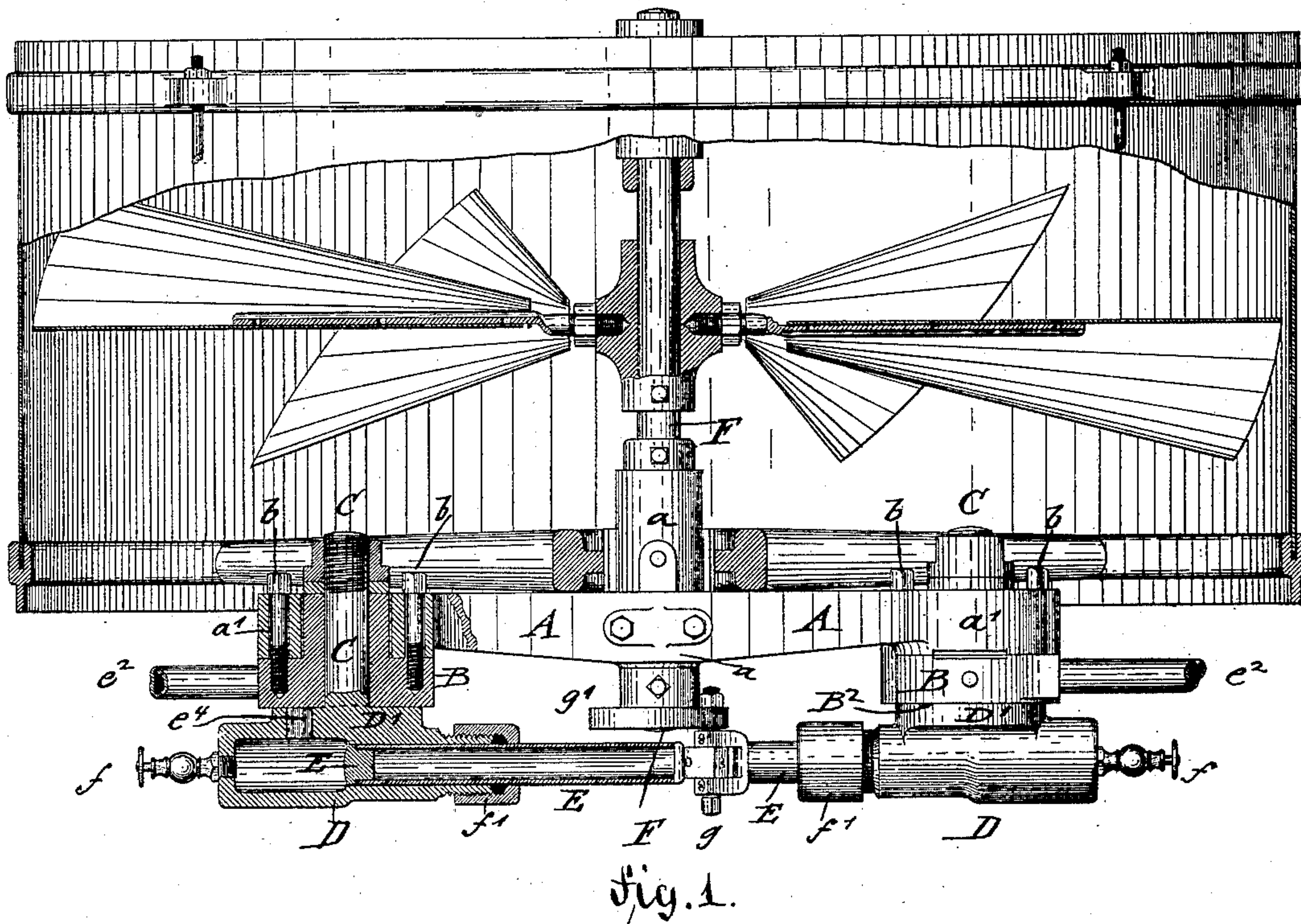
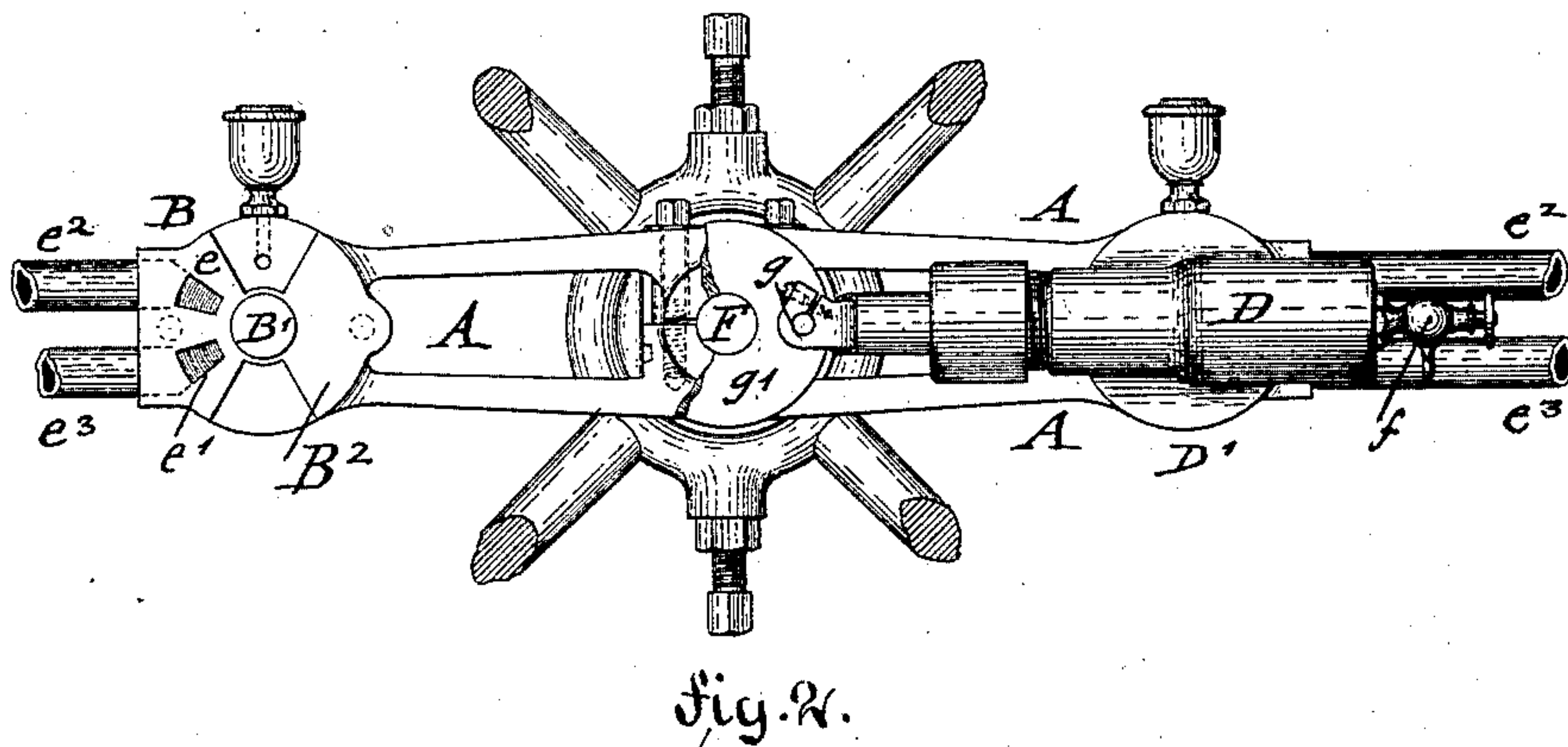
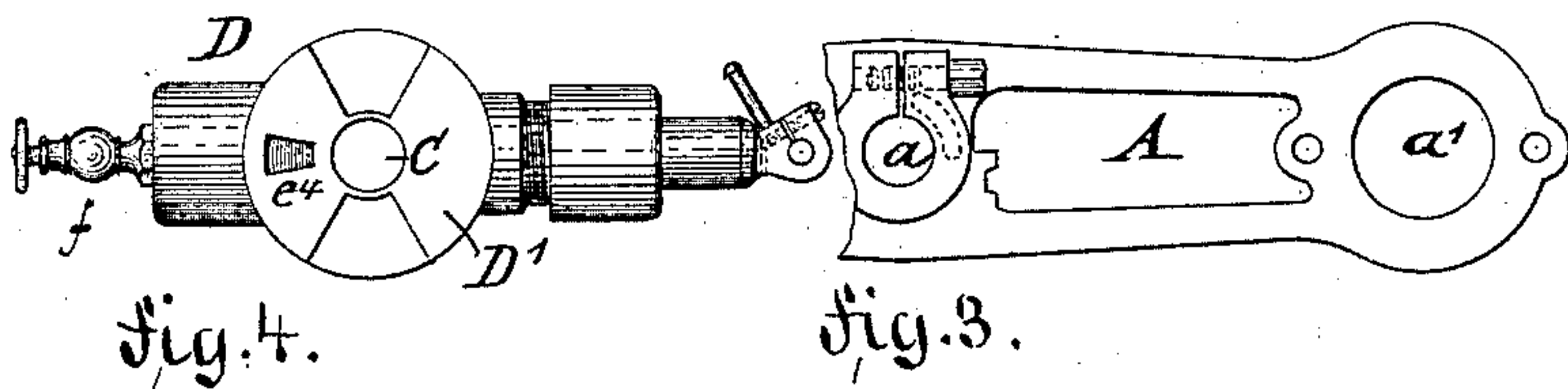


(No Model.)

L. J. WING & T. A. RICHARDS.  
OSCILLATING ENGINE.

No. 363,496.

Patented May 24, 1887.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

LEVI J. WING, OF NEW YORK, AND THERON A. RICHARDS, OF BROOKLYN,  
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## OSCILLATING ENGINE.

SPECIFICATION forming part of Letters Patent No. 363,496, dated May 24, 1887.

Application filed November 20, 1886. Serial No. 219,433. (No model.)

*To all whom it may concern:*

Be it known that we, LEVI J. WING, of the city, county, and State of New York, and THERON A. RICHARDS, of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Oscillating Steam-Engines, of which the following is a specification.

This invention relates to improvements in oscillating steam-engines, by which they are adapted to move small machinery of all kinds, such as ventilating fans, propellers for yachts, lathes, dynamos, sewing-machines, &c., but which may also be used for heavy work. The engine may be constructed with two or more cylinders. For ordinary light-running machinery two cylinders will be sufficient, while for heavy work three or more cylinders can be used. The engine works without strain, noise, or vibration, and has the advantage of simplicity, compactness, ease of application, and comparatively small cost of construction and maintenance.

The invention consists of a supporting frame, the center of which is provided with a journal-bearing for the shaft to be driven, while the ends of the supporting-frame are made ring-shaped to receive the steam-chests and the bearings for the pivots of the oscillating steam-cylinders. Each cylinder is provided with a disk-shaped face that fits tightly to the face of the steam-chest, so as to form close contact, to prevent any leakage of steam. The ports of the steam-chest supply and exhaust the steam to and from the port of the cylinder. The pistons are pivoted to a crank-pin of the shaft to be driven, so that by the alternating reciprocating action of the pistons, in connection with the oscillations of the cylinders, continuous rotary motion is imparted to the shaft.

In the accompanying drawings, Figure 1 represents a top view, partly in horizontal section, of our improved oscillating steam-engine, shown as applied to a ventilating-fan. Fig. 2 is a front elevation of the same with parts broken away to show one of the steam-chests. Fig. 3 is a side view of one-half of the supporting-frame, and Fig. 4 is a rear view of one of the oscillating cylinders.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents a fixed supporting-frame, at the center of which is arranged a journal-bearing, *a*, for the shaft to be driven, while the ends of the frame A are provided with ring-shaped bearings *a'*, which serve to support centrally-perforated steam chests B, that form the bearings B' for the pivots C of two or more oscillating cylinders, D. The combined steam-chests B and pivot-bearings B' are rigidly attached to the ring-shaped ends *a'* of the frame A by fastening-screws *b b*. The pivots C pass through the bearings B', and are attached to the back of the frame A by fastening screw-nuts *d* and washers *d'*, said screw-nuts being applied to the threaded rear ends of the pivots, as shown in Fig. 1.

The steam-chests B are provided with disk-shaped faces B<sup>2</sup>, which are smoothly turned off, so as to form contact with the smooth disk-shaped faces D' of the cylinders D. The steam-chests B are provided with steam-admission ports *e* and exhaust-ports *e'*, which are connected, respectively, with the steam inlet and outlet pipes *e<sup>2</sup> e<sup>3</sup>*, as shown in Fig. 2. A suitable two-way cock (not shown in the drawings) may be arranged in connection with the steam inlet and outlet pipes, so as to permit the reversing of the engine and supply the steam to the former exhaust-port, *e'*, while exhausting through the former admission-port, *e*.

Each cylinder D is provided with a port, *e'*, which registers with the ports *e e'* of the steam-chest B. The oscillating cylinders D are provided at their closed ends with small openings closed by petcocks *f*, through which the water of condensation is discharged from time to time. At their opposite ends the cylinders D are provided with stuffing-boxes *f'* for the piston-rods E, which piston-rods also perform the functions of pistons. The inner ends of the cylinders D are somewhat enlarged, so that the steam will play entirely around the inner ends of the pistons, while the remaining parts of the pistons are tightly fitted into the contracted portions of the cylinders. The outer ends of the piston-rods E are pivoted to a crank-pin, *g*, of a disk, *g'*, that is attached to the end of a shaft, F, which is supported in the center bearing, *a*, of the frame A, and to which motion is to be imparted by the oscillating engine.



lating steam-cylinders D and reciprocating pistons E. When steam is supplied to one cylinder, the other cylinder exhausts, so that the piston of the same can recede, while when the steam in the first cylinder exhausts live steam is supplied to the second cylinder, and so on alternately, whereby an alternating oscillatory motion is imparted to the steam-cylinders and a reciprocating motion to the pistons, which latter impart a continuous rotary motion to the shaft F. The crank-pin is passed over its dead-points by the momentum imparted to the fan, fly-wheel, or other article located on the shaft F, so that the regular motion of the cylinders is kept up.

A small and compact motor for driving ventilating-fans and for other purposes is thus obtained, which motor can be arranged close to and as a part of the machine to be driven. Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination of a supporting-frame having a central bearing and ring shaped end bearings, steam-chests attached to said end bearings and provided with ports, steam-cylinders pivoted to said steam-chests and provided with ports registering with the ports of the steam-chest, pistons in said cylinders, and a transmitting-shaft connected by a crank-pin to the outer ends of the pistons, substantially as shown and described.

2. The combination of a supporting-frame having a central bearing for the shaft to be driven and ring-shaped end bearings, steam-chests fastened to said end bearings and provided with ports, oscillating steam-cylinders having pivots passing through said steam-chests and provided with ports registering with the ports of the steam-chests, pistons reciprocating in said cylinders, and a transmitting-shaft having a crank-pin connected to the outer ends of the pistons, substantially as set forth.

3. The combination of a supporting-frame having a center bearing and ring-shaped end bearings, steam-chests attached to said end bearings and provided with disk-shaped faces and ports, steam-cylinders having faces fitted to the faces of the steam-chests and ports registering with the ports of the steam-chests, pistons reciprocating in said cylinders, and a transmitting-shaft supported in the center bearing and connected by a crank-pin to the outer ends of the pistons, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

LEVI J. WING.

THERON A. RICHARDS.

Witnesses:

PAUL GOEPEL,  
CARL KARP.