No. 720,962. PATENTED FEB. 17, 1903.

C. PAUTHONIER.

INCANDESCENT ELECTRIC LAMP.

APPLICATION FILED JULY 7, 1900.

NO MODEL. 3 SHEETS—SHEET 1.

FIG 1.

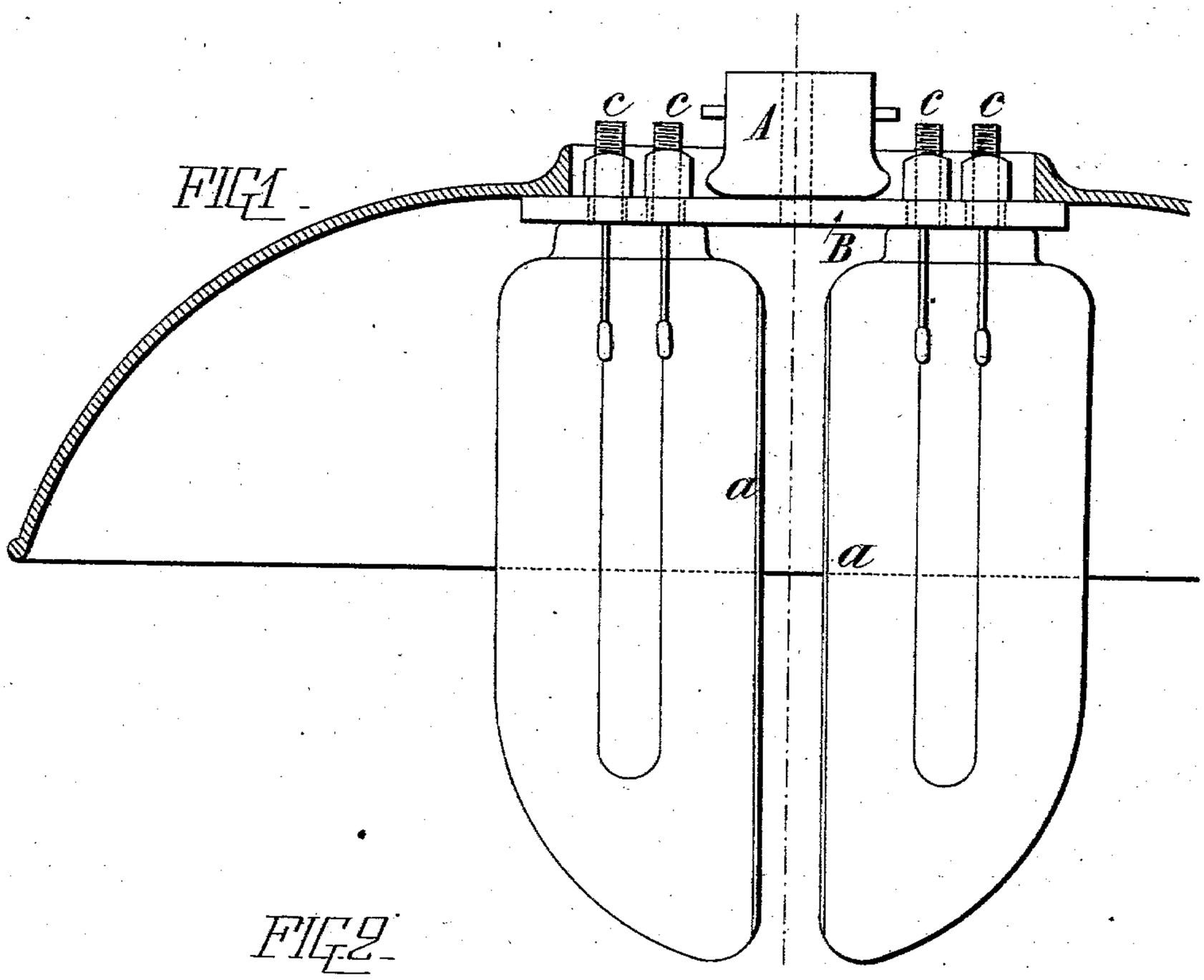
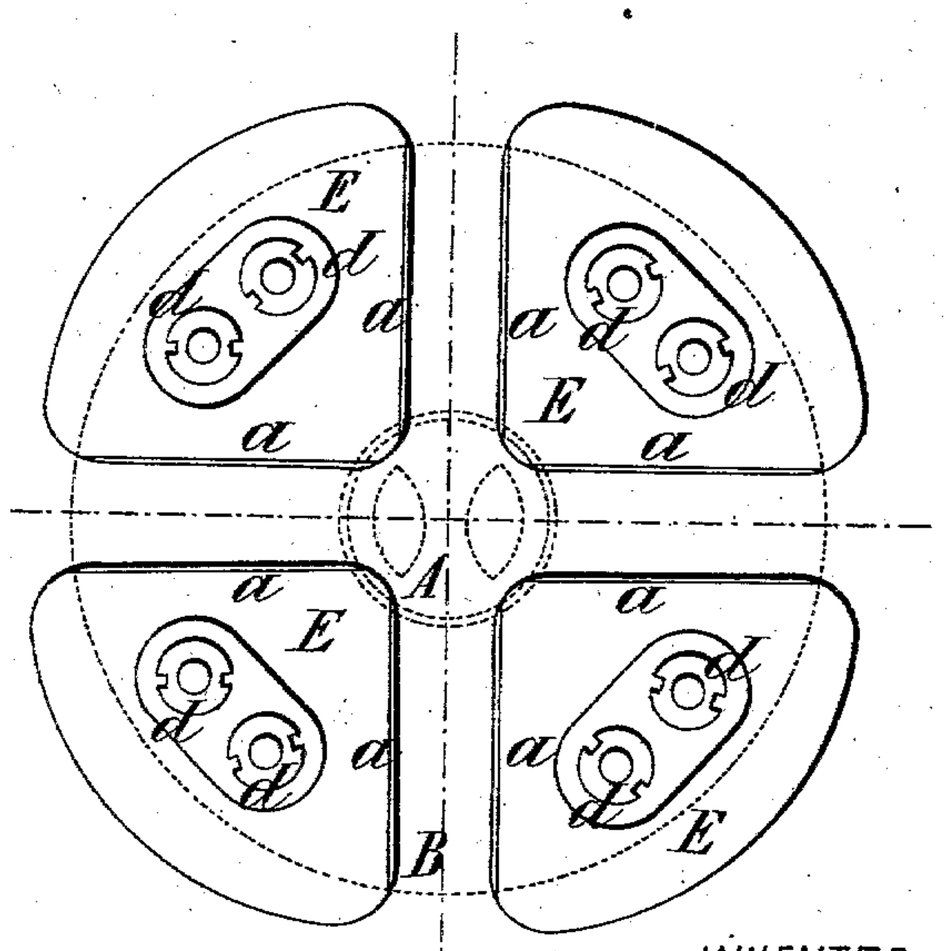


FIG 2.



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NO MODEL. 3 SHEETS—SHEET 2.

FIG 3.

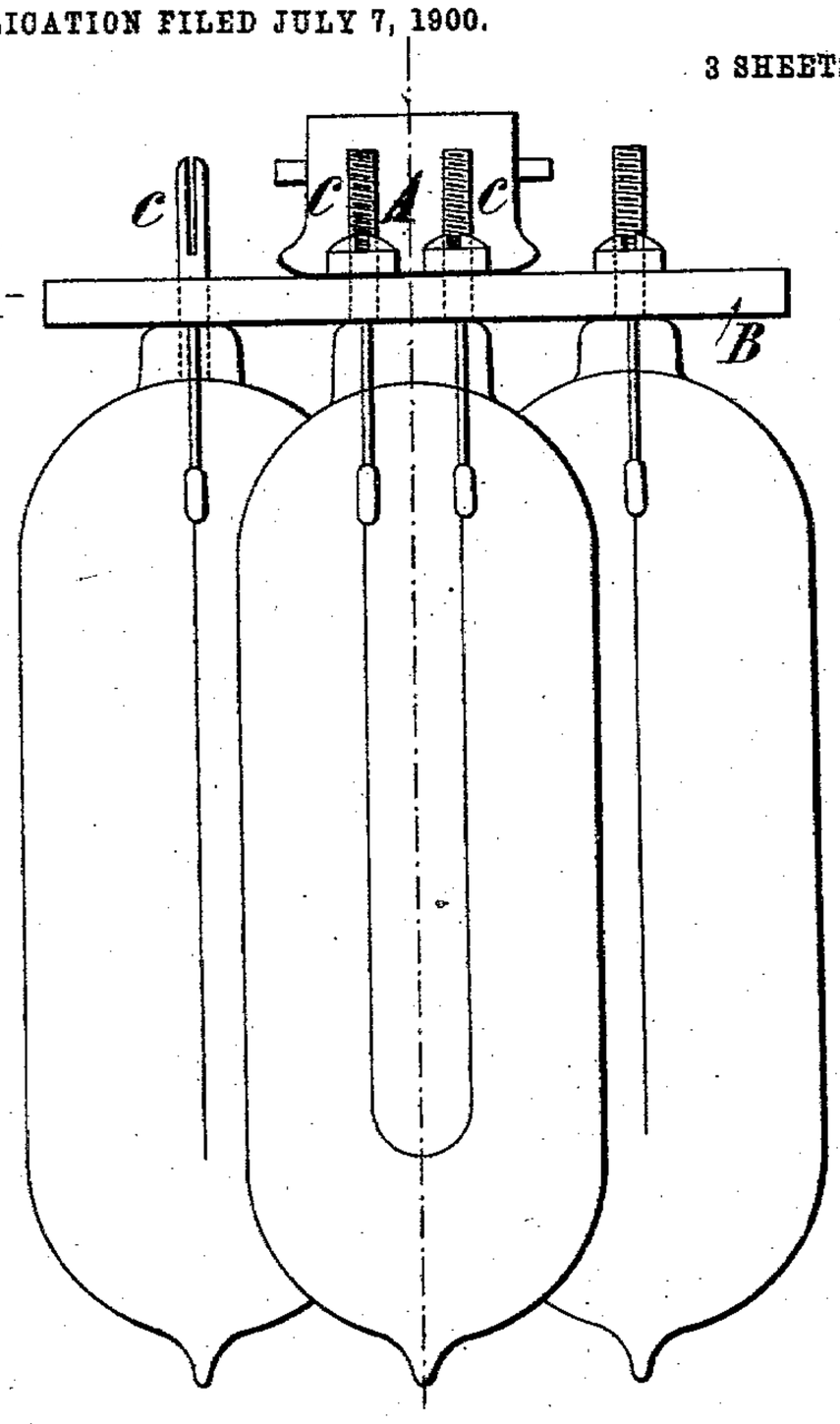


FIG 7.

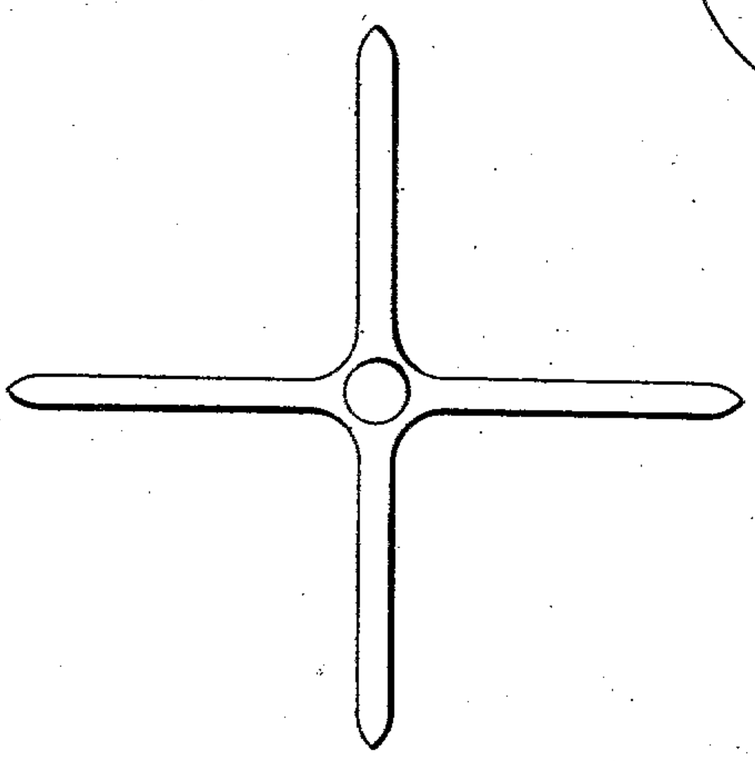
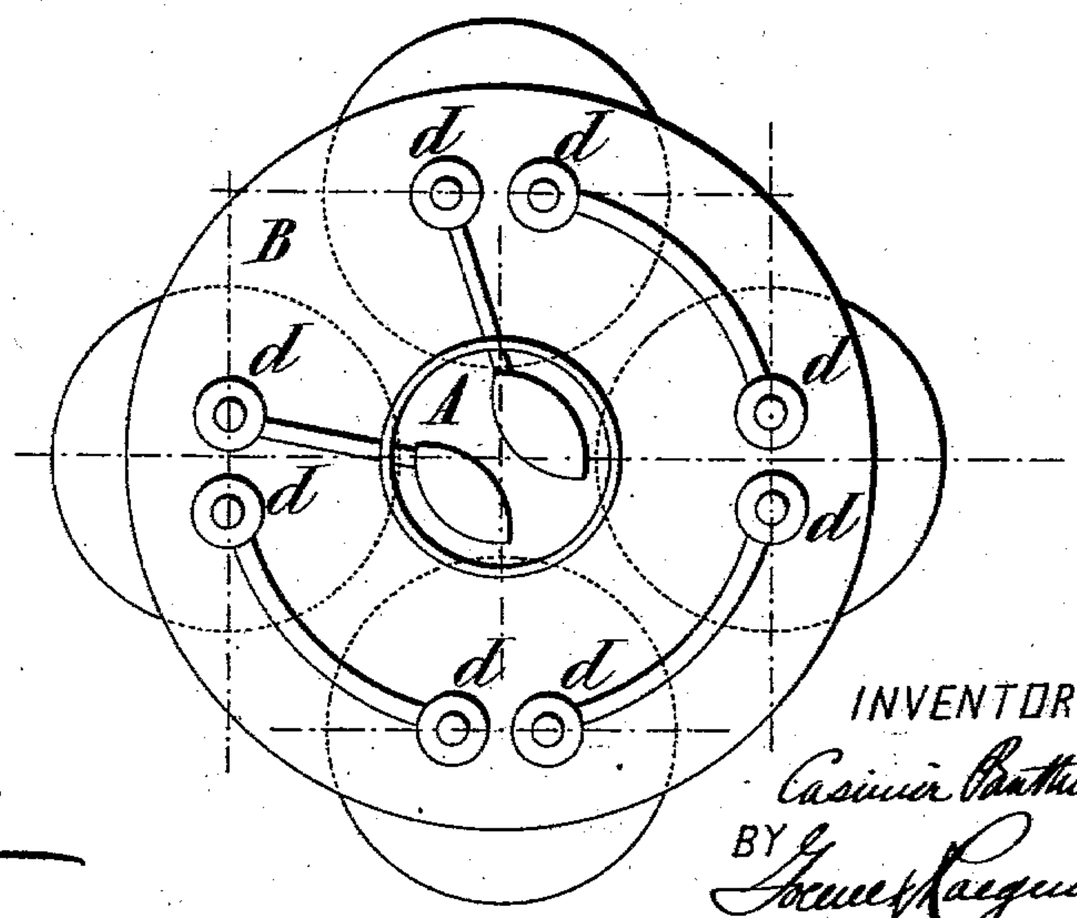


FIG 5.



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INCANDESCENT ELECTRIC LAMP.

APPLICATION FILED JULY 7, 1900.

NO MODEL. 3 SHEETS—SHEET 3.

FIG 4.

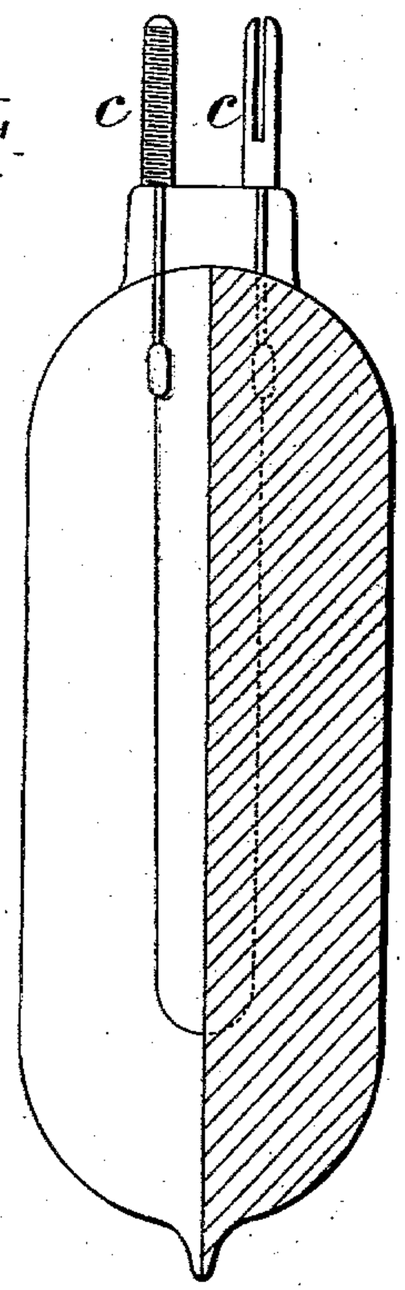
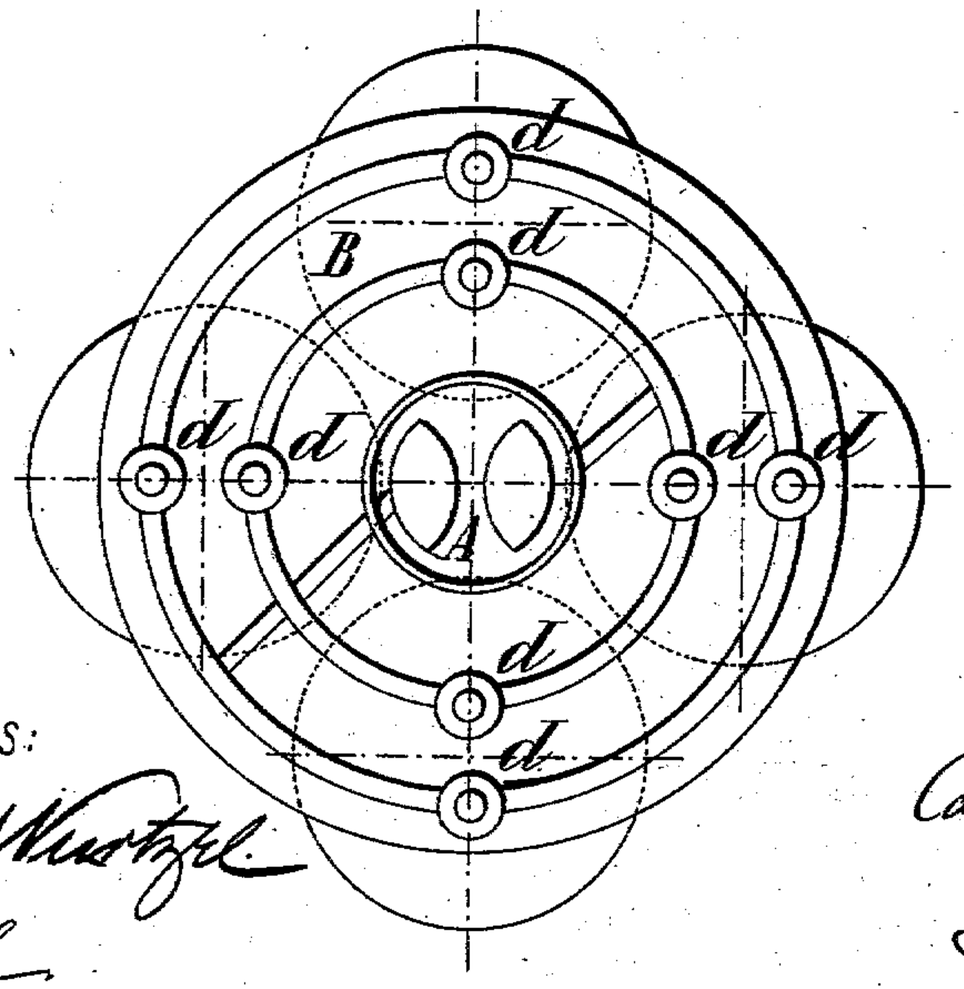


FIG 6.



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UNITED STATES PATENT OFFICE.

CASIMIR PAUTHONIER, OF PARIS, FRANCE.

INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 720,962, dated February 17, 1903.

Application filed July 7, 1900. Serial No. 22,777. (No model.)

To all whom it may concern:

Be it known that I, CASIMIR PAUTHONIER, engineer, a citizen of the Republic of France, and a resident of 4 Rue St. Jean, Paris, in the Republic of France, have invented a new and useful Improvement Relating to Incandescent Electric Lamps, which is fully set forth in the following specification.

Incandescent electric lamps as hitherto constructed are inadequate to present requirements. Notwithstanding that all methods of illumination have been improved incandescent electric lamps remain practically what they were at their inception, having only undergone minor improvements, by means of which the consumption of electricity has been materially reduced. A great deal yet remains to be accomplished, inasmuch as high-tension currents for traction upon tramways and for metallurgical purposes require to be transformed into low-tension currents in order to be employed with existing types of incandescent electric lamps.

The objects of this invention are to provide a lamp in which these high-tension currents may be utilized as they are—that is to say, without having to transform them—while increasing the illuminating power of the lamps and reducing the consumption of electricity and without altering existing installations.

The lamp which forms the subject of my invention is suitable for use with any current of any tension, high and low, and even for such tensions for which at present there exists no incandescent electric lamps.

In order that my invention may be more fully understood, I will proceed to describe the same with reference to the accompanying drawings, in which—

Figure 1 is a sectional side elevation of an incandescent cluster electric lamp embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of a modified form of the invention. Fig. 4 is a detail view of one of the individual lamps which may be used. Figs. 5 and 6 are plan views showing the group of the individual lamps arranged in series and parallel, respectively; and Fig. 7 is a plan view of the form of a screen which may be employed between the lamps.

In Fig. 1 the fitting is the same as that for ordinary lamps, and may consequently be fixed to the ordinary appliances by means of a bayonet-joint, a screw-socket, or the like. On a mount or center plate B, of insulating material, the contacts *d d* are arranged in such a manner as to provide for four lamps, grouped either in series or in parallel or in series and in parallel, according to circumstances. These contacts are arranged either concentrically with the edge of the insulating-mount, as in Fig. 5, or in radial lines, as in Fig. 6. This mount may be made of glass, porcelain, or any other appropriate insulating material and may be extended and so formed as to serve as a reflector, or a separate reflector may be provided, as in Fig. 1. The contacts *d d* are preferably constructed in such a manner that the conductors are engaged and maintained therein by a spring-clamp, a nut, or in other suitable manner.

E E are the lamps, the glass or crystal bulb of which is preferably made in the form of a sector—*i. e.*, in as many parts as a circle may be aliquotly divided—the flat portions being silvered like a mirror, or the said bulbs may be constructed partly of clear glass or crystal and partly of translucent white enamel, the flat portion only being enameled.

The sector shape is preferable in order that the lamps when placed upon the support (the enameled faces being arranged opposite one to the other and separated by a slight interval in order to permit of the circulation of air) may constitute a perfectly cylindrical whole and possess an entirely novel appearance.

Fig. 2 shows the arrangement of the lamps upon the supporting-mount, the translucent enameled portions *a a* opposite one another. From this arrangement it follows that the lamps being lighted each of these enameled translucent faces is brightly illuminated and traversed upon each of its sides, thus forming by their assemblage an irradiant mass which greatly increases the brilliancy of the light emitted by a given electromotive force, producing a whiter light than ordinary lamps and one which is softer and has a better ef-

fect. In Fig. 2 four of these lamps are shown. There may, however, be three, five, six, or any suitable number, according to the nature of the circuit, the luminous intensity, or the decorative effect it is desired to produce. If the plane faces are silvered, these mirrors by reason of their angular arrangement form reflectors and increase the brilliancy of the light; but this latter does not then possess the whiteness which is communicated to it by the faces of white translucent enamel. Fig. 3 shows a similar grouping of four lamps, the bulbs of which are cylindrical in form, partly clear glass or crystal and partly white enamel. The bulbs or globes are mounted upon the mounts or supports, the enameling faces opposite one to the other, and the same effect of irradiation as with the sector-shaped lamps is produced; but the appearance is less elegant.

The bulbs or globes, whether of cylindrical or sector shape, may be of glass or crystal of various colors, either opaque or clear, or partly colored and partly clear, or variously colored, and in this manner all possible effects of lighting are obtained. Nevertheless I obtain all these effects of coloring while preserving the white enamel and coloring the clear portion as desired. These parts colored or enameled are employed in the direction of the length of the filament.

By separating the lamps upon the mount or support by means of opaque preferably radiate screens S the lamp may be caused to present several aspects at the same time. It may be red or blue on one side and upon the other green or orange, for example.

Fig. 4 shows one of these lamps of cylindrical form, the shaded portion representing the white or colored enamel of the silvered portion. The form of contact is also shown. The electrode-rods are screw-threaded or split in order to insure electrical contact either by the spring action on opening the slit or by means of a nut, which at the same time insures the rigidity of the lamp upon its fitting. These electrodes *c c* are introduced into the holes *d d* of the insulating mount B, which are provided with simple metallic eyes assembled one with the other by means of wires of sufficient section and either insulated or not. This connection may also be effected by means of copper lugs eyeleted at their extremities or by means of any other appropriate metal and arranged in such a manner as to group the lamps in series or in parallel or in series and in parallel, according to circumstances, and I utilize this lamp either isolated or grouped upon my mount or support to any desired number.

Figs. 5 and 6 show the insulating mount having its contents connected in series and parallel, respectively, in groups of four. This arrangement may be varied according to the number of lamps employed in any one group and the manner of grouping them; but whatever may be the number and manner of grouping the enameled faces are always arranged adjacent to each other. Fig. 5 shows that the arrangement of the contacts is the reverse of that in Fig. 6, and I employ one or other of these methods, according to circumstances. In this manner I am able to make lamps of all voltages and of all degrees of luminous intensity, because I may unite upon my mount or support lamps of twenty-five volts, which, grouped in series in fours, may be arranged in circuits of one hundred volts, and in the same way three lamps of seventy volts may be arranged upon circuits of two hundred and twenty volts, or five lamps of one hundred volts may be placed upon a circuit of five hundred volts. The fittings may themselves be arranged in series or in parallel, according to circumstances. A group of four lamps of fifty-five volts may be arranged upon a circuit of two hundred and twenty volts, and four groups of five lamps of one hundred volts may be placed upon a circuits of two thousand volts, &c. All combinations are therefore possible for all currents of high or low tension.

The filaments may be of ten, sixteen, thirty, fifty, one hundred, or five hundred candle power, and it is not necessary to manufacture them specially for a given intensity, as in ordinary lamps. The grouping of the lamps upon my fitting permits of diversifying the luminous intensity in the same manner as it permits of diversity of voltages. I thus obtain a divisibility of the electric light, an adaptability and extent which have never been obtained, notwithstanding the use of reflectors of all kinds, in addition to which I may of course utilize these same or any other suitable reflectors.

A lamp of sixteen-candle power under ordinary circumstances consumes at the potential (generally one hundred and ten volts) 0.48 amperes or two hundred and eleven watts for four lamps of sixteen candles, or 3.3 watts per candle-power. The same would obtain for lamps of other potentials for which lamps may readily be made. These lamps may be combined in any manner so as to render them fitted for different potentials, even those high tensions for which hitherto no incandescent lamps have been constructed and which it is consequently useless to transform. I would also point out that it is the irradiation of the opal translucent portions and the arrangement of the opal portions in opposition one to the other which by annulling interferences forms an irradiant mass, which not only increases the quantity of light emitted, but also its brilliancy. I may also combine upon one of my mounts or supports only any number of lamps corresponding to the potential to be utilized, whatever it may be, and I may also give to my support any desired form, such as a letter or design, for example, the successive or simultaneous illumination of which

may constitute a kind of luminous telegraphy in ordinary letters which may be caused to operate by means of suitable devices. I may also constitute straight or sinuous lines of lights, form designs, reproduce marks or conventional signs, &c., with the minimum expenditure of electric current.

With these lamps I may in many cases advantageously replace arc-lamps, the defects of which are numerous. For example, it is necessary to renew the carbon frequently; the brilliancy of the arc is too great and necessitates the employment of globes which absorb the light; they burn with a naked light, so that the sparks which are liberated from the carbons are dangerous; they get out of order, and, finally, their price is relatively high. My lamps may be selected in such a manner as to give only the desired amount of light. It is only necessary to appropriately select the lamp corresponding to the potential available and the illumination which is necessary. The fitting and reflector being constructed separately from the lamps it is unnecessary to replace the whole device when renewing the lamps themselves.

I reserve the right in order to prevent heating of the lamp to form in the mount or plate B a shaft or passage for air traversing the lamp-base, if this latter is retained. I also reserve the right to replace the said lamp-base by suitable terminals.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. An incandescent cluster electric lamp, consisting of a disk-shaped mount of insulating material, a socket upon said mount adapted to be connected with an electrical source, contact-pieces secured on said mount connected in circuit with said socket, and lamps having their terminals electrically connected with said contact-pieces, said lamps being grouped on the mount around the center thereof and having translucent adjacent portions, substantially as set forth.

2. An incandescent cluster electric lamp, consisting of a disk-shaped mount of insulating material, means for securing said mount in connection with an electrical source, contact-pieces arranged on said mount in circuit with the electrical source, and lamps arranged in the circuit on the mount, said lamps being of sector-shape cross-section and symmetrically disposed around the center of said mount and having translucent flat surfaces arranged in juxtaposition, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CASIMIR PAUTHONIER.

Witnesses:
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EDWARD P. MACLEAN.