E. J. CONILL.

ROTARY EXPLOSION ENGINE.

APPLICATION FILED APR. 20, 1908.

951,388.

Patented Mar. 8, 1910.

3 SHEETS—SHEET 1.

FIG. 1.

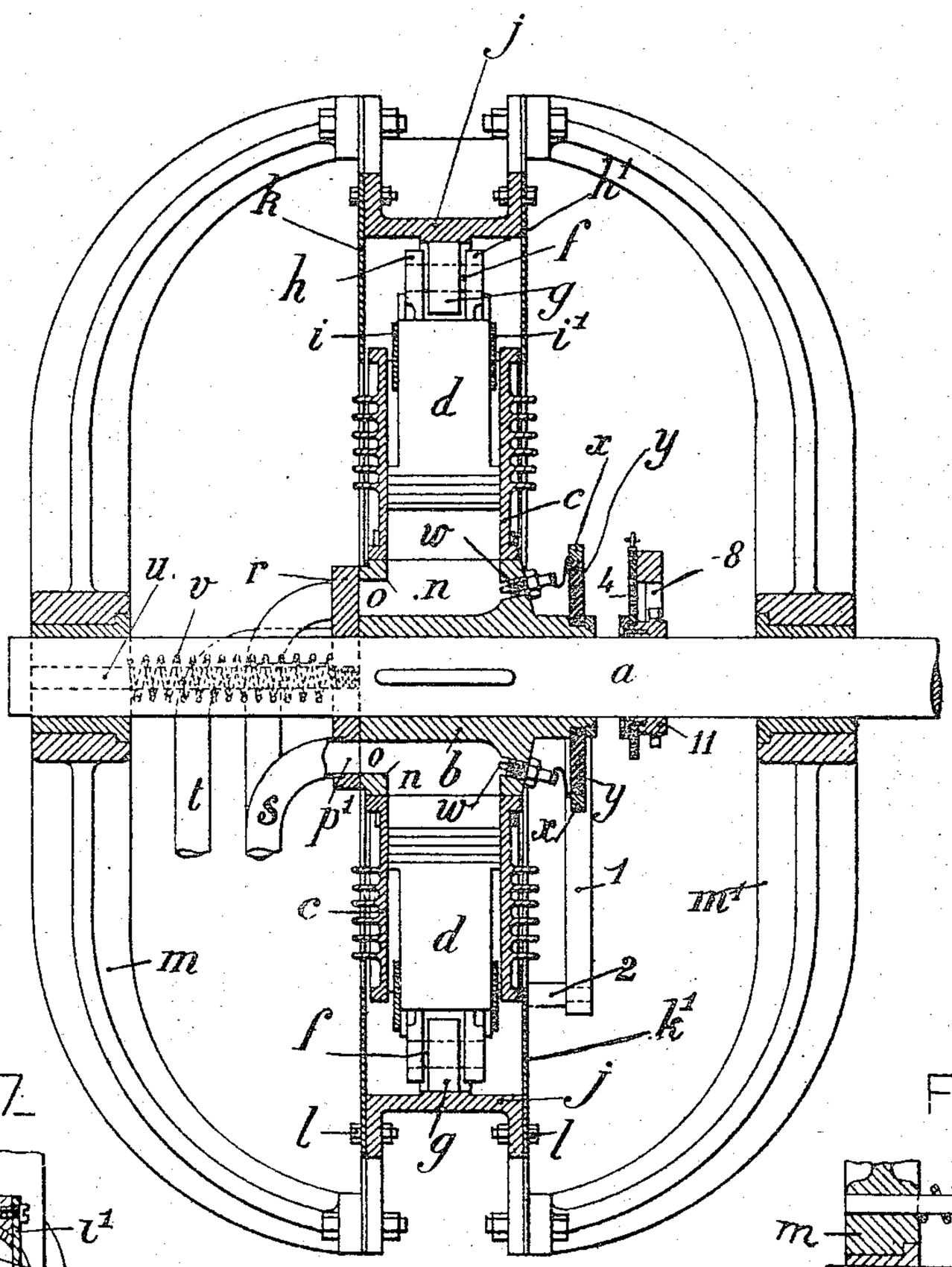


FIG. 7.

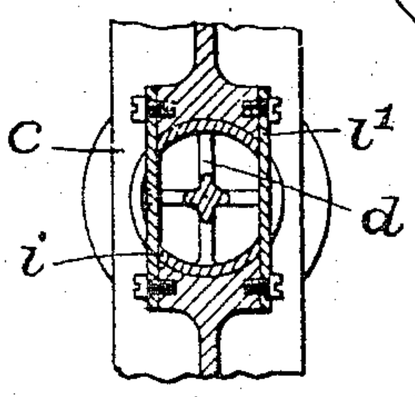
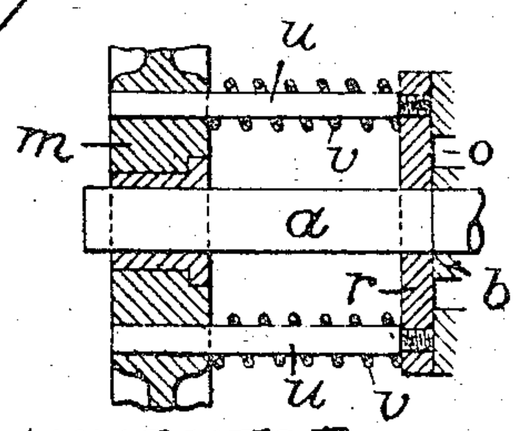


FIG. 8.



WITNESSES

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3 SHEETS—SHEET 2.

FIG_2_

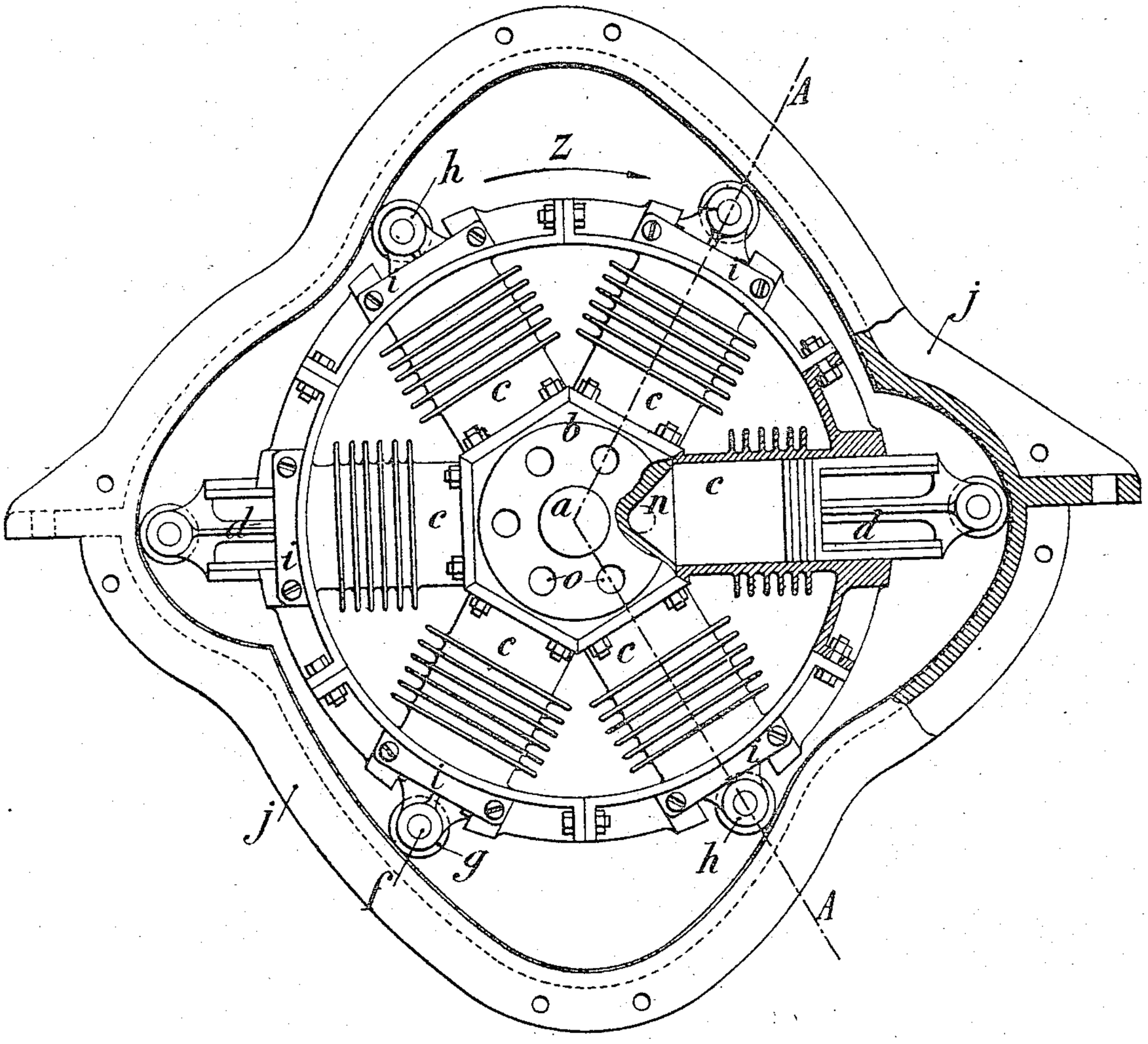
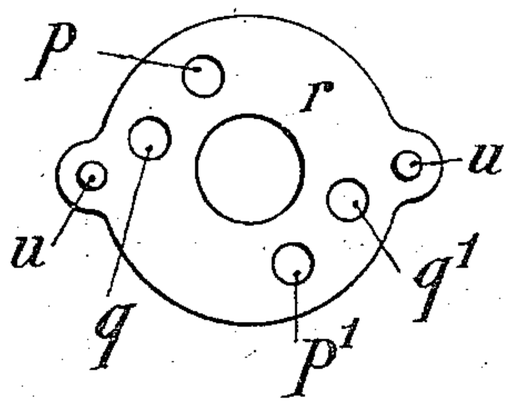


FIG_4_



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3 SHEETS—SHEET 3.

FIG_3_

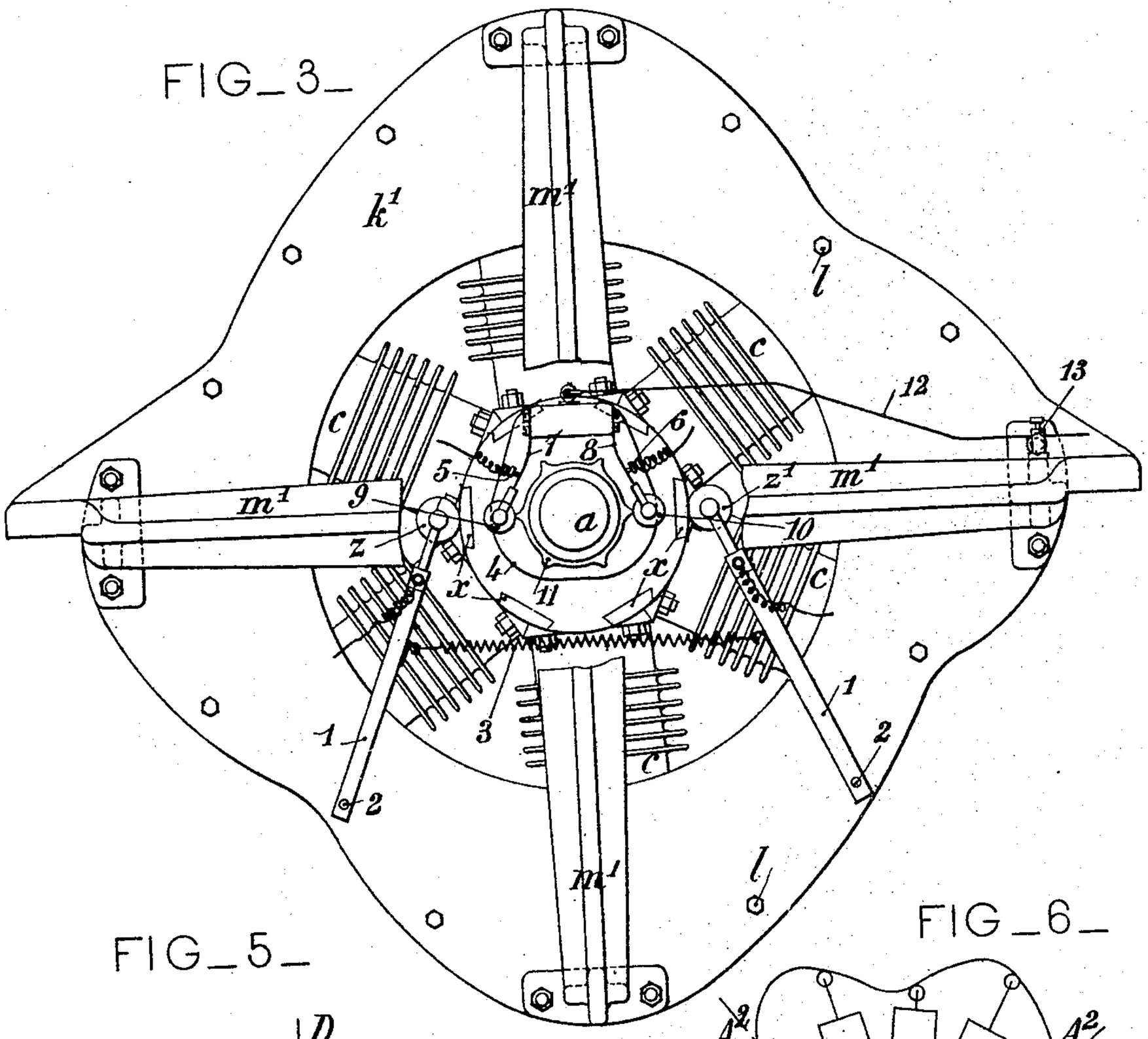


FIG_5_

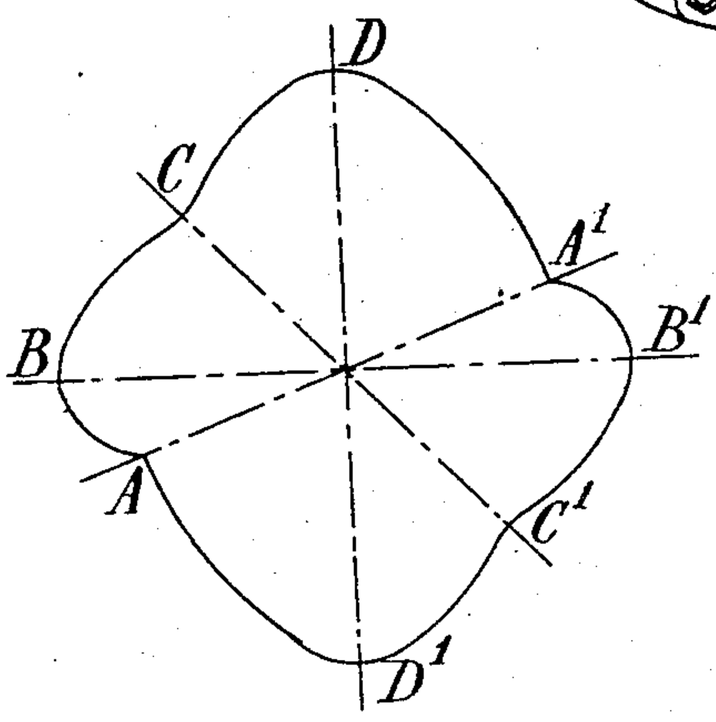
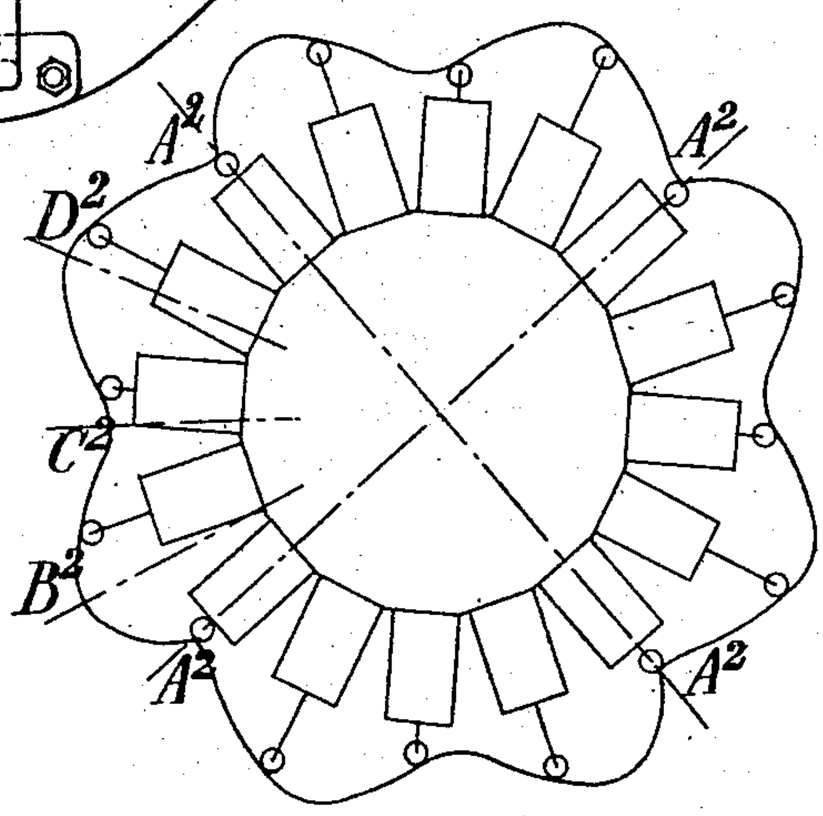


FIG_6_



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UNITED STATES PATENT OFFICE.

ENRIQUE JUAN CONILL, OF PARIS, FRANCE.

ROTARY EXPLOSION-ENGINE.

951,388. Specification of Letters Patent. **Patented Mar. 8, 1910.**

Application filed April 20, 1908. Serial No. 428,245.

To all whom it may concern:

Be it known that I, ENRIQUE JUAN CONILL, a citizen of Cuba, residing at 1 Rue de Presbourg, Paris, in the Republic of France, have invented new and useful Improvements in Rotary Explosion-Engines, of which the following is a specification.

This invention relates to an engine with radial cylinders revolving with the shaft more especially intended to be operated by gas, alcohol or petrol and comprising a certain number of radial cylinders supported on the main shaft, the piston rods having each a roller, which rollers by rolling in a suitable fixed path cause all of the cylinders carried by the shaft to revolve.

The annexed drawings illustrate a form of explosion rotary engine constructed according to the invention and comprising six cylinders each making two explosions for one revolution of the engine.

Figure 1 is a section on the line A—A of Fig. 2. Fig. 2 is an elevation view on the side of the admission, with some parts broken away. Fig. 3 is an elevation view on the side of the ignition arrangement, with some parts of the supporting frame broken away. Fig. 4 is an outside elevation of the distributing plate. Fig. 5 shows diagrammatically the form of the roller path of the engine. Fig. 6 shows diagrammatically the form of the roller path and the arrangement of the cylinders of an engine with radial cylinders rotating with the shaft having sixteen cylinders each making four explosions per revolution of the engine. Fig. 7 is a sectional view showing how the plates *i*, *i'* are secured to the cylinder. Fig. 8 is a sectional view showing how the stamps *u* are supported by the element *m*.

The main shaft *a* has keyed to it a hexagonal drum or steel part *b* on the six faces of which are fixed by means of bolts the six cylinders *c*. Each of these cylinders has cast integral therewith a segment of an annulus, all these segments, fixed together by means of bolts constituting a complete annulus. Each piston *d* is hollowed and carries a roller *g* of steel or other suitable material which is loosely mounted on a stud *f* supported by two ears *h h'* solid with the piston. Each piston is further cut away according to two planes perpendicular to the axis of the engine and moves between two blades *i i'* secured to the cylinder by means of screws as seen in Fig. 2 and preventing the piston from turning on itself. The rollers *g* are adapted to roll against a roller path *j* formed of steel cast in one piece. This roller path can be fixed to any suitable frame or to the chassis of an automobile. The rolling band on which bear the rollers of the piston is slightly projecting. The form of the roller path is determined in such manner as to give the best output; to this end the parts of the roller path corresponding to the compression are formed by gently sloping curves, so as to give a slow and progressive compression, and the parts corresponding to the expansion are formed by rapidly sloping curves so as to give a very active expansion.

The casing is closed at the sides by two pieces of sheet-metal *k k'* which have central apertures for allowing the rotation and cooling of the cylinders. These metal-sheets are secured by small bolts *l* to the rolling way *j*.

The shaft *a* is carried by two bearing supports *m*, *m'*, with four arms fixed to the rolling way *j* by means of bolts.

To each cylinder corresponds in the part *b* a chamber *n* extended by a conduit *o* leading to the side of the distribution. During the rotation of the engine, the ports *o* pass successively in front of corresponding ports *p*, *q*, *p'*, *q'*, of the distributing plate *r* (Fig. 4). The fresh gases are supplied to the admission ports *p p'* by pipes *s* and the burned gases escape through pipes *t* leading to the exhaust ports *q*, *q'*. The distributing plate *r* has two threaded stems *u* which slide in two corresponding holes of the bearing support *m*. These stems *u* hold the plate in place and prevent it from revolving. Spiral springs *v* mounted on the stems *u* and bearing on the support *m* force the distribution plate to bear energetically on the rotating part *b*.

Into each chamber *n* corresponding to a cylinder projects the end of a sparking plug *w* connected to a bronze contact *x* fixed to the periphery of a circular ebonite plate *y* secured to the drum *b*; the six bronze contacts *x* pass successively, during the rotation in front of two small bronze rollers *z z'* mounted at the end of ebonite stems 1 articulated on pivots 2 carried by the casing; the rollers *z z'* are caused to bear against the plate *y* by means of a spring 3 and are electrically connected to one of the poles of a suitable source of electric current. In front

of the plate *y* is mounted loosely on the main shaft another ebonite plate 4 on which are attached two terminals 5 and 6 connected to the second pole of the source of current. Two springs 7 and 8 fixed to the ebonite plate 4 carry two bronze rollers 9 and 10 against which bear the teeth of a pinion 11 keyed on the main shaft; these teeth by moving the springs apart through the medium of the rollers, put them in contact with the screws 5 and 6 and on leaving the rollers produce a spark which produces in the chambers *n* corresponding to the cylinders the explosion of the gases.

To explain the operation of the engine, the operation of one cylinder must be studied by referring to the diagrammatic Fig. 5.

Suppose that the roller of a piston is at the point A of the roller path: at this point the explosion is produced in the corresponding cylinder and the piston is forced out violently. The curve of the roller path favors this violent projection by utilizing to the maximum the force produced for rotating the whole rotary part. The roller thus rolls up to B where the piston has come at the end of its stroke. The engine continuing to revolve on account of the speed acquired, the roller rolls up to C and forces the piston to return into the cylinder. During this time the port *o* of the cylinder passes in front of the port *q* of the distributing plate *r* and the exhaust of the burned gases is produced. From C to D centrifugal force alone causes the piston to bear on said path and to cause the suction owing to the passage of the port *o* in front of the admission port *p*. At D the compression commences and lasts until A′ is reached. It is to be remarked that the compression which is the stroke during which is produced the largest loss of work, takes place slowly, and is produced almost entirely at the moment when another cylinder is at its working stroke. This concordance assures a regular operation of the engine and almost entirely avoids the dead point. When the roller of the piston reaches the point A′ the ignition roller *z* touches the contact *x* corresponding to the sparking plug of the cylinder: the toothed pinion 11 in its rotation produces the spark, the explosion is produced in the cylinder and the operations previously described are repeated.

It will be understood that the diametrically opposed cylinders operate simultaneously: the result is that no flexion strains are imparted to the motor shaft *a* and that each cylinder has two explosions to each revolution of the engine, the six cylinders thus giving twelve explosions for each revolution.

The advance of the ignition may be insured by turning in one direction the ebonite plate *y* by means of the rod 12 which slides in a sleeve 13 fixed to the frame *m′* of the engine.

The lubrication of the engine is assured by means of oil contained in the casing and in which dip successively the heads of the six pistons at the moment where they project out as far as possible.

The present arrangement allows of doing away with the crank shaft, and of dispensing with the fly-wheel, the mass of the moving cylinders taking its place: further, the cylinders are, on account of their rotation, in contact with constantly renovated air, so that overheating need not be feared and the use of radiators will be unnecessary.

In Fig. 6 is illustrated diagrammatically by way of example a form of engine based on the same principle as the one described but having sixteen cylinders instead of six. The explosion is produced simultaneously at four points A^2, that is to say in four cylinders at the same time and four times per cylinder and per revolution. Between two successive points A^2 each cylinder accomplishes a complete cycle: from A^2 to B^2 useful work; from B^2 to C^2 exhaust; from C^2 to D^2 suction and from D^2 to A^2 compression and ignition. Each cylinder giving four explosions per revolution, there is thus for the sixteen cylinders, sixty four explosions per revolution. The distributing plate has in this case four admission openings and four exhaust openings. The engine is in this case very regular, the dead points are avoided and on account of the continuity of the engine efforts, the respective dimensions of all the parts may be very much reduced, which gives a great lightness with a great regularity.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A rotary explosion engine comprising in combination a motor shaft, a polygonal drum keyed on said motor shaft, a plurality of radiating cylinders secured respectively one on each face of the polygonal drum, a piston arranged in each cylinder, valve-means for controlling the inlet to and the exhaust from the cylinders, means for igniting the fresh gases in the cylinders, rollers carried by the outer ends of the pistons and a stationary roller path on which are adapted to roll the said rollers and having a form coöperating with the valve mechanism to force the pistons to effect the suction, compression, expansion and exhaust of the gases in each cylinder, said roller path presenting curves slowly approaching the motor shaft for the compression strokes of the pistons and curves extending rapidly away from the motor shaft for the power strokes of said pistons, substantially as described and for the purpose set forth.

2. A rotary explosion engine comprising

in combination a motor shaft, a polygonal drum keyed on said motor shaft, a plurality of chambers formed in said drum, a plurality of radiating cylinders secured respectively one on each face of the polygonal drum, and having one end open and one end leading respectively to one of the chambers formed in said drum, a piston arranged in each cylinder, a port for the admission and exhaust of gases provided in each chamber of the polygonal drum, a stationary distributing plate having admission and exhaust ports adapted to register with the ports of the chambers of the polygonal drum, admission and exhaust pipes leading respectively to the admission and exhaust ports of the distributing plate, pressure means for holding the said plate in position, sparking plugs arranged in the chambers of the polygonal drum and connected to a source of electric current, a roller carried by each piston at its outer end, and a stationary roller path on which are adapted to roll said rollers and having a form coöperating with the valve mechanism to force the pistons to effect the suction, compression, expansion and exhaust of the gases in each cylinder, substantially as described and for the purpose set forth.

3. A rotary explosion engine comprising in combination a motor shaft *a*, a hexagonal drum *b* keyed on said shaft, a chamber *n* formed in each of the six faces of said drum, six radiating cylinders *c* secured respectively on the faces of said drum, a piston *d* arranged in each cylinder, a port *o* provided in the drum for each chamber *n*, a distributing plate *r* having ports *p* and *q* adapted to register with the ports of the chambers *n*, elastic means adapted to apply the distributing plate *r* against the face of the drum in which are provided the ports *o*, admission and exhaust pipes leading respectively to the ports *p* and *q* of the distributing plate, sparking plugs *w* arranged in the chambers *n*, a roller *g* carried by each piston on ears *h h'* formed at the outer end of said piston, a closed roller path *j* of a form coöperating with the valve mechanism to force the pistons to effect the suction, compression, expansion and exhaust of the gases in each cylinder, a rolling surface slightly projecting from the roller path, two sheet metal plates *k k'* secured to the roller path and overlapping the free ends of the cylinders, said plates having central apertures for allowing the rotation of the cylinders, and supporting arms *m m'* on which is journaled the motor shaft and to which is secured the roller path, substantially as described and for the purpose set forth.

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

ENRIQUE JUAN CONILL.

Witnesses:
ANTOINE LAVOIX,
DEAN B. MASON.