

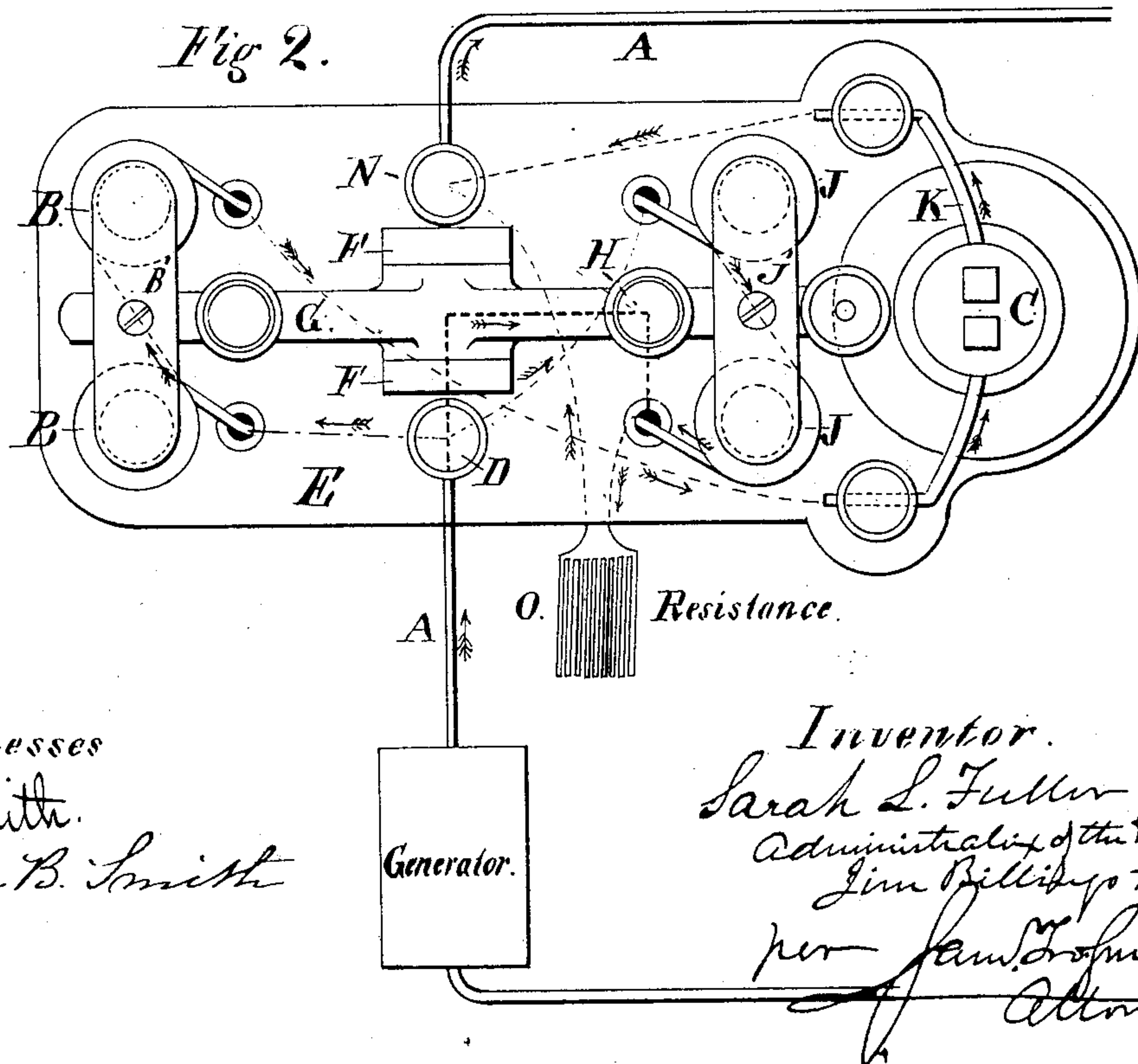
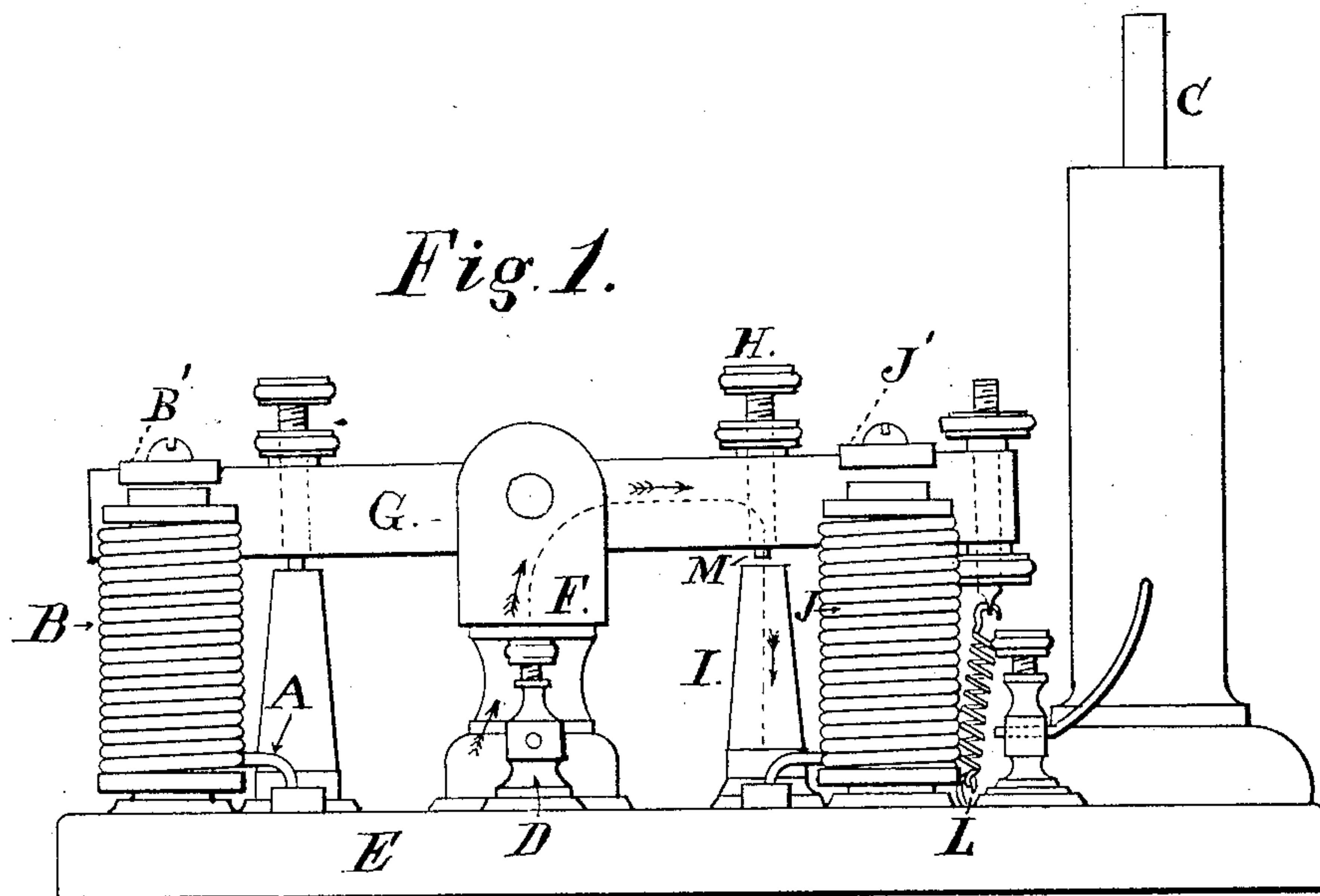
J. B. FULLER, Dec'd.

S. L. FULLER administratrix.

ELECTRIC LIGHTING APPARATUS.

No. 253,032.

Patented Jan. 31, 1882.



Witnesses
C. H. Smith.
Ella B. Smith

Inventor.
Sarah L. Fuller
Administratrix of the Estate of
Jimm Billings Fuller
per Sam. H. Smith
Attorney

UNITED STATES PATENT OFFICE.

SARAH L. FULLER, OF NEW YORK, N. Y., ADMINISTRATRIX OF JIM BILLINGS FULLER, DECEASED, ASSIGNOR TO THE FULLER ELECTRICAL COMPANY, OF SAME PLACE.

ELECTRIC LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 253,032, dated January 31, 1882.

Application filed January 5, 1880.

To all whom it may concern:

Be it known that JIM BILLINGS FULLER, deceased, late of the city of Brooklyn, county of Kings, and State of New York, invented
5 certain new and useful Improvements in Electric Lighting Apparatus, of which the following is a specification.

This invention relates to electric lighting and the controlling of the electric current
10 with reference to defective, badly-operating, and extinguished lamps, and especially to the use and controlling of more than one light in a single electric circuit.

It consists of a single electric circuit wherein are placed two or more electric lamps or
15 light-regulators, so arranged and electrically connected as to be operated by the current at the same time, each lamp or regulator having connected with it a short-circuiting device,
20 the whole so arranged and adjusted that when too great an electrical resistance shall be offered at any one of the lamps that lamp shall be automatically cut out of the circuit. It includes a short circuit for the current of electricity around each lamp, with suitable mechanism to be operated by the electric current,
25 in combination with the lamp to automatically cut such lamp out of the circuit whenever too great resistance shall be offered at the lamp.
30 Several electric lights can be operated on one circuit without difficulty and without any other or different apparatus than is required for one light. All that is required is a sufficient current of electricity to keep up the several lights, notwithstanding the combined resistance offered by the several lamps or regulators. If a room is lighted with several lamps,
35 each having its own independent circuit, the temporary extinguishment of one of the lamps is not a serious matter, as the others remain in operation until the defective one can be replaced or readjusted; but previous to the invention of Mr. FULLER, herein described, the extinguishment of one of several lights on a
40 single circuit was sure to extinguish the others and leave the room in darkness until all the lamps were again put in proper condition.

It is evident that this defect rendered the method of electric lighting by means of several lamps on a single circuit impracticable. It
50 was to overcome this difficulty that Mr. FULLER conceived and perfected this invention.

In the drawings accompanying this specification, A represents the main circuit, in which are included the generator, the electro-magnet B, and the electric lamp or regulator C.
55 The binding-post D, the stand F, the armature-lever G, and the screw H being in metallic connection, they, together with the stud I and binding-post N in metallic connection
60 therewith, form a shunt around the lamp or regulator C.

In making his experiments and perfecting his invention Mr. FULLER made use of a dynamo-electric generator with which to produce the
65 current of electricity, and the Jablochkoff candle as a regulator of the lights; but the same results can be produced with any other form of machine or with a proper battery, and with any other form of lamp or regulator, by making slight mechanical changes well known in
70 the arts, to adapt the operating device to the kind of lamp or regulator used.

In adjusting the current of electricity to keep up a series of lights on a single circuit it is
75 necessary to provide a sufficient electro-motive force to operate the lamps, notwithstanding the resistance, including that at the point where the light is to be produced, whether the means used to produce the light be the voltaic
80 arc or incandescence, and there must be a sufficient surplus force to guard against slight variations in the electrical resistance, which will always occur. It is found, however, not
85 to be advisable to have a large surplus force. The adjustment should be made with a comparatively small margin for variation in the current. It follows that any defect in any lamp
90 on the circuit which materially increases the electrical resistance at the light will at the same time weaken the electric current in the same degree, and when such resistance becomes sufficient to counterbalance all the surplus force and reduce the strength of the cur-

rent at the lamp below the minimum standard necessary to overcome the resistance at the lamp the circuit is broken at the lamp, the light extinguished, and the efforts of the generator useless until the current is again restored. To prevent this result of a too great resistance and consequent weakening of the current at the lamp, Mr. FULLER, in his invention, placed in the main circuit A, at a point through which the current must pass in reaching the lamp or regulator C, a device consisting of an electro-magnet, B, through the helices of which the current passes, giving attracting force enough to the cores to hold the main circuit closed for the passage of the current through the lamp or regulator C by means of an armature-lever, G, supported in the middle on a bearing, to the opposite end of which is attached a spring, L, whose compensating power is not sufficient to pull down the armature-lever G and break circuit when the current is sufficiently strong to operate the light successfully and safely, but, together with the electro-magnet J, is sufficient for that purpose when the too great resistance at the light C or any other cause has so weakened the current at the light as to extinguish it or endanger its extinguishment. He also divided the current at the binding-post D by making a short circuit around the lamp, commencing at the binding-post D, where the current in the main circuit enters the device from the generator, and terminating at the binding-post N, where the current in the main circuit leaves the device, in which short circuit he placed the electro-magnet J and the resistance-coil O.

The inventor did not intend to confine himself to this particular construction, as any manner of using one or more electro-magnets in connection with a shunting device operated by a derived circuit, whereby the too great resistance offered at the lamp or regulator should be the means, through the electric current, of operating such magnet or magnets to shunt the current from the lamp, would evidently be a modification of his device as shown and described herein.

In operation, when the current at the lamp becomes weakened, as above stated, the attracting power of the magnet B becomes proportionally weakened, and the spring L, aided by the magnet J, overcoming the weakened magnetic force, brings down the opposite end of the armature-lever until it contacts with the post I at the point M. This movement of the armature-lever G closes a shunt-circuit as follows: The current then passes through the stud F, the armature-lever G, the screw H, the post I, and to the main circuit at the binding-post N, thus cutting the lamp or regulator out of the main circuit, the spring L holding the shunt-circuit closed until the abnormal resistance is removed, and the current through the main circuit restored with sufficient magnetic

force to again attract the armature-lever G to the magnet B, and thus maintain the light at the lamp or regulator C. While the lamp C is in operation and the principal portion of the current is passing through the main circuit a small portion is always passing through the helices of the magnet J, and the resistance-coil O, which is always closed, as a derived circuit, from the binding-post D to the binding-post N, whether the lamp is in operation or not. If it is desired to protect the fine-wire resistance-coil, or for any other reason, a switch may be applied between the post I and the coil J, to transfer the current from the post I directly to the post N, in which case the spring L will still hold the shunt-circuit closed until the lamp C is again in operation. It follows as a matter of course that the amount of the current which flows through the derived or shunt circuit at D will be increased in proportion to the increased resistance at the light, and that the attracting force of the magnet J will be increased in the same ratio. If a switch is used, it forms no part of the automatic device, and is only used as a convenience when it is desired to shunt all the current from the resistance-coil O or restore it to that channel again after it has been shunted from it.

Instead of placing the resistance in a separate position, it may, if desired, be arranged in the form of fine wire helices around the cores of the magnet J, or in any other desired form, care being taken to make the electrical connections so as to operate substantially as described.

Having thus described the invention of JIM BILLINGS FULLER, and its operation, I claim as new—

1. In an electric lighting apparatus wherein two or more electric lamps or light-regulators are placed in a single electric circuit, the combination of the electro-magnet B, placed in the main circuit, with the electro-magnet J, placed in a short circuit around the lamp, the two magnets having a common armature-lever, G, in connection with the fine-wire resistance-coil O, substantially as specified, and arranged to partially shunt the electric current from the lamp to which it is attached and hold the shunt-circuit closed.

2. In combination with an electric lamp or light-regulator which forms one of several in the same electric circuit, each of which is provided with a short-circuiting device, an electro-magnet in the main circuit, and electro-magnet in the short circuit, with a resistance-coil or conductor of comparatively high resistance, dividing the current at the part of the circuit where the lamp is located, all so connected electrically that any too great resistance at the lamp or light-regulator will cause the electric current to operate the magnets without entirely breaking the circuit, thereby shunting the current from the lamp in time to

prevent the other lamps in the circuit from being extinguished, substantially as described and shown.

5 3. In an electric lighting apparatus or shunting device, the combination of the movable armature J' of the shunt-magnet J and the movable armature B with the contact M, the attraction of the magnet J upon the armature operating to close said contact, and the release

of the armature of the magnet B also operating by the spring L to close said contact.

SARAH L. FULLER,
Administratrix of the estate, &c., of Jim Billings Fuller, deceased.

Witnesses:

LEO C. FULLER,
SAM. TRO. SMITH.