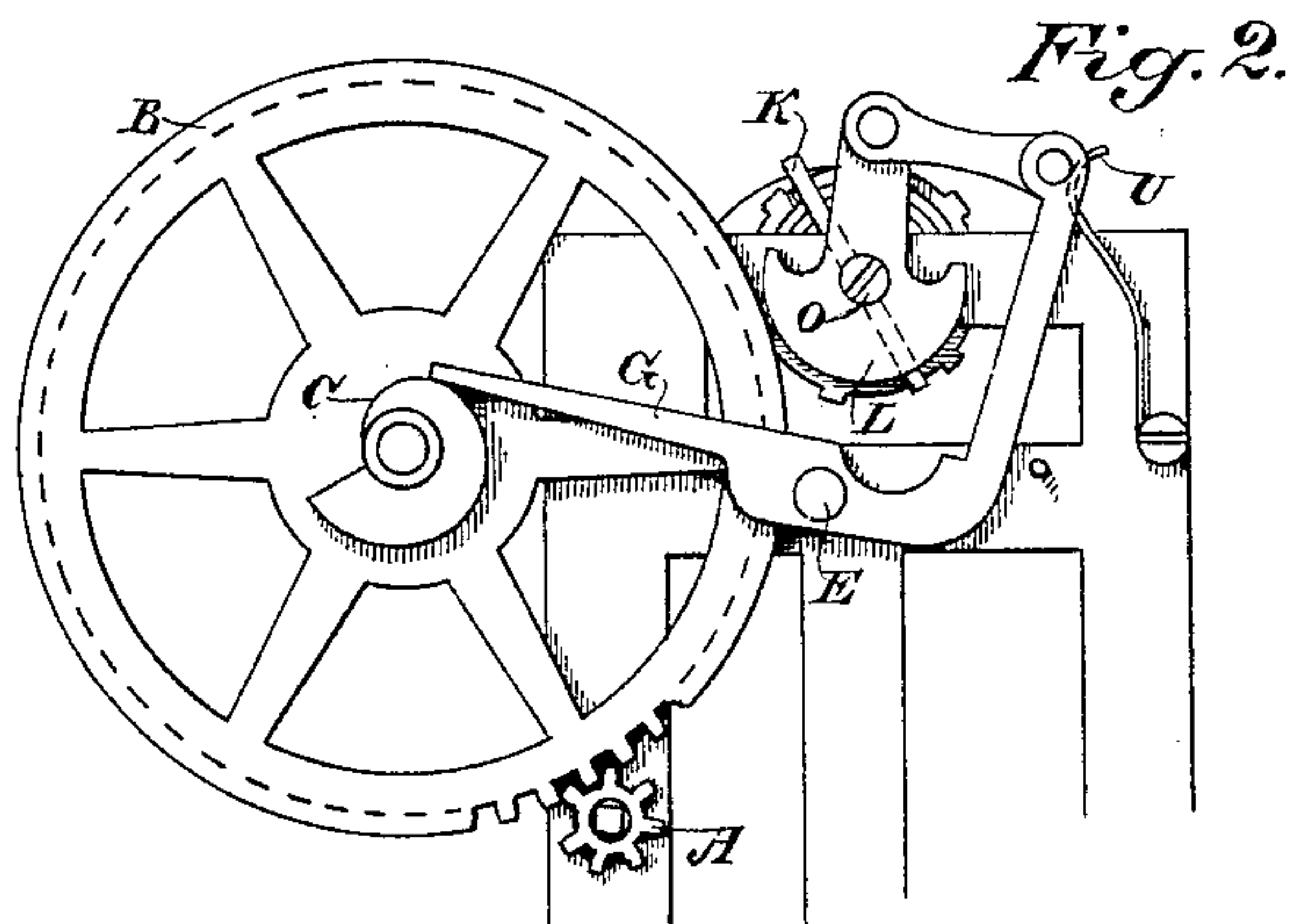
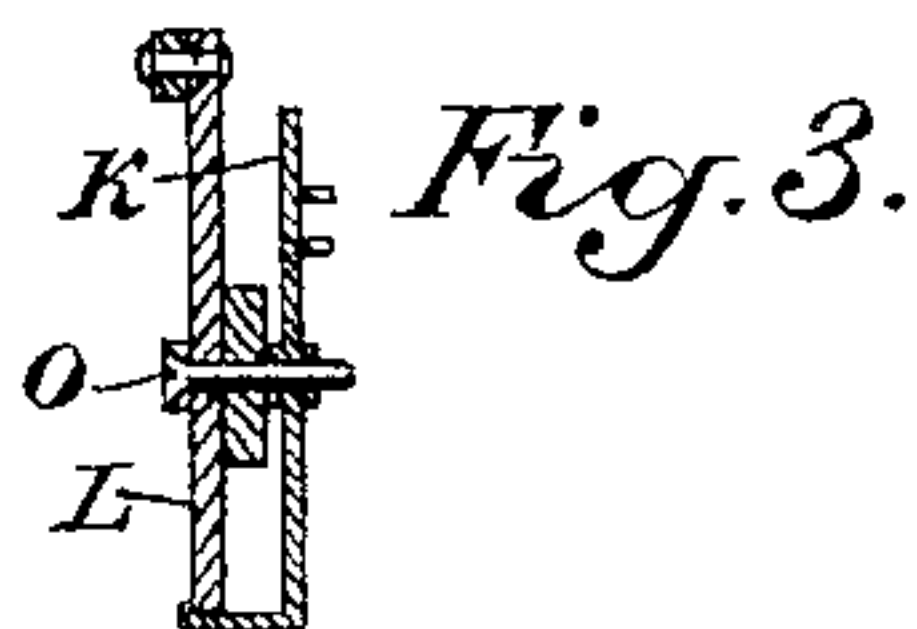
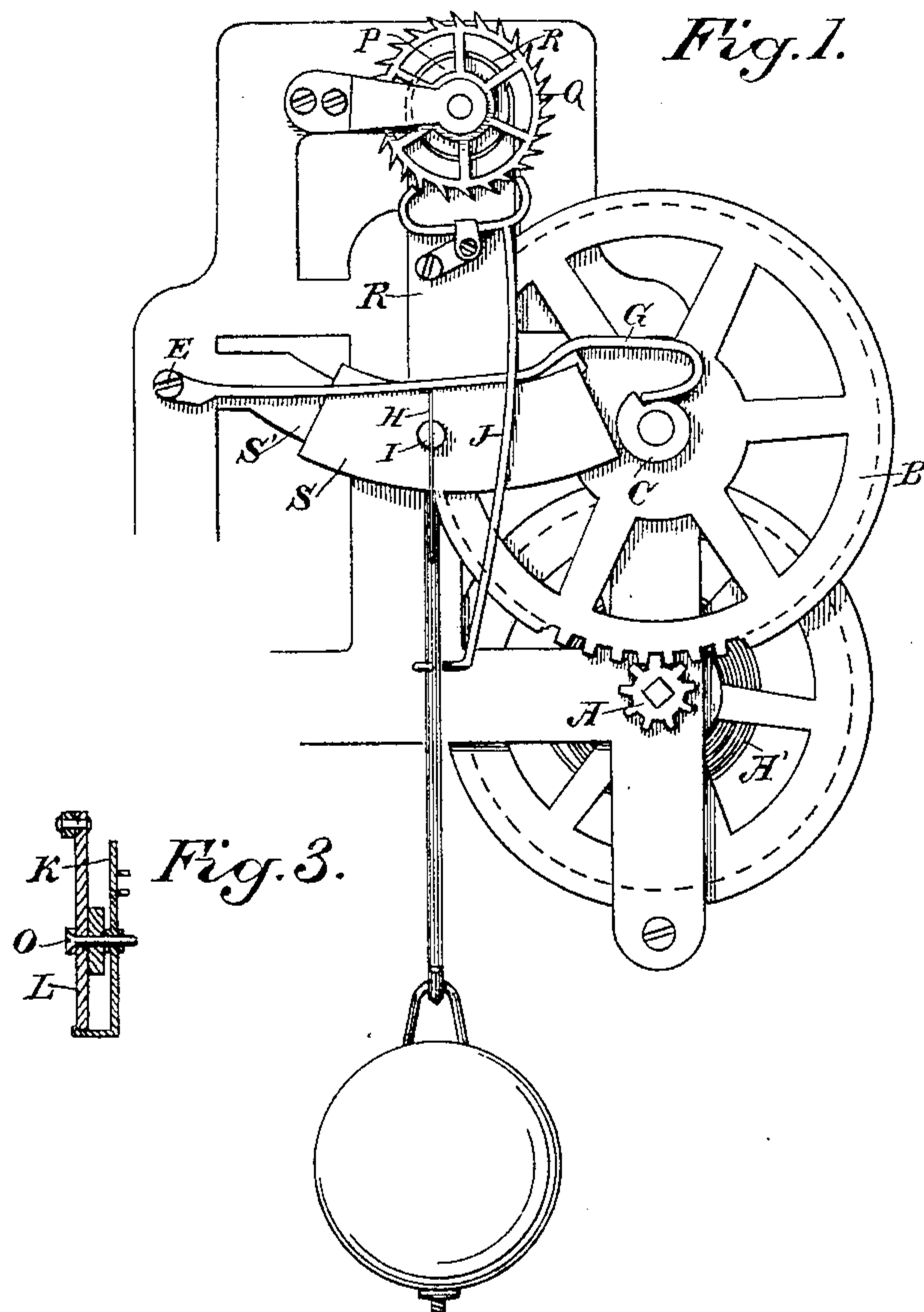


(No Model.)

J. SCHULTE, Jr.
CLOCK.

No. 594,654.

Patented Nov. 30, 1897.



Witnesses,
J. F. Aschbeck

Inventor,
Joseph Schulte, Jr.
By Dewey & Co.
attys

UNITED STATES PATENT OFFICE.

JOSEPH SCHULTE, JR., OF MONTEREY, CALIFORNIA, ASSIGNOR OF ONE-HALF TO THOMAS J. FIELD, OF SAME PLACE.

CLOCK.

SPECIFICATION forming part of Letters Patent No. 594,654, dated November 30, 1897.

Application filed May 13, 1897. Serial No. 636,362. (No model.)

To all whom it may concern.

Be it known that I, JOSEPH SCHULTE, Jr., a citizen of the United States, residing at Monterey, county of Monterey, State of California, have invented an Improvement in Clocks; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in clocks and timepieces; and it consists, essentially, in a means for regulating the clock by shortening the pendulum or balance-wheel spring of a clock in proportion as the driving-spring unwinds and becomes weaker, and also in a means for regulating the beat of the pendulum and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 shows my improvement attached to a pendulum. Fig. 2 shows it attached to a balance-wheel. Fig. 3 is a detail section through regulator and connections.

The object of my invention is to regulate the clock by a compensating device which increases the rapidity of the pendulum or balance-wheel beats in proportion as the strength of the spring giving the impulse decreases, and in also enabling the pendulum to automatically regulate and center itself with relation to the escapement-wheel, so that its beats will be of even duration, although the clock itself may incline a little to one side or the other.

In the drawings I have shown a pinion A, fixed upon the winding-post and driven by the direct action of the spring A'.

B is a wheel having a toothed periphery which is engaged by the pinion A, the train of gearing being such that in an eight-day clock the wheel B may make a complete revolution in a week, and it may be correspondingly proportioned for longer or shorter times. Upon this wheel or its shaft is fixed a cam C, having any suitable increase in curvature from the center to the end of the cam.

G is a lever, one portion of which may be fulcrumed, as shown at E, and one end is so disposed as to rest upon the cam C. At any suitable point the suspending flexible strip H of the pendulum-rod is connected with this

lever, as shown in Fig. 1, and as this strip passes through a slit in the stud I it will be manifest that by slipping it up or down with relation to its point of suspension the length of the pendulum-rod will be increased or diminished. As this suspending-strip is moved with relation to the stud it will also be manifest that the rod may be otherwise constructed to be lengthened or shortened, but in the present case I have shown my device as applied to the ordinary construction of clocks.

The verge-rod J carries a pallet at the upper end, which engages the escapement-wheel and itself engages the pendulum-rod, so as to give it impulses and continue its vibration.

When the clock is wound, the lower portion of the cam C will lie beneath the end of the lever G, and the lever thus being allowed to be depressed to its lowest point will carry the pendulum down so that it has its greatest length below the stud through which it is suspended. As the clock moves and the spring becomes weaker the rod G is gradually raised by the revolution of the wheel B until at the end of the allotted time it will rest upon the highest portion of the cam and will then have drawn the suspending-strip of the pendulum-rod up through the slit in the stud, and the portion of the pendulum-rod below this point, about which it vibrates, being correspondingly shortened the vibrations of the pendulum will be sufficiently more rapid to compensate for the weakening of the spring by its uncoiling.

In cases where a balance-wheel is employed instead of a pendulum the lever G may be made in any suitable way to suit the particular construction of the balance arrangement. The lever being pivoted, as shown at E, in this case at a point intermediate between the end which rests upon the cam C and the end which engages with the regulator K, it will be manifest that the movement of the lever about its fulcrum-point will actuate the regulator by turning it about its point of support, and as it engages the hair-spring of the balance-wheel the shortening of the latter will increase the speed of the balance-wheel in the same manner as that of the pendulum. In

the present case I have shown this regulating-arm K as connected with the quadrant L by means of an eyelet passing through the two, so that the pressure of the arm K upon the quadrant L is sufficient to make a little friction, and thus hold the regulator-arm at any position where it may be originally set with reference to the quadrant, at the same time allowing it to be moved for such ordinary adjustments as may be desired. Through this eyelet passes the cup screw or pin O, which enters the frame of the clock and suspends the two parts K and L, so as to allow them both to move freely upon this pin. The automatic regulation by means of the lever G acts to move both the arm K and the quadrant L and to thus adjust the regulating-spring, as before described.

In order to keep the mechanism of the escapement and pendulum central with relation to the escapement-wheel, I have shown a disk P, mounted upon the same center with the escapement-wheel Q. The stud from which the pendulum is suspended forms the center of this disk and is also central with relation to the escapement-wheel. Extending downwardly from the disk is a shank R, having at the lower end a curved segment S.

The verge-rod and the pallet are fulcrumed upon the extension R, so that whatever position this part may take with reference to the other portions of the clock the pallet and verge-rod will always remain in the same position relative to the teeth of the escapement, and as the pendulum hangs vertically from its point of suspension it will swing with even beats in each direction even although the clock may be tilted a slight distance to one side or the other.

The curved segment S preferably forms a frictional contact with the corresponding surface S' behind it, the friction being sufficient to prevent the segment S and the connecting portion R from swinging with the movement of the pendulum; but if by any reason the clock should become tilted a little to one side or the other, so as to be unevenly placed, the part S would slide sufficiently upon S' to bring the pinion into its normally vertical position with the escapement in proper relation to operate with even beats.

U is a spring which presses against the lever-arm and serves to hold the parts in position.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a clock, the combination with the coiled spring and mechanism impelled thereby, of a cam in the train of clock mechanism and having a gradual increase in curvature from the beginning to the end of its cam-surface, a fulcrumed lever having a free end extending above the cam and adapted to rest thereon, and to be lifted by the movement of said cam, and a regulator movable in unison with the movement of the lever whereby the beats of the clock are increased in proportion as the spring which gives the impulse becomes weakened.

2. In a clock, the combination with the coiled spring and mechanism impelled thereby, of a fulcrumed lever, a cam with which one end of said lever-arm engages and by which it is gradually turned about its fulcrum-point by the movement of the clock mechanism, said cam being in the train of clock mechanism and having a gradual increase in curvature from the beginning to the end of its cam-surface, and having the free end of the lever-arm resting directly upon it, a regulator, a quadrant adapted to frictionally engage an adjacent surface, a connection between the lever-arm and the quadrant whereby it and the regulator are automatically moved by the movement of the cam transmitted through the lever-arm.

3. In a clock, a regulating mechanism comprising a cam in the train of clock mechanism and having a gradual increase in curvature from its initial point to the terminus of its cam-surface, and a fulcrumed lever having its free end continuously in engagement with said cam, whereby the impulse of the escapement is increased in proportion as the tension of the winding-spring is reduced, a disk centrally mounted with relation to the escapement-wheel, a pallet and verge carried by a downwardly-projecting extension of the disk, the verge connecting with the pendulum-rod whereby the tilting of the clock allows the disk and extension to move and arrange itself automatically with relation to the vertical position of the pendulum.

In witness whereof I have hereunto set my hand.

JOSEPH SCHULTE, JR.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.