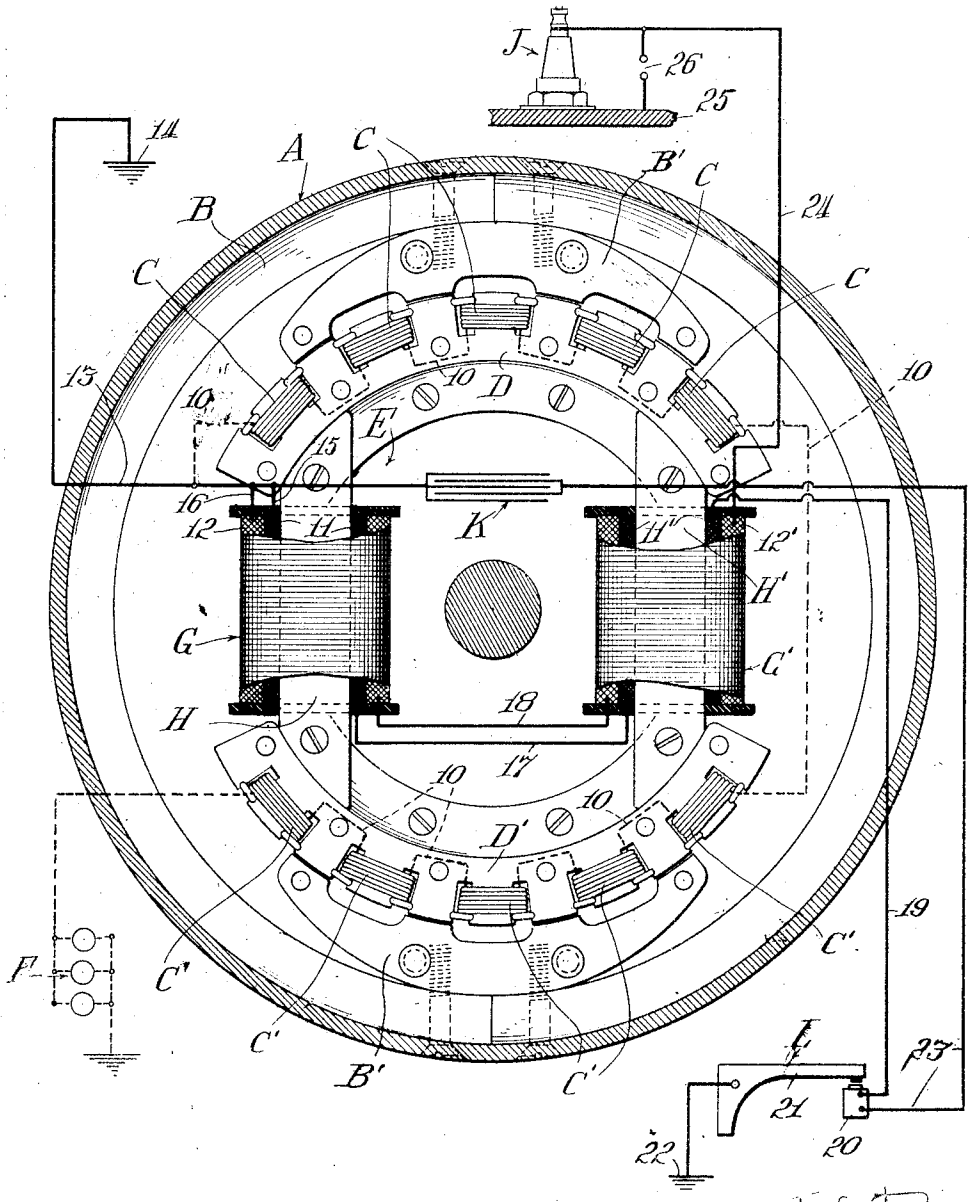
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J. A. SMITH

ELECTRIC CURRENT GENERATOR

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JOSEPH ALLAN SMITH, OF SYRACUSE, NEW YORK, ASSIGNOR TO NER-A-CAR CORPORATION, A CORPORATION OF NEW YORK.

ELECTRIC-CURRENT GENERATOR.

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To all whom it may concern:

Be it known that I, JOSEPH ALLAN SMITH, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Electric-Current Generators, of which the following is a specification.

My invention relates to an electric current generator, and more specifically to an apparatus the rotor of which is adapted to be fixed to a revoluble part, for example, the fly wheel, of the internal combustion engine of an automobile or motor boat for supplying a high tension current for ignition purposes and a current of lower voltage for the lights carried by the vehicle or boat.

One of the principal objects of the invention is to provide a generator of this type which will supply, for the lighting system, a current of relatively high frequency, that is interrupted for only short intervals so that the lamps will be illuminated, in effect, continuously and steadily even when the rotor is revolving slowly, thereby obviating the "winking" of the lights which with most lighting systems supplied with current from fly wheel generators, occurs when the engine is operated at low speeds.

A further object is to simplify and reduce the manufacturing cost of the generator with regard particularly to the winding and assembling of the ignition coil.

Both these objects are obtained by providing a plurality of lighting coils arranged in two spaced groups, and, in place of the single high tension coil heretofore used, employing two such coils arranged between the two groups of lighting coils.

The accompanying drawing illustrates, somewhat diagrammatically, a suitable construction for carrying out the principles of my invention. It will be understood, however, that the invention is not considered as limited to this particular embodiment.

Referring to the drawing, A designates the fly wheel of an automobile engine to the rim of which is secured the rotor of the generator consisting of a permanent magnet B of the usual construction, provided with pole shoes B′, B′ of suitable construction. For generating low tension or lighting current a plurality of coils are provided divided into two groups, the coils of one of the groups being designated C, C, the coils of the other group being designated C′, C′. These coils are arranged on a pair of arcuate core pieces D, D′ of laminated construction secured to a stationary element designated E. Coils C, C, C′, C′ are connected in series, the circuit wires being designated 10, and the lights indicated at F. In the drawing I have indicated grounded circuits throughout although that is not essential.

Instead of the usual single high tension coil I provide two such coils which are designated G, G′, and are arranged between the groups of lighting coils C, C, C′, C′, on cores H, H′ which are attached to and bridge the gaps between the ends of the lighting coil core pieces D, D′. The high tension coils G, G′ comprise primary windings 11, 11′ of coarse wire and secondary windings 12, 12′ of fine wire. J designates one of the spark gaps in the combustion chamber of the motor (spark plug). K is a condenser and L the usual interrupter or breaker which may be provided with any of the suitable timing mechanisms (not shown).

The wiring of the ignition system is as follows: 13 is a wire grounded at 14 and connected at 15, 16 with the primary coil 11 and secondary coil 12, respectively. 17 is a wire connecting the primary coil 11 with the primary coil 11′. 18 is a wire connecting the secondary coil 12 with the secondary coil 12′. 19 is a wire connecting primary coil 11′ with the fixed terminal 20 of the circuit breaker L, the movable element 21 of which is grounded at 22. The condenser K is connected to wire 13 and by wire 23 with the stationary terminal 20 of the circuit breaker. 24 is a wire from secondary coil 12′ to the spark plug J which is grounded at 25, the usual safety gap being provided as indicated at 26.

It will be observed that, due to the relatively large number of lighting coils C, C′, the lighting current will be one of relatively high frequency. The gaps between the groups of coils C, C and C′, C′ are comparatively short so that even when the motor is operating at low speed the interval of time between the excitation of the end coil of one group and the adjacent end coil of the other group will be short. As a result there

will be no appreciable interruption of the current supply to the lamps. The novel arrangement of the coils as hereinabove described results in a marked improvement, in this respect, in the character of the illumination. Heretofore in lighting systems supplied with current from fly wheel generators there has always been a noticeable "winking" of the lights when the motor revolves at low velocity.

Difficulty has also been experienced in the construction of the ignition coil. Because of the limitations of space and the necessity of obtaining a high voltage for the ignition current very fine wire has had to be used, which, besides cutting down the amperage, makes the cost of winding the coil very considerable, particularly since the construction of the stator as designed heretofore made it necessary to do the winding directly on the stator element itself. As a matter of fact; this necessity was one of the reasons why the gap between the lighting coil or coils and the ignition coil in former constructions had to be as great as was the case. By dividing the ignition coil into two coils (which electrically, however, are one), each coil may be considerably smaller than the single coil previously used; and it is possible, moreover, without exceeding the necessary limitations of space, to use a coarser wire for the secondary windings than has been heretofore feasible. This is advantageous electrically since the amount of current is increased giving a better spark, and also because with the coarser wire the operation of winding is considerably facilitated. Furthermore, the winding may be done on spools that are afterward assembled on the cores H, H'. These cores are made separate from core pieces D, D' and are attached thereto in the assembly of the device after the spools have been wound and placed thereon.

I claim:

1. In combination with the rotor of a generator of the type described, a stator comprising a plurality of lighting coils divided into two spaced groups, and a pair of high tension ignition coils arranged between the groups of lighting coils.

2. In combination with the rotor of a generator of the type described, a stator comprising two arcuate core pieces, the ends of which are spaced apart, two groups of lighting coils, one group on each of said core pieces, and a pair of induction coils having high and low tension windings, which induction coils are arranged between said groups of lighting coils and are provided with cores that bridge the spaces between the ends of the aforesaid core pieces.

3. In combination with the rotor of a generator of the type described, a stator comprising two arcuate core pieces, the ends of which are spaced apart, two groups of lighting coils one group on each of said core pieces, a pair of induction coils having high and low tension windings, which induction coils are arranged between said groups of lighting coils and are provided with cores separately formed from but attached to and bridging the spaces between the ends of the aforesaid core pieces.

4. In an apparatus for generating a low voltage current of relatively high frequency and a high voltage current, the combination of rotating and stationary elements, one of which consists of a permanent magnet and the other of which comprises two spaced groups of coils connected in series for generating the low voltage current and two high tension coils serially connected and arranged in the spaces between and in the same magnetic circuit with the low voltage coils.

JOSEPH ALLAN SMITH.