May 9, 1967 A. SPIEGL ETAL 3,318,462

KNOCKDOWN MODULAR RACK

Filed May 24, 1965 2 Sheets-Sheet 1

FIG. 1.

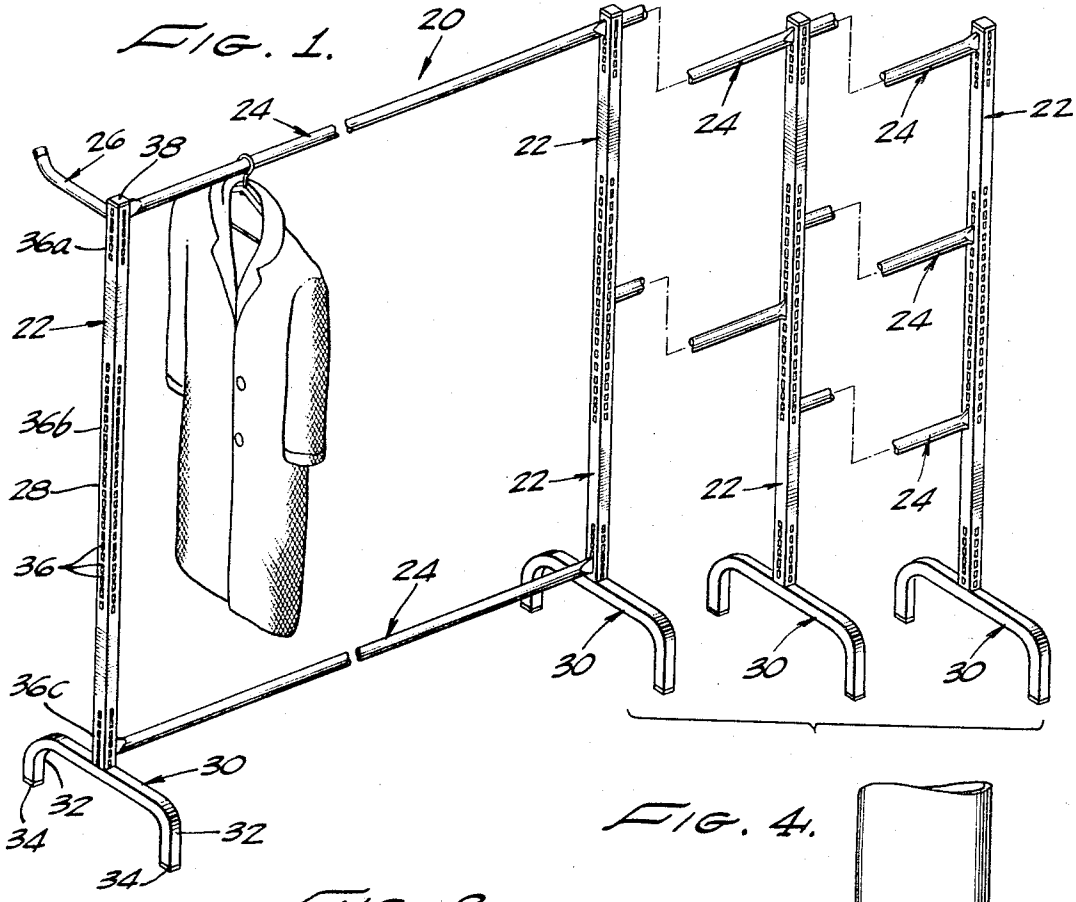
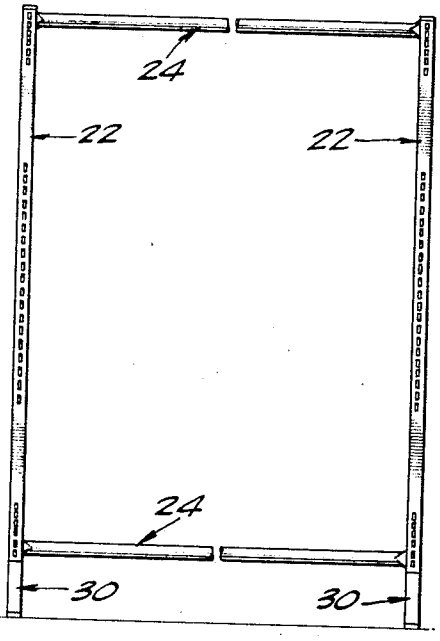


FIG. 2.



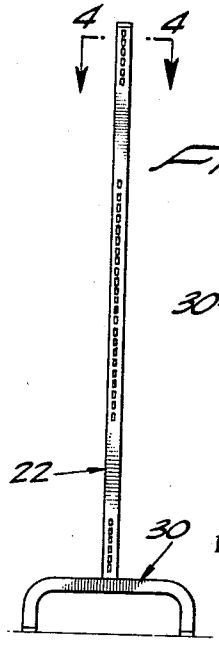


FIG. 4.

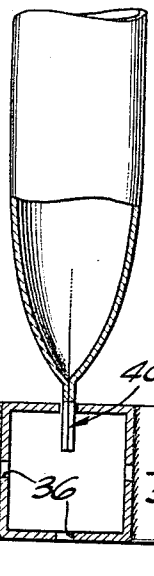
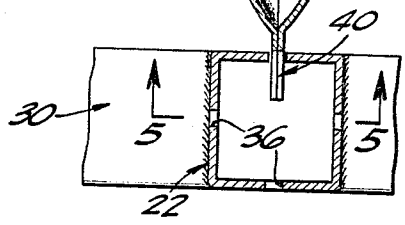


FIG. 3.



ANDREW SPIEGL
SIDNEY H. BACON
INVENTORS

BY Beehler & Arant

ATTORNEYS

May 9, 1967 A. SPIEGL ETAL 3,318,462

KNOCKDOWN MODULAR RACK

Filed May 24, 1965 2 Sheets-Sheet 2

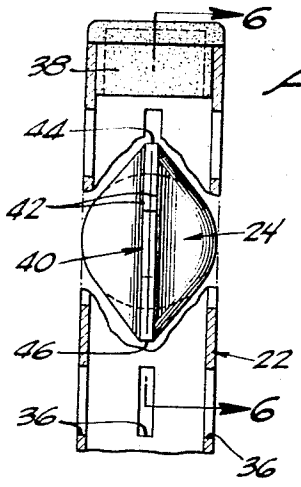


FIG. 5.

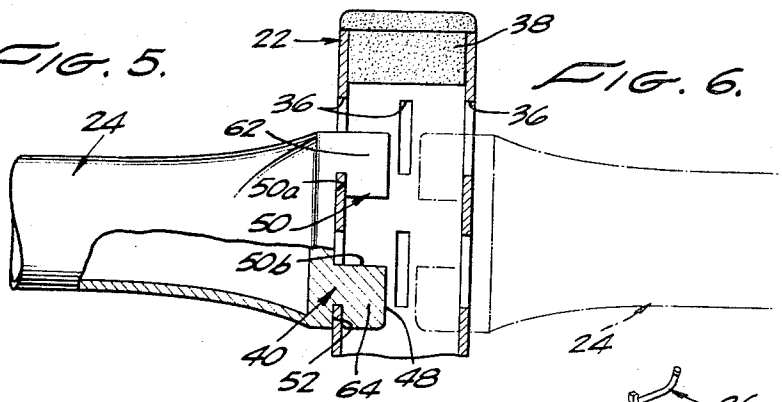


FIG. 6.

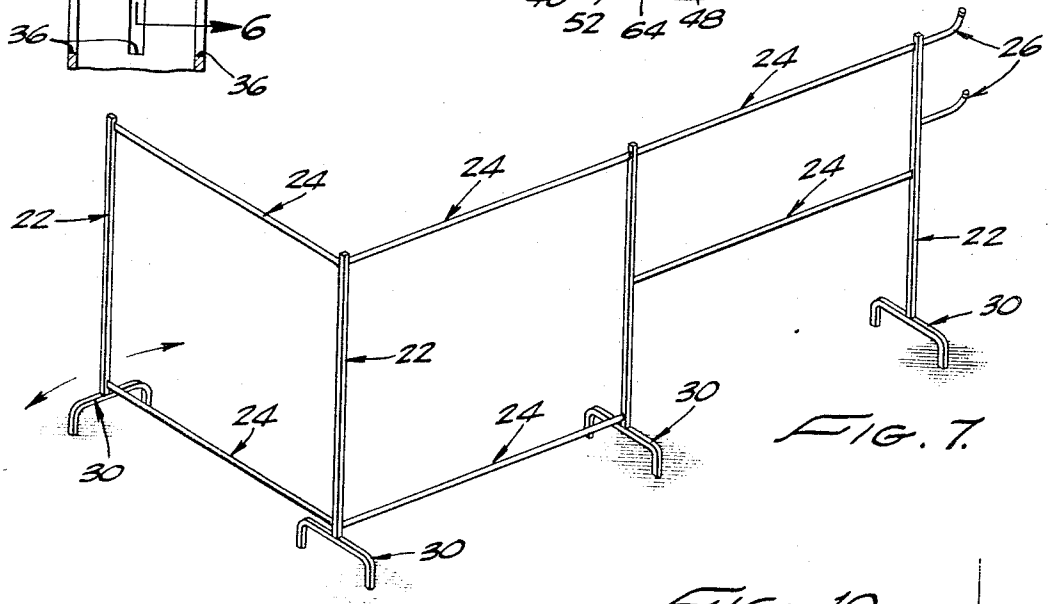


FIG. 7.

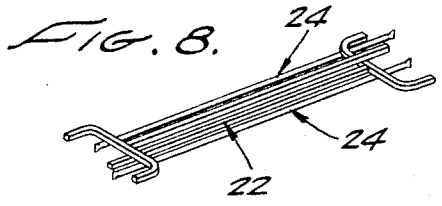


FIG. 8.

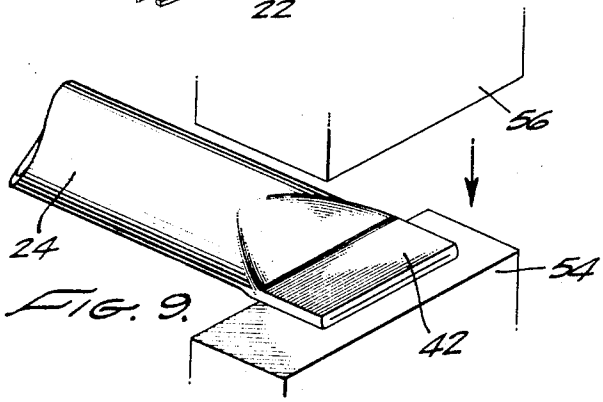


FIG. 9.

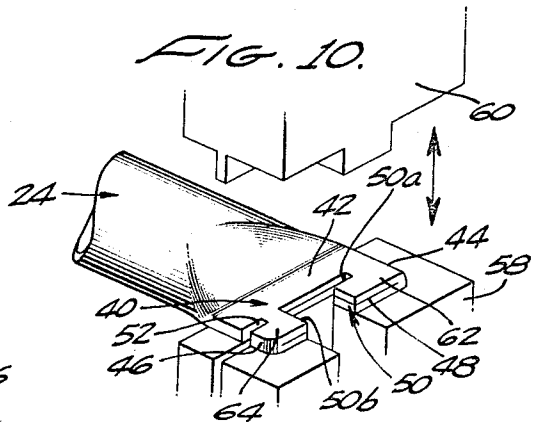


FIG. 10.

ANDREW SPIEGL
SIDNEY H. BACON
INVENTORS

BY Beehler & Arant

ATTORNEYS

United States Patent Office 3,318,462
Patented May 9, 1967

3,318,462

KNOCKDOWN MODULAR RACK

Andrew Spiegl, 4603 Ethel Ave., Sherman Oaks, Calif. 91403, and Sidney H. Bacon, 18631 Pasadero Drive, Tarzana, Calif. 91356

Filed May 24, 1965, Ser. No. 458,179
4 Claims. (Cl. 211—177)

This invention relates generally to supporting racks and has more particular reference to a novel knockdown modular rack.

The knockdown supporting rack of this invention is designed primarily for use as a garment rack. For this reason, the present rack will be described herein primarily in connection with this particular application thereof. As will appear from the ensuing description, however, the principal features of the invention may be embodied in supporting racks for other purposes. Accordingly, the invention should not be regarded as limited in application to garment racks.

Garment racks are installed in a wide variety of social, business, industrial and other establishments, either for the convenience of patrons and/or employees, or for use in connection with the normal business activities of such establishments. Most hotels, assembly halls, and the like, for example, provide garment check racks for the convenience of their patrons. On the other hand, many industrial and business establishments, such as clothiers, dry cleaning plants, and the like, require garment racks in the course of their normal business activities. Garment racks of this type are preferably so constructed as to be collapsible for convenience of initial shipment to the purchaser, convenience of subsequent transportation from one location to another, when necessary, and convenience of storage when not in use.

To be completely practical, a collapsible garment rack must satisfy certain prerequisites. For example, the ideal collapsible garment rack will be simple in construction, economical to manufacture, and easy to assemble and disassemble. Thus, a rack with a large number of intricate parts, while it may be collapsible, is generally so costly to manufacture and difficult and time-consuming to assemble and disassemble as to render its collapsibility virtually worthless. The ideal garment rack, then, will have a minimum number of simply and inexpensively formed parts which may be quickly and easily assembled by even the most unskilled persons. Garment racks of this type, of course, may be installed in spaces of widely varying size and shape. The ideal garment rack, therefore will be flexible in its manner of assembly so as to enable the overall size, shape, and arrangement of the rack to be adjusted in such a way as to accommodate the rack to the particular space in which the rack is to be installed. In this regard, flexibility in the overall size, shape and arrangement of the assembled rack is also of importance from the standpoint of optimum utilization of the available space. The ideal garment rack will also possess the capability of adjustment of its various members in accordance with the particular garments or other articles to be supported. For example, in many applications of garment racks, it may be desirable or necessary to adjust the elevation and/or vary the number of horizontal supporting bars in a given rack. Such adjustment should be capable of quick and simple accomplishment. Finally, the ideal collapsible garment rack will possess sufficient strength, ragidity and stability to support a large number of garments without danger of accidental collapse or tipping over and, in addition, will be light in weight and compact when collapsed for shipment or storage.

A wide variety of collapsible garment racks have been devised in the past. These existing racks, however, are deficient for one reason or the other, such as high cost,

complexity, difficulty of assembly and disassembly, lack of flexibility in the overall size, shape, and arrangement of the assembled rack, lack of adjustability, and so on. Accordingly, there is a definite need for an improved collapsible garment rack.

A particular requirement for collapsible garment racks is in the conduct of trade shows or exhibits by garment manufacturers. Such shows or exhibits are frequently conducted in large hotels where thousands of different garments are exhibited in hundreds of different rooms, and each exhibitor desires to achieve the most attractive display of his goods while at the same time utilizing all the room space available regardless of its size or configuration. But when the exhibit is over the garment racks must then be taken down and stored in a very small space until the next exhibit.

This invention provides such an improved knockdown garment rack. As noted earlier, however, the present collapsible rack may be used for other purposes. In this regard, it is significant to note that most, if not all, of the foregoing prerequisites of the ideal collapsible garment rack are also prerequisites of ideal racks for other purposes.

It is a general object of this invention, therefore, to provide an improved knockdown rack which satisfies most, if not all, of the foregoing prerequisites of the ideal collapsible rack.

A highly important object of the invention is to provide a knockdown rack which is characterized by its simplicity of construction, ease of assembly and disassembly, adjustability, strength and rigidity, minimum number of simple, inexpensively formed parts, flexibility of the final assembled size, shape, and arrangement of the rack, and economy of manufacture.

An important object of the invention related to the foregoing object is to provide a knockdown rack composed of simple tubular members that are formed in a new and unique way to adapt the members for releasable interlocking engagement.

A further object of the invention is to provide a knockdown rack of the character described which is ideally suited for use as a garment rack.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims, and illustrated in the attached drawings.

In these drawings:

FIGURE 1 is a perspective view of a knockdown garment rack according to the invention;

FIGURE 2 is a front elevation of the left-hand section of the knockdown rack in FIGURE 1;

FIGURE 3 is an end elevation of the rack section of FIGURE 2;

FIGURE 4 is an enlarged section taken on line 4—4 in FIGURE 3;

FIGURE 5 is a section taken on line 5—5 in FIGURE 4;

FIGURE 6 is a section taken on line 6—6 in FIGURE 5;

FIGURE 7 is a perspective view of a modified rack arrangement according to the invention;

FIGURE 8 is a perspective view illustrating a number of members of the rack knocked down and assembled for shipment or storage;

FIGURE 9 is a perspective view illustrating an initial step in forming certain connecting keys on the ends of the horizontal supporting bars of the rack; and

FIGURE 10 is a perspective view illustrating the final step involved in forming the connecting keys.

The knockdown rack **20** illustrated in these drawings

is intended for use as a garment rack and comprises upright supporting posts **22** and horizontal supporting bars **24** and **26**. The several supporting posts **22** of the rack are identical, as are the supporting bars **24** and the supporting bars **26**.

Each supporting post **22** comprises an upper tubular supporting member **28** and a lower supporting base **30**. Both the supporting member **28** and base **30** are preferably constructed of commercially available, square metal tubing. The tube which forms the base **30** is bent into the inverted U shape illustrated to define on the base a pair of depending legs **32**. The upper connecting member of the base is welded or otherwise rigidly joined at its center to the lower end of the supporting member **28** of the post. The lower ends of the base legs **32** are preferably fitted with plastic or rubber caps **34** to restrain the rack against sliding on the floor and to prevent the legs from scratching or otherwise marring the floor.

The upper tubular member **28** of each supporting post **22** has a multiplicity of vertically spaced, axially extending and aligned slots **36**. Conceivably, each post may have slots in only one of its walls. Preferably, however, all four sides of each post are provided with slots, as shown. The slots are arranged in three vertically spaced sets, to wit, an upper set **36***a*, and an intermediate set **36***b*, and a lower set **36***c*. The corresponding slots **36** in each of these sets, at the four sides of the supporting post member **22**, are disposed at the same elevation above the base **30**. The upper end of each post supporting member **28** is closed by a cap **38**.

Each horizontal supporting bar **24** is preferably constructed of commercially available round metal tubing. The ends of each bar are shaped to form flat, slotted, connecting keys **40**. As will be explained shortly, each connecting key **40** is engageable in a pair of adjacent slots **36** and a supporting post **22** in such manner as to releasably interlock the post and bar. Each key **40** has flat contacting walls **42** with integrally joined upper and lower edges **44** and **46**, respectively, and axially presented edges **48**.

Formed in each key is an upper, generally L-shaped locking slot **50** and a lower locking slot **52**. The upper locking slot **50** has one leg **50***a* disposed in a plane normal to the central axis of its respective supporting bar **24** and a lower leg **50***b* extending axially from the lower end of the slot leg **50***a* and through the axially presented key edges **48**. The lower key slot **52** is disposed in the same normal plane as the upper leg **50***a* of the upper key slot **50**.

The connecting keys **40** of the supporting bars **24** may be formed in various ways. According to the preferred practice of the invention, however, these keys are formed by first placing the ends of each bar on a mandrel **54** and then driving a ram **56** against the bar to flatten the bar end, as shown in FIGURE 9. Thereafter, the flattened end of the bar is placed on a die **58**, and a punch **60** is driven against the bar end and into the die cavity to form the key slots **50**, **52**, as illustrated in FIGURE 10.

The key slots **50**, **52** define, on each connecting key **40**, a pair of generally L-shaped locking tongues **62** and **64**. The tongues **62**, **64** on each supporting bar **24** are dimensioned for axial insertion through a pair of adjacent slots **36** in a supporting post **22** to an initial position wherein the upper key slots leg **50***a* and the lower key slot **52** are aligned with the respective post side wall. The supporting bar is then moved laterally toward the lower end of the post to shift the engaged locking key **40** downwardly in the slots to the locked position illustrated in FIGURE 6, wherein the post side wall portions at the lower ends of the slots engage in the key slots, as shown. The supporting post **22** and supporting bar **24** are then releasably interlocked. Disengagement of the bar and post is effected by reversing this procedure.

According to the preferred practice of the invention, the locking tongues **62**, **64** on each connecting key **40** are dimensioned to have a slightly loose fit in the post slots **36**. This is to permit relative lateral hinging movement of adjacent sections of an assembled rack according to the invention, as illustrated by the arrows in FIGURE 7, thereby to prevent damage to the supporting posts and connecting keys.

When assembling a collapsible rack **20** according to the invention, the supporting posts **22** and supporting bars **24** are interlocked in the manner explained above. The supporting bars, of course, may be located at any desired elevation along the posts. Generally, a completed rack will embody a pair of supporting bars **24**, although three or more bars may be used, as shown in FIGURE 1.

It will be recalled that the post slots **36** are arranged in three vertically spaced sets **36***a*, **36***b*, and **36***c*. This facilitates placement of the ends of each supporting bar **24** at the same elevation. Thus, it is a simple matter to determine the corresponding slots in two adjacent supporting posts **22** by counting the slots starting from the upper ends or lower ends of the corresponding slot sets on the posts. This procedure of locating corresponding slots and adjacent posts to receive the ends of a supporting bar is easier, for example, than counting slots from one end of long continuous rows of slots.

It is evident at this point that several supporting posts **22** and supporting bars **24** of the invention may be assembled in various arrangements to form garment racks of various overall sizes and shapes, thereby to accommodate the rack to and optimally utilize different available spaces in which racks are to be installed. FIGURES **1** and **7** illustrate two possible rack arrangements. Other rack arrangements are possible, of course. This flexibility in the assembled size, shape and arrangement of the rack is due, in large part, to the fact that all sides of the supporting posts **22** are slotted, whereby supporting bars **24** may extend from one, two, three, or all four sides of each supporting post **22**. In this connection, attention is directed to FIGURE 6, wherein it will be observed that the locking tongues **62**, **64** on each connecting key **40** are axially dimensioned to permit four supporting bars to be interlocked with the same supporting post **22** at the same elevation along the post. Each supporting bar **24**, of course, may be located at any desired elevation by placing the connecting keys **40** on the bar in the appropriate slots **36** in the posts. It is apparent, therefore, that several supporting posts **22** and supporting bars **24** may be assembled in many different arrangements to provide finished garment racks of widely varying overall size and shape. As noted earlier, the looseness in the joints of the rack permits one section of the rack to hinge a limited amount relative to an adjacent rack section without damaging the joints.

The short supporting bars **26** have connecting keys **40** at one end only. These short supporting bars, therefore, may be mounted on any side of any supporting post **22**, thereby to further increase the flexibility in the overall size, shape and arrangement of the finished rack.

When the present knockdown garment rack is disassembled, the supporting post **22** and supporting bars **24**, **26** of the rack may be compactly stacked, as illustrated in FIGURE 8, for convenience of storage and shipment.

As noted earlier, while the knockdown rack of the invention has been disclosed herein in connection with its use as a garment rack, the principal features of the invention may be employed in collapsible racks for other purposes. Accordingly, the invention should not be regarded as limited in application to garment racks.

While the invention has herein been shown and described in what is presently conceived to be its most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

We claim:

1. A modular knockdown rack comprising: a pair of

generally identical normally upright tubular supporting posts of rectangular cross-section, each said post having vertically spaced, axially extending and axially aligned slots in at least two sides thereof and a lower supporting base; and a normally horizontal tubular supporting bar having its ends flattened to form connecting keys engageable in adjacent pairs of said post slots, respectively, thereby to releasably interlock said bar and posts, each said key comprising flat contacting side walls having integrally joined normally upper and lower edges and axially presented edges, there being a normally upper generally L-shaped locking slot in each said key having a first leg disposed in a plane generally normal to the axis of the respective bar and a second leg extending from the lower end of said first leg and axially through said axially presented edges of the respective key side walls, there being a second normally lower locking slot in each said key disposed in said plane of said first leg of the adjacent upper locking slot and opening through said normally lower edges of the respective key side walls, said locking slots of each said key defining upper and lower locking tongues engageable in an adjacent pair of said post slots, respectively; each said key having a position of interlocking engagement with its respective post wherein the wall portions of the respective post below the respective upper and lower post slots engage in said first slot leg and said lower slot, respectively, of the adjacent key.

2. A knockdown rack as claimed in claim **1** wherein said locking tongues are proportioned to fit loosely in the respectively associated post slots, thereby to permit a limited horizontal hinging movement of said bar relative to each of said posts.

3. A modular knockdown rack, comprising: a pair of generally identical normally upright tubular supporting posts of rectangular cross-section, each said post having vertically spaced, axially extending and axially aligned slots in at least two sides thereof and a lower supporting base; and a plurality of vertically spaced, normally horizontal tubular supporting bars of circular cross-section extending between said posts, each said bar having its ends flattened to form a connecting key engageable in two adjacent post slots, thereby to releasably interlock said bars

and posts, each said key comprising flat contacting side walls having inwardly joined normally upper and lower edges and axially presented edges, there being a normally upper generally L-shaped locking slot in each said key having a first leg disposed in a plane generally normal to the axis of the respective bar and a second leg extending from the lower end of said first leg axially through said axially presented edges of the respective key side walls, there being a normally lower locking slot in each said key disposed in said plane of said upper leg of the adjacent upper locking slot and opening through said normally lower edges of the respective key side walls, said locking slots of each said key defining upper and lower locking tongues engageable in a pair of adjacent post slots, respectively; each said key having a position of interlocking engagement with its respective post wherein the wall portions of the respective post below the respective upper and lower post slots engage in said first slot leg and said lower slot, respectively, of the adjacent connecting key; said supporting bars being disposed one above the other along said posts.

4. A knockdown rack as claimed in claim **3** wherein said locking tongues are proportioned to fit loosely in the respectively associated post slots, thereby to permit a limited horizontal hinging movement of said bar relative to each of said posts.

References Cited by the Examiner

UNITED STATES PATENTS

1,803,016	4/1931	Harsted	248—225
2,674,476	4/1954	Grosso	287—53.5
3,045,834	7/1962	Seiz	211—148
3,154,833	11/1964	Kimball	25—131
3,157,252	11/1964	Tucker	52—298
3,194,407	7/1965	D'Altrui	211—148

FOREIGN PATENTS

877,649	9/1961	Great Britain.

CLAUDE A. LE ROY, *Primary Examiner.*

W. D. LOULAN, *Assistant Examiner.*