PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
A47D 7/00, 11/00

A1

(11) International Publication Number: **WO 97/16095**

(43) International Publication Date: 9 May 1997 (09.05.97)

(21) International Application Number: PCT/US96/17383

(22) International Filing Date: 31 October 1996 (31.10.96)

(30) Priority Data:
08/543,859 31 October 1995 (31.10.95) US

(71) Applicant: FISHER-PRICE, INC. [US/US]; 636 Girard Avenue, East Aurora, NY 14052 (US).

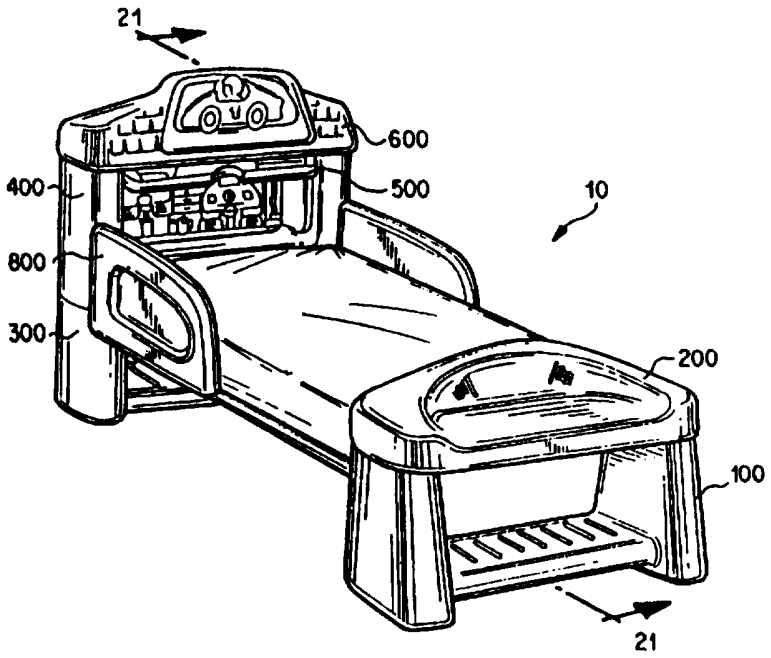
(72) Inventors: ASBACH, Ronald, M.; 1920 Harvey Road, Grand Island, NY 14072 (US). LEMMEYER, Gary, R.; 470 Buffalo Road, East Aurora, NY 14072 (US). DOMBROWSKI, David; 1280 Center Street, East Aurora, NY 14052 (US).

(74) Agents: TALBOT, C., Scott et al.; Howrey & Simon, 1299 Pennsylvania Avenue, N.W., Washington, DC 20004 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: CHILD'S FURNITURE SYSTEM INCLUDING A BED



(57) Abstract

This invention relates generally to a multi-purpose child's furniture system including a bed, and more specifically to such a system including a child's bed that may be transformed from a bed into a three-tier bookshelf or a two-tier bookshelf and a toddler bench. Additionally, the headboard serves as a child's play area. The invention also relates to a system whereby the components of the bed may be interchangeably arranged to accommodate different configurations, thus allowing for alternate uses as well as easy storage. Another embodiment relates to a furniture system including a child's bed which may be transformed from a bed into a desk with a flip-top work surface.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia
AT	Austria
AU	Australia
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CS	Czechoslovakia
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgystan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakhstan
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam

CHILD'S FURNITURE SYSTEM INCLUDING A BED

Background Of The Invention

This invention relates generally to a multi-purpose child's furniture system including a bed, and more specifically to such a system including a child's bed where components of the bed may be interchangeably arranged to accommodate different configurations, thus allowing for alternate uses as well as easy storage.

The conventional child's bed is incapable of being transformed from one piece of furniture to another, requiring the consumer to purchase additional furniture components, thus increasing the cost for the consumer. Providing the consumer with a bed which may be transformed into a useful piece of furniture when the child outgrows the bed would extend the useful life of the purchase. Furthermore, multiple furniture components occupy more space, the average child needing toy storage space, playing surface space, book storage space, a place to study and a place to sleep. Frequently, the typical child is hard pressed to go to sleep, quite often because he or she desires more play time. By providing the child with a sleeping area with which he or she associates with playing, the child may more readily entertain the thought of sleeping.

Summary Of The Invention

The invention solves the problems and avoids the drawbacks of the prior art by providing a multi-purpose furniture system, with one embodiment capable of being configured for use as a bed, as a three-tier bookshelf, or as a two-tier bookshelf and a toddler bench. Another embodiment of the invention provides for a multi-purpose furniture system which is capable of being configured for use as a bed or as a desk. The major components other than the bed frame are comprised of a colorful, hollow molded plastic.

In one aspect, the invention provides a child's furniture system comprising a first support having a bench portion a second support, and a bed frame for supporting a child, wherein the system has a first configuration in which the frame

spans a distance between the first support and the second support and the frame is arranged for supporting the child, and a second configuration in which the frame is detached from the first support, and the bench portion is arranged for supporting the child.

In another aspect, the invention provides a child's furniture system comprising a first support having a storage portion, a second support, and a bed frame for supporting a child, wherein the system has a first configuration in which the frame spans a distance between the first support and the second support and the frame is arranged for supporting the child and the storage portion is accessible for storing objects, and a second configuration in which the frame is detached from the first support, and the first support is freestanding and the storage portion is accessible for storing objects.

In still another aspect, the invention provides a child's furniture system comprising a first support, a second support, and a frame, wherein the system has a first configuration in which the frame spans a distance between the first support and the second support, and a second configuration in which the first support is freestanding, and the second support is stackable on at least part of the first support.

In yet another aspect, the invention provides a child's furniture system comprising a first support, a second support, and a frame, whereby in a first configuration, the frame spans a distance between the first support and the second support, and in a second configuration the frame is detached from the first and the second supports and the first support is detachably mounted to the second support, wherein the first support is arranged as a footboard for a bed in the first configuration and a desktop for a desk in the second configuration and the second support serves as a headboard for a bed in the first configuration and as the support structure for a desk in the second configuration.

In another aspect, the invention provides a child's furniture system comprising a footer having a first surface, a base having second and third surfaces, a

first bench, a second bench, a headboard having a fourth and fifth surfaces, and a frame, the system having a first configuration, in which the frame is releasably secured to the first support and the second support and spans the distance therebetween, the first bench is releasably attachable to the first surface of the first support, the fifth surface of the headboard is releasably attached to the second surface of the second support, and the second bench is releasably attached to the fourth surface of the headboard, the first configuration forming a child's bed; and a second configuration, in which the frame is detached from the first support and the second support, the third surface of the second support is releasably attached to the first surface of the first support, and the fifth surface of the headboard is releasably attached to the second surface of the second support, the second configuration forming a three-tier storage area; and a third configuration, in which the first support is releasably attached to the first surface of the first bench to form a seat and the fifth surface of the headboard is releasably attached to the second surface of the second support to form a two-tier storage area.

In one configuration, the invention provides for a child's bed, which includes a footer which doubles as a child's seat and a headboard which doubles as a toy storage area. The footer incorporates a contoured front bench surface which is attached to the footer support structure by mating protuberances and apertures on the footer support structure with protuberances and apertures on the contoured front bench. The headboard/toy storage area is attached to a lower support member by mating protuberances on the lower support member with apertures on the headboard. Sandwiched between the footer support structure and the front bench surface are two side rails, which serve as the support structure for the beds' mattress. Likewise, the two side rails are sandwiched between the lower support member and the headboard. In an effort to further secure the side rails to their respective supports, the terminal ends of the side rails are equipped with flared ends which rest in cavities within the aforesaid supports. Attached to the top surface of

the headboard/toy storage area is a decoratively contoured component which may serve as a level surface for placing objects. This contoured component is attached to the upper aspects of the headboard by mating protuberances on the contoured component with apertures on the headboard. A shelf door defines the space between the decoratively contoured component and the headboard, providing an enclosed toy storage area. The invention in the bed configuration also provides protective guard rails to prevent the child from inadvertently rolling out of the bed.

In another configuration, the invention provides for a three-tier bookshelf. The footer serves as the first tier in the three-tier bookshelf configuration. The underside of the lower support member is releasably attached to the top of the footer by mating apertures on the underside of the lower support member with protuberances on the top side of the footer. Releasably attached to the top of the lower support component, mating with protuberances thereon, is the headboard. Attached to the top surface of the headboard/toy storage area is a decoratively contoured component which may serve as a level surface for placing objects. This contoured component is attached to the upper aspects of the headboard by mating protuberances on the contoured component with apertures on the headboard. A shelf door defines the space between the decoratively contoured component and the headboard, providing an enclosed toy storage area.

In another aspect; the invention provides a child's furniture system comprising a first support, a second support, and a frame, wherein the system has a first configuration in which the frame spans a distance between the first support and the second support, and in a second configuration the frame is detached from the first and the second supports and the first support is releasably mounted to the second support, and wherein the first support is arranged as a footboard for a bed in the first configuration and a desktop for a desk in the second configuration and the second support serves as a headboard for a bed in the first configuration and as the support structure for a desk in the second configuration.

In still another configuration, the invention provides for a two-tier bookshelf and a toddler bench. The lower support member serves as the first tier. The headboard/toy storage area, which serves as the second tier, is attached to the lower support member by mating protuberances on the lower support member with apertures on the headboard. As in the three-tier bookshelf configuration, attached to the top surface of the headboard/toy storage area is a decoratively contoured component which may serve as a level surface for placing objects. This contoured component is attached to the upper aspects of the headboard by mating protuberances on the contoured component with apertures on the headboard. A shelf door defines the space between the decoratively contoured component and the headboard, providing an enclosed toy storage area. The toddler bench incorporates the contoured front bench surface which is attached to the footer support structure by mating protuberances and apertures on the footer support structure with protuberances and apertures on the contoured front bench. The underside of the contoured front bench includes a series of ridges to reinforce the rigidity of the structure, reducing bending caused by the weight of the child sitting on the contoured components' top surface.

In yet another aspect of the invention, the headboard serves as a toy storage area which includes a flip top door. This toy storage area can be manipulated to take on the appearance of a garage, a doll-house, or any other child-pleasing environment.

In one configuration of another embodiment, the invention provides for a child's bed, which includes a head support having a storage valley and a footboard which doubles as a desk top in a second configuration. In the bed configuration, two side rails span a distance between the head support and the footboard and are connected to both the head support and the footboard by conventional means, such as by screws. The head support is comprised of two head support walls and a center valley portion. The two head support walls are connected to either side of the valley

portion via sliding hooks. The valley portion is equipped with two apertures for receiving the footer in the second configuration. The footboard is correspondingly equipped with two lateral protuberances.

In another configuration of this embodiment, the invention provides for a flip-top desk. In the flip-top desk configuration, the footboard is attached to the valley portion of the head support by mating the two lateral protuberances on the footboard with the two apertures on the valley portion. This connection allows for vertical rotation of the footboard with respect to the valley portion. The valley portion serves as a storage area in the second configuration of the third embodiment.

Brief Description Of The Drawings

Fig. 1A is a perspective view, taken from the front-left, showing the first embodiment in the bed configuration constructed in accordance with the invention.

Fig. 1B is a front view of the first embodiment in the three-tier bookshelf configuration constructed in accordance with the invention.

Fig. 1C is a perspective view of the first embodiment of the two-tier bookshelf configuration with the toddler bench constructed in accordance with the invention.

Fig. 1D is a perspective view, taken from the front-right, showing a second embodiment of the bed configuration constructed in accordance with the invention, differing from the first embodiment by having a different decorative scheme.

Fig. 1E is a front view of the second embodiment in the three-tier bookshelf configuration constructed in accordance with the invention.

Fig. 1F is a perspective view of the second embodiment of the two-tier bookshelf configuration with the toddler bench constructed in accordance with the invention.

Figs. 2A, 2B, 2C, 2D, 2E and 2F are perspective, front, rear, top, bottom and side views, respectively, of the footer component constructed in accordance with the invention.

Figs. 3A, 3B, 3C, 3D and 3E are perspective, front, rear, top and bottom perspective views, respectively, of the front bench constructed in accordance with the invention.

Figs. 4A, 4B, 4C and 4D are perspective, front, top and bottom perspective views, respectively, of the base constructed in accordance with the invention.

Figs. 5A, 5B, 5C, 5D and 5E are perspective, front, rear, top and bottom perspective views, respectively, of the headboard, constructed in accordance with the invention.

Fig. 6 is a front view of the rigid planar sheet portion of the base constructed in accordance with the invention.

Figs. 7A, 7B and 7C are front, rear and right-side views, respectively, of the shelf door constructed in accordance with the invention.

Figs. 8A, 8B and 8C are perspective, front and bottom perspective views, respectively, of the front bench constructed in accordance with the invention.

Fig. 9 is a perspective view of the support frame constructed in accordance with the invention.

Fig. 10 is a perspective view of a guardrail constructed in accordance with the invention.

Fig. 11 is an exploded left-side perspective view of the first embodiment in the bed configuration constructed in accordance with the invention.

Figs. 12A and 12B illustrate the interaction between the side rails and the footer.

Figs. 13A and 13B illustrate the interaction between the side rails and the base.

Fig. 14 illustrates the interaction between the footer and the front bench.

Fig. 15 illustrates the interaction between the headboard and the base.

Fig. 16 illustrates the interaction between the headboard, the base, the shelf door, the rigid planar sheet and the footer top.

Fig. 17A illustrates the interaction between the rigid planar sheet and the headboard. Fig. 17B illustrates the interaction between the shelf door and the headboard.

Fig. 18 illustrates the interaction between the footer top and the headboard.

Fig. 19 is a cross-sectional view taken along line 19-19 in Figure 18 illustrating the interaction between the footer top, the headboard and the shelf door.

Figs. 20A and 20B illustrate the interaction between the second guard rail, the headboard, the base and the second side rail.

Fig. 21 is a cross-section taken along line 21-21 in Figure 1A.

Fig. 22 illustrates the interaction between the footer, the base and the headboard in the three-tier bookshelf configuration.

Fig. 23 illustrates the interaction between the footer and the footer top in the toddler bench configuration.

Fig. 24 illustrates the interaction between the base and the headboard in the two-tier bookshelf configuration.

Fig. 25 is a perspective view of the third embodiment of the invention in the bed configuration.

Fig. 26 is a rear perspective view of the third embodiment of the invention in the bed configuration.

Fig. 27 is a perspective view of the third embodiment of the invention in the flip-top desk configuration.

Fig. 28 is a cross-sectional view taken along line 28-28 in Figure 27 of the third embodiment of the invention in the flip-top desk configuration.

Detailed Description

Reference will now be made in detail to presently preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Preferred embodiments of the invention are illustrated in Figures 1 through 28. A first configuration of the first and second embodiments of the invention forms a bed,

as shown in detail in Figures 1A and 1D. A second configuration of the first and second embodiments of the invention forms a three-tier bookshelf, best shown in Figures 1B and 1E. A third configuration of the first and second embodiments of the invention forms a two-tier bookshelf with a toddler bench, as shown in Figures 1C and 1F. A first configuration of the third embodiment of the invention includes a toddler bed, as shown in Figures 25 and 26. A second configuration of the third embodiment of the invention forms a flip-top desk, illustrated in Figures 27 and 28.

The construction and configuration of the various components of the invention allow the user to create a structure, e.g., a bed, a bookshelf, a desk or a toddler bench, according to the needs of the individual. It is envisioned that the existence of a functional yet hideable bed will be a welcome addition to those families who entertain the children of other parents on overnight stays. The first and second embodiments are functionally similar, differing only in their color schemes and decoration.

1. Components

Preferred first and second embodiments of the invention are illustrated in Figs. 1A and 1D, respectively. The first and second embodiments differ only in their color scheme and decoration, as seen in more detail in Figs. 1A through 1C for the first embodiment and 1D through 1F, for the second embodiment. Figs. 2A through 24 and the accompanying description illustrate and describe the first embodiment only, since the second embodiment is similar in function and construction, differing only in color and decorative scheme.

The footer 100, as illustrated in Figs. 2A through 2F, is substantially u-shaped and includes a footer center portion 102 and first and second footer walls 104, 106. The footer center portion 102 has superior and inferior footer surfaces 108, 110. The superior footer surface 108 contains six grooves 112 parallel to the first and second footer walls 104, 106, spanning the distance therebetween. The inferior footer surface 110, shown in detail in Fig. 2E, includes four footer support ridges 114

integrally connected thereto and laterally spanning the distance between the first and second footer walls 104, 106. The footer support ridges 114 serve to reinforce the rigidity of the structure. The first and second footer walls 104, 106 are generally trapezoidal having first and second inferior footer wall surfaces 116, 118, first and second superior footer wall surfaces 120, 122, first and second front footer wall surfaces 124, 126, first and second rear footer wall surfaces 128, 130, first and second side rail receiving portions 132, 134 and first and second footer protuberances 136, 138. As best illustrated in Figs. 2A, 2C, and 2D, the first and second side rail receiving portions 132, 134 occupy space cut away from the first and second superior footer wall surfaces 120, 122 and the first and second rear footer wall surfaces 128, 130, respectively. The first and second side rail receiving portions 132, 134 terminate in first and second cavities 140, 142, which reside approximately at the midpoint between the first and second front footer wall surfaces 124, 126 and the first and second rear footer wall surfaces 128, 130, respectively. The first and second side rail receiving portions 132, 134 are shaped to receive first and second side rails 702, 704, the first and second side rails 702, 704 being generally cylindrical in shape having first, second, third and fourth flared ends 706, 708, 710, 712 (shown in Fig. 9). As illustrated in Figs. 2A, 2C, 2D and 2F, the first and second footer protuberances 136, 138 are generally trapezoidal and reside on the first and second superior footer wall surfaces 120, 122, respectively. The first and second footer protuberances are sized to connect with apertures on both the footer top 200 and the base 300, as described below.

The footer top 200 is illustrated in Figs. 3A through 3E. The footer top 200, which is releasably attachable to the footer 100, includes superior and inferior footer top surfaces 202, 204, first and second footer top protuberances 206, 208 and first and second footer top apertures 210, 212. As best shown in Fig. 3E, integrally affixed to the inferior footer top surface 204 are the first and second footer top protuberances 206, 208, sized to mate with the first and second side rail receiving portions 132, 134,

whose use will become apparent below. Also existing on the inferior footer top surface 204, parallel and proximate the first and second footer top protuberances 206, 208, are the first and second footer top apertures 210, 212, sized to form a connection with the first and second footer protuberances 136, 138. The inferior footer top surface 204, much like the inferior footer surface 110, includes four footer top support ridges 218 integrally connected thereto and laterally spanning the distance between the first and second footer top protuberances 206, 208. The footer top support ridges 218 serve to reinforce the rigidity of the structure.

The superior footer top surface 202 will now be described. In the preferred embodiment, the contours of the superior footer top surface 202 may function as both a seat and as a level area for placement of objects. Thus, the footer top 200 serves as a storage area and also as a seating surface. The footer top, or seat, 200 includes first and second front ramped walls 220, 222, a footer top edge 224 and a footer top lip 226. As best shown in Figs. 3A and 3D, the first and second front ramped walls 220, 222, the footer top edge 224 and the footer top lip 226 enclose a front planar region 228 on the superior front bench surface 202.

Referring now to Figs. 4A through 4D, the invention includes a base 300. The base 300 is substantially u-shaped and includes a base center portion 302 and first and second base walls 304, 306. The base center portion 302 has superior and inferior base surfaces 308, 310 and front and rear base edges 312, 314. The superior base surface 308 contains six base ridges 316 parallel to the first and second base walls 304, 306. Referring to Fig. 4D, the inferior base surface 310 includes four base support ridges 318 integrally connected thereto and laterally spanning the distance between the first and second base walls 304, 306. The base support ridges 318 serve to reinforce the rigidity of the structure. The first and second base walls 304, 306 are generally rectangular having first and second inferior base wall surfaces 320, 322, first and second superior base wall surfaces 324, 326, first and second front base wall surfaces 328, 330, first and second rear base wall surfaces 332, 334, third and fourth

side rail receiving portions 336, 338, first and second base apertures 340, 342 and first and second base protuberances 344, 346. As best illustrated in Figs. 4A, 4B and 4C, the third and fourth side rail receiving portions 336, 338 occupy space cut away from the first and second superior base wall surfaces 324, 326 and the first and second front base wall surfaces 328, 330. The third and fourth side rail receiving portions 336, 338 terminate in third and fourth cavities 348, 350, which reside approximately at the midpoint between the first and second front base wall surfaces 328, 330 and the first and second rear base wall surfaces 332, 334, respectively. The third and fourth side rail receiving portions 336, 338 are shaped to receive first and second side rails 702, 704, the first and second side rails 702, 704 being generally cylindrical in shape having first, second, third and fourth outwardly flared ends 706, 708, 710, 712 (shown in Fig. 9). As illustrated in FIGS. 4A, 4B and 4C, the first and second base protuberances 344, 346, sized to mate with the third and fourth headboard apertures 476, 478, are generally trapezoidal and reside on the first and second superior base wall surfaces 324, 326. First and second base apertures 340, 342 reside on the first and second inferior base wall surfaces 320, 322, respectively.

Turning now to Figs. 5A through 5F, the invention includes a headboard 400. The headboard 400 serves both as a child's toy/storage area and as a support structure in both the bed configuration 10 and the bookshelf configurations 20, 30 of the first and second embodiments. The headboard 400 is substantially u-shaped and includes first and second headboard walls 402, 404 and a headboard center portion 406. The headboard center portion 406 has superior and inferior headboard surfaces 408, 410 and front and rear headboard portions 412, 414. The superior headboard surface 408 contains six headboard ridges 416 parallel to the first and second headboard walls 402, 404. The inferior headboard surface 410, shown in detail in Fig. 5E, includes four headboard support ridges 418 integrally connected thereto and laterally spanning the distance between the first and second headboard walls 402, 404. The headboard support ridges 418 serve to reinforce the rigidity of the

structure. As illustrated in Figs. 5A, 5B and 5D, located proximal the midpoint of the front headboard portion 412 is a finger cavity 420, whose use will become apparent below. Located along the rear headboard portion 414 and spanning the distance between the first and second headboard walls 402, 404 is a groove 422. Nested within the groove 422 and spaced equidistant from each other are four rigid plate retaining notches 424 (not shown) which serve to maintain the rigid planar sheet 426 in an upright orientation, as described below. The first and second headboard walls 402, 404 include first and second inferior headboard wall surfaces 428, 430, first and second superior headboard wall surfaces 432, 434, first and second front headboard wall surfaces 484, 486, first and second rear headboard wall surfaces 436, 438, first and second interior wall portions 460, 462 and first and second hook holes 448, 450. As illustrated in Figs. 5A and 5D, disposed upon the first superior headboard wall surface 432 is a first headboard aperture 452. Likewise, disposed upon the second superior headboard wall surface 434 is a second headboard aperture 454. The first and second headboard apertures 452, 454 are sixed to mate with the first and second headboard top protuberances 606, 608. Existing parallel and proximate the first and second headboard apertures 452, 454 and spanning the distance between the first and second front headboard wall surfaces 484, 486 and the first and second rear headboard wall surfaces 436, 438 are first and second channel portions 456, 458. The first and second channel portions 456, 458 are essentially rectangular cut-out portions existing on the first and second superior headboard wall surfaces 432, 434, as best shown in Fig. 5A. Referring to Figs. 5A and 5B, integrally affixed to the first and second headboard walls 402, 404 and lying within the u-shaped configuration formed by the first and second headboard walls 402, 404 and the headboard center portion 406 are first and second interior wall portions 460, 462. The first and second interior wall portions 460, 462 are generally rectangular having first and second front interior wall surfaces 464, 466, first and second rear interior wall surfaces 468, 470 and first and second top interior wall surfaces 472, 474. As shown in Fig. 5A, the

first and second front interior wall surfaces 464, 466 lie in a plane parallel (but not collinear) with the plane formed by the first and second front headboard wall surfaces 484, 486 and between the front headboard portion 412 and the rear headboard portion 414. For reasons which will become apparent below, the distance between the first and second front headboard wall surfaces 484, 486 and the first and second front interior wall surfaces 464, 466 is approximately equal to the width of the shelf door 500. The first and second rear interior wall surfaces 468, 470 abut the groove 422 along the rear headboard portion 414. The first and second top interior wall surfaces 472, 474 lie in a plane parallel and slightly below the plane defined by the lower aspects of the first and second channel portions 456, 458. Existing on the first and second front headboard wall surfaces 484, 486, proximal the midpoint between the first and second inferior headboard wall surfaces 428, 430 and the first and second superior headboard wall surfaces 432, 434, are the first and second hook holes 448, 450. Located on the first inferior headboard wall surface 428 is a third headboard aperture 476. Similarly, located on the second inferior headboard wall surface 430 is a fourth headboard aperture 478.

Referring to Figs. 7A through 7C, the shelf door 500 will now be described. The shelf door 500 includes first, second, third and fourth door edges 502, 504, 506, 508 and first and second posts 510, 512. The first door edge 502 has first front, first rear and first side contact surfaces 514, 516, 518. Similarly, the second door edge 504 has second front, second rear and second side contact surfaces 520, 522, 524. The first and second posts 510, 512 are integrally affixed to the first and second door edges 502, 504, on the first side and second side contact surfaces 518, 524, respectively. As shown in Fig. 7C, the third door edge 506, which spans the distance between the first and second door edges 502, 504, is generally semi-cylindrical in shape having a first horizontal contact surface 526. The fourth door edge 508 spans the distance between the first and second door edges 502, 504 and includes a second horizontal contact surface 528.

As illustrated in Figs. 8A through 8C, the first and second embodiments of the invention include a headboard top 600. The headboard top 600 provides a means for trapping the first and second posts 510, 512 on the shelf door 500 within the first and second channel portions 456, 458. The headboard top 600 has superior and inferior headboard top surfaces 602, 604. Disposed upon the inferior headboard top surface 604 are first and second headboard top protuberances 606, 608 and a headboard top lip 620.

In the preferred embodiment, the contours of the superior headboard top surface 602 function as a level area for the placement of objects. Thus, similar to the front bench 200, the headboard top 600 serves as a storage area. However, in other embodiments, the headboard top surface 602 might also serve as a seating surface similar to the footer top surface 202. The headboard top 600 includes first and second rear ramped walls 610, 612, a headboard top edge 614 and a headboard top wall 616. As best shown in Fig. 8A, the first and second rear ramped walls 610, 612, the headboard top edge 614 and the headboard top wall 616 enclose a planar region 618 on the superior headboard top surface 602.

Referring to Fig. 9, the mattress support frame 700 includes first and second side rails 702, 704, each having a diameter equal to or less than the width of the first, second, third and fourth side rail receiving portions 132, 134, 336, 338. The first side rail 702 has first and second flared ends 706, 708, sized to rest within the first and third cavities 140, 348, respectively. Similarly, the second side rail 704 has third and fourth flared ends 710, 712, sized to rest within the second and fourth cavities 348, 350, respectively. A series of six cylindrical rods 714 are rigidly affixed at right angles along the longitudinal axis of the first and second side rails 702, 704 and are spaced equidistant from each other. The generally rectangular frame formed by the interaction between the first and second side rails 702, 704 and the six cylindrical rods 714 is capable of supporting a weight therebetween. Of course, any structure capable of supporting a weight is suitable, such as a planar sheet. In the preferred

embodiment, a mattress is placed on the frame when in the bed configuration. Of course, any type of support surface, including a planar member, may be used to support the mattress. Also, although a frame 700 is provided in the preferred embodiment, in other embodiments the footer 100 and base 300 may be configured with attachment points accepting a standard bed or crib frame, so that the standard frame is used instead of the preferred frame 700.

In an effort to inhibit the occupant from inadvertently rolling out of the planar region defined by the first and second side rails 702, 704 and the six cylindrical rods 714 when the invention is in the bed configuration of the first and second embodiments, first and second guard rails 800, 802 are provided. The first guard rail 800 has a first guard rail edge 804 and a second guard rail edge 806. Located near the lower aspects of the first guard rail edge 804 is a first guard rail hole 808. Integrally affixed to the upper aspects of the second guard rail edge 806 is a first guard rail hook 810. The first guard rail hook 810 is cylindrical in shape and sized to fit within the first hook hole 448. Integrally connected along the lower aspects of the second guard rail edge 806 is a first tab 812. As shown in detail in Fig. 10, the second guard rail 802 has a third guard rail edge 814 and a fourth guard rail edge 816. Located near the lower aspects of the third guard rail edge 814 is a second guard rail hole 818. Integrally affixed to the upper aspects of the fourth guard rail edge 816 is a second guard rail hook 820. The second guard rail hook 820 is cylindrical in shape and sized to fit within the second hook hole 450. Integrally connected along the lower aspects of the fourth guard rail edge 816 is a second tab 822.

A preferred third embodiment of the invention in the convertible bed configuration 50, as illustrated in Figs. 25 and 26, includes a footboard 101. The footboard 101 is generally rectangular in shape and includes superior and inferior footboard surfaces 103, 104, first and second vertical footboard edges 107, 109 a horizontal footboard edge 111 and a pivoting portion 113. The inferior footboard surface 105 contains nine footboard cutout portions 115, whose use will become

apparent below. Also existing on the inferior footboard surface 105, parallel and proximate the first and second vertical footboard edges 107, 109, respectively, are first and second support rail receiving slots 117, 119. The superior footboard surface 103, best shown in Fig. 27, includes a substantially smooth center surface 121. The pivoting portion 113, which lies in the same plane as the horizontal footboard edge 111, is essentially a cut-out portion having first, second and third pivoting edges 123, 125, 127. First and second footboard apertures 129, 131 reside on the first and third pivoting edges 123, 127, respectively. First and second footboard notches 133, 135 reside in a plane parallel and proximate to the first and second vertical footboard edges 107, 109.

The head support 401 is illustrated in Figs. 25 through 28. The head support 401 includes first and second head support walls 403, 405 and a valley portion 407. The first head support wall 403 includes first superior and first inferior head support wall surfaces 409, 411 and first, second, third, fourth, fifth and sixth head support wall edges 413, 415, 417, 419, 421, 423. The first superior head support wall surface 409 includes a first indention 425. Located within the first indention 425, shown best in Fig. 27, are head support wall holes 427. Residing on and traversing through both the first superior head support wall surface 409 and the first inferior head support wall surface 411 are first and second sliding hook holes 429, 431. The first inferior head support wall surface 411 includes a first rail receiving notch 433, best shown in Fig. 28. The first rail receiving notch 433 and the first indention 425 reside in approximately the same plane and are parallel to one another. The second head support wall 405 includes second superior and second inferior head support wall surfaces 435, 437 and seventh, eighth, ninth, tenth, eleventh and twelfth head support wall edges 439, 441, 443, 445, 447, 449. The second superior head support wall surface 435 includes a second indention 451. Located within the second indention 451, shown in Fig. 26, are head support wall holes 453. Residing on both the second superior head support wall surface 435 and the second inferior head

support wall surface 437 are third and fourth sliding hook holes 455, 457. The second inferior head support wall surface 437 includes a second rail receiving notch 459. The second rail receiving notch 459 and the second indention 451 reside in approximately the same plane and are parallel to one another.

The valley portion 407 includes first and second valley edges 461, 463, first and second valley protuberances 477, 479 and a valley 465 having superior and inferior valley surfaces 481, 483. Integrally affixed to the first valley edge 461 are first and second sliding hooks 467, 469. Similarly, integrally affixed to the second valley edge 463 are third and fourth sliding hooks 471, 473. Residing between the first and second valley edges 461, 463 is the valley 465, as best shown by cross-sectional view in Fig. 28. The inferior valley surface 483 is contoured (as shown in Figs. 25 and 28) and includes a front valley lip 475 and a valley hinge 485. The first and second valley protuberances 477, 479 reside on opposing sides on the valley hinge 485, best shown in Fig. 26.

Referring to Figs. 25 and 26, the third embodiment includes a frame 701. The frame 701 includes first and second support rails 703, 705, each having a diameter approximately equal to or slightly less than the width of the first and second support rail receiving slots 117, 119 and the first and second rail receiving notches 433, 459. Referring to Fig. 26, the first support rail 703 is generally L-shaped and has first and second support rail ends 707, 709. Similarly, the second support rail 705 is generally L-shaped having third and fourth support rail ends 711, 713. A series of six connector rods 715 are rigidly affixed at right angles along the longitudinal axis of the first and second support rails 703, 705 and are spaced equidistant from one another. The generally rectangular frame formed by the interaction between the first and second support rails 703, 705 and the six support rods 715 is capable of supporting a weight therebetween. Of course, any suitable structure capable of supporting a weight, including a planar sheet, may be used as a support frame. In the preferred embodiment, a mattress is placed on the frame when in the bed

configuration. Also, although a frame 700 is provided in the preferred embodiment, in other embodiments the footboard 101 and head support 401 may be configured with attachment points accepting a standard bed or crib frame, so that the standard frame is used instead of the preferred frame 700.

2. Bed Configuration

The first and second embodiments as arranged in the bed configuration 10 will now be described in detail. The bed configuration utilizes the footer 100, the footer top 200, the base 300, the headboard 400, the rigid planar sheet 426, the shelf door 500, the headboard top 600, the first and second side rails 702, 704, the six cylindrical rods 714 and the first and second guard rails 800, 802, as illustrated in Fig. 11. The basic support structure for the bed frame utilizes the footer 100, the base 300 and a rectangular frame formed by the interaction between the first and second side rails 702, 704 and the six cylindrical rods 714. Referring to Figs. 12A and 12B, the first and second side rails 702, 704 are placed within the first and second side rail receiving portions 132, 134, which are nested within the first and second footer walls 104, 106, respectively. The first flared end 706 on the first side rail 702 is inserted into the first cavity 140 located within the first side rail receiving portion 132. Similarly, the third flared end 710 on the second side rail 704 is inserted into the second cavity 142 located within the second side rail receiving portion 134. To complete the support network, the first and second side rails 702, 704 are placed within the third and fourth side rail receiving portions 336, 338, which are nested within the first and second base walls 304, 306, respectively, as shown in Figs. 13A and 13B. The second flared end 708 on the first side rail 702 is inserted into the third cavity 348 located within the third side rail receiving portion 336. In like fashion, the fourth flared end 712 on the second side rail 704 is inserted into the fourth cavity 350 located within the fourth side rail receiving portion 338.

In an effort to provide both a sitting area and/or storage area for a toddler and a means for further securing the first and second side rails 702, 704 to the footer

100, the footer top 200 is releasably attached to the footer 100. As illustrated in Fig. 14, the footer top 200 is oriented over the top of the footer 100 such that the first and second footer protuberances 136, 138, integrally affixed to the first and second superior footer wall surfaces 120, 122, mate with the first and second footer top apertures 210, 212, residing on the inferior footer top surface 204. Simultaneously, the first and second footer top protuberances 206, 208, integrally affixed to the inferior footer top surface 204, mate with the first and second side rail receiving portions 132, 134. As illustrated by cross-section in Fig. 20, the first and second footer top protuberances 206, 208 are sized in length so that they do not completely describe the space defined by the first and second side rail receiving portions 132, 134, leaving a gap large enough to accommodate the first and second side rails 702, 704. The first and second side rails 702, 704 are trapped between the lower aspects of the first and second side rail receiving portions 132, 134 and the first and second footer top protuberances 206, 208. Additional fastening means, such as screws, may be used to further strengthen the connection points between the footer 100 and the footer top 200. The first and third flared ends 706, 710 on the first and second side rails 706, 710 prevent the first and second side rails 702, 704 from sliding longitudinally within the footer 100. Likewise, the second and fourth flared ends 708, 712 prevent the first and second side rails 702, 704 from sliding longitudinally within the base 300. The footer top 200 rests on the footer 100, and forms a storage area defined by the superior footer top surface 202 of the footer 200, the first and second footer walls 104, 106 and the interior footer top surface 204. In the preferred embodiment, this storage area resembles a bookshelf, but it may take other shapes. For example, the storage area may be fully or partially enclosed from the front and/or rear by a fixed panel or a movable door. Also, the superior footer top surface 202 serves as a seat and/or a storage shelf.

Referring to Fig. 15, the headboard 400 is releasably attached to the base 300 as follows. The headboard 400 is oriented over the top of the base 300 such that the

first base protuberance 344, residing on the first superior base wall surface 324, mates with the third headboard aperture 476, located on the first inferior headboard wall surface 428. Accordingly, the second base protuberance 346, residing on the second superior base wall surface 326, mates with the fourth headboard aperture 478, located on the second inferior headboard wall surface 430. The first and second inferior headboard wall surfaces 428, 430 provide a ceiling for the openings created on the first and second superior base wall surfaces 324, 326 by the third and fourth side rail receiving portions 336, 338. This configuration allows for a gap between the first and second side rails 702, 704, resting within the third and fourth side rail receiving portions 336, 338, and the first and second inferior headboard wall surfaces 428, 430. Additional fastening means, such as screws, may be used to further strengthen the connection points between the headboard 400 and the base 300.

Once the headboard 400 is secured to the base 300, the rigid planar sheet 426 and the shelf door 500 may be attached to the headboard 400 to form an enclosed storage area defined by the rigid planar sheet 426, the shelf door 500, the first and second headboard walls 402, 404 and the headboard center portion 406. As shown in detail in Figs. 15 and 16A, the rigid planar sheet 426 is inserted into the groove 422, which is located along the rear headboard portion 414 and spans the distance between the first and second headboard walls 402, 404. The rigid planar sheet 426 describes the space between the first and second headboard walls 402, 404 and the headboard center portion 406. The rigid planar sheet 426 is secured in an upright position, in part, by the four rigid plate retaining notches 424 (not shown) nested equidistant from each other within the groove 422.

Referring to Figs. 15 and 16B, the shelf door 500, which is movable between a first and a second position, is positioned such that the first and second posts 510, 512, located on the first and second door edges 502, 504, respectively, rest within the first and second channel portions 456, 458. In a first door position, shown in Fig. 17, the first and second posts 510, 512 rest within the first and second channel portions

456, 458 such that the first and second posts 510, 512 are abutting the rear aspects of the first and second front headboard wall surfaces 436, 438, respectively. The first rear contact surface 516 on the first door edge 502 lies in contact with the first front interior wall surface 464 on the first interior wall portion 460. In a like manner, the second rear contact surface 522 lies in contact with the second front interior wall surface 466 on the second interior wall portion 462. The first and second front interior wall surfaces 464, 466 prevent the fourth door edge 508 from traveling from the front headboard portion 412 toward the rear headboard portion 414. Completing the description of the first door position, the fourth door edge 414 rests along the front headboard portion 412 located on the superior headboard surface 408 of the headboard center portion 406. The finger cavity 420 located on the front headboard portion 412 allows the user to reach under the door to move it from a first position to a second position, as described below.

The headboard top 600 may be attached to the headboard 400 once the rigid planar sheet 426 and the shelf door 500 are in the position described above. Referring to Fig. 17, the headboard top 600 is oriented such that the headboard top wall 616 abuts the first horizontal contact surface 526 on the shelf door 500, proximal the intersection between the first and second front headboard wall surfaces 436, 438 and the first and second superior headboard wall surfaces 432, 434. The headboard top 600 is lowered onto the headboard 400 such that the first and second headboard top protuberances 606, 608, integrally affixed to the inferior headboard top surface 604, mate with the first and second headboard apertures 452, 454, residing on the first and second superior headboard wall surfaces 432, 434, respectively. Additional fastening means, such as screws, may be used to further strengthen the connection points between the headboard 400 and the headboard top 600.

In the preferred embodiment, the protuberances and apertures are sized to permit stacking of only some components into preselected other components. Since the sizes of the apertures and protuberances are different on components which are

not intended to be stacked on each other, the stacking of components in unintended configurations is prevented. Although the system of protuberances and apertures described above are sized to fit only within the predetermined components, any or all of the footer 100, the footer top 200, the base 300, the headboard 400 and the headboard top 600 may all incorporate identically sized apertures and protuberances for ease of manufacture and versatility to permit a greater range of configurations.

The inferior headboard top surface 604 provides a ceiling for the first and second channel portions 456, 458, allowing the first and second posts 510, 512 on the shelf door 500 to travel in only one, linear direction, as shown in detail in Fig. 18. When moving the shelf door 500 from the first position to the second position, the first and second posts 510, 512 travel along the partially enclosed ridge defined by the first and second channel portions 456, 458 and the inferior headboard top surface 604. As the first and second posts 510, 512 travel along the first and second channel portions 456, 458, traversing from the first and second front headboard wall surfaces 436, 438 towards the first and second rear headboard wall surfaces 440, 442, the first rear contact surface 516 of the first door edge 502 slidingly makes contact with first top interior side wall surface 472 on the first interior wall portion 460. Likewise, the second rear contact surface 518 of the second door edge 504 slidingly makes contact with the second top interior wall surface 474 on the second interior wall portion 462. The shelf door 500 is retained in the second position (the open position) by resting the first and second rear contact surfaces 516, 522 on the first and second top interior wall surfaces 472, 474, which effectively serve as supports for the shelf door 500. Thus in the preferred embodiment, this storage area is thus enclosed from the top, sides, and rear and further by a movable door that fully encloses the storage area. However, the storage area may take other shapes, and the movable door may be omitted.

First and second guard rails 800, 802 are provided to inhibit the occupant from inadvertently rolling out of the bed. For purposes of brevity, only attachment

of the second guard rail 802 is described, as both the first and second guard rails 800, 802 are attached in identical fashion. Referring to Figs. 10, 20A and 20B, the second guard rail 802 is attached as follows. The second guard rail hook 820, which is integrally affixed to the upper aspects of the fourth guard rail edge 816, is inserted into the second hook hole 450, residing in the second front headboard wall surface 438. The geometry of the second guard rail hook 820 requires the second guard rail 802 to be positioned in a first orientation during insertion. As shown in detail in Fig. 19A, the first orientation is such that the second guard rail hole 818, located near the rear aspects of the third guard rail edge 814, lies above the second guard rail hook 820 in relation to the plane defined by the first and second side rails 702, 704. With the second guard rail hook 820 inserted into the second hook hole 450, the second guard rail 802 is pivoted to a second orientation, forcing the second tab 822 into the gap defined by the space between the second side rail 704 and the second inferior headboard wall surface 430. The second guard rail 802 is further secured by releasably coupling the second guard rail 802 to the second side rail 704. This is accomplished by providing a screw or similar element through the second guard rail hole 818, wherein the screw mates with a hole in the second side rail 704 proximate the position where the second guard rail hole abuts the second side rail 704.

The third embodiment, arranged in a bed configuration 50 will now be described in detail. The bed configuration 50 utilizes a footboard 101, a frame 701 and a head support 401. Referring to Fig. 26, the first and second support rails 703, 705 are placed within the first and second support rail receiving slots 117, 119, located on the inferior footboard surface 105. The first support rail end 707 of the first support rail 703 is placed within the first support rail receiving slot 117. Likewise, the third support rail end 711 of the second support rail 705 is placed within the second side rail receiving slot 119. The first and second support rails 703, 705 are held within the first and second side rail receiving slots 117, 119 by conventional means, such as screws. Because the first and second footboard notches

133, 135 lie in the same parallel plane as the first and second rail receiving slots 117, 119, and thus lie in the same parallel plane as the first and second side rails 703, 705, the distance between the first and second support rails 107, 109 and the superior footboard surface 103 is reduced, facilitating the insertion of screws to secure the first and second support rails 107, 109 to the footboard 101. Pre-drilled holes on the first and second side rails 703, 705 at predetermined locations facilitates the connection to the footboard 101. To complete the support network, the first and second support rails 703, 705 are placed within the first and second rail receiving notches 433, 459, which reside on the first and second inferior head support wall surfaces 411, 437, respectively. The second support rail end 709 of the first support rail 703 is placed within the first rail receiving notch 433. In like fashion, the fourth support rail end 713 of the second support rail 705 is placed within the second rail receiving notch 459. The first and second support rails 703, 705 are held within the first and second rail receiving notches 433, 459 by inserting conventional screws through the head support wall holes 427, 453. Because the first and second indentions 425, 451 lie in the same parallel plane as the first and second rail receiving notches 433, 459, and thus lie in the same parallel plane as the first and second side rails 703, 705, the head support wall holes 427, 453 provide for direct contact with the first and second support rails 703, 705. Pre-drilled holes on the first and second side rails 703, 705 at predetermined locations where the head support wall holes 427, 453 provide direct contact with the first and second support rails 703, 705 facilitates the connection. The valley portion 407 is connected to the first head support wall 403 by mating the first and second sliding hooks 467, 469, residing on the first valley edge 461, with the first and second sliding hook holes 429, 431. In a like manner, the valley portion 407 is connected to the second head support wall 405 by mating the third and fourth sliding hooks 471, 473, residing on the second valley edge 463, with the third and fourth sliding hook holes 455, 457. In this configuration, the superior valley surface 481 serves as a storage/support area.

3. Three-Tier Bookshelf Configuration

The first and second embodiments can be arranged in a three-tier bookshelf configuration 20, which will now be described in detail. As shown in Fig. 21, this configuration utilizes the headboard 400, the rigid planar sheet 426, the shelf door 800, the headboard top 600, the base 300 and the footer 100. The footer 100, which is firmly placed on a level surface, serves as the first tier in the three-tier bookshelf configuration 20.

The base 300 serves as the second tier of the three-tier bookshelf configuration 20. The base 300, which is releasably attached to the footer 100, is oriented over the footer 100 such that the first footer protuberance 136, which resides on the first superior footer wall surface 120, mates with the second base aperture 342, located on the second inferior base wall surface 322. Accordingly, the second footer protuberance 138, which resides on the second superior footer wall surface 122, mates with the first base aperture 340, located on the first inferior base wall surface 320. Additional fastening means, such as screws, may be used to further strengthen the connection points between the footer 400 and the base 300.

The headboard 400 serves as the third tier in the three-tier bookshelf configuration 20. The headboard 400, which is releasably attached to the base 300, is oriented over the top of the base 300 such that the first base protuberance 344, residing on the first superior base wall surface 324, mates with the third headboard aperture 478, located on the first inferior headboard wall surface 428. Accordingly, the second base protuberance 346, residing on the second superior base wall surface 326, mates with the fourth headboard aperture 478, located on the second inferior headboard wall surface 430. Additional fastening means, such as screws, may be used to further strengthen the connection points between the headboard 400 and the base 300.

To complete the three-tier bookshelf configuration 20, the shelf door 500, the rigid planar sheet 426 and the headboard top 600 may be integrated with the

headboard 400. Although the headboard may be utilized as a storage area, the shelf door 500 and the rigid planar sheet 426 need not be attached in this configuration. If an enclosed storage area is desired, attaching the shelf door 500 and the rigid planar sheet 426 may be accomplished in the same fashion as in the bed configuration 10. Referring back to Figs. 15 and 16A, the rigid planar sheet 426 is inserted into the groove 422, which is located along the rear headboard portion 414 and spans the distance between the first and second headboard walls 402, 404. The rigid planar sheet 426 describes the space between the first and second headboard walls 402, 404 and the headboard center portion 406. The rigid planar sheet 426 is secured in an upright position, in part, by the four rigid plate retaining notches 424 (not shown) nested equidistant from each other within the groove 422.

The shelf door 500, which is movable between a first and a second position, is positioned such that the first and second posts 510, 512, located on the first and second door edges 502, 504, respectively, rest within the first and second channel portions 456, 458. In a first door position, shown in Fig. 21, the first and second posts 510, 512 rest within their corresponding channel portions 456, 458, such that the first and second posts 510, 512 are abutting the rear aspects of the first and second front headboard wall surfaces 436, 438. The first rear contact surface 516 on the first door edge 502 lies in contact with the first front interior wall surface 464 on the first interior wall portion 460. In a like manner, the second rear contact surface 522 lies in contact with the second front interior wall surface 466 on the second interior wall portion 462. Completing the description of the first door position, the fourth door edge 508 rests along the front headboard portion 412 located on the superior headboard surface 408 of the headboard center portion 406. The finger cavity 420 located on the front headboard portion 412 allows the user to reach under the door to move it from a first position to a second position, as described below.

The headboard top 600 may be attached once the rigid planar sheet 426 and the shelf door 500 are in the position described above. The headboard top 600,

which is releasably attachable to the headboard 400, is oriented such that the first and second headboard top protuberances 606, 608, integrally affixed to the inferior headboard top surface 604, mate with the first and second headboard apertures 452, 454, residing on the first and second superior headboard wall surfaces 432, 434. As shown in Fig. 21, additional fastening means, such as screws, may be used to further strengthen the connection points between both the headboard 400 and the headboard top 300 and the base 300 and the footer 100.

The inferior headboard top surface 604 provides a ceiling for the first and second channel portions 456, 458, allowing the first and second posts 510, 512 on the shelf door 500 to travel in only one, linear direction. When moving the shelf door 500 from the first position to the second position, the first and second posts 510, 512 travel along the partially enclosed ridge defined by the first and second channel portions 456, 458 and the inferior headboard top surface 604. As the first and second posts 510, 512 travel along the first and second channel portions 456, 458, traversing from the first and second front headboard wall surfaces 436, 438 towards the first and second rear headboard wall surfaces 410, 442, the first rear contact surface 516 of the first door edge 502 slidingly makes contact with the first top interior wall surface 472 on the first interior wall portion 460. Likewise, the second rear contact surface 518 of the second door edge 504 slidingly makes contact with the second top interior wall surface 474 on the second interior wall portion 462. The shelf door 500 is retained in the second position (the open position) by resting the first and second rear contact surfaces 516, 522 on the first and second top interior side wall surfaces 472, 474, which effectively serve as supports for the shelf door 500.

The first and second hook holes 448, 450, which have no utility in the three-tier bookshelf configuration, are concealed by conventional means, such as by first and second plugs 480, 482.

4. Two-Tier Bookshelf Configuration With Toddler Bench

The first and second embodiments which can be arranged in a two-tier bookshelf configuration 30 with a toddler bench 40, will now be described in detail. As shown in Figs. 22 and 23, this configuration utilizes the headboard 400, the rigid planar sheet 426, the shelf door 500, the headboard top 600, the base 300, the footer top 200 and the footer 100. The footer 100, which is firmly placed on a level surface, serves as the support structure for the toddler bench 40. Referring to Fig. 22, the footer top 200 serves as the sitting surface for a toddler. The footer top 200, which is releasably attachable to the footer 100, is oriented over the top of the footer 100 such that the first and second footer protuberances 136, 138, integrally affixed to the first and second superior footer wall surfaces 120, 122, mate with the first and second front bench apertures 210, 212, residing on the inferior footer top surface 204. Simultaneously, the first and second footer top protuberances 206, 208, integrally affixed to the inferior footer top surface 204, mate with the first and second side rail receiving portions 132, 134. The first and second footer top protuberances 206, 208 are sized lengthwise so that they do not completely describe the space defined by the first and second side rail receiving portions 132, 134, leaving a gap, as shown by cross-sectional view in Fig. 21. Additional fastening means, such as screws, may be used to further strengthen the connection points between the footer 100 and the footer top 200.

The two-tier bookshelf 30 utilizes the base 300, the headboard 400, the rigid planar sheet 426, the shelf door 500 and the headboard top 600. The base 300 serves as the first tier, whereas the headboard 400 serves as the second tier in the two-tier bookshelf configuration 30. The base 300 is free-standing and can support the headboard 400 when stacked thereon. Alternatively, the base 300 can be utilized alone. Referring to Fig. 24, the headboard 400, which is releasably attached to the base 300, is oriented such that the first base protuberance 344, residing on the first superior base wall surface 324, mates with the third headboard aperture 476, located

on the first inferior headboard wall surface 428. Accordingly, the second base protuberance 346, residing on the second superior base wall surface 326, mates with the fourth headboard aperture 478, located on the second inferior headboard wall surface 430. Additional fastening means, such as screws, may be used to further strengthen the connection points between the headboard 400 and the base 300.

To complete the two-tier bookshelf configuration, the shelf door 500, the rigid planar sheet 426 and the headboard top 600 are integrated with the headboard 400. This is accomplished in the same fashion as both the bed configuration 10 and the three-tier bookshelf configuration 20. Referring back to Figs. 15 and 16, the rigid planar sheet 426 is inserted into the groove 422, which is located along the rear headboard portion 414 and spans the distance between the first and second headboard walls 402, 404. The rigid planar sheet 426 blocks the space between the first and second headboard walls 402, 404 and the headboard center portion 406. The rigid planar sheet 426 is secured in an upright position, in part, by the four rigid plate retaining notches 424 (not shown) nested equidistant from each other within the groove 422.

The shelf door 500, which is movable between a first and a second position, is positioned such that the first and second posts 510, 512, located on the first and second door edges 502, 504 respectively, rest within the first and second channel portions 456, 458. In a first door position, shown in Fig. 24, the first and second posts 510, 512 rest within their corresponding channel portions 456, 458 such that the first and second posts 510, 512 are abutting the rear aspects of the first and second front headboard wall surfaces 436, 438. The first rear contact surface 516 on the first door edge 502 lies in contact with the first front interior wall surface 464 on the first interior side wall portion 460. In a like manner, the second rear contact surface 522 lies in contact with the second front interior wall surface 466 on the second interior wall portion 462. Completing the description of the first door position, the fourth door edge 508 rests along the front headboard portion 412 located on the superior

headboard surface 408 of the headboard center portion 406. The finger cavity 420 located on the front headboard portion 412 allows the user to reach under the door to move it from a first position to a second position, as described below.

The headboard top 600 may be attached once the rigid planar sheet 426 and the shelf door 500 are in the position described above. Referring to Figs. 15 and 17, the headboard top 600, which is releasably attachable to the headboard 400, is oriented such that the first and second headboard top protuberances 606, 608, integrally affixed to the inferior headboard top surface 604, mate with the first and second headboard apertures 452, 454, residing on the first and second superior headboard wall surfaces 432, 434. Additional fastening means, such as screws, may be used to further strengthen the connection points between the headboard 400 and the headboard top 600.

The inferior headboard top surface 604 provides a ceiling for the first and second channel portions 456, 458, allowing the first and second posts 510, 512 on the shelf door 500 to travel in only one, linear direction. When moving the shelf door from the first position to the second position, the first and second posts 510, 512 travel along the completely enclosed slot defined by the first and second channel portions 456, 458 and the inferior headboard top surface 604. As the first and second posts 510, 512 travel along the first and second channel portions 456, 458, traversing from the first and second front headboard wall surfaces 436, 438, towards the first and second rear headboard wall surfaces 440, 442, the first rear contact surface 516 of the first door edge 502 slidingly makes contact with first top interior wall surface 472 on the first interior wall portion 460. Likewise, the second rear contact surface 518 of the second door edge 504 slidingly makes contact with the second top interior wall surface 474 on the second interior wall portion 462. The shelf door 500 is retained in the second position (the open position) by resting the first and second rear contact surfaces 516, 522 on the first and second top interior side wall surfaces 472, 474, which effectively serve as supports for the shelf door 500.

The first and second hook holes 448, 450, which have no utility in the two-tier bookshelf configuration, are concealed by conventional means, such as by first and second plugs 480, 482.

5. Toddler Desk Configuration

The third embodiment can be arranged in a toddler desk configuration 60, which will now be described in detail. As shown in Figures 27 and 28, this configuration utilizes the head support 401 and the footboard 101. The first head support wall 403 is releasably connected to the valley portion 407 by mating the third and fourth sliding hooks 467, 469, residing on the first valley edge 461, with the third and fourth sliding hook holes 455, 457, which span the distance between the second inferior head support wall surface 411 and the second superior head support wall 409. In a like manner, the second head support wall 405 is secured to the valley portion 407 by mating the first and second sliding hooks 471, 473, residing on the second valley edge 463, with third and fourth sliding hook holes 429, 431, which span the distance between the first inferior head support wall 437 and the first superior head support wall 435. In this configuration, the inferior valley surface 483 serves as a storage area (as opposed to the superior valley surface 481 in the bed configuration 50).

The footboard 101 is attached to the head support 401 as follows. The footboard 101 is attached to the valley portion 407 of the head support 401 such that the first and second footboard apertures 129, 131, residing on the first and second pivoting edges 123, 125, respectively, mate with the first and second protuberances 477, 479, integrally affixed to opposing sides on the hinge 485, as shown in Fig. 26. The connection points between the first and second footboard apertures 129, 131 and the first and second protuberances 477, 479 allow the footboard 101 (which now serves as the desk-top) to pivot from a first position, overlying the interior valley surface 483, shown in Fig. 27, in the direction shown in arrow A, to a second raised position, providing access to the interior valley surface 483. The nine footboard

cut-out portions 115 effectively stiffen the footboard 101 to facilitate its use as a desk top. In the desk configuration 60, the inferior valley surface 483 serves as a storage area. Thus, the footboard 101 functions as a flip-top desk and a flip-top cover for the storage area underneath. As shown by cross-sectional view in Fig. 28, the front valley lip 475 provides for an inclined surface to prevent objects stored within the valley portion 407 from inadvertently sliding out of the plane defined by the inferior valley surface 483. The first and second head support walls 403, 405 serve to enclose the area defined by the inferior footboard surface 105 and the valley portion 407.

6. Other Embodiments

Other components may be used in the invention. For example, any of the components, such as, for example, the footer 100, the headboard 400 or the base 300, may include a toy box forming a storage portion in the first and second embodiments. In the third embodiment the head support 401 may be configured to encompass a toy box, and may have the footboard 101 as a pivoting lid. Also, although in the preferred embodiment the footer 100, footer top 200, base 300, headboard 400, shelf door 500, headboard top 600, footboard 101, and head support 401 are hollow-molded from plastic, these components may of course be manufactured from any suitable materials, such as wood or metal.

What Is Claimed Is:

1. A child's furniture system comprising:

a first support having a first bench portion;

a second support; and

a bed frame for supporting a child,

wherein the system has a first configuration in which said frame spans a distance between said first support and said second support and said frame is arranged for supporting the child, and a second configuration in which said frame is detached from said first support, and said bench portion is arranged for supporting the child.

2. The child's furniture system according to claim 1, wherein said second support comprises a second bench portion; and in the second configuration, said second bench portion is arranged for supporting the child.

3. The child's furniture system according to claim 1, wherein said first support portion comprises a footer and said first bench portion is releasably mountable on said footer to form a seat.

4. The child's furniture system according to claim 3, wherein said first bench portion is releasably stackable on said footer.

5. The child's furniture system according to claim 3, wherein said footer is substantially u-shaped, and said footer comprises a center portion and first and second vertical walls and said first bench portion is mountable on said first and second walls.

6. The child's furniture system according to claim 1, wherein said first support portion further comprises a footer, said footer being substantially u-shaped, having a footer center portion and first and second vertical footer walls, and a said first bench portion is releasably stackable on said footer.

7. A child's furniture system according to claim 1, wherein said first support is comprised of hollow, molded plastic.

8. A child's furniture system comprising:

a first support having a storage portion;

a second support; and

a bed frame for supporting a child,

wherein the system has a first configuration in which said frame spans a distance between said first support and said second support and said frame is arranged for supporting the child and said storage portion is accessible for storing objects, and a second configuration in which said frame is detached from said first support, and said first support is freestanding and said storage portion is accessible for storing objects.

9. The child's furniture system according to claim 8, wherein said second support has a second storage portion, and in the second configuration, said second support is freestanding and said storage portion is accessible for storing objects.

10. The child's furniture system according to claim 9, wherein said first support comprises a base and a headboard releasably mountable on said base, and one of said base and said headboard comprise said storage portion.

11. The child's furniture system according to claim 10, wherein said headboard is releasably stackable on said base.

12. The child's furniture system according to claim 10, wherein said base is substantially u-shaped, having a center base portion and first and second vertical base walls.

13. The child's furniture system according to claim 11, wherein said base is releasably mountable on said first and second walls.

14. A child's furniture system according to claim 8, wherein said first support is comprised of hollow, molded plastic.

15. A child's furniture system comprising:

a first support;

a second support; and

a frame,

wherein the system has a first configuration in which said frame spans a distance between said first support and said second support, and a second configuration in which said first support is freestanding, and said second support is stackable on said first support.

16. A child's furniture system according to claim 15, wherein said first support comprises a bench portion and a footer and said second support comprises a headboard and a base, wherein in the second configuration, said base is stacked on said footer and said headboard is stacked on said base.

17. A child's furniture system comprising:

a first support comprising a footboard/desktop member;

a second support comprising a headboard/support member; and

a frame,

wherein the system has a first configuration in which said frame spans a distance between said first support and said second support to form a bed, and a second configuration in which said frame is detached from said first and said second supports and said footboard/desktop member is detachably mounted to said headboard/support member to form a desk.

18. A child's furniture system according to claim 16 [17], wherein said first support is pivotally attached to said second support in the second configuration.

19. A child's furniture system according to claim 18, wherein said headboard/support member comprises a storage shelf and said footboard/desktop member is pivotable between a first position overlying said storage shelf and a second position where said storage shelf is accessible for storing objects.

20. A child's furniture system according to claim 17, wherein said footboard/desktop member and said headboard/support member are comprised of hollow, molded plastic.

21. A child's furniture system comprising:

a footer having a first surface;

a base having second and third surfaces;

a front bench;

a rear bench;

a headboard having a fourth and fifth surfaces; and

a frame,

said system having a first configuration, in which said frame is releasably secured to said footer and said base and spans the distance therebetween, said front bench is releasably attached to said first surface of said footer, said fifth surface of said headboard is releasably attached to said second surface of said base, and said rear bench is releasably attached to said fourth surface of said headboard;

said system having a second configuration, in which said frame is detached from said first support and said base, said third surface of said base is releasably attached to said first surface of said footer, and said fifth surface of said headboard is releasably attached to said second surface of said base, to form a three-tier storage area;

and said system having a third configuration, in which said front bench is releasably attached to said first surface of said footer to form a seat and said fifth surface of said headboard is releasably attached to said second surface of said base to form a two-tier storage area.

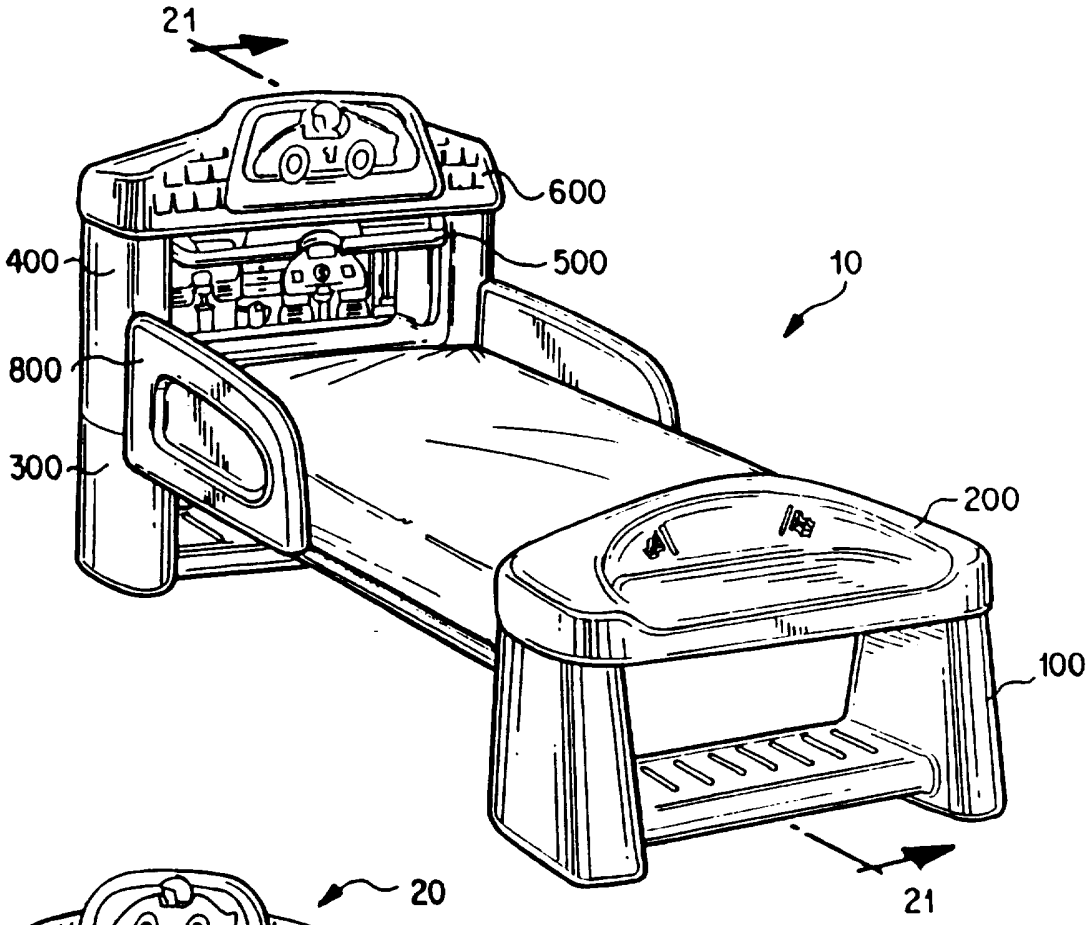


FIG. 1A

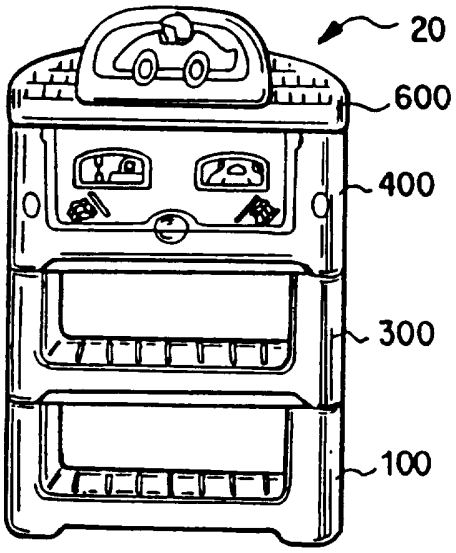


FIG. 1B

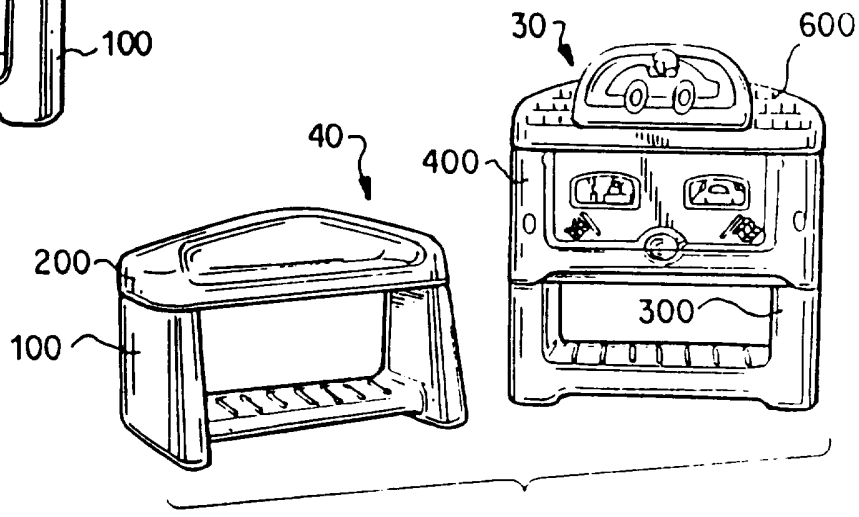


FIG. 1C

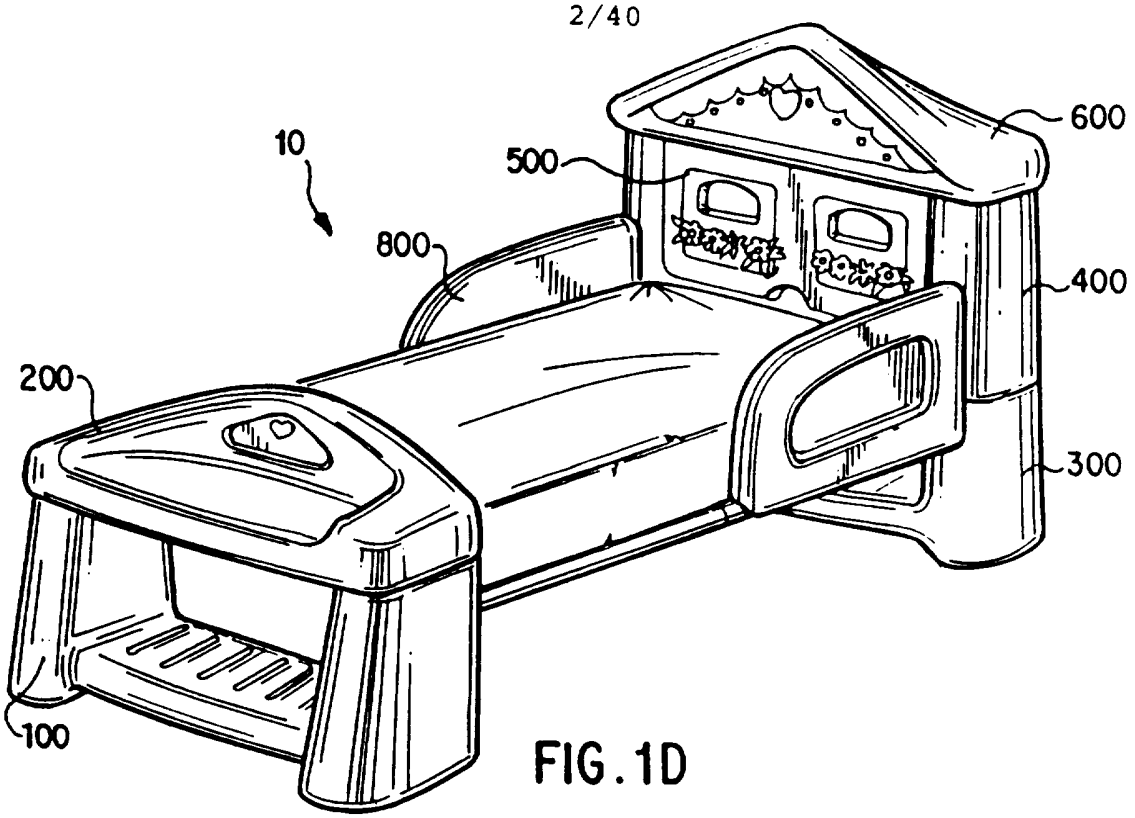


FIG. 1D

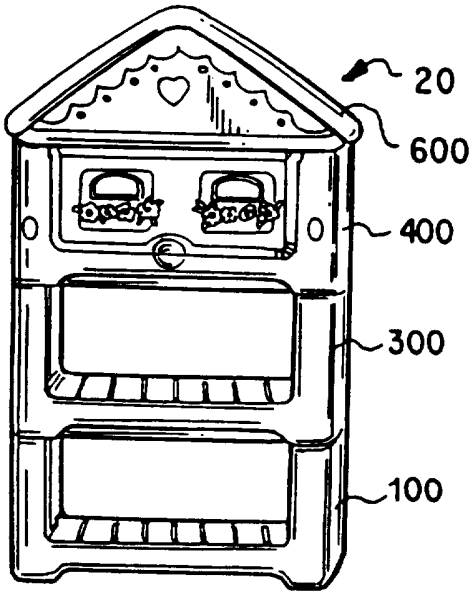


FIG. 1E

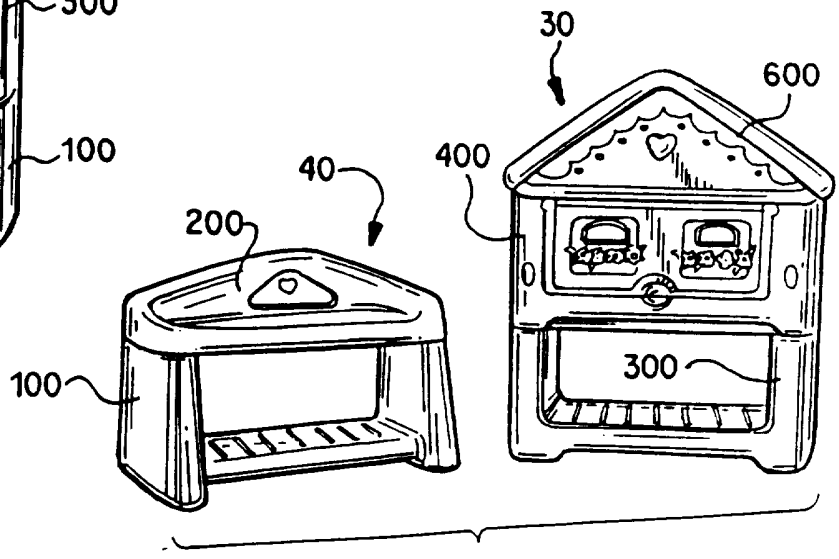


FIG. 1F

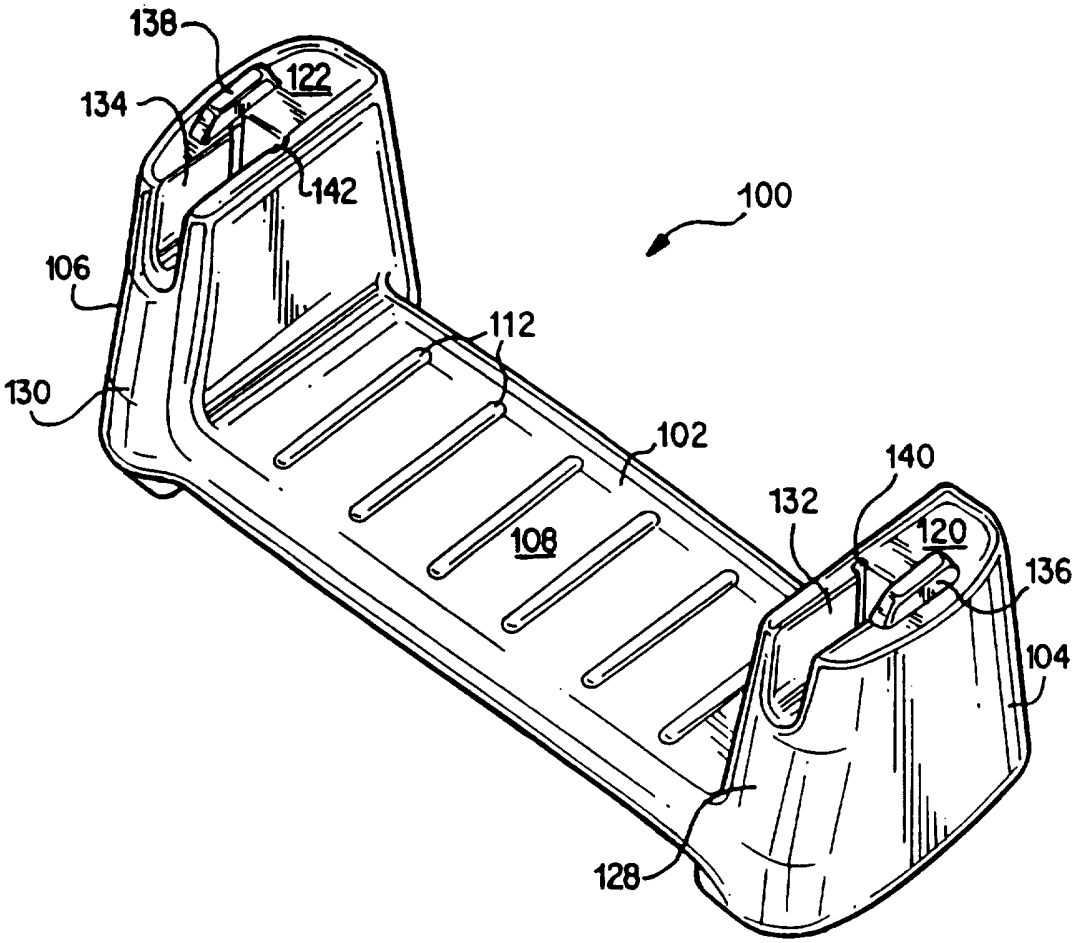


FIG. 2A

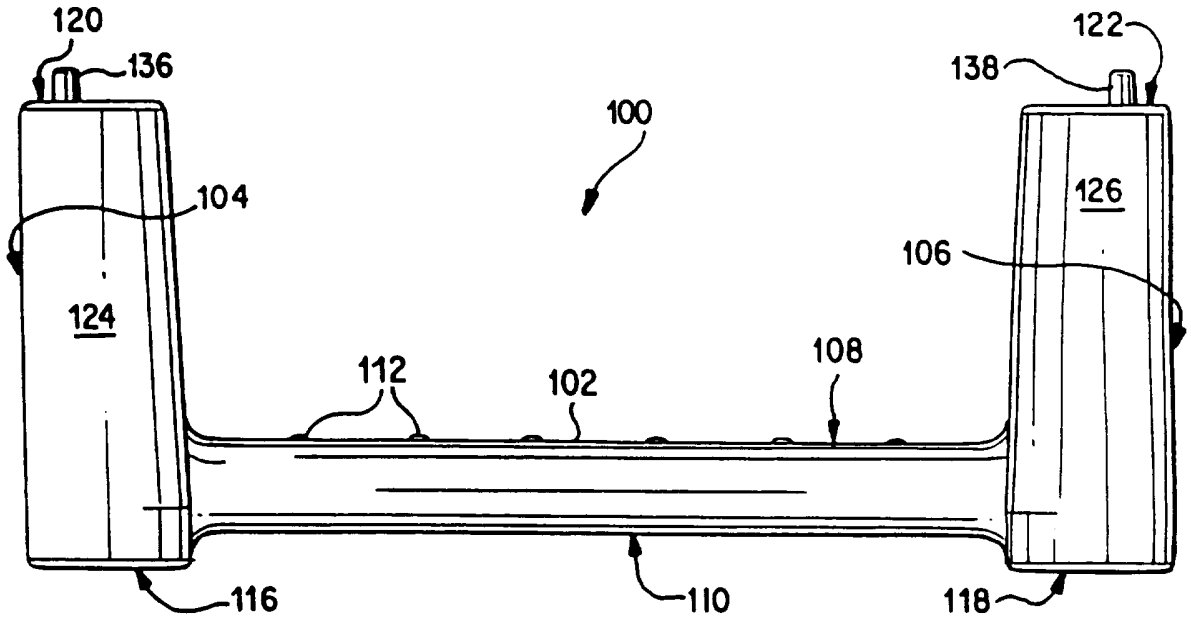

120
136
122
138
100
104
126
106
124
112
102
108
116
110
118

FIG. 2B

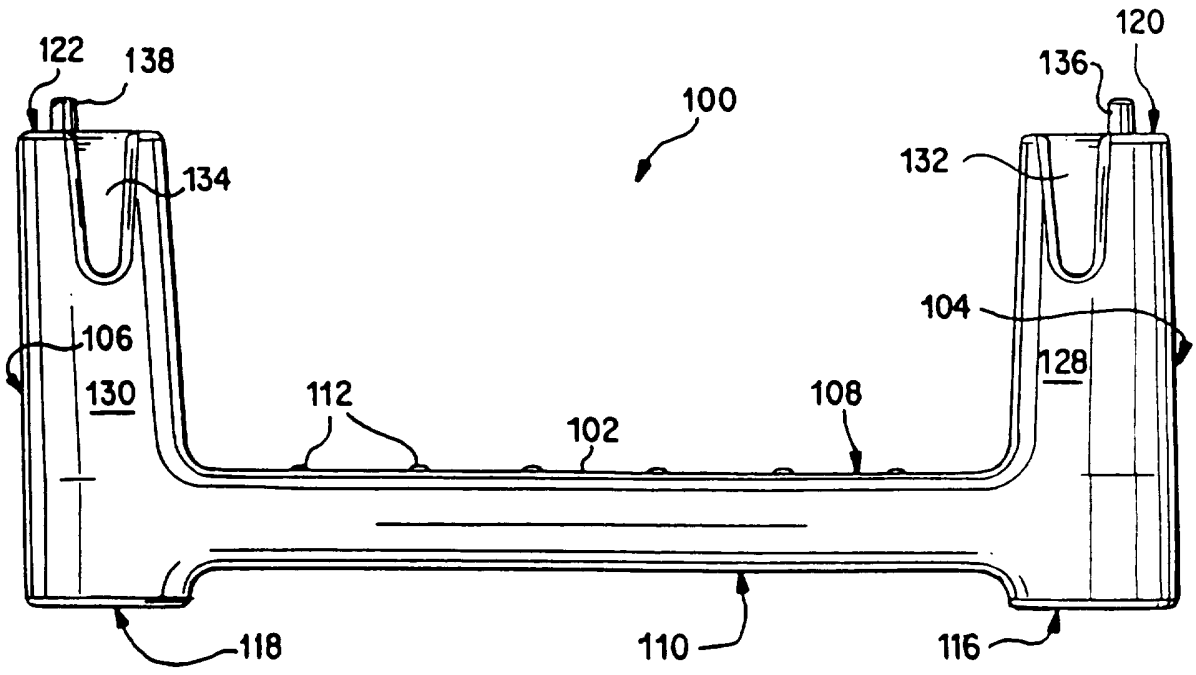

122
138
120
136
100
134
132
104
106
128
130
112
102
108
118
110
116

FIG. 2C

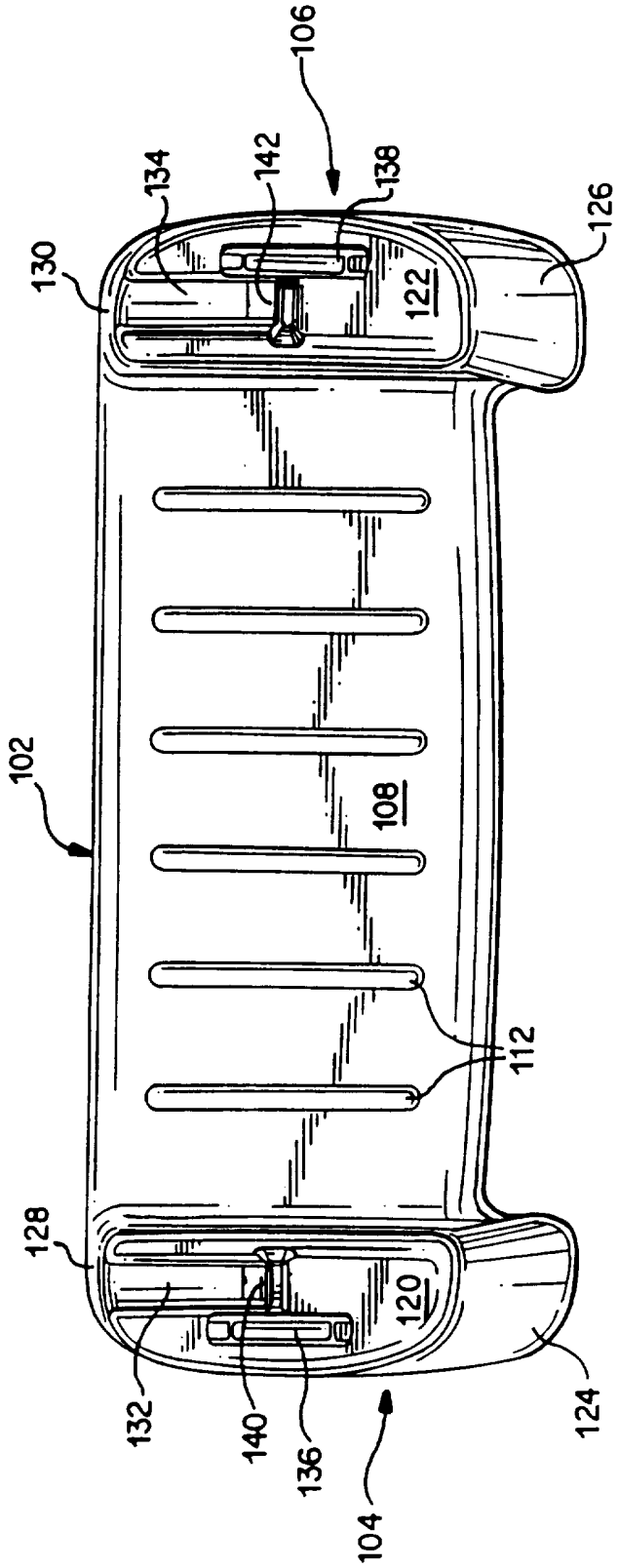

106
134
142
138
126
130
122
102
108
112
128
120
132
140
136
124
104

FIG. 2D

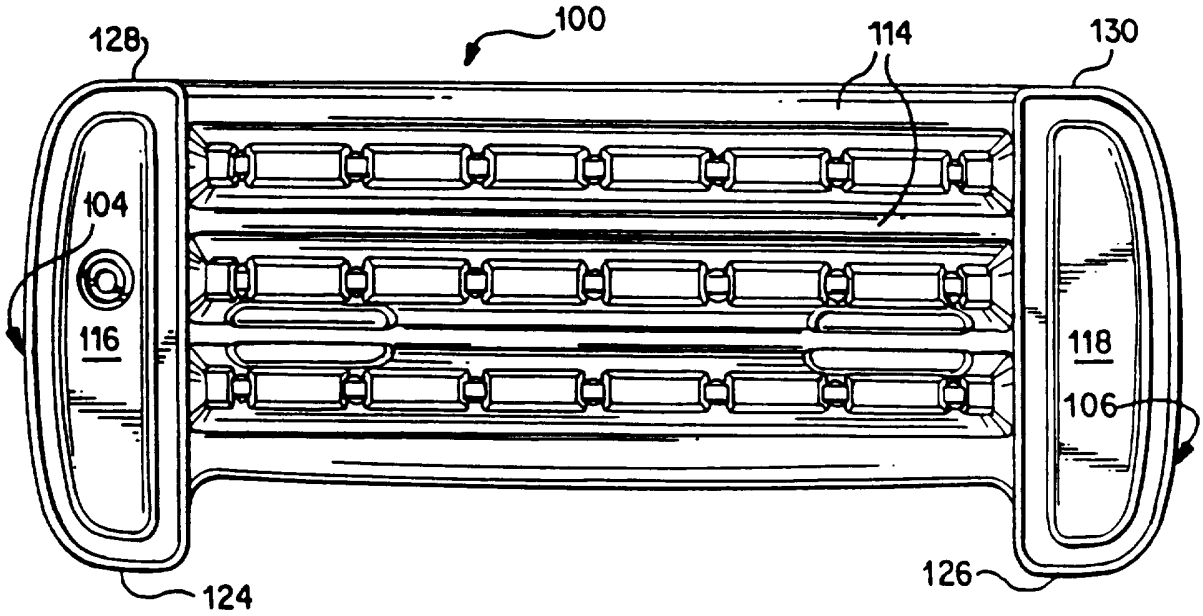

100
128
114
130
104
116
118
106
124
126

FIG. 2E

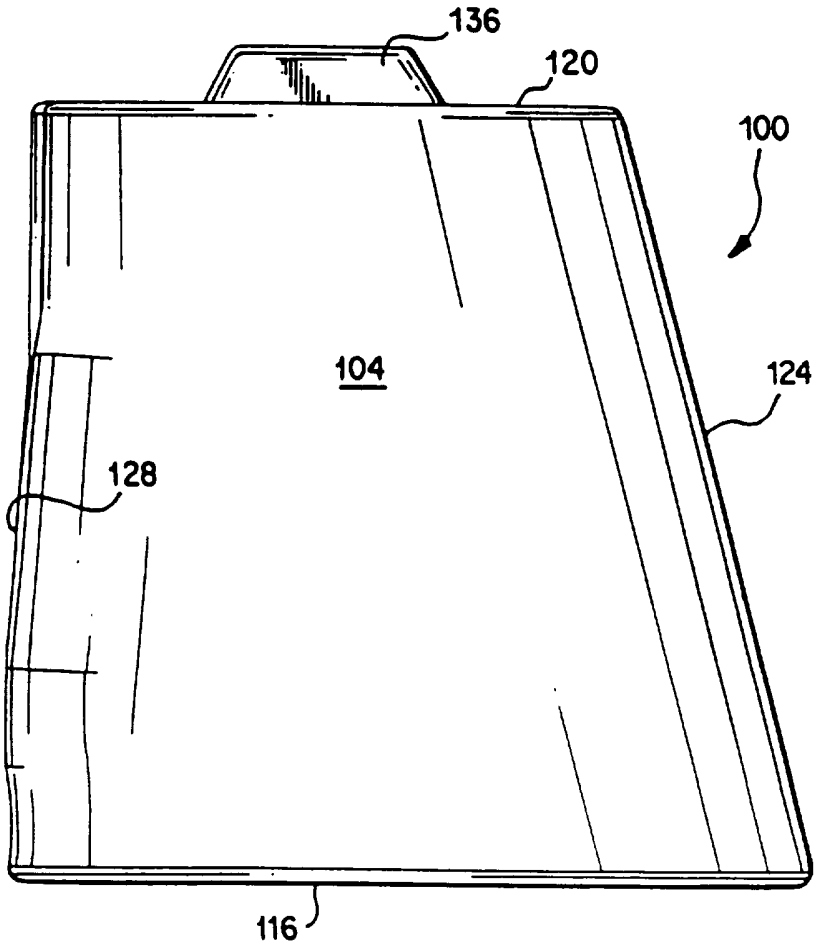

136
120
100
104
124
128
116

FIG. 2F

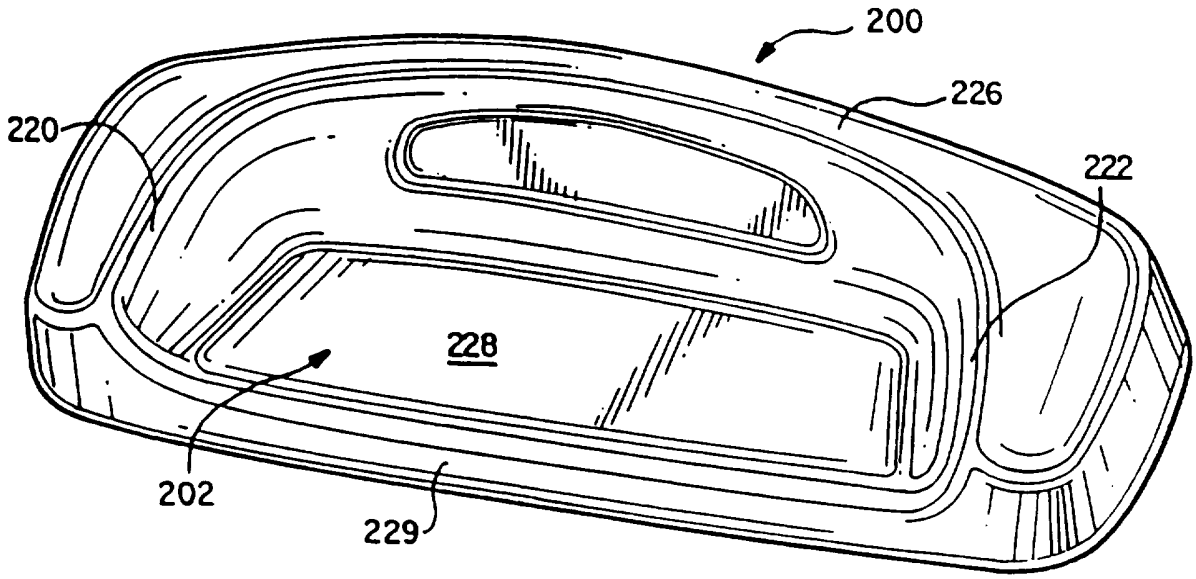


FIG. 3A

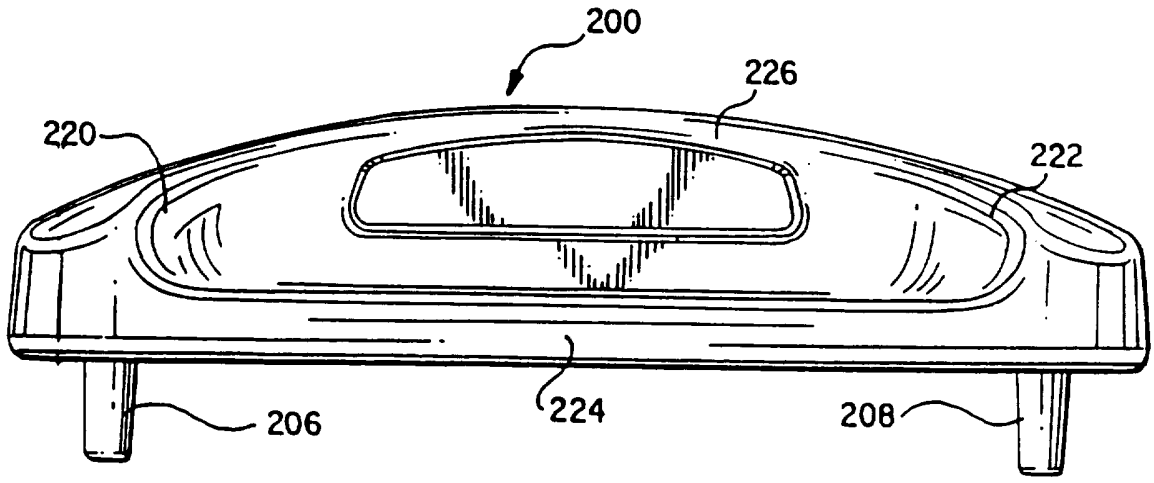


FIG. 3B

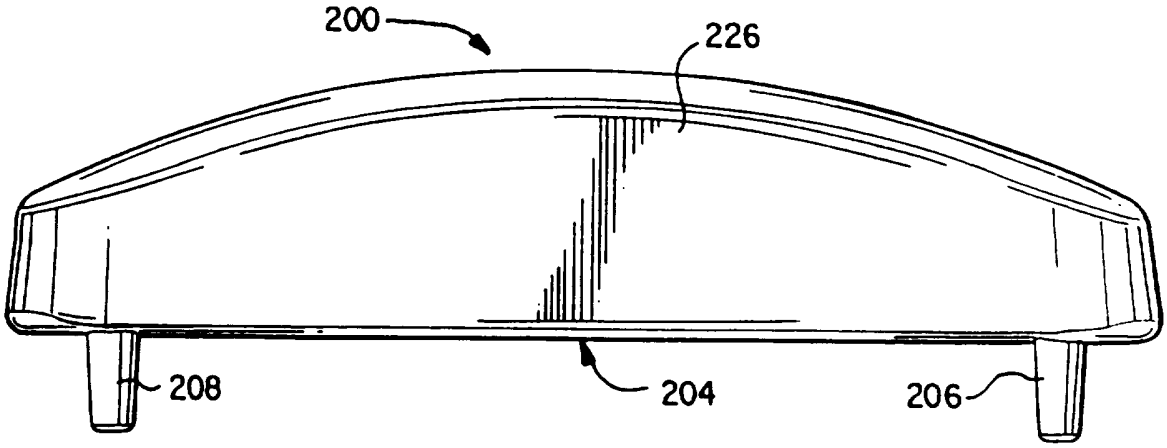


FIG. 3C

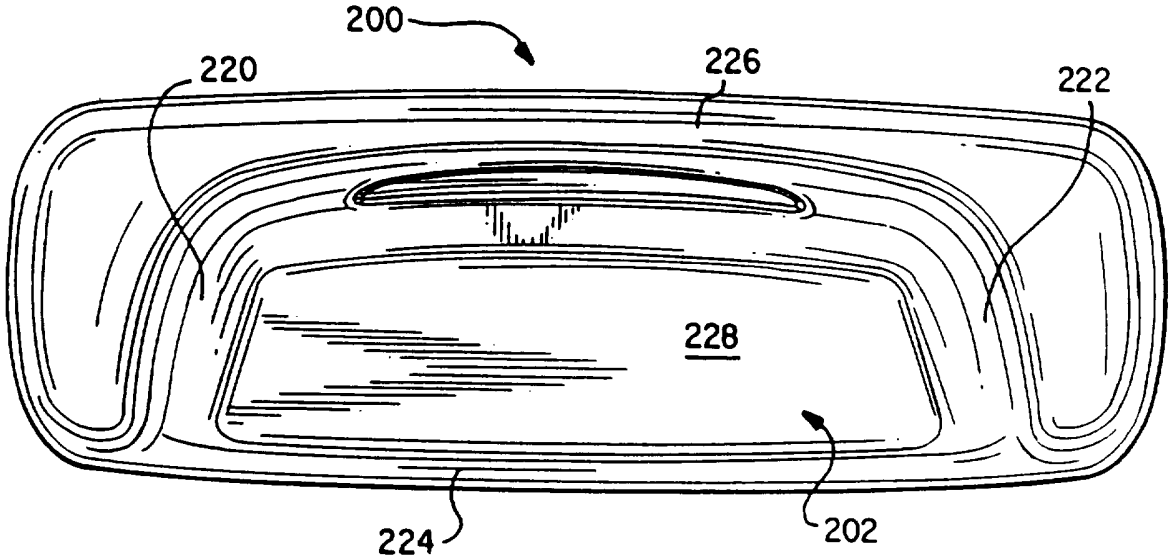


FIG. 3D

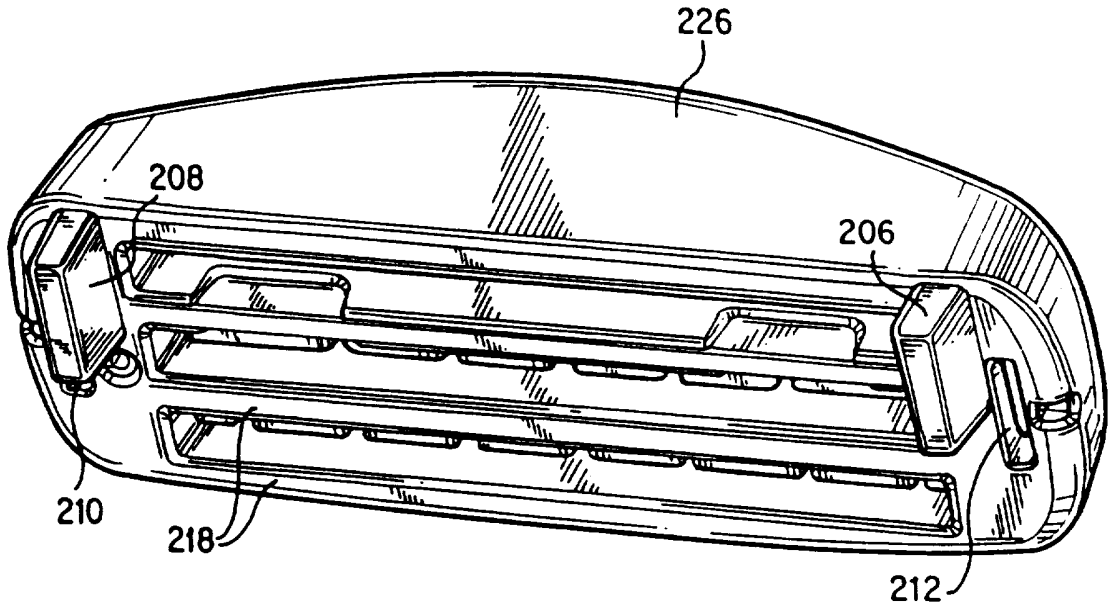


FIG. 3E

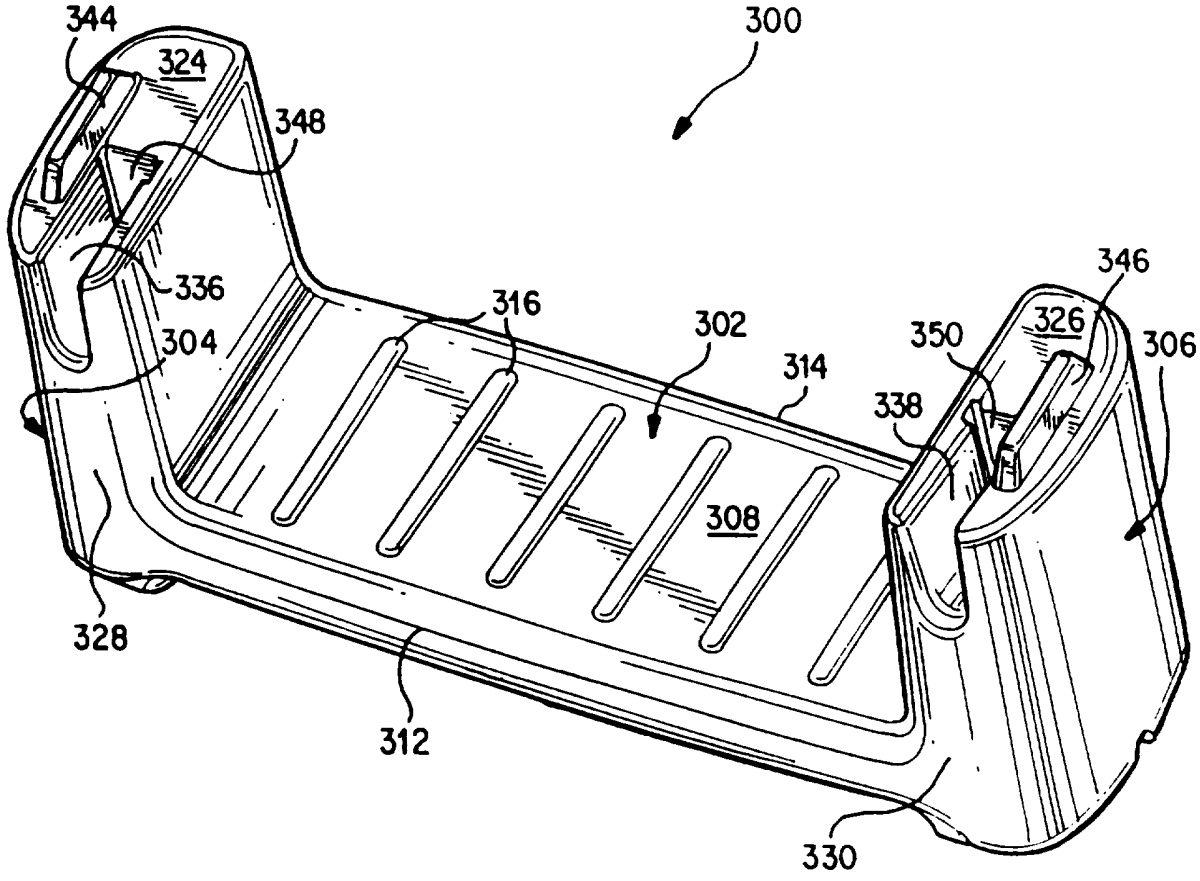

344
324
348
300
336
304
316
302
314
346
326
350
306
338
308
328
312
330

FIG. 4A

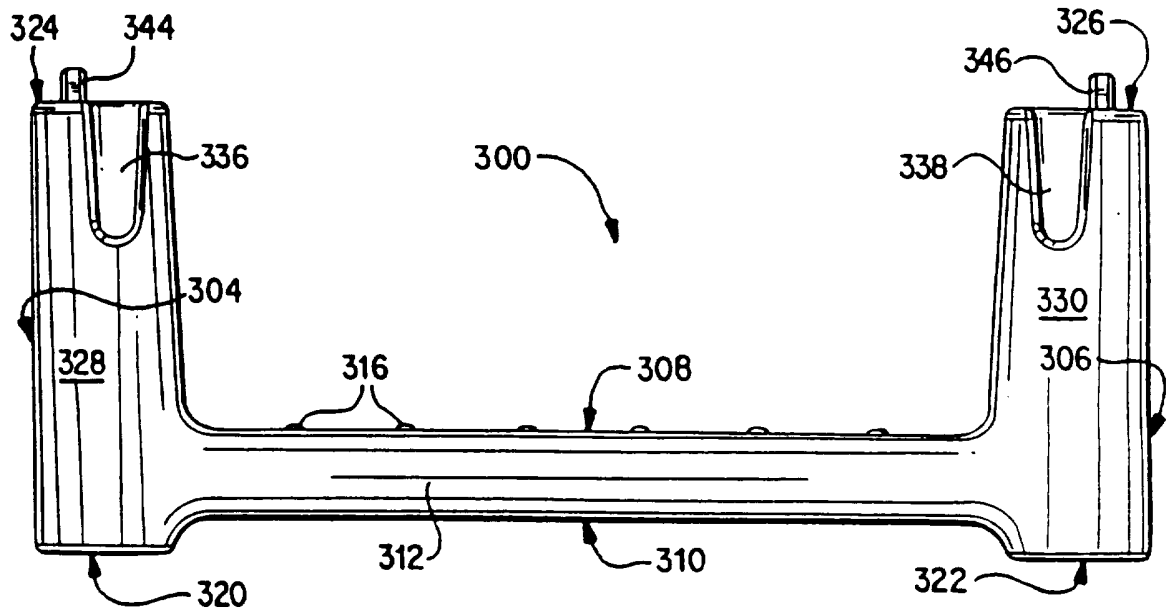

324
344
326
346
336
300
338
304
330
328
316
308
306
312
310
320
322

FIG. 4B

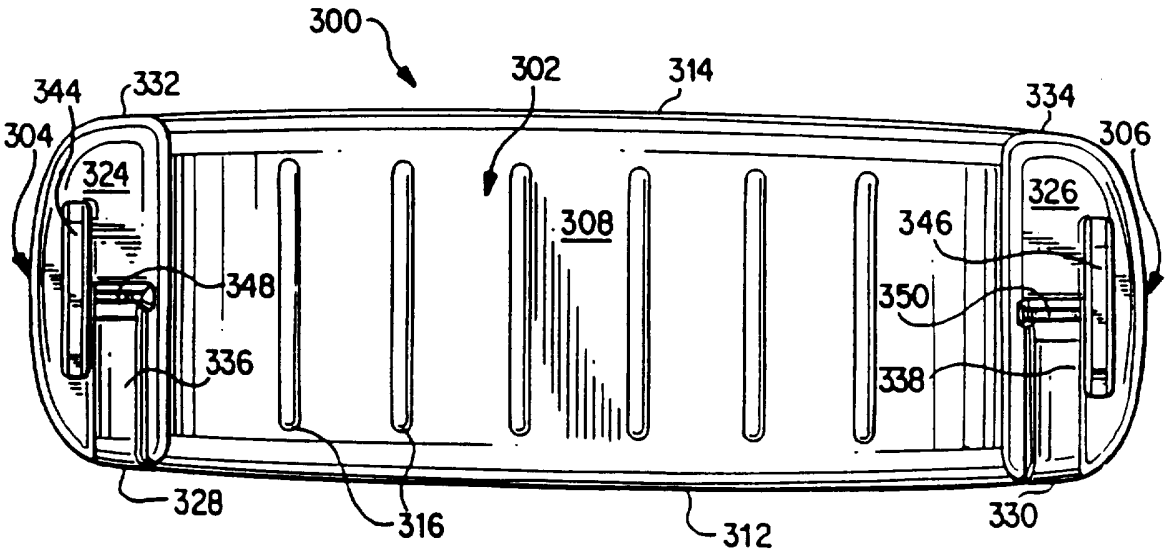

300
344
332
302
314
334
304
306
324
326
308
346
348
350
336
338
328
316
312
330

FIG. 4C

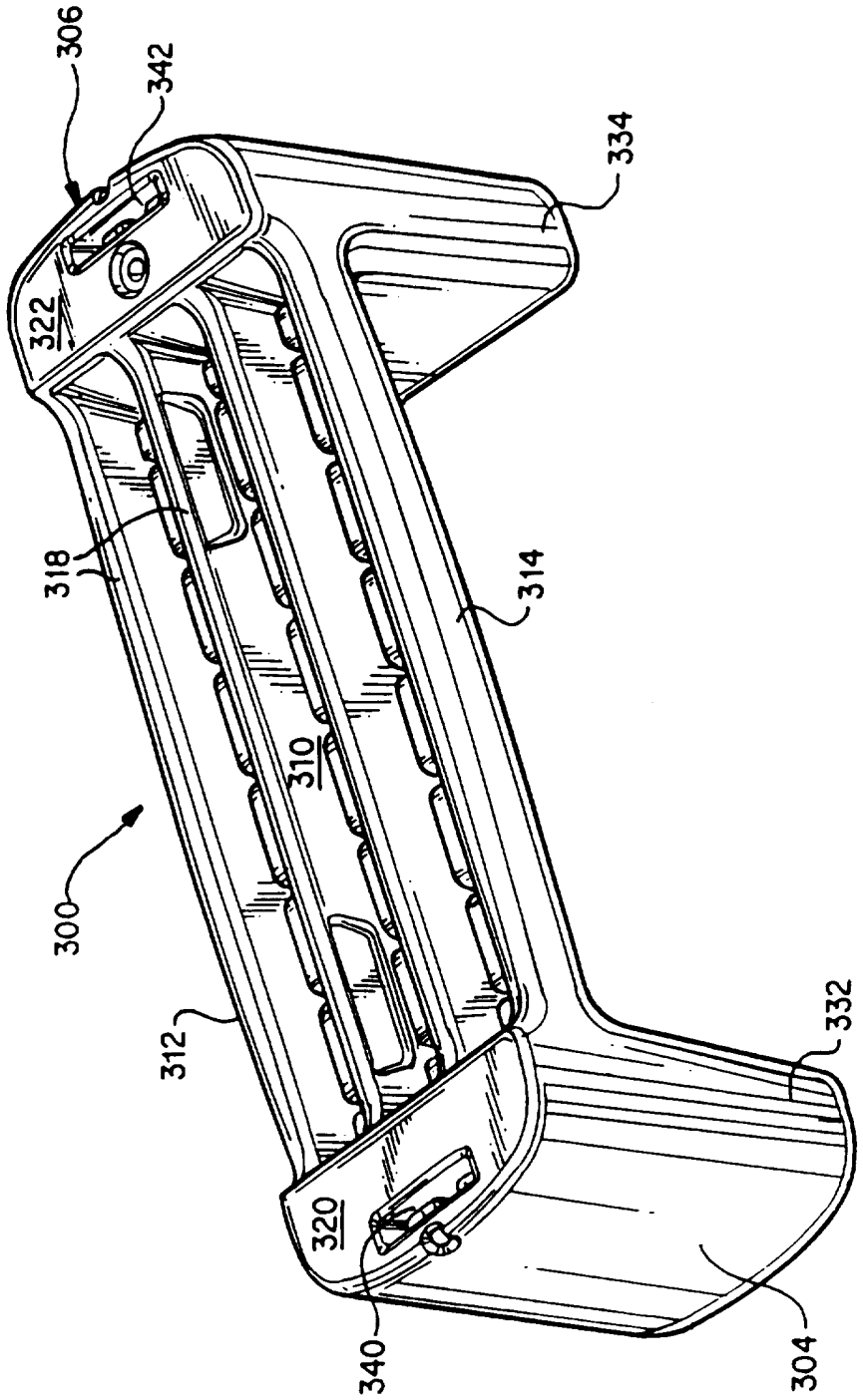


FIG. 4D

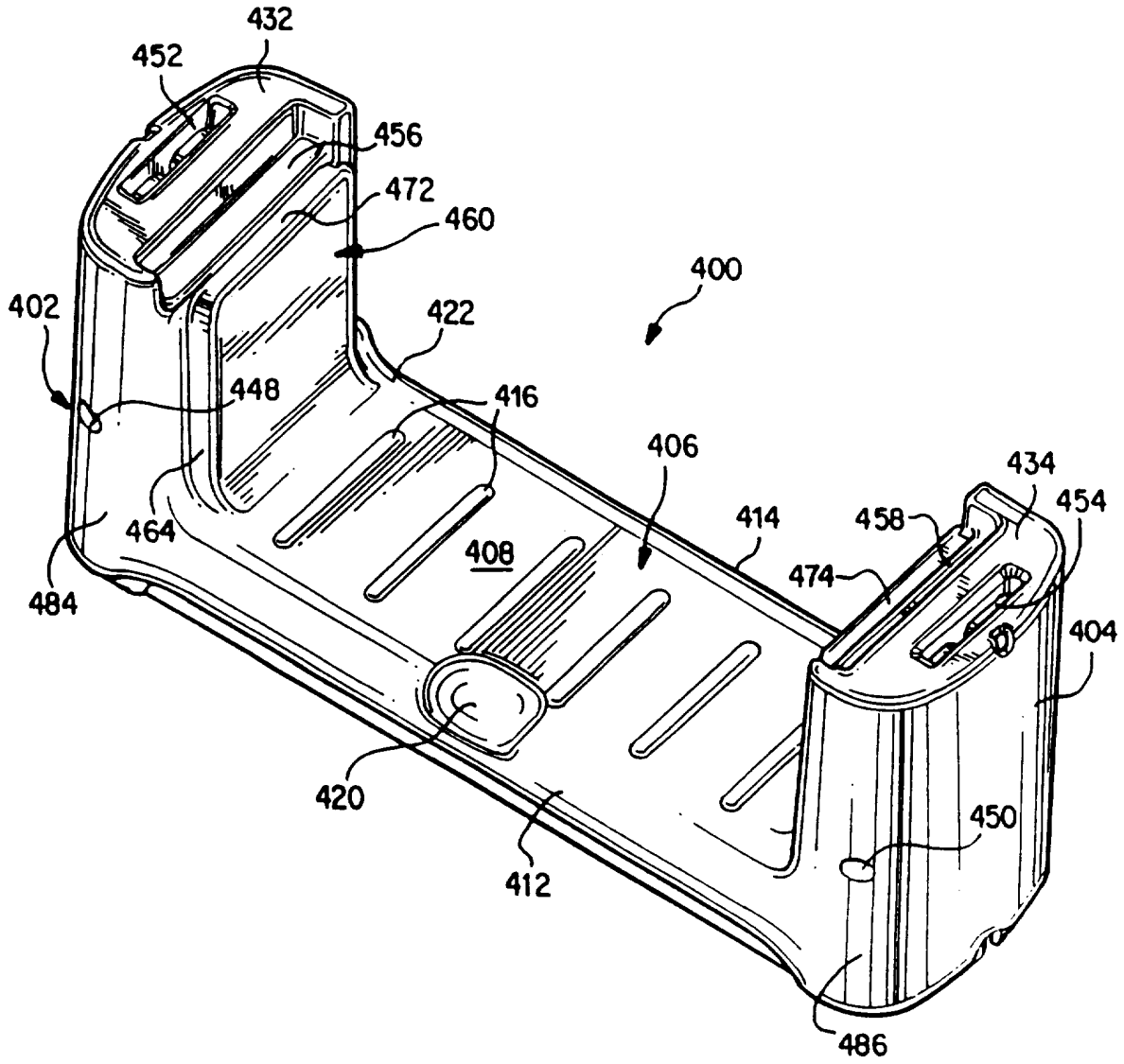

432
452
456
472
460
400
402
422
448
416
406
434
454
458
464
414
408
474
484
404
420
450
412
486

FIG. 5A

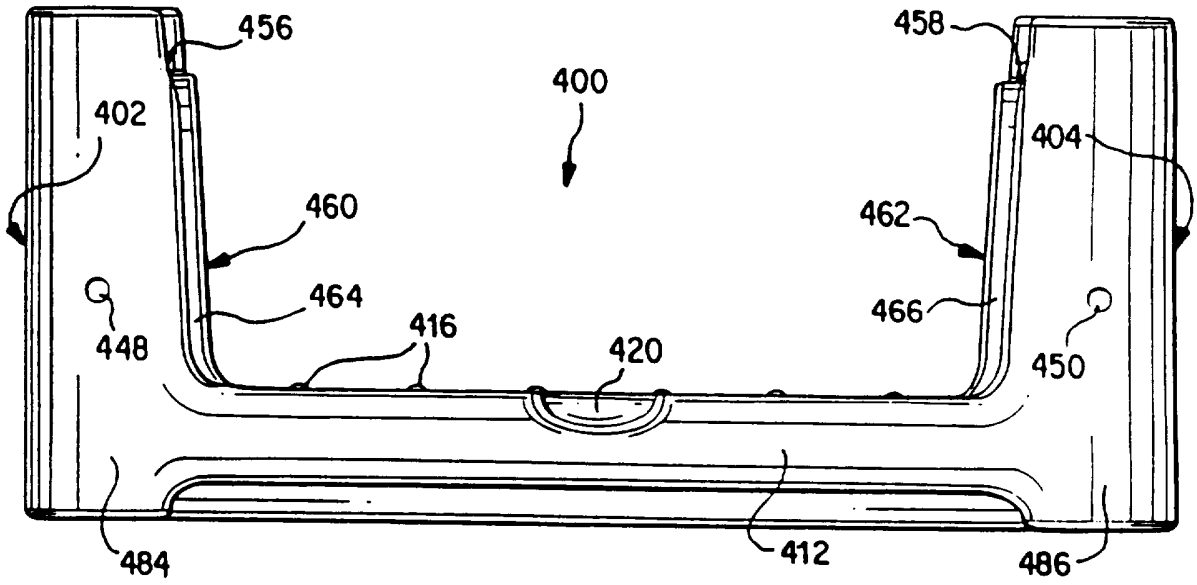

456
458
400
402
404
460
462
464
466
448
416
420
450
484
412
486

FIG. 5B

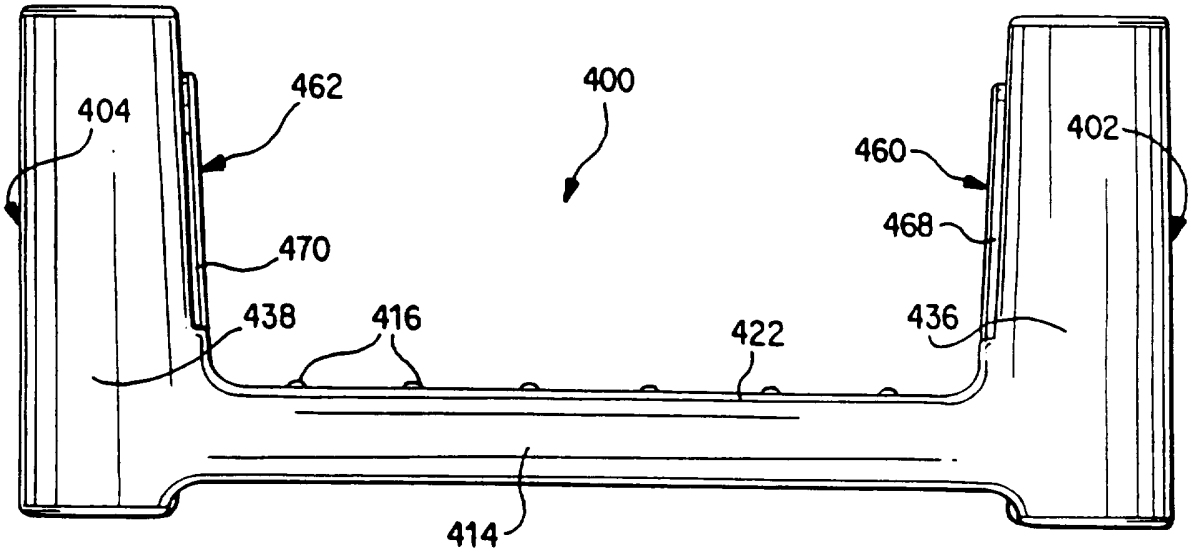

404
462
400
402
460
468
470
438
416
422
436
414

FIG. 5C

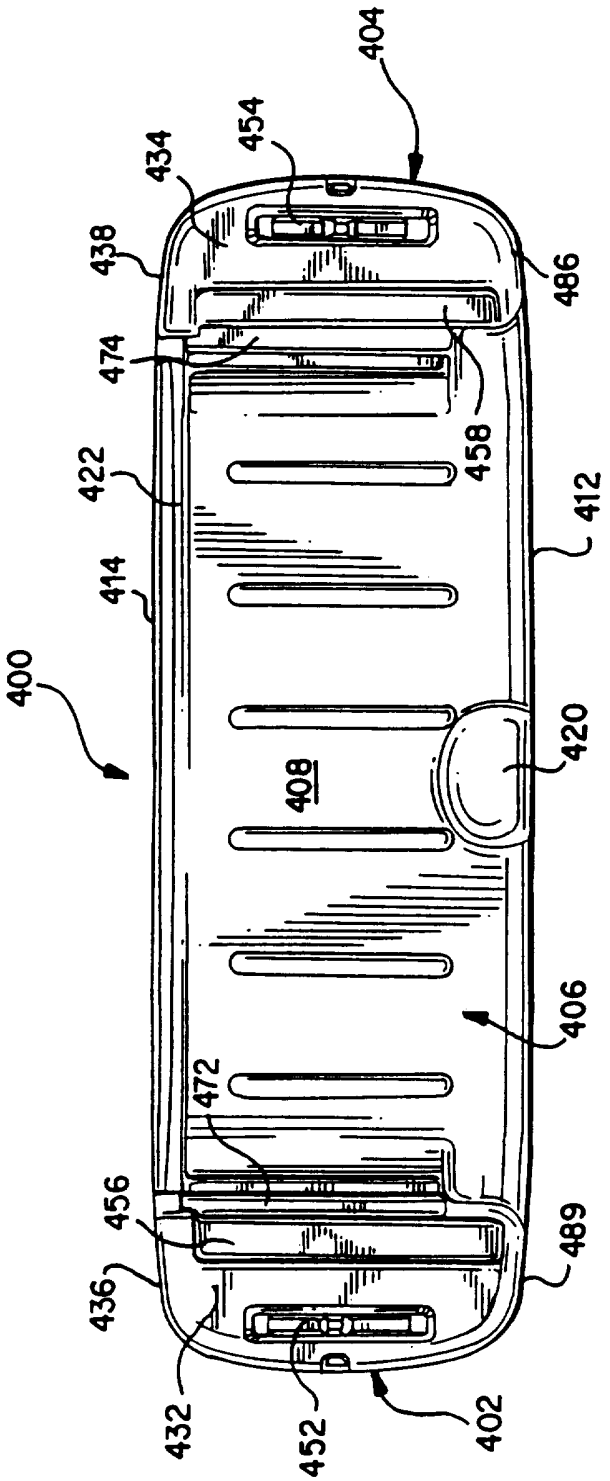

404
454
434
438
486
474
458
422
412
414
400
420
408
406
472
456
489
436
432
452
402

FIG. 5D

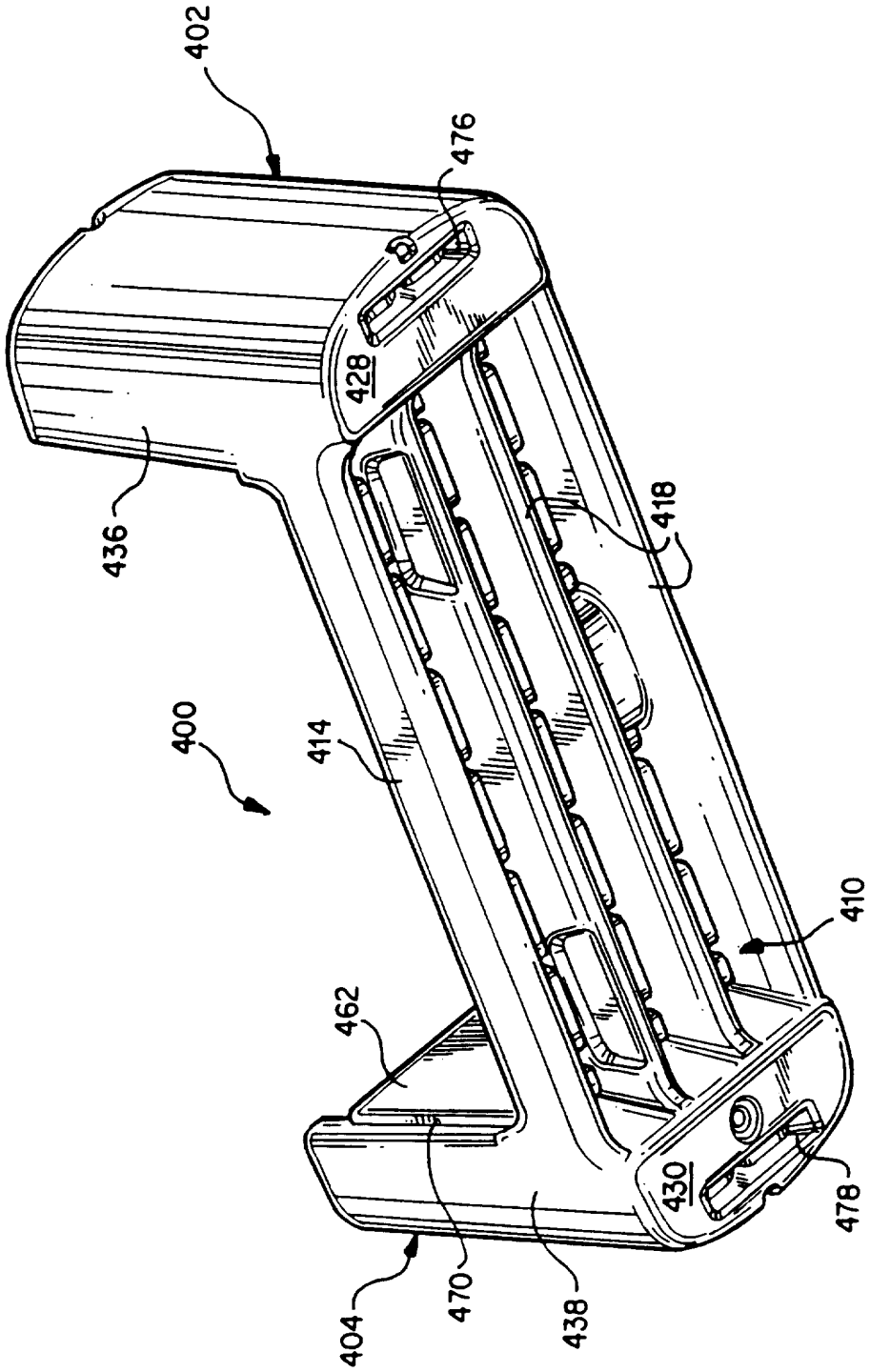


FIG. 5E

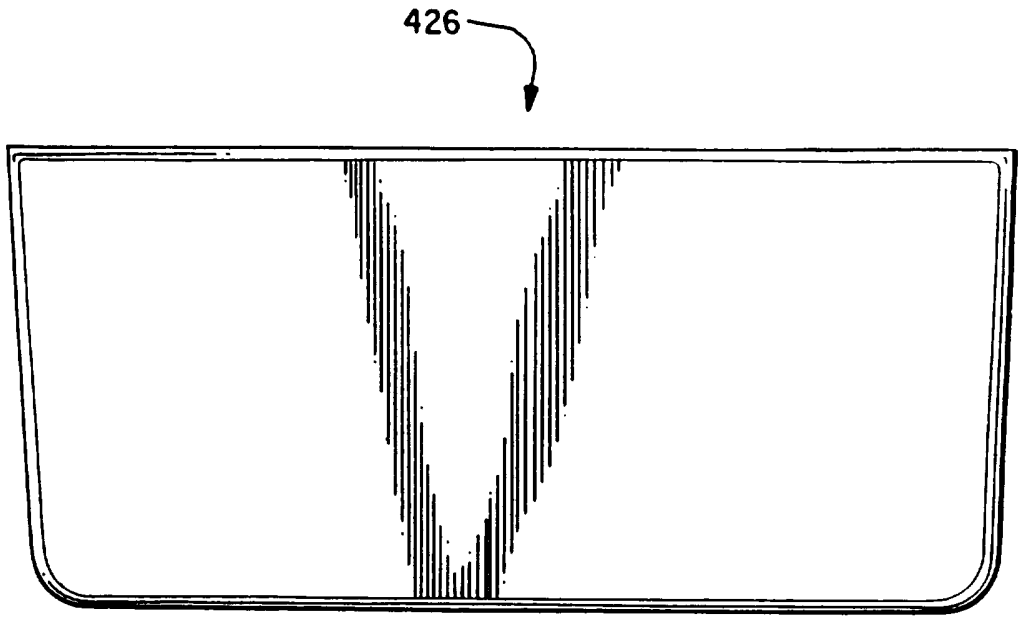


FIG. 6

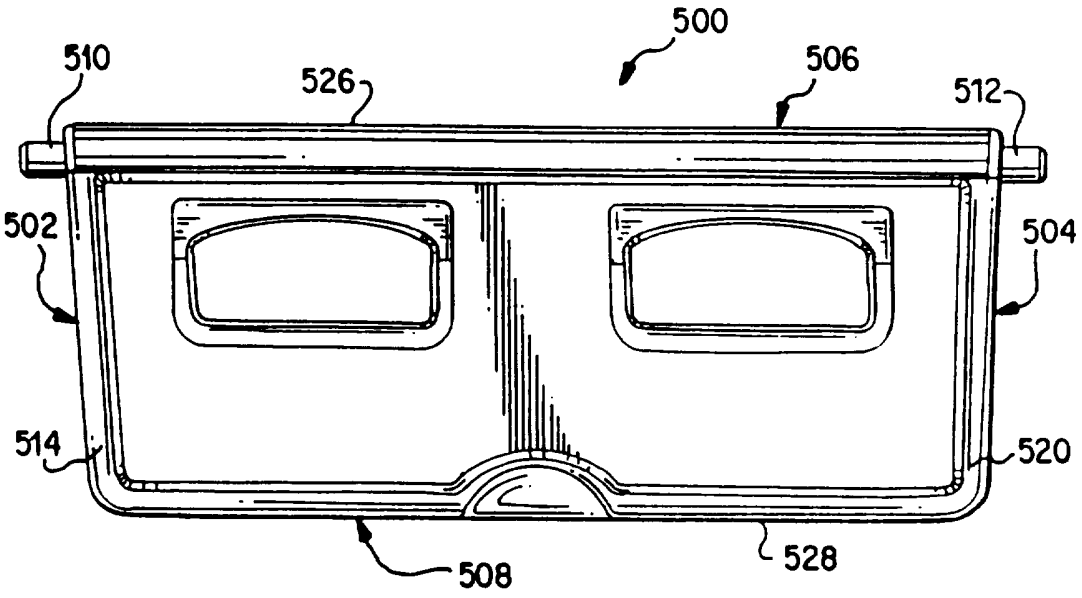

500
510
526
506
512
502
504
514
520
508
528

FIG. 7A

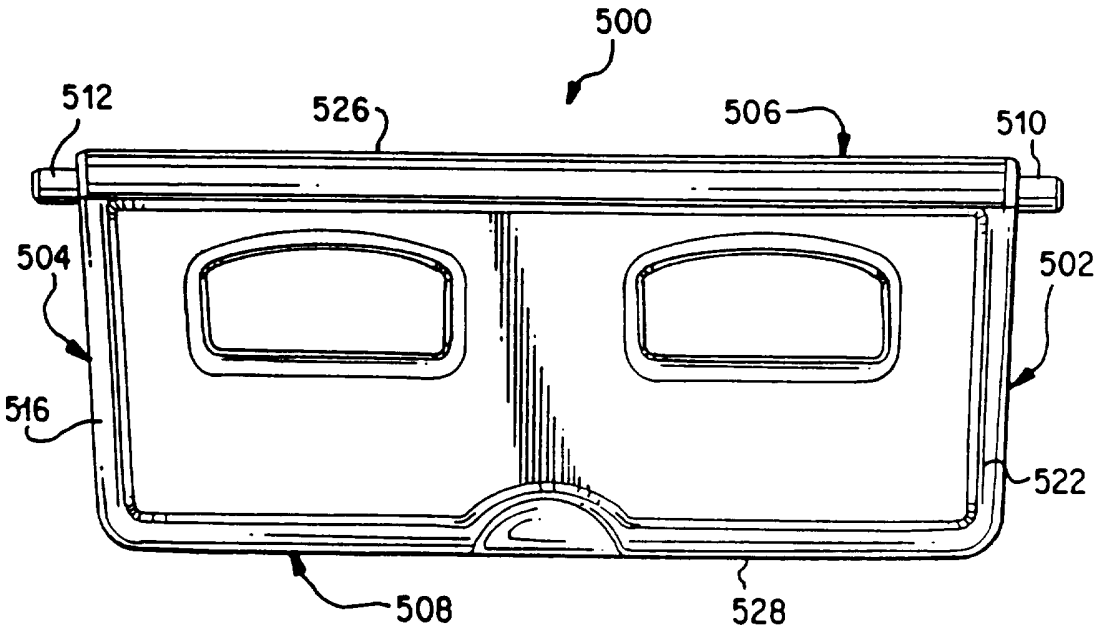

500
512
526
506
510
504
502
516
522
508
528

FIG. 7B

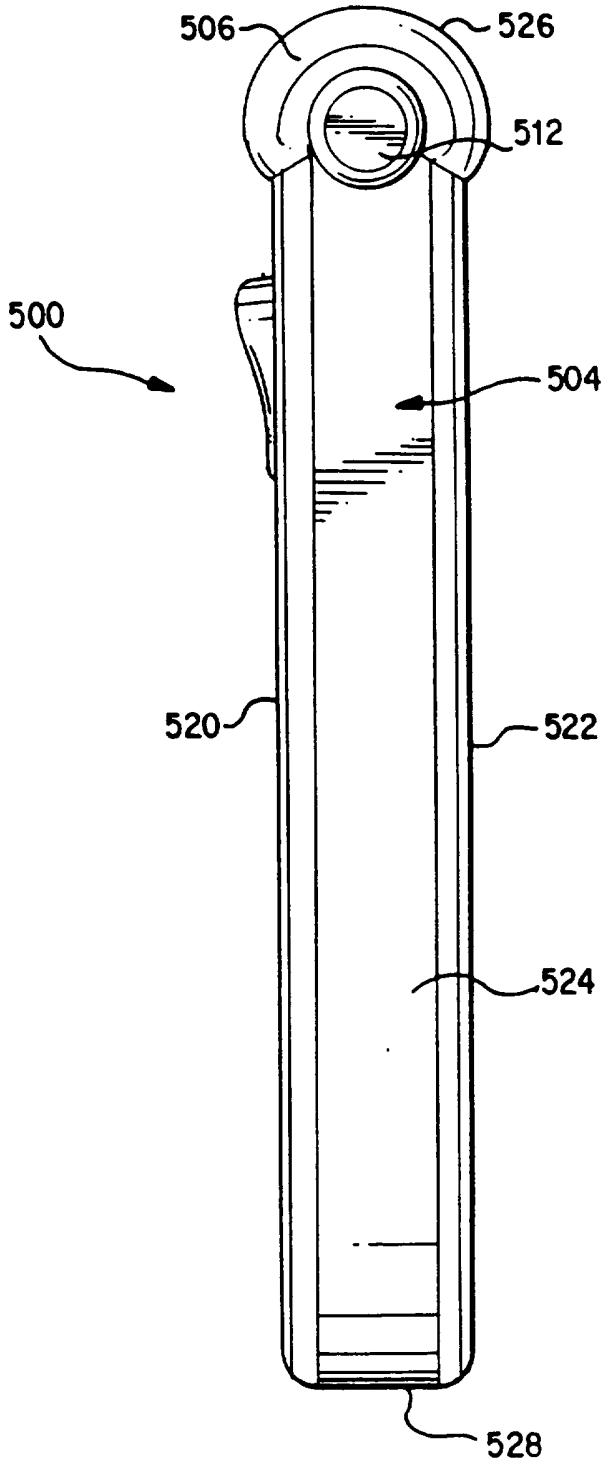


FIG. 7C

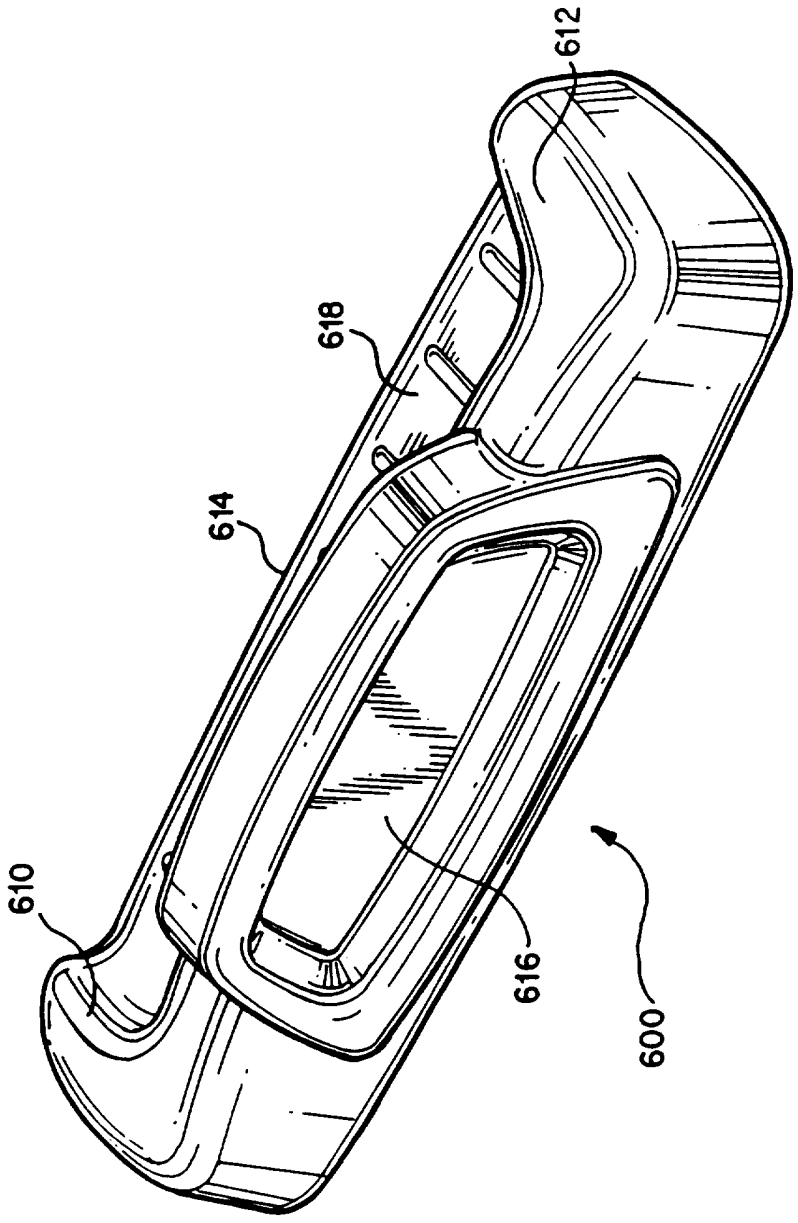


FIG. 8A

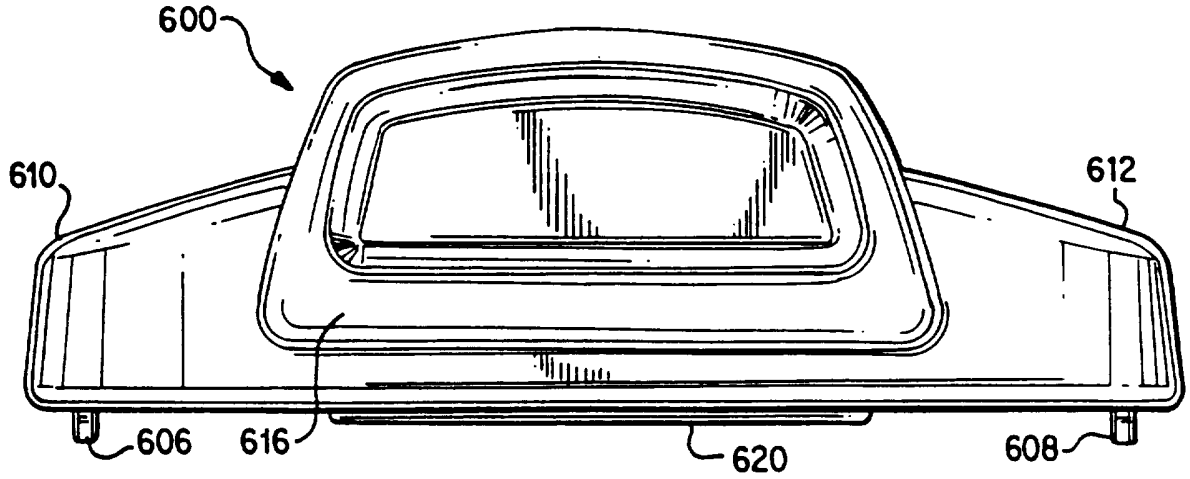


FIG. 8B

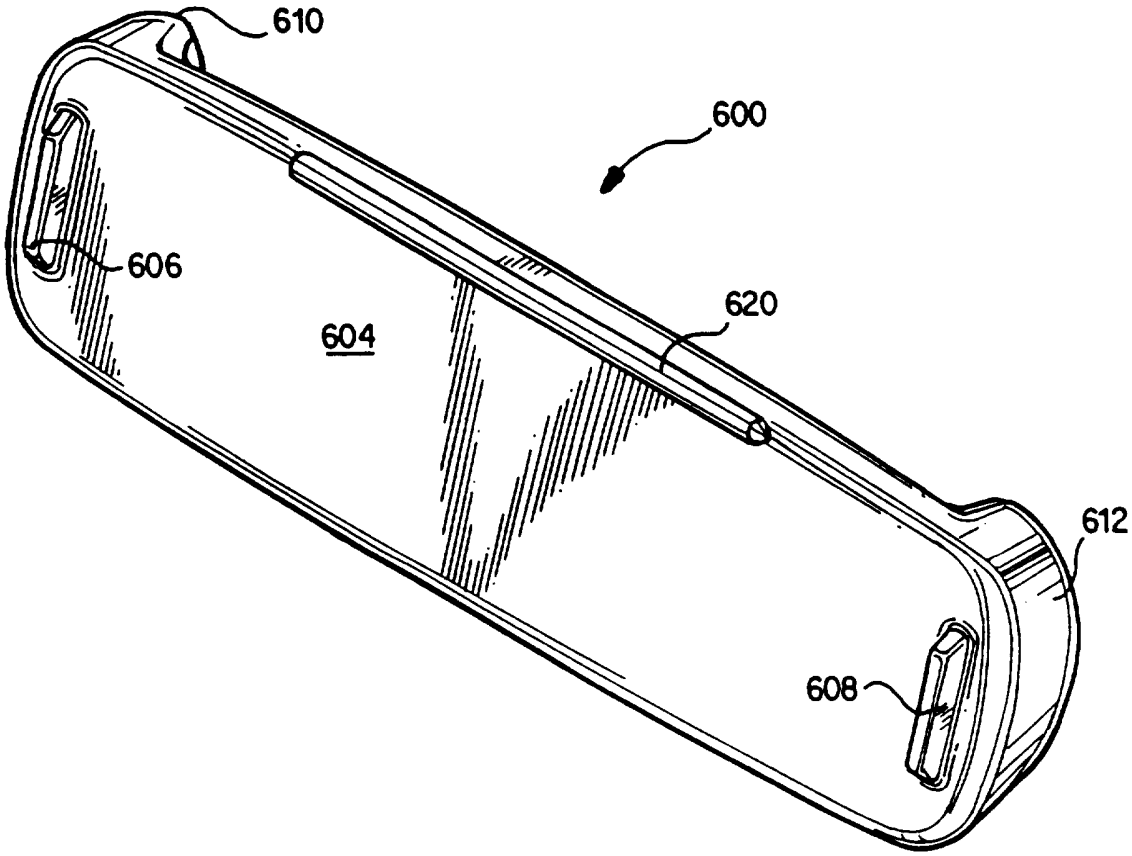


FIG. 8C

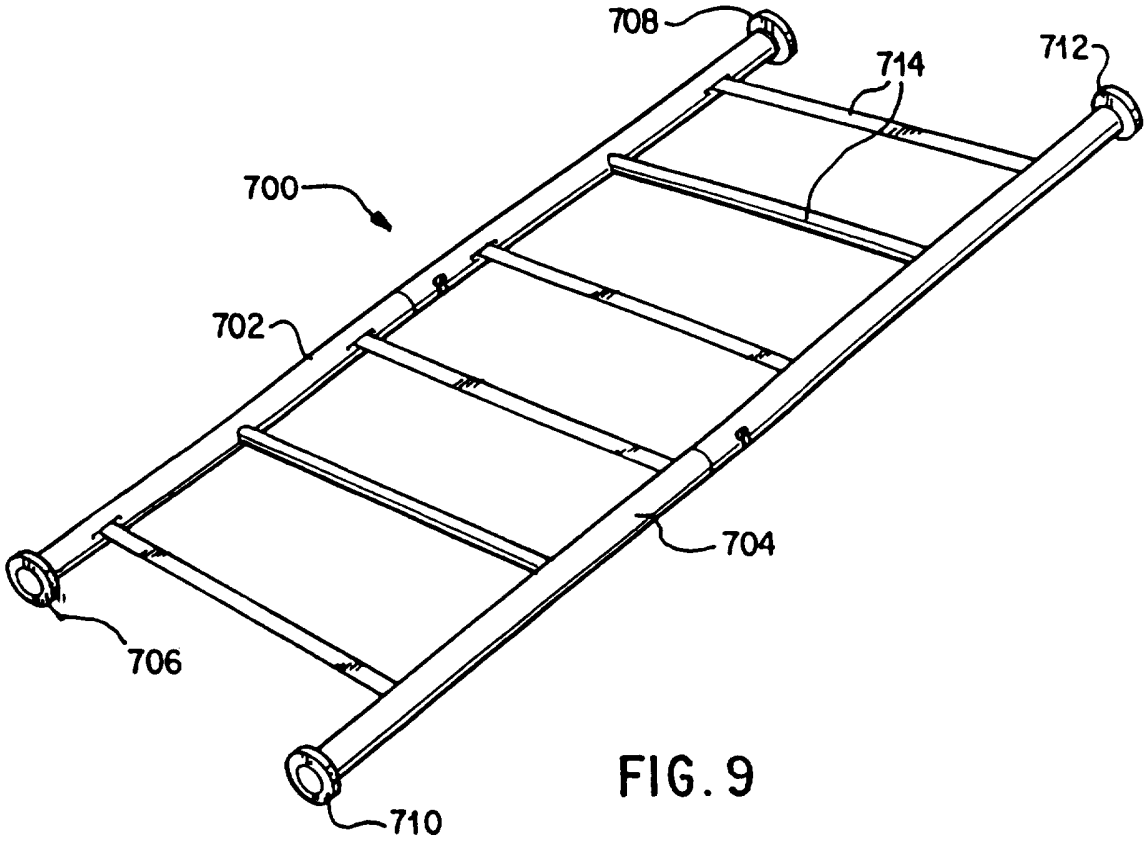


FIG. 9

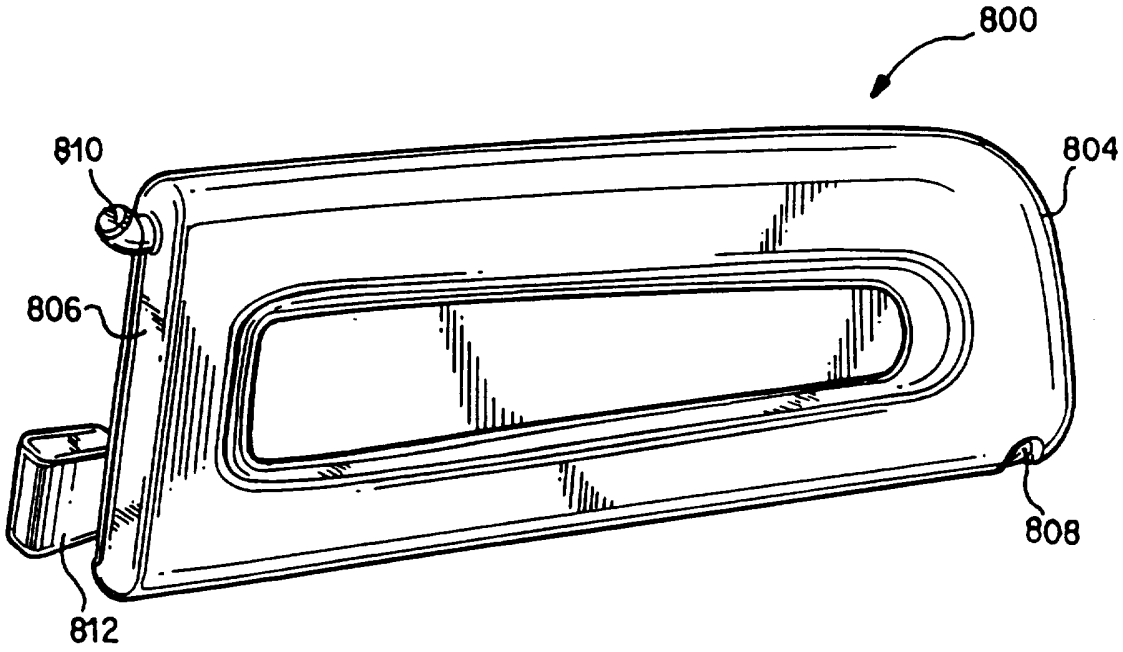


FIG. 10

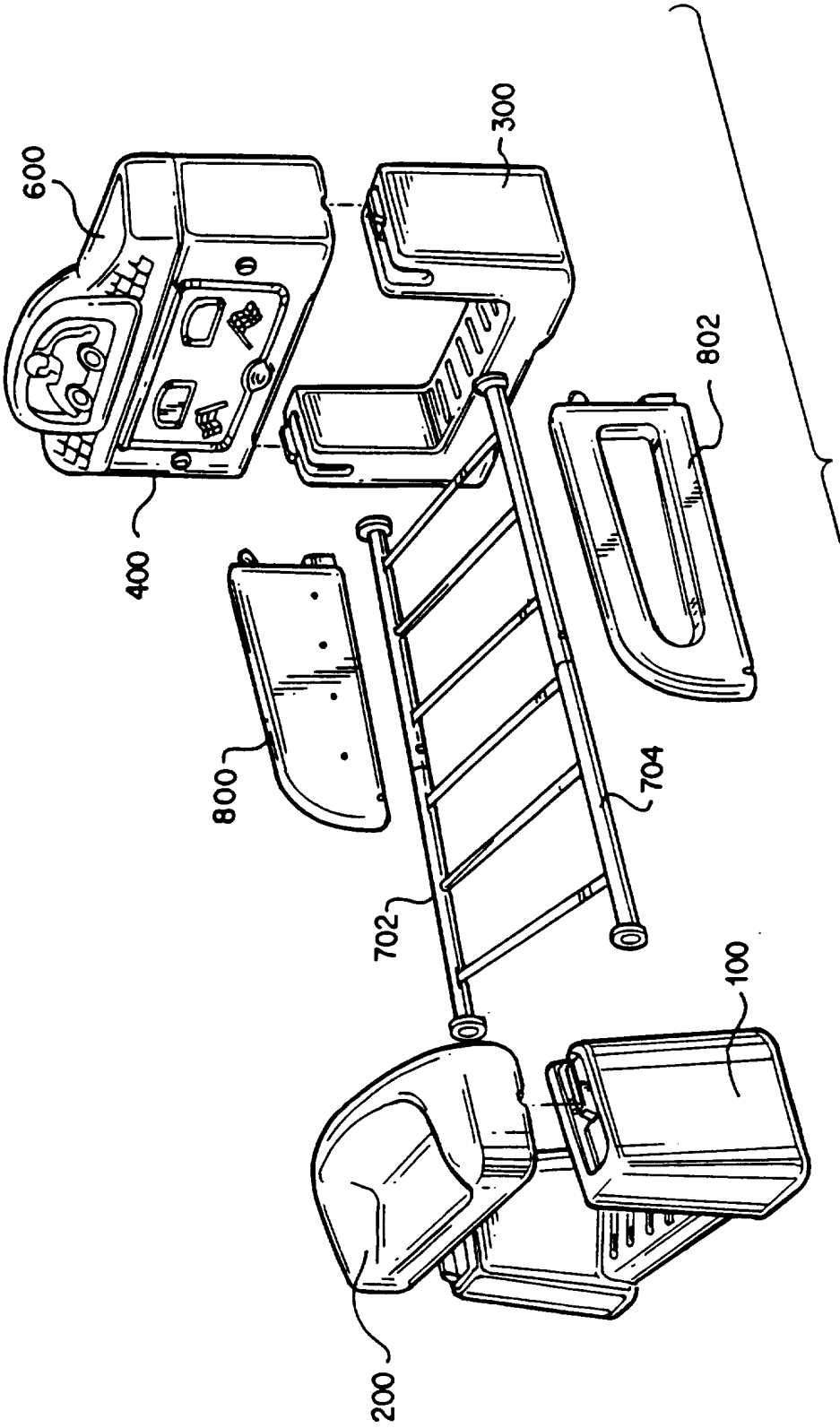


FIG.11

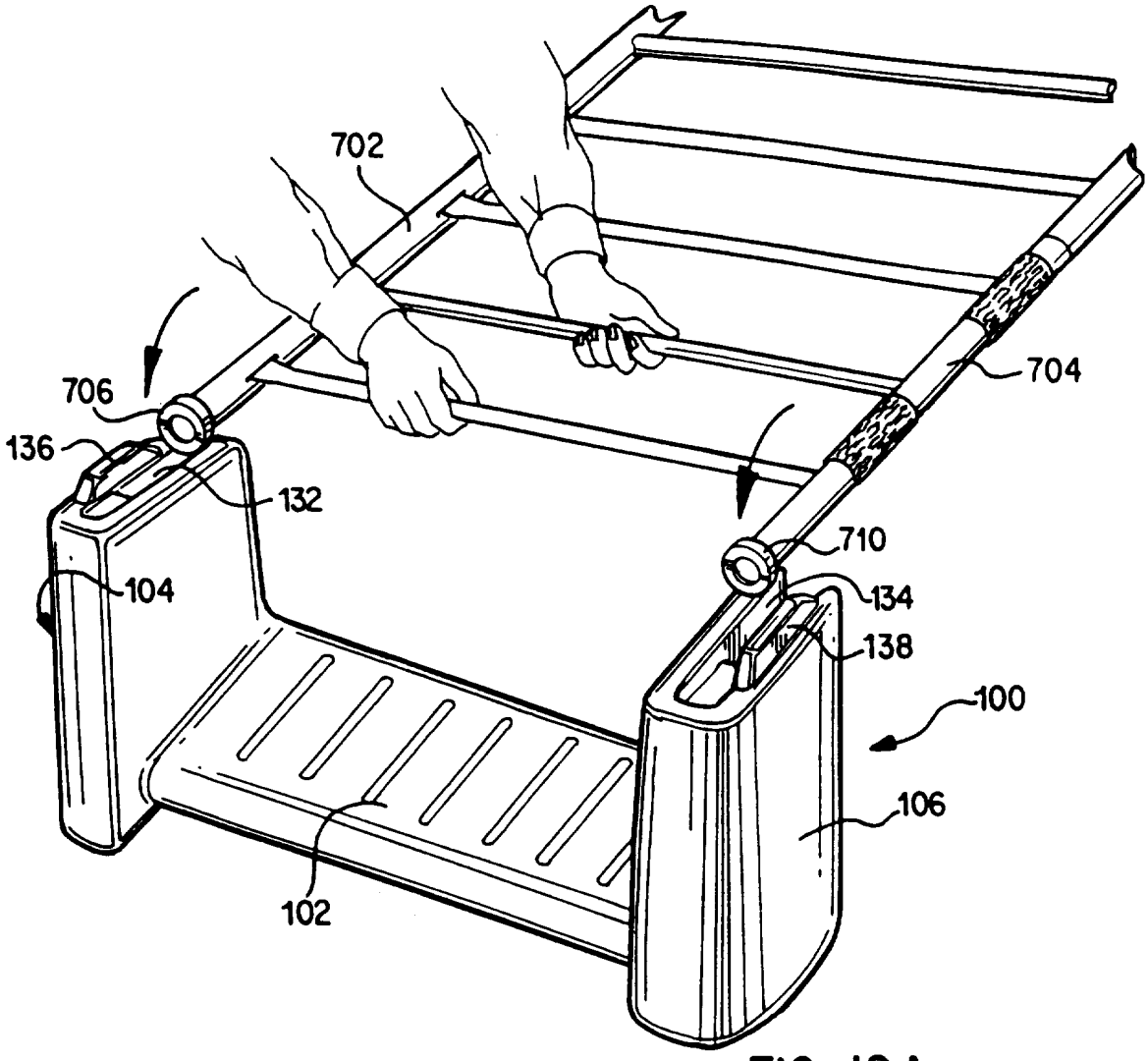


FIG. 12A

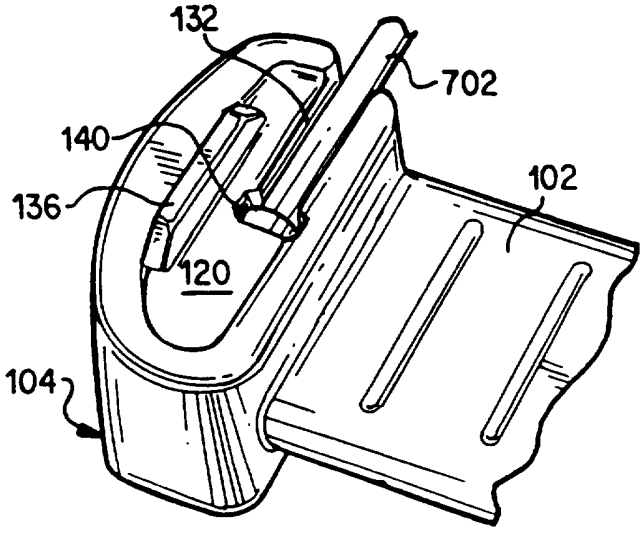


FIG. 12B

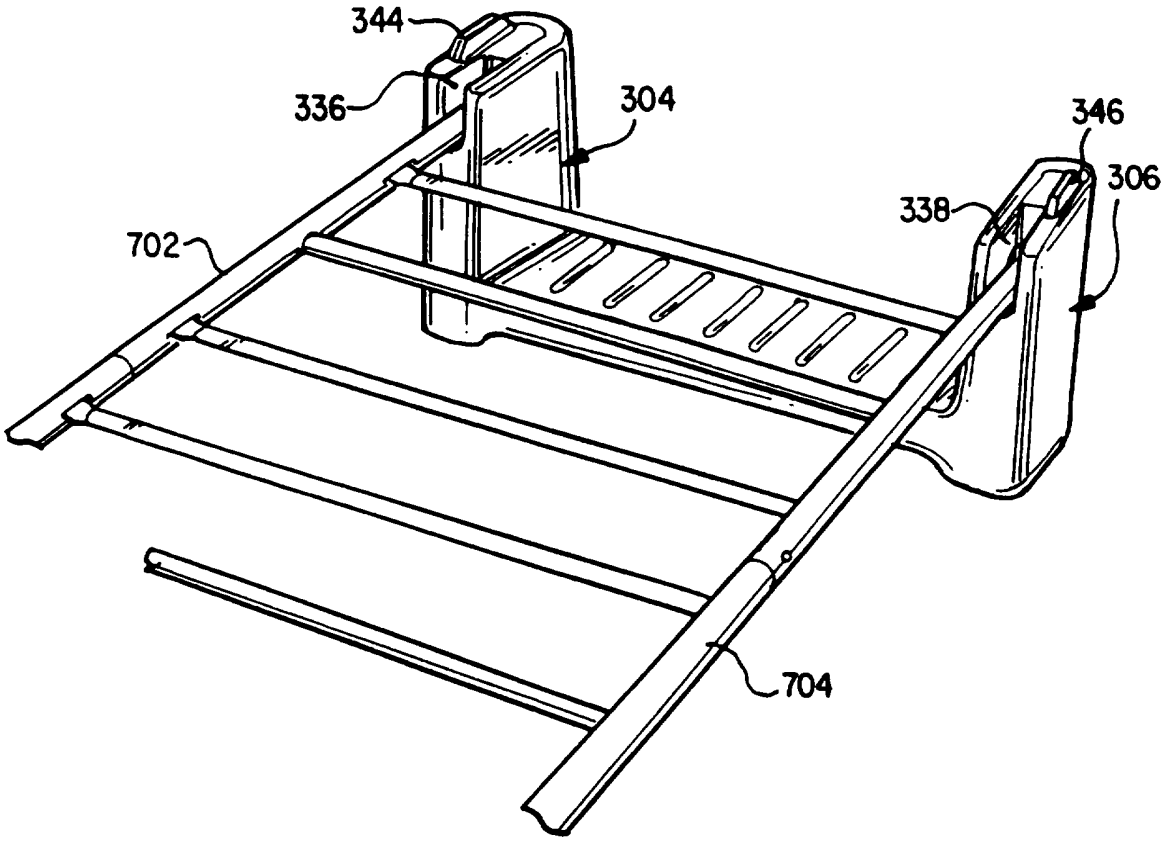


FIG. 13A

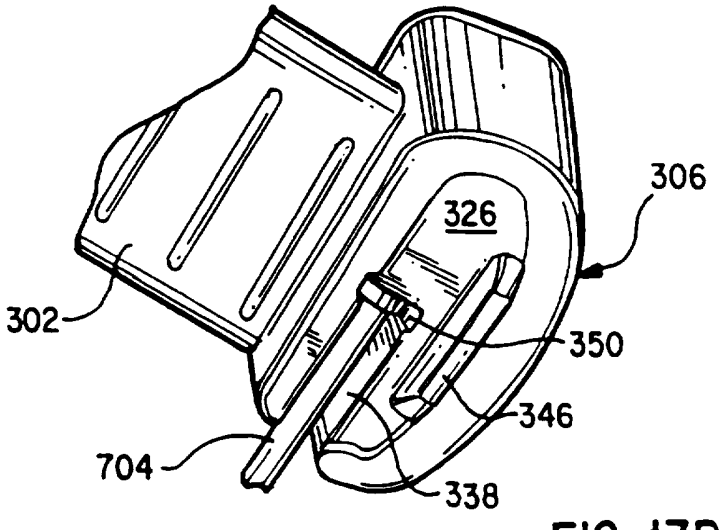


FIG. 13B

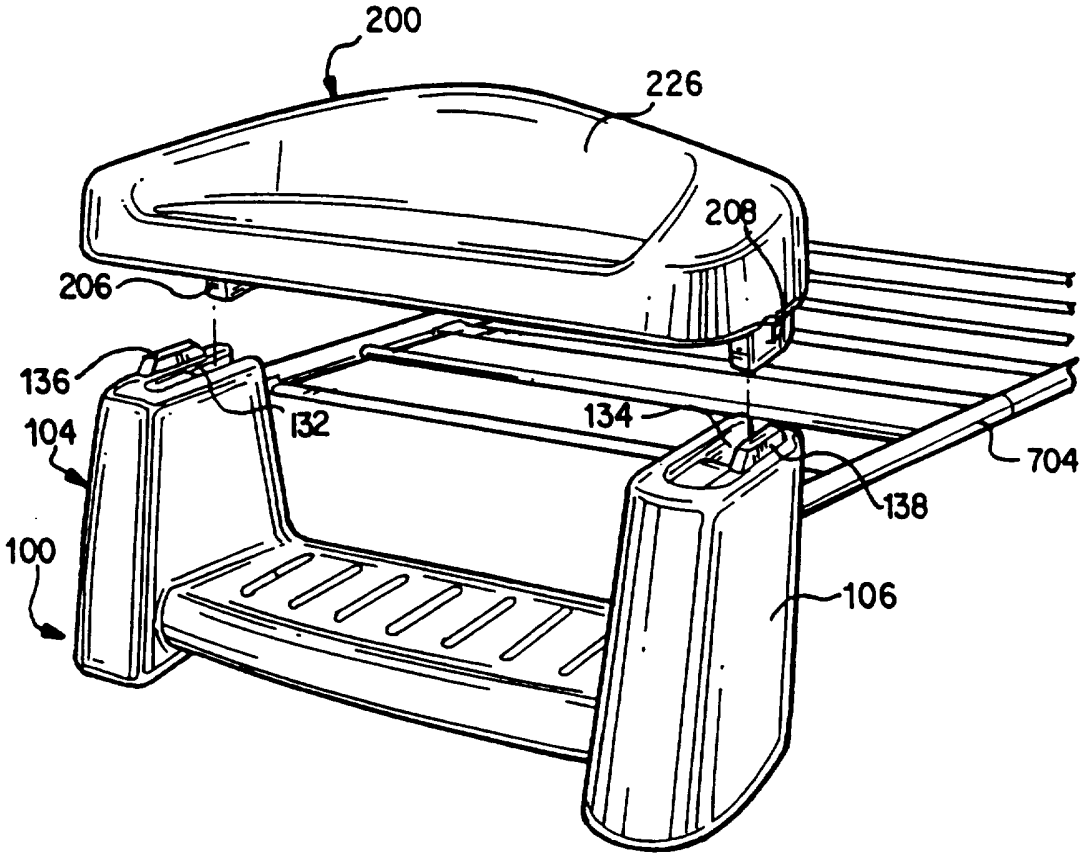


FIG. 14

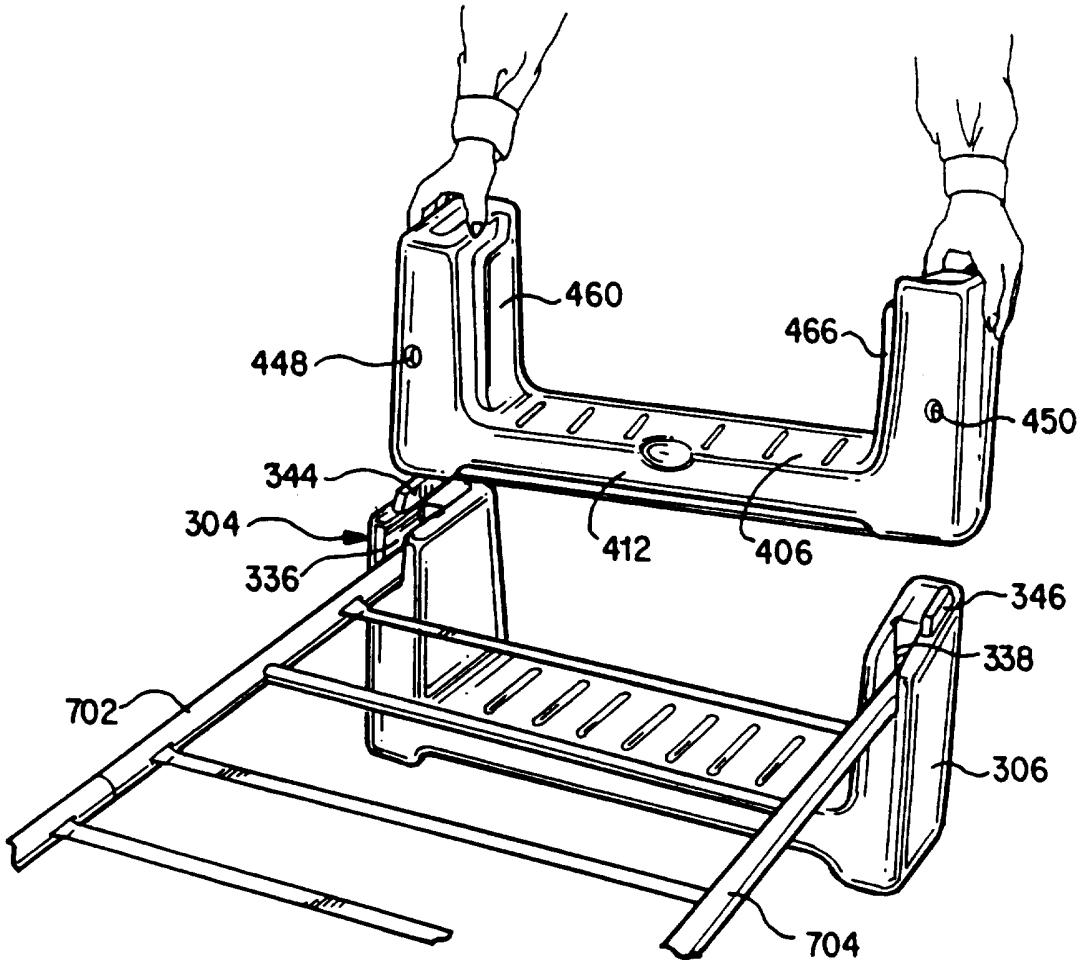


FIG.15

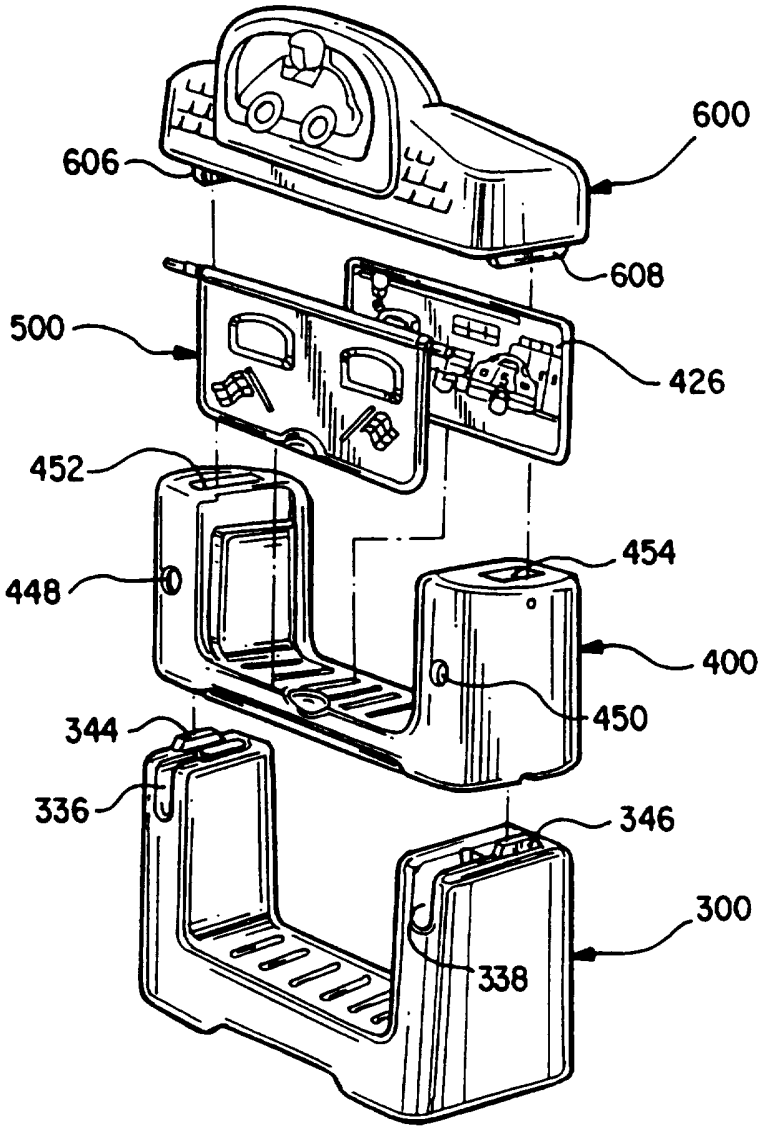


FIG. 16

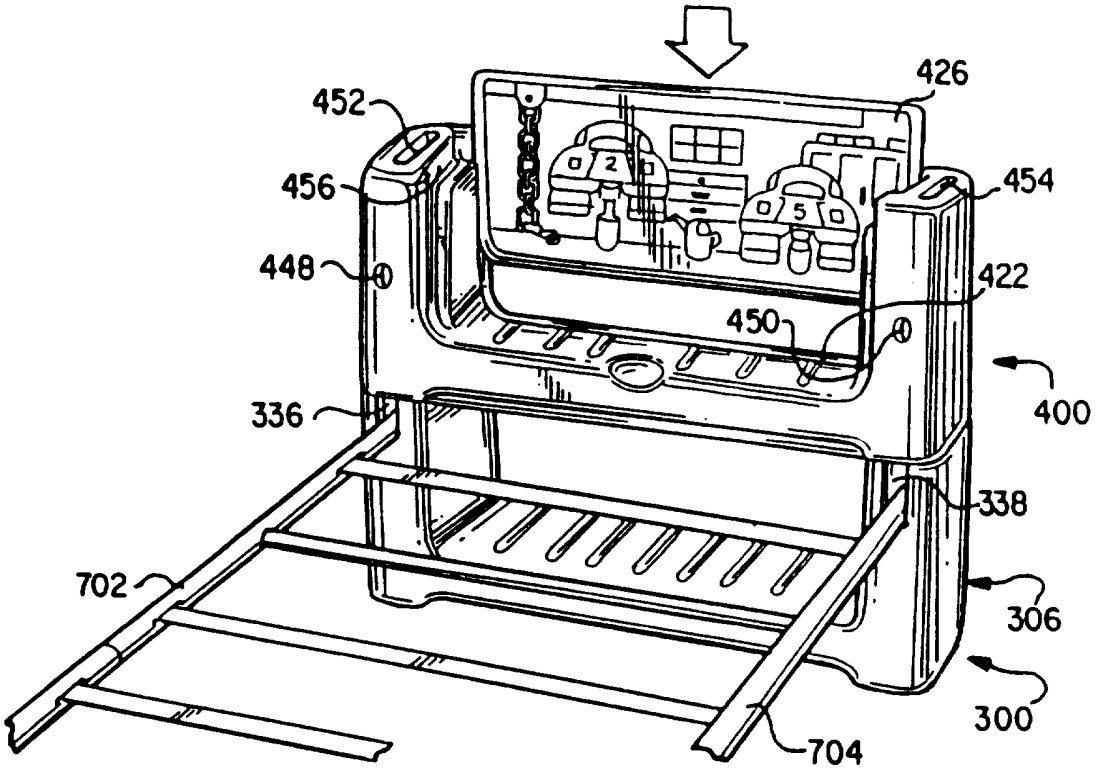


FIG. 17A

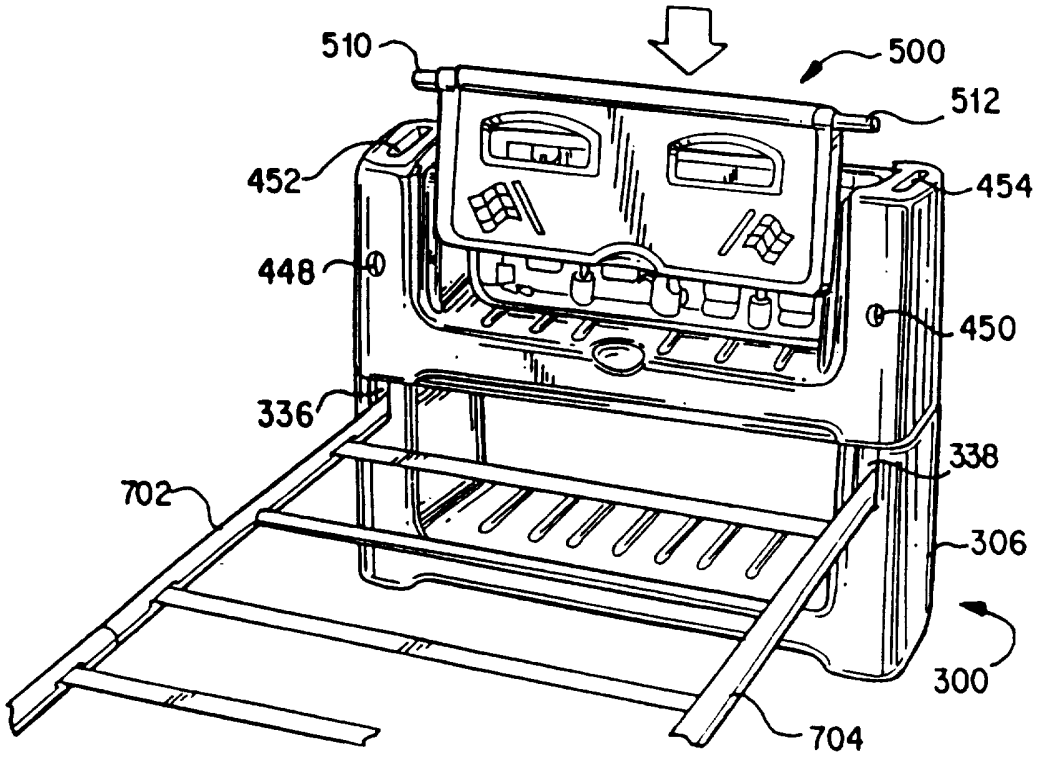


FIG. 17B

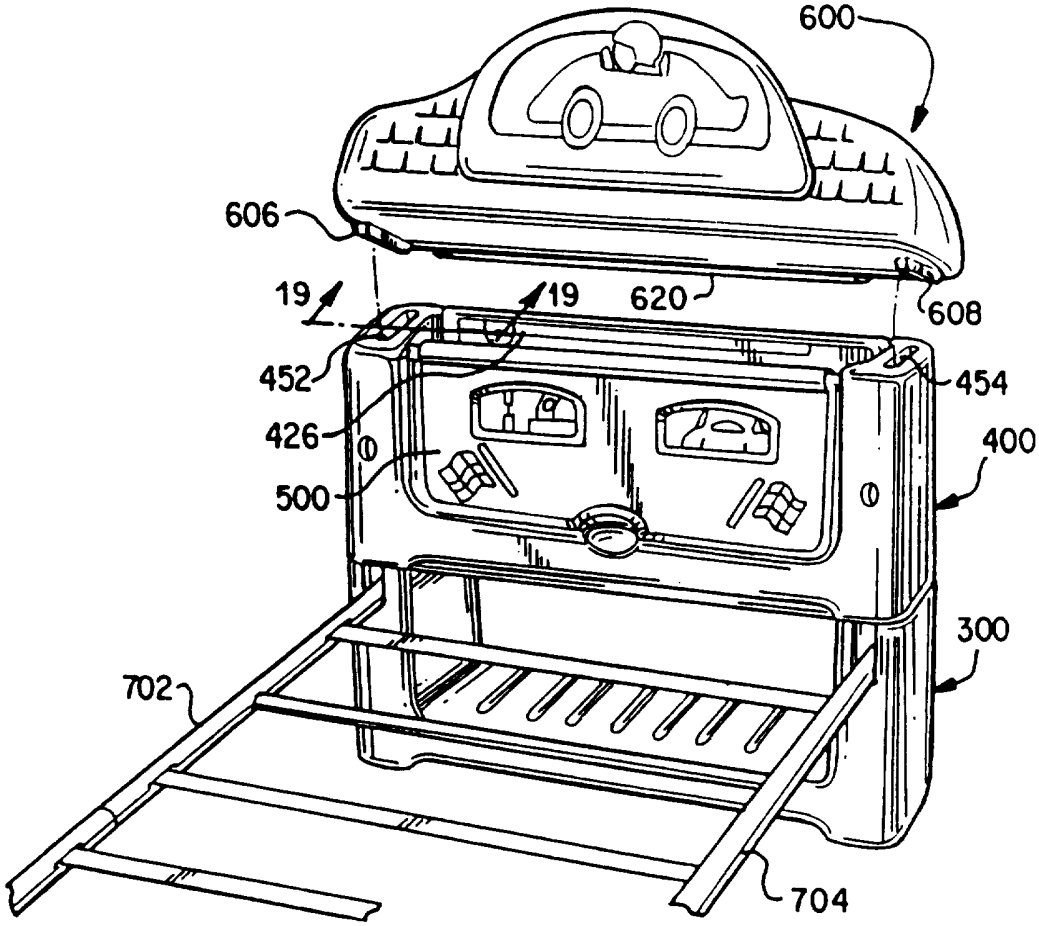


FIG.18

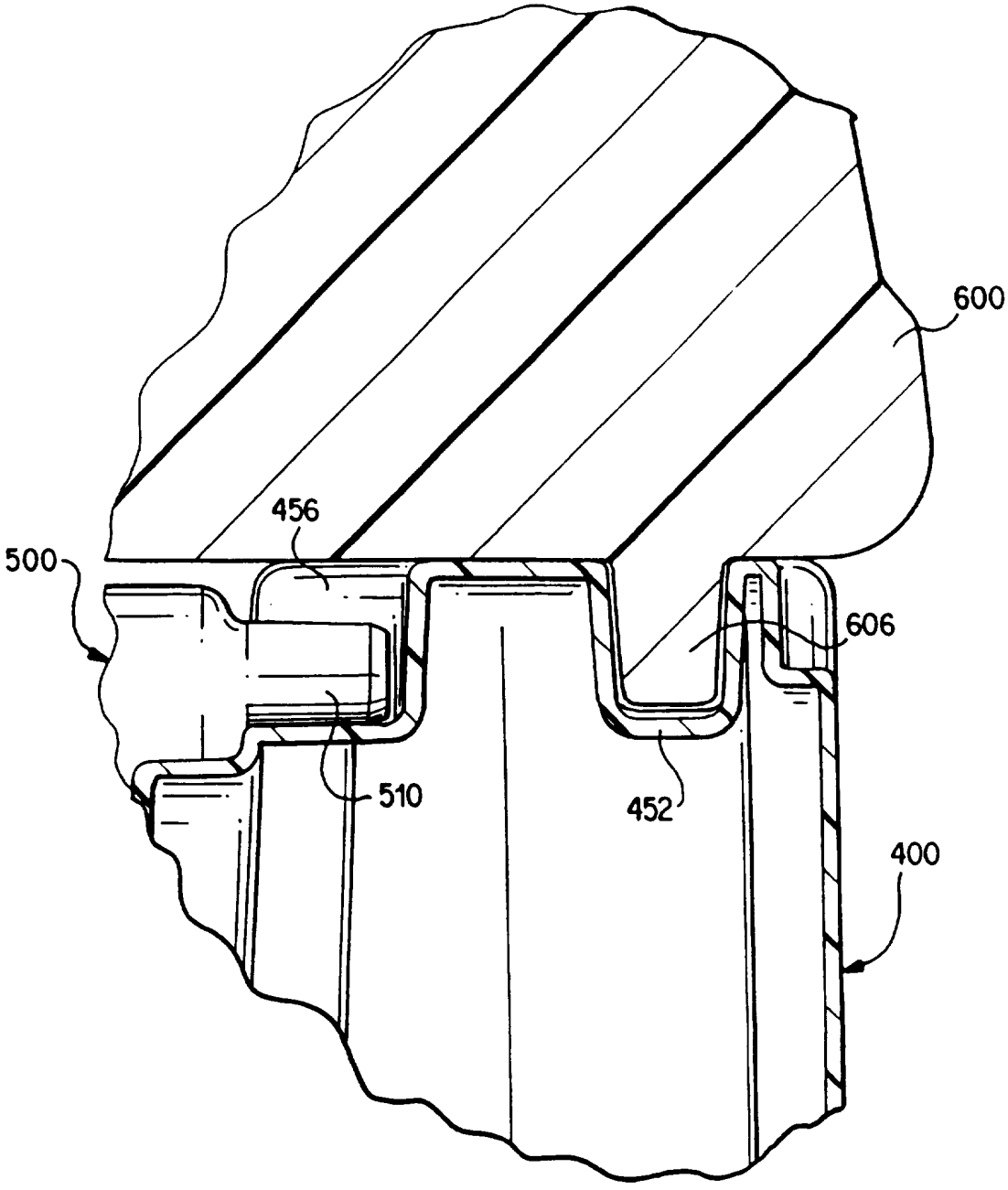


FIG. 19

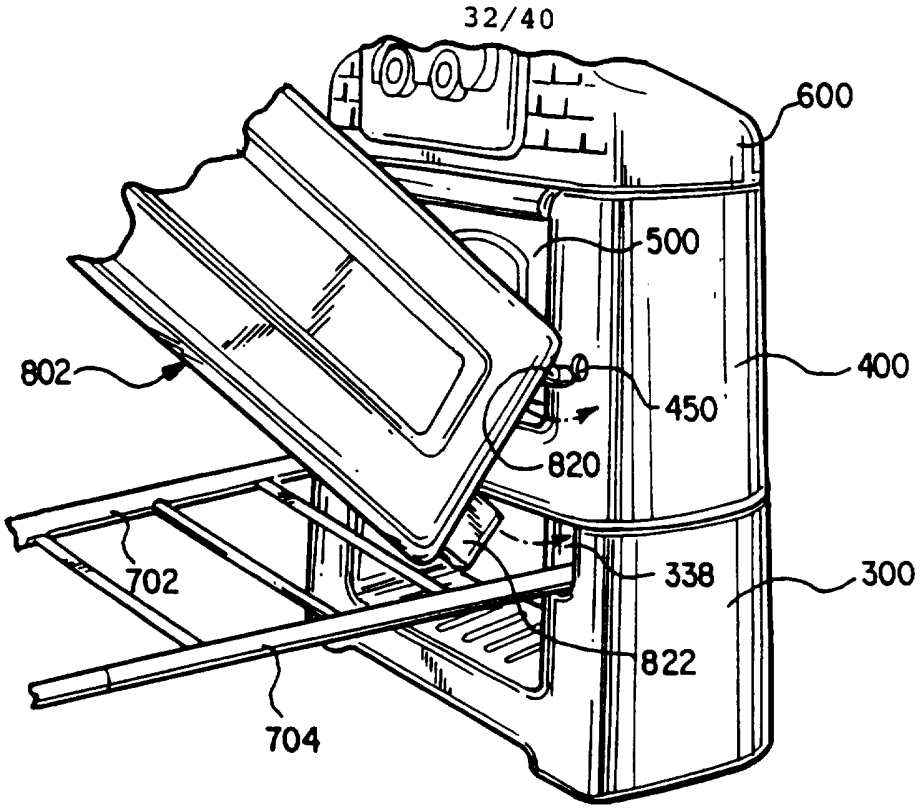


FIG. 20A

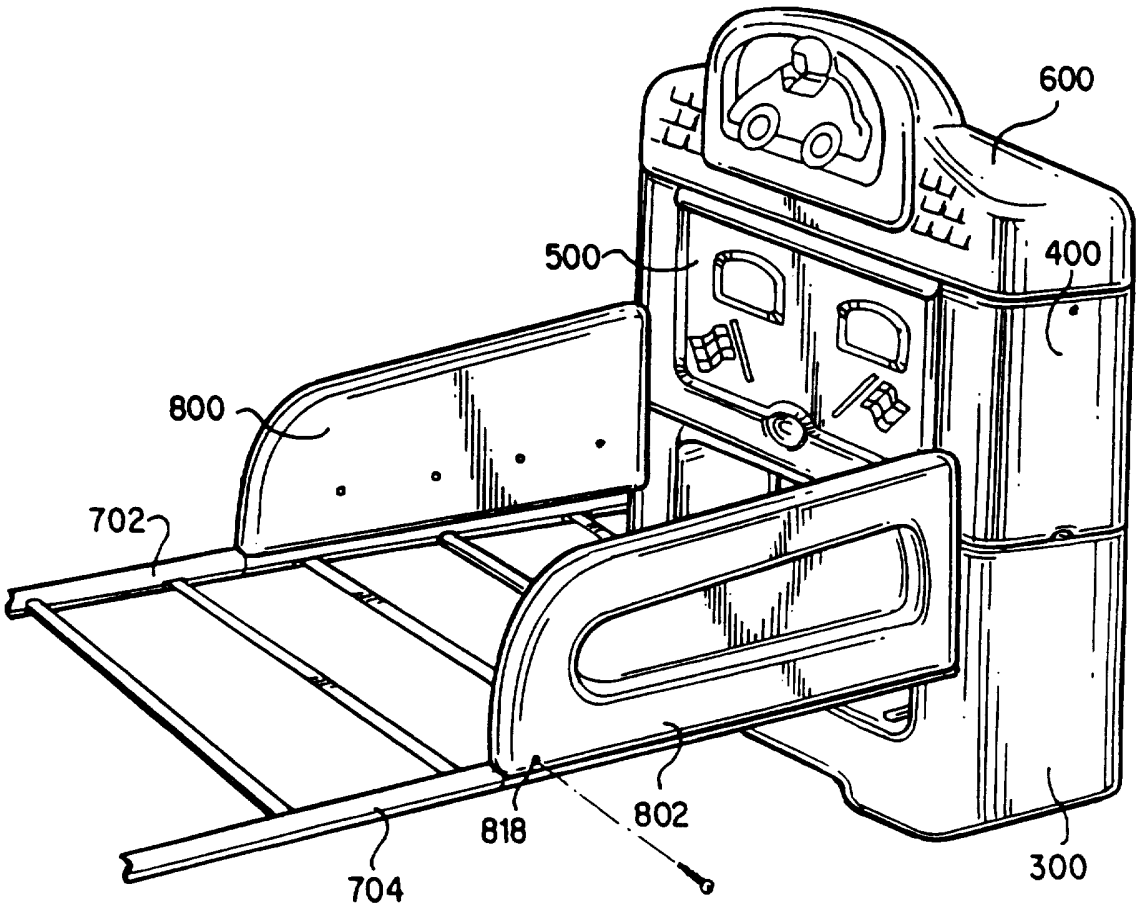


FIG. 20B

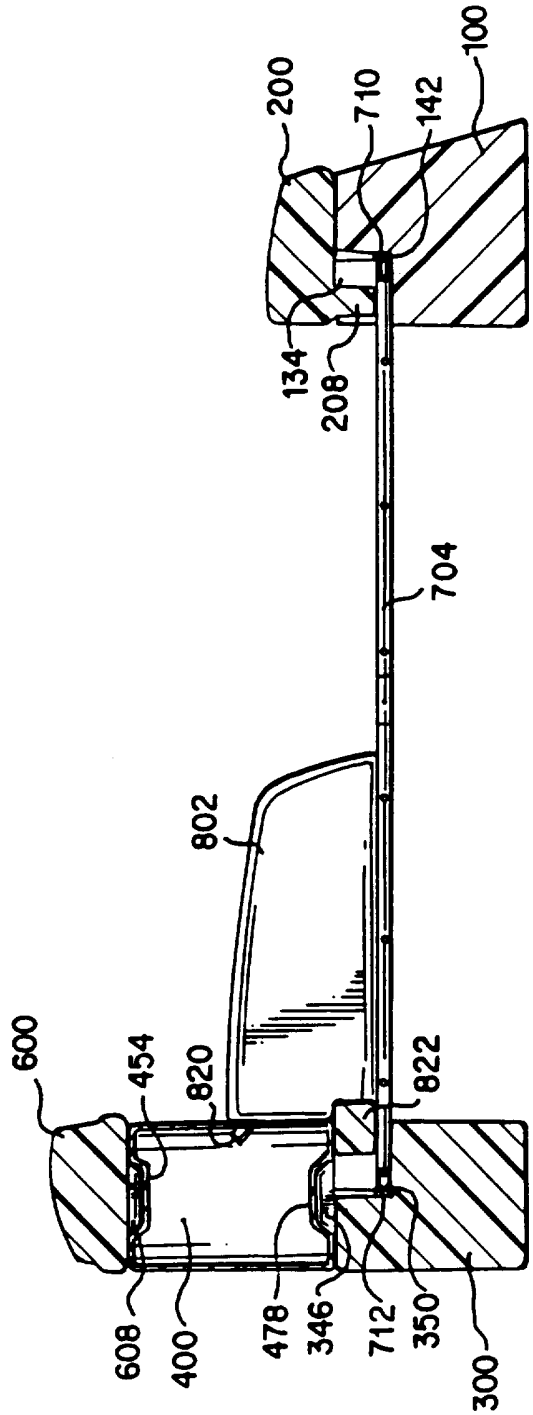

100
200
710
142
134
208
704
802
600
454
820
822
608
400
478
346
712
350
300

FIG. 21

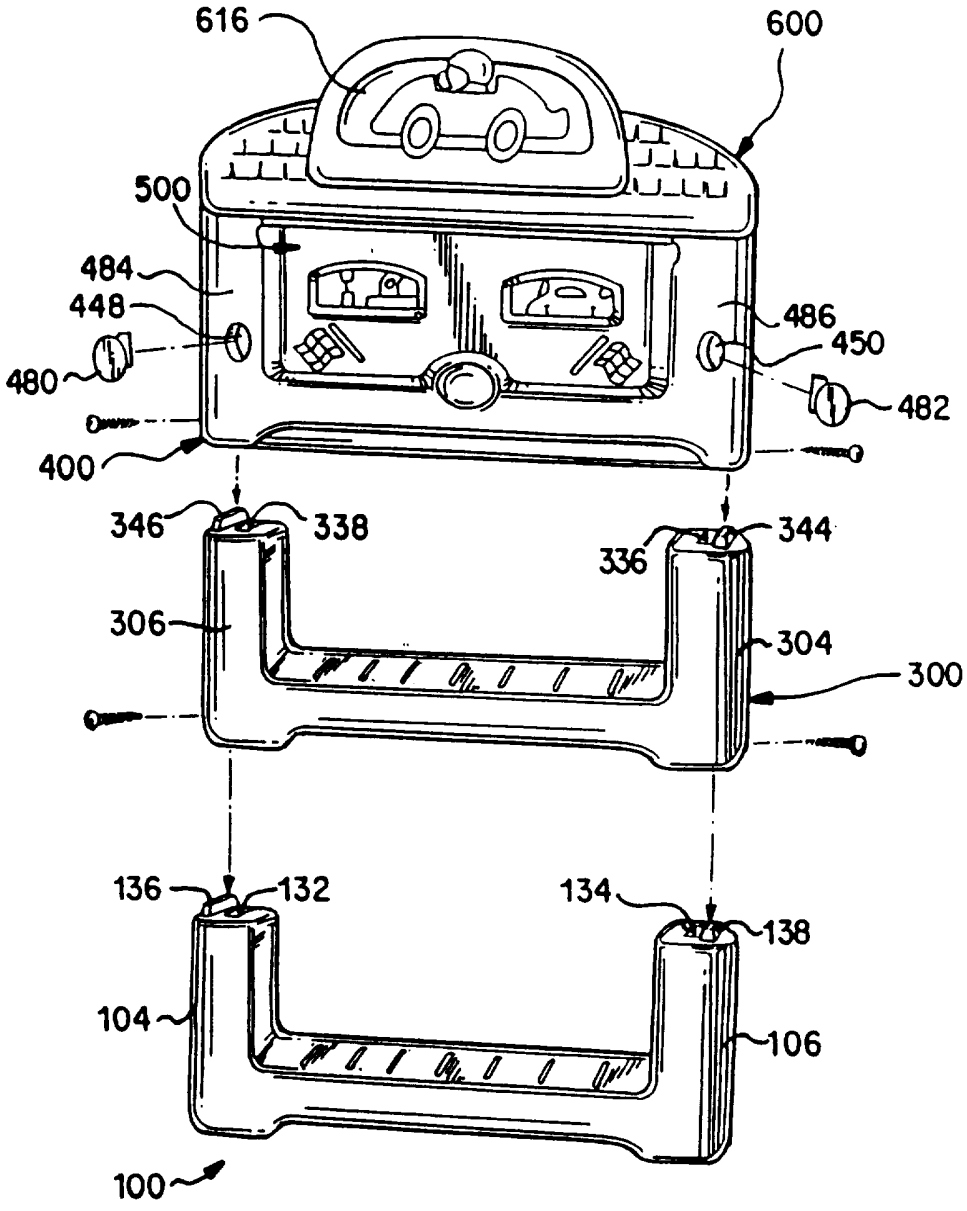

616
600
500
484
448
486
450
480
482
400
346
338
344
336
306
304
300
136
132
134
138
104
106
100

FIG. 22

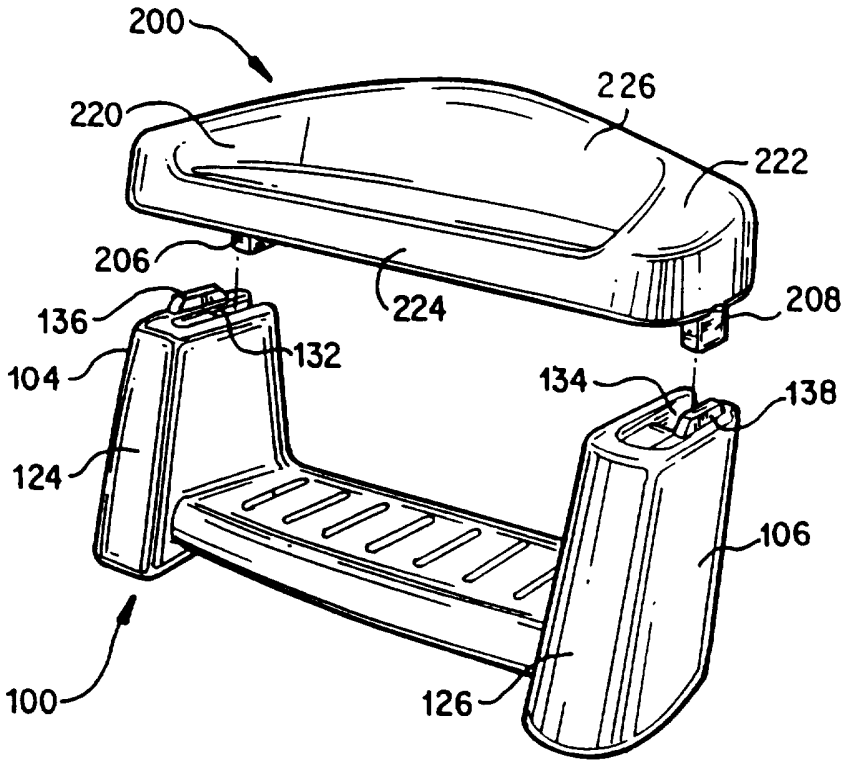


FIG. 23

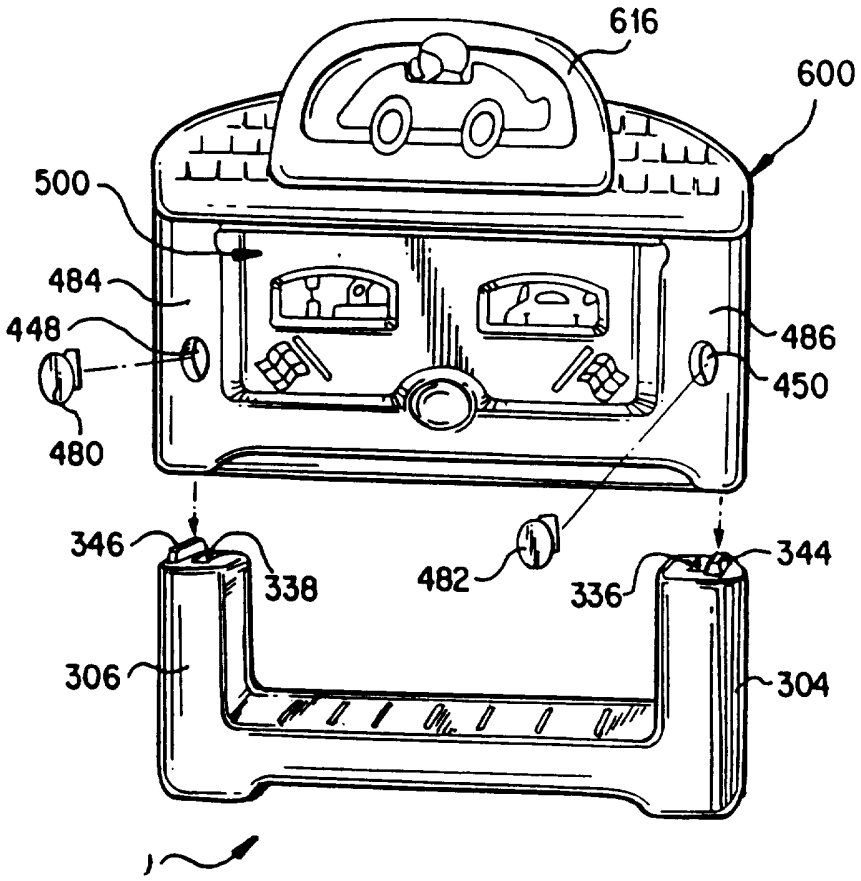


FIG. 24

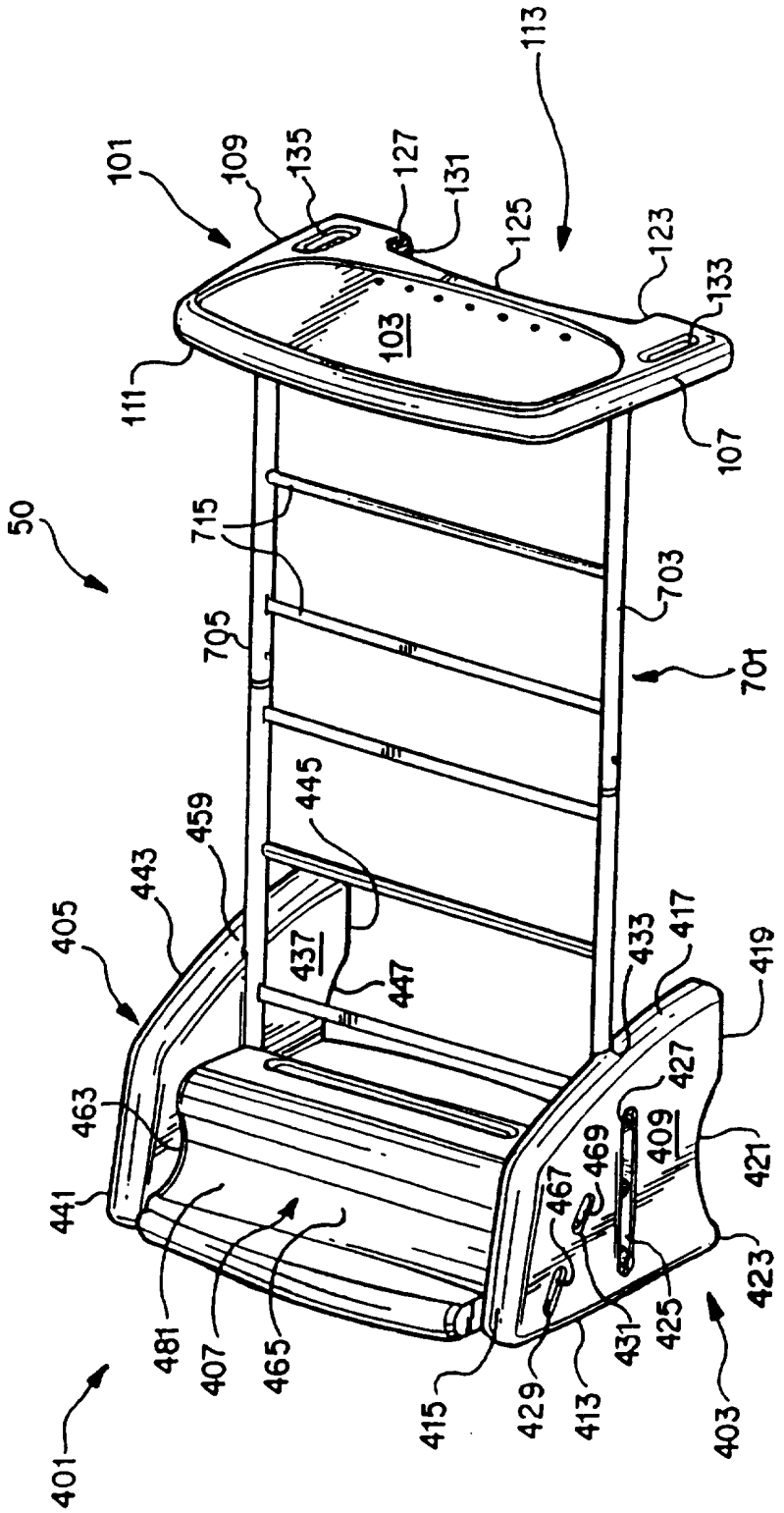

113
101
109
135
127
131
125
123
133
103
111
107
50
715
705
703
701
445
459
443
405
437
447
433
417
419
427
463
409
421
469
467
441
423
481
407
465
431
425
415
429
413
403
401

FIG. 25

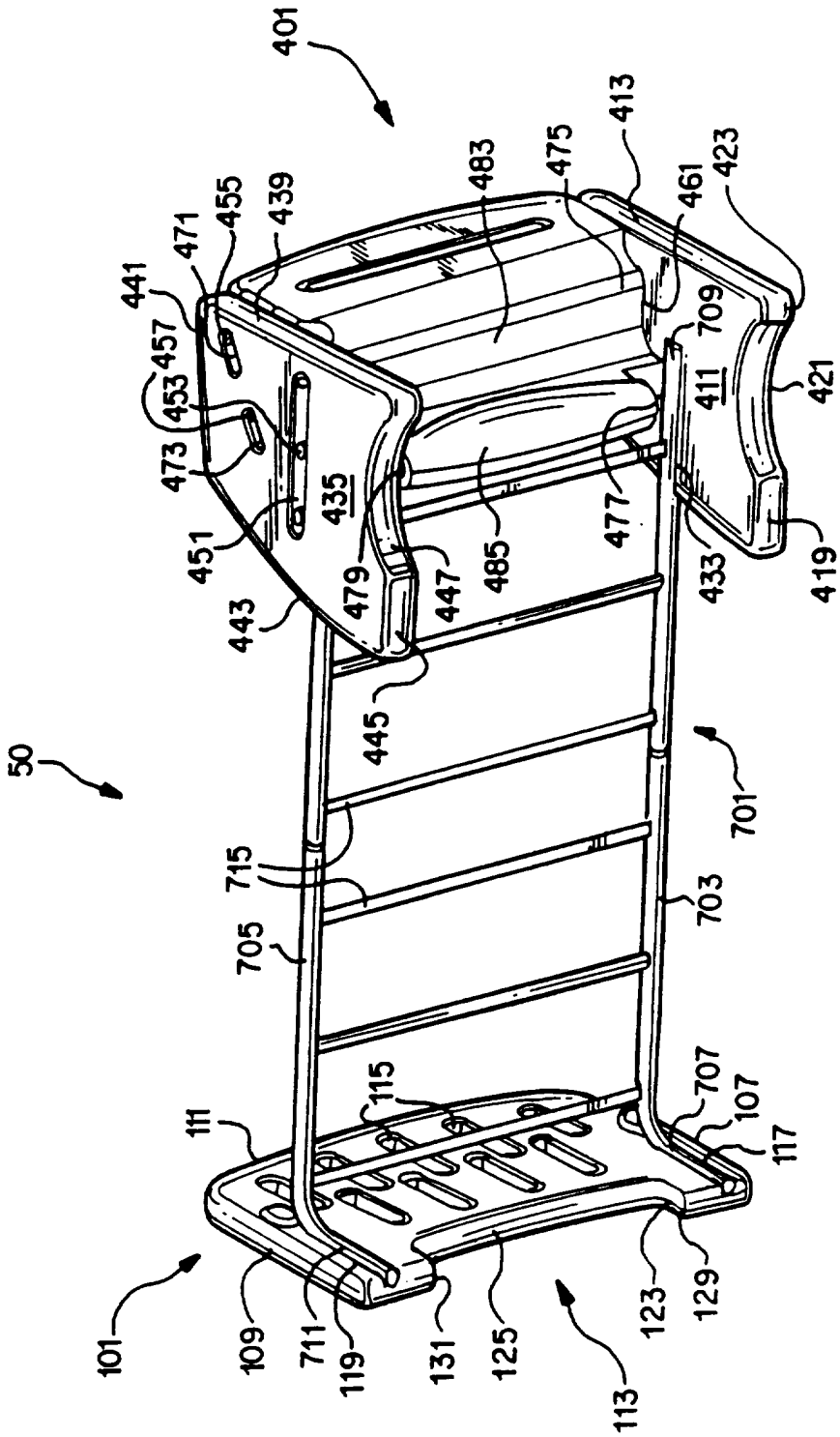

401
413
483
475
461
423
455
439
471
441
457
453
709
411
421
473
435
451
477
485
479
447
433
419
443
445
50
701
715
703
705
707
107
115
111
117
101
109
711
119
131
125
123
129
113

FIG. 26

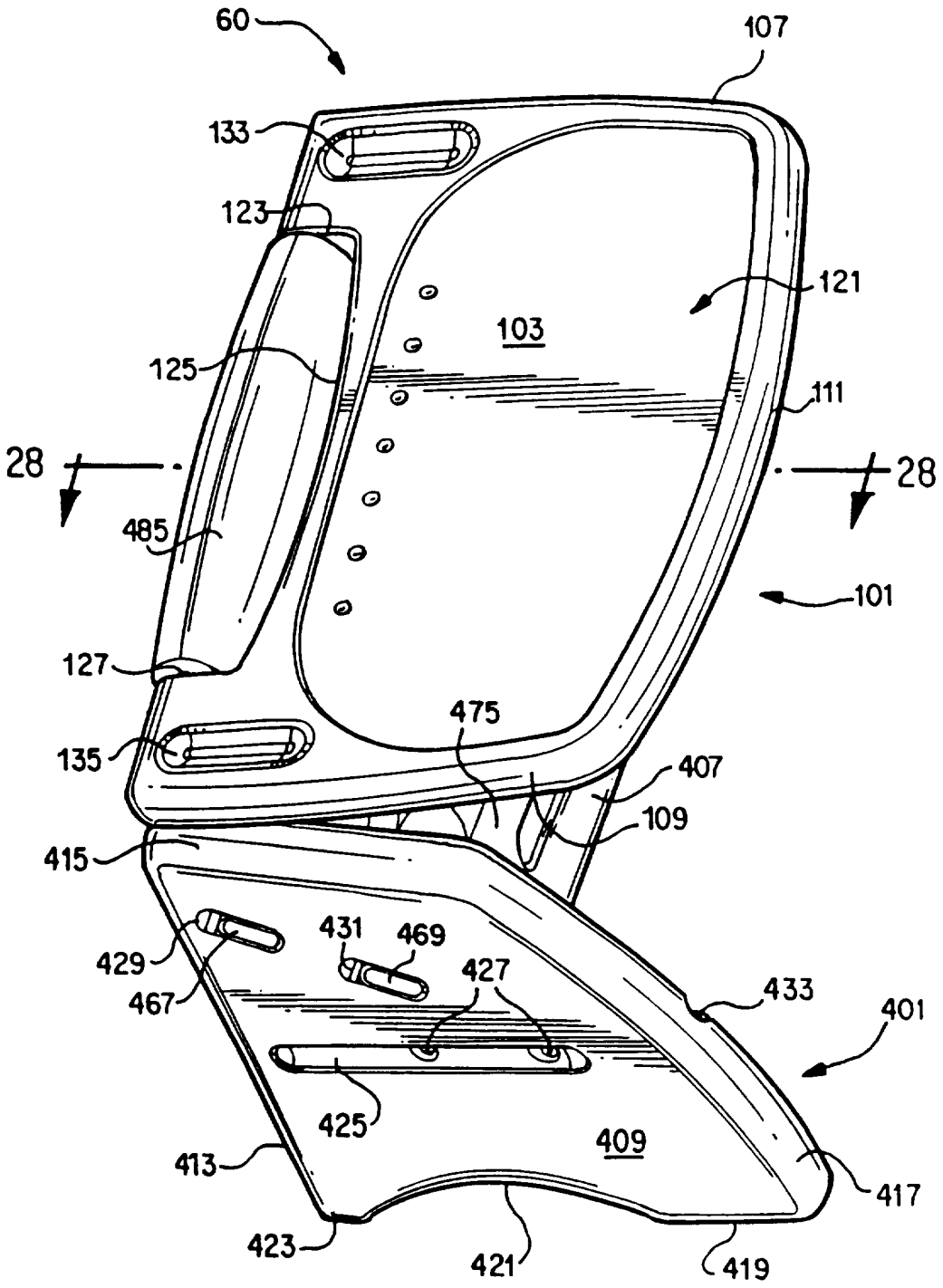

60
107
133
123
121
103
125
111
28
28
485
101
127
475
135
407
109
415
431
469
429
427
467
433
401
425
409
413
417
423
421
419

FIG. 27

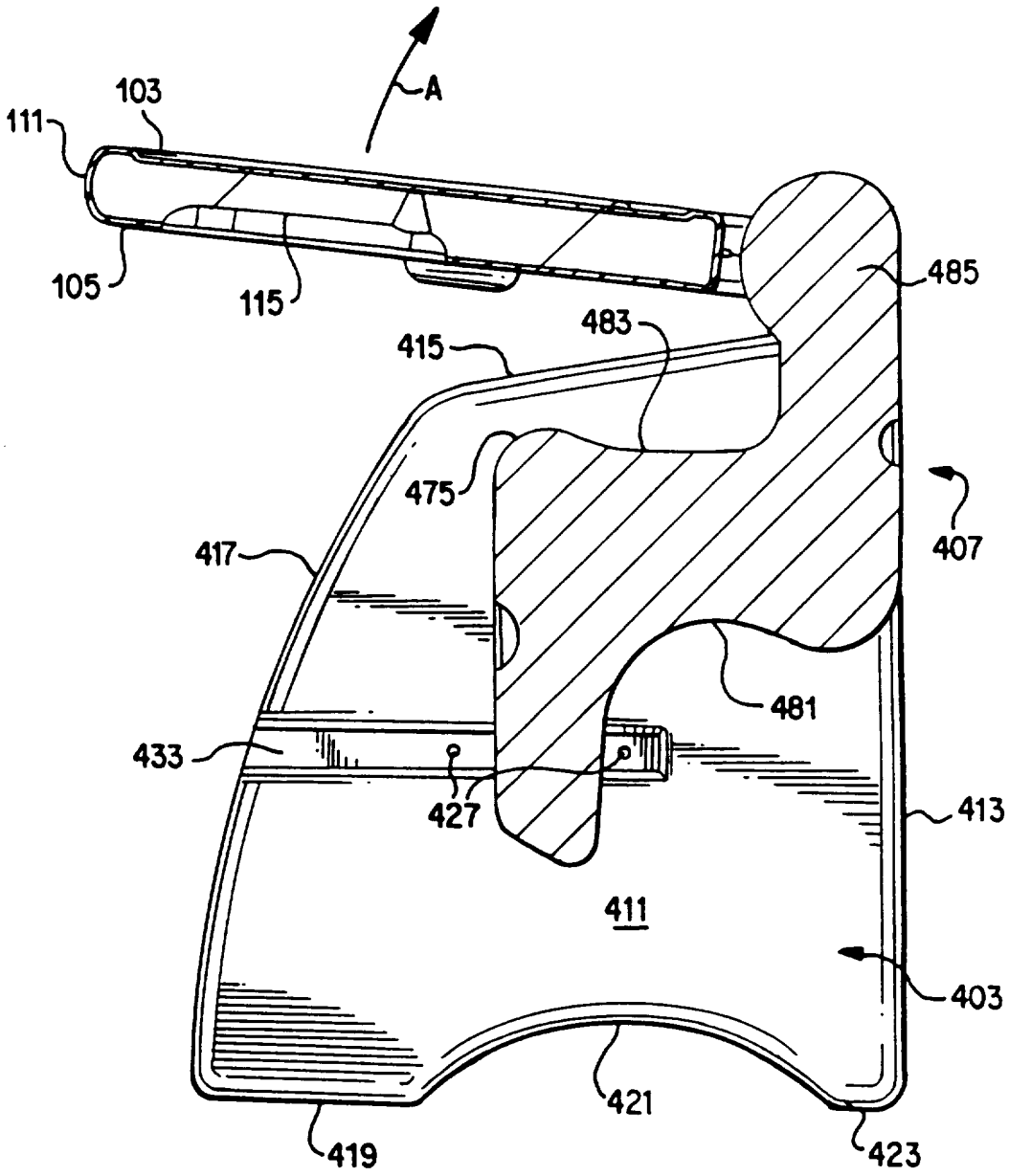

A
103
111
105
115
485
483
415
475
407
417
481
433
427
413
411
403
421
419
423

FIG. 28

INTERNATIONAL SEARCH REPORT

Interna al Application No
PCT/US 96/17383

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A47D7/00 A47D11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A47D A47B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3 575 465 A (DOLBY ET AL.) 20 April 1971 see column 1, line 74 - column 2, line 70; figures 1-3	1,8,15, 17,21
A	WO 88 04904 A (GARLAND) 14 July 1988 see figures 1-3,6,16	1,8,15, 17,21

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
10 February 1997	25.02.97

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+ 31-70) 340-3016	Mysliwetz, W

INTERNATIONAL SEARCH REPORT

Interna al Application No
PCT/US 96/17383

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-3575465	20-04-71	NONE	
WO-A-8804904	14-07-88	US-A- 4763580	16-08-88