Aug. 25, 1925. 1,551,275

C. F. WAGNER ET AL

POWER DISTRIBUTING SYSTEM

Filed Sept. 2, 1922

Fig. 1.

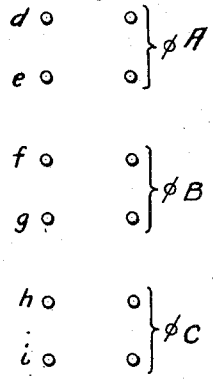


Fig. 2.

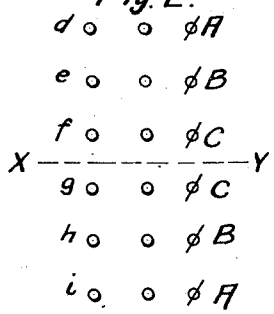
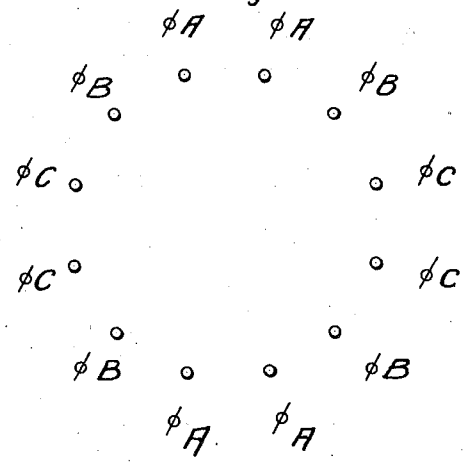


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES F. WAGNER, OF PITTSBURGH, AND JOSEPH SLEPIAN, OF SWISSVALE, PENNSYLVANIA, ASSIGNORS TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

POWER-DISTRIBUTING SYSTEM.

Application filed September 2, 1922. Serial No. 585,888.

To all whom it may concern:

Be it known that we, CHARLES F. WAGNER, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, and JOSEPH SLEPIAN, a citizen of the United States, and a resident of Swissvale, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Power-Distributing Systems, of which the following is a specification.

Our invention relates to power-distributing systems and particularly to the arrangement of conductors in polyphase power-distributing systems wherein heavy currents are carried.

It has been found that, where conductors are arranged in inductive relation and wherein the groups of conductors of one phase are placed unsymmetrically with respect to the conductors constituting other phase groups, an unequal current distribution between the conductors of like phase results from the inductive action of the conductors of one group upon the conductors of another group. Such unequal current distribution causes uneven heating of conductors and a reduction in efficiency of the entire group.

One object of our invention is to arrange the conductors of a group of inductively-related conductors of different phase in such manner that the conductors of one phase occupy substantially similar corresponding relative positions with respect to the conductors of a different phase, thereby equalizing the inductive action of the entire group of conductors between conductors of like phase.

Another object of our invention is to so connect the conductors of a group in which unequal current distribution prevails that, without altering the physical grouping of the conductors, equal distribution of the current is obtained.

These and other objects, that will be made apparent throughout the further description of our invention, are attained by means of the apparatus hereinafter described, and illustrated in the accompanying drawings, wherein:

Figure 1 diagrammatically indicates a group of conductors for polyphase circuits in which unequal distribution of the current between conductors of like phase prevails.

Fig. 2 is a diagram indicating the arrangement of the conductors resulting in equal distribution between conductors of like phase, and

Fig. 3 is a diagram indicating a modified arrangement of the conductors wherein their physical grouping has been altered.

As indicated in Fig. 1, there are six pairs of conductors *d*, *e*, *f*, *g*, *h* and *i*, the pairs *d* and *e* constituting a group carrying current of like phase A, the pairs of conductors *f* and *g* constituting a group carrying current of like phase B and the pairs of conductors *h* and *i* constituting a group carrying current of like phase C. It will be apparent that the current in the conductors *f* will inductively affect the conductors *e* with greater intensity than the conductors *d* which are more remote, and that the conductors *f* and *g* will be differently inductively affected by the groups of conductors carrying current of phase A and phase C.

By connecting the conductors to the source of current in the manner indicated in Fig. 2, that is, so that the conductors *d* and *i* constitute the group carrying current of phase A and so that the conductors *e* and *h* constitute the group carrying current of phase B and conductors *f* and *g* constitute the group carrying current of phase C, the conductors *d* and *i* will be inductively affected alike by current in the remaining conductors for the reason that they are arranged so that they occupy similar corresponding relative positions with respect to the other conductors.

It will be seen that the conductors for each phase have been divided into pairs disposed symmetrically on opposite sides of the line X—Y. The conductors of the pair *e* on one side of the line have similar relative positions with respect to the remaining conductors that the conductors of pair *h* have with respect to all other conductors. This is also true of the pairs of conductors *f* and *g* and pairs *d* and *i*.

It will be seen, therefore, that, by reason of the arrangement indicated in Fig. 2, the conductors of any pair or phase are inductively affected in like manner and, consequently, the current distribution in the conductors of like phase is equal.

It will be noted that the physical grouping of the conductors, as shown in Figs. 1 and 2, remains unaltered but that the conductors are connected to circuits of different phase.

It is obvious that the physical grouping indicated in Fig. 2 may be altered in various ways, such, for instance, as that indicated in Fig. 3, while, at the same time, maintaining symmetrical arrangement of the conductors.

While we have described and illustrated but two embodiments of our invention, it will be apparent to those skilled in the art that various changes, modifications, substitutions, additions and omissions may be made in the apparatus illustrated without departing from the spirit and scope of our invention, as set forth in the appended claims.

We claim as our invention:

1. The method of equalizing inductive effects between conductors of the same phase in a group of inductively-related conductors of different phase which consists in disposing the conductors of like phase symmetrically with respect to a common point in a plane between the conductors.

2. The method of equalizing inductive effects between conductors of the same phase in a group of inductively-related conductors of different phase, which consists in disposing the conductors of one phase so that they occupy similar relative positions with respect to the conductors of different phase.

3. The method of equalizing inductive effects between conductors of the same phase in a group of inductively-related conductors of different phase, which consists in disposing the conductors of each phase so that they occupy similar corresponding relative positions with respect to the conductors of different phase.

4. The method of maintaining equal current distribution between conductors of the same phase in a group of inductively-related conductors of different phase, which consists in dividing the conductors of like phase into equal sub-groups and in disposing each sub-group so that the conductors thereof occupy similar corresponding relative positions with respect to the conductors of sub-groups of different phase.

5. A current-conducting system for a polyphase circuit comprising a group of inductively-related conductors having the conductors of like phase so arranged that the conductors of one phase occupy similar corresponding relative positions with respect to the conductors of different phase.

6. The method of equalizing the inductive effect between conductors of the same phase in a group of inductively-related conductors of different phase, which consists in dividing the conductors into two groups, each having a conductor of each separate phase, and in disposing the conductors in each group in the same relative order with respect to a point between the groups.

In testimony whereof, we have hereunto subscribed our names this 30th day of August, 1922.

CHARLES F. WAGNER.
JOSEPH SLEPIAN.