

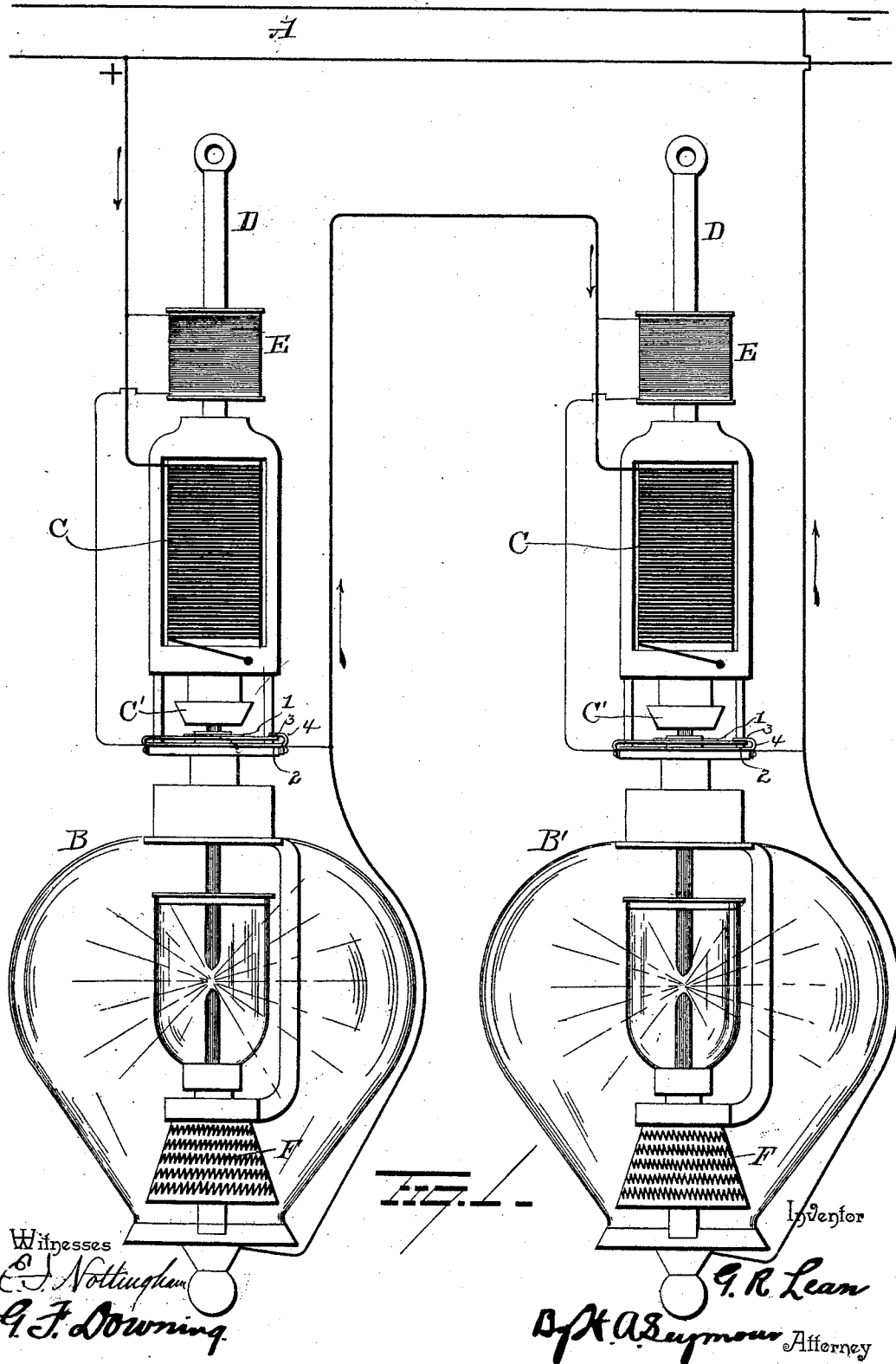
(No Model.)

2 Sheets—Sheet 1.

G. R. LEAN.
ELECTRIC ARC LIGHTING.

No. 553,919.

Patented Feb. 4, 1896.



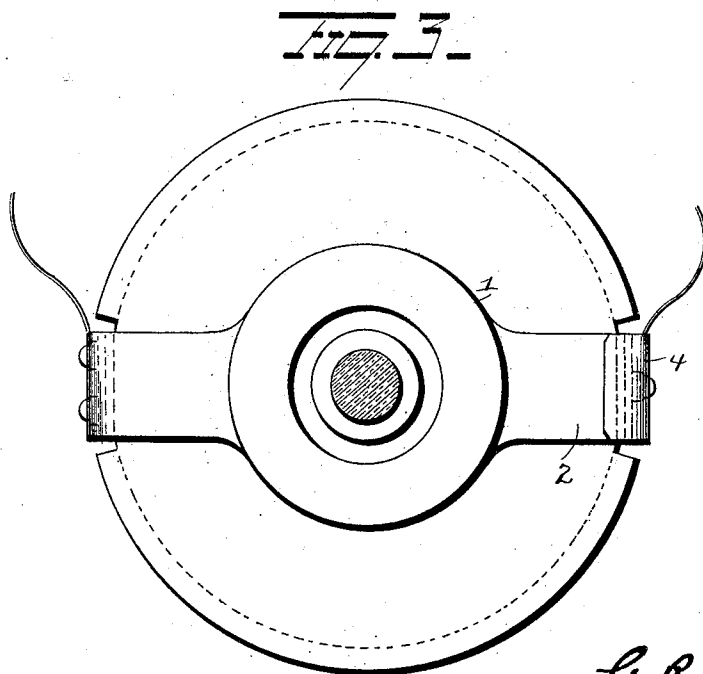
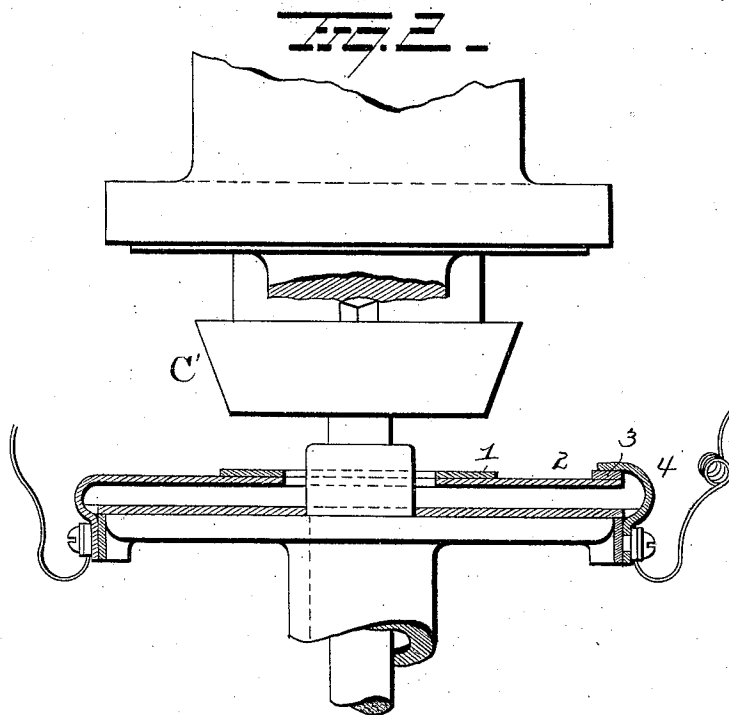
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Witnesses
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Inventor
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UNITED STATES PATENT OFFICE.

GEORGE R. LEAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE JANDUS
ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC-ARC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 553,919, dated February 4, 1896.

Application filed September 23, 1895. Serial No. 563,753. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. LEAN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and
5 useful Improvements in Electric-Arc Light-
ing; 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
10 use the same.

My invention relates to an improvement in electric-arc lighting, and more particularly to means for operating electric-arc lamps in series in multiple-arc circuits of high voltage
15 and constant potential.

It is known that when two or more arc lamps, in which no provision is made in their regulating mechanism (such as differentially-wound coils) for permitting them to burn in series, any fluctuations in the voltage of the arc of one lamp will correspondingly affect the other; and it is the object of this inven-
20 tion to provide means whereby two or more arc lamps, not in themselves adapted to burn in series, can be successfully operated in multiple-arc series on high-voltage constant-potential circuits.

With this object in view the invention consists in the combination, with a multiple-arc circuit supplied with a current of constant potential, of two or more arc electric lamps included in series in said multiple-arc circuit, each of said lamps being provided with a main or lifting magnet which is included
30 in series with the arc and also provided with a resistance included in a circuit shunting the arc and the said magnet.

The invention further consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth and pointed out in the claims.

In the accompanying drawings, Figure 1 represents an embodiment of my invention. Figs. 2 and 3 are detail views.

45 My improvements are intended more particularly for use with arc lamps, such as described in patent to William Jandus, No. 543,445, in which a long arc of correspondingly high voltage is employed, and I have
50 illustrated my improvements in connection with such lamps.

A A represent two mains, between which two arc-lamps B B' are shown connected in multiple-arc series. Each lamp is provided with a separating and feeding magnet C, and
55 the frame of each lamp is preferably made with a stem or upward extension D, which serves as means whereby to suspend the lamp and also to receive and hold in position a coil E of resistance, the terminals of which are
60 connected in a shunt-circuit between the terminals of the lamp. Each lamp is provided with a steadying resistance F.

When two or more arc lamps, such as the Jandus lamp above referred to, are placed in
65 multiple-arc series, (without the provision of the shunt-resistance coils E,) each lamp will draw its arc through the agency of the magnet C, but if one lamp should draw a longer arc than the other, both lamps would be af-
70 fected equally instead of correcting only the lamp which has drawn the excessive arc.

Each coil E is so constructed that when there is any increase of the length of the arc beyond the normal and consequent rise in
75 voltage at the terminals of any one of the series of lamps, the excess will flow through the shunt-coil E of that particular lamp and thus weaken its magnet by robbing it of that
80 amount of current and cause the lamp to feed, owing to the weakened magnet C, and thus correct the length of the arc without affecting the other lamps in the series.

Each coil E is of such comparatively low resistance as to permit an amount of current
85 to be shunted through it commensurate with the increase of voltage at the lamp-terminals caused by the lengthening of the arc. In other words, the resistance-coil E of one lamp will compensate for any increase of voltage
90 caused by the lengthening of the arc of that lamp and rob the magnet C of such excessive current so as to permit the carbon to feed and the length of the arc to right itself without affecting the other lamp or lamps in the
95 circuit.

It is desirable to provide means whereby to open-circuit the shunt in case the lamps cease to burn on account of accident, such as the breaking of a carbon, and also when
100 the carbons have burned out. For this purpose an annular switch-arm 1 is disposed un-

der and normally parallel with the armature C' of the separating and feeding magnet C, said switch-arm being made with a spring extension 2, which is secured to but insulated from the lamp-frame. The switch-arm is provided with a contact-block 3 adapted to normally engage a contact-arm 4 secured to and insulated from the lamp-frame. The shunt-circuit above described includes the switch devices 1 4 in series with the resistance-coil E. From this construction it will be seen that when the armature C' falls and engages the annular switch-arm the latter will be depressed so as to separate the contacts 3 4 and open the shunt-circuit.

My improvements are very simple, but are of importance in the operation of arc lamps of the Jandus type and similar lamps in high-voltage constant-potential multiple-arc series, and they are accurate and effectual in the performance of their functions.

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

1. In a system of arc lighting, the combination with a multiple-arc circuit supplied with a current of constant potential, of two or more arc electric lamps included in series in said multiple-arc circuit, each of said lamps being provided with a main or lifting magnet which is included in series with the arc, and also provided with a resistance included in a circuit shunting the arc and the said magnet, substantially as set forth.

2. In a system of arc lighting, the combination with a multiple-arc circuit supplied

with a current of constant potential, of two or more arc lamps included in series in said multiple-arc circuit, each of said lamps being provided with a main or lifting magnet which is included in series with the arc and also a resistance included in a circuit shunting the arc and the feeding-magnet and each lamp being also provided with a steadying resistance included in series with the said magnet and the arc, substantially as set forth.

3. In a system of arc lighting, the combination with a multiple-arc circuit supplied with a current of constant potential, of two or more arc electric lamps included in series in said multiple-arc circuit, each of said lamps being provided with a separating and feeding magnet included in series with the arc and a steadying resistance included in series with the separating and feeding magnet and the arc, each lamp being also provided with a resistance in a circuit shunting the feeding and separating magnet, the arc and the steadying resistance, a spring switch-arm secured to the frame of the lamp and a contact-arm with which the switch-arm normally engages, said switch-arm and contact-arm being included in said shunt-circuit, substantially as set forth.

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

GEORGE R. LEAN.

Witnesses:

WARREN H. MUSSER,
MARVIN B. JENKINS.