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(54) **GUN SIGHT**

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(57) **ABSTRACT**

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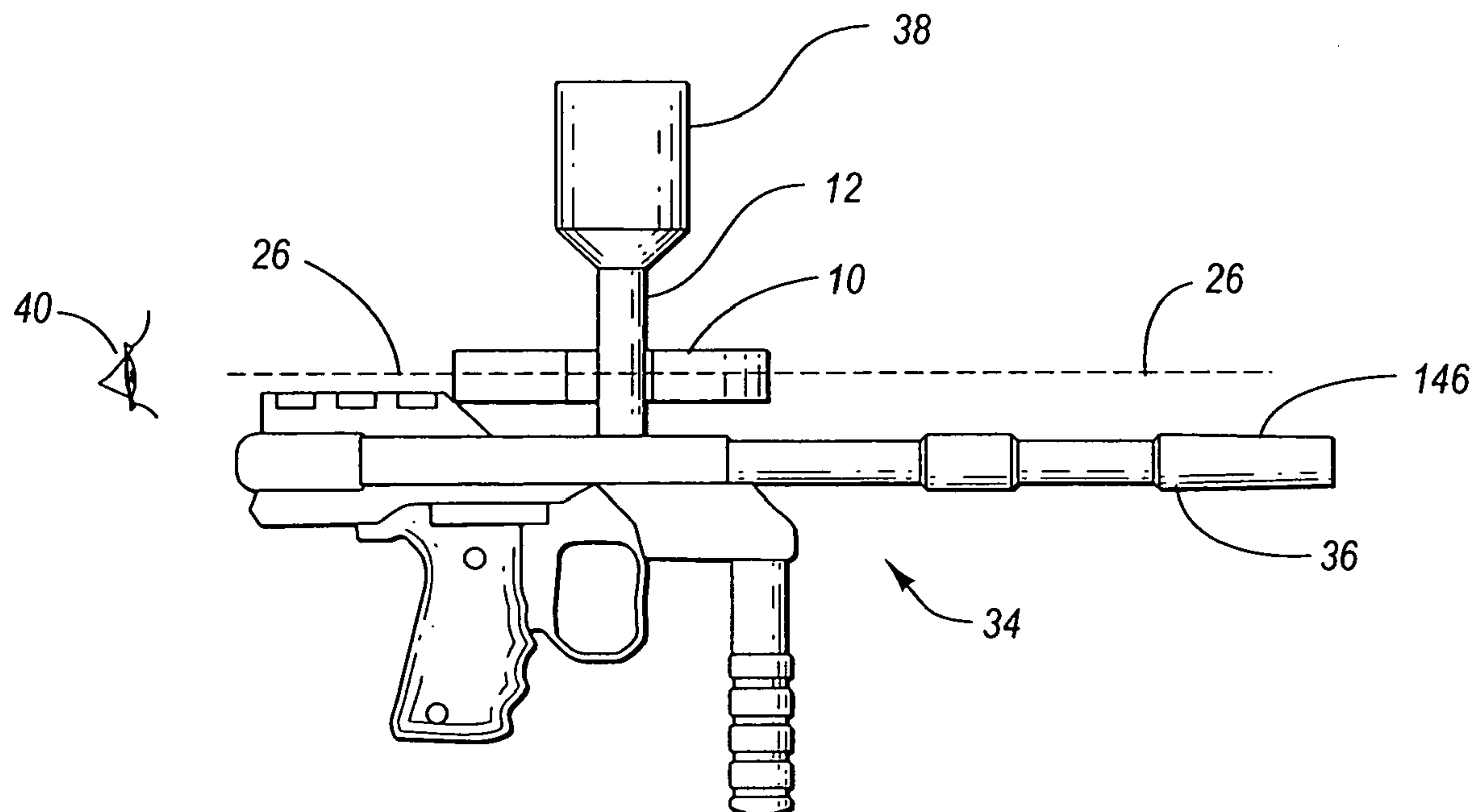
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A sighting device for a paint ball or other gun which uses optics to allow a user to sight along the top of the paint ball gun, around the feed tube or other obstruction along the top of the gun. The device is an optical reflective device which reflects an image around the paint ball feed tube to present an image to the gun user which appears directly above the top of the gun.

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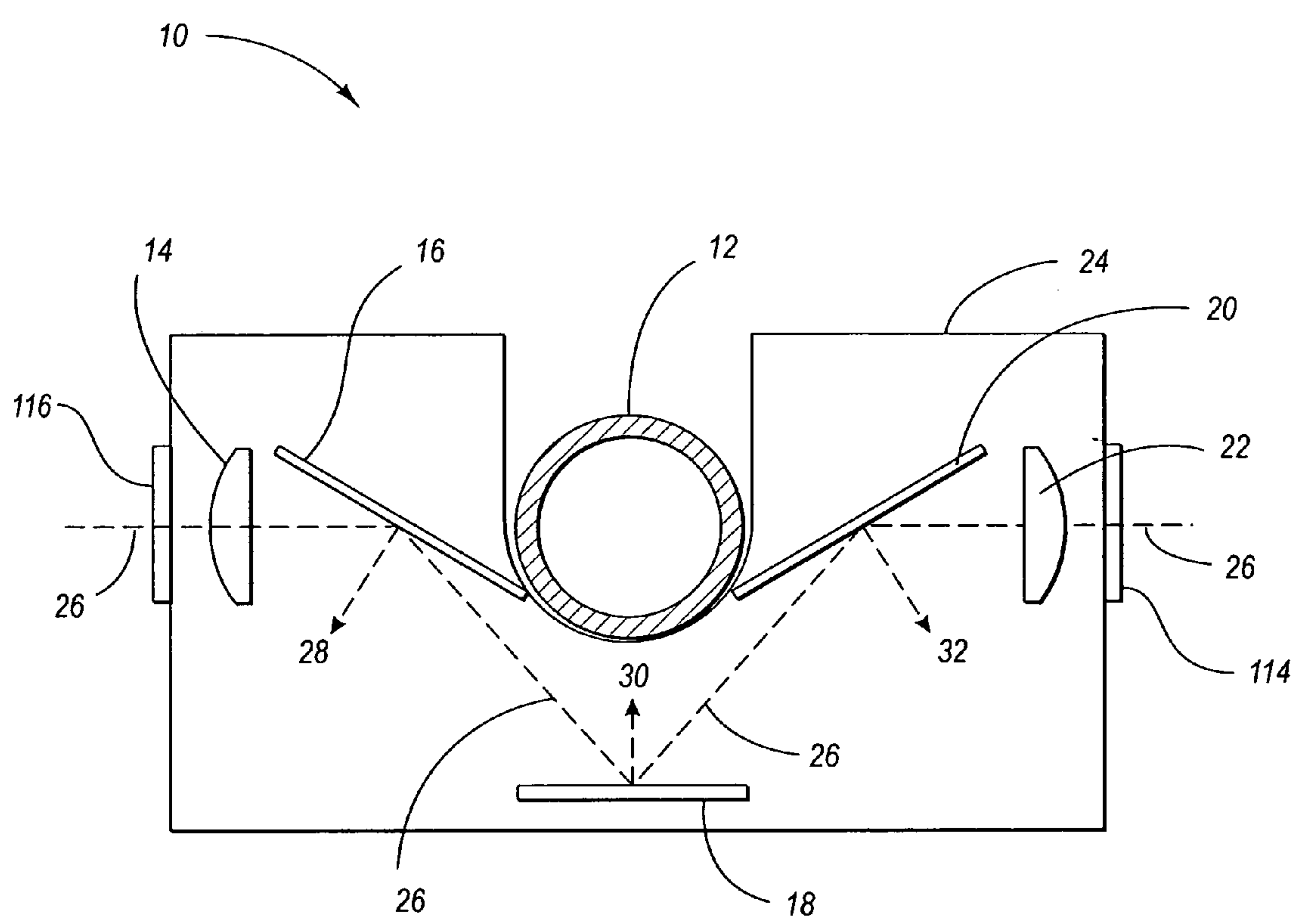


Fig. 1

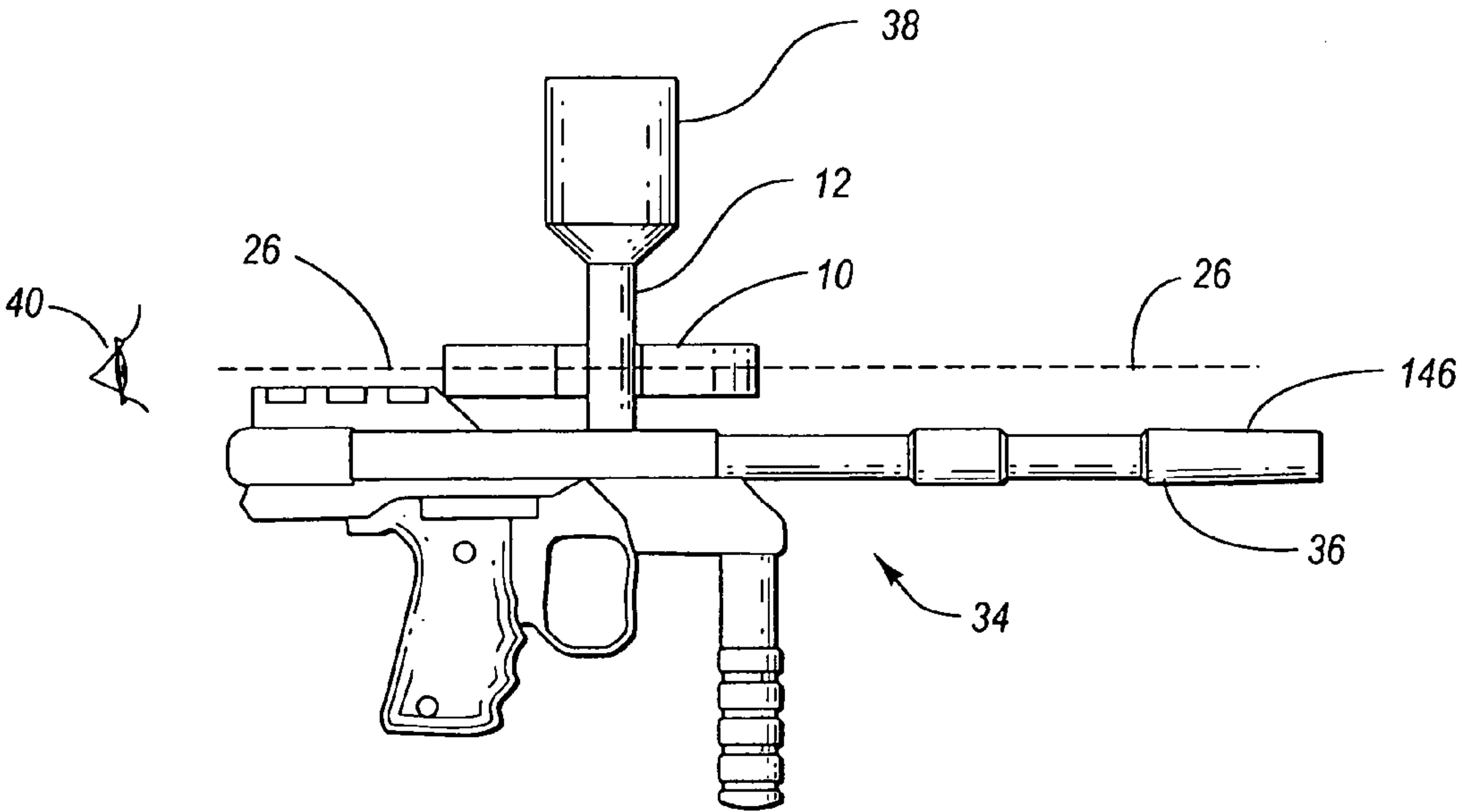


Fig. 2

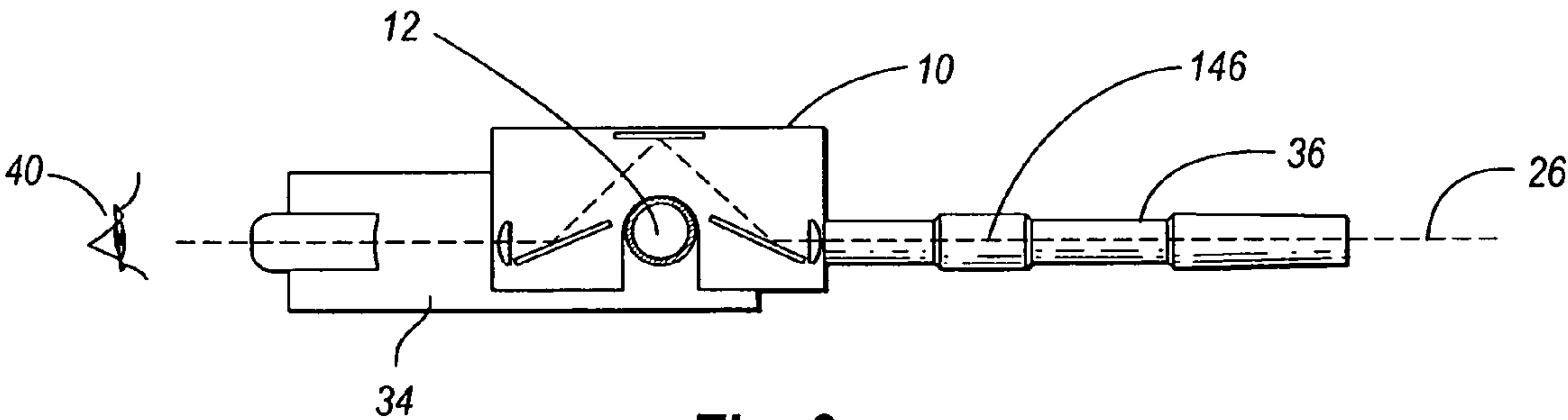


Fig. 3

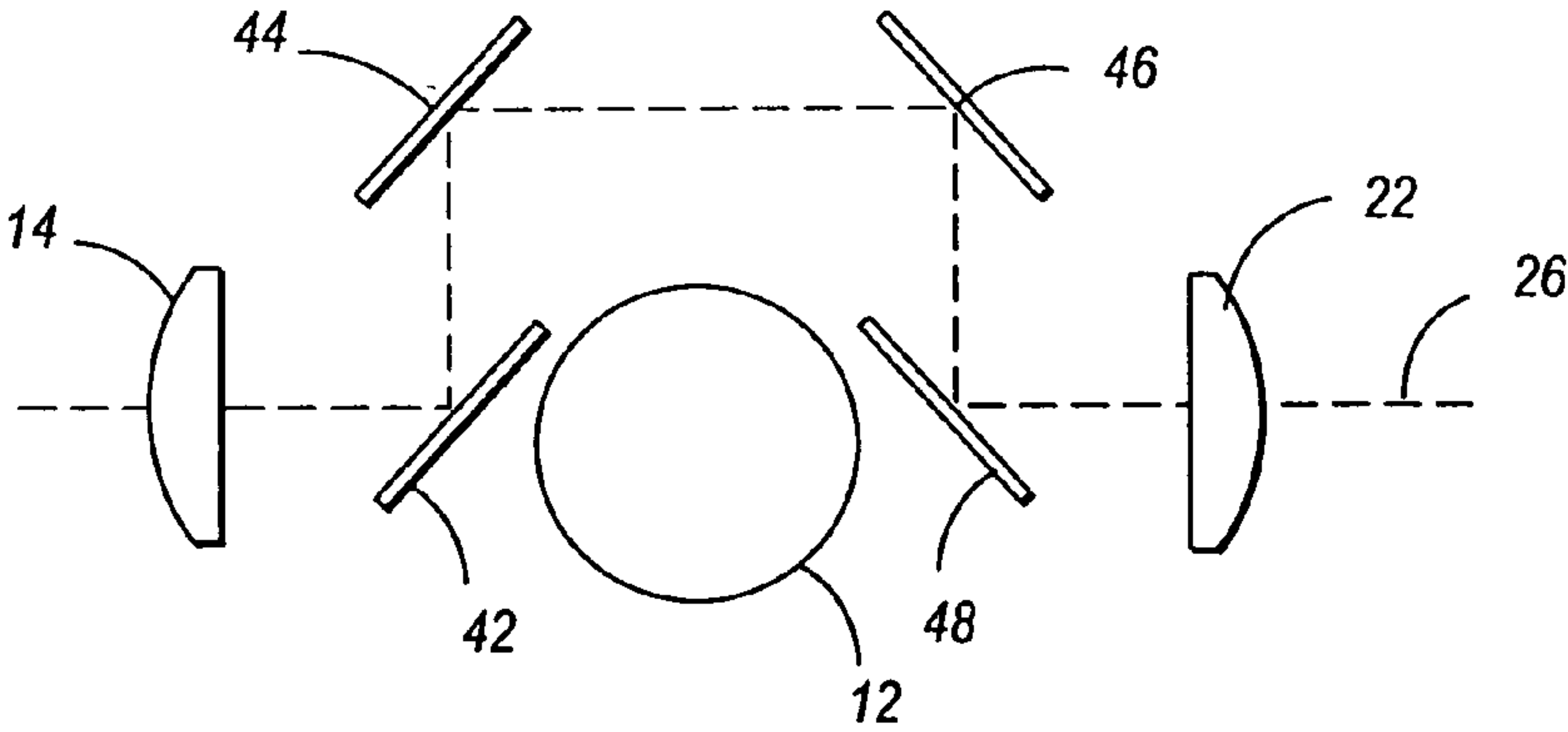


Fig. 4

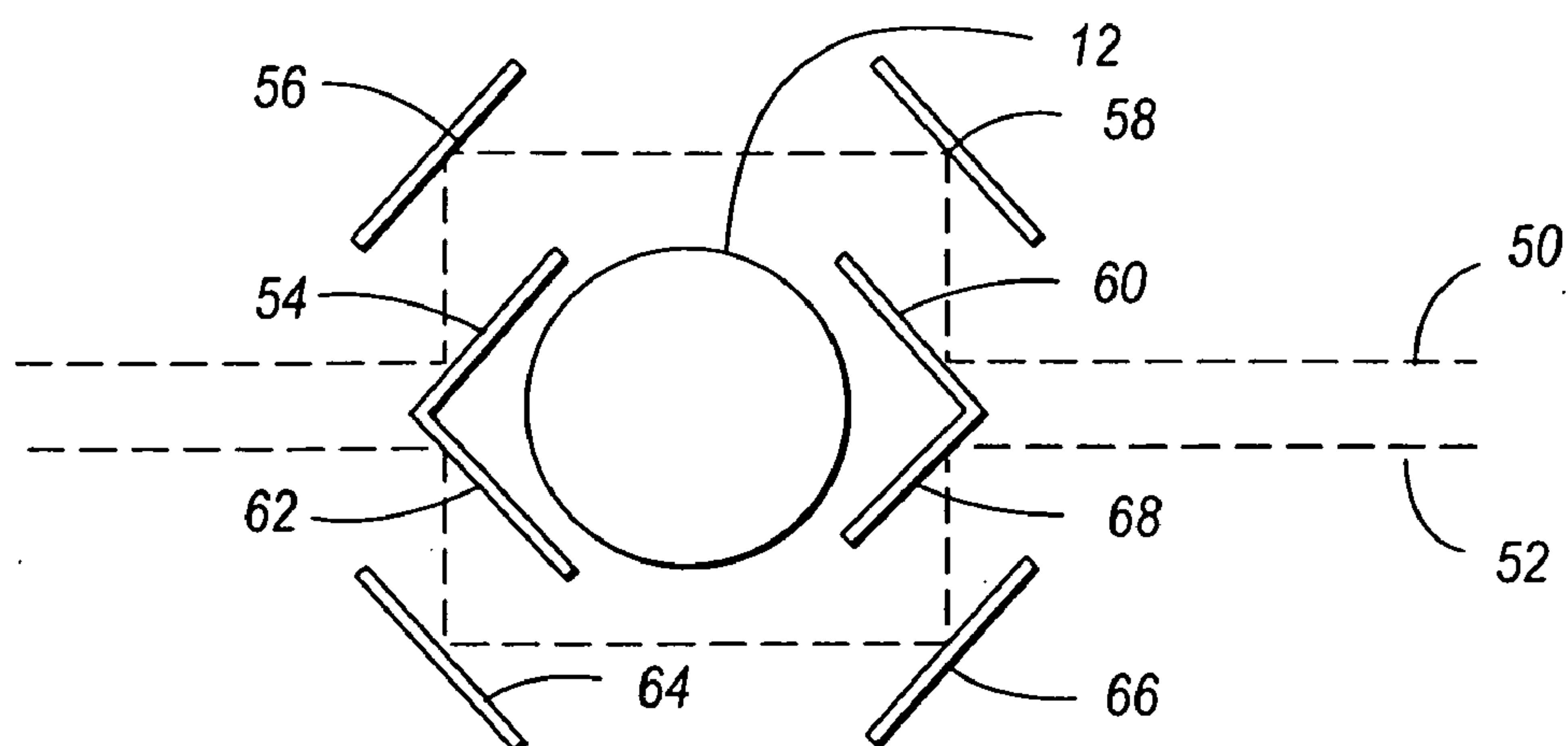


Fig. 5

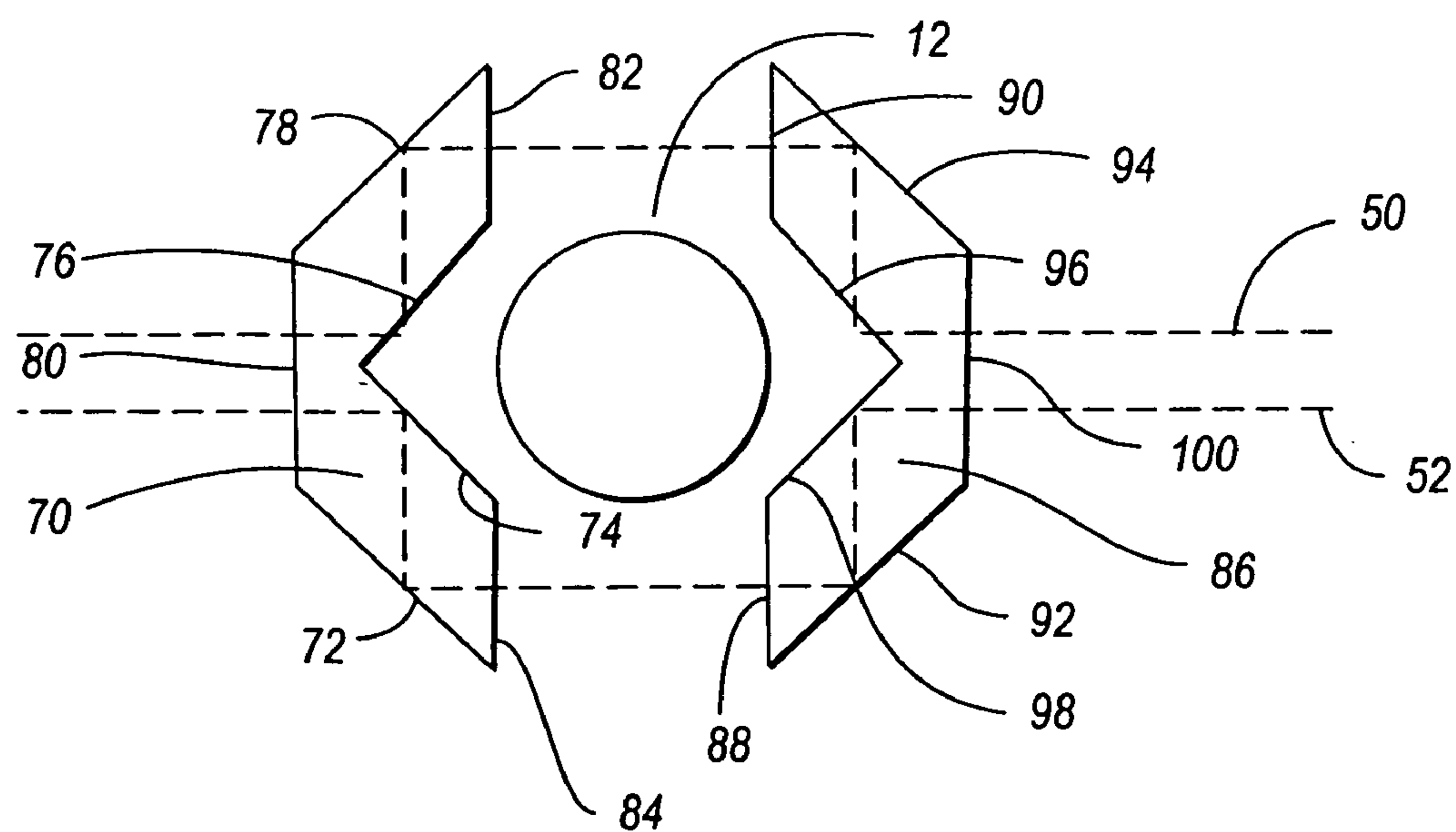


Fig. 6

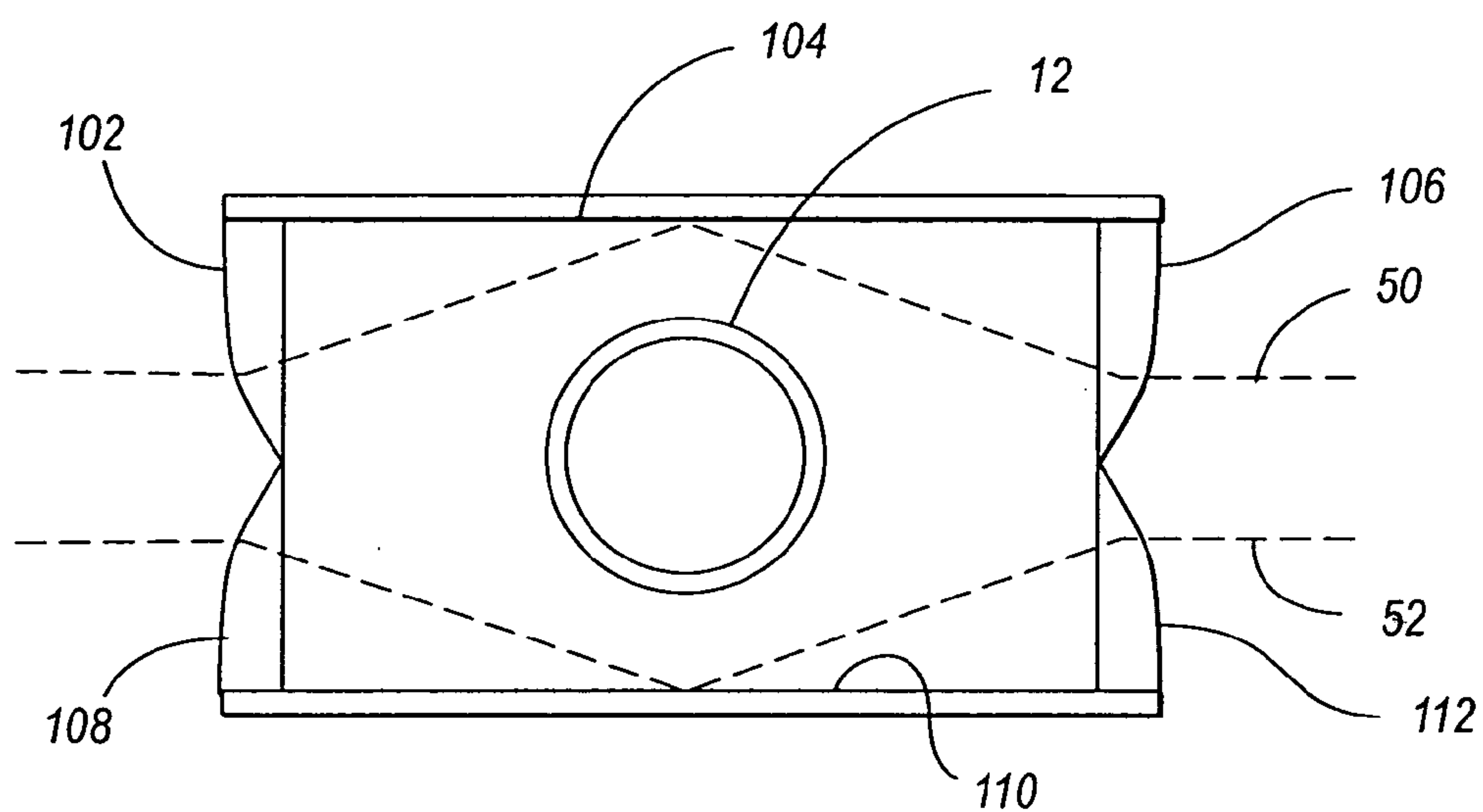


Fig. 7

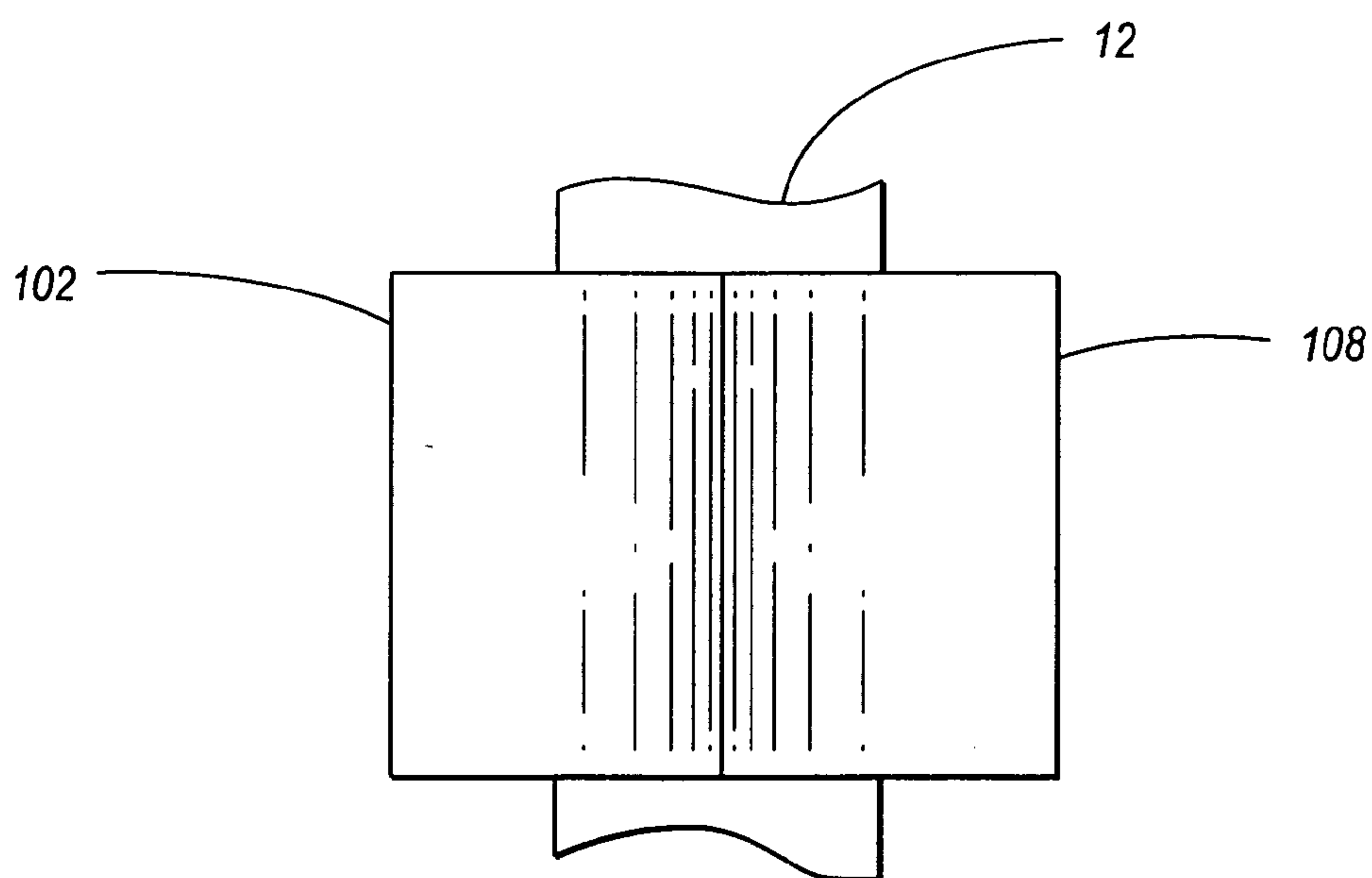


Fig. 8

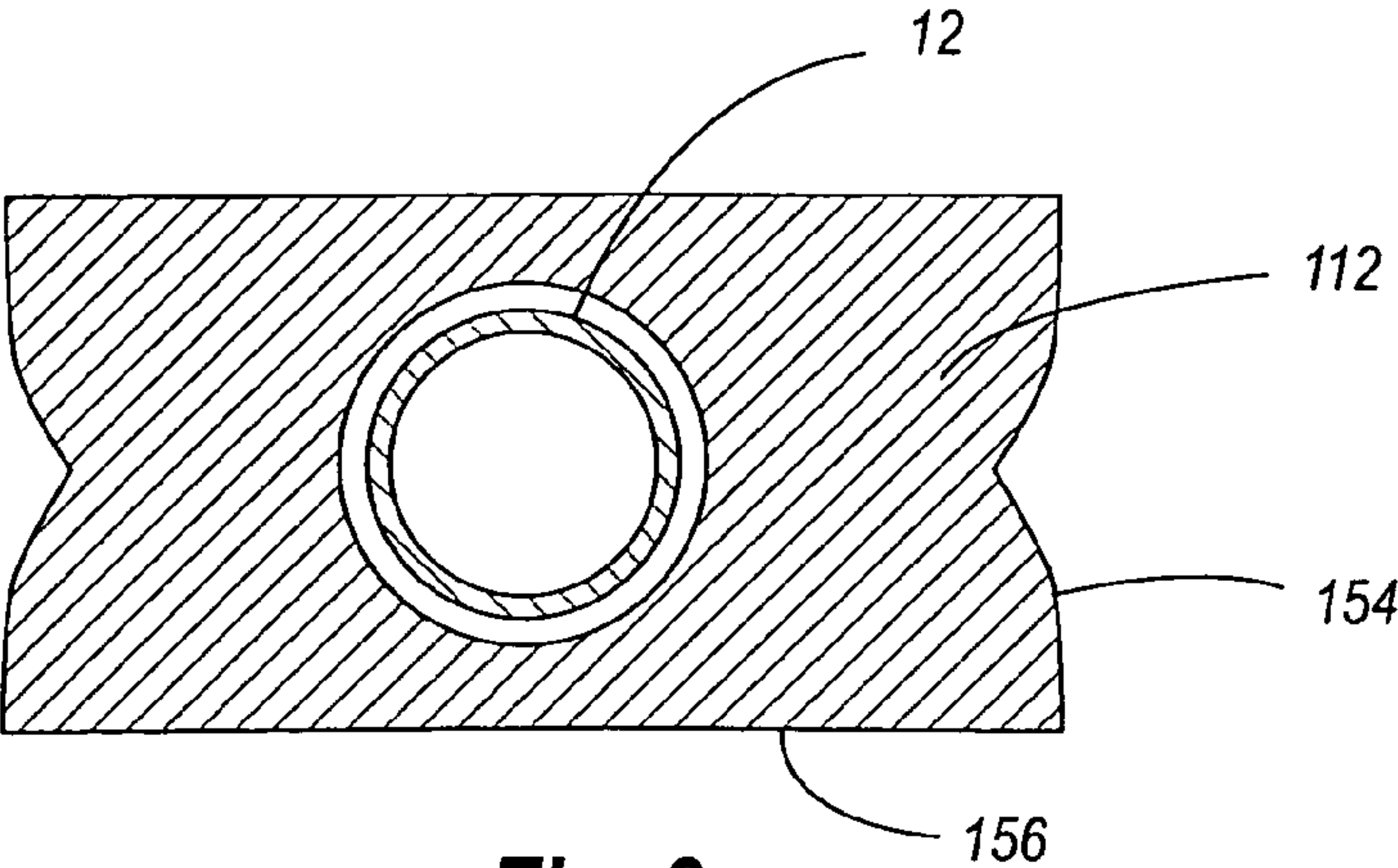


Fig. 9

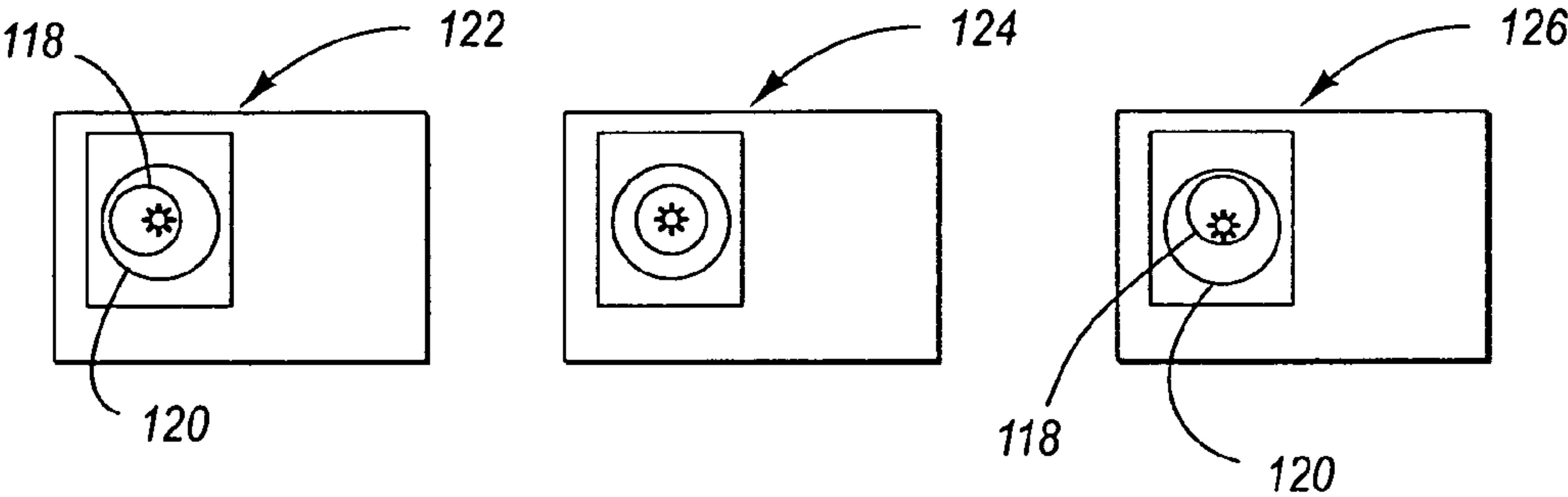


Fig. 10

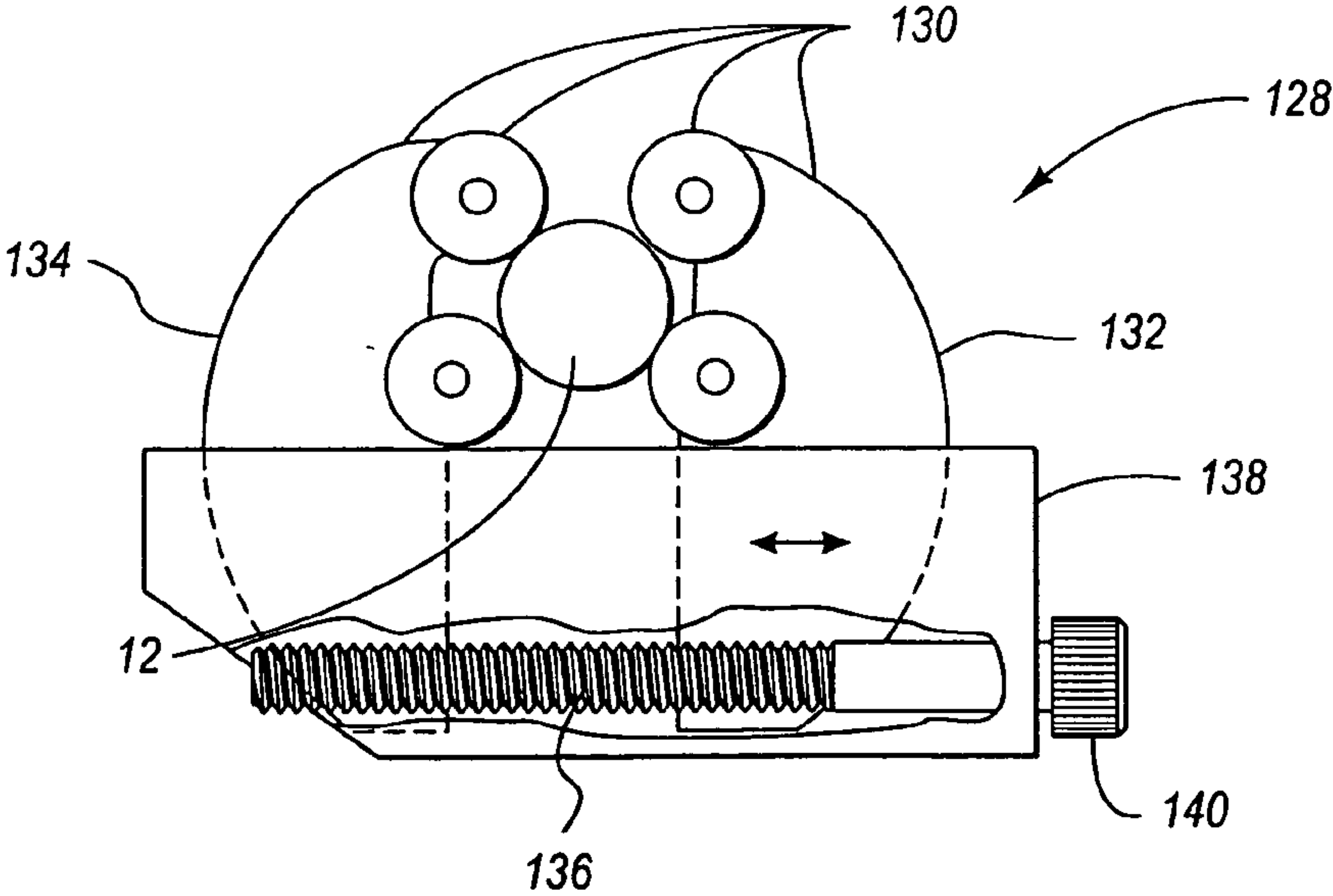


Fig. 11

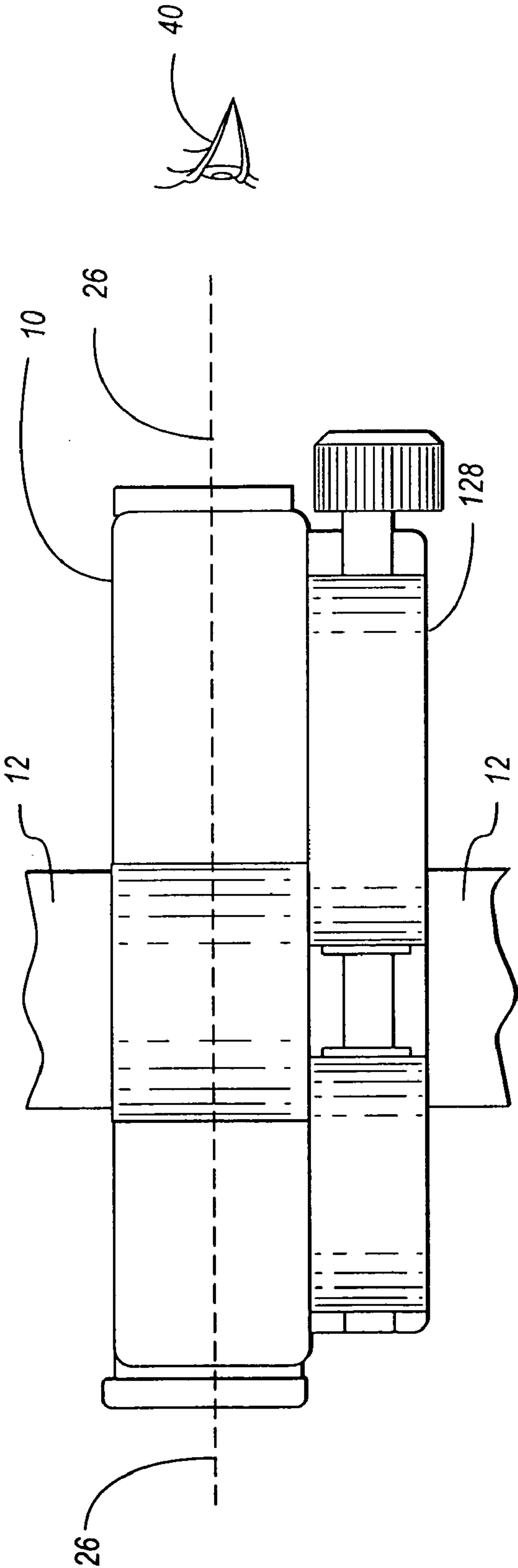


Fig. 12

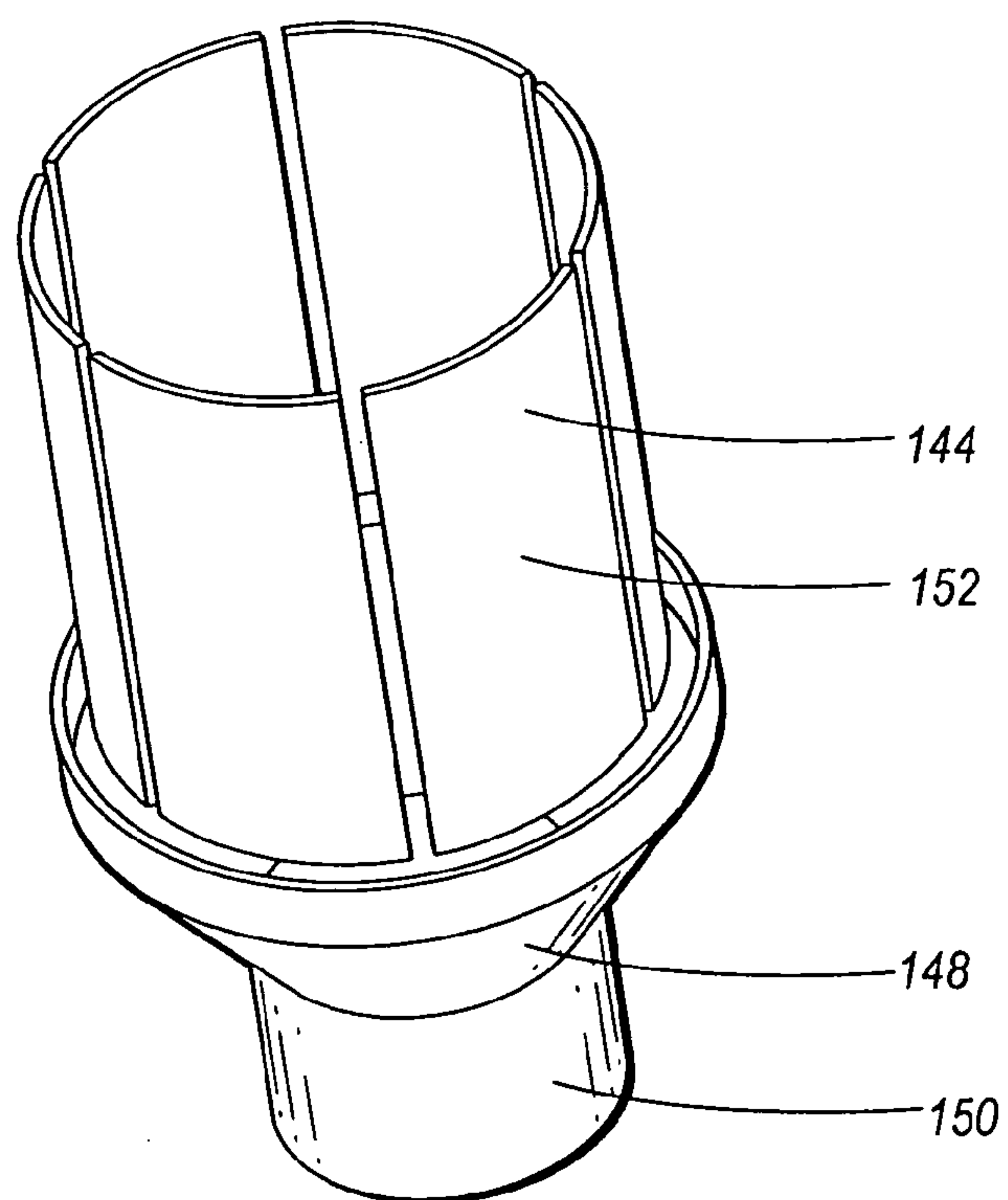


Fig. 13

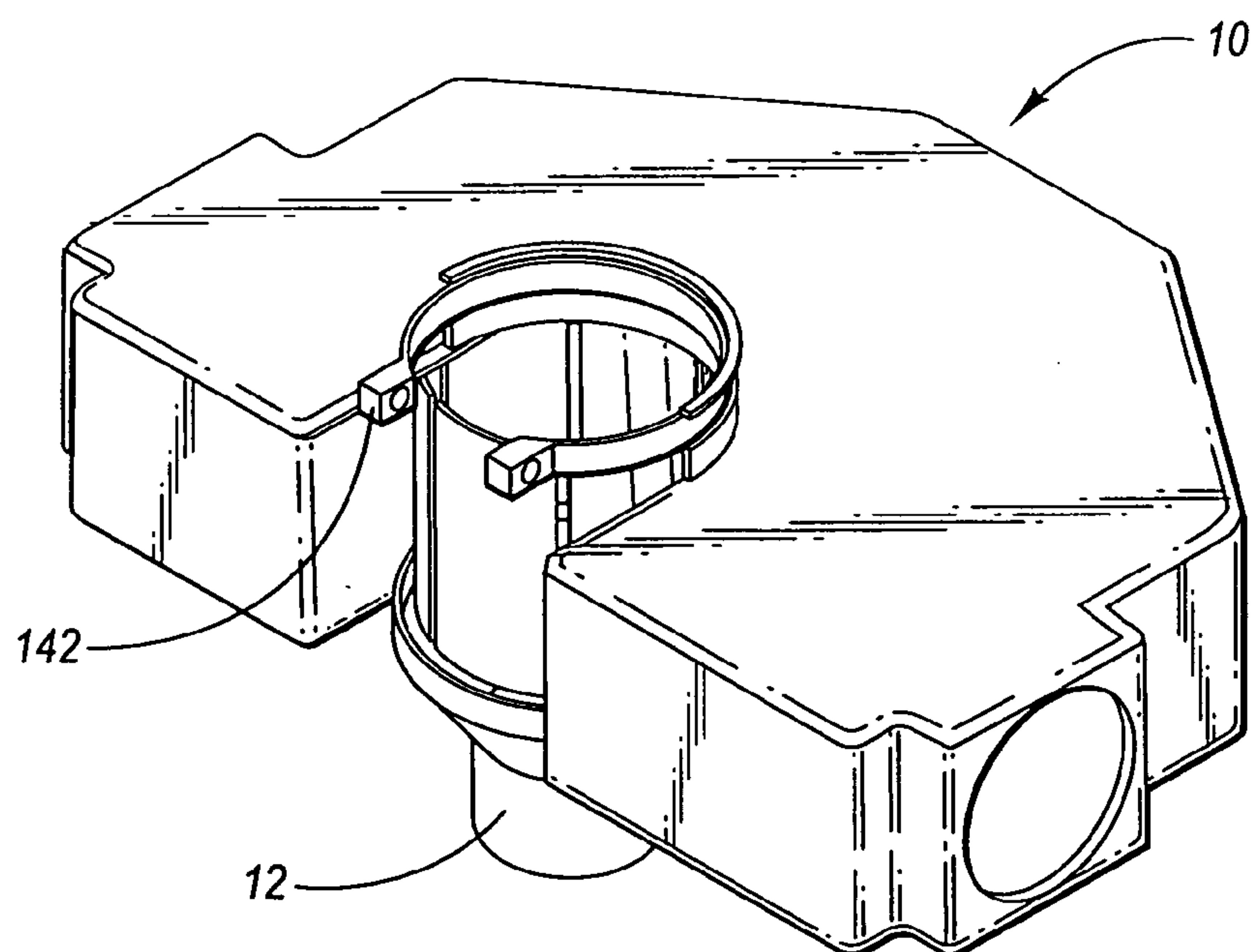


Fig. 14

GUN SIGHT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention generally relates to gun sights, and more specifically to a gun sight for a firearm with an obstruction on the top of the barrel.

[0003] 2. Background Information

[0004] Paint ball has become one of the fastest growing sports in America and perhaps, worldwide. In paint ball, users use a paint ball gun to shoot at opponents for recreation. The paint ball gun is similar in appearance and user operation to a rifle. However, a paint ball gun differs in significant ways. A typical paint ball gun has these components: a main shooting body, a butt, a barrel, a breach, feed tube also known as a riser, and air bottle acting as a power source. A paint ball gun fires a paint ball which consists of an external casing encapsulating a dye, paint, or non lethal pepper inside. When fired at a target the casing bursts when it impacts the target, releasing the dye, paint, or pepper and marking the target.

[0005] In the typical paint ball gun, the breach is a mechanism that loads the paint ball in preparation for firing. The air bottle provides high pressure air to launch the paint ball down the barrel, which guides the projectile in the desired direction. The user places the butt against the shoulder or other portion of the body to help hold the paint ball gun during firing. A significant difference between a paint ball gun and a regular rifle is that the paint balls are stored in a hopper instead of a magazine. The paint balls are forced usually by a motor inside the hopper or vacuum system, down the feed tube and into the air chamber. Feed tubes or risers are different lengths and widths, but still act with the same purpose which is to feed paint balls to the firing chamber of the paint ball gun. With this feed tube directly on top of the barrel, there is no way of aiming by sighting down the barrel and estimating where the paint ball will hit. Paint ball players call this "snap shooting." Snap shooting has become most commonly used since a sight does not exist which allows a user to sight down the top of the paint ball barrel. The paint balls are fed by gravity from the hopper through a feed tube to the breach of the paint ball gun. Common paint ball games include "Scenarios," wherein the player carefully aims before making each shot at a target and "Speedball," where the player generally points the paint ball gun in the direction of the target and releases a barrage of paint balls with the intent of making at least one paint ball hit the target even without careful aiming.

[0006] The feed tube provides a considerable obstacle to careful aiming. In the typical rifle, the user sights down the top of the barrel usually through some sort of notch sight or a telescopic sight. On a paint ball gun, the feed tube blocks the line of sight of the user down the barrel. Another gun which presents a problem for conventional scopes is a lever action rifle. In a lever action rifle, the obstruction on top of the barrel is the ejection path of the cartridge, which would be obstructed by a conventional scope.

[0007] Thus there is a need for a sighting mechanism that allows the user to sight down the barrel of a gun, yet avoid obstructions along the top of the barrel. Because paint ball is played outdoors and is a highly active and physically active game, the mechanism must be durable and sealed against humidity, rain, dust and the like.

[0008] For ease of storage and transport, there is also the need for the sight to be removable from the paint ball gun. Finally, the sight must be adjustable in the horizontal and vertical plane and have a shape that indicates to the user when the sight is properly sighted through the sight and down the barrel.

[0009] The user must be able to align the sight with the barrel of the paint ball gun by looking along the top edge of the rifle.

[0010] Additional desirable features include the ability to magnify the image seen through the sight for more accurate aiming and to provide color for polarized filters

[0011] Additional objects, advantages and novel features of the invention will be set forth in part in the description which follows and in part will become apparent to those skilled in the art upon examination of the following or may be learned by practice of the invention. The objects and advantages of the invention may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

SUMMARY OF THE INVENTION

[0012] These and other objects are achieved by the gun sighting device of the invention. The sighting device is designed for use in sighting along a gun barrel in which the line of sight or the top of the barrel is obstructed. This can be the obstruction of a feed tube of a paint ball gun, a pepperball gun or the obstruction of an ejection path of a lever action top ejecting rifle. In the case of the rifle, a traditional scope would block the ejection path of the rifle. The disclosure will primarily discuss the sight used with paint ball guns, realizing that it would be useful for any gun with an obstruction on the barrel, such as a top ejection rifle.

[0013] A typical paint ball gun is comprised of a gun barrel, with the gun barrel having a longitudinal axis, and a ventral surface along the top of the barrel of the gun. It includes a gun handle which also has a longitudinal axis, and the gun handle is attached to the gun barrel. The gun handle and the gun barrel form a sighting plane which passes through the longitudinal axis of the gun barrel and the longitudinal axis of the gun handle, and which also passes through a line centered in the ventral surface of the gun barrel. The paint ball gun includes a gun body, a paint ball hopper, and a ball feed tube which extends from the upper portion of the gun body on the ventral surface of the gun barrel.

[0014] The sighting device is designed to allow the user of the paint ball to sight along the ventral line of the gun barrel, in a manner similar to the sighting used for any rifle or handgun, in order to accurately aim the paint ball gun at a target. This task is normally not possible in a paint ball gun because the feed tube is located in the path through which the user must sight. This is because paint balls are fed by gravity from the paint ball hopper through the ball feed tube into the firing chamber of the paint ball gun. In order to overcome this obstacle to sighting along the ventral line of the paint ball gun barrel, the sighting device uses optical means to reflect an image around the ball feed tube. The sighting device includes a sight body, a mounting means for attaching the sight body to the gun body and an optic system which includes a number of reflective surfaces for reflecting an image from directly in front of the feed tube, to around the feed tube, to an eye-piece directly behind the feed tube and directly in line with the ventral line of the gun barrel.

[0015] The sighting device would typically attach to the feed tube itself, but certain variations could include attachment to the gun barrel or other parts of the gun body. The sighting device preferably can flow around a left or right side of the ball feed tube, or in certain configurations can go around both sides of the ball feed tube. A version which passes around one side of the ball feed tube can be reversed so that it fits on the opposite side of the ball feed tube.

[0016] The optic system can include a front lens which is mounted symmetrically over the ventral line of the barrel. It would also have one or more reflective surfaces, and would include a rear lens adjacent to the eyepiece, located symmetrically over the ventral line of the gun barrel through which a user sights in his target.

[0017] In one version of the device, the front lens, the reflective surface, and the rear lens are configured as a semi-cylindrical unitary optics piece. The circular front lens in front of the feed tube can also send an image around both sides of the feed tube, and can further include one or more reflective surfaces along with the circular rear lens adjacent to the eyepiece.

[0018] The sighting device can be formed from the generally cylindrical solid, such as a tube formed from sections of plastic joined together. A surface of the plastic would form a reflective surface to guide the image around the feed tube. One version of the device utilizes three reflective surfaces for reflecting an image from the front of the feed tube, to around the feed tube and delivering the image to an eyepiece directly behind the feed tube. The device can include one or more lens which concentrate the image before it is reflected around the feed tube, or before it is delivered to the eyepiece for the user to see. Another configuration of the optic system of the device utilizes four right angle turns for routing the image around the feed tube. This configuration utilizes four reflective surfaces which direct an image through four right angle turns and around the feed tube to display the image in the eyepiece. A version of this device can utilize four reflective surfaces on one side of the feed tube and four reflective surfaces on the other side of the feed tube to deliver an image around both sides of the feed tube.

[0019] Another version of the device can include an input window mounted on a side of the feed tube, in which the input window is not symmetrically located over the ventral line of the barrel, but is instead mounted at the side of the feed tube. In a sighting device of this configuration, reflective optics would route a target image to an eyepiece at the rear of the barrel, symmetrical over the ventral line of the gun barrel, with the eyepiece centered in the sighting plane of the gun. As with other versions of this sighting device, this device could include an input window or two input windows with one on either side of the feed tube, and with neither of the input windows in the sighting plane of the gun nor symmetrically disposed over the ventral line of the barrel.

[0020] The sighting device that is described above can be mounted using a tube attachment device, which includes at least two feed tube contacts that are configured for tightening around the feed tube. Tightening around the feed tube could take various configurations such as using a ring with set screws, with the ring slipping over the top of the feed tube when the hopper is removed. Similarly, the hopper and the feed tube could both be removed from the paint ball gun, and the ring could be slid into place on the feed tube when the feed tube is reattached. One type of connection could

include two contacts against the feed tube. One would be basically a point which could apply pressure, and one of the tube contacts could be concaved to receive the curve of the feed tube as the first tube contact is tightened. Three tube contacts could also be used, with the tube contacts being configured so that one or more of them could be moved towards the others to tighten around the feed tube. The input windows, also called the front lens, can include a first sighting mark which corresponds to a second sighting mark on the eyepiece of the device. The two sighting marks are used for alignment of the barrel of the paint ball gun on a selected target.

[0021] Another embodiment of the sighting device of the invention is one in which the sighting device is attachable or is incorporated as one piece into a feed tube assembly. The feed tube assembly and the attached sighting device would either replace the feed tube assembly of the paint ball gun, or would be sold with the gun as the manufacturer supplied feed tube assembly. By supplying the user with a feed tube assembly which is adapted for use with the sighting device, guns of various manufacturers and models can be supplied with the sighting device, even though each of them may have slightly different feed tube diameters. This version of the device would replace the manufacturer's version of the feed tube with a universal feed tube assembly to which the sighting device is attached or may be attached.

[0022] The purpose of the foregoing Abstract is to enable the United States Patent and Trademark Office and the public generally, and especially the scientists, engineers, and practitioners in the art who are not familiar with patent or legal terms or phraseology, to determine quickly from a cursory inspection, the nature and essence of the technical disclosure of the application. The Abstract is neither intended to define the invention of the application, which is measured by the claims, nor is it intended to be limiting as to the scope of the invention in any way.

[0023] Still other objects and advantages of the present invention will become readily apparent to those skilled in this art from the following detailed description wherein I have shown and described only the preferred embodiment of the invention, simply by way of illustration of the best mode contemplated by carrying out my invention. As will be realized, the invention is capable of modification in various obvious respects all without departing from the invention. Accordingly, the drawings and description of the preferred embodiment are to be regarded as illustrative in nature, and not as restrictive in nature.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 shows a top view of an embodiment of the invention.

[0025] FIG. 2 shows a side view of the present invention mounted to a feed tube of a paint ball gun.

[0026] FIG. 3 shows the top view of one embodiment of the invention mounted to the feed tube of a paint ball gun.

[0027] FIG. 4 shows the top view of another embodiment of the invention.

[0028] FIG. 5 shows the top view of another embodiment of the invention.

[0029] FIG. 6 shows the top view of another embodiment of the invention using prisms.

[0030] FIG. 7 shows another embodiment of the invention using lenses.

[0031] FIG. 8 shows a front view of the embodiment of the invention shown in FIG. 7.

[0032] FIG. 9 shows an embodiment of the invention using lenses.

[0033] FIG. 10 shows three views of aiming of the alignment marks as seen by the user of the gun sight.

[0034] FIG. 11 shows an adjustable and removable mount used according to an embodiment of the present invention.

[0035] FIG. 12 shows a side view of an embodiment of the sight and the mount according to an embodiment of the present invention.

[0036] FIG. 13 is a perspective view of an embodiment of the sighting device of the invention mounted on a universal feed tube.

[0037] FIG. 14 is a perspective view of the universal feed tube neck for use with the sighting device of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0038] While the invention is susceptible of various modifications and alternative constructions, certain embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific form disclosed; rather, the invention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention as defined in the claims. For example, while embodiments of the present invention were developed for a paint ball gun, the invention is not limited to use with paint ball guns and may be used with other firearms. The sight of the invention is also particularly useful in top ejecting rifles, where an ejection path creates an obstruction to mounting a conventional scope. While the invention is not limited to use with paint ball guns, it is expected that various embodiments of the invention will be particularly useful in such devices.

[0039] An embodiment of the invention is shown in FIG. 1. Referring to FIG. 1, gun sight 10 is made up of a series of optical elements that pass light around feed tube 12. For the purposes of this document, an optical element is any device that transmits, refracts or reflects light. Each optical element has an optical axis, which means the straight line that is coincident with the axis of symmetry of the surfaces of the element. An optical path is a path taken by the light as it passes through or is reflected from each of the optical elements in sequence. Referring to FIG. 1, gun sight 10 includes an objective lens 14, a first mirror 16, a second mirror 18, a third mirror 20, and an eyepiece lens 22. The optical elements are supported by body 24. The light passing through each of the optical elements defines an optical path 26. First mirror 16 has a first optical axis 28 that is perpendicular to the surface of the mirror. Likewise, second mirror 18 has a second optical axis 30 and third mirror 20 has a third optical axis 32. Lens 14 has an optical axis that is coincident with path 26. Similarly eyepiece lens 22 has an optical axis coincident with path 26. As can be seen in FIG. 1, optical path 26 passes around feed tube 12, meaning that the feed tube 12 does not interfere with optical path 26 at any point. Note that optical axes 28, 30, 32 and the optical axis of lens 22 and 14 are all co-planar. The materials used to construct the device of the invention can be various plastics and metals for the housing and plastics or glass for the optics. The selection of the materials would be an engineering decision and any suitable material could be used.

[0040] In the case of a paint ball gun, the feed tube 12 constitutes an obstruction to the user's sighting along the barrel of the gun. In other guns, other obstructions may be overcome with the sight of the invention. In top ejecting rifles, the ejection path of the cartridge is the obstruction.

[0041] FIG. 2 shows gun sight 10 mounted on a paint ball gun 34 having a barrel 36. Paint ball gun 34 also has a hopper 38 attached to feed tube 12. Gun sight 10 is mounted around feed tube 12 so that optical path 26 outside of the gun sight 10 is parallel to barrel 36. The user aligns optical path 26 with his eye 40 so that he sights down the barrel to aim the gun. The barrel 36 also has a ventral line 146 along its top surface and the optical path 26 is directly above the ventral line 146 of the barrel, in the sighting plane of the barrel.

[0042] FIG. 3 shows a top view of gun sight 10 installed on paint ball gun 34. Note that the user's eye 40 is aligned along the top of the barrel 36 to aim the gun. This aiming alignment along the barrel is the most natural and convenient way to aim the paint ball gun or any gun. In effect, the user aims paint ball gun 34 in the normal fashion and by sighting through gun sight 10, the feed tube 12 no longer becomes an obstacle to aiming.

[0043] An alternative embodiment of the gun sight is shown in FIG. 4. In FIG. 4 the three mirrors have been replaced by four mirrors resulting in a more compact sight. Mirrors 42, 44, 46 and 48 direct optical paths around feed tube 12. The four mirror arrangement shown in FIG. 4 allows the angles made by path 26 to be more acute, resulting in a more compact sight than the sight shown in FIG. 1 with the addition of an additional mirror.

[0044] Referring now to FIG. 5. An alternative embodiment is shown having two optical paths. The first optical path 50 and a second optical path 52. Optical path 50 passes around the feed tube 12 on one side and optical path 52 passes around feed tube 12 on the other side. This arrangement takes twice as many mirrors but results in a broader field of view. Optical path 50 is defined by mirrors 54, 56, 58 and 60 while optical path 52 is defined mirrors 62, 64, 66 and 68. The layout of mirrors 54, 56, 58 and 60 are the same as shown in FIG. 4 while the layout of mirrors 62, 64, 66 and 68 create an optical path 52 that is the inverse of optical path 50. While this embodiment provides a broader field of view, it has twice as many mirrors as shown in FIG. 4 and is thus, more expensive to manufacture, because each mirror must be aligned to create a coherent image.

[0045] FIG. 6 shows an optical path arrangement, the same as shown in FIG. 5 but created with prisms. Prisms are defined as any polyhedron with at least two polygonal faces lying in parallel planes and with all other faces parallelograms. In the gun sight shown in FIG. 6, prism 70 has four reflecting faces, faces 72, 74, 76 and 78. Light enters face 80, is then reflected off of surfaces 74 and 76 and are reflected off of 72 and 78 and exit faces 82 and 84. Faces 82 and 84 are parallel with face 80. Similarly, light enters faces 88 and 90 and prism 86, reflects off surfaces 92 and 94 and surfaces 96 and 98 and exit face 100. Faces 88, 90 and 100 are parallel, faces 94, 96, 92 and 98 are parallel. In this embodiment, the alignment of the reflecting faces is created during the manufacturing process of the prisms. Once assembled, no additional alignment is required. This allows the sight to be assembled at lower manufacturing costs than sights with independent mirrors. Furthermore there are fewer overall parts in this embodiment. A person skilled in the art will see

that any number of optical paths can be created by adding additional reflecting facets so that the sight will become more compact at the cost of an increase in the number of reflecting faces.

[0046] FIG. 7 shows another embodiment of the gun sight invention. In FIG. 7, optical path 50 is created by passing light through lens 102 reflecting off of mirror 104 and passing through lens 106 to the eye of the user. A second optical path 52 can be created by adding lens 108, mirror 110 and lens 112. This embodiment results in a sight that is narrower than the sights created using prisms and mirrors. The curvature of lens 102, 106, 108 and 112 may be calculated using standard ray tracing techniques. In FIG. 7, lens 102, 106, 108 and 112 are shown with one curved surface, however both surfaces may be curved. A front view of this embodiment is shown in FIG. 8.

[0047] FIG. 9 shows yet another embodiment of the invention. In FIG. 9 the gun sight is constructed similarly to that as shown in FIG. 8 except the lens 112 is constructed of a single monolithic block of material. The lens surfaces 154 are machined to the desired curvature. The mirror surfaces 156 are coated with a reflective substance. The lens 112 can be constructed as a molded part so the construction of the gun sight takes only a minimum number of steps.

[0048] In each of the embodiments described above, the objective lens and eyepiece lens are optional. The use of the lens reduces the overall size of the gun sight by making the width of the optical path more compacted.

[0049] Referring again to FIG. 1, optional input window 114 and output window 116 may be added to the sight. Aiming rings may be added to window 114 and 116 so that the user aligns his eye correctly with the image presented by the gun sight. Aiming is shown in FIG. 10. Input aiming ring 118 is presented on input window 114 and output aiming ring 120 is present on output window 116. View 122 shows that the sight is in a position in which the gun must be turned slightly to the left to correctly align it with the user's eye. View 124 shows the sight properly aligned. View 126 shows the sight in a position in which the gun must be turned upwards to appropriately align the sight with the user's eye. An additional advantage to the windows 114 and 116 is that they protect the interior of the sight from dust and contaminants from entering and coating the optical elements. Optionally, colored filters may be utilized (not shown) to enhance the image of the target presented by the sight. One of the windows 114 or 116 can be optionally polarized, again to help enhance the contrast of the target presented by the sight.

[0050] FIG. 11 shows an adjustable and removable mount 128. In FIG. 11, feed tube 12 is grasped by up to four rollers 130. Two rollers are held by arm 132 and two by arm 134. Machine screw 136 is held by frame 138. Machine screw 136 is free to turn in place when it is rotated by knurled knob 140. Threads on machine screw 136 engage corresponding threads on arm 132 so that rotating machine screw 136 causes arm 132 to move to the left or to the right as shown in FIG. 11. When arm 132 moves to the left, feed tube 12 is grasped by the four rollers 130. Moving arm 132 to the right, causes the rollers to be free of feed tube 12, allowing the mount to be rotated about feed tube 12. Moving arm 132 further to the right, allows the mount to be released entirely from feed tube 12. This particular mounting arrangement is specific to paint ball guns, but other mounting strategies would be utilized for other gun configurations.

[0051] FIG. 12 shows a side view of gun sight 10 mounted to mount 128. In this embodiment, feed tube 12 is vertical, mount 128 secures the sight 10 to the feed tube 12 so that the optical path 26 in gun sight 10 is in the horizontal plane. Alternative embodiments may use fewer rollers, perhaps 3 or more rollers depending on the needs of the gun sight and the size of feed tube 12. Furthermore, arm 134 could be removable and arm 132 fixed, or alternatively both arms could be moveable so that turning the knob in one direction moves arm 132 and 134 towards each other turning knob 140 in the other direction, moves arms 132 and 134 apart. Rollers 130 can be replaced by protrusions on arms 132 and 134 or any one roller can be replaced by protrusions so that as the arms are tightened against the clamp, the protrusions provide the friction to prevent the sight from rotating around feed tube 12.

[0052] Mounts with adjustment left and right, and up and down are also optional features on the sight of the invention. Left and right adjustments would be available to correct for wind, and for fine adjustments in alignment. Up and down adjustments would be available for distance adjustments, and for fine alignment.

[0053] FIG. 13 shows one embodiment of the sighting device of the invention. The version shown in FIG. 13 surrounds a feed tube 12 and is attached to the feed tube by an attachment ring 142. The attachment ring 142 includes brackets for a tightening screw (not shown). The tightening screw would secure the attachment ring 142 to the feed tube 12 as it is tightened.

[0054] FIG. 14 shows a modified feed tube which can be used with the embodiment shown in FIG. 13. This modified feed tube is designated as 144 and includes an upper section 152, a frustal conical form section 148, and a lower section 150. The lower section 150 would be inserted into the feed tube receptacle of a paint ball gun 34. By the use of the alternate feed tube 144, the sighting device of the invention can be utilized with any feed tube by using the feed tube with the appropriate lower section 150 for any particular model of paint ball gun.

[0055] The exemplary embodiments shown in the figures and described above illustrate but do not limit the invention. Other forms, details, and embodiments may be made and implemented. Hence, the foregoing description should not be construed to limit the scope of the invention, which is defined in the following claims.

[0056] While there is shown and described the present preferred embodiment of the invention, it is to be distinctly understood that this invention is not limited thereto but may be variously embodied to practice within the scope of the following claims. From the foregoing description, it will be apparent that various changes may be made without departing from the spirit and scope of the invention as defined by the following claims.

I claim:

1. A sighting device for a gun with a top-of-barrel obstruction to sighting, the gun being comprised of a gun barrel with a longitudinal axis, a gun handle with a longitudinal axis attached to the gun barrel, forming a sighting plane which passes through both the axis of the gun barrel and the gun handle, and a gun body, with the sighting device comprising:

- a sight body;
- a gun mount bracket for securing the sight body to the gun body; and

- an optics system, comprising a plurality of reflective surfaces for presenting an image to an eyepiece adjacent the rear of the barrel and above said gun barrel and in said sighting plane, by reflecting an image horizontally around said top-of-barrel obstruction.
2. The sighting device of claim 1 in which said sight body includes an input window in the sighting plane in front of said top-of-barrel obstruction.
3. The sighting device of claim 1 in which said sight body includes an input window positioned to one side of the sighting plane.
4. The sighting device of claim 1 in which said gun mount bracket secures the sight body to the feed tube of a paint ball gun.
5. The sighting device of claim 1 in which said gun mount bracket secures the sight body to the gun body.
6. A sighting device for a paint ball gun with a top-of-barrel sighting obstruction in the form of a feed tube, the paint ball gun being comprised of a gun barrel with a longitudinal axis, a gun handle with a longitudinal axis attached to the gun barrel, forming a sighting plane which passes through both the axis of the gun barrel and the gun handle, a gun body, a paint ball hopper, and a feed tube connected to said hopper and attached to the top of said gun barrel, with the sighting device comprising:
- a sight body;
 - a gun mount bracket for securing the sight body to the gun body; and
 - an optics system, comprising an input window in the sighting plane in front of said top-of-barrel obstruction, and a plurality of reflective surfaces for presenting an image to an eyepiece adjacent the rear of the barrel and above said gun barrel and in said sighting plane, by reflecting an image horizontally around said top-of-barrel obstruction.
7. The sighting device of claim 6 in which said gun mount bracket secures the sight body to the feed tube of a paint ball gun.
8. The sighting device of claim 6 in which said gun mount bracket secures the sight body to the gun body.
9. The sighting device of claim 1 in which said sight body is configured to be reversible, so it can be turned 180 degrees and go around said top-of-barrel obstruction to the left or to the right.
10. The sighting device of claim 1 in which said optics system further comprises a front lens on an input end of said sight body which magnifies an image and passes it to said reflective surfaces of said optics system, and a rear lens in an output end of said sight body, for focusing and displaying said image in an eyepiece.
11. The sighting device of claim 10 in which said front lens, reflective surface, and said rear lens are configured as a single unitary optics piece with a hollow interior.
12. The sighting device of claim 10 in which said front sight, rear sight and reflective surfaces are comprised of a transparent solid, configured to bend the light of an image entering the front lens around the feed tube, with the rear lens reforming the image in the eyepiece.

13. The sighting device of claim 1 in which the optics system comprises at least three reflective surfaces for routing an image around said top-of-barrel obstruction.

14. The sighting device of claim 1 in which the optics system comprises four reflective surfaces for routing an image around said top-of-barrel obstruction.

15. The sighting device of claim 10 in which the optics system further comprises four reflective surfaces which direct an image through four right angle turns around the feed tube to display the image in the eyepiece.

16. The sighting device of claim 1 in which said sight body includes one or more input windows and in which light from an image takes a path to the left of the top-of-barrel obstruction, and a second path to the right of the top-of-barrel obstruction, and in which a single image is formed in an eyepiece at the rear of the gun barrel, and behind said top-of-barrel obstruction and in the sighting plane of said gun.

17. The sighting device of claim 16 in which the optics system further includes three or more reflective surfaces which direct an image around one side of said top-of-barrel obstruction and a second set of three or more reflective surfaces which direct an image around an opposite side of said top-of-barrel obstruction, with the images being joined at an eyepiece for display to a user.

18. The sighting device of claim 1 in which said reflective surfaces are formed by surfaces of a prism.

19. The sighting device of claim 14 which further includes two input windows mounted on either side of the feed tube and not in the sighting plane of the paint ball gun, with reflective optics which route a target image to an eyepiece at the rear of the barrel with the eyepiece centered in the sighting plane of the gun.

20. The sighting device of claim 6 in which said mounting bracket comprises at least two feed tube contacts that are configured for tightening around said feed tube.

21. The sighting device of claim 6 in which said sighting device includes a feed tube configured to be compatible with said sighting device and with a feed tube receiver of a selected paint ball gun.

22. The sighting device of claim 21 which further includes a mounting bracket for tightening around said feed tube for attachment of said sighting device to said feed tube.

23. The sighting device of claim 22 in which said mounting bracket includes an attachment ring and a tightening bolt for securing said attachment ring to said feed tube.

24. The sighting device of claim 6 in which said sighting device includes a feed tube assembly incorporated into said sighting device, with said feed tube assembly configured to interfit with a paint ball gun.

25. The sighting device of claim 6 in which said sighting device includes a feed tube assembly for attachment to said sight body with an upper portion sized to fit said feed tube sight body, and a lower portion sized to fit a selected paintball gun, so that when selecting a feed tube assembly, a feed tube opening of any size can be accommodated.

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