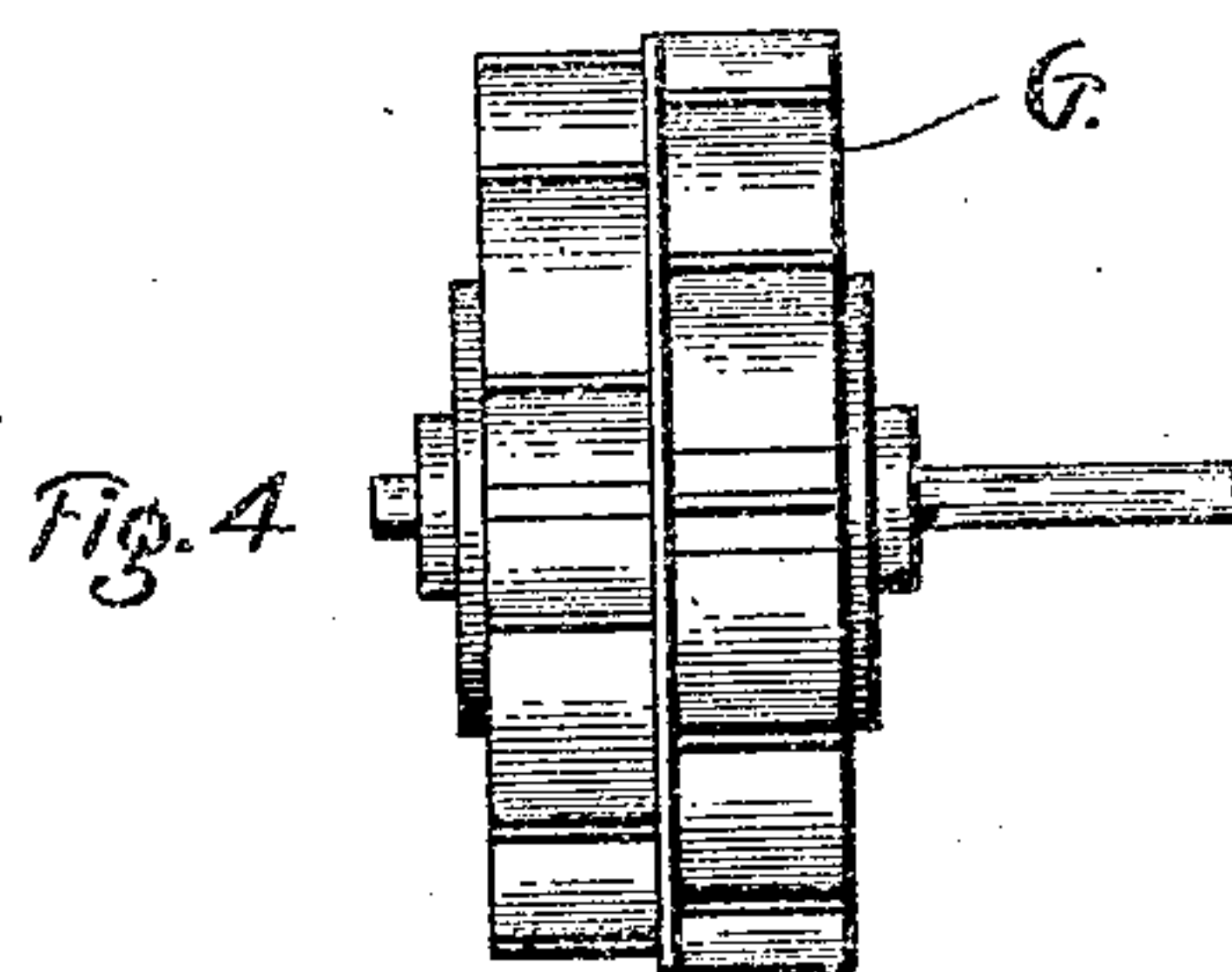
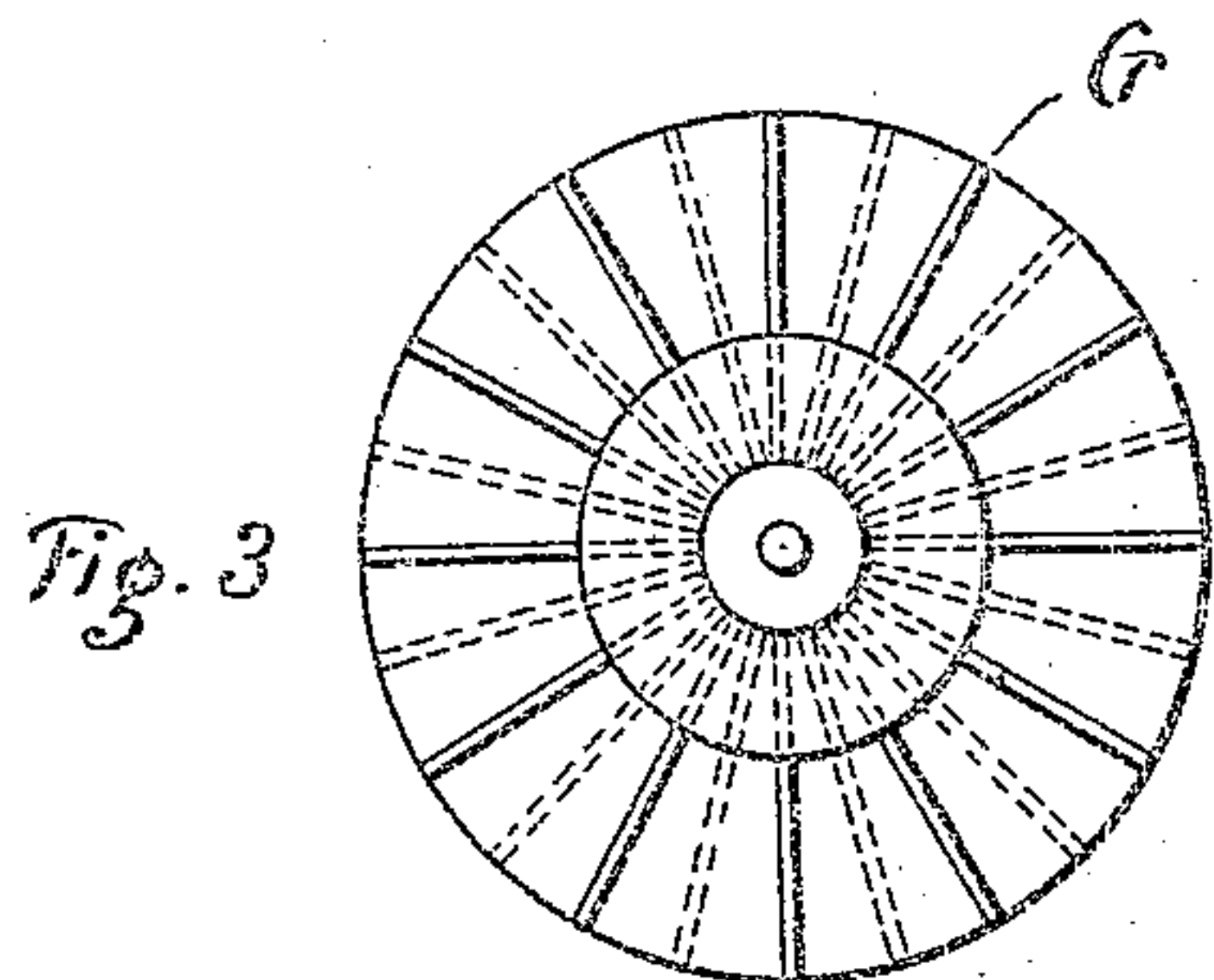
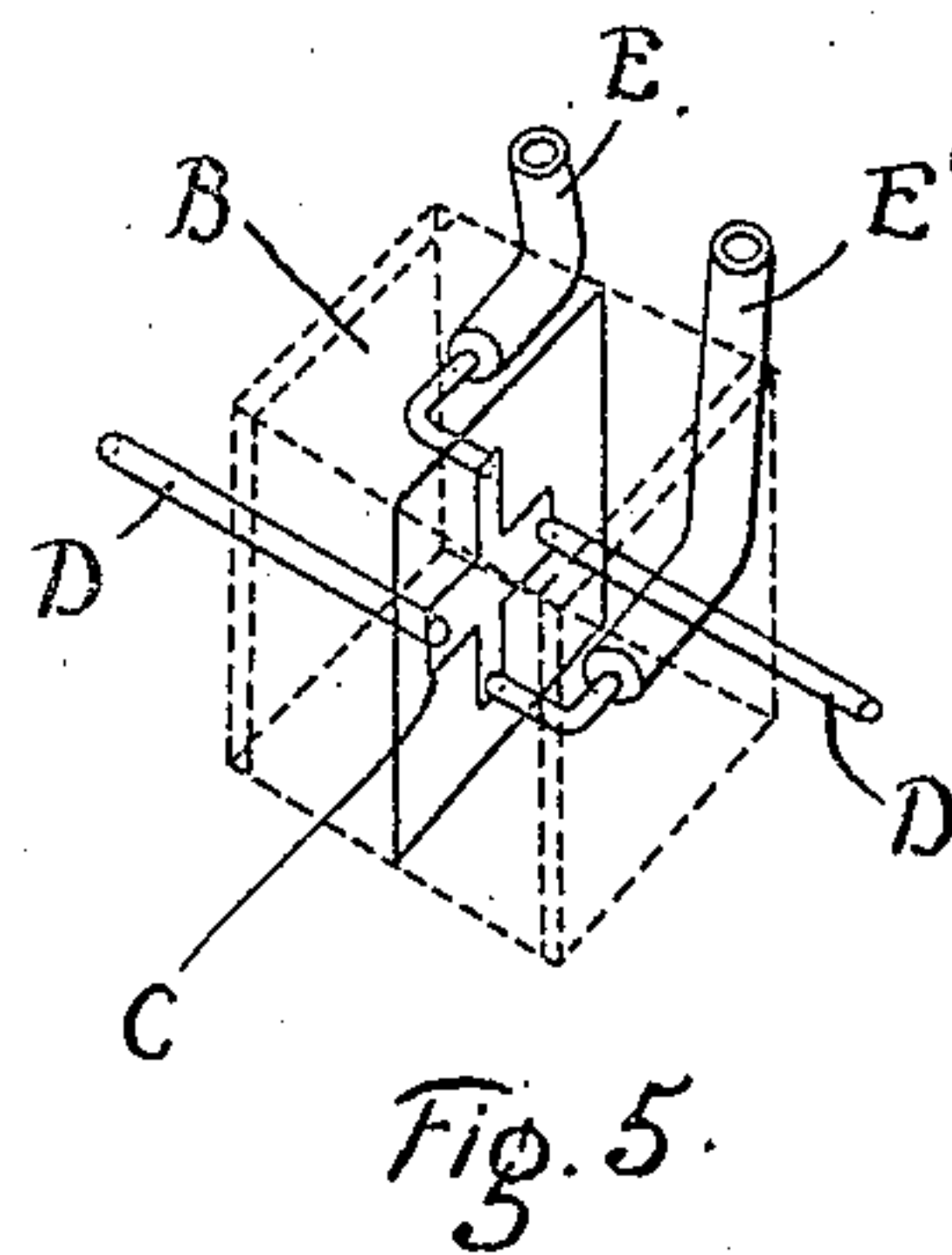
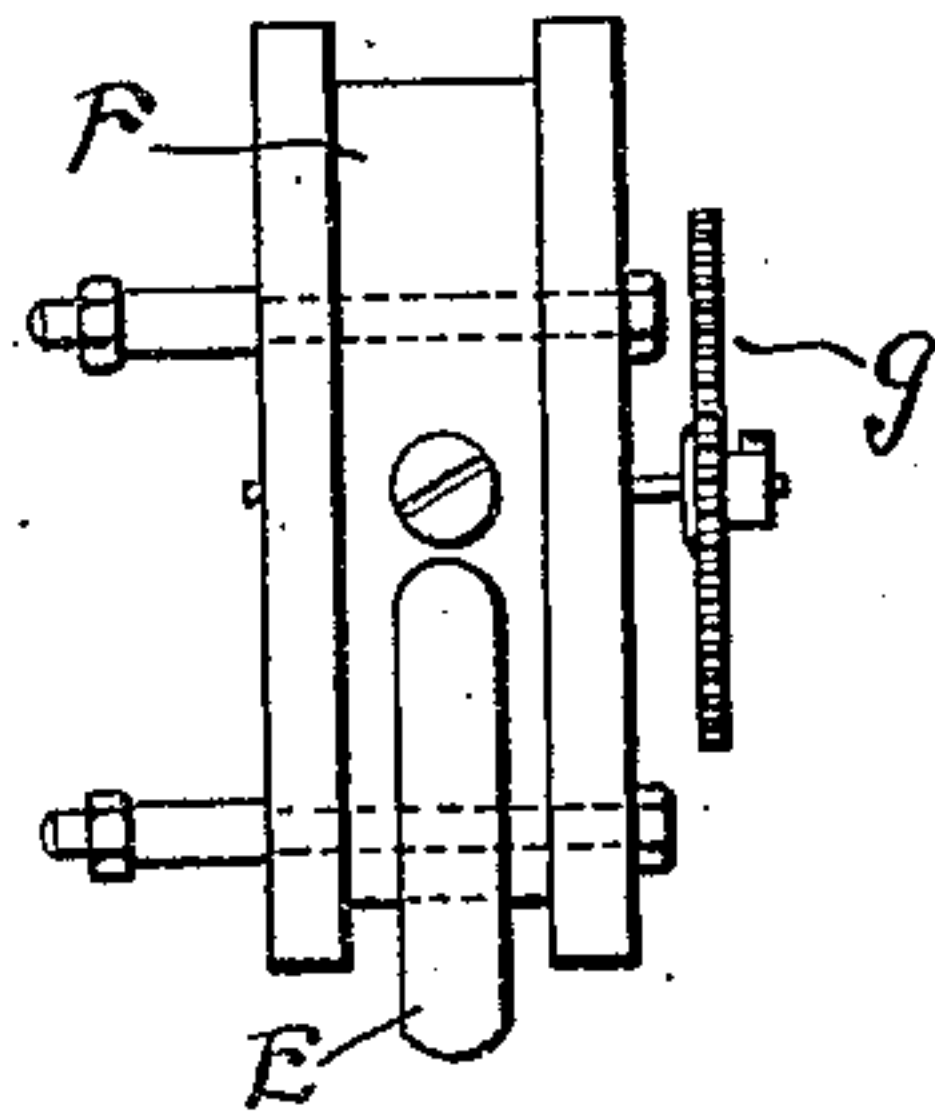
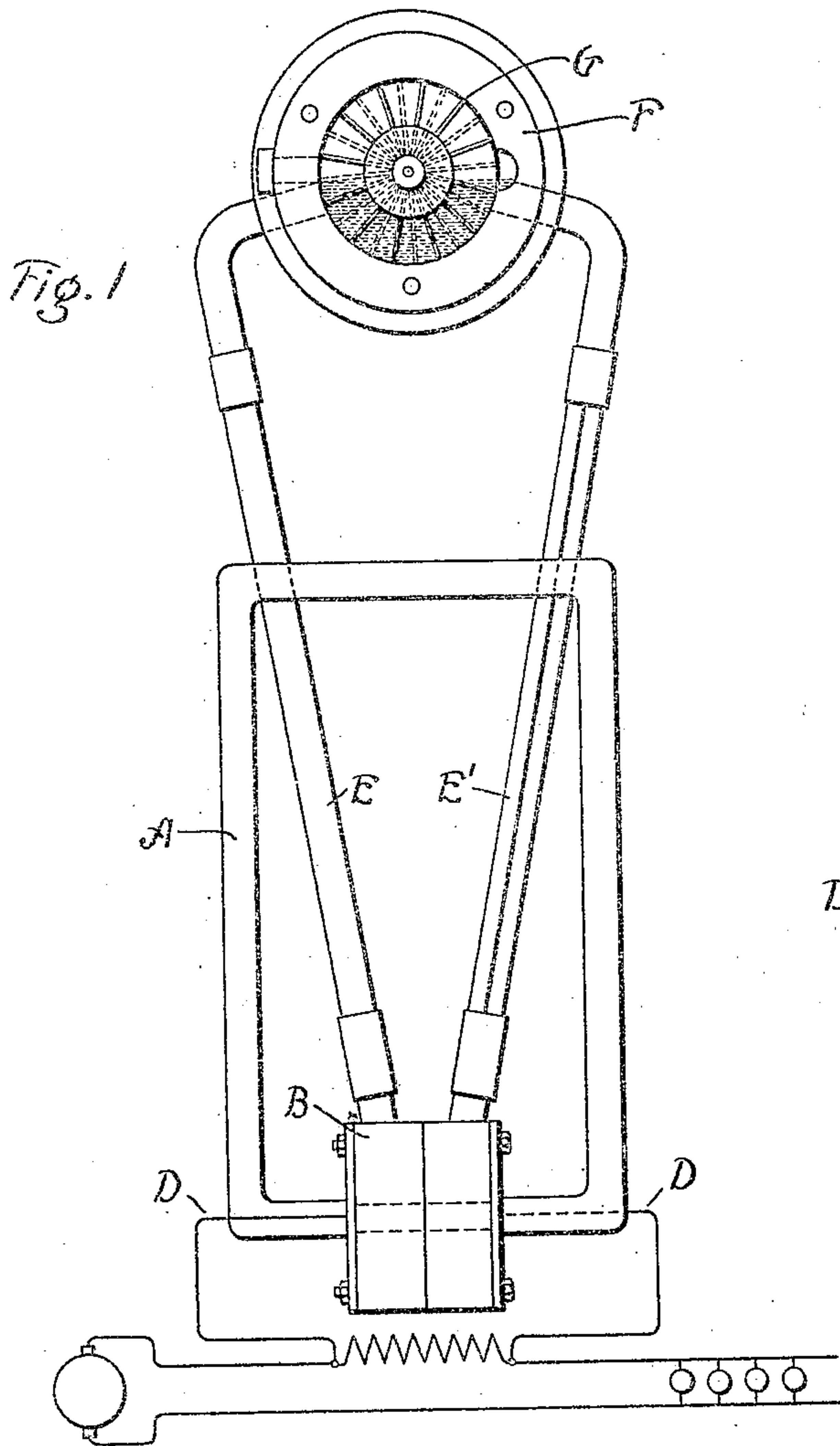


F. HOLDEN.  
MERCURY METER.

APPLICATION FILED MAR. 19, 1907.

924,989.

Patented June 15, 1909.



WITNESSES:  
Lester H. Palmer.  
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INVENTOR  
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ATTY.



# UNITED STATES PATENT OFFICE.

FRANK HOLDEN, OF LONDON, ENGLAND, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## MERCURY-METER.

No. 924,989.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed March 19, 1907. Serial No. 363,288.

*To all whom it may concern:*

Be it known that I, FRANK HOLDEN, a citizen of the United States, residing at London, England, have invented certain new and useful Improvements in Mercury-Meters, of which the following is a specification.

My invention relates to mercury meters, and consists in an improvement in the meter described in my former application, Serial No. 297,600, filed January 24, 1906. In that application I described a mercury meter comprising a field, a mercury chamber within the field, current-leads to the mercury in the chamber, a closed duct with its ends opening into the chamber having a portion of capillary cross-section, so as to produce proper retardation of mercury-flow, and a registering device included in the duct. One form of registering device disclosed consisted of a paddle-wheel rotated by the flow of the mercury and geared to the recording mechanism.

My present invention consists in an improvement in the construction of the paddle-wheel.

When a paddle-wheel of the usual construction is employed, the inlet from the duct to the wheel varies in its effective size with variation in position of the wheel. When a paddle is directly opposite the inlet, the area of the inlet is reduced, and owing to surface tension of the mercury, the mercury flow is retarded. This produces a slight error in the registration on light loads. By my present invention this source of error on light loads is avoided by so arranging the paddle-wheel as to present a free opening from the duct into the wheel in any position of the paddles relative to the inlet to the wheel. More specifically stated, I arrange the wheel with two sets of paddles separated by a partition, and staggered with relation to each other, so that when a paddle of one set is opposite the inlet, a space between adjacent paddles of the other set is opposite the inlet, so that a free opening into the wheel is provided in any position of the wheel.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows a front elevation of a mercury meter arranged in accordance with my invention; Fig. 2 shows a side elevation of the paddle-wheel box; Figs. 3 and 4 show enlarged end and side views of the paddle-

wheel; and Fig. 5 shows a view in perspective of the mercury chamber; the inclosing portion being shown in dotted lines.

In the drawings, A represents the field magnet, which, for a Coulomb meter, may be a permanent magnet, as indicated, and for a wattmeter would be provided with a potential winding.

B represents a casing formed of insulating blocks, between which is a thin cruciform chamber C, shown in Fig. 5. The poles of magnet A extend through the walls of chamber B to opposite sides of chamber C as shown in Fig. 1 in dotted lines. D D represent the current-leads to the mercury in this space.

E E' represent tubes with their ends opening into the mercury chamber C, and forming, with the paddle-wheel casing F, a closed duct for the mercury. One of the tubes E' has a portion of capillary cross-section, as shown in Fig. 1, in order to produce the proper retardation of mercury-flow. The paddle-wheel G is mounted in the casing F. The shaft of the wheel projects through the casing, and carries a gear g, by means of which it is connected to any suitable form of recording mechanism.

The instrument, as thus far described, is the same as that disclosed in my former application, above referred to, but the paddle-wheel, instead of being constructed of a single set of paddles, is, in accordance with my present invention, arranged as shown in Figs. 3 and 4. As shown in these figures, the wheel comprises two sets of paddles separated by a partition, the paddles of the two sets being staggered with regard to each other. Consequently, when a paddle of either set is opposite the inlet to the wheel, a space between paddles of the other set is opposite the inlet, so that a free opening into the wheel is provided in any position of the wheel. The paddles and partition fit the interior of casing F closely enough to prevent leakage of mercury past them but loosely enough to permit free rotation of the wheel.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. The combination in a mercury meter, of a magnetic field, a mercury chamber in said field, current leads to the mercury in said chamber, a closed duct having its ends opening into said chamber, and a paddle-wheel included in said duct having its paddles arranged in a plurality of sets separated by a



partition at right-angles to the axis, the paddles in said sets being relatively staggered.

2. The combination in a mercury meter, of a magnetic field, a mercury chamber in said field, current leads to the mercury in said chamber, a closed duct having its ends opening into said chamber, and a paddle-wheel included in said duct having its paddles arranged with the space between paddles at one part of the wheel in line with a paddle on another part of the wheel, and a partition at right-angles to the axis separating the parts of the wheel.

3. The combination in a mercury meter, of a magnetic field, a mercury chamber in said field, current leads to the mercury in said chamber, a closed duct having its ends opening into said chamber, and a paddle-wheel included in said duct having a plurality of sets of radial paddles separated by partitions at right-angles to the axis of the wheel, the space between the paddles on one side of the partitions being in line with a paddle on the other side of the partitions.

4. The combination in a mercury meter, of

a magnetic field, a mercury chamber in said field, current leads to the mercury in said chamber, a closed duct having its ends opening into said chamber, and a paddle-wheel included in said duct having radial paddles arranged in two sets separated by a partition at right-angles to the axis of the wheel, the space between the paddles in one set being in line with a paddle of the other set.

5. The combination in a mercury meter, of a magnetic field, a mercury chamber in said field, current leads to the mercury in said chamber, a closed duct having its ends opening into said chamber, and a paddle-wheel included in said duct having radial paddles arranged in two sets separated by a partition at right-angles to the axis, the paddles in one set being in line with the bisectors of the angles between the paddles in the other set.

In witness whereof, I have hereunto set my hand this sixth day of March, 1907.

FRANK HOLDEN.

Witnesses:

H. D. JAMESON,

A. NUTTING.