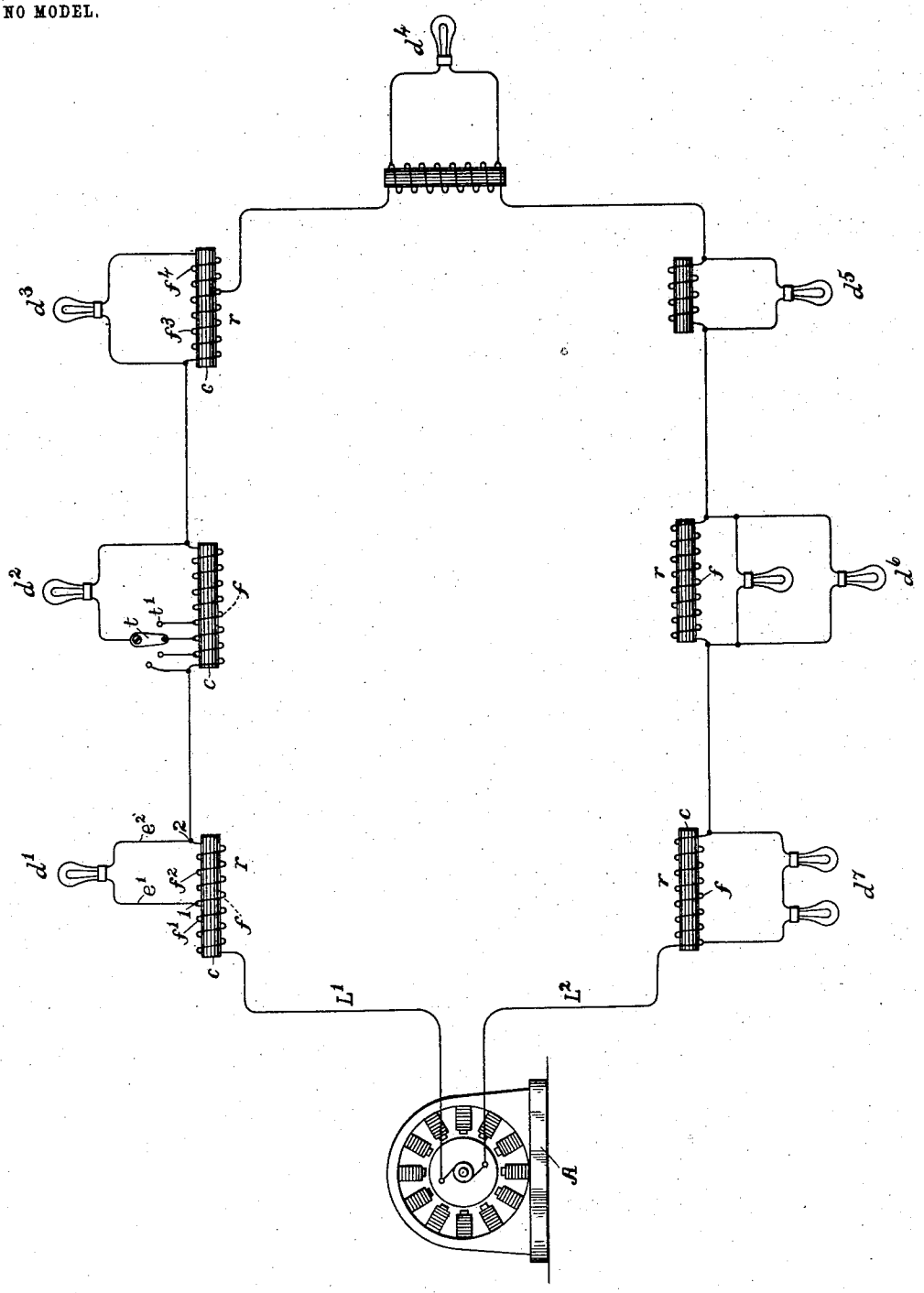
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O. B. SHALLENBERGER.

SYSTEM OF ELECTRICAL DISTRIBUTION.

APPLICATION FILED SEPT. 4, 1890.

NO MODEL.



Witnesses
James N. Smith.
Alice C. Glosser.

Inventor
Oliver B. Shallenberger.
By his Attorney
Charles A. Terry

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 740,189. Patented September 29, 1903.

UNITED STATES PATENT OFFICE.

OLIVER B. SHALLENBERGER, OF ROCHESTER, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 740,189, dated September 29, 1903.

Application filed September 4, 1890. Serial No. 363,957. (No model.)

To all whom it may concern:

Be it known that I, OLIVER B. SHALLENBERGER, a citizen of the United States, and a resident of Rochester, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Systems of Electrical Distribution, of which the following is a specification.

The invention relates to certain improvements in those systems of electrical distribution by alternating, intermittent, or undulatory electric currents which provide for so operating electric lamps in series that the circuit connections for each lamp will be maintained complete independently of the operation of the other lamps.

The object of the invention is to provide economical means for operating isolated incandescent electric lamps or isolated groups of lamps or other translating devices, and especially to provide for connecting in series with each other devices requiring different currents. Thus, for example, it may be desired to place at one point a lamp requiring 1.5 amperes, at another a lamp requiring three amperes, and at another a lamp requiring but one ampere, and to operate all of these on a circuit supplied with a constant current of, say, 1.5 amperes. This invention provides such a system, and further provides that in case any lamp in the series should become inoperative the circuit connections to the other lamps will still remain complete and their normal operation continued.

In carrying the invention into practice a number of translating devices are connected in series and the terminals of the conductors leading to each translating device or group of translating devices are connected at proper points with the coil of a corresponding reactive device or current-modifier. This device is so constructed that a sufficient difference of potential will be maintained between the points of attachment to cause the required current to traverse the corresponding translating device as long as its circuit connections are complete, and when the translating device is out of circuit a normal current will continue to flow through the reactive device to the remaining translating devices.

The invention will be more particularly described in connection with the accompanying drawing, which is a theoretical diagram illustrating a method or carrying the invention into practice.

Referring to the drawing, A represents a dynomo-electric generator or other suitable source of alternating electric currents, and L' L^2 a circuit derived therefrom. Translating devices—such, for instance, as incandescent electric lamps—are shown at d' d^2, &c. These are connected in series in the lines L' L^2. A reactive device or current-modifier T is provided for each lamp or group of lamps. These consist of coils f of insulated wire wound about or suitably disposed with reference to a core c. The translating device d' is connected in shunt upon a portion of the coils f of the reactive device r, as shown by the conductors e' e^2, leading to the points 1 and 2. The coils and cores are so related and proportioned to each other and to the electromotive force to be employed and the number of alternations of the current and the number of devices to be used in series that the current traversing the circuit will maintain a sufficient difference of potential between the points 1 and 2 to cause the required current to traverse the corresponding translating device included between these points. The shunted and unshunted portions of the coil may to a certain extent be regarded as the primary and secondary coils, respectively, of a converter. If the unshunted portion f' be equal to the shunted portion f^2 in the case of the lamp d', then a current of 1.5 amperes traversing the portion e' will be added to the current of 1.5 amperes induced in the portion f^2, and the resultant current of three amperes will traverse the lamp d'. If then the circuit through the lamp d' be interrupted and the shunt thereby opened, then the entire current will traverse the entire length of the coil f. The apparent difference of potential at the terminals of the coil f will now be considerably greater than before, and the

core will attain a much higher degree of magnetic saturation, and the current passing through the entire coil will be approximately the same as that which formerly traversed the portion f'—that is to say, 1.5 amperes.

For the purpose of varying the current which may be required for any given lamp the relative lengths of the shunted and unshunted portions of the coil may be varied. Means for accomplishing this are indicated in connection with the lamp d^2. This consists of a switch t and contact-points t', connected with different points in the length of the coil f. By including more or less of the coil the current caused to traverse the translating device may be decreased or increased, and the translating device in that circuit will alone be affected. By applying this feature to all the coils the number of translating devices which may be normally connected in a given circuit may be readily varied without changing the value of the applied electromotive force.

In the case of the lamp d^3 a slightly-different arrangement is shown, in that the lamp-terminals are connected through the entire length of the coil, while the main-line circuit includes only a portion f^3. If the latter portion be such that the difference of potential at its terminals be but 33.3 volts, for instance, and the remaining portion f^4 of the coil be half the length of the portion f^3, then there will be added to the normal applied electromotive force of 33.3 volts an induced electromotive force of 16.6 volts, making approximately fifty volts applied to the lamp-terminals. If the current traversing the circuit be 1.5 amperes, then .5 of an ampere will pass through the portion f^3 of the coil and one ampere will traverse the lamp and the portion f^4 of the coil. It will be seen thus that this invention readily adapts itself to various different requirements of lamps or translating devices both as regards electromotive force and quantity of current.

The lamps d^4, d^5, d^6, and d^7 and the current-modifiers shown in connection therewith are combined and included in the circuit substantially in accordance with the system set forth in my Patent No. 390,990, issued October 9, 1888. These particular devices form no part of my present invention and are shown merely for the purpose of illustrating generally a plurality of translating devices included in series in a constant-current circuit.

For convenience of illustration the cores c are represented in the drawing as being straight. It will be understood, however, that in practice they should preferably be constructed as closed magnetic circuits.

I claim as my invention—

1. In a system of electrical distribution, the combination with a source of alternating electric currents, of a main-line circuit, a plurality of translating devices connected in series in said circuit, a plurality of reactive devices, each consisting of a magnetizable core and a unidirectional coil permanently in circuit with the source of current, a portion of said coil being connected both in the main circuit and in shunt to a corresponding translating device, the cores and coils of said reactive devices being so proportioned and disposed that a difference of potential will be developed at the terminals of each shunt sufficient to cause the desired quantity of current to traverse the corresponding translating device when in circuit, and, when not in circuit, to permit sufficient current to traverse the coil to furnish the normal current to the remaining translating devices in circuit.

2. The combination with a source of alternating electric currents, of a main circuit supplied thereby, a plurality of translating devices connected in said circuit in series, a plurality of reactive devices each consisting of a core and a unidirectional coil permanently in circuit with said source of current, a portion of said coil constituting both a shunt to a corresponding translating device and a portion of the main circuit, and means for varying the length of such portion of one or more of the reactive coils.

3. In a system of electrical distribution, the combination with a source of alternating currents, of a main circuit supplied thereby, a plurality of translating devices connected in series in said circuit, a current-modifier for each translating device consisting of an iron core and a unidirectional coil of wire disposed about the same, said coil being connected to the terminals of the corresponding translating device and to the main circuit at two points, only one of which is coincident with a translating-device point of connection, whereby the currents supplied to said translating devices are rendered either greater or less than the main-line current.

4. In a system of electrical distribution, the combination with a source of alternating currents, of a main circuit supplied thereby, a plurality of translating devices connected in series in said circuit, a current-modifier for each translating device consisting of an iron core and a unidirectional coil of wire disposed about the same, said coil being connected to the respective terminals of the corresponding translating device and to the main circuit at two points only one of which is coincident with a translating-device point of connection, and other translating devices requiring different electromotive forces of different amounts of current connected in the same circuit.

In testimony whereof I have hereunto subscribed my name this 20th day of August, A. D. 1890.

OLIVER B. SHALLENBERGER.

Witnesses:

H. B. SHALLENBERGER,

JAMES W. SMITH.