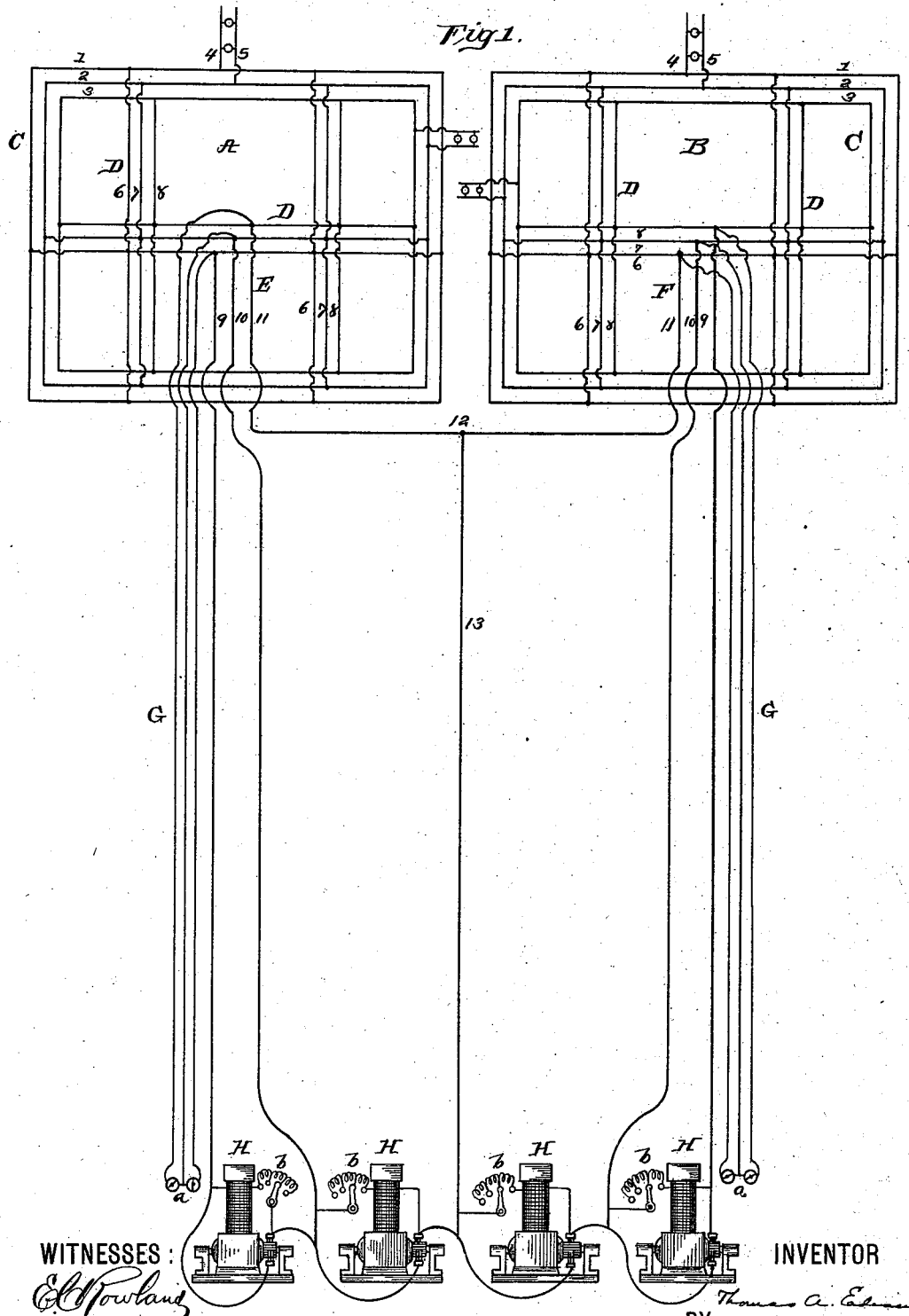
(No Model.) 2 Sheets—Sheet 1.

T. A. EDISON.

SYSTEM OF ELECTRICAL DISTRIBUTION.

No. 380,101. Patented Mar. 27, 1888.

Fig 1.



WITNESSES:

E. C. Rowland

William Beyer

INVENTOR

Thomas A. Edison

BY

Dyer & Lee

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

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SYSTEM OF ELECTRICAL DISTRIBUTION.

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Fig 2.

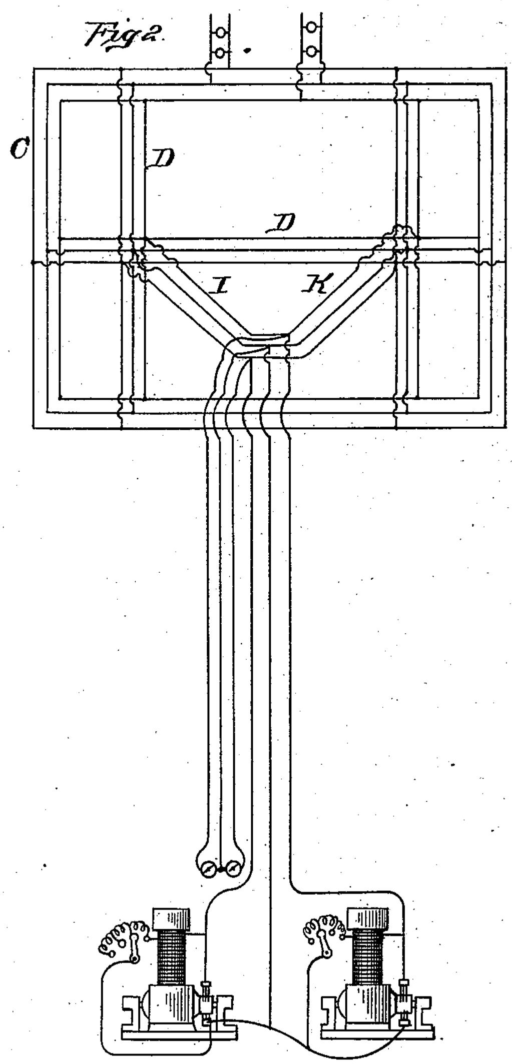
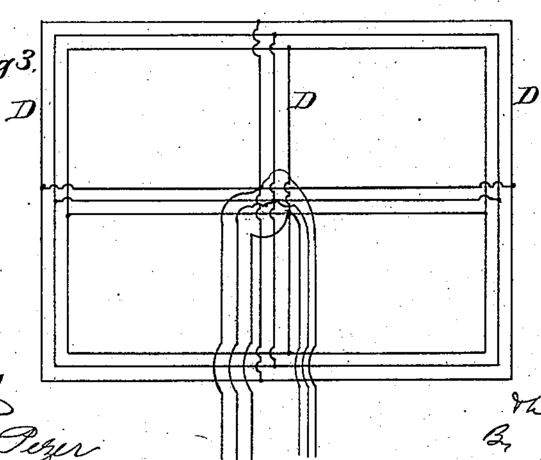


Fig 3.



ATTEST:

E. C. Rowland
William Pelzer

INVENTOR:

Thomas A. Edison
By Dyer & Seely
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 380,101, dated March 27, 1888.

Application filed September 23, 1887. Serial No. 250,476. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Systems of Electrical Distribution, (Case No. 730,) of which the following is a specification.

My invention relates to systems of high-tension electrical distribution, and may be considered an improvement upon my patent, No. 365,978, dated July 5, 1887.

The object I have in view is to produce an arrangement of conductors which will make unnecessary the sub-stations and the regulating and indicating devices thereat described in said patent. This I accomplish by the employment of sub-feeders so arranged and constructed that the drop in potential upon them at full load will be very small—say, for example, only two per cent.—and hence no regulators for these sub-feeders will be required. For this purpose the sub-feeders are preferably constructed as a net-work of conductors. They have no lamps connected with them, but run to the net-work of mains at various points. A main feeder extends from the center of the net-work comprising the sub-feeders back to the station. This is calculated for a larger drop in potential—say ten or fifteen per cent.—and has pressure-wires carried back with it for indicators. The main feeders, sub-feeders, and mains are arranged on the three-wire system. I preferably divide the area to be lighted into two or more sections, each arranged, as described, on the three-wire plan, with mains, sub-feeders, and a main feeder, and I connect the two or more sections together in series, forming, in the case of two sections, a five-wire system. All except the two outside conductors of the main feeders are balancing-wires, preferably of smaller size than such outside conductors. The dynamos used have separate regulators and have a surplus capacity for increased electrical pressure, so that if any side of either section is thrown greatly out of balance the pressure can be kept constant at all points notwithstanding a great drop on the smaller balancing-conductors. The sections into which the entire area to be lighted is divided being small, the sub-feeders will be short, so that to secure the small drop in potential great mass of copper is not required, especially when they are arranged to intersect. The drop upon the sub-feeder net-work being inconsiderable, no feeder-equalizers will be required for them, the differences in distribution in each section being taken up by flow of current upon the sub-feeder net-work instead of upon the mains.

In the accompanying drawings, forming a part hereof, Figure 1 is a diagram of a two-section system, illustrating the invention; Fig. 2, a diagram of one section, showing a slightly-different arrangement of the sub-feeders; Fig. 3, a diagram of a modified arrangement of the sub-feeders for a section, showing the connection of the main feeder and pressure-wires therewith. Fig. 1 illustrates the preferred arrangement, the area to be lighted being divided into two sections, A B, and the whole forming a five-wire system.

1 2 3 are the three conductors of the mains C of each section, from which are taken house-circuits 4 5. For simplicity of illustration the mains of each section are shown as describing a rectangle; but in practice the mains will of course follow the streets and will preferably intersect and form a net-work, as will be well understood. The sub-feeders D of each section are composed of the three conductors 6 7 8, branching in several directions and intersecting and forming a net-work, as shown, which is connected at a number of points (shown in the drawings as at six points) to the mains. To the center of this net-work of sub-feeders of the two sections A B are connected the conductors 9, 10, and 11 of the main feeders E F, the sub-feeders from these points of connection to their outer ends being calculated for a small drop in potential—say two per cent.—while the main feeders are calculated for a larger drop—say ten or fifteen per cent. A bridge-conductor, 12, connects the inner conductors, 11, of the main feeders of the two sections together and to a common balancing-conductor, 13, extending back to the station. The other conductors, 9 and 10, of the two main feeders run directly back to the station. Three pressure-wires, G, are carried back with each feeder and have the usual pressure-indicators, *a*, one for each of the four divisions of the five-wire system, which show

the pressure for each division of the system. Four dynamo-electric machines, H, are employed—one for each division of the system—and each of these machines is separately regulable by means of an adjustable resistance, *b*, in its field-circuit.

The lamps in section A are in series with the lamps of section B, the same as the lamps of one division of each section A or B are in series with those of the other section, compensating conductors extending back between the divisions of each section, as well as between the sections. The pressure on the mains of each section will be equalized through the low-resistance sub-feeder net-work, while inequalities in balance between the divisions of the system will be equalized at the dynamos.

The system possesses advantages for lighting one section from a distance. This is shown in Fig. 2, which also illustrates a modified arrangement of sub-feeders and main feeders which is applicable to a system of two or more sections. The sub-feeders in Fig. 2 are the same as in Fig. 1, with the exception that the main feeder is divided at its end and by branches I K connects with the sub-feeder net-work at two points.

In Fig. 3 no mains are shown, the sub-feeder net-work being shown in a somewhat modified arrangement, branching immediately in four directions from the point of connection of the main feeder, and having all these branches bridged together.

What I claim is—

1. In a system of electrical distribution, the combination of main conductors and consumption-circuits therefrom with sub-feeding conductors having no translating devices connected therewith and constructed to have a low resistance or small drop in potential, so as to equalize the pressure between various points on the mains without adjustable resistances or equivalent devices, and a main feeder connected with the sub-feeders and extending to the point of electrical supply, the drop in potential upon such main feeder being greater than upon the sub-feeders, substantially as set forth.

2. In a system of electrical distribution, the combination of main conductors and consumption-circuits therefrom with a connected net-work of conductors connected with said mains and forming sub-feeders having a low resistance or small drop in potential, and a main feeder extending from the sub-feeder net-work back to the point of electrical supply, substantially as set forth.

3. In a system of electrical distribution, the combination of two or more sections of main conductors, sub-feeders of low resistance for each section, a main feeder from each set of sub-feeders back to the station, and a conductor connecting such sections in series, substantially as set forth.

4. In a system of electrical distribution, the combination of two or more sections of main conductors, sub-feeders of low resistance for each section, a main feeder from each set of sub-feeders back to the station, a conductor connecting such sections in series, and a compensating conductor extending from a point electrically between the sections back to the station, substantially as set forth.

5. In a system of electrical distribution, the combination of two or more sections of mains, each formed of three conductors, a set of three-wire sub-feeders for each section of low resistance, a three-wire main feeder from the sub-feeders of each section, and a connection between the adjoining conductors of the feeders, substantially as set forth.

6. In a system of electrical distribution, the combination, with mains and consumption-circuits, of a set of low-resistance sub-feeders, a main feeder from the sub-feeders to the station, and pressure-indicators at the station showing the pressure at the outer end of the main feeder, substantially as set forth.

7. In a system of electrical distribution, the combination of two or more sections of main conductors, each of one or more divisions, sub-feeders of low resistance for each section, a main feeder for each section extending from the sub-feeders back to the station, a conductor connecting the sections in series, compensating conductors for the divisions of the system, pressure-indicators showing the pressure at the outer end of each main feeder, and a dynamo-electric machine for each division of the system provided with means for its independent regulation, substantially as set forth.

This specification signed and witnessed this 13th day of September, 1887.

THOS A. EDISON.

Witnesses:

WILLIAM PELZER,

E. C. ROWLAND.