United States Patent

Hogrebe

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[54] ARTICULATED CARRYING FRAME

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[52] **U.S. Cl.** **248/278,** 248/325

[51] **Int. Cl.** **A47g 29/00**

[58] **Field of Search** 248/324, 325, 326, 278, 279, 248/280, 281, 285, 16, 309

[56] **References Cited**

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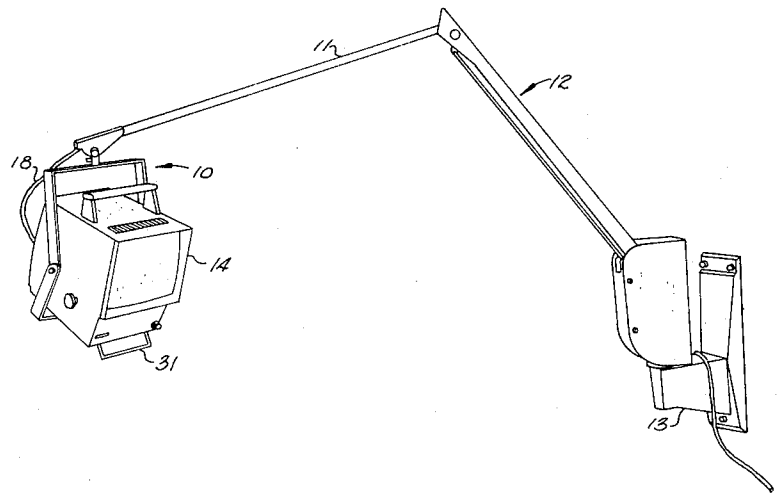
[57] **ABSTRACT**

This carrying frame includes upper and lower pivotally interconnected U-shaped members. The lower member is adapted to mount an article thereon and the upper member is adapted to be connected by a swivel member to an adjustable bracket or similar support. The axis of rotation of the pivotal connection between the upper and lower members is so chosen as to pass through or near the center of gravity of the carried article so that a minimum of effort is required to relocate the carried object and so that the article will maintain its relocated position.

1 Claim 4 Drawing Figures



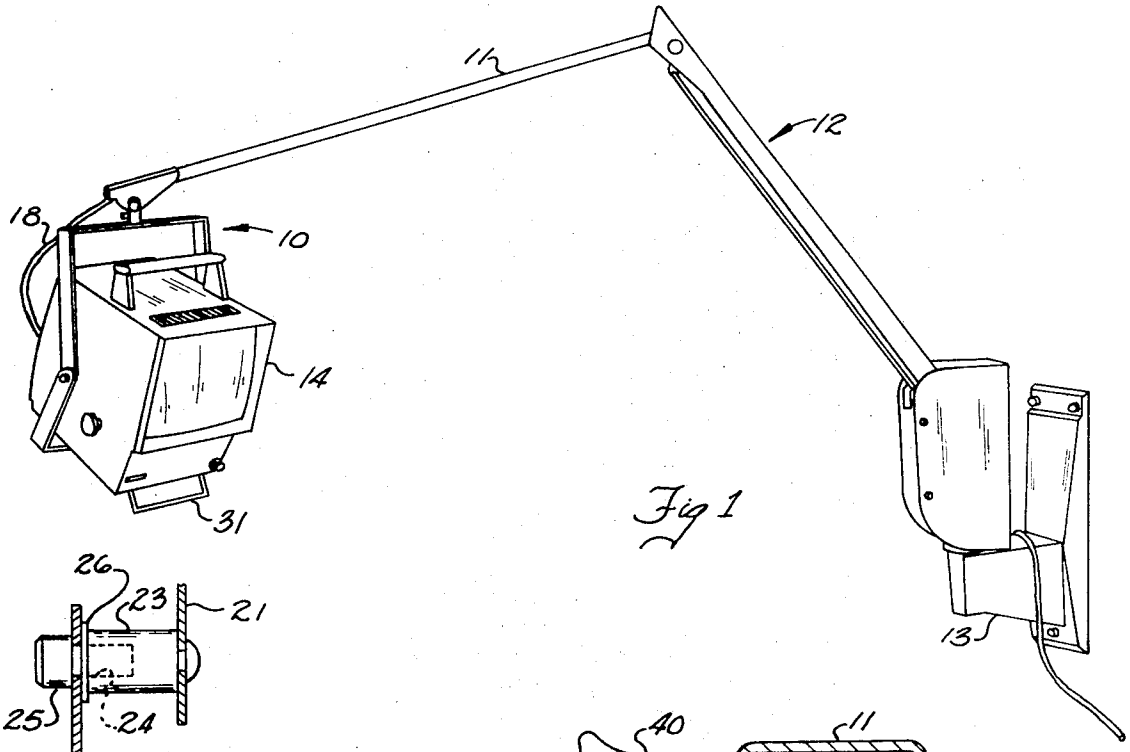


Fig 1

Fig 4

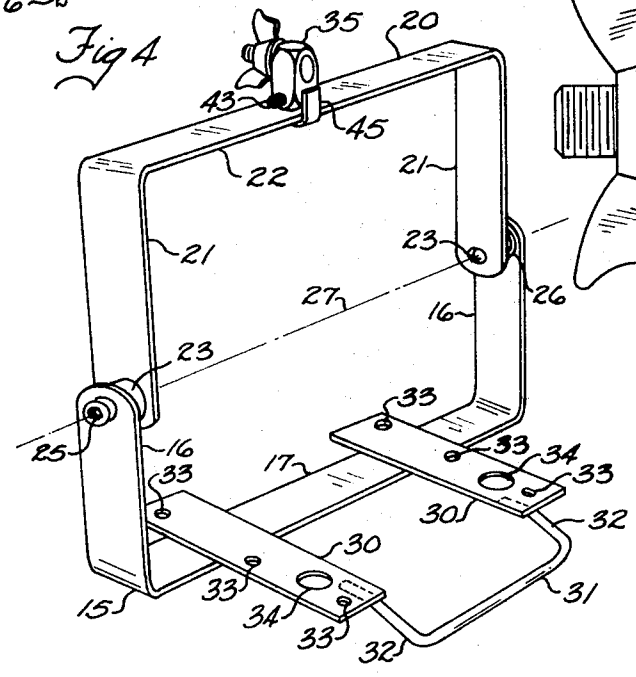


Fig 2

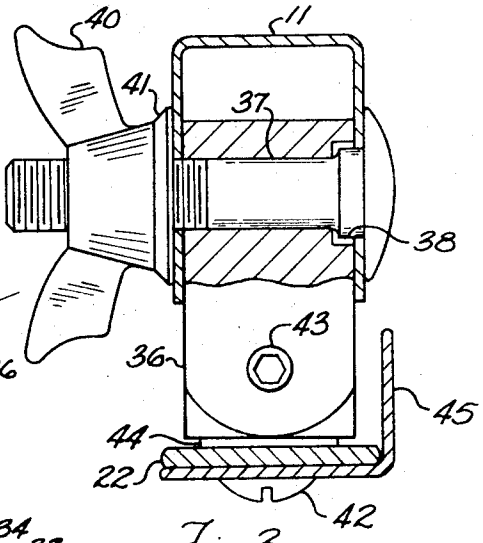


Fig 3

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ARTICULATED CARRYING FRAME

BACKGROUND OF THE INVENTION

This invention relates in general to an articulated carrying frame suitable for maintaining a carried article in a selected position, and in particular, to a carrying frame adapted to be attached to the end of a bracket member.

An article such as a television set which is to be suspended from a bracket arm some distance from the user, is, in general, limited to such relocation capability as is permitted by the bracket itself, and whatever additional rotation the connection between the article and the bracket allows, the latter being usually about the vertical axis of the article. If a carrying frame is provided for the article, then the versatility of the article with respect to its movement capability is controlled by the connection of the carrying frame to the bracket.

There are many applications in which it is highly desirable that the article should possess such movement capability as to enable it to be rotated easily, not only about a vertical axis, but also about its own horizontal axis so that it may be relocated to a desired angular position and be capable of maintaining that position. This is particularly true in the case of an article having a specific portion which is to be examined in such a manner as to suit the convenience of an operator or viewer who is located in a relatively stationary position.

A television set in a hospital provides an example of such usage, and a carrying frame which is suspended at the end of an articulated arm for movement toward and away from the viewer and which can also be oriented relative to its own principal axes, can easily be set for perfect viewing.

Of course, it is highly desirable that such orientation should be accomplished with a minimum amount of effort and it is equally desirable that the carrying frame should be of simple construction and easily operated. A carrying frame meeting these exacting specifications does not appear to be available in the prior art.

SUMMARY OF THE INVENTION

This articulated carrying frame has the capability of rotating an article mounted upon it about the horizontal and vertical axes of the article. The arrangement of parts is such as to permit articulation of the frame and article with a minimum amount of effort. Once oriented, the balancing of the frame is such that re-orientation is easily achieved. The structure of the frame is of utmost simplicity and it may be adapted to a variety of uses.

The carrying frame includes first and second U-shaped members, each including opposed arms and pivot means interconnects associated arms of the first and second frame members.

Mounting means mounts the article to the first frame member and support means, attached to the second frame member, mounts the frame to a bracket arm or similar structure.

The axes of rotation of the pivot means are substantially aligned and pass substantially through the combined center of gravity of the first frame member, including the mounting means, and the article. The pivot means includes friction means selectively controlling the pivotal rotation between the first and second frame members.

A pair of bent straps, disposed in inverted nested relation, provide the U-shaped members. The mounting means includes a pair of plates attached to and transversely disposed of the bight portion of the first U-shaped member. A depending handle interconnects associated ends of the plates.

The support means includes a swivel adaptor attached to the bight portion of the second U-shaped member, and the adaptor includes a projecting lug. The bight portion of the second U-shaped member also includes a projecting lug and the lugs are engageable to provide a stop means limiting the swivel action of the swivel adaptor relative to the second U-shaped frame.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view illustrating the carrying frame mounted at the end of an adjustable bracket;

FIG. 2 is an enlarged perspective view of the carrying frame;

FIG. 3 is an enlarged view partly in cross section illustrating the vertical swivel adaptor, and

FIG. 4 is an enlarged view in cross section illustrating the horizontal pivot.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

Referring now by characters of reference to the drawing and first to FIG. 1, it will be understood that the carrying frame, generally indicated by numeral **10**, is adapted to be attached to the outer end **11** of an adjustable bracket **12** which is mounted to a wall or similar structure by means of a pedestal **13**. In the embodiment described, the carrying frame **10** is adapted for use with a portable television set **14**.

FIG. 2 illustrates the structure of the carrying frame **10** in greater detail. The carrying frame **10** includes a lower U-shaped strap member **15** constituting a first frame member, and having opposed arm portions **16** and a bight portion **17**. An upper U-shaped strap **20**, constituting a second frame member having opposed arm portions **21** and a bight portion **22**, is pivotally connected to the lower U-shaped strap **15** to provide the articulated carrying frame **10** having relatively movable upper and lower portions.

The pivot means provided between associated arms **16** and **21** is illustrated in enlarged detail in FIG. **4** and includes a cylindrical socket member **23**, riveted into an elliptical hole or otherwise non-rotatively secured to the arm **21**. The threaded socket **24** receives a locking screw **25**, and a spring washer, such as the belleville washer **26**, provides a light frictional resistance between the arm **16** and the socket member **23**. By this arrangement, the arm **16** can move with a selected degree of freedom relative to the arm **21** without rotating the lock screw **25**.

In order to facilitate mounting of the article in the carrying frame **10**, a pair of plates **30** is provided. Each plate **30** is transversely disposed to the bight portion **17** of the lower U-shaped strap **15** and welded, or otherwise rigidly attached to the bight **17**. An inclined U-shaped handle member **31** is connected by its leg portions **32** to associated plates **30** as by welding. In the preferred embodiment, the handle is inclined to facilitate gripping without interference with the article mounted on the carrying frame **10**. Each plate portion **30** includes a plurality of mounting apertures **33** by which the television set **14** is mounted to said plate portions **30** as by screws (not shown). The larger apertures **34** are representative of cut-out portions which may be necessary to accommodate specific protuberances existing on the underside of the article to ensure a firm seating of the article on the plate portions **30**.

A swivel adapter **35**, constituting a support means, is attached to the bight member **22** of the upper U-shaped strap **20**. As indicated in FIG. **3**, the end of the bracket arm **11** has a channel configuration which embracingly receives the adaptor post **36**. A bolt **37** interconnects the arm **11** and the adaptor post **36**. The bolt **37** includes a square neck **38** to prevent relative rotation of the bolt **37** and a wing nut **40**, provided with a built-in, relatively rotatable washer having a serrated underface, ensures a tight connection between the arm **11** and the carrying frame **10**, yet permits the carrying frame **10** to be oriented to a desired position. This orientation is usually vertical in the case of a television set **14**, and is attained under self-weight of this article. It will be understood that the arm **11** is adjustable to several different positions and thus, relative movement between the arm **11** and the adaptor **35** is important.

The adaptor post **36** is pivotally attached to the bight portion **22** of the upper U-framed strap **20** by a swivel bolt **42**. The swivel bolt **42** is locked in place by means of a set screw

43. A spring washer 44 of the belleville type creates the requisite degree of friction between the post 36 and the bight portion 22 to ensure that the swivel action is controlled and not entirely free.

In order to prevent the carrying frame 10 from rotating a full 360°, stop means is provided between the adaptor post 36 and the upper U-shaped strap 20. In the preferred embodiment, this stop means is provided by an ell-shaped lug 45 mounted to the underside of the bight portion 22 by means of the swivel bolt 42, and the set screw 43 which is chosen to have sufficient length so that it projects beyond the adaptor face to provide another lug engaging the ell-shaped lug 45. With this arrangement, the engagement of the lugs precludes rotation of the carrying frame 10 in one direction of more than 360°. Hence, any danger of twisting of the power cable 18 is eliminated.

It is thought that the structural features of this articulated carrying frame have become apparent from the description of parts, particularly with regard to the pivotal relationships between the various elements. A specific and important feature of this carrying frame which renders it particularly useful lies in the positioning of the pivot means between the upper and lower U-shaped straps 20 and 15 to provide for optimum control of the carried article. This feature will now be discussed.

All articles, including the television set, indicated by numeral 14, have an ascertainable center of gravity. In the preferred embodiment, the length of the arms 16 of the lower U-shaped strap 15 is so chosen that the pivot axis 27 between the aligned lock screws 25 passes through or below the point within the article, representing the center of gravity of the carried article, in this case, the television set 14. It will be understood that in consideration of the axis of the center of gravity of the television set 14, the location of the axis is required fore and aft, as well as vertically, and that the intersection of the horizontal plane on which the center of gravity lies and the fore and aft plane on which the center of gravity lies, defines the axis of the center of gravity in the preferred embodiment. It will also be understood that in order to achieve perfect balance, the weight consideration should include, not only the television set itself, but also the lower portion of the carrying frame 10 which is attached to the television set 14. The television set 14 of the preferred embodiment can be expected to weigh up to 20 pounds and therefore, the weight of the lower portion of the carrying frame is not too significant. However, perfect balance can be achieved by consideration of the center of gravity of the combined mass of the television set and said lower portion including the mounting plates 30 and the handle 31. With substantially perfect balance, the television set 14 may be rotated to any desired position with virtually no effort and it will maintain that position. The light friction means provided in the pivot by the spring washers 26 serve to compensate for an alignment which is somewhat less than perfect.

An operator or viewer, wishing to re-orient the television set 14, simply grasps the handle 31 and with virtually no effort, can turn the set about a vertical or a horizontal axis, the weight of the set and the specific connection between the adaptor 35 and the bracket arm 11 ensures that the set will not be tilted out of the vertical unless this is desirable, which might occur if the carrying frame were used for an article other than a television set. It will be understood that the center of gravity of the carried article in each of its three dimensions, particularly vertically and fore and aft, may be easily determined in a variety of conventional ways, perhaps the best being by testing. The location of an axis passing through the center of gravity may be lightly scribed on each side of the television set 14. Given the location of this axis, and knowing the center of gravity of the lower portion of the frame which is easily determined by conventional means, the location of the combined center of gravity axis and the pivot axis 27 may be found and the length of the arms 16 determined accordingly.

I claim as my invention:

1. An articulated carrying frame for an article, comprising:
   a. a first U-shaped frame member including a strap, providing a bight portion, and opposed arm portions,
   b. a second U-shaped frame member including a strap, providing a bight portion, and opposed arm portions adjacently disposed to associated arm portions of the first frame member, said U-shaped members being disposed in inverse nested relation,
   c. pivot means interconnecting associated arms of the first and second frame members to suspend the first frame member below the second frame member,
   d. mounting means attached to the first U-shaped frame member adapted to mount the article, and including a pair of plate portions attached to and transversely disposed of the bight portion of said first U-shaped member,
   e. the axes of rotation of the pivot means being substantially aligned and passing substantially through the combined center of gravity of the suspended portion of the carrying frame and the article,
   f. a handle interconnecting associated ends of the plate portions,
   g. support means attached to the second U-shaped frame member,
   h. the support means including an adaptor means having a pin attached to the bight portion of the second U-shaped member to provide rotation of the article about an axis transversely related to the axis of rotation of the pivot means,
   i. the adaptor means including a set screw precluding rotation of the pin and providing a projecting lug, and
   j. the bight portion of the second U-shaped frame member including a projecting lug, said lugs engaging to provide stop means limiting swivel of the adaptor means relative to the second U-shaped frame.

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