(No Model.)

E. ARNOULD.

ELECTRICAL LIGHTING APPARATUS.

No. 319,380. Patented June 2, 1885.

Fig. 1.

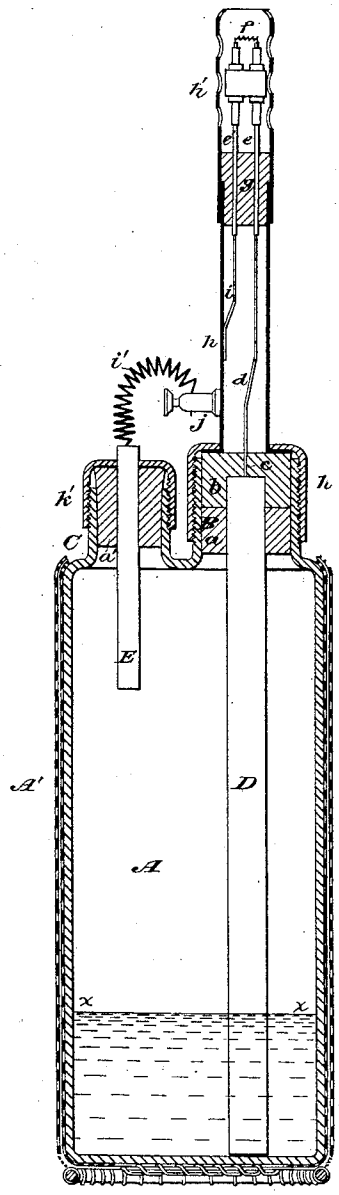


Fig. 2.

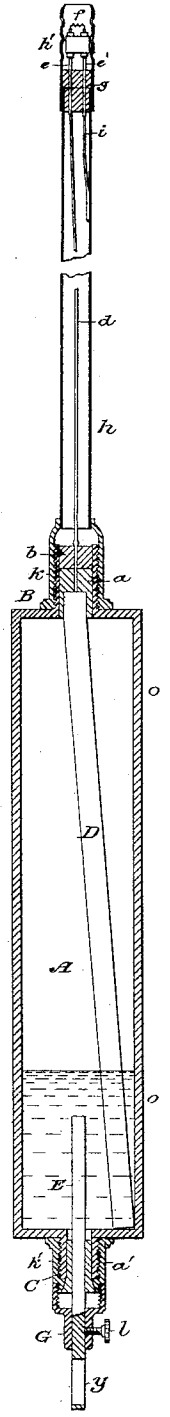


Fig. 3.

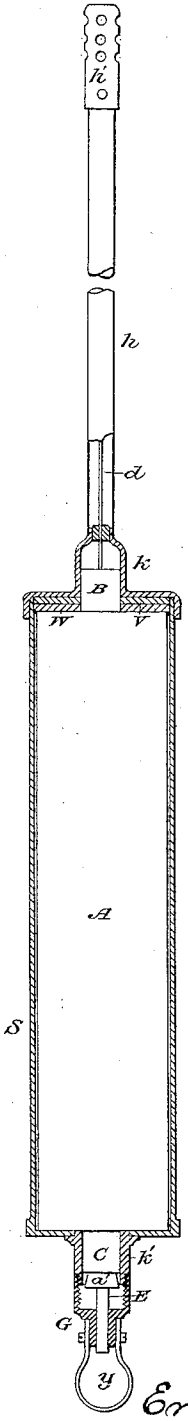


Fig. 4.

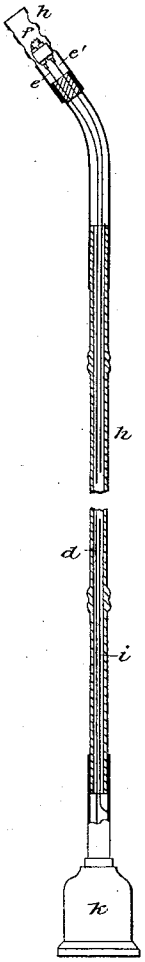
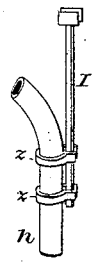


Fig. 5.



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ELECTRICAL LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 319,380, dated June 2, 1885.

Application filed September 20, 1884. (No model.)

To all whom it may concern:

Be it known that I, ERNEST ARNOULD, a citizen of the French Republic, and a resident of Paris, France, have invented certain new and useful Improvements in Electrical Lighting Apparatus, of which the following is a specification.

My invention relates to that class of electric lighting apparatuses wherein a reversing-pile is employed, and in which the circuit is broken and closed by turning the pile, which has the effect to immerse the zinc pole in the exciting-liquid to close the circuit and to remove said pole from said liquid to break the circuit. My object is to mount the poles—usually zinc and carbon—separately in the pile-receptacle, so that the zinc pole may be adjusted and replaced without disturbing the other parts.

The details of construction will be hereinafter fully described, and the novel features defined in the claims.

In the drawings which serve to illustrate my invention, Figure 1 is a vertical mid-section of one form of my igniting apparatus, wherein the current is set up by the inversion of the pile. Fig. 2 is a vertical mid-section of another form, in which the current ceases when the pile is inverted. Fig. 3 is a view of an apparatus similar to that illustrated in Fig. 2, but having the glass or other receptacle for the exciting-liquid mounted in a metal casing. In this view the said receptacle is in elevation and the metal casing in section. Fig. 4 is a sectional elevation on a smaller scale of the long igniting-stem of the apparatus. Fig. 5 is a fragmentary view illustrating the application to the igniting-stem of a key for turning on the gas.

Referring to Fig. 1, A represents the pile-receptacle, which may be of gutta-percha, hard rubber, glass, or other suitable material. This receptacle is shown as provided with a protecting-covering, A′, of wicker-work.

The receptacle A is provided with two necks, B and C, which are or may be exteriorly screw-threaded to receive screw-caps *k* and *k′*, respectively.

D is the carbon pole, which rests, by preference, on the bottom of the receptacle A, and is secured at its top in a rubber stopper, *a*, which fits tightly in the neck B of the receptacle.

In order to further assure the hermetic sealing of the receptacle, the stopper *a* is covered with a bed of wax, *b*, as shown.

To the carbon D is attached a short platinum wire, *c*, which traverses the wax *b*, and is electrically connected with a copper wire, *d*.

Secured to the receptacle A by the screw-cap *k* is a tubular igniting-stem, *h*, which is preferably provided with a perforated tip, *h′*. This stem may be constructed of any suitable material, of any desired or convenient length, and either straight or crooked. In said stem is arranged a plug, *g*, of some insulating material—as rubber, by preference—and in this plug are fixed or mounted two metal pins or rods, *e* and *e′*, which are connected together at their tops by a fine platinum wire, *f*, preferably arranged in a spiral or helical form. To steady them, the pins *e* and *e′* may be connected near their upper ends, as shown, by a tie of some insulating material. The wire *d* is connected to the lower end of pin *e*, thus putting said pin in electrical connection with carbon D, and the pin *e′* is connected by a wire, *i*, with the stem *h*, which should in this construction be of conducting material.

On the stem H is a binding-post, *j*, to which is connected one end of a wire coil, *i′*, the other end of which is connected to the end of the zinc pole E of the pile. This zinc is short, and is fixed in a stopper, *a′*, preferably of rubber, which fits hermetically but removably in the neck C of receptacle A. The normal level of the exciting-fluid in A, when the latter is held or stands as shown in Fig. 1, is indicated by *x x*, and the zinc E is not submerged in said liquid; but if the apparatus be turned over or wholly inverted the carbon and zinc poles will both be submerged, and at the same time, and a current of electricity will be generated in the circuit described, of which the platinum wire *f* forms a part. The resistance offered by this wire *f* will heat it to incandescence, and if it be then applied to the gas the latter will be ignited. As soon as the apparatus is turned back again to the position shown in the drawings—that is to say, so that it will set or stand on a table, for example—the zinc pole will be again freed from the exciting-liquid

and the current will cease. I will say here, as to the construction, that if the stem *h* is long more than one plug *g* may be used, and if the wires or rods which pass through said plug or plugs be covered with insulating material this plug may be made of conducting material. The conductor indicated by the letters *c d e* might be one wire, and also the conductors *c' i'*. If the stem *h* were made of non-conducting material, the wire *i* might connect directly with the binding-post *j*. The object in connecting the zinc E to the binding-post by a wire or coil, *i'*, is to permit the stopper *a'* to be conveniently removed from the neck of the receptacle in order to replenish the pile with the exciting-liquid, and also to renew the zinc. The perforated tip *h'* on the stem *h* serves to protect the wire *f*, and yet permits the gas to reach said wire when the gas is to be ignited. By mounting the stem *h* on the neck B over the carbon D the neck C is left free to be opened and closed at pleasure. The stem *h* is preferably made hollow to receive and protect the wires of the circuit; but this stem might be a slender rod arranged to support the wires of the circuit, arranged exteriorly to the stem, which wires might have an ordinary insulating-covering.

Referring to Fig. 2, the construction is nearly the same as that of Fig. 1, except that the zinc E is inserted at the bottom of receptacle A, and when not in use the apparatus is hung up in an inverted position—that is, with the igniting-stem down. A metallic strip, *o*, electrically connects the wire *i* with the zinc E through the medium of the stem *h*, screw-cap *k*, screw cap or thimble *k'*, and screw-cap G, which screws onto the cap *k'* and is provided with a set-screw, *l*, for clamping onto and holding the zinc E in place. In the end of the zinc E, or it may be in a metal piece to which the zinc is soldered, is a a hole, *y*, by which the apparatus may be suspended when not in use.

Referring to Fig. 3, the receptacle A, which is of glass or other similar fragile material, is protected by an exterior casing, S, of metal. The screw-cap *k* has a flange which screws onto this casing, suitable felt packing, V W, being inserted between it and the top of receptacle A. The part *k'*, designated as a "screw-cap" when referring to the other figures, is here formed in one with the casing S or soldered thereto. In this construction *y* is a suspending-loop secured to G.

Fig. 4 requires no particular description. It merely shows an elongated stem, *h*, with a curve or bend formed in it the better to adapt it to lighting some forms of gas-jets. When made long, the hollow stem may be made of wood for lightness, and the wires *i* of the circuit be carried down and connected with the metal base of said stem, or to a metal binding-post thereon, such as is shown in Fig. 1.

Fig. 5 shows a key, I, for turning the gas-cock, secured to stem *h* by means of clips *z z*. This is not new in electrical igniters for gas.

I may say that the exciting-liquid I usually employ is composed of water, sulphuric acid, and hydrochloric acid; but any of the well-known exciting-liquids may be used.

The pile or battery element I employ, and which I have described, is generally known as a "reversing-pile," as by turning it, inverting it, or reversing its position a current may be set up or broken at will.

I am aware that it is not new, broadly, to employ a reversing-pile in an electric-lighting apparatus. In such as have been proposed, however, so far as I am aware, the provision for shifting, adjusting, and renewing the zinc has differed from mine. In my apparatus the zinc may be renewed, adjusted, and replaced without disturbing the carbon and the igniting-stem, which I consider an important advantage.

I am also aware that it has been proposed to employ for a like purpose a battery or pile in which the zinc is immersed by depressing it momentarily, the pole rising out of the liquid through the medium of a spring when pressure is removed. This I do not claim as new.

Having thus described my invention, I claim—

1. The combination, to form an electrical igniting apparatus, of a reversing-pile comprising a receptacle for the exciting-liquid with two distinct necks, each provided with a stopper, and the carbon and zinc poles connected, respectively, to said stoppers, the igniting-stem mounted on the neck where the carbon pole is attached, and the electric circuit of which the platinum wire *f* forms a part, the ends of said circuit being connected with the poles of the battery or pile, and the wire *f* being arranged at the extremity of the said igniting-stem, substantially as set forth.

2. The combination of the receptacle A, provided with two necks, B and C, both formed in the same end of the receptacle and side by side, the carbon D, secured hermetically in the neck B, substantially as shown, the zinc E, mounted in the stopper *a'*, the said stopper mounted in neck C, the stem H, secured to the receptacle A over the neck B when the carbon pole is mounted, the platinum wire *f*, and the metallic connection between it and the carbon D, the metallic connection between the wire *f* and the binding-post *j*, the said binding-post, and the wire connecting said post with the zinc, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ERNEST ARNOULD.

Witnesses:
ROBT. M. HOOPER,
AMAND RITTER.