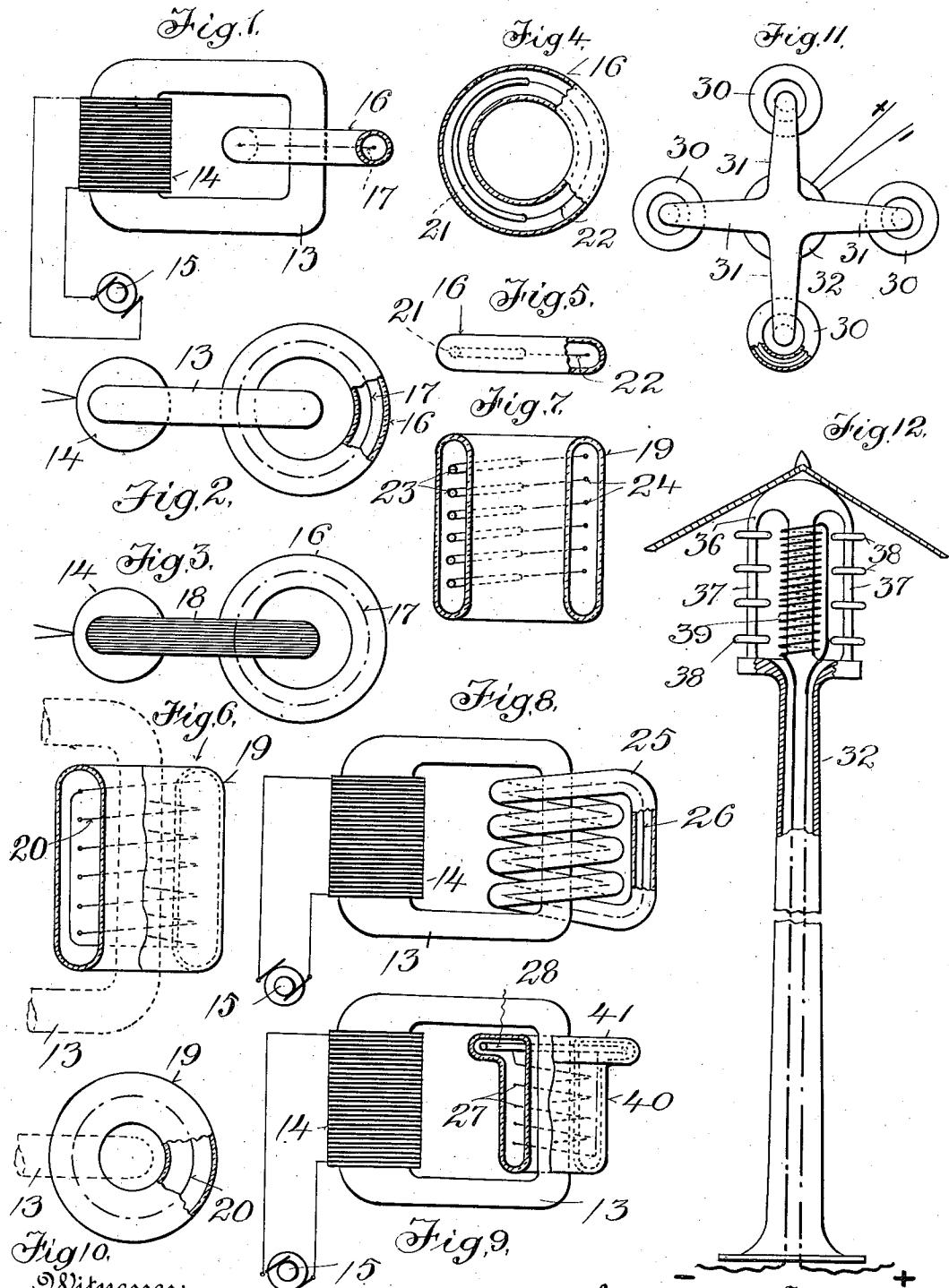


J. LEDWINKA,  
INDUCTION LIGHT SYSTEM,  
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# UNITED STATES PATENT OFFICE.

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## INDUCTION LIGHT SYSTEM.

1,136,684.

Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed February 25, 1913. Serial No. 750,528.

To all whom it may concern:

Be it known that I, JOSEPH LEDWINKA, a citizen of the United States, residing at Philadelphia, county of Philadelphia, State 5 of Pennsylvania, have made a certain new and useful Invention in Induction Light Systems, of which the following is a specification.

This invention relates to light systems, 10 and particularly, to light systems of the induction type.

The object of the invention is to provide a lighting system wherein the energy for producing incandescence of a filament or 15 other light source is derived through induction.

A further object of the invention is to provide a lighting system wherein no wires are employed for conveying current to the 20 incandescent filament or element which forms the source of the light.

Other objects of the invention will appear more fully hereinafter.

The invention consists substantially in 25 the construction, combination, location and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

30 In carrying out my invention, I propose to employ a member which is evacuated of air, and which contains the element or member in the form of a vapor or of an incandescent filament designed to be heated to 35 an incandescent state by the inductive effect of a current of electricity flowing around a portion of an iron core.

My invention may be embodied in and carried out practically in a wide variety of 40 specific arrangements, and therefore, in the accompanying drawing, and in the specification, I propose to show and describe various practical embodiments of the principles thereof, but my invention, in its broadest 45 scope as defined in the claims, is not to be limited or restricted to any specific details of construction or arrangement.

Referring to the accompanying drawing:—Figure 1 is a view, somewhat diagrammatic, showing one form of embodiment of an induction type of light system embodying the principles of my invention. Fig. 2 is a top plan view of the same, parts 50 broken out. Fig. 3 is a view similar to Fig.

2, showing a modified form of core employed. Fig. 4 is a view in section showing a modified form of filament for use in connection with the form of evacuated member shown in Fig. 1. Fig. 5 is a view, partly broken out, in edge elevation, of the 60 construction shown in Fig. 4. Fig. 6, is a view showing a modified form of evacuated member and wherein is employed a spirally coiled filament member. Fig. 7 is a view showing a type of evacuated member 65 similar to that shown in Fig. 6 but with a modified form of filament employed. Fig. 8 is a view showing another modified arrangement of evacuated member included within the scope of my invention. Fig. 9 70 is a similar view showing another form of evacuated member and a modified form of filament or incandescent member employed. Fig. 10, is a top plan view, partly broken away, of the construction of evacuated member 75 shown in Fig. 6. Fig. 11, is a view showing a multiple system of light sources or lamps, so called, adapted for use in carrying out the principles of my invention. Fig. 12 is a view in vertical section, showing the 80 adaptation of an induction type of light system embodying my invention to a street lamp.

The same part is designated by the same reference numeral wherever it occurs 85 throughout the several views.

In Figs. 1, 2 and 3, I have shown the simplest form of embodiment of my invention. In this form the core portion 13, is of iron, such as is ordinarily employed 90 in connection with induction types of apparatus and, as shown, is rectangular in form. Around one leg of this core portion is wound a coil 14 to which alternating current is supplied from any suitable source, 95 such as an alternating current generator indicated at 15. Surrounding the other leg of the core, is a hollow vessel or member 16, preferably of suitable transparent material such for instance as glass. In this example 100 of my invention the member 16 is in the form of a tubular ring, and, in accordance with my invention, it should be evacuated of air. The incandescent material or substance to be heated to a state of incandescence as a source of light, is contained within the interior of the evacuated hollow member 16. This incandescent member may be 105

of any suitable material or substance, capable of being heated or raised to a state of incandescence by the action of the induced current, or induced current effect produced by the action of the alternating current flowing through the circuit of the coil 14 and acting through the core 13. In the particular example shown in Fig. 1, the substance to be raised to incandescent heat is in the form of a filament 17, which may be of the ordinary form of an incandescent lamp filament.

The core 13, may be of the solid type, as indicated in Figs. 1 and 2, or, if desired, it may be laminated or otherwise suitably constructed as indicated at 18 in Fig. 3.

Instead of the member 16 being in the form of a closed ring, it may be, if desired, in the form of an elongated vessel or member, as indicated at 19, in Figs. 6, 7 and 10. In this case as in the case of Figs. 1, 2, and 3, the member 19, is hollow and its interior chamber should be evacuated of air, and the incandescent substance or material is inclosed within the evacuated chamber of said member 19. In the particular arrangement shown in Figs. 6 and 10 the incandescent member is in the form of a filament 20, which is inclosed in the chamber of the evacuated member 19, and this filament is formed into a coil which surrounds or encircles leg of the core 13. In this case the leg of the core 13, passes longitudinally through the bore or central opening of member 19 in such relation that the incandescent material, substance or filament encircles said core portion as shown.

In Fig. 4 I have shown a modified example of filament. In this case, the vessel member, indicated at 16, corresponds with the form shown in Figs. 1, 2, and 3. The modification resides in the shape or form of the incandescent member, which is inclosed within the evacuated interior of the hollow ring 16. This incandescent member formed of two portions 21, 22, respectively, the portion 21, being of comparatively large cross sectional area while the portion 22 thereof, is of comparatively small cross sectional area. The result of this arrangement is that the enlarged portion 21, will be raised to only a red glow, for instance, while the portion 22, will be raised to a state of incandescence. With this arrangement it will be seen that one portion of the incandescent material contained in the hollow member 16, which, for want of a better term may be called the "lamp", will be raised to a high state of incandescence while another portion thereof will remain more darkened, thus securing, in effect, the action of a reflected light.

In Fig. 7, I have shown a lamp or hollow member 19, similar in construction and elongated contour to the member 19 shown in

Fig. 6, but I have shown contained therein, the incandescent filament or element to be raised to lighting condition of the same form as that shown in Figs. 4 and 5, that is to say, one portion, indicated at 23, is of enlarged cross sectional area while another portion, indicated at 24, is of small cross sectional area. In this arrangement the incandescent material or filament is in the form of a spiral coil placed within the interior of the hollow evacuated member 19, and in the form of a spiral coil which surrounds or encircles the leg of the core.

In Fig. 8 I have shown a modified arrangement wherein the evacuated member or vessel 25 is itself in the form of a tubular coil and it is designed to be made hollow and to be evacuated of air and to contain in the interior thereof the incandescent material or element, such for instance, as the filament 26. In this arrangement the coil of the hollow member 25, encircles the leg of the core 13, another leg or portion of said core being encircled by the coil 14, the circuit of which is supplied with alternating current from the current source indicated at 15.

In Fig. 9 I have shown another modified arrangement of device embodying the principles of my invention, wherein the evacuated member is in the form of an elongated hollow glass part 40, the interior of which is evacuated of air and contains the incandescent material or filament 27, which in this example is in the form of a filament of fine wire arranged in coils to encircle the leg of the core 13, but the member 40, is provided at one end with an enlarged chamber or portion 41 in which is located a portion 28, of the incandescent member or filament which is of large cross sectional area and designed to be raised only to a comparatively low state of heat preferably below that of incandescence, by reason of its enlarged cross sectional area.

In Fig. 11, I have shown a multiple arrangement of so called lamps 30, surrounding ledge portions 31, of a core having a central core portion which is surrounded by the coil 32 which receives the alternating current from the current source. In this manner I am enabled to secure a cluster of lights or lamps and without the use of any connecting wires to the lamps or the filaments or incandescent members or portions thereof.

In Fig. 12 I have shown a practical adaptation or application of the principles of my invention to a street lamp, the post 32 containing the lead wires for the circuit terminals, and carrying at its upper end the score 125 which is fixed and which is provided with leg portions 37 to receive one or more "lamps" so called, indicated at 38, and which also is formed with a leg portion surrounded by a coil 39, this coil being included 136

in the circuit of the current supply source. In this way I am enabled to secure a most efficient and economical lighting system.

A light system of the type and embodying the principle as above described is exceedingly simple in structure and efficient in operation, and requires a minimum amount of current to secure the desired result.

It will be observed that there are no leading wires to the lamp, the action of the coils and core, having the relation and arrangement described, resulting in an induced effect upon the incandescent material contained within the evacuated members or lamps, and raising the same to the state of incandescence thereby enabling them to serve as a source of light, the intensity of which will depend largely on the character of the energizing coil 14, and the core employed, the nature of the filament, and its relation to the core and coil. In all cases where the filament is spirally coiled it should form a closed circuit upon itself.

As above indicated, my invention may be carried out in a wide variety of different arrangements, relations and constructions. While therefore, I have shown and described various arrangements embodying the principles of my invention, it will be understood that the principle of employing a closed and evacuated hollow vessel, adapted to encircle or surround a portion of an iron core, another portion of which core is energized by an alternating current, which vessel contains a suitable incandescent material or substance forming a closed circuit upon itself, constitutes the essence of my invention. An arrangement embodying these features results in the production of an induced effect upon the incandescent material contained in the evacuated vessel causing it to give light without the use of any lead wires other than the circuit leads from the source of current. It will be understood, of course, that in all cases as above stated, the incandescent filament should be closed upon itself, so as to form of itself a closed circuit whether such filament is in the form of a gas contained within the chamber of the evacuated hollow vessel, or is in the form of a filament thread suitably supported and arranged within said chamber.

It is to be understood that when I refer to a core, I desire to include not only a solid core, but a core of any other equivalent or suitable type, whether solid or laminated, or otherwise. Although I refer to a filament, it is not my intention to be limited thereto as my invention is applicable to any substance, vapor or the like, which is capable of being raised to incandescence or to the state of emitting light by the action induced by the relation and arrangement of such filament with reference to the core, as above described and set forth.

In the use of the word "lamp" or "vessel," I desire to include broadly any form of evacuated hollow member adapted to contain the filament or incandescent member, the essential being that the incandescent member or filament shall surround the core of the transforming or induction device, and shall be inclosed within an evacuated hollow member and shall be included within a circuit closed upon itself.

Having now set forth the objects and nature of my invention, and various constructions and arrangements embodying the principles thereof, what I claim as new and useful, and of my own invention, and desire to secure by Letters Patent is:—

1. In a lighting system, a translating device including a core formed into a closed magnetic circuit, a hollow transparent member surrounding a portion of said core, and an incandescent element contained within the interior chamber of the evacuated member.

2. In a lighting system, a translating device including a core formed into a closed magnetic circuit, an evacuated hollow member encircling a portion of said core, and an incandescent material contained within the evacuated member and forming a circuit closed upon itself.

3. In a lighting system, a translating member, a source of alternating energizing current therefor, said translating member including a core formed into a closed magnetic circuit, and an evacuated hollow member encircling a portion of said core and containing a filament closed upon itself.

4. In a lighting system, a source of alternating current, a translating device including a core formed into a closed magnetic circuit, a coil arranged in the circuit of the source of current and encircling a portion of the core, and an evacuated hollow member encircling another portion of the core and containing an incandescent material.

5. In a lighting system, a translating device including a core formed into a closed magnetic circuit, an evacuated hollow member encircling a portion of said core and containing an incandescent filament a coil encircling another portion of the core, and a source of alternating current for said coil.

6. In a lighting system, a translating device including a core formed into a closed magnetic circuit, a coil surrounding a portion of said core, a source of alternating current for said coil, a closed transparent hollow member encircling another portion of the core, said member being evacuated of air, and an incandescent filament contained within said vessel or member.

7. A lighting system including a translating device having a core formed into a closed magnetic circuit, a coil surrounding a portion of the core, a source of alternating

current for said coil, a hollow member of transparent material encircling another portion of the core, said member being evacuated of air, and a filament arranged within 5 said evacuated member and in encircling relation with respect to said core.

8. In a lighting system, a translating device including a core formed into a closed magnetic circuit, a coil surrounding a portion 10 of the core, a source of alternating current for said coil, and a transparent hollow member evacuated of air and encircling another portion of the core, and a filament contained within said evacuated member, 15 said filament having one portion thereof of a large cross sectional area and another portion thereof of reduced cross sectional area.

9. In a lighting system, a translating device including a core formed into a closed 20 magnetic circuit, a coil surrounding a portion of the core, a source of alternating current for said coil, an evacuated hollow member surrounding another portion of the core, a filament contained within said evacuated 25 member, said filament arranged in the form of a coil closed upon itself.

10. In a lighting system, a translating device including a core formed into a closed magnetic circuit, a coil surrounding a por- 50

tion of the core, a source of alternating current for the coil, an evacuated hollow member surrounding another portion of the coil, a filament inclosed within said evacuated member, said filament being arranged in a coil, one portion of the coil being of large 35 cross sectional area, and another portion of the coil being of a reduced cross sectional area.

11. In a lighting system a translating device including a core formed into a closed 40 magnetic circuit, a coil surrounding a portion of the core, a source of alternating current for the coil, a hollow evacuated member surrounding another portion of the core, a filament inclosed within said hollow evacuated member, said filament being arranged 45 in the form of a coil surrounding the core, and in a circuit closed upon itself, one portion being of small cross sectional area.

In testimony whereof I have hereunto set 50 my hand in the presence of the subscribing witnesses, on this 14th day of February, A. D. 1913.

JOSEPH LEDWINKA.

Witnesses:

S. K. THOMPSON,  
J. MARMION.