No. 730,961. PATENTED JUNE 16, 1903.

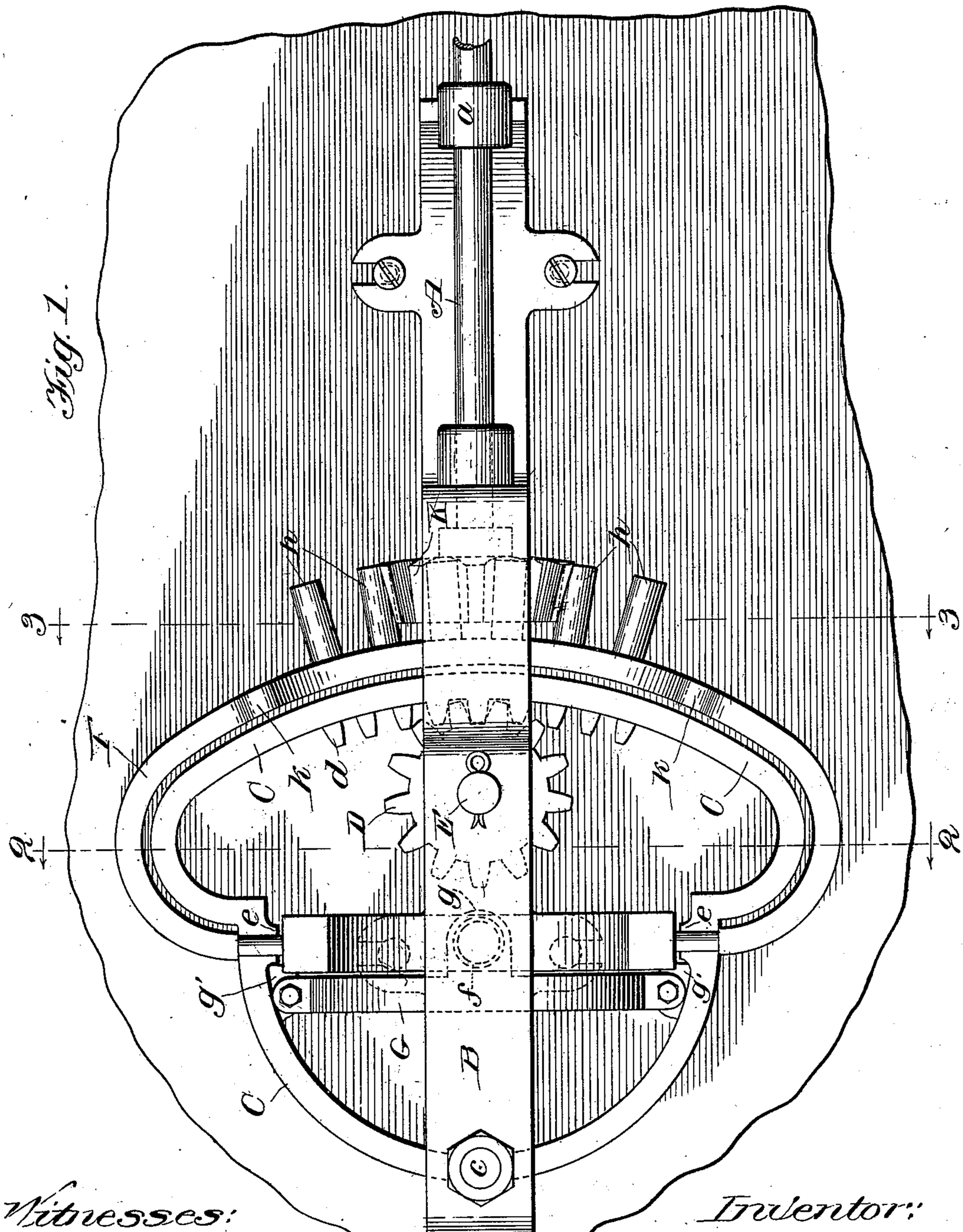
A. PLAGMAN.

MECHANICAL MOVEMENT.

APPLICATION FILED AUG. 4, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

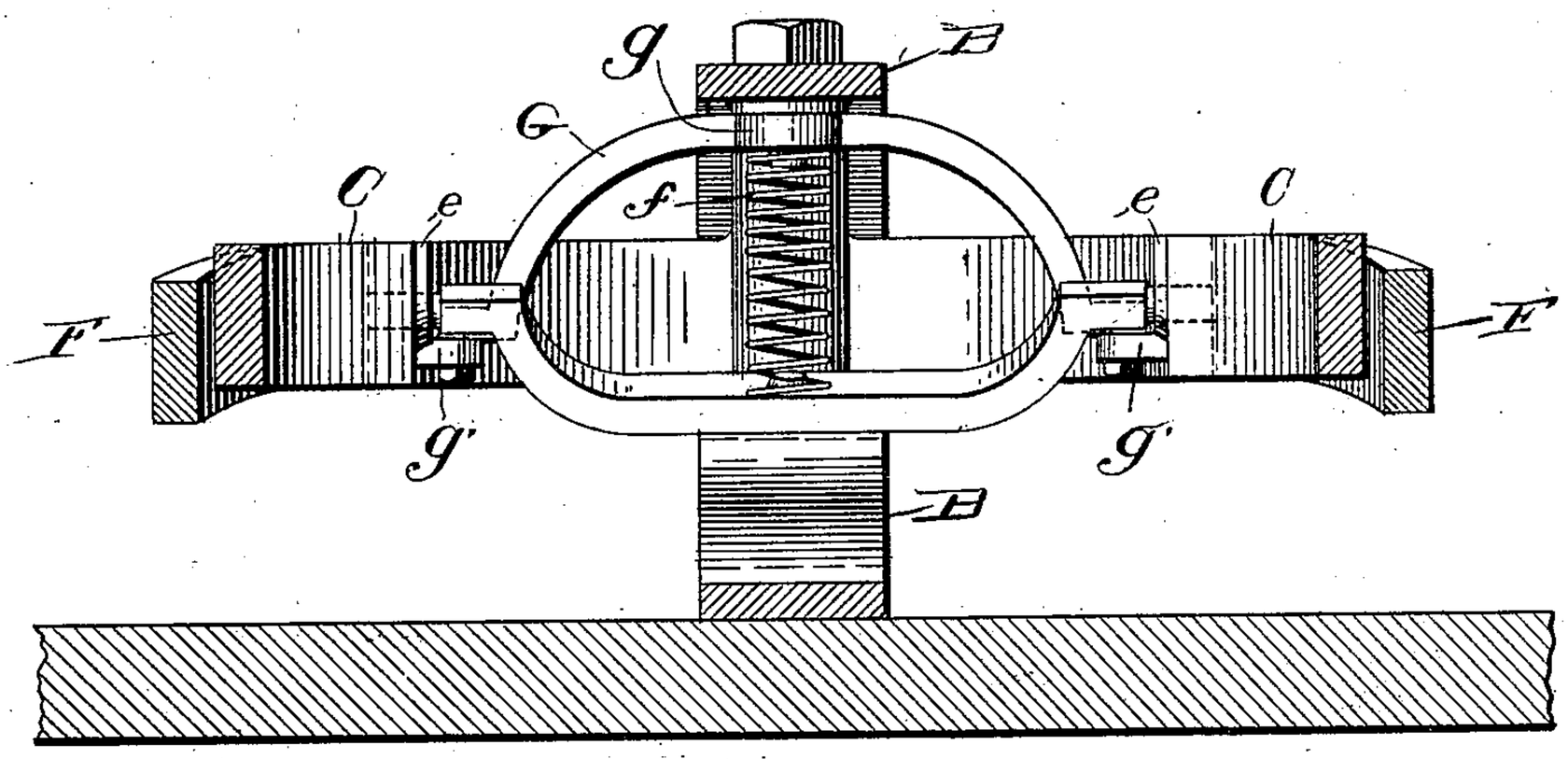
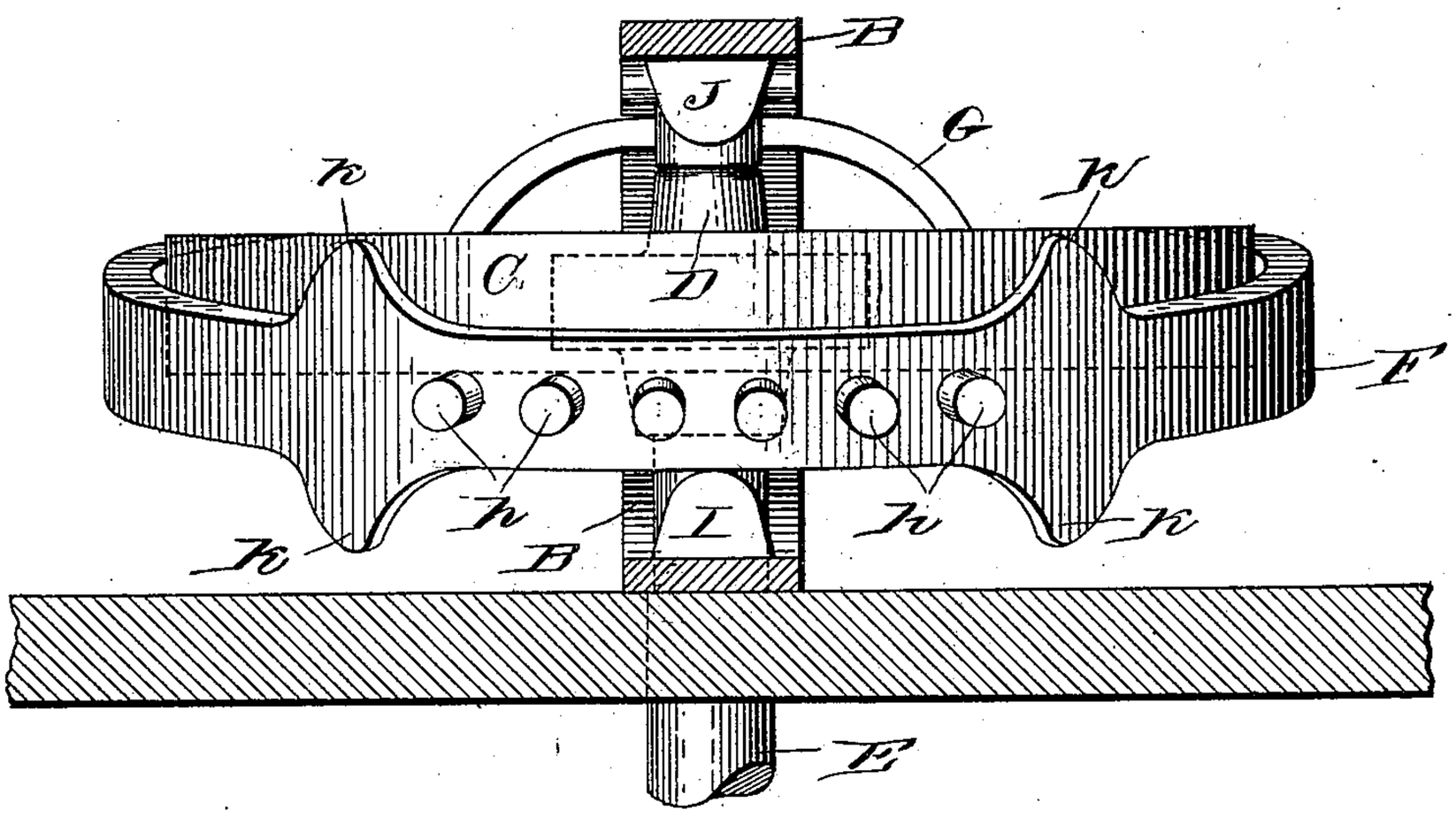


Fig. 3.



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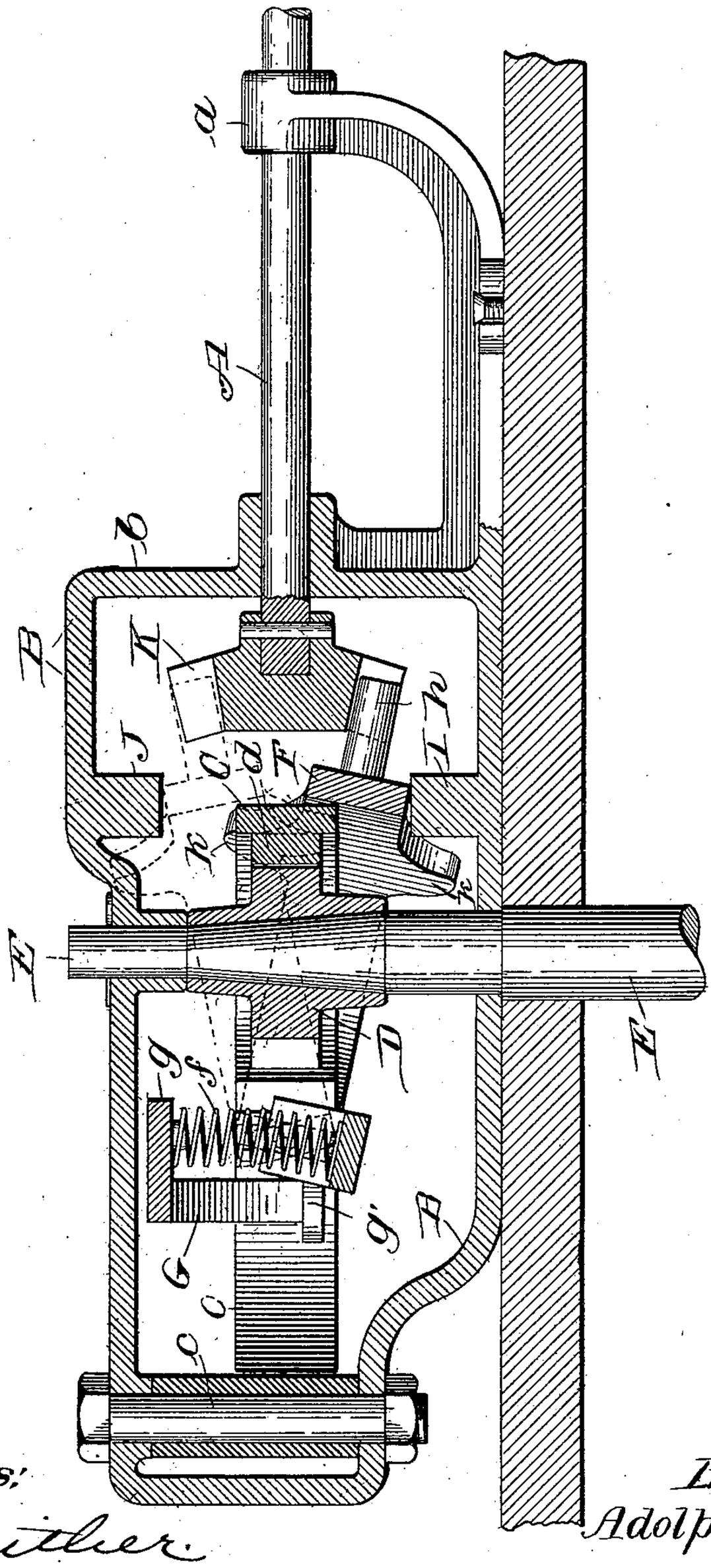
NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

ADOLPH PLAGMAN, OF DAVENPORT, IOWA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 730,961, dated June 16, 1903.

Application filed August 4, 1902. Serial No. 118,288. (No model.)

To all whom it may concern:

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

The object of my invention is to provide simple and effective mechanism for converting a continuous rotary motion into a rotary reciprocal movement the parts of which are easily assembled and can readily be separated and removed and replaced where repairs are considered necessary by the ordinary user without any previous training or special tools. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings, Figure 1 is a plan view of my invention. Fig. 2 is a vertical transverse section taken on dotted line 2 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a front view of the rack having the driving-gear removed therefrom. Fig. 4 is a longitudinal central section of my invention.

Referring to the drawings, A represents a drive-shaft which when in operation is revolved continuously in one direction and is journaled at or near its outer end in a standard *a*, arising from and preferably forming a part of an extension of the framework B. This framework consists of an open casting, in the perpendicular end of which, *b*, the inner end of the drive-shaft has bearings, and its height adjacent to said end *b* is not less than twice the distance from the plane of its support to the center of the bearings therein. The end portion of this framework opposite end *b* is preferably stepped to a less height and near the extremity thereof has pivoted to a vertical pivotal bolt *c* a horizontal rotary reciprocal rack C.

The open frame of rack C branches in opposite directions from the pivotal boss or knuckle thereof and curves forward therefrom in such manner as to form a semicircle, and therefrom the ends of this semicircular portion are so designed as to form the ends and one side of an elliptical figure, the major axis of which is considerably greater than the diameter of the rear semicircular portion of the rack. The forward curved sweep of rack-frame is struck from the pivotal center of the same and has rack-teeth *d* projecting toward said center from the inner surface thereof that mesh with the pinion D, secured to the rotary reciprocal shaft E, having suitable bearings in the upper and lower parallel stretches of the framework B. As this rack moves back and forth the rack-teeth *d* engage pinion D and impart a rotary reciprocal movement to shaft E. In order to produce this movement of rack C, an elliptical actuating-rack F is provided, which is of such dimensions that it surrounds the elliptical outer portion of rack C, and has its side nearest the pivotal center of the latter made straight and journaled in open bearings *e e* in said rack C, near the ends of the semicircular portion thereof. Between these bearings *e e* the rack F is sagged or dipped downward, and midway between said bearings supports a coil expansion-spring *f*, the upper end of which bears against an overhanging lug *g*, projecting forward from an arch G, whose ends are secured to and spring from suitable lugs *g' g'* on the inner side of the branches of the semicircular portion of rack C.

The portion of the actuating-rack extending outside of rack C is parallel therewith, and the stretch or side thereof farthest from the pivotal center of said rack C, coming within the radii bounding the rack-teeth *d*, is provided with a series of equidistant cog-pins *h*, projecting from the outer surface thereof farthest from rack C, which are engaged by the drive-gear K on the contiguous end of the drive-shaft A. Just beyond the ends of these series of pins *h* the actuating-rack F is provided with upwardly and downwardly corresponding horns *k k*, the edges of which, facing the pins *h*, are curved and form a continuation of the top or the bottom edges of said rack, as the case may be, which latter between said horns are preferably parallel. Projecting downward from the upper rail of the framework and up from the base-plate or lower rail thereof are corresponding guide-lugs I J, which are so situated that when the pins *h* of the actuating-rack F are engaged by the under segment of the drive-

gear K the under edge of the rack F will move upon and be supported by lug I, and when the pins *h* are engaged by the upper segment the upper edge will contact with the end of the upper guide-lug.

The operation of my invention is as follows: Say the rack-pins *h* are being engaged by the under portion of the drive-gear. The actuating-rack will move in the direction the under segment of the drive-gear is traveling until the end of the series of pins *h* is reached, whereupon the downwardly-projecting horn *k* at that end of the series will engage the lower guide-lug I, and assisted by the expansive effort of spring *f* aid said drive-gear to rock said actuating-rack until the cog-pins get above said gear, whereupon, as the upper segment of the latter travels in the direction opposite to its lower segment, the motion of the actuating-rack will be reversed until the opposite end of the series of cog-pins is reached. The upper horn adjacent to this latter end will then engage the upper guide-lug, and partly by its own weight and the engagement of the end cog-pin by the drive-gear the actuating-rack will return to its first-mentioned lower position, and so on be moved back and forth. The motion of the actuating-rack is imparted to the rack C, and this rack in the manner hereinbefore explained imparts its motion to the reciprocal rotary shaft.

What I claim as new is—

1. A mechanical movement comprising a continuously-revolving shaft, a rotary reciprocal segmental rack, a hinged rack carried thereby and engaged by said continuously-revolving shaft, and a rotary reciprocal shaft actuated by said rotary reciprocal segmental rack.

2. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured thereto, a pivoted segmental rack, a rack carried by and hinged to said pivoted rack and engaged by said drive-gear in planes both above the same and below the same, and a rotary reciprocal shaft actuated by said pivoted segmental rack.

3. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured thereto, a pivoted segmental rack, a rack carried by and hinged to said pivoted rack, and having a series of cog-pins engaged by said drive-gear in planes both above the same and below the same, and a rotary reciprocal shaft actuated by said pivoted segmental rack.

4. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured to the inner end thereof, a pivoted rack having teeth projecting from the inner surface of the stretch thereof farthest from the pivot, a rack carried by and hinged in open bearings in the sides of said pivoted rack having a series of cog-pins projecting from the stretch thereof farthest from its hinge in the opposite direction from said rack-teeth, which are engaged by said drive-gear, and a rotary reciprocal shaft actuated by said pivoted segmental rack.

5. A mechanical movement comprising a continuously-revolving shaft, a pivoted rack, a rack actuated by said shaft which is carried by said pivoted rack and has, in addition to the movement of said pivoted rack an independent movement at right angles thereto.

6. In a mechanical movement the combination with a continuously-revolving shaft, and a rotary reciprocal shaft arranged at an angle thereto, of means for operatively connecting said shafts comprising a segmental rack the axis of which is at right angles to said continuously-revolving shaft and is intersected by the axis thereof, and a segmental rack hinged to said first-mentioned rack whose axis is at right angles to both said first-mentioned rack and said continuously-revolving shaft.

7. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured thereto, a pivoted segmental rack whose axis is at right angles to and is intersected by the line of axis of said continuously-revolving shaft, a segmental rack hinged to said pivoted rack in a plane at right angles to the axis of both said shaft and pivoted rack and having a series of cog-pins engaged by said drive-gear, and means for automatically moving said hinged rack up and down, when the end pin of said series of pins is reached by said drive-gear to engage first the upper segment and then the lower segment of said gear, or vice versa.

8. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured thereto, a pivoted segmental rack whose axis is at right angles to and is intersected by the line of axis of said continuously-revolving shaft, a segmental rack hinged to said pivoted rack in a plane at right angles to the axis of both said shaft and pivoted rack and having a series of cog-pins engaged by said drive-gear, and having an upwardly and downwardly projecting horn at each end of said series of pins and two guide-lugs situated above and below said hinged rack, substantially as and for the purpose set forth.

9. A mechanical movement comprising a continuously-revolving shaft, a drive-gear secured thereto, a segmental rack pivoted in a plane intersected by the line of the axis of said shaft to which its axis is at right angles, and having the portions thereof branching from its pivot bridged by an arch, a segmental rack hinged to pivoted rack adjacent to the ends of said arch, and sagged downward between its bearing, a spring interposed between the sagged portion of said hinged rack, and said arch, and a rotary reciprocal shaft engaged and actuated by said pivoted rack.

10. A mechanical movement comprising a continuously-revolving shaft, a drive-gear se-

cured thereto, a pivoted segmental rack whose axis is at right angles to and is intersected by the axis of said shaft, and which has the portions thereof branching from its pivot bridged by an arch, a segmental rack hinged to said pivoted rack in a plane at right angles to the axes of both said shaft and said pivoted rack, having the portion between its bearing sagged downward and having a series of cog-pins engaged by said drive-gear and upwardly and downwardly projecting horns at each end of said series of pins, a spring interposed between the sagged portion of said hinged rack and said arch, and two guide-lugs situated respectively above and below said hinged rack, and a rotary reciprocal shaft actuated by said pivoted rack.

11. In a mechanical movement, the combination with a rotary reciprocal shaft, of a segmental rack movable longitudinally therewith and pivotally secured at a distance from said shaft but connected thereto, a continuously-revoluble shaft, and a pinion thereon to engage the rack, substantially as described.

12. In a mechanical movement, the combination with a rotary reciprocal shaft, of a segmental rack movable longitudinally therewith and loosely secured at a distance from said shaft but connected thereto, a continuously-revoluble shaft and a pinion thereon to engage the rack, substantially as described.

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