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Boundy

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[54] **EVEN LOAD CLIP**

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[52] **U.S. Cl.** **248/243**; 211/148

[51] **Int. Cl.**[2] **A47F 5/08**; A47G 29/02

[58] **Field of Search** 211/148, 134; 248/243, 248/300, 242, 244, 245; 52/36; 108/108

[56] **References Cited**

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[57] **ABSTRACT**

An improved mounting bracket for connecting a cantilevered load to a slotted standard in which the hook type connectors have a varying hook depth with the variation extending from a larger hook depth at the uppermost hook with the hook depth decreasing over the upper few hook connectors to a standard hook depth for the remainder of the lower hook connectors of the mounting bracket to thereby accommodate deformation in the slotted standard and equally distribute the cantilevered load over the upper few hook connectors.

2 Claims, 3 Drawing Figures

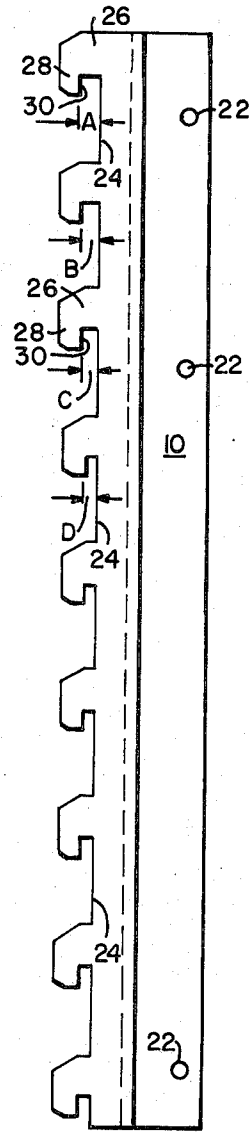
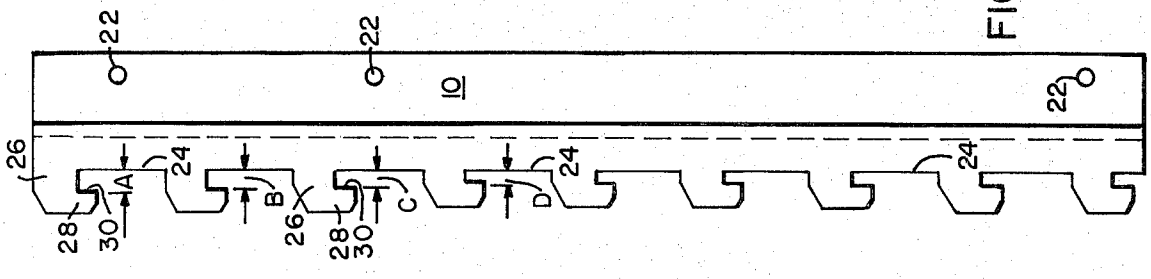


FIG.2



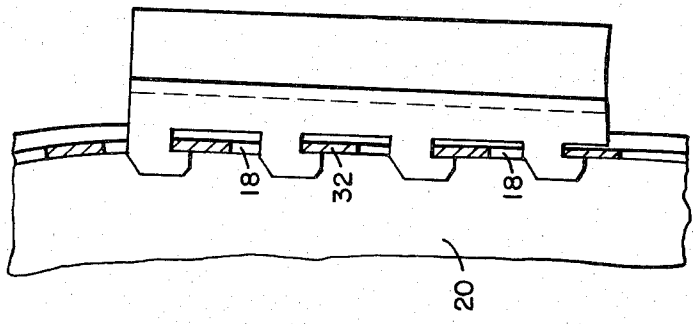


FIG.3

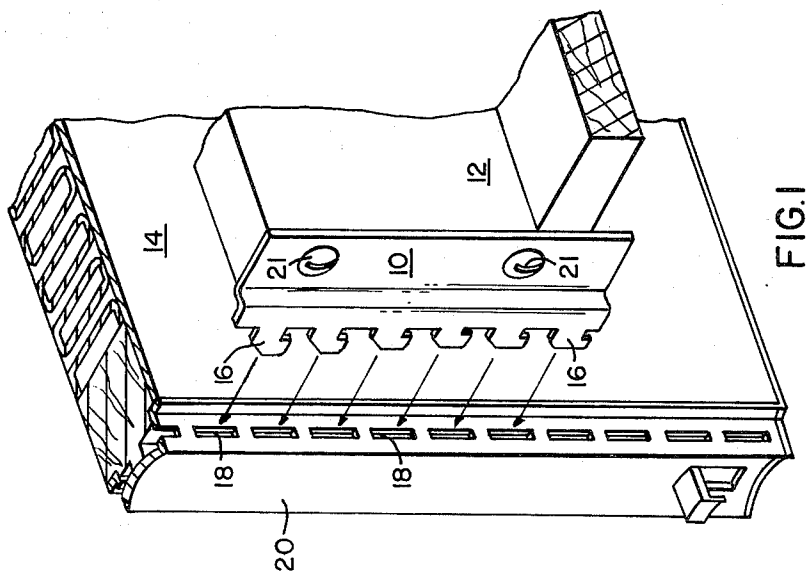


FIG.1

EVEN LOAD CLIP

BACKGROUND OF THE INVENTION

The use of hook or T-shaped connectors on mounting brackets to mount shelving, cabinets or related wall mounted accessories to a fixed wall or partition is common practice. Generally the hook or T-shaped connector coacts with a slotted standard fixed to the wall or partition to thereby securely mount the accessory to the wall. The conventional configuration for hook shaped connectors is illustrated in U.S. Pat. No. 3,358,956 to Thornton and U.S. Pat. No. 2,925,918 to Atwood. Illustrations of the conventional T-shaped connector may be found in U.S. Pat. Nos. 3,759,297 and 3,762,116 issued to Anderson et al. In the case of both the T-shaped and hook shaped connector the equidistantly spaced connectors are slipped through a plurality of similarly spaced slots in the slotted standard and moved downwardly so that the hook or the bottom end of the T-shaped connector lodges behind the spaces between the slots in the slotted standard to thereby retain the bracket fixed to the wall panel thus facilitating the support of a load in the form of shelving, work surfaces or cabinets.

All of the prior art hook or T-shaped connectors employ a standard uniform hook depth for the connectors of a single bracket. This hook depth dimension is generally designed to be compatible with the thickness of the metal between the slots on the slotted standard to provide a substantially tight fit when the bracket is secured into the slotted standard. In almost all cases, the conventional construction is adequate for the unloaded shelf or cabinet or the work surface to which no additional load has been applied. As will be apparent because of the cantilevered nature of the load the upper half of the hooks of the connectors will carry the entire load in tension while the bottom half will carry a compressive load on the bracket side of the hook. When excessive loading is applied to any of these accessories a slight deformation occurs in the slotted standard causing the entire bending moment or torque load to be applied to the single upper hook, in many instances, causing that hook to deform substantially. When the upper hook deforms it generally acquires a permanent canted set or under extreme conditions fracture of the upper hook may occur. One solution to this problem is to design extremely heavy duty bracket and standard systems using heavy gauge materials. This brute force solution to the problem, of course, results in heavier and more expensive components.

A study of the failure pattern of excessively loaded brackets illustrates that a concentration of tensile forces exist on the top tab with diminishing tensile forces on each successive tab to a point midway down the clip and compressive forces on the remainder of the tabs. It has also been found that the forces on the successive tabs do not diminish in a straight-line relationship which is clearly attributable to the heretofore unrecognized fact that the slotted standard flexes slightly, no matter what gauge material it is made of, under a torque load into a slight S shape. This slight deflection concentrates the strain on the top tab with a lesser strain on the second tab and each successive tab down to about the midpoint of the plurality of hooks on the bracket.

SUMMARY OF THE INVENTION

The foregoing problem is solved in accordance with the present invention, while avoiding the use of more expensive and heavier gauge materials, by designing the hook or T-shaped connectors to coincide with the slight deformation of the slotted standard. More particularly, a mounting bracket for connecting a cantilevered load to a slotted standard in accordance with this invention includes a body portion constructed and arranged to be connected to the load to be supported, a plurality of linearly aligned hook connectors extend from one edge of the body portion with the hook connectors each including a shank portion and a hook portion with the shank portion defining the distance between the hook portion and the body portion. The distance between the hook portion and the body portion being of a predetermined non-uniformity with respect to at least some of the plurality of linearly aligned hook connectors to thereby provide a more uniform distribution of the cantilevered load. In this connection, the shank portion of the uppermost hook connector is larger than the shank portion of the adjacent next lower hook connector with this relationship extending over the upper several hook connectors of the bracket. The majority of the remaining hook connectors have a uniform shank portion.

BRIEF DESCRIPTION OF THE DRAWING

Many of the attendant advantages of the present invention will become more readily apparent and better understood as the following detailed description is considered in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a hook connector constructed in accordance with this invention and its associated slotted standard;

FIG. 2 is a side elevational view of a hook connector bracket of this invention; and

FIG. 3 is a side elevational view partly in section of a slotted standard under torsional loading.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing wherein like reference characters represent like parts throughout the several views there is illustrated in FIG. 1 a showing of a typical wall panel cantilever load combination in which a mounting bracket, generally designated **10**, connects a load **12** to an upstanding wall panel **14** through the interaction of a plurality of hook connector members **16** on the bracket and slots **18** in a conventional slotted standard end rail **20**. Of course, it is not particularly necessary in connection with this invention that the slotted standard be on an end rail and the slotted standard could equally be of the type that is directly affixed to the face of a wall or partition intermediate its ends.

Referring now more particularly to FIG. 2, there is illustrated in side elevation a mounting bracket generally designated **10** adapted to be secured as by bolts **21** (FIG. 1) through apertures **22** to a cantilevered load **12** in the form of shelving, a cabinet or work surface to support that accessory in the manner illustrated in FIG. 1. As best seen in FIG. 2, the bracket **10** has a linearly aligned edge **24** which serves to form the base of each of the hook members **16**. Each of the hook members **16** include a shank portion **26** and a hook portion **28** with

the hook portion having an inner edge **30** which is disposed in the same plane as the base edge **24** separated by a distance defined by the shank portion **26** of the hook connector. The length of the shank portion **26** or more particularly the spacing between the inner hook edge **30** and the base edge **24** which is the same as the shank length defines the hook depth. In a standard hook connector bracket the hook depths are uniform throughout the extent of the linearly aligned hook members and is generally only slightly larger than the thickness of the particular gauge steel employed in the slotted standard. In accordance with the present invention, the linearly aligned hook connectors have hook depths of different dimensions at least in part. In this connection, the uppermost hook connector has the largest hook depth (A), the next lower hook connector having a slightly smaller hook depth (B) which in turn is slightly larger than the hook depth (C) of the third hook connector. The fourth hook connector has a hook depth (D) which is the standard hook depth and is equal to the hook depths of the remainder of the hook connectors **16** of the bracket.

As illustrated in FIG. **3,** the slotted standard **20** due to the torsional loading of the accessory **12** will bow slightly at the top of the connection with bracket **10** and the non-uniform hook connectors of the mounting bracket of this invention will cause the heavy torsional load to be distributed evenly over the upper **3** or **4** hook connectors instead of substantially all of that load being carried by the uppermost hook connector as in the standard bracket configurations.

As a specific example 13 gauge H.R.P.O. steel is employed for a conventional slotted standard and has a thickness of 0.090 inch which also defines the thickness of the parts **32** of the slotted standard **20** which are interposed between each of the linearly aligned slots **18.** The standard hook depth for this bracket-standard combination is 0.95 inch which is the hook depth (D) and the hook depth of the lower five additional hook connectors on the bracket illustrated in FIG. **2.** It has been found that the load will be equally distributed among the upper three or four hook connectors if the hook depth (C) is 0.098 inch, the hook depth (B) is 0.105 inch and the hook depth (A) is 0.120 inch. Although these dimensions will vary for different gauges of steel and different materials employed in the bracket and slotted standard combinations a progressively smaller increment from top to bottom is indicated.

Although the invention has been described and claimed with regard to hook type connectors it will be apparent that the invention is equally applicable to T-shaped connector elements although brackets constructed in accordance with the present invention would not have the transferability from a right-hand bracket to a left-hand bracket by reversing the orientation as a typical standard T-shaped connector and the upper hook portion of the T-shaped connector would be superfluous.

As will be apparent from the foregoing, the mounting bracket of the present invention provides a simple and positive solution to the deformation of connectors caused by excessive loading in this type mounting bracket without resorting to the use of expensive and cumbersome heavy gauge steel which is itself only a partial solution to the problem.

What is claimed is:

1. A mounting bracket for connecting a cantilevered load to a slotted standard, said mounting bracket comprising;

a body portion constructed and arranged to be connected to the load to be supported,

a plurality of linearly aligned hook connectors extending from one edge of said body portion, said hook connectors including a shank portion and a hook portion with the shank portion defining the distance between the hook portion and said one edge of said body portion, said distance between said hook portion and said body portion being of a predetermined non-uniformity with respect to at least some of said plurality of linearly aligned hook connectors and said shank portion being largest for the uppermost hook connector and the shank portions of each adjacent lower hook connector being, for the next several hook connectors, slightly smaller than the connector immediately above with the shank portions of the remainder of said plurality of hook connectors being uniform to thereby provide a more uniform distribution of said cantilevered load.

2. An improved mounting bracket for connecting a cantilevered load to a slotted standard, said improved mounting bracket comprising;

a body portion constructed and arranged to be connected to the load to be supported;

a plurality of linearly aligned hook connectors extending from one edge of said body portion, at least some of said linearly aligned hook connectors having a hook depth of different dimensions with the uppermost hook connector having the largest hook depth of said plurality of hook connectors and the next lower hook connector to said uppermost hook connector having the next largest hook depth, with the hook depth of at least half of said plurality of linearly aligned hook connectors being uniform.

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