J. C. PIPER.

ARC LAMP.

APPLICATION FILED JUNE 10, 1907.

961,733.

Patented June 14, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

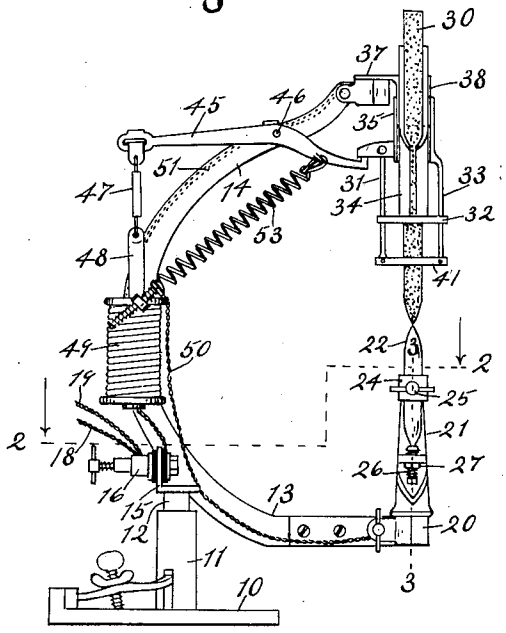


Fig. 3.

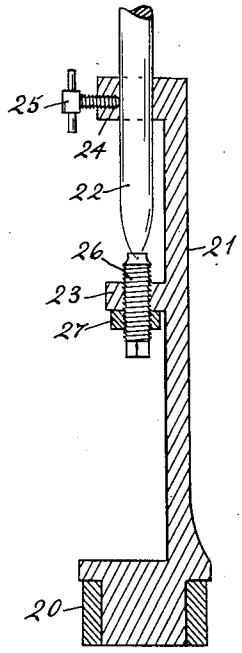
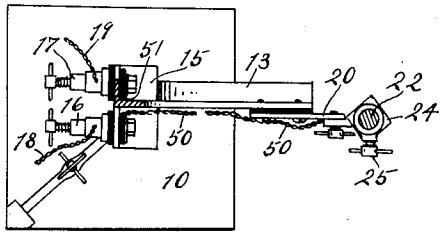


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

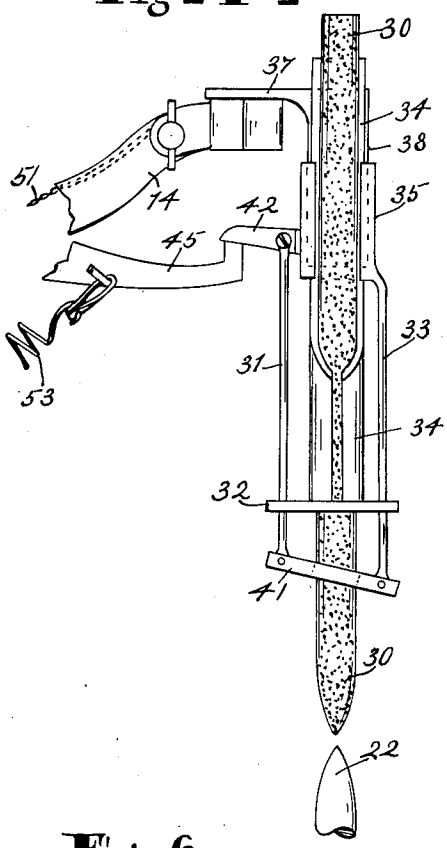


Fig. 5.

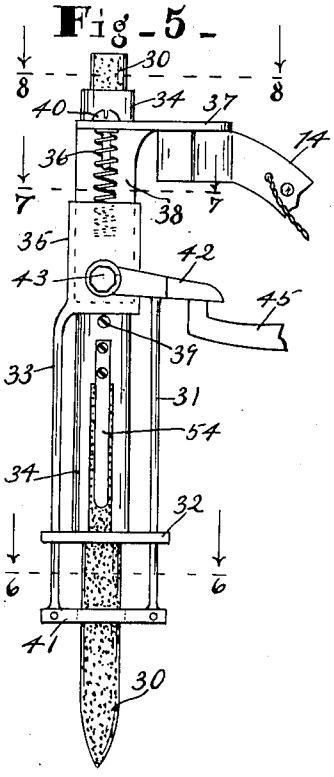


Fig. 6.

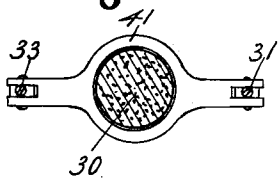


Fig. 8.

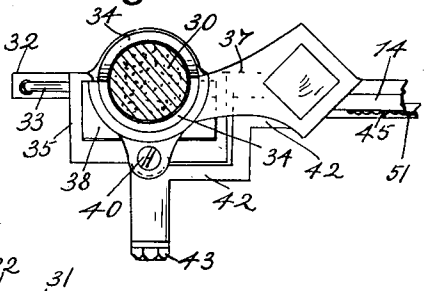
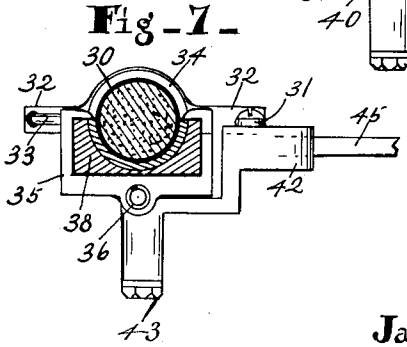


Fig. 7.



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UNITED STATES PATENT OFFICE.

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ARC-LAMP.

961,733. Specification of Letters Patent. Patented June 14, 1910.

Application filed June 10, 1907. Serial No. 378,267.

To all whom it may concern:

Be it known that I, JAMES C. PIPER, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Arc-Lamp; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like numerals refer to like parts.

The object of this invention is to improve the construction and operation of arc lamps and adapt them particularly for use as electric headlights for locomotives. To this end I have improved the means for controlling the upper carbon. It is necessary in locomotive electric headlights that the light be constant and that the controlling means be extremely reliable and sensitive.

The nature of this invention will be understood from the accompanying drawings and the following description and claim.

In the drawings Figure 1 is a side elevation of the lamp with the upper carbon in its idle position, and showing the mechanism for releasing the carbon and permitting it by gravity to slip down. Fig. 2 is a horizontal section on the line 2—2 of Fig. 1. Fig. 3 is a vertical section on the line 3—3 of Fig. 1, showing the means for holding the lower electrode. Fig. 4 is a side elevation of the means for holding the upper carbon, said means being in position to clamp, lift and support the upper carbon, the upper end of the lower electrode being shown also and the lower part thereof broken away. Fig. 5 is an elevation of the left hand side with the parts of the carbon guide in the same position as in Fig. 1. Fig. 6 is a horizontal section on the line 6—6 of Fig. 5. Fig. 7 is a similar section on the line 7—7 of Fig. 5. Fig. 8 is a similar section on the line 8—8 of Fig. 5.

A base plate 10 has a tubular post 11 in which the downwardly projecting support 12 of the lamp bracket is adjustably mounted. The lamp bracket consists of the lower arm 13 and upper arm 14. There is also a plate 15 cast on support 12 and on which the binding posts 16 and 17 are mounted with which the wires 18 and 19 are connected.

The lower arm 13 has secured to its outer end the arm 20 which carries the holder 21 for the lower electrode 22. This electrode holder extends vertically and has two laterally extending plates 23 and 24. The electrode 22 extends through the upper plate 24 and is secured thereon by the screw 25. The lower plate 23 has a vertical adjusting screw 26 in it that carries on its upper end the lower end of the electrode. By this screw the proper position of the electrode is predetermined and it is locked in that position by the nut 27. The lower end of the electrode extends into a recess in the upper end of the screw 26, as indicated by the dotted line in Fig. 3, whereby the lower end of the electrode will be held from lateral movement.

The upper carbon 30 extends through a guide 34 that is secured to the outer end of the arm 14. The guide has a vertical slot on one side for its full length, the upper part of said slot being wide enough for the insertion of the carbon, and the lower part of the slot enabling the operator to see the carbon and remove it when desired. A transverse guide plate 32 is secured to the lower end of the guide 34 and at points diametrically opposite to each other in said plate it is provided with holes guiding the rods 33 and 31 in their vertical movements. The rod 33 extends downward from the frame 35 which is vertically slidable on the block 38 that is secured to one side of the guide 34 as indicated in Fig. 7. The stop or screw 39 in said guide 34 limits the downward movement of said sliding frame 35 and it is held normally down upon said stop 39 by the expansion spring 36 located between said frame 35 and the bar 37 that is mounted on the outer end of the arm 14. A screw 40 in said bar 37 holds the upper end of the spring 36 in place.

To the lower ends of the rods 33 and 31 a ring clutch 41 is pivoted as shown in Figs. 5 and 6. The rod 31 at its upper end is pivotally connected with the lever 42 that is fulcrumed in the pin 43 extending laterally from the sliding frame 35. The outer or free end of said lever 42 rests upon the end of the solenoid lever 45 which is fulcrumed at 46 to the lever 42 and is actuated by the link 47, core 48 and solenoid 49. The current comes in and goes out over the wires 18 and 19 and the electrodes are in circuit with the solenoid through the wires 50 and 51. The spring 53 counteracts the pull of the solenoid coil on the core 48 so as to steady its influence on the lever 45. There is a flat spring 54 secured to the upper carbon guide 34 with its lower end projecting through the slot 55 in said holder and frictionally engag-

ing said carbon to press the carbon against the opposite wall of the guide to assure a positive electrical contact with the wall of the carbon guide.

The lamp is shown in Fig. 1 in its idle condition. When the current is sent through it, the coil in the solenoid will be energized and the lever 45 actuated which will tip the clutch and lift the upper carbon away from the lower electrode and form the arc. As the lower end of the upper carbon burns away and the arc increases, the current correspondingly diminishes so that the spring 53 will tend to draw the core 48 out of the coil of the solenoid and return the clutch gradually toward the horizontal position until it releases the upper carbon, which then by gravity moves down toward the lower electrode, whereupon the current increases through the solenoid and it again maintains the arc. In this manner the arc is sustained with marked uniformity. When the electrodes reëstablish the circuit, the full force of the solenoid elevates the lever 45, and that elevates the outer end of the lever 42 and lifts the rod 31 and one end of the clutch 41, as shown in Fig. 4. In the upward movement of levers 45 and 42 the sliding frame 35 is also lifted somewhat against the spring 36, so that at first the left-hand end of the clutch 41 is elevated, and then both ends of the clutch, but immediately after the limit of upward movement of lever 45, the spring 36 reacts and forces the rod 33 and the right-hand end of the clutch ring 41 downwardly, whereby the parts adjust themselves to bring the clutch to its normal clutching position. At this time the tendency of the lever 42 is to elevate one end of the clutch ring, and the tendency of the spring 36 and sliding frame 35 is to lower the other end of the clutch ring.

The lower electrode may be of metal and the mechanism here shown for adjusting its position enables the arc to be located in the desired position in front of the center of the reflector used in electric headlights. The double set screw construction for maintaining the lower electrode in position is of value in holding it firmly in spite of the terrible jar it receives while on a locomotive.

What I claim as my invention and desire to secure by Letters Patent is:

In an electric arc lamp, the combination of a guide for the upper carbon, a ring clutch for the carbon located below the guide, a frame vertically slidable on the guide, a rod extending downwardly from said frame and at its lower end pivoted to one side of said clutch ring, a vertical rod pivoted at its lower end to the opposite side of said clutch ring, a lever pivoted at one end to said sliding frame and intermediate its ends to said last mentioned vertical rod, and means controlled by the circuit through the lamp for elevating the outer end of said lever.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

JAMES C. PIPER.

Witnesses:
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OLIVE BREEDEN.