J. A. ZIEGENFUSS.

ARC LAMP.

APPLICATION FILED NOV. 18, 1909.

1,002,622.

Patented Sept. 5, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

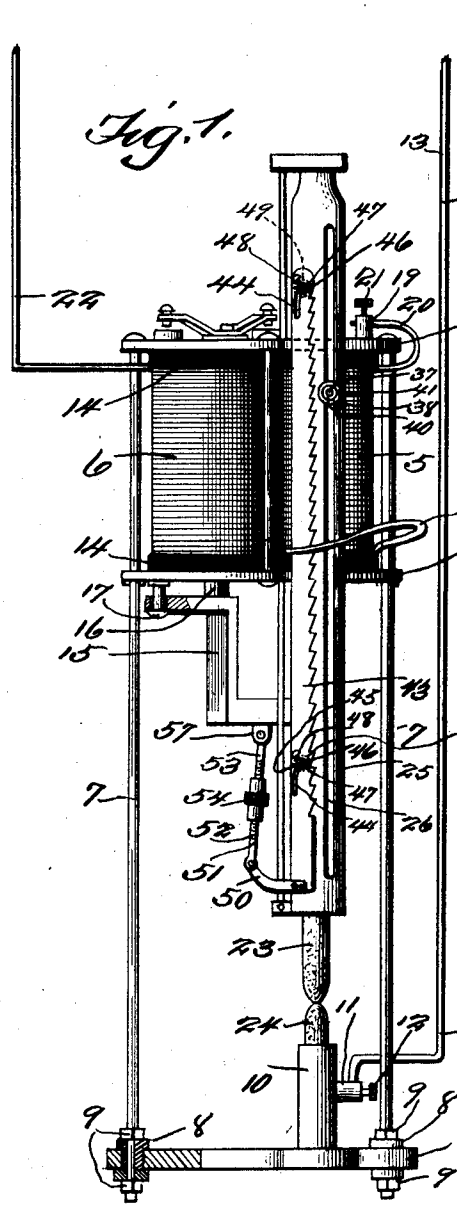
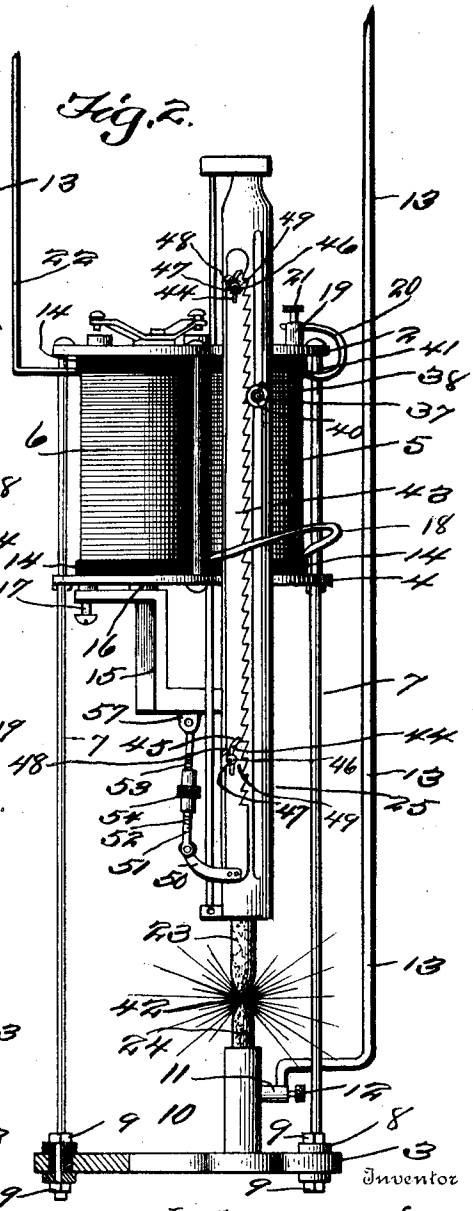


Fig. 2.



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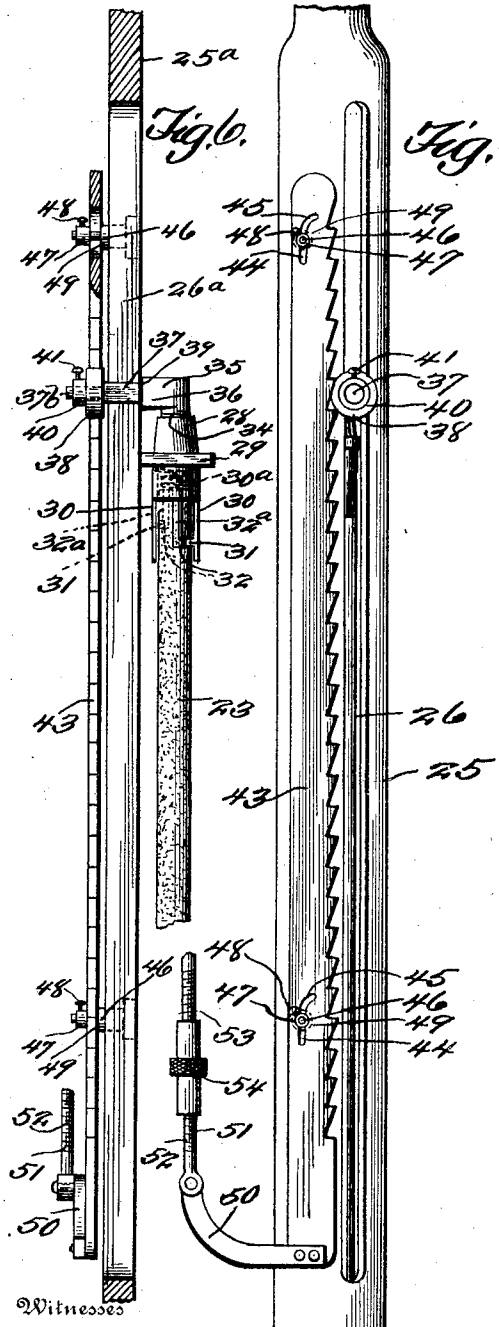
2 SHEETS—SHEET 2.

Fig. 6.



Witnesses

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Fig. 3.

Fig. 4.

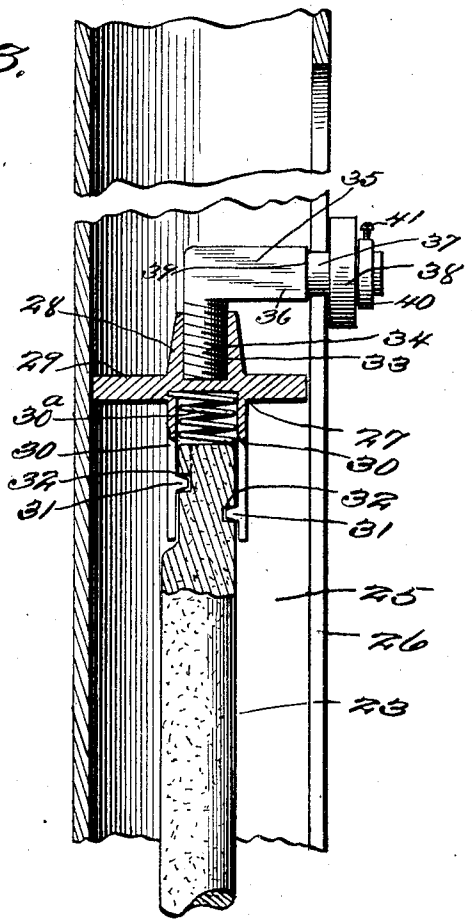
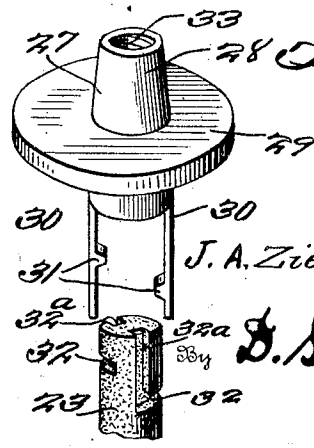


Fig. 5.



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UNITED STATES PATENT OFFICE.

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ARC-LAMP.

1,002,622. Specification of Letters Patent. **Patented Sept. 5, 1911.**

Application filed November 18, 1909. Serial No. 528,770.

To all whom it may concern:

Be it known that I, JOHN ALBERTIS ZIEGENFUSS, a citizen of the United States, residing at Caney, in the county of Montgomery and State of Kansas, have invented a new and useful Arc-Lamp; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention about to be set forth and claimed, belongs to the art of arc lamps, and it particularly pertains to new and novel means for intermittently feeding the upper carbon of the lamp, as the same is consumed, and means for separating the carbons.

The invention in its broadest scope, provides as its main object novel means for holding and guiding the upper carbon within a tubular slotted member.

A further object of the invention, is to so construct the holding and guiding means, as to allow the consumed carbon to be removed, for the ready insertion of a new one.

Another object of the invention is to provide a ratchet feed bar having cam slots (through which pins of the tubular slotted member project) to coöperate with a roller carried by the holding and guiding means, in order to raise the upper carbon, when the magnets of the lamp are energized; said ratchet bar is operated by mechanical means, which in turn is electrically operated.

In this specification and the annexed drawings, a particular design of device is adhered to, but the invention is not to be confined to this specific design.

The device in its actual reduction to practice may necessitate changes and variations, the right thereto belongs to the applicant, provided such changes and variations are comprehended by the appended claims.

The invention aims at further objects and combination of parts, which will be hereinafter set forth and pointed out in the appended claims.

Figure 1 is a side elevation of an arc lamp, embodying the novel features of the invention, showing the upper and lower carbons in contact. Fig. 2 is a similar view to Fig. 1, showing the carbons separated, in order to form a voltaic arc. Fig. 3 is an enlarged detail view of the slotted tubular member showing the ratchet feed bar engaging the roller carried by the holding and guiding means for the carbon. Fig. 4 is an enlarged detail sectional view of a portion of the slotted tubular member, showing the holding and guiding means for the carbon so mounted, as to allow its lateral projecting portion to extend through the slot of the tubular member, in order to receive the roller or friction member. Fig. 5 is a detail perspective view of the holding and guiding means. Fig. 6 is a detail elevation of the supporting and guiding means, for the upper carbon 23, which supporting and guiding means, is shown as being flat, otherwise the detail structure is similar to that shown in the other figures of the drawings, while the surrounding coöperating parts thereof are all identical in structure as are the similar parts in the other views.

Referring to the drawings (which form a part of this application) the frame of the arc lamp, comprises the upper and lower plates 2 and 3, and the intermediate plate 4, between which and the upper plate 2 the magnets 5 and 6 are fixed; said plates are braced by the rods 7, in order to afford a stable structure or frame for the lamp. The rods 7 are insulated from the lower plate 3 by means of the bushings 8, there being suitable nuts 9 threaded upon the rods, to prevent the displacement of the said plate, and also to provide a rigid frame work. The plate 3 is provided with a carbon holder 10, to which a binding post or terminal 11 is fixed, there being a suitable thumb screw 12 for holding the wire or lead 13 to the said post.

The magnets 5 and 6 are provided with the usual windings, and the interior structure thereof is of the usual design. However, there is no invention involved in the detail structure and the mounting of the said magnets. The magnets are insulated from the plates 2 and 4 by the material 14, as shown in Figs. 1 and 2. The magnets are provided with the usual stirrup member 15, having the usual cores or plungers 16, as shown clearly in Figs. 1 and 2. This stirrup member is limited in its downward movement by the screw or headed lug 17, which projects through an opening of one of the arms of the said member. 18 designates a wire or lead, which electrically connects the two magnets. The plate 2 has projecting upwardly therefrom a binding post or terminal 19, to which a wire 20 is secured, by means of the thumb screw 21;

this wire 20 connects with the windings of the magnet 5. The windings of the magnet 6 have connected thereto the wire or lead 22, over which the current from the main line (not shown) travels, as will be clearly evident.

The carbon 23 (which coöperates with the lower carbon 24, in order to provide the voltaic arc,) is supported and approximately guided within the tubular member 25 (which is provided with a slot 26) by means of the holding member 27. In practice the holding member 27 is to be made of such a diameter as to closely and neatly fit within the tubular member 25, yet with sufficient clearance to allow the holding member 27 to freely move with the least possible friction. It is to be understood, however, that the inner circumference of the tubular member 25 may be lubricated in order to insure movement of the holding member 27. Furthermore, being that the holding member 27 is below the part 37 (which fits the slot 26 rather close, yet with sufficient clearance to permit movement therein) the carbon 23 will be guided sufficiently in alinement with the lower electro to create the proper voltaic arc. In practice the tubular member 25 may be made of seamless steel tubing, the thickness of the metal of which may be approximately 3/16ths, or of any suitable thickness, thus obviating the possibility of the tubular member becoming bent. The clearance between the circumference of the annular flange 29 of the member 27 and the inner circumference of the tubular member 25, and between the part 37 and the walls of the slot 26 may be approximately 1/1,000th or 2/1,000ths of an inch, or any suitable clearance.

In Fig. 6 the tubular member 25 is dispensed with, and in lieu thereof a flat bar 25^a is employed, in which is formed a slot 26^a, through which the part 37 of the angular member 35 extends. In this figure the part 37 is shown as being rectangular, in order to assist in guiding and holding the holding member 27 properly in position. Also in Fig. 6, the flange 29 is shown rectangular, so that one face or edge thereof will contact with the face of the bar 25^a, in order to also assist in guiding and holding the holding member 27 in position. With the exception of the member 25^a, the part 37 and the flange 29, the remaining construction of the form shown in Fig. 6, is identical with the structures shown in the other figures.

The holding member 27 consists of a tubular portion 28 having an annular flange 29, and the arms 30, which are provided with lugs 31, to engage the semi-annular notches 32 of the carbon 23. The arms 30 are to be made of spring steel of sufficient rigidity to hold the carbon 23 approximately in alinement with the lower electrode, as it approaches the same. Furthermore, in practical fields the lugs 31 are to be made to closely fit the semi-annular notches 32, which together with the fact that the carbon 23 is hung or suspended from the holding member 27 and slightly received within the lower cylindrical portion of the member 27, the carbon 23 will be held in its proper position, and sufficiently supported to perform the functions required. In addition to these features, the spring 30^a bears against the upper end of the carbon 23, to assist in holding the carbon properly in position, in combination with the lug 31 and the semi-annular slots 32.

Disposed vertically upon the upper portion of the carbon 23 and extending into the notches or grooves 32, are oppositely arranged vertical grooves 32^a, in order to admit the lugs 31, as the carbon 23 is inserted in the holding member. After the carbon 23 is inserted in the holding member sufficiently so as the lugs 31 will reach the notches or grooves 32, the carbon is partially rotated, so as the lugs 31 are brought out of registration with the grooves 32^a, after which the spring 30^a (shown clearly in Fig. 4) imparts pressure upon the carbon in order to hold the same in place. When the carbon is being inserted into the holding member, the spring 30^a is being depressed, as will be clearly manifest.

The tubular portion 28 of the holding member is threaded, as at 33, in order to receive the threaded shank 34 of the angular member 35. The horizontal portion 36 of the angular member is provided with a contracted portion 37 (which projects through the slot 26 of the tubular member) upon which the roller 38 is journaled; there being a suitable shoulder 39 at the base of the contracted portion 37, to engage the inner circumference of the said tubular member, in order to guide and to steady the holding means 27, as it moves vertically within the tubular member. It will be plainly manifest that by the employment of the shoulders 39 and the annular flange 29, the holding means or member 27 is prevented from twisting as the same moves. To hold the roller 38 upon the contracted portion 37, a collar 40 is provided (which is held in place upon the contracted portion by means of a set screw 41) to engage the outer face of the roller.

To raise the carbon 23, in order to form a space as indicated at 42 in Fig. 2, whereby a voltaic arc is obtained, a ratchet feed bar 43 is provided. Extending through the slots 44 are pins 46 (which project laterally from the tubular member 25) upon which collars 47 are held by means of said screws 48, so as to retain the ratchet feed bar properly in place. These pins 46 are provided with

shoulders 49, as indicated in dotted lines in Figs. 1, 2 and 3, in order to prevent the ratchet feed bar from twisting, and to further in conjunction with the collars 47 assist in guiding the said bar, as the same is raised. As the bar is raised, by the energizing of the magnets, the teeth of the bar 43 are thrown in engagement with the roller 38 by virtue of the action of the cam portions 45 of the slots 44, sufficiently to raise the carbon 23.

The applicant is not to be restricted to the exact dimensions of the teeth of the bar 43, as shown in the drawings, for it is obvious that these teeth may be made any suitable dimensions or proportions.

Projecting laterally, upwardly and carried by the lower end of the ratchet feed bar, is an arm or projection 50, to which a pitman rod 51 is pivotally connected. This pitman rod 51 consists of two parts 52 and 53, having their adjacent end portions threaded in opposite directions, with which a turn buckle or sleeve 54 engages. By manipulating this turn buckle or sleeve, the two parts 52 and 53 of the pitman rod may be separated or drawn together, in order to adjust the movement of the ratchet feed bar, whereby the space between the two carbons may be increased or decreased, as desired. The part 53 of this pitman rod is pivotally mounted between the ears 57 of the stirrup member 15, as shown clearly in Figs. 1 and 2.

The circuit through the lamp is as follows: The current leaves the line wire (not shown) to the conductor 22, to the coil 6, over the lead 18, from the coil 6 to the coil 5, over the wire 20 to the frame plate 2, from the plate 2 by the rods 7 to the plate 4. The current leaves the plate 4 by the core 16, the stirrup 15 and the connections, to the bar 43, thence to the tube 25 or bar 25^a, through the carbon holder 27 to the upper carbon 23. The carbons being in contact, the circuit is further traced through the lower carbons 24, and its holder 10, to the binding post 11, over the wire 13, to the opposite line wire (not shown).

The operation of the invention is very simple, and is as follows: Assuming the magnets 5 and 6 are deënergized, through the lack of current supply, the carbon 23 and various other moving parts are disposed in the positions as shown clearly in Fig. 1. But when the magnets are supplied with current over the wire or means 22, they become energized, and when in such a state, the cores or plungers 16 (there being only one shown in the drawings) are drawn or sucked within the bores (not shown) of the magnet, thereby raising the stirrup member 15. As the stirrup member 15 is raised or elevated, the ratchet feed bar is also lifted, through the medium of the connections between it and the said stirrup. As the ratchet feed bar is raised, it is moved over toward the roller 38, in order to cause the teeth thereof to engage the same, through the coöperation of the cam portions of the slots 44 and the pins 46. When the ratchet feed bar so engages the roller 38, the carbon 23 is elevated, thereby forming the space 42 between the two carbons, in order to cause the voltaic arc. The steady volatilization of the carbons so increases the space between them, that the arc becomes too attenuated to be maintained, and when such is the case, the magnets are deënergized, the stirrup member is dropped back in the position shown in Fig. 1. As the stirrup member is dropped, the ratchet feed bar is also lowered, thereby releasing its engagement upon the roller 38, in which case the carbon 23 is brought in contact with the carbon 24, the current then increases, and the magnets are again fully energized, which causes the stirrup member to be raised and with it the ratchet feed bar, which again raises the carbon 23, thereby forming the space 43, whereby the voltaic arc is formed. This cycle of operations is consecutively repeated.

Having thus fully described the invention, what is claimed as new and useful is:—

1. In an arc lamp, a slotted member, an angular member having a reduced portion extending through the slot thereof and provided with a roller, said angular member having a threaded portion, a carbon holder threaded thereto and provided with a flange arranged adjacent the slotted member, said carbon holder having arms and provided with a lower cylindrical portion from which the arms project, said arms being designed to engage and support a carbon, and a vertical movable member to engage the roller of the angular member for raising the holder and its carbon.

2. In an arc lamp, a slotted member, an angular member having a restricted portion engaging through the slot thereof and provided with a roller upon said restricted portion, said angular member having a threaded lower end, a cylindrical member threaded to the threaded lower end of the angular member and provided with a flange arranged adjacent the slotted member, said flange and the restricted portion of the angular member constituting means for substantially guiding a carbon, said cylindrical member constituting a carbon holder and provided with arms projecting from its lower portion, a carbon having a slot connection with said arm, said arms having lugs to engage the slots of the carbon, and a vertical movable member to engage the roller of the restricted portion of the angular member to raise the holder and its carbon.

3. In an arc lamp, a slotted member, an

angular member having a restricted portion engaging through the slot thereof and provided with a roller upon said restricted portion, said angular member having a threaded lower end, a cylindrical member threaded to the threaded lower end of the angular member and provided with a flange arranged adjacent the slotted member, said flange and the restricted portion of the angular member constituting means for substantially guiding a carbon, said cylindrical member constituting a carbon holder and provided with arms projecting from its lower portion, a carbon having a slot connection with said arm, said arms having lugs to engage the slots of the carbon, a spring arranged in the cylindrical portion to engage the upper end of the carbon a vertical movable member to engage the roller of the restricted portion of the angular member to raise the holder and its carbon, and means for regulating the movement of the vertical movable member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN ALBERTIS ZIEGENFUSS.

Witnesses:
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C. E. MCMILLAN.