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Kosecoff

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[54] **WHEELCHAIR CARRIER ATTACHABLE TO VEHICLE**

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[52] **U.S. Cl.** ..... **214/450,** 224/42.03 B

[51] **Int. Cl.** **B60m 9/00**

[58] **Field of Search** .....224/42.03 B, 42.03 A, 42.03 R, 224/42.32, 42.45 R, 29 R; 214/450; 211/17, 18

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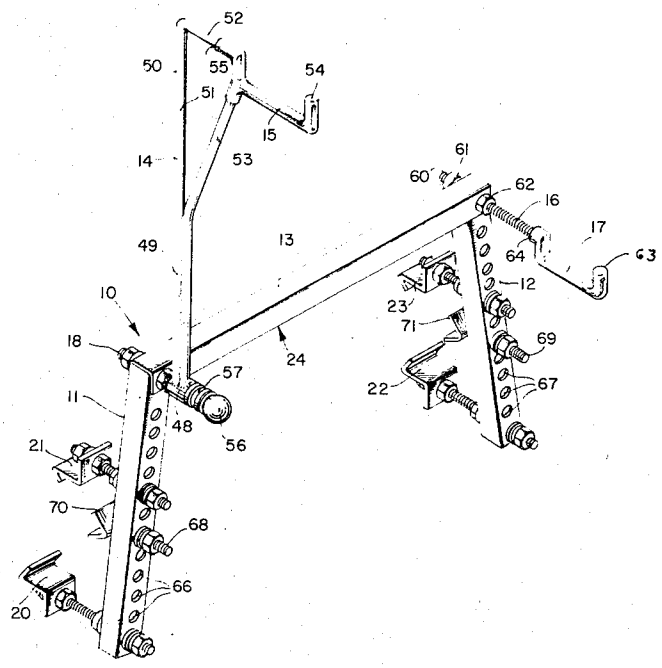
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[57] **ABSTRACT**

A wheelchair carrier has a generally U-shaped frame work constituted by a pair of upright struts whose upper ends are coupled to a relatively low-slung cross brace. Projecting rearwardly is a swing arm pivotally coupled to one side of the frame work and a holding arm fixed to the other side of the frame work.

With the swing arm rotated out of the way to a retracted position, a wheelchair may be assembled onto the carrier by first looping or placing a front corner section of the wheelchair over the holding arm and using it as a pivot to swing the wheelchair upwardly with a lifting action. Once the wheelchair is urged to the desired position, then the swing arm is rotated back to underlie and support the wheelchair handle grips or back rest section. The swing arm may be set in place by a detent and locking knob arrangement.

9 Claims, 6 Drawing Figures



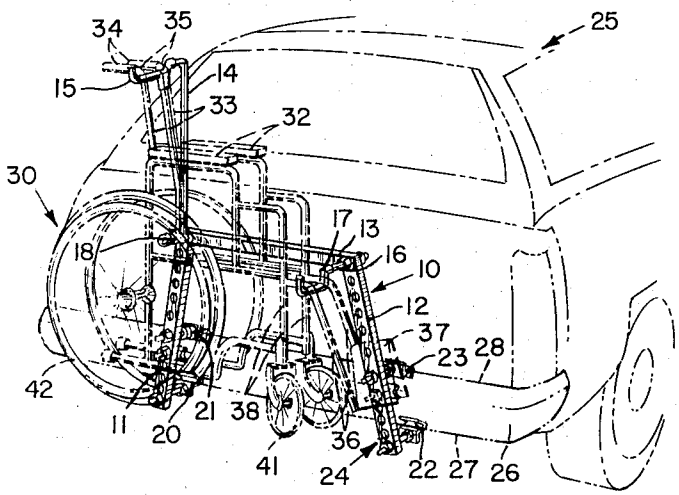


FIG.1

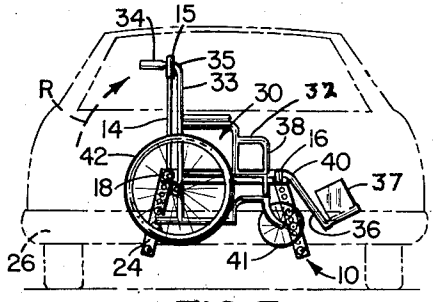


FIG.3

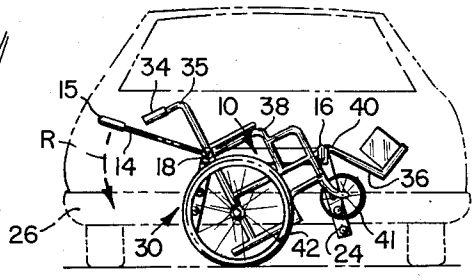


FIG.2

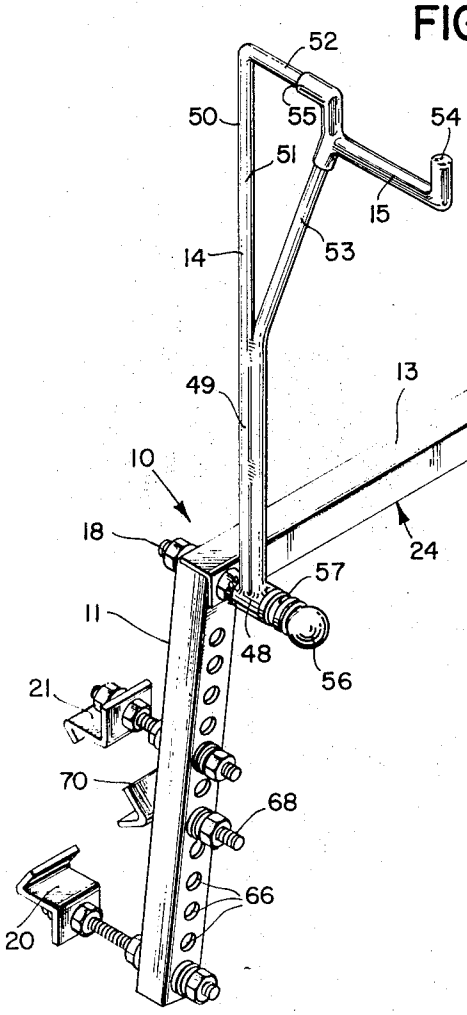


FIG.4

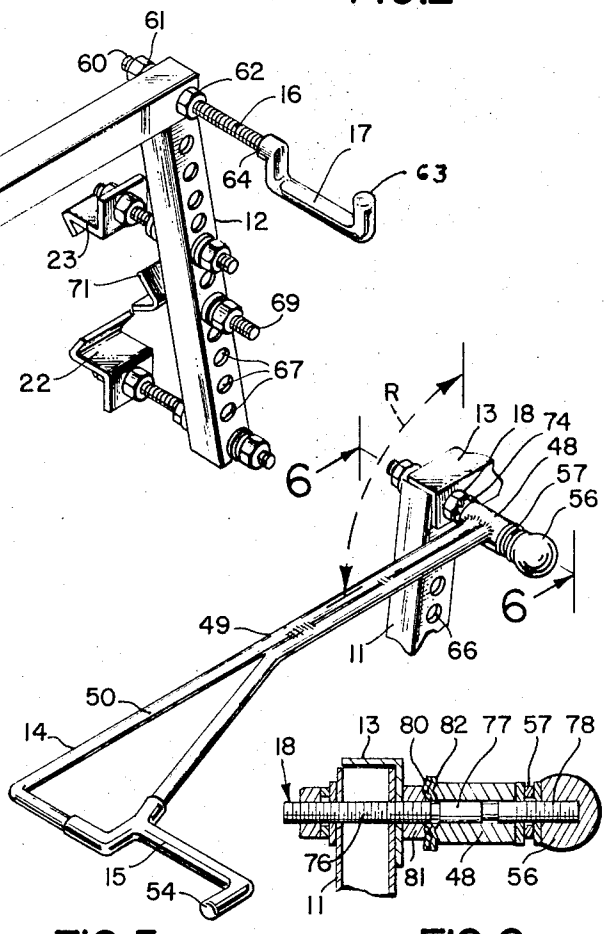


FIG.5

FIG.6

WHEELCHAIR CARRIER ATTACHABLE TO VEHICLE

BACKGROUND OF THE INVENTION

This invention generally relates to article carrying devices and more specifically to carriers for wheelchairs or the like capable of being removably installed on vehicle bumpers.

A number of stationary and collapsable bike carriers exist that can be demountably installed on the rear bumpers of automobiles. Their outwardly projecting arms or hangers are ordinarily spaced apart and structured so that the bike can be supported between its front upper portions and middle upper portions. These conventional bike carriers are not equipped or configured to accommodate wheelchairs or similar articles of bulky and unusual shape.

In order to transport a wheelchair by way of a family automobile, it must ordinarily be loaded into the back seat area of the vehicle which is tedious, awkward, time-consuming and very annoying. The wheelchair then consumes considerable space that could otherwise be used by additional occupants and may necessitate using two family automobiles.

Moreover, there is considerable risk that seat covers and upholstery will become ripped, gradually worn, smudged, etc.

The invalid, paraplegic, geriatric or other person using the wheelchair can certainly not accomplish the loading and unloading effort himself and therefore assistance from others is unavoidable.

A primary purpose of this invention is to permit many people to assemble their wheelchairs on a special article carrier attached to a vehicle bumper without assistance from others and in minimal time.

SUMMARY OF THE INVENTION

Briefly stated, this invention comprehends a relatively inexpensive, simple and durable article carrier capable of being removably installed on vehicle bumpers, the carrier being structured so that a collapsed wheelchair can be easily manipulated onto and withdrawn from the carrier by a single person.

In its broader aspects, the article carrier has a generally U-shaped frame work with a pair of laterally spaced struts and a cross brace coupled to the upper end of the struts. A pair of clamping assemblies are secured to corresponding struts for removably securing the U-shaped frame work to the bumper of a vehicle. Extending from and coupled to one side of the U-shaped frame work is a pivot element that rotatably couples a swing arm. The swing arm is thereby able to move within an arcuate path within a verticle plane that is preferably generally parallel to the plane of the U-shaped frame work. A holding arm extends rearwardly from and is coupled to the other side of the U-shaped frame work. An article such as a wheelchair may be disposed between and supported by the swing arm and holding arm.

A detent interconnects the swing arm and pivot element and is structured to allow the swing arm to be locked at selected positions within its path of movement. The detent includes a first serrated disk secured to the pivot element and a second serrated disk secured to the swing arm. The disks are arranged next to each other in releasable interlocking engagement.

Preferably a knob is provided that is coupled to the pivot element and arranged in releasable engagement with the swing arm so that it may be selectively loosened in order to relax locking pressure on the detent and tightened in order to exert locking pressure on the detent.

The swing arm outer or distal end is formed with a rearwardly extending hanger. The swing arm has a straight shank portion and an open triangular portion. Pliable, scratch resistant material covers the hanger and open triangular portion.

The holding arm is fixed to the U-shaped frame work and likewise is formed with a hanger covered in part by pliable, scratch-resistant material.

The article to be supported by the carrier may be a collapsed wheelchair supported at a back rest section by the swing arm and supported at a forward section by the holding arm.

BRIEF DESCRIPTION OF THE DRAWINGS

The numerous benefits and unique aspects of the present invention will be fully understood when the following detailed description is studied in conjunction with the drawings in which:

FIG. 1 is a perspective view showing an article carrier constructed in accordance with this invention supporting a collapsed wheelchair;

FIG. 2 is an elevational schematic view showing a wheelchair being assembled to the carrier with the swing arm moved to a retracted position;

FIG. 3 is also an elevational schematic view showing the collapsed wheelchair fully assembled with the swing arm rotated back to its supporting position;

FIG. 4 is a detailed, perspective, enlarged view of the article carrier;

FIG. 5 is a perspective fragmentary view showing the swing arm rotated to a substantially horizontal position; and,

FIG. 6 is a sectional fragmentary view taken along line 6—6 of FIG. 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now primarily to FIG. 1, an article carrier 10 is shown having a pair of spaced and generally upright struts 11 and 12 and a cross brace 13 spanning between and connected to the top ends of the struts 11 and 12.

Extending rearwardly from the corner or juncture defined by the intersection of strut 11 and cross brace 13 is an elongated swing arm 14 having a hanger 15 formed by its outermost or distal end. The swing arm 14 is rotatably coupled to a pivot element 18 for arcuate movement generally within a verticle plane. Extending rearwardly from the corner or juncture defined by the intersection of strut 12 and cross brace 13 is a holding arm 16 whose outer portion is formed with a hanger 17 similar in construction to hanger 15. Swing arm 14 is movable over a broad angular displacement and holding arm 16 is generally stationary, although it may rotate about its own axis if desired.

Secured to strut 11 is a clamping assembly constituted by a lower bumper clamp 20 and an upper bumper clamp 21. Similarly, secured to the other strut 12 is an identical clamping assembly constituted by a lower bumper clamp 22 and an upper bumper clamp 23.

The U-shaped frame work **24** constituted by the struts **11** and **12** and cross brace **13** is demountably attached to the rear bumper **26** of an automobile **25.** The lower bumper clamps **20** and **22** are secured to the lower bumper edge **27** and the upper bumper clamps **21** and **23** are secured to the upper bumper edge **28.**

An article characterized by a wheelchair **30** is shown assembled between and supported by swing arm **14** and holding arm **16** of the carrier **10.** The wheelchair **30** is of conventional construction and its symmetrical sides are shown collapsed inwardly towards the longitudinal center line where a number of split section panels, etc., are folded and generally flattened against one another so that the overall collapsed wheelchair **30** is compressed within a relatively narrow space. The wheelchair **30** has collapsed back rest portion **33,** push bars or handle bars **34,** and corners or junctions **35** defined generally by the back rest portion **33** and handle bars **34.** For simplicity, this area or section will be referred to as the back rest portion. The wheelchair **30** is shown with inwardly folded leg rest sections **36,** foot rest pads **37** and front section support legs **38.** Corners or junctions **40** are defined by the intersection of leg rest sections **36** and legs **38** or by bends in the leg rest sections **36.** For the sake of simplicity, this area or section will be referred to as the forward section **40.** The wheelchair also has relatively small front wheels **41** and relatively large rear wheels **42.**

Referring now to FIG. **2,** the wheelchair **30** is shown collapsed and ready for installation on to carrier **10.** The person who uses the wheelchair **30** or another person initially loops or places the wheel chair forward section **40** over the holding arm **16** after rotating swing arm **14** downwardly and out of the way to a retracted position. Thereafter, holding arm **16** can be used as a lever to derive a mechanical lifting advantage.

Referring to FIG. **3,** the person continues installing wheelchair **30** onto carrier **10** by swinging it upwardly about the axis of holding arm **16** until the back rest portion **33** is substantially erect or otherwise in the desired position. At that point in time the person may grasp swing arm **14** and crank it upwardly again to a substantially erect position where the hanger **15** will underlie and support the wheelchair back rest portion **33.**

Referring now essentially to FIG. **4,** the swing arm **14** has a barrel-shaped connector **48** swivelly connected to the pivot element **18** which essentially is a bolt having threaded and smooth segments as shall be more fully explained. Adjacent the barrel-shaped connector **48** is a straight shank portion **49** that merges with an open triangular portion **50** constituted by bars **51, 52** and **53.** The outermost tip of hanger **15** terminates in a hook **54** which is arranged to project upwardly when swing arm **14** is in its operational position as illustrated in FIGS. **1, 3** and **4.** To protect the wheelchair or other article of unusual geometry assembled on carrier **10,** the hanger **15** and at least a part of triangular portion **50** are covered with pliable, scratch-resistant material **55.** Secured to the rearward end of the pivot element is a manual knob **56** that can be selectively manipulated to exert pressure on barrel-shaped connector **48** through one or more spring washers **57** or the like.

The holding arm **16** is essentially a threaded bolt **60** held tightly to the juncture of strut **12** and cross brace **13** by a plurality of nut fasteners **61** and **62.** The pivot element **18** and threaded bolt **60** hold the U-shaped frame work **24** together as a rigid unit. The outermost tip of hanger **17** terminates in an upwardly projecting hook **63.** A coating of pliable, scratch-resistant material **64** is likewise applied to holding arm **16.**

A series of height adjustment retaining holes **66** and **67** are formed through the channel-shaped bars constituting struts **11** and **12** respectively. The bumper clamps **20, 21, 22** and **23** can be selectively positioned in the retaining holes in order to accommodate varying sizes and curvatures of different vehicle bumpers. Stabilizing bolts **68** and **69** are inserted between their associated upper and lower bumper clamps. The bumper-engaging forward ends **70** and **71** of the stabilizing bolts **68** and **69** respectively are covered with pliable, scratch-resistant material in order to guard against gouging or scratching the vehicle bumper **26.** The sets of upper and lower bumper clamps and stabilizing bolts constitute a pair of three-point contacts with the bumper to assure tight and dependable attachment.

FIG. **5** shows the swing arm **14** rotated counterclockwise and downwardly from its erect position to a horizontal and partially retracted position. With the swing arm **14** swung to this position it will be out of the way so that a person will have adequate elbow room and unobstructed access to the carrier **10** for the purpose of effecting the first phase of the installation procedure. A detent **74** is interposed between the swing arm **14** and pivot element **18** in order to assist in allowing the swing arm **14** to be locked at selected positions within its path of movement. The detent **74** may be any conventional interlock, positive lock catch or related mechanism.

Referring to FIG. **6,** the pivot element **18** is an elongated bolt having a forwarded threaded segment **76** extending through strut **11** and cross brace **13,** an intermediate smooth segment **77** that passes through and retains barrel-shaped connector **48** of swing arm **14,** and, a rearward threaded segment **78** that holds the one or more spring washers **57** and threadably receives the knob **56.**

The detent **74** in this embodiment is characterized by a serrated locking disk **80** fixed to a nut **81** which is in turn tightly secured to threaded segment **76** of the pivot element **18.** A mating serrated locking disk **82** is fixed to an end of the barrel-shaped connector **48.** When the swing arm **14** is set in place, the adjacent and abutting disks **80** and **82** will be held together in releasable interlocking engagement. When the knob **56** is loosened then the locking pressure between disks **80** and **82** will be relaxed so that the swing arm **14** may be rotated to a different angular position.

The swing arm **14** is preferably constructed from chrome-plated tubular or rod steel. The arm **14** may incorporate a telescopable connection in order to be length adjustable. Preferably the end-to-end length of arm **14** is equal to or greater than the space between the struts **11** and **12.** If desired a plurality of hangers could be formed on the swing arm **14** and holding arm **16** so that a plurality of wheelchairs could be tandemly aligned and held by the single article carrier **10.**

While the article carrier **10** has been described in connection with accommodating a collapsed wheelchair **30,** it is constructed to accommodate other articles such as collapsible furniture, large toys, etc.

While it is preferable that the swing arm **14** be erect for optimum support purposes, this is not essential and the arm **14** could be locked in place at numerous inclined positions dictated primarily by the shape and

special problems presented by the article to be assembled.

OPERATION

Keeping the above construction in mind, it can be understood how the previously described disadvantages pertaining to the transportation of wheelchairs and the like are overcome or substantially eliminated by this invention.

With the article carrier **10** suitably secured to automobile bumper **26** a collapsed wheelchair **30** may be assembled with relative ease by practically any person, including many people who must use wheelchairs. The wheelchair **30** is tilted backwardly on rear wheels **42** until the wheelchair forward section **40** is raised to a level where it may be pushed forwardly to rest upon holding arm **16** as shown in FIG. **2**. During this maneuver, the rear wheels **42** have remained on the ground so there has been no need to lift the entire weight of wheelchair **30**.

With the swing arm **14** rotated downwardly to one side and generally out of the way, the person may then use the holding arm **16** as a lever and derive a mechanical lifting advantage from it. The handles **34** or the like are grasped and raised until the back rest portion **33** is substantially verticle. Holding the wheelchair in that desired position, the person may then grasp the swing arm **14** and rotate it upwardly to a position where the hanger **15** underlies and supports the back rest portion **33**. Then the knob **56** is tightened, causing the detent **18** to become positively locked in order to fix the swing arm **14** in the desired position. Straps may then be tightened to further secure the stability of the wheelchair **30** and carrier **10** prior to travelling.

From the foregoing, it will be evident that the present invention has provided an article carrier for a wheelchair in which all of the various advantages are fully realized.

What is claimed is:

1. An article carrier attachable to a bumper of a vehicle, comprising:

a. a generally U-shape frame work having a pair of laterally spaced struts and a cross brace coupled to the upper ends of the struts;

b. clamping assemblies secured to corresponding struts for removably securing the U-shaped frame work to a vehicle bumper;

c. a holding arm extending rearwardly from and being coupled to one side of the U-shaped framework, the holding arm having a hook;

d. a pivot element extending rearwardly from and coupled to the other side of the U-shaped framework;

e. a swing arm with a hook arranged offset vertically from the holding arm, the swing arm being rotatably coupled to the pivot element for arcuate movement in a plane generally parallel to the plane of the framework, and,

f. a detent coupled to the swing arm and pivot element and structured for allowing the swing arm to be locked at selected positions within its path of movement across the framework,

wherein, an article may be disposed between and supported by the swing arm and holding arm.

2. The structure according to claim **1**, wherein:

the detent includes a first serrated disk secured to the pivot element and a second serrated disk secured to the swing arm, the disks being mutually adjacent and arranged in releasable interlocking engagement.

3. The structure according to claim **1**, including:

a knob coupled to the pivot element and arranged in releasable engagement with the swing arm,

wherein, the knob may be selectively loosened to relax locking pressure on the detent and tightened to exert locking pressure on the detent.

4. The structure according to claim **3**, wherein:

the swing arm has a barrel-shaped connector positioned between the knob and detent.

5. The structure according to claim **1**, wherein:

the swing arm distal end is formed with a rearwardly extending hanger.

6. The structure according to claim **5**, wherein:

the swing arm has a straight shank portion and an open triangular portion, and

pliable, scratch-resistent material covers the hanger and at least part of the open triangular portion.

7. The structure according to claim **1**, wherein:

the holding arm is fixed to the U-shaped frame work, and, is formed with a hanger convered in part by pliable, scratch-resistant material.

8. The structure according to claim **1**, wherein:

the swing arm is mounted to the junction of one strut and the cross brace,

the holding arm is mounted to the juncture of the other strut and the cross brace,

the struts are formed with height adjustment retaining holes, and,

the clamping assemblies are adjustably secured to their corresponding struts in part by projecting through selected height adjustment retaining holes.

9. The structure according to claim **1**, including:

a collapsed wheelchair supported by the carrier with a back rest section supported by the swing arm and a forward section supported by the holding arm.

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