

No. 625,431.

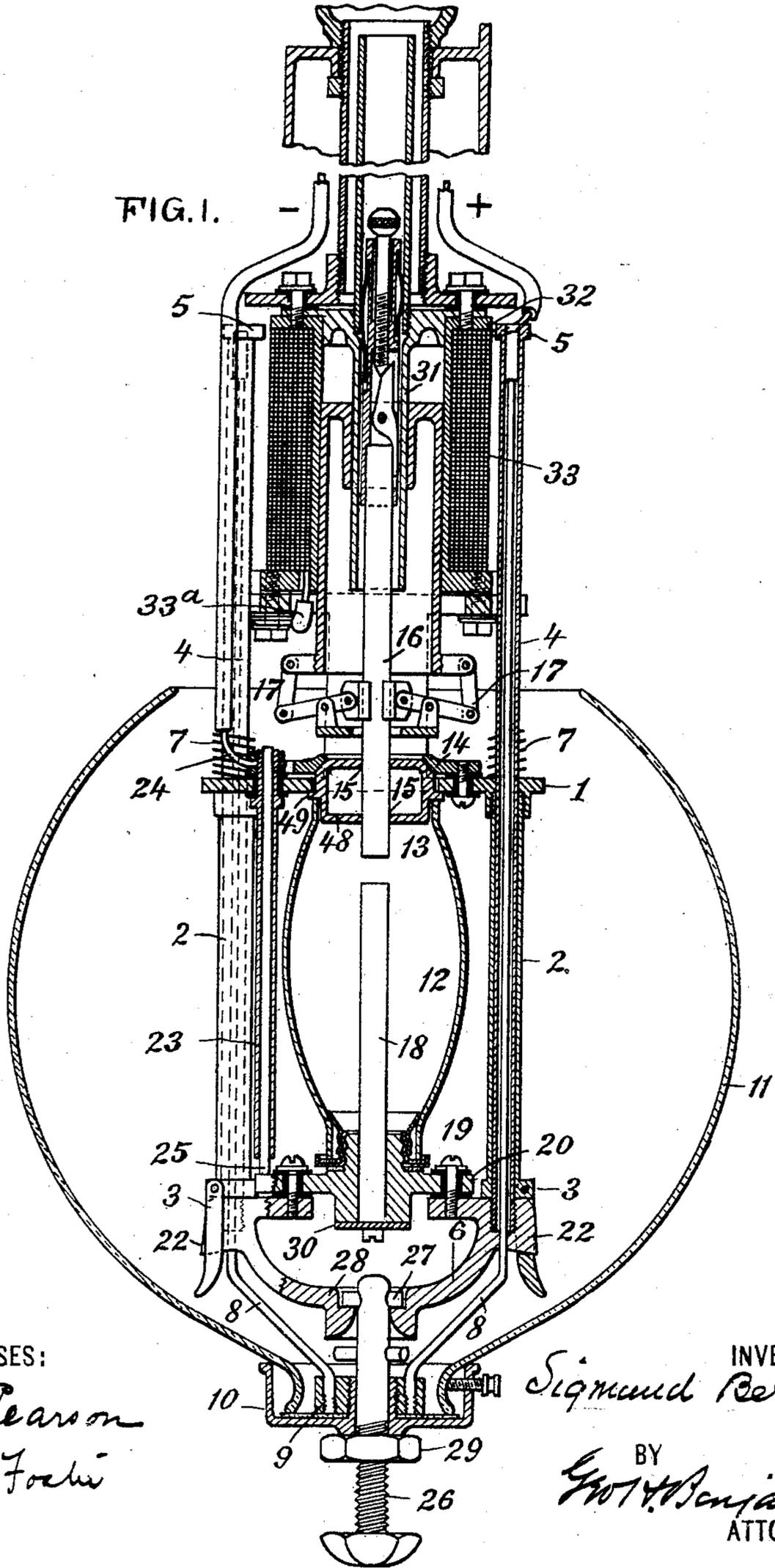
Patented May 23, 1899.

S. BERGMANN.  
ELECTRIC ARC LAMP.

(Application filed May 7, 1897.)

(No Model.)

3 Sheets—Sheet 1.



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FIG. 4.

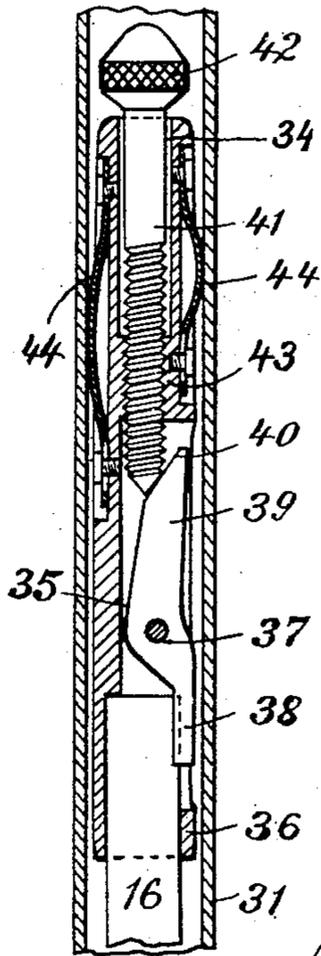


FIG. 2.

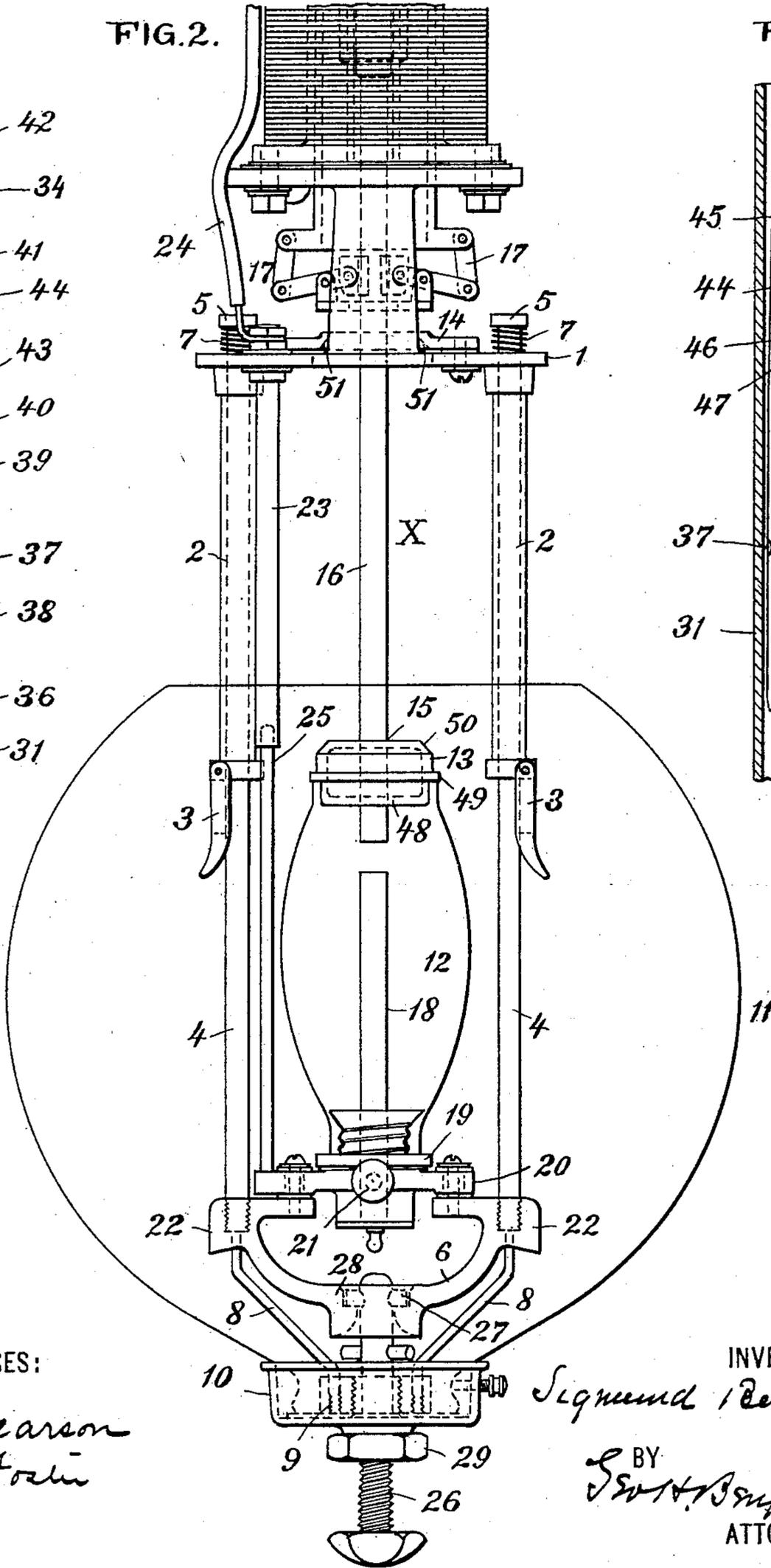
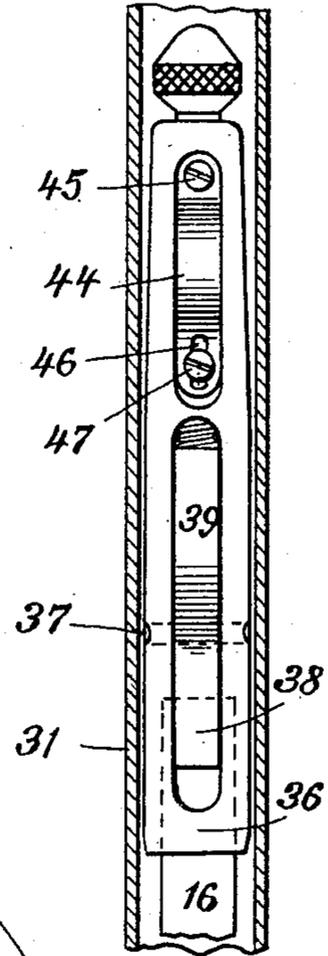


FIG. 5.



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FIG. 6.

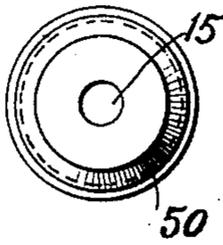


FIG. 3.

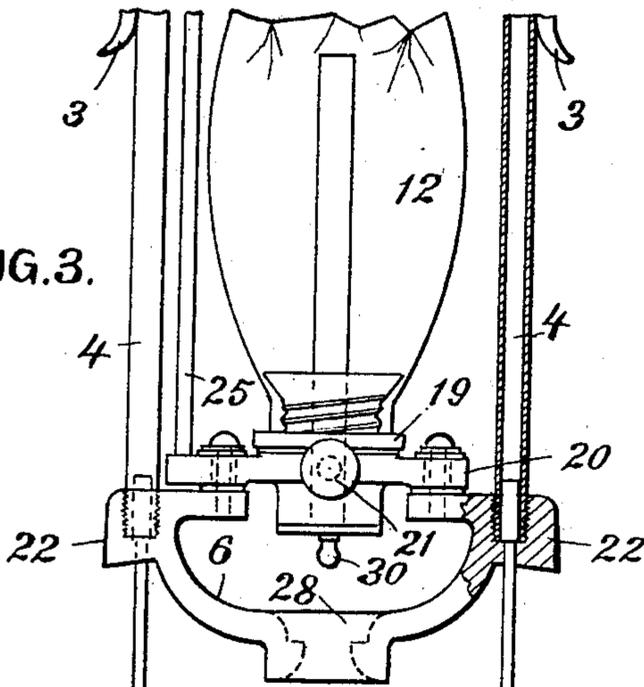
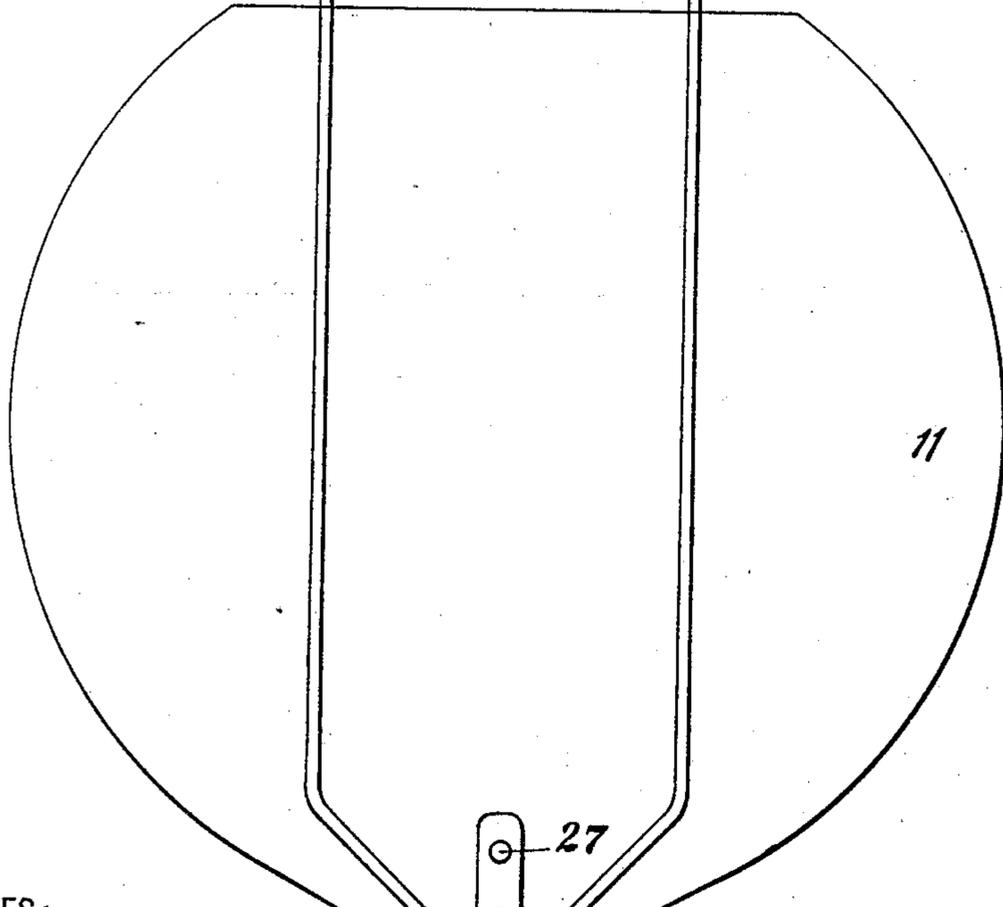
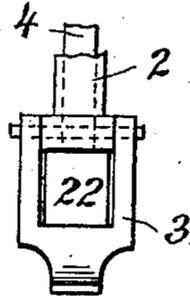


FIG. 7.



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# UNITED STATES PATENT OFFICE.

SIGMUND BERGMANN, OF NEW YORK, N. Y., ASSIGNOR TO THE GENERAL INCANDESCENT ARC LIGHT COMPANY, OF NEW YORK.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 625,431, dated May 23, 1899.

Application filed May 7, 1897. Serial No. 635,520. (No model.)

*To all whom it may concern:*

Be it known that I, SIGMUND BERGMANN, a citizen of the United States, residing at New York, State of New York, have invented certain new and useful Improvements in Arc-Lamps, (for which I have obtained Letters Patent in Great Britain, No. 13,107, dated May 27, 1897; in Belgium, No. 128,622, dated June 1, 1897, and in Austria, No. 3,143, dated August 26, 1897,) of which the following is a specification.

My invention relates to electric-arc lamps of the type in which the light-arc is maintained within a small inner globe; and it consists, first, in a special construction of the frame of the lamp, by reason of which the inner and outer inclosing globes are permitted to descend so far below the base of the lamp as to readily permit the introduction of new carbons in trimming the lamp; secondly, in providing a special form of holder for the upper carbon, by reason of which the carbon is not only held securely in the holder, but electrical connection is formed between the holder and the inner surface of the tube in which the holder is placed; thirdly, in providing the inner globe with a cap so constructed on its outer surface as to seat itself in a ring-seat provided in the base of the upper portion of the lamp and in such a manner that the cylindrical opening in said cap is directly in line with the carbon and carbon-holder; fourthly, in providing a telescopic electrical connection between the upper portion of the lamp and the lower-carbon holder.

My invention further relates to various details of construction, which will hereinafter be specifically set forth and claimed.

The object of my invention is to improve the general construction of lamps of this type.

In the accompanying drawings, which serve to illustrate my invention, similar numerals indicate like parts.

Figure 1 is a vertical section and illustrates the operating mechanism and the relation of the several parts of the lamp when the lamp is in use and with the inclosing globe in its first position. Fig. 2 is an elevation showing the base of the lamp and outer globe partially down and in its second position. Fig. 3 is an elevation showing the outer globe all

the way down and in its third position. Fig. 4 is an enlarged view, partially in section, of the removable and adjustable electric-contact-making holder for the upper carbon and of the tube in which it moves. Fig. 5 is a side view of the said parts, showing the contact-springs. Fig. 6 is a top view of the cap for the inner small globe, showing its beveled outer edge. Fig. 7 is a side view of the pivoted links which support the base of the lamp.

Referring to the drawings, 1 represents the base or floor of the lamp, which supports above it the regulating mechanism of the lamp and below it the tubes 2 2. To an enlarged portion on the bottom of the tubes 2 2 are pivoted the links 3 3. Located within the tubes 2 2 and passing through the plate 1 are the tubes 4 4. These tubes are provided at their upper ends with stops 5 5 and are attached at their lower ends to a supporting-yoke 6. Located between the stops 5 5 on the tubes 4 4 and the top of the plate 1 are the helical springs 7 7. Located within the tubes 4 4 are the wire rods 8 8, provided at their upper end with small keys (not shown) and connected at their lower end to a ring 9, screw-threaded on its inner circumference and which forms a point of attachment for the saucer 10, which supports the outer globe 11.

12 is the inner globe; 13, cap for inner globe; 14, a plate mounted on but insulated from the plate 1. The inner circumference of this plate is beveled from within outwardly, and the upper surface of the cap 13 is provided with a similar bevel, so that when the parts are in the position shown in Fig. 1 the top of the cap seats itself in the beveled ring on the under surface of the plate 14. The effect of this arrangement is to bring the opening 15 in the cap 13 in line with the upper carbon 16 as held and fed by the clutch mechanism 17.

18 is the lower carbon, which is carried in the tubular portion 19 of the plate 20 and secured therein by the screw 21, Fig. 2. The plate 20 is carried by the yoke 6, which latter is provided with the offsets 22 22, over which the pivoted links 3 3 are secured when the parts are in the position shown in Fig. 1.

Depending from and also insulated from

the plate 1 is a tube 23, the upper end of which is in electrical contact with the conductor 24. Located within the tube 23 and making electrical contact therewith is a wire rod 25, which is in contact at its lower end with the supporting-plate 20. This arrangement of tube 23, conductor 24, and rod 25 is for the purpose of providing a telescopic electrical connection between the base of the lamp and the outgoing conductor. Manifestly this arrangement may be changed and the usual flexible electrical conductor take its place. The saucer 10 and the outer globe 11 are supported by means of a hanging rod 26, which is provided with the lugs 27 27, which lugs normally rest in depressed seats 28 28 of the yoke 6.

29 is a nut by which the parts are secured in position.

The parts of the lamp so far as described relate principally to what may be termed the "telescopic" features of its frame, the operation of the parts being as follows: When it is desired to carry down the outer globe in order to trim the lamp, the links 3 3 are moved outwardly. This releases the yoke 6 and permits the lower portion of the lamp and the outer and inner globes to descend to the position shown in Fig. 2. The springs 7, surrounding the tubes 4, serve to cushion the downward movement. When the parts have reached the position shown in Fig. 2, the nut 29 is rotated and also the hanging rod 26, which permits the lugs 27 to pass out of their seats and through the yoke 6, and thereby permits the outer globe to be carried down to the position shown in Fig. 3, leaving sufficient room between the top of the globe and the door 30 in the tubular portion 19 of the plate 20 to permit of the introduction of new carbons in the manner hereinafter described.

Referring now to the removable and adjustable electric-contact-making holder for the upper carbon, which is shown in Fig. 1 and also as an enlarged view in Figs. 4 and 5, 31 represents a cylindrical tube supported by a flange resting upon and in electrical contact with the metallic spool 32 of the magnet 33. Located within this tube and arranged so as to be freely movable therein and removable therefrom is the carbon-holder 34. This holder consists of the cylindrical body portion 35 of sufficient size at its lower end 36 to receive the upper carbon 16. Pivoted within the tube 35 is a dog 37, the lower end 38 of which is made semicylindrical to conform to the shape of the carbon 16. The upper end 39 is beveled outwardly to conform to the conical end 40 of the adjusting-screw 41. The screw 41 is provided with a milled head 42 and moves in a thread 43, cut in the body of the tube 35. 44 44 are contact-springs arranged opposite to each other and secured to the tube 35 by the screws 45. Their lower ends are provided with a slot 46, which leaves them

free to move over the screws 47. These springs make contact with the tube 31. The operation of this carbon-holder and contact-making device in the normal use of the lamp and in trimming the lamp is as follows: In the normal use of the lamp the circuit through the lamp is from conductor + coil of magnet 33, conductor 33<sup>a</sup>, metallic spool 32, tube 31, carbon-holder 34, through the intervening contact-springs 44, carbon 16, carbon 18, plate 20, rod 25, conductor 24, conductor -. It will be understood that the carbon-holder 34 moves up and down in the tube 31 in accordance with the movement of the carbon 16, as affected by gravity and the movement of the clutch 17.

In trimming the lamp the operation of the carbon-holder is as follows: When the parts are in the position shown in Fig. 3 and the door 30 opens, the lower carbon may be removed through the door by releasing the screw 21. The upper carbon follows the lower carbon downward, carrying with it the carbon-holder 34, which passes the clutch and reaches the position indicated at  $x$ , Fig. 2—that is, between the bottom of the plate 1 and the top of the cap 13, when the inner globe is in its second position. At this point the carbon-holder is taken in the left hand and the screw 42 rotated with the right hand. This releases the upper carbon, which falls through the door 30. A new upper carbon is now introduced through the door 30 and into the bottom of the carbon-holder and secured therein by rotation of the screw 42 in the opposite direction. The holder then is introduced upwardly into the tube 31 past the clutch 17. At the same time a new lower carbon is passed through the door and the door closed. The parts are then brought to the position shown in Fig. 1. The carbon-holder 34 is therefore seen to be removable, adjustable relative to the carbon which it carries, and also adjustable relative to the tube 31 by means of the adjustable contact-springs 44. These springs may be considered adjustable, as they may be readily bent to exert more or less spring-pressure, as desired.

Referring now to the third portion of my invention—namely, the construction of the cap which covers the small inner globe and the relation of such cap to a seat in the upper part of the lamp—in Fig. 1 the cap 13 is shown as seated in the plate 14, whereas in Fig. 2 the cap is shown in its second position. By reason of this construction, as also the construction of the upper-carbon holder, I am able to produce a very short lamp, not exceeding twenty-six inches in length, which is a feature of very considerable commercial importance, as a short lamp may be used in rooms where a long lamp as commonly made would not be suitable. Further, I am enabled to do away entirely with the necessity of providing a cap which has a lateral play in the top of the inner globe or which is

provided with a floating washer. A cap which has a lateral play in the inner globe is objectionable, as if it is given too much play the requisite atmosphere cannot be maintained in the globe, whereas in the use of a floating washer the washer is apt to jam. In the construction described only sufficient play is permitted between the cap and the globe to permit the expansion of the metal of the cap when heated. The cap consists, essentially, of a body portion 48, which is made hollow, the confined air acting as a non-conductor. The body portion is provided with a flange 49, which rests on top of the globe 12. Its surface is beveled, as at 50, Fig. 2, to conform to a similar bevel 51 in the plate 14. I do not limit myself to the precise construction of the cap 13 or of the plate 14, provided that the essential requirements are complied with—that the cap seat itself in the plate 14 and preserve an alinement between the carbon-holder, the carbon carried thereby, and the opening for the carbon in the cap.

The fourth portion of my invention has been described, as well as its office, in connection with the first portion.

The drawings filed with this application show various other parts of the lamp—as, for instance, the parts relating to the clutch mechanism, connection of the inner globe, &c.—to all of which I make no claim in this application, as the claims for such parts have been made in other applications, as follows, which stand allowed, to wit: Serial Nos. 578,371, 611,554, 628,394, and 628,411.

Having thus described my invention, I claim—

1. In an arc-lamp, the combination of an inner arc-inclosing globe, a cap for said globe, having its top shaped as a flattened cone, and a plate having a seat for said cap and corresponding to the shape of the top of said cap, substantially as described.

2. In an arc-lamp, the combination with the supporting-frame of the lamp, of a telescopic support for the outer inclosing globe and a telescopic support for the inner arc-inclosing globe, substantially as described.

3. In an arc-lamp, the combination with the supporting-frame of the lamp, of an adjustable support for the outer inclosing globe, an adjustable support for the inner arc-inclosing globe, and means for fixing and releasing said supports, substantially as described.

4. In an arc-lamp, the combination with the upper carbon of a carbon-holder comprising a cylindrical tube, a pivoted dog, a screw for adjusting the position of the dog and contact-springs, substantially as described.

5. In an arc-lamp, the combination with the supporting-frame, of a pair of depending tubes, a pair of tubes within said first-named tubes, a support for the inner arc-inclosing globe attached to said second-named tubes,

and means for supporting said arc-inclosing globe against the action of gravity and releasing the same when desired, substantially as described.

6. In an arc-lamp, the combination with the supporting-frame a pair of depending tubes, pivoted links on the end of said tubes, a pair of tubes within said first-named tubes, and a support for the inner arc-inclosing globe provided with offsets over which said links take, substantially as described.

7. In an arc-lamp, the combination with the supporting-frame, of a pair of depending tubes, gravitally-acting links on the end of said tubes, and a support for the lower carbon provided with offsets over which said links take, substantially as described.

8. In an arc-lamp, the combination with the supporting-frame, of a pair of depending tubes, a pair of tubes within said first-named tubes, a support for the lower portion of the lamp attached to said second-named tubes, and an elastic cushioning device for said second-named tubes, substantially as described.

9. In an arc-lamp, the combination with the supporting-frame, of a pair of tubes, links on the ends of said tubes, a pair of tubes inclosed in said first-named tubes, a yoke carried on the end of said second-named tubes provided with offsets over which said links take, and springs introduced between the point of support for the first-named tubes, and stops on the ends of said second-named tubes, whereby an elastic telescopic support is provided for the bottom of the lamp, substantially as described.

10. In an arc-lamp, the combination with the supporting-frame, of a pair of tubes, pivoted links on the end of said tubes, a pair of tubes inclosed in said first-named tubes, a support for the inner globe carried on the end of said tubes provided with offsets, a pair of rods inclosed in said second-named tubes, a support for the outer globe carried by said rods, and a support and releasing device introduced between the supports for the globes, substantially as described.

11. In an arc-lamp, the combination with the vertically-adjustable support for the lower carbon, of a sliding electrical connection, substantially as described.

12. In an arc-lamp, an arc-inclosing chamber adjustable relatively to the carbon feeding and regulating mechanism, and an outer inclosing chamber adjustable relatively to the arc-inclosing chamber, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

SIGMUND BERGMANN.

Witnesses:

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WM. H. GRAHL.