

(No Model.)

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SYSTEM OF SUPPLYING CURRENTS TO RECIPROCATING ELECTRIC ENGINES.

No. 479,963.

Fig. 1 Patented Aug. 2, 1892.

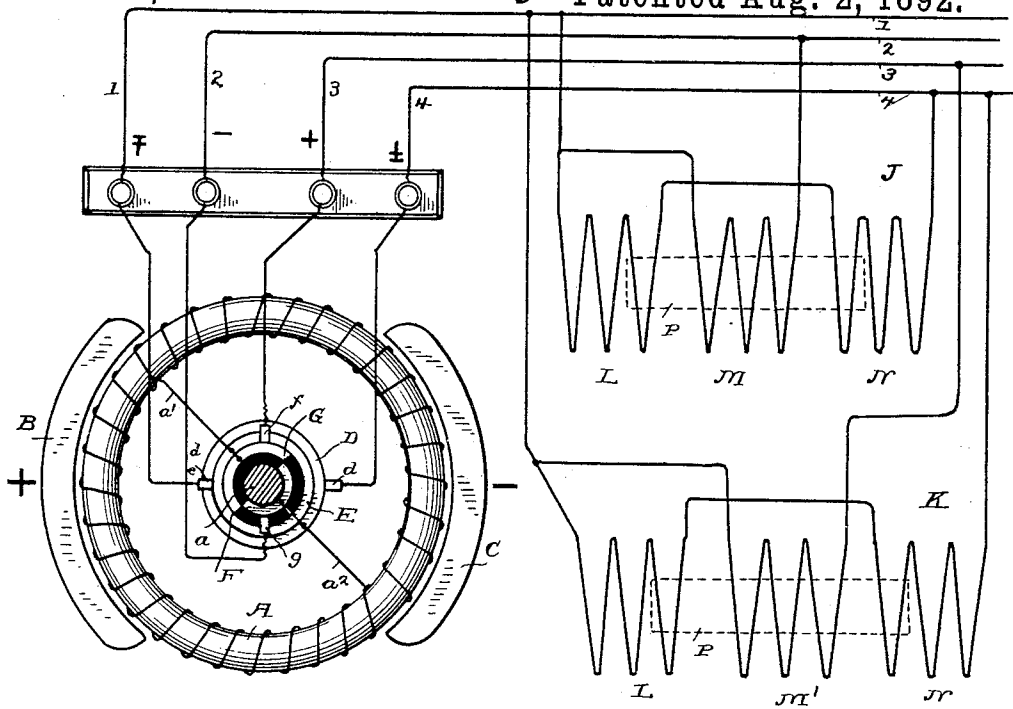
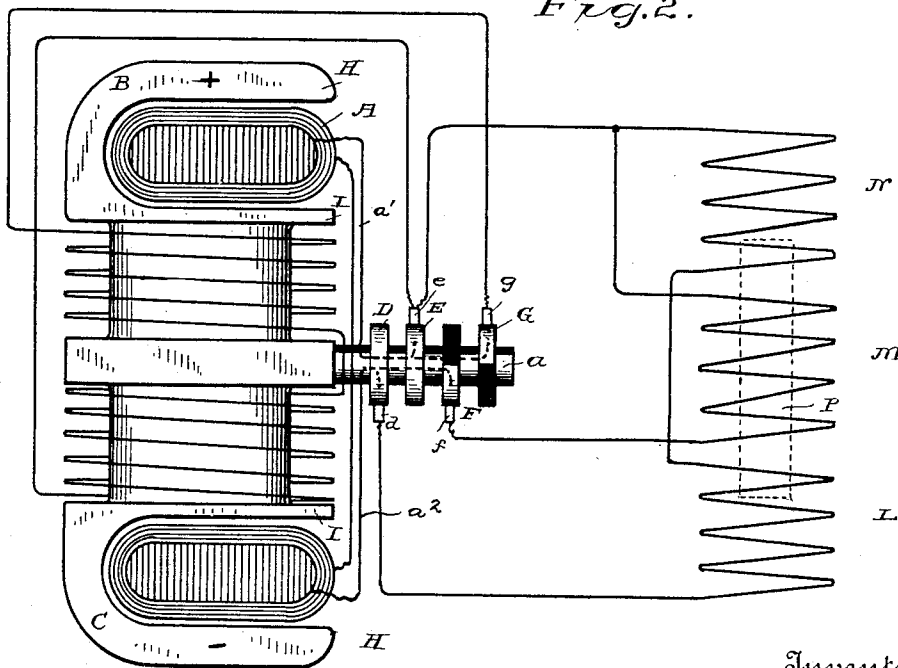


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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SYSTEM OF SUPPLYING CURRENTS TO RECIPROCATING ELECTRIC ENGINES.

SPECIFICATION forming part of Letters Patent No. 479,963, dated August 2, 1892.

Application filed April 11, 1891. Serial No. 388,565. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DE-
POELE, a citizen of the United States, residing
at Lynn, in the county of Essex and State of
Massachusetts, have invented certain new and
useful Improvements in Systems of Supply-
ing Currents to Reciprocating Electric En-
gines, of which the following is a description,
reference being had to the accompanying
drawings, and to the letters and figures of
reference marked thereon.

My invention relates to improvements in
reciprocating electric engine systems.

In a prior application, Serial No. 376,610, filed
January 3, 1891, I have shown, described, and
claimed a reciprocating electric engine oper-
ated by a plurality of motor-coils, one set of
which is energized by current constant in di-
rection, but pulsating or rising and falling in
quality, the other set of said coils being actu-
ated by current rising and falling in quality
and also alternating in direction. Such an
engine therefore comprises two distinct ele-
ments, each embodying a distinguishing fea-
ture—that is to say, one element being a coil
or coils through which an alternating current
is sent, while the other element comprises a
coil or coils energized by currents constant
in direction but pulsating in quality—the ob-
ject being to utilize the currents of constant
direction for magnetizing the plunger and the
other iron parts of the machine, while the coil
or coils energized by the alternating currents
operate to react upon the constant polarity
of the iron parts. As set forth in my said
prior application, this may be accomplished
in a number of ways, specifically as set forth
in my said prior patent, dated No. 422,855,
March 4, 1890. The patent referred to, how-
ever, mentions an auxiliary brush or brushes
moved upon the commutator toward and away
from the main stationary commutator-brushes.

By my present invention I am enabled to
entirely dispense with moving parts upon the
commutator, substituting therefor additional
contact-surfaces, which are provided with in-
sulated portions and from which current is
collected by stationary brushes in a simple
and efficient manner.

A form of the invention is illustrated in the
accompanying drawings; but it will be un-
derstood that the construction of the genera-
tor or source of current may be varied as well
as the construction of the reciprocating en-
gine without in any way departing from the
invention.

In the drawings, Figure 1 is a diagrammatic
view showing the source of current embody-
ing the invention, together with a working
circuit and two reciprocating engines con-
nected therewith. Fig. 2 is an elevation,
partly in section, showing a dynamo-electric
machine embodying the invention, parts
thereof being in section. A reciprocating
electric engine is also indicated diagram-
matically in this figure.

In said drawings, A is an armature wound
with suitable coils.

B C are the field-magnet poles, between
which the armature revolves or is rotated.

a is the armature-shaft, upon which are
mounted contact-surfaces D E F G, each pro-
vided with a collector-brush *d e f g*. For the
purposes of the present invention the rings
D E are continuous, while the rings F G are
composed half of metallic and half of insu-
lating material. As shown, the coils of the
armature A are divided into two by cross con-
nections $a' a^2$. The conductors $a' a^2$ are con-
nected, respectively, as follows: conductor a'
with ring E and the metallic portion of the
contact-surface G and the conductor a^2 with
ring D and the metallic portion of the con-
tact-surface F. The armature A is inclosed
within a suitable field of force B C, which
may be, as seen in Fig. 2, provided with ex-
terior pole-pieces H and interior pole-pieces
I, the arrangement and construction of the
field-magnet poles being, however, a matter
of choice. Working conductors 1 2 3 4 ex-
tend, respectively, from the contact-brushes
d e f g. In Fig. 1 a pair of reciprocating elec-
tric engines are indicated diagrammatically
at J K, the said engines being similar and
each comprising three motor-coils L M N. As
arranged, the coils L N are in series between
conductors 1 and 4, and therefore will be en-
ergized by currents of alternating direction

emanating from contact-rings D E, said currents rising and falling in synchronism with the rotation of the armature A and having a frequency depending wholly upon the speed of rotation of said armature. The middle coil M has one of its terminals connected with conductor 2, which conductor is connected with brush *f*, and it has its other end connected by conductor *m* with conductor 1, so that, assuming that the current is of alternating direction in conductors 1 and 4 and of constant direction, but pulsating or intermittent in character in conductors 2 and 3, the end coils L and N will be energized by rising and falling alternating currents, while the middle coil M will receive every phase of current of like direction. In other words, it will receive one impulse during each rotation of the armature A. This will of course cause an intermittent or fluctuating polarity in the iron parts affected by said coil; but the fluctuations will merely be in the strength of polarization, the poles established and maintained by said coil being always in the said direction and therefore being always ready to be reacted upon by the changing current in the coils L and N, the only fluctuations being in the effect of the reaction upon the moving plunger.

As indicated in dotted lines, a plunger P, of magnetic material, is adapted to be reciprocated within the coils comprising the engines J K. The plunger P is magnetized by the pulsating coil M, and although its magnetization is subject to rise and fall, still it will always be in the same sense and the said plunger will be reacted upon by the alternating current coils with greater or less effect, according to the strength of the poles maintained in the plunger by the said pulsating-current coil. Of course it will be understood that the positions of these coils with respect to each other may be varied, it being only essential that there be a coil or coils arranged to magnetize the plunger and the other magnetic portions of the machine and a coil or coils energized by currents alternating in direction, and therefore adapted to attract said plunger first in one direction and then in the other.

As indicated in Fig. 1, the coils L N are in series between conductors 1 and 4, said conductors being connected with the alternating-current collector-brushes *d e*, the remaining coil M being in multiple arc between conductors 1 and 2. Conductor 2 is connected with the brush *g*, and having a suitable return through conductor 1 and brush *d* every other phase of current will pass through said coil, which, being constant in direction, will serve to continuously magnetize the plunger and to keep up the magnetism of the magnetic system of the machine. As indicated in said Fig. 1, the coil M' of engine K is connected at one end with the conductor 1, but at its other end is connected with conductor 3, so that it will receive the current phases which do not

flow through the coil M of engine J. With this construction an economical, simple, durable, and highly-efficient machine is produced, in which insulated surfaces and the requisite number of brushes are substituted for the moving brush or brushes referred to in my said other applications and prior patent. This arrangement therefore possesses the advantage of dispensing with all moving parts; but on the other hand the electric engine must operate in synchronism with the rotation of the armature A, which of course must therefore be specially designed to produce the desired results. By suitably connecting the terminals of the field-magnet coils—as, for example, as indicated in Fig. 2, where one terminal of the field-magnet circuit is connected to the brush *e* and the other to the brush *g*—a pulsating current of constant direction will pass through the field-magnet circuit, thus making the machine self-exciting.

Various modifications and changes may be made in the herein-described apparatus in view of the principles set forth without departing from the invention.

Certain features of construction not herein claimed will form the subject-matter for a separate application for Letters Patent.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A system of generating and distributing electric currents, comprising an armature rotating within a field of force and having a suitable winding provided with terminals connected to two continuous rings and also to two discontinuous rings, a working circuit connected with and supplied by the continuous rings with current of alternating direction, and a separate circuit connected with and supplied by the discontinuous rings with current of continuous direction, and a motor coil or coils connected separately in each circuit and supplied thereby with currents of different character.

2. A system of generating and distributing electric currents, comprising an armature having a suitable winding terminating in two terminals, each of which is connected both to a continuous ring and to a ring forming part of a circle, a reciprocating electric engine having motor-coils energized by currents of different character, connections between the continuous ring and part of the motor-coils, and connections between the discontinuous ring or rings and the remainder of the motor-coils, whereby currents of different character are supplied to the separate sets of motor-coils.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. VAN DEPOELE.

Witnesses:

STEPHEN JANNUS,
FRANKLAND JANNUS.