E. S. PORTER.

ARC LAMP.

APPLICATION FILED FEB. 3, 1917.

1,272,313.

Patented July 9, 1918.

2 SHEETS—SHEET 1.

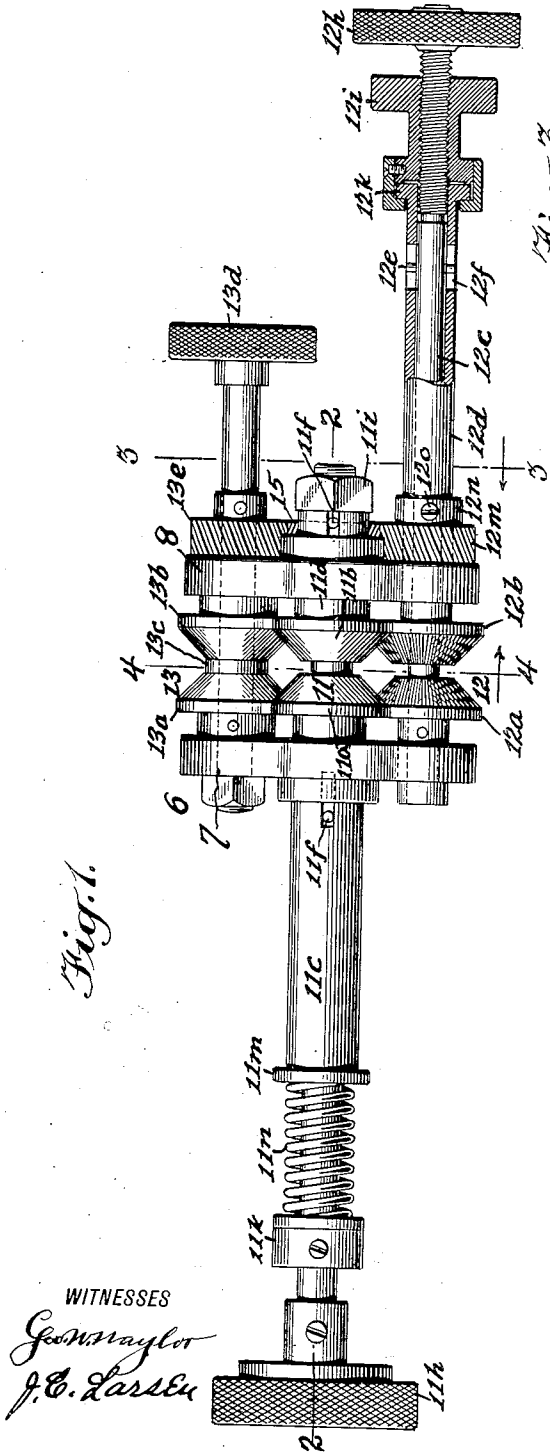


Fig. 1.

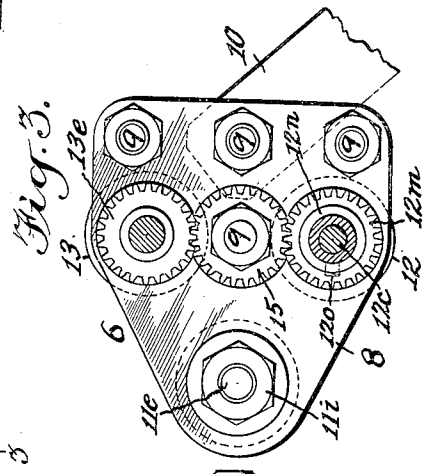


Fig. 3.

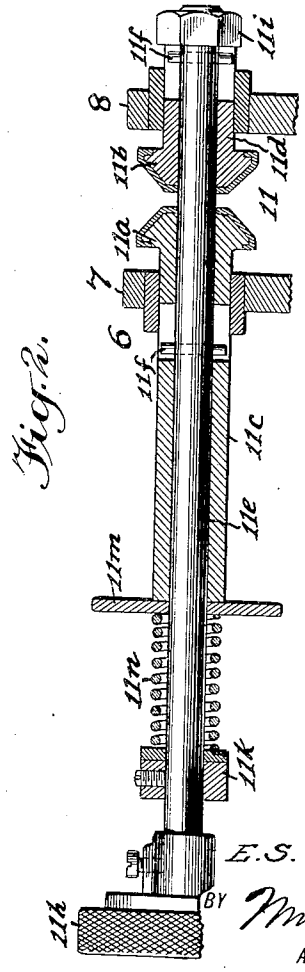


Fig. 2.

WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

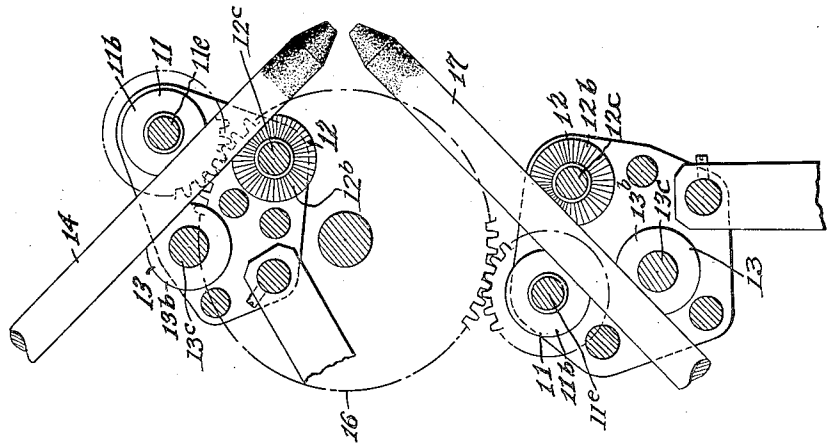
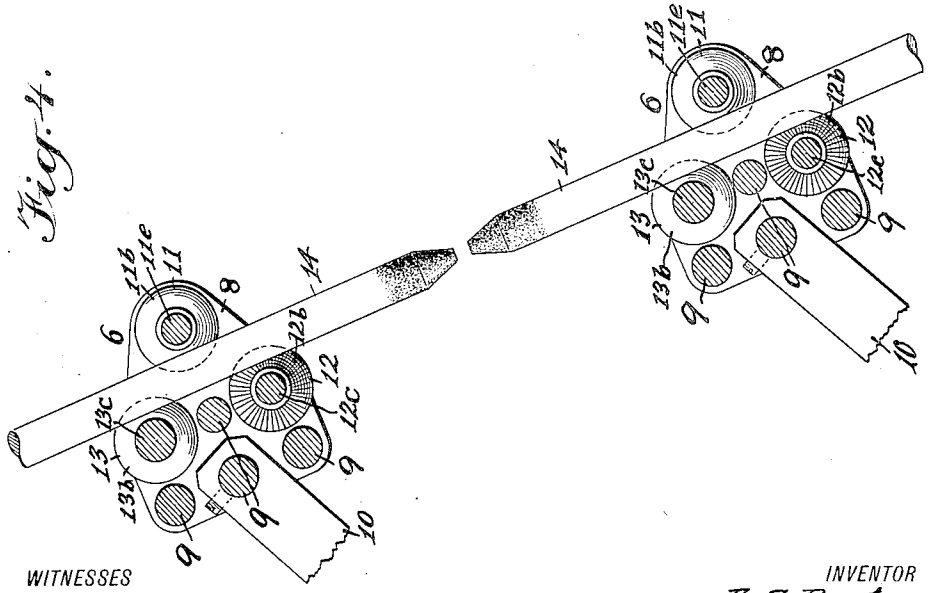


Fig. 4.



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EDWIN STANTON PORTER, OF NEW YORK, N. Y.

ARC-LAMP.

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Application filed February 3, 1917. Serial No. 146,355.

To all whom it may concern:

Be it known that I, EDWIN S. PORTER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

My invention relates to electric arc lamps used in conjunction with projectors for moving pictures and the like, and it has reference particularly to the carbon holding and feeding means, which present a plurality of rolling supports to a carbon.

Another object is to provide means for rapid manipulation of a carbon in the holder, said means automatically clamping the carbon in a yielding manner and automatically accommodating themselves to carbons of different diameters and to surface inequalities on the carbon, said means also automatically changing the speed of movement of carbons of different diameters.

Another object is to provide manually controlled means for changing the axial angularity of a carbon with respect to its support, and which means also automatically vary, when operated, the speed of movement of a carbon of a given diameter supplemental to the above mentioned speed varying means for carbons of different diameters.

Another object is to provide means for applying the feeding power at either of said supports and for permitting independent longitudinal movement or adjustment of carbon at another of said supports during the operation of said feeding support.

Another object is to operatively connect the carbon feeding rolling supports of two carbon holders whereby two carbons may be simultaneously fed toward each other, said connecting means also enabling an operator to change the relative angularity of the two carbons at will.

And further objects are to provide such devices in a simple and practical form, to construct the same of few parts not likely to get out of order and, in the hands of a careless or unskilled operator, will be maintained foolproof.

My invention is fully described in the following specification, of which the accompanying drawings form a part, in which like characters refer to like parts in each of the views, and in which:—

Figure 1 is a side view of one embodiment of the invention, partly in section to show details with the parts in normal positions;

Fig. 2 is a longitudinal section taken on the line 2—2 of Fig. 1;

Fig. 3 is a section taken on the line 3—3 of Fig. 1;

Fig. 4 is a section taken on the line 4—4 of Fig. 1, showing my device in duplicate for two carbons on a single axis; and

Fig. 5 is a substantially similar section, showing the carbons in angular relationship and showing the devices geared together for simultaneous operation and for changing the angularity of the carbons in an epicyclic manner.

Referring to the drawings, 6 shows a frame formed of side plates 7 and 8 joined by cross members 9 to constitute a unit, said frame being mounted in any desired manner as by a bar 10 adjustably locked thereto.

Rotatably mounted between the plates 7 and 8 are three peripherally grooved rollers 11, 12 and 13, the spindles of which are parallel and arranged in triangular relationship. The roller 13 consists of two truncated cones in fixed and opposed relationship with a cylindrical member joining the same to form the groove, designated 13^a, 13^b and 13^c, the spindle of said roller being extended and provided with a knob 13^d whereby said roller may be manually rotated. The spindle carries a spur gear 13^e keyed thereto. It will be noted that the roller is central with the plates 7 and 8 and is prevented from longitudinal displacement therebetween.

The rollers 12 and 13 constitute a pair supporting the same side of a carbon 14 with the roller 11 bearing against the opposite side of said carbon, the spindles of the rollers 12 and 13 being spaced from the spindle of the roller 11 to permit the introduction of carbons of different diameters within certain limits.

The roller 12 differs from the roller 13 in that the truncated cones 12^a and 12^b, hereinafter referred to as cheeks, are unconnected, the former being pinned to the spindle 12^c and the latter secured to a sleeve 12^d slid-

able on the spindle though prevented from independent rotary movement because of a pin 12^e and slot 12^f, Fig. 1.

The spindle 12^c is provided with a knob 12^h and is screw threaded for a distance adjacent to said knob, a nut 12^i being in threaded engagement with said spindle and provided with a recessed inner end inclosing a flange 12^k on the sleeve 12^d whereby, when the said nut is rotated to approach the knob 12^h, the sleeve 12^d and cheek 12^b will move away from the cheek 12^a and widen the gap therebetween and if the nut is rotated reversely the cheeks approach each other to narrow the groove therebetween.

A spur gear 12^m with a collar 12^n is coupled to revolve with the sleeve by a key 12^o, which allows the sleeve to slide in the gear, thus the spindle 12^c, sleeve 12^d and roller 12 can be moved longitudinally in either direction until the adjacent cheek and side plate of the frame contact, thus providing a floating roller 12 with respect to the fixed roller 13.

Enmeshed with the gear 13^e and with the gear 12^m is an idle gear 15 which insures simultaneous and similar rotation of the rollers 12 and 13 regardless of which knob is rotated, and it will be noted that, when the groove in the roller 12 is widened or narrowed the corresponding end of the carbon is moved toward or from the spindle 12^c and thus the axial angularity of the carbon is changed with respect to the frame 6.

The roller 11 is also provided with relatively movable cheeks 11^a and 11^b, the former being integral with or secured to a sleeve 11^c freely slidable in the frame plate 7 and the latter is similarly mounted on a sleeve 11^d slidable in the frame plate 8.

A spindle 11^e is slidably arranged within said sleeves and provided with pins 11^f arranged in suitable grooves in the said sleeves to compel rotary movement of said sleeves with said spindle when the knob 11^h of the said spindle is rotated, either manually or by any desired power driven means, not shown.

The spindle 11^e is provided with a nut 11^i on its end opposite the knob 11^h and with an adjustable locked collar 11^k and a finger plate 11^m between which a coil spring 11^n is arranged the tendency of which is to move the spindle and cheek 11^b to the left of Fig. 2 and the sleeve 11^c and cheek 11^a to the right to carry said cheeks into contact with each other to narrow the groove therebetween but, if the finger plate 11^m is manually drawn toward the knob 11^h, said cheeks are correspondingly moved apart to widen the groove therebetween and thus permit the introduction of the carbon 14 and, after the carbon is introduced, release of the said finger plate will again tend to force the cheeks toward each other to narrow the groove therebetween and thus cause the said cheeks to bear on the carbon and to force the same into the grooves of the rollers 12 and 13.

While the rollers 12 and 11 are capable of sliding movement in the frame when no carbon is in place, such movement is prevented by the fixed roller 13 when a carbon is introduced between the rollers. To attempt to slide either of the rollers 12 or 11 in the frame would cause the carbon to slide up on the respective conical surfaces of the cheeks resisted by the spring 11^n and, upon cessation of such attempt, said spring would immediately cause the rollers 12 and 11 to center themselves in the frame.

As shown in Fig. 2, I may provide insulation on the cheeks of said rollers and I prefer to serrate, score, knurl, or otherwise roughen the cheeks 12^a and 12^b to insure a positive grip on the carbon, although this could also be done on the cheeks of the rollers 11 and 13.

Power driven means may be operatively connected with any one of the rollers to feed the carbon forwardly or the respective knob could be manually rotated to accomplish said forward carbon feed, but I prefer to have the roller 11 the driving or forward carbon feeding roller, and the other rollers may then be used to adjust the carbon longitudinally.

In Fig. 5 I have shown the rollers 11 of two holders geared together by means of an idle gear 16 whereby two carbons 14 and 17 are simultaneously fed forwardly though individually adjustable longitudinally in the manner hereinbefore described and, in view of this sun and planet gear arrangement, either or both of the holder frames can be moved in an epicyclic manner about the axis of the gear 16 to correspondingly vary the relative angularity of the two carbons, by adjusting the holder by means of the arm 10, in other words, letting the pinion enmesh with the gear 16 of a holder to run on the gear, while the pinion of the other holder remains stationary.

It will thus be seen that a carbon can be installed or introduced into a holder, that the holding means will automatically accommodate themselves to carbons of different diameters within limits and to surface inequalities, that a carbon may be adjusted longitudinally without regard for the carbon feeding means, that a carbon may be deflected from its normal path through the frame by adjustment of the cheeks of the roller 12, that the speed of carbon feed is greater or less as its diameter is greater or less for the reason that the greater its diameter the farther up the cheeks of the rollers it will bear and thus be farther removed from the axes of the rollers, and that the roller 12, upon cheek adjustment, also controls the speed of carbon feed as said carbon

moves inwardly or outwardly of the axis of said roller and, thus, outwardly or inwardly of the axis of the roller 11.

My device is very simple though efficient and saves much time in removing old and in installing new carbons and, with all of the foregoing novel advantages, it possesses all the advantages of devices of this kind now known to me.

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

1. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a peripherally grooved roller on the opposite side of the carbon, means for varying the width of one of said rollers, and means for actuating one of said rollers to feed said carbon.

2. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a peripherally grooved roller on the opposite side of the carbon, yieldingly resisted means for widening the groove in one of said rollers to admit a carbon between said rollers, and means for actuating one of said rollers to feed said carbon.

3. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a peripherally grooved roller on the opposite side of said carbon, means for one of said rollers to feed said carbon and for automatically varying the speed of carbon feed in accordance with the diameter of said carbon.

4. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of a carbon, a peripherally grooved roller on the opposite side of the carbon and yieldingly resisted means for widening the groove in said last named roller to cause a carbon to approach the axis of said roller and thus decrease the speed of feed thereof when of relatively great diameter, and for narrowing said groove to cause a carbon to recede from the axis of said roller to increase the speed of feed thereof when of relatively small diameter.

5. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of a carbon, a peripherally grooved roller on the opposite side of said carbon, means for actuating one of said rollers to feed said carbon, and means for adjusting the width of one of said pair of rollers to swing one end of the carbon laterally.

6. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of a carbon, a peripherally grooved roller on the opposite side of the carbon, means for actuating one of said rollers to feed said carbon, means for adjusting the width of one of said pair of rollers to swing one end of the carbon laterally, and means on said roller disposed on the opposite side of the carbon for maintaining pressure on said carbon in the lateral movement thereof.

7. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of a carbon, a peripherally grooved roller on the opposite side of the carbon, means for actuating one of said rollers to feed said carbon, means for adjusting the width of one of said pair of rollers to vary the speed of carbon feed, and means on said roller disposed on the opposite side of the carbon for maintaining pressure on the carbon in any adjustment of said adjustable width groove.

8. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a train of gears connecting said rollers, a peripherally grooved roller on the opposite side of the carbon, and means for actuating one of said rollers to feed the carbon, the axes of all of said rollers being parallel and arranged in triangular relationship.

9. In an electric arc lamp, a carbon holder and feed, comprising a frame, a peripherally grooved roller on one side of the carbon, two sleeves movable in opposite sides of said frame, a beveled cheek on each sleeve jointly forming a peripherally grooved roller on the side of the carbon occupied by said first named roller, a spindle in said sleeves secured to one of said sleeves, means for preventing spindle rotation in the other of said sleeves, a nut in screw threaded engagement with said spindle and in rotary connection with the other of said sleeves for adjusting said spindle longitudinally of said last named sleeve, a peripherally grooved roller on the opposite side of said carbon, and means for actuating one of said rollers to feed the carbon.

10. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a peripherally grooved roller on the opposite side of the carbon, manual means for increasing the width of the groove in said last named roller, and a spring for narrowing said groove when said manual means are released, to grip the carbon, and means for actuating one of said rollers to feed the carbon.

11. In an electric arc lamp, a carbon holder and feed, comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a sleeve movably mounted in each side of said frame having beveled

cheeks jointly forming a peripherally grooved roller on the opposite side of the carbon, a spindle longitudinally movable in said sleeves, means for preventing rotation of said spindle in said sleeves, a spring bearing on one of said sleeves and on said spindle tending to hold said cheeks together yieldingly, and means for actuating one of said rollers to feed the carbon.

12. In an electric arc lamp, a carbon holder and feed, a supplemental carbon holder and feed, each of said holders comprising a frame, a pair of peripherally grooved rollers on one side of the carbon, a peripherally grooved roller on the opposite side of the carbon, a pinion carried by said last named roller, and means for manually increasing the width of the groove in said last named roller, and a gear enmeshed with the pinions of both carbon holders and feeds to actuate the same simultaneously and to permit adjustment of the two carbons relative to one another.

13. In an electric arc lamp, a pair of carbon holding and feeding means, each presenting a plurality of rolling supports for a carbon, an adjustable support for each holding and feeding means, a pinion associated with a rolling support of each of the carbon holding and feeding means, and a gear in mesh with said pinions whereby motion may be transmitted through said gear to said pinions simultaneously the adjustable supports permitting the movement of the pinion of each holding and feeding means on the gear without the other pinion being moved.

14. In an electric arc lamp, a carbon holder and feed, comprising a frame, a plurality of peripherally grooved rollers adapted to receive a carbon therebetween, means for varying the width of one of said rollers, and means for rotating one of said rollers to feed a carbon therebetween.

15. In a carbon holder and feeder for an electric arc lamp, a grooved roller having moving cheeks whereby the width of the groove may be varied, and means for moving said cheeks.

16. In a carbon holder and feeder for an electric arc lamp, a grooved roller having moving cheeks whereby the width of the groove may be varied, and yielding means normally tending to draw said cheeks together.

17. In a carbon holder and feeder for electric arc lamps, a grooved roller formed of two separate cheeks each having a sleeve, a spindle engaging said sleeves so that the cheeks are constrained to revolve on said spindle but are free to slide thereon, said spindle having a head against which one of the sleeves abuts, an adjustable collar on said spindle, a spring abutting with one end against said collar and with the other end against the other sleeve, and means for turning said spindle.

18. In a carbon holder and feeder for electric arc lamps, a grooved roller formed of two separate cheeks each having a sleeve, a spindle engaging said sleeves so that the same are free to slide on the spindle but are constrained to revolve therewith, a head at one end of said spindle against which one of the sleeves is adapted to abut, a collar adjustably mounted near the other end of the spindle, a spring on said spindle abutting with one end against the collar and with the other against the sleeve of the other cheek, said sleeve having means whereby the same can be manipulated to draw the two cheeks apart, and means for turning said spindle.

19. In a carbon holder and feeder for electric arc lamps, a grooved roller formed of two separate cheeks each having a sleeve, the two sleeves being directed in opposite directions, a spindle engaging said sleeves so that the same are free to slide on the spindle but are constrained to revolve with the spindle, a head on one end of the spindle against which one of the sleeves of one of the cheeks is adapted to abut, a finger plate in proximity of the end of the sleeve of the other cheek, a collar adjustably mounted on said spindle in proximity of said finger plate, a spring on said spindle between said collar and finger plate, and means for turning said spindle.

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