

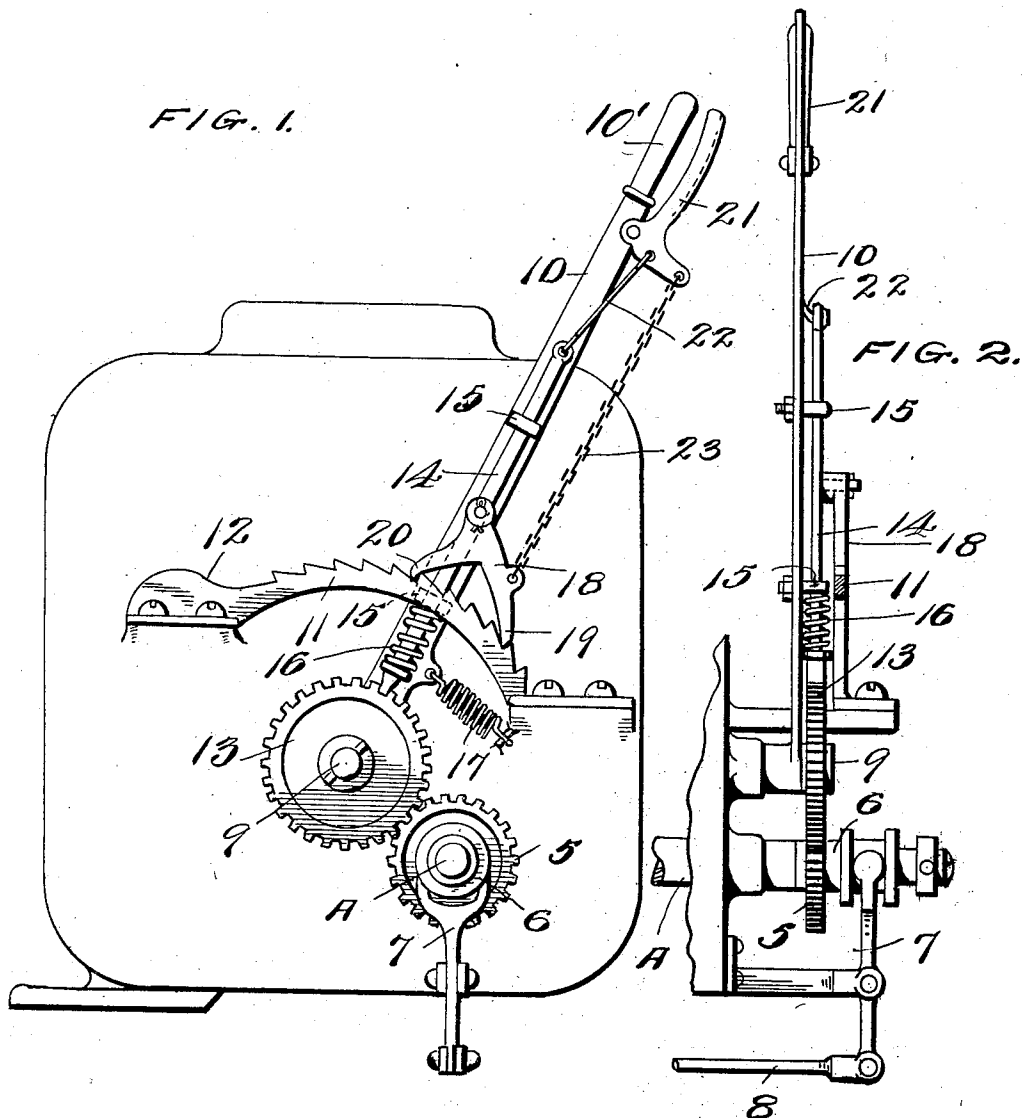
H. C. COLHOWER & J. T. SAINSBURY.

ENGINE STARTING DEVICE.

APPLICATION FILED MAY 27, 1909.

959,997.

Patented May 31, 1910.



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HARRY C. COLHOWER AND JAMES T. SAINSBURY, OF HARTFORD CITY, INDIANA.

ENGINE-STARTING DEVICE.

959,997.

Specification of Letters Patent.

Patented May 31, 1910.

Application filed May 27, 1909. Serial No. 498,646.

To all whom it may concern:

Be it known that we, HARRY C. COLHOWER and JAMES T. SAINSBURY, citizens of the United States, residing at Hartford City, in the county of Blackford and State of Indiana, have invented certain new and useful Improvements in Engine-Starting Devices, of which the following is a specification.

Our invention is a starting device for engines, especially adapted for internal combustion engines in connection with automobiles and like vehicles, and our object is to provide a simple and inexpensive device which will be easy to operate and in which the cranking lever will not fly backwardly under back pressure of the engine.

In the accompanying drawings, which illustrate our invention, and form a part of this specification, Figure 1 is a front elevation of our improved mechanism, and, Fig. 2 is a side elevation thereof, partly in section.

In accordance with our invention, we provide a crank shaft A of an engine, with a pinion 5, splined thereon by means of a sliding sleeve 6, which sleeve may be moved to slide pinion 5 longitudinally upon said shaft by means of a central pivoted oscillatory yoke-arm 7, with which an operating arm 8 is coupled for a purpose to be hereinafter described.

Mounted above crank shaft A with its lower end loosely rotatable upon a stud shaft 9, is a swinging operating lever 10, having the handle portion 10' movable along a segmental plate 11, provided with an upper ratcheted edge and forming a rack, said plate having at its end, forming the limit of the operative movement of said lever for starting the engine, an upstanding shoulder 12, provided with an inclined face for a purpose to be hereinafter described.

Suitable gearing may connect the lever 10 to pinion 5 of crank shaft A, but in the present instance we have shown simple gearing in the form of a pinion 13, loosely mounted upon stud shaft 9, and a latch bar 14 longitudinally slidably mounted upon said lever 10, and having its inner end formed for engagement within the teeth of said pinion 13, said latch bar extending through brackets 15 between one of which, and its inner end is compressed a spring 16, tending to force said latch bar longitudinally into engagement with pinion 13. A coil spring 17 connected between the lever 10 and the forward

end of rack 11 tends to return said lever in the position ready for operation.

Pivotaly mounted upon the latch bar 14, above rack 11, is a double-ended pawl 18, the ends 19 and 20 which engage rack 11 upon opposite sides of lever 10, the said end 19 serving as a pivotal point, whereby said end 20 may be raised when said lever 10 is swung in the direction of said end 19. Pivotaly mounted upon the upper end of lever 10 near the handle portion 10' is a grip 21 connected to the outer end of latch bar 14 by a connecting rod 22, and to the end 19 of pawl 18 by a chain 23, so as to simultaneously move bar 14 and pawl 18 out of engagement with said rack 11 and gear 13 respectively when said grip 21 is drawn inwardly toward said lever 10, whereby said lever 10 will be free to be moved forwardly to assume approximately the position shown in Fig. 1 from which it is oscillated rearwardly toward the raised portion 12 by grasping the handle portion 10' behind the latch 21, for starting the engine. Thus, when it is desired to start the engine, the crank shaft pinion 5 is moved into engagement with pinion 13, by means of yoke-arm 7 and its operating arm 8, and lever 10 is then grasped and moved across rack 11, communicating rotation to the crank shaft A through said gears 13 and 5, to start the engine. Should premature or back-fire take place, the consequent movement of crank shaft A would cause tendency of backward movement to lever 10, which would at once oscillate pawl 18 upon its end 19 engaging rack 11, to move latch bar 14 longitudinally and withdraw its inner end from engagement with pinion 13. Should the engine on the front start up correctly, it would tend to cause continued movement of lever 10 in the operative direction, causing the end 20 of pawl 18 to ride up the inclined surface upon shoulder 12 of rack 11, thereby causing longitudinal movement of latch bar 14 and withdrawing its inner end from engagement with pinion 13. Thus lever 10 not only operates to start the engine, but also to withdraw its means connecting the same with the crank shaft, either when the engine correctly starts, or when premature or back-fire takes place.

It will thus be seen that we provide a mechanism in which the operating lever after its movement under manual operation of the operator, does not, to any extent, move

farther, and is prevented from "kicking" under back-fire, which is the objection to starting levers now in common use.

It will be understood that, when the engine is well started, crank shaft pinion 5 is withdrawn from engagement with pinion 13 by means of the yoke-arm 7, and its operating rod 8 which may be suitably mounted adjacent and within reach of the operator.

Having fully described our invention, we claim:

1. In an engine starter of the character described, the combination with a crank shaft, of a stud shaft, a segmental rack, a lever swingingly mounted upon the said stud shaft to move alongside said segmental rack, means connected to said lever adapted to rotate said crank shaft, said means comprising gears, a movable member arranged upon said lever and adapted to engage one of said gears for rotating the same, means comprising a movable pawl connected to said movable member and coöperating with said segmental rack for automatically moving said movable member out of engagement with said gear, when said lever is swung a predetermined distance in either direction, substantially as described.

2. In an engine starter of the character described, the combination with a crank shaft, of a swinging lever to rotate said crank shaft, means connecting said lever and said crank shaft, embodying gears and a longitudinally slidable latch bar carried by said lever and having its inner end formed for engagement with the teeth of one of said gears, and means comprising a double-ended pawl and rack, the former being centrally pivoted upon said latch bar to travel upon the latter, whereby movement of the said lever in either direction after completion of its swinging movement, causes oscillation of the pawl upon one of its ends to withdraw the said latch bar from said gear, substantially as described.

3. In an engine starter of the character described, the combination with a crank shaft, of a swinging lever to rotate said crank shaft, a stud shaft upon which the

inner end of said lever is mounted, a pinion loosely mounted on said stud shaft adjacent said lever, a pinion splined upon said crank shaft in engagement with said first named pinion, means for moving said last named pinion out of engagement, a latch bar longitudinally slidable upon said lever to engage with its inner end, said first named pinion, a rack mounted above said pinions, and provided with an upper shoulder upon one end having an inclined face, a double ended pawl centrally pivoted upon said latch bar above said rack and having its ends engaging the same on opposite sides of said latch bar, and a swinging grip member, pivoted adjacent the outer end of said lever and having connection with said latch bar and said pawl to withdraw the same, substantially as described.

4. In an engine starter of the character described, the combination with a crank shaft, of a stud shaft, a segmental rack provided with an elevated portion, a lever swingingly mounted upon said stud shaft to move alongside said segmental rack, means connected to said lever and adapted to rotate said shaft, said means comprising gears, a movable member arranged upon said lever adapted to engage one of said gears for rotating the same, a movable member arranged upon said first named movable member and coöperating with said segmental rack for automatically moving said first named movable member out of engagement with said gear, when said lever is swung a predetermined distance in either direction, and manually operative means for disengaging said first named movable member from said gear and said second named movable member from said segmental rack, for returning said lever to its operative position, substantially as described.

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

HARRY C. COLHOWER.
JAMES T. SAINSBURY.

Witnesses:

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