(12) UK Patent Application (19) GB (11) 2 345 182 (13) A

(43) Date of A Publication 28.06.2000

(21) Application No 9826111.8

(22) Date of Filing 28.11.1998

(71) Applicant(s)
Duncan Rawsthorne
23 Johnson Close, Crag Bank, CARNFORTH, Lancashire, LA5 9UJ, United Kingdom

(72) Inventor(s)
Duncan Rawsthorne

(74) Agent and/or Address for Service
Appleyard Lees
15 Clare Road, HALIFAX, West Yorkshire, HX1 2HY, United Kingdom

(51) INT CL^7
G09B 25/06

(52) UK CL (Edition R)
G5G G2 G2A3

(56) Documents Cited
EP 0269798 A **US 5348478 A** **US 5326267 A**
US 4874176 A **US 3981506 A**

(58) Field of Search
UK CL (Edition R) **A6H HKB , A6S , G5G G2 G4**
INT CL^7 **A63F , A63H , G09B**
ONLINE:WPI,EPODOC,JAPIO

(54) Abstract Title
Three dimensional model

(57) A three dimensional model comprises a frame section (10) having a base portion 12, a removable front section (14) and side and rear sections (16 Figure 1). The frame section (10) encloses a plurality of model pieces 18, the upper surfaces of which, when placed together, form a topographic surface, such as a relief map or a man-made structure. Side walls 20 of the model pieces 18 have markings 22 thereon which indicate subsurface or internal structure of the three dimensional structure being depicted.

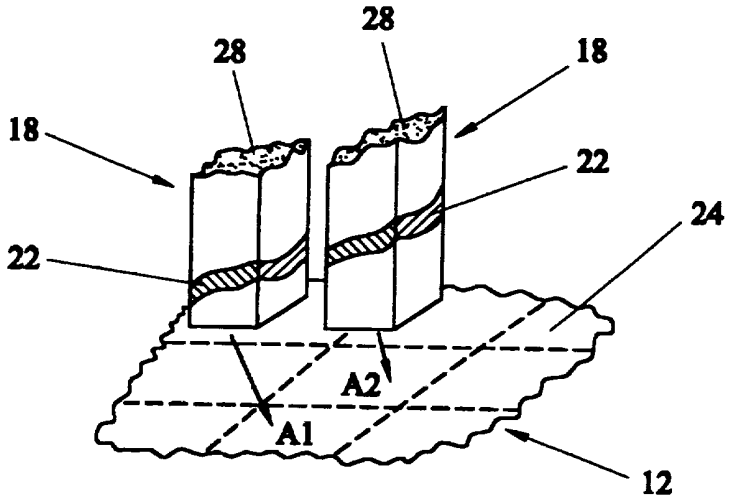

FIG. 3

GB 2 345 182 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

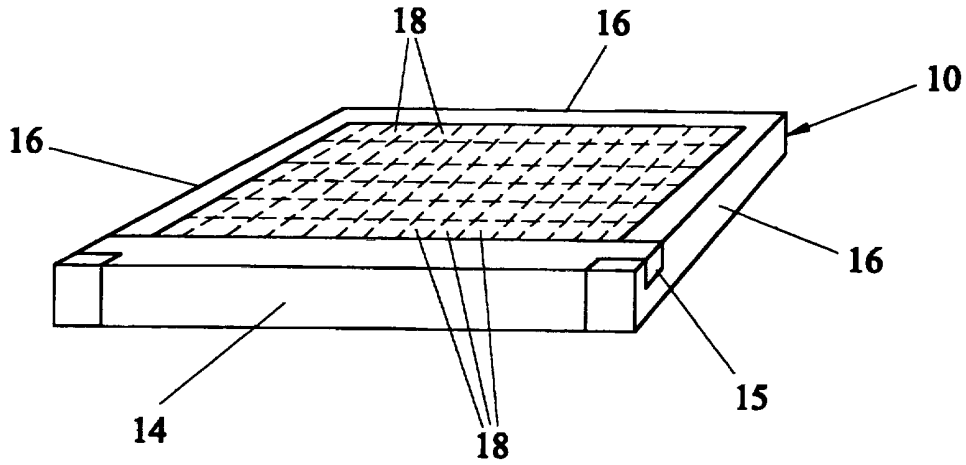

FIG. 1

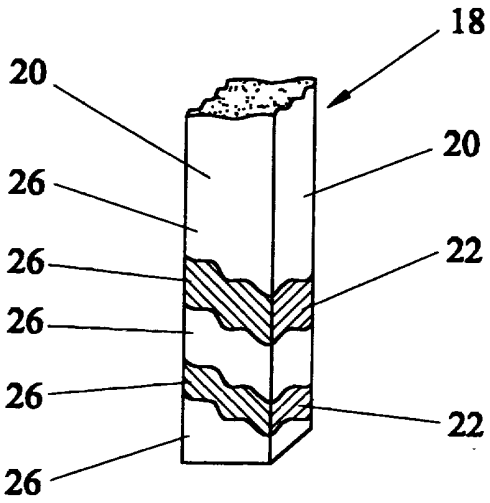

FIG. 2

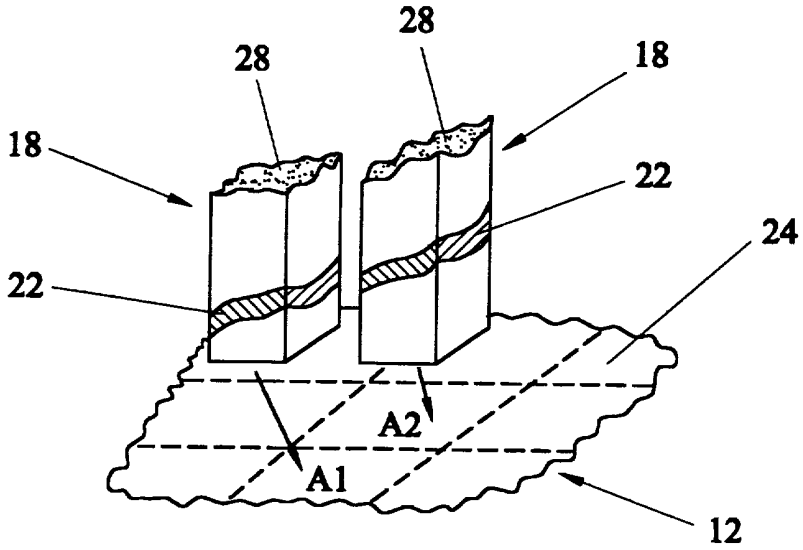

FIG. 3

THREE DIMENSIONAL MODEL

This invention relates to a three dimensional model and to a method of assembling a three dimensional model.

Existing three dimensional models are typically formed from a single piece, which leads to difficulties in manufacturing, storing and transporting such models.

It is an object of the present invention to address the abovementioned disadvantages.

According to one aspect of the present invention a three dimensional model comprises a plurality of model pieces each having an upper face and side faces, the pieces being arranged so that when placed adjacent one another, the upper faces thereof form a surface in relief and the side faces thereof depict subsurface features.

The model pieces may have a unique configuration in which a desired surface is formed by adjacent blocks. The unique arrangement may additionally depict a desired arrangement of subsurface features.

The upper surfaces of the model pieces may form discrete parts of the surface in relief. The surface in relief may be a geographical surface or may be a man-made structure. The surface in relief may have markings thereon to indicate features of the surface, which may be abstract features, such as contours, or may be physical features, such as roads and the like.

The model pieces may have substantially flat side faces. Alternatively, the model may have shaped side faces, one or more of which may be arranged to match only a desired adjacent piece. The side faces may be

interlocking side faces which may comprise interengaging openings and corresponding projections. The side faces of adjacent pieces may have communicating curved shapes.

Each model piece may consist of at least two subsidiary pieces, the heights of which may correspond to the subsurface features depicted on the side faces of a particular model piece. A first subsidiary piece may correspond to a first subsurface feature, such as a first geological stratum, and a second subsidiary piece may correspond to a second subsurface feature, such as a second geological stratum. Alternatively, the heights of the subsidiary pieces may be chosen arbitrarily, simply to give smaller model pieces, in which case a boundary between subsidiary pieces may be a horizontal boundary.

A lower face of each model piece may have a location indicator marking, which may indicate the location of a model piece relative to other model pieces.

The three dimensional model may include a frame portion, which may comprise a base portion and side portions.

The base portion may provide a base which is arranged to receive the model pieces. The base portion may include markings which may indicate the intended location of the model pieces relative to one another. The markings may correspond to markings on the model pieces, preferably on a lower face of the model pieces. The markings may comprise contour lines of the surface in relief formed by the model pieces.

The markings may be included on at least one insert section of the base portion. Preferably, a plurality of

insert sections are provided, each having different markings.

The side portions may be arranged to deter lateral movement of model pieces places on the base portion. One of the side portions may be a front portion, which may be removable, to assist in obtaining access to model pieces located on the base portion.

The frame portion may include markings relevant to the surface in relief formed by the model pieces. The markings may be the co-ordinates of a geographical location formed by the model pieces. The markings may be continuations of features shown on the surface in relief, such as roads, or the like.

According to another aspect of the present invention a method of assembling a three dimensional model comprises placing a plurality of model pieces adjacent to one another, so that upper faces of the model pieces form a surface in relief and side faces of the model pieces depict subsurface features.

The model pieces may have a unique configuration to define an intended surface and/or surface features.

The model pieces may be inserted or removed by removing a front portion of a frame portion of the three dimensional model.

All of the features disclosed herein may be combined with any of the above aspects, in any combination.

Specific embodiments of the present invention will now be described, by way of example with reference to the accompanying drawings, in which;

Figure 1 is a schematic perspective view of the pieces of a three dimensional model held in a frame;

Figure 2 is a schematic perspective view of one of the pieces of the model; and

Figure 3 is a schematic partially exploded view of two of the pieces of the model and a portion of the frame.

A three dimensional model comprises a frame section 10 having a base portion 12 (see Figure 3), a removable front section 14 and side and rear sections 16. The frame section 10 encloses a plurality of model pieces 18, the upper surfaces of which, when placed together, form a topographic surface, such as a relief map or a man-made structure. Side walls 20 of the model pieces 18 have markings 22 thereon which indicate subsurface or internal structure of the three dimensional structure being depicted.

The frame section 10 is arranged to hold the model pieces 18 in place by preventing lateral movement of the pieces 18 when they are placed on the base portion 12. To assist easy removal of the model pieces 18, the front section 14 is removable from the remainder of the frame section 10 to allow the pieces to be tipped from the frame section 10. The front section 14 is removable by lifting it out of grooves 15 in the side sections 16. Also, the removable front section 14 allows easy access to the model pieces 18 when they are placed on the base portion 12.

The base portion 12 may hold a number of inserts, one of which is shown at 24 in Figure 3. One insert may depict an indication of the intended location of a particular model piece 18, as shown by the markings A1 and A2 in Figure 3. Alternatively, an insert may show contour lines of the 3D structure to be formed by the model pieces 18. The inserts 24 may be placed one on top of the other and stored on the base portion 12.

The frame section, in particular the removable front section 14 and side and rear sections 16, may be marked to indicate specific details of the three dimensional structure depicted by the model pieces 18. The details may be latitude and longitude markings for a particular geographical location or may be, for instance, road destinations for continuations of roads marked on the upper surface of the model pieces 18.

The model pieces 18 consist of a rectangular or square column, each having a flat base having an individual identifying mark relating to that particular piece and its intended location on the base portion 12. In Figure 3, the markings on the base of the model pieces 18 may be "A1" and "A2" to correspond to the markings on the insert 24.

The markings 22 on the side walls 20 of the model pieces 18 may show geological strata, where the three dimensional model depicts a relief map. Alternatively, the markings 22 may depict man-made structures, such as tunnels, or the interior of a man-made structure depicted by the three dimensional model. The side walls 20 may be flat as shown in Figure 2, or may, alternatively, have curved or grooved surfaces to ensure that two adjacent model pieces 18 have an unique fit, similar to a jig-saw.

The model pieces 18 may be sub-divided into smaller subsidiary pieces 26, the division of which may relate to the subsurface markings 22 shown on the side walls of the pieces 18 or may simply be horizontal divisions.

The upper surface 28 of each model piece 18 gives external topographical details of the model, such as geographical features or the external shape of a man made structure. Surface markings, in addition to the shape of the upper surface 28 may be included. The surface markings may comprise abstract features such as contour lines or footpaths, or roads.

In use, the frame section 10 is emptied and the model pieces 18 are placed in their respective locations based on the marking on the base of each piece 18 and the markings on the insert 24. As the 3D structure is built up, the relationship of the subsurface or internal structure of the model can be related to the subsurface shape. The provision of the markings 22 on the side walls 20 may also assist in finding the correct location for the model pieces 18.

The three dimensional model described above has the aesthetic value and is also of considerable educational value, both in the home and in a formal education environment.

Examples of 3D structures which could be represented are terrestrial geographic features such as Mount Everest, Mont Blanc or Snowdon; extra terrestrial geographic features, such as the surface of the Moon or Mars or other planets; and man made structures such as the Hoover Dam or the Pyramids.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS:

1. A three dimensional model comprises a plurality of model pieces each having an upper face and side faces, the pieces being arranged so that when placed adjacent one another, the upper faces thereof form a surface in relief and the side faces thereof depict subsurface features.

2. A three dimensional model according to claim 1, in which the model pieces have a unique configuration in which a desired surface is formed by adjacent blocks.

3. A three dimensional model as claimed in claim 2, in which the unique arrangement additionally depicts a desired arrangement of subsurface features.

4. A three dimensional model as claimed in any preceding claim, in which the upper surfaces of the model pieces form discrete parts of the surface in relief.

5. A three dimensional model as claimed in claim 4, in which the surface in relief is a geographical surface or a man-made structure.

6. A three dimensional model as claimed in any preceding claim, in which the model pieces have substantially flat side faces.

7. A three dimensional model as claimed in any one of claims 1 to 5 in which the model has shaped side faces, one or more of which are arranged to match only a desired adjacent piece.

8. A three dimensional model as claimed in any preceding claim, in which each model piece consists of at least two subsidiary pieces, the heights of which correspond to the subsurface features depicted on the side faces of a particular model piece.

9. A three dimensional model as claimed in any preceding claim, in which a lower face of each model piece has a location indicator marking, which indicates the location of a model piece relative to other model pieces.

10. A three dimensional model as claimed in any preceding claim, which includes a frame portion, which comprises a base portion and side portions.

11. A three dimensional model as claimed in claim 10, in which the base portion includes markings which indicate the intended location of the model pieces relative to one another.

12. A three dimensional model as claimed in claim 11, in which the markings comprise contour lines of the surface in relief formed by the model pieces.

13. A three dimensional model as claimed in either claim 11 or 12, in which the markings are included on at least one insert section of the base portion.

14. A three dimensional model as claimed in claim 13, in which a plurality of insert sections are provided, each having different markings.

15. A three dimensional model as claimed in any one of claims 10 to 14, in which the frame portion includes markings relevant to the surface in relief formed by the model pieces.

16. A method of assembling a three dimensional model comprises placing a plurality of model pieces adjacent to one another, so that upper faces of the model pieces form a surface in relief and side faces of the model pieces depict subsurface features.

Application No:	GB 9826111.8	**Examiner:**	ROGER A H CASLING
Claims searched:	1-16	**Date of search:**	19 April 2000

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.R): A6H(HKB),A6S,G5G(G2,G4)

Int Cl (Ed.7): A63F,A63H,G09B

Other: Online:WPI,EPODOC,JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP 0269798 A2	(HESSE) see column 2 line 34 et seq	1-8
X	US 5348478	(BRADSHAW) see column 2 line 54 et seq and column 4 line 45 et seq	1-7, 10 and 16
X	US 5326267	(BROKAW) see column 4 line 54 et seq and column 5 line 43 et seq	1-7 and 16
X	US 4874176	(AUERBACH) see column 4 line 58 et seq and column 7 line 43 et seq	1-7, 10 and 16
X	US 3981506	(DANIEL) see column 2 line 50 et seq	1-7

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.