Dec. 9, 1969 W. J. PIVACEK 3,482,873

LOCKING CONNECTION FOR WHEEL CHAIR ATTACHMENTS

Filed Dec. 14, 1967 2 Sheets-Sheet 1

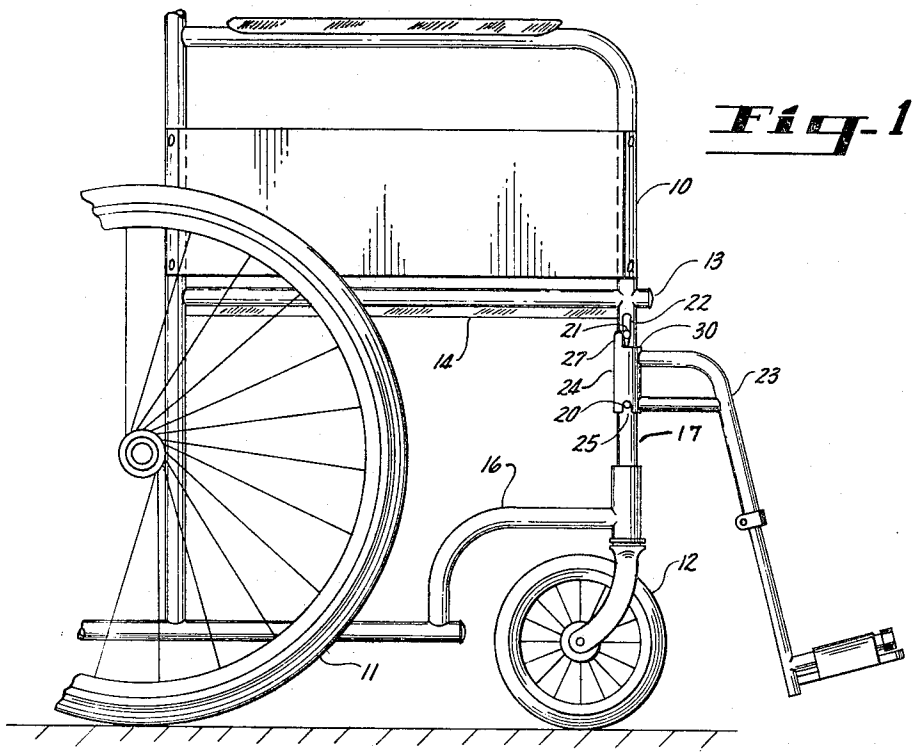


Fig. 1

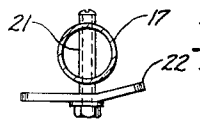


Fig. 3

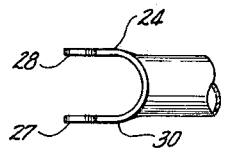


Fig. 5

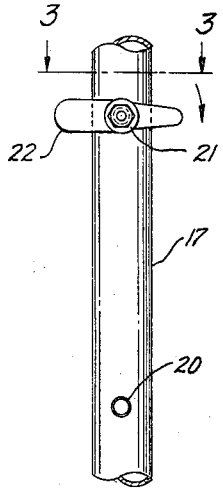


Fig. 2

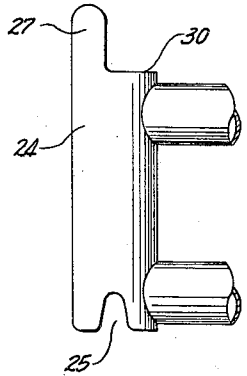


Fig. 4

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Dec. 9, 1969 W. J. PIVACEK 3,482,873

LOCKING CONNECTION FOR WHEEL CHAIR ATTACHMENTS

Filed Dec. 14, 1967 2 Sheets-Sheet 2

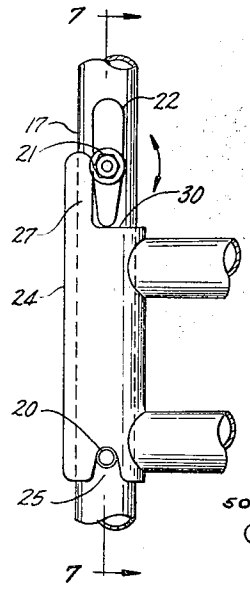


Fig. 6

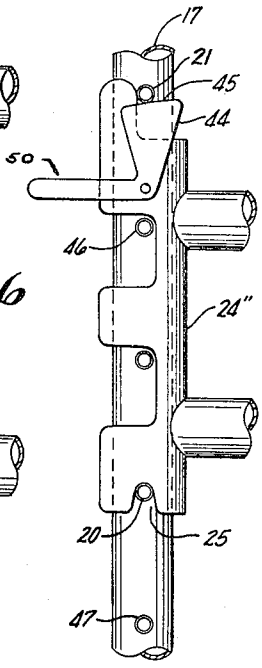


Fig. 10

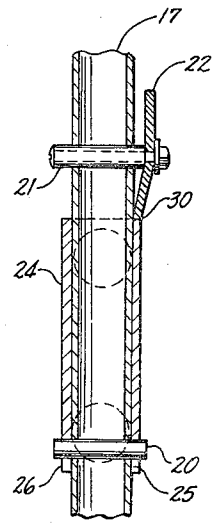


Fig. 7

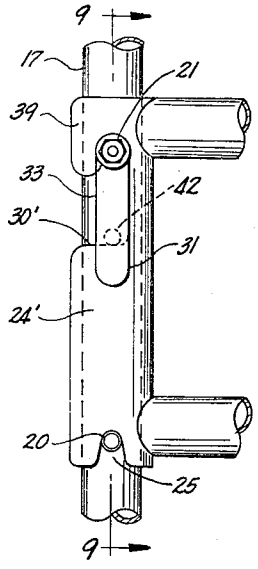


Fig. 8

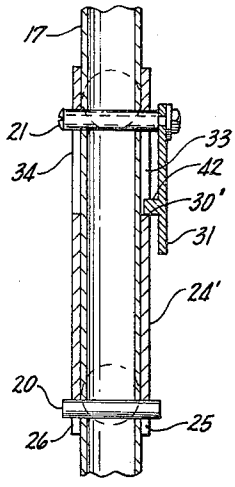


Fig. 9

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LOCKING CONNECTION FOR WHEEL CHAIR ATTACHMENTS

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U.S. Cl. 297—429 7 Claims

ABSTRACT OF THE DISCLOSURE

There is disclosed herein a means for removably connecting and locking a wheel chair attachment to a frame member of a wheel chair so that the locking function maintains and enhances the firmness and dependability of the connection, and, iter alia, the chair ad occupant may be lifted by the attachment, such as a footrest. A saddle connection is disclosed as a means for obtaining firmness of connection while allowing quick and easy detachment of the wheel chair attachment. Also disclosed is the provision of a latch for locking the saddle connection thereby maintaining and, by camming action, improving the firmness of the connection. Means for connecting and locking the attachment at any one of a multiplicity of longitudinally spaced locations on the frame member is also disclosed.

BACKGROUND OF THE INVENTION

(1) The field of the invention is in wheel chairs having removable footrests, legrests and other attachments which may also be position adjustable, such as for height. Within this field is the area of providing firm reliable connections between wheel chair and attachments. Within this area the invention pertains to lockable connections between wheel chair and attachments thereto.

(2) Detachable footrests and legrests are known in the art. Footrests have been disclosed which are both swingable and removable such as that disclosed in my prior U.S. Patent No. 3,185,527. Others are removable only such as that disclosed in U.S. Patent No. 3,230,010 to A. C. Mommsen. As noted in the Mommsen patent there are advantages to having the footrest quickly and easily removable over merely having it hinged for swinging aside. These advantages are in the lesser amount of space required for storage of the wheel chair in which the footrest is detachable, and in the capability of providing a firmer connection for patient comfort of the detachable footrest as compared to the hinged footrest. The hinged footrest, because of its permanent connection to the wheel chair, has the advantage of not being accidentally detachable. However, the hinge connection has the disadvantage of allowing relative motion between wheel chair and footrest to the discomfort of the passenger.

In the Mommsen patent the rigid but detachable feature of the footrest is accomplished by wedging action between an inclined, tapered slot in the mounting bracket of the footrest and a transverse pin on the wheel chair frame member. A downward force exerted on the footrest or legrest by a foot or leg of the wheel chair occupant tends to wedge pin and slot together more and more snugly thereby further increasing the rigidity of the connection. The probability of jarring the wheel chair occupant because of relative motion between footrest and wheel chair is thus materially reduced. The footrest is also quickly removable by application of force to it in an upward direction.

However, there is still disadvantage to the Mommsen connection in that the footrest is not locked, nor are any means disclosed for locking it, against removal by mere upward motion. On many occasions it may be desirable for some persons assisting the wheel chair occupant to lift the wheel chair or to guide it in some manner which is facilitated by grasping the footrest. In either of these cases it is virtually impossible to accomplish the intended result without applying upward force on the wheel chair attachment thereby detaching or tending to detach it. Likewise in the normal course of traveling about in a wheel chair the occupant thereof may inadvertently strike a protruding corner of some object or wall with the footrest. In such case there may be a component of force exerted upwardly on the footrest thereby lessening the rigidity of the connection. Thus, it is impossible to lift the wheel chair or to guide it in any manner which requires upward force on the footrest without substantial risk of dislodging the footrest with attendant consequences should the wheel chair be occupied.

SUMMARY OF THE INVENTION

A general embodiment of my invention comprises as principal parts a frame member of a wheel chair and a wheel chair attachment member having a saddle part shaped complementary to the frame member. The frame member carries longitudinally spaced first and second transverse pins. The complementary shaped member is provided with slots which are adapted to seat onto the first of the transverse pins and with rearwardly disposed portions which are adapted to contact the rearward side of the second transverse pin. A latch is pivotally mounted on one of the members and the other member is provided with a surface facing the latch so that the latch may be rotated into contact with the surface.

The connection between wheel chair attachment and wheel chair frame member consists of the engagement between frame member and saddle, seating of the tapered slots in the saddle onto the first transverse pin of the wheel chair member, and contact between the longitudinally extending portions of the saddle and the rearward side of the second transverse pin on the wheel chair member. The connection can be locked by rotating the pivotally mounted latch until it contacts the facing surface of the other member.

The connection can be made at numerous longitudinally spaced locations on the frame member by providing the frame member with a multiplicity of transverse pins. Any two of the pins which are properly spaced from each other may serve as a first and second transverse pins. In this embodiment the latch is mounted on the saddle and locks the connection by engagement with the facing side of the second transverse pin as will be disclosed more fully hereinafter. The latch may also be provided with a surface which is inclined relative to the facing portion of the second transverse pin to allow camming action between pin and latch thereby further urging the slots onto the first transverse pin. The attachment can be disconnected and relocated by the wheel chair occupant with little difficulty as will be described more fully hereinafter.

In a typical form of my invention the wheel chair frame member will be a forward vertical member of cylindrical shape carrying vertically spaced transverse pins on the upper of which a latch is pivotally mounted. The saddle part of the attachment may then be a U-shaped bracket having upwardly tapered slots in its lower end which are adapted to engage the first or lower of the transverse pins. At the outer or leg portions of the U are longitudinally extending portions adapted to contact the rearward side of the second, or upper, transverse pin. The latch pivotally mounted on the upper transverse pin may

then be rotated into contact with an upwardly facing surface of the U-shaped bracket thereby locking the U-shaped bracket against upward motion relative to the wheel chair member.

As will be more fully described hereinafter the U-shaped bracket or saddle may be constructed so that its base portion engages the wheel chair member only between the two spaced transverse pins. In this form the longitudinally extending portions project upwardly from the top of the legs of the U-shaped bracket to contact the rearward side of the upper transverse pin. An alternate form of saddle or U-shaped bracket has an L-shaped slot in each leg of the U adapted to receive the upper transverse pin and hold it at the top of the vertical leg of the L-shaped slot. In this form the L-shaped slot defines longitudinally extending portions which extend downwardly to contact the rearward side of the upper transverse pin.

Likewise the latch may be adapted to perform its function of contacting an upwardly facing locking surface of the saddle by having one end inclined inwardly toward the circumference of the wheel chair member or, alternatively, by having a suitably attached orthogonal portion adapted to contact the aforesaid locking surface of the saddle.

In addition the upwardly facing surface of the saddle may be inclined at a suitable angle to allow camming action between said surface and the latch thereby further securing the tapered slots in the bottom of the saddle onto the lower transverse pin of the wheel chair member.

The wheel chair attachment, then, may be locked against accidental detachment by force applied to it in any direction thereby fulfilling one of my objectives. At the same time because of the firm seating of the tapered slots onto the lower transverse pin the footrest is held tightly and snugly with respect to the wheel chair so as not to jar the wheel chair occupant.

The locking connection may also be used with various types of wheel chair attachments and for attachment at numerous heights thereby fulfilling other of my objectives.

My connection then maintains and enhances rigidity between wheel chair and attachment for comfort of the wheel chair occupant, is reliable in that it can be locked against accidental detachment, and is applicable to many attachments. At the same time the attachment is easily disconnected and may be readily reconnected at a different height.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a side view of part of the frame of a wheel chair to which a wheel chair attachment is connected according to a preferred form of my invention.

FIGURE 2 is a side elevation of a portion of the cylindrical front post and frame member of a wheel chair showing transverse connecting pins and latch.

FIGURE 3 is a horizontal section taken on the line 3—3 of FIGURE 2.

FIGURE 4 is a side elevation of the U-shaped bracket or saddle part shown broken away from the footrest attachment of which it is a part.

FIGURE 5 is a top plan view of the saddle of FIGURE 4.

FIGURE 6 shows the front post of FIGURE 2 and the saddle of FIGURE 4 connected and locked according to a preferred form of my invention.

FIGURE 7 is a vertical sectional view of the assembly of FIGURE 6 taken along the line 7—7 of FIGURE 6.

FIGURE 8 shows a modified form of my invention with the parts related as in FIGURE 6 comprising a specifically different form of saddle and latch.

FIGURE 9 is a vertical sectional view of the assembly of FIGURE 8 taken along the line 9—9 of FIGURE 8.

FIGURE 10 is a side elevation of a form of my invention in which the saddle is height adjustable on the frame member.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with a preferred form and embodiment of my invention FIGURE 1 illustrates a portion of a wheel chair generally designated **10** having a main drive wheel **11**, forward caster wheel **12**, horizontal seat support **13**, eat panel **14**, horizontal rail member **16**, and vertical frame member **17**, all of which are conventional wheel chair components. On vertical frame member **17** are lower and upper transverse pins **20** and **21** respectively, and pivotally mounted on upper transverse pin **21** is latch **22**. A wheel chair attachment **23** is shown connected and locked according to a preferred form of the invention to the vertical frame member **17**. An integral part of the wheel chair attachment **23** is U-shaped bracket or saddle **24** having diametrically spaced tapered slots **25** and **26**, vertical projecting portions **27** and **28**, and upwardly facing locking surface **30** all of which are shown in at least one of FIGURES 4 through 7.

FIGURES 2 through 7 illustrate in greater detail the components forming the locking connection and the connection itself according to a preferred form of the invention.

FIGURES 2 and 3 show a portion of the wheel chair vertical frame member **17** having a lower transverse pin **20**, an upper transverse pin **21**, and a latch **22** pivotally mounted on upper transverse pin **21**. Lower transverse pin **20** extends diametrically through vertical frame member **17** and has each of its end portions extending approximately ¼" beyond the circumference of frame member **17**. Upper transverse pin **21** likewise extends diametrically through and beyond the circumference of frame member **17**. Latch **22** is pivotally mounted on one end of upper transverse pin **21** by a bolt or other suitable means extending through the latch and the hollow cylindrical interior of pin **21**. In this illustrative embodiment one end of latch **22** is tapered, and, as shown in FIGURES 3 and 7, the tapered portion is inclined inwardly toward the circumference of frame member **17** at an angle of approximately 15°. Latch **22** is thus pivotally mounted at a radial distance beyond the circumference of frame member **17** and has one end inclined toward said circumference for reasons which will appear more fully hereinafter.

FIGURES 4 and 5 are side and top views respectively of saddle **24** shown broken away from the wheel chair attachment of which it is an integral part. Extending upwardly from the bottom edge of the saddle and diametrically spaced thereon are tapered slots **25** and **26** as shown in FIGURES 4 and 7. The slots **25** and **26** are adapted to seat onto lower transverse pin **20** of the wheel chair frame member as will be more fully described hereinafter. Extending vertically upward from the top of the legs of the U-shaped bracket or saddle **24** are longitudinal projections **27** and **28** adapted to contact the rearward side of upper transverse pin **21**. Longitudinal projection **27** is also adapted to prevent rotation of latch **22** beyond its locking position as hereinafter described.

FIGURES 6 and 7 show the saddle **24** and vertical frame member **17** in locking connection. FIGURE 7 is a sectional view of the assembly of FIGURE 6 taken along the line 7—7 of FIGURE 6. To effect the connection latch **22** is rotated to a non-locking position approximately perpendicular to the axis of the vertical frame member **17**. The saddle **24** is then tilted and brought into circumferential engagement with frame member **17** so that longitudinal projections **27** and **28** contact the rearward side of upper transverse pin **21**. Saddle **24** is then pushed upward sufficiently so that its lower edge may be rotated into engagement with frame member **17** without interference from lower transverse pin **20**. The saddle **24** is then slidingly lowered on frame member **17** so that tapered slots **25** and **26** are seated onto the top surface of lower transverse pin **20**.

At this point a connection exists between frame member **17** and saddle **24** which consists of the seating of slots **25** and **26** on lower transverse pin **20**, and contact between longitudinal projections **27** and **28** and the rearward side of upper transverse pin **21**. When so connected the saddle **24** can be disconnected from the frame member **17** only by force applied vertically upward to disengage tapered slots **25** and **26** from lower transverse pin **20**. The connection as formed at this point is suitable under ordinary circumstances but still has the disadvantage of being inadvertently detachable by force transmitted directly upward to saddle **24**. To overcome this disadvantage the connection may be locked against detachment by rotating latch **22** until its inwardly inclined tip contacts the upwardly facing locking surface **30** of saddle **24** and further rotation is blocked by longitudinal projection **27**. Latch **22** thus locks tapered slots **25** and **26** onto lower transverse pin **20** and prevents upward movement of saddle **24** with respect to vertical frame member **17**.

There is thus formed a locked connection which is rigid for the comfort of the wheel chair occupant, is convenient and dependable in that the wheel chair may be guided or lifted by force applied upwardly on the wheel chair attachment, and yet may be swiftly and easily unlocked and disconnected.

The upwardly facing locking surface **30** of saddle **24** may also be inclined slightly to allow camming action between latch **22** and locking surface **30** thereby further urging slots **25** and **26** onto lower transverse pin **20** to secure an even tighter connection.

FIGURES 8 and 9 illustrate the connection according to the present invention of a wheel chair attachment employing an alternate form of saddle **24'** to a vertical cylindrical wheel chair frame member **17** on which is mounted an alternate form of latch designated **31**. In the particular embodiment shown saddle **24** is constructed to have reversed L-shaped slots **33** and **34** adapted to receive upper transverse pin **21** and to engage said upper transverse pin **21** at the top of the vertical legs of the L-shaped slots **33** and **34** as illustrated in FIGURES 8 and 9. L-shaped slots **33** and **34** together with the rearward edges of saddle **24** define longitudinally extending portion **39** and its counterpart, not shown, which contact the rearward side of upper transverse pin **21**. Longitudinal extension **39** and its counterpart perform the same functions as longitudinal projections **27** and **28** in the embodiment previously described. The lower boundary of the horizontal leg of L-shaped slot **33** comprises locking surface **30'** adapted to be contacted by latch **31**.

Latch **31** is again pivotally mounted on upper transverse pin **21** but in this embodiment has no inwardly inclined tip, having instead an orthogonal pin **42**, cylindrical in shape, adapted to contact locking surface **30'** as seen most clearly in FIGURE 9.

As in the previous embodiment locking surface **30'** may be inclined slightly to allow camming action between said locking surface and the orthogonal pin **42** of latch **31**.

FIGURE 10 illustrates a form of my invention in which the saddle may be connected to the frame member at different heights.

In this embodiment a multiplicity of longitudinally spaced transverse pins are carried by the frame member **17**. When the saddle **24''** is connected at the height shown pins **20** and **21** fulfill the functions of lower and upper transverse pins respectively as in the embodiments previously described. Latch **44** is pivotally mounted on the saddle **24''** and has a surface **45** which contacts the lower side of upper transverse pin **21** thereby locking slots **25** and **26** onto lower transverse pin **20**.

To change the height of the footrest saddle **24''** is disconnected from frame member **17** in the usual manner, after which the saddle may be reconnected at, for example, a lower height by utilizing transverse pins **46** and **47** as upper and lower transverse pins respectively. Slots

25 and **26** will then seat onto lower transverse pin **47** and cam surface **45** of latch **44** may be rotated into contact with upper transverse pin **46** to lock the connection. Surface **45** may be inclined with respect to the lower side of the upper transverse pin to allow camming action between pin and latch.

In order to allow the wheel chair occupant to more easily lock and unlock the connection the handle portion **50** of latch **44** is formed at an angle of approximately 90° with respect to the latching portion. The 90° handle is also useful to the wheel chair occupant in adjusting the height of the footrest. The handle can be used to unlock the connection and then to manipulate the attachment in disconnecting it from one set of transverse pins and reconnecting it to a higher or lower set.

While I have specifically illustrated and described a preferred form and embodiment of my invention, changes and improvement will occur to those skilled in the art who come to understand its essential principles and accomplishments. I do not, therefore, wish to be confined to the specific forms of my invention herein specifically disclosed, nor in any other way inconsistent with the progress by which my invention has promoted the art.

I claim:

1. In the combination of a wheel chair having a forward post member and a removable attachment for said wheel chair having a rearwardly disposed saddle member adapted for connection to said post member, the improvement comprising longitudinally spaced first and second pins extending transversely through said post member and comprising operative parts thereof, said saddle member having at least one slot adapted to seat onto said first transverse pins, said saddle member contacting the rearward side of said second transverse pin to prevent rotation of said saddle member about said first transverse pin, and a latch carried by one of said members adapted for coaction with the other to prevent relative motion between said members.

2. The improvement of claim **1** wherein a portion of said saddle member lies between said first and second pins and has a surface facing said second pin spaced longitudinally from said second pin a distance greater than the depth of said slot, and said saddle member has longitudinally extending portions contacting the rearward side of said second pin whereby, in connecting and disconnecting said members, engagement and disengagement between said slot and said first pin may be effected only by relative longitudinal motion between said members.

3. The improvement of claim **2** wherein said latch is pivotally mounted on said second transverse pin and is engageable with said surface to prevent relative motion between said members.

4. The improvement of claim **3** wherein said latch and said surface are relatively inclined to provide camming action between said latch and said surface to urge said slot onto said first transverse pin.

5. The improvement of claim **1** wherein said post member comprises an upright post of the wheel chair and said first transverse pin lies below the second transverse pin, said saddle member has rearwardly extending side flanges having slots in the lower end seated on said first pin and having rearwardly disposed longitudinally extending portions engaging said second transverse pin, said saddle member has a surface facing the lower side of said second pin, and said latch is pivotally mounted on said second pin and contacts said surface whereby said saddle memper is connected and locked to said post member allowing said wheel chair to be lifted by force applied to said attachment.

6. The improvement of claim **1** wherein said first and second transverse pins are provided at a plurality of longitudinally spaced locations on said post member and said latch is carried by said saddle member and contacts the side of said second transverse pin which faces toward said first pin whereby said saddle member may be con-

nected and locked to said post member at a plurality of longitudinally spaced locations on said post member.

7. The improvement of claim 6 wherein said latch and said side of said second transverse pin are relatively inclined to provide camming action between said latch and said second transverse pin thereby urging said slot onto said first transverse pin.

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U.S. Cl. X.R.

287—53.5