The present invention relates to sighting devices and, more particularly, to an archery sighting device for correction of either or both the bow cants about the central longitudinal sight axis of the bow toward the intended target as well as the horizontally-applied torque or twist about a vertical axis through the bow.

In the past, it has been difficult to provide a suitable archery sighting device which will properly align the bow as well as the arrow with respect to an intended target because of the inherent instability of the bow as it is held outside of the hand of the archer and because of the physical characteristics of a bow in that it is relatively tall and thin. In the firearm art, sighting devices are not usually so physically restricted because of the ability to space apart certain sighting points on the firearm which can be readily aligned with an intended target. However, in the archery sighting art, it is not physically practical to provide for sighting points which can be widely spaced apart in the longitudinal or sighting direction. Therefore, archery sights generally have been limited to various means of providing for tilting or canting of the bow in a nominally vertical plane which includes the bow and the intended target, thus providing a range adjustment, and various means of providing for lateral offset of the line of sight, thus providing a wind drift adjustment. However, such prior art archery sighting devices do not provide adequate means for assuring the elimination of tilting or canting as well as for correction of twisting or torquing of the bow about a vertical axis, both of which factors tend to detract from the effectiveness of the range and wind adjustment factors as well as imparting uncontrollable and unpredictable angular and torsional forces to the arrow. Therefore, prior sighting devices are limited in their reference to shooting accuracy.

Various other conventional sighting devices employ means in the form of a pendulum-like device mounted within a sighting tube or a bubble tube in combination with a sighting line. However, these devices have been found to be unsuitable for achieving a high degree of accuracy and have been found to be easily damaged as well as unreliable.

The present invention obviates the problems encountered by prior archery sighting devices by incorporating into a single compact unit means for correcting bow displacement caused by rotational tilt about the longitudinal axis of the sight as well as correcting displacement of the bow caused by twisting or torquing of the bow about a vertical axis. Furthermore, the device of the present invention is easily mounted on the bow itself and may be readily secured to other sighting apparatus secured on the bow such as wind drift and range correction indicators. By properly employing the present invention, shooting accuracy is greatly enhanced. No pre-setting of or adjustments to the sighting device are required prior to shooting at a desired target other than the alignment of the sighting points during aiming.

In one embodiment of the present invention, a gravity responsive ball is mounted on an arcuate member of the device which permits correction for tilting or canting of the bow in a plane at right angles to the longitudinal sighting axis of the sight device while at least one vertical line, when aligned with the ball, operates to correct for twist or torque of the bow about a vertical axis of the bow. When properly sighted on an intended target, the vertical
8,279,071 3. As shown in FIGURES 1 and 2, the sighting device 11 includes a hollow cylindrical sighting tube body 15 hav...g to the right or left, canted downward to the left or right, or canted upward to the front or rear. The gravity responsive ball 21 is provided with a groove 22 which is deep enough to avoid engagement of the bottom thereof with the ball 21. Therefore, the ball 21 rests on the parallel corners 33 and 34 which serves two purposes, namely, greatly reduces the friction encountered during rolling of the ball 21 and effects only two-point contact therewith, and maintains the ball away from contact with either of the inner surfaces of the discs 23 and 24 so as to prevent scratching or other marring thereof. Thus, a feature of the present invention resides in this manner of ball mounting since the object of the sighting device is to obtain accurate sighting with a minimum of either visual obstruction or frictional delay in the actuation and operation of the device.

Referring to FIGURE 4, wherein a modified sighting device of the present invention is shown fully assembled, the gravity responsive ball 21 is centrally located on the center of the gravity responsive ball 21. The parallel discs 23 and 24 are aligned with the vertical sight line 28 on the disc 23 but, due to the parallax occasioned by the perspective aspect illustrated, the appearance is one of misalignment. In practice, such misalignment occurs as a result of twisting or torquing the bow about a vertical axis which may be due to unintentional turning of the wrist. The vertical sight line 28 and the ball 21 being very close to each other, which factor necessarily appertains in order to insure accuracy of centering of the ball 21 at the bottom of the curve of the arcuate member 20 to eliminate tilting or canti...ing the arrow 37 and the front vertical sight line 29 which is physically in parallel alignment with the rear sight line 28 along the longitudinal axis and the central vertical plane of the sighting tube body 15 so that the archer can correct more easily for the twist misalignment illustrated in FIGURE 4 until visual coincidence of both the front and rear sight lines, as evidenced by visual coincidence of such lines, as well as the bisecting of the ball 21 by such visually coincident lines so as to have the appearance as illustrated in FIGURE 1. The front inner retainer tube 31 is provided with an enlarged bore 37 which provides an annular shoulder 38 against which the front third disc 35 is securely seated as by press-fit engagement with the bore 37. As now should be clear, the two vertical sight lines 28 and 29 on the rear and front discs 23 and 35, respectively, serve as spaced sighting points for improved correction of twist or torque of the bow which otherwise would cause lateral forces resulting in horizontal deflection of the arrow upon release of the bow string during firing and subsequent flight of the arrow.

Therefore, the gravity responsive ball 21 and the arcuate member 20 permit correction for tilting or canti...
single composite line, and the ball 21 will appear to be both superimposed on the intended target and bisected by such composite vertical line.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed is:

1. An archery sighting device comprising:
a hollow symmetrical body adapted to be attached to a bow with its longitudinal axis in alignment with the line of sight for the bow;
a stationary arcuate member rigidly disposed within said body symmetrically with respect to the central vertical plane of said body, with the center of said member extending below the central horizontal plane of said body and the opposite ends thereof lying on the central horizontal axis of said body;
means connecting the opposite ends of said member to said body;

2. A sighting device in accordance with claim 1 wherein said arcuate member is provided with a central groove along its length for partially receiving said ball, said groove being narrower than the diameter of said ball and deeper than the extension of said ball into said groove whereby said ball rides in only two-point contact on said member, said arcuate member being wider than said ball whereby said ball is separated from said disc while rolling on said member.

3. A sighting device in accordance with claim 1 wherein each of said pair of plates has a respective vertical sight line marking thereon parallel to each other and residing in such central vertical plane whereby visual alignment of both such sight lines with each other and so as to appear to bisect said ball tends to assure alignment of the longitudinal axis of said body with the line of sight to a target.

4. An archery sighting device comprising:
a hollow symmetrical body adapted to be attached to a bow with its longitudinal axis in alignment with the line of sight for the bow;
a arcuate member disposed within said body symmetrically with respect to the central vertical plane of said body, with the center of said member below the central horizontal plane of said body;
said body having an internal rib, said rib being provided with a pair of opposing longitudinal slots for receiving opposite ends of said arcuate member;

5. A sighting device in accordance with claim 4 further comprising a pair of retainer tubes disposed in press-fit engagement with said body internally thereof and at opposite ends thereof, each of said tubes being in abutment

6. A sighting device in accordance with claim 5 wherein said arcuate member is provided with a central groove along its length for plurality receiving said ball, said groove being narrower than the diameter of said ball and deeper than the extension of said ball into said groove whereby said ball rides in only two-point contact on said member, said arcuate member being wider than said ball whereby said ball is separated from said discs while rolling on said member.

7. An archery sighting device comprising:
a hollow cylindrical body adapted to be attached to a bow with its longitudinal axis in alignment with the line of sight for the bow;
an arcuate member disposed within said body symmetrically with respect to the central vertical plane of said body with the center of said member below the central horizontal plane of said body;
a gravity responsive ball supported by said member for rolling thereon;
a pair of transparent parallel discs mounted in said body on opposite sides of said member in abutment therewith;
a rear tube and a front tube disposed in press-fit engagement with said body internally thereof and at opposite ends thereof, each of said tubes being in abutment against a respective one of said pair of discs for retention thereof;
a third transparent disc mounted in said front tube parallel to and a distance spaced from said pair of discs; and
each of said third disc and at least one of said pair of discs having a respective front and rear vertical sight line marking thereon residing in such central vertical plane, whereby said ball appears to be bisected by said rear sight line when said ball rests on the center of said arcuate member.

8. A sighting device in accordance with claim 7 wherein said arcuate member is provided with a central groove along its length for partially receiving said ball, said groove being narrower than the diameter of said ball and deeper than the extension of said ball into said groove whereby said ball rides in only two-point contact on said member, said arcuate member being wider than said ball whereby said ball is separated from said discs while rolling on said member.

9. A sighting device in accordance with claim 7 wherein said body has an internal annular rib, said rib being provided with a pair of opposing longitudinal slots for receiving opposite ends of said arcuate member.

10. An archery sighting device comprising:
a hollow cylindrical body adapted to be attached to a bow with its longitudinal axis in alignment with the line of sight for the bow;
an arcuate member disposed within said body symmetrically with respect to the central vertical plane of said body with the center of said member below the central horizontal plane of said body;
said body having an internal annular rib, said rib being provided with a pair of opposing longitudinal slots for receiving opposite ends of said arcuate member;
a gravity responsive ball supported by said member for rolling thereon;
a pair of transparent parallel discs mounted in said body on opposite sides of said member in abutment therewith; and

at least one of said pair of discs having a vertical sight line marked thereon residing in such central vertical plane whereby said ball appears to be bisected by
said sight line when said ball rests on the center of said arcuate member.

11. An archery sighting device comprising:
a hollow cylindrical body adapted to be attached to
a bow with its longitudinal axis in alignment with
the line of sight for the bow;
an arcuate member disposed within said body sym-
metrically with respect to the central vertical plane
of said body with the center of said member be-
low the central horizontal plane of said body;
a gravity responsive ball supported by said member
for rolling thereon;
a pair of transparent parallel discs mounted in said body
on opposite sides of said member in abutment there-
with;
each of said pair of discs having a respective vertical
sight line marking thereon parallel to each other and
residing in such central vertical plane whereby visual
alignment of both such sight lines with each other
and so as to appear to bisect said ball when said
ball rests on the center of said arcuate member
which tends to assure alignment of the longitudinal
axis of said body with the line of sight to target; and
a pair of retainer tubes disposed in press-fit engage-
ment with said body internally thereof and at op-
posite ends thereof, each of said tubes being in
abutment against a respective one of said discs for
retention thereof.

12. A sighting device in accordance with claim 9 where-
in said gravity responsive ball is movably enclosed be-
 tween said pair of transparent parallel discs and between
said arcuate member and a portion of said cylindrical
body.

13. A sighting device in accordance with claim 12
wherein said body includes an external groove formed
therein adaptable for receiving mounting fixtures for secur-
ing the sighting device onto the bow.

14. A sighting device in accordance with claim 13
wherein said arcuate member is composed of metal and
said transparent discs are composed of low surface fric-
tion material.

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