M. P. MITCHELL.

ELECTRIC ENGINE STARTER.

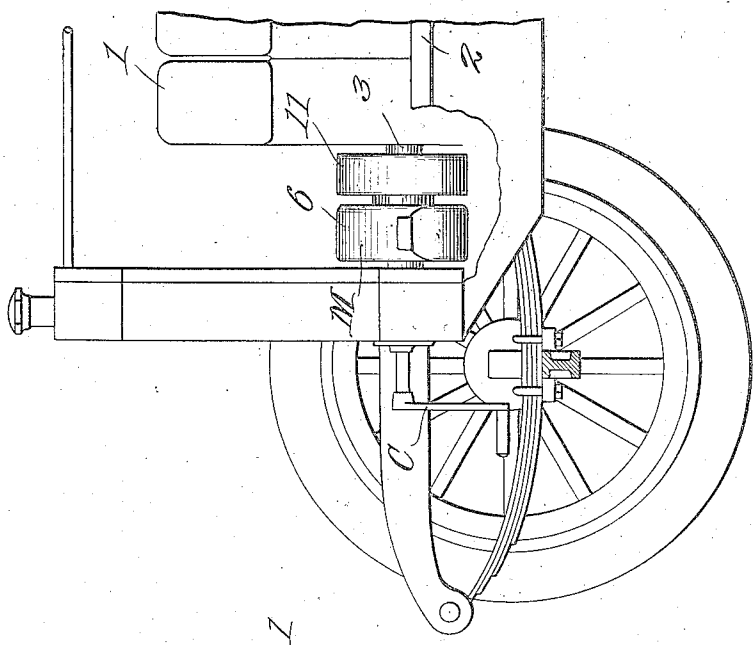
APPLICATION FILED MAR. 14, 1914.

1,139,210.

Patented May 11, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



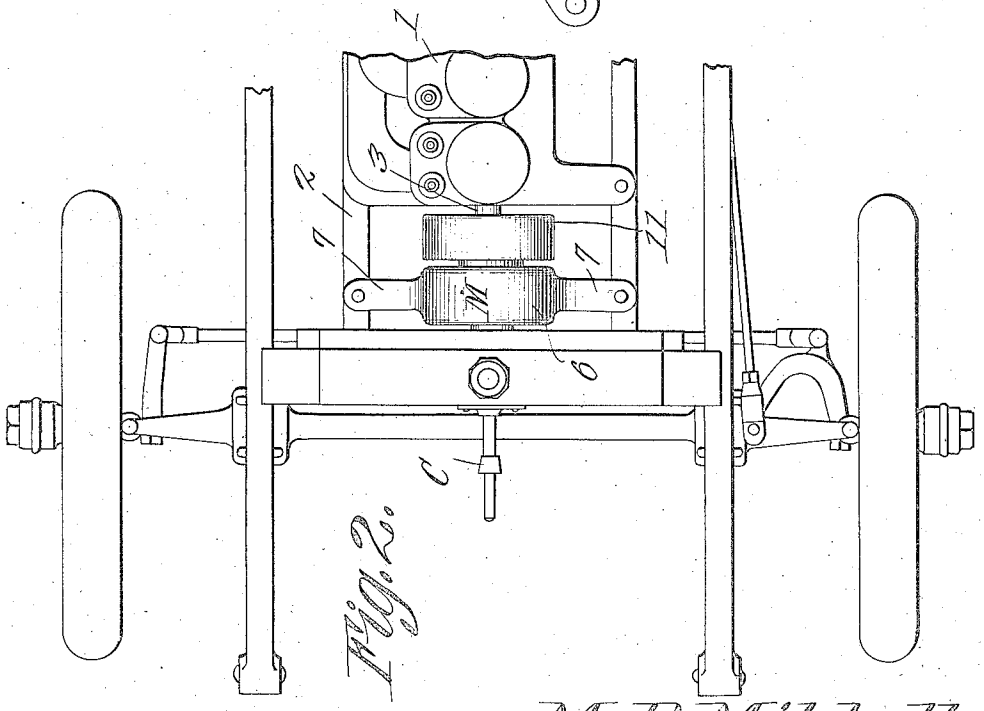


Fig. 2.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 4.

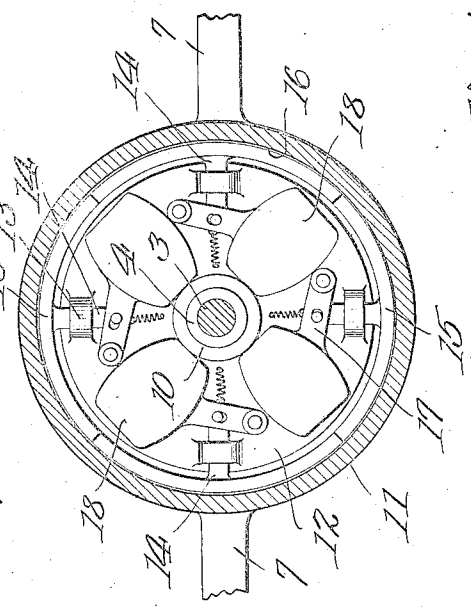


Fig. 7.

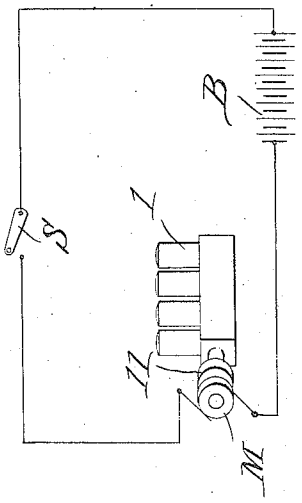


Fig. 6.

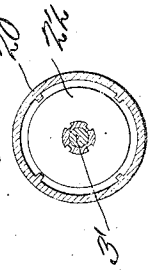


Fig. 3.

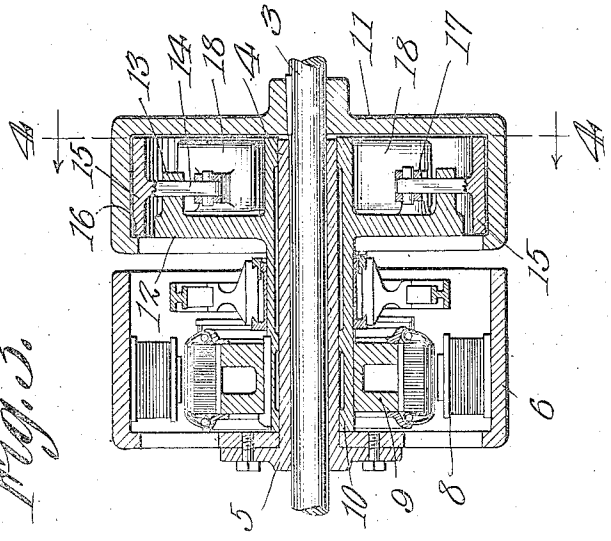
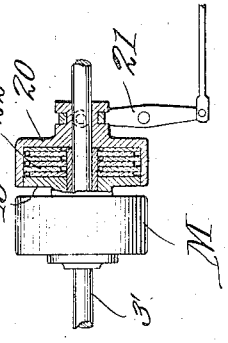


Fig. 5.



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UNITED STATES PATENT OFFICE.

MARY PIERSON MITCHELL, OF EATON, OHIO.

ELECTRIC ENGINE-STARTER.

1,139,210. Specification of Letters Patent. Patented May 11, 1915.

Application filed March 14, 1914. Serial No. 824,831.

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 present invention being the provision of an electric motor, mounted in a compact manner and which after being started and attaining speed, is automatically clutched or connected to the crank shaft of an explosion engine, to rotate the same and thus automatically crank it at the initial starting of the explosion engine, the operation of the motor being controlled entirely by a simple switch in a circuit.

A further object of the present invention is the provision of a novel mounting for a motor concentrically about the crank shaft of an explosion engine, and by means of which an automatic clutch is operated to connect the motor to the crank shaft of the engine after the motor has attained a predetermined speed and sufficient momentum to impart the initial rotation at the starting of the explosion engine.

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 side elevation of the forward end of a motor car showing a portion of the explosion engine with the present invention applied thereto. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged detailed sectional view through the electric motor and clutch showing the operable connection of the two to the crank shaft of the engine. Fig. 4 is a section taken on the line 4—4 of Fig. 3. Fig. 5 is a view similar to Fig. 3 upon a reduced scale showing another form of clutch for connecting the motor to the crank shaft. Fig. 6 is a section taken on line 6—6 of Fig. 5. Fig. 7 is a diagrammatic view showing an electrical installation for operating the motor.

Referring to the drawings, the numeral 1 designates the explosion engine, which is supported in the frame or the chassis 2 of the motor car, said explosion engine being provided with a crank shaft 3, the forward end of which is extended and is controlled when desired by a manual crank C. Forming a bearing or support for the forward end of the crank shaft 3 is a sleeve 4, which is carried by the member 5 at the forward end of the sleeve, said member 5 being connected to and carrying the shell 6 of the electric motor M, the diametrically disposed arms 7 being connected to support the shell and the sleeve 4 from the frame 2. The stator 8 of the motor is carried within the shell 6, while the rotor 9 is connected to the sleeve 10 for rotation about the sleeve 4.

The driven member 11 of the clutch is keyed to the shaft 3, as clearly illustrated in Fig. 4, while connected to and carried by the sleeve 10 is a disk 12. This disk 12 is housed within the driven clutch member casing 11 and rotates with the rotor of the motor. A plurality of apertured arms 13 are carried from one face of the disk 12, and slidable therein and guided thereby are the carrying arms 14 of the clutch sections 15. These clutch sections 15 at the proper time, that is when the rotor 9 of the motor has attained the desired speed, are projected outwardly into engagement with the inner face of the rim 16 of the driven clutch member 11 so that the rotor of the motor is operably connected through the sections 15 to the driven clutch member 11, and consequently rotates the crank shaft 3 at the initial starting of the explosion engine.

In order to automatically operate the clutch sections 15, so that the same will be projected into frictional engagement with the inner face of the clutching band or rim 16 of the driven member 11, an arm 17 pivoted to the disk 12 is operably connected to its respective arm 14 of its segment 15, and carries a weight 18, which due to the centrifugal force imparted thereto during the rotation of the sleeve 10, will be moved outwardly, and consequently moves its respective segment 15 outwardly and into engagement with the friction band 16 of the driven clutch member 11. These weights may be so constructed as to regulate the predetermined speed at which the rotor 9 of the motor is rotated before the sections 15 are clamped and held in frictional engagement with the driven clutch member 11, thus permitting

the rotor of the motor to attain the desired speed that will insure the proper rotation of the crank shaft 3 at the initial starting of the explosion engine.

In the electrical installation for controlling the motor M so that the rotor thereof may be operated at the desired speed and be directly under the control of the chauffeur or operator seated within the motor car, an electrical circuit, as clearly illustrated in Fig. 7, having the battery B and the controlling manually operated switch S, is employed. By closing the switch S, the rotor 9 of the motor M will be rotated, and as before described when the same has attained the desired speed, it will through the sleeve 10, and the centrifugally actuated segments 15, cause the segments 15 to engage the driven clutch member 11, and thus through the clutch member 11 rotate the crank shaft 3. When the engine is started and is operating explosively, the switch S is thrown to open position, and consequently the electric torque upon the rotor 9 is relieved, and the weight 8 will fall or move toward the shaft 3, and consequently disengage the clutch sections 15 from the clutch member 11, thus permitting the shaft 3 to rotate freely within the sleeve 4 and also rotate the driven clutch member 11 without in any way affecting the clutch sections 15 and the rotor of the motor.

In the form shown in Figs. 5 and 6, the motor M′ is constructed as shown in Fig. 3, and is mounted upon the crank shaft 3′ but instead of having a disk 12 is provided with a friction disk 19, which maintains the same in relative position as regards the driven clutch member 20 which is splined upon the shaft 3′ and is movable to and from the inner face of the disk 19 through a manually actuated clutch throwing lever 21. A plurality of friction rings 22 are disposed within the driven clutch member 20 and by compressing the member 20 toward the member 19, a clutching action is afforded between the members 19 and 20, so that the rotation of the rotor of the motor M′, will through the friction rings 22 and the driven clutch member 20 operate the shaft 3′. This mechanism is a manually controlled mechanism, and will not operate automatically as the clutch shown in Figs. 3 and 4.

It is evident that many forms of friction clutch may be used, and that a motor and generator, or a motor-generator may be used. It is also possible the motor need not be built about the crank shaft.

What is claimed is:

1. In combination, an explosion engine, a shaft connected thereto, a sleeve in which the shaft is journaled, a motor having a stator casing attached to the sleeve, the rotor of the motor being rotatable upon the sleeve, and coöperable clutch device carried by the shaft and the rotor.

2. In combination, an explosion engine, a shaft connected thereto, a sleeve forming a journal for a portion of the shaft, a motor having a stator casing attached to said sleeve, the rotor of the motor being rotatable upon the sleeve, a driven clutch member carried by the shaft, and a centrifugally operated clutch member operably connected to the rotor, whereby when the rotor has attained a predetermined speed, the centrifugally operated clutch member automatically engages the driven clutch member to connect the rotor of the motor to the shaft.

3. In combination, an explosion engine, a shaft connected thereto, a motor embodying a casing having a shaft incasing sleeve and a stator carried by the casing, a second sleeve mounted for rotation upon the first sleeve, the rotor of the motor being carried by the second sleeve, two coöperable clutch members carried by the shaft and the second sleeve, whereby when the rotor has attained a predetermined speed, the shaft is automatically connected to the rotor of the motor.

4. In combination, an explosion engine, a shaft connected thereto, a motor embodying a casing having a sleeve through which the shaft is journaled and having a stator carried by the casing, a second sleeve mounted for rotation upon the first sleeve, the rotor of the motor being carried by the second sleeve, and coöperable clutch devices carried by the shaft and second sleeve.

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

MARY PIERSON MITCHELL.

Witnesses:
JOHN RISINGER,
HARRY L. RISINGER.