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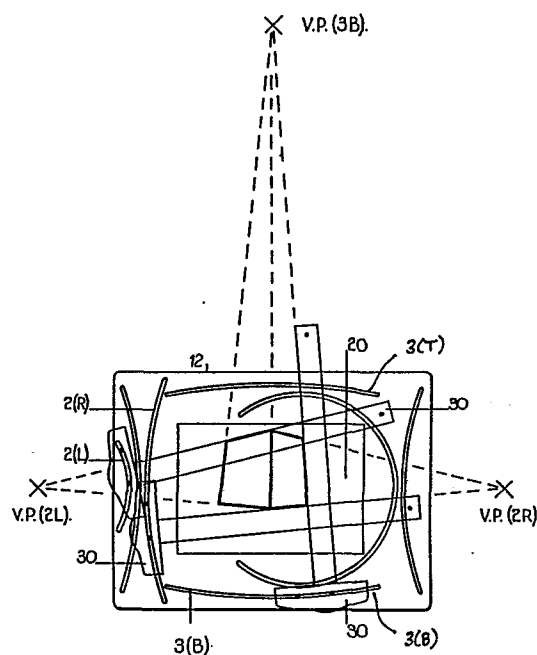
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54 **Drawing board.**

57 A drafting system includes a drawing board (12) and drawing instrument(s) (30) for use with the board for the production of perspective drawings. The board includes a drawing surface (20) and guide means (2(L), 2(R)) on at least one side of the drawing surface (20) for cooperative engagement by the instrument(s) (30) to produce perspective views having vanishing points (VP(2L), VP(2R)) at one or both sides of the drawing surface (20). The board (12) further includes guide means (3(T), 3(B)), above and/or below the drawing surface (20) to permit the production of height and/or depth perspective drawings having vanishing points above (VP(3B)) and/or below the drawing surface (20). In one form of the invention (Figure 10) at least some of the guide means are disposed on a removable and replaceable portion (60) of the board to permit use of guide means having different characteristics.



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DRAWING BOARDBACKGROUND OF THE INVENTION

The present invention relates to a drafting system and in particular to a system comprising a drawing board and drafting implements to use with said board to produce perspective drawings.

A number of drawing boards have previously been suggested which facilitate the production of perspective drawings, these being particularly useful for architects, draftsmen and the like. In addition, such drawing boards are of value to schools and learning institutions where students are taught to prepare drawings including perspective views.

For example, one such drawing board is disclosed in U.S. Patent No. 4,380,124. This patent discloses a drawing board specially adapted for the preparation of perspective drawings, but which suffers from a number of disadvantages. In particular, it does not provide for the preparation of perspective drawings in which the vanishing points are located above and/or below a substantially horizontal line of the drawing surface. Thus, one is not aided with such a board in preparing drawings having height and/or depth perspectives.

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Danish Patent No. 74469 also discloses a drawing board on which perspective drawings may be formed, but again does not disclose any arrangement providing vanishing points above and/or below a substantially horizontal center line of the drawing surface.

The above-noted U.S. Patent No. 4,380,124 and Danish Patent No. 74469 each disclose drawing boards having a drawing surface with guide means for drawing instruments, the guide means being arranged so that they do not protrude above the plane of the drawing surface. As will be appreciated, this is important to permit drawing instruments to be moved freely across the drawing surface. Both patents disclose guide means on one side of the drawing surface, which include a pair of arcuate guides of basically opposite curvature, which are capable of aligning the drawing instruments with vanishing points on opposite sides of the center of the drawing surface. Both patents further disclose a recess or spacing between the arcuate guides to allow for a drawing instrument or the like to be moved from one arcuate guide to the other during the formation of drawings.

In addition to the above-mentioned patents, other patents are known relating to drawing boards having various means for forming perspective drawings. In such arrangements however, the guide means have limited capabilities. None of the prior art specifications suggest or disclose means for defining vanishing points above and/or below a substantially horizontal center line of the drawing surface (in addition to vanishing points at substantially opposite sides of the drawing surface). Examples of such prior art include U.S. Patent Nos. 2,412,194 and 2,876,547, United Kingdom Patent No. 74633, Italian Patent No. 438,176 and West German Patent No. 1,087,359.

In addition, none of the prior art specifications discloses or suggests means whereby the arcuate guides provided

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along at least one side of the drawing surface can be replaced, such as by being incorporated into a replaceable portion of the board, thus allowing arcuate guides of differing dimensions and curvature to be used in association with the same drawing surface and drawing implements. Such an arrangement allows for the board to be used for a far greater number of differing situations as compared with a board which has fixed guide means at one side of the drawing surface as is the case with known boards.

10 BRIEF SUMMARY OF THE INVENTION

In the present invention, a drawing system is provided including a drawing board having guide means and a drawing instrument or instruments adapted for cooperation with said guide means for the production of perspective drawings.

15 The present drawing board includes guide means at one or both sides of a drawing surface for defining in conjunction with a drawing instrument a vanishing point or points along a substantially horizontal center line of the drawing surface, and in addition, includes guide means above and/or below said drawing surface defining in conjunction with a drawing instrument
20 a vanishing point or points above and/or below a substantially horizontal center line of the drawing surface.

In a further form of the invention, at least two substantially arcuate guides are provided at one side of the drawing surface, and are formed or provided in a replaceable
25 board portion which is capable of demountable attachment to the drawing board at one side of the drawing surface. In that the portion is replaceable, it can be removed and replaced with a portion carrying arcuate guides of a different dimension
30 or configuration, depending upon the desires of a user.

It is accordingly one aim of the present invention to provide a drafting system including a drawing board which permits the preparation of perspective drawings

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having vanishing points above and/or below a substantially horizontal center line of the drawing surface.

5 A further aim of the invention is to provide a drawing board having guide means for the preparation of perspective drawings, which guide means are disposed on a removable portion of the board to permit replacement thereof with a portion having different guide means.

10 Another aim of the invention is to provide a drafting system as described of a relatively simple construction which can be efficiently employed in the production of perspective drawings.

15 Other aims of this invention will become apparent from the following description of preferred embodiments thereof, which descriptions are given with reference to the accompanying drawings, in which:-

Fig. 1 is a plan view of a drafting system comprising a drawing board and drawing implements in accordance with the present invention, said system being illustrated in the process of producing a one point perspective drawing;

20 Fig. 2 is a plan view of the system of Fig. 1 shown in the process of producing a two point perspective drawing;

25 Fig. 3 is a plan view of the system of Figs. 1-2 shown in the process of producing a three point perspective drawing with the third point located above the drawing surface;

Fig. 4 is a plan view similar to Fig. 3 but showing the production of a three point perspective drawing with the third point located below the drawing surface;

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Fig. 5 is a plan view of the present system shown in the process of producing an isometric perspective drawing;

Fig. 6 is a plan view of the drawing board of the system of Figs. 1-5;

5 Fig. 7 is a plan view of a T-square for use with the present system;

Fig. 8 is a plan view of an isometric drawing instrument for use with the present system;

10 Fig. 9 is a view of the drawing board of Figs. 1-5 showing the available vanishing points defined by the board guide means;

15 Fig. 10 is a plan view of a modified form of the drawing board of Figs. 1-5 wherein the arcuate guides at one side of the drawing surface are located on a replaceable portion of the drawing board;

Fig. 11 is a schematic layout showing a manner of selecting the third point of a three point perspective view; and

20 Fig. 12 is an enlarged partial sectional view showing the manner of attachment of one of the guide studs to a drawing instrument and its interaction with one of the drawing board grooves.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

25 The present drafting system comprises a drawing board and one or more drawing instruments which are specially constructed for use with said board to aid in the production of

perspective drawings. The drawing board includes guide means which preferably comprise arcuate grooves in the board surface, and the instruments include complementary means such as a pair of spaced downwardly extending studs for engagement with the arcuate grooves of the board.

Considering the specific details of the board, and with particular reference to Fig. 6, a drawing board 12 in accordance with the present invention comprises a rectangular board of rigid material having planar face surfaces. The board edges are substantially straight edges, permitting use of the board in a conventional manner with a T-square applied along any preferred edge.. The board may be made of any appropriate material, such as for example, plastics, fiberboard, wood and the like.

The board includes on one face thereof a drawing surface 20 which is centrally disposed thereon and of a sufficient size to accommodate drawing views to be produced. The drawing surface is preferably of a rectangular shape as illustrated, having the same general rectangular proportions as the board. The board, as is the case with most drawing boards, is intended to be used with one of its longer edges adjacent the user and parallel to the horizon of the view being drawn. A horizontal center line 25 of the drawing surface 20 extends substantially parallel to the longer edges of the board. The drawing surface 20 may be bounded on one or more sides by appropriate scales 15 as illustrated in Fig. 6.

As indicated above, the board includes a plurality of guide means in the form of grooves in the board face adjacent the drawing surface, the guide means being adapted to receive complementary guide elements of the drawing instruments. Since the guide means do not protrude above the surface of the board, none of the guide means interferes with the free movement of the special instruments in cooperation with other

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guide means, nor does the plurality of guide means prevent the usual sliding movement of conventional T-squares, triangles, scales and the like across the face of the board containing the drawing surface.

5 Considering the details of the guide means, with reference to Figs. 6 and 9, at the left side of the drawing surface 20 are provided spaced guide means 2(L) and 2(R), which guide means are formed as arcuate grooves or depressions in the surface of the board. The grooves may be molded or cut
10 in the board, depending on the manner and material used in forming the board. The grooves 2(L) and 2(R) are of opposite curvature and, in the illustrated embodiment, are located so as to be substantially convex relative to each other. The groove 2(L) as shown in Fig. 9 is an arc of a circle centered
15 at point VP(2L) which, as will be described hereinafter, comprises a horizontal vanishing point for the formation of a perspective drawing. The point VP(2L), in the embodiment illustrated, lies on the projected horizontal center line to the left of the drawing surface 20.

20 Similarly, the groove 2(R) comprises an arc of a circle having its center at point VP(2R), also on the projected center line 25, and defining a horizontal vanishing point at the right hand side of the board for perspective views as later described. The guide means comprising the grooves 2(L) and
25 2(R) are intended for use as a pair and it will be noted that the vanishing points VP(2L) and VP(2R) are substantially equally spaced from a vertical center line 50 passing centrally through the drawing surface, although different vanishing points could be chosen.

30 A second set of arcuate guide means 4(L) and 4(R) of opposite curvature are provided in convex facing relation on opposite sides of the drawing surface 20. The guide 4(L) comprises an arcuate groove disposed between the spaced grooves 2(L) and 2(R) and comprises an arcuate groove centered at point

C.(4L) on the center line 25 to the left of the board. Similarly, guide means 4(R) comprises an arcuate groove centered at point C.(4R) on the center line 25 to the right of the board. As will be described below, the guide means 4(L) and 4(R) are intended for use as a pair in the production of isometric type views.

A third guide means is provided on the board in the form of an arcuate groove 1 having a center at point VP(1) on the center line 25, which point is on the drawing surface 20 slightly to the right of its center. The groove 1, which subtends an arc of approximately 270°, extends circumferentially around a substantial portion of the drawing surface and is used in the production of single vanishing point perspective drawings as described hereinafter.

A fourth guide means which may be disposed above and/or below the drawing surface 20 comprises in the preferred embodiment arcuate grooves 3(T) and 3(B) which are respectively located above and below the drawing surface. The groove 3(T) is an arc of a circle centered at point V.P.(3T) on the projection of the vertical center line 50 below the board. Similarly, the groove 3(B) is an arc of a circle centered at point V.P.(3B) on the projection of vertical center line 50 above the board. The guide means 3(T) and 3(B) are used in conjunction with the guide means 2(L) and 2(R) to produce three point perspectives and function to permit height and depth perspectives.

In the preferred form of the invention, the arcuate grooves 3(T) and 3(B), which are oppositely curved relative to each other, are disposed on opposite sides of the drawing surface 20. If desired, however, only an upper guide means 3(T) or a lower arcuate means 3(B) could be provided. For example, if only a lower arcuate guide was provided, then only a third vanishing point height perspective would be obtainable,

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whereas, if only an upper arcuate guide means 3(T) was provided, then only a third vanishing point depth perspective could be obtained.

5 With reference to Figs. 7 and 8, the drawing instruments especially constructed for use with the drawing board 12 are illustrated. In Fig. 7, a T-square 30 is shown which is similar in construction to conventional T-squares except that the cross member 32 thereof is flush with the longitudinal member 31 and a pair of spaced studs 35 are provided projecting
10 from the underside of the cross member 32. The studs 35 are equally spaced on either side of the projection of the drawing edge 31a of the longitudinal member 31 and are configured so as to snugly but slidably fit in any of the grooves of the above-described guide means. As will be evident from the de-
15 scription of the use of the system below, the placement of the T-square 30 with its studs 35 in any of the grooves will result in the drawing edge 36 being aligned with the center of that groove which serves as a vanishing point. This relationship will hold true regardless of the position of the
20 T-square along the length of the groove.

Referring to the enlarged sectional view of Fig. 12, one of the studs 35 of T-square 30 is shown disposed in the groove 4(L) of drawing board 12 for sliding movement therein. The stud 35 comprises a lower male portion 35a
25 having a frusto-conical downwardly directed face 35b cooperatively engaging the bevelled groove walls. A cylindrical stem portion 35c of the male stud portion passes through a bore in the T-square 30 and is held captive therein by a female stud portion 35d, being press fitted within a bore
30 35e thereof.

The drawing implement 40 shown in Fig. 8 is intended for use in the production of isometric type views and comprises

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a large 30°-60° triangle having a straight drawing edge 41 along the hypotenuse thereof and a pair of spaced studs 42 extending downwardly from the short leg thereof in spaced relation. The studs 42 are identical in shape to the studs 35 of the T-square 30 and thus permit the implement 40 to also
5 be slidably moved in the grooves of the guide means.

The structure of the drawing board and the instruments specially adapted for use with the board having been described, the multiple uses provided by the present drafting
10 system will now be considered.

For use of the present system to produce a one point perspective drawing view, the T-square 30 is placed with its studs 35 in the groove 1 as shown in Fig. 1. The edge 31a of the T-square will accordingly pass through the vanishing point
15 VP(1) for any position of the T-square in the groove 1. The vanishing point thus need not be constructed and any lines to be drawn toward the vanishing point from points on the picture plane are simply drawn along the T-square edge 31a. As may be seen in Fig. 1, a conventional T-square 36 and a
20 conventional triangle 50 may be employed in a conventional manner to complete the drawing view.

The use of the board to produce two point perspective drawings is shown in Fig. 2. In this view, the special T-square 30 is disposed with its studs engaged in grooves 2(L) or 2(R) to respectively enable the drawing of lines directed
25 at vanishing points VP(2L) or VP(2R). In Fig. 2 a pair of T-squares 30 are shown to illustrate different operating positions, but in practice only a single T-square is needed since it can be readily lifted from one groove to another. A conventional T-square 36 is shown engaged with the upper edge
30 of the board to produce vertical lines on the drawing view.

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The arrangement of Fig. 2 and particularly the use of the guide means 2(R) and 2(L) to produce two point perspective views is similar to the arrangement for such purpose shown in the previously mentioned U.S. Patent 4,380,124.

A primary object of the invention is to provide a system enabling the production of three point perspective drawing views. For this purpose, the guide means 3(T) and 3(B) are provided, which guide means are used in conjunction with the two point perspective guide means 2(L) and 2(R).

10 Fig. 3, for example, illustrates the use of the board to create a three point perspective view wherein a height perspective is added to the two horizontal perspectives. For this purpose, the T-square 30 is shown in three separate positions in three different grooves. In Fig. 3, a first position
15 of the T-square 30 is shown wherein the studs thereof are engaged in the groove 2(L), thereby permitting the T-square edge 31a to produce lines directed toward the vanishing point VP(2L) at the left side of the board. In a second position, the T-square is shown in use in conjunction with groove 2(R),
20 whereby the edge 31a thereof will produce lines directed toward the vanishing point VP(2R) at the right hand side of the board. For lines creating a height perspective, the T-square 30 is engaged with the groove 3(B) as shown in Fig. 3 and the edge 31a thereof will then be directed toward vanishing point VP(3B)
25 located above the board. It may thus be seen that the three vanishing points utilized permit the formation of a drawing having a height perspective in addition to the two conventional horizontal perspectives.

In Fig. 4, a three point perspective view similar
30 to that of Fig. 3 is shown in the process of production, the difference being that a depth perspective rather than a height perspective is utilized. In the production of such a view, the guide means 3(T) is used in conjunction with the T-square 30, as well as the guide means 2(L) and 2(R). With this arrangement, the vanishing points VP(2L), VP(2R) and VP(3T) are
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employed to produce a three point perspective drawing having a depth perspective.

While the choice of vanishing points to be produced for three point perspective drawings is largely a matter of taste, a formula has been devised for choosing the location of the height or depth perspective vanishing point, which formula may be used to choose the center of curvature of grooves 3(T) and 3(B). The schematic layout of Fig. 11 illustrates how this formula is employed. The points and distances of the layout of Fig. 11 are as follows:

A,B - vanishing points whose positions are known

N - "center"

T - projection of view-point.

C - vanishing point whose position is required.

s - height of viewing point above eye level scaled down to the scale of the drawing.

AN = m

BN = v

CN = h

The required formula is:

$$h = \frac{m \times v}{s}$$

As s gets smaller and smaller, h increases and becomes infinite when s = 0. For s negative (i.e. viewpoint below eye level) h is negative so the third vanishing point is below eye level.

Referring to Fig. 5 of the drawings, the present drawing system is also useful in forming isometric type drawings utilizing the drawing instrument 40 which is engaged with the arcuate guide means 4(L) or 4(R) at either side of the drawing surface 20. The use of the instrument 40 in the guides results in the alignment of the drawing edge 41 thereof selectively with either the vanishing point VP(4L) or VP(4R). Such

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an arrangement is conventional and is illustrated, for example, in U.S. Patent 4,380,124..

As referred to hereinbefore, it is a further advantage and feature of a modified form of the present invention to provide guide means at one side of the drawing surface 20 on a replaceable portion of the board. As shown in Fig. 10, a modified drawing board 70 includes a board portion 60 at one side of the drawing surface 20 which is capable of being clipped into and out of position, or alternatively which is
.0 capable of being slid into and out of position. The replaceable portion 60 is preferably formed with at least two arcuate guide means 2(L) and 2(R) of a desired length, configuration and curvature, depending upon the desires of a user and depending upon the vanishing points required relative to the draw-
.5 ing surface 20.

In the embodiment shown in Fig. 10, the replaceable portion 60 is received within a recess 65 of the board and can be secured in position on the board by lugs at each side of the portion 60 which can engage with receiving slots at
10 each side of the recess 65. In this way, the replaceable portion 60 of the drawing board, locating the arcuate guide means 2(L), 2(R) can be replaceably clipped into position. When it is desired to change the configuration or curvature of the arcuate guide means, the portion 60 can be removed and replaced.
25 For example, the drawing board 70 can have associated with it, a number of portions 60, having arcuate guide means of differing configurations, dimensions or curvature.

In an alternate arrangement, the recess 65 can be provided with grooves and the replaceable portion 60 can be
30 provided with elongate runners or tongues down each side. These can then engage within the grooves in the sides of the recess 65 to allow for the portion 60 of the board to be slidably engaged within the recess and removably and releasably located within the board. Again, a drawing board could be associated

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with a number of slide replacements, each having arcuate guide means of differing configurations and curvature, so that the arcuate guide means 2(L), 2(R) can be replaced in a straightforward and efficient manner, when desired by a user.

5 . Where a replaceable portion 60 (carrying arcuate guides 2(L) and 2(R) is slidably engageable within the recess 65, it is also an advantage of the present invention, that by slideably moving the portion 60 within the recess 65, the horizontal center line 25 of the drawing surface 20 can
10 be raised or lowered, depending on the desires of a user. This contributes greatly to the value and flexibility in use, of the present invention.

 It should be appreciated that any appropriate means of releasably engaging the portion 60 with the board 70 can
15 be used. The above described means are by way of example only.

 The provision of a guide-carrying replaceable portion of the board is a particularly advantageous feature of one form of the present invention, in that a user is not forced to continue to use one set of arcuate guide means of predetermined length, configuration or curvature. The arcuate guide
20 means used basically to define vanishing points can thus be replaced and varied as may be required.

 The present invention has been described by way of example only, and improvements or modifications may be made
25 without departing from the scope thereof, as defined by the following claims.

CLAIMS

1. A drawing board (12) including a drawing surface (20), and at least one drawing instrument (30, 40) characterised in that at least two substantially arcuate guides (2(L), 2(R)) located on at least one side of said drawing surface (20) and being capable in use of defining vanishing points (VP) on opposite sides of said drawing surface (20), at least one arcuate guide (3(T), 3(B)) being provided above and/or below a substantially horizontal center line (25) of said drawing surface (20), said arcuate guides (2(L), 2(R); 3(T), 3(B)) being so positioned and located relative to the drawing surface (20) and to each other, that at least one of said drawing instruments (30, 40) is capable of being used in conjunction therewith to define vanishing points (VP) on opposite sides of said drawing surface (20) and to define at least one further vanishing point (VP(3B), VP(3T)) above and/or below a substantially horizontal center line (25) of said drawing surface (20).

2. A drawing board as claimed in claim 1, characterised in that said at least two substantially arcuate guides (2L, 2R) located to at least one side of said drawing surface (20) are located substantially convex relative to each other.

3. A drawing board as claimed in claim 1 or claim 2, characterised in that an upper arcuate guide (3(T)) is provided above the horizontal center line (25) of said drawing surface and a lower arcuate guide (3(B)) is provided below the horizontal center line (25) of said drawing surface; the upper and lower arcuate guides (3(T), 3(B)) being substantially concave relative to each other.

4. A drawing board as claimed in any preceding claim, characterised in that said arcuate guides comprise

elongate grooves in said drawing board.

5. A drawing board as claimed in claim 3, characterised in that a drawing instrument (30) in conjunction with said lower or upper arcuate guide respectively below
5 or above the horizontal center line (25) of said drawing surface (20) is capable of defining a respective vanishing point (VP(3B)) above or (VP(3T)) below the substantially horizontal center line (25) of said drawing surface.

6. A drawing board (70) as claimed in any preceding
10 claim, characterised in that said at least two arcuate guides (2(L), 2(R)) located to at least one side of said drawing surface (20) are provided in a releasably engageable, replaceable, portion (60) of said board.

7. A drawing board (70) as claimed in claim 6,
15 characterised in that the replaceable portion (60) is slidably engageable within an elongate recess (65) in said board (70).

8. A drawing board (70) including a drawing surface (20), at least two substantially arcuate guides (2(L),
20 2(R)) situated on one side of said board (70) and being capable in use of defining vanishing points (VP(2L), VP(2R)) on substantially opposite sides of said drawing surface (20), and said at least two substantially arcuate guides being provided in a replaceable portion (60) of
25 said board (70) which is releasably engageable with said board (70).

9. A drawing board (70) as claimed in claim 8,
characterised in that the replaceable portion (60) of said board is releasably engageable within said board
30 (70) by means of a clip engagement.

10. A drawing board as claimed in claim 8 or 9,

characterised in that the replaceable Portion (60) of said board is slidably engageable within an elongate recess (65) in said board (70).

11. A drawing system comprising a drawing board
5 (12) and a drawing instrument (30) for cooperative use with said board, said board including a flat drawing surface (20), characterised in that first guide means (2(L), 2(R)) is provided on said board (12) on at least one side of said drawing surface (20), complementary
10 means (35) on said instrument (30) for engagement with said guide means (2(L), 2(R)) to provide selective alignment of a straight drawing edge (31(a), 41) of said instrument (30) with vanishing points (VP(2L), VP(2R)) at either side of said drawing surface (20), second guide
15 means (3(T), 3(B)) on said board disposed above and/or below said drawing surface (20) for selective engagement by said instrument means (30) to provide alignment of said edge (31a) of said instrument (30) with a vanishing point above (VP(3B)) and/or below (VP(3T)) said drawing
20 surface (20).

12. A drawing system as claimed in claim 11, characterised in that said first and second guide means comprise arcuate grooves (2(L), 2(R) : 4(L), 4(R)) in the surface of said board and in that said complementary means on
25 said instrument (30, 40) comprise a pair of spaced studs (35, 41) adapted for engagement with said grooves.

13. A drawing system as claimed in claim 11 or 12, characterised in that each of said arcuate grooves (2(L), 2(R) : 4(L), 4(R)) comprises an arc of a circle
30 having its center at a drawing vanishing point (VP).

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FIG. 1

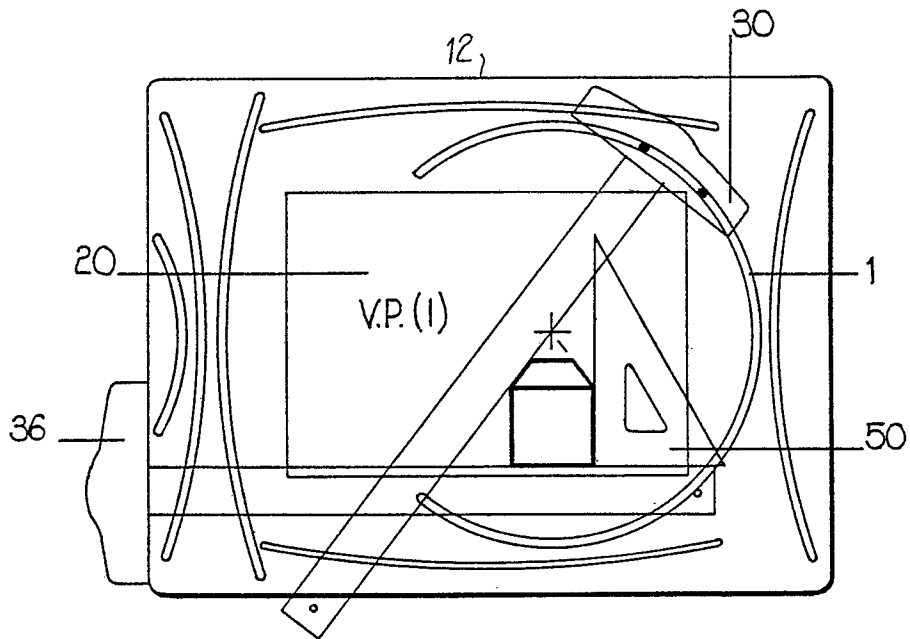
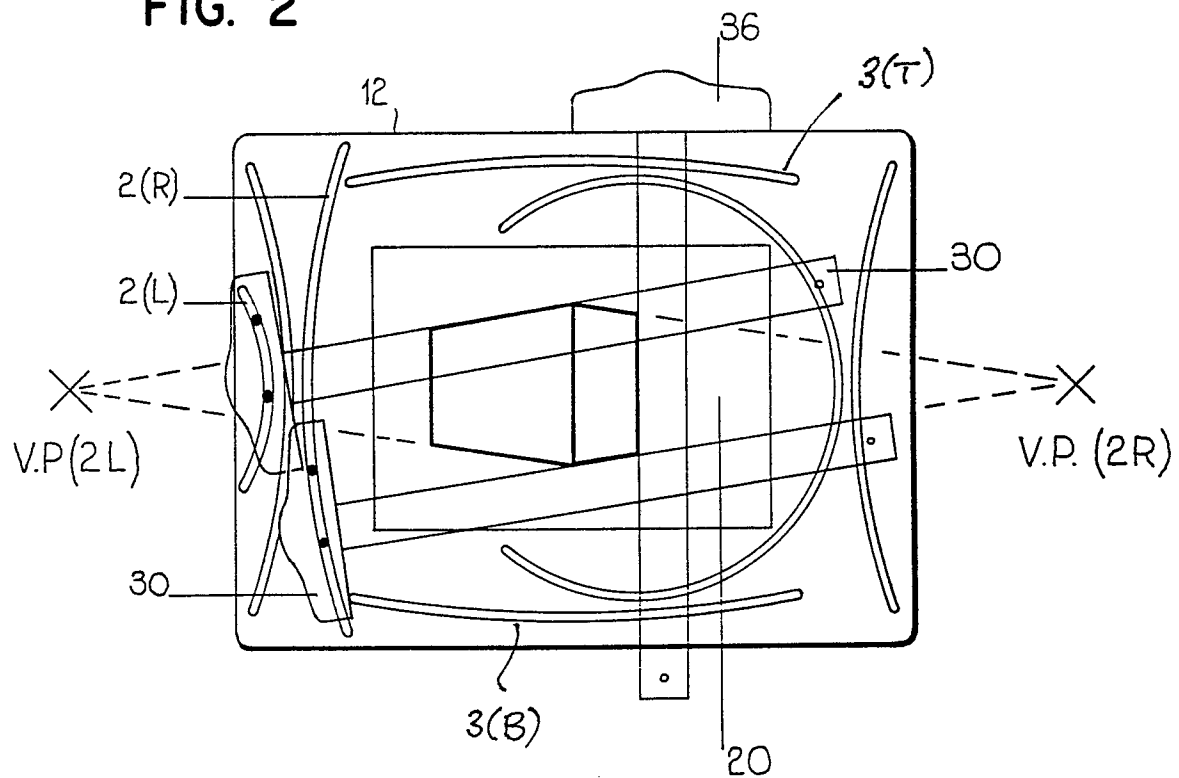
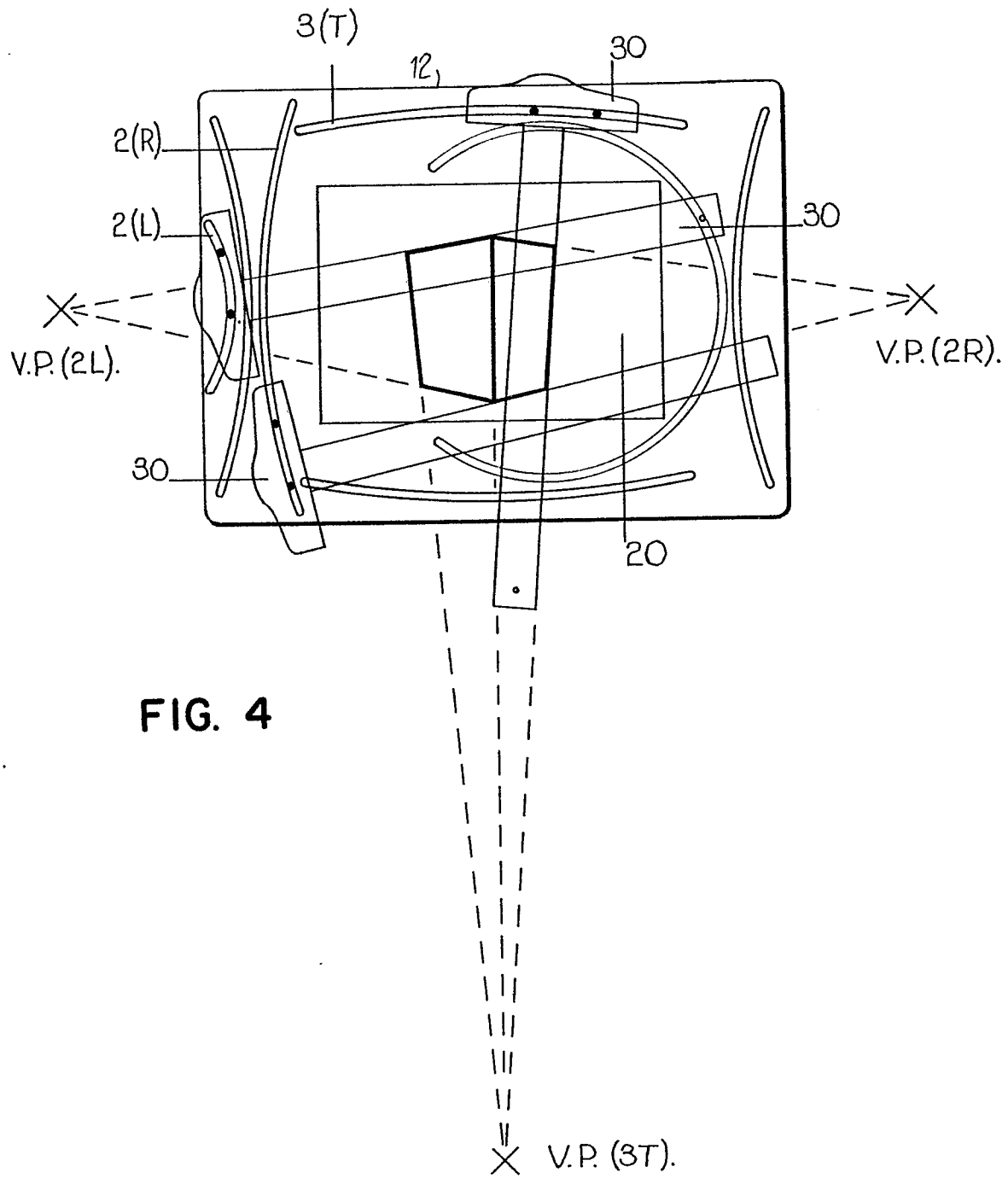
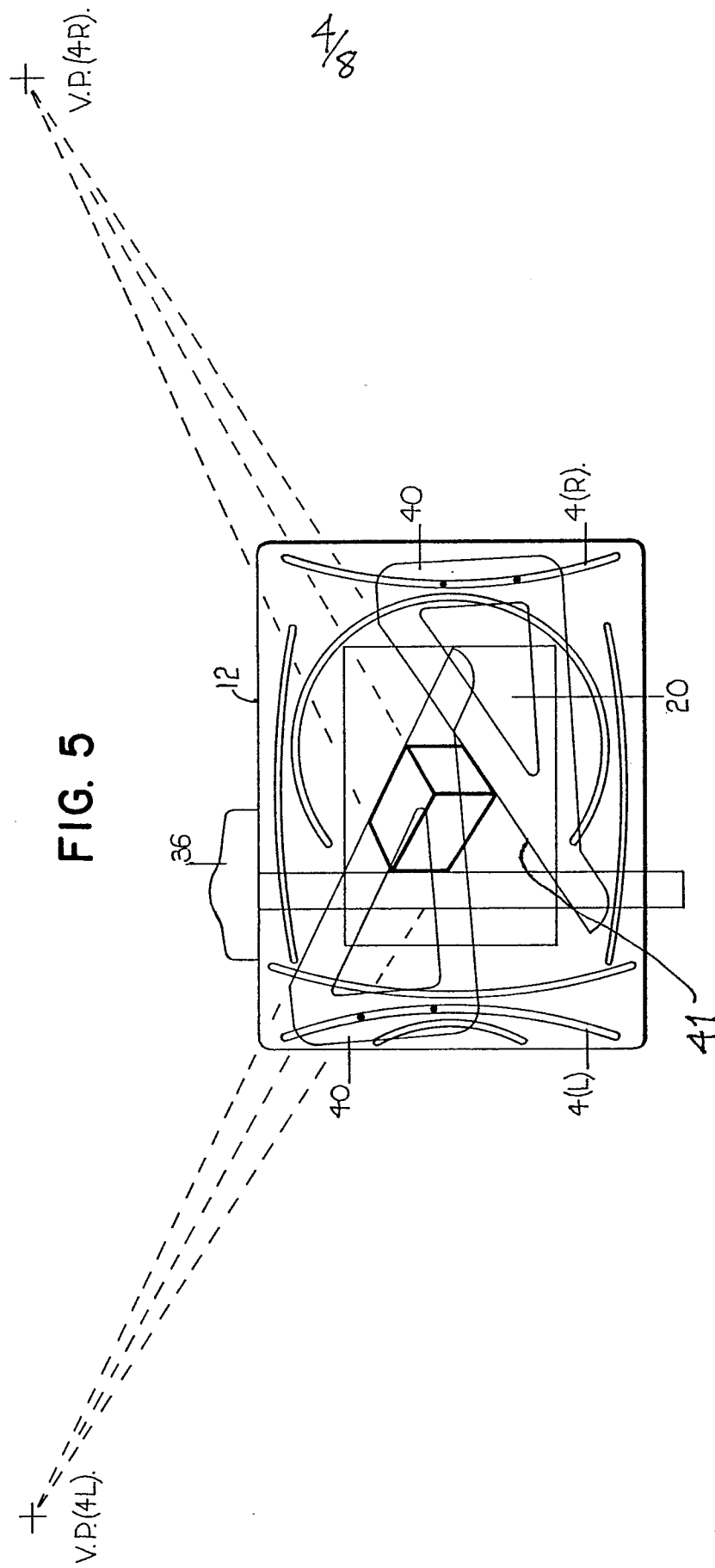


FIG. 2



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FIG. 6

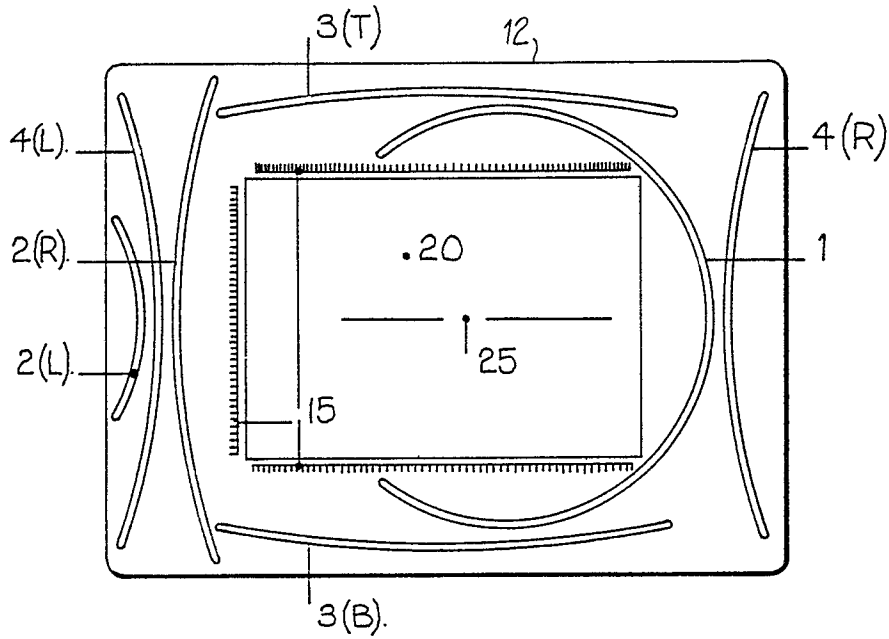


FIG. 7

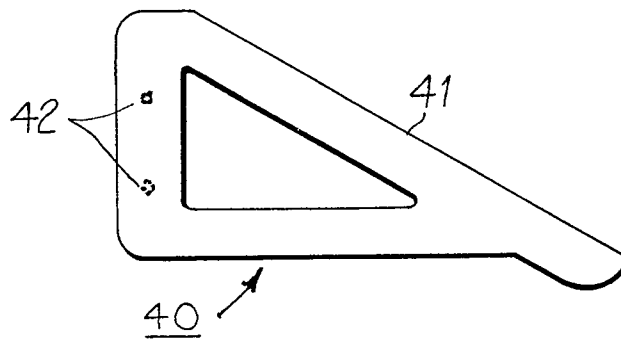
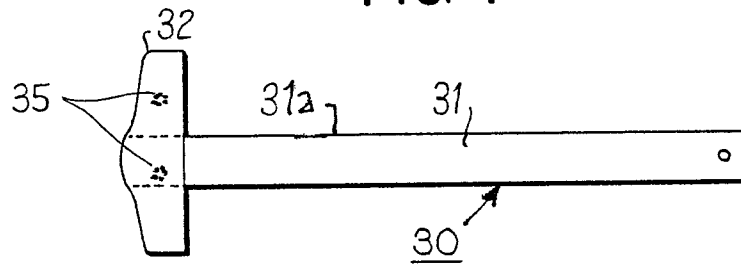


FIG. 8

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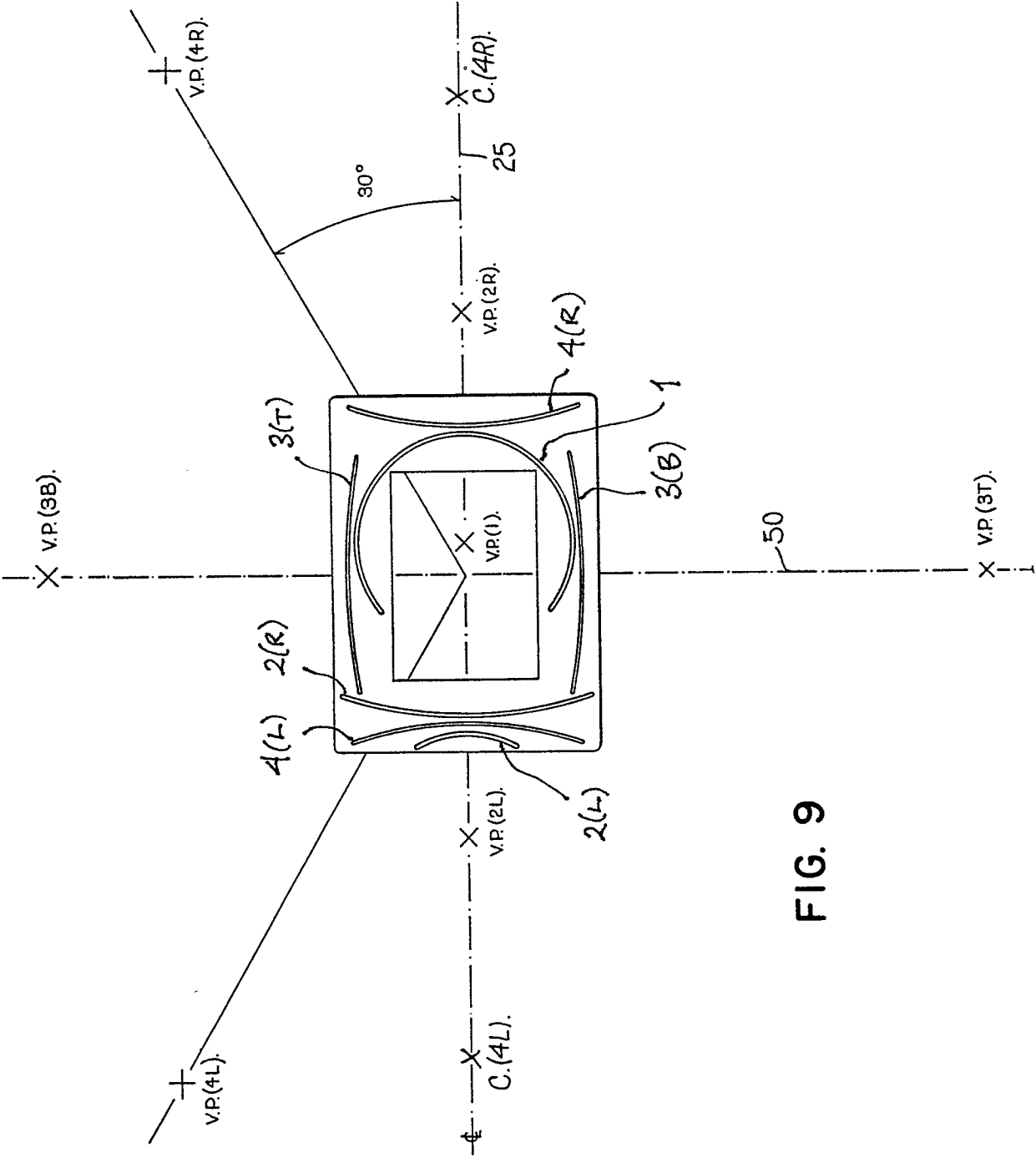


FIG. 9

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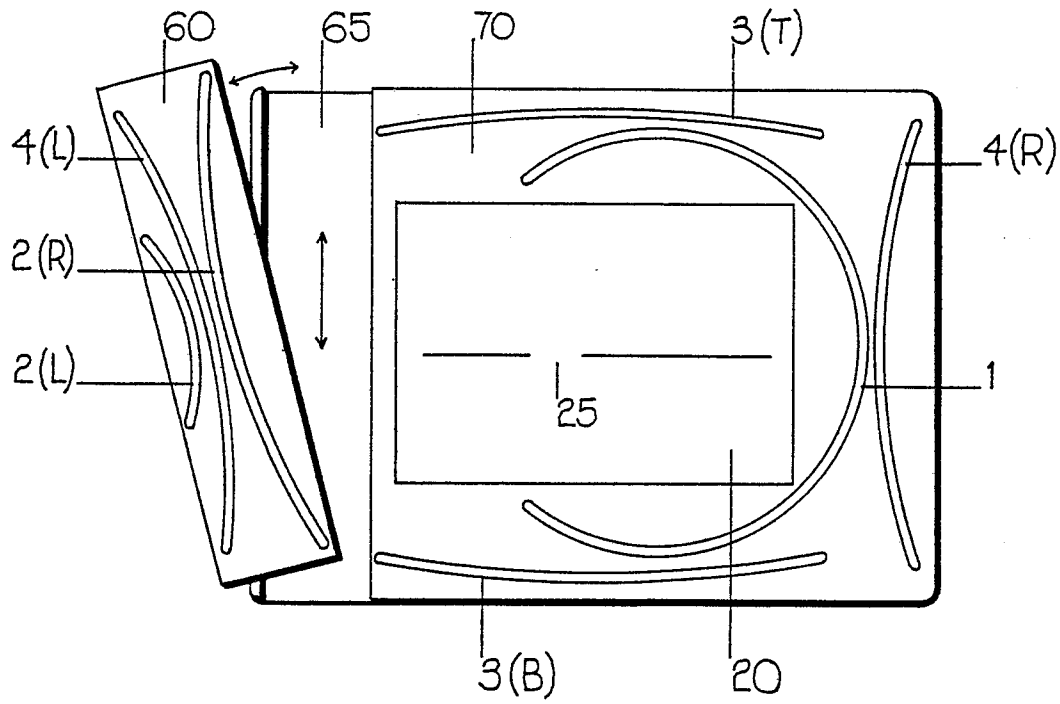


FIG. 10

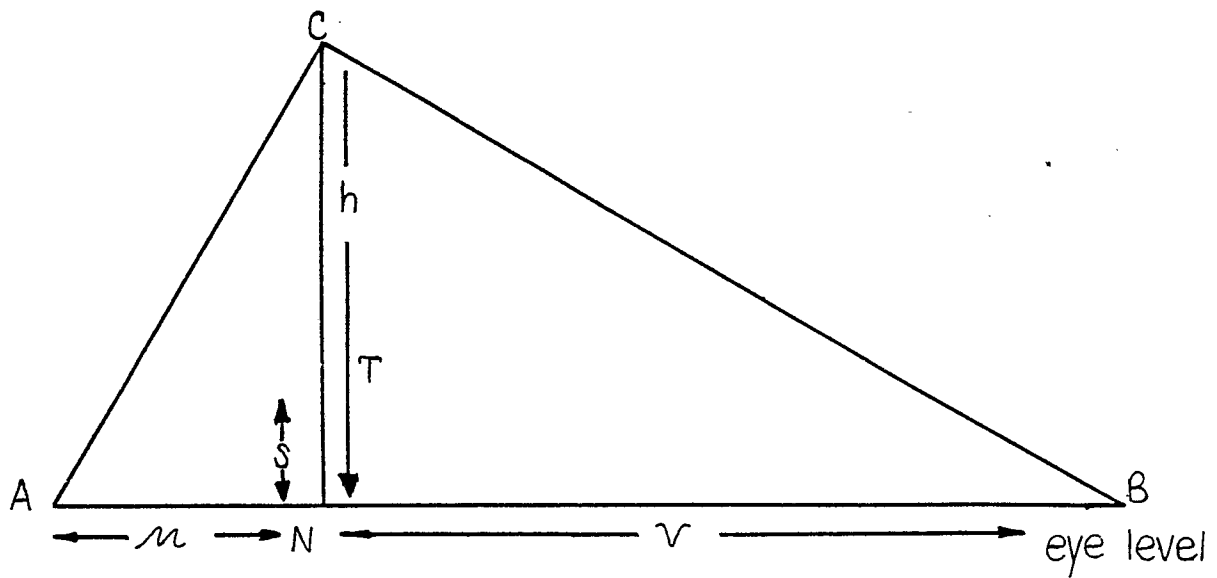
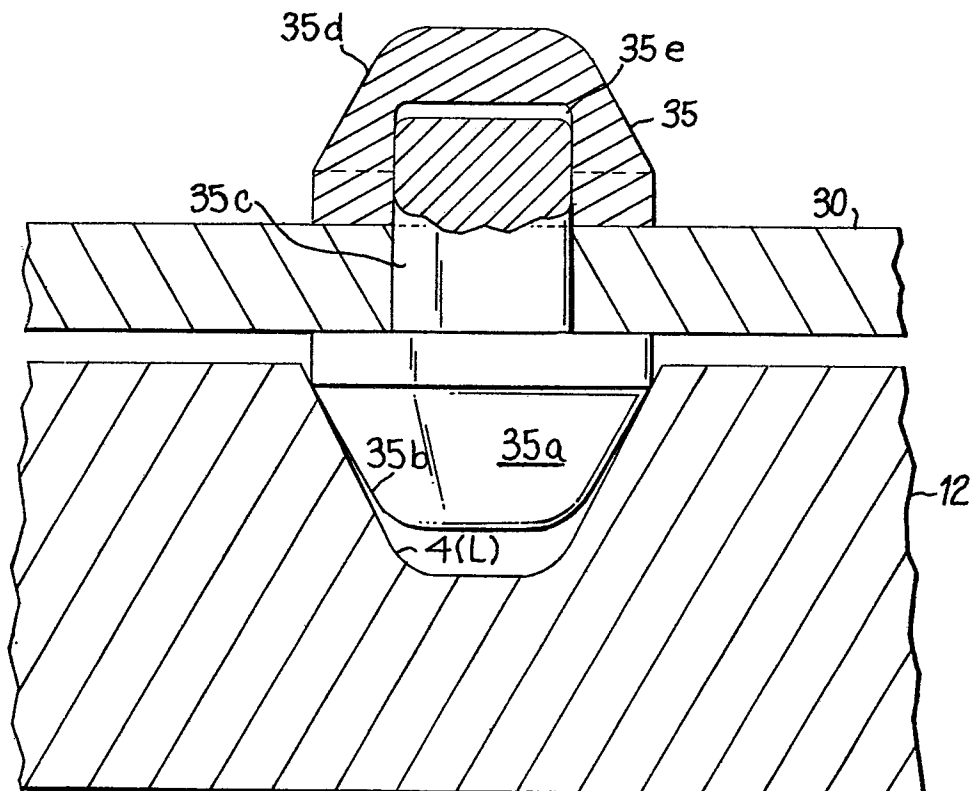


FIG. 11

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FIG. 12





European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 85 30 2594

0161808

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.4)
X,P	GB-A-2 132 562 (NEEDLE et al.) * Page 2, lines 23-71; page 3, lines 7-28, 49-85, 89-96 *	1,4-8, 10-13	B 43 L 13/14
X,P	GB-A-2 143 779 (LAMBDA INTEGRAL DESIGN LTD.) * Page 1, lines 96-130; page 2, lines 15-52, 72-80 *	1,3,5-11	
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 04-07-1985	Examiner LAMMINEUR P.C.G.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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</p>			