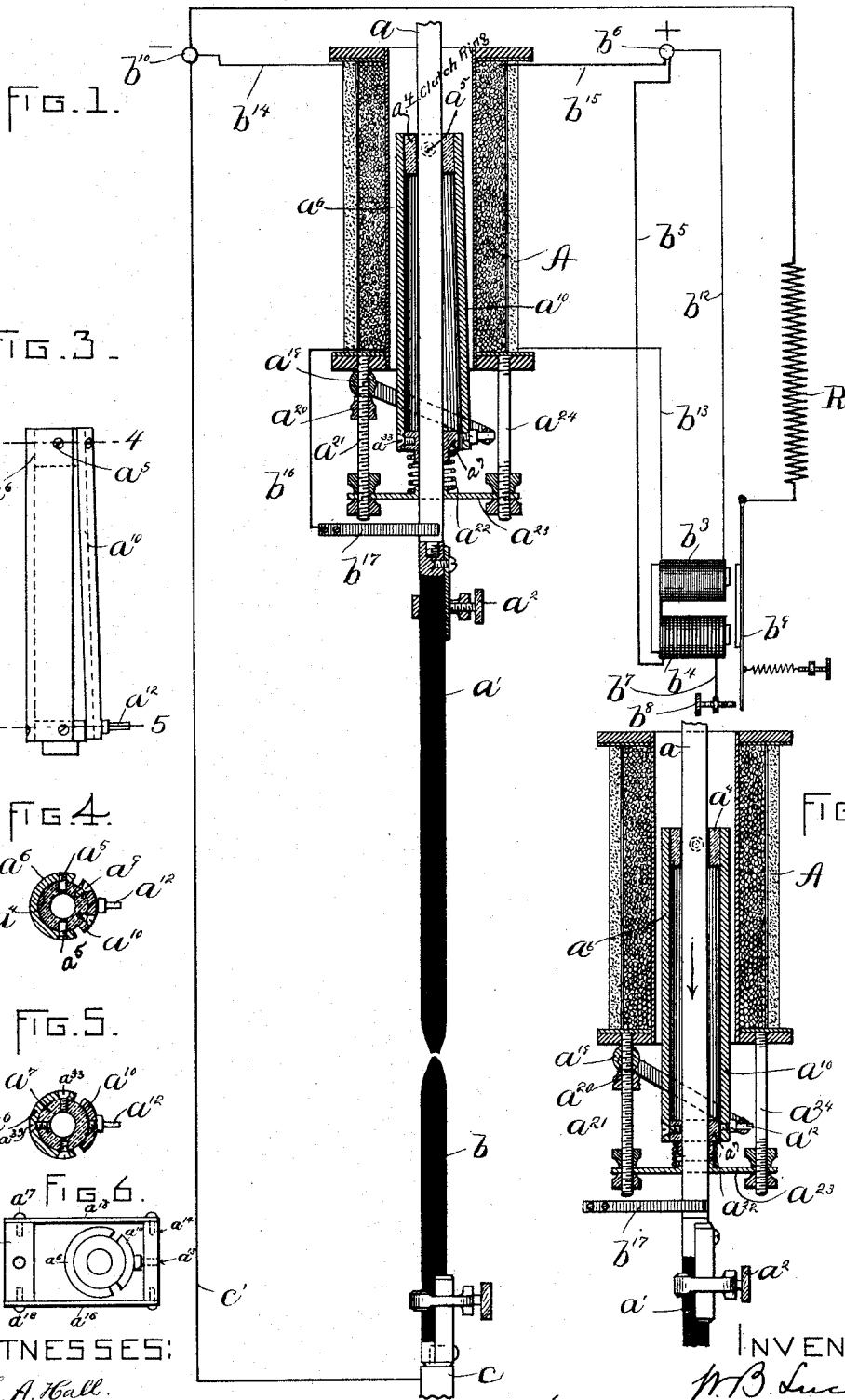


W. B. LUCE.
ELECTRIC ARC LAMP.

No. 505,051.

Patented Sept. 12, 1893.



WITNESSES:

H. A. Hall.
A. D. Harrison.

INVENTOR:

W. B. Luce
by Knight Brown & Cooley
Attys.

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FIG. 7.

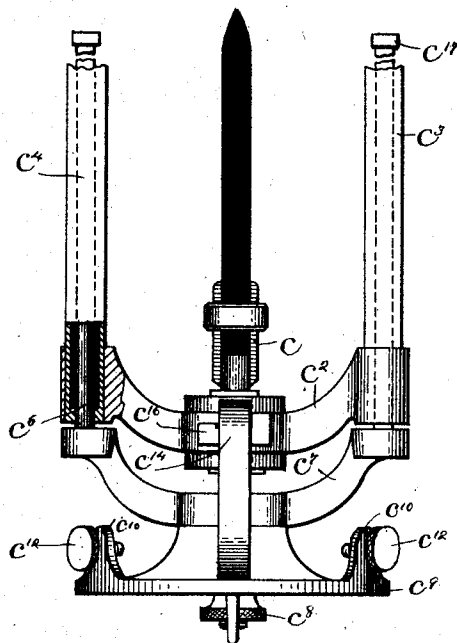
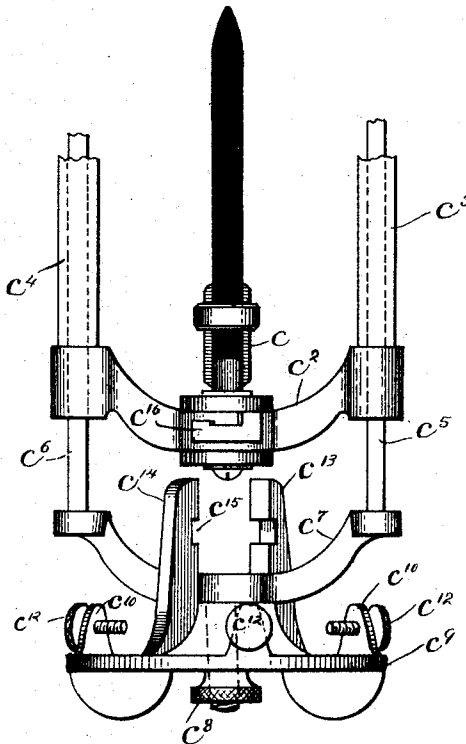


FIG. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM B. LUCE, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR OF ONE-
THIRD TO EDWARD S. RITCHIE & SONS, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 505,051, dated September 12, 1893.

Application filed December 5, 1892. Serial No. 454,113. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. LUCE, of Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

This invention relates to electric arc lamps, and has for its object to improve the construction of the same. One feature of my present invention consists in a clutch mechanism, of novel construction as will be described, by which the feed of the upper carbon is controlled.

Another feature of my invention consists in a novel construction of globe or shade holder, whereby the globe or shade may be lowered away from the lamp frame to permit the globe to be readily removed, and also to permit of free access to the carbon pencils, whereby the latter may be more easily and quickly renewed.

The particular features in which my invention consists will be pointed out in the claims at the end of this specification.

Figure 1 represents an electric arc lamp embodying my invention, the frame for the lamp being omitted; Fig. 2, a longitudinal section, through the lifting magnet, showing the clutch mechanism in position to permit the upper carbon to feed downward; Fig. 3 a detail in elevation of my improved form of clutch; Fig. 4, a sectional detail on the line 4 4, Fig. 3; Fig. 5, a sectional detail on the line 5 5 Fig. 3; Fig. 6, a detail to be referred to; Fig. 7, a detail in elevation, partially broken out, of the lower portion of the lamp frame showing the globe holder in its normal or elevated position; Fig. 8, a detail in elevation of the lower portion of the lamp frame showing the globe in its lowered position.

Referring to Fig. 1, A represents a solenoid of any usual or well-known construction, through which is extended, the carbon holder *a* for the upper carbon *a'*, the latter being secured to its holder as by a clamping screw *a²*.

The carbon holder *a* has co-operating with it, a clutch mechanism of special construction, as will now be described. The clutch mechanism referred to, consists essentially of a ring or band *a⁴*, pivotally connected,

as by screws or pivots *a⁵* to the upper end of a magnetic core composed of two parts or members, one part or member being preferably made as a substantially semi-circular tube *a⁶*, secured at its lower end, as herein shown, by screws *a³³* to a guiding collar or ring *a⁷*, through which the carbon-holder *a* is extended. The clamping ring *a⁴* has secured to it, as by screws *a⁹*, the other member or part of the magnetic core which is preferably a bar or piece *a¹⁰* of iron, preferably made to conform to the cylindrical shape of the tube *a⁶*, to co-operate with the said tube to complete the same. The bar or strip *a¹⁰* has secured to its lower end, a stud or projection *a¹²* inserted into a hole or opening *a¹³* (see Fig. 6) in a cross bar *a¹⁴*, having secured to it, arms *a¹⁵* *a¹⁶* pivotally connected, as at *a¹⁷*, *a¹⁸* to a cross bar or rod *a¹⁹*, herein shown as supported by an adjusting screw *a²⁰*, on a threaded rod *a²¹*, the latter being extended through a suitable hole or opening in the cross bar *a¹⁹*. The core as shown in Fig. 1, is supported upon a spring *a²²*, which in practice, encircles the carbon holder *a*, and rests upon a cross bar *a²³* secured to the solenoid A by the threaded rod *a²¹* and the rod *a²⁴*. The upper carbon *a'* co-operates with the usual lower carbon *b*. When the lamp is not in operation and the carbons *a' b* are in contact, the clutch mechanism occupies the position shown in Fig. 2, the bar *a¹⁰*, at such time being moved inward or toward the tube *a⁶* by the weight of core on the cross-bar *a¹⁴*, and the spiral spring *a²²* is, at such time, depressed. When the lamp is not in operation, the bar *a¹⁰* is in a substantially vertical plane, as represented in Fig. 2, and at such time, the pivoted clutch ring has been turned on its pivots *a⁵*, so as to be withdrawn from engagement with the carbon holder *a*. When the current is supplied to the solenoid A, the magnetic core, consisting of the tube *a⁶* and the part *a¹⁰*, is attracted up within the solenoid A, and the part *a¹⁰* being movable and similarly magnetized to the part *a⁶* is repelled at the same time by the part *a⁶*, thereby tilting the clutch ring *a⁴* on its pivots *a⁵* and causing the said ring to bind on the carbon holder at diametrically opposite upper and lower points of the ring, thereby firmly grasping the carbon holder *a* and

lifting the latter upward to establish the arc between the carbons. When the arc becomes abnormal the current is shunted through the high resistance coil of the solenoid A and the attractive force of the main coil of the solenoid is diminished, thereby permitting the part a^{10} of the clutch to be removed by the weight of the cross bar a^{19} toward the other part of the core, which movement tilts the clutch ring back to its normal position and permits the carbon to feed down.

In connection with the lamp, shown in Fig. 1, I have represented an automatic cut out, which may be of any usual or well-known construction, it being shown as consisting of an electro-magnet $b^3 b^4$, the coil b^3 of the electro magnet being of high resistance, and the coil b^4 being of substantially low resistance; the coil b^4 having one of its wires, as b^5 , joined to the positive binding post b^6 of the lamp and the other end of its coil b^7 , joined to the front stop b^8 for the armature b^9 , the said armature being connected through the resistance R to the negative binding post b^{10} of the lamp. The coil b^3 has one of its wires, as b^{12} , connected to the positive binding post b^6 and its other wire b^{13} joined to the high resistance shunt coil of the solenoid A; the other end of the high resistance coil being connected to the negative binding post b^{10} by wire b^{14} . The positive binding post b^6 is connected by wire b^{15} with one end of the low resistance coil of the solenoid, the other end of the low resistance coil being connected by wire b^{16} to a brush b^{17} normally in contact with the carbon holder a , the lower carbon holder b being connected by wire c' to the negative binding post b^{10} . The lower carbon holder c , in accordance with my invention, is supported in a cross bar c^2 , secured to the tubular rods $c^3 c^4$ forming part of the frame for the lamp. The tubular rods $c^3 c^4$ have extended into them guide rods $c^5 c^6$, having secured to them a cross bar c^7 to which is pivotally secured, as by screws c^8 , a globe holding base c^9 , provided with the usual lugs or uprights c^{10} and set screws c^{12} . The globe holding base c^9 is detachably secured to the carbon holding bar c^2 , by means of two uprights $c^{13} c^{14}$, having slots or openings c^{15} adapted to engage suitable locking projections or lugs c^{16} on the opposite sides of the cross bar c^2 . The guide rods $c^5 c^6$ are provided at their upper ends with suitable enlargements or caps c^{17} (see Fig. 7) by which the downward movement of the globe holding base is limited. In the normal condition of the lamp, the globe holding base c^9 is firmly locked to the cross-bar c^2 as represented in Fig. 7, but when it is desired to remove the globe for any purpose, or when it is desired to renew the carbons and especially the lower

carbon b , the globe holding base c^9 may be turned on its pivot c^8 , so as to disengage the slotted uprights $c^{13} c^{14}$ from the locking lugs c^{16} , and when thus disengaged, the said base may be lowered into the position shown in Fig. 8, leaving the lower carbon b readily accessible.

I claim—

1. In an electric arc lamp, the combination of the following instrumentalities, viz: a solenoid, a carbon holder extended therethrough, and a magnetic core consisting of two parts or members, one part or member being movable longitudinally within the solenoid and the other member being movable longitudinally and laterally, and a clutch ring pivoted to the first member and operated by the lateral movement of the second member to grasp the carbon holder, substantially as described.

2. In an electric arc lamp, the combination of the following instrumentalities, viz. a solenoid, a carbon holder extended therethrough, and a magnetic core consisting of two parts or members, one part or member being movable longitudinally within the solenoid, and the other member being movable longitudinally and laterally, a clutch ring pivoted to the first member and operated by the lateral movement of the second member to grasp the carbon holder, and means to act on the laterally moving member to turn the clutch ring to release the carbon holder, substantially as described.

3. In an electric arc lamp, the combination of the following instrumentalities, viz. a solenoid, a carbon holder extended therethrough, and a clutch mechanism to operate on the carbon holder consisting of a tube or shell, a clutch ring pivoted thereto, and a magnetic bar or piece, secured to the said ring and adapted to tilt the ring on its pivot to clutch the carbon holder, substantially as described.

4. In an electric arc lamp, the combination of a carbon holder for the lower carbon b , a supporting bar c^2 for the said carbon holder, tubes $c^3 c^4$ secured to the said support, guide rods $c^5 c^6$ movable in the said tubes, a cross bar connecting said guide rods and a globe holding base pivotally secured to the said cross bar, and means to lock the said base to the support for the lower carbons, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 2d day of December, A. D. 1892.

WILLIAM B. LUCE.

Witnesses:

C. F. BROWN,
A. D. HARRISON.