

(No Model.)

2 Sheets—Sheet 1.

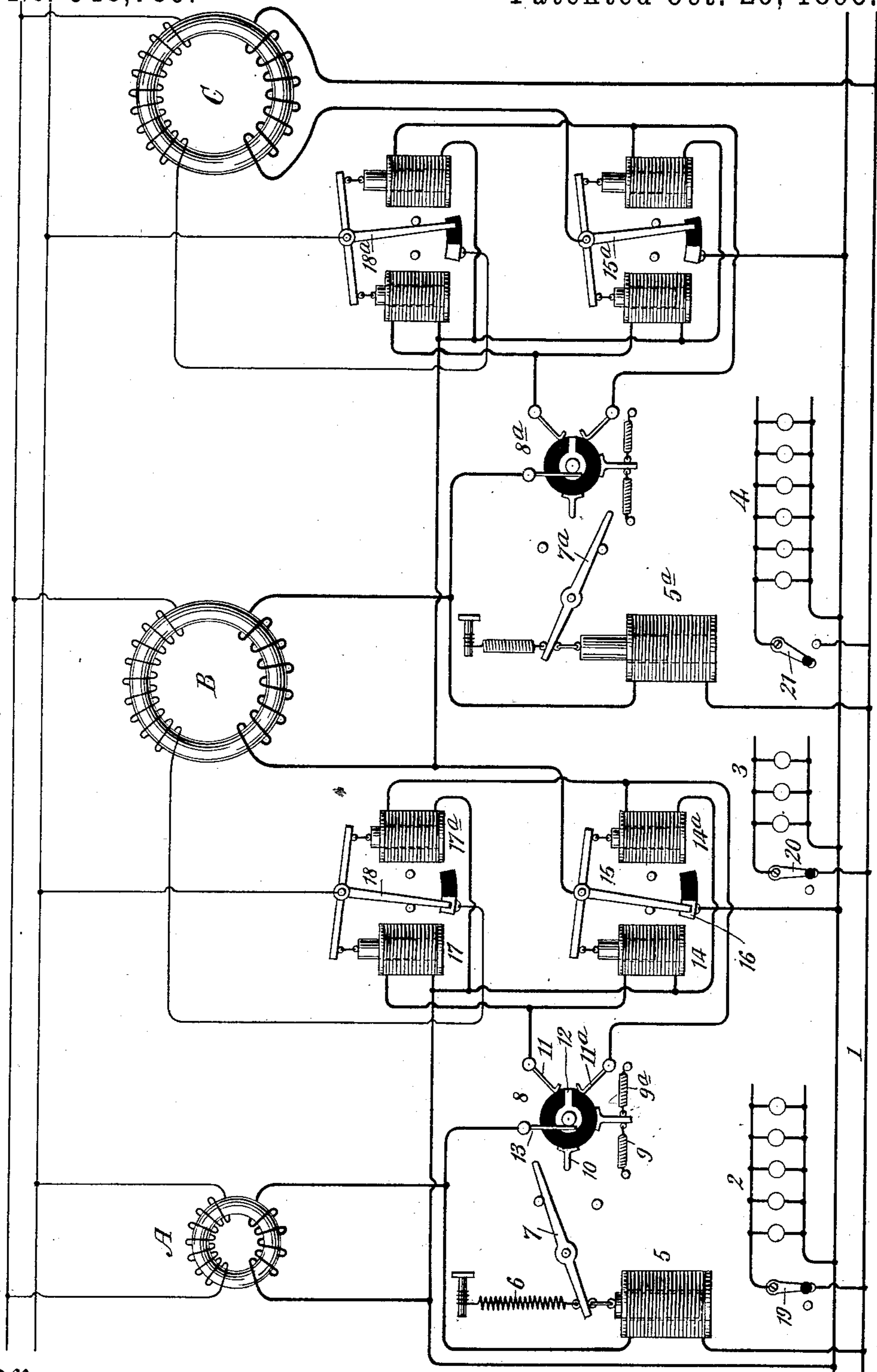
A. L. SEARLES.

DISTRIBUTION SYSTEM FOR ALTERNATING CURRENTS.

No. 548,789.

Patented Oct. 29, 1895.

Fig. 1.



Witnesses
C. E. Ashley
H. W. Lloyd.

Inventor
Alva L. Searles
By his Attorneys
Proprietors

(No Model.)

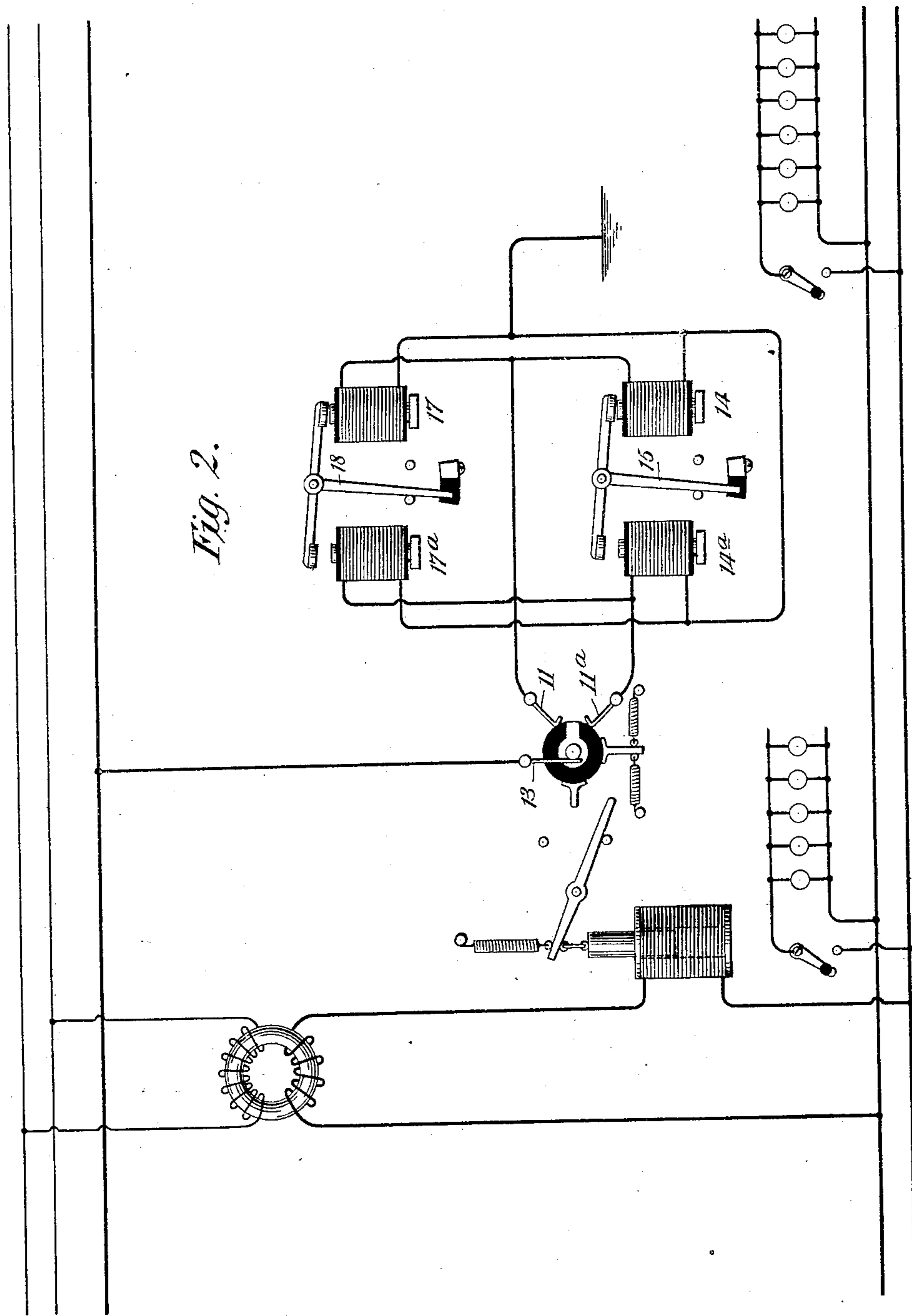
2 Sheets—Sheet 2.

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Witnesses
C. E. Ashley
H. W. Lloyd

Inventor
Alva L. Searles

By his Attorneys

Robert L. Searles

UNITED STATES PATENT OFFICE.

ALVA L. SEARLES, OF BROOKLYN, NEW YORK.

DISTRIBUTION SYSTEM FOR ALTERNATING CURRENTS.

SPECIFICATION forming part of Letters Patent No. 548,789, dated October 29, 1895.

Application filed April 18, 1895. Serial No. 546,205. (No model.)

To all whom it may concern:

Be it known that I, ALVA L. SEARLES, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Distribution Systems for Alternating Currents, of which the following is a specification.

This invention relates to automatic switches for alternating currents, and has for its object a local regulation of the supply-current in accordance with the local demands on the circuit.

The invention is carried out by providing one or more magnetically-controlled switches adapted to operate at predetermined loads to increase or decrease the supply of current to local distributing-mains and thereby maintain uniform the working current. For example, in a local plant requiring for its maximum load a plurality of transformers it is desirable, when the load declines materially, to reduce the number of active transformers and thereby economize the draft of current. I provide the several transformers with switches controlled, preferably, both by the primary and secondary circuits, said switches being governed by solenoids in the circuit and actuated thereby to cut in or out transformers as the load varies.

The several features of novelty of the invention will be hereinafter more fully described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a diagram of a system embodying my improvements, and Fig. 2 is a diagram of a modification.

Referring first to Fig. 1, A B C represent a bank of transformers adequate to the requirements of a local distribution-circuit 1. The circuit may be utilized to supply any desired types of translating devices. As shown at 2 3 4, three groups of lamps are connected in parallel relation thereto. Transformer A may be a pilot-transformer having its secondary permanently closed on the secondary mains through a solenoid 5, the core of which is provided with a tension-regulating device 6, which may be a coil-spring and adjusting-screw or other suitable appliance of similar function. By varying the adjustment its op-

eration may be regulated to throw a controlling-lever 7 of a switch 8 at any desired load. The switch 8 is shown as a cylinder mounted to rock in suitable bearings and centered in a normal position by two springs 9 9^a. A projection 10, lying in the path of the lever 7, is moved by the latter, when it is given a full throw and partially rotates the cylinder upwardly or downwardly, thereby connecting brush 11 or 11^a momentarily with an insulated contact 12 in continuous engagement with a brush 13. Brushes 11 11^a connect, respectively, with solenoids 14 14^a, the cores of which are attached to a T-shaped lever 15, adapted to make contact with a conducting-spot 16, connected with one of the secondary mains, and close the secondary circuit of transformer B. Brushes 11 11^a are similarly connected with solenoids 17 17^a, the lever 18 of which is adapted to close the primary of transformer B. Controlled by the secondary circuit of transformer B is a solenoid 5^a, similarly constructed to solenoid 5 and adjusted to operate its lever 7^a when the load on transformer B varies from a predetermined limit, and thereby actuates switch 8^a and cuts in or out another transformer C. As the organization of the controlling apparatus for this transformer is precisely like that provided for B, I deem it unnecessary to further describe it.

The operation of the system is as follows: The tension-regulator of solenoid 5 may be adjusted to permit one group of lamps, as 2, within the load limit of the first transformer being supplied without producing sufficient movement of lever 7 to throw switch 8. If, however, another group of lamps 3 be cut into circuit, the resistance of the circuit will be lowered and the increased draft of current will cause solenoid 5 to draw in its core, thereby rocking switch 8 and bringing contact 12 for an instant into engagement with brush 11^a. The duration of this contact may be varied by giving contact 12 a greater or less circumferential breadth. The temporary engagement of brush 11^a with contact 12 closes a branch of the secondary circuit of transformer A through solenoid 14^a and tilts lever 15 to the position indicated, thereby closing the secondary circuit of transformer B through lever 15 and contact 16 to one side

of circuit 1 and through solenoid 5^a to the other side of said circuit. Solenoid 17^a of switch 18 is simultaneously energized and lever 18 completes primary circuit of trans-
 5 former B through the lever and its co-operating contact. In the drawings, transformer B is shown as thrown into circuit. If, now, the load should decline, solenoid 5 will weaken and lever 7 in descending will move contact
 10 12 upwardly, thereby causing it to engage brush 11, thus energizing the companion coils 14 and 17 of the respective secondary and primary switches 15 18, tilting the levers and breaking the circuits. If, however, another
 15 group of translating devices, as 4, be cut in, the increase of current strength in solenoid 5^a will actuate switch 8^a and throw transformer C into circuit. It will be evident that if the several lamps in the groups were oper-
 20 ated by individual keys instead of by a common switch-lever the result would be the same, since upon definite and adjustable variations of load the several transformers are cut in or out to maintain an adequate and
 25 economical supply.

The switching apparatus may be controlled by a separate circuit, if desired—as, for example, in Fig. 2 I have shown an auxiliary supply-wire which may carry a direct current
 30 from the supply-station or from a local source, and the brush is connected thereto, brushes 11 11^a being grounded through the pairs of solenoids 14 17 14^a 17^a, respectively. As the

connections with the switches and the transformer-circuits are the same as in Fig. 1 they
 35 have not been shown in Fig. 2. In Fig. 2 both lamp-circuits are shown on open circuit.

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

1. A local distributing system for alternating currents comprising a plurality of transformers one of which is normally in circuit, a solenoid controlled by energy flowing through the latter, a snap switch actuated by
 40 the solenoid core, two electromagnetic devices alternately actuated by the snap switch for cutting in or out of circuit an auxiliary transformer when current exceeds or falls below a determinate strength.

2. A local distributing system for alternating currents comprising a plurality of transformers, a solenoid supplied by one transformer for opening or closing the circuit of another transformer at a predetermined load,
 50 switch-magnets controlling said opening or closure, and means for momentarily energizing one of said switch-magnets when the solenoid is operated.

In testimony whereof I have hereunto subscribed my name this 16th day of April, A. D.
 60 1895.

A. L. SEARLES.

Witnesses:

GEORGE A. ADAMS,
 ROBT. H. READ.