No. 805,557. PATENTED NOV. 28, 1905.

W. KAISLING.

ELECTRIC CURRENT GENERATOR.

APPLICATION FILED MAY 31, 1904.

Fig. 1.

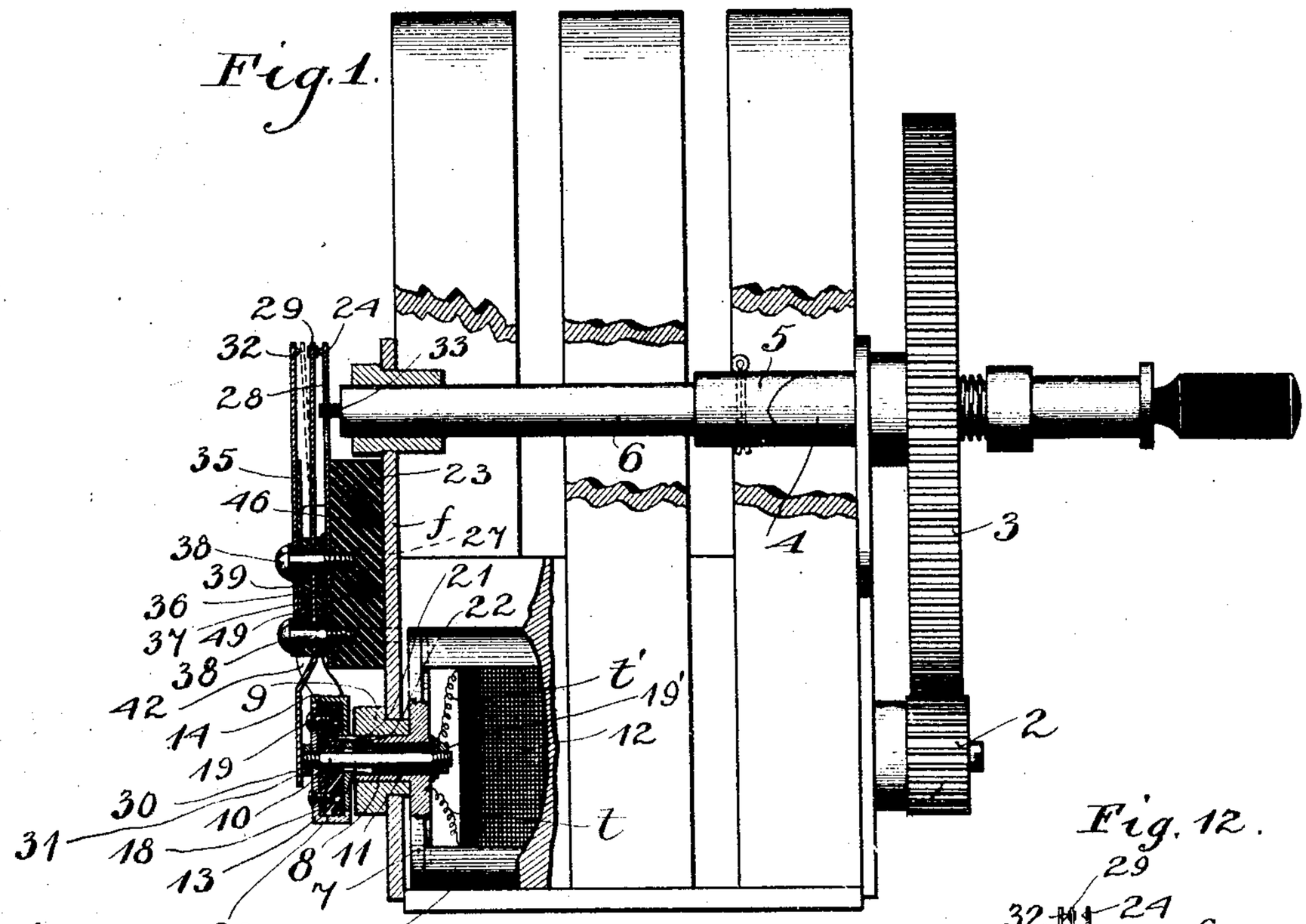


Fig. 12.

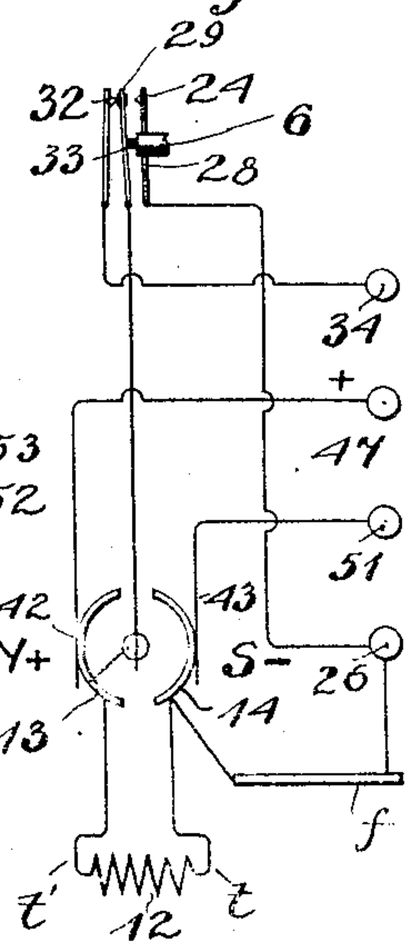


Fig. 2.

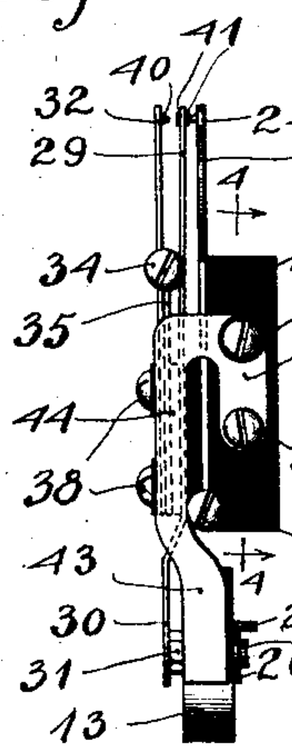


Fig. 3.

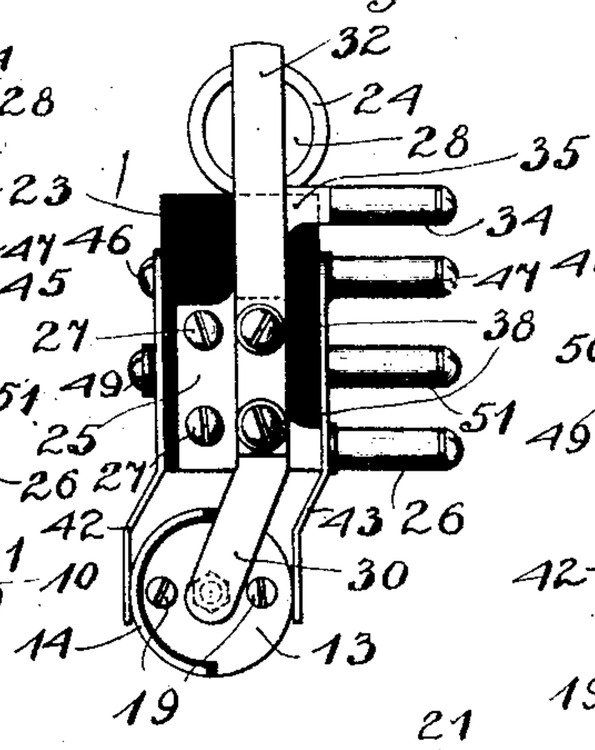
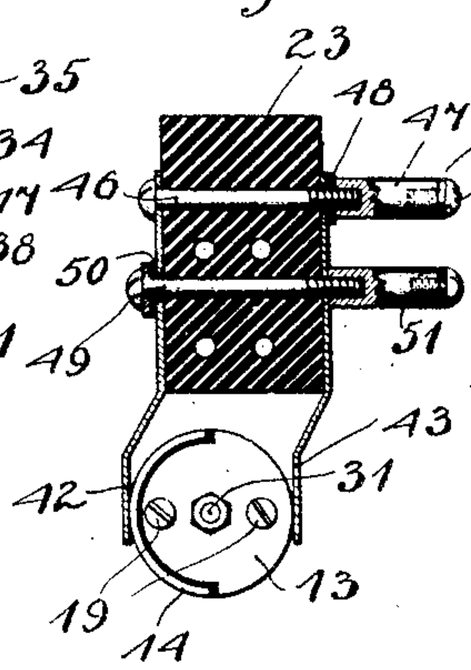


Fig. 4.



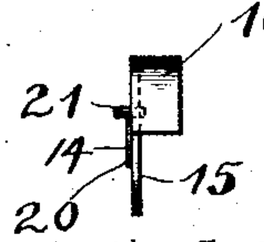


Fig. 5.

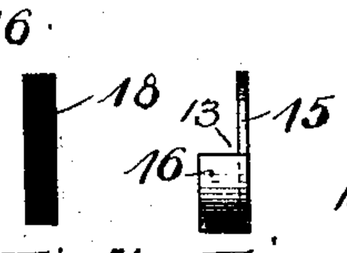


Fig. 7.

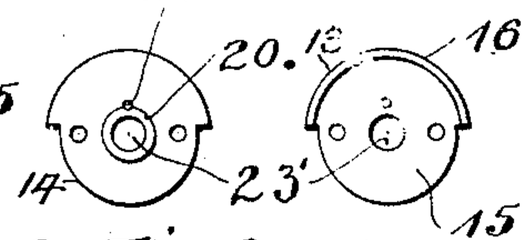


Fig. 6. Fig. 8. Fig. 9.

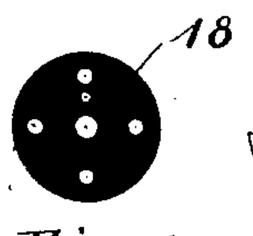


Fig. 10.

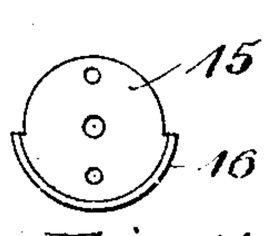


Fig. 11.

Witnesses:
Leonard W. Novander.
Charles J. Schmidt.

Inventor
William Kaisling
By Charles A. Brown
Attorney

UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRIC-CURRENT GENERATOR.

No. 805,557. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed May 31, 1904. Serial No. 210,334.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric-Current Generators, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to electric generators, particularly to magneto-generators employed in the telephone art.

The object of my invention is to provide improved switching mechanism whereby various connections may readily be made with the armature of the generator to supply various kinds of currents.

My invention is of great importance in party-line telephone systems where, for instance, alternating currents, pulsating currents, and direct currents are required for operating substation selective apparatus, and heretofore this could only be accomplished by the use of a plurality of generators each furnishing a certain kind of current.

My invention provides improved switching mechanism attachable to any generator and provided with terminals which offer various combinations. By connecting with two of the terminals alternating current will be received from the generator. By connecting with another set of terminals direct current will be delivered, and two other sets respectively furnish pulsating positive current and pulsating negative current. Thus a generator of my invention eliminates the necessity of a separate generator for each kind of current.

My invention will be best understood by referring to the accompanying drawings, in which—

Figure 1 is an elevation view of a generator, the improved switching mechanism being shown in section. Fig. 2 is an elevation side view of the switching mechanism. Fig. 3 is a front view thereof. Fig. 4 is a longitudinal sectional view thereof, taken on line 4 4 of Fig. 2. Figs. 5 and 6 are side views of commutator-segments employed. Fig. 7 shows an insulating-disk to which the segments are connected. Fig. 8 is a rear view f Fig. 5. Fig. 9 is a front view of Fig. 5. Fig. 10 is a front view of the insulating-disk. Fig. 11 is a front view of Fig. 6, and Fig. 12 is a diagrammatic view showing the connections of the switching mechanism with the terminals.

Like reference characters refer to like parts throughout the various figures.

I have shown my improved switching mechanism as applied to a generator such as is described in my copending application, Serial No. 166,273, filed July 20, 1903.

The armature 1 connects with a pinion 2, engaged by the driving-gear 3, connected to a counter-shaft 4, having mitered connection with a collar 5, secured to the actuating-shaft 6. The end plate 7 of the armature has a forwardly-extending bearing-sleeve 8, journaled in a journal-box 9. A bolt or rod 10 passes through the sleeve-bearing 8, being insulated therefrom by a bushing 11. One terminal *t* of the armature 12 connects with the sleeve-bearing 8, and thus with the frame of the machine, while the other terminal *t'* connects with the rod or bolt 10. The bolt 10 serves to carry a commutator composed of front and rear segments 13 and 14, respectively. Each segment of the commutator consists of a disk part 15 and an annular wall 16, extending almost one-half way around the circumference of the disk part. The segments are secured to an insulating-disk 18 by means of screws 19 19, the segments when in place being entirely insulated from each other. The bolt 10 passes through the center of the segments and insulating-disk, to be engaged at its inner end by a nut 19'. The rear segment 14 is provided with a hub 20 for engaging the front face of the sleeve-bearing 8. A pin 21 is secured in the rear segment and extends therefrom to form a key for engaging the slot 22, cut in the front end of the sleeve-bearing 8, and thus when the nut 19' is tightened the commutator will be securely held against the front of the sleeve-bearing 8, and the commutator will be rotated with the armature by virtue of the key 21. The central opening 23' through the rear segment 14 is made larger than the diameter of the bolt to insulate the rear segment from the bolt, and thus the rear segment is connected with the frame of the machine and the armature-terminal connected therewith, while the bolt and front segment are insulated from the rear segment and frame and connected with

the other armature-terminal. A mounting-block 23, of insulating material, is provided for the switching mechanism. A stationary switch-spring 24 is provided at its lower end with a body portion 25 and a terminal 26, screws 27 27 passing through the body portion and the mounting-block 23 to engage the frame *f* of the machine, and thus spring 24 is permanently connected with the frame. The upper end of the spring 24 is provided with an expanded opening 28, through which the actuating-shaft 6 may pass upon rotation of the driving-gear. The stationary spring is normally in engagement at its upper end with the switching-spring 29, the lower end 30 of this switching-spring extending downwardly into engagement with the head 31 of the bolt 10, and is consequently permanently connected with the armature-terminal connected with the bolt. An alternate contact-spring 32 is adapted to be engaged by the switching-spring 29 upon rotation of the driving-gear 3 to cause longitudinal movement of the actuating-shaft 6 through the opening 28 of the spring 24 and against the switching-spring 29, the end of the shaft 6 being provided with a stud 33, of insulating material. The alternate spring 32 is provided with a terminal 34, which may be integral with the spring or may be the terminal of a plate 35, which is in contact with the spring 32. The springs 24, 29, and 32 and the terminal plate 35 are assembled, as best shown in Fig. 1, an insulating-disk 36 being disposed between springs 24 29 and the insulating-disk 37 being disposed between springs 29 and 32, spring 32 and terminal plate 35 being adjacent and in contact. These springs are secured to the mounting-block 23 by means of screws 38 38, bushings 39 causing insulation of the screws from the springs. The ends of these springs may be provided with contact-tips 40 and contact-plates 41 to afford better contacts.

Commutator springs or brushes 42 and 43 are secured to the sides of the mounting-block 23. Each commutator-spring consists of a spring part 44 for engaging the commutator and a mounting part 45. A screw 46 passes through the mounting-block 23 and through the upper end of the mounting parts 45 of the commutator-springs. This bolt is in contact with the spring 42, the threaded end of the bolt being engaged by a terminal 47, a bushing 48, however, serving to insulate the terminal and bolt from the other commutator-spring 43. A second bolt 49 passes through the mounting-block 23 and through the lower end of the mounting parts 45 of the commutator-springs. This bolt 49 is insulated from the spring 42 by means of an insulating-bushing 50. The threaded end of this second bolt is engaged by terminal 51, which is in contact with the spring 43. The terminals of these springs may be adapted to have conducting-wires soldered thereto; but they are preferably constructed, as shown, in the shape of binding-posts provided with clamping-screws 52 and washers 53.

In Fig. 12 I have diagrammatically shown the circuit engagement connecting the springs with the armature and terminals, the shaft 6 being shown as actuated to connect the switching-spring 29 with the alternate spring 32. I have shown a permanent magnetic field to be of north polarity at the left of the armature and of south polarity at the right. It is seen that under normal conditions the armature-winding is shunted by a low-resistance path through the frame of the generator and traced as follows: From the terminal *t* of the armature to frame through the spring 24 and through the spring 29 to the terminal *t'* of the armature.

If it is desired to derive alternating current from the generator, the external circuit will be connected with terminals 34 and 26, and upon actuation of the shaft 6 to break the shunt-circuit and to connect springs 29 and 32 alternating current will flow as follows: From the terminal *t* of the armature to the frame of the machine and to terminal 26, thence through the external circuit back to terminal 34 to the spring 32, spring 29, and through the bolt 10 to the terminal *t'* of the armature.

If direct current is desired, the external circuit will be connected with terminals 47 and 51 and the commutated current from the armature will be delivered to the external circuit.

If positive pulsating current is desired, the external circuit will be connected to terminals 34 and 47. During one-half revolution of the commutator, as shown in Fig. 12, the external circuit is short-circuited through the circuit extending from terminal 47 to brush 42, segment 13 to springs 29 and 32 and to terminal 34. During the next half-revolution segment 14 will engage the commutator-spring 42 and positive pulsating current will flow as follows: from the *t* terminal of the armature to the segment 14, to the commutator-spring 42, terminal 47, and through the external circuit to terminal 34, through springs 32 and 29 to segment 13, and to the *t'* terminal of the armature. Thus for every revolution of the commutator a positive pulsating current is sent through the external circuit when connected with terminals 34 and 47.

To receive negative pulsating current, the external circuit will be connected to terminals 34 and 51, and during engagement of the commutator-spring 43 with the segment 14, as shown in Fig. 12, a negative impulse will flow through the external circuit as follows: From the *t* terminal of the armature to segment 14, to commutator-spring 43, terminal 51, and through the external circuit to terminal 34, through springs 32 and 29 to segment 13, and to the *t'* terminal of the arma-

ture. When the actuating-shaft 6 returns to its normal position, the switching-spring 29 again engages the spring 24, and the shunt-circuit about the armature-winding is again established. This shunting of the armature-winding under normal conditions is of particular importance where the generator is employed at party-line substations, the impedance and resistance of the armature-winding being cut from circuit when the generator is inactive.

I thus produce a generator with means whereby various currents may be readily derived from the armature, my improved switching mechanism and commutator being readily attachable to any style of generator, and the necessity of employing a generator for each kind of current is avoided.

I do not wish to be limited to the exact arrangement or construction of parts as shown, as many changes may readily be made without departing from the spirit of the invention.

I describe as new, however, and desire to secure by Letters Patent—

1. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for said winding, switching mechanism connected with said commutator, a plurality of contact-terminals connected with said switching mechanism and said commutator, one pair of said terminals being the outlet of alternating current, a second pair being the outlet of direct current, a third pair being the outlet of positive intermittent current, and a fourth pair being the outlet of negative intermittent current.

2. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for said winding, contact-springs for said commutator, switching mechanism connected with said commutator and said winding, a switching-spring for said switching mechanism, a normal contact-spring normally engaging said switching-spring to close a shunt of low resistance about said armature-winding, an alternate contact-spring to be engaged by said switching-spring upon actuation of said generator, and a plurality of contact-terminals for said commutator-springs and switching-springs, different pairs of said contact-terminals being outlets of different kinds of current from said winding.

3. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for said winding, contact-springs for engaging the said commutator, switch mechanism connected with said commutator and winding, a switching-spring for said switch mechanism, a normal contact-spring engaged by said switching-spring when said generator is at rest to close a shunt path of low resistance about the armature-winding, an alternate contact for said switching-spring, a pinion connected with said armature, a driving-gear engaging said pinion, an actuating-shaft adapted upon actuation of said generator to move longitudinally and engage said switching-spring with said alternate contact-spring, and a plurality of contact-terminals for said switch-springs and commutator-springs, different pairs of said terminals being the outlets of different kinds of current-flow from said armature.

4. In an electric-current generator, the combination with an armature having a winding, of a commutator for said winding, a mounting-block adapted to be secured to the frame of said generator, commutator contact-springs secured to said mounting-block, a switching-spring secured to said mounting-block and connected with one terminal of said winding, a normal contact for said switching-spring, said switching-spring and normal spring serving to close a shunt-path of low resistance about said winding when said generator is at rest, an alternate contact-spring secured to said mounting-block, a plurality of contact-terminals for said springs, and automatic means upon actuation of said generator for causing said switching-spring to be moved from said normal contact to engage the alternate contact, whereby said shunt-path is broken, and whereby current is supplied to said contact-terminals, different pairs of said terminals being outlets of different kinds of current-flow from said winding.

5. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for said winding, contact-springs for said commutator, switching mechanism, a normal contact-spring for said switching mechanism connected with one terminal of said winding, a switching-spring for said switching mechanism connected with the other terminal of said winding and normally connected with said normal contact-spring to close a path of low resistance in shunt of said winding, an alternate contact-spring for said switching mechanism, a plurality of contact-terminals for said commutator-springs and switch-mechanism springs, and automatic means upon actuation of said generator for moving said switching-spring from said normal contact-spring into engagement with said alternate spring, whereby said shunt-circuit is broken and whereby current is supplied to said contact-terminals, different pairs of said terminals being outlets of different kinds of current-flow from said winding.

6. In an electric-current generator of the class described, the combination with an armature having a winding normally shunted by a path of low resistance, of a commutator for said winding, contact-springs for said commutator, terminal contacts for said commutator-springs, a switching-spring permanently connected with one terminal of said winding, a

contact-spring for said switching-spring, additional contact-terminals for said contact-spring and the other terminal of said winding, and automatic means upon actuation of said generator for breaking said shunt-path about said winding and for moving said switching-spring into engagement with said contact-spring, whereby current is supplied to said terminal contacts, different pairs of said terminal contacts being outlets of different kinds of current-flow from said winding.

7. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for said winding, commutator-springs for said commutator, switch mechanism, a normal contact-spring for said switch mechanism permanently connected with one terminal of said armature, a switching-spring for said switch mechanism permanently connected with the other terminal of said armature and engaging said normal contact-spring to close a shunt-path of low resistance about said winding when said generator is at rest, an alternate contact-spring for said switching mechanism, and contact-terminals for said alternate spring, said commutator-springs and said normal spring, different pairs of terminal contacts being the outlets of different kinds of current-flow from said winding.

8. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator composed of two segments for said winding, a mounting-block secured to the frame of said generator, commutator contact-springs secured to said mounting-block, switch mechanism secured to said mounting-block, a normal contact-spring for said switch mechanism permanently connected with one terminal of said winding, a switching-spring for said switch mechanism permanently connected with the other terminal of said winding and normally engaging said normal contact-spring to close a shunt-path of low resistance about said winding when said generator is at rest, an alternate contact-spring for said switch mechanism, contact-terminals for said alternate spring, said commutator-springs and said normal spring, and automatic means upon actuation of said generator for moving said switching-spring from said normal spring to open said shunt-path about said winding and to move said switching-spring into engagement with said alternate spring to raise said contact-terminals to a potential, one pair of said contact-terminals being the outlet of alternating current, a second pair being the outlet of direct current, a third pair being the outlet of positive pulsating current, and a fourth pair being the outlet of negative pulsating current.

9. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for the winding, commutator-springs engaging said commutator, switch-springs connected with said commutator and said winding, and a plurality of contact-terminals for said switch-springs and commutator-springs, said switch-springs in their normal position serving to close a low-resistance shunt about the armature-winding, and different pairs of said contact-terminals being the outlets of different kinds of current from the winding upon actuation of said generator.

10. In an electric-current generator of the class described, the combination with an armature having a winding, of a commutator for the winding, commutator-springs engaging said commutator, switch-springs connected with said commutator and winding, said switch-springs in their normal position serving to close a low-resistance shunt about the armature-winding, and a plurality of contact-terminals for said switch-springs and commutator-springs, one pair of said terminals being the outlet for alternating current, a second pair being the outlet for direct current, a third pair being the outlet for positive intermittent current, and a fourth pair being the outlet for negative intermittent current.

11. In an electric-current generator of the class described having a single armature, of a commutator for the winding of said armature, switching mechanism connected with said commutator and with said winding, a plurality of contact-terminals connected with said switching mechanism and with said commutator, one pair of said terminals being the outlet for alternating current, a second pair being the outlet for direct current, a third pair being the outlet for positive intermittent current, and a fourth pair being the outlet for negative intermittent current.

12. In an electric-current generator of the class described having a single armature, of a commutator for the winding of said armature, a mounting-block supported from the generator-frame, switch-springs supported on said mounting-block and connected with the armature-winding, commutator-brushes supported on said mounting-block and engaging the commutator, a contact-terminal for each switch-spring and brush, one pair of said terminals being the outlet for alternating current, a second pair being the outlet for direct current, a third pair being the outlet for positive intermittent current, and a fourth pair being the outlet for negative pulsating current, all emanating from said armature.

13. In an electric-current generator of the class described having an armature provided with a commutator for its winding, of a mounting-block supported from the generator-frame, switch-springs supported on said mounting-block and adapted for mechanical engagement with the actuating-shaft of the generator, brushes extending from said mounting-block and engaging the commutator, a contact-terminal for each switch-spring and

brush, two of said switch-springs being connected with the armature-winding and normally in engagement with each other to short-circuit said winding, actuation of the generator causing opening of said short circuit and polarization of said contact-terminals, one pair of said terminals being the outlet for alternating current, a second pair being the outlet for direct current, a third pair being the outlet for positive intermittent current, and a fourth pair being the outlet for negative intermittent current, all emanating from the armature-winding.

In witness whereof I hereunto subscribe my name this 26th day of May, A. D. 1904.

WILLIAM KAISLING.

Witnesses:
CHARLES J. SCHMIDT,
HARVEY L. HANSON.