

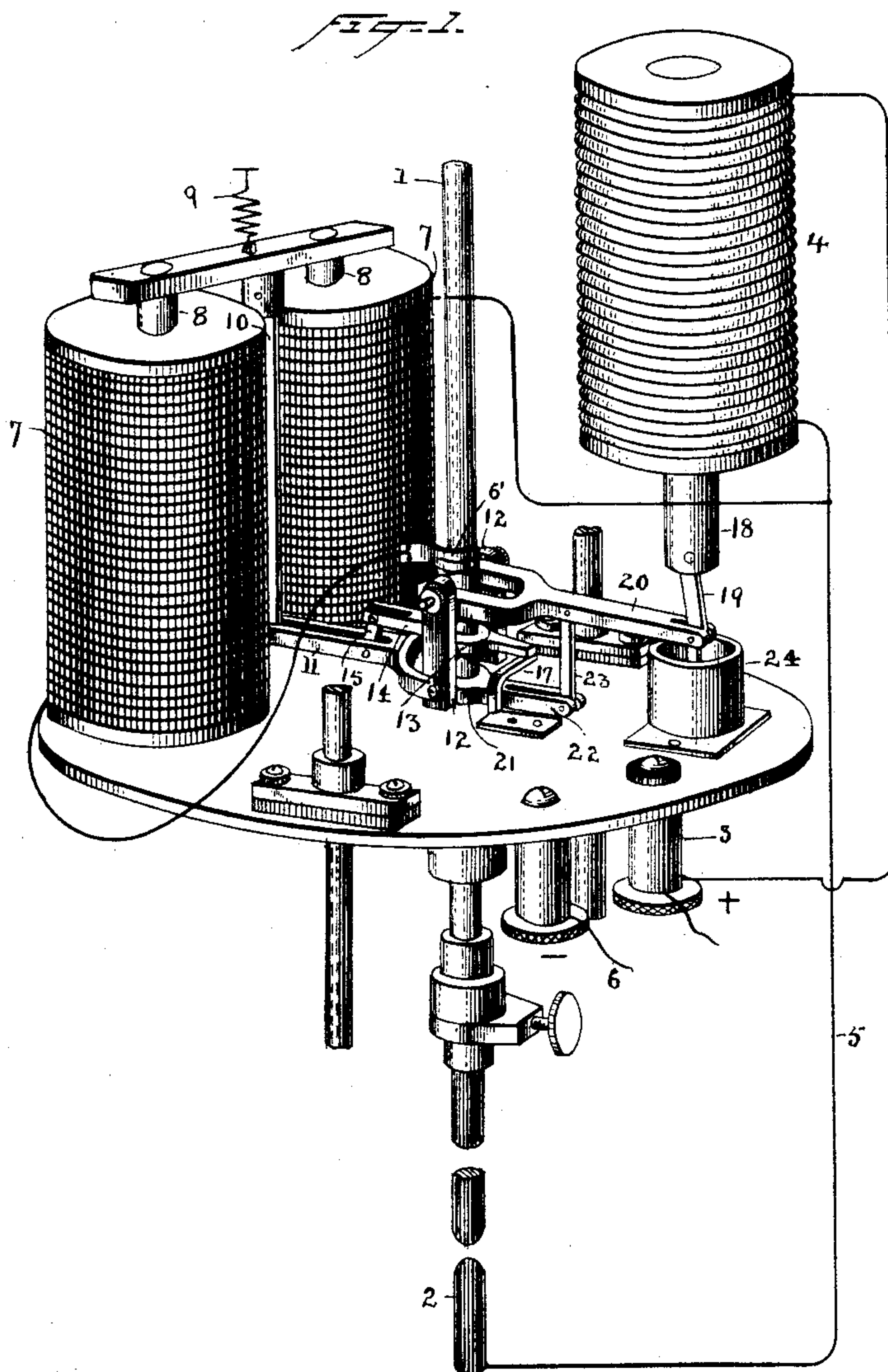
(No Model.)

2 Sheets—Sheet 1.

S. W. RUSHMORE.  
ELECTRIC ARC LAMP.

No. 472,274.

Patented Apr. 5, 1892.



Witnesses  
Norris A. Clark.  
St. F. Charles.

Inventor  
S. W. Rushmore  
By his Attorneys  
Dyer & Seely.

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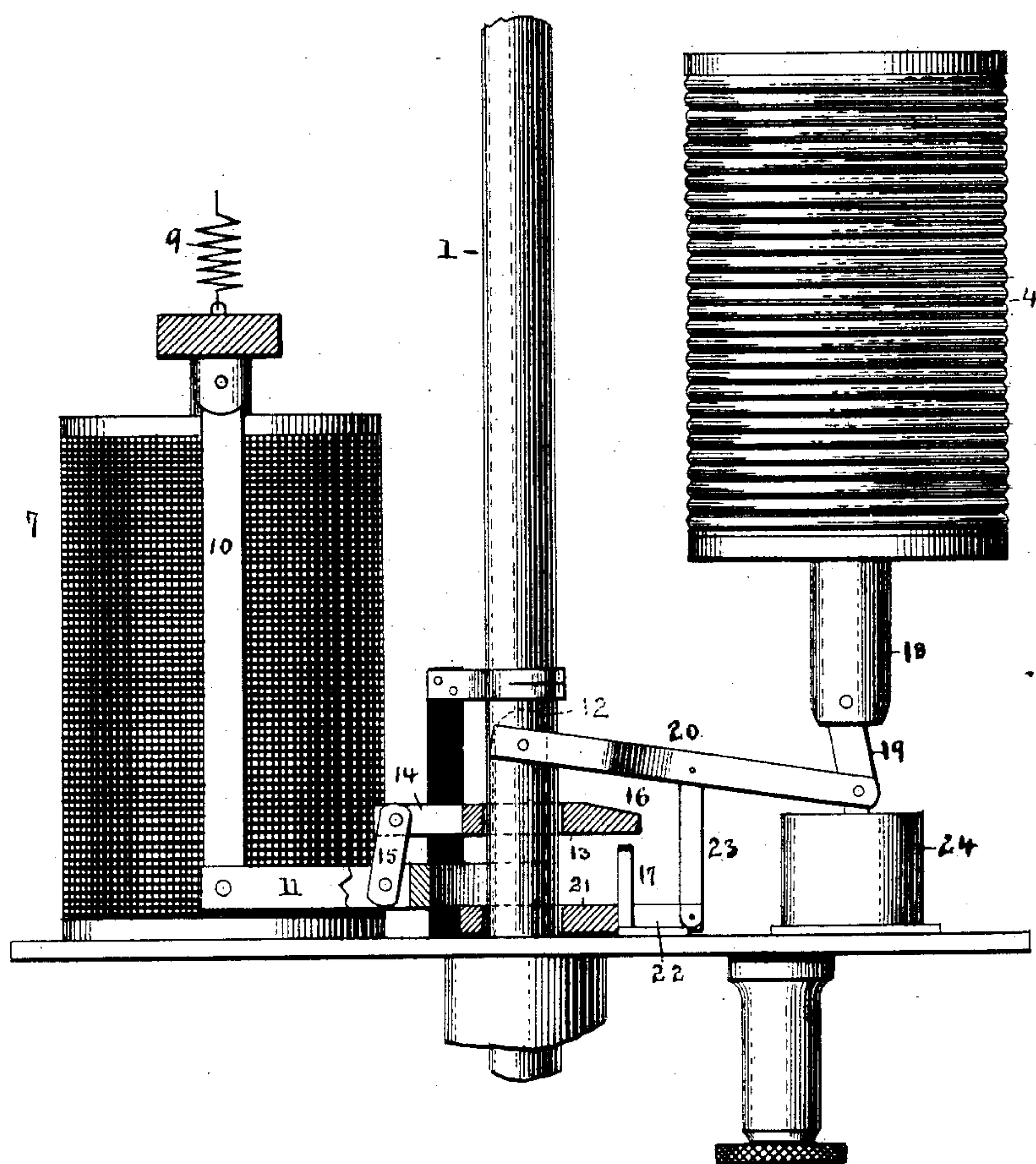
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Fig. 2.



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# UNITED STATES PATENT OFFICE.

SAMUEL W. RUSHMORE, OF BROOKLYN, NEW YORK.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 472,274, dated April 5, 1892.

Application filed July 27, 1891. Serial No. 400,808. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL W. RUSHMORE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Arc Lamps, of which the following is a specification.

The present invention relates to mechanism for advancing the movable carbons of arc lamps.

The main object is to provide a lamp adapted for use on a constant-potential circuit—such as the usual incandescent circuits—in which the feeding of the carbon shall not depend entirely on the strength of a shunt coil or magnet, but shall depend, also, on the operation of a coil or magnet in series with the arc, as hereinafter more fully set forth and claimed.

In the accompanying drawings, Figure 1 is a perspective view of the main parts of an arc lamp, showing the improvement applied thereto. Fig. 2 shows a side view of the clutches and parts connected thereto.

1 is the movable carbon or the movable rod which carries the carbon in the usual manner, and 2 is the lower and preferably stationary carbon.

3 is the positive terminal of the lamp, and is connected to the coarse series coil 4, the opposite end of which is connected by conductor 5 to the lower carbon. In the lamp as constructed this conductor will be one of the side rods of the frame.

6 is the negative terminal of the lamp.  
7 is a high-resistance shunt-coil connected between the terminal 6 and the conductor 5. Instead of being connected directly to the terminal 6 or to the frame of the lamp, the shunt-coil is connected to a spring 6', which normally rests against the carbon-carrying rod, and is thus connected to the frame and terminal 6. With this arrangement when the carbon is fed down until it is all consumed, the upper end of the carbon-rod will leave the spring 6' and open the circuit through the shunt-coil. Were it not for this the entire potential of the system would be left on the shunt-coils, subjecting them to the danger of burning out.

8 is the armature of said coil, and is provided with a spring 9 or other suitable retractor. To the armature is pivoted a link

10, the lower end of which is pivoted to a Y-shaped lever 11, the two branches of which are pivoted to the two posts 12. Above this lever is a clutch plate or ring 13, surrounding the carbon or carbon-carrying rod and having an extension or arm 14 on one side, at the end of which is a link 15, forming a mechanical connection between the lever 11 and the clutch. At the opposite side the clutch plate or ring has an arm 16, which stands over a post 17 and is adapted to strike said post when moved.

18 is the armature of the series coil, and is connected by a link 19 to a Y-shaped lever 20, also pivoted to the two posts 12. Below this lever is a second clutch-plate 21, surrounding the carbon or carbon-carrying rod and having an arm 22 connected by link 23 to the lever 20. The clutch controlled by the shunt-coil is so arranged that it grips and holds the carbon when the armature of said coil is in its retracted position, while the clutch of the series coil is so arranged that it grips and holds the carbon when the armature of that coil is in its opposite—that is, its attracted—position.

24 is a dash-pot, serving to retard the movement of the armature 18.

When the circuit is first closed to this lamp, the shunt-coil is immediately energized and attracts its armature, causing the clutch 13 to release its grip on the carbon and allowing the carbon to fall until it comes in contact with the lower carbon. This immediately short-circuits the shunt-coil, the circuit being from the insulated binding-post 3, through the series coil, conductor 5, carbons, to the frame of the lamp, and to the binding-post 6, in metallic connection with the said frame, and the armature 8 is retracted by the spring 9 raising the carbon and establishing the arc. The circuit when first closed includes the series coil; but the armature thereof is not influenced by the small current passing the shunt, but is attracted by the main current after the arc is established. When the carbon is entirely consumed, the end of the rod comes below the spring 6', thereby opening the circuit of the shunt-coil and protecting it from injury, as already described.

When several of the lamps are placed in series on a circuit of constant potential, they



will burn regularly and practically together, thus obviating one of the serious difficulties which has existed in operating arc lamps on incandescent circuits.

5 What I claim is—

1. The combination, in an arc lamp, of a movable carbon or carbon-carrying rod, a shunt-coil, a clutch ring or plate controlled thereby, a series coil, and a separate feeding  
10 device controlled thereby, one of said devices acting as a check on the other, substantially as described.

2. The combination, in an arc lamp, of carbons, means for holding the same apart when  
15 the lamp is out of use, a shunt-coil and armature therefor, the latter being connected to said means in such manner as to cause the movable carbon to advance when the armature is attracted, a retractor for the armature  
20 acting against the shunt-coil, a series coil, an armature therefor, and means operated thereby for holding the carbon when the armature of the series coil is attracted, substantially as described.

3. The combination, in an arc lamp, of carbons, a clutch for holding the same apart when  
25 the lamp is out of use, a shunt-coil and armature therefor, the latter being connected to said clutch in such manner as to cause the movable carbon to advance when the armature is attracted, a retractor for the armature,

acting against the shunt-coil, a series coil, an armature therefor, and a clutch operated thereby for holding the carbon when the armature of the series coil is attracted, substantially as  
35 described.

4. The combination, in an arc lamp, of a movable carbon, feeding mechanism therefor, and a shunt-coil to control said mechanism, said  
40 coil being connected to a contact upon the carbon-rod or carbon, whereby the shunt-circuit is interrupted when the carbon or carbon-rod passes said contact, substantially as described.

5. The combination, in an arc lamp, of a shunt-coil whose armature has a suitable re-  
45 tractor and is connected to a feeding device and when the lamp is out of use is retracted to hold the carbons apart, a feeding device, a series coil whose armature is connected to said feeding device and which is normally  
50 retracted to allow the carbon to approach, whereby a current passing through the lamp attracts the shunt-coil armature to approach the carbons and close the circuit through the carbons, substantially as described. 51

This specification signed and witnessed this 24th day of July, 1891.

SAMUEL W. RUSHMORE.

Witnesses:

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