

(No Model.)

H. C. CROWELL.
FRICTION CLUTCH.

No. 465,429.

Patented Dec. 15, 1891.

Fig. 1.

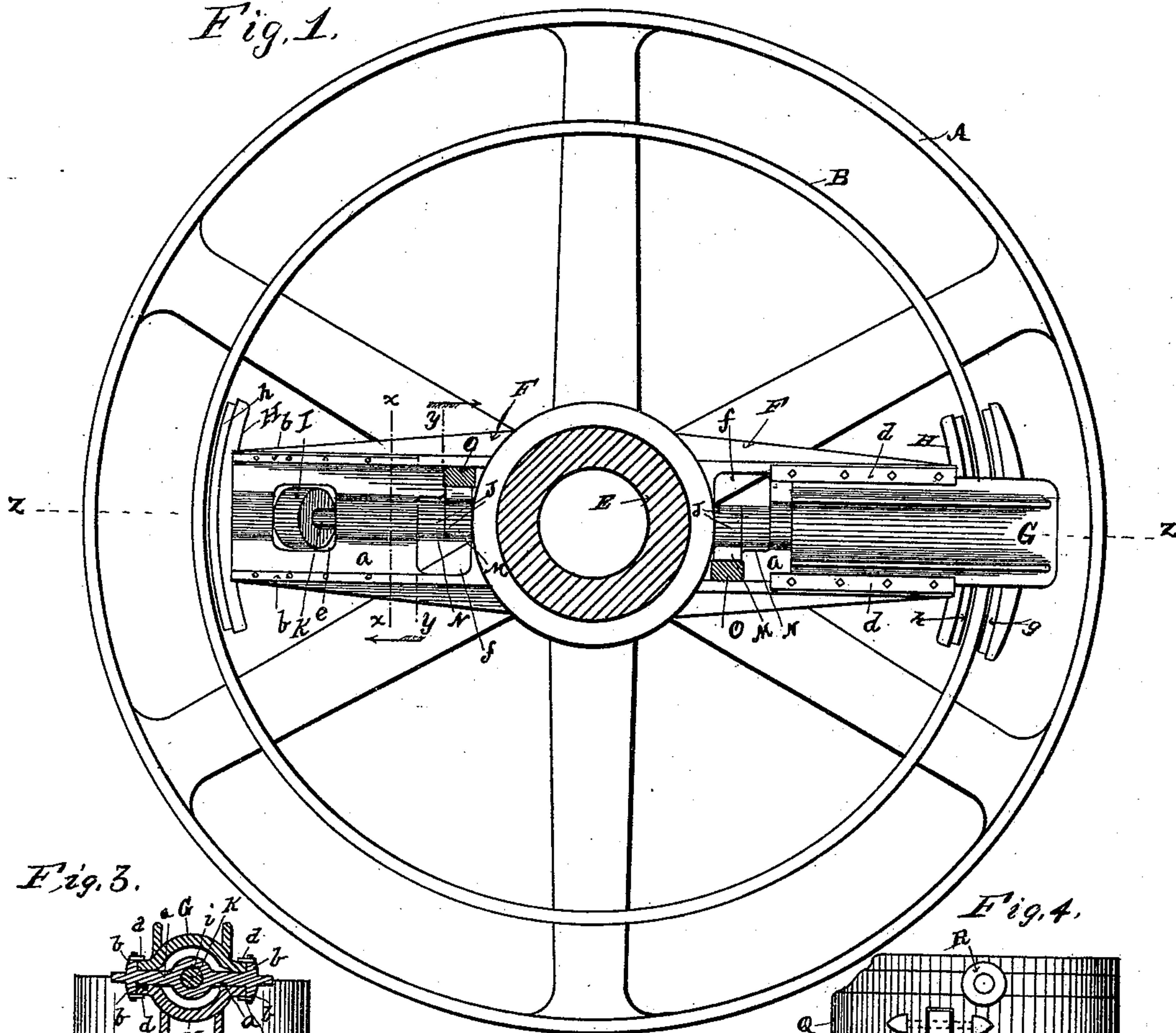


Fig. 3.

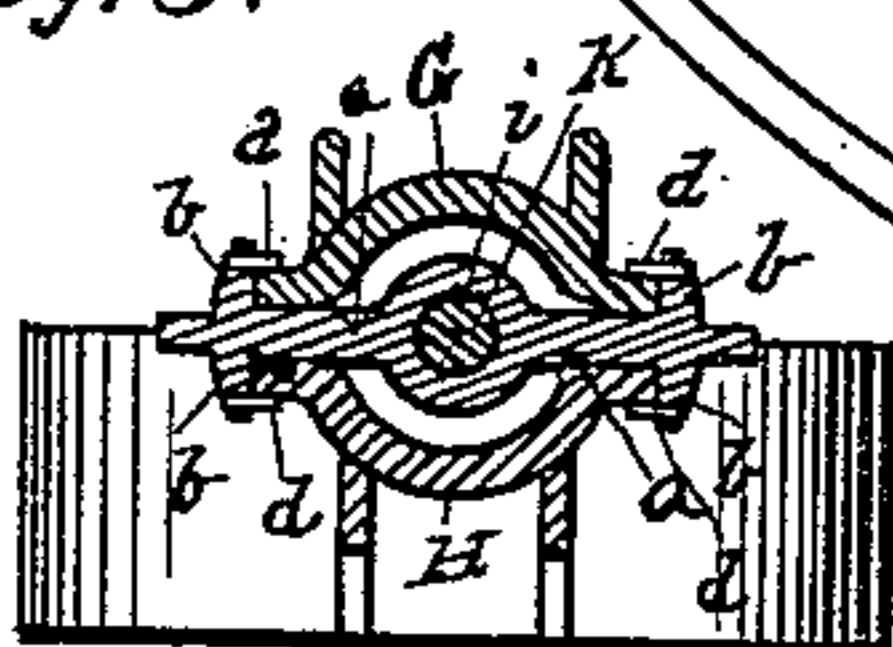


Fig. 4.

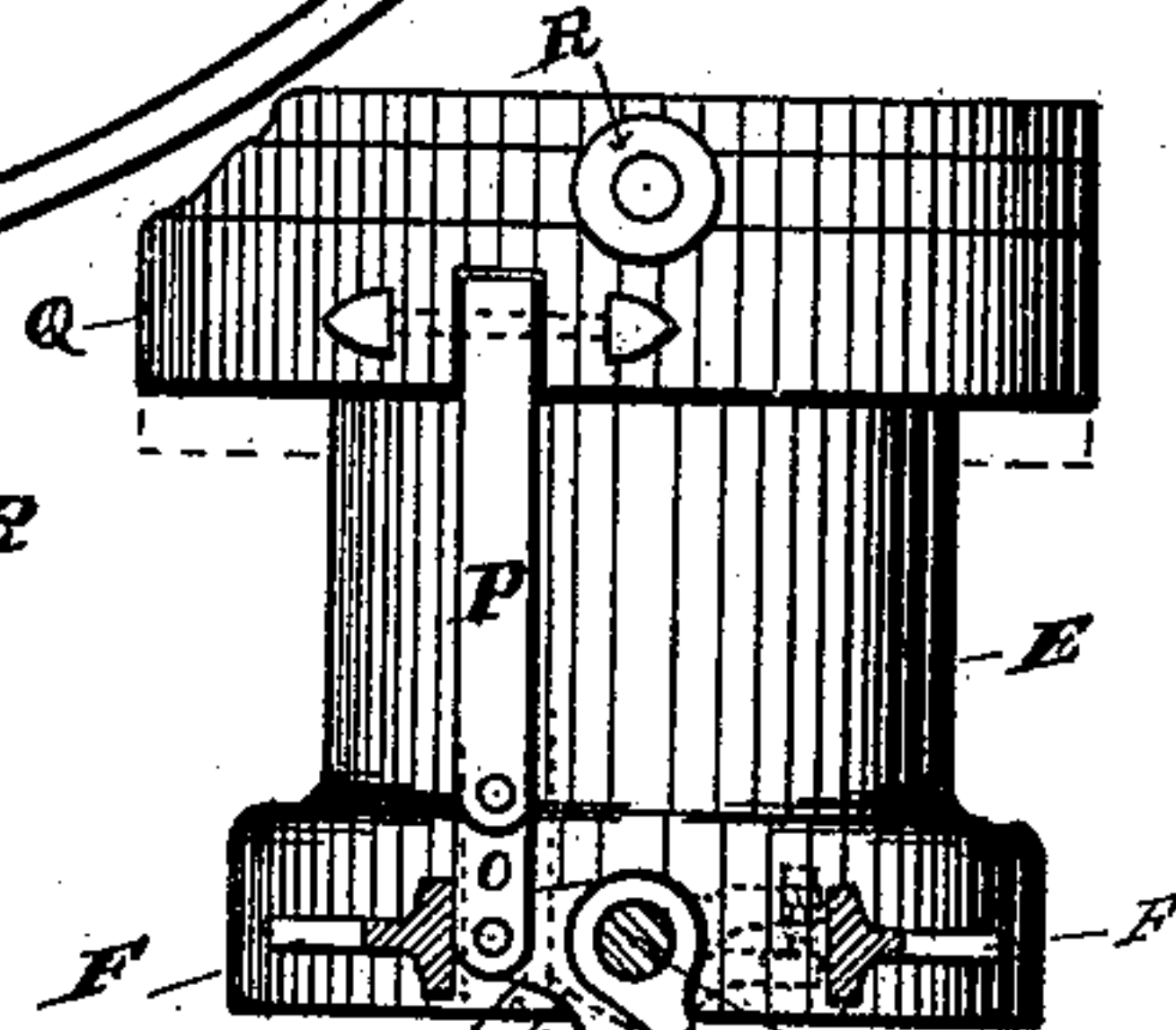
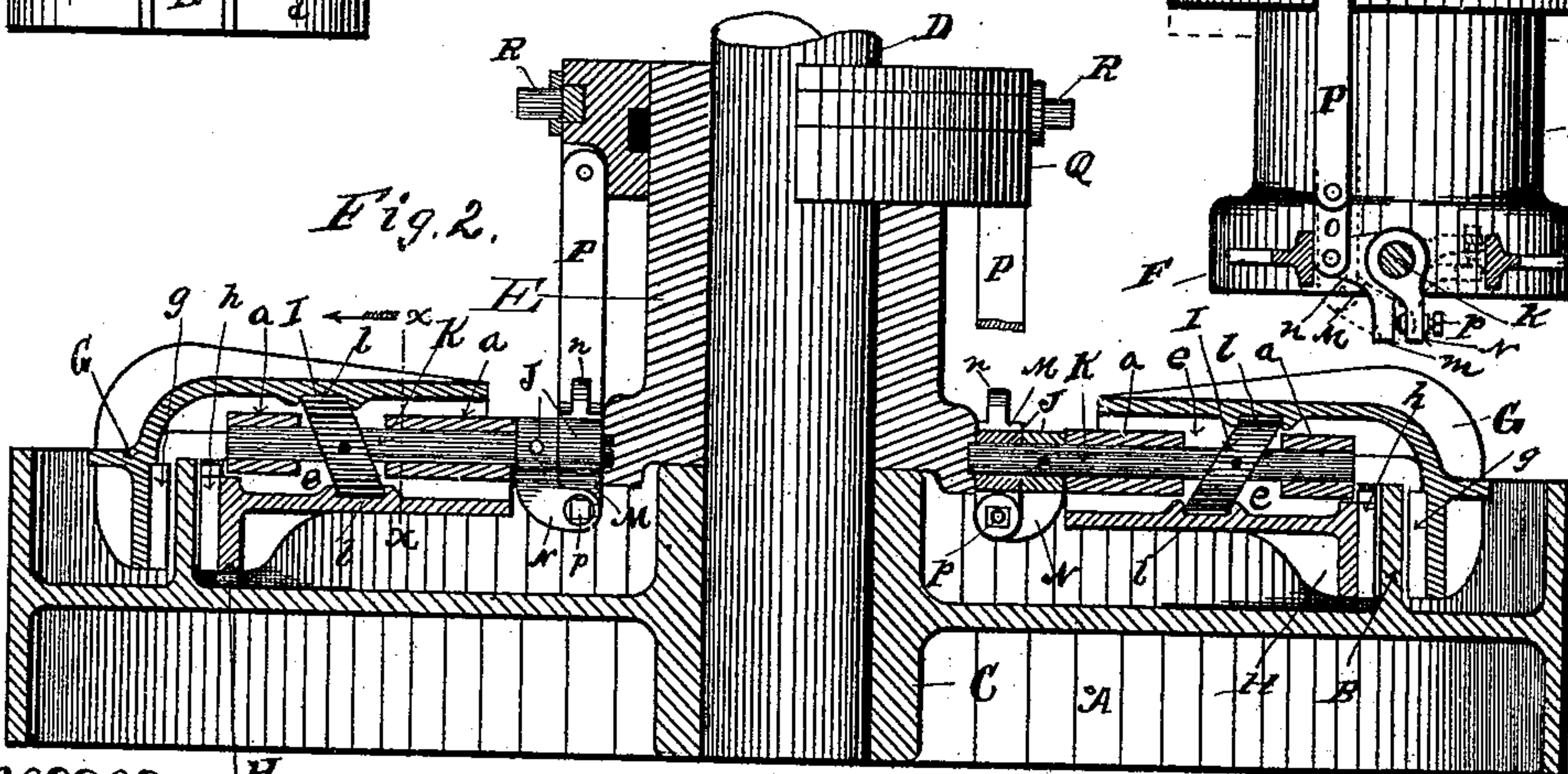


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

HILEN C. CROWELL, OF ERIE, PENNSYLVANIA, ASSIGNOR TO EDWARD D. SCHMITT, OF SAME PLACE.

FRICITION-CLUTCH.

SPECIFICATION forming part of Letters Patent No. 465,429, dated December 15, 1891.

Application filed October 16, 1888. Serial No. 288,872. (No model.)

To all whom it may concern:

Be it known that I, HILEN C. CROWELL, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Friction-Clutches; and I 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, forming part of this specification.

My invention consists in the improvements in friction-clutches hereinafter set forth and described, and illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of a friction-clutch embodying my invention with one of the outer jaws removed therefrom. Fig. 2 is a longitudinal central section of same on the line $z z$ in Fig. 1. Fig. 3 is a cross-section of one of the clutch-arms on the line $x x$ in Figs. 1 and 2, looking in the direction of the arrow. Fig. 4 is a cross-section of one of the clutch-arms on the line $y y$ in Fig. 1, looking in the direction of the arrow.

Like letters refer to like parts in all the figures.

In the construction of my invention shown, A is a pulley having an annular flange B thereon, the hub C of the pulley being adapted to turn freely upon the shaft D. On the shaft D, at one end of the pulley A, is secured a hub E, having radial arms F thereon, adapted to support clutch-jaws G and H, moving in and out radially thereon. These arms F are preferably constructed of a web a having on each edge thereof radial ribs or ways b , between which the jaws G and H operate, the jaws G and H being held in place by means of strips of metal $d d$, bolted to the ways or ribs b , so that jaws G and H slide in and out freely in the grooves or ways thus formed. Through the web a openings e and f are made, the opening e for the double cam I and the opening f for the clutch actuating and adjusting mechanism J.

Radially through the center of the web a I bore a shaft-opening i , in which is mounted a radial shaft K, to which the double cam I and

the actuating-lever and adjusting mechanism J are secured. On the inner faces of the arms L of the clutch-jaws G and H, I cut grooves l , adapted to engage with opposite edges of the double cam I when in place. On the lower end of the shaft K, I secure an arm N, the outer end of which curves downward so as to engage with one arm M of the bell-crank-actuating lever M, the lever being firmly secured to the shaft, while the bell-crank lever M is loose thereon. Through the end of the arm N an adjusting-screw passes into the arm m of the lever M, so that the bell-crank lever M can be adjusted at any desired point. To the opposite arm n of the bell-crank lever M, I pivot a link O, and to the end of the link O is pivoted the end of the thrust-link P from the loose sleeve Q, this sleeve Q being mounted on the hub E so as to slide longitudinally thereon, the outer end of each thrust-link P being secured to said sleeve Q, so that the longitudinal motion thereof is communicated to the thrust-links P. Around the sleeve Q is cut an annular groove, in which groove is secured a loose ring having trunnions R R thereon, upon which a shifting-lever (not shown) operates, these parts being of usual and ordinary construction.

In operation the movement of the sleeve Q toward the pulley A operates upon the link O and bell-crank lever M to rotate the radial shaft K, and with it the double cam I, which movement of the cam I moves the clutch-jaw G inward and the clutch-jaw H outward, so as to compress the friction-surfaces g and h of these jaws firmly against the inner and outer surfaces of the annular flange B, and the reverse movement of the sleeve Q rotates the shaft K and its cam I in the opposite direction, which operates to move the jaws G and H apart by a positive movement.

The adjusting mechanism J is so constructed and located that it can only be operated when the jaws G and H are closed upon the annular flange B, the adjusting mechanism being then in the position shown by the dotted lines in Fig. 4. The set-screw p is then accessible and can be tightened or loosened, so as to adjust the grip of the clutch-surfaces g and h upon the ring B at pleasure.

Before my invention clutches were known

in which radially-moving members provided with jaws had a screw-thread connection, respectively, with right and left hand screw-threads upon a radial shaft, as described in application for Letters Patent of the United States by Edward D. Schmitt, Serial No. 262,673, and although my present invention involves the principle of such a clutch yet it embodies an improvement thereon. Thus by the substitution for such right and left hand screw-thread connection of my double cam I the construction is simplified and its capacity for durability is increased. The double cam I, constituting a collar or ring, may be in one piece with or made separate from the shaft K and made fast thereto in any suitable manner, the opposite faces of said ring, which form the bearing-faces of the cam, being parallel with each other, so as to positively insure a corresponding movement of the two jaws in opposite directions. When thus constructed, also the pitch of the cam-surfaces may be reduced to any desired extent without reducing the thickness of the collar, thereby increasing the power of the clutch without weakening the strength of the connection, whereas with the screw-thread it is obvious that it is impracticable to thicken the screw-threads beyond a certain thickness without increasing the pitch of the screw. In addition, the provision on each jaw for connection with the double cam is simple, and if necessary the bearing-surfaces on each jaw above and below the cam might readily be made adjustable to and from each other to take up any wear and prevent looseness in the joint—a feature which it would be very difficult, if not impossible, to employ in connection with the screw-thread.

It is desirable that a slight movement of the shaft K shall be sufficient to operate the jaws. In practice I do not intend to move it more than about one-fourth turn. The double cam I should therefore be regulated so as to secure by this movement sufficient clearance between the jaws and the flange, and I have found that a pitch of from one-eighth to three-sixteenths of an inch for one-fourth turn answers a good purpose.

Having thus fully described my invention, so as to enable others to construct and operate the same, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a clutch having inversely-moving ra-

dial members provided with jaws adapted to grip a flange cylindrical to the shaft and mounted upon a clutch-arm, the combination, with a radial shaft mounted and rotatable in the clutch-arm, of a ring fast on said radial shaft, having the planes of its faces inclined to the axis of said radial shaft and engaging at its periphery said clutch members, and devices whereby said radial shaft may be revolved, substantially as described.

2. In a friction-clutch having reversely-movable jaws, the combination of radial shafts mounted and rotatable in the clutch-arms and reverse cams on said shafts engaging with grooves on the jaw-arms, with bell-crank levers mounted loosely on the inner ends of said shafts and fixed arms secured to said shaft, so as to engage with one of the arms of said bell-crank levers, and adjusting-screws operating between said levers, substantially as and for the purpose set forth.

3. In a friction-clutch-jaw-actuating mechanism, the combination of a radial shaft having a double cam engaging with the jaw-arms, a bell-crank lever mounted loosely on the inner end of said shaft, a link pivoted to one arm of said bell-crank lever, and a thrust-link pivoted to the opposite end of the link with a fixed arm secured to said shaft, so as to engage with the other arm of said bell-crank lever, and adjusting mechanism between said arms, substantially as and for the purpose set forth.

4. In a friction-clutch having reversely-movable jaws G and H, a radial shaft K, having a double cam I thereon engaging with grooves on the inner faces of the jaw-arms, in combination with a fixed arm N on said shaft, a bell-crank lever M, loosely mounted on said shaft, and an adjusting-screw p, substantially as and for the purpose set forth.

5. In a friction-clutch-adjusting mechanism, the radial shaft K, having the reverse cam I thereon, in combination with the fixed arm N and the loose bell-crank-lever mechanism M on said shaft and adjusting-screws p between said arm and lever, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HILEN C. CROWELL.

Witnesses:

GEO. MARVIN,
J. C. CASTLE.