair the cylinders and explosion chambers being arranged symmetrically in relation to the driving shaft.

3. In a motive-power engine the combination of two pairs of cylinders each cylinder at an angle to its companion an explosion chamber and set of valve apparatus for each pair of cylinders two cranks on the driving shaft two auxiliary shafts each with four cranks two connected with two of the cylinder pistons and the other two with the two driving shaft cranks.

In testimony whereof we have hereto set our hands in the presence of the two subscribing witnesses.

JUSTIN LANDRY.
GABRIEL BEYROUX.

Witnesses:
LOUIS CULLEGE,
DAVID T. S. FULLER.