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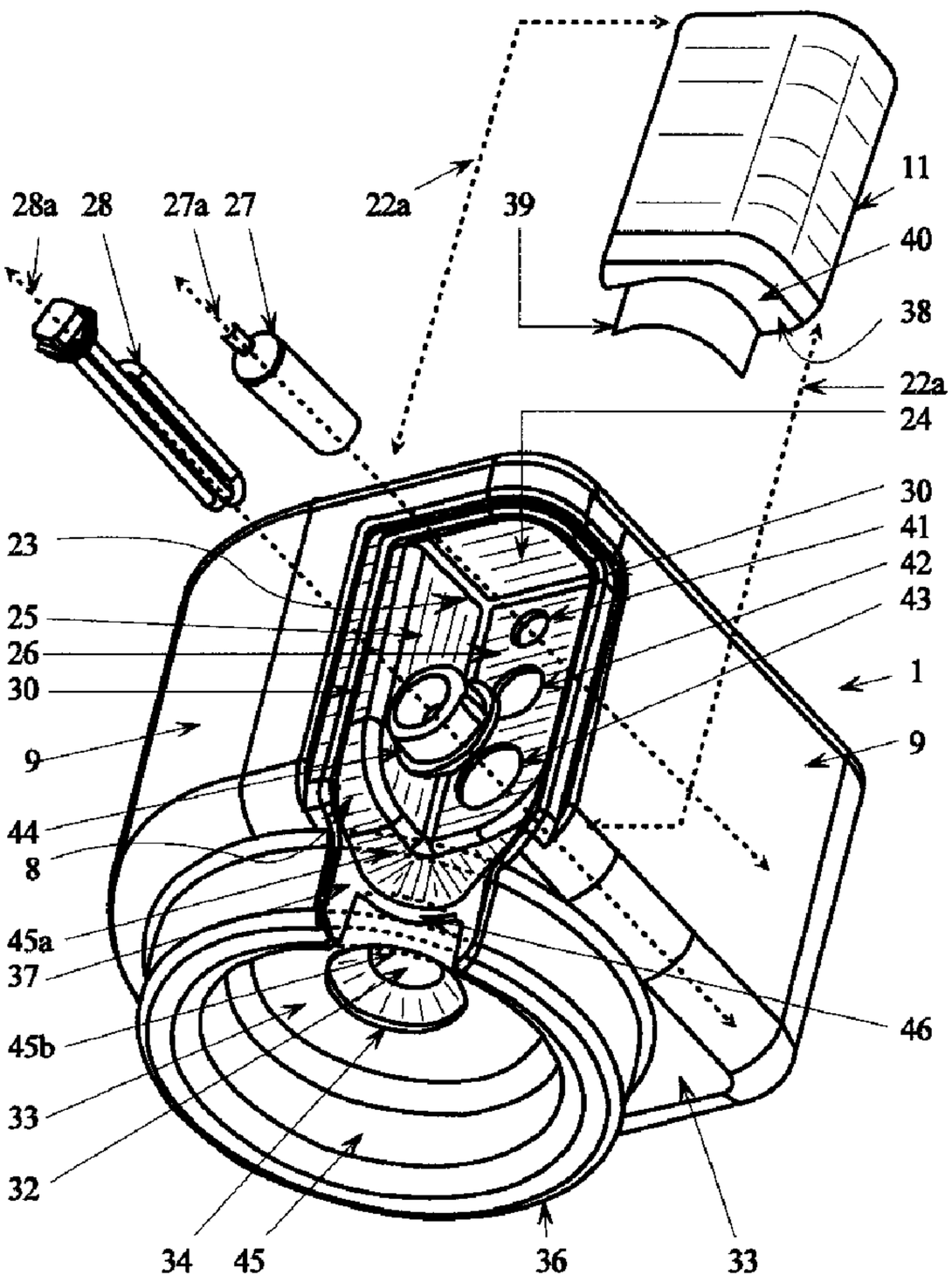
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(54) Titre : ABREUVOIR A BETAIL
(54) Title: LIVESTOCK WATERER



(57) Abrégé/Abstract:
A livestock waterer for installation upon an upstanding culvert including a generally horizontal periphery and a generally vertical interior surface. The waterer includes a unitary housing means including spaced apart interior and exterior surfaces. The interior

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(57) Abrégé(suite)/Abstract(continued):
surface forms an interior water receptacle including generally vertical interior side surfaces, connection means on interior side surfaces for water supply, temperature control and water level control components, and, a receptacle bottom surface. The exterior surface includes generally vertical side surfaces with and access door adjacent said connections and a bottom surface with a generally horizontal housing support surface adapted to engage the periphery of an upstanding culvert, and, a downwardly extending engagement surface adapted to engage the interior surface of a culvert. A passage between said interior and exterior surfaces accommodates generally vertical passage of water and electrical supply lines between the interior of the culvert, the connections and an expanded connection compartment. The connections and the access door areas formed into interior side surfaces of the receptacle.

ABSTRACT

A livestock waterer for installation upon an upstanding culvert including a generally horizontal periphery and a generally vertical interior surface. The waterer includes a unitary housing means including spaced apart interior and exterior surfaces. The interior surface forms an interior water receptacle including generally vertical interior side surfaces, connection means on interior side surfaces for water supply, temperature control and water level control components, and, a receptacle bottom surface. The exterior surface includes generally vertical side surfaces with and access door adjacent said connections and a bottom surface with a generally horizontal housing support surface adapted to engage the periphery of an upstanding culvert, and, a downwardly extending engagement surface adapted to engage the interior surface of a culvert. A passage between said interior and exterior surfaces accommodates generally vertical passage of water and electrical supply lines between the interior of the culvert, the connections and an expanded connection compartment. The connections and the access door areas formed into interior side surfaces of the receptacle.

TITLE: LIVESTOCK WATERER

BACKGROUND OF THE INVENTION

This invention is directed to livestock watering apparatus and particularly waterers for horses and the like which are adaptable to a wide range of conditions of use such as are encountered winter and summer in field grazing and barn situations.

Field of the Invention

This invention relations to a livestock waterer with a continuous outer and inner surface, the inner surface forming a water receptacle divided into 2 parts and the outer surface providing for installation and protection from dislocation and damage.

Description of the Prior Art

Waterers have been widely proposed and used in a variety of settings but are invariably susceptible to physical damage and dislocation as a result of farming practises and animal behaviour. Many such waterers seek to meet the basic need while accommodating the wide temperature ranges that are encountered and which will easily freeze the waterer contents in winter and overheat same in summer. Prior art solutions are overly complex and difficult to manufacture, resulting in high cost, expensive installation and high maintenance requirements, particularly over the period of years of use which is the expected norm for farm installations.

In most instances in the prior art valving and supply lines are buried below the frost line and are brought to the surface and then connected to the lower

extremity of prior art waterers, exposing the components to failure and correspondingly increased maintenance difficulty.

For instance United States Patent 3,948,221 {USP'221} issued April 6, 1976 to Wiuniski. Patent USP'221 discloses a waterer with a single fragile shell fully exposed to the elements and the farm environment. The main supply components are bottom mounted and the device rests on supports. In that patent it was considered novel to provide a removable cover to provide 2 separate compartments. Component attachment at the bottom provides a maintenance complexity as the waterer must be removed from its support and supply lines to service the parts, often a difficult task carried out at night or in severe and freezing weather.

Another example is provided by United States Patent 4,704,991 {USP'991} issued Nov. 10, 1987 to Moore. Moore provides a single layer solution similar to Wiuniski and suspends the receptacle within a support. As with many prior art solutions the supply components are bottom mounted thus requiring a restricted access door in the support with high installation and maintenance costs.

US'991, Moore, discloses a waterer of problematic design with a large water surface exposed to atmosphere and an internal horizontal partition separating the animal from the workings. Any drainage or leakage is directly above the mechanical and electrical components and service is awkward as by the door. Visual inspection of the state of the bowl is obscured by the partition itself thereby creating a condition where dirt and debris may accumulate in the mechanical/electrical volume unbeknownst to the operator, particularly where water supplies contain high amounts of entrained material.

Substantial temperature differences between the 2 water volumes necessitating a separate temperature sensor compartment (with its own connections and cover) intermediate the 2 volumes but removed from interaction with the animals using the waterer.

The user of Moore would also be left to uncertainty in respect of the water line. Insulation may be operational under some conditions but exposes the workings to freeze-up failure when the waterer is subjected to cold conditions when coupled with a low-use scenario. Placement of all components and connections in the lower volume exposes the device to corrosion, debris and/or mechanical failure which then presents leaking cold water directly to the insulation.

The user of Moore would also be presented with service issues as components and connections, particularly the flow control, require removal of the assembly from the housing in many circumstances, particularly as the access door provides restrictions in space and illumination and the interior attachments are at the bottom, deep in the water well.

Another example of a complex attempt at a solution is shown in United States Patent 6,722,313 {herein USP'313} issued April 20, 2004 to Wenstrand. This patent presents a highly complex unitary construction with a high cost of initial mold building and individual unit manufacture necessarily resulting in quality control and uniformity issues.

The base cylinder is optional for particular use in areas outside of a stable or barn and requires complex cut outs in each of the 4 corners to provide for mounting the waterer in a vertical corner.

The unitary nature of the device is compromised by 3 separate and complex intrusions. The water well is an ovoid in cross-section in an effort apparently to maximize the exposed water surface, to permit the other intrusions and to keep the animals head away from walls.

The Wenstrand solution is very complex and costly to manufacture and maintenance requires special tools along with removal of the unit from its support.

A still further example is provided by United States Patent 4,440,112 {USP'112} issued Apr. 3, 1984 to Lilyerd. US'112 to Lilyerd discloses another waterer of problematic design with a large water surface exposed to atmosphere. Any drainage or leakage is separated from the mechanical components by the use of a standpipe and service is awkward as the assembly must be lifted clear of its stand pipe for service due to attachment of components from the bottom. As can be seen, this results in a high degree of mechanical complexity even without temperature support thereby increasing overall costs particularly in the requirement for specialized components.

OBJECTS OF THE INVENTION

It is the object of the invention to overcome the deficiencies in the prior art with a multiple surface waterer of unitary construction which is simple, fast and inexpensive to manufacture and install in standard culverts or stand-pipes in exterior field and interior barn situations.

It is a further object to be simple to inspect and maintain and rugged in farm use.

It is another object of the invention to fully secure components and access away from the bottom of the waterer while remaining readily available without removal.

SUMMARY OF THE INVENTION

The invention provides an animal waterer adapted for installation upon an upstanding culvert including a generally horizontal periphery and a generally vertical interior surface. The waterer includes a unitary housing means including spaced apart interior and exterior surfaces. The interior surface forms an interior water receptacle including generally vertical interior side surfaces, connection means on said interior side surfaces for water supply, temperature control and water level control components, and, a receptacle bottom surface. The exterior surface includes generally vertical side surfaces with access door means adjacent said connection means and a bottom surface with a generally horizontal housing support surface adapted to engage the periphery of said upstanding culvert, and, a downwardly extending engagement surface adapted to engage the interior surface of said culvert. There is passage means between said interior and exterior surfaces to accommodate passage of water and electrical supply means between the interior of said culvert and said connection means.

In another aspect of the invention the interior and exterior surfaces are spaced apart so as to provide said passage means with an expanded connection compartment adjacent said connection means and said access door means preferably formed into said interior side surfaces of said receptacle and the passage means is substantially vertical.

In another aspect the animal waterer includes a removable substantially vertical panel adapted to segregate said water receptacle into a drinking area and a component area and cover the components.

In a still further aspect the animal waterer the access door extends through said support and said engagement surfaces.

In yet another aspect the animal waterer a generally vertical passage is provided between the interior and exterior surfaced which extends through the support and engagement surfaces.

DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view in wire frame showing the waterer of the invention as installed upon a cylindrical culvert extending above ground level a distance H.

Figure 2 is a perspective view in wire frame showing the waterer of Figure 1 in an exploded form.

Figure 3 is a plan view of the bottom surface of the waterer of Figure 1.

Figure 4 is a cross-section of the access door of the waterer.

Figure 5 is a cross-section of the waterer of Figure 3 taken along line A-A.

Figure 6 is a perspective view in wire frame of the waterer of Figure 2 viewed from below.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As illustrated in the accompanying drawings in which the various parts are similarly identified, the waterer 1 of the invention is adapted to be supported in use upon a preferably cylindrical culvert 2 shown in dotted outline.

In Figure 1 a culvert 2 extends from below the ground surface 3 to a height H which may be any convenient height for the animals intended to use the waterer. Culvert 2 includes cylindrical outer and inner surfaces 4 and 5 and an upper end 6 which is preferably positioned horizontally to act as a support surface for waterer 1. Upon installation water and electrical supply conduits {not shown} are provided to the waterer from below ground level upwards through culvert 2.

Waterer 1 of the invention is a unitary housing 7 including a plurality of vertical interior and exterior surfaces 8 and 9 respectively joined along their upper edge by curved upper surface 10 which is preferably cylindrical so as not to expose any sharp edges. Housing 7 is preferably formed by molding or by plastic welding to comprise a seamless structure.

The generally vertical interior surfaces 8 are closed by bottom surface 13 so as to form a water receptacle 14 which is preferably segregated into a drinking area 15 and a component area 16 by a removable panel 17. Panel 17 is preferably formed with a close fitting cover 18 which separates operational components from the animals which have occasion to drink from the waterer and provides for ready inspection and cleaning of the waterer receptacle.

Housing exterior surface 9 includes an access door 11 removably secured to exterior surfaces 9 as by screws 12. Access door 11 may be removed along directions 22 for ready access to the internal operative components of the waterer (not shown in Figure 1).

Panel 17 may be retained in position by 2 pairs of ridges 19 formed into the interior surfaces 8 at a suitable location for vertical sliding removal along directions 20.

Preferably panel 17 does not extend the full height of the receptacle 14 and is provided with a series of holes 21 to assist with thermal circulation of water between drinking area 15 and component area 16.

In Figure 2 the waterer of Figure 1 is shown in an exploded wire frame perspective view.

Panel 17 has been removed from the waterer 1 by vertical sliding along ridges 19 in directions 20 thereby exposing component area 16 and a portion of the enlarged component compartment 23 formed into interior surfaces 8 as by horizontal interior surface 24 and vertical surfaces 25 and 26.

Access door 11 has been removed along directions 22 thereby exposing the balance of compartment 23.

Preferably the vertical exterior surfaces 9 of housing 7 are substantially spaced from interior surfaces 8 adjacent access door 11 to provide a portion of component compartment 23 between the access door 11 and the interior surfaces 24, 25 and 26.

As can be seen in Figure 2, a water level regulator 27, preferably a float and water supply valve, and a temperature regulator 28, preferably a thermostat/heater combination with a unitary and watertight base, are readily accessible in component compartment 23 behind access door 11 which completely encloses compartment 23.

Figure 3 presents a bottom view of the waterer 1 of the preferred embodiment shown in Figures 1 and 2. Access door 11 has been removed along directions 22 and is shown in cross-section in Figure 4. Figure 5 presents a cross-section of the waterer 1 of Figure 3 taken along line A-A with upper surfaces 10 shown without the preferable cylindrical shaping.

Vertical surfaces 25 and 26 provide for a portion of compartment 23. In Figure 3 horizontal surface 24 is shown hatched and is extends towards exterior vertical surface 9 so as to leave a recess 30 for access door 11

Also shown hatched in Figure 3 and in dotted outline is bottom surface 13 of receptacle 14.

Preferably bottom surface 13 is sloped as at 31 in Figure 50 and is provided with a drain 32 fitted with a removable plug {not shown}.

Preferably the exterior of housing 7 is completed with a generally horizontal lower support surface 33 which includes opening 35 to accommodate drain 32 and is adapted to support the waterer 1 on culvert 4 at its upper end 6. Support surface 33 includes retaining ring 36 adapted to fit closely with culvert interior surface 5 and retain waterer 1 in position.

As can be seen in Figure 3 cut-out 37 in support surface 33 provides a passage between compartment 23 and the interior of culvert 4 for water and electrical supply conduits {not shown}.

Figure 6 presents a further exploded perspective view in wire frame taken from below the waterer 1.

Access door 11 has been removed and displaced along lines 22a exposing the whole of compartment 23.

Preferably access door 11 has a depending extension 40 including horizontal surface 38 and ring portion 39 to fully close the waterer once door 11 is in place and sits in recess 30.

Compartment 23 is provided by horizontal surface 24 and vertical surfaces 25 and 26 formed into interior surface 8.

Vertical surface 26 includes attachment holes 41, 42 and 43 each adapted to receive a component of the waterer. Holes 41, 42 and 43 are preferably supported by a fitment as at 44 so as to readily attach components to the interior surface 8 and into component area 16. Alternatively, the components may be secured onto interior surface 8 by nuts associated with a single assembly in the compartment 23.

Level control component 27, which is preferably a combination float and interconnected water supply valve, is presented into compartment 23 along direction 27a and through hole 41 into component area 16.

Temperature control component 28, which is preferably a combination of temperature sensor, electrical switch and heating element, is presented into compartment 23 along direction 28a and through both fitment 44 and hole 43 also into component area 16. Alternately, a temperature sensor and electrical switch may be presented into hole 42 in a similar manner or hole 42 may be closed.

Preferably temperature component 28 is below level component 27 so as to facilitate thermal circulation within receptacle 14 by holes 22 between component area 16 and drinking area 17.

Exterior surface cut-out 37 extends inwards through depending ring 36 from its periphery as at 45a beyond its inner surface 45 as at 45a so as to provide a passage 46 between compartment 23 and the interior of culvert 2 for water and electrical supply connections. As may be seen the preferred form of access door 11 shown in Figure 6 fully closes compartment 23 from the elements and from external forces and the completed depending ring 36 is securely retained on top of culvert 2.

Most preferably cut-out 37 is vertically aligned with compartment 23 and holes 41, 42 and 43 so as to provide aligned connectivity with water and electrical supply conduits (not shown) installed within culvert 2.

Other embodiments will be apparent to those skilled in the art as various changes and modifications may be made without departing from the spirit of the invention.

CLAIMS:

WHAT IS CLAIM IS:

1) An animal waterer adapted for installation upon an upstanding culvert, said culvert including a generally horizontal periphery and a generally vertical interior surface, said waterer comprising:

a) Unitary housing means including spaced apart interior and exterior surfaces;

b) Said interior surface forming an interior water receptacle including:

i) generally vertical interior side surfaces,

ii) connection means on said interior side surfaces for water supply, temperature control and water level control components, and,

iii) a receptacle bottom surface;

c) Said exterior surface including:

i) generally vertical side surfaces including access door means adjacent said connection means;

ii) a bottom surface comprising:

(1) A generally horizontal housing support surface adapted to engage the periphery of said upstanding culvert, and,

(2) a downwardly extending engagement surface adapted to engage the interior surface of said culvert;

d) passage means between said interior and exterior surfaces to accommodate passage of water and electrical supply means between the interior of said culvert and said connection means.

2) An animal waterer as claimed in claim 1 wherein the said interior and exterior surfaces are spaced apart so as to provide said passage means with an expanded connection compartment adjacent said connection means and said access door means.

3) An animal waterer as claimed in claim 2 wherein said connection compartment is formed into said interior side surfaces of said receptacle.

4) An animal waterer as claimed in claim 3 wherein said passage means is substantially vertical.

5) An animal waterer as claimed in claim 4 wherein said waterer further comprises a removable substantially vertical panel adapted to segregate said water receptacle into a drinking area and a component area.

6) An animal waterer as claimed in claim 5 wherein said panel includes a cover for said component area.

7) An animal waterer as claimed in claim 6 wherein said cover is generally horizontal.

8) An animal waterer as claimed in claims 6 or 7 wherein said waterer further comprises a water level regulation component in said component area adapted to supply water to said receptacle and maintain a predetermined level therein.

9) An animal waterer as claimed in claim 8 wherein said regulation component comprises a float operatively coupled with a water supply valve.

10) An animal waterer as claimed in claim 9 water temperature maintenance component in said component area.

11) An animal waterer as claimed in claim 10 wherein said maintenance component comprises a thermostat and an electrical heater.

12) An animal waterer as claimed in claim 11 wherein said components are attached to said interior vertical surface at said connection means and extend into said connection compartment.

13) An animal waterer as claimed in claim 12 wherein said access door means extends through said support and said engagement surfaces.

14) An animal waterer as claimed in claim 13 wherein said components are operatively attached to water supply and electrical supply sources respectively in said component compartment.

15) An animal waterer as claimed in claim 14 wherein said supply sources extend through said passage means between said interior and exterior surfaces and into said culvert.

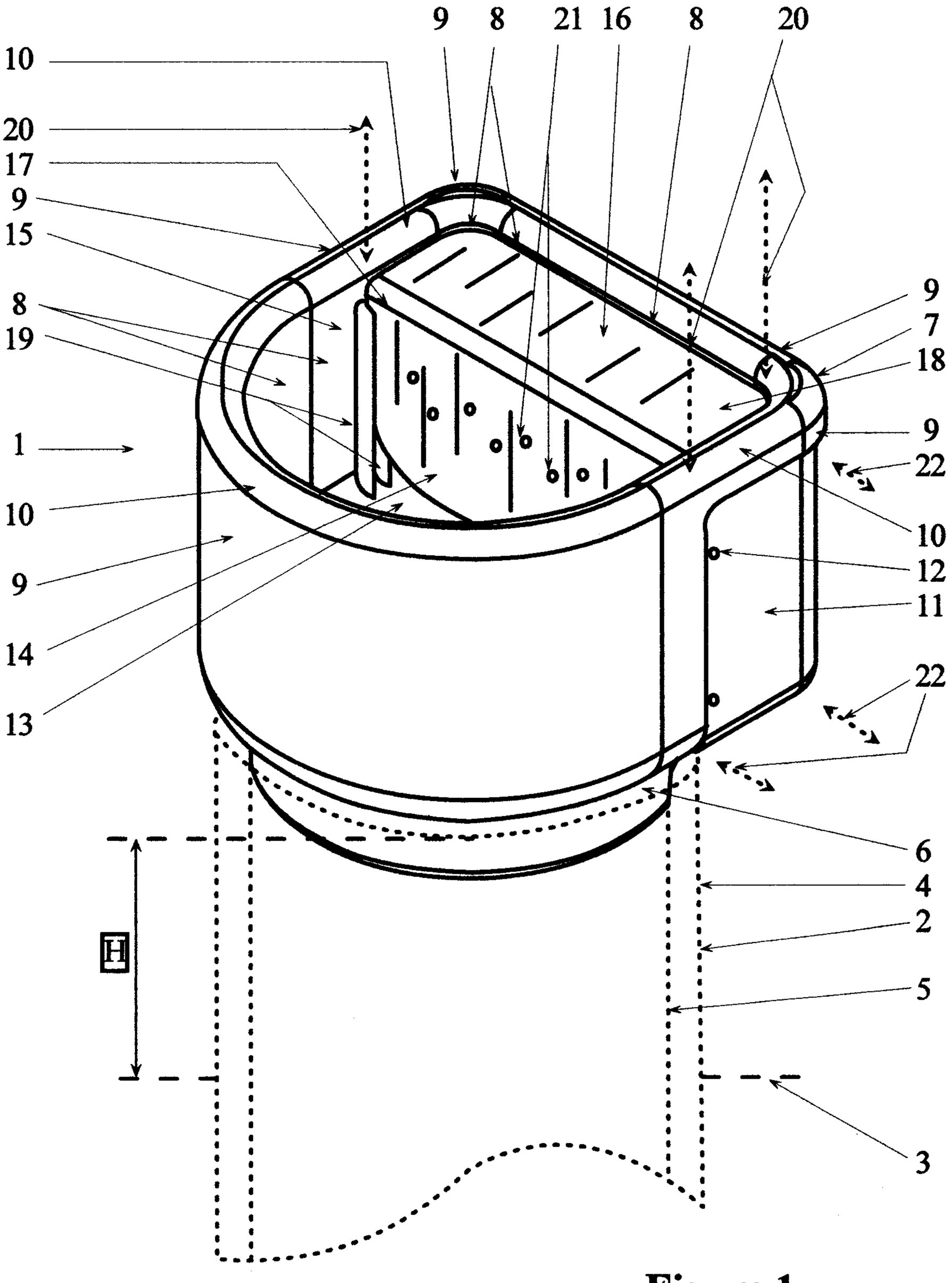

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H
3

Figure 1

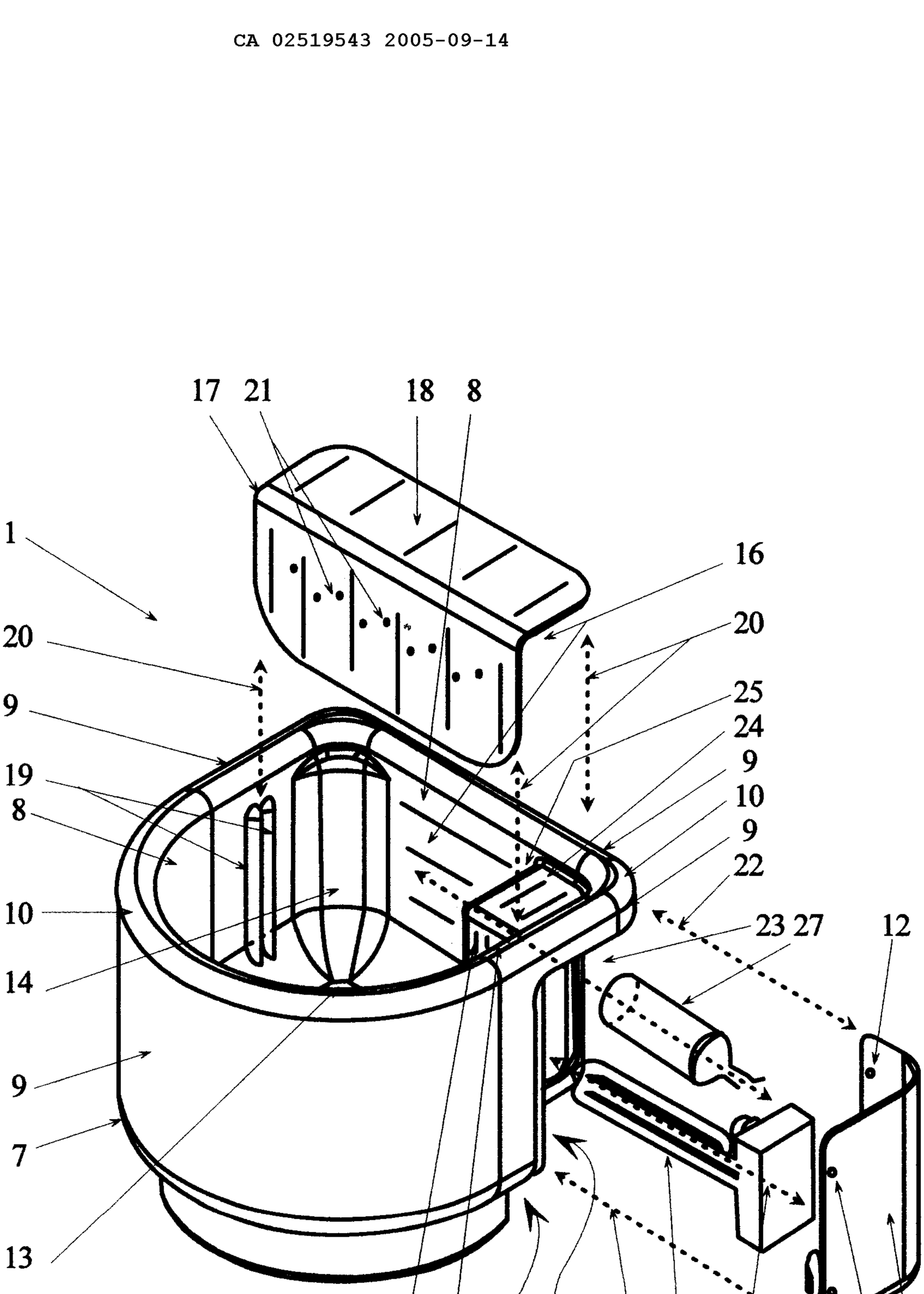

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Figure 2

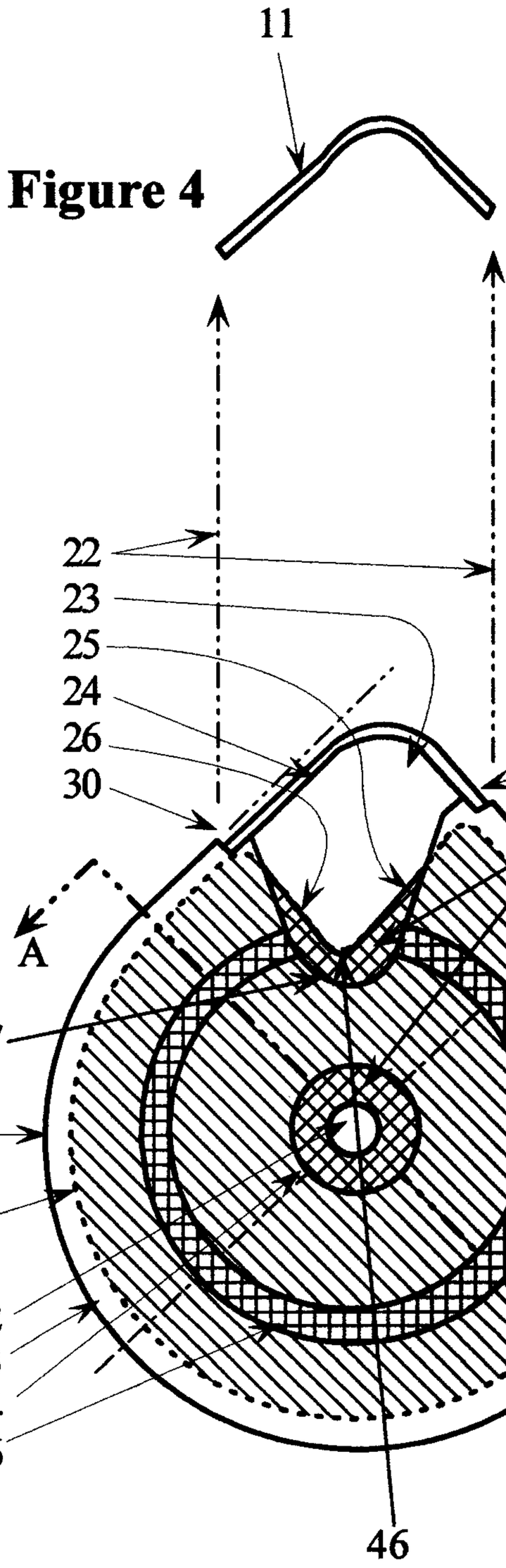


Figure 4

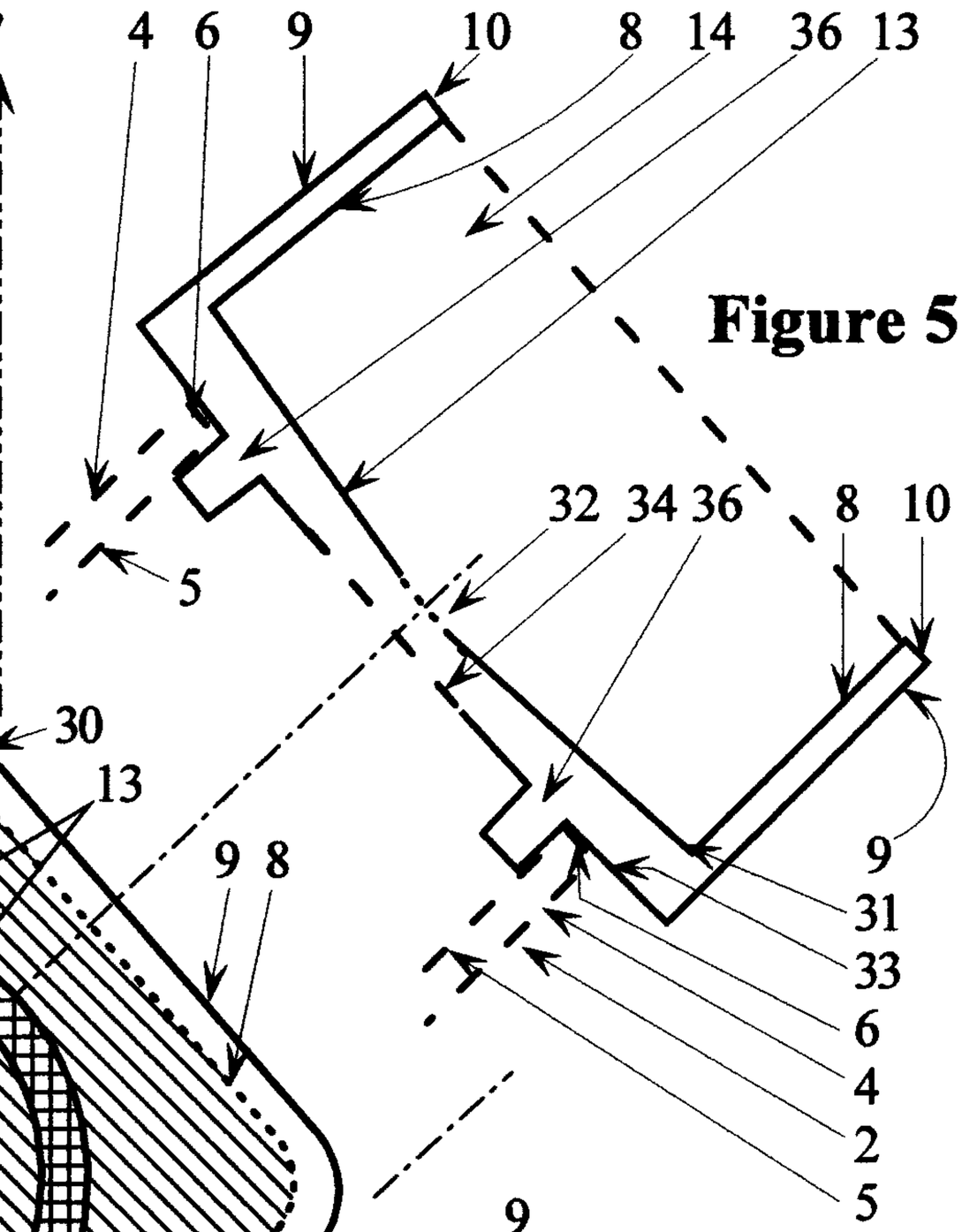
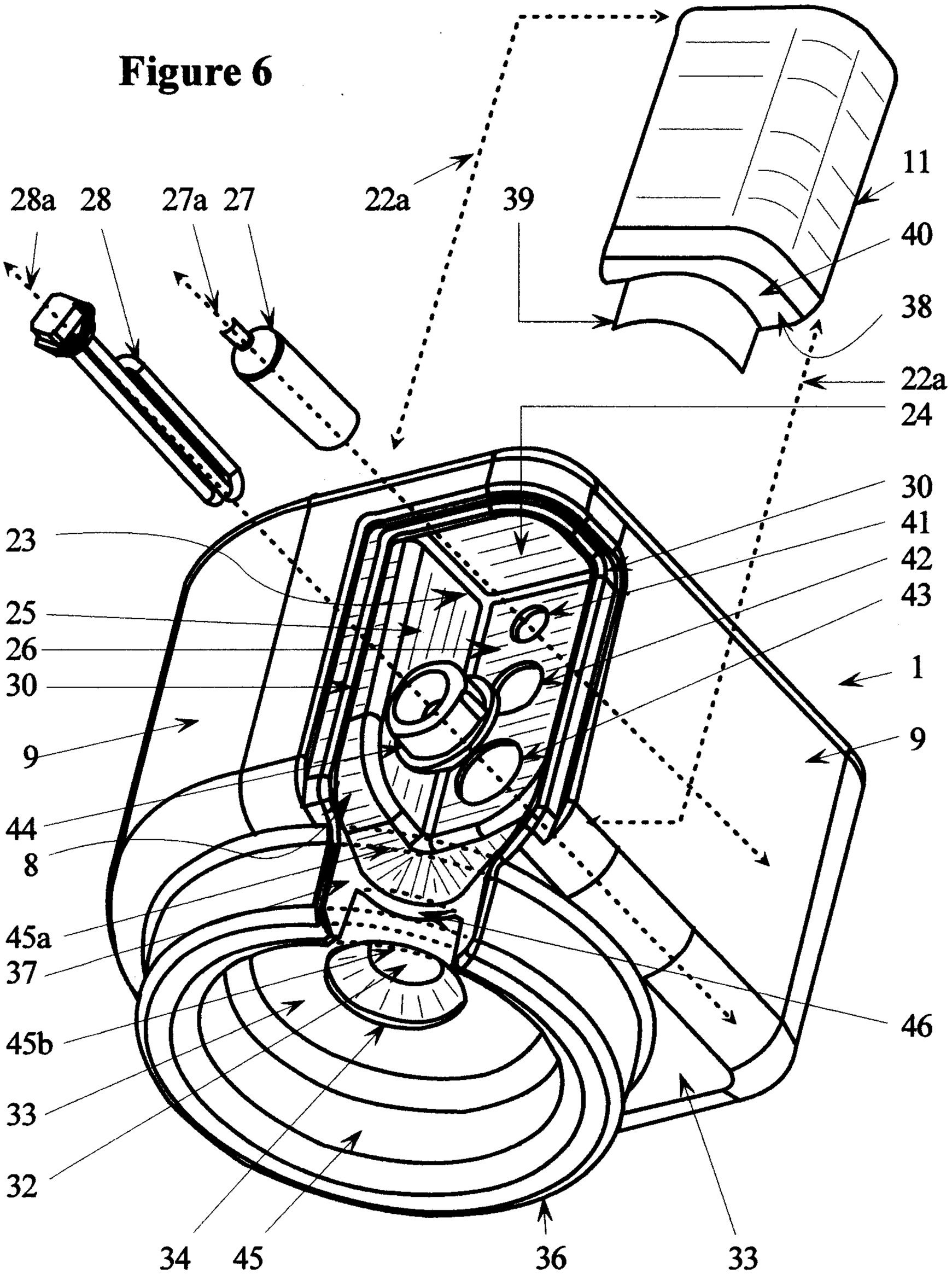
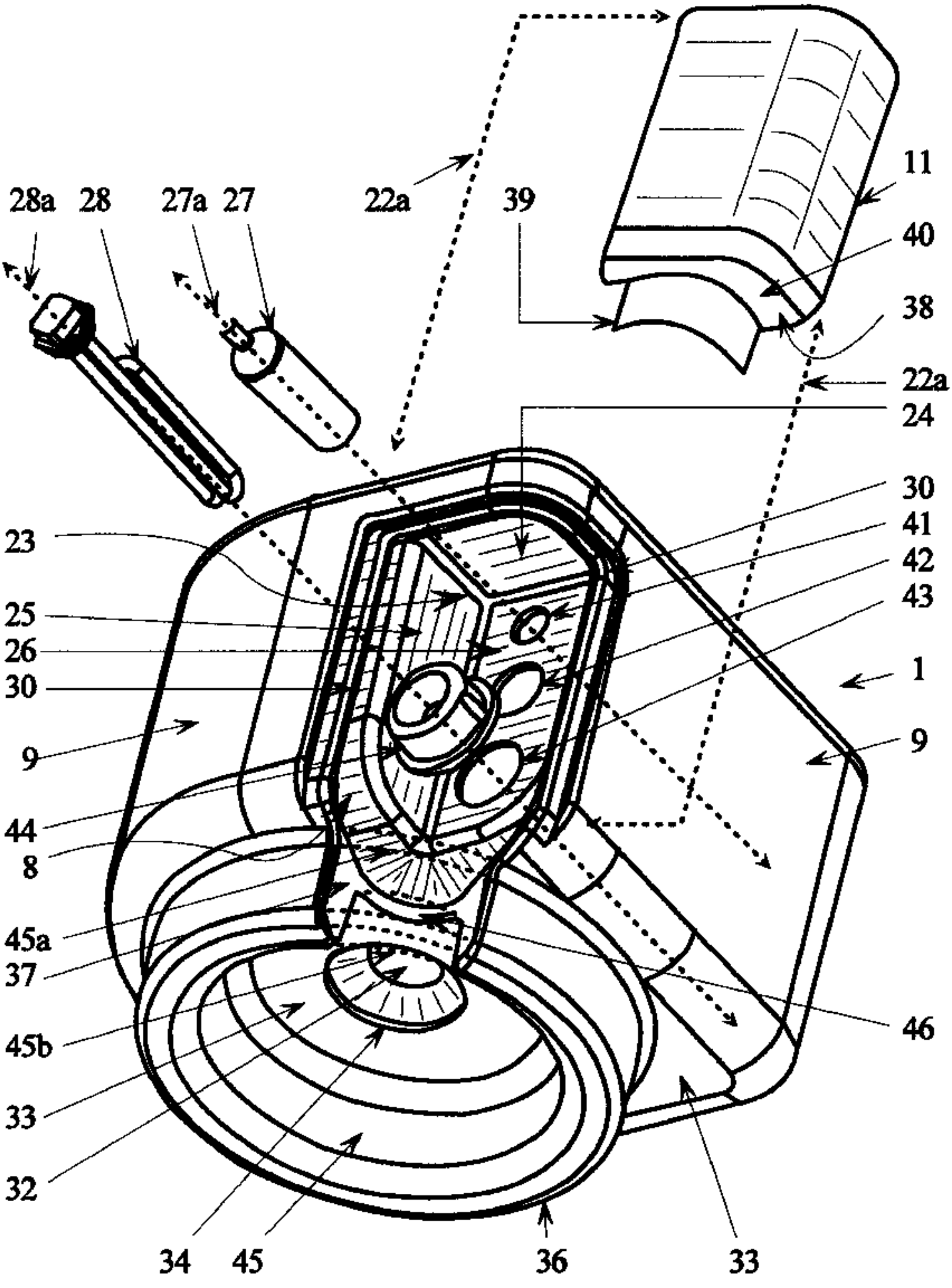


Figure 5

Figure 3

Figure 6


28a
28
27a
27
22a
39
11
40
38
22a
24
30
41
42
43
1
9
23
25
26
30
9
44
8
45a
37
45b
33
32
46
34
45
36
33


28a
28
27a
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22a
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11
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38
22a
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