

(No Model.)

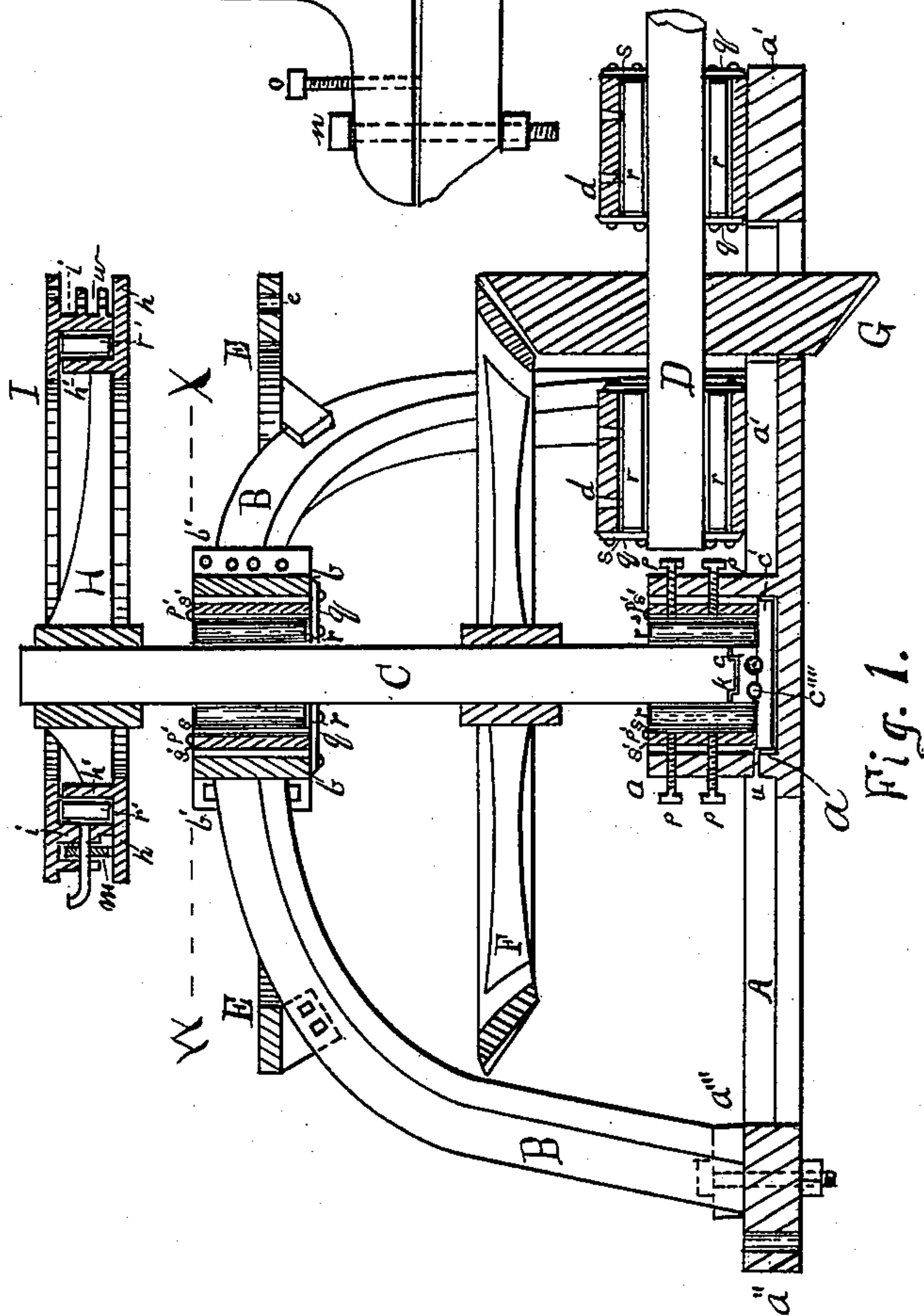
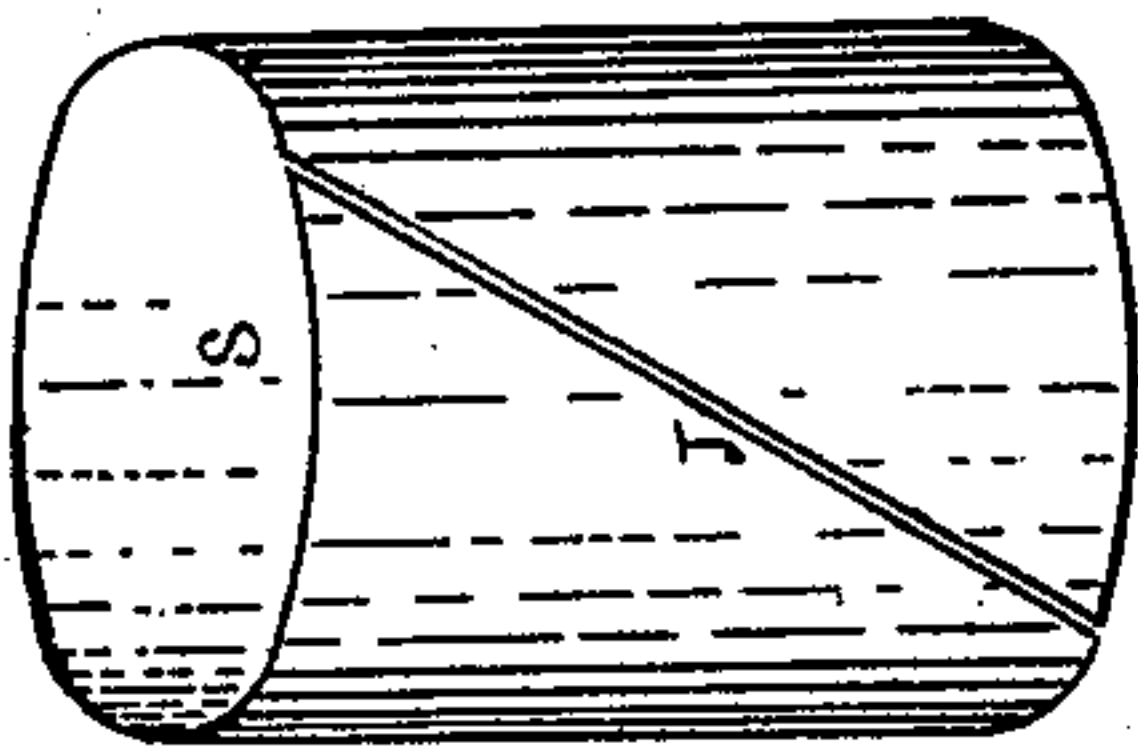
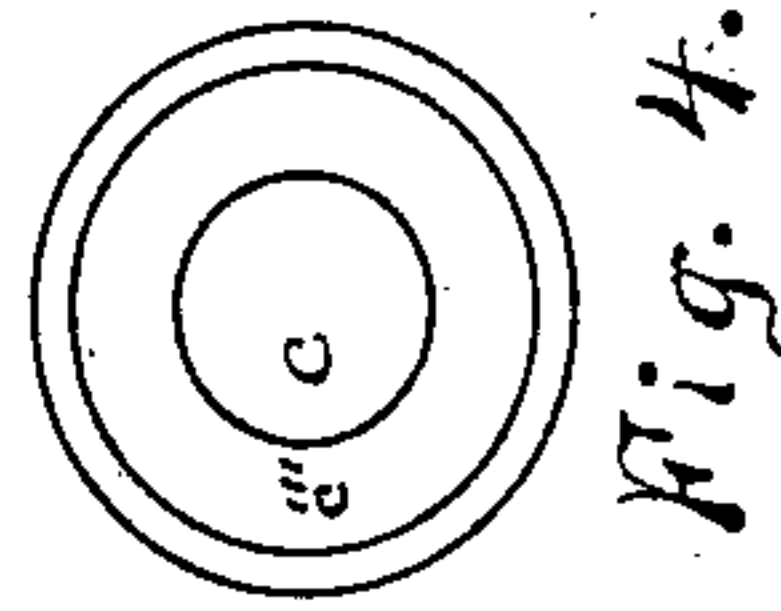
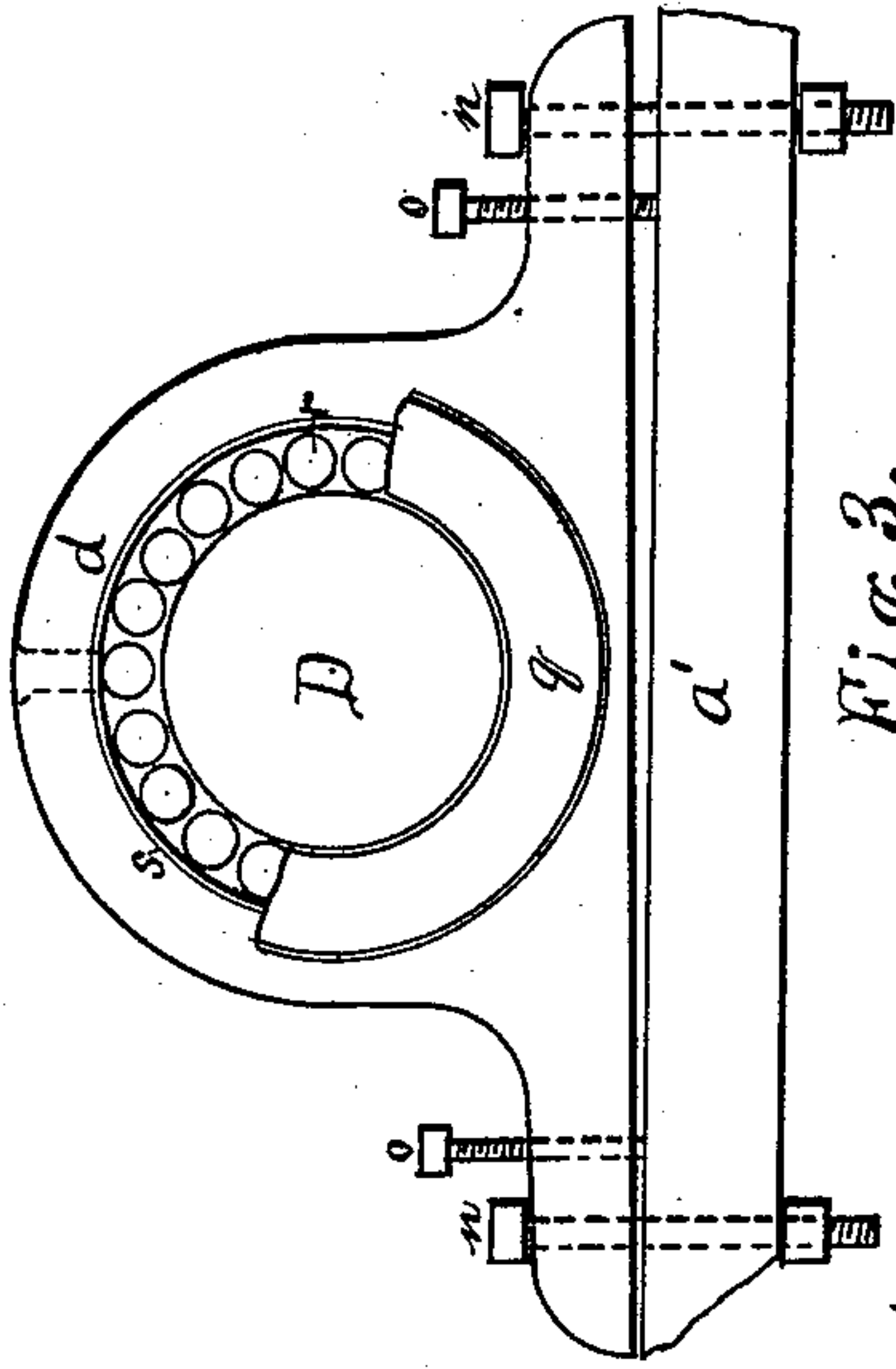
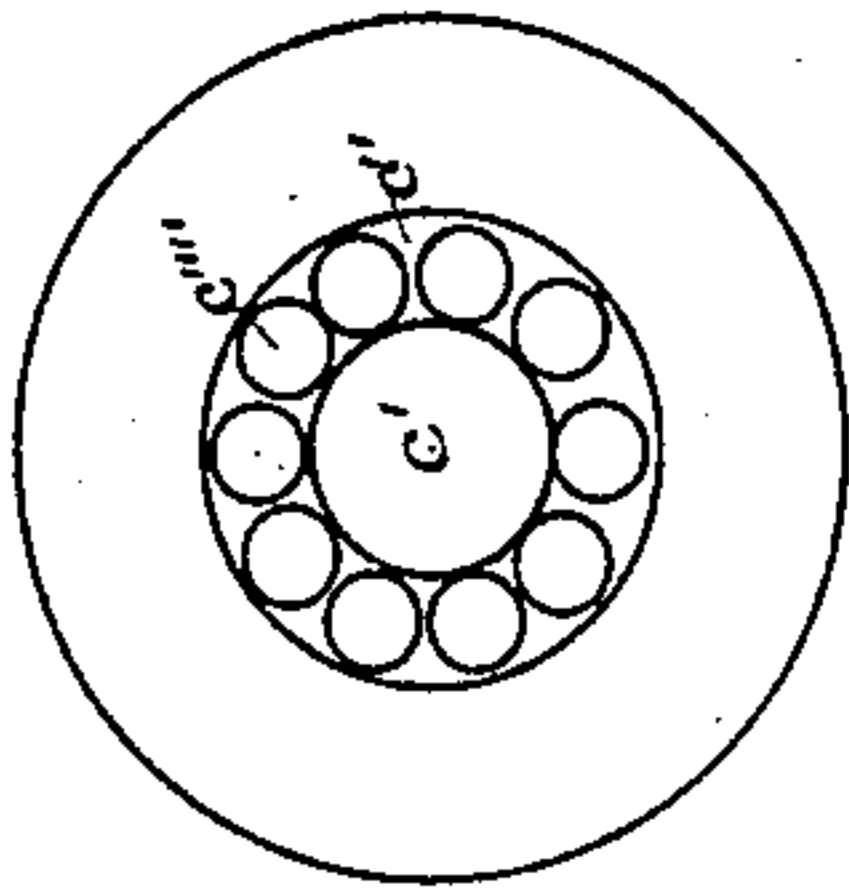
2 Sheets—Sheet 1.

R. MARVIN.

# DEVICE FOR DISTRIBUTING AND EQUALIZING POWER.

No. 602,087.

Patented Apr. 12, 1898.



Witnesses,  
Henry B. Fuller.  
Tom T. Robinson..

Russell Marvin.  
Inventor, By his Attorney  
A. S. Fuller.

(No Model.)

2 Sheets—Sheet 2.

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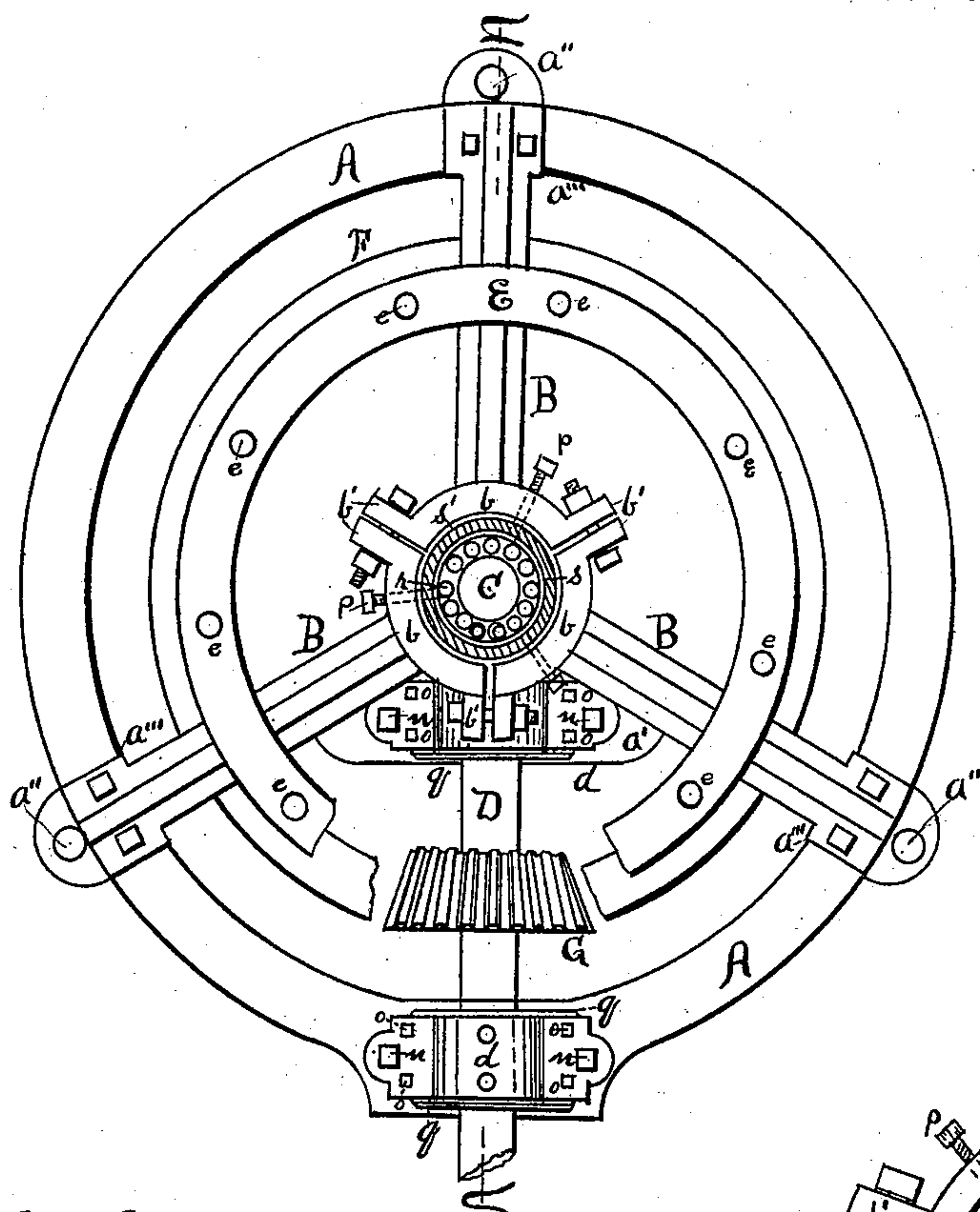


Fig. 2.

Fig. 8.

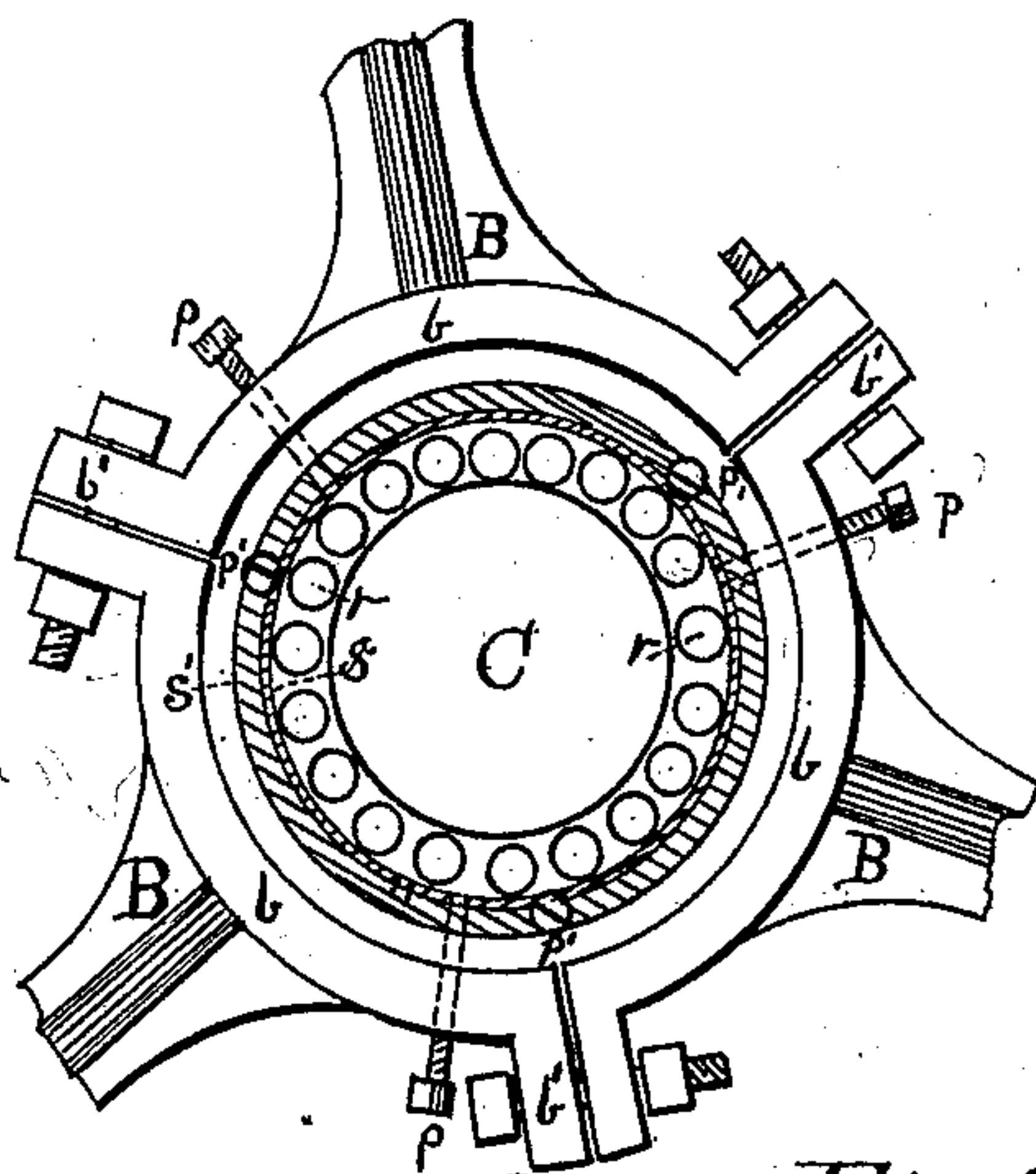
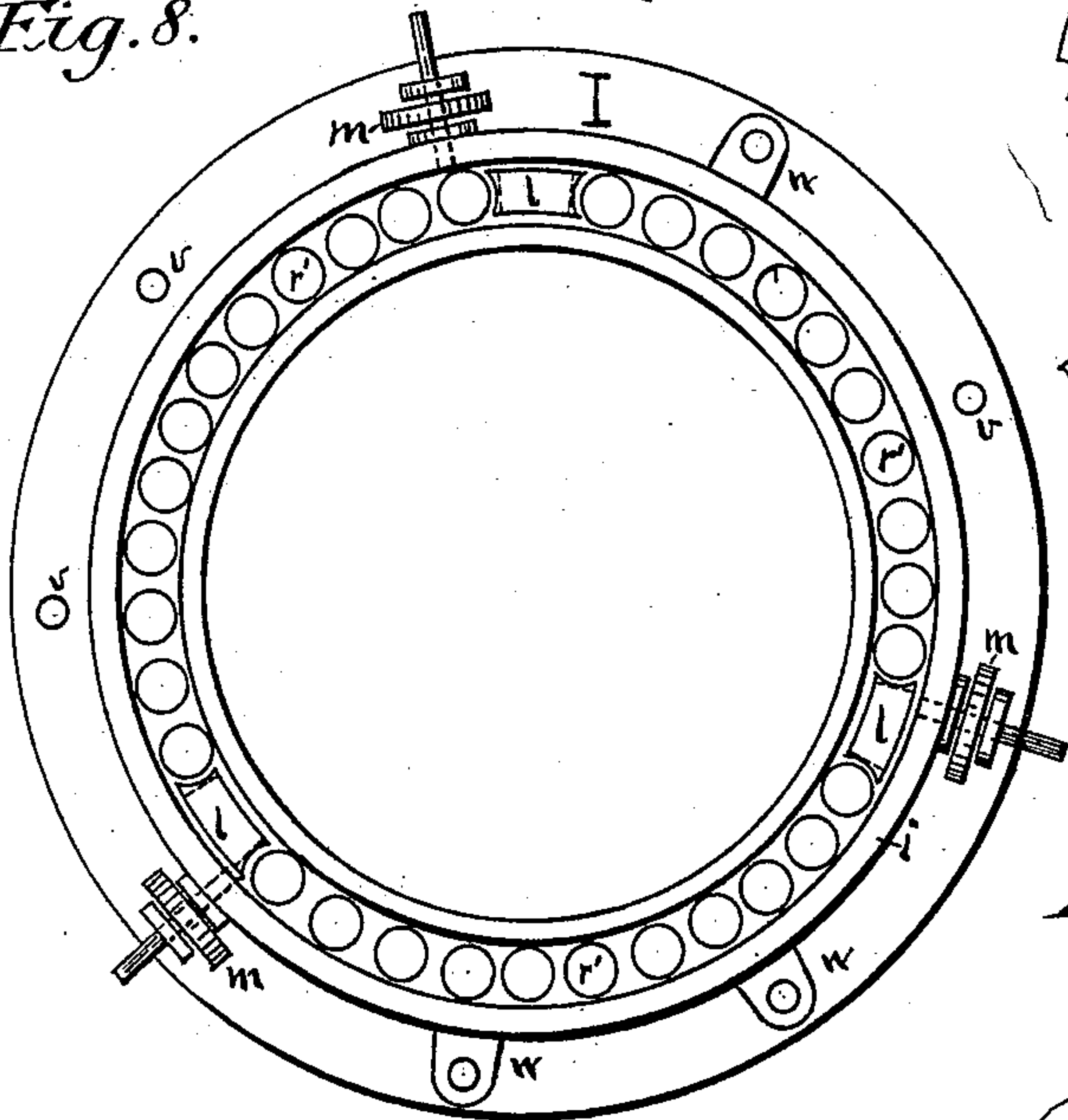


Fig. 7.

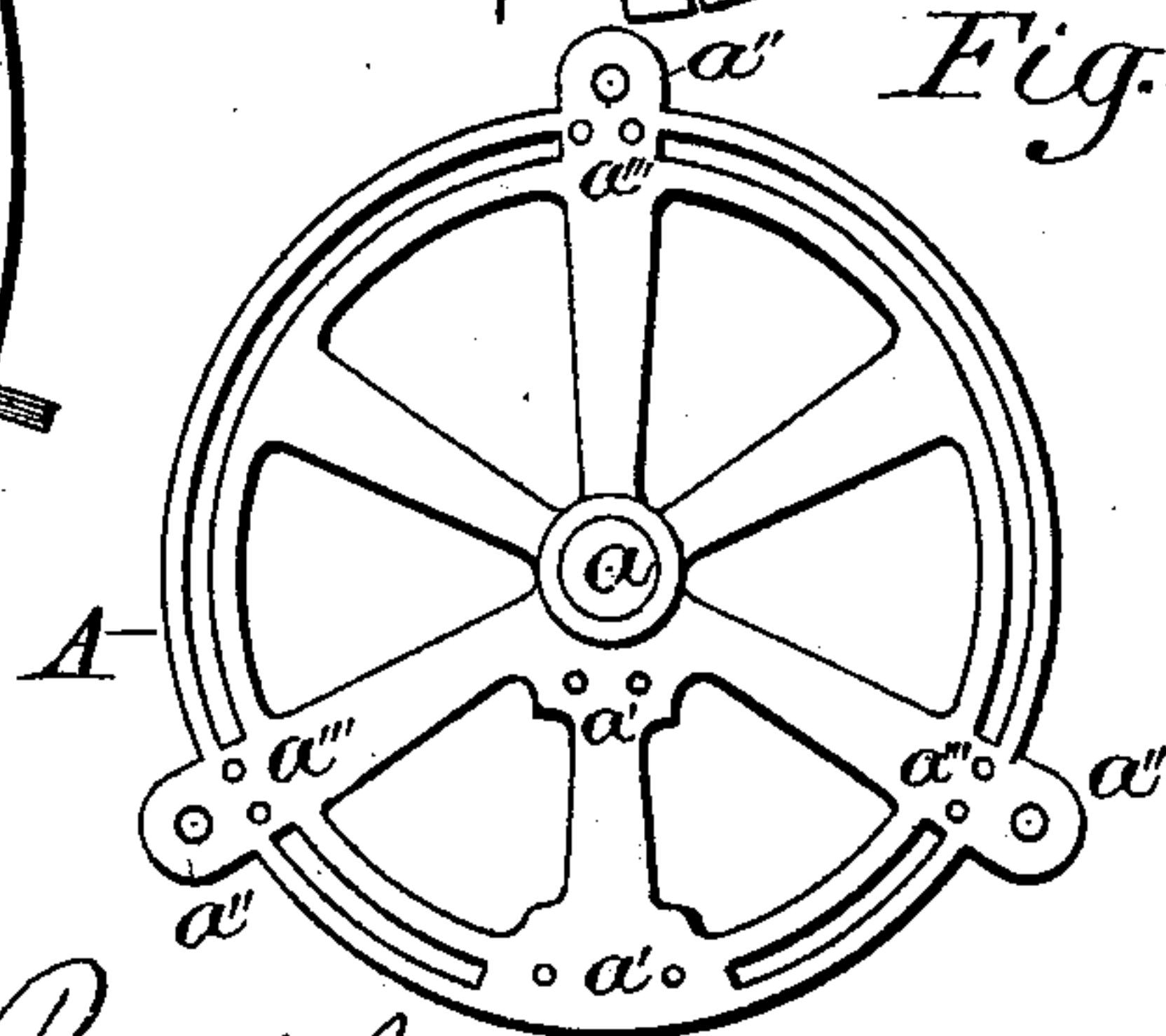


Fig. 9.

Witnesses  
Henry C. Fuller.  
Tom J. Robinson.

Russell Marvin Inventor,  
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# UNITED STATES PATENT OFFICE.

RUSSELL MARVIN, OF FINDLAY, OHIO, ASSIGNOR OF ONE-HALF TO S. N. E. PRIDDY, OF SAME PLACE.

## DEVICE FOR DISTRIBUTING AND EQUALIZING POWER.

SPECIFICATION forming part of Letters Patent No. 602,087, dated April 12, 1898.

Application filed May 10, 1897. Serial No. 635,959. (No model.)

*To all whom it may concern:*

Be it known that I, RUSSELL MARVIN, a citizen of the United States, residing in the city of Findlay, Hancock county, and State of Ohio, have invented new and useful Improvements in Devices Adapted to Receive, Equalize, and Distribute Power from any Suitable Generating-Motor, of which the following is a specification.

10 The particular object of my invention is to provide a power-distributor for the purpose of pumping from a common point of application a number or cluster of oil or other wells by means of surface-rods or other similar devices, and by means of such distributor balance and equalize by a proper application of gravity the separate resistance to be overcome in the several wells, thereby economizing the otherwise necessary expenditure of power, and to use the gravity and frictional resistance of any particular well in such cluster when the same is not being pumped to anchor the said distributor against the otherwise unbalanced strain of the wells being at the time operated. I attain these objects by means of the mechanism illustrated in the several drawings hereto attached and hereby made a part of this specification.

Throughout the several views like letters refer to identical or like parts.

30 In the said drawings, Figure 1 is a sectional view on a vertical plane through the line U V in Fig. 2, including an eccentric device not shown in Fig. 2. Fig. 2 is a plan view from above, on a smaller scale than Fig. 1, showing all the parts visible from that point except an eccentric above referred to and hereinafter described. Fig. 3 is a detail of the end and bearing of a counter-shaft D shown in the preceding named figures. Fig. 4 is a view of the under side of a terminal bearing-cap c; and Fig. 5 is a corresponding view of the upper side of a bearing-plate c' and balls c''', upon which such cap rests. Fig. 6 is a detail view of a bushing used in the bearing of the vertical shaft C shown in Figs. 1 and 2. Fig. 7 is a sectional view on the line W X in Fig. 1, on a larger scale, to better show the several parts of the bearing of the shaft C. Fig. 8 is a view of the under side of a ring I, which in position surrounds the eccentric wheel H, as shown in Fig. 1. Fig. 9 is a

plan view of a bed-piece A, which is a foundation to my entire device.

I construct my device of the several parts 55 illustrated in said drawings, as follows: I provide first a substantial and solid frame, preferably in a tripod form, consisting of a bed-casting A, (shown in Figs. 1, 2, and 9,) said bed having arms or spokes running to its center and there supporting a suitable socket a to receive, with an antifriction-roll and ball-bearing, hereinafter particularly described, a central vertical bearing-shaft C, said bed A also, at points a' a', being webbed in suitable form to receive the journal-blocks d d of a horizontal counter-shaft D. Securely bolted to points marked a''' are three posts or risers B, so curved inwardly as to meet about the vertical axis of socket a at a suitable distance above it to receive an antifrictional roller-bearing as a lateral support for shaft C, the upper ends of posts B so meeting having concaved ends b and flanges b', adapting the posts B to be fastened together 75 by bolts or other suitable devices, and when so bolted together forming by their concave ends b a journal-block to contain said bearing for shaft C. To make the frame more rigid and to assist in the anchoring of the same, as hereinafter mentioned, I bolt or securely fasten to posts B, either cast entire or in suitable segments, the ring E, perforated at intervals with holes e. (Shown in Figs. 1 and 2.) Bed A is also provided with perforations a'' 85 to allow it to be anchored by bolting to suitable mudsills or by stakes in the earth.

Within the socket a and the concave ends b of posts B is journaled a vertical shaft C in the following manner: The bottom of socket a is closely fitted with a horizontal plate c', provided on its upper surface with a groove c'', concentric with the walls of socket a and adapted to receive balls c''', as shown in Figs. 1 and 5. Upon said balls c''' rests a terminal 95 cap c of the shaft C. This terminal cap c is concentric with both plate c' and shaft C and is provided on its under side with a groove c''' to fit said balls c''', exactly corresponding to groove c''. The upper side of cap c is recessed in any suitable manner to receive and hold the lower end k of shaft C, which is fitted to such recess. 100

In socket a, above and resting vertically on



plate *c'*, is a lateral roller-bearing for shaft C, formed as follows: Immediately about shaft C and cap *c* are a series of vertical rollers resting and rotating on their lower ends on plate *c'*. Rolls *r* are confined to position by, first, a bushing *s*, preferably of tempered steel, though it may be of any material sufficiently hard enough to stand the wear. This bushing is formed by bending a thin sheet of said metal to conform to the periphery of said rolls *r* about C, the ends of such sheet being so cut as to meet accurately and on a bias or diagonal to the vertical, as shown in Fig. 6. The thin hard bushing *s* is immediately inclosed by a heavy ring or bushing *s'* to make the entire journal solid and firm; but bushing *s'* may be of a soft iron or other metal suitable for economical working. The height of bushings *s* and *s'* and rolls *r* are the same. Any remaining space between *s'* and the wall of socket *a* is filled with a Babbitt or other suitable packing metal, so that when complete the whole will be as solid as if cast in one piece. These several parts of this journal—viz., the babbitt and bushings *s* and *s'*—are made more firm and held in proper adjustment by screws *p*, which pass through the said parts and by which the proper vertical adjustment of bushings *s* and *s'* can be effected before said babbitt is applied, so that when the babbitt is filled in between socket *a* and bushing *s'* it will by its adhesion prevent the loosening of screws *p*. If bushing *s* is too hard to be successfully drilled, screws *p* may end in bushing *s'* and bushing *s* be kept in place by screws or bolts *p'*, screwed into the upper end of bushing *s'* close enough to bushing *s* that the heads project over and prevent it from working up, if it have such tendency. At the bottom of rolls *r* is a drain *u* through socket *a* to draw off surplus oil, &c., when necessary.

The lateral bearing within the concave ends *b* of B is in all respects similar to the one in socket *a*, except that at the lower end a plate *q* is closely fitted to shaft C to support the rolls and bushings and to retain lubricator. The plate *q* may be conveniently bolted to the under side of the ends *b* of posts B. Since this upper journal of shaft C is identical, as stated, with the lower one, except as noted, I have lettered the like parts thereof in the drawings the same.

The vertical shaft C carries near its lower end and solidly attached to it wheel F for the communication of power to it from the counter-shaft D by means of wheels G on shaft D. Shaft D is provided with bearings by journal-blocks *d*, bolted firmly by bolts *n* to the bed A, as shown in Figs. 1, 2, and 3, but adjustable for the purpose of alinement, &c., by set-screws *o*. These bearings are in all respects similar to the lateral bearings of shaft C, already described, except as the blocks *d* are easily handled for work, &c., the bushing *s'* and the babbitt used about it are omitted and the block *d* itself immediately holds the bushing *s* and the rolls *r*, which throughout the

drawings are lettered as are the parts of the journal of shaft C. The said journals of D are provided at either end with the plates *q*.

Above the bearing at the upper end of posts B shaft C carries an eccentric device consisting of an eccentric wheel H, solidly attached to shaft C, provided upon its lower side with a flange *h*, adapted to support and carry upon suitable travelers *m* a loosely-mounted non-rotating inclosing ring I and to support and carry upon said flange *h* and between its perimeter *h'* and the perimeter *i* of ring I a bearing consisting of a series of vertical rolls *r'*, separated at intervals into sections by rectangular shoes *l*, said ring I having suitable holes *v* or lugs *w* or other suitable means of attachment for surface-rods, said eccentric device being, except as to the use of shoes *l*, in all respects similar to the eccentric device described by me in my application for patent for eccentric devices filed in the United States Patent Office July 1, 1895, Serial No. 554,665. Said shoes *l* are of slightly less diameter than the rolls *r'* and of the same height, but of breadth about equal to twice the diameter of the same, and at the edges either plane or concaved to conform to the rolls *r'*, the reasons for which I hereinafter specify.

My power being so constructed as above described and illustrated, its operation for the purpose named is as follows: Being suitably located with reference to the wells to be pumped, preferably near the center of the group, the wells are attached to ring I of the power by suitable connection, as by surface-rods, care being taken in attaching to the various points of ring I to balance as far as possible the gravity and frictional resistance of the several wells, so that as nearly as possible equal power may be required throughout a revolution. Power is communicated through counter-shaft D and wheels G and F and shaft C to the eccentric H, by which an oscillatory motion is communicated to ring I and by it, through surface-rods and suitable connecting mechanism, reciprocating motion to the well operated.

When for any reason it is desired to stop the action of one or more wells while the balance is operated, the rods connecting such wells with I should be disengaged from I and attached to ring E, as the gravity and frictional resistance of the well not operated become an anchor to the power and a counterpoise to the strain from other directions by the wells still being pumped. Ring E thus serves the double purpose of making the posts B rigid and of anchoring the entire power against unequal lateral strains.

Some of the advantages of the mechanism described and illustrated for the purpose specified are as follows: Accuracy of adjustment, economy of construction and repair, mechanical convenience in repairing or renewing parts, and economy of power in operation.

It is practically both inconvenient and ex-



pensive in heavy and irregular-shaped castings, such as are necessary in forming the frame to my power, to turn and plane the castings to perfect alinement and exact dimensions, and when so dressed when any considerable wear shows in the bearing parts some device must be resorted to to take up the loss or the parts must be wholly renewed to keep the machine in effective condition. By the use of the bearings I have above described the heavy parts may be used as they come from the mold without machine-dressing by simply adjusting the bushings inclosing the antifriction-rolls forming the immediate bearing to the shaft and making the whole solid by the set-screws and any suitable packing.

Should at any time the bushings become worn too much and need replacing, it may be removed and another inserted in its place without the inconvenience of removing the shaft or even of raising it temporarily from its bottom bearing, as the bushing made, as described, of a thin sheet of metal can be sprung open and so placed about the shaft. This is an important advantage as to the upper bearing especially, as it comes between the solidly-attached wheel F and the eccentric H, so that without the device of the open bushing one of these wheels would have to be removed from the shaft to replace the part. This bushing *s*, as also the terminal cap *c* to shaft C and the bearing-plate *c'*, may be tempered exceedingly hard, so as to greatly resist ordinary wear, without the expense and inconvenience of so tempering and working the larger and heavier parts, and should the bearing at the bottom of shaft C, formed by the cap *c* and plate *c'* and the balls *c'''* between, become by wear or breakage or otherwise out of order they may be easily repaired and replaced by duplicate parts by simply temporarily raising shaft C and removing the lateral bearing in socket *a*.

The method of controlling the journal-blocks *d*, holding the bearings of the shaft D, is also a great advantage, for by their means not only may leveling and alinement be rectified within certain limits, but perfect adjustment may be made of the wheels F and G and wear thereon compensated.

Experience has shown that in the use of a roller-bearing about a large perimeter, as that of eccentric H, when the rolls are placed in normal vertical position with sufficient practical working space between them to obviate binding, &c., that by the wear and friction of revolution they have a tendency to get into positions diagonal to their normal vertical position, thereby creating a large amount of unnecessary friction and consequent loss of power. By inserting in such a series of rolls shoes *l*, thereby dividing the series into sections of such a size that the aggregate of wear and working space does not allow opportunity for any great degree of tipping of the rolls of that section or the communication of

such tipping to other sections, this tendency is overcome, and the small amount of friction caused by the insertion of such shoes is unnoticeable.

It will be noticed that the mechanism above illustrated is applicable both for the purpose specified in the form described and in modifications of it that will be at once suggested to any machinist or mechanic for many other applications. I do not therefore confine myself to the forms or parts as described, nor to specific arrangement beyond those mechanically necessary to accomplish the objects stated, but expect to use the same with such modifications as may be desirable without departing from the spirit of my invention for all purposes to which the same may be applicable.

I am aware that eccentrics with encircling non-rotating rings upon vertical shafts for the purpose of developing and communicating oscillatory motion and converting the same into reciprocal motion have been in use publicly for some time and to some extent with roller-bearings between such eccentric and ring and that the same are in use for the purpose of distributing and equalizing the application of power in the pumping of oil and other deep wells. I am also aware that both ball and roller bearings are widely used in the transmission of mechanical power in many forms and that some other features of the mechanism I have described are in use and known for other purposes. I do not herein, therefore, broadly claim any novelty in the use of such devices; but,

Having above described my invention in all its parts, so that any skilled machinist may build or operator use the same or any suitable modification of it, what I claim as novel, and desire to secure by Letters Patent, is—

1. A frame for a power device comprising a rigid cast bed A, having at its center a socket *a*; posts or risers B rigidly attached to bed A, and curving inwardly, meeting at their upper concaved ends *b*, about the vertical axis of socket *a*, and adapted by bolts through flanges *b'* to be solidly fastened together; and a ring E having holes *e*, said ring encircling and rigidly attached to posts B, substantially as above described.

2. In a frame of a power device, the combination of a bed-piece A, having a socket *a* at its center, and posts B rising from its perimeter and curving inwardly meeting by concaved ends about the vertical axis of said socket *a*, with a ring E, rigidly attached to posts B, and having holes *e*, as and for the purpose above described.

3. In a power device a bearing for a vertical shaft D, comprising antifriction-rolls *r*, a hard thin metal bushing *s*, its wall severed by a diagonal slit J; a heavy bushing of softer metal *s'* and set-screws *p* and *p'* for adjusting and holding said bushings substantially as and for the purpose specified.



4. In a power device the combination of an antifriction-bearing sustaining the weight of a rotating vertical shaft C, comprising a terminal cap *c* to said shaft, having on its under side a groove *c'''*, a bearing-plate *c'* having a corresponding groove *c''* said grooves containing balls *c''''*, with an antifrictional bearing sustaining the lateral strain of said shaft C, comprising rolls *r*, a thin hard-metal bushing *s*, a softer heavy bushing *s'* and set-screws *p* and *p'*; both said bearings being contained in a socket *a*, substantially as and for the purpose above specified.

5. In a power device, the combination of a frame comprising a cast bed-piece A, provided at its center with a socket *a*, adapted to contain a bearing for the foot of a rotating vertical shaft C; risers or posts B securely fastened at their feet to said bed-piece A, curving inwardly and meeting by upper concaved ends *b*, and adapted to be solidly fastened by flanges *b'* about the vertical axis of socket *a*, and to receive within the orifice formed by

said concaved ends *b*, a bearing for the upper end of said vertical shaft C, with a vertical shaft C, adapted to be rotated and bearing solidly attached thereto wheel F, and eccentric-wheel H, with an encircling ring I, substantially as and for the purpose above described.

6. In an eccentric device for converting rotary motion into reciprocating motion comprising the eccentric-wheel H, solidly mounted upon a vertical rotating shaft C, and bearing loosely mounted on a flange *h* by travelers, an encircling non-rotating ring I, said eccentric H and ring I having between them an antifrictional bearing formed by a series of vertical rolls *r'* broken into sections by rectangular shoes *l*, the combination of such eccentric H and ring I with rolls *r'* and shoes *l*, as and for the purposes above described.

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