Nov. 22, 1966 R. B. DUGGAN 3,286,280

CARRIER

Filed Feb. 10, 1964 3 Sheets-Sheet 1

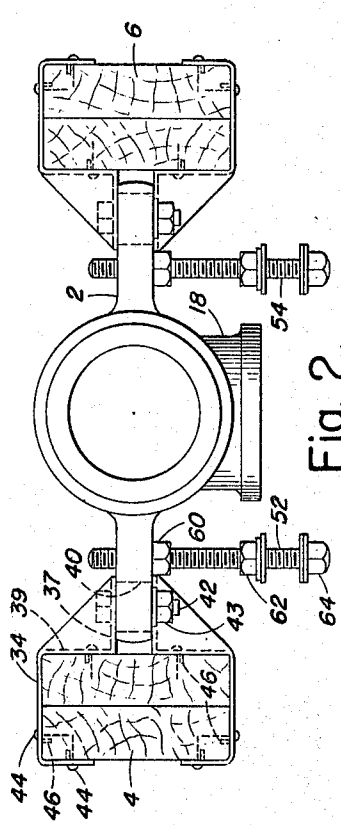

Fig. 2.

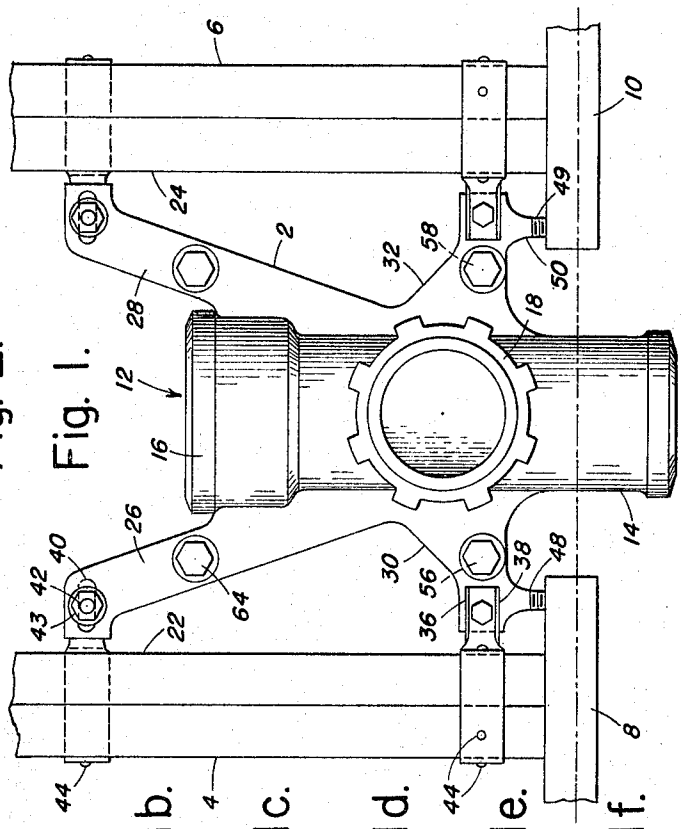

Fig. 1.

Fig. 1b.

Fig. 1c.

Fig. 1d.

Fig. 1e.

Fig. 1f.

Fig. 3.

Fig. 1a.

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Fig. 6.

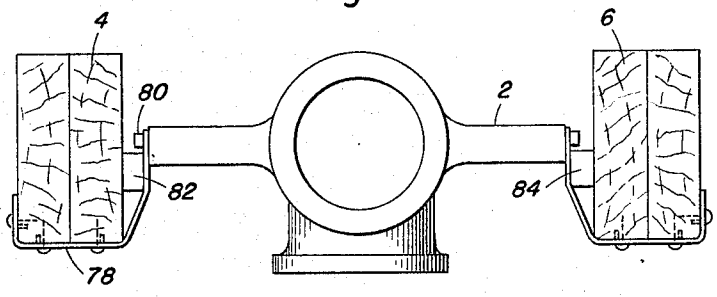

Fig. 8.

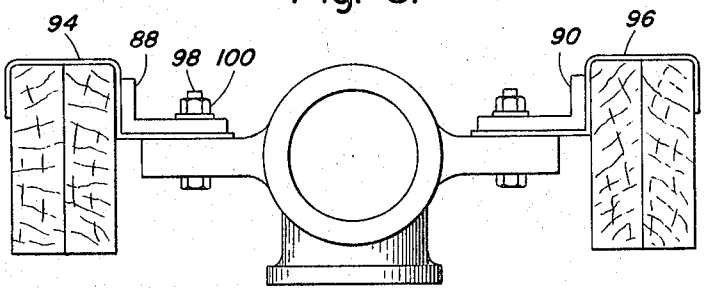

Fig. 4.

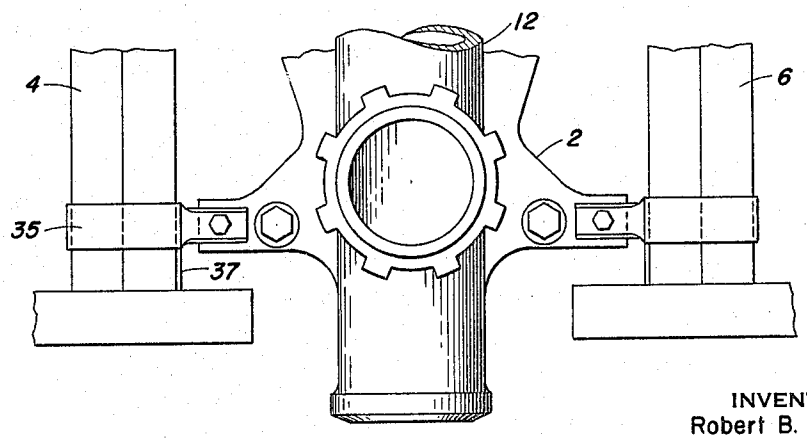

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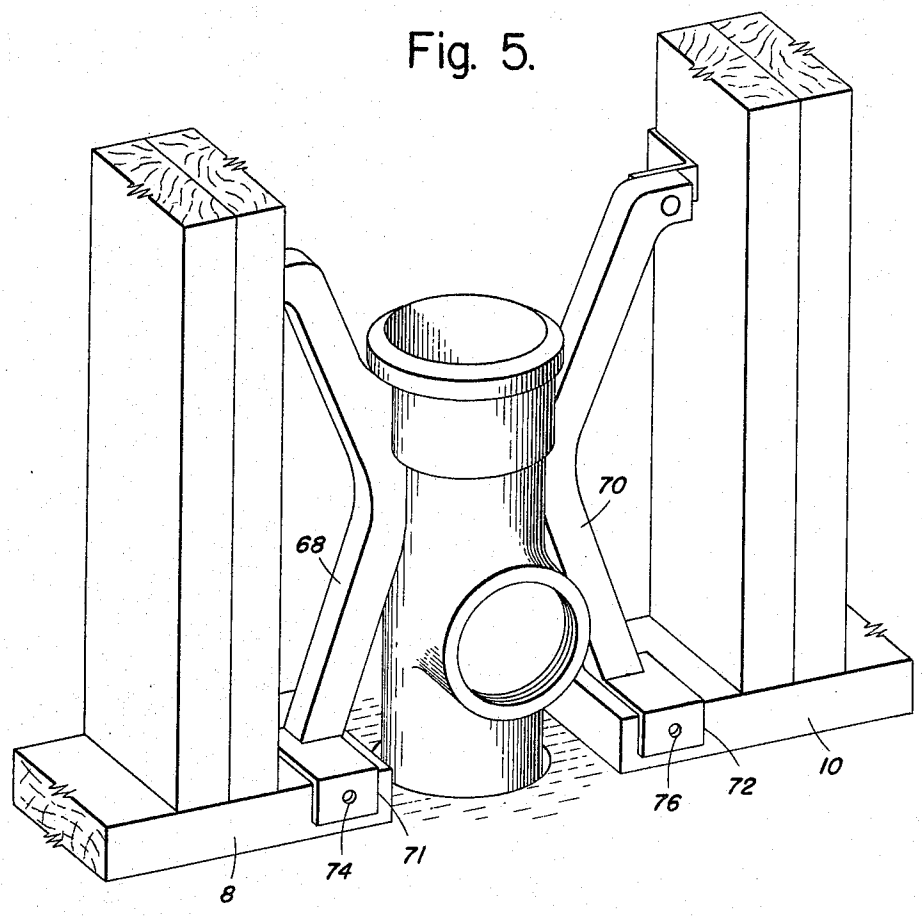
Fig. 5.



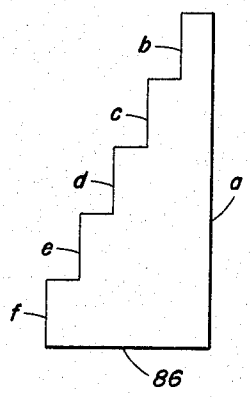


Fig. 7.

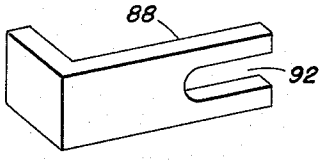


Fig. 9.

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3,286,280
CARRIER

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Filed Feb. 10, 1964, Ser. No. 343,573
16 Claims. (Cl. 4—252)

This invention relates to a mounting device and method of mounting wall hung plumbing fixtures.

The invention is particularly useful in the hanging of water closets and will be described in relation to such use, it being understood however that the invention is also useful in handling other plumbing fixtures.

Heretofore, installation of a wall hung plumbing fixture such as a water closet required accurate measuring procedure to locate the proper stud position at which mountings were to be affixed and accurate drilling or notching of the studs for attaching the mounting means. Special tools such as saws, power drills and wood chisels were also required.

According to the subject invention measuring procedure is simplified and special tools are eliminated, as is the need for drilling or notching studs.

In one aspect of my invention, mounting of a plumbing fixture on vertically positioned spaced studs of a conventional building is accomplished through flexible straps connected to a carrier and laid transversely of the studs, the lower straps having depending portions to rest on the sill plates to determine the vertical position of the carrier. The straps may be maintained temporarily connected in selected position by forming projections on the side of the strap so that such projections may be driven into the stud. Thereafter fastening means may be applied to connect the strap to the stud in a manner to develop a clamping force on the stud when the carrier is connected to support the plumbing fixture, whereby the major weight of the fixture is supported by the clamping action on the stud.

In another aspect of my invention the need for any measurement for vertical position of the carrier is eliminated by predetermined proportionment of the carrier and resting of a lower portion of the carrier on the conventional sill plates of the housing frame.

In still another aspect of my invention, the lower portion of the carrier is provided with vertically adjustable legs to effect correct vertical position.

In a further aspect of my invention lateral positioning of the carrier between the studs is facilitated by the use of shim means, adjustable connections or diverging lower legs as will be described.

It is thus an object of the subject invention to provide an improved mounting device for installing wall hung plumbing fixtures.

A further object is to provide an improved method for installing wall hung plumbing fixtures.

Another object is to provide a simple, inexpensive and reliable means for installing wall hung plumbing fixtures.

A still further object is to provide a mounting device and method reducing the time and skill required to install a wall hung plumbing fixture.

A further object is to provide a mounting device for a wall mounted plumbing fixture which requires no separate measuring means for correctly effecting the mounting.

Another object is to provide in such device means for adjustment to accommodate normal dimensional variations in stud spacing.

Other objects and features of the invention will appear as the description of the particular physical embodiments selected to illustrate the invention progresses, and from reading the accompanying drawings, wherein like numerals of reference indicate similar parts throughout the several views and wherein:

FIGURE 1 is a front elevational view of one embodiment of the mounting device of the subject invention.

FIGURE 1*a* is a sectional elevation of an adapter which may be used with the mounting of FIGURE 1.

FIGURES 1*b*, 1*c*, 1*d*, 1*e*, and 1*f* are perspective views of various tabs.

FIGURE 2 is a plain view of FIGURE 1.

FIGURE 3 is a side elevational view of the mounting device of FIGURES 1 and 2 taken through the wall with the left hand mounting means removed and also showing a portion of an attached water closet.

FIGURE 4 is a partial front elevational view of a mounting device having lower securing means modified in accordance with an additional aspect of my invention.

FIGURE 5 is a perspective view of a further modified form of mounting device in accordance with my invention.

FIGURE 6 is a plan view of a mounting device having upper securing means modified in accordance with a further aspect of my invention.

FIGURE 7 is an enlarged elevational view of a spacer member shown in FIGURE 6.

FIGURE 8 is a plan view of a mounting device having upper securing means again modified in accordance with another aspect of my invention and,

FIGURE 9 is an enlarged perspective view of a brace element shown in FIGURE 8.

Referring to the drawings, the numeral **2** indicates a carrier positioned vertically in a frame structure between adjacent horizontally spaced and vertically positioned studs **4** and **6** which are mounted on sill plates **8** and **10**. The carrier **2** has formed integrally therewith a plumbing connection **12** having one conduit portion **14** for connection to a waste pipe (not shown), another conduit portion **16** for connection to a stack (not shown), and a third conduit portion **18** for connection to a water closet **20** as shown in FIGURE 3.

Extending generally radially and in the direction of the adjacent faces **22** and **24** of the studs **4** and **6** are arms **26**, **28**, **30** and **32** by which the carrier **2** is connected to the studs **4** and **6** and to the closet **20**, as will be described.

The arms **26**, **28**, **30** and **32** are connected to the studs **4** and **6** by elongated flexible strap members **34**. In the embodiment shown in FIGURES 1 to 3 each strap **34** is bent at right angles adjacent one end and formed with integral flanges **36** and **38** to provide rigid right angular braces between which the strap is apertured for bolting to the associated arms **26**, **28**, **30** and **32**. Each of the carrier arms is slotted adjacent its free end as at **40** by which the strap is secured to the carrier arm. The purpose of the slot **40** is to allow lateral adjustment of the brace portion of the strap with respect to the carrier such that one face **37** of the brace rests against the carrier arm and the other face **39** at right angle thereto rests against the adjacent face of the associated stud. This adjustment is desirable to compensate for normal tolerance in spacing of the studs.

It is understood that an elongated slot **40** could be formed in the strap rather than in the associated carrier arm to obtain lateral adjustment. Bolts **42** passing through each strap and its associated carrier arm and securing nuts **43** are used to secure the strap to the carrier.

Referring again to FIGURE 2 it will be noted that the remainder of each strap is sufficiently long to pass around two corners of the associated stud and the free end of each strap is fastened to the outer face of the stud. In one form of the strap, the strap is pierced to form on one side one or more projecting portions or tabs **46** which serve when driven into the stud to secure the strap in

place or, alternatively to provide an initial temporary securement of the straps during positioning of the same. In the latter case fastenings **44** may be passed through the holes formed by piercing the straps. Since the holding power of the strap on the stud develops mainly from a clamping of the strap on the studs and not from the fastenings, as will be described later, the straps may be secured, as previously mentioned, by the projecting tabs of this type shown in FIGURES 1*b* to 1*f* without using separate fastenings such as nails, screws, or the like. These tabs may be readily formed merely by piercing the strap as shown in FIGURES 1*b* to 1*f*. The tabs may be triangular such as shown at **46***b* in FIGURE 1*b*, rectangular with pointed or rounded ends as shown at **46***c* and **46***d* in FIGURES 1*c* and 1*d* respectively, bent over from an edge portion of the strap as shown at **46***e* in FIGURE 1*e*, or bent as shown at **46***f* in FIGURE 1*f* such that a hammer blow to the bent tab portion will drive the free end into the stud. One or more of these tabs may be used in each strap as required.

The direction of passing the strap around the stud should preferably be in the direction opposite to the force applied to the strap from the carrier under weight of the water closet. Thus, the two upper straps are passed over the rear corners of the stud and the two lower straps are passed over the front corners of the stud. It will be understood that the straps may be made relatively thin, in the nature of light sheet metal for example, and that the holding power of the straps on the stud develops mainly from a clamping action of the straps on the studs and not from the fastenings.

In the matter of vertically positioning the straps for connection to the studs, an advantageous feature of my invention is that the carrier **2** itself serves as a template by providing depending legs **48** and **50** of predetermined length to properly position the carrier and its associated straps. Thus the straps may be connected to the carrier legs by the bolts **42** and nuts **43** and the carrier is set vertically between the studs resting with its depending legs **48**, **50** on the adjacent sill plates. The straps may then be moved laterally such that each brace face engages its associated stud and the straps wrapped around the stud and secured by sinking the strap projections **46** into the studs. Thereafter the fastenings **44**, if used, may be inserted through the straps and the nuts on the bolts tightened to form a permanent installation.

As indicated in FIGURES 1, 2 and 3 intermediate sections of the arms **26**, **28**, **30** and **32** are formed with threaded apertures to receive closet bolts **52**, **54**, **56** and **58** by which the closet **20** is secured to the carrier **2**. Suitable lock nuts **60** are provided to abut the carrier **2** and prevent rotation of the closet bolts and suitable stop nuts **62** are provided to cooperate with cap nuts **64** for holding the closet flange **66** therebetween and against the wall surface. A conventional threaded adapter or coupling and suitable packing is used to provide a water tight seal and connection between the water closet and the carrier conduit portion **18**.

Under conditions of reasonably competent carpentry in the framing of a house, no adjustments of the carrier beyond those described above should be required. However, in the event of unusual circumstances where the framing is considerably out of line, as may be encountered in the replacement of plumbing in a settled house, there may be occasion for adjusting the height of one or the other side of the carrier **2**. In such circumstances it may be necessary to insert spacers under one or the other of the depending legs **48**, **50**. Thereafter the procedure for installing the carrier remains the same with its attendant advantages. It is also contemplated that the depending legs may be formed to accept adapters to be threaded or otherwise adjustably attached to the legs for adjustment of the length thereof. One example of such adapter is shown in FIGURE 1*a* as an internally threaded member **51** adapted to be threaded on the threaded portion **49** of leg **50** and secured by a set screw **53**. Such adapters could then be used on such special installations.

Referring to FIGURE 4 there is shown therein a modification of the invention in which the two lower straps **35** are formed with depending portions **37** of predetermined length to provide proper vertical spacing for the carrier **2**. In this embodiment the lower and upper straps are connected to the carrier. The carrier is set in vertical position between the studs **4** and **6** with the strap portions **37** resting on the sill plates **8** and **9** thereby determining the verical position of all four straps. The straps are secured by taping the projections **46** thereof into the studs and, if used, thereafter passing fastenings **44** through the straps and into the studs.

Referring to FIGURE 5 there is shown therein a modification of the subject invention in which lower straps are eliminated and the carrier is provided with lower arms **68**, **70** formed with downwardly extending flanges **71** and **72** to engage the front face of the sills **8** and **10**. The flanges **71** and **72**, which may be fastened to the carrier (by means not shown) or formed integrally with the carrier, as shown, are fixed to the sill plates **8** and **10** by fasteners **74** and **76**. In this modification the lower arms **68**, **70** are made of predetermined length such that the carrier acts as a template for securing the upper straps and the installation procedure is as described for the embodiment of FIGURE 1.

Referring to FIGURE 6 there is shown therein a carrier secured by a modified form of strap **78** having an aperture adjacent one end for passing a screw **80** or other suitable fastening by which the strap is secured to the carrier. The strap is passed about two edges of its associated stud and secured thereto as described for the straps of FIGURES 1 and 2. The carrier in FIGURE 6 is maintained in a desired location between the adjacent studs by trim members **82** and **84** positioned between the strap and its adjacent stud as indicated. A preferred form of trim member is shown in FIGURE 7 and comprises a plurality of steps with each succeeding step in the direction of the end **86** of the trim member providing a greater width while maintaining surfaces *b*, *c*, *d* and *e* parallel to the surface indicated at *a*. With this form of trim member the surface *a* is placed adjacent the stud and the trim member lowered until a selected surface *b*, *c*, *d*, or *e* is in engagement with the adjacent surface of the strap. An advantage of this form of trim member is the maintenance of planar contact on both sides of the trim member and the utility of the steps in preventing the member from passing downwardly between the strap and stud should compression on the member be relieved.

Referring to FIGURE 8 there is shown a plan view of the carrier mounted to the supporting studs in accordance with a further modification of the invention in which separate right angle brace members **88** and **90** are employed. Each brace member such as **88** is formed with an elongated slot **92** adjacent the end of one leg of the brace. The slot may be open at the end as shown in FIGURE 9 or alternatively, the end of the slot **92** may be closed. In this arrangement straps **94** and **96** are each formed with an aperture adjacent one end and the remainder of the strap is passed around the edges of the stud and fixed thereto in the previously described manner. A bolt **98** is passed through the apertured carrier and strap and through the slot **92**. The brace is urged outwardly to sandwich portions of the strap between the brace and carrier and between the brace and stud as indicated and a nut **100** is tightened on the bolt. This arrangement produces an adjustable rugged connection of the carrier to the stud and is adapted to low cost manufacturing methods.

It is to be understood that any of the methods described for connecting the upper straps to the carrier may be used with any of the methods described for sup-

porting the lower portion of the carrier. Thus, any of several combinations may be used in accordance with the invention.

It is also to be understood that the connecting conduit shown and described herein as a conventional T may assume other forms and may be separately connectable to the carrier by bolts, set screws or other suitable means to provide flexibility in the form of connecting conduit while effecting standardization of the carrier and securing means.

It will be evident from the foregoing that several advantageous improvements are effected by the subject invention. No special tools are required to install the mounting device. No separate templates are required to effect proper location of the carrier. Means are provided for facilitating lateral adjustment in compensation for normal tolerance in erecting frame members. No drilling, notching or other carpentry is required. The strap connecting means being flexible and relatively thin offer no interference to the installation of sheet rock or wall board, are easily bent into position on the stud, and yet through clamping action on the stud, afford a secure and reliable support means. The device is adapted to low cost manufacturing methods and requires less time and skill to install than conventional mounting devices.

It is to be understood that the invention is not limited to the precise constructions shown and described, but that changes and modifications are contemplated as fall within the spirit of the invention and the scope of the appended claims.

I claim:

1. A mounting device for supporting a plumbing fixture from spaced vertically positioned frame members comprising, a carrier, said carrier having sections formed to receive connecting means for supportingly connecting the plumbing fixture thereto and apertured portions extending in the direction of the frame members, together with means for connecting said carrier portions to said frame members, said means comprising elongated mounting straps, means for connecting one end portion of each of said straps to an associated carrier portion, said straps being sufficiently flexible to wrap transversely about an associated frame member in a direction opposite and tensile force to be applied to said straps by the weight supported by said carrier, said straps being sufficiently long to overlap at least two corners of said frame members, and means for securing the free end of each strap to its associated frame member.

2. A mounting device as set forth in claim **1** and in which the ends of said straps which attach to said carrier are bent and reinforced to form rigid angular braces, each of said braces having one leg apertured for connection to said carrier, its other leg being adapted to seat against the frame member.

3. A mounting device as set forth in claim **1** and including right angle bracket members, each bracket member having one leg formed to receive a connector means securing the bracket to an associated carrier portion with one of said straps positioned between said bracket and carrier portion and between said bracket and frame member.

4. A mounting device as set forth in claim **3** and in which said one leg of each bracket is slotted to provide lateral adjustment of said bracket with respect to said carrier.

5. A mounting device as set forth in claim **1** and in which spaced portions of said straps are pierced to form projecting tabs which may be forced into said frame members to secure said straps in position.

6. A mounting device for supporting a plumbing fixture from horizontally spaced vertically positioned frame members and above horizontal sill plates fixed to the frame members, comprising a carrier, means attached to said carrier for supporting the plumbing fixture therefrom, said carrier having upper outwardly extending portions for attachement to the frame members and lower outwardly extending portions to rest on said sill members, said lower portions having downwardly extending flange portions to engage a vertical side of the sill plates to prevent inward movement of said lower portions, said flange portions being formed to receive a fastening to secure said flanges to the sills, means for connecting said upper portions to the frame members to prevent outward movement thereof, said lower carrier portions being of a predetermined length to provide proper vertical position for the plumbing fixture when said lower portions rest on said sill plates.

7. A mounting device as set forth in claim **6** in which the means for connecting said upper portions to the frame members comprise elongated straps, each strap having one end connected to one of said upper carrier portions and being of sufficient length that its other end may be secured to the remote side of the frame member such that said strap passes tranversely over two rear corners of its associated frame member.

8. A mounting device as set forth in claim **7** and in which said elongated straps are pierced to form projecting portions to secure said straps to the frame members.

9. A mounting device as set forth in claim **7** and comprising spacer elements for wedging between the carrier end of each strap and its adjacent frame member to maintain a desired spacing of said carrier between the frame members.

10. A mounting device as set forth in claim **9** and in which said spacer elements have one stepped side to provide for lateral adjustment while effecting planar contact.

11. A mounting device as set forth in claim **6** and in which the means for connecting said upper portions to the frame members comprise elongated straps, each strap having secured at one end thereof a right angle brace apetured for connection to its associated upper carrier portions, the remainder of said strap being sufficiently long to wrap tranversely about its associated frame member to pass over the two rear corners thereof, the other end of said strap being apertured to receive fastenings for fastening to the frame member.

12. A mounting device as set forth in claim **11** and in which said brace is formed with an elongated aperture to provide for lateral adjustment of said carrier with respect to the frame members.

13. The mounting device as set forth in claim **11** and in which the upper carrier portions are formed with elongated apertures to provide for lateral adjustment of said carrier with respect to the frame members.

14. A mounting device for supporting a plumbing fixture from horizontally spaced vertically positioned frame members and above horizontal sill plates fixed to the frame members comprising, a carrier, means attached to said carrier for supporting the plumbing fixture therefrom, said carrier having upper extending legs and lower extending legs, elongated straps for connecting each of said legs to an adjacent frame member when said carrier is positioned between adjacent internally facing sides of the spaced frame members, each of said straps being of sufficient length to fasten one end portion thereof to a side of an associated frame member opposite its internally facing side and to connect its other end to an associated carrier leg adjacent said internally facing side, means for attaching the other end of each of said straps to an associated carrier leg, each of the lower legs of said carrier having downwardly extending portions of predetermined length for engaging the respective sill plates to vertical position said straps on their respective frame members.

15. A mounting device as set forth in claim **14** and in which said elongated straps are pierced to form projecting portions to secure said straps to the frame members.

16. A mounting device for supporting a plumbing fixture from horizontally spaced vertically positioned studs mounted on horizontally positioned sill plates comprising a carrier, means for supportingly connecting a plumbing fixture to said carrier, said carrier having at least two upper and two lower extending portions, a plurality of elongated straps for connecting said corner portions to adjacent studs, each of two of said straps having an end formed to receive coupling means for connecting the strap to one of said carrier upper portions and a length sufficient to pass the free end of the strap over the rear edges of its associated stud, each of two additional of said straps having an end formed to receive coupling means for connecting the strap to one of said carrier lower portions and a length sufficient to pass over the front edges of its associated stud, each of said additional straps being

formed with a depending portion of predetermined length to rest on its associated sill plate to position the carrier in correct vertical position.

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