A ladder storage rack is provided that can be mounted to a surface. The ladder storage rack includes at least one strut having first and second opposing ends, a top side, a bottom side and a means for substantially horizontally mounting the strut to said surface, a sliding mount movably connected to the bottom of the at least one strut that slideably moves horizontally between the first and second ends of the strut, a fixed mount attached to the at least one strut between the sliding mount and one of the first and second ends and a means connected to the sliding mount for urging the sliding mount towards the fixed mount.
SLIDING LADDER AND EQUIPMENT RACK

[0001] The present invention is a sliding ladder rack for providing an adjustable sliding mount that connects to universally available hanger struts (some brands are commonly referred to as “Unistrut” or “B-Line”) to easily slide and hold a ladder inside a vehicle without having to enter the vehicle or use additional straps or clamping devices to maintain a secure mount. The ladder rack can be used on the interior ceiling of a vehicle which is the area least occupied on most vehicles, but may also be mounted in many other environments and locations. Placing the ladder inside the vehicle keeps the ladder clean, and avoids damage by not being in contact with other items being stored in the same cargo space.

[0002] One problem with existing devices that store ladders inside of or on vehicles is that mounting and removing the ladder can be difficult in confined spaces, such as in the back of a vehicle, where reaching hooks or other hanging devices may be impractical. Another problem with existing devices are if a vehicle’s compartment is crowded with materials, usage of such products is cumbersome and they don’t provide both horizontal and vertical mounting options to make full use of the cargo space. Another problem with existing devices is that many ladder mounts are for mounting ladders outside of the vehicle thereby exposing them to the weather and increasing the likelihood of theft. Also, many existing devices require additional clamping or strapping to hold a ladder firmly in place.

[0003] The present invention overcomes the problems of existing devices, the sliding ladder rack substantially departs from the conventional concepts and designs of the prior art, and in so doing provides an apparatus developed for the purpose of providing an adjustable sliding mount that connects to universally available hanger strut to easily slide and hold a ladder inside a vehicle without having to enter the vehicle or use additional means to hold the ladder securely in position.

[0004] In one embodiment, the present invention generally comprises a sliding front mount 20, adjustable receiving pin 22, adjustable front stop 40, rear stop 46. An elastic shock cord 60 is also provided as shown in FIGS. 4-6. The sliding front mount 20 is designed to fit inside between the rails on 1/8” hanger strut and has an “H” section 24 that, when inserted into a strut the “H” portion 24 cannot fall out of or rise into the strut 10 but remains free to slide linearly along the strut 10 rails. The opposite end of mount 20 has a slot 25 for a bolt or other connector that connects the adjustable receiving pin 22 having a grooved mating surface 28 to prevent slippage. There is also an attachment point for a shock cord 60 toward the top section of the structure. The receiving pin 22 has a grooved peg-like section 26 that is to be inserted into the ladder. The grooves aid in holding the ladder to the receiving pin 22 during removal and insertion. This receiving pin 22 has a slot or hole for a bolt or other connector that connects to the sliding mount 20 and a grooved mating surface to prevent slippage.

[0005] The fixed mount 30 is designed to be attached firmly to the 1/8” strut 10 by means of bolting through 2 holes 34 in the top of the mount 30. The lower portion has a grooved mating surface 36 to prevent slippage with the adjustable catch 32. It also has a slot 38 along the center to accommodate a bolt or other connector that tightens the adjustable catch 32 to the mount 30. The working portion 33 has a “V” shape that physically holds the rung or rung support to the ladder and includes notches to accommodate the ladder rungs when the ladder is stored with the sides vertical. This catch is wide enough to firmly hold the ladder rung within the “V” and prevents a twisting motion during transit.

[0006] In one embodiment, the front stop 40 may be a large square washer 1½” by 1½” that attaches to the strut 10 with standard mounting hardware and limits the forward motion of the front sliding mount 20. In one embodiment, the rear stop 46 may be a large square washer 1½” by 1½” that attaches to strut 20 with standard mounting hardware and limits the backward motion of the sliding mount 20. The elastic shock cord 60 provides the tension between the sliding mount 20 and the fixed mount 30.

OBJECTS OF THE INVENTION

[0007] A primary object of the present invention is to provide a sliding ladder rack that will overcome the shortcomings of existing devices.

[0008] An object of the present invention is to provide a sliding ladder rack for providing an adjustable sliding mount that connects to universally available hanger strut (some brands are commonly referred to as “Unistrut” or “B-Line”) to easily slide and hold a ladder inside a vehicle without having to enter the vehicle or use additional straps or clamping devices to maintain a secure mount.

[0009] Another object is to provide a sliding ladder rack that provides a sliding mount and hold method for ladders of various sizes and includes both a horizontal and vertical mounting option for ladders mounted within crowded vehicles.

[0010] Another object is to provide a sliding ladder rack that allows a person to easily slide a ladder in or out of a very full vehicle compartment.

[0011] Another object is to provide a sliding ladder rack that is designed to utilize widely available one and five-eighths inch hanger strut that is the industry standard for mounting various systems and devices.

[0012] Another object is to provide a sliding ladder rack that accepts a wide variety of ladder brands and sizes by adjusting the mounting sections.

[0013] Another object is to provide a sliding ladder rack that firmly holds a ladder in place by means of a clamping tension between the top platform and any rung near or at the bottom of the ladder.

[0014] Another object is to provide a sliding ladder rack that allows a person to easily insert a ladder or remove a ladder from a vehicle without having to enter the vehicle or significantly adjust the contents of the vehicle.

[0015] Other objects and advantages of the present invention will become obvious to the reader and it is intended that these objects and advantages are within the scope of the present invention. To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only of some embodiments, and that changes may be made in the specific construction illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a perspective view of the present invention without the shock cord.
FIG. 2 is a side view of the present invention. FIG. 3 is a perspective view of the various components not assembled. FIG. 4 is an operational side view of the invention with the sliding mount 20 between the front and rear stop. FIG. 5 is an operational side view of the invention with a ladder in the fully stowed position.

DETAILED DESCRIPTION OF THE INVENTION

As shown in the drawings is a sliding ladder rack, which comprises in one embodiment, a sliding front mount 20, adjustable receiving pin 22, a fixed mount 30, adjustable catch 32, front stop 40, rear stop 46. An elastic shock cord 60 is also provided as shown in FIGS. 4-6. The front mount 20 is designed to fit inside between the rails on 1 5/8" hanger strut and has an "H" section 24 that, when inserted into the strut the "H" portion 24 cannot fall out of or rise into the strut 10 but remains free to slide linearly along the strut 10 rails. The opposite end of mount 20 has a slot 25 for a bolt or other connector that connects the adjustable receiving pin 22 having a grooved mating surface 28 to prevent slippage. There is also an attachment point for a shock cord 60 toward the top section of the structure. The receiving pin 22 has a grooved peg-like section 26 that is to be inserted into the ladder. The grooves aid in holding the ladder to the receiving pin 22 during removal and insertion. This receiving pin 22 has a slot or hole for a bolt or other connector that connects to the sliding mount 20 and a grooved mating surface to prevent slippage.

The fixed mount 30 is designed to be attached firmly to the 1 5/8" strut 10 by means of bolting through 2 holes 34 in the top of the mount 30. The lower portion has a grooved mating surface 36 to prevent slippage with the adjustable catch 32. It also has a slot 38 along the center to accommodate a bolt or other connector that tightens the adjustable catch 32 to the mount 30. The working portion 33 has a "V" shape that physically holds the rung or rung support to the ladder notches to accommodate the ladder rungs when the ladder is stored with the sides vertical. This catch 33 is wide enough to firmly hold the ladder rung within the "V" and prevent a twisting motion during transit.

In one embodiment, the front stop 40 may be a large square washer 1 5/8" by 1 5/8" that attaches to the strut 10 with standard mounting hardware and limits the forward motion of the front sliding mount 20. In one embodiment, the rear stop 46 may be a large square washer 1 5/8" by 1 5/8" that attaches to strut 40 with standard mounting hardware and limits the backward motion of the sliding mount 20. The elastic shock cord 60 provides the tension between the sliding mount 20 and the fixed mount 30.

In one embodiment, there is also an attachment point for a shock cord that extend on either side of the mount that serve to keep the shock cord up and away from the receiving pin allowing for the area to be clear of slack shock cord when placing the ladder upon the receiving pin. The sliding mount 20 can be made from plastic, metal or various other materials. It could have different attachment points for the shock cord. It could be made adjustable or non-adjustable for different types of ladders or other equipment. It could be built to look different but still perform the same task(s) and operate the same. It could be made to slide using a different track. It could be made to slide using bearings or rollers. It could be made to slide with less friction by applying coatings to the rail or the mount itself. It could use something other than a shock cord to provide holding tension.

The receiving pin 22 has a grooved peg-like portion 26 that is to be inserted into the ladder as shown in FIGS. 4-6. The grooves aid in holding the ladder to the receiving pin 22 during removal and insertion. This receiving pin 22 section has a slot for the bolt that connects to the sliding mount 20 and a grooved mating surface to prevent slippage. The receiving pin 22 could be made of a variety of materials. It could be made adjustable or non-adjustable for different types of ladders or other equipment. It could be built to look different but still perform the same task(s) and operate the same. It could be fastened to the sliding mount in a variety of different ways.

The fixed mount 30 is designed to be attached firmly to the 1 5/8" strut by means of bolting or using other connectors through 2 holes in the top of the structure. The lower portion of the mount 30 has a grooved mating surface 36 to prevent slippage with the adjustable catch 32. It also has a slot 38 along the center of this section to accommodate a bolt that tightens the adjustable catch to the fixed mount 30. The fixed mount could be made of a variety of materials. It could have different attachment points for the shock cord. It could be made adjustable or non-adjustable for different types of ladders or other equipment. It could be built to look different but still perform the same task(s) and operate the same. It could be made to use a different type of track.

The working portion 33 has a "V" shape that physically holds the rung or rung support to the ladder notches to accommodate the ladder rungs when the ladder is stored with the sides vertical. This catch 33 is wide enough to firmly hold the ladder rung within the "V" and prevent a twisting motion during transit has a "V" shape on it's side that faces the receiving pin 26 and notches to accommodate the ladder rungs when the ladder is stored with the sides vertical. The adjustable catch could be made of a variety of materials. It could be made adjustable or non-adjustable for different types of ladders or other equipment. It could be built to look different but still perform the same task(s) and operate the same. It could be fastened to the rail in a variety of ways. Other designs could eliminate the use of a stop entirely.

In one embodiment, the rear stop 46 is a large square washer 1 5/8" by 1 5/8" which attaches to the strut with standard mounting hardware and limits the backward motion (sliding forward/away in front of the user) of the front sliding mount 20. The front stop 40 could be made of a variety of materials. It could be built to look different but still perform the same task(s) and operate the same. It could be fastened to the rail in a variety of ways. Other designs could eliminate the use of a stop entirely.

In one embodiment, an elastic shock cord 60 provides the tension between the sliding mount 20 and the fixed mount 30. It could be made of varying size, strengths and material. There may be one or more cords 60. It could be replaced entirely with any device that provides the holding/return force required to operate the present invention.
are connected together using a carriage bolt with a mating surface on each to prevent slippage. The front stop 40 and rear stop 46 are affixed to the strut channel 10 according to the position necessary for proper operation which will vary with different sizes and types of ladders. The shock cord 60 attaches between the sliding mount 20 and fixed mount 30 through holes or notches formed in each. The present invention could be built in various sizes. It could use differing materials for all parts. It could be altered to hold many different types of equipment aside from “A frame” ladders. The device providing holding tension could be any mechanism suitable to perform the task. This embodiment illustrates the 15/8th strut standard, any rail or strut dimension could be used provided the components are sized accordingly.

During use, as shown in FIGS. 4-6, the large tool hole found common in the top platform of an “A frame” ladder, is aligned with the receiving pin 26 that is attached to the sliding mount 20. The operator moves the ladder away from himself/herself which causes the sliding mount 20 to move along the rail toward the front stop 40. At this point the shock cord 60 is tensioning. As shown in FIG. 6, the sliding mount 20 hits the front stop 40 at which point the operator lifts the ladder and aligns the rung or rung support with the adjustable catch 33 which is fastened to the fixed mount 30. After alignment with the adjustable catch 33, the operator allows the tension of the shock cord 60 to return the ladder to the fully stowed position. To remove the ladder from the stowed position, simply reverse the process.

Specific embodiments of novel methods and apparatus for construction of novel sliding ladder racks according to the present invention have been described for the purpose of illustrating the manner in which the invention is made and used. It should be understood that the implementation of other variations and modifications of the invention and its various aspects will be apparent to one skilled in the art, and that the invention is not limited by the specific embodiments described. Therefore, it is contemplated to cover the present invention any and all modifications, variations, or equivalents that fall within the true spirit and scope of the basic underlying principles disclosed and claimed herein.

1. A ladder storage rack that can be mounted to a surface, comprising:
   - at least one strut having first and second opposing ends, a top side, a bottom side and a means for substantially horizontally mounting the strut to said surface;
   - a sliding mount movably connected to the bottom of the at least one strut that slideably moves horizontally between the first and second ends of the strut;
   - a fixed mount attached to the at least one strut between the sliding mount and one of the first and second ends; and
   - a means connected to the sliding mount for urging the sliding mount towards the fixed mount.

2. The ladder storage rack of claim 1 further comprising one or more stopping means attached to the strut to limit the movement of the sliding mount along the strut.

3. The ladder storage rack of claim 1 further comprising a receiving head joined to the sliding mount.

4. The ladder storage rack of claim 3 further comprising at least one peg attached to the receiving head.

5. The ladder storage rack of claim 1 further comprising a catch head joined to the fixed mount.

6. The ladder storage rack of claim 1 further comprising a catch connected to the catch head.

7. The ladder storage rack of claim 1 wherein the means for urging is a bungee cord.

8. The ladder storage rack of claim 7 wherein a first end of the bungee cord is operably connected to the sliding mount and a second end of the bungee cord is operably connected to the fixed mount.

9. A ladder storage rack for mounting to a strut whereby the strut has first and second opposing ends, a top side and a bottom side and the strut top side is horizontally mounted to a surface, comprising:
   - a movable mount attached to the strut bottom side to enable the mount to move horizontally along at least a portion of the horizontally mounted strut between the first and second ends;
   - a fixed mount removably attached to the strut bottom side between the movable mount and at least one of the first and second ends; and
   - a means connected to the movable mount for urging the movable mount towards the fixed mount.

10. The ladder storage rack of claim 9 further comprising one or more stopping means attached to the strut to limit the movement of the sliding mount along the strut.

11. The ladder storage rack of claim 9 further comprising a receiving head joined to the sliding front mount.

12. The ladder storage rack of claim 11 further comprising at least one peg attached to the receiving head and within the peg can fit into a hole located in the top platform of the ladder.

13. The ladder storage rack of claim 9 further comprising a catch head joined to the fixed mount.

14. The ladder storage rack of claim 13 further comprising a catch connected to the catch head and wherein the catch can accept and hold the ladder rung.

15. The ladder storage rack of claim 9 wherein the means for urging is a bungee cord.

16. The ladder storage rack of claim 15 wherein the first end of the bungee cord is operably connected to the sliding mount and a second end of the bungee cord is operably connected to the fixed mount.

17. (canceled)

18. (canceled)

19. (canceled)

20. (canceled)

21. (canceled)

22. (canceled)

23. (canceled)

24. (canceled)

25. A ladder storage rack that can be horizontally mounted to a surface, comprising:
   - at least one strut having first and second opposing ends, a top side, a bottom side and a means for horizontally mounting the strut to said surface;
   - a sliding mount movably connected to the bottom of the at least one strut that slideably moves horizontally between the first and second ends of the strut;
   - a fixed mount attached to the at least one strut between the sliding mount and one of the first and second ends; and
   - a means connected to the sliding mount for urging the sliding mount towards the fixed mount.

26. The ladder storage rack of claim 25, whereby the means for urging is a hydraulic device.

27. The ladder storage rack of claim 25, whereby the means for urging is a pneumatic device.

28. (canceled)