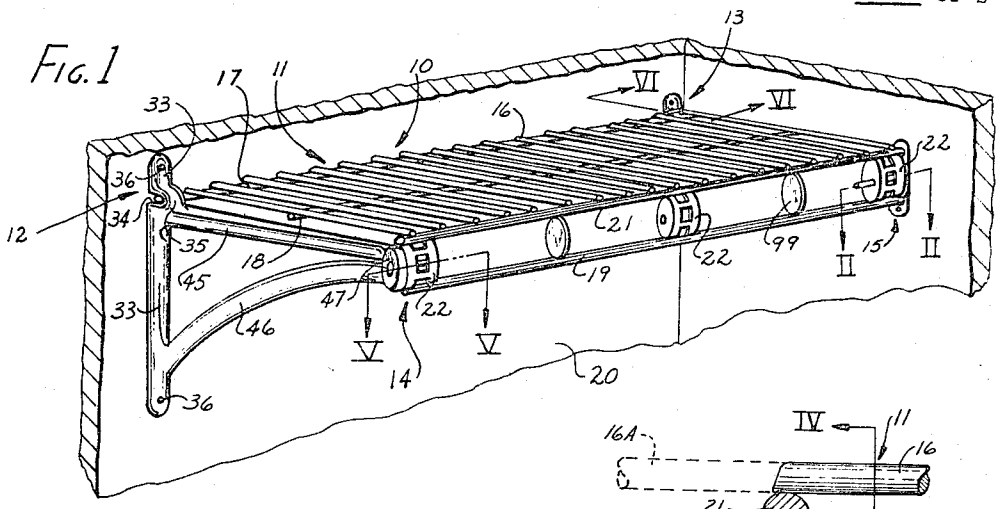
Dec. 31, 1968 J. W. BLACK ETAL 3,419,155

STORAGE UNIT

Filed Nov. 21, 1966 Sheet 1 of 2

FIG. 1



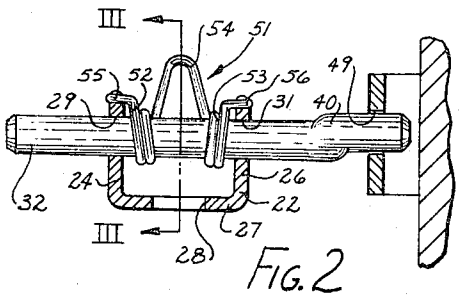


FIG. 2

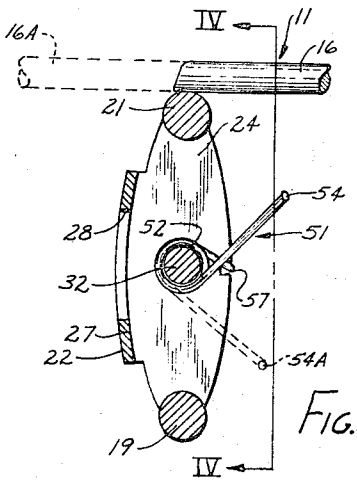


FIG. 3

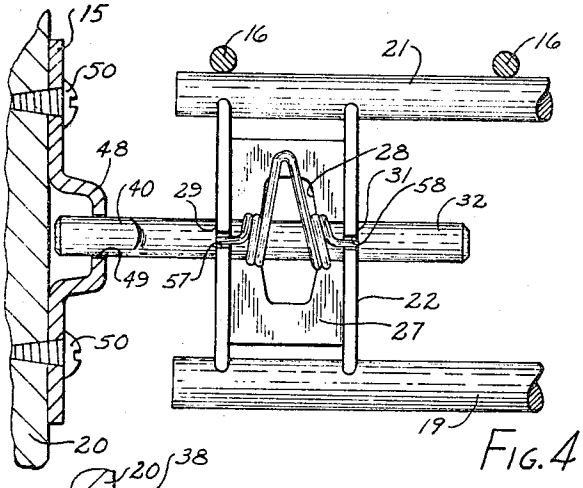


FIG. 4

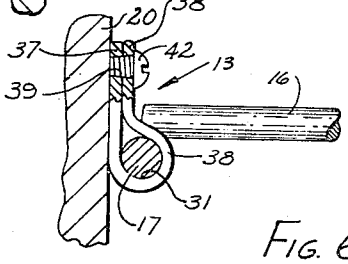


FIG. 6

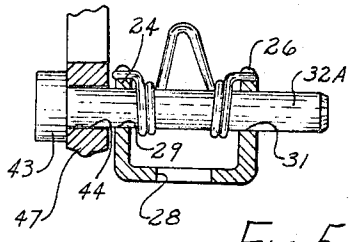


FIG. 5

INVENTORS
JOHN W. BLACK &
RONALD W. LINDSEY
BY
Woodhams, Blanchard & Flynn
ATTORNEYS

Dec. 31, 1968 J. W. BLACK ETAL 3,419,155

STORAGE UNIT

Filed Nov. 21, 1966 Sheet 2 of 2

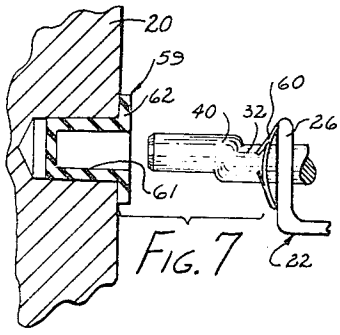


FIG. 7

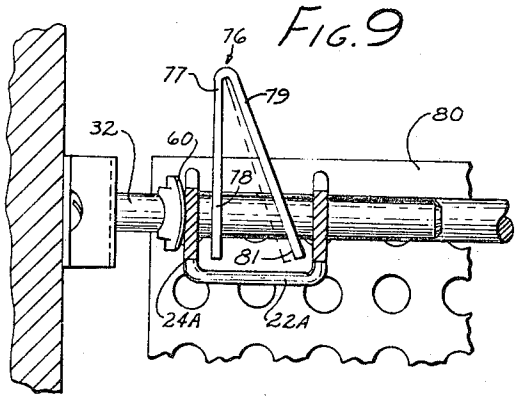


FIG. 9

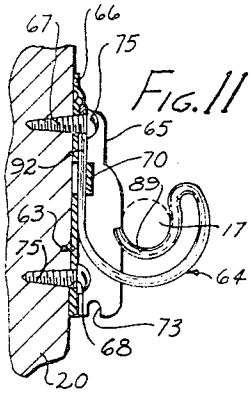


FIG. 11

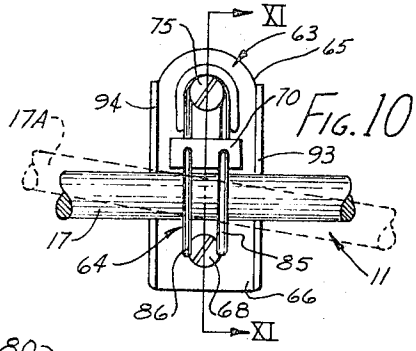


FIG. 10

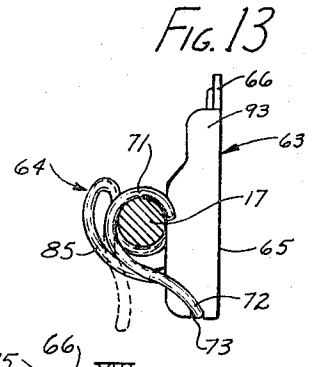


FIG. 13

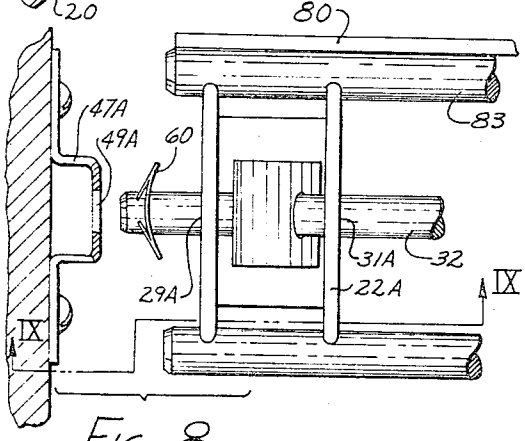


FIG. 8

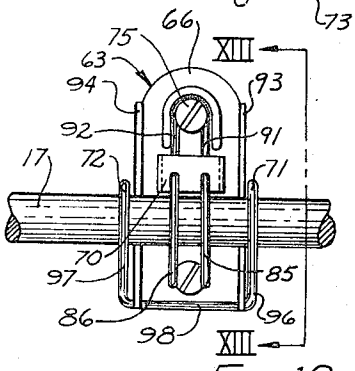


FIG. 12

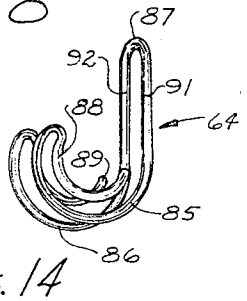


FIG. 14

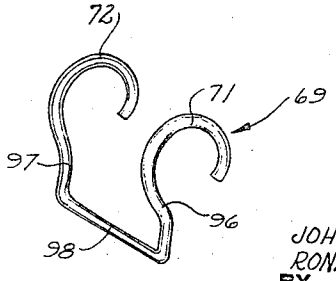


FIG. 15

INVENTORS
JOHN W. BLACK &
RONALD W. LINDSEY
BY
Woodhams, Blanchard and Flynn
ATTORNEYS

United States Patent Office 3,419,155 Patented Dec. 31, 1968

3,419,155

STORAGE UNIT

John W. Black, Prairieville Township, Barry County, and Ronald W. Lindsey, Gun Plains Township, Allegan County, Mich., assignors to Pemco Wheel Company, Kalamazoo, Mich., a corporation of Michigan

Filed Nov. 21 1966, Ser. No. 595,878
10 Claims. (Cl. 211—90)

ABSTRACT OF THE DISCLOSURE

This invention relates in general to a storage unit and, more particularly, to a type thereof comprising an article-supporting deck and means for removably mounting said deck upon upright wall means. In this embodiment, the storage unit is fabricated substantially completely from metal parts, the majority of which are rod form. The unit comprises a deck having a plurality of spaced cross-rods supported upon spaced lengthwise rods, the rear one of which is mounted upon an upright wall by rear brackets which preferably permit pivotal movement of the deck around its rearward edge at least between a substantially horizontal position and a substantially vertical position depending from the rearward edge of the deck. The frontward edge portion of the deck is supported upon and between front brackets which are either mounted upon an adjacent side wall or upon the frontward end of a frontward projection on the rear bracket. In one form, the front brackets can be easily disconnected from the deck to permit pivotal movement of the deck in installations where such movement is desired. Alternatively, the same front brackets can be fixedly attached to the deck so that disconnection requires damage to or distortion of the connecting parts, whereby the unit is theftproof.

In a modified form of the invention, the front and rear brackets are arranged so that the shelf deck can be quickly and easily removed from the wall structure upon which it is normally mounted. However, by a minor modification involving the addition of relatively minor parts to the brackets, the same deck can be rendered incapable of movement from a fixed position so that it is theftproof.

The problems of providing adequate storage space are well known and ever present. Many attempts have been made to develop improved storage units and one such device is disclosed in copending patent application Ser. No. 550,401, filed May 16, 1966. However, in the course of commercializing this earlier storage unit, it was found that other problems existed which had not been overcome. For example, shelves which can be easily and quickly detached from their mounting brackets for the purpose of cleaning and/or redecorating, are readily susceptible to theft. Thus, while such storage units are completely adequate for installation and use in private dwellings, they are not desirable in commercial installations.

On the other hand, even though a storage unit, such as shelving, is fabricated so that it can be installed "theftproof," it is generally desirable to construct and install the shelving so that it can be moved, or at least repositioned, when the need arises.

It has also been found that in commercial installations, it is highly desirable to have all hardware installed after the completion of the construction work and with a minimum amount of installation cost, such as that arising out of the services of skilled artisans, required to make adjustments in the basic structure in order to receive the hardware. For example, where "purchased finished" storage units are to be installed, it is desirable that all of the preliminary arrangements for such installations can be

completed by the contractor prior to delivery of the purchased finished items which can then be installed after the regular construction workmen have departed the premises.

However, it has been found that many types of storage units, such as shelving, must be installed by the workman during the final stages of the actual construction of the building or the resulting installation of the units will be unacceptable to the proprietors of the building. That is, it has been practically impossible to install the shelving units, for example, on preinstalled brackets and supports without making a great many adjustments in the positions of said brackets and supports, during the installation of the shelving decks.

Accordingly, the objects and purposes of this invention have been to provide a storage unit, and particularly an article-supporting shelf structure, which:

(1) Can have all of its supporting brackets and hardware installed in advance of the installation of the shelving deck, thereby simplifying the completion and decoration of the building prior to the final installation of the shelving deck;

(2) Is designed so that it can be alternatively installed theftproof or removable, thereby adapting it for both commercial and residential use with a minimum of variations in its basic and principal components;

(3) Is capable of installation so that the deck can be easily moved between a normal article-supporting position and a second position which facilitates redecorating of the wall space adjacent thereto, but which still prevents easy theft of the shelf structure;

(4) Is capable of being installed in preselected lengths which do not have to be exact and which include adjustment features permitting adaptation of the shelf to a substantial variation in the space dimensions and the locations of preinstalled brackets without adversely affecting the performance of the shelving unit;

(5) Is fabricated in modular sizes which can be adapted to any space requirements, which is extremely sturdy in construction, easy to maintain and attractive in appearance.

Other objects and purposes of this invention will become apparent to persons familiar with this type of equipment upon reading the following descriptive material and examining the accompanying drawings, in which:

FIGURE 1 is a perspective view of a storage unit embodying the invention;

FIGURE 2 is a sectional view taken along the line II—II in FIGURE 1;

FIGURE 3 is a sectional view taken along the line III—III in FIGURE 2;

FIGURE 4 is a sectional view substantially as taken along the line IV—IV in FIGURE 3;

FIGURE 5 is a sectional view taken along the line V—V in FIGURE 1;

FIGURE 6 is a sectional view taken along the line VI—VI in FIGURE 1;

FIGURE 7 is an exploded fragment of FIGURE 4 showing a modified deck and support bracket;

FIGURE 8 is an exploded sectional view similar to that appearing in FIGURE 4 and showing a modified structure;

FIGURE 9 is a sectional view taken along the line IX—IX in FIGURE 8;

FIGURE 10 is a front elevational view of a support bracket for the rear edge of a shelf deck including a broken portion of such deck;

FIGURE 11 is a broken side view of said modified rear bracket;

FIGURE 12 is a front elevational view of said modified rear bracket with a theftproof attachment thereon;

FIGURE 13 is a sectional view taken along the line XIII—XIII in FIGURE 12;

FIGURE 14 is a perspective view of the support member on the modified rear bracket;

FIGURE 15 is a perspective view of the theftproof member for the modified rear bracket.

For convenience in description, the terms "upper," "lower," "front," "rear" and words of similar import will have reference to the storage unit of the invention and parts thereof as appearing in FIGURE 1, wherein the front edge of the storage unit is in the right front of the figure. The terms "inner," "outer" and derivatives thereof will have reference to the geometric center of said storage unit and parts thereof.

Description

The objects and purposes of the invention, including those set forth above, have been met by providing an article-supporting device or storage unit **10**, a preferred embodiment of which is illustrated in FIGURE 1. Said storage unit **10** is comprised of a deck **11** which is supported by rear brackets **12** and **13**, which are attached to an upright wall **20**, and by front brackets **14** and **15** which are attached to the rear bracket **12** and said wall **20**, respectively. Although the following description of the invention is in terms of structure made largely from rod-form materials, it should be realized that other types of construction could be used.

The deck **11** is comprised of a plurality of preferably evenly spaced parallel crossrods **16** which extend transversely of and are secured, as by welding, to two or more lengthwise rods, such as the rods **17**, **18** and **21**. The front rod **21** is seucred to a hanger bar **19** by a plurality of truss members **22**, which extend between said rods and are secured thereto, as by welding.

Each truss member **22** (FIGURES 2, 3 and 4) is channel shaped and has a pair of flanges **24** and **26**, and a web **27**. For aesthetic, as well as utilitarian purposes, said flanges may have an elliptical shape. A portion at each end of web **27** may be removed and an opening **28** may be provided in the center of said web to permit easy draining when the deck is coated. The flanges **24** and **26**, have coaxial openings **29** and **31**, respectively, through which a latch member or pin **32** may be slideably received.

The rear lengthwise rod **17** of the deck **11** is supportedly engaged by rear brackets **12** and **13** which may be provided with various constructions, as shown. For example, rear bracket **12** (FIGURE 1) is comprised of an upright bar **33** having a frontwardly offset portion **35** which defines with the wall **20** a transverse opening **34** into which one end of the rear rod **17** may be inserted. Said bar **33** may be fastened to the upright wall **20** by conventional means, such as screws **36**.

The other rear bracket **13** (FIGURE 6) may be formed of strap material which is bent to form an opening **31** into which the other end of rod **17** may be inserted. The ends **37** and **38** of said bracket **13** have aligned openings **39** so that the bracket may be secured to the wall **20** by conventional means, such as the screw **42**. Rear bracket **13** is of a type which may be positioned at a plurality of closely spaced locations along the rear rod **17**, simply by spreading apart the two ends **37** and **38** of the strap and inserting rod **17** therebetween until it seats in the opening **31**.

When the deck **11** is connected to the wall **20** by rear brackets **12** and **13**, only, said deck may be pivoted upwardly and downwardly around the axis of the rear rod **17**.

Front brackets **14** and **15** may be of various types, as long as they have an opening into which a latch pin may be supportedly received. The front bracket **14**, for example, may be of a type (FIGURES 1 and 5) which is integral with, and a forward extension of, the rear bracket **12**. Said front bracket **14** is comprised of a pair of arms **45** and **46** (FIGURE 1) which are preferably

integral with the bar **33** and converge frontwardly therefrom where they are connected to boss **47** having a pin opening **44** (FIGURE 5).

The latch pin **32A**, which has a head **43**, extends through the opening **44** in the boss **47** and through the openings **29** and **31** in the flanges **24** and **26**.

The front bracket **15** is preferably utilized where there is an adjacent wall **20** to which said bracket **15** may be secured. The opposite ends of the bracket **15** are secured to wall **20** by conventional means, such as screws **50**. Bracket **15** (FIGURE 4) may be formed from strap material and has a central offset portion **48** with a transverse opening **49** for reception of latch pin **32**. The latch pin **32** is slideably disposed in the openings **29** and **31** of the truss member **22** adjacent the front bracket **15** and in the opening **49** of the bracket **15** for normal support.

The brackets **12**, **13**, **14** and **15** may be fabricated from metal or plastic material. The latch pin **32** has an offset portion **40** which facilitates alignment thereof with the opening **49** in bracket **15**.

Latch pin **32** (FIGURE 2) may be releasably, but securely, held in position in holes **29**, **31** and **49** by lock spring **51**, which is disposed between the flanges **24** and **26**. Said spring has a pair of coils **52** and **53** through which pin **32** extends, and said coils are connected by an elongated, U-shaped portion **54** which projects rearwardly of the truss member **22** for manual engagement. Said coils **52** and **53** have projections **55** and **56**, respectively, extending laterally therefrom (FIGURE 3) for locking engagement in notches **57** and **58** (FIGURES 3 and 4) of the flanges **24** and **26**, respectively. To effect lengthwise movement of said pin **32**, the elongated portion **54** is forced in a clockwise direction (FIGURE 3) from its solid line position to its broken line position **54A**, while said projections are secured in said notches, thereby causing coils **52** and **53** to expand. While the spring **51** is retained in such position, pin **32** may be rotated or moved axially through openings **29** and **31**, coils **52** and **53** and opening **49**. When said spring **51** is released, coils **52** and **53** contract, thereby gripping the surface of said pin and preventing its accidental movement with respect to the truss **22** in which it is supported.

Modification

The above-described storage unit **10** is well suited for installation in private dwellings or closely controlled commercial buildings where there is little concern about theft. However, with minor modification, the storage unit **10** can be adapted for use in commercial and industrial installations where it is especially desirable to provide a unit which is theftproof.

As shown in FIGURE 7, the front bracket **15** is replaced with a front bracket **59** which can be flush with and recessed into the plastered wall **20**. Bracket **59** is preferably cup-shaped and has a lip **62** which may rest against the surface of the wall **20**. Said bracket has a recess **61**, the dimensions of which are such that the offset end **40** of latch pin **32** may be inserted therein. Being plastered into the wall, bracket **59** is inconspicuous when not in use and is not readily removable. Bracket **59** may be molded of a suitable material, such as metal or plastic. The latch pin **32** is firmly held (hence theftproof) in the recess **61** in bracket **59** by the self-locking washer **60** which is pressed tightly against the adjacent flange **26** of the truss member, when the pin **32** is properly disposed in said recess **61**. Thus, to remove the deck **11** from the bracket **59**, it is first necessary to overpower the lock washer **60**.

FIGURES 10 through 13 illustrate an alternate rear bracket **63** which permits quick and easy release of the deck **11** from support thereby, but which can be readily made theftproof by adding the element disclosed in FIGURE 15.

The rear bracket **63**, which may be positioned at substantially any location along the rear of deck **11**, is comprised of a U-shaped wire hanger **64** and a channel-shaped

member 65. Holes 67 and 68 are provided in the backplate 66 of said member 65 through which screws 75 may be inserted to fasten said bracket 63 to an upright wall 20.

The U-shaped, wire hanger 64 (FIGURE 14) is in fact comprised of two outer, U-shaped elements 85 and 86 which are spaced from each other, substantially parallel and interconnected at one end of each by the arcuate portion 87. The U-shaped member 64 also includes a pair of inner U-shaped elements 88 and 89 which are integral with and disposed radially inwardly of the outer U-shaped elements 85 and 86, respectively, for engagement with the rod 17, as shown in FIGURE 10.

Since the wire hanger 64 is preferably fabricated from a single piece of spring wire, and since the inner elements 88 and 89 are spaced from the outer elements 85 and 86, the hanger 64 can engage and properly support the rod 17 in a substantial number of relative positions between the rod 17 and the mounting member 65, as shown by the broken line position 17A of the rod 17 in FIGURE 10. Accordingly, minor misalignment of the mounting member 65 during its installation will not affect its performance. Moreover, minor irregularities in the surface of the wall can also be absorbed by the described structure of the wire hanger 64.

The backplate 66 has a transverse and substantially horizontal offset portion 70 through which the legs 91 and 92 of the outer elements 85 and 86 may be inserted to help anchor the hanger 64 upon the mounting member 65. One of the screws 75 (as shown in FIGURE 11) extends between the legs 91 and 92 adjacent the arcuate portion 87 to complete the anchoring of the hanger 64 upon the mounting member 65. However, the spacing of legs 91 and 92, and the length of the offset portion 70 are such that the inner elements 88 and 89 can move axially of the rear rod 17 for the purpose of avoiding interference from the crossrods 16 in the event that one of said rods is located close to or in front of a preinstalled bracket 63.

With bracket 63 secured to the wall 20, the rod 17 of deck 11 (FIGURE 10) may rest in the upwardly opening recesses of the U-shaped elements 88 and 89. As indicated in FIGURE 11, the front ends of the elements 88 and 89 extend slightly above the centerline of the rod 17 and hook rearwardly to clamp the rod 17 against the front edges of the flanges 93 and 94 on the mounting member 65, whereby accidental disengagement is yieldingly resisted.

The bracket 63 (FIGURES 12 and 13) may be adapted for theftproof amendment to the rear lengthwise rod 17 by means of the U-shaped lock member 69 (FIGURE 15). Said lock member 69 has a pair of hooks 71 and 72 on its legs 96 and 97, respectively, which are hooked over rod 17, after the rod is held by the bracket 63 on said wall. The bight 98 is adjusted downwardly until it can be moved into the notches 73 in the lower edges of the flanges 93 and 94. Wire hanger 64 and lock member 69 are made of material that is sufficiently resilient that rod 17 may be adjusted into place even though the rear bracket 63 has been secured to the wall 20 in advance.

The alternate locking member 76 (FIGURES 8 and 9) is V-shaped and has flanges 77 and 79. The flange 77 has a circular hole 78, the diameter of which is slightly larger than the diameter of pin 32. Flange 79 has a slightly oval-shaped hole 81, which has its major axis lengthwise of the flange. To move the pin 32 lengthwise into or through the locking member 76, the flanges 77 and 78 must be squeezed together as illustrated by the dotted lines in FIGURE 9. When said flanges are released they move apart and thereby grip the pin 32. Locking member 76 is preferably made of spring steel. In this embodiment, the deck 80 comprises a perforate sheet, which may be metal, wood or plastic, and which is mounted upon lengthwise rods 83.

It will be evident from the foregoing descriptive material that a variety of different deck or shelf constructions can be used and that they may be supported upon upright wall means by brackets according to the invention, including the rear brackets 63 and front brackets 14 and 15.

The deck 11 (FIGURE 3) is disclosed as having its front edge directly above the hanger bar 19. However, it will be recognized that the crossbars 16 can extend forwardly of the hanger bar 19, hence the front rod 21, as indicated in broken lines at 16A. Under such circumstances, it may be desirable to provide a further truss member 22 at both ends of the extended frontward edge of the deck with a corresponding pin 32 for the purpose of supporting the extended frontward edge of the deck upon the upright wall. The offset outer end portion 40 (FIGURE 2) of the pin 32 permits normal insertion of the pin into the opening in the bracket or an opening in the wall by which the support is achieved. Moreover, normal irregularities in the runout of the wall or the locations of brackets or openings in the wall do not require change or modification in order to effect completely satisfactory installation and support of the storage unit.

In fact, installation of the storage unit as it is normally thought of in the building trade, wherein the brackets are all mounted after the interior is finished, is not required for this storage unit. Furthermore, it is unnecessary to make the considerable adjustments often required to adapt the deck structure to the preinstalled brackets or openings. The decks are merely mounted upon the brackets and the aforementioned structure permits such mounting without the use of any tools or special instructions.

Where it becomes desirable to have intermediate support lengthwise of the shelf deck, such is accomplished by using two decks 11 and placing them in abutting relationship on opposite sides of a rear bracket 12. In such case, the pin 32A (FIGURE 5) may be replaced by a single pin which extends completely through a pair of trusses located at the abutting ends of the decks, hence, on opposite sides of the front boss 47 of the bracket 12. Alternatively, if it is desirable to provide an offset portion in the pin, for reasons described above, the boss 47 may be made somewhat oversized so that two pins having offset portions may be used whereby such offset portions can enter the opening in the boss 47 from opposite sides thereof.

While a truss member 22 is shown near the center of the hanger bar 19 for the purpose of supporting same upon the front rod 21, it will be recognized that this truss member may be replaced by one of the oval-shaped truss elements 99 which also extend between and are rigidly secured to the bar 19 and rod 21.

Although particular, preferred embodiments of the invention have been described above in detail for illustrative purposes, it will be recognized that variations or modifications of such disclosure, which lie within the scope of the appended claims, are fully contemplated.

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

1. A storage device mountable upon upright wall means comprising:

article support means having front and rear lengthwise edges and first and second lengthwise rods, said first rod being adjacent said rear lengthwise edge and said second rod being laterally spaced from said first rod in a direction toward the front lengthwise edge;

a third rod parallel with and near to said second rod;

a plurality of truss members extending between and connected to said second and third rods, a pair of said truss members being positioned near the opposite ends of said front edge, each one of said pair of truss members having spaced flange means with coaxial pin openings therein;

first bracket means engaging said support means adjacent said rear lengthwise edge for securing same to said wall means;

second bracket means adapted for connection to said wall means and having a pin opening therein;

pin means slideably disposed in said pin openings in each of said pair of truss members for axial movement with respect to said support means, said pin means being slideably receivable into the pin opening formed in said second bracket means when same is connected to said wall means; and

gripping means engaged with said pin means between said flange means and adapted to engage said flange means for limiting axial movement of said pin means with respect to said support means while it is engaged with said second bracket means.

2. A storage device as defined in claim **1**, including two second bracket means;

wherein said pin means includes two pins, each of said pins being slideably received within the pin opening formed in one of said pair of truss members positioned near one end of said front edge, and also being simultaneously positionable within the pin opening formed in said second bracket means; and

wherein the pin openings formed in said pair of truss members are positioned substantially between said second and third rods.

3. A storage device as defined in claim **1**, wherein said first bracket means includes a bracket member having a first portion adapted to be secured to said wall means and a second elongated portion fixedly secured to said first portion and extending outwardly from said wall means, the second portion of said bracket member being positioned adjacent one end of said article support means and said second bracket means being positioned adjacent the other end of said article support means, said second portion of said first bracket means supporting said article support means near the front edge thereof.

4. A storage device as defined in claim **1**, wherein said first rod is pivotally engaged by said first bracket means and said second rod is substantially parallel with and adjacent to said pin means;

wherein said pair of truss members are channel shaped and said flange means are rigidly secured to said second and third rods; and

wherein said gripping means comprises spring means encircling and gripping said pin means between said flanges of each of said pair of channel-shaped truss members, said spring means being manually releasable from gripping said pin means.

5. A storage device as defined in claim **1**, wherein said article support means includes a plurality of spaced rod-like members extending across and fixedly secured to said first and second rods, said rod-like members being substantially perpendicular to said rods.

6. A storage device as defined in claim **1**, wherein said article support means has a substantially flat support surface thereon, said surface extending between said first and second rods.

7. A storage device as defined in claim **6**, wherein said support surface is defined by a flat, rigid sheet having a plurality of perforations therein.

8. A storage device as defined in claim **1**, wherein said first bracket means includes a plurality of support members rigidly securable to said wall means and a spring member mounted upon each support member and having a U-shaped, upwardly opening recess; and

wherein said first rod is snugly and yieldably held in said recess.

9. A storage device as defined in claim **1**, wherein said article support means includes a support deck extending between and fixedly secured to said first and second rods with said support deck defining a substantially planar support surface; and

wherein said second and third rods define a plane substantially transverse to said planar support surface with said third rod being spaced below said second rod.

10. A storage device mountable upon upright wall means, comprising:

substantially planar, article support means having front and rear lengthwise edges and first and second lengthwise rods, said first rod being adjacent said rear lengthwise edge and said second rod being laterally spaced from said first rod in a direction toward the front lengthwise edge;

a third rod parallel with and near to said second rod and spaced from the plane of said support means;

a plurality of truss members extending between and connected to said second and third rods, a pair of said truss members being positioned near the opposite ends of said front edge and having coaxial pin openings;

first bracket means pivotally engaging said first rod adjacent said rear lengthwise edge and adapted for mounting said support means on said wall;

second bracket means adapted for connection to said wall means and having a pin opening therein;

pin means slidably disposed in said pin opening in each of said pair of truss members for axial movement with respect to said support means, said pin means being slideably receivable into the pin opening formed in said second bracket means when same is connected to said wall means, said pin means being substantially parallel with and adjacent to said second rod; and

yieldable gripping means engaged with said pin means and adapted to engage said support means for restricting axial movement of said pin means, said gripping means being manually releasable from said pin means.

References Cited

UNITED STATES PATENTS

687,431	11/1901	Kimball	292—306
847,510	3/1907	Rogers	292—60
1,216,983	2/1917	Goldberg	248—262
1,659,111	2/1928	Lett	292—306
2,454,894	11/1948	Tatom	248—261 X
3,049,273	8/1962	Crane	211—90 X

ROY D. FRAZIER, *Primary Examiner.*

U.S. Cl. X.R.

108—134; 211—99; 248—250