(12) UK Patent Application (19) GB (11) 2 336 858 (13) A

(43) Date of A Publication 03.11.1999

(21) Application No 9909249.6

(22) Date of Filing 22.04.1999

(30) Priority Data
(31) 9808563 (32) 22.04.1998 (33) GB

(71) Applicant(s)
Ward Building Components Limited
(Incorporated in the United Kingdom)
Widespan Works, Sherburn, MALTON, Yorkshire, YO17 8PQ, United Kingdom

(72) Inventor(s)
Mark Victor Stevens

(74) Agent and/or Address for Service
Urquhart-Dykes & Lord
Alexandra House, 1 Alexandra Road, SWANSEA, SA1 5ED, United Kingdom

(51) INT CL[6]
E04D 3/36 , E04F 13/08

(52) UK CL (Edition Q)
E1D DCA2 DF172 DLEKH2 D2035 D2121 D2140 D402

(56) Documents Cited
GB 2185272 A GB 2148975 A GB 2103261 A
GB 1447180 A GB 1035817 A US 4015389 A
US 3899857 A

(58) Field of Search
UK CL (Edition Q) E1D DF104 DF172 DLEKH DLEKJ
INT CL[6] E04D 3/36 , E04F 13/08 13/12

(54) Abstract Title
A support system for panels or structural members

(57) A support system for supporting a panel in spaced relation from a structural member or to maintain two panels spaced-apart comprises a number of elongate support members (2) and a number of brackets (10). The support member (2) has a base and side webs with inturned lips (5). Each bracket (10) has a head part (11), a support leg (12) and a mounting foot (13). The bracket head (11) fits slidingly in the channel of the support member (2). Brackets (10) can connect at either end of a support member (10) and in this manner a chain of brackets and support members can be fitted together. Insulation may be interposed between the separated panels.

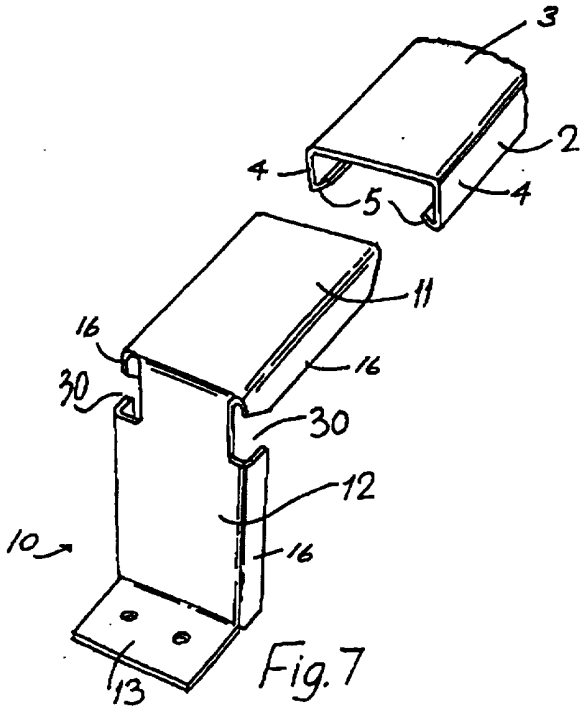

Fig. 7

GB 2 336 858 A

1/8

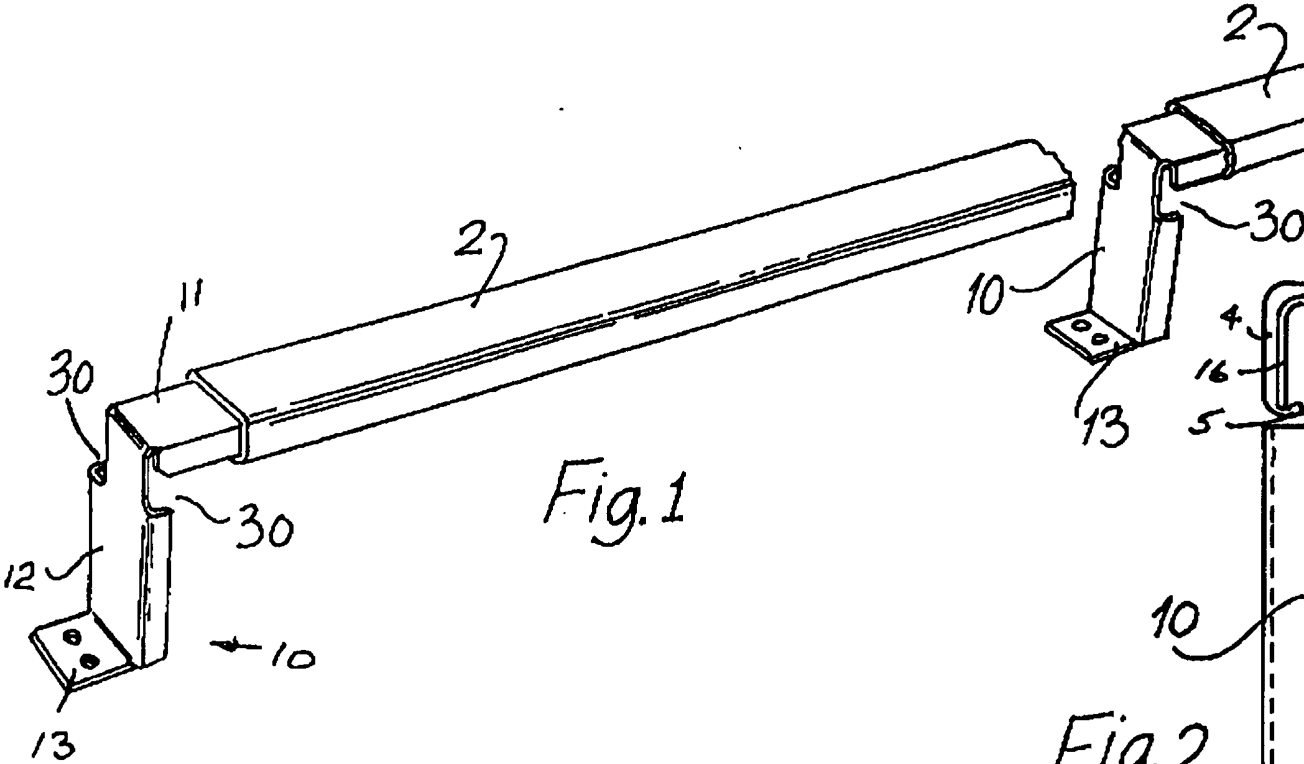

Fig.1

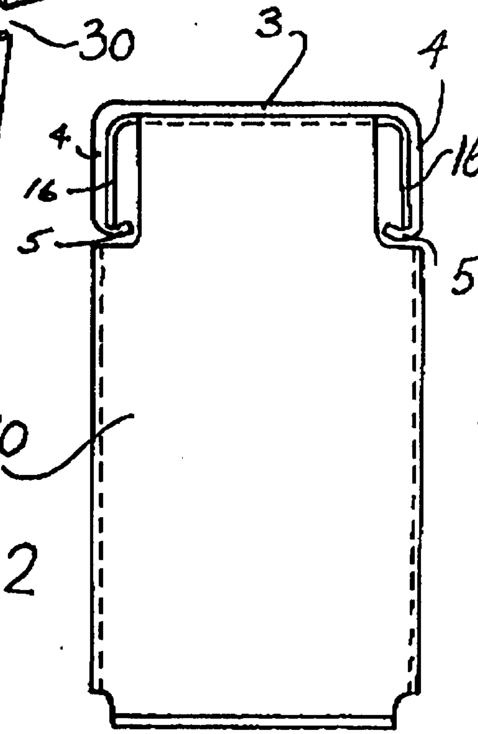

Fig.2

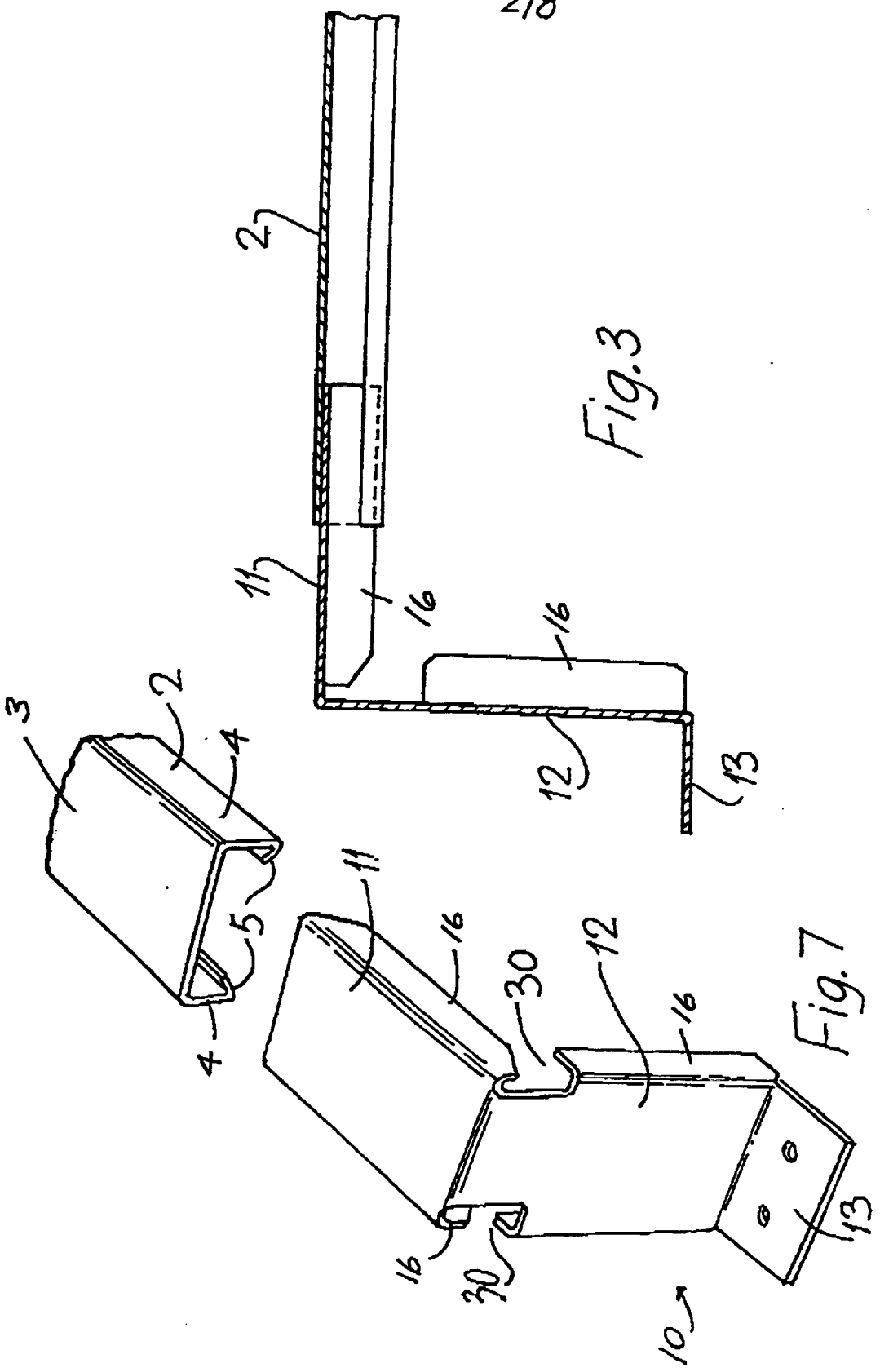

Fig. 3

Fig. 7

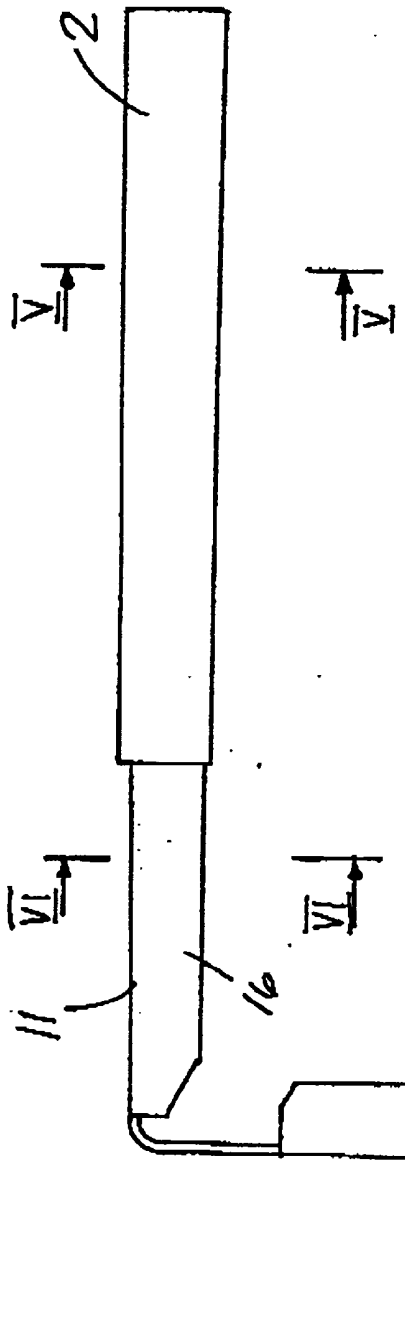

Fig.4

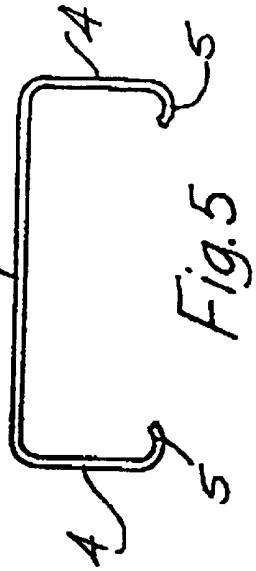

Fig.5

Fig.6

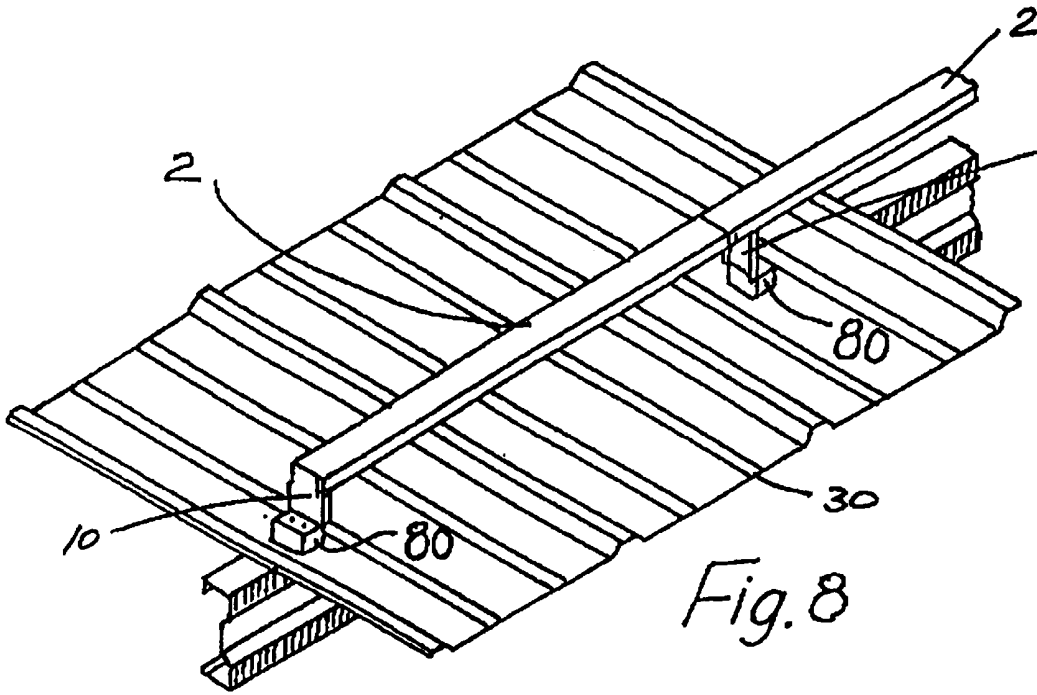

Fig. 8

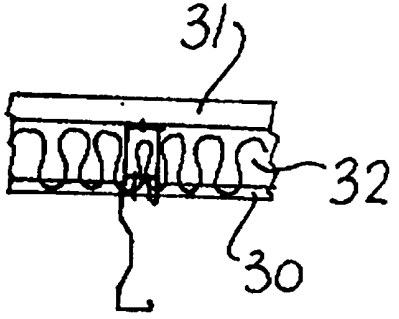

Fig. 9A

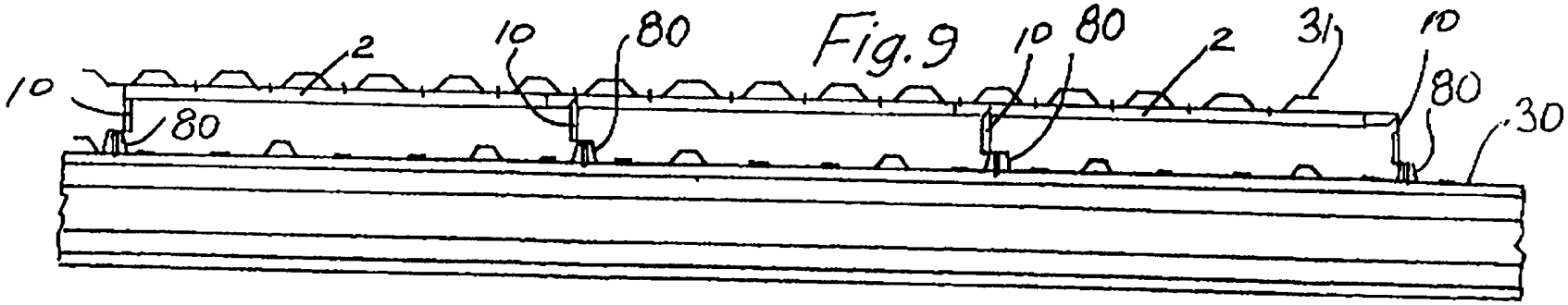

Fig. 9

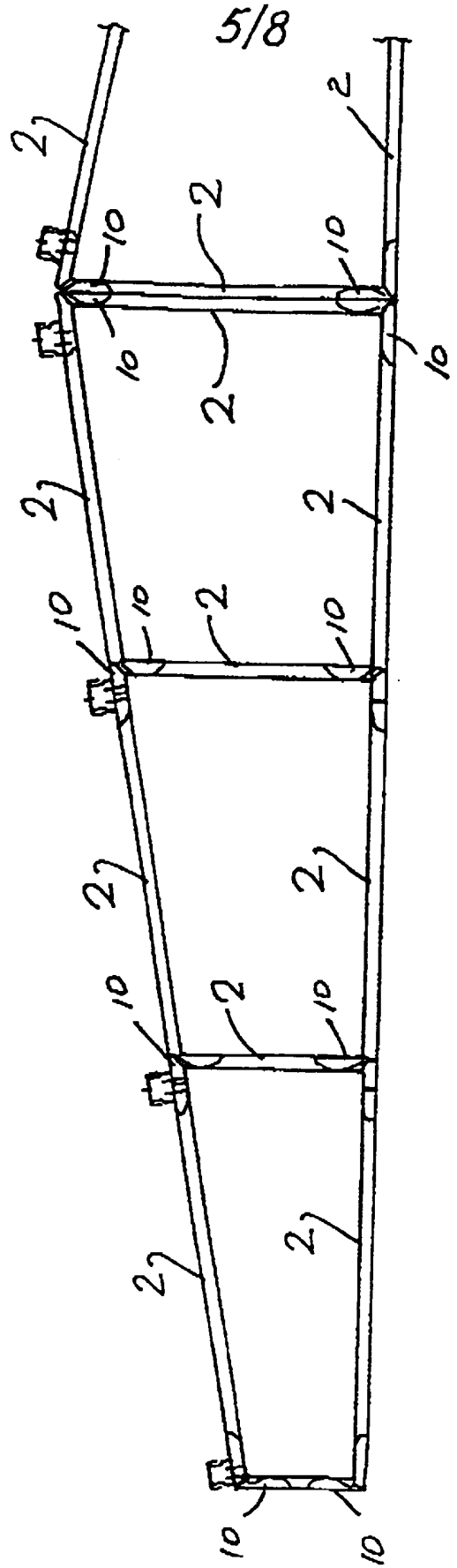

Fig. 10

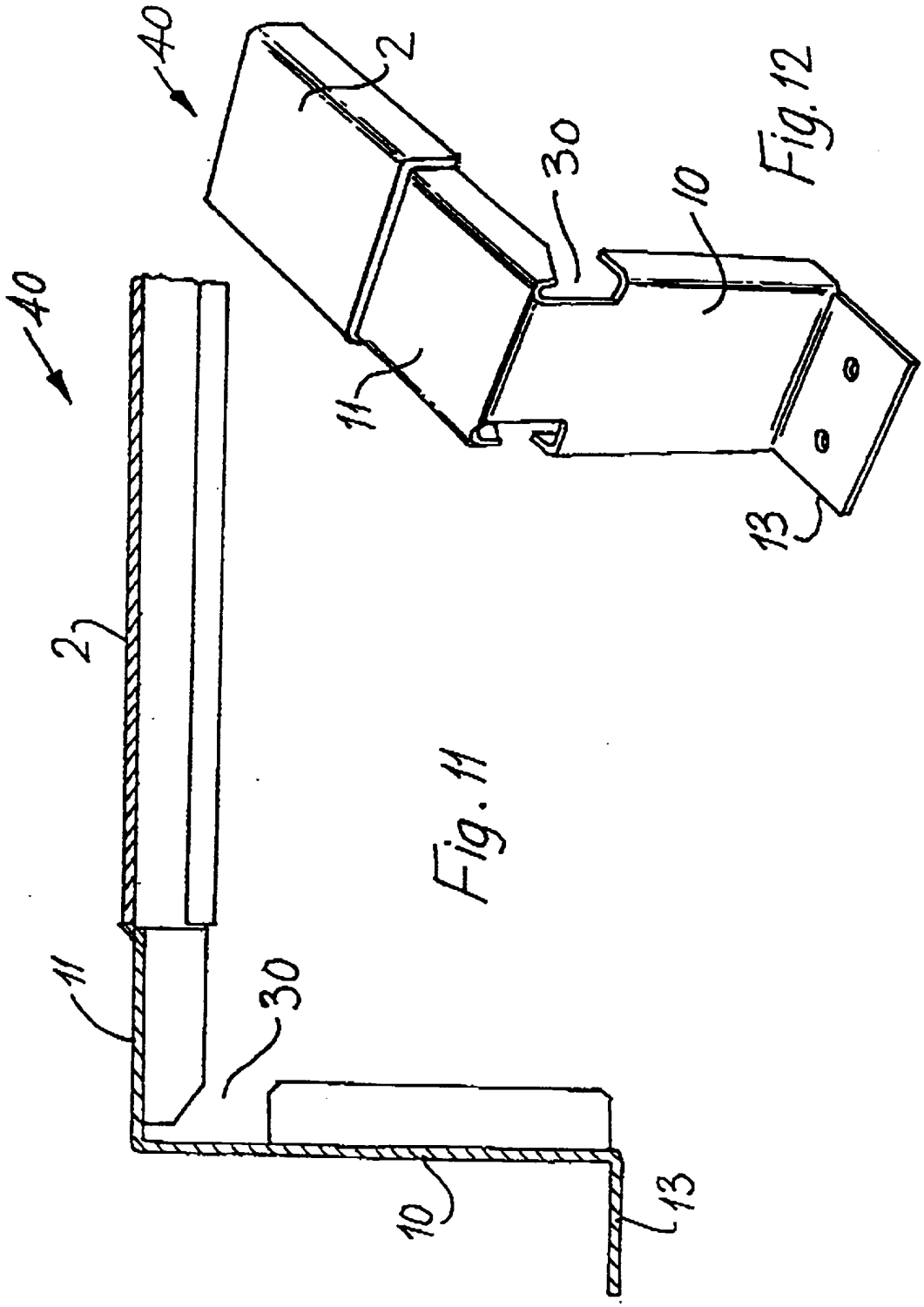

Fig. 12

Fig. 11

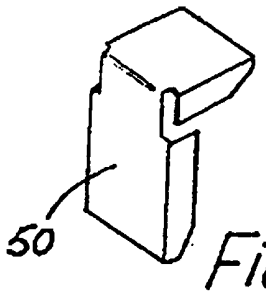

Fig.13

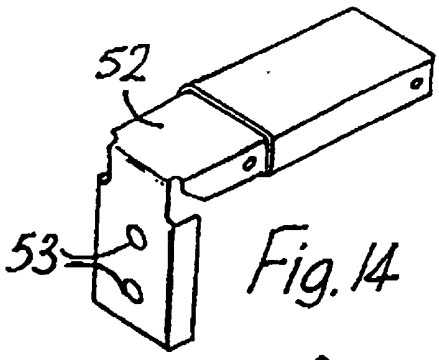

Fig.14

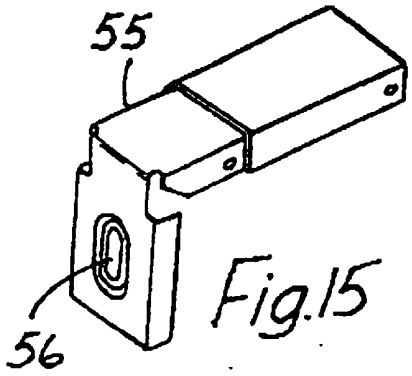

Fig.15

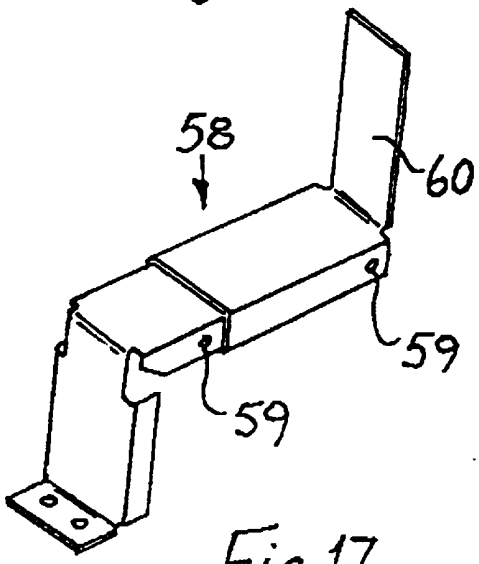

Fig.17

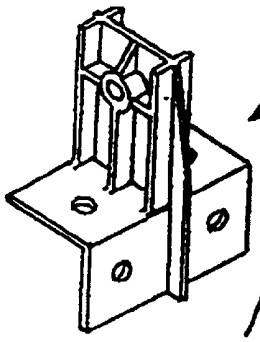

Fig.16

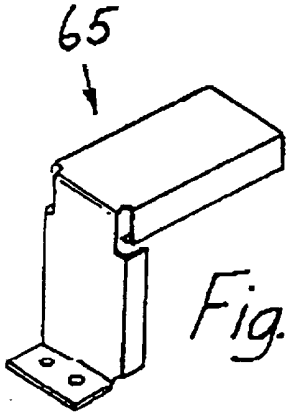

Fig.18

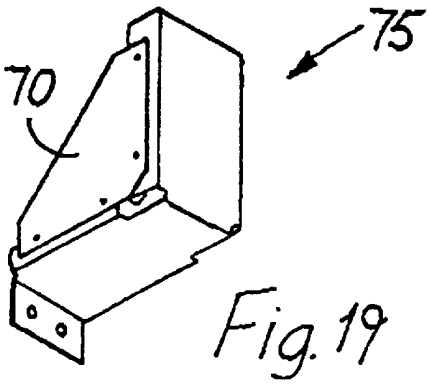

Fig.19

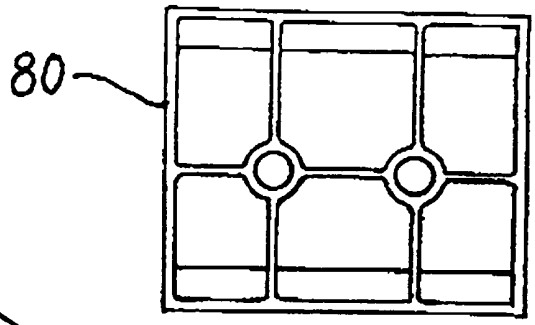

Fig. 21

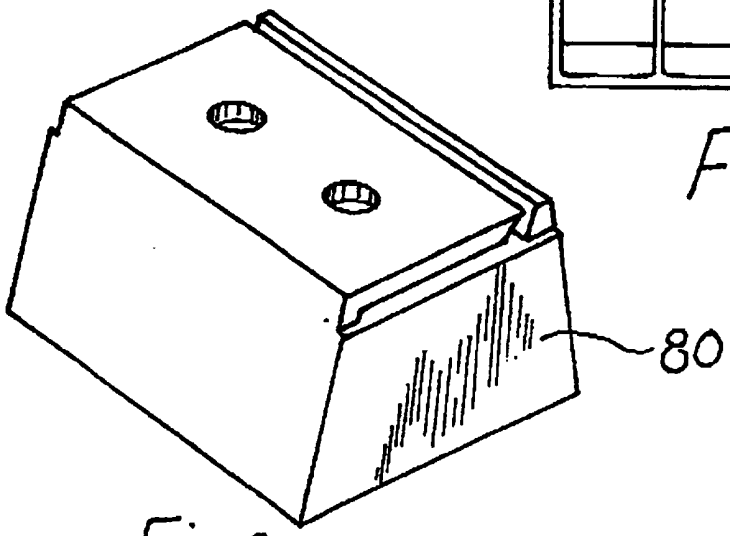

Fig. 20

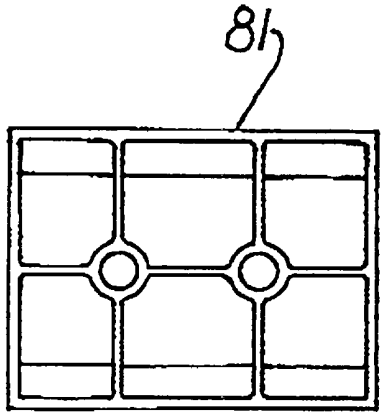

Fig. 23

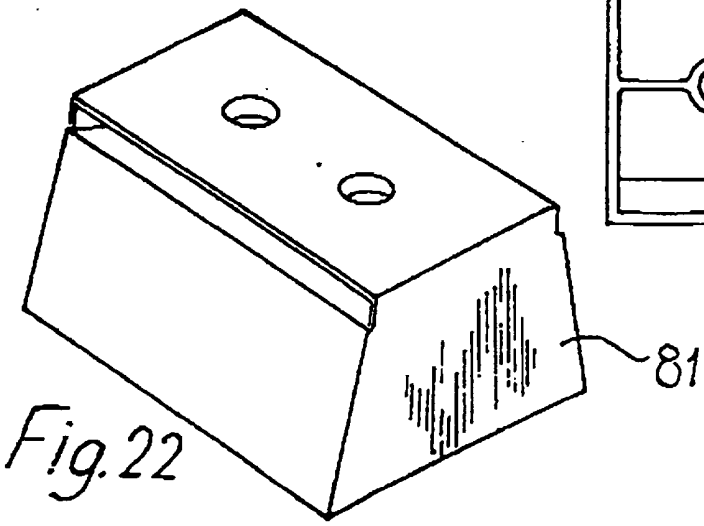

Fig. 22

"A support system"

Introduction

The invention relates to a support system and in particular to a support system for supporting a panel in spaced-apart relation to another panel or a structural member, for example for use in providing a pitched roof over a flat roof, or for supporting panels in spaced-apart relation to create a void between panels to receive insulation.

Various support systems of this type are known. One such known system (UK-A-2 148 975) comprises an elongate support member on which a panel is mounted and a plurality of plastics brackets which are shaped to engage the elongate support member with a twist lock action. One of the problems with such systems is that the brackets are difficult to use. The attachment of the bracket is difficult and requires considerable dexterity by the user. There is also a risk of the bracket becoming dislodged in use.

Another support system is described in UK-A-2 240 558 which includes brackets that are mounted to a support using a twist and lock action. In this case the bracket is of sheet metal with tongues defined by slots to facilitate the mounting of the brackets to the support by a twist and lock action. One of the tongue portions of the bracket has an anti-rotating element to assist in avoiding the risk of rotation of the bracket when mounted in the elongate support.

There is however, still a problem with all such known support systems in that the brackets are difficult to handle and manipulate and require considerable user dexterity for inserting and fixing. The assembly and fixing can be slow and, in particular fastening is difficult because the system requires holes to be drilled at an angle. In addition, although the brackets must be positioned accurately, measurement is the only way of registering a predetermined position.

This invention is therefore directed towards providing an improved support system which will overcome this problem.

Statements of Invention.

According to the invention there is provided a support system for supporting an outer panel in spaced-apart relation to an inner panel or a structural member, the support system spacing the outer panel from the inner panel or the structural member and comprising an elongate support member for supporting the outer panel and at least a pair of brackets, each bracket having a head part and a leg part extending from the head part for engagement with an inner panel or a structural member, at least one end of the elongate support member being non-rotatably slidably engagable with the head part of a bracket for linear longitudinal adjustment on assembly of the elongate support member to the bracket.

In a particularly preferred embodiment of the invention the support member and the head port of the bracket have complementary engagable profiles.

Preferably the support member is of inverted channel profile having in-turned edges defining retaining lips for engagement with a complementary profile of the bracket head part.

In a particularly preferred embodiment of the invention the bracket head is of inverted channel profile having a base and pair of side webs, the side webs engaging, an assembly, with the retaining lips of the support member.

In one embodiment of the invention the support member and bracket are integrally formed.

In another embodiment of the invention the support member and bracket are separately formed.

In one embodiment the support system is height adjustable. Typically, in this case, the bracket includes an elongate slot to facilitate height adjustment.

In a preferred embodiment of the invention the support system includes fixing means for fixing the bracket in a desired position relative to a support member. Preferably the bracket and support member have complementary locating holes or slots in which the fixing means is engaged to fix the support member to the bracket.

In a particularly preferred arrangement the bracket includes cut-away portions to facilitate movement of the bracket relative to the support member.

Usually the bracket includes a mounting foot for mounting directly or indirectly to a structural member or panel.

The bracket may be formed from the same material section as that of the support member.

In one embodiment the support system includes a thermal break means for interposing between a bracket and a support member.

According to a particular aspect of the invention there is provided a support system for supporting a panel in spaced-apart relation to a structural member or another panel, the support system comprising a support member for mounting to a panel and spacer means comprising a bracket having a head part and a leg part with mounting means for mounting to a structural member or another panel, the bracket being mountable to the support member for longitudinal adjustment in relation thereto and the bracket being non-rotatably engagable with the support member.

The invention also provides a bracket, a support member, and/or a thermal break means for use with the support system.

The invention further provides a cladding system comprising an outer panel, an inner structural element and a support system for supporting the outer panel in spaced-apart relation to the inner structural element, the support system comprising an elongate support member for supporting the outer panel and at least a pair of brackets, each bracket having a head part and a leg part extending from the head part for engagement with the elongate support member, at least one end of the elongate structural support member being non-rotatably slidably engagable with the head part of a bracket for linear longitudinal adjustment on assembly of the elongate support member to the bracket.

In one embodiment of the invention the inner structural element is an inner panel. In this case typically the bracket provides a spacing means defining a cavity between the inner and outer panels.

Alternatively the inner structural element is an inner structural member such as a purlin.

A cladding system of the invention may be used for converting a flat roof to a pitched roof.

Brief Description of the Drawings.

The invention will be more clearly understood from the following description thereof given by way of example only in which:-

Fig. 1 is a perspective view of a support system of the invention assembled;

Fig. 2 is an end view of the assembled support system;

Fig. 3 is a cross sectional view of the assembled support system;

Fig. 4 is a side elevational view of part of the support system, assembled;

Fig. 5 is a cross-sectional view on the line V-V in Fig. 4;

Fig. 6 is a cross sectional view on the line VI-VI in Fig. 4;

Fig. 7 is an exploded view of a bracket and elongate support element of the system;

Fig. 8 is a perspective view of part of a panel support system for supporting one panel in spaced-apart relation to another panel;

Fig. 9 is a cross sectional view of the panel support system of Fig 8;

Fig. 9A is a view of a detail of the panel support system of Figs 8 and 9;

Fig. 10 is a cross sectional view of a roof structure incorporating the support system of the invention;

Fig. 11 is a cross sectional view of another support system according to the invention;

Fig. 12 is a perspective view of the support system of Fig 11;

Figs. 13 to 19 are perspective views of various constructions of support systems;

Figs. 20 and 21 are respectively perspective and plan views of a thermal barrier element for use with the support system; and

Figs. 22 and 23 are respectively perspective and plan views of another thermal barrier element for use with the support system.

Detailed Description

Referring to the drawings and initially to Figs. 1 to 10 thereof there is illustrated a support system for supporting a panel in spaced-apart relation to another panel or a structural member. For example, the support system may be used as illustrated in Fig 10 for converting a flat roof to a pitched roof. Alternatively, the support system may be used as illustrated in Figs 8 and 9 for maintaining two panels 30, 31 in spaced-apart relation to create a void between the panels 30, 31 to receive insulation 32.

The support system comprises a number of elongate support members 2 and a number of spacer means comprising brackets 10 which in this case are separately formed from the support member 2. The support member 2 is of inverted channel profile having a base 3 and side webs 4 with inturned side lips 5. The lips 5 are in this case turned in at an angle of approximately 60° to the vertical.

The bracket 10 has a head part 11, a support leg 12 and an out-turned mounting foot 13. The bracket head part 11 has a swaged inverted channel profile comprising a base 15 and side webs 16. The profile of the bracket head 11 is sized and shaped to be a sliding fit in the channel profile of the support member 2. In the engaged position the side webs 16 of the bracket 10 are engaged in the tracks defined by the inturned lips 5 of the support member side webs 4.

It will be noted that for ease of forming the support leg 10 of the bracket 3 is of the same profile as that of the head part 11. However, to allow the bracket 3 to slide

along the length of the support member 2 the profiles are cut-away to define cut-away portions 30 at the corner through which the side webs 4 of the support member 3 pass on sliding adjustment.

In use, a bundle of support members 2 of predetermined length and brackets 3 form a kit for on-site assembly of a support system. A number of support members 2 are arranged according to the span length required and the brackets 3 are inserted into the ends of the support members 2 to give support at various desired supporting locations. Adjustment of the brackets 3 may also be made to facilitate mounting of the support feet 13 of the brackets 3 to a panel or a structural member. Construction of the support system is continued in this way and an outer panel, such as a roof panel, is then attached to the support members 2. The system is extremely quick and easy to assemble and fix in position and because of the non-rotatable engagement between the support members and the brackets there is no risk of a bracket becoming dislodged, in use.

Referring to Figs 11 and 12 there is illustrated another support system 40 according to the invention which is similar to the support system of Figs 1 to 10 and like parts are assigned the same reference numerals. In this case the bracket 10 and support member 2 are integrally formed. To manufacture such a unit a flat strip is sheared to desired developed profile. The sheared strip will then pass through a rolling mill with tooling to form the lipped channel profile. The spigot section is then pressed/swaged so that its profile is offset by the material thickness in relation to the lipped channel profile. A rib may be formed to take up excess material. The bracket section is then bent up. If a rib is used the shape of the rib will be preserved around the bend to negate width variation and to act as a stiffener in service. The operations may be carried out in-line automatically, although the operations may be carried out at more than one station.

The bracket 10 is formed at one end of the support member 2. The other end of the support member 2 is a free end. The longitudinal adjustment is achieved by

engagement of the free end of the support member 2 with a bracket section 10 of an adjacent support system 40. The engagement is similar to that illustrated in Figs 1 to 10.

Various different elements of support assemblies are illustrated in Figs. 13 to 19. In each case the support member has been condensed in length.

The bracket 50 of Fig 13 may be used as a grid system. Such a system allows complex assemblies, such as trusses for over-roof systems, to be constructed. Numbers of structural members may be assembled linearly and in an intersecting orientation.

The bracket 52 of the assembly of Fig 14 has bolt-receiving holes 53 in the support leg for mounting the assembly to form part of a structural system.

In the case of the bracket 55 of Fig 15 the support leg includes an elongate slot 56 and serrated edges to facilitate height adjustment and locking. It is designed to fit with a separate foot component 57 (Fig 16) which includes complementary locking serrations.

The assembly of Fig 17 includes pre-punched rivet/pin holes 59 for fixing location when used in a firewall. The spacer has an upstand 60 which is formed from the same material as the spacer channel to engage in the seams of a standing seam system.

The assembly 65 of Fig 18 is for use as a start end for a roof or horizontal wall system. In this case the bracket and spacer are formed from the same material section.

Fig 19 illustrates a vertical spacer assembly 75 in which a gusset 70 is spot welded, projection riveted or self piercing riveted to provide structural strength to resist the

downforce exerted by cladding. The assembly may be used to provide a start end piece of a start unit for a bottom or vertical wall.

The system may include thermal breaks interposed between the bracket and structural member. The thermal breaks may be of a suitable plastics material such as polypropylene and may be shaped to suit a required function. The thermal break is used to isolate the metal parts of the spacer system from the internal surfaces of the building, reducing the rate of conductive heat loss. Two alternative breaks 80, 81 are illustrated in Figs. 20 and 21, and 22 and 23 respectively. A thermal break 80 is illustrated in use in the panel spacing system of Figs 8 and 9.

It will be appreciated that the dimensions of the various elements in the support system in the drawings are illustrative. In particular, it will be appreciated that the aspect ratio (i.e. the width to height) of the channel may vary, depending on the application. The channel may also have uneven leg lengths to provide enhanced strength.

The invention is not limited to the embodiments hereinbefore described which may be varied in construction and detail.

Claims.

1. A support system for supporting an outer panel in spaced-apart relation to an inner panel or a structural member, the support system spacing the outer panel from the inner panel or the structural member and comprising an elongate support member for supporting the outer panel and at least a pair of brackets, each bracket having a head part and a leg part extending from the head part for engagement with an inner panel or a structural member, at least one end of the elongate support member being non-rotatably slidably engagable with the head part of a bracket for linear longitudinal adjustment on assembly of the elongate support member to the bracket.

2. A support system as claimed in claim 1 wherein the support member and the head part of the bracket have complementary engagable profile .

3. A support system as claimed in claim 1 or 2 wherein the support member is of inverted channel profile having in-turned edges defining retaining lips for engagement with a complementary profile of the bracket head part.

4. A support system as claimed in claim 3 wherein the bracket head is of inverted channel profile having a base and pair of side webs, the side webs engaging, an assembly, with the retaining lips of the support member.

5. A support system as claimed in claim 4 wherein the side webs of the bracket head are cut-away at a leading edge thereof to define lead in portions for locating and aligning the bracket head with a support member.

6. A support system as claimed in any preceding claim wherein the support member and a bracket are integrally formed.

7. A support system as claimed in any of claims 1 to 5 wherein the support member and bracket are separately formed.

8. A support system as claimed in any preceding claim wherein the support system is height adjustable.

9. A support system as claimed in claim 8 wherein the bracket includes an elongate slot to facilitate height adjustment.

10. A support system as claimed in any preceding claim including fixing means for fixing a bracket in a desired position relative to the support member.

11. A support system as claimed in claim 10 wherein a bracket and support member have complementary locating holes or slots in which the fixing means is engaged to fix the support member to the bracket.

12. A support system as claimed in any preceding claim wherein the bracket includes cut-away portions to facilitate movement of the bracket relative to the support member.

13. A support system as claimed in any preceding claim wherein the bracket includes a mounting foot for mounting directly or indirectly to an inner panel or a structural member.

14. A support system as claimed in any preceding claim wherein the bracket is formed from the same material section as that of the support member.

15. A support system as claimed in any preceding claim including a thermal break means for interposing between a bracket and a support member.

16. A support system substantially as hereinbefore described with reference to the accompanying drawings.

17. A support member substantially as hereinbefore described with reference to the accompanying drawings.

18. A bracket substantially as hereinbefore described with reference to the accompanying drawings.

19. A thermal break element substantially as hereinbefore described with reference to the accompanying drawings.

20. A cladding system comprising an outer panel, an inner structural element and a support system for supporting the outer panel in spaced-apart relation to the inner structural element, the support system comprising an elongate support member for supporting the outer panel and at least a pair of brackets, each bracket having a head part and a leg part extending from the head part for engagement with the elongate support means, at least one end of the elongate structural support member being non-rotatably slidably engagable with the head part of a bracket for liner longitudinal adjustment on assembly of the elongate support member to the bracket.

21. A cladding system as claimed in claim 20 wherein the inner structural element is an inner panel.

22. A cladding system as claimed in claim 21 wherein the bracket provides a spacing means defining a cavity between the inner and outer panels.

23. A cladding system as claimed in claim 20 wherein the inner structural element is an inner structural member such as a purlin.

24. A cladding system as claimed in any of claims 20 to 23 for converting a flat roof to a pitched roof.

25. A cladding system substantially as hereinbefore described with reference to the accompanying drawings.

The Patent Office

14

INVESTOR IN PEOPLE

Application No: GB 9909249.6
Claims searched: 1-16 & 20-25

Examiner: Dr. Robert Fender
Date of search: 20 May 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): E1D DF104, DF172, DLEKH, DLEKJ

Int Cl (Ed.6): E04D 3/36; E04F 13/08, 13/12

Other: -

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2185272 A	(CAVANAGH) see figures 1, 3 & 5	1, 2, 8-14 & 20-24
X	GB 2148975 A	(ASH & LACY) see figures 1-4	1-3, 7, 10-14 & 20-23
X	GB 2103261 A	(HARVEY *et al*) see figures 2 & 3	1, 2, 8-14 & 20-24
X	GB 1447180 A	(ALCAN) see figure 8	1-4, 7-14, & 20-23
X	GB 1035817 A	(DENCO MILLER LIMITED) see figure 2	1, 2, 8-14 & 20-24
X	US 4015389	(JOHNS-MANVILLE CORPORATION) see figure 1	1-4, 7-10, 13, 14 & 20-23
X	US 3899857	(MOCHIZUKI) see figures 1-6	1-5, 7-10, 13, 14 & 20-23

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.