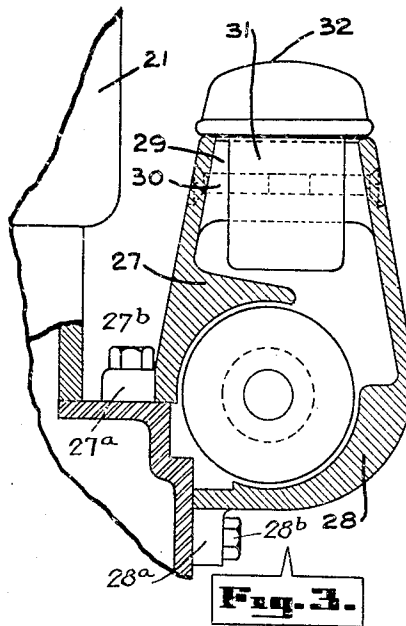
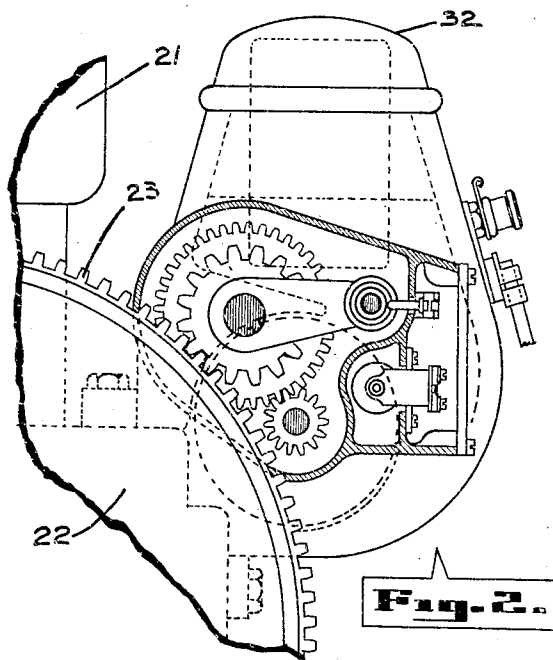
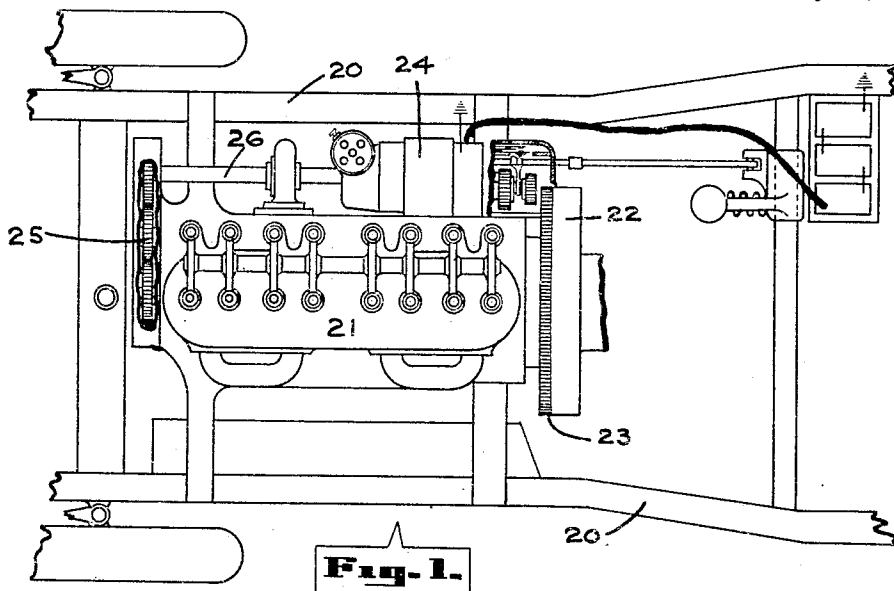


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ENGINE STARTING SYSTEM.
APPLICATION FILED MAR. 1, 1916.

1,273,871.

Patented July 30, 1918.



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UNITED STATES PATENT OFFICE.

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THE DAYTON ENGINEERING LABORATORIES COMPANY, A CORPORATION OF OHIO.

ENGINE STARTING SYSTEM.

1,273,871.

Specification of Letters Patent.

Patented July 30, 1918.

Original application filed September 13, 1913, Serial No. 789,641. Divided and this application filed March 1, 1916. Serial No. 81,410.

To all whom it may concern:

Be it known that we, CHARLES F. KETTERING and WILLIAM A. CHRYST, citizens of the United States of America, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Engine Starting Systems, of which the following is a full, clear, and exact description.

This invention relates to a system of devices adapted to be combined with combustion or explosion engines, for supplying power to start an engine, and the engine when thus started, may be arranged to store up power for similar future starting operations, and other purposes.

Among the objects of the present invention is to provide an electric machine of simplified construction, which may be manufactured at low cost and easily combined with the engine upon which it is to be installed.

In carrying out the objects of the present invention, an electric machine is provided, which is so mounted upon the apparatus with which the machine is combined, that a non-magnetic portion of the apparatus serves as a base for the electric machine to which the pole pieces are directly attached in a rigid manner without providing the apparatus with any special mounting for the machine, and also eliminating the separate non-magnetic base usually placed intermediate the electric machine and the apparatus to which the machine is attached.

The structure may be further simplified by mounting the commutator brushes of the electric machine upon a single element, which, when assembled in position, not only maintains the commutator brushes in correct position, but also functions as a cover for the end housing of the electric machine.

The present application is a division of our co-pending application, Serial No. 789,641, filed September 13, 1913 for engine starting system, Patent No. 1,250,188, dated Dec. 18, 1917.

Further objects and advantages of the present invention will be apparent from the following specification, reference being had to the accompanying drawings, wherein a

preferred form of the present invention is set forth.

Referring to the drawings:

Figure 1 is a top plan view of the chassis of an automobile, including the engine and the electric machine which forms a part of the present invention.

Fig. 2 is a fragmentary detail view in section of an engine having an electric machine included in the present invention installed thereon.

Fig. 3 is a detail sectional view of the electric machine applied to an engine having a non-magnetic crank case or portion.

Referring to the drawings and more especially to Figs. 1 to 3 inclusive, the numeral 20 designates the side frames of the chassis, while the numeral 21 indicates the engine, provided with a flywheel 22, having gear teeth 23 cut in its periphery.

The type of chassis and engine construction shown in the present instance is similar to that manufactured and placed on the market by the Buick Motor Car Company.

The dynamo electric machine is designated by the numeral 24, and is adapted to be driven as a generator, during the normal operation of the engine, by means of the timing gears 25, which transmit motion to the generator through the shaft 26, as is clearly shown in Fig. 1.

The location and arrangement of the dynamo electric machine is similar in certain respects to that described, illustrated and claimed in the copending applications of Charles F. Kettering, Serial No. 621,512, filed April 17, 1911; Serial No. 721,237, filed September 19, 1912; and that of Charles F. Kettering and William A. Chryst, Serial No. 778,934, filed July 14, 1913; and U. S. patent to Charles F. Kettering, No. 1,150,523, dated August 17, 1915.

In certain types of automobiles, such as for instance in automobiles of the Buick type, the assembly of the chassis and the associated mechanisms, such as the engine, is such that an extremely limited space is provided for the installation of systems of the present type.

In the type of engine used in automobiles of the above mentioned type, the crank case

or certain parts of the engine frame is constructed of non-magnetic material, such as aluminum or its equivalent.

In order to economize in space and also to make use of the non-magnetic crank case or frame of the engine, the electric machine included in the present invention is so installed on the engine that the non-magnetic portion of the engine frame will form the base of the electric machine. This arrangement not only tends to economize in space, but also tends to eliminate certain of the elements which have heretofore been necessary in electric machines of the type set forth.

The electric machine, as will be clearly seen from Fig. 3, comprises a frame having side portions 27 and 28, connected together at their upper ends by means of the transverse bar or block 29, which is connected by any suitable fastening means 30. This bar forms a support for the field coil 31, which in the present invention contains both the generator and motor field windings.

The lower end of the side portion 27 terminates in an enlargement which constitutes one of the pole pieces of the machine, while the side portion 28 also has an enlarged portion which constitutes the opposite pole piece. The lower free ends of the side portions 27 and 28 are provided with lugs 27^a and 28^a respectively, having bearing surfaces at an angle to one another, which cooperate with similarly disposed surfaces of a corner portion of the engine crank case and serve to locate the engine crank case and serve to locate the frame in two directions with respect to the crank case and the flywheel 22. By thus locating the frame, the gearing carried by the electric machine 24 is correctly aligned with the engine flywheel gear 23. The frame of the machine 24 is located in the third direction, longitudinally of the crank case by means of bolts 27^b and 28^b passing the lugs 27^a and 28^a.

It will be noted that the lugs 27^a and 28^a are located on the same side of a plane passing through the center line of armature and perpendicular to the center line of bar 29, constituting the field core; and that the pole pieces are obliquely disposed with respect to said plane. This arrangement permits the armature to be brought as close as possible to the crank case; and therefore the space at the side of the engine necessary for the electric machine 24 is reduced to a minimum. The presence of the non-magnetic crank case in close proximity to the armature will not affect the field in which the armature is mounted for movement.

Any suitable arrangement may be made for inclosing the top of the machine, as by the cover 32.

While the form of mechanism herein

shown and described, constitutes one preferred form of embodiment of the present invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What we claim is as follows:

1. In an electric machine, the combination with an armature and field windings; of a frame of magnetic material comprising an intermediate portion which constitutes a core for the field winding, and side portions which terminate in pole pieces between which the armature is mounted; lugs extending in different planes from the pole pieces and adapted to mount the frame astraddle a corner portion of a non-magnetic support with the lowest point of the armature located below the plane of the top of the support.

2. In an electric machine, the combination with an armature and field windings; of a frame of magnetic material comprising an intermediate portion which constitutes a core for the field winding, and side portions which terminate in pole pieces between which the armature is located, the side portions extending on either side of a plane passing through the center line of the armature perpendicular to the center of the core, the pole pieces being arranged diametrically opposite with respect to the armature and obliquely with respect to the said plane, and the pole pieces being provided with lugs spaced apart and located wholly on one side of the aforesaid plane, and adapted to secure the frame upon the corner portion of a non-magnetic support with the armature in close proximity to the support.

3. In an electric machine, the combination with an armature and field windings; of a frame of magnetic material supporting the field windings and the armature, said frame having portions thereof spaced apart to provide a gap there-between and provided with lugs having surfaces at an angle with one another and adapted to cooperate with corresponding surfaces formed on a support of non-magnetic material and to locate the frame in two directions with respect to the support with a portion of the support located in the gap.

4. In an electric machine, the combination with an armature; of a frame of magnetic material supporting the armature; said frame having attaching bearing surfaces extending therefrom in different planes and adapted to locate the frame upon the top and side of a support with the armature in close proximity to the support and with the lowest point of the armature located below the plane of the top of the support.

5. In an electric machine, the combination with an armature; of a frame of magnetic material in relation to which the armature

is mounted for movement, said frame having provisions adapting it to support the machine upon a corner portion of a support with the support in close proximity to the
5 armature and occupying a gap between certain portions of the said frame.

In testimony whereof we affix our signa-

tures in the presence of two subscribing witnesses.

CHARLES F. KETTERING.
WILLIAM A. CHRYST.

Witnesses:

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