C. E. HUNT.

STARTER FOR EXPLOSIVE ENGINES.

APPLICATION FILED SEPT. 21, 1914.

1,153,085.

Patented Sept. 7, 1915.

2 SHEETS—SHEET 1.

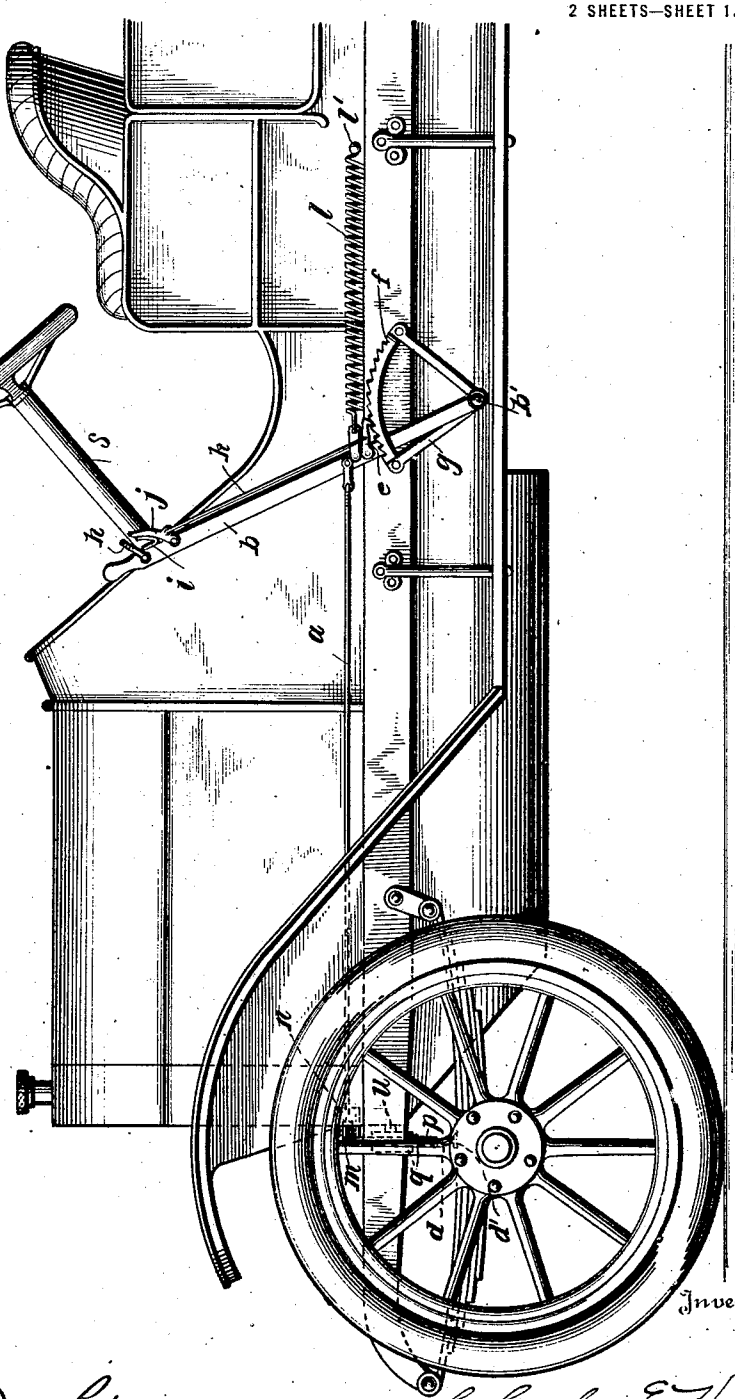


FIG. 1.

Witnesses
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2 SHEETS—SHEET 2.

FIG. 3.

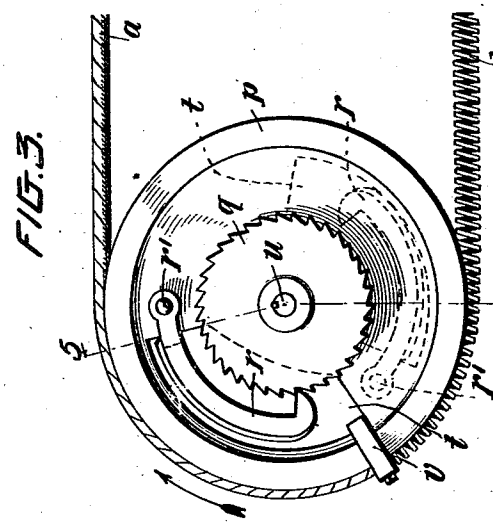


FIG. 5.

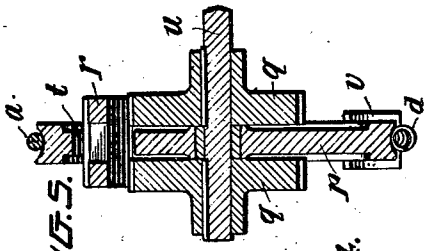


FIG. 4.

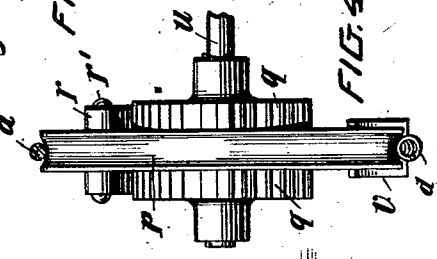
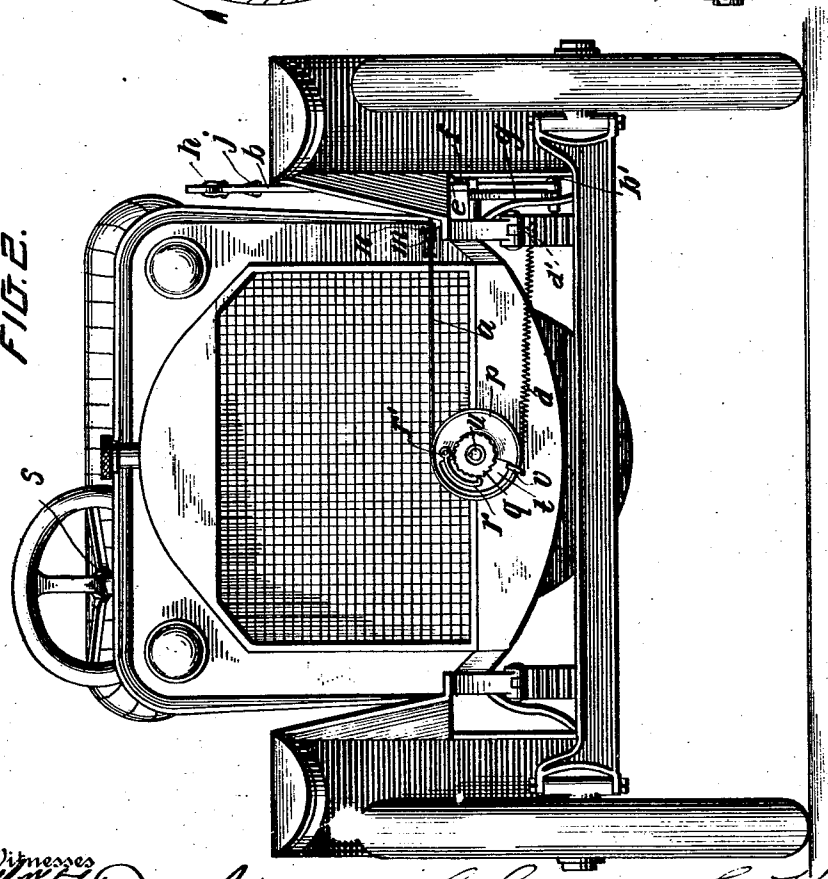


FIG. 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## STARTER FOR EXPLOSIVE-ENGINES.

1,153,085. Specification of Letters Patent. Patented Sept. 7, 1915.

Application filed September 21, 1914. Serial No. 862,631.

*To all whom it may concern:*

Be it known that I, CHARLES E. HUNT, a citizen of the United States, residing at Thomasville, in the county of Clarke and State of Alabama, have invented certain new and useful Improvements in Starters for Explosive-Engines; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel manually operable starting device for automobile motors, and its object is to provide a simple powerful and efficient operating device which can be easily operated by the driver from the seat, and in which danger of injury to the operator in case the motor should "backfire" is prevented.

In the drawings I have illustrated one practical embodiment of the invention which will enable same to be readily understood and used by those skilled in the art, and will explain the invention in detail with reference to said drawings and set forth in the claims the essential features and combinations of parts for which protection is desired.

In said drawings: Figure 1 is a side elevation of part of an automobile equipped with my improved starting device. Fig. 2 is an enlarged front view showing part of the casing removed to show the clutch devices. Fig. 3 is an enlarged face view of the clutch devices detached. Fig. 4 is an edge or end view of the parts shown in Fig. 3; the cable-end connection with the grooved wheel being omitted. Fig. 5 is a section on line 5—5, Fig. 3.

The invention is shown as applied to an ordinary type of automobile. The starting lever *b* is pivoted at its lower end as at *b'* to a bracket *g* which is fastened in any suitable manner to the automobile body and in the desired position, preferably so that the lever can be easily operated by the driver when seated. This bracket is provided with a ratchet segment *f* which is adapted to be engaged by a catch *e* pivoted to lever *b* and connected by a rod *k* to a hand latch *j* pivoted on lever *b* adjacent the upper end thereof, and a spring *i* is arranged to engage the hand latch and normally hold the catch *e* in engagement with the ratchet *f*; but this catch *e* may be held out of engagement with the ratchet *f* by engaging the upper end of latch *j* with a loop *h* pivoted to the lever.

To the lever *b* is pivotally connected one end of a cable or chain *a* which extends forward to and around a sheave *m* mounted in a suitable bracket *n* attached to the body of the motor; and from pulley *m* cable *a* extends to and partially around a grooved wheel *p* to which it is attached by means of a clamp *v* or other suitable fastening device.

The grooved wheel or pulley *p* is preferably loosely mounted upon the main shaft *u* of the engine of the vehicle, or a shaft connected therewith, and on this shaft *u* at each side of the pulley *p* are keyed ratchet disks *q*, pulley *p* being freely rotatable on shaft *u* between the ratchets *q*. This pulley *p* has an opening *t* in its web for the accommodation of a dog *r* which is wide enough to engage both ratchets *q* simultaneously, and said dog has a bifurcated end by which it is pivoted on a pin or bolt *r'* transfixing the web of the pulley *p* as shown. In this way the dog can be made strong and powerful enough to simultaneously engage both ratchets *q* and thus give a straight strong pull on the shaft *u* when the cable *a* is pulled so as to turn the pulley *p* in the proper direction to start the engine.

To pulley *p* is attached one end of a spring *d* which may be connected to the periphery of the pulley by the same clamp *v* by which the cable *a* is attached thereto. The other end of spring *d* is attached to a retainer *d'* secured to a suitable relatively fixed part of the body or chassis of the machine. This spring *d* tends to rotate pulley *p* in a backward direction, and normally holds the pulley in the position indicated in Fig. 2; in which position the dog is in engagement with the ratchet gear so that when the lever *b* is thrown to the right, as seen in Fig. 1, or drawn back, the wheel *p* will be rotated in the direction indicated by the arrow in Fig. 3, for the purpose of starting the engine, and as the rotation continues and the power of the engine is brought into action, the ratchet will release the dog which will drop by gravity into the position indicated by dotted lines in Fig. 3, out of engagement with the ratchet.

Fig. 3 indicates in full lines the device in operative position and pulley $p$ turning in the direction indicated by the arrow to start the motor. By pulling lever $b$ (Fig. 1) to right or in a backward direction relatively to the vehicle, cable $a$ will turn pulley $p$ to the right, and dog $r$ will engage the ratchets $q$ and turn the shaft $u$, which starts the motor. Lever $b$ has about three times the amount of leverage of an ordinary crank, and when operated imparts sufficient motion to the pulley $p$, by means of cable $a$, to revolve the motor shaft $u$ each time the lever is pulled to the right, or in the proper direction. As the lever is pulled the dog $r$ engages ratchets $q$ and turns shaft $u$ and continues turning it until dog $r$ passes below the motor shaft to the right; the dog then drops by gravity out of engagement with the ratchets and stays in that position until lever $b$ is moved forward, or to the left, at which time the spring $d$ contracts and turns pulley $p$ to the left or backward; after dog passes center of motor shaft it engages ratchets by gravity and at the same time takes up any slack in the cable. The dog $r$ normally remains out of engagement with the ratchets, as indicated in dotted lines in Fig. 3 while the motor is running.

The wheel $p$ is preferably provided with a bushing $p^2$ of brass or other non-frictionless metal so that it will not be injured, nor become bound while the engine shaft is running, and so that it can be easily moved in either direction while the motor is running without doing damage.

The catch $e$ engaging the ratchet $f$ prevents danger to the operator in case the engine should "back-fire" while he is starting the motor, the catch $e$ being strong enough to stall the motor and prevent wheel $p$, carrying the dog $r$, from moving backward in case of back firing; but to further prevent accident in case of "back-firing," if the catch should happen to be disengaged, I employ a spring $l$ which has sufficient strength to exert about half as much power as is required to crank the motor; its power being much greater than that of the spring $d$; which is used for the purpose of turning the wheel $p$ to the left or back to starting point when the lever $b$ is thrown forward is connected to the lever $b$ and to a retainer $l'$ attached to the body at any suitable point; see Fig. 1. This spring $l$ will resist the shock if the motor back-fires, and will also assist the operator in actuating lever $b$ to start the motor. The starter can easily be operated by the driver without leaving the seat.

The parts of the starter can be made of any suitable material and attached in any manner desired to practically any of the modern motor cars or automobiles without altering or changing the car body or chassis. The working parts could obviously be housed if desired to render them invisible, or they might be located on the inner side frames of the body. A sprocket wheel and chain could be used instead of grooved wheels and cables if desired.

It will be seen that in this starter the ratchet wheels are fastened to the motor shaft and run all the time the motor is running, but the grooved pulley stands still after the motor is started, the dog fastened to said pulley falls in and out of engagement with the ratchet wheels by gravity.

What I claim is:

1. In an automobile starter, the combination with a driven shaft operatively connected with the motor of a vehicle, a pulley on said shaft having an opening in its web; a pair of ratchets keyed to the shaft at opposite sides of the pulley, a dog pivoted to the pulley and extending through the opening therein so as to simultaneously engage both ratchets, a spring for normally holding the pulley in normal position with the dog disengaged, a manually operable lever pivoted on the vehicle adjacent the seat and connections between said lever and said pulley whereby the pulley may be turned by pulling the lever to start the motor.

2. In an automobile starter, the combination with a driven shaft operatively connected with the motor of a vehicle, a pulley on said shaft having an opening in its web; a pair of ratchets keyed to the shaft at opposite sides of the pulley, a dog pivoted to the pulley and extending through the opening therein so as to simultaneously engage both ratchets, and a spring for holding the pulley in normal position together with the dog disengaged; with a manually operable lever pivoted on the vehicle, connections between said lever and said pulley, whereby the pulley may be turned to start the motor by pulling the lever, and a spring connected to said lever and to a fixed part of the vehicle and adapted to assist the operator in the starting movement of the lever and to resist forward movement of the lever should the engine back-fire.

3. In an automobile starter the combination with a driven shaft operatively connected with the motor of a vehicle, a pulley on said shaft and having an opening in its web; a pair of ratchets keyed to the shaft at opposite sides of the pulley, a dog pivoted to the pulley and extending through the opening therein so as to simultaneously engage both ratchets, a spring for holding the pulley in normal position with the dog disengaged, a lever pivoted on the vehicle adjacent the seat, connections between said lever and said pulley whereby the pulley may be turned by pulling the lever to start the motor; a ratchet segment beside the lever, and a catch pivoted to said lever adapted to engage the segment to prevent

injury by back-firing of the motor when starting.

4. In an automobile starter the combination with a driven shaft operatively connected with the motor of a vehicle, a pulley on said shaft, a pair of ratchets keyed to the shaft at opposite sides of the pulley, a dog pivoted to the pulley and engaging the ratchet, a spring for normally holding the pulley in normal position with the dog disengaged; with a manually operable lever pivoted on the vehicle adjacent the seat, connections between said lever and said pulley whereby the pulley may be turned by pulling the lever to start the motor; a ratchet segment beside the lever, a catch pivoted to said lever adapted to engage the segment to prevent injury by back-firing, and a spring connected to said lever and to a fixed part of the vehicle and adapted to assist the operator in the starting movement of the lever and to also resist forward movement of the lever should the engine back-fire.

5. An engine starter comprising a wheel loose on the engine shaft and carrying a pivoted dog, a swinging lever, flexible connections betwen said lever and said wheel, a spring tending to move said lever backwardly and start said wheel through said connections, a weaker spring tending to restore said wheel to starting position, and interengaging means on said wheel and shaft adapted to cause the wheel and shaft to turn together in a direction to start the engine; said means being adapted to become disengaged as rotation of the shaft is continued by the power of the engine, permitting said weaker spring to restore the wheel to starting position.

6. An engine starter comprising a wheel loose on the engine shaft, a swinging lever, flexible connections between said lever and said wheel, a spring tending to move said lever backwardly and start said wheel through said connections, a weaker spring tending to restore said wheel to starting position, and a pivoted dog on said wheel engaging a ratchet gear fixed on the engine shaft and adapted to drop by gravity out of engagement with said ratchet as the pivotal point of the dog is carried below said shaft.

7. A starter for internal combustion engines comprising a ratchet gear adapted to be attached to the driving shaft of the engine, a wheel loose on said shaft carrying a dog adapted to engage said ratchet and release the same at different points in its rotary movement by gravity, a spring for retracting said wheel to starting position, a lever having a flexible connection with said wheel for moving it in opposition to said spring, a segment beside the lever, and a catch pivoted to said lever adapted to engage the segment to prevent injury by back firing of the motor when starting.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

CHARLES E. HUNT.

Witnesses:
JESSE V. BOYLES,
T. N. GRIFFIN.