

(No Model.)

2 Sheets—Sheet 1.

J. F. H. GORGES.

SYSTEM OF OPERATING GLOW LAMPS BY MEANS OF MULTIPHASE
CURRENTS.

No. 468,500.

Patented Feb. 9, 1892.

Fig. 5.

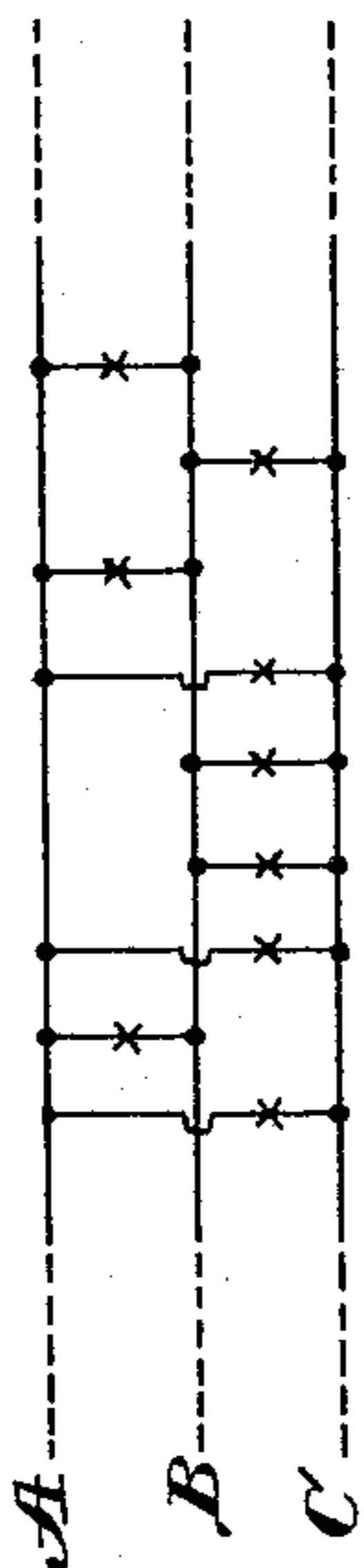


Fig. 6.

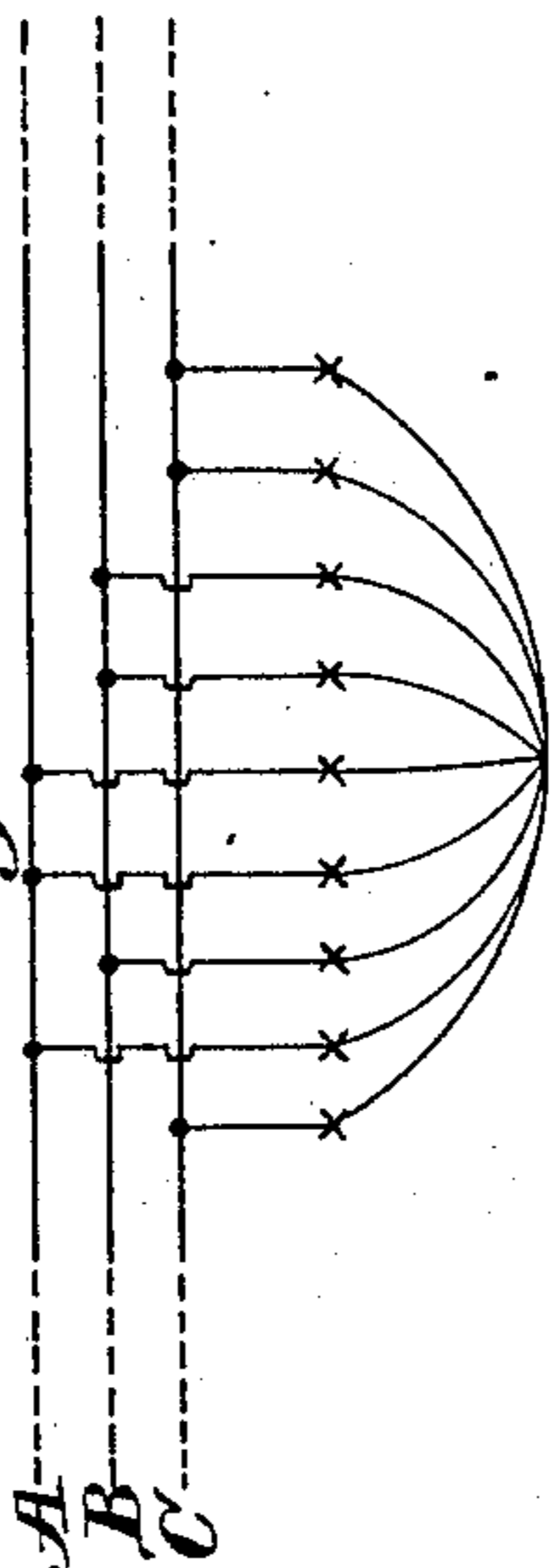


Fig. 7.

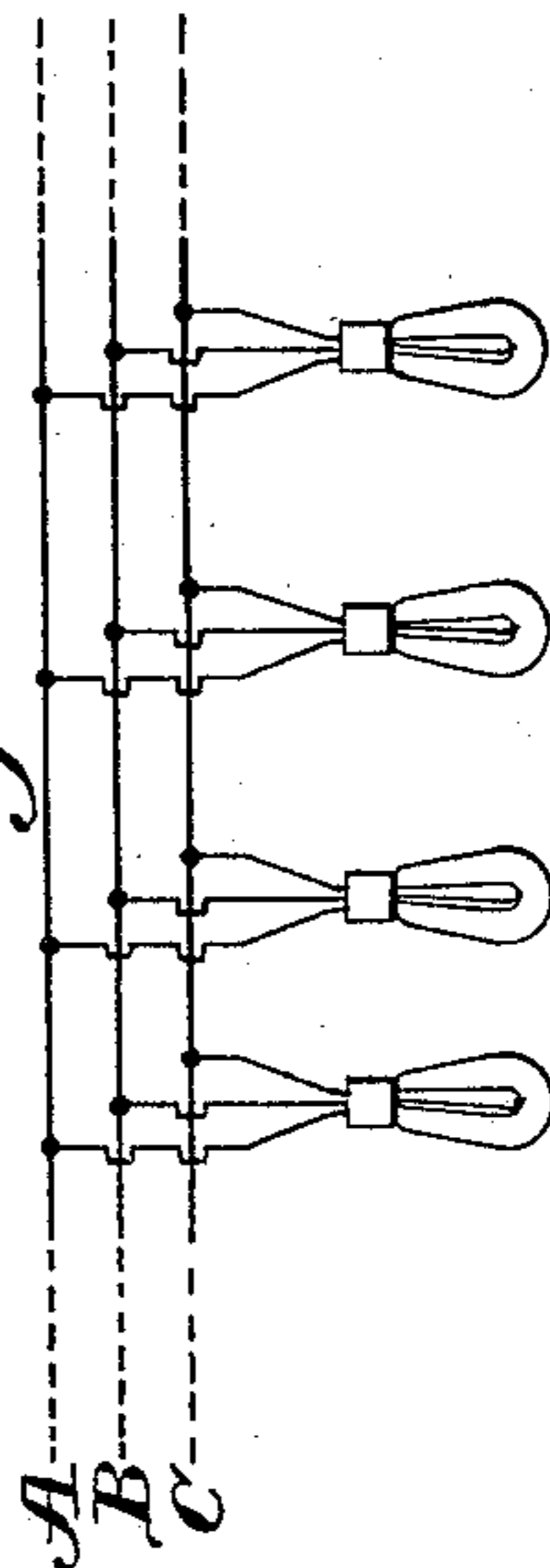


Fig. 3.

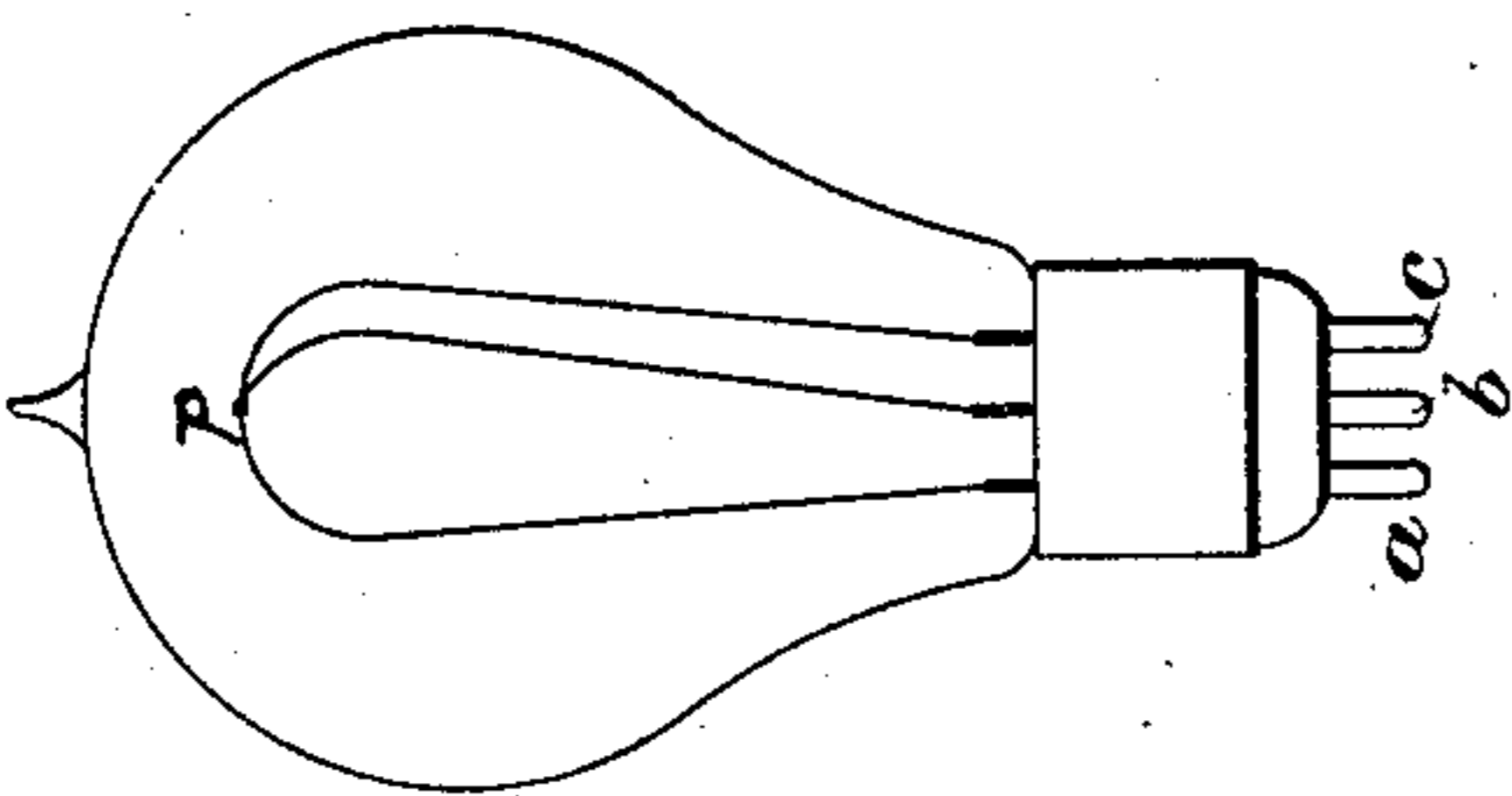


Fig. 4.

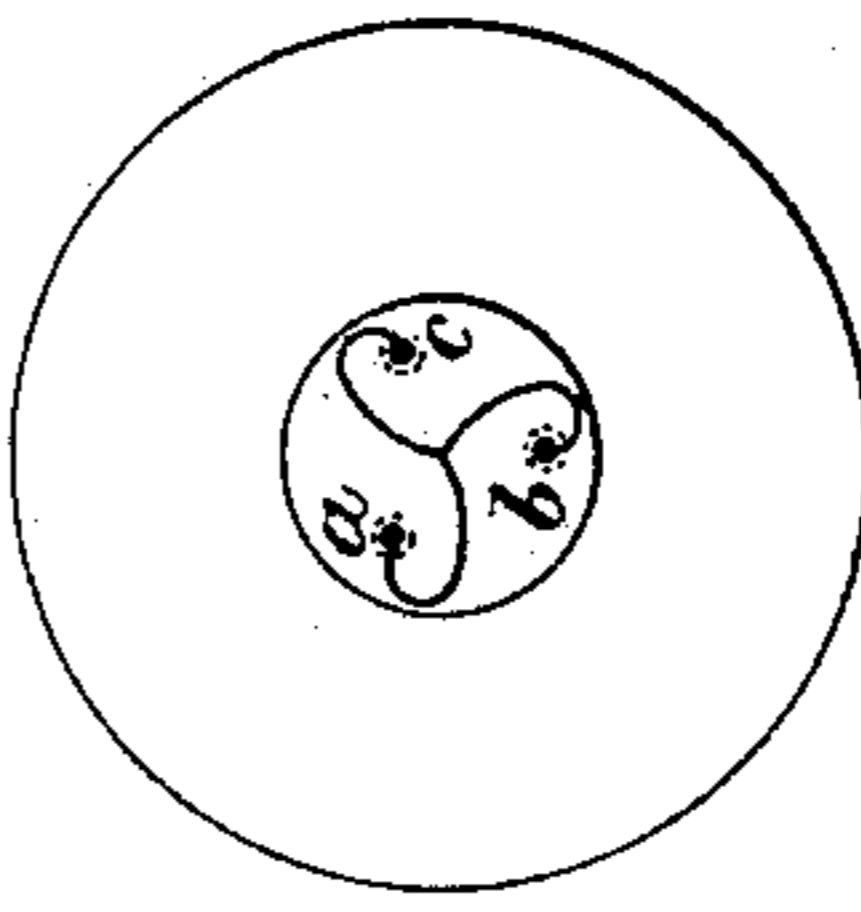


Fig. 1.

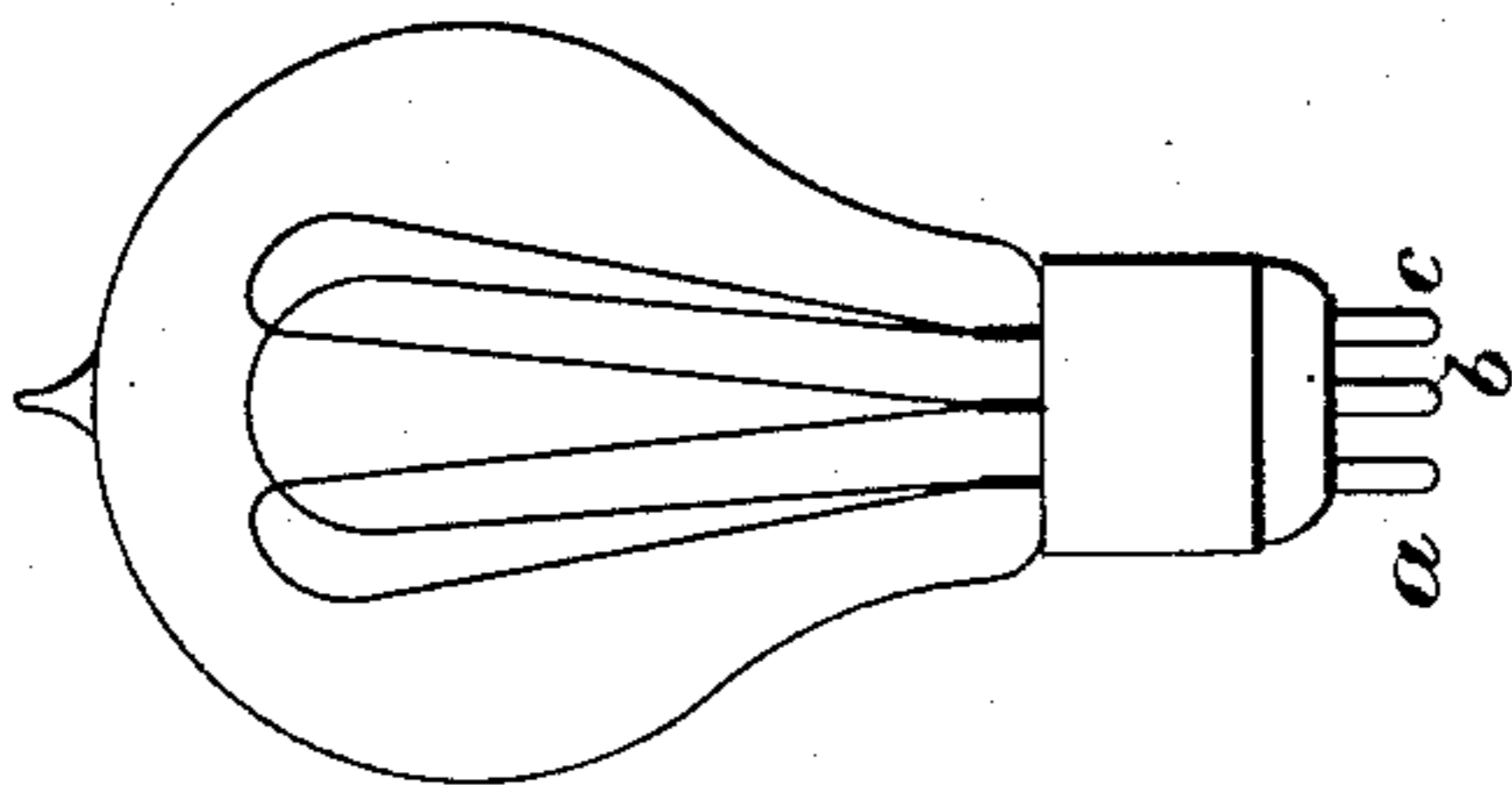
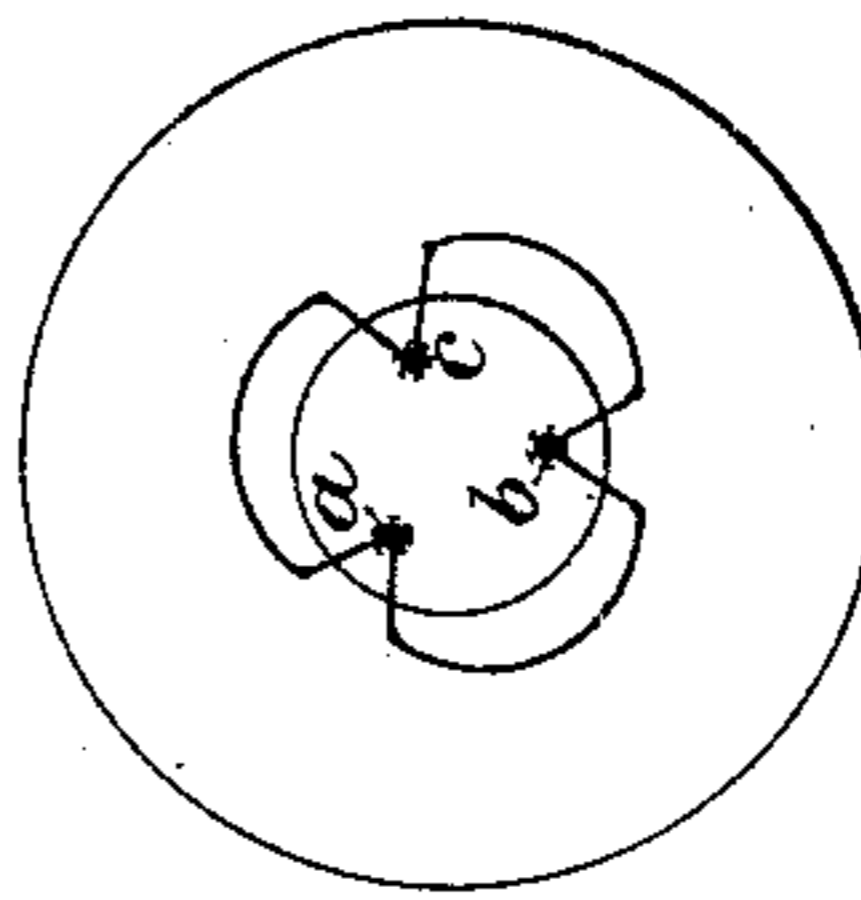


Fig. 2.



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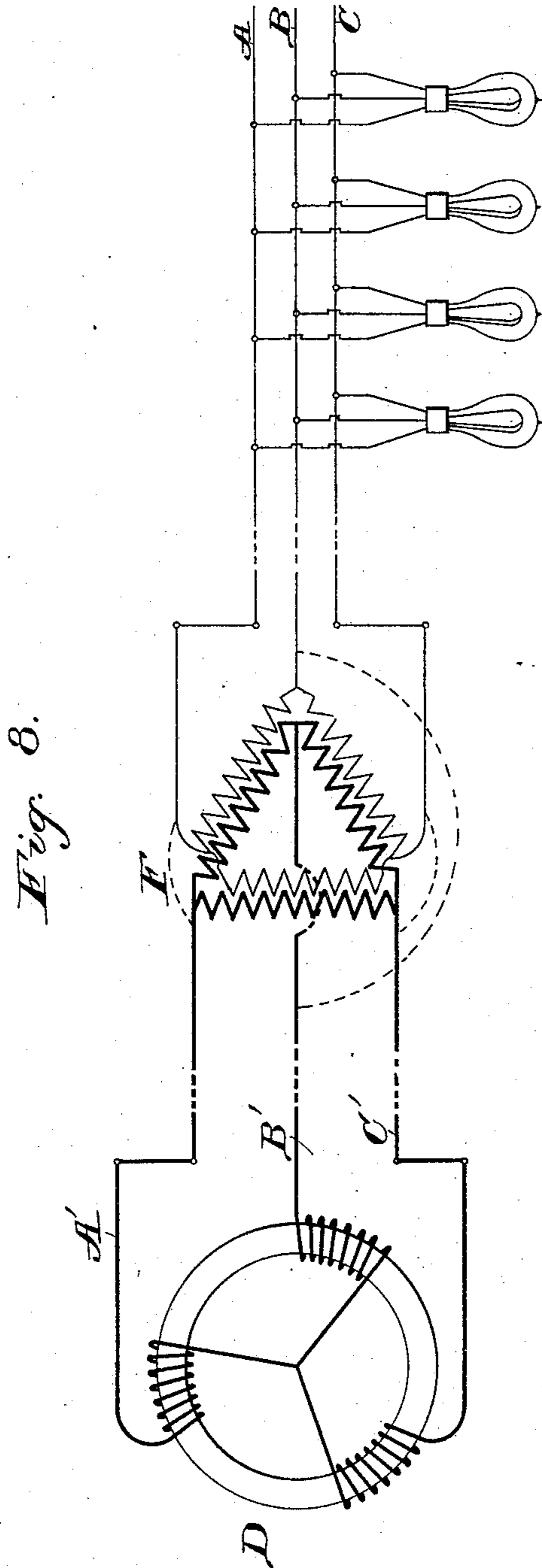
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UNITED STATES PATENT OFFICE.

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TO SIEMENS & HALSKE, OF SAME PLACE.

SYSTEM FOR OPERATING GLOW-LAMPS BY MEANS OF MULTIPHASE CURRENTS.

SPECIFICATION forming part of Letters Patent No. 468,500, dated February 9, 1892.

Application filed September 3, 1891. Serial No. 404,632. (No model.)

To all whom it may concern:

Be it known that I, JOHANNES FRIEDRICH HEINRICH GÖRGES, a subject of the King of Prussia, residing at Berlin, in the Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Systems for Operating Glow-Lamps by Means of Multiphase Currents; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to such establishments for the distribution of electricity as are adapted for the use of the so-called "rotation-current"—that is, with three or more alternating currents which, according to the phase, differ from each other by equal magnitudes.

While my invention relates to all classes of rotation-current or multiphase systems, I will, for the sake of convenience, show it as applied only to such systems as are operated with three alternating currents differing from each other by 120° .

Reference is had to the accompanying drawings, wherein similar letters refer to similar parts through the several views.

Figure 1 represents a side view of a glow-lamp fitted with three filaments of practically equal resistance connected together in pairs and having three leading-in wires. Fig. 2 represents a plan view of the glow-lamp shown in Fig. 1. Fig. 3 represents a side view of a glow-lamp having three filaments of practically equal resistance connected together at a common central point *p*. Fig. 4 represents a plan view of the same. Fig. 5 represents three current receivers or mains connected together in pairs according to my invention. Fig. 6 represents three current receivers or mains connected by a like number of conductors from each main to some common point. Fig. 7 represents a diagrammatic view of three current receivers or mains connected together in pairs, the said connections including glow-lamps having three filaments also connected together in pairs, as shown in Fig. 3. Fig. 8 represents a diagrammatic view of a three-phase dynamo, transformer, and lamp system, and illustrates the operation of my device.

A, B, and C represent three current re-

ceivers or mains leading to the source of electricity. These mains may be connected either directly to the terminals A', B', and C' of the three-phase dynamo D, as shown in dotted lines in Fig. 8, or may lead to the transformer F, as shown in said figure.

a, *b*, and *c* represent three external connections to the filaments shown in Figs. 1 and 3; and the cross-marks *x* in Figs. 5 and 6 represent one of the resistances interposed between each pair of mains A, B, and C. It will be seen that if the mains A, B, and C receiving a three-phase current are connected together, as shown in Figs. 5, 6, 7, and 8, there will always be a flow from the wire or wires of high potential and those of low potential, and since the currents along these wires differ from each other in phase there will be a rotation-current passing from wire to wire through the interposed resistances, and the alternations will follow each other in the order of the phases. These mains A, B, and C may be connected together in two ways, either in pairs with equal resistances interposed between each pair, as shown in Fig. 5, or each wire may be connected by a like number of equal resistances to some common point, as shown in Fig. 6. The resistances shown diagrammatically in Figs. 5 and 6 are represented in Figs. 7 and 8 as lamp-filaments and illustrate the application of my invention to a glow-lamp system. To each of the rotation-current conductors A B C at optional points branch conductors are connected leading to the connectors *a*, *b*, and *c* of each lamp. In either case it will be seen that each interposed resistance may be considered as a loop connecting a pair of mains, and that by means of these loops the mains are connected in series. It is immaterial whether the loops be entirely distinct from each other, as shown in Figs. 1, 2, and 5, or whether they include two resistances electrically connected, each one of which forms part of another loop, as shown in Figs. 3, 4, 6, 7, and 8. Since each lamp is joined to all three wires and is entirely independent of all other lamps, the arrangement secures uniformity in the current in the three mains—that is, when each additional lamp is turned in or out, the load on each main is increased or decreased in the

same proportion, a condition which does not prevail with the three-wire system of electric lighting now in general use. Moreover, since the connectors *a*, *b*, and *c* are joined to each other by resistances (filaments) which are practically equal, the current through each of the three resistances becomes practically uniform. It will be obvious that should the number of phases be increased above three the number of rotation-current receivers (mains) and the number of connecting-resistances (filaments in the glow-lamps) should be correspondingly increased. The shape or arrangement of the filaments may also be varied in many details, provided the fundamental idea be adhered to of the multiphase current entering the lamp through as many connectors as there are phases and passing through a number of filaments of equal resistance connected to each connector and forming equal resistances between the various mains.

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

1. A system for operating glow-lamps by means of multiphase currents, which consists in a number of rotation-current conductors corresponding to the number of phases of the current, any desired number of glow-lamps, a number of current-introducers to each lamp equal to the number of said conductors and connected to the said conductors, and glow-bodies at the interior of the lamp electrically connected to each other and to pairs of the said current-introducers, substantially as described.

2. In a system for operating glow-lamps by means of multiphase currents, the combination, with a multiphase dynamo, of a number of rotation-current conductors deriving their electricity from the terminals of the said dynamo, any desired number of glow-lamps con-

nected to the said conductors and having a number of leading-in wires corresponding to that of the said rotation-current conductors, with glow-bodies at the interior of the lamp electrically connected to each other and connecting the said leading-in wires in series, substantially as described.

3. A system for operating glow-lamps by means of three-phase currents, which consists in three rotation-current conductors, any desired number of glow-lamps, a current-introducer from each of said conductors electrically connected to each lamp, and three glow-bodies at the interior of the lamp electrically connected to each other and to the said current-introducers, substantially as described.

4. A system for operating glow-lamps by means of three-phase currents, which consists in three rotation-current conductors, any desired number of glow-lamps, a leading-in wire from each of said conductors to each lamp, and three filaments connecting the three leading-in wires with each other in series, substantially as described.

5. A system for operating glow-lamps by means of three-phase currents, which consists in three rotation-current conductors, any desired number of glow-lamps, a leading-in wire from each of said conductors to each lamp, and three filaments of equal length, each connected at one end to one of said leading-in wires and connected at the other to the ends of the other two filaments, substantially as described.

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

JOHANNES FRIEDRICH HEINRICH GÖRGES.

Witnesses:

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