

No. 896,274.

PATENTED AUG. 18, 1908.

G. N. CHAMBERLIN.

ARC LAMP.

APPLICATION FILED DEC. 21, 1906.

Fig. 1.

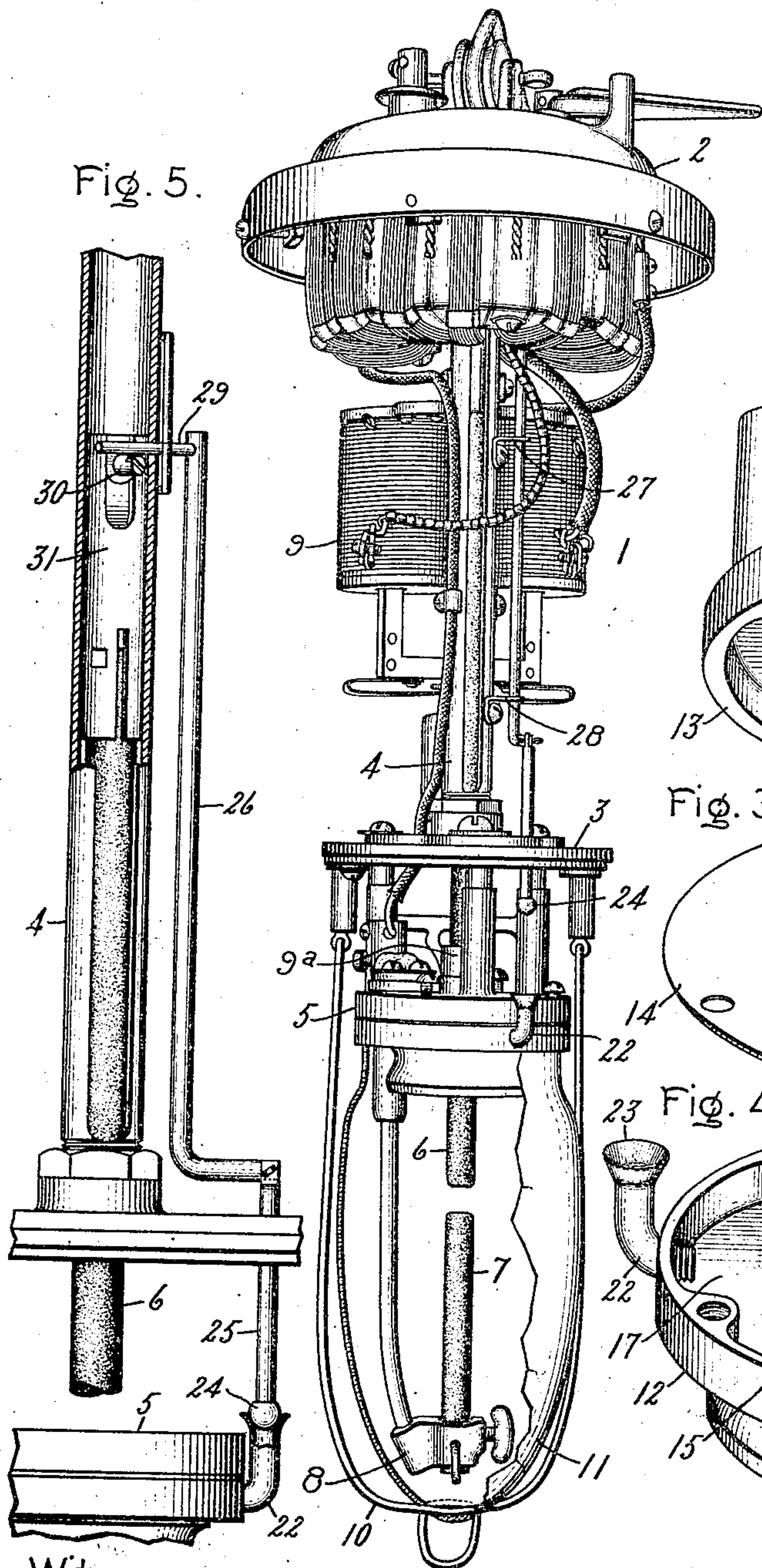


Fig. 5.

Fig. 2.

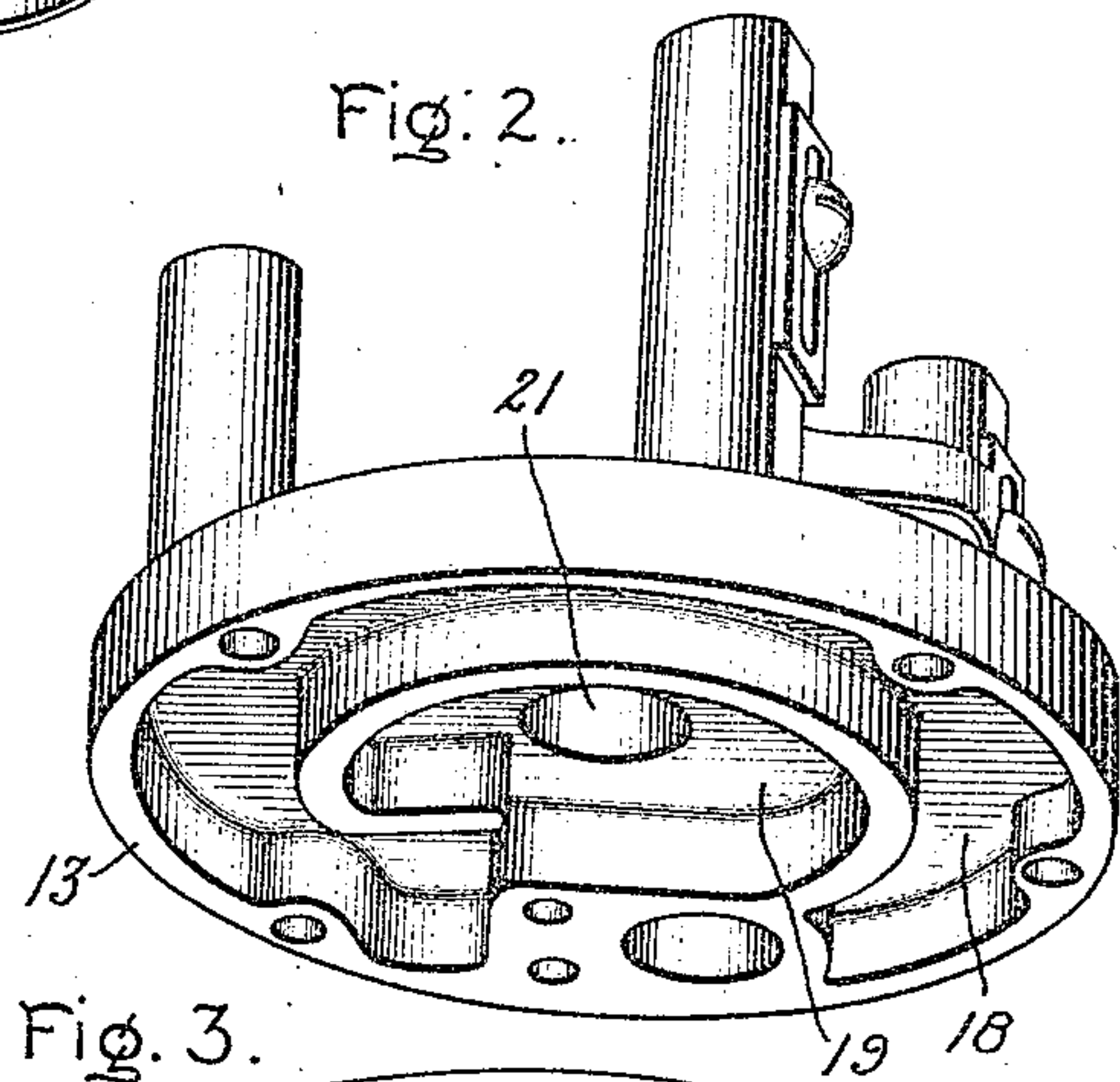


Fig. 3.

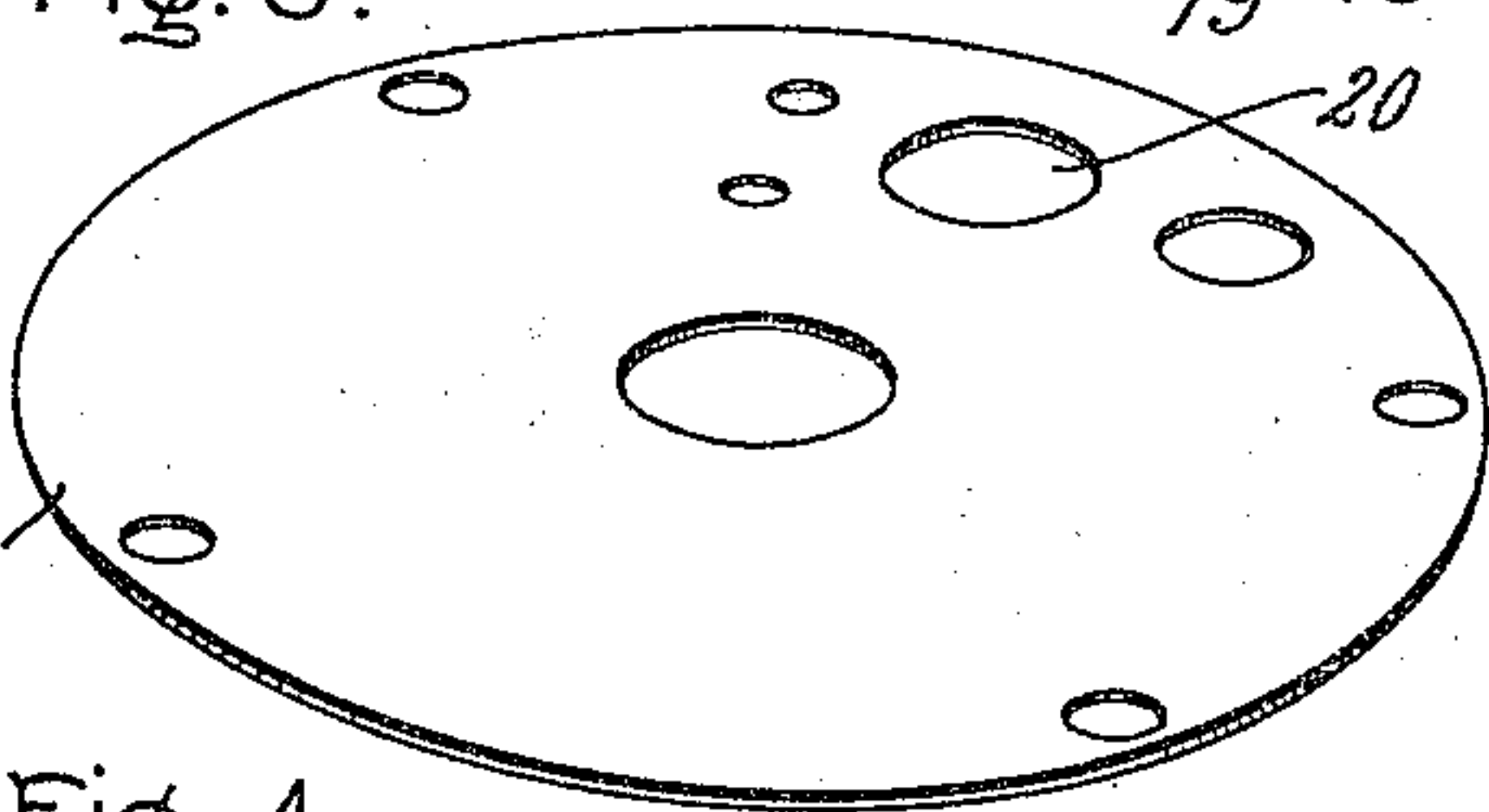
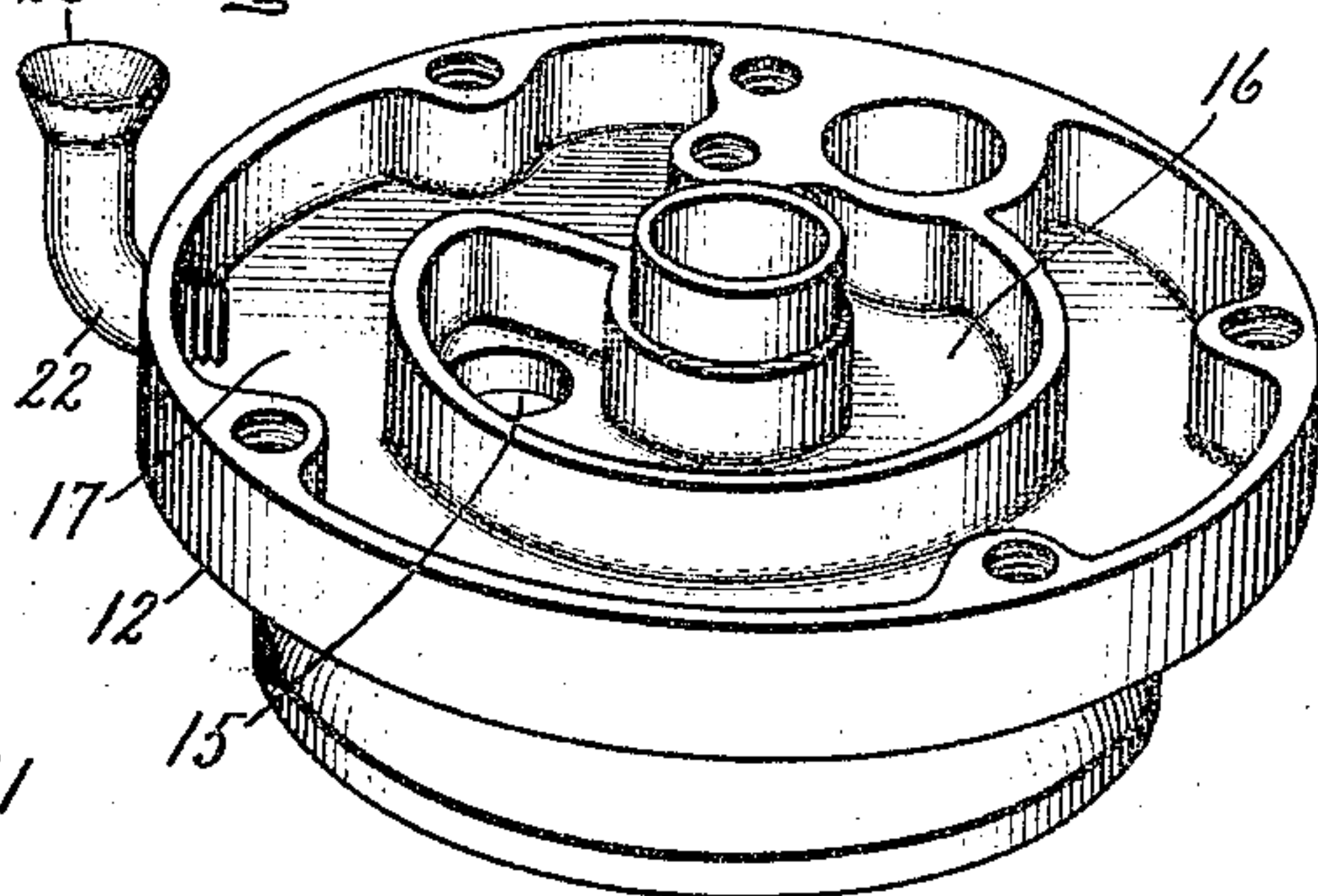


Fig. 4.



Witnesses:

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Guy N. Chamberlin,  
by *Alfred Davis*  
Att'y.



# UNITED STATES PATENT OFFICE.

GUY N. CHAMBERLIN, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ARC-LAMP.

No. 896,274.

Specification of Letters Patent.

Patented Aug. 18, 1908.

Application filed December 21, 1906. Serial No. 348,884.

*To all whom it may concern:*

Be it known that I, GUY N. CHAMBERLIN, a citizen of the United States, 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.

My invention relates to electric arc lamps and has for its object to improve the same.

10 In inclosed arc lamps the admission of air into the inner globe is restricted so as to prolong the life of the electrodes. A limited supply of air is however necessary for effective lighting. In the most common form of  
15 arc lamps, namely, that wherein the lower electrode is held stationary and the upper electrode is fed to compensate for the consumption of both electrodes, the quantity of air required for effective illumination varies  
20 as the arc travels downwards in the globe; more air being required when the arc is near the top of the globe than when it is lower down. Heretofore it has been customary to so adjust the means for controlling the air  
25 supply that sufficient air may enter the globe at the time the maximum amount is required. Therefore, in such constructions an unnecessarily large amount of air is supplied after the arc has left its extreme upper position and the electrodes are then consumed at  
30 an unnecessarily rapid rate. By my invention the air supply is automatically regulated to meet the different conditions existing on account of the downward travel of the  
35 arc.

To the above end my invention comprises a novel construction and arrangement of parts to be hereinafter particularly pointed out in the claims.

40 For a full understanding of the invention and of its various objects and advantages, reference is to be had to the following detailed description taken in connection with the accompanying drawing, wherein

45 Figure 1 is a perspective view of a lamp embodying the present invention in a preferred form, the casing and outer globe being removed to more clearly show the lamp mechanism; Figs. 2, 3 and 4 are perspective  
50 views showing on an enlarged scale the three different parts of which the gas cap is made; and Fig. 5 is an enlarged view of a detail.

Reference being had to the drawing, 1 represents an arc lamp of any usual or preferred  
55 construction, that illustrated having a frame

made up of a hood or canopy 2, a platform 3, and a central tube or backbone 4 connecting the hood and platform together. Beneath the platform is supported a gas-cap 5.

6 and 7 are, respectively, the upper and 60 the lower electrodes, the electrode 6 being slidably arranged within the tube 4 and the electrode 7 being fixed in a holder 8.

9 is a regulating magnet which controls the upper electrode in any usual or desired way, 65 as by means of a clutch 9<sup>a</sup>.

10 is a bail for holding the inclosing globe 11 against the under surface of the gas-cap.

In accordance with my invention, a channel or passage connects the interior of the 70 globe with the atmosphere and means are provided for controlling this channel in such a way that the quantity of air which may be admitted to the globe varies as the arc assumes different positions in the globe. This 75 passage may conveniently be formed by constructing the gas-cap in the manner illustrated in an application filed in the name of Richard Fleming, on May 4, 1905, Serial No. 258,796, namely, the gas-cap may consist of 80 two portions 12 and 13, separated from each other by a thin disk 14; the members 12 and 13 being cored out, so that when the parts are assembled there is formed in the gas-cap an elongated passage which opens into the 85 globe at one end and into the atmosphere at the other. This passage consists of concentric spiral grooves 16 and 17 in the member 12, and grooves 18 and 19 in the member 13, the two sets of grooves being joined in series 90 with each other by means of an opening 20 in the disk 14 through which the grooves 17 and 18 are made to communicate with each other. The groove 16 communicates at one 95 end with the arc inclosure through an opening 15 in the gas-cap. The groove 19 opens into atmosphere through the electrode opening 21. Thus, when the lamp is in operation, gases may discharge from and air may enter into the globe through the circuitous 100 passage in the gas-cap.

The passage may be controlled in various ways so as to vary the amount of air admitted into the globe during the operation of the lamp. Thus the parts may conveniently be 105 so proportioned that the gas-cap, in the condition described, provides the minimum supply of air required during the operation of the lamp. Then, when the arc is in such position that more than the minimum amount 110



of air is required, the character of the passage may be altered. This may of course be done in various ways as, for example, the effective length of the passage between the globe and the atmosphere may be varied. This latter method of controlling the passage I have found to be satisfactory. I have also found that good results are obtained by providing only two different effective passage lengths, that is, causing the lamp to operate with one length of passage until the arc has traveled part way down the globe and then increasing the effective length of the passage and maintaining this increased length during the further operation of the lamp.

In the embodiment of my invention illustrated, the passage in the gas-cap is tapped at a point intermediate its length and a valve provided for normally opening the passage into the atmosphere at this point and for closing such communication between the passage and the atmosphere when the upper electrode has fed a predetermined distance. To this end a short section of tube 22 is screwed into or otherwise secured to the gas-cap so as to communicate with the groove 17. The outer end of the tube is provided with a valve seat 23 arranged to receive a valve 24. This valve is carried upon the lower end of a rod 25 which is connected to or forms an extension of a rod 26 mounted in brackets 27 and 28 on the backbone of the lamp. At the upper end of the rod 26 is a finger or projection 29 which extends into the path of movement of the pin 30 carried by the holder 31 for the upper electrode.

The parts are so arranged that when new electrodes are put in the lamp, the pin on the holder for the upper electrode engages with the finger on the valve rod and raises the valve off its seat. Therefore, at this time, the groove 17 in the gas-cap communicates with the atmosphere through the short tube 22, and the effective passage-length between the interior and exterior of the globe is now shorter than the maximum, consisting only of the groove 16, a portion of the groove 17, and the tube 22. As the electrodes are consumed the upper electrode and its holder descend gradually, carrying the valve toward its seat, until the electrodes have been partially consumed and it becomes desirable to lengthen the air passage. This occurs when the arc has descended to the point indicated by the arrow in Fig. 1. The valve now drops into its seat and the end of the tube 23 is closed. During the further operation of the lamp, therefore, the air which enters the globe must pass throughout the entire length of the combined grooves in the gas-cap.

It will of course be understood that in its broad aspects my invention may be embodied in many different forms, and I therefore do not desire to be limited to the particular form shown, but intend to cover all

forms coming within the scope of my invention as defined in the appended claims.

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

1. In an arc lamp, an arc-inclosing globe, means for supplying air to said globe, and means actuated by the feeding movement of an electrode for automatically varying the rate at which air is supplied during the operation of the lamp.

2. In an arc lamp, an arc-inclosing globe, means for supplying air to said globe, and means for causing the rate at which the air is supplied to be automatically varied after the electrodes have been consumed a predetermined amount.

3. In an arc lamp, an arc-inclosing globe, means for supplying air to said globe, and means for causing the rate at which air is supplied to be automatically varied after one of the electrodes has been consumed a predetermined amount.

4. In an arc lamp, an arc-inclosing globe having a passage through which air enters the globe, and means actuated by the feeding movement of an electrode for automatically regulating said passage to vary the rate at which air may enter the globe.

5. In an arc lamp, electrodes, an arc-inclosing globe, electrode-feeding means arranged to cause the position of the arc in the globe to vary as the electrodes are consumed, means for supplying air to said globe, and means for automatically varying the rate at which the air is supplied as the arc changes its position in the globe.

6. In an arc lamp, electrodes, an arc-inclosing globe, electrode-feeding means arranged to cause the position of the arc to vary as the electrodes are consumed, means for supplying air to the globe, and means for automatically changing the rate at which air is supplied when the arc reaches a predetermined position in the globe.

7. In an arc lamp, an arc-inclosing globe having a passage through which air is admitted, and means for automatically varying the effective length of said passage.

8. In an arc lamp, an arc-inclosing globe having a passage through which air is admitted, and means for automatically changing the effective length of said passage when a predetermined operating condition is reached.

9. In an arc lamp, an arc-inclosing globe having a passage through which air is admitted, and means for automatically changing the effective length of said passage after the electrodes have wasted away a predetermined amount.

10. In an arc lamp, electrodes, an arc-inclosing globe having a passage through which air is admitted, electrode-feeding mechanism arranged to cause the position of the arc to vary as the electrodes are consumed, and means for automatically vary-



ing the effective length of said passage when the arc reaches a predetermined point.

11. In an arc lamp, electrodes, an arc-inclosing globe having a passage through which air is admitted, electrode-feeding mechanism arranged to cause the arc to travel downwards in the globe as the electrodes are consumed, and means for automatically shortening the effective length of said passage when the arc reaches a predetermined point.

12. In an arc lamp, electrodes, one of which is movable, an arc-inclosing globe having a passage for the admission of air, feeding mechanism arranged to cause said movable electrode and the arc to travel downward as the electrodes are consumed, and means for automatically shortening the effective length of said passage when the movable electrode has traveled a predetermined distance.

13. In an arc lamp, electrodes, an arc-inclosing globe having a passage opening into the surrounding medium, there being an outlet into said medium intermediate the ends of the passage, a valve for controlling said outlet, electrode-feeding mechanism arranged to cause the arc to travel downwards in the globe as the electrodes are consumed, and means for causing said

valve to close said outlet when the arc reaches a predetermined position in the globe.

14. A gas-cap for inclosed arc lamps having a passage communicating at its ends respectively with the arc inclosure and the atmosphere, there being an outlet from said passage intermediate the ends thereof, and a valve for controlling said outlet, and means for actuating said valve.

15. In an inclosed arc lamp, electrodes, a gas-cap having a passage communicating at its ends respectively with the arc inclosure and with the atmosphere, electrode-feeding mechanism arranged to cause the arc to travel downwards in the globe as the electrodes are consumed, there being an outlet in said passage intermediate the ends thereof, a valve for said outlet, and means for operating said valve to close the said outlet when the arc reaches a predetermined position.

In witness whereof, I have hereunto set my hand this seventeenth day of December, 1906.

GUY N. CHAMBERLIN.

Witnesses:

JOHN A. McMANUS, Jr.,  
PHILIP F. HARRINGTON.