Nov. 1, 1966 D. JONES 3,282,379

COLLAPSIBLE SAWHORSE AND HINGE THEREFOR

Filed April 5, 1965

FIG. 3.

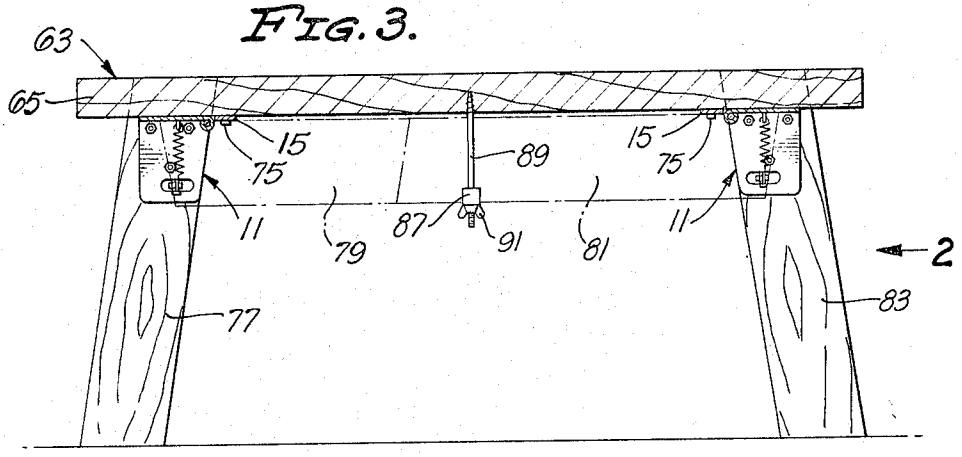


FIG. 2.

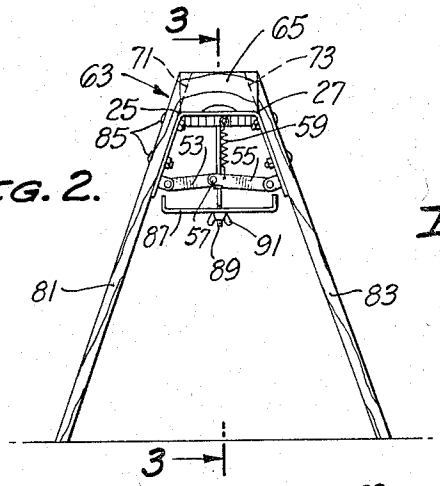
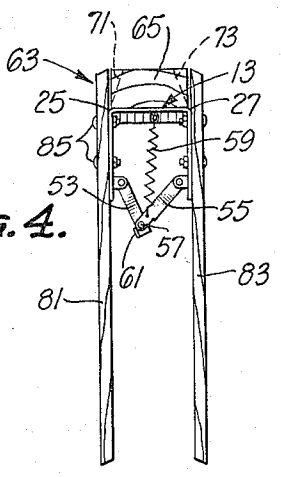


FIG. 4.



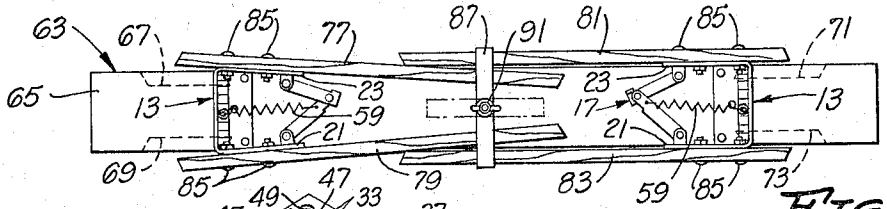


FIG. 5.

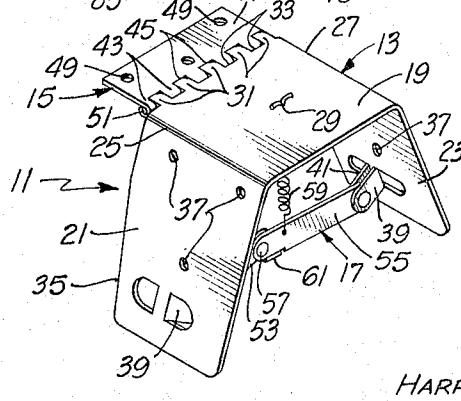


FIG. 1.

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COLLAPSIBLE SAWHORSE AND HINGE THEREFOR

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This invention relates to a sawhorse and a hinge therefor.

Various horizontal members having a narrow or short horizontal dimension such as the elongated narrow body or horizontal member of a sawhorse are supported by diverging legs which depend therefrom. In the case of a sawhorse two pairs of legs are usually provided with one leg of a given pair of legs being opposed to and separated from the other leg of that pair by the short horizontal dimension of the horizontal member. Because of the narrowness of the horizontal member, it is necessary that the legs in each pair of legs diverge as they extend downwardly to adequately support the body member against lateral forces which tend to tip the sawhorse.

As the diverging legs enclose a relatively large volume, it is considered necessary or desirable to fold or collapse the legs prior to storage to reduce the storage volume required and to facilitate movement thereof. In the prior art conventional leaf-type hinges having disaligned pivotal axes were utilized to pivot the diverging legs toward each other and then to a position closely adjacent the horizontal member. These leaf-type hinges do not provide a sufficiently stable sawhorse structure, are relatively complex, and are subject to numerous other disadvantages.

According to the present invention a novel hinge is provided which permits the diverging legs to be pivoted or moved hingedly toward each other without use of the conventional leaf-type hinge joint, the latter having been eliminated for this purpose. The hinge of the present invention is more easily opened, less subject to malfunctioning due to corrosion or contaminants, and of simpler construction than leaf-type hinges and when employed in a collapsible sawhorse, the resulting structure is more stable than conventional collapsible sawhorses. The legs of the collapsible sawhorse of this invention are locked in the uncollapsed or operative position so that a kick or other lateral force received by it will not cause it to collapse and the legs are also locked in the collapsed position so that the sawhorse may be jarred or otherwise roughly handled without a leg or legs moving toward the operative position.

An object of this invention is to provide a collapsible sawhorse in which the legs thereof are pivotal about disaligned axes to a collapsed position, pivotal motion of opposed legs being accomplished by a one-piece resilient member.

Another object of this invention is to provide a collapsible sawhorse in which the legs thereof are positively locked in the collapsed position.

Another object of this invention is to provide a collapsible sawhorse in which the legs thereof may be snapped to an operative position.

It is a further object of this invention to provide a collapsible sawhorse in which the outward movement of the legs in the operative or noncollapsed position is limited, and the legs are locked against inward movement from the operative position.

Another object is to provide a hinge which allows hinged motion even in the presence of corrosion and foreign particles and is not subject to "sticking."

Another object of this invention is to provide a hinge especially for use with a sawhorse and having several

pivotal axes, the pivotal movement about at least one of the axes being accomplished by a resilient integral strap. According to a particular object of this invention, the integral strap has a base and two sides integral therewith, the strap being bendable in the area of the junctures of the sides and the base to allow the sides to move bodily toward each other against the resilience of the strap. In a preferred environment, the hinge is utilized to foldably connect the legs of a sawhorse to the body member thereof.

A further object of this invention is to provide a hinge particularly adapted for use with a sawhorse which is easy to construct and requires only a very few parts. According to a particular object of this invention, a resilient strap formed from a single sheet of metal makes up a primary portion of the hinge.

Briefly stated, many objects of this invention can be accomplished by providing a hinge which comprises an integral resilient generally trough-shaped strap having a base and two spaced generally opposed sides integral with the base, the strap being bendable in the area of the junctures of the sides and the base to allow the sides to move bodily toward each other. A tab is pivotally connected to the base for pivotal movement about an axis which is disaligned from the junctures of the sides and the base. Thus, pivotal movement about the junctures and the tab is accomplished. The hinge may also include over-center toggle levers connected between the sides of the strap for snapping the sides to an operative position, limiting the outward movement of the sides, and releasably locking the sides against inward movement.

Other objects of this invention may be accomplished by utilizing the hinge as described above to connect the legs of a sawhorse to the body member thereof. By securing the tab to the body member and one leg to each of the sides, a completely collapsible sawhorse is obtained. It is also desirable to provide means for locking the legs in the collapsed position against the resilient force of the strap. Such means may include a generally channel-shaped member releasably secured to the body member. Grooves or notches may also be formed in the body member for receiving the upper ends of the legs to lock the legs in the operative or noncollapsed position.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof may best be understood by reference to the following description taken in connection with the accompanying drawing.

In the drawing:

FIG. 1 is an enlarged perspective view of a hinge constructed in accordance with the teachings of this invention;

FIG. 2 is an end elevational view taken in the direction of the arrow in FIG. 3 and showing a collapsible sawhorse in the operative position thereof constructed in accordance with the teachings of this invention;

FIG. 3 is a sectional view taken along line 3—3 in FIG. 2;

FIG. 4 is a view similar to FIG. 2 with some parts removed for clarity showing a partially collapsed position of the legs of the sawhorse; and

FIG. 5 is a plan view of the sawhorse showing the legs thereof locked in the collapsed position.

Referring to FIG. 1 of the drawing, a hinge **11** includes an integral resilient generally trough-shaped strap **13**, a tab **15**, and over-center toggle lever means **17**. The strap **13** which is formed from a single sheet of resilient metal includes a broad flat base **19** and two spaced generally opposed sides **21** and **23** integral with the base and diverging downwardly therefrom to form a generally trough-shaped structure. The sides **21** and **23** join the base **19**

at parallel junctures 25 and 27, respectively, the strap being bendable in the area of the junctures against the resilience of the strap 13 to allow the sides to move bodily toward and away from each other. The junctures 25 and 27 are generally parallel to each other and the area adjacent each of these junctures allows limited bending or pivoting or hinged movement of the sides 21 and 23 toward and away from each other.

The base 19 is thin, flat, and generally rectangular, has a small centrally located aperture 29 and spaced integral apertured lugs 31 formed along one edge thereof, the spaces between adjacent lugs forming groves 33.

The sides 21 and 23, which are preferably identical, are thin, flat, and generally rectangular and have a slightly tapered edge 35 and a plurality of apertures 37. Two ears 39 and 41 are formed by cutting out portions of each of the sides 21 and 23 respectively and bending such cut-out portions inwardly.

The tab 15, which is preferably metal, includes integral apertured lugs 43 received by the grooves 33 and grooves 45 for receiving the aperture lugs 31. The tab 15 includes a generally thin, flat, rectangular plate portion 47 having a plurality of apertures 49 therein. A rod 51 extending through the apertured lugs 31 and 43 pivotally connects the tab 15 to the base 19 and forms a pivotal axis which is generally perpendicular to the junctures 25 and 27.

Referring to FIGS. 1 and 2, the over-center toggle lever means 17 includes two links 53 and 55 pivotally connected by a joint 57 to form a jointed arm, one end of the jointed arm being pivotally connected to the ears 39 and 41 of the side 21 and the other end of the jointed arm being pivotally connected to the ears integral with the side 23. A spring 59 is connected at one end to the link 55 and at the other end to the base 19 and biases the links 53 and 55 and the joint 57 toward the base so that the joint is over center; i.e., positionable above a straight line drawn between the points of connection of the sides 21 and 23 and the ends of the jointed arm. A finger or stop 61 formed integrally with one end of the link 53 limits the upward movement of the links 53 and 55 and the joint 57. Preferably, the resilient strap 19 is unstressed when the toggle lever means 17 is in the position shown in FIGS. 1 and 2 and will tend to maintain the hinge in such position. It is apparent that the links 53 and 55 will limit outward movement of the sides 21 and 23 and that movement of the sides 21 and 23 inwardly or toward each other from the operative position of FIGS. 1 and 2 is prevented.

The operation of the hinge 11 may best be understood when considered in connection with a sawhorse 63. The sawhorse 63 includes an elongated preferably wooden body member 65 of generally rectangular cross section having four vertically extending grooves or notches 67, 69, 71, and 73 (FIG. 5) cut in the elongated sidewalls thereof and increasing in depth as they extend upwardly. Two of the hinges 11 are secured to the underside or bottom surface of the body member 65 by suitable fasteners 75 (FIG. 3) extending through the apertures 49 and the tab 15, the length of the base 19 being about equal to the width of the body member (FIG. 2). The tabs 15 extend inwardly from the rods 51 and the sides 21 and 23 of the two hinges 11 are secured to two identical pairs of legs 77, 79 and 81, 83 by a plurality of bolts 85. As shown in FIGS. 2 and 3, in the operative position, the legs 81 ad 83 diverge downwardly from the sides 21 and 23, respectively, in spaced-apart relationship and support the body member 65 in the operative position. Substantial portions of the legs are beneath the junctures 25 and 27. The legs 77 and 79 are similarly disposed, and longitudinally spaced legs 77 and 83 (FIG. 3) and 79 and 81 also diverge downwardly. With the sawhorse 63 in the operative position (FIG. 2) the upper portions of the legs 77, 79, 81, and 83 are locked within the grooves 67, 69, 71, and 73, respectively, and the top of each leg is preferably substantially flush with the top surface of the body member 65. In order to allow the toggle links 53 and 55 to move through the dead-center position in which the joint 57 is aligned with the points of connection of the links 53 and 55 with the ears 39 and 41, the upper portions of the legs should be spaced slightly from the back walls of the grooves 67, 69, 71 and 73 when the sawhorse is in the position shown in FIG. 2.

To collapse the sawhorse 63, the over-center toggle links 53 and 55 are urged downwardly from the position of FIG. 2 through the dead-center position against the biasing action of the spring 59 and the resilience of the strap 13 to the partially collapsed position shown in FIG. 4. The initial movement of the links 53 and 55 downwardly from the position of FIG. 2 to the dead-center position causes the sides 21 and 23 to bend outwardly in the area of the junctures 25 and 27, respectively, and also causes the legs 81 and 83 below the junctures 25 and 27 to be moved slightly outwardly as permitted by the grooves 71 and 73, respectively. Downward movement of the links 53 and 55 past the dead-center position causes the strap 13 to bend in the area of the junctures 25 and 27 to allow the sides 21 and 23 and the legs 81 and 83 below the junctures 25 and 27 to move bodily toward each other. When the legs 81 and 83 have reached the substantially parallel position as shown in FIG. 4, the upper portions thereof are no longer received within the grooves 71 and 73, respectively, and, accordingly, the strap 13 and the legs may be pivoted about the rod 51 to the position shown in FIG. 5 and in phantom in FIG. 3. It should be noted that the grooves 71 and 73 lock the legs 81 and 83 against pivotal movement about the rod 51 until the legs have been hingedly moved the required amount. A similar collapsing procedure may be followed with respect to the legs 77 and 79.

An important feature of this invention is the provision of means for locking the legs in the collapsed position against the resilient force of the straps 13 and the springs 59. Such means include a channel-shaped bracket 87, a threaded rod 89 secured generally centrally in the under side of the body member 65, the bracket being retained on the rod by a wing nut 91. When the four legs have been collapsed, the bracket 87 may be utilized to lock the legs in the collapsed position as shown in FIGS. 3 and 5 against the resilient force of the strap 13 and the spring 59.

Another important feature of this invention is the toggle lever means 17 which locks the legs against inward movement from the position shown in FIG. 2. Thus, the legs of the sawhorse 63 may be directly jarred or kicked without effecting a collapse of the sawhorse, such collapse resulting only by applying a force to the toggle lever means 17 to move it downwardly through the dead-center position. The toggle lever means 17 is also operative to snap the legs to the operative position of FIG. 2 and to limit outward movement of the legs.

The use of the resilient metal strap 13 is also a significant feature of the invention. The one-piece resilient strap 13 is easier to construct than the conventional hinge structure and is not subject to malfunction; e.g., "sticking," caused by corrosion or foreign particles as is the conventional hinge.

Many changes, modifications, and substitutions may be made without departing from the spirit and scope of this invention.

What is claimed is:

1. A hinge for connecting a pair of legs to a body member comprising:

an integral resilient generally trough-shaped strap having a base and two spaced generally opposed sides integral with said base, said strap being bendable in the area of the junctures of said sides and said base to allow said sides to move bodily toward each other, one of said sides being connectible to one leg of the pair of legs and the other of said sides being connectible to the other of the pair of legs; and

a tab pivotally connected to said base and connectible to the body member.

2. A hinge for connecting a pair of legs to a body member comprising:

an integral resilient generally trough-shaped metal strap having a base and two spaced generally opposed sides integral with said base, said strap being bendable in the area of the junctures of said sides and said base to allow said sides to move bodily toward each other, said junctures being generally parallel, one of said sides being connectible to one leg of the pair of legs and the other of said sides being connectible to the other of the pair of legs; and

a tab pivotally connected to said base for pivotal movement about an axis generally perpendicular to said junctures, said tab being connectible to the body member.

3. A hinge for connecting a pair of legs to a body member comprising:

an integral resilient generally trough-shaped strap having a base and two spaced generally opposed sides integral with said base, said strap being bendable in the area of the junctures of said sides and said base to allow said sides to move bodily toward each other, one of said sides being connectible to one leg of said pair of legs and the other of said sides being connectible to the other of said pair of legs;

a tab pivotally connected to said base and connectible to the body member; and

over-center toggle lever means pivotally connected to said sides for locking said sides against inward movement.

4. A hinge as defined in claim 3 wherein ears cut from said sides and integral therewith connect said over-center toggle lever means to said sides.

5. A hinge as defined in claim 3 wherein said over-center toggle lever means includes a jointed arm pivotally connected to said sides and means for biasing said arm toward said base so that the joint of said arm is positionable above a straight line drawn between the points of connection of said arm to said legs.

6. A collapsible sawhorse comprising:

a body member;

an integral resilient generally trough-shaped strap having a base and two spaced generally opposed sides integral with said base, said resilient strap being bendable in the area of the junctures of said sides and said base to allow said sides to move bodily toward each other;

a tab pivotally connected to said base for pivotal movement about a pivotal axis and secured to said body member; and

a pair of spaced legs secured to said sides for supporting said body member, substantial portions of said legs being movable bodily toward each other in response to a force tending to urge said sides inwardly about said junctures, said sawhorse being collapsible by moving said substantial portions of said legs toward each other in response to said force and pivoting said integral strap about said pivotal axis.

7. A collapsible sawhorse comprising:

a body member;

a pair of spaced legs for supporting said body member;

an integral resilient generally trough-shaped strap having a base and two spaced generally opposed sides integral with said base, said base being pivotally secured to said body member for pivotal movement about a pivotal axis, one of said sides being secured to one of the legs of said pair of legs and the other of said sides being secured to the other of said pair of legs, said legs extending downwardly from said sides

in spaced apart relationship and supporting said body member in an operative position of the sawhorse, said resilient strap being bendable in the area of the junctures of said sides and said base in response to an inwardly directed force to allow substantial portions of said legs to move bodily toward each other, said legs being movable to a collapsed position by moving said substantial portions of said legs bodily toward each other against the resilience of said strap and pivoting said strap about said pivotal axis; and

means for locking said legs in said collapsed position against the resilient force of said strap.

8. A collapsible sawhorse as defined in claim 7 further including means operative in said operative position for preventing pivotal movement of said strap about said pivotal axis until said substantial portions of said legs have been moved bodily toward each other a predetermined amount against the resilience of said strap.

9. A collapsible sawhorse as defined in claim 7 further comprising over-center toggle lever means connected to said strap for snapping said legs to said operative position.

10. A collapsible sawhorse comprising:

a body member having grooves in the opposed side walls thereof;

a pair of spaced legs for supporting said body member;

a tab secured to the underside of said body member;

an integral resilient generally trough-shaped strap having a base and two spaced generally opposed downwardly extending sides integral with said base, said base being pivotally secured to said tab for movement about a pivotal axis, one of said sides being secured to one of the legs of said pair of legs and the other of said sides being secured to the other of said pair of legs, said legs diverging downwardly from said sides in spaced-apart relationship and supporting said body member in an operative position of the sawhorse, the upper portions of said legs in said operative position being received in said grooves, said strap being bendable in the area of the junctures of said sides and said base to allow the portions of said legs below said junctures to move bodily toward each other, said junctures being generally parallel to each other and generally perpendicular to said pivotal axis, said strap including a first pair of ears integral with and extending inwardly from said one side and a second pair of ears integral with and extending inwardly from said other side, said legs being movable to a collapsed position by moving said portions of said legs bodily toward each other against the resilience of said strap and pivoting said strap about said pivotal axis;

a jointed arm pivotally connected at one end thereof to said first pair of ears and pivotally connected at the other end thereof to said second pair of ears;

spring means for biasing the joint of said jointed arm toward said base so that said joint is positionable above a straight line drawn between the points of connection of said sides and said jointed arm;

a stop on said jointed arm for limiting the movement thereof toward said base; and

means for locking said legs in said collapsed position against the resilient force of said strap.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,282,379

November 1, 1966

Dick Jones

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, lines 4 and 5 strike out "assignor to Joe D. Cox and William I. Flinn, both of Los Angeles, Calif." and insert instead -- assignor, by direct and mesne assignments, to Joe D. Cox, La Habra, Calif.

Signed and sealed this 5th day of September 1967.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents