Sept. 16, 1947. J. UNERTL ET AL 2,427,516

ADJUSTABLE RETICULE FOR TELESCOPES

Filed July 15, 1944

Fig. 1.

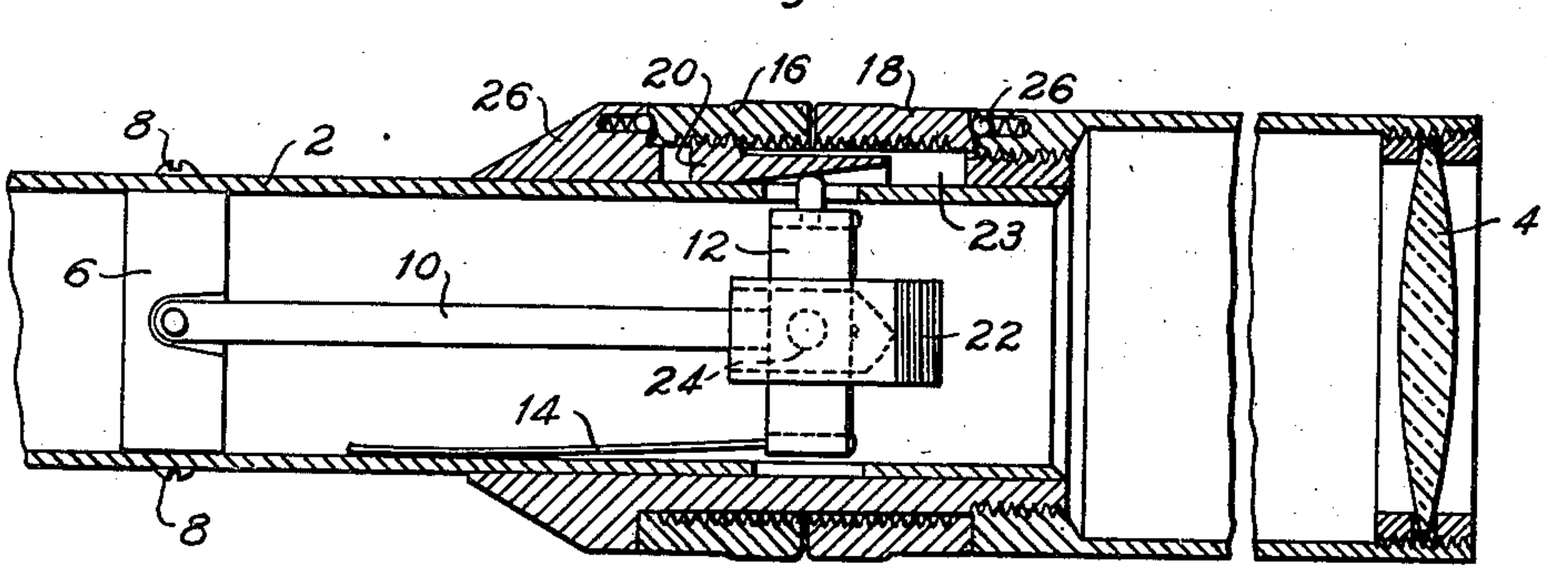

Fig. 4.

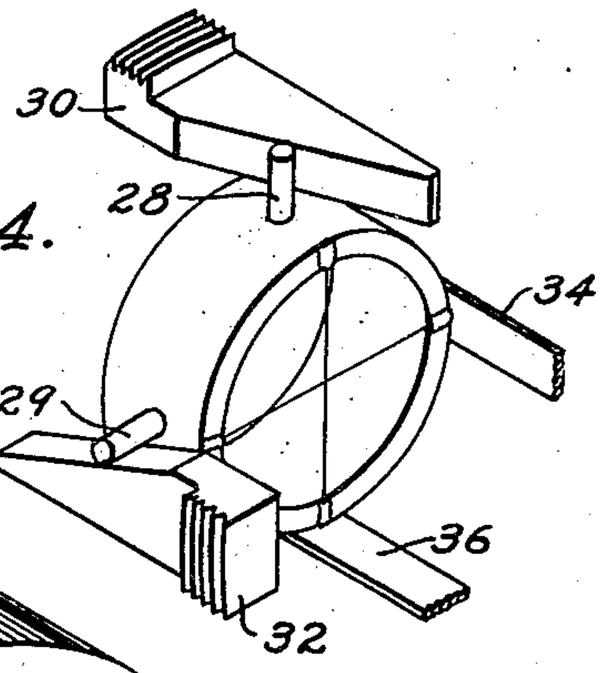

Fig. 2.

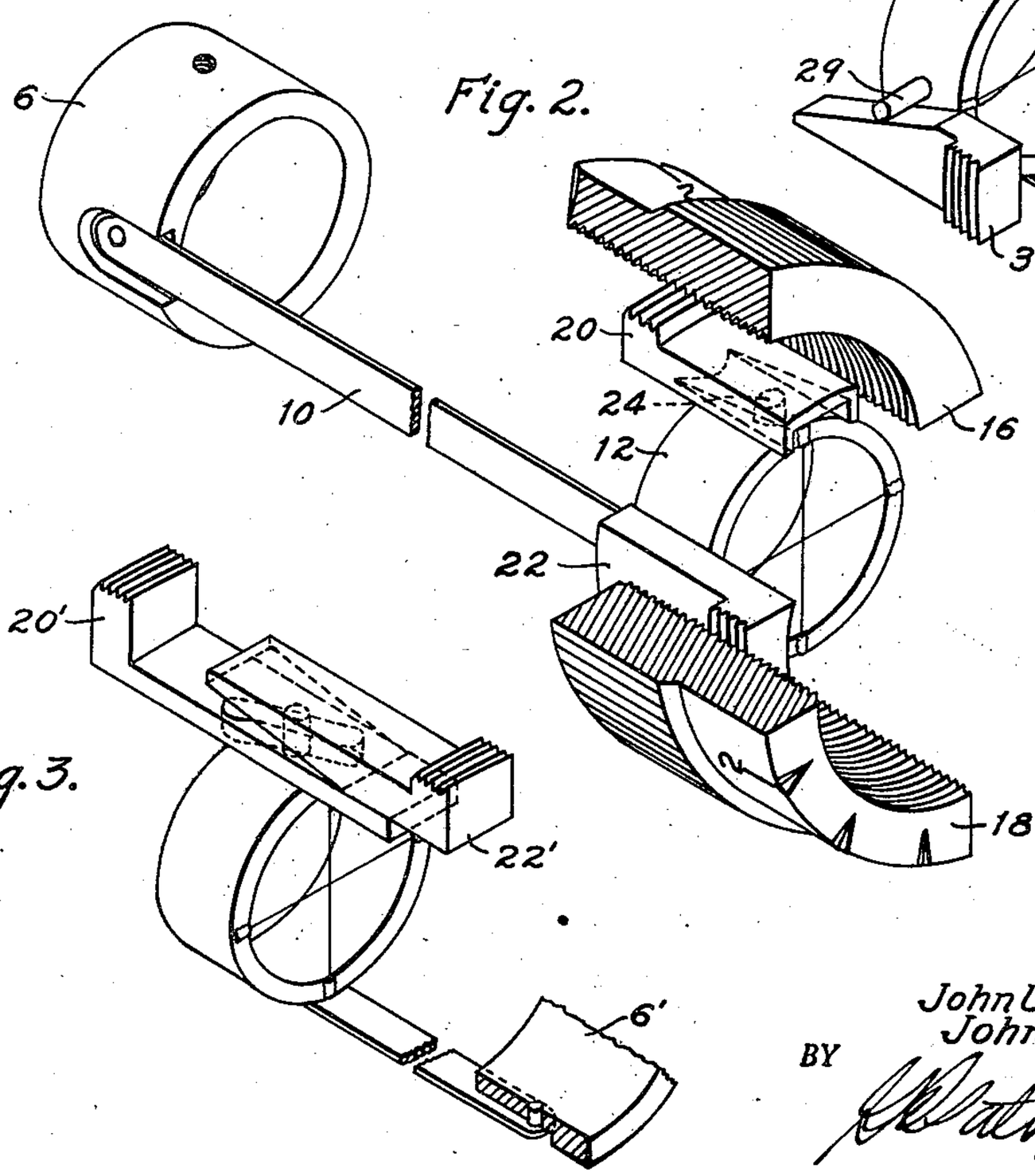

Fig. 3.

INVENTORS
John Unertl and
John Unertl, Jr.

BY

ATTY.

Patented Sept. 16, 1947

2,427,516

UNITED STATES PATENT OFFICE

2,427,516

ADJUSTABLE RETICULE FOR TELESCOPES

John Unertl and John Unertl, Jr., Pittsburgh, Pa.

Application July 15, 1944, Serial No. 545,146

5 Claims. (Cl. 33—50)

1

The invention relates to an adjusting device in which a rotary movement is converted into a rectilinear movement, and more particularly to an adjustment for the vertical and horizontal positioning of a telescope reticule to adjust the cross-hairs thereof for both range and windage.

In the past, gun-sight telescopes have been adjustable for range and windage by vertically and horizontally acting screws which usually directly engage and move the reticule carrying the cross-hairs. These involve screw-knobs projecting from the barrel of the telescope with the attendant inconvenience of handling the gun upon which the scope is mounted; for example, see Unertl Patent 2,189,766, issued February 13, 1940. Also such adjusting knobs are provided with a "click" device so that the rifleman, after a trial shot, may turn them a required number of "clicks" to make the necessary corrections. Since these adjusting knobs engage the reticule directly, a single "click" may involve a greater correction than actually required.

It is an object of the present invention to provide an adjusting device for telescope reticules and the like, in which lateral movements of the reticule may be effected by a rotary movement of adjusting rings substantially flush with the telescope barrel.

It is a further object of the invention to provide a click device for such adjusting rings in which the rings indirectly control the positioning of the reticule to afford a substantially greater sensitivity of adjustment and, accordingly, a finer adjustment in the aiming control for each "click."

A further object of the invention is to provide a simple and unusually sensitive mounting for a rifle telescope reticule which is sufficiently sturdy in construction to withstand normal use of the rifle, and at the same time, of simple construction.

Other objects of the invention will be apparent from the following description and the accompanying drawing in which

Figure 1 is a fragmentary view in vertical section of a portion of a rifle telescope, embodying the invention;

Fig. 2 is a view in perspective, partly in section, of the reticule mount of Fig. 1; and

Figs. 3 and 4 are perspective views of modifications of the reticule adjustment means of Figs. 1 and 2.

2

Referring to Figs. 1 and 2, a rifle sighting telescope, for example, may include a barrel portion 2 having an enlarged end containing a lense assembly 4. For the purposes hereof the proportions of the telescope barrel, the lense assembly, etc., may be considered schematic.

The reticule support includes a ring 6 which is fixed in the telescope barrel, as by machine screws 8 (Fig. 1). A pivoted arm 10 extends from ring 6 to the reticule frame 12 to which it is rigidly attached, as by soldering or brazing. It will be noted that the left end of the arm 10 is pivotally mounted on the ring 6 in a recess so that it may swing vertically with respect thereto free of the inner surface of the telescope barrel. The reticule frame accordingly is pivoted for vertical movement with the arm 10, and such arm is of resilient strip material having substantial width compared to its thickness to exert a spring-bias against horizontal movement of the reticule frame, and prevents rotational movement of the frame.

Also, rigidly attached to the reticule frame 12, ninety degrees from the arm 10, is a spring strip 14 (Fig. 1), the free end of which engages the surface of the telescope barrel to resiliently bias the vertical movement of the reticule frame 12. Such spring is omitted from Fig. 2 to simplify the showing.

The vertical and horizontal movements of the reticule 12 are controlled by a pair of adjusting rings 16 and 18 which coact respectively with externally threaded segments of wedge devices 20 and 22. When either adjusting ring is rotated, the respective wedge is given a linear movement along the axis of the scope.

Each threaded wedge device is provided with a hollow, or channeled, under portion, with a cam or wedge base surface to engage a pin 24 fixed to the reticule frame. The diameter of such pins are approximately half the width of the wedge channels to permit the required lateral movements of the reticule.

The wedges 20 and 22 are retained in slots 23 in the enlarged portion of the scope barrel so that they may move axially of the barrel under the influence of the adjusting rings 16 and 18, but lateral movement is prevented. When ring

16, for example, is turned, the wedge 20 is advanced or moved backward accordingly, and the reticule casing is raised or depressed a corresponding amount depending on the angularity of the under-surface of the wedge. Similarly, the wedge 22 controls the horizontal movement of the reticule depending upon the degree of movement of the wedge 22.

Of course, the threaded portions of the wedges 20 and 22 are off-set so that they only engage their respective adjusting rings 16 and 18 within the limits of movement of the reticule. The movement of the reticule frame 12 is always in a vertical or horizontal plane because its rotation is restricted by reason of the arm 10.

The peripheries of rings 16 and 18 may be suitably inscribed to cooperate with indexes on the telescope barrel, or vice versa, to indicate the position of the reticule. In addition, it is desirable to provide an audible indication and to that end the outer edge of each ring is notched or serrated and is resiliently engaged by a small ball 26, so that rotation of the ring causes a series of clicks.

For purposes of illustration, the rings 16 and 18 are spaced a slight amount. Actually, there would be no such spacing, for obvious reasons, or if it is desired to space them a greater distance to facilitate distinguishing between them, an idler ring may be used to close the space between them.

A modification of the invention is shown in Fig. 3, in which both of the wedges 20′ and 22′ are mounted in the same plane, instead of 90° apart. Here a single pin on the reticule frame extends through a diagonal slot in the lower wedge device 20′ into an appropriate wedge slot on the device 22′. The pin extends through the slot in the wedge 20′ with as little lost motion as possible consistent with freedom of sliding along the slot, and as in Fig. 2, the pin thickness is approximately half the width of the cam channel of wedge 22′. Linear movement of wedge 20′ causes lateral horizontal movement of the reticule by reason of the lateral component resulting from the angularity of the slot in the wedge. Linear movement of wedge 22′, causes vertical movement, as in Figs. 1 and 2.

In this modification (Fig. 3), the arm 10′ is secured to the bottom of the reticule, instead of at one side as previously described, and is pivotally attached to the fixed ring 6′, as in Fig. 1. A spring corresponding to 14 of Fig. 1 is not required. The arm 10′ affords the required bias for vertical movement, and by reason of the close fit of the reticule pin in the slot of wedge 20′, a horizontal bias is not required.

In Fig. 4, the reticule is provided with somewhat elongated pins 28 and 29 which respectively engage the inclined surfaces of the wedge members 30 and 32. The wedge members are longitudinally movable by reason of threaded engagement with adjusting rings such as 16 and 18 of Fig. 1, and are retained against lateral movement by being caged in slots in the telescope barrel. In this modification, the arm 34 and spring 36 will be the same as in Fig. 1, and mounted in the same manner. Longitudinal movement of either wedge will react against its respective pin to move the reticule laterally with no rotational movement thereof.

In accordance with the invention, I have developed an adjusting device for converting rotary motion into linear motion perpendicular to the plane of the rotary motion, in a unique manner,

resulting in a precision adjusting device for instrumentalities such as reticules for telescopes. For example, by the use of the structure described, a sensitivity of adjustment of the reticule with respect to the target is of the order of one-fourth minute for each "click," which is much more sensitive than anything produced heretofore in this field.

Obviously, modifications may be made in the structures disclosed and it is intended that the invention be limited only by the scope of the appended claims.

We claim as our invention:

1. In a telescope comprising a tubular body and a reticule therein, means for adjustably supporting said reticule comprising resilient means biasing it for movement laterally of said body, a device having a wedge surface extending longitudinally of the body and in engagement with a pin secured to the periphery of the reticule, and means for moving said device longitudinally of the body to adjust the position of the reticule against the bias of said resilient means.

2. In a telescope comprising a tubular body and a reticule therein, means for adjustably supporting said reticule comprising resilient means biasing it for movement laterally of said body, a device having a wedge surface extending longitudinally of the body and in engagement with a pin secured to the periphery of the reticule, and means for moving said device longitudinally of the body to adjust the position of the reticule against the bias of said resilient means, said means comprising a rotatable ring coaxial with said body in threaded engagement with a portion of said wedge device.

3. In a telescope comprising a tubular body and a reticule therein, means for adjustably supporting said reticule comprising resilient means biasing it for movement laterally of said body, a device having a wedge surface extending longitudinally of the body and in engagement with means secured to the periphery of the reticule, and means for moving said device longitudinally of the body to adjust the position of the reticule against the bias of said resilient means, comprising an internally threaded ring rotatably mounted to turn axially of the telescope body in engagement with a threaded sector on said wedge device.

4. In a telescope comprising a tubular body and a reticule therein, means for adjustably supporting said reticule comprising resilient means biasing it for movement laterally of said body, a device having a wedge surface extending longitudinally of the body and in engagement with means secured to the periphery of the reticule, and means for moving said device longitudinally of the body, to adjust the position of the reticule against the bias of said resilient means, comprising an internally threaded ring rotatably mounted to turn axially of the telescope body in engagement with a threaded sector on said wedge device, the outer circumference of said threaded ring being of substantially the same diameter as that of the telescope body and disposed in an annular recess in said body.

5. In a telescope comprising a tubular body and a reticule therein, means for adjustably supporting said reticule comprising resilient means biasing it for movement laterally of said body, a device having a wedge surface extending longitudinally of the body and in engagement with means secured to the periphery of the reticule, means for moving said device longitudinally of

the body to adjust the position of the reticule against the bias of said resilient means, said means comprising a rotatable ring coaxial with said body in threaded engagement with a portion of said wedge device, and means defining a recess in said body for guiding the longitudinal movement of said wedge device and preventing lateral movement thereof.

JOHN UNERTL.
JOHN UNERTL, JR.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
966,254	Smith	Aug. 2, 1910
1,088,137	Fidjeland	Feb. 24, 1914
2,045,670	Noske	June 30, 1936
2,180,184	Weaver	Nov. 14, 1939
2,155,390	Arden	Apr. 25, 1939

FOREIGN PATENTS

Number	Country	Date
104,921	Great Britain	Mar. 23, 1917