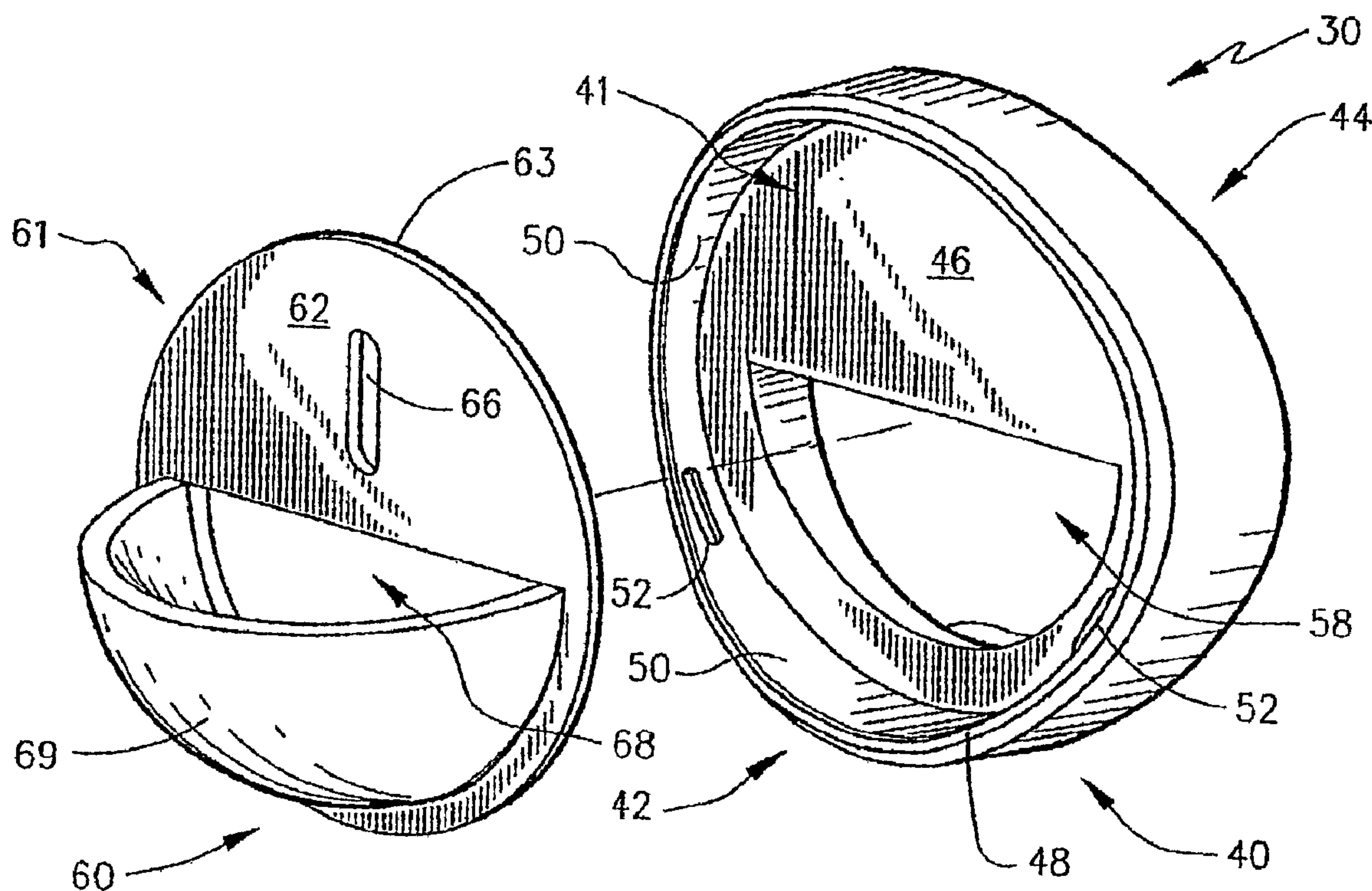




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 (54) Title: BIRDFEEDER AND SEED DISPENSER THEREFOR



(57) Abrégé/Abstract:

A birdseed dispenser and birdfeeder incorporating the same are provided. The dispenser has a base piece mounted to an opening in the sidewall of the birdseed reservoir and an apertured piece disposed therein. The apertured piece includes a first seed aperture having a first configuration and a second seed aperture of a second and different configuration. The apertured piece is moveable relative to the base between a first orientation, which places the first seed aperture in a seed accessible state permitting birds access to the seed, and a second orientation to place the second seed aperture in the seed accessible state. The apertured piece may be a dial that is rotatable relative to the base and able to dispense both thistle and mixed birdseed via the first and second apertures respectively. The invention is also directed to a method of feeding bird feeder having such a dispenser.



ABSTRACT

A birdseed dispenser and birdfeeder incorporating the same are provided. The dispenser has a base piece mounted to an opening in the sidewall of the birdseed reservoir and an apertured piece disposed therein. The apertured piece includes a first seed aperture having a first configuration and a second seed aperture of a second and different configuration. The apertured piece is moveable relative to the base between a first orientation, which places the first seed aperture in a seed accessible state permitting birds access to the seed, and a second orientation to place the second seed aperture in the seed accessible state. The apertured piece may be a dial that is rotatable relative to the base and able to dispense both thistle and mixed birdseed via the first and second apertures respectively. The invention is also directed to a method of feeding bird feeder having such a dispenser.

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BIRDFEEDER AND SEED DISPENSER THEREFOR

FIELD OF THE INVENTION

The present invention generally relates to bird feeders for attracting and feeding
5 wild birds. More particularly, the present invention concerns a device that enables a
bird feeder to dispense different types of birdseed, thereby to attract different species
of wild birds. Specifically, the present invention is directed to a rotatable seed
dispenser having multiple ports for dispensing seeds of different sizes. This invention
also concerns a method of providing a seed dispenser, with alternative seed ports, and
10 selectively placing a desired seed port in the seed accessible state, thereby to permit
feeding birds access to the birdseed.

BACKGROUND OF THE INVENTION

Bird watching is a highly prevalent pastime in both urban and rural areas. The
15 world is full of birds of numerous varieties in an astounding array of colors and
designs. Many people enjoy viewing birds of various types, and an industry has
evolved around products directed to improving the ability of persons to closely observe
birds in their natural environment. On one hand, many people venture into the
outdoors, where binoculars and spotting scopes may be utilized to better view various
20 birds in their natural habitats. Such an approach requires a certain degree of skill,
however, in finding and spotting various species of birds. Another approach utilizes
various means of attracting birds to one's residence or a desired viewing location, such
as adjacent a home's porch or window, where birds may be viewed at one's leisure.

For example, persons have used bird feeders, birdbaths, and the like to attract
25 birds of various types to their homes. Different types of feeders have been developed,
which each dispense foodstuffs that are preferred by a selected variety of bird which
a person might desire to view. For example, seeds, grains, suets, and nectars are
common foodstuffs that can be dispensed by a selected type of feeder.

Seed dispensing bird feeders are perhaps the easiest and most popular way
30 of attracting a myriad of wild birds to a particular location for viewing. This is especially
so in the winter months when food is scarce. Typically, seed feeders are suspended

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from a pole or hung from a tree branch so as to elevate the feeder above the ground and are built to hold and protect the seed from the elements.

There are a variety of seed feeders that have been constructed to attract various species of wild birds. In general, such feeders fall into three categories: tray feeders, hopper feeders, and tube feeders. Tray feeders are rather simplistic in design and generally comprise a tray or platform on which birdseed is spread. Hopper feeders further include a feed reservoir, which is oftentimes shaped like a house. The seed is dispensed beneath the reservoir onto a tray or platform that is accessible by the birds. Tube feeders, on the other hand, are hollow, cylindrical tubes, often made of plastic, and have multiple feeding stations spaced along the length of the tube. Typically, feeding stations include both a seed port and an adjacent perch to provide the feeding bird with a place to alight.

Tube feeders are a very popular bird feeder construction due, in part, to their ability to keep the seed fairly dry and attract various bird species. Particularly, though, the size of the seed ports largely dictate the type of birdseed that may be used to fill the tube feeder and, thus, the types of bird species that will be attracted to the feeder. For example, if the seed ports are relatively large, the feeder can be filled with mixed birdseed or sunflower seeds, which will generally attract larger birds, such as blue jays, cardinals, and grackles. Smaller seed ports, on the other hand, dispense thistle seed, which is a different type of birdseed and is attractive to finches. Accordingly, some tube feeders are specially constructed as thistle feeders with extra small ports for dispensing thistle seeds.

Oftentimes, people prefer to attract several different species of birds to a desired viewing location. Accordingly, it is not uncommon for people to own a variety of bird feeders for dispensing different types of birdseed. To accommodate this desire, there are a variety of tube feeders available, which vary in size, appearance, and of course, seed port size.

However, for many, space may be limited for hanging bird feeders, especially for individuals living in apartments with very limited balcony space. For others, time and money may simply limit one's ability to acquire and maintain several different bird feeders. As a result, many are perhaps limited to owning only one type of bird feeder

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that is only capable of dispensing one type of birdseed. Accordingly, there remains a need to provide seed dispensers that are capable of dispensing different types of seed. Further, there is a need to provide new and improved bird feeders that are capable of dispensing different types of birdseed. The present invention is directed to
5 meeting these needs.

SUMMARY OF THE INVENTION

The present invention provides a new and useful bird feeder for attracting different species of wild birds.

10 The present invention also provides a selectively versatile bird feeder that is capable of dispensing different types of birdseed.

The present invention also provides an improved bird feeder that is capable of dispensing thistle birdseed, mixed birdseed, or sunflower seeds.

15 The present invention also provides a tube feeder with multiple feeding stations, which incorporate rotatable seed dispensers.

The present invention also provides a seed dispenser with multiple seed ports.

The present invention also provides a seed dispenser that is capable of dispensing at least two different types of birdseed.

20 The present invention further provides a method for selectively placing a desired seed port in fluid communication with the birdseed in the bird feeder.

According to an aspect of the present invention, there is provided a birdfeeder adapted to dispense birdseed to birds comprising a housing with a top, a bottom, and a sidewall having an outer surface and an inner surface defining a seed reservoir, the sidewall having at least one opening into the seed reservoir; a seed dispenser having
25 a base piece and a moveable piece, the base piece fitted in the sidewall opening and having an access opening formed therethrough passing from the reservoir outer surface to the reservoir inner surface and in fluid communication with the seed reservoir, the moveable piece supported by the base piece at a location adjacent the base piece access opening and having a seed aperture formed therethrough which is
30 smaller than the base piece access opening, the moveable piece being moveable relative to the base piece in a plane that is substantially parallel with a plane of the

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base piece between a first orientation in which at least a portion of the base piece access opening is unobstructed to provide birds with access to birdseed in the seed reservoir while the movable piece seed aperture is blocked, and a second orientation in which the movable piece seed aperture is in fluid communication with the base piece access opening to provide birds with access to birdseed in the reservoir through the movable piece seed aperture.

According to another aspect of the present invention, there is provided a birdfeeder adapted to provide birdseed to birds, comprising a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, the sidewall having an outer surface and an inner surface and an opening formed therethrough, the sidewall being generally vertical in use and the opening having an axis that is generally perpendicular to the sidewall; a seed dispenser fitted within the sidewall opening to dispense the birdseed to the birds, the seed dispenser having a base piece and a movable piece cooperating therewith both oriented to be generally parallel with the sidewall, the base piece having an access opening in fluid communication with the seed reservoir, the movable piece including a seed aperture that is smaller than the base piece access opening, the movable piece being moveable relative to the base piece in a plane substantially parallel therewith such that the movable piece always remains substantially parallel with the base piece, the movable piece being moveable between a first orientation in which the movable piece seed aperture is blocked and the base piece access opening is totally or mostly unobstructed to provide birds with access to seed in the reservoir, and a second orientation in which the movable piece seed aperture is in fluid communication with the base piece access opening to provide birds with access to birdseed in the reservoir through the movable piece seed aperture.

According to another aspect of the present invention, there is provided a birdfeeder adapted to provide birdseed to birds, comprising a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, the sidewall having an outer surface and an inner surface and an opening formed therethrough; a seed dispenser having an access opening formed therethrough passing from the reservoir outer surface to the reservoir inner surface and fitted into the sidewall opening, the dispenser including first and second pieces cooperating with one another through

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movement of at least one of the first and second pieces relative to the other to present, in a first orientation, a first seed aperture of a first size in a seed accessible state, and in a second orientation, to bring a second seed aperture of a second size that is smaller than the first size into a seed accessible state; the movement of at least
5 one of the first and second pieces relative to the other piece being in a plane that is substantially parallel with a plane of the other piece and with a plane of the sidewall; and a perch projecting outwardly from the sidewall and positioned below the seed dispenser to support a bird feeding from the seed dispenser.

According to another aspect of the present invention, there is provided a
10 birdfeeder adapted to dispense birdseed to birds comprising a housing with a top, a bottom, and a sidewall having an outer surface and an inner surface defining a seed reservoir, the sidewall having at least one opening into the seed reservoir; a seed dispenser associated with the sidewall opening and having a movable piece with at least one seed aperture formed therethrough, the movable piece being moveable in
15 a plane that is substantially parallel with a plane of the sidewall between a first orientation in which at least a portion of the sidewall opening is unobstructed to provide birds with access to birdseed in the seed reservoir while the movable piece seed aperture is blocked, and a second orientation in which the movable piece seed aperture is in fluid communication with the sidewall opening to provide birds with
20 access to birdseed in the reservoir through the at least one seed aperture of the movable piece.

According to another aspect of the present invention, there is provided a birdfeeder adapted to provide birdseed to birds, comprising a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, the sidewall having an outer
25 surface and an inner surface and an opening formed therethrough, the opening in fluid communication with the seed reservoir, the sidewall being generally vertical in use and the opening having an axis that is generally perpendicular to the sidewall; a seed dispenser associated with the sidewall opening to dispense birdseed to birds, the seed dispenser having a movable piece oriented to be generally parallel with the sidewall
30 and including a seed aperture that is smaller than the sidewall opening, the movable piece being moveable relative to the sidewall in a plane substantially parallel therewith

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such that the movable piece always remains substantially parallel with the sidewall, the movable piece being movable between a first orientation in which the movable piece seed aperture is blocked and the sidewall opening is totally or mostly unobstructed to provide birds with access to seed in the reservoir, and a second orientation in which
5 the movable piece seed aperture is in fluid communication with the sidewall opening to provide birds with access to birdseed in the reservoir through the movable piece seed aperture.

According to another aspect of the present invention, there is provided a birdfeeder adapted to provide birdseed to birds, comprising a birdseed reservoir with
10 a surrounding sidewall for receiving birdseed therein, the sidewall having an outer surface and an inner surface and an opening formed therethrough in fluid communication with an interior of the reservoir; a seed dispenser associated with the sidewall opening, the seed dispenser including a captivated movable piece configured to reduce an effective size of the sidewall opening that is accessible for birds to access
15 seed in the reservoir, the movable piece being movable between a first orientation in which the effective size of the sidewall opening serving as a first seed aperture is a first size and is in a seed accessible state, and a second orientation in which the effective size of the sidewall opening is smaller than the first size and is in a seed accessible state; and the movement of the movable piece being in a plane that is
20 substantially parallel with a plane of the sidewall.

According to the present invention, then, a dispenser is provided that is adapted to access and dispense birdseed from a birdfeeder that has a reservoir with a sidewall. The sidewall includes an opening in the form of a mounting hole to which the dispenser is attached or otherwise mounted. The opening has a central axis that is
25 generally perpendicular to the sidewall.

The dispenser may include a base piece, an aperture piece, and may further include a retaining piece. The base piece is mounted to an opening in the sidewall of the reservoir and may further be at least partly disposed in the birdseed reservoir when mounted therein. Preferably, the base piece has a wall that includes a seed outlet
30 formed therethrough in fluid communication with the opening in the sidewall. The base piece may include a plurality of prongs and a registration finger for mounting in the

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opening of the sidewall. Alternatively, the base piece may include cooperating fasteners that releasably secure it to the sidewall of the reservoir.

As contemplated, the apertured piece may be disposed in the base piece. As such, the base piece may include a plurality of spaced apart retaining tabs that can
5 retain the apertured piece and permit movement thereof relative to the base piece. The aperture piece includes a first seed aperture of a first configuration and second seed aperture of a second configuration that is different from the first. The first configuration is adapted to dispense thistle birdseed from the reservoir while the second configuration is adapted to dispense mixed birdseed from the reservoir. It is
10 moveable relative to the base piece between a first orientation and a second orientation. In the first orientation the first seed aperture is oriented in a seed accessible state so as to provide access to the birdseed. Meanwhile, the second orientation places the second seed aperture in a seed accessible state. When in the first orientation, the first seed aperture is in fluid communication with the seed outlet,
15 while access to the birdseed via the second seed aperture is obstructed by the wall. In a second orientation, the seed outlet is in fluid communication with the second seed aperture while access to the birdseed via the first seed aperture is obstructed by the wall.

As contemplated by the present invention, the apertured piece may be in the
20 form of an apertured dial that is journaled for rotation on the central axis of the opening in the sidewall of the reservoir. The apertured dial may be rotated relative to the sidewall, or the base piece.

As mentioned above, the dispenser according to the present invention may also include a retaining piece. The retaining piece may be releasably securable to the base
25 piece whereby the apertured piece is located therebetween. The retaining piece may be further be provided with a plurality of spaced apart resilient retaining tabs that are adapted to retain the apertured piece and permit movement thereof relative to the base piece. Generally, the base piece, the apertured piece, and if included, the retaining piece, may each be formed of materials selected from a group consisting of
30 plastic, wood, metal, and a combination thereof.

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The present invention also provides for a birdfeeder that is adapted to be suspended from a support structure against the force of gravity and to provide birdseed to birds that comprises the hanger member to engage the support structure of a birdseed reservoir with a surrounding sidewall, a seed dispenser mounted in the opening of the sidewall and adapted to dispense birdseed to the birds. The birdseed reservoir may have a configuration selected from the group consisting of tubular, rectangular, and frustoconical. Further, the birdfeeder may be provided with a plurality of openings that are formed in the sidewall such that a plurality of seed dispensers are mounted thereto.

10 The present invention also contemplates an improvement to a birdfeeder that provides birdseed to birds. The improvement generally comprises a dispenser having a moveable apertured piece coupled to the opening of the sidewall. The apertured piece includes a plurality of seed apertures of different configurations.

The present invention also provides a method for feeding birds utilizing a birdfeeder having a birdseed reservoir with a surrounding sidewall. The method comprises the steps of providing the birdfeeder with a seed dispenser that has a plurality of seed apertures associated therewith. The method also includes the step of adding a selected type of birdseed to the birdseed reservoir and then moving one of the seed apertures into a seed accepted state whereby the selected seed aperture is in fluid communication with the opening in the sidewall. The method may further include the steps of providing the seed dispenser with a dial piece and then rotating the dial piece to move a selected one of the seed apertures into the seed accessible state.

25 The present invention will become more readily appreciated and understood from a consideration of the following detailed description of the exemplary embodiments of the present invention when taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

30 Figure 1 is a front perspective view of a new and useful bird feeder according to the present invention, which incorporates a plurality of new and useful seed dispensers, also according to the present invention according to the present invention;

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Figure 1 is a front perspective view of a new and useful bird feeder according to the present invention, which incorporates a plurality of new and useful seed dispensers, also according to the present invention;

Figure 2 is an exploded perspective view of a representative one of the seed
5 dispensers shown in Figure 1 ;

Figure 3 is a front view in elevation of the base piece of the seed dispenser shown in Figure 2;

Figure 4 is a rear view in elevation of the base piece of Figure 3;

Figure 5 is a top view in elevation of the base piece of Figure 3;

10 Figure 6 is a right side view in elevation of the base piece of Figure 3;

Figure 7 is a front view in elevation of the apertured dial of the seed dispenser shown in Figure 2;

Figure 8 is a top view in elevation of the apertured dial;

15 Figure 9 is a cross-sectional view of the apertured dial shown in Figure 7 taken about lines 9-9:

Figure 10(a) is a cross-sectional view of a representative seed dispenser shown in Figure 1 taken about lines 10(a)-10(a) with the second seed aperture in the seed access state;

20 Figure 10(b) is a cross-sectional view of the seed dispenser shown in Figure 1 taken about lines 10(a)-10(a) with the first seed aperture in the seed access state;

Figure 11 is a perspective view of an alternative bird feeder according to the present invention, which incorporates a plurality of seed dispensers according to a second exemplary embodiment of the present invention;

25 Figure 12 is a front perspective view, in elevation, of a bird feeder shown in Figure 11 ;

Figure 13 is an exploded perspective view of one of the seed dispensers shown in Figures 11 and 12;

Figure 14 is a rear perspective view of the base piece of the seed dispenser shown in Figures 11 and 12;

30 Figure 15 is an exploded left side view, in elevation, of the seed dispenser shown in Figures 11 and 12;

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Figure 17 is a front view in elevation of the retaining ring shown in Figures 11 and 12;

Figure 18(a) is a cross-sectional view of a representative seed dispenser shown in Figure 12 taken about lines 18(a)-18(a) showing the second seed aperture in the
5 seed access state;

Figure 18(b) is a cross-sectional view of the seed dispenser shown in Figure 12 taken about lines 18(a)-18(a) showing the first seed aperture in the seed access state;

Figure 19 is a rear view in elevation of an alternative retaining ring;

Figure 20 is a right side view in elevation of the alternative retaining ring shown
10 in Figure 19;

Figure 21 is a cross-sectional view of the seed dispenser shown in Figures 11 and 12 in use with the alternative retaining ring shown in Figures 19 and 20;

Figure 22 is a front view in elevation of another bird feeder according to the present invention, which incorporates a plurality of seed dispensers according to a
15 third exemplary embodiment of the present invention;

Figure 23 is a partial exploded view of the bird feeder shown in Figure 22 with a representative one of the seed dispensers removed from its mounting hole;

Figure 24 is an exploded perspective view of a representative one of the seed dispensers shown in Figures 22 and 23

20 Figure 25 is a rear view in elevation of the base piece shown in Figure 24;

Figure 26 is a front view in elevation of the base piece shown in Figure 24; and

Figure 27 is a side view in elevation of the seed dispenser shown in Figure
24.

25 DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to seed dispensing bird feeders for attracting wild birds. In particular, the present invention relates to a seed dispenser that may be used in conjunction with a bird feeder so as to increase its versatility. More particularly, as contemplated, the seed dispenser of the present invention provides alternative seed
30 apertures, each capable of dispensing different types of birdseed so as to attract a variety of species of birds.

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Broadly, the seed dispenser of the present invention includes an apertured piece with multiple seed apertures of different configurations. The apertured piece may be coupled to the sidewall of the birdfeeder with a base piece so as to be moveable relative thereto. The base piece may be removably mounted to the sidewall of a bird feeder such that it is partly disposed in the silo, and the apertured piece preferably includes a first seed aperture of a first configuration and a second seed aperture of a second configuration that is different from that of the first configuration.

The apertured piece may be in the form of an apertured dial that is rotatably disposed in the base piece. The apertured dial is moveable between a first orientation wherein a first seed aperture is oriented in a seed accessible state so as to provide access to the bird seed and a second orientation wherein a second seed aperture is in the seed accessible state. When the desired seed aperture is in the seed accessible state, the feeding bird may access the seed therethrough while the other aperture(s) on the piece are obstructed or blocked such that the birds are unable to access the seed therethrough. The seed dispenser of the present invention may alternatively include a retaining piece used to secure the dispenser to the feeder and to secure the dial thereon.

To better understand the construction of the seed dispenser of the present invention, and its ability to enhance the versatility of bird feeders, reference is first made to Figure 1, which shows a bird feeder in the form of a tube feeder 10 in use with seed dispensers 30 and 31 according to the present invention. Generally, a tube feeder 10 has birdseed reservoir 12, lid 14, hanger member 16, and feeding stations 20. As shown, birdseed reservoir 12 has a cylindrical sidewall 11 and an interior and may be constructed from a clear plastic material, but may also be constructed of any suitable material as known in the art, such as metal, glass, and the like. Lid 14 further includes a hanger member 16, which is in the form of a chain that may be used to suspend the feeder from any appropriate support structure, such as a post, tree branch, porch ceiling, or other desired location for observing birds. Hanger member 16 may be of any suitable construction that enables tube feeder 10 to be elevated above the ground.

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Feeding stations 20 include perches 18 located adjacent to a respective seed dispenser 30 and 31. Since seed dispensers 30 and 31 are identical in construction, seed dispenser 30 will be used as a representative sample to discuss the construction of the seed dispensers in more detail. Seed dispenser 30 may be removably disposed
5 in designated locations along the length of the sidewall 11 of birdseed reservoir 12. More particularly, seed dispenser 30 is adapted to nest within holes cut out of the sidewall 11 of the birdseed reservoir. For example, the opening in sidewall 11, shown here as mounting hole 80 in Figure 1, is cut directly out of the sidewall 11 of birdseed reservoir 12. As shown, mounting hole 80 further includes registration notch 82, which
10 will be described below in further detail. Seed dispenser 30 may be either removably disposed in hole 80 or, alternatively, permanently fixed therein.

Although not shown, it may be desirable to reinforce the bird feeder silo in an area proximate to the seed dispensing device 30 with metal such as copper, stainless steel, and the like. Metal reinforcement of the area surrounding seed dispensing
15 device 30 assists in preventing squirrels from chewing the sidewall 11 of birdseed reservoir 12 in and around the feeding stations and gaining access to the seed.

Before describing the nested relationship between seed dispenser 30 and mounting hole 80 in further detail, it is perhaps first helpful to better understand the construction of the seed dispenser itself. Accordingly, with reference now to Figure 2,
20 seed dispenser 30 generally includes base piece 40 and an aperture piece, which is shown here to be in the form of apertured dial 60. Apertured piece is coupled to sidewall 11 by base piece 40. Both the base piece 40 and the apertured dial 60 may be made of plastic, wood, metal, a combination thereof or any other material suitable for the construction of a bird feeder.

25 Base piece 40 is shown in Figures 2 to 6. As shown, base piece 40 is unitary in construction and has a front portion 42 and back portion 44, which are separated from one another by a partitioning wall 46. Front portion 42 includes sidewall 50, which extends outwardly from partitioning wall 46 to terminate in rim 48. Retaining tabs 52 are disposed on the interior surface of sidewall 50 in spaced relation to one another.
30 While two retaining tabs 52 are shown, it should be appreciated that any number of retaining tabs may be disposed circumferentially about sidewall 50. Preferably, though,

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the number and placement of retaining tabs 52 is able to accomplish an engagement between base piece 40 and apertured dial 60 sufficient to retain apertured dial therein while allowing rotation of apertured dial 60 relative to the base piece 40.

As shown in Figures 4 to 6, back portion 44 of base piece 40 includes resilient
5 prongs 54 and registration finger 56. The backside of retaining tabs 52 is also shown. Prongs 54 are adapted to releasably secure base piece 40 on the sidewall 11 of birdseed reservoir 12 in mount hole 80 (shown in Figure 1). Further, registration finger 56 is adapted to engage registration notch 82 shown in Figure 1 to facilitate proper registration of base piece 40 within mount hole 80. These features are discussed in
10 further detail below in reference to Figures 10(a) and 10(b).

Retaining tabs 52 and prongs 54 may be formed as an integral part of the base piece as a one-piece molding of plastic. Retaining tabs 52 and prongs 54 may be made of other materials, but are preferably resilient so as to allow the respective pieces to be fitted together as is contemplated by this exemplary embodiment of the
15 present invention.

Partitioning wall 46, which partitions base piece 40 as shown in Figures 2 to 4 to include an opening in the form of seed outlet 58. Outlet port 58 is shown as a semicircular opening that is approximately half the size of wall 46. As should be understood, outlet port 58 is not limited to the size and configuration shown, however,
20 it is preferred that outlet port 58 be of a size and configuration that can dispense multiple types of birdseed.

Now that base piece 40 has been described in some detail, the features of apertured dial 60 may be discussed. First, as may be seen with reference to Figures 2 and 7 to 9, apertured dial 60 includes a disc-shaped wall 61 that has a front surface
25 62 and a back surface 64 defined by edge 63 and two seed apertures 66 and 68 formed therethrough. First seed aperture 66 is in the form of a thistle seed dispenser and second seed aperture 68 is in the form of a mixed seed dispenser and is surrounded by a forwardly projecting, cup-shaped trough 69. Mixed seed aperture 68 is primarily sized and adapted to dispense mixed seed or sunflower seeds, which may
30 collect in trough 69 so as to be accessible by the feeding birds.

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Having now discussed base piece 40 and apertured dial 60 independently, their interrelationship may now be described. As mentioned above, apertured dial 60 is adapted to be rotatably disposed in base piece 40. More particularly, and with reference to Figure 2, apertured dial 60 may be pressed into place in interior 41 such that edge 63 clears retaining tabs 52 and back surface 64 confronts partitioning wall 46, thereby to accomplish a snap-fit engagement.

With reference now to Figure 1 and Figure 10(a), the interrelationships between base piece 40 to both apertured dial 60 and birdseed reservoir 12 may now be more fully appreciated. Opening 56 or mount hole, in sidewall 11 has a central axis "A" that is generally perpendicular to sidewall 12. Base piece 40 nests within mount hole 80 of birdseed reservoir 12 such that it is mounted to the sidewall 11 of birdseed reservoir 12 and partly disposed therein. Accordingly, registration post 56 is seated within registration notch 82 and prongs 54 anchor base piece 40 to the sidewall 11 of birdseed reservoir 12. Apertured dial 60 is disposed in base piece 40 and journaled for rotation on the central axis "A" and rotates relative thereto. Accordingly, back surface 64 is in confronting relationship with partitioning wall 46 of the base piece. Further, edge 63 has been pressed past retaining tabs 52 and is frictionally engaged with sidewall 50. Mixed seed aperture 68 is in the seed accessible state, and, as such, it is in fluid communication with outlet port 58. Thistle seed aperture 66 is obstructed from access to the birdseed in the birdfeeder by partitioning wall 46.

Apertured dial 60 may be rotated, if desired, to register thistle seed aperture 66 in the seed accessible state. With reference then to Figure 10(b), thistle seed aperture 66 is now in fluid communication with outlet port 58. As such, mixed seed aperture 68 is now in the inactive state and partitioning wall 46 and thereby obstructed from access to the birdseed in the birdfeeder by partitioning wall 46.

An alternative seed dispenser, according to the present invention, is shown in Figures 11 to 18. Broadly, this alternative seed dispenser includes three pieces - a base piece, an alternating seed aperture piece, and a retaining piece. Since the alternating seed aperture piece has the same construction as that described above with reference to Figures 1 to 10, the following discussion will focus primarily upon the

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construction of the base piece, the retaining piece, and the interrelationship among the three pieces.

Turning first to Figures 11 and 12, a birdfeeder in the form of hopper feeder 110 is shown to include birdseed reservoir 112, lid 114, and feeding stations 120, two of which are shown. Each feeding station 120 includes a perch 118 located adjacent a respective seed dispenser 130 and 131, which are adapted to be mounted to the sidewall 111 of birdseed reservoir 112, in fluid communication with the bird seed inside the birdseed reservoir via a mounting hole, such as mount hole 180, which may be cut out of the sidewall 111 of birdseed reservoir 112. Mount hole 180 includes first notches 182 and second notches 184, which will be described in further detail below.

Since seed dispensers 130 and 131 are identical, seed dispenser 130 will be used as a representative sample to discuss the construction of this exemplary embodiment of the present invention. Accordingly, with respect to Figure 13, seed dispenser 130 generally includes base piece 140, an alternating seed aperture piece in the form of apertured dial 160, and a retaining piece in the form of retaining ring 190. Each of these three pieces may be made of metal, plastic, a composite thereof, or other material suitable as a seed dispenser for use with a bird feeder.

Similar to seed dispenser 30 described above, base piece 140 mounts seed dispenser 130 to the sidewall 111 of the birdseed reservoir and apertured dial 160 is rotatably disposed therein to allow a desired seed aperture 166 or 168 to be in the seed accessible state. As shown in Figures 13 to 15, base piece 140 is an annular piece of unitary construction with a front portion 142 and a back portion 144 separated by a partitioning wall 146. Partitioning wall 146 includes outlet port 158, which, similar to the seed dispenser shown in Figures 1 to 10, is sized to dispense different types of birdseed. When a desired seed aperture 166 or 168 is registered to be in fluid communication with outlet port 158, feeding birds may access the selected seed within the birdseed reservoir.

With continued reference to Figures 13 to 15, base piece 140 has an outer surrounding sidewall 150 with an inner surface 151 located in front portion 142. Notably, inner surface 151 does not include retaining tabs disposed circumferentially thereabout to retain apertured dial 160 therein. Rather, as will be discussed in more

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detail below, retaining ring 190 is adapted to retain apertured dial 160 therein when the three pieces are assembled.

Base piece 140 is also shown to include a pair of first ears 152 and a pair of second ears 154 disposed about the outer surface of sidewall 150. As shown in Figure 5 15, first ears 152 are adapted to allow screws 153 to pass therethrough so as to be received by stand offs 196 of retaining ring 190. Accordingly, retaining ring 190 may be releasably secured to base piece 140. As shown, grooves 169 may further be associated with first ears 152 to help alignment of the screws with the ears and to reduce any gaps or open spaces resulting from the coupling of the base piece and the 10 retaining ring. Second ears 154, are adapted to receive a respective screw 157, which, in conjunction with a respective washer 159 releasably secure base piece 140 to the sidewall 111 of the birdseed reservoir. This will be discussed in more detail below with respect to Figures 18(a) and (b).

As should be appreciated by one skilled in the art, other forms of fasteners 15 besides screws 153 may be used to couple the base piece and retaining ring. For example, fasteners such as nails, rivets, and the like can pass through first ears 152 to be secured into the retaining ring. It should also be appreciated that the location of first ears 152 and second ears 154 are not limited to the respective locations shown in the Figures. Further, additional first or second ears could be disposed about the 20 surface of the outer sidewall for additional places of securement. Alternatively, first and second ears 152 and 154 may be formed in outer sidewall 150 of retaining ring 190 such that they do not project therefrom an such that the outer surface of sidewall 150 is generally uniform.

With continued reference to Figures 13 and 15, and with additional reference 25 to Figures 16 and 17, retaining ring 190 is shown as an annulus of unitary construction having a front surface 192, a back surface 194, an outer edge 193, and an inner edge 195. As perhaps best shown in Figures 13 and 15, retaining ring 190 further includes a sidewall 197 extending from inner edge 195 outwardly from back surface 194 to terminate in rim 191.

30 As shown in Figures 13 and 16, three retaining tabs 198 are disposed about the inner surface of sidewall 197 in spaced relation to one another. As contemplated, when

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the seed dispenser is assembled, retaining tabs 198 confront the front surface 162 of apertured dial 160 so as to keep apertured dial 160 between retaining ring 190 and base piece 140. Although three retaining tabs 198 are shown, any number of retaining tabs may be disposed circumferentially about sidewall 197. Preferably though, the number, size, and placement of the tabs allows free rotation of the apertured dial but yet creates enough friction such that the apertured dial stays in place while in use. Alternatively, retaining tabs could be disposed on the front surface of apertured dial 160 instead of about sidewall 197 of the retaining ring. As contemplated, an appropriate number of retaining tabs could be disposed circumferentially about the front surface 162 of the apertured dial so as to confront portions of the rim 191 of the retaining ring.

Now that the individual components of the alternative seed dispenser shown in Figures 11 to 17 have been described in some detail, both its assembly and interrelationship with a bird feeder may be more fully appreciated. Turning then to Figures 18(a) and 18(b), assembled seed dispenser 130 is shown mounted in opening 180, which has a central axis "A" that is generally perpendicular to sidewall 111. Base piece 140 and retaining ring 190 are releasably secured to one another by screws 153 and apertured dial 160 is rotatably disposed therebetween and relative to base piece 140 such that front surface 162 confronts rim 191 and retaining tabs 198. In Figure 18(a), seed dispenser 130 is in the first seed access state wherein mixed seed aperture 168 is in fluid communication with outlet port 158. In Figure 18(b), seed dispenser 130 is in the second seed access state wherein thistle seed aperture 166 is in fluid communication with outlet port 158.

As briefly mentioned above, seed dispenser 130 nests within a mount hole cut out of the sidewall 111 of the birdseed reservoir and is retained in position with fasteners in the form of screws. More specifically, base piece 140 nests within mount hole 180, which is shown in Figure 12. Since first ears 152 and second ears 154 project from the outer sidewall 150 of base piece 140, mount hole 180 further includes first notches 182 and second notches 184, which correspond, respectively to first ears 152 and second ears 154 such that hole 180 nestably receives base piece 140.

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Base piece 140 is releasably secured to the sidewall 111 of birdseed reservoir 112 by a fastener in the form of screw 157 and washer 159. More specifically, a respective screw 157 is received by a respective second ear 154 (shown in Figure 15). Together, screw 157 and washer 159, anchor base piece 140 to the sidewall 111 of
5 birdseed reservoir 112 thereby to releasably fasten the seed dispenser thereto.

Turning now to Figures 19 and 20 an alternative retaining ring 290 is shown which is also an annulus of unitary construction having a front surface 292, back surface 294, an outer edge 293, and an inner edge 295. Retaining ring 290 further includes a sidewall 297 extending from inner edge 295 outwardly from back surface
10 294 to terminate in rim 291. As compared to retaining ring 190 shown above in Figures 13, 15 to 18(a) and (b), retaining ring 290 in Figures 19 and 20 does not include separate, angularly spaced retaining tabs to hold the apertured dial in place. Rather, sidewall 297 includes a radially inwardly projecting rim 291 extending around the inner perimeter of sidewall 297 that is wide enough to confront the front surface 262 of
15 apertured dial 260. This confronting relationship is shown in Figure 21. As may be seen, rim 291 confronts front surface 262 proximately to edge 263 of apertured dial 260. Accordingly, rim 291 keeps apertured dial 260 between retaining ring 290 and base piece 240.

Another seed dispenser according to the present invention is shown in Figures
20 22 to 27. This seed dispenser includes two pieces - the base piece and the apertured piece. Turning first to Figures 22 and 23, a birdfeeder 310, of generally of frustoconical configuration, is shown to include birdseed reservoir 312 having a sidewall 311 and a plurality of seed dispensers 330. Each seed dispenser 330 is adapted to be mounted to mounting hole, such as hole 380, which is in fluid communication with the birdseed
25 inside the birdseed reservoir and adapted to provide access thereto. As shown mount hole 380 includes two notches 382, which will be described in further detail below.

With reference to Figure 24, a representative seed dispenser 330 is shown to include base piece 340 and apertured dial 360. Base piece 340 has a different configuration than heretofore described in that it is adapted to confront the sidewall
30 311 of the birdfeeder shown in Figures 22 and 23. Base piece 340 is more elongated

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than compared to that shown Figures 3 and 4 above and further includes perch 318, which is releasably securable to standoffs 356 such as by a snap fit engagement.

With reference to Figures 24 to 27, base piece 340 includes back wall 346, which extends the length thereof. Back wall 346 further includes an opening in the form
5 of seed outlet 358. When base piece 340 is mounted to the sidewall of the birdseed reservoir, seed outlet 358 is in fluid communication with the mounting hole permitting access to the birdseed contained therein.

Base piece 340 is shown further to include four retaining tabs 352 in spaced relation to one another. Similar to the retaining tabs described above with reference
10 to Figures 2 to 6, retaining tabs 352 are adapted to accomplish an engagement between base piece 340 and apertured dial 360 sufficient to retain apertured dial therein while allowing rotation of apertured dial 360 relative to the base piece 340.

Base piece 340 further includes a pair of prongs 354. Again, similar to that described above with respect to Figures 4 to 6, prongs 354 are adapted to releasably
15 secure base piece 340 to the sidewall 311 of birdseed reservoir 312 in mount hole 380 shown in Figure 23. With reference to Figure 23, the attachment of base piece 340 is similar to that described above with reference to Figures 10(a) and 10(b) in that prongs 340 pass through notches 382 to anchor base piece 340 to the sidewall 311 of birdseed reservoir 312. Preferably, prongs 354 are formed of a resilient material to
20 facilitate the removal and reattachment of base piece 340 to sidewall 311.

With continued reference to Figures 24 to 26, apertured dial 360 is similar in construction to both the apertured dials described above with reference to Figures 2 and 13. As such, it is rotatably disposed in the base piece 340. Accordingly, when mixed seed aperture 368 is in the seed accessible state, it is in fluid communication
25 with outlet port 358 and thistle seed aperture 366 is obstructed from access to the birdseed by back wall 346. Similarly, when thistle seed aperture 366 is in the seed accessible state, it is in fluid communication with outlet port 358 while mixed seed aperture 368 is obstructed from access to the birdseed in the birdfeeder by back wall 346.

30 Accordingly, the present invention has been described in great detail with reference to Figures 1 to 27. It should be appreciated from the foregoing that variations

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of the constructions described may be made by the ordinarily skilled artisan in this field without departing from the inventive concepts herein. For example, the individual pieces that make up the alternative seed dispensers are not limited to any particular size or dimension. Rather, the configuration of these pieces are primarily dictated by
5 the sidewall of the birdseed reservoir that incorporates the seed dispenser. Also, the seed dispenser may employ alternative means by which the seed ports are alternated between the various seed access states. For example, an alternating seed aperture piece that moves horizontally or vertically within the base piece is contemplated whereby the horizontal or vertical movement shifts the seed aperture piece among the
10 seed access states.

Also, as should be appreciated, the present invention further contemplates a method of utilizing a bird feeder having a birdseed reservoir with a surrounding sidewall adapted to contain the birdseed and an opening formed in the sidewall adapted to access and dispense the birdseed to the birds. The method comprises the steps of
15 providing the bird feeder with a seed dispenser having a plurality of seed apertures associated therewith and adding a selected type of birdseed to the birdseed reservoir. The method also includes moving one of the seed apertures into a seed accessible state whereby the selected seed aperture is in fluid communication with the opening in the sidewall to permit access to the birdseed and allow for the birdseed to be
20 dispensed therethrough. The method may also include the use of a rotatable dial piece having a plurality of seed apertures formed therethrough whereby the dial piece is rotated to move a selected seed aperture into the seed accessible state.

The method further includes rotating or otherwise moving a piece of the seed dispenser so as to place a desired seed port in the seed accessible state thereby to
25 permit feeding birds access to the birdseed in the birdseed reservoir. It should be appreciated that the methodology of the present invention can include any steps, not limited to those discussed hereinabove, that can be accomplished by the above-described structures.

Accordingly, the present invention has been described with some degree of
30 particularity directed to the exemplary embodiments of the present invention. It should be appreciated, though, that the present invention is defined by the following claims

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construed in light of the prior art so that modifications or changes may be made to the exemplary embodiments of the present invention without departing from the inventive concepts contained herein.

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The embodiments of the present invention in which an exclusive property or privilege is claimed are defined as follows:

1. A birdfeeder adapted to dispense birdseed to birds comprising:
 - a housing with a top, a bottom, and a sidewall having an outer surface and an inner surface defining a seed reservoir, said sidewall having at least one opening into said seed reservoir;
 - a seed dispenser having a base piece and a movable piece, said base piece fitted in said sidewall opening and having an access opening formed therethrough passing from said reservoir outer surface to said reservoir inner surface and in fluid communication with said seed reservoir, said movable piece supported by said base piece at a location adjacent said base piece access opening and having a seed aperture formed therethrough which is smaller than said base piece access opening, said movable piece being moveable relative to said base piece in a plane that is substantially parallel with a plane of said base piece between a first orientation in which at least a portion of said base piece access opening is unobstructed to provide birds with access to birdseed in said seed reservoir while said movable piece seed aperture is blocked, and a second orientation in which said movable piece seed aperture is in fluid communication with said base piece access opening to provide birds with access to birdseed in said reservoir through said movable piece seed aperture.
2. The birdfeeder according to claim 1, wherein said movable piece is rotatably moveable relative to said base piece in a plane that is substantially parallel with a plane of said base piece.
3. The birdfeeder according to claim 1, wherein said sidewall opening has an axis that is generally perpendicular to said sidewall, said sidewall being generally vertical in use of said birdfeeder.

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4. The birdfeeder according to claim 1, wherein said base piece includes at least one retaining member adapted to retain said movable piece in engagement with said base piece while allowing said movement thereof between said first and second orientations.

5. The birdfeeder according to claim 1, wherein said base piece includes a plurality of spaced retaining members spaced around said access opening and adapted to retain said movable piece in engagement with said base piece while allowing said movement thereof between said first and second orientations.

6. The birdfeeder according to claim 1, wherein said dispenser includes a cup-shaped trough associated with said sidewall opening that collects seeds therein from said reservoir and which is accessible to birds.

7. The birdfeeder according to claim 1, further comprising a perch positioned adjacent said sidewall opening to support a bird.

8. The birdfeeder according to claim 1, wherein said base piece is elongated as between the top and the bottom of the seed reservoir.

9. The birdfeeder according to claim 1, wherein said top has a lid with a hanger member from which the birdfeeder may be suspended for use.

10. A birdfeeder adapted to provide birdseed to birds, comprising:
a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, said sidewall having an outer surface and an inner surface and an opening formed therethrough, said sidewall being generally vertical in use and said opening having an axis that is generally perpendicular to said sidewall;

a seed dispenser fitted within the sidewall opening to dispense the birdseed to the birds, said seed dispenser having a base piece and a movable piece cooperating therewith both oriented to be generally parallel with said sidewall, said base piece

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having an access opening in fluid communication with said seed reservoir, said movable piece including a seed aperture that is smaller than said base piece access opening, said movable piece being moveable relative to said base piece in a plane substantially parallel therewith such that said movable piece always remains substantially parallel with said base piece, said movable piece being movable between a first orientation in which said movable piece seed aperture is blocked and said base piece access opening is totally or mostly unobstructed to provide birds with access to seed in said reservoir, and a second orientation in which said movable piece seed aperture is in fluid communication with said base piece access opening to provide birds with access to birdseed in said reservoir through said movable piece seed aperture.

11. The birdfeeder according to claim 10, wherein said movable piece is rotatably moveable around said sidewall opening axis.

12. The birdfeeder according to claim 11, wherein said dispenser includes a cup-shaped trough located adjacent said access opening for holding seed, said trough projecting outwardly and generally parallel with said sidewall opening axis.

13. A birdfeeder adapted to provide birdseed to birds, comprising:

a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, said sidewall having an outer surface and an inner surface and an opening formed therethrough;

a seed dispenser having an access opening formed therethrough passing from said reservoir outer surface to said reservoir inner surface and fitted into the sidewall opening, said dispenser including first and second pieces cooperating with one another through movement of at least one of said first and second pieces relative to the other to present, in a first orientation, a first seed aperture of a first size in a seed accessible state, and in a second orientation, to bring a second seed aperture of a second size that is smaller than the first size into a seed accessible state;

said movement of at least one of said first and second pieces relative to the other piece being in a plane that is substantially parallel with a plane of said other

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piece and with a plane of said sidewall; and a perch projecting outwardly from said sidewall and positioned below said seed dispenser to support a bird feeding from said seed dispenser.

14. The birdfeeder according to claim 13, wherein said first seed aperture is unobstructed in said first orientation while said second seed aperture is blocked, and said first seed aperture being at least partly obstructed in said second orientation while said second seed aperture provides access to birdseed.

15. The birdfeeder according to claim 13, wherein said second seed aperture is in fluid communication with said access opening in said second orientation.

16. The birdfeeder according to claim 13, wherein said second piece is rotatably moveable relative to said first piece.

17. The birdfeeder according to claim 13, wherein said sidewall opening has an axis that is generally perpendicular to said sidewall, said sidewall being generally vertical in use of said birdfeeder.

18. The birdfeeder according to claim 17, further comprising a cup-shaped trough for holding seed from said seed dispenser, said trough projecting outwardly and generally perpendicular to said sidewall and adjacent said access opening.

19. The birdfeeder according to claim 13, wherein said dispenser includes a cup-shaped trough for holding seed from said seed dispenser, said trough projecting outwardly and generally perpendicular to said sidewall and positioned between said access opening and said perch.

20. The birdfeeder according to claim 19, wherein said cup-shaped trough is integral with said seed dispenser.

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21. A birdfeeder adapted to dispense birdseed to birds comprising:

a housing with a top, a bottom, and a sidewall having an outer surface and an inner surface defining a seed reservoir, said sidewall having at least one opening into said seed reservoir;

a seed dispenser associated with said sidewall opening and having a movable piece with at least one seed aperture formed therethrough, said movable piece being moveable in a plane that is substantially parallel with a plane of said sidewall between a first orientation in which at least a portion of said sidewall opening is unobstructed to provide birds with access to birdseed in said seed reservoir while said movable piece seed aperture is blocked, and a second orientation in which said movable piece seed aperture is in fluid communication with said sidewall opening to provide birds with access to birdseed in said reservoir through said at least one seed aperture of said movable piece.

22. The birdfeeder according to claim 21, wherein said at least one seed aperture formed in said movable piece is smaller than said sidewall opening.

23. The birdfeeder according to claim 21, wherein said movable piece is rotatably moveable relative to said sidewall in a plane that is substantially parallel with a plane of said sidewall.

24. The birdfeeder according to claim 21, wherein said sidewall opening has an axis that is generally perpendicular to said sidewall, said sidewall being generally vertical in use of said birdfeeder.

25. The birdfeeder according to claim 21, wherein said dispenser includes a cup-shaped trough adjacent said sidewall opening that collects seeds therein from said reservoir and which is accessible to birds.

26. The birdfeeder according to claim 21, further comprising a perch positioned vertically below said sidewall opening to support a bird.

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27. The birdfeeder according to claim 21, wherein said top has a lid with a hanger member from which the birdfeeder may be suspended for use.

28. The birdfeeder according to claim 21, wherein said movable piece has a plurality of seed apertures formed therethrough.

29. A birdfeeder adapted to provide birdseed to birds, comprising:

a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, said sidewall having an outer surface and an inner surface and an opening formed therethrough, said opening in fluid communication with said seed reservoir, said sidewall being generally vertical in use and said opening having an axis that is generally perpendicular to said sidewall;

a seed dispenser associated with the sidewall opening to dispense birdseed to birds, said seed dispenser having a movable piece oriented to be generally parallel with said sidewall and including a seed aperture that is smaller than said sidewall opening, said movable piece being moveable relative to said sidewall in a plane substantially parallel therewith such that said movable piece always remains substantially parallel with said sidewall, said movable piece being moveable between a first orientation in which said movable piece seed aperture is blocked and said sidewall opening is totally or mostly unobstructed to provide birds with access to seed in said reservoir, and a second orientation in which said movable piece seed aperture is in fluid communication with said sidewall opening to provide birds with access to birdseed in said reservoir through said movable piece seed aperture.

30. The birdfeeder according to claim 29, wherein said movable piece has a plurality of seed apertures formed therethrough, with a total open area provided by said plurality of seed apertures being smaller than the sidewall opening.

31. The birdfeeder according to claim 29, wherein said dispenser includes a cup-shaped trough projecting outwardly and generally parallel with said sidewall opening axis.

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32. A birdfeeder adapted to provide birdseed to birds, comprising:

a birdseed reservoir with a surrounding sidewall for receiving birdseed therein, said sidewall having an outer surface and an inner surface and an opening formed therethrough in fluid communication with an interior of said reservoir;

a seed dispenser associated with said sidewall opening, said seed dispenser including a captivated movable piece configured to reduce an effective size of said sidewall opening that is accessible for birds to access seed in said reservoir, said movable piece being movable between a first orientation in which the effective size of said sidewall opening serving as a first seed aperture is a first size and is in a seed accessible state, and a second orientation in which the effective size of said sidewall opening is smaller than said first size and is in a seed accessible state; and

said movement of said movable piece being in a plane that is substantially parallel with a plane of said sidewall.

33. The birdfeeder according to claim 32, further comprising a perch projecting outwardly from said sidewall and positioned below said seed dispenser to support a bird feeding from said seed dispenser.

34. The birdfeeder according to claim 32, wherein said movable piece includes at least one access opening formed therethrough that is in the seed accessible state when said movable piece is in said second orientation.

35. The birdfeeder according to claim 34, wherein said first seed aperture is unobstructed in said first orientation while said movable piece access opening is blocked, and said first seed aperture being at least partly obstructed in said second orientation while said movable piece access opening provides access to birdseed.

36. The birdfeeder according to claim 34, wherein said movable piece access opening is in fluid communication with said sidewall opening in said second orientation.

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37. The birdfeeder according to claim 32, wherein said sidewall opening has an axis that is generally perpendicular to said sidewall, said sidewall being generally vertical in use of said birdfeeder.

38. The birdfeeder according to claim 37, further comprising a cup-shaped trough for holding seed from said seed dispenser, said trough projecting outwardly and generally perpendicular to said sidewall and adjacent said sidewall opening.

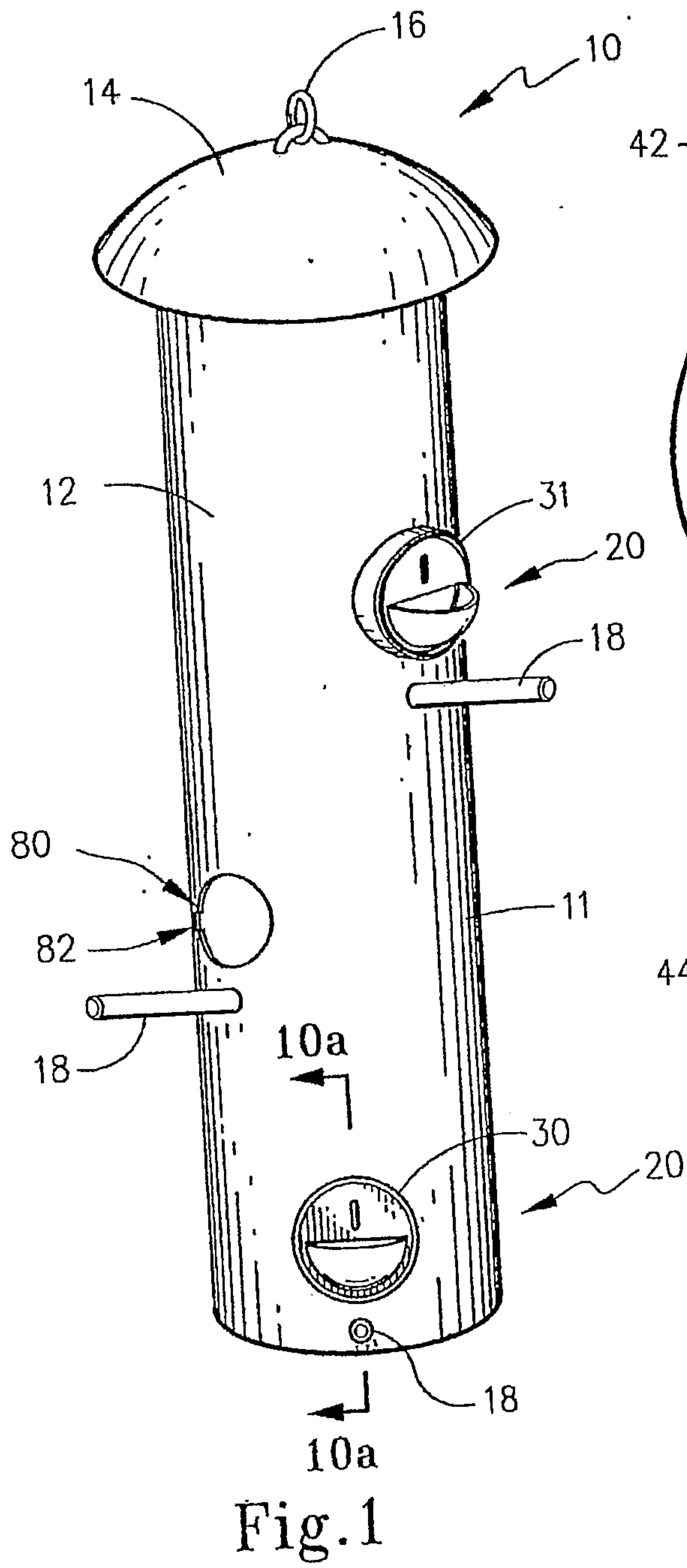


Fig. 1

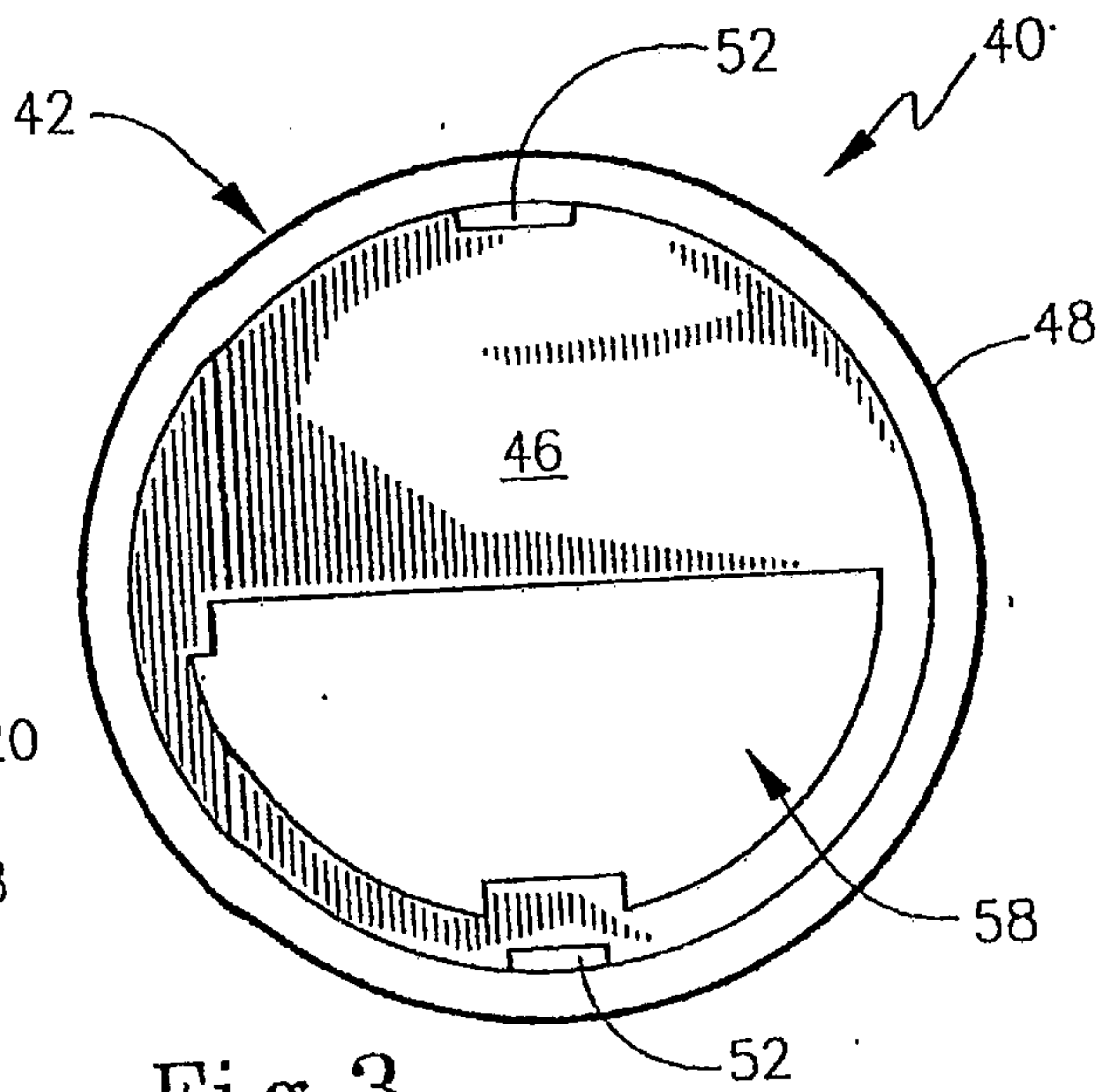


Fig. 3

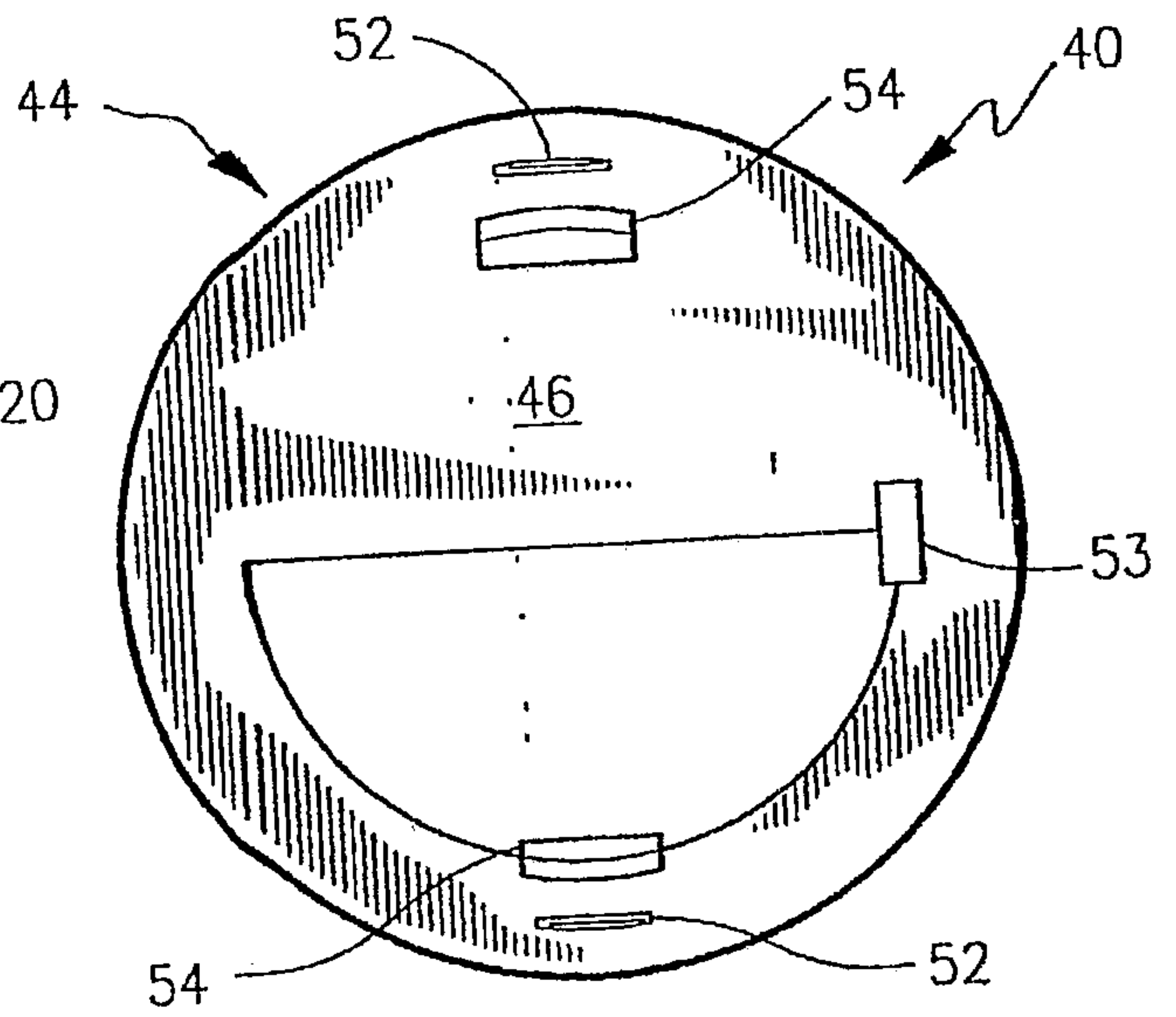


Fig. 4

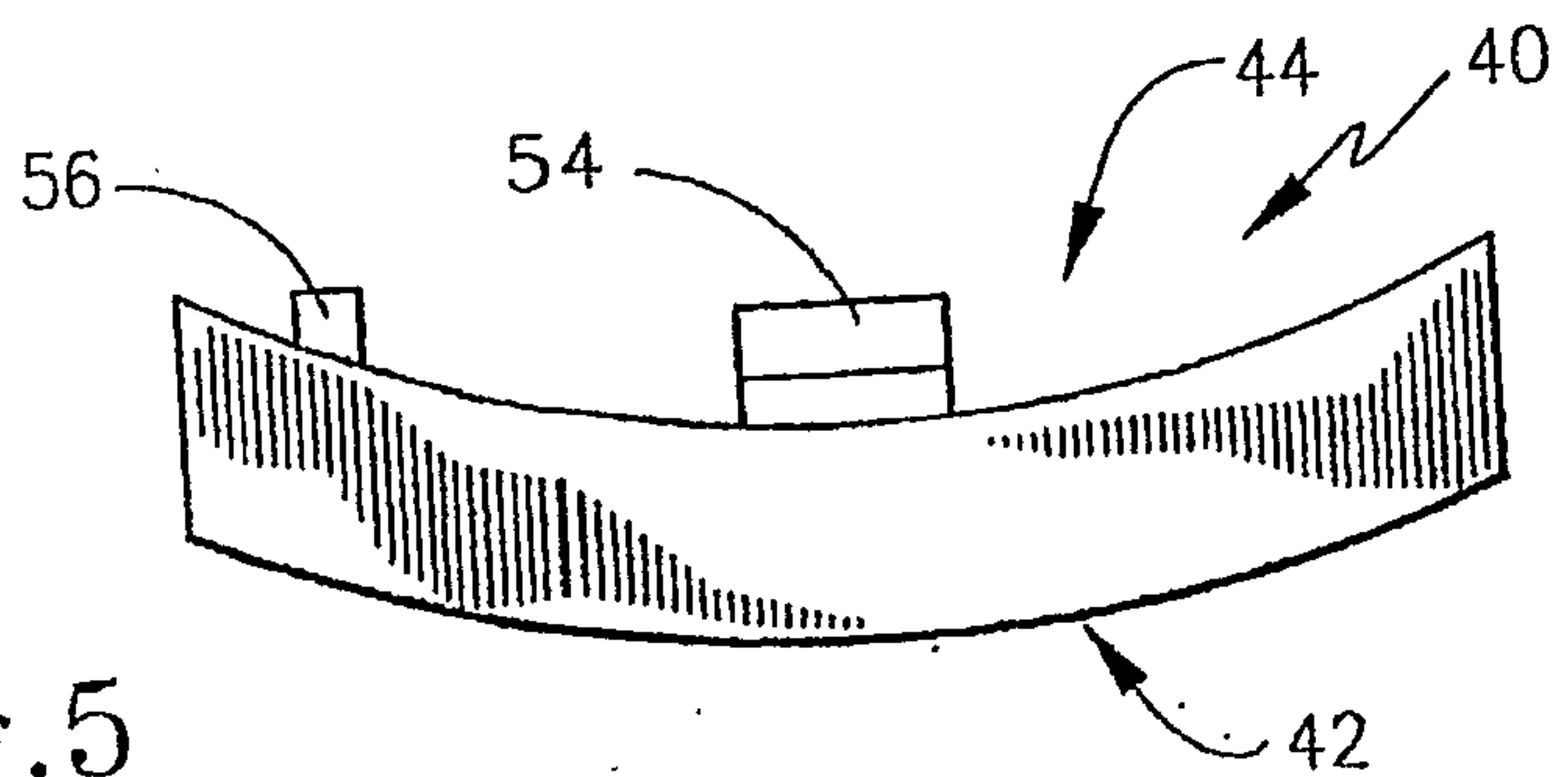


Fig. 5

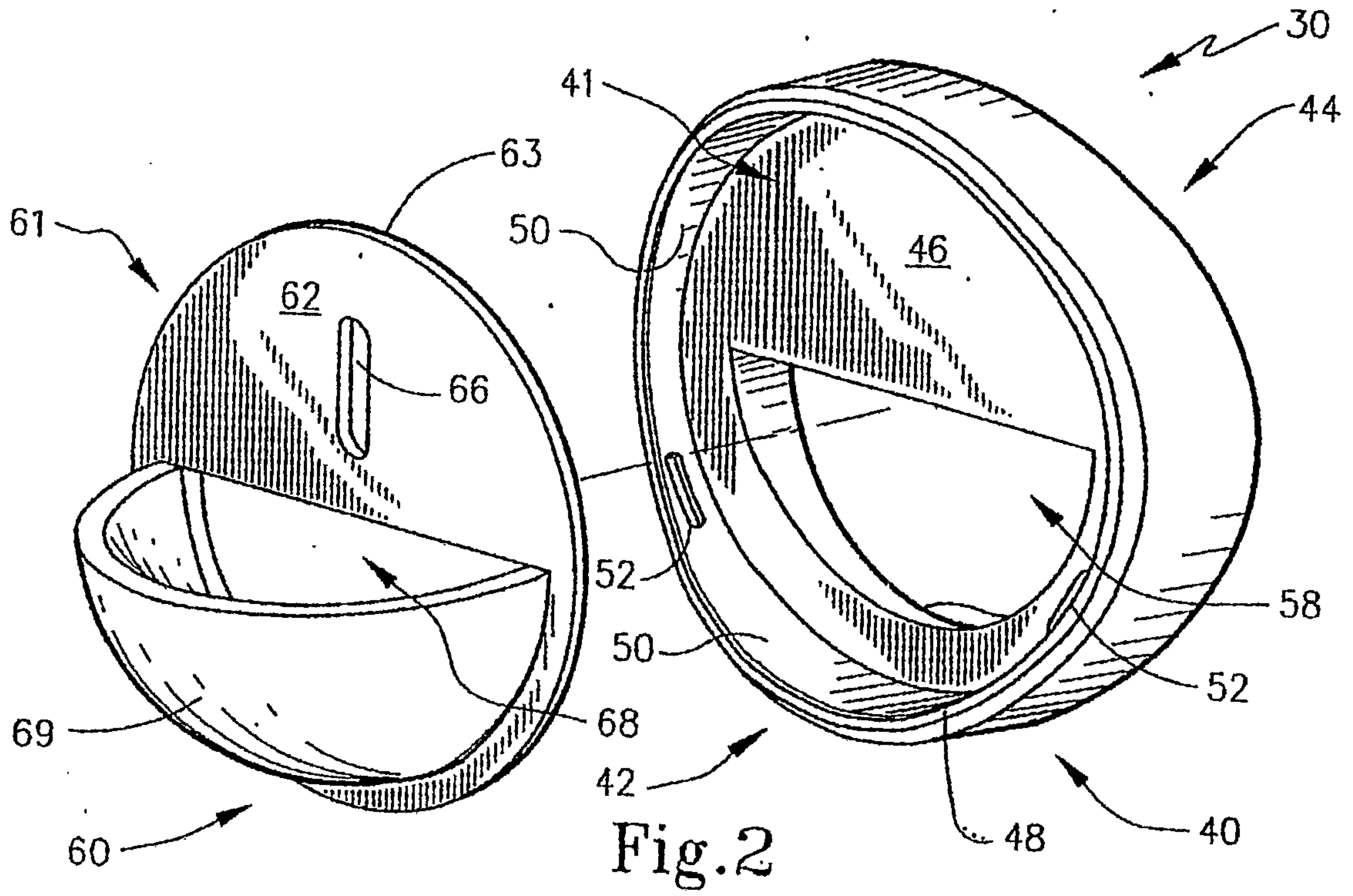


Fig. 2

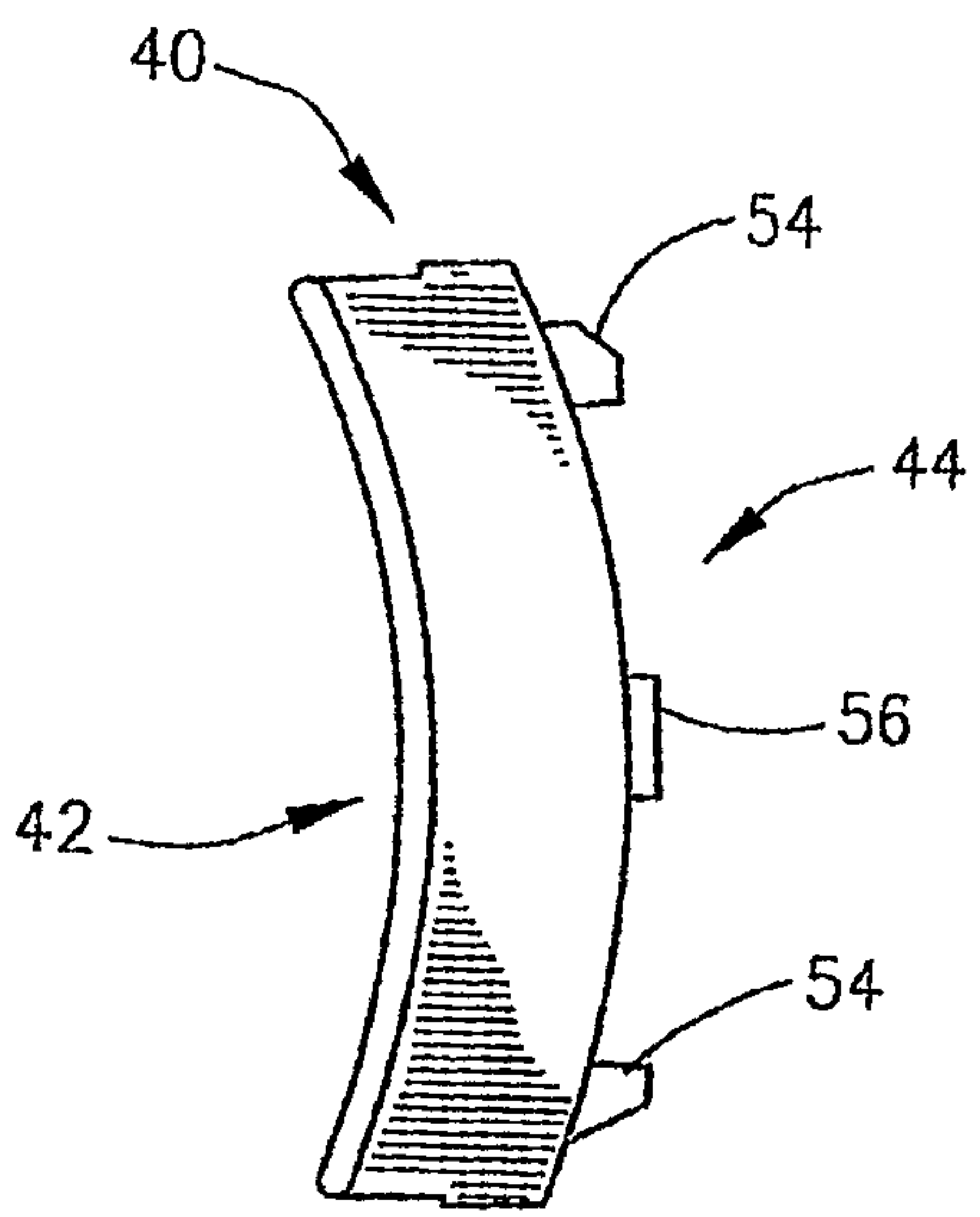


Fig. 6

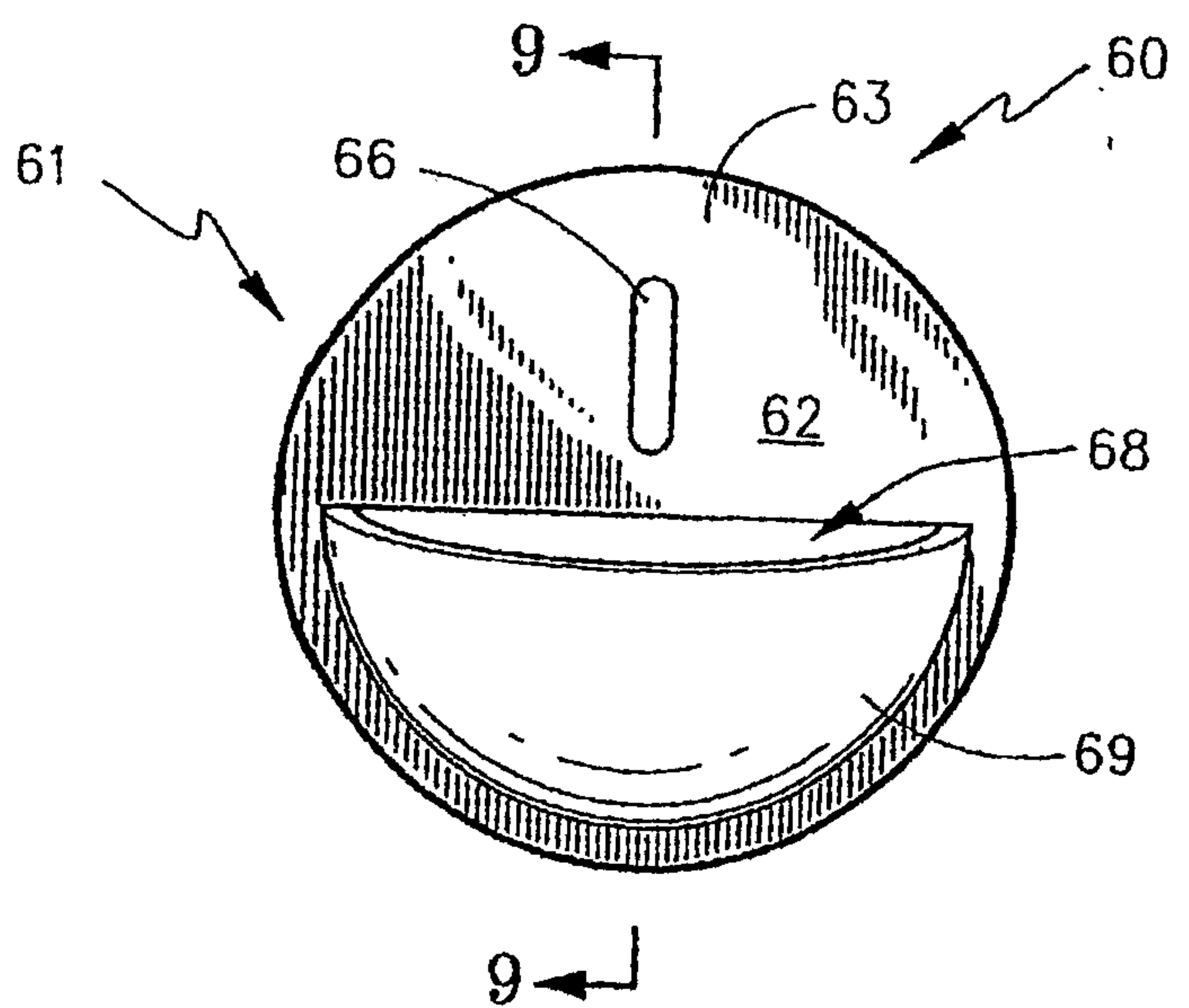


Fig. 7

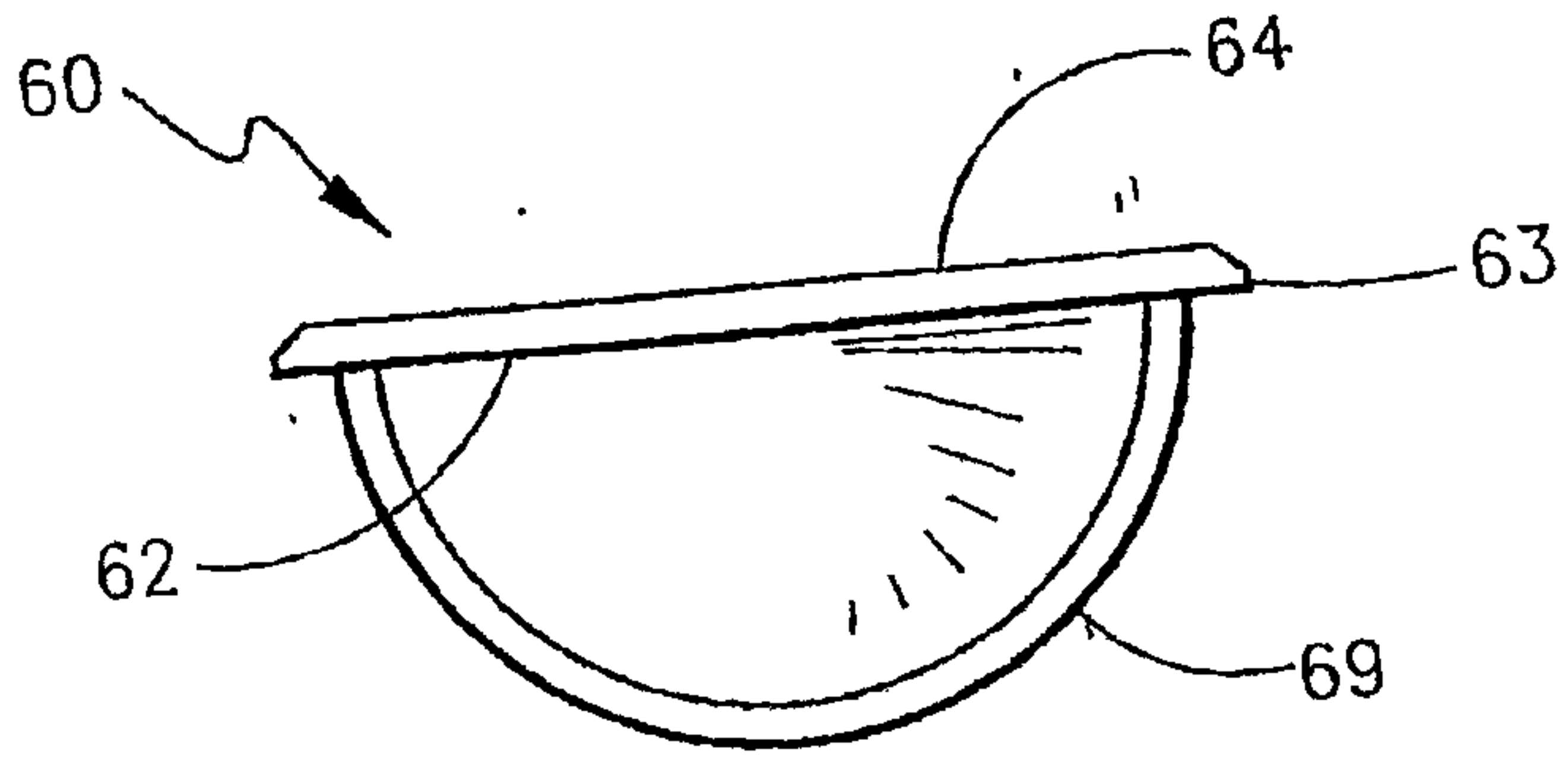


Fig. 8

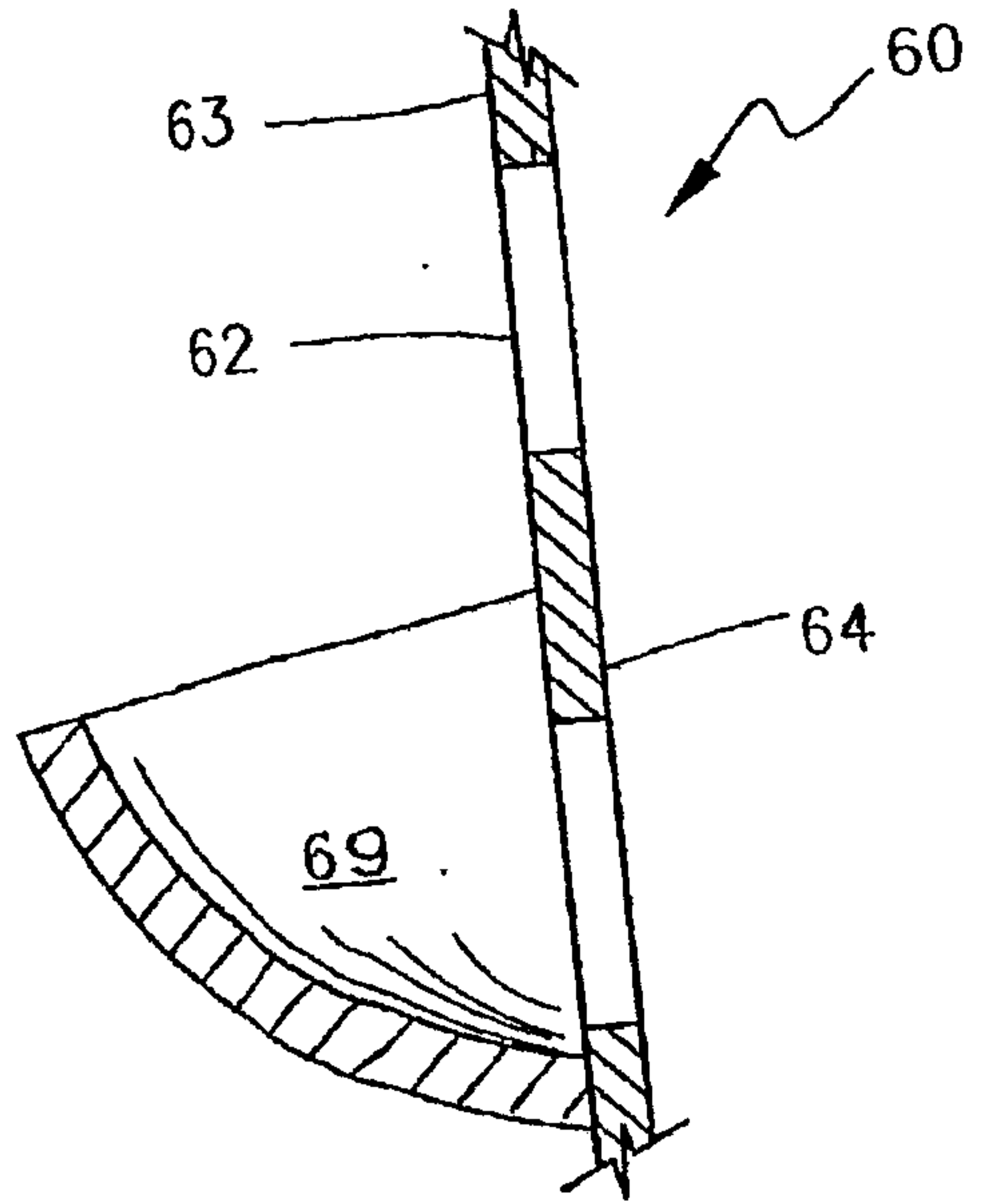


Fig. 9

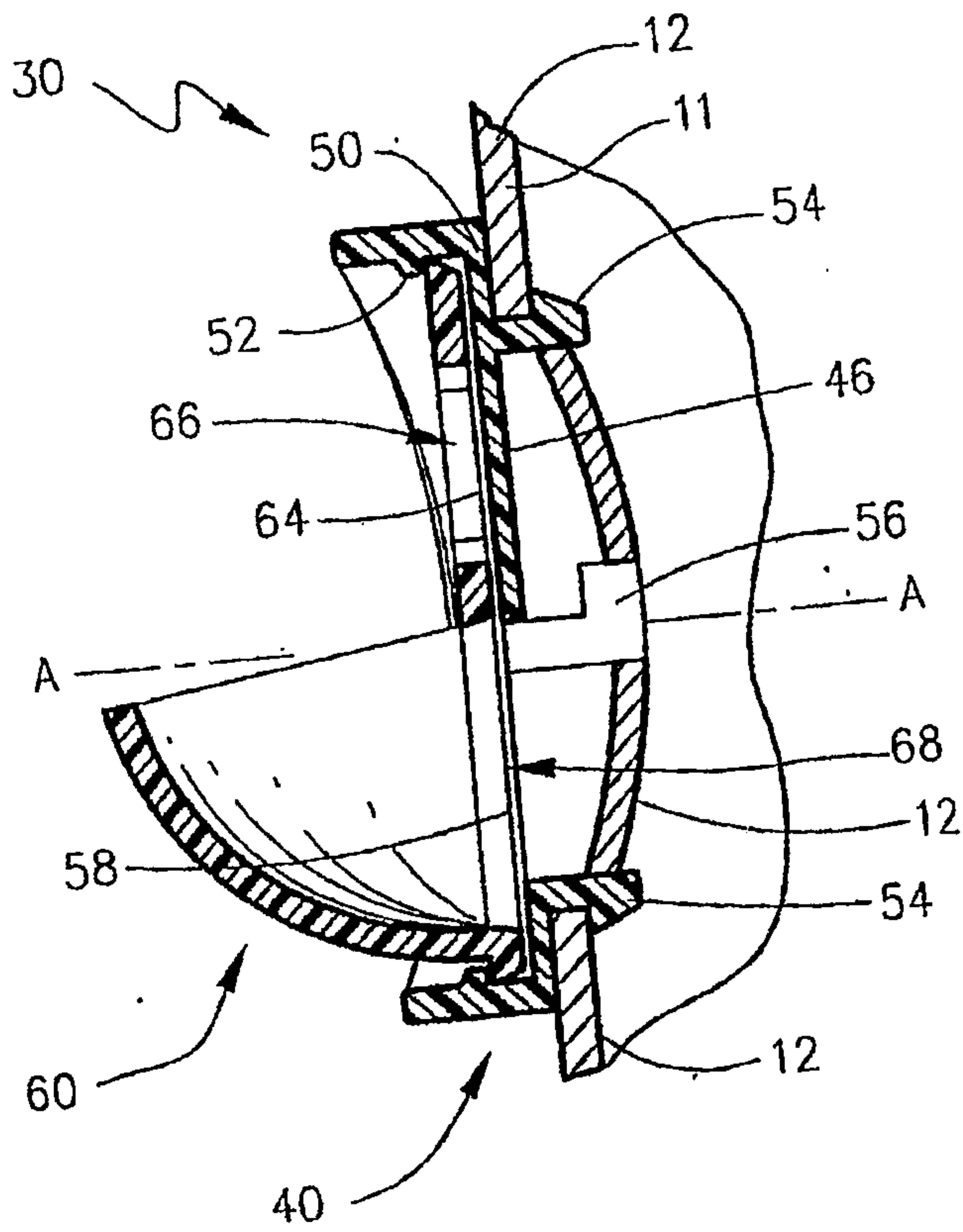


Fig. 10a

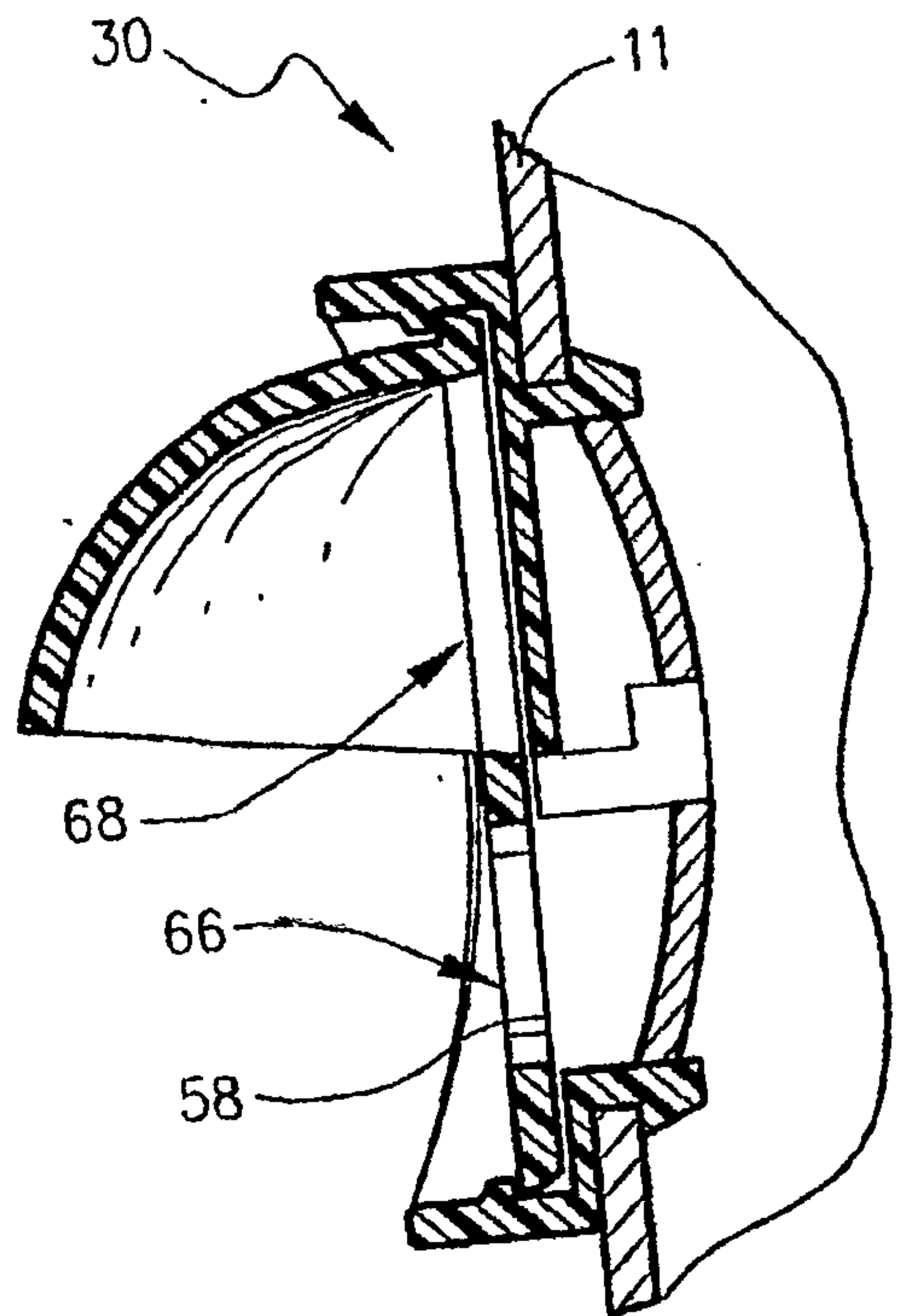


Fig. 10b

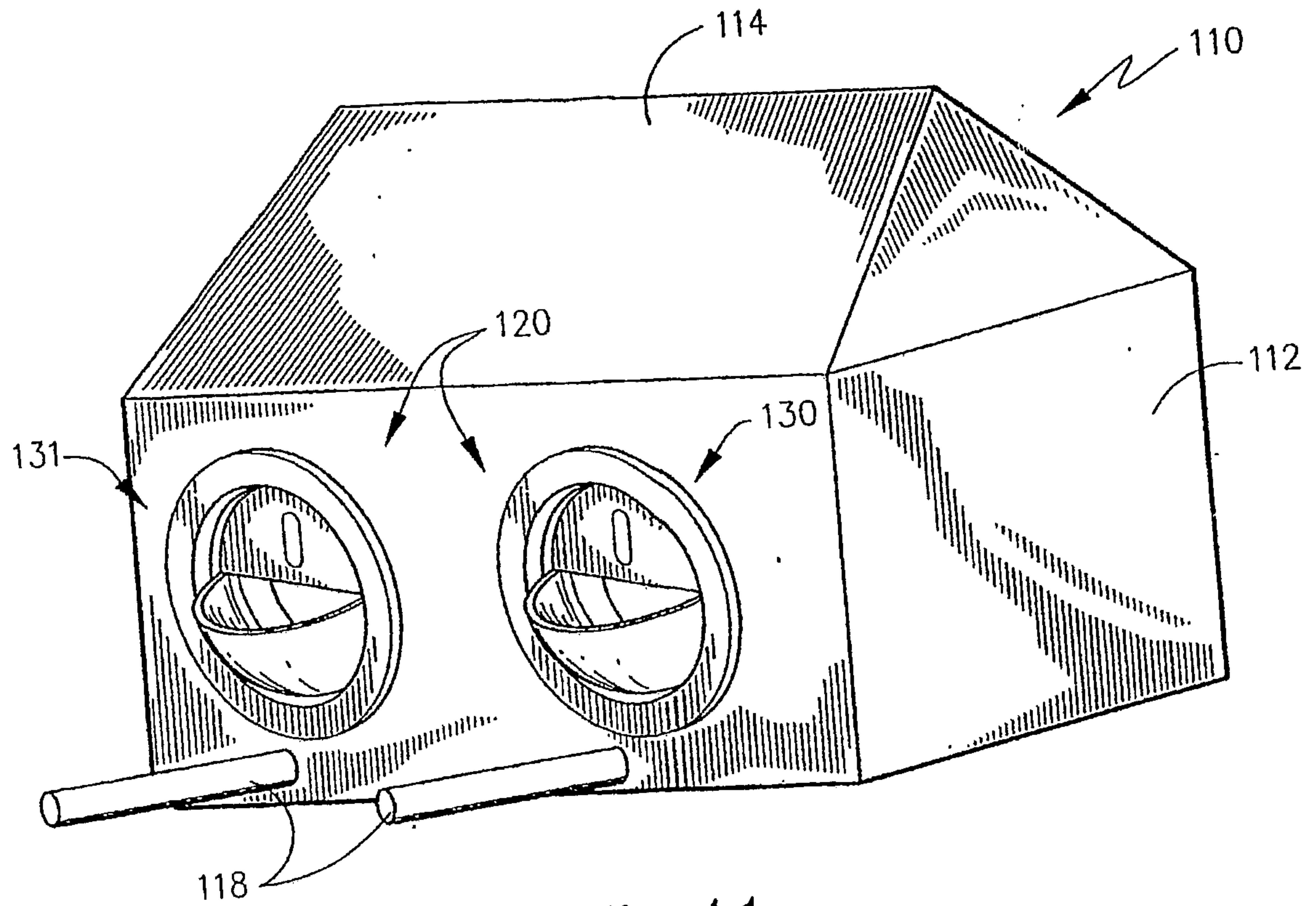


Fig. 11

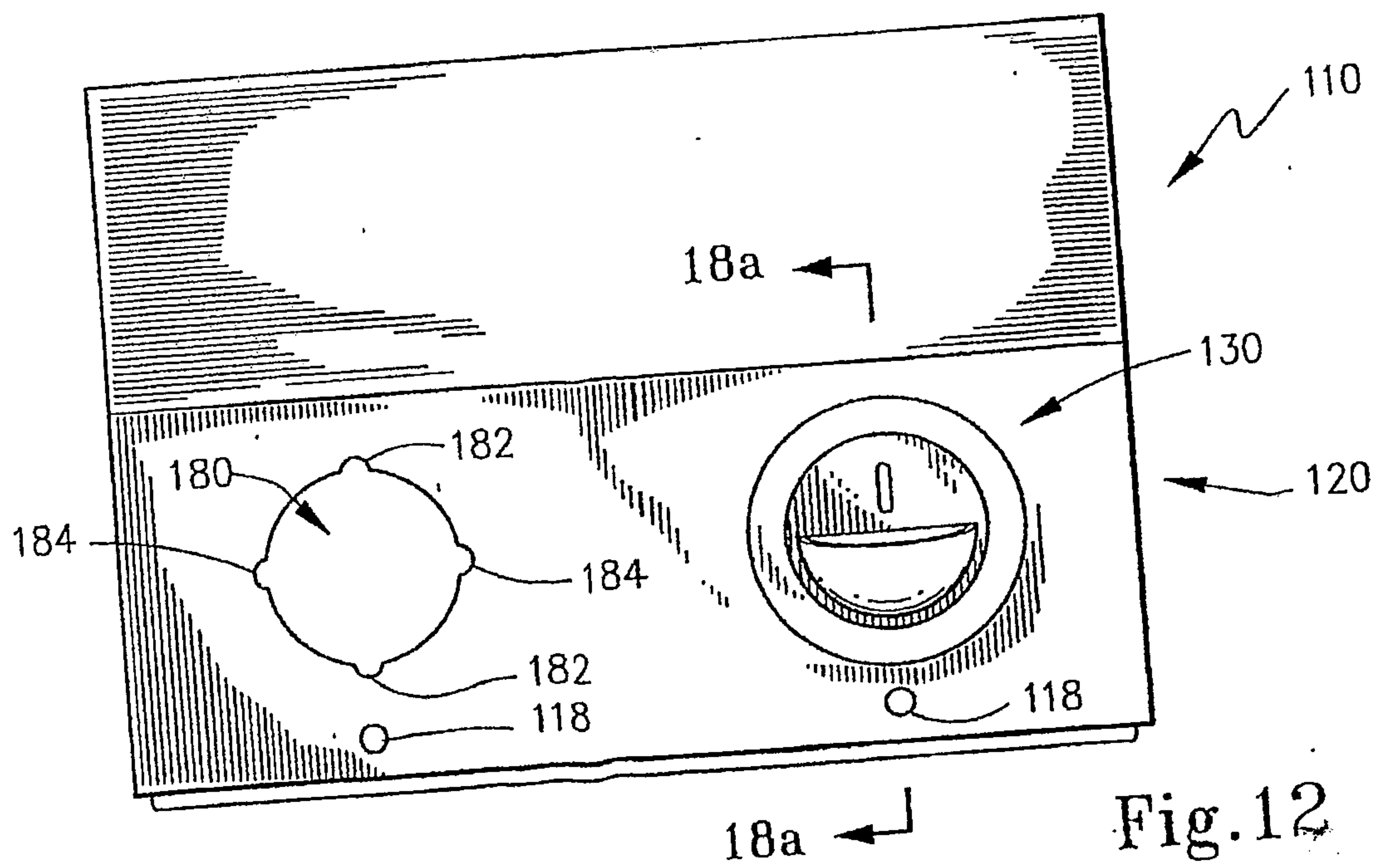


Fig. 12

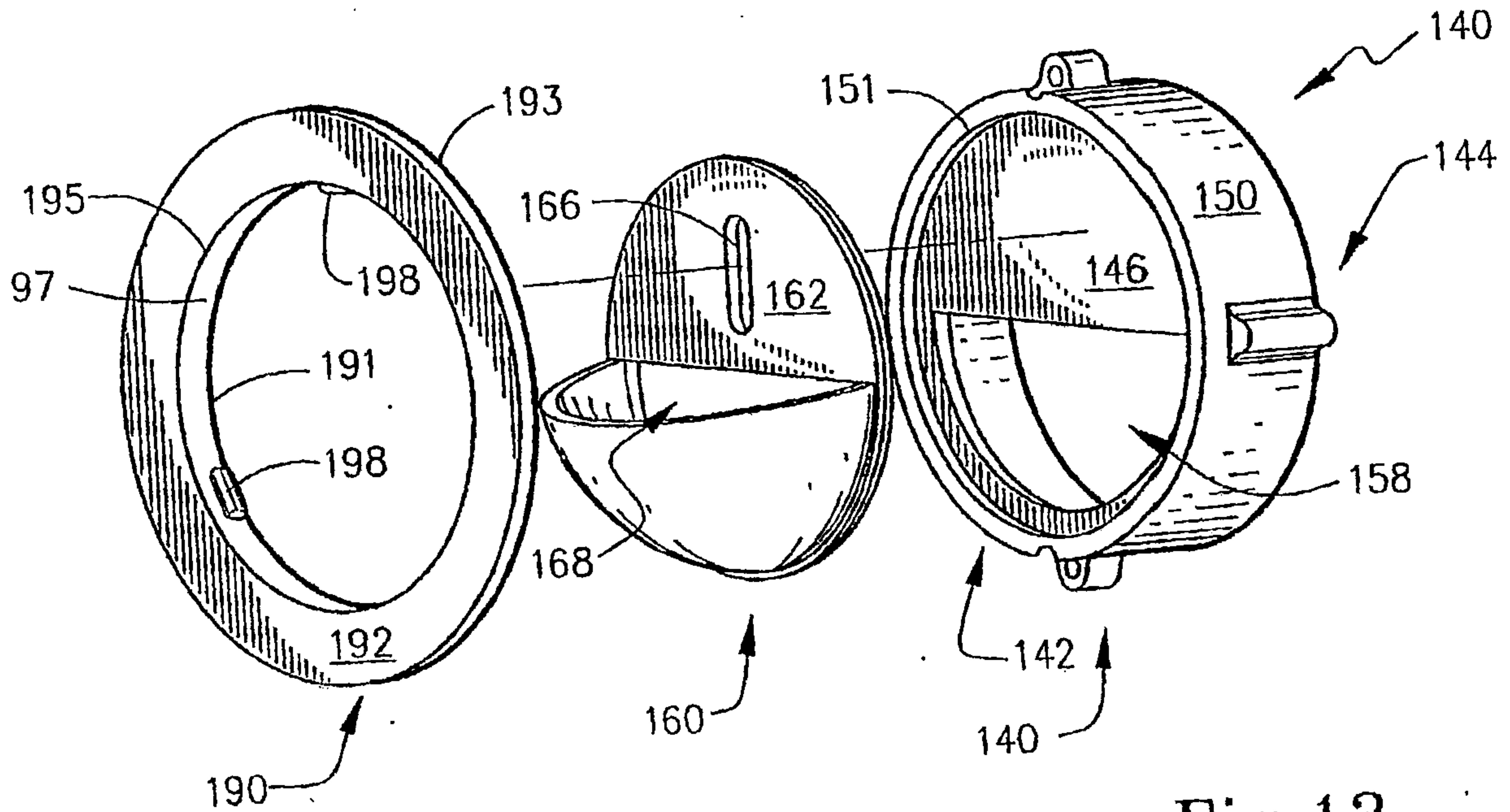


Fig.13

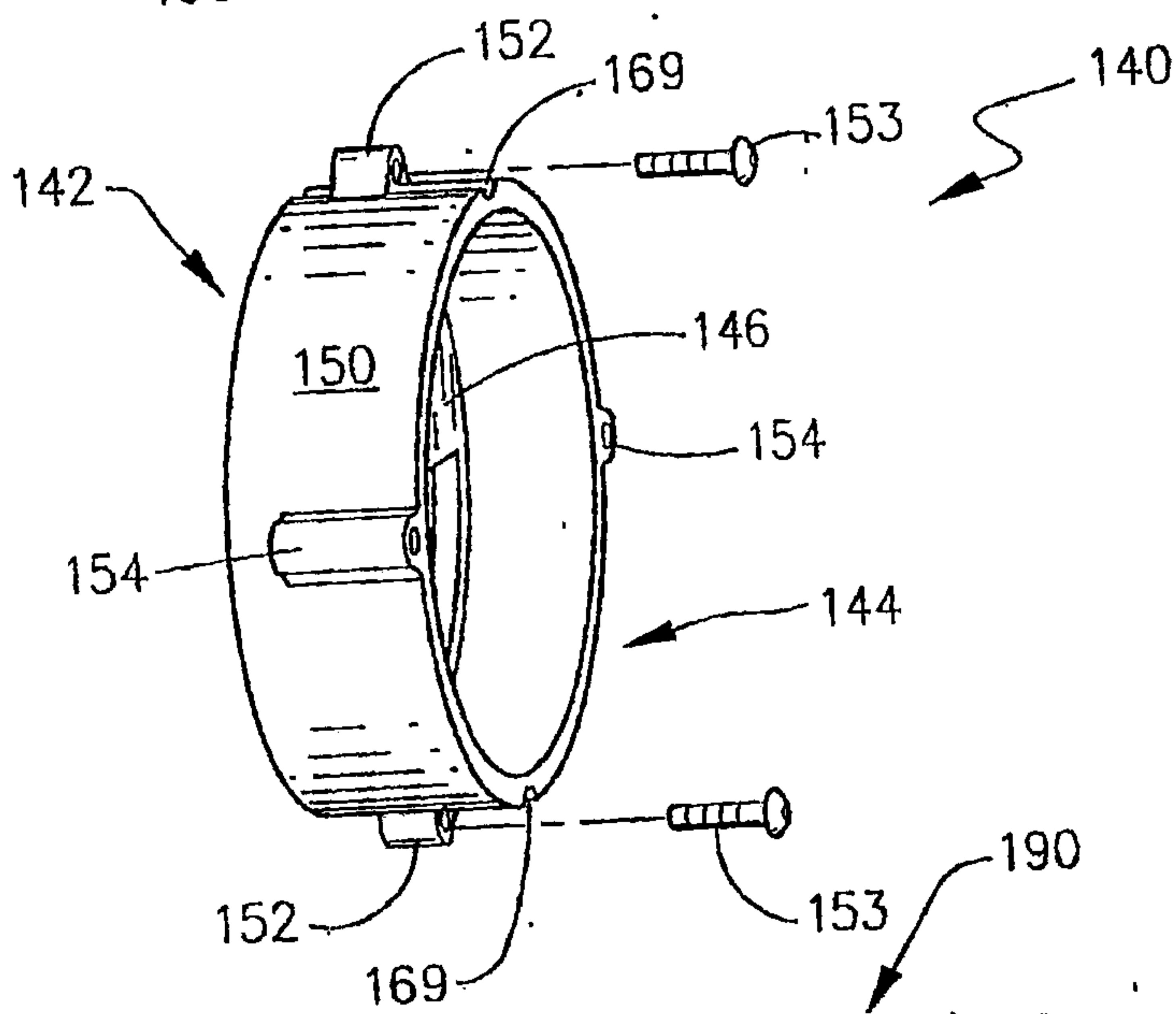


Fig.14

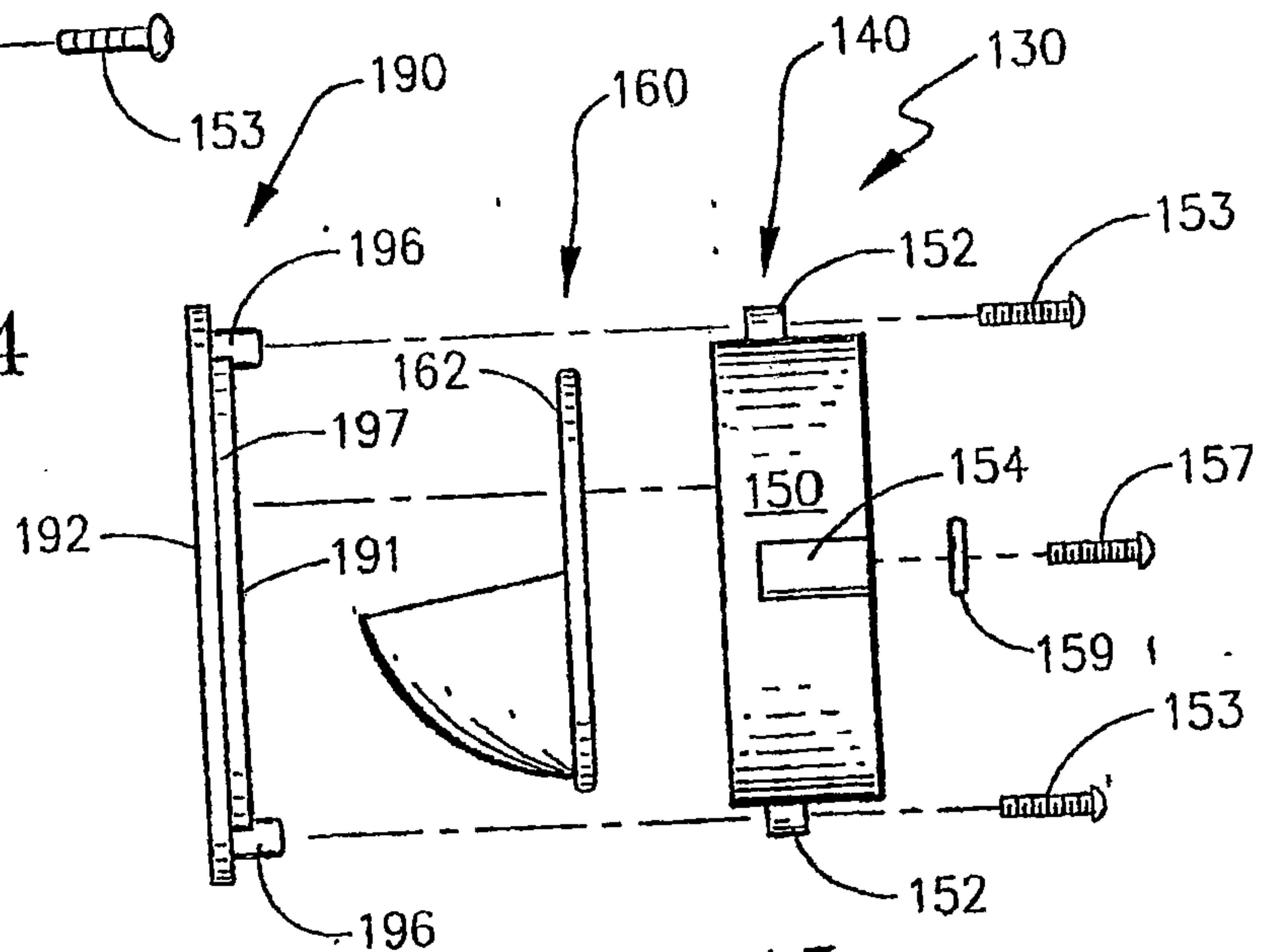


Fig.15

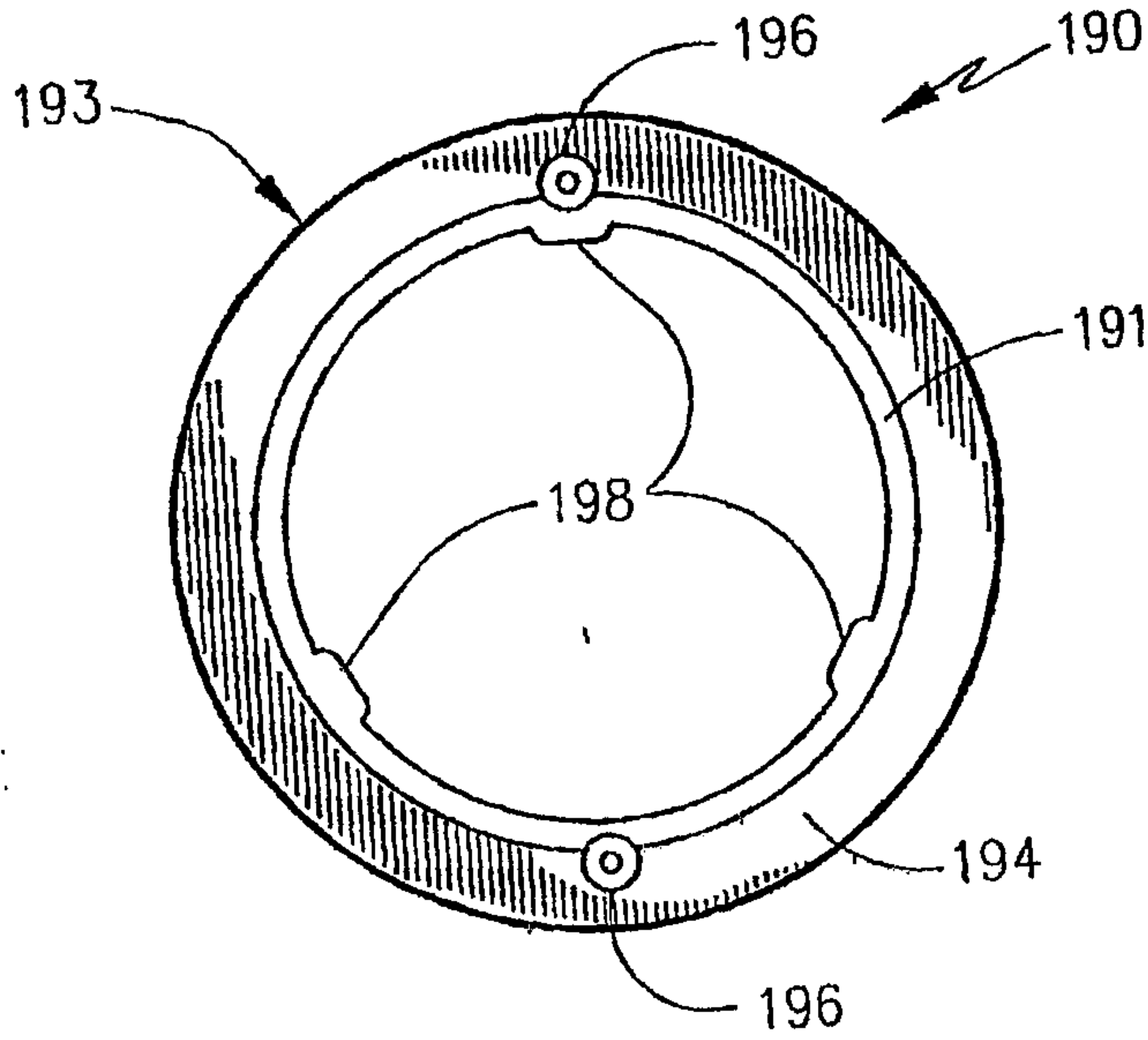


Fig. 16

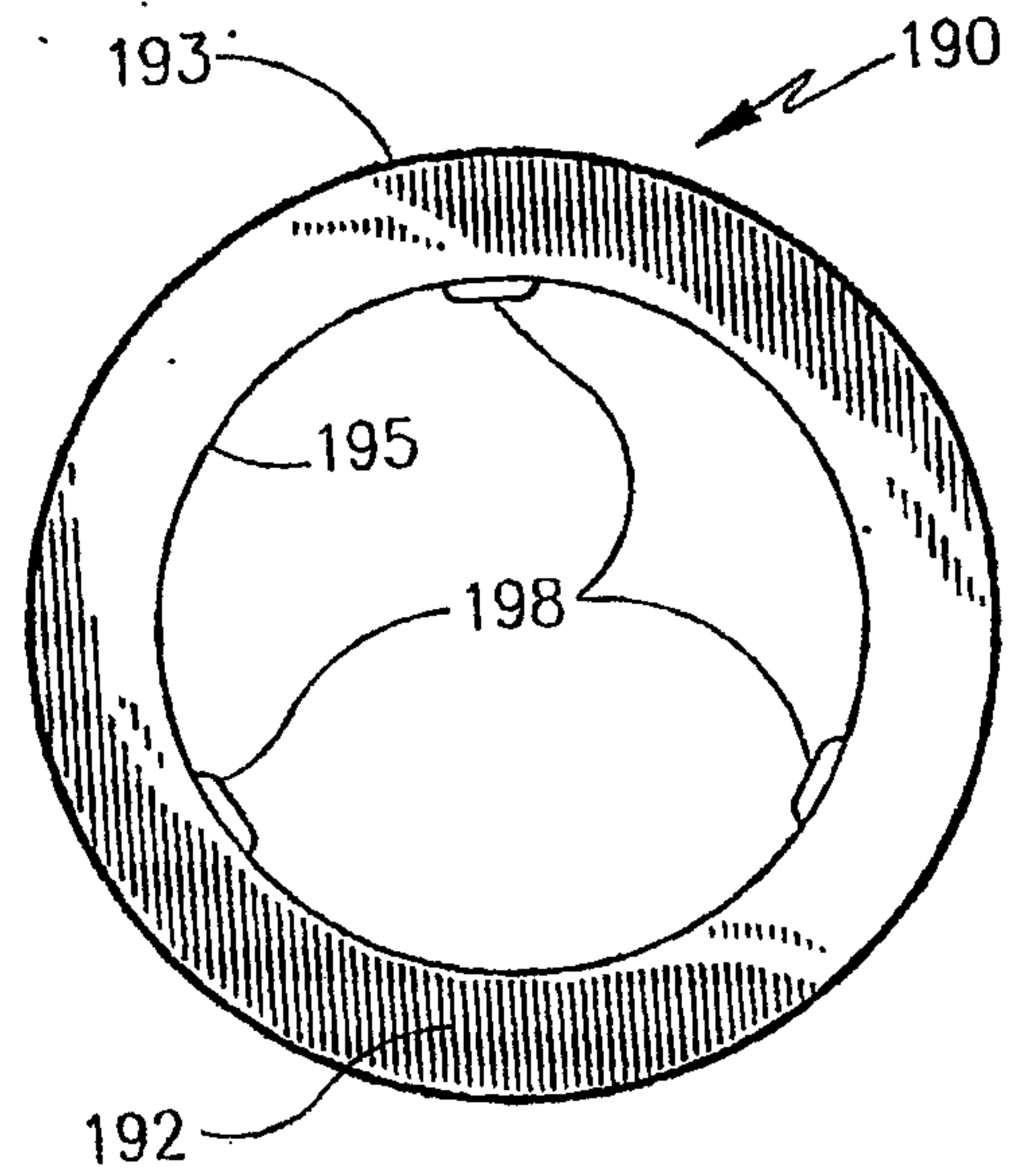


Fig. 17

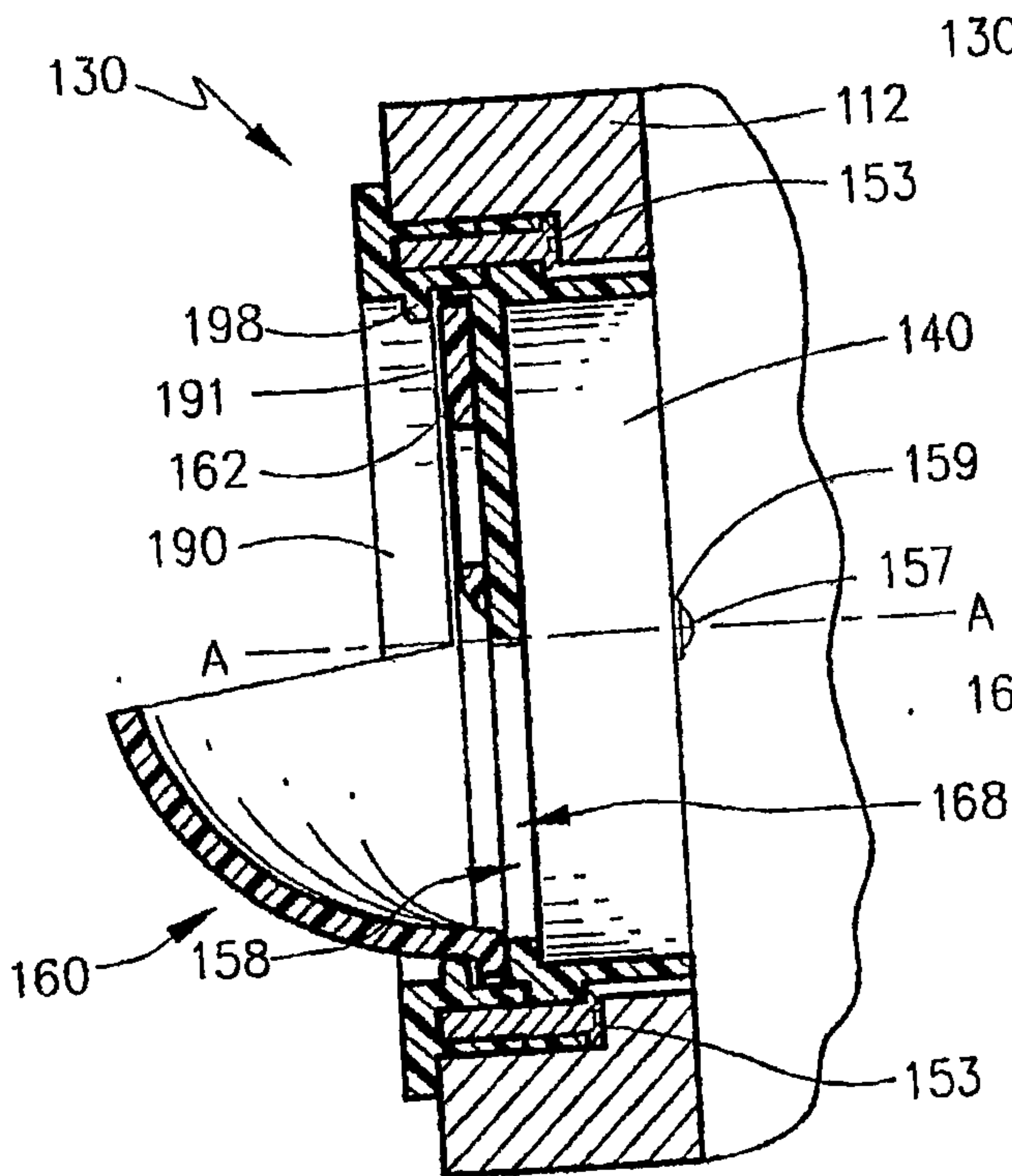


Fig. 18a

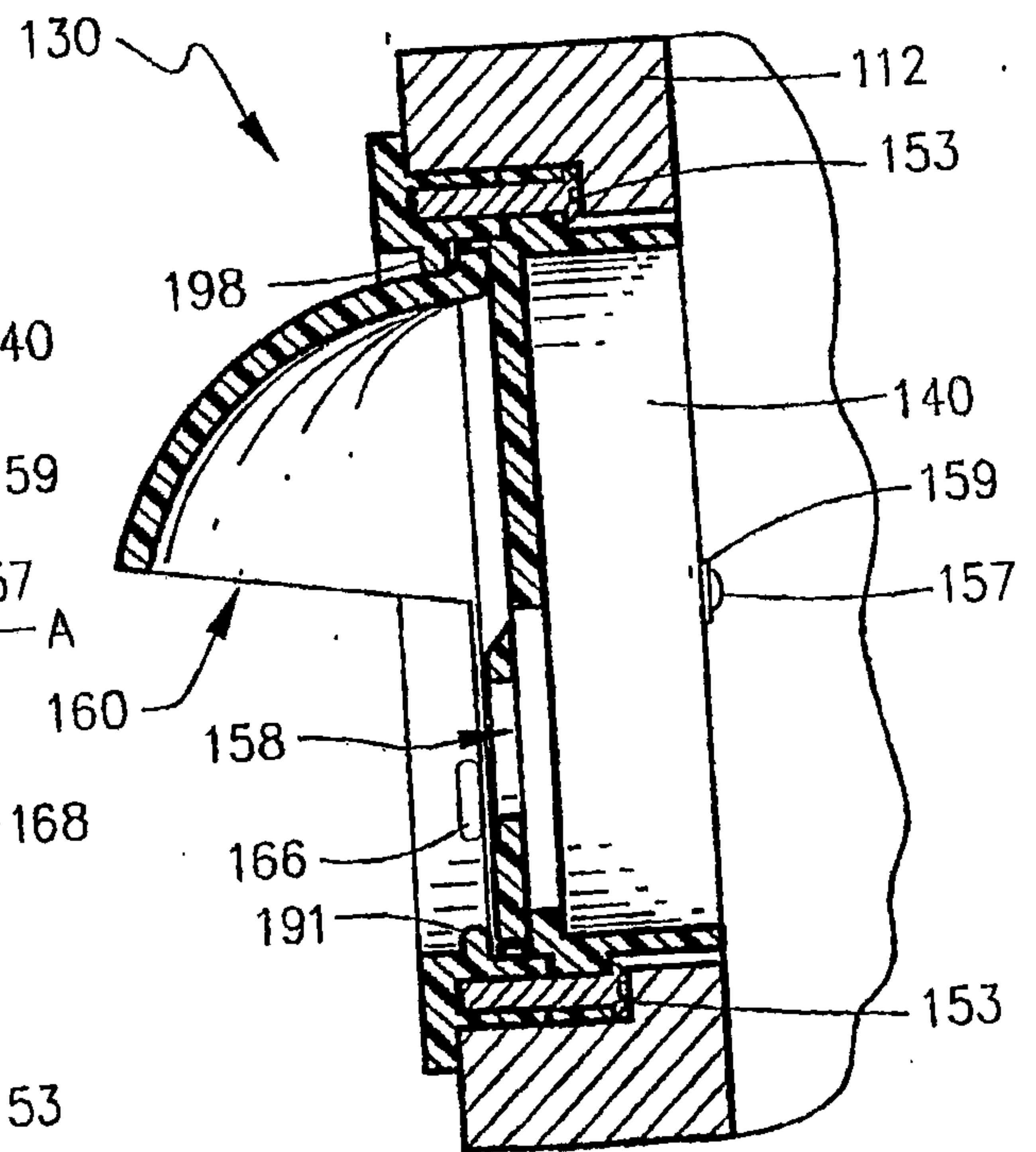


Fig. 18b

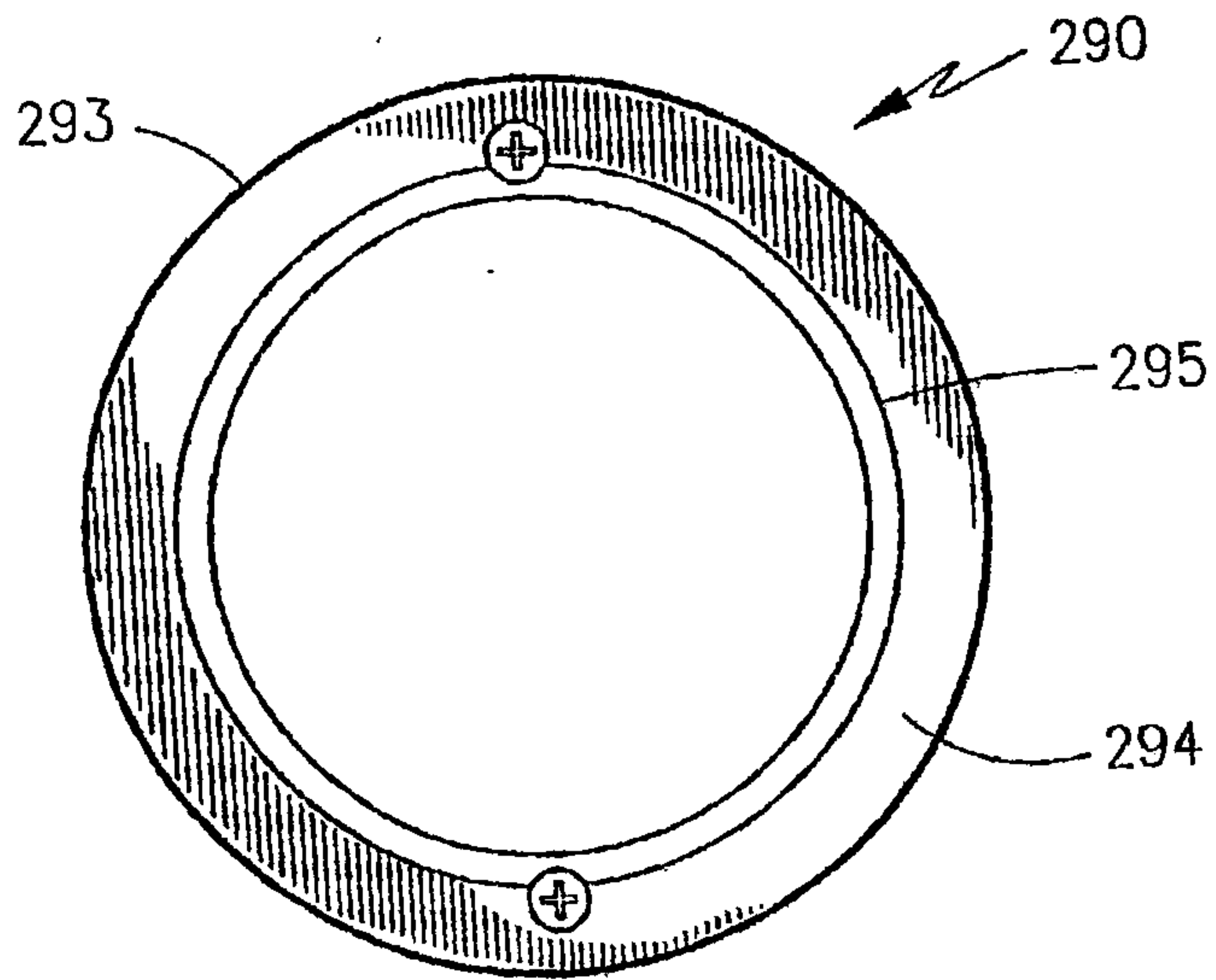


Fig.19

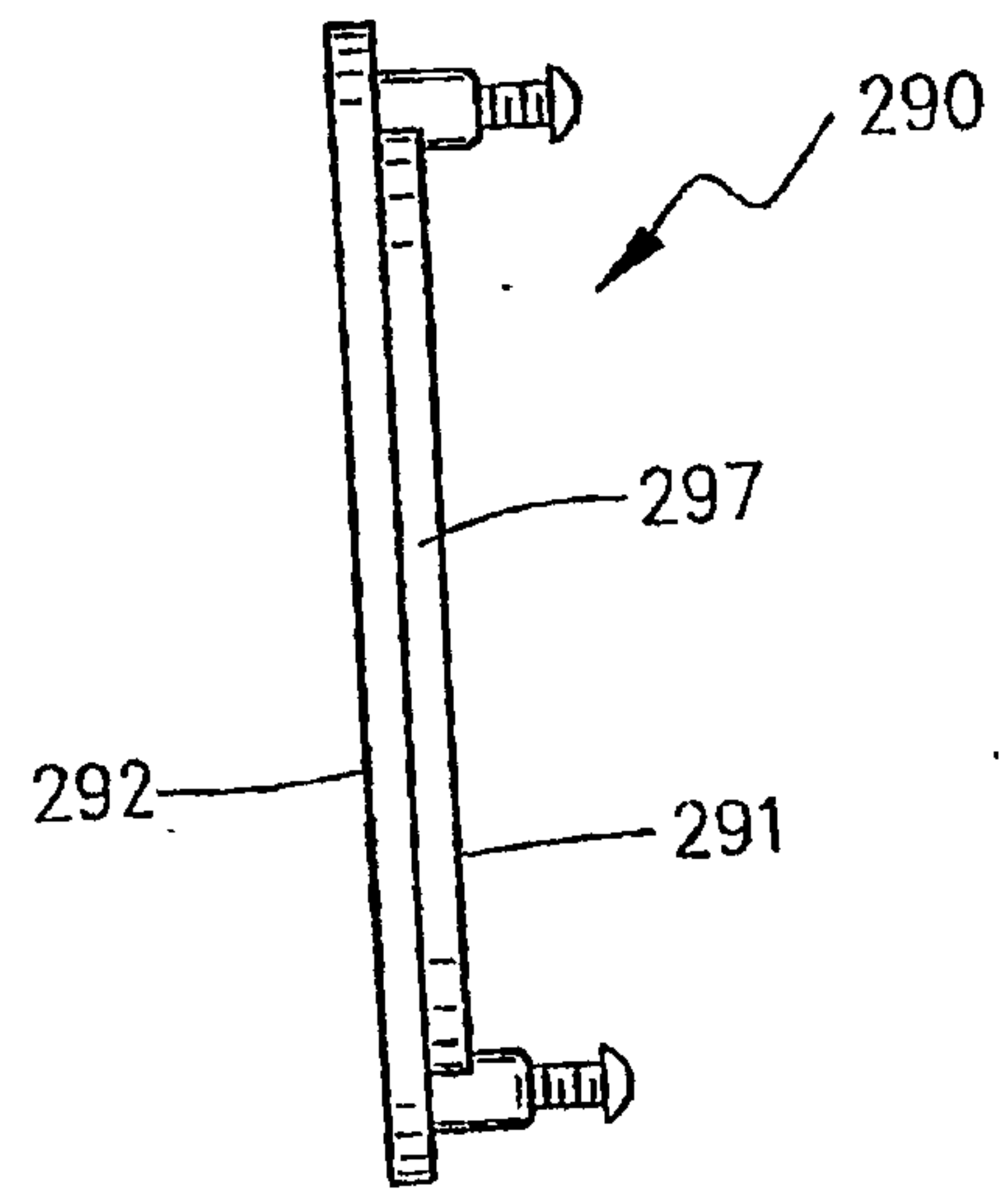


Fig.20

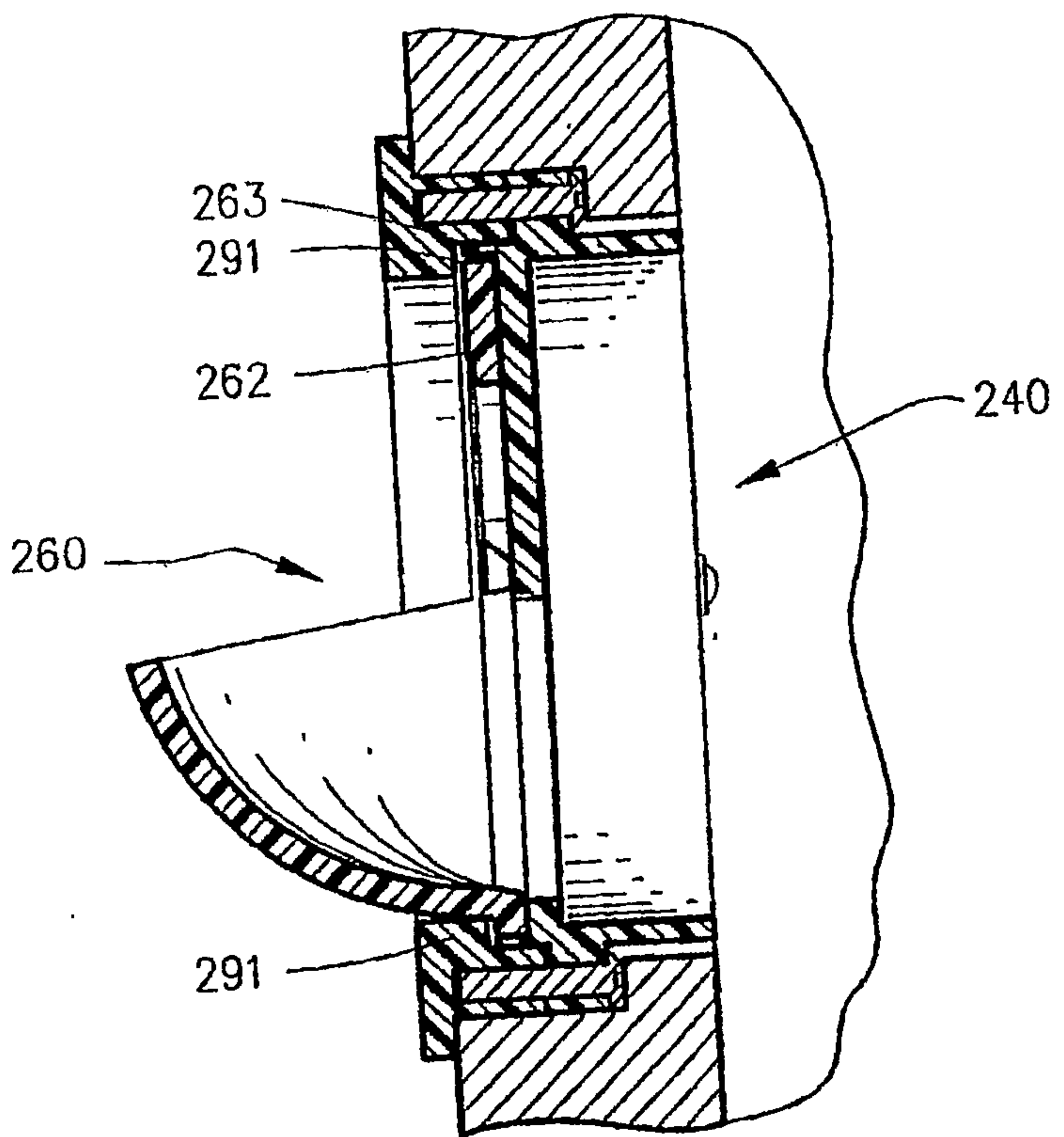


Fig.21

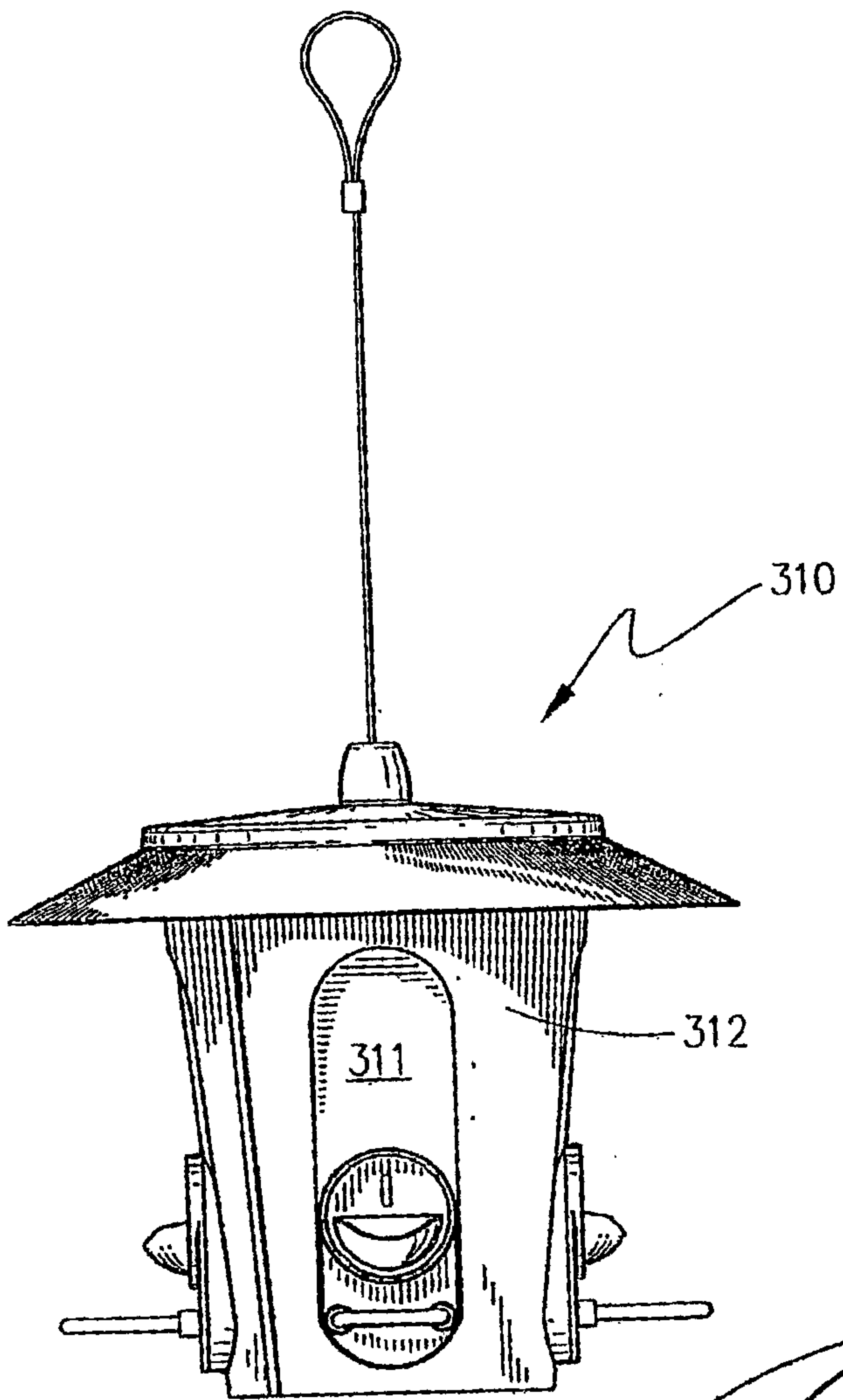


Fig. 22

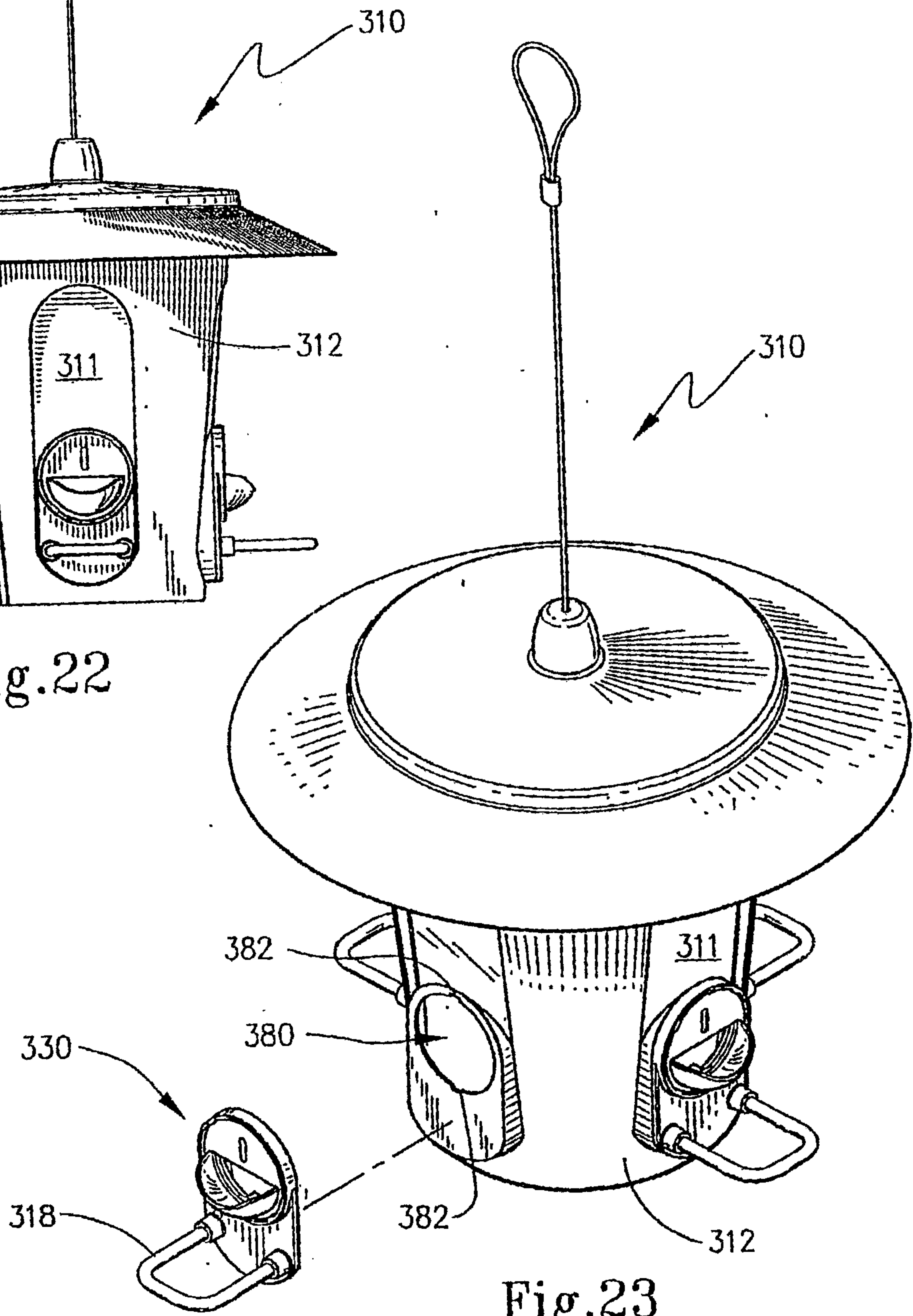


Fig. 23

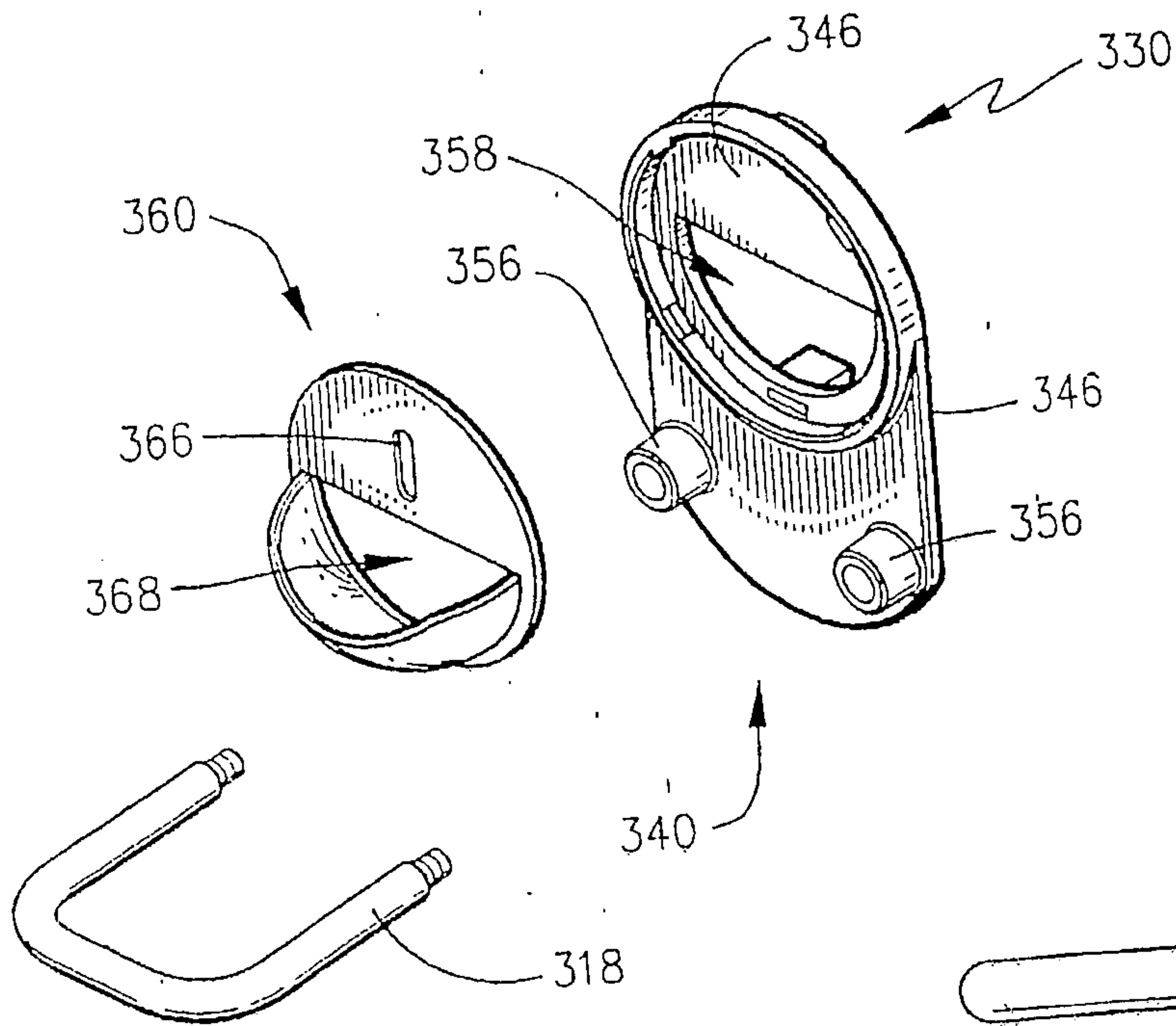


Fig.24

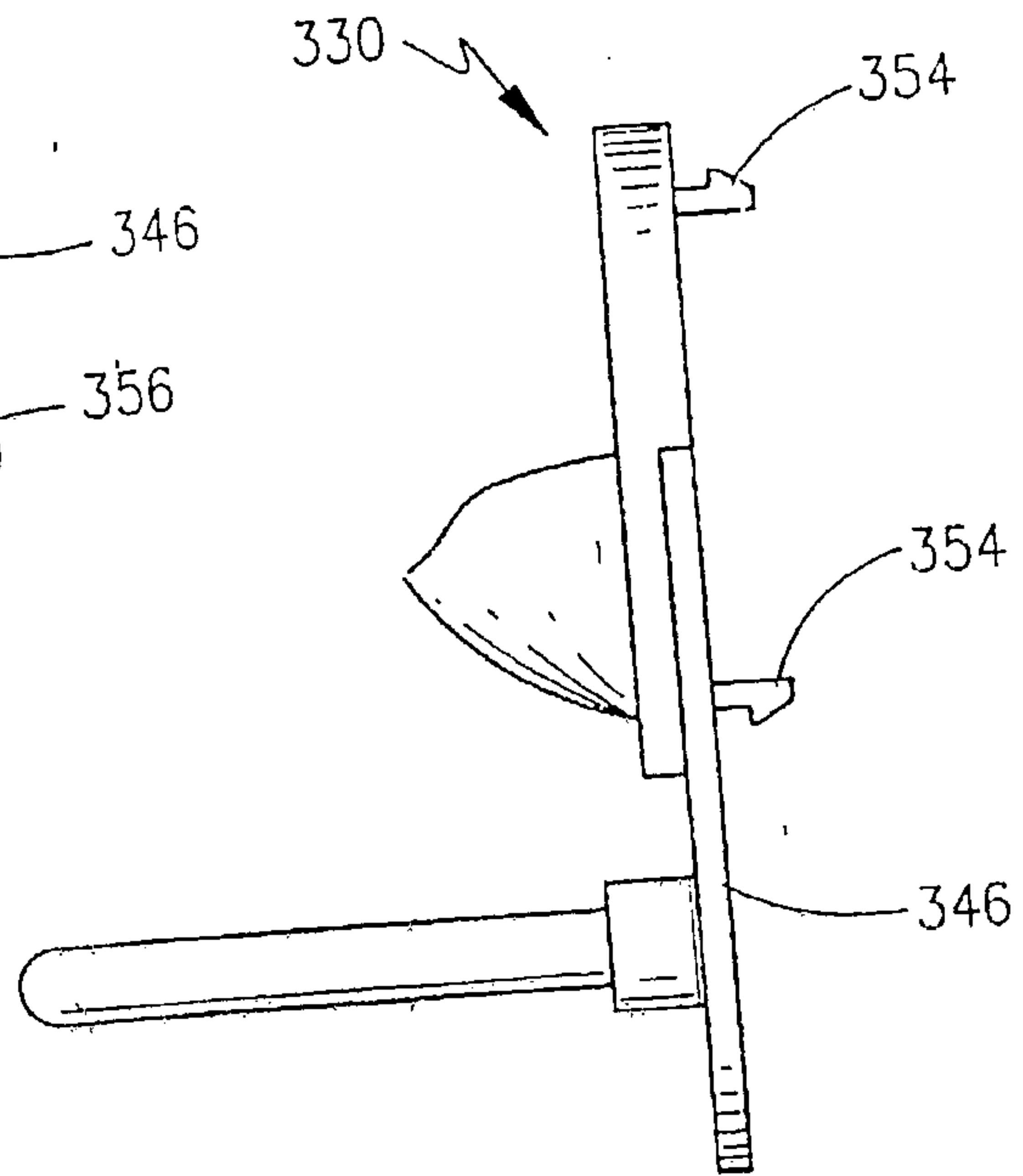


Fig.27

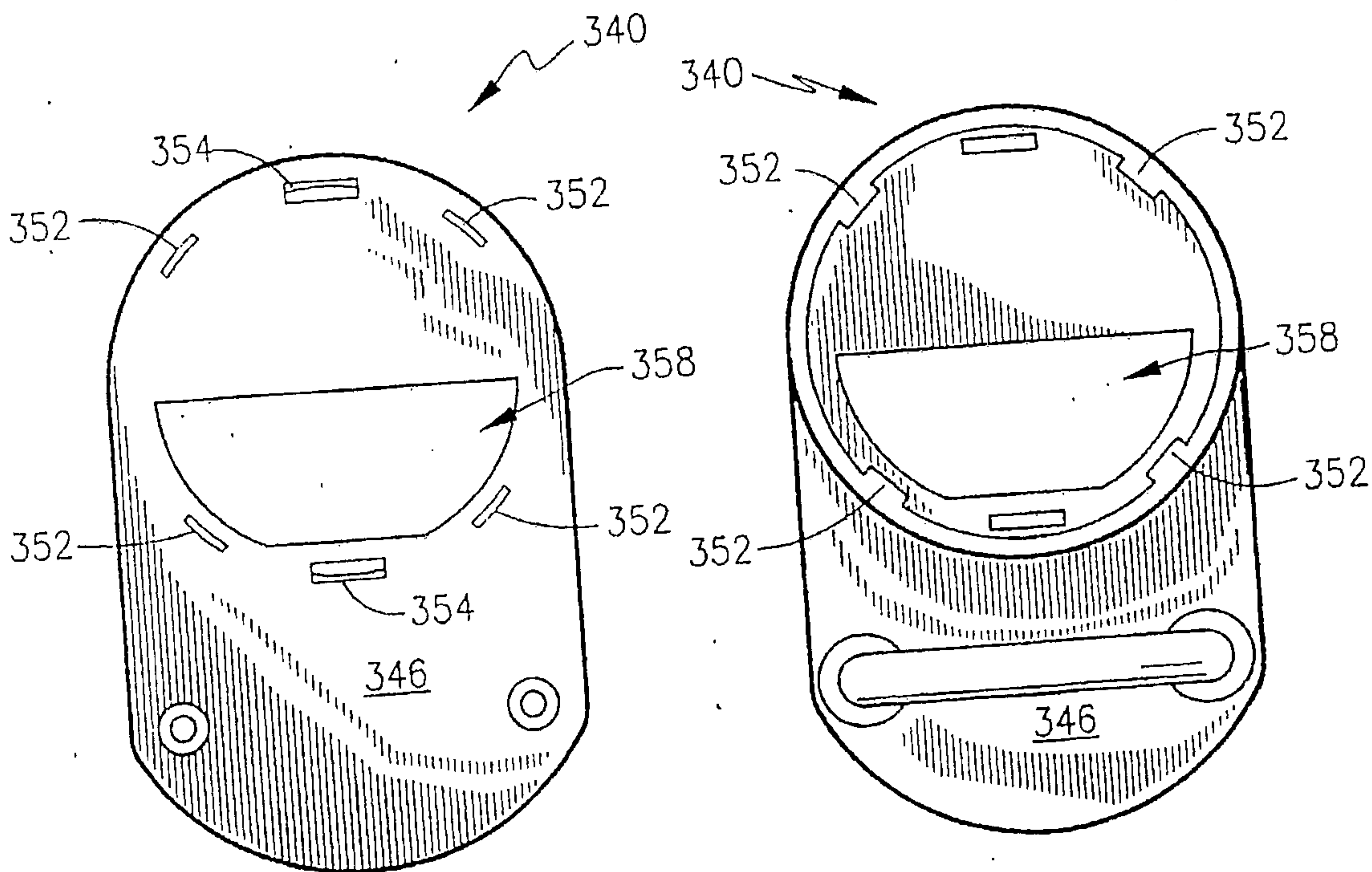


Fig.25

Fig.26

