No. 730,898. PATENTED JUNE 16, 1903.

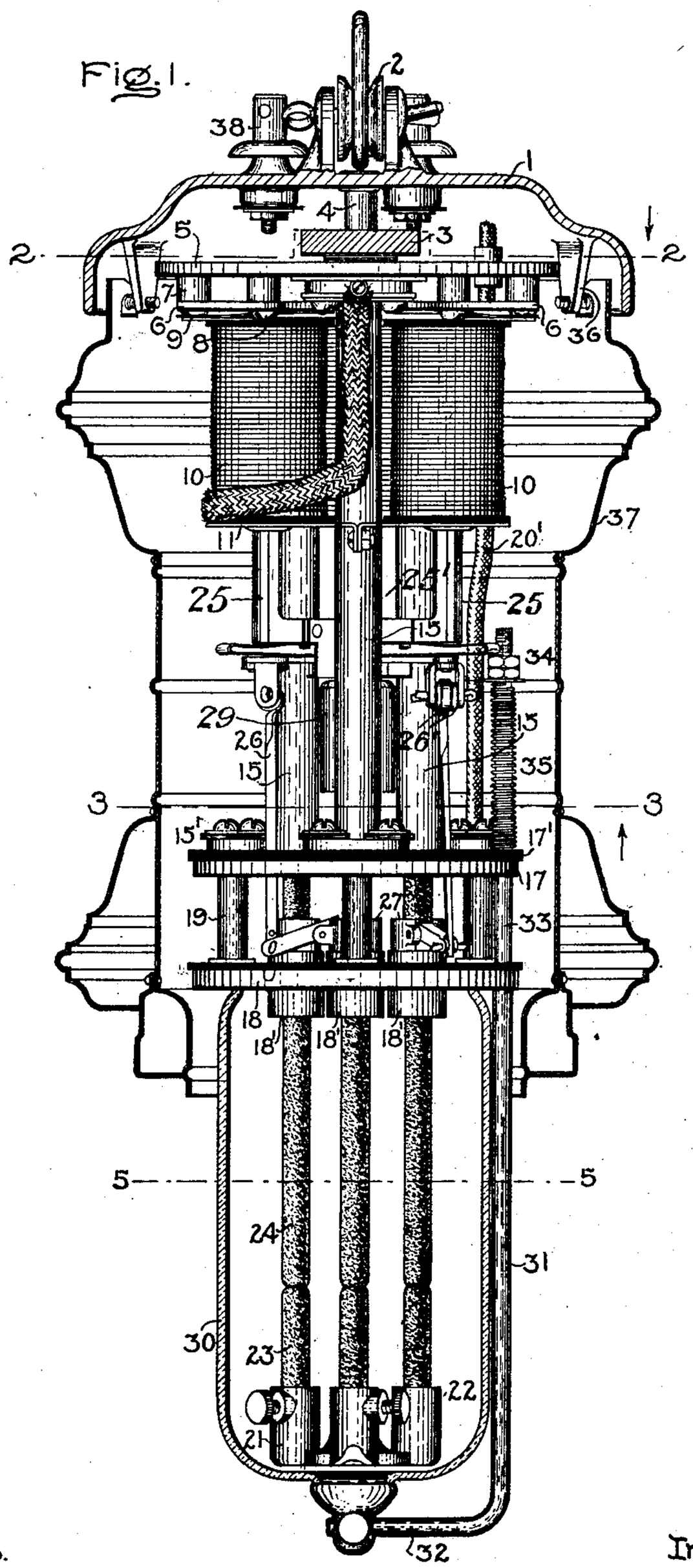
R. FLEMING.

ELECTRIC ARC LAMP.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

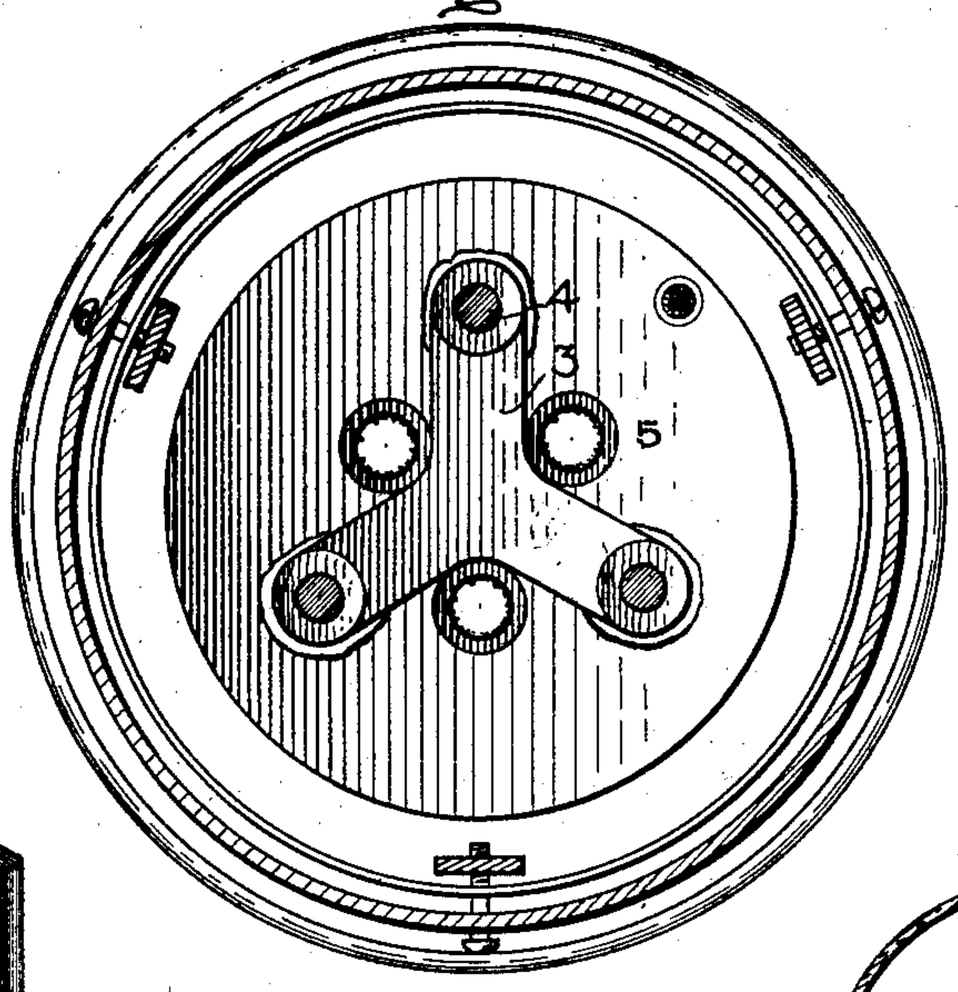



Fig. 4.

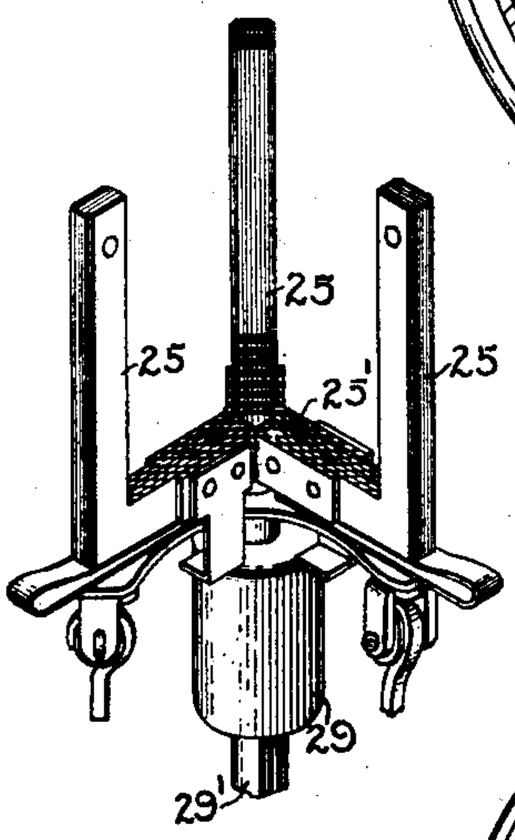



Fig. 5

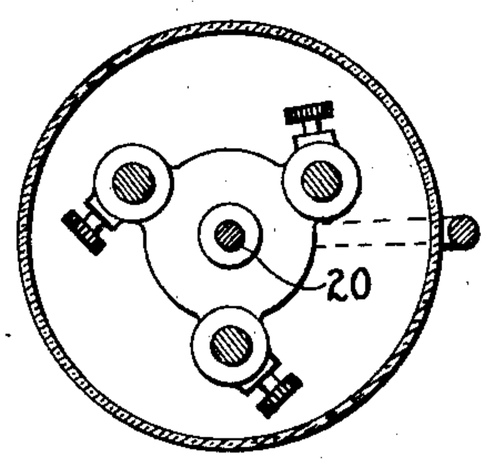
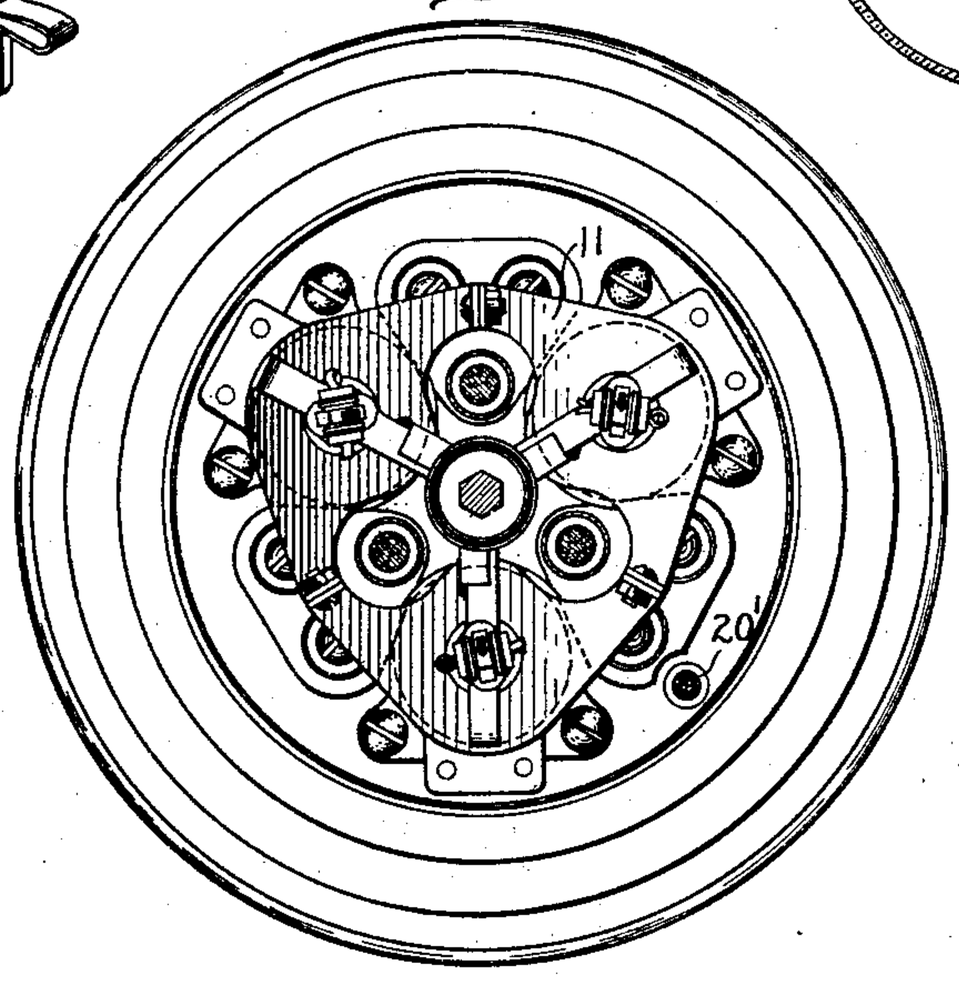



Fig. 3.

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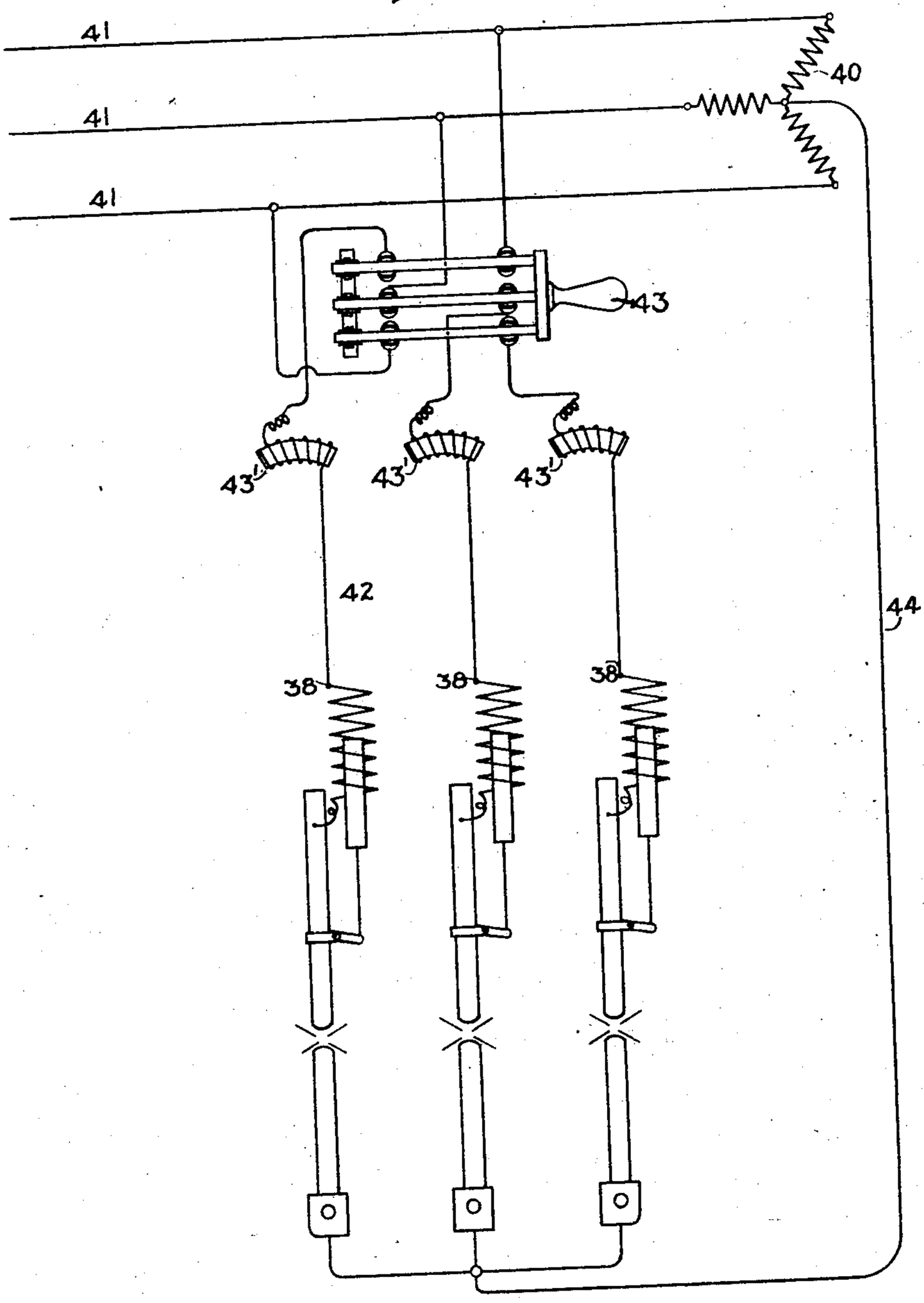
ELECTRIC ARC LAMP.

APPLICATION FILED SEPT. 22, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 730,898. Patented June 16, 1903.

# UNITED STATES PATENT OFFICE.

RICHARD FLEMING, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 730,898, dated June 16, 1903.

Application filed September 22, 1902. Serial No. 124,318. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD FLEMING, a subject of the King of Great Britain, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

The object of my invention is the production of an improved form of arc-lamp, which can be operated on a multiphase circuit and which has a pair of light-giving electrodes located in each branch of the multiphase circuit. One of the important features of my invention consists in the provision of a common feed mechanism for all of the electrodes, which is influenced by the current passing in all branches of the multiphase system.

Other features of my invention are pointed out in the description and claims annexed to and forming part of this specification.

In the accompanying drawings, Figure 1 is an elevation showing parts in section. Fig. 2 is a section taken on the line 2 2 of Fig. 1. Fig. 3 is a section taken on the line 3 3 of Fig. 1. Fig. 4 is a perspective view showing a portion of the feeding mechanism. Fig. 5 is a view taken on the line 5 5 of Fig. 1, and Fig. 6 is a diagram showing the circuits of the lamp.

The lamp is provided with a supporting or top member 1, which carries on its upper side a cord-engaging pulley 2. A spider 3 is secured to the under side of the top member by suitable posts 4. Below the spider 3 and attached thereto is a disk 5, which in turn supports three plates 6, which are symmetrically disposed with respect to the center of the disk. The plates 6 are separated from the plate 5 by bushings 7 and are secured to the plate by the screws 8, which pass through the bushings and are threaded into the plate 5.

Secured to the lower side of each plate 6 by a suitable spring-supporting member 9 is a solenoid-coil 10. These coils are cylindrical and are placed with their axes vertical and are connected together at the bottom by a frame 11.

Vertical tubes 15 depend from the plate 5 and carry at their lower ends a horizontal plate 17. The tubes 15 are provided at their extremities at one side with offsets or flanges 15′, which extend at right angles to the axes of the tubes and are provided with screw-holes by means of which the tube may be secured to the plates 5 and 17, respectively. The plates 5 and 17 are preferably made of metal, and the tubes 15 are insulated therefrom in any suitable manner. In the drawings I have shown a disk of insulating material 17′ between the flange portions of the tubes and the disk 17. I have also shown insulating-washers between the heads of the fastening-screws and the flanged ends. Washers of insulating material are placed at each side of the flanges at the upper end of the tubes 15. In order to avoid confusion in the drawings, I have shown the upper end of only one of the tubes 15 in Fig. 1.

Below the plate 17 and parallel thereto a plate 18 is secured by suitable posts 19. This plate is preferably insulated from the plate 17 in some suitable manner. Depending from the lower side of the plate 18 is a rod 20, (see Fig. 5,) provided at its lower end with an electrode-carrying member 21. The member 21 is provided with three parallel vertical sockets 22, in which the lower electrodes 23 are placed. An insulated lead 20′ extends from the plate 18, which is in electrical contact with the rod 20, to a suitable terminal (not shown) carried by the top member 1. This lead passes through openings in the disks 17 and 5. Insulated bushings may be provided to guard against contact between the lead and the plates.

The core or armature of the solenoid-coils 10 consists of three vertical bars or members 25, which are connected together at the bottom in any suitable manner. In the drawings I have shown the members 25 as such, having at the bottom a horizontal portion 25′. The horizontal portions are secured together at the bottom by riveting side plates to them. Spring-connected to the bottom of the core, one each beneath each vertical portion 25, are

three connecting-rods 26. The connecting-rods are insulated from the core, as indicated at 26'. The connecting-rods by reason of their spring connection to the core are movable to a slight extent independently of each other. The rods 26 pass through the plates 17 and carry at their lower end carbon-clutches 27 of the usual construction. The plates 17 and 18 are separated, so that the play of the clutch mechanism between them is sufficient so that the upper electrodes, which are carried in the tubes 15, may be moved to form an arc of the proper length.

In the plate 18 I have placed insulating bushings 18' in the apertures through which the electrodes pass. The apertures through which the electrodes pass in the plates 17 may be made sufficiently large so that no bushings are required.

Secured to the under side of the connected cores is the shell of a dash-pot 29. The piston of the dash-pot is carried by its stem 29' and extends upward from the plate 17.

A transparent casing 30 is provided for inclosing the lower portion of the electrodes and is carried by a rod 31. The rod 31 has a horizontal portion 32, which supports the casing, and a vertical portion 33, which extends upward and passes through perforations in the plates 17 and 18. Insulated bushings may be placed in the openings of these plates, through which the rod passes. The upper end of the rod is screw-threaded and carries a pair of locking-nuts 34. Between the lock-nuts and the plate 17 an extension spiral spring 35 is placed. On pulling down the rod 31 the portion 32 may be disengaged from the casing 30 and swung to one side, thus allowing the removal on occasion of the inspection of the lamp.

Depending from the under side of the top member 1 are lugs 36, and bolts passing transversely through these lugs in the main portion of the member 1 sustain the outer casing or shell 37. Terminals 38 are carried by the top member 1 and are connected inside the casing to the tubes surrounding the upper electrodes through the windings of the coils 10. I have not deemed it necessary to show the details of the connections between the terminals, coils, and the electrodes.

In the diagram shown in Fig. 6 I have shown a generator 40 for delivering three-phase current to the transmission-lines 41. These lines are connected to the terminals 38 by lines 42. A switch 43 is provided for making and breaking contact in the lines 42. A steadying reactive coil 43' is shown in each line 42. Line 44 connects the neutral point of the generator, which is wound in Y with the lower electrode-support 21.

The operation of the lamp described is as follows: The electrodes are normally in the position shown in Fig. 1. On the closing of the switch 43 the passage of current through the coils of the solenoid raises the core 25, and this by means of connecting-rods 26 raises the electrodes 24.

While I have shown and described my invention as embodied in a three-phase lamp, it is obvious that it might be embodied in a multiphase lamp in which the number of phases are different. The connection between the electrode-holder 21 and the neutral point of the generator may be dispensed with in some circumstances.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an arc-lamp embodying a multiphase circuit, a plurality of solenoid-coils, one arranged in each branch of the circuit, and a feed-actuating mechanism influenced by all of said coils.

2. In a multiphase system, a plurality of parallel solenoid-coils arranged one in each branch of the system, and a core member for each coil, said core members being connected at one end.

3. In an arc-lamp embodying a multiphase circuit, a plurality of pairs of electrodes, one pair being located in each branch of the circuit, and a common feed-actuating mechanism for all the electrodes, said feed-actuating mechanism being influenced by the current passing through each electrode.

4. In an arc-lamp embodying a multiphase circuit, a plurality of movable electrodes, one being located in each branch of the circuit, and a common feed-actuating mechanism influenced by the current passing in each branch of the circuit.

5. In an arc-lamp embodying a multiphase circuit, a solenoid and a movable electrode located in each branch of the circuit, and a feed-regulating armature having rigidly secured thereto members to be acted upon by each solenoid.

6. In an arc-lamp embodying a multiphase circuit, a plurality of movable electrodes, one in each branch of the circuit, a common feed-actuating mechanism for said movable electrodes, and a yielding connection between said electrodes and the actuating mechanism so that each electrode may have a limited movement independent of the other electrode.

7. In an arc-lamp, a plurality of movable electrodes, a clutch member for each of said movable electrodes, and a common actuating member for each clutch, said clutch members being yieldingly connected to said common actuating member.

8. In an arc-lamp embodying a multiphase circuit, a movable electrode and a coil for moving it in each branch of the circuit.

9. In an arc-lamp embodying a plurality of circuits, a coil in each circuit, and an actuating member influenced by each of said coils.

10. In an arc-lamp embodying a multiphase

circuit, a movable electrode in each branch of the circuit, and a common actuating member for said electrodes operated by the joint action of the currents passing in each branch of the multiphase circuit.

11. In an arc-lamp, a plurality of movable electrodes, means for supplying phase-displaced current to said electrodes, and a common actuating means for said movable electrodes influenced by current passing through said electrodes.

In witness whereof I have hereunto set my hand this 19th day of September, 1902.

RICHARD FLEMING.

Witnesses:
DUGALD MCK. MCKILLOP,
JOHN A. MCMANUS.