A bracket for connecting together two legs and an upper crosspiece of a sawhorse or similar structure, and including two elements into which the upper ends of the sawhorse legs are insertable, and having upper portions adapted upon relative pivotal movement of the two elements to grip the crosspiece of the sawhorse, with a toggle linkage being actuable by downward movement of a manually operated handle to swing the two elements to their gripping positions, and to simultaneously actuate gripping teeth into holding engagement with the legs.

11 Claims, 7 Drawing Figures
CONNECTOR BRACKET FOR SAWHORSES OR THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to improved connector brackets for releasably securing together a number of pieces of lumber or the like in a manner forming a rigid upstanding structure capable of use as a sawhorse or for other similar purposes.

Though there have in the past been devised various different types of brackets intended to be used for constructing a sawhorse, each of these prior arrangements has had one or more disadvantages in actual use. For example, U.S. Pat. No. 2,819,931 issued Jan. 14, 1958 to Robert L. Chesney shows a sawhorse bracket including two elements which are relatively pivotable between active clamping positions and inactive released positions, but in which actuation of the clamp to its gripping condition requires inversion of the entire device including two of the clamps and the boards to be gripped thereby, so that in the inverted condition the user may press downwardly on the clamp with his foot to force it to a condition in which it grips and rigidly holds the boards. Such manipulation is relatively inconvenient and time consuming, and detracts greatly from the practicality of the clamp. Further, the device shown in that patent is structurally more complex than would be desired, in requiring a first set of link elements for actuating the primary pivotal members of the device between their active and released conditions, and a second set of elements for exerting gripping force against the upper ends of the sawhorse legs.

Other previously proposed sawhorse brackets of which I am aware have had similar disadvantages in requiring an inconvenient type of manipulation in order to actuate the unit between active and released conditions, and/or by virtue of excessive structural complexity of the clamps.

SUMMARY OF THE INVENTION

A clamp embodying the present invention is capable of securing together a number of boards or the like in a sawhorse type structure with greatly increased facility as compared with the above discussed prior art devices, and with maximum simplicity of structure and an extremely low cost of manufacture. As will appear, the bracket is preferably actuatable from released condition to its active gripping condition while the entire structure remains in an upright non-inverted position, and with such actuation being attained by simple downward displacement of an easily accessible actuating handle. The downward force exerted on this handle may then be taken directly by the legs of the device and by whatever floor or ground structure the sawhorse is resting on. More particularly, the handle may be located at an outer side of one of the primary pivotal elements of the device, and may actuate these elements by means of two arms projecting from the handle along opposite sides of one of the pivotal elements and connected to a linkage structure between the elements.

Certain particular features of the invention reside in a unique relationship in which a mechanism for actuating the two pivotal elements between gripping and released positions includes a link which is rigidly connected to the actuating handle, and which may form one of two links of a toggle mechanism. These links of the toggle mechanism may themselves carry projections for biting or cutting into the sawhorse legs in the active or gripping condition of the clamp structure.

BRIEF DESCRIPTION OF THE DRAWING

The above and other features and objects of the invention will be better understood from the following detailed description of the typical embodiments illustrated in the accompanying drawings in which:

FIG. 1 is a fragmentary perspective representation of a saw horse utilizing two clamps embodying the invention;

FIG. 2 is an enlarged vertical section through one of the clamps, taken on line 2—2 of FIG. 1;

FIG. 3 is a side elevational view of the clamp taken essentially on line 3—3 of FIG. 1, but showing the clamp in its released condition;

FIG. 4 is an enlarged fragmentary section taken on line 4—4 of FIG. 2;

FIG. 5 is a horizontal section taken on line 5—5 of FIG. 2;

FIG. 6 is a section taken on line 6—6 of FIG. 2; and

FIG. 7 is a fragmentary perspective representation of a variational form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1, I have shown at 10 a sawhorse structure including two pairs of upwardly converging legs 11 and 12 and an upper crosspiece 13. The legs 11 and 12 and crosspiece 13 may be formed in conventional manner from standard lumber of nominal two inch by four inch cross section (normally one and one half inch by three and one half inches in actual measurement). The crosspiece 13 is connected to the upper ends of the legs at opposite ends of the crosspiece by two brackets 14 embodying the invention. Since these two brackets may be identical, only one has been shown in detail in the drawing and will be described.

As seen best in FIGS. 2 and 3, each of the brackets 14 includes two elements 15 and 16 connected together for relative pivotal movement about a horizontal axis 17 and between the active gripping condition of FIG. 2 and the released condition of FIG. 3. These two elements 15 and 16 may be identical, and are shaped essentially as channel elements (FIG. 6) defining downwardly opening socket recesses 18 into which the upper ends of the two by four legs 11 and 12 are removably insertable upwardly. More particularly, as seen in FIG. 6, the member 15, which may be formed of an appropriate rigid metal such as cold rolled steel, has an outer rectangular planar wall 19 against which the outer planar surface 20 of wooden leg 11 is receivable. Projecting rightwardly from the opposite edges of wall 19, the element 15 forms two parallel vertical planar channel side walls 21 and 22 having interrior aligned edge portions 23 disposed parallel to outer wall 19 of element 15 to engage and confine the inner surface 24 of leg 11. Thus, the walls 19, 21, 22 and 23 of element 15 define together the socket recess 18 of rectangular cross sectional configuration corresponding substantially to the cross section of leg 11, to receive and closely confine the upper end of the leg in that recess. The upward movement of leg 11 into recess...
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18 is limited by engagement of the upper transverse end surface 25 of leg 11 with a pair of rigid inturned tabs 26 from the material of wall 19. More particularly, each tab 26 may be formed by cutting three sides of an aperture 27 in outer wall 19 of element 15, and then deforming the resultant tab inwardly to a position of transverse extension relative to the inclined longitudinal axis 28 of element 15 and its contained leg 11. The two side walls 21 and 22 may have two tabs 29 similarly punched from their material, but with these tabs desirably being formed to provide downwardly projecting points 30 which project downwardly somewhat beneath the plane of the undersurfaces of the first mentioned tabs 26 in a manner cutting into and assisting in gripping and holding the upper surface of leg 11. For this purpose, each tab 29 may have a first edge 31 lying in a plane disposed essentially transversely of the inclined axis 28, a second edge 32 extending essentially parallel to axis 28, and a third inclined edge 33 which advances downwardly as it advances inwardly away from the associated wall 21 and 22, to provide the point 30. At its fourth edge 34, the rigid tab 29 remains attached to wall 21 or 22.

In FIG. 2, the inturned edge portions or flanges 23 of the channel element 15 extend between the locations designated 35 and 36. Above the location 35, the side walls 21 and 22 of elements 15 continue rightwardly to form two connector lugs 37 which are connected by rivets 38 to corresponding lugs 37' of the second channel element 16, in a manner connecting elements 15 and 16 together for the desired relative pivotal movement about horizontal axis 17. As will be apparent from FIG. 6, the lugs 37 and 37' may be slightly offset relative to one another to lie in slightly different planes in a manner enabling pivotal interconnection by rivets 38.

Above the location of rivets 38, channel element 15 has a portion 39 forming a gripping jaw with two teeth 40 for biting into and tightly gripping one of the sides of the upper crosspiece 13 of the sawhorse. To describe this gripping jaw in greater detail, it may be formed by upper continuations of outer wall 19 and side walls 21 and 22 of channel element 15, with the two side walls 21 and 22 being cut away to form an essentially right angle corner recess 41 into which one of the corners of crosspiece 13 fits, and with gripping teeth 40 being formed as sharp projections on the upper portions of side walls 21 and 22.

Element 16 may be substantially identical with element 15, having walls 19', 21', 22' and 23' corresponding to walls 19, 21, 22 and 23 of element 15, and having tabs 26' and 29' corresponding to tabs 26 and 29. Similarly, the upper portion of element 16 functions as a jaw, defining an essentially right angle corner 41' into which a corner of crosspiece 13 fits, and defining a pair of gripping teeth 40' for biting into the material of the crosspiece. When the two elements 15 and 16 are pivoted relative to one another to the FIG. 2 condition, teeth 40 and 40' bite into the crosspiece to grip it tightly in assembled relation. If the elements 15 and 16 are swung oppositely to the FIG. 3 condition, the gripping teeth 40 and 40' retract away from and out of engagement with the opposite sides of cross piece 13, and allow it to be removed upwardly from the clamp.

For actuating channel elements 15 and 16 between their discussed FIG. 2 and FIG. 3 conditions, I provide two essentially identical toggle mechanisms 42 and 42' at opposite sides of the clamp. Each of these toggle mechanisms includes a first link 43 pivoted by a pivot 44 to an ear 45 formed by side wall 21 or 22 of channel element 15, and a second link 46 pivoted by a pivot 47 to an ear 48 formed by side wall 21' or 22' of element 16. The two links 43 and 46 are pivoted to each other by a pivot 49 at a location intermediate the two elements 15 and 16. As will be apparent, the pivotal connections formed by the two rivets 44 at opposite sides of element 15 are aligned and have a common pivotal axis 50, while the two rivets 47 have a common axis 51, and the two rivets 49 have a common axis 52. These three axes 50, 51 and 52 of the three pairs of rivets are parallel to one another and disposed horizontally, and are parallel to the main pivotal axis 17 of parts 15 and 16.

In the retracted or released position of FIG. 3, the central rivets 49 and their axis are displaced upwardly a substantial distance above rivets 44 and 47 and their axes, to move the lower portions of elements 15 and 16 relatively together. In the active gripping condition of FIG. 2, the axis 52 of rivets 49 moves downwardly slightly beyond a horizontal plane containing the two axes 50 and 51, and thus to a slightly overcenter position in which the lower ends of the elements 15 and 16 and their connected legs 11 and 12 are held in relatively separated positions, and are locked in those positions by the overcenter relationship. The downward movement of pivotal axis 52 is limited in the FIG. 2 position by engagement of an inturned horizontal ear 53 formed by link 46 with the upper side of the coacting link 43 (with such a stop lug or ear 53 of course being provided in each of the overcenter toggle mechanisms 42 and 42' at opposite sides of the device).

For actuating the toggle mechanisms 42 and 42' between their FIG. 3 released and FIG. 2 active conditions, I provide an actuating handle 54 which is received adjacent and extends across the outer side of element 15, and which has a generally horizontal portion 55 against which an operator may press downwardly. Handle 54 may be formed of rigid sheet metal, typically cold rolled steel, cut and shaped to provide two parallel integrally connected opposite side arms 56 lying in parallel vertical planes and extending closely adjacent the opposite side walls 21 and 22 of channel element 15. These arms 56 are desirably so shaped and constructed as to themselves form, at the extremities of the arms, the two previously discussed links 46 of the toggle mechanisms. That is, continuations of the two arms 56 contain apertures at the locations of the rivets 47 and 49 by which the arms may be connected to the rivets and to link 43 and element 16.

As seen best in FIG. 5, the portions of the arms 56 which form links 46 may be deflected or offset laterally toward one another at 56', so that the extremities of the arms are received laterally inwardly of the tabs 48 of element 16.

The two links 43 and 46 of each toggle mechanism are shaped to have sharp points 57 which bite into and tightly grip the inner surfaces of legs 11 and 12 in the FIG. 2 condition of the mechanism, but which are retracted away from engagement with the legs in the FIG. 3 setting, to thus allow free removal of the legs from their socket elements 15 and 16.
To now describe the manner of assembly of the sawhorse of FIG. 1, assume first of all that the two brackets are both in the released condition of FIG. 3. With the brackets in this condition, the legs 11 and 12 are inserted upwardly into both of the brackets, and crosspiece 13 is placed downwardly within the generally rectangular recess formed by the upper jaw portions of elements 15 and 16. A person may then merely press downwardly on the two handles 54 of the two brackets, with resultant actuation of the toggle mechanisms and connected parts to the FIG. 2 setting, in which crosspiece 13 is tightly gripped between the jaw projections 40 and 40', and the upper ends of the legs are tightly gripped by teeth 57. The device may then be utilized as a sawhorse, and after use be easily separated into its component parts by merely swinging the two handles 54 upwardly to allow separation of legs 11 and 12 and crosspiece 13 from the brackets.

FIG. 7 shows fragmentarily a variational form of the invention which may be considered as identical to that of FIGS. 1 to 6 except for the manner of formation of the two links 46a and handle arms 56a (corresponding to parts 46 and 56 of FIGS. 1 to 6). In FIG. 7, the two links 46a may be formed of a single rigid sheet metal element having a connecting crosspiece 146a cut to provide two or more biting teeth 57a which dig into and tightly grip a leg such as that shown at 12 in FIG. 2 when the toggle assemblies 42a and 42a are swung to their active gripping conditions. The rivets 44a, 47a, and 49a serve the same function as rivets 44, 47 and 49 of FIG. 3, except that links 46a are formed separately from arms 56a of handle 54a, with rivets 47a and 49a connecting the extremity of each arm 56a to the corresponding link 46a in fixed relative position. Thus, swinging movement of handle 54a and its two arms 56a causes corresponding swinging movement of links 46a in the same manner discussed in connection with the first form of the invention, and with the projections 57a biting into leg 12 to grip it.

While certain specific embodiments of the present invention have been disclosed as typical, the invention is of course not limited to these particular forms, but rather is applicable broadly to all such variations as fall within the scope of the appended claims.

I claim:

1. A bracket for connecting two legs and an upper crosspiece of a sawhorse or the like, comprising two elements defining downwardly opening socket recesses into which the upper ends of said two legs respectively are insertable in a relation supporting said elements thereon; said elements having upper portions defining opposed jaws between which said crosspiece is receivable; means connecting said two elements together for relative swinging movement between released positions in which said jaws are relatively far apart to enable movement of the cross-piece into and out of the space therebetween, and gripping positions in which said jaws are closer together and grip the crosspiece in retaining relation; linkage between said two elements for swinging the two elements between said different positions; an actuating handle mounted to be pressed downwardly relative to said elements when the sawhorse is in an upright position with said elements connected to the upper ends of said legs; and means connecting said handle to said linkage in a relation to swing said two elements relatively from said released positions to said gripping positions in response to said downward relative movement of said handle, said handle being received at an outer side of one of said elements, and having two spaced arms extending along opposite sides of said one element and connected to said linkage in actuating relation.

2. A bracket as recited in claim 1, in which said linkage includes two pairs of toggle links interconnecting opposite sides respectively of said elements in actuating relation, each of said pairs of links including a first link which is connected rigidly to and forms an end portion of one of said arms of said handle and is pivotally connected to the second link of said pair and to the other of said elements.

3. A bracket as recited in claim 2, including gripping teeth formed on said links and actuable into gripping relation with said legs in response to said downward movement of said handle.

4. A bracket as recited in claim 1, in which said linkage includes two toggle links having first ends pivotally connected together at a first axis and having second ends pivotally connected to said two elements respectively at two spaced outer axes; said links being inclined upwardly from said second ends thereof to said connected first ends thereof when said elements are in said retracted positions; said first ends of the links being movable downwardly by said downward movement of the handle and in a relation swinging said elements from said released positions to said gripping positions; and said links having leg gripping portions at said second ends thereof beyond said two outer axes respectively constructed and positioned to swing upwardly upon said downward movement of said handle and said first ends of the links and constructed upon such upward movement to engage and tightly grip said legs and tend to urge them upwardly within said socket recesses and retain them tightly therein.

5. A bracket as recited in claim 4, in which said linkage includes two pairs of said toggle links interconnecting opposite sides respectively of said elements in actuating relation; one link of each of said pairs being connected rigidly to and forming an end portion of one of said arms of said handle.

6. A bracket for connecting two legs and an upper crosspiece of a sawhorse or the like, comprising two elements defining downwardly opening socket recesses into which the upper ends of said two legs respectively are insertable in a relation supporting said elements thereon; said elements having upper portions defining opposed jaws between which said crosspiece is receivable; means connecting said two elements together for relative swinging movement between released positions in which said jaws are relatively far apart to enable movement of the cross-piece into and out of the space therebetween, and gripping positions in which said jaws are closer together and grip the crosspiece in retaining relation; and linkage between said two elements for swinging the two elements between said different positions; said linkage including two toggle links having first ends pivotally connected together at a first axis and having second ends pivotally connected to said two elements respectively at two spaced outer axes; said links being inclined upwardly from said second ends thereof to said connected first ends thereof when said
elements are in said released positions; said first ends of the links being movable downwardly between said second ends in a relation swinging said elements from said released positions to said gripping positions; and said links having leg gripping portions at said second ends thereof and beyond said two outer axes respectively constructed and positioned to swing upwardly upon said downward movement of said first ends of the links and constructed upon such upward movement to engage and tightly grip said legs and tend to urge them upwardly within said socket recesses and retain them tightly therein.

7. A bracket as recited in claim 6, including a handle connected to one of said links and operable by downward movement to displace said first ends of the links downwardly.

8. A bracket as recited in claim 6, in which said gripping portions of the links are teeth projecting from the links at locations outwardly beyond said spaced outer axes and projecting into said socket recesses to engage said legs.

9. A bracket for connecting two legs and an upper crosspiece of a sawhorse or the like, comprising two elements defining downwardly opening socket recesses into which the upper ends of said two legs respectively are insertable in a relation supporting said elements thereon; said elements having upper portions defining opposed jaws between which said crosspiece is receivable; means connecting said two elements together for relative swinging movement between released positions in which said jaws are relatively far apart to enable movement of the crosspiece into and out of the space therebetween, and gripping positions in which said jaws are closer together and grip the crosspiece in retaining relation; linkage between said two elements for swinging the two elements between said different positions; an actuating handle located at an outer side of one of said elements at a side facing away from the outer of said elements, and means connecting said handle to said linkage in actuating relation.

10. A bracket as recited in claim 9, in which said last mentioned means include arms extending along opposite sides of said one element and connected to said linkage.

11. A bracket as recited in claim 10, in which said linkage includes two pairs of toggle links connected to said arms of the handle respectively.