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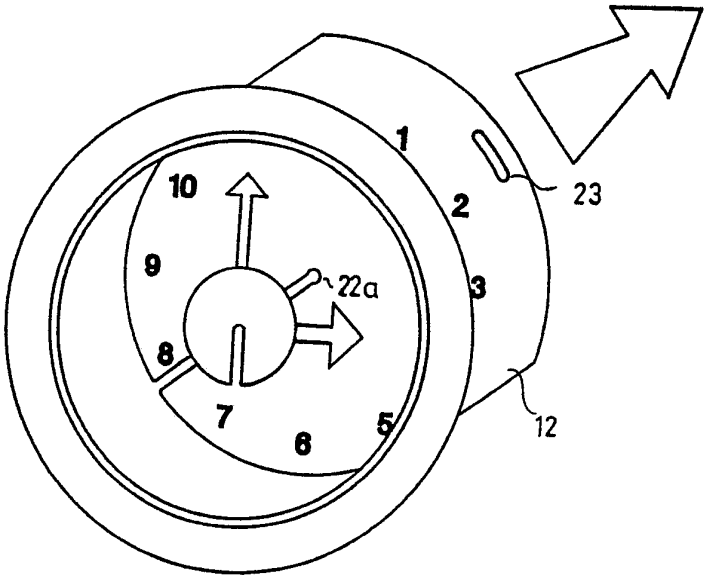
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(54) Title: DISPLAY UNIT AND COMPONENTS THEREFOR



(57) Abstract

A display unit comprising a housing and a removable face, such that the face can be fitted interchangeably with the other faces. In one embodiment of the invention the display unit is a clock, with the seconds hand being replaced by a disc containing a cut-out. The dial of the clock comprises two regions, an inner region generally obscured by the disc, and an outer region outside the outer periphery of the disc. The outer region typically carries pictures of articles, and the inner region radially inward of each article carries the name of that article, such that the name is visible only when the cut-out in the disc is adjacent the article.

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DISPLAY UNIT AND COMPONENTS THEREFOR

FIELD OF THE INVENTION

This invention relates to a display unit and components therefor , and relates in particular to a display unit having one or more hands adapted to traverse a face carrying markings, to highlight those markings. The invention has particular application to a timepiece having a dial, the dial usefully carrying markings to indicate the hours and minutes, so that the dial is the display portion of the unit.

BACKGROUND TO THE INVENTION

At present, timepieces (watches or clocks) are commonly designed in such manner that the dial or face is firmly fixed inside the timepiece housing, to the movement or to the inside of the rear housing i.e to a support portion. The design intention is that the same dial will remain affixed to the timepiece for its lifetime, usually protected by a transparent cover.

On a traditional timepiece, the hands, which are the members which traverse the display portion, include thin pointers (fingers) each connected to a central movement spindle to rotate at a speed determined by the respective spindle drive. The movement is usually within an enclosed housing, with a mechanical

or electrical drive, but some clocks also include a pendulum; the spindle(s) project forwardly through the face.

If the dial is damaged for any reason, or otherwise needs to be replaced, the timepiece must be opened, usually with special instruments, the (seconds, minutes and hour) hands removed, and the screws retaining the dial removed. This is a time-consuming and skilled operation, often needing the timepiece to be left for several days with the repairer.

If the dial has been bonded to the inside of the timepiece, or moulded into the inside of the rear housing, it cannot usually be removed without destroying the dial or the timepiece; the dial is therefore traditionally printed on only one side.

DISCLOSURE OF THE INVENTION

We now propose a display unit which includes a support portion, a display portion and a member adapted to traverse the display portion, the display portion being between the support portion and the member, characterised in that the display portion is removably located between the support portion and the member.

We also propose a display unit which includes a drive housing, a face, at least one rotatable drive spindle projecting through the face, and a display hand attached to the spindle characterised in that the face is removable, such that the face

is replaceable by a different face.

Preferably the display unit comprises a closed housing containing a re-usable dial wherein the dial is releasably located in the housing. The dial can thus be readily replaced, it can be interchanged for another dial, and it can usefully be printed or otherwise illustrated on both sides since both sides can alternately be made visible, having first been re-sited between the support portion and the member. Preferably the dial is in loose engagement with internal abutments in the housing so that it can be removed from the housing without need for special tools, and without disturbing the traversing indicator hands. Usefully the display unit is a timepiece, preferably a clock with a dial carrying illustrations suitable for a child.

The dial preferably is slotted radially from its centre, the slot being sized to permit it to be slid to either side of a central rotatable drive spindle, preferably to either side of a tubular housing (non-rotatable) for the spindle, and to be frictionally retained thereby. When so fitted the dial preferably will rest against the forward surface of the movement housing, but since the face or dial is now removable we recognise that a front planar surface on the movement housing and to which the dial is affixed need no longer be an essential design feature.

We also disclose a display unit housing having an opening in

its periphery through which a dial can be removed and replaced, without need for the housing otherwise to be open or opened. The dial is thus removed and replaced edgeways, as a disc and substantially in its own plane. Preferably the display unit is a timepiece.

We also disclose as a further feature of our invention a display hand having a circular part and a non-circular part, the circular part being of greater area than the non-circular part, the hand being connected to a rotatable drive. Preferably the rotatable drive is from a timepiece mechanism. Thus the display hand will turn in synchronism with the rotatable drive, which preferably is the drive for a timepiece seconds hand but which can be the drive for the minute or hour hand, or can be a specially designed drive rotating at a selected angular rate. Whilst turning, the display hand will alternately cover by its circular portion a major part of a dial located non-rotatably therebelow and expose by its non-circular portion a minor part of the dial, which minor part usefully contains at least one educational wording or picture, and which is thereby intermittently visible.

For ease of manufacture, the display hand will preferably replace the seconds hand of an otherwise standard drive mechanism. It will however be located in a modified housing apertured to permit removal and replacement of the dial. As above described, the dial will contain one or more pictures

and/or scripts which are successively highlighted as the hand or hands traverse thereover.

In one embodiment the invention could be applied to a so-called "wrist watch" with the selected dial carrying reminders e.g. of appointments, or of telephone numbers to be rung at an appointed time, and to which as a reminder a hand (e.g. the "hour" hand), points at the appropriate time. However I forsee that a valuable use is for a child's clock, free-standing or wall-mounted, with a disc carried to rotate with a (seconds) hand, the disc usefully being slotted to uncover wording or pictures on the dial; the wording or pictures are selected to provide an educational aid for young children and are successively highlighted as the hand and thus the disc rotates. If for a wrist watch, closure means for the peripheral opening can be provided, but this may not be necessary for a child's clock since a required manual dexterity can be inbuilt into the design, especially for dial removal but also for dial insertion. For a pendulum clock, the pendulum can be used to cover and uncover words and pictures as it swings, and this can be in addition to the highlighting of displays on the dial.

It will be understood that although it is within the invention for the (timepiece) dial to be "interchanged" simply by modifying the front face of a standard non-replaceable dial e.g. by affixing replaceable transfers, this would require the closed housing first to be opened, or the hands to be left in use

unprotected by a transparent cover. Thus I prefer an arrangement using a replaceable dial (which can be either a different disc or a single disc carrying a removable transfer).

In the preferred embodiment wherein the dial can be replaced without need to open the timepiece, usefully one dial is removed before another is inserted. I do not however exclude an embodiment wherein a number of dials are stacked successively one on top of another such that only the top dial is visible, and then either all the stacked dials are removed together, or one of the (lower) dials is withdrawn from the housing or casing, to be re-positioned above the other dials. "Above" in this context means closer to the traversing member or viewing face, so that this dial will then normally be the one which is visible in use.

Many conventional timepieces comprise a face with numbers and/or markings equally spaced around the periphery. Thus there may be the numbers 1 to 12 denoting the hours, and marks between these numbers to indicate the sixty minutes of each hour. I do not exclude embodiments wherein this numbering, and marking, are used or retained, since for instance the child can also be taught thereby to read the time. Such timepiece will have an hour hand, and minute hand, usually formed as elongated pointers or fingers to indicate clearly to the user the number to which they are pointing. In my preferred embodiment my timepiece will additionally have a "seconds" hand to which for example a slotted disc can be affixed so that the traversal rate is significant,

the size and positioning of the wording and pictures on the dial therebelow being selected for ease of comprehension by a normal child. The slotted disc will rarely be removed, usually only to be replaced with a disc of different outline.

If discs are additionally fitted to the respective minutes and/or hours movement drive spindle, these disc(s) are then also turned by the mechanical or quartz timepiece movement, to create more complicated changing patterns, or colours or words, or to relate a simple story.

The discs can be supplied as individual discs of different decorative design, or in the form of "disc books" wherein the respective pages contain differently printed dials, perhaps inside a perforated border ready for press-out into a form suitable to be slid into the housing. Alternatively, the dials may be supplied uncoloured, so that they may require "colouring in" before use. Thus I propose a display unit with a removeable face and which can be fitted interchangeably with other faces. The face is preferably a dial of a timepiece.

Additionally, I propose a timepiece with replaceable dials each designed to appeal to, and educate, young children. The timepiece need not have a "full circumference" front housing, especially if there are hooks or clips to hold an inserted dial in position.

Specifically I propose that one or more of the hands of the timepiece (hour,minute,seconds) be formed as a disc having highlighting means such as a cut-out such that the appearance of the face of the timepiece changes as the disc rotates to indicate the time. Alternatively, the highlighting means may be a window or windows left clear in a disc of transparent plastic with a large proportion of its surface covered as by opaque silkscreen printing, or may be one or more transparent magnifying sections within the disc.

The replacement dial could have wording in another language, so that the housing and movement can be the same for all countries with only the dials needing to be individually prepared and stocked. Alternatively, a removeable transfer may be provided carrying the wording alone, hence the dial, with its pictures, would be the same for each country of use, but with the transfer(s) being affixed depending upon the language of the country. The transfers could also be used for the teaching of words in a foreign language.

When the dial is in the form of a disc, it can be self coloured by children, for instance in schools.

As above mentioned, the invention could be utilised by wrist-watch manufacturers, and clock makers generally, whereby the face of the timepiece may be interchanged for a purpose other than education, for example simply to alter the appearance of the

timepiece. However, I foresee its greatest utilisation for the purpose of educating the young.

SHORT DESCRIPTION OF THE DRAWINGS.

The invention will be further described by way of example in the accompanying drawings, in which :- In the drawings :-

Fig.1 is a front elevation of a timepiece with an interchangeable dial in place, and with the seconds hand fitted as a disc with a cut-out slot;

Fig.2 is the timepiece of Fig.1 with the interchangeable dial partially removed;

Fig.3 is an exploded view of the timepiece of Fig.1, with the dial partially removed;

Fig.4 is a side view of the timepiece of Fig.1, and including a front housing and a rear housing, shown hung to a wall by the rear housing;

Fig.5 is a central part-sectional view of the embodiment of Fig.4;

Fig.6 is a front elevation of the rear housing of Fig.4;

Fig.7 is a rear elevation of the front housing of Fig.4;

Fig.8 is of one embodiment of interchangeable dial;

Fig.9 is an enlarged view of part of one embodiment of dial suitable for use in the arrangement of Fig.8;

Figs.10-21 are embodiments of discs, driven as a hand of the timepiece, preferably the seconds hand;

Fig.22 is a front elevation of a timepiece with a different disc-hand arrangement, and with the dial partly removed;

Fig.23 is a side section illustrating several disc-hands above a replaceable disc-dial;

Fig.24 is a partial section on the line W-W of Fig.22, after removal of the disc-hand;

Fig.25 is a side view of a housing similar to the housing of Fig.4, and with enlargements Figs.25a,25b;

Fig.26 is a side view of the embodiment of Fig.4, table-mounted;

Fig.27 is a rear view of the embodiment of Fig.4, with the table stand in the clip-on stowed position;

Fig.28 is a perspective view of the table stand of Fig.26;

Fig.29 is a front view of the stand of Fig.26; and

Fig.30 is a side view of the stand of Fig.26.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Fig.1 shows a part of a timepiece 10, comprising a face 12 in the form of a dial, and located below an hour hand 14, a minute hand 16, and a second hand 18. The hands 14,16,18 are driven in conventional fashion to rotate about spindle 44 (Fig.5), by clock movement 21 (Fig.5, Fig.23) powered in this embodiment by a 1.5V "AA" battery. Face 12 is between the traversing members 14,16,18 and a timepiece support portion such as rear housing 26 (Fig.5, Fig.23) for the timepiece movement 42.

In this embodiment the hour hand 14, and minute hand 16, are elongated pointers, whilst the seconds hand 18 is a disc with a cut-out 20 in its outer periphery 21, as also in the embodiments of Figs.9/10. Thus in this embodiment the seconds hand 18 is the display hand, and the major part of this display hand 18 is a circular disc, whilst its minor part forming the slot 20 is acircular.

The face 12 includes a slot 22, to allow the face to be inserted and removed through an opening 40 (Fig.4, Fig.24) in an edge of the timepiece, and embrace the spindle 44 to either side, for dial location. In this embodiment the slot 22 terminates in an enlarged portion 22a adapted frictionally to grip the spindle 44; spindle 44 also upon engagement with enlarged portion 22a limits the radially inwards insertion of the dial. In an alternative embodiment, the dial is of flexible material, such as

PVC sheet, which can be silkscreen printed with a decorative design, and the slot 22 can then be reduced to a simple cut. In yet a further embodiment the edge of the face 12 opposed to slot 22 is thinned or otherwise of reduced weight to balance the face about its axis, though alternatively the material removed to form slot 22, or its equivalent, can be replaced to either side of the slot 22 both for disc balancing and slot strengthening.

Aperture 23 is used as a finger grip to assist removal of the face or dial 12.

As best seen in Fig.3, the face 12, and hands 14,16 and 18 are contained between a front housing 24, and a rear housing 26.

The front housing 24 in this embodiment is of diameter 450mm and comprises a rigid surround 28, securely supporting a transparent central portion 30, made of either glass or clear plastic, to allow the face 12 to be seen therethrough. As best seen in Fig.24, the front housing has its rear surface raised at 39, to provide a side entrance 40 for insertion and removal of the dials 12. The rigid surround 28 includes on its rearward side (Fig.7) ribs 46 to ease the insertion and removal of face or dial 12; screw holes 48 are provided so that the front housing 24 may be attached and detached from the rear housing 26 when required.

Rear housing 26 includes opposed guides 32, shaped end-stop 34, and screw holes 38 (Fig.6). As best seen in Fig.24, the rear

housing has a forward surface 37 to help guide into position and then locate a dial 12. Guides 32, and end-stop 34, are raised sections positioned to ensure that upon insertion of the face 12 through opening 40, it passes between guides 32, until it engages end-stop 34, and the enlarged portion 22a of slot 22 engages spindle 44, whereupon it is correctly positioned within the timepiece. Recess 36 is provided to allow the user to grip the face 12 from below when it is desired to remove it from the timepiece.

Fig.4 and Fig 25a show the opening 40 in the rear housing 26 through which the face 12 is inserted, without the need to separate the front 24, and rear 26, housings of the timepiece. In this embodiment, the timepiece is a wall-clock, though it may equally be a stand-mounted clock.

Hook 27 is suitable for hanging replacement discs, conveniently from aperture 23 (Fig.2). Usefully the back of the rear housing also has three positioning strips so that several clock faces can be stored behind the clock when it is hung from the wall.

Fig.5 shows a part of a central section through the timepiece. The timepiece is operated in conventional manner by movement 42, located by nut 43 in countersunk hole 45 in the front face of the rear housing. Movement 42 may alternatively utilise the tension in a spring to rotate spindle 44; spindle 44 comprises three coaxial shafts, separately connected to the three hands of the

timepiece. The movement includes conventional means to control the rate of rotation for each shaft in order that the timepiece will keep accurate time.

In a preferred embodiment, the face is divided into two regions, to conform with the size of the overlying seconds disc-hand 18, as indicated by the dotted line of Fig.8 representing the outer periphery 21 of seconds-disc hand 18. The outer region 46 of the face 12 typically may have several pictures printed thereon (for example animal pictures, by silk-screen printing). The inner region 47 has radially inwards of each animal the name of that animal printed along a radius (in the example of Fig.9 - "Boy", "Fish", "Tiger", "Bird", "Dog", "Cat"), so that the child sees a picture aligned simultaneously with its name, uncovered successively as the hand 18 traverses over the illustrated dial. The child is encouraged to learn both to recognise each animal and the spelling of its name.

This dial or face can be replaced according to the invention, as by another face with different animals (and names), or with the same animals but with their names in another language than English, or with different illustrated objects and their name e.g. Square, Triangle, Circle, Star, Heart. In each case, as the seconds disc-hand 18 (which is of the form of Fig.11) rotates, the slot 20 reveals the name of the picture next to it, so that the name is highlighted, as indirectly is the pictured object.

More advanced dials or faces can for instance illustrate different varieties of fish, or bird. A learning advantage of my arrangement is that only one name is uncovered at any one time, the remaining names being hidden by the major (circular) portion of the disc hand 18.

In an alternative embodiment, the inner region 47 of the face 12 is left blank, and several removeable transfers are provided, sized to fit over face 12 and within the periphery 21 of the seconds disc-hand 18. These transfers have printed upon them the names of the pictures. In this way, the same face 12 can be supplied to any country (with therefore the pictures and perhaps also the numbering for hours/minutes), with the relevant transfer identifying the objects in the local language. However, different language transfers could be alternately fastened to the face 12 to aid in foreign language teaching.

The hour and minute hands of the timepiece are, in this embodiment, elongated pointers, so that the time may be correctly read, whilst as described the seconds hand provides an additional educational element.

The timepiece of Fig.5 includes as an extra feature for this embodiment a known optional voice synthesizer 50, which can be linked to the rotation of the second hand to give the child a linked aural description of the picture, suitable interconnected trigger means (not shown) being used.

In an alternative embodiment, the hour and minute hands may themselves also be discs, so that for example, the disc hour hand includes a cut-out slot 20 as shown in Fig.11, to reveal the correct spelling of the hour (one, two, etc.). The discs may be of more complex shape, as shown in any of Figs.10-21 so that the face, and the three rotating discs, display a continuously changing picture, the discs usefully being shaped to be self-balancing e.g. Figs 12,13,15,18,19,20. Thus Fig.10 has a crescent cut-out 60, Fig.12 four crescent cut-outs 61, Fig.13 eight sectoral cut-outs 62, Fig.14 a part-annular cut-out 63 leaving a parallel-sided projection 64, Fig.15 four square cut-outs or windows 65, Fig.16 a part-annular cut-out 66 leaving a pointed projection 67, Fig.17 two rectangular cut-outs or windows 68, Fig.18 twelve pointed cut-outs 69 leaving twelve parallel-sided fingers 70, Fig.19 four L-shaped cut-outs or windows 71, Fig 20 four part-segmental cut-outs or windows 72, Fig 21 an arrow-shaped window 73.

Alternatively the disc-hand shapes shown in Figs. 10-21 could be produced on a large sheet of transparent plastic, by selectively screen printing the sheet so that windows are left transparent in an otherwise opaque sheet.

Collections of disc-dials can be bound into disc-books. Thus the limitation of currently known timepieces of being fitted permanently with the same dial is avoided. The dial can be

changed without need to remove the hands, or to open the housing. The disc-dials can be printed on both sides, rather than as in the known dials only on one side.

More than one disc-hand can be used, as shown in Fig.22 and Fig.23.

Fig.26 is a side elevation of a clip-on clock stand 82 in use to support a clock such as that of Fig.4 on a table or the like. When stand 82 is not required, it can be stowed and stored as seen in Fig.27.

Thus Fig.27 is a rear elevation of one embodiment of the timepiece, whereby radially extending raised ribs 80a-h, serve to strengthen the housing, with ribs 80b,80f providing both stowaway support for the stand 82 by way of slots 87 (Fig.28), and the angled in-use support (Fig.26) by way of slots 86.

Figs.28,29 and 30 show views of the stand 82, which is in this embodiment moulded from a rigid plastics material. The stand has two feet 83 at its lower end (in use), and a pair of upper lugs 84 at its top end, and a pair of intermediate lugs 85 between the feet 83 and the upper lugs 84. The lugs 84,85 project forwardly of the stand, and have the respective recess 86,87. As above described, the recesses are formed so as to slidably fit over the raised ribs 80 in the rear surface of the rear housing 26. The recesses 87 on the lower lugs 85 project substantially

perpendicularly from the stand, a distance such that when fitted over raised ribs 80b and 80f, the stand is substantially flush with the rear surface of the timepiece, and is thus in the stored condition. The recesses 86 on the upper lugs 84 project partially upwards with respect to the stand, so that when they are fitted over raised ribs 80b,80f, the stand rests at a slight angle to the timepiece. The size of the stand, and the positioning of the feet 83 are such that the timepiece can lean back against the stand, and be supported thereupon (Fig.26).

CLAIMS

1. A display unit which includes a support portion, a display portion and a member adapted to traverse the display portion, the display portion being between the support portion and the member, characterised in that the display portion is removably located between the support portion and the member.

2. A display unit which includes a drive housing, a face, at least one rotatable drive spindle projecting through the face, and a display hand attached to the spindle characterised in that the face is removable, such that the face is replacable by a different face.

3. A display unit according to Claim 2 characterised in that the display hand is a disc having highlighting means, in that the face has an inner region and an outer region, and in that the inner region is obscured by the disc except for that portion of the inner region adjacent the highlighting means.

4. A display unit according to Claim 2 characterised in that the highlighting means is at least one cut-out in the disc, and in that the disc is a sheet of polyvinyl chloride having a first display on one face and a second display on the opposed face.

5. A display unit according to Claim 2 characterised in that the face is in loose engagement with internal abutments in the housing, and in that the face is removeable substantially parallel to the display hand through an opening in the periphery of the housing, and in that the face and display hand are located between the housing and a transparent cover.

6. A display unit according to any of Claims 2-5 characterised in that the display unit is a timepiece, in that the timepiece has a drive spindle for a seconds hand, in that the face is the dial of the timepiece, and in that the display hand is coupled to the seconds hand drive spindle.

7. A display unit according to Claim 2 characterised in that a number of faces are stacked successively one on top of another between the face and the display hand such that only the face closest to the display hand is visible.

8. A display unit according to any of Claims 2-7 characterised in that the face is slotted radially from its centre, the slot being defined by side edges spaced to permit the edges to be slid to either side of the rotatable drive spindle, and to be frictionally retained thereby.

9. A display unit according to Claim 3 characterised in that the outer region of the face carries at least one picture

the outer region of the face carries at least one picture of an article, and in that radially inwardly of that picture the inner region carries the name of that article, whereby the display unit is an educational aid for a young child.

10. A display unit according to Claim 3 characterised in that the inner region of the face carries a transfer, and in that the transfer may be removed and replaced by another.

11. A display unit according to Claim 6 characterised in that the timepiece has multiple drives, each drive being connected to a disc having highlighting means, the discs being driven at different angular velocities, such that the appearance of the face of the timepiece changes as the discs rotate.

12. A display unit according to Claim 2 characterised in that the display unit is a clock, in that the housing has a plurality of external ribs, in that the ribs are engageable with a stand so that clock is supportable by the stand, and in that the stand includes upper lugs and intermediate lugs, the upper lugs locating upon the said ribs to support the clock, the intermediate lugs locating upon the said ribs to store the stand when not in use.

13. A display hand for use in a display unit as claimed in any

of claims 1-12 characterised by a circular part and a non-circular part, the circular part being of greater area than the non-circular part, the hand having connection means for connection to a rotatable drive, and by the rotatable drive being from a timepiece movement.

14. A display hand as claimed in Claim 13 characterised in that the hand is a disc with highlighting means, and in that the highlighting means is a cut-out.

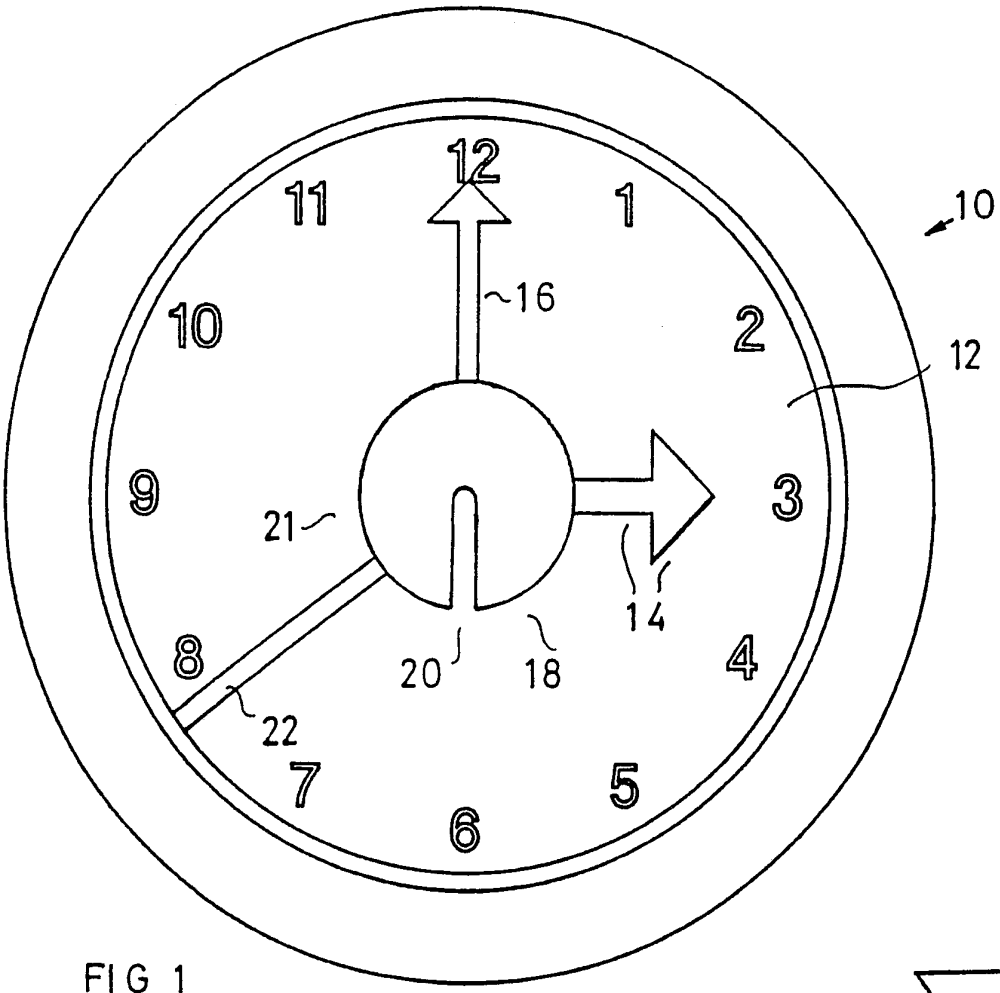


FIG 1

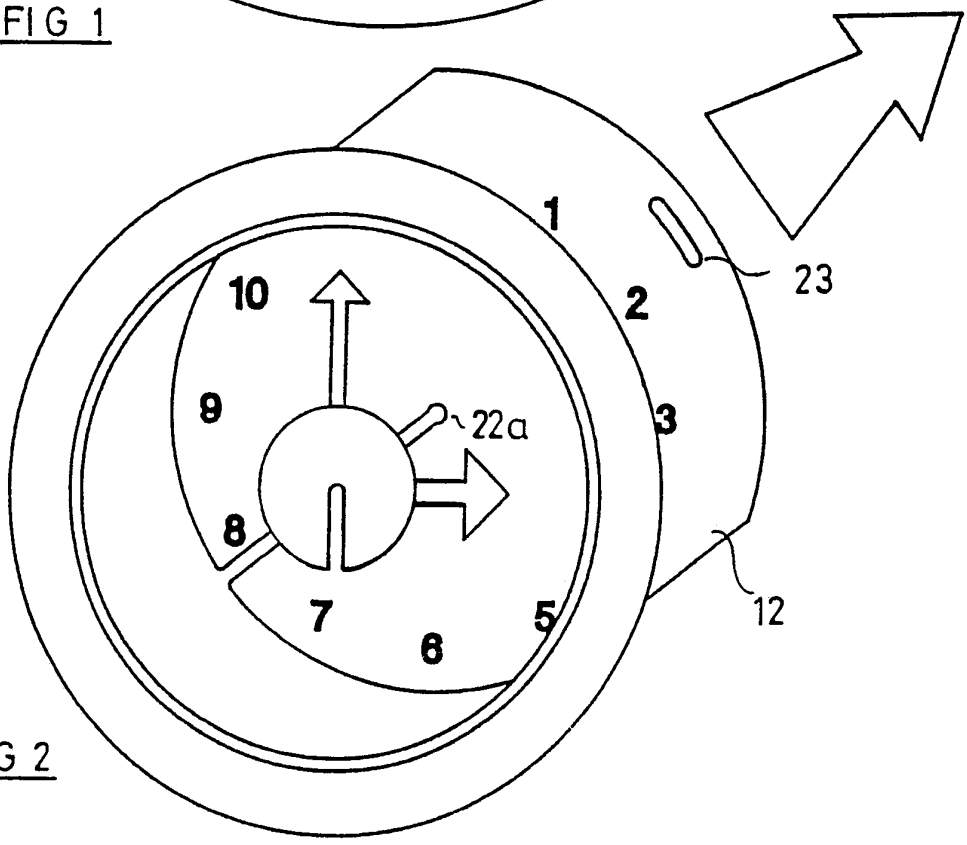


FIG 2

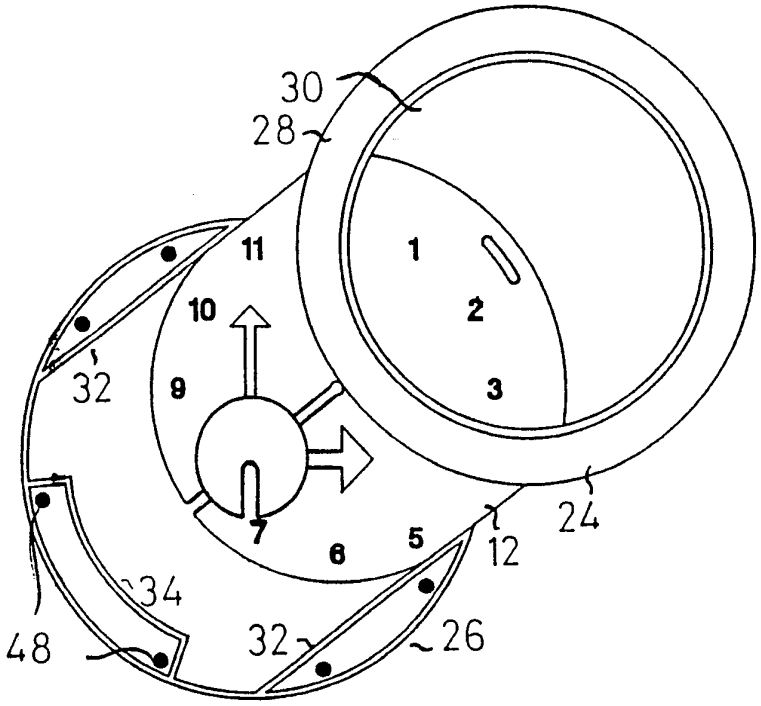


FIG 3

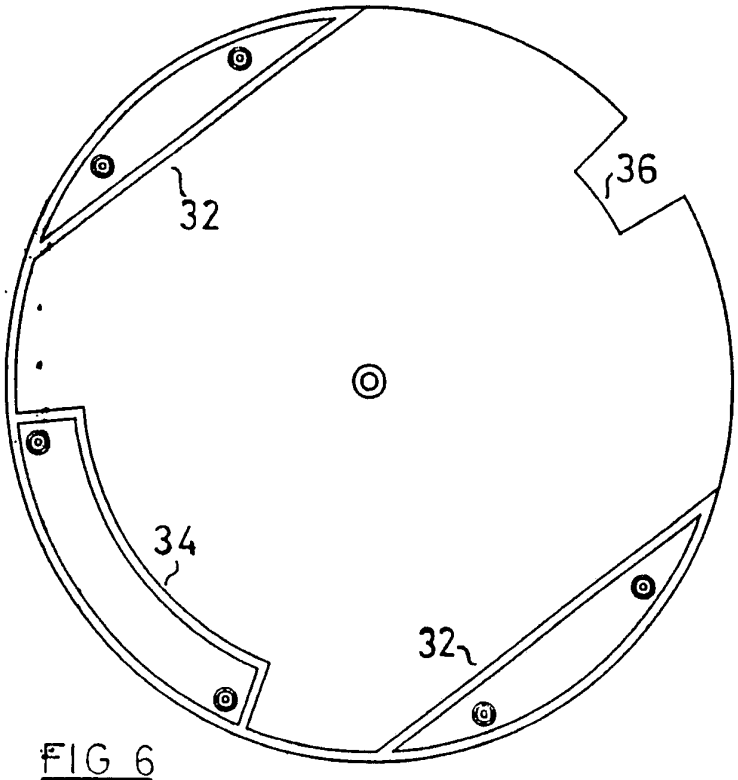


FIG 6

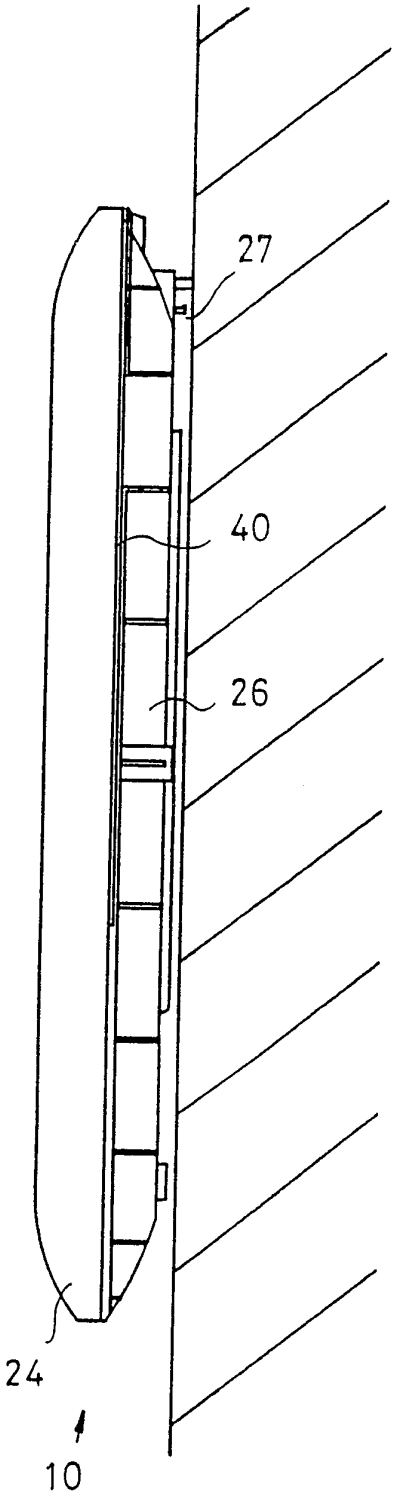


FIG 4

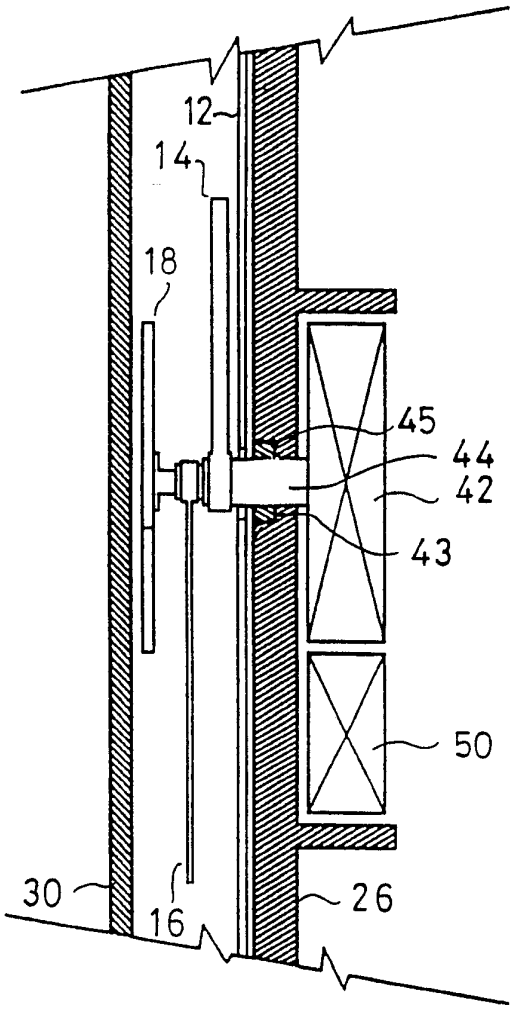


FIG 5

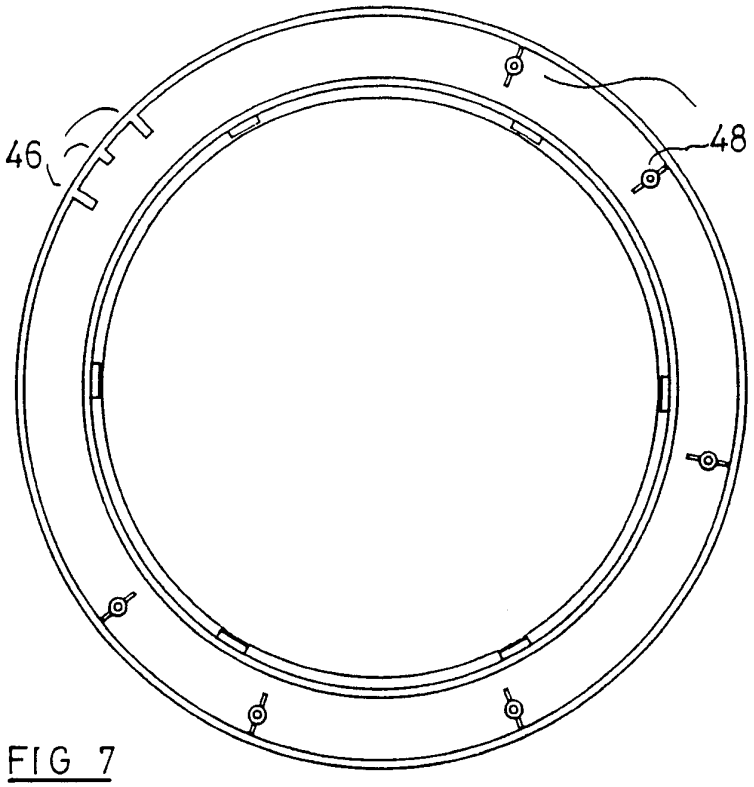


FIG 7

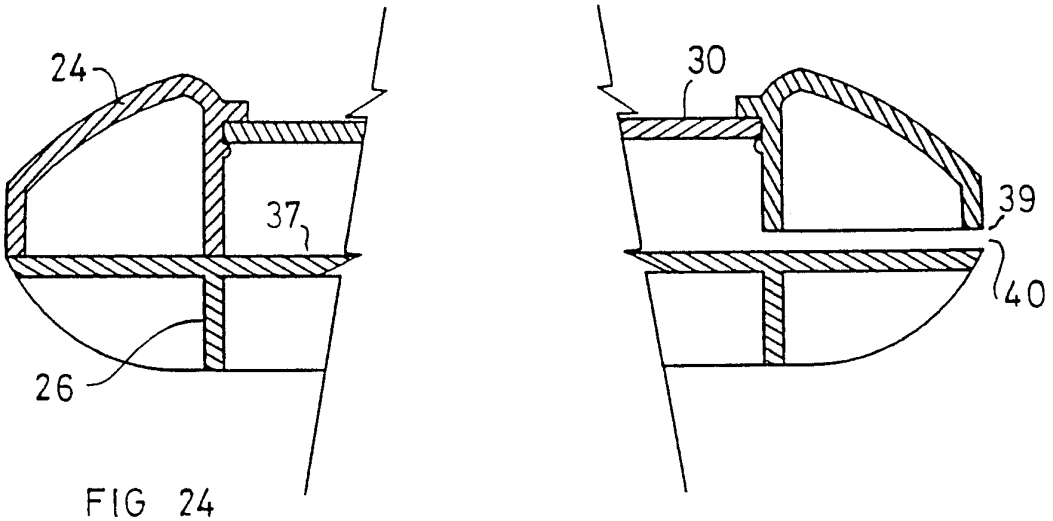


FIG 24

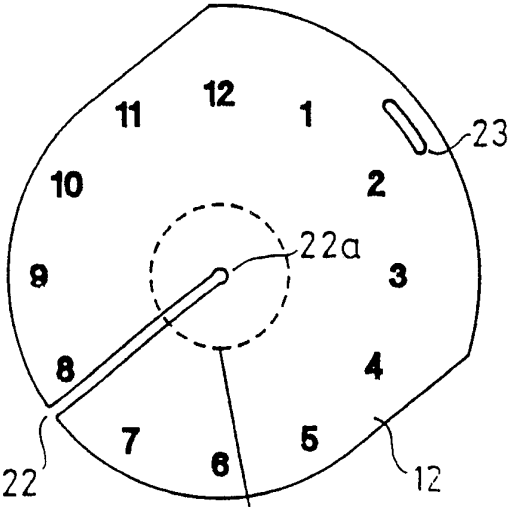

12
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23
22a
22
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FIG 8

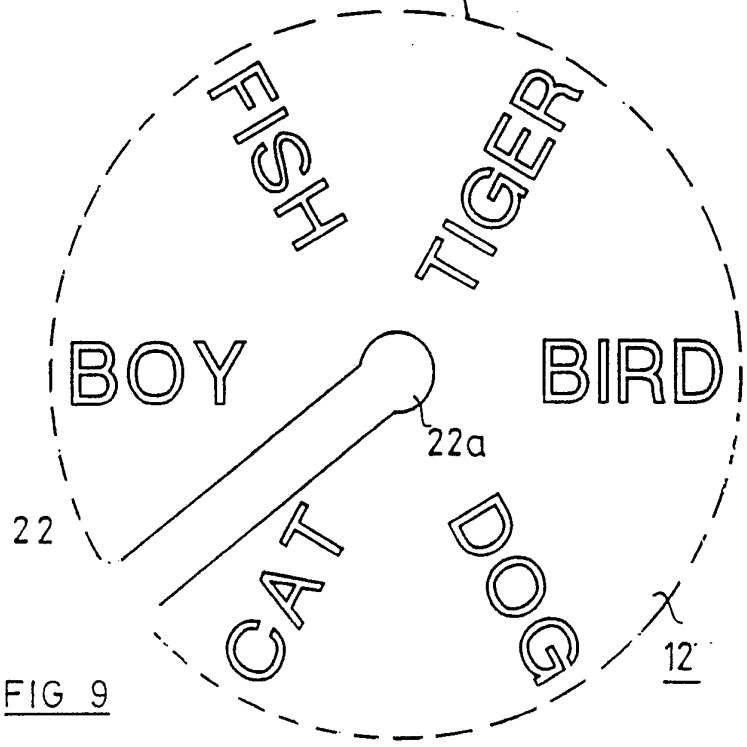

FISH
TIGER
BOY
BIRD
22a
22
CAT
DOG
12

FIG 9

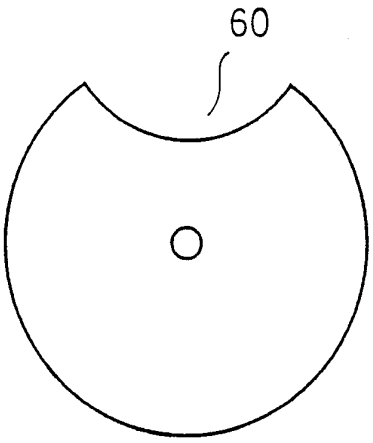


FIG 10

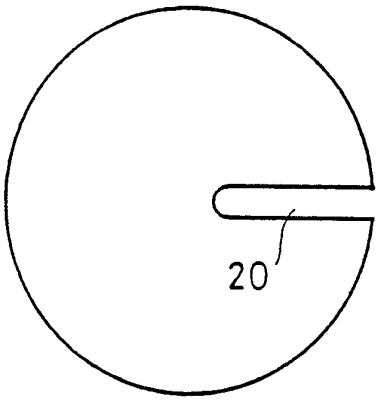


FIG 11

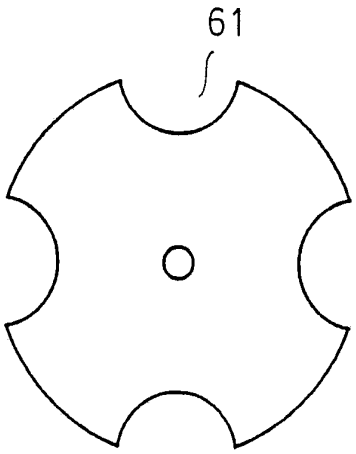


FIG 12

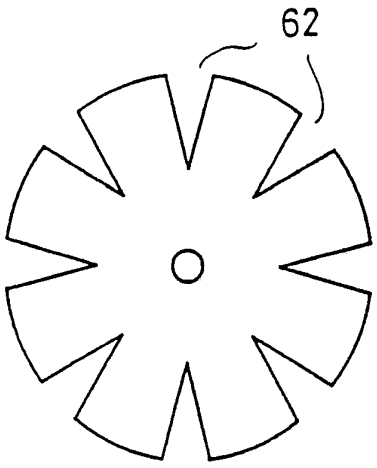


FIG 13

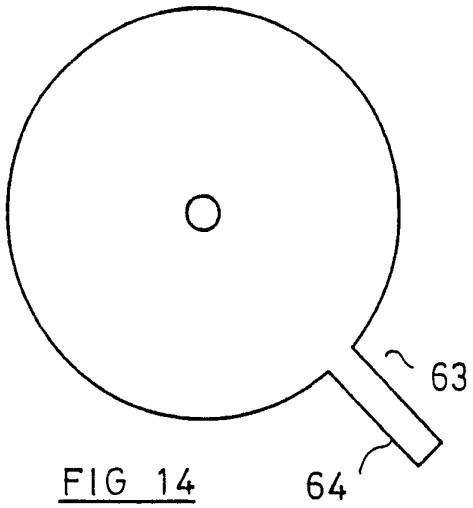


FIG 14

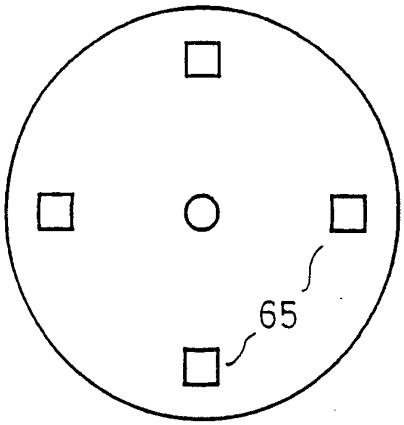


FIG 15

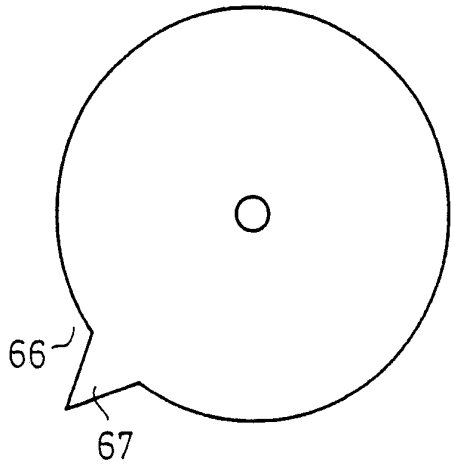


FIG 16

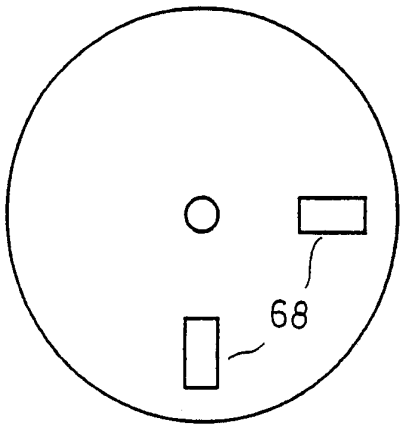


FIG 17

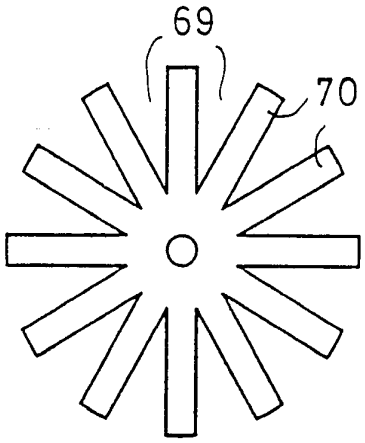


FIG 18

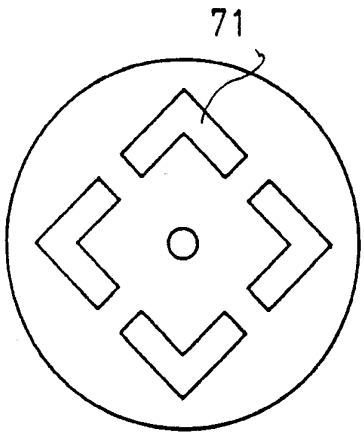


FIG 19

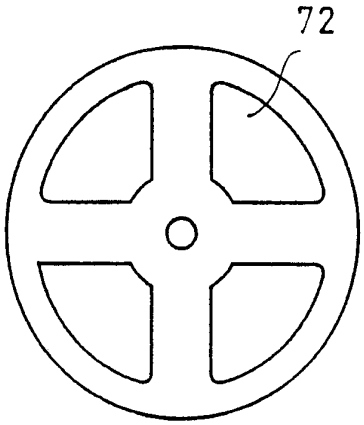


FIG 20

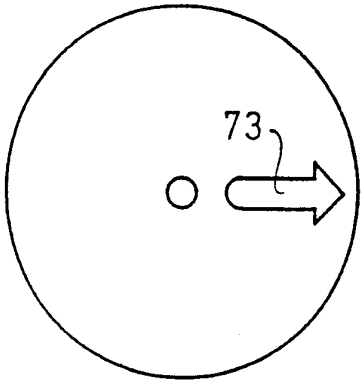


FIG 21

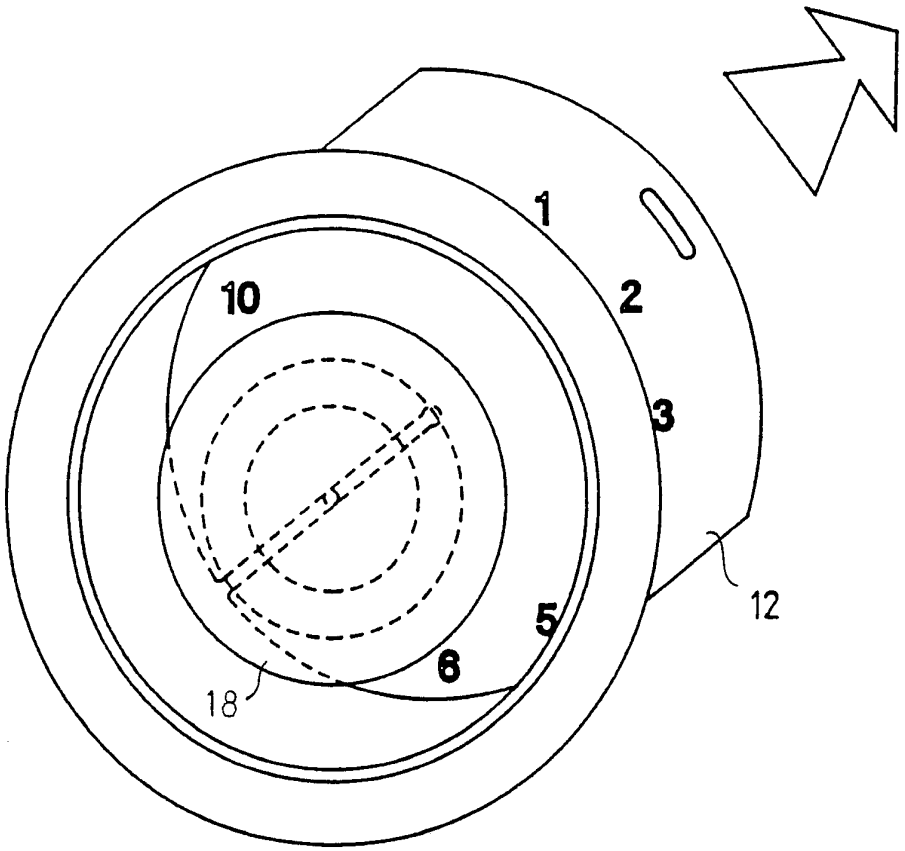


FIG 22

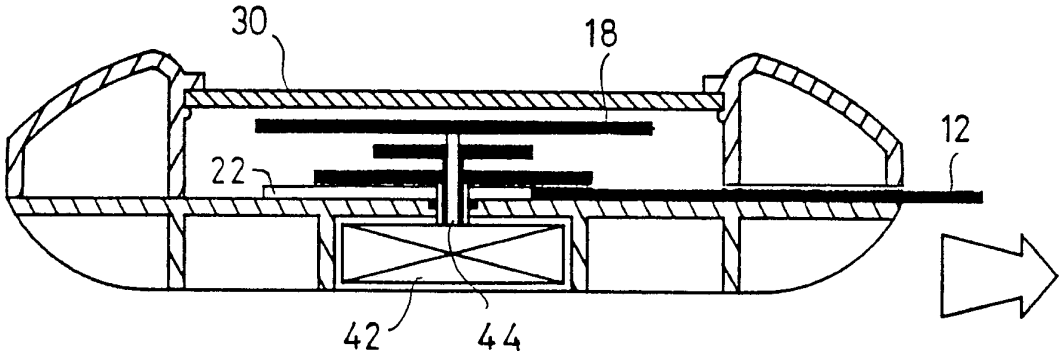


FIG 23

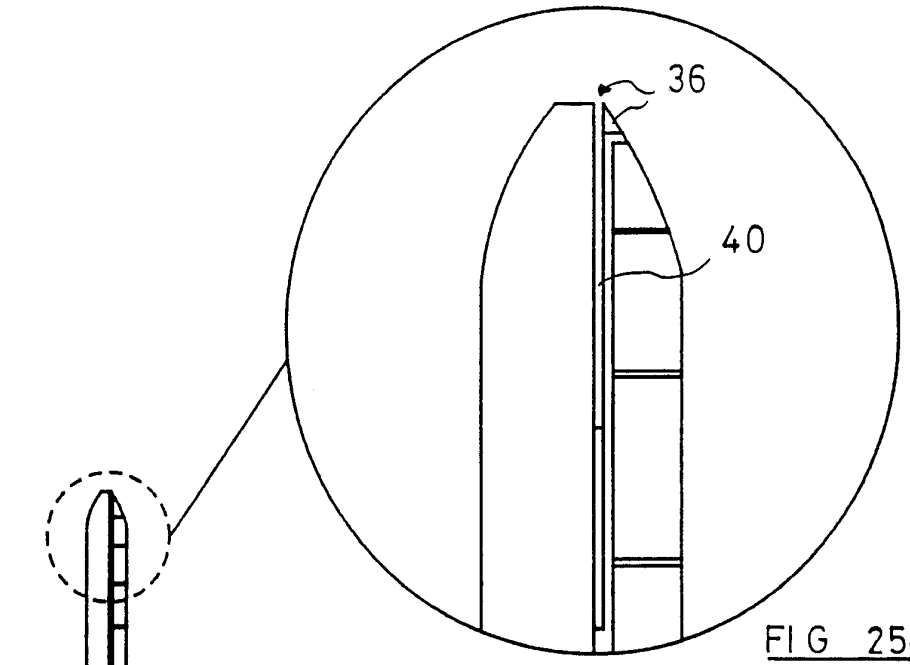


FIG 25a

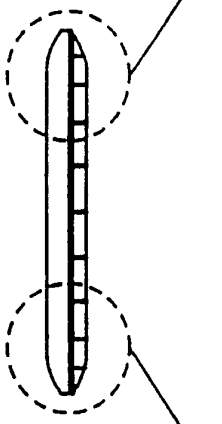


FIG 25

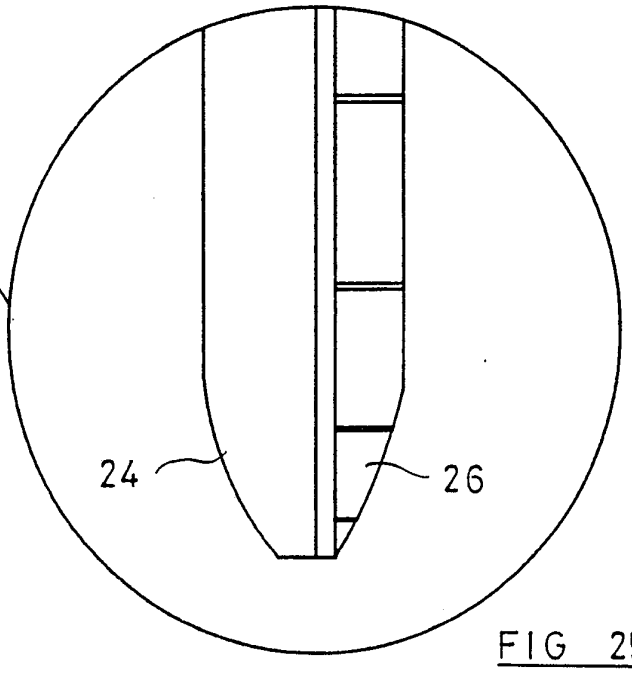


FIG 25b

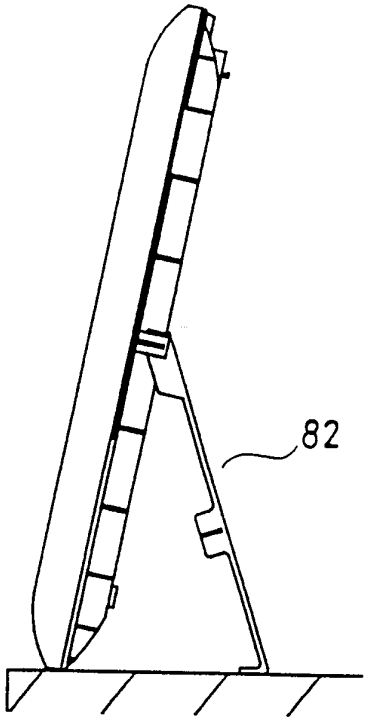


FIG 26

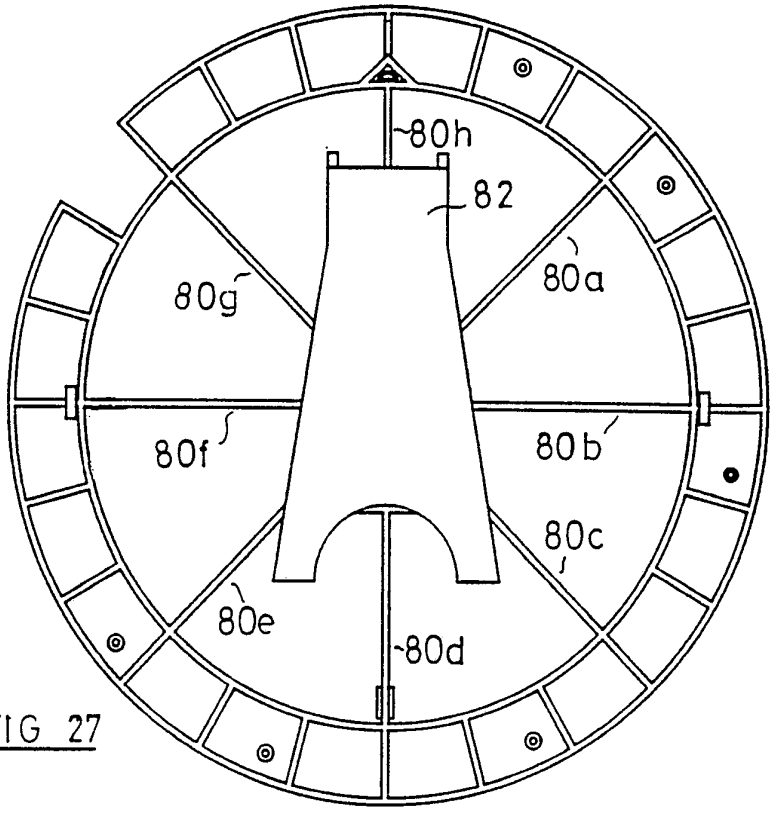


FIG 27

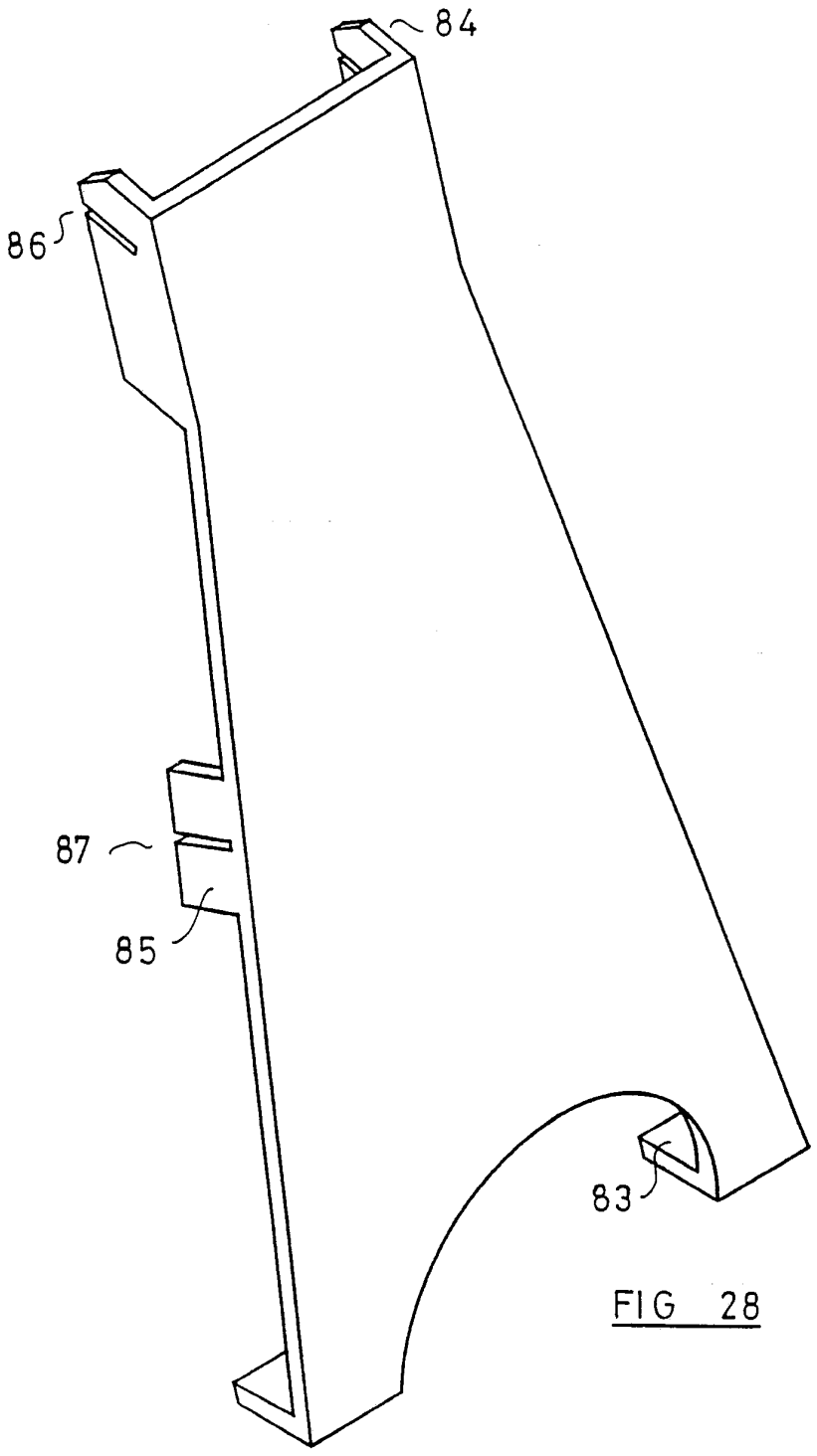


FIG 28

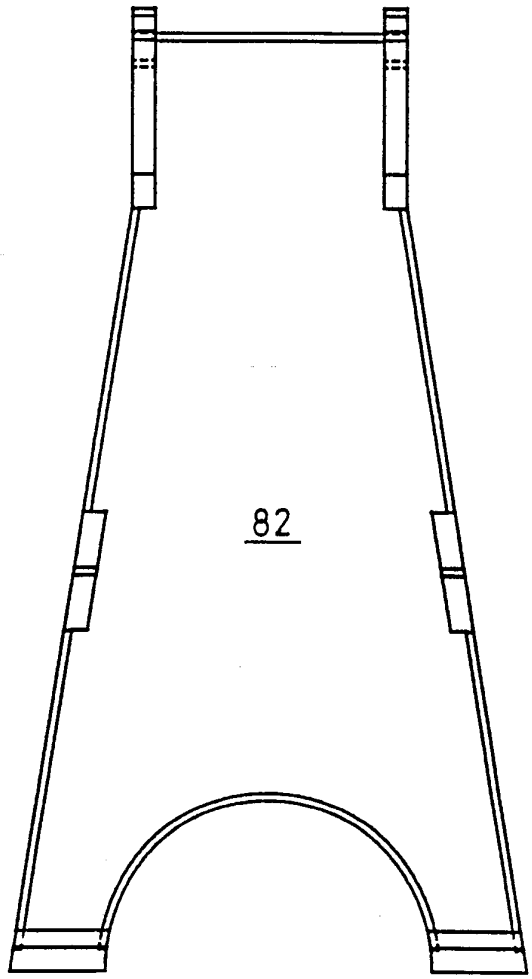


FIG 29

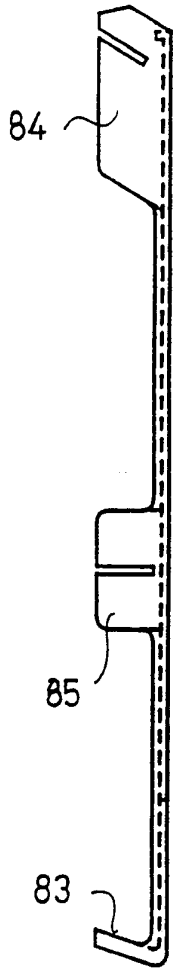


FIG 30

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 92/00905

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 G04B45/00; G04B47/04; G04B19/06; G04B37/14
G04B19/04

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	G04B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	US,A,4 660 992 (PAUL) 28 April 1987 see column 3, line 23 - column 5, line 20; figures	1,2,5,8
X	CH,A,336 023 (SALOM) 14 March 1959 see the whole document	1,2,5,12
X	FR,A,2 588 975 (JACOB) 24 April 1987 see page 3, line 19 - page 5, line 24; figures	1,2,5,6, 10
X	FR,A,2 614 443 (CUVELIER) 28 October 1988 see the whole document	1,2,5,8, 13
A	US,A,2 305 283 (KLEIN THEILKAS) 15 December 1942 see the whole document	1,3,4,9, 14

-/--

° Special categories of cited documents :[10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
11 AUGUST 1992	21. 08. 92
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	PINEAU A.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	DE,U,7 003 837 (DE WIT) 15 October 1970 see page 5, line 22 - page 6, line 27; figure 4	3,4,11, 14
A	DE,A,2 342 704 (PETER-UHREN GMBH) 27 March 1975 see claims 1,2; figures	3,4,11
A	DE,U,1 424 955 (ULLSTEIN) 30 December 1937 see figure 2	9
A	FR,A,2 507 792 (DROCOURT) 17 December 1982 see figures 7,8	12

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9200905 SA 59448

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 11/08/92

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4660992	28-04-87	None	
CH-A-336023		None	
FR-A-2588975	24-04-87	None	
FR-A-2614443	28-10-88	None	
US-A-2305283		None	
DE-U-7003837		None	
DE-A-2342704	27-03-75	None	
DE-U-1424955		None	
FR-A-2507792	17-12-82	None	