Dec. 29, 1931. G. ARANO 1,838,170

PROJECTION LAMP

Filed May 28, 1928 2 Sheets-Sheet 1

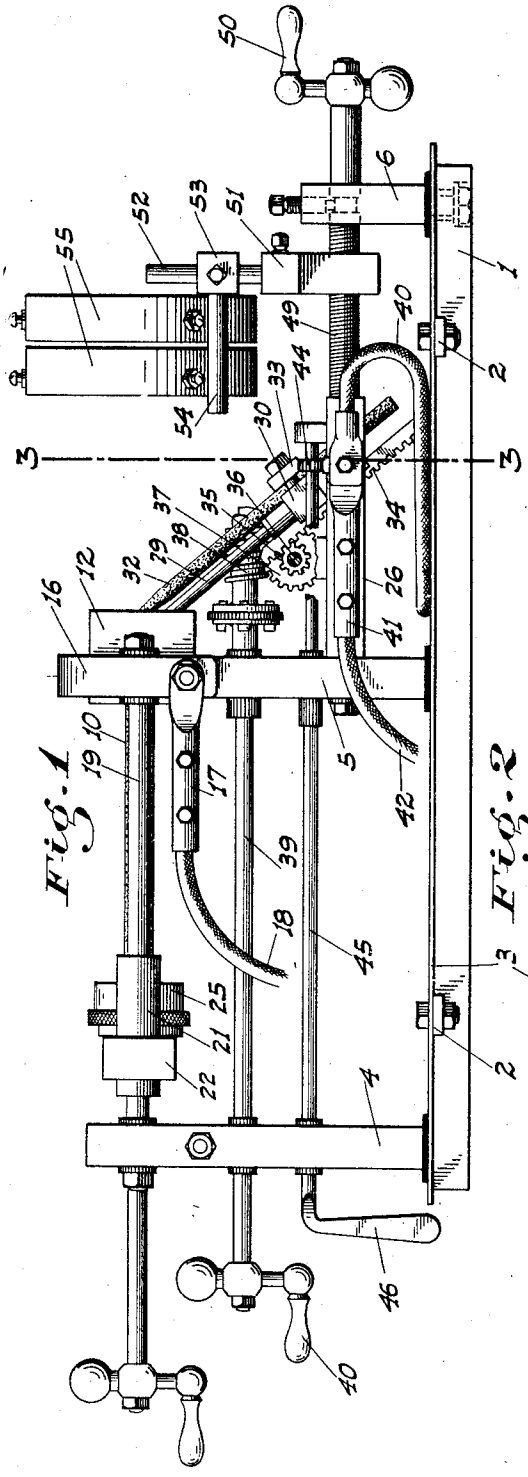

Fig. 1

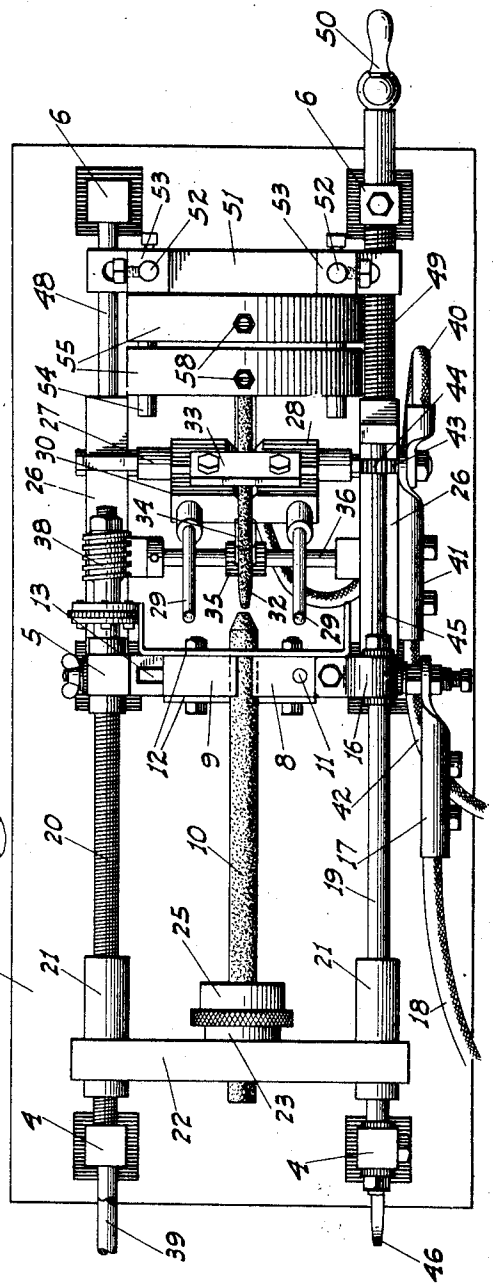

Fig. 2

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Fig. 3

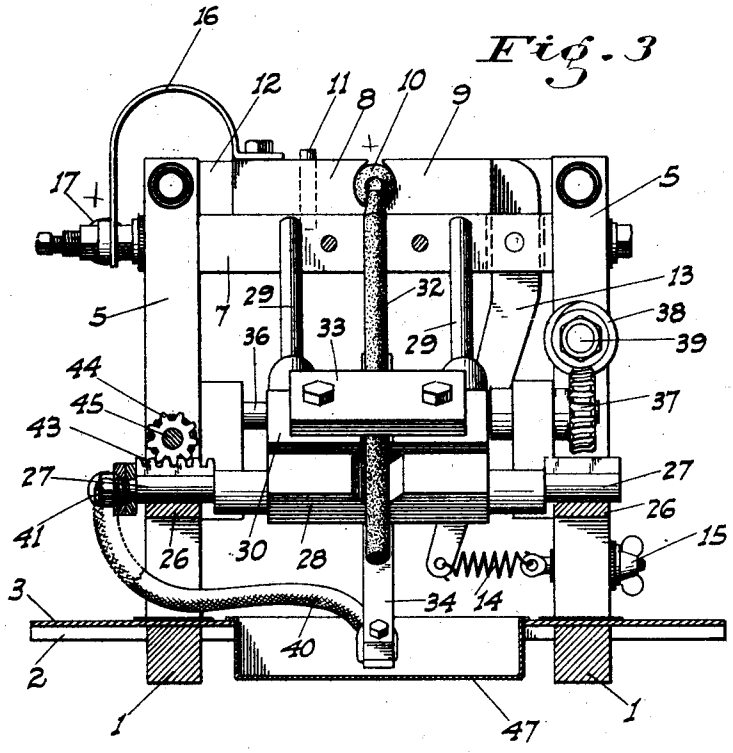


Fig. 4

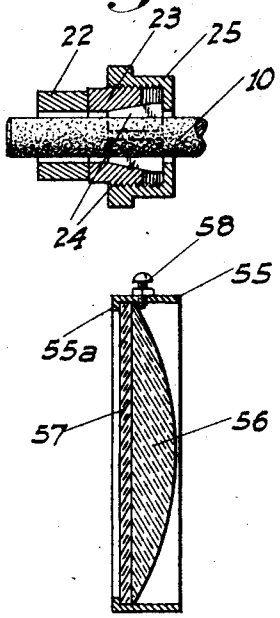


Fig. 5

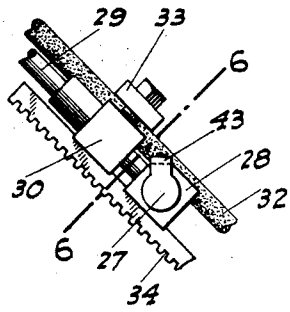


Fig. 6

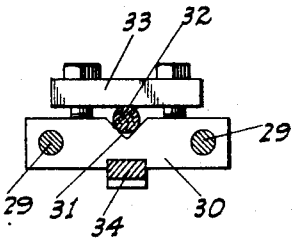


Fig. 7

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Patented Dec. 29, 1931 1,838,170

# UNITED STATES PATENT OFFICE

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## PROJECTION LAMP

Application filed May 28, 1928. Serial No. 280,977.

This invention relates to projection lamps such as are used in connection with motion picture projecting. My principal objects are to provide a lamp of this character especially arranged to burn low intensity carbons which are set at such an angle to each other that they burn away very slowly and which provide a very even and large sized field of light; one in which the carbons can be burnt away until they are very short without any possibility of damage to the lamp, so that the lamp is very economical to operate; one in which the necessary adjusting and feeding mechanism is very simple and easy of operation; one in which the condensing lenses are mounted as a unit with the lamp and which when once set are always axially alined with the positive carbon and readily adjustable to and from the same; one so constructed that larger lenses may be used than is possible with present machines and enabling lenses of different sizes to be easily mounted in the proper relationship to the positive carbon; and one so constructed that the lamp may be assembled for either right or left hand operation.

As a result of the use of the above improved features, the lamp provides a more brilliant and constantly centered light than is had with present structures, while the cost of operation is lessened.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

The objects I accomplish by means of such structure and relative arrangement of parts will fully appear by a perusal of the following specifications and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side elevation of my improved lamp.

Fig. 2 is a top plan view of the same.

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

Fig. 4 is a section of the positive carbon clamp.

Fig. 5 is a fragmentary side elevation of the negative carbon support and adjusting means.

Fig. 6 is a cross section on the line 6—6 of Fig. 5.

Fig. 7 is a sectional elevation of one of the lens units.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 denotes a pair of longitudinal transversely spaced bars which support cross bars 2 on which a base plate 3 is mounted. Projecting upwardly and secured to the bars 1 in insulated relation thereto and to the plate are three pairs of longitudinally spaced posts 4, 5, and 6, these being the members on which the lamp structure is mounted. Extending between and connected to the central pair of posts 5 toward the top thereof is a cross bar 7, on which opposed jaw blocks 8 and 9 are mounted for frictional engagement with the horizontally disposed positive carbon 10, which passes through cooperating rounded recesses formed in the adjacent faces of these blocks as plainly shown in Fig. 3. The block 8 is removably secured in a fixed position on the bar 7 by a dowel pin 11 projecting upwardly from said bar. The block 9 merely rests on the bar and is slidable along the same, being guided by plates 12 upstanding from both sides of the bar; the foremost plate also being formed as a hood. This enables the blocks to be easily removed and replaced by others having different sized carbon engaging recesses, so as to allow carbons of different sizes to be used when desired. The upper end of a lever 13 which is pivoted on the bar 7 bears against the outer end of the block 9, the lower end of the lever being connected to a tension spring 14 whose effectiveness is adjusted by means of a hand screw 15 mounted in the corresponding side post 5. By this means an adjustably yielding pressure will be exerted against the carbon to maintain the same rigid without interfering with the longitudinal feeding thereof.

A current conducting strip 16 is secured to the block 8 and also to a socket 17 from which the positive feed cable 18 leads. These clamping blocks are adjacent the tip of the carbon, which cooperates with the negative carbon

hereinafter described, and said positive carbon extends rearwardly from said blocks toward the posts 4.

Extending between the corresponding posts 4 and 5 and disposed parallel to the carbon are a rod 19 and a screw 20, arranged in horizontally alined but transversely spaced relation to each other. Slidable on the rod and threaded onto the screw are sleeves 21, which support a transverse bar 22 extending therebetween. Secured to the bar is the upper end of a cylinder 23 through which the rear end of the carbon 10 projects. Segmental cone elements 24 project into this cylinder from one end and surround the carbon, being advanced into clamping engagement with the same by a cap 25 threaded onto the cylinder. This arrangement insures the carbon being positively held against movement relative to the cylinder and bar, while enabling different sized carbons to be used. The screw 20 projects to the front end of the machine and is rotated to advance the bar and carbon either by hand or automatically as is usually done.

Projecting forwardly from the bars 5 are horizontally rigid bars 26 which support transverse shaft elements 27 having a rigid block 28 interposed therebetween and connected thereto. The shafts 27 are arranged for limited axial but non-turning movement relative to the bars 26. A pair of transversely spaced rods 29 projects upwardly and rearwardly at a certain angle from the block 28 and slidably support another block 30.

The upper face of the block 30 is notched centrally of its length as at 31 to form a seat for the negative carbon 32 which extends parallel to the rods 29 to adjacent the tip of the carbon 10, and is disposed so that the axes of the carbons intersect between their tips at an angle of about fifty-five degrees. The carbon 32 is removably clamped against the block 30 by a cross bar 33 extending over said carbon and bolted to the block. Secured to the under face of the block 30 and depending downwardly and parallel to the carbon and rods is a rack 34. This rack is engaged by a relatively wide pinion 35 mounted on a shaft 36 supported from the bars 26. At one end the shaft carries a gear 37 engaged by worm 38 mounted on a shaft 39 journalled in the adjacent posts 4 and 5, said shaft extending to the rear end of the machine. Like the screw 20 the shaft 39 may be arranged to be operated automatically or by hand. By means of the above construction and arrangement of parts it will be seen that the negative carbon may be advanced as burnt, while being maintained always in the same axial position relative to the positive carbon. A flexible length of cable 40 is connected to the lower end of the rack and to a socket 41 secured on the outside of one bar 26 and to which the main negative cable 42 is connected.

To adjust the negative carbon laterally as may be necessary to positively line the same up transversely with the positive carbon, a short rack 43 is provided on one of the shaft elements 27 which is engaged by a pinion 44. This pinion is fixed on shaft 45 journaled in the corresponding side posts 4 and 5 and has an operating handle 46 on its rear end. By turning the handle one way or the other it will be seen that the shaft 27 and all parts connected thereto will be shifted transversely as a unit, the width of the relatively fixed pinion 35 being sufficient to permit such adjustment without disengagement from the rack 34.

It will be noted that all the feed and adjustment members are operated from the one end of the machine, which of course makes them very convenient to manipulate. It is to be understood that all parts are suitably insulated from each other where necessary to avoid the possibility of the operator getting a shock and also causing a short circuit around the carbons. An ash pan 47 is mounted in an opening provided in the base plate 3 so as to catch all carbon residue as burnt. One of the bars 26 is formed with a rod portion 48 which extends to the adjacent post 6. The other bar has a rotatable screw 49 projecting therefrom to the corresponding post 6 and journaled against longitudinal movement therein, with an operating handle 50 on said screw ahead of the post. This rod and screw support a transverse block 51 which is slidable on the rod and is tapped to receive the screw. Vertical transversely spaced posts 52 project upwardly from the block and are adjustably mounted therein so that the space therebetween may be altered; said block having different transversely spaced holes toward each end to receive said stems. Vertically adjustable sleeves 53 are slidable on these posts, the sleeves having rods 54 projecting rearwardly or toward the carbons. These rods support a pair of cylinder lens casings 55 in which the condensing lenses 56 are mounted. The casings have an inwardly projecting flange or shoulder 55a around the rear edge, and in the casing nearest the carbons a disk 57 of plain glass is disposed in front of the lens or between said lens and the carbons and is held between the shoulder and lens, the latter being clamped in position by radial set screws 58 in the lens casing as shown in Fig. 7. This disk of glass, which is cheap compared to the lens and which is easily replaced at a slight cost, protects the lens from being pitted by the material thrown off from the burning carbons.

The rods 54 are adjustable relative to the stems 53 so that the axial line of the lenses will positively aline with the axis of the positive carbon, and being mounted as a unitary

part of the carbon supporting structure never get out of alinement.

Also on account of this mounting of the lens relative to the carbon, I am enabled to use much larger lenses than is at present the case, with corresponding improvements in the results obtained on the screen. The posts 52 and the rods 54 being independently adjustable, lens casings of different sizes may be supported by the rods while still maintaining the lenses axially alined with the positive carbon as is necessary. The lens being directly ahead of the positive carbon (which is the source of light), there is no obstruction to the free passage of light to the lens.

It will be noted that all parts of the supporting structure are built up of separately machined pieces rather than being formed as unitary castings. This arrangement not only enables such parts to be easily insulated from each other wherever necessary but also enables the parts to be interchanged from right to left hand or reversed in position when being assembled, so as to provide a lamp which may be operated from either the right or left hand as conditions may require, and without the necessity of making different dies or patterns for the right and left hand machines.

Though the lamp is particularly constructed and intended to burn low intensity carbons, it may also be adapted for use with high intensity carbons, white flame and other special carbons and in fact all carbons such as are ordinarily used in motion picture projection.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

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

1. In a projection lamp, a positive carbon, a lens axially alined with and ahead of the carbon, a cylindrical casing in which said lens is mounted, transversely spaced supporting means for the casing, members on which said supporting means are vertically adjustable, and means supporting said members for transverse adjustment to enable the spacing between said supporting means to be altered.

2. In a projection lamp, a horizontal positive carbon, a negative carbon facing and disposed at an angle to the positive carbon, a rigid block extending transversely of the negative carbon, transversely spaced guide members secured to and projecting from the block toward the positive carbon in parallel relation to the negative carbon, a block slidably supported by said members and on which the negative carbon is clamped, means applied to said last named block for advancing the same along the guides and means for shifting the first named block transversely.

3. In a projection lamp, a horizontal positive carbon, a negative carbon facing and disposed at an angle to the positive carbon, a rigid block extending transversely of the negative carbon, transversely spaced guide members secured to and projecting from the block toward the positive carbon in parallel relation to the negative carbon, a block slidably supported by said members and on which the negative carbon is clamped, a rack secured to said last named block and extending thence downwardly and parallel to the guide members, a fixed pinion engaging the rack and means for rotating the pinion.

4. In a projection lamp, a horizontal positive carbon, a negative carbon facing and disposed at an angle to the positive carbon, a rigid block extending transversely of the negative carbon, transversely spaced guide members secured to and projecting from the block toward the positive carbon in parallel relation to the negative carbon, a block slidably supported by said members and on which the negative carbon is clamped, means for advancing said last named block along the guides, a rack mounted in connection with the first named block and extending in a plane transversely of the guide members, a pinion engaging said rack and means for rotating said pinion.

5. A structure as in claim 3, with separate means applied to said first named block for adjusting the same laterally whereby to also adjust the last named block and carbon laterally; the width of the pinion relative to the rack enabling them to remain enmeshed regardless of the extent of lateral adjustment of the block.

In testimony whereof I affix my signature.

GEORGE ARANO.