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Europäisches Patentamt
European Patent Office
Office européen des brevets



11 Publication number:

0 531 590 A1

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EUROPEAN PATENT APPLICATION

21 Application number: **91308315.0**

51 Int. Cl.⁵: **E03C 1/33**

22 Date of filing: **11.09.91**

43 Date of publication of application:
17.03.93 Bulletin 93/11

72 Inventor: **Willis, Gavin Rex**
11 Ashleigh Close
Basonbridge, Somerset(GB)

84 Designated Contracting States:
AT BE CH DE DK ES FR GR IT LI LU NL SE

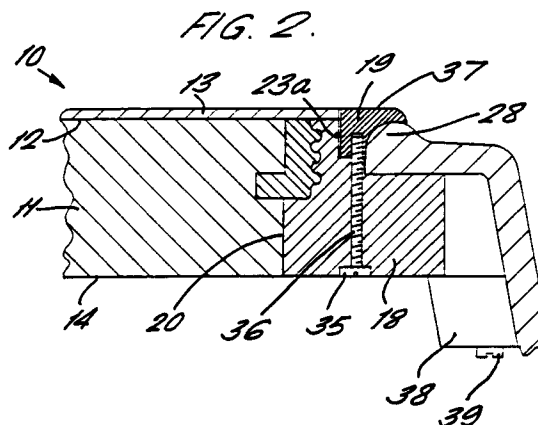
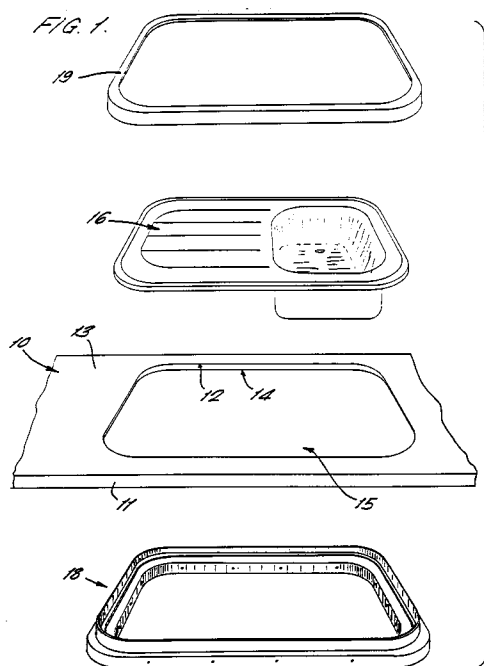
71 Applicant: **CASTLE NEROCHE (INTERIORS) LIMITED**
Neroche House
Basonbridge, Somerset TA9 4RN(GB)

74 Representative: **Bayliss, Geoffrey Cyril et al**
BOULT, WADE & TENNANT 27 Furnival Street
London EC4A 1PO (GB)

54 Improvements in or relating to worktop assemblies.

57 The disclosure relates to a worktop assembly for receiving and supporting an appliance such as a sink unit (16), the worktop (10) having upper and lower surfaces (12, 14), a facing sheet (13) bonded to the upper surface, an opening (15) in the worktop with a downwardly open encircling rebate (20) around the opening, a peripheral mounting frame (18) located in the rebate from the underside of the worktop and

secured therein, the frame having an inner portion located within the periphery of the opening formed with an upwardly open rebate (23a) in which the periphery (28) of the sink unit is located and a seal (19) mounted on the frame to engage between the inner periphery of the upwardly open rebate and the outer periphery of the appliance.



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This invention relates to worktop assemblies.

Worktops on which a variety of different appliances are mounted are utilised in a wide range of domestic, professional, commercial and industrial premises. For example worktops are extensively used in kitchens in which appliances such as bowls, sinks, hobs, fryers, grills and the like are mounted. Likewise worktops are used in doctors or dental surgeries in which bowls or sinks are mounted and in laboratories or other similar commercial or industrial premises in which sinks or other appliances are mounted. Conventionally such appliances have peripheral flanges and the worktop is formed with an opening to receive the appliance. The flange overlies the worktop around the opening and sits on the worktop usually with a form of seal between the flange and worktop to prevent the ingress of dirt and moisture and some form of clamping arrangement on the appliance to engage the underside of the worktop to secure the worktop in place. Recently materials have been devised for the manufacture of worktops which can be utilised for forming integral bowls or sinks in the worktop. This has enabled a bowl or sink to be formed flush with the worktop surface giving a very clean and satisfactory appearance. However such materials are extremely expensive making the overall cost of a worktop and sink relatively high and cannot of course be utilised for the flush mounting of appliances other than sinks and bowls.

This invention provides a worktop assembly for receiving and supporting an appliance, the worktop having upper and lower surfaces, a facing sheet bonded to the upper surface, an opening in the worktop with a downwardly open encircling rebate around the opening, a peripheral mounting frame located in the rebate from the underside of the worktop and secured therein, the frame having an inner portion located within the periphery of the opening formed with an upwardly open rebate in which the periphery of the appliance is located and a seal mounted on the frame to engage between the inner periphery of the upwardly open rebate and the outer periphery of the appliance.

Preferably the seal has an upper surface which lies flush with the upper surface of the facing sheet.

It is also preferred that the seal is secured to the frame by fastening means extending through the frame from below to engage the seal. For example, the fastening means may comprise screws or bolts extending through the frame at spaced locations around the frame to engage in the seal to secure the seal in the rebate in the frame.

In any of the above arrangements the seal may be formed with a downwardly open concave cross-section around its inner periphery to engage over a corresponding convex cross section periphery of

an appliance.

An additional sealing strip may be disposed between the seal and the periphery of the appliance.

Also in any of the above arrangements the mounting frame may have an upwardly open rebate around its outer periphery to form a cavity with the substrate which is filled with a bonding material to secure the frame to the worktop, the sides of the cavity being shaped to provide a key with the bonding material.

In one arrangement the sides of the cavity are formed with encircling grooves to provide a key with the bonding material.

More specifically the substrate side of the cavity may be formed with a relatively deep encircling groove and the frame side of the cavity may be formed with a plurality of relatively shallow encircling grooves.

The mounting frame may have a passageway or passageways extending from the underside of the frame to the cavity through which said bonding material may be injected when the frame is located in situ in the worktop to secure the frame in place in the worktop.

Also in any of the above arrangements the frame may be secured to the substrate of the worktop by screws at spaced locations around the frame driven through the frame into the substrate.

For example the frame may have bores to receive the screws with a clearance between the shanks of the screws and the sides of the bores to enable the screws to be engaged in the bores and partially screwed into the substrate and the frame to be held tightly against the underside of the rebate whilst the screws are tightened against the frame to lock the frame firmly in position in the worktop.

In accordance with a further feature of the invention the frame may be formed in two parts comprising an outer part which engages and is secured in the downwardly open rebate in the substrate and an inner part secured to the outer part and forms the upwardly open rebate with the outer part to receive and support the appliance.

More particularly the inner periphery of the outer part of the frame is formed with an encircling groove the lower surface of which lies generally flush with the upper surface of the inner part of the frame and the seal is formed with a base section to engage in the groove where it is held by the outer periphery of the appliance, the seal being dimensioned so that it is firmly clamped against the inner periphery of the opening in the substrate and against the outer periphery of the appliance when the outer part of the frame is secured to the inner part of the frame to lock the appliance in situ.

In any of the latter arrangements the inner part of the frame may have an encircling flange which engages under the outer part of the frame and is secured thereto by bolts to lock the parts of the frame firmly together.

The following is a description of some specific embodiment of the invention, reference being made to the accompanying drawings in which:

Figure 1 is a perspective view of the components of a worktop and sink assembly showing the components of the assembly exploded;

Figure 2 is a section or view through the worktop and sink assembly as assembled; and

Figures 3 to 8 show the preparation of a worktop to receive a sink and the mounting of a sink in the worktop stage by stage; and

Figures 9 to 11 show various further arrangements according to the invention.

Referring firstly to Figure 1 of the drawing where there is shown a worktop indicated generally at 10 which comprises a substrate 11 having an upper side 12 to which a facing sheet 13 is bonded and an underside 14. An elongate rectangular opening 15 is formed in the substrate to receive a sink unit 16, from above the substrate. A peripheral mounting frame 18 is secured to the opening in the substrate from below to receive and support the sink unit around its inner periphery. A sealing ring 19 is secured between the periphery of the sink and the inner periphery of the opening 15 in the worktop to complete the assembly. The arrangement is shown in greater detail in the sectional view in Fig. 2 of the drawings and in the stage by stage drawings illustrating the manufacture of a worktop and sink assembly in Figs. 3 to 8 to which reference is now made.

Figure 3 of the drawings shows the basic worktop 10 comprising the substrate 11, surface laminate or veneer bonded to the upper side 14 thereof and the opening 15 cut in both the substrate and surface laminate or veneer by means of hand router. A jig or pattern may be used to guide the hand router to cut the aperture to the precise required shape and dimensions.

Figure 4 shows a downwardly open rebate 20 formed in the substrate 11 leaving an edge portion 21 of the laminate or veneer overhanging the opening 15 in the worktop. The rebate is formed using a hand router which can be used to route back the substrate accurately to the final required dimensions. If necessary, the last 0.5 to 1 millimeter of substrate may be sanded back with coarse grain sand paper to leave the underside of the laminate or veneer ready for bonding.

Figure 5 shows the next stage in which a groove 22 is cut in the side of the rebate 20 at a location spaced halfway down the rebate substrate to form a key for a bonding/filling material as

described below. A bonding/filling material is brushed on to the inner edge of substrate 20 and dried quickly using a hair dryer or similar heat source. This is repeated three times to seal the inner edge of the substrate and to prevent any further soaking in of bonding material injected subsequently as described below.

Referring now to Figure 6 of the drawings, the mounting frame 18 is shown located in the opening 15. The frame engages the rebated substrate below the groove 22 and has an upstanding central wall 23 with inner and outer upwardly open rebates 23a, 23b on either side of the wall. The top face of the wall 23 abuts the underside of the overhanging part of the surface laminate or veneer 21. The lower part of the ring is secured to the substrate by means of a plurality of screws 24 extending with clearance through bores 25 in the ring with the heads 26 of the screw located in counter bores 25a in the ring. The screws are partially screwed into the substrate 11 as indicated and then the frame 18 is adjusted in the opening in the substrate using the tolerance between the screws and bores 25 in the ring to ensure that the top face of the wall 23 is firmly in engagement with the laminate or veneer 21 all the way around the frame. The screws 24 are then driven home into the substrate to hold the ring firmly in the substrate.

The upwardly facing surface of the mounting frame 18 on the inner side of wall 23 is formed with a shallow rebate 27 to receive a peripheral part 28 of the sink 16. The rebate 27 has an encircling ledge 27a with which the outer surface of the sink periphery 28 engages to locate the sink in the frame 18. The sink is offered up to the mounting frame to ensure a proper fit and if necessary, the face 20 can be further cut away by sanding/routing or paper or laminate or shims can be inserted between the mounting frame 18 and face 20 as required to provide the required gap between the periphery of the sink 28 and the wall 23 to receive the sealing ring 19 as described later. The sink is then lifted away to allow the joint between the frame 18 and the substrate to be completed as shown in Figures 7 and 8 to which reference will now be made.

A cavity 30 is formed between the outer rebate 23b of the mounting ring, the upper part of the rebate 20 in the substrate (including the groove 22) and the overhanging surface laminate or veneer 21. The side of the wall 23 in the cavity is formed with a plurality of horizontally extending grooves 32 to provide a key for bonding/filling material to be inserted into the cavity 30 along with the groove 22 in the substrate. The frame member 18 is formed with a plurality of passage ways 33 extending from the underside of the frame to the bottom of the cavity and bonding/filling material is injected

through the passage ways into the cavity using a syringe 40 to fill the cavity as indicated in Figure 7. Sufficient bonding material is injected into the cavity until it begins to seep out between the top of the wall 23 and the underside of the surface laminate 21. Once this has been achieved around the entire length of the frame light pressure is applied to the surface laminate 21 around the entire aperture in the cavity until the bonding agent has cured. This ensures an accurate and efficient bond between the surface laminate and the frame member 18. It will be appreciated that the bonding/filling material in the cavity 30 filling the groove 22 in the substrate and grooves 32 in the wall 23 will provide a strong keying structure between the frame 18 and substrate to lock the frame securely in the substrate.

Once the bonding/filling material has cured, the inner peripheral or edge of the surface laminate 21 is trimmed back to the wall 23 to form a flush upright face 34 around the frame.

The sink is then offered up to the frame 18 in the worktop from above locating the peripheral flange 28 of the sink in the rebate 27 as before. The shaped sealing ring 19 is then inserted between the periphery 28 and the face 34 with a closed cell foam seal attached to the outer side of the sealing ring 19 to engage the face 34. Alternatively or in addition a sealing strip or polyurethane seal may be provided between the sink 16 and sealing ring 19. As can be seen in Figure 2, the sealing ring 19 has a downwardly facing concave cross-section around its inner periphery to engage over the convexly curved periphery of the sink. Bolts 35 extend through bores 36 in the frame 18 and are screwed into the under side of the seal 18 to secure the seal firmly in place against the periphery 28 of the sink and the face 34. When secured firmly in place, the upper surface 37 of the seal lies flush with the face of the laminate 13. Sink retaining clips 38 of a conventional type used for sink fixings are then tightened against the under side of frame member 18 using screw 39.

It will be understood that the arrangement provides a flush mounting for a sink or other appliance in a worktop utilising a conventional form of sink which is located in the worktop from above and is therefore conveniently installed in the worktop on site and after mounting of the worktop if necessary. The arrangement is equally applicable to other forms of appliance whether to a kitchen, other domestic appliances or commercial or industrially used appliances intended to be mounted in worktop. The arrangement is simple to enable a competent kitchen fitter or installer to effect installation on site using a simple template guide and hand router. The design enables the sink or other appliance to be removed upwardly from the worktop in

the event of failure if required.

The sealing ring 19 of the arrangement can be manufactured from a polycarbonate, ABS "ASTERITE" or any similar composition material and will be formed to match or complement the colour and set the finish of the sink or other appliance to be installed in the worktop. Thus in the case of a stainless steel sink, the sealing ring may be provided with a stainless steel upper surface finish to match. The sealing ring fully covers the edge of the opening in the worktop form to receive the sink assembly including the edge of the laminate.

Figure 9 shows a further form of worktop assembly in accordance with the invention which is generally similar to the above described embodiment and like parts have been given the same reference numerals. In this case the support frame comprises inner and outer parts 18a, 18b. The inner part 18a has an outwardly projecting flange 40 around its lower periphery which engages under the outer part 18b and is secured thereto by bolts 41. The inner part of the frame stops short of the outer part to form the inner upwardly open rebate 23a to receive the periphery of the sink as before but the outer rebate 23b is omitted as are the grooves in the face 20 of the substrate and the frame.

The frame is bonded by an epoxy adhesive such as "Structural Polymer Systems" (SPS) "WEST" in the downwardly open rebate in the worktop, to vertical face 20 of the substrate, and to the under side of the facing sheet 13.

The inner periphery of the outer part 18b of the support frame projects just beyond the inner periphery of the opening in the facing sheet and is formed with a rectangular cross-section recess or groove 42 spaced a short distance below the upper periphery of the ring and the part of the ring above the groove is cut back to provide a vertical face 43 which is flush with the inner periphery of the facing sheet.

The sink to be secured in the opening in the worktop has a conventional peripheral flange with a rounded outer periphery 28 as before. The sink also has conventional clips 38 as before secured at spaced locations around its outer periphery below the flange which receive and engage the inner part 18a of the mounting frame to lock the sink in place in the frame.

The sink with the inner part 18a of the mounting frame attached is offered up to the outer part of the frame already bonded into the substrate from below and the flange 40 of the inner part is secured to the outer part by means of the bolts 41. Before the sink is finally secured in position the soft rubber or plastics sealing ring 19 is located between the flange 28 and frame. In this case the

seal has an upper part 44 shaped to engage between the outer part 18b of the frame and the inner periphery of the facing sheet above it and the rounded outer profile 28 of the sink. The periphery of the sink is disposed just below that of the facing sheet and the upper face of the seal therefore has a shallow downwards incline between the laminate and sink as illustrated.

The lower portion 31 of the seal has an inner periphery engage around the rounded outer profile 23 of the sink and an outer periphery formed with a rib 30 to engage in the groove 40 in the support frame. A suitable length of seal to fit between the sink and mounting ring is cut and inserted between the periphery of the sink flange and inner periphery of the support ring as shown before the sink is fully raised into its final position by the clamping screws. Once the seal has been inserted the bolts 41 are tightened to lock the clamping ring to the support ring and, in so doing, the outer periphery of the sink presses the rib portion of the seal firmly into the groove 42 thereby locking the lower part of the seal in position and compresses the upper part of the seal between the rounded upper side 28 of the sink periphery and the inner edge of the facing sheet and adjacent face 20 of the support frame. Because the upper part of the resilient sealing ring is firmly compressed between the surfaces of the sink, support frame and facing sheet, the ingress of moisture between either the sealing ring and sink flange or sealing ring and work surface/support member is prevented.

As can be seen from the drawings, the sealing ring forms a simple and neat joint between the facing sheet/support frame and the peripheral flange of the sink.

Figure 10 shows a modified construction in which the groove 42 is replaced by a downwardly facing rebate 45. The arrangement is otherwise the same as that described with reference to Figure 1 above.

Figure 11 shows a further arrangement drawing features from the above embodiments and in which screws 41 locking the parts 18a, 18b of the frame together are replaced by "Allen" grub screws 46 which engage in locking washers 47 located in slots in the outer frame part. The grub screws allow adjustment of the inner and outer frame parts so that the upper face of the profiled sealing ring 19 can be brought flush with the work surface.

Claims

1. A worktop assembly for receiving and supporting an appliance, the worktop having upper and lower surfaces, a facing sheet bonded to the upper surface, an opening in the worktop with a downwardly open encircling rebate ar-

ound the opening, a peripheral mounting frame located in the rebate from the underside of the worktop and secured therein, the frame having an inner portion located within the periphery of the opening formed with an upwardly open rebate in which the periphery of the appliance is located and a seal mounted on the frame to engage between the inner periphery of the upwardly open rebate and the outer periphery of the appliance.

2. A worktop assembly as claimed in Claim 1, wherein the seal has an upper surface which lies flush with the upper surface of the facing sheet.

3. A worktop assembly as claimed in Claim 1 or Claim 2, wherein the seal is secured to the frame by fastening means extending through the frame from below to engage the seal.

4. A worktop assembly as claimed in Claim 3, wherein the fastening means comprise screws or bolts extending through the frame at spaced locations around the frame to engage in the seal to secure the seal in the rebate in the frame.

5. A worktop assembly as claimed in any of the preceding claims wherein the seal is formed with a downwardly open concave cross section around its inner periphery to engage over a corresponding convex cross-section periphery of an appliance.

6. A worktop assembly as claimed in any of the preceding claims wherein an additional sealing strip is disposed between the seal and the periphery of the appliance.

7. A worktop assembly as claimed in any of the preceding claims wherein the mounting frame also has an upwardly open rebate around its outer periphery to form a cavity with the substrate which is filled with a bonding material to secure the frame to the worktop, the sides of the cavity being shaped to provide a key with the bonding material.

8. A worktop assembly as claimed in Claim 7, wherein the sides of the cavity are formed with encircling grooves to provide a key with the bonding material.

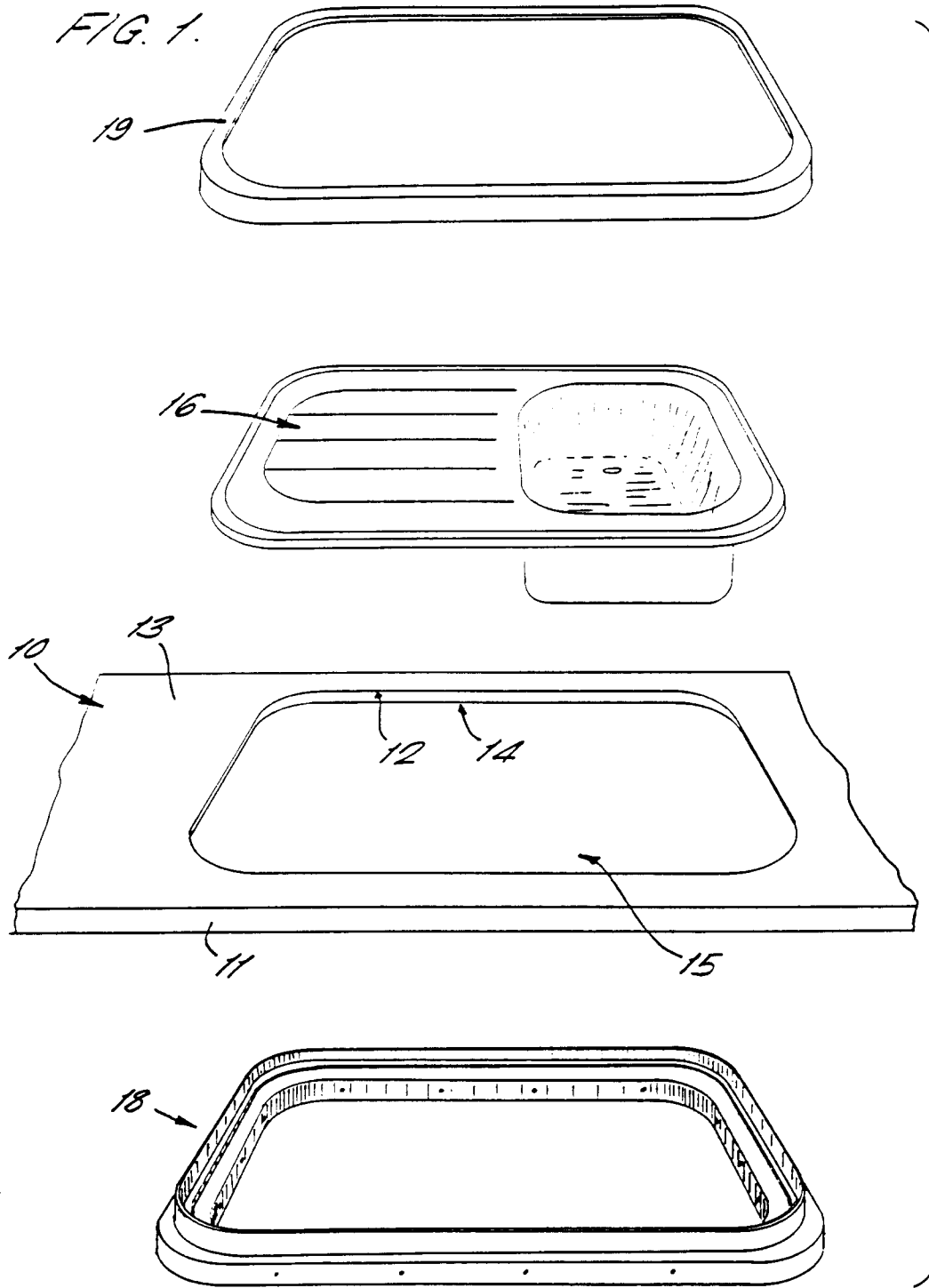
9. A worktop assembly as claimed in Claim 8, wherein the substrate side of the cavity is formed with a relatively deep encircling groove and the frame side of the cavity is formed with

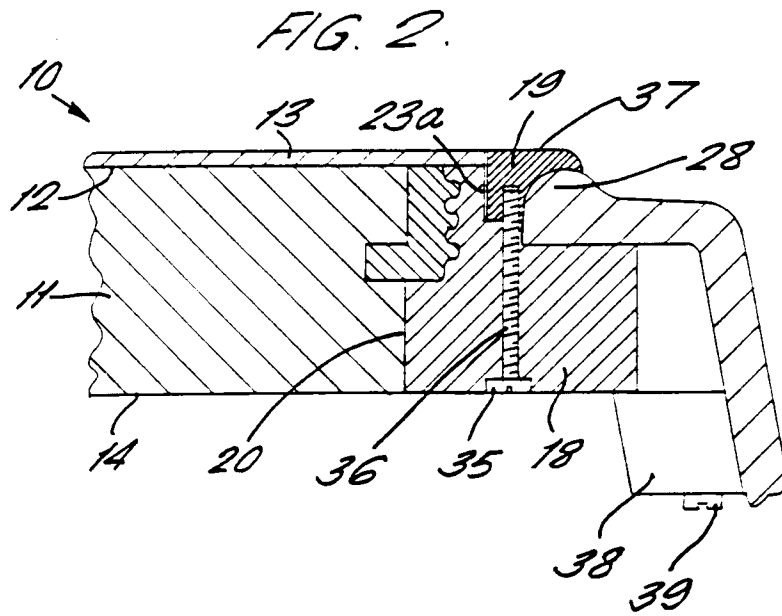
a plurality of relatively shallow encircling grooves.

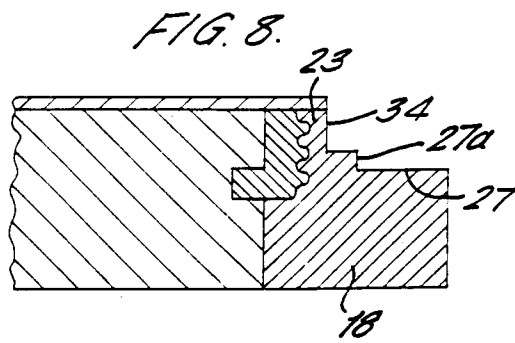
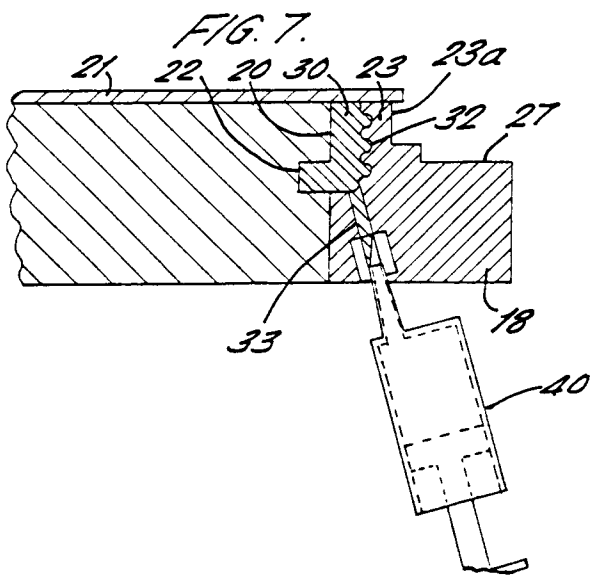
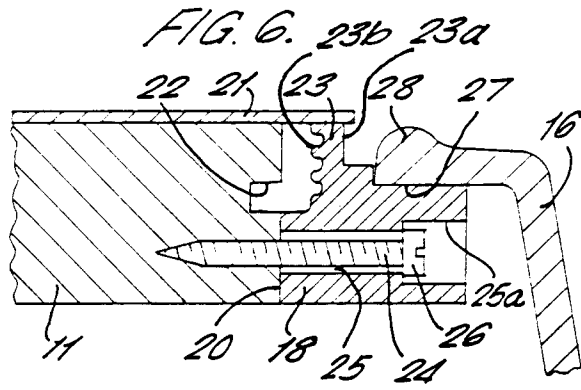
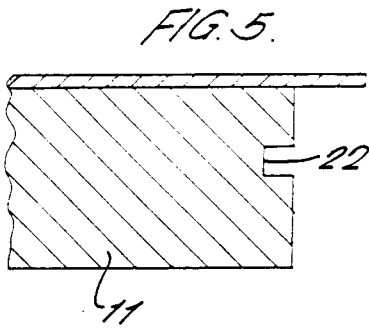
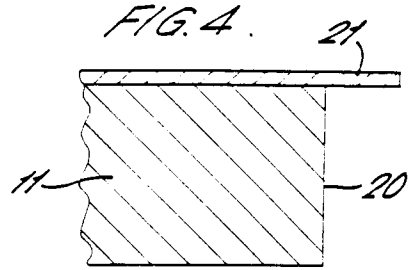
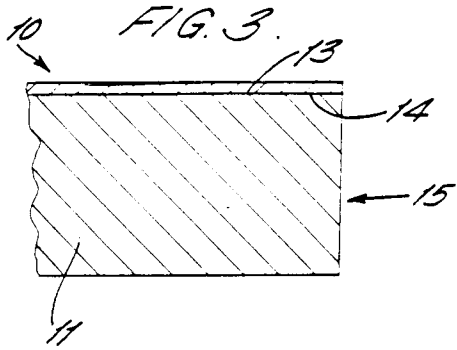
10. A worktop assembly as claimed in any of Claims 7 to 9, wherein the mounting frame has a passageway or passageways extending from the underside of the frame to the cavity through which said bonding material may be injected when the frame is located in situ in the worktop to secure the frame in place in the worktop. 5 10
11. A worktop assembly as claimed in any of the preceding claims wherein the frame is secured to the substrate of the worktop by screws at spaced locations around the frame driven through the frame into the substrate. 15
12. A worktop assembly as claimed in Claim 11, wherein the frame has bores to receive the screws with a clearance between the shanks of the screws and the sides of the bores to enable the screws to be engaged in the bores and partially screwed into the substrate and the frame to be held tightly against the underside of the rebate whilst the screws are tightened against the frame to lock the frame firmly in position in the worktop. 20 25
13. A worktop assembly as claimed in any of the precedings claims, wherein the frame is formed in two parts comprising an outer part which engages and is secured in the downwardly open rebate in the substrate and an inner part secured to the outer part and forms the upwardly open rebate with the outer part to receive and support the appliance. 30 35
14. A worktop assembly as claimed in Claim 13, wherein the inner periphery of the outer part of the frame is formed with an encircling groove the lower surface of which lies generally flush with the upper surface of the inner part of the frame and the seal is formed with a base section to engage in the groove where it is held by the outer periphery of the appliance, the seal being dimensioned so that it is firmly clamped against the inner periphery of the opening in the substrate and against the outer periphery of the appliance when the outer part of the frame is secured to the inner part of the frame to lock the appliance in situ. 40 45 50
15. A worktop assembly as claimed in any of Claims 12 to 14, wherein the inner part of the frame has an encircling flange which engages under the outer part of the frame and is secured thereto by bolts to lock the parts of the 55

frame firmly together.

16. A worktop assembly as claimed in any of Claims 12 to 15, wherein an adjustable clamping device is provided between the inner and outer peripheral parts of the frame to allow the outer part to be adjusted upwardly or downwardly to bring the surface of the seal flush with the surface of the facing sheet of the substrate.
17. A worktop assembly as claimed in any of the preceding claims wherein brackets are secured at spaced locations around the appliance to engage under the frame.







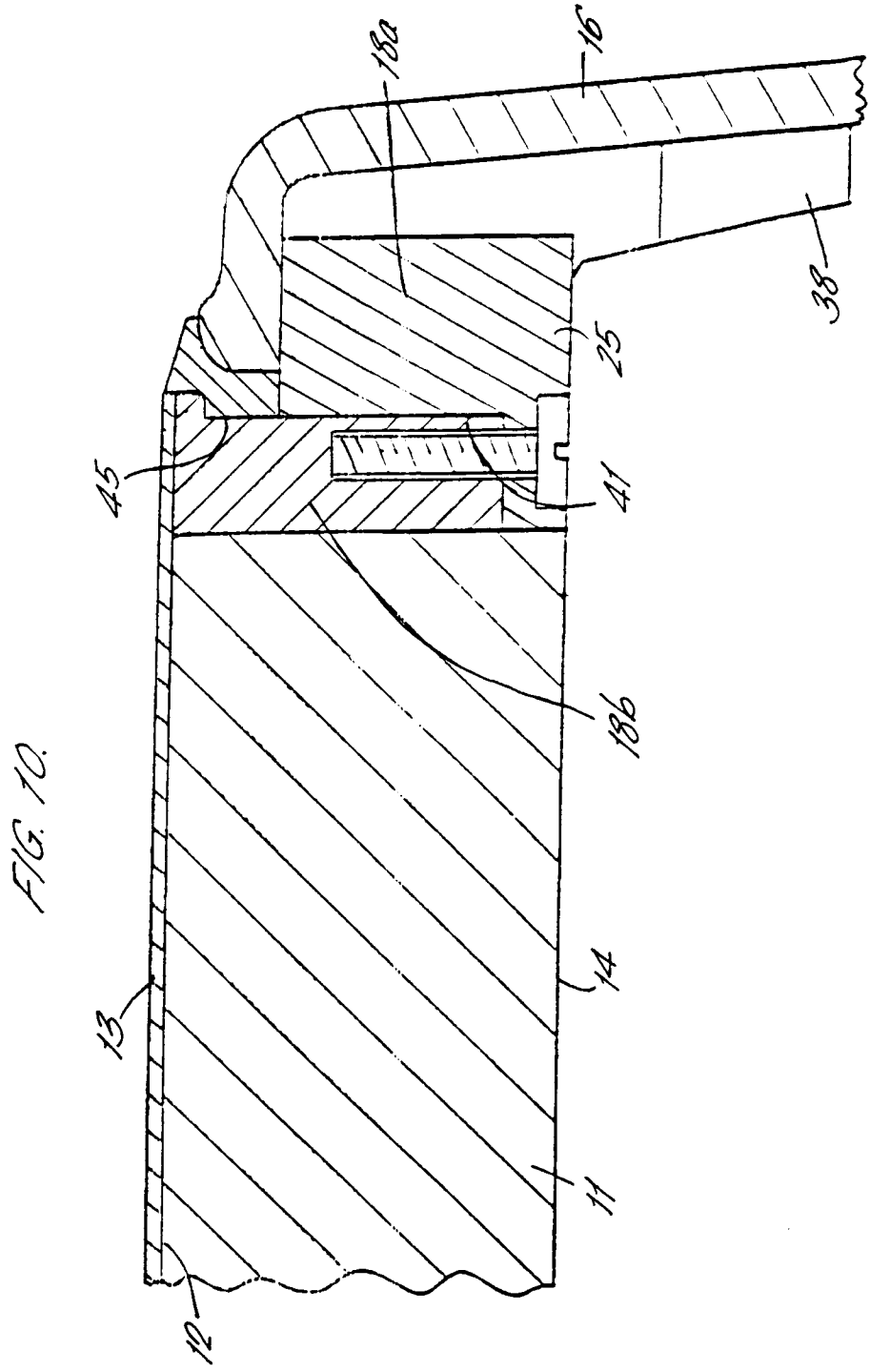
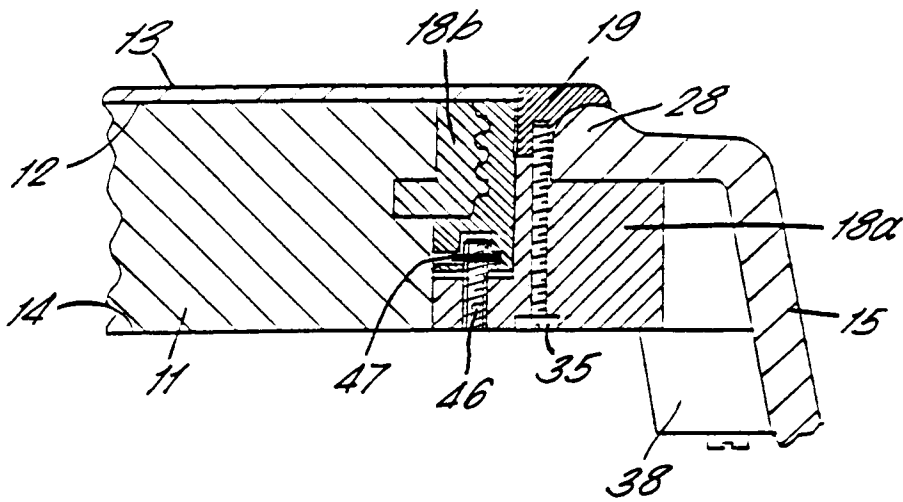


FIG. 11.





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 092 855 (W.P. VAN DER KOOIJ) * page 6, last paragraph - page 7, paragraph 1; figure 7 * ---	1-17	E03C1/33
A	EP-A-0 026 236 (AICA KOGYO CO. LTD.) * figure 4A * ---	1-4, 7, 11	
A	EP-A-0 442 189 (CASTLE NEROCHE (INTERIORS) LTD) * the whole document * ---	1-4, 11-13, 17	
A	EP-A-0 169 981 (NIRO PLAN AG) ---		
A	FR-A-2 424 373 (W HERBOLD) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E03C A47B
Place of search THE HAGUE		Date of completion of the search 12 MAY 1992	Examiner VAN BEURDEN J. J. C. A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	