

- [54] **TILTABLE TRAY WITH PIVOTALLY MOUNTED LEGS HAVING EXTENSIBLE FEET**
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- [22] Filed: **Mar. 29, 1973**
- [21] Appl. No.: **346,046**
- Related U.S. Application Data**
- [63] Continuation-in-part of Ser. No. 238,787, March 28, 1972, abandoned, which is a continuation-in-part of Ser. No. 131,855, April 7, 1971, abandoned.
- [52] **U.S. Cl.**..... **108/6, 108/32, 297/439**
- [51] **Int. Cl.**..... **A47f 5/12, A47f 41/04**
- [58] **Field of Search**..... 108/1-6, 116, 108/32, 127, 136, 131-134, 91, 116, 153-159; 248/188-188.6, 346, 382, 384, 248/397, 348; 297/423-438, 460, 461

- [56] **References Cited**
- UNITED STATES PATENTS**
- | | | | |
|-----------|---------|----------------|-----------|
| 99,608 | 2/1870 | Spencer | 108/129 |
| 157,753 | 12/1874 | Hildreth | 248/398 |
| 1,266,929 | 5/1918 | Enis | 108/133 |
| 1,303,416 | 5/1919 | Tidyman | 248/188.5 |
| 1,855,219 | 4/1932 | Brownell | 248/396 |
| 1,924,945 | 8/1933 | Klotz | 108/1 |

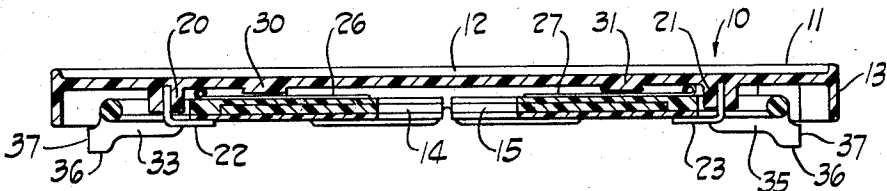
2,293,188	8/1942	Brice	248/188.5
2,472,962	1/1949	Shufin	108/131
2,485,178	10/1949	Weinkauf	108/132
2,580,126	12/1951	Randolph	108/131
2,755,152	7/1956	Calgy	108/1
2,760,837	8/1956	Wade	108/129
2,978,012	4/1961	Norseen	108/116

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[57] **ABSTRACT**

A tray structure with legs for supporting a platform selectively at one of two heights above a planar surface, and at a selected inclination relative to the planar surface. Two long pivotally mounted legs are provided which are hollow and receive extensible feet. When the feet are retracted, the long legs serve to support the platform horizontally. When the feet are extended, they serve to support the platform in an attitude tilted from the horizontal. Latching mechanisms are provided for locking the long legs and feet in their extended and retracted positions. In the preferred embodiment, short legs are provided which serve the dual function of supporting the tray when the long legs are retracted, and locking the long legs in position when they are extended.

15 Claims, 29 Drawing Figures



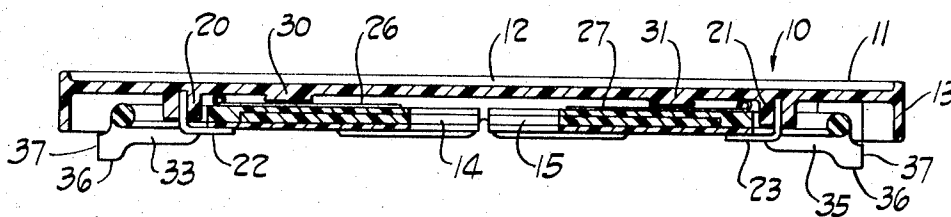


Fig. 1

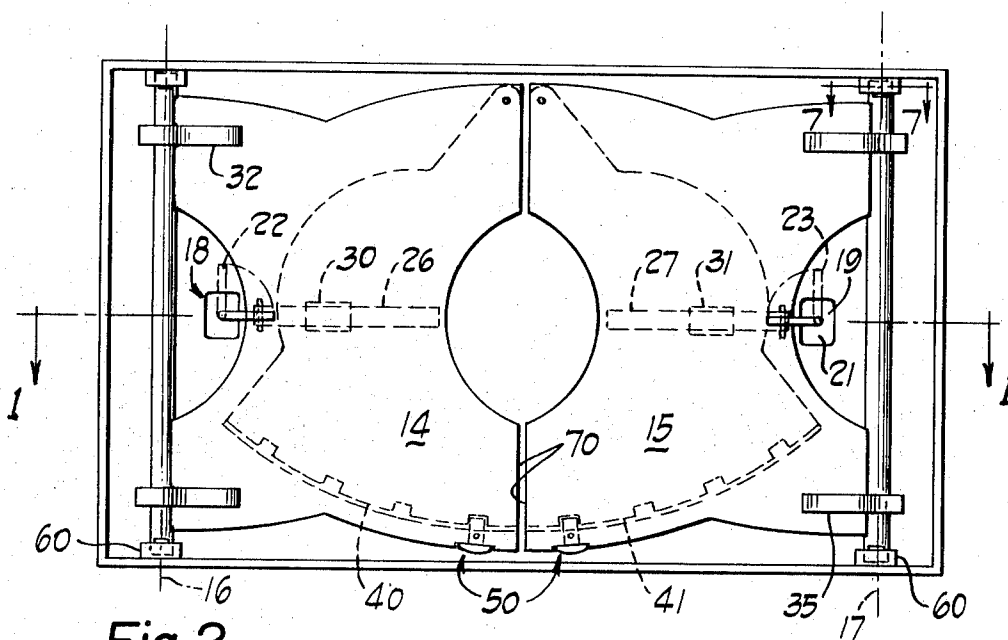


Fig. 2

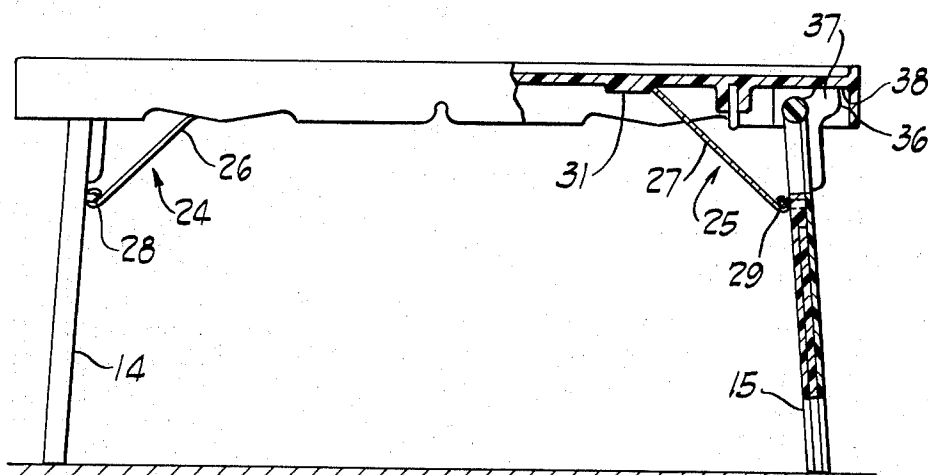


Fig. 3

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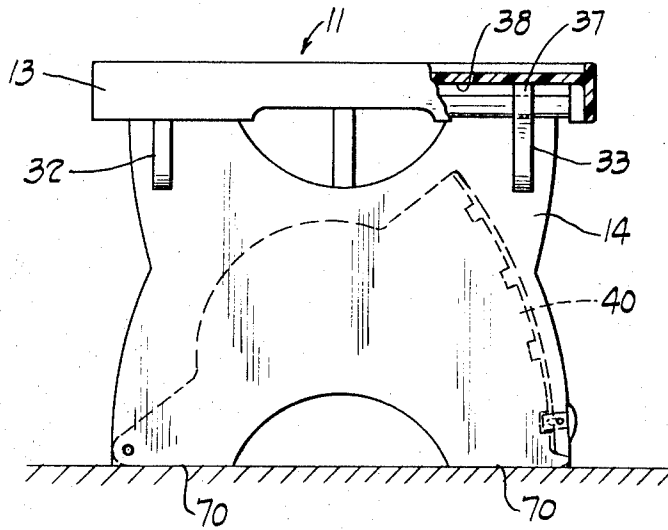


Fig. 4

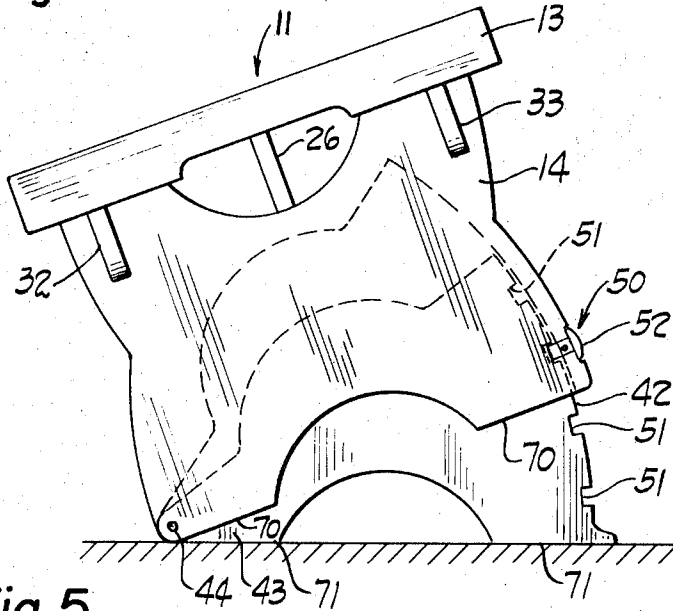


Fig. 5

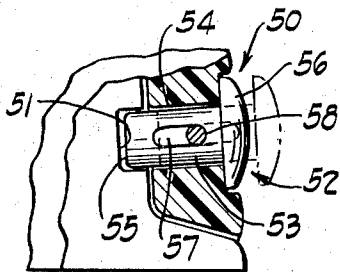


Fig. 6

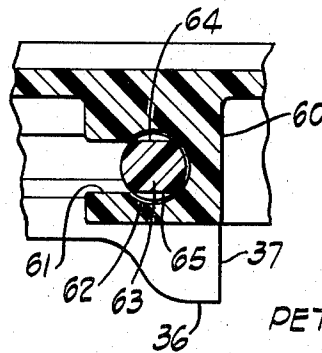
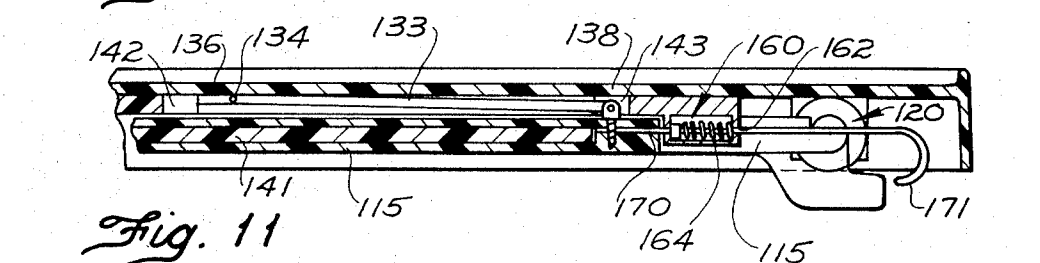
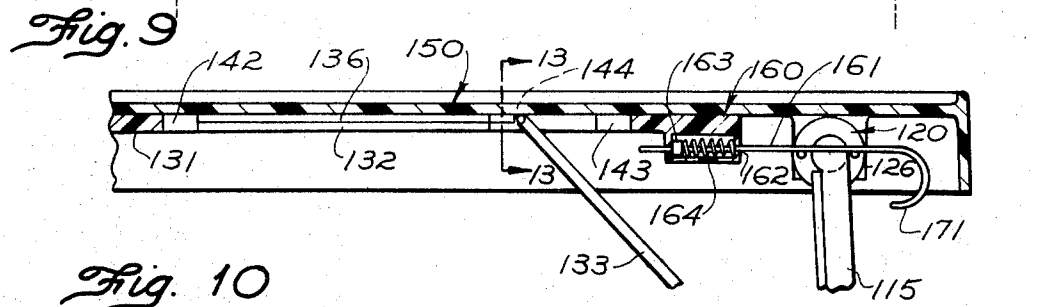
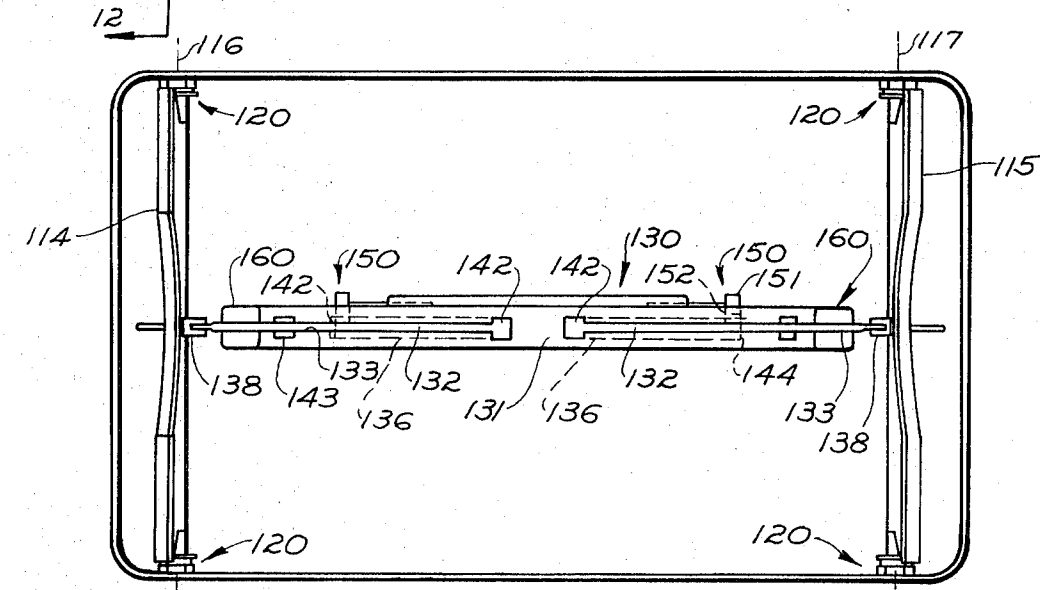
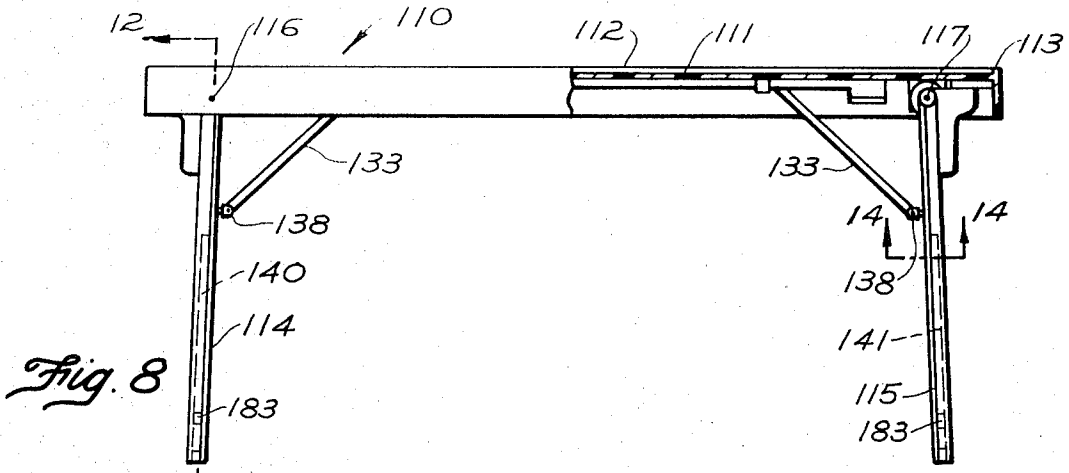


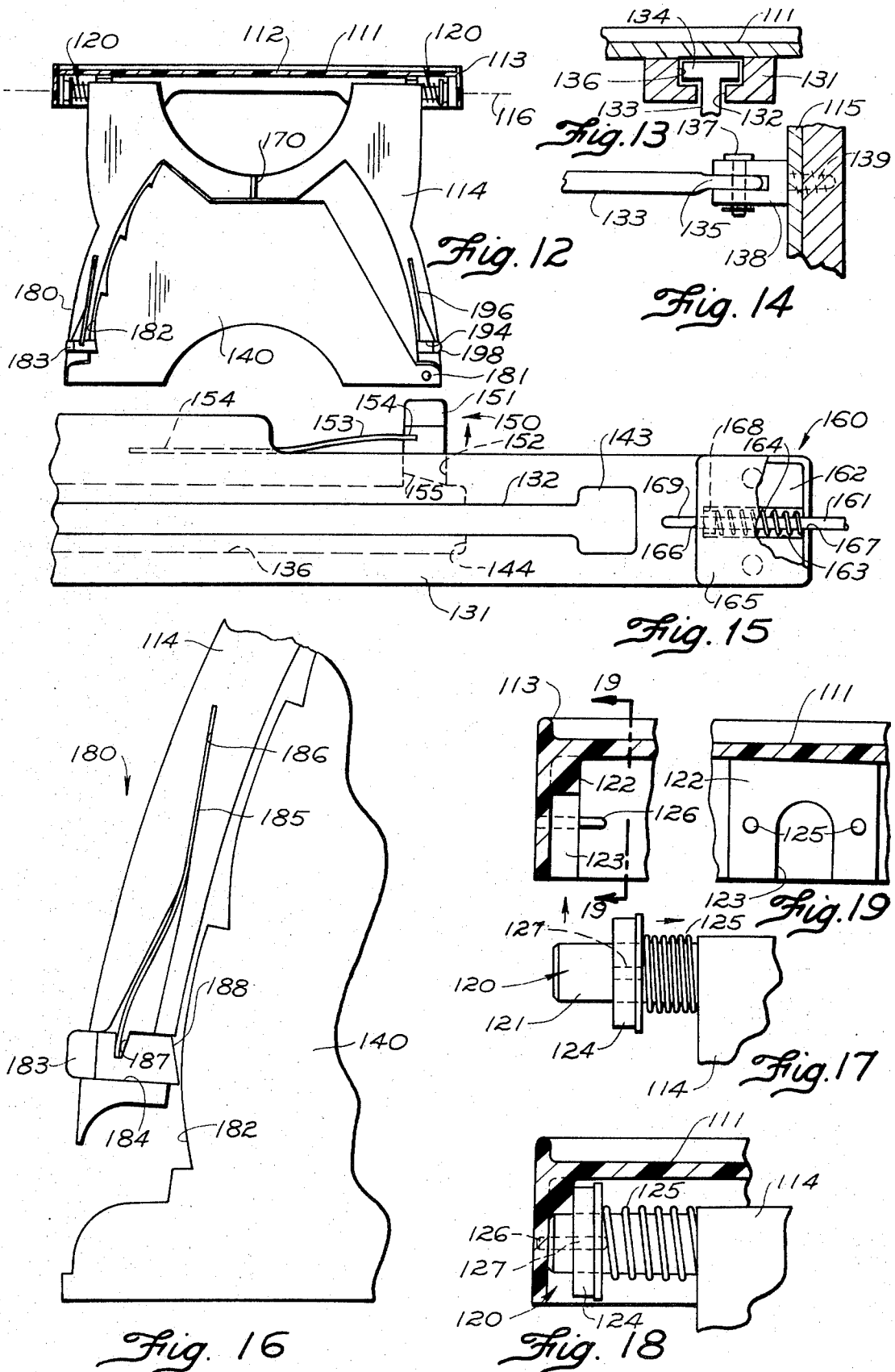
Fig. 7

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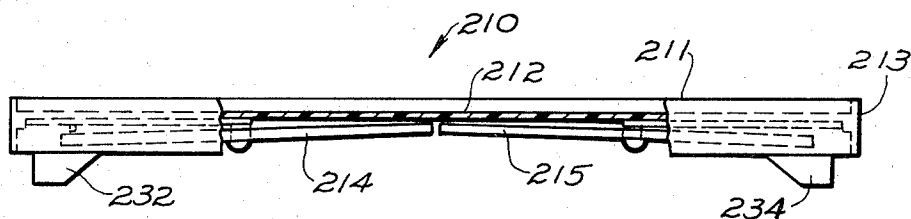


Fig. 20

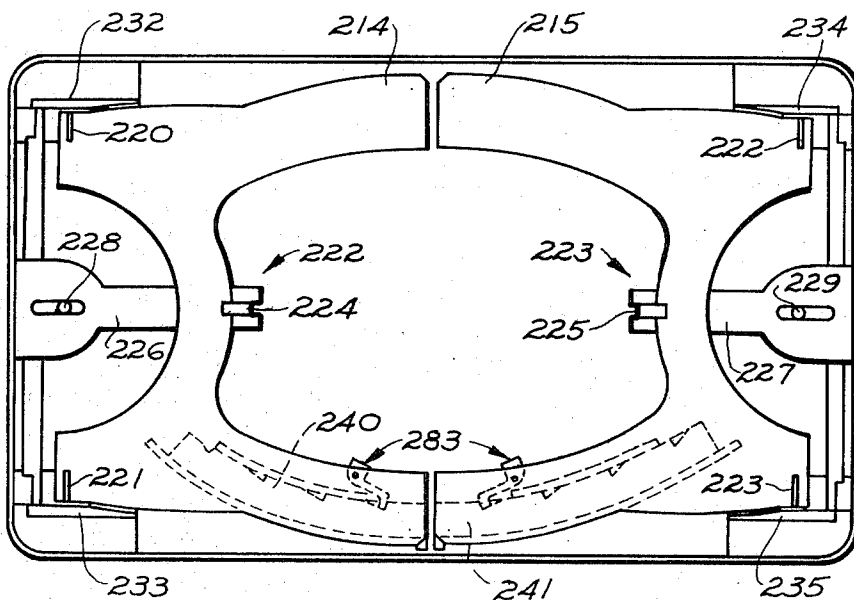


Fig. 21

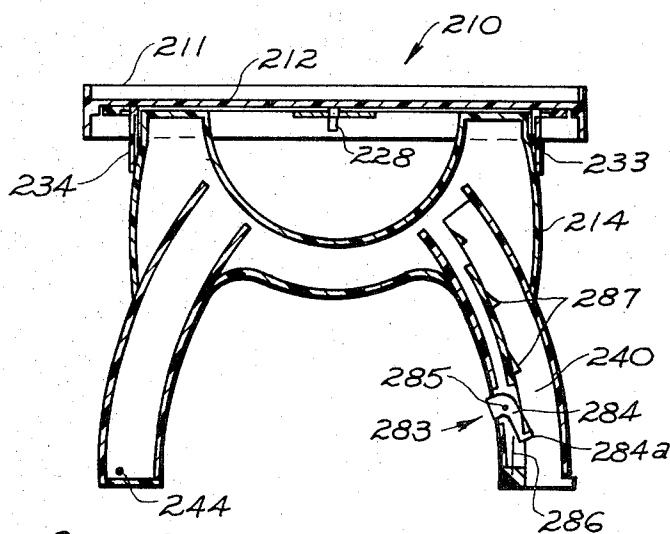
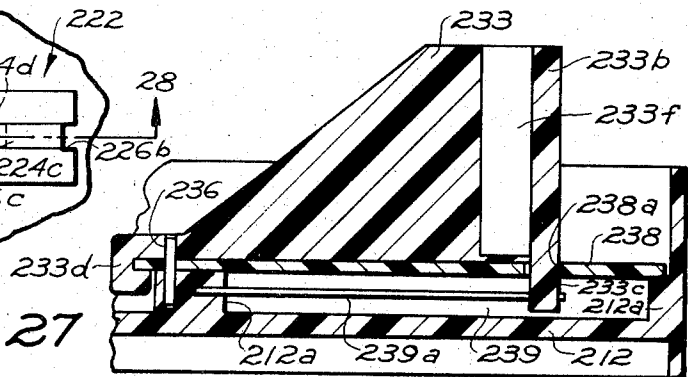
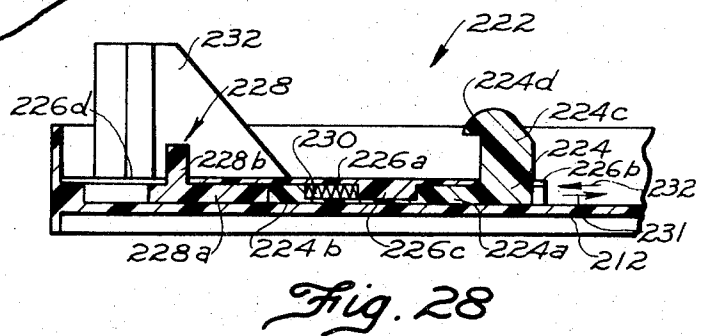
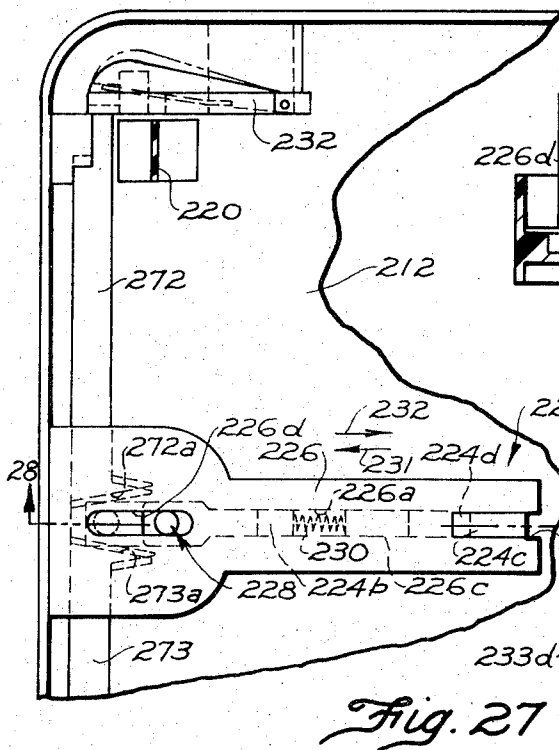
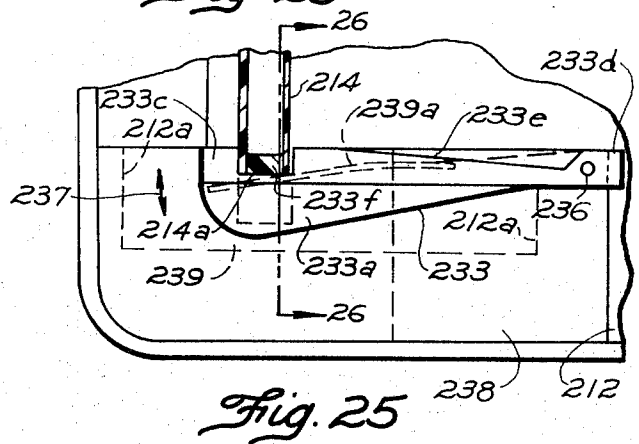
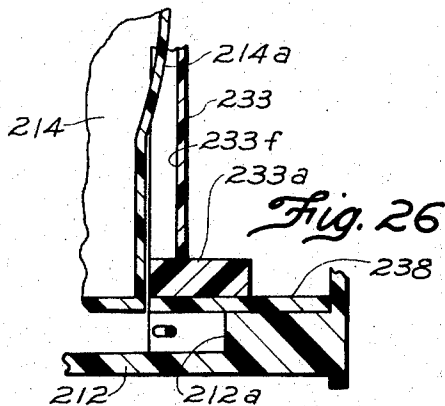
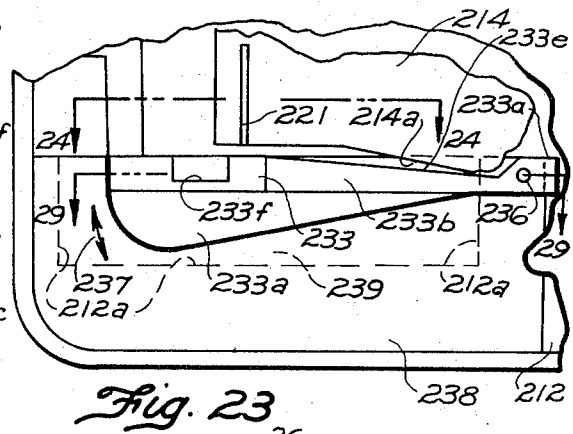
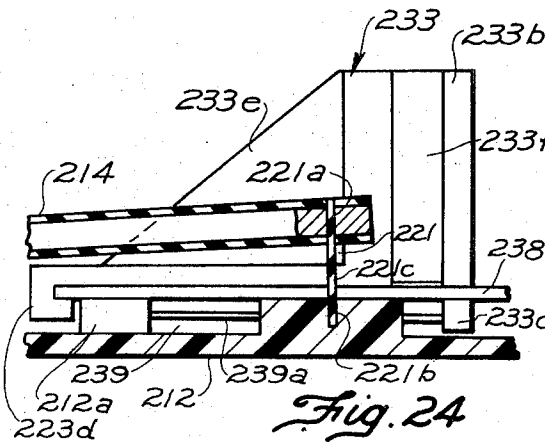


Fig. 22



TILTABLE TRAY WITH PIVOTALLY MOUNTED LEGS HAVING EXTENSIBLE FEET

CROSS-REFERENCE TO RELATED APPLICATION

The present application is a continuation-in-part of application Ser. No. 238,787, filed Mar. 28, 1972, now abandoned, which was a continuation-in-part of application Ser. No. 131,855, filed Apr. 7, 1971, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to horizontally supported tiltable planar surfaces, and more particularly to a tiltable tray with pivotally mounted legs having extensible feet.

2. Prior Art

Platforms which are tiltable mounted on various leg structures are well known. Platforms having legs which are pivotally mounted to fold beneath the platform are also well known.

It is frequently desirable to provide a platform which includes both of these features, whereby the platform can be tilted relative to the surface above which it is supported, while the legs may also fold beneath the platform for storage. In conjunction with bed trays, for instance, it is desirable to provide a collapsible tray having a platform which may be positioned horizontally for eating, and tilted for reading and writing.

Most such trays proposed by the prior art suffer from at least three substantial drawbacks:

1. the movable connectors which provide for pivotal leg movement and tilting of the platform are normally combined to form a bi-directionally movable connection between the platform and the legs. Such a connection is difficult to form in an inexpensive and simple manner without a substantial loss of rigidity.

2. The legs are not ordinarily adapted to support the platform above a planar surface when they are folded beneath the platform. Hence, most such trays are not usable with the legs folded beneath the platform.

3. The tray is either not provided with a means for locking its movable components in both the extended and retracted positions, or the latching mechanisms provided for such purposes are of relatively complex design.

SUMMARY OF THE INVENTION

The present invention overcomes the foregoing and other drawbacks of the prior art and provides a tiltable tray with pivotally mounted legs having extensible feet.

The tilting movement of the platform is provided by means of feet which are extensible along an arcuate path beyond bottom portions of the platform legs. The legs are hollow and telescopically receive the extensible feet. By this arrangement, the tilting of the platform is not controlled by means of a tiltable connection between the platform and the legs, but rather by a telescopic connection between the legs and their extensible feet. Hence, a highly stable pivotal connection may be used between the legs and the platform to permit the legs to pivot smoothly beneath the platform.

Both the feet and the legs are provided with planar bottom portions adapted to support the platform above a horizontal surface. The planar bottom portions of the legs serve to support the platform horizontally above a

horizontal surface. The planar bottom portions of the feet are extensible along an arcuate path beyond the planar bottom portions of the legs to support the platform in a tilted attitude above a horizontal surface.

In two of three disclosed embodiments the legs are provided with transversely extending projections which serve as short auxiliary legs to support the platform when the legs are folded to their retracted position. These auxiliary supports also serve as stops to limit the pivotal movement of the legs and to define their extended position.

In the preferred embodiment, short auxiliary legs are pivotally mounted beneath the platform to support the tray when the long legs are folded beneath the platform. The short legs are provided with cam surfaces which are biased into engagement with the long legs. During movement of the long legs to their extended position, the short legs are cammed outwardly. Once the long legs reach their extended position, the short legs snap inwardly to lock the long legs in their extended position.

In two of the three disclosed embodiments, the legs are pivotally mounted beneath the platform in such a way as to be removable for cleaning and repair. In one embodiment, each of the legs is removable only when it alone is moved to the retracted position. With both legs moved to the retracted position, their bottom portions are so closely positioned as to prevent removal of either of the legs. In a second embodiment, the legs are held in place by spring biased collars which can be moved axially of their supporting projections to permit leg removal regardless of whether the leg is in its extended or retracted position.

In the preferred embodiment, a compact leg locking assembly is secured to the underside of the platform. A pair of release members are provided which, when moved in one direction will release the long legs from their retracted position, and when moved in the opposite directions will release the long legs from their extended position.

Another pair of latching mechanisms are interposed between the legs and the feet to releasably hold the feet in selected extended or retracted positions. In one embodiment, this foot locking mechanism comprises leg-carried pins which are engageable with knotted surfaces on the feet. In the preferred embodiment, the foot locking mechanism comprises leg-carried pawls biased into engagement with knotted ratchet surfaces formed on the feet.

Accordingly, it is the principal object of the present invention to provide a novel and improved tiltable tray with pivotally mounted legs having extensible feet.

Other objects and a fuller understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIGS. 1-7 represent the preferred embodiment of the invention at the time of filing the referenced parent application,

FIGS. 8-19 represent the preferred embodiment at the time of filing the referenced abandoned continuation-in-part application, and FIGS. 20-28 represent the preferred embodiment at the time of filing the present continuation-in-part application.

FIG. 1 is a sectional elevational view of a tray constructed in accordance with one embodiment of the present invention, the legs of the tray being shown in their retracted position;

FIG. 2 is a bottom plan view of the tray of FIG. 1;

FIG. 3 is a side elevational view of the tray of FIG. 1 partially in cross section with the legs pivoted to their extended position;

FIG. 4 is an end elevational view of the tray of FIG. 1 partially in cross section with the legs in their extended position and the feet in their retracted position whereby the platform of the tray is supported substantially horizontally;

FIG. 5 is an end elevational view of the tray of FIG. 1 with the legs and feet both in extended positions whereby the platform is tilted from the horizontal;

FIG. 6 is an enlarged end elevational view of a portion of the tray of FIG. 1 showing the lock means which is interposed between one of the legs and its extensible foot;

FIG. 7 is an enlarged sectional view as seen from the plane indicated by the lines 7—7 in FIG. 1, showing the pivotal connection between one of the legs and the platform whereby the legs are rendered removable from the platform when in their retracted position;

FIG. 8 is a side elevational view of a second tray embodiment, the view being partially in cross section with the legs pivoted to their extended position;

FIG. 9 is a bottom plan view of the tray of FIG. 8;

FIG. 10 is an enlarged cross sectional view of a portion of the tray of FIG. 8 with the leg which is shown being pivoted to its extended position;

FIG. 11 is a cross sectional view on the same scale as FIG. 10 with the leg which is shown being pivoted to its retracted position;

FIG. 12 is a cross sectional view as seen from the plane indicated by the line 12—12 in FIG. 8;

FIG. 13 is an enlarged cross sectional view as seen from the plane indicated by the line 13—13 in FIG. 10;

FIG. 14 is an enlarged cross sectional view of a portion of the tray as seen from the plane indicated by the line 14—14 in FIG. 8;

FIG. 15 is an enlarged bottom plan view of a portion of the leg-locking assembly of the tray of FIG. 8, the view being partially broken away to illustrate detail;

FIG. 16 is an enlarged cross sectional view of a portion of FIG. 12 illustrating the ratchet latching mechanism interposed between one foot and its associated leg;

FIG. 17 is an enlarged view partially in cross section and illustrating the pivotal connection between one of the legs and the platform, the leg and platform being shown prior to assembly;

FIG. 18 is a view on the same scale as FIG. 17 and illustrating the leg and platform of FIGS. 17 in assembled configuration;

FIG. 19 is a cross sectional view on the same scale as FIG. 17 as seen from the plane indicated by the line 19—19 in FIG. 17;

FIG. 20 is a side elevational view of the preferred tray embodiment with the long tray legs pivoted to their retracted position portions of the tray being broken away to illustrate detail of construction;

FIG. 21 is a bottom plan view of the tray of FIG. 20;

FIG. 22 is a cross sectional view of the tray with the long tray legs pivoted to their extended position as seen

from a plane extending through one of the legs in a manner similar to that of FIG. 12;

FIG. 23 is an enlarged bottom plan view of a one corner region of the tray with the long tray legs pivoted to their retracted position;

FIG. 24 is a cross sectional view on the same scale as FIG. 23 as seen from the plane indicated by the line 24—24 in FIG. 23;

FIG. 25 is a view similar to FIG. 23 but with the long tray legs pivoted to their extended position, as seen from a plane extending through the long tray legs;

FIG. 26 is a cross sectional view on the same scale as FIG. 25 as seen from the plane indicated by the line 26—26 in FIG. 25;

FIG. 27 is an enlarged, bottom plan view of a portion of the tray with the long legs removed to better illustrate the details of construction of the leg locking mechanism;

FIG. 28 is a cross sectional view on the same scale as FIG. 27, as seen from the plane indicated by the line 28—28 in FIG. 27, and

FIG. 29 is a cross sectional view on the same scale as FIG. 23 as seen from the plane indicated by the line 29—29 in FIG. 23.

DESCRIPTION OF ONE EMBODIMENT

Referring to FIG. 1, a tray is indicated generally by the numeral 10. The tray 10 represents the preferred embodiment of the invention at the time of filing the referenced parent application. The tray 10 includes a platform 11 having a planar top portion 12. The platform 11 comprises a molded plastic material and includes an integrally formed peripheral rim 13.

A pair of legs 14, 15 are pivotally mounted beneath the platform 11. The legs 14, 15 are pivotally mounted about spaced parallel axes 16, 17. The legs 14, 15 are shown in their retracted positions in FIGS. 1 and 2, and in their extended positions in FIG. 3.

When in their retracted position, the legs are releasably locked beneath the platform by means of primary leg locks 18, 19. The primary leg locks 18, 19 comprise apertured projections 20, 21 which are integrally formed with the platform 11. Rotatable L-shaped lock elements 22, 23 are carried by the apertured projections 20, 21. As best seen in FIG. 2, the lock elements 22, 23 are movable between a locked position, shown in solid lines, wherein they underly and engage portions of the legs 14, 15 to an unlocked position, shown in phantom, wherein they are positioned beside and disengage the legs 14, 15.

The legs 14, 15 are releasably held in their extended position by means of secondary leg locks 24, 25. The secondary leg lock structures 24, 25 comprise latch arms 26, 27. The latch arms 26, 27 have one pivotally mounted about projections 28, 29 formed integrally with the legs 14, 15. The other ends of the latch arms 26, 27 releasably engage a pair of depending projections 30, 31 formed integrally with the platform 11. As is best seen in FIG. 1, the latch arms 26, 27 rotate to a position wherein they are juxtaposed along the legs 14, 15 permitting the legs to move to their retracted positions.

The legs 14, 15 have integrally formed supports 32, 33 and 34, 35. The supports serve a dual function. First, each of the supports includes a planar bottom portion 36 which is adapted to support the platform 11 above a planar surface when the legs 14, 15 are rotated

to the retracted position of FIG. 1. Second, each of the supports includes a planar end portion 37 which serves as a stop to limit the pivotal movement of the legs and to define the extended position of the legs. As is best seen in FIG. 3, the planar end portions 37 engage the underside 38 of the platform 11 when the legs are in their extended position.

Each of the legs 14, 15 is hollow and telescopically carries an extensible foot. The extensible feet are shown in dotted lines in FIG. 2 and are indicated generally by the numerals 40, 41. Since the feet 40, 41 are substantially identical with each other, only one of the foot and leg assemblies will be described.

Referring to FIGS. 4 and 5, the leg 14 is shown having its associated foot 40 respectively in retracted and extended positions. The foot 40 comprises a substantially circular segment including an arcuate side surface 42 which is disposed opposite an apex region 43. The foot 40 is pivotally mounted from the leg 14 about an axis 44 which extends through the apex region 43 of the foot 40. The arcuate surface 42 is substantially equidistant along its length from the pivot axis 44. The pivot axes of both feet are coaxially aligned when the legs are in their extended position.

A latch means, generally indicated by the numeral 50, is interposed between each of the legs and its respective foot. As seen in FIG. 5, the latch means 50 includes a series of notches 51 formed in the arcuate surface 42. A latch member 52 is carried by the leg 14 and is engageable with the notches 51. As is best seen in FIG. 6, the latch member 52 comprises a body 53 which is carried in a slot 54 formed through the leg 14. The body 53 has an inner end 55 which is engageable with the notches 51. The outer end of the body 53 comprises an integrally formed head 56. The head 56 is so designed as to be readily grasped by an operator to translate the body 53 in the slot 54. The body 53 further includes an elongated slot 57. A pin 58 extends through the leg 14 and through the slot 57 to limit the inward and outward movement of the latch member 52 in the slot 54.

Referring to FIG. 7, the pivotal connection between the legs and the platform is more clearly shown. The platform 11 has depending integrally formed projections 60. Each of the projections 60 includes a slot 61 which terminates an enlarged circular aperture 62. The circular apertures 62 are adapted to receive and journal end portions 63 extending from opposite sides of each of the legs. The end portions 63 have flattened surface portions 64, 65 which permit their insertion through the slot 61 into the aperture 62 when each of the legs is in the retracted position of FIG. 1. Upon rotation of the legs from their retracted position, the flat portions 63, 64 no longer align with the slots 61 and the legs are thereby held in position. Removal of the legs can only be accomplished with the legs in their retracted position.

Each of the legs 14, 15 has planar bottom portions 70 which are adapted to support the platform 11 substantially horizontally when the legs are in their extended position. When the legs are in their retracted position, the planar bottom portions 70 are closely spaced adjacent each other so as to prevent the removal of the end portions 63 of the legs from the tray 10. Each of the feet 40, 41 also has planar bottom portions 71 which are adapted to extend beyond the planar bottom portion 70 of the legs to support the platform 11 at se-

lected angles of inclination tilted from the horizontal.

DESCRIPTION OF A SECOND EMBODIMENT

Referring to FIG. 8, a tray 110 is shown which represents the preferred embodiment of the invention at the time of filing the referenced abandoned continuation-in-part application. The tray 110 includes a platform 111 having a planar top portion 112. The platform 111 comprises a molded plastic material and includes an integrally formed peripheral rim 113. A pair of legs 114, 115 are mounted beneath the platform 111 for pivotal movement about spaced parallel axes 116, 117. The legs 114, 115 are hollow and telescopically carry extensible feet 140, 141.

The overall appearance of the trays 110 and 10 including the platforms 111 and 11, the legs 114, 115 and 14, 15 and the feet 140, 141 and 40, 41 are substantially similar and function in substantially identical manners. The major points of difference between the tray structures 110, 10 lie in the pivotal mountings of the legs 114, 115 from the platform 11, an improved mechanism for locking the legs 114, 115 in both their extended and retracted positions, and an improved mechanism for locking the feet 140, 141 in both their retracted and extended positions.

A novel connection means, generally indicated by the numeral 120, is provided for connecting both sides of the legs 114, 115 to the platform 111. Referring to FIGS. 17-19 wherein the connection of one side of the leg 114 to the platform 111 is illustrated in detail, the connection means 120 includes a cylindrical projection 121 formed integrally with the leg 114. A mounting block 112 is formed integrally with the platform 111 and has a downwardly opening slot 123. The slot 123 is of such size as will movably journal the projection 121 without substantial play.

The projection 120 is held in the slot by means of a spring biased collar 124. The collar 124 is slidably positioned on the projection 121. A compression coil spring 125 is positioned on the projection 121 in engagement with the collar 124 so as to bias the collar 124 toward the mounting block 122. A pair of pins 126 carried by the mounting block 122 are received in a pair of apertures 127 formed through the collar 124.

During assembly, the collars 124 on opposite sides of the leg 114 are moved inwardly along the projections 121, as shown in FIG. 16, to compress the springs 125. The projections 121 are then inserted into the slots 123. The apertures 127 are then aligned with the pins 126 and the collars released so that the springs 125 move the collars 124 toward the mounting blocks 122. The pins 126 are thereby caused to extend through the apertures 127 to prevent the projections 121 from sliding out of the slots 123.

A compact leg locking assembly, generally indicated by the numeral 130, is secured to the underside of the platform 11, as shown in FIG. 9. The assembly 130 includes a track structure 131 forming a pair of tracks 132 which journal one end of each of a pair of T-shaped leg support rods 133. A pair of latching devices, indicated generally by the numerals 150, are provided intermediate the ends of the slots 132 for locking the legs 114, 115 in their extended positions. A pair of latching devices indicated, generally by the numerals 160, are provided near the ends of the track structure 131 for locking the legs 114, 115 in their retracted positions.

Referring to FIGS. 13 and 14, the support rods 133 each comprise rod-like stems having a T-shaped formation 134 at one end, and having an apertured flattened region 135 at the other end. The T-shaped formation 134 is slidably received in an enlarged recess 136 formed in the track structure 131 inwardly of the slot 132. The apertured flattened region 135 is pivotally connected by means of a pin 137 to a yoke 138. The yoke has a threaded portion 139 which is threaded into the associated leg, 114, 115.

The slots 132 are enlarged adjacent their inner ends 142 and their outer ends 143. The enlarged inner end openings 142 provide access to the recesses 136 for inserting the T-shaped end formations 134 into the recesses 136 during assembly. The enlarged outer end openings 142 receive the yokes 138 when the legs are retracted as shown in FIG. 11. The recesses 136 do not extend the entire length of the slots 132 but terminate at 144 adjacent the latching means 150.

Referring to FIG. 15, the latching means 150 each include a bolt 151 slidably positioned in an aperture 152 formed in the track structure 131. A leaf spring 153 biases the bolt 151 inwardly. One end of the leaf spring 153 is supported in a slot 154 formed in the track structure 131. The other end of the leaf spring 153 is received within a slot 154 formed in the bolt.

The inner end 155 of the bolt 151 is tapered so that the T-shaped end 134 of the rod 133 will force the bolt 151 outwardly as it passes by the bolt 151 in moving into engagement with the end wall 144. As the T-shaped end 134 comes into engagement with the end wall 144, the bolt 151 is released and travels inwardly under the influence of the spring 153 so as to hold the T-shaped end 134 against the end wall 144. This action of the latch mechanism 150 serves to lock the associated legs in its extended position. To retract the legs, the outer end of the bolt 151 is grasped by the operator and pulled outwardly so as to let the T-shaped end 134 pass by inner end 155 of the bolt 151.

The latch mechanisms 160 which lock the legs in their retracted positions are best seen in FIGS. 10, 11 and 15. Each of the latch mechanisms 160 includes a latching rod 161 which is supported for sliding axial movement by the track structure 131. The end regions of the track structure 131 are provided with depending mounting blocks 162. Each of the mounting blocks 162 has a centrally located recess 163 which carries a compression coil spring 164. Cover plates 165 overlie the recesses 163 and are adhered to the mounting blocks 162. Aligned apertures 166, 167 formed through opposite side walls of the mounting blocks 162 slidably support the latching rods 161 and position them so as to extend through the recesses 163.

The springs 164 serve to bias the latching rods 161 toward each other. A collar 168 is crimped rigidly in place on portions of the latching rods which extend through the recesses 163. The springs 164 are positioned on the latching rods in engagement with the collars 168 so as to bias the rods 161 toward each other.

The inner ends 169 of the latching rods 161 are rounded so as to be readily inserted into apertures 170 formed in the legs 114, 115. The outer ends 171 of the latching rods 161 are curved so as to provide a finger-type handle that can be readily grasped by an operator.

In order to lock the legs 114, 115 in their retracted position the latching rods 161 are pulled outwardly.

The legs 114, 115 are then moved to their retracted position, and the latching rods 161 are then released so as to project into the apertures 170 under the influence of the springs 164.

The aforedescribed leg mounting and latching structures, when combined in the described arrangement of the second embodiment provide a tray structure which is very easy to operate. By way of example, assume the legs 114, 115 are in their retracted position and the tray is loaded with dishes of food for serving to a patient lying in bed. As the tray is moved into position over the patient, all that needs to be done to lower the legs and lock them firmly in position is to pull the finger rings 171 outwardly. When the finger rings 171 are pulled outwardly, the legs 114, 115 are released to permit their pivoting downwardly under the influence of gravity. As the legs approach their extended positions, they have gained sufficient momentum to pull the T-shaped ends 134 of the support rods 133 past the bolts 151 such that the legs are firmly locked in their extended position.

Retracting the legs is a simple matter of releasing the bolts 151 and holding the finger rings 171 outwardly as the legs return to their retracted position. This simple procedure is most easily accomplished with the tray inverted so that the leg movement is again facilitated by the force of gravity.

An improved ratchet latching mechanism, indicated generally by the numeral 180, is provided for adjustably positioning the feet 140, 141 relative to the legs 114, 115. Referring to FIGS. 12 and 16 where the ratchet mechanism 180 which interconnects the foot 140 and the leg 114 is shown in detail, the foot 140 is pivotally mounted on the leg 114 at 181. The foot 140 includes a notched arcuate surface 182.

A pawl 183 is slidably positioned in an aperture 184 formed in the leg 114 and is biased into engagement with the surface 182 by a leaf spring 185. One end of leaf spring 185 is carried in a slot 186 formed in the leg 114. The other end of the leaf spring 185 engages a notch 187 in the pawl 183.

The inner end 188 of the pawl 183 is tapered to cooperate with the notched surface 182 to form a ratchet latching mechanism that will hold the foot 140 in any of several extended positions. In order to retract the feet from their extended positions, the operator simply grips the outer ends of the pawls 183 and pulls them outwardly to permit the notched surface 182 to pass freely by the inner end 188 of the pawl 183.

The pawls 183 serve the additional function of releasably holding the feet 140, 141 in their retracted position. The biasing action of the springs 185 is sufficiently strong such that when the feet 140, 141 are retracted, they will not extend under the influence of gravity but must be pulled downwardly by an operator.

Referring to FIG. 12, in order to provide the legs 114, 115 with a symmetrical molded configuration, a pawl mounting aperture 194 and spring mounting slot 196 are formed above the region of the pivotal mounting 181. No spring or pawl is positioned in these formations, however, and a plug 198 is secured in the aperture 194.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 20-21, a tray 210 is shown which represents the preferred embodiment of the invention

at the time of filing the present continuation-in-part application. The tray 210 includes a molded plastic platform 211 having a planar top portion 212 and an integrally formed peripheral rim 213. A pair of long supporting legs 214, 215 are pivotally mounted beneath the platform 211. The legs 214, 215 are hollow and telescopically carry extensible feet 240, 241. Two pairs of short supporting legs 232, 233, 234 and 235 are also pivotally mounted beneath the platform 211 and serve to support the tray when the long legs 214, 215 are retracted. As will be explained in greater detail, the short legs 232-235 also serve as latching devices for locking the long legs 214, 215 in their extended position.

The major points of difference between the tray 210 and the tray 110 lies in the pivotal mountings of the legs 214, 215 from the platform 211, improved mechanisms for locking the legs 214, 215 in their retracted position, an improved mounting of the extensible feet 240, 241 within the long legs 214, 215, and the provision of short legs 232-235 which serve the dual functions of releasably latching the long legs 214, 215 in their extended position and supporting the tray 210 when the long legs 214, 215 are retracted.

The long legs 214, 215 are pivotally connected to the underside of the platform 211 by means of two pairs of plastic hinges 220, 221 and 222, 223. Referring to FIG. 24, one of the hinges 221 is illustrated in cross section. Opposite ends 221a, 221b of the hinge 221 are received in slots formed in the leg 214 and the underside of the platform 212. A suitable adhesive holds the ends 221a, 221b in place. A central region 221c of reduced cross section is formed in the hinge 221 to confine the bending of the hinge to a relatively small region intermediate the ends 221a, 221b.

When the long legs 214, 215 are in their retracted position, they are latched securely beneath the platform 211 by primary leg locks 222, 223. The leg locks 222, 223 include latching members 224, 225 slidably carried within housings 226, 227. The latching members 224, 225 are adapted to overlie central portions of the long legs 214, 215, as shown in FIG. 21, to latch the long legs in their retracted position. Control members 228, 229 are provided to release the latching members 224, 225. Since the primary leg locks 222, 223 are identical in construction, only the leg lock 222 will be described in detail.

Referring to FIGS. 27, 28, the latching member 224 is of J-shaped configuration including a stem 224a having an enlarged end portion 224b, and a transversely projecting portion 224c terminating in a latching projection 224d. The stem 224a and its end portion 224b are slidably carried within a channel 226a formed in the housing 226. The projecting portion 224c extends through a slot 226b formed in an end region of the housing 226. The latching projection 224d is adapted to overlie a central region of the long leg 214 to latch it in its retracted position, as shown in FIG. 21.

The latching member is biased to the latched position of FIGS. 21, 27, 28 by a compression coil spring 230. The spring 230 is positioned within the channel 226a between the enlarged end portion 224b and a depending projection 226c formed inwardly of the housing 226. The spring 230 operates to bias the latching member 224 in the direction of arrow 231 to bring the projection 224c into engagement with the end of the slot 226b.

The control member 228 includes a base portion 228a which is slidably mounted within the channel 226a. An upstanding knob-like projection 228b formed integrally with the base 228a extends through a slot 226d formed in the housing 226. One end of the base 228a abuts the end region 224b of the latching member 224. Movement of the knob 228 in the direction of arrow 232 will cause concurrent movement of the latching member 224 to release the long leg 214 from its retracted position. The spring 230 effects return of the latching member 224 and the control member 228 to the position of FIGS. 27, 28 once the knob 228b is released.

The short legs 232-235 serve dual functions. In one capacity they support the tray 210 when the long legs 214, 215 are retracted. In a second capacity, the short legs 232-235 serve to latch the long legs 214, 215 in their extended position. Since all four of the short legs are substantially identical (two are left and two are right) only the leg 223 will be described in detail.

Referring to FIGS. 23-26 and 29, the short leg 233 includes a base portion 233a and an integrally formed upstanding portion 233b. The leg 233 is pivotally mounted by a pin 236 for pivotal movement about the axis of the pin 236 in directions toward and away from the long leg 214 as indicated by the arrows 237.

A cover plate 238 is provided adjacent the base portion 233a of the short leg 233. The cover plate 238 is adhered by suitable adhesive to a raised region 212a of the platform 212. A slot 238a is formed in the cover plate 238, as best seen in FIG. 29. A depending projection 233c formed on the short leg 233 extends through the slot 238a into a region 239 between the cover plate 238 and the platform 212.

A wire spring 239a biases the short leg 233 toward the long leg 214. One end region of the spring 239a is embedded in the raised platform region 212a, as shown in FIG. 29. The other end region of the spring 239a rests against the depending projection 233c. The spring 239a extends through the region 239 along a curved path, as shown in FIG. 25 to preload the spring 239a.

A hook-shaped formation 233d is provided on the short leg 233. The formation 233d wraps around one side of the cover plate 238, as shown in FIG. 29, and maintains the leg 233 in contact with the cover plate 238.

A cam surface 233e is formed on the surface of the short leg 233 which faces the long leg 214. The cam surface 233e is configured such that as the long leg 214 is moved from its retracted to its extended position, a side 214a of the leg 214 contacts the cam surface 233e and causes the short leg 233 to pivot about the pin 236 in a direction away from the long leg 214.

A slot 233f is also formed in the surface of the short leg 233 which faces the long leg 214. The slot 233f is adapted to receive the side 214a of the long leg 214 when the long leg 214 reaches its extended position. When the side 214a is received in the slot 233f, the short leg 233 is then free of pivot inwardly toward the long leg 214 under the influence of the spring 239a to latch the long leg 214 in its extended positions. Since two of the short legs 232-235 operate on each of the long legs 214, 215 to latch opposite sides of the long legs, a very secure latching action is provided to maintain the long legs in their extended position.

The long legs 214, 215 are released from their extended latched positions by the same control knobs

228, 229 as release the long legs from their retracted latched positions. The type of latch release mechanism which effects the release of the long legs from their extended position is illustrated in FIG. 27.

Referring to FIG. 27, a pair of slides 272, 273 extend from within the housing 226 and into engagement with the short legs 232, 233, respectively. The inner ends of the slides 272, 273 have inclined surfaces 272a, 273a formed thereon which engage the base 228a of the control member 228. The inclined surfaces 272a, 273a are arranged such that movement of the control member 228 in the direction of arrow 231 will cause the slides 272, 273 to move away from each other thereby pivoting the short legs 232, 233 away from the long leg 214. The spring 239a and its counterpart in the leg 232 serve to bias the slides 272, 273 inwardly and to bias the control member 228 to the position of FIG. 27.

In operation, moving the long legs 214, 215 from their retracted to their extended position is accomplished simply by positioning the tray as shown in FIG. 20 and moving the control members 228, 229 toward each other to release the latching members 224, 225. The long legs 214, 215 are then pivoted under the influence of gravity to their extended position. During movement to the extended position, the long legs 214, 215 cam the short legs outwardly. As the long legs 214, 215 reach their extended position, the short legs 232-235 snap inwardly to latch the long legs in place.

Moving the long legs from their extended to their retracted position is accomplished simply by moving the control members 228, 229 away from each other to cam the short legs 232-235 outwardly, whereupon the long legs 214, 215 are folded inwardly. As the long legs 214, 215 approach their retracted positions, they contact the rounded end of the latching members 224, 225 causing the latching members 224, 225 to travel toward each other. As the long legs 214, 215 reach their retracted position, the latching members 224, 225 snap to their latched positions.

In the preferred embodiment, the extensible feet 240, 241 comprise arcuate segments movable along an arcuate path. Referring to FIG. 22, the extensible foot 240 is movable along a path having a center of curvature at the point 244. As will be seen by comparing the structure of the preferred embodiment with the structures of the aforescribed embodiments, the resulting tilting function of the feet 240, 241 as compared to the feet 140, 141 and 40, 41 is identical. In all instances, the feet 240, 241 and 140, 141 as well as 40, 41 provide a planar bottom surface which, by virtue of the arcuate movement of the foot, extends into parallel surface contact with a supporting surface regardless of the angle to which the tray is tilted.

The feet 240, 241 are provided with ratchet type latches 283 quite similar in configuration to those described in conjunction with the feet 140, 141. Referring to FIG. 22, the latches 283 each include a lever 284 pivotally mounted internally of its supporting leg by a pin 285. A leaf spring 286 carried inwardly of the leg biases the inner end 284a of the lever 284 into engagement with a knotted surface formed on the associated foot 240, 241.

In operation, the feet 240, 241 are extended by grasping the lower ends thereof and pulling them outwardly of the legs 214, 215 to the desired degree of extension. In each of several extended positions defined by knuckles 287 along the feet 240, 241, the levers

snap into latching engagement with the knuckles 287. The feet 240, 241 are retracted simply by pivoting the levers 284 to release their engagement with the knuckles 287, whereupon the feet can be retracted by pushing them into the legs 214, 215.

Although the invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

What is claimed is:

1. A tray structure comprising:

- a. a platform defining a planar top surface;
- b. a pair of legs pivotally carried beneath said platform near opposite end regions thereof and being movable between a retracted position where said legs are folded beneath said platform to an extended position where said legs depend from said platform to support said platform at an elevated height above a horizontal supporting surface;
- c. leg locking means interposed between said platform and said legs for selectively locking said legs in said retracted and extended positions;
- d. a pair of extensible feet each being movably carried by a separate one of said legs and each being movable along an arcuate path between a retracted position where bottom portions of said feet cooperate with said legs to support said platform horizontally above a horizontal supporting surface when said legs are extended, to extended positions where said bottom portions depend from said legs; and
- e. feet locking means interposed between said feet and said legs for locking said feet selectively at one of a plurality of predetermined extended positions for supporting said platform in inclined attitudes relative to a horizontal supporting surface.

2. The tray structure of claim 1 wherein said feet are telescopically carried in downwardly opening recesses formed in said legs.

3. The tray structure of claim 2 wherein:

- a. said feet have the general shape of circular sectors and are pivotally connected to said legs in the region of the apex of said circular sectors; and,
- b. the axes of pivotal connection between said feet and said legs are substantially coaxially aligned when said legs are in said extended position.

4. The tray structure of claim 2 wherein:

- a. said feet have the general shape of arcuate segments; and
- b. said recesses each have at least one curved wall which slidably engages its respective foot to guide said foot for movement along said arcuate path.

5. The tray structure of claim 1 wherein said feet locking means includes a plurality of notches formed in each of said feet and a latch member carried by each of said legs and engageable with said notches to selectively lock said feet in said predetermined extended positions.

6. The tray structure of claim 1 wherein said leg locking means includes:

- a. first latch means movably carried by said platform for releasably engaging said legs when said legs are in said retracted position; and

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b. second latch means movably carried by said platform for releasably engaging said legs when said legs are in said extended position.

7. The tray structure of claim 6 wherein said leg locking means additionally includes a pair of actuators movably carried by said platform, one of said actuators being associated with each of said legs and being operable to release said first and second latch means associated with its respective leg.

8. The tray structure of claim 6 wherein said second latch means includes:

a. a separate pair of support members associated with each of said legs and being pivotally carried by said platform;

b. biasing means biasing said support members into engagement with said legs when said legs are in their extended position to releasably retain said legs in their extended position.

9. The tray structure of claim 8 wherein said support members have bottom end regions which depend from said platform and are operable to support said platform above a horizontal surface when said legs are in their retracted position.

10. The tray structure of claim 1 wherein said leg locking means includes manually actuated means operable to release said legs from their retracted position thereby permitting the pivotal movement of said legs under the influence of gravity to their extended position, said leg locking means being automatically operable to lock said legs in their extended position.

11. The tray structure of claim 1 wherein said leg locking means includes a separate manually operated actuator associated with each of said legs, each of said actuators being operable to release its associated leg from the locking action of said leg locking means when said associated leg is in either of said retracted and extended positions.

12. The tray structure of claim 1 additionally including four supports which below said platform when said legs are retracted to support said platform above a horizontal supporting surface.

13. The tray structure of claim 12 wherein said sup-

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ports are carried by said legs and are operable when said legs are in their extended position to serve as stops engaging said platform to limit the movement of said legs.

14. A tray structure comprising:

a. a platform defining a planar top surface;

b. a pair of legs pivotally carried near opposite sides of the platform, each of said legs being movable along a path between a retracted position folded beneath the platform to an extend position depending from the platform;

c. a pair of feet, each being carried by a separate one of said legs and each being extensible beyond the bottom of its associated leg;

d. means for locking said legs in said extended position including:

i. at least one locking member associated with each leg and being pivotally carried by said platform at a position along said path of movement of its associated leg;

ii. each of said locking members having a slot formed therein for receiving and retaining a portion of its associated leg when said leg is in its extended position; and

iii. biasing means biasing said locking members into retaining engagement with said legs when said legs are in their extended position.

15. The tray structure of claim 14 wherein each of said locking members has cam surface portions formed thereon which are engaged by said associated leg as said associated leg approaches its extended position, said engagement between said cam surface portions and said associated leg being operable to pivot the respective locking member transversely of said path of leg movement to increase the biasing force exerted on the respective locking member by said biasing means thereby assuring that said biasing means will be operative to effect positive retaining engagement between said legs and said locking members when said legs reach their extended position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,859,930 Dated January 14, 1975

Inventor(s) Peter G. Sherwin

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 33, delete "the" and substitute - - The - -

Column 4, line 55, insert after "one" the word - - end - -

Column 9, line 11, delete "detial" and substitute - -
detail - -

Column 10, line 20, delete "righ" and substitute - -
right - -

Signed and sealed this 13th day of May 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
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