The present invention is an apparatus for holding sporting equipment. The apparatus includes a pair of J-shaped or U-shaped tubular arms spaced apart from one another and in a generally equivalent horizontal position. At least one flexible support is suspended between the opposing ends of each tubular arm so that lateral supports, in combination, support the sporting equipment thereon without the equipment contacting the arms.
SPORTING EQUIPMENT SUPPORT SYSTEM

CROSS REFERENCE

[0001] The following related application is hereby incorporated by reference for its teachings:


[0003] This invention relates generally to a sporting equipment support system and more particularly to an adjustable wall or rack-mountable system for the storage and display of sporting equipment, watercraft such as kayaks, canoes and articles associated therewith.

BACKGROUND AND SUMMARY OF THE INVENTION

[0004] The present invention is directed to a sporting equipment hammock, including adjustable and swinging supports, and suspension straps for providing a uniform support to sporting equipment including personal watercraft such as kayaks, sea kayaks, canoes, etc.

[0005] In accordance with the present invention, there is provided a rack for holding sporting equipment, comprising: a pair of parallel vertical members, laterally-spaced in relation to each other; a pair of tubular arms each mounted on one of said vertical members using a mounting bracket at generally equivalent heights, said arms being substantially parallel and extending outward, generally perpendicular to the surface; at least one flexible support suspended between an inward end and an outward end of each tubular arm; and wherein the mounting bracket associated with each tubular arm allows the tubular arm to pivot with respect to the mounting bracket so that said arm may be rotated from a stored position generally parallel with the surface to a support position generally perpendicular to the surface.

[0006] In accordance with another aspect of the present invention, there is provided an apparatus for storing sporting equipment, comprising: a pair of tubular arms each mounted on a surface using a mounting bracket at generally equivalent heights, said arms being substantially parallel and extending outward and perpendicularly to the surface; at least one flexible support suspended between an inward end and an outward end of each tubular arm; and wherein the mounting bracket associated with each tubular arm allows the tubular arm to pivot with respect to the mounting bracket so that said arm may be rotated from a stored position to a support position generally perpendicular to the surface.

[0007] One aspect of the invention deals with a basic problem in the storage or display of sporting equipment such as kayaks, surf boards, wind surfers, etc.—the longitudinal and lateral support of equipment that is not flat in shape and that has varying contours amongst the types and designs of watercraft. In other words, unless a system is able to conform to the watercraft or equipment being stored, it may either fail to support the equipment adequately, or may potentially damage the equipment. This aspect is further based on the discovery of a technique that alleviates this problem. The technique employs a rack, support arms and flexible supports whereby the equipment may be supported over a portion thereof without actually touching or riding on rigid surfaces. The techniques described herein are advantageous because they are both simple and flexible in their application, allowing for a common rack system to be employed for a variety of equipment types. Moreover, the rack system may be employed not only as a storage device for use by consumers, but also as an adaptable display device that may be used by retailers and others. As a result of the invention, users of kayaks, surf boards, wind surfers and other sporting equipment may have a convenient way of storing and displaying such equipment.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1, is a perspective illustration of an embodiment of the present invention used to store sporting equipment in the nature of personal watercraft;

[0009] FIG. 2, is a side orthogonal view of an alternative application of the present invention;

[0010] FIG. 3 illustrates an embodiment of the flexible support element of the present invention;

[0011] FIGS. 4 and 5 are side views of the tubular arms in accordance with exemplary arms depicted in FIGS. 1 and 2;

[0012] FIG. 6 is a illustrative representation of one embodiment for attaching the flexible support to the tubular arm;

[0013] FIG. 7 is a top view of the embodiment of FIG. 6;

[0014] FIG. 8 is a representation of an alternative embodiment for attaching the flexible support to the tubular arm;

[0015] FIGS. 9 and 10 are top views of the embodiment of FIG. 6 showing further alternative wire loop configurations;

[0016] FIGS. 11, 12 and 13 are perspective illustrations of various embodiments of the mounting bracket and adjustable attachment mechanisms of the present invention; and

[0017] FIG. 14 is an orthogonal view of the mounting bracket of FIGS. 11-13, in a pre-formed condition.

[0018] The present invention will be described in connection with a preferred embodiment, however, it will be understood that there is no intent to limit the invention to the embodiment described. On the contrary, the intent is to cover all alternatives, modifications, and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] For a general understanding of the present invention, reference is made to the drawings. In the drawings, like reference numerals have been used throughout to designate identical elements.

[0020] Referring to FIG. 1, there is shown a perspective illustration of an embodiment of the present invention used to store sporting equipment in the nature of personal watercraft. More specifically, a rack 120 is employed to support one or more kayaks 126 on pairs of tubular arms 146, 148 and 150, wherein the heights or positions of the arms are adjustable on the rack. However, the rack may be employed to support other sporting equipment such as skis, hanggliders, sailboards and wind surfers, sails, etc. as the present
invention is particularly adapted to provide lateral suspension of such equipment while stored. It is also contemplated that the particular support assemblies, as will be further described below, may be mountable on a wall or similar self-supporting structure, but for purposes of the description are described with respect to rack 120. It is further contemplated that, although depicted with three tubular arm configurations on rack 120, it is possible to interchange arm shapes so as to customize the rack to the needs of the user.

[0021] Referring also to FIG. 2, rack 120 may alternatively include a vertical support surface 131, where tubular support arms 150 may be spaced apart from one another a distance of between 1.5 meters and 3.0 meters. It will be appreciated that the horizontal distance separating the members 130 and 132 is, to a large extent, dependent upon the length of the items being supported by the rack. The vertical members, and indeed many of the elements of the rack 120, may be manufactured from hardwoods, metal or even plastic components, although metal is believed preferable for weather resistant reasons. As noted above, equivalent to the vertical support members 130 and 132 is a wall or other generally vertical surface 131 upon which the support system described herein may be mounted. Use of metal components may require painting or other surface treatments (e.g., anodizing) in order to assure that the components do not corrode with exposure to moisture. Moreover, use of metal components, as contemplated herein, may also require the addition of sealing and/or drainage means in the event that such components are used outdoors.

[0022] Members 130 and 132 are maintained in an upright position through one of a plurality of supporting mechanisms. In the embodiment depicted in FIG. 1, members 130 and 132 may be maintained in an upright position via a base or floor supports 140 and 142, respectively. As depicted in the figures, the bases are attached to the bottoms of vertical members 130 and 132, so as to support the vertical members in a generally upright position. While depicted as extending perpendicularly outward from a plane defined by the vertical members, it is also possible that the bases extend rearwardly as well, so as to allow rack 120 to support equipment by placing pairs of tubular arms (e.g., 146, 148 or 150), or mixed combinations thereof, on either the front or rear sides of the vertical members 130 and 132. Lastly, it also possible to support J-shaped or U-shaped pairs of arms 146, 148 and 150 on a wall or similar vertical surface 131, for example as depicted in FIG. 2.

[0023] Referring to FIG. 2, which is an orthogonal view at the end of a kayak 126 of FIG. 1, the vertical member 130, or a wall 131, provide structural support for the J-shaped arm 150, so that pairs of arms may be adjusted to support sporting equipment such as the kayak 126. Each of the pairs of arms, although differing in actual size and configuration, are generally “U” or “J” shaped (FIGS. 4 and 5) and are adjustably coupled to a first one of the respective first or second vertical members 130 or 132. As placed on the vertical members, the arms are preferably substantially parallel and horizontally aligned, extending forward or rearward in a direction generally perpendicular to a plane defined by the vertical members.

[0024] Also included in the rack system 120, in situations where the vertical members are not attached to a wall, is at least one and preferably two bridge members (122 and 124) that serve to retain the vertical members in a spaced-apart relationship. The bridge members may be manufactured from the same materials as the vertical members, and may be reinforced or constructed with an “L” shaped or “U” channel cross-section so as to withstand forces tending to bend or buckle the bridge members when heavy sporting equipment is supported by the storage system 120.

[0025] As will be noted by a close examination of FIGS. 1 and 2, the kayak 126 is not supported directly upon the arms 150, but is preferably supported by a fabric strap 160 or an equivalent flexible support suspended from opposite ends of the arms. In an alternative embodiment, the strap may be further extended so as to continue from the outward end of the arm to the inward end of the second arm of the horizontal pair. Strap 160 is preferably made from woven polyethylene fiber, and may also be made from nylon, polyester, and other synthetic or natural fibers. The straps are of a size of approximately 3 centimeters wide and 2 millimeters thick, however alternative widths and thicknesses may be used depending upon the weight of the load to be supported by the straps.

[0026] For example, referring to arm 150 in FIG. 2, along with FIG. 3, strap 160 extends from the inward end of the first arm at location 162, where it is attached, to the outward end of the same arm, location 164, where it is additionally attached. More specifically, the inward end of the strap 160, may be permanently attached to a looped pin 200 by passing the strap material through the looped pin and doubling it back on itself before stitching as indicated by dashed lines 214. On the opposite end, the strap preferably contains a hook and loop fastening mechanism, where hook region 210 is at the end thereof and loop region 212 is placed toward the middle of the strap. Hook region and the end of the strap may then be passed through a metal loop or equivalent fastening means on the end of arm 150, and doubled back on to the loop region to provide an adjustable length for the strap.

[0027] It will also be appreciated that it may be possible to employ a double-back buckle or similar mechanism to enable the outward end of strap 160 to be threaded through loop 158 and adjustably anchored to itself. Alternatively, it is also conceivable that strap 160 is made to a predetermined length based upon the arm dimensions and that it is not adjustable on one end as described above. This is more fully illustrated by the top view of the end of arm 150 as depicted in FIG. 10. Strap 160 provides at least one flexible longitudinal support suspended between the inward and outward ends of arm 150. In a preferred embodiment, a second strap 168 (FIG. 1) is similarly suspended on the second arm and, as mentioned above, straps may also be suspended between a pair of arms to provide longitudinal support to the equipment as well. Thus, the straps 160 and 168, either alone or in combination, provide lateral support for the equipment being supported by the arms, yet keep the equipment from contacting the arms themselves.

[0028] It will be further appreciated that similar flexible support means such as a woven netting or mesh (open weave), a strong fabric such as canvas (closed weave) and combinations of straps, netting and/or canvas may be employed to provide equipment support. Furthermore, open and closed weave fabrics may also be employed in the present invention to provide storage for associated gear such
as paddles, lifejackets, etc. It is also contemplated that the arms may include hooks or other suspension mechanisms to allow for the storage of gear suspended beneath the arms.

[0029] Turning next to FIGS. 4 and 5 there are depicted orthogonal views of two exemplary arm shapes. In particular, FIG. 4 shows a J-shaped arm 150, whereas FIG. 5 shows a U-shaped arm 148. It will be appreciated that various shapes may be employed for the arms in accordance with the nature of the present invention, and the intention is not to be specifically limited to the shapes illustrated for purposes of explanation. Both arms are preferably formed from 0.875-inch diameter, round tubing stock having a wall thickness of about 0.065 inches, although other standard tubing sizes may be employed. The material employed is preferably aluminum, although various steel alloys and other metals may also be used. The J-shaped arm 150 is formed from stock cut to approximately 33 inches in length (before bending), whereas the U-shaped arms 146 and 148 are approximately 36 inches in length.

[0030] Each of the arms includes a vertical inward section 170 that transitions to a first middle section 172 and a second middle section 174 and finally an outward vertical section 176. For the J-shaped arm of FIG. 4, the angle formed between sections 170 and 172 is approximately 45-degrees, between sections 172 and 174 about 60-degrees and between sections 174 and 176 about 75 degrees. Similarly, for the U-shaped arm, the respective angles are 90-degrees, 15-degrees and 75-degrees. As will be appreciated from an examination of FIG. 1, arms 146 are also U-shaped arms that have only a single middle section between the vertical sections. Along a bottom of each tubular arm (146, 148, and 150), preferably at a low point thereof, a small weep hole 160 or slot may be cut so as to provide for the egress of any water that may seep into the tubing, thereby reducing the likelihood of water accumulating in the tubular arm and causing rust or other damage.

[0031] Each of the arms also includes a wire form loop 158, at the end thereof. In one embodiment, depicted in FIG. 6, the loop is a detachable loop affixed to the outward end 64 of the arm using a drilled hole 159 or milled slot into the end thereof. As shown in FIG. 7, which illustrates a top view of the end of the tube 150, the T-shaped end of the wire form loop 158 is preferably inserted into the slot and turned so that it may not be withdrawn when strap 160 is pulled in the direction of arrow 157. Referring again to FIG. 6, end cap 161 may be employed to both close off the end of the tubular arm 150 and to retain the T-shaped end of loop 158 therein.

[0032] In the alternative strap attachment embodiment of FIGS. 8, 9 and 10, the attachment mechanism 200 may include a wire-form loop 220 having an inward-facing pin end 222 that is inserted into hole 178 so as to “lock” or attach the pin end of the wire form to the end of the tubular arm 150. As depicted in FIGS. 9 and 10, which are alternative top views of the tube 150 having the wire form 158 inserted therein, the wire form loop 158 may be of a generally rectangular shape (FIG. 9) or of a rounded shape (FIG. 10). In yet another alternative, the loop 158 may be welded or otherwise permanently affixed to the end of the tubing. As illustrated between the dashed and solid lines depicted in FIGS. 9 and 10, the pin-loop 200 is inserted over the end of the tubular arm, and the pin 222 is inserted into hole 178 in tube 150. In this way pin 222 and pin loop 200 serve to hold the strap to the arm, and the arm 150 in bracket 190 as depicted in FIG. 11.

[0033] Similarly, as depicted in the alternative arrangements of FIGS. 11 and 12, on the inward end of each of the arms (e.g., 146, 148, 150), there is preferably a hole or slot 179 cut into the tubular arms to receive the end of a second wire form loop to anchor the opposite end of belt 160. As with the first end of the belt, the wire form loops may be of a design having a T-shaped end for retaining them in the tubular arm 150, or they may be of the inward-facing pin design as previously described and depicted in detail in FIGS. 9 and 10.

[0034] Referring again to FIGS. 1 and 2 in conjunction with FIGS. 11 through 14, details of the mounting bracket 190 will be described. As employed with the present invention, mounting bracket 190 is preferably a U-shaped device that includes an upper arm support element 192 and a lower arm support element 194, with a mounting member 196 therebetween. The upper and lower arm supports preferably have holes 198 cut therein, where the diameter of the holes is suitable to receive the tubular stock of arms 146, 148 and 150 therethrough. Mounting member 196 further includes at least one, and preferably two or more mounting holes 200, in one embodiment, for receipt of a screw 197 (FIG. 2) or similar fastening means (e.g., lag bolt and nut 199 in FIG. 12) by which the bracket 190 may be affixed to a vertical support 130, 132 or a wall 131, as described above. It is contemplated that the shape of holes 200 may be of an inverted key-hole shape to enable easy mounting, however, safety and manufacturing costs suggest that a circular hole is preferred so as to avoid accidentally dislodging the bracket from the vertical surface. As illustrated in FIGS. 11 and 13, the upper arm support element 192 further includes a pair of flanges 202 that extend in an upward direction for purposes that will be discussed below. The alternative embodiment of the mounting bracket 190, as shown in FIG. 12, does not include the upward-facing flanges 202.

[0035] In one embodiment, C-shaped bracket 190 is preferably manufactured from stainless steel alloy or from cold-rolled steel having a thickness of approximately 0.0897 inches (13 gauge), and is bent or formed along the dashed lines shown in FIG. 14 so as to produce the C-shaped bracket as depicted in FIGS. 11-13. Referring again to FIGS. 11-13, bracket 190 is preferably designed to hold the inward, vertical section of arms 146, 148 and 150 in a swiveling or pivotable manner, meaning that the arms may be retained in a support position perpendicular to surface 130, or a stored position parallel to the surface 130. It is believed that the swiveling nature of the arms is desirable as it allows for the arms to be extended only when needed for storage of equipment, and to otherwise be “folded” to store against the rack or vertical surface 130. This is believed to be of particular value in a confined storage region such as the interior of a garage, where the present invention might find particular use for the storage of kayaks or other equipment along the side of the garage, yet the swiveling nature would prevent someone from being injured in the event they walked into the arms when they were not supporting equipment.

[0036] Referring again to FIGS. 11-14, a further aspect of the present invention will be described. As noted above
bracket 190, in combination with tubular arms 146, 148 and 150, provides a swivel or pivotable mounting mechanism. For example, a comparison between FIGS. 11 and 13 shows the tubular arm in its respective stored and extended positions. However, as will be appreciated, the arms should not pivot as a user is attempting to place or remove a piece of equipment on the storage system, but should remain in a generally outward orientation as illustrated in FIG. 13. Accordingly, the present invention contemplates the use of the pin loop 200, located at the inward end of the strap 160, as a means not only for connecting the strap to the inward end of the arm, but also as the means by which the arm is retained within the bracket 190, yet allowed to pivot. To assemble the arm and the bracket, a user would insert the vertical, inward end of the arm into the lower and then upper holes of the bracket. Next, the user would insert the pin end of clip 200 into hole 179 so as to assure that the wire form loop 137 is inserted into the strap to the tubular arm and prevents the arm from falling downward. In other words, because the holes in the bracket that receive the tubular arm are close in dimension to the outer diameter of the tubular stock, the loop and its pin are suitable for retaining the tubular arm in the desired position. It will be appreciated, however, that alternative means for retaining the tubular arm in the bracket may be employed, including screws, clips or pins. The various wire form loops, both pin and T-shaped designs, are preferably formed from at least 0.09-inch diameter stainless steel (13 gauge) wire.

Furthermore, as shown in FIGS. 11 and 13, the flanges 202 of bracket 190 serve to retain the pin loop 200 therein and thereby prevent the arms from easily rotating relative to the bracket. Moreover, it is contemplated that while the pin loop 200 may be placed over or removed from the end of arm 150, when the strap 160 is inserted through the pin loop, there is insufficient clearance for the pin 222 to be removed from hole 178, thereby assuring that the arm will not accidentally be separated from the bracket 190.

In the alternative embodiment depicted in FIG. 12, a T-shaped wire form loop 158 is employed in much the same manner as previously described. A slot 179 is milled into the tubular arm, and the T-shaped end of the wire form loop 158 is inserted therethrough and then turned ninety degrees to “lock” the wire form loop to the tube. Again, when this is done while the tube is inserted into bracket 190, the tubular arm will be prevented from sliding downward and will be pivotably retained within the bracket.

Referring specifically to FIGS. 11 through 13, there are also depicted alternative attachment mechanisms for fastening the bracket 190 to the vertical supports 130 and 132 of rack 20 (FIG. 1). FIGS. 11 and 13 illustrate an adjustable mounting mechanism that employs a pair of common screw-eyes 250 and 252, and preferably two pair per bracket/arm. In the embodiment illustrated in FIG. 11 for example, the conventional screw-eyes are bent to have a ninety-degree angle at a point (256) on the midsection thereof. In this way, the pair of screw-eyes may be made to encompass the bracket and vertical support, with the ability to tighten the mounting mechanism by turning the nut 260, thereby securing the bracket to the vertical support 130, 132. It will be appreciated that a wing-nut may be substituted for nut 260 in order to make the mounting mechanism easier to assemble or adjust.

FIG. 12 illustrates an alternative attachment mechanism, wherein a pair of backing plates 270 and 272 are placed on opposite sides of the vertical support 130, 132, and are brought into a clamping relationship with one another via screws 276 (only one shown). As the user tightens screws 276, the pair of backing plates 270 and 272 has a pair of screw legs welded thereto or otherwise extending from the plates, through the holes in bracket 190. Hence, the bracket 190 may be attached to the backing plates using conventional hex nuts 199.

Lastly, FIG. 1 further depicts yet another improvement to the storage system 20, where a netting layer 280 may be strung or supported along a lower region of the rack 120. Netting 280 is preferably of a cargo netting design and may be made from numerous materials, including polypropylene, Nylong® or other natural or man-made woven fabric web or netting materials. Also, netting 280 may include elastic elements therein, or may be mounted or attached to rack 120 with such elements, so as to assure that the netting remains taught and suspended above the ground or floor below the rack, even when equipment or gear is stored thereon.

In recapitulation, the present invention is an apparatus for holding sporting equipment and accessories, wherein the apparatus may be used independently or in conjunction with a rack assembly. The invention includes at least a pair of U-shaped or J-shaped arms spaced apart from one another and in a generally equivalent horizontal position. Each of the arms includes a web or strap suspended from the ends of the arm to support a piece of equipment on the strap without contacting the arms. The arms are also pivotable within respective mounting brackets between a storage position and an extended position.

It is, therefore, apparent that there has been provided, in accordance with the present invention, an apparatus for storing and displaying equipment. While this invention has been described in conjunction with preferred embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. Accordingly, it is intended to embrace all such alternatives, modifications and variations that fall within the spirit and broad scope of the appended claims.

I claim:
1. A rack for holding sporting equipment, comprising:
a pair of parallel vertical members, laterally-spaced in relation to each other;
a pair of tubular arms each mounted on one of said vertical members using a mounting bracket at generally equivalent heights, said arms being substantially parallel and extending outward, generally perpendicular to the surface;
at least one flexible support suspended between an inward end and an outward end of each tubular arm; and
wherein the mounting bracket associated with each tubular arm allows the tubular arm to pivot with respect to the mounting bracket so that said arm may be rotated
from a stored position generally parallel with the surface to a support position generally perpendicular to the surface.

2. The rack of claim 1, wherein the rack further includes: a base to which the vertical members are attached at their respective bottoms; and at least one bridge member spanning between the respective vertical members, wherein the combination of the base and the bridge provides sufficient support to retain the vertical members in a generally vertical, spaced-apart position.

3. The rack of claim 1, wherein said rack further includes an adjustable attachment mechanism associated with each of said mounting brackets so that said tubular arms may be moved in a vertical direction along the respective vertical member.

4. The rack of claim 1, wherein said flexible support is a fabric strap.

5. The rack of claim 4, wherein at least one end of said flexible support is affixed to said tubular arm using a wire form loop.

6. The rack of claim 5, wherein said wire form loop includes a T-shaped end thereon for insertion through a slot and into an interior region of said tubular arm.

7. The rack of claim 5, wherein said wire form loop includes a pin end thereon for insertion through a hole and into an interior region of said tubular arm.

8. The rack of claim 7, wherein said mounting bracket further includes at least one flange to retain the wire form loop therein and thereby prevents the arms from freely rotating relative to the mounting bracket.

9. The rack of claim 1, wherein the tubular arms are formed in a J-shape.

10. The rack of claim 1, wherein the tubular arms are formed in a U-shape.

11. An apparatus for storing sporting equipment, comprising: a pair of tubular arms each mounted on a surface using a mounting bracket at generally equivalent heights, said arms being substantially parallel and extending outward and perpendicularly to the surface; at least one flexible support suspended between an inward end and an outward end of each tubular arm; and wherein the mounting bracket associated with each tubular arm allows the tubular arm to pivot with respect to the mounting bracket so that said arm may be rotated from a stored position to a support position generally perpendicular to the surface.

12. The apparatus of claim 11, wherein said flexible support is a fabric strap.

13. The apparatus of claim 12, wherein at least one end of said flexible support is affixed to said tubular arm using a wire form loop.

14. The apparatus of claim 13, wherein said wire form loop includes a T-shaped end thereon for insertion through a slot and into an interior region of said tubular arm.

15. The apparatus of claim 13, wherein said wire form loop includes a pin end thereon for insertion through a hole and into an interior region of said tubular arm.

16. The apparatus of claim 15, wherein said mounting bracket further includes at least one flange to retain the wire form loop therein and thereby prevents the arms from freely rotating relative to the mounting bracket.

17. The apparatus of claim 11, wherein the tubular arms are formed in a J-shape.

18. The apparatus of claim 11, wherein the tubular arms are formed in a U-shape.