Dec. 23, 1969 E. A. PETERSEN 3,484,877

CANTILEVERED TRANSFER SUPPORT FOR WHEELCHAIRS AND WHEELCHAIR INCORPORATING THE SAME

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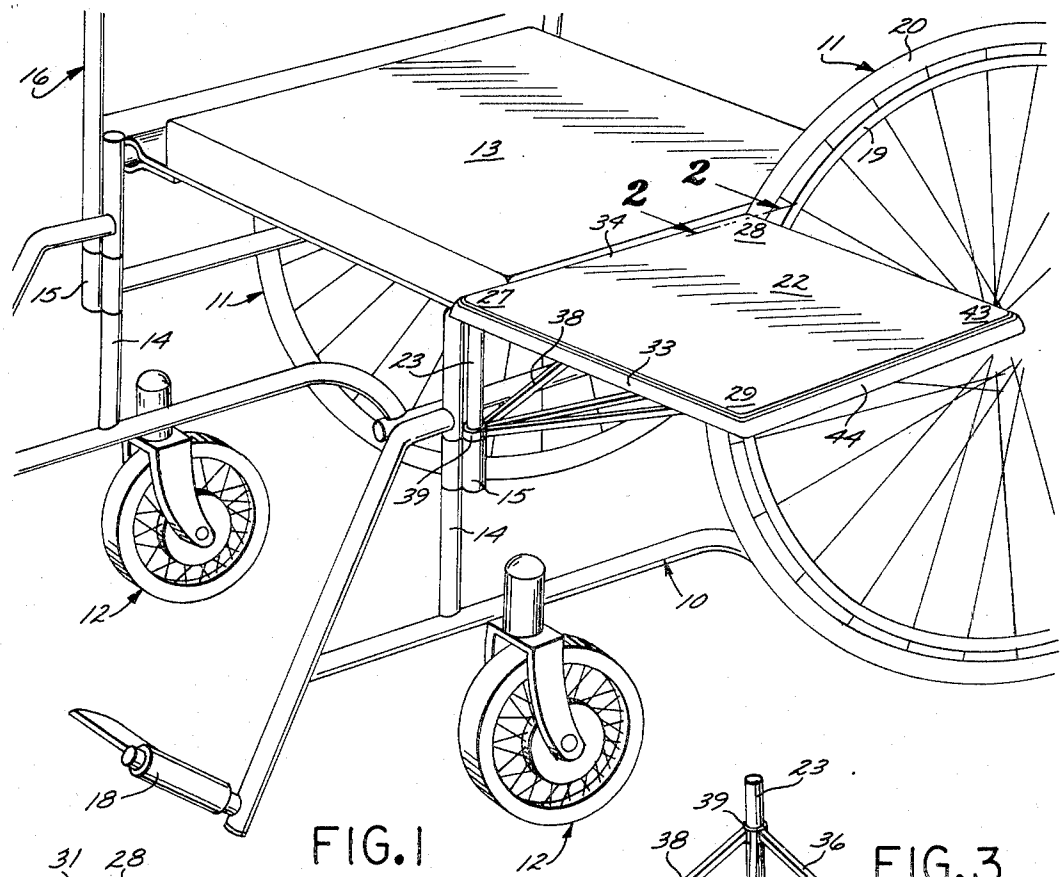


FIG. 1

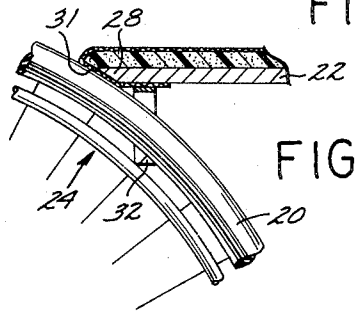


FIG. 2

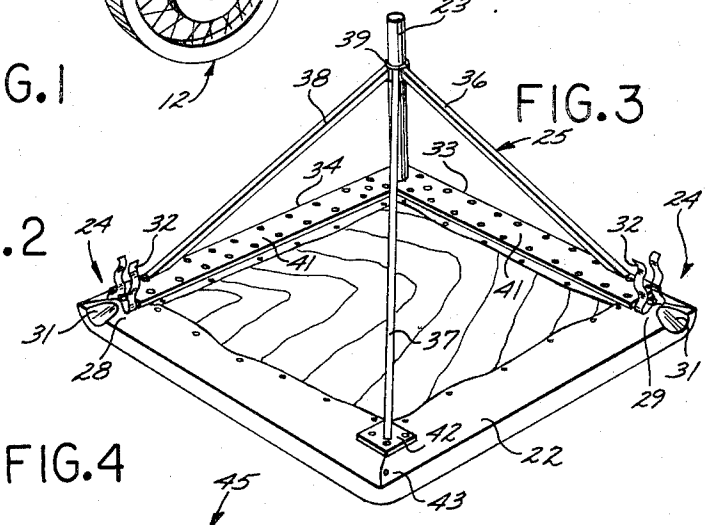


FIG. 3

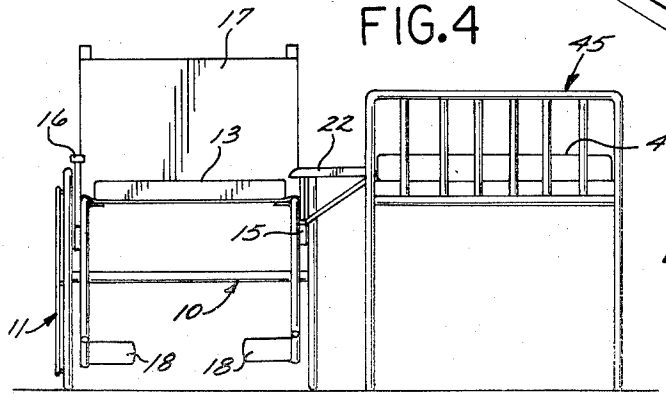


FIG. 4

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CANTILEVERED TRANSFER SUPPORT FOR WHEELCHAIRS AND WHEELCHAIR INCORPORATING THE SAME

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U.S. Cl. 5—86 7 Claims

ABSTRACT OF THE DISCLOSURE

A transfer support which permits a paraplegic to move from a wheelchair into a bed, automobile, etc. The support comprises a board having a leg which is mounted in the front socket for the armrest of the wheelchair. The board is also supported upon a drive wheel of the wheelchair, which serves not only to complete the mounting of the board but also to lock such drive wheel against rotation.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to the art of wheelchairs, and more particularly to the art of devices for permitting paraplegics and certain types of quadriplegics to transfer themselves between wheelchairs and automobiles, beds, and the like.

Description of the prior art

The most pertinent construction known to applicant is a bridge board which is presently on the market and is adapted to bridge the gap between a wheelchair and a car seat, bed, etc. Such bridge board is, however, characterized by numerous deficiencies some of which are as follows:

(a) It is hingedly or pivotally related to the wheelchair by means of a generally U-shaped mounting bracket the legs of which rest in both the front and rear armrest sockets of the chair. Since the relationship is pivotal, the board may not be used unless the distal end thereof is actually resting upon the horizontal upper surface of a car seat, bed, etc. Accordingly, the bridge board must extend a substantial distance from the wheelchair and must lap a substantial distance over the car seat or other surface to which the user is attempting to transfer himself. Because of the overlapping relationship, the user must move a major distance away from the wheelchair before he is no longer supported upon the bridge board. Such substantial distance makes it difficult to complete the transfer, difficult to demount the bridge board after the transfer, and difficult to manipulate the wheelchair (as by folding it up and placing it in the rear seat of an automobile) after the transfer.

(b) Another major disadvantage of the overlapping, pivotally-mounted bridge board is that it is difficult or impossible for the user to manipulate himself onto a surface which is substantially higher than the upper surface of the wheelchair seat. When the bridge board is resting upon a surface which is substantially higher than the wheelchair seat, the bridge board is inclined at a considerable angle to the horizontal. This slide or chute relationship makes it difficult or impossible for many users to make the transfer from a wheelchair to certain types of car seats, beds, etc.

(c) Wheelchairs are conventionally equipped with wheel locks, but it may occur that the user forgets to lock the wheels of the chair prior to attempting transfer from wheelchair to a car seat or vice versa. When such event occurs, all wheels of the wheelchair are completely free to move, which maximizes the likelihood of movement of the chair and consequent falling of the user into the space between the chair and the object onto which he is attempting to transfer himself. The indicated presently-marketed construction makes no provision for insuring that at least one drive wheel of the chair is locked during transfer.

(d) The user may, for example, wish to leave the automobile on the opposite side from that through which he entered the same. With the indicated bridge board construction, this cannot be done unless certain troublesome adjustments are made. It therefore follows that, as a practical matter, the user is obliged to enter and leave the automobile on the same side at all times.

(e) Each user of a wheelchair has an individualized set of requirements, which may necessitate different size boards, different board elevations, etc. Furthermore, there are several different sizes of chairs, which are known as junior chairs, senior chairs, etc. With the indicated presently-marketed device, it is difficult or excessively expensive to market boards meeting the individualized requirements of various users and various types of chairs. This is because the above-indicated U-shaped mounting bracket and/or the associated hinge means, must be altered in order to change the elevation of the board, in order to adapt the board for mounting on different types of chairs wherein the front and rear armrest sockets are spaced different distances apart, etc.

(f) Because the indicated presently-marketed construction requires the use of both front and rear sockets in order to support the bridge board, it is difficult for the user to remove the bridge board after he has transferred himself into an automobile, etc. It is also difficult to remount the bridge board on the wheelchair.

SUMMARY OF THE INVENTION

The present invention provides a highly simple manner of removably cantilevering a transfer board at one side of the wheelchair while at the same time automatically locking the adjacent main drive wheel of the chair. It is characterized by the following, and other, advantages in comparison to the above-indicated and other constructions:

(a) Because the transfer board is cantilevered, the distal edge thereof is not supported upon the upper surface of the bed or car seat, etc., but instead is independently supported by the wheelchair and is brought into close abutment with the vertical face at the edge of the bed or car seat. Thus, for example, when the user is making a transfer from wheelchair to car seat, he can support himself on the car seat after only a very minimum movement away from the wheelchair, which movement is effected with minimum ease. Since the user is then sitting on the car seat, etc., at the extreme seat edge adjacent the chair, it is very simple for the user to remove the transfer board from the wheelchair, and thereafter fold the wheelchair and place it in the rear seat of the automobile.

(b) Also because the transfer board is cantilevered, it is assured that the surface of the board will always be parallel to the surface of the wheelchair seat, instead of being inclined relative thereto. This produces many major advantages one of which is that the user may, with perfect safety, and without danger of falling, breaking his legs, etc., elevate himself onto a surface which is a substantial number of inches higher than the upper surface of the wheelchair seat.

(c) One of the supporting elements for the present transfer board is a main or drive wheel of the wheelchair. A locking relationship is thus automatically created between the transfer board and such wheel, which makes it certain that such wheel is always locked during

use of the transfer board. This reduces the likelihood that the inadvertent neglect to lock the wheels of the wheelchair will result in injury to the user.

(d) Because the present transfer board has only one leg and fits in only the front armrest socket of the wheelchair, the rear support for the board being effected by the adjacent main wheel of the chair, it follows that the same board may be utilized on either the right or left side of the wheelchair, without the necessity for making any adjustment whatsoever. Accordingly, the user may enter the left side of a car, for example, and may leave through the right side thereof, without the necessity for making any manipulations or adjustments of the transfer board.

(e) Because the present transfer board has only one leg, which leg is simply and economically manufactured in different lengths, both the elevation of the board and the size thereof may be readily adapted to the requirements of a particular user, without increasing the manufacturing cost in any major respect.

(f) The single-leg construction of the present board makes it exceedingly simple for the user to remove the board from the wheelchair after he has transferred himself into a car or onto a bed. Correspondingly, mounting of the board onto the wheelchair is very easy.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an isometric view illustrating the transfer support of the invention, and the combination transfer support and wheelchair, in condition for a transfer of a user into or out of the wheelchair;

FIGURE 2 is a fragmentary sectional view taken on line 2—2 of FIGURE 1 and illustrating the locking relationship between the transfer board and the associated wheel;

FIGURE 3 is an isometric view illustrating the transfer board of the present invention in inverted condition; and

FIGURE 4 illustrates the relationship between the wheelchair-transfer board and an associated bed, the latter having a surface which is substantially higher than that of the seat of the wheelchair.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present transfer support is adapted to be employed in combination with a wheelchair of the type having removable armrests or arms. Such a wheelchair is illustrated in FIGURE 1 as comprising a frame **10** on which are mounted two main drive wheels **11** and two caster wheels **12**, the latter being located in advance of the drive wheels. Drive wheels **11** are large in diameter, the upper portions thereof extending a considerable distance above the seat portion **13** of the wheelchair, such seat portion being suitably supported from frame **10**.

Stated more definitely, frame **10** has vertical forward leg elements **14** to which are fixedly secured, in vertical relationship, tubular forward or front socket elements **15** for the removable armrests or arms **16** of the chair. Only one such armrest **16** is illustrated in the drawings, since the armrest on the side where it is desired to mount the transfer support is removed prior to mounting thereof. There are corresponding socket elements at the rear portion of the chair and which receive rear portions of the armrests **16**, but these are not illustrated in the drawings since they are not employed in the present invention.

The remaining portions of the chair comprise a conventional back **17**, FIGURE 4, and also comprise leg supports or leg rest elements **18** which extend forwardly from the frame **10**. The drive wheels are provided with suitable handrails **19** adapted to be grasped by the operator in order to propel the chair.

The transfer apparatus of the present invention comprises a board **22** having a single leg **23** adapted to be inserted into the forward armrest socket element **15** after removal of the armrest which is normally mounted therein. Means **24** are provided to mount at least one corner of the board **22** in supported and locking relationship relative to the adjacent drive wheel **11** of the wheelchair. In addition, means **25** are provided to support the board **22** in cantilevered relationship from leg **23**, and to limit the degree of insertion of the leg into the socket **15** in order to regulate the elevation of the board relative to seat portion **13** of the wheelchair.

The board **22** is illustrated as being generally square, for example twelve inches by twelve inches, but it is to be understood that the exact size is determined in large part by the characteristics of the individual user. The board may be constructed of plywood, metal, etc., and may be suitably padded and provided with a protective covering of plastic or other material.

The dimension of the board **22** parallel to the normal direction of the movement of the wheelchair is sufficient that the board may support the user after he has slid onto the board from the seat **13**. The dimension of the board transverse to the normal direction of movement of the wheelchair is sufficient to permit support of the user as stated above, and also is sufficient to bridge the gap which is normally present between the wheelchair and the front seat of an automobile, for example.

The leg **23** is fixedly connected at its upper end to one corner of board **22**, such corner being numbered **27** in FIGURE 1. The lower end of the leg **23** is shaped for insertion into the front armrest socket **15**, the amount of insertion being sufficient that the socket **15** will restrain the lower leg end from pivoting about a horizontal axis when the weight of the user is applied to the board **22**.

The mounting and lock means **24** is provided on the same edge of the board **22** as that on which the leg **23** is mounted. Preferably, there are two mounting and lock means **24** in order to permit the apparatus to be employed on either side of the wheelchair. Thus, a mounting and lock means **24** is provided at each of the corners numbered **28** and **29** in FIGURES 1–3.

Each of the illustrated mounting and lock means **24** comprises a mounted, recessed or notched portion **31** of the underside of board **22**. Such portion **31** is shaped to nest or seat over the tire **20** of each drive wheel **11**. It follows that, when the user is supported on board **22**, the downward pressure present at the interface between notched portion **31** and tire **20** will lock the wheel **11** against rotation. It will also insure that the board **22** does not pivot about a vertical axis through leg **23** and socket **15**.

To provide further assurance against pivotal movement of the board **22** about a vertical axis through leg **23**, the illustrated mounting and lock means **24** additionally comprises a generally bifurcated or U-shaped clip **32** the arms of which are shaped to fit resiliently over opposite sides of tire **20**. Each clip **32** is aligned with the associated routed region or notch **31**, the relationship being such that when the clip is pushed downwardly over tire **20** the notched portion **31** will seat upon such tire. A suitable mark or indication, not shown, is provided on the upper surface of board **22** immediately above the center of clip **32** in order to indicate to the user when the clip is positioned directly over the tire **20**.

It is pointed out that corners **27** and **29** are at opposite ends of one edge **33** of the board **22**, whereas the corners **27** and **28** are at opposite ends of an adjacent edge **34** of the board.

Proceeding next to a description of support means **25**, this comprises three braces or struts **36–38** which extend, respectively, from the leg **23** to the three corners of the board which are remote from such leg. More specifically, each brace or strut **36–38** is welded or otherwise suitably connected to a collar **39** which, in turn, is welded or otherwise fixedly associated with leg **23** at a region spaced from the end of such leg and also from the base thereof.

In the illustrated construction, an angle brace **41** is fixedly secured, for example by means of suitable screws, to the underside of board **22** along edges **33** and **34** thereof. Struts **36** and **38** extend from collar **39** to the ends of angle brace **41** which are adjacent the respective corners **29** and **28**. The remaining strut, number **37**, extends from collar **39** to a foot plate **42** which is secured by screws to the remaining corner, numbered **43**, of the board **22**. The angle brace **41** further serves as a means for effecting rigid mounting of the leg **23** to the board **22**.

The collar **39** serves not only to anchor the struts **36–38** but as a stop which limits the downward insertion of leg **23** into socket **15**. Other stop means could be employed, for example at the bottom of socket **15**.

OPERATION

The apparatus will first be described in conjunction with its use in entering and leaving an automobile. Thereafter, and with reference to FIGURE 4, the apparatus will be described in conjunction with its use in getting onto a bed. It is pointed out that both of the chair arms **16** are normally in mounted positions in their respective sockets.

The user, when he desires to enter the front seat of an automobile, opens the front door of the auto, and then positions the wheelchair so that one side thereof (for example, the left side of the chair) is adjacent the front seat of the auto. The operator then removes the left armrest (not shown) and places it in the auto, normally in the rear seat. He then grasps the board **22** (which normally is stored in the automobile), inserts the leg **23** in socket **15**, and pushes down on corner **28** to snap the associated clip **32** over the tire **20**.

The positioning of the wheelchair is caused to be such that the edge of board **22** remote from seat **13** (denoted by the reference numeral **44** in FIGURE 1) is closely adjacent the front car seat at substantially the same elevation as the upper surface of such seat. Edge **44** does not overlap the car seat but instead is close to being in endwise abutment relative thereto.

The user then employs his arms to slide his torso into supported relationship on the board **22**, the legs of the user then remaining on one or both of the leg supports **18**. He next employs his arms to move his legs from the supports **18** into the automobile passenger compartment forwardly of the front seat. After his legs are in proper position in the vehicle, the user emplodys his arms to grasp the car seat (or suitable supporting elements) and thereby shift his torso off the board **22** and onto the portion of the front car seat which is immediately adjacent edge **44**. As above indicated, it is a very important feature of the invention that the user need only move a short distance away from the wheelchair seat **13** before he is off the board **22** and sitting on the edge portion of the car seat.

Because the user is still close to the wheelchair, it is a simple matter for him to use only one hand in grasping the board **22** and lifting upwardly thereon, so that the leg **23** moves out of the socket **15**. Board **22** is then placed in the rear seat of the vehicle, following which the remainder of the wheelchair is folded up by the user and also put in the rear seat of the vehicle.

It is emphasized that the weight of the average user is supported entirely by the board **22** during the transfer operation, not by the vehicle seat. However, in the case of very heavy individuals, weighing on the order of 200 pounds, the wheelchair may tend to tip over in response to the moment exerted downwardly on the board **22**. Even then, however, the wheelchair may not tip over since the edge **44** of board **22** engages the vertical edge surface at the end of the automobile seat.

As previously explained, the relationship between the elements **31–32** and tire **20** not only prevents pivoting of board **22** about a vertical axis through leg **23**, but also locks the tire **20** and thus the entire drive wheel **11** of the wheelchair.

To leave the automobile and enter the wheelchair, the above procedure is reversed. It is, however, an important feature of the present invention that the user may, if desired, exit through the automobile door on the opposite side from that through which he entered. Thus, in the case of the above illustration, let it be assumed that the operator wishes to exit from the left side of the automobile whereas he entered through the right side thereof. To do this, the wheelchair is first lifted out of the back seat and unfolded in a position adjacent the left side of the vehicle, following which an armrest **16** is mounted in position but on the opposite side of the wheelchair from that shown in FIGURE 1. The board **22** is then mounted in position, but on the right side of the wheelchair instead of on the left side. This is readily accomplished, without any adjustment or manipulation of any means whatsoever, by merely causing the corner **29** of board **22** to be over the right drive wheel of the wheelchair, such corner **29** being provided with mounting and locking elements **31–32** which correspond to those utilized when board **22** is in the position of FIGURE 1.

After the user has slid out onto the chair seat **13**, he demounts the board **22**, places it in the vehicle, mounts the remaining armrest **16** in position, and is ready to use the wheelchair.

Referring next to FIGURE 4, let it be assumed that the user wishes to raise himself onto a bed **45** the upper surface **46** of which is substantial distance above, for example four or five inches, the upper surface of chair seat **13**. It is to be understood, however, that the same principle applies to automobile seats which are higher than a chair seat or, conversely, are lower than a chair seat.

For such an operation, it is advantageous that transfer support be employed which is so constructed that the upper surface of board **22** is several inches higher than the upper surface of seat **13**. Thus, board **22** acts as an intermediate "stairstep" or platform which is parallel to both the seat **13** and the bed surface **46**. There is no inclined "slide" or "chute" relationship which makes it impossible for the average user to manipulate himself.

Although the board **22** is then several inches above seat **13**, the average user, for example by grasping suitable unshown apparatus associated with bed **45**, can readily lift himself onto the board or "stairstep" **22**. Once he is seated on the board **22**, he grasps his legs with his arms and lifts such legs onto the bed surface **46**. After his legs are on the bed surface, the user employs his arms to lift his torso onto the bed surface **46**. Because of the described operation, there is no substantial possibility that the user will break his legs or will fall into the space between the wheelchair and the bed. As described above, the edge **44** is brought into close abutment with the vertical face of the mattress or other side portion of the bed **45**.

It is an added feature of the invention that the board **22** serves advantageously as a night stand, this being contrasted with constructions in which the transfer element performs no useful function after the user is in bed.

It is emphasized that the present construction makes it extremely simple to provide the board **22** at different elevations, and to provide boards **22** of different widths. This may be accomplished by merely causing the leg **23** to be longer and by placing an extra collar (not shown) adjacent the one indicated at **39**. The added length of the leg **23**, and the width of the additional collar, are selected to raise the board **22** to the desired elevation. In addition, the board is caused to be sufficiently wider that the corner **28** (or **29** as the case may be) will engage the tire **20** as

indicated in FIGURE 2, despite the fact that a portion of the tire more remote from the supporting surface is contacted. In other words, the length of the leg (between board and collar) is correlated to the width of the board in such manner that collar **39** is seated on socket **15** at the same time that notch **31** seats on tire **20**.

The above may be done not only during construction, for example by making the board **22** overhang or cantilever from the angle brace **41** and foot plate **42**, but also after construction by providing suitable adapter means at the socket **15** (and/or leg **23**) and at the corners **28** and **29**. In similar manner, the board **22** may be lowered to a position below the upper surface of the chair seat **13**.

It is emphasized that the present transfer board may be used not only by paraplegics but by certain types of quadriplegics, for example those having use of their arms but not their hands.

It should be further noted that paraplegics and quadriplegics frequently have very poor senses of balance, making it important that it be possible to disassemble the unit with only one hand and without leaning an excessive distance outwardly from the car seat.

I claim:

1. A cantilevered transfer support for use on a wheelchair of the type having removable armrests, which comprises:

a board adapted to support the user of the wheelchair,

said board having one edge adapted to be positioned adjacent one side edge of the seat portion of the wheelchair whereby the user may readily transfer himself from said seat portion onto said board,

said board also having another edge on the opposite side of said board from said one edge thereof and adapted to be positioned adjacent a vertical side face of a bed or seat whereby to permit the user to transfer himself from said board onto said bed or seat,

a leg mounted on said board at one end portion of said one edge thereof and adapted to be inserted into the front armrest socket of said wheelchair,

said leg and socket being so shaped that said leg may rotate in said socket about a vertical axis, and

wheel-engaging means provided at the other end portion of said one edge for mounting in supported relationship on the main drive wheel of said wheelchair to the rear of said front armrest socket,

said wheel-engaging means including means to prevent said rotation of said leg about said axis.

2. A cantilevered transfer support for use on a wheelchair of the type having removable armrests, which comprises:

a board adapted to support the user of the wheelchair,

said board having one edge adapted to be positioned adjacent one side edge of the seat portion of the wheelchair whereby the user may readily transfer himself from said seat portion onto said board,

said board also having another edge on the opposite side of said board from said one edge thereof and adapted to be positioned adjacent a vertical side face of a bed or seat whereby to permit the user to transfer himself from said board onto said bed or seat,

a leg mounted on said board at one end portion of said one edge thereof and adapted to be inserted into the front armrest socket of said wheelchair, and

wheel-engaging means provided at the other end portion of said one edge for mounting in supported relationship on the main drive wheel of said wheelchair to the rear of said front armrest socket,

said wheel-engaging means seating on the tire portion of said main drive wheel and locking said wheel against rotation.

3. The invention as claimed in claim **2**, in which said wheel-engaging means comprises a recessed portion of said board, said recessed portion being shaped to seat on the tire portion of said main drive wheel.

4. The invention as claimed in claim **2**, in which said wheel-engaging means includes means shaped for mounting in straddling relationship over the tire portion of said main drive wheel.

5. The invention as claimed in claim **2**, in which said wheel-engaging means comprises a recessed portion of said board, said recessed portion being shaped to seat on the tire portion of said main drive wheel, said wheel-engaging means also including means shaped for mounting in straddling relationship over the tire portion of said main drive wheel.

6. A cantilevered transfer support for use on a wheelchair of the type having removable armrests, which comprises:

a board adapted to support the user of the wheelchair,

said board having one edge adapted to be positioned adjacent one side edge of the seat portion of the wheelchair whereby the user may readily transfer himself from said seat portion onto said board,

said board also having another edge on the opposite side of said board from said one edge thereof and adapted to be positioned adjacent a vertical side face of a bed or seat whereby to permit the user to transfer himself from said board onto said bed or seat,

a leg mounted on said board at one end portion of said one edge thereof and adapted to be inserted into the front armrest socket of said wheelchair,

stop means to limit the degree of insertion of said leg into said socket, and

wheel-engaging means provided at the other end portion of said one edge for mounting in supported relationship on the main drive wheel of said wheelchair to the rear of said front armrest socket,

said wheel-engaging means being so correlated to said stop means that said wheel-engaging means seats on the tire portion of said main drive wheel when said leg is inserted into said socket to the full extent permitted by said stop means.

7. A combination transfer support and wheelchair, which comprises:

a wheelchair having a removable armrest on each side of the seat thereof,

said armrests having support portions adapted to be inserted into front sockets provided on said wheelchair in advance of the main drive wheels thereof,

said wheels being large in diameter and extending upwardly to elevations substantially above the elevations of said front sockets,

a board adapted to support the user of said wheelchair,

said board having one edge positioned adjacent one side edge of the seat portion of said wheelchair whereby the user may readily transfer himself from said seat portion onto said board,

said board also having another edge on the opposite side of said board from said one edge thereof and adapted to be positioned adjacent a vertical side face of a bed or seat whereby to permit the user to transfer himself from said board onto said bed or seat,

a leg mounted on said board at one end portion of said one edge thereof and inserted into one of said front sockets of said wheelchair, and

wheel-engaging means provided at the other end portion of said one edge and mounted in supported rela-

tionship on the main drive wheel of said wheelchair to the rear of said one front socket.

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U.S. Cl. X.R.

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