

(No Model.)

2 Sheets—Sheet 1.

C. J. VAN DEPOELE, Dec'd.

C. A. COFFIN & A. WAHL, Executors.

ELECTRICAL TRANSMISSION OF POWER.

No. 479,966.

Patented Aug. 2, 1892.

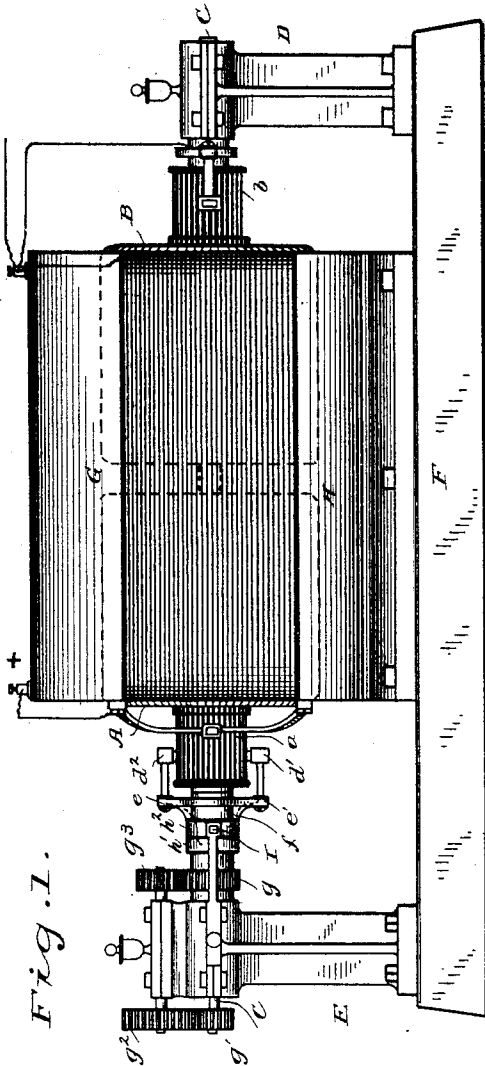


Fig. 1.

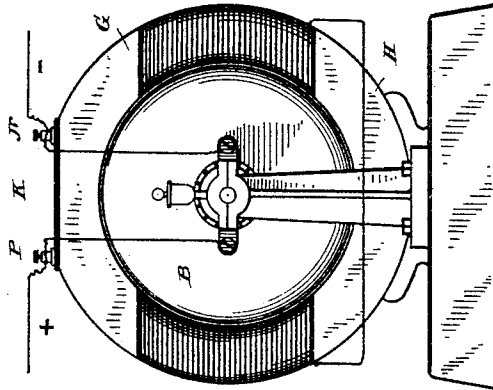


Fig. 3.

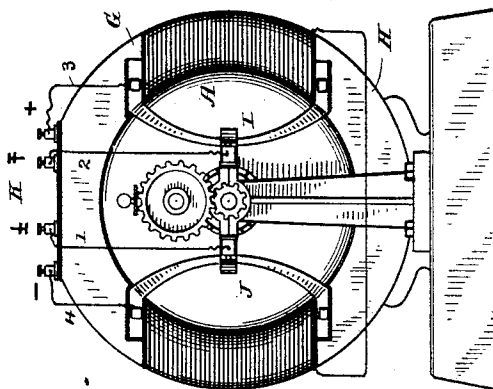


Fig. 2.

Witnesses

H. A. Lamb

Stephen James

Inventor

Charles J. Van Depoele

By Frankland James

Attorney

(No Model.)

C. J. VAN DEPOELE, Dec'd. 2 Sheets—Sheet 2.

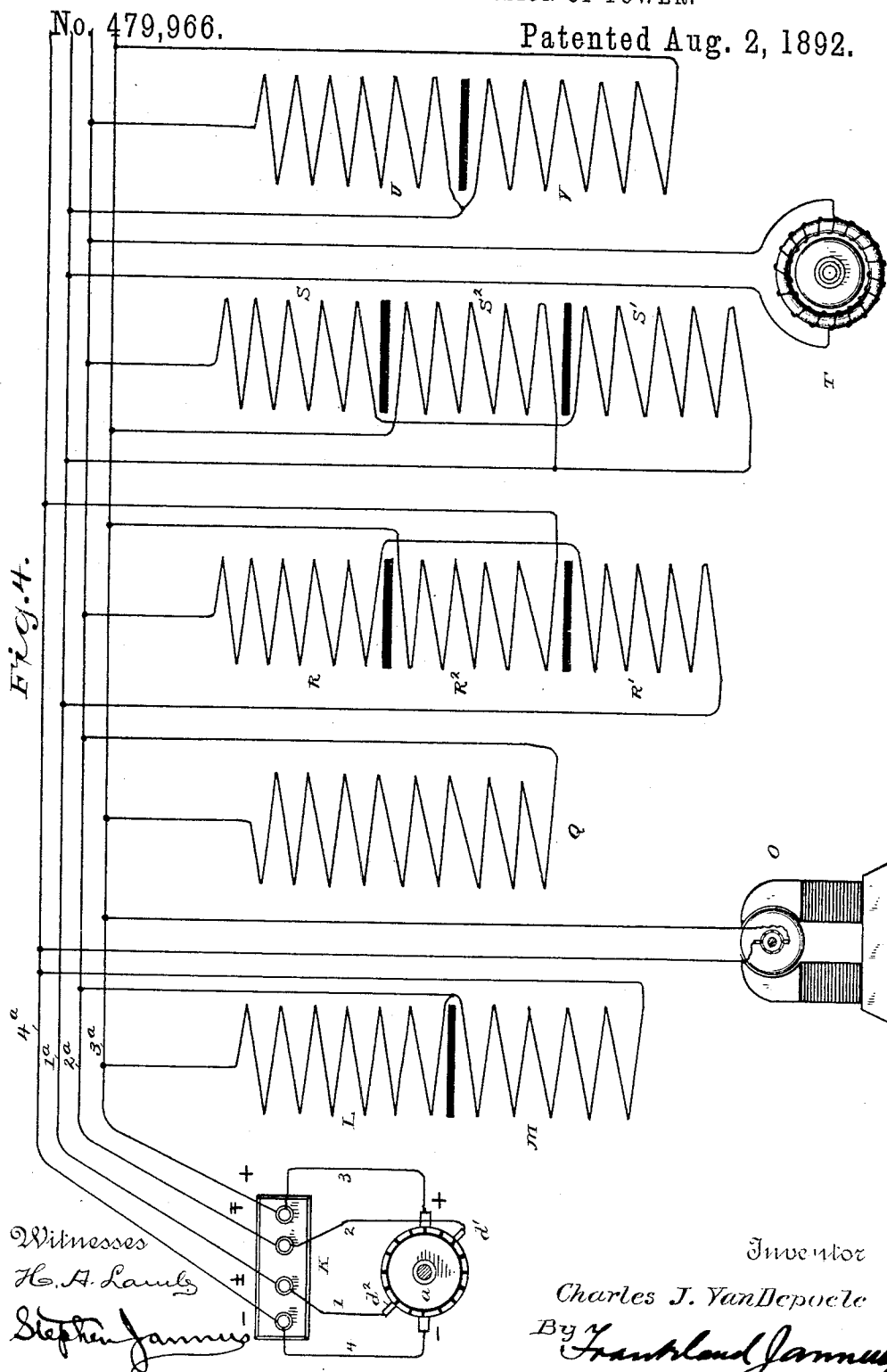
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Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES J. VAN DEPOELE, OF LYNN; C. A. COFFIN AND ALBERT WAHL,
EXECUTORS OF SAID VAN DEPOELE, DECEASED, ASSIGNORS TO THE
THOMSON-HOUSTON ELECTRIC COMPANY, OF BOSTON, MASSACHU-
SETTS.

ELECTRICAL TRANSMISSION OF POWER.

SPECIFICATION forming part of Letters Patent No. 479,966, dated August 2, 1892.

Original application filed May 6, 1891, Serial No. 391,799. Divided and this application filed September 24, 1891. Serial No. 406,741.
(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 Electrical
Distribution, of which the following is a de-
scription, reference being had to the accom-
panying drawings, and to the letters and fig-
ures of reference marked thereon.

This application is a division of a prior case
filed May 6, 1891, Serial No. 391,799.

My invention relates to new and useful im-
provements in means and apparatus for the
distribution of pulsating electric currents for
the operation of reciprocating electric en-
gines, as rock-drills and other mining machin-
ery, or for any purpose to which the inven-
tion is applicable.

My prior patent, No. 400,231, dated April 9,
1889, sets forth and shows (in Fig. 4) a con-
verter for imparting a rising-and-falling qual-
ity to a continuous current and also for modi-
fying the potential thereof. In the present
instance, however, this feature has been fur-
ther elaborated and developed and additional
methods of utilizing such currents provided
for.

In a prior application, Serial No. 382,877, filed
February 26, 1891, I have shown, described, and
claimed a system of distributing electric cur-
rents in which a continuous current is sent
from any available source and changed at or
near the point of distribution into currents
having a defined rise and fall and also into
currents of alternating direction and of con-
stant direction, so that from a continuous-cur-
rent circuit of any kind both alternating cur-
rents and currents of continuous direction
might be obtained for the operation of recip-
rocating electric engines requiring currents of
different character for its motor-coils.

The present invention comprises a further
development of that system in that I not only
produce pulsating currents having a defined
rise and fall, both alternating and continuous
in direction, of the desired potential and at
or near the point of distribution, but I also

provide for the simultaneous production of
continuous currents by the same machine, 50
whereby I can take any available continuous
current and transform the same into the spe-
cies of currents required for my reciprocating
engines, at the same time modifying the
potential of the supply-current to suit the par- 55
ticular occasion, thus providing means for
operating reciprocating electric engines under
almost any conditions. For example, where
power is transmitted electrically for many
miles to the point of utilization it would from 60
commercial necessity be sent over relatively
small conductors and at high potential, which,
although a necessity in the transmission of
high powers over long distances, would be ex- 65
tremely dangerous to handle and would also
be very difficult to insulate. It is well known
that where alternating currents are to be so
transmitted an inductional transformer fur-
nishes the simplest possible means of conver- 70
sion to lower the potential, and, furthermore,
conversion can be carried on to any extent re-
quired to produce the desired modification in
the tension of the current. It is also under- 75
stood that high tension continuous currents
can be reduced in potential and correspond-
ingly increased in quantity by rotary contin-
uous-current transformers; but according to
my present invention I require currents which 80
do not come strictly under either head, being
part alternating or pulsating and part contin-
uous, and, furthermore, these currents have a
defined rise and fall, the frequency of which
should be under control. Apparatus embody- 85
ing the invention is shown in the accompa-
nying drawings, and will be hereinafter de-
scribed, and referred to in the appended
claims.

Figure 1 is a view in elevation showing an
apparatus embodying the invention. Fig. 2
is an end elevation of the front of the ma- 90
chine. Fig. 3 is an end elevation of the rear
or other end of the machine. Fig. 4 is a dia-
grammatic view illustrating several arrange-
ments of working circuits.

In Fig. 1 of the drawings is seen an electro- 95
dynamic machine mounted upon a suitable

base and comprising armatures A B, both mounted upon a shaft C, said shaft being carried in suitable bearings upon posts D E upon the base F. Field-magnets G H are also mounted upon the base F and is arranged to incase the armatures A B. The armatures may be of any continuous-current type and provided with sectional commutators. The armature A has a somewhat extended sectional commutator *a*, a sectional commutator *b* of usual construction being provided for the armature B. Main stationary brushes, plus and minus, are suitably sustained in contact with the commutator *a*, and a pair of auxiliary commutator-brushes *d'* *d*² is arranged to also engage the face of the commutator *a* and to be moved thereupon toward and away from the stationary brushes. The auxiliary brushes are arranged to be rotated about or oscillated upon the commutator, so as to collect and transmit pulsating currents of constant direction or alternating currents having a defined rise and fall to suitable working circuits. As indicated, the moving brushes are attached, respectively to arms *e e'*, being suitably insulated therefrom. Arms *e e'* are mounted upon a sleeve *f*, sustained upon the armature-shaft C. The sleeve *f* is provided with a gear *g*², through which it is rotated upon the armature-shaft C. Motion may be imparted to the sleeve *f* and brushes through the pinion *g'* or by separate means, as set forth in my patent, No. 422,855; but the arrangement illustrated more nearly resembles that seen in Patent No. 422,860, dated March 4, 1890, and consists of a driving-pinion *g'* upon the armature-shaft, a gear *g*², engaging and driven thereby, a gear *g*³, carried upon a shaft driven by gear *g*² and engaging the pinion *g* upon the sleeve *f*. A pair of insulated contact-surfaces *h'* *h*² is carried upon the sleeve *f*, and the rotating brushes *d'* *d*² are electrically connected separately with one of the contact-surfaces. A pair of collector-brushes I J engage the contact-surfaces and transmit the current therefrom to conductors 1 and 2, extending to the working circuit or circuits. As set forth in my said prior patents, with an arrangement of this description the auxiliary brushes will be rotated about their commutator, and the currents collected by them will flow to working circuits, and said currents will have a rapid rise and fall, their frequency depending upon the speed with which their moving brushes are rotated or moved about the commutator, and it is also understood that the defined currents having a distinct rise and fall may not only be arranged to occur with any desired degree of frequency irrespective of the speed of the armature, but they may also be continuous in direction or alternating.

It will be understood that the winding of the armature B, also the field-magnet coils, must be proportioned to the character of the supply-current, having a greater or less resistance, according to the potential thereof.

The winding of the generator-armature A will depend upon the desired voltage of the current to be produced thereby, so that currents of the very highest potential may be used to operate the motor-armature B and to energize the field-magnets of the generator-armature A, serving to give forth currents of the desired potential irrespective of the character of the primary supply-current.

It will be understood that where, as in the present instance, the current-modifying device comprises an armature operated as a motor to drive another armature operating as a generator both the windings may be placed upon the same armature-core and the whole apparatus be operated in the form of a single armature with double commutator, and such arrangement of the parts I consider the equivalent of that which is herein illustrated and described. So, also, it will be apparent that the pulsating currents having a defined rise and fall, which it is principally the object of this invention to produce, may be alternating in direction, as stated, or by imparting an oscillating instead of a rotating motion to the moving brushes said current may be caused to pulsate at any desired speed without any change of direction. It will therefore be apparent that the generator portion, element, or armature of the motor-generator is capable of supplying a two, three, or four wire circuit and of delivering thereto an alternating current, a current of constant direction, but pulsating in character, or a combination of either of the foregoing with current of constant potential.

As indicated in Fig. 4, many species of apparatus can be operated with the currents produced according to the present system. Conductors 1 2 3 4 extend from the four brushes upon the commutator *a* to binding-posts upon a board K, from which extend distributing-conductors 1^a 2^a 3^a 4^a, numbers 1 and 2 being supplied with alternating currents, while numbers 3 and 4 are supplied with continuous current of relatively low tension, and from these supply-conductors working circuits can be furnished with currents having varying characteristics.

As indicated in Fig. 4, a number of different forms of such apparatus are connected in said circuit. The motor-coils L M have their outer terminals connected to conductors 3^a and 4^a and their intermediate terminal to conductor 2^a. Therefore as the polarity of the intermediate conductor changes current will flow first through one motor-coil and then through the other.

O indicates an electric motor of the continuous-current type, with its commutator and brushes connected, respectively, to conductors 3^a 4^a. The field-magnet coils of the motor may be connected in shunt or series. The motor-coil Q has its terminals connected, respectively, with the positive conductor 3^a and the alternating conductor 2^a. Consequently intermittent currents of constant di-

re-
 5 tion will flow through said coil. Motor-
 coils R R' are connected in series and receive
 their current from the alternating-conduct-
 10 5 terminals connected with the continuous-current
 conductors 3^a 4^a. It will therefore be contin-
 uously supplied with current, while the end
 coils R R' will be supplied with alternating
 15 currents. Motor-coils S S' S² are arranged
 like the preceding, except that three wires
 are employed to make the connection instead
 of four and the current in the central coil, al-
 though continuous in direction, is pulsating
 and intermittent in character.

15 The device seen at T indicates an induc-
 tion-motor, the same having an armature
 wound with closed circuits and a field-mag-
 net through which alternating currents are
 sent, the current changes in the field-magnet
 20 circuit acting to induce polarizing currents in
 the armature. Motor-coils U V are so con-
 nected with the supply-circuit that the coil
 U receives alternating currents, while the
 coil V receives intermittent pulsating cur-
 25 rents of constant direction. These illustra-
 tions, it is believed, will show the wide range
 and great utility of the system.

Any method for regulating the speed of the
 motor might be used; but I have here shown
 30 a motor of the shunt type, which will run at
 a constant speed with a constant electro-mo-
 tive force independent of the load of the ma-
 chine. The field here shown is of the circu-
 lar type, the iron pole-pieces being placed
 35 one on the bottom and the other on the top
 of the machine and the winding being exe-
 cuted on each side of the field and between
 the respective pole-pieces. P and N repre-
 sent the terminals of the motor to be con-
 40 nected to the supply-line of high tension.

The precise details of construction and ar-
 rangement may be varied according to my
 several patents already granted, and in addi-
 45 tion thereto various minor changes and addi-
 tions may be made in accordance with the
 foregoing description without departing from
 the invention.

Having described my invention, what I

claim, and desire to secure by Letters Patent,
 is—

1. A system of electrical distribution com-
 50 prising a source of supply-current of rela-
 tively high potential, a motor-armature, a gen-
 erator-armature wound to produce currents
 of the desired potential below that of the sup- 55
 ply, a sectional commutator, main stationary
 brushes and auxiliary moving brushes, and
 connections between said main and auxiliary
 brushes, and suitable working circuits where-
 by the high-tension supply-current is con- 60
 verted into currents of lower potential, part
 having a defined rise and fall and part of
 constant potential.

2. A system of electrical distribution com-
 prising a motor-armature, a generator-arma- 65
 ture, both of the continuous-current type and
 each provided with a sectional commutator,
 a common field-magnet, a source of supply
 of relatively high potential connected with
 the motor-armature, stationary and moving 70
 brushes on the secondary commutator, and
 working circuits of different character con-
 nected, respectively, with the stationary and
 with the moving brushes and supplied with
 current of different character and of modi- 75
 fied potential.

3. A system of electrical distribution com-
 prising a motor-armature, a generator-arma-
 ture, a common field-magnet, a source of sup-
 ply-current of relatively high potential con- 80
 nected with the motor-armature, means con-
 nected with the generator-armature for im-
 parting a pulsating or rising-and-falling char-
 acter to part of the current produced thereby,
 consisting of auxiliary moving commutator- 85
 brushes, a working circuit or circuits con-
 nected with the said auxiliary moving brushes,
 and a circuit or circuits connected with the
 stationary brushes and supplied with contin-
 uous current, also of modified potential. 90

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

CHARLES J. VAN DEPOELE.

Witnesses:

JOHN W. GIBBONEY,
 STEPHEN JANNUS.