

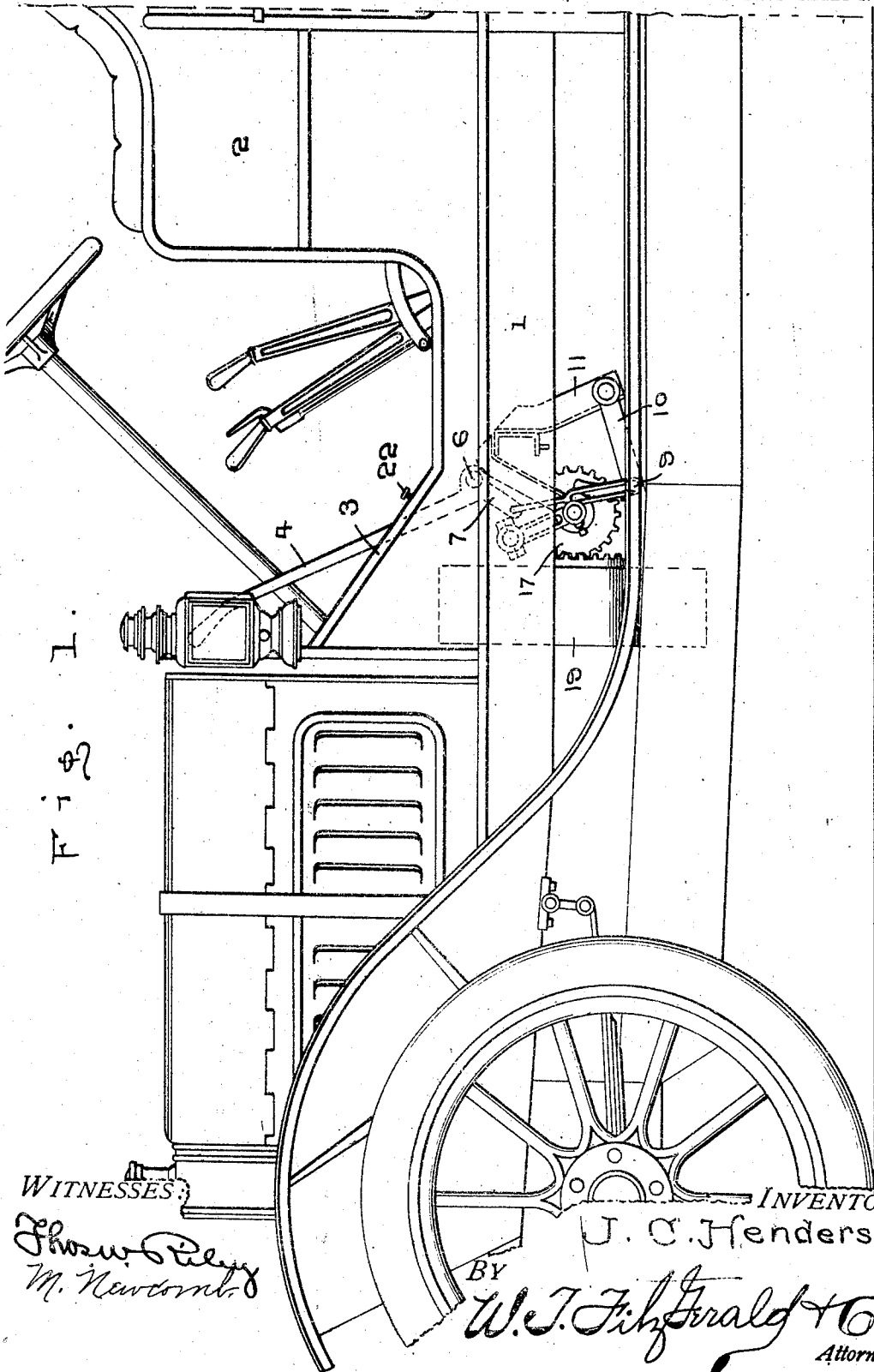
J. C. HENDERSON.
STARTER FOR ENGINES.

APPLICATION FILED JUNE 29, 1910.

1,038,132.

Patented Sept. 10, 1912.

4 SHEETS—SHEET 1.



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4 SHEETS—SHEET 2.

Fig. 2.

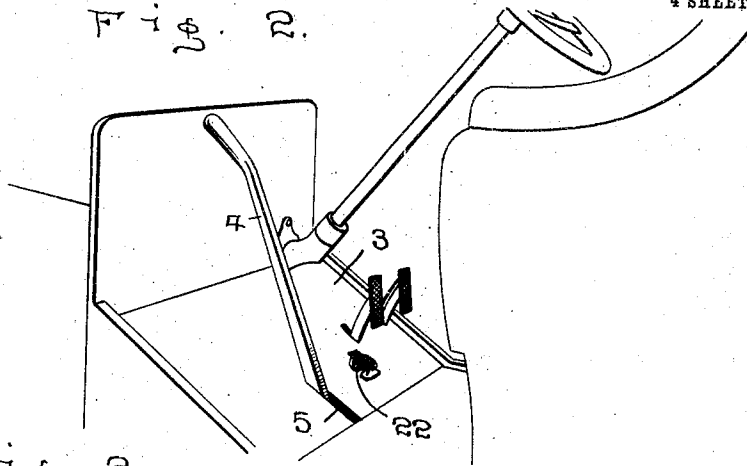


Fig. 3.

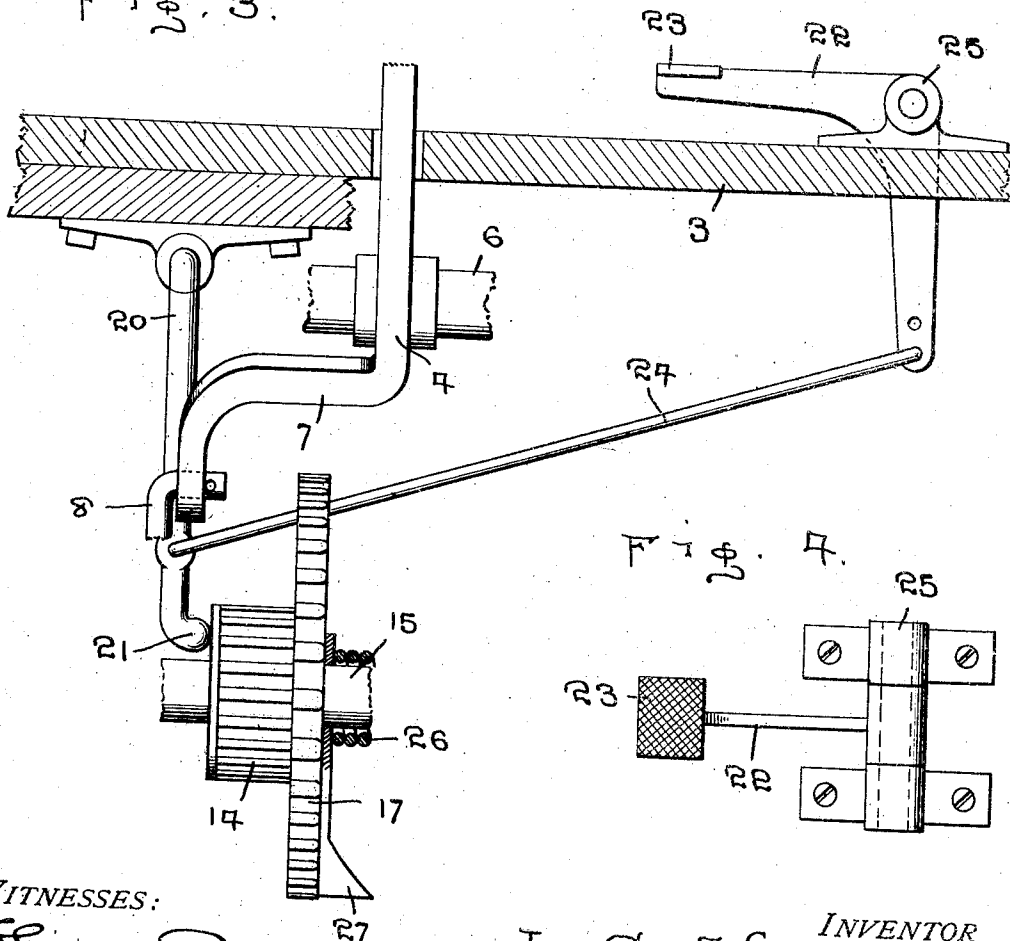
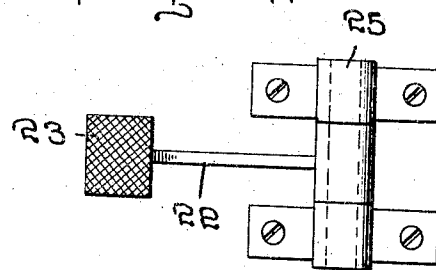


Fig. 4.



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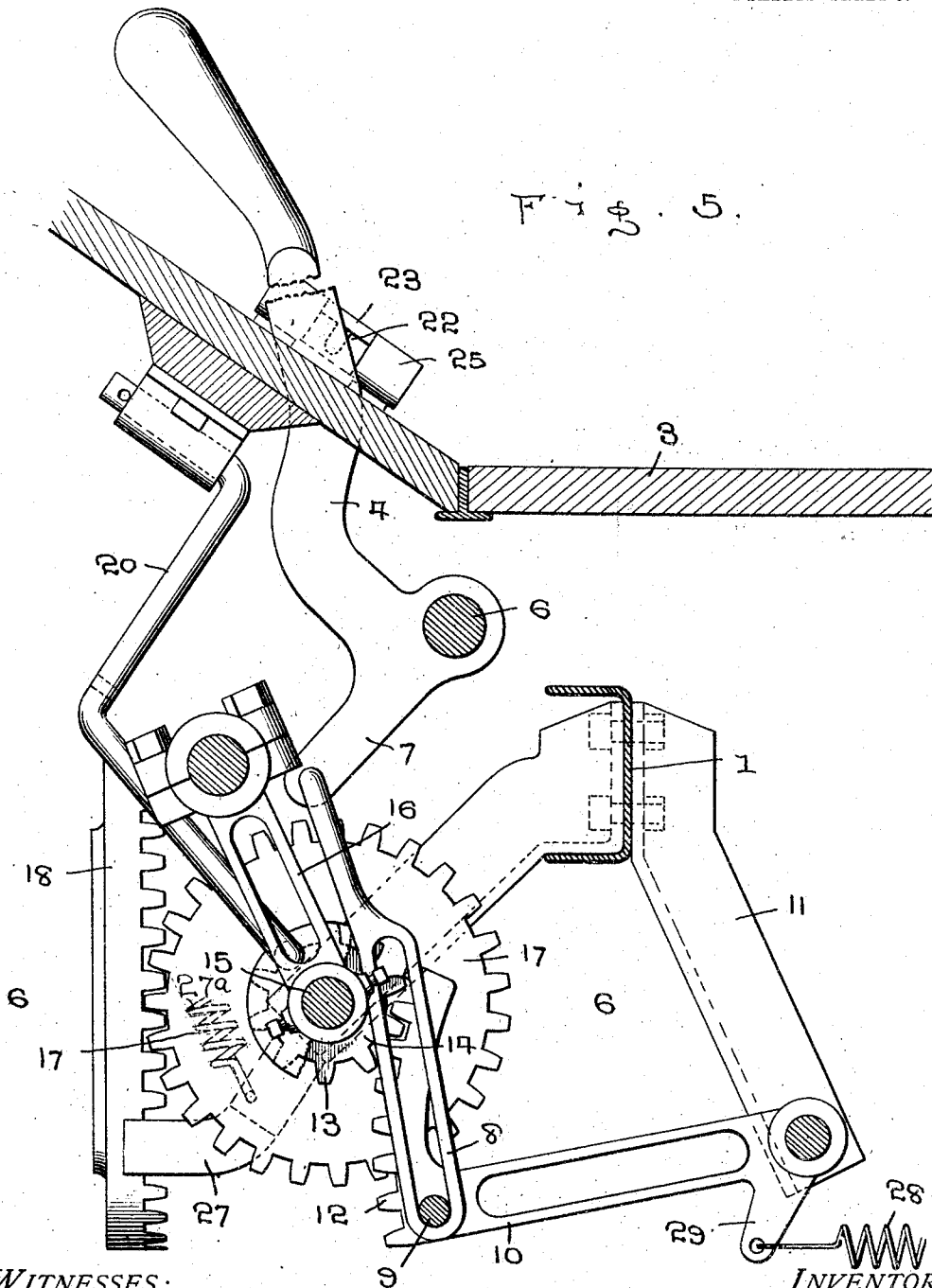
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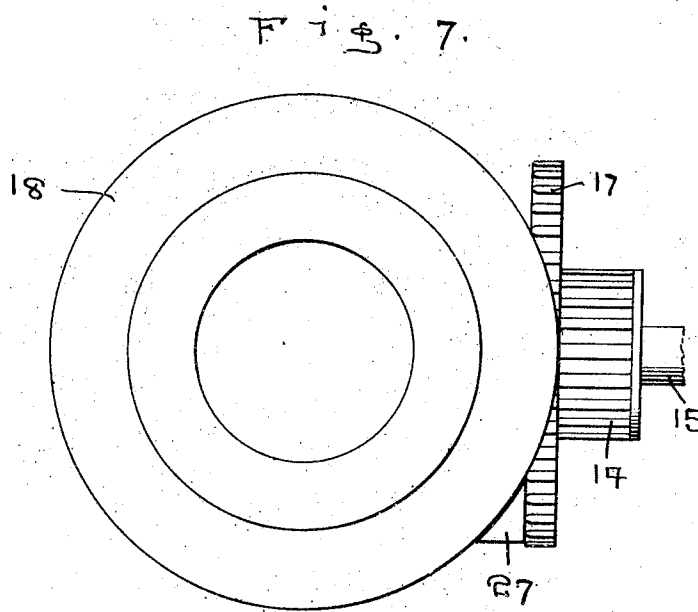
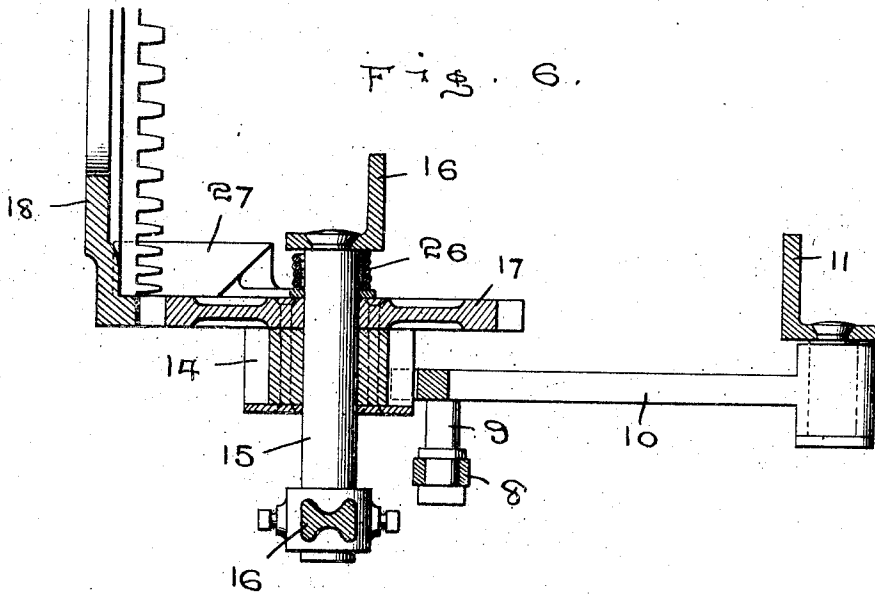
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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STARTER FOR ENGINES.

1,038,132.

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed June 29, 1910. Serial No. 569,515.

To all whom it may concern:

Be it known that I, JOHN CHARLES HENDERSON, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Starters for Engines; 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.

My invention relates to new and useful improvements in starters for engines and is adapted more particularly to be used for starting the engines of motor propelled vehicles and my object is to provide suitable gears in connection with the shaft or other parts of the motor, through the medium of which the shaft of the motor may be rotated.

A further object is to provide means for moving one of said gears into or out of engagement with the other gear.

A further object is to connect a segmental gear with the movable gear, whereby when said segmental gear is moved upwardly, said gears will be rotated, and, a further object is to provide a lever and connect the same to said segmental gear, said lever being in convenient reach of the operator in the vehicle.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the specification hereunto annexed.

In the accompanying drawings which are made a part of this application, Figure 1 is a detail side elevation of an automobile showing my improved starting device applied thereto. Fig. 2 is a detail perspective view of a portion of an automobile showing the manner of placing the starting lever therein. Fig. 3 is a detail transverse sectional view of the starting mechanism on an enlarged scale. Fig. 4 is a top plan view of the foot lever employed for moving the gears into engagement with each other. Fig. 5 is a longitudinal sectional view of the vehicle body showing my improved starting mechanism in position thereon. Fig. 6 is a detail sectional view seen on line 6—6 Fig. 5, and, Fig. 7 is an elevation of the stationary and movable gears.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1

indicates the frame of the vehicle, which in this instance is an automobile, 2 indicates the seat and 3 the bottom of the vehicle bed, these parts being constructed in the usual or any preferred manner.

It has been the custom heretofore in starting engines of automobiles to extend the shaft of the engine to the forward end of the automobile and engage the same with a crank, thus necessitating considerable energy in cranking the engine, as well as the danger of being struck by the crank should the engine fly back and to overcome this objectionable feature and at the same time provide means whereby the engine may be started without leaving the vehicle, a lever 4 is extended upwardly through the floor 3, a slot 5 being cut through the floor and substantially at the transverse center of the automobile. The lever 4 is pivoted to a shaft 6 at a suitable point below the floor and has a terminal 7 below its pivot, which terminal extends laterally, forwardly and downwardly, thus disposing said terminal to one side of the longitudinal axis of the lever, to which it is attached. The free end of the terminal 7 has attached thereto a link 8, which link coöperates with a pin 9 carried by a segmental gear 10, one end of the segmental gear being pivoted to an extension 11, which extension is attached in any manner to parts of the frame 1 and depends therefrom. One portion of the segmental gear 10 is formed into a segment of a circle and has teeth 12 on its outer edge, which coöperate with teeth 13 of a pinion 14, said pinion being rotatably mounted upon a shaft 15, which shaft is in turn carried by hangers 16. Also rotatably and movably mounted upon the shaft 15 is a gear 17, which is fixed to one end of the pinion and rotates therewith, the teeth of the gear 17 being adapted to mesh with the teeth of a gear 18, which latter gear, in this instance, is fixed to the fly wheel 19 of the engine, but as said engine forms no part of the present invention, it is not deemed necessary to show the same.

The gear 17 and pinion 14 are adapted to be moved longitudinally of the shaft 15, so as to bring the teeth of the gear 17 into engagement with the teeth of the gear 18 and the result is accomplished by pivotally attaching an arm 20 to the floor of the vehicle, the lower end of the arm being preferably formed into a ball or knob 21, which

bears against the free end of the pinion 14, so that when the arm is swung in one direction, the pinion and gear will be moved longitudinally of the shaft 15 and into engagement with the teeth of the gear 18. The arm 20 is adapted to be swung in one direction through the medium of the pressure of the foot upon a foot lever 22, said foot lever having a horizontal and a vertical section, the horizontal section having a tread plate 23 thereon, while the vertical section has attached thereto one end of a rod 24, the opposite end of the rod being secured to the arm 20 adjacent its lower end and as said foot lever is pivotally mounted in brackets 25, it will be readily seen that when the end of the horizontal portion is depressed, the arm 20 will be swung into engagement with and move the gear 17 into engagement with the gear 18. After the pressure has been released from the foot lever 22, the gear 17 is moved out of engagement with the gear 18 by means of a coil spring 26, which is positioned between one of the hangers 16 and the hub of the gear 17, the tension of the spring serving to hold the gears out of engagement with each other until such time as the foot lever is operated to connect said gears.

In order to guard against injury to the operator should the engine "back fire", I provide means for automatically disengaging the gear 17 from the gear 18 and to this end, a cam 27 is swung from the shaft 15 and placed between the gear 17 and the spring 26, said cam extending downwardly and forwardly so that the free end thereof will move into engagement with the gear 18 when the gear 17 is moved into engagement therewith. That face of the cam engaging the periphery of the gear 18, is curved to conform to the contour of the gear so that the frictional engagement of the cam with the gear 18 will cause the cam to swing upwardly when the gear 18 is rotated in the wrong direction and as the cam is placed at the inner face of the gear 17, the upward swinging movement of the cam will force the gear 17 outwardly and disengage the same from the gear 18, thus preventing the lever from "kicking" in case of premature ignition or back firing.

The end of the cam 27 is preferably held in close proximity to the periphery of the gear 18 by means of a coil spring 27^a, one end of said spring being attached to said cam and the opposite end thereof to any suitable part of the frame of the vehicle. As shown, the spring 27^a will be compressed when the cam is elevated between the gears. When the gears have been separated, said spring will return said cam to initial position.

When it is desired to start the engine, pressure is applied to the tread plate 23 by

placing the foot thereon, which will result in moving the gear 17 and pinion 14 attached thereto, longitudinally of the shaft 15 until the spring 26 is depressed, which stops further movement of the gear inwardly. The upper end of the lever 4 is then grasped and moved rearwardly, which will result in swinging the segmental gear 10 upwardly and rotating the gears, which will impart motion to the shaft of the engine. If the engine fails to start with one operation of the lever, pressure is released from the tread plate and the lever 4 swung forwardly, which will lower the segmental gear and parts cooperating therewith so that by again moving the sliding gear into engagement with the gear 18, the starting operation may be repeated.

The segmental gear 10 will normally descend by gravity, but in order to cause the same to positively descend when the gears are out of mesh with each other, a spring 28 is attached to a projection 29 on the segmental gear.

As the segmental gear 10 remains stationary so far as its lateral movement is concerned, the pinion 14 is constructed of such length as to compensate for the movement of the pinion on its shaft, thus keeping the teeth of the segmental gear in engagement with the pinion at all times.

While I have shown and described the gear 18 as connected with the fly wheel of the engine, it will be readily understood that said gear can be connected to the usual form of clutch mechanism (not shown) or direct to the shaft of the engine, or to any suitable part of the motor. It will further be seen that by placing the main lever substantially in the center of the vehicle, said lever will be sufficiently removed from the other levers as to avoid confusion and it will also be seen that the engine can be readily started without the driver leaving the seat. It will further be seen that in view of the simplicity of the device, it can be very cheaply and at the same time strongly and durably constructed and it will further be seen that the starting mechanism can be readily attached to any make of vehicle having an internal combustion engine for propelling the same.

What I claim is:—

1. In a starter for motors, the combination with a gear fixed to parts of the motor, a rotatable and slidably mounted gear adapted to be moved into engagement with the first mentioned gear and means to operate the rotatable and slidably mounted gear to rotate the first mentioned gear when engaged therewith in one direction, of a cam adapted to move between and separate said gears upon reverse rotation of the first mentioned gear.

2. In a starter for motors, the combina-

tion with a gear fixed to parts of the motor, a slidable and rotatably mounted gear adapted for engagement with the first mentioned gear and means to rotate said gears in a forward direction, of a cam adapted to frictionally engage the first mentioned gear when said gears are in mesh and move between and separate said gears upon backward rotation of the latter.

10 3. In a motor starter, the combination with a gear operatively connected with the shaft of a motor; of a second gear slidably mounted on its shaft, means for disposing said gear in operative or inoperative relation with said first mentioned gear, a pinion attached to the second gear, a segmental gear meshing with said pinion, a slotted link adapted to engage a pin on said segmental gear, a bell crank lever pivotally secured to the handle, means for operating the lever, means for returning the segmental gear to its initial position when a cycle of operation is completed.

20 4. The combination with a motor having a shaft adapted to rotate in one direction; of a gear operatively connected with said shaft, a second gear slidably mounted on its shaft, means for disposing said second gear

in operative or inoperative relation with the first mentioned gear, means for causing the rotation of the second gear, and means for automatically forcing said gears out of mesh when the motor shaft rotates in the wrong direction.

5. In a motor starter, the combination with a gear operatively connected with the shaft of a motor and a second gear slidably mounted on its shaft, of means for sliding said second gear into or out of mesh with the first, and additional means consisting of an arm pivotally mounted on the shaft of the second gear and having its end held in frictional engagement with the periphery of the first, whereby the rotation of the motor shaft in a certain direction will cause said arm to wedge between said gears and force the same out of mesh, and means to rotate the gears.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN C. HENDERSON.

Witnesses:

JOHN J. DOYLE,
MAX T. RAU.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."