(No Model.)

E. G. P. OELSCHLAEGER.

SYSTEM OF ELECTRICAL DISTRIBUTION.

No. 540,216. Patented May 28, 1895.

Fig. 1

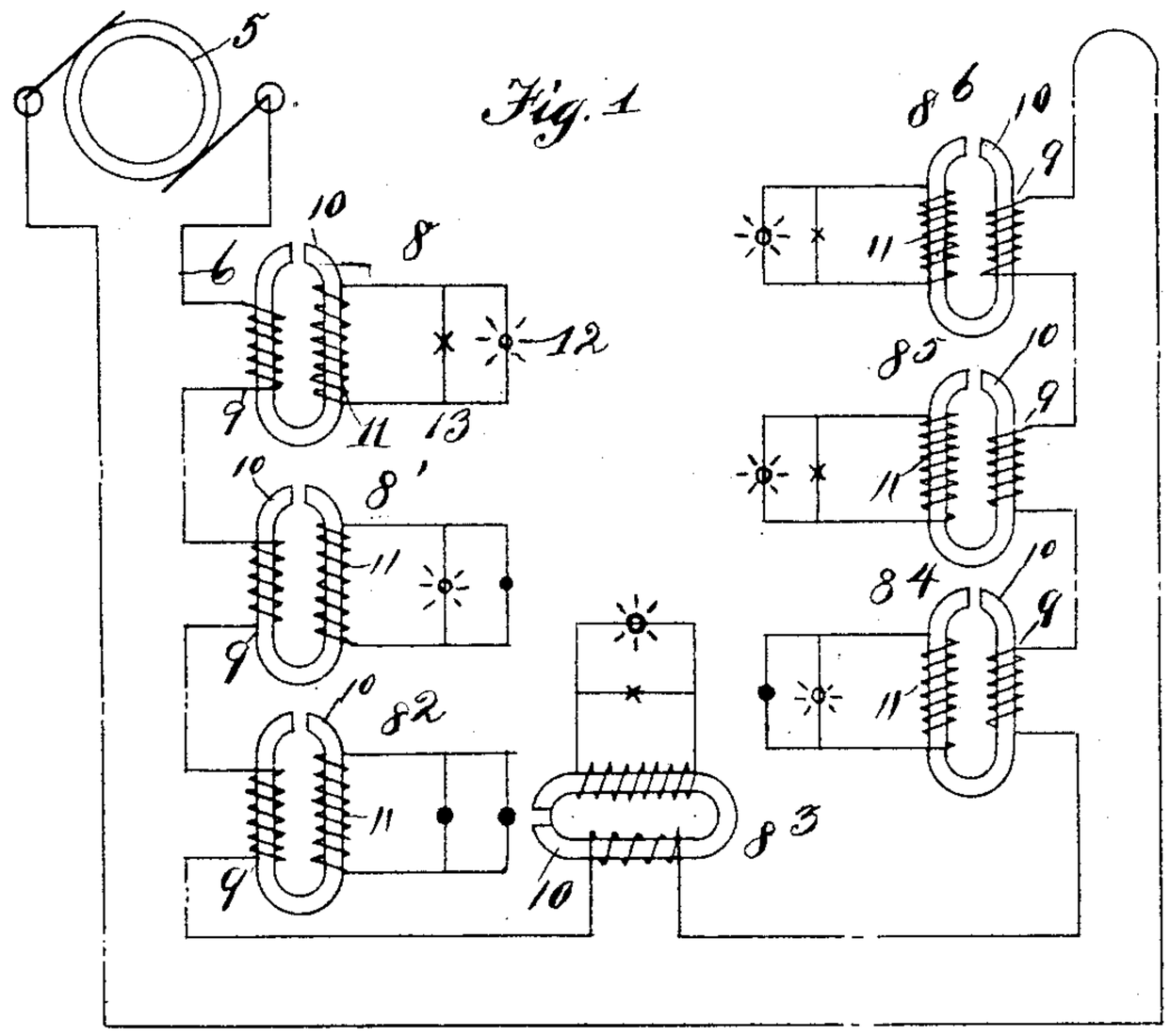


Fig. 3

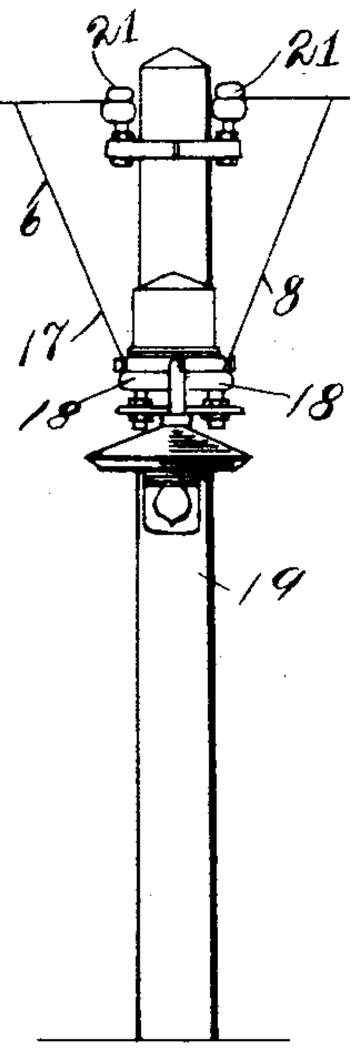


Fig 4

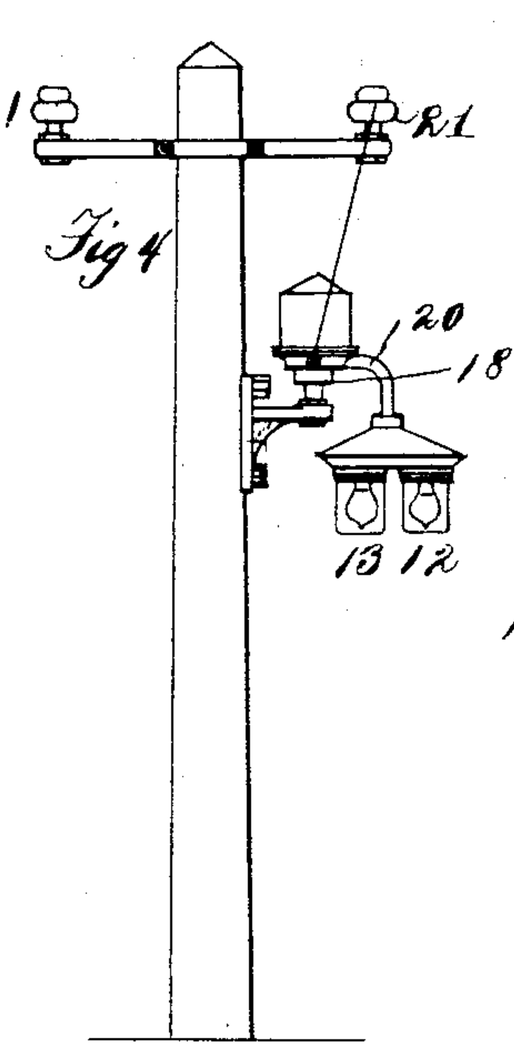
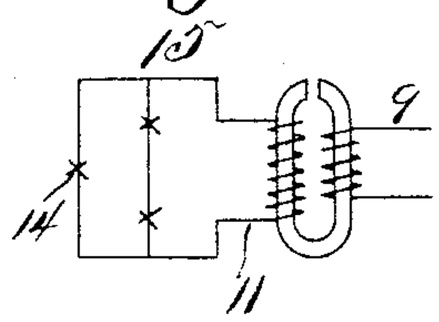


Fig. 2.



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UNITED STATES PATENT OFFICE.

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SYSTEM OF ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 540,216, dated May 28, 1895.

Application filed April 6, 1895. Serial No. 544,749. (No model.)

To all whom it may concern:

Be it known that I, ERNST GUSTAV PAUL OELSCHLAEGER, a subject of the Emperor of Germany, residing at Charlottenburg, Germany, have invented an Improved System of Electrical Distribution, of which the following is a specification.

My invention relates to an improved system of electrical distribution.

The objects of my invention are, first, to distribute electricity economically to a number of separate points scattered over a large area at a distance from the source of supply, and, second, to maintain the continuity of the light at each of such points.

To carry my invention into effect, I combine, with a generator of alternating or polyphase currents, a number of separate transformers, one of which is situated at each local point of distribution. All the primary coils of such transformers I connect in series to form a part of the main feeding circuit, and in the secondary of each of such transformers I connect, in parallel, incandescent lamps, arc lamps or other translating devices adapted to operate at different voltage.

The operation of my improved system depends upon the well known fact that the potential of the current in the secondary of a transformer, with a constant ampèrage in the primary of such transformer, depends principally upon the resistance in the secondary circuit. As a practical application of this fact, if two incandescent lamps of different voltage, adapted for a normal candle power at different voltage, are connected in parallel in the secondary of a transformer, normally the lamp of low voltage will be operated at full brilliancy; while only a very small amount of current will be transmitted through the lamp of high voltage. If now the lamp of low voltage should be burned out or be destroyed, the total resistance of the secondary circuit will be increased, and the potential of the current in the secondary circuit will be approximately correspondingly increased to cause the lamp of high voltage to burn at full brilliancy; thus maintaining the light at normal candle power at a local point of distribution.

My invention is illustrated in the accompanying figures, in which—

Figure 1 is a diagram illustrating my invention as applied to incandescent lamps; Fig. 2, its application to arc lamps; Figs. 3 and 4, as practically carried out for street-lighting and similar purposes.

In the figures, 5 indicates any suitable generator of alternating or multiphase currents; 6, a feeder conductor, commencing at brush marked A and ending at brush marked B of the generator; 8 to 8^6, inclusive, transformers of the usual construction, or modified as hereinafter described. The primary coil 9 of each transformer is shown as included in and forming a part of the feeder conductor 6. By this arrangement the primary coils of the respective and successive transformers, it will be seen, are connected in series. By making use of well known means for regulating the generators at the source of energy, a current of constant ampèrage may be maintained in the primary of each transformer, irrespective of the load in the secondary circuits of the respective transformers.

10 designates the core of the transformer; 11, secondary coil; 12, low voltage lamps as normally used; 13, high voltage reserve lamps; 14, (Fig. 2,) arc lamps.

In constructing the transformers I prefer to make use of a core in which the magnetic circuit is but imperfectly closed, as by so doing I avoid the possibility of overheating the core, and further take advantage of the fact that where such cores are used the secondary voltage of the transformer is less dependent upon the load, than is the case in transformers provided with cores having closed magnetic circuits. The transformers should be so calculated that they will give, with a constant ampèrage in the primary circuit, the exact current required for the lamps or other translating devices of different voltage, when in use. For example, the transformers may be calculated for a ratio of twenty to fifty. Then so long as the low voltage lamp 12 and the high voltage lamp 13 are connected in parallel, a current of fifty volts will exist in the secondary circuit. 1.5 ampères of this secondary current will pass through the fifty volt lamp, and 0.5 ampères through the one hundred volt lamp. Just as soon as the fifty volt lamp 12 burns out, the secondary voltage rises to one hundred volts, and a secondary

current of .8 of an ampère passes through the reserve lamp. In practice it is preferable to select the high voltage reserve lamp, that the difference between the voltage of the lamps or other translating devices employed be not too great, as otherwise the core of the transformer may become heated beyond practical limits, and also to select the high voltage lamp 13, so that it should burn below normal candle power, when alone in the secondary circuit, as by so doing the possibility of this lamp burning out and leaving the local point of distribution without light is decreased. Should this, however, occur, the operation of the system as a whole is not appreciably disturbed, as the secondary voltage of the transformer would rise but little. In practice it is permissible to leave the primary coil of the transformer in circuit without endangering the operation of the system. Experiments show that the increase of the potential in the secondary circuit is but from fifteen to twenty per cent.

In the diagram Fig. 1, the transformers 8, 8^3, 8^5, 8^6 show the low voltage lamp 12 in operation; in $8'$ and 8^4, the reserve lamp in operation; and in 8^2, both lamps are cut out.

In Fig. 2 my invention is shown as employed with arc lamps. In this case a fifty volt arc lamp 14 takes the place of the lamp 12, and two fifty volt arc lamps 15, connected in series, take the place of the single high voltage lamp 13. In the normal operation of the system, the fifty volts potential in the secondary circuit would be divided between the two fifty volt arc lamps, preferably of the shunt type, connected in series—*i. e.*, twenty five volts to each lamp—which would not be sufficient to establish the arc if the lamps are properly adjusted. When the single arc lamp is cut out the potential would rise, as in the case where incandescent lamps are used. The same principle of operation would prevail if other translating devices were used. It will also be understood that instead of using a single fifty volt arc or incandescent lamp as the normal light, a number of lower voltage lamps might be connected in series, and the same is true as regards the reserve lamp or lamps.

In Figs. 3 and 4 I have shown the practical execution of this invention, as applied to street lighting or for other purposes. The transformer 8 is in this case inclosed in a casing carried upon the coil insulators 18, which are connected to the posts or supports 19. The normal and reserve lamps 12, 13 are carried in a suitable bracket 20. 21, 22 represent insulators to which the feeder conductor (outgoing and return) are connected.

Having thus described my invention, I claim—

1. A system of electrical distribution, comprising a source of alternating currents; a transformer, the primary coil of which forms a part of the feeder circuit, and through which a current of constant mean ampèrage is transmitted; and two translating devices, adapted to operate at different potentials, connected in parallel across the secondary circuit of such transformer, substantially as and for the purpose described.

2. A system of electrical distribution, comprising a source of alternating currents; two or more transformers having their primary coils connected in series and forming a part of the feeder circuit, through which a current of constant mean ampèrage is transmitted; and two translating devices or groups of translating devices, adapted to operate at different potential, connected in parallel across the secondary circuits of the respective transformers, substantially as and for the purpose described.

3. A system of electrical distribution, comprising a source of alternating currents; a transformer provided with an open magnetic circuit core, and in which the primary coil forms a part of the feeder circuit, and through which a current of constant mean ampèrage is transmitted; and two translating devices, adapted to operate at different potential, connected in parallel across the secondary circuit of such transformer, substantially as and for the purpose described.

4. The herein described method of distributing electricity, which consists in generating an alternating current of electricity; transmitting a current of constant mean ampèrage through the primary coil of the transformer, which forms a part of the feeder circuit; converting such current to one of different potential, and transmitting such converted current normally through two translating devices of different voltage connected in parallel in the secondary circuit, and abnormally through the one of such translating devices having the highest voltage.

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

ERNST GUSTAV PAUL OELSCHLAEGER.

Witnesses:

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