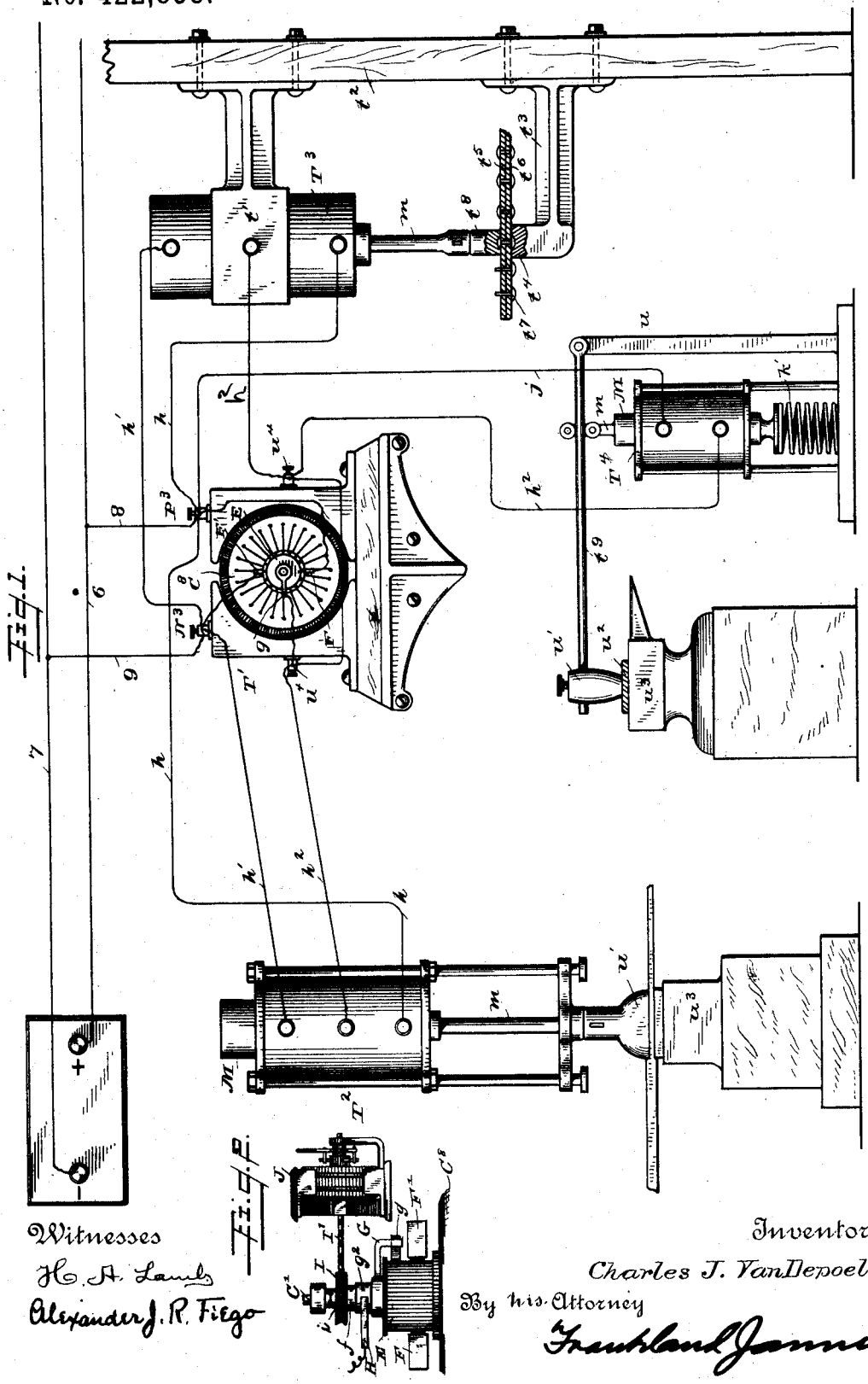
(No Model.)

C. J. VAN DEPOELE.

CONVERTING CONTINUOUS INTO PULSATING ELECTRIC CURRENTS.

No. 422,858. Patented Mar. 4, 1890.



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CONVERTING CONTINUOUS INTO PULSATING ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 422,858, dated March 4, 1890.

Original application filed March 23, 1889. Serial No. 304,544. Divided and this application filed October 4, 1889. Serial No. 326,023. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. VAN DEPOELE, 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 Converting Continuous into Pulsating Electric Currents, of which the following is a description, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This application is a division of my application filed March 23, 1889, Serial No. 304,544.

My invention relates to improvements in electric generators, more especially with reference to the production of currents having a defined rise and fall—that is to say, pulsating or intermittent currents—for example, such as are referred to in Patents Nos. 400,809 and 401,231, dated, respectively, April 2, and April 9, 1889—and particularly adapted for operating reciprocating electric engines.

As set forth in my said prior applications, my improved electro-magnetic reciprocating engines are operated synchronously with the generator or source of defined currents, each current energizing a coil in the engine for the purpose of imparting movement to the working parts.

Since the rapidity of alternation in what are known as "alternate currents" in electric-lighting machines is altogether too great and beyond the speed at which the piston of a direct-acting engine of any size is required to be moved, and since it is impracticable to operate known forms of alternate-current electric-light generators at a speed low enough to accomplish my purpose, I have provided special means whereby I am enabled to convert a continuous current into undulating or pulsating currents having any desired rate of succession or phase and without any regard to the speed of the generator.

According to the present invention the object in view is attained by the combination, with the commutator of an ordinary continuous-current motor, which, as here employed, may be termed a "counter-electro-motive-force" device, of a moving brush or brushes arranged to be rotated about said commutator and connected in the local circuits in which the translating devices are included. Continuous current is supplied to the main terminals of the motor, causing the armature thereof to be rotated. The local circuits to be supplied are also connected to the terminals of the counter-electro-motive-force device or motor and to a traveling commutator-brush which moves around the commutator, thereby creating a rise and fall of potential in the various working-circuits.

An arrangement embodying the invention is shown in the accompanying drawings, and will be hereinafter explained, and referred to in the appended claims.

In the drawings, Figure 1 is a diagrammatic view of an organization of apparatus supplied with pulsating currents, a continuous-current motor supplied from a continuous-current circuit being used to produce the rise and fall of potential in the several working-circuits. Fig. 2 is a detail view showing means for actuating the moving commutator-brushes.

In said drawings, T′ is an electric motor having a continuously-connected armature C^8 of the Gramme or other type and a sectional commutator E, upon which bear stationary brushes F F′, and which is further provided with a moving brush *g*, rotated about the said commutator E by any suitable means—for example, as indicated in Fig. 2, where is shown a small separate motor for rotating the moving commutator-brush *g*. Upon the armature-shaft C′ is placed a rotating sleeve *f*, insulated from the shaft and provided with an arm G, extending rearward to a point over the commutator, and in the extremity of said arm the brush *g* is secured. The brush-carrying arm G is carefully insulated from the rotating sleeve *f*, and adjacent to the support of said arm is located a collector-ring g^2, which is in electrical connection with the brush *g* through the arm G or otherwise, as preferred. A contact-brush H connects the ring g^2 with its circuit. The sleeve *f* is provided with a worm-wheel I, which is engaged by a worm *i* upon a driving-shaft I′, which may be an extension of the armature-shaft of the electro-motor J. By means of said motor the shaft I, worm-wheel *i*, sleeve *f*, and with it the commutator-brush *g*, may be rotated at any de-

sired speed, suitable means being provided for regulating the motor. The motor T′ is supplied with continuous current from conductors 6 7, extending from any suitable source of continuous currents and connected to the said motor by conductors 8 9, attached to binding-posts P^3 N^3. The field-magnet coils of the motor are connected in any suitable manner with respect to the armature which is supplied with current through the stationary brushes F F′, connected to the binding-posts P^3 N^3, and the armature of said motor should be arranged to rotate at a substantially constant speed.

Several pieces of apparatus actuated by my improved electro-magnetic reciprocating engines are shown in connection with the motor T′, hereinafter referred to as the "pulsator."

At T^2 is indicated a hammer, which may be actuated by a double-coil motor, such as shown in the application of which this is a division, or in my prior patents above referred to. The circuit-connections h h' h^2 are led to separate binding-posts connected with coils upon the interior of the casing seen in the drawings, substantially as indicated in Fig. 3 of the parent case.

T^3 indicates a reciprocating engine similar to that in Fig. 2 of said parent application, but shown as applied to a somewhat different form of work. As indicated, the engine T^3 is supported by a bracket t', extending from an upright t^2, which is also provided with a second bracket t^3, carrying an anvil or die t^4 for receiving the work, and upon which, as shown, are placed two pieces of metal t^5 t^6, to be united by rivets t^7, which, when placed upon the anvil t^4, are set up by blows of a suitable hammer t^8, attached to the extremity of the piston-rod m.

T^4 indicates a form of apparatus shown diagrammatically in Fig. 1 of the aforesaid application—that is to say, the engine T^4 is provided with a single-acting coil, the return-stroke being effected by a spring k'. The piston-rod m of the engine T^4 may be connected, as shown, to an arm t^0, pivoted at one end to an upright u and carrying at its free extremity a hammer or other tool u', adapted when oscillated by reciprocations of the piston-rod m to act upon work u^2 upon a suitable anvil u^3.

No work is connected to the armature-shaft of the motor T′, unless it be desired to apply a brake thereto for the purpose of regulating the speed. The motor-armature, being rotated by the continuous currents from the line, will serve to distribute pulsating currents in a manner similar to the generator shown and described in the present application, with this difference, however, that the current sent to the various working-circuits is received from the continuous-current-supply conductors 6 and 7, and is merely divided up by the pulsator. The supply-conductor 6 is connected to the binding-post P^3 of the motor, to which is connected the stationary brush F and the outgoing circuits h j of the various engines. The opposing circuits h' are all similarly connected to binding-post N^3, which is connected to the line-conductor 7 and to the stationary brush F′. The moving brush g is electrically connected with a binding post or posts w^4, to which the return-circuit of the various engines is connected by conductors h^2. With this or equivalent construction it will be understood that as the brush g travels around the commutator the current from the supply-conductors 6 and 7 will flow through the several circuits as the rotating brush approaches and recedes from the stationary brushes F F′, thus producing rising and falling currents in the said circuits. This arrangement will be very convenient in many instances—as, for example, where a source of continuous current is available and only a few engines are to be operated, or when for other reasons the circumstances do not require or justify the installation of a separate generator arranged to produce pulsating currents only.

It will be understood that the foregoing is by way of illustration only, and that the invention is not limited to the details of construction and arrangement set forth.

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

1. In a system of converting continuous into pulsating electric currents, the combination of a source of continuous currents and a current-distributer in circuit therewith, one or more working-circuits arranged to receive current from the current-distributer, and means for causing the continuous current supplied thereto to rise and fall in the working circuit or circuits connected therewith, said means comprising a commutator brush or brushes connected to the said working circuit or circuits and arranged to be constantly moved about the commutator of the current-distributer toward and away from the points of maximum and zero potential and at the desired rate of speed.

2. In a system of converting continuous into pulsating electric currents, the combination of a source of continuous currents and a current-distributer in circuit therewith, said current-distributer comprising a revolving armature provided with a sectional commutator and having stationary commutator-brushes connected to the source of continuous current, and an additional commutator-brush arranged to be moved around the commutator between the points of maximum and zero potential upon said commutator, working-circuits, and connections between said working-circuits and the stationary and moving commutator-brushes, whereby the currents supplied to said working-circuits are caused to rise and fall.

3. The combination, with a source of continuous currents, of one or more working-circuits and a current-distributer receiving the

said continuous current and supplying the same to the working circuit or circuits as currents having a defined rise and fall of any desired rate, said current-distributer comprising a rotating armature and sectional commutator, and a set or sets of brushes constantly moved about said commutator at any desired speed toward and away from the points of maximum and zero electro-motive force, and connections between said brush or brushes and the working-circuits.

4. The combination, with a source of continuous currents, of a current-distributer comprising an armature and commutator of the continuous-current type, a stationary set of brushes upon said commutator, connections between said brushes and one or more working-circuits, and one or more brushes arranged to move around said commutator and also connected to the working-circuits, whereby the supply-current is distributed to the working-circuits and the potential therein caused to rise and fall constantly by the action of the moving brush or brushes.

5. The combination, with a source of continuous currents, of one or more working-circuits and means for distributing said continuous currents to the said working circuit or circuits and for causing the potential thereof to constantly rise and fall, comprising an electro-dynamic motor of the continuous-current type, connections between the source of continuous current and the main commutator-brushes of the motor and between the working-circuits and said brushes, and one or more additional brushes arranged to be moved about the commutator of the motor and connected to the working circuit or circuits, whereby the pulsating effect is produced upon the continuous supply-current.

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

CHARLES J. VAN DEPEOLE.

Witnesses:
FRANKLAND JANNUS,
JOHN W. GIBBONEY.