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64 **Universally adjustable wheelchair attachment.**

57 A universally adjustable wheelchair attachment supports equipment for use by an individual confined to the wheelchair. The attachment includes a pair of columns (17, 33) coupled by a friction joint (36, 38, 40, 42). One of the columns (17) is coupled by a friction joint (20, 22, 24, 26) to a block (12) which is rotationally coupled to a wheelchair member (2). The other of the columns (33) is coupled by a friction joint (50, 52, 54, 56) to an equipment supporting member (60). Each of the columns (17, 33) are adjustable away from and toward each other and include rotationally and telescopically adjustable members (28, 44). The one column (17) is adjustable away from and toward the wheelchair member (2) and the supporting member (60) is rotationally adjustable relative to the other column (33).

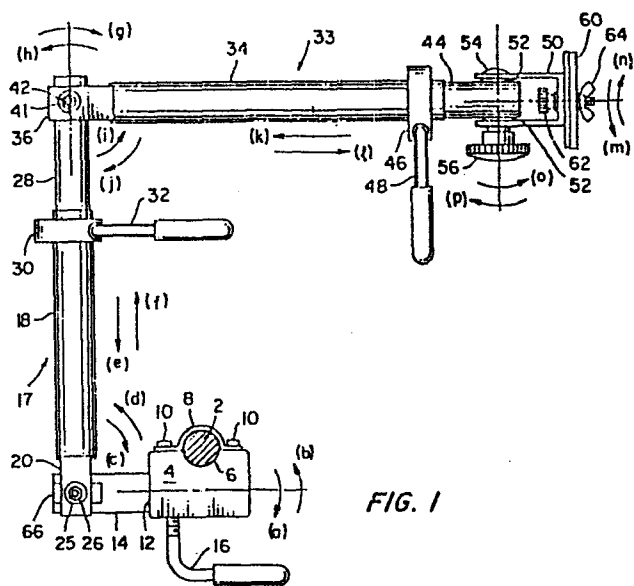


FIG. 1

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UNIVERSALLY ADJUSTABLE WHEELCHAIR ATTACHMENTBACKGROUND OF THE INVENTION

5 Wheelchair attachments coupled to wheelchair frames are used to support trays, receptacles and other equipment within reach of an individual confined to the wheelchair. In order to maximize the advantages of these attachments it is necessary that they be easily adjustable to various verticle, horizontal,
10 angular and combined positions relative to the individual. That is to say, the attachments should be substantially universally adjustable.

 Attachments for the purposes intended are known, but are less than universally adjustable, and the available adjustment
15 is not easily accomplished. The attachment described in U.S. Patent 4,458,870 issued to Leroy R. Dugan on July 10, 1984, for example, is adjustable in several linear and angular directions by means of lever advantaged forces and friction joints which require tools for the adjustment. These features
20 can be distinct disadvantages, particularly for individuals who desire self-sufficiency and prefer to make the required adjustments without the assistance of others. The present invention overcomes these disadvantages.

 Accordingly, it is the object of this invention to

provide a wheelchair attachment for supporting equipment used by an individual confined to the wheelchair, and which attachment is substantially universally adjustable, with the adjustment being accomplished more easily than has heretofore been the case.

SUMMARY OF THE INVENTION

This invention contemplates a universally adjustable wheelchair attachment of the type which is coupled to the wheelchair frame for supporting equipment or the like for use by an individual confined to the wheelchair. The attachment has three friction joints. A first and second of these friction joints are adjusted by a wrench and a third is adjusted by a knob. A pair of columns coupled by the first joint are adjusted longitudinally and rotationally through an arrangement of collars and collar arms. One of the columns is coupled by the second joint to the wheelchair through a rotationally adjustable block. The other of the columns is coupled through the third joint to rotationally adjustable equipment support member.

BRIEF DESCRIPTION OF THE DRAWING

Figure 1 is a plan view of a universally adjustable wheelchair attachment according to the invention.

Figure 2 is a partial end view of one of the first and second friction joints.

Figure 3 is a partial end view of the other of the first and second friction joints.

DETAILED DESCRIPTION OF THE INVENTION

With reference to Figure 1, a wheelchair member is designated by the numeral 2. Wheelchair member 2 may be a horizontal or vertical portion of a wheelchair such as a wheelchair armrest made of metal tubular or bar stock. The wheelchair attachment of the invention is secured to

member 2 as will next be explained.

An attachment block 4 includes a recess 6 which receives wheelchair member 2. A strap 8 fits over wheelchair member 2 and is secured to block 4 by screws or the like 10, whereby block 4 is securely fastened to the wheelchair member in a rotational position relative thereto.

Block 4 has a hole 12 at one end thereof for receiving a bar 14. Bar 14 is secured in block 4 by means of a set screw (not shown) tightened by a block arm 16. With the arrangement shown, bar 14 can be rotationally displaced about the longitudinal axis of bar 14 in opposite directions as shown by arrows (a) and (b) so as to orient the wheelchair attachment relative to wheelchair member 2, as will now be understood.

A column 17 includes a tube 18 having a yoke 20 at one end thereof, as best shown in Figure 2. Bar 14 is received in yoke 20 and is separated on either side thereof by washers 22 which may be spring-type washers for purposes to be hereinafter explained. A bolt 24 enters one side of yoke 20, extends through washers 22 and bar 14 and extends through the other side of the yoke where it is secured thereto by a washer 25 and a nut 26 which may be tightened and loosened by a conventional open end wrench. With the arrangement shown, column 17 may be angularly displaced away from and toward bar 14 as indicated by arrows (c) and (d) in Figure 1.

Tube 18 of column 17 receives in telescopic fashion a bar 28. Bar 28 is longitudinally displaceable within tube 18 as shown by arrows (e) and (f) in Figure 1. Bar 28 is secured in a desired longitudinal position within tube 18 by a collar 30. Collar 30 may be a conventional split collar which is tightened against tube 18 to squeeze the tube against the bar and to thereby hold bar 28 in the desired position by a collar arm 32 which tightens a set screw (not shown). With the arrangement shown, bar 28 can be rotationally displaced about its longitudinal axis as shown by arrows (g) and (h) in Figure 1 and secured in a desired rotational position by tightening collar 30.

A column 33 includes tube 34 having a yoke 36 at one end

thereof as best shown in Figure 3. Bar 28 is received in yoke 36 and is separated on either side thereof by washers 38 which may likewise be spring-type washers. A bolt 40 enters one side of yoke 36, extends through washers 38 and bar 28 and extends through the other side of the yoke where it is secured thereto by a washer 41 and a nut 42 which is loosened and tightened by a conventional open end wrench. With the arrangement shown, tube 34 may be angularly displaced away from or toward bar 28 as indicated by arrows (i) and (j) in Figure 1.

Tube 34 receives in telescopic fashion a bar 44. Bar 44 is longitudinally adjustable within tube 34 as shown by arrows (k) and (l) in Figure 1. Bar 44 is secured in a desired longitudinal position within tube 34 by a conventional split collar 46 which is tightened against tube 34 to squeeze the tube against the bar and to thereby hold bar 44 in the desired position by a collar arm 48 which tightens a set screw (not shown). With the arrangement shown bar 44 can be rotationally displaced about its longitudinal axis as shown by arrows (m) and (n) in Figure 1 and secured in a desired rotational position by tightened collar 46.

The end of bar 44 is received by a yoke 50 and is separated on either side thereof by spring washers 52. A bolt 54 enters one side of yoke 50, extends through washers 52 and bar 44 and extends through the other side of the yoke, with a knob 56 being secured to the extending end of the bolt. With the arrangement shown, yoke 50 may be displaced about the axis of bolt 54 through knob 56 as shown by arrows (o) and (p) in Figure 1.

A supporting plate 60 is secured to yoke 50 by means of a screw 62 and a wing nut 64. Supporting plate 60 may be used to support equipment used by the individual confined to the wheelchair. In this connection, it will be understood that the equipment may be adapted to be fastened to the plate through screw 62 and wing nut 64 as will now be understood.

As will now be seen from the foregoing description of the invention that three friction joints are provided for adjustment of the wheelchair attachment. That is to say, the joint joining bar 14 and column 17; the joint joining column 17

and column 33; and the joint joining column 33 and yoke 50. The first two of these joints are tightened and loosened by an open end wrench and the last mentioned joint is tightened and loosened by a knob.

5 In this connection it is noted that the aforementioned joints include spring washers 22, 38 and 52 respectively, which separate the bars 14, 28 and 44 from the respective yokes 20, 36 and 50. The spring washers provide a friction force to maintain a desired angular position, but yet do not provide
10 a positive lock in said position whereby an extensive amount of force is required to displace the bar to another angular position as may be desired. This feature of the invention is of importance since it results in less frequent tightening and loosening of nuts 42 and 46 and knob 56 for adjustment
15 purposes as is desireable.

 The tightening and loosening of block 4 and collars 30 and 46 can be accomplished with relative ease due to the mechanical advantage offered by arms 16, 32 and 48 respectively. In this connection it will be understood that the set screws
20 associated with the arms may be made integral therewith as be welding or the like, whereby loss of the arm and/or set screw is minimized.

 With reference to Figures 1 and 2 it will be seen that the portion of bar 14 received by yoke 20 carries a pair of flat
25 areas 66. Flat areas 66 extend the abutting surface between bar 14 and washers 22 to enhance the friction locking of column 17 in a desired position relative to bar 14 as will now be understood. Although not shown in the drawing, bar 28 and bar 44 may likewise carry such flat areas for the purposes
30 intended.

 It will now be seen from the aforementioned description of the invention that a substantially universally adjustable wheelchair attachment is provided, with the adjustment being accomplished more easily than as heretofore been the case. By
35 virtue of the arrangement described, an infinite number of vertical, horizontal, angular and combined positions of the attachment relative to the wheelchair are possible. The arrangement thereby enhances the use of the attachment in

that is is capable of supporting a variety of equipment in a variety of positions. Further, the arrangement enhances adjustment by those confined to the wheelchair without the necessity of assistance of others as is desireable.

5 With the above description of the invention in mind, reference is made to the claims appended hereto which define the scope of the invention.

 The figures used in the claims are only meant to explain more clearly the intention of the invention and are
10 not supposed to be any restriction concerning the interpretation of the invention.

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WHAT IS CLAIMED IS:

1. U universally adjustable wheelchair attachment which supports equipment for use by one confined to the
5 wheelchair, characterized by:

a first column including a longitudinally and rotationally displaceable member;

a second column including a longitudinally and rotationally displaceable member;

10 a first friction joint for coupling one of the first and second columns to the longitudinally and rotationally displaceable member of the other of the first and second columns, whereby said columns are angularly displaceable relative to each other;

15 means coupled to the wheelchair;

a second friction joint for coupling the other of the first and second columns to the means coupled to the wheelchair, whereby said column and said means are angularly displaceable relative to each other;

20 equipment supporting means; and

a third friction joint for coupling the longitudinally and rotationally displaceable member of the one of the first and second columns to the equipment supporting means, whereby said column and said supporting means are angularly displaceable
25 relative to each other.

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2. A universally adjustable wheelchair attachment as described by claim 1, wherein each of the first and second columns is characterized by:

a tubular member having a yoke at one end thereof
5 and receiving the longitudinally and rotationally displaceable member in telescopic fashion at the other end; and

collar means for securing said longitudinally and rotationally displaceable member in a predetermined longitudinal and rotational displacement within the tubular member.

10

3. A universally adjustable wheelchair attachment as described by claim 2, wherein the first friction joint is characterized by:

the yoke of the one of the first and second
15 columns receiving the longitudinally and rotationally displaceable member of the other of the first and second columns;

resilient means disposed between the yoke and the longitudinally and rotationally displaceable member; and

means for coupling said yoke, said member and said
20 resilient means, whereby the first and second columns are frictionally maintained at a predetermined angular displacement relative to each other.

4. A universally adjustable wheelchair attachment as
25 described by claim 2, wherein the second friction joint is characterized by:

the yoke of the other of the first and second columns receiving the means coupled to the wheelchair;

resilient means disposed between the yoke and the
30 means coupled to the wheelchair; and

means for coupling said yoke, said means and said resilient means, whereby the other column and the means coupled to the wheelchair are frictionally maintained at a predetermined angular displacement relative to each other.

35

5. A universally adjustable wheelchair attachment as described by claim 2, wherein the third friction joint is characterized by:

the equipment supporting means including a yoke;
the yoke receiving the longitudinally and rotationally
displaceable member of the one of the first and second columns:
resilient means disposed between the yoke and said
5 longitudinally and rotationally displaceable member; and
means for coupling said yoke, said member and said
resilient means, whereby the one column and the equipment
supporting member are frictionally maintained at a predetermined
angular displacement relative to each other.

10

6. A universally adjustable wheelchair attachment which
supports equipment for use by one confined to the wheelchair,
characterized by:

a first column including a tubular member having
15 a yoke at one end thereof and a longitudinally and rotationally
displaceable member received in telescopic fashion at the other
end;

a second column including a tubular member having
a yoke at one end thereof and a longitudinally and rotationally
20 displaceable member received in telescopic fashion at the other
end;

first collar means associated with the first column
for securing the telescopic member thereof at a predetermined
longitudinal and rotational displacement;

25 second collar means associated with the second
column for securing the telescopic member thereof at a predetermined
longitudinal and rotational displacement;

the yoke of the first column receiving the longitudinally
and rotationally displaceable member of the second column;

30 means coupled to the wheelchair;

the yoke of the second column receiving the means
coupled to the wheelchair;

equipment supporting means including a yoke;

the yoke of the equipment supporting means receiving
35 the longitudinally and rotationally displaceable member of
the first column;

first means for coupling the yoke of the first column
and the member of the second column, whereby said first and

second columns are frictionally maintained at a predetermined angular displacement relative to each other;

second means for coupling the yoke of the second column to the means coupled to the wheelchair, whereby said
5 second column and said means are frictionally maintained at a predetermined angular displacement relative to each other; and

third means for coupling the yoke of the equipment supporting means and the member of the first column, whereby said first column and said means are frictionally maintained
10 at a predetermined angular displacement relative to each other.

