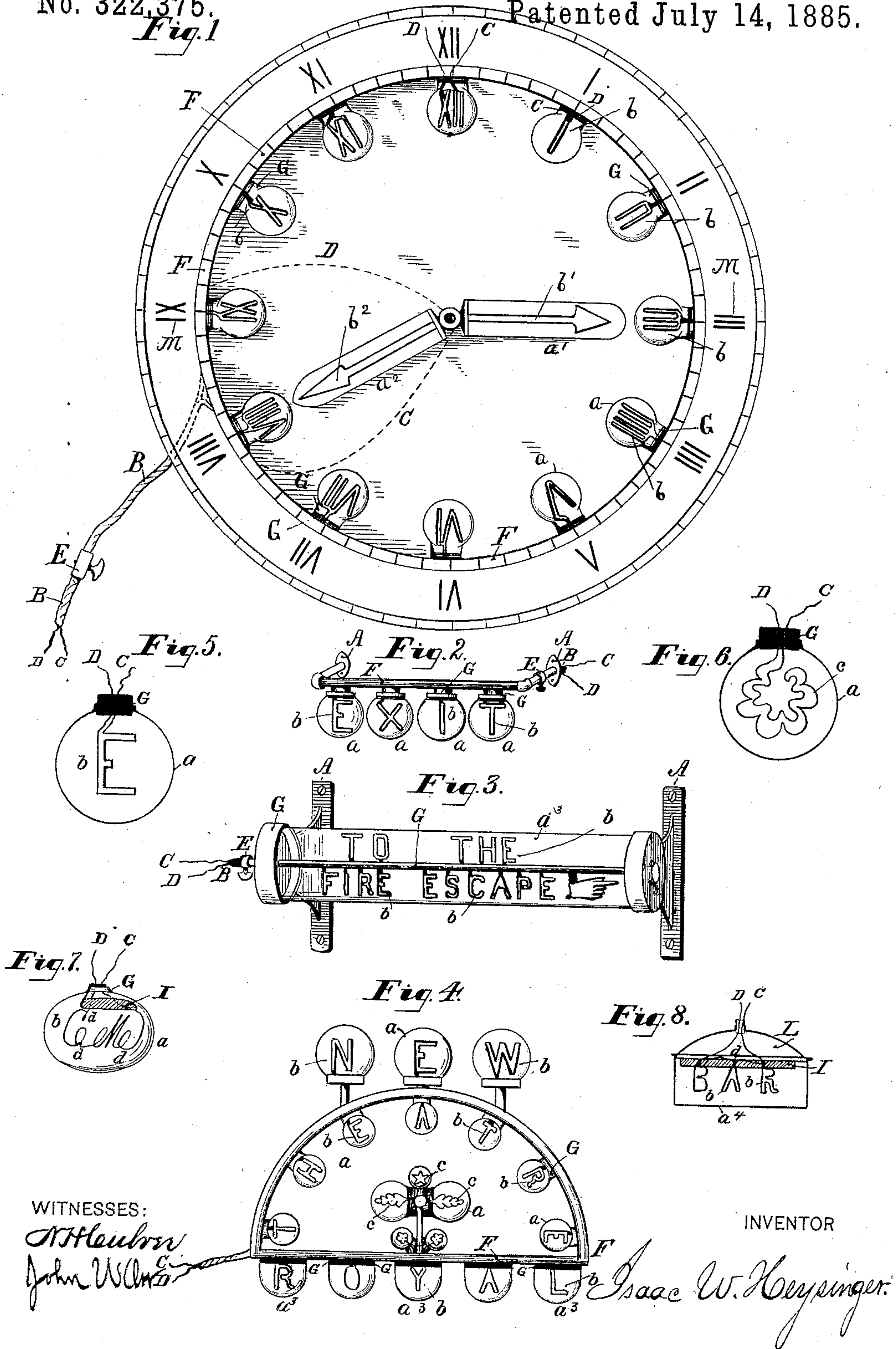


(No Model.)

I. W. HEYSINGER.
ELECTRIC INCANDESCENT SIGN.

No. 322,375.
Fig. 1

Patented July 14, 1885.



UNITED STATES PATENT OFFICE.

ISAAC W. HEYSINGER, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRIC INCANDESCENT SIGN.

SPECIFICATION forming part of Letters Patent No. 322,375, dated July 14, 1885.

Application filed September 17, 1884. (No model.)

To all whom it may concern:

Be it known that I, ISAAC W. HEYSINGER, of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a certain new and useful Improvement in Electric Incandescent Signs, &c., of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming a part of this specification, in which—

Figure 1 is a front view of the dial of a clock with the hands in position, said dial and hands exhibiting my invention in a form adapted thereto. Fig. 2 shows my invention as applied to the exit of a building in such manner as to form the word "EXIT" in the filaments of one or more electric incandescent lights, which, when a current is passing, is rendered visible to those within the building, each letter of the said word in this figure being contained in a separate bulb or vacuum-chamber. Fig. 3 shows a similar application to a fire-escape, in which a larger vacuum-chamber is employed, through which pass conducting-wires, to which are attached, by suitable connections, a series of continuous incandescent filaments, each in the form of a letter or design, the whole forming, when rendered incandescent by the passage of an electric current, the words "to the fire-escape," with a hand pointing in the proper direction. Fig. 4 shows a large design for the front of a theater, having, in addition to letters and words, a series of ornamental designs in the form of flowers, stars, &c. This figure also shows, along its lower edge, a series of vacuum-chambers of bell shape, into which the filament letters, numerals, or other designs are more easily introduced when large than with the contracted necks shown in some of the other figures. Fig. 5 shows the construction of the letters into which the carbon or like filaments are formed, and also the conductors through which is transmitted the current of electricity. Fig. 6 shows the same in the form of a flower or other involved or ornamental design. Fig. 7 shows a parlor or other light having its incandescent filament in the form of a monogram of the proprietor, or other complicated design, and also exhibits the shield which I use to cut off the incandescent light from such parts of the filament as would

impair the symmetry of the letter—and it also shows the method, at *d d*, by which I cross the filaments in forming the loops of letters without diverting the current from said loops; and Fig. 8 shows a bar-sign with a vacuum bell-glass, a metallic or other reflecting cover hermetically joined thereto, a series of filaments within the said bell-glass forming a number of letters through which the current passes and by which they are rendered incandescent, and also shows the opaque shield *I*, which covers the parts of the filaments not required for the letters, and at *d* the means by which filaments are crossed or overlapped without diverting the current across said crossings or overlaps.

The lettering in all the figures is uniform.

My invention relates to the construction of electric incandescent signs, advertising devices, ornamental designs, clock-faces, danger-signals, illuminated names of streets, street numbers of houses, theatrical, political, ecclesiastical or other mottoes or transparencies, illuminated head-dresses, articles of apparel, bouquets, &c., in which the continuous filament or filaments of carbon, platinum, or equivalent material are contained, to prevent oxidation, in a transparent vacuum or gas chamber, and which filament or filaments become incandescent when a current of electricity is passed along the same, the said filament or filaments being formed in the shape of letters, numerals, stars, flowers, crosses, or other like figures, so that when a current of electricity passes, in addition to the illumination furnished by the light of incandescence thereof, the filament or filaments themselves will exhibit words, letters, or other designs adapted to convey a special meaning to those who may see the light, whereby, without additional cost, and without loss of light, the light subserves a double purpose—first, that of illumination; and, second, that of directly conveying by words, letters, numerals, or other designs, a meaning supplemental to said illumination, and which could not be otherwise conveyed thereby without great loss of light. I sometimes place a single letter or numeral in each bulb or vacuum-chamber, and then form a connected series of bulbs, all attached to the same main conductor, just as incandescent-light bulbs are ordinarily attached, except

that the letters into which the filaments are formed are so arranged in the series that the series of bulbs shall, as a whole, form a complete word, phrase, or sentence; or I place a number of these filaments formed in the shape of letters, or a single filament formed into a number of letters—such as a word, phrase, or sentence, or an ornamental design—in a single vacuum-chamber, into and from which a suitable conductor passes, and from which are transmitted the currents through the continuous filament or all the filaments simultaneously, and the whole thereby made incandescent.

Referring to the drawings, in Fig. 1 I show a clock-dial in which the numerals to indicate the hours from one to twelve are each contained in a hermetically-sealed vacuum-bulb, and are composed of filaments of carbon or other suitable substance used for incandescent lighting. Each of these filaments is formed into the shape of a number, and in order to transmit the current of electricity through the numeral and back to the conductor, I usually double the filament in such manner that the doubled sides do not come into contact, and then join the ends thereof to a conductor, which passes through the neck of the bulb in the ordinary way, and to the main conductor F, which surrounds the dial and is united with the electric cable B. I also form the hour and minute hands of double filaments b' b'' , in the same way, and inclose them in the light transparent bulbs a' a'' .

The object of thus doubling the filaments is to secure an easy return-connection, and also to greatly increase the body and brilliancy of the incandescent letters, numerals, &c. The connection of the hands with the conductor is made through the arbors upon which the hands rotate. The electric conductor B transmits the current to the dial and also actuates the mechanism of the clock, unless a mechanical motor be preferred. At E is a switch, which cuts off the electric current from the dial and hands, or conversely. If, now, the current be turned on, the outline of the hands will be clearly shown in lines of incandescence, and also the numerals around the periphery of the dial, so that the hour of the night can be recognized at great distances from tower-clocks; or a simple turn of the switch E, for shelf or office clocks, will illuminate the hands and dial, making the arrangement of great utility for the sick-room, where the switch can be readily controlled by the nurse or patient, as well as for many other purposes. In addition to the numerals formed by the filaments I sometimes use a separate series of numerals of the ordinary sort, M M, either outside or within the circle of incandescent lights. The special advantage of this illuminated clock over those illuminated through a transparent dial-face, which advantage equally pertains to the other forms of my invention, is that there is no loss of light, all the light used for illuminating the clock or

sign being of the same value for general illumination as though no clock or sign were used.

In Fig. 2 I show my invention applied to the exit of a hotel, theater, or other place of popular assemblage. A main conductor, F, supports a number of incandescent bulbs, substantially like those in general use, though I sometimes make my bulbs flat, oval, or square in cross-section, and provide them with round or elongated mouths, as may be most convenient for the form and size of the letters to be used. Each bulb contains a filament formed into the shape of a letter, and the four bulbs shown side by side when the filaments are made incandescent exhibit more clearly than can be done in any other way, and with no loss of light, the word "EXIT," thus directing persons in times of darkness and danger from fire, panic, &c., to a point of safety from as far as the light itself is visible.

In Fig. 3 I form the letters which constitute the direction to the fire-escape out of a series of filaments, all of which are inclosed in a single long glass vacuum-jar and attached to the conductors, which enter the jar and are connected at their outer end with the electric-supply cable.

In Fig. 4, in addition to the series of bulbs, each containing a single letter, I show certain ornamental designs $c c c c c$, which may be varied at will when the filaments are formed. At the lower part of Fig. 4, $a^3 a^3 a^3$, I show bell-glass bulbs with large openings, sealed to the plugs carrying the conductors, whereby larger letters and designs can be introduced than through more contracted necks.

In Figs. 5 and 6 will be seen the method by which the letters, &c., are formed. A continuous filament is cut, molded, pressed, or otherwise shaped into the form of a letter, or the like, and then baked between retaining-plates until completely carbonized, when it is attached to the conductors in the manner of the loops in ordinary use.

It frequently occurs that the upper parts of letters will exhibit incandescent stems likely to destroy the symmetry of the letters. In such cases they may be rendered non-luminous by increasing the weight of the conductor there, but it is simpler to use the shield shown at I, in Figs. 7 and 8, which overlies, without touching such parts either on the front or on both sides, and effectually conceals the same. This shield I make of any light and opaque material, and clip it to shape to suit the letter or design with which it is to be used.

Where the convolutions of the letters require the filaments to cross or overlap each other, it would evidently cause the current to pass from one to the other at such points, if in contact, leaving the parts beyond in darkness. To avoid this, I deflect the filament which lies in the rear at such points into a different vertical plane, whereby a bend is made sufficiently great to keep the overlapping parts out of contact with each other, without impairing the

effect of the letter when illuminated. This is shown at *d d d*, Figs. 7 and 8. For a barsign or other light over the door of a saloon, &c., I use a large bell-glass, *a*⁴, turned upward and covered by a reflector, *L*, hermetically attached thereto. (See Fig. 8.) I attach the filaments, forming the word "BAR," for instance, to the conductor which passes through the top of the reflector, and the device illuminates the letters most beautifully, and furnishes all the light which it could do if a simple series of incandescent loops were alone employed.

I support these various devices by means of brackets, or in any other well-known way, and I modify the applications of my invention to suit the varying conditions met with—as, for instance, store-windows, on ship-board, in factories, halls, churches, over altars, in schools, &c., or for ornamental work of every class, either with plain or colored glasses, and with all degrees of incandescence, as a full current may be turned on to one portion of a design and a low red on another, so as to vary the effect at pleasure.

When a low red light is turned onto a clock-dial it may be made barely visible in a darkened room, and may glow thus all night, easily read, but entirely harmless to disturb the occupant.

As shown in the figures, I prefer to form my vacuum-chambers, *a a*³ with detachable air-tight stoppers *G G G*, through which the conducting-wires are carried, and to which are attached the shield or shields, *I I*. (See Figs. 7 and 8.) The glass bulbs or chambers being thus provided with the detachable stoppers, which carry the incandescent filaments, as shown, the said stoppers may be readily removed and the filaments be replaced with others showing different letters, designs, &c., which may thus be kept in stock in a much less expensive and cumbersome form than with the bulbs or chambers complete and with the letters permanently sealed in. The stoppers also admit of ready replacement of worn out filaments.

As shown in Fig. 1, the conductors which supply the peripheral series of numerals around the dial are controlled by the switch *E*, while the conductors which transmit electricity to the hands, as shown in dotted lines, are supplied by an independent set of wires, which are not, as shown, controlled by the same switch, *E*. This allows the numerals of the dials, or the hands, to be illuminated, both together or separately, or one may be kept at a low red heat while the other is in a state of brilliant incandescence. The same is true of the other designs, phrases, &c., shown, which may be differentially illuminated, if desired, by the same system of independent currents, or by a single switch and a single conductor.

For general use these incandescent electric-light bulbs can be made in factories for the purpose, all complete, and assorted into letters and numerals in any desired proportion.

The number of lights required to supply a window, theater, railroad, or other sign, &c., being known, the lights can be ordered from the factory according to the letters requisite, when they can be readily screwed into place on the conducting-rod, as with ordinary incandescent lights, and the whole device will be complete and ready for use. If one is broken it can be easily replaced, or they can all be renewed or changed at pleasure.

Having now described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An electric incandescent light, consisting of a series of transparent vacuum-chambers, *a a a a*, provided with detachable stoppers *G G G G*, transmitting electric conductors *C D*, connected with a series of incandescent filaments, *b b b b*, within the said bulbs or chambers, said filaments being formed into various letters or numerals so adapted to each other that the series shall form, when illuminated, a word or phrase, substantially as described.

2. In combination with the supporting-rod *F*, provided with the conducting-wires *C* and *D*, the vacuum-chamber *a*³, into or through which the said rod *F* extends, the bracket or brackets *A*, which support the same, together with the incandescent electric filaments *b b b*, in the form of letters, &c., connected with the conductors *C* and *D* and supported by the said rod *F*, and extending upward or downward therefrom within the said chamber so as to exhibit a complete word, phrase, or design when viewed from the front, and to have the light thereof unobstructed when emitted to the rear, substantially as described.

3. In combination with the vacuum chamber *a*³ or chambers *a a a a*, the conducting-wires *C* and *D*, the switch *E*, and supporting-rod *F*, a series of incandescent electric filaments, *b b b b*, extending along above the rod *F*, and an opposite series extending along beneath the said rod *F*, the upper series having their connections with the conductors *C* and *D* at the lower parts of said letters and the lower series at the upper parts thereof, as shown in Figs. 3 and 4, substantially as described.

4. In an incandescent electric light consisting of a series of filaments formed into a word, phrase, or ornamental design, the combination of the various filaments with independent electric conductors controlled by duplicate switches, by means of which one portion of the design is kept at a low red heat and the other in a stage of brilliant incandescence, whereby various ornamental or useful effects are produced, substantially as described.

5. In a clock-dial, in combination with the ordinary numerals *I, II, III, &c.*, and the rotating hands or pointers, the concentric and parallel series of incandescent electric filaments formed into numerals corresponding thereto, inclosed in vacuum-chambers *b b b*,

connected with the conducting wires C and D and controlled by the switch E, by means of which the said dial may be illuminated and the duplicate numerals rendered incandescent, substantially as and for the purposes set forth.

6. A clock for chamber or other use having a dial provided with concentric numerals and an hour and minute hand, in combination with one or more electric incandescent lights forming an integral part of said dial and controlled by the local switch E, to illuminate the said dial momentarily or continuously, substantially as described.

7. In a clock or other time-piece, the hands b' and b^2 , provided with incandescent electric filaments contained within the vacuum-chambers a' and a^2 , electrically connected, through the arbors or journals upon which said hands rotate, with the conductors C and D, or their equivalents, through which, when a current of electricity is transmitted, resistance thereof will be encountered in the said filaments b' and b^2 and the same be raised to a state of incandescence, substantially as and for the purpose set forth.

8. The combination, in a time-piece, of the concentric series of incandescent electric filaments $b b b b$, formed into numerals, one or more transparent vacuum-chambers, $a a a$, inclosing said numerals and provided with electric conductors C and D, by means of which a current of electricity is transmitted through the said filaments, the main conductor B, and switch E, together with the rotating hour and minute hands having electric incandescent filaments b' and b^2 , contained within the vacuum-chambers a' and a^2 , and provided with electric conductors connecting the said hands with the said main conductor, through the centers of rotation thereof, the whole constructed to operate substantially as and for the purposes shown and described.

9. In combination with the filament b of an electric incandescent light, the opaque shield I, adapted to cover and conceal, without touching, such parts of the filament as are not to

appear illuminated, substantially as and for the purpose described.

10. A carbon or other filament or filaments adapted for use in an incandescent electric light, said filament or filaments being formed into the shape of a word, letter, phrase, or ornamental design, in a plane surface or curve, or a series of such planes or curves, one line or the other of each filament at the points $d d d d$, where they cross or overlies each other being bent to the front or rear in an arc, or its equivalent, to prevent contact and deflection of the current without interference with the general plane or surface upon which such letter or design is formed, substantially as described.

11. A letter, numeral, word, or ornamental design, formed of carbon or its equivalent and adapted to be used as the incandescent filament of an electric light, said letter, word, or design consisting of a double filament, or a series of double filaments, following the outlines of the said letter, &c., so that when rendered incandescent each letter, numeral, word, or design will be shown in a double outline, and produce a more broad, solid, and brilliant effect, and may be read at a greater distance or with a lower power of incandescence than could be otherwise done, substantially as described.

12. An electric incandescent sign consisting of a series of transparent vacuum-bulbs containing a series of incandescent electric filaments connected with electric conductors, said filaments being constructed in the forms of words, letters, or ornamental designs, erected upon or depending from a supporting rod above, beneath, or at the sides of said letters, &c., so that when viewed from the front a complete connected word, phrase, or design is exhibited, while the emission of light from the said incandescent filaments is unobstructed to the rear, substantially as described.

ISAAC W. HEYSINGER.

Witnesses:

P. O'DONNELL,
F. L. ROEPKE.