

No. 681,424.

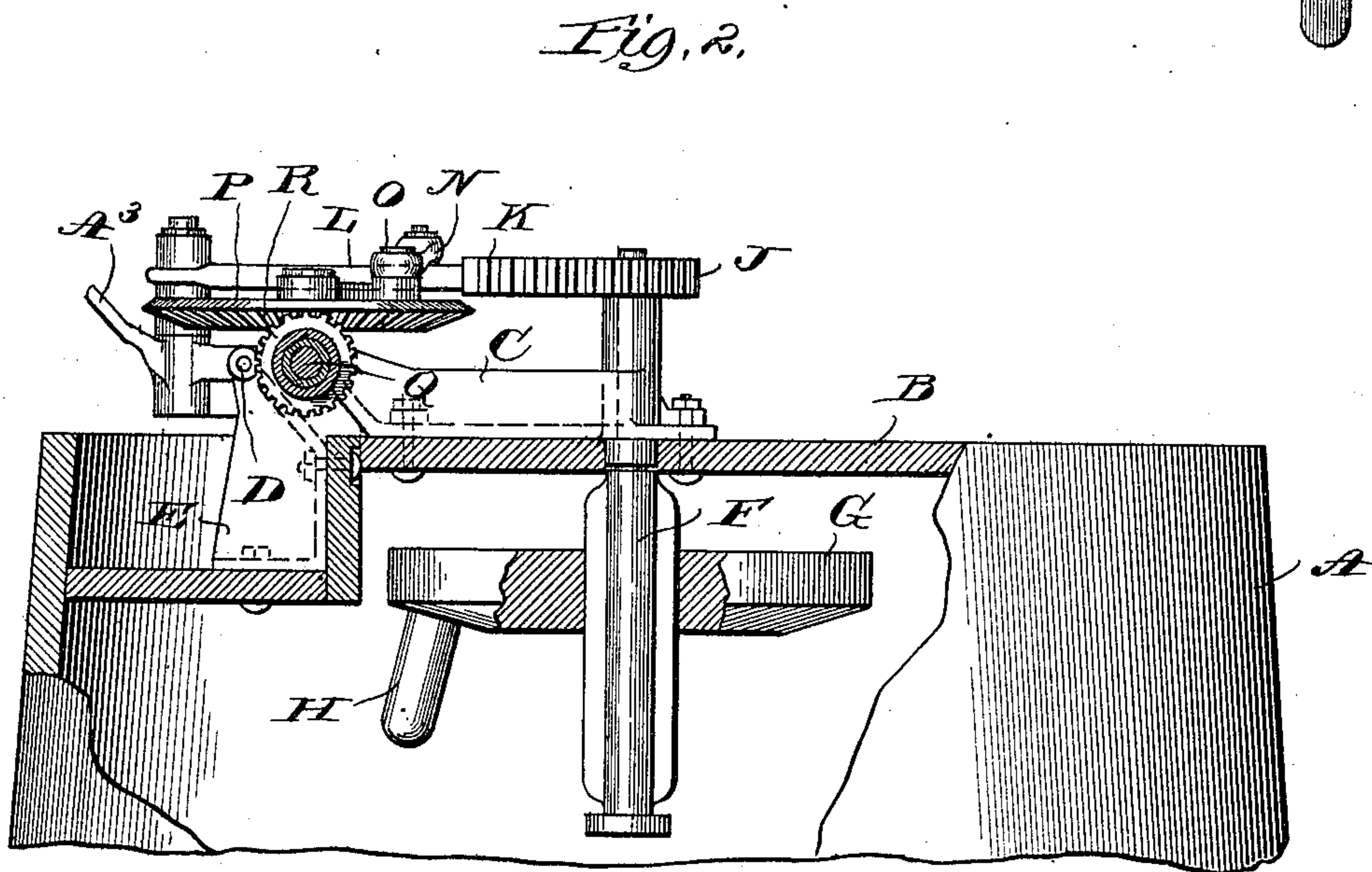
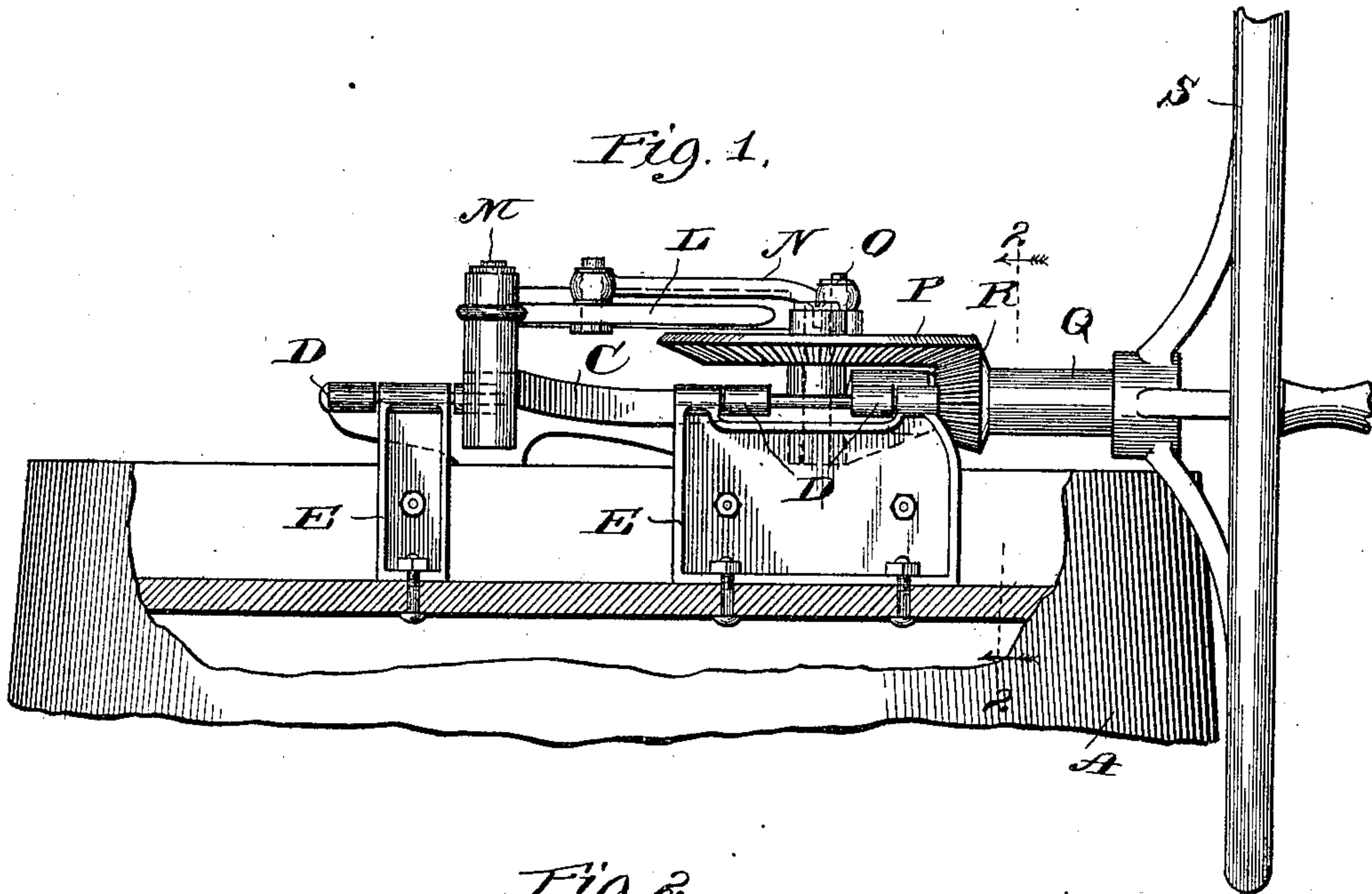
Patented Aug. 27, 1901.

H. SAWYER.  
GEARING FOR WASHING MACHINES.

(Application filed June 27, 1900.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses  
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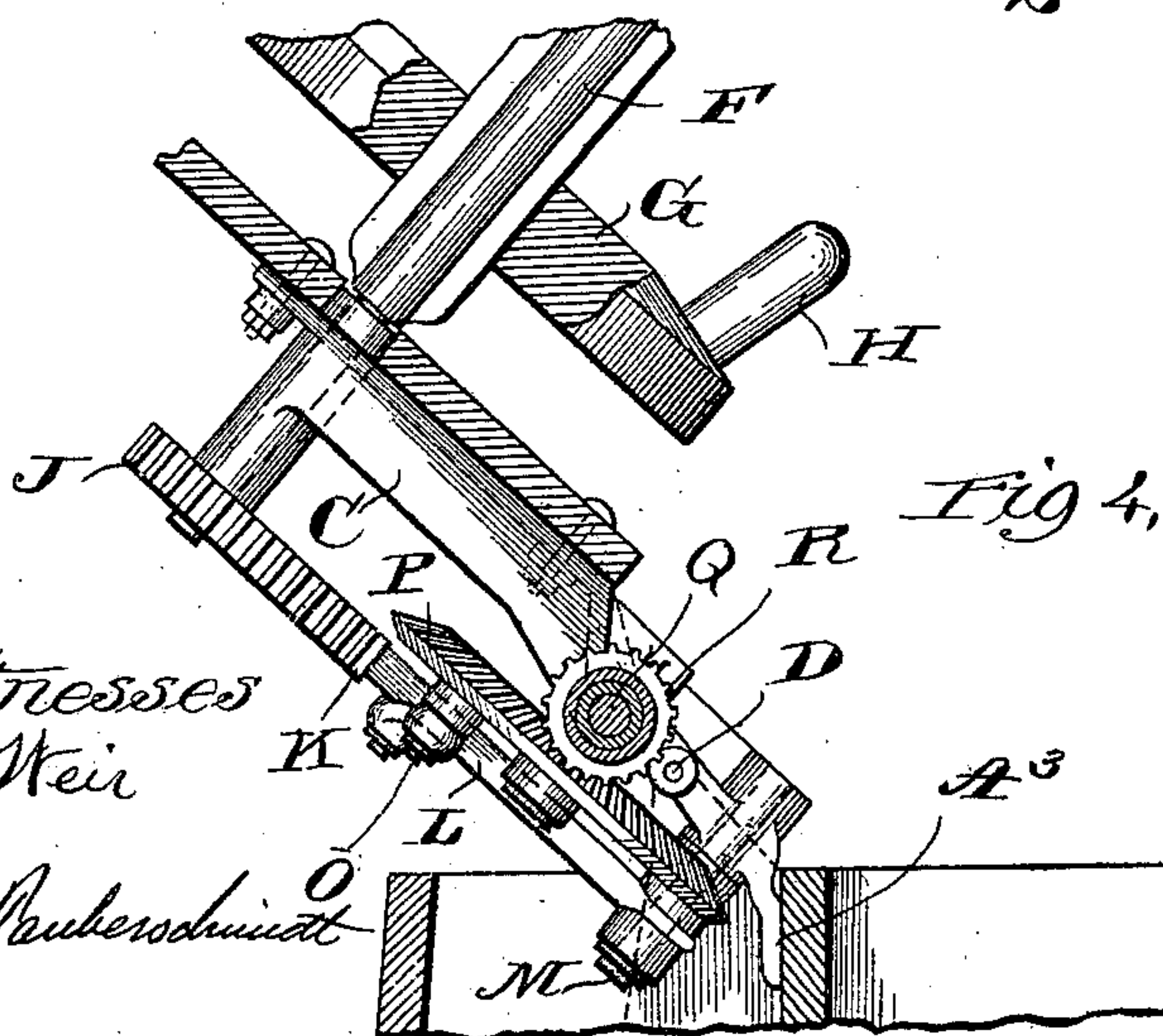
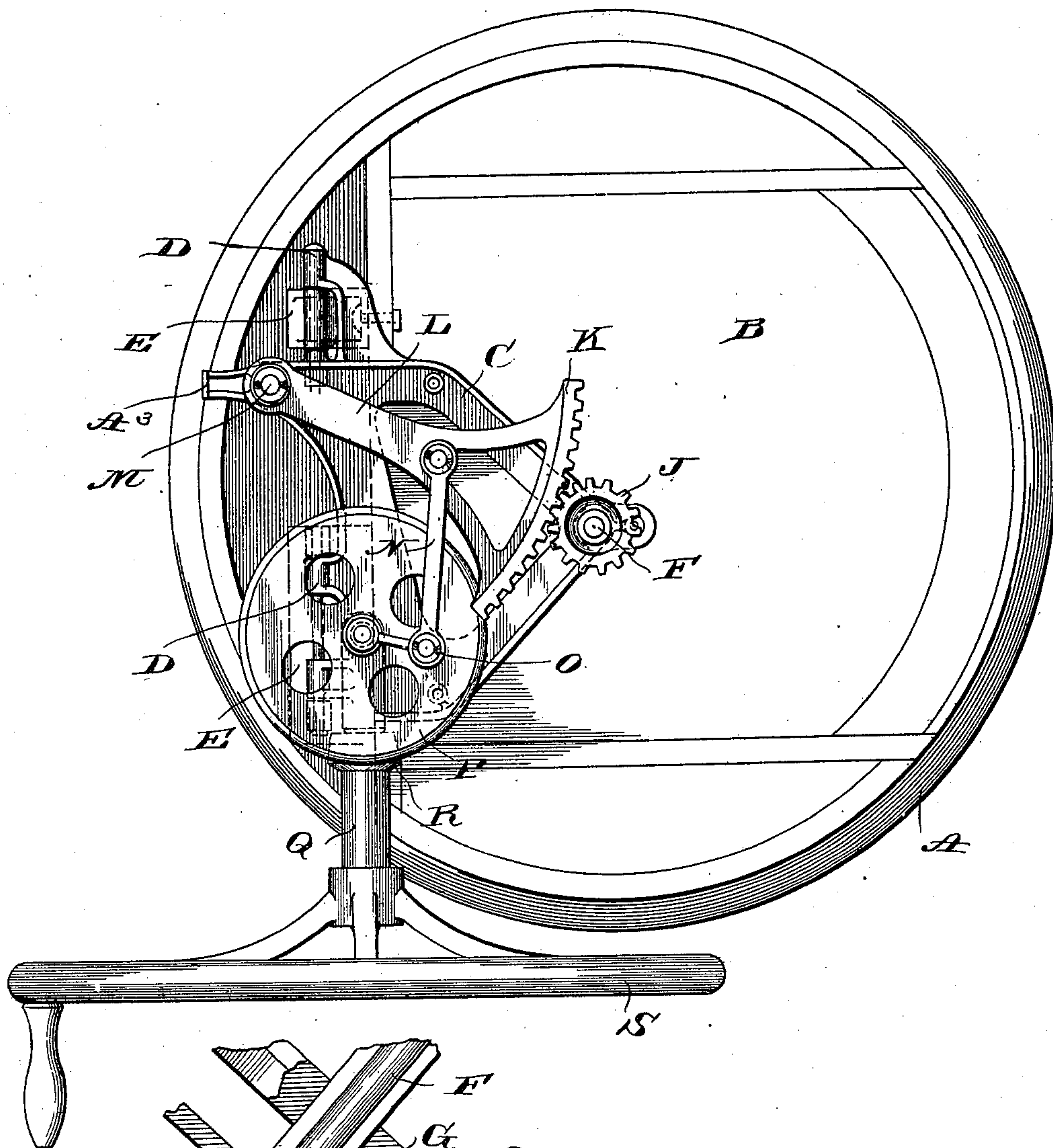
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Fig. 3.



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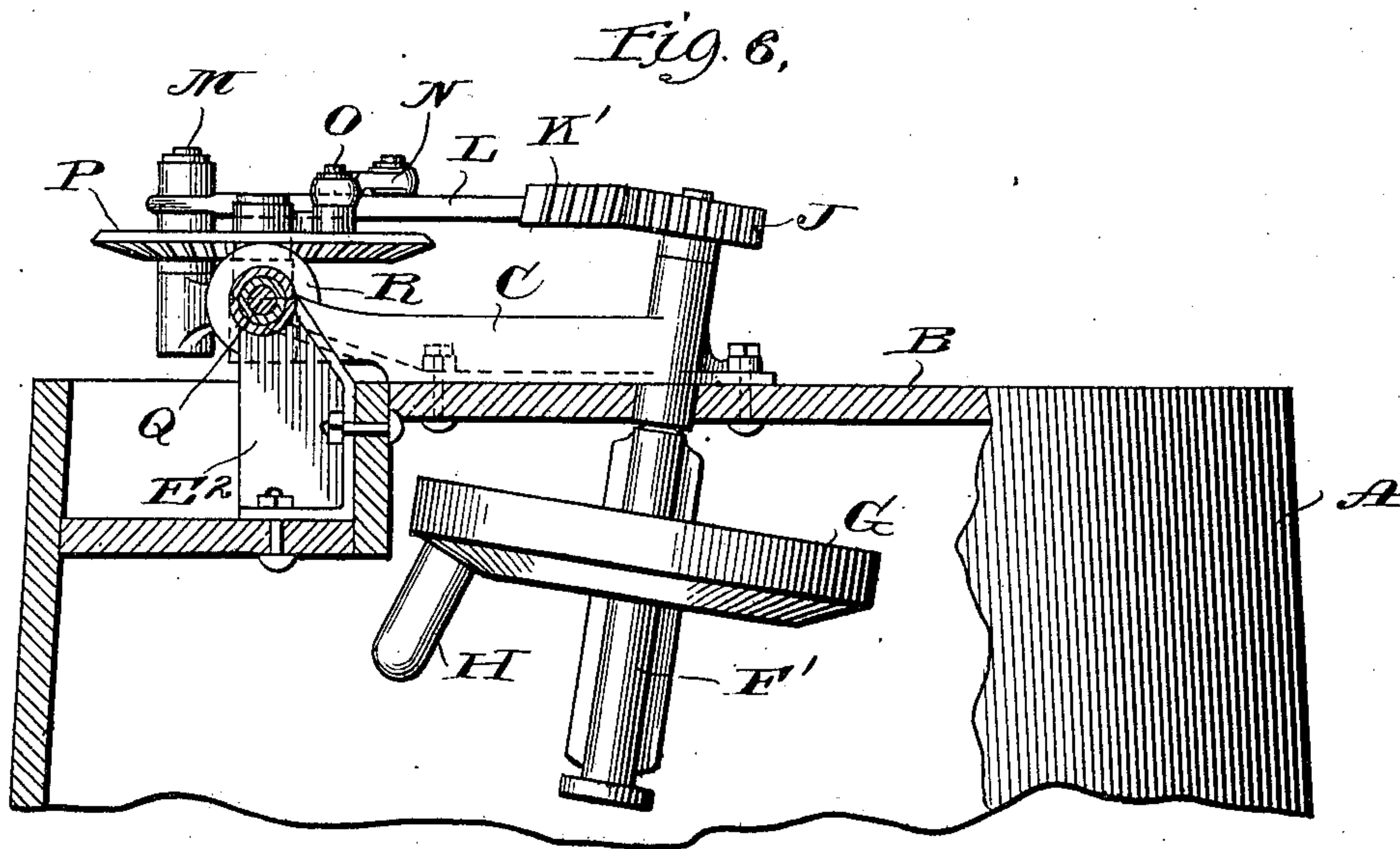
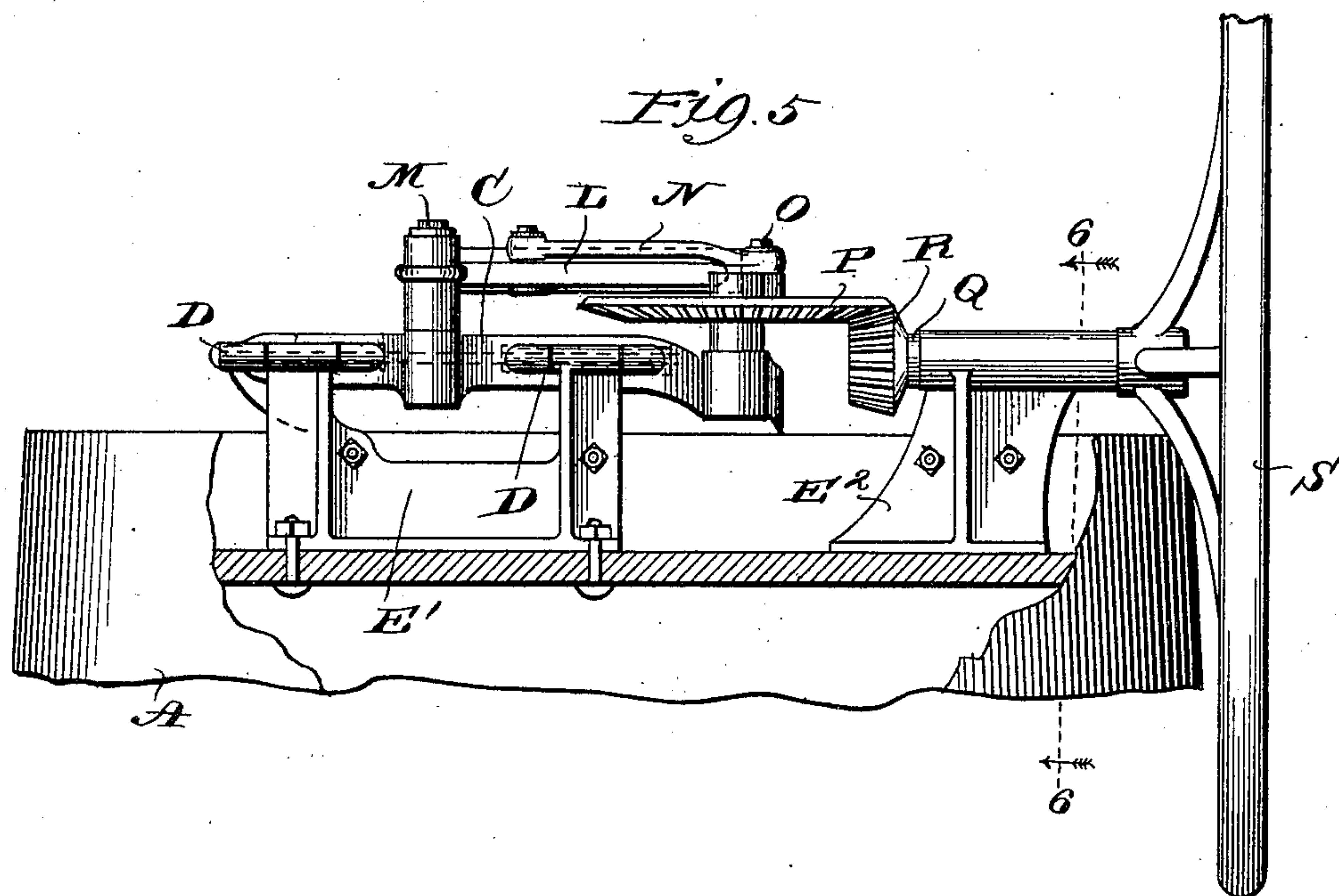
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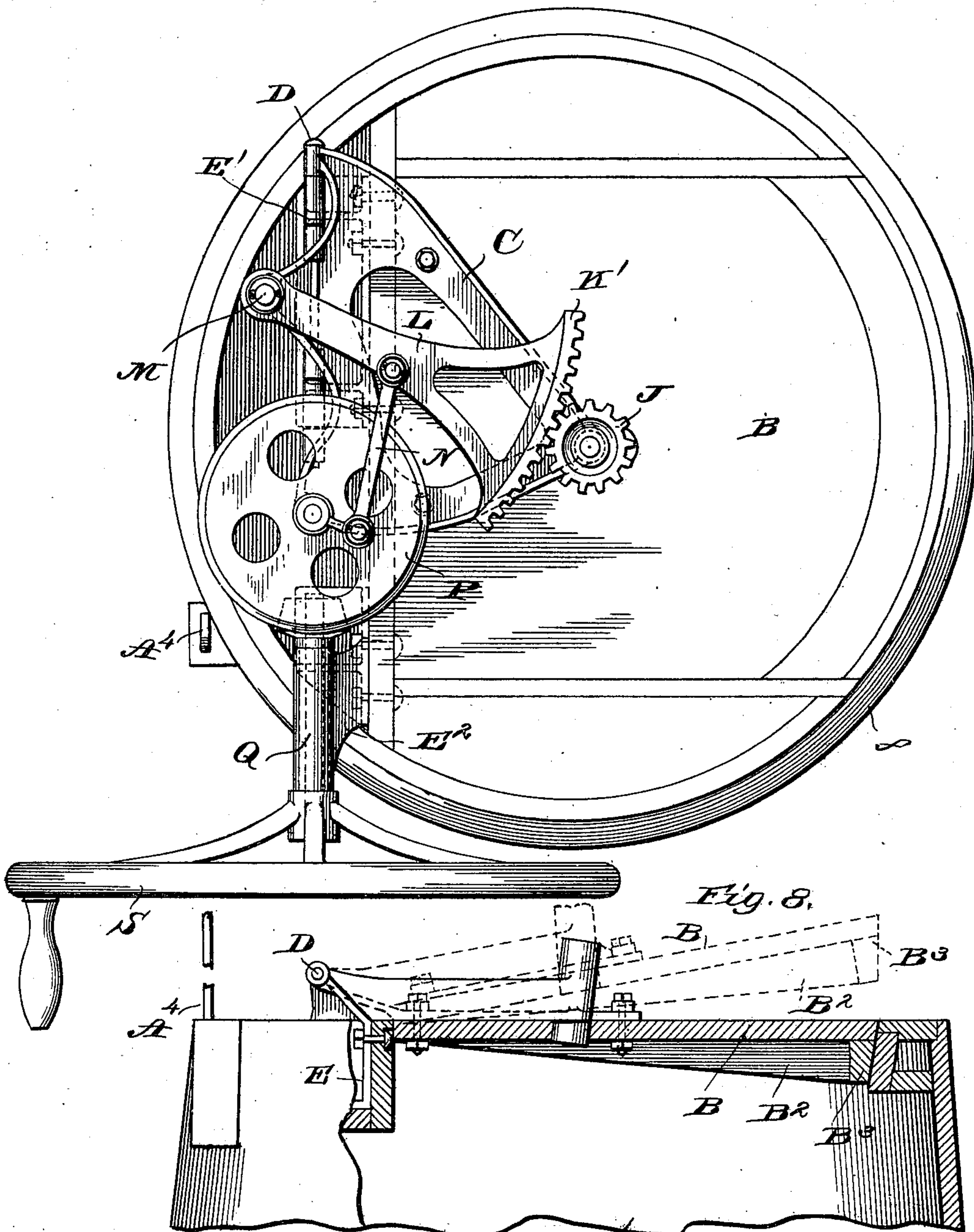
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4 Sheets—Sheet 4.

Fig. 7.



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# UNITED STATES PATENT OFFICE.

HARRY SAWYER, OF MUSKEGON, MICHIGAN.

## GEARING FOR WASHING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 681,424, dated August 27, 1901.

Application filed June 27, 1900. Serial No. 21,742. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY SAWYER, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented new and useful Improvements in Gearing for Washing-Machines, of which the following is a specification.

This invention relates to improvements in gearing for washing-machines.

The object of the invention is to simplify and improve the construction of washing-machines of the type wherein an oscillatory movement is imparted to a stirrer arranged within the tub or other receptacle and to render the same more efficient and more readily, easily, and smoothly operated.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in rear elevation, parts being broken off and parts being broken out, of a washing-machine embodying the principles of my invention. Fig. 2 is a vertical section on the line 2 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a plan view of the construction shown in Figs. 1 and 2. Fig. 4 is a view similar to Fig. 2, showing the cover of the washing-machine and the associated parts of the stirrer-operating mechanism in raised or open position. Fig. 5 is a view similar to Fig. 1, showing a slightly-different arrangement of parts. Fig. 6 is a sectional view similar to Fig. 2, taken on the line 6 6, Fig. 5, looking in the direction of the arrows. Fig. 7 is a top plan view of the construction shown in Figs. 5 and 6. Fig. 8 is a broken detail sectional view showing in dotted lines a displaced position of the cover of the washing-machine.

The same part is designated by the same reference-sign wherever it occurs throughout the several views.

It is common in machines of the class to which this invention relates to employ a stirrer

arranged within a tub or other receptacle, and various arrangements of mechanism have been proposed for imparting motion to such stirrer. One way has been to mount the stirrer upon a rotary or rotarily-oscillating shaft, and mechanisms of various kinds have been employed for imparting the desired rotarily-oscillating motion to such shaft; but difficulty has been experienced with some forms of reversing mechanism employed by reason of the fact that the stirring-shaft is stopped while under full speed and reversed suddenly, thereby imposing objectionable strain upon the parts, increasing the labor required for operating the shaft, and incurring the danger of injuring the materials being washed. In the constructions illustrated in the accompanying drawings I have provided a simple and efficient arrangement of gearing for accomplishing the desired actuation of the stirrer-shaft and the reversals of the rotarily-oscillating movements thereof in such manner as to avoid the objections noted.

In carrying my invention into practical operation I employ a tub or other receptacle A, which may be of any suitable size, dimension, or shape. In the form shown, to which, however, the invention is not to be limited or restricted, I employ a tub or barrel of cylindrical shape and which is provided with a cover B. In the particular construction and arrangement shown in Figs. 1, 2, 3, and 4 a bracket or casting C is suitably secured to the cover B, said bracket or casting being hinged or pivoted, as at D, to brackets E, carried by the tub, so that said cover may be swung or turned about its hinges or pivots to open or close the tub. Suitably journaled in the cover B is the stirrer-shaft F. Suitably splined to partake of the rotary movements of shaft F, but capable of movement longitudinally thereof, is a spider G, which is provided with downwardly-projecting pins H and which serves the purposes of a stirrer for the materials to be washed. Carried by the end of shaft F which projects above the top or cover B is a gear J, with which meshes a segmental rack K, carried by a lever L, suitably pivoted, as at M. The desired swinging movement of lever L, whereby reciprocatory rotary movement is imparted to shaft F through the engagement of segment-rack K and pinion or



gear J, is secured by means of a link N, pivotally connected at one end to said lever L and at the other end to a crank or wrist pin O, carried by a bevel-gear P. A shaft Q carries a bevel-pinion R, arranged to mesh with and rotate bevel-gear P. Rotation is imparted to said pinion and shaft through a hand-wheel S or other suitable driving device. From this description it will be seen that the rotary movement of drive-wheel S and drive-shaft Q is transformed into reciprocatory oscillating movement of stirrer-shaft F. It will also be seen that the rotary movement of the stirring-shaft is reversed through the arrangement of the segment-rack, pivoted lever, and link connected to the crank or wrist pin on gear P. It will also be seen that this reversal is effected by slowing up gradually at the limit of the rotating movement of said shaft F in one direction and that the movement in the reverse direction begins gradually. It will also be seen that the link or connecting rod N is connected directly to the lever L, which carries the segment-rack, and to the wrist or crank pin of gear P, and hence I secure an exceedingly simple and efficient arrangement of gearing for accomplishing the desired object with the fewest possible number of parts, thereby reducing the labor of operation and relieving the mechanism in the various parts thereof of undue strain.

The arrangement of gearing above described is substantially the same in the constructions shown in Figs. 5, 6, and 7, with some minor modifications, to which attention will now be called.

Instead of employing separate brackets E E, as in Figs. 1 and 3, for the hinges or pivots of cover B, said hinges or pivots in the constructions shown in Figs. 5, 6, and 7 are carried in a single bracket E', and instead of mounting the shaft Q in casting C or the cover B and journaling the bevel-pinion and its operating device S to rotate thereon said shaft in Figs. 5, 6, and 7 is journaled to rotate in a bracket E<sup>2</sup>, carried by the tub, and the pinion R and operating device S are mounted to rotate therewith; but the arrangement is such that said shaft Q is longitudinally in approximate alinement with the axis of the pivots D of the cover, so that said cover may be raised or lowered without disturbing the intermeshing relation or engagement of the bevel-pinion and gear R P. In other respects the drive-wheel S, shaft Q, pinion R, gear P, link or rod N, and lever L may be substantially the same in construction and mode of operation as above described with respect to Figs. 1, 2, 3, and 4, and the arrangement of shaft Q in alinement with the pivots about which the cover or top hinges or swings in the construction shown in Figs. 5, 6, and 7 retains, as above stated, the intermeshing relation of pinion R and gear P. The same result is attained in the construction shown in Figs. 1, 2, 3, and 4 by mounting the gear P and main drive-shaft Q

in fixed relation upon the top or cover, so that when said top or cover is moved or swung to open or closed position such relation is not disturbed.

In the efficient operation of a washing-machine it is desirable to impart to the materials being washed a movement toward and from the inner surface of the tub or receptacle. This movement may be toward or away from the side walls of the tub or it may be an up-and-down movement toward and away from the bottom. Many different ways for imparting the movement of the materials toward and from the inner surface of the tub may be employed. For instance, in Figs. 2 and 3 I have shown the stirrer-shaft F arranged out of or to one side of the geometric center of the tub, as most clearly shown in the plan view in Fig. 3, and hence the rubber or spider G will operate out of the center with respect to the tub. By this arrangement it will be seen that the materials being operated upon will be pushed and pulled toward and from the sides of the tub. The same generic idea—namely, a movement of the materials from the inner surface of the tub—may be secured by arranging the stirrer-shaft in inclined position, as clearly shown in Fig. 6, wherein the shaft F' is shown inclined. In this case the stirrer-head or spider G will operate in an inclined plane, and hence out of a horizontal plane or out of a plane parallel with the bottom of the tub. In this construction of course the gear-segment K' and pinion J should be correspondingly shaped or beveled to accommodate the inclined position of pinion J. With the rubber or spider G arranged in the relation shown in Fig. 6—that is, arranged to operate in a plane inclined with reference to the plane of the bottom of the tub—a movement of the clothes or other materials being operated upon is effected toward and away from the bottom of the tub. Of course it is evident that in either case the spider G will be arranged out of the center of the tub, and whether arranged in the center of the tub or not may or may not be arranged to operate at an angle of the horizontal line, so far as the generic principles of my invention are concerned, the essential and generic feature being the arrangement of such spider to effect a movement of the clothes toward and away from the inner surface of the tub.

It is desirable to provide means whereby when the cover or top B is turned or dropped into closed position, as shown in full lines in Fig. 8, it will drop into place without imparting injurious shocks or jars to the mechanism carried thereby. To effect this result, I so construct the top or cover and the seat in which it is received when in closed position that there will be a considerable movement of the cover in closing after the opening in the top of the tub is partly closed, so that the air-cushion inside the tub will prevent the cover from slamming if dropped. This



result is secured by making the cover or the opening which it is to close of considerable depth. As shown in Fig. 8, the top or cover is provided with a depending flange B<sup>2</sup>. This  
 5 flange at the front edge of the top or cover and also said front edge is beveled, as indicated at B<sup>3</sup>, to approximate the arc of a circle struck from the axis of the hinge and to fit the corresponding shape of the seat formed  
 10 in the top of the tub to receive it. By this construction it will be seen that when the cover is moved toward closed position the opening controlled thereby is closed for a considerable extent before the cover reaches or  
 15 attains its final closed position, the final movement of the cover toward closed position being permitted only as the air confined within the tub is displaced or leaks out through the cracks around the cover or otherwise.  
 20 It is desirable to provide means whereby the cover may be supported when raised into open position. This result may be accomplished in many different ways. In the construction shown in Figs. 2, 3, and 4 I employ  
 25 a projecting heel A<sup>3</sup>, which when the cover is raised into open position, as shown in Fig. 4, engages or bears against a convenient part of the tub and forms a rest for the cover and the mechanism carried thereby to support  
 30 the same in raised position. In Figs. 7 and 8 I have shown a standard A<sup>4</sup>, upon which the cover may rest when in raised position. For many reasons the construction shown in Fig. 8 is preferable. For instance, the stand-  
 35 ard A<sup>4</sup> may serve as a hand-rest for the operator when the cover is closed and while turning the hand-crank of operating-wheel S, thus affording a restful support for the operator of the machine and also serving to counteract the strains applied to the handle and  
 40 to prevent the tub from being moved if worked under a heavy load.

It is obvious that many variations and changes in the details of construction and  
 45 arrangement would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention; but,

Having now set forth the object and nature  
 50 of my invention and various constructions and arrangements embodying the generic principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United  
 55 States, is—

1. In a washing-machine, a hinged or piv-

oted support, a shaft carried by said support, a pinion mounted on said shaft, a lever pivotally mounted at one end on said support and carrying a segment-rack arranged to en- 60  
 gage said pinion for actuating the same, a drive-gear also carried by said support, a link pivotally connected at one end eccentrically to such operating-gear and at the other end  
 65 to said lever, and a drive-shaft arranged in axial alinement with the hinge of said support for actuating said operating-gear, as and for the purpose set forth.

2. In a washing-machine, a hinged or piv- 70  
 oted support, a shaft carried thereby, a pinion mounted on said shaft, a lever pivotally mounted at one end on said support and carrying a segment-rack arranged to engage and operate said pinion, a drive-gear carrying a  
 75 crank-pin, a link pivotally connected at one end to such pin and at the other end to said lever, and a driving-shaft for said gear, said shaft being arranged in axial alinement with the hinges or pivots of said support, as and  
 80 for the purpose set forth.

3. In a washing-machine, a support, a shaft carried thereby, a pinion mounted on said shaft, a segment-gear arranged to operate in a plane approximately parallel with the sur- 85  
 face of said support and engaging said pinion, an operating-gear also arranged to operate in a plane approximately parallel with the surface of the support, and a link connecting said segment with said operating-gear,  
 90 and means for actuating said operating-gear, as and for the purpose set forth.

4. In a washing-machine, a hinged or piv- 95  
 oted support, a shaft carried thereby, a pinion mounted on said shaft, a gear-segment carried by said support and meshing with said pinion, an operating-gear also carried by said support, a link pivotally connected at one end to said segment-gear and at the  
 100 other end eccentrically to said operating-gear, a pinion for actuating said operating-gear, a shaft carrying said pinion, said shaft being arranged in axial alinement with the hinge of said support, and means for rotating said shaft, as and for the purpose set forth.

In witness whereof I have hereunto set my  
 105 hand, this 21st day of June, 1900, in the presence of the subscribing witnesses.

HARRY SAWYER.

Witnesses:

OTTO ALBERT,  
 T. C. AKIN.