United States Patent

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[54] **COLLAPSIBLE SAWHORSE**
16 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **182/155**
[51] **Int. Cl.** **E04g 1/32,** F16m 11/00
[50] **Field of Search** 182/155, 184, 186, 224, 225, 195; 248/188.5

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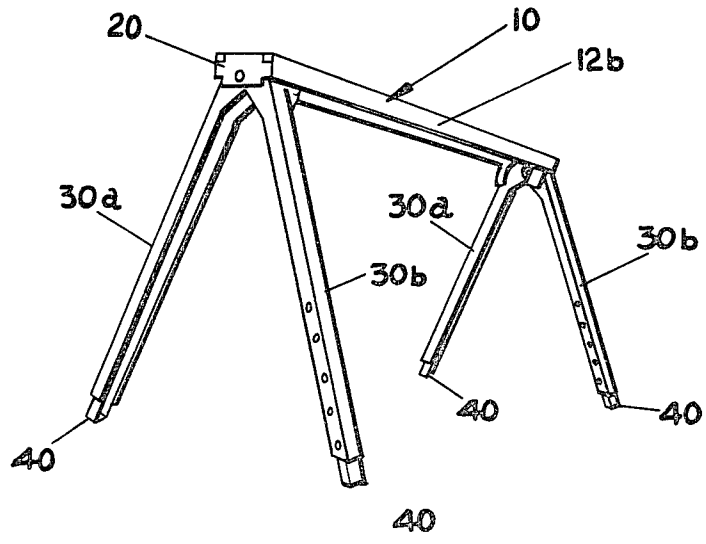
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ABSTRACT: This sawhorse has a channel-shaped beam and extendible, collapsible legs. The legs can be collapsed for storage generally within the channel-shaped beam. Each pair of legs is rotatably mounted on a common axle extending from the base of a U-shaped bracket. The arms of each U-shaped bracket are rotatably secured to the channel sidewalls of the beam near its end. Thus, each pair of legs can be rotated downwardly from the beam until the edge of the bracket abuts the underside of the top of the beam. Then, the legs can be rotated laterally outwardly from the beam until the upper end of each leg abuts the underside of the top of the beam. Longitudinal inward rotation of the legs is prevented when they are folded up and out by detent flanges depending downwardly from the sides of the beam.



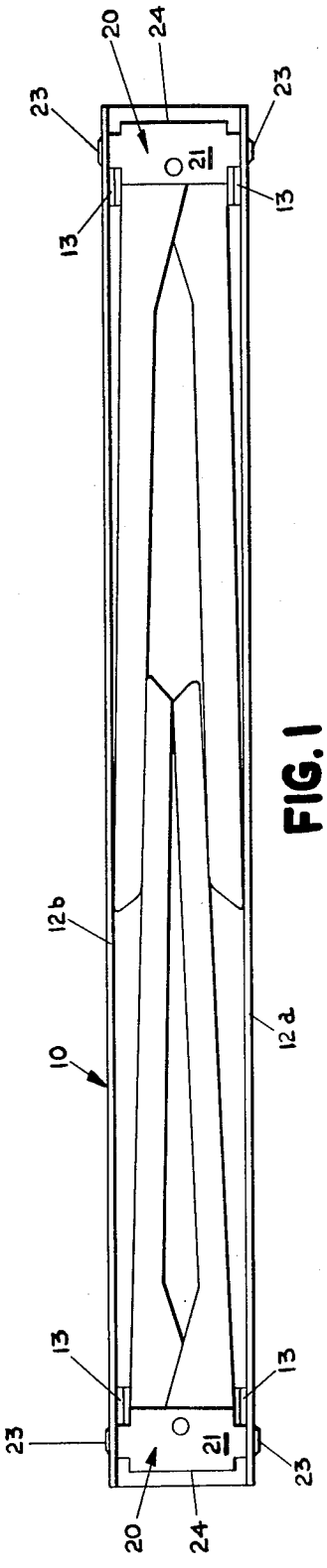


FIG. 1

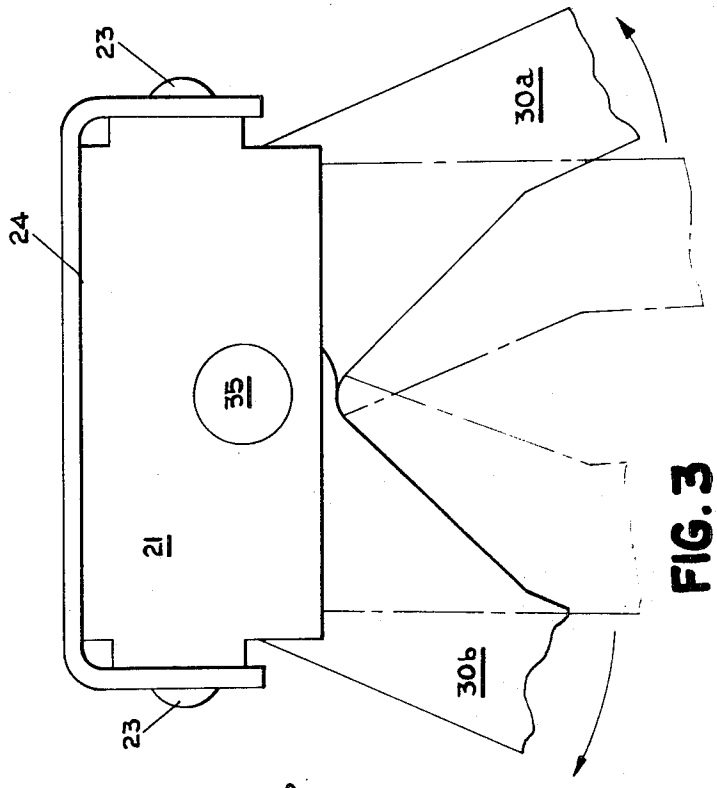


FIG. 3

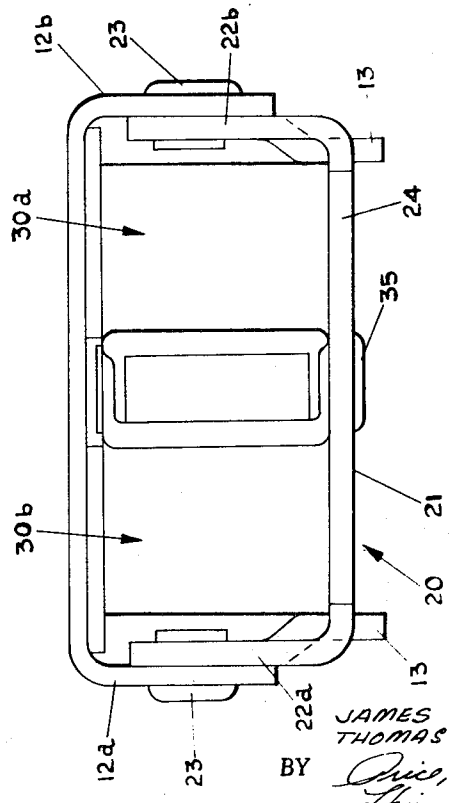


FIG. 5

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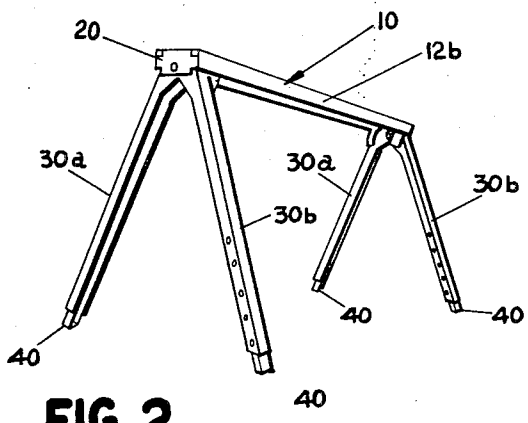


FIG. 2

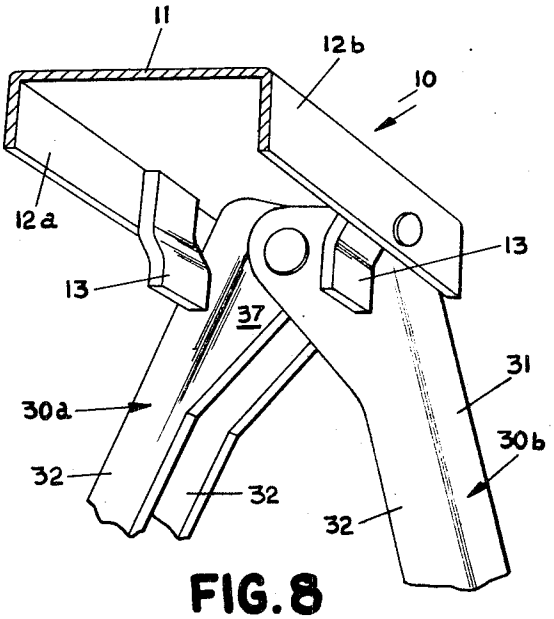


FIG. 8

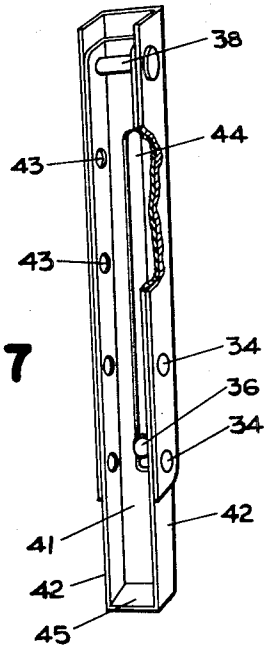


FIG. 7

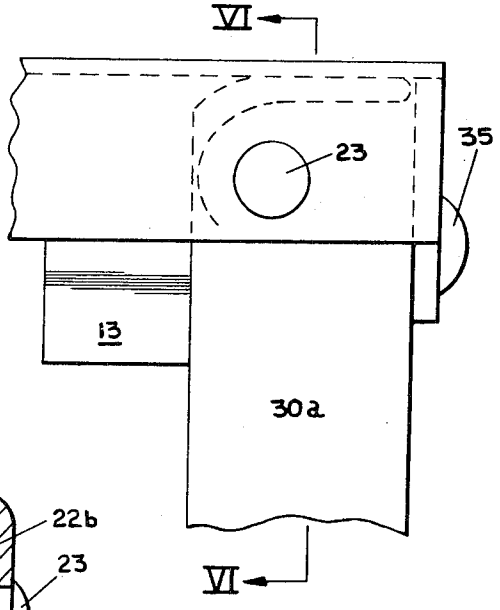


FIG. 4

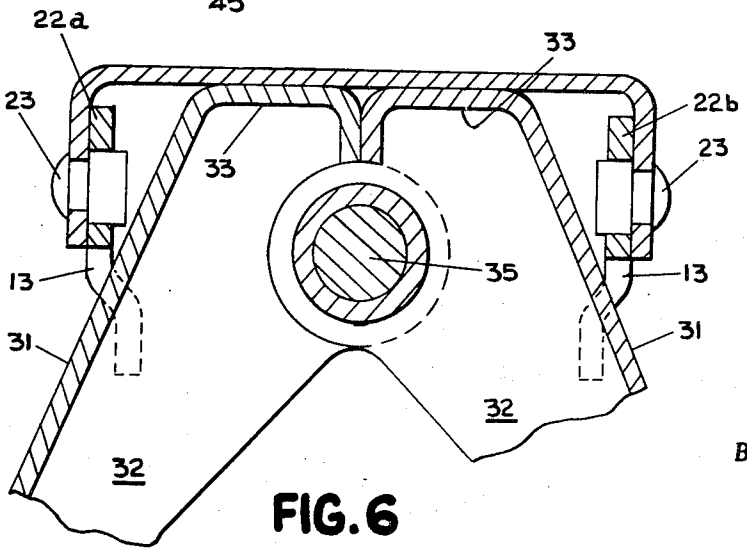


FIG. 6

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COLLAPSIBLE SAWHORSE

BACKGROUND

Integral, collapsible sawhorses have been previously invented, but have never met with any particular degree of commercial success. Usually, the mechanisms for these inventions are extremely complicated making them extremely expensive to manufacture. For example, cross braces are generally required to brace the legs and hold them in their inverted V-shaped position. Sometimes, braces are required between the legs and the cross beam of the horse. This prevents the legs from collapsing longitudinally inwardly or outwardly of the beam. Heretofore, such braces have generally been necessary in order to provide a sufficiently sturdy sawhorse.

Another drawback to existing structures are the complicated hinge mechanisms which are required. Frequently, these hinges have protruding portions which interfere with the ease with which the collapsed sawhorse is stored. Thus, they defeat the very purpose of a collapsible sawhorse.

Generally, brackets are required to hold the sawhorse legs in a collapsed position. Without such brackets, the legs may actually flop around during transport, thus again defeating the purpose of a collapsible sawhorse. If brackets are used, the legs are held in place but the brackets themselves provide undesirable protrusions which interfere with storage.

Existing collapsible sawhorses are generally so complicated already that it is not desirable to provide them with extendible legs. However, the lack of such legs greatly decreases the versatility of the collapsible sawhorse and may be another reason for the lack of commercial success of such devices. Furthermore, existing extendible leg mechanisms are generally not desirable because of their complicated nature. Not only are they generally expensive to manufacture, but also the extension portion of the legs may become separated from the stationary part of the leg during storage or transport. Thus, a workman may get to the job and find that a portion of a leg of his sawhorse is missing and it is absolutely not usable.

Thus, existing collapsible sawhorse structures have a number of disadvantages which may appear singly or in combination. The result is a sawhorse which is expensive to manufacture and which is so complicated that the collapsed sawhorse does not really provide a sufficiently compact package. Thus, the purpose of the device is defeated and the cost of manufacture is simply not warranted.

As a result of this, the most commonly used sawhorses which could be called collapsible are those with separable legs and crossbeams. Generally, each pair of legs is rigidly maintained in an inverted V-shape with a frame at the junction between the legs. The crossbeam of the sawhorse can be fitted into the frame of each pair of legs thus making an integral sawhorse. Since this device is easier and less expensive to manufacture, it is considerably more successful than unitary collapsible sawhorses. However, it suffers a number of very major drawbacks. First of all, it does not provide as compact a package for storing, albeit a more compact package than a noncollapsible sawhorse. Furthermore, since the legs and bean are separable, they may become separated and lost. Accordingly, a workman may arrive on the job only to find that one of his sawhorses is incomplete and hence cannot be used.

This invention comprises a collapsible sawhorse which has an operative position and a collapsed position. The cross beam has a top and opposite sidewalls depending downwardly from either side of the top along its length. A pair of legs is rotatably connected at the upper ends of the legs to the base of a generally U-shaped bracket having a base and a pair of arms. The pair of legs is generally between those arms. One of such brackets is pivotally connected at its arm to the opposite sidewalls of the beam near each end of the beam. When in their collapsed position, the legs are generally parallel and at least partially between the sidewalls of the beam. The legs are rotatable to an upright position by rotating the brackets longitudinally outwardly of the beam. The base of the bracket has an abutment edge which abuts the top of the beam to limit the extent of the aforesaid outward rotation. The legs are then rotatable to an inverted V-shape operative position by rotation laterally outwardly of the beam.

The resultant invention is compact when collapsed, sturdy when in use and simple in construction and operation. Cross braces between the legs and braces between the legs and crossbeam can be eliminated. The hinging construction is simple and economical to manufacture rather than complicated. Still, the device is an extremely sturdy sawhorse, even in the absence of braces and complicated mechanisms.

When in collapsed position, the legs all fit snugly between the sidewalls of the beam such that transportation and storage merely comprises transportation and storage of a beamlike structure without bulky protrusions which interfere with storage and transport.

The legs are provided with a unique extension mechanism which in no way interferes with the storage of the sawhorse in collapsed position. The mechanism is such that the extension piece of each leg cannot become separated from the fixed piece, thereby eliminating the problem of lost members resulting in operative sawhorses.

These and other objects and advantages of the invention can be seen by reference to the referred embodiment and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a bottom view of the sawhorse in its collapsed position;

FIG. **2** is a perspective view of the sawhorse in its operative position;

FIG. **3** is a fragmentary end view of the sawhorse in its operative position with an intermediate portion shown in phantom;

FIG. **4** is an end view of the sawhorse in its collapsed position;

FIG. **5** is a fragmentary front view of one end of the sawhorse in operative position;

FIG. **6** is a view of the sawhorse taken along plane VI—VI of FIG. 5;

FIG. **7** is a perspective view of the portion of a leg carrying an extension; and

FIG. **8** is a fragmentary perspective view of the inside of an end of the sawhorse.

PREFERRED EMBODIMENT

Referring to FIG. **2**, the preferred embodiment of the invention comprises generally a crossbeam **10**, a pair of U-shaped mounting brackets **20** (see FIG. **4**), one rotatably mounted at each end of beam **10**, a pair of legs **30***a* and **30***b* rotatably mounted on each bracket **20**, and an extension member **40** mounted on each of the legs **30***a* and **30***b*.

Referring more specifically to FIG. **8**, it can be seen that crossbeam **10** comprises a generally channel shaped member having a top **11** and sidewalls **12***a* and **12***b* depending downwardly from the edges of top **11** along the length thereof. Preferably, beam **10** is made of metal by means of bending or the like. Depending downwardly from each of the sidewalls **12***a* and **12***b* are two detent flanges **13**, each being located near an end of beam **10**.

Bracket **20** is generally U-shaped having a base **21** and arms **22***a* and **22***b* (FIG. **4**). Each arm **22***a* and **22***b* is rotatably mounted to a sidewall **12***a* and **12***b* respectively by means of a short rivet or axle **23**. On each side **12***a*and **12***b*, a short axle **23** extends through side **12***a* or **12***b* and through arm **22***a* or **22***b* respectively. Base **21** of bracket **20** includes an abutment edge **24** which is the top longitudinal edge of base **21** (see also FIGS. **1** and **3**). Each bracket **20** is rotatably mounted to beam **10** to the outside of the detent flanges **13** located near each end of beam **10** (FIG. **1**).

Rotatably secured to base **21** of each bracket **20** are a pair of legs **30***a* and **30***b* (FIGS. **1**, **2** and **3**). Each leg **30***a* and **30***b* has a back **31**, sides **32** and a top **33** (FIGS. **7** and **8**). Leg **30***a*

has a depressed portion 37 near its top whereby it fits snugly within the upper portions of sides 32 of leg 30*a* (FIG. 8). A bolt 35, which acts as an axle, passes through base 21 of bracket 20 and through the overlapping upper portions of legs 30*a* and 30*b* (FIG. 4). It is preferable that there be only one such bolt 35 for each pair of legs since this improves strength by minimizing the number of "weak links" in the form of moving parts. Also, this is a more economical construction.

There is also a leg extension 40 for each leg 30*a* and 30*b* (FIG. 7). Extension 40 also includes a back 41 and sides 42. The outer dimensions of back 41 correspond to the inner dimensions of back 31 of each of the legs 30*a* and 30*b*. In this fashion, extension 40 fits snugly into a leg 30*a* or 30*b*.

The back 41 of extension 40 includes a slot 44 extending generally the length of back 41. Each leg 30*a* and 30*b* includes a pin 36 extending inwardly between sides 32 from back 31. Slot 44 slides on pin 36 and the head of pin 36 is sufficiently large that extension 40 cannot become disengaged from a leg 30*a* or 30*b* unless pin 36 is removed. In this fashion, an extension 40 is slidably mounted in each of the legs 30*a* and 30*b*. Extension 40 also has a foot 45 which engages the ground.

Each of the sides 42 of extension 40 includes a plurality of oppositely disposed holes 43. Similarly, each of the sides 32 of a leg 30*a* or 30*b* includes a plurality of holes 34. The holes 34 are located such that the holes 43 can be mated therewith. The stop pin or bolt 38 can be passed through a set of mating holes 34 and 43 to prevent extension 40 from sliding in its leg 30*a* or 30*b*.

When in its collapsed position, FIGS. 1 and 4, the sawhorse provides an extremely compact package with no substantial interferring protrusions. Legs 30*a* and 30*b* are folded inwardly in the overlapping relationship shown in figure one. The right set of 30*a* and 30*b* are spread slightly such that the outside of each leg engages or abuts a sidewall 12*a* or 12*b*. The opposite pair of legs 30*a* and 30*b* are folded inwardly towards each other until they abut. Then they are folded downwardly to a position between the spread pair of legs 30*a* and 30*b*. A slight force must be used in forcing the abutting legs 30*a* and 30*b* between slightly spread legs 30*a* and 30*b*. In this fashion, all of the legs 30*a* and 30*b* are held snugly between opposite sidewalls 12*a* and 12*b*.

In the preferred embodiment, the sidewalls 12*a* and 12*b* are not sufficiently deep that the legs 30*a* and 30*b* lie entirely there between. This results in a savings in material. However, the legs 30*a* and 30*b* do lie at least partially between sidewalls 12*a* and 12*b* and are maintained in that position because of the snug fit involved in so locating the legs.

In order to render the sawhorse operative, the legs 30*a* and 30*b* are first rotated longitudinally outwardly to an upright position as shown in phantom in FIG. 3. This can be done because each set of legs 30*a* and 30*b* is mounted to base 21 of bracket 20 and bracket 20 rotates with respect to beam 10 on axles 23. The rotation of bracket 20 is stopped when abutting edge 24 engages the underside of top 11 of beam 10 (FIG. 3).

Once the legs 30*a* and 30*b* are in this position, they can be rotated laterally outwardly on axle 35. The extent of outward rotation of each leg 30*a* and 30*b* is limited when its upper end 33 abuts the underside of top 11 (FIGS. 3, 5 and 6). This abutment also provides additional direct support for beam 10 and thereby makes it even sturdier. However, the lateral outward movement of legs 30*a* and 30*b* can be prevented solely by their abutment against each other.

When the legs are in this inverted V-shape operative position, bracket 20 can no longer be rotated in either direction. Its rotation longitudinally outwardly is limited by edge 24 abutting the underside of top 11. This is also facilitated by the tops 33 of legs 30*a* and 30*b* abutting the underside of top 11 (FIGS. 3, 5 and 6), although the action of edge 24 is more positive and sure. Its rotation longitudinally inwardly is limited by legs 30*a* and 30*b* engaging the edges of detent flanges 13 (FIGS. 5 and 8).

In this fashion, the sawhorse is placed in its operative condition with the legs 30*a* and 30*b* maintaining an inverted V-shaped position. The height of crossbeam 10 can now be varied by adjusting extensions 40 in their legs 30*a* and 30*b* (FIG. 7). When pin 36 is removed, extension 40 can be slidably moved in its leg 30*a* or 30*b* by removing bolt 38 and sliding slot 44 along pin 36. When a desired leg length is achieved, the holes 43 are lined up with holes 34 and bolt 38 is again passed through a set of mating holes.

Thus, this invention provides a sawhorse which can be collapsed to an extremely compact position. Further, this sawhorse is extremely sturdy when in its operative position even without cross braces between the legs and braces between the legs and beam. The height of the sawhorse beam 10 can be varied by adjusting the length of the legs through extensions 40. Thus, the sturdiness of the sawhorse is complimented by its versatility.

It is understood that the above is merely a preferred embodiment of the invention and that various alterations can be made thereof without departing from the broader features and spirit of the invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows.

1. An improved collapsible sawhorse having an operative position and a collapsed position, comprising: a crossbeam having a top and opposite sidewalks depending downwardly from either side of said top along its length; a pair of generally U-shaped brackets, each having a base and a pair of arms; a pair of legs, each having an upper end being rotatably connected to said base; each of said brackets being rotatably connected at its arms to the opposite sidewalls of said beam, one of said brackets being located near each end of said beam, said rotatable connection for each of said brackets being about a predetermined axis; said legs being generally parallel and at least partially between said sidewalls when in said collapsed position; said legs being rotatable to an upright position by rotating said brackets longitudinally outwardly of said beam; means on said base for abutting the bottom surface of said top of said beam said means being located a distance from said predetermined axis greater than the distance between said axis and the bottom surface of said top to thereby limit the extent of said outward rotation; said legs then being rotatable to an inverted V-shape operative position by rotating said legs laterally outwardly of said beam.

2. The device of claim 1 wherein said beam includes detent means located near each of said ends, such that when said legs are rotated to said operative position, inward rotation of said brackets is prevented by said legs engaging said detent means.

3. The device of claim 2 wherein said detent means comprises a pair of flanges near either end of said beam, one of said pair of flanges depending downwardly from one sidewall and the other of said pair of flanges depending downwardly from the opposite sidewall.

4. The sawhorse of claim 1 wherein: the upper ends of said legs abut said top of said beam when in said operative position such that the extent to which said legs are rotatable laterally outwardly of said beam is limited thereby.

5. The sawhorse of claim 2 wherein: the upper ends of said legs abut said top of said beam when in said operative position such that the extent to which said legs are rotatable laterally outwardly of said beam is limited thereby.

6. The device of claim 1 wherein both of said pair of legs overlap when in said collapsed position; one pair of legs being spread slightly with one leg abutting one sidewall and the other leg abutting the other sidewall of said beam; the other pair of legs being pushed together such that they abut; said abutting pair of legs being fitted snugly between said spread pair of legs, the exertion of a slight force being necessary to so position said legs.

7. The device of claim 2 wherein both of said pair of legs overlap when in said collapsed position; one pair of legs being spread slightly with one leg abutting one sidewall and the other leg abutting the other sidewall of said beam; the other pair of legs being pushed together such that they abut; said abutting pair of legs being fitted snugly between said spread

pair of legs, the exertion of a slight force being necessary to so position said legs.

8. The device of claim 4 wherein both of said pair of legs overlap when in said collapsed position; one pair of legs being spread slightly with one leg abutting one sidewall and the other leg abutting the other sidewall of said beam; the other pair of legs being pushed together such that they abut; said abutting pair of legs being fitted snugly between said spread pair of legs, the exertion of a slight force being necessary to so position said legs.

9. The device of claim 1 wherein: said pair of legs is mounted on said base of said bracket on a common axis of rotation.

10. The device of claim 5 wherein: said pair of legs is mounted on said base of said bracket on a common axis of rotation.

11. The device of claim 6 wherein: said pair of legs is mounted on said base of said bracket on a common axis of rotation.

12. An improved collapsible sawhorse having an operative position and a collapsed position, comprising: a crossbeam having a top and opposite sidewalls depending downwardly from either side of said top along its length; a pair of generally U-shaped brackets, each having a base and a pair of arms; a pair of legs, each having an upper end being rotatably connected to said base; each of said brackets being rotatably connected at its arms to the opposite sidewalls of said beam, one of said brackets being located near each end of said beam; said legs being generally parallel and at least partially between said sidewalls when in said collapsed position; said legs being rotatable to an upright position by rotating said brackets longitudinally outwardly of said beam; said legs then being rotatable about a predetermined axis to an inverted V-shape operative position by rotating said legs laterally outwardly of said beam; the upper ends of said legs having surfaces which when the legs are in said operative position are located a distance from said predetermined axis equal to the distance from said axis to the bottom surface of said top of said beam whereby said surfaces about said bottom surface of said top of said beam when in said operative position such that the extent to which said legs are rotatable laterally and longitudinally outwardly of said beam is limited thereby.

13. The device of claim 12 wherein said beam includes detent means located near each of said ends, such that when said legs are rotated to said operative position, inward rotation of said brackets is prevented by said legs engaging said detent means.

14. The device of claim 12 wherein both of said pair of legs overlap when in said collapsed position; one pair of legs being spread slightly with one leg abutting one sidewall and the other leg abutting the other sidewall of said beam; the other pair of legs being pushed together such that they abut; said abutting pair of legs being fitted snugly between said spread pair of legs, the exertion of a slight force being necessary to so position said legs.

15. The device of claim 13 wherein both of said pair of legs overlap when in said collapsed position; one pair of legs being spread slightly with one leg abutting one sidewall and the other leg abutting the other sidewall of said beam; the other pair of legs being pushed together such that they abut; said abutting pair of legs being fitted snugly between said spread pair of legs, the exertion of a slight force being necessary to so position said legs.

16. The device of claim 12 wherein: said pair of legs is mounted on said base of said bracket on a common axis of rotation.

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