

A. WAHLE.
MECHANICAL MOVEMENT.
APPLICATION FILED APR. 1, 1904.

2 SHEETS-SHEET 1.

Fig. 1.

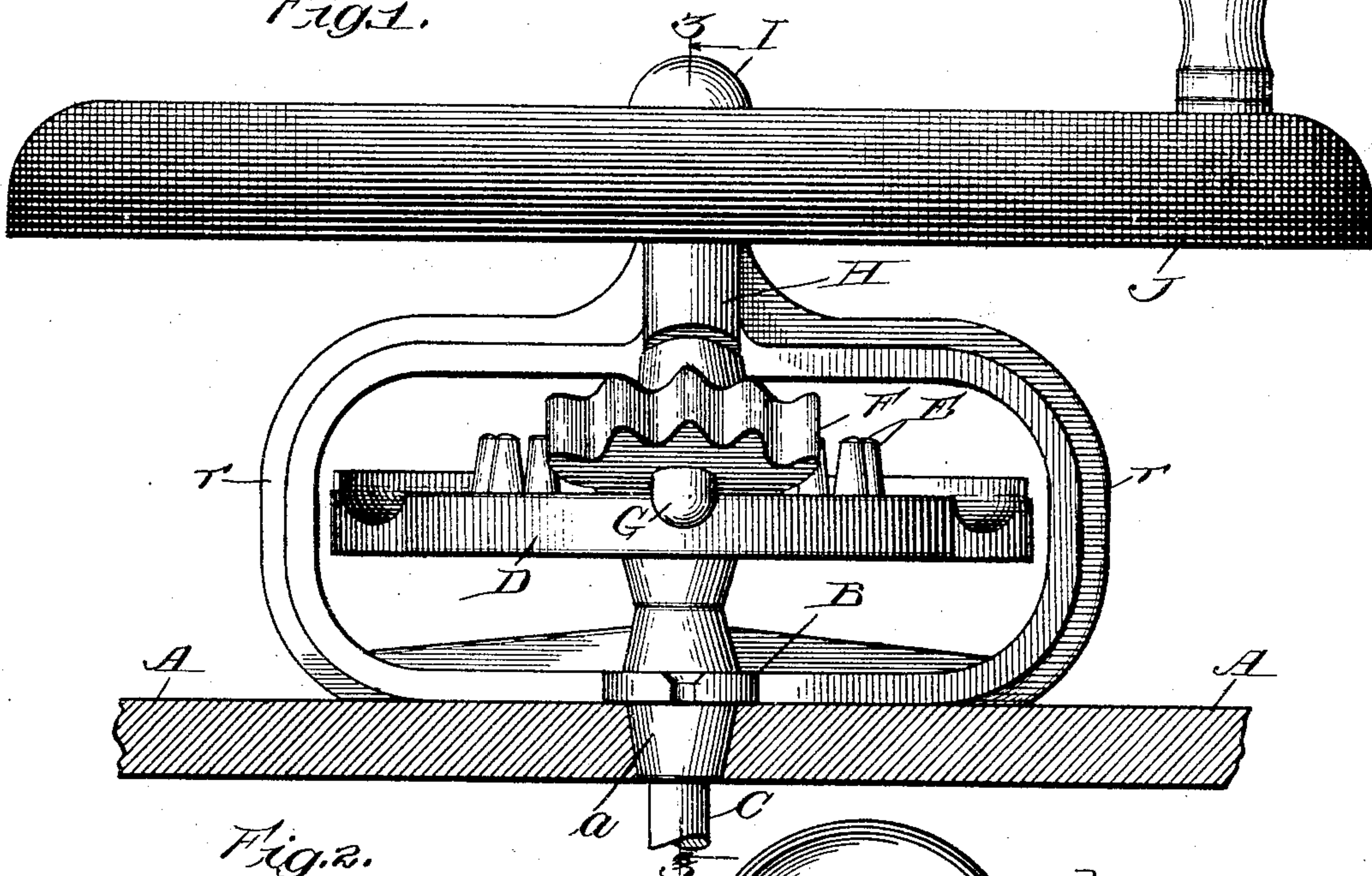


Fig. 2.

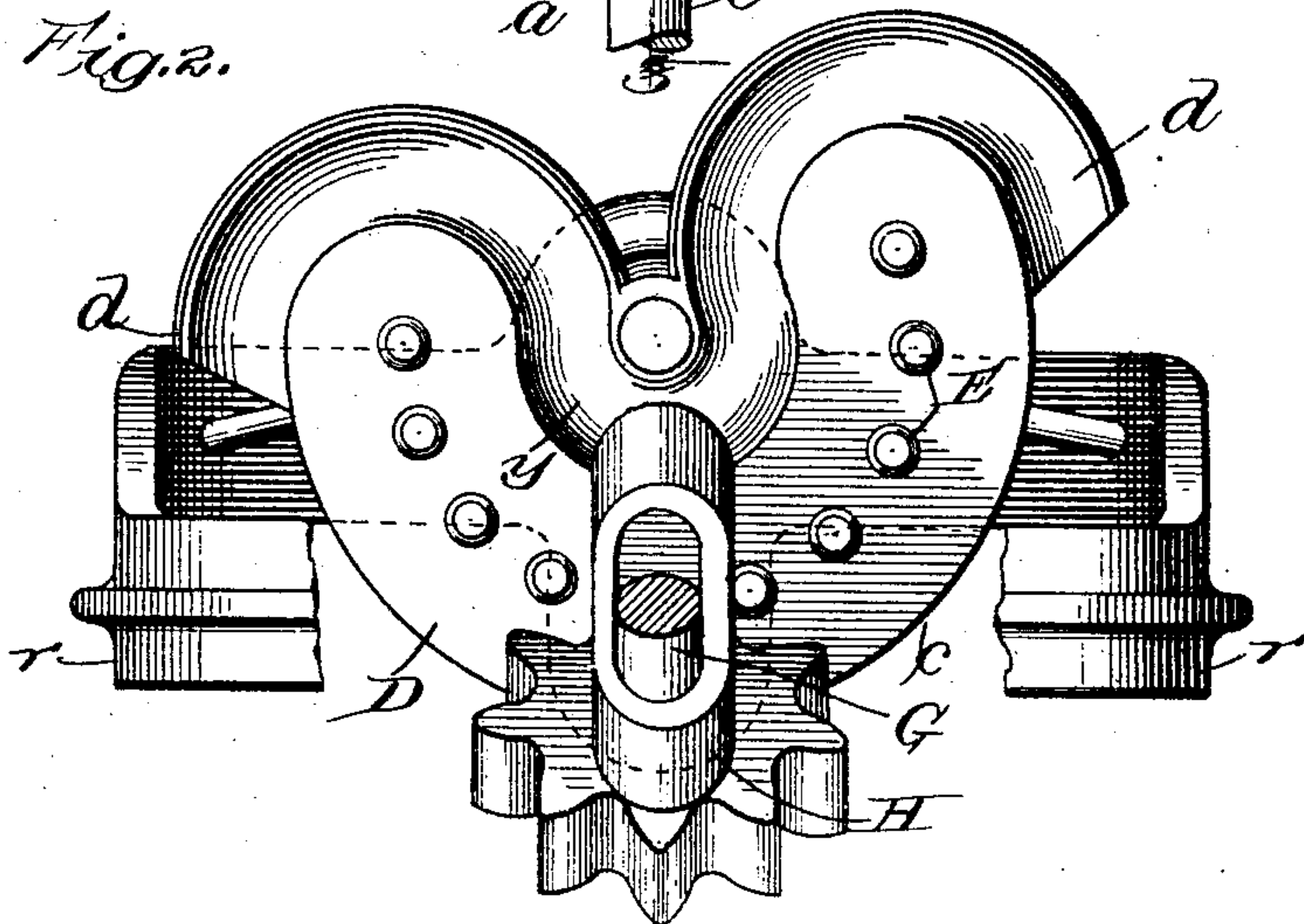
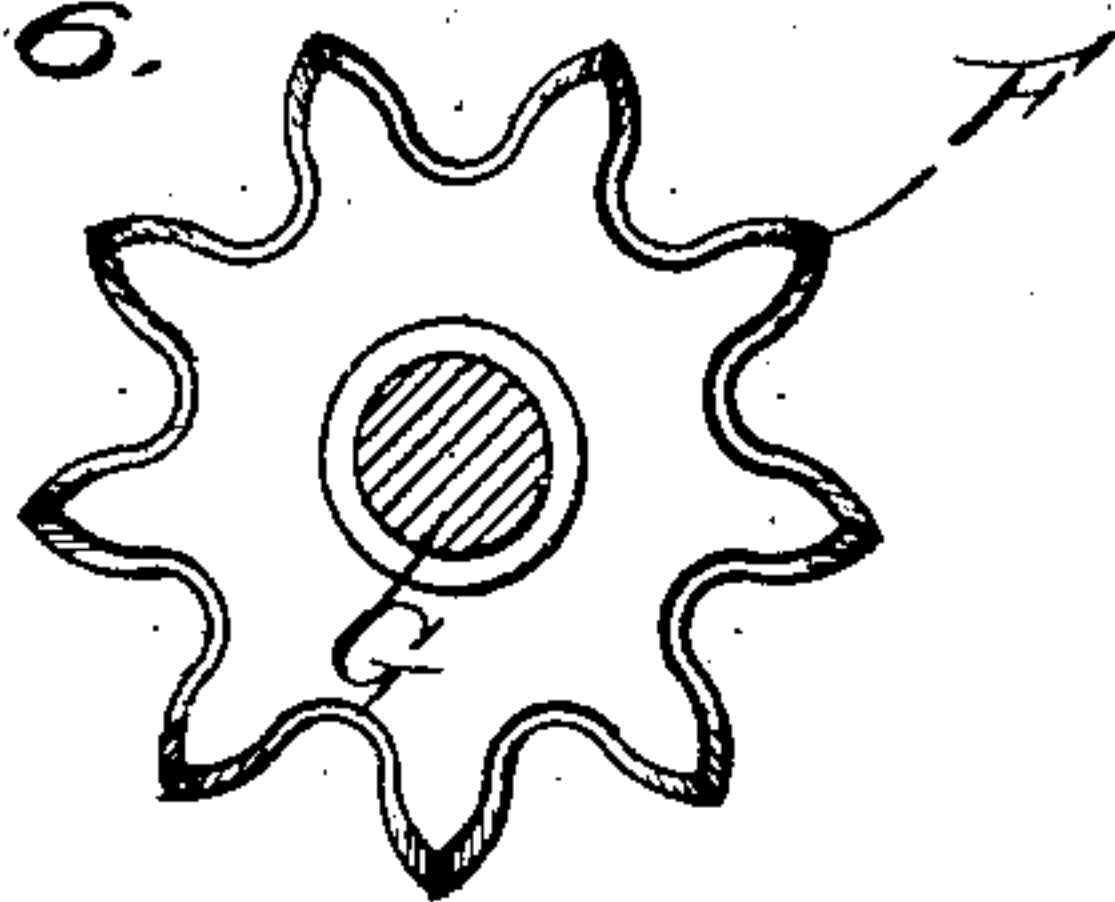


Fig. 6.



Witnesses:
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E. K. Lundy.

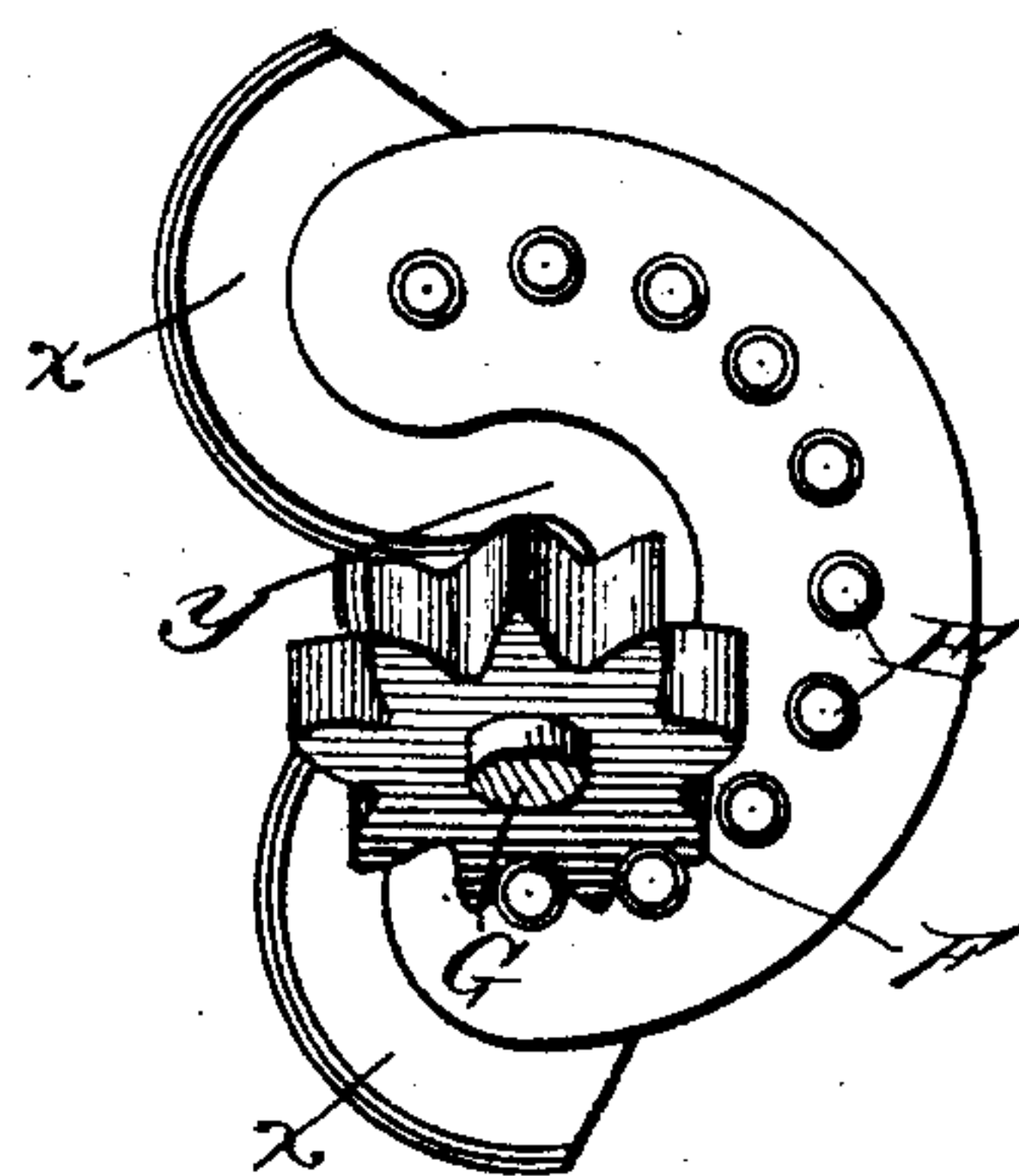
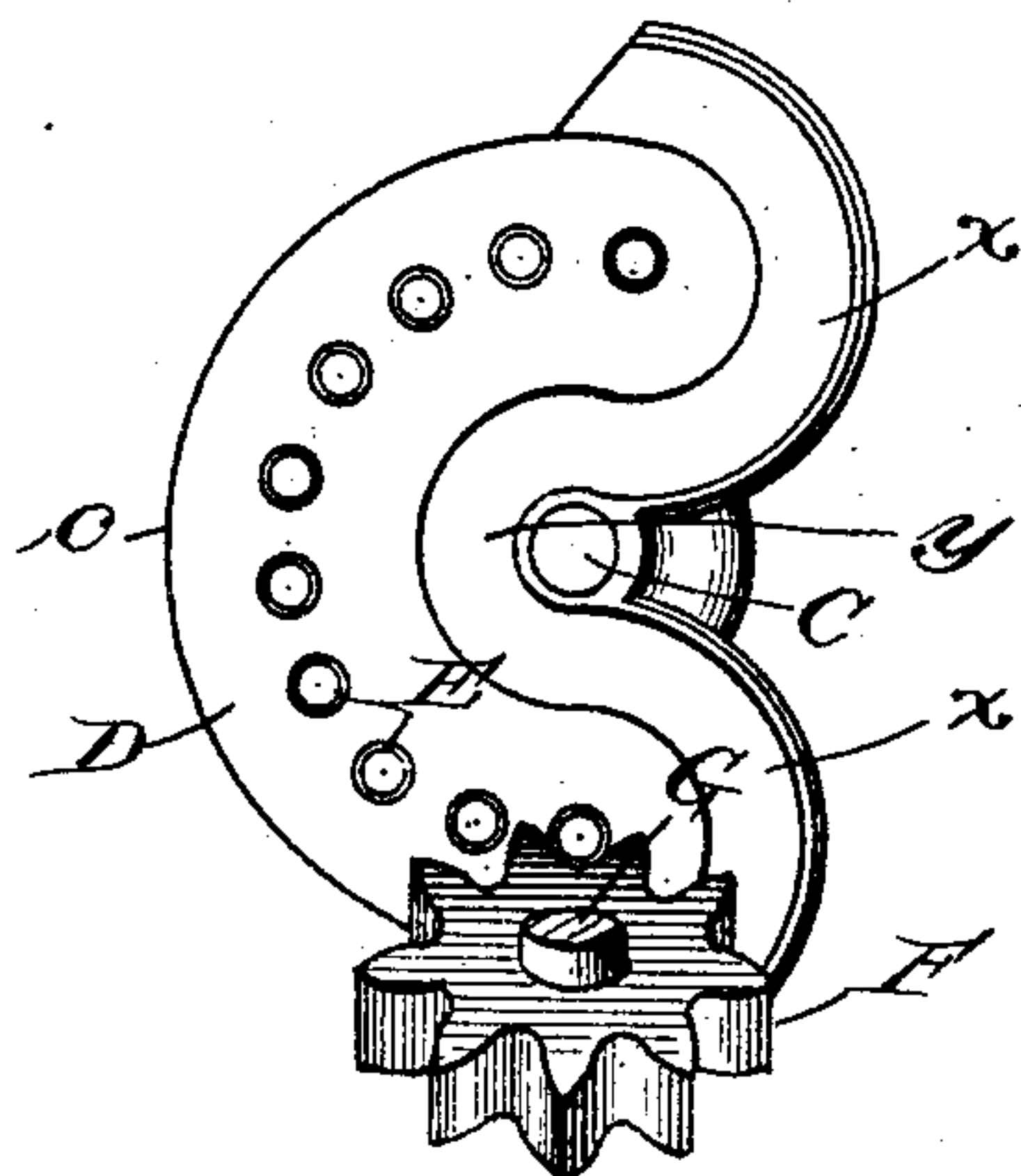
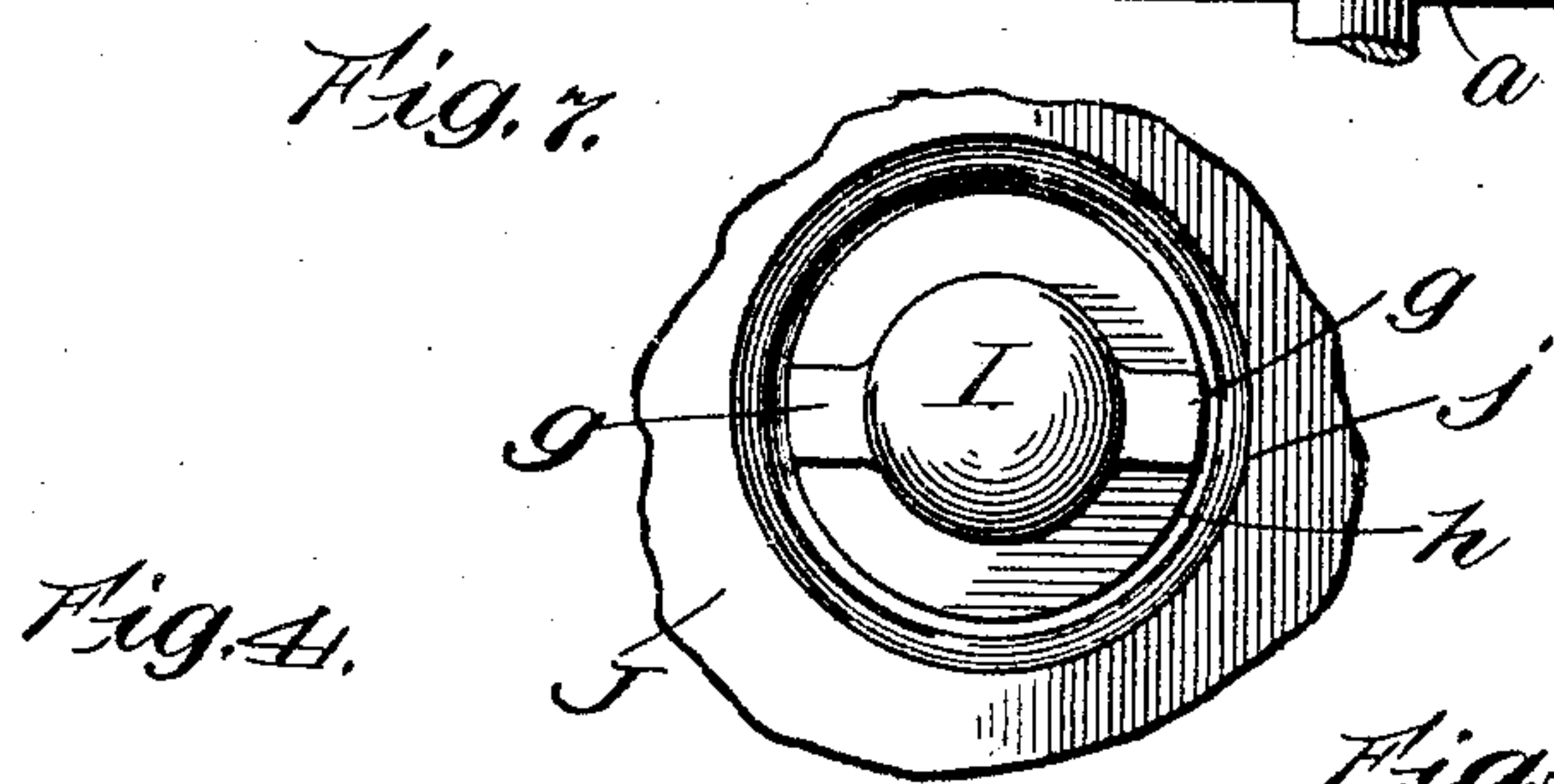
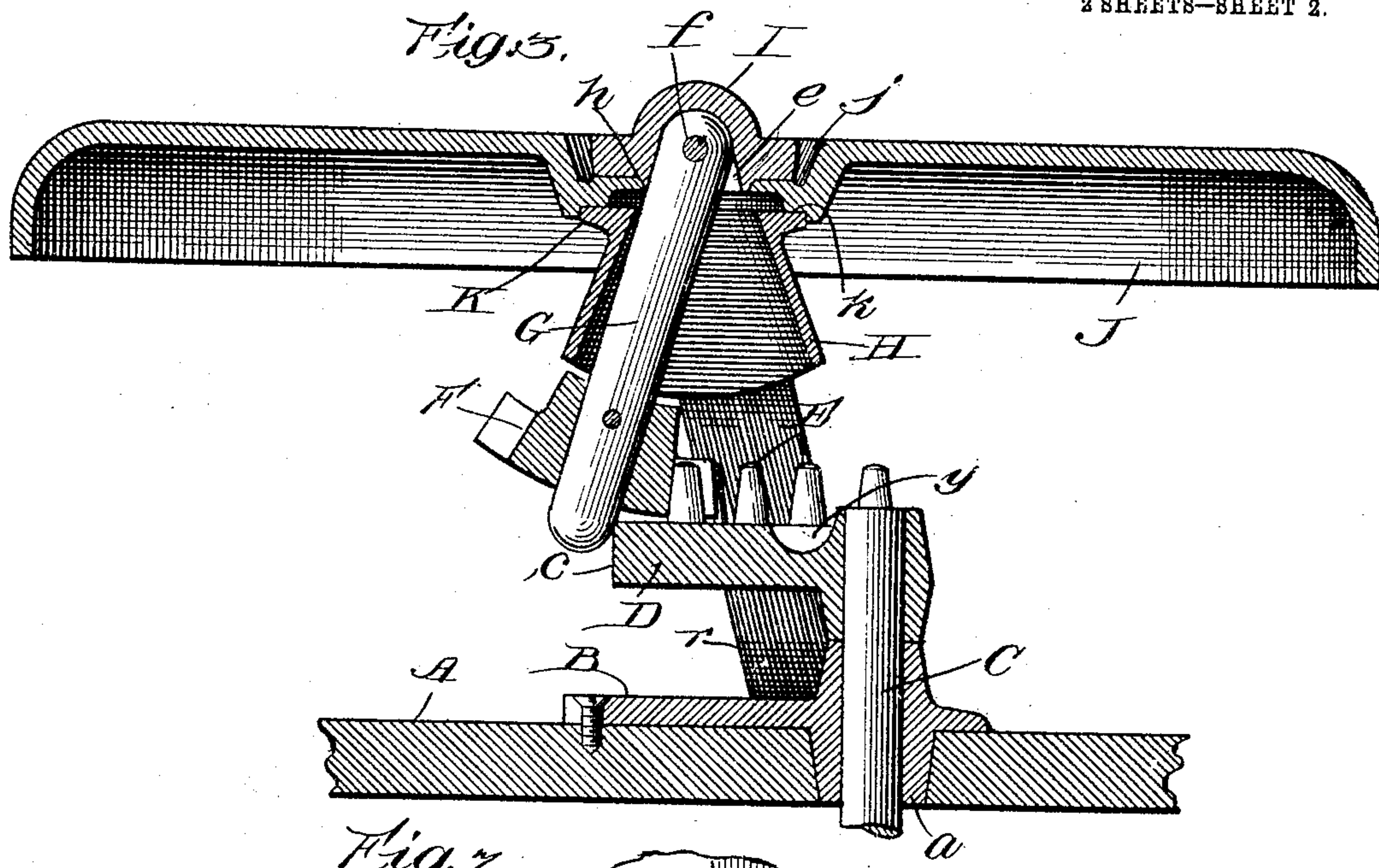
Inventor:
Adolph Wahle.
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No. 779,451.

PATENTED JAN. 10, 1905.

A. WAHLE.
MECHANICAL MOVEMENT.
APPLICATION FILED APR. 1, 1904.

2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ADOLPH WAHLE, OF DAVENPORT, IOWA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 779,451, dated January 10, 1905.

Application filed April 1, 1904. Serial No. 201,138.

To all whom it may concern:

Be it known that I, ADOLPH WAHLE, a citizen of the United States, and a resident of Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a full, clear, and exact description.

My invention can be applied to various machines, but is more particularly designed to be used in connection with washing-machines, churns, &c. Its object is to provide a simple and effective means for converting a continuous rotary motion into a rotary reciprocal movement which is so constructed that when the point is reached by the actuating-gear where the reversing movement takes place it does not suddenly remove the resistance to said gear and create a jerky movement in the machine, but accomplishes such reversion gradually and smoothly. This I accomplish by the means hereinafter fully described and as particularly described, and as particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my invention. Fig. 2 is a plan view of the same with the fly-wheel and a portion of the supporting-frame thereof broken away. Fig. 3 is a transverse vertical section taken on dotted line 3 3, Fig. 1, looking in the direction indicated by the arrows. Figs. 4 and 5 are diagrammatical views illustrating different positions of the drive-gear and driven gear when at different points in their cycle of movement. Fig. 6 is a detail view of the drive-gear. Fig. 7 is a detail view showing a plan of the knuckle of the universal joint in the center of the fly-wheel.

In the drawings, A represents a suitable support for my invention, such as the cover of the tub of a washing-machine or churn, and B represents the screw-plate of the supporting-frame of said mechanism, which has a centrally-located bearing-boss *a*, that penetrates down through said cover A, that has journaled therein a vertically-disposed rotary reciprocal shaft C. Immediately above bearing-boss *a* shaft C has secured thereto a plate D, which latter at a suitable distance from

its center has a concentric segmental series of upwardly-projecting studs E, whose length preferably exceeds one-half of the circle intersecting the centers of said studs. These studs are engaged first on the side thereof nearest the center of the plate D and then on the side farthest therefrom by a spur-gear F, which latter is preferably slightly beveled and is secured on the lower end of the pendulous shaft G, that is pivotally connected at a point above and in alinement with the center of the stud F to means that revolve it continuously in one direction. The lower end of this shaft G extends below the spur-gear F, and by its position in the elongated bell H and its contact with the outer edge *c* of plate D, struck from the center of shaft C outside of the series of studs F, said gear F is maintained in proper engagement with the outer circumference of the series of studs E and by engagement with the grooved guideways *d*, which the lower end of shaft G enters as it approaches the ends of the series of studs E, is maintained in engagement with the inner circumference thereof. The end portions *x* of this guideway are made by making semicircular grooves in said plate, that are struck from the center of the end studs of the series E, and these semicircular end portions are connected by a reverse segmental groove *y*, struck from the center of said shaft C. When the lower end of shaft G enters the guideways *d*, the spur-gear F is thereby held in engagement with the adjacent end stud of the series E and its movement controlled so that it swings from its overhead pivotal point an equal distance in the oppositedirection toward shaft C, in which position its engagement with the side of said studs E nearest shaft C reverses the motion of plate D and the shaft C, to the upper end of which said plate is secured. When the spur-gear F while in engagement with the inner circumference of studs E reaches and engages either end stud of said series E, the end of shaft G in the guideway will be moved by reason of its engagement with the guideway *d* until its axis is outside of the circle intersecting the centers of said studs, whereupon said spur-wheel will engage the outer circum-

ference of said series of studs and reverse motion of the plate D and cause it and shaft C to move in an opposite direction.

The supporting-frame of the machine above
 5 the screw-plate B describes a flattened inclined ellipse and consists of two branches *r r*, that extend in opposite directions from the said screw-plate up around the periphery of plate D to points on either side of an imaginary
 10 vertical line intersecting the pivotal center of the upper end of shaft G, where they merge into a flattened bell H. The interior chamber of the bell is elongated in a vertical plane at right angles to that intersecting the said
 15 branches *r* and is of a width corresponding to about the diameter of the shaft G. The shaft G extends up through the open upper end of said bell, and its upper rounded end fits snugly into the socket *e* in the under side of knuckle
 20 I in the manner of a ball-and-socket joint and is pivoted thereto by a transverse pin *f*. The mouth of this socket *e* is widened slightly and is of such dimensions as to restrict the swinging movement of shaft G to that required to
 25 enable the spur-gear on the lower end of the same to engage first the inner and then the outer circumference of the series of studs E. The exterior of this knuckle is spherical in so far as the making of the socket *e* in its un-
 30 der side will permit, and it is provided at points diametrically opposite each other with trunnions *g g*, that are in a plane at right angles to the vertical plane intersecting the axis of the pin *f*. These trunnions are journaled
 35 in open bearings made in the edges *h* of the the central opening in which the knuckle I is seated and journaled, which central opening is made in the depressed central portion *j* of a horizontally-disposed balance-wheel J. The
 40 under edge of the depressed central portion *j* of the fly-wheel J is rabbeted to form a seat *k* therein for the circular flange K, projecting horizontally from the upper edge of the bell H, to enter. The fly-wheel J is supported and
 45 has bearings upon the upper flanged edges of the bell and is prevented from accidental displacement therefrom by the boss of the spur-gear F coming in contact with the lower edge of the bell, which lower edge prevents the
 50 knuckle I from working out of its seat.

From the foregoing description it will be apparent that as the pendulous shaft G can only swing in a vertical plane at right angles to the vertical plane in which the upper por-
 55 tion of the branches of the supporting-frame B are in and in a plane at right angles thereto intersecting the center of shaft C the engagement of the spur-gear on the lower end of the same with the segmental series of studs
 60 E will result in the rotary reciprocal movement of the plate D and the shaft C. In this connection it is desired to call attention to the fact that the guideway at the points intersected by the circle intersecting the centers of the
 65 studs E will be deeper than at other points

along the length of the said guideway, so as to permit of the shaft G swinging toward or from shaft C while circling around the end studs of series E.

What I claim as new is—

1. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; and
 75 a continuously-revolving spur-gear engaging said studs and having a side movement to and from said shaft; and means for retaining said gear in engagement with said studs.

2. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving drive-shaft having a pen-
 85 dulous movement; a spur-gear on the swinging end of said drive-shaft engaging said studs; and means for retaining said gear in engagement therewith.

3. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suitable actuating means; a continuously-revolv-
 95 ing drive-shaft pivoted to said actuating means opposite said plate and having a pendulous movement; and a spur-gear on the swinging end of said drive-shaft constantly engaging said studs.

4. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suit-
 105 able actuating means; a continuously-revolving drive-shaft pivoted to said actuating means opposite said plate and having a pendulous movement; devices for directing the movement of said drive-shaft to and from said ro-
 110 tary reciprocating shaft; and a spur-gear on the swinging end of said drive-shaft constantly engaging said studs.

5. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suit-
 115 able acting means; a continuously-revolving drive-shaft pivoted to said actuating means op-
 120 posite said plate and having a pendulous movement; a flattened bell through which said drive-shaft extends for directing the movement thereof to and from said rotary reciprocatory
 125 shaft; and a spur-gear on the swinging end of said drive-shaft constantly engaging said studs.

6. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting
 130

from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocal shaft; a pendulous drive-shaft connected to the center of said fly-wheel by a universal joint; a spur-gear on the swinging end of said drive-shaft engaging said studs; and means for retaining said gear in engagement with said studs.

7. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said reciprocating shaft; a pendulous drive-shaft connected to the center of said fly-wheel by a universal joint; a flattened bell for directing the movement of said drive-shaft to and from said rotary reciprocating shaft; a spur-gear on the swinging end of said drive-shaft engaging said studs; and means for retaining said gear in engagement with said studs.

8. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocal shaft; a knuckle having trunnions journaled in a suitable seat in the center of said fly-wheel; a pendulous drive-shaft pivoted to said knuckle in a plane at right angles to said trunnions; a spur-gear on the swinging end of said drive-shaft; and means for retaining said gear in engagement with said studs.

9. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocal shaft; a knuckle having trunnions journaled in a suitable seat in the center of said fly-wheel; a pendulous drive-shaft pivoted to said knuckle in a plane at right angles to said trunnions; a spur-gear on the swinging end of said drive-shaft; a flattened bell for directing the movement of said drive-shaft to and from said rotary reciprocating shaft; and means for retaining said gear in engagement with said studs.

10. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving drive-shaft having a pendulous movement and having its adjacent end entering a suitable guideway in said plate; and a spur-gear on the swinging end of said drive-shaft engaging said studs

beyond which the end of said drive-shaft extends and engages said guideway.

11. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suitable actuating means; a continuously-revolving drive-shaft pivoted to said actuating means opposite said plate having a pendulous movement and having its adjacent end entering a suitable guideway in said plate; and a spur-gear on the swinging end of said drive-shaft engaging said studs beyond which the end of said drive-shaft extends and engages said guideway.

12. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suitable actuating means; a continuously-revolving drive-shaft pivoted to said actuating means opposite said plate having a pendulous movement and having its adjacent end entering a suitable guideway in said plate; devices for directing the movement of said drive-shaft to and from said rotary reciprocating shaft; and a spur-gear on the swinging end of said drive-shaft engaging said studs beyond which the end of said drive-shaft extends and engages said guideway.

13. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; suitable actuating means; a continuously-revolving drive-shaft pivoted to said actuating means opposite said plate having a pendulous movement and having its adjacent end entering a suitable guideway in said plate; a flattened bell through which said drive-shaft extends for directing the movement thereof to and from said rotary reciprocating shaft; and a spur-gear on the swinging end of said drive-shaft engaging said studs beyond which the end of said drive-shaft extends and engages said guideway.

14. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocating shaft; a pendulous drive-shaft connecting to the center of said fly-wheel by a universal joint and having its lower end entering a suitable guideway in said plate; a spur-gear on the swinging end of said drive-shaft engaging said studs beyond which the end of the drive-shaft extends and enters and engages said guideway.

15. A mechanical movement comprising a

rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocating shaft; a pendulous drive-shaft connected to the center of said fly-wheel by a universal joint and having its lower end entering a suitable guideway in said plate; a flattened bell for directing the movement of said drive-shaft to and from said rotary reciprocating shaft; a spur-gear on the swinging end of said drive-shaft engaging said studs beyond which the end of the drive-shaft extends and enters and engages said guideway.

16. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocating shaft; a knuckle having trunnions journaled in a suitable seat in the center of said fly-wheel; a pendulous drive-shaft pivoted to said knuckle in a plane at right angles to said trunnions and having its lower end entering a suitable guideway in said plate; and

a spur-gear on the swinging end of said drive-shaft beyond which the end of said drive-shaft extends and enters and engages said guideways.

17. A mechanical movement comprising a rotary reciprocating shaft; a plate secured to the end of the same; a series of studs projecting from the face of said plate arranged in a curved line struck from the center of said shaft; a continuously-revolving fly-wheel having its axis parallel to that of said rotary reciprocating shaft; a knuckle having trunnions journaled in a suitable seat in the center of said fly-wheel; a pendulous drive-shaft pivoted to said knuckle in a plane at right angles to said trunnions and having its lower end entering a suitable guideway in said plate; a flattened bell for directing the movement of said drive-shaft to and from said rotary reciprocating shaft; and a spur-gear on the swinging end of said drive-shaft beyond which the end of said drive-shaft extends and enters and engages said guideways.

In testimony whereof I have hereunto set my hand this 24th day of March, A. D. 1904.

ADOLPH WAHLE.

Witnesses:

WM. W. WAHLE,
EMIL W. STROHBEHN.