M. P. MITCHELL.

ELECTRIC ENGINE STARTER.

APPLICATION FILED APR. 24, 1914.

1,122,146.

Patented Dec. 22, 1914.

3 SHEETS—SHEET 1.

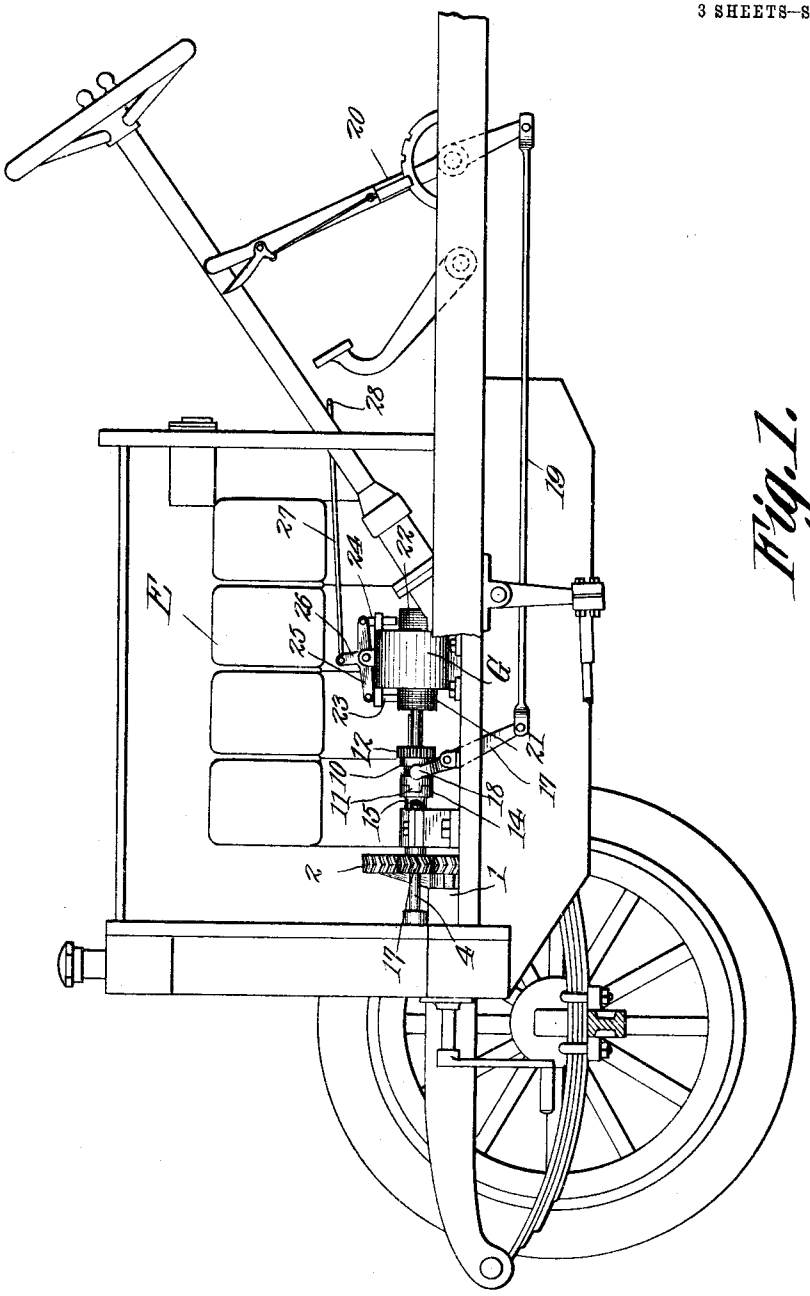


Fig. 1.

Witnesses

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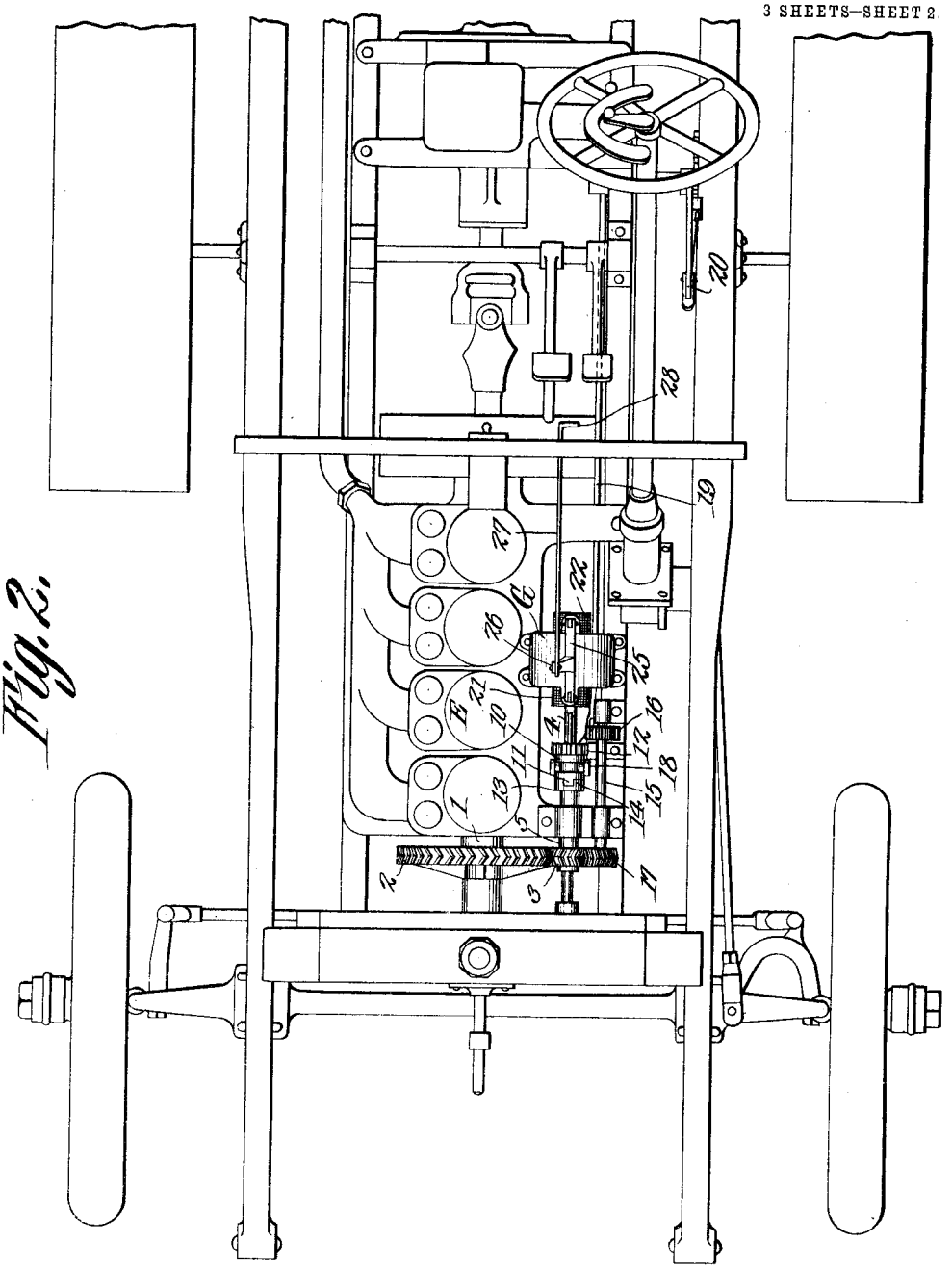
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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3 SHEETS—SHEET 3.

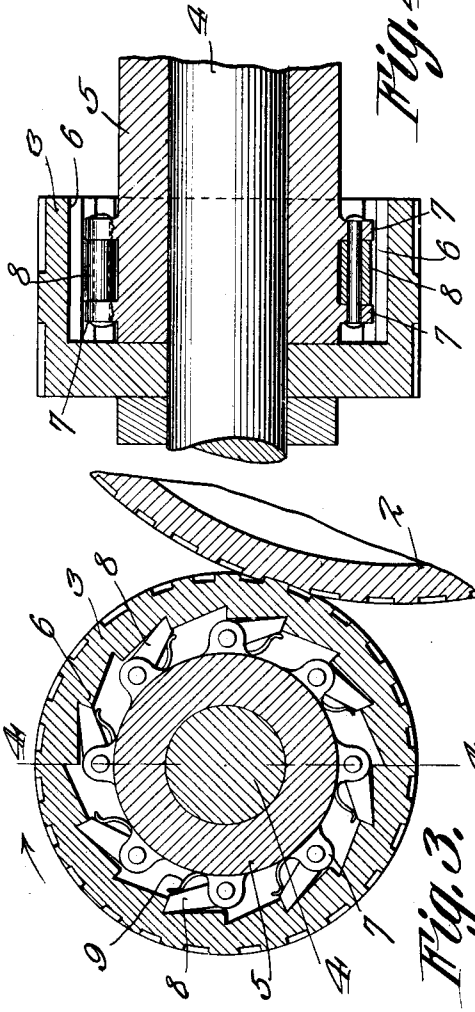


Fig. 3.

Fig. 4.

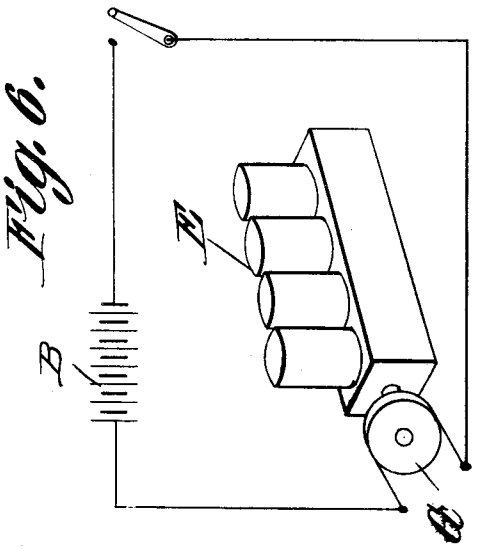


Fig. 6.

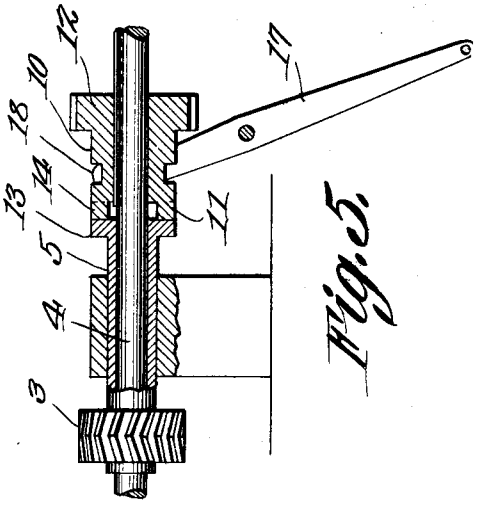


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

MARY P. MITCHELL, OF EATON, OHIO.

ELECTRIC ENGINE-STARTER.

1,122,146. Specification of Letters Patent. Patented Dec. 22, 1914.

Application filed April 24, 1914. Serial No. 834,207.

To all whom it may concern:

Be it known that I, MARY P. MITCHELL, a citizen of the United States, residing at Eaton, in the county of Preble and State of Ohio, have invented a new and useful Electric Engine-Starter, of which the following is a specification.

The present invention relates to improvements in electric engine starters, one object of the invention being the provision of an electric starter, constituting a motor and generator or a motor-generator, and provided with operable connections, whereby when the engine is initially started and the motor-generator is operating as a motor, the engine will be properly rotated for the initial starting thereof, the same after attaining speed through a selective mechanism operating the motor-generator as a generator so as to store the current in the batteries for again starting the motor and also for operating the electric lighting and signaling means used in connection with motor cars.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings Figure 1 is a view in side elevation of the forward part of a motor car showing the present electric starter in operable relation thereto. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged detail sectional view through the ratchet connected gear operably connected to the crank shaft of the explosive engine. Fig. 4 is a section taken on line 4—4 of Fig. 3. Fig. 5 is a sectional view of the motor-generator shaft and the clutch mechanism carried thereby. Fig. 6 is an electrical diagram of the present installation.

Referring to the drawings, E designates the explosion engine and G the motor-generator, the crank shaft 1 of the explosion engine having fixed thereon, the large gear wheel 2, which may be a bevel, spur or other form of gear for causing the explosion engine to be started through the instrumentality of the motor and generator or the motor-generator as will presently appear or the motor-generator to be operated from the explosion engine as a generator, also as will presently appear.

A small pinion or bevel or spur gear 3 is rotatably mounted upon the motor-generator shaft 4, and is recessed to fit about one end of the sleeve 5, and is provided with the internal ratchet teeth 6, while carried by the sleeve 5 are the pairs of lugs 7 for the pivotal mounting of the pawls 8 which are normally held outward by the springs 9. Thus when the shaft 4 is being operated as a motor, the pawls will cause the gear 3 to be operated in the direction of the arrows Fig. 3, so as to rotate the gear 2 in the direction of the arrow and consequently impart the desired motion to the crank shaft of the explosion engine.

Splined upon the shaft 4 adjacent the inner end of the sleeve 5 for sliding movement relative to the shaft and for rotation therewith, is a sleeve 10, which is provided with the clutch teeth 11 at its forward end and with the pinion 12 at its rear end. Upon the end of the sleeve 5 adjacent to the clutch 11, as at 13, is a clutch 14, which thus permits the motor-generator shaft 4 when the motor is operating as a motor to be connected so as to drive the pinion 3 as heretofore described. Journaled parallel to the shaft 4 is a shaft 15, which has fixed upon one end to be engaged by the pinion 12 when the clutch sleeve 10 is moved to extreme rear position, the pinion 16, a gear 17 being fixed to the forward end thereof and in mesh at all times with the gear 3. It will thus be seen that when the gear 12 is in mesh with the gear 16, and the engine E is operating explosively, that the gear 3 will rotate freely in the direction of the arrow Fig. 3, without disturbing or transmitting motion to the sleeve 5, but will transmit motion to the gear 17 and through the shaft 15 and the gears 16 and 12 rotate the shaft 4 and consequently operate the motor-generator as a generator.

In order to provide a means for selectively operating the sliding member 10, the lever 17 having the yoke end 18 is mounted adjacent the sleeve 10, there being disposed upon the lower end thereof, a link 19 which is extended rearwardly and connected to the manually controlled lever 20. Thus the chauffeur or operator of the motor car may selectively operate the member 10, so that the motor-generator G will be connected to initially rotate to start the explosive engine

G, and can again be operated as a generator to supply the current to the storage battery B. When the storage batteries have been properly charged, the lever 20 may be operated to place the sleeve 10 in neutral position, or as is well known, a governor mechanism may be employed actuated by the current of the storage battery for throwing the clutch or sleeve 10. In the present instance, the motor-generator G is provided with the two commutators 21 and 22, the forward one of which is the motor commutator while the latter is the generator commutator. It is therefore essential that the brushes 23 and 24 alternately engage the respective commutators so that the device will operate either as a motor or generator. To accomplish this, the brushes 23 and 24 are connected to the pivoted yoke or walking beam 25, which through the arm 26 and the rod 27 may be manually operated, as the operating end 28 of the rod 27 is projected in ready access to the chauffeur or operator. Where pinion or gears are employed, it is evident that spur or bevel gears may be used, according to the position of the present installation relatively to the crank shaft of the engine.

What is claimed is:

1. The combination with an explosion engine, of an electric starting mechanism therefor, including an electric motor-generator, a gear fixed to the engine shaft, a gear freely rotatable upon the motor-generator shaft, a sleeve also freely rotatable upon the generator shaft, coöperating pawl and ratchet means carried by said sleeve and the gear of the motor-generator shaft for fixedly connecting the said gear to the sleeve, and a clutch carried by the motor-generator shaft and one end of the sleeve, whereby the sleeve may be connected to the motor-generator shaft when the motor-generator is operating as a motor.

2. The combination with an explosion engine, of an electric starting mechanism therefor, including an electric motor-generator, a gear fixed to the engine shaft, a gear freely rotatable upon the motor-generator shaft, a sleeve also freely rotatable upon the motor-generator shaft, coöperating pawl and ratchet means carried by said sleeve and the gear of the motor-generator shaft for fixedly connecting the said gear to the sleeve, a clutch carried by the motor-generator shaft and one end of the sleeve, whereby the sleeve may be connected to the motor-generator shaft when the motor-generator is operating as a motor, a secondary shaft mounted in parallel to the motor-generator shaft, a gear fixed thereupon and meshing with the freely rotatable gear of the motor-generator shaft, and coöperable selective means carried by the secondary shaft and the clutch member, whereby the secondary shaft is connected to the motor-generator shaft and the first gear operates through all gears to operate the motor-generator as a generator.

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

MARY P. MITCHELL.

Witnesses:
HARRY L. RISINGER,
L. D. LESH.

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