No. 631,965. Patented Aug. 29, 1899.

M. S. OKUN.

ELECTRIC ARC LAMP.

(Application filed Oct. 23, 1895.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1

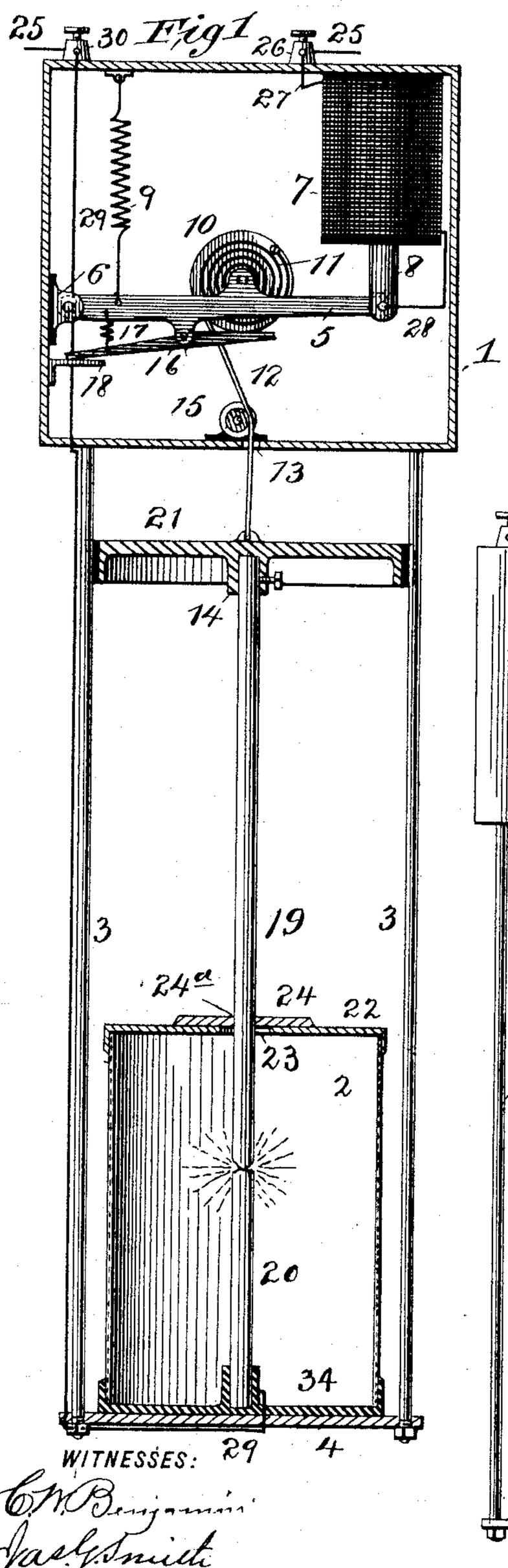
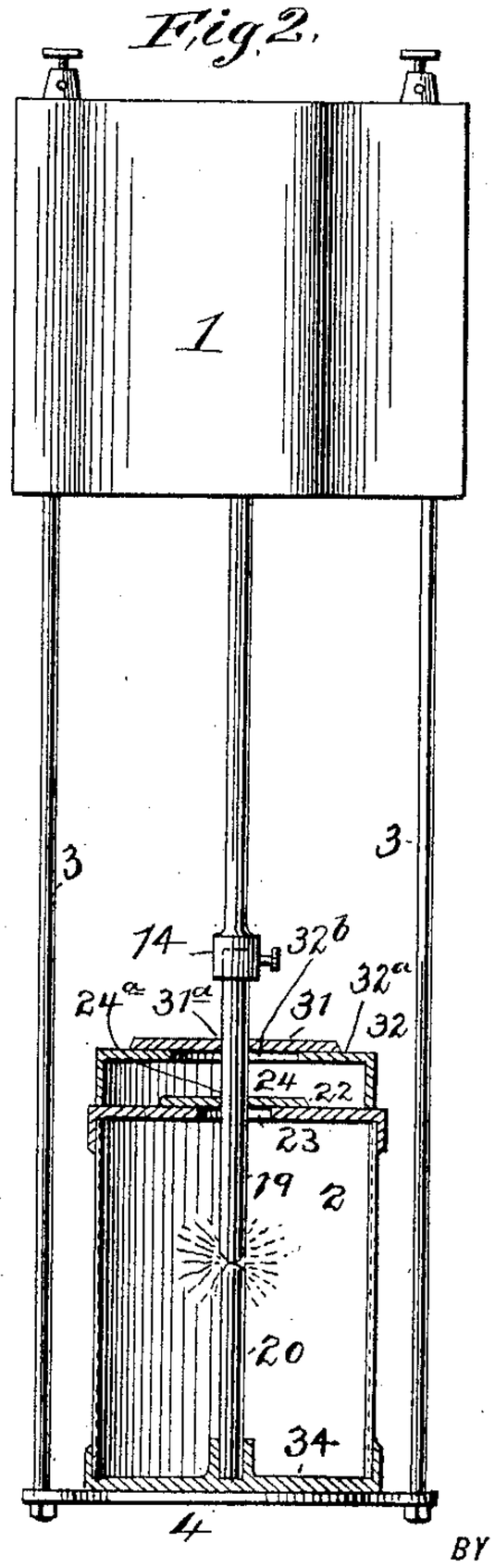


Fig 2.



WITNESSES:

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No. 631,965.

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2 Sheets—Sheet 2.

Fig 3.

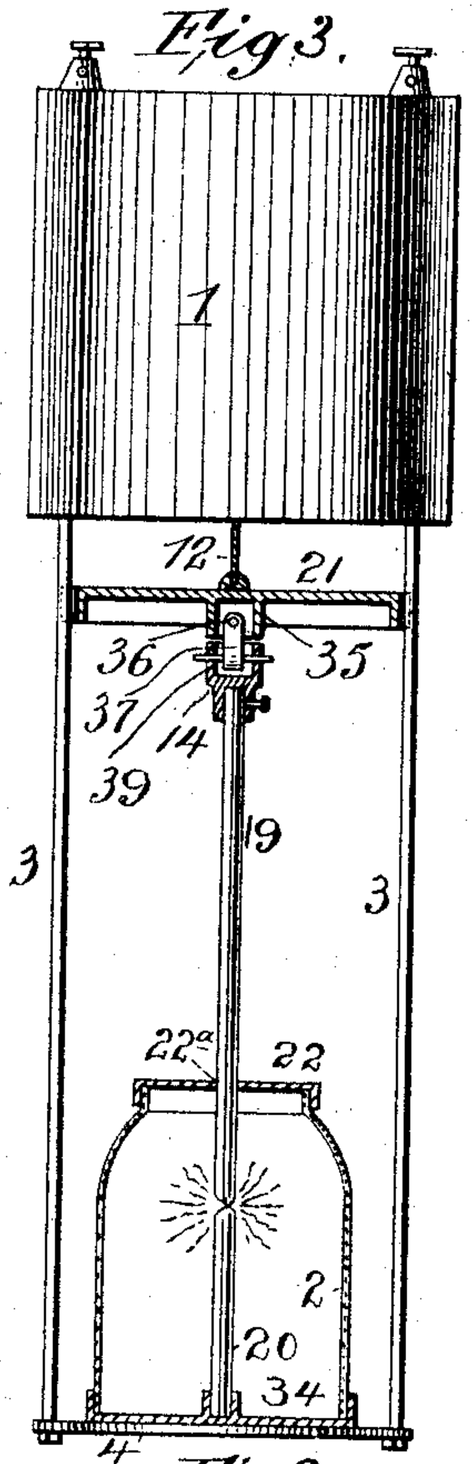


Fig 4.

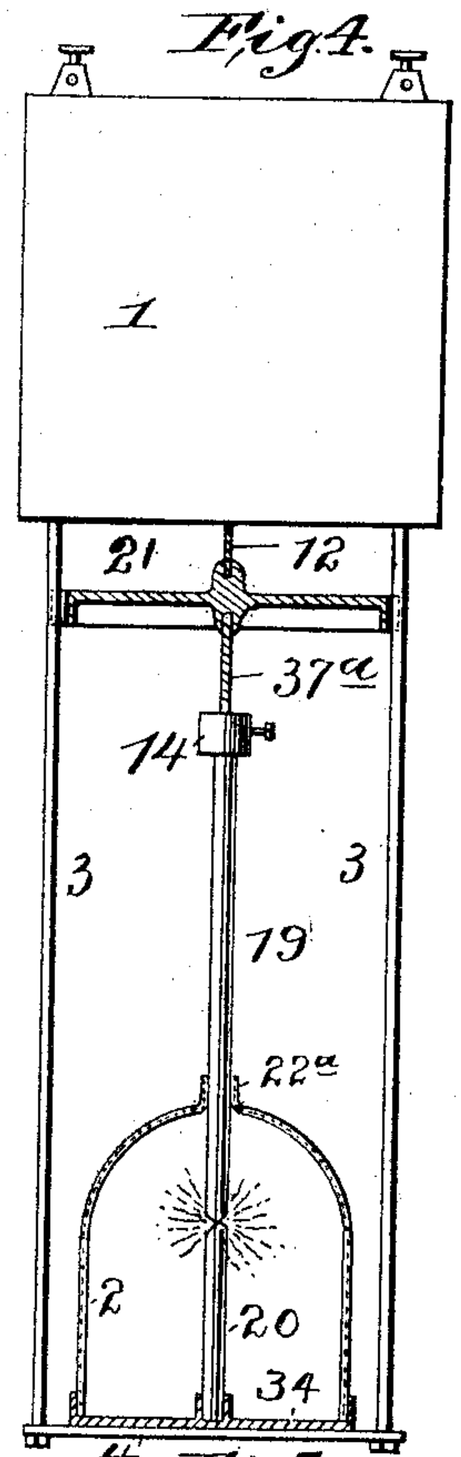


Fig. 5.

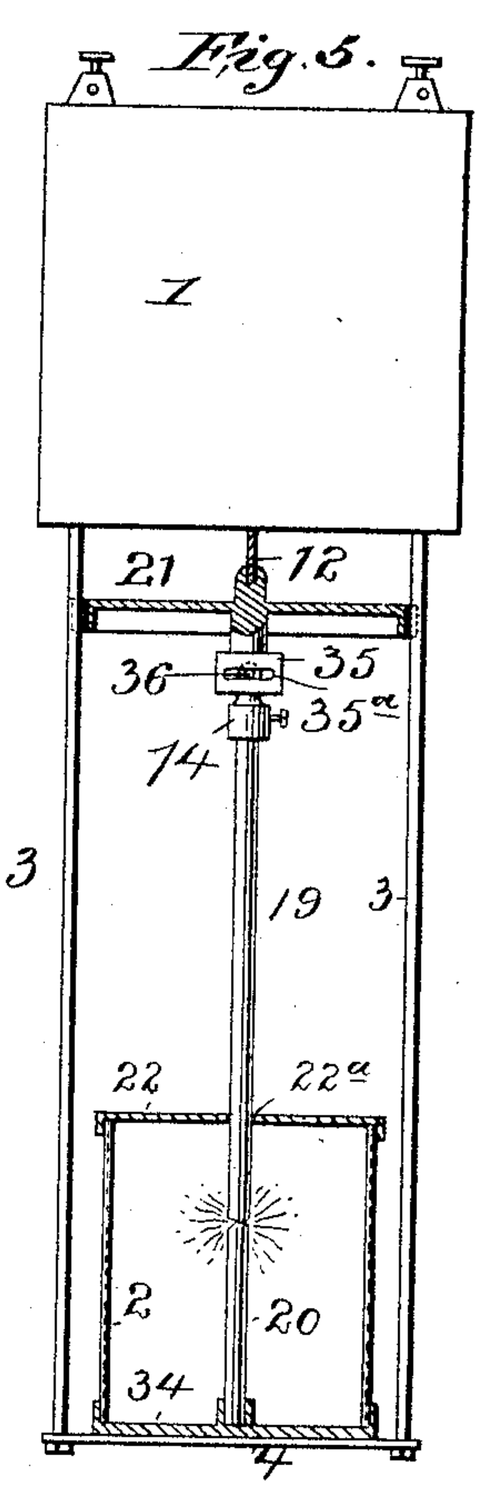


Fig 6

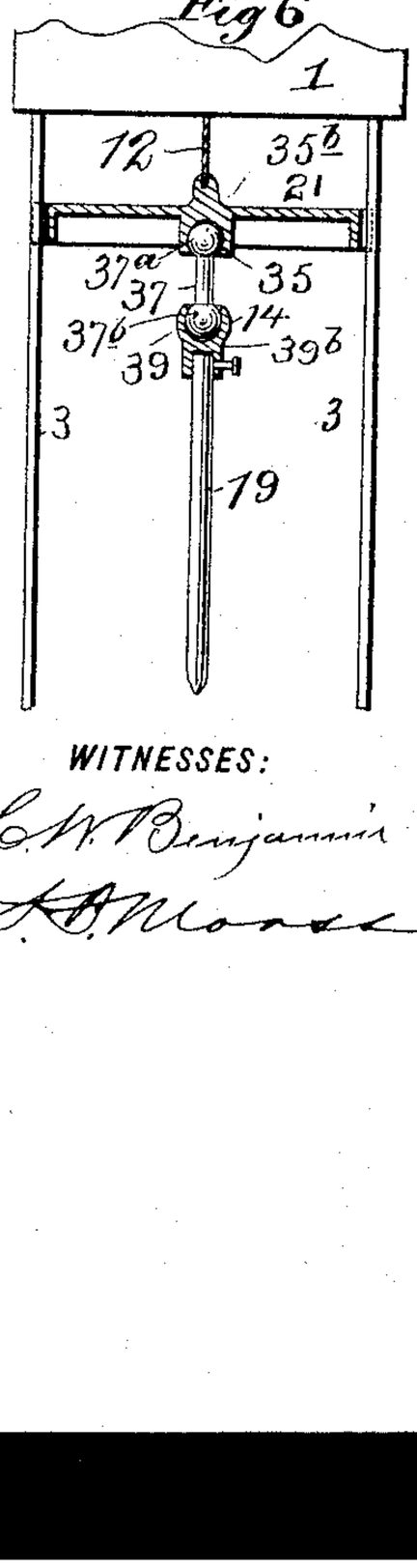


Fig 7.

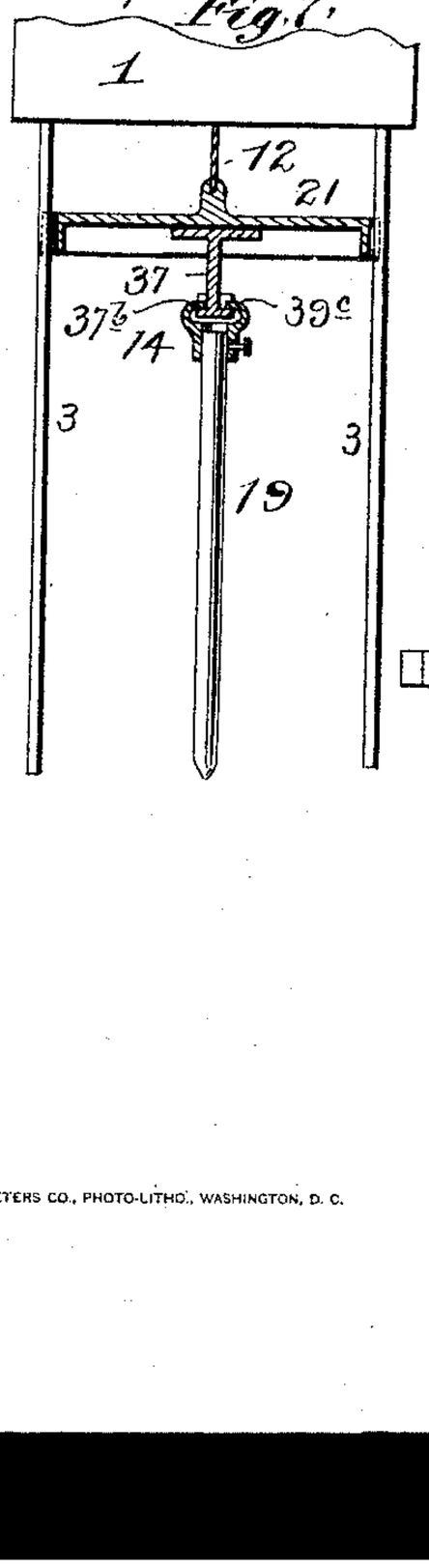


Fig. 8.

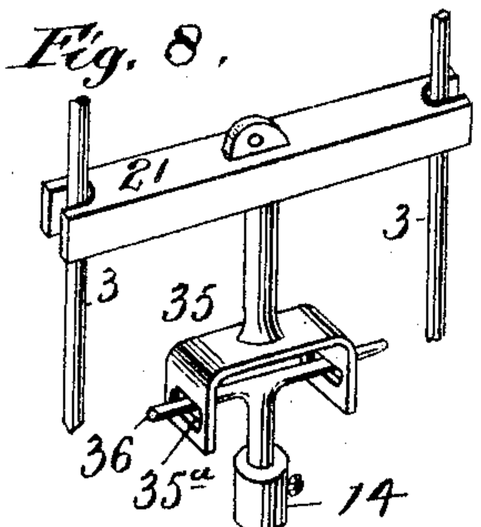
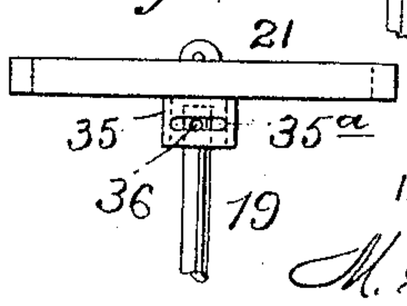


Fig. 9.



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UNITED STATES PATENT OFFICE.

MOSES S. OKUN, OF NEW YORK, N. Y.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 631,965, dated August 29, 1899.

Application filed October 23, 1895. Serial No. 566,633. (No model.)

To all whom it may concern:

Be it known that I, MOSES S. OKUN, a citizen of the United States, and a resident of New York city, county and State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

One portion of my invention relates to improved mechanism for operating the carbon or carbons in arc-lamps for regulating the arc; and the invention consists in a mechanism comprising a solenoid or magnet, a lever to be operated thereby, a drum (preferably spring-acting) carried by said lever, a brake carried by said lever to act on said drum, and a carbon-holder connected with said drum by a flexible connection which passes around said drum. With this arrangement when the lever is raised by the action of the solenoid or magnet the brake will hold the drum from rotation, so that the carbon-holder and carbon will also be raised, and when the lever descends a certain distance the brake will release the drum and allow the carbon to feed the proper amount.

Another portion of the invention relates to improved means for making a globe substantially air-tight while permitting the proper operation of the carbons; and the invention consists in a globe closed air-tight below the arc and having a cover movably connected therewith and provided with a snugly-fitting feed-opening for the passage of the carbon or its operating-rod, and above said cover is a supplemental cover carried by a housing or the like, which cover is also movable and provided with a snugly-fitting feed-opening for the passage of the carbon or its rod, said openings being alined to allow the carbon to feed. By this means double security is provided to prevent the entrance of air into the globe, while permitting free feeding of the carbon. The said covers are arranged to have lateral movement, so as to prevent binding of the carbon in the apertures.

Another portion of the invention relates to improved means for permitting a carbon to have independent lateral movement relatively to a guide-bar when the latter is raised and lowered by carbon-operating mechanism and when the upper carbon travels in a guide—such, for instance, as an opening in a globe; and the invention consists in the combination of carbon-operating mechanism and a guide-bar operated thereby with a carbon-holder, means for permitting the carbon-holder to have lateral movement relatively to said guide-bar, and a guide for the carbon.

The invention further consists in the novel details of improvement and the combinations of parts, that will be more fully hereinafter set forth, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a vertical section of an arc-lamp embodying my improved carbon-operating mechanism. Fig. 2 is a side elevation of an arc-lamp provided with my improvements for producing a substantially air-tight globe. Fig. 3 is a side elevation, partly in section, of a lamp having a guide-bar and a movable connection between said bar and a carbon-holder. Fig. 4 is a similar view showing a yielding or flexible connection between the guide-bar and the carbon-holder. Fig. 5 is a similar view showing a simplified connection between the guide-bar and the carbon-holder. Figs. 6 and 7 are partly-broken side views of portions of a lamp, showing various devices for movably connecting the guide-bar with the carbon-holder. Fig. 8 is a detail perspective view showing the guide-bar, its guide-rods, and a simple form of connection between the guide-bar and the carbon-holder; and Fig. 9 is a detail view showing means for movably connecting a carbon directly with its operating-support.

In the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the number 1 indicates a suitable casing or box to contain the carbon-operating mechanism, and 2 is a globe which may be supported below the box in any suitable manner, rods 3 being shown depending from the casing 1 and carrying a plate, bar, or support 4, which sustains the globe.

5 is a lever shown pivotally carried within the casing 1, as by a bracket 6, carried by said casing, said lever or its bracket being by preference insulated from the casing, so that the lever can, if desired, form part of the circuit for the carbons.

7 is a solenoid carried by the casing 1, and

its core 8 is shown pivotally connected with the free end of the lever 5, so as to operate said lever.

9 is a spring connecting the lever 5 with the casing 1 or with a support thereon, so that said spring can act in regulating the current.

Of course a magnet and armature could be used instead of the solenoid and core to operate the lever 5.

10 is a drum or roller pivotally carried by the lever 5, and 11 is a spring suitably connected with the drum and with the lever 5 or the pivot of the drum and arranged to rotate the drum in one direction.

12 is a wire, chain, or other suitable flexible connection wound on the drum 10 and extending down through an opening 13 in the bottom of the box or casing and carrying a carbon-holder 14.

15 is a pulley or sheave carried by the casing to properly guide the connection 12 through the opening 13, which pulley should be insulated from the casing or made of insulating material when the connection 12 is used as part of the circuit. The spring 11 serves to take up slack in the connection 12 when the carbon-holder is raised to adjust a carbon in it; but the drum could be wound by hand or by weight for this purpose, if preferred.

A brake is provided to keep the drum 10 from rotating when the carbons are separated and the weight of the carbon comes on the connection 12, as well as to enable the lever 5 to lift and sustain the upper carbon. For this purpose I have shown a lever 16 pivotally carried by the lever 5 and acting at one end upon the drum 10, a spring 17, located between the levers 5 and 16, serving to press said lever 16 upon the drum 10.

18 is an abutment carried by the casing 1, against which one end of lever 16 may bear when the lever 5 has descended a certain distance to reduce the braking pressure on drum 10, to enable the latter to rotate to allow the carbon 19 to feed toward the carbon 20, and to allow the drum to take up the slack in the connection 12 when a carbon is to be adjusted in place in the holder.

The upper carbon 19 may be guided in line with the lower carbon 20 by any suitable means. I have shown a guide-bar 21, connected with the carbon-holder 14 and guided at its ends by the rods 3 3, the guide 21 being insulated from the rods 3 or from the carbon-holder or made of insulating material; or, if preferred, the globe 2 may have an aperture to receive and guide the carbon. I have shown the globe 2 as provided with a cover 22, having an aperture that is larger than the carbon, and over said aperture is a disk or plate 24, provided with a snugly-fitting feed-opening for the carbon to feed through. The cover 22 can be rigidly secured to the globe, or the disk 24 can be secured on the cover 22 to guide the carbon if the carbon-holder is not rigidly secured to guide 21, or the cover or disk can have lateral motion if the carbon-holder is rigidly secured to guide 21, the lateral movement of the cover or disk allowing the carbon to feed freely in the opening in the globe.

The mechanism above described operates as follows: When no current is passing, the core 8 and lever 5 descend until lever 16 rests upon abutment 18 and the braking-pressure on drum 10 is reduced. The weight of the upper carbon and its holder (and guide 21 when used) cause said carbon to descend and rest on the lower carbon, completing the circuit through both carbons. When the current is turned on, it energizes the solenoid, causing the latter to draw in its core and raise lever 5. As the lever 5 rises it first reduces the pressure of lever 16 on abutment 18 or lifts it therefrom, thereby allowing spring 17 to press lever 16 upon drum 10 with sufficient force to keep the latter from rotating, so that the carbon 19 will be lifted with lever 5 to "strike" the arc. When the resistance of the arc increases, the core 8 and lever 5 will descend until the brake or lever 16 engages abutment 18 and reduces the pressure on drum 10 and allows the carbon to descend to regulate the arc, and so on as the lamp burns. The course of the current may be traced as follows: from main line 25 to post 26, wire 27 to solenoid or magnet 7, thence through wire 28 to lever 5, drum 10, connection 12, holder 14, carbons 19 20, conductor 29, and post 30 to the line 25. But of course the current could travel otherwise than through the lever 5 directly to the connection 12 from the solenoid, if preferred.

In Fig. 2 for keeping the globe 2 tightly closed to retard the consumption of the carbons a chamber is formed above the globe by two laterally-movable apertured covers. For this purpose I have shown the cover 22 closing the open end of the globe 2, and the disk or plate 24 covers the aperture 23 in cover 22, the disk 24 also having a snugly-fitting feed-opening 24^a for the carbon or carbon rod, the disk or plate 24 also being arranged to have lateral movement to prevent binding of the carbon and reduce friction. A supplemental cover 31, carried by a housing or framing 32, supported by the cover 22, incloses the latter and disk 24. The housing 32 has an inwardly-extending flange 32^a, provided with an aperture 32^b, the cover or disk 31 resting on the flange 32^a and having an aperture 31^a for the passage of the carbon or carbon rod, and the cover 31 is adapted to have lateral movement, similarly to the cover or disk 24, to avoid friction between the carbon or carbon rod and the cover. The apertures in the two covers receive the same carbon. The parts 22 and 24 constitute a cover made in two pieces, one of which pieces is laterally movable.

In the arrangement shown in Fig. 2 the covers and the housing serve to form a substantially air-tight chamber above the inner

cover and to thereby doubly resist the entrance of air into the globe through its open end, the upper cover and the housing serving to protect the inner or lower cover from direct access of air. The lower end of the globe may be closed by suitable means. I have shown it resting in a flanged disk or plate 34, carried by the support 4.

Any suitable carbon-operating mechanism may be used with the improvements shown in Fig. 2.

In Figs. 3 to 9 I have shown means for permitting the carbon 19 to have independent lateral or sidewise movement relatively to the guide-bar 21.

In Fig. 3 the guide-bar 21 and the carbon-holder are connected together by an intermediate joint, which is arranged as follows: The guide-bar 21 has a depending extension or housing 35, provided with oppositely-disposed apertures, in which fits a pin or projection 36, carried by a bar or block 37, said pin or projection having pivotal movement in said apertures and also preferably being arranged to slide therein. The bar or block 37 also carries a pin or projection 38, which is arranged substantially at right angles to the pin or projection 36 and is located in oppositely-disposed apertures in an extension 39, carried by the carbon-holder 14, which apertures are at substantially right angles to the apertures in the extension 35. The pin or projection 38 is also by preference adapted to slide in the apertures in the extension 39, as well as to have pivotal movement therein. The carbon 19 passes through a guide-opening in or on the globe 2. By means of the devices above described the carbon 19 can have independent lateral movement relatively to the guide-bar 21, so as to reduce friction between the carbon and its guide-opening, the various movements of the pins 36 and 38 in their respective apertures in the extensions 35 and 39 permitting these necessary movements of the carbon relatively to the guide-bar 21.

In Fig. 4 the guide-bar 21 is shown connected with the carbon-holder 14 by a flexible or yielding connection 37^a—such as a wire, cord, or chain—whereby the carbon 19 can have independent lateral movement in various directions relatively to the guide-bar 21. In this figure also the globe 2 is shown provided with a snugly-fitting feed-opening 22^a, made directly in the globe for guiding the carbon into the globe, and the connection 37^a enables the carbon to feed freely in said opening.

In Fig. 5 the apertures 35^a in the extension 35 of the guide-bar 21 are in the form of opposed horizontal slots, and the pin or projection 36 is carried directly by the carbon-holder 14. These slots permit the pin or projection 36 to slide longitudinally, as well as to move sidewise, sufficient space within the extension 31 being provided for the movement of the carbon-holder or its extension, (see Fig. 8,) whereby the carbon can move laterally relatively to the guide-bar 21.

In Fig. 6 the guide-bar 21 is shown movably connected with the carbon-holder 14 by means of a ball-and-socket joint. In this case the bar 37 has balls or enlargements 37^a 37^b, which fit in sockets 35^b 39^b in the extensions 35 and 39, respectively, whereby the carbon 19 can have independent lateral movement relatively to the guide-bar 21.

In Fig. 7 the bar 37 depends from the guide-bar 21 and carries an extension or disk 37^b, which may have a flat upper surface, and the extension 39 on holder 14 has an inwardly-extending flange or flanges 39^c, which rest on the extension 37^b, whereby the carbon-holder is supported. The inner edges of the flange or flanges 39^c are at such a distance apart as to enable the holder 14 to move laterally in various directions, so that the carbon 19 can move laterally independently of the guide-bar 21.

In Fig. 8 the extension 35 from the guide-bar 21 is in the form of two depending arms provided with opposed horizontal slots 35^a, and the pin or projection 36 is carried by the holder 14 and enters said slots, so that the carbon can move laterally in various directions relatively to the guide-bar 21.

In Fig. 9 the carbon 19 is connected with the guide-bar 21 directly by the pin or projection 36 without the intervention of some of the other parts shown in the other figures; or, in other words, the pin or projection 36 passes through an aperture in the carbon near its upper end and enters the horizontal opposed slots 35^a in the extension 35, carried by the guide-bar 21. By this means the upper carbon 19 can have various lateral movements relatively to the guide-bar 21.

In all of the examples illustrated in Figs. 3 to 9 it will be understood that a guide-opening in the globe for the passage of the upper carbon can be provided in any suitable manner, either directly in the globe or by means of a cover having an opening, and that the lateral movement of the cover enables the carbon to feed freely in said guide-opening notwithstanding that the guide-bar 21 is guided by the rods 3 3. It will be understood, furthermore, that the relative positions of the parts connecting the guide-bar with the carbon can be reversed, if desired, and that the details of construction shown can be varied without departing from the principles of my invention.

Having now described my invention, what I claim is—

1. In an arc-lamp, a carbon-feeding mechanism comprising a lever, a spring-acting drum carried thereby, a flexible connection wound on said drum, a brake-lever to control the movement of said drum, an abutment to act on said brake-lever, said abutment being located adjacent to the pivot of the first-mentioned lever, the end of the

brake-lever that is opposite its end which acts on the abutment being arranged to act on the drum, a carbon-holder carried by said connection, and means for operating said lever by the passing of a current, substantially as described.

2. In an arc-lamp, a carbon-feeding mechanism comprising a lever, a drum carried thereby, a lever pivotally carried by said first-mentioned lever to act on said drum to hold it from rotation, an abutment to act with said second-mentioned lever to cause the latter to release the drum, the pivot of the second-mentioned lever being located between said abutment and said drum a flexible connection wound on said drum, and a carbon-holder carried by said connection, substantially as described.

3. In an arc-lamp, a carbon-feeding mechanism comprising a lever, a drum carried thereby, a lever pivotally carried by said first-mentioned lever to act on said drum to hold it from rotation, a spring to act on said second-mentioned lever to press it upon the drum, an abutment to act with the second-mentioned lever to cause the latter to release the drum, said abutment being located adjacent to the pivot of the first-mentioned lever a flexible connection wound on said drum, and a carbon-holder carried by said connection, substantially as described.

4. In an arc-lamp, a globe closed below the arc, a supplemental chamber above the globe having a top opening, a movable cover separating said chamber from the globe, and a movable cover over the chamber to retard the entrance of air into the globe, said covers each having a snugly-fitting feed-opening for the passage of the carbon or carbon rod.

5. In an arc-lamp, a globe closed below the arc, and a chamber above the globe having opposed openings for the passage of a carbon or carbon rod, the parts of the chamber which have said openings being laterally movable independently of each other, substantially as described.

6. In an arc-lamp, a globe closed below the arc and having a movable cover provided with a snugly-fitting feed-opening for the passage of a carbon or carbon rod, and a housing over the open end of the globe consisting of two concentric walls joined together at the lower part, the outer wall extending above said cover, and another cover closing the upper end of said housing, said cover having a feed-opening fitting snugly to a carbon or carbon rod.

7. In an arc-lamp, a globe closed below the arc, a housing inclosing the open end of the globe and consisting of two concentric walls joined at the lower parts, the inner wall passing above the top of the globe, and the outer wall passing above the inner wall, a cover fitting upon the top of the inner wall and a cover fitting upon the top of the outer wall, said walls and covers forming a chamber above the globe, said covers having snugly-fitting feed-openings for the passage of a carbon or carbon rod, said covers being adapted to have lateral movement.

8. A globe closed below the arc and having a top opening, a tubular wall placed concentric to said opening and extending above the top of the globe, and a cover resting on said wall and having a snugly-fitting opening for the passage of a carbon or carbon rod, said cover being adapted to have lateral movement.

9. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon, means to connect the carbon with said guide-bar so that the carbon can have motion of translation laterally during operation of the lamp, and a guide for the carbon.

10. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, a guide for a carbon, and means to connect the carbon-holder with said guide-bar so that the carbon-holder can have motion of translation laterally during operation of the lamp and a guide for the carbon.

11. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, means connecting said holder with said guide-bar and permitting the carbon-holder to have motion of translation laterally in two directions substantially at right angles to each other during operation of the lamp, and means for guiding a carbon when carried by said holder.

12. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, means for connecting said guide-bar and holder so that one part can have motion of translation laterally relatively to the other, said rod and holder also having pivotal or oscillatory movement relatively to each other, and means for guiding a carbon when carried by said holder.

13. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon, and means connecting the carbon with said guide-bar and permitting the carbon to have progressive lateral movement at the place of suspension, and a guide for the carbon.

14. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, a guide for a carbon, and means connecting the guide-bar with the carbon-holder for permitting the carbon-holder to have progressive lateral movement at the place of suspension during operation of the lamp.

15. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, and a pin or projection carried by one part and connected with the other part so that one of said parts or the pin or projection can move relatively to the other to permit one or both of said parts to have independent lateral movement during the operation of the lamp, and a guide for a carbon when the latter is carried by said holder.

16. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, and a car-

bon-holder, one of said parts having an extension provided with opposed apertures, the other part carrying a pin or projection located in said apertures to permit one of said parts to move laterally relatively to the other, and means for guiding a carbon when the latter is guided by said holder.

17. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, a carbon-holder, one of said parts having opposed horizontal slots, the other part carrying a pin or projection which enters said slots so that one part can have lateral movement relatively to the other part in various directions.

18. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, said bar carrying an extension provided with oppositely-disposed openings, a carbon-holder also carrying an extension provided with oppositely-disposed openings, a bar or block between said extensions and having pins or projections that enter the respective openings in said extensions to permit one part to move laterally relatively to the other, and means for guiding a carbon when the latter is carried by said carbon-holder.

19. In an arc-lamp, an operating mechanism, a guide-bar, a guide therefor, said guide-bar carrying an extension provided with oppositely-disposed openings, and a pin or projection carried by a carbon and located in said apertures, and a guide for the carbon.

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