

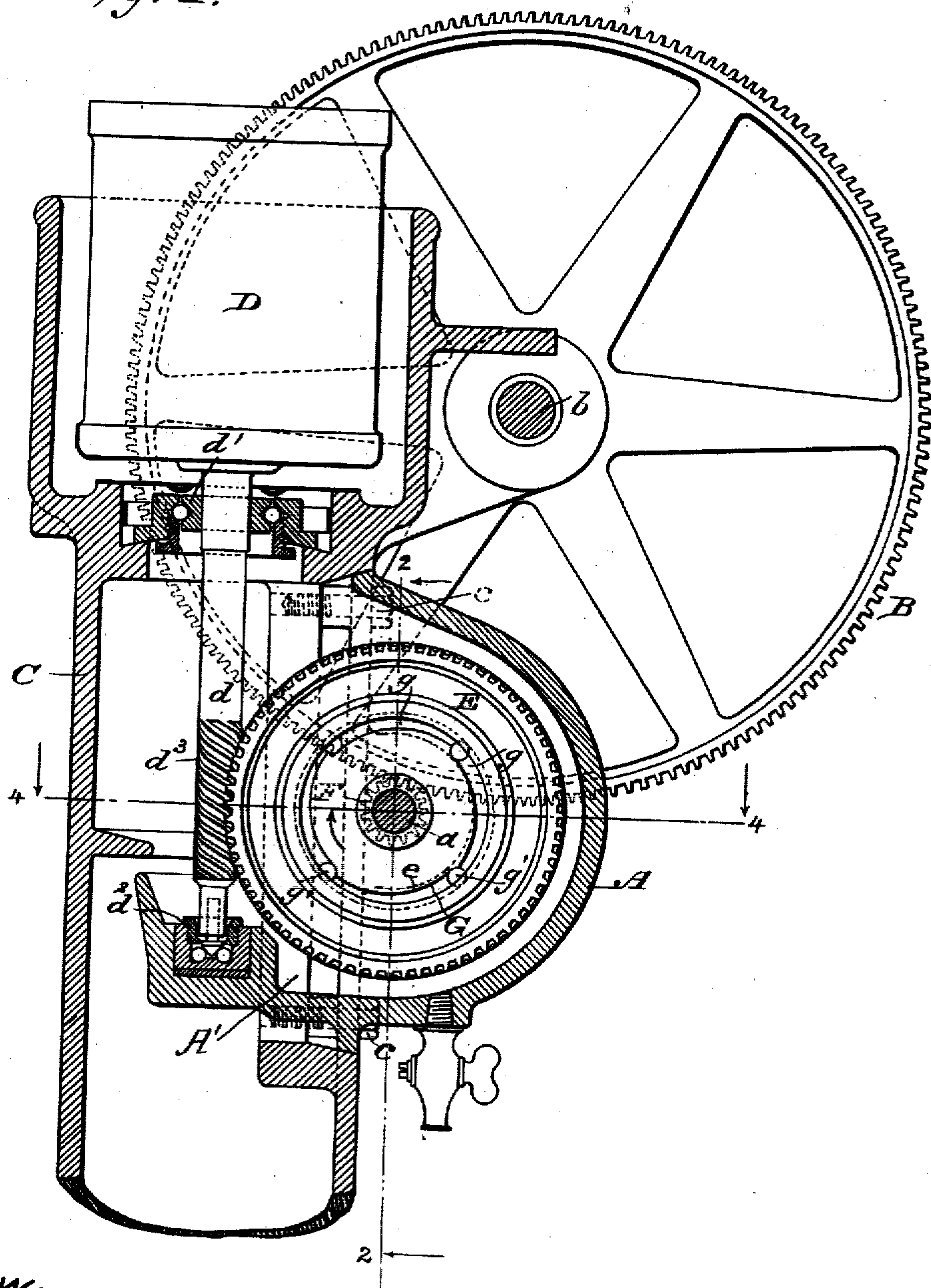
No. 814,023.

PATENTED MAR. 6, 1906.

J. C. CROMWELL.
DRIVING MECHANISM.
APPLICATION FILED APR. 18, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:
D. Davis
G. W. Saywell

INVENTOR:
John C. Cromwell
by his attorney
J. D. Fay

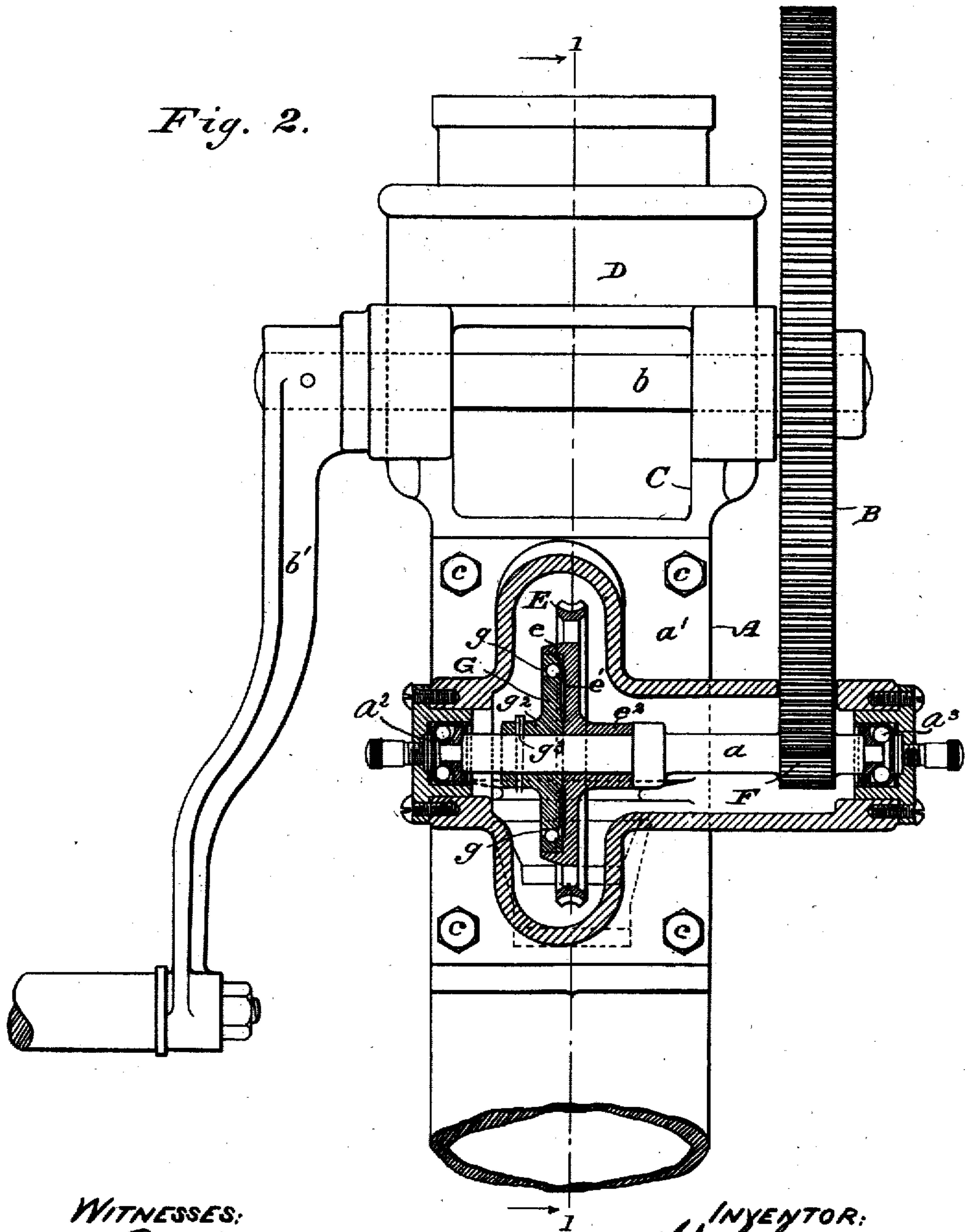
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

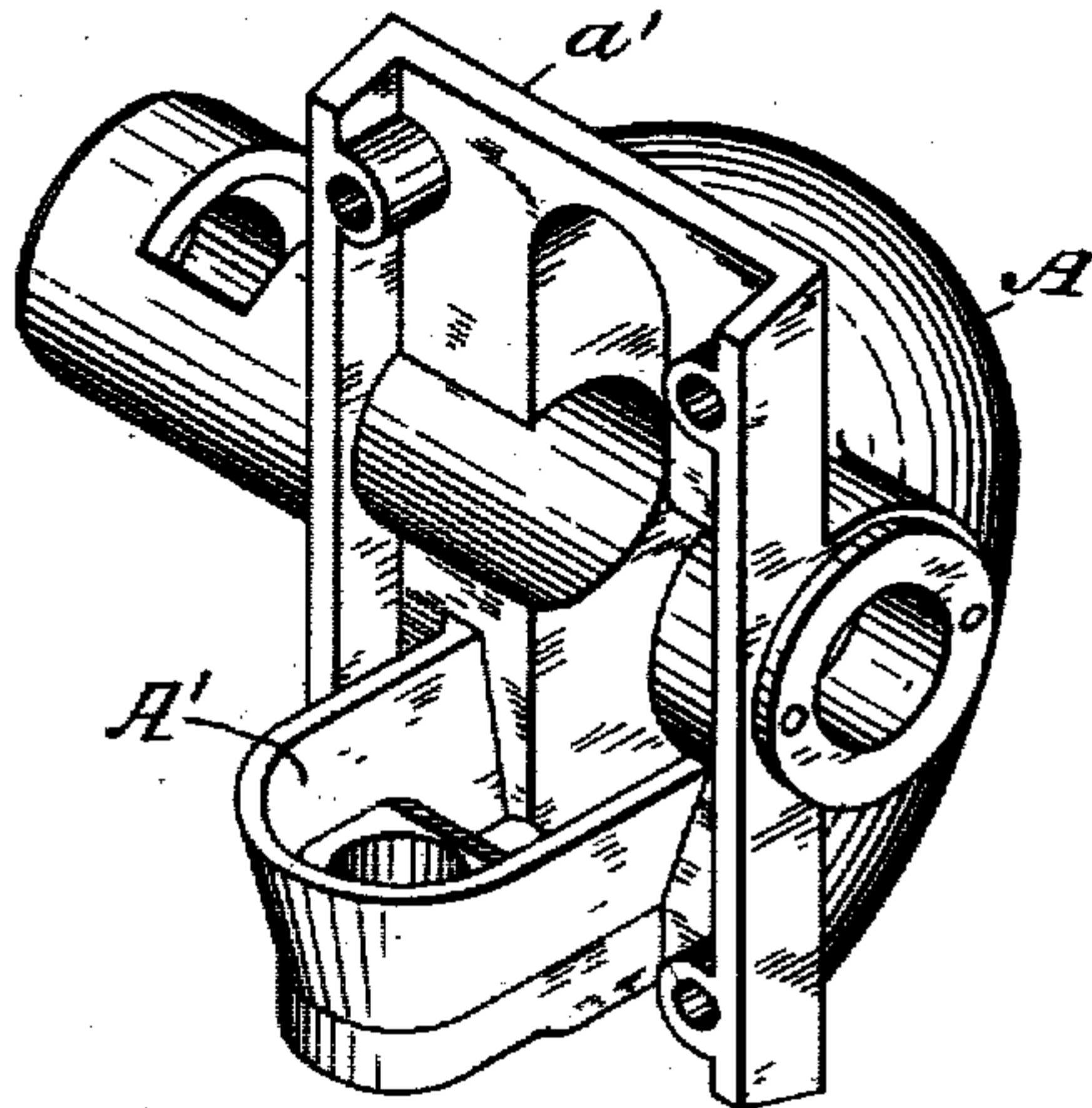
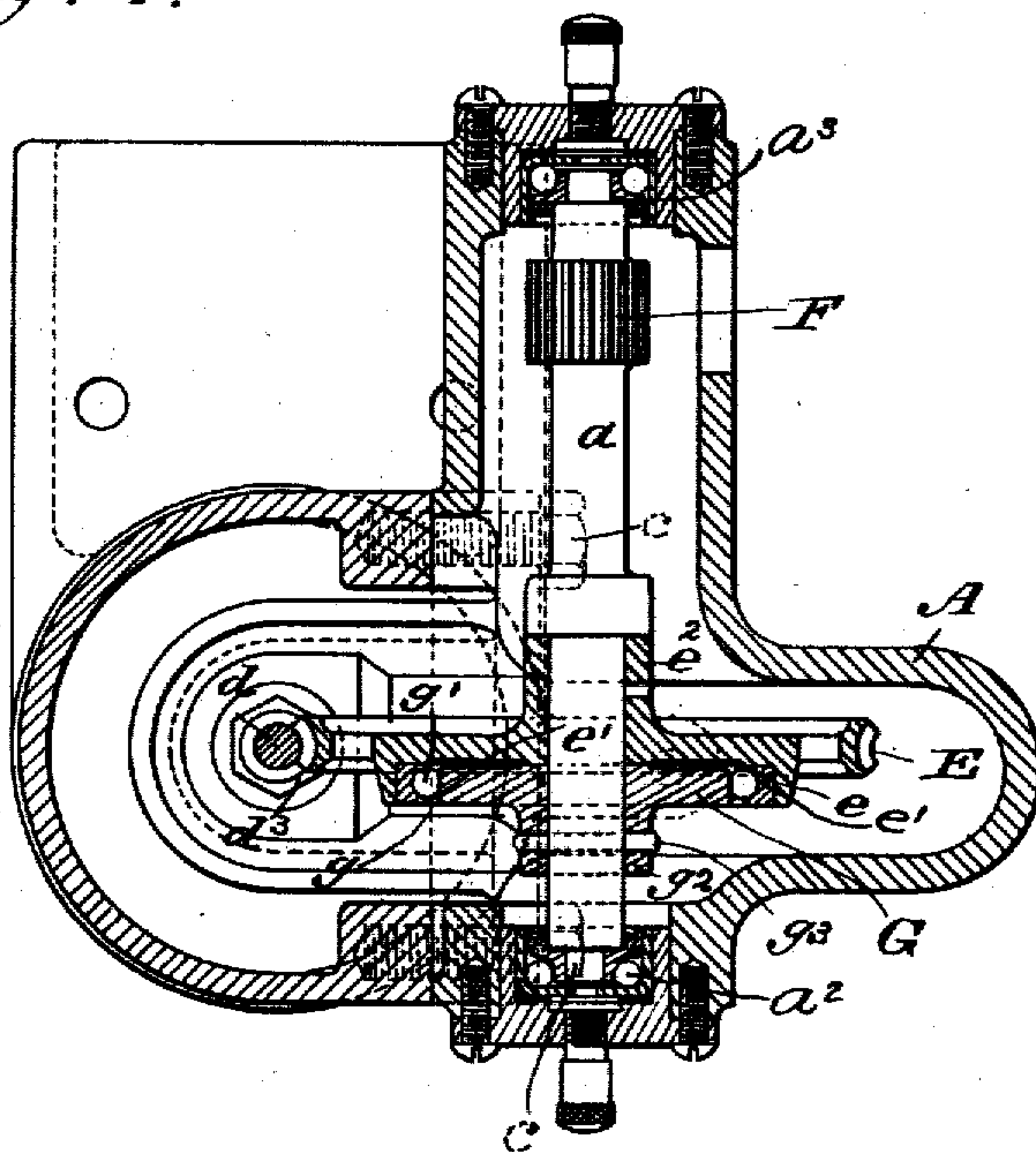


Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN C. CROMWELL, OF CLEVELAND, OHIO.

DRIVING MECHANISM.

No. 814,028.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed April 18, 1904. Serial No. 203,684.

To all whom it may concern:

Be it known that I, JOHN C. CROMWELL, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Driving Mechanism, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention relates to driving mechanism, and particularly to the latter as it is used in combination with the frames of centrifugal separators, and has for its object the provision of driving mechanism of this character which shall satisfactorily fulfil the general purposes for which said mechanism is intended and the parts of which, together with said frames, may be readily and easily assembled and dismantled.

Said invention consists of mechanism hereinafter fully described, and specifically set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure 1 represents a broken vertical longitudinal section of the frame of a centrifugal separator upon which is supported and within which is inclosed my improved driving mechanism, said section being taken upon the plane indicated by the line 1 1, Fig. 2, and some connecting parts being shown in elevation. Fig. 2 represents a side elevation of the mechanism illustrated in Fig. 1, with parts shown in vertical transverse section, taken upon the plane indicated by line 2 2, Fig. 1. Fig. 3 represents a perspective view of one part of a two-part frame comprising an element of my invention, which part of the frame is separable from the remainder of the frame and within which all the gearing connecting the driving-gear of the centrifugal separator and the shaft carrying the separating means is carried, such connecting-gearing being omitted from this view. Fig. 4 represents a horizontal section of such part of the frame and the connecting-gearing carried thereon, such section being taken upon the plane indicated by the line 4 4, Fig. 1.

In general the features of a centrifugal separator are comprised in a frame, means mounted upon the same within which the constituent liquids are separated by centrifugal action, a driving-gear, and connections upon the frame between said driving-gear and said separating means and intended to impart a rotation to the latter and secure the necessary centrifugal action. In the centrifugal separators heretofore in use considerable time has been consumed and great difficulty encountered in assembling and dismantling the different parts of the frame and the gearing inclosed by them, which connects the driving-gear and separating means.

It is the object of this invention to obviate these difficulties and save this time by providing driving mechanism and a frame part carrying this mechanism which shall be readily removable from the remainder of the frame and readily inserted in the same for assembling the whole mechanism for operation.

The essential features of my invention are comprised of a two-part separable frame, one part A of which is shown in perspective in Fig. 3 and the other part of which is shown at C in Fig. 1, a driving mechanism carried by said part A and connecting the driving-gear, and the vertical shaft *d*, carrying the separating-bowl D. Further, the general features of a centrifugal separator are provided as follows: A driving-gear B is carried upon the shaft *b*, journaled in suitable bearings in the part C of the frame, which driving-gear is operated by a crank *b'*. The separating means, including the bowl D, is carried upon the vertical shaft *d*, suitably journaled in an upper bearing *d'* on the part C of the frame and in a lower bearing *d''*, located in the part A of the frame. The connections between the vertical shaft *d* and the driving-gear B will be hereinafter fully described. The rotation of the shaft *d* is intended to secure the rapid rotation of the bowl D and a consequent separation of the constituent liquids. The lower standards of the separator are not shown in the drawings.

Passing centrally and transversely through the part A of the frame and suitably journaled therein by the bearings *a'* and *a''* is a worm-wheel and pinion shaft *a*, and carried upon the latter within the part A of the frame is a worm-wheel E, meshing with a worm *d'* upon the lower part of the vertical shaft *d*. A pinion F is carried upon the shaft *a* and

meshes with the driving-gear B. Concentric with the worm-wheel E and formed in a central recess *e* of the same and around the shaft *a* is a clutch G of such a size as to form
 5 between the flange *e'*, bounding said recess *e*, and the periphery of the clutch G a ball-groove *g*, within which are contained the balls *g'*, the periphery of said clutch G converging in several places toward the flange *e'*,
 10 the construction being such that the balls *g'* are permitted free play for a short distance in said ball-groove *g*, as will be hereinafter more fully described. The hub *e''* of the worm-wheel E is loose upon the shaft *a*, while
 15 the hub *g''* of the clutch G is rotatably fixed to said shaft *a* by means of a suitable pin *g'''*, so that it will be noted the worm-wheel E can rotate freely upon the shaft *a* independent of the clutch G when the shaft *a* is rotating in the direction denoted by the arrow in
 20 Fig. 1, the balls *g'* remaining in the enlarged portions of the ball-groove *g* when the shaft *a* is rotating in said direction. However, if the shaft *a* is rotating in the other direction,
 25 the balls *g'* will become wedged in the constricted portions of said ball-groove *g* between the flange *e'* and the periphery of clutch G, so as to bind upon the same and cause the worm-wheel E and the clutch G to
 30 rotate together. The part A of the frame is secured to the part C by means of screws *c*, Fig. 2, there being provided in the form of device shown one such screw at each corner of the rectangularly-shaped back *a'* of the
 35 frame part A.

It will be noted from the above description that the frame carrying and inclosing the driving mechanism is composed of two parts, that they are readily separable one from the
 40 other, and that they jointly form an inclosing casing.

Only one bearing of the vertical shaft *d* is carried by the part C of the frame, the other bearing of the vertical shaft and the two
 45 bearings of the worm-wheel and pinion shaft *a* being carried by the part A of the frame.

As can be readily seen from Fig. 3, the part A forms a shield for the worm-wheel and at its lower portion an oil-reservoir A'. The
 50 part A of the frame and the gearing contained within the same form the sole intermediate connection between the driving-gear B and the vertical shaft *b*, which carries the separating-bowl D, and by simply lifting up such
 55 bowl and carrying the shaft *d* out of the lower bearing *d''* and then removing the screws *c* the part A and all the connecting-gearing with it can be separated from the driving-gear B and the part C of the frame, the mechanism being thus completely dismantled in a
 60 few moments' time and by means of a few simple operations.

Having described my invention in detail, that which I particularly point out and distinctly claim is—
 65

1. In driving mechanism, the combination of a worm-wheel; a worm; a vertical shaft driven by said worm-wheel and worm; a frame comprising two separable parts; and suitable bearings carried in said frame, one of
 70 said frame parts carrying only one bearing.

2. In driving mechanism, the combination of a worm-wheel; a worm; a vertical shaft driven by said worm-wheel and worm; a frame comprising two separable parts; and
 75 suitable bearings carried in said frame, one of said frame parts carrying only one of the bearings of the vertical shaft.

3. In driving mechanism, the combination of a worm-wheel; a worm; a vertical shaft
 80 driven by said worm-wheel and worm; a frame comprising two separable parts; and suitable bearings carried in said frame, one of said frame parts carrying only one bearing, the parts of said frame jointly forming an in-
 85 closing casing.

4. In driving mechanism, the combination of a worm-wheel; a worm; a vertical shaft driven by said worm-wheel and worm; a frame comprising two separable parts; and
 90 suitable bearings carried in said frame, a portion of one part of said frame adapted to form an oil-reservoir.

5. In driving mechanism, the combination of a worm-wheel; a worm; a vertical shaft
 95 driven by said worm-wheel and worm; a frame comprising two separable parts; and suitable bearings carried in said frame, one of said frame parts carrying only one bearing, and the other frame part adapted to form a
 100 shield for said worm-wheel.

6. In driving mechanism, a train of spur-gearing; a worm-wheel and a worm; means connecting said spur-gearing and said worm-wheel; a vertical shaft driven by said worm;
 105 a frame comprising two separable parts; and suitable bearings carried in said frame, one of said frame parts carrying one bearing of the vertical shaft and two bearings of said connecting means.
 110

7. In driving mechanism, a train of spur-gearing; a worm-wheel and a worm; means connecting said spur-gearing and said worm-wheel; a vertical shaft driven by said worm;
 115 a frame comprising two separable parts; and suitable bearings carried in said frame, one of said frame parts carrying only one bearing, the parts of said frame jointly forming an inclosing casing.

8. In driving mechanism, a train of spur-
 120 gearing; a worm-wheel and a worm; means connecting said spur-gearing and said worm-wheel; a vertical shaft driven by said worm; a frame comprising two separable parts; and suitable bearings carried in said frame, a portion of one part of said frame adapted to form
 125 an oil-reservoir.

9. In driving mechanism, a train of spur-
 130 gearing; a worm-wheel and a worm; means connecting said spur-gearing and said worm-

5 wheel; a vertical shaft driven by said worm;
a frame comprising two separable parts; and
suitable bearings carried in said frame, one of
said frame parts carrying only one bearing,
and the other frame part adapted to form a
shield for said worm-wheel.

10 10. In driving mechanism, a driving-gear;
a vertical shaft; gearing connecting said driv-
ing-gear and vertical shaft and including a
train of spur-gearing, a worm-wheel and a
worm; and a single frame part carrying all of
said connecting-gearing.

15 11. In driving mechanism, a driving-gear;
a vertical shaft; gearing connecting said driv-
ing-gear and vertical shaft and including a
train of spur-gearing; a worm-wheel and a
worm; and a frame comprising two separable
parts and forming an inclosing casing, one

part of said frame carrying all of said con-
necting-gearing.

20 12. In driving mechanism, a driving-gear;
a vertical shaft; means connecting said driv-
ing-gear and vertical shaft and including a
train of spur-gearing, a worm-wheel, a worm,
and a clutch connecting said train of spur-
gearing and said worm-wheel; and a frame
comprising a plurality of parts, one of said
parts carrying all of said connecting means
and separable, together with said connecting
means, from the remainder of said frame.

30 Signed by me this 4th day of April, 1904.

JOHN C. CROMWELL.

Attest:

G. W. SAYWELL,

A. E. MERKEL.