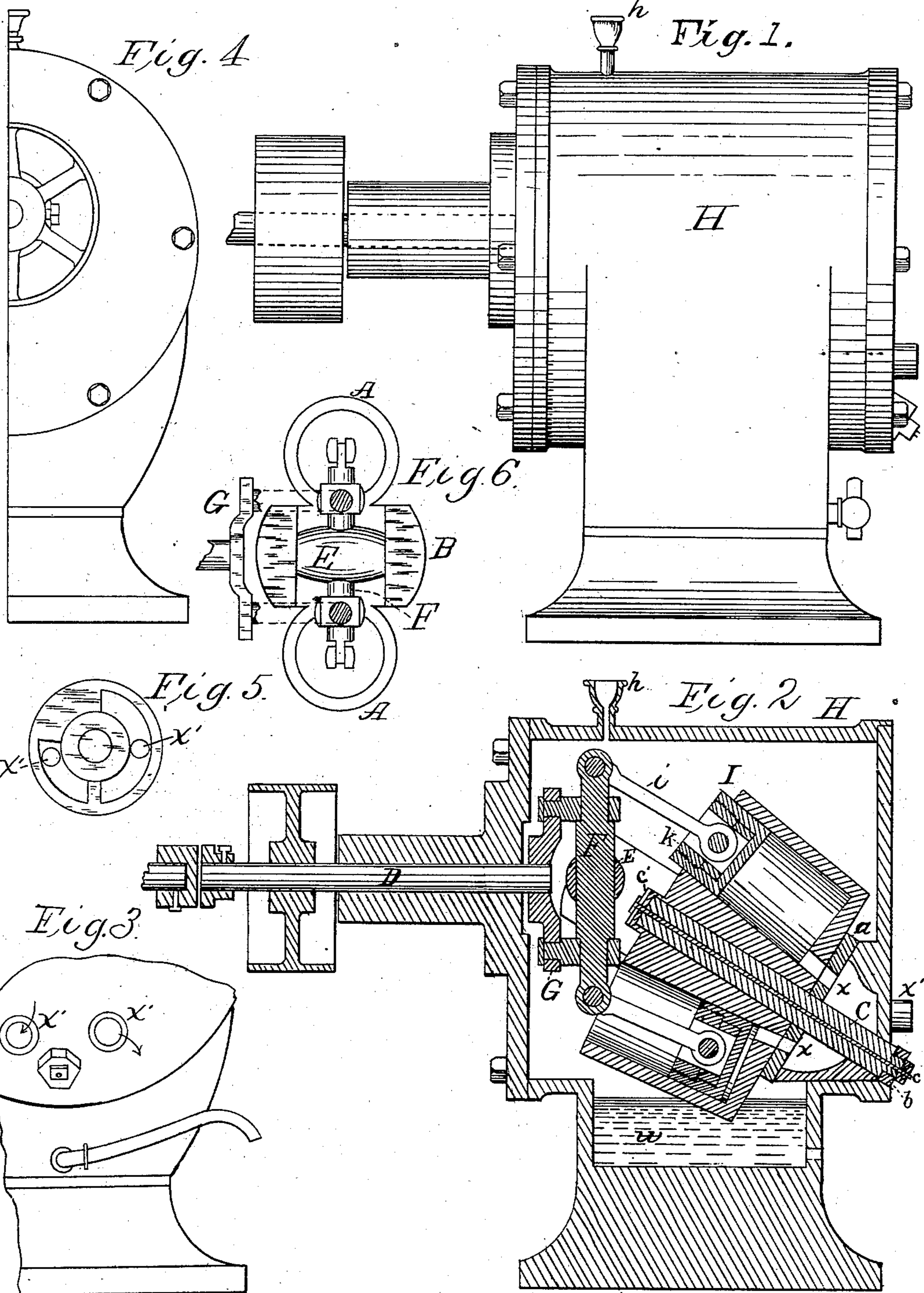


(No Model.)

G. W. HUNTER.  
REVOLVING CYLINDER ENGINE.

No. 280,041.

Patented June 26, 1883.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## REVOLVING-CYLINDER ENGINE.

SPECIFICATION forming part of Letters Patent No. 280,041, dated June 26, 1883.

Application filed March 29, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. HUNTER, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Revolving-Cylinder Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such that persons skilled in the art to which it appertains may be able to make and use the same.

The object of my invention is to make a compact and efficient engine which shall run so as to give a perfectly uniform rotary motion by direct attachment to a shaft, and therethrough to machinery. This is especially desirable in motions for dynamo-electric machines for generating electricity for electric lights.

My invention relates to certain novel devices and combinations whereby the object may be carried out; and it consists, first, in the combination, with a shaft, of a pair of revolving cylinders and pistons mounted upon an arbor at an angle, preferably, of about one hundred and fifty degrees with said driving-shaft, which in the example shown is horizontal; second, in the combination, with a pair of revolving cylinders and pistons, of pillars for supporting a rock-shaft; third, in the combination, with a pair of cylinders and pistons and pillars, as shown, of a rock-shaft and walking-beam; fourth, in the combination, with the walking-beam connected with a rock-shaft, as shown, of a yoke attached to and adapted to operate a driving-shaft; fifth, in the combination, with an inclined arbor and a pair of cylinders receiving and exhausting steam at one end, of a walking-beam and driving-shaft opposite the other end of said cylinders; and, finally, in other details of construction and combinations, which will be particularly pointed out in the claims.

In the drawings, Figure 1 is a side view of the exterior casing of my improved engine, showing a driving-pulley and other exterior connections. Fig. 2 is a central section, showing the pistons, respectively, at the beginning and end of their stroke, and other parts in their relative position. Fig. 3 is an exterior view with a part broken away from the end opposite the shaft, showing the exterior inlet

and exhaust ports. Fig. 4 is a view of the side from which the shaft extends. Fig. 5 is a plan of a steam-chest and exhaust-chamber, showing the inlet and exhaust ports and an expanded diaphragm between them, which serves as a cut-off, so that the steam may be used expansively. Fig. 6 is a view with the yoke and shaft broken away and lying at one side, looking into the open ends of the cylinders, showing the rock-shaft, the walking-beam, the yoke, and the pillars for sustaining the rock-shaft.

A A are the steam-cylinders, connected together and by preference divergent, as shown in Fig. 2.

B B are pillars attached to the side of the cylinders, or to a frame or plate binding them all together. These parts are formed with or are attached to a circular base or plate, *a*, having parts *x* leading to the cylinders.

C is an arbor or bearing arranged at an angle with the driving-shaft D, as shown in Fig. 2. This arbor may be adjusted slightly by the screw *b*. Through the axis of the bearing is a tie-rod, *c*, which clamps the disk *c'* against the edge of the cylinders, and by means of the outer screw thereon the parts may be tightened to compensate for wear between the base and the steam-chest.

*x' x'* are the ports leading to the steam-chest and from the exhaust-chamber through the outer casing.

E is a rock-shaft supported by the pillars B B, to which is attached a vibrating bar, F, which I call a "walking-beam." To the walking-beam is joined the yoke G, which is rigidly secured to the driving-shaft D. The pistons I are made cup-shaped, and for convenience in assembling the parts their rods *i* are coupled therewith by means of the hollow nuts *k*.

H is the casing within which the engine works, and *h* is a funnel through which oil and water or other lubricant may be introduced. At the bottom of the casing I provide a kind of well, *w*, into which the revolving cylinders project. By partially filling this well with water, and then adding a small quantity of oil, the entire machine will be kept lubricated by the agitation given to the liquid upon the revolution of the cylinders. The shaft and cylin-

ders being at an angle with each other and being joined by the jointed coupling described, the admission of steam to one of the cylinders moves the piston, and it in turn operates upon the walking-beam, which, through the yoke, imparts a torsional strain upon the shaft, which causes it as well as the cylinders to revolve. A greater number of cylinders than I have here shown and described may be used without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a plurality of cylinders and pistons, a driving-shaft arranged at an angle with said cylinders, and a universal joint for coupling the engine and shaft, substantially as described.

2. The combination herein described of a plurality of cylinders, pillars for supporting the rock-shaft, and circular base, as set forth.

3. The combination of a plurality of cylinders and pistons, a driving-shaft, an arbor inclined to said driving-shaft, and means, substantially as described, for directly coupling the pistons and shaft, as specified.

4. The combination of the pistons of a revolving-cylinder engine, a rock-shaft supported by pillars connected with the engine, a walking-beam, and a yoke, substantially as described.

5. The combination of a pair of cylinders running and exhausting steam at one end, an inclined arbor, and a driving-shaft opposite the other end of said cylinders.

6. The combination of the arbor tie-rod, disk *c'*, and tightening-nuts, as herein described.

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Witnesses:

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