United States Patent

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[54] **EXPANSION CLIP AND METHOD OF INSTALLING RECESSED FIXTURES WITH SUCH CLIPS**
2 Claims, 10 Drawing Figs.

[52] **U.S. Cl.** **287/189.35,** 85/71, 174/58, 220/3.5, 220/3.6
[51] **Int. Cl.** **F16b 2/04**
[50] **Field of Search** ..... 287/189.35, 189.36 C, 189.36 D, 20.92 C, 137; 248/27; 85/71; 220/3.5, 3.6; 174/58

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ABSTRACT: An expansion clip includes a pair of angularly related legs which intersect at a fold line and are provided with laterally turned ears at their opposite ends. The expansion clip fits at the corner formed by the intersection of a sidewall and an outwardly turned flange on a recessed fixture, and is secured to the fixture by a screw which extends through the flange and threads into the far end of the clip. When the screw is tightened, the angle between the legs decreases so that the clip transversely expands and lodges between the sidewall of the fixture and the portion of the wall construction bounding the recess into which the fixture is installed.

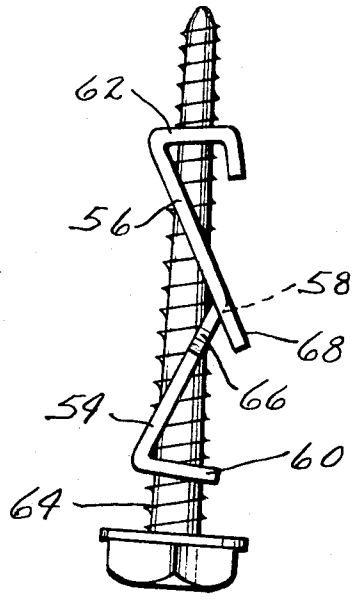


FIG. 1

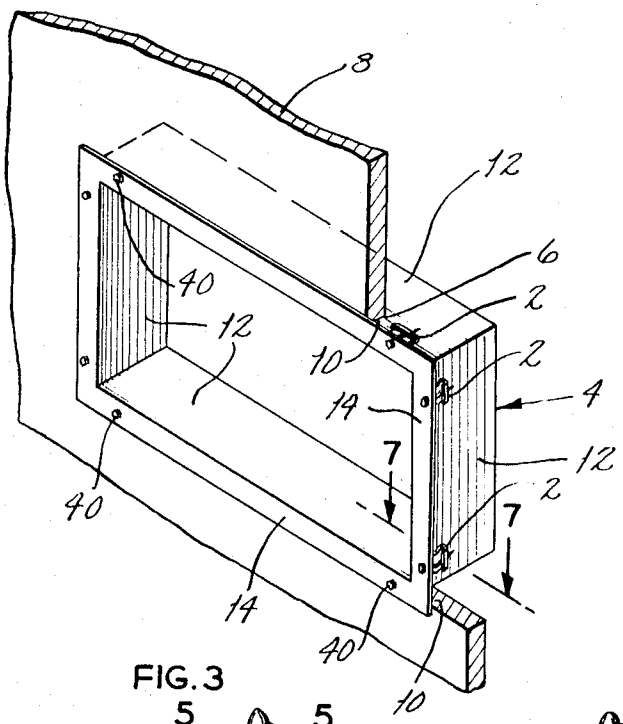


FIG. 2

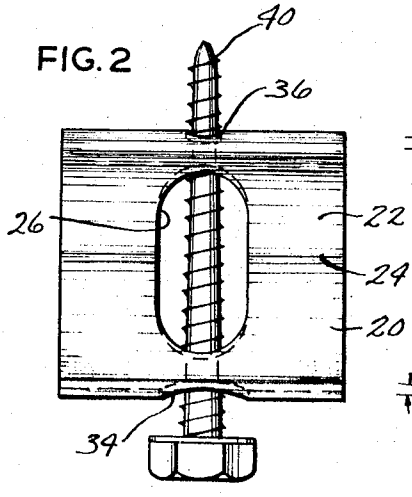


FIG. 3

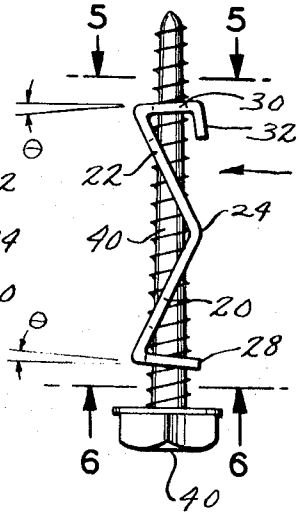


FIG. 4

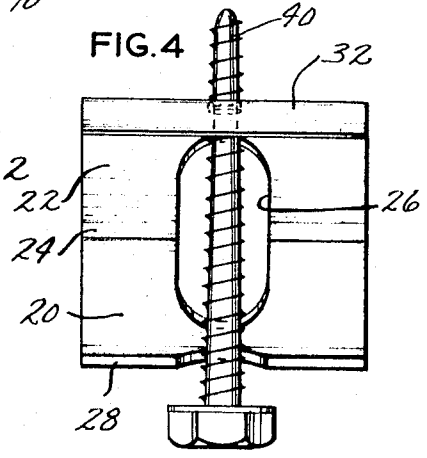


FIG. 5

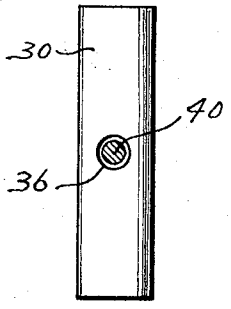
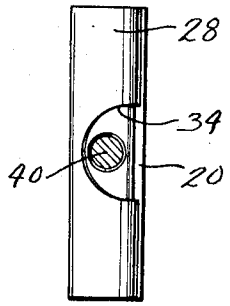


FIG. 6



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FIG. 7

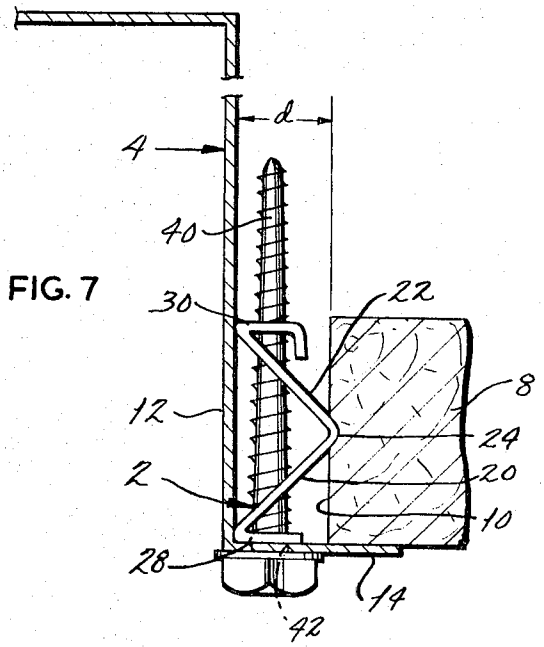


FIG. 8

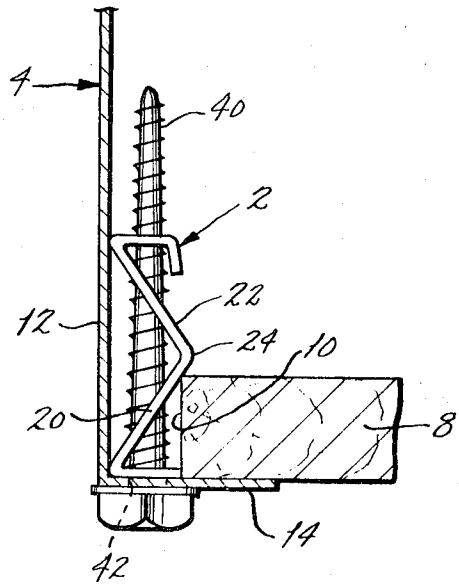


FIG. 9

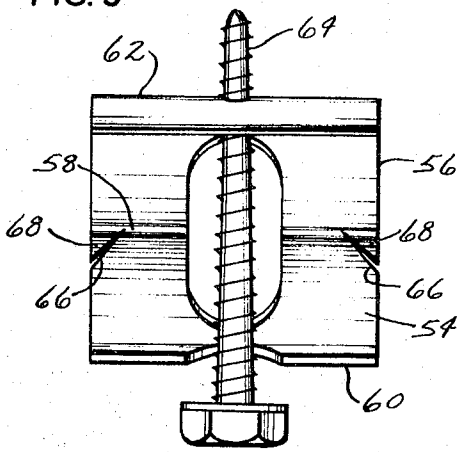
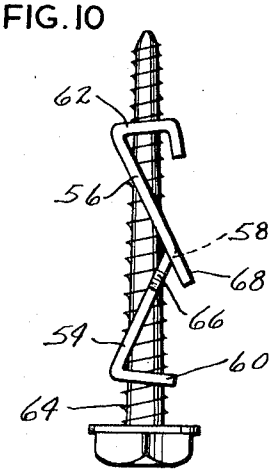


FIG. 10



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EXPANSION CLIP AND METHOD OF INSTALLING RECESSED FIXTURES WITH SUCH CLIPS

BACKGROUND OF THE INVENTION

This invention relates in general to mounting devices and a method of installing fixtures and, more particularly, to an expansion clip and a method of installing recessed fixtures with such clips.

While recessed cabinets, appliances, and the like are more attractive in appearance than their counterparts which merely mount against the face of a wall, they are considerably more difficult to install. Aside from forming the recess in the wall, the primary difficulty encountered in installing such fixtures is securing the fixture firmly to the wall itself.

SUMMARY OF THE INVENTION

One of the principal objects of the present invention is to provide an expansion clip for securing recessed fixtures to wall constructions. Another object is to provide an expansion clip which is concealed within the recess and is transversely expanded by a self-tapping screw, only the head of which is exposed. A further object is to provide an expansion clip which firmly engages the portion of the wall construction against which it bears so as to securely fasten the fixture within the opening. An additional object is to provide an expansion clip which is simple in construction and economical to manufacture. Still another object is to provide a method of mounting recessed fixtures with mounting clips of the type stated. These and other objects and advantages will become apparent hereinafter.

The present invention is embodied in an expansion clip having a pair of angularly related legs and means for decreasing the angle between the legs so that the clip can be transversely expanded and lodged between a recessed fixture and the portion of a wall construction in which the recess for the fixture is formed. The invention further resides in a process for installing a fixture with such a clip. The invention also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

DESCRIPTION OF THE DRAWINGS

In the accompanying drawings which form part of the specification and wherein like numerals and letters refer to like parts wherever they occur:

FIG. 1 is a perspective view, partially broken away and in section, of a fixture installed in a wall construction by means of expansion clips constructed in accordance with and embodying the present invention;

FIGS. 2, 3 and 4 are side elevational views of the expansion clip in its unexpanded configuration;

FIGS. 5 and 6 are sectional views taken along lines 5—5 and 6—6, respectively, of FIG. 3;

FIG. 7 is a sectional view taken along line 7—7 of FIG. 1 and showing the clip transversely expanded and lodged between the fixture and wall construction;

FIG. 8 is a sectional view similar to FIG. 7 but showing the clip lodged against a somewhat thinner wall construction; and

FIGS. 9 and 10 are elevational views of a modified expansion clip in its unexpanded configuration.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now in detail to the drawings, 2 designates an expansion clip for securing a fixture 4 within a recess 6 formed in a wall construction 8. The recess 6 is bounded at least in part by a fairly rigid and firm material having laterally presented gripping surfaces 10 which are located adjacent to the expansion clip 2. In the case of heavier recessed fixtures 2 such as space heaters the material forming the surfaces 10 should consist of wood, whereas in the case of lighter recessed fixtures 2 such as medicine cabinets conventional wallboard will suffice. The fixture 4 includes a sidewall 12 which is spaced inwardly a distance *d* (FIG. 7) from the end face 10 of the wall construction 8, and a wall flange 14 which projects across the outer margins of the recess 6 and overlies the surrounding front surface of the wall construction 8. The clip 2 fits within the space between the end face 10 on the wall construction 8 and the sidewall 12 on the fixture 4, and in its unexpanded or initial configuration its width is slightly less than the dimension *d*.

Turning now to FIGS. 2–6, the clip 2 resembles the shape of the Greek letter sigma and includes a pair of angularly related center legs 20 and 22 which intersect along a fold line 24. The center legs 20 and 22 are further provided with a common cutout 26 which is disposed centrally thereof and extends a substantial distance longitudinally through each leg 20 and 22. At its remote end located opposite to the fold line 24 the leg 20 is bent reversely toward the fold line 24 in the formation of an abutment ear 28 and, similarly, the leg 22 at its remote or opposite end is also bent reversely toward the fold line 24 in the formation of an end ear 30. Being reversely bent, the ears 28 and 30 are located at acute angles relative to their respective legs 20 and 22, and they are furthermore slightly divergent with respect to one another. The end ear 30 merges into a short lip 32 which projects toward the fold line 24 and imparts rigidity to the ear 30, while the abutment ear 26 is provided with a semicircular cutout 34 which aligns with the common cutout 26 in the legs 20 and 22, as well as with a circular aperture 36 centrally disposed in the end ear 30. The diameter of the aperture 36 is such that it will accept the lead end of a self-tapping screw 40 so that when the screw 40 is turned it will thread into the end ear 30. The length of the screw 40 exceeds the distance between the ears 28 and 30 plus the thickness of the wall flange 14 on the fixture 4. Normally, the clip 2 is supplied with the screw 40 extending through the center of it and threaded partially into the aperture 36. When the screw 40 is restrained in this manner, it is disposed within the cutouts 26 and 34, and the perpendiculars to its axial centerline at the cutout 34 and aperture 36 are presented a slight angle θ (FIG. 3) to the ears 28 and 30. This angle θ should approximate 5°. The clip 2 possesses substantial width, and indeed its width measured along the junctures of the legs 20 and 22 and the ears 28 and 30 to which they are respectively attached is greater than its length, that is the distance between the ears 28 and 30. This prevents the clip 2 from turning or twisting as the screw 40 is tightened or in other words gives the clip 2 great stability.

The clip 2 is preferably stamped into the aforementioned sigma configuration from a suitable sheet metal such as steel or aluminum.

OPERATION AND INSTALLATION

To install and secure the fixture 4 in the recess 6 (FIGS. 1 and 7), a hole 42 is punched or drilled in the wall flange 14 in close proximity to the sidewall 12 and at the location on the fixture 4 at which it is desired to emplace the expansion clip 2. With the fixture 4 removed from the wall construction 8, the expansion clip 2 is fitted into the corner formed by the sidewall 12 and the wall flange 14 and is oriented such that the abutment ear 28 facewise abuts the wall flange 14 and the far ends of the center legs 20 and 22 bear against the sidewall 12, in which case the fold line 24 will point away from the sidewall 12. Next the cutouts 34 and 26 are aligned with the hole 42, and the lead end of the screw 40 is passed through them and threaded into the aperture 36. The screw 40 is advanced through the end ear 30 until the abutment ear 28 bears snugly against the rear face of the flange 14. At this point, rotation of the screw 40 is terminated to avoid deforming the clip 2, By reason of the fact that the ears 28 and 30 are not presented truly at right angles to the axial centerline of the screw 40, but are angled slightly beyond such a disposition, the clip 2 will be swung toward and maintained snugly against the sidewall 12 as the screw 40 draws it into position. Generally, more than one expansion clip 2 is installed on the fixture 4 in this manner, the number utilized being dependent on several considerations such as the weight and size of the fixture 4, the nature of the

fixture 4 including its intended use, and the availability and nature of the gripping surface 10.

Once the expansion clips 2 are installed on the fixture 4, the fixture 4 is inserted into the recess 6 and urged rearwardly until its wall flange 14 engages the outer surface of the wall construction 8. Thereafter, the heads of the screws 40, which are the only portions of the clips 2 exposed, are turned successively such that all of the clips 2 are transversely expanded a uniform amount.

Turning now to any one of the individual clips 2 (FIG. 7), as its respective self-tapping screw 40 is rotated the clip 2 is longitudinally collapsed, or in other words, its end ear 30 is drawn toward it abutment ear 28, and this of course decreases the angle of convergence between the center legs 20 and 22. Since the ends of the legs 20 and 22 at the points where they merge into the ears 28 and 30, respectively, are disposed against the sidewall 12, that side of the clip 2 is laterally stabilized, and the fold line 24 is, accordingly, driven away from the sidewall 12. In time the fold line 24 will engage the gripping surface 10 and with continued rotation will bite into that surface, securing the fixture 4 to the wall construction 8. Moreover, during this continued rotation the fold line is drawn toward flange 14, and this in turn draws the flange 14 rearwardly into tight abutment with the front surface of the wall construction 8. If the recess 6 is properly cut as can reasonably be expected, the screws 40 can be fully advanced one by one in succession with only slight and unobjectionable displacement of the fixture 4 relative to the wall 8. The clips 2 have sufficient capacity insofar as their ability to expand laterally is concerned to accommodate normal variances in the dimension *d* (FIG. 7). Moreover, when all of the clips 2 have been expanded the fixture 4 will be centered in the recess 6. Thus, when the fixture 4 is installed each one of its sidewalls 12 will be spaced from its opposed gripping surface 10, and this is desirable from a safety standpoint when the fixture 4 is a heating device such as a wall mounted space heater.

The depth of the gripping face is not critical and may be less than the expanded length of the clip 2, or for that matter, even the expanded length of the leg 20. In the latter case, as is best illustrated in FIG. 8, the leg 20 tends to extend across the rear margin of the gripping surface 10 so that the end of the material on which the gripping surface 10 exists is more or less captured between that segment of the leg 20 located in juxtaposition to the fold line 24 and the wall flange 14.

MODIFIED EMBODIMENT

It is possible to provide a modified expansion clip 50 which is very similar to the clip 2 and includes center legs 54 and 56 which intersect at a fold line 58, an abutment ear 60, an end ear 62, and a self-tapping screw 64 which extends through the clip 50 and threads into the ear 62. The center leg 54, however, during the initial stamping operation is provided with a pair of slits 66 which extend diagonally inwardly at equal angles to each of the side margins of the leg 54 and terminate at about the fold line 58. Consequently, when the legs 54 and 56 are subjected to the further stamping operation which bends the legs 54 and 56 such that they are disposed at angles to one another, those portions of the leg 54 located outwardly from the slits 66 will not bend, but will remain planar with the leg 56 so as to form a pointed continuation of the leg 56. In other words, the portions of the leg 54 located outwardly from the slits 66 form prongs 68 which project from the leg 56 at the fold line 58. By reason of the fact that these prongs 68 are in

effect on the leg 56, they project toward the flange 14 on the fixture 4 and will pierce the gripping surface 10 of the wall construction 8 as the end ear 62 is drawn toward the abutment ear 60 by the self-tapping screw 64.

Removal of the fixture 4 from the wall recess 6 is easily accomplished by removing the screws 40 and pulling the fixture outwardly from the recess 6. The clips 2 and 50 may or may not remain in the recess 6, depending on how tightly they are embedded in the gripping surface 10 of the wall construction 8.

This invention is intended to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

I claim:

1. An expansion clip for securing a fixture in a recess formed in a wall construction, the fixture having a sidewall which projects into the recess and a flange which projects outwardly from the sidewall substantially perpendicular thereto; said expansion clip comprising first and second angularly related legs connected to and formed integral with each other at a fold line, the legs having remote ends spaced from and disposed generally parallel to the fold line and positioned adjacent to the fixture sidewall whereby the fold line is spaced further outwardly from the fixture sidewall, the legs having a common cutout which extends through the fold line and away from it toward the remote ends of the legs, an abutment ear formed integral with the first leg at the remote end thereof and projecting away from the fixture sidewall, the abutment ear further being in abutment with the fixture flange and having a cutout which aligns with the common cutout in the legs, the included angle between the fist leg and the abutment ear being an acute angle, and end ear formed integral with the second leg at the remote end thereof and projecting away from the fixture sidewall, the end ear having a threaded aperture which aligns with the common cutout in the legs and with the cutout in the abutment ear, the included angle between the end ear and the second leg being an acute angle, a lip on the end ear and bent at an angle thereto for reinforcing the end ear, and a headed screw extending through the fixture flange and the cutouts in the abutment ear and legs and threaded into the threaded aperture so that when the screw is turned the end ear will be drawn toward the abutment ear and the fixture flange against which the abutment ear abuts, thereby decreasing the angle between the legs and causing the fold line to move away from the fixture sidewall, whereby the clip will become lodged between the fixture sidewall and the side of the recess in the wall construction and will secure the fixture in the wall construction, the width of the clip at the juncture of the end ear and second leg being at least as great as the distance between the end and abutment ears so that the clip possesses substantial width adjacent to the fixture sidewall and is stable as the screw is tightened, the abutment ear being canted slightly with respect to a plane perpendicular to the axis of rotation for the screw and the cant being in a direction which urges the remote end of the second leg toward and against the fixture sidewall when the abutment ear is brought into snug abutment with the fixture flange by the screw, whereby the clip is held tightly against the fixture wall to facilitate insertion of the fixture in the recess.

2. An expansion clip according to claim 1 wherein a portion of one of the legs continues beyond the fold line as a prong for engaging the portion of the wall bounding the recess.