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ADJUSTABLE BAR HANGER FOR ELECTRICAL FIXTURES

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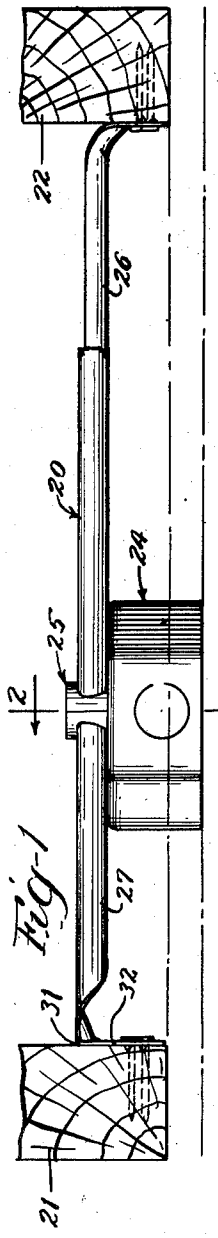

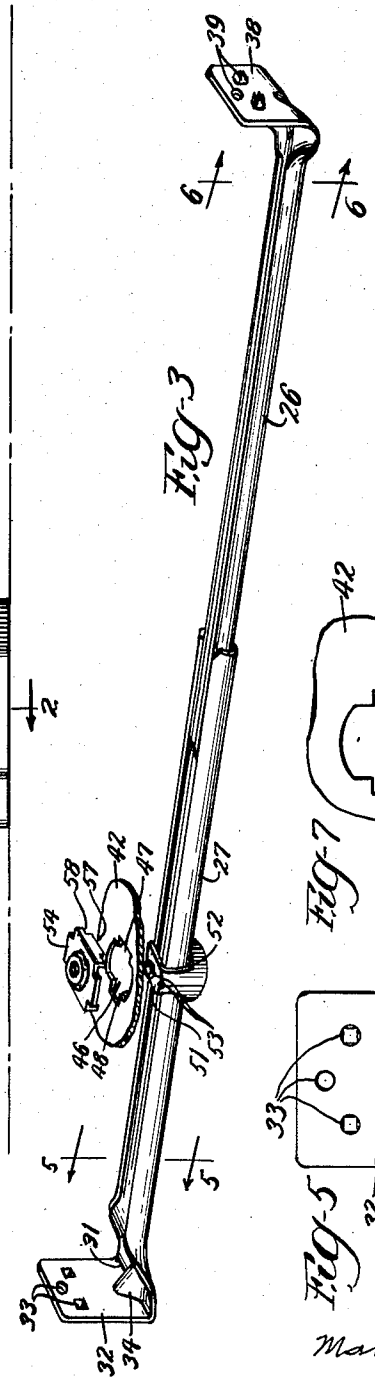

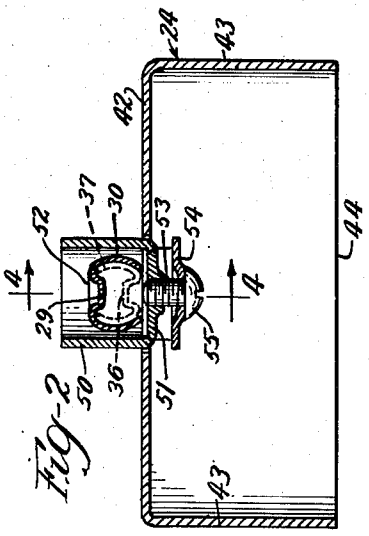

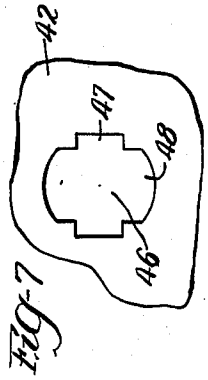

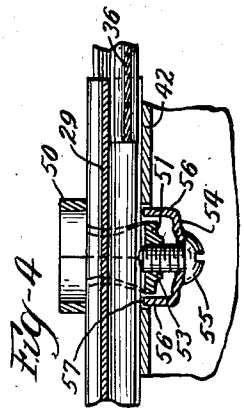

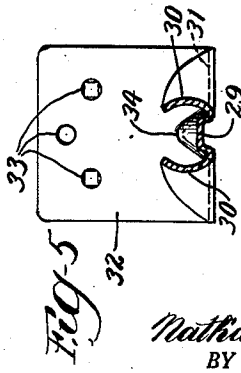

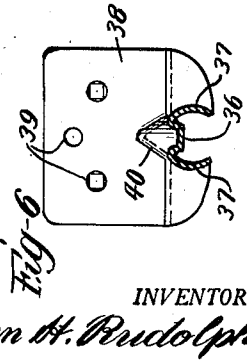

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ADJUSTABLE BAR HANGER FOR ELECTRICAL FIXTURES

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4 Claims. (Cl. 248—205)

This invention relates to a variable length support for installing electrical fixtures between a pair of joists and more particularly is concerned with a support having a pair of telescopically mounted members that are relatively slidable to permit lengthwise adjustments.

It is desired that structures of this general type be of light weight, high strength construction, a feature that is lacking in all known prior art devices. In addition, there are many applications in which the mounting location for the support is relatively inaccessible and it becomes desirable to first secure the electrical fixture to the support and then to install the support. To facilitate such an installation, it is important that the support be capable of lengthwise adjustment even though the fixture is already secured thereto.

Accordingly, it is the principal object of the present invention to provide an adjustable bar hanger that is of light weight, high strength, and low cost construction; that is adjustable lengthwise though a fixture is rigidly secured thereto; that reduces the frictional resistance to sliding; and that is adapted to withstand substantial clamping pressures without deformation.

In the bar hanger of the present invention, the individual bars derive their strength by virtue of their unique cross-sectional shape. Each bar includes a central channel shaped portion that merges with a pair of curved wall portions formed outwardly and reversely of the channel portion to define a generally M-shaped cross-section. The strength of the assemblage comprising a pair of telescoped bars is derived from the manner in which the bars are nested together. The outer M-shaped bar is inverted relative to the inner M-shaped bar, and the overlapping portions thus consist of cooperating opposed channel portions that are interlocked by the curved wall portions.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Fig. 1 is an elevational view illustrating a bar hanger installed between a pair of joists;

Fig. 2 is an expanded sectional view of the bar hanger taken along the line 2—2 of Fig. 1;

Fig. 3 is an exploded perspective view of the hanger with parts broken away to illustrate the arrangement for clamping an electrical fixture thereto;

Fig. 4 is an expanded, fragmentary sectional view taken along the line 4—4 of Fig. 2;

Figs. 5 and 6 are sectional views taken along the lines 5—5 and 6—6, respectively, of Fig. 3; and

Fig. 7 is a fragmentary plan view of the mounting opening of the electrical fixture.

In Fig. 1 a typical mounting arrangement of the adjustable bar hanger, designated generally at 20, is shown, and in this typical arrangement the bar hanger is bridged

between a pair of supports 21 and 22. Usually the supports 21 and 22 will be the wooden joists of a building, and the important feature is the fact that they are frequently irregularly spaced. Due to their irregular spacing, it has been found most convenient to provide a bar hanger that is adjustable lengthwise so that a single device may be employed in a wide variety of applications. For purposes of the present disclosure, a familiar outlet box 24 is chosen as the electrical fixture that is to be suspended from the bar hanger 20 by means of a clamping device 25.

The bar hanger comprises a pair of nested, partially overlapping telescopic members, the inner and outer members being designated 26 and 27, respectively. The members 26 and 27 are preferably formed of light weight sheet metal. The outer member, as shown in Fig. 5, comprises a central portion formed with a longitudinally extending recess that is offset in a vertical direction to provide a channel shaped portion 29 that merges with a pair of outwardly bowed, smoothly curved walls 30 that extend generally in a vertical direction and are formed by bending portions of the side walls outwardly and reversely relative to the channel portion 29. At one end, the outer member 27 is bent, as long the line 31, to form a mounting flange 32 that is disposed in right angle relationship with the axis of the bar and a number of mounting holes 33 are drilled into the flange 32 to facilitate its mounting on the joist 22. An indentation 34 is formed medially along the bend line 31 to provide an integral knee brace. The knee brace reinforces the structure and improves its rigidity.

The inner bar member includes an inverted channel portion 36 that merges with a pair of outwardly bowed, smoothly curved arms 37 that are formed outwardly and reversely relative to the channel portion 36. One end is formed with a flange 38 having a number of mounting holes 39 and a similar knee brace 40 is formed by suitably indenting the bend line that defines the flange 38.

The inner member 26 is adapted to be inserted in the outer member 27, and when the members are thus mounted, the curved walls 30 of the outer member 27 are effective to support the inner member 26 for relative sliding movement. The members nest together such that the extremities of the curved walls 37 of the inner member are disposed within the troughs or trackways defined by the inner end of the curved walls 30 of the outer member 27. Thus the troughs of the outer member and the extremities of the curved walls of the inner member serve to guide the two bar members as they slide relative to each other, and it should be noted that only the opposed areas of the walls 30 and 37 are in contact. This arrangement substantially reduces the area of frictional contact and minimizes the frictional resistance to relative sliding movement between the members. It is considered apparent that when the members are telescopically related, the overlapping portions are intimately nested together to provide a substantially rigid structure, the length of which may be varied as desired. In this connection it should be noted that the members need not be of equal length as this is merely a matter of design to be determined in accordance with the needs of the contemplated applications.

It will be apparent from the foregoing description and the accompanying drawings that the side walls of each of the telescoping members are smoothly curved and bowed outwardly throughout their vertical extent, with the greatest distance between opposite side walls of each of the members being substantialy midway of their vertical extent and with the distance between the side walls decreasing gradually above and below such midway point. It is also apparent that the adjacent or contacting side walls of the telescoping members are complementally shaped.

The adjustable bar hanger is shown with an outlet

box 24 that is of conventional design and includes a rear wall 42, side walls 43, and an open front face 44. The rear wall 42, however, is specially provided with a generally rectangular opening 46 bounded by a pair of opposed rctangular recesses 47 and a pair of opposed arcuate recesses 48 and is adapted to receive a cylindrically shaped tubular saddle member 50 having an end wall 51. The cylindrical walls of the saddle are broken away medially, as at 52, to permit the saddle to telescopically receive the outer bar member 27. The end wall 51 serves as a mounting strap and is formed with a tapped hole 53. The cylindrical wall portions of the saddle are adapted to extend into the rectangular opening 46 of the rear wall 42 of the outlet box to fit snugly within the arcuate recesses 48.

The saddle 50 cooperates with a clip 54 and a screw 55 to secure an electrical fixture to the outer bar member. The clip 54, as seen in the cross-sectional view of Fig. 4, is of channel shape and the legs 56 of the channel are provided with centrally located, upwardly extending ears 57 bounded at each end by shoulder portions 58. The shoulder portions 58 are adapted to abut against the inner surface of the rear wall of the outlet box and the ears 57 are adapted to project into the rectangular recesses 47. The ears 57 cooperate with the recesses 47 to assist in positioning the clip relative to the opening 46 and to maintain the clip in its initial position. The ears are of such a size that they do not extend past the outer surface of the rear wall 42 and, hence, do not contact the bar members.

In assembling the apparatus of the present invention, the outer tubular member is telescoped through the opposed openings 52 formed in the cylindrical walls of the saddle 50 and the fixture to be installed is secured to the saddle by means of the clip 54 and screw 55. The parts may either be assembled in the order recited or the saddle 50, fixture 24, and clip 54 may be loosely preassembled and the outer member subsequently telescoped through the cylindrical walls of the saddle 50. In either case it is possible to fixedly secure the fixture to the adjustable bar members if the exact desired location of the fixture is known. In such an instance, the outer member is engaged by the upper portions of the saddle and by the outer face of the rear wall 42 of the fixture. The curved walls 30 of the outer member are of an appropriate size and shape so that the inner member is entirely supported therewithin and so that no part of the clamping structure contacts the inner member. In achieving this, it is necessary to select a screw 55 of minimum size so that when it is fully engaged, it will not extend into contact with the inner member.

Due to the strong structural characteristics provided by the generally M-shaped cross-section of the outer member, it is able to withstand significant clamping pressures without in any way being deformed, and hence there is no danger that the clamping arrangement will increase the frictonal resistance to relative sliding movement between the outer and inner bar members.

In view of the fact that many of the locations in which electrical fixtures must be installed are relatively inaccessible, it is oftentimes desirable that the fixture first be fixedly secured to its support and that the support then be adjusted lengthwise to suit the needs of the application. The adjustable bar hanger of the present invention is well adapted for such use.

There are certain instances when it is not convenient to fix the position of the fixture relative to its supporting bars prior to the actual installation of the support, and in such cases the clamping mechanism and fixture may be loosely mounted on the hanger bars to permit the necessary final adjustments and then may be finally tightened simply by advancing the screw 55.

Thus it may be seen that the objects of the present invention have been accomplished in that an adjustable bar hanger of unusually strong cross-sectional shape is employed to provide a high strength device. The individual bars may be formed from a single piece of sheet metal and require but a minimum of forming operations. Additionally, the outer bar is adapted to receive a clamping mechanism without in any way impairing the relatively free sliding movement of the outer and inner bars.

It should be understood that the description of the preferred form of the invention is for the purpose of complying with section 112, title 35 of the United States Code and that the appended claims should be construed as broadly as the prior art will permit.

I claim:

1. In an arrangement having a fixture, a support, and a clamping device for attaching said fixture to said support, the improvement wherein said fixture has an attaching wall formed with a central opening defining first and second pairs of opposed recesses alternating about the center of said opening, and said clamping device comprises a saddle telescoping over said support and having an end portion projecting into the center of said opening and said first pair of opposed recesses, a channel-shaped clip straddling said end portion to bear against the inner surface of said attaching wall and having a pair of projections extending within said second pair of opposed recesses, and securing means engaged between said clip and said end portion of said saddle to draw said support against the outer surface of said attaching wall and fix the parts in their assembled relationship and prevent relative rotation therebetween.

2. In an arrangement having a fixture, a support, and a clamping device for attaching said fixture to said support, the improvement wherein said fixture has an attaching wall formed with a central opening, and said clamping device comprises a saddle telescoping over said support and having an end wall projecting into said central opening in substantially flush relation with said attaching wall, said end wall having a threaded aperture, a generally channel-shaped clip defining an attaching wall and a pair of legs, said attaching wall of said clip having an aperture aligned with said threaded aperture and said legs straddling said end wall with each leg having an intermediate extension bounded by shoulder portions, the shoulder portions bearing against the inner surface of said attaching wall of said fixture to maintain a small clearance distance between said attaching walls and the extensions projecting within said central opening on opposite sides of said saddle for engagement with portions of the attaching wall of said fixture that surround said opening to prevent transverse movement between said clip and said fixture, and a screw extending into said aperture to engage between the attaching wall of said clip and said end wall of said saddle and draw said support against the outer surface of said attaching wall of said fixture and fix the parts in their assembled relationship.

3. An adjustable length bar hanger for supporting an electrical fixture and comprising inner and outer telescoping horizontal members formed from sheet metal blanks, with said members carrying mounting flanges at their opposite ends; said members each having a central portion formed with a longitudinal recess offset in a vertical direction and each having opositely shaped, outwardly bowed, smoothly curving pendant walls extending generally in a vertical direction from opposite sides of their central portions, with said inner member being nested in free sliding engagement in and in inverted relationship to said outer member with the adjacent walls at one side of said members being complementally shaped and with the adjacent walls at the other side of said members also being complementally shaped.

4. An adjustable length bar hanger for supporting an electrical fixture and comprising inner and outer telescoping horizontal members formed from sheet metal blanks, with said members carrying mounting flanges at their opposite ends; said members each having a central portion with each central portion having, at its opposite sides, oppositely shaped, outwardly bowed, smoothly

curving pendant walls extending generally in a vertical direction, the central portion of said outer member having a longitudinal recess offset in the same general direction that the walls of said outer member extend to form longitudinal internal trackways at opposite sides of the central portion of said outer member, said inner member being nested in and in inverted relationship to said outer member with the extremities of the walls of said inner member in cooperating free sliding engagement in said trackways, with the adjacent walls at one side of said members being complementally shaped and with the adjacent walls at the other side of said members also being complementally shaped.

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