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(54) **COLLAPSIBLE FLAT RACK**

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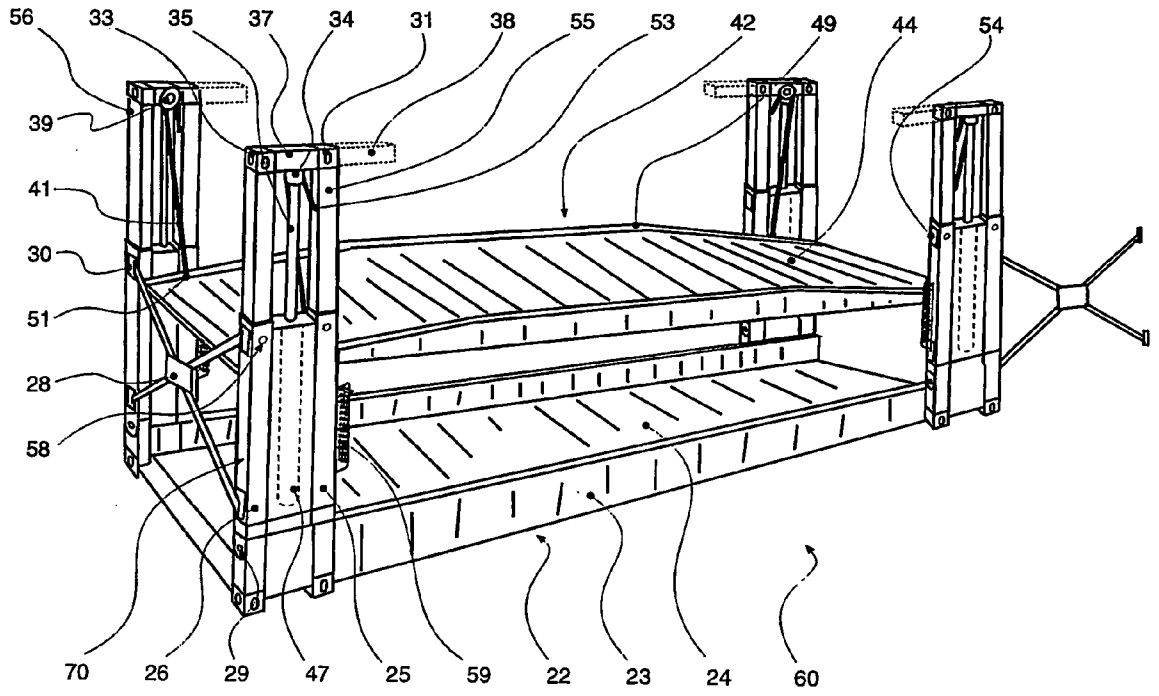
(57) **ABSTRACT**

A collapsible dual deck (**22, 42**) platform deck or flat rack container (**60**), adapted for vehicle cargo (**65, 66**), has dual (40 fit and 45 ft) span capture and handling fittings (**31, 33**) upon twin or joint adjustable height corner support post modules (**70**), foldable transversely inward to overlie one another at platform deck (**24**) ends, with an underlying hinged end gate (**28**) upon one post; post modules (**70**) feature telescopic rams (**35**) with a pulley traveller (**39**) carrying a cable lift (**41**) to a movable deck (**42**).



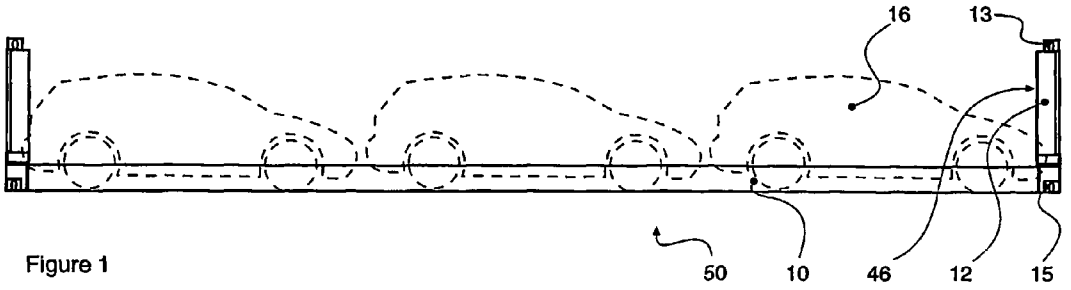
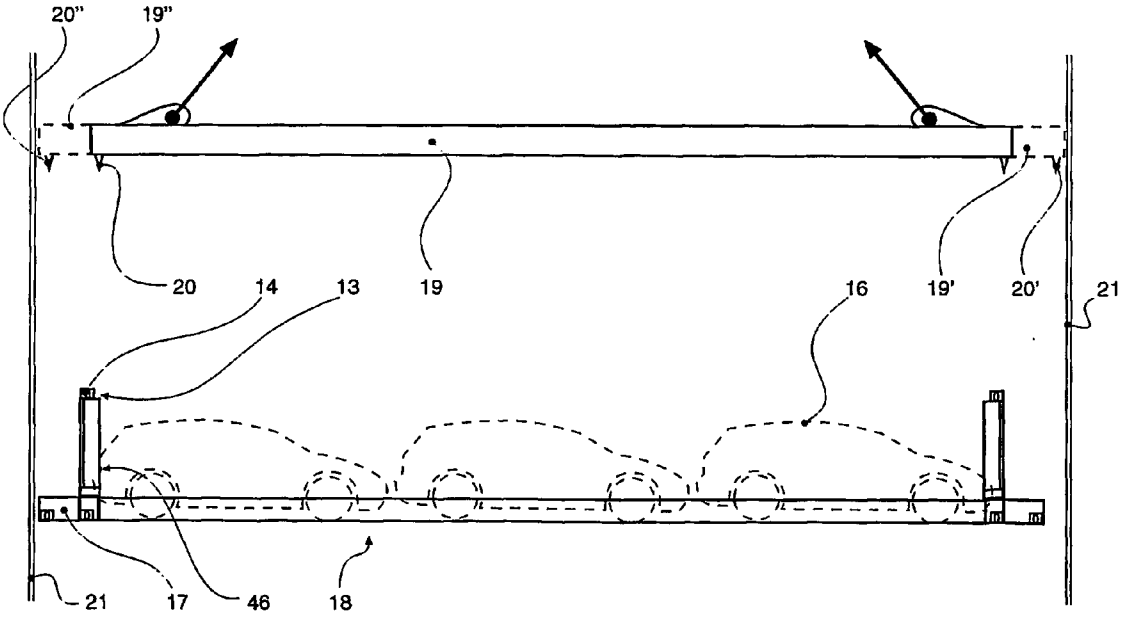


Figure 1



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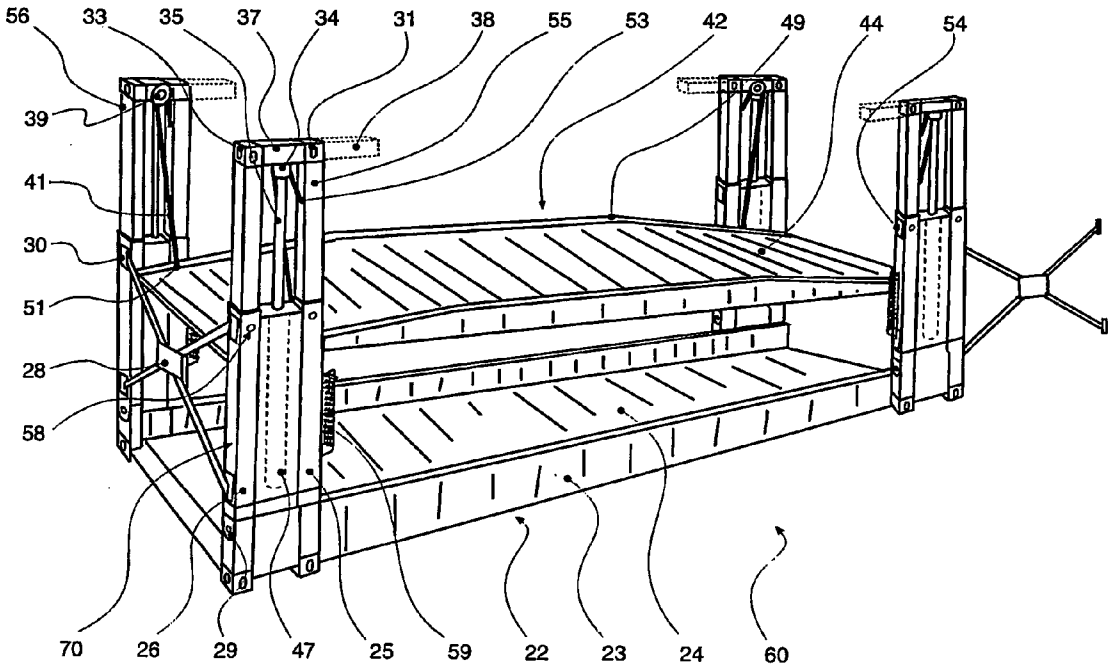
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Figure 3

Figure 4A

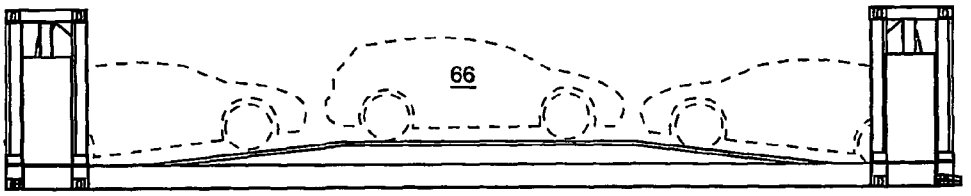


Figure 4B

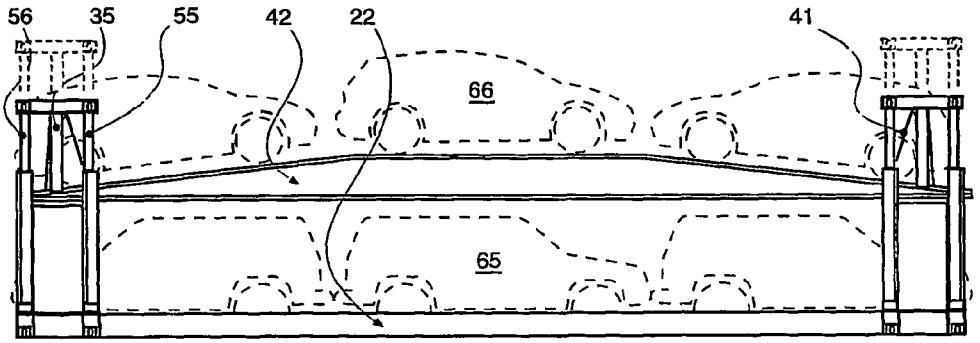
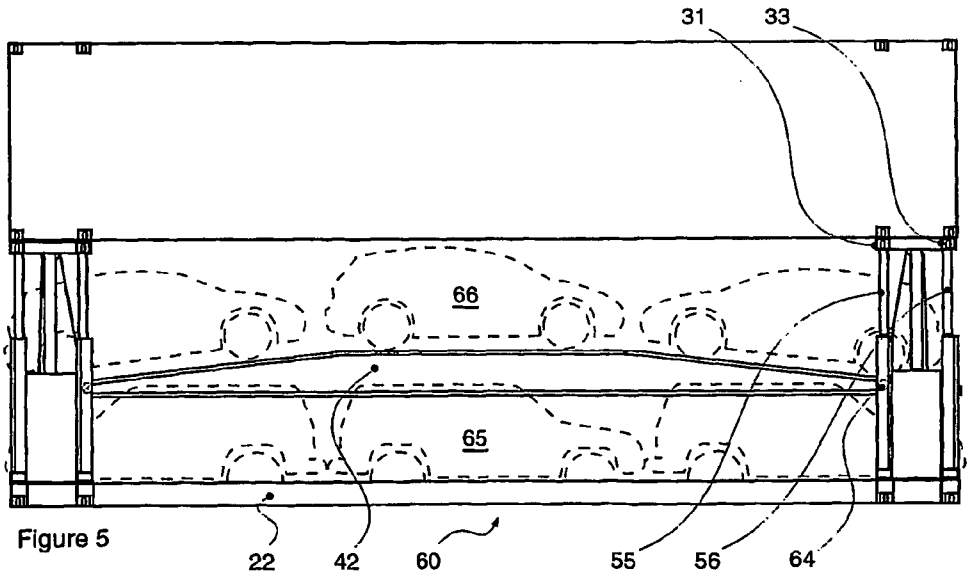


Figure 4C



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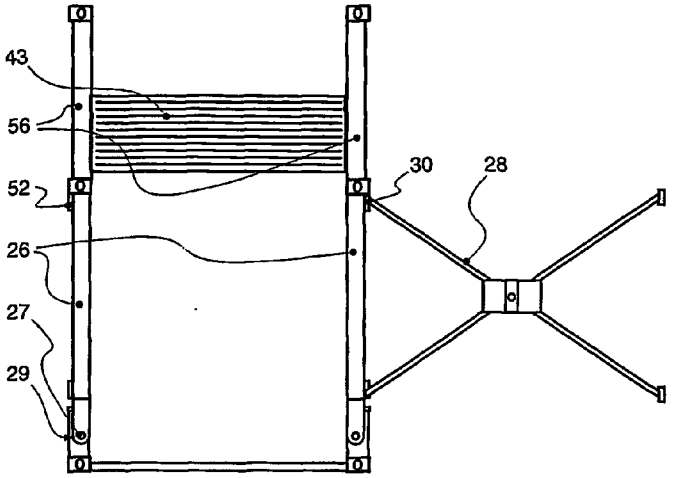


Figure 7

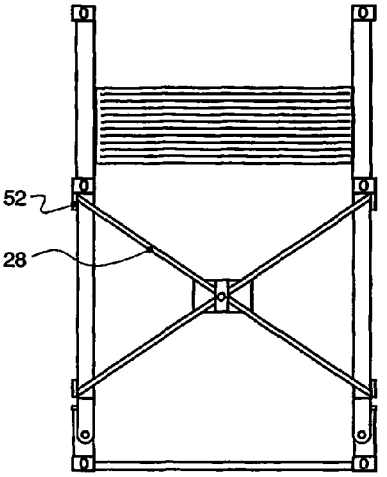
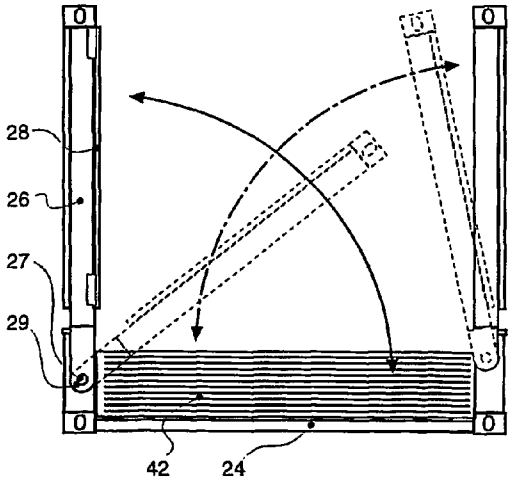


Figure 6



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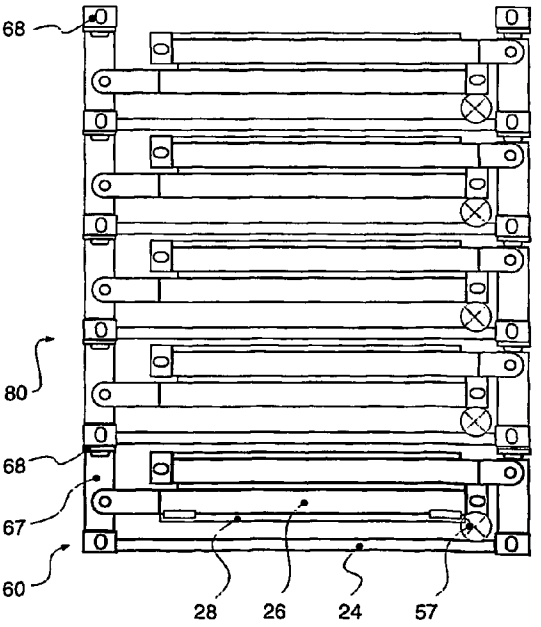

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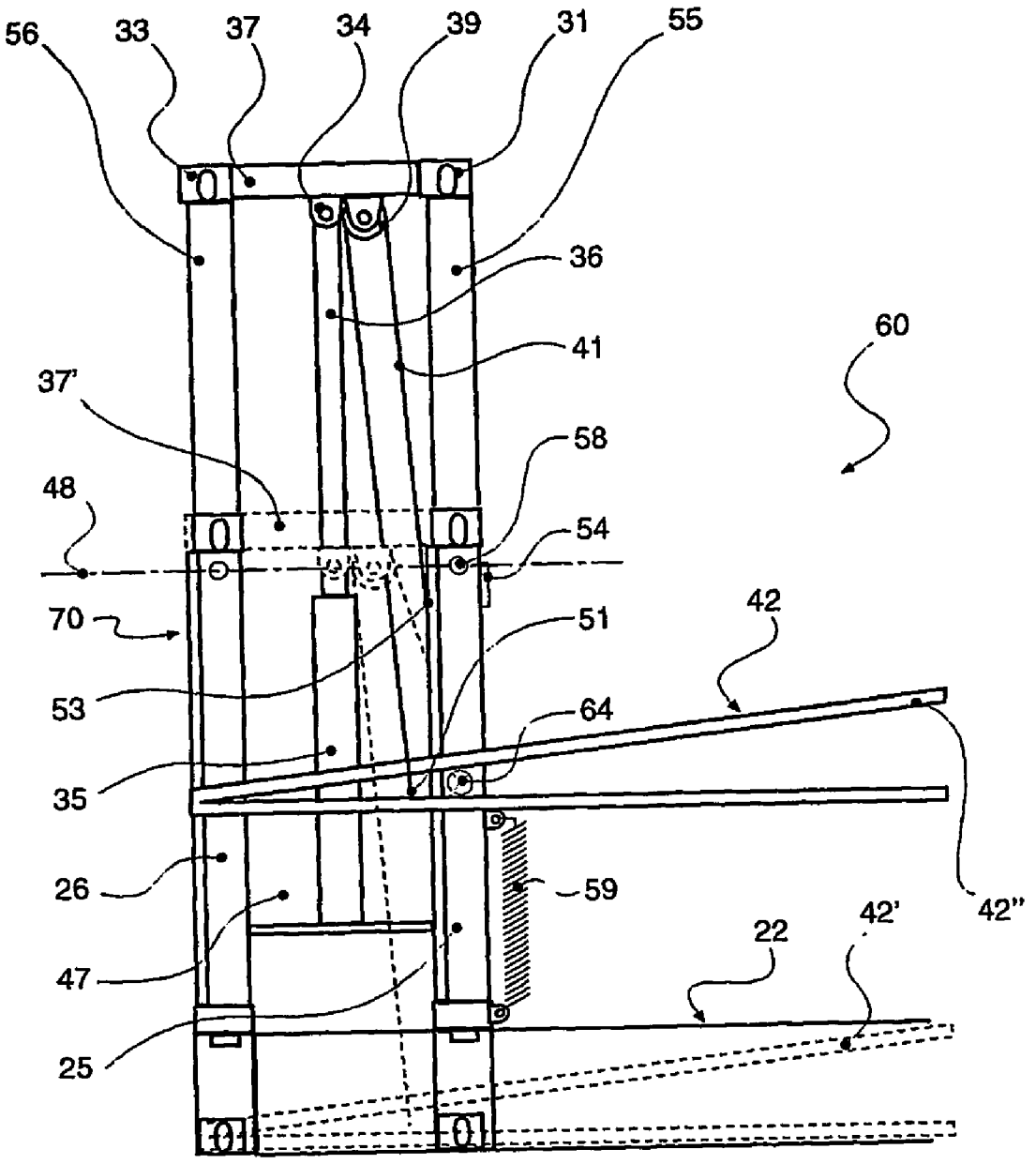
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Figure 10

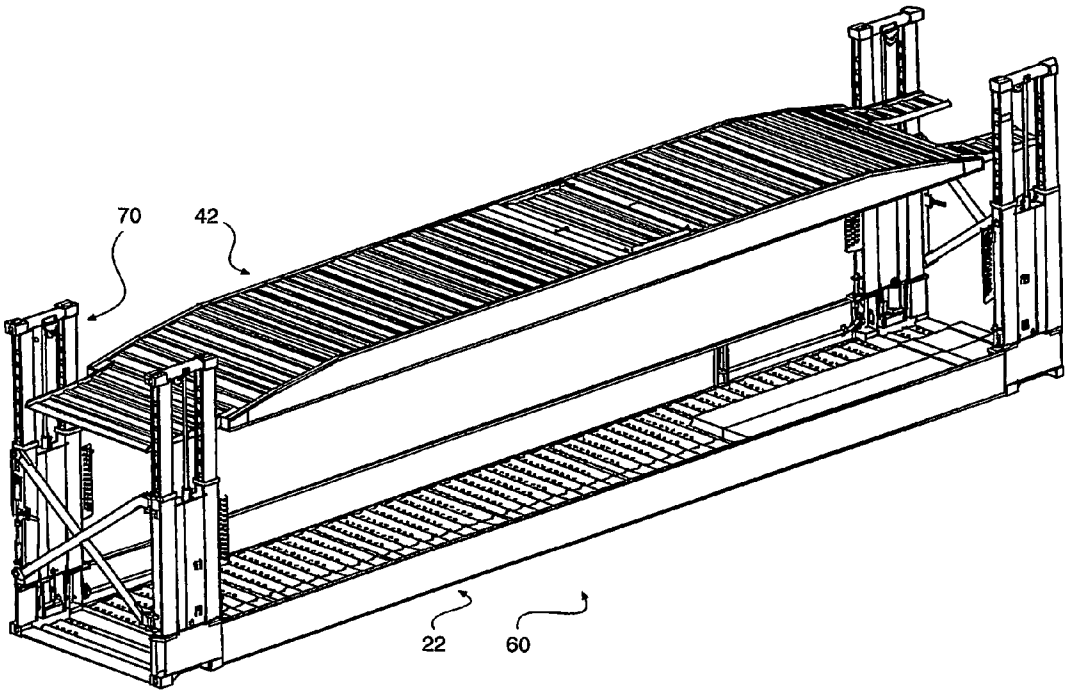

Figure 11

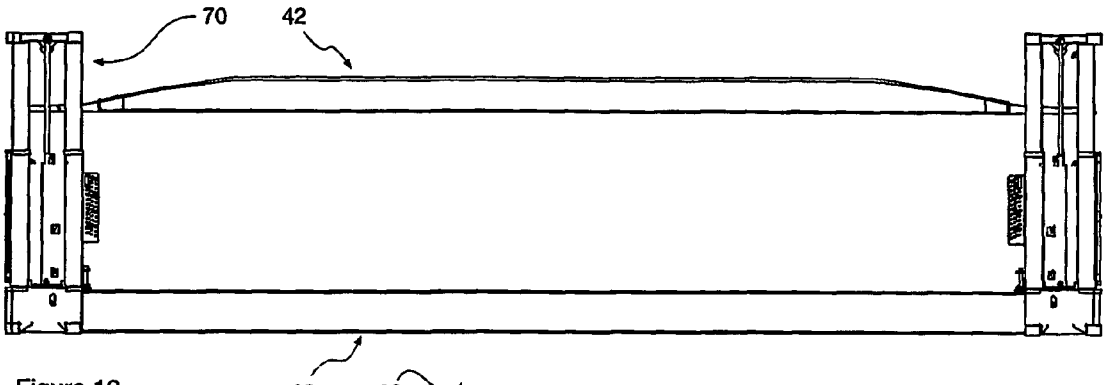

Figure 12

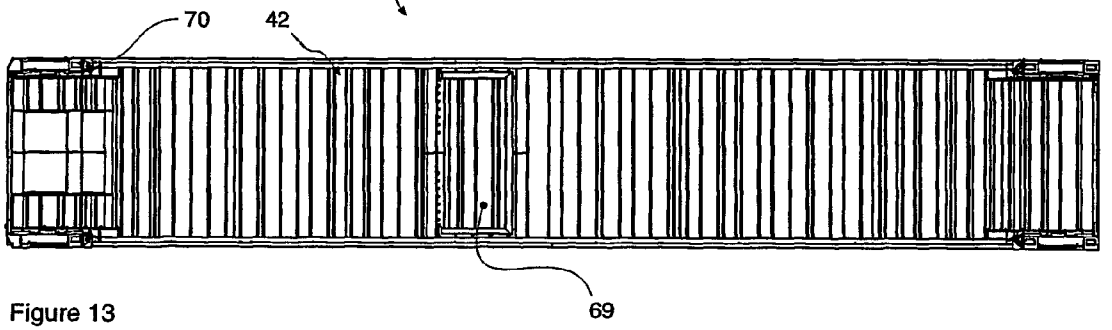

Figure 13

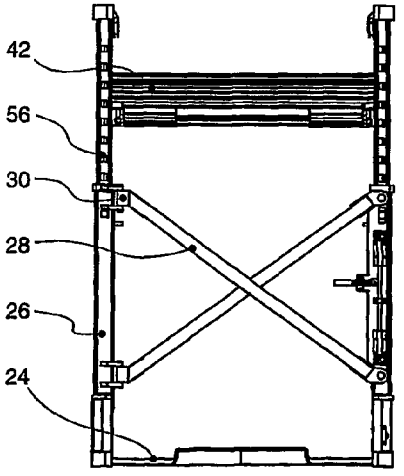

Figure 14

COLLAPSIBLE FLAT RACK

[0001] Collapsible platform deck, or so-called 'flat rack', containers adapted for carrying (road) vehicles, in particular cars, are known.

[0002] Typically the flat rack is some 40 ft long, with a deck capacity for 2 or 3 cars in tandem.

[0003] Recent developments in containers have allowed an increase in standardised length from 40 ft to 45 ft—and in some countries even longer at 58 ft.

[0004] Handling devices and transport vehicles for the former 40 ft standard containers have hitherto been adapted to carry only 40 ft lengths.

[0005] Nowadays, longer 45 ft length spreaders for top lifting and 45 ft span cargo hold cell guides are increasingly common in containerised sea going cargo vessels or ships, for constraining and guiding 45 ft containers.

[0006] For compatibility between 40 ft and 45 ft containers, supplementary capture and handling points, (such as twistlocks upon corner posts), are required at 40 ft positions on 45 ft long containers.

[0007] This allows 40 ft spreaders, and perhaps 40 ft trailers or rail wagons, to engage capture fittings at 40 ft positions, even though the container extends each end by another 2 ft.

[0008] However, a problem arises in using 40 ft spreaders to handle 45 ft containers within 45 ft span cell guides.

[0009] Once within a ship, a 45 ft container slides down 45 ft span cell guides, rubbing its corner fittings upon cell guide surfaces.

[0010] In this way a 45 ft container can be lowered safely and rapidly down into a vessel in accurate registration with

[0011] and to sit with its handling and support fittings upon

[0012] those of an underlying 45 ft container.

[0013] For so long as a 40 ft span spreader remains attached to a 45 ft container, accuracy of lateral and longitudinal location is ensured within cell guides.

[0014] Once detached from a container, a 40 ft spreader can be raised up a cell guide,albeit is no longer governed by cell guide to container contact.

[0015] However, the spreader is moving away from exposed cargo on the deck of the container just deposited.

[0016] For container pick up, a crane must negotiate the spreader carefully down between cell guides and accurately register respective 40 ft capture fittings.

[0017] In doing so, the spreader and cargo can come into inadvertent contact, with attendant damage risk.

[0018] This is less of a concern for solid roof (eg dry freight) containers, since if capture fittings should fail to register and engage, the roof deflects and supports the spreader and protects the cargo inside.

[0019] An open frame flat rack has no roof, so a 40 ft spreader travelling down between cell guides and missing top corner fittings can easily impact exposed cargo.

[0020] Some form of cargo protection is thus desirable for a flat rack.

[0021] One protection option would be to insist that 45 ft spreaders be used in cell guide operation, and indeed this is virtually the norm.

[0022] A 45 ft spreader could readily pass down cell guides and locate directly into 45 ft capture fittings, such as those located upon corner posts—and safely pick up the flat rack without cargo damage.

[0023] However, 40 ft spreaders are still in use—even on 45 ft cell guide vessels.

[0024] For compatibility with existing container fleets, capture and handling fittings at 40 ft positions must be provided—as land based operations (where there are no cell guides) still use 40 ft spreaders.

STATEMENT(S) OF INVENTION

[0025] According to one aspect of the invention, a flat rack has capture and handling fittings, such as upon corner posts, at different handling spans.

[0026] A prime example would be capture and handling fittings at both 45 ft and 40 ft standard positions.

[0027] This allows dual mode handling operation.

[0028] Capture and handling fittings could be upon respective support posts or share a post.

[0029] Multiple posts could be grouped in post modules with common extension drives, such as hydraulic rams and/or cables.

[0030] Flat Rack Collapse Fold

[0031] Flat racks are generally collapsible, so that when cargo is unloaded from a platform base, end frames and corner posts can be folded down thereupon, in a collapsed compact 'flat-pack' (return-empty) configuration.

[0032] Such collapsed units can be stacked, one upon another, for economical storage and transport.

[0033] The container stack shares the footprint of an individual container and stack depth can be contrived to match container depth standards.

[0034] Thus, when coupled together (say through their respective capture fittings), the stack contents can be handled together as a unified load.

[0035] If corner posts are required at 40 ft and 45 ft positions a total of 8 corner posts surmount a common platform deck and all of which be folded down—perhaps one on top of the other—adding to folded stack height.

[0036] According to another aspect of the invention, a flat rack has handling capture fittings upon corner posts, at different capture and handling spans, such as at both 40 ft and 45 ft standard positions, all configured for compact collapse fold upon a base deck, or internested multiple deck platforms.

[0037] In a particular construction, a flat rack has at one or both ends of a rectangular base a multiple (two or more) post structure, each with respective capture and handling fittings at is upper end, for multiple alternative container handling spans.

[0038] Support posts at opposite sides could be pivot mounted for inward transverse fold, to overlie one another upon a platform deck.

[0039] Support post pivots at different heights, would allow mutual collapse fold overlay.

[0040] Support post pivot mountings could be biased by torsion bar springs, to counterbalance post weight.

[0041] On-board hydraulic rams, and cable pulley drive coupling, could effect support post extension and suspended deck movement.

[0042] Paired telescopic support posts, could be operable by joint ram and cable drive,with respective capture and handling fittings at different standard spans

[0043] A movable deck, could be carried at or adjacent each corner, by paired adjustable span support posts, with respective capture and handling fittings at different spans.

[0044] A movable upper deck could be carried by support posts surmounting a base deck.

[0045] An end access closure gate could be fitted between paired support posts,with respective capture and handling fittings at opposite sides of each deck end.

[0046] A tapered deck end profile could create end ramps for a vehicle cargo, to allow vehicle tilt for compact fit within flat rack deck confines.

[0047] Similarly, a hinged trap door in a deck floor intermediate deck ends could allow local tilt of a vehicle cargo disposed with wheels thereupon.

[0048] Multiple capture and handling fittings could be carried by individual support posts.

[0049] A support post extension ram could be disposed within post confines.

[0050] Similarly, a cable suspension could be disposed within support post confines.

[0051] Dual inter-fitting decks could be carried between adjustable span support posts,pivotally mounted for inward transverse fold, to allow a compact overall collapse fold with support posts within mutually inset decks.

[0052] A selectively operable deck lock could secure deck position.

[0053] A selectively operable collapse fold interlock could be fitted between inward folded support posts, gate carried thereby, and underlying deck.

[0054] A collapse fold support post and underlying deck interaction could brace residual corner stub posts and attendant capture and handling fittings.

[0055] A movable deck over-travel facility, could facilitate under deck loading.

[0056] A movable deck over-travel lock could secure under deck loading access.

Embodiment(s)

[0057] There now follows a description of some particular embodiments of the invention, by way of example only, with reference to the accompanying diagrammatic and schematic drawings.

[0058] Mix and Match

[0059] Various features identified can be 'mixed and matched' selectively—albeit it is impractical here to set out every feasible combination.

[0060] **FIG. 1** shows a side elevation of a known single (base) platform deck or flat rack of some 40 ft span, with triple tandem vehicle (car) load;

[0061] **FIG. 2** shows an extended variant of the flat rack of **FIG. 1** extended to some 45 ft span, for location in a containerised cargo vessel cell guides, along with a spreader beam of 40 ft span;

[0062] **FIG. 3** shows a perspective view of a collapsible multiple (dual) deck flat rack adapted for vehicle load according to the invention and with both 40 ft and 45 ft capture and handling fittings;

[0063] **FIGS. 4A through 4C** show sequential loading operation for the dual deck flat rack of **FIG. 3**;

[0064] More specifically:

[0065] **FIG. 4A** shows a movable upper deck lowered upon a base deck between erect corner support post modules;

[0066] **FIG. 4B** shows initial car cargo loading of the lowered upper deck;

[0067] **FIG. 4C** shows elevation of the upper deck to allow base deck loading and optional support post extension to present capture and handling fittings above upper deck load height;

[0068] **FIG. 5** shows a fully loaded flat rack of **FIG. 4C** with end support post modules extended to support an overlying container;

[0069] **FIGS. 6 and 7** show an end elevations of the flat rack of **FIGS. 3, 4** and **5**, with a single full-width end gate hung from one corner post closed; double half-span gates hung from respective posts may be substituted;

[0070] More specifically:

[0071] **FIG. 6** shows a single gate swung open for unobstructed deck end access;

[0072] **FIG. 7** shows gate closed and coupled between opposite end posts as end bracing;

[0073] **FIG. 8** shows an end elevation of transverse inward (mutually overlaid) fold of dual (40 ft and 45 ft) span corner support post modules at one deck end;

[0074] **FIG. 9** shows an end elevation a stack of collapsed flat racks of **FIGS. 3, 4** and **5**;

[0075] **FIG. 10** shows a detail of a dual (**40**fit and 45 ft) span corner end post module, with hydraulic ram and cable pulley lift, for the flat rack of **FIGS. 3, 4** and **5**;

[0076] **FIGS. 11 through 14** show views of an engineered flat rack embodying features of preceding drawings;

[0077] More specifically:

[0078] **FIG. 11** shows a 3D perspective view of a dual deck flat rack, with movable upper deck carried by corner support post modules (with 40 ft and 45 ft span capture and

handling fittings), surmounting a base deck and mounted for inward compact collapse fold;

[0079] **FIG. 12** shows a side elevation of the flat rack of **FIG. 11**, with upper deck elevated from a cable suspension with pulley traveller upon extendible rams in corner post modules;

[0080] **FIG. 13** shows a plan view of the flat rack of **FIGS. 11 and 12**; and

[0081] **FIG. 14** shows an end elevation of the flat rack of **FIGS. 11 through 13**, with single hinged end gate addressing both upper and base deck access;

[0082] Referring to the drawings . . .

[0083] **FIG. 1** depicts a typical known collapsible container **50** of some 40 ft length or span, with a platform base deck **10** surmounted at each end by a pair of opposed corner posts **12**.

[0084] Upon each corner post **12** is a top capture and handling fitting **13**, such as a hollow rectangular box with apertures on three outermost sides for a standard so-called 'twistlock'.

[0085] Similarly, a bottom capture and handling fitting **15** is located at each four bottom corners of flat rack **50**.

[0086] **FIG. 1** depicts three small cars **16** disposed in tandem upon base deck platform **10** of flat rack **50**.

[0087] Overall flat rack **50** height (distance of top fitting **13** above ground) is limited by fixed end support post frames **46**.

[0088] **FIG. 2** depicts a flat rack **18** similar to flat rack **50**, but with base deck stub extensions **17** at each end—taking overall length typically to some 45 ft or more.

[0089] However, support posts **46** remain at a 40 ft span.

[0090] Suspended above flat rack **18** is a crane lift spreader **19** with capture and handling fittings (such as twistlocks) **20**—to engage top apertures **14** of top fittings **13** for capture and lift of flat rack **18**.

[0091] Should a capture fitting **20** not line up with top aperture **14** of top fitting **13**, but sit over to one side, as denoted by **19'** and with capture fitting at **20'**, serious contact damage could occur to car **16** roof.

[0092] When a 45 ft span flat rack **18** is located in corresponding 45 ft span vessel cell guides **21**, its lateral and longitudinal position is constrained.

[0093] However, a 40 ft span spreaders **9** lowered down inside 45 ft span cell guides **21**, can still swing from one side to the other, as denoted by broken line **19'**, and cause damage to a car **16**.

[0094] If spreader **19** were made, say, 45 ft span, as denoted by broken line **19"**, and with twistlocks located at **20'**, **20"**, no cargo **16** damage could arise, as spreader **19"** would also be constrained by cell guides **21**.

[0095] Hitherto, neither spreaders nor containers have featured both 40 ft and 45 ft span capture fittings **20**.

[0096] Thus cargo **16** of flat rack **18** is protected from 45 ft spreader **19** contact, but not from a 40 ft spreader **19**.

[0097] **FIG. 3** shows a perspective view of an embodiment of the present invention, with multiple decks and dual (40 ft and 45 ft) span capture and handling fittings upon respective paired support posts, configured as collapse fold corner modules **70**.

[0098] More specifically, a base **22** is configured as a shallow tray of longitudinal upstanding side rails **23** at each side of an intervening braced platform deck floor **24** of corrugated sheet steel.

[0099] Inboard (bottom) support posts **25** are located at a 40 ft span position and adjacent outboard (bottom) posts **26** at a 45 ft span position.

[0100] Bottom posts **25** and **26** are joined structurally by bridge plates **47**, to create an integrated corner post module **70** surmounting base **22**.

[0101] Bottom posts **25** and **26** are pivotally mounted upon base **22** by hinges **29** fitted to side rails **23**, along with paired torsion bar bias springs **, as detailed in **FIGS. 8 and 10**.

[0102] Bottom posts **25**, **26** are configured as hollow (rectangular or circular) box sections, from which telescope respective inboard and outboard upper posts **55**, **56** to carry a movable upper deck **42**.

[0103] Upper posts **55**, **56** are capped by respective capture and handling top fittings **31**, **33**.

[0104] A top rail **37** joins fittings **31**, **33** and is extended inward by a (spreader impact) guard bar **38**.

[0105] Paired (or single) end access gates **28** are mounted by hinges **39** upon outboard bottom posts **26** at opposite deck ends.

[0106] Hinges **30** allow gates **28** to rotate through **270** degrees, from a closed position abutting one another or an opposite post **26**, to a folded back open position (not illustrated) alongside base **22**.

[0107] Above base deck **24** is a movable upper deck **42** of upstanding longitudinal side rails **49** at opposed sides of braced platform deck floor **43**, also of corrugated sheet steel.

[0108] Upper deck **42** is suspended from wire cable or chains **41** detachably connected by removable pins **51** to side rails **49**—cable **41** passing over pulley wheels **39** mounted upon inboard upper posts **55**.

[0109] Pulleys **39** are disposed close to post **55** and top fitting **31** axis, to bring cable **41** close to, or within the confines of, corner support post module **70**.

[0110] As more readily discerned from **FIG. 10**, the other end of cable **41** is secured to inboard bottom post **25** at anchor pin **53**.

[0111] A travel limit stop **54** is fitted to one or both bottom posts **25**, **26**, for upper deck **42** support when cables **41** are released to allow upper post **55**, **56** extension to present capture fittings **31**, **33** above an upper deck load **26**, as depicted in **FIG. 6**.

[0112] Limit stop **54** represents a lower limit for upper deck **42** when cargo is carried upon base deck **22**, but is disengaged to allow upper deck **42** to be lowered upon base deck **22** in a single deck operating mode or preparatory to overall flat rack collapse.

[0113] A removable detent **58** is operable to lock together associated bottom and upper posts **25/55**, **26/56**.

[0114] **FIGS. 4 and 5** show upper support post **55**, **56** extension, initially to carry upper deck **42** and then beyond an upper deck load **66**.

[0115] Operationally, absent any transverse header beams or braces, upper deck **42**, along with its car load **66**, can be carried way above base deck **22**.

[0116] This provides ample drive-on/off headroom for a base deck car load **65**.

[0117] Once both decks **22**, **42** are loaded, upper deck **42** can be lowered closer to base deck **22**, as depicted in **FIG. 5**.

[0118] In this mode, the roofs of tall vehicles **65** on base deck **22** can intrude somewhat into the under-deck confines of upper deck **42**, allowing a closely internested compact load profile.

[0119] Upper deck **42** can be restrained by locks **64**, with and cables **41** uncoupled by releasing pins **51**.

[0120] This allows full upper post **55**, **56** extension, to present associated capture fittings **31**, **33** above upper deck car load **66**.

[0121] In this mode container **60** can be handled by a spreader (not shown) or support a corresponding container stacked upon it.

[0122] Inter-Post Detents

[0123] For security, inter-post detents **58** are engaged between upper posts **55**, **56** and respective bottom posts **25**, **26**, as a default load carrying stop, upon failure of support wire **41** or lift ram **35** collapse.

[0124] Once raised to a desired position, upper support posts **55**, **56** are locked to respective bottom posts **25**, **26** by detents **58**, shot through corresponding aligned holes therein.

[0125] Detents **58** take lifting, racking and stacking loads placed upon capture fittings **31** or **33**.

[0126] Inter-post detents **58** are desirably configured as flat-faced latch pins, for load spread and to minimise wear or risk of seizure in situ.

[0127] Lift Rams

[0128] Hydraulic lift rams **35** are located between inboard and outboard bottom support posts **25**, **26**.

[0129] Extendible ram pistons **36** lie between upper inboard and outboard support posts **55**, **56** and are secured to bar **37** by a capture pin **34**.

[0130] Lift rams **35** sit upon a base frame **45** within corner module **70** and operate selectively—say through a hand pump—upon bar **37** through capture pin **34**

[0131] Ram **36** retraction or extension moves upper posts **55**, **56** and associated pulley **39**, which effectively lengthens or shortens the run of cable **41** by double the ram **36**'throw' for rapid deck movement.

[0132] U-Shape Deck Profile

[0133] Upper and base decks **42**, **22** are of complementary 'U'-shaped cross-sectional profile for a certain inter-fit.

[0134] Thus, when fully lowered by cables **41** and retraction of lift rams **35**, upper deck **42** can sit or nest within 'U' tray profile confines of base deck **22**—as depicted in broken line in the fragmentary end view of **FIG. 10**.

[0135] Guard bar **38** inhibits contact of, say, a laterally misaligned 40 ft spreader with upper deck load **66**.

[0136] Thus either a 40 ft or **45** spreader can be used without risk of load damage—unlike, say, the flat rack **18** of **FIG. 2**.

[0137] Post Hinge

[0138] A post hinge **29**, has a pivot pin **27** axis of horizontal longitudinal orientation, so bottom posts **25** and **26** can fold transversely together towards base deck **24**.

[0139] **FIG. 6** shows differential relative height of hinges **29** for bottom posts **25**, **26** at opposite deck sides.

[0140] This allows collapsed posts **25**, **26** mutually to overlie one another and sit within the base deck **22** confines when folded transversely inward.

[0141] Gate Lock

[0142] In order to keep support posts **25**, **26** erect under transport and handling loads, single or multiple end gates **28** are locked together and/or to an opposite post by a spigot **52**.

[0143] When post and gate are fully collapse folded inward, they are secured to an underlying base deck **24** by a lock **57**—creating a stiff braced structure.

[0144] Stub Posts

[0145] Residual upstanding stub posts **67**, with respective top capture and handling fittings **68**, protrude beyond the transverse inward folded support posts **25**, **26**.

[0146] This allows mutual stacking—as represented in **FIG. 9**—without contact damage to internal fittings.

[0147] These stub posts **67** are subjected to severe racking and stacking loads and are braced by the interlocked post, gate and deck structure.

[0148] **FIG. 7** depicts end gate(s) **28** swung open through 180 degrees, allowing end access for cargo onto floor **24** of base **22**.

[0149] Deck floor **44** of upper deck **42** is shown in a raised position, allowing a car **65** to drive in and out underneath any cars **66** upon floor **23**.

[0150] **FIG. 8** shows a corresponding end elevation to **FIGS. 6 and 7**, but with upper corner support post extensions **55**, **56** retracted into respective bottom corner support posts **25**, **26**.

[0151] End gate **28** is folded back through 270°, to lie alongside longitudinal sides of flat rack **60**.

[0152] Upper deck **42** has been lowered and its floor surface **44** lies upon base deck floor **24**.

[0153] In order to collapse flat rack **22**, posts **25** and **26** are counter folded inward—respectively from left and then from the right as viewed—as indicated by arrows A and B towards floor **24** about pivot pins **27**.

[0154] Guard bar **38** and top rail **37** can fold easily with the corner posts **25**, **26** and one or more end gates **28** can fold along therewith to lie unobtrusively within a compact overall collapse folded module **60** profile.

[0155] A bottom support post for a single end gate **28** is folded first, so gate **28** sits underneath both its appended post and an overlying post.

[0156] A ramp end profile base deck **24** allows bottom post **25**, **25** fold within the depth of base side rails **23**.

[0157] Integrated Support Posts

[0158] It is envisaged that discrete posts **25/55**, **26/56** might be integrated as a single post.

[0159] Capture fittings **31**,**33** for 45 ft and 40 ft span could be (re-) located along top rail **37** or guard bar **38**.

[0160] Stack

[0161] **FIG. 8** is an end elevation of a stack **80** of some five flat-pack collapsed flat racks **60**, with respective support posts **25** and **26** folded inward as described. Overall stack **80** depth generally equates to that of an erected individual flat rack **60**, with top posts **55**, **56** retracted within respective bottom posts **25**, **26**.

[0162] Flat racks **60** can be inter-coupled through respective adjoining capture fittings **68** to create a unitary stack assembly **80**, which can be handled from uppermost top fittings **68**.

[0163] **FIG. 10** is an enlarged fragmentary side elevation detail of a corner support post module at one end of flat rack **60**.

[0164] Comer posts **25**, **26** are erected and locked in place with one or more end gates **28** locked together, or to opposite posts from which they are hinged.

[0165] Posts **55**, **56** are raised, along with top rail **37**, capture fittings **31**, **33** and guard rail **38** from a fully retracted position shown in broken line **37'**.

[0166] Pump driven hydraulic ram **35** moves posts **55**, **56** up and down within posts **25**, **26**.

[0167] A ram piston rod **36** acts through a pin **34** upon top rail **37** to push up top rail **37** and raise upper structure **60** (of elements **55**, **56**, **37** and **38**).

[0168] Once raised to a desired height, posts **55**,**56** can be locked in place by detent **58** operative on axis **48**.

[0169] For retraction of upper support posts **55**, **56**, detent **58** is withdrawn so gravity action retracts ram piston **36**, and/or by exhaust pumping of ram **35** cylinder.

[0170] Raising and lowering of upper support posts **55**, **56** has an additional function.

[0171] A pulley wheel **39** is mounted upon bar **37** by a bracket **49**.

[0172] Over the pulley **39** is draped a chain or wire rope **41**, pinned at one end ** to upper deck **42**, and at the other end is secured to post **25** by a pin **63**.

[0173] As upper support posts **55**, **56** are raised up and down by ram **35**, so wire **41** transfers the motion to upper deck **42**, from a lowermost position **42'** nested within base **22** up to a desired height **42"**.

[0174] Once at desired height, deck **42** can be pinned in place by a deck lock **64** upon post **25**—and upon which deck **42** can rest solidly for transport.

[0175] Although the flat rack **60** described has telescopic corner support posts **55**, **56**, fixed height corner support posts are also envisaged.

[0176] Other embodiments might include a profiled deck **24** surface to maximise slope of cars **66** placed upon it.

[0177] In this case, movable upper deck **42** has a platform infill at the top edge of side rails **43**—affording greater headspace to an underlying cargo on base deck **22**.

[0178] As depicted in **FIG. 5**, upper deck floor **24** might be replaced, partially or overall, by spaced transverse bars **61**, locally to capture and support individual car **66** wheels.

[0179] Rather than being fixed to deck **22**, bars **61** might be adjustable, to allow selective local tilt of cars **66** when upper deck **42** is raised clear of base **22**.

[0180] Built-in rams **35** or pulley wheels **39** and cables or chains **41** are not essential.

[0181] Rather, upper deck **42** could be raised and lowered by external or auxiliary means—such as a crane, fork truck or some other specially adapted device.

[0182] Base deck **22** and indeed also movable upper deck **42** could be of adjustable (eg telescopic) span.

[0183] Thus, say, a 45 ft flat rack could be extended or retracted to some other length.

[0184] Whilst 40 ft and 45 ft lengths are widely adopted standards,others can be accommodated.

[0185] Upper deck **42** could be raised to a high level, as a protective cover or roof over lower deck cargo.

[0186] End gate(s) **28** could be wholly or partially infilled or panelled, for cargo protection.

[0187] Side curtains could hang from guard bars **38** between posts **55**, and connected to bottom side rails **23**, for an enclosed cargo space.

[0188] One end of deck **42** could be raised before the other, and vehicles **26** driven up the slope—requiring less lifting work by rams **35**.

[0189] Base and upper decks **22**, **42** can act together when nested and even locked together as an integrated structure to support larger heavier vehicles or cargo.

[0190] Vehicles wider than (erect) post **15**, **16** spacing can be driven between, by canting them out beyond the vertical erect position illustrated.

[0191] Indeed posts could be folded outward, say to a horizontal position, for an access width greater than the internal width of base **14**.

[0192] Deck **42** can be removable.

[0193] Deck floors **24**, **44** can be of multiple discrete (albeit possibly edge interlinked) elements, for individual relative local slope adjustment, more readily to accommodate different car shapes and sizes.

[0194] Alternatives of deck end ramps and intermediate trap doors are discussed later.

[0195] Pulley Disposition

[0196] The cable transfer pulley is desirably fitted at or close to the piston ram axis centre line.

[0197] Post Base Pivot

[0198] The post base pivot is also desirably fitted at or close to the post axis or centre-line.

[0199] Taller & Tapered Vehicle Profile

[0200] Taller or more upright stance vehicles, such as so-called people carriers or multi-purpose vehicles (MPV's) have a somewhat tapered profile, from a taller rear (tailgate) end to a shallower front bonnet.

[0201] Load height or head space between decks when in their transit position is generally of even depth—and so may be inadequate for taller vehicles or inefficiently occupied by such a multiple load profile.

[0202] The Applicant's earlier Multi-Deck PCT/GB97/02319 envisaged multiple decks with relative deck portion and attendant load tilt and re-orientation, for denser inter-nesting load packing.

[0203] Deck Ramp Ends

[0204] Ramp ends of a deck allow end vehicles to sit with one set of (rear) wheels somewhat lower.

[0205] This would require end vehicles to be loaded front first from respective ends, for with decks fully separated to be reversed on from one end.

[0206] Deck Trap Door

[0207] Similarly, a deck trap door, (such as **69** in **FIG. 13** upper deck), could be fitted—to allow wheels at a taller (rear) vehicle end to sit lower in the deck and bring the roof contour into greater conformity with available load height.

[0208] This includes vertical between deck load space.

Component List

[0209] **10** platform base

[0210] **12** corner posts

[0211] **13** top capture+handling fitting

[0212] **14** top apertures

[0213] **15** bottom capture fitting

[0214] **16** car cargo load

[0215] **18** flat rack

[0216] **19**, **19'** crane lift spreader

[0217] **20**, **20'** capture fitting (spreader **19**)

[0218] **21** cell guides

[0219] **22** base

[0220] **23** longitudinal side rails

[0221] **24** platform deck floor

[0222] **25** (inboard) bottom support post

[0223] **26** (outboard) bottom support post

[0224] **27** pivot pin

[0225] **28** end gate

[0226] **29** post hinge

[0227] **30** gate hinge

[0228] **31** top capture and handling fitting

[0229] **33** top capture and handling fitting

[0230] **34** capture pin

[0231] **35** lift ram

[0232] **36** ram piston

[0233] **37** bar

[0234] **38** guard bar

[0235] **39** pulley

[0236] **41** wire cable/chain

[0237] **42**, **42'** (movable) upper deck (**+42"**)

[0238] **43** side rail

[0239] **44** deck

[0240] **45** ram frame

[0241] **46** corner support post end frames

[0242] **47** bridge plate

[0243] **48** detent (**58**) axis

[0244] **49** pulley bracket

[0245] **50** flat rack

[0246] **51** removable cable pin

[0247] **52** gate spigot lock

[0248] **53** cable anchor pin

[0249] **54** travel limit stop

[0250] **55** (inboard) upper post

[0251] **56** (outboard) upper post

[0252] **57** gate-post-deck lock

[0253] **58** inter-post detent

[0254] **59** bias springs

[0255] **60** flat rack

[0256] **61** deck bars

[0257] **62** bar position

[0258] **64** (upper) deck lock

[0259] **65** (lower deck) car load

[0260] **66** (upper deck) car load

[0261] **67** stub post

[0262] **68** capture+handling fitting

[0263] **69** (deck) trap door

[0264] **70** corner support post module

[0265] **80** stack

1-26. (canceled)

27. A platform deck or flat rack container, with capture and handling fittings, disposed at different spans.

28. A flat rack of claim 27, wherein the capture and handling fittings are grouped by different span standards.

29. A flat rack of claim 27, with respective support posts, and attendant capture and handling fittings, at different spans.

30. A flat rack of claim 27, with multiple support posts, grouped together in a post module at or adjacent deck ends.

31. A flat rack of claim 27, with independently folding support post groups.

32. A flat rack of claim 27, with capture and handling fittings at both 40 ft and 45 ft span, for conformity with dual handling standards.

33. A flat rack of claim 27, with support posts at opposite sides pivot mounted for inward transverse fold, to overlie one another upon a platform deck.

34. {Different height post pivots} A flat rack of claim 33, with support post pivots at different heights, to allow mutual collapse fold overlay.

35. A flat rack of claim 27, with paired telescopic support posts, operable by joint ram and cable drive, with respective capture and handling fittings at different standard spans.

36. A flat rack of claim 27, with a movable deck, carried at or adjacent each corner by paired adjustable span support posts with respective capture and handling fittings at different spans.

37. A flat rack of claim 36, with on-board hydraulic rams, and cable pulley drive coupling, for support post extension and suspended deck movement.

38. A flat rack of claim 27, with a movable upper deck, carried by support posts surmounting a base deck.

39. A flat rack of claim 27, with a tapered deck end profile to create end ramps for a vehicle cargo to allow vehicle tilt for compact fit within flat rack deck confines.

40. A flat rack of claim 27, with a hinged trap door in a deck floor intermediate deck ends to allow local tilt of a vehicle cargo disposed with wheels thereupon.

41. A flat rack of claim 27, with multiple capture and handling fittings, carried by individual support posts.

42. A flat rack of claim 29, with a support post extension ram disposed within post confines.

43. A flat rack of claim 29, with a cable suspension disposed within support post confines.

44. A flat rack of claim 27, with dual inter-fitting decks carried between adjustable span support posts pivotally mounted for inward transverse fold to allow a compact overall collapse fold with support posts within mutually inset decks.

45. A flat rack of claim 27, with selectively operable collapse fold interlock, between inward folded support posts, gate carried thereby, and underlying deck.

46. A flat rack of claim 38, with movable deck over-travel facility and lock, to facilitate under deck loading.

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