

No. 760,318.

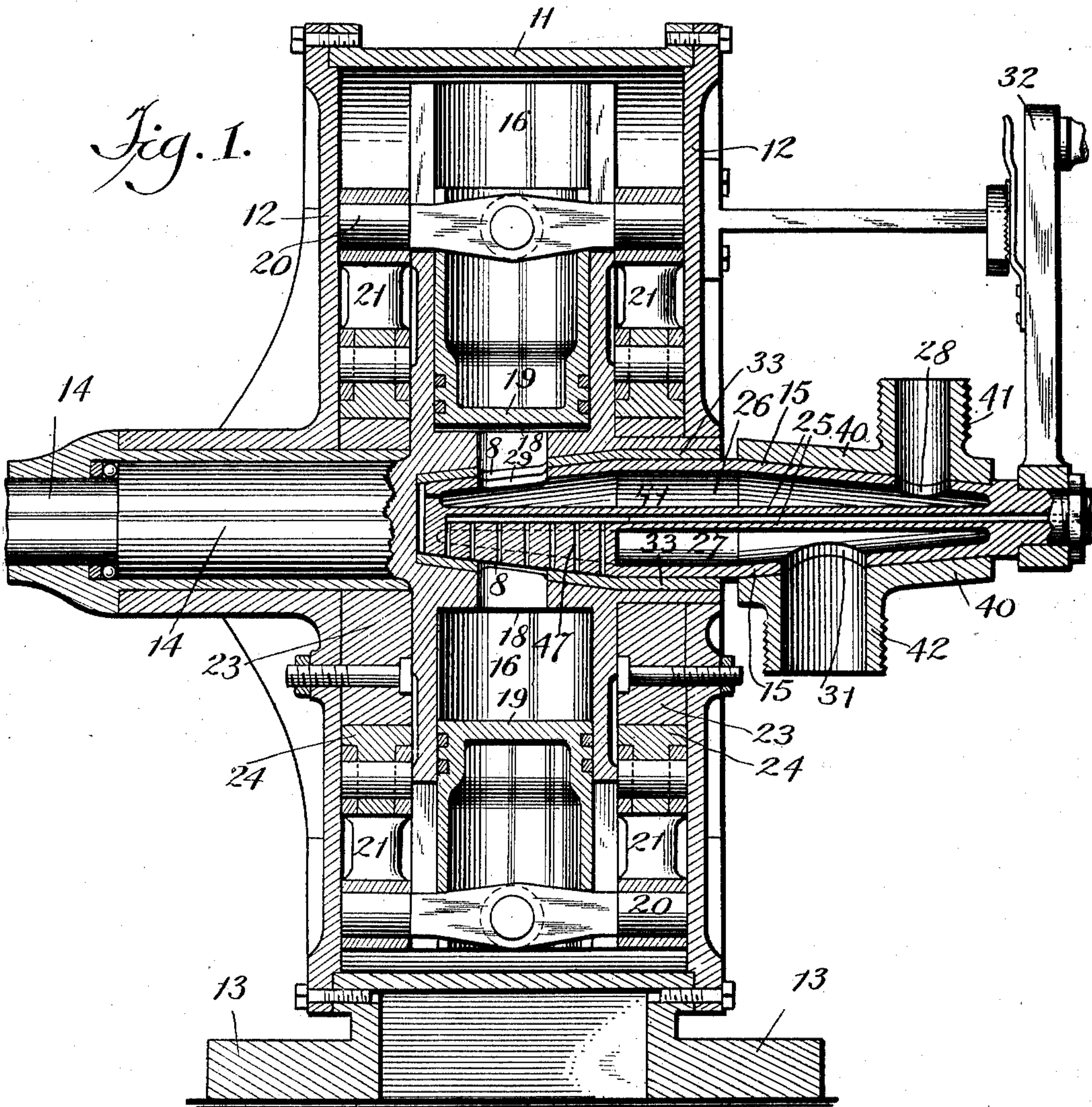
PATENTED MAY 17, 1904.

W. K.-L. DICKSON & G. A. CUCCOTTI.  
ENGINE.

APPLICATION FILED FEB. 11, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

*Wm N. MacLean*

INVENTORS:

*William Kennedy Laurie Dickson  
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BY

*Edmund Conyar Brown*  
ATTORNEY.



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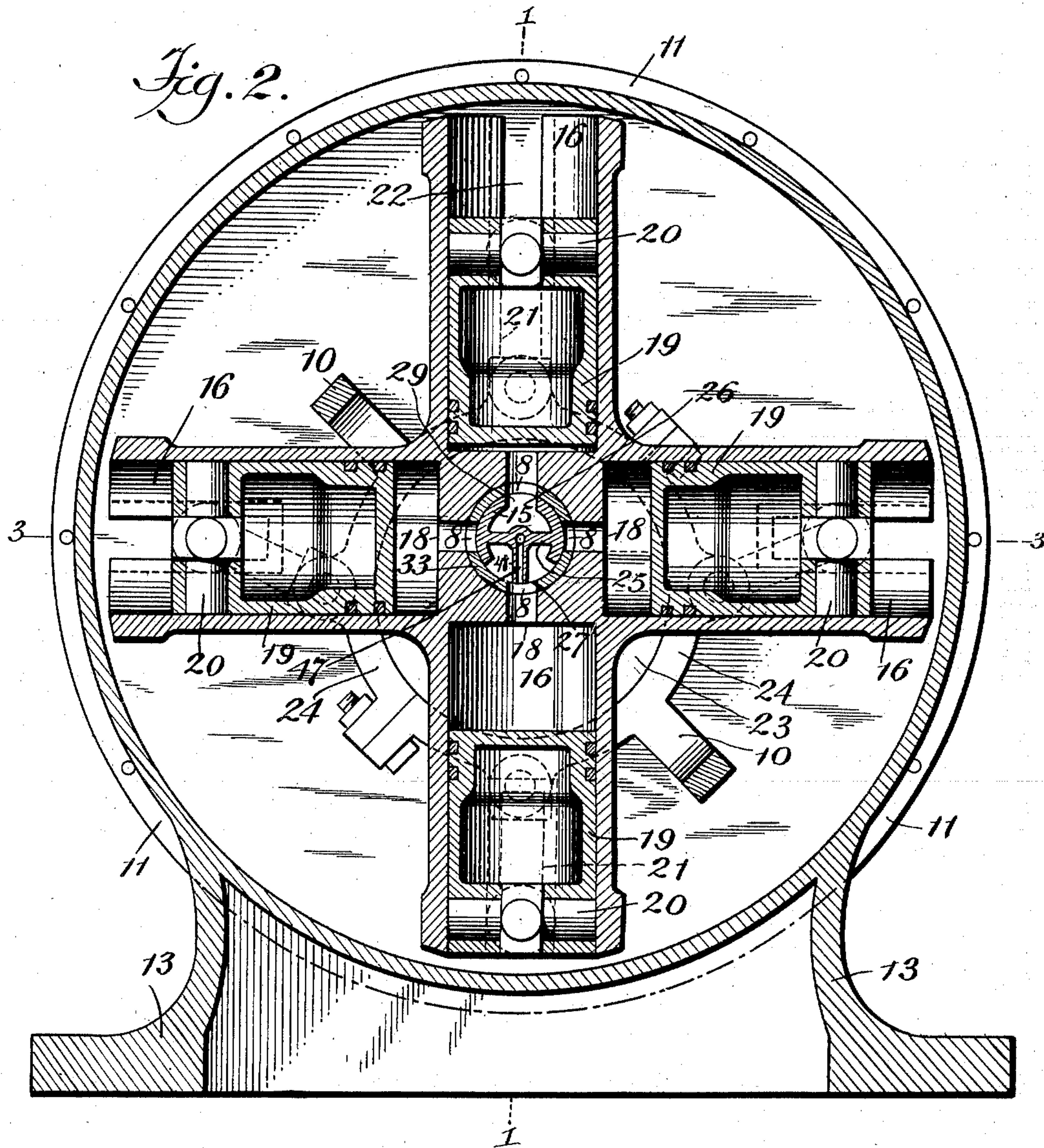
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3 SHEETS—SHEET 2.



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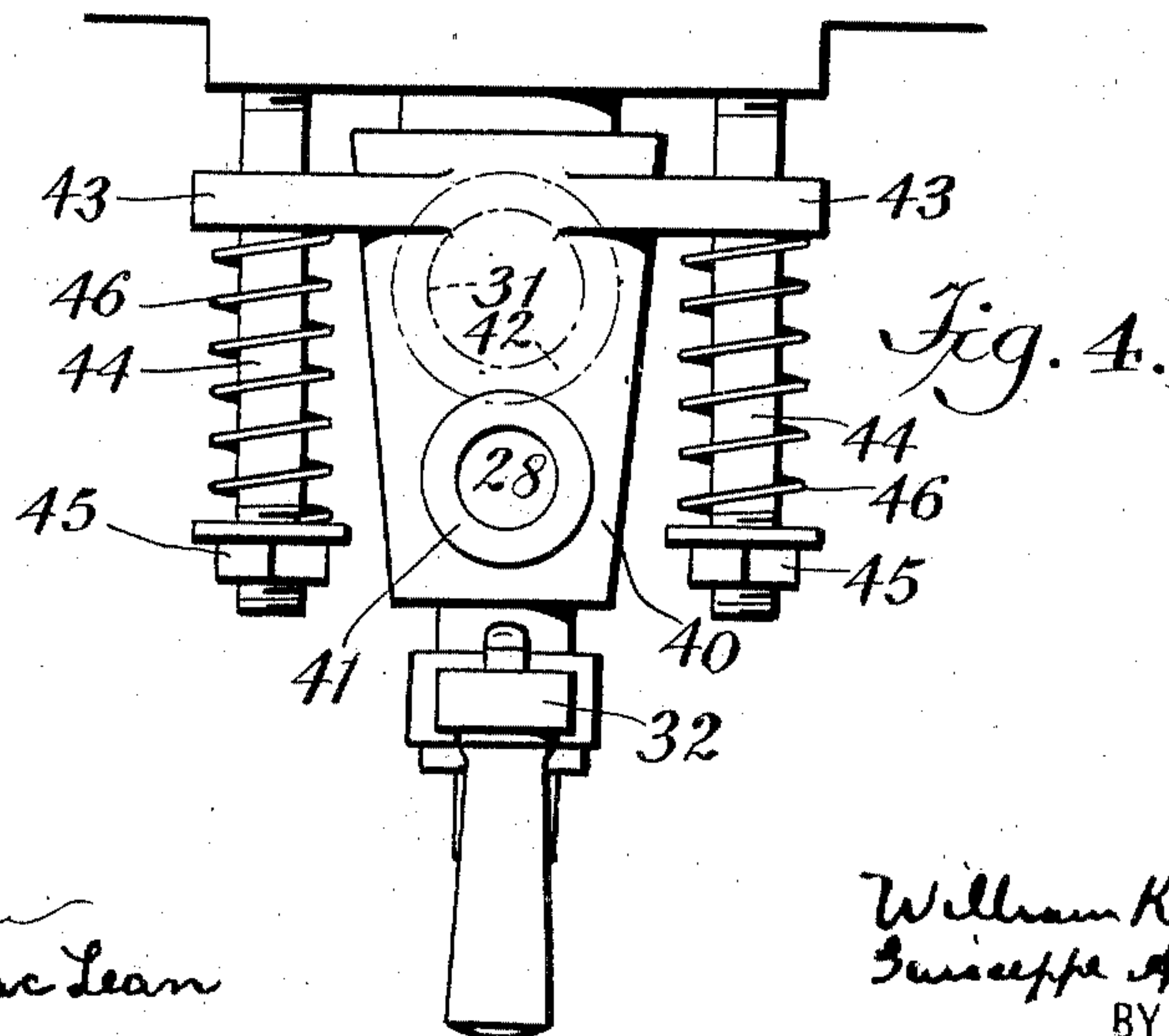
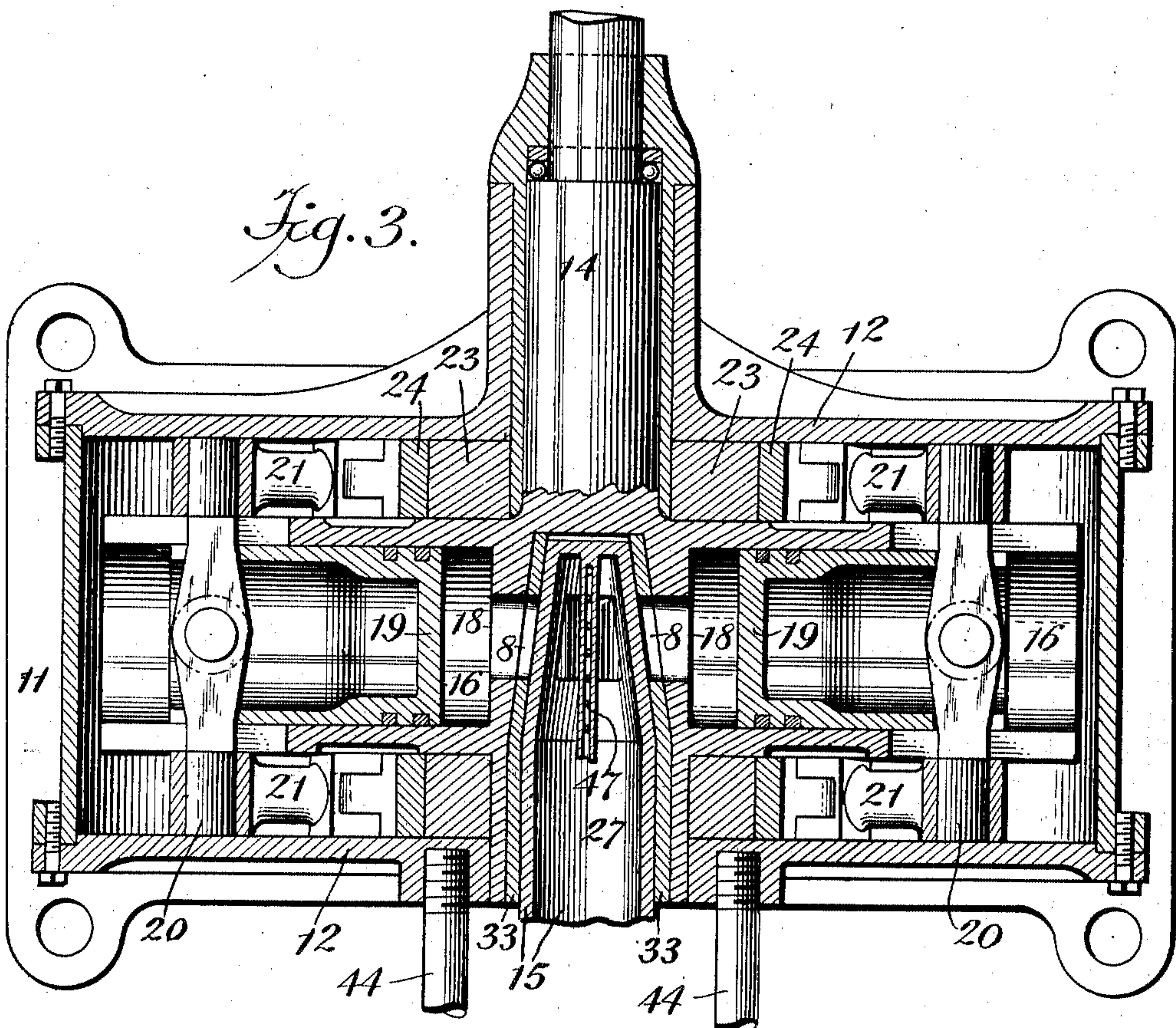
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3 SHEETS—SHEET 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM KENNEDY-LAURIE DICKSON AND GIUSEPPE ANTONIO CUCCOTTI, OF LONDON, ENGLAND; SAID CUCCOTTI ASSIGNOR TO SAID DICKSON.

## ENGINE.

SPECIFICATION forming part of Letters Patent No. 760,318, dated May 17, 1904.

Application filed February 11, 1903. Serial No. 142,838. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM KENNEDY-LAURIE DICKSON, a subject of the King of Great Britain and Ireland, and GIUSEPPE ANTONIO CUCCOTTI, a subject of the King of Italy, both residents of London, England, have invented certain new and useful Improvements in Engines, of which the following is a specification.

Our invention relates to engines or motors, and particularly to that class of such engines or motors as are usually termed "revolving-cylinder" engines.

The principal object of our invention is to provide a simple and efficient motor occupying but small space in proportion to the amount of power developed by the same, whereby it is particularly adapted for use in motor-cars, automobiles, and in all cases where the utmost economy of space is desirable, although our improved motor is by no means limited to such uses, being capable of advantageous employment in many other ways.

A further object of our invention is to overcome various defects which have heretofore been present in engines of the class referred to.

Our invention consists of the novel construction, arrangement, and combination of various devices and parts, as hereinafter more particularly described.

In the accompanying drawings, Figure 1 is a transverse vertical section across the motor-case; Fig. 2, a longitudinal vertical section; Fig. 3, a horizontal section, and Fig. 4 a top view of the controlling-lever and certain other parts, all as hereinafter particularly referred to and explained.

In carrying our invention into effect we provide a casing comprising an annular portion 11 and sides 12 12, the whole being supported by a base 13. The sides 12 12 are perforated to allow the passage of the shaft 14 and the plug 15, hereinafter described. Four cylinders 16 are provided, which may be integral with each other or otherwise, but in either case are rigidly attached together in the form of an X, each cylinder constituting one arm thereof. The shaft 14 projects from one side

of the cylinder structure, and into the other side and nearly transversely through the cylinder structure passes the plug 15. The inner end portion of the said plug is tapering, and means are provided, as hereinafter described, for keeping the plug always snug in its socket. A bushing or sleeve 33 is provided intermediate the plug and the cylinder structure provided with openings 8.

Each cylinder has at its inner end an aperture 18, which opens into the central opening, in which lies the plug 15. The cylinders are open at their outer ends. Each cylinder contains a hollow or cup-shaped piston 19, the outer portion of which bears a cross-arm 20, to each end of which is attached a rod 21. The cylinders are provided with slots 22, into which the cross-arms 20 pass when the piston moves toward the inner end of the cylinder.

Suitably rigidly secured to the inner sides of the casing are eccentrics 23, around each of which is placed an eccentric-strap 24. The inner ends of the rods 21 are pivotally attached at four equidistant points to the straps 24. The said straps are connected by arching bridge-pieces 10, tending to keep them revolving always at equal speeds.

The plug 15 is hollow and is provided with a longitudinal partition 25, which divides the interior into two chambers, (designated in the drawings 26 and 27.) Each of these chambers has an opening at each end, the four openings being designated 28, 29, 30, and 31. The function of these openings will be hereinafter fully described. A partition 48 extends downward from the rear or inner portion of the longitudinal partition 25, and through this partition 48 are drilled a number of holes or channels 47, which enter a channel 49, drilled longitudinally through the partition 25. These channels 49 and 47 are for containing lubricating-oil and conducting the same to the bearing-surfaces. The plug 15 is free to turn on its axis and bears at its outer end a lever 32 for so turning the same. Any suitable means may be provided—as, for instance, those shown in Fig. 1—for holding said lever, and consequently said plug, in any desired posi-



tion. The plug is tapered at its outer end also, and fitting closely over the same is a correspondingly interiorly-tapered sleeve 40, provided with an upwardly-extending pipe 41 and a somewhat larger downwardly-extending pipe 42. This sleeve 40 is provided with two lateral lugs 43. (See Fig. 4.) From the front of the casing extend forward two rods 44, which pass through perforations in said lugs and are provided at their outer ends with nuts 45. Between said lugs and said nuts are helical springs 46, tending to keep said sleeve always pressed firmly in upon the tapering end of the plug and to keep the plug itself snug in its seat in the cylinder structure.

The operation of our invention is as follows: The opening 28 being connected with a source of supply of steam or other motive power, the same passes through said opening into the chamber 26 and out of said chamber through the opening 29 into such one of the cylinders as may at the time have its opening 18 in communication with the opening 29. Should neither cylinder happen to be at the time in such communication, a slight movement of the lever 32 will turn the plug sufficiently to bring it into a position in which such communication shall take place. The steam of course tends to force the piston outward toward the end of the cylinder, and thus exerts a pull upon the eccentrics, which causes the cylinder to move sidewise toward the point where the rods are attached to the eccentric. As the cylinder moves its aperture 18 passes out of communication with the opening 29, and the influx of steam into the cylinder ceases; and the steam then works expansively during the remainder of the stroke. When the cylinder has made a half-revolution, the opening 18 is brought into communication with the opening 30 of the plug, and the steam in the cylinder passes out into the chamber 27 and thence into the open air through the exhaust-opening 31. It will of course be understood that when the cylinder which first receives the steam moves one-quarter of a revolution the second cylinder has been brought into position to receive steam and that this second cylinder and its piston then aid in the work, and that when the first cylinder has made one-half of a revolution and is in position to exhaust the third cylinder is in position to receive steam, and so on.

It will be evident that the direction of the revolution of the cylinder structure and its shaft will depend upon the direction in which the opening 29 of the plug is made to face and upon which one of the cylinders the steam is first caused to enter.

The advantages of our invention are obvious. We would particularly call attention, however, to the fact that as the plug 15 is tapered and spring-pressed it is always steam-tight, that the work of the pistons is done by means of pulling only, thus minimizing fric-

tion, and to the simple and efficient throttle cut-off device which we have provided.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is as follows:

1. A reversing-valve for rotary engines, comprising a hollow plug adapted to be inserted into the revolving part of the engine at its axis, said plug being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the operative parts of the engine and the other to permit the escape of exhaust-steam therefrom, said partition being provided with a channel adapted to conduct lubricating-oil to the bearing parts of the engine, and said plug being also provided with means for revolving the same.

2. A reversing-valve for rotary engines, comprising a hollow plug adapted to be inserted into the revolving part of the engine at its axis, said plug being provided with a longitudinal partition dividing the same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the operative parts of the engine and the other to permit the escape of exhaust-steam therefrom; said partition having a second partition extending approximately at right angles from the rear or inner part of its lower surface, and said partitions being provided with connecting-channels adapted to conduct lubricating-oil to the bearing parts of the engine; said plug being also provided with means for revolving the same.

3. In a reversing-valve for rotary engines, the combination with a hollow plug adapted to be inserted into the revolving part of the engine at its axis, said plug being tapered at its inner end and being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the operative parts of the engine and the other to permit the escape of exhaust-steam therefrom; of means adapted to elastically hold said plug in its place, and means adapted to revolve the said plug.

4. In a reversing mechanism for rotary engines, the combination with a hollow plug adapted to be inserted into the revolving part of the engine at its axis, said plug being tapered at both its inner and outer ends and being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the operative parts of the engine and the other to permit the escape of exhaust-steam therefrom; of means adapted to elastically hold said plug in its place and means adapted to revolve the said plug.

5. In a reversing mechanism for rotary engines, the combination with a hollow plug



adapted to be inserted into the revolving part of the engine at its axis, said plug being tapered at both its inner and outer ends and being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the operative parts of the engine and the other to permit the escape of exhaust-steam therefrom; of means adapted to revolve the said plug, and means adapted to elastically hold the said plug in its place, comprising a sleeve closely fitting over the outer tapering end of said plug and secured elastically to the casing of the engine.

6. A revolving-cylinder engine, comprising a casing, cylinders rigidly attached together at their inner ends, a shaft rigidly attached to said cylinder structure and journaled in said casing, pistons in said cylinders, eccentrics on said casing, piston-rods operatively connected to said pistons and to said eccentrics, and valve mechanism adapted to admit steam to the cylinders and convey away the exhaust-steam therefrom comprising a hollow plug adapted to be inserted into the cylinder structure at its axis, said plug being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the cylinders and the other to permit the escape of exhaust-steam therefrom.

7. A revolving-cylinder engine, comprising a casing, cylinders rigidly attached together at their inner ends, a shaft rigidly attached to said cylinder structure and journaled in said casing, pistons in said cylinders, eccentrics on said casing, piston-rods operatively connected to said pistons and to said eccentrics, and valve mechanism adapted to admit steam to the cylinders and convey away the exhaust-steam therefrom comprising a hollow plug adapted to be inserted into the cylinder structure at its axis, said plug being provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the cylinders and the other to permit the escape of exhaust-steam therefrom, and a sleeve or bushing intermediate the plug and the cylinder structure, provided with openings near its inner end and opposite to each other.

8. A revolving-cylinder engine, comprising a casing; cylinders rigidly attached together at their inner ends and provided with a shaft journaled in said casing upon which shaft the cylinder structure is adapted to revolve, said cylinder structure being provided at its axis with a transverse socket having a contracted or tapering inner end; pistons in said cylinders; eccentrics on said casing; piston-rods operatively connected to said pistons and to said eccentrics; a valve device comprising a hollow plug provided with a longitudinal partition dividing same into two chambers each

of which is provided with openings, said chambers being adapted one to admit steam to the cylinders and the other to permit the escape of exhaust-steam therefrom, said plug having its inner end tapered; and means for elastically holding said plug in the socket in said cylinder structure.

9. A revolving-cylinder engine, comprising a casing; cylinders rigidly attached together at their inner ends and provided with a shaft journaled in said casing upon which shaft the cylinder structure is adapted to revolve, said cylinder structure being provided at its axis with a transverse socket having a contracted or tapering inner end; pistons in said cylinders; eccentrics on said casing; piston-rods operatively connected to said pistons and to said eccentrics; a valve device comprising a hollow plug provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the cylinders and the other to permit the escape of exhaust-steam therefrom, said plug having its inner end tapered; and means for elastically holding said plug in the socket in said cylinder structure and means adapted to revolve the said plug.

10. A revolving-cylinder engine, comprising a casing; cylinders rigidly attached together at their inner ends and provided with a shaft journaled in said casing upon which shaft the cylinder structure is adapted to revolve, said cylinder structure being provided at its axis with a transverse socket having a contracted or tapering inner end; pistons in said cylinders; eccentrics on said casing; piston-rods operatively connected to said pistons and to said eccentrics; a valve device comprising a hollow plug provided with a longitudinal partition dividing same into two chambers each of which is provided with openings, said chambers being adapted one to admit steam to the cylinders and the other to permit the escape of exhaust-steam therefrom, said plug having both its inner and outer ends tapered; and means for elastically holding said plug in the socket in said cylinder structure, of means adapted to revolve the said plug, and means adapted to elastically hold the said plug in its place, comprising a sleeve closely fitting over the outer tapering end of said plug and secured elastically to the casing of the engine.

In witness whereof we have hereunto signed our names, this 28th day of January, 1903, in the presence of two subscribing witnesses, at London, England.

WILLIAM KENNEDY-LAURIE DICKSON.  
GIUSEPPE ANTONIO CUCCOTTI.

Witnesses:

FRANCIS W. FRIGOUT,  
H. D. JAMESON.