Sept. 17, 1963 E. W. KNUTH 3,103,988

SCAFFOLD HORSE

Filed May 3, 1962 3 Sheets-Sheet 1

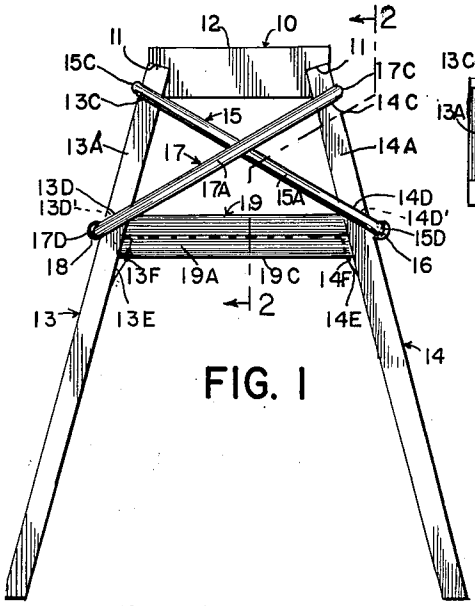


FIG. 1

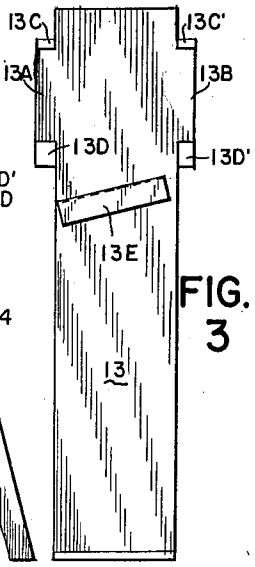


FIG. 3

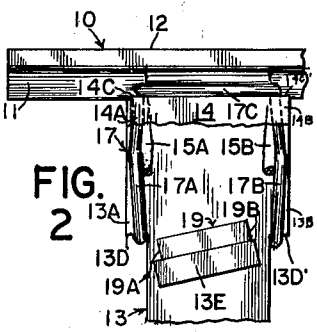


FIG. 2

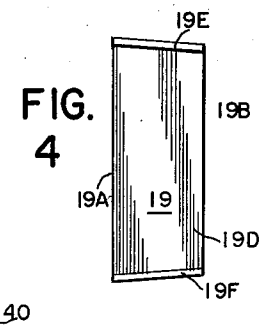


FIG. 4

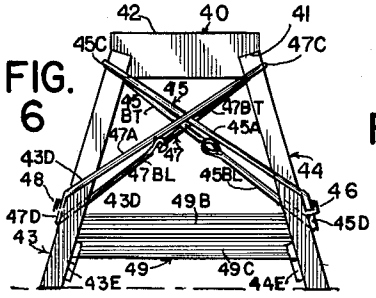


FIG. 6

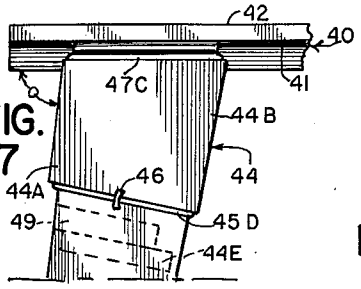


FIG. 7

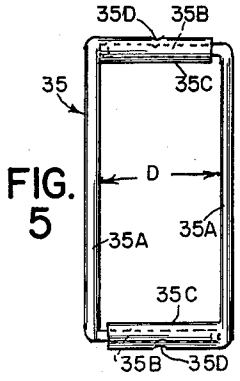


FIG. 5

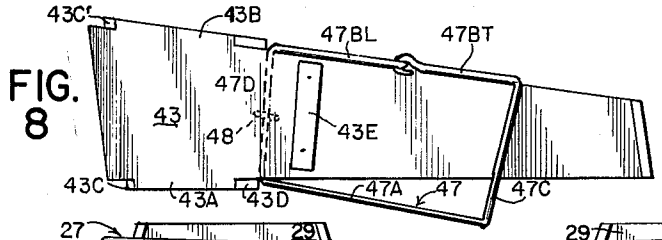


FIG. 8

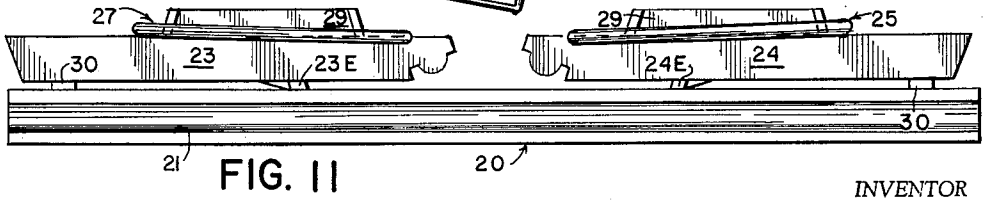


FIG. 11

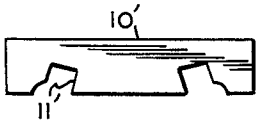


FIG. 20

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Sept. 17, 1963 E. W. KNUTH 3,103,988

SCAFFOLD HORSE

Filed May 3, 1962 3 Sheets-Sheet 2

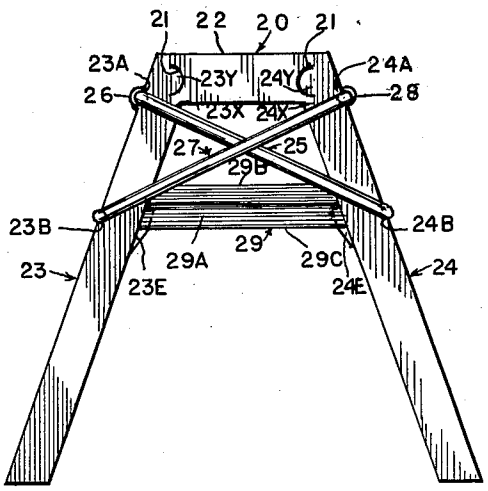


FIG. 9

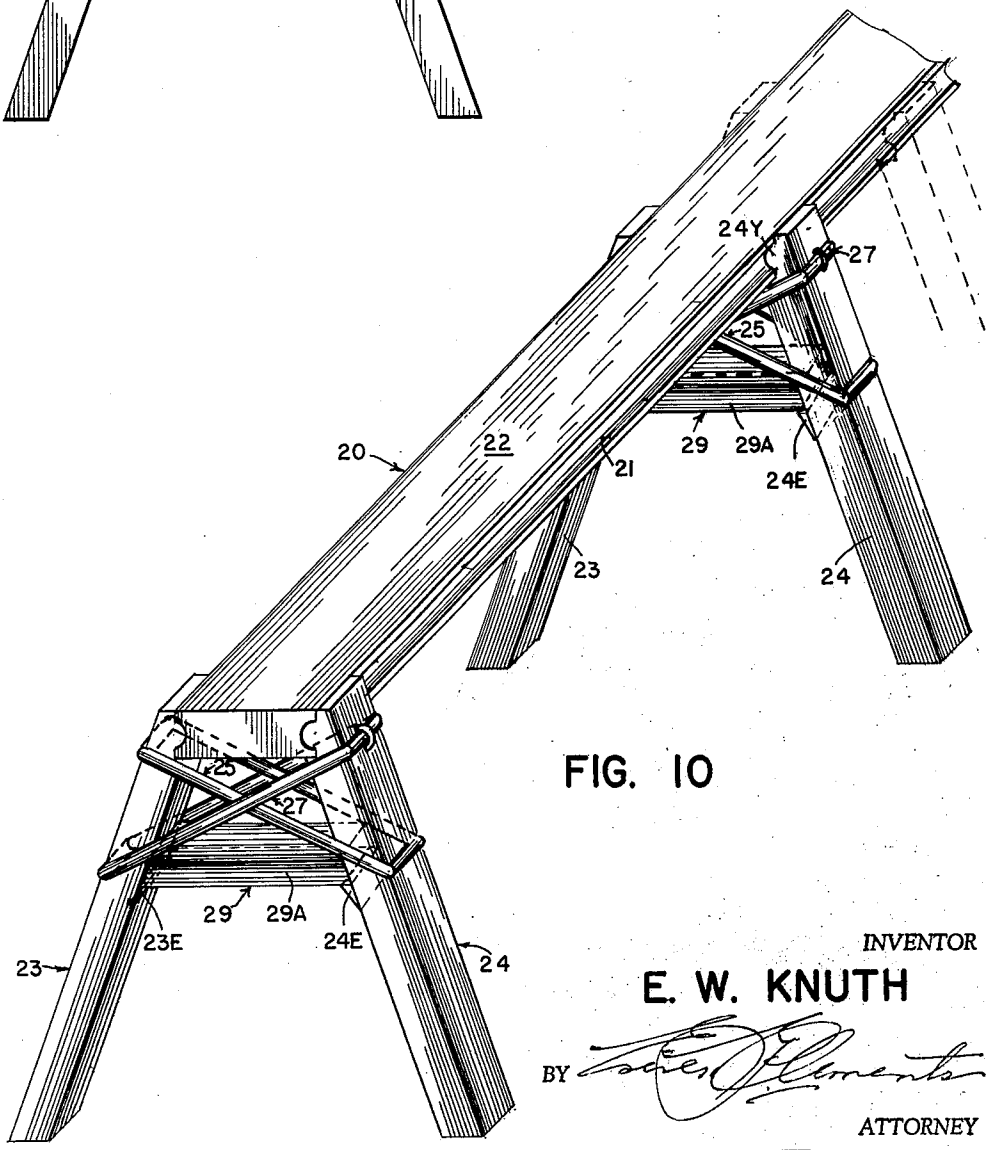


FIG. 10

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Sept. 17, 1963 E. W. KNUTH 3,103,988

SCAFFOLD HORSE

Filed May 3, 1962 3 Sheets-Sheet 3

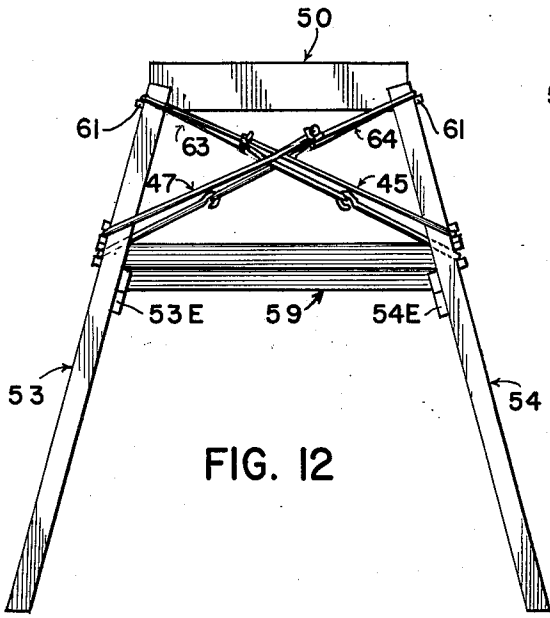


FIG. 12

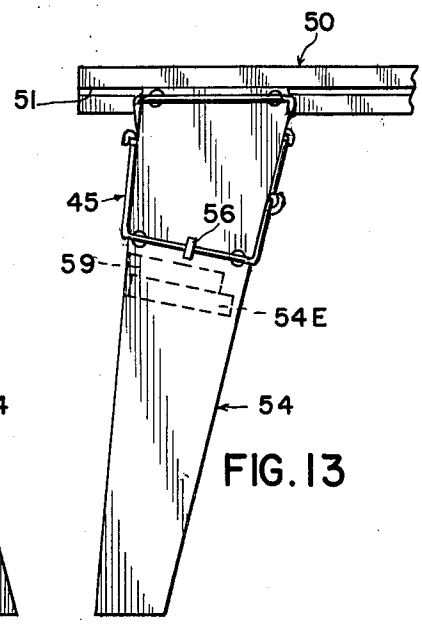


FIG. 13

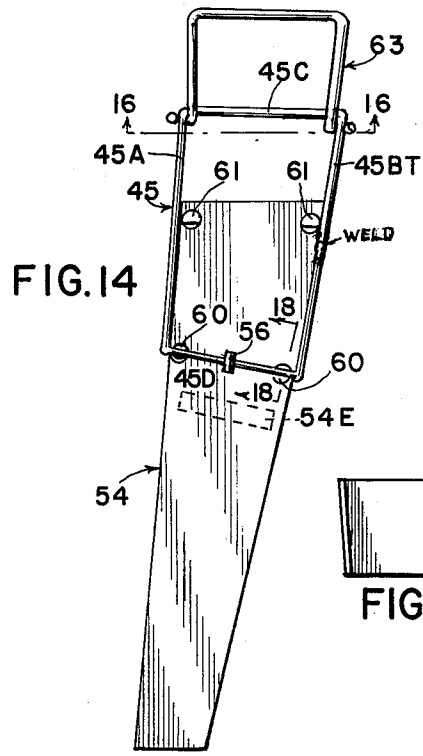


FIG. 14

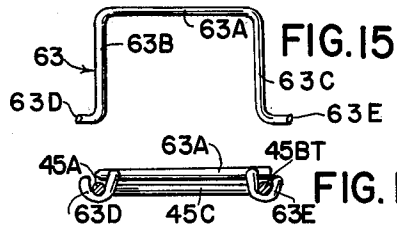


FIG. 15

FIG. 16

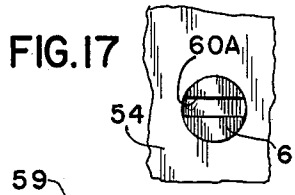


FIG. 17

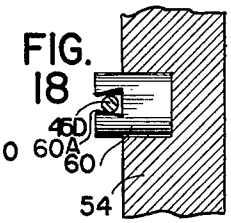


FIG. 18

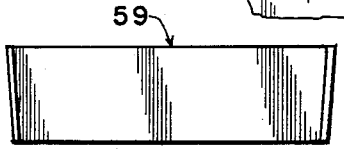


FIG. 19

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United States Patent Office 3,103,988 Patented Sept. 17, 1963

3,103,988

SCAFFOLD HORSE

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Filed May 3, 1962, Ser. No. 192,208
7 Claims. (Cl. 182—226)

The present invention relates to a work supporting structure and more particularly to a knockdown structure of this character usually known in the building trades as a carpenter's horse. Such a type of work supporting device when set up should be sturdy and provide for such adjustability and strength as will adapt it for usefulness in the great varieties of trades employed in the building fields.

Horses of this type while initially rigid in construction because the parts thereof were permanently secured together, were not therefore readily stored and/or carried about and moved into or out of close quarters for performing useful work where required. To overcome these difficulties and to adapt such a device to greater usefulness in a large variety of trades, many attempts have heretofore been made to provide a completely collapsible and/or disassembled device which may be set up in a variety of adjustable lengths and forms in each of which the required strength and rigidity must be provided for the work to be performed thereon. As examples of such prior collapsible devices see Patents 2,343,557, March 7, 1944, 1,742,637, January 7, 1930, and 1,819,252, August 18, 1931, as merely illustrative of the art just referred to.

In knockdown devices of the character stated however, no means has been also devised for lengthwise adjustment of the supporting leg structure relative to the elongated work supporting bar or surface, nor has any provision heretofore been made for the addition of other leg structures to any desired longitudinal place thereon where greater supporting strength is required. Hence, such prior art structures have failed to provide for the compact, collapsability and strength required for ease in storage and handling while permitting quick and easy means of adjustable and sturdy assembly thereof to meet the vast requirements of the many building trades.

Accordingly, an object of the present invention is to provide an economical and entirely practical knockdown work supporting horse structure which overcomes the difficulties and objections herein referred to and which will provide greater usefulness in a greater variety of trades.

A further object is to provide in a collapsible work supporting horse structure means for the addition of supporting legs when and where desired and for full longitudinal adjustability of all legs for the proper and rigid assembly of the resulting required structure.

A still further object of my invention resides in a collapsible work supporting horse structure wherein each part thereof may be separately and economically made and handled as units for packaging and for storage thereof in compact form yet which will provide for ready and complete cooperation of each part for the adjustable association of all parts in providing a rigid, supporting horse structure.

Another object is to provide a work supporting horse structure having several relatively adjustable legs which are longitudinally assembled thereon and wherein the several parts of the assembly are of simple and rigid construction which may be separately produced, handled and quickly and readily assembled without the use of tools.

A further object of my invention is to provide an improved method of making, assembling and mounting such work supporting structures for greater utility.

Other and further objects will be present as the description proceeds and upon reference to the accompanying drawings wherein:

FIG. 1 is an end view of one form of my work supporting scaffold horse structure showing the desired adjustable clamping action of the opposed top side edges of the legs on opposite sides of the elongated work supporting bar or member, which member is provided along each lower side edge thereof with a rabbet to slidably and/or adjustably receive said top edges of the legs to be supported thereon.

FIG. 2 is a fragmentary section taken on the broken line 2—2 of FIG. 1 to further show the cooperation of the parts and particularly illustrating the relationship and expanding or spreading action of the angularly disposed wedge shaped strut between opposed leg members to tension the cross bails or hoops onto the leg members and thus securely bind them into adjusted, tight frictional engagement with the walls of the rabbet.

FIG. 3 shows the inner side surface of one leg of a pair of legs shown in FIG. 1 illustrating the position and shape of the notches receiving the pair of cross bails or hoops and also showing the angular position of the strut supporting shoulder members.

FIG. 4 is a plan view of a wedge shaped strut member.

FIG. 5 shows a modification of a hoop or bail member illustrating how an adjustment may be provided for when used with different widths or shapes of legs, etc., so that the bails or hoops may be provided in a limited number of sizes, as required.

FIG. 6 is a fragmentary end view of a modified form of work supporting horse in which the legs extend at an obtuse angle to the work supporting member for increasing stability against movement in a longitudinal direction when once adjusted.

FIG. 7 is a side elevation of the fragmentary end part of FIG. 6.

FIG. 8 is a plan view of the inner surface of one leg of the modification of FIG. 6 with the bail or hoop swung into storage position and showing the abutment shoulders for the bail and for the wedge or strut member.

FIG. 9 is an end view of a further modification of the supporting horse structure of the present invention with the elongated work supporting member having semi-circular grooves on the side edges thereof and the legs having semi-circular grooves forming shoulders on their outer surfaces receiving the bail or hoop members.

FIG. 10 is an oblique perspective of the modification of FIG. 9 showing two pairs of legs in full lines and showing how any cooperating pair of legs may be adjusted to any position as illustrated by the phantom outline of a third pair of legs and how any number of pairs of legs may be used to provide the necessary support.

FIG. 11 is a side elevation of the parts of the horse of FIGS. 9 and 10 in disassembled condition.

FIGS. 12 and 13 are end and side views of a modification similar to FIGS. 6 and 7 using the same bail members with U-shaped extensions, and a longer wedge and a wider work supporting plank.

FIG. 14 is a view of one leg of the modification of FIGS. 12 and 13 viewed normal to the outside surface thereof with the U-shaped extension inverted with respect to FIGS. 12 and 13 and mounted on the bail and illustrating how the bail member is held in pivotal condition by the staple and slotted dowels embracing the lower end of the bail.

FIG. 15 is a plan view of the U-shaped extension separated from its cooperating bail.

FIG. 16 is a section taken on line 16—16 of FIG. 14 showing the connection of the U-shaped extension to its cooperating bail.

FIG. 17 is a fragmentary view on an enlarged scale showing the slotted dowel construction for retaining the

bail in pivotal condition and preventing sliding thereof along the leg.

FIG. 18 is an enlarged fragmentary section of the slotted dowel taken on line 18—18 of FIG. 14.

FIG. 19 is a top plan view of the wedge strut used in the modification of FIGS. 12 to 14, and

FIG. 20 is an end view of a further modified form of work supporting plank which may have a wider work surface.

Briefly the supporting horse structure of the present invention includes an elongated work supporting plank member having a longitudinal groove or rabbet on each side edge thereof. Into these opposite grooves or rabbets the upper ends of one or more pairs of legs are adapted to be seated to support the elongated plank member as shown. Each pair of legs is provided with a pair of quadrilaterally shaped hoops or bails encircling the upper legs and are held in opposed clamping position by the reaction of the bail or hoop members against shoulders on the legs. A staple or other suitable fastener prevents separation of the hoop or bail from its respective leg while permitting relative rotation of the bail or hoop on its leg. As stated the upper ends of the legs are received where desired in the grooves or rabbets and the legs are then forcibly spread apart with a specially formed wedge strut member reacting against the inner surfaces of the legs and against abutment shoulders causing the upper ends of the legs to be clamped against the lower grooved side edges of the elongated plank member. Any pair of legs with its bail and wedge strut member may be mounted along the elongated plank member in any position and in any number of pairs of legs to provide the necessary support for any load.

Referring more particularly to FIGS. 1 to 4 of the drawings, an elongated member in the form of a heavy bar or plank 10 is provided with a rabbet or groove 11 along the length of each lower edge thereof and has a plain upper work supporting surface 12.

Cooperating with the rabbets 11 of the elongated plank member 10 are one or more pairs of legs 13 and 14 with their transverse upper ends extending into and seated against the walls of rabbets 11, 11.

The leg 13 has lateral extensions 13A and 13B which provide upper and lower shoulders 13C and 13D on one side and shoulders 13C' and 13D' respectively on the other side. Similarly a leg 14 has lateral extensions 14A and 14B respectively forming shoulders 14C and 14D and 14' and 14D' respectively.

A rectangularly shaped hoop or bail 15 having sides 15A, 15B and ends 15C, 15D is rotatably connected to leg 14 intermediate the ends of the leg and the outer surface of leg 14 by means of a staple 16 embracing end 15D of the hoop. The end 15C of the hoop 15 engages the outer surface and shoulders 13C and 13C' of the leg 13 adjacent the upper end and the end 15D engages the lower shoulders 14D, 14D' of leg 14.

Similarly a hoop 17 having sides 17A, 17B and ends 17C, 17D is rotatably connected by its end 17D to the outer surface of leg 13 intermediate the ends of the leg by a staple 18 and the reactions of the sides 17A and 17B are taken by the shoulders 13D, 13D' of leg 13 and shoulders 14C, 14C' of leg 14. The legs 13 and 14 are spread apart by a relatively flat wedge strut member 19 tapering from its edge 19A toward its edge 19B and lying in a position between the legs 13 and 14 adjacent the shoulders 13D, 13D' and 14D and 14D'. The wedge is prevented from sliding down the legs by abutment cleats 13E, 14E having upwardly facing shoulders 13F, 14F in engagement with the bottom surface 19C of the ends of the flat wedge strut member 19.

The wedge strut member 19 had its ends 19E and 19F cut as shown in FIG. 4 so that the taper between the front edge 19A and the back edge 19B is about 3/8 inch in a conventional 4" board. The cleats 13E, 14E have their shoulders 13F and 14F of sufficient width to provide easily positioning the wedge member without jambing against the inner surfaces of such cleats. The precise taper of the wedge strut member is dependent upon the angle of divergence between the legs 13 and 14 and the angle of the abutment cleats 13E and 14E relative to the legs.

The wedge strut member is forced into place by pushing and/or by tapping impact from a person's hand such as a pounding action obtained by forceably engaging the front edge 19A of the wedge with the heel of the hand in assembling the pair of legs on the elongated plank member or by a pounding or pushing action on the rear edge upon disassembly. A dry lubricant such as paraffin is preferably used on the ends 19E and 19F of the wedge strut member to facilitate assembly and disassembly.

It will be apparent that the structure of FIGS. 1 to 4 may include several of the pairs of legs supporting the elongated plank member 10. The leg frames can be made to extend at an acute angle to the elongated member if desired by having the top ends cut at the desired angle as shown in FIGS. 6 to 8.

In FIG. 5 an adjustable form of bail or hoop 35 is shown as made of two identical sections, each section comprising a side tension member 35A rigidly connected to an end rod member 35B at one end and to a tubular telescoping member 35C which receives the rod member of the other section whereby the width dimension D will be correct for the width of the board used for the leg. After the desired adjustment has been obtained between the cooperating bail sections the telescoping tubular members 35C and rod members 35B are deformed by striking a dimple or the like 35D therein to maintain the sections in adjusted assembled relation.

Referring more particularly to FIGS. 6–8 a heavy plank member 40 having a rabbet or groove 41 on each lower side edge thereof provides a plane work supporting surface 42 on the upper face thereof.

Cooperating with the rabbets or grooves 41 are one or more pairs of legs with each leg of said pairs of legs arranged at an acute angle O to the work supporting member 49 to take forces applied in a longitudinal direction and to bring the base ends of the legs 43 and 44 outwardly of the ends of the elongated plank member 40 for the increased stability thus provided.

The two legs 43 and 44 of a cooperating pair have their upper ends received in the rabbets 41. The leg 43 has lateral extensions 43A and 43B which provide upper and lower shoulders 43C and 43D on one side and shoulders 43C' and 43D' respectively (not shown) on the other side. Similarly the leg 44 has lateral extensions 44A and 44B respectively forming shoulders 44C, 44D and 44C', 44D' respectively.

A quadrilaterally shaped hoop or bail 45 having side 45A, composite side 45BL, 45BT, and ends 45C, 45D is rotatably connected to leg 44 by means of a staple 46 embracing the end 45D of the hoop, the end 45C engaging the outer surface and shoulders 43C and 43C' of the leg 43 adjacent the upper end and the end 45D engaging the lower shoulders 44D, 44D' of leg 44.

Similarly bail or hoop 47 having side 47A, composite side 47BL, 47BT and ends 47C, 47D is rotatably connected by its end 47D to the outer surface of leg 43 intermediate the ends of the leg by staple 48 embracing said end 47D. The reactions of the side 47A, and composite sides 47B, 47BT are taken by the shoulders 43D, 43D' of leg 43 and shoulders 44C, 44C' of leg 44.

It will be observed that the hoops are inexpensively made by forming a quadrilateral by bending a rod and connecting the ends of the composite side elements 45BL, 45BT and 47BL, 47BT with eyes as shown and the eyes are formed and positioned so that even though the eyes may come in contact with a person or clothing no injury or damage can occur, or by welding.

The legs 43 and 44 are spread apart by a wedge strut member 49 tapering from its edge 49A toward its edge

49B and lying in a position between the legs 43 and 44 adjacent the shoulders 43D, 43D' and 44D, 44D'. The wedge is prevented from sliding down along the legs 43, 44 by the abutment of cleats 43E, 44E fixed to the inner surfaces of the legs at the angles shown which abutment cleats have their abutment shoulders or slideways 43G, 44G in engagement with the bottom surface 49C of the wedge strut member 49. The wedge strut member 49 is similar to wedge strut 19 and the parts are identified by corresponding letter postscripts used for wedge strut 19.

It will be observed in FIG. 8 that the quadrilateral bail or hoop 47 has been collapsed against the inner surface of the leg 43, and that the ends and sides of the quadrilateral bail or hoop are all of a different length thereby illustrating the adaptability of the invention to any type of support regardless of whether the legs taper in one or more directions and regardless of whether the angle O between the work support and the leg frame is a right angle or an acute angle.

Upon reference to FIGS. 9 to 11 another modification of the invention includes an elongated plank member 20 having a work supporting surface 22 and a semi-circular groove 21 in each side edge intermediate the top and bottom surfaces of the member 20. Two legs 23 and 24 have notches 23X, 24X and tongues 23Y, 24Y respectively on one side at their upper ends which notches receive the edges of the elongated member 20 and the tongues are received in the grooves 21.

The legs 23 and 24 are provided with upper and lower semicircular transverse grooves 23A, 23B and 24A, 24B respectively on their outer surfaces which grooves form shoulders to take the reaction of rectangularly shaped hoops or bails 25 and 27.

A hoop or bail 25 extends from groove 23A at the top of leg 23 to lower groove 24B at an intermediate location on the leg 24 and similarly the hoop 27 extends from groove 24A at the top of leg 24 to lower groove 23B on leg 23. The hoop 25 is rotatably held in position in the top groove 23A by the staple 26, and the hoop 27 is rotatably held in position in top groove 24A by staple 28 so that the hoops will not become separated from their cooperating legs.

A wedge strut member 29 is positioned between the legs 23 and 24 and applies a force tending to spread the bottoms of the legs thereby causing a reaction against the bails or hoops 25, 27 resulting in the upper ends of the legs clamping the edges of the member 20 holding the member and legs in positive fixed relation. Abutment cleats 23E and 24E fixed on the inner facing surfaces of legs 23 and 24 respectively engage the bottom surface 29C of the wedge strut member 29. The wedge strut member 29 is pushed into position from the front side of the pair of legs as seen in FIGS. 9 and 10 and the legs are forced apart due to the taper of the ends of the wedge from the front edge 29A toward the back edge 29B.

The corners of the wedge are preferably rounded as shown to facilitate the application and removal of the wedge and to prevent injury to the user.

The wedge strut member can be pushed into place with the hand and the heel of the hand can be used to produce impact for additional force in applying or removing the wedge thereby avoiding any need for tools for assembly or disassembly.

The legs can be made in the form of legs of a horse and be used in toy manufacture and provide for ease of packaging and storage of the toys while providing a rugged and strong construction which can take the forces applied by children in their play. The savings in cost to the manufacturer and to the user are therefore very substantial.

It will thus be seen that the present invention provides a supporting structure that can be used wherever needed and can be stored in a minimum of space as shown in FIG. 11 for the modification of FIGS. 9 to 11 where the elongated plank member 20 supports two pairs of legs

thereon with the rear pair of legs being hidden by the front pair and showing the wedge strut members nested within the space defined by the bails or hoops, each hoop being rotated to lie on the outside of its cooperating leg. Consequently the entire structure can be packaged in a small package. To provide for parallel arrangement of the legs with respect to the elongated member during storage, spacing members 30 shown as work retaining cleats are fixed to the work supporting upper surface 22 on the elongated work supporting plank member 20.

Although the showing in FIG. 11 illustrates the knock down arrangement of the modification of FIGS. 9 and 10 a similar arrangement can be made from the knocked down parts of the supporting structure of FIGS. 1 to 8.

It will be apparent that the grooves 11 and tongues 23Y and 24Y may be omitted from the modification of FIGS. 9 to 11 and still provide a suitable supporting structure or horse since the clamping action will be effective and the lower corners of the plank and notches 24X and 23X provide a form of tongue and groove interengagement with the walls of the notches serving as a groove or rabbet receiving the edge and a portion of the lower surface of the elongated work supporting member 20. However, an additional advantage is obtained by the use of the tongue and groove arrangement as the parts will be more positively retained in assembled relation due to the effect of the substantially parallel surfaces formed by the diametrically opposite wall portions of the groove 21.

Upon reference to the modifications shown in FIGS. 12 to 17 it will be noted that the plank 50 is substantially wider than the planks shown in the other figures and the horse formed thereof makes use of the quadrilaterally shaped hoop or bail members 45 and 47 shown in FIGS. 6 to 8 and requires a modification of such bail members by the use of extension U-shaped member 63 and a different length wedge 59 to accommodate for the difference in width.

The plank 50, shown as being of substantially double the width of the planks shown in the other figures is supported by at least two legs 53 and 54 having their upper ends extending into the rabbets 51 at each edge of the plank 50 and such legs are retained in position by bails 45 and 47 with extension U-shaped members 63 and 64 respectively attached thereto. The extension U-shaped members 63 and 64 embrace the upper ends of legs 53 and 54 respectively and the wedge strut member 59 is of sufficiently greater length than the wedge strut 49 to cooperate with the lengthened bails 45, 63 and 47, 64 to cause the clamping action. Except for this modification of the bail members by the addition of the extensions and the use of the longer wedge strut 59, the supporting action of the legs 53 and 54 is substantially the same as the supporting action of the other modifications.

Thus a modifying kit of extension U-shaped members 63, 64 and wedge 59 and edge rabbeted plank 50 makes it possible to obtain a sturdy work supporting surface of any suitable width.

The extension U-shaped members 63 and 64 are substantially identical and the bail or hoop members 45 and 47 are substantially identical so that the description of a single one and the interconnection should be sufficient for a complete description of this feature. U-shaped extension member 63 has a bight section 63A which engages the top outer surface of the leg 53 and the leg portions 63B and 63C of the U-shaped extension member extend at substantially right angles thereto in the unattached condition shown in FIG. 15 and terminate in hooks 63D and 63E respectively which hooks are disposed at right angles to leg portions 63B and 63C respectively which engage the sections 45A and 45BT of bail 45 with the interengagement of leg portions 63B and 63C with end 45C serving to positively hold the extension 63 in tension condition relative to the bail 45 when the wedge 59 is inserted against cleats 53E and 54E spread-

ing the legs **54** and **54** apart as previously described in the other modifications. It will be apparent that the length of the leg portions **63B**, **63C** of the U-shaped extension is such as to cause the legs **53** and **54** of the horse to be arranged at the correct angle which angle is the same at that shown in the other figures and assures that the same supporting legs will be useful with both the wide plank **50** or with the narrow plank **40** for example.

To prevent the bail members from sliding along the outer surface of the legs, short dowels **60** are inserted into drilled holes in the legs and slots **60A** of a width to receive the end **45D** of the bail as formed therein preventing the bail from sliding along the leg. Each bail is prevented from separation from its leg by a staple **56**.

To prevent sliding of the extensions along the upper end of the leg, dowels **61** are inserted in drilled holes in the upper ends of the legs as shown, but a notch is formed in the dowels **61** to simplify assembly of the parts with the lower portion of the dowel **61** extending outwardly to provide an abutment engaging bight portion **63A** of the U-shaped extension.

It will thus be seen that this form of the invention can be readily adapted to the use of a narrow work supporting plank **40** or a wide work supporting plank **50** by including the U-shaped extensions **63** and **64**, wedge strut **59**, and plank **50** with a horse structure shown in FIGS. 6 to 8.

It will be apparent that changes may be made within the valid scope of the invention as defined by the valid scope of the claims.

As shown in FIG. 18 slot **60A** may be dove-tail in cross-sectional shape so that a bail snapped therein through the narrower entrance will be held thereby and make staple **56** unnecessary. Obviously the harder grain of the dowels will prevent the engaging bail from cutting into the leg.

What is claimed is:

1. A carpenter's horse comprising an elongated bar member having side edges and a work supporting surface, each of the side edges of said elongated bar member being provided with a groove extending along the length thereof, at least one pair of legs supporting said elongated bar member, each leg of said pair of legs having one end edge thereof transversely shaped to be slidably received in a groove in said elongated bar member, a pair of crossed bails each bail comprising a closed figure having sides and ends, one end of each bail being pivotally connected to one leg and adapted to frictionally embrace and engage the outer surface of the opposite leg of said pair at a point remote from the pivoted end of the other bail on said opposite leg, and a relatively movable strut engaging the inner surface of said pair of legs between the ends of said pairs of crossed bails remote from the upper end of the legs for forcing said legs apart against the reaction of said pair of bails and urging the said one end edge of each leg into positive frictional engagement with the grooved edges of said elongated supporting member.

2. The structure of claim 1 in which an abutment is provided on each leg for engaging the bail of the opposite leg to maintain same in fixed position thereon.

3. The structure of claim 1 in which spaced means is provided on said legs engaging said bails and preventing sliding movement of said bails along said legs.

4. The structure as defined in claim 1, wherein the grooves extend the entire length of each side edge of the work supporting top bar member, and said pair of legs having opposed means slidably engaging the groove in each side edge of said top bar, whereby the legs may be slidable at any point along the length of said work supporting top bar member by merely loosening of the wedge strut.

5. The structure as defined in claim 1 including provisions for employing a wider work supporting top member wherein said crossed bail members are each provided with an extension loop releasably secured to the sides thereof, and each extension loop being frictionally engageable with the outer face of the opposite leg of said pair of legs.

6. The structure as defined in claim 1 wherein the means on each leg engaging said pair of crossed bails comprises spaced shoulder means adjacent the upper end of said leg and other shoulder means adjacent the points at which the said pair of crossed bails are pivotally carried by said legs.

7. In a carpenter's horse having a longitudinally extending planar top bar and at least one pair of supporting legs, the top having an upper work supporting surface, a lower substantially parallel surface and substantially parallel side edges, the improvement providing adjustably supporting the legs at desired position along the top, said improvement comprising longitudinally extending grooves along the side edges, the upper ends of the legs being seated in said grooves, means retaining said legs in said grooves comprising a pair of closed substantially rectangular bail members each having sides and ends, one end of each of said bail members being swingably carried by the outer face of each leg at a point spaced from the upper end of such leg, each said bail being adapted to engage over the other leg at a point adjacent the upper end thereof and to cross the other of said pair of bails between said pair of legs, a wedge strut engaging the inner face of each leg adjacent a plane joining the points at which the bails are swingably carried thereby and reacting against the lower ends of said pair of bails to cause the upper ends thereof to force the upper ends of the legs into clamping engagement with said grooves, and obliquely positioned shoulder means engaged by said wedge strut for guiding and retaining same.

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