No. 659,705. Patented Oct. 16, 1900.

H. C. SPINNEY.

CLUTCH FOR ELECTRIC ARC LAMPS.

(Application filed Apr. 4, 1898.)

(No Model.)

FIG. 1.

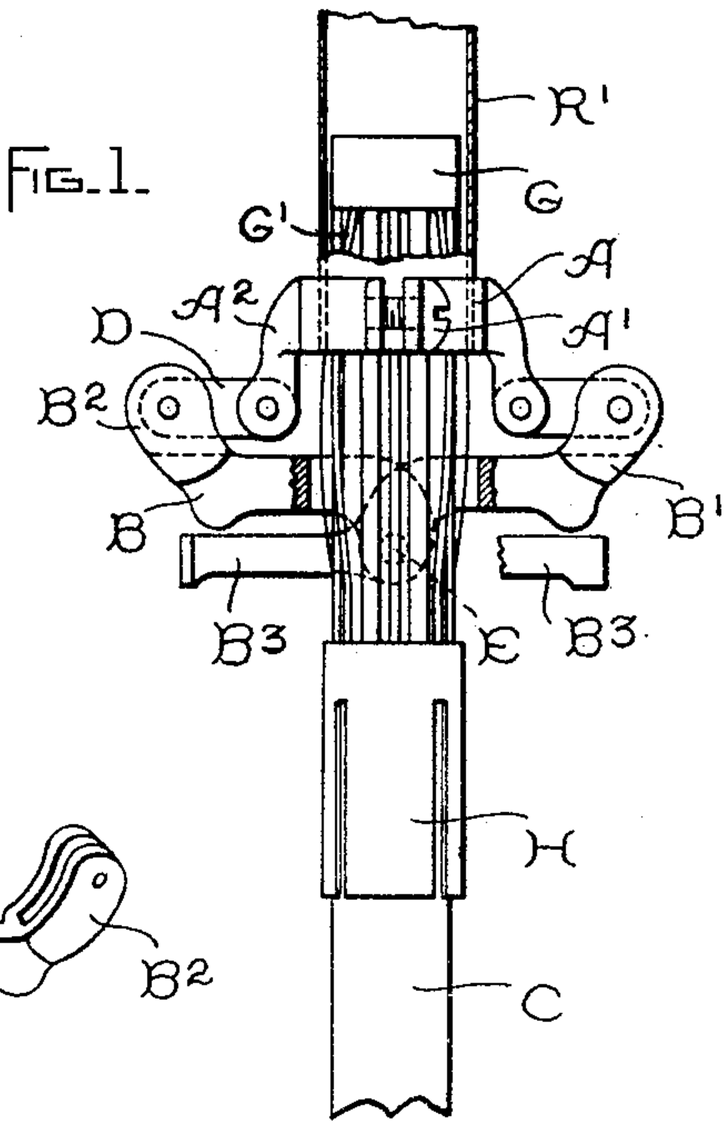


FIG. 2.

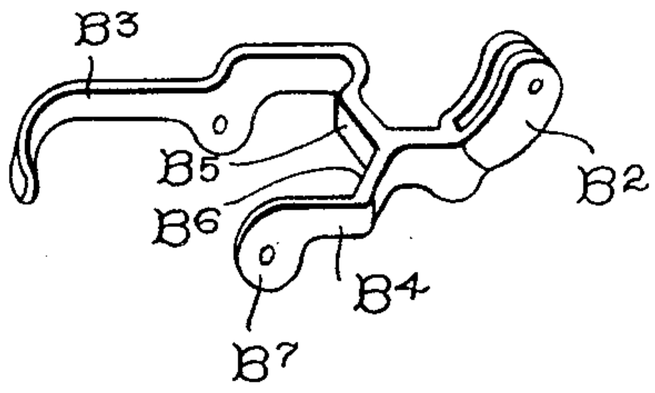


FIG. 3.

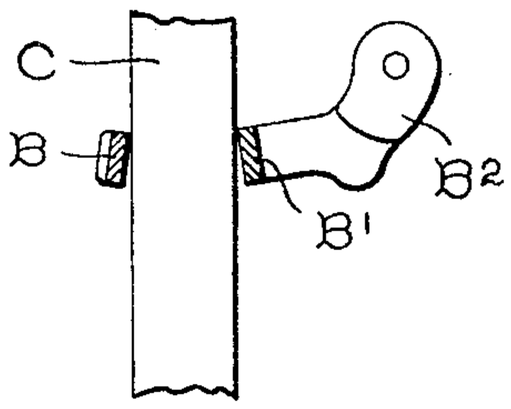


FIG. 4.

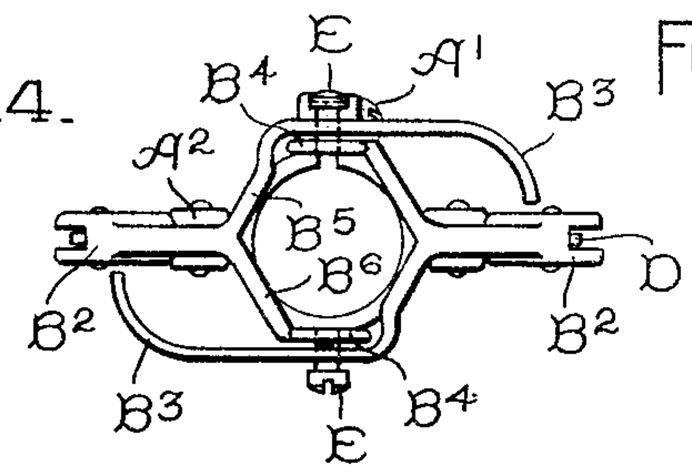


FIG. 5.

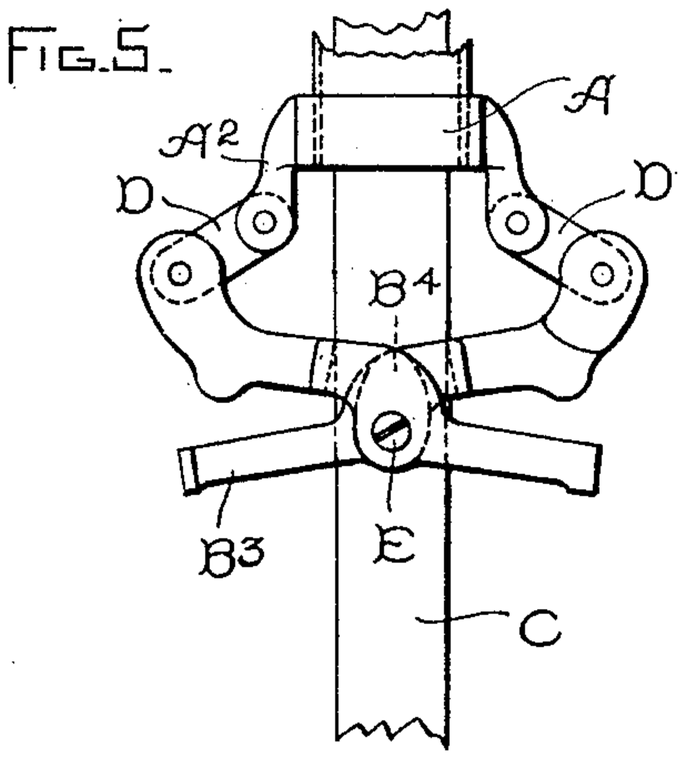
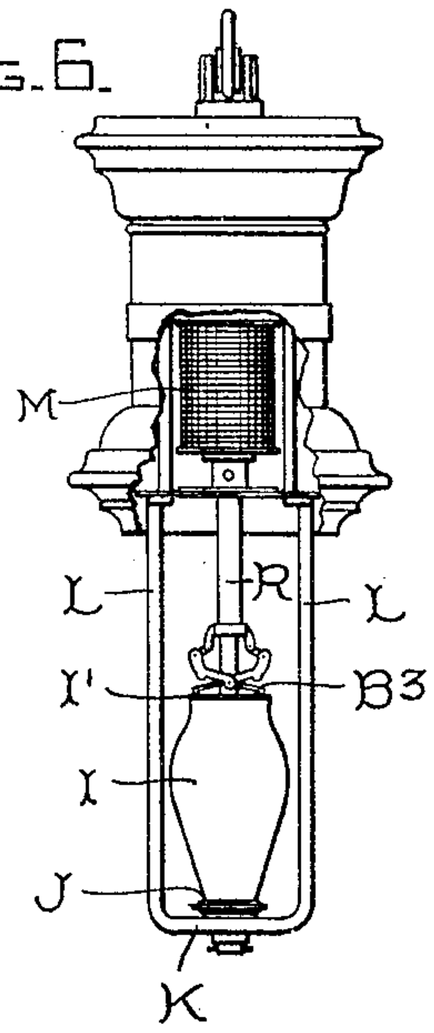


FIG. 6.



WITNESSES-
Edw. Hilliams Jr.
A. F. Macdonald.

INVENTOR-
Henry C. Spinney,
by Albert G. Davis.
Atty.

UNITED STATES PATENT OFFICE.

HENRY C. SPINNEY, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GENERAL ELECTRIC COMPANY, OF NEW YORK.

CLUTCH FOR ELECTRIC-ARC LAMPS.

SPECIFICATION forming part of Letters Patent No. 659,705, dated October 16, 1900.

Application filed April 4, 1898. Serial No. 676,322. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SPINNEY, a citizen of the United States, residing at Lynn, in the county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Clutches for Electric-Arc Lamps, (Case No. 782,) of which the following is a specification.

My invention has for its object to improve the construction of the clutches employed on electric-arc lamps, and particularly those in which the clutch works directly on the carbon pencil.

In the case of inclosed arc-lamps the arc is usually at first at the top of the inner globe, and during the operation of the lamp becomes gradually lower in position till the bottom of the inner globe is reached. This leaves a certain length of upper carbon rod which when the lamp is trimmed is used as a lower carbon. Economy in the use of carbon is obtained when this remnant which is to be used as a lower carbon is of the proper length—that is, neither too long nor to short. If the clutch is too far away from the top of the cap of the inner globe, the remaining piece of the upper carbon is apt to be too long. It is therefore best to have the clutch operate very close to the cap of the inner globe, which forms the "floor" of the clutch. In arc-lamps having clutches working directly on the carbon pencil it is necessary to provide a weighted follower, so that the carbon pencil will feed after its weight has been reduced by burning. In retrimming a lamp of this character it is more or less difficult to hold the weighted follower while the carbon pencil is being inserted into place, due to the lamp mechanism. Heretofore it has been customary to insert the carbon pencil in place and force it upward until the weighted follower struck a stop in the upper part of the lamp, after which the carbon pencil could be forced into the clamping-jaws of the weight. This was an objectionable arrangement, principally because the spring clamping-jaws of the weight could not be seen, and they were liable to be bent while the carbon was being inserted. To overcome this objection, the clutch is made in such a manner that it can be forced upward to a point where it will open sufficiently to permit the weighted follower to be removed. The carbon pencil may then be mounted in place and the weighted follower returned to its position in the lamp. In addition to securing these advantages I provide a clutch which is simple, positive, and reliable.

In the accompanying drawings, which shows my invention applied to an arc-lamp, Figure 1 is a front elevation of my improved clutch with certain portions broken away. Fig. 2 is a perspective view of one element of the clutch. Fig. 3 is a detail view showing the position of the clamping-surfaces with respect to the carbon. Fig. 4 is an inverted plan view of the clutch. Fig. 5 is a rear elevation of the clutch and carbon pencil, and Fig. 6 is a front elevation of an inclosed arc lamp with a part of the casing broken away.

Surrounding the carbon pencil C is a tube R′, which is connected to the armature of the operating-magnet M in any desirable manner. Secured to the lower end of the tube is a clutch which works directly on the carbon pencil C. The clutch is provided with a split collar A, which is frictionally secured to tube R′ by screw A′. Projecting downward from the collar are two lugs A^2, forming supports for the jaws B B′ of the clutch. The clutch-jaws are counterparts, so that a single pattern may be employed for both. This simplifies the construction of the clutch and at the same time obviates trouble when parts are ordered by the users, as the question of right or left hand does not have to be considered. The extension B^2 of the clutch-jaw is slotted to receive the link D, which forms the connection between it and the split collar A. The links D are made of thin pieces of metal of uniform thickness and are preferably punched from sheet metal on account of cheapness. The slots in the lugs A′ and B^2 are somewhat wider than the thickness of the links, so as to permit the latter to work freely and to adjust themselves for irregularities in the carbon.

Two arms B^3 and B^4 are provided on each clutch-jaw, the arm B^3 being long and terminating in a curved end which is employed to trip the clutch, and the arm B^4 being short and extending only to the center of the car-

bon. The arms B^3 are curved toward each other, so that their ends which rest on the floor of the clutch are substantially in the same straight line. This arrangement insures the proper tripping action of the clutch. By varying the length of the arm B^3 the clutch can be made more or less sensitive. As the length of the arm increases the sensitiveness of the clutch increases. Two angular clamping-faces B^5 B^6 are provided on each jaw. These are so arranged that when the clutch is assembled the jaws will automatically adjust themselves with respect to the pencil and the four angular faces of the clutch will grip the carbon pencil.

The successful action of the clutch is largely dependent upon the position which the pivots E between the jaws occupy with respect to the clutch-faces B^5 and B^6. I have found by experiment that the action is more successful when the pivots E are comparatively low. To obtain this effect, the pivots are mounted in the downwardly-extending lugs B^7. In certain instances, however, where a delicate adjustment is required I have made the pivots E more nearly in line with the angular gripping-faces B^5 and B^6. The two jaws of the clutch are pivotally united at the point of crossing by the screws E, which are threaded at the end where they enter the inner jaw, the remainder of the screw being left plain. By this arrangement the uncut portion of the screws acts as a shoulder and also as a jam-nut to hold the screws from becoming loose and dropping out. Referring to Fig. 4 it will be seen that considerable lateral play is permitted between the jaws at the pivots E. This is to provide for lateral adjustment of the clutch when the carbon pencil C is slightly out of line or is irregular in shape.

Fig. 3 shows the manner in which the jaws grip the carbon pencil C. It will be seen that the upper edges of the angular faces are in engagement with the carbon. The clutch as constructed requires no finishing with the exception of the split collar A and the angular clamping-faces B^6 and B^7, and even in these parts the amount required is very small.

In order to insure a positive feed for an arc-lamp in which the clutch works directly on the carbon pencil, it is necessary to provide a weighted follower so arranged that it will assist the carbon to feed. This is particularly important when the greater part of the carbon has been consumed. In the present instance I have shown a weighted follower composed of a main body of metal G, with phosphor-bronze springs G′ arranged to make contact with the inside of tube R′ and supply current to the upper carbon C, but the design of the follower may be widely varied without departing from the spirit of my invention. On the lower end of the weighted follower is a carbon-holder consisting of a split metal tube H, arranged to grip the carbon. To facilitate the trimming of the lamp, the weighted follower is so arranged that it can be removed from the lamp by pushing the jaws of the clutch upward to the position shown in Fig. 1. This is a highly-desirable arrangement, as it permits the trimmer to save considerable time, and it also prevents injury to the lamp parts which was formerly occasioned in lamps not having a removable follower by ramming the carbon pencil C upward until it was caught and gripped by the holder H.

In Fig. 6 is shown a front elevation of an arc-lamp provided with an arc-inclosing globe I, having a metal cap I′, which is arranged to act as the floor of the carbon-clutch. The inclosing globe is secured in place by a globe-holder J, which is mounted on a support K, carried by the side rods L. Mounted in the mechanism chamber of the lamp is the actuating-magnet M, and depending from the chamber is a frame composed of the side rods L and support K.

There is always a certain amount of carbon left in the upper carbon-holder after the lamp is cut out, and by properly proportioning the lamp parts the remaining piece may be employed for the lower carbon when the lamp is trimmed. When a portion of the lamp-frame is employed as the floor of the clutch, the piece remaining in the holder is too short, unless the lamp-frame is made unduly long, but by employing the cap of the inner globe as the floor of the clutch the frame may be made short—a most important feature in commercial arc-lamps—and by adjusting the vertical height of the cap—that is to say, building it for a desired height—the carbon remaining after the lamp is cut out may be made of any desired length.

The action of the lamp is as follows: As the actuating-magnet weakens it permits the tube R to drop, and the outer ends of the clutch-arms B^3, striking the top of the cap I′, will release the carbon and permit it to feed by gravity. In the upward movement of the tube the jaws are drawn together and firmly clutch the carbon, the clutch operating like a toggle actuated by the weight of the carbon, aided by that of the weighted follower found in lamps of this type.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a clutch for arc-lamps, the combination of a clamp consisting of two counterpart elements, counterpart jaws pivoted to each other each provided with angular gripping-faces, and counterpart links connecting the clamp with the jaws.

2. In a clutch for an arc-lamp, the combination of a collar which is secured to the actuating mechanism of the lamp, a pair of forked counterpart clamping-jaws loosely suspended from the collar, each fork being provided with a long and a short arm, the long arm acting to trip the clutch, and pivots passing through the long arm of one jaw and the short arm of the other jaw.

3. In a clutch for an arc-lamp, the combi-

nation of a collar which is secured to the actuating mechanism of the lamp, a pair of forked clamping-jaws suspended from the collar, two angular faces on each jaw for gripping the carbon, the faces on one jaw being adjustable laterally independent of the faces on the other jaw so that they will automatically adjust themselves to irregularities in the carbon, and means for tripping the clutch.

4. In an arc-lamp, the combination of a follower which rests on the top of the carbon pencil, and a clutch which normally grips the carbon, but feeds it downward as it is consumed, the clutch being so arranged that it can be opened to permit the removal of the weighted follower.

5. In an arc-lamp, the combination of a follower to which the upper carbon is secured, a contact between the follower and a stationary part of the lamp, and a clutch which normally grips the carbon, but releases it when the lamp-magnet becomes weak, the arrangement of the clutch and the follower being such that under normal conditions the follower is prevented from passing through the clutch, but as soon as the clutch is manually lifted, the follower may be removed from the lamp for the purpose of retrimming.

6. In an electric-arc lamp, the combination of an arc-inclosing globe, a support for the globe, a clutch for gripping the carbon, a cap for the inclosing globe, which acts as the floor of the clutch, and a releasing-arm for the clutch adapted to engage the cap to produce feed of the movable carbon.

7. In an electric-arc lamp, the combination of a chamber for the mechanism, a clutch which works directly on the carbon pencil, a frame depending from the frame of the lamp-chamber, an arc-inclosing globe supported by the frame, and a floor for the clutch, which is supported by the globe.

8. In a clutch for an arc-lamp, the combination of a pair of counterpart clutch members, each member comprising a pair of arms one of which is longer than the other and acts as a tripping device, a gripping-face between the arms, and pivotal connections between the long arm of one member and the short arm of the other member, the said connection permitting the members to move laterally with respect to each other for the purpose of adjusting themselves to irregularity in the carbon or in the alinement.

9. As an article of manufacture, a clutch member comprising a metal piece having long and short arms B^3, B^4, formed integrally therewith, with angular clamping-faces B^5, B^6, between them and extensions B^2 and B^7.

In witness whereof I have hereunto set my hand this 31st day of March, 1898.

HENRY C. SPINNEY.

Witnesses:
ELIHU THOMSON,
A. F. MACDONALD.