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Galloway et al.

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[45] **Jan. 15, 1974**

[54] **MODULAR CEILING CONNECTOR**

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[73] Assignee: **Illinois Tool Works Inc.**, Chicago, Ill.

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[52] **U.S. Cl.** ..... **52/715**, 52/484, 52/665, 287/189.36 A

[51] **Int. Cl.** **E04b 5/52**

[58] **Field of Search** ..... 52/488, 484, 476, 52/665, 712, 715, 719, 144; 287/189, 36 A

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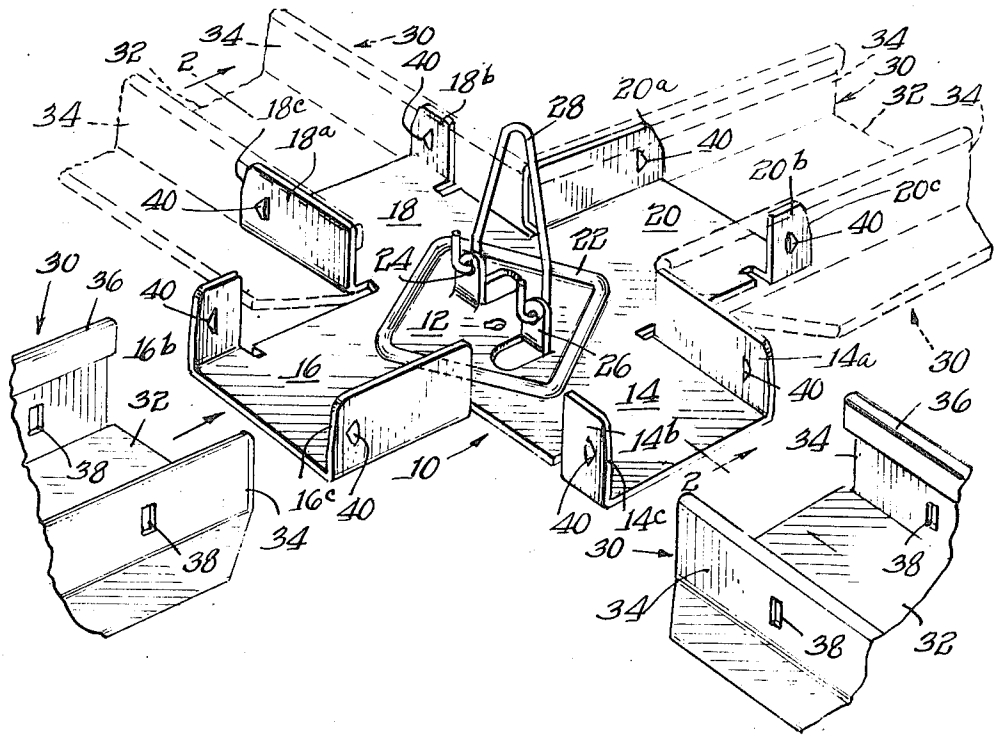
[57] **ABSTRACT**

The present invention relates generally to improvements in modular connectors for horizontal runners of a ceiling grid system, and more particularly to improvements in modular connectors comprising a one piece sheet metal stamping. The embodiment of the invention disclosed in the present application includes a central sheet metal plate section having a plurality of integral arms radiating therefrom. Each arm presents a plate portion having integral flanges extending upwardly from opposite margins thereof for telescopically accommodating the extremity of a complementary grid channel member. Means is also provided for accommodating the lower extremity of a vertically disposed grid suspending member such as a wire.

4 Claims, 8 Drawing Figures



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SHEET 1 OF 2

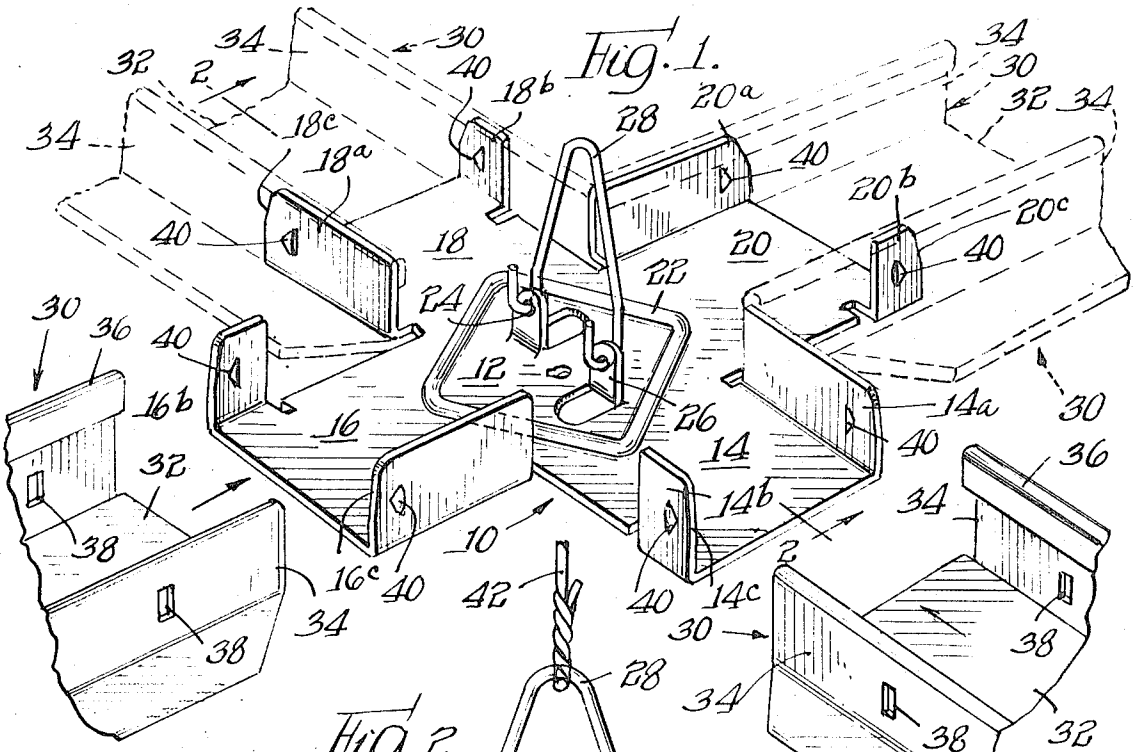

Fig. 1.

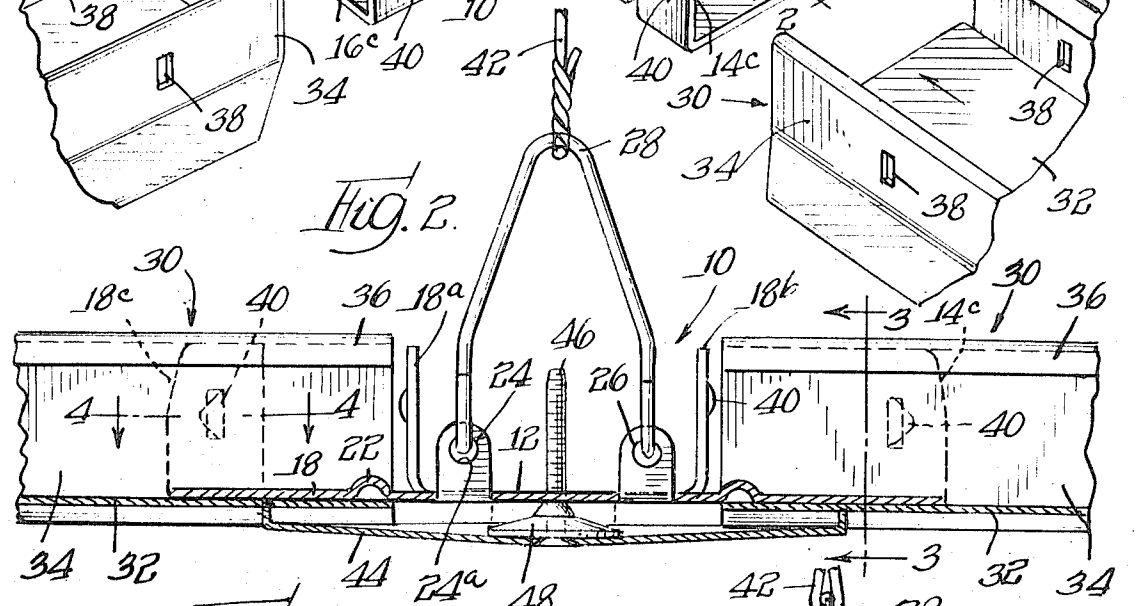

Fig. 2.

Fig. 3.

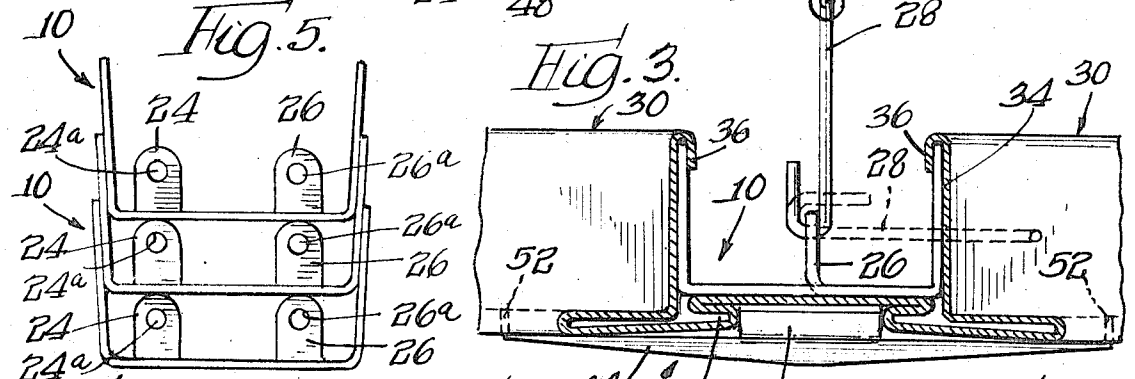

Fig. 5.

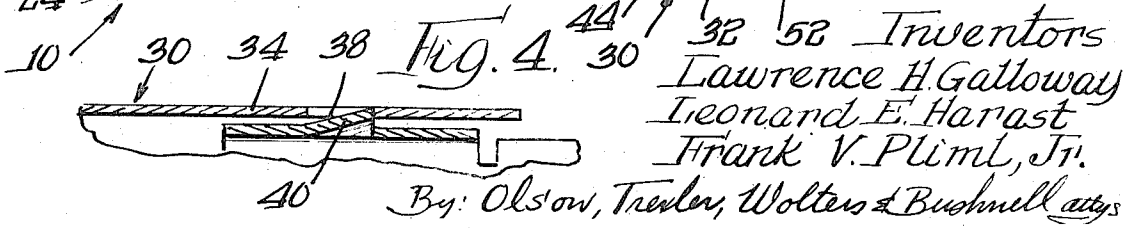

Fig. 4.

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Fig. 6.

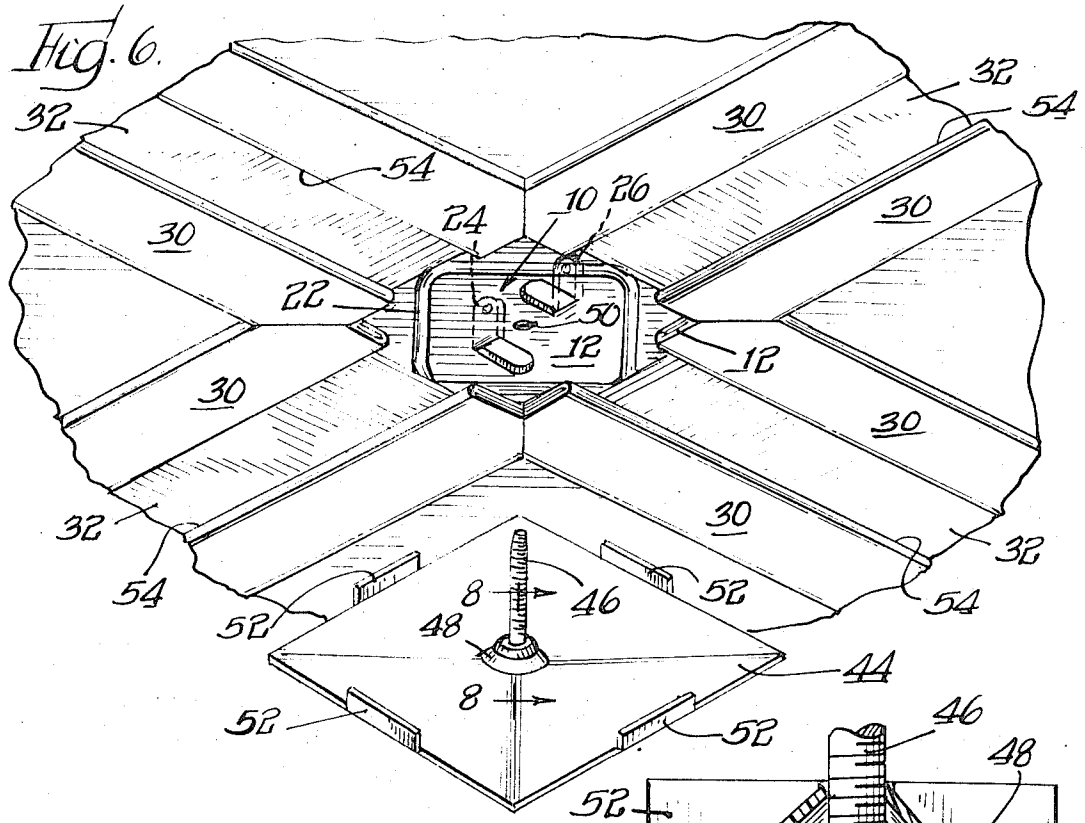


Fig. 8.

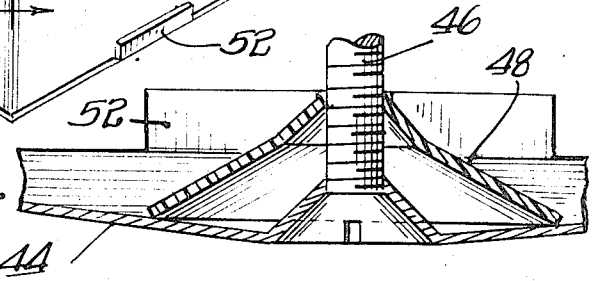
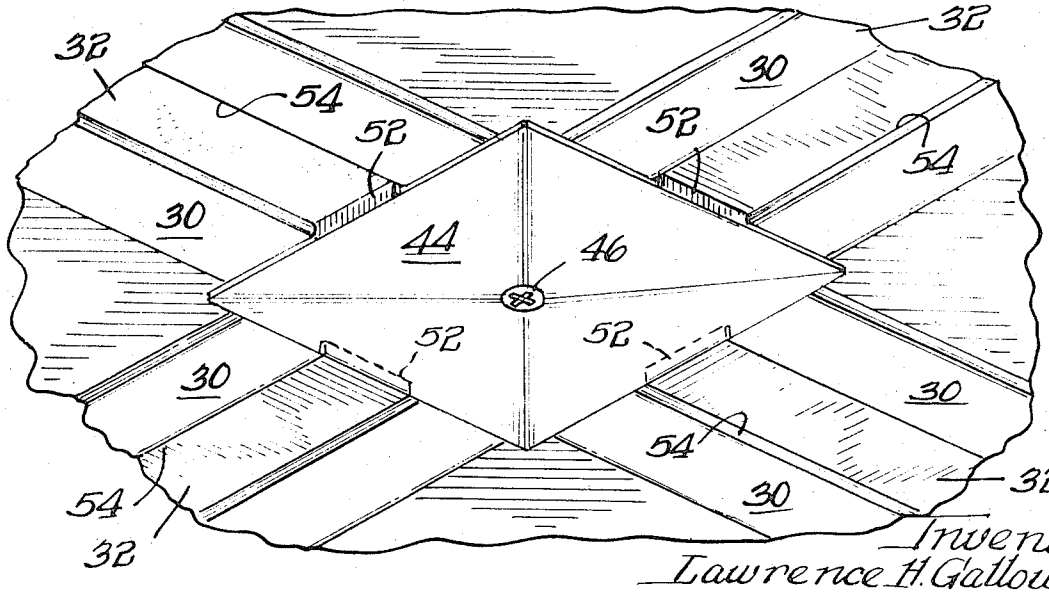


Fig. 7.



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MODULAR CEILING CONNECTOR

SUMMARY OF THE INVENTION

In modern building construction there is a trend toward the installation of ceilings which do more than merely provide an overhead surface. Developments in lighting, air conditioning, etc., are among the factors which have brought about or encouraged the use of a grid type ceiling structure suspended from the roof or truss work by a length of wire. These grid type ceiling systems include a plurality of horizontal steel channels commonly referred to as runners which are disposed at right angles to each other and are interlocked at points of juncture. At the area of juncture or intersection a connector may be used to which the lower extremity of a ceiling suspending wire may be attached. The present invention is concerned with the provision of a novel and very practical modular connector which may be produced at minimum cost.

More specifically, the present invention contemplates an improved modular connector in the form of a one piece sheet metal stamping which is so designed as to readily accommodate the extremities of complementary grid channel members.

It is a further object of the present invention to provide modular connectors of the type referred to above which are structurally arranged so as to greatly facilitate the ease with which the extremities of a grid channel member may be brought into attachment with the connector.

The invention also contemplates a modular connector arrangement having in association therewith a cover member which may be detachably associated with the connector so as to completely conceal structural areas of the connector which might otherwise present a rather unsightly appearance.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a modular connector of the type contemplated by the present invention, shown in association with the extremities of complimentary grid channel members adapted to be accommodated by the connector;

FIG. 2 is a vertical, transverse, sectional view taken substantially along the line 2—2 of FIG. 1;

FIG. 3 is a fragmentary, detailed, sectional view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a fragmentary, detailed, sectional view taken substantially along the line 4—4 of FIG. 2;

FIG. 5 illustrates the manner in which the modular connectors contemplated by the present invention may be readily stacked to facilitate packaging for shipment and the like;

FIG. 6 is a perspective view of the underside of the modular connector and the grid channel members associated therewith prior to the application of a cover member, said cover member being disclosed in readiness for attachment, to the central plate section of the connector by a screw member;

FIG. 7 is a perspective view similar to FIG. 6 disclosing the cover member attached to the underside of the central plate section of the connector; and,

FIG. 8 is an enlarged, fragmentary, sectional view taken substantially along the line 8—8 of FIG. 6, more clearly to illustrate the manner in which the fastening screw is held in association with the cover member.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings more in detail, wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that one embodiment of a modular connector of the type contemplated by the present invention is designated generally by the numeral **10**. The connector **10** is generally cruciform in shape as viewed in plan and includes a central plate section **12** having plate portions **14, 16, 18** and **20**, forming radial continuations of said central plate section. The plate section **12** is preferably formed with a boss or rib **22** to lend lateral strength thereto. Tabs **24** and **26** struck from the central plate section **12** are provided with apertures **24***a* and **26***a*, respectively, to hingedly accommodate hook extremities of a wire member **28**.

The plate portion **14** is provided with a pair of upstanding flanges **14***a* and **14***b*. The flange **14***a* extends along substantially the entire margin of the plate portion **14**, whereas the flange **14***b* is of appreciably reduced length. The plate portion **16** is correspondingly formed with a flange **16***a* and a shorter flange **16***b*. Similarly the plate portions **18** and **20** respectively, support flanges **18***a* and **20***a* which extend over the full length thereof, and opposite flanges **18***b* and **20***b* of reduced length. It will be clear from the foregoing that the various plate and flange portions of the connector **10** may be stamped and formed as a single unit from a metallic sheet with a minimum amount of resulting scrap.

The above described connector **10** is designed to telescopically accommodate grid channel members indicated generally by the numeral **30**. Each channel member or runner **30** includes a bottom or base section **32** and sidewalls **34**. The upper margins of the sidewalls **34** are bent to provide reentrant flanges **36**. The space presented between the flanges **36** and the complementary sidewall **34** is sufficient to snugly accommodate the upper margins of the flanges of the connector **10**.

Each of the sidewalls **34** of the runners **30** is provided with a recess **38**, FIG. **1**, adapted to interlock with abutments **40** struck or sheared from the material of each of the outstanding flanges of the connector **10**, see for example, the flanges **16***a* and **16***b* of the plate portions **16**. Each plate portion and its associated flanges are so proportioned as to telescopically accommodate the extremity of a complementary runner or channel **30**. One of the problems which must be overcome and contemplated in the design of a system of this type is the effect that heat will have on the system in the event of a fire. The runners **30** which are normally formed sheet metal have a tendency when exposed to thermal energy to expand or elongate. The connector **10** is adapted to accept such expansions by the provision of the cam surface of the abutments **40**. When the runners **30** expand, the walls of the recess or aperture **38** will ride up the cam surface and permit the expansion of the runner.

Normally the flanges **34** of the runners **30** are positioned a short distance from the base **12** of the connector and hence the connector will accept such expansions. After a fire, and the resultant contraction of the

runners, the shoulders of the aperture **40** will catch on the inside wall of the recess **38** and maintain the runners in a mounted position.

The bight of the U-shaped wire **28** is attached to the lower extremity of a suspension member or wire **42**, FIG. **2**, the upper extremity of which may be secured to a roof or truss (not shown). Thus, the grid channel members **30** radiate from the connector **10** as clearly shown in FIG. **6**.

In order to afford a trim appearance to the area of juncture of the runners **30**, a cover member **44** is employed. In the disclosed embodiment the cover member **44** is square in shape and centrally carries a fastener screw member **46**. The screw member **46** may be secured against longitudinal dislodgement from the connector **10** by a conical plastic washer member **48** as clearly shown in FIG. **8**. The cover member is preferably dished so that it may be yieldably clamped in position by tightening the screw member **46** within a screw accommodating aperture **50** in the plate section **12**, as shown in FIG. **7**. Lugs or flanges **52** extending axially from intermediate marginal areas of the cover **44** are adapted to fit within longitudinal recesses **54** formed along the underside of each runner **30**. In this manner the cover **44** is secured in a predetermined position of orientation with respect to the runners and positively secured against relative rotation with respect thereto.

From the foregoing it will be apparent that the present invention contemplates a very practical modular type connector for supporting ceiling runners. By having the U-shaped wire members **28** hingedly connected to the tabs **24** and **26** of minimum height, the connectors **10** may be nested for purposes of storage or shipment as illustrated in FIG. **5**. Attention is also directed to the fact that in telescopically associating the extremities of the runners with a companion arm of the connector **10**, the installer is positioned below the connector. To facilitate this manual operation telescopically associating the runners with the connector **10**, the outer edges of all of the connector flanges are tapered as at **14***c*, **16***c*, **18***c* and **20***c* toward the center of the connector. This greatly facilitates the ease with which a workman is able to manually manipulate the runner extremity into initial telescopic association with its complementary connector spoke or arm. It has been found advantageous to have the free or hooked extremities of the U-shaped wire member **28** initially spaced from each other a distance slightly greater than the spacing of the apertures **24***a* and **26***a*. This will require the arms of the U-shaped spring **28** to be forced forward toward each other in order to bring the extremities thereof into registration with said apertures, thereby resulting in a tight fit of the spring extremities within the tabs **24** and **26**. The length of the outer edges of the connector flanges is sufficient to preclude any looseness of fit of the runner, or in other words to prevent rocking of the runner with respect to the connector. By having one of the connector flanges, namely the flanges **14***a*, **16***a*, **18***a* and **20***a*, relatively short as compared with the other flanges it is possible to produce the one piece connector from sheet metal stock with a minimum amount of scrap waste. Also, the connector **10** may be manufactured by the practice of conventional shearing and forming steps thereby enabling a relatively low cost of manufacture.

I claim:

1. A modular connector for horizontal runners of a ceiling grid system, including a central plate section, a plurality of integral arms radiating therefrom, each arm comprising a plate portion forming a continuation of said central plate section, integral flanges extending upwardly from opposite margins of said plate portion, said plate portion and flanges being adapted to telescopically accommodate the extremity of a complementary grid channel member, and means associated with said plate section for accommodating the lower extremity of a vertically disposed grid suspending member said means including a tiltable member adapted to be positioned in substantial parallelism with the plane of the central plate section when occupying an inoperative position whereby to facilitate nesting of said connector with another like connector.

2. A modular connector for horizontal runners of a ceiling grid system as set forth in claim **1**, wherein the tiltable member includes a pair of arms, one extremity of each arm being hingedly coupled with said central plate section, and the opposite extremities of said arms being joined to provide means for accommodating the lower extremity of a vertically disposed grid suspending member.

3. A modular connector for horizontal runners of a ceiling grid system as set forth in claim **1**, wherein the tiltable member consists of a U-shaped length of wire, the free extremities of which are hingedly coupled with said central plate section.

4. A modular connector for horizontal runners of a ceiling grid system, including a central plate section, a plurality of integral arms radiating therefrom, each arm comprising a plate portion forming a continuation of said central plate section, integral flanges extending upwardly from opposite margins of said plate portion, said plate portion and flanges being adapted to telescopically accommodate the extremity of a complementary grid channel member, and means associated with said plate section for accommodating the lower extremity of a vertically disposed grid suspending member said means including a pair of spaced tabs struck from the central plate section, and a U-shaped member hingedly connected at the free extremities thereof with said tabs.

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