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(54) **EXTENDED SHORT SPAN TEE FOR DRYWALL CEILING**

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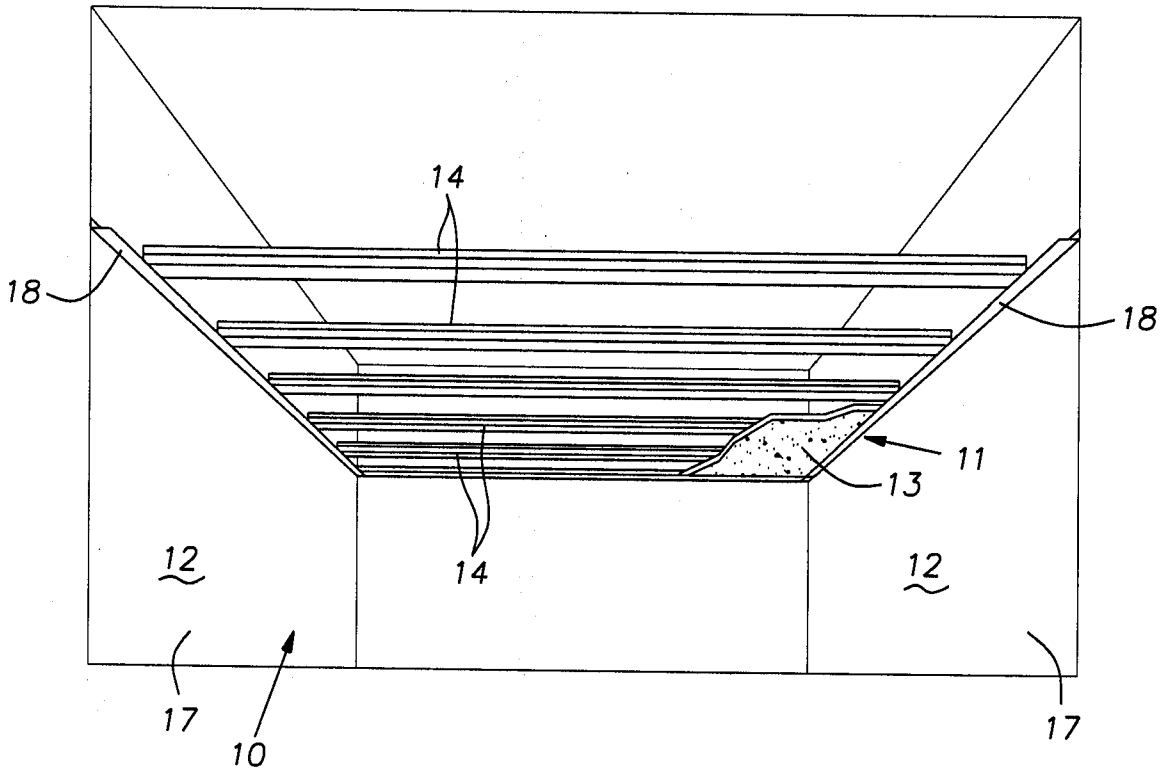
(57) **ABSTRACT**

A short span flat drywall ceiling construction comprising a pair of spaced parallel wall angles facing one another, the wall angles each having a vertical leg secured to vertical support surfaces and a horizontal leg cantilevered from its respective vertical leg towards the other wall angle, a plurality of substantially identical roll-formed sheet metal tees extending between the wall angles and vertically supported thereby, each tee having a main body formed of a single strip of sheet steel, the tee having a horizontal single layer lower flange, a vertical double layer central web disposed above the flange, and a bulb at the top of the web centered on a plane of symmetry, a sheet metal U-shaped reinforcement channel fitted on a central part of the length of the tee such that it is in contact with at least the sidewalls of the bulb.



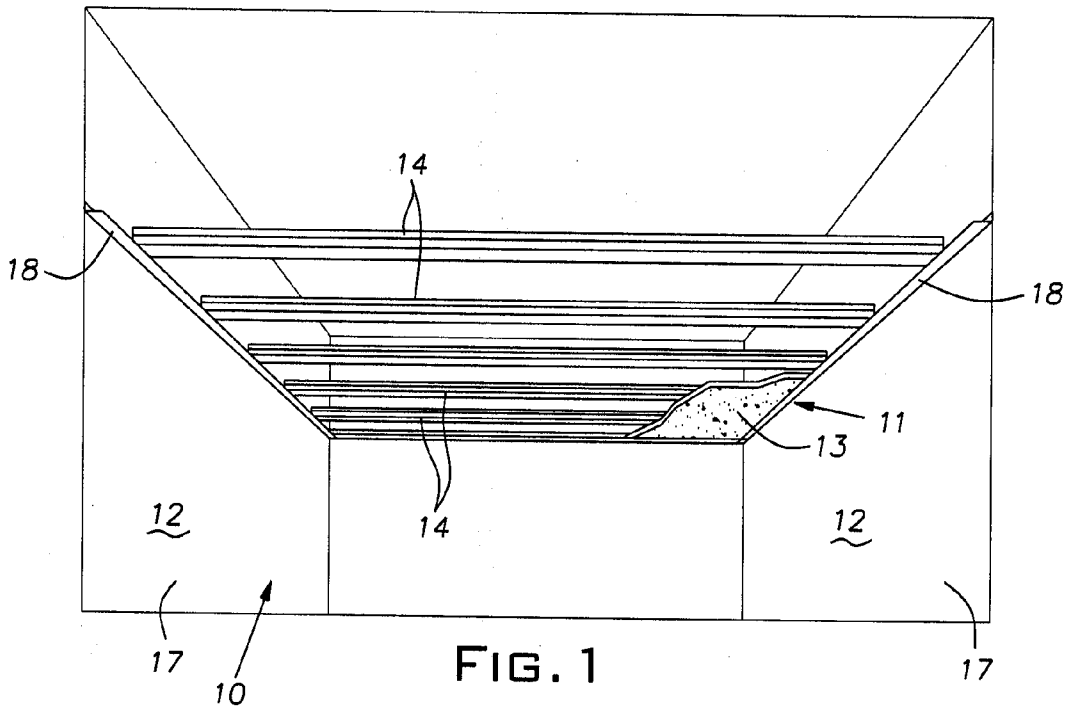


FIG. 1

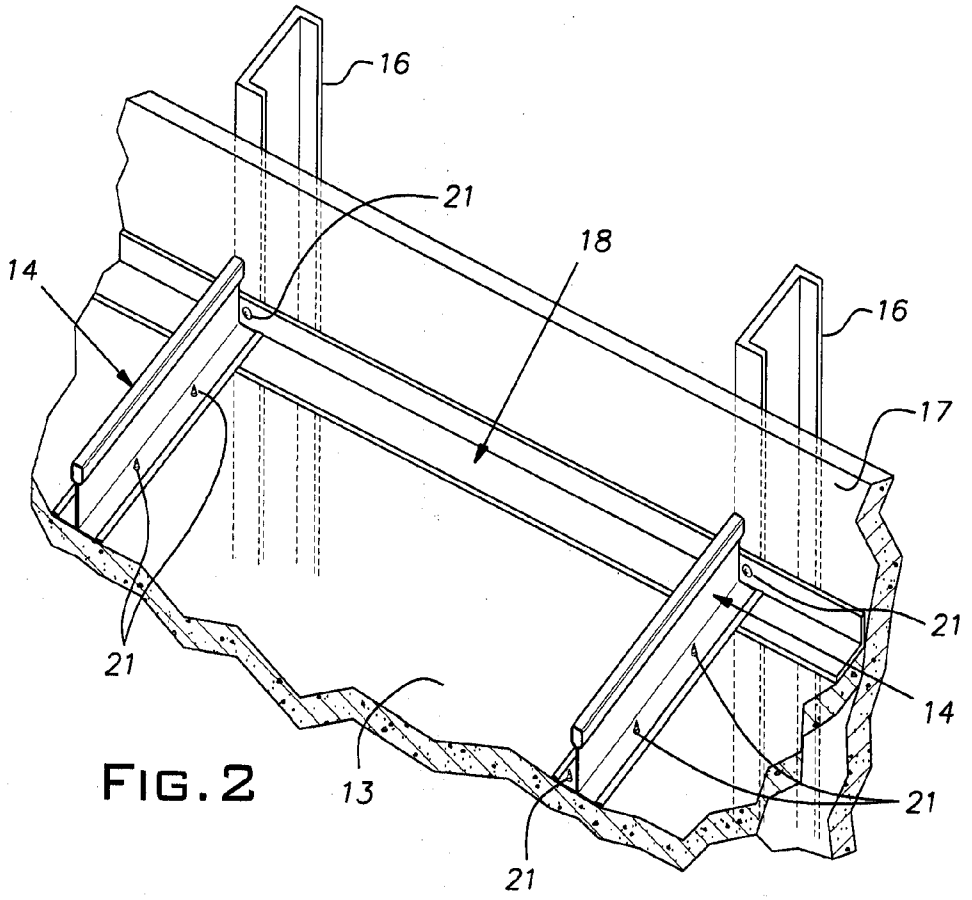


FIG. 2

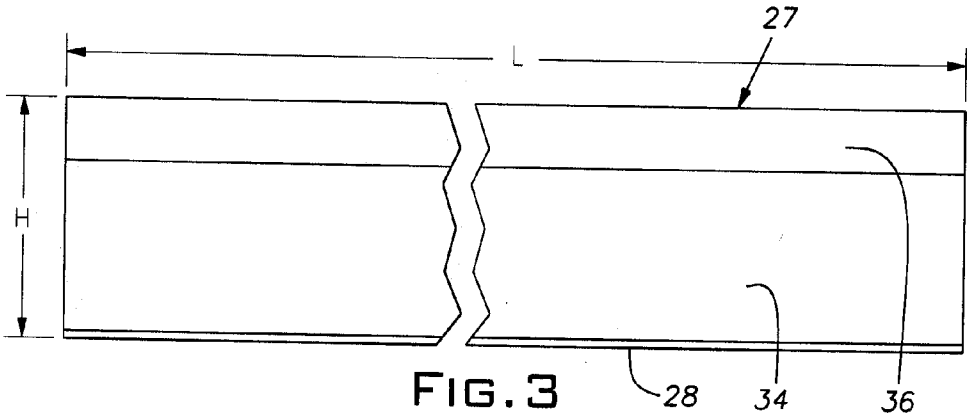


FIG. 3

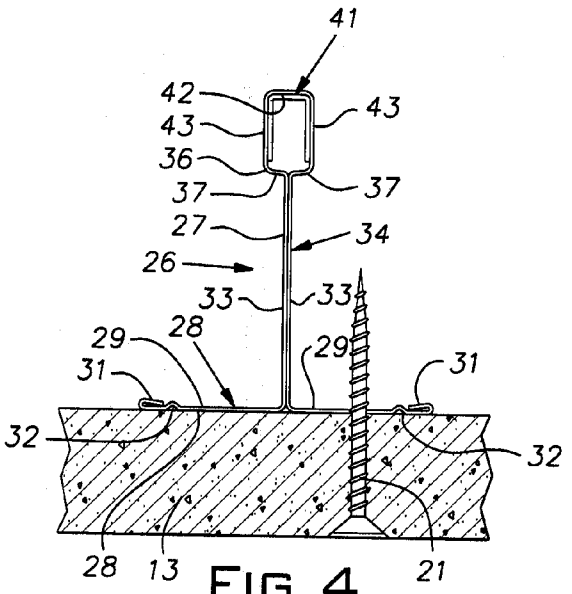


FIG. 4

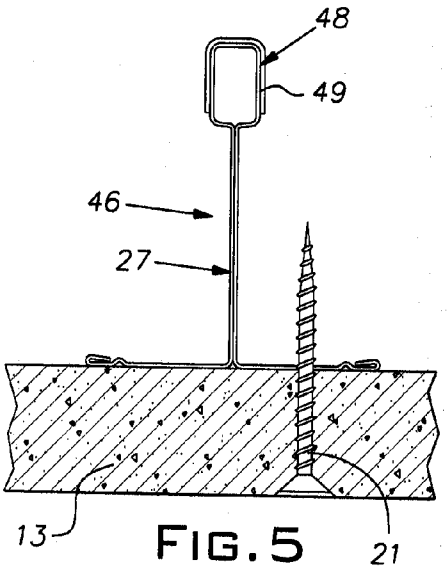


FIG. 5

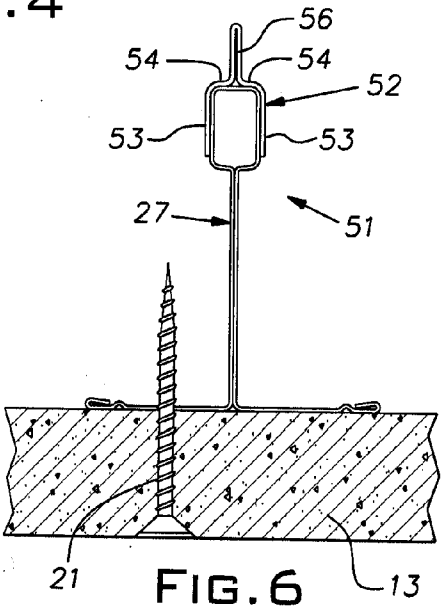


FIG. 6

EXTENDED SHORT SPAN TEE FOR DRYWALL CEILING

BACKGROUND OF THE INVENTION

[0001] The invention relates to building construction and, in particular, to short span flat drywall ceiling construction.

PRIOR ART

[0002] A type of ceiling construction found in commercial buildings involves the use of horizontally spaced inverted metal tees suspended by wires from overlying structure. Sheets of drywall are fastened by screws to these metal tees and then are taped and otherwise finished. Building areas such as corridors, stairwells, landings, and small rooms found in apartments, condominiums, hotels, motels, dormitories, and the like are commonly finished with flat drywall ceilings. These building areas are typically relatively narrow and, therefore, involve a relatively short span from wall-to-wall. In many instances, the space or plenum above the ceiling, especially in corridors and hallways, is occupied by duct work, conduit, and mechanical equipment. The presence of this and like equipment frequently interferes with the installation of suspension wires. As a result, additional layout planning, tradesmen scheduling and, eventually, more labor, is incurred. Frequently, unforeseen physical interference problems add to the cost of construction.

SUMMARY OF THE INVENTION

[0003] The invention involves an improved tee construction that can advantageously be used for supporting flat drywall ceilings in extended "short span" applications. The disclosed tee construction is capable of supporting standard drywall sheets and satisfying applicable building codes while avoiding the need for suspension wires. The tees of the invention are sufficiently rigid to enable them to be supported exclusively at their ends on conventional wall angles. This rigidity avoids the labor of anchoring overhead suspension wires and the problems associated with interference with equipment in the space above the ceiling. The disclosed tees are commercially made with mostly existing technology, tooling, and material stock. Only a limited quantity of extra material is used in the manufacture of the disclosed tee forms of the invention.

[0004] More specifically, standard drywall tees are effectively rigidified by increasing their section modulus with a channel sized to closely fit with the standard reinforcing bulb provided at the top of the inverted standard drywall tee form. The resulting tee, in accordance with the invention, is familiar in form and size. The relatively low profile or height of the inventive tee affords full utilization of the space above the ceiling for free placement of utilities, duct work and like equipment without the need to leave clearance for suspension wires or to improvise and fabricate custom anchor points for the suspension wires. The freedom to use the full space of the plenum and not be hindered by suspension wires or supplemental brackets or supports is an important feature. This freedom is in addition to the basic cost savings obtained by eliminating the need for locating, installing, and tying off suspension wires.

[0005] The disclosed tee construction of the invention retains the benefit of a relatively light gauge tee body material and a single wall flange thereby affording easy and reliable penetration by self-drilling drywall screws.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** is an isometric schematic view of an extended short span flat drywall ceiling;

[0007] FIG. **2** is a fragmentary isometric view of the ends of the tees of the invention and their relation to a wall angle;

[0008] FIG. **3** is a diagrammatic illustration of the height-to-length ratio of the tee of the invention;

[0009] FIG. **4** is a fragmentary cross-sectional view of a first embodiment of the tee of the invention;

[0010] FIG. **5** is a fragmentary cross-sectional view of a second embodiment of the tee of the invention; and

[0011] FIG. **6** is a fragmentary cross-sectional view of a third embodiment of the tee of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012] FIG. **1** illustrates a corridor, hallway or other building area **10** characterized by a relatively short span ceiling structure **11** between opposing walls **12** and finished with a flat drywall surface. The term "flat" means that the drywall sheets are installed in a flat plane although their finished lower sides may be textured as is customary. Only a fragmentary area of the drywall **13** of the ceiling structure **11** is shown to reveal the arrangement of a plurality of tees **14** supporting the ceiling drywall.

[0013] The opposed walls **12** can be of any suitable construction. In reference to FIG. **2**, the illustrated walls **12** are constructed of vertical sheet metal studs **16** on which are hung drywall sheets **17**. It will be seen that the opposite wall assemblies formed by the studs **16** and drywall **17** serve as the vertical supports for the ceiling structure **11**.

[0014] The ceiling structure **11** comprises a wall angle **18** on each of the opposed walls **12**, support tees **14** extending between the wall angles, and drywall sheets **13** screwed to the lower sides of the tees. The wall angles **18** are conventional elements preferably formed from knurled or dimpled sheet metal strips and are nominally 1" high by 1½" wide or metric equivalents, and of, for example, a nominal gauge of 0.020 inch thickness. The wall angles **18**, typically, are secured to the walls **12** with self-drilling drywall screws **21** driven through the drywall sheets **17** into the studs **16**.

[0015] FIG. **4** illustrates a first embodiment of a tee **26** in cross-section. The tee has a main body **27** roll-formed of a single strip of sheet metal. The strip is, for example, relatively light gauge stock being about 0.018" galvanized (G40) hot-dipped steel (HDG). The form of the tee main body **27** is conventional. At the lower side, the tee main body **27** includes a single layer horizontal flange **28** comprising oppositely extending parts **29**. Distal edges of the flange parts **29** have hems **31** folded over their upper sides. Adjacent and parallel to their distal edges, the flange parts **29** have small grooves **32** that serve to restrain screws from "skating" laterally off of the lower face of the flange **28** when being screwed into the flange. Additionally, the lower face of the flange **28** can be knurled, as is known, to stabilize a screw tip and further prevent it from skating across this lower flange face. At their proximal edges, the flange parts **29** merge integrally with respective layers **33** of a double layer or double wall vertical web **34**. The web layers **33** are fixed together by a suitable fastening process such as the stitching technique shown in

U.S. Pat. No. 6,047,511, clinching as shown in U.S. Pat. No. 6,041,564, or by welding, adhesives, or other known expedient. The web layers **33**, at their upper edge, merge integrally with a hollow reinforcing bulb **36**. More specifically, the web layers **33** join lower sides **37** of the bulb **36**. In the illustrated example, the lower sides **37** of the bulb **36** are nearly horizontal, being nominally about **5** degrees off true horizontal. The bulb **36** is generally rectangular in cross-sectional shape. By way of example, the flange **28** from edge-to-edge can extend nominally 1½" and the height of the tee main body **27** from the bottom face of the flange **28** to the top face of the bulb can be nominally 1⅝", or metric equivalents.

[0016] A roll-formed sheet steel inverted channel **41** is closely fitted and assembled in the interior of the bulb **36**. The material of the channel **41** can be slightly heavier in gauge than the tee main body **27**. For example, the stock forming the channel **41** can be a nominal minimum of 0.024" thick. Ideally, a bight **42** of the channel **41** abuts the upper wall of the bulb **36**. The channel **41** ordinarily will run from end-to-end of the tee main body **27**. The channel **41** can be locked in the illustrated position by appropriately punching or piercing the sidewalls, designated **43** of the bulb **36** at spaced locations along the length of the main tee body **27**.

[0017] FIG. **3** diagrammatically illustrates the relative geometry of the tee **26** formed by the main body **27** and the channel insert **41**. The height "H" of the tee main body **27** is nominally 1⅝" and the length of the tee **26** will be between about 7' and about 8½' to about 9', for example. It has been projected that a length greater than a dimension between about 9' to about 9½' would require an amount of additional channel stock which would make the disclosed tee construction uneconomical. The tee **26** ordinarily obtains its vertical support solely at its ends from reaction forces developed by the wall angles **18**. That is, the tees **26** are sufficiently rigid to be devoid of any vertical support along the entire span between the wall angles **18**. This capability eliminates the labor and materials attendant with hanging suspension wires from overhead structures and leaves the full space above the tees **26** available for building equipment. In FIG. **3**, the length L denotes the length of the tees.

[0018] FIG. **4** shows the relationship of a sheet **13** of drywall and a typical tee. By way of example, the drywall sheet **13** is illustrated as ⅝" thick; where appropriate ½" thick drywall can be similarly used. As is customary, a plurality of self-drilling drywall screws **21** secure the drywall sheet **13** to the bottom of the tee flange **28**. The single wall light gauge character of the tee main body **27** is of great advantage over heavier gauges or double-layer flanges because it is relatively easy to pierce this stock with a common, commodity quality self-drilling drywall screw.

[0019] FIG. **5** illustrates a second embodiment of a tee **46** in cross-section. A tee main body can be identical to the tee main body **27** disclosed in connection with FIGS. **1-4**. In the tee **46** of FIG. **5**, an inverted channel **48** is fitted, cap-like, over the reinforcing bulb **36**. Channel **48** is preferably roll-formed from a strip of sheet steel of a gauge somewhat heavier than the gauge of the main tee body **27**. The channel gauge can be nominally a minimum of 0.024", for example. The channel **48** includes a pair of sides **49** proportioned to closely abut the sides of the hollow reinforcing bulb **36** and to extend vertically over a major portion of the vertical height of the bulb. The channel **48** is rigidly fixed in place on the main body by appropriate staking, piercing, riveting, welding, or the like. The length of the channel **48** need not extend the full length of the main tee body **27** and can, for example, be half or more in length as the length of the tee main body and be centered lengthwise over the tee main body.

[0020] FIG. **6** illustrates yet another embodiment of an extended short span tee **51**. The tee **51** utilizes the tee main body **27**, referenced in connection with FIGS. **1-5**, and a unique inverted ribbed channel **52**. The channel **52**, like the earlier described channels **41**, **48** is, ideally, a one-piece or integral roll-formed sheet steel strip preferably of a nominal gauge heavier than that of the tee main body **27** such that it has a nominal minimal thickness of 0.024", for example. The channel has vertical depending legs **53**, horizontal webs **54** and an upstanding double wall central flange or rib **56**. Preferably, the height of the rib above the bulb **36** is at least one-half the height of the sidewalls **43** of the bulb. The webs **54** bridge the distance between the legs **53** and the rib **56**. The channel **52** is shaped to cause the legs **53** to abut the sides of the bulb **36**. The legs **53** cover a substantial portion of the height of the bulb sides. The channel **52**, like the channel **41** of FIG. **5**, need not extend along the full length of the tee main body **27** and can be about half as long as the tee main body and be centered on its length. The channel **52** is fixed in position in the same manner as described in connection with the channel **41** of FIG. **5**. The rib or flange **56** adds significantly to the rigidity of the tee **51** in a vertical plane.

[0021] While the invention has been shown and described with respect to particular embodiments thereof, this is for the purpose of illustration rather than limitation, and other variations and modifications of the specific embodiments herein shown and described will be apparent to those skilled in the art all within the intended spirit and scope of the invention. Accordingly, the patent is not to be limited in scope and effect to the specific embodiments herein shown and described nor in any other way that is inconsistent with the extent to which the progress in the art has been advanced by the invention.

What is claimed is:

1. A short span flat drywall ceiling construction comprising a pair of spaced parallel wall angles facing one another, the wall angles each having a vertical leg secured to vertical support surfaces and a horizontal leg cantilevered from its respective vertical leg towards the other wall angle, a plurality of substantially identical roll-formed sheet metal tees extending between the wall angles and vertically supported thereby, each tee having a main body formed of a single strip of sheet steel, the tee having a horizontal single layer lower flange, a vertical double layer central web disposed above the flange, and a bulb at the top of the web centered on a plane of symmetry, the bulb having a pair of opposed generally vertical walls each spaced from the plane of symmetry, a top bridging a space between the vertical walls and a bottom that merges with the double layer of the web, a sheet of drywall secured against lower faces of the tees with screws driven through the drywall into the flanges of the tees, a sheet metal U-shaped reinforcing channel fitted on a central part of the length of the tee such that it is in contact with at least the sidewalls of the bulb, the nominal height of the main body of the tees being between about 1½" to about 1⅝", the length of the tees being between preferably about 7' to preferably between about 8½' to about 9' long.

2. A ceiling construction as set forth in claim **1**, wherein the reinforcing channel is on the inside of the bulb and runs the full length of the tee.

3. A ceiling construction as set forth in claim **1**, wherein said reinforcing channel is fixed to the outside of the bulb.

4. A ceiling construction as set forth in claim **3**, wherein said channel has a central rib extending above the bulb.

5. A ceiling construction as set forth in claim **4**, wherein the bulb has a vertical height, the central web of the reinforcing channel extends above the bulb a distance at least half the height of the bulb.

6. A ceiling construction as set forth in claim **1**, wherein the tees are spaced from one another a nominal distance of 16" or 24" or metric equivalent.

7. An extended short span tee for constructing flat drywall ceilings, the tee being roll-formed from two strips of steel sheet and being symmetrical about a central vertical plane, a first of said strips forming a single layer horizontal lower flange, a double wall central vertical web and a hollow upper reinforcing bulb, the reinforcing bulb being generally rectangular in cross-section with generally vertical sidewalls, the second strip being formed into an inverted U-shaped channel with a pair of vertical sidewalls and a horizontal web, the channel sidewalls being proportioned to abut the sidewalls of the reinforcing bulb, the first strip of the tee having a length of between about 7' and about 9' or metric equivalent.

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