April 24, 1962 D. W. BIGELOW 3,030,670

CEILING CONSTRUCTION

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FIG. 1

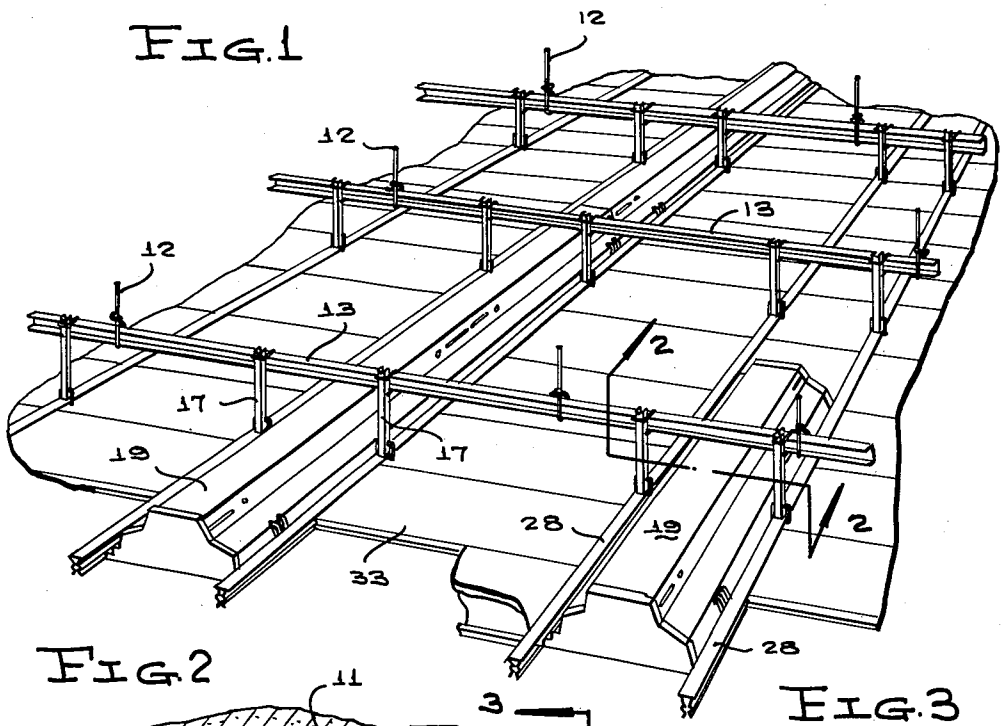


FIG. 2

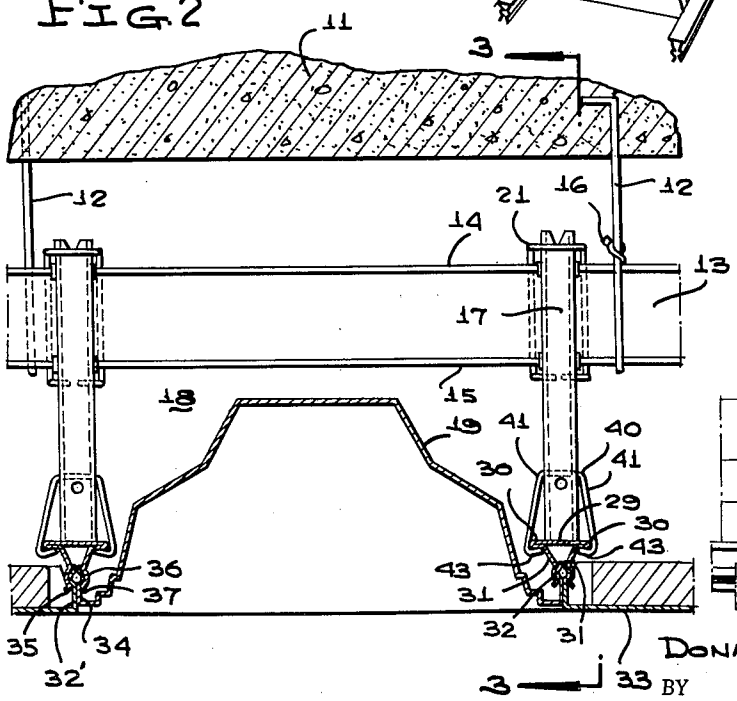
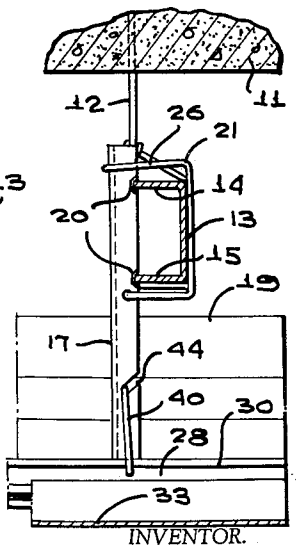


FIG. 3



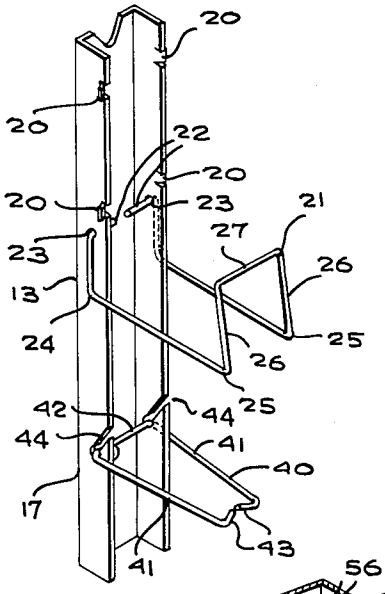
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FIG. 4



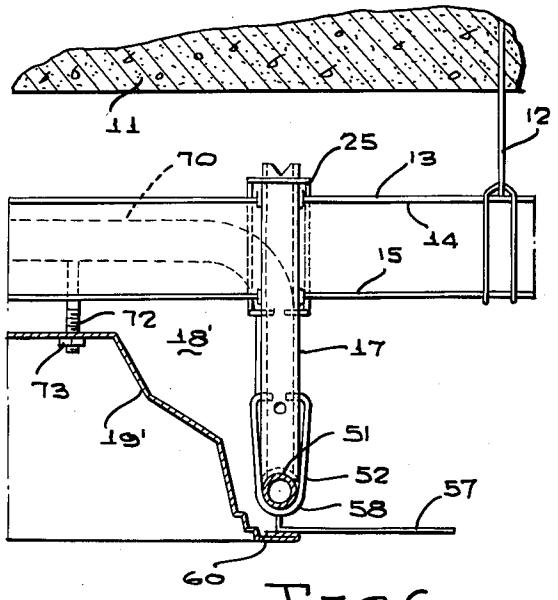


FIG. 6

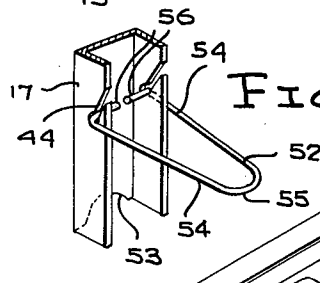
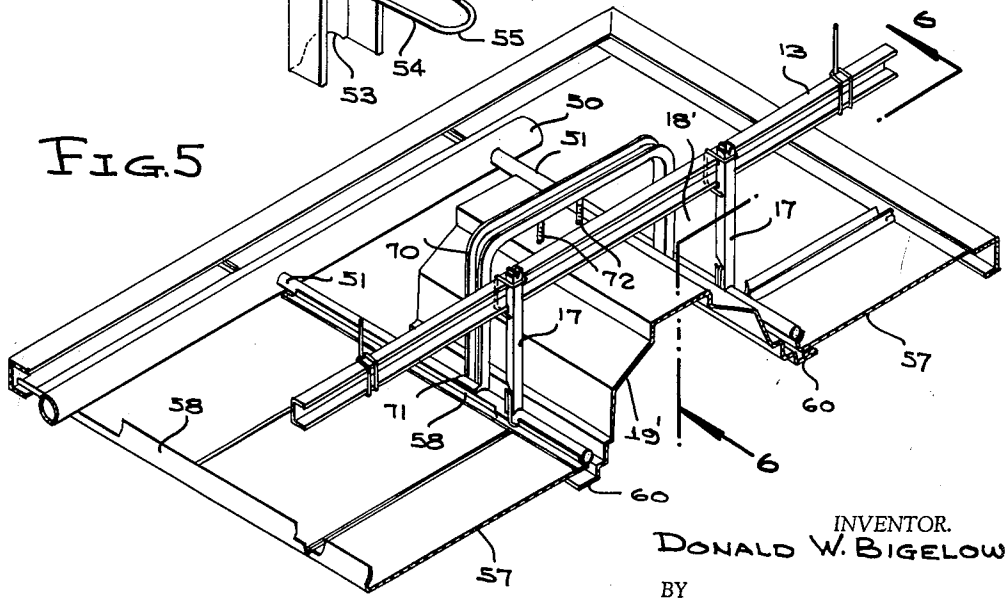


FIG. 7

FIG. 5



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CEILING CONSTRUCTION

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3 Claims. (Cl. 20—4)

This invention relates to building structures, and more particularly to an improved ceiling construction especially adapted to receive lighting fixtures of the recessed type.

The main object of the invention is to provide a novel and improved ceiling construction which involves simple components, which is easy to install, and which provides clearance for the mounting therein of recessed lighting fixtures without the necessity of cutting away any of the ceiling structure.

A further object of the invention is to provide an improved ceiling construction especially adapted to receive lighting fixtures of the recessed type, the construction involving inexpensive components, being arranged so that ceiling tiles or similar ceiling elements may be rapidly and easily installed, and being useful with various other types of ceilings, including plastered ceilings.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a fragmentary perspective view showing a ceiling structure constructed in accordance with the present invention.

FIGURE 2 is an enlarged vertical cross sectional view taken on the line 2—2 of FIGURE 1.

FIGURE 3 is a vertical cross sectional view taken on the line 3—3 of FIGURE 2.

FIGURE 4 is an enlarged perspective view of one of the hanger bars employed in the ceiling structure of FIGURES 1 to 3.

FIGURE 5 is a fragmentary perspective view showing the manner in which the ceiling structure of the present invention may be adapted for use with tubular ducts forming part of a radiant heating or a fluid-type cooling system mounted in a ceiling.

FIGURE 6 is an enlarged vertical cross sectional view taken on the line 6—6 of FIGURE 5.

FIGURE 7 is a fragmentary perspective view showing a modified form of bottom clip employed with a hanger bar in the form of construction shown in FIGURES 5 and 6.

Referring to the drawings, and more particularly to FIGURES 1 to 4, 11 designates the usual top supporting structure provided in a building, for example, a horizontal concrete beam or similar member, from which a ceiling is to be suspended. Embedded in the supporting structure 11 and depending therefrom are a plurality of ceiling-supporting rods 12, said rods being arranged in suitable rows, as is clearly illustrated in FIGURE 1.

Fastened to and supported by the rods 12 are a plurality of spaced parallel horizontal channel-shaped runner bars 13, said runner bars being arranged with their flanges 14 and 15 extending horizontally, as is clearly shown in FIGURES 2 and 3.

The supporting rods 12 may comprise lengths of relatively heavy wire looped around the runner bars 13 and secured thereto by knotting the ends of the wire-like members 12 to the shank portions thereof above the top flanges 14 of the runner bars 13, as shown at 16 in FIGURE 2.

Secured to the runner bars 13 and depending therefrom are spaced vertical, channel-shaped hanger bars 17 said hanger bars being arranged in pairs aligned transversely with respect to the runner bars 13, as shown in FIGURE 1 the pairs of hanger bars 17, 17 being spaced

apart by equal distances along the parallel runner bars 13, 13 to define transversely aligned spaces 18 adapted to receive elongated lighting fixture troughs 19 for recessed lighting fixtures.

As shown in FIGURES 3 and 4, the top portions of the hanger bars 17 are formed with vertically spaced pairs of notches 20, 20 in the edges of their flanges adapted to receive the edges of the respective horizontal flanges 14 and 15 of the runner bars 13. Resilient wire clips 21 are pivotally engaged on the upper portions of the hanger bars 13, said clips being generally U-shaped and being formed with opposing inturned aligned pivot elements 22, 22 engaged through apertures 23 provided in the side flanges of the hanger bars, the side arms of the clip members 21 being formed with right-angled bends 24 adjacent the pivoted ends thereof, as shown in FIGURE 4. The side arms of the clip members are formed with additional bends 25, 25, defining the relatively short arms 26, 26 integrally connected with the bight portions 27 thereof. As shown in FIGURE 3, the bends 25 define angles slightly less than 90 degrees. However, the arms 26, 26 are sufficiently flexible to allow the bight portion 27 of each clip member 21 to be engaged over the top end of the associated hanger bar 17 with the associated channel-shaped runner bar 13 received within the clip member with the edges of its flanges 14 and 15 engaged in the notches 20 of the hanger bar in the manner illustrated in FIGURE 3.

As will be readily apparent, the hanger bars 17 may be readily attached to the runner bars 13 by engaging the notches 20 of the hanger bars with the top and bottom flanges of the runner bars and then rotating the clip members 21 from the positions thereof shown in FIGURE 4 to the positions illustrated in FIGURE 3, the bight portion 27 being engaged over the top end of the associated hanger bar 17 and the top portion of said hanger bar being received between the side arms 26, 26, to clamp the hanger bar to the associated runner bar 13 as illustrated in FIGURE 3.

Respective ceiling tile supporting strips 28 are disposed beneath and secured to the bottom ends of the transverse rows of hanger bars 17. Thus, the strips 28 are of conventional construction and comprise members of generally triangular cross sectional shape having horizontal top walls 29 and being bent to define opposite top flanges 30, 30 and downwardly convergent side walls 31, 31, as shown in FIGURE 2. The lower portions of the side walls 31, 31 are formed with opposing rounded channels 32, 32, said side walls 31 being yieldable and being adapted to allow the engagement of the upstanding vertical flange portions 32′ of conventional ceiling tile members 33 to be received between the channels 32, 32. The lighting fixture troughs 19 are likewise formed with upstanding side flanges 34 adapted to be received between the locking channels 32, 32 of the supporting strips 29. The flanges 32′ and 34 are formed with locking corrugations 35 and 36 which are received between the locking channels 32, 32 of the supporting strips 28 and are interlocked therewith and clamped in opposing relationship so that the flanges 32′ and 34 are clamped together by the strips 28, thus supporting both the trough members 19 and the ceiling tile members 33.

The bottom margins of the side walls 31, 31 of the strips 29 are curved outwardly, as shown at 37, to facilitate the insertion therebetween of the locking corrugations 35, 36 of members 33 and 19.

The ceiling tile-supporting strips 28 are secured to the bottom ends of the hanger bars 17 by generally U-shaped wire clip members 40. The clip members 40 comprise flexible side arms 41, 41 integrally connected by a transversely extending bight member 42, said side arms being formed at their outer ends with inturned opposing lugs

43, 43. The bight portion 42 is engaged through respective parallel upwardly inclined open-ended slots 44, 44 formed in the side flanges of the associated hanger bar 17, the lower ends of the slots being rounded to define bearings for the corners of the clip members 40. The arms 41, 41 are of sufficient length so that the lugs 43, 43 will engage beneath the respective flange elements 30, 30 of a tile-supporting strip 28 when the top wall 29 thereof is engaged against the bottom end of the hanger bar. Thus, the arms 41, 41 are flexed outwardly so that the lugs 43, 43 may engage beneath the flanges 30, 30 and grip same in the manner illustrated in FIGURE 2, whereby to securely fasten the supporting strips 28 in abutment with the bottom end of the hanger bar 17.

As will be readily apparent, the supporting strips 28 may thus be rapidly fastened to the bottom ends of the hanger bars 17 and may be thus secured in transverse vertically spaced relation to the parallel runner bars 13, as illustrated in FIGURE 1, whereby recessed lighting fixture members 19 may be engaged between the spaced pairs of ceiling tile supporting strips 28, 28, and whereby ceiling tile members 33 may be engaged between the outside strips 28 of said spaced pairs.

It will be further apparent that the recessed lighting fixtures 19 may be located in any desired position since the hanger bars 17 may be adjusted along the runner bars 13. It will be further apparent that the lighting fixtures may be installed without the necessity of cutting away any of the ceiling supporting structure, as has been required heretofore in installing lighting fixtures of the recessed type.

Referring now to the modification illustrated in FIGURES 5, 6 and 7, 50 designates one of the side headers of a radiant heating ceiling grid, the headers being connected by transverse tubular branch members 51. The grid may be supported from the runner bars 13 by the hanger bars 17 in the manner illustrated in FIGURES 5 and 6 by providing the hanger bars 17 with the generally U-shaped wire supporting slings 52 adapted to supportingly engage around the branch conduits 51 and clamp same to the bottom ends of the hanger bars. The hanger bars are formed with arcuate notches 53 at their bottom ends adapted to receive the tubular branch members 51. The sling members 52 comprise flexible side arms 54, 54 connected by an arcuate bight portion 55. The side arms 54, 54 are formed at their free ends with opposing inturned pivot lugs 56, 56 which are engageable in the inclined slots 44, as shown in FIGURE 7. The side arms 54 are of sufficient length to clamp the tubular members 51 against the bottom ends of the depending hanger bars 17 with said tubular members 51 received in the arcuate notches 53, whereby to securely fasten the members 51 to the bottom ends of the hanger bars 17.

The respective lighting fixture troughs, such as the troughs 19' shown in FIGURE 5 are received in the spaces 18' defined between the hanger bars 17, without the necessity of cutting away any of the ceiling supporting structure. The ceiling tile elements, shown at 57, are formed at their side edges with suitable concave, upstanding locking flanges 58 lockingly engageable with the successive pairs of tubular branch conduits 51 of the radiant heating grid, and the recessed lighting fixture troughs 19' are secured to the bight portions of supporting yokes 70 which are, in turn, supported on the tubular members 51. Thus, the yokes 70 as shown in FIGURE 5, are of sufficient length to extend between a pair of adjacent members 51 and are provided at their ends with arcuate flanges 71 supportingly engageable on said tubular members 51. Each yoke 70 has a pair of studs 72, 72 depending from its bight portion which pass through apertures in the top wall of the trough 19' and which are provided with suitable nuts 73, as shown in FIGURE 6, for supporting the trough. The lighting fixture troughs 19' are provided with horizontal outwardly extending bottom flange elements 60, 60 which underlie the side margins of the ceiling tile elements 57 and which are clamped thereagainst when the nuts 73 are tightened. Alternatively, the troughs may be provided with arcuate flanges similar to the flanges 58 on the tile elements, to engage the bottom surface of the tubular members 51 instead of the side margins of the adjacent ceiling tiles 57.

As will be readily understood, the hanger bars 17 may be employed to support any type of ceiling tile-supporting framework, and may be employed to support ceiling tile-supporting strips of any desired design, the invention not being limited to the specific design employed in the structure illustrated in FIGURES 1 to 4.

While certain specific embodiments of an improved ceiling structure have been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitation be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a ceiling, a top supporting structure, a plurality of spaced parallel horizontal channel-shaped runner bars suspended from said supporting structure and having vertically spaced top and bottom flanges extending horizontally, vertical channel-shaped hanger bars formed at the top portions of the edges of their side flanges with vertically spaced notches receiving the edges of said first-named top and bottom flanges, respective generally U-shaped resilient wire clips formed with inturned ends pivotally engaged in the side flanges of the hanger bars and having side arms extending around the runner bars and having resilient bight portions engaged over the top end portions of the hanger bars, securing the hanger bars in depending vertical relation to said runner bars, said hanger bars being arranged in spaced rows extending transverse to said runner bars, and supporting strips disposed beneath and secured to the bottom ends of the transverse rows of hanger bars, said strips being spaced sufficiently to receive a recessed lighting fixture therebetween.

2. In a ceiling, a top supporting structure, a plurality of spaced parallel horizontal channel-shaped runner bars suspended from said supporting structure and having vertically spaced top and bottom flanges extending horizontally, vertical channel-shaped hanger bars formed at the top portions of the edges of their side flanges with vertically spaced notches receiving the edges of said first-named top and bottom flanges, respective generally U-shaped resilient wire clips formed with inturned ends pivotally engaged in the side flanges of the hanger bars and having side arms extending around the runner bars and having resilient bight portions engaged over the top end portions of the hanger bars, securing the hangar bars in depending vertical relation to said runner bars, said hanger bars being arranged in spaced rows extending-transverse to said runner bars, supporting strips disposed beneath the bottom ends of said hanger bars, and clip means connected to the lower portions of said hanger bars and supportingly engaging and securing said supporting strips to said bottom ends, said strips being spaced sufficiently to receive a recessed lighting fixture therebetween.

3. In a ceiling, a top supporting structure, a plurality of spaced parallel horizontal channel-shaped runner bars suspended from said supporting structure and having vertically spaced top and bottom flanges extending horizontally, vertical channel-shaped hanger bars formed at the top portions of the edges of their side flanges with vertically spaced notches receiving the edges of said first-named top and bottom flanges, respective generally U-shaped resilient wire clips formed with inturned ends pivotally engaged in the side flanges of the hanger bars and having side arms extending around the runner bars

and having resilient bight portions engaged over the top end portions of the hanger bars, securing the hanger bars in depending vertical relation to said runner bars, said hanger bars being arranged in spaced rows extending transverse to said runner bars, supporting strips disposed beneath the bottom ends of said hanger bars, said hanger bars being formed at their lower portions with upwardly and outwardly inclined notches, and clip means supportingly engaged in said last-named notches and supportingly engaging and securing said supporting strips to said bottom ends, said strips being spaced sufficiently to receive a lighting fixture therebetween.

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