June 17, 1958 J. W. POTTER 2,838,832

METHOD OF INSTALLING FIXTURE HANGERS ON A CEILING STRUCTURE

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FIG.1.

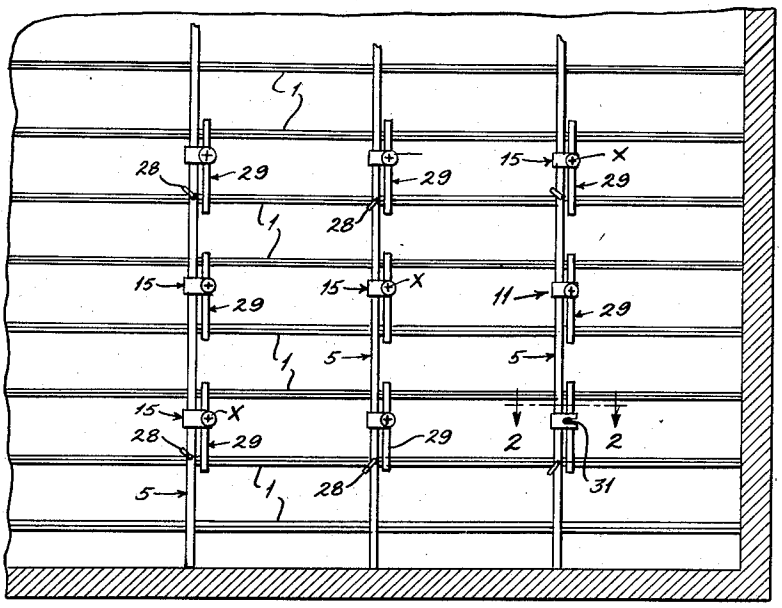

FIG.2.

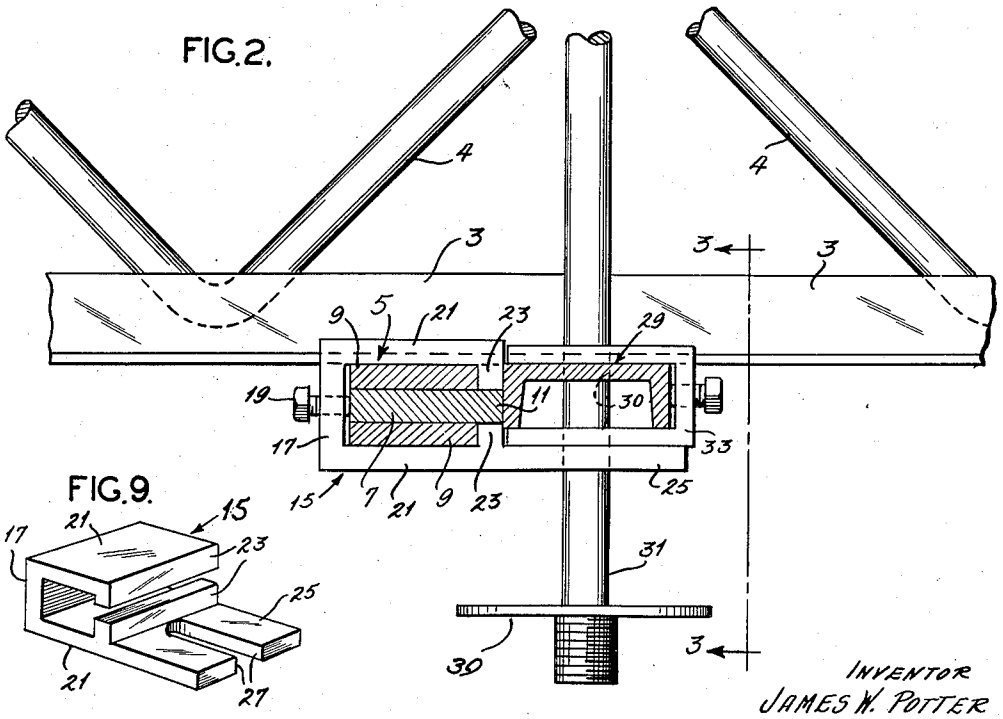

FIG.9.

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FIG. 3.

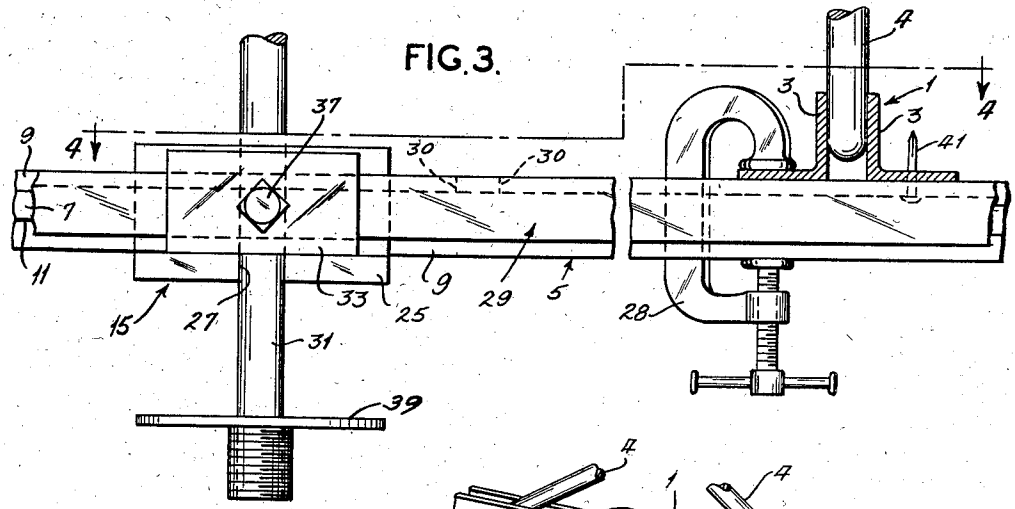

FIG. 5.

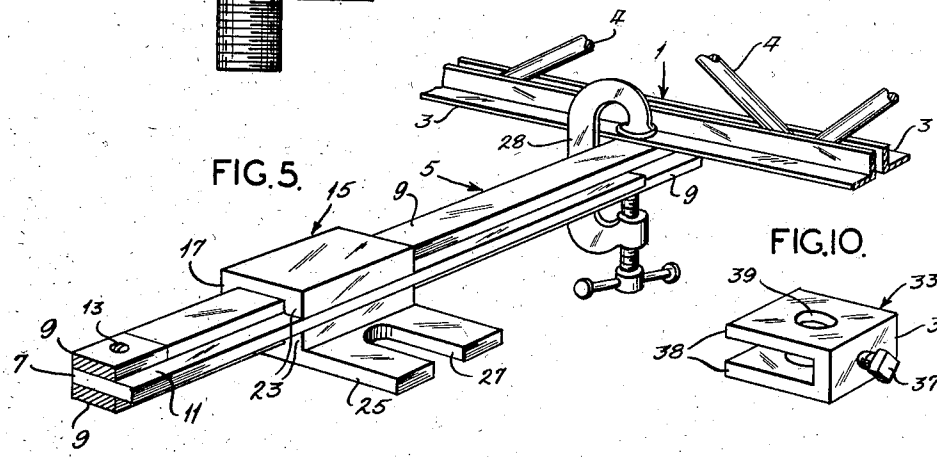

FIG. 10.

FIG. 4.

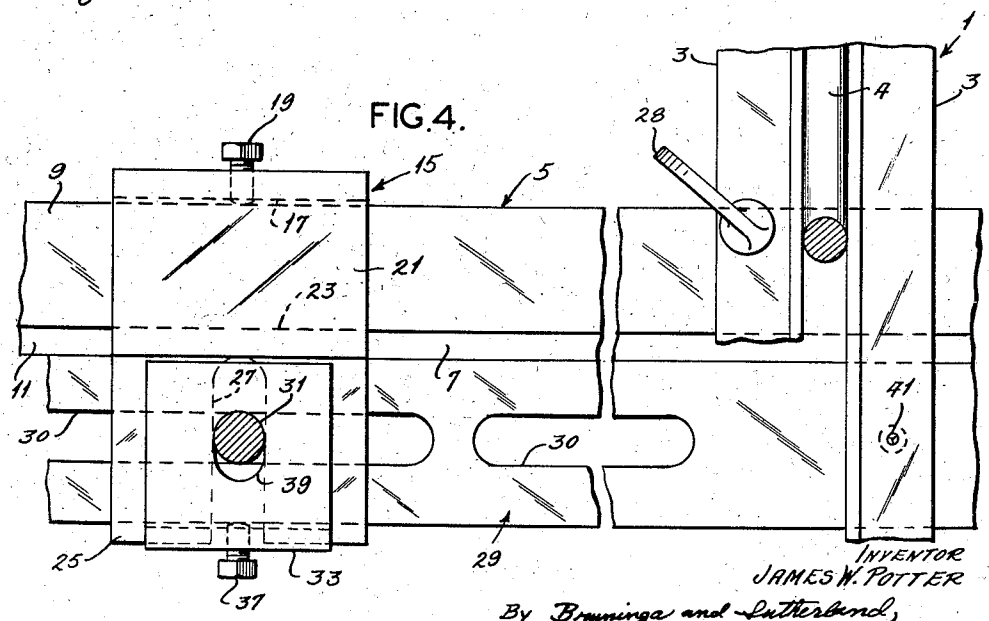

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FIG.6.

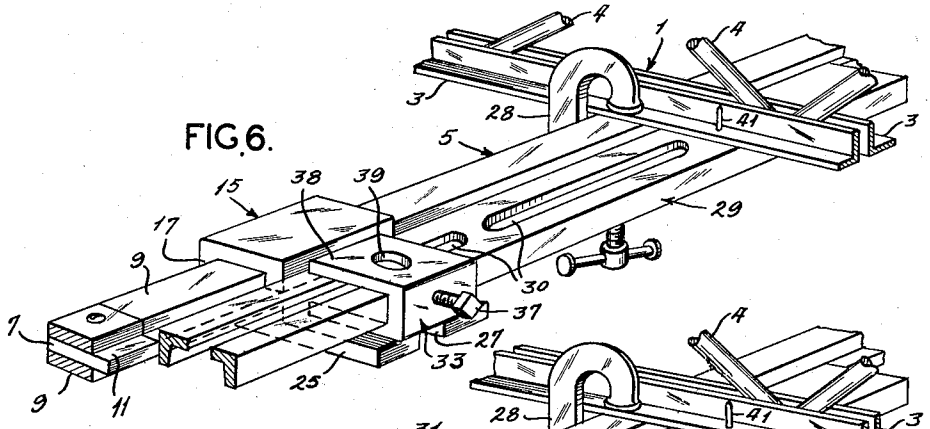


FIG.7.

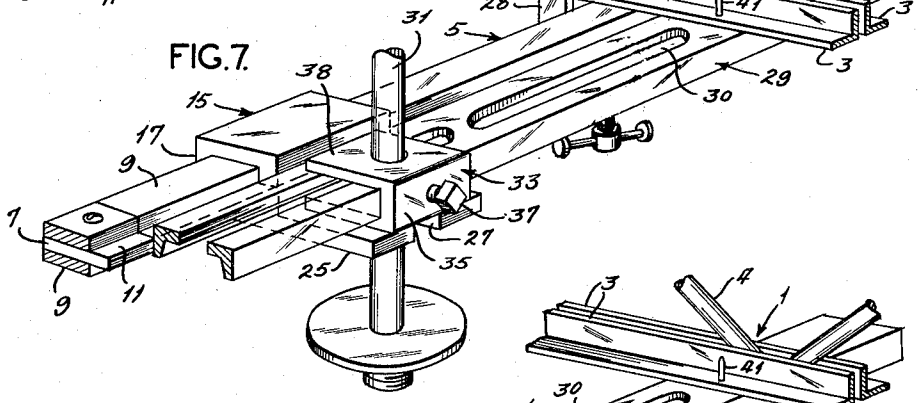


FIG.8.

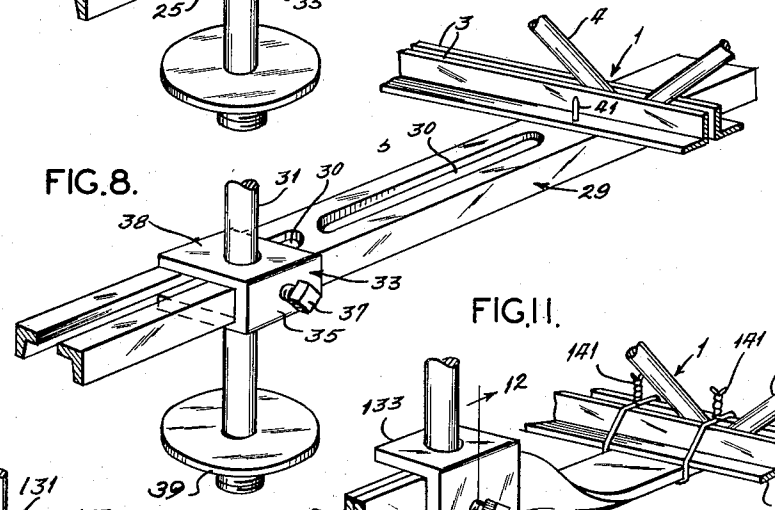


FIG.11.

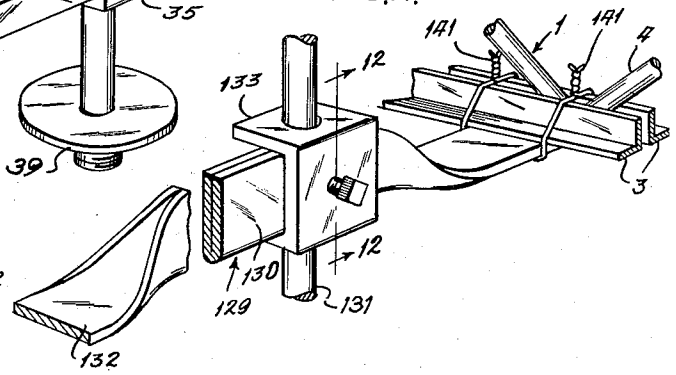
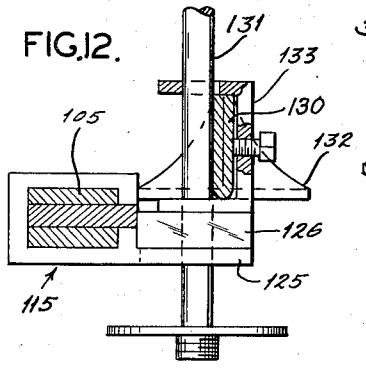


FIG.12.



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METHOD OF INSTALLING FIXTURE HANGERS ON A CEILING STRUCTURE

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Application October 7, 1954, Serial No. 460,941

4 Claims. (Cl. 29—428)

This invention relates generally to the hanging of lighting fixtures, and more particularly to a method of installing the fixture hangers and the attaching of such hangers to the joists of a ceiling.

It will be understood that a joist type of ceiling structure is encountered in most buildings, and that the pattern for placement of lighting fixtures usually bears no relationship to the location of the joists, although it is generally necessary to support the lighting fixtures from the joists. The architectural plans specify the location of the fixtures by reference only to the perimeter of the ceiling, with the result that the hangers may be located at points between the joists. It will be apparent that it is difficult to locate a point on the openwork ceiling structure, hence the installation of the ceiling fixtures is a tedious, awkward job, requiring much measuring, checking and manipulation of parts and equipment. Moreover, in office and public buildings, where metal bar joists are customarily utilized, some difficulty is experienced in attaching the fixture hangers to the joists.

Accordingly, it is an object of the invention to provide a method that simplifies the task of locating fixture hangers and facilitates their attachment to the ceiling joists. Among the more specific objects of the invention may be noted the provision of a method of placing the fixtures by measurements made at floor level; the provision of a method of temporarily holding certain hanger parts while permanent connections are made to the joists; and the provision of a method of quickly and conveniently securing the hangers in proper position at points between the joists.

In the attainment of these objectives, briefly stated, the invention contemplates the use of an elongate jig which carries a plurality of adjustable hanger-aligning bar-supporting elements. Each element is designed to hold a short bar (preferably in parallelism with the jig) at a point corresponding to the placement of a fixture hanger rod. In use, the jig is laid upon the floor so as to extend transversely of the ceiling joists with one end of the jig being pushed up against a wall of the room. The several bar-supporting elements are then adjustably fixed in positions corresponding to the placement of a row of fixture hanger rods, as measured from that end of the room.

In particular, the bar-supporting elements may be slidably mounted on the jig, set screws being provided to fix the positions of the elements after their adjustment. Each element, in turn, has a slotted or bifurcated support projecting outwardly at the bottom of the jig from one side thereof, this support serving to hold one of the relatively short bar members. The bars are of a length sufficient to bridge the space between a pair of ceiling joists, a convenient length being two and one-half feet. The supporting elements are positioned with reference to the slot in the outwardly projecting support, which slot is designed to accommodate a fixture hanger rod.

After adjustment of the elements, the jig is temporarily secured adjacent the joists of the building, as by clamps.

That end of the jig from which measurements were made is positioned against the corresponding end of the ceiling, and the jig otherwise extends along a line defining one row of fixtures, such row, of course, being transverse to the joists of the ceiling and the slots in the bar-supporting element being in intersecting relationship with the line defining the row of hanger rods.

Individual bars are then rested upon the several supports in position to bridge the adjacent pair of joists. While so supported against or closely adjacent the joists, the bars are secured thereto, preferably using a power-actuated tool which drives a fastener through the ends of the bar and into the lower portions of the joists. Before removal of the jig, C-shaped clamping brackets are then utilized to secure the hanger rods. In one form, the bar is a channel member having slots extending substantially the entire length along the center web thereof, which slots intersect with the slot in a jig-mounted bar-supporting element. Each of these clamping brackets has legs which reach over the top and bottom of the channel member, and these legs have openings which align with the slots in the bar. A fixture hanger rod is then inserted through the several openings of the clamping bracket bar and bar support, and a set screw on the head of the clamp is screwed against one side of the bar to clamp the hanger tightly to the bar. The open slot on the bar-supporting element then permits the jig to be withdrawn sidewise clear of the secured parts. Other shapes of bars and hanger clamping brackets may be employed, however.

Other features of the invention will be in part apparent from and in part pointed out in the following detail description taken in connection with the accompanying drawings, in which:

Fig. 1 is a bottom plan view of a ceiling, illustrating features of this invention;

Fig. 2 is an enlarged section taken on the line 2—2 of Fig. 1;

Fig. 3 is a section taken on the line 3—3 of Fig. 2;

Fig. 4 is a sectional view on the line 4—4 of Fig. 3;

Fig. 5 is an oblique view of the jig shown in Figs. 2–4, prior to installation of the joist-bridging bars;

Fig. 6 is a view similar to that of Fig. 5, but showing a joist-bridging bar supported on the jig;

Fig. 7 is a view similar to that of Fig. 6 after attachment of a fixture hanger rod;

Fig. 8 is a view similar to that of Fig. 7 after removal of the jig;

Fig. 9 is an oblique view of a bar-supporting element of the jig;

Fig. 10 is an oblique view of a hanger rod clamp;

Fig. 11 is a view similar to that of Fig. 7, but illustrating an alternative form of joist-bridging bar; and

Fig. 12 is a cross-sectional view taken on the line 12—12 of Fig. 11.

In many buildings, the ceilings are formed with a series of joists which constitute the principal load-sustaining portion of the ceiling. In installing ceiling lighting facilities, it is usually necessary to suspend the luminaires from these joists, and when the hangers therefor are to be located between the joists, it is customary to bridge the joists with bars, the hangers being secured to these bars. Heretofore, this has not been a simple task. It has been necessary to locate the positions of the joist-bridging bars by measurements across the openwork ceilings. After the bars are located and are secured to the joists, it has been necessary to remeasure and locate the points on the bars where the fixture hangers are to be attached. Brackets were then attached to the bars in proper positions, and the fixture hanging rods were cut

or otherwise adjusted to proper length and secured to the brackets.

Referring now to the drawings, there is shown a ceiling, the load-supporting portion of which is constituted by a series of joists **1**. In large buildings, such as used for commercial and public purposes, steel bar joists customarily form this portion of the ceiling, such bar joists comprising flange-forming angle sections **3** and an open center web of bars **4**. The ceiling lighting fixtures are supported from these joists by depending hangers, which are installed prior to closing over the ceiling with acoustical tile, gypsum board and the like. Where fluorescent lighting fixtures are utilized, it is customary to arrange them in rows, the hanger rods being spaced at four foot intervals as indicated at X, this being a standard length for fluorescent luminaires.

The invention contemplates that the installation of the hanger rods will be made using an elongate jig generally designated **5**, which may be made up from a plurality of sections of a conveniently handled length. For example, each section of the jig might be eight feet long and approximately one inch by one-half inch in cross-section. These sections can be of a three-piece laminated construction, the center ply **7** thereof projecting at one end beyond the outer strips **9**, and the outer strips projecting at the other end beyond the center ply, in order to provide for a tongue and slot connection of the several sections. Also, the center ply **7** may project at one side **11** slightly beyond the outer strips **9**. Screws **13** are utilized in joining the several sections together. The jig in turn carries a plurality of longitudinally adjustable elements **15**, which have the dual function of supporting certain joist-bridging bars and of locating the fixture hanger rods.

Referring more particularly to Figs. 2–5 and 9, each adjustable element **15** has a side wall **17** through which is threaded a set screw **19**. Webs **21** project from the sides **17** over the top and bottom surfaces of the jig **5**, and flanges **23** extend inwardly from the webs **21** over the other side of the jig toward the lip **11** thereof. In addition, a leg **25** projects outwardly from the side **23** of the element at the bottom thereof, this leg **25** being slotted at **27** in a direction transverse to the jig.

In use, the jig is first laid out upon the floor of the room in which fixtures are to be installed, the jig extending in a direction transverse to the joists **1** along a line defining the positions X of one row of fixture hanger rods. One end of the jig is aligned with one end of the room or ceiling, and the bar-supporting elements **15** are adjusted and secured by means of set screws **19** in positions with their several slots **27** corresponding to the locations X of the fixture hanger rods, as measured from that end of the room. Inasmuch as the locations of the fixtures are specified in the architectural plans by reference to the perimeter of the room, it is a simple matter to determine the positions of the bar-supporting elements as the jig rests upon the floor.

The jig is then elevated to the ceiling level and is temporarily secured against the lower surfaces of the joists, as by C-clamps **28**. It will be understood that the jig is aligned so that the centers of the slots **27** in the bar-supporting elements **15** lie on a line defining a row of fixtures, the positions of the hanger rods along this row necessarily being determined by the slots **27**. In its secured position, the jig supports a plurality of joist-bridging bars generally designated **29**, one form of which is shown in Figs. 2–8 to be a channel section.

Each of these bars **29** is of a length sufficient to bridge a pair of joists (a length of two and one-half feet being satisfactory for most installations), and the center web thereof is formed with elongate slots **30** for accommodating a fixture hanger rod at substantially any point between the joists. The exact position of the bar **29** is not critical, provided the ends thereof overlap a pair of joists and one of the longitudinal slots **30** lies in intersecting relationship with the slot **27** in the bar-supporting element **15**, thereby predetermining the positions of hanger rods **31**. While so supported, the several joist-bridging bars **29** are fastened to the joists, and the fixture hanging rods **31** are secured to these bars.

The hangers **31** are attached to the bars **29** by means of U-shaped brackets generally designated **33**. As best shown in Fig. 10, the brackets **33** have a side or base portion **35** in which a set screw **37** is threaded. The projecting legs **38** of the bracket are spaced to extend across the top and bottom of a joist-bridging bar **29**, and the legs **38** are apertured at **39** to receive a fixture hanging rod **31**.

Although different sequences of steps may be followed in assembling the components, the recommended procedure involves fitting brackets **33** over the joist-bridging bars **29**, inserting fixture hanging rods **31** through the openings defined at **30** and **39**, and temporarily tightening the set screws **37** so that the rods **31** become clamped between the brackets **33** and bars **29**.

Several such bars are fitted to the jig prior to its elevation and positioning against the joists, the brackets **33** resting upon the supports **25**, and the rods **31** being received in the slots **27**. Upon securement of the jig against the joists, bars **29** are held in position by lateral engagement with the projecting side portion **11** of the jig and by engagement with the lower surfaces of the joists **1**. As illustrated in Fig. 2, the thickness of the bracket **33** and bar **29** are such that when the jig **5** is clamped against the joists, the upper surfaces of the bars engage with the lower surfaces of the joists. Should the initial positioning of a bracket **33** on a bar **29** be such as to prevent the bar from overlapping a pair of joists, the set screws **37** may be loosened, the bar slipped longitudinally over the support **25** to proper position, the set screw **37** then being tightened. The set screws **37** also facilitate vertical adjustment of the hangers **31** so that the bases **39** thereof are at proper elevation.

The installation is completed by securing the bars **29** to the joists, this attachment preferably being accomplished by means of penetrating fasteners **41**, which are driven with a power-actuated tool. Once the bars are fastened at the joists, the jig may be removed, the slots **27** in the bar supports permitting lateral withdrawal of the jig. A second row of fixture hanger rods may then be installed, and in most instances it will not be necessary to readjust the positions of the elements **15**.

Whereas Figs. 1–10, illustrate a joist-bridging bar which is in the form of a slotted channel member, other forms might be utilized. For example, Figs. 11 and 12 show a bar **129** formed from a flat strip, an elongate center portion **130** thereof being double-folded at right angles to the relatively short end portions **132**. A U-shaped clamping bracket **133** is employed in attaching the hanger rods to the bar **129** in the manner described heretofore; but in this instance, the hanger rod **131** is held against one side of the elongate vertical center web **130** of the bar **129** by the bracket **133**.

The arrangement of Figs. 11 and 12 is somewhat advantageous in that very little of the bar **129** projects below the joists. It is necessary, however, to thicken the bar supports **125**, so that the end portions **132** of the bar seat against the lower surfaces of the joists. When the jig is to be used for installing both types of joist-bridging bars, filler blocks **126** would be provided for removable attachment to the supports **125**, these blocks being secured on opposite sides of the slot in the support. Otherwise, the adjustable elements **115** and the jig **105** are identical to those described heretofore.

In addition, Fig. 11 illustrates an alternative arrangement, whereby wires **141** are utilized to secure the bridging bars to the joists.

From the above, it will be apparent that the invention considerably simplifies the task of placing and attaching fixture hanger rods to an openwork ceiling structure,

such as that formed by a series of joists. Most of the measuring and assembly work can be carried out at floor level, the apparatus not only holding the parts in position during attachment of the bridging bars to the joists, but also serving to locate the fixture hanging rods and facilitate their attachment to the joist-bridging bars.

Although several embodiments have been disclosed in detail, it is to be understood that the invention is not limited thereto, but the drawings and description thereof are to be understood as being merely illustrative. It is realized that many modifications and variations will present themselves to those skilled in the art without departing from the spirit of this invention or the scope thereof as set forth in the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. The method of installing fixture hangers on a joist ceiling structure comprising the steps of providing an elongate jig having a plurality of adjustably positionable hanger-aligning bar-supporting members disposed therealong, positioning and securing said hanger-aligning bar-supporting members at predetermined points along said jig corresponding to the desired spacing of the hangers, temporarily securing said jig against the ceiling, providing a plurality of relatively short bars and supporting one bar on each of said members in position to bridge the adjacent joists, fastening each of said bars to the joists bridged thereby while so supported, securing a hanger to each bar at the predetermined location of its supporting member, and thereafter removing the jig.

2. The method of installing fixture hangers on a joist ceiling structure comprising the steps of providing an elongate jig having a plurality of adjustably positionable hanger-aligning bar-supporting members disposed therealong, positioning and securing said hanger-aligning bar-supporting members at predetermined points along said jig corresponding to the desired spacing of the hangers from one edge of the ceiling, thereafter temporarily securing said jig against the ceiling, with one end of the jig aligned with an edge of the ceiling, providing a plurality of relatively short bars and supporting one bar on each of said members in position to bridge the adjacent joists, fastening each of said bars to the joists bridged thereby while so supported, securing the hangers to each bar at the predetermined location of its supporting member, and thereafter removing the jig.

3. The method of installing fixture hangers on a joist ceiling structure comprising the steps of providing an elongate jig having a plurality of adjustably positionable bar-supporting members, each of which has a laterally-projecting slotted bar-supporting leg, positioning and securing said members along said jig with the slots thereof located at predetermined points corresponding to the desired spacing and location of the hangers, thereafter temporarily securing said jig against the ceiling, providing a plurality of relatively short bars and supporting one bar on each of said members in position to bridge the adjacent joists, fastening each of said bars to the joists bridged thereby while so supported, securing hanger rods to each bar while disposed within the slot of the supporting leg, and thereafter removing the jig.

4. The method set forth in claim 3, wherein said bars are slotted, the hanger rods being inserted within the slots thereof and clamped against the edges of said slots, thereby to provide for adjustment of the depending length of the hanger rods.

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