No. 680,103. Patented Aug. 6, 1901.

J. P. & J. N. WRIGHT.

STARTING DEVICE FOR OIL OR GASOLENE ENGINES FOR AUTOMOBILES.

(Application filed May 9, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

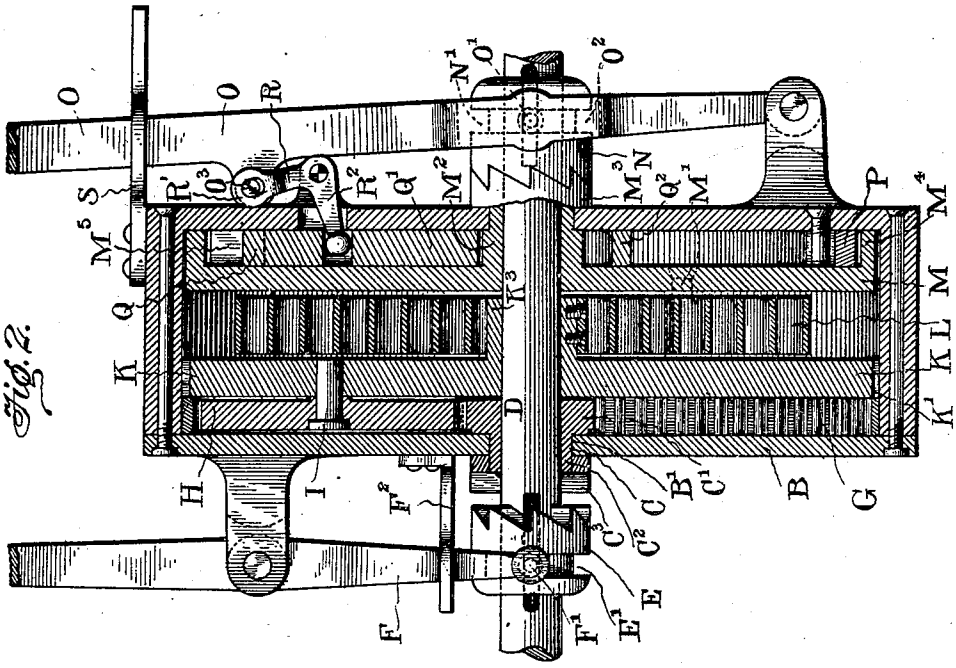
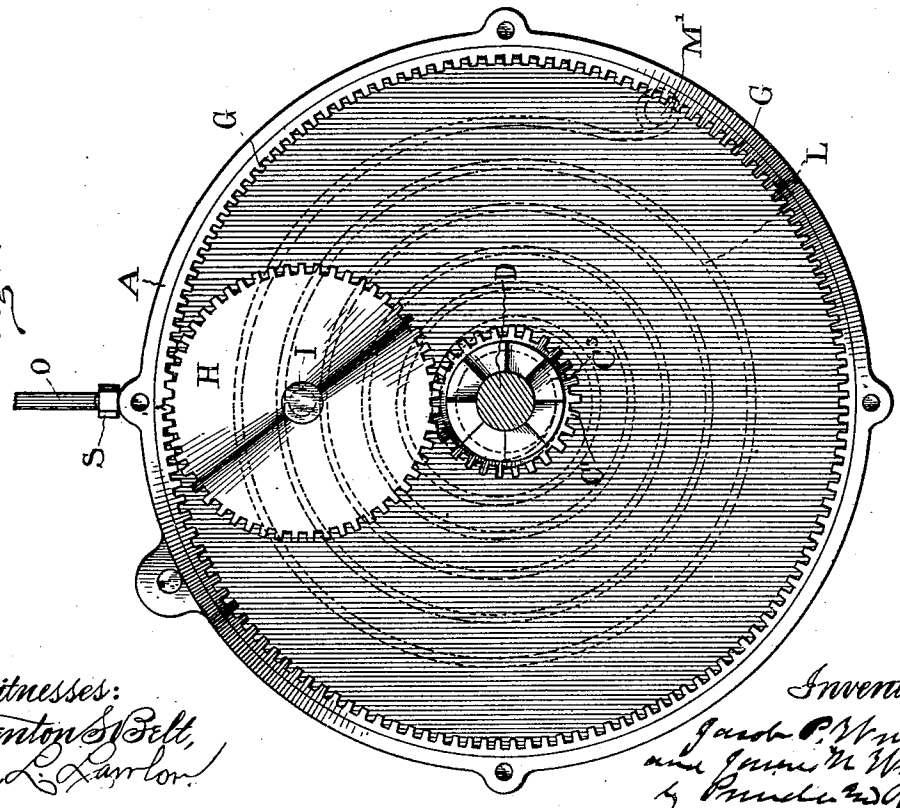


Fig. 1.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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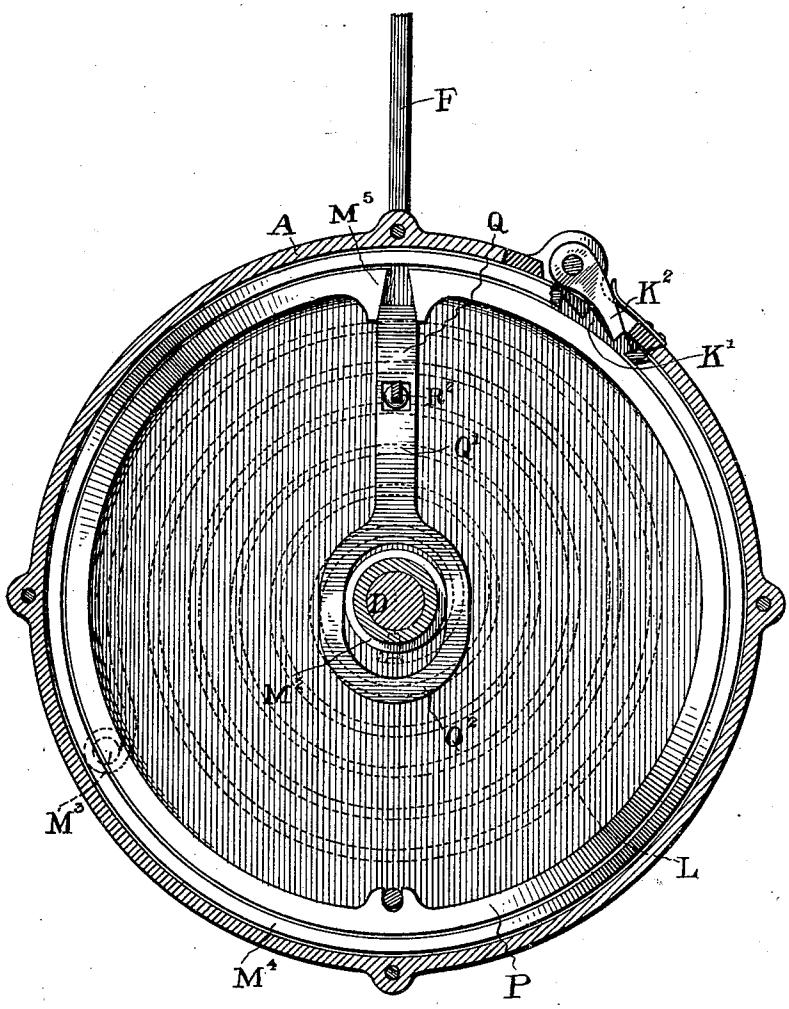
Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB P. WRIGHT, OF NEW HAVEN, CONNECTICUT, AND JAMES N. WRIGHT, OF NEWARK, NEW JERSEY.

STARTING DEVICE FOR OIL OR GASOLENE ENGINES FOR AUTOMOBILES.

SPECIFICATION forming part of Letters Patent No. 680,103, dated August 6, 1901.

Application filed May 9, 1900. Serial No. 16,104. (No model.)

To all whom it may concern:

Be it known that we, JACOB P. WRIGHT, of New Haven, county of New Haven, Connecticut, and JAMES N. WRIGHT, of Newark, in the county of Essex, and in the State of New Jersey, have invented certain new and useful Improvements in Starting Devices for Oil or Gasolene Engines for Automobiles, &c.; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of our starting mechanism, the cover of the casing being removed. Fig. 2 is a vertical sectional view of the same; and Fig. 3 is an elevation of our starting mechanism from the side opposite that shown in Fig. 1, the side of the casing being broken away.

The object of our invention has been to provide means for setting in motion an automobile driven by an explosive-engine, the engine and its igniting apparatus, the engine alone, or the igniting apparatus alone, so that a charge of explosive material may be drawn into the engine and compressed, if such action is necessary, and the igniting apparatus made to explode the charge, thus giving the engine momentum, by which it can of itself perform the succeeding cycles of its operations; and to such end our invention consists in the starting mechanism hereinafter specified.

In carrying our invention into practice we provide a preferably cylindrical casing A, which is fixedly secured to the framework of the automobile or of the engine, said casing having a cover B. The cover is provided with a central opening B′, in which bears a part C, consisting of a pinion C′, having a cylindrical hub C^2, on which is secured a clutch member C^3, the portion of the hub between the pinion and clutch member forming a neck, which occupies the bearing in the cover. A shaft D passes freely through a bore in the hub C^2, its axis being coincident with the axis of the casing. A second clutch member E is splined on the shaft D in position to engage the clutch member C^3. A lever F engages the clutch member through pins F′, carried by said lever and extending into a groove E′, formed in the clutch member E. A spring-clip F^2 is secured to the casing and serves to hold the lever F in either of its two positions.

Within the casing is formed an internal gear G, which is geared to the pinion by an intermediate gear H, the latter being mounted on a stud I, which is carried by a disk K, having a bearing on the shaft. The periphery of the disk K is provided with ratchet-teeth K′, which are inclined in the direction in which the shaft revolves. A pawl K^2 is pivoted between ears on the casing and projects through an opening in the casing and engages the ratchet-teeth. To the hub K^3 of the disk is secured one end of a spiral spring L, the opposite end being attached to a disk M by means of a stud M′. The disk M is provided with a hub M^2, which passes centrally through a wall of the casing opposite to the opening B′ in the cover, the hub having secured thereto a clutch member M^3 and having a central bore through which passes the shaft D. The opposite clutch member N is splined on the shaft D and has teeth which are inclined in the direction in which said shaft rotates. The clutch member N has a circumferential groove N′. The clutch member N is thrown into and out of engagement with the clutch member M^3 by a lever O, which is pivoted between ears formed on the casing and which engages said clutch member by means of pins O′ and O′, carried by a yoke O^2, which spans the clutch member, the pins O′ and O′ engaging the walls of a groove N′, that is formed in the clutch member N. A split ring P is situated within an annular flange M^4, which is formed on the disk M, the flange and split ring together forming a friction-clutch. The ends M^5 and M^5 of the split ring have oppositely-inclined surfaces, forming between them an outwardly-tapering recess, which is occupied by a wedge Q, the latter having a shank Q′, at the inner end of which is a loop Q^2, having parallel inner walls which engage the hub M^2, and thereby guide the wedge. The wedge is moved into and out of engagement with the inclined surfaces on the end of the split ring by means of a bell-crank R, which is pivoted between ears formed on the casing. The said lever

has a slotted arm R′, which engages a pin O^3, formed on the lever O, and an arm R^2, which extends through an opening in the casing and whose rounded end occupies a slot in the shank Q′ of the wedge Q. A spring-clip S is secured to the casing and engages the lever O to hold it in either of its two positions.

The shaft upon which our starter is placed may be the shaft of the automobile, in which case the vehicle, as well as the explosive-engine and igniter, will be set in motion by its action, or such shaft may be the shaft of the engine, in which case, if desired, the engine and igniter may be set in action by the starter without moving the vehicle, or our starter may be attached to the shaft of the magnetic igniter where such an igniter is used, and the engine being charged with compressed explosive the igniter alone may be set in motion until its action explodes the charge in the engine and sets the latter in motion.

The operation of our mechanism is a follows: The lever O is operated to disengage the clutch member M^3 and N and to expand the split ring within and clamp the annular flange M^4 to prevent its rotation. While the shaft D is in motion the lever F is moved to engage the clutch members C^3 and E, which action causes the pinion C′ to revolve the intermediate gear H. Owing to the engagement of the gear H with the internal gear G the former is caused to slowly travel in the direction of motion of the shaft, carrying with it the disk K. The spring L, having one end attached to the hub of disk K and having its outer end held stationary by the friction-clutch, is caused to wind up on the hub of the disk K, thus storing up the power of the shaft. When the spring is sufficiently wound, the clutch members C^3 and E are disengaged, and the pawl L′ holds the disk K from backward rotation and prevents the spring from unwinding. When it is desired to cause the shaft to revolve, the lever O is operated to disengage the wedge Q from the inclined ends of the split ring, thus releasing the friction-clutch, and to engage the clutch members M^3 and N, thus connecting the disk M with the shaft. The spring being now wound up and having the end which is attached to the disk K held stationary and its other end connected to the shaft causes the shaft to revolve until the explosive-engine has gone through its cycle of operations sufficiently to make its action automatic. The clutch members M^3 and N are now disengaged, leaving the shaft free to revolve without connection with our starting mechanism.

While in the embodiment of our invention which we have herein shown and described we have shown the spring as transmitting motion to the shaft from which it derived its motion, we desire to have it understood that we can cause the spring to be wound by one shaft and to transmit the power thus derived to another shaft.

Having thus described our invention, what we claim is—

1. The combination of a shaft, a cylindrical casing surrounding such shaft, a pinion loose on said shaft, means for clutching such pinion to said shaft, a disk loose on said shaft, means for preventing motion of said disk in one direction, a gear carried by such disk and meshing with said pinion, an internal gear on the casing with which meshes such first-mentioned gear, a spring attached at one end to said disk, a friction-disk loose on such shaft, one end of said spring being attached to such friction-disk, a stationary friction member which is adapted to coact with said friction-disk, and a clutch by which such friction-disk can be secured to said shaft, substantially as and for the purpose described.

2. The combination of a shaft, a cylindrical casing surrounding such shaft, a pinion loose on the shaft, a clutch member splined thereon and adapted to engage a clutch member formed on said pinion, a lever for operating such clutch, said lever being mounted on the casing, a ratchet-disk loose on the shaft, a pawl on the casing for holding the disk from rotating in one direction, a gear carried by the disk and meshing with the pinion, an internal gear on the casing, with which meshes such first-mentioned gear, a spring attached at one end to the disk, a friction-disk loose on said shaft, the opposite end of the spring being attached to such friction-disk, a stationary, split friction-ring which is adapted to coact with the friction-disk, a wedge for expanding said friction-ring, a clutch member formed on the friction-disk, a clutch member splined on such shaft and adapted to engage with the clutch member on the friction-disk, and a lever fulcrumed on the casing and adapted, when moved in one direction, to move the wedge, and when moved in the opposite direction to engage the last-mentioned clutch member, substantially as and for the purpose described.

In testimony that we claim the foregoing we have hereunto set our hands, respectively, the 5th and 8th days of May, 1900.

JACOB P. WRIGHT.
JAMES N. WRIGHT.

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