

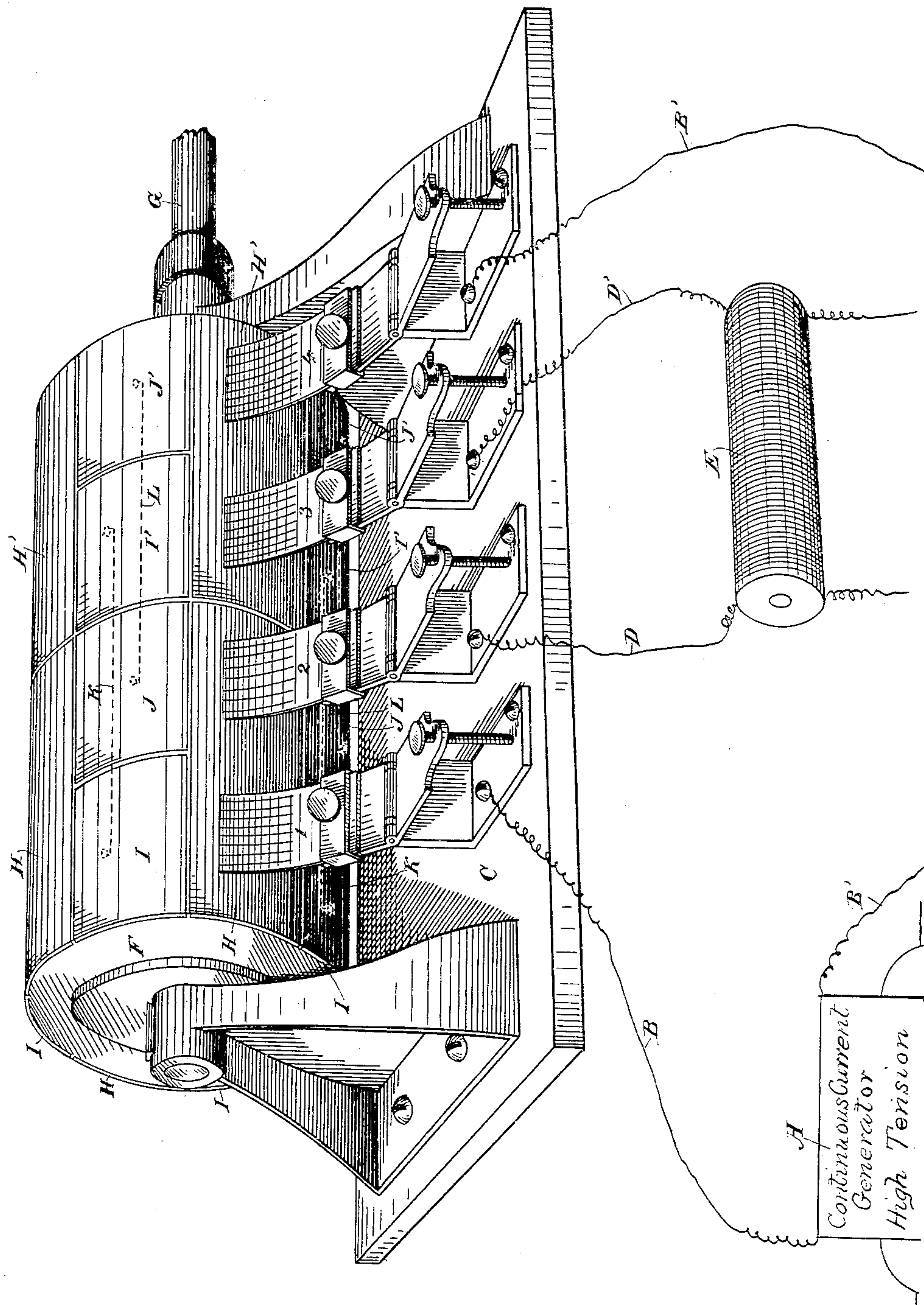
(No Model.)

G. B. FRALEY.

APPARATUS FOR ELECTRICAL DISTRIBUTION.

No. 392,114.

Patented Oct. 30, 1888.



Witnesses,  
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 392,114, dated October 30, 1888.

Application filed March 6, 1888. Serial No. 266,355. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE B. FRALEY, of the city and county of San Francisco, State of California, have invented an Improvement in Electric Lighting; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in electric lighting and apparatus connected therewith, by the use of which I am enabled to convert a continuous direct high-tension electric current into an alternating current at any point or points in the line, for the purpose of using the same for incandescent lights without diminishing or interfering with the high-tension current, or its use in the ordinary arc lights, or for other purposes.

Referring to the accompanying drawings for a more complete explanation of my invention, the figure is a perspective view of my commutator and converter with connecting-wires and a dynamo from which the current is derived.

A represents a dynamo, which may be of any of the well-known forms of construction, for the purpose of producing a continuous direct high-tension electric current, and B B' are wires leading therefrom, these wires being of a length to complete any desired circuit, and at any point or points within this circuit where it may be desired the ordinary high-tension arc lights may be introduced and used. At any other points where it may be desired to use an alternating current for incandescent lighting it is done by the introduction of the commutator and current-reverser and a converter through which the current is transmitted, so as to produce the necessary secondary current for the use of the incandescent lights. At whatever point it may be desired to introduce this commutator the wires B B' are connected with two metallic brushes, 1 and 4, which are fixed upon a base or convenient support, C, the other two brushes, 2 and 3, being fixed to the same base and between the brushes 1 and 4. The brushes 2 and 3 are connected by wires D D' with the primary coil of the converter E. This converter consists of the primary and secondary or induction coils, which may be arranged in any of the usual and well-known ways for producing second-

ary currents, and these secondary currents are employed to supply the incandescent lights by means of any of the well-known systems.

All the brushes 1, 2, 3, and 4 press upon the surface of the horizontal cylinder F, which may be made of hard wood or any other suitable non-conducting material, this cylinder having a shaft, G, passing through its axis and supported by suitable standards and journal-boxes from the base C, said shaft having a pulley to which a belt may be applied from any suitable source of power, so as to cause the cylinder F to rotate. This cylinder may be of any desired size—as seven inches in length by three inches in diameter—and its circumference is divided into two or more sections, upon which are fixed a series of plates or segments made of brass, copper, or other suitable conducting material.

The arrangement of the plates upon the sections alternates as follows: Upon one section two plates, H and H', are arranged in line with each other, extending from end to end of the cylinder, and being supported sufficiently separated in the center to insulate them from each other. The next sections upon either side contain four plates or segments, I and J, I' and J', arranged in like manner in line with each other, sufficiently separated to be insulated from each other, and also from the segments H and H', above described. The segments I and I' are united by wires K, which are let into the surface of the cylinder, so as to be out of contact with the segments J and J', and the segments J and J' are in like manner united by a similar wire, L, so that the plates I and I' alternate with the plates J and J', and are united in pairs, as shown. The entire circumference of the commutator is thus covered with segments arranged alternately in pairs H H' and I, J, I', and J'.

The brushes 1, 2, 3, and 4 press with an elastic contact upon the surface of the commutator as the latter is rotated. When it turns to a point which brings the plates H and H' into contact with the brushes, the current from the direct-circuit wire B, entering brush 1, passes thence into the segment H. From thence it passes into the brush 2, and thence through the converter E into the brush 3, and from



thence into the segment H' and into the brush 4, from which it passes again to the main or circuit wire B', and throughout the circuit back to the dynamo A. As the commutator continues its revolution, the segments I J I' J' next pass beneath the brushes 1, 2, 3, and 4, and the current then passes through the apparatus as follows: from the wire B through the brush 1 into the segment I, and thence through the wire K to the segment I', thence through the brush 3 and into the primary coil of the converter in the opposite direction from that previously described to the brush 2, thence into the segment J and through the connecting-wire L to the segment J' and into the brush 4, and thence again through the main wire B' into the direct circuit. This operation reverses the current through the converter, and as the commutator rotates this alternate reversal of the current takes place backward and forward through the converter, and any number of changes or reversals per minute may be obtained by changing the speed of rotation of the commutator. By this construction it will be seen that incandescent lighting may be effected from a series circuit, and the continuous high-tension current or currents may be converted into an alternating current or currents, this conversion taking place either at the station or anywhere along the line of the series circuit or circuits, and the incandescent lights can thus be operated at any distance away from the station and at any point within the circuit.

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

1. A commutator or current-reverser introduced into a continuous high-tension current, and comprising a non-conducting rotary cyl-

inder having the plates H H' and I I' J J' and four brushes arranged in pairs, and a converter connected with one of said pairs, having a secondary circuit, through which the incandescent lighting is effected, substantially as herein described.

2. The commutator consisting of the non-conducting rotary cylinder having its periphery divided into sections, with the alternate insulated segments or plates H H' and I I' J J', wires by which the segments I I' and J J' are connected together, and the four brushes, two of which are connected with the main circuit and the other two with the converter, substantially as described.

3. The brushes 1 and 4, connected with the continuous high-tension circuit, and the brushes 2 and 3, connected with the primary coil of a converter, said brushes forming a contact with the periphery of the commutator cylinder, in combination with the segments H H' and I J I' J', arranged around its periphery and alternating with each other, substantially as herein described.

4. A commutator consisting of a non-conducting rotary cylinder, with the insulated conducting-segments fixed to its periphery, as described, in combination with four brushes pressing upon its surface, two of which are connected with the conducting-wires of a continuous high-tension current and the other two with a converter, substantially as herein described.

In witness whereof I have hereunto set my hand.

GEORGE B. FRALEY.

Witnesses:

AUG. J. BOWIE,  
J. H. BLOOD.