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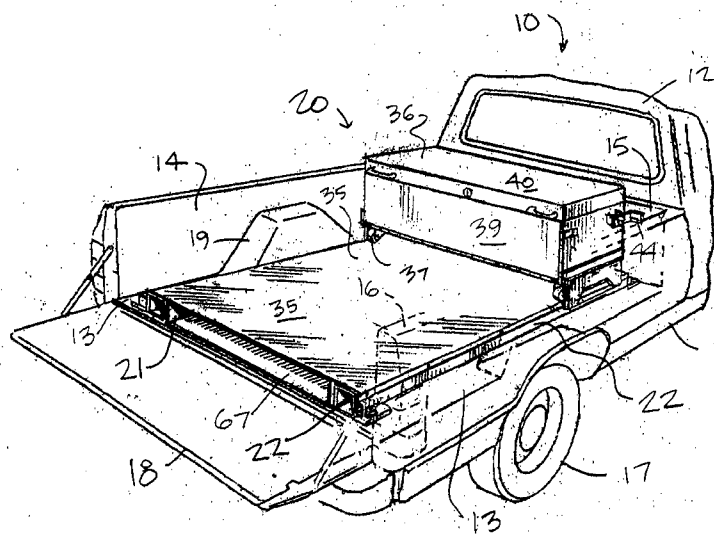
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[Continued on next page]

(54) Title: VEHICLE CARGO STORAGE SYSTEM



(57) Abstract: A vehicle cargo storage system attaches to a truck bed, providing a plurality of beams that can support individual fasteners (e.g. eyebolts) to which cables can attach for securing a load. Alternatively, a load carrying module having a cargo deck and an under deck storage area is affixable to the beams. Optional devices (e.g. toolbox, grill, table, storage containers/boxes) can be supported upon the cargo deck or under deck storage area of the load carrying module.

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PATENT APPLICATION

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TITLE OF THE INVENTION

"VEHICLE CARGO STORAGE SYSTEM"

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CROSS-REFERENCE TO RELATED APPLICATIONS

Priority is hereby claimed to US patent application
serial number 11/187,447, filed 22 July 2005, which is also
incorporated herein by reference, and to US patent
15 application serial number 11/187,475, filed 22 July 2005.

In the US this is a continuation in part of US patent
application serial number 11/187,475, filed 22 July 2005,
which application is a continuation in part of US Patent
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20 which 2005 application also claimed priority to US
provisional patent application serial number 60/590,186
filed 22 July 2004.

In the US this is a continuation in part of US patent
application serial number 11/187,447, filed 22 July 2005,
25 which application claimed priority to US provisional patent
application serial number 60/590,187, filed 22 July 22
2004.

In the US this application also claims priority to US
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30 filed 22 July 2004.

In the US this application also claims priority to US
provisional patent application serial number 60/590,187,
filed 22 July 22 2004.

Each of the above referenced applications is
35 incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
DEVELOPMENT

Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

5 Not applicable

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to truck bed cargo storage systems. More particularly, the present invention
10 relates to an improved vehicle cargo storage system that is attached to the bed of a truck such as a common pick-up truck, wherein a rail system optionally accepts tie down anchors (e.g. eyelets), a platform, modules for storing boxes of different configurations, accessories such as a
15 grill, toolbox and/or table, and optionally providing a multi-level storage arrangement that includes a deck having an under storage area that receives elongated relatively thin boxes and an upper cargo deck that supports accessories such as a toolbox, grill or the like.

20 The present invention also relates to a vehicle cargo transport apparatus and method that can be used to carry and secure packages or loads on vehicles such as trucks, vessels, airplanes, rail cars and the like.

2. General Background of the Invention

25 Trucks such as the common pick-up truck typically provide an elongated bed area that is usually about six and one half to eight feet long (or longer) and that is surrounded by walls that include left and right bed walls, the passenger compartment of the vehicle and a forward bed
30 wall next to it as well as a removable rear wall commonly called a tailgate.

The present invention provides an improved load and cargo carrying system that maximizes storage area for a pick-up truck bed. However, the system of the present
35 invention can be also adapted to other transportation

vehicles (e.g. train, truck, marine vessel, aircraft, trailer, rail car) or can optionally be used with certain stationary structures (e.g. a dock, slab, or offshore platform).

5 Vehicles such as trucks, vessels, airplanes and rail cars provide a load platform with an upper surface that carries large packages to and from selected destinations. Tie down straps are often used to secure a load to the upper surface of the load platform of the vehicle. In a
10 marine environment, work boats carry loads to and from offshore locations such as oil well drilling and production platforms. In heavy seas, these loads are desirably restrained in multiple directions.

15 Truck and trailer rigs typically employ tie down straps that are positioned side-to-side, extending to the left and right sides of the vehicle load platform upper surface.

BRIEF SUMMARY OF THE INVENTION

20 The apparatus of the present invention comprises a truck bed load carrying system of improved configuration.

25 The present invention thus provides a vehicle cargo storage system for use with a vehicle load carrying bed that includes a frame that is attached to the vehicle at its load carrying bed, the frame including a pair of longitudinal beams and one or more transverse beams that
30 define together an overall rectangular shape generally corresponding to the shape of the bed. Each of the beams is hollow, including a beam wall surrounding a bore. A plurality of beam openings extend through the beam wall at spaced apart positions such as for example about one foot
35 apart. Preferably, these beam openings are on the top of the beam wall.

 A plurality of tie down fittings are provided that each can removably attach to the beam wall at a selected
35 opening, at least some of these tie down fittings providing

eyelets. As an option, one or more accessories are provided that optionally fit the frame. These accessories can include for example a cargo module that is attachable to the frame, the module including an upper deck and a lower cargo carrying receptacle. Other accessories include for example a storage box, a platform, a toolbox, or a barbecue pit as examples.

The present invention further provides an improved vehicle cargo transport apparatus for carrying and securing a load to a selected vehicle. The system includes a vehicle having a load platform with an upper surface preferably flush with the upper surface.

Beams are affixed to the load platform at the upper surface. A first pair of the beams forms an angle with a second pair of the beams. In the preferred embodiment, the first pair of beams are generally parallel and each forms an angle of about 90° with each beam of a second pair of beams. The second pair of beams are thus preferably generally parallel.

In one embodiment, a plurality of tie down anchors (preferably eye bolts) are selectively and removably attachable to spaced apart openings or sockets that are located at different positions along the beams. The anchors enable multiple load tie down straps to be selectively attached to the beams at the tie down anchors when securing the load.

A plurality of the tie down straps, slings, chains or the like are provided for securing the load to the platform, each strap or sling extending between a tie down anchor affixed to one beam and another tie down anchor on another beam.

The tie down anchors are provided with a proximal upper end portion and an expandable distal lower end portion. This lower end portion interlocks with the openings or sockets when the proximal portion of the anchor

is rotated.

In the preferred embodiment, the anchor proximal end portion is an eyelet mounted on a shaft that can be rotated relative to the remaining portion of the tie down anchor.

5 The expandable portion of each tie down anchor includes a plurality of separate members that move between retracted and expanded positions.

The vehicle can be a marine vessel, a truck, an aircraft, an automobile, or a rail car.

10 The tie downs preferably include a strap or sling and a sleeve that is attached to the strap. The sleeve forms an interface between each strap and the load to be secured. The sleeve is preferably of a softer foam material (core) covered with a generally cylindrically shaped wall of a
15 harder material that can be color coded to define the load being transported.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

For a further understanding of the nature, objects, and advantages of the present invention, reference should
20 be had to the following detailed description, read in conjunction with the following drawings, wherein like reference numerals denote like elements and wherein:

Figure 1 is a perspective view of the preferred embodiment of the apparatus of the present invention;

25 Figure 2 is a perspective view of the preferred embodiment of the apparatus of the present invention;

Figure 3 is a partial perspective view of the preferred embodiment of the apparatus of the present invention;

30 Figure 3a is a sectional view taken along lines 3a-3a of figure 3;

Figure 4 is a fragmentary perspective view of the preferred embodiment of the apparatus of the present invention;

35 Figures 5A-5D are other fragmentary perspective views

of the preferred embodiment of the apparatus of the present invention showing the anchor portion;

Figure 6 is a partial exploded perspective view of the preferred embodiment of the apparatus of the present invention;

Figure 7 is a fragmentary perspective view illustrating the toolbox accessory;

Figure 8 is a fragmentary perspective view illustrating the grill accessory;

Figure 9 is a partial perspective view of the preferred embodiment of the apparatus of the present invention showing one of the cargo boxes that is housed in the under deck storage area;

Figure 10 is a partial perspective view of the preferred embodiment of the apparatus of the present invention showing one of the cargo boxes that is housed in the under deck area;

Figure 11 is a fragmentary perspective view of the preferred embodiment of the apparatus of the present invention showing an alternate accessory in the form of a folding table in its folded position;

Figure 12 is a fragmentary perspective view of the preferred embodiment of the apparatus of the present invention showing an alternate accessory in the form of a folding table in an operating position;

Figure 13 is a partial perspective view that shows an insert portion that is used with a fastener for attachment to one of the beams of the apparatus of the present invention;

Figure 14 is a sectional view of the insert shown in figure 13;

Figures 15 and 16 are elevation views of an eyebolt that can be used with the insert of figures 13-14;

Figure 17 is an elevation view of a fastener portion of the preferred embodiment of the apparatus of the present

invention;

Figure 18 is a sectional view taken along lines 18-18 of figure 17;

Figure 19 is an end view taken along lines 19-19 of
5 figure 17;

Figures 20-21 are perspective views showing the preferred embodiment of the apparatus of the present invention with optional loading ramps;

Figure 22 is a perspective view of an alternate
10 embodiment of the apparatus of the present invention;

Figure 23 is a fragmentary perspective view of the alternate embodiment of the apparatus of the present invention;

Figure 24 is another fragmentary perspective view of
15 the alternate embodiment of the apparatus of the present invention;

Figure 25 is a sectional view taken along lines 24-24 of figure 23;

Figure 26 is a partial perspective, fragmentary of the
20 alternate embodiment of the apparatus of the present invention, illustrating the vehicle load platform upper surface and one of the metallic beams, prior to modification;

Figure 27 is a partial perspective, fragmentary of the
25 alternate embodiment of the apparatus of the present invention, illustrating the vehicle load platform upper surface and one of the metallic beams, prior to modification;

Figure 28 is a partial perspective view of the
30 alternate embodiment of the apparatus of the present invention showing insertion of a new section having a socket for one of the beams attached to the vehicle load platform upper surface;

Figure 29 is a partial perspective view of the
35 alternate embodiment of the apparatus of the present

invention showing insertion of a new section having a socket for one of the beams attached to the vehicle load platform upper surface;

5 Figure 30 is a partial perspective view of the alternate embodiment of the apparatus of the present invention illustrating attachment of a tie down anchor to the vehicle load platform; and

10 Figures 31, 32 and 33 are top, side and end views respectively of the new section of beam added in figures 28 and 29.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

15 In figures 1-4, vehicle and cargo storage system 10 shows a pick-up truck body 11 having a passenger compartment or cab 12, bed 13, bed walls 14, 15, 16, a plurality of wheels 17 and a folding tailgate 18. Such commercially available trucks (e.g. FORD, CHEVROLET, DODGE) having a body 11 as shown are well known. The body 11 can provide a pair of wheel wells 19. Such a prior art known truck is designated generally by the numeral 20 in figure 20 1.

Vehicle cargo storage cargo system 10 provides a pair of longitudinal beams 21, 22 that are preferably parallel and one or more transverse beams 23, 24. These beams 21, 22, 23, 24 are shown in figure 3. The beams 23, 24 can be 25 generally parallel and extend longitudinally, each beam 23, 24 being attached to bed 13 next to a bed wall 14 or 16. Each of the beams 21, 22 is preferably a transverse beam that is perpendicularly oriented to the beams 23, 24. In figures 3-3A, the beams 21, 22 can be removably attached to 30 forward anchors 25 that can be permanently or removably connected (for example, bolted) to truck bed 13. Forward anchor 25 (see figure 3A) can include a plate 26 having an opening 27 that is receptive of fastener 29. Fastener 29 can be a common bolted (i.e. bolt and nut and washer(s)) 35 connection. However, the fastener 25 can also be a

5 specially configured device indicated as locking member 32 in figures 17-19 or the fastener shown and described in prior, copending application number 10/071,786 filed February 7, 2002 entitled "Toggle Bolt Device", hereby incorporated herein by reference.

10 Each forward anchor 25 can be in the form of a square tubing section 28 connected (e.g. welded) to plate 26 and that fits an open bore 30 of a longitudinal beam 21, 22. This type of a connection between anchor 25 and beam 22 is sometimes referred to as a stab fitting or stab type connection. When a fastener (e.g. bolted connection) 29 is used to secure anchor 25 to truck bed 13, a nut 31 can be used to complete the connection. However, a nut 31 can also be attached to the locking member 32 of figures 17-19.

15 Truck bed 13 provides truck bed openings 33 that are receptive of any suitable fastener or a bolted connection 29 or a locking member 32. Openings at 33, 34 are provided so that fastener 29 or locking member 32 can extend through square tubing section 28, as well as the truck bed 13 as shown in figure 3A.

20 Figures 4 and 5A-5D show an alternate forward anchor 52. In figure 4, anchor 52 has a square tubing section 54 with attached stab fitting 53. Flange 55 is welded or otherwise attached to square tubing section 54. Slot 56 in flange 55 enables a connector 32 or a fastener/bolted connection 29 as shown in figure 3 to secure flange 55 and thus anchor 52 to truck bed 13. Openings 58 enable eyebolts 60 (or any other eyebolt) to be removably connected to beams 21, 22. Several such beam openings 58 can be provided at intervals along beams 21, 22, 23, 24 as seen in figure 3.

25 A selected beam 21 or 22 can be removably affixed to anchor 52 by connecting with stab fitting 53 as indicated by arrow 59 in figure 4.

30 In figure 5A, transverse beam 23 can attach to anchor

52 using fastener 29 or 32 or eyebolt 60 with insert 61. In such a case, openings 62 and 57 are aligned with insert 61 penetrating both of the openings 57, 62. In figures 4 and 5B-5D, multiple stab fittings 53 can be provided with anchor 52 so that vertical beams can be used to build an upwardly extending frame having transverse beams and longitudinal beams at an elevated level(s) and/or for connecting one longitudinal or transverse beam to another.

A platform or raised cargo box 35 can be attached to the beams 21, 22 and 23-24 as shown in figures 1 and 6. Raised cargo deck 35 provides a deck 35A. Box 35 can support a number of different accessories and containers such as toolbox 36, grill 63, table 68, and/or storage boxes 64, 65, 66 or a ramp. The raised cargo deck 35 includes an under deck panel 48 connected at its edges to a pair of flanges 49, 50 that extend longitudinally and generally parallel to the longitudinal beams 21, 22. An interior 67 is receptive of storage boxes 64, 65, 66 or other accessories such as folding table 68.

Toolbox 36 is preferably wheeled so that it can travel between a position next to cab 12 as shown in figure 1 and a position shown in figure 2 near tailgate 18. This travel path is indicated schematically by arrow 77 in figure 1.

In figure 6, toolbox 36 provides casters 37 attached to body 38. The body 38 can have a hingedly mounted front panel 39 and a hingedly mounted lid or top panel 40. The two panels 39, 40 conceal a compartmentalized storage area 41 that can include for example a plurality of drawers. The toolbox 36 rests upon platform 42 that has a plurality of downwardly extending fingers 43. Fingers 43 engage the sides of raised cargo box 35, thus ensuring that the toolbox 36 will track a straight path when moving between the forward position of figure 1 and the rear position of figure 2. Latches 44 retain toolbox 36 (or grill 63) in the forward position of figure 1, next to cab 11. Each

latch 44 includes a locking member 46 that can be spring loaded to engage aperture 47 of socket 45 on toolbox 36 (or grill 63). The toolbox 36 (or grill 63) is released to travel to the rearward position of figure 2 by pulling locking member 46 overcoming spring pressure.

Another accessory that can be mounted upon platform 42 is the grill 63 shown in figure 8. In addition to the storage boxes 64, 65, 66 that can be stored with an interior 67 of raised cargo box 35, a table 68 can also be stored in that area. Table 68 is shown in figure 11 in a stored position. In figure 12, the table 68 has been pulled to an expanded, operating position wherein leg frame 69 has been unfolded to an operating position, released from its retainer 70. In figure 12, a part of the table is supported by leg frame 69. The opposing end portion of the table 68 remains housed with an interior 67 of raised cargo deck 35 thus being supported by the cargo deck 35 and the truck 20. In figure 12, the tailgate 18 assumes a lowered, open position.

It is possible to carry loads inside of the beams 21, 22, 23, 24 when the raised cargo deck 35 is not in place. In such a situation, a plurality of eyebolts 60 can be attached to a selected one of the beams 21, 22, 23, 24 by attaching insert 61 to a selected opening 58. Alternatively, common threaded eyebolts can be attached using a nut and washer(s).

In figures 13 and 14, insert 61 can be seen as including a cylindrical portion 71 that supports a plurality of lower diagonally extending angled tabs 72 in a plurality of upper angled tabs 73 that extend at about right angles to the cylindrical portion 71 and thus generally parallel with the upper surface of the beam 22 to which it is attached as shown in figure 14. A gap 74 is seen above each tab 72 in figure 14. Opening 58 includes a larger diameter section 75 and a smaller diameter section

76.

Upon insertion, the tabs 72 engage the larger diameter section 75 and expand to fit into it as shown in figures 15 and 16 when eyebolt 60 is connected to the combination of insert 61 and beam 22 at opening 58. The distance between tabs 72, 73 can be selected to suit the thickness of the material (e.g. square tubing) to be drilled with opening 58, or when two beams such as 22, 23 are to be fitted with an insert 61 (see figures 4-5) and a fastener or eyebolt 29, 32, 60. Eyebolt 60 can be provided with lower projecting members 78 that automatically extend when eyelet 79 is rotated.

The mechanism that extends the projecting members 78 can be the same as the mechanism of prior application 10/071,786 that extends projecting members 80 of fastener 32 and is illustrated in figures 17-19. Fastener 32 has a cylindrically shaped body 81 having external threads 82 at its upper end portion 83 and can be unthreaded at its lower end portion 84. Central bore 85 receives shaft 86 which is threaded at 87, 88 and unthreaded at 89, 90. Bore 85 is correspondingly shaped to receive shaft 86. Projecting members 80 move to an extended position when shaft 86 is rotated using wrench 91.

Shaft 86 provides head 92 with tool receptive socket (e.g. hexagonal) 93. Nut 94 engages the threads 82 so that it can be tightened against projecting members 80 once they are extended (see for example prior application 10/071,786 for operation of projecting members 80 when shaft 86 is rotated). Disk 95 threadably engages shaft 86 at threads 88. Lock nut 96 retains disk 95 in position upon shaft 86 at threads 88. Set screws 97, 98 can be used to affix the position of each nut 94, 96.

Figures 20 - 21 illustrate that a ramp or ramps can connect to cargo box 35. Ramp sections 99, 100 define a hinged ramp with the sections 99, 100 connected at hinge

101. Part of ramp section 99 is received into interior 67 of cargo box 35 as shown in figure 20 and can be locked in place with a locking pin or pins (not shown). In figure 21, two ramps 102, 103 are connected to the left and right sides of cargo box 35 using stab fittings 104, 105 provided at the top of each ramp 102, 103. The stab fitting 104 is inserted into interior 67 of cargo box 67 while the stab fitting 105 is inserted into bore 30 of longitudinal beam 22, held in place with locking pin 106. Similarly, a stab fitting 105 of ramp 102 inserts into bore 30 of longitudinal beam 21. Either ramp arrangement of figure 20 or 30 could be used to load a smaller vehicle such as an all terrain vehicle, lawnmower, small tractor or golf cart to the upper surface of cargo box 35.

15 In figure 22, the present invention provides a vehicle cargo transport apparatus 110 that features specially configured securements for holding a package 150 to the load carrying surface 113 of a vehicle 111, restraining it from movement in numerous directions.

20 A vehicle 111 (e.g. marine vessel, truck, rail car, aircraft, wagon or the like) provides a vehicle platform 112 with an upper load carrying surface 113. In figures 22 and 26-33, vehicle platform 112 upper surface 113 can be defined by a plurality of wooden, plastic or metallic members 114, 115, 116 or like structural supports. An underdeck 139 (e.g. steel plate) can be provided under the members 114, 115, 116. A groove 117 in platform 112 (see figure 30) carries each of a plurality of beams (e.g. 118, 118A). Preferably four or more beams 118, 119, 120, 121 are provided that surround a package 150 or other load to be transported. The plurality of beams can include front and rear transverse beams 118, 119 respectively. The plurality of beams can provide a second pair of beams, namely first and second longitudinal beams 120, 121.

35 In the preferred embodiment, the beams 118, 119 are

parallel. In the preferred embodiment, the beams 120, 121 are parallel. Each of the beams of the first pair 118, 119 are generally perpendicular to each of the beams 120, 121 of the second pair.

5 Each of the beams 118, 119, 120, 121 is provided with a plurality of openings or sockets 122. Each socket 122 can be part of a new section of beam that replaces part of an existing beam. For example, in offshore work boats, some beams 118A are often existing beams that are provided
10 in the vehicle platform 112 upper surface 113 as shown in figure 26. Alternatively, openings or sockets 122 can be selectively positioned in a metal deck.

For vehicles 111 already having a vehicle platform 112 provided with beams such as beam 118A, the existing beam
15 118A can be modified by replacing a section of the beam 118A with a new section 138. In figure 27, the removed section 137 is shown. In figures 29 and 30, the new section 137 is shown having been welded into the position that was vacated by the removed section 137. The weld
20 beads 143 are shown in figure 29 for joining the new section 138 to the existing beam 118A, thus forming a new beam 118.

Each beam 118, 119, 120, 121 provides a socket or opening 121 that is receptive of a specially configured
25 bolt 145. The new section 138 provides reinforcing that surrounds the socket 122, namely upper plate 140, flanges 141, 142 and plate 150. An insert 144 that is specially configured is placed in an opening formed in plate 140, the insert 144 and opening defining socket 122.

30 Bolt 145 is a specially configured bolt that is shown and described in prior U.S. patent application serial no. 10/071,786 filed February 7, 2002, hereby incorporated herein by reference.

Bolt 145 provides proximal end 146 and a distal end
35 147. An eyelet 148 can be provided in proximal end 146.

After insertion of bolt 145 into socket 122, the proximal end 146 portion (for example eyelet 148) is rotated. Socket 122 can be provided with a reinforcing insert 144. This rotation causes a plurality of extendable members 151 to move from a retracted position that enables the bolt 145 to be inserted into the socket 122 to an expanded position that prevents the bolt 145 from being removed from the socket 122. In figure 22, a plurality of beams 118, 119 and 120, 121 are shown that are positioned in a rectangular fashion and surrounding load 150 to be secured. A plurality of tie down straps include cables 123 and cushions 124. The cushions 124 are surrounded by a cylindrical outer wall 125. The cushions 124 include a foam core 136. A radial slot 127 communicates between bore 126 and cylindrical outer wall 125. As shown in figures 24 and 25, this slot 127 enables each cushion 124 to be mounted upon a selected length of cable by spreading the slot 127 as indicated by arrow 133 in figure 24. Once mounted upon a section of cable 123, a plurality of straps 129 can be used for securing each cushion 124 to the cable 123. Each strap 129 provides fastener material 130. Correspondingly positioned fastener material 131 on cylindrical outer wall 125 enables a connection to be made between each strap 129 and cylindrical outer wall 125. This fastener material 130, 131 can be for example hook and loop material (for example Velcro). Arrows 134 illustrate the connection of straps 129 to cylindrical outer wall 125 of cushion 124. Cushion 124 provides surface 132 that can be of a selected color and/or pattern (e.g. stripes, cross hatch, etc.). Similarly, strap 129 provides a surface 128 that can be colored and/or patterned as well. The surfaces 128, 132 can be color coded and thus used to identify the contents of package or load 150.

The following is a list of parts and materials suitable for use in the present invention. Fastener 32 of

figures 17-19 can also be used with an insert 61.

PARTS LIST

	<u>Part Number</u>	<u>Description</u>
5	10	vehicle cargo storage system
	11	body
	12	cab
	13	bed
	14	bed wall
10	15	bed wall
	16	bed wall
	17	wheel
	18	tailgate
	19	wheel well
15	20	truck
	21	longitudinal beam
	22	longitudinal beam
	23	transverse beam
	24	transverse beam
20	25	forward anchor
	26	plate
	27	opening
	28	square tubing section
	29	fastener/bolted connection
25	30	open bore
	31	nut
	32	fastener
	33	truck bed opening
	34	opening
30	35	raised cargo box
	36	toolbox
	37	caster
	38	body
	39	front panel
35	40	top panel

	41	storage area
	42	platform
	43	finger
	44	latch
5	45	socket
	46	locking member
	47	aperture
	48	under deck
	49	flange
10	50	flange
	51	fastener
	52	forward anchor
	53	stab fitting
	54	square tubing section
15	55	flange
	56	slot
	57	opening
	58	opening
	59	arrow
20	60	eyebolt
	61	insert
	62	opening
	63	grill
	64	storage box
25	65	storage box
	66	storage box
	67	interior
	68	folding table
	69	folding leg frame
30	70	retainer
	71	cylindrical portion
	72	lower angled tab
	73	upper angled tab
	74	gap
35	75	larger diameter section

	76	smaller diameter section
	77	arrow
	78	projecting member
	79	eyelet
5	80	projecting member
	81	body
	82	threads
	83	upper end portion
	84	lower end portion
10	85	bore
	86	shaft
	87	threaded section
	88	threaded section
	89	unthreaded section
15	90	unthreaded section
	91	wrench
	92	head
	93	socket
	94	nut
20	95	disk
	96	nut
	97	set screw
	98	set screw
	99	first ramp section
25	100	second ramp section
	101	hinge
	102	left ramp
	103	right ramp
	104	stab fitting
30	105	stab fitting
	106	locking pin
	110	vehicle cargo transport system
	111	vehicle
	112	vehicle platform
35	113	upper surface

	114	wooden' member
	115	wooden member
	116	wooden member
	117	groove
5	118	front transverse beam
	118A	existing beam
	119	rear transverse beam
	120	first longitudinal beam
	121	second longitudinal beam
10	122	socket
	123	cable
	124	cushion
	125	cylindrical outer wall
	126	central bore
15	127	radial slot
	128	surface
	129	strap
	130	fastener material
	131	fastener material
20	132	surface
	133	arrow
	134	arrow
	135	arrow
	136	foam core
25	137	removed section
	138	new section
	139	underdeck
	140	plate
	141	flange
30	142	flange
	143	weld bead
	144	insert
	145	bolt
	146	proximal end
35	147	distal end

148	eyelet
149	plate
150	package
151	extendable members

5 The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.

CLAIMS

1. A vehicle cargo storage system for use with a vehicle load carrying bed comprising:

5 a) a frame that attaches to a vehicle at its load carrying bed; the frame including a pair of longitudinal beams and a pair of transverse beams that define together a generally rectangular shape;

10 b) a cargo module affixable to the frame, the module including an upper deck and a lower cargo carrying receptacle;

15 c) a plurality of accessories that optionally fit the cargo module including at least one accessory affixable to the upper deck and traveling between fore and aft positions thereupon and at least one accessory sized and shaped to fit the receptacle; and

20 d) a plurality of tie down anchor bolts that are attachable to the frame when either there is no cargo module attached to the frame or when there is no accessory affixed to the module upper deck, at least some of the anchor bolts providing eyelets that accept tie down straps.

2. The vehicle cargo storage system of claim 1 wherein the frame has frame corners and the frame is attached to the vehicle cargo bed at the corners.

25 3. The vehicle cargo storage system of claim 1 wherein at least one of the beams is hollow, providing a bore surrounded by a beam wall.

4. The vehicle cargo storage system of claim 1 wherein each of the beams is hollow, each beam providing a bore surrounded by a beam wall.

30 5. The vehicle cargo storage system of claim 3 wherein there are openings in the beam wall

6. The vehicle cargo storage system of claim 1 wherein some of the anchor bolts connect a beam of the frame to the vehicle load carrying bed.

35 7. The vehicle cargo storage system of claim 1

further comprising a vehicle having a load carrying bed.

8. The vehicle cargo storage system of claim 4 wherein the eye bolts attach to selected ones of the beams by extending through a beam wall to communicate with a beam
5 bore.

9. The vehicle cargo storage system of claim 1 wherein one of the accessories rolls upon the combination of frame and cargo module.

10. A vehicle cargo storage system for use with a
10 vehicle load carrying bed comprising:

a) a frame that attaches to a vehicle at its load carrying bed; the frame including a pair of longitudinal beams and a pair of transverse beams that define together a generally rectangular shape;

15 b) a cargo module affixable to the frame, the module including an upper deck and a lower cargo carrying receptacle;

c) a plurality of accessories that optionally fit the cargo module including at least one accessory affixable
20 to the upper deck and traveling between fore and aft positions thereupon and at least one accessory sized and shaped to fit the receptacle; and

d) the beams including at least one hollow beam with a hollow bore and a beam wall surrounding the bore, the
25 beam wall having multiple attachment openings, and wherein one or more anchor bolts are removably attachable to the hollow beam at selected attachment openings.

11. The vehicle and cargo storage system of claim 10 further comprising connections that enable connection of a
30 transverse beam to the longitudinal beams at spaced apart positions that are at varying distances from the passenger compartment.

12. The vehicle and cargo storage system of claim 11 wherein the connections include a connector that is
35 connectable to the beam by passing through an opening in

the beam wall and being expandable in part inside the bore.

13. A vehicle and cargo storage system, comprising:

5 a) a truck having a body with a passenger compartment, a load carrying bed and a pair of longitudinally extending bed walls that extend along the sides of the bed;

10 b) a load carrying frame that attaches to a vehicle at the load carrying bed, the frame including a pair of longitudinally extending beams that are positioned next to the bed walls, and at least one transverse beam that connects to each of the longitudinal beams;

c) each of the beams being hollow, and including a beam wall surrounding a bore;

d) a plurality of beam openings in the beam wall;

15 e) a plurality tie down fittings that each removably attach to the beam wall at a selected opening, at least some of the tie down fittings providing eyelets.

20 14. The vehicle cargo storage system of claim 13 further comprising a platform that is supported by the frame.

25 15. The vehicle cargo storage system of claim 13 further comprising an accessory that is movably mounted to the frame, being movable between a position next to the passenger compartment and a position spaced away from the passenger compartment.

16. The vehicle cargo storage system of claim 15 wherein there are multiple accessories that are mounted to the frame.

30 17. The vehicle cargo storage system of claim 16 wherein the frame has frame corners and the frame is attached to the vehicle cargo bed at the corners.

18. The vehicle cargo storage system of claim 16 wherein at least one of the beams is hollow, providing a bore surrounded by a beam wall.

35 19. The vehicle cargo storage system of claim 16

wherein each of the beams is hollow, each beam providing a bore surrounded by a beam wall.

20. The vehicle cargo storage system of claim 13 wherein removable connections connect the transverse beam to the longitudinal beams.

21. The vehicle cargo storage system of claim 20 wherein bolted connections comprise the removable connections.

22. The vehicle cargo storage system of claim 21 wherein some of the bolted connections include eyebolts.

23. The vehicle cargo storage system of claim 22 wherein some of the anchor bolts connect a beam of the frame to the vehicle load carrying bed.

24. The vehicle cargo storage system of claim 13 wherein one of the accessories rolls upon the combination of frame and cargo module.

25. A vehicle and cargo storage system, comprising:

a) a truck having a body with a passenger compartment, a load carrying bed and a pair of longitudinally extending bed walls that extend along the sides of the bed;

b) a load carrying frame that attaches to a vehicle at the load carrying bed, the frame including a pair of longitudinally extending beams that are positioned next to the bed walls, and at least one transverse beam that connects to each of the longitudinal beams;

c) each of the beams being hollow, and including a beam wall surrounding a bore;

d) a plurality of beam openings in the beam wall;

e) a plurality of fixtures that each removably attach to the frame at a beam opening, each fixture including a rotatable shaft and having proximal and distal end portions, extendable members mounted to the short distal end portion, and wherein rotation of the shaft enables selective extension or retraction of the extendable

members so that a fixture can be anchored to the frame by inserting the distal end portion through a frame opening until the distal end portion occupies the bore and rotating the shaft to extend the extendable members.

5 26. A vehicle cargo transport apparatus for carrying and securing a load comprising:

 a) a vehicle having a load platform with an upper surface;

 b) first and second pluralities of beams affixed to
10 the load platform at the upper surface, the first pair of said beams forming an angle with the second plurality of said beams, each beam having at least one beam opening;

 c) a plurality of tie down anchors selectively attachable to spaced apart positions on the beams at the
15 beam openings, the anchors enabling multiple load tie down cables to be selectively attached to the beams at the tie down anchors when severing the load;

 d) a plurality of tie down cables for securing the load to the load platform, each tie down cable extending
20 between a tie down anchor on one beam opening and another tie down anchor on another beam opening; and

 e) each of the tie down anchors being provided with a proximal portion and an expandable distal portion that enables an interlock connection to be made with a beam
25 opening when the proximal portion of the anchor is rotated.

 27. The vehicle cargo transport apparatus of claim 26 wherein each tie down anchor proximal portion includes an eyelet.

 28. The vehicle cargo transport apparatus of claim 26
30 wherein the expandable portion includes a plurality of separate members that move between retracted and expanded positions.

 29. The vehicle cargo transport apparatus of claim 26 wherein the vehicle is a marine vessel.

35 30. The vehicle cargo transport apparatus of claim 26

wherein the vehicle is a truck.

31. The vehicle cargo transport apparatus of claim 26 wherein the vehicle is an aircraft.

5 32. The vehicle cargo transport apparatus of claim 26 wherein the vehicle is a rail car.

33. The vehicle cargo transport apparatus of claim 26 wherein said first pair of beams are generally parallel.

34. The vehicle cargo transport apparatus of claim 26 wherein said second pair of beams are generally parallel.

10 35. The vehicle cargo transport apparatus of claim 26 wherein a beam of the first pair of beams is perpendicular to a beam of the second pair of beams.

36. The vehicle cargo transport apparatus of claim 26 wherein the cables each include a cable and a foam sleeve
15 attached to the cable.

37. The vehicle cargo transport apparatus of claim 36 further comprising a cylindrically shaped wall surrounding the foam sleeve.

20 38. A vehicle cargo transport apparatus for carrying and securing a load comprising:

a) a vehicle having a load platform with an upper surface;

25 b) first and second pluralities of beams affixed to the load platform at the upper surface, the first pair of said beams forming an angle with the second plurality of said beams;

30 c) a plurality of tie down anchors selectively attachable to spaced apart sockets at different locations to the pairs of beams, the anchors enabling multiple load tie downs to be selectively attached to the beams at the tie down anchors when severing the load;

35 d) a plurality of tie down straps for securing the load to the load platform, each tie down strap extending between a tie down anchor on one beam and another tie down anchor on another beam;

e) the tie down anchors being provided with a proximal portion and an expandable distal portion that interlocks with the socket when the proximal portion of the anchor is rotated.

5 39. The vehicle cargo transport apparatus of claim 38 wherein each tie down anchor proximal portion includes an eyelet.

10 40. The vehicle cargo transport apparatus of claim 38 wherein the expandable portion includes a plurality of separate members that move between retracted and expanded positions.

41. The vehicle cargo transport apparatus of claim 38 wherein the vehicle is a marine vessel.

15 42. The vehicle cargo transport apparatus of claim 38 wherein the vehicle is a truck.

43. The vehicle cargo transport apparatus of claim 38 wherein the vehicle is an aircraft.

44. The vehicle cargo transport apparatus of claim 38 wherein the vehicle is a rail car.

20 45. The vehicle cargo transport apparatus of claim 38 wherein said first pair of beams are generally parallel.

46. The vehicle cargo transport apparatus of claim 38 wherein said second pair of beams are generally parallel.

25 47. The vehicle cargo transport apparatus of claim 38 wherein a beam of the first pair of beams is perpendicular to a beam of the second pair of beams.

48. The vehicle cargo transport apparatus of claim 38 wherein the tie downs each include a strap and a foam sleeve attached to the strap.

30 49. The vehicle cargo transport apparatus of claim 36 further comprising a cylindrically shaped wall surrounding the foam sleeve.

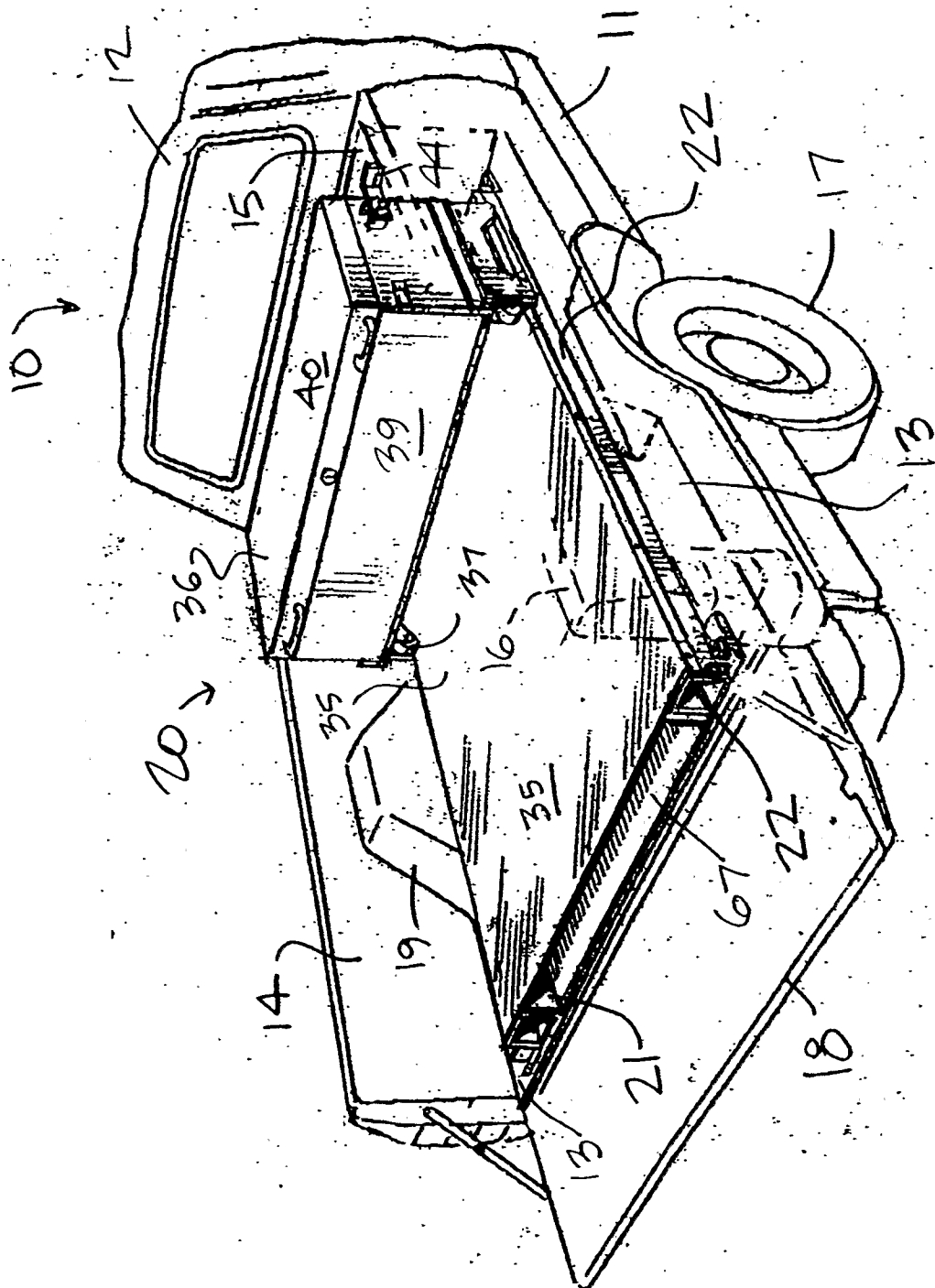


FIG. 1

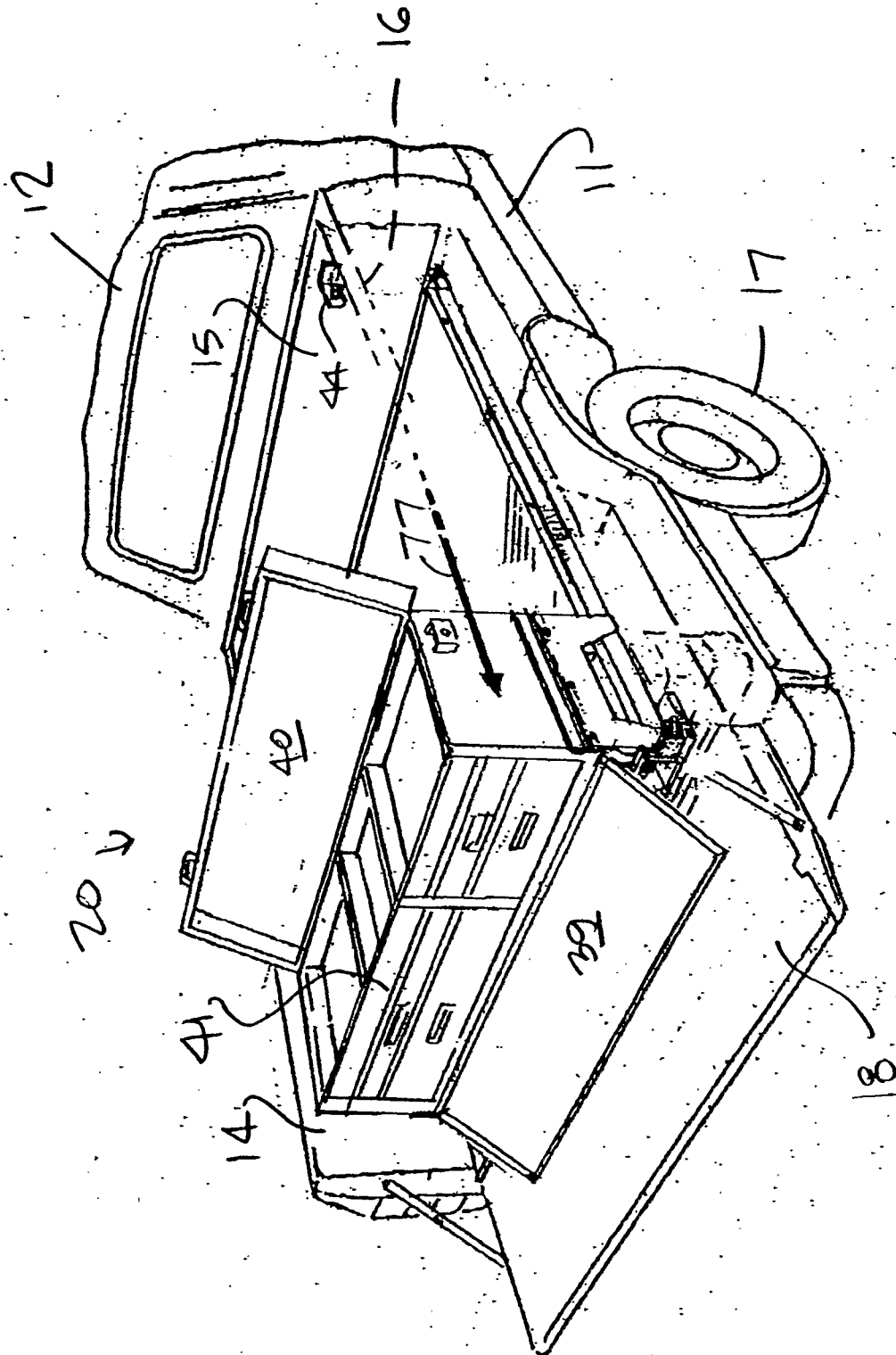


FIG. 2

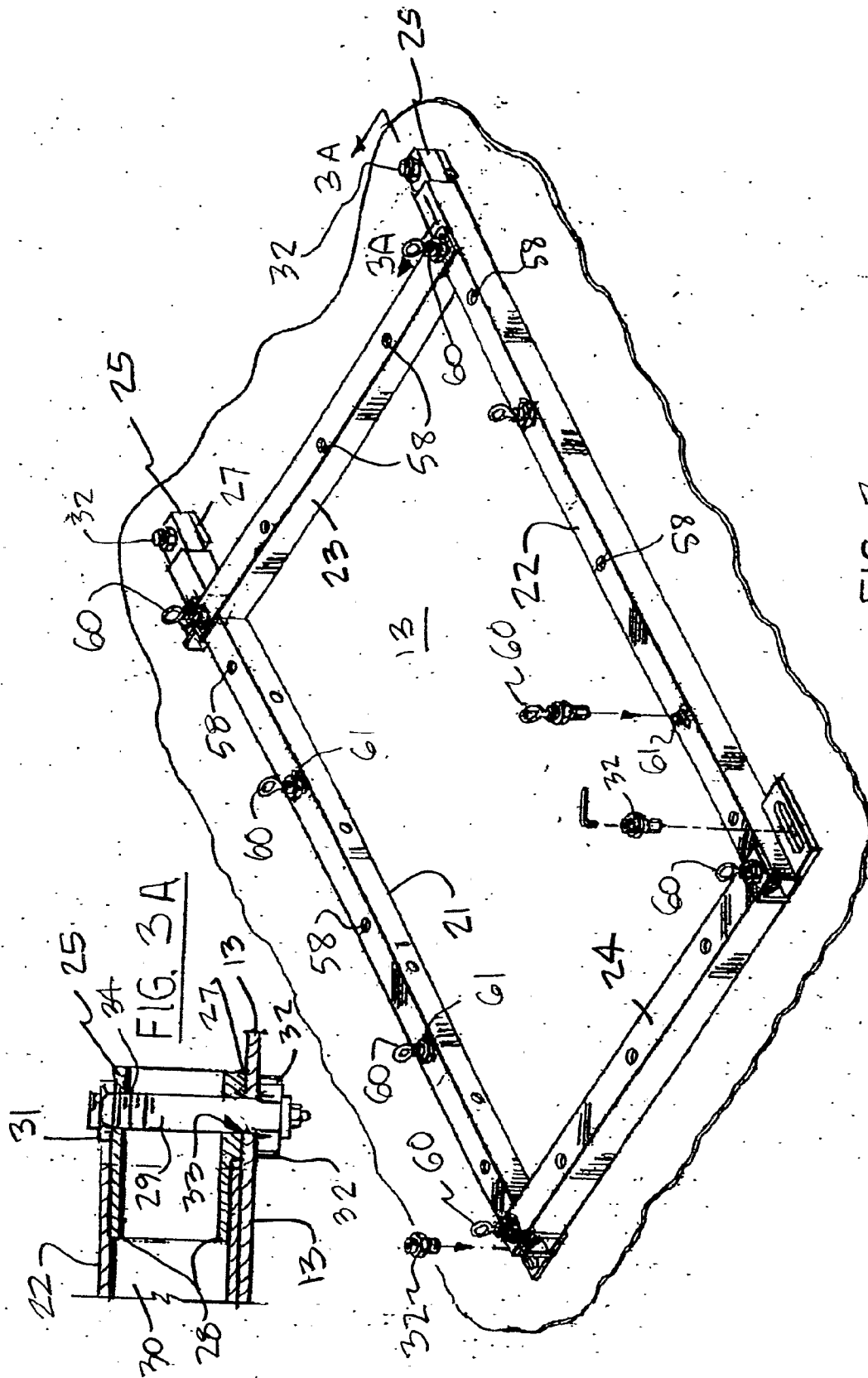
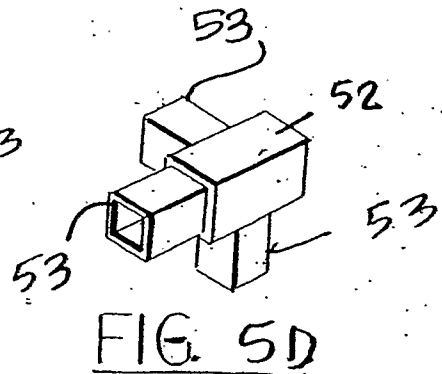
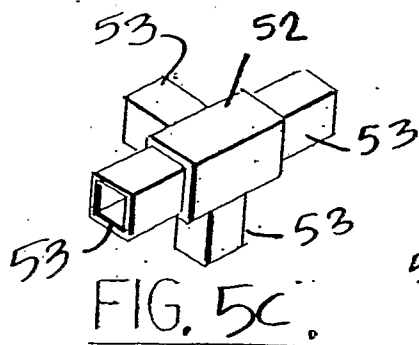
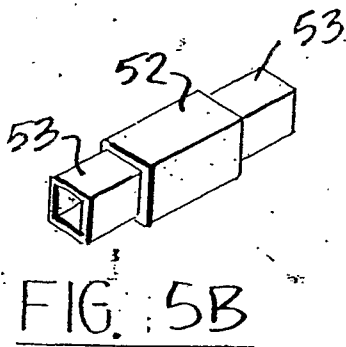
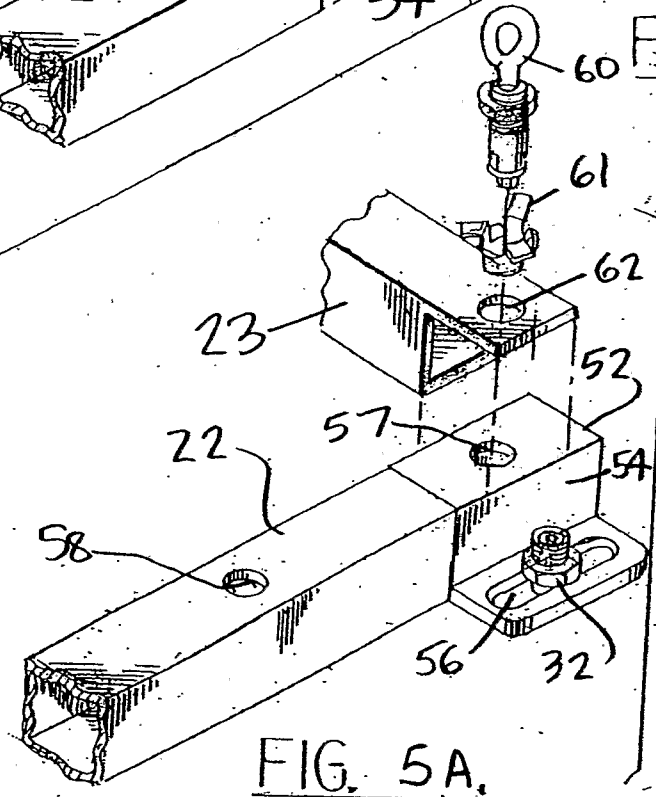
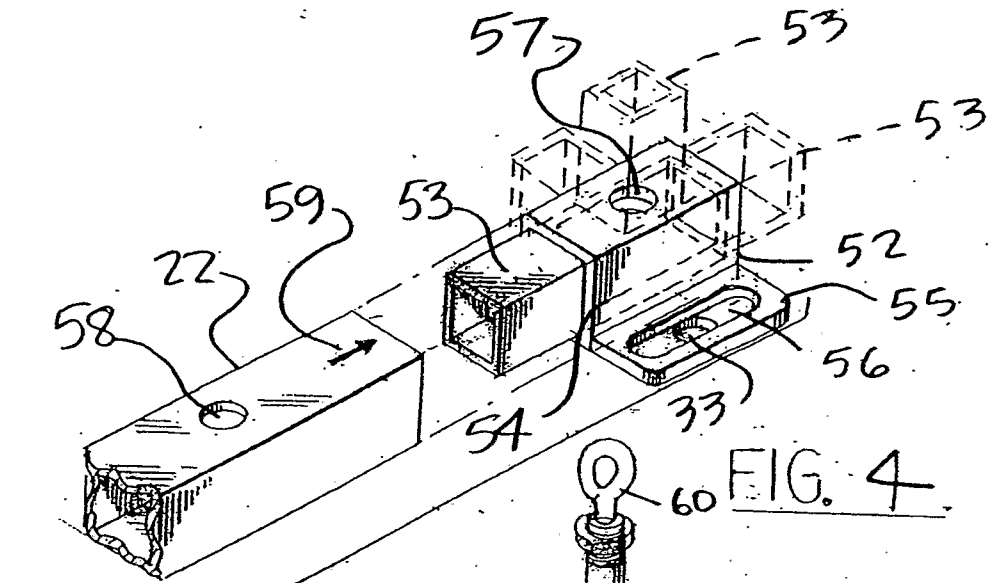
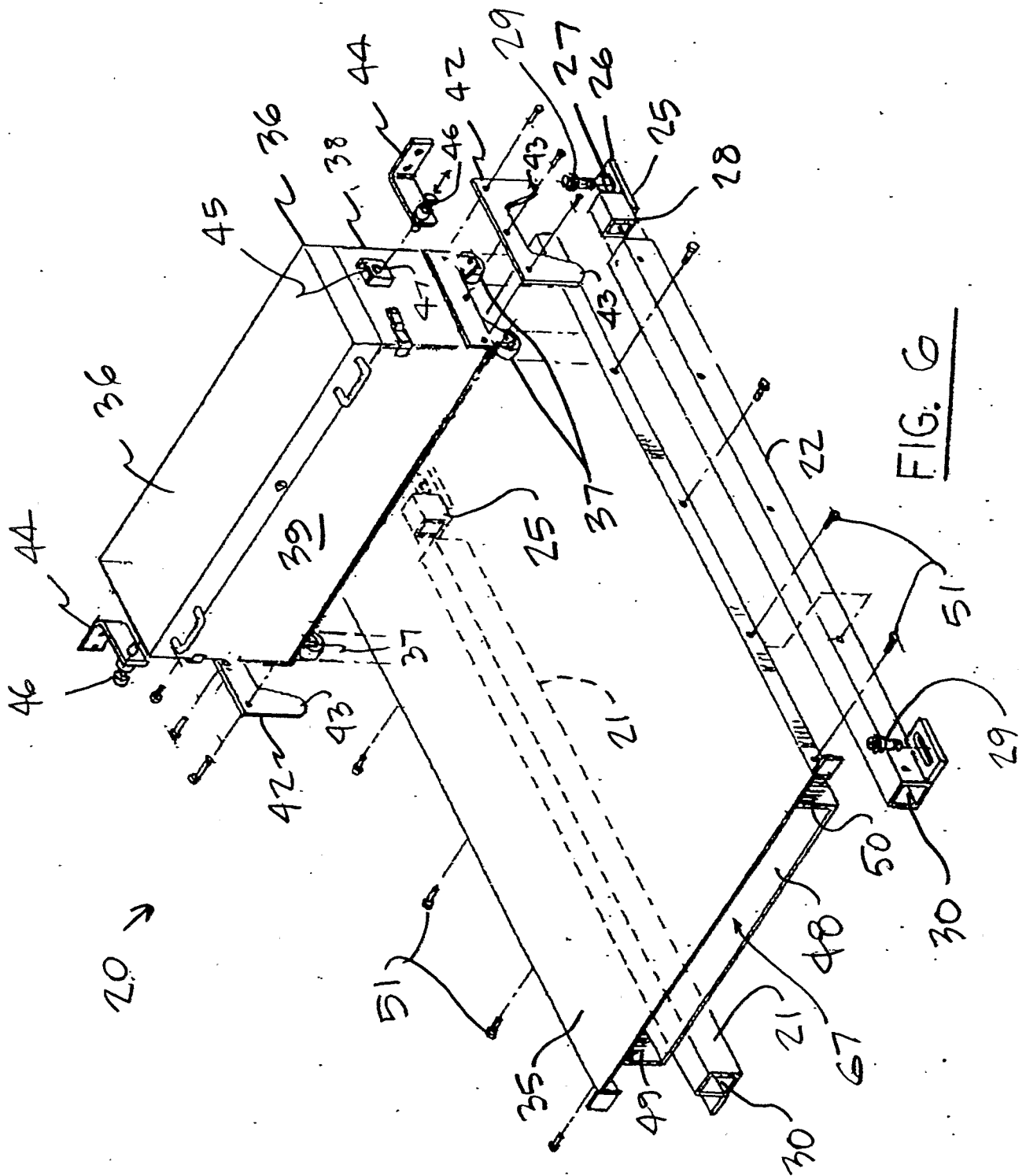
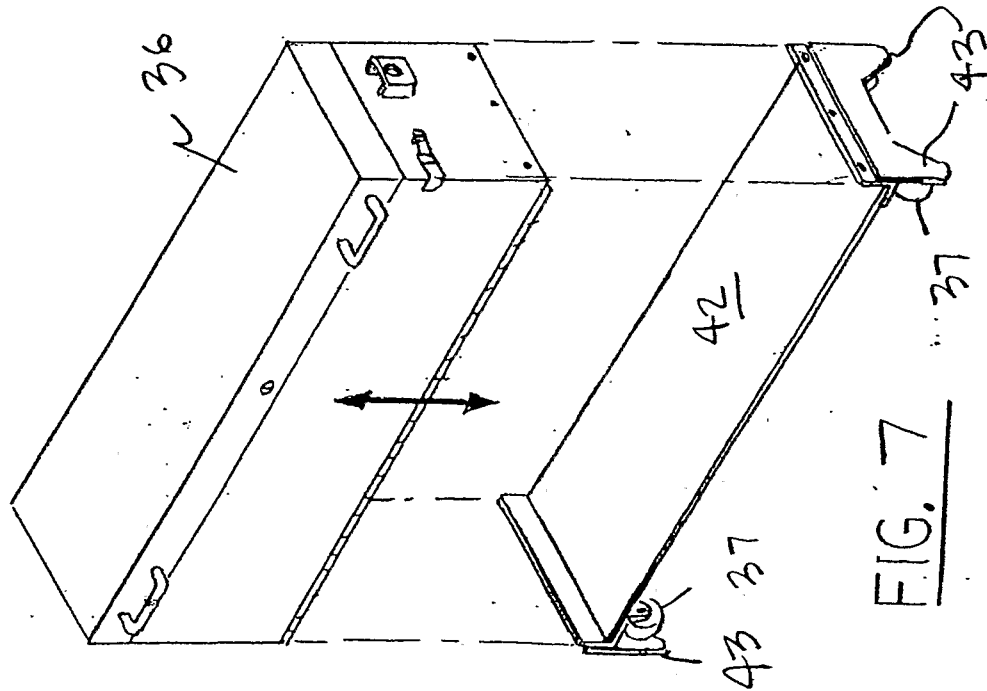
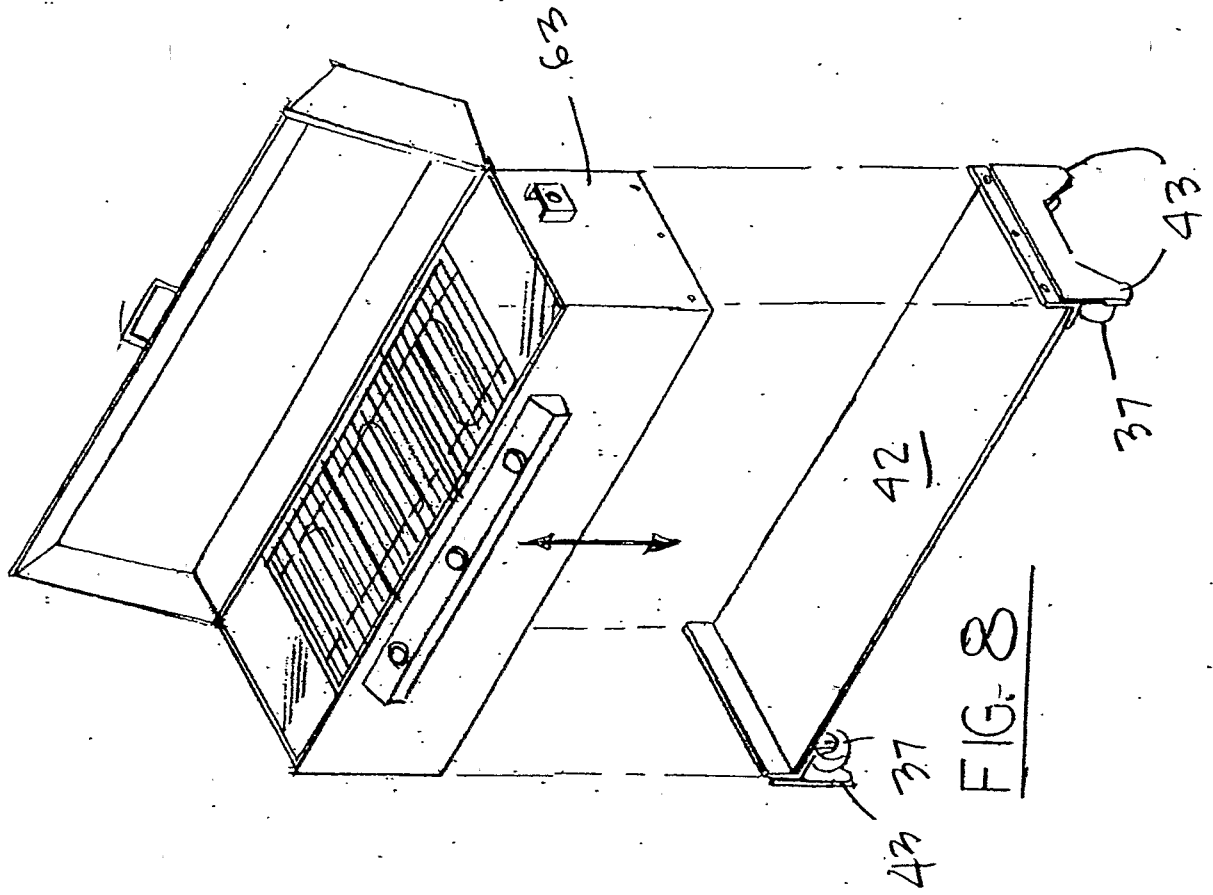


FIG. 3







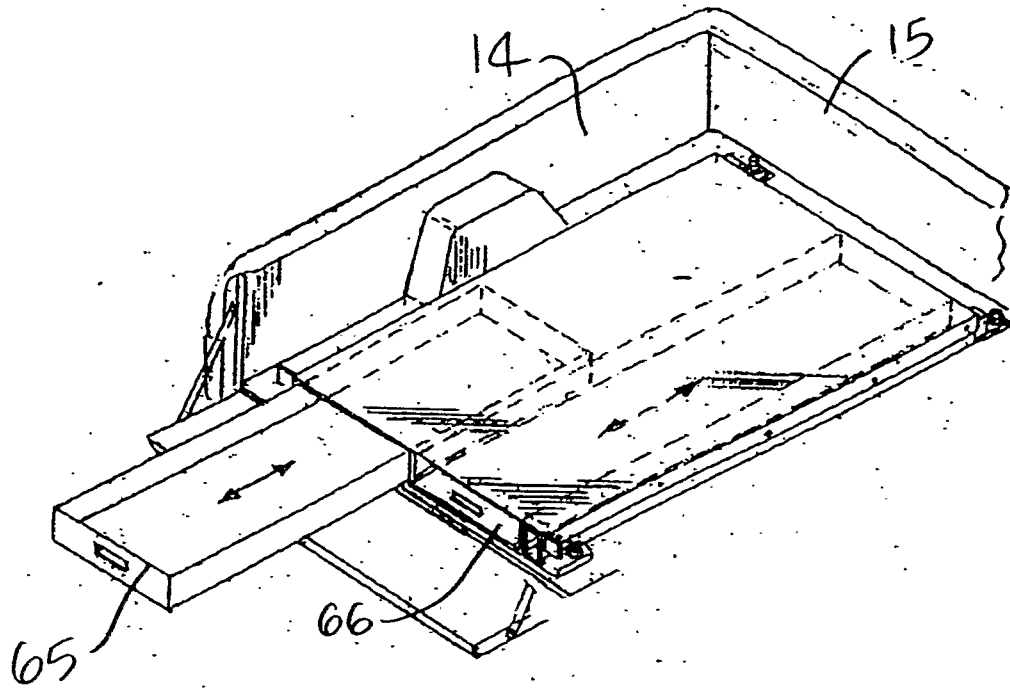


FIG. 9

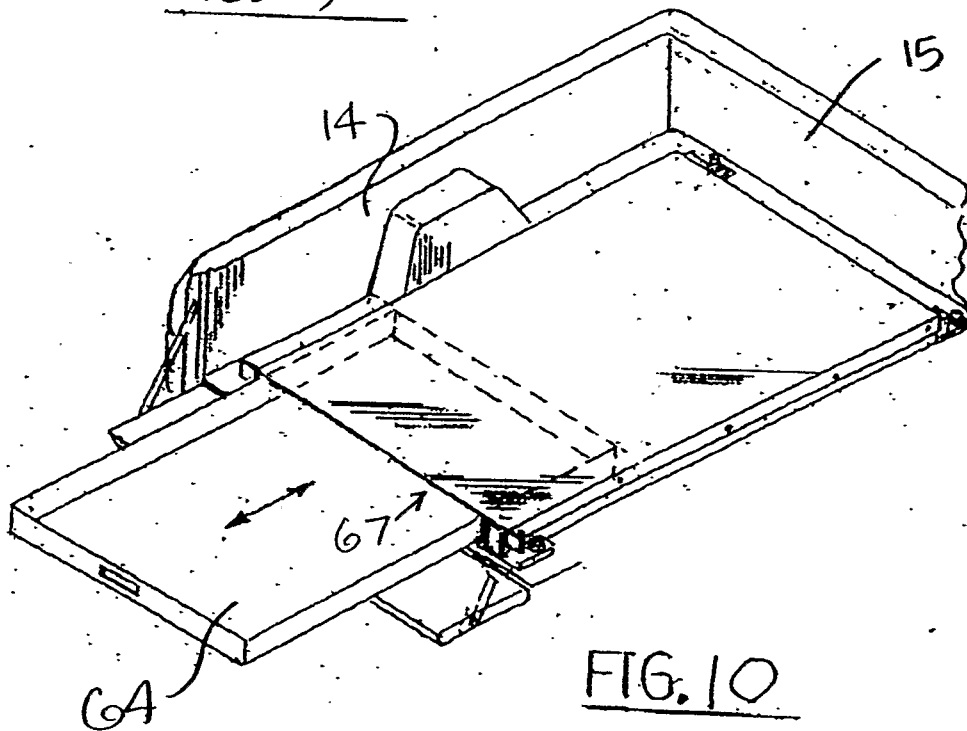


FIG. 10

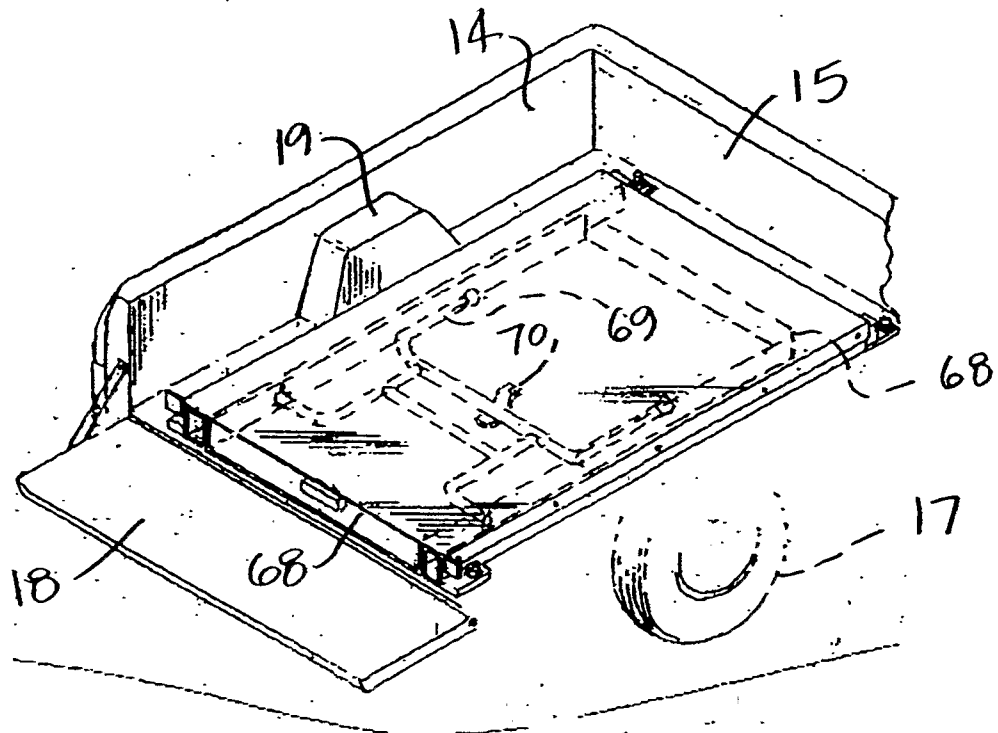


FIG. 11

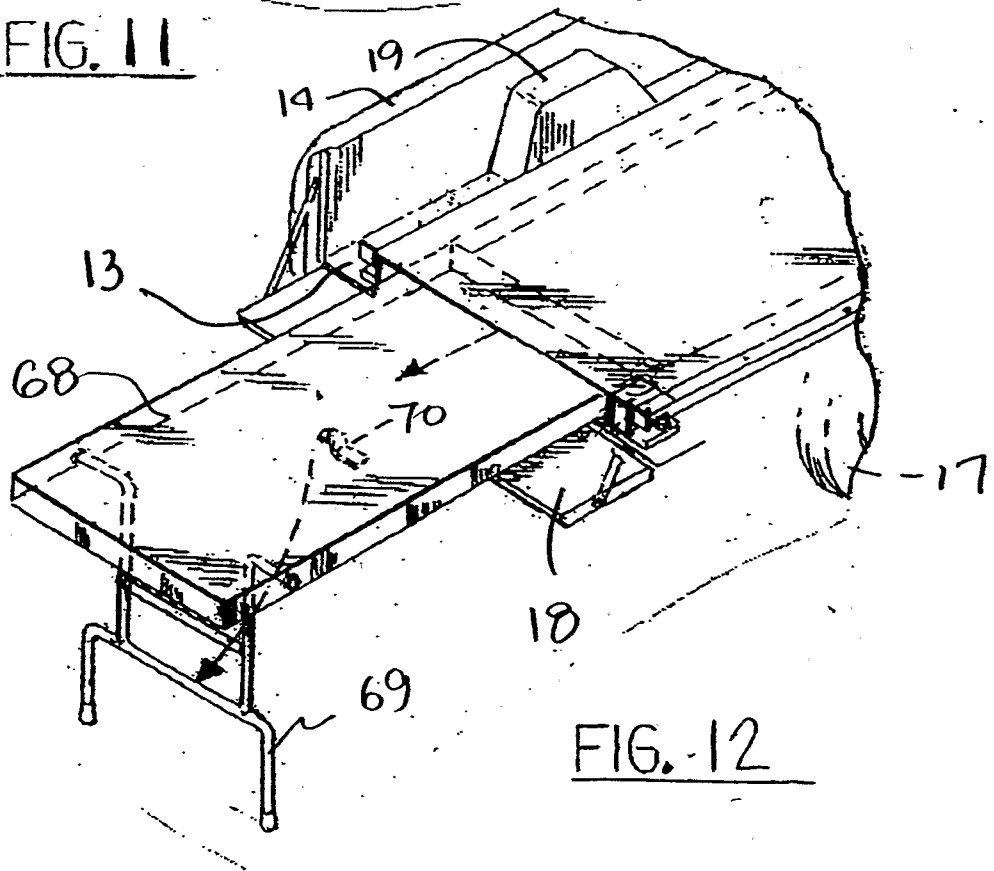


FIG. 12

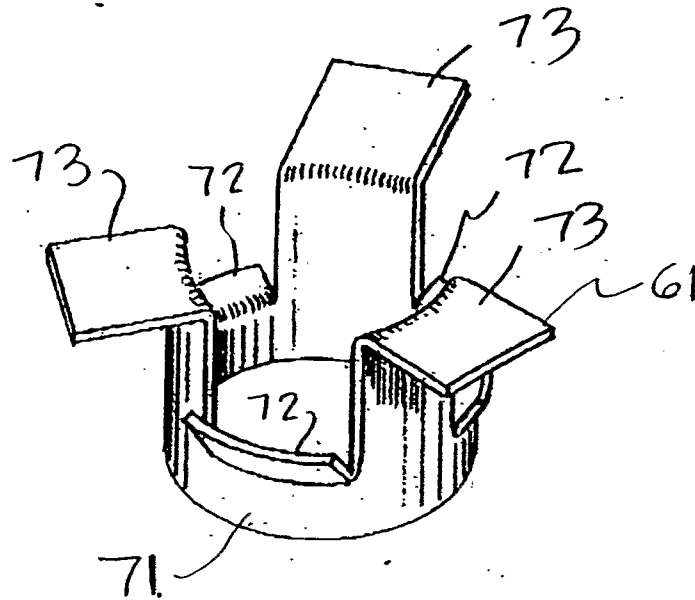


FIG. 13

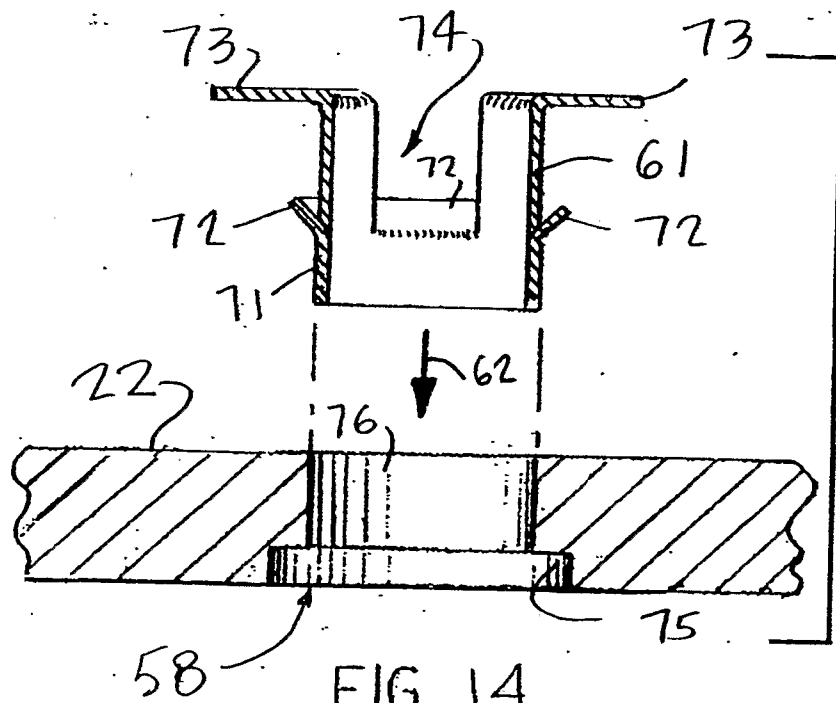


FIG. 14

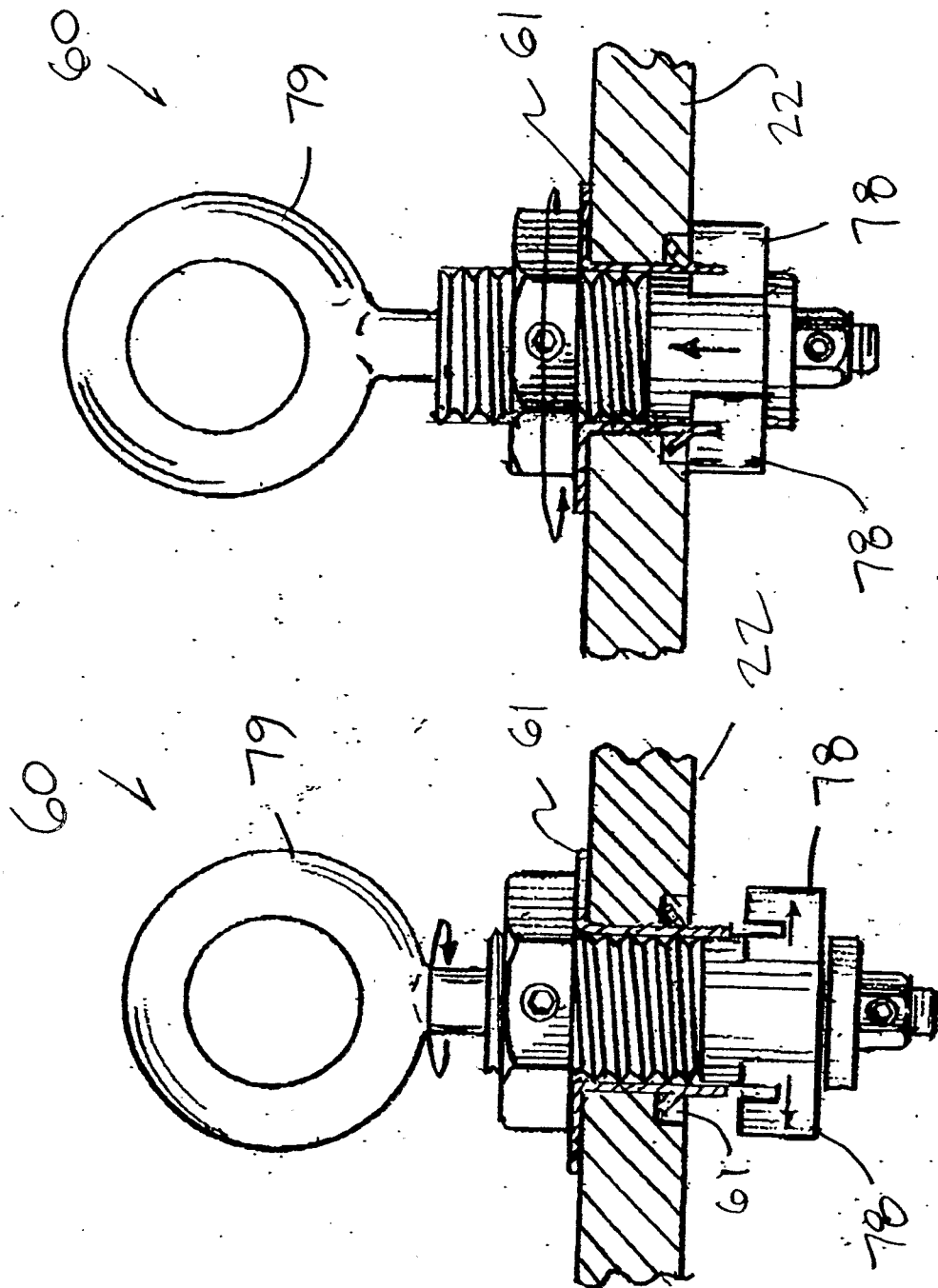
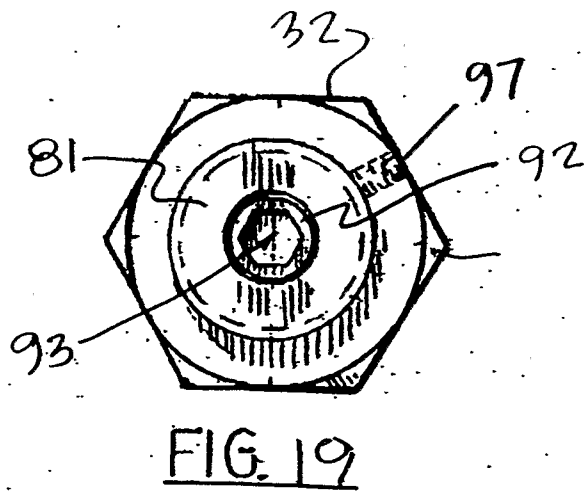
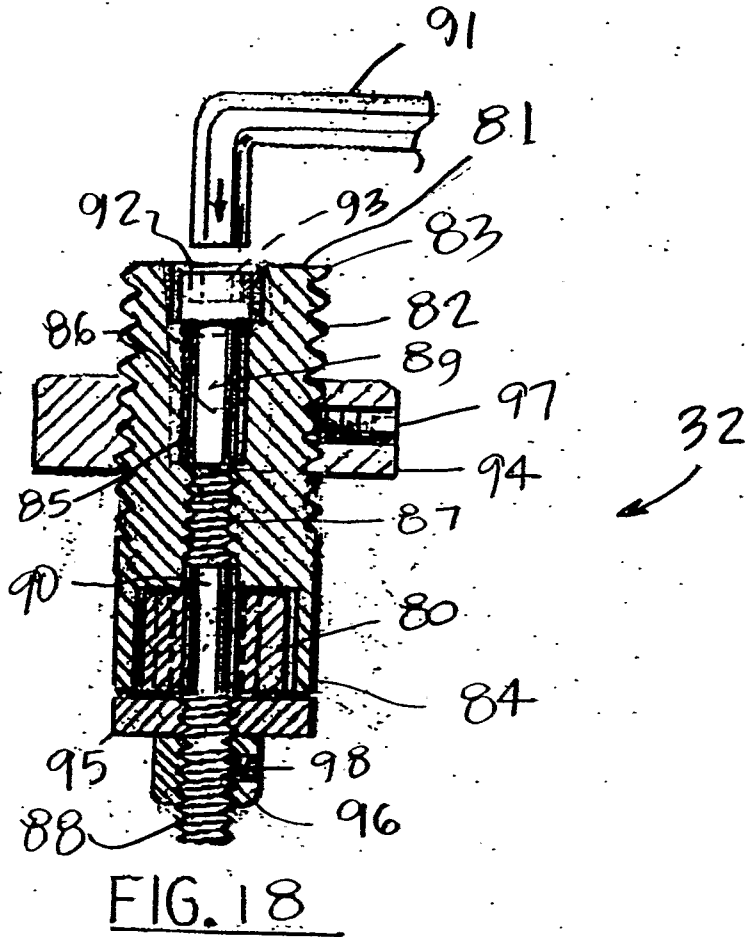
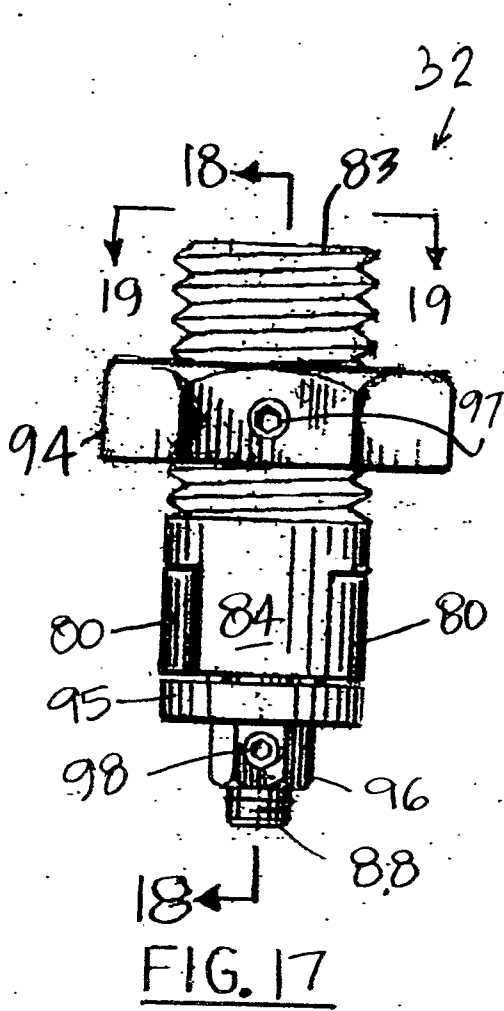


FIG. 16

FIG. 15



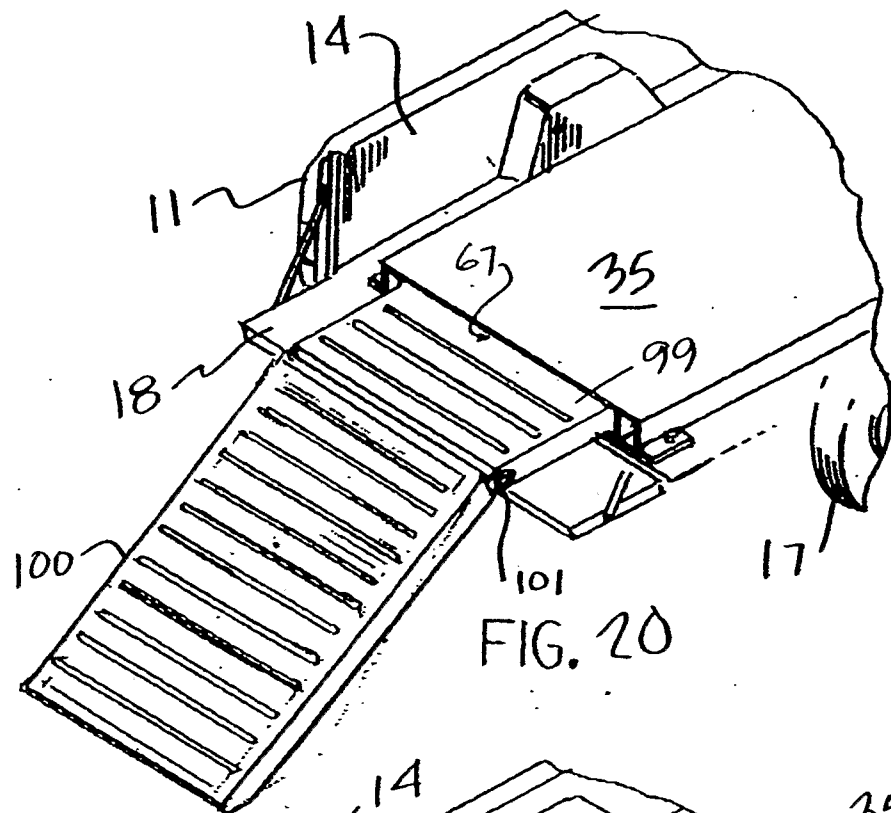


FIG. 20

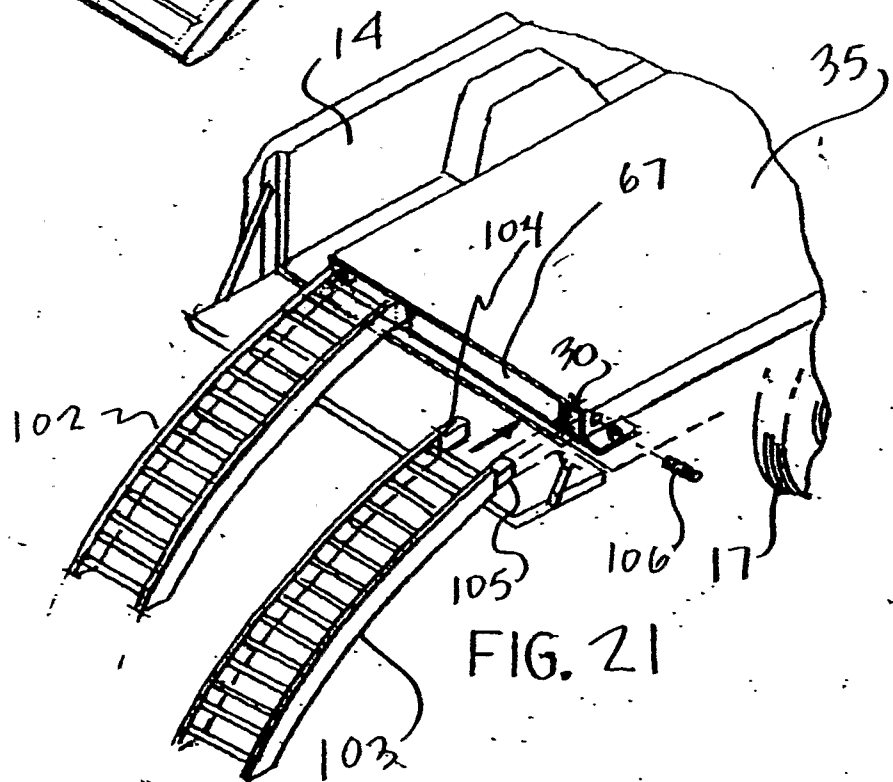
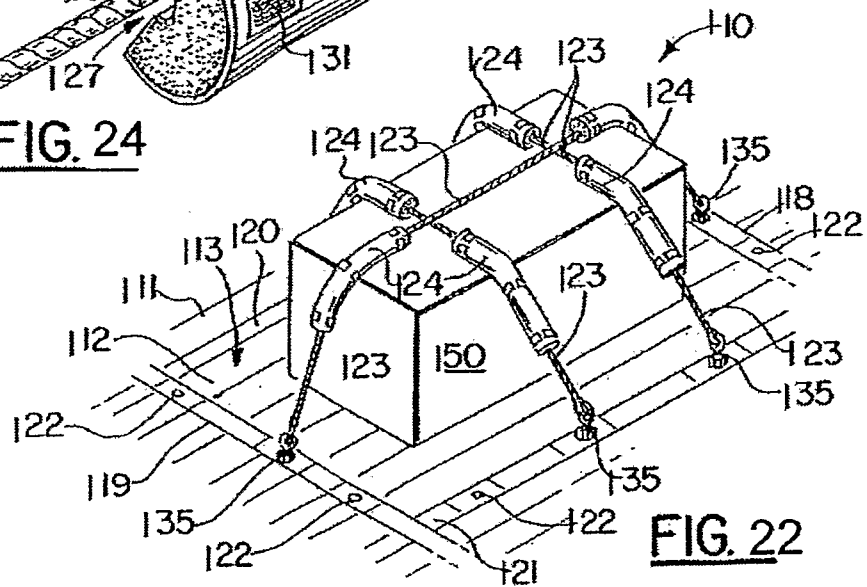
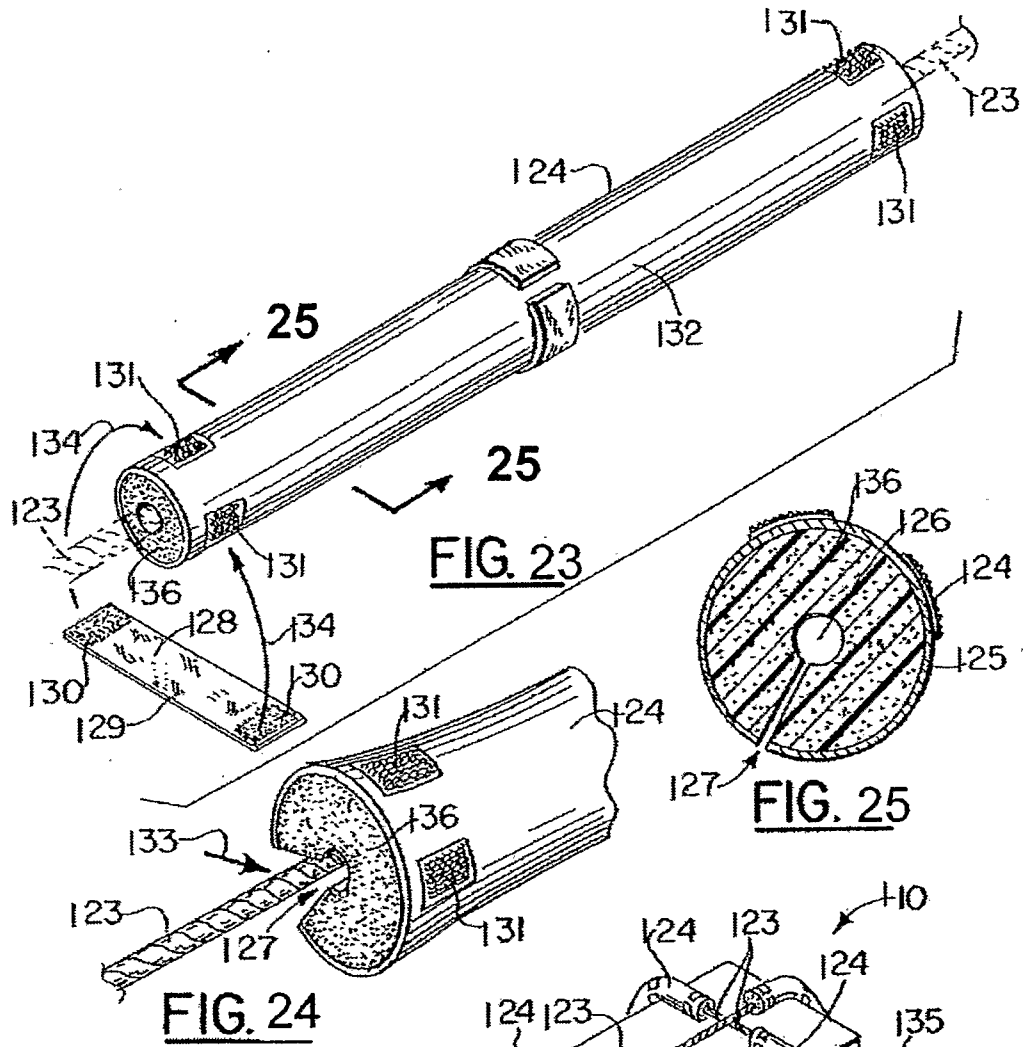


FIG. 21



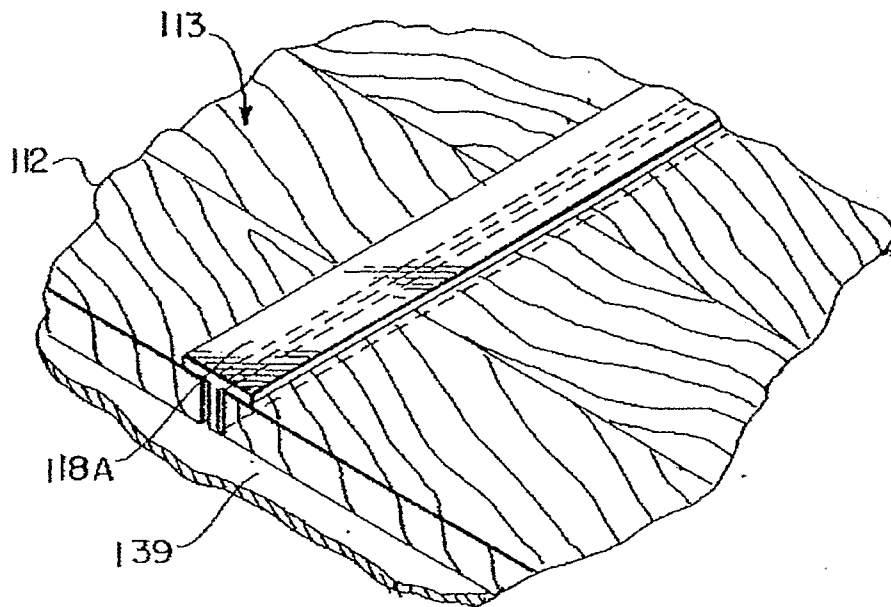


FIG. 26

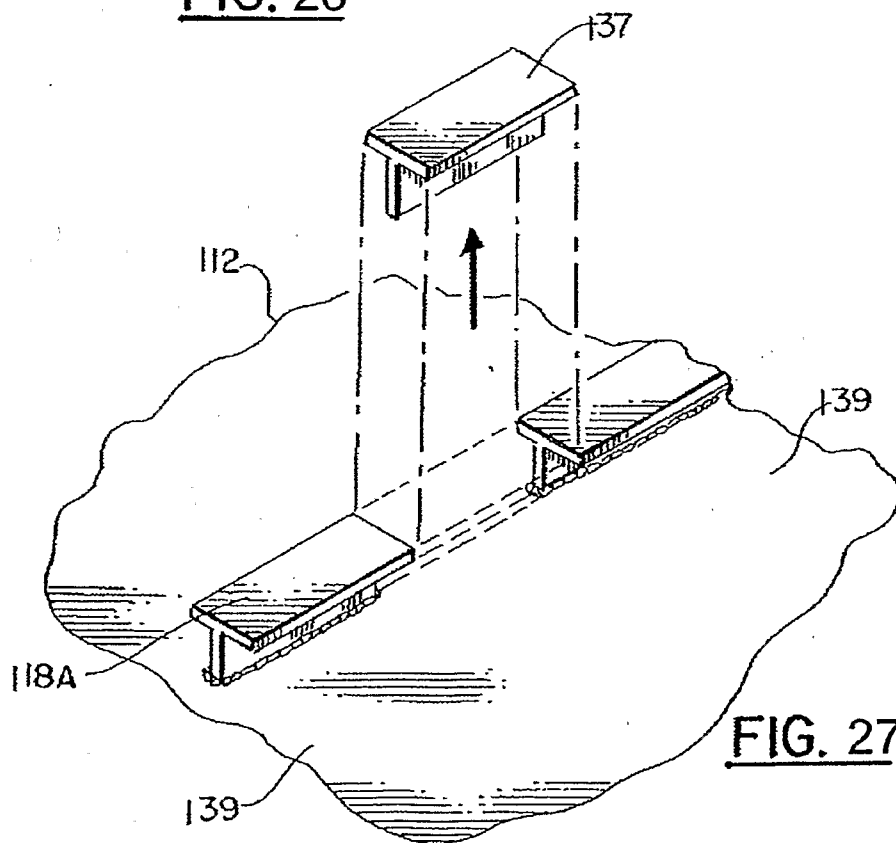


FIG. 27

