United States Patent [19]

Wright

[11] **3,857,340**

[45] **Dec. 31, 1974**

[54] **RETURN BULL WHEEL AND CABLE CLAMP FOR CABLE-DRIVEN CHAIR LIFT**

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[73] Assignee: **Berry Metal Company,** Harmony, Pa.

[22] Filed: **Dec. 20, 1973**

[21] Appl. No.: **426,747**

[52] **U.S. Cl.**..... **104/173,** 74/230.4, 74/230.9, 104/180, 104/202, 104/209, 104/216

[51] **Int. Cl.**..... **B61b 7/04**

[58] **Field of Search**.....104/180; 104/173, 182, 104/197, 200, 202, 204, 209, 216; 74/230.4, 230.5, 230.9; 29/159 R, 159.3

[56] **References Cited**

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Primary Examiner—Lloyd L. King
Assistant Examiner—Randolph A. Reese
Attorney, Agent, or Firm—Richard J. Myers

[57] **ABSTRACT**

A return bull wheel construction for cable-driven chair lift comprising a hub and a flanged head extending from the hub and surrounding and reinforcing the spokes, the flanged head terminating at the outer periphery of the wheel and has an upper flange to engage the inner jaw of grip or clamp and having a lower flange below the neoprene liner that engages the cable. The lower flange has a stiffener and the upper flange has a reinforcement bar. A channel member connects with the outer bent rim portion of the flanged head and a bent angle member that connects with the stiffener and the spokes.

10 Claims, 9 Drawing Figures

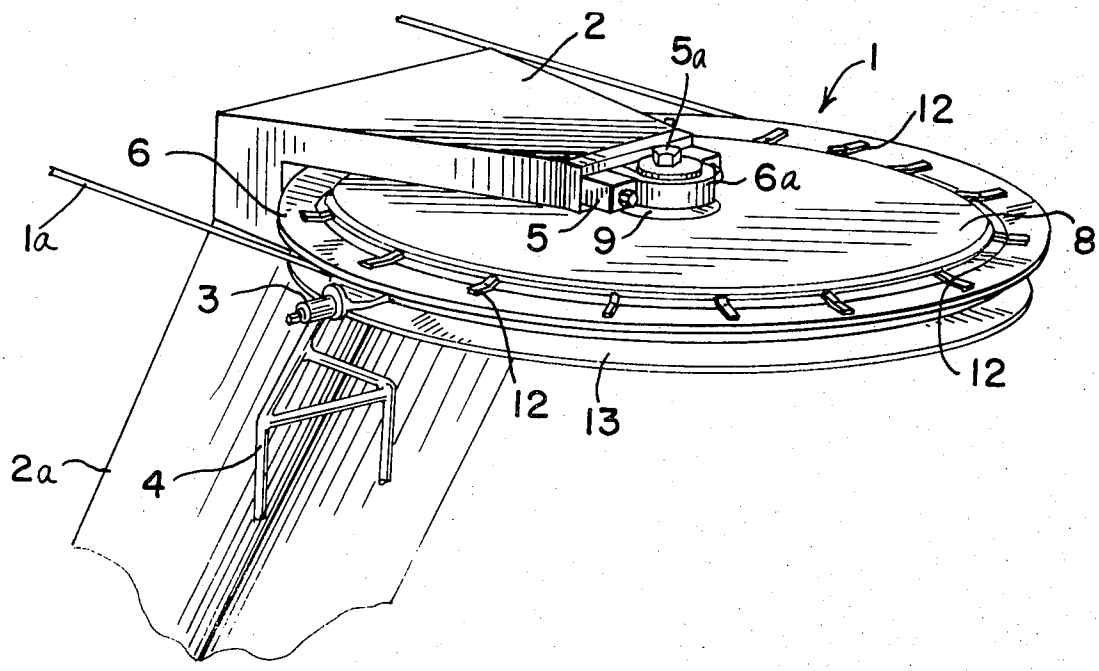
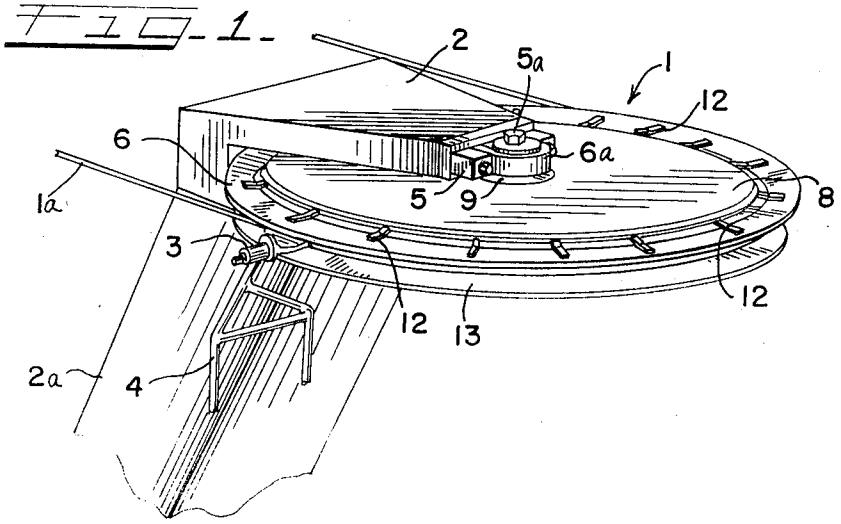


FIG. 1


2
5a
1
12
6
6a
1a
5
9
8
3
12
12
13
2a
4

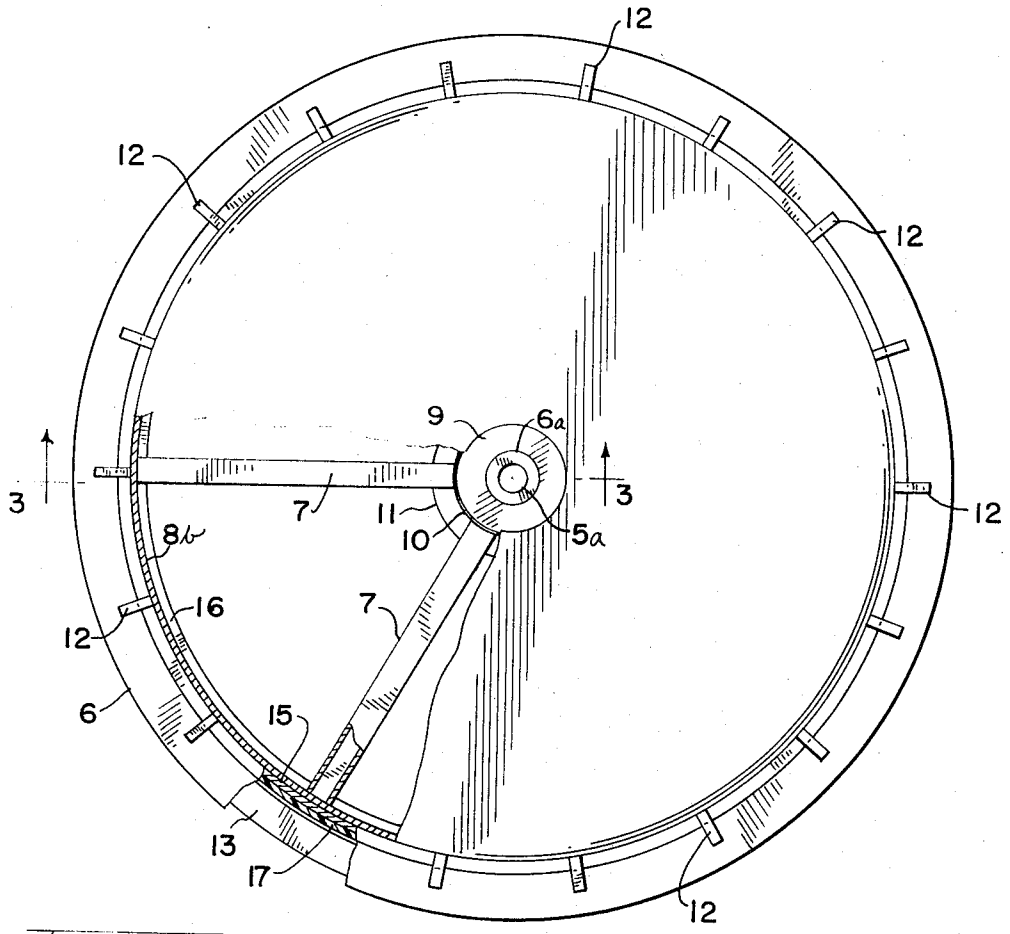

12
12
12
9
6a
3
3
7
11
10
5a
12
8b
16
7
12
6
15
13
17
12

FIG. 2

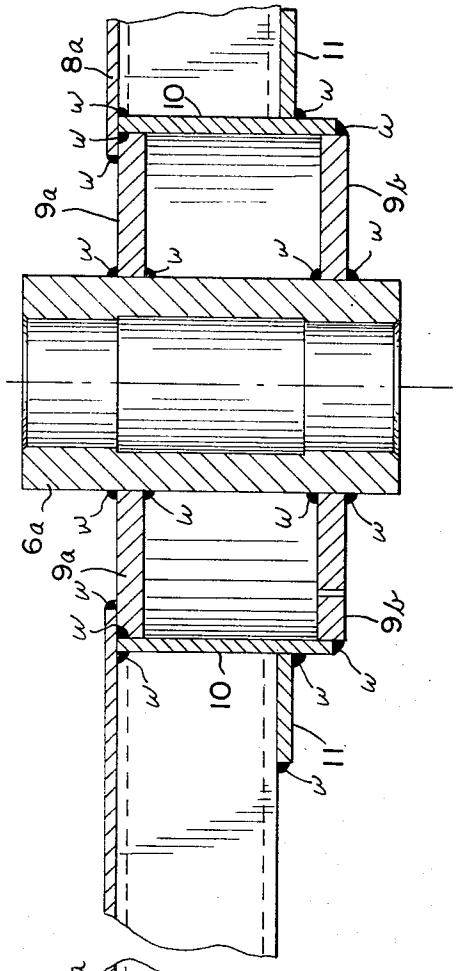


FIG. 3

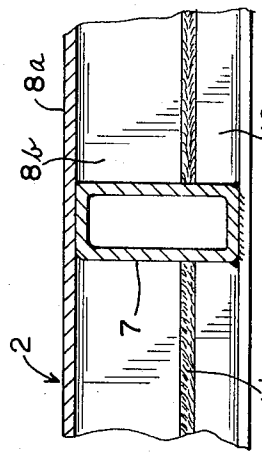
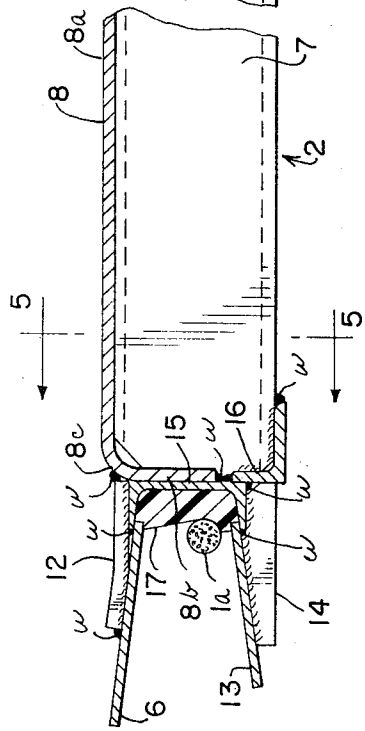


FIG. 5



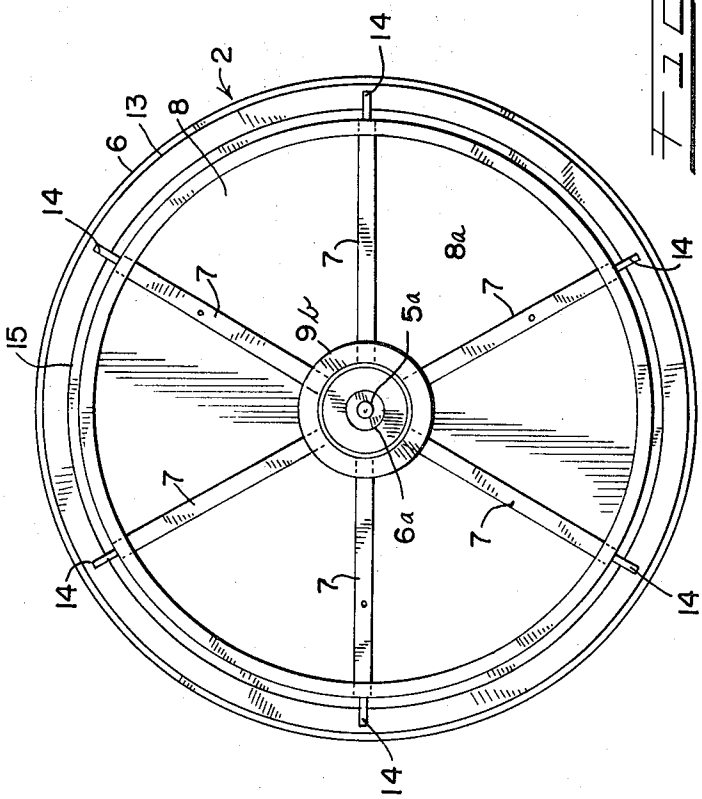


FIG. 4

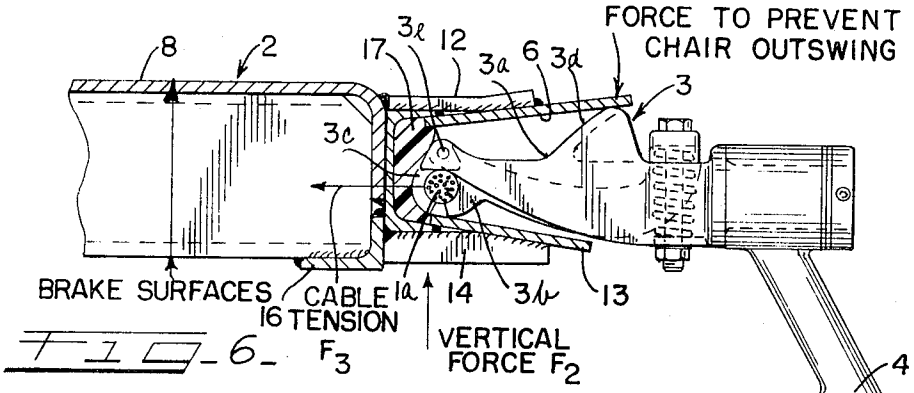


FIG-6-

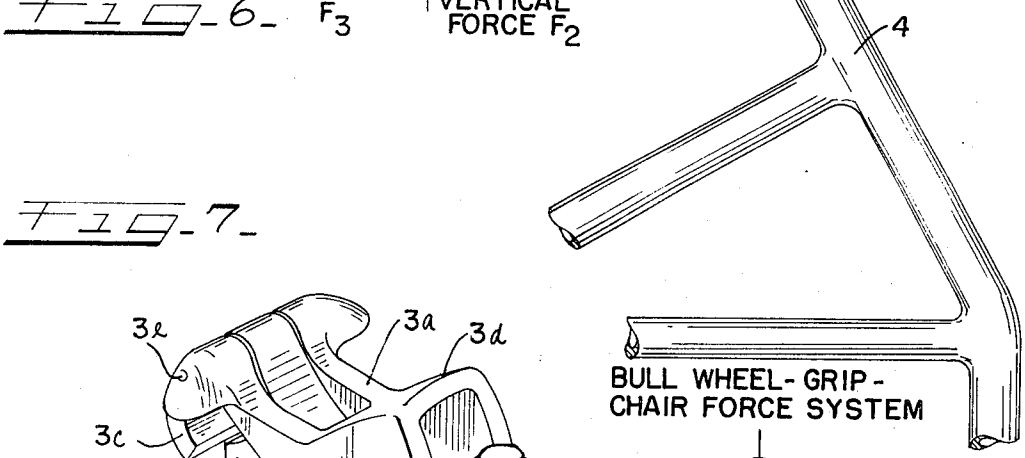


FIG-7-

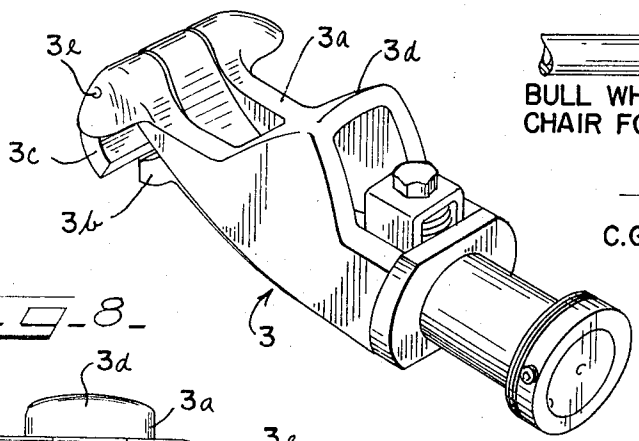
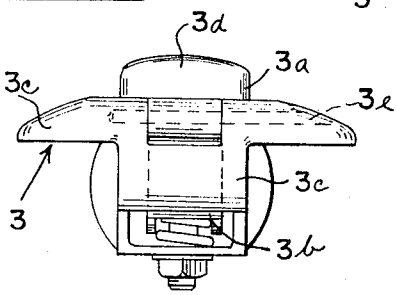


FIG-8-



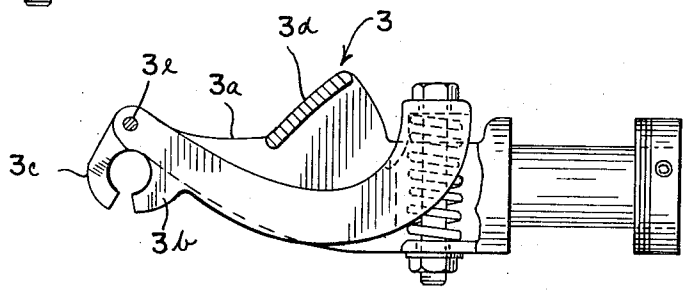


FIG-9-

RETURN BULL WHEEL AND CABLE CLAMP FOR CABLE-DRIVEN CHAIR LIFT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to skier's chair lifts and in particular relates to the return bull wheel construction for the cable-driven chair lift.

2. Description of the Prior Art

Improving the securability of the turn wheel of the cable-driven chair lift has been the focal point of design activities for many years. In this respect attention is directed to U.S. Pat. No. 3,391,650 to S. P. Goforth et al., for a turn wheel used to alter the direction of travel of the moving support cable of a chair lift conveyor. The driving torque causes bending of the return bull wheel. Construction of the subject return bull wheel eliminates this bending problem. Further current clamps or grips prevent chair outswing transmitting centrifugal force from the inner jaw to the outer jaw through the cable to the top flange on the bull wheel. The present design prevents these jaws from working on the cable and damaging it. Other prior at consists of U.S. Pat. Nos. 347,443, 404,498, and 3,008,622.

SUMMARY OF THE INVENTION

The important feature of the bull wheel is the flanged head used in the construction of the wheel. The flanged head in this design transmits all the driving torque from the outer circumference to the inner hub; this eliminates all bending, due to driving torque, from the spokes or arms that transmit this torque in more conventional designs. The corner radius at the flange plays an important part in the transmission of this torque as it is free from discontinuities and eliminates fatigue failures in this area often encountered where the spokes are attached to the outer rim. The head also provides a continuous surface that will prevent workmen from being entangled between spokes and the surrounding structure during maintenance operations and protects the under parts from exposure to the weather.

The principal advantage of the grip or clamp is an improvement made in the design to prevent chair outswing from centrifugal force as the grip passes around the bull wheel. This grip or clamp as originally developed and used, first in Europe and then in this country, prevented chair outswing by transmitting the centrifugal force from the inner jaw to the outer jaw through the cable, then to the top flange on the bull wheel. The subject grip or clamp transmits the centrifugal force directly from the inner jaw to the top flange. This eliminates the jaws from working on the cable as the grip rounds the bull wheel, reducing wire fatigue in the cable and eliminating centrifugal forces from the outer jaw and pivot pin.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of the return bull wheel for the chair lift arm depending therefrom as shown, for instance, in U.S. Pat. No. 3,391,650 which shows a clamp **15** and a hanger bar **16**;

FIG. **2** is a plan view of the return bull wheel;

FIG. **3** is a sectional view of the return bull wheel taken along line **3—3** of FIG. **2**;

FIG. **4** is a bottom view of the return bull wheel;

FIG. **5** is a sectional view taken along line **5—5** of FIG. **3**;

FIG. **6** shows a bull wheel grip or clamp;

FIG. **7** shows the grip or clamp in perspective;

FIG. **8** is an end view of the clamp or grip, and

FIG. **9** is an elevational view of the clamp.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the FIGS. there is shown in FIG. **1** a return bull wheel **1** used in ski lift arrangements as shown, for instance, in U.S. Pat. No. 3,391,650 to Goforth. The chair lift assembly includes an endless conveyor cable or tow line **1***a* entrained about the turn wheel **1** which is mounted for rotation about a substantially vertical axis by an upstanding axle **5***a* carried in pillow block **5** on end of top fork **2** by a suitable pillar **2***a*.

Although the turn wheel as shown may be freely rotatable and driven by movement of the cable thereabout it may be that the turn wheel can be positively driven to impart movement to the cable.

Fixedly attached to the cable at spaced intervals along its length and for longitudinal movement therewith are a plurality of clamp members or grips, one of which is shown in the drawings and identified by the numeral **3.** Secured to the grip **3** is the upper end portion of a downwardly extending hanger bar **4.** Attached to the lower end of the hanger bar (not shown) is the chair or other passenger conveying means of the system, which chair is supported by clamp **3** and hanger bar **4** for longitudinal movement with the cable or rope **1***a*.

Referring now more specifically to the turn wheel **1,** the same includes a hub **6***a* rotatably supported on said shaft or axle **5***a* and having rearly outward thereof and attached thereto as by welding an annular cylindrical ring-shaped member **9** having upper and lower ring elements **9***a* and **9***b*. The ring member **9** includes a vertically extending rim or wall pipe **10** welded to and surrounding the upper and lower ring members **9***a* and **9***b*. Surrounding the rim or vertical wall of ring unit **9** and welded thereto is the horizontally extending annular disc member **11.** Attached to and rotating outwardly from it is a plurality of spokes or arms **7** of rectangular configuration, six in all, as for instance shown in FIGS. **2–5.** The upper part of the spokes **7** are covered by a bent rim plate or flanged head structure **8** which is provided with a horizontal plate surface **8***a* and a downwardly extending outer vertical plate portion **8***b*. Extending radially outward from the upper plate portion **8***a* at its juncture with the vertical portion **8***b* is an arcuate reinforcement bar **12** which is welded thereto and to an upper flange or outer ring **6.** A lower flange or outer ring **13** is spaced in general radial alignment below the upper ring **6** and is supported on and attached to a lower annular member or stiffener **14** which is attached to an uprightly extending U-shaped or channel member **15** that is attached to the upper reinforcement bar **12** and the lower stiffener member **14.** The outer ring **6** and the lower outer ring **13** are divergent radially outward of one another. The channel member **15** is attached to the outer face of the plate portion **8***b* and to the outer face of the upper portion of bent angle member or U-shaped bottom member or ring **16** that is also attached to the spokes **7.** The ring or angle member **16** is on the underside of the spokes as is the annu-

lar disc member but at the opposite end of the spoke members **7**. As best seen in FIG. **3**, the welds *w* hold the various discussed components together. An annular neoprene liner **17** is attached to the outer face of the channel member **15** and to the upper and lower radially spaced segments **6** and **13** and compressingly receives the cable or rope **1***a*.

The flanged head or top cover plate **8** transmits the drive torque from the outer circumference of the flanged head, the channel member **15** and the neoprene liner **17** to the hub **6***a*. This eliminates bending (due to driving torque) of the spokes or arms that transmit this torque in more conventional designs. The corner radius or juncture **8***c* between the horizontal plate portion **8***a* and the vertical plate portion **8***b* aids in the transmission of this torque as the corner radius is free from discontinuity and eliminates fatigue failures in this area often encountered where the spokes alone are attached to the outer rim of annular channel member **15**. The head or top plate **8** also provides a continuous surface that will prevent workmen from being entangled between the spokes **7** of the surrounding structure during maintenance operations and protects the under parts of the turn wheel from exposure to the weather.

FIGS. **6–9** illustrate that the principal advantage of the grip or clamp **3** is an improvement of this type of design to prevent chair outswing from the centrifugal force as the grip **3** passes around the bull wheel **1**. This grip or clamp as originally developed in the past prevented chair outswing by transmitting the centrifugal force from the inner jaw **3***a* to the outer jaw **3***b* through the cable **1***a*, then to the top flange segment **6**. The grip **3** of the instant application transmits the centrifugal force directly from the inner C-shaped portion **3***c* of the inner jaw **3***a* to the upright protuberance **3***d* of the inner jaw **3***a* to the top flange segments **3***c* without ever effecting the outer jaw **3***b* to react on the cable **1***a*. This eliminates the jaws **3***a* and **3***b* from working on the cable **1***a* in the instant construction, as the grip **3** rounds the bull wheel **1**, thus reducing wire fatigue in the cable **1***a* and eliminating centrifugal forces from the outer jaw **3***b* and the pivot pin **3***e*.

The foregoing description and drawings merely explain and illustrate the invention and the invention is not limited thereto, except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications and variations therein without departing from the scope of the invention.

What is claimed is:

1. A bull wheel construction for receiving a cable or the like thereabout including:
a central hub,
a plurality of spokes extending radially outward from the hub,
a cover in the form of a flanged head disposed over the spokes and connecting with the hub,
an outer peripheral cable receiving portion coupled at the outer periphery of the flanged head, and
said flanged head including a horizontally extending portion generally radially of the hub and a downwardly extending portion generally axially of the hub.

2. The invention according to claim **1**, and
a pair of divergingly angularly spaced disc shaped segments radiating outwardly from the outer periphery of the flanged head adapted to entrain an associated cable therebetween.

3. The invention according to claim **1**, and
said outer peripheral cable receiving portion including a channel shaped member having a generally vertical portion facing outwardly and receiving therearound a liner.

4. The invention according to claim **3**, and
said peripheral portion further including a pair of upper and lower outwardly diverging annular segment parts spaced from one another and radially of the hub and about the channel member for capturing of the liner and an associated cable or the like.

5. The invention according to claim **4**, and
said upper segment part having an upper reinforcement bar thereon and coupling with the flanged head and said lower segment part having a stiffener thereunder for supporting same.

6. The invention according to claim **4**, and
a clamp unit for carrying a hanger and chair extending within and between said segment parts and including:
an inner jaw,
an outer jaw,
pivot means connecting each jaw,
said inner jaw including an abutment engageable with the upper segment part for transmitting centrifugal forces directly from the inner jaw to the upper segment part eliminating working on the cable as the clamp rounds the bull wheel, reducing wire fatigue in the cable and eliminating centrifugal forces from the outer jaw and the pivot means.

7. The invention according to claim **6**, and
pivot means connecting each jaw whereby wire fatigue is reduced in the cable and thus eliminating centrifugal forces from the outer jaw and the pivot means.

8. The invention according to claim **1**, and
an angle member spaced beneath said downwardly extending portion and coupling with a spoke.

9. The invention according to claim **1**, and
said hub including an outer cylindrical upright wall and an inner upright cylindrical wall for receiving a vertical axis shaft therethrough,
an upper ring connecting with the inner and outer cylindrical walls and a lower ring connecting with the inner and outer cylindrical walls,
each ring connecting with the inner portion of the flanged head.

10. The invention according to claim **9**, and
an outer disc surrounding the outer cylindrical wall and coupling with the inner portions of the spokes.

* * * * *