(No Model.) 2 Sheets—Sheet 1.

C. A. PFLUGER.

CARBON HOLDER FOR ARC LAMPS.

No. 471,190. Patented Mar. 22, 1892.

Fig. 1.

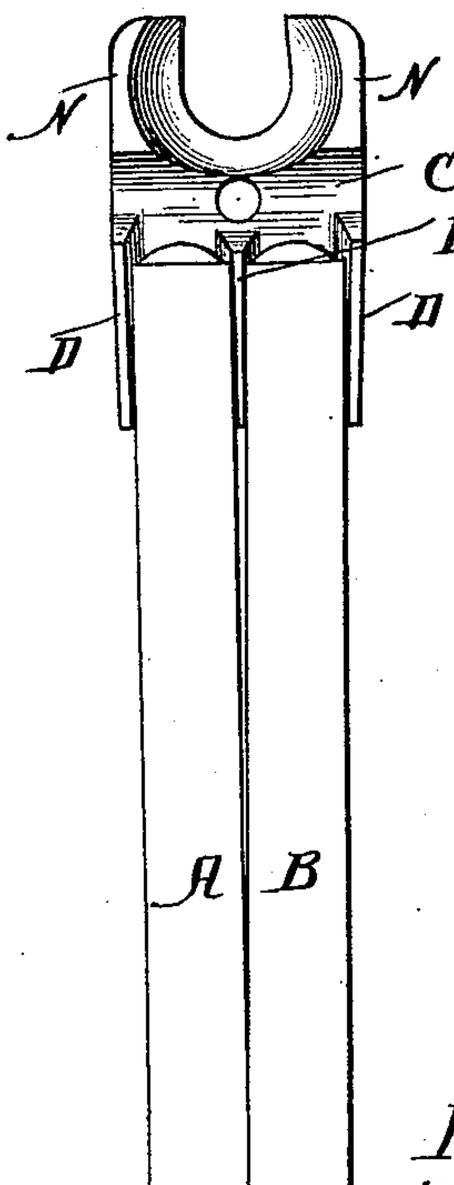


Fig. 2.

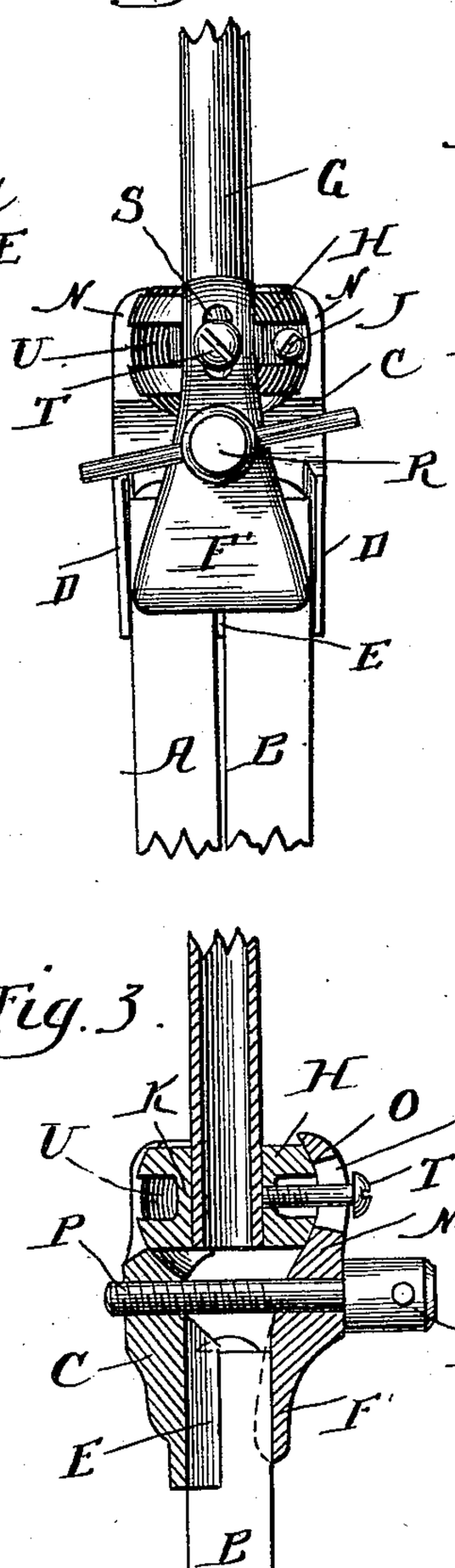


Fig. 5.

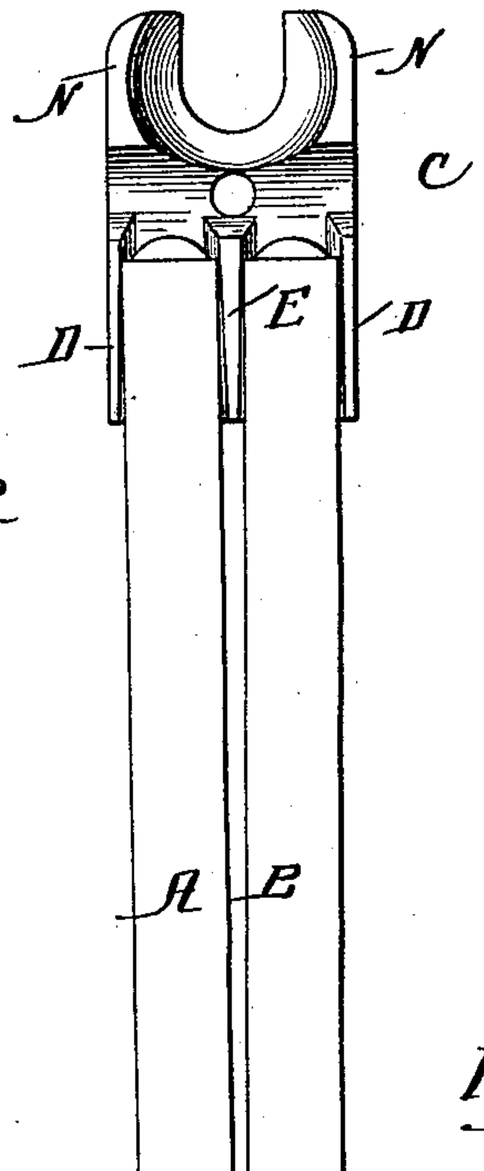


Fig. 3.

Fig. 4.

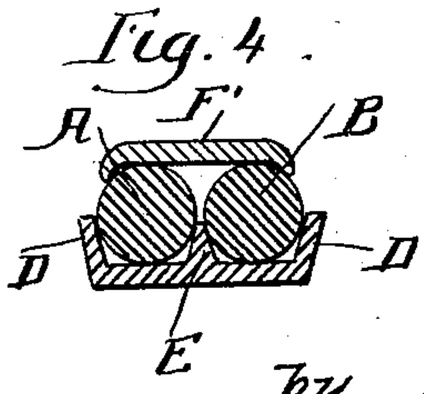
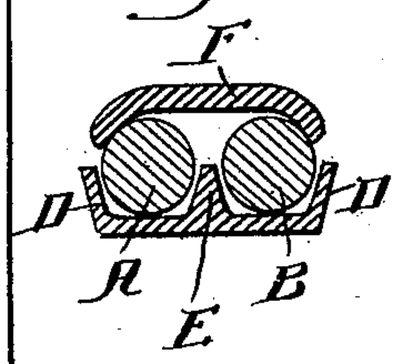


Fig. 6.



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(No Model.) 2 Sheets—Sheet 2.

C. A. PFLUGER.

CARBON HOLDER FOR ARC LAMPS.

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Fig. 7

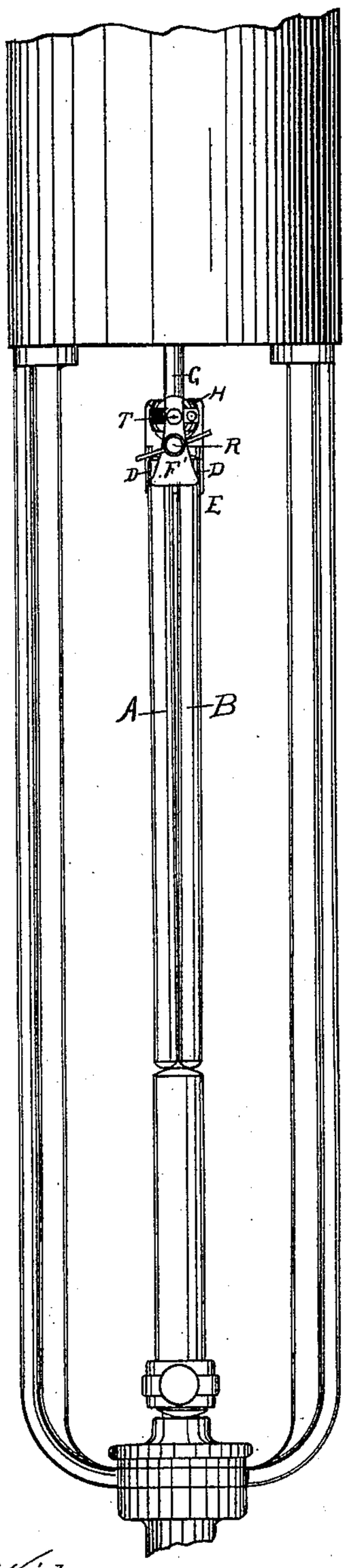
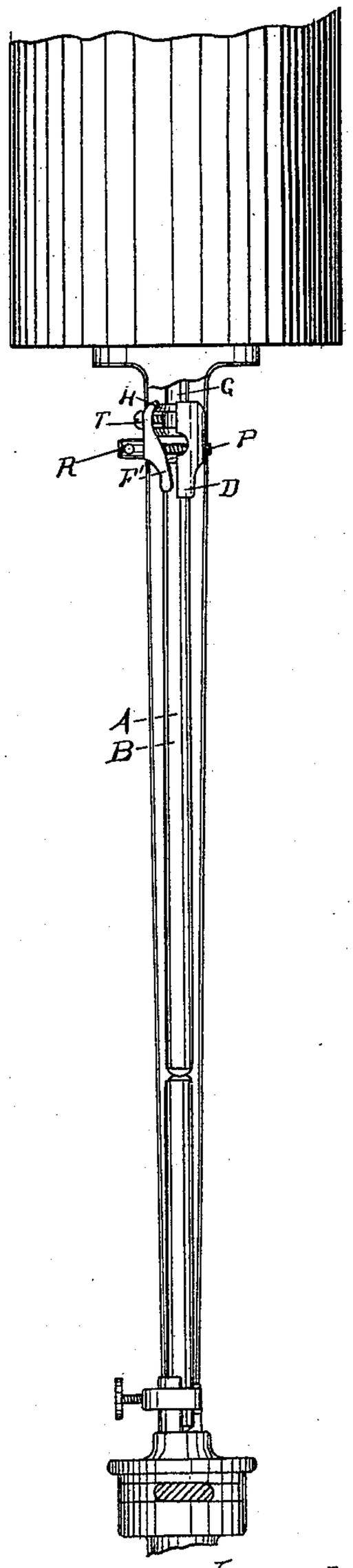


Fig. 8.



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UNITED STATES PATENT OFFICE.

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CARBON-HOLDER FOR ARC LAMPS.

SPECIFICATION forming part of Letters Patent No. 471,190, dated March 22, 1892.

Application filed October 17, 1890. Serial No. 368,419. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. PFLUGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Carbon-Holders for Arc Lamps, of which the following is a full, clear, and exact specification.

My invention relates to arc lamps, and has for its object to provide means whereby a practically continuous arc long-burning lamp may be provided, and also whereby a better carbon-holder may be obtained. It is illustrated and shown in the accompanying drawings, wherein—

Figure 1 is a side view of the invention with the carbon-holder incomplete. Fig. 2 is a side view of the same with the holder complete. Fig. 3 is a longitudinal section through the same; Fig. 4, a cross-section; Fig. 5, a view similar to Fig. 1, but with modifications; Fig. 6, a cross-section through the latter. Fig. 7 is a front view of a lamp, showing upper and lower carbons in position. Fig. 8 is a side view of lamp with a portion of the frame removed, so as to give a side view of the carbons.

Like parts are indicated by the same letter in all the figures.

A and B are the carbons secured to the body of the holder C, which body is provided with the side ledges D D and the intermediate rib E. This rib is in all the figures of less diameter toward its lower end than toward its upper.

Referring to Fig. 1, it will be observed that the ribs D D and E approach each other at their lower extremities, so as to form a groove just capable of being filled with the carbon on each side of the central rib, and as the central rib is wider at its upper cross-section it follows that these grooves are at an angle to each other and that when the carbons are put in position they are sprung together along their lower portions, as indicated in Fig. 1. Evidently as these carbons burn off they will tend to approach each other until they have burned to within the usual distance of the carbon-holder. Thus they are held practically in contact, and should they at any time on account of the inequalities in the carbons be slightly separated the space between them, it is found, is filled to such a degree with carbon vapors and the like as to preserve the arc in its passage from one carbon to the other.

Referring to Figs. 5 and 6, it will be observed that the carbons do not lie in such manner as to fill the grooves, but that there is a space between each carbon and the middle rib, and, indeed, it will be readily seen that this middle rib toward its lower end could in this case be substantially dispensed with. The upper extremities of the carbons are given a bearing against the middle rib, and their lower extremities are brought together. They are then clamped in position, and by forming a clamp, as indicated in Fig. 6, it will be observed that if the lower portion F of such clamp have a slight spring to it (such spring may be nothing more than the elasticity of the metal itself) the carbons will be gradually forced together, so as always to keep their lower ends substantially in contact.

Referring to the carbon-holder illustrated more fully in Figs. 2, 3, and 4, it consists of the lower end of the rod G, with the ball H secured thereon by the screw J, which passes through its two members K and L, and also the body C and the clamp M, having the lower portion F or F′, as the case may be, said body and clamp M being provided with upwardly-extending overhanging arms N N and O, which engage the ball or globe H. The clamp M is adjustably secured to the body C by means of the screw-bolt P and the thumb-piece R. The arm O is slotted at S for the passage of the retaining-screw T. The globe H is grooved at U, by which means the carbon-holder proper is more securely fixed in position upon such globe and better contacts are made along the edges of such groove for the purpose of leading the current to the carbon. Of course many changes in the arrangement and relation of the parts could be made without departing from the spirit of my invention, as will be particularly more fully shown and understood when its use and operation are set forth.

The use and operation of my invention are as follows: In arc lamps for long burning, or such lamps as are adapted to burn longer than would be the case if single carbons of the ordinary size and shape were employed, it is

desirable to provide means whereby the arc formed in such lamp shall be continuous as distinguished from alternating—that is to say, where attempts have been made to produce long-burning lamps by the use of ordinary carbons, this result has sometimes been brought about by using two or more pairs of carbons adapted to form an arc for a short period on one pair, and then to extinguish such arc and form another on the second pair, thus to form what may be called an "alternating arc." This construction is so far objectionable that it has never been brought into commercial use. In the lamp shown in the drawings I have provided means whereby the arc may be burned continuously and entirely substantially without alternation. This is accomplished by placing, preferably at the lower electrode, a sheet-carbon or a single carbon so constructed as to form to all intents and purposes a single carbon. It might in some cases, to a greater or less degree, be shaped as Fig. 8 in cross-section, as illustrated in my prior application for a form of carbon; or it might be in a single sheet of practically uniform diameter. For the upper electrode I employ two carbons of the usual form and shape and such as are familiarly known in the trade. These, in order that the arc may be continuous, should be held preferably with their ends in close contact during the process of burning. In this event the current descending from one of the upper carbons will form an arc between it and the lower single carbon, and gradually, of course, consume or disintegrate the carbons between such arc, and as this process continues it is found by experience that the arc is disposed to eat its way, so to speak, or to crawl across toward the other upper carbon. If now the two carbons are in contact or practically so at the arc-forming point, it is clear that such arc will cross over without being interrupted or extinguished, and hence will burn continuously, crawling back and forth from one upper carbon to the other in a regular manner and maintaining a practically uniform arc. This holding of the carbons together at their lower extremities can obviously be accomplished in many ways—as, for example, by placing them in grooves with a rib between them, which diminishes in cross-section toward its lower end, and then securely forcing them together. By this means the carbons will be elastically forced together along their adjacent edges and sides, the carbon rods being sufficiently elastic to thus elastically bring their lower ends always together in the process of burning. It will of course be observed that the chief difficulty in this result springs from the fact that commercial carbons are not of exactly uniform size at all points and are not perfectly true. If two carbons with axes parallel should be secured in a holder there might be periods in the process of burning when the lower extremities thereof would not be in contact. The other means which I have suggested are illustrated and described. The carbons are held in a sort of holder at their upper extremities, their lower extremities brought in contact, and the holder at the faces, which lie between such carbons, hollowed or ground out, so that as the carbons burn they will be forced by a more or less elastic clamp toward such faces, and thus their lower extremities be kept in contact. In each case the result is the same—namely, to bring the lower points of the carbons together securely at their burning ends. Neither do I wish to limit myself to any particular device for bringing about this result; but any means whereby the two upper carbons are continuously maintained in contact at their lower extremities, and particularly when so maintained for the purpose of making a continuous arc would appear to be within the scope of my invention. The motion imparted to the carbons to keep their points together should obviously be confined on one and the same plane to bring about the best results. It is to be observed that I have spoken of the points being in contact; but by this I do not necesarily mean actual mechanical contact, but only such contact as is sufficient to enable the arc to crawl without extinguishment from one upper carbon to the other. In certain cases and under same conditions I find that this result is attained even when the upper carbons are not actually in mechanical contact, but a carbon vapor or the like from the arc is interposed between them so as to produce the result of crawling over, and I use the word "contact" with a significance broad enough to include this idea.

The carbons are clamped, as indicated in Fig. 2, and if the ribs are disposed as shown in Fig. 1 the clamp may fasten upon the carbons directly, with the object simply of securing them in position. If, however, the ribs and grooves are organized as shown in Fig. 5, then a somewhat elastic clamp is to be provided, or at least a clamp which will engage the outer sides of the carbon, so as to tend to force them in toward each other and toward the middle rib so far as the same is employed. In the latter case it is of course only necessary to have so much of the middle rib as is sufficient to give a bearing to the upper ends of the carbons. The employment of the grooved globe or ball H is for the purpose of giving more perfect contact and for giving a better grip to the arms of the ball, so as to hold the parts more rigidly together.

I claim—

1. In an arc lamp, the combination of a single carbon at one electrode with two or more distinct carbons rigidly secured to one and the same holder, so as to travel together at the other electrode, and means for keeping the points of such distinct carbons always substantially in contact with each other during the period of burning.

2. In an arc lamp, the combination of a single carbon at one electrode with two or more

distinct carbons rigidly secured to one and the same holder, so as to travel together at the other electrode, said distinct carbons held elastically substantially together at their lower extremities during the period of burning.

3. In an arc-lamp, a carbon-holder adapted to hold two or more distinct carbons which are rigidly clamped so as to travel together with the holder, and a securing device on such carbon-holder, whereby the carbons are held in substantial contact at their lower extremities during the whole period of burning.

4. In an arc lamp, a carbon-holder provided with open grooves inclined toward but nearly parallel with each other, and clamps whereby the carbons may be clamped in such grooves, so that their lower ends are constantly substantially in contact during the period of burning.

5. In an arc lamp, a carbon-holder provided with means for rigidly holding two carbons, so that they travel together and their axes are at a very acute angle one with another, and a clamp to secure them in position, so that their burning ends tend to be always substantially in contact at the moment of burning, while their upper ends are near together.

6. In an arc lamp, a holder for two carbons provided with a rib diminishing in diameter toward its lower extremity and between which said carbons lie, so that when clamped in position they are forced toward each other at their lower extremities.

7. In an arc lamp, a carbon-holder adapted to carry two or more carbons and provided with clamps or securing devices whereby said carbons are rigidly and fixedly held at one end and at the other are forced toward each other in one and the same plane.

8. In an arc lamp, the combination of a carbon rod with the lower ball-shaped projection thereon, a groove about such projection, and a carbon-holder containing arms which embrace such ball and engage when in position the edges of the groove.

CHARLES A. PFLUGER.

In presence of—
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HARRIET M. DAY.