No. 872,527.

PATENTED DEC. 3, 1907.

A. W. MANZ.

MOTOR STARTER.

APPLICATION FILED FEB. 26, 1906.

Fig. 1.

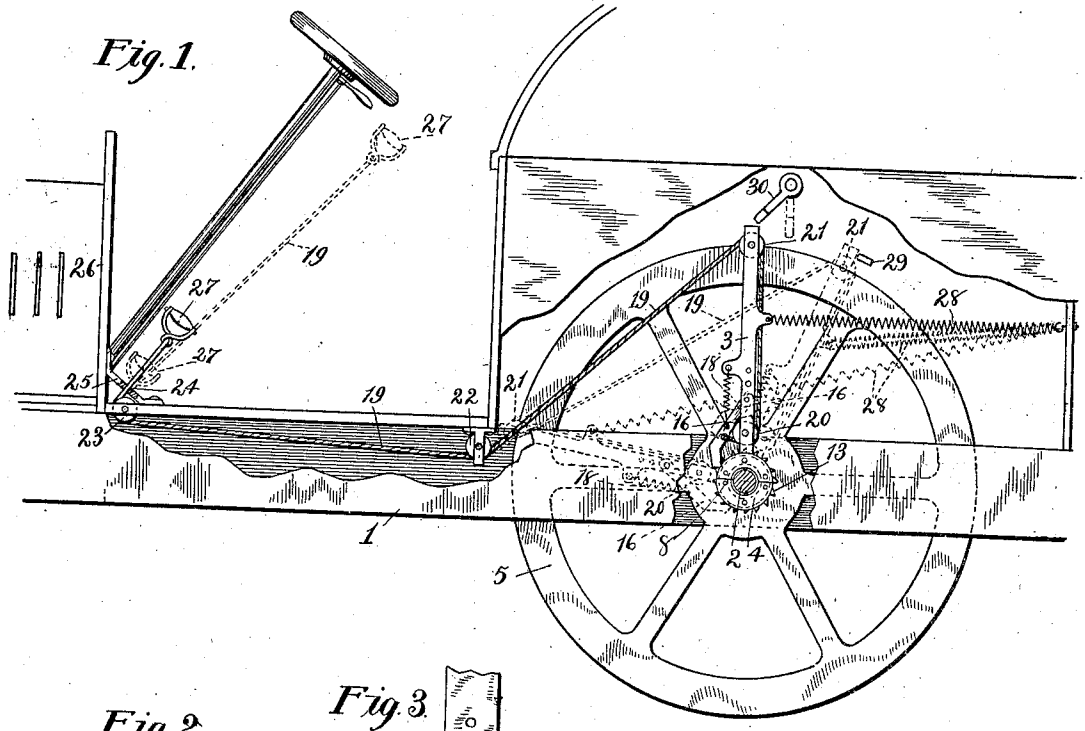


Fig. 2.

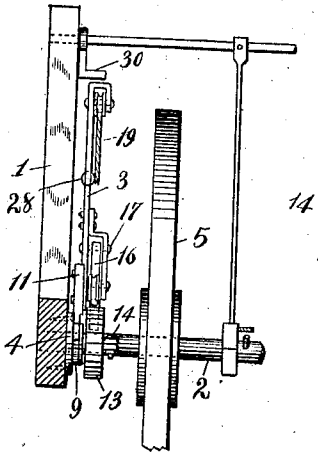


Fig. 3.

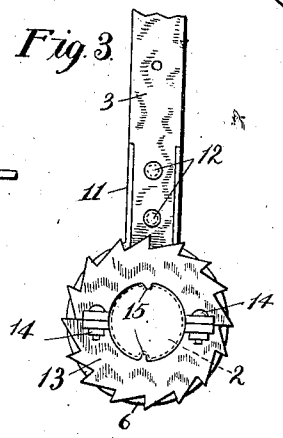
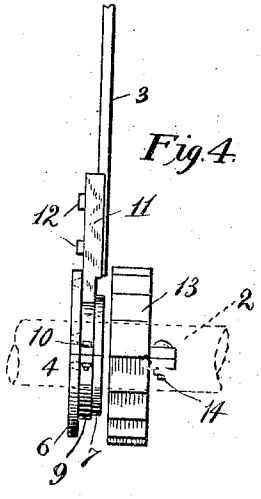


Fig. 4.



Witnesses:

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MOTOR-STARTER.

No. 872,527. Specification of Letters Patent. Patented Dec. 3, 1907.

Application filed February 26, 1906. Serial No. 302,922.

To all whom it may concern:

Be it known that I, ADOLPH W. MANZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Motor-Starters, of which the following is a specification.

My invention relates to starting devices for explosive engines or motors and especially to that type of motor employed for driving vehicles.

The chief objects of my invention are to provide a convenient, efficient and economical device by means of which the operator can quickly and safely start the engine without leaving his seat.

It is well known that the main shaft of an explosive engine must be given a sufficient movement to cause at least one explosion before its action will become automatic and that this movement must be imparted by some power outside of the engine itself. As ordinarily constructed the mechanism by which this is accomplished, in order to economize space and for other reasons, is placed beneath the body of the vehicle or in some other equally inconvenient location. This makes it necessary for the operator to alight from the vehicle and it often happens that he must do this in a place where the mud or water makes it very disagreeable and considerable time may be consumed before the desired result is accomplished. The ordinary starting device consists of a detachable crank which can be temporarily applied to turn the engine shaft. The operator in his haste has been known to leave the operating crank behind only to discover his loss when he again needed it to start his motor. It is also well known to those skilled in the art that with explosive motors it is necessary that the time of ignition should bear a certain relation to the position of the piston with reference to its dead center, such relation varying according to the speed of the engine. For this reason the setting of the sparker has a direct bearing upon the movement of the piston and its driven crank; for instance, if the time of ignition is set in advance when the crank is approaching dead center and ignition of the charge should take place, a reverse movement of the engine will occur and as a result the operator will be in danger of severe injury from the backward jerk of his crank by the engagement of the dog by the ratchet. For this reason provision must be made to render it impossible to start the motor when the sparking mechanism is set in the zone of danger.

I accomplish the above objects in a general way by attaching a ratchet wheel to the engine shaft and operating the same by means of a pawl mounted upon a lever and controlled by a cable passing over suitably arranged pulleys, said cable being furnished with a handle placed conveniently near to the driver's seat.

The means employed by me is adaptable to the great variety of the motor vehicles in common use. Hitherto it has been necessary to construct the starting device to suit the exigencies of each type of motor and when it forms a part of the mechanism its construction must be carried on in conjunction with that of the vehicle itself. In my improved device this is not necessary as the apparatus is constructed with the view of making it possible to apply it to vehicles already constructed and of almost any design whatever.

The ordinary method of starting the engine by the application of a crank is so awkward and inconvenient that it is customary to keep the engine in motion when short stops of the vehicle are made. By the use of my improved starting device which is easily operated and rapid in its action, the motor will be more frequently stopped and thus there will be a great saving in fuel, oil, wear etc.

In the accompanying drawing forming a part of this specification:—Figure 1 is a side elevation of my improved explosive engine starter attached to the frame of an automobile, sufficient only of the vehicle being shown to illustrate the application of my invention thereto; Fig. 2 is a fragmentary view showing the method of removably attaching the ratchet wheel and its relation to the journal of the operating lever; Fig. 4 is a side view of the ratchet wheel and the flanged journal of the operating lever.

Referring to the drawing, 1 is the framework of an automobile, 2 the engine shaft and 3 an operating lever, journaled in a bearing 4 concentric with the rotating center of the main shaft. In some types of automobile construction the method of supporting the main shaft is such as to render it impossible to attach the lever center in line

with the shaft center as for instance, when both ends of the shaft are journaled in the frame, I therefore construct the said bearing 4 in two parts that can be assembled so as to surround the shaft, each portion having flanges 6, 7, the wider of the two having holes 8 for screws or bolts by which the bearing can be secured to the framework. A collar 9 also made in two parts to facilitate assembling and fastened together by bolts 10 has an arm 11 perforated for bolts 12 by means of which the operating lever 3 can be firmly attached thereto. A ratchet wheel 13 made in halves and fastened together by bolts 14 is firmly clamped upon the main shaft and rotates with it, being keyed upon said shaft by means of feathers 15 which engage splines cut in the surface of the shaft on opposite sides. A pawl 16 is pivotally attached to the said operating lever by a bolt 17 and is adapted to engage the notches of said ratchet wheel 13, and is normally kept out of engagement thereof by means of a spring 18. A cable 19 is secured at one end to the pawl 16 and is carried around grooved wheels 20, 21, attached to the operating lever, thence around pulleys 22, 23, attached to the framework and then passes through a hole 24 in a foot plate 25 placed at the base of the dash 26, where it terminates in a handle 27. When released the said handle rests upon the foot plate 25 and a spring 28 holds the operating lever in retracted position against a stop 29, the adjustment being such that the spring 18 will then hold the pawl 16 out of engagement with the ratchet wheel 13. The mechanism is so adjusted that when the regulating lever 30 of the sparking device is within the zone of danger, *i. e.*, so advanced that the discharge will be likely to cause reversal of the engine and consequent injury to the starting mechanism and possibly to the operator, it will be in the path of movement of the operating lever 3 so that when the handle 27 is pulled the operating lever will engage with the said regulating lever 30 and prevent any further movement of said lever 3. When this happens the operator will be reminded to set the lever 30 over far enough to clear the operating lever and thus the starting mechanism will be freed from the obstruction and the engine can be started by pulling upon the handle 27 without any danger of a premature explosion.

Having thus described the mechanism of my improved starting device for explosive engines I will briefly indicate the method of using the same. When the motor is at rest and the operator desires to start the engine he first turns the sparking control lever 30 to a position where it will not interfere with the excursion of the operating lever, and grasping the handle 27 gives it an upward and backward movement. As the handle begins to move, since the cable 19 is attached at the opposite end to the pawl 16, the latter will be extended until it engages the ratchet wheel 13. A continuance of the handle movement in the same direction will then cause the lever 3 to move upon its center carrying the ratchet wheel with it and thus produce a partial revolution of the engine shaft 2, the momentum of the fly wheel 5 continuing the movement sufficiently to cause a discharge and initiate the desired automatic action of the motor mechanism. The handle then being released the action of the spring 28 will retract the parts to their initial position with the handle 27 upon the foot plate 25, the operating lever 3 resting against its stop 29 and the pawl 16 free from engagement with the ratchet teeth. Should one impulse of the handle be insufficient to give the required momentum to the fly wheel, the movement can be repeated as many times as may be necessary, but since the arrangement is such that the operating lever will describe an arc of about 90 degrees one pull upon the handle will ordinarily be all that is required.

It is evident that many changes may be made in the precise form of the parts and the construction of the mechanism herein shown without departing from the spirit and scope of my invention, and I therefore do not wish to be limited to the exact construction herein set forth, but

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

A starting device for motors, in combination with the motor main shaft, a lever loosely mounted on said shaft, split bearings on said shaft embracing said lever, a split ratchet-wheel secured on said shaft adjacent to said lever, pulleys mounted on said lever near its ends, operative means for making traction upon said lever, said operative means consisting of a flexible and a yielding portion, said flexible portion passing over said pulleys and provided with a handle, a pawl pivoted to the lever and forming a link between the said portions of the operative means for the lever, means for retaining the lever in inoperative position, and means for preventing the untimely operation of said lever.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPH W. MANZ.

Witnesses:
PAUL H. MANZ,
C. F. BASSETT.