

LCD Projector Bracket and Stand Assembly

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Abstract

A Liquid Crystal Display bracket and a stand assembly that secures the LCD projector is disclosed. The bracket and a stand comprise of a base that can be mounted on any surface. An adjustable connecting member includes a ball joint that allows the projector to be tilted and rotated in 360 degrees on horizontal angle. An intermediate support that couples the ball joint to projector adapter, and a projector adapter that holds the LCD projector firmly. This tool makes the use of LCD projector convenient.

Keywords— Liquified Crystal Display (LCD), Projector bracket, Stand assembly

I. INTRODUCTION

The present invention relates generally to a mounting mechanism that supports LCD projectors. In particular, it works as an LCD projector bracket and stand assembly that can be mounted on ceiling or as a stand on floors.

A common set-up for Liquid-Crystal Display (LCD) projectors is by table-top placing manner, wherein a table is positioned in front of the class or audience serving as the projector stand. Projectors are provided with focusing and adjusting mechanisms. Most of the time, however, additional wedges or stuffs are needed to be placed beneath the projector in order to attain good position. This manner is a little bit awkward because it causes delay during the preparation period.

Another projector bracket with Patent Number (US) 8,724,037 B1, issued May 13, 2014 describes a mounting system capable of mounting objects to support structures. The mounting system includes a wall mount including a display bracket configured to hold the object, a fixed support bracket coupleable to a vertical support structure and a linkage assembly. The linkage assembly has a low-profile stowed configuration in which the object is held and raised position close to the support structure. The linkage assembly moves to another configuration to move the object. The object can be held I a lowered position. A

biasing mechanism can facilitate convenient movement of the object. This mounting device has a multi-link and bracket assembly that supports an object such as LCD monitors and has adjusting mechanism to be adjusted to desired position. Nevertheless, it has a limitation in terms of multi-angle position since it is a wall-mounted design only.

Patent No. (US) 6,042,068, issued March 28, 2000 describes a mounting device that secures a projector on the ceiling. The mount includes an upper element which is attached to the ceiling, and a lower element which is attached to the projector. The two elements are adapted to slidably engage and disengage for quick mounting without having to detach the upper element from the ceiling and the lower element to the projector. This design probably answers the problem of adjustability. Yet, this apparatus lacks rotational-angle adjustability and is ceiling-mounted type only.

Patent application number CN20141336254 20140715, with priority no. US201313941603 20130715, and published as US2015016866 (A1) and DE102014109440 (A1), described an apparatus for retaining ball joint, and assembly for enabling multi-adjustment of a lamp. The assembly includes a frame to which the lamp is attachable, a ball joint, and an apparatus for retaining the ball joint. The apparatus is attached to the frame, and includes a housing and a cap. The housing defines a chamber

configured to receive the head of the ball joint and may further be defined a slot in which the neck is slidable such that the ball joint is insertable into and removable from the chamber. The cap is configured to interlock with the housing to secure the ball joint such that they are substantially restricted to rotational movement with respect to each other. The cap and the housing may have retention tabs and retention ridges, respectively, configured to engage with each other to enable the interlocking. However, though this assembly allows rotational movement, it does not allow tilting. At the same time, this assembly can only support light-weight materials such as lamps.

II. SYNTHESIS

In view of the limitations of the aforementioned prior arts, it is therefore the object of the present invention to provide solutions to the inadequateness of the current set-up whereby creating a dual-purpose projector bracket and stand. The present invention provides easier adjustment and projection of the focus because of the ball joint mechanism.

III. SIGNIFICANCE OF THE STUDY

The present invention relates generally to a mounting mechanism that supports LCD projectors. In particular, it works as an LCD projector bracket and stand assembly that can be mounted on ceiling or as a stand on floors.

IV. OBJECTIVE OF THE STUDY

Generally, this study aimed to design and fabricate LCD projector bracket and stand assembly. Specifically, this study aimed to: (1) design and fabricate LCD projector bracket and stand assembly; and (2) evaluate the operating performance of the device.

V. SUMMARY OF INVENTION

The present invention is a dual-purpose type projector bracket designed to adapt and support an LCD projector when mounted on the ceiling or on the floor. It is capable of carrying a standard lecture/presentation type LCD projector weighing 2 to 5 kilograms (gross weight). It can be adjusted to multiple positions (can be tilted up and down or can be turned at 360 degrees horizontal angle).

Another object of the present invention is to provide an LCD projector bracket and stand assembly that allow the user to rotate and tilt the LCD to a desired angle of rotation up to 360 degrees.

Still an object of the present invention is to provide an LCD projector bracket and stand assembly that can be extended to a desired length depending on the height of the screen for projection.

Yet an object of the present invention is to provide an LCD projector bracket and stand assembly that can be made movable on any locations that will not leave a mark on the floors due to the provisions of rubber cushions to protect the floor from scratching.

VI. BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a preferred embodiment of the LCD projector bracket and stand assembly.

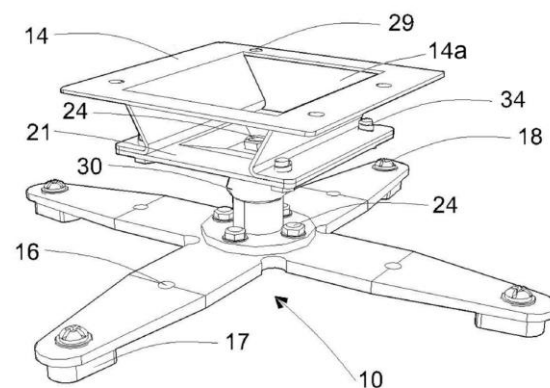


Fig. 1

Figure 2 is a perspective view of the disintegrated parts of the LCD projector bracket and stand assembly.

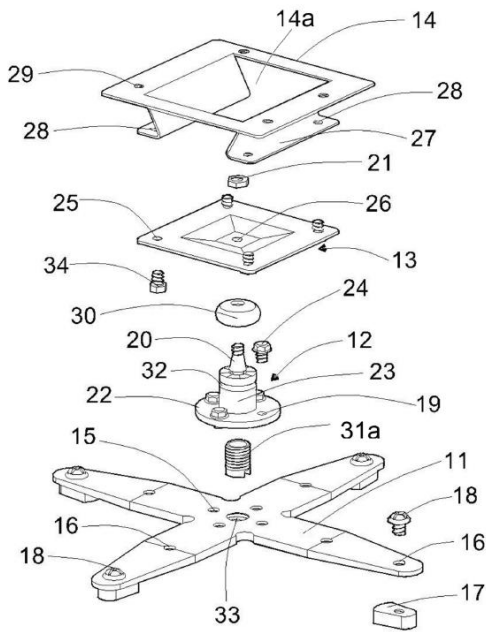


Fig. 2

Figure 3 is a perspective view of the disintegrated parts of the adjustable connecting member.

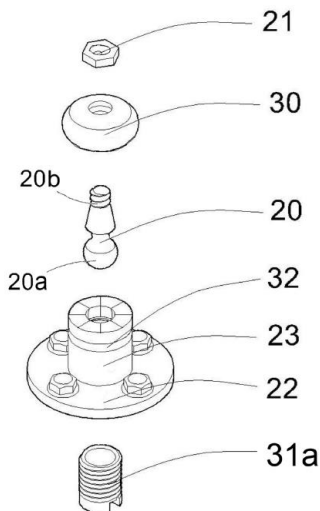


Fig. 3

Figure 4 is a section view of the adjustable connecting member showing the installation position of the ball joint inside the cylindrical socket support.

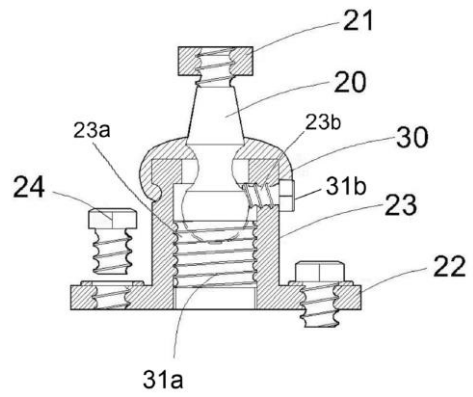


Fig. 4

Fig. 5 is the perspective view of the extension post.

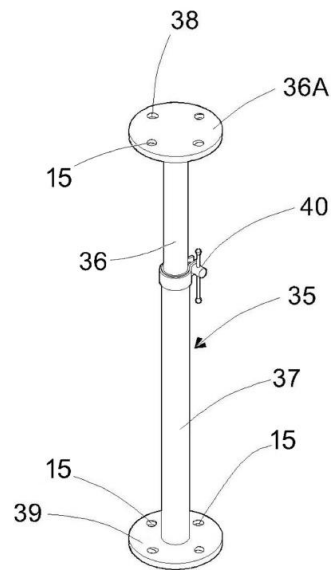


Fig. 5

Fig. 6 is the perspective view of the LCD projector bracket and stand assembly as mounted on the ceiling.

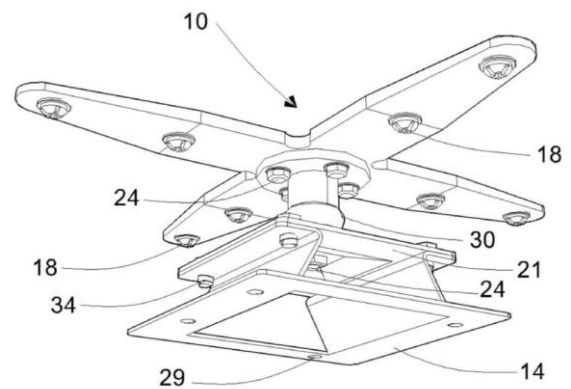


Fig. 6

Description of the Preferred Embodiment

A preferred embodiment of the present invention in Fig. 1 illustrates the complete set of a projector bracket and stand assembly for LCD's generally designated as 10, constructed in accordance with the specifications of the present invention. The bracket and stand **10** consists of four major parts (best shown in Fig. 2), a base designated at **11**, an adjustable connecting member designated at **12**, an intermediate support designated at **13**, and a projector adapter designated at **14** being interconnected by a fastening means preferably bolt and nuts.

The base **11** is a cross-shape plate with plurality of screw holes **15**, plurality of base apertures **16**, and a base centre aperture **33** designed to carry the whole projector bracket and stand assembly including the LCD projector. Such screw holes **15** enable the ball joint assembly **12** to be attached using plurality of flange fastening means **24**. Fasteners like screws or bolts are adapted to be inserted on the base apertures **16** when mounting the projector bracket **10** to the ceiling (Fig. 6). The base apertures **16** at the outermost of base **11** are used to set up plurality of rubber cushions **17** using plurality of rubber cushion attaching means **18** when mounted on the floor or used as stand.

Referring to Figures 2, 3 and 4 is an adjustable connecting member **12** comprising of a flange **22** having a plurality of spaced apertures **19** is superimposed to the base **11** where all the spaced apertures **19** are aligned to the screw holes **15** and being fixed using fastening means **24**. A cylindrical socket support **23** is extended from said flange **22** having an inside thread **23a**, an upper outer seat groove **32**, and a side threaded retaining hole **23b**. A threaded tubular rod **31a** screwably held into the socket support **23** through said inside thread **23a**.

A ball joint **20** having a ball head **20a** and tapered upper body **20b** with threaded end is movably held inside the cylindrical socket support **23**. The ball head **20a** is being seated into said tubular rod **31a**. The tightness of the tubular rod **31a** can be adjusted using a screw

driver through said base centre aperture **33**. The ball joint **20** can be retained by a retainer screw **31b** held to said hole **23b** to provide aid to adjustably secure a heavier projector and/or to adjustably secure the ball head of a ball joint at its wear and tear condition, and can be adjusted or tightened using a screw driver at the side portion of the cylindrical socket support **23**.

Once the base **11** with adjustable connecting member **12** is already installed, the tubular rod **31a** cannot be adjusted. The retainer screw **31b** can then be adjusted for fitness of the ball head of ball joint **20**. This is done in order to confine the projector after adjusting to the desired position. The rod **31a** and the retainer screw **31b** are adjusted for wear and tear purposes. The ball head **20a** of ball joint **20** and the inside portion of cylindrical socket support **23** shall be lubricated with a grease lubricant (not shown). In order to eliminate the spillage of grease, the ball joint assembly **12** is provided with a rubber boot **30**. The said rubber boot **30** is tightly fitted outside the cylindrical socket support **23** through the outer seat groove **32** wherein the wider opening of the rubber boot **30** rests and settles.

The intermediate support **13** is a thin plate formed in a predetermined profile with plurality of corner apertures **25**, and a center hole **26**. The said centre hole **26** is concentrically aligned and attached to the threaded end of said ball joint **20**, thereby being securedly connected using a fastening means preferably a nut **21**.

The projector adapter **14** is a preformed quadrilateral metal having a cut opening **14a** and plurality of projector apertures **29**. A pair of angular support oppositely disposed and integrally attached to said cut opening **14a** forming thereon flanges **27** of predetermined profile and provided with plurality of adapter flange apertures **28**. The said projector adapter **14** is attached to the intermediate support **13** by aligning the flange apertures **28** to said intermediate support apertures **25** and secured using a plurality of attaching means **34** preferably bolt screws. The projector adapter **14** will hold and secure the LCD Projector using the appropriate attaching elements fitted to the

projector screw holes provision (not shown). The alignment of, locations of, and balance between the different projector adapter apertures **29** are customized in concinnity to the model of LCD projector available.

Another embodiment of this invention, as shown in Figure 5, is that a retractable extension post **35** is attached between the base **11** and the adjustable connecting member **12**. The extension post **35** is defined by a pair of tubular rods **36** and **37** of different diameter retractably connected to each other and being securedly locked by a locking means **40** preferably a lock ring. The distal ends of said post are provided with flange **38**, **39** disposed opposed to each other. Each flanges **38**, **39** includes a plurality of screw holed **15**. Flange **39** is connected to the base **11** while flange **38** is connected to the adjustable connecting member **12**. The length of tubular **37** is fixed and that of tubular rod **36** is to be varied as desired. The locking means **40** fastens the rods **36** and **37** after adjustments of the length are made in the extension post 35. This allows the LCD projector bracket and stand assembly to be adjusted to the desired height when mounted to the ceiling or on the floor.

With the provision of said ball joint **20** and the present structure of the assembly **10**, it is apparent that the assembly allows the LCD projector to simultaneously achieved horizontal and vertical tilt and to be rotated to a desired horizontal angle preferably up to 360 degrees horizontal angle.

The embodiments of the present invention as specifically described herein is exemplary only, and is not intended to limit the scope of the present invention to the precise form disclosed, and many modifications and variations are possible in light of the above teaching without deviating from the spirit and the scope of the invention. The invention accordingly includes all the means constituting technical equivalents of the means described as well as their combinations.

VII. RESULTS

What is claimed is:

1. An LCD projector bracket and stand assembly *comprising*:
a base defined by a cross-shaped plate; an adjustable connecting member superimposed to said base includes a cylindrical socket support having an inside tubular rod wherein a ball head of a ball joint is seated and adjustably secured through a retainer; an intermediate support concentrically aligned and attached to said ball joint and secured by a fastening means; and a projector adapter securedly attached to said intermediate support adapted to hold and secure the LCD projector, said ball joint allows the LCD projector to simultaneously achieved horizontal and vertical tilt and to be rotated to a desired horizontal angle, *characterized in that* said retainer of said adjustable connecting member allows the ball joint adjustment within 360-degree horizontal angle.
2. An LCD projector bracket and stand assembly in claim 1, *characterized in that* said base can be mounted on the ceiling.
3. An LCD projector bracket and stand assembly in claim 1, *characterized in that* said base includes rubber cushions when used as stand.
4. An LCD projector bracket and stand assembly in claim 1, *characterized in that* said base having a center aperture that allow adjustment of said ball joint.
5. An LCD projector bracket and stand assembly in claim 1, *characterized in that* said fastening means is a screw.
6. An LCD projector bracket and stand assembly in claim 1, *characterized in that* said fastening means is a threaded bolt.
7. An LCD projector bracket and stand assembly in claim 1, *characterized in that* the projector adapter has apertures customized in accordance with the model of the LCD Projector.
8. An LCD projector bracket and stand assembly *comprising*: a base defined by a cross-shaped plate; an extension post attached to said base defined by a pair of tubular rods having a flange at its distal ends; an adjustable

connecting member superimposed to said base includes a cylindrical socket support having an inside tubular rod wherein a ball head of a ball joint is seated and adjustably secured through retainer; an intermediate support concentrically aligned and attached to said ball joint and secured by a fastening means; and a projector adapter securedly attached to said intermediate support adapted to hold and secure the LCD projector, said ball allows the LCD projector to be tilted and rotated to a desired horizontal angle, *characterized in that* said extension post is pair of tubular rods of different diameters retractably connected to each other and being securedly locked by a locking means.

9. An LCD projector bracket and stand assembly in claim 8, *characterized in that* said locking means is a lock ring.

10. An LCD projector bracket and stand assembly in claim 8, *characterized in that* at least one of said tubular rods with a fixed length and the other is to be varied as desired.

VIII. ACKNOWLEDGEMENT

The LCD Projector Bracket and Stand Assembly has applied for its patent with a number 1/2015/000377 on November 9, 2015. A deep appreciation is given to the ISAT U President, Dr. Raul F. Muyong, Vice-President for Research and Extension, Dr. Carmelo V. Ambut and Director for Intellectual Property Management, Engr. Naci John C. Trance.

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