

No. 704,583.

Patented July 15, 1902.

C. W. SCHINDLER & J. FREEMAN.

HYDRAULIC MOTOR.

(Application filed July 15, 1901.)

(No Model.)

3 Sheets—Sheet 1.

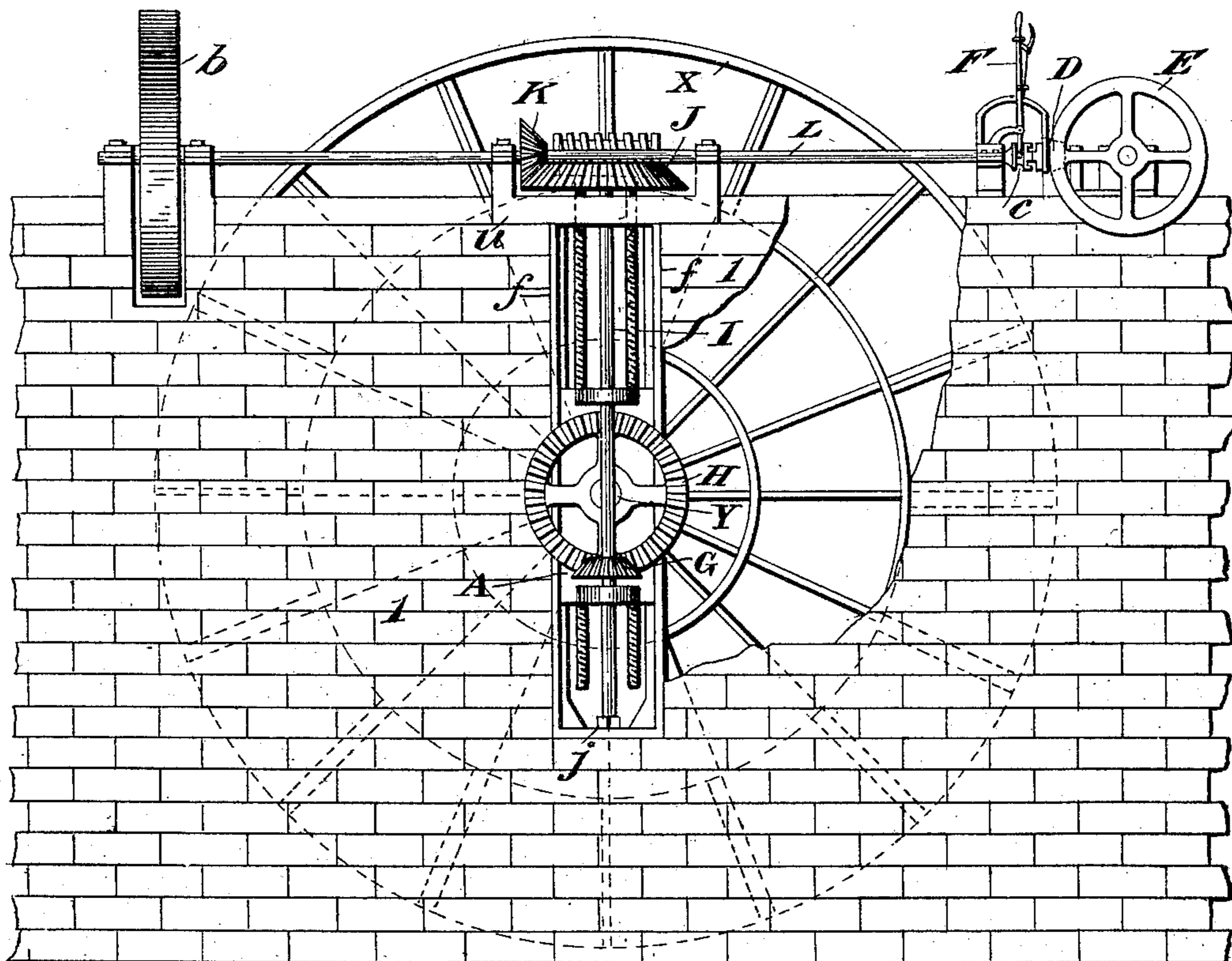


Fig. 1.

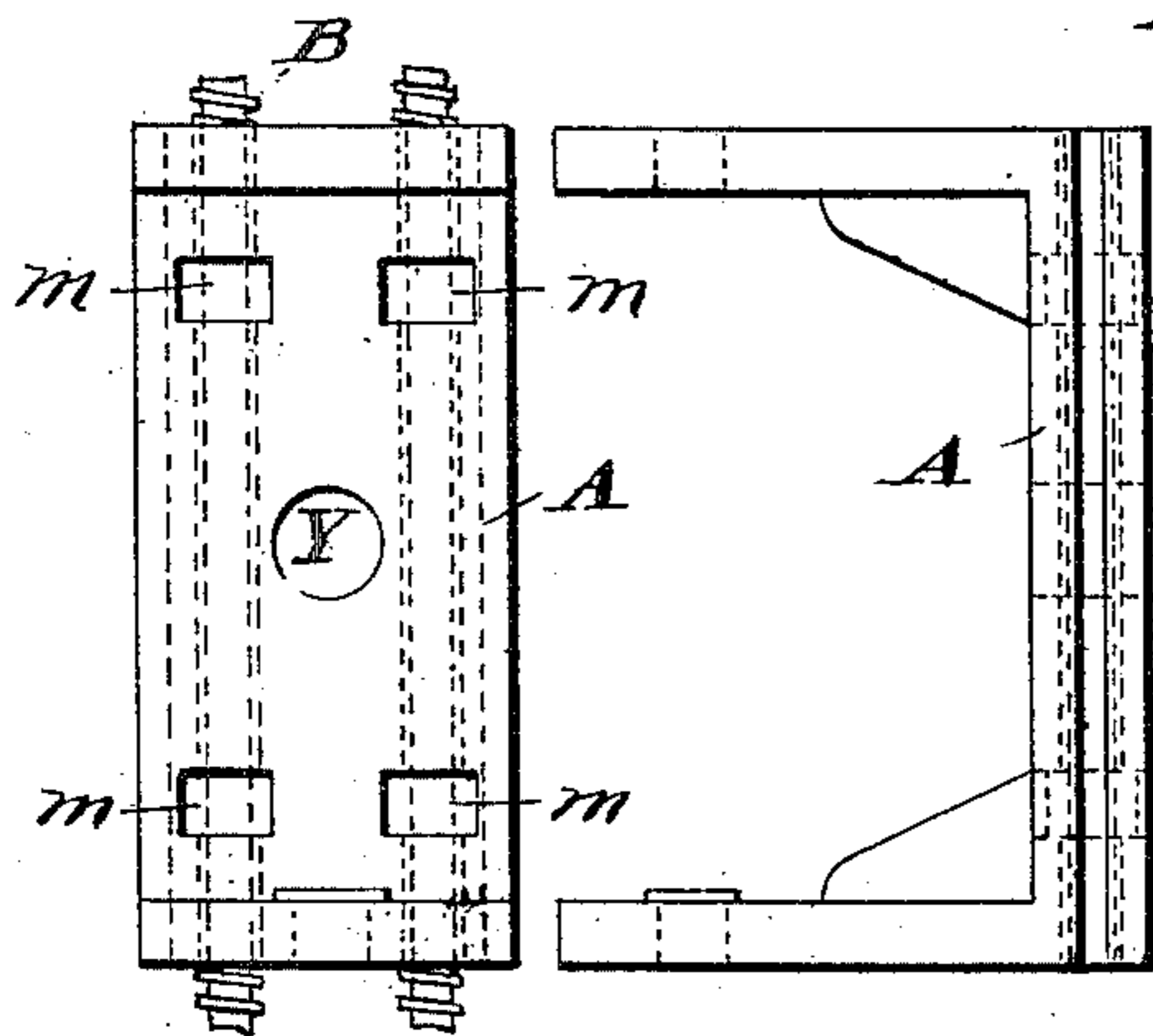


Fig. 2.

Fig. 3.

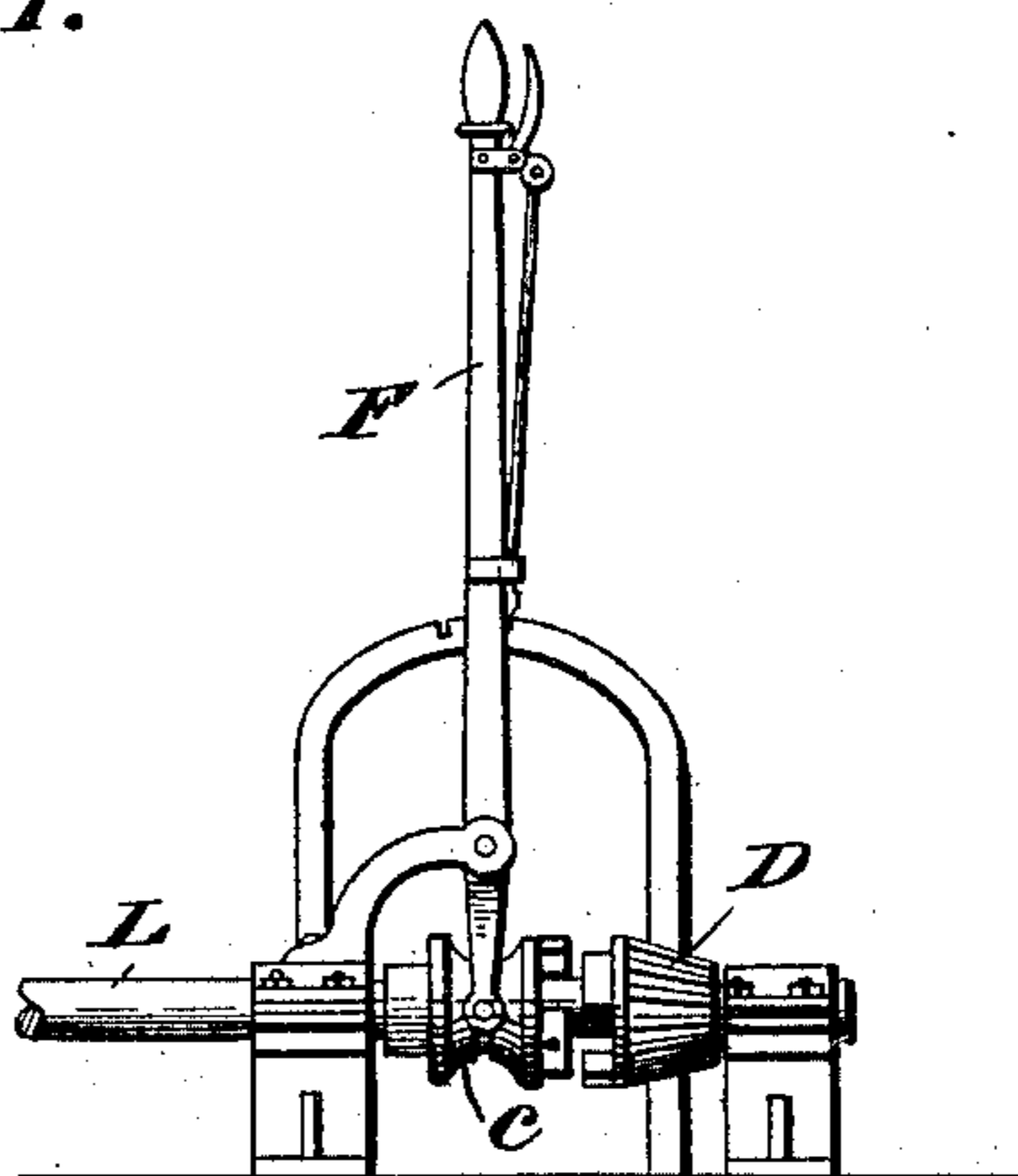


Fig. 4.

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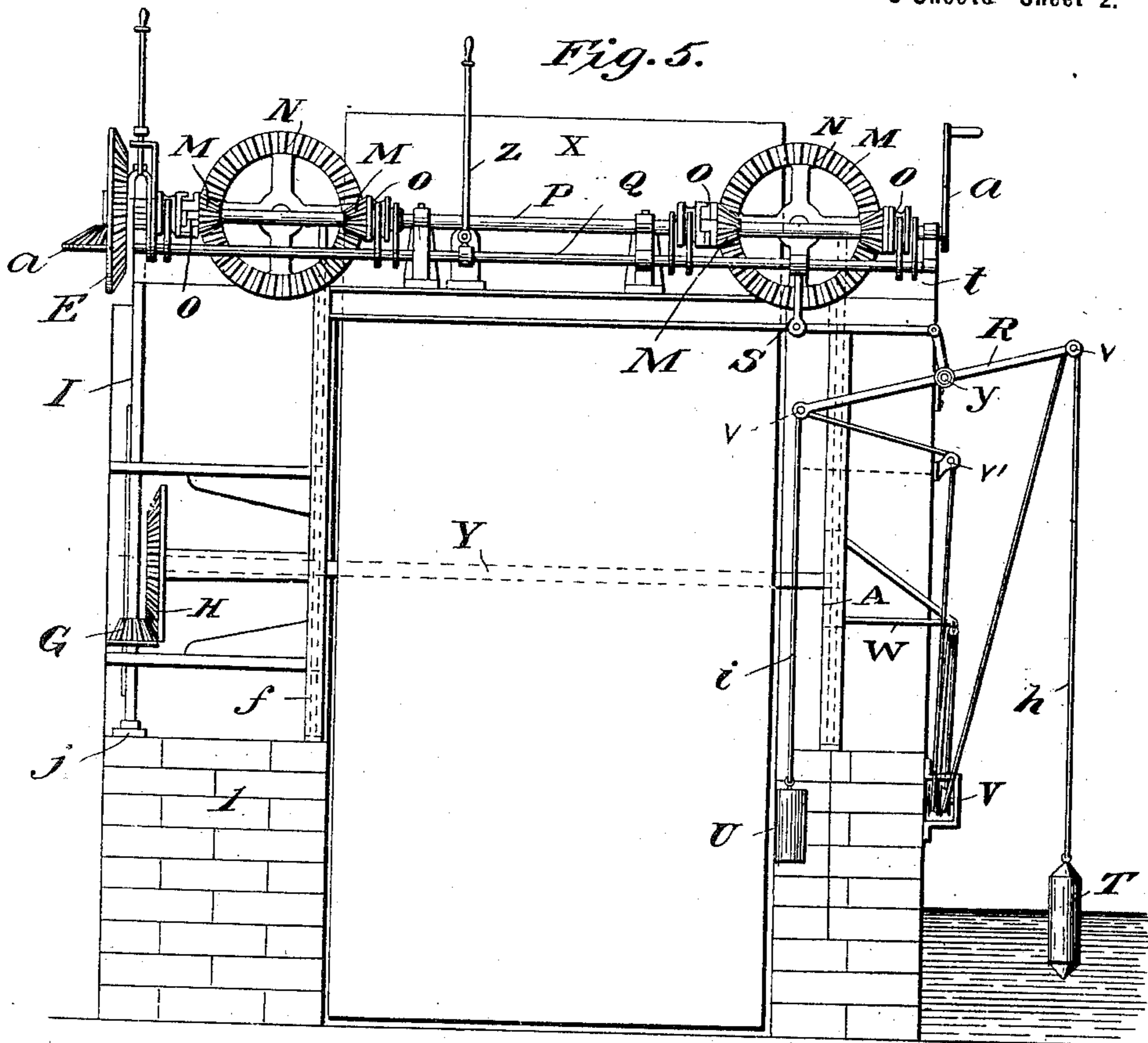
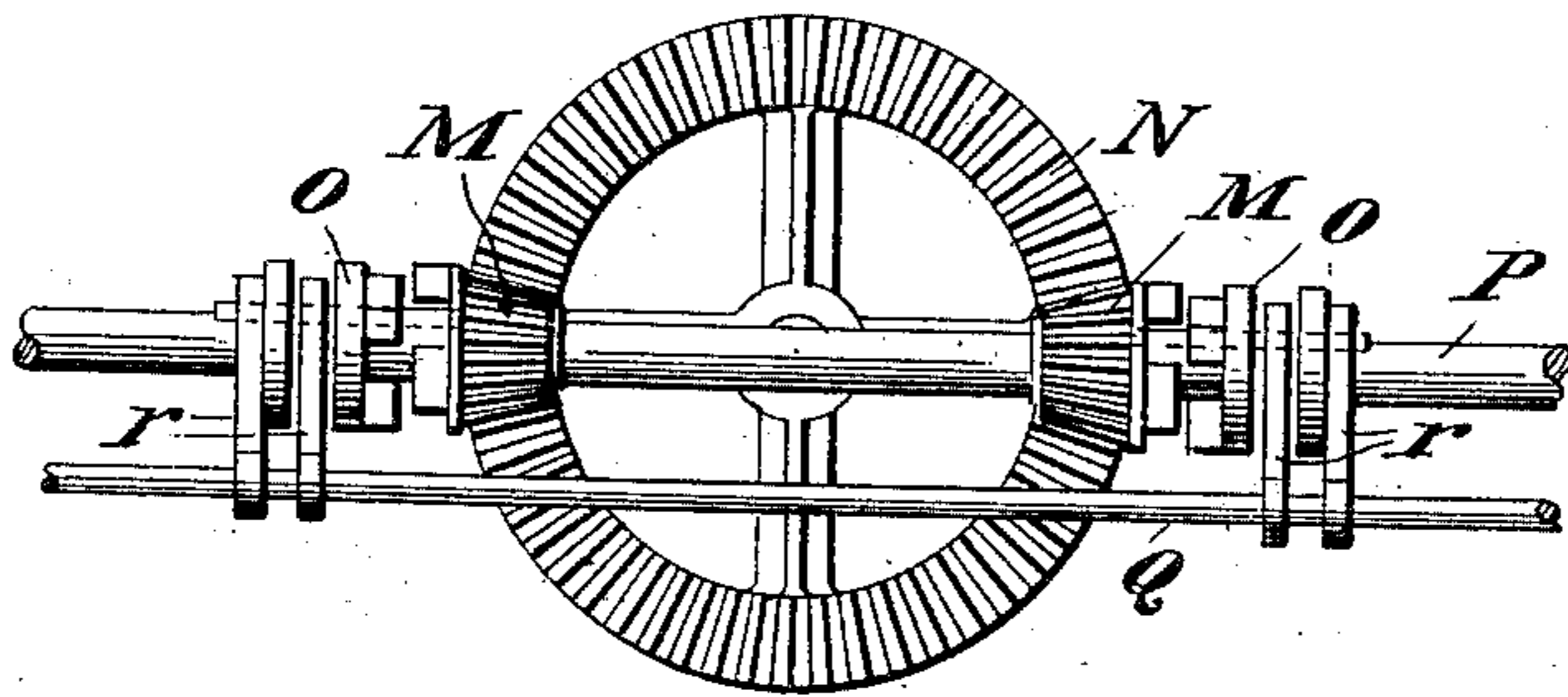


Fig. 6.



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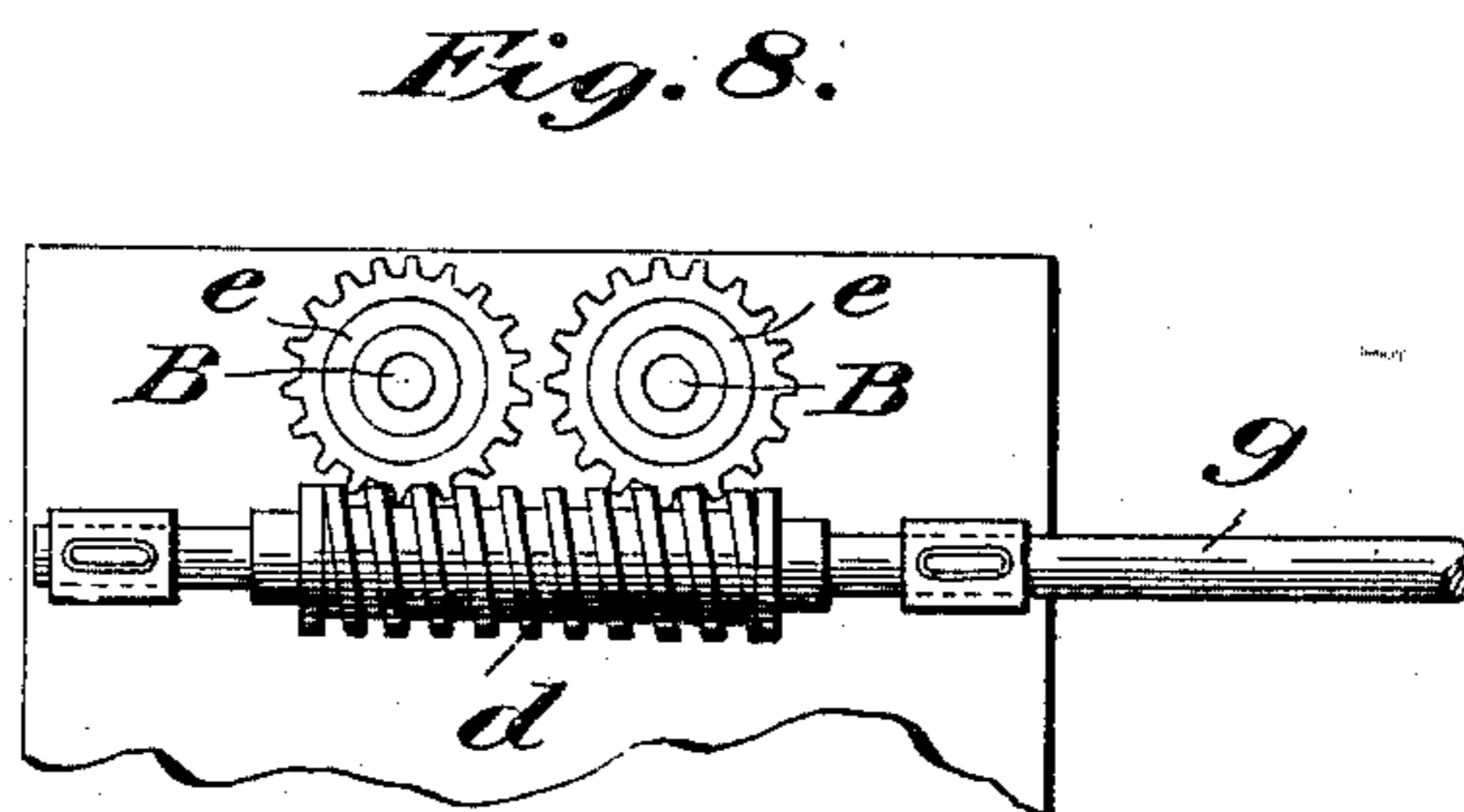
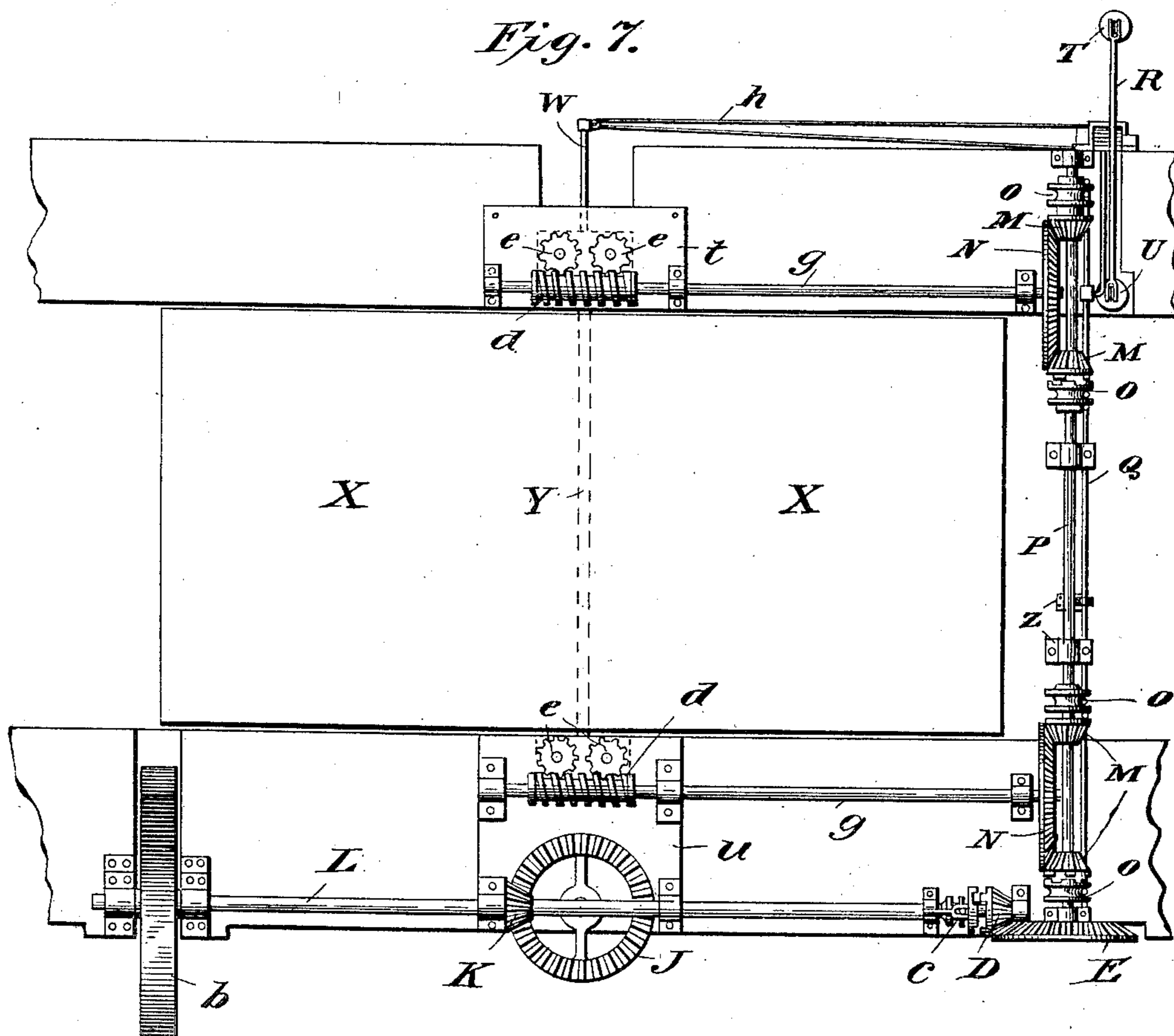
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

CHARLES W. SCHINDLER AND JOHN FREEMAN, OF NEW ALBANY, INDIANA.

HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 704,583, dated July 15, 1902.

Application filed July 15, 1901. Serial No. 68,407. (No model.)

To all whom it may concern:

Be it known that we, CHARLES W. SCHINDLER and JOHN FREEMAN, citizens of the United States, residing at New Albany, in the county of Floyd and State of Indiana, have invented certain new and useful Improvements in Hydraulic Motors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to water-wheels, but more particularly to the class of "rotary hydraulic motors," and has for its object to provide a device of this class which is adapted to be used in streams and rivers which are subject to a great variation in the height of water.

A further object of our invention is to provide a hydraulic motor which can be raised or lowered, so as to conform to the variable height of water in rivers and streams.

A further object of our invention is to provide a hydraulic motor which is permanently secured to the bed of a river or stream, thus distinguishing between "floating" motors.

A further object of our invention is to provide a hydraulic motor which will automatically adjust itself to the height of water in a river or stream.

A further object of our invention is to provide a hydraulic motor which uses its own power automatically to adjust and regulate itself to the height of water in rivers or streams.

A further object of our invention is to provide a hydraulic motor which is simple in its construction, positive in its operation, and, above all, durable and efficient.

With all these objects in view our invention consists principally in our novel manner of automatically adjusting the motor-wheel to the height of water.

Our invention also consists in certain other novel features of construction and in combination of parts, which will be hereinafter fully described, and specifically pointed out in the appended claims.

Referring to the accompanying drawings, Figure 1 is a side elevation of our hydraulic motor in an operative position. Fig. 2 is a detail front elevation of journal-boxing, double lifting-jacks, and threaded nuts in jour-

nal-boxing. Fig. 3 is a side view of said journal-boxing. Fig. 4 is a detail view of clutch and operating mechanism on horizontal power-shaft. Fig. 5 is an end view of hydraulic motor in an operative position. Fig. 6 is a detail view showing gearing connecting the horizontal connecting-shaft P with worm-screw shaft *g*, together with clutches operating the same. Fig. 7 is a top plan view of the motor. Fig. 8 is a detail view of worm-screw and worm-wheels at the upper end of double lifting-jacks.

Like letters of reference indicate the same parts throughout the several figures, in which—

1 indicates the brick walls of a flume.

X indicates the motor-wheel, having blades or buckets.

Y is the main shaft of the wheel, journaled in the boxing A. Said boxing is also provided with horizontal extensions at its top and bottom, through which the vertical power-shaft I passes, and is provided with vertical grooves in its sides, within which the tongues on the upright standards enter.

f indicates upright standards having vertical tongues on the inner sides thereof, within which the journal-boxing A is adapted to move vertically.

B indicates the threaded shafts forming a double lifting-jack, to the upper ends of which are attached worm-wheels *e*, which mesh with worm-screw *d*. The threaded shafts B extend through journal-boxing A and through threaded nuts *m* in journal-boxing A, by means of which said journal-boxing A is firmly held at any desired point on said double lifting-jacks B, and said screws are suspended from the top of the pier and rest on bed-plate *t* on the float side of motor and on bed *u* on the power side of said motor in such a manner as to admit of free rotary movement and extend through journal-boxing A. Secured to the end of said main shaft Y is a bevel gear-wheel H, which meshes with bevel gear-wheel G on vertical power-shaft I, which may be square, octagonal, or round, and if round said shaft is provided with a vertical groove, and the bevel-gear G has a corresponding projection or key in its bore, the object of which construction is to allow the bevel-gear G a free vertical movement on

shaft I and at the same time cause said shaft to turn with said bevel-gear. At the lower end of said power-shaft I is a step or seat *j*, in which said shaft rotates. Secured to the top of said vertical shaft I is a bevel gear-wheel J, permanently secured thereon, which meshes with a small bevel-gear K, permanently secured to horizontal power-shaft L. At one end of said shaft L is a power-wheel *b*, from which power is transmitted, and at the other end of the horizontal power-shaft L is clutch C, operated by clutch-lever F, which clutches with pinion D, and said pinion D meshes with bevel gear-wheel E, which is permanently attached to one end of connecting-shaft P, on which shaft are the four pinions M, loosely carried thereon. The said pinions M mesh with the bevel gear-wheels N, permanently attached to the ends of the two worm-screw shafts *g*, and at the other end of each worm-screw shaft *g* and permanently attached thereto is worm-screw *d*, which meshes with the two worm-wheels *e*, permanently attached to the upper ends of the double lifting-jacks B, that rotate in the threaded nut *m* in the journal-box A, thus raising or lowering the wheel X, as may be required.

Below the connecting-shaft P and parallel with said shaft is clutch-operating shaft Q, to which are attached four clutch-forks *r*, which are so arranged that when said clutch-operating shaft slides to the right it throws the two clutches O on the left of pinions M in mesh with the ends of the two pinions M; but when said clutch-operating shaft Q slides to the left it throws the two clutches O on the left of the two pinions M on connecting-shaft P out of mesh with the pinion-wheels M and throws the two clutches O on the right of said two pinion-wheels M in mesh with said two pinions M.

Attached permanently to clutch-operating shaft Q is a bar with a link S, which connects with a T-shaped bar R, which is fastened on a pivot *y*, so as to permit either end of the horizontal portion of the bar R to move vertically. At each end of the horizontal portion of the bar R is a pulley *v*, and below said horizontal portion of said bar R is a pulley *v'*, and on the outside of the right-hand pier and at a point lower than the wheel-shaft Y or lower than the journal-boxing A will ever reach and attached to outside of said pier are two pulleys V. Attached to journal-boxing A is a bracket or cable-hanger W, to which is attached cable *h*, to which is attached float T. Also attached to said bracket or cable-hanger W is cable *i*, to which is attached weight U, which is about one-half as heavy as float T and arranged as shown in Fig. 5. The cable *h* and the cable *i* are attached to bracket or cable-hanger W, which hanger is attached to journal-boxing A, and therefore rises as the wheel rises and takes up the slack in said cable *h* until the bar R is exactly horizontal and makes the horizontal bar R sensitive to any rise or fall of the float T at all stages of water.

Attached to clutch-operating shaft Q is lever Z, which is used to slide manually said clutch-operative shaft Q to the right or left, as may be desired, without depending on the automatic arrangement to slide said clutch-operative shaft Q to the right or left, as may be desired. On end of connecting-shaft P is a crank *a*, which can be used to raise or lower said wheel X entirely out of the water, as may sometimes become necessary to make repairs. When clutch-lever F is thrown to the right, it prevents the automatic raising and lowering machinery from being in motion, which will be necessary when the wheel is being raised or lowered manually by means of crank *a* at end of the connecting-shaft P; but when the clutch-shifting lever F is thrown to the left the automatic raising and lowering machinery is put in motion by the turning of the power-shaft L.

Having thus described the several parts of our invention, its operation is as follows: The wheel turns in the direction contrary to the hands of a watch. The frame and upright standards or piers of our hydraulic motor are permanently secured to the beds of rivers or streams on which our motors are placed, and a motor having a foundation of this kind would be of little value if it could not be adjusted to the rise and fall in the water. When, however, the water rises on our motor, the float T, being sensitive to any variation, rises also. This rise of the float causes a slack in the cable *h* and causes the weight U to draw the horizontal bar R down on the left, thus causing the worm-screw shafts *g* and the worm-screws *d* to turn to the right, which in turn causes worm-wheel *e* and lifting-jacks B to turn to the left, thus causing journal-boxings A and water-wheel X to rise. Said water-wheel will continue to rise until the clutches become disengaged. When the water begins to fall, the float T goes down with the water, and being twice as heavy as the weight U it pulls the horizontal bar R down on the float end, as shown in Fig. 5, thus sliding the clutch-operating shaft to the right, which causes the worm-screw shafts *g* and the worm-screws *d* to turn to the left, which causes worm-wheels *e* and lifting-jacks B to turn to the right in thread-nuts *m*, which in turn causes the water-wheel X and the journal-boxing A to lower, which lowering will continue until the clutches become disengaged. If, however, the water is neither rising nor falling, then the float will be simply resting on the water and the horizontal bar R will be perfectly horizontal and none of the four clutches O will mesh with the end of the four pinions M, and the worm-screw shafts *g* and the worm-screws *d* will not turn at all, and the wheel X will be stationary until there is a perceptible rise or fall in the water.

It is our intention to so construct said hydraulic motor that it will require a foot of rise or fall in the water before said lifting-jacks are put in operation. We do not wish to limit

ourselves to this particular automatic means, as no doubt others could be employed. Furthermore, we claim the right to operate our wheel by jacks operated by hand should circumstances require us to do so.

Having thus described our invention, we do not wish to be understood as limiting ourselves to the exact construction herein set forth, as various slight changes might be made therein by those skilled in the art which would fall within the limit and scope of our invention, and we consider ourselves clearly entitled to all such changes and modifications.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a water-motor, the combination of a wheel, a vertical power-shaft turned thereby, a horizontal power-shaft turned by said vertical power-shaft, a clutch on said horizontal shaft, a connecting-shaft adapted to be operated by said horizontal power-shaft, bevel-gears on said connecting-shaft, clutches on said connecting-shaft, means for automatically operating said clutches, jacks adapted to raise or lower said water-wheel, and means for transmitting the motion of said beveled gears to said jacks, substantially as described.

2. In a water-motor, the combination of a water-wheel, boxings within which said wheel

is journaled, jacks passing through said boxings, power-shafts turned by said wheel, a connecting-shaft turned by said power-shafts, bevel-gears on said connecting-shaft, worm-screw shafts connected to said jacks and adapted to be turned by said beveled gears, and means for connecting either set of bevel-gears to said connecting-shaft for revolving said worm-screw shafts in either direction, substantially as described.

3. In a water-motor, the combination of a wheel, a main shaft, boxings for said shaft, power-shafts turned by said wheel, a connecting-shaft turned by said power-shafts, bevel-gears on said shaft, worm-screw shafts adapted to be turned by said bevel-gears, clutches on said connecting-shaft, a float adapted to operate said clutches whereby said bevel-gears alternately operate said worm-screw shafts, and jacks passing through and engaging said boxing and connected to said worm-shafts, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES W. SCHINDLER.

JOHN FREEMAN.

Witnesses:

EDGAR B. MARTIN,

COLUMBUS C. KELLY.