April 12, 1949. C. H. MEYER 2,466,724

RETICULE CELL

Filed July 8, 1944

Fig. 1.

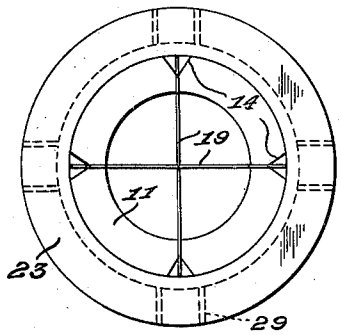


Fig. 2.

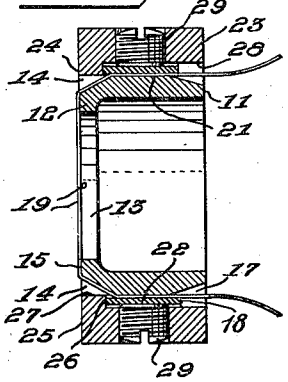
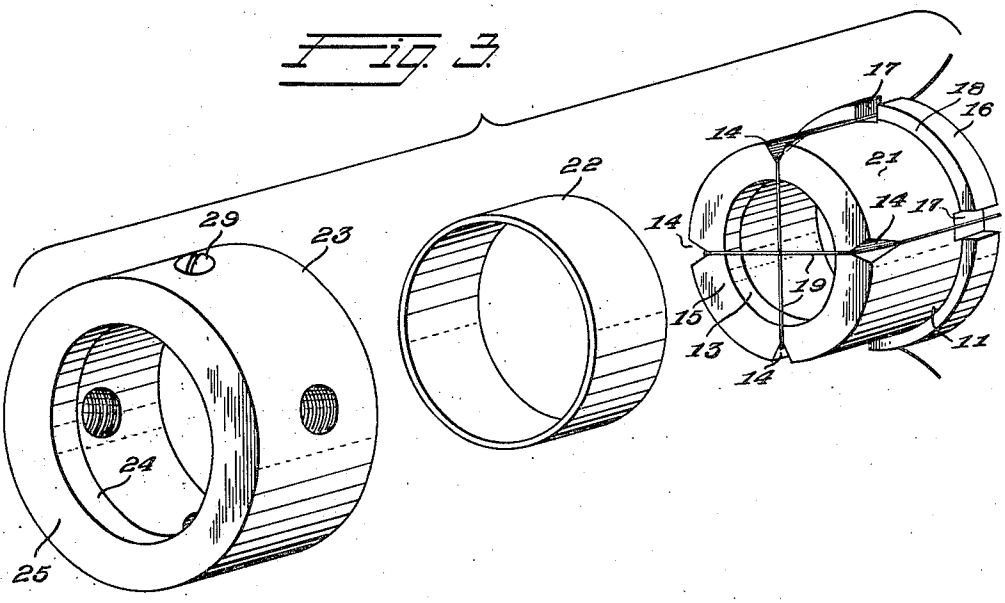


Fig. 3.



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RETICULE CELL

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15 Claims. (Cl. 33—50)

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This invention relates to sighting and like devices and is more particularly concerned with improved reticule cells wherein fiducial filaments are fixedly mounted and precisely located in the sight path.

In the mounting of fiducial filament wires, cross hairs and the like in gun sight telescopes and other optical instruments, it has been a major problem to locate the filaments accurately in the sight path and to clamp them so tightly that they will not break or work loose, accidentally or from vibration as when the reticule is employed in a gun sight telescope. An attendant problem which has arisen in mounting reticules in sighting devices is that of avoiding distortion or displacement of the filaments due to deformation of the holder therefor when mounted in the telescope or other sighting devices. For example, in some prior telescopes, reticule cells containing cross hairs are mounted within the telescope tube on adjustment screws which are threaded directly into the element on which the cross hairs are mounted. In such constructions, undue tightening of the adjustment screws results in uncontrolled deformation of the cell and resultant deformation or displacement of the cross hairs which destroys the accuracy of the entire device. The present invention is directed to a novel reticule assembly wherein filament wires, cross hairs, and the like are accurately positioned on a cell member in desired location across the sight path and are effectively clamped taut across the sight path without deforming that member. The invention further contemplates mounting the filaments in a ring assembly unit adapted to be mounted in a rifle telescope or the like without appreciable deformation due to such mounting.

With the above in mind, the major object of the invention is to provide a novel reticule cell assembly embodying special constructional and assembly details for securing and locking filament wires, cross hairs and the like accurately in position.

It is a further object of the invention to provide a novel reticule assembly wherein filament wires, cross hairs or the like extending across the sight path are frictionally clamped to an inner cell member which in turn is interfitted with and secured to an outer cell member by a fastening arrangement which insures against displacement or release of the clamped filaments.

It is a further object of the invention to provide a novel constructional arrangement for mounting filament wires, cross hairs or the like under tension in a reticle assembly.

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Further objects of the invention will presently appear as the description of the invention proceeds in connection with the appended claims and the annexed drawings, wherein

Figure 1 is an end elevation of an improved reticule cell assembly according to a preferred embodiment of the invention,

Figure 2 is a section through a diameter of the assembly of Figure 1, illustrating details of the cross hair clamp and other reticule cell construction, and

Figure 3 is an exploded view in perspective illustrating the nature and interfitting relation of the elements comprising the assembly of Figure 1.

In its preferred embodiment, the reticule assembly of the invention comprises an inner cell member consisting of a short rigid cylindrical metal sleeve 11 having at its front end an inwardly directed radial flange 12 formed with a coaxial cylindrical aperture 13 which will hereinafter be known as the sighting aperture through the assembly.

The external periphery of the front end of sleeve 11 is formed with a plurality of spaced substantially V-shaped notches 14 which, in the illustrated embodiment, are diametrically disposed pairs arranged at right angles to each other. The front end of sleeve 11 is machined to provide a perfectly flat end face 15 extending at right angles to the axis of sighting aperture 13.

At its rear edge, sleeve 11 is formed with an externally extending flange 16 having a plurality of spaced notches 17 each located in longitudinal alignment with one of the V-shaped notches 14 on the front edge of sleeve 11. The front surface of flange 16 is machined to provide a perfectly smooth flat face 18 which is exactly parallel to face 15 and perpendicular to the line of sight through the assembly. The peripheral surface of flange 16 is preferably cylindrical to fit snugly with recess 28.

As shown at the right side of Figure 3 and also in Figures 1 and 2, sleeve 11 has mounted thereon two fine filament wires 19 which provide the fiducial lines of the sighting assembly. In the illustrated embodiment, each filament is positioned diametrically across the sight path so that the two filaments intersect at right angles on the axis of aperture 13.

Each filament 19 is drawn taut across the front end of sleeve 11 in a plane defined by face 15 upon which it rests and therefore lies substantially in the plane of face 15. The opposite ends of each filament extend rearwardly through positioning

and guiding notches 14 along the external cylindrical peripheral surface 21 of sleeve 11 and through notches 17 in rear flange 16. Both filaments 19 are frictionally clamped upon sleeve 11 by means of a deformable thin spring metal normally cylindrical band 22 which fits loosely over cylindrical surface 21 of sleeve 11 and abuts against face 18 of rear flange 16. The purpose of this loose mounting for band 22 is to enable it to be introduced into the assembly without shearing filaments 19.

Sleeve 11 comprises the inner cell member of the assembly, and fits generally telescopically within a short, rigid outer cylindrical cell member 23 formed at its front end with an inwardly directed radial flange 24. Front face 25 of cell member 23 is machined flat and lies in the same plane as face 15 of sleeve 11. Flange 24 is formed with a machined flat rear face 26 parallel to rear flange face 18 and abuts against the front edge of band 22. Flange 24 is formed with a cylindrical bore 27 which fits snugly with the cylindrical outer periphery 21 of sleeve 11. The interior recessed surface 28 of cell member 23 may be of any suitable contour but is preferably cylindrical so as to fit snugly with flange 16 and of a diameter slightly greater than the combined inner cell member and clamp band assembly which is to be mounted therewithin.

In the assembly, with the two cell members telescopically fitted together as illustrated in Figure 2, cell members 11 and 23 are engaged with a relatively snug fit because of the engagement of coextensive surfaces at 21 and 27, and band clamp 22 is immovably held against longitudinal displacement by reason of engagement of its opposite edges with stop faces 18 and 26 of the respective cell members.

The longitudinal dimension of band 22 with respect to the spacing of faces 18 and 26 is therefore critical, and its opposite edges should be planar extending perpendicularly to the sight axis so as to fit snugly with the abutting cell member flanges. By proper dimensioning of band 22, the plane of the filaments in the assembly can be accurately located with respect to face 25 of the outer cell member.

In order to clamp the filaments in position, I provide an arrangement involving a plurality of radial set screws 29 threaded in suitable apertures in outer cell member 23 well inwardly of flange 24 and adapted when tightened to engage the outer periphery of clamp band 22. As shown in Figure 1, it is essential to locate each of these set screws so that its center of pressure falls directly in alignment with the filament therebeneath between band 22 and sleeve 11. Thus when each set screw 29 is set tight it exerts considerable pressure against band 22 and deforms it into contact with filament 19 therebeneath and this pressure is sufficient through the medium of the frictional engagement of band 22 with sleeve 11 to bind cell members 11 and 23 together rigidly and to also lock band 22 against shift longitudinally.

Preferably the bottom of each screw 29 is flat so that an appreciable region of flexible band 29 is deformed and this insures that the filaments will be properly secured. This deformation of band 22 usually causes regions of the band to spring outwardly against recess surface 28 and prevent relative rotation of the cell members.

When set screws 29 are tight, the clamped portions of filaments 19 are effectively keyed to band

22 and sleeve 11. Maximum holding pressure is exerted on the filaments.

While outer cell member 23 is illustrated as a cylindrical element, which is desirable when it is to be mounted in a telescope or the like, its external surface may assume any desirable contour for conformation with the holder or instrument in which the cell is mounted, since the invention is by no means limited to military sights or telescopes but may be used in any fiducial instrument. Cell member 23 is sufficiently sturdy for mounting in a reticule adjustment arrangement such as that disclosed in my co-pending application Serial No. 520,935 filed February 3, 1944.

In assembly, filaments 19 are chosen of a length such as illustrated in Figures 2 and 3 so that they may be stretched across the front end of sleeve 11 and pulled back rearwardly through notches 14 and 17.

Notches 14 are accurately located and machined with the lines representing their bottoms extending parallel to the optical sighting axis of the assembly and thereby forming positioning guides for accurately locating the filaments in the assembly. Notches 17 may be of any suitable shape. Prior to assembly, it may be advisable to round off all the sharp edges which are formed when notches 14 and 17 are cut and are likely to be encountered by filaments 19 so as to remove any chance that the wires might be sheared off during assembly.

With the filaments in the position shown at the right of Figure 3, band 22 is slid over the front edge of sleeve 11 toward rear flange 16. Notches 14 maintain the filaments in desired angular position while band 22 is being mounted. Preferably, during this operation, sleeve 11 is held in a stationary jig of some kind which has clamps for pulling the opposite ends of filaments 19 so that the latter are stretched taut across sighting aperture 13. After band 22 has been mounted on sleeve 11 over the filaments, the inner cell member is now ready to be mounted in the outer cell member.

This is accomplished simply by inserting the front edge of sleeve 11 within recess 28 and telescoping the two cell members together until flange 24 abuts against the front edge of band 22. When the cell members have been telescoped together, screws 29 are tightened thereby locking the two cell members and band 22 against longitudinal displacement. It will be observed that the inner peripheral edge of flange 24 does not contact the filaments and thereby has no tendency to sever them when the cell members are telescoped together. Notches 14 extend rearwardly and notches 17 extend forwardly sufficient distances to provide clearances for the filaments 19 to prevent the filaments from being sheared off by the sharp edges of flange 24, ring 22 and the corner between flange 16 and surface 21.

The above-described reticule assembly comprises a compact unit wherein the filaments are securely locked against deformation or displacement, and is sturdy enough to be used in a rifle telescope or the like. By securing band 22 against movement axially between the cell members as described a construction is provided wherein shocks such as recoil effect are prevented from shifting band 22 in such direction as to loosen filaments 19. The projecting loose ends of the filaments illustrated in Figure 2 are suitably clipped off when the cell unit is assembled.

My reticule assembly is capable of easy and speedy manufacture which may be accomplished

by non-skilled labor, and there is no necessity for complicated and expensive devices for holding the filaments under tension or for adjusting the tension of the wires during use of the reticule in an instrument. Although the assembly is so inexpensive that, should a filament become damaged, the entire cell can be readily replaced with a slight expense, the assembly is also of such extremely simple construction that even in the field it can be readily taken apart by ordinary mechanics and speedily repaired and reassembled. The parts are so dimensioned that, when reassembly is made, the filaments are automatically located in the proper plane and there are no adjustments whatsoever to be made.

While the reticule assembly invention is primarily designed for use in rifle telescopes and the like, the principle of the invention involving the novel manner of assembling filaments into fiducial units is intended for use in any instrument. Also, while filaments 19 are above-described as fine metal wires, they may be filaments made of any material suitable for purposes of the sighting assembly.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a reticule assembly, a support member, a cell member mounted on said support having a sighting aperture, a filament mounted across said aperture, and deformable means interposed between said members overlying said filament at opposite sides of said aperture for frictionally clamping said filament to said cell member.

2. In a reticule assembly, a pair of interfitted cell members formed with a sight aperture therethrough, a filament disposed across said aperture, a strip of deformable material disposed between said cell members and overlying a portion of said filament, and means on one of said members adapted to contact said strip adjacent to but on the opposite side from said filament, said means being movable for deforming said strip into tight engagement with said filament and the other cell member for locking the assembly with the filament taut across said aperture.

3. In a reticule assembly, an inner cell member having a sighting aperture, a filament mounted across said aperture, a deformable band surrounding said inner cell member and overlying portions of said filament at opposite sides of said aperture, an outer cell member interfitted with said first cell member and means on said outer cell member acting on said band for securing said cell members together and locking said filament taut across said aperture.

4. A reticule assembly comprising inner and outer cell members, a clamping element for a sighting filament disposed upon the inner of said members, and means on the outer of said members cooperating with said clamping element for actuating said clamping element and securing said members together.

5. A reticule assembly comprising two tubular cell members arranged in telescoping relation,

means positioning a sighting filament on said cell members, a clamp band for said filament disposed between said cell members, and means securing said clamp band and cell members together.

6. In the reticule assembly defined in claim 5, cooperating stop means on said members abutting opposite ends of said clamp band.

7. A reticule assembly comprising an inner cell member having an aperture, a filament positioned across said aperture, a deformable band fitting over a portion of said cell member and over said filament at opposite sides of said aperture, an outer cell member interfitting with said inner cell member, and means for deforming said band at spaced regions adjacent said underlying filament to clamp said filament in the assembly.

8. A recticule assembly comprising a tubular inner cell member having a sight aperture, a radial flange on said member, a sighting filament positioned across said aperture, a clamp band surrounding said inner cell member and overlying said filament at opposite sides of said aperture, a tubular outer cell member within which said inner cell member is mounted, an oppositely extending radial flange on said outer cell member, said band having its opposite ends abutting said flanges when said cell members are assembled, and means securing the cell members together.

9. A reticule assembly comprising interfitting inner and outer tubular cell members having a sight aperture, external and internal radial flanges on opposite ends of said cell members, a sighting filament positioned across said aperture, a deformable clamp band disposed between said cell members in overlying relation to said filament at opposite sides of said aperture and having its opposite ends abutting said flanges when said cell members are assembled, and means for deforming said band into tight frictional gripping contact with said filament.

10. A reticule assembly comprising an inner cell member having a sighting aperture, a filament positioned on said member and extending across said aperture, an outer cell member having a recess within which said inner cell member is adapted to be positioned, said filament being out of contact with said outer cell member so as not to be sheared during assembly of said members, and cooperating frictional means on and between said inner and outer cell members for locking said cell members against relative movement and preventing relaxation of the tension on said filament.

11. A reticule assembly comprising a sleeve having a pair of aligned notches at one end, a filament extending across said one end of the sleeve with its opposite ends passing through said notches and extending along the outer periphery of said sleeve, a deformable band initially loosely fitted upon the outer periphery of said sleeve overlying said opposite filament ends, a cell member for receiving said band and sleeve, and means on said cell member for deforming said band and holding the filament under tension in the assembly.

12. In a reticule assembly, an inner cell member comprising a tubular sleeve, means providing a plurality of filament guiding and positioning notches on one end and the adjacent outer peripheral surface of said sleeve, and radial stop flange means on the other end of said sleeve, having filament passage openings in longitudinal alignment with said notches.

13. In the reticule assembly defined in claim 12, said inner cell member being formed with a cyl-

indrical outer periphery forwardly of said stop means providing a filament end clamp surface on said member.

14. A reticule assembly comprising two tubular cell members arranged in telescoping relation, a frictional clamp element between said members for clamping a sighting filament to one of said members, and stop means on the respective cell members abutting opposite ends of said frictional clamp element.

15. In a reticule assembly, a pair of telescoped cell members having a sight aperture, a filament mounted across said aperture and spring clamp means mounted between said cell members for anchoring said filament in the assembly.

CLARENCE H. MEYER.

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