

E. M. CARD.
ENGINE STARTER.
APPLICATION FILED SEPT. 5, 1911.

1,038,286.

Patented Sept. 10, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

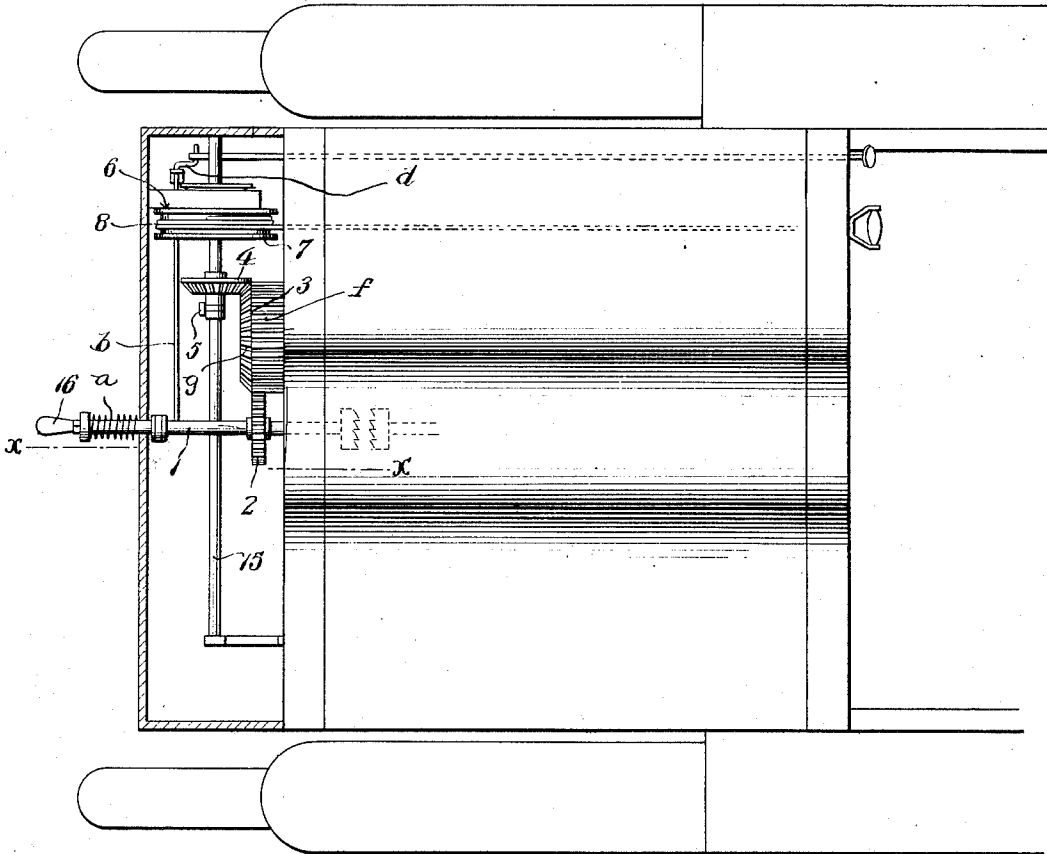


Fig. 4.

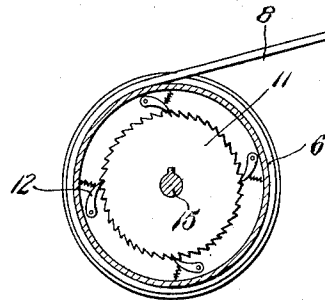
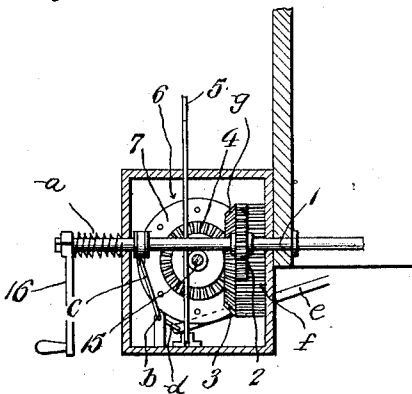


Fig. 5.

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Witnesses

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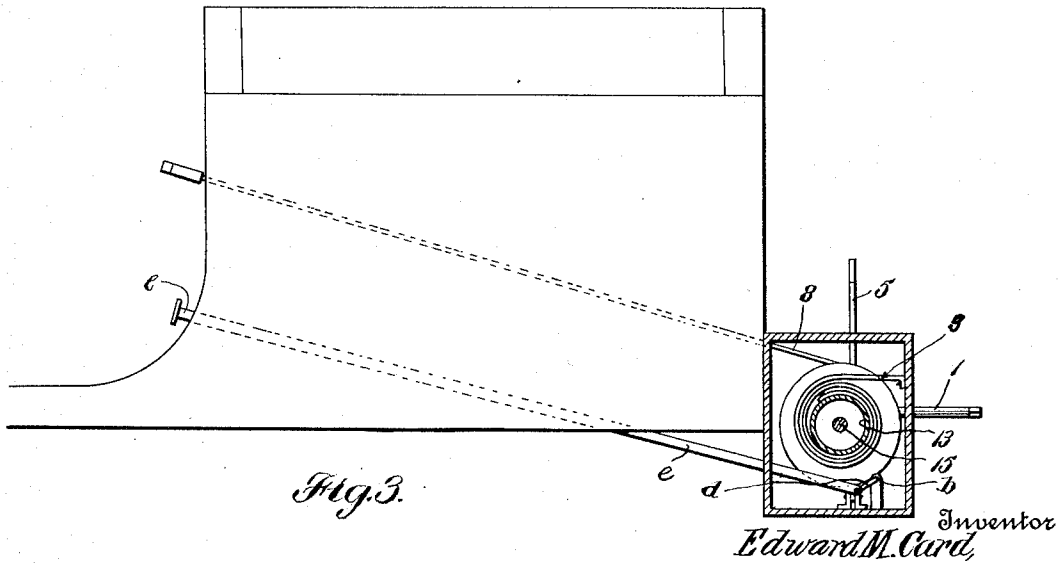
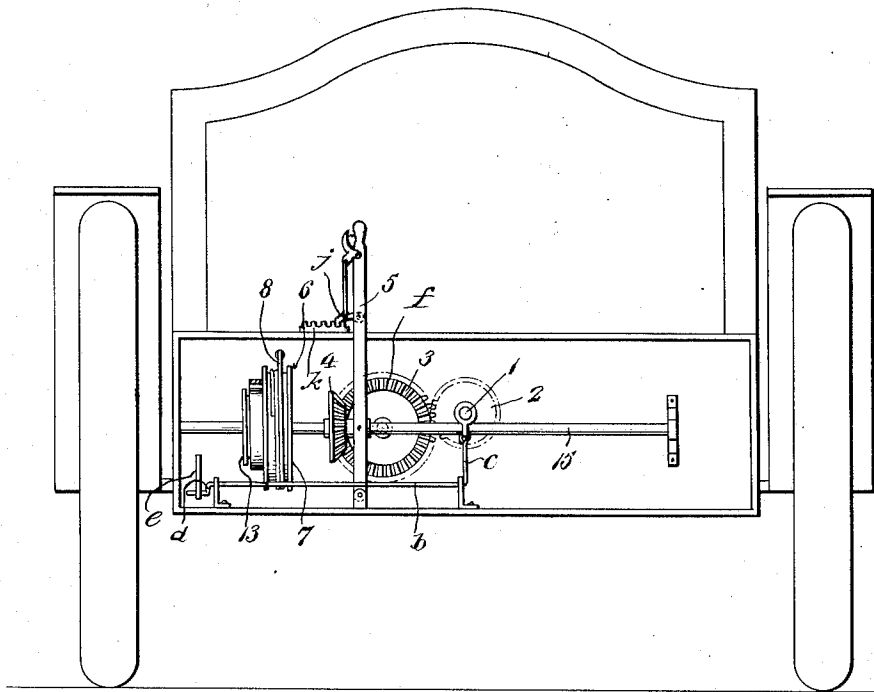
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

EDWARD M. CARD, OF BRIDGEPORT, CONNECTICUT.

ENGINE-STARTER.

1,038,286.

Specification of Letters Patent. Patented Sept. 10, 1912.

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To all whom it may concern:

Be it known that I, EDWARD M. CARD, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented new and useful Improvements in Engine-Starters, of which the following is a specification.

The invention provides novel means whereby an explosive engine may be started without requiring the usual cranking operation, being of special advantage in connection with gasoline engines used for driving automobiles and like mechanically propelled vehicles, so that the operator may start the engine while seated in the machine.

The invention provides a starting mechanism which may be applied to engines in use and which will not interfere with the starting by means of the ordinary crank should it become necessary to use the starting crank from one cause or another.

The invention consists of the novel features, details of construction and combination of parts, which hereinafter will be more particularly set forth, illustrated in the accompanying drawings, and pointed out in the appended claims.

Referring to the drawings, forming a part of the specification, Figure 1 is a top plan view of the front portion of an automobile provided with engine starting mechanism embodying the invention. Fig. 2 is a front view. Fig. 3 is a side view, parts broken away. Fig. 4 is a section on the line $x-x$ of Fig. 1. Fig. 5 is a section on the line $y-y$ of Fig. 2.

Corresponding and like parts are referred to in the following description, and indicated in all the views of the drawings, by the same reference characters.

The numeral 1 designates a starting shaft which is in line with the engine shaft and is provided with a half clutch to engage with a complementary half clutch provided upon the engine shaft in the usual manner. The starting shaft 1 is mounted to rotate and to move longitudinally so that it may be thrown into or out of clutched engagement with the engine shaft. A helical spring a of the expansible type is mounted upon the starting shaft 1 and normally exerts a pressure to hold the clutch member thereof away from the clutch member of the engine shaft.

A rock shaft b is mounted transversely of the machine and is provided with an arm c ,

which is in engagement with the shaft 1. A second arm d projecting from the shaft b has a rod e connected thereto, said rod terminating in a button or head to be engaged by the foot of the operator when it is required to throw the starting shaft into clutched engagement with the engine shaft.

A shaft 15 arranged transversely of the machine and mounted in suitable bearings supports a gear wheel 4, which is secured thereto by a feather and spline connection to admit of the gear wheel moving on the shaft and yet rotating therewith in any adjusted position. A lever 5 extending within convenient reach of the operator has connection with the gear wheel 4 to admit of moving the latter on the shaft. This lever is adapted to be held in the adjusted position by means of a hand operated latch j and a toothed bar k . A gear wheel 2 is mounted upon the starting shaft 1 and is secured thereto so as to rotate and move longitudinally therewith. A gear wheel 3 is adapted to mesh with the teeth of the gear wheels 2 and 4. The gear wheel 3 transmits motion from the gear wheel 4 to the gear wheel 2 and is provided with two sets of cog teeth, the one f on its outer edge and the other g upon a side thereof and in mesh with the cog teeth of the gear wheel 4. Movement of the gear wheel 4 on the shaft 15 throws it into or out of engagement with the teeth g of the gear wheel 3, whereby provision is had for starting the engine with the usual crank indicated at 16. The crank 16 is detachably fitted to the shaft 1 so as to be laid aside when not required for immediate use.

A ratchet wheel 11 is secured to the shaft 15 so as to rotate therewith. A hollow wheel 6 incloses the ratchet wheel 11 and is provided upon its inner side with a plurality of dogs 12 which are adapted to engage with the teeth of the ratchet wheel 11. A pulley 13 is formed or otherwise provided upon a side of the hollow wheel 6 and is mounted upon the shaft 15. A disk 7 closes the open side of the hollow wheel 6 and is attached thereto and is mounted upon the shaft 15. It will thus be observed that the ratchet wheel 11 and dogs 12 are housed by the parts 13, 6 and 7. The hollow wheel 6, pulley 13 and disk 7 rotate as one part upon the shaft 15. The outer edge of the pulley 13 is grooved to receive a flexible connection 8. An end portion of the flexible con-

nection 8 is wound on the pulley 13 and the other end extends within convenient reach of the driver to be pulled upon. A coil spring 9 is mounted upon the wheel 6 and has one end attached thereto, the opposite end being secured to the front of the machine.

A pull upon the connection 8 to unwind the same from the wheel 6 rotates the latter forwardly and the dogs 12 engaging with the teeth of the ratchet wheel 11 turn the latter and the shaft 15, motion being transmitted from the shaft 15 to the starting shaft by means of the gearing 4, 3 and 2 and when the shaft 1 is moved into clutched engagement with the engine shaft the latter is started. As the connection 8 is drawn upon to unwind it from the pulley 13 the wheel 6 is turned to wind the spring 9 thereon. Upon relaxing the pull upon the connection 8 the spring 9 turns the pulley 13 and wheel 6 backward, thereby rewinding the connection 8 on the pulley 13 preliminary to the next operation for starting the engine. Prior to starting the engine pressure is applied to the rod *e*, thereby moving the starting shaft 1 into clutched engagement with the engine shaft. The connection 8 is now drawn upon and during this operation pressure is removed from the rod *e*, the friction between the clutch members of the starting and engine shafts being sufficient to hold said members in engagement. When the engine starts the shaft 1 is thrown out of clutched engagement by the spring *a* in a manner well understood. Again when the pull upon the connection 8 is relaxed the spring *a* moves the shaft 1 outward. Should the first operation not succeed in starting the engine it becomes necessary to repeat the operation, the starting shaft being thrown into clutched engagement with the engine shaft and the connection 8 drawn upon in the manner stated. It is to be understood that the parts *e* and 8 terminate within convenient reach of the operator when seated in the machine so as to be easily accessible when required for use.

From the foregoing description, taken in connection with the accompanying drawings, the advantages of the construction and of the method of operation will be readily apparent to those skilled in the art to which the invention appertains, and while I have described the principle of operation of the invention, together with the device which I now consider to be the embodiment thereof, I desire to have it understood that the device shown is merely illustrative, and that such changes may be made when desired as are within the scope of the claims appended hereto.

Having thus described the invention what is claimed as new, is:—

65 1. In engine starting mechanism of the

character stated, the combination of a starting shaft mounted to rotate and to have a longitudinal movement imparted thereto for throwing it into and out of clutched engagement with the engine shaft, a second shaft, gearing between said second shaft and the starting shaft, said gearing including elements which are adapted to be thrown into or out of engagement to admit of operating the starting shaft by the usual crank, and a ratchet mechanism applied to said second shaft to impart an intermittent rotary movement thereto.

2. In engine starting mechanism of the character stated, the combination of a starting shaft mounted to rotate and to have a longitudinal movement imparted thereto for throwing it into and out of clutched engagement with the engine shaft, a second shaft, gearing between said second shaft and the starting shaft, said gearing including elements which are adapted to be thrown into or out of engagement to admit of operating the starting shaft by the usual crank, a ratchet wheel secured to the said second shaft, a wheel mounted loosely upon the second shaft, a dog carried by said wheel and adapted to engage the teeth of the ratchet wheel, and means for imparting an oscillatory movement to the said wheel.

3. In engine starting mechanism of the character stated, the combination of a starting shaft mounted to rotate and to have a longitudinal movement imparted thereto for throwing it into and out of clutched engagement with the engine shaft, a second shaft, gearing between said second shaft and the starting shaft, said gearing including elements which are adapted to be thrown into or out of engagement to admit of operating the starting shaft by the usual crank, a ratchet wheel secured to the said second shaft, a wheel mounted loosely upon the second shaft, a hollow wheel encircling the ratchet wheel, a dog carried by the hollow wheel and adapted to engage the teeth of the ratchet wheel, a pulley at one side of the hollow wheel loosely mounted upon said second shaft, a disk closing the open side of the hollow wheel and secured thereto and loose upon the second shaft, a flexible connection wound upon the hollow wheel, a coil spring mounted upon the pulley and co-operating with the flexible connection wound upon the hollow wheel.

4. In engine starting mechanism, the combination of a starting shaft in line with the engine shaft and having the usual clutch member to engage with the companion clutch member of the engine shaft, said starting shaft being mounted to rotate and to move longitudinally, a gear wheel mounted upon the starting shaft, a second gear wheel in mesh with the first mentioned gear wheel, a second shaft, a third gear wheel

mounted upon the second shaft and having
a feather and spline connection therewith
and adapted to be thrown into and out of
engagement with the said second gear wheel,
5 means for imparting a longitudinal move-
ment to the starting shaft to throw the same
into clutched engagement with the engine
shaft, and a ratchet connection mounted

upon said second shaft to impart an inter-
mittent rotary movement thereto.

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

EDWARD M. CARD.

Witnesses:

V. B. HILLYARD,
BENNETT S. JONES.

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