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AIM INDICATOR

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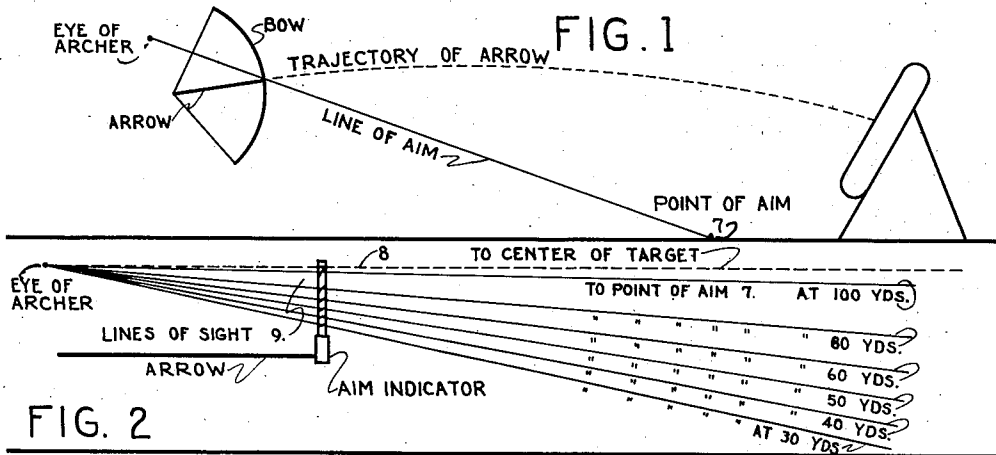


FIG. 2

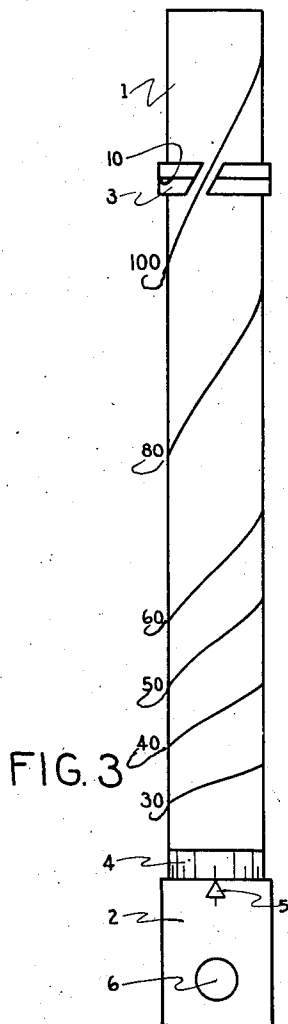


FIG. 3

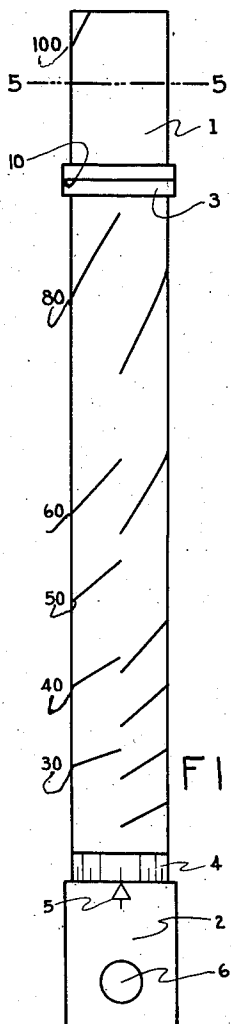


FIG. 4

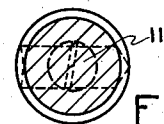


FIG. 5

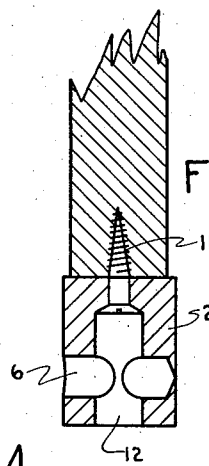


FIG. 6

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AIM INDICATOR

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6 Claims. (Cl. 33-46)

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This invention relates to aim indicators and more particularly to instruments for locating points of aim under conditions wherein said points are remote from a target. An illustration of such conditions appears in archery, wherein points of aim are carefully located at predetermined points distant from the target, so as to guide the archer in shooting at the target.

In arranging to discharge an arrow from a bow an archer may establish a straight line of aim from his eye, through the point of the arrow and thence to an object located on the ground or above the target. This object is known as the "point of aim." Three fundamental conditions determine the general location of a point of aim relative to a target, namely; distance, or range from archer to target—velocity of arrow, and location of arrow relative to archer's eye at time arrow is aimed.

Standard rules for competition in archery specify that a given number of arrows be shot from each of several predetermined distances or ranges from the target, and in changing from one predetermined range to that of a shorter or longer range no practice shots are allowed to determine the point of aim for the new range. It is thus very important that the archer have some predetermined means for readily and accurately locating a point of aim while shooting at any of the standard ranges.

As stated above, the location of a point of aim relative to a target is determined by the combination of three factors, namely; the range from archer to target, method of aiming, and the velocity of the arrow. Especial attention is called to the fact that although the predetermined ranges are fixed and definite and method of aiming may be easily duplicated; the velocity of the arrow, even when shot from the same bow, is continually being changed due to the effect of temperature and moisture changes upon the bow. The arrow velocity may also be changed due to the archer changing to a different bow or using arrows of lighter or heavier weight. In other words, the factors of variable ranges and methods of aiming when once established remain relatively constant, the factor of arrow velocity will always be variable and must be so considered in any means for locating a point of aim.

An object of my invention is to produce a sighting device by means of which an archer may conveniently locate points of aim for shooting at different predetermined ranges from the target under variable conditions of arrow velocity. It may consist of a primary sight to be aimed at the

target and a series of adjustable secondary sights, the primary sight and a different one of the secondary sights being used at each of the several predetermined ranges. The series of secondary sights are correlated in that they are always located in their proper aiming position relative to the primary sight for one and the same arrow velocity. Means are provided for adjusting said series of secondary sights to conform to other arrow velocities, each of the secondary sights being simultaneously moved proportional distances relative to the primary sight, said movements conforming with the relative effect of a unit change in arrow velocity at the corresponding ranges from the target.

The above mentioned sights are cooperative in nature in that the combination of the primary sight and any one of the secondary sights, for a corresponding range, may be used to compensate for the effect of arrow velocity when the above mentioned combination of primary sight and secondary sight are selectively adjusted to an experimentally located point of aim for that range, and; in said adjustment to a known point of aim, all other secondary sights are simultaneously adjusted to conform to the same arrow velocity and can thus be used to find the location of points of aim for all other predetermined ranges corresponding to that arrow velocity. In other words, the combination of any secondary sight and the primary sight may be used to find the proper combination of the primary sight with all other secondary sights.

With the foregoing and other objects in view the invention comprises the novel combination and arrangement of parts hereinafter more specifically described and shown in the accompanying drawings. However, it is to be understood that the scope of the patent extends to changes, variations and modifications described by terms of the claims hereunto appended.

Fig 1 is a simple diagram illustrating a method of aiming an arrow.

Fig. 2 is another diagram, not drawn to scale, illustrating the manner in which an aim indicator may be used to sight locations of points of aim relative to targets at predetermined ranges.

Fig. 3 is a side view of the aim indicator embodying features of the invention and showing a primary sight 10 and correlated secondary sights, 100, 80, 60, 50, 40 and 30 for corresponding ranges. Said sights are properly arranged for one arrow velocity and may conform with the points of tangency of primary sighting line 8 and secondary sighting line 9 with prearranged lines on the

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surface of an aim indicator sighted as in Fig. 2.

Fig. 4 is a side view of the aim indicator, the main body of which has been rotated 180 degrees, demonstrating means for selective adjustment of the device for various arrow velocities and indicating means associated therewith.

Fig. 5 is a tranverse section on the line 5—5 in Fig. 4.

Fig. 6 is a fragmentary cross sectional view showing details of means for selective adjustment for various arrow velocities also means by which the device may be supported at the end of an arrow.

A study of Fig. 1 will show how an archer may aim the arrow by sighting through a straight line of aim extending from his eye to the point of the arrow and thence to an object 7 on the ground known as a point of aim. This point of aim 7 may be carefully located by trial and error to provide for discharge of the arrow through a trajectory leading to the center of the target. The location of the above point of aim 7 would be suitable only for the predetermined range, method of aiming and arrow velocity for which it was established.

Fig. 2 is a diagram, not drawn to scale but suggesting a means by which the locations of several points of aim 7, each for a separate predetermined range but all for the same arrow velocity, may be sighted. In this diagram there is a primary sighting line 8 extending from the eye of the archer to the center of a target which target may be located at different predetermined ranges from the archer. Secondary sighting lines 9 extend from eye of archer to points of aim 7 for predetermined ranges of 30, 40, 50, 60, 80 and 100 yards from archer to target. Assuming that all points of aim 7 are simultaneously correct for the same arrow velocity and each point of aim is correct for its corresponding range at that velocity, then sighting points established on an aim indicator at the points of intersection of line 8 and lines of sight 9, with an aim indicator held as in Fig. 2 could be used to later duplicate the location of a point of aim 7 for any one or all of the standard ranges for that arrow velocity. It would follow that numerous other arrangements or series of secondary sighting points could be established on an aim indicator, each series for a different arrow velocity but for the same standard ranges.

Fig. 3 illustrates an aim indicator comprising a cylindrically shaped rod 1 rotatably connected and frictionally secured to a base 2. A primary sight 10 may be carried by a split-spring ring 3 embracing and frictionally secured to rod 1. Said primary sight 10 may consist of a point on a line united with carrier 3, said line encircling rod 1 forming a ring.

Secondary sights 100, 80, 60, 50, 40 and 30 may consist of corresponding points on helically formed lines imprinted upon the surface of rod 1. The above mentioned ring and helixes when viewed in connection with rod 1 as in Fig. 3 or sighted as in Fig. 2, appear as a horizontal straight line and several slanting lines respectively; each of the said lines appearing to end at points of tangency of lines of sight with the surface of rod 1. The apparent ends of the said lines at points of tangency are actually used as sights. As rod 1 is sighted as per Fig. 2 and rotated relative to base 2, primary sight 10 remains at a constant elevation relative to base 2 while the secondary sights simultaneously move through different distances relative to primary

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sight 10, said distances being determined by the relative degree of spiral of the corresponding helixes. The united arrangements of said ring relative to helixes is such that a primary sight 10 and secondary sights 100, 80, 60, 50, 40 and 30 are always visible in proper location for sighting points of aim corresponding to one and the same arrow velocity, at the several ranges.

Fig. 4 illustrates an aim indicator in which rod 1 has been rotated 180 degrees relative to base 2 the extent of rotation being indicated by a scale 4 and reference mark 5. An opening 6 in base 2 is provided to receive the point of the archer's arrow which arrow, as per Fig. 2, serves to locate the aim indicator in the proper sighting position. The extremities of range helixes 100, 80, 60, 50, 40 and 30 are shown; also, the united arrangement of said helixes. Primary sight 10 and another series of secondary sights 100, 80, 60, 50, 40 and 30 are shown which secondary sights have been simultaneously adjusted for a much lower arrow velocity, said adjustment taking place when rod 1 was rotated 180 degrees relative to base 2. Especial attention is called to the fact that although the series of secondary sights in Fig. 4 correspond to the same predetermined ranges as in Fig. 3, in the process of adjustment for a lower arrow velocity, all secondary sights have moved upward relative to primary sight 10, the amount of movement for sight 100 being much greater than that of sight 30. This series would locate the 100 yard point of aim above the target as indicated by sight 100 now being above primary sight 10.

The primary sight 10 is usually retained in a fixed position relative to rod 1 but may be moved toward or away from the secondary sights to compensate for any difference in methods of aiming an arrow between different arches. Above variation in methods of aiming include, variation in distances from archer's eye to point of arrow also vertical distance from eye to opposite or rear end of arrow at time of release of arrow when shot. Such adjustment of the primary sight will not affect the cooperative relationship of the secondary sights and when once made for a given method of aiming, becomes permanent.

A study of Fig. 6 will show an opening 6 extending horizontally into base 2 serving as a means for affixing the aim indicator on the end of an arrow and at 90 degrees to said arrow. A screw 11 secured to rod 1 serves as an axis for rotation of rod 1 relative to base 2. A vertical opening 12 in base 2 merely serves as a port for insertion of screw 11.

With the foregoing details in mind the practical application of my invention may be demonstrated by the following assumed condition:

An archer while shooting at 100 yards range notes that his arrows are falling below the target and immediately relocates the point of aim to a higher elevation. The next shot at 100 yards shows the new location of the point of aim to be correct. The fact that the point of aim had to be changed, while shooting at the same range with the same method of aiming, indicated that the arrow velocity had changed, hence affecting points of aim for all ranges by different amounts.

With the 100 yard point of aim now relocated experimentally the archer, before moving to another range, may employ the aim indicator and the known point of aim at 100 yards to indicate the changed locations of points of aim corresponding to other predetermined ranges. This

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would be accomplished as follows: the point of an arrow would be inserted in the opening 6 in base 2 and with the opposite or rear end of arrow held against archer's teeth; aim indicator would be sighted as per Fig. 2 so as to locate primary sight 10 in line of sight from eye to center of target at 100 yards while rod 1 would be selectively rotated relative to base 2 so as to adjust secondary sight 100 in line of sight from eye to corrected point of aim for 100 yards.

Since all secondary sights are moved simultaneously so as to conform to the same arrow velocity thence, in adjusting the aim indicator to the 100 yard point of aim, the sights for all other ranges would be automatically located so as to conform with the arrow velocity for which the 100 yard point of aim was established and the archer could then proceed to any other range from the target and determine the proper location of a point of aim for that range by sighting primary sight 10 at the target and at the same time sighting through the corresponding secondary sight to point of intersection of line of sight with the ground or other object.

The archer may frequently find it necessary to use a different bow or a different set of arrows. The archer would, in that case, first test the new combination by experimentally locating a point of aim at one of the closer ranges such as 40 yards. The aim indicator would then be adjusted to the 40 yard point of aim and all other points of aim could thus be determined without laboriously finding said points of aim by trial and error.

Specific ranges of 100, 80, 60, 50, 40 and 30 yards have been mentioned because they conform to a series of popular ranges for archery practice but the invention is not limited to such ranges. In other words, the invention is to be found in a device having the novel combination and arrangement of cooperative details described by any one of the following claims, and not in the specific distances, etc., selected to aid in explaining the new concept.

However, in this simple form of the invention, all of the sights are exposed for sighting in a sighting zone at one side of the vertical rod 1. The user depends upon his view of the primary and secondary sights appearing at an extreme side face of the rod 1. Consequently, rotation of the rod 1 with relation to the base 2 will change the locations of the spirally formed secondary sights in this vertical sighting zone. Such rotation will either raise or lower the actual sighting points of said secondary sights with relation to the primary sight 10.

After the desired adjustment has been made, the user will notice the scale 4 at the bottom of the rod 1, and observe its location with respect to the reference mark 5 on the base 2, which serves as an indicating guide for continued use under the adjusted conditions.

I claim:

1. In an instrument for locating points of aim under conditions wherein said points are remote from a target, an aim indicator comprising a sighting device having cooperative sights including a primary sight to be aimed at the target, and a series of secondary sights to be aimed at different points remote from the target, so as to find the points of aim, for different arrow velocities, at several predetermined ranges from the target, there being a separate secondary sight for each of said ranges from the target, all of said sights being exposed for sighting in a sighting

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zone at one side of the sighting device, said secondary sights being at different distances from said primary sight and movable in said sighting zone toward and away from said primary sight, so as to locate any one of the secondary sights in its aiming position, and indicating means associated with said secondary sights to indicate corresponding aiming positions of the several secondary sights.

2. In an instrument for locating points of aim under conditions wherein said points are remote from a target, an aim indicator comprising a sighting device having cooperative sights including a primary sight to be aimed at the target and a series of secondary sights to be aimed at different points remote from the target, so as to find the points of aim, for different arrow velocities, at several predetermined ranges from the target, there being a separate secondary sight for each of said ranges from the target, all of said sights being exposed for sighting in a sighting zone at one side of the sighting device, said secondary sights being at different distances from said primary sight and movable in said sighting zone toward and away from said primary sight, said secondary sights being united with the sighting device and movable simultaneously to locate any one of the secondary sights in its aiming position, and indicating means associated with said secondary sights to indicate corresponding aiming positions of the several secondary sights.

3. In an instrument for locating points of aim under conditions wherein said points are remote from a target, an aim indicator comprising a sighting device having cooperative sights including a primary sight to be aimed at the target and a series of secondary sights to be aimed at points remote from the target, so as to find the points of aim for different arrow velocities at several predetermined ranges from the target, there being a separate secondary sight for each of said ranges from the target, said secondary sights being located at different distances from said primary sight so as to locate the aiming positions of the several secondary sights with relation to said primary sight when one of said secondary sights is selectively adjusted to its aiming position, said secondary sights being in the form of spirals carried by and exposed in a sighting zone at one side of the sighting device, including a relatively steep spiraled helix serving as the sights for points of aim for the range, most remote from the target, and spirals of less pitch for the secondary sights for points of aim nearer to the target.

4. In an instrument for simultaneously indicating locations of several points of aim under conditions wherein said points are remote from a target, an aim indicator comprising a sighting device having a cylindrically shaped surface provided with cooperative sights exposed in a sighting zone at one side of said cylindrically shaped surface, said sights including a primary sight to be aimed at the target and a series of secondary sights to be aimed at different points remote from the target, so as to find the points of aim for different arrow velocities at several predetermined ranges from the target, there being a separate secondary sight for each of said ranges from the target, said secondary sights being in the form of helically shaped lines carried by said cylindrically shaped surface, said sighting device being rotatable to adjust said secondary sights, and the spirals of said helically shaped lines being varied to simultaneously move the

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secondary sights different distances in said sighting zone in response to such rotation.

5. In an instrument for locating points of aim under conditions wherein said points are remote from a target, a sighting device in the form of a cylindrical rod having a primary sight to be aimed at the target, and a series of secondary sights, located at different elevations, to be aimed at different points remote from the target, all of said sights being exposed for sighting in a sighting zone at one side of said cylindrical rod, the secondary sights being in the form of varying spirals carried by and exposed at the periphery of said cylindrical rod, and movable in response to rotary movements of said rod, so as to vary the locations of said secondary sights in said sighting zone.

6. In an instrument for locating points of aim under conditions wherein said points are remote from a target, a sighting device in the form of a cylindrical rod having a primary sight to be aimed at the target, and a series of secondary sights, located at different elevations, to be aimed at different points remote from the target, all

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of said sights being exposed for sighting in a sighting zone at one side of said cylindrical rod, the secondary sights being in the form of varying spirals carried by and exposed at the periphery of said cylindrical rod, and movable in response to rotary movements of said rod, so as to vary the locations of said secondary sights in said sighting zone, and a base pivotally connected to said cylindrical rod, said base and cylindrical rod having indicating designations associated with each other to indicate selected positions of the rod with relation to the base.

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