(No Model.)

J. E. GILES.

ELECTRIC ARC LAMP.

No. 462,698. Patented Nov. 10, 1891.

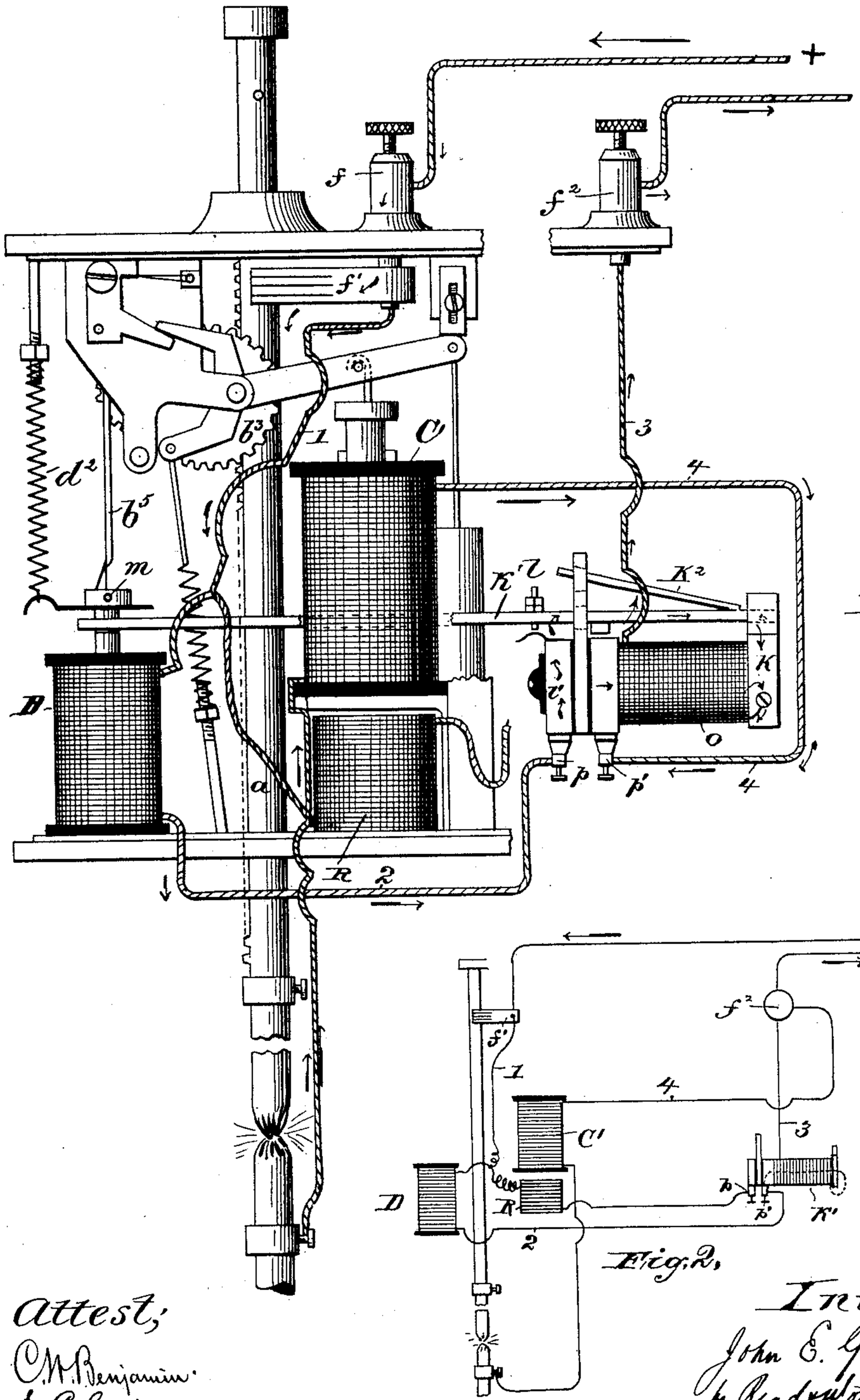

Fig. 1.

Fig. 2.

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JOHN E. GILES, OF HAZLETON, PENNSYLVANIA.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 462,698, dated November 10, 1891.

Application filed January 29, 1891. Serial No. 379,600. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. GILES, a citizen of the United States, residing at Hazleton, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Electric-Arc Lamps; 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.

This invention relates to arc lamps, its object being to enable such a lamp to be used on regular arc circuits where a constant current is used or on circuits of constant potential, as those in which incandescent lamps are used.

It is well known that arc lamps as ordinarily employed—that is, when arranged in series on a constant-current circuit—are provided with a device known as a "cut-out" adapted to come into action when the arc is interrupted and close the circuit around the arc, thus permitting current to flow through the lamp and supply the other lamps of the system without interruption.

It is the design of my invention to provide a device which may also be adjusted to cut out the shunt-coils of the arc lamp when used on a circuit of constant potential or multiple-arc circuit in case the arc is interrupted, inasmuch as in the absence of such provision the full strength of current flowing through the shunt-coil would cause it to overheat and burn, and thus destroy the usefulness of the lamp.

It is the further design of my invention to short-circuit the shunt-coils of the lamp upon permanent rupture of the arc when the lamp is used on a constant-current or series circuit. In a prior patent granted to me—namely, No. 442,617, issued on December 16, 1890—this same object was attained by the use of two independent auxiliary coils. In my present invention the cut-out device is operated by a single auxiliary coil, thus reducing the number of parts, and the cut-out magnet is provided with changeable connections by which, in case the lamp is used on a circuit of constant potential, the circuit through the lamp is interrupted when the main circuit through the arc is ruptured, and when used on a circuit of constant current a short circuit through the lamp is closed when the main current is ruptured.

The invention embodies also details which will be hereinafter fully described in the specification, and definitely indicated in the appended claims.

In the accompanying drawings, Figure 1 is a view illustrating a lamp involving my improvements, the connections being adjusted for a circuit of constant potential or multiple-arc circuit. Fig. 2 illustrates diagrammatically a change of connections to adjust it for a constant-current or series system.

Inasmuch as the lamp illustrated in the drawings is of the same construction, so far as its feed-regulating mechanism is concerned, as the lamp described in my former patent, No. 442,617, referred to above, it will be unnecessary to give a detailed description of the feed-regulating mechanism. The arc is sprung by means of a solenoid C in the main circuit, which acts upon an eccentrically-pivoted gear-wheel b^3, forming part of the feed-regulating train, and lifts this wheel slightly, the carbon-rod a rising with it, and thus springing the arc. As the carbon burns away the feed is regulated by means of the shunt-coil D, the core of which is elastically suspended by means of a spring d^2 and releasing a detent b^5 of the train, permitting the upper carbon to descend.

In the accompanying drawings, which illustrate my present invention, the cut-off device is shown broken away and removed somewhat from the other parts of the lamp in order to prevent confusion. This device comprises a magnet K, provided with an armature K′, pivoted to a polar extension, said armature or an extension thereof extending to the core of the shunt-coil D and co-operating therewith. This armature is provided with the retractile spring K^2, supported in a metallic post l, secured to but insulated from the core of the magnet. The armature carries a contact adapted to co-operate with a corresponding contact mounted upon a metallic piece l', likewise insulated from the core of the cut-out magnet. Binding-posts p p' are secured to the piece l' and the polar extension of the magnet-core, respectively.

R is a resistance suitably mounted in the

lamp and adapted to be brought into play when the lamp is used on a circuit of constant current for the purpose of throwing resistance into the circuit when the cut-out is brought into action—a feature of construction commonly adopted in commercial arc lamps. A removable pin *m*, secured to the core of shunt-coil D, co-operates with the extension of the armature K′ when the core is sufficiently attracted, and forces the armature down so as to bring the two contacts carried by the support *l′* and armature K′ into engagement.

When used on a circuit of constant potential, the path of the current through the lamp will be as follows, the connections being as shown in Fig. 1 of the drawings: Entering at the positive binding-post through brush *f′*, it passes through the carbons and main coil C′ to binding-post *p′*, thence to the core of the cut-out polar extension K, to which one terminal of the coil *o* is connected, and thence to the outgoing wire through post f^2. Magnet K is thus energized and attracts armature K′, bringing the two contacts carried by K′ and *l′* into engagement and closing the shunt-circuit from *f* by way of wire 1, shunt-coil D, wire 2, post *p*, support *l′*, armature K′, polar extension K, coil *o*, wire 3, post f^2, and out. Should the arc be interrupted, armature K will be retracted from *l′*, the strength of current passing through the shunt-circuit being insufficient to counterbalance the tension of spring K^2 and the shunt-circuit will be opened, thus interrupting the circuit through that lamp, as is desirable in circuits of constant potential. When the main circuit is again closed through the carbons, the armature K′ will again be attracted and the shunt-circuit closed, as hereinbefore described.

When the lamp is used on a constant-current system, the wires 2 and 4 are detached from the binding-posts *p p′*, the former being connected to *p′* and the latter directly to the outgoing binding-post f^2 of the lamp, and the resistance R is connected to the binding-post *p*—a change of connections which is indicated diagrammatically in Fig. 2 of the drawings. The current now enters at *f*, passes through *f′*, carbons, main coil C, and passes directly to the binding-post f^2 by wire 4. Should the arc be interrupted for a moment, the main current will cease to flow in the circuit just traversed and the entire pressure will be thrown upon the shunt-coil D through the circuit *f f′* 1 D 2 *p′*, core of cut-out, coil *o*, wire 3, and outgoing post f^2. The core of the shunt-coil D will be drawn violently downward and operate upon the armature K′, forcing the contact carried thereby into engagement with the contact carried by support *l′*, and thus affording a by-pass for the current around the shunt-coil over the circuit *f f′*, R *l′* K′ K *o* 3 f^2, the coil of the cut-out magnet being thus included in this by-pass and the short circuit being maintained closed, in which condition it will remain until the carbons are fed into contact, when the larger part of the main current will pass through the main coil and the cut-out magnet be sufficiently weakened to permit its retractile spring to withdraw the circuit-closing lever or arm K′ and separate the contacts which closed the short circuit. It will thus be seen that the lamp may be adapted for a constant-potential or constant-current system by a simple change of adjustment of these terminals, requiring no substitution of parts or any difficult mechanical changes in the structure of the lamp.

While I have described the cut-out mechanism in connection with my own feed-regulating mechanism, it will of course be understood that it is not restricted to such a narrow field of application, as it might also be employed in connection with lamps having different feed-regulating mechanisms.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cut-out for an arc lamp, provided with changeable connections, one set including the cut-out magnet in the main circuit, thereby opening the shunt-circuit on cessation of the main current, the other set closing a by-pass around the regulating-coils when the main circuit is interrupted, whereby the lamp may be used on constant-potential or constant-current lighting systems.

2. An arc lamp for constant-current or constant-potential systems, provided with a cut-out magnet, connections for closing the main circuit through or around said magnet, a circuit-closing lever for the shunt-coil controlled by the magnet in one condition of adjustment, a by-pass around the feed-regulating coils, and means for closing this by-pass by the shunt-regulating coils in the other condition of adjustment.

3. The combination, with the main and shunt-regulating coils of an arc lamp, of the magnet *o*, circuit-closing lever K′, controlled both by the magnet and by the shunt-coil, and means for connecting the magnet in the main circuit and the circuit-closer of the lever in the shunt-circuit or for connecting the magnet in the shunt-circuit and the circuit-closer of the lever in a by-pass around the shunt-regulating coils, thus adjusting the lamp for use on constant-current or constant-potential systems.

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

JOHN E. GILES.

Witnesses:
C. H. LINDEMANN,
H. B. KISNER.