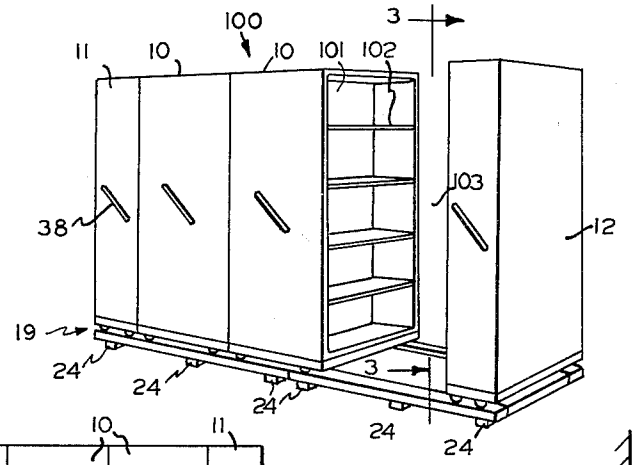
Sept. 4, 1962 H. INGOLD 3,052,415

STORAGE ASSEMBLY

Filed Dec. 2, 1958 2 Sheets-Sheet 1

FIG.1



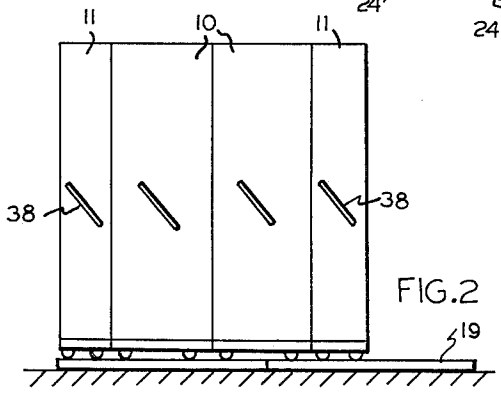


FIG.2

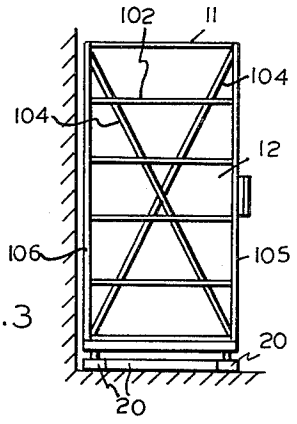
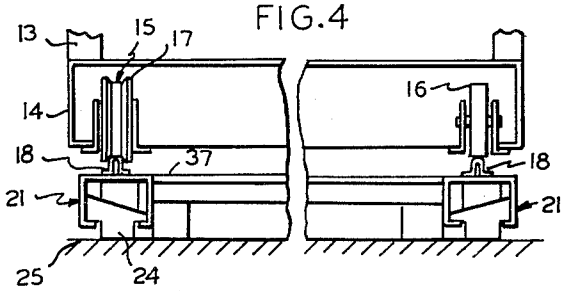


FIG.3

FIG.4



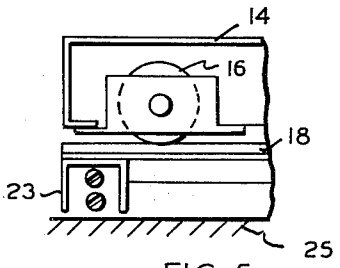


FIG.5

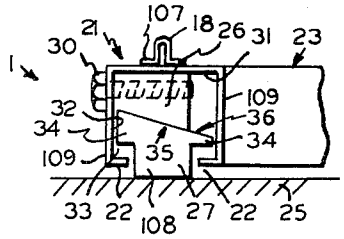


FIG.6

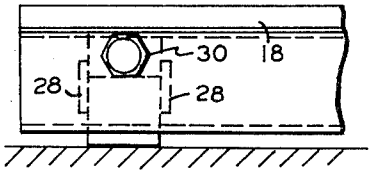


FIG.7

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STORAGE ASSEMBLY

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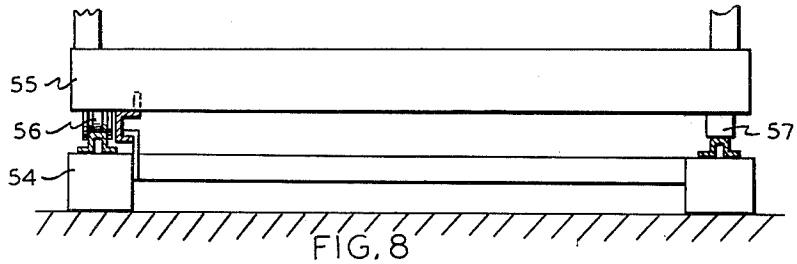

FIG. 8

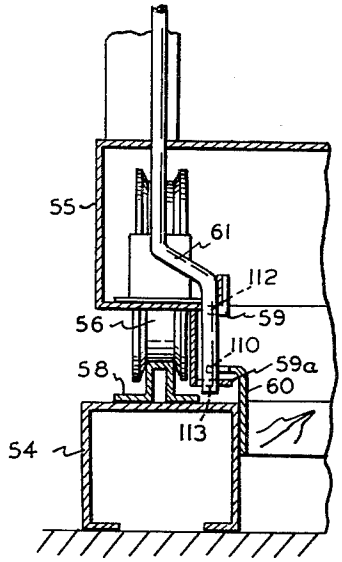

FIG. 10

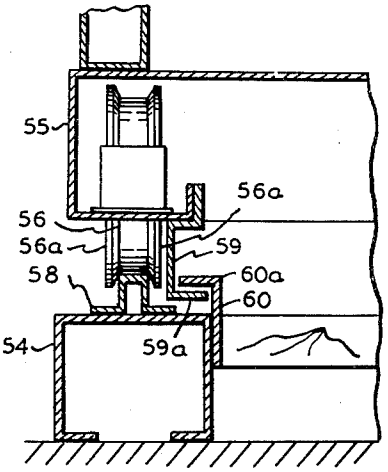

FIG. 9

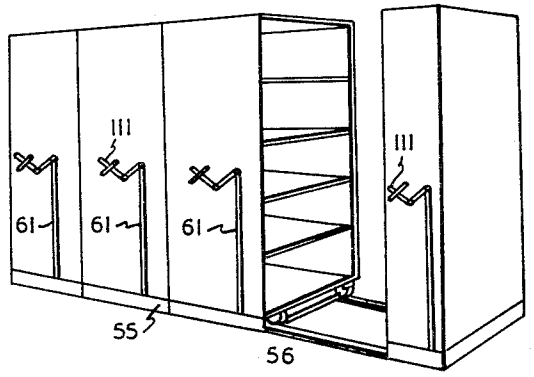

FIG. 11

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STORAGE ASSEMBLY

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Filed Dec. 2, 1958, Ser. No. 777,791
Claims priority, application Switzerland Dec. 5, 1957
2 Claims. (Cl. 238—10)

The present invention relates, in general, to a storage assembly or plant and, in particular, to a plant having a plurality of storage units mounted on a common support structure on which they are movable into abutting side-by-side relation and on which an access opening can be provided between any two of the units.

It is an object of the present invention to provide means ensuring easy mounting of a support structure for a storage plant of the above type on a supporting surface.

It is another object of the present invention to provide means contriving a non-rigid mounting of the support structure on the underlying support surface, the support structure being held in position on the support surface by friction.

Another object of the present invention is to provide means conducive to a precise horizontal or level positioning for the storage units of the storage plant.

Still another object of the present invention is to provide means affording an adjustable support structure having means to assure that adjustment will take place at a required location.

Another object of the present invention is to allow for the installation of a storage plant, of the described type, without damage to the floor and which can be effected by an inexperienced workman.

A further object of the present invention is the provision of a storage plant of the described type which can be readily disassembled, moved and then re-erected.

A further object is the provision of a storage plant of the described type which can be readily moved manually and without the aid of mechanical hoisting devices.

These and other objects of the invention will become further apparent from the following detailed description, reference being made to the accompanying drawings showing preferred embodiments of the invention.

In the drawings which illustrate the best modes presently contemplated for carrying out the invention:

FIG. 1 is a perspective view of a storage plant, pursuant to the present invention, with an access corridor between two of the storage units;

FIG. 2 is a front view of the storage plant, the various units being all closed together;

FIG. 3 is a vertical sectional view taken in the direction of the arrow 3—3 in FIG. 1;

FIG. 4 is a fragmentary cross-sectional view, on an enlarged scale, taken through the bottom of one of the storage units and the underlying support structure;

FIG. 5 is a fragmentary longitudinal sectional view at one end of the support structure;

FIG. 6 is a fragmentary end view illustrating a rail mounted by a hollow girder, and one of the adjustable supports of the support structure.

FIG. 7 is a fragmentary view taken in the direction of the arrow 7 in FIG. 6;

FIG. 8 is a fragmentary view of a storage unit and foundation pursuant to another embodiment of the invention;

FIG. 9 is a fragmentary detail, in section, of a portion of FIG. 8;

FIG. 10 is a sectional view of a locking device in a storage unit pursuant to FIG. 8; and

FIG. 11 is a perspective view of a storage plant, pursuant to the embodiment illustrated in FIGS. 7–10.

Referring now to FIGS. 1 to 7 in detail, there is shown a storage plant 100 pursuant to the present invention. As here shown, the plant 100 comprises two inner storage units 10 and two outer or end storage units 11, which are relatively movable by hand. The two inner units are subdivided by a vertical partition 101 to provide two compartments, each of which is accessible from an opposite side of the unit, and each of which is provided, as here shown, with shelves 102. The end units 11 are single compartment units, being closed at their outer facing side by an end wall 12, and being open at their inner facing side. Consequently, the storage plant is completely closed when the four storage units are pushed together into their closed position illustrated in FIG. 2, which is the normal position thereof, except when pushed apart to form an access opening or corridor 103 for the insertion or removal of articles stored in the units, such as for example, books, forms, documents, office supplies, etc. It will be noted that the outer units 11 are also supplied with shelves 102 and, if desired, reinforcing cross-struts 104 may be provided.

The frame 13 of each individual unit is securely mounted on an individual chassis 14. Each chassis is provided with two front wheels or rollers 15 and two rear wheels or rollers 16.

The front wheels are disposed below the front wall 105 and the rear wheels are disposed below the rear wall 106, of each unit. The front wheels have lateral control flanges 17, the rear wheels being devoid of such flanges. This arrangement allows for variations in the distance between the rails 18 on which the units are mounted.

The support structure for the storage plant 100 is designated generally by the reference numeral 19 and comprises a steel frame 20. The lengthwise or longitudinal dimension of the support structure is equal to the combined lengthwise dimension of the four juxtaposed units 10—11 plus the distance required for an access opening or corridor 103 between any two of the units. The frame 20 comprises two longitudinal trough-shaped or inverted channel girders 21, which are arranged in spaced relation to each other, the girders 21 being open at their bottoms, which are defined by narrow confronting aligned flanges 22.

As best seen in FIG. 6, the girders 21 are substantially rectangular in cross section.

The rails 18 are secured to the girders 21, as by welding, screws or like fastening means (not shown). The girders are interconnected at their opposite ends through transverse spacer members 23 to form a continuous and permanent frame. The spacers are readily removable from the girders and may be subdivided into smaller sections so as to facilitate transportation of the frame and to compensate for variations in the floor surface 25 on which the assembly 100 is to be mounted.

The girders 21 and the spacers 23 are interconnected by connecting pieces and screws (not illustrated). A cover plate 37 is inserted between the channels 21 at the upper surfaces thereof.

Adjacent each end thereof, each girder 21 is provided with a support 24, additional supports being provided along each girder and being spaced at distances from 600 to 700 millimeters. Due to the supports 24, the support structure 19 is disposed in solely frictional relation to the supporting surface 25 which can be constituted, for example, by a linoleum-covered or parquet floor of an office, apartment, library and the like.

The support structure 19 is retained in position on the underlying floor surface by the friction between the supports 24 and said surface. The support structure is so rigid that there is no sag at any portion thereof which

could result from the weight of the storage units and their contents.

The supports 24 are individually adjustable to ensure a precise horizontal or level position of the supporting plane formed by the rails 18 on which the units 10—11 are movable by means of wheels 15, 16. As best seen in FIG. 6, each support 24 comprises two wedge elements 26, 27 provided with mutually inclined contact planes 35, 36.

The wedges are disposed between two spaced transverse control plates 28 (FIG. 7) secured to the girder 21. Said plates prevent displacement of the supports longitudinally of the girder. The upper wedge 26 is displaceable transversely of the girder by means of a screw 29, inserted from outside the girder and threaded into the wedge. The head 30 of the screw is accessible from the exterior of the girder.

When the screw is threaded into the wedge 26, the latter is displaced to the left, viewing FIG. 6. The upper surface 107 of wedge 26 slides along the inner upper surface 31 of the girder 21, the upper wedge being urged against the lower wedge 27. The lower wedge 27 is provided with a depending extension 108 which abuts the floor or supporting surface 25.

Consequently, the lower wedge cannot be forced down so that the girder 21 is raised upwardly relative to the floor by the described operation of the upper wedge. The lower wedge 27 abuts against the inner surfaces 32 of the side walls 109 of the girder 21. Adjustment of the girder relative to the lower wedge 27 results from the fact that wedge is recessed, at 33, to define the extension 108 and shoulders 34 which are engageable by the confronting girder flanges 22 so as to allow for a vertical adjustment of the girder relative to the wedge.

The shoulders 34 and flanges 22 prevent the wedge 27 from dropping out of the support structure during transportation of the latter. The angle of wedge of the wedges 26 and 27 is such that the coefficient of friction of the wedges in the inclined wedge surfaces 35 and 36 is close to the limit at which the wedges become self-locking, but it is high enough for the wedges not to become completely self-locking.

As a result, when an adjustment has to be made as when a part yields so that the upper wedge 26 can slide automatically on the lower wedge 27, the necessary lowering of the support structure is achieved at the required point. The wedges can also be made self-locking. In this case, a special force must be exerted on the wedge 26 transversely of the girder, even under load, in order to lower the support structure.

If necessary, the abutting wedge surfaces 35 and 36 can be so treated that either a lower or a higher coefficient of friction is obtained, for example, by smoothing, or grinding and roughening, respectively, or by the application of a friction coat.

When the longitudinal girders are subdivided, as previously explained, it is preferable to provide a support 24 on each side of each joint.

The support structure 19 permits the installation of the storage plant 100 on a floor without damaging the floor. The plant can easily be installed by an inexperienced workman and it can be readily removed and transported to a new location or readily moved within the same location.

Handles 38 are provided on the units 10 and 11 so that they are readily manually movable without the aid of any mechanical device. This is facilitated by the fact that the support structure 19 provided with the adjustable supports 24 can be readily adjusted so that the rails 18 form a plane, horizontal supporting surface for the unit wheels and require very little effort for movement thereof. In this manner, there is also avoided the possibility that the units could move by themselves and possibly damage the stored contents or inconvenience office personnel.

In the case of high and narrow storage units having a high center of gravity, the security of mounting thereof

on the floor may be insufficient. Such units may be easily overturned and therefore constitute a hazard to personnel and a source of possibly considerable damage. This possibility is eliminated by the embodiment illustrated in FIGS. 8–11.

Referring now to FIGS. 8–11 in detail, there is shown a storage unit 55 provided with front wheels or rollers 56 and with rear wheels or rollers 57 which ride on rails 58. The rails are mounted on a pedestal-type foundation 54. The pedestal 54 is constructed as a box supporting structure. As best shown in FIGS. 9–10, on the underside of each unit 55, there is secured in parallel relation to rail 58 associated with the wheel 56 a contoured member 59 having an L-shaped portion 59*a*.

An L-shaped member 60 is secured to the foundation 54 and its horizontal portion or flange 60*a* overlies the underlying corresponding flange 59*a*. The distance between the flanges 59*a* and 60*a* is less than height of the flanges 56*a* of the wheel 56. Consequently, it is practically impossible for the unit 55 to tilt or to jump off or be lifted from the rails 58.

FIG. 10 illustrates a locking device provided in the stabilizer constituted by the cooperating members 59 and 60. Member 60 is provided with recesses 110 defined at certain points thereof. Each unit 55 is provided with a locking rod 61, mounted laterally thereon, which is operated by a hand lever 111 (FIG. 11). The rod is reflexed, at its bottom, as shown, and extends first through an upper aperture 112 and then through a lower aperture 113 in the member 59.

When a unit 55 is to be locked in position, it is first moved into the desired position. The rod 61 is then lowered, by means of hand lever 111, so that it passes through the aligned apertures 112 and 133 in member 59 and an associated recess 110 in member 60 so as to couple the unit 55 with member 60.

Consequently, the unit is prevented from moving along the rails 58. Member 59 prevents the rod 61 from being disengaged from the member 60 even when the unit 55 would be lifted for unlocking the safety lock device. FIG. 10 shows the various parts in the locked position thereof to prevent any inadvertent movement of unit 55.

Various changes and modifications may be made without departing from the spirit and scope of the present invention and it is intended that such obvious changes and modifications be embraced by the annexed claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A support structure for a storage assembly comprising frame means including inverted channel members each provided with an open bottom which is defined by inturned confronting stop flanges, a plurality of spaced support assemblies received within said channel members and having leg means projecting through said open bottoms of said channel members for engagement with a support surface thereby to support said support structure above the level of said support surface, and adjusting means for vertically displacing said channel members relative to said leg means to level said support structure relative to said support surface, the distance between said confronting stop flanges being narrower than the width of said support assemblies to prevent said support assemblies including said leg means from becoming detached from said channel members when said support structure is lifted from said support surface, each support assembly comprising a pair of abutting superimposed wedges arranged for lateral displacement relative to each other, the upper wedges being slidable transversely of said channel members and in abutting relation with the adjacent inner surfaces thereof.

2. A support structure for a storage assembly comprising frame means including inverted channel members each provided with an open bottom which is defined by stop members, a plurality of spaced support assemblies including transversely slidable members received

within said channel members and having leg means projecting through said open bottoms of said channel members for engagement with a support surface thereby to support said support structure above the level of said support surface, and adjusting means for vertically displacing said channel members relative to said leg means to level said support structure relative to said support surface, the distance between said stop members being narrower than the width of said support assemblies to prevent said support assemblies including said leg means from becoming detached from said channel members when said support structure is lifted from said support surface.

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