No. 708,879. Patented Sept. 9, 1902.

N. J. FORTUNESCO & A. GEORGES.

ROTARY ENGINE OR MOTOR.

(Application filed Nov. 7, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

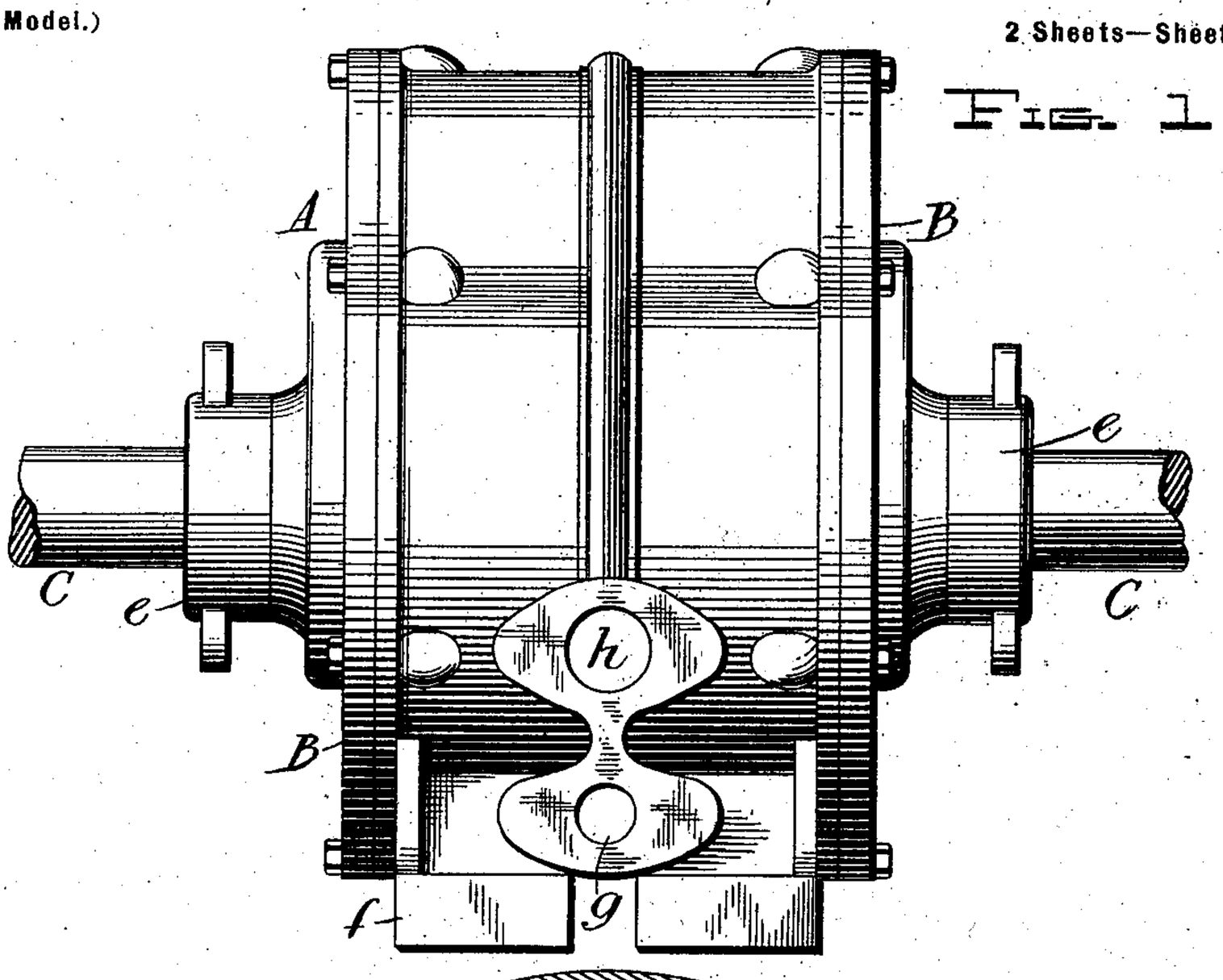

Fig. 2

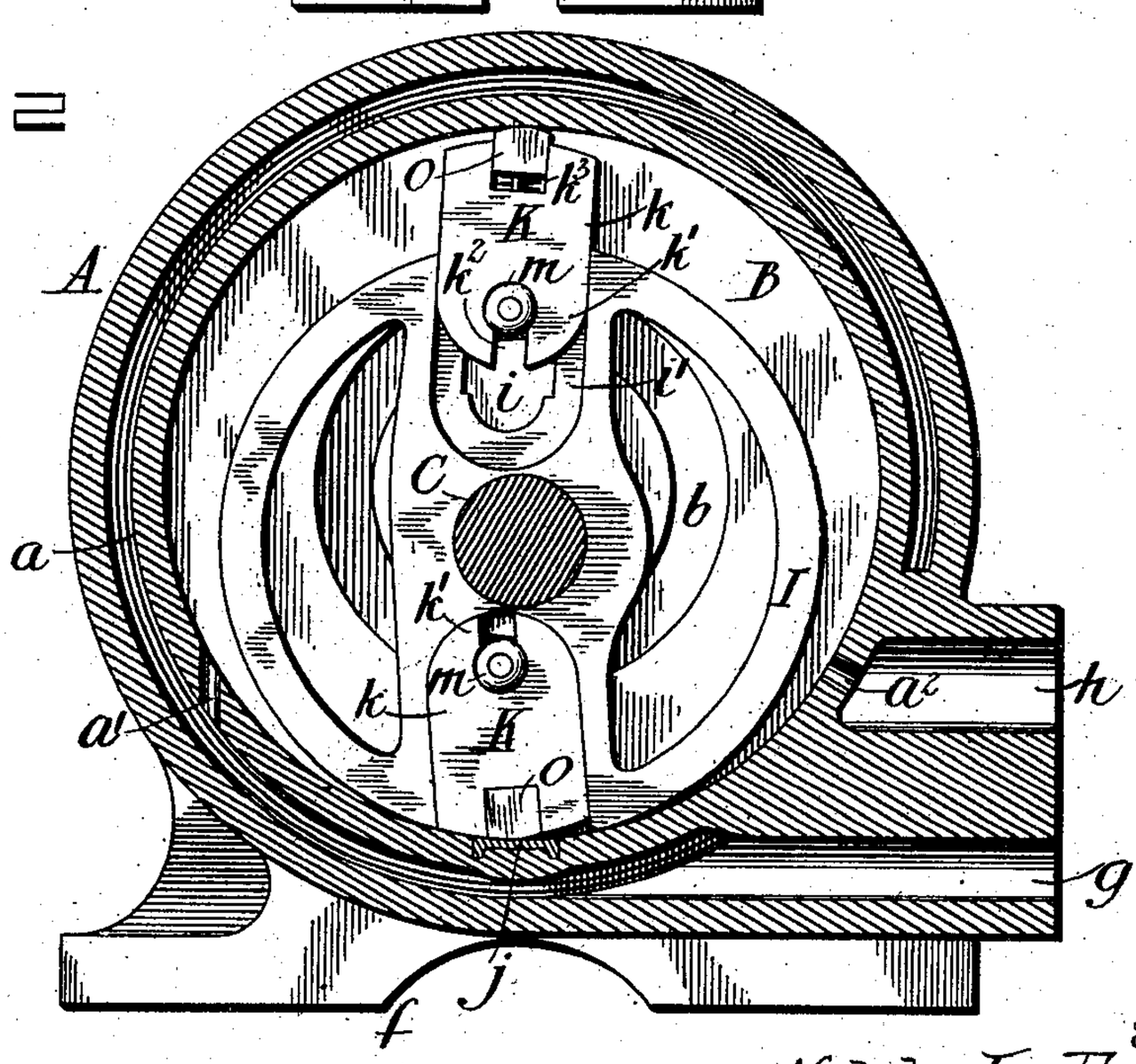

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FIG. 3

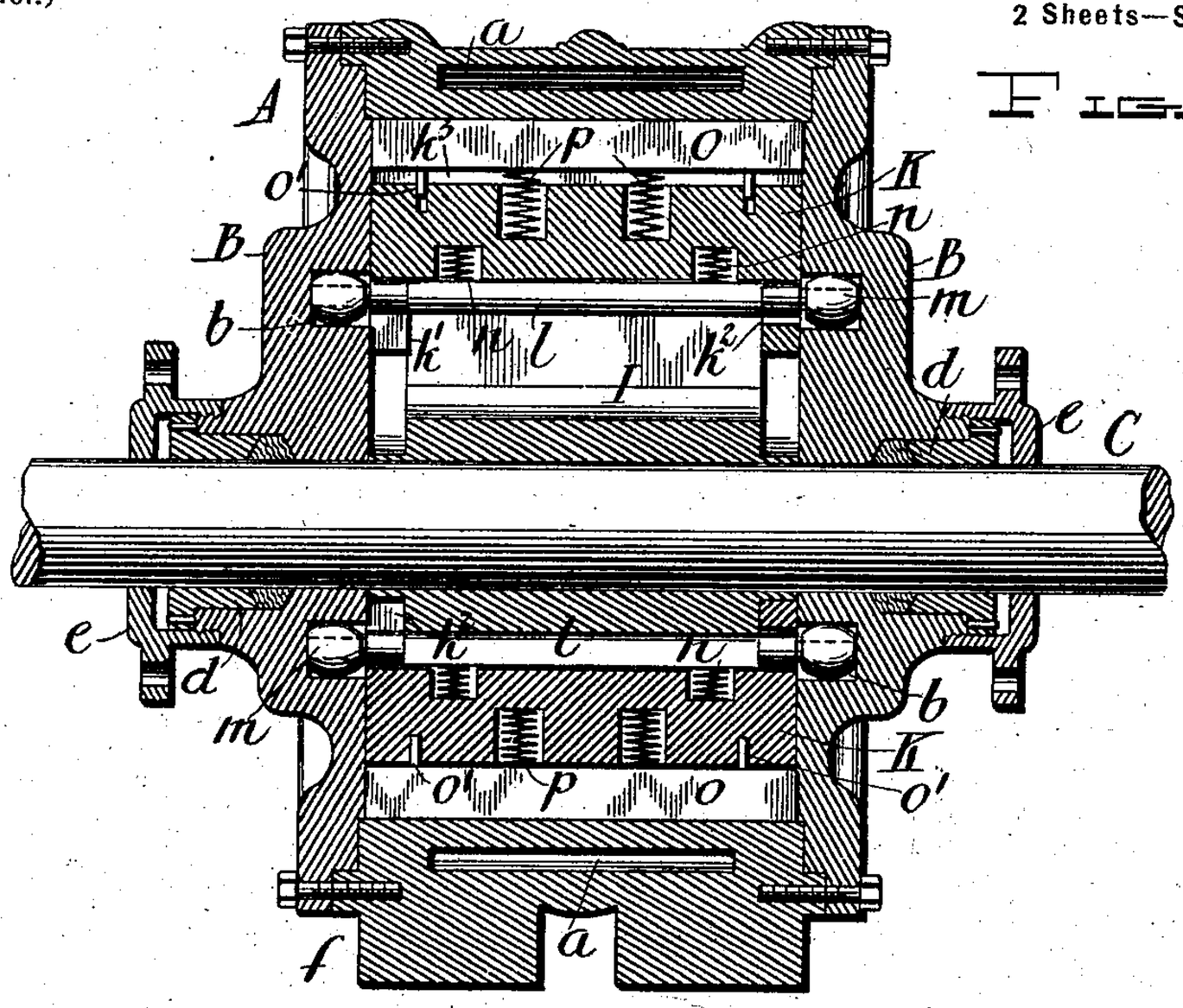
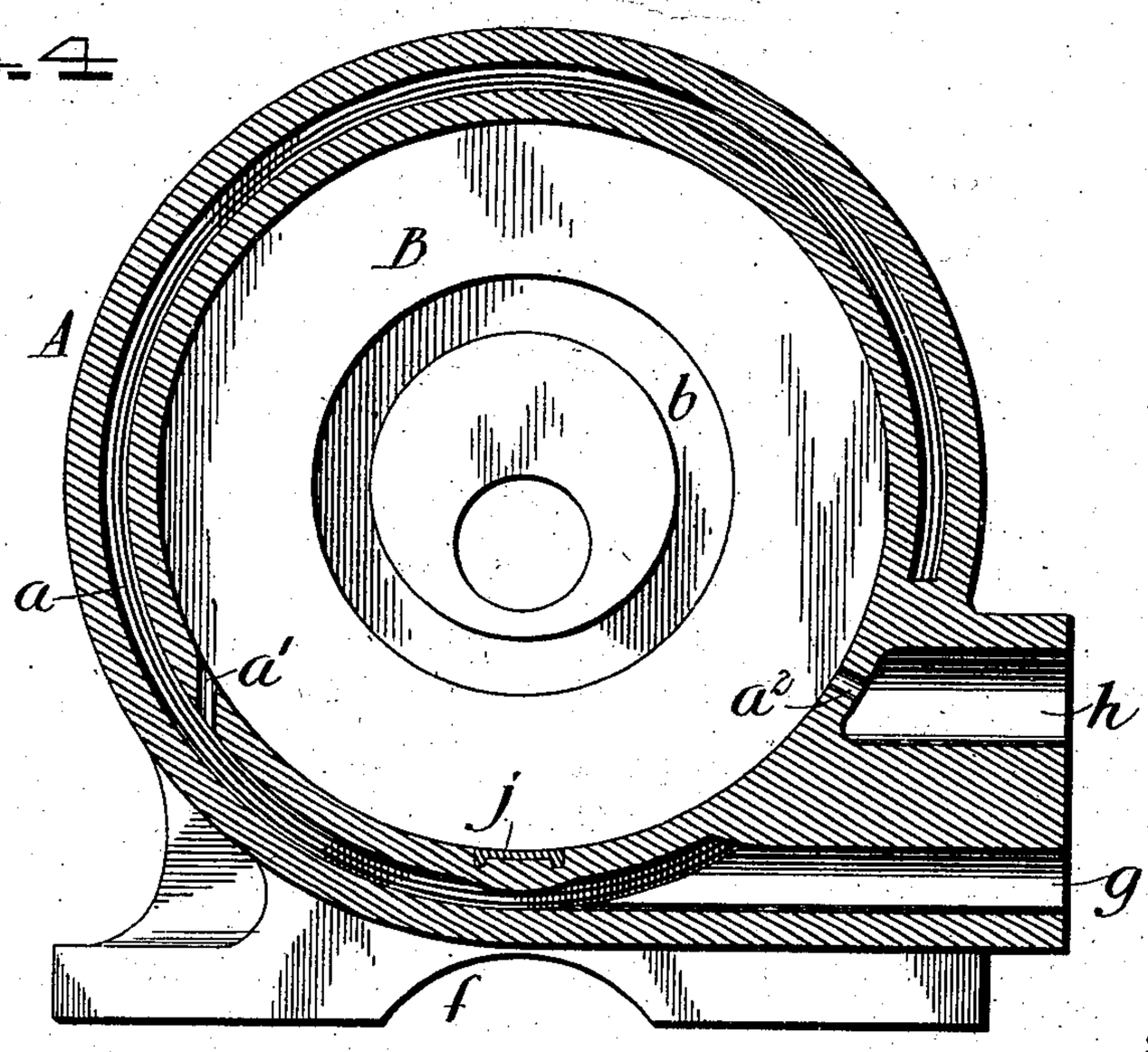


FIG. 4



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UNITED STATES PATENT OFFICE.

NICOLAS JEAN FORTUNESCO AND ALFRED GEORGES, OF LIEGE, BELGIUM, ASSIGNORS OF ONE-THIRD TO JOSEPH GEORGES, OF LIEGE, BELGIUM.

ROTARY ENGINE OR MOTOR.

SPECIFICATION forming part of Letters Patent No. 708,879, dated September 9, 1902.

Application filed November 7, 1901. Serial No. 81,397. (No model.)

To all whom it may concern:

Be it known that we, NICOLAS JEAN FORTUNESCO, a subject of the King of Roumania, and ALFRED GEORGES, a subject of the King of Belgium, both residing at Liege, Belgium, have invented certain new and useful Improvements in Rotary Engines or Motors; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention, which relates to eccentric rotary piston engines, contemplates the production of an improved engine of this character adapted to be used as a motor for furnishing power or as a pump for compressing fluids, the object of the improvements being the simplification of rotary-engine structures and to obtain compactness and durability, coupled with high efficiency and economy in operation.

Other advantages possessed by the invention are set forth in the following detailed description of the construction and operation, in connection with which attention is called to the accompanying drawings, illustrating the engine in its preferred form.

In the drawings, Figure 1 is a side elevation of a rotary engine embodying the invention. Fig. 2 is a vertical longitudinal sectional view. Fig. 3 is a vertical cross-sectional view. Fig. 4 is a vertical longitudinal sectional view, the piston being omitted.

Referring to the drawings by letter, A denotes the cylinder, the ends or heads B B of which are removably bolted thereto, suitable annular flanges on the cylinder and heads being provided to receive the bolts. The shaft C is supported in bearings eccentrically disposed in said heads, and at each bearing is a stuffing-box d, covered by a screw-cap e. The cylinder is provided with a foot f, by which it is secured to a suitable base or foundation.

a designates a concentric channel in the cylinder-wall, which communicates directly with the induction-port g and with the interior of the cylinder through a passage a'.

h is the eduction-port, which communicates with the interior of the cylinder through a passage a^2. The induction and eduction ports are arranged, preferably, one above the other at the same side of the cylinder, and the passages a' a^2 are at opposite sides of the center of the cylinder.

Within the cylinder and fixed to the shaft C is an eccentric piston I, of cylindrical form, which contacts at one point of its periphery with the inner wall of the cylinder. At the point of contact is a spring-pressed wear-plate j, removably inserted in a recess in the cylinder-wall and serving to maintain the contact fluid-tight. The piston is provided with oppositely-disposed recesses i i, in which are slidably mounted abutments K K. Each abutment, of which there are preferably two, is provided at its ends with lateral flanges k k and with inwardly-extending ears k' k', the flanges and ears fitting recesses i' i' in the piston ends. l is a bar carried by each abutment, the bar toward its ends being loosely held in openings k^2 in the ears k'. The ends of the bar which project beyond the ears are reduced and serve as axles for rollers m, which travel in annular grooves b b, provided in the inner sides of the cylinder-heads, said grooves being concentric with the cylinder, and therefore eccentric to the shaft and piston. In practice the abutments being guided by the grooves through the medium of the bars l and rollers m contact with the inner wall of the cylinder throughout the revolution of the piston and shaft, the rollers reducing the friction to the minimum. Thus the abutments are positively extended and retracted and are properly guided in their radial movement by the side walls of the piston-recesses. Coiled springs n n are interposed between each bar and abutment, the springs occupying recesses in the latter. These springs press the abutments outwardly and produce yielding contact between the abutments and cylinder-wall. To further insure proper yielding contact between the abutments and cylinder-wall and obtain exact conformation throughout the revolution of the piston, there

is provided at each abutment a bar *o*, which is movable in a recess k^3 in the abutment and which contacts with the cylinder-wall, the contact being maintained by the action of coiled springs *p p*, occupying recesses in the abutment and pressing against the bar *o*. The bars *o*, which fit closely the recesses k^3 to prevent the passage of the fluid, are guided in their outward movement by the walls of the recesses k^3 and also by pins *o' o'* thereon, which enter corresponding openings in the abutment. As shown, the pistons are arranged at an angle to the radius of which the shaft C is the center. The angle or inclination of the pistons, which is increased in proportion to the increase in the size of the engine or motor, results in an increased area of piston-surface against which the steam or other fluid acts with a consequent increase of power as compared with an engine or motor the pistons of which are arranged in a line which is the true radius. In addition by such inclination an increase of contact-surface of the piston is obtained, the curvature of the piston ends closely approximating the curvature of the cylinder-wall, the result being a perfect fluid-tight contact throughout a complete revolution. It will be observed also that the curvature of the outer or contact surface of the bars *o* also closely approximates the curvature of the cylinder-wall, thereby contributing to a fluid-tight contact, and that also the bars are guided in their movement in a line coincident with the line of movement of the pistons or at an angle to the radius.

In practice the compressed fluid, which may be steam, gas, compressed air, liquid air, water under pressure, or the like, enters the port *g* and passing into the cylinder through the passage *a a'* exerts force against the abutment which is past the opening *a'*, driving the abutment, and consequently rotating the piston and shaft. In the rotation of the piston the driven abutment is gradually extended by the bar *l* and the opposite abutment is gradually retracted, this being positively accomplished, as above stated. As the driven abutment passes the opening a^2 the compressed fluid exhausts through said opening and the port *h*. The abutments, which are preferably arranged at a slight angle to the radius, are alternately acted upon by the fluid, so that force is constantly applied to rotate the piston and without back pressure. Obviously by admitting the compressed fluid at the port *h* and by exhausting at the port *g* the direction of rotation of the piston will be reversed. Power being applied to the shaft from any suitable source, the engine may be utilized as a pump or compressor.

The engine is very simple in construction and operation. The means employed to reduce friction renders the engine durable and enables its operation by the expenditure of comparatively little power with consequent economy. The yielding construction of abutment promotes easy running and insures a fluid-tight contact with the cylinder, whereby all of the power of the fluid is utilized. The engine is, moreover, very compact and occupies but little space, thereby adapting it for universal use. The engine is also comparatively light of weight and runs steadily and without a fly-wheel, thereby rendering it especially desirable for use in motor-vehicles. The engine may be produced at a comparatively low cost and is not liable to disorder.

We claim as our invention—

In a rotary engine or motor, a cylinder having a concentric channel, an induction-port leading thereto, an opening leading from the channel to the interior of the cylinder, an eduction-port leading from the interior of the cylinder, circular grooves in the cylinder-heads concentric with the cylinder, a rotary piston-disk eccentric to the cylinder, pistons slidably mounted in the disk at an angle to the radius, rollers yieldingly carried by the pistons and traveling in the grooves, and yielding contact-bars carried by the pistons.

In testimony whereof we affix our signatures in presence of two witnesses.

NICOLAS JEAN FORTUNESCO.
ALFRED GEORGES.

Witnesses:
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