

(No Model.)

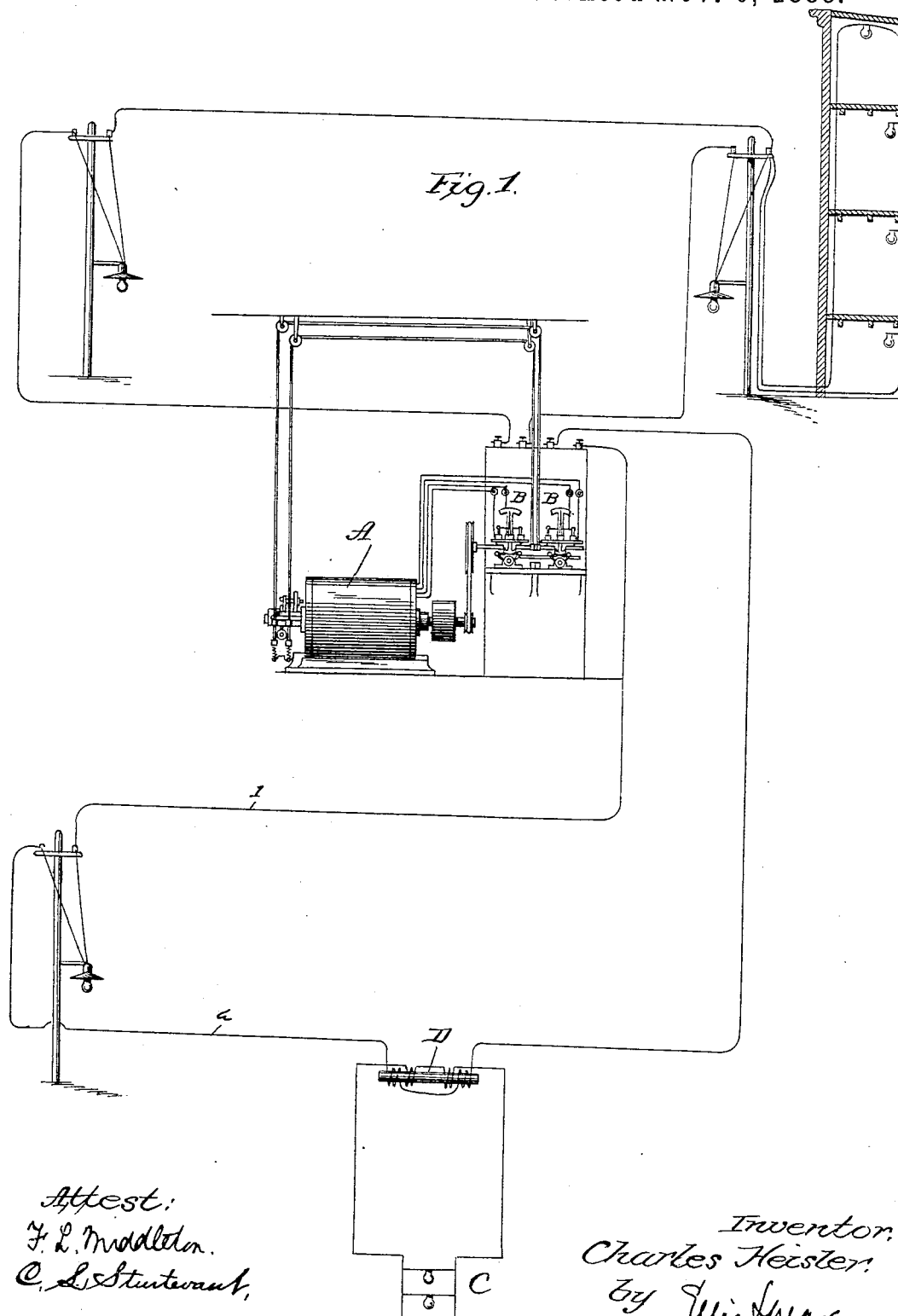
3 Sheets—Sheet 1.

C. HEISLER.

SYSTEM OF INCANDESCENT LIGHTING.

No. 392,513.

Patented Nov. 6, 1888.



Attest:
F. L. Middleton.
C. L. Sturtevant,

Inventor,
Charles Heister,
by Wm. Spear,
Atty.

(No Model.)

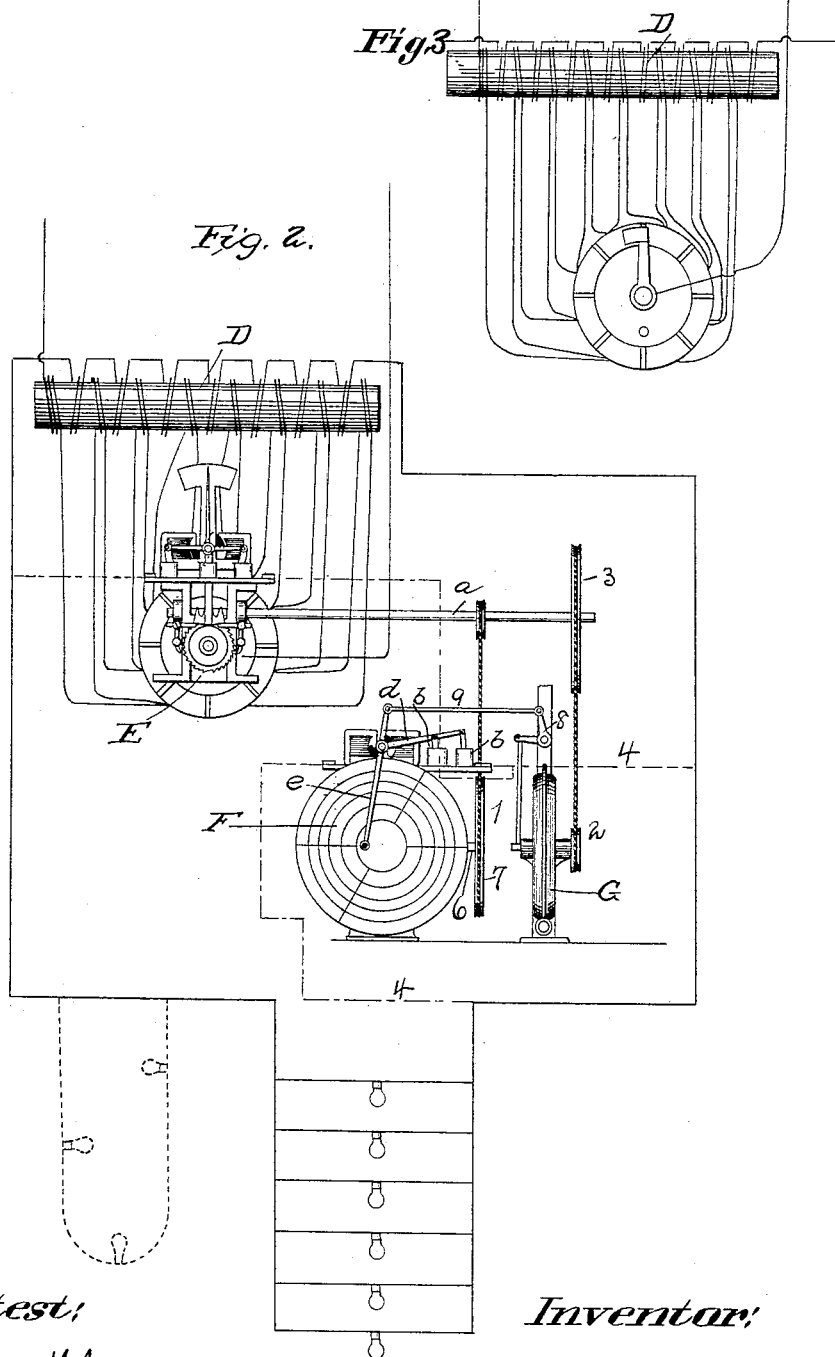
3 Sheets—Sheet 2.

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Attest:
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C. L. Sturtevant.

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(No Model.)

3 Sheets—Sheet 3.

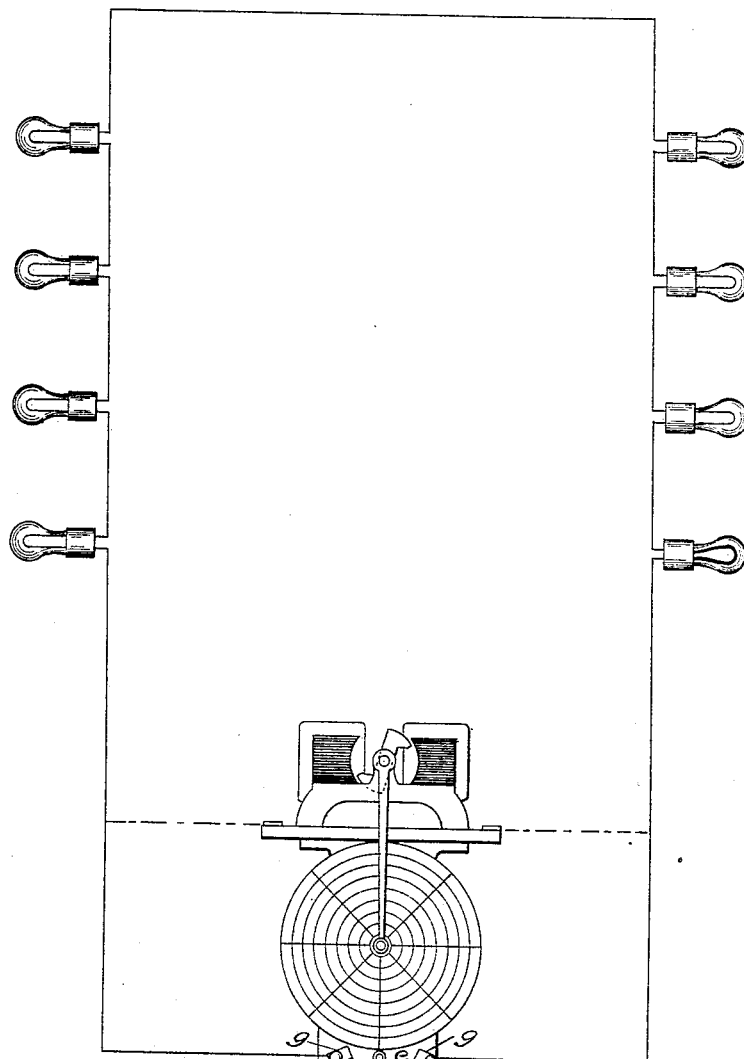
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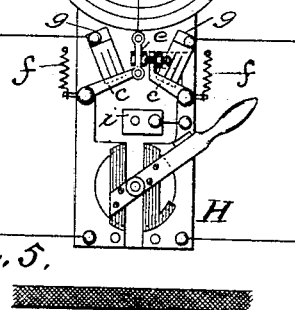
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Fig. 4.



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Fig. 5.



Inventor,
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UNITED STATES PATENT OFFICE.

CHARLES HEISLER, OF ST. LOUIS, MISSOURI.

SYSTEM OF INCANDESCENT LIGHTING.

SPECIFICATION forming part of Letters Patent No. 392,513, dated November 6, 1888.

Application filed June 24, 1887. Serial No. 242,360. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HEISLER, of St. Louis, in the State of Missouri, have invented a new and useful Improvement in the System of Incandescent Lighting; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to a system of incandescent lighting, and includes what I will term a "direct" and "indirect" lighting from the same line, the direct lighting including the lamps in series whose filaments or conductors are in the same circuit, and the indirect lighting where the lamps are arranged in multiple arc or in series on a branch circuit—as in a house, for instance.

My invention includes, in a system of incandescent lighting, a main circuit supplied from an alternating-current machine and a transformer or induction-coil for supplying a branch circuit for indirect lighting.

The invention also includes, in connection with a transformer for the branch circuit, a regulator for the coils of the transformer and a mechanical power device operated by the switching in of the first lamp of the branch circuit, said power device being in connection with the regulator, which is thus automatically operated to connect or disconnect one or more of the coils of the transformer. It also includes details of construction hereinafter fully described.

In the drawings, Figure 1 represents a diagram showing two circuits of the main line with house-connections for series lighting, direct street-lighting, and lamps arranged upon a branch circuit in multiple arc. Fig. 2 is a view of the transformer with a branch circuit, which includes series and multiple-arc lamps, with a regulator and ampère-meter and power-connection for the regulator. Fig. 3 is a detail view of the transformer. Fig. 4 represents a diagram of the house series with an automatic switch. Fig. 5 shows a section of the low-resistance carbon conductors.

In order to carry my system into effect successfully and economically, it is necessary to employ alternating currents of high tension, and I have represented at A a dynamo which is of the construction described in Letters Patent granted me on the 27th day of March, 1888, this machine being an alternating-cur-

rent machine. In order to use inexpensive conductors to convey the current to any desired distance, I provide low-resistance carbon filaments, which may consist of short thick filaments similar to those described in Letters Patent No. 330,586, granted to me November 17, 1885, as with these filaments and the alternating currents described it is practicable to apply very small and inexpensive conductors and to carry the current to any desired distance. In such filaments, also, the variations of the current are scarcely perceptible, and they permit a higher strain on the lamps, a higher degree of incandescence, and a standard of illumination higher than that of gas or of filaments of a higher resistance. From the dynamo A, as shown in Fig. 1, the alternating currents are carried to the regulator B, which in the present case is similar to that shown in Letters Patent granted me on the 27th day of March, 1888, No. 379,956; but it may be of any desired construction suitable for the purpose. After passing through the regulator the currents pass to the line.

In the circuit on the upper part of the sheet I have represented the direct lighting by two street-lamps and by a house-connection. In this diagram the filaments of the lamps are in the main circuit. The second circuit upon the lower part of the sheet includes the direct lighting, and the indirect lighting by multiple arc, as shown at C. Where the filaments of the lamps are in the main circuit, the current may be sent through direct from the regulator at the main station by line 1 and 2; but where the lighting is indirect a transformer or induction-coil, D, is interposed between the main line and the branch, which reduces the current from a high to a low tension, the induced current supplying the light within the house, store, or other place.

In Fig. 2 I have shown a regulator in connection with the main line and the coils of the transformer for connecting or disconnecting one or more of the coils of the said transformer according to the number of lamps used, and while this may not always be found necessary, especially when lamps are used in multiple arc on a circuit of this kind, it will be found desirable, and particularly in the case of series lighting.

In Fig. 2, D is the stationary transformer or

induction-coil. E is the voltmeter or regulator, and F the ampère-meter, in connection with a power device, (indicated at G.) This power device may be a water-wheel or a motor of any kind, and I have shown it as enclosed in a case which may be in connection with the driving medium. The shaft of the power device upon one end carries an arm, 1, extending at right angles upwardly therefrom, and the other end of the shaft carries a pulley, 2, which is in connection by a band with a second pulley, 3, on the shaft *a*. This shaft *a* extends to the regulator, where it is connected by a pawl-and-ratchet connection, substantially as shown in my patent above referred to, No. 379,956, and the operation of the shaft *a* will operate the regulator, as described in the said patent. An ampère-meter is inserted in one of the lines of the induced circuit, as shown by dotted lines 4 4, and its armature carries an arm, *d*, provided with contact-points held normally suspended above mercury-cups *b*, which bring into connection the voltmeter (which is, as shown, arranged above the regulator, and is substantially the same as in my patent referred to, No. 379,956) through the connection also shown in dotted lines extending to the opposite line of the circuit. The ampère-meter is provided with a dial, as shown at F, and an index or marking finger, *e*, extends down in contact with the face thereof from the armature of the meter. The disk or dial is operated continuously, as hereinafter described, by a shaft, 6, arranged at right angles thereto and in connection therewith by any suitable connection. The shaft 6 carries a pulley, 7, which is also in connection with the shaft *a* by means of a rope or band, as shown. The upper end of the arm *e* is connected to a bell-crank lever, 8, by means of a pitman, 9, and the free end of the bell-crank extends into the path of the vertical arm 1 of the power device, thus preventing its movement in a normal position of the parts. As soon as the first lamp is switched in, however, a slight impulse passes through the line 4, which draws the armature of the ampère-meter downwardly from the position shown, which thus throws the upper end of the arm *e* to the right and the free end of the bell-crank upward out of the path of the arm 1, and the power device is thus free to operate the shaft *a* and through its connection with the regulator to connect one or more of the coils of the transformer according to the number of lamps in use. The rotation of the shaft *a* also revolves the disk or dial of the ampère-meter through the connection described, and thus the length of time the circuit is closed and the strength of current that passes through would be recorded.

Fig. 3 is a detail view, which shows more plainly the connection between the regulator and the coils of the transformer. The arm pivoted on the shaft has connection with the main line through its hub at one end, and the

circuit is closed through said arm when on the first contact-space on the left. As the arm is moved, however, by the connection between the ratchet-wheel on its end and the shaft *a*, the arm moves to the next contact-space, and this cuts in one of the coils of the transformer, and thus the arm may be adjusted according to the number of coils which it is desired to connect, and a permanent and constant voltage may thus be established between the two terminals of the induced circuit. The connection between the shaft *a* and the regulator is controlled by the movement of the armature of the meter, as described in Patent No. 379,956.

In Fig. 4 I have shown a house-circuit with series incandescent lamps therein. At H, the entrance to the circuit, I place a house-switch and in connection with this switch a registering device or ampère-meter. The house-switch is provided with a hand-lever for positively cutting out the circuit inside when it is desired for any purpose. In order to automatically cut out the circuit, however, in case of breakage, and so effectually as not to disturb the main line, I employ two arms, *c c*, which are held back by a fusible plug, *e*, against the pressure of springs *f*. Between the arms *c c* and the opposite wires of the house-circuit are spring-plates *g g*, bearing upon the said arms.

When for any reason the inside circuit is broken, the spark which indicates it at the house-switch will fuse the solder block, which will thus release the arms *c c*, and the tension of their springs will force them away from the plates *g g*, thus breaking the connection with the branch and against the central block, *i*, which will thus complete the main circuit at this point without the slightest disturbance. While I have shown such a switch as applied to a branch circuit, it will be understood that I may use this at the main station in connection with the main circuit, so that if a break occurs upon the main circuit the same action will take place.

I claim as my invention—

1. A system of incandescent lighting consisting of a main circuit supplied from an alternating-current machine, a transformer in said main circuit, an induced circuit extending from said transformer, a regulator in connection with the main and induced circuits, a power device in connection with the shaft of the regulator for operating the same, and means for automatically releasing the power device on the switching in of the first lamp, substantially as described.

2. A system of incandescent lighting consisting of a main circuit, an induced circuit, a regulator in connection with the main and induced circuit, an ampère-meter in the induced circuit, a power device for operating the regulator, and a lever operated by the armature of the ampère-meter by the switching in of the first lamp to release the power mechanism, substantially as described.

3. A system of incandescent lighting consisting of a main circuit, an induced circuit, a regulator, and voltmeter, in connection with the main and induced circuits, an ampère-meter having a registering-dial, a power device, connections from said device to the (electrically-controlled) regulator and the dial of the ampère-meter, and a connection between the armature of the ampère-meter and the power device, whereby the latter is released on the switching in of the first lamp, substantially as described.

4. In a system of incandescent lighting, a switch consisting of pivoted arms *c c*, under

spring tension, a fusible link holding said arms in contact with line-connections against said spring-pressure, and a block, *i*, in line with the end of the arms *c*, the circuit being closed through said block when the arms are in contact therewith on the melting of the fusible link, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHAS. HEISLER.

Witnesses:

M. W. HYER,

H. B. KINGHORN.