

(No Model.)

2 Sheets—Sheet 1.

H. EDMUNDS, Jr.
ELECTRIC LIGHTING SYSTEM.

No. 495,932.

Patented Apr. 18, 1893.

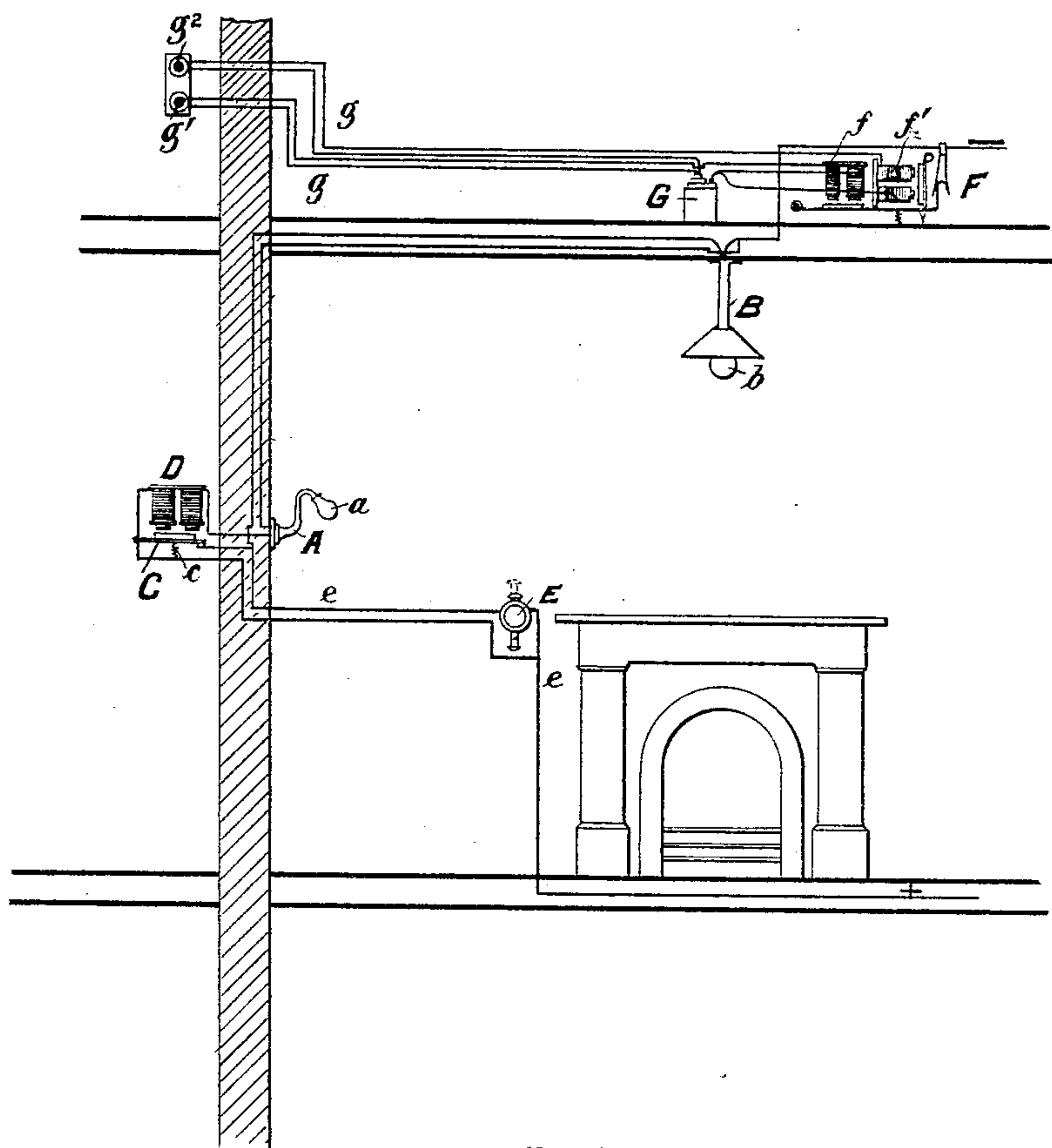


FIG. 1

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Witnesses:

E. B. Bolton.

E. K. Sturtevant.

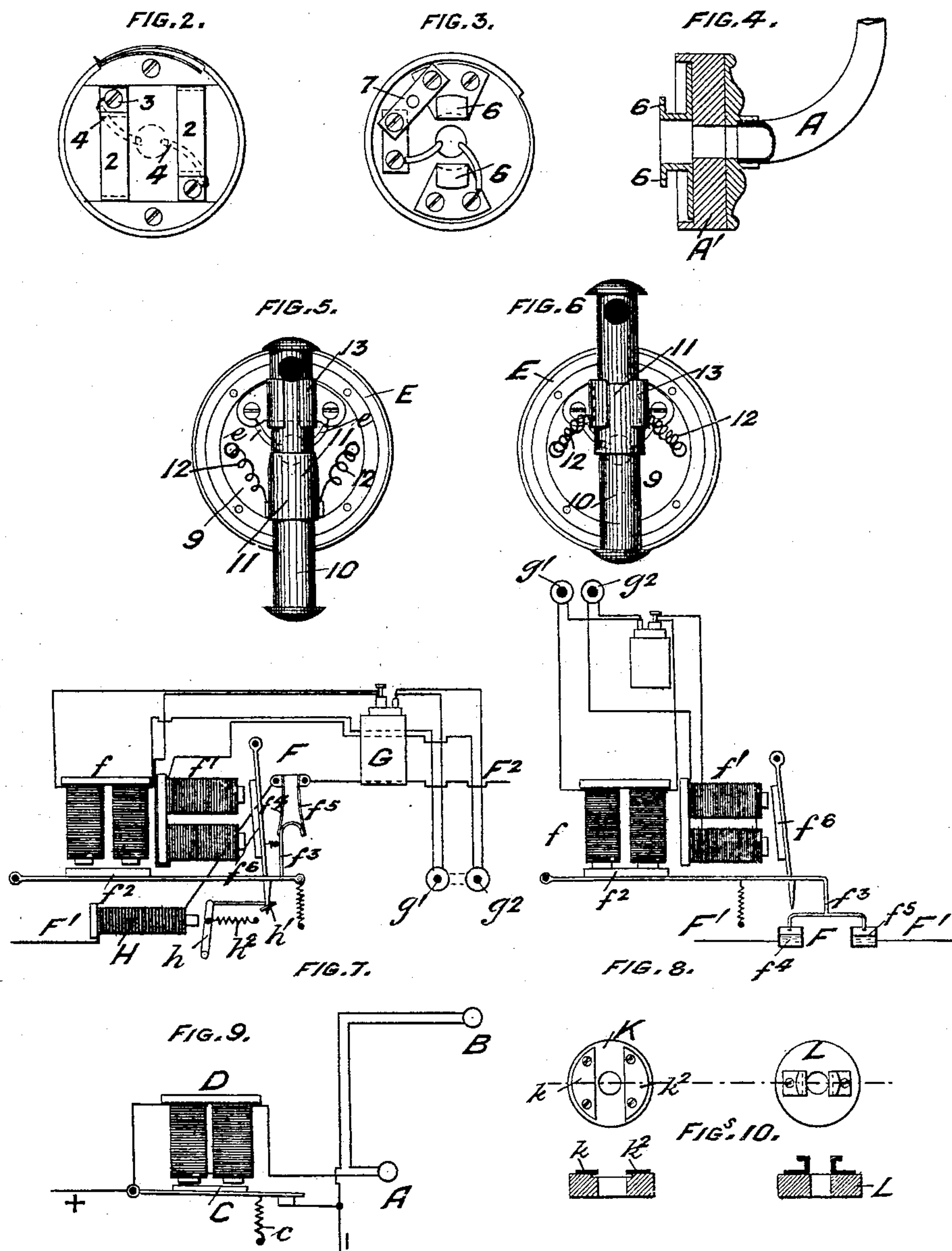
By

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His Attorneys.

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UNITED STATES PATENT OFFICE.

HENRY EDMUNDS, JR., OF LONDON, ENGLAND, ASSIGNOR OF NINE-TENTHS
TO ALBERT SECHRIST, OF DENVER, COLORADO.

ELECTRIC-LIGHTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 495,932, dated April 18, 1893.

Application filed October 19, 1892. Serial No. 449,389. (No model.) Patented in England March 29, 1884, No. 5,670.

To all whom it may concern:

Be it known that I, HENRY EDMUNDS, JR., a subject of the Queen of Great Britain, residing at 2 Victoria Mansions, in the city of Westminster, London, county of Middlesex, and Kingdom of England, have invented a new and useful Electric-Lighting System, (for which I have obtained a patent in Great Britain, No. 5,670, dated the 29th of March, 1884,) of which the following is a specification.

The object of the present invention is to give greater facilities than heretofore for economically and efficiently controlling the supply of electricity to lamps and especially incandescent lamps, whether singly or in groups used in the lighting of houses and similar structures.

In the accompanying drawings—Figure 1 is a diagram view explanatory of my arrangement of circuit connections and devices for controlling the supply of electricity to lamps. Fig. 2 is a front view of a fixed socket containing terminals for the attachment of a lamp bracket. Fig. 3 is a front view of a pair of hooks adapted to engage with the said fixed terminals. Fig. 4 is a sectional side view of Fig. 3. Fig. 5 is a front view of a switch for controlling the current to an electric pilot light in its open or inoperative position the cover being moved to show the interior. Fig. 6 is a similar view of this switch in its closed or operative position. Fig. 7 represents my improved arrangement for operating a main line switch from a distance by the feeble current from a "Leclanché" or other small battery. Fig. 8 shows another form of main line switch adapted to be similarly operated. Fig. 9 shows the arrangement of bridge piece and electro-magnet by which the lighting or extinguishing of a pilot lamp may be automatically governed by the removal or insertion of a detachable bracket lamp. Figs. 10 are detail views of my snap connection for attaching lamps to their sockets or detaching them therefrom.

In applying my improved arrangements of electrical connections to say, for example, a drawing room, I fit to the wall or other surface one or more sockets adapted to receive detachable electric lamps and I provide a permanent lamp in the center of the ceiling or

elsewhere which I call a pilot lamp. Interposed in the circuit leading to this pilot light is a switch controlled by an electro magnet which magnet is arranged and wound so as to be excited by the current or currents passing to the terminals in the sockets above referred to. When it is desired to illuminate the apartment at any particular place or places, one or more of the detachable lamps are connected with the terminal plates or wires of the fixed sockets, the current passes, and one or more lights are obtained. So soon however as this is done the electro magnet is excited and operates the switch or bridge-piece by which the current had passed to the pilot lamp, automatically cutting that lamp out of the circuit and economizing the current. On detaching the local lamp or lamps on the contrary, the magnet becomes inoperative, the switch or bridge-piece falls or swings round and the pilot lamp is again rendered incandescent. The advantage of this automatic arrangement is that sufficient light is afforded by the pilot lamp to enable the position of the socket or sockets for a local detachable lamp or lamps to be easily found, and when the lamps have to be detached and removed elsewhere there is no necessity to grope for the door in the dark. It may however happen that the pilot lamp is required to be lighted at the same time as the local lamps, and for this purpose a double push spring switch is provided; pressure on one part thereof serving to force a spring or springs into close electrical contact with a locking catch or socket, and pressure on the other part serving to disengage the spring or springs therefrom. I arrange this auxiliary device in any convenient spot so that by simply pressing on one part or another of the switch, the pilot lamp (or it may be a group of lamps of which it forms one element) may be brought into use or extinguished. In order however to have full control over these lamps it is necessary in addition to the foregoing arrangement of leads and circuit connections to provide for the final extinguishing of all the lamps including the pilot lamp during the day or when householder retires to rest. This I effect by a balance mercury switch or equivalent device operated by a pair of small elec-

tro magnets capable of being excited by a current from a single small battery such as a "Leclanché" battery, and by a pair of push buttons or switches, by which one or other of the magnets may be brought into action and the mercurial balance switch or equivalent lamp circuit making and breaking device be operated from any distance.

On quitting the drawing room for example, the pilot lamp of which room is controlled by the foregoing arrangement, the said lamp may be extinguished from the hall or bedroom or other convenient part of the house, and no diversion of the valuable current from the storage battery or other source of electricity for the lamps need take place, the feeble current from a single "Leclanché" cell being fully sufficient for the purpose. The extinction of the pilot lamp may be also effected by disengaging the lamp proper from its socket, and for this purpose the lamp is fitted with a pair of broad flat plates or springs with flanged outer extremities which are adapted to be inserted at right angles between two parallel plates or bars of metal in the sockets, and on being turned by hand to snap into place against and in close contact with the said parallel plates, and this simple connection may be applied to all the lamps in the room.

Referring now to Fig. 1 of the accompanying drawings:--which represent a portion of a room and indicates the method of economically controlling the several electric lights therein, according to my system, it should be understood that although represented as grouped in or closely around one apartment, the several circuit connections might be carried out on the same principle in several or all of the rooms in a house, and that the above diagram is given merely by way of example for the purpose of illustrating the principle of the arrangement on a simple scale. In this diagram A represents a detachable bracket carrying a lamp or lamps *a*. B represents an electric pilot light consisting of the lamp *b*, or it might be cluster of lamps. C represents a movable armature or bridge piece in the circuit leading to the pilot light B, and D is an electro magnet so arranged with respect to the fixed socket of the detachable bracket A that when this bracket is fixed in place the current will pass through the coils of the magnet D on its way to the lamp *a*, and by exciting that magnet effect the lifting or deflection of the armature or bridge piece C, and break the circuit by which the current passes to the pilot light B. Hence when entering the room the pilot lamp, being incandescent, will enable the position of the detachable bracket A or the point for its attachment to be found without difficulty or accident, but when the said point has been found and the bracket A has been fixed in place the pilot lamp will be automatically extinguished. In case, however, it is desired to have the pilot lamp or lamps alight, notwithstanding the

presence in position of the bracket A, I arrange a by pass circuit *e, e* controlled by a push spring switch E. This switch under normal conditions will be off as drawn in full lines, but by pushing it to the dotted position the circuit will be closed and current will flow to the pilot lamp or lamps.

To enable the current in a main or principal lead to be electrically controlled without waste from any part of the house or structure I arrange a switch as indicated at F in combination with a pair of electro magnets *f', f'* which can be separately and alternately energized by the feeble current from a "Leclanché" or other single cell battery G, by wires *g, g* from any part of the house or structure. The magnets *f', f'* are respectively energized by completing the circuit connecting them with the battery by push buttons such as *g', g'*. This arrangement enables all or a part only of the lights in the house (according to the importance of the lead in which the switch is located) to be lighted or extinguished from any part of the house to which the small wires from the "Leclanché" or the simple battery may be led, and without wasting the current from the generator or storage battery for that purpose. Finally it will be understood that the several lamps themselves (such as *a* and *b*) may be individually detached from their supports by means of a spring snap, connection details of which will be given hereinafter.

Referring now to Figs. 2, 3 and 4—1 represents the socket containing a pair of insulated terminal plates 2, 2 secured in place by screw 3, 3 and electrically connected with the flow and return wires 4, 4 respectively. 5 represents a strong spring for locking the pins 6, 6 of the bracket A in place, when they have been brought into engagement with the said terminal plates 2, 2. The wires from the lamp *a* are attached respectively to the pins 6, 6, a fusible strip of mica and tin foil 7 being interposed in one circuit. A' is a block of wood on which the pins 6, 6 are fixed, and 8 is a metal bearing plate for protecting the wood from cutting by the end of the spring 5. The plate 8 and spring 5 form a locking snap connection between the block A' and fixed socket 1. It will be obvious that other well known forms of detachable brackets for electric lamps may be used in place of that above described in combination with the circuit connections leading to the pilot lamp and with the movable bridge piece or switch C and automatic electro-magnet regulator D.

Referring now to Figs. 5 and 6 I will describe the construction of the double push spring switch indicated by letter E in the diagram view Fig. 1. 9 represents a wooden cylindrical box or case slotted at diametrically opposite points for the reception of a double acting push piece 10, of insulating material, fitted midway of its length with a sheath of metal 11, connected by a pair of spiral springs 12, 12 with the bottom or back of the case.

13 is a spring clip consisting of two separate and insulated halves fitting rather closely around the sliding push piece 10 and having their inner edges flared to allow of the insertion of the beveled or rounded edge of the sheath 11. When the push piece is in its operative position one part of the branch circuit *e* is electrically connected to one half of this spring clip, and the other part of the circuit *e* to the other half of the clip 13. Normally the switch is off, and the circuit broken between the two halves of the clip 13, the springs 12, 12 thrusting back the push piece 10; but when the push piece is thrust so that the metal sheath 11 enters and forces open the clip 13, the circuit *e*, *e* is completed and a light will pass to the pilot lamp at B, whether or not the bracket A be in position. I distinguish the "off" and "on" ends of the push piece 10 by a mark on one such as a black disk. This double push spring switch is intended to be covered in by a rose or metal plate.

Referring now to Figs. 7 and 8, F is the switch or contact making and breaking device arranged in the main or a branch line, and operated by a pair of electro magnets *f*, *f'*; the said electro magnets being respectively energized by a separate current from a "Leclanché" or other single cell battery G when one or other of the circuits from that battery is completed by the pressing in of one or other of the buttons *g'*, *g²* which may be located at any distance from the battery and magnets. For example on pressing the "on" button *g'* the circuit between the battery G and electro magnet *f* will be completed; the electro magnet will be energized and the armature *f²* will be attracted forcibly drawing up the spring tongue *f³* between and into close electrical contact with the flexible terminals *f⁴*, *f⁵* in the main line or branch conductor F', and allowing the current therein to flow. The spring tongue *f³* of the armature *f²* is retained in contact with the flexible terminals *f⁴*, *f⁵* after the magnet *f* has become impotent, by a hook or catch with which the end of the armature *f⁶* of the other electro magnet *f'* is provided. On the other hand on retiring to rest the lights in that part of the house or structure supplied with current by the said conductor F', may be extinguished by reversing the switch F, which is effected by pressing in the "off" button *g²* and thereby completing the circuit between the battery G and electro magnet *f'*, whereupon that magnet will be in turn excited and by attracting its armature *f⁶* provided with a hook or catch at its end as before stated will release the armature *f²* which will fall and withdraw its spring tongue *f³* from engagement or contact with the flexible terminals *f⁴*, *f⁵* and interrupt the main circuit F'. A pair of push buttons *g'*, *g²* may be arranged in any convenient part of the house, and at any distance from the main line switch F; and the battery G may be located

near the pair of switch-actuating electro magnets *f*, *f'*, or near the push buttons *g'*, *g²* and at a distance from the said electro magnets *f*, *f'*. I preferably combine with the main line or branch conductor F' and the switch-actuating magnets *f*, *f'*, an automatic current interrupter such as H for unlocking the switch or bridge piece F, and breaking circuit when the current exceeds the normal strength or safety limit. This interrupter H consists of a simple core of soft iron arranged in the main or branch line, and wound with wire of a section equal to that of the conductor F', or with a portion of the said conductor, its armature *h* being provided with a hook *h'* engaging with the armature *f⁶*, and acting to draw back that armature when the current in the line F' becomes so strong as to energize the interrupter H sufficiently to overcome the resistance of an adjustable spring *h²*. When this takes place the armature *f⁶* will be withdrawn, and its catch will be inoperative to restrain the armature *f²* in its raised position, whereupon that armature *f²* will fall and its spring tongue *f³* will break contact with the terminals *f⁴*, *f⁵* and interrupt the circuit in the line F'. Instead of the spring tongue *f³* and flexible terminals *f⁴*, *f⁵*, I may use mercury connections such as are indicated at Fig. 8. In this case the circuit is made by allowing the bridge piece *f³* to drop into the mercury terminal cups *f⁴*, *f⁵* and is broken by lifting the said bridge piece out of the said cups; hence the functions of the magnets *f*, *f'* are reversed in this arrangement, and the magnet *f'* is that which effects the closing of the circuit and the magnet *f* that which opens the said circuit. The push buttons *g'*, *g²* respectively therefore in this arrangement act reversely to those in Fig. 7. I might use the well known balanced rocking mercury switch in lieu of the spring tongue and flexible terminals, or bridge piece and mercury cups above described for effecting the same object, combining it with a pair of magnets *f*, *f'* and a "Leclanché" or other battery and a pair of separate circuits from that battery in the manner and for the purpose above explained, but I prefer to employ the forms of switch shown in Figs. 7 and 8.

In Fig. 9 is represented in diagram view the automatic economizer represented by similar letters of reference in Fig. 1 and consisting in the combination with a socket containing a pair of fixed terminals for the reception of a detachable bracket lamp such as A, and with a pilot light such as B, of suitable circuit connections or leads, a movable bridge piece C in the circuit leading to the pilot light B, and an electro magnet or its equivalent D in the circuit leading to the pair of fixed terminals, whereby the bracket A is fixed in position and a current flows through the circuit in which the magnet D is located, the bridge piece C will be deflected and the circuit leading to the pilot light B be interrupted, thereby extinguishing that light, but allowing it to be-

come again incandescent so soon as the bracket A is detached, and the bridge piece C falls under the influence of a light spring *c*.

In Fig. 10, I have shown in plan and sectional views the two parts of my spring snap attachment for securing lamps to their sockets. In these figures, K is a block of insulating material supported on the end of the bracket or lamp support, and provided with a pair of metal plates *k, k'* of semi-circular or segmental form fixed over or across a shallow recess in the block K, with their flat sides facing one another but at some distance apart. The wires are connected respectively to their plates *k, k'*. L represents the base of the lamp holder carrying flat spring tongues of L shape also insulated, the one from the other. These spring tongues are of such width as will allow of their being inserted between the plates *k, k'* and their ends are slightly bent to engage with the under side of the said plates when the base of the holder L and its spring tongues are turned a quarter round, the spring tongues yielding to allow of this movement and snapping into place and pressing throughout their breadth against the flat edges of the plates *k, k'* respectively; thereby making good electrical contact and holding the parts securely in place. By this means the lamps may be individually extinguished and facilities are afforded for detaching the lamp and lamp base from the end of its bracket or other form of lamp support and replacing it by another when desired. For heavier work I use the strong form of spring snap connection shown in Figs. 2, 3 and 4 in which the tongues which engage with the terminal plates are rigid, and the locking is effected by a separate spring as above described. Thus it will be seen that by my improved arrangement of electrical connections a pilot light may be left burning in a room which will be automatically extinguished when other local lights are used, in that room, but which, if desired, can be used in conjunction with those lights; that the pilot light may be lighted or extinguished from any convenient part of the house, as for instance on entering the dining room from the drawing room or vice versa, or when returning from town, or on retiring to bed, and this by using a feeble source of electricity such as is sufficient to work an ordinary electric bell, thereby economizing the electric light current; and finally that the pilot and other lamps in the room may be lighted or extinguished if desired, individually, within the room itself, by means of the simple spring snap connection above described. By this arrangement of circuit connections the most complete control over the lamps in a room or house can be exercised, and a great economy of current be effected.

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. In combination, in an electric lighting system, the main circuit, the pilot lamp therein, the bracket lamp or lamps detachably connected to their supports and the cut out for the pilot lamp operated by the insertion of the bracket lamp, substantially as described.

2. In combination, in an electric lighting system, the main circuit, the pilot lamp therein, the bracket lamp detachably connected to its support, the cut out for the pilot lamp arranged to be operated by the insertion of the bracket lamp, the circuit breaker for the main circuit, and the supplemental circuit controlling the said circuit breaker, substantially as described.

3. In a system of electric lighting, the combination with a detachable bracket or other local lamp such as A, and wires for conveying the current thereto, of a pilot lamp B, a circuit leading thereto, a bridge piece or switch C in the said circuit, and an electro magnet D for operating the said switch, for the purpose of automatically switching the current to or from the pilot lamp when the bracket or local lamp A is detached or inserted as set forth.

4. In combination, the pilot lamp in the circuit, the detachable bracket lamp and the cut out for the pilot lamp operated by the insertion of said bracket lamp, the by pass circuit *e*, leading to the said pilot and the switch E, in said by pass circuit whereby the pilot lamp may be lighted when the bracket lamp is inserted.

5. In a lighting system, the combination of the lamp, the circuit therefor and the switch E, comprising the push piece 10, having a conducting sheath 11, thereon, the spring clip 13, between the parts of which the piece 10, slides and the supporting case for the spring clip 13, the circuit wires being connected with the parts of the spring clip, and the said spring clip serving to support and guide the movable piece 10, substantially as described.

6. In combination, the main electric light circuit, a switch F comprising an electro magnet *f*, controlling the switch lever *f*², a contact piece *f*³ carried by said switch lever, the contacts *f*⁴, *f*⁵ in the circuit between which the contact *f*³ is adapted to fit, the locking and releasing device controlled by an electro magnet *f*¹ suitable circuit connections and circuit closing devices therein controlling the switch whereby either magnet may be energized at will, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HENRY EDMUNDS, JR.

Witnesses:

ISAAC BRADLEY,
E. J. PITCHER.