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A. D. DAVIES ET AL

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HOLDER FOR A PHOTSENSITIVE ELEMENT

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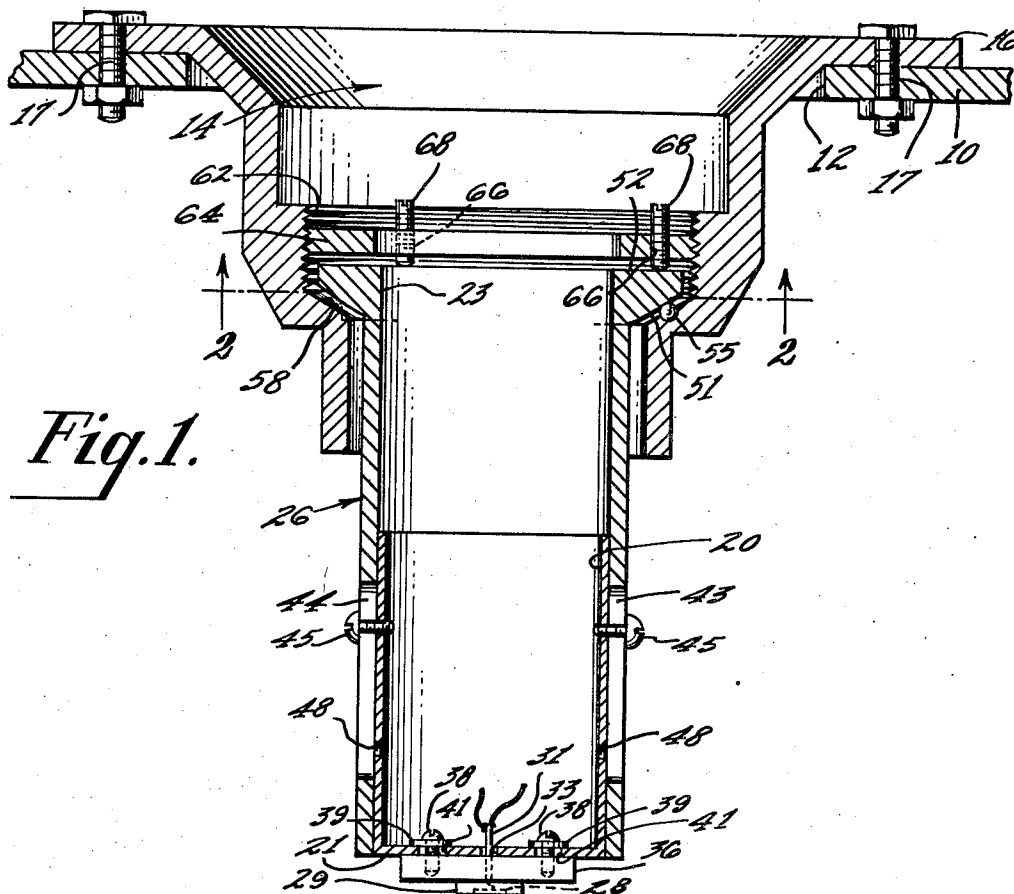


Fig. 1.

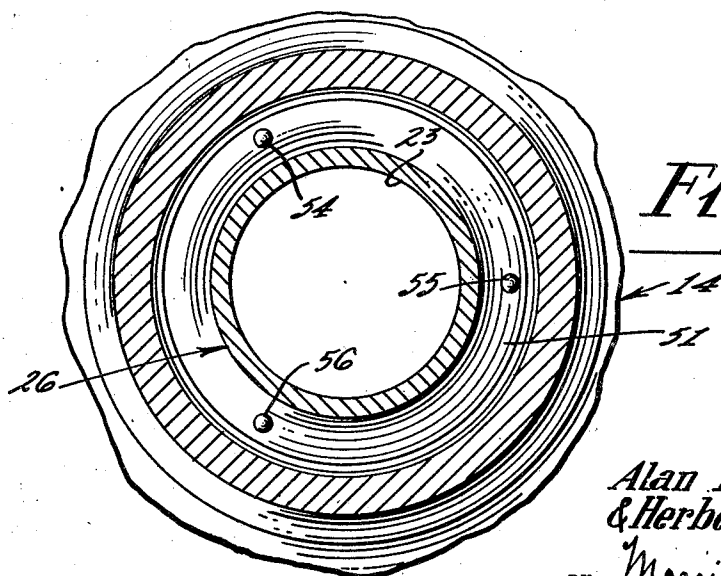


Fig. 2.

INVENTORS
Alan D. Davies
& Herbert Singer
 BY *Morris Rabin*
 ATTORNEY

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HOLDER FOR A PHOTSENSITIVE ELEMENT

Alan D. Davies, Pennsauken, and Herbert Singer, West Collingswood, N. J., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

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6 Claims. (Cl. 248—27)

The present invention relates to holders for a photosensitive element, and, more particularly, although not necessarily exclusively, to a holder arrangement for a photosensitive element of a character such that it may be used to align the photosensitive surface of the photosensitive element accurately upon an axis or point in space, such, for example, as the optical axis or focal point of an intricate mirror system.

In accordance with the present invention cylindrical means are provided for adjustably retaining a photosensitive member so that it may be accurately positioned with respect to the axis of the cylindrical means. A second cylindrical means is provided for telescopically receiving the first-named cylindrical means so that a coaxial relationship will exist between the two cylindrical means. An adjustment is provided for the last-named cylindrical means so that its axis may be inclined with respect to an axis of a holder or the like. The holder may be a part of a scanning mechanism which imparts a scanning movement to the photosensitive element and the photosensitive element is or may be maintained at the focus of a complicated optical system such as a Cassegrainian system of mirrors. The latter is not a part of the present invention and will not be described hereinafter.

An object of the present invention is to provide a novel adjustable holder for a photosensitive element.

Another object of the present invention is to provide for accurately positioning a photosensitive element on a movable holder capable of executing a scanning motion.

A further object of the present invention is to provide novel means for positioning the axis of a cylindrical element.

Still another object of the present invention is to provide novel means for supporting a photosensitive element which is axially and angularly adjustable.

Other objects and advantages of the present invention will, of course, become apparent and immediately suggest themselves to those skilled in the art to which the invention is directed from a reading of the following specification in connection with the accompanying drawing in which:

Fig. 1 is a cross-sectional view of apparatus embodying the invention, the section being taken substantially on the axis of the disclosed apparatus; and

Fig. 2 is a plan view in section, the section being taken on the broken section line 2—2 of Fig. 1 as viewed in the direction of the arrows.

Referring to the drawing, reference character 10 designates any movable portion or member of a desired scanning apparatus which has a movement of oscillation imparted to it by means not shown. As indicated on the drawing, the member 10 is shown as being plate-like in form and is provided with an aperture 12 to receive a substantially cup-shaped member designated in its entirety by reference character 14. The cup-shaped member 14 is provided with a flange 16 which is secured to the member 10 by suitable means such as bolts and

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nuts 17. The upper part of the cup-shaped member 14 is hollow as shown on Fig. 1 of the drawing to provide access to the adjusting mechanism later to be described. Reference character 20 designates a tubular member having an end wall 21. The outer periphery of the tubular member 20 is slidably received within a bore 23 in a holder designated in its entirety by reference character 26.

The end wall 21 of the tubular member 20 is provided to support a photosensitive element 28 which is adhesively or otherwise secured on a flat holder 29. The holder 29 is provided with a pair of conducting pins 31, one of which appears in Fig. 1 of the drawing. The other pin 31 is assumed to be located immediately behind the exposed pin 31. These pins extend through apertures 33 in the end wall 21. The holder 29 is adhesively or otherwise fastened to a plate member 36 which rests on the surface of the end wall 21. The holder 29 and the plate member 36 appear in side elevation in Fig. 1 of the drawing. The plate member 36 is secured against the wall member 21 by suitable means such as screws 38 and washers 39. The screws 38 extend through enlarged apertures 41 in the end wall 21 to provide for positional adjustment of the plate member 36 prior to tightening of the screws. By the means just described the sensitive element 28 may be located so that its photosensitive surface lies on the axis of the tubular member 20.

Axial adjustment of the sensitive surface of the photosensitive element 28 is provided by the telescopic fit of the tubular member 20 in the bore 23 of the holder 26 as pointed out above. The holder 26 is slotted as indicated at 43 and 44 to receive the shank of clamping screws 45. The range of adjustment is increased by providing a plurality of tapped holes 48 for receiving the screws 45.

Adjustment of the inclination of the axis of the member 26 is obtained by providing a spherical surface 51 on a radially projecting flange or shoulder 52. The center of the spherical surface 51 lies on the axis of the holder 26 and this spherical surface rests on three balls 54, 55 and 56 which are seated in circumferentially spaced recesses formed in the sloping wall 58 in the interior of the cup-shaped member 14. The cup-shaped recesses and hence the balls are spaced 120° apart circumferentially. The upper part of the cup-shaped member 14 is provided with an internally threaded bore 62 which receives an externally threaded ring member 64. The latter is provided with three circumferentially spaced internally threaded apertures 66 each of which receives a set screw 68. The set screws 68 are circumferentially spaced 120° apart.

It will be seen from the foregoing that the photosensitive surface of the photosensitive element 28, or a definite point thereon, may be accurately located in space by a combination of wall adjustment of the tubular member 20 and rocking movement of the spherical surface 51 on the balls 54 to 56. The latter adjustment is made by turning the set screws 68 so that the axis of the tubular member 20 may be made to coincide with the axis of the member 14. It will be understood that, if desired, adjustments may be obtained with the axis of the member 26 inclined with respect to the axis of the member 14.

What is claimed is:

1. A locating holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced

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ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

2. A holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, a tubular member having an end wall, said cylindrical member having a bore slidably receiving said tubular member, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

3. A holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, a tubular member having an end wall, said cylindrical member having a bore slidably receiving said tubular member, a plate member engaging said end wall of said tubular member, adjustable means for securing said plate member against said end wall, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

4. A holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, a tubular member having an end wall, said cylindrical member having a bore slidably receiving said tubular member, slots in said peripheral wall of said cylindrical member, screw means engaged in said tubular member and projecting through said slots whereby to provide adjustment of said tubular member with respect to said cylindrical member, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

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5. A holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, a tubular member having an end wall, said cylindrical member having a bore slidably receiving said tubular member, slots in said peripheral wall of said cylindrical member, screw means engaged in said tubular member and projecting through said slots whereby to provide adjustment of said tubular member with respect to said cylindrical member, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

6. A holder comprising a cup-shaped member, said member having means whereby it may be secured to a support, a cylindrical member having a peripheral wall, said cylindrical member having a flange at one end provided with a spherical surface, a tubular member having an end wall, said cylindrical member having a bore slidably receiving said tubular member, slots in said peripheral wall of said cylindrical member, screw means engaged in said tubular member and projecting through said slots whereby to provide adjustment of said tubular member with respect to said cylindrical member, a plate member engaging said end wall of said tubular member, adjustable means for securing said plate member against said end wall, said cup-shaped member having an internally threaded bore, a sloping wall adjacent said bore, circumferentially spaced ball support means positioned on said sloping wall whereby to support said spherical surface on said flange, an externally threaded ring threadedly engaged in said threaded bore, and circumferentially spaced screw means received in said ring for adjustable engagement with said cylindrical member.

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