

Oct. 12, 1965

D. S. COX

3,210,776

SELF ADJUSTING, RELEASABLE APPLIANCE MOUNTING STRUCTURE

Filed April 15, 1964

2 Sheets-Sheet 1

Fig. 1.

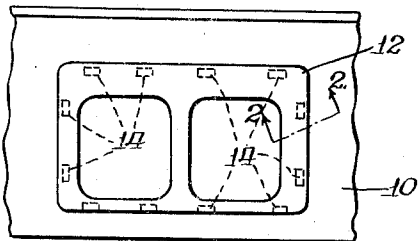


Fig. 2.

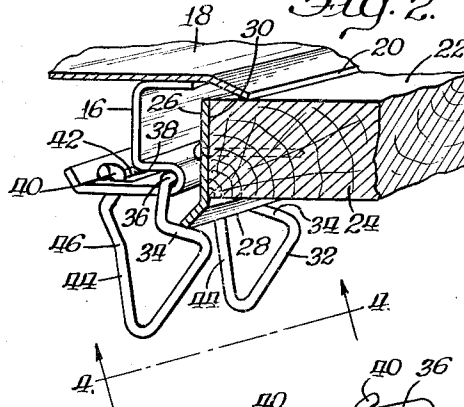


Fig. 3.

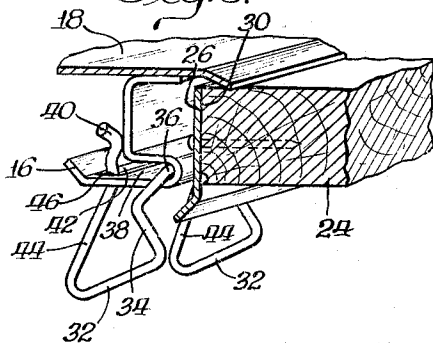


Fig. 4.

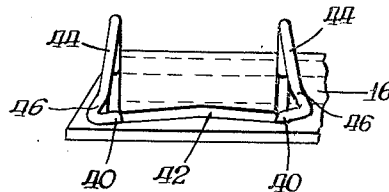


Fig. 5.

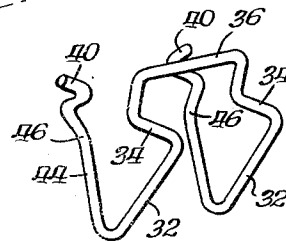


Fig. 6.

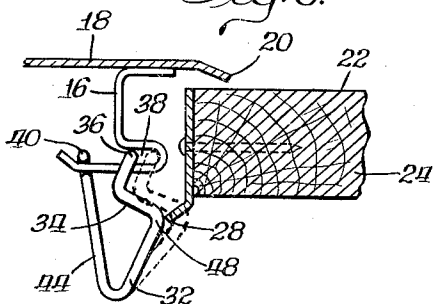


Fig. 8.

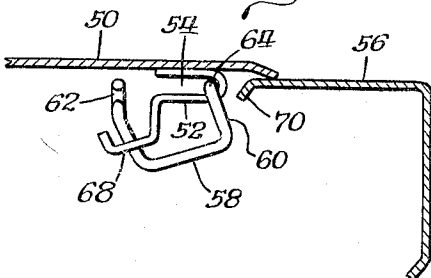
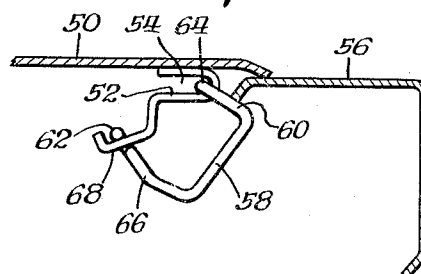


Fig. 7.



INVENTOR.

Darwin S. Cox

Oct. 12, 1965

D. S. COX

3,210,776

SELF ADJUSTING, RELEASABLE APPLIANCE MOUNTING STRUCTURE

Filed April 15, 1964

2 Sheets-Sheet 2

Fig. 9.

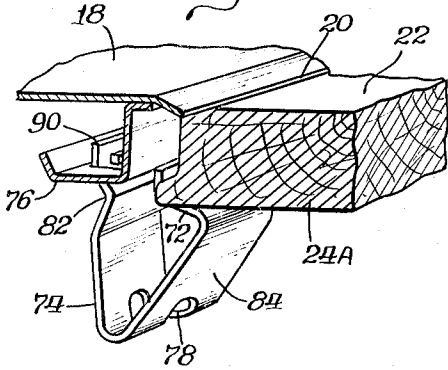


Fig. 10.

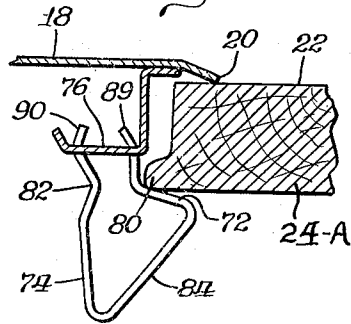


Fig. 11.

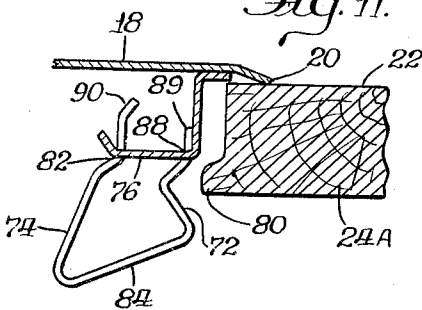


Fig. 12.

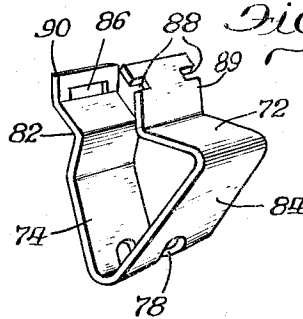


Fig. 13.

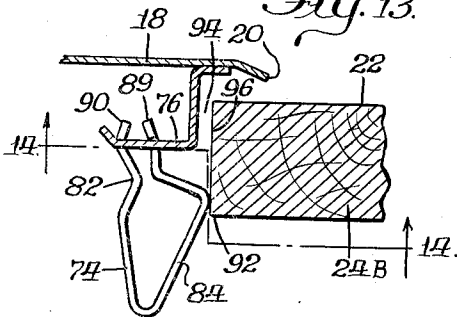


Fig. 14.

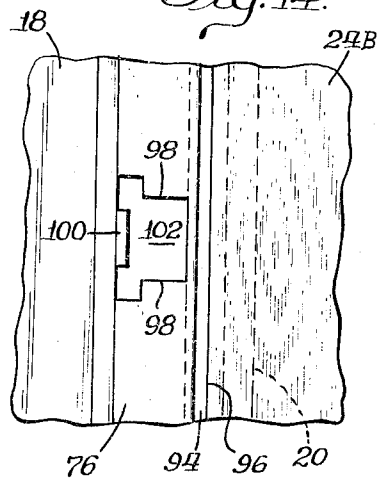
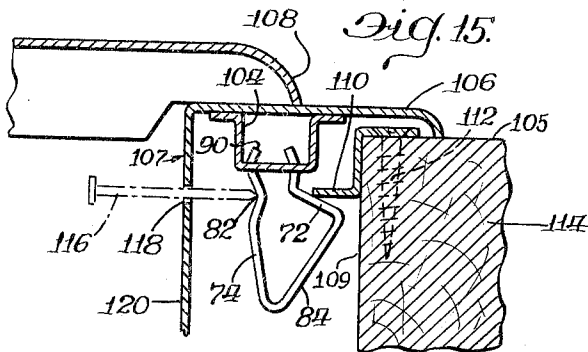


Fig. 15.



INVENTOR.

Darwin S. Cox

1

3,210,776

SELF ADJUSTING, RELEASABLE APPLIANCE MOUNTING STRUCTURE

Darwin S. Cox, 10712 S. Bell Ave., Chicago, Ill.

Filed Apr. 15, 1964, Ser. No. 359,920

11 Claims. (Cl. 4-187)

This application is a continuation-in-part of application Serial Number 261,574, now abandoned, filed in my name February 26, 1963.

This invention relates to the mounting of peripherally flanged appliances, such as sinks, range units, etc., into counter tops, walls, or cabinets, and/or mounting of panels or removable sections of appliances, walls, or cabinets.

More particularly it relates to a self adjusting, self locking mounting structure or device for tightly securing the appliance or panel in fixed position. The device is quickly releasable for removal of the unit when necessary, without the need of screw drivers or other tools commonly required for installations of this type.

The manufacturers of appliances such as sinks and range units, and those who install such units, have long felt the need of a simple device that would reduce the installation time and eliminate the time consuming assembly of screw type devices. Such screw type clamping devices generally require removal of the counter top or cabinet or that the installer work in very cramped quarters in the cabinets while fastening the appliance in place, or when removing same. Often in such cramped quarters the appliance is not properly secured, due to the difficulty of correctly placing and tightening such screw type devices while working in cramped quarters.

One object of this invention is to provide a mounting structure or device which properly draws the edge of the appliance against the mounting surface to form a tight seal.

Another object is to provide an assembly device which reduces time and labor required for the appliance installation.

A further object is to provide a device which can be located in fixed position at the factory, or remote from the appliance receiving aperture, and will remain in proper location on the unit through repeated assembling and/or removal of the unit.

A still further object of the invention is to provide a structure which can be installed into a counter or appliance base without need for gaining access to cramped spaces under counters or behind such openings.

An additional object of the invention is to provide a mounting structure which permits the clamping force to be quickly released for removal of the appliance when necessary.

Another object of the invention is to provide a structure which eliminates screw type adjustments, thereby reducing the chance of cracked enamel, warped or distorted flanges, etc., which are often caused by improperly adjusted screws of other mounting devices.

A further object of the invention is to provide a means of quickly and accurately resetting the clamping mechanism after removing the appliance, so that it is again ready for installation.

Another object is to provide a structure which has enough flexibility to automatically adjust to normal variation of dimensional tolerances of appliance apertures, while retaining the tight sealing and clamping action of the structure.

Another object of the invention is to provide a mounting structure which embraces all of the desired features of minimum installation time, tight sealing action, sufficient flexibility to automatically adjust to size of aperture, eliminates screw type adjustments, quickly releasable for

2

removal of the appliance when necessary, remains in correct location after release and removal of the appliance, and can be quickly reset ready for reassembly into the aperture provided for the appliance.

Other objects of this invention will appear in the following description and appended claims, references being made to the accompanying drawings forming a part of this specification, wherein:

FIGURE 1 is a plan view of a sink-countertop assembly utilizing one embodiment of the invention,

FIGURE 2 is a fragmentary sectional perspective view as seen at line 2-2 in FIGURE 1,

FIGURE 3 is a fragmentary sectional perspective view similar to FIGURE 2, but with the spring shown in release position,

FIGURE 4 is a fragmentary view of the spring and spring retaining member as seen from line 4-4 in FIGURE 2,

FIGURE 5 is a perspective view of the spring before it is assembled to the spring retaining member,

FIGURE 6 is a sectional view showing the movement of the spring during assembly of the appliance into the opening,

FIGURE 7 is a fragmentary sectional view showing a second embodiment of the invention as seen in the locked position,

FIGURE 8 is a fragmentary sectional view of the embodiment in FIGURE 7 as it would appear in the release position,

FIGURE 9 is a fragmentary perspective view of an alternate design wherein the clip is of flat spring material, FIGURE 10 is a fragmentary side view of the assembly shown in FIGURE 9,

FIGURE 11 is a fragmentary side view of the clip assembly shown in FIGURES 9 and 10, with the clip in the unlatched position,

FIGURE 12 is a perspective view of the clip only, as shown in FIGURE 9,

FIGURE 13 is a fragmentary side view of similar alternate embodiment showing retracting action of clip during installation of appliance.

FIGURE 14 is a fragmentary sectional view taken at line 14-14 of FIGURE 13 showing the retainer notch.

FIGURE 15 is a fragmentary sectional view of another embodiment suitable for wall type ovens and the like.

Describing the invention in detail and directing your attention to FIGURE 1, there is shown a conventional counter top 10 having an aperture therein to receive a conventional sink appliance 12. The outer edge of the sink flange is larger than the opening in the counter and contacts the top surface of the counter. A plurality of clips 14 are shown in phantom spaced along the flange of the appliance in FIGURE 1.

FIGURE 2 shows channel like spring retaining member 16 attached to the sink flange 18. Outer edge 20 of the sink flange 18 is seated against the surface 22 of the counter top 24. A nailing strip 26 is shown attached to the inner edge 30 of the opening in the counter top 24. It may be possible to omit the nailing strip on some types of installations. Some alternate designs where the nailing strip is omitted are shown in FIGURES 7, 10 and 13. The main function of the nailing strip, as shown here is to permit greatest variation in size of opening and provide a uniform distance from the top surface 22 of the counter top 24, to the pressure clamping area 34 of the spring 32.

Spring 32 is shown in FIGURE 2 in the locked position. In this position, portion 34 of the spring 32 is wedged against the flange 28 of the nailing strip 26. The intermediate portion 36 of the spring 32 is confined in a groove 38 formed in the spring retaining member

3

16. The two hooked ends 40, 40 of the spring 32 are fitted into notches or grooves 42, formed in retainer member 16. In this position the hooked ends are locked into the spring retainer element so as to hold the spring ends firmly in position.

FIGURE 3 shows the same assembly as in FIGURE 2, but with the spring in the released position. Here the two legs 44, 44 of the spring member have been forced slightly together, thereby releasing the grip of the hooked ends 40, 40. It will be understood that as the grip of the hooked ends 40, 40 is released the clamping force of the portion 34 of the spring, wedged against the nailing strip 26, causes the spring to pivot on its intermediate portion 36 and the legs 44, 44 are forced to slide upward into the notch 42 of the spring retaining member 16. As the spring pivots in this manner the portion 34 of the spring, moves away from the edge 28 of the nailing strip 26, thereby freeing the clamping action and permitting the appliance to be easily removed. Bends 46, 46 are provided in the legs of the spring so that the spring will remain in the released position during removal of the appliance.

It will be noted that the releasing of the clamp force of the spring can be quickly accomplished by pressing the legs 44, 44 between the thumb and finger, and that no screwdriver or other tool is required to release or adjust the pressure of this device.

FIGURE 4 gives a clear view of the notch 42 as seen from the underside of the spring retaining element 16 and shows how the hooked ends 40 of the legs 44, 44 of the spring 32 are anchored into the notch 42. It should be understood that the channel like spring retaining element 16 can be made as one long channel, having several springs spaced along its length, or, it may be desirable in some applications to have a separate spring retaining element for each spring.

FIGURE 5 shows the spring separate so the intermediate portion 36, which slides and pivots in the groove 38 of the retainer element 16, can be clearly seen.

FIGURE 6 shows the action of the spring as the appliance is being forced into the opening. Edge 20 of the appliance flange 18 is not yet touching the top surface 22 of the counter 24. As the hump 48 of the spring passes over the edge 28 of the strip 26, the intermediate portion 36 of the spring is forced to retract in the groove 38 of the retainer element 16. When the hump 48 has passed over the edge 28, the tension of the spring forces the sloping portion 34 of the spring clip 32 to thrust outwardly and to wedge tightly against the nailing strip edge 28, as shown in FIGURE 2. This action provides added flexibility to automatically adjust to normal dimensional tolerances and insures maximum wedge like clamping pressures.

FIGURE 7 shows an alternate design incorporating the same general principle. Here a spring retaining element 52 is attached to a panel 50 and held tightly against corner member 56 of an appliance, by spring 58. Here again the portion 64 of the spring rides in groove 54 formed in the retaining member 52. The hooked ends 62 of the legs 66 of the spring 58 are anchored into slots in portion 68 of the retaining element 52.

FIGURE 8 shows the hooked ends 62 released and the spring 58, pivoted on its intermediate portion 64, has released the clamping pressure of area 60 from the edge 70 of the corner member 56. The panel is ready to be removed.

FIGURES 9, 10, and 11 show various views employing an alternate design of clip made of flat spring material instead of wire. The clip retainer which is mounted to the underside of the appliance flange 18, is also of modified design. The modified clip and retainer bear new numbers 74 and 76 respectively. For purposes of clarification the spring clip 74 is shown separate in FIGURE 12, and FIGURE 14 provides a view of the modified

4

spring retaining member 76, as seen from line 14—14 of FIGURE 13.

In the clip 74 a cut out area 78 is provided to obtain desired flexing of the spring clip in this bend area. The clip is so designed as to provide a surface 84 formed to desired angle to properly guide the appliance into the aperture.

FIGURE 12 shows the clip 74 having an outer leg 89 with notches 88, 88 and an inner leg 90 with a slot 86. It will be understood that the edges 98, 98 of the opening 102 of the clip retainer 76 (shown in FIGURE 14) are so made as to slide into the notches 88, 88 of the clip 74. The projecting portion 100, in the formed opening 102 of the clip retainer 76, fits into the slot 86 of the inner leg 90 of the clip 74 during installation and while the clip 74 is in the normally locked position shown in FIGURES 9 and 10.

Referring to FIGURES 9, 10, and 11, it will be noted the modified counter top 24-A incorporates a formed ledge 80 as an integral part thereof. Here the sloping surface 72 of the clip 74 provides a wedge like clamping action against the inner edge of the formed ledge 80. The formed ledge 80, of course, serves the same purpose as the cleat or nailing strip element 26 shown in FIGURES 2, 3, and 6, as it allows for substantial variation in size of aperture for receiving the appliance and provides uniform spacing between the top surface 22 and the inner edge of the ledge 80, against which the outwardly thrusting wedge like angle 72 of the spring clip 74 clamps.

It will be understood that, in this alternate design shown here, when the inner leg 90 of the clip 74 is pushed slightly toward the outer leg 89, the slot 86 of the clip 74 is released from its normally locked position on portion 100 of the formed notch 102 of the retainer 76. As the inner leg is released in this manner the wedge like clamping force of the slope 72 of the spring clip 74 against the inner edge of the formed aperture causes the inner leg 90 to move toward the unlocked position shown in FIGURE 11. The formed notch 82 in the clip 74 helps to retract and hold the spring in the released position during removal of the appliance.

FIGURE 13 shows the action of the clip 72 as the outer leg 89 retracts inward toward the inner leg 90 during assembly of the appliance into the aperture. FIGURE 13 also shows another type aperture for receiving the appliance. Here the aperture in the counter top 24-B is shown with a plain straight edge 96. No nailing strip or formed ledge is provided. The clamping force is applied directly against the inner corner edge 92 of the aperture. The space 94, between the edge 96 of the aperture and the clip retainer member 76 has been reduced to a minimum, in this arrangement, so as to provide desired clamping leverage.

FIGURE 15 shows how this alternate design of clip 74 can be used advantageously to install such items as wall ovens. Here the flange 106 of the oven 107 is so formed as to contact the surface 105 around the aperture 109 in the wall 114. The inner wall 120 of the oven 107 is provided with small holes 118 placed in proper relation to the bend 82 in the clip 74. In this way the oven or similar appliance can be easily removed for cleaning or repairs by merely opening the door 108 and releasing the spring clip 74 from its locked position by pushing a nail 116 into the small hole 118 and pressing against the spring clip 74 in the area of the groove 82. This will release the inner leg 90 of the spring clip 74 and the wedging force against the surface 72 of the clip will cause the clip to retract to the unlocked position. FIGURE 15 also incorporates another alternate type of inwardly directed cleat or strip 110 which is here shown fastened in place with screws 112. An alternate design of clip retainer 104 is also shown, which may be more suitable for oven or similar installation.

In the various alternates shown and described the clamping pressure of the spring clip is released by un-

5

hooking the inner leg or legs of the clips from their normally locked position in the spring retainer member. The clips can be quickly reset, ready for reinstallation, by simply pushing the clip back to its original locked position in the retainer.

The invention described and shown therefore accomplishes the originally listed objectives and embraces the various desired features, including: substantial time and labor savings; permits assembly of the device, in fixed position, at the factory or remote from the appliance receiving aperture; tightly holds and seals the flanged edge of the appliance against the mounting surface; self adjusting positive wedge like clamping under normal dimensional variation of apertures; installation from outside the cabinet, thereby eliminating the need for gaining access to, or working in, cramped quarters; elimination of troublesome screw type adjustments which, in turn, eliminates chances of cracking the enamel of the appliance during installation; mechanisms that can be quickly and selectively released, for appliance removal, when necessary, without need of screw drivers or special tools, and can be quickly and accurately reset ready for reinstallation.

The invention as shown is by way of illustration and not limitation and may be subject to various modifications without departing from the spirit thereof or the scope of the appended claims.

I claim:

1. The combination including a flanged appliance, a mounting surface around an aperture receiving the appliance with said flange overlying said mounting surface, a inner edge on the aperture in spaced relation to the mounting surface, spring retaining elements secured to the underside of the appliance flange generally adjacent to and within the marginal edges of said aperture, spring clips having inwardly mounted portions thereof releasably held in fixed position in the retaining elements and outer portions thereof so held in the retaining elements as to be inwardly pressure retractable toward said inwardly mounted portions, said outer portions being joined to said inner portions by integral intermediate angularly formed resilient portions and said outer portions being so bent as to define a cam surface having acute angular wedge like clamping surfaces which thrust outwardly and wedge against said inner edge of said aperture, said spring clips being further defined in that releasing said inner portions of said spring clips from said fixed positions releases said clamping surfaces from against said inner edge of said aperture.

2. The combination according to claim 1 and including determined bends in said inwardly mounted portions of said spring clips to facilitate holding said clips in released position when removing the appliance.

3. The combination according to claim 2 wherein said spring clips are made of wire.

4. The combination according to claim 2 wherein said spring clips are of materials other than wire.

5. In combination, a flanged appliance, a mounting surface around an aperture receiving the appliance with said flange overlying said mounting surface, a formed inner edge on the aperture in spaced relation to the mounting surface, spring retaining elements mounted to the inner surface of said flange substantially adjacent to and within the marginal edges of said aperture, spring clips mounted in determined notches of said spring retaining elements, said spring clips having cam like outer portions which are angularly formed and normally in acute wedge like contact with said inner edge of said aperture to lock said flange to said mounting surface, said outer portions of said spring clips being movably supported in said retaining elements in such manner as to be inwardly pressure yielding and outwardly thrusting, said outer portions being joined by resilient integral intermediate portions to inner portions thereof which are releasably held in fixed position in said retaining ele-

6

ments, whereupon releasing said inner portions from said fixed position releases the wedging contact of said outer portion from said inner edge of said aperture.

6. In combination an appliance having an outwardly extending mounting flange, a mounting surface around an aperture receiving the appliance with said flange overlying said mounting surface, a formed inner edge on the aperture in determined spaced relation to the mounting surface, spring retaining elements mounted to the inner surface of said flange substantially adjacent to and within the marginal edge of said aperture, spring clips mounted in determined notches and grooves of said spring retaining elements, said spring clips having cam like outer portions which are angularly formed and in acute wedge like contact with said inner edge of said aperture to lock said flange to said mounting surface, said outer portions of said spring clips being so movably held in the retainer as to be inwardly pressure yielding and outwardly thrusting a plane generally parallel to the mounting surface, said spring clips being further defined as having inner portions thereof releasably held in fixed position in the retainer, whereupon releasing said inner portion from said fixed position releases said outer cam like portion from said wedge like contact with said inner edge of said aperture.

7. The combination comprising a flanged appliance, a mounting surface with an aperture to receive the appliance with said flange overlying the mounting surface, the inner edge of said aperture being in determined spaced relation to the mounting surface and so formed as to complement the clamping action of determined spring clips mounted in spring retaining elements which are secured to the underside of the appliance flange and extend into and generally adjacent the marginal edges of said aperture, said spring clips having inner portions thereof releasably held in fixed position in the retaining elements and outer portions thereof so held in the retaining elements as to be movably pressure retractable in a plane generally parallel to said mounting surface and toward said inner portion, said outer portions having cam like surfaces which are angularly formed and in acute wedge like contact with said inner edge of said aperture to lock said flange to said mounting surface, said spring clips being further defined in that by releasing said inner portion from said fixed position said outer portion is released from said wedge like contact with said inner edge.

8. The combination comprising a flanged appliance, a mounting surface having an aperture therein to receive the appliance with said flange overlying said mounting surface, said aperture including a complementally formed inner edge in determined spaced relation to the mounting surface, spring retaining elements secured to the underside of the appliance flange and spring clips mounted in determined notched out areas of said retaining elements, said spring clips having inner portions so notched and formed as to securely hold said inner portion in a normally fixed but releasable position in said retaining element and facilitate holding said spring clip in an unclamp position when said inner portion is released from said normally fixed position in said retaining element, said spring clips having outer portions thereof slideably held in said notched out areas in such manner as to be inwardly pressure retractable toward said inner portions, said outer portions of said spring clips being so bent as to define a cam surface having acute angular clamping surfaces outwardly thrusting and wedging against said inner edge of said aperture, said inner portions being joined to said outer portions by integral intermediate angularly formed resilient portions, said spring clips being further defined in that by releasing said inner portions from said fixed position said clamping surfaces move inwardly and away from said inner edge of said aperture.

9. In combination a panel having the outer edges thereof overlying and contacting mounting surfaces around an aperture, the inner edge of said aperture being in deter-

7

mined spaced relation to said mounting surfaces and formed to interlock with spring clips mounted in spring retaining elements which are secured to the underside of the panel adjacent the marginal edges of said aperture, said spring clips having inner portions thereof releasably held in fixed position in the retaining elements and outer portions thereof held in the retaining elements in such a way as to be movably pressure retractable in a plane generally parallel to said mounting surfaces and toward said inner portions, said outer portions of said spring clips being joined to said inner portions by integral intermediate angularly formed resilient portions, said outer portions being bent to define an outwardly formed cam like surface having acute angular clamping surfaces outwardly thrusting and tightly wedging against said inner edge of said aperture, said clamping surfaces being releasable from against said inner edge by releasing said inner portion from said fixed position.

10. In combination, a flanged appliance, a mounting surface around an aperture receiving the appliance with said flange overlying said mounting surface, a formed inner edge on the aperture in spaced relation to the mounting surface, spring clips mounted in spring retaining elements which are secured to the underside of the appliance flange and extend into and generally adjacent the marginal edges of said aperture, said spring clips having cam like outer portions supported in determined notched out areas of the retaining elements in such a way as to be inwardly and slideably pressure retractable toward inner terminal portions of the spring clips which are releasably held in fixed position in said notched out areas of said retaining elements, said cam like outer portions having clamping surfaces which angle slightly away from the appliance flange and thrust outwardly to wedge against said inner edge of said aperture, inner portions of said spring clips being joined to said outer portions by integral intermediate angularly formed resilient portions, said spring clips being further defined in that upon releasing said inner portions from said fixed position said clamping surfaces move inwardly and away from said inner edge of said aperture.

8

11. The combination including a flanged appliance, a mounting surface around an aperture to receive the appliance with said flange overlying said mounting surface, an inner edge on the aperture in determined spaced relation to the mounting surface, angularly formed channel like spring retaining elements secured to the underside of the appliance flange generally adjacent to and extending inward and within the marginal edges of said aperture, spring clips having portions thereof inwardly and releasably mounted in fixed position in said retaining elements, said inwardly mounted portions being joined to outwardly extending cam like portions by intermediate resilient portions, part of said outwardly extending cam like portions defining a slightly sloping plane which thrusts outwardly and wedges against said inner edge of said aperture, thereby securely locking the appliance flange against said mounting surface and positively blocking removal of the appliance; said outer cam like portions of said spring clips being slideably supported in the retaining element in such manner as to be pressure retractable toward said inwardly mounted portions, said spring clips being further defined in that upon releasing said inwardly mounted portions from said fixed position said locking action is released and said sloping plane swings inwardly and away from the inner edge of the aperture and is retained in release position while the appliance is being removed.

References Cited by the Examiner

UNITED STATES PATENTS

915,708	3/09	Snowden	292—76
987,894	3/11	Lee	292—76
1,943,261	1/34	Knutson.	

References Cited by the Applicant

UNITED STATES PATENTS

3,126,552	3/64	Scharmer.
-----------	------	-----------

LEWIS J. LENNY, *Primary Examiner.*