

June 27, 1961

A. J. BARNA
ARCHERY TARGET

2,990,179

Filed April 7, 1958

2 Sheets-Sheet 1

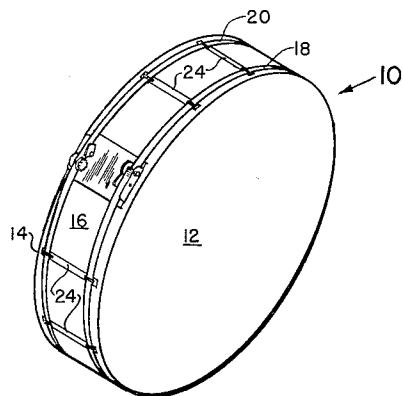


FIG. 1

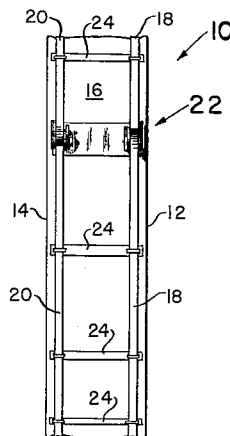


FIG. 2

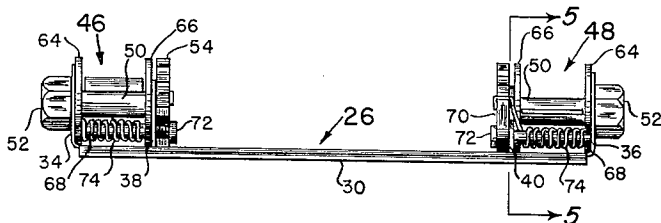


FIG. 3

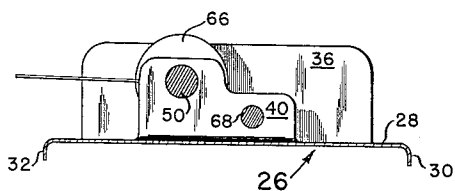


FIG. 5

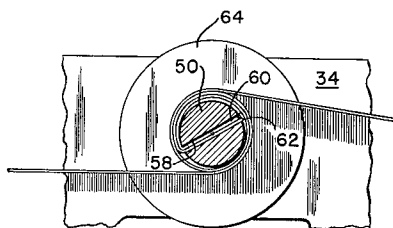


FIG. 6

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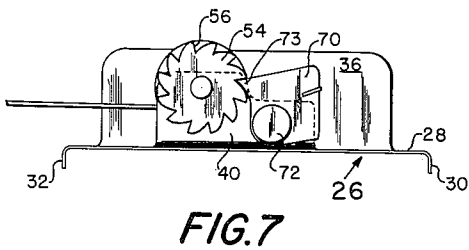
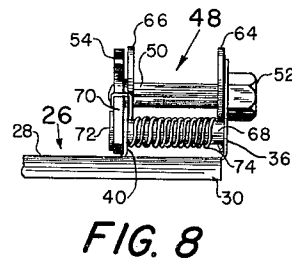
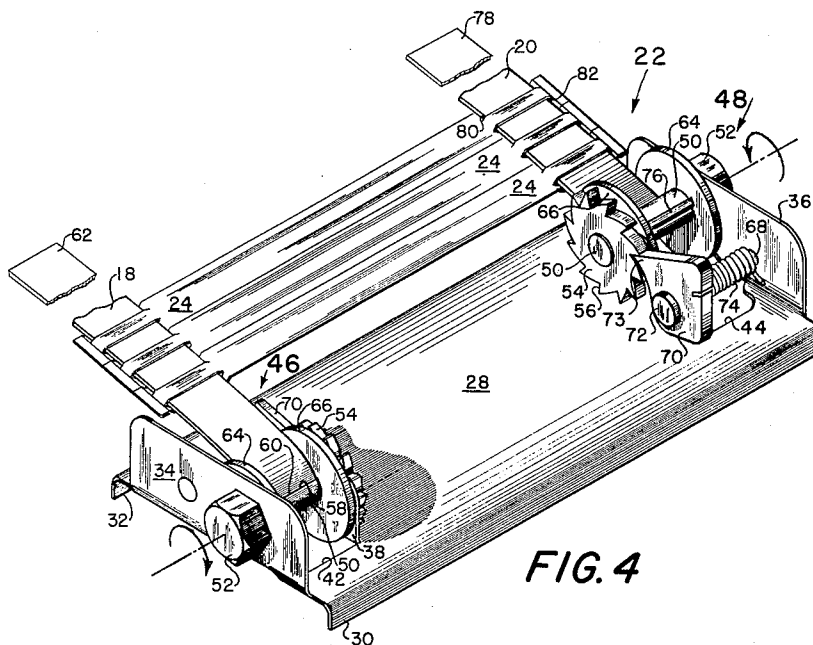
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1

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ARCHERY TARGET

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Filed Apr. 7, 1958, Ser. No. 726,895
5 Claims. (Cl. 273-102)

This invention relates to a new and improved archery target and more particularly to a target tensioning means that preserves and extends the useful life of the target.

The useful life of an archery target constructed of coiled fibrous material is determined principally by the density or compactness of the fibrous material. This is particularly true at the center of the target where a majority of the arrows strike and the target receives the largest amount of wear. When the target loses its desired compactness it literally disintegrates under the pounding of the arrows and the arrows soon begin to pass completely through the target. When this occurs, it has been the practice in the past to discard the used target and replace it with a new one. This is both an expensive and time consuming practice. In addition, it is difficult at times to judge exactly when a target is in condition for replacement so that little confidence can be placed in a used target and the archer is always risking the destruction of damage of expensive arrows.

Several methods of target construction have been proposed in the past to securely compact or compress the straws as the target is being formed. Where the straw or fibrous material is wound extremely tight and compact during the formation of the target, it has been found that the target has another undesirable characteristic in that the arrows have difficulty in penetrating the target. Therefore, to circumvent this undesirable characteristic, targets are formed with the straw having the optimum density or compactness. This permits the arrows to readily penetrate the target and yet not penetrate to an extent that the tail feathers of the arrow are damaged.

Others have proposed to include convoluted layers of fabric between the layers of straw to assist in maintaining compactness of the straw. Still others have proposed to elaborately sew the various layers of straw either to each other or to fabric convolutes. These proposals increased the expense of target construction and did not solve the problem of maintaining the same desired density of the straw during the entire life of the target.

Moisture is another variable factor that enters into the density or compactness of the straw. A target constructed of straw having a high moisture content may have the desired density at the time of its formation; however, when the target dries out and loses its moisture it has a tendency to expand and loses the desired density or compactness to a degree where the target is destined for a short span of usefulness. These methods and proposals of target construction do not, therefore, solve the problem of maintaining a desired density of straw during the entire life of the target. As above stated, this is particularly true where the moisture content of the straw changes after the target is formed.

It is now possible, with my invention, to maintain the desired density or compactness of the straw so that it may be used for a longer period of time. I have found by encircling the side wall of the target with metal straps and exerting a tension on the straps that the desired density or compactness of the straw may be achieved. My invention also provides a means to increase the tension on the straps when, through usage or otherwise, the density of the straw decreases below its desired density. The tension on the straps can also be relieved when the density of the straw exceeds the desired density. My tensioning means includes a ratchet and pawl type mechanism that maintains the desired tension on the flexible

2

metallic straps. The tension forces so exerted are distributed so that my tensioning means does not tend to penetrate the side wall of the target.

Accordingly, the principal object of this invention is to provide a fibrous archery target that maintains its desired compactness after extended use.

Another object of my invention is to provide an archery target in which the density or compactness of the fibres can be changed after its formation.

A further object of my invention is to provide a target tensioning means that is easily secured to and removed from the fibrous target disc; a tensioning means that is sturdy in construction and able to sustain the high tension loads required to compress the target.

This invention comprises the new and improved construction and combination of parts, their operating relation to each other which will be described more fully hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

In the accompanying drawings to be taken as part of this specification, I have fully and clearly illustrated my invention, in which drawings:

FIGURE 1 is a perspective view of my improved archery target.

FIGURE 2 is a view of my improved archery target in side elevation.

FIGURE 3 is a view in side elevation of my tensioning means.

FIGURE 4 is an enlarged perspective view of my tensioning means.

FIGURE 5 is a view in section taken along the line 5-5 of FIGURE 3 and illustrating the inner support for the spool.

FIGURE 6 is a fragmentary sectional view of a spool illustrating the longitudinal slot in the shaft.

FIGURE 7 is a view in elevation of a ratchet and pawl locking means.

FIGURE 8 is an enlarged view in side elevation of a portion of my tensioning means illustrated in FIGURES 3 and 4.

Referring to the drawings and more particularly to FIGURES 1 and 2 there is illustrated my improved archery target generally designated by the numeral 10 constructed of fibrous material such as hay, straw or the like. The target 10 is disc shaped and has a pair of substantially planar face portions 12 and 14 and a circular side wall 16. In practice a fabric scoring indicator is usually secured to one of the face portions to indicate the skill exhibited by the archer.

The side wall portion 16 has a pair of flexible metallic straps 18 and 20 extending therearound in hoop like fashion. The end portions of the straps 18 and 20 are connected to a tensioning means generally designated by the numeral 22 which, as will be later explained, exerts a tension on straps 18 and 20 to thereby compress or compact the straw therebetween. A plurality of longitudinal spacer members 24 are connected to both straps 18 and 20 and maintain them in proper spaced parallel relation to each other and also adjacent the respective face portions 12 and 14. With the tensioning means 22 longitudinal tensions are exerted in opposite directions on the straps 18 and 20 to thereby compress the straw therebetween and increases its density or compactness. When, through extended use, or otherwise, the target loses its desired compactness, through tension means 22 additional tension may be exerted on the straps 18 and 20 to further compact the straw and again increase its density to the desired density. When it is found that the straw is too compact the tension on straps 18 and 20 may be decreased until the target expands and the compactness of the straw lowered to a desired degree. At times, in order to obtain desired compactness at the radial center of the target,

3

tension forces in the vicinity of 1,000 pounds must be exerted on the straps 18 and 20. These tension forces in turn, exert a high twisting force on the structure of the tensioning means 22 so that it must be of sturdy construction.

It should also be noted that the straps 18 and 20, spacers 24 and tensioning means 22 may be easily removed from the fibrous portion of the target and used on other targets. Thus, in target replacement, only the fibrous disc need be replaced. The tensioning means may be reused as desired.

The tensioning means 22 is illustrated in detail in FIGURES 3, 4, 5, 6, 7 and 8. Referring particularly to FIGURES 3 and 4, the tensioning means 22 has a rectangular base plate 26 with a longitudinal dimension substantially equal to the longitudinal dimension of the target side wall 16. The base plate 26, constructed of heavy gauge metal, has a body portion 28 with a pair of down turned longitudinal edge portions 30 and 32 and a pair of upturned lateral end portions 34 and 36. The body portion 28 has a second pair of upturned portions 38 and 40 which are formed from the body portion 28 and extend substantially parallel to and are adjacent to the respective upturned end portions 34 and 36. A detail view of upturned portion 40 appears in FIGURE 5. Because of the upturned intermediate portions 38 and 40 being formed from the base plate body portion 28, there are a pair of lateral slots 42 and 44 in the body portion 28 adjacent to the upturned end portions 34 and 36. The upturned portions 34, 36, 38 and 40 serve principally as a supporting means for a pair of spools 46 and 48 and will therefore be also referred to as supporting means.

Supporting means 34 and 38 are positioned in spaced relation to each other and have two pair of aligned (unnumbered) apertures extending therethrough. The spool 46 has its shaft 50 extending through and rotatably supported in one pair of these apertures. One end portion of the shaft 50 terminates in an expanded hexagonal head portion 52 that abuts the external surface of support 34 and is readily accessible for a wrench like tool that is employed to rotate the spool 46. Secured to the other end of the shaft 50 is a ratchet wheel 54 having pawl receiving portions 56. The ratchet wheel 54 is secured to the shaft 50 by means of welding or the like and abuts the inner surface of support 38. The shaft 50 has a longitudinal slot 58 extending therethrough which receives the free ends 60 and 62 of strap 18. A pair of washers 64 and 66 are positioned on the shaft 50 and are rotatable relative thereto. The washers 64 and 66 abut the inner surface of support 34 and outer surface of support 38 and literally form vertical side walls for the spool 46. The washers 64 and 66 guide the spooling of portions of strap 18 on the shaft 50 so that a greater amount of the strap 18 may be spooled or wound on the shaft 50. The slot 42 in the base plate body portion 28 provides space for the spooled strap and washers 64 and 66.

Another shaft 68 extends through and is secured in a second pair of apertures in the supports 34 and 38 in spaced parallel relation to the spool 46. The shaft 68 carries a pawl 70 thereon and the shaft head portion 72 maintains the pawl 70 in abutting relation with the interior surface of support 38. The pawl 70 is rotatable on shaft 68 and has a pointed end portion 73 that is urged into the pawl receiving portions 56 of ratchet wheel 54 by means of the coiled spring 74 extending around shaft 68.

With the above construction, as the hexagonal head 52 of spool 46 is rotated in a clockwise direction both ends 60 and 62 of strap 18 are spooled thereon. The pawl 70 and ratchet wheel 54 prevent counter rotation of spool 46 to thereby maintain any tension exerted on strap 18. To release the tension and unwind the portion of strap 18 wound on spool 46, the pawl 70 is rotated against the compressive force of spring 74 until the pointed end 73 is free of the pawl receiving portion 56.

4

At the opposite end of the base plate 26, the spool 48 is similarly supported in support members 36 and 40. Like reference characters are used to designate similar parts. The ratchet wheel and pawl assembly of spool 48 are arranged, however, to limit counter rotation in a counter clockwise direction facing the hexagonal head 52 of spool 48. Because of the endwise arrangement of spools 46 and 48, to spool the straps 18 and 20 on the respective spools 46 and 48, the spools must be rotated in opposite directions to each other. This is clearly illustrated in FIGURE 4 by the arrows adjacent the respective hexagonal heads 52.

With this arrangement the torsional forces of spools 46 and 48 oppose each other so that there is no tendency for the base plate 26 to rotate or to dig into the fibrous material of side wall 16.

The metallic strap 20 also has end portions 76 and 78 that are inserted in the slot 58 of spool 48. The spacers 24 have a pair of longitudinal slots 80 and 82 at each end through which the respective straps 18 and 20 are threaded. The spacers 24 are slidable on the straps 18 and 20 and are distributed around the target side wall 16.

Operation

The tensioning means 22 is assembled with the end portions 60 and 76 of respective straps 18 and 20 secured in the spool slots 58. The spacers 24 are threaded on the straps 18 and 20 (FIG. 4) and the remainder of the straps 18 and 20 is coiled for shipment. The tensioning means 22 is positioned on the target side wall 16 with the underside of base plate 26 abutting the fibrous material. Straps 18 and 20 are then positioned around the target side wall 16 (FIGS. 1 and 2) and their other free ends 62 and 78 threaded into the respective spool slots 58 and drawn hand tight to form a pair of hoops around the target side wall 16. The spacers 24 are spaced around the target side wall 16 and excess portions of the free ends 62 and 78 of straps 18 and 20 extending through the slots 58 are cut off. The spools 46 and 48 are rotated in opposite directions to each other as previously described until the desired tension is exerted on straps 18 and 20 to compress or compact the fibrous materials, thus providing the desired density for the fibrous material.

After extended use of the target, or where the arrows penetrate too deep into the target face, the spools are again rotated until the desired fiber density or compactness is again achieved.

The tensioning means 22 and straps 18 and 20 can be easily removed from the target side wall 16 by releasing pawls 70 and rotating spools 46 and 48 until the straps 18 and 20 are unwound therefrom.

According to the provisions of the patent statutes, I have explained the principle, preferred construction, and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. An archery target comprising a disc of fibrous material, said disc having a pair of substantially planar face portions and a cylindrically shaped side portion, a base plate abutting said disc side portion, a spool having longitudinal slotted portions, said spool carried by said base plate and rotatable relative thereto, ratchet means secured to said spool, a flexible metallic strap secured at one end in said spool slotted portion and extending around said disc side portion, said flexible strap having its other end secured in said slotted portion to form a hoop around said disc side portion, said spool arranged upon rotation to wind portions of said strap end portions thereon to tension said strap and thereby reduce the diametrical dimension of said hoop and compress said fibrous material therebetween, and pawl means associated with said ratchet to

5

limit counter rotation of said spool and thereby maintain tension on said strap.

2. An archery target comprising a disc of fibrous material, said disc having a pair of substantially planar face portions and a cylindrically shaped side portion, a base plate abutting said disc side portion, a pair of spools each having a longitudinal slotted portion, said spools carried by said base plate in spaced relation to each other and rotatable relative to said base plate, a pair of flexible metallic straps each secured at one end in said respective spool slotted portion and extending around said disc side portion in spaced parallel relation to each other, said flexible straps each having their other end secured in the same respective spool slotted portion in overlying relation with said first named strap end portion, said straps thereby forming a pair of flexible metallic hoops around said disc side portion, said spools arranged upon rotation to wind portions of said respective straps thereon to thereby tension said straps, reduce the diametrical dimension of said hoops and compress said fibrous material therebetween, said spools each having a ratchet wheel secured thereto, and pawl members associated with each of said ratchet wheels to lock and limit counter rotation of said spool and thereby maintain tension on said straps, said ratchet wheels and said pawl members arranged in a manner to restrain counter rotation of said spools in opposite directions so that the tension forces exerted by said straps are opposite to each other.

3. A tensioning device for an archery target of fibrous material comprising a pair of flexible straps encircling said archery target, a base plate, a pair of spools rotatably mounted on said base plate, said spools each having a longitudinal slot therethrough adapted to receive the end portions of said respective flexible straps, said spools arranged upon rotation to wind portions of said respective straps thereon to tension said straps and compact said archery target fibrous material, and locking means for each of said spools, said locking means including ratchet wheels secured to each of said spools, pawl members carried by said base plate in engageable relation with said respective ratchet wheels, means urging each pawl member into engagement with said respective ratchet wheel to thereby prevent counter rotation of said spools, said locking means arranged to restrain the counter rotation of said spools in directions opposite to each other so that the tension exerted by one of said spools will oppose the ten-

6

sion exerted by the other of said spools to thereby maintain said archery target fibrous material in a compact condition.

4. A tensioning device for an archery target of fibrous material comprising strap means encircling said archery target, a base plate, spool means rotatably mounted on said base plate, said strap means secured at one end to said spool means, said spool means having receiving means for the other end portion of said strap means, said spool means arranged upon rotation to wind portions of said strap means thereon to tension said strap means and thereby compact said archery target fibrous material, and locking means associated with said spool means and operable to prevent counter rotation of said spool means to thereby maintain said archery target fibrous material in a compact condition.

5. An archery target of fibrous material having a base portion and a side portion, a spool having a longitudinal slotted portion, means carrying said spool in rotatable relation thereto, a flexible metallic strap secured at one end in said spool slotted portion and encircling said target side portion, said flexible strap having its other end secured in said spool slotted portion to form a hoop around said target side portion, said spool arranged upon rotation to wind portions of said strap end portion thereon to tension said strap and thereby reduce the diametrical dimension of said hoop and compress said fibrous material therebetween, and locking means associated with said spool operable to limit counter rotation of said spool and thereby maintain tension on said strap.

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