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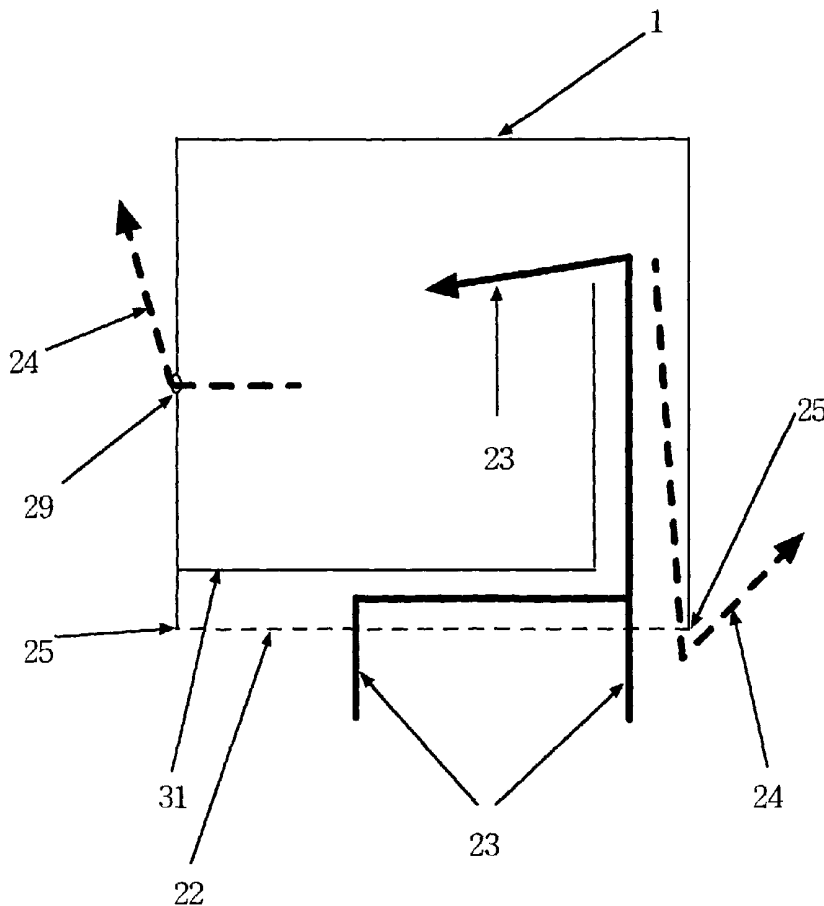
(43) International Publication Date
25 October 2001 (25.10.2001)

PCT

(10) International Publication Number
WO 01/78501 A1

- (51) International Patent Classification⁷: A01K 29/00 (81) Designated States (*national*): CA, CN, DE, GB, IN, JP, RU, US.
- (21) International Application Number: PCT/KR01/00594
- (22) International Filing Date: 10 April 2001 (10.04.2001) (84) Designated States (*regional*): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (25) Filing Language: Korean
- (26) Publication Language: English
- (30) Priority Data: 2000/18786 10 April 2000 (10.04.2000) KR
- (71) Applicant and (72) Inventor: PARK, Gun-Young [KR/KR]; Songhyen-jukong APT 132-301, Sangin-dong 860, Dalseo-gu, Taegu 704-371 (KR).
- Published:**
 — with international search report
 — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: THE PET NEST IN WATER



(57) Abstract: This invention relates to a pet house. Whereas existing pet houses function by caging pets in, the present invention upgrades pet houses to a toy by installing lungs in the water with various additional functions. To achieve the above purpose, I suggest several methods. There are 2 ways to supply oxygen to the pet house; 1. to use an air suction pipe and an oxygen producer (or an air pump. The oxygen producer for this invention includes an air pump.) 2. to use buoyancy to supply air from the bottom. To keep this pet house from sinking under the water or floating on the surface of water, I suggest various methods using an up-and-down shifter, a buoyancy globe, and a string.



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The Pet Nest in Water

Field of the invention

This invention relates to a pet house which can be used as a toy.

This water pet house, which can be used as a toy, is an upgrade and creates
5 a new view by installing lungs in water with various additional functions.

Background of the invention

In general, existing pet houses function by caging pets in.

Summary of the invention

To install a pet house in water, (1) oxygen should be supplied to pet and
10 (2) the balance of the pet house should be kept to overcome buoyancy. (3) To
upgrade its value as a toy, it should move freely in the water.

To supply oxygen in the pet house ; 1. Attach an air suction pipe to the pet
house to supply air (For further information, see the following detailed
description of the preferred embodiments.), 2. Use buoyancy to supply oxygen
15 from the water bottom to the pet house, 3. Attach a pipe or an oxygen
producer (or an air pump. The oxygen producer for this invention includes an
air pump.) to the main frame.

Also, I consider a type of main frame which lets smaller or the same amount
of air out of the supplied air as the air which the pet can breath in the
20 water and the balance in the water and transfer method through invention of
an up-and-down shifter utilizes the differences between water, air, and
buoyancy.

One of main reasons for raising pets is for enjoyment and beauty. When using this pet house in an aquarium, a new view of the harmony of fish and land animals can be created.

Also most of the existing toys are used on land, on the surface of the water and in the air. But this kind of toy that works in the water has not been developed well, so it is expected to create promising demands.

Brief Description of the drawings

Fig. 1 is a floor plan of a pet house.

- A. A view seen from the upper part B. A view seen from the side
C. A view seen from the rear

Fig. 2 is a floor plan of a buoyant globe.

- A. A view seen from the upper part B. A view seen from the side

Fig. 3 is a floor plan of an air suction pipe.

- A. A view seen from the upper part B. A view seen from the side

Fig. 4 is a floor plan of a gravity sinker or an oxygen producer.

- A. A view seen from the upper part B. A view seen from the side

Fig. 5 is a floor plan of an up-and-down shifter.

- A. A view seen from the side B. A view seen from the front

- C. A view seen from the rear

Fig. 6 is a floor plan of a main frame attached with a gravity sinker, an air suction pipe and a buoyant globe.

Fig. 7 is a floor plan of a main frame connected with a string on the floor and

attached with an air suction pipe.

Fig. 8 is a floor plan of a main frame attached with an oxygen producer and a buoyant globe with sealed upper part.

Fig. 9 shows a main frame used as a bladder type up-and-down shifter.

5 Fig. 10 shows a relation between a position where extra air is exhausted and a pet's footstep in case of not having a water shutting valve on a general main frame. (Closed type shown as Fig. 1)

A. A view seen from the side B. A view seen from the upper part

10 Fig. 11 shows a relation between the highest position on the main frame with opened bottom and a pet's footstep.

A. A view seen from the side B. A view seen from the upper part

Fig. 12 shows a principle on supplying oxygen when a pet house whose main frame is opened on the bottom and an oxygen producer (or an air pump) are at a certain distance.

15 Fig. 13 shows an up-and-down-shifter with opened bottom

A. A view seen from the side B. A view seen from the upper part

Fig. 14 shows how to supply oxygen (air) directly in the main frame of a pet house

(The figure shows a main frame with opened bottom.)

20 Fig. 15 shows a pet house with partly opened bottom

A. In case a floor is lower than a pet's footstep
(water level in the main frame)

B. In case a floor is higher than a pet's footstep

(water level in the main frame)

Fig. 16 shows a pet house with opened bottom and a wide inlet

Description of major components shown in the drawings

- 5 1. Main frame
2. Attachment position for a gravity sinker or an oxygen producer
3. Attachment position for an air suction pipe
4. Position where extra air is exhausted when attaching an oxygen producer
5. Water shutting valve
- 10 6. Attachment place for an air suction pipe
7. Air outlet
8. Air exhaust valve
9. Water pressure sensor
10. Water inlet
- 15 11. Water level
12. Buoyant globe
13. Air suction pipe
14. Gravity sinker or Oxygen producer
15. String
- 20 16. Floor
17. Oxygen producer
18. Buoyant globe with sealed upper part

19. Main frame of an up-and-down shifter
20. Part moving back and forth for adjusting size
21. Pet's footstep
22. Pet house whose main frame is opened on the bottom and water level of an
5 up-and-down shifter with opened bottom.
23. Solid arrow showing the direction of new air motion produced by an oxygen
producer (or an air pump) for a pet house whose main frame with opened
bottom -- in case a pet house and an oxygen producer are separated
24. Dotted arrow showing the direction of existing air motion in the pet house
10 whose main frame with opened bottom
25. The highest position on the main frame with opened bottom and the frame
of an up-and-down shifter with opened bottom
(As the lowest part of the main frame in the water, the frame is a border
of water and air. -- Water and air makes a border on the highest position
15 of a frame of the main frame with opened bottom.)
26. Arrow showing the direction which adjusts the height of sides back and forth
for adjusting the amount of air supplied into the inside of an up-and-down
shifter with opened bottom
27. Arrow showing the direction which adjusts the height of sides vertically for
20 adjusting the amount of air supplied into the inside of an up-and-down shifter
with opened bottom.
28. Solid arrow showing the direction of air motion when supplying air directly

to the inner main frame of a pet house

29. Small hole on the main frame of a pet house

30. Pipe supplying air directly to the inner main frame of a pet house

31. Floor of the main frame of a pet house

5 **Detailed description of the preferred embodiments**

1-1. Contents of the invention

This invention is to install a pet house so pets can breathe under water. To upgrade it to a toy, it can move vertically and horizontally in water. To achieve the above purpose, I suggest following methods.

10 1-2. Main frame

Put pet inside the main frame and attach air suction pipe, oxygen producer and up-and-down shifter outside.

The shape of the main frame on Fig.1 is just an example and its shape doesn't matter if the following conditions are satisfied.

15 As shown on Fig 1., if not equipped with a valve, it shuts water off at the spot where extra air from general type closed main frame is exhausted, the spot where the extra air is exhausted should be the same height or lower than the pet's footstep (See Fig. 10, It doesn't matter if a water valve is equipped).

20 As shown on Fig 11, an example of a different shape of the main frame, the bottom is opened and the upper part is closed. As in Fig 1, a general closed main frame, the pet's footstep should be the same height or higher than the

highest position of the main frame.

Here I review how to supply air into the water pet house whose main frame is opened on the bottom as follows. Air can be supplied by attaching an oxygen producer (or air pump) to the pet house directly in the water or by using a
5 hose through an oxygen producer (or air pump). Also in the case of an oxygen producer or an air pump for the pet house at a certain distance (not connecting with even a hose), air can be supplied to the water pet house using the buoyancy and gravity difference between water and oxygen. When observing the air stream from an oxygen producer which is separate from the
10 pet house, air full of oxygen has potential energy in the water and moves up like the solid line of Fig. 12. When air moving in upwards direction arrives at the water level of the pet house whose main frame is opened on the bottom, the prior potential energy is changed to kinetic energy rushing into the main frame with an opened bottom at a high speed and filling the pet
15 house with air by pushing the exhausted air out toward the same direction of the dotted line of Fig. 12.

Repeating this cycle, fresh air is consistently supplied to the pet house. The highest position of the main frame with an opened bottom and the position of the general main frame where its extra air is exhausted (The
20 hole depends on the supplied air, but it should be larger the size that the same amount of air as the supplied air can go through immediately.) should be strictly sealed so water and air can't escape. Or a small hole (for a

better air stream) can be made for discharging only smaller amounts of air than the supplied air (or exactly the same amount). In this case, if smaller or the exactly same amount of air can be released through the highest position of the main frame with open bottom or a small hole (or holes) where
5 the extra air of a general main frame is exhausted, water can't go up to the pet's footstep of the main frame.

As shown in Fig. 14, oxygen(air) consistently in the main frame by attaching a pipe on the main frame or putting a pipe in the main frame, water can't go into the main frame as the air pressure gets higher in the main frame. For
10 the main frame with opened bottom, water can't go into the lower position (it is only a few mm, though) than the highest position of the main frame with opened bottom as the air is released in a lower direction (like the dotted arrow, No. 24) and the water is pushed by the air on the main frame with opened bottom.

15 Of course it depends on how strongly air pushes onto the inner main frame, but without a water shutting vale, the size of the position where the extra air exhausts should be somewhat smaller. At this time, the footstep can be installed on the lower spot for the highest position on the main frame with open bottom and a hole where extra air exhausts on the general type closed
20 main frame. Especially for the closed type general main frame, no water flows into the bottom. (though a water shutting valve is not equipped.) This method can be used for expanding the inner space in the main frame, but to

use this method, special care is required as the water can go into the closed type main frame or go up to the highest position of the main frame with opened bottom and the pet can get wet if its air supply is disconnected or weakened for a short moment.

5 There is a structure with partly opened bottom which is a modification of a main frame with opened bottom and air can be supplied at a certain distance from the bottom or laterally. In this case, as shown on Fig 15, the closed bottom part can be lower than the pet's footstep or can be higher like Fig. 15 B, or it can be at the same level. As Fig 15, A shown, in case the bottom
10 of pet house is lower than the opened part, if there's a low sill beside the opened bottom part keeping the air pressure in the main frame, water doesn't go into the lower position of the pet's footstep. (Fig 15, A shows a high sill and in this case, a footstep should be installed for pets to pass through the opened part.) In the case of not having a sill, water doesn't go
15 into it if the size of the opened part is small enough and strong air pressure is consistently kept.

For the pet house with partly opened bottom, shown as Fig. 15, A, a small hole such as No. 29 of Fig. 15 is required to raise the mobility of air and to consider that pet can be put on a lower position than the water level of
20 opened bottom part. Except this point, its working principal is the same as the pet house with fully opened bottom.

(In the case of a higher sill shown as Fig. 15 A, its necessity is stronger.)

Also a small hole such as No. 29 on the Fig. 15 is located higher than the water level in the pet house. In case the way to the main frame is narrow as shown on the Fig. 15, the air inlet (can be same as the water level in the main frame of the pet house) can be the same size as the pet house floor or
5 can be larger. Fig. 16 can be considered as a modification of Fig. 15, A and in the case of Fig. 15, B, an expansion modification is possible. The reason why structures such as Fig. 15 and Fig. 16 which are the main frame with a partly opened bottom are needed is to prevent pet's waste going into the water by separating water and pet.

10 2. How to supply pet air

A. Using an air suction pipe (See Fig. 3)

The pipe connecting the main frame of the pet house and air outside the water surface (See Fig 6 & 7.) can connect a buoyant globe to the main frame of the pet house(See Fig 6 & 8.).

15 B. Using an oxygen producer (See Fig. 4)

Installed under the main frame of the pet house, an oxygen producer supplies air to the pet house (See Fig. 8). Also it supplies air to the following up-and-down shifter, sinking the main frame of the pet house instead of a gravity sinker. (See Fig. 8)

20 3. How to sink the pet house in the water

A. Using a gravity sinker (See Fig. 4)

A gravity sinker is made of metal whose specific gravity is higher than

water. The main frame of the pet house can be made of materials with high specific gravity, but in this case, portability of the pet house gets lower.

When attaching a gravity sinker under the main frame of the pet house (See Fig. 6), the pet house sinks. An oxygen producer made of materials with high specific gravity can replace it. (See Fig. 8.)

B. Using a string (See Fig. 7)

Hang a string on the floor or right/left wall to place the pet house in the adequate depth of water.

4. Balancing of the pet house in the water at an adequate depth

A. Using the up-and-down shifter

As the specific gravity of air is lower than water, air goes up when water is mixed with air in a closed space and air pressure gets higher, pushing water out, when air quantity gets larger. The Up-and-down shifter is used to manipulate these characteristics of air.

For reference, the amount of water in/outlet and air outlet of an up-and-down shifter does not matter, but the height difference of the water in/outlet and air outlet does.

Here is an explanation about an up-and-down shifter with one in/outlet and one air outlet

(1) As a basic type shown on Fig. 5, there can be an up-and-down shifter with 2 holes for a water in/outlet and an air outlet. As shown in the Fig, the air outlet should be higher than the water in/outlet. When working, the

up-and-down shifter produces power which overcomes air pressure and water pressure by installing a motor on the water in/outlet or the air outlet for strengthening the discharge of water or air and absorbability of water. It can be moved though the height of the air outlet and the water in/outlet is the same or the higher than the air outlet as a result of structural change.

Here is how to work of the up-and-down shifter on Fig. 5.

First, connect an up-and-down shifter to an oxygen producer and attach it to the pet house. If the pet house is too light and floats because of its buoyancy, open an air exhaust valve. As the water pressure of the water in/outlet in the low position is higher than the water pressure of the air outlet on high position, water can enter into the up-and-down shifter from the water in/outlet. Then the air is vented through the air outlet as the inner pressure of the up-and-down shifter gets higher. Therefore the pet house sinks as the up-and-down shifter filled with water gets heavy.

Contrarily, when the pet house is too heavy and sinks, shut the air outlet with the air exhaust valve and inject air into the up-and-down shifter. As the air with lower specific gravity fills the upper up-and-down shifter, the air pressure inside the up-and-down shifter gets higher and overcomes the water pressure. Then the up-and-down shifter gets lighter and floats as water is pushed into water in/outlet.

(2) Bladder type up-and-down shifter

- Shut water as main frame or up-and-down shifter doesn't contact water (Air

can be contacted or not.), and adjust the buoyancy by adjusting the size of main frame or up-and-down shifter. When the main frame or up-and-down shifter isn't contacting water and set with the adequate center of gravity (Can float or sink with little weight difference), the pet house floats as
5 the up-and-down shifter or main frame gets bigger and its buoyancy gets higher. Contrarily when the up-and-down shifter or main frame gets smaller and its buoyancy gets lower, the pet house sinks. To adjust the size of the main frame or up-and-down shifter, various methods are used such as folding, inserting and blowing up with air.

10 For example in the case of Fig. 9, the buoyancy is changed by adjusting the size of main frame in an inserting way. For the working process of Fig. 9, there is a hole for air exhaust (See Fig. 1) and a water valve on the main frame (It is the same as the up-and-down shifter.) as shown on Fig. 1. When air pressure in the main frame or up-and-down shifter gets higher by
15 reducing the volume, inner air goes out through the hole. In the case of maintaining a certain status, water can't flow inside the main frame or up-and-down shifter as water pushes the water shutting valve outside (Water pressure occurs.)

20 When expanding the volume of the main frame or up-and-down shifter, for the outside water shutting valve, internal draw-in power acts by air pressure and external water shutting valve pushing power acts by water pressure as inner air pressure gets lower. Therefore water can't flow inside the main

frame or up-and-down shifter

At this time, if supplying air in the main frame or up-and-down shifter from an oxygen producer, the volume can be easily increased.

However if the up-and-down shifter is not in contacted with water, it can
5 work with the elasticity of air volume. (In this case, the capacity of the up-and-down shifter gets lower, but the structure is more simple without an air outlet or air exhaust valve.)

(3) Up-and-down shifter with opened bottom

Same as the main frame, an up-and-down shifter can have an opened bottom.

10 Like other up-and-down shifters, this capacity condition (When the up-and-down shifter is blown to the utmost - See Fig. 13.) represents the amount of water which makes a level with the highest position of the below frame of an up-and-down shifter with opened bottom going into the inner up-and-down shifter above and showing weight adjustment capability of the up-and-down shifter with
15 opened bottom.

(Specific gravity of water is 1.)

To move an up-and-down shifter with opened bottom, as Fig 13 shows, move the side wall like the arrow 27, or adjust the amount of air going into the up-and-down shifter by adjusting the whole volume of the up-and-down shifter
20 horizontally like the arrow 26 above the up-and-down-shifter with opened bottom. (When moving some parts which make a gap vertically not moving the entire parts at once, the highest position of the moved wall side makes a level

with water and cage air inside. - Of course you can move the entire parts.)

Applying the working process of the up-and-down shifter with opened bottom to a main frame with opened bottom of Fig. 11, it can be used as an up-and-down shifter.

5 B. Using a buoyant globe

A buoyant globe is a device for having more buoyancy with an empty tube, hemisphere (See Fig. 2) or sphere. A buoyant globe prevents the pet house from sinking to the bottom by a gravity sinker. When using an oxygen producer as a gravity sinker (See Fig. 8), use a buoyant globe with a closed
0 inlet. In other cases, open the inlet and vent with air suction pipe. (See Fig. 6)

C. Using a string

In the case of fixing the bottom or wall (See Fig. 7) using a string, the pet house can be situated at the appropriate height in the water by the
5 adjusting length of the string.

D. To calculate the weight of the pet and pet house exactly, it can be in the water balanced with the buoyancy.

5. Transfer of pet house

A. Vertical Transfer

10 The pet house can be moved up and down by adjusting an up-and-shifter.

B. Horizontal Transfer

(1) Using an oxygen producer

As shown on Fig. 8, air from an oxygen producer is released through the right hole and the exhausting power acts as thrust.

(2) Using a motor

Using a motor, the pet house can be moved horizontally.

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What is claimed is:

1. A detachable pet house for pets to live in water or an aquarium.

2. The pet house is attached to an air suction pipe on the main frame to supply pet air.

5 3. An up-and-down shifter (In case of using by modifying a main frame and including a bladder

type up-and-down shifter and an up-and-down shifter with opened bottom)

As the specific gravity of air is lower than water, air goes up when water is mixed with air and air goes in a upper direction and this up-and-down shifter is used to manipulate these characteristics of air.

As injecting water into the up-and-down shifter, air pressure gets higher pushing the water outside up-and-down shifter. When the up-and-down shifter gets lighter, it rises as buoyancy is bigger and gravity is lighter. Contrarily the air is let out in the up-and-down shifter, it descends. When water can't contact with the main frame or up-and-down shifter,

15 4. The highest position of the main frame with opened bottom and the position of general main frame where its extra air is exhausted should be strictly sealed and water and air can't be contacted with outside through those positions. Or a

20

small hole (for a better air stream) can be made for discharging only smaller amount of air than the supplied air (or exactly the same amount) to keep air for pet breathing in the water.

5. Installing an oxygen producer (or an air pump) laterally or under the main frame or an up-and-down shifter separating from them, air from the oxygen producer (or an air pump) is supplied to the pet house whose main frame and up-and-down shifter with opened bottom using buoyancy.
6. As attaching an oxygen producer (or an air pump) to the main frame of pet house which can be closed type or opened type directly, oxygen (air) is supplied into the main frame directly.
- Or putting a pipe in the main frame (See Fig. 14), oxygen (air) is injected into the main frame and is supplied to pet directly.

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Fig.1

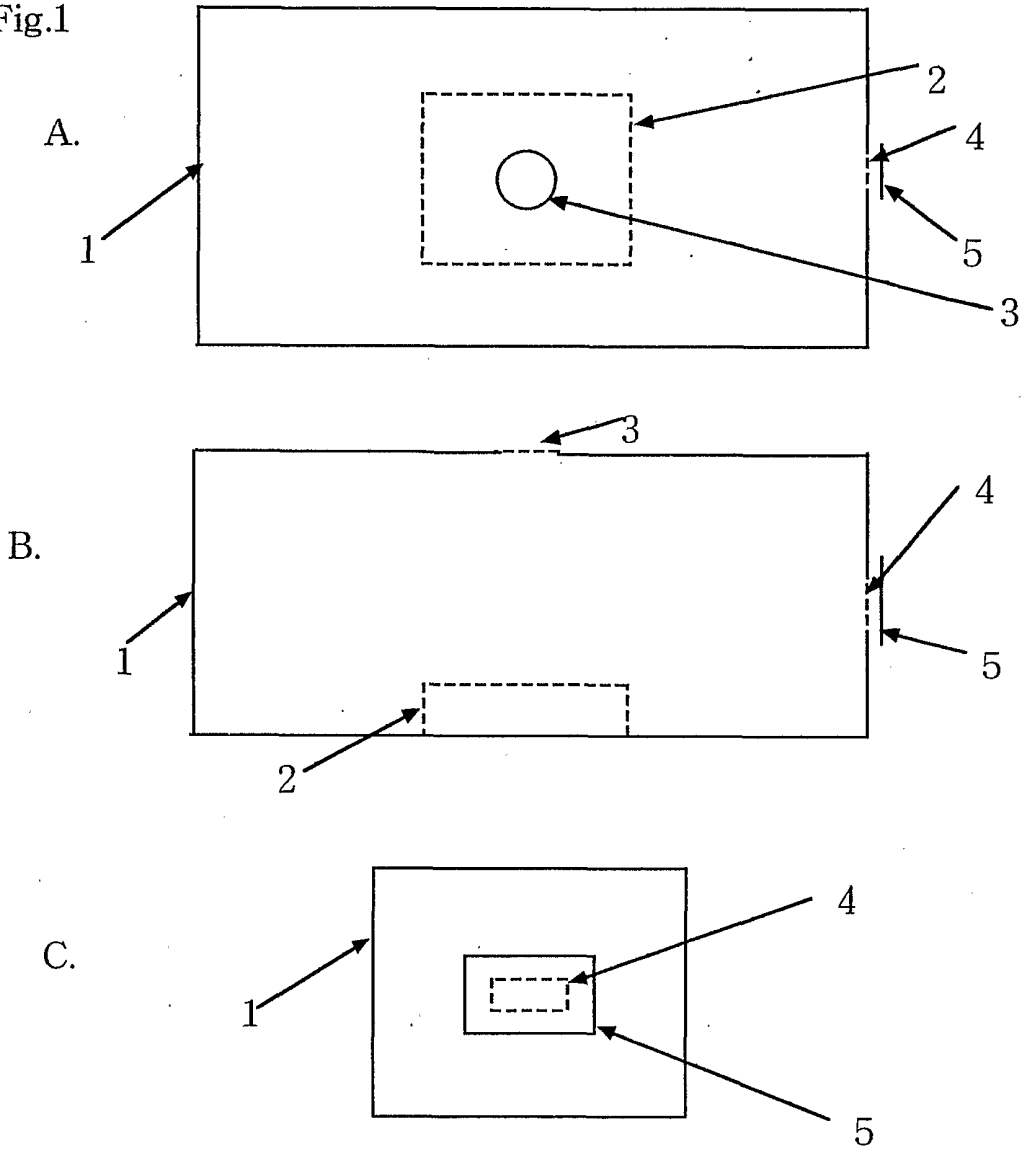
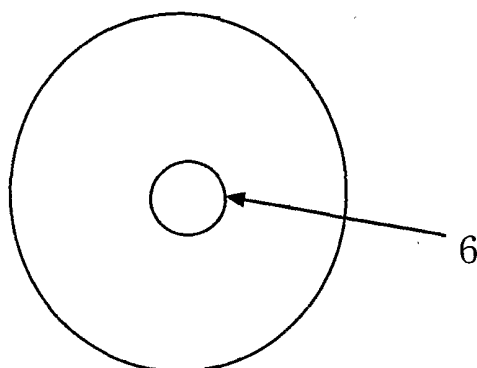
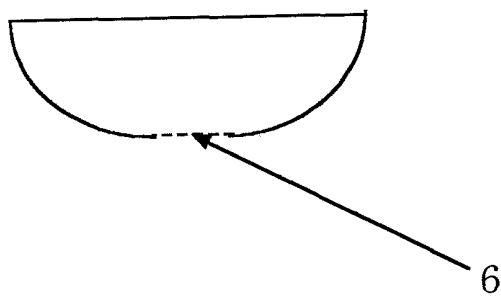


Fig.2

A.



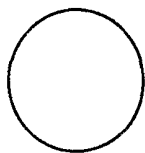
B.



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Fig.3

A



B

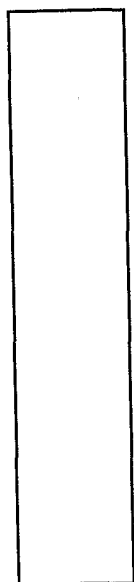
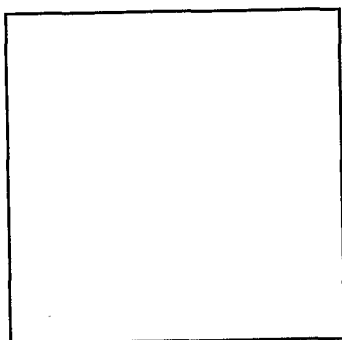


Fig.4

A.



B.

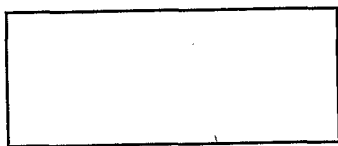
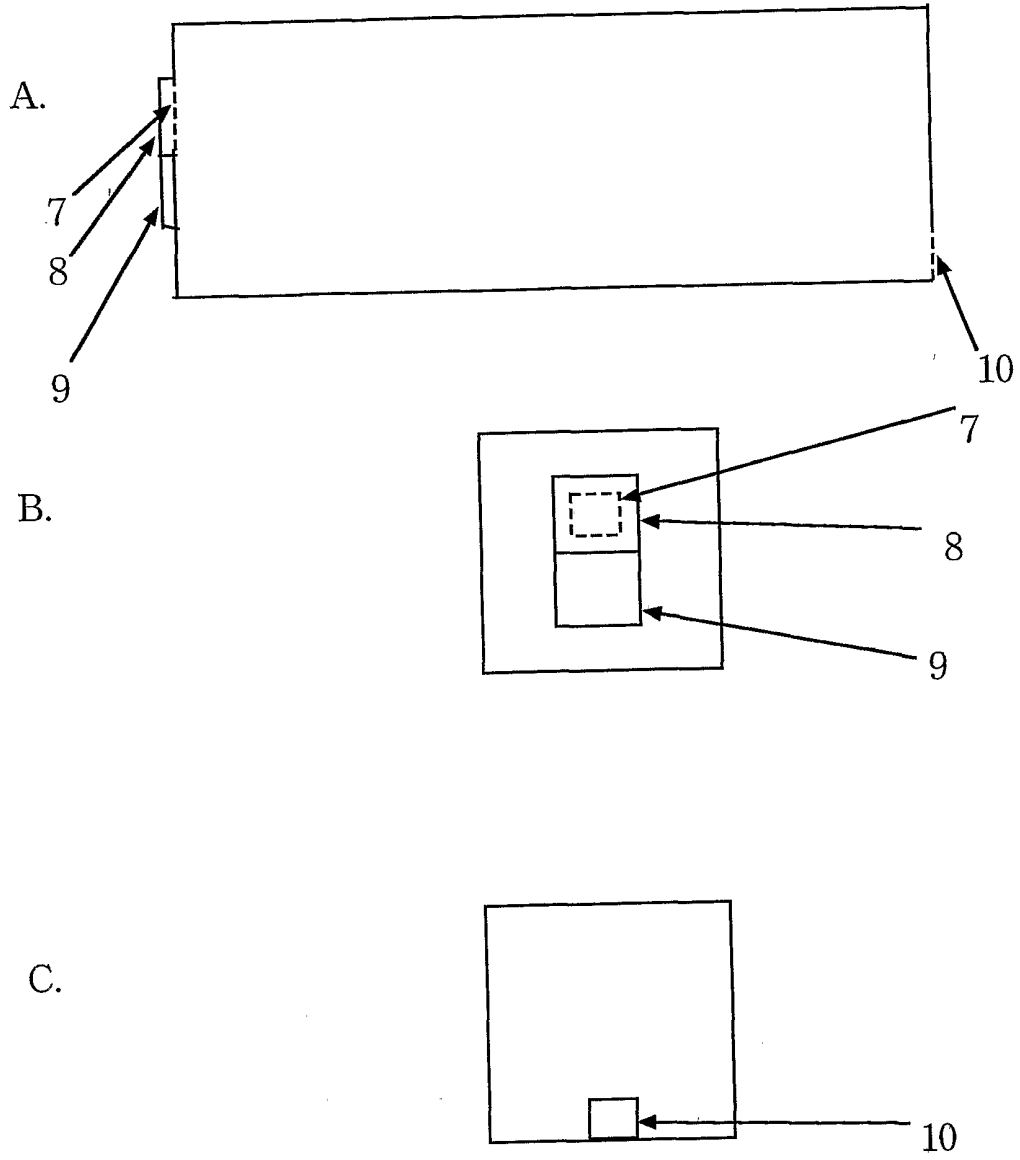
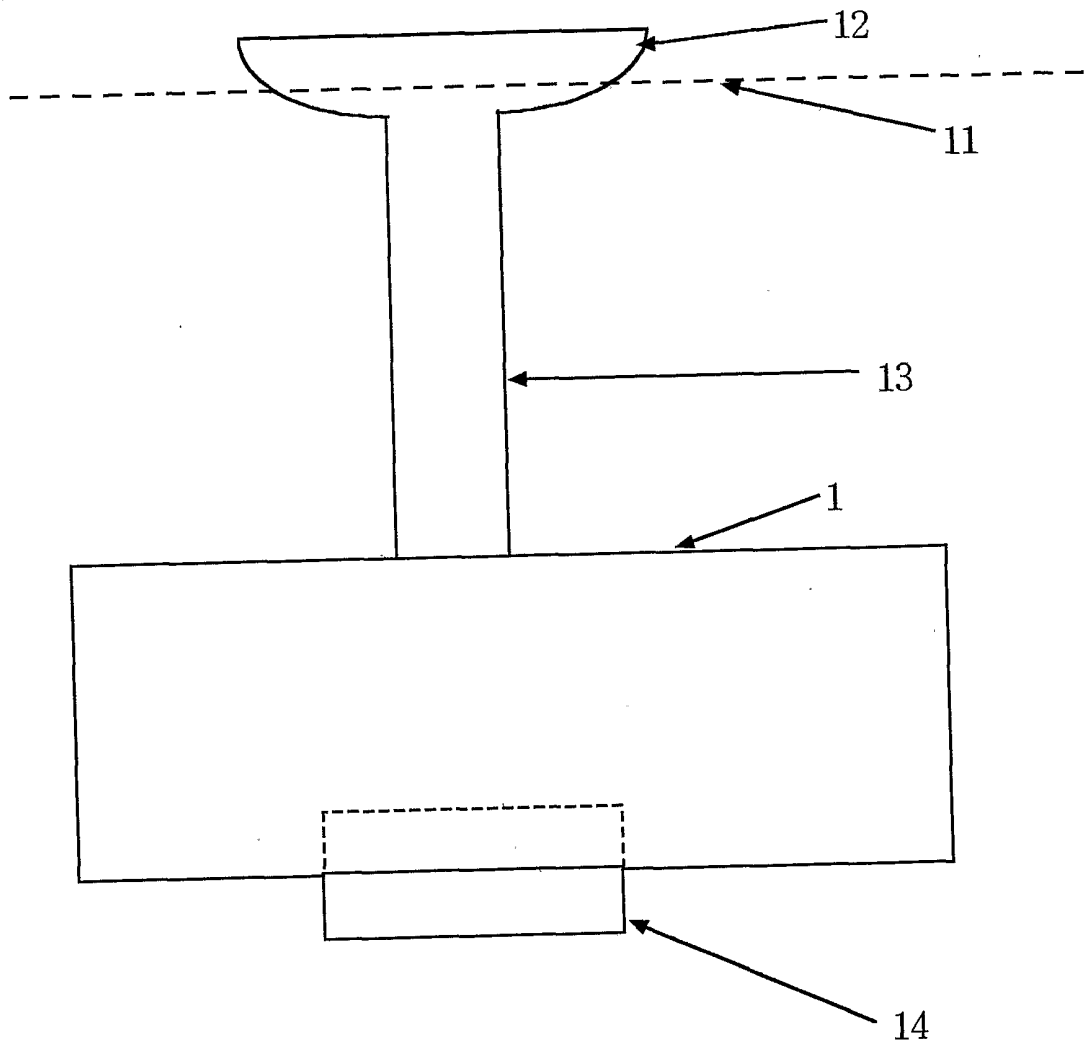


Fig. 5



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Fig.6



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Fig.7

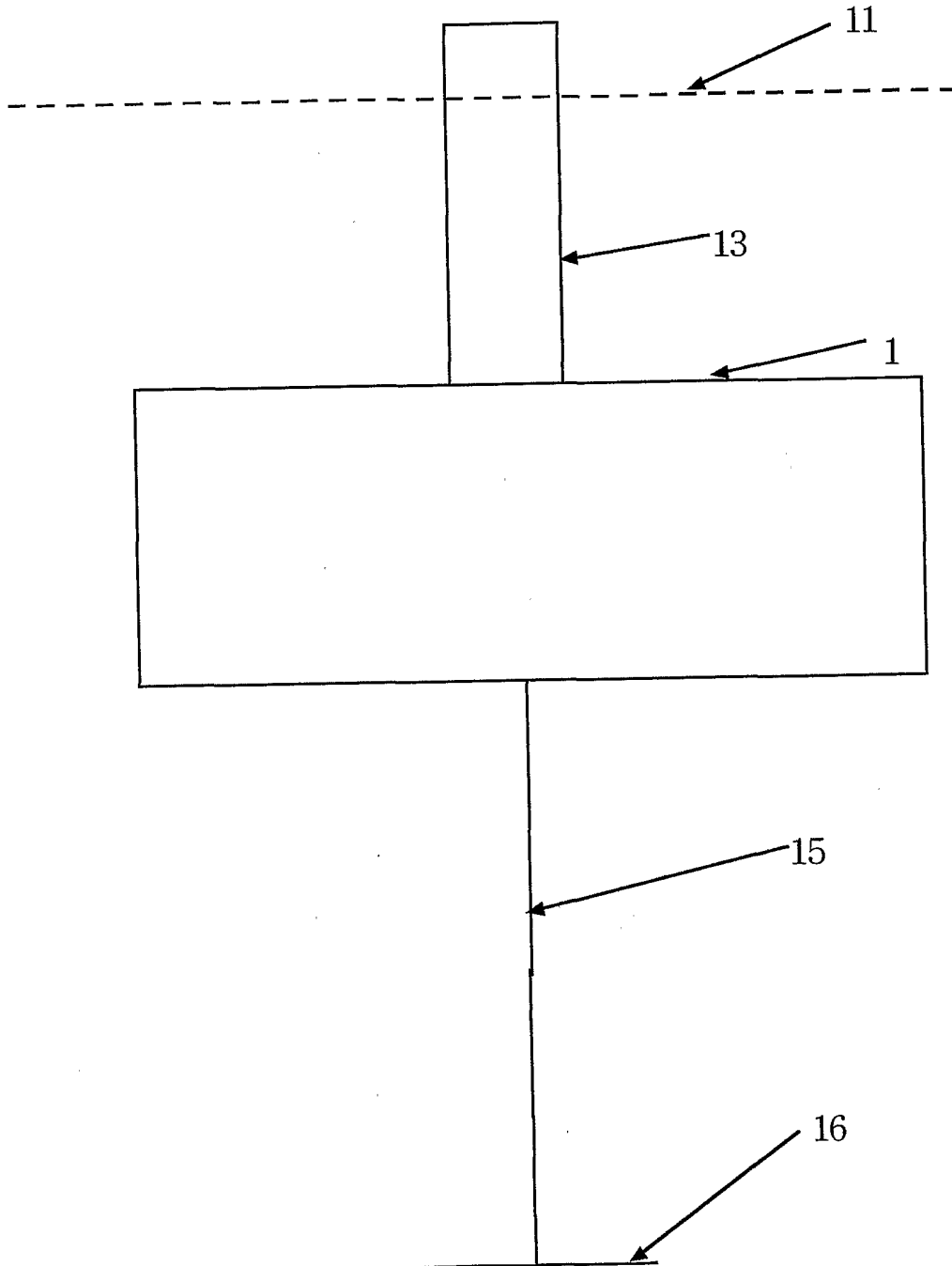
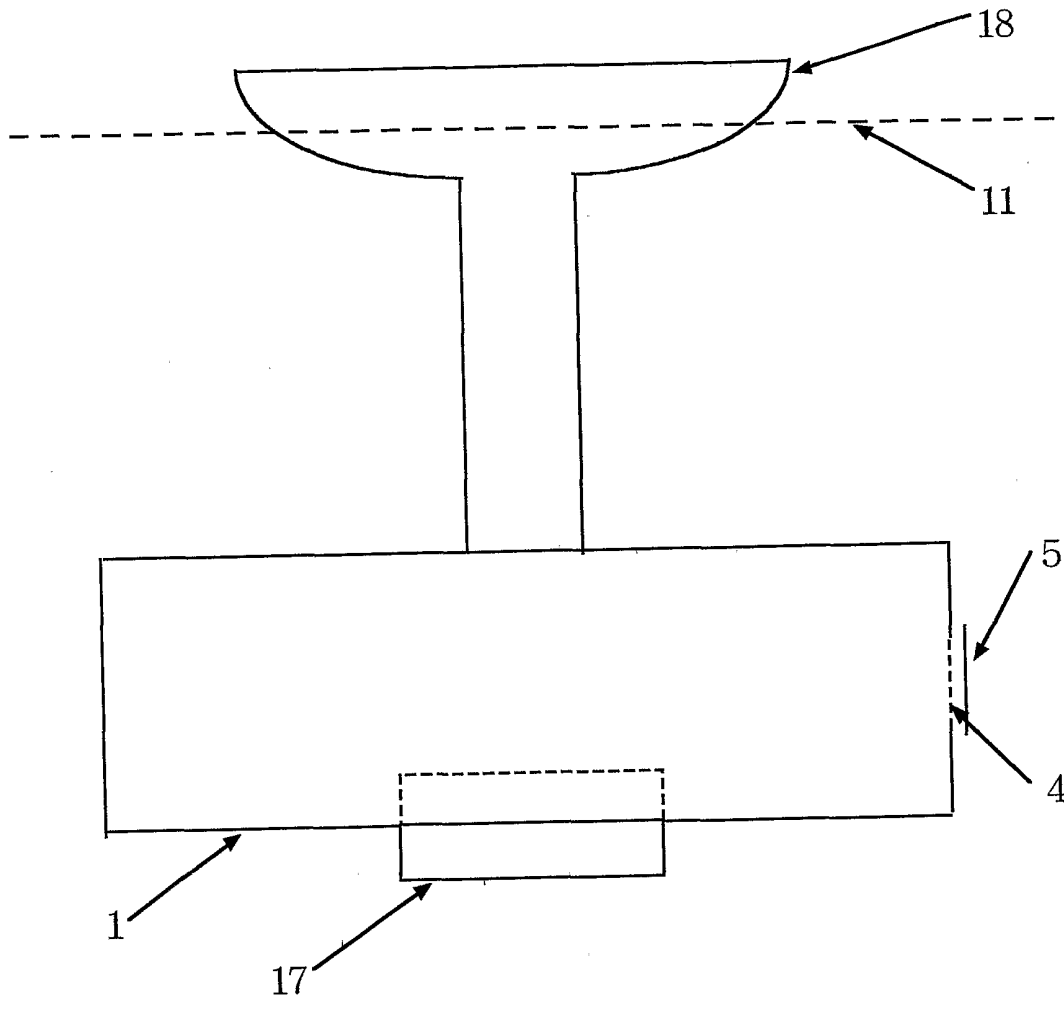
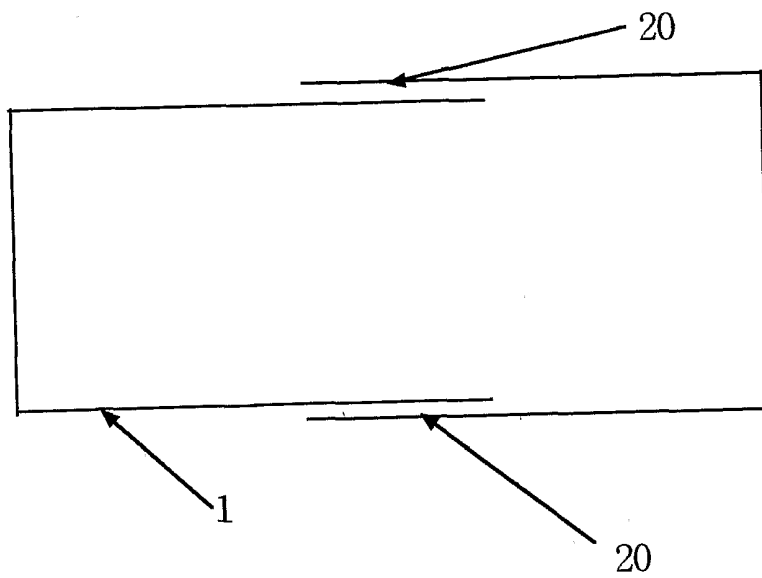


Fig.8



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Fig.9



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Fig.10

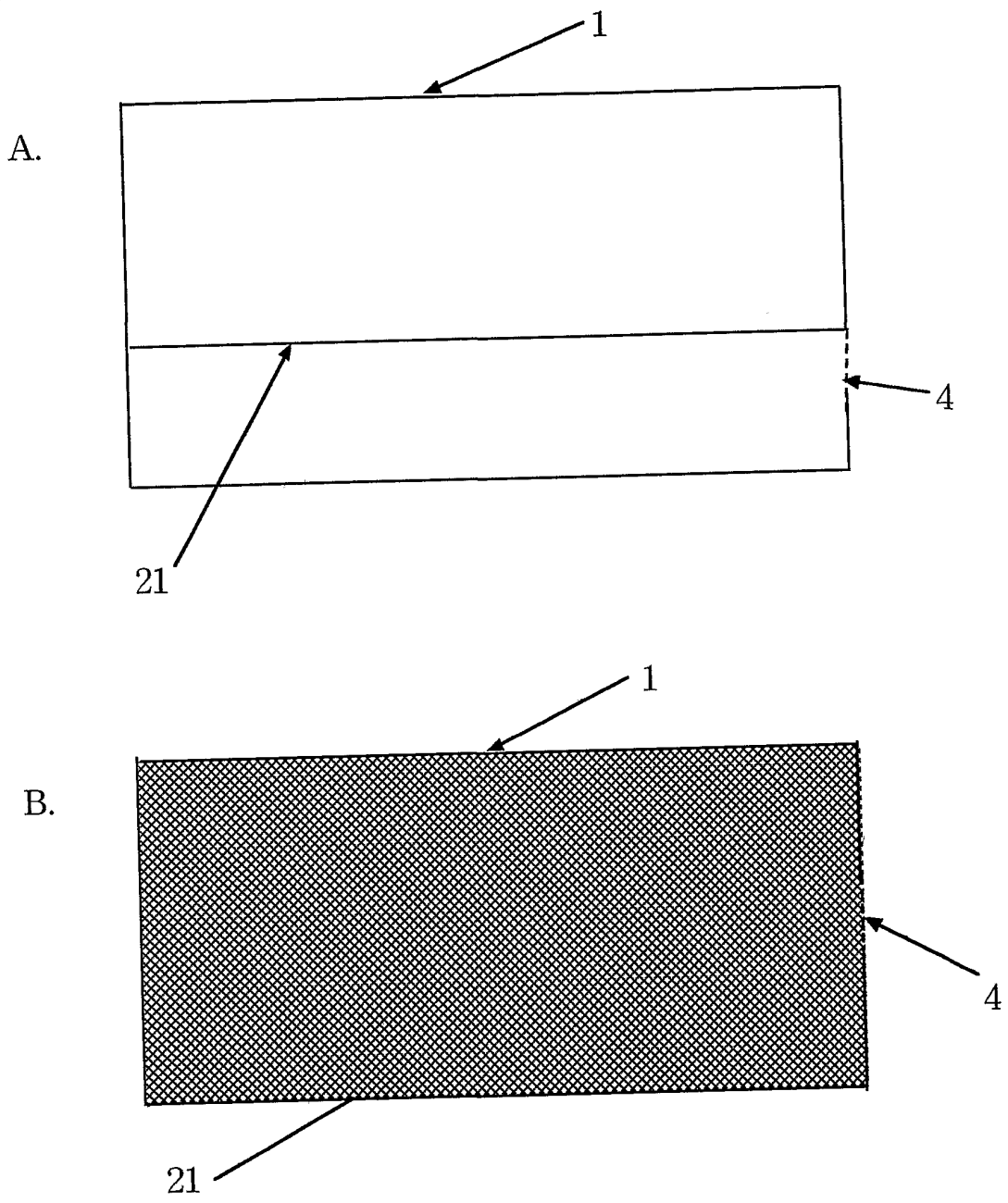
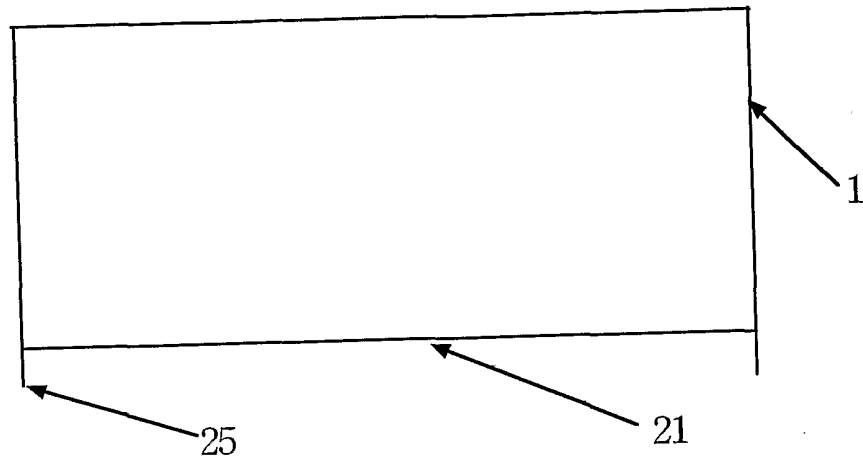


Fig.11

A.



B.

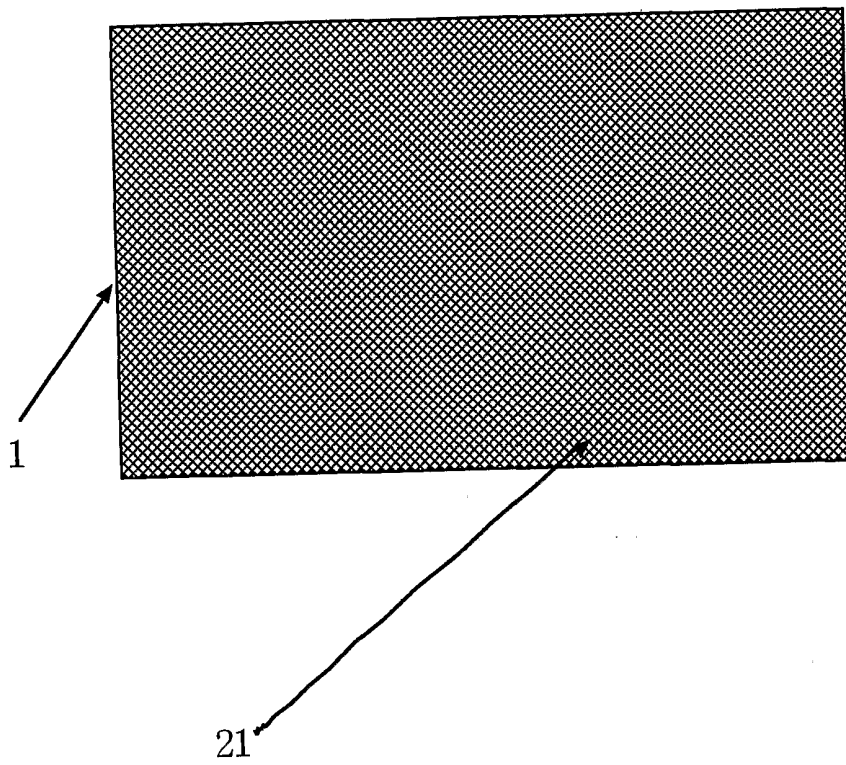


Fig.12

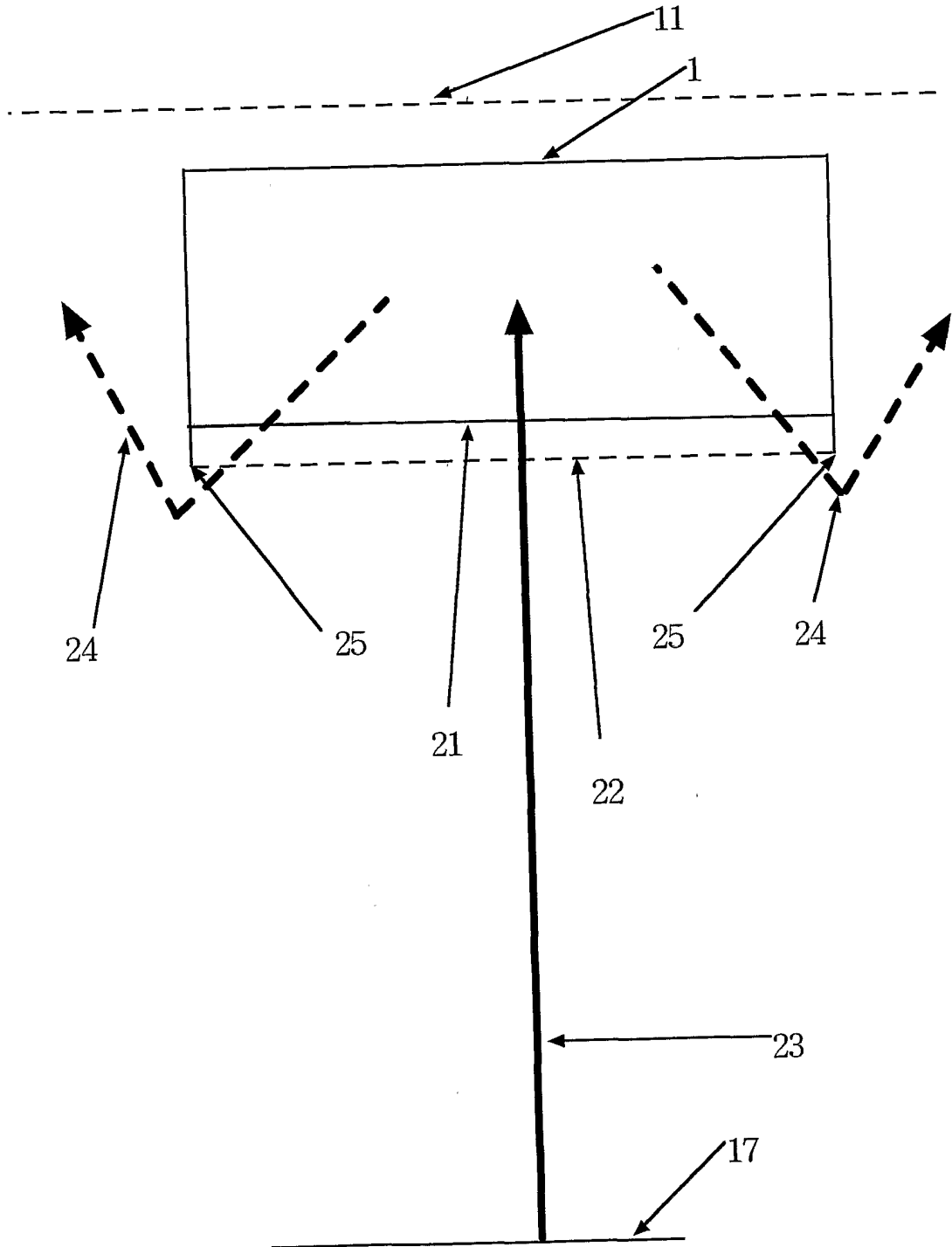
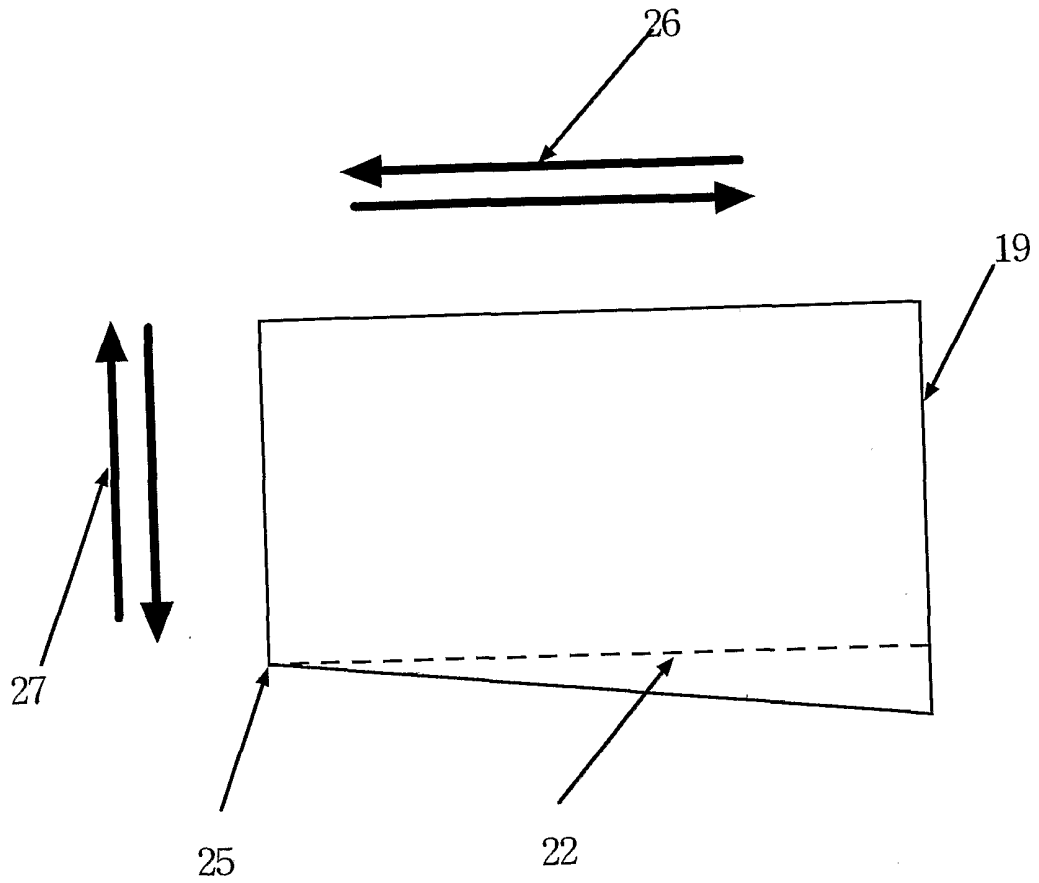


Fig.13

A.



B.

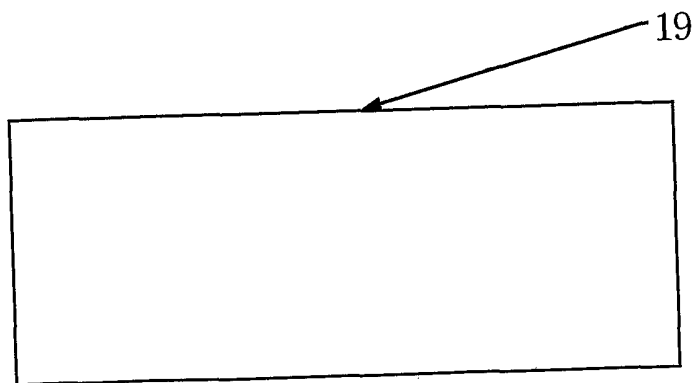


Fig.14

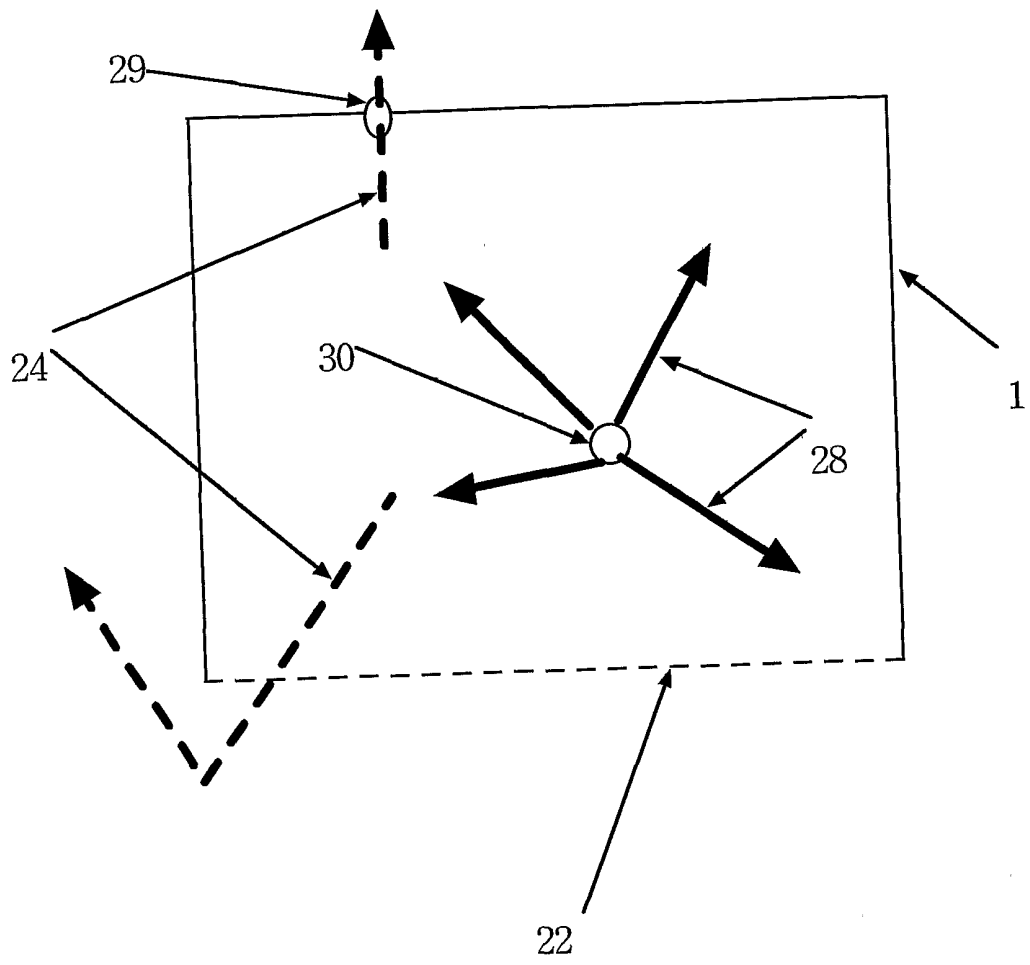
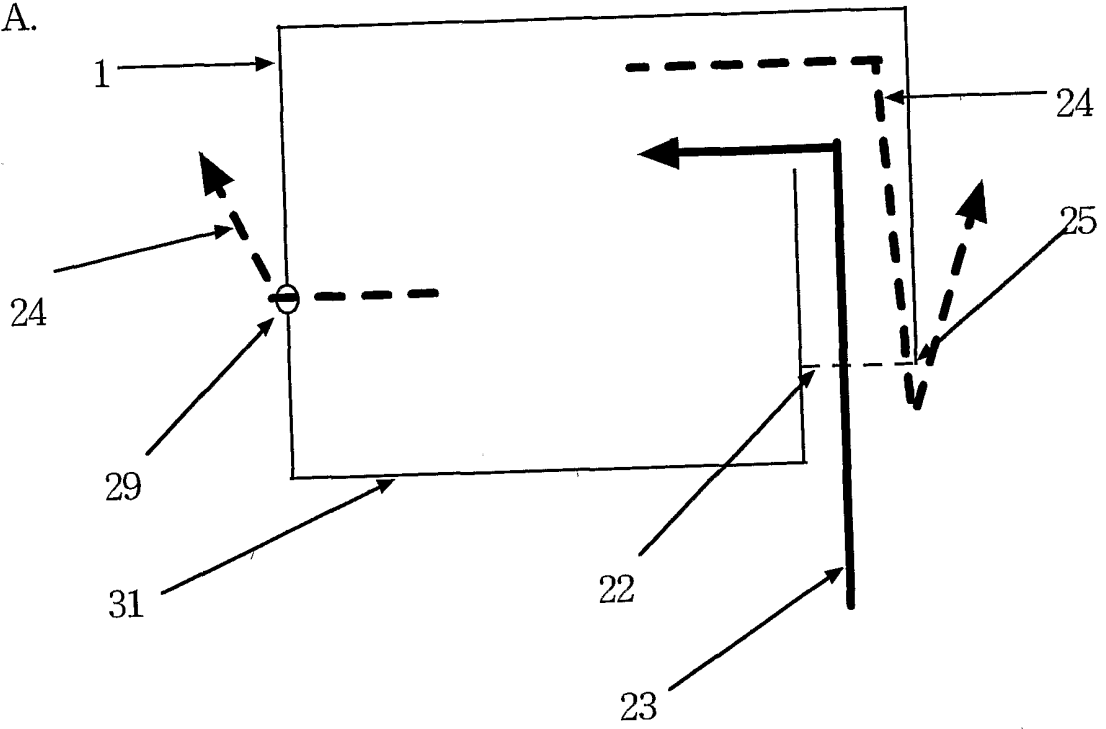


Fig.15

A.



B.

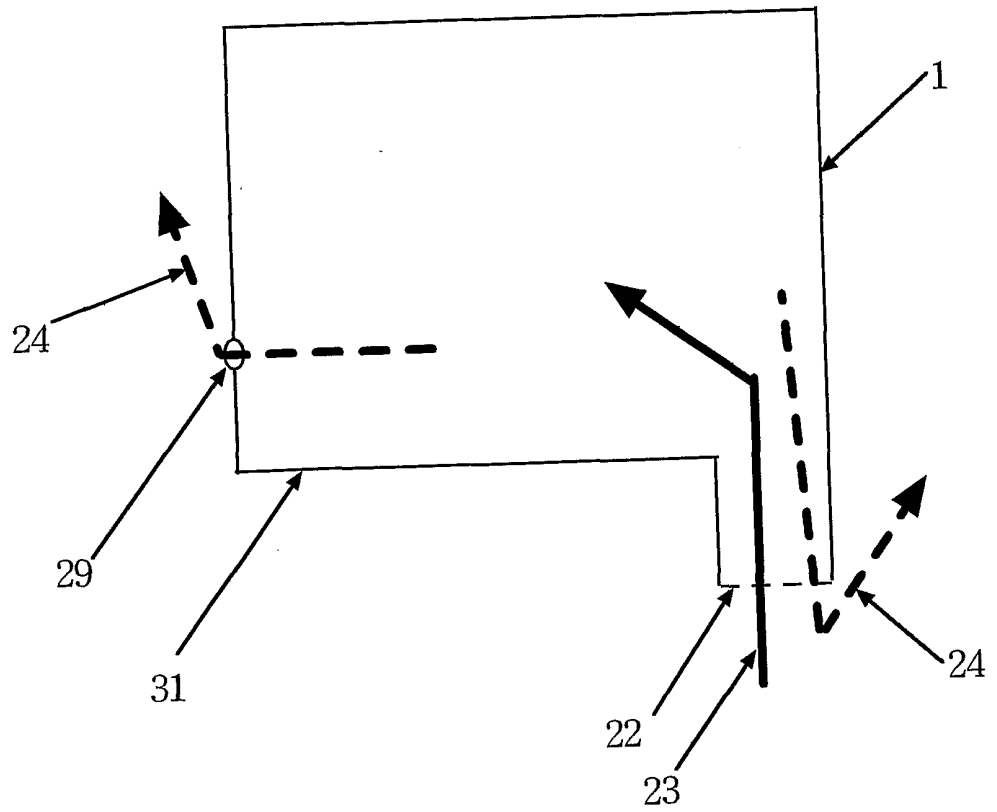
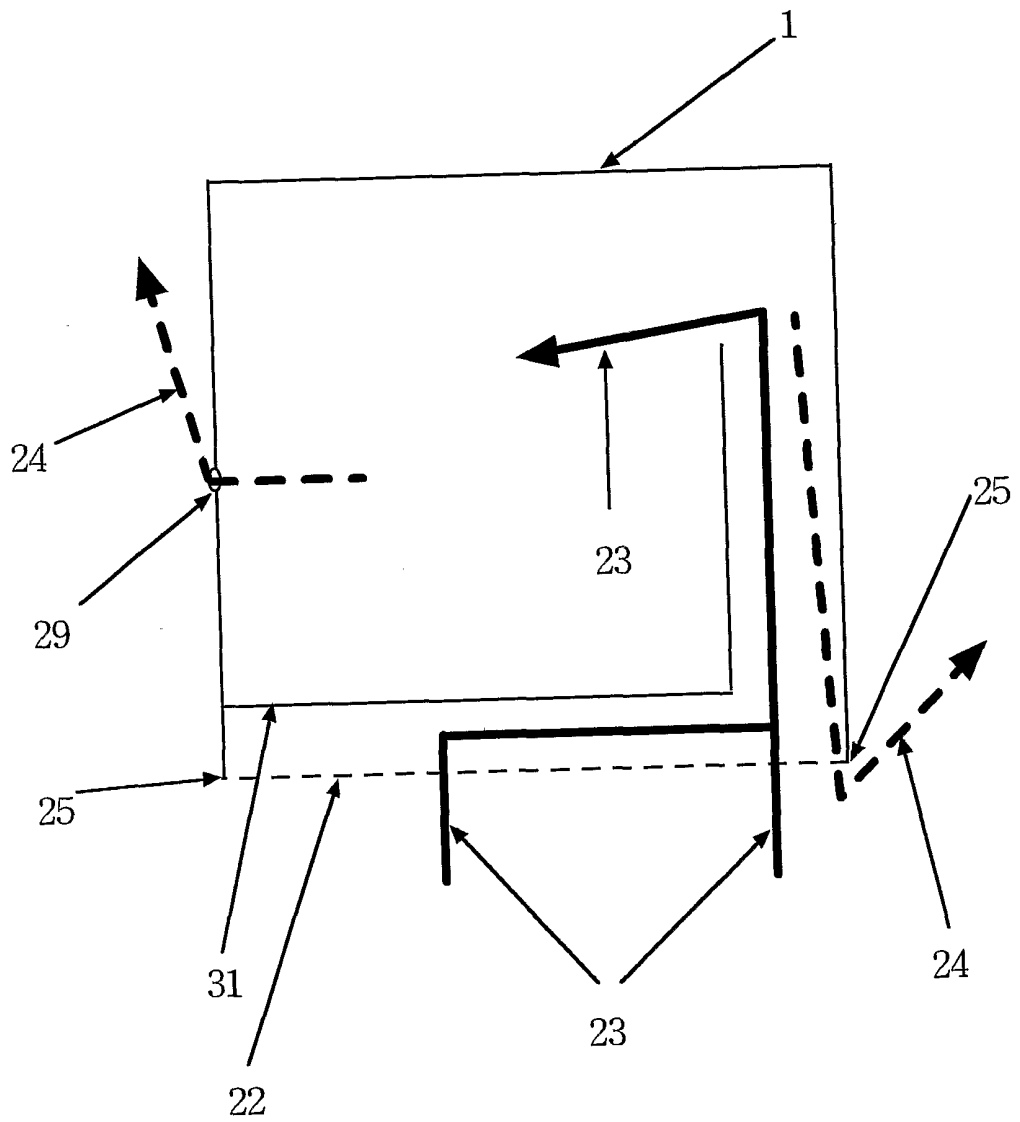


Fig.16



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR01/00594

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A01K 29/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7 A01K 1/02, A01K 63/00, A01K 63/04, A01K 64/00, C02F 3/34, G09B 23/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,958,593 A (James P. Hurlburt et al.) 25 September 1990 See 3rd column line 50 - 4th column line 12; fig. 6	1, 2, 6
A	See the whole document	3, 4, 5
A	US 5,135,400 A (Victor A. Ramey) 04 August 1992 See the whole document	1 - 6
A	US 4,117,805 A (Nazareen Ward) 03 October 1978 See the whole document	1 - 6
A	JP 9-84489 A (Hukuske Kogyo Kabusikikaisha) 31 March 1997 See the whole document	1 - 6

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of 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 when the document is taken alone

"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

Date of the actual completion of the international search

20 AUGUST 2001 (20.08.2001)

Date of mailing of the international search report

21 AUGUST 2001 (21.08.2001)

Name and mailing address of the ISA/KR

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