

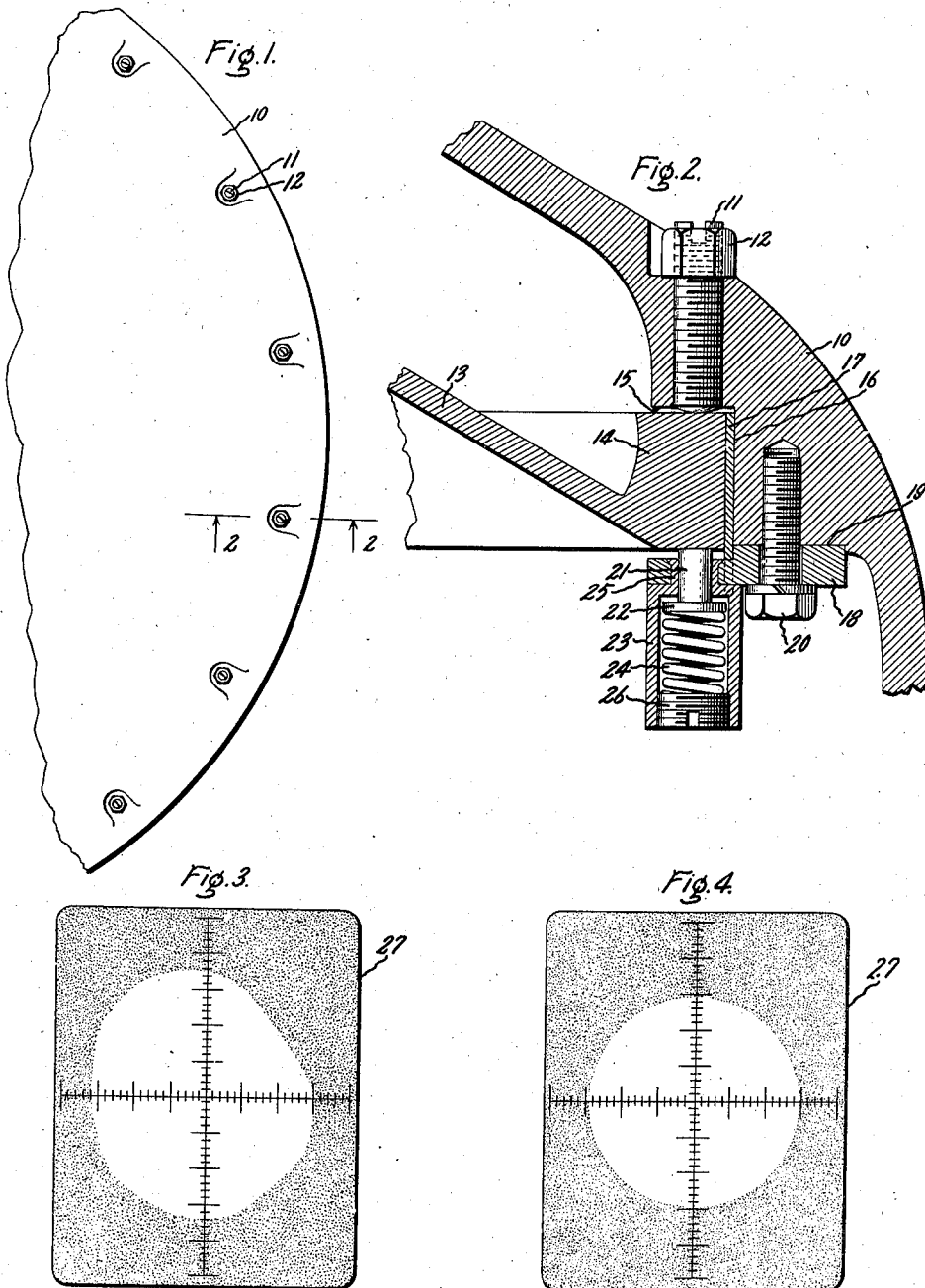
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MEANS FOR ADJUSTING REFLECTORS

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MEANS FOR ADJUSTING REFLECTORS

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1 Claim. (Cl. 88—73)

My invention relates to an adjusting and truing means for reflectors, more particularly for mirrors, used in light projectors.

One object of my invention is to provide an improved and simplified means whereby the mirror used in light projectors, such as searchlights, for example, may be readily adjusted to project a true and symmetrically shaped beam.

For a better understanding of my invention, together with other and further objects thereof, reference is had to the following description, taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claim.

In the accompanying drawing Fig. 1 illustrates a fragmentary view of the back of a searchlight drum provided with adjusting means built in accordance with my invention; Fig. 2 is a cross-sectional view illustrating the details of my improved adjusting means; Fig. 3 illustrates a target showing the shape of a beam projected by a poorly adjusted and warped reflector, and Fig. 4 illustrates the same beam projected subsequent to a truing of the reflector with the aid of my improved adjusting and truing means.

Referring to the drawing in detail, Fig. 1 illustrates the fragmentary back view of a searchlight drum 10 in which a series of set screws 11 are equally spaced near the edge of the drum, project through the wall of the drum and are parallel to the axis of the drum. They are provided with lock nuts 12. The set screws and lock nuts are both operable from outside of the drum so that adjustments may be made when both the drum and mirror have reached normal operating temperatures. In the example illustrated 18 screws are equally spaced about the edge of the drum. Any other suitable number may, of course, be used.

In Fig. 2 a section of this drum 10, taken through line 2—2 of Fig. 1 looking in the direction of the arrows, is illustrated. In this figure a fragment of the mirror 13 provided with a reinforcing rim 14 is illustrated. This reflector is preferably made of metal, the surface of which is suitably treated and polished to produce a specular surface for reflecting the light from any suitable source. The curvature of this mirror is immaterial although in the present case a paraboloidal surface is used for the purpose of reflecting a narrow round beam. The drum 10 is machined in order to provide an annular surface, or a seat, 15 for the back surface of the mirror rim 14. The drum is further machined to provide a surface 16 for supporting the out-

side surface, or perimeter, of the rim 14. A gasket 17 is provided between the perimeter of rim 14 and the surface 16 to establish a snug fit between the drum and the rim. The mirror and drum herein illustrated are for a 60-inch diameter searchlight wherein a slight distortion of the reflected beam results in a substantial loss of the revealing power of this beam. A simple means for truing the reflector at any time during operation is, therefore, of considerable importance.

In order to properly adjust and clamp the mirror within the drum a ring 18 is provided which is clamped against a machined surface 19, which is parallel to surface 15, by means of a suitable number of bolts 20. The parallel surfaces are preferably at right angles to the axis of the drum and are spaced from each other by a distance which is slightly greater than the thickness of the rim 14. In the ring 18, directly opposite to and axially aligned with each of the set screws 11, a plunger 21 is provided. This plunger is provided with a head 22 mounted in a cup 23 and is urged forward by a spring 24. The plunger moves in and out of the cup 23 through a bearing, or neck portion 25, and the pressure with which it is urged outwardly may be regulated by a cap 26 screwed into the end of the cup 23. In the illustrated example the cup 23 is attached to the ring by means of its neck portion 25 which is peened over, welded or attached in any other suitable manner. It is, of course, not necessary for ring 18 to be a solid ring. The same clamping action may be obtained by mounting the cups 23 into individual lugs which can be bolted to the surface 19 by bolts 20 and which can be aligned with the screws 11 so that each plunger 21 and screw 11 will move on a common axis. The cross-section of ring 18 indicates a greater thickness under the bolt head 20 than at the part which overlaps the rim 14. This arrangement provides a greater rigidity and more room for adjustment of the rim 14 between the surface 15 and the ring 18.

When mirrors of the above-described type are mounted within their respective drums, it often happens that the beam projected thereby is distorted. This may be due to improper machining operations of the drum, unequal temperatures in the several parts of the projector, or other causes occurring during the manufacture of either the drum and the reflector or during operation of the light. It becomes important, therefore, to provide means for adjusting the rim of the reflector and thereby the mirror it-

self so as to counteract and eliminate the distortions and cause it to project a true and symmetrical beam which in the present instance is a round beam. This may be readily accomplished with my improved adjusting means by first clamping the reflector in the drum, then mounting the ring 18 and bolting it up against its seat 19 by means of the bolts 20. The plungers 21 then engage the rim 14 and force it towards the surface 15 and against the ends of the set screws 11. Then, if the beam proves to be distorted, it becomes merely necessary to turn the set screws 11 and thereby move the rim toward or away from its seat 15 at the various points at which the set screws and the opposing plunger hold the rim, until the true symmetrical beam is obtained. After this adjustment each set screw may be locked into position by the lock-nut 12.

As stated above, the plungers 21 and set screws 11 are axially aligned so that their respective pressures on the two surfaces of the mirror rim at any two corresponding points which are opposite to each other are equal and opposite. Since the set screws and plungers are axially aligned, in that they are arranged on a common axis, and since the set screws 11 are parallel to the axis of the drum, the corresponding opposite points on the two surfaces of the rim are the points through which this common axis is drawn. This is of considerable advantage because no local distortion is set up due to these two opposing forces. The correcting distortion is only between the points of contact between the adjacent set screws and plungers.

A ready means for determining the shape of a projected beam is illustrated in Figs. 3 and 4. Fig. 3 illustrates a chart 27 having horizontal and vertical scale markings which intersect at the center of the chart. A chart of this type and of any suitable size may be set up at about 150 feet from a projector of this size and the beam

projected thereon. In Fig. 3 the cross-section of the beam is oval-shaped indicating a distorted mirror. The most convenient method of using my improved adjusting means is to advance the set screws 11 beyond the surface 15 so that the rim of the reflector will be spaced centrally between surface 15 and the inner surface of the ring 18. Adjustments may then be made in either a forward or reverse direction. In the case of the beam illustrated in Fig. 3, the rim section in the upper right-hand quadrant of the target is too far forward of the remaining portion of the rim. Therefore, by backing out the screws 11 this portion of the rim and the reflector section attached thereto may be moved by the plungers until the cross-section becomes a true circle. The advantage of this adjusting means being that the plungers hold the reflector rim against the end of each set-screw. It is, therefore, only necessary to adjust each set-screw separately with a simple screw-driver until the proper beam cross-section is obtained and then lock the screws into their respective positions.

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

In a light projector the combination of a drum closed at one end, a reflector, and means for supporting and adjusting the rim of said reflector comprising a pair of spaced parallel annular surfaces at the closed end in said drum, adjusting screws projecting through the end wall of said drum and through one of said parallel surfaces against one side of the rim of said mirror, and a ring attached to the other of said parallel surfaces and provided with spring operated plungers axially aligned with said screws and projecting against the other side of said rim to respectively urge said rim against said adjusting screws whereby said mirror rim may be adjusted solely by said adjusting screws.

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