April 27, 1965 E. W. SOUTHWICK 3,180,545

LOAD-CARRYING RACK

Filed Dec. 4, 1962

FIG. 1.

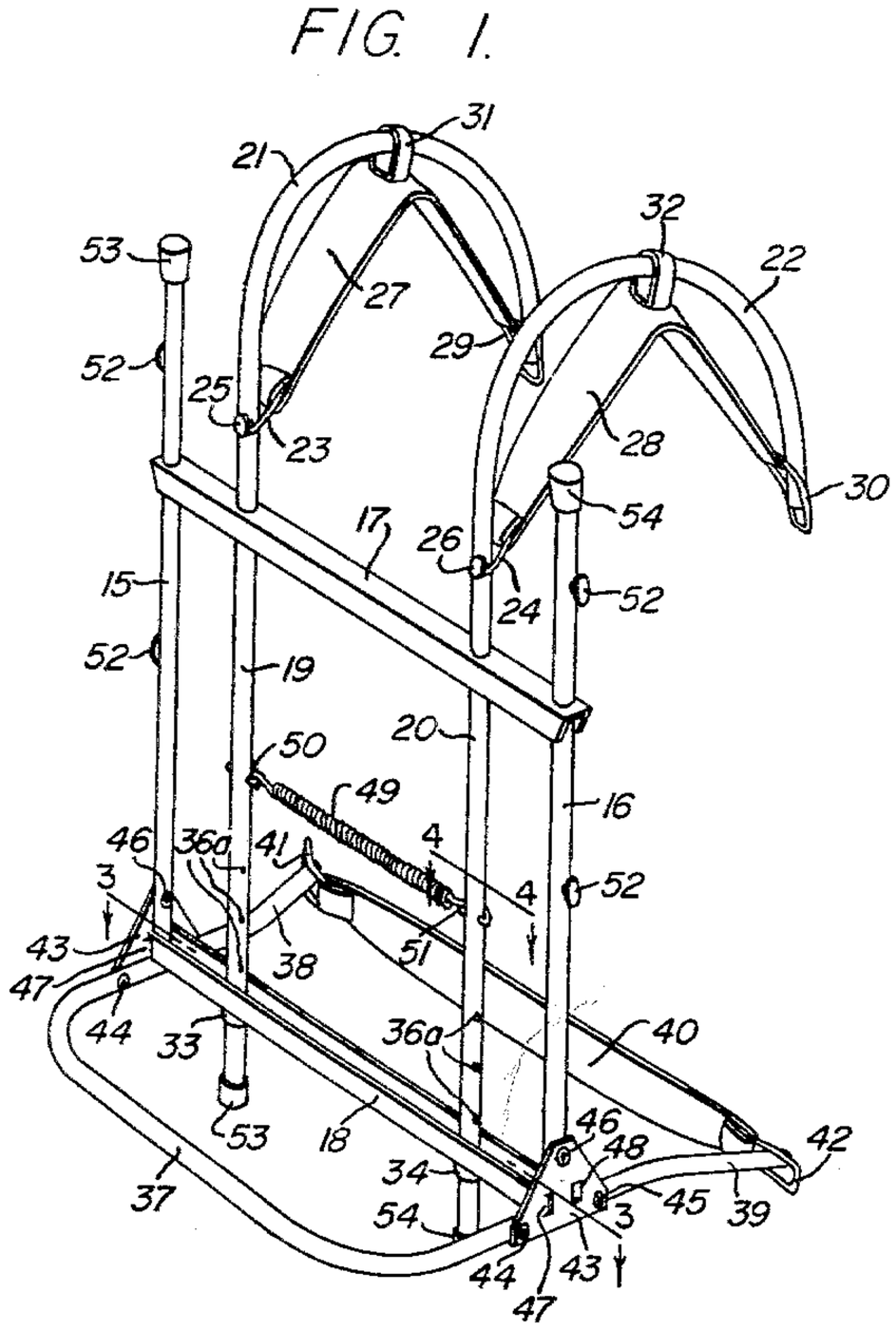


FIG. 2.

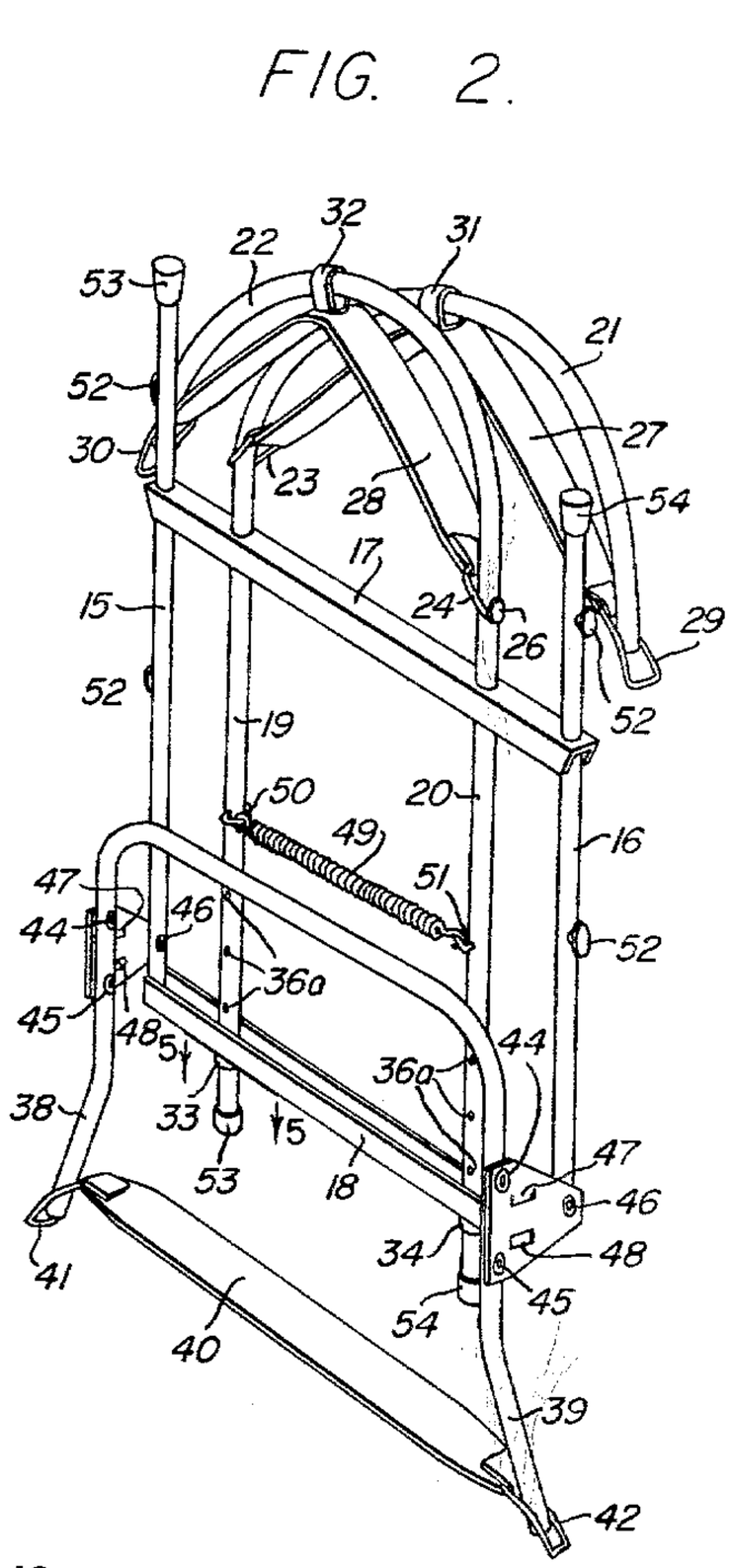


FIG. 3.

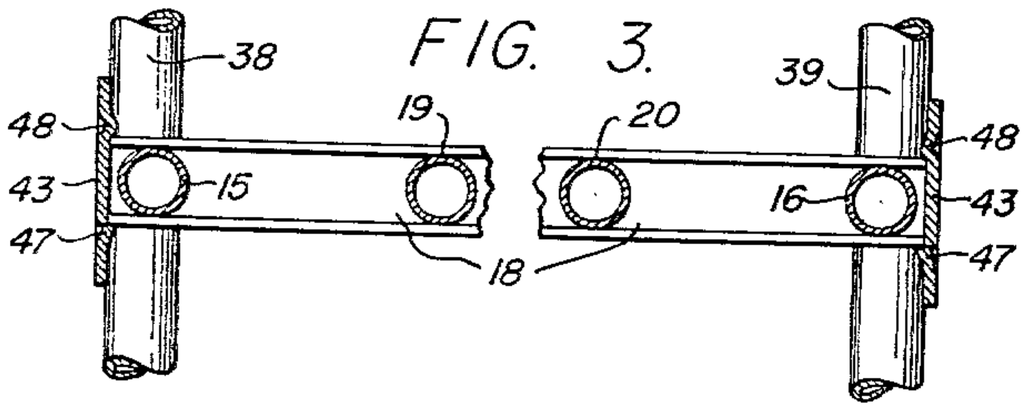


FIG. 4.

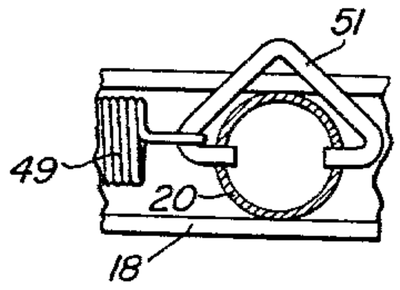


FIG. 5.

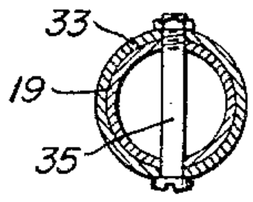
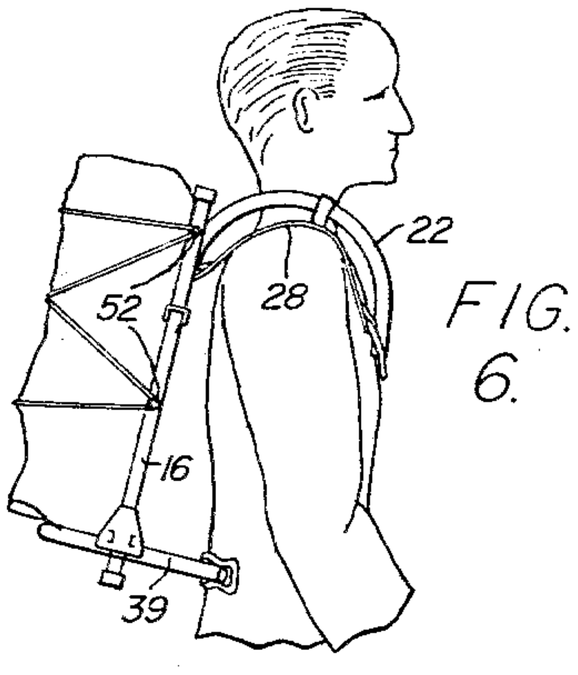


FIG. 6.



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United States Patent Office

3,180,545

Patented Apr. 27, 1965

3,180,545

LOAD-CARRYING RACK

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Filed Dec. 4, 1962, Ser. No. 242,185
9 Claims. (Cl. 224—25)

The invention relates to racks for carrying loads and particularly to load-carrying racks which are adapted to be temporarily attached to a person's back, to the back of the seat of a car, or to some other support for transportation from one place to another.

A variety of racks of this type, embodying a rigid load-carrying frame and means for attaching such frame to a supporting carrier, are well known. This is especially true with respect to so-called pack boards or racks for use by hikers, hunters, mountaineers, and the like for carrying food, bedding, camping supplies, etc. on their backs. Many of these racks are light in weight, structurally strong, capable of being quickly and easily put in place on the supporting carrier, and foldable for convenient storage when not in use. Yet, despite the possession of some or all of these highly desirable characteristics limitations of various kinds exist in racks of heretofore known constructions which impair their usefulness. For example, comfort is an extremely important factor in racks intended for carrying on a person's back, and there is much to be desired from this standpoint.

A principal object of the present invention is to provide a load-carrying rack that can be carried under heavy load and for long distances over rough terrain by a hiker, hunter, soldier or the like, much more comfortably than can racks of previously known constructions, without sacrificing the desirable characteristics mentioned above.

In U.S. Patent No. 2,822,117 granted to R. G. Mack on February 4, 1958, there is shown a type of load-carrying rack, which has a broad and rigid frame adapted to receive and support a load on one broad face thereof and is adapted to be mounted on a supporting carrier, by means of either rigid hooks or flexible straps, with its opposite broad face overlying a broad face of the carrier, e.g. a person's back in those instances where the rack is to be carried by a person, so that parts of the rigid frame rest directly against such carrier. The discomfort of rigid parts bearing against a person's back is alleviated to a certain extent by the fact that this rack also has a second frame, pivoted intermediate its length to the lower end of the first-mentioned frame, so as to project beyond the broad faces of such first frame when in working position to provide a spacer portion below and extending beyond the aforesaid opposite broad face, and by the fact that a flexible strap is connected across such spacer portion transversely of the rack to cushion the weight of the load as it rests upon the lower part of a person's back.

The present invention constitutes an improvement on racks of this type in that, among other things, it provides means to hold all rigid parts away from the body to prevent their chafing the user. This is accomplished by utilizing, in combination with a pair of rigid support-engaging arms of curved hook formation, flexible spacer straps, shorter in length than the hook portions of such arms and connected to the front and rear of such hook portions, and flexible keeper means attached to the straps and suspended from the midpoint of the respective hook portions to maintain the straps in suspended positions so that each forms, in effect, a pair of chords across the front and rear of its hook.

With this arrangement, the flexible straps contact a user's shoulders and effectively hold all of the upper rigid portions of the rack away from the body of the user at the same time as the lower rigid portions are being held away by the aforementioned transverse strap.

Another feature which ties in functionally with the above structural combination of this invention is the provision for adjusting the rigid support-engaging arms longitudinally of the first or main frame, so as to place the load and the transverse cushioning strap in the most favorable positions on a person's back from the standpoint of comfort and carrying ability.

Other improvements attributable to the present invention are the provision of means to facilitate mounting and dismounting of the rack and folding of the rack to compact position. These means comprise rotatable mountings for the rigid support-engaging arms, means resiliently biasing the arms toward support-engaging positions and the compact folded position, means cooperating therewith for holding the arms in the respective positions, and combination stop and latch means for the second frame so as to enable it to be quickly and easily placed into working position from folded position, and vice versa, and to yieldably secure it in working position.

By making the support-engaging arms axially slidable through the main frame, longitudinal movement being limited only by the vertical adjusting means, one arm is easily positioned to rotate over the other and both arms can be moved to a folded position in common against one broad face of such main frame.

Because the arms are resiliently biased to their support-engaging positions, either or both of them can be rotated out of the way of the shoulders when mounting the pack on the back, or in removing it. The biasing arrangement is advantageously such as will return the arms to the support-engaging position and normally hold them in this position. This prevents accidental rotation which might result from the motion of walking and climbing or from catching on trees, brush, and the like.

There is shown in the accompanying drawing a specific embodiment of the invention representing what is presently regarded as the best mode of carrying out the generic concepts in actual practice. From the detailed description of this presently preferred form of the invention, other more specific objects and features will become apparent.

In the drawing:

FIG. 1 is an isometric view of the rack in load-carrying position;

FIG. 2, a similar view showing the same rack in folded position;

FIG. 3, a fragmentary, transverse section taken on the line 3—3 of FIG. 1;

FIG. 4, a similar sectional view taken on line 4—4 of FIG. 1;

FIG. 5, a similar sectional view taken on line 5—5 of FIG. 2; and

FIG. 6, a side elevation showing the rack of the foregoing figures in place on a person's back.

In the illustrated preferred construction, rigid side members 15 and 16 and upper and lower cross-pieces 17 and 18 are rigidly secured together to form a broad carrier frame.

Passing through each of the cross-pieces 17 and 18 are straight sections of support-engaging arms 19 and 20. These arms are spaced apart, as shown, a distance sufficient to allow hook portions 21 and 22, which are bent to conform generally to the curvature of a wearer's shoulders, to be clear of the neck of the user.

Fixed to support-engaging arms 19 and 20, as by rings 23 and 24 which are prevented from upward movement by rivets 25 and 26, are shoulder straps 27 and 28. The straps are further fixed at the end of the curved sections to one end of the double rings 29 and 30 and thus prevent contact of support-engaging arms 19 and 20 with a user's shoulders. To prevent the shoulder straps from

dangling loose and getting in the way when the load-carrying rack is being put on or taken off, the keepers 31 and 32 are provided to hold the straps in a chord-like suspended position, as shown.

The vertical position of the support-engaging arms with respect to the carrier frame is determined by the position of collars 33 and 34 held in place by bolts 35, 36 which pass through any of the holes 36*a*. Simply by removing the bolts, changing the position of the collars 33 and 34 along arms 19 and 20, and replacing the bolts in the desired holes, the user is able to change the elevation of the carrier frame and hence the load on his back, to position it most comfortably.

Pivotally connected to the side members 15 and 16 of the carrier frame, and movable therewith, is a second rigid frame 37 of wide U-formation, the legs 38 and 39 of which are flared outwardly to clear the body of a user.

A flexible strap 40 is connected between double rings 41, 42 at the free ends of the legs 38 and 39 and is adapted to contact the body of the user as a cushion and to prevent rigid parts of the rack from making contact.

From the description above, it is obvious that in use on a person the only parts of the load-carrying rack which will come in contact with the body are the flexible shoulder straps 27 and 28 and back strap 40, and that no rigid members will be able to rub against and chafe the body of the user.

The pivotal connections between generally U-shaped second rigid frame 37 and side members 15 and 16 include lockplates 43. The lock-plates are formed rigid with the second frame, as by rivets 44 and 45, but are pivotally connected to side members 15 and 16 as by rivets 46 having a bushing thereon. In addition, plates 43 have pressed out stop tabs 47 and pressed friction detent buttons 48. As the second frame 37 is pivoted from the folded position of FIG. 2 to the use position of FIG. 1, the friction detent buttons 48 are forced past the lower cross-piece 18, until stop tabs 47 contact the lower cross-piece 18 to prevent further rotation. The friction detent buttons 48 reverse pivoting until sufficient force is applied to overcome the frictional holding force, but when such force is applied, the detent means will yield. Thus, although the second frame 37 is locked in position to be loaded, should a substantial force be applied to pivot the second frame back to its folded position of FIG. 2, the second frame would pivot before any of the pivot pins or connecting rivets would shear off, thus damaging the pack rack.

Fastened between the support-engaging arms 19 and 20 is a tension spring 49. The spring is connected to triangular shaped hog rings 50, 51, which in turn are connected to the arms, so that peaks of the triangles point in the same direction as do the hook sections 21 and 22 of the arms, and the triangle bases extend into the straight sections of such arms. In load-carrying position, spring 49 engages base corners of the triangular hog rings and biases the support arms to the position of FIG. 1. However, when one of the arms is slipped downwardly through the rigid frame to allow the other arm to rotate over it and both arms are rotated inwardly to the position shown in FIG. 2, the ends of the spring slip to the apices of the triangular shaped hog rings to hold the support-engaging arms in the folded position.

The double rings 29, 30 and 41, 42, in addition to providing holding means for the shoulder and back straps as previously described provide means whereby an additional front pack or "kangaroo pouch" can be carried. Such a pack would be supported by straps connected to the free rings in each double ring arrangement.

In use, the load to be carried rests on the second rigid frame and is securely fastened to tie points 52 formed on each of the members 15 and 16. These tie points may, for example, consist of protruding rivets. Cap members 53 and 54 are provided to strengthen the ends of members 15 and 16 and to provide smooth surfaces at the ends.

Since the entire rack with the exceptions of straps 27, 28, and 40 can be made of a lightweight metal, as for example aluminum or aluminum alloys, weight is kept to a minimum. Inasmuch as the rack consists of a main rigid carried frame, and a second rigid frame which is locked in place, the rack is easy to load and is capable of supporting heavy loads without damage thereto. Additionally, no rigid portions of the rack structure come in contact with the body of the user to press against and chafe him, and since the position of the load can be varied on the user's back merely by adjusting the vertical location of collars 33 and 34, the rack can be made to fit comfortably.

It can also be seen that since spring 49 biases support-engaging members 19 and 20 to hold them in the use position of FIG. 1, there is no tendency for them to inadvertently pivot off the shoulder of the user. However, the spring biasing means does allow the support-engaging members to be easily rotated outwardly from the first rigid frame to facilitate putting the rack on or taking it off the user's back. When released, the support-engaging arms return to the use position of FIG. 1 under the influence of the spring.

Whereas there is here illustrated and described a certain presently preferred arrangement of structure which I presently regard as the best form of my invention, it should be understood that various changes may be made without departing from the disclosed inventive subject matter particularly pointed out and distinctly claimed herebelow.

I claim:

1. A load-carrying rack comprising: a rigid, load-supporting main frame adapted to be carried in a generally vertical position and having mutually opposite broad faces, one adapted to directly face a carrier support and the other to receive a load; a pair of support engaging arms having lower portions rotatably mounted in the frame on respective mutually parallel axes which are parallel with the vertical axis of the frame, and support-engaging upper portions of hook formation normally projecting from said one broad face, but foldable into substantially the plane of the frame when the rack is not in use; a second frame extending transversely across the main frame at the lower end thereof and having a position normal to the plane of the main frame; pivot means rigidly connected to said transverse frame intermediate its length and pivotally connected to the main frame so that the transverse frame projects beyond both broad faces of the main frame when in normal working position, and serves both as a platform for a load, and a spacer between the main frame and a support, and is pivotable to a second folded position; stop means to prevent said transverse frame from pivoting from said folded position beyond the position normal to the plane of the main frame; and detent means to yieldably hold said transverse frame in said last mentioned position, but responsive to pressure on the frame to release said transverse frame from its held position before any of the components of said rack are damaged by said pressure.

2. A load-carrying rack comprising: a rigid, load-supporting main frame adapted to be carried in a generally vertical position and having mutually opposite broad faces, one adapted to directly face a carrier support and the other to receive a load; a pair of support-engaging arms having lower portions rotatably mounted in the frame on respective mutually parallel axes which are parallel with the vertical axis of the frame, and support-engaging upper portions of hook formation normally projecting from said one broad face, but foldable into substantially the plane of the frame when the rack is not in use; and biasing means for yieldably holding said support-engaging arms in their normal projecting position and their folded positions.

3. A load-carrying rack comprising: a rigid main frame having a front, a back, a top, and a botom; support-engaging arms rotatably mounted in the frame in mutually spaced relationship and having hook end sections extending above the top of said frame; a second rigid frame; means pivotally connecting said second frame to said main frame transversely at the bottom thereof, said means including second means to latch said transverse frame in load-carrying position in a plane normal to the plane of said main frame assembly; first and second flexible strap means having a length slightly less than that of the hook sections and being connected to the inside of the hook sections of said support-engaging arms; and third flexible strap means connected to said transverse frame, said first, second, and third strap means being adapted to contact a carrier, and to transmit the weight of said load-carrying rack and a load thereon.

4. The load-carrying rack of claim 3, wherein said rigid main frame comprises first and second side members rigidly interconnected by upper and lower cross-pieces.

5. The load-carrying rack of claim 4, wherein said support-engaging arms include straight sections extending through said upper and lower cross-pieces and in which a collar is positioned on the straight portion of each arm below the lower cross-piece, said main frame resting on said collars, and said collars including adjustment means for positioning said collars along said arms.

6. The load-carrying rack of claim 5, wherein resilient means are provided to bias said support-engaging arms to a position where the hook end sections of said arms extend away from the front of the main frame in planes substantially normal to the plane of said main frame.

7. The load-carrying rack of claim 6, wherein said resilient biasing means additionally biases said support-engaging arms to a folded position wherein the hooked end sections of said support-engaging arms cross each other, and one of said hooked end sections abuts one of said side members of the first rigid frame assembly.

8. The load-carrying rack of claim 3, wherein said transverse frame comprises a U-shaped member, the legs of said U-shaped member being flared outwardly at the ends thereof, and wherein said third strap means is connected between the flared out ends of the said U-shaped member.

9. The load-carrying rack of claim 8, wherein said means to pivotally connect said transverse frame to said rigid main frame comprises a pair of plate members, said plate members each being rigidly fixed to said U-shaped member at opposite intermediate points of the legs thereof, and connected through a pivot pin to said side members at locations between said upper and lower cross-pieces, and said means to yieldably lock said transverse frame in load-carrying position comprises friction detent means formed on said plates and engageable with said lower cross-piece at the front of said main frame when said transverse frame is in position normal to the plane of the rigid frame, and stop means formed on said plate and engageable with the lower cross-piece at the back of said main frame when said transverse frame is in position normal to the plane of the main frame, said transverse frame being pivotable from the position normal to the plane of the main frame to a position wherein the cross portion of the U-shaped member abuts the support-engaging arms at the back of the main frame.

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