

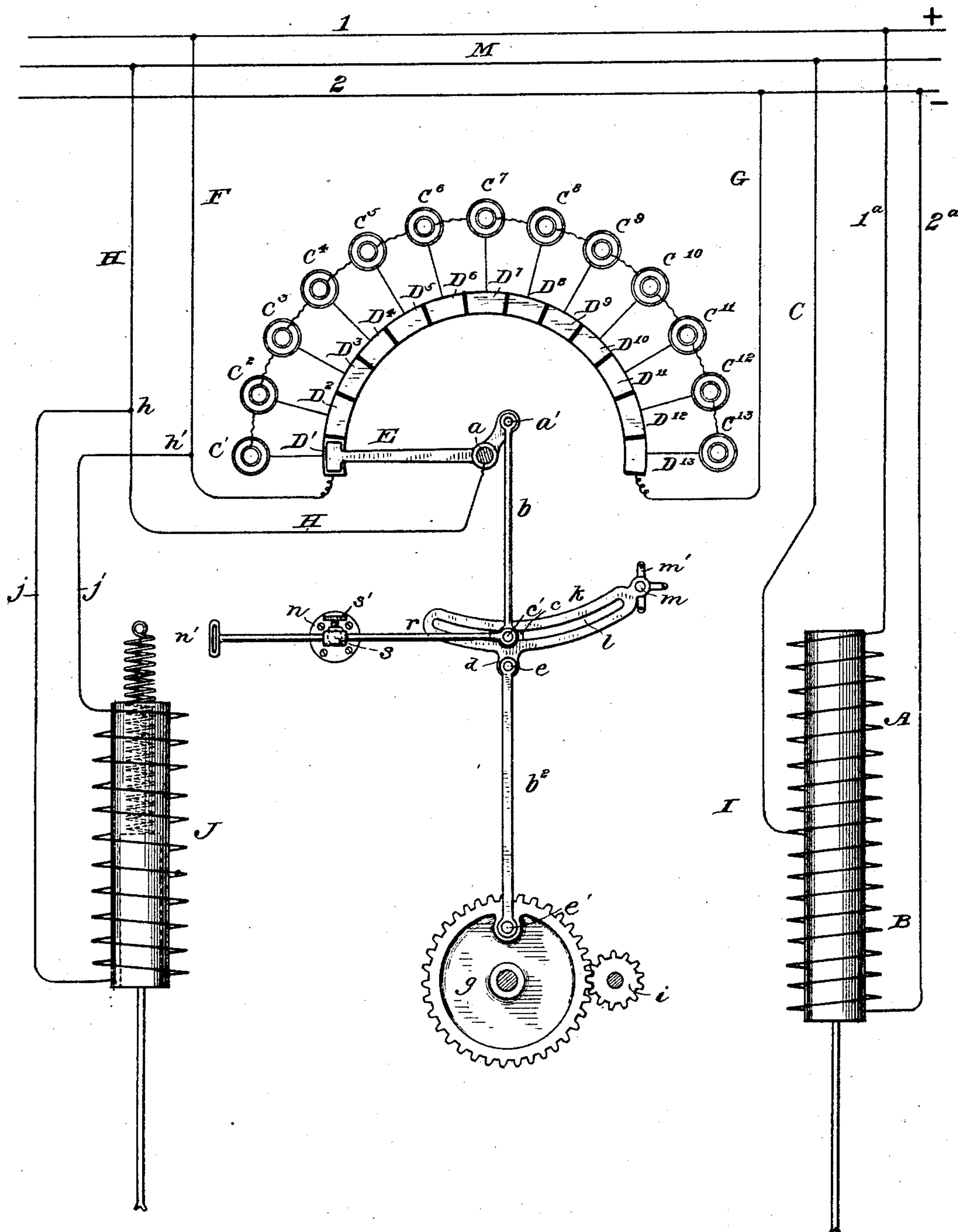
(No Model.)

C. J. VAN DEPOELE.

ADJUSTABLE CURRENT RECIPROCATING ENGINE SYSTEM.

No. 436,276.

Patented Sept. 9, 1890.



Witnesses

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CHARLES J. VAN DEPOELE, OF LYNN, MASSACHUSETTS.

ADJUSTABLE-CURRENT RECIPROCATING-ENGINE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 436,276, dated September 9, 1890.

Application filed May 14, 1890. Serial No. 351,721. (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 Adjustable-Cur-
rent Reciprocating-Engine Systems, of which
the following is a description, reference being
had to the accompanying drawing, and to the
letters and figures of reference marked there-
on.

My invention relates to a system of dis-
tributing pulsating or rising and falling cur-
rents alternately to a plurality of working-
circuits; and a special feature of the inven-
tion consists in means for varying the current
in the said circuits—that is to say, for send-
ing impulses of greater power to one circuit
than to the other and for varying the differ-
ence in power as desired. The currents them-
selves are desirably continuous in character,
and by my present invention may be obtained
from any continuous-current circuit, the
means hereinafter described imparting to the
said continuous current the rising and falling
character required for the operation of recip-
rocating electric engines of the type shown
and described in my Patents Nos. 400,801 and
401,235.

As a means of varying the current supplied
to the motor-coils and causing it to rise and
fall therein, I employ the counter electro-mo-
tive force of a group of chemical elements,
which may be primary or secondary batteries,
the combinations of said elements with the
working-circuits being constantly varied to
produce the desired effects. By employing
such means I am enabled to utilize for this
work and to secure effective service from a
source of continuous current which would
ordinarily be insufficient to operate the en-
gines, and this particular result is produced
by employing secondary batteries sufficient
in number or capacity to store current be-
tween impulses or during the time the ma-
chines are at rest and to supply the working-
circuits when required. These features of the
present application are not herein broadly
claimed, since they form the subject-matter
of a prior application filed April 9, 1890, Serial
No. 347,231; but I find it desirable in many in-

stances to be able to impart to the current in
one coil a preponderance in strength, so as to
give to the magnetic piston of the recipro-
cating engine a more powerful impulse in one
direction than in the other, and this feature of
the invention is herein broadly claimed, and,
together with the various details required for
practical use, will be hereinafter fully de-
scribed, and set forth and referred to in the
appended claims.

The accompanying drawing is a diagram-
matic representation of an organization of
parts embodying the invention.

As indicated in the drawing, continuous
current is supplied from any available source
through conductors 1 2, and the said supply-
conductors are connected through branch con-
ductors 1^a 2^a to the outside terminals of motor-
coils A B, which may be employed to actuate
the magnetic piston of a reciprocating engine.
An intermediate conductor C is connected to
the inner ends of both the coils A B.

A series of chemical elements C¹ C² C³ C⁴
C⁵ C⁶ C⁷ C⁸ C⁹ C¹⁰ C¹¹ C¹² C¹³ are connected be-
tween the main supply-conductors 1 2 through
branch conductors F G. The said elements
are connected in series, and from each one of
them extends a conductor connecting the
same with an insulated contact, the contacts
D¹ to D¹³ each, therefore, representing one of
the elements, or where a plurality of elements
are arranged to form a single unit each con-
tact will represent one of the units, however
constituted. A movable contact device E is
arranged to be moved back and forth over
the contacts D¹ to D¹³, and the intermediate
conductor C is connected to the traveling con-
tact E through the conductors M and H.
The elements interposed between the supply-
conductors 1 2 may vary greatly as to size,
number, and construction, as stated in my
said prior application. From conductors H F
at h h' branch conductors j j' lead to the ter-
minals of a single-coil engine J, the motor-
coil of which is in multiple arc with the coil
A of the reciprocating engine I when contact
E is between the contacts D⁷ and D¹³.

The main feature of the present invention
consists in the nature of the mechanism em-
ployed to actuate the contact, although the
particular structure is not material. The con-

tact-arm, as shown, is an ordinary bell-crank, and is centrally pivoted at *a* with respect to a circle, half of which is formed by the segments *D'* to *D*¹³. To the free end of said arm at *a'* is pivotally attached the connecting-rod *b*, which is pivotally attached at its opposite end to the sliding block *c*, moving in the slot *l* of the link *k*. The pivot *c'* and rod *b* are held in any desired relation to the link *k* by the rod *r*, adjustably supported by the sleeve *s*. The link *k* is pivotally supported at *m* by a stationary bracket *m'*. The slot *l* in the link *k* extends beyond the pivot *c'* far enough to allow free play when the gear-wheel *g* is rotated. A second connecting-rod *b*² is attached to a pin *e* upon a lug *d* on the lower side of the swinging end of the link *k*. The opposite end of the connecting-rod *b*² is attached to a crank-pin *e'* upon the gear-wheel *g*, which may be rotated by the pinion *i* or directly from any suitable source of power. To the pin *c'*, which engages the rod *b*, is attached a rod *r*, which is loosely engaged by the pivoted sleeve *s* and adapted to be held firmly at any desired position by the set-screw *s'*, attached to said sleeve. The sleeve *s* is mounted upon the stationary plate-bracket *n*. The rod *r* is provided with a handle *n'*.

With the apparatus in the position shown current will flow from conductor 1, through branch conductor *F*, arm *E*, and conductors *H M C*, to coil *B*, and out through branch conductor 2^a to 2, which represents the negative side of main circuit. The conductors *F H* being both of practically the same resistance, no current will flow through *j j'* to core *J*, and it will remain inactive until the contact *E* has passed the contact *D*⁷. The current, however, will fall in the coil *B* in proportion as the resistances *C'* to *C*⁷ are put in circuit, and will be in equilibrium when the contact *E* passes to *D*⁸. As the resistances *D*⁸ to *D*¹³ are successively cut out, the current will rise in coil *A* while falling in coil *B*, and reaching its maximum in coil *A* when the contact *E* reaches the segment *D*¹³, there being then no resistance in circuit therewith. With the contact *E* upon any of the segments *D*⁸ to *D*¹³, current will flow from conductor 1, through 1^a, coil *A*, conductors *C M H*, and contact-arm *E*, through whatever resistances are at the time in circuit between the contact and segment *D*¹³, and thence through conductor *G* to negative main 2. At the same time current will flow from conductor 1, through *F* to *h' j'*, coil *J*, conductor *j* to *h*, to conductor *H*, contact *E*, resistances *D*⁸ to *D*¹³, and through branch conductor *G* to main return 2, thus placing the coil *J* in multiple arc with the coil *A* of reciprocating engine *I*.

By the use of the adjusting mechanism shown the throw of the contact-arm *E* may be varied. For example, if the rod *r* be thrust forward in the sleeve *s* the sliding block and pivot *c'* will be nearer to the point of support of the link *k*, thus reducing the radius of the arc of the circle described by the pivot

c', the stroke of the rod *b* therefore being shorter, and in consequence the throw of the arm and contact *E* from *D*⁸ to *D*¹³ will be restricted. With the link in the position shown the throw of the contact-arm will be normal—that is, from *D'* to *D*¹³; but as the sliding block and pivot *c'* is moved toward the support *m* more resistance will be left in the circuit, thus restraining the flow of current to the coils *A* and *J* without affecting that in coil *B*. A similar construction may be applied to influence the current in its opposite phase, and it will be readily understood that the force of the solenoid or solenoids may be changed at will, or the up or down stroke, where more than one coil is used in the same machine, may be given the preponderance of power.

It will be understood that where it is desired to use primary or secondary batteries independently the connections will be made directly from such batteries to the translating devices. Where secondary batteries are used it is of course necessary to connect them into a suitable charging-circuit.

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

1. In a system of distributing pulsating currents, a circuit including a number of chemical elements, a sectional commutator for the said elements, a moving contact upon said commutator, means for varying the travel of said contact across all or a part of the segments thereof, and an intermediate conductor between the main conductors of the said circuit, said intermediate conductor connected to the moving contact.

2. In a system of distributing pulsating currents, a source of continuous current spanning a number of chemical elements, a sectional commutator for the successive elements, a moving contact upon said commutator, means for varying the travel of said contact across all or a part of the segments thereof, working-circuits spanning the elements, and an intermediate circuit between the working-circuits connected to the moving contact.

3. In a system of distributing pulsating or rising and falling currents, an electro-chemical electro-motive-force device having fixed terminals of opposing polarity, the successive elements connected to a sectional commutator, a moving contact upon said commutator, means for varying the travel thereof, and working-circuits in electrical connection between the fixed terminals and the moving contact device.

4. In a system of distributing pulsating currents, a constant-current supply energizing a set of electro-chemical elements, a sectional commutator having its sections connected to corresponding sections of the elements, and a moving contact device having a variable travel between the points of maximum and minimum electro-motive force of the combined elements, means for varying the travel

of the moving contact, and working-circuits connected between the fixed terminals of the elements and the traveling contact.

5 In a system of distributing pulsating currents, the combination, with a suitable source of continuous current, of a group of chemical elements spanning the supply-conductors, two working-circuits having their outer terminals connected with the supply-conductors, a series of contacts connected to and representing
10 the units of the group of elements, an intermediate circuit connected to the inner terminals of the working-circuits and to a contact device engaging the segments, and means
15 for moving the contact device upon said segment and imparting thereto a changeable motion to vary the electro-motive force of the portion of the group in circuit between either one of the supply-conductors and the inter-
20 mediate conductor.

6. In a system of distributing pulsating currents of unequal force, the combination, with a constant-current supply, of a number of chemical elements spanning the supply-con-
25 ductors, a sectional commutator representing

the elements, working-circuits spanning said elements, an intermediate circuit between the latter, a movable contact representing the intermediate circuit, mechanism for operating the movable contact, and means, substantially as described, for varying the travel
30 of the moving contact.

7. In a system of distributing pulsating currents of unequal force, the combination, with a constant-current supply, of a number of
35 chemical elements spanning the supply-conductors, a sectional commutator representing the elements, working-circuits spanning said elements, an intermediate circuit between the latter, a movable contact representing the in-
40 termediate circuit, and means for operating the moving contact, said means comprising an adjustable link-motion and mechanism for imparting movement thereto.

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

CHARLES J. VAN DEPOELE.

Witnesses:

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