United States Patent [19]

Selden et al.

[11] **3,777,434**

[45] **Dec. 11, 1973**

[54] **CONNECTOR**

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[73] Assignee: **Weyerhaeuser Company,** Tacoma, Wash.

[22] Filed: **Apr. 26, 1971**

[21] Appl. No.: **137,382**

[52] **U.S. Cl.** ..... **52/753 C,** 52/760

[51] **Int. Cl.** **F16b 7/04**

[58] **Field of Search** ..... 287/20.92 D, 20.92 Y, 287/20.92 L, 20.92 R, 189.36 C, 189.36 D, 189.36 F, 189.36 H, 189.35, 54 A, 54 C; 52/656, 665, 721, 220, 221, 649; 248/221, 223, 300; 240/9 R, 73 R, 73 BA

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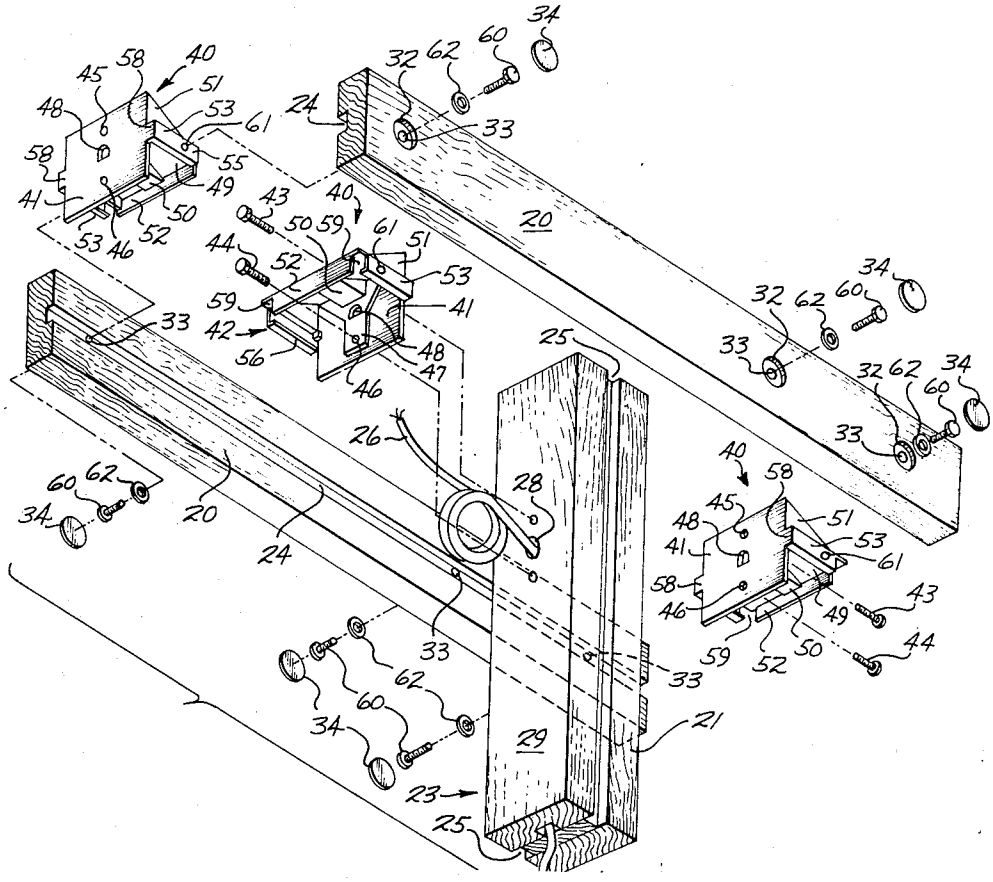
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[57] **ABSTRACT**

A means for attaching one member to another to prevent racking or twisting of the members. It includes a connector which attaches to one member and has a key which fits into a groove in the other member. Several modifications are shown. In one the connector clamps to the first member. In another, both members have grooves which are angularly displaced and the connector has keys which fit into both grooves. A light standard is illustrated. The groove is in the horizontal crossarm and is used to conceal the wire from the pole to the luminaire. The key may be channel-shaped to provide access into the groove for the wire.

7 Claims, 22 Drawing Figures



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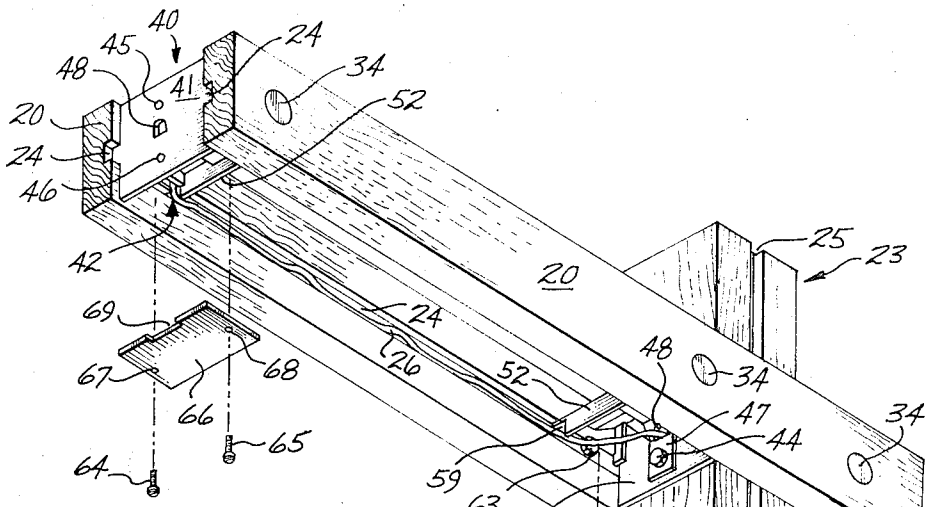


Fig. 2

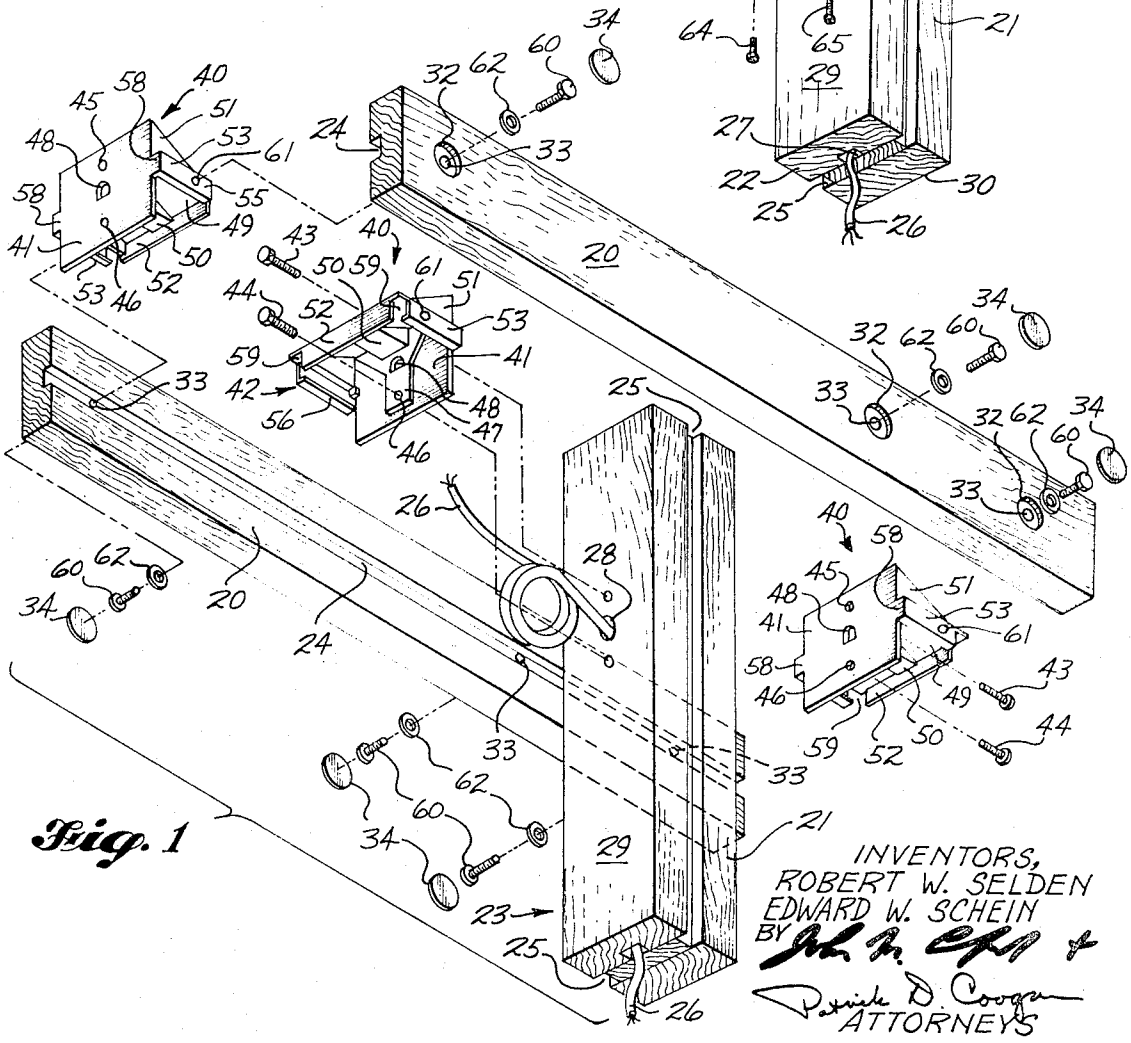


Fig. 1

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Fig. 3

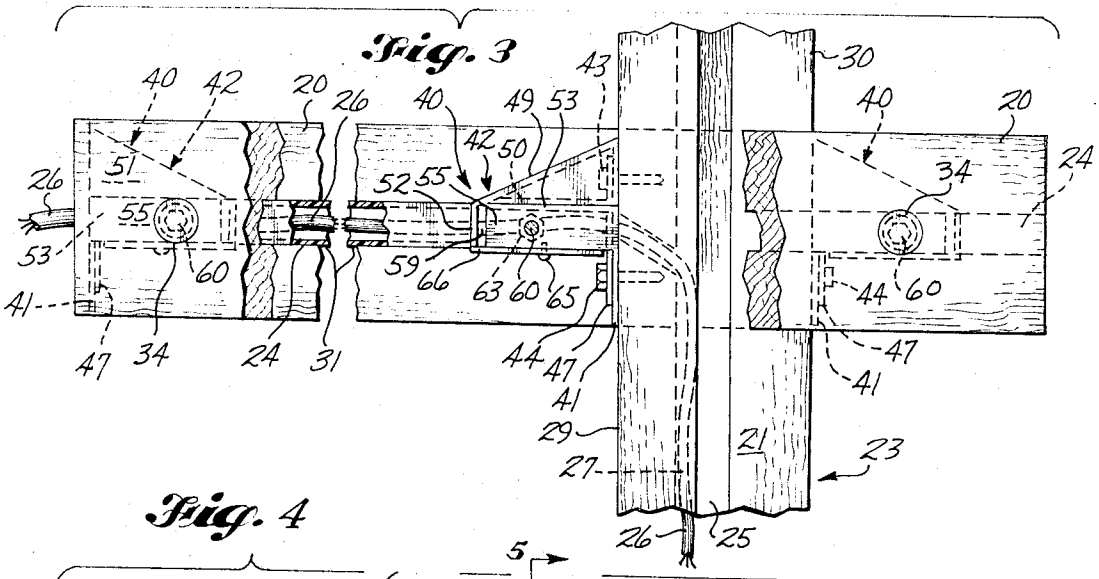
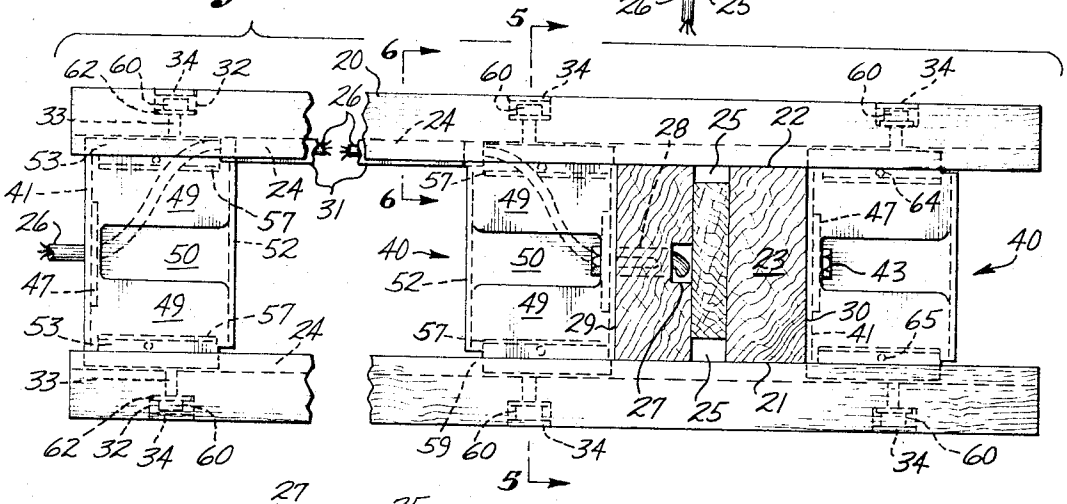


Fig. 4



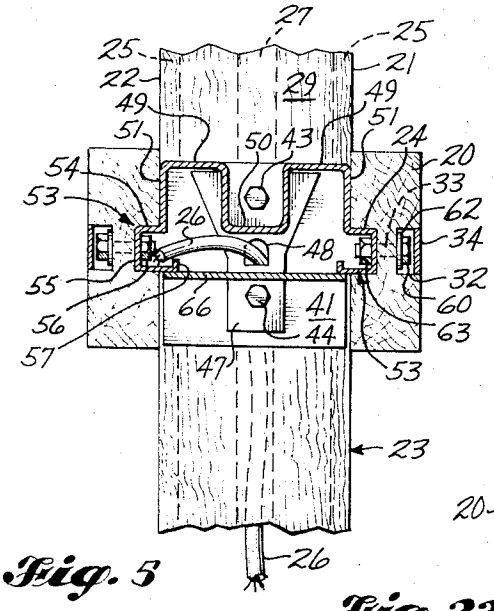
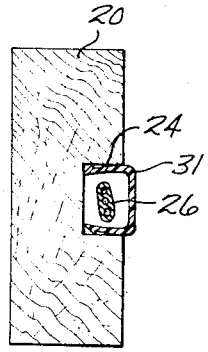


Fig. 5

Fig. 6



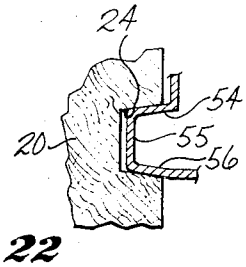


Fig. 22

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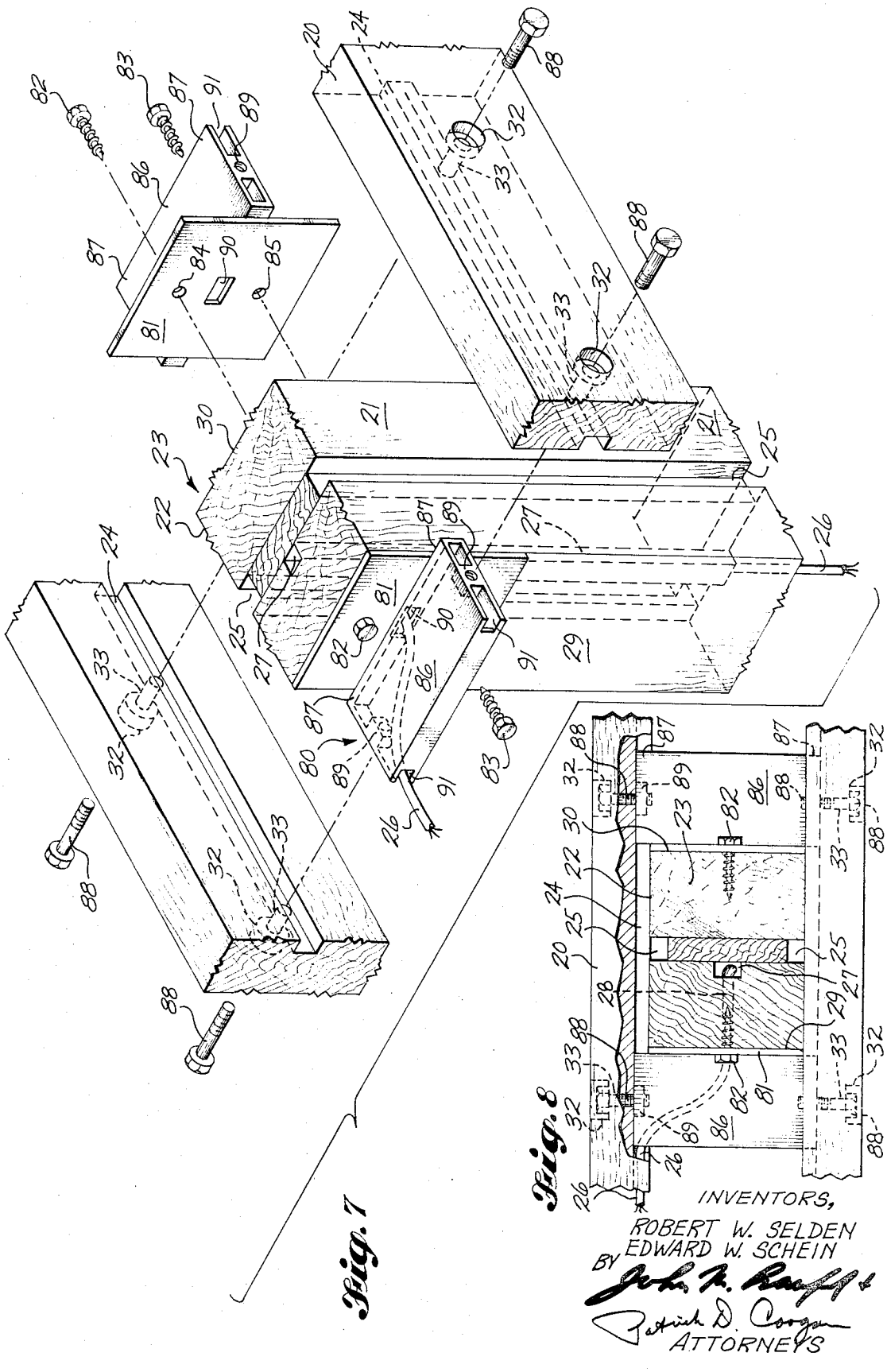
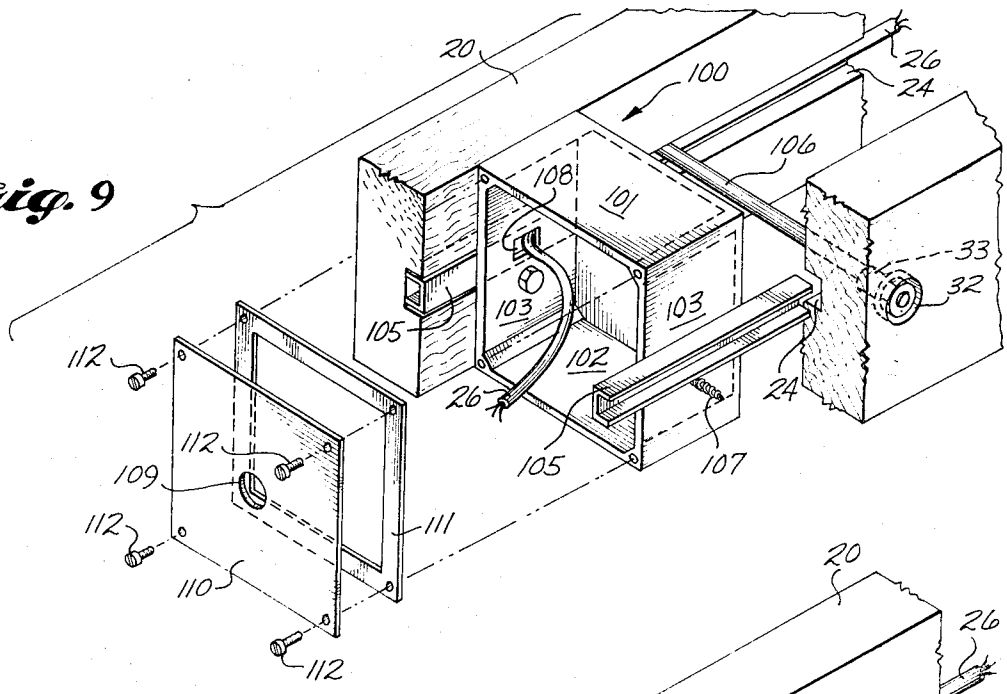


Fig. 7

Fig. 8

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Fig. 9



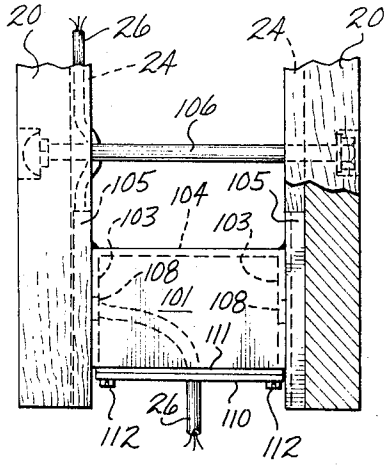


Fig. 10

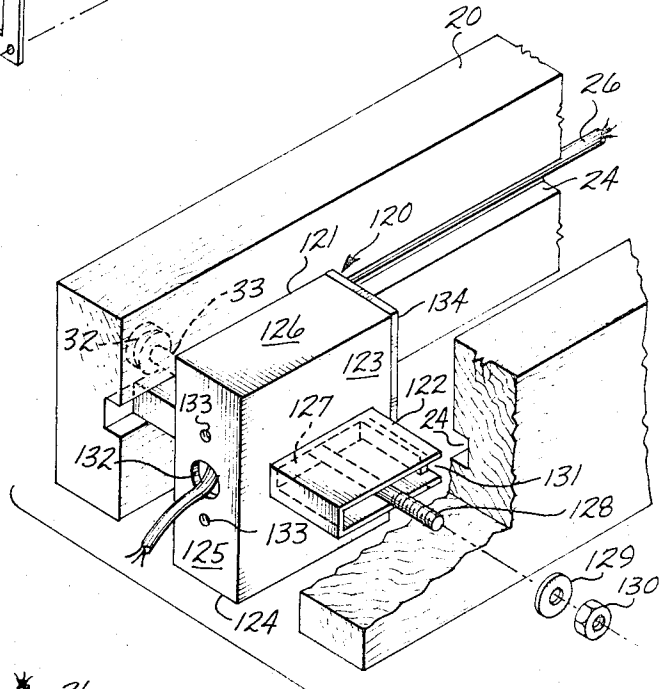


Fig. 11

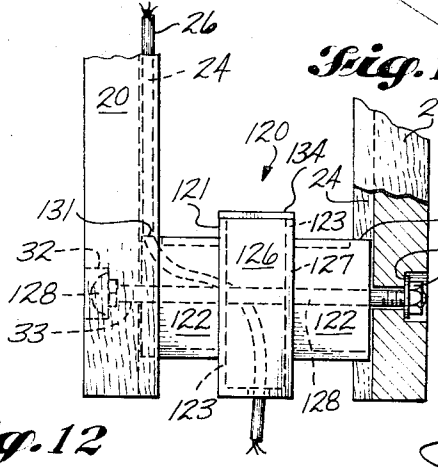


Fig. 12

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Fig. 14

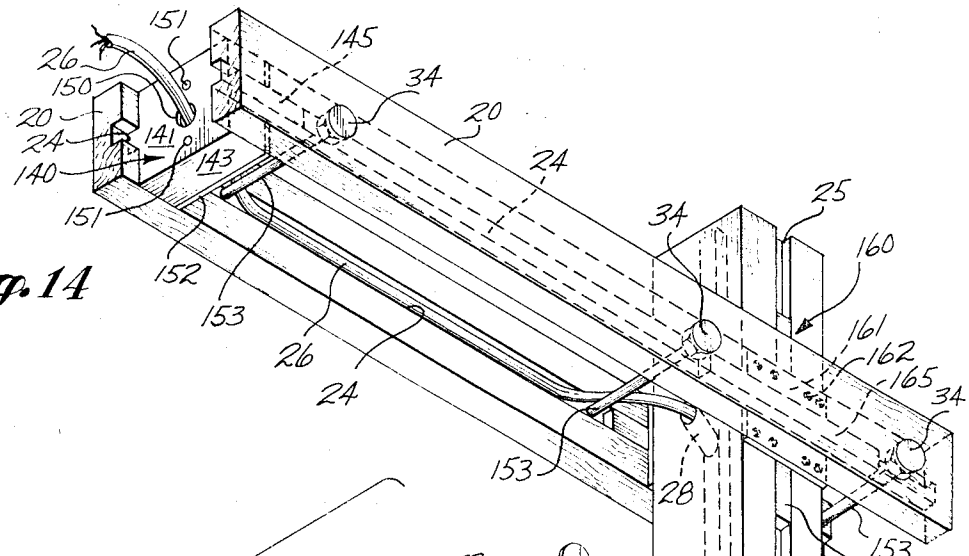
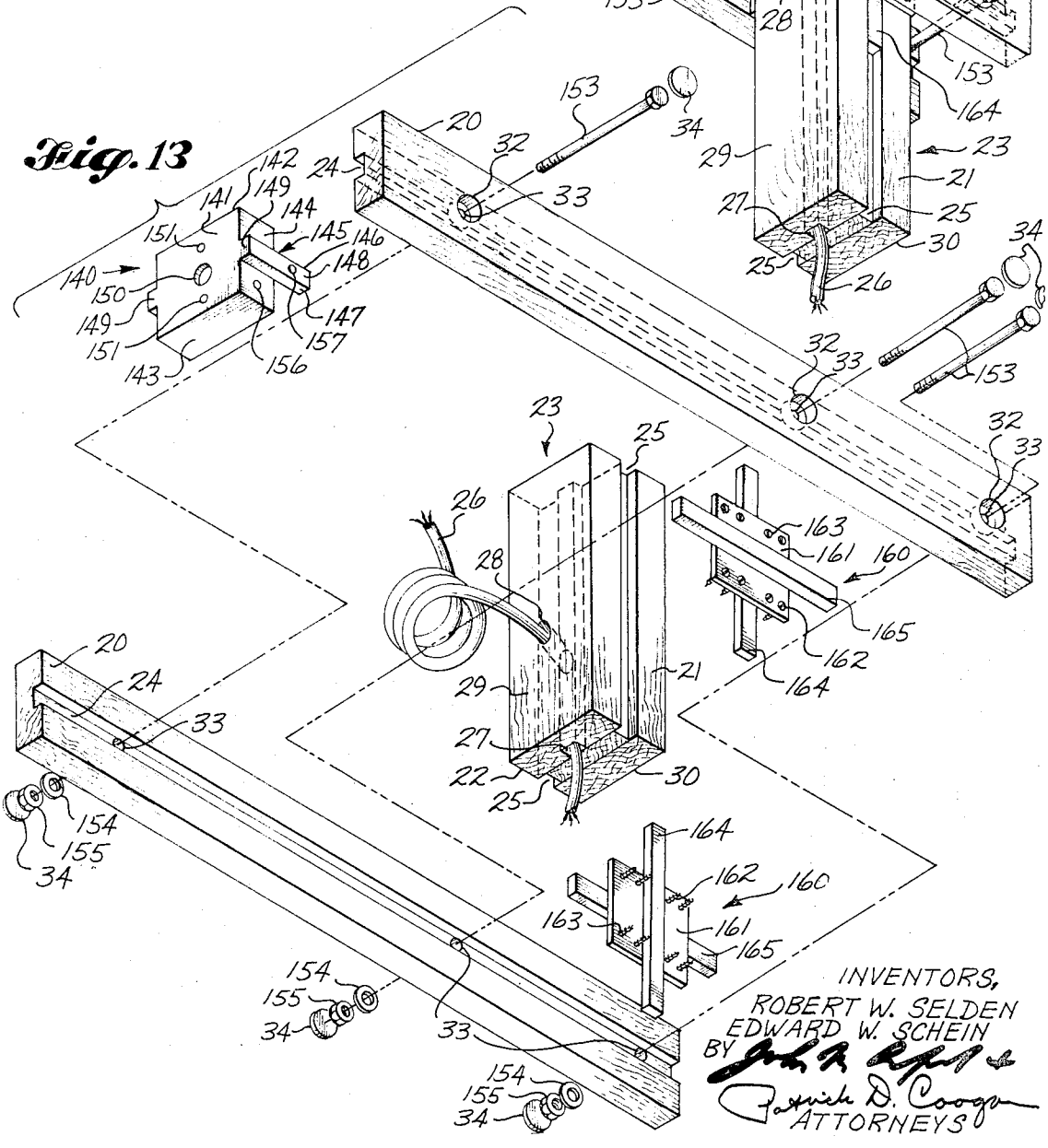


Fig. 13



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Fig. 15

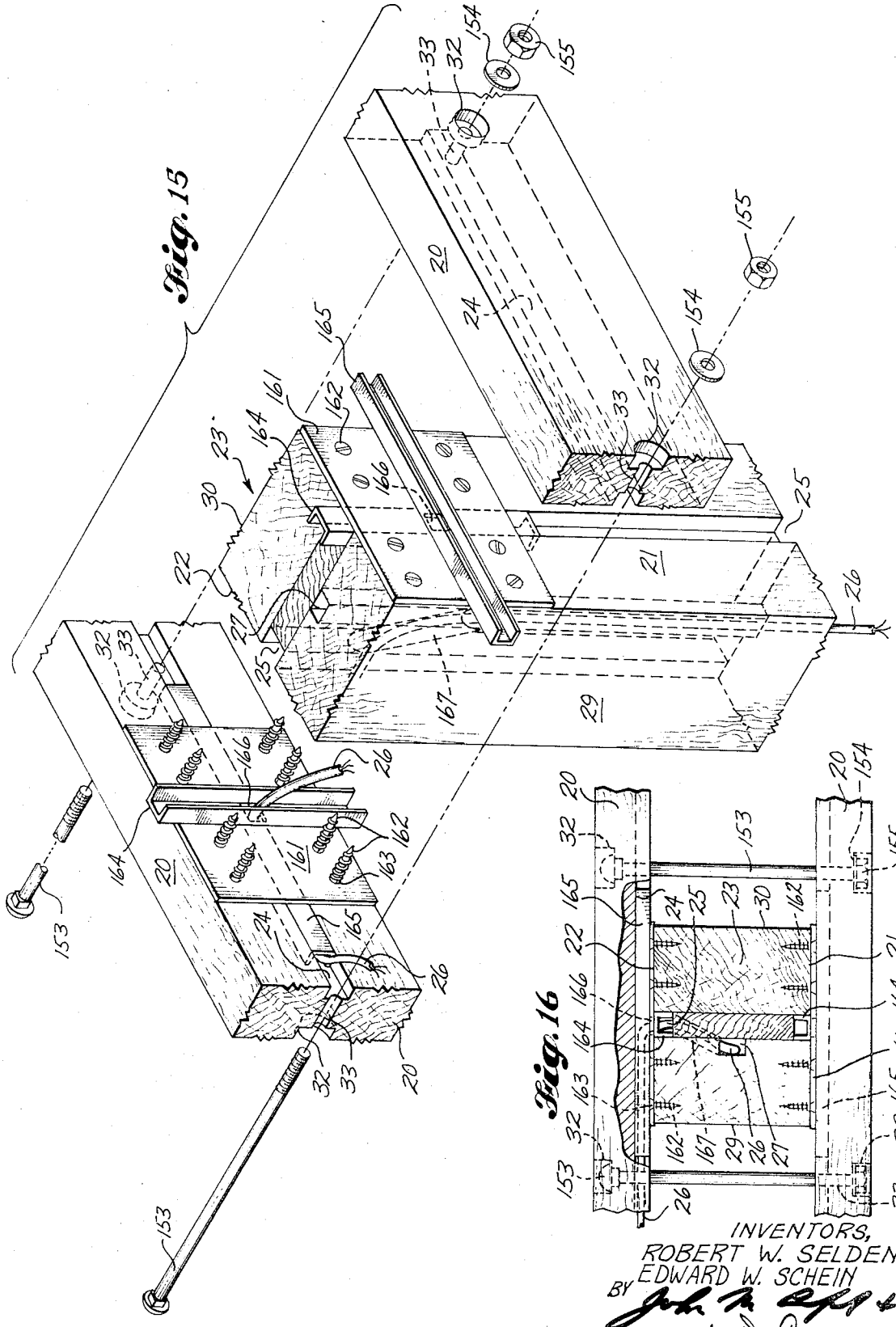


Fig. 16

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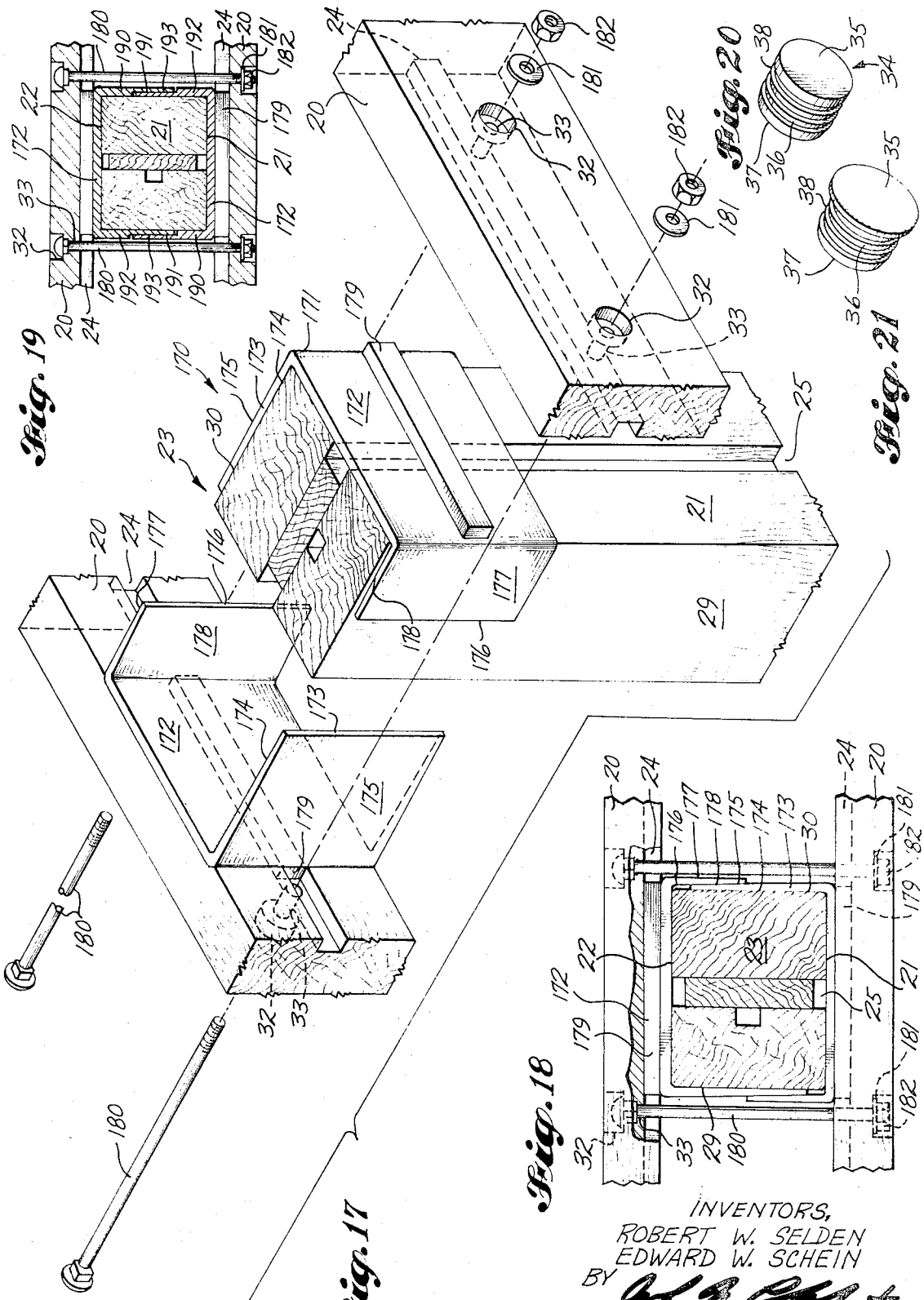


Fig. 17

Fig. 18

Fig. 19

Fig. 20

Fig. 21

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CONNECTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

A connector structure for attaching members, the overall structure formed by such attachment and, particularly, a light standard having such an attachment.

2. Description of the Prior Art

Typically, structural members are attached by bolts and nails. However, in power lines the crossarms are subject to twisting or racking in high winds.

Other systems for connecting members are shown in Jennings U.S. Pat. No. 3,153,299 issued Oct. 20, 1964; Brann U.S. Pat. No. 3,167,609 issued Jan. 26, 1965; Thom U.S. Pat. No. 3,352,541 issued Nov. 14, 1967; and Demers U.S. Pat. No. 3,423,899 issued Jan. 28, 1969. Each of these patents discloses the interlocking of structural components. However, each is relatively complicated and none has the simplicity or interchangeability of the present invention.

BRIEF SUMMARY OF THE INVENTION

The present invention has a simple method of attaching angularly displaced members. A connector is attached to the upright or vertical member. The connector may have a key which fits into a vertical groove in the vertical member. In another modification, the connector may be clamped around the vertical member.

The connector has a horizontal key which fits into a groove in the horizontal member. This construction prevents racking and twisting of the horizontal member with respect to the vertical member.

This construction may be used for light standards and the groove in the horizontal member would house the wires for the lights. The keys on the connector may be U-shaped to allow access of the wire to the groove. A second connector is attached to the horizontal members at their outer ends and the light or luminaire is attached to this member. This connector also has keys fitting into the grooves in the horizontal members.

The construction is simple, uses standard parts, and is easy to use at the job site. It allows the crossarm to be mounted at any elevation on the post and provides a wide variety of different structures with the use of a few simple standard members. It prevents racking and twisting of the crossarms and creates a much sturdier structure because of the good moment connection between the horizontal crossarms and the vertical post and, in a light standard, the good moment connection between the light fixture and the end of the crossarm. This is done without the use of braces or tension members.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an isometric exploded view of a construction showing the invention. FIG. **2** is an isometric partially exploded view of the construction. Additional elements are shown.

FIG. **3** is a front elevational view of the construction.

FIG. **4** is a top plan view of the construction.

FIG. **5** is a cross-sectional view taken along line **5—5** of FIG. **4.**

FIG. **6** is a cross-sectional view taken along lines **6—6** of FIG. **4.**

FIG. **7** is an isometric partially-exploded view of a second embodiment of the invention.

FIG. **8** is a top plan view of the second embodiment.

FIG. **9** is a partially exploded isometric view of a modified end construction.

FIG. **10** is a top plan view of the latter modification.

FIG. **11** is an isometric view of another modified end construction.

FIG. **12** is a top plan view of this modification.

FIG. **13** is an exploded isometric view of another embodiment.

FIG. **14** is an isometric view of the embodiment assembled.

FIG. **15** is a partially exploded isometric view of the post and crossarm connection of FIGS. **13** and **14.**

FIG. **16** is a top plan view of the structure of FIG. **15.**

FIG. **17** is a partially exploded isometric view of another construction.

FIG. **18** is a top plan view of this construction.

FIG. **19** is a top plan view of a construction using a modified form of the connector of FIGS. **17–18.**

FIGS. **20–21** are isometric views of two types of plugs.

FIG. **22** shows a cross section showing a modification in the key structure.

The drawings are fragmentary, exploded or partially exploded and partially cut away both for convenience of illustration and to show details of construction.

DETAILED DESCRIPTION OF THE INVENTION

FIGS. **1–16** show light standards and associated wiring. However, as in FIGS. **17–18,** the connectors and structural elements may have end uses in which wiring is not essential.

In each of the illustrations, a pair of horizontal crossarms **20** are attached to the front and back sides **21** and **22,** respectively, of a vertical post **23.** Each of the arms **20** has an interior lengthwise horizontal groove or dado cut **24.** The front and back faces **21** and **22** of post **23** have vertical grooves **25.**

A wire **26** extends through the vertical channel **27** in post **23** and exits from one or both side faces **29** and **30** of the post **23** through aperture **28.** The wire **26** is concealed in one of the grooves **24** between the post **23** and the light fixture. It may be held in the groove **24** completely hidden from view by a cover **31** which fits within the groove **24.** The cover is shown in FIGS. **3, 4** and **6.**

The counter bores **32** of bolt holes **33** in arms **20** are covered with plugs **34.** These plugs are illustrated schematically in FIGS. **1–5** and **13–14,** and two types of plugs are shown in FIGS. **20** and **21.** Each type has a face plate **35** and a hollow body **36** formed of a thin wall **37** having a number of rearwardly extending ribs **38** on its outer periphery. FIG. **20** shows the flush mounted type of plug in which the diameters of the face plate **35** and body **36** are equal, and FIG. **21** shows the exposed type of plug in which the diameter of the face plate **35** is greater than that of the body **36.** In both types the wall **37** is thin and rigid but it is resilient enough to conform to the shape of the hole **32.**

As can be seen, the posts and crossarms are identical in each of the various constructions shown. The difference among the constructions is in th post and end connectors.

In FIGS. **1–5** the post and end connectors are identical. The connector **40** has a face plate **41** and a hollow body **42** attached to the face plate. The face plate **41** of the post connector is attached to the post **23** by screws or lag bolts **43** and **44** which extend through

holes 45 and 46. In the end connector, these same holes are used as bolt holes for a luminaire. The face plate 41 has a reinforcement 47 to strengthen the connector in the area of attachment, and a central aperture 48 for the wire 26.

The body 42 has an upper sloping wall 49 with a central valley 50. The central valley strengthens the connector and allows access to hole 45. Side walls 51 extend downwardly from the upper wall 49 to a level approximately that of the central valley 50. A back wall 52 also extends downwardly from the upper wall 49 and side keys 53 extend outwardly from each of the side walls 51. The side keys 53 — comprising an upper flange 54, a side wall 55, a lower flange 56 and an inner upwardly extending reinforcing flange 57 — fit into the grooves 24 of the arms 20. The close tolerances between the dimensions of the key 53 and the groove 24 may be avoided in some instances by tapering the upper and lower flanges 54 and 56 and the upper and lower faces of the groove 24, and making the groove deeper than the key to seat the key in the groove and to create greater surface contact between the key and groove. This is shown in FIG. 22. The forward end of each side key 53 is closed by a side extension 58 on the face plate 41. The back end of the side key 53 is open at 59 to provide access from the interior of the key to the groove 24, and allow the wire 26 to exit from the body of the connector 40 into the groove. This access is created by the back wall 52 which extends only between the arms 20 and not into the grooves 24.

The arms 20 are attached to the connectors 40 by bolts 60 which extend through the bolt holes 33 in the arms 20 and the bolt holes 61 in the side walls 55. A suitable washer 62 and nut 63 are provided for this attachment. If desired, the nut 63 may be eliminated by tapping the bolt holes 61.

Each of the lower flanges 56 extends inwardly of the arms 20 and is tapped for the reception of screws 64 and 65, which attach the base plate 66 to the body 42. The screws extend through apertures 67 and 68 in the base plate. The forward edge of the base plate is cut out at 69 for reception of the reinforcement 47. As can be seen, the lower portion of face plate 41 and the lower hole 46 are below the base plate 66.

A modified post connector 80 is shown in FIGS. 7 and 8. This connector has a face plate 81 connected to a side face 29 or 30 of the post 23 by screws 82 and 83. The screws extend through the holes 84 and 85 in the face plate 81. An elongate rectangular tube 86 is attached to the face plate 81 and has side extensions 87 which fit snugly into the groove 24. The arm 20 is held onto the connector 80 by bolts 88 which thread into the tapped nuts 89 attached in the ends of the rectangular tube 86. A central aperture 90 in the face plate 81 and the side of tube 86, and forward side reliefs 91 in the tube 86 allow the wire 26 to pass from the aperture 28 into the groove 24.

FIGS. 9 and 10 disclose an end connector 100 having a top wall 101, a bottom wall 102, side walls 103 and an end wall 104. Outwardly extending horizontal channels 105 are attached to the side walls 103 and are sized to fit snugly into the groove 24. The arms 20 are held against the connector by the bolt 106. Screws 107 are used to fasten the connector 100 to the arms. Suitable holes are provided in the side walls 103 for this purpose. The wire 26 passes from the groove 24 into the channel 105, through the side aperture 108 in the channel and the side wall 103 into the body of connector 100, and out through central aperture 109 in face plate 110 of the connector. The face plate 110 and its gasket 111 are fastened to connector 100 by screws 112.

FIGS. 11 and 12 disclose a modified end connector 120 having a central body 121 and two rectangular tubes 122 attached to side walls 123 of body 121. The central body 121 also has a bottom wall 124, a front wall 125 and a top wall 126. Side apertures 127 connect the interiors of body 121 and rectangular tubes 122. The rectangular tubes 122 are sized to fit snugly into the grooves 24. The arms 20 are held against the connector by bolt 128 which extends through the connector, and is fastened by washer 129 and nut 130. Relief sections 131 in the rear edge of the tubes 122 and the central aperture 132 in the front wall 125 allow the wire 26 to pass from groove 24 to the luminaire through the connector. Bolt holes 133 in the front wall 125 allow attachment of the luminaire to the connector. A cover plate 134 is also provided.

FIGS. 13 and 14 disclose another end connector which is similar to the connectors shown in FIGS. 1–5. This connector 140 is integral and has a front wall 141, top wall 142, bottom wall 143 and side walls 144. The side keys 145 extend outwardly from the side walls 144 and have top walls 146, bottom walls 147 and side walls 148. The front wall of keys 145 are covered by extensions 149 of front wall 141. The keys 145 are sized to fit snugly into the groove 24. The rear wall of the key is open, and the wire 26 extends from the groove 24 into the key 145 and central body of connector 140 and out the central aperture 150 in the front wall 141. Bolt holes 151 allow attachment of the luminaire. The connector also has a detachable back plate 152.

The arms 20 are held against the connector 140 by bolt 153, fastened in place by nut 154 and washer 155. The connector is held against lateral movement either by attachment to the arms 20 by screws extending through apertures 156 in the side wall 144 or the bolt 153 passing through aperture 157 in the key 145.

The FIGS. 13–16 also show a different post connector which attaches to the front and back faces of the post instead of the side faces. The connector 160 has a face plate 161 which is attached to the front or back face of the post 23 by screws 162 extending through apertures 163 in the face plate. An outwardly extending vertical channel 164 is attached to the base plate 161 and extends into the groove 25 of the post 23. An outwardly extending horizontal channel 165 is attached to the opposite side of the face plate 161 and extends into groove 24. Both channels are sized to fit snugly in their respective grooves. Again, the arms 20 are held against the connectors 160 by the bolts 153 and their associated washers 154 and nuts 155.

FIGS. 13 and 14 show the wire 26 exiting from aperture 28 into the groove 24. FIGS. 15 and 16 disclose an alternate method of carrying the wire to groove 24. In this configuration, a central aperture 166 extends through channels 164 and 165 and the face plate 161. An aperture 167 extends from the channel 27 to the groove 25. The outwardly extending legs of channels 164 and 165 provide passages in grooves 25 and 24. The wire 26 then passes through the channel 164, the aperture 166 and the channel 165 into the groove 24.

FIGS. 17 and 18 disclose another post connector. These figures illustrate a construction connector. However, it may be modified for wiring. The connector 170

is formed of two members **171.** Each of these members has a center plate **172** sized to fit face **21** or **22** of post **23,** a long leg **173** having an inner straight face **174** which fits the side face **29** or **30** of the post **23** and an outer tapered face **175,** and a short leg **176** having an outer straight face **177** and an inner tapered face **178.** As shown in FIG. **18,** the long legs **173** fit against the post **23** and the outer tapered face **175** of leg **173** wedges tightly against the inner tapered face **178** of leg **176.**

A key **179,** attached to the outer face of center plate **172,** fits snugly within groove **24.** The arms **20** are held against the connector by bolts **180** and their accompanying washers **181** and nuts **182.**

If used for wiring, key **179** would be an outwardly extending channel as shown in FIGS. **13–16** and an aperture would be provided through the channel and center plate **172** so that wire would extend between the aperture **167** shown in FIG. **15** and the groove **24.**

FIG. **19** shows a modification of the connector of FIGS. **17** and **18.** In this modification the legs are of equal length. One of the legs, **190,** has a relieved section **191** in its inner face and the other leg, **192,** has a relieved section **193** in its outer face. The faces of the relieved sections are tapered and wedge together as shown. The other inner faces of the connector are shaped to fit the post **23.**

In some configurations the luminaire is between the cross-arms. The end connectors are then turned around and the face plates are toward the post. In this construction the covered ends of the keys are relieved to admit wire **26.**

What is claimed is:

1. A connector for attaching cross-arms to standards or luminaires, allowing the passage of wires from said standards to said luminaires, and reducing the racking of the cross-arms comprising

a body defined by a pair of parallel sides, a face plate and an upper wall,

means on said face plate for attaching said body to said standard or luminaire,

said face plate defining an opening into said body,

a hollow key extending outwardly of each of said sides, said keys being parallel to each other and transverse to said face plate,

each of said sides and said keys defining an opening between said body and said key,

the end of each of said keys opposite said face plate defining an opening extending outwardly of said side,

said openings in said face plate, said sides and said keys allowing passage of wires through said connector.

2. The connector of claim **1** in which said sides are defined by side walls and said keys are channels on said side walls.

3. The connector of claim **2** in which said channels extend inwardly with the legs of said channel members extending toward said side walls.

4. The connector of claim **2** in which said channels extend outwardly with the legs of said channels extending away from said side walls.

5. The connector of claim **1** in which said body is a rectangular tubular member having upper, lower, back and front walls and said keys are extensions of said tubular member, and said face plate extends above and below said tubular body.

6. The article of claim **1** further comprising

a standard attached to said face plate, and

a pair of cross-arms attached at each of the sides of said connector, said cross-arms having grooves into which said keys fit to reduce racking of said cross-arms.

7. The article of claim **6** further comprising

a second connector attached to the cross-arms at their outer ends, the keys of said connector extending into the grooves in said cross-arms and a luminaire attached to the back wall of said second connector.

* * * * *