(No Model.)

2 Sheets—Sheet 1.

M. M. M. SLATTERY.

SYSTEM AND APPARATUS FOR ELECTRICAL DISTRIBUTION.

No. 391,923. Patented Oct. 30, 1888.

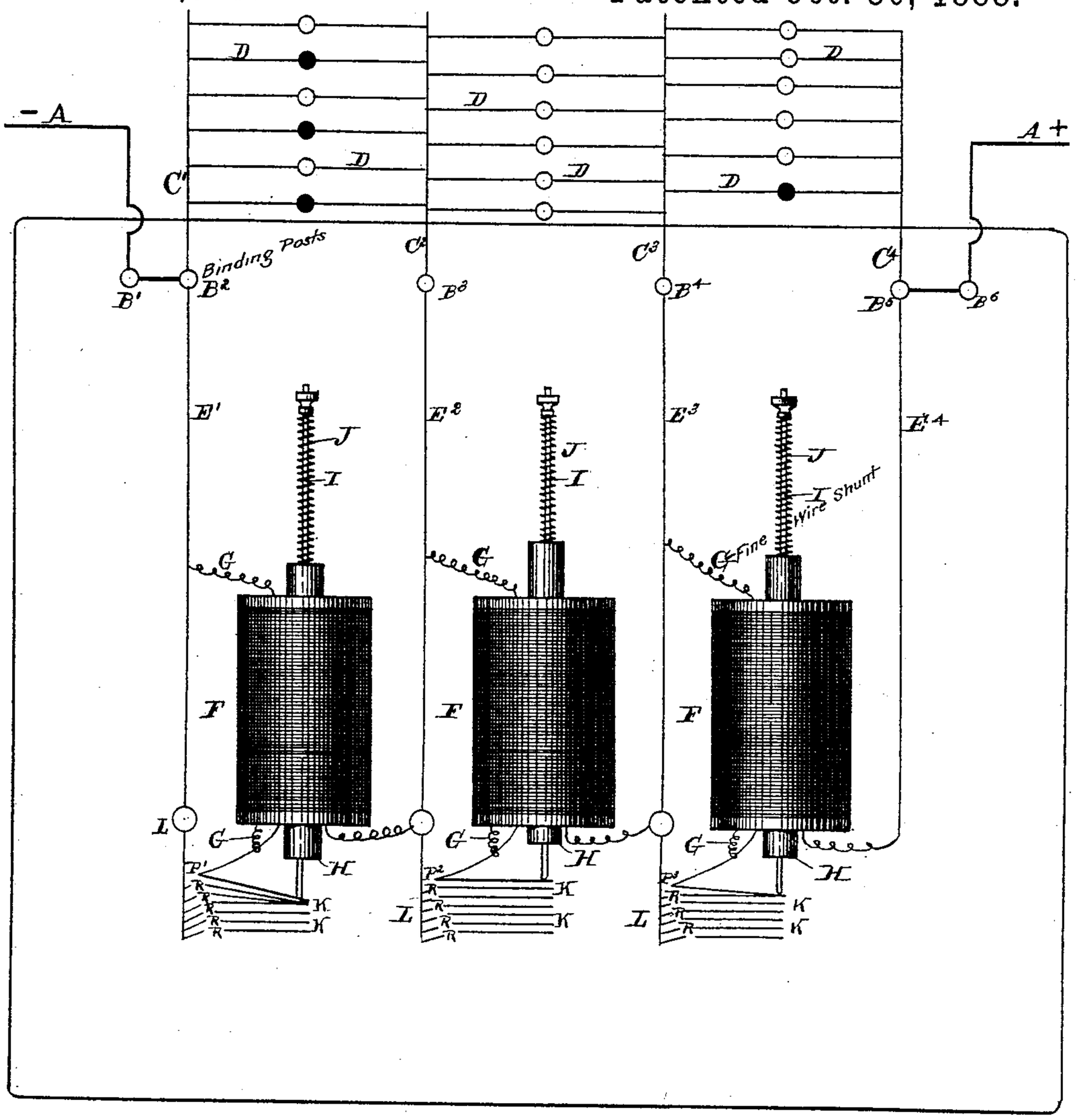

Fig. 1.

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INVENTOR:
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(No Model.)

2 Sheets—Sheet 2.

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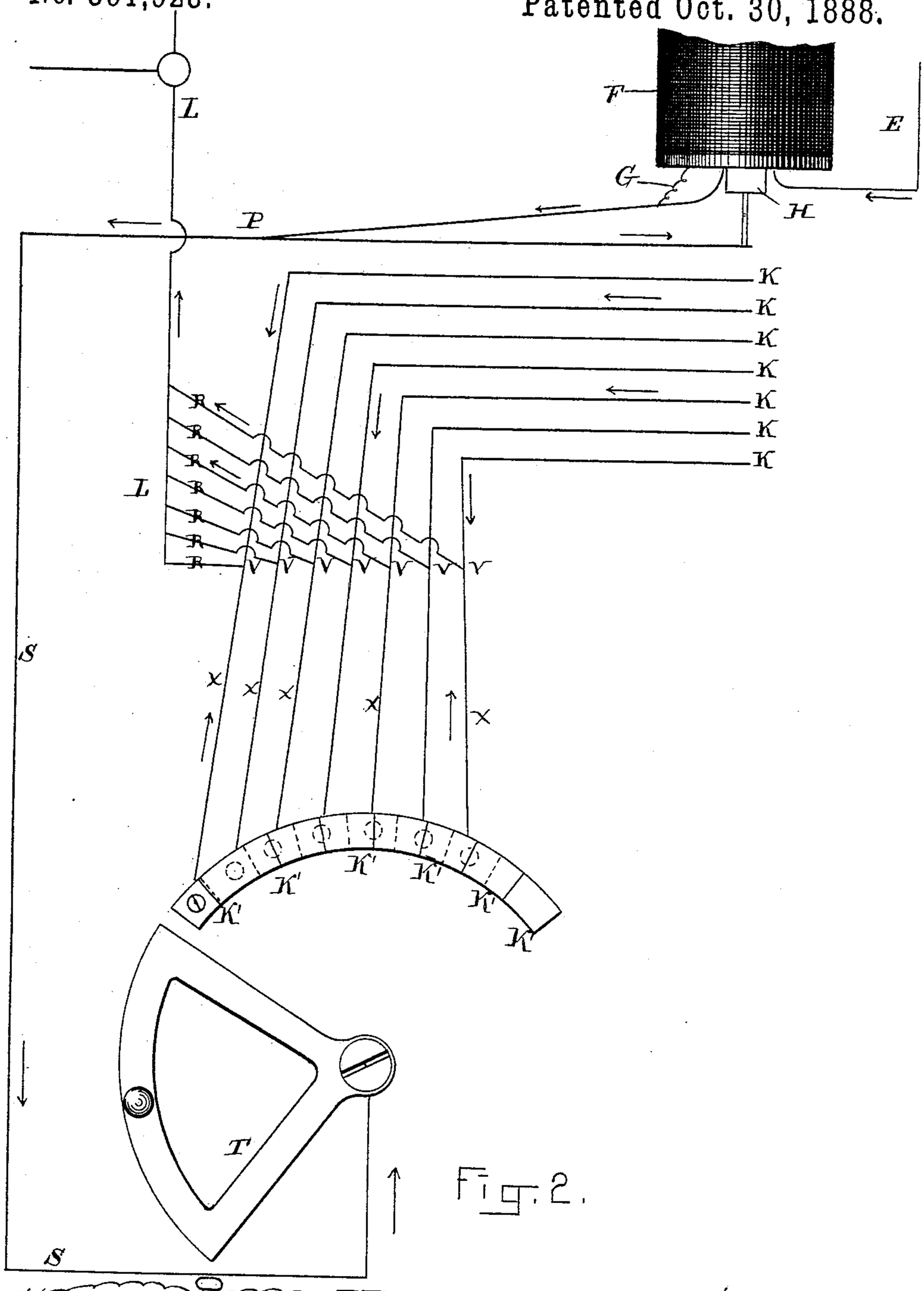

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

MARMADUKE M. M. SLATTERY, OF WOBURN, MASSACHUSETTS.

SYSTEM AND APPARATUS FOR ELECTRICAL DISTRIBUTION.

SPECIFICATION forming part of Letters Patent No. 391,923, dated October 30, 1888.

Application filed April 6, 1887. Renewed September 27, 1888. Serial No. 286,511. (No model.)

To all whom it may concern:

Be it known that I, MARMADUKE M. M. SLATTERY, of Woburn, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Systems of and Apparatus for Electric Distribution, of which the following is a specification.

My present invention consists in a system of electric distribution at low tension from a circuit of higher tension of substantially constant current, so as to allow of economy of wiring and flexibility of distribution and manipulation of the light or energy delivered; and it consists, mainly, in a disposition and arrangement of the circuits with reference to and in combination with apparatus or means for regulating and protecting the devices for utilizing the current. It comprises as its chief features a number of multiple branch circuits, each containing a translating device or devices, such multiples or groups being operated in series, a number of resistance multiple branch circuits, also in series, but in parallel arc with said multiples of translating devices, and conductors between said multiples, together with mechanism for protecting said multiples or groups from injury by reason of undue access of current thereto, and also for varying, if desired, the quantity of current supplied to said translating devices.

The system and its operation will be best understood by a reference to the drawings, where—

Figure 1 shows in diagram the general disposition of the circuits; Fig. 2, the means for varying at will the quantity of current supplied to each working-circuit, and Fig. 3 another view of a preferred form of switch for this purpose.

It may here be observed that the general scheme of this system is that of operating multiples in series and controlled from one center by fewer conductors than heretofore employed, that owing to the possibility of translating devices being introduced into or removed from circuit, and the consequent necessity for compensating-resistances to preserve the balance of the circuit automatically operated, protecting-circuits containing resistance are provided, and that means are also provided for varying at will the quantity of current traversing the working-circuits independently of the number of translating devices in operation. In the present instance a triple multiple is shown; but the number of multiples which may be operated in series by means of one set of apparatus may be increased, subject to considerations of safety and convenience—*e. g.*, with regard to the difference of potential existing at the extremities or terminal points of the apparatus, which it is desirable should not exceed three hundred or four hundred volts, and the cumbersomeness of the apparatus beyond certain limits.

Referring, now, to Fig. 1 of the drawings, A A is a main line supplying a current substantially constant in quantity. B', B^2, B^3, B^4, B^5, and B^6 are terminal points, the current entering and leaving at B' B^6. C' C^2 C^3 C^4 are conductors leaving the terminals B^2 B^3 B^4 B^5 and supplying current to the branches D D D, containing translating devices. E' E^2 E^3 E^4 are conductors leading to the regulating and protecting devices and resistance-circuits. F F F are solenoids included in the circuits of E', E^2, E^3, and E^4, which circuits are normally open, as at P^2, and also included in the permanently-closed circuit G, connected across the poles of the multiple and of relatively fine wire and high resistance. H H H are cores free to move within said solenoids and adjustable by means of rod I and spring J. K K K are contact-strips disposed relatively to the cores H, so as to be depressed and brought into contact one with another on the downward movement of the core or an extension thereof, thereby closing one or more circuits in parallel with the translating devices through suitable resistance media, (indicated by R R R R.) These resistance-circuits have preferably a common return-wire, L, connected with the opposite side of the multiple.

Fig. 2 shows the resistance-circuit E divided, as at P, between the upper one of the contact-strips K and the conductor S, leading to a switch-arm, T. The individual branch circuits K are also divided, as at *v v v v*, into other branches, *x x x x x*, leading to contact-plates K′ K′ K′ K′, relatively disposed to T in such manner that any desired number of them may, by revolution of the arm T, be successively brought into or removed from contact therewith, thus closing or opening cir-

cuits through E, P, S, T, K′, *x*, *v*, and R to L, independently of the action of the solenoid F, core H, and strips K.

Fig. 3 is an end view of the contacts K′ K′ K′, which are preferably thin strips of copper or brass separately attached to an insulating-base and bent to the form shown and disposed in an arc relatively to the arm T, as shown in Fig. 2. Fig. 3 shows certain of them closed by T, others remaining open. It will of course be understood that the mechanical details may be varied within the scope of the invention.

The automatic operation of the apparatus is as follows: Assuming the current to enter the apparatus by the main line, say at B^6, it will pass to B^5, dividing at that point between the conductors C^4 and E^4, passing part by the former to and through the translating devices D on to the succeeding multiples, and thence to the main line again, as at B′, part by the latter E^4 to and through the solenoid F and fine-wire shunt G, and such resistances as may be in circuit by way of P^3, K K, R R, and L to E^3, and in like manner to and through E^2 and E′ and the circuits G and similar resistance-passages. In its course through F it will attract the core H downward, as here shown, in proportion to the number of translating devices out of circuit and closing a corresponding number of resistance-circuits. Thus it will be noticed that in the drawings in one of the multiples one of the translating devices is shown as not in operation and that a compensating resistance is thrown into circuit by means of the core H being attracted within the solenoid by the increased current shunted through the coils thereof, causing the top strip connected at P^3 with E^4 to make contact with the one beneath it. In the middle multiple all the translating devices are in operation and the resistance-circuits all open. In the third three translating devices are out of circuit and three substitute resistance-circuits are closed. There are thus two sets of passages for the current—one through such translating devices as may be in circuit and another through such resistances as may be in circuit—and therefore, the current being constant and the resistances equivalent to those of the translating devices whose place they are intended to supply, each translating device will only receive its proper proportion of current.

The other portion of the apparatus is primarily intended for the purpose of regulating the degree of incandescence of incandescent lamps operated in a circuit of the kind described; and it consists, briefly, in utilizing the apparatus or part thereof and resistance-circuits previously described for introducing resistance into any desired multiple at the same time as and in parallel arc with the lamps. By this means additional paths for the current are opened, which, being constant, will divide between them, and therefore each will receive a smaller proportion of the total current than before such additional passages were afforded, and in the case of lamps will not be raised to the same degree of incandescence.

Referring to Figs. 2 and 3, which show a preferred form of mechanism which may be used in connection with any one or more of the multiples, as required, it will be seen that a derived circuit is provided at P through S to T, as before explained, where it is open, unless closed by revolution of T through the contacts K′ K′, *x*, *v*, R, and L. When it is desired to reduce the current supplied to the lamps or other translating devices in the working-circuit, the arm T is revolved over the contact-plates K′, so as to close the desired number of additional resistance-circuits through *x*, *v*, R, and L. These circuits, being in parallel with the lamps or other translating devices, will, by so many as are closed, reduce the current in the working-circuit, and consequently the incandescence of the lamps. This regulation is especially applicable to theatrical or similar purposes where gradations in the light are frequently required.

I am of course aware that resistances have been introduced in electric-lighting circuits with a similar object; but they have been in series with the lamps and unwieldy and expensive.

Having thus explained my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A system of electric distribution consisting of a number of multiples of translating devices, said multiples in series with one another, a number of multiples of resistance-circuits, also in series with one another, but in parallel arc with said translating devices, and conductors between said multiples of translating devices, each intermediate conductor being common to two multiples, and switching devices for automatically closing or opening such resistance-circuits to compensate for translating devices removed from or introduced into the working-circuit, substantially as described.

2. A system of electric distribution consisting of a number of multiples of translating devices, said multiples in series with one another, a number of multiples of resistance-circuits, also in series with one another, but in parallel arc with said translating devices, and conductors between said multiples of translating devices, each intermediate conductor being common to two multiples, and a switch for opening and closing said resistance-circuits at will.

3. The combination, with a series of local circuits containing working translating devices and resistances in multiple arc, and conductors between said local circuits common to two circuits, of an electro-magnetic device, also in multiple arc with said translating devices and resistances, and mechanism to be operated thereby for automatically introducing or removing said resistances into or from

circuit, as working devices are removed or introduced.

4. The herein-described means for varying the degree of incandescence of incandescent lamps operated in a series of multiples, consisting in a second series of multiples in parallel arc with the lamp-multiples, each branch thereof containing a suitable resistance, and a manual switch in series with said resistance-circuits for opening and closing same at will, substantially as shown and described.

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