No. 815,632. PATENTED MAR. 20, 1906.

J. L. PILLING.

OSCILLATING ENGINE.

APPLICATION FILED FEB. 27, 1905.

2 SHEETS—SHEET 1.

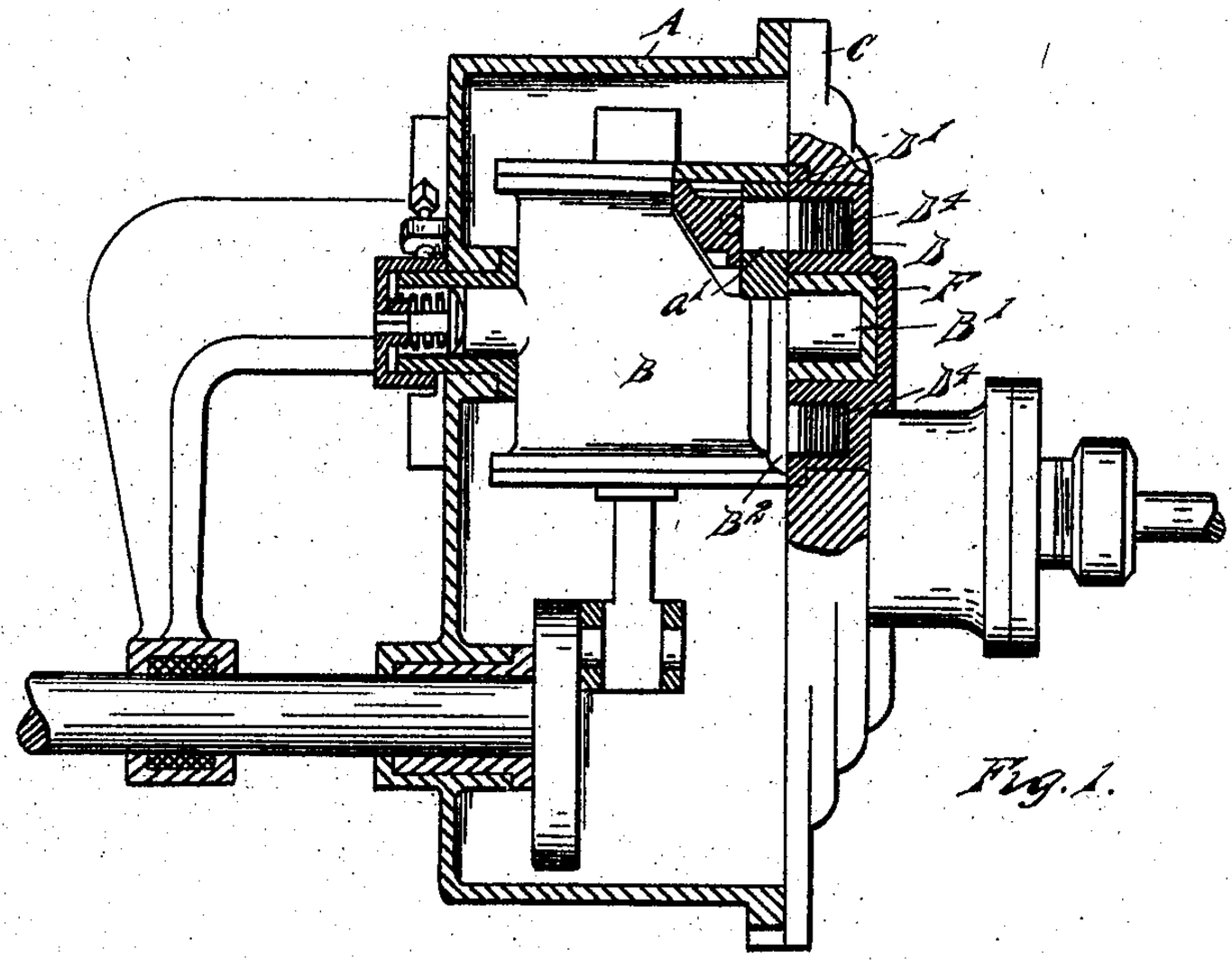

Fig. 1.

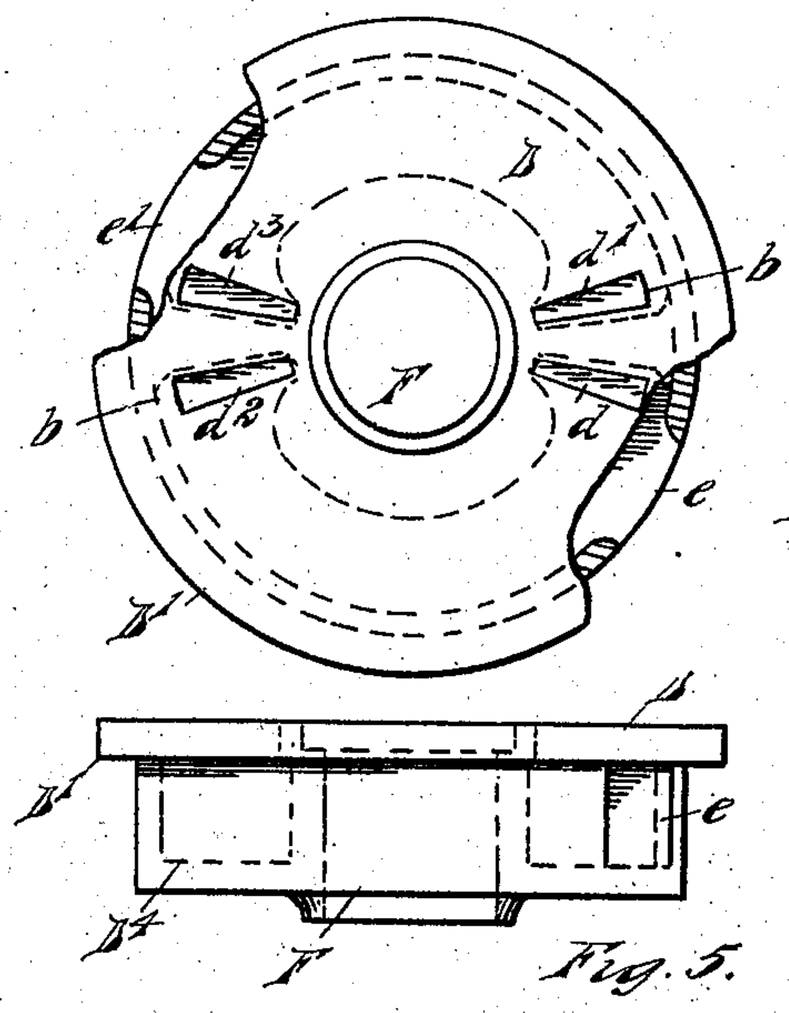

Fig. 4.

Fig. 5.

WITNESSES

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2 SHEETS—SHEET 2.

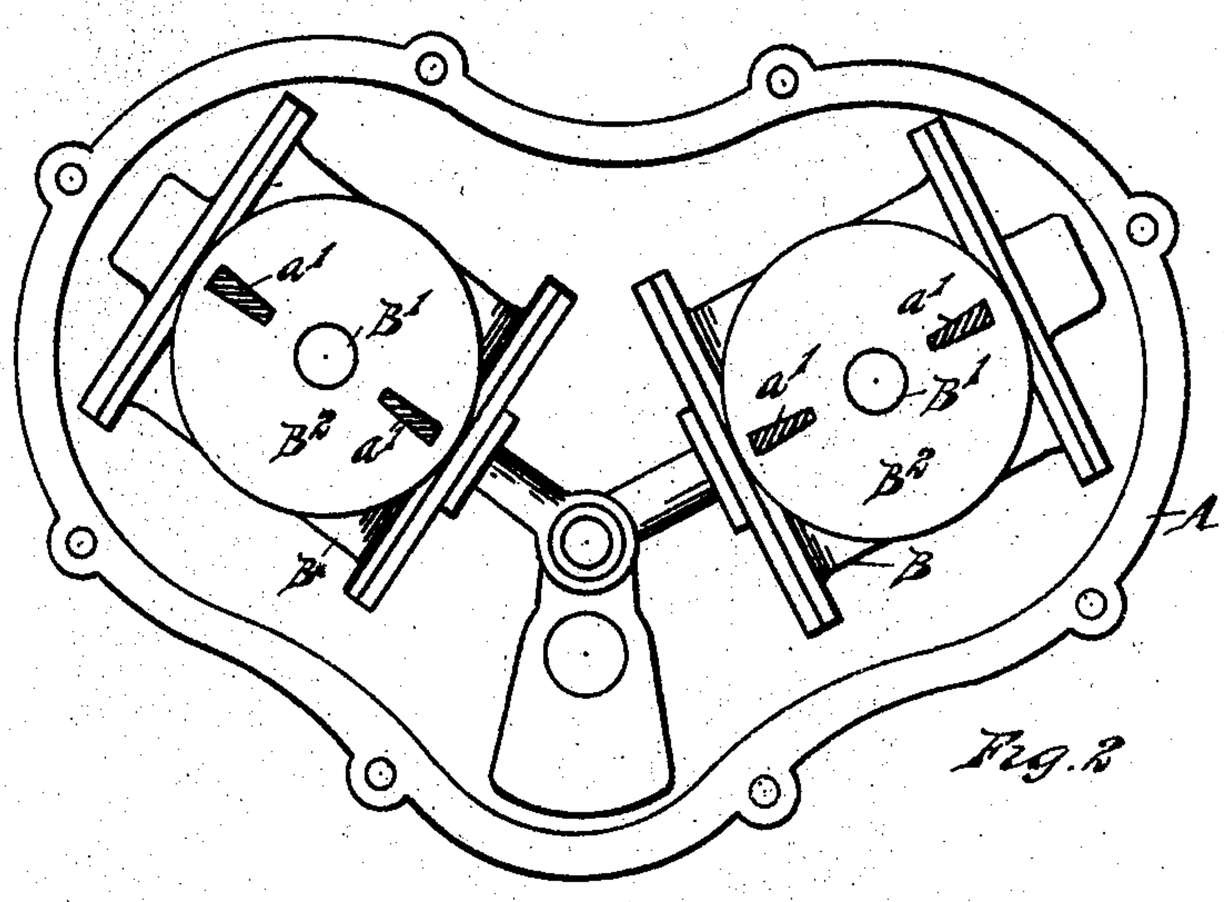

Fig. 2.

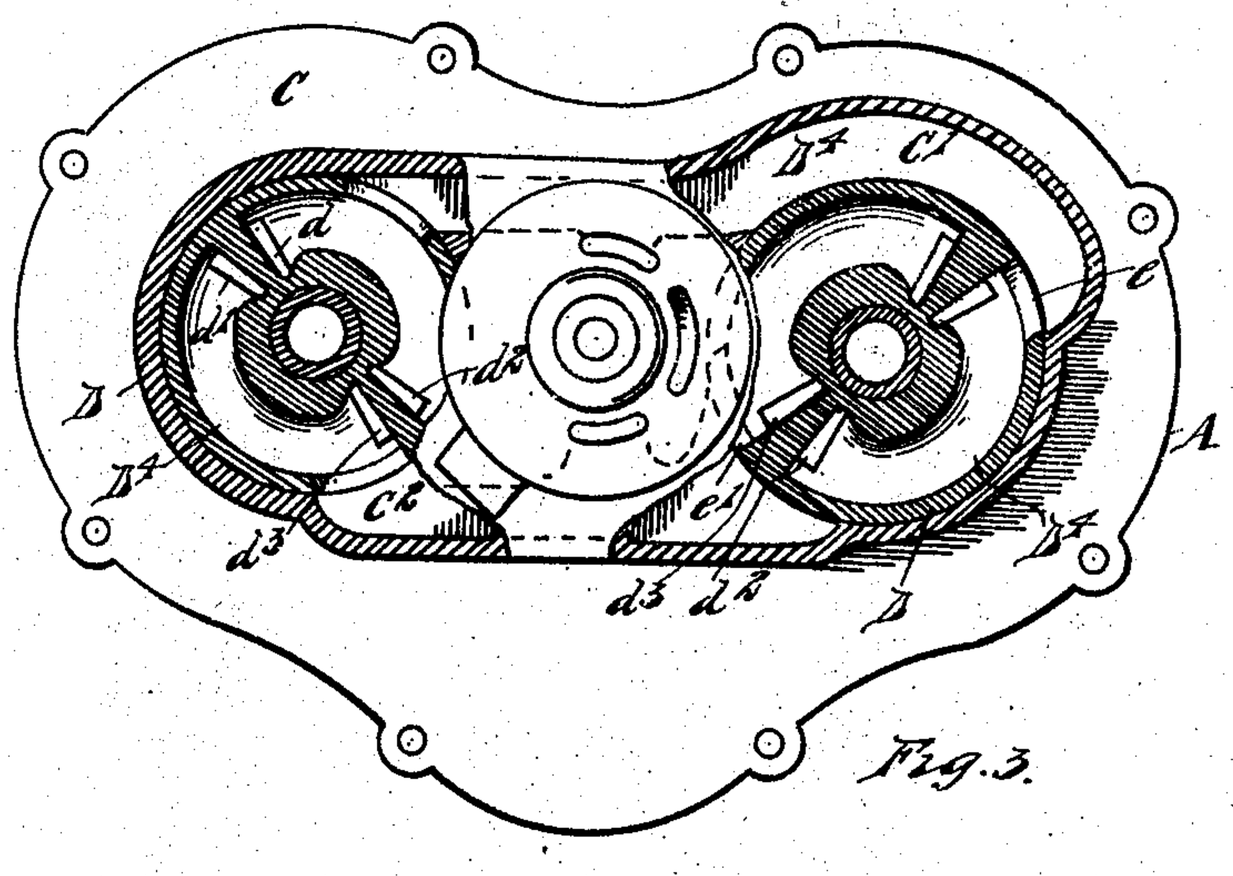

Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES LOWE PILLING, OF BUCYRUS, OHIO, ASSIGNOR TO PILLING AIR ENGINE COMPANY, OF DETROIT, MICHIGAN, A CORPORATION.

OSCILLATING ENGINE.

No. 815,632. Specification of Letters Patent. Patented March 20, 1906.

Application filed February 27, 1905. Serial No. 247,495.

To all whom it may concern:

Be it known that I, JAMES LOWE PILLING, a citizen of the United States, residing at Bucyrus, county of Crawford, State of Ohio, have invented a certain new and useful Improvement in Oscillating Engines; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to oscillating engines, and is in the nature of an improvement upon the invention described by me in my application filed in the United States Patent Office September 12, 1903, and having the serial number of 172,877, to which application reference is hereby made for more specific description of parts not immediately coacting with my present invention.

The particular object of my present invention is to cheapen and facilitate the construction of that part of the cover adjacent to the cylinder which provides the bearing-surfaces for that portion of the cylinder in which the ports are formed.

In the drawings, Figure 1 is an elevation of an engine embodying my invention, partly in section, the section-line passing through that part of the casing-cover shown in Fig. 4 indicated by the broken line *b*. Fig. 2 is a side elevation of the engine, the cover of the casing being removed. Fig. 3 is a view similar to Fig. 2, the cover being in place, but partly broken away to show its internal construction. Fig. 4 is a detail view of a removable part of the casing-cover. Fig. 5 is a side eletion of the part shown in Fig. 4.

A is the casing, in which the cylinders B are pivoted by means of their trunnions B′.

B^2 B^2 are the valve-faces upon the cylinders through which the ports a' a' are cut.

C is a cover for the casing A. In the cover C are cored various passages C′ C^2. At the portion of the cover C opposite the valve-faces B^2 B^2 are formed cylindrical apertures, and into these apertures are fitted the cylinders D, having overhanging faces, as indicated at D′. The overhanging peripheries B′ of said faces fit into corresponding cut-out portions in the cover C, as indicated in Fig. 1. The face of the cylinder D is finished to correspond to the valve-face B^2 on the cylinder B and is provided with ports d d' d^2 d^3 and is cored out, forming two chambers D^4, each of which communicates with two of the ports d d^2 or d' d^3.

e e' are openings from the periphery of the cylinder D into the cored-out chambers D^4. The smaller cylindrical portion of the cylinder D is made slightly conical, and the aperture in the cover C is correspondingly formed to receive the cylinder which is put in to make a close fit that shall retain it in place, the openings e e' communicating with the passages in the cover C. The centers of the cylinders D are formed with cylindrical cavities F, in which the trunnions D′ bear. The casing and cover thereto form supports for the cylinders.

By providing separate cored and finished cylinders D and forming apertures to receive the same in the cover C the engine construction is greatly simplified, as the cylinders B may be easily swung in the lathe for finishing, quickly placed in position with their ports accurately adjusted, and may be replaced cheaply and expeditiously when worn or injured.

What I claim is—

1. In an oscillating engine, a support, a cylinder pivoted to said support, said support consisting of a stationary and removable part, the stationary part being provided with suitable passages adapted to form portions of the conduits leading to the ports, the removable part being provided with a finished surface and ports opening therethrough, and with suitable passages adapted to form portions of the conduits leading to the ports, said stationary and removable parts being adapted to be rigidly united with a tight joint with their respective passages communicating to form continuous conduit-passages.

2. In an oscillating engine, a support, a cylinder pivoted to said support, said support consisting of a stationary part having passages therein and provided with a cylindrical cavity, and a removable cylindrical part adapted to fit into said cavity forming a tight joint and being held rigidly therein, said removable part being provided with passages opening at the periphery of the removable part adapted to communicate with the passages in the stationary part to form continuous

conduit-passages, said removable part being provided with a finished outer surface, and ports opening therethrough.

3. In an oscillating engine, a support, a cylinder pivoted to said support, said support consisting of a stationary part having passages therein, said stationary part being provided with a cylindrical cavity, and a removable cylindrical part adapted to fit into said cavity forming a tight joint and being held rigidly therein, said removable part being provided with passages opening at its periphery and adapted to communicate with the passages in the stationary part and with the finished outer surface and ports opening therethrough, the cylinder being pivoted to said removable part and provided with ports adapted to register with the ports in the same.

In testimony whereof I sign this specification in the presence of two witnesses.

JAMES LOWE PILLING.

Witnesses:
CHARLES F. BURTON,
ELLIOTT J. STODDARD.