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PATENTED AUG. 13, 1907.

W. J. J. O'DEA.
AUTOMATIC ENGINE STARTER.
APPLICATION FILED SEPT. 7, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

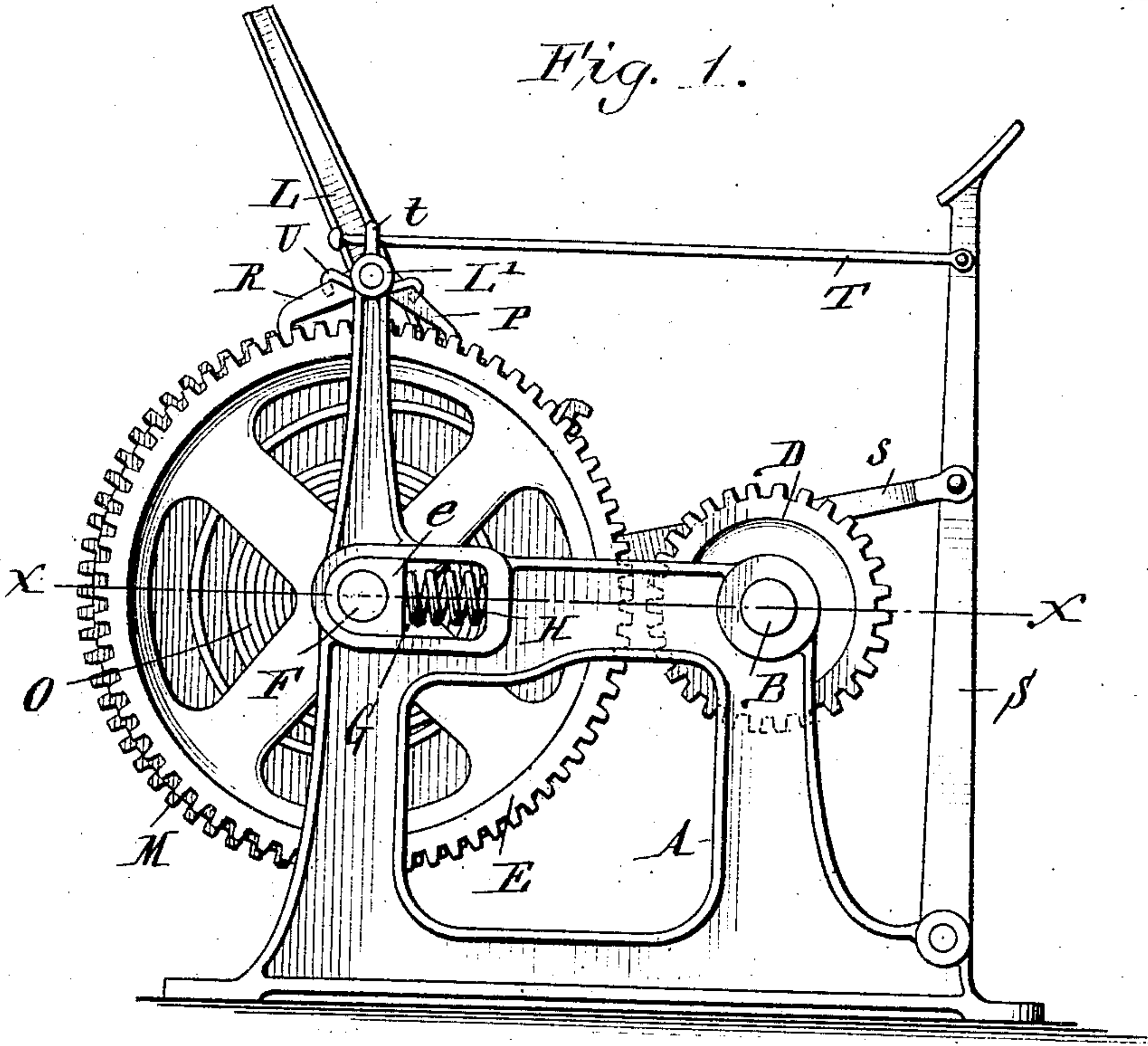
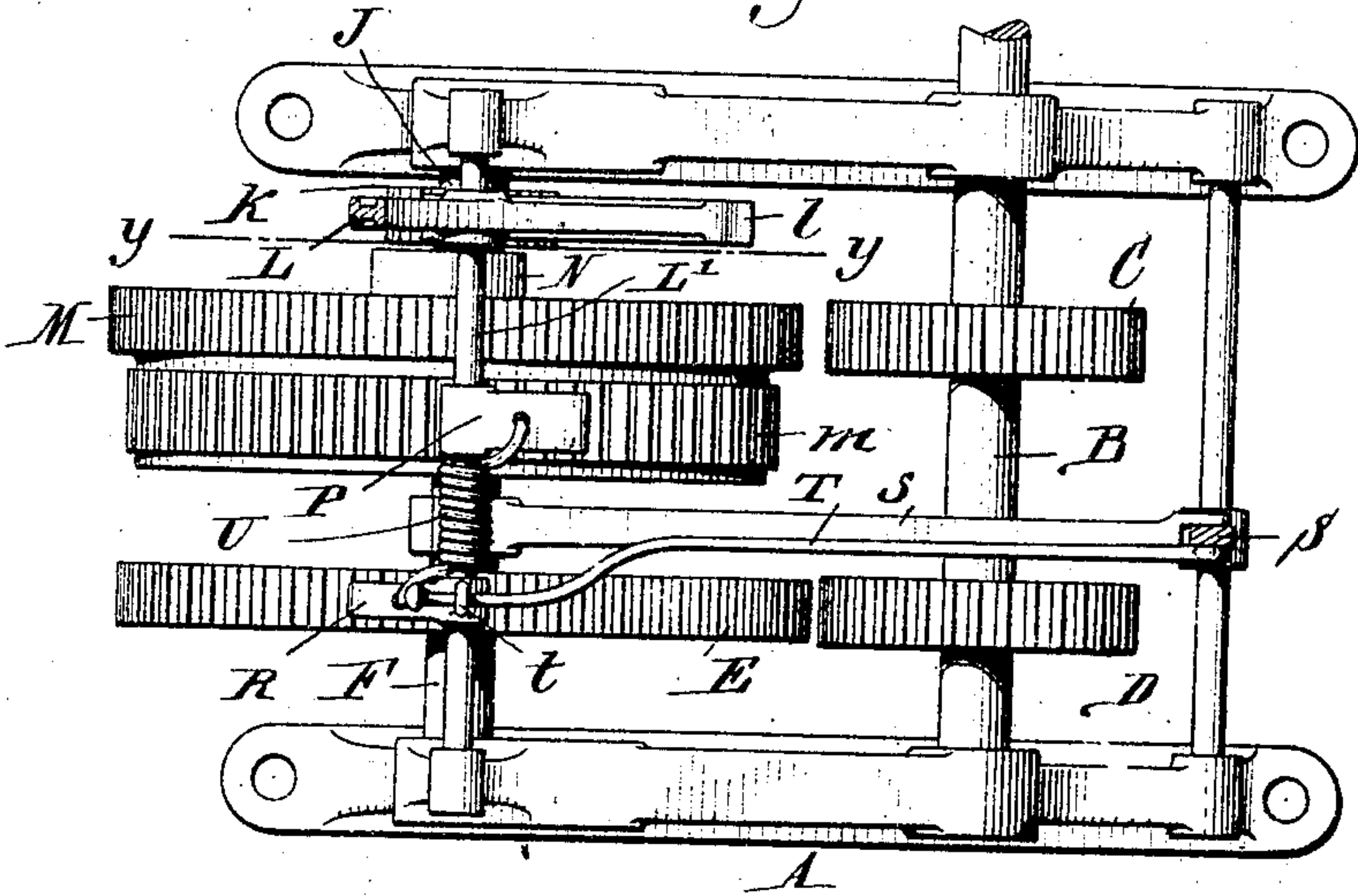


Fig. 2.



Witnesses:

Julius Lanke
Harry Harris.

William J. J. O'Dea, Inventor.

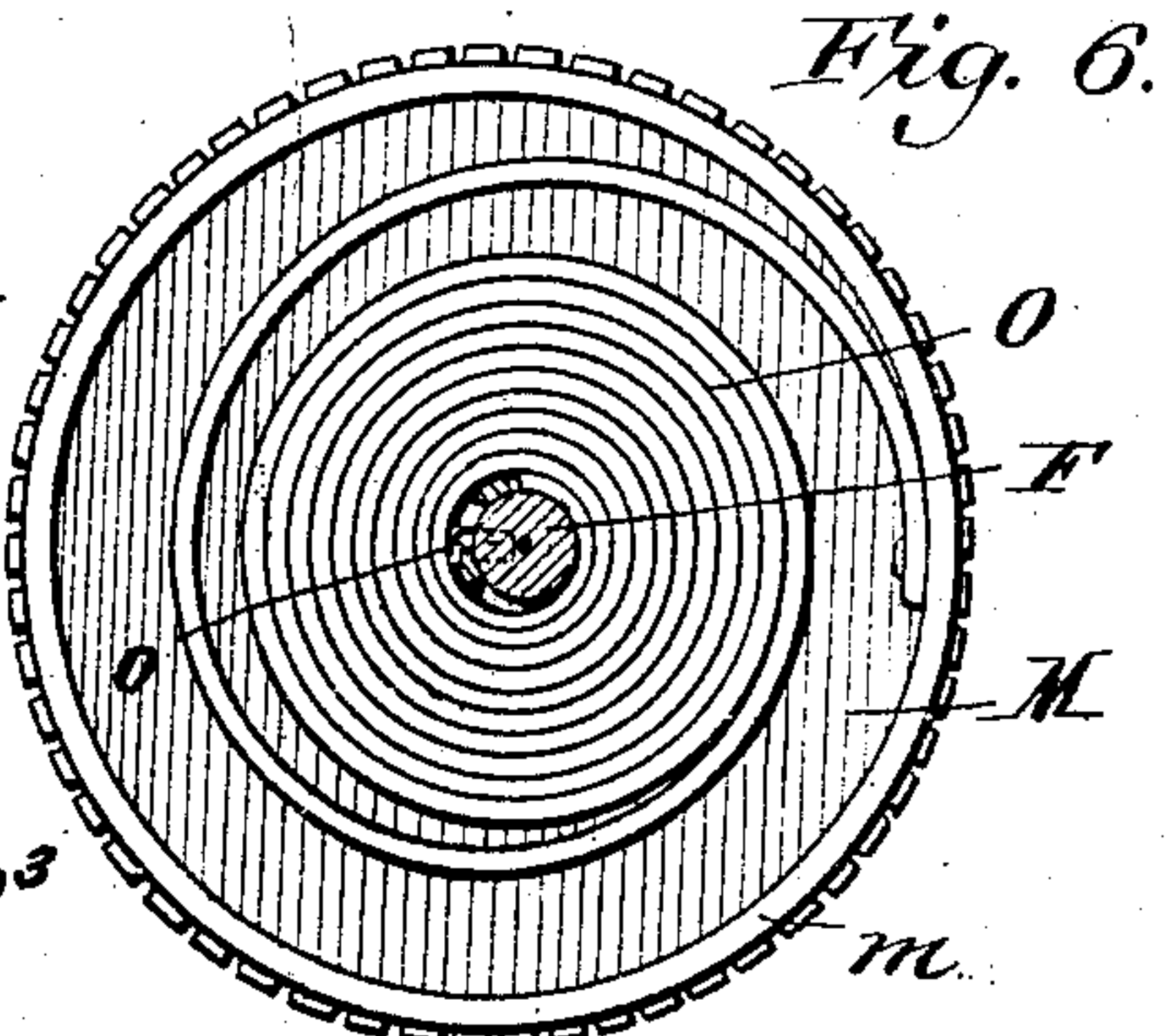
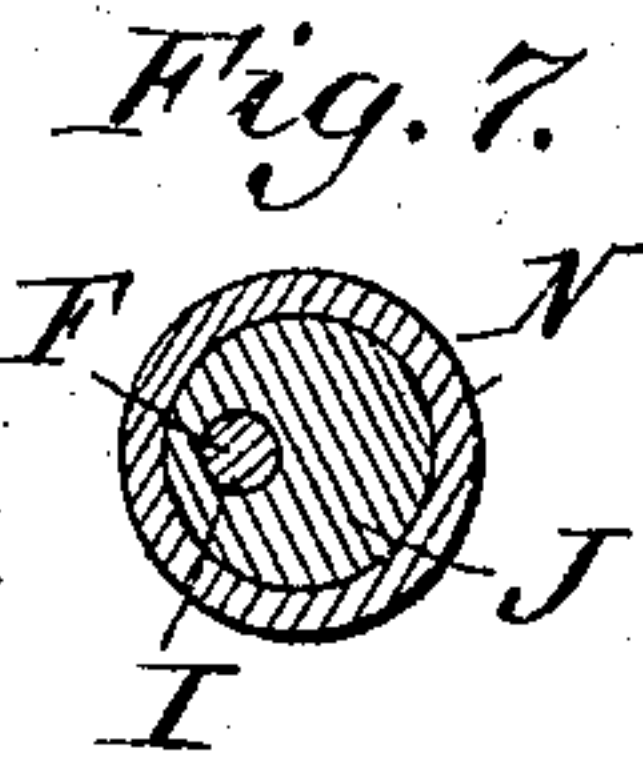
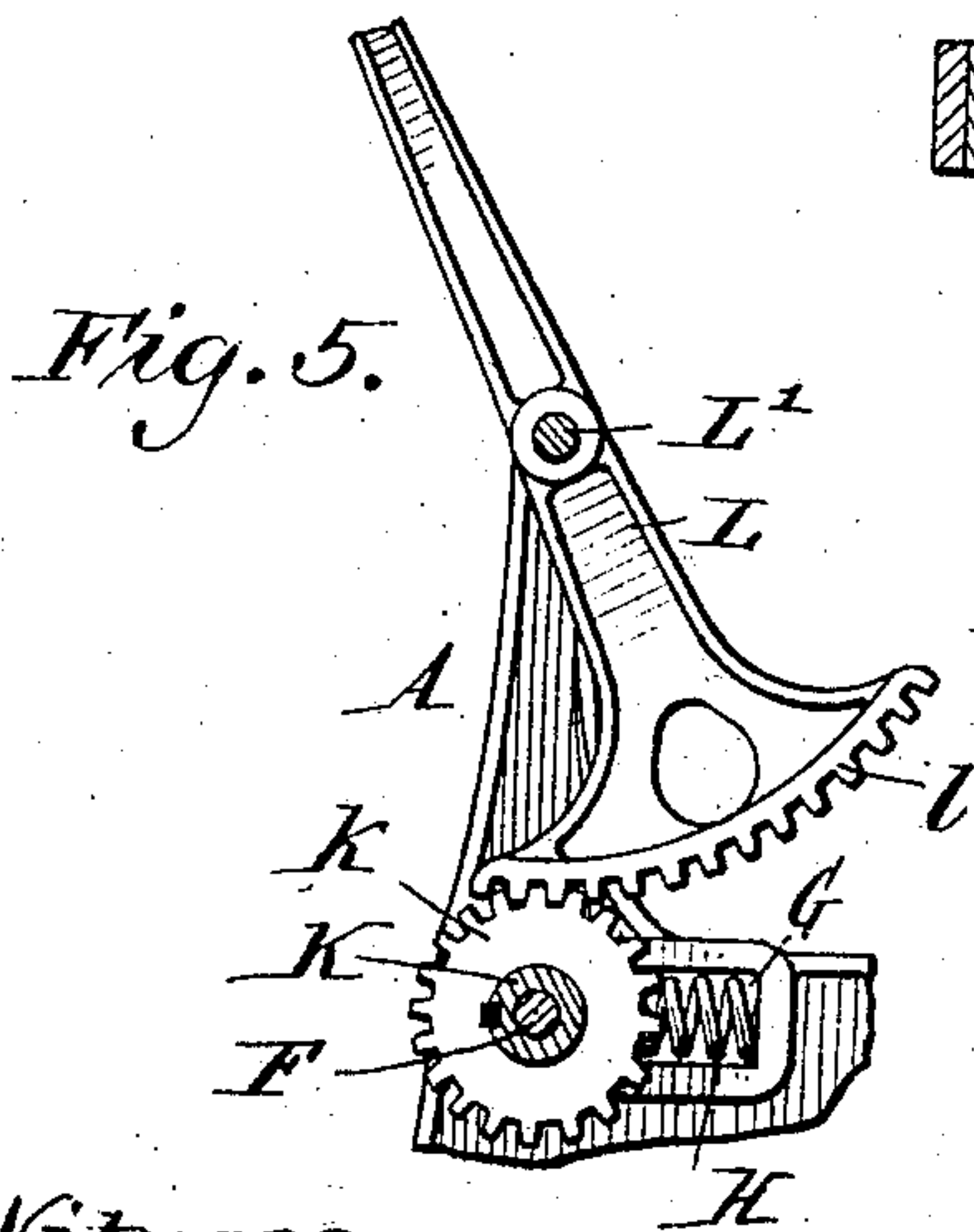
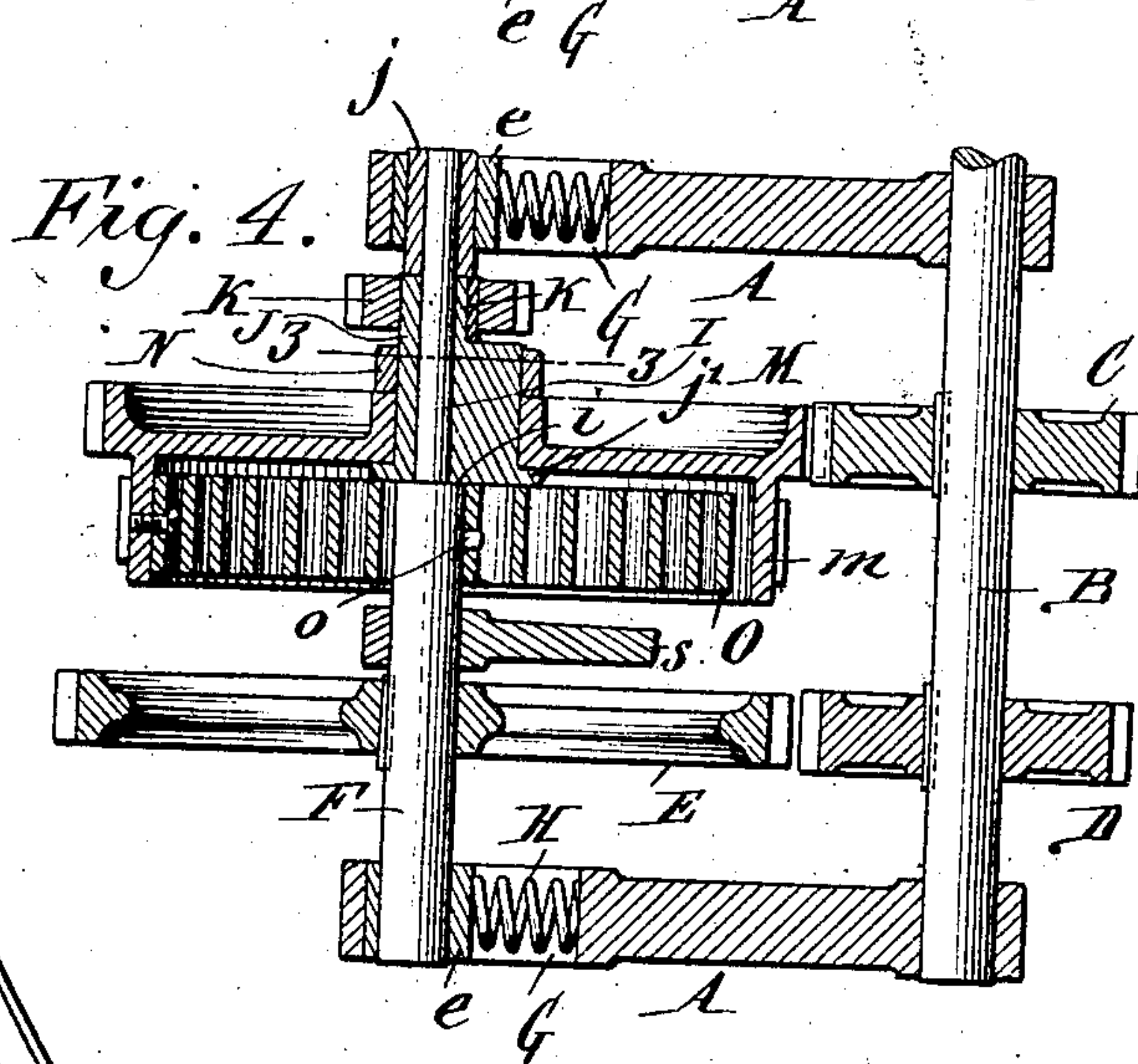
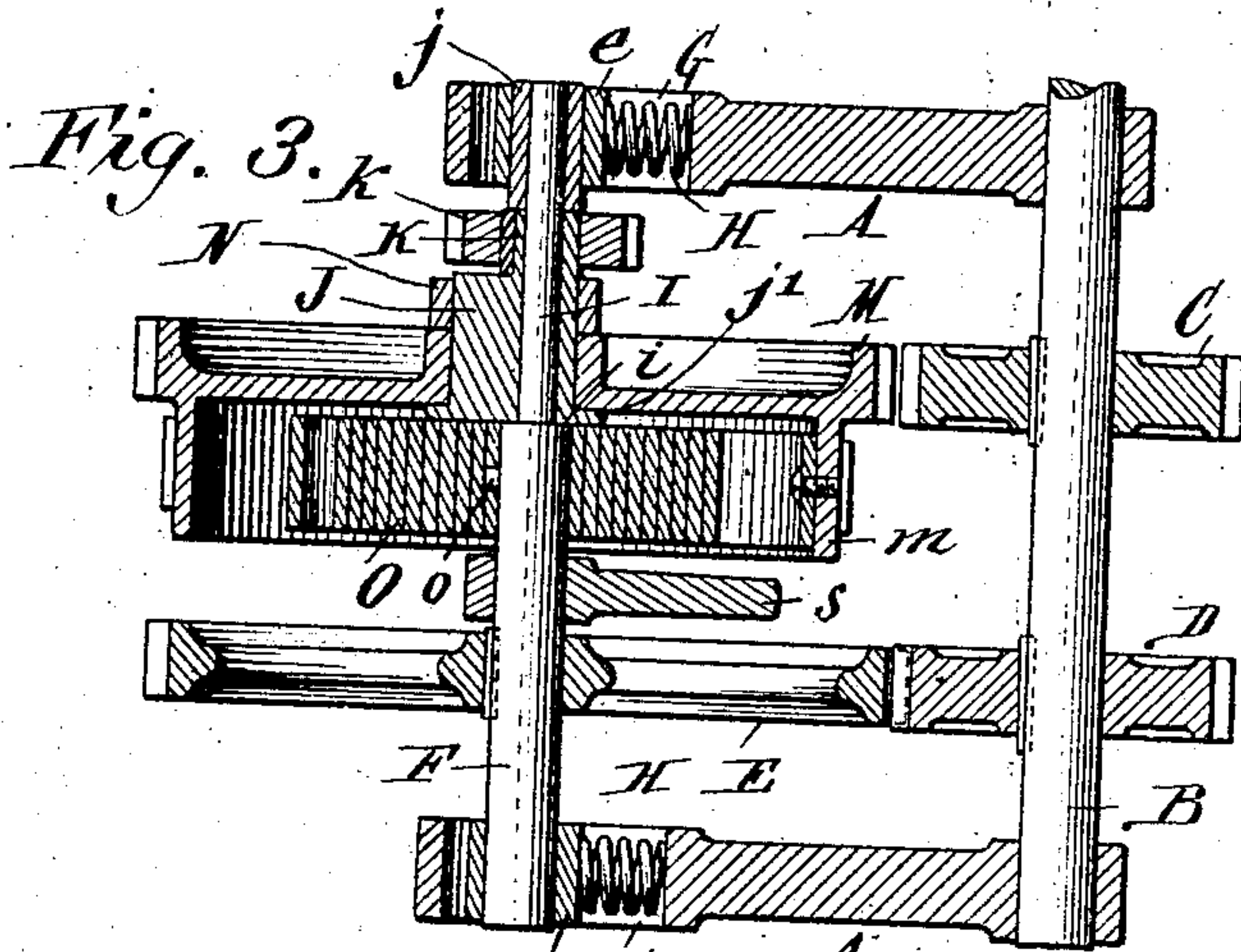
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2 SHEETS—SHEET 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM J. J. O'DEA, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-FOURTH TO JOHN L. MERKLE, OF BUFFALO, NEW YORK.

AUTOMATIC ENGINE-STARTER.

No. 863,554.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed September 7, 1905. Serial No. 277,448.

To all whom it may concern:

Be it known that I, WILLIAM J. J. O'DEA, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Automatic Engine-Starters, of which the following is a specification.

This invention relates to improvements in automatic engine starters.

The object of my invention is the production of a simple, durable, and powerful starting-device in which the parts are reduced to a minimum, and in which power may be stored by the action of the engine, and released at will by the manipulation of a lever within convenient reach of the operator.

My invention consists in the construction, arrangement, and combination of parts to be hereinafter described and particularly pointed out in the subjoined claims.

In the drawings,—Figure 1 is a side elevation of the device. Fig. 2 is a top plan view, showing the parts in their normal position. Fig. 3 is a horizontal section taken on line $x-x$, Fig. 1, the parts being shown in the position they assume when starting an engine. Fig. 4 is a similar view, the parts being shown in the position they assume when storing power. Fig. 5 is a vertical section taken on line $y-y$, Fig. 2. Fig. 6 is a side elevation of the gear containing the power-spring, the inner end of the latter and the shaft passing through the casing being shown in section. Fig. 7 is a transverse section taken on line $z-z$, Fig. 4. Fig. 8 is an enlarged sectional view showing the manner of securing the inner end of the spring to the shaft.

Referring to the drawings in detail, like letters of reference refer to like parts in the several figures.

The letter A designates the frame which may be of any desirable construction and outline; it serving simply to support the various parts of the device. Revolverly mounted in a fixed location in said frame is a shaft B which may be the engine-shaft or a shaft having connection with the engine-shaft; but which will, for convenience, be hereinafter referred to as the engine-shaft. Secured to said engine-shaft are two gear-wheels C and D, one of which is adapted to be brought into mesh with a gear-wheel E secured to a shaft F which I will term the power-shaft. Said shaft is mounted in bearings e slidable within longitudinal slots G formed in the frame. Interposed between said bearings and the ends of the slots nearer the engine-shaft are springs H that serve to normally maintain said bearings at the opposite ends of said slots. One end of said yieldingly-mounted shaft is reduced in diameter, as at I, to form a shoulder i , and loosely mounted on said reduced portion of the shaft is an eccentric bushing J; it being held from lengthwise

movement on the shaft by said shoulder and by a collar j secured to the end of the shaft and journaled in one of the bearings e , said collar serving as a journal for said shaft.

At the outer end of the bushing is a reduced portion K having its circumference concentric with the shaft, and having secured thereto a pinion k by means of which the bushing is revolved. A lever L is pivotally attached between its ends to a cross-bar L^1 mounted in the frame, and at its lower end said lever has a gear-segment l which is held in mesh with the pinion k . Said lever, on being rocked, causes said pinion to revolve and consequently the bushing J to which said pinion is secured. Mounted loosely on said bushing is a gear-wheel M having an annular ratchet-rim m . Said gear-wheel is held against longitudinal movement on said bushing by a flange j^1 formed on the inner end of the latter and by a collar N secured to said bushing and bearing against the hub of said gear-wheel. Within said ratchet-rim is a convolute power-spring O having one end thereof secured to a pin o projecting from shaft F and its other end secured to the inner side of said rim. Said pin is notched at o^1 and provided with an inclined end o^2 . The inner end of spring o is provided with an elongated opening o^3 having its inner end beveled. The metal of the spring between the end thereof and the outer end of said opening enters the notch in the pin, said notch serving to securely hold the spring to the pin. In the event of the engine reversing while the starting-device is in connection therewith, the inner end of the spring becomes disconnected from the pin by reason of the beveled inner end of opening o^3 riding up the inclined end of said pin, thereby avoiding injury being done to the starting-device; the spring automatically engages the pin when the engine is given a proper start.

Loosely mounted on the cross-bar L^1 is a detent pawl P which is engaged with the ratchet-rim m and serves to prevent unwinding of the power-spring. A dog R is also loosely mounted on the bar L^1 and engages gear-wheel E to prevent turning of the shaft F. It is therefore apparent, that said pawl and dog act to maintain the power-spring in its wound-up condition.

S designates a foot-lever which is pivoted at its lower end to the frame and has one end of a rod s pivotally connected thereto; the other end of said rod being provided with an eye through which shaft F extends. In this manner said shaft is free to revolve while maintaining connection with said rod. A second rod T is pivotally connected at one end with the foot-lever and has its opposite end passed through a perforated upstanding lug formed on the dog R; the extremity thereof being enlarged and adapted to be brought into contact with said lug t to disengage said dog from the gear-wheel E.

Surrounding bar L^1 is a spring U having opposite ends

bearing against pawl P and dog R, respectively, it serving to normally maintain them in locked position.

In applying the device, the spring is coiled up and power stored thereby for use when needed. In this condition the bushing has its eccentricity on that side of shaft F farthest from shaft B, both gears on shaft being out of mesh with their cooperating gears. When the engine is to be started, the foot-lever S is operated to cause the shaft F and parts carried thereby to be drawn forward against the action of springs H, which brings gear E in mesh with gear D, while gear-wheel M is held out of mesh with its cooperating gear C by the bushing J having its eccentricity as described. While the teeth of gears E and D are being intermeshed, the head or enlarged end of rod T comes in contact with dog R and releases same, thereby permitting the unwinding of the power-spring, which serves to revolve the engine-shaft and start the engine. When the engine is started, the foot-lever is released to permit the parts to be returned to normal. After the engine is started, the lever L may be actuated to revolve the bushing J and thus bring the eccentricity of the bushing to the opposite side of the shaft, which changes the center of gear-wheel M with reference to the axis of shaft F. The gear-wheel M is thus moved forward into mesh with gear-wheel C on the engine-shaft, to cause the power-spring to be recoiled for the purpose of storing power. The lever L may now be returned to normal to move the gear-wheel M out of mesh with its cooperating gears. From the foregoing, it is understood that the gear-wheels are arranged in pairs, which, however, are normally disengaged, and that one of each pair is secured to the engine-shaft and the other carried on the yieldingly mounted shaft.

This invention is susceptible to changes in form, construction and arrangement of parts, without departing from my invention or sacrificing any of the advantages thereof.

Having thus described my invention, what I claim is,—

1. The combination with a frame having coinciding slots, a shaft having a gear-wheel loosely mounted, bearings for said shaft movable in said slots, a spring between each bearing and one of the ends of the corresponding slots, a second gear-wheel loosely mounted on said shaft, a power spring having one end secured to said shaft and its opposite end secured to said loosely mounted gear-wheel, means to hold said gear-wheel against movement, a second shaft having a fixed position, gear-wheels secured to the last mentioned shaft and adapted to be engaged by the gear-wheels on the first mentioned shaft, and means to move the loosely mounted gear-wheel on the first mentioned shaft into mesh with its cooperating gear-wheel on the second shaft.

2. In a starting-device, the combination with a suitable frame, of two shafts revolubly mounted in said frame and one being movable toward the other, springs to hold the movable shaft in its normal position, two pairs of gear-wheels mounted on said shafts and normally out of mesh, a power spring having connection at one end with one of

said shafts and at its other end with one of the gear-wheels on said shaft, an operating-lever, and a rod connecting said operating-lever with the movable shaft.

3. In a starting-device, the combination with a suitable frame, of a shaft having a fixed position and provided with two gear-wheels, a yieldingly mounted shaft having a gear-wheel secured thereto and adapted to mesh with one of the gear-wheels on the first mentioned shaft, a gear-wheel loosely mounted on said yieldingly mounted shaft adapted to mesh with the other gear-wheel on the first mentioned shaft, and means to move the gear-wheels on the yieldingly mounted shaft into mesh with their respective gear-wheels on the first mentioned shaft.

4. In a starting-device, the combination with a suitable frame, of a shaft having a gear-wheel secured thereto, a second shaft carrying means to store power, an eccentric bushing loosely mounted on the last mentioned shaft, a gear-wheel loosely mounted on said bushing and positioned to be brought into mesh with the gear on the first mentioned shaft, and means to rotate said bushing.

5. In a starting-device, the combination with a suitable frame, of a shaft revolubly mounted in said frame and having a fixed position, two gear-wheels secured thereto, a yieldingly mounted shaft having an eccentric bushing loosely mounted thereon, a gear-wheel loosely mounted on said bushing and adapted to be brought into mesh with one of the gears on the first mentioned shaft, a power-spring having one end thereof secured to said yieldingly mounted shaft and its other end to the last mentioned gear-wheel, a second gear-wheel secured to said yieldingly mounted shaft, and means to move said yieldingly mounted shaft toward and from the first mentioned shaft.

6. In a starting device, the combination with a frame, of a shaft secured thereto, a gear-wheel secured to said shaft, a shaft having an eccentric bushing loosely mounted thereon, a gear-wheel loosely mounted on said bushing and positioned to be brought into mesh with the gear on the first mentioned shaft, means to rotate said bushing, and means to store power.

7. In a starting-device, the combination with a suitable frame, of two shafts revolubly mounted in said frame, two pairs of gear-wheels mounted on said shafts and normally out of mesh, one of said gear-wheels being loosely mounted, a power-spring serving as a connection between the last mentioned gear-wheel and the shaft supporting the same, means to cause said gear-wheel to be brought into mesh with its cooperating gear-wheel, and means for causing the other pair of gear-wheels to be brought into mesh.

8. In a starting-device, the combination with a suitable frame having coincident slots in opposite sides of said frame, a shaft journaled in said slots, springs to hold said shaft at one end thereof, a gear-wheel secured to said shaft, means to prevent the rotation of said shaft, an eccentric bushing loosely mounted on said shaft, a gear-wheel loosely mounted on said bushing, a power-spring having one end thereof secured to said shaft and its other end secured to said last mentioned gear-wheel, means to prevent rotation of the latter, a second shaft having gear-wheels adapted to mesh with the gear-wheels on the first mentioned shaft, means to revolve said bushing to bring the gear-wheel mounted thereon into mesh with one of the gears on said second shaft, and means to move the first mentioned shaft toward the second shaft.

In testimony whereof, I have affixed my signature in the presence of two subscribing witnesses.

WILLIAM J. J. O'DEA.

Witnesses:

EMIL NEUHART,
MAY F. SEWERT.