No. 627,524. Patented June 27, 1899.

E. B. PETERSEN.

HEAT OR COLD INDICATOR.

(Application filed July 7, 1898.)

(No Model.) 2 Sheets—Sheet 1.

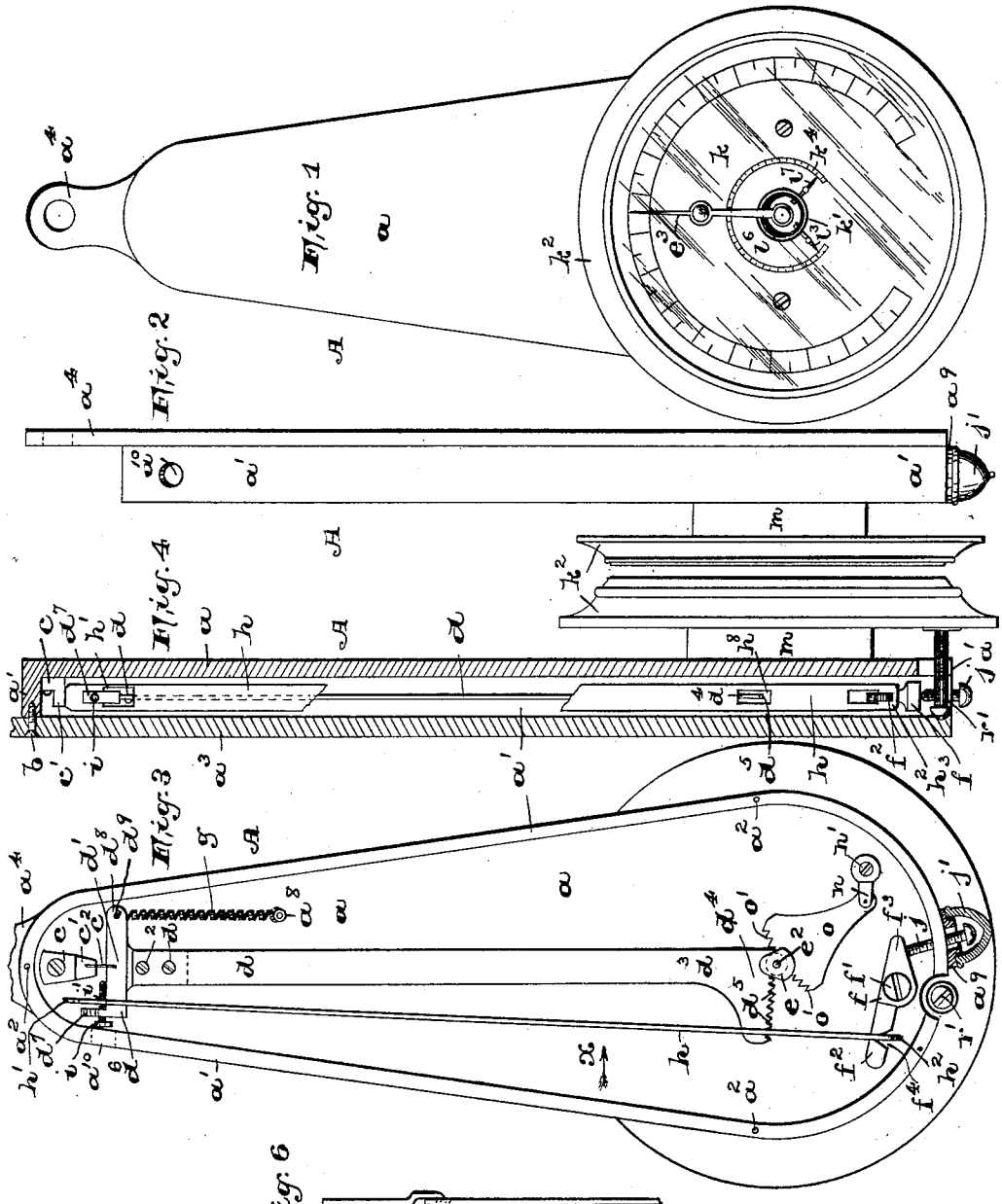


Fig. 1

Fig. 2

Fig. 4

Fig. 3

Fig. 6

Fig. 5

WITNESSES:

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Thos. G. Plate.

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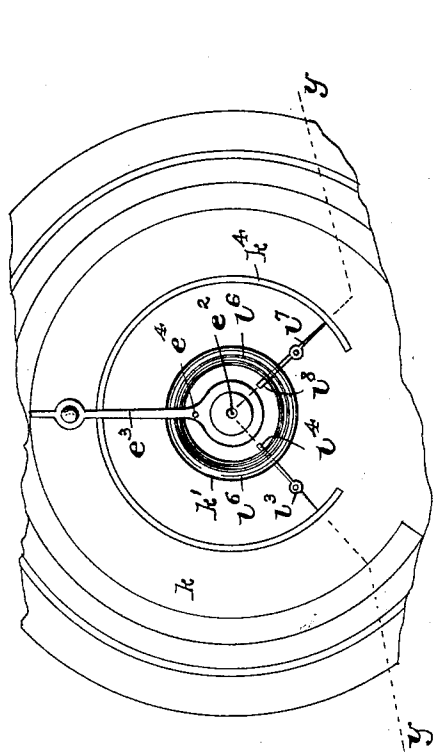


Fig. 8

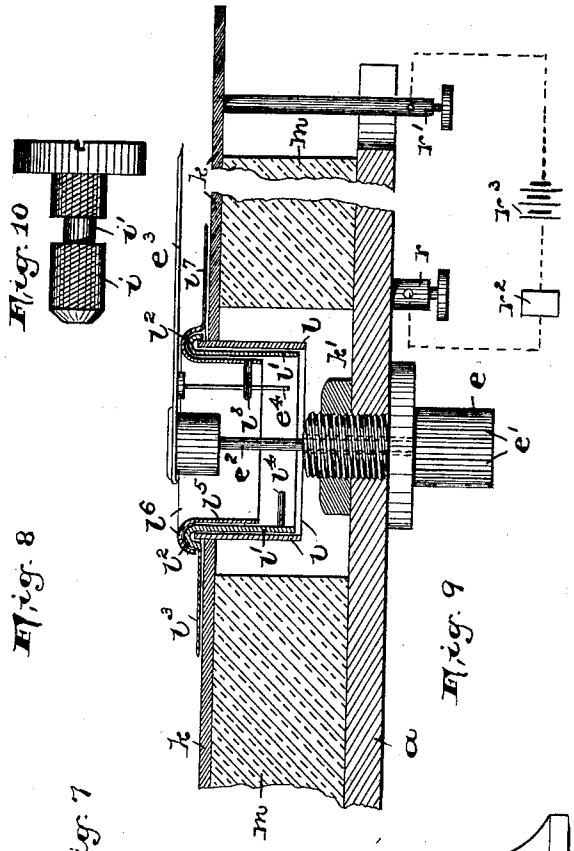


Fig. 9

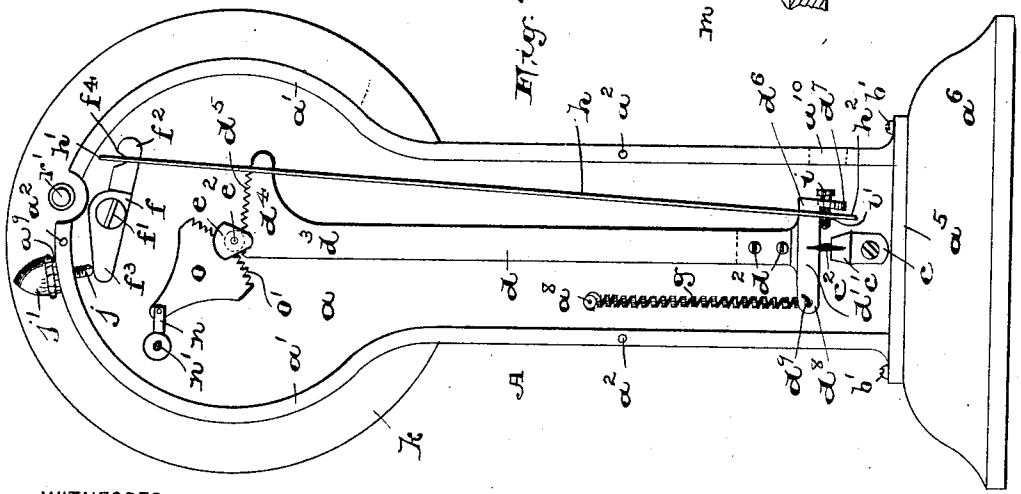


Fig. 7

Fig. 10

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UNITED STATES PATENT OFFICE.

EMIL B. PETERSEN, OF KEARNY, NEW JERSEY.

HEAT OR COLD INDICATOR.

SPECIFICATION forming part of Letters Patent No. 627,524, dated June 27, 1899.

Application filed July 7, 1898. Serial No. 685,322. (No model.)

To all whom it may concern:

Be it known that I, EMIL B. PETERSEN, a citizen of the United States, residing at Kearny, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Heat or Cold Indicators; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My present invention relates to heat or cold indicators and is in the nature of improvements in the construction of devices of this character set forth in my previous Letters Patent No. 605,129, granted June 7, 1898.

The primary object of my present invention is to simplify the construction and general arrangements of the parts and also to provide a more accurate means of adjusting the parts.

A further object of this invention is to provide a novel means of regulating an electrical contact between the index-hand of the indicating-dial and certain other parts of the indicator to give notice when the temperature rises above or falls below that required.

My invention therefore consists in the novel construction of a heat or cold indicator, herein set forth, and also in such novel arrangements and combinations of parts, all of which will be described more in detail in the accompanying specification and finally embodied in the clauses of the claim.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a front view of a heat or cold indicator embodying the principles of my present invention, and Fig. 2 is a side view of the same. Fig. 3 is a back view of the indicator with the cover of its casing removed, illustrating in elevation the arrangement of the mechanism within the casing; and Fig. 4 is a longitudinal vertical section of the same when looking in the direction of the arrow x in Fig. 3. Figs. 5 and 6 are a face and edge view, respectively, illustrating in detail a modified construction of attaching or connecting the ends of a metallic strip, which is to be expanded by heat or contracted by cold, to an actuating-arm of the indicator. Fig. 7 is a back view of a modified construction of a heat or cold indicator with the cover of the casing removed, illustrating the actuating mechanism within the casing in elevation. Fig. 8 is a face view of a portion of the indicating-dial on an enlarged scale; and Fig. 9 is a cross-section of the same, taken on line $y\ y$ in said Fig. 8, illustrating in connection therewith a portion of the casing and binding-screws arranged respectively on said casing and on the dial. Fig. 10 is a view of an adjusting-screw on an enlarged scale.

Similar letters of reference are employed in all of the said above-described views to indicate corresponding parts.

In said drawings, A indicates the complete device, comprising a casing of any desirable material and configuration in outline, said casing consisting, essentially, of a front a and the surrounding edge a', in which there is an arrangement of screw-threaded holes a^2. Secured to said edge a' by means of screws b (see Fig. 4) is a removable back or cover a^3. The said casing may be provided at the top of the front a with a perforated ear or lug a^4 for suspending the indicator from a nail, as will be understood from an inspection of Figs. 1 and 2, or said casing may have a bottom a^5 and may be secured by means of screws b' to an ornamental base a^6, as indicated in Fig. 7.

As will be seen from Fig. 3, 4, and 7, I have secured the top thereof, as in Figs. 3 and 4, or near the bottom, as in Fig. 7, a bracket c, having a rearwardly-extending arm c', to which is secured, preferably by being soldered or otherwise fastened in a slot in said arm c', one end of a small flexible band or plate c^2, which has its opposite end likewise arranged and secured in a slot of a cross-arm d' of an actuating lever or rod d. Said rod is thereby pivotally connected with said bracket c' and is free to oscillate in the manner to be hereinafter more fully set forth. Said arm d' and the lever d are usually made in separate pieces, the two parts being secured together by means of screws or pins d^2, substantially as illustrated in Figs. 3 and 7. The opposite end d^3 of the said actuating lever or rod d is provided with a sector-like portion d^4, which is provided with notches or teeth d^5 in oper-

ative engagement with the teeth e' of a pinion e, which is secured on a spindle or arbor e^2, provided with the usual form of index-hand e^3, as clearly illustrated in Fig. 9. On a pivotal pin or screw f' on the inner surface of the said front a is an arm f, having a pair of oppositely-extending finger-pieces f^2 and f^3, said finger-piece f^2 being preferably provided with a notch f^4 in the lower or under edge thereof. The said arm d' of the lever or rod d has a forwardly-extending portion d^6 with a bearing d^7 thereon, and in said bearing I have arranged an adjusting-screw i, which can be turned by a screw-driver inserted through an opening a^{10} in the side a' of the casing, said screw being provided with an annular recess i'. Connecting said upper end of the lever d with the said arm f is a thin strip or band of metal h, said strip having an open end h' arranged over the said screw i and in the recess i' on said screw, whereby said end h' is capable of a lateral adjustment, and also having an open end h^2 arranged over the finger-piece f^2 and hooked into the notch f^4 therein, as will be seen from Figs. 3 and 7. Said strip or band is also provided with an opening h^8, in which the end portion d^4 oscillates to enable the swinging motion of the lever d. Said opening h^8 is large enough so as not to interfere with the movement of said portion d^4 of the lever d when said strip h expands or contracts.

In order that the parts may not sag and that the strip or band h will always be taut, the arm d' has a suitable projection d^8, provided with a hole d^9, in which is secured the end of a tension-spring g, having its opposite end secured to a screw or post a^8, as shown. The arm f is also capable of an adjustment by having its finger portion f^3 in contact with the point of a set-screw j, screwed through a perforation in the side a' from the outside and having its head protected by a suitable cover j', screwed or otherwise secured on a boss a^9 on said side a', as clearly indicated in the several figures of the drawings, to prevent tampering with the mechanism of the device. By means of this screw j the tension on the strip or band h can be increased or decreased and the index-hand under the normal conditions of temperature brought to the proper indicating-point to cause the instrument to register the rise and fall in degrees of temperature very accurately.

From an inspection of Figs. 1, 2, and 9 it will be seen that I have secured on the face of the front a of the casing a dial-plate k, which has a central opening k' and may be insulated from the said plate or front a by suitable non-conducting materials m. Said plate k is also protected with the usual construction of frame k^2 and glass k^3.

From an inspection of Figs. 3 and 7 it will be seen that in case of an expansion of the strip or band h the spring g will cause the lever or rod d to move over toward the left of the casing, the distance of such movement being in proportion to the degree of expansion of said strip h. The movement of said rod h will actuate the pinion e, which, being on the spindle or arbor e^2, will cause the index-hand e^3 to indicate the degree of heat on the dial. In case of a contraction of said strip or band h, owing to a fall in temperature, the strip h will exert a pull upon the screw i, whereby the several parts will move in the opposite direction, and the fact will be indicated by the hand e^3 on the face of the dial k.

In lieu of the form of strip or band h illustrated in Figs. 3 and 4 I may use a strip or band h^3, having at its ends an opening h^4, through which is passed the tongue h^6 of an eye-plate h^5, which may be secured to the band or strip by rivets h^7, as clearly illustrated in Figs. 5 and 6, the said eye-plates h^5 being arranged one over the screw i and the other over the finger-piece f^2 of the arm f, as will be clearly understood.

In order to make up for any lost motion between the teeth or notches d^5 of the lever or rod d and the teeth of the pinion e, I have pivoted to a suitable bracket n, secured against the inner surface of the front a of the case by means of a screw n', a weight o, which has an arc-shaped edge provided with teeth or notches o', adapted to engage with the pinion e, whereby the said teeth of the said pinion and the teeth or notches d^5 of the lever or rod d will be caused at all times to be in operative contact without any possible lost motion between them.

From the above description it will be evident that I have provided a simply constructed and efficient device which can be used as a thermometer to indicate degrees of heat or cold.

When it is intended to use the device as an annunciator to indicate certain previously-determined degrees of heat or cold, I have arranged in the opening k' of the dial k a tubular sleeve l, the upper edge of which is preferably made to extend slightly above the face of the dial k. Movably arranged in said sleeve l and in frictional contact with the inner surface thereof is a second sleeve l', having an annular bead l^2 and an index-hand or pointer l^3. Within said sleeve l' is a radially-arranged post or stud l^4. A second sleeve l^5, which is shorter than the sleeve l', is arranged in movable frictional contact with the inner surface of said sleeve l', said sleeve l^5 having a bead l^6, which fits over the bead l^2 and is provided with a pointer or index-hand l^7. Within said sleeve l^5 is a radially-arranged post or stud l^8, the arrangement of said sleeves and studs being substantially as indicated in Figs. 8 and 9. The large index-hand e^3 is provided on its under side with a rod e^4, which extends down into the said sleeve l^5 and is of sufficient length to be brought in contact with the stud or post l^8 when moving toward the right, and will also be brought in contact with the stud or post l^4 when moving toward the left. Owing to the independent

movable arrangement of the sleeves l' and l^5, the index-hands or pointers can be arranged in any desired positions on the face of the dial k to indicate any predetermined numbers of degrees on the graduations k^4 on said dial k. The said dial k is insulated from the front a by means of a rubber or other suitable disk m of a non-conducting material, and r is a binding-post on said front a, while r' indicates a second binding-post on the dial-plate. In circuit with said posts r and r' are an electric alarm r^2 and a battery r^3, and it will be evident that no matter at what graduations the pointers l^3 and l^7 point the studs l^4 and l^8 on their respective sleeves will have been correspondingly arranged, whereby said post e^4 of the index-hand e^3 will make an electrical contact when it is brought against either of said studs l^4 or l^8, which fact will be indicated by the electrical alarm. This device can therefore be successfully used as an indicator for designating a certain rise in temperature or a certain fall in temperature, as will be clearly evident.

I am aware that many changes may be made in the several arrangements and combinations of parts, as well as in the details of the construction thereof, without departing from the scope of my present invention. Hence I do not limit my invention to the exact arrangements and combinations of the parts herein described, and illustrated in the accompanying drawings.

Having thus described my invention, what I claim is—

1. A heat or cold indicator, comprising a casing, an index-dial, a bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, a pinion in said casing, in operative engagement with the teeth or notches of said lever, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, and a metallic strip or band h having open ends arranged respectively over said screw i and over a notched finger-piece of said arm f, substantially as and for the purpose set forth.

2. A heat or cold indicator, comprising a casing, an index-dial, a bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, and a metallic strip or band h having open ends arranged respectively over said screw i and over a notched finger-piece of said arm f, and an adjusting-screw in said casing, in engagement with a portion of said arm f, substantially as and for the purpose set forth.

3. A heat or cold indicator, comprising a casing, an index-dial, a bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, a pinion in said casing, a weight o pivoted in said casing having teeth or notches in operative engagement with said pinion, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, and a metallic strip h having open ends arranged respectively over said screw i and over a notched finger-piece of said arm f, substantially as and for the purpose set forth.

4. A heat or cold indicator, comprising a casing, an index-dial, a bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, a pinion in said casing, a weight o pivoted in said casing having teeth or notches in operative engagement with said pinion, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, and a metallic strip h having open ends arranged respectively over said screw i and over a notched finger-piece of said arm f, and an adjusting-screw in said casing, in engagement with a portion of said arm f, substantially as and for the purposes set forth.

5. A heat or cold indicator, comprising a casing, an index-dial, bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, a pinion in said casing, a weight o pivoted in said casing having teeth or notches in operative engagement with said pinion, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, a metallic strip or band, eye-plates h^5 secured to the ends of said strip or band, having openings, whereby one of said plates can be placed over the screw i and the other plate over the notched finger-piece of said arm f, substantially as and for the purpose set forth.

6. A heat or cold indicator, comprising a casing, an index-dial, a bracket within said casing, a lever d connected with said bracket so as to oscillate, a cross-arm d' on said lever, having a bearing, a screw i in said bearing, and a spring connected with said arm d' and attached to the casing, teeth or notches on said lever, a pinion in said casing, a weight o pivoted in said casing having teeth or notches in operative engagement with said pinion, an index-hand on an arbor on which said pinion is arranged, an arm f in said casing, a metallic strip or band, eye-plates h^5 secured to the ends of said strip or band, having openings, whereby one of said plates can

be placed over the screw *i* and the other plate over the notched finger-piece of said arm *f*, and an adjusting-screw in said casing, in engagement with a portion of said arm *f*, substantially as and for the purpose set forth.

7. A heat or cold indicator, comprising a casing, an index-dial, an index-hand e^3, a pinion on an arbor connected with said index-hand, a bracket in said casing, a lever *d* connected with said bracket so as to oscillate, a cross-arm *d'* on said lever, having a bearing, a screw *i* in said bearing, and a spring connected with said arm *d'* and attached to the casing, teeth or notches on said lever in operative engagement with said pinion, an arm *f* in said casing, a metallic strip or band *h* having open ends arranged respectively over said screw *i* and over a notched finger-piece of said arm *f*, a pair of centrally-arranged and independently-movable sleeves having points of contact, and a rod on said index-hand capable of engagement with either of said points of contact connected with said sleeves, to establish an electric circuit, substantially as and for the purpose set forth.

8. A heat or cold indicator, comprising a casing, an index-dial, an index-hand e^3, means for actuating the same, centrally-arranged sleeves *l'* and l^5, movable independently, one within the other, a radially-arranged stud or post l^4 on said sleeve *l'*, a radially-arranged stud or post l^8 on said sleeve l^5, index-hands l^3 and l^7 connected, respectively, with said sleeves *l'* and l^5, and a rod e^4 on said index-hand e^3 capable of engagement with said studs or posts l^4 and l^8, to establish an electric circuit, substantially as and for the purpose set forth.

9. A heat or cold indicator, comprising a casing, an index-dial, an index-hand e^3, a pinion on an arbor connected with said index-hand, a bracket in said casing, a lever *d* connected with said bracket so as to oscillate, a cross-arm *d'* on said lever, having a bearing, a screw *i* in said bearing, and a spring connected with said arm *d'* and attached to the casing, teeth or notches on said lever in operative engagement with said pinion, an arm *f* in said casing, a metallic strip or band *h* having open ends arranged respectively over said screw *i* and over a notched finger-piece of said arm *f*, a pair of centrally-arranged sleeves *l'* and l^5 movable independently, one within the other, a radially-arranged stud or post l^4 on said sleeve *l'*, a radially-arranged stud or post l^8 on said sleeve l^5, index-hands l^3 and l^7 connected, respectively, with said sleeves *l'* and l^5, and a rod e^4 on said index-hand e^3 capable of engagement with said studs or posts l^4 and l^8, to establish an electric circuit, substantially as and for the purpose set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 2d day of July, 1898.

EMIL B. PETERSEN.

Witnesses:

FREDK. C. FRAENTZEL,

WALTER H. TALMAGE.