

(No Model.)

2 Sheets—Sheet 1.

V. BÉLANGER.
MECHANICAL MOVEMENT.

No. 606,158.

Patented June 21, 1898.

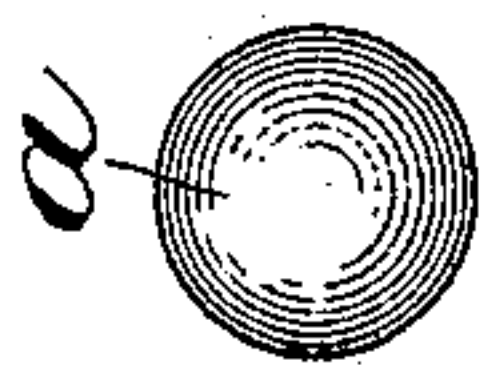
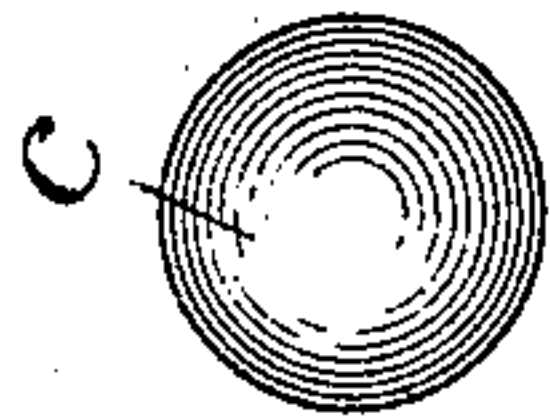
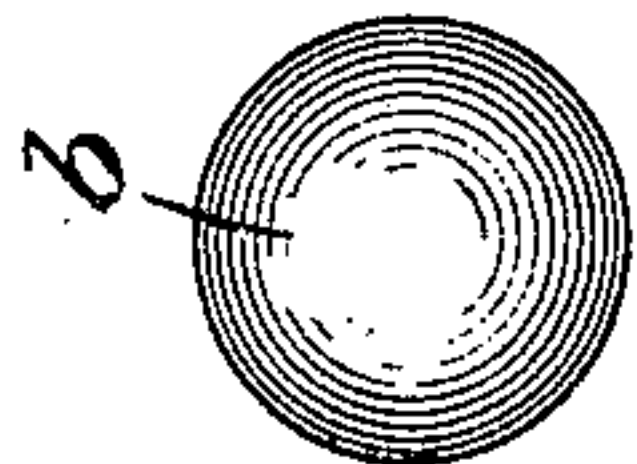
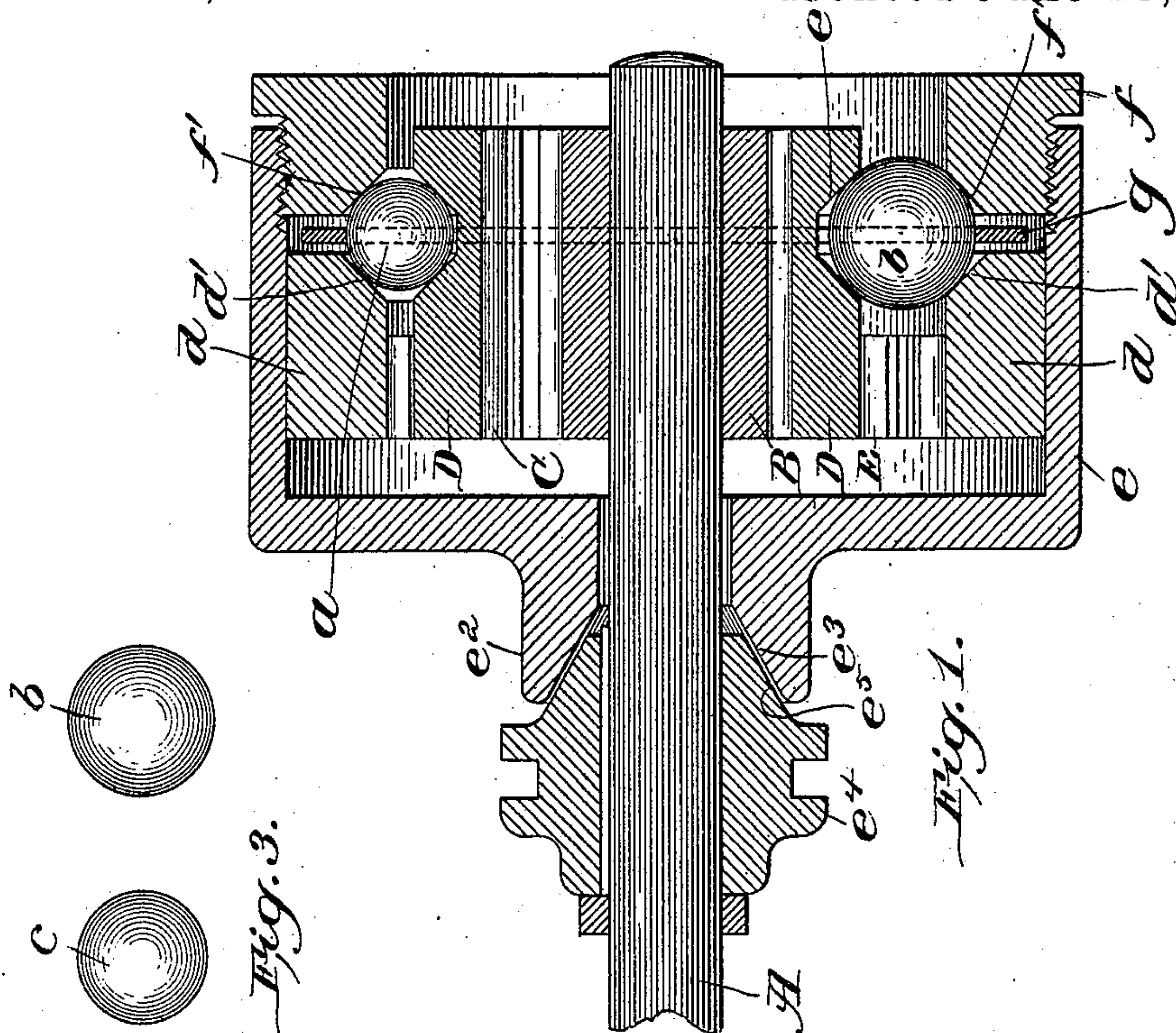
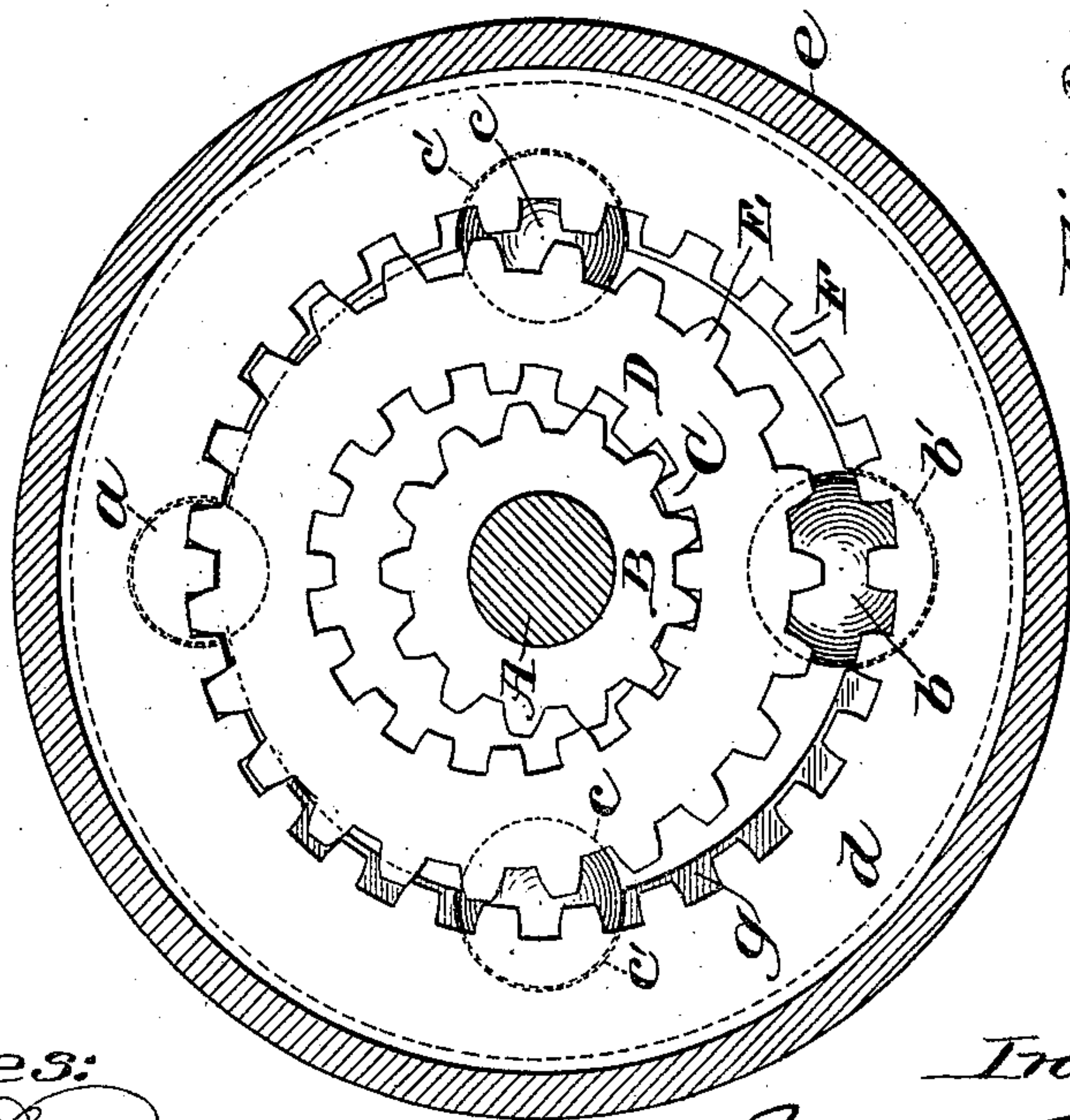


Fig. 3.



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C. C. Cate

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Victor Belanger
By *Arthur H. Randall*, Att'y.

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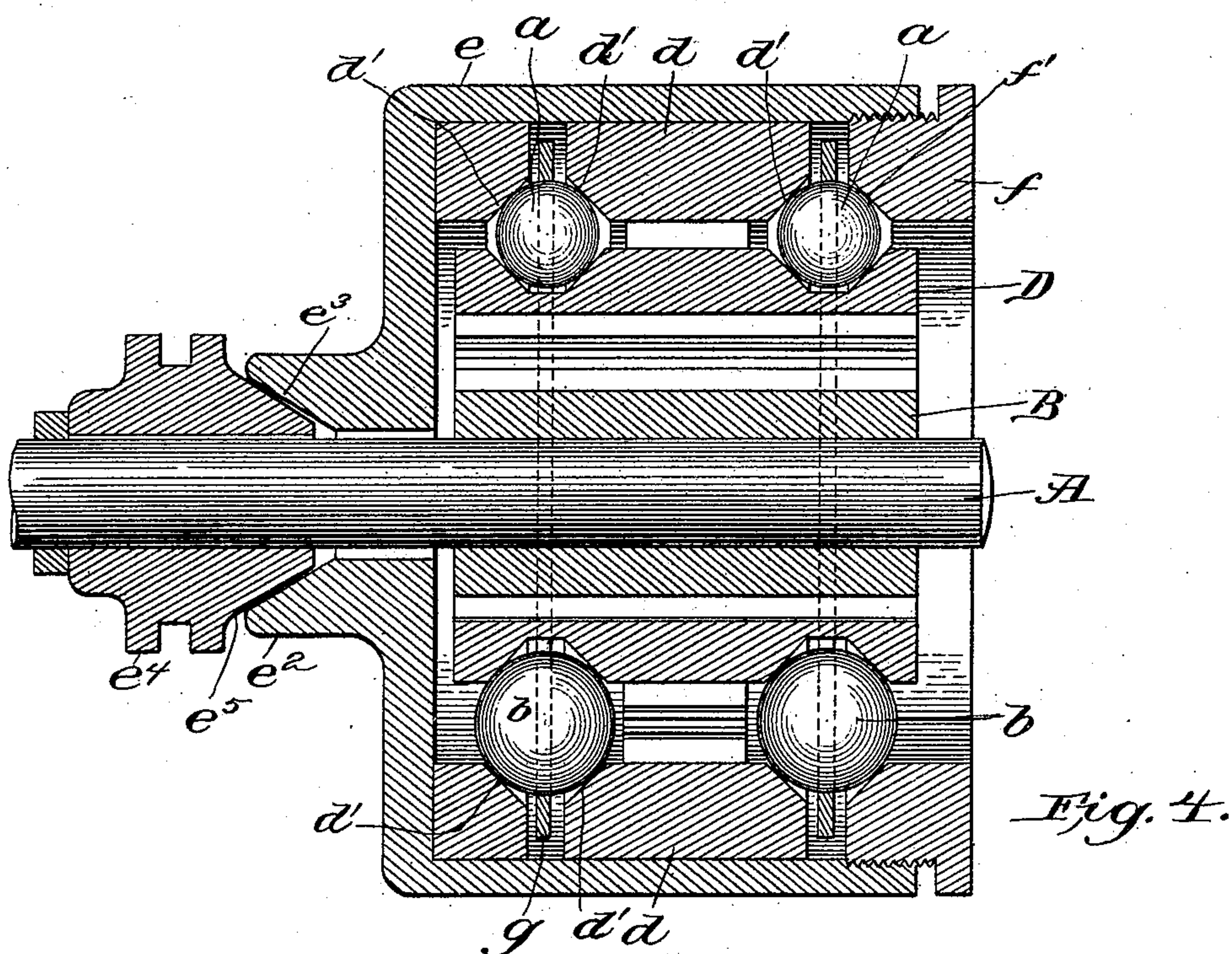
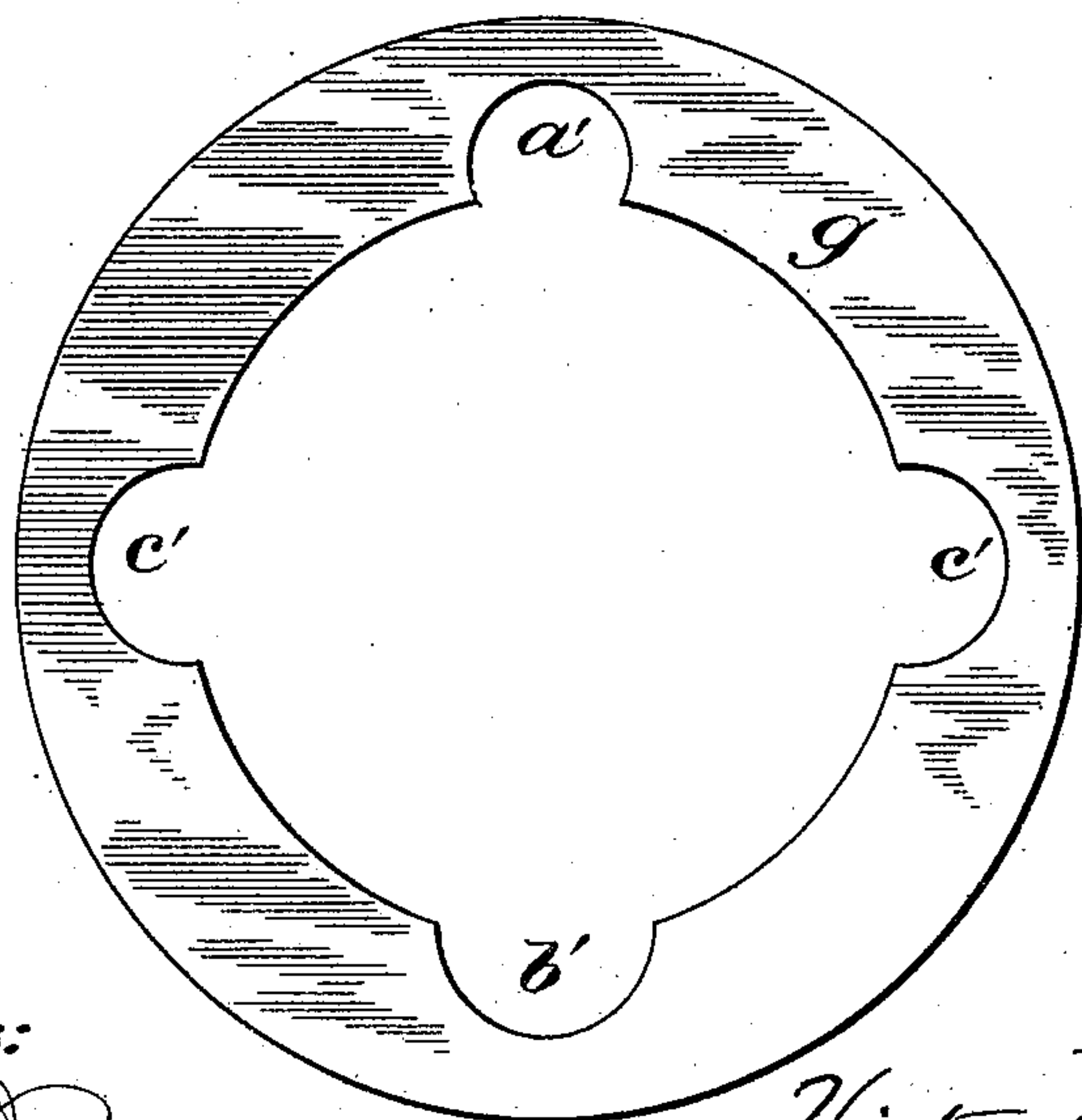


Fig. 5.



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Inventor:

Victor Bélangier

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Arthur W. Fossey, Att'y.

UNITED STATES PATENT OFFICE.

VICTOR BÉLANGER, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO MRS. B. F. WEED, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 606,153, dated June 21, 1898.

Application filed December 28, 1896. Serial No. 617,302. (No model.)

To all whom it may concern:

Be it known that I, VICTOR BÉLANGER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and
5 useful Improvements in Mechanical Move-
ments, of which the following is a description sufficiently full, clear, and exact to enable those skilled in the art to which it appertains or with which it is most nearly connected to
10 make and use the same.

The object of the invention is to provide a change-gearing or arrangement of gearing capable of being so operated or manipulated that the initial power employed to manipu-
15 late the same may be multiplied at the expense of but slight loss of speed and in which is embodied means for rendering the gearing inoperative, or, in other words, means whereby the power and speed as applied may be
20 utilized without change.

To these ends the invention consists in certain new and improved features of construction and arrangement of parts, all as is hereinafter more fully set forth and described in
25 the following description, the novel features of which are particularly set forth and ascertained in the claims at the close hereof.

Of the drawings, Figure 1 is a central vertical section of my improved change-gearing.
30 Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 shows view of the balls detached. Fig. 4 is a modification. Fig. 5 is a detail.

Referring to the drawings, A represents the prime power-shaft, which may be driven from
35 any suitable power source and by any means from which it may be desired to transmit power to other mechanisms or devices. Upon the shaft A is fixed a pinion B, which meshes with the internal gear C, formed upon the in-
40 ner side of a sleeve D, which surrounds the pinion B. The sleeve D has formed thereon the exterior gear-teeth E, which mesh with the internal gear F, formed upon the inner side of a ring *d*, which is secured within a
45 drum *e* by being forced therein or otherwise.

The diameter of the pitch-circles of the pinion B and internal gear C are preferably of the relative sizes shown. The pinion B is smaller in diameter than the gear C, so that
50 the two engage practically at one point in

their circumference, and the diameters of the pitch-circles of the gear E and F are preferably of the relative sizes shown, and they in turn engage practically at one point in their circumference.

The sleeve D has formed therein the groove *e'* for the reception of the balls *a*, *b*, *b*, and *c*. A ring *f*, externally threaded and applied to the interiorly-threaded mouth or opening of the drum *e*, is formed with a cut-away or beveled face *f'*, which, together with the beveled face *d'* of the ring *d*, also serves as a bearing for the balls *a*, *b*, *b*, and *c*. The construction and arrangement of the ring *f* permits of adjustment of the latter as the bearing for the
60 balls is worn away. Between the rings *d* and *f* and encircling the sleeve D, I provide a separator *g*, (shown in detail in Fig. 5,) which is notched at *a'*, *b'*, *b'*, and *c'* for the reception of the graded balls *a*, *b*, *b*, and *c*, respectively.
70 The object of providing or employing the separator *g* is to maintain the balls in their proper relative positions as they travel around the groove or bearing within which they lie, they being moved or caused to travel around
75 the sleeve D within said groove or bearing through the movement of rotation imparted to them by reason of their contact with said sleeve, which is itself revolved by the engagement of the gear B therewith.
80

The maintenance of the balls in their proper relative positions causes the sleeve D to be kept in engagement with the pinion B and gear F by reason of its eccentric position with relation to both said gears. Thus during the
85 operation of the device not only is the speed and power of the rotation of the sleeve D upon its own axis communicated to the gear F, but additional speed is imparted to the gear F through rotation of the said sleeve D
90 around the axis of the shaft A caused by the travel of the balls around their groove or bearing.

The drum *e* has formed thereon the boss *e*², which has formed therein the cone-shaped
95 socket *e*³, which constitutes one member of a clutch mechanism. The other (shown at *e*⁴) is formed with a cone *e*⁵, fitting in the socket *e*³. The member *e*⁴ is splined to the shaft A and may by any suitable means be moved into
100

engagement with the socket e^3 . By this means the drum may be locked to the shaft A and my change-gearing thrown out of operation and the initial power utilized as applied by
5 transmission through the medium of a belt, chain, or gearing engaging the drum e or otherwise.

In Fig. 3 are shown in detail the relative sizes of the balls a , b , and c . The said balls
10 being arranged around the sleeve D equidistant and within the groove or bearing provided for their reception, with the balls a and c diametrically opposite each other, the sleeve D is held in the desired eccentric position
15 with relation to the pinion B and gear F.

In Fig. 4 I have shown a modification in which I employ two series of balls a , b , b , and c , by which construction the liability of binding or unequal wear of the parts may be ob-
20 viated.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it
25 may be made or all of the modes of its use, it is declared that what is claimed is—

1. In combination, a driving-pinion, an internally and externally toothed eccentric sleeve meshing with said pinion, a driven in-
30 ternally-toothed ring concentric with the pinion and meshing with the said sleeve, and graded balls for maintaining said sleeve in its eccentric relation to the said pinion and ring.

2. In combination a driving-pinion, a concentric driven internally-toothed ring, an intermediate internally and externally toothed eccentric sleeve, graded balls for maintaining the eccentric relation of the said sleeve, and
35 a drum for supporting the graded balls.

40 3. Gearing comprising in its construction

a pinion; driving means for said pinion; a sleeve encircling said pinion formed with an internal gear, and having gear-teeth formed upon the exterior thereof arranged to engage
45 with the teeth of an internal gear; graded balls interposed between the sleeve and a ring; means for maintaining the balls in their proper relative positions, and a ring concentric with the pinion and encircling the sleeve formed with internal gear-teeth, substantially
50 as described.

4. Gearing comprising in its construction a pinion; a driven internally-toothed ring; driving means for said pinion; a sleeve encircling said pinion formed with an internal
55 gear, and having gear-teeth formed upon the exterior thereof arranged to engage with the teeth of an internally-toothed ring; graded balls interposed between the sleeve and a ring; a separator formed with notches for the
60 reception of the balls, each notch of a size to accommodate its respective ball; and a ring concentric with the pinion and encircling the sleeve formed with internal gear-teeth, substantially as described.
65

5. Gearing comprising, a driving-pinion, a driven internally-toothed ring, an eccentric internally and externally toothed sleeve meshing with said pinion and said ring, a rotary drum, graded balls, between said drum
70 and said sleeve, and a separator formed with notches to receive the balls.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 14th day of
November, A. D. 1896.

VICTOR BÉLANGER.

Witnesses:

ARTHUR W. CROSSLEY,
ARTHUR F. RANDALL.