



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication: **21.08.2013 Bulletin 2013/34** (51) Int Cl.: **F41H 5/26 (2006.01)**

(21) Application number: **12176761.0**

(22) Date of filing: **17.07.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(72) Inventor: **Kuisis, Gerald Benoni (ZA)**

(74) Representative: **Round, Edward Mark Marks & Clerk LLP**
90 Long Acre
London
WC2E 9RA (GB)

(30) Priority: **20.02.2012 ZA 201201242**

(71) Applicant: **VSG - Vehicle Security Glass (Pty) Ltd.**
Johannesburg, GA 2001 (ZA)

(54) **Gun port arrangement for an armoured structure**

(57) A gun port arrangement (10, 100, 200) including a frame (12) for mounting the arrangement to an armoured structure, the frame (12) including interior and exterior mount plates (16, 14) and a closure plate (20) that is openable and closable relative to the gun port (18). The arrangement includes a handle (30) for opening the closure plate (20), the handle being biased to remain in a locked position. Also included is a connector (50) having exterior and interior ends (54, 52) and an intermediate portion (53) between said ends (54, 52). The exterior end (54) of the connector (50) is secured to the closure plate (20), the interior end (52) is secured to the handle (30), and the intermediate portion (53) extends between the mount plates (16, 14). The connector (50) has bias means (60) biasing the closure plate (20) to remain in abutment with the exterior mount plate (14).

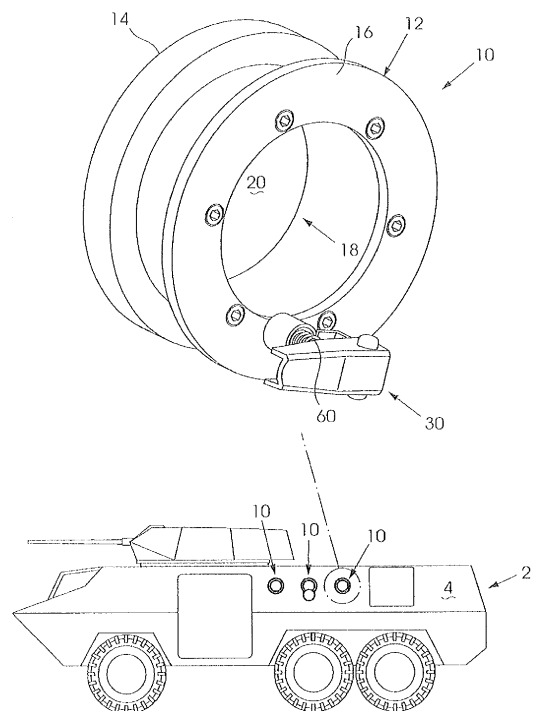


FIGURE 1

Description**FIELD OF THE INVENTION**

[0001] This invention relates generally to armoured structures such as armoured vehicles and fortifications from which an attack or defence can be launched. In particular, the invention relates to a gun port arrangement for an armoured structure and to an armoured structure including said gun port arrangement.

BACKGROUND OF THE INVENTION

[0002] Naval vessels, military vehicles, military aircrafts, turrets and cash-in-transit vehicles are all commonly provided with a fortified or armoured structure in which at least one gun port is defined. The gun port provides a means through which a gun can be fired by armed crew from within the structure.

[0003] In particular, cash-in-transit vehicles are increasingly faced with attacks against them. Although cash-in-transit vehicles are commonly equipped with peepholes and/or gun ports that allow armed crew to defend the vehicle and its contents when attacked in a cash-in-transit heist, many of the existing gun ports are difficult to open or close while carrying a firearm. One existing gun port arrangement requires a two step opening process in which a latch, preventing unauthorised opening of the gun port arrangement, first needs to be unlatched before an external closure plate can be moved to open the gun port arrangement so as to allow the armed crew to place a gun barrel through the gun port.

[0004] It will be appreciated that measures need to be implemented to boost security of crew driving cash-in-transit vehicles, or armed crew when in transit, against increasing security risks.

[0005] This invention, at least in part, attempts to address the above described problem by saving the gun port operator time when actuating the gun port arrangement.

[0006] In this specification the following terms or expressions are used with the meanings indicated:

"gun" means any weapon having a barrel and a trigger or firing mechanism for projecting a missile; it may be a piece of ordnance or a smallarm. It may use combustible or explosive propellant charges, air pressure, electromagnetism or other propulsive forces;

"sighting" means bringing into visual coincidence a direction defined by a so-called "sighting" device with the direction of a target;

"aiming" means bringing a weapon to a direction differing from the sighting direction by corrections in order that the projectile may hit the target; and

"laying" means setting a weapon in the correct position for hitting a target.

SUMMARY OF THE INVENTION

[0007] In broad terms and in accordance with this invention there is provided a gun port arrangement for an armoured structure, the gun port arrangement comprising:

a frame for mounting the gun port arrangement to the armoured structure, the frame including an exterior mount plate that defines a gun port dimensioned to support a closure plate which is openable and closable relative to the gun port so as to allow sighting, laying and aiming from within an interior of the armoured structure;

a handle operable to be displaced between a locked position in which the closure plate abuts the exterior mount plate and an unlocked position in which the closure plate is displaced relative to the exterior mount plate, the handle having first bias means biasing the handle to remain in the locked position; and

a connector having an intermediate portion disposed between opposing exterior and interior ends, the exterior end of the connector being secured to a peripheral region of the closure plate, the interior end being secured to the handle, and the intermediate portion is arranged to pass through a chamber defined in the frame, the connector having second bias means biasing the closure plate to remain in abutment with the exterior mount plate.

[0008] There is also provided for the handle to comprise a locking member which projects from a first end of the handle, said locking member having a seat to in use facilitate maintaining the handle in a locked position by abutting a fixed stop, associated with the frame, so as to prevent displacement of the closure plate relative to the exterior mount plate. The seat may be located at a remote end of the locking member and may comprise a portion of the locking member which is bent substantially perpendicularly relative to the direction in which the locking member extends.

[0009] In addition, there is provided for the handle to comprise first bias means adapted to urge the seat into a position in line with the stop so as to prevent displacement of the closure plate from the exterior mount plate. Preferably, the first bias means comprises a springy member such as, for example, a coil spring.

[0010] There is further provided for the stop to be formed on an interior end of an open-ended sleeve, which sleeve is connected to, and extends from, an interior mount plate of the frame and locates around part of the intermediate portion of the connector.

[0011] There is also provided for the interior end of the

connector to be secured to a fixed base of the handle, which base includes a cavity for locating the first bias means.

[0012] There is further provided for the connector to have a second bias means, co-axial with the intermediate portion of the connector and secured thereto between the handle's base and an internal mount plate of the frame, the second bias means being configured to apply a tension force between the handle's base and an internal mount plate of the frame tending to in use draw the closure plate into the gun port to facilitate rapid closure of the gun port. Preferably, the second bias means comprises a springy member such as, for example, a coil spring capable of applying a tension force larger than that which the first bias means is adapted to apply.

[0013] Moreover, there is provided for the closure plate and frame to be manufactured from armoured materials so that upon linear displacement of the closure plate away from the exterior mount plate, gravity automatically urges the closure plate downwards whereby the connector rotates within the chamber.

[0014] The invention further extends to an armoured structure including a gun port arrangement as described hereinbefore.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] An embodiment of the invention is now described, by way of example, with reference to the accompanying non-limiting diagrammatic drawings. In the drawings:

- | | |
|----------|---|
| Figure 1 | shows a side view of a gun port arrangement according to the invention, mountable to an armoured structure of a military vehicle; |
| Figure 2 | shows a plan view of a gun port arrangement of Figure 1 in an operatively locked position; |
| Figure 3 | shows a plan view of a gun port arrangement of Figure 1 in an operatively unlocked position; |
| Figure 4 | shows a section view of the gun port arrangement of Figure 2, taken along line IV-IV of Figure 2; |
| Figure 5 | shows a section view of the gun port arrangement of Figure 2, taken along line V-V of Figure 2; |
| Figure 6 | shows a section view of the gun port arrangement of Figure 3; |
| Figure 7 | shows a perspective view of a gun port arrangement of Figure 1 in an opera- |

tively locked position;

Figure 8 shows a perspective view of a gun port arrangement of Figure 1 in an operatively unlocked position;

Figures 9&10 show section views of a gun port arrangement, respectively closed and partially opened, in accordance with an alternative embodiment of the invention; and

Figures 11&12 show section views of a gun port arrangement, respectively closed and partially opened, in accordance with a further alternative embodiment of the invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0016] In the drawings, like numerals generally indicate like members, unless otherwise indicated.

[0017] Referring to Figures 1 to 8, reference numeral 10 generally refers to a gun port arrangement in accordance with the invention. Reference numerals 100 and 200 in Figures 9 to 10 and 11 to 12, respectively refer to alternative embodiments of the invention.

[0018] The arrangement 10 can be fitted to an opening in an armoured structure such as, for example, a cash-in-transit vehicle 2. Although not described herein, it will be appreciated that gun port arrangement 10 can also find application in naval vessels, military vehicles, military aircrafts, and other fortifications such as turrets.

[0019] Evident from Figures 1, 7, and 8 is that gun port arrangement 10 consists of a frame 12 for mounting gun port arrangement 10 to a side wall 4 of the cash-in-transit vehicle 2. The frame 12 includes an exterior mount plate 14 and an interior mount plate 16. The exterior mount plate 14 defines a gun port 18 dimensioned to support a closure plate 20 which is openable and closable relative to the gun port 18 so as to allow sighting, laying and aiming from within an interior of vehicle 2.

[0020] Gun port arrangement 10 further includes a handle 30 which is connected to closure plate 20 by means of a connector 50, typically in the form of a push-rod as shown in Figures 4 to 6 of the drawings. Handle 30 is connected to an interior end 52 of connector 50, which also includes an intermediate portion 53 disposed between opposite ends 52 and 54, being an exterior end 54 and the interior end 52 of the connector 50. The exterior end 54 is connected to a peripheral region of closure plate 20 while the interior end 52 is secured to the handle 30 and the intermediate portion 53 is arranged to slidably pass through an elongate chamber or through bore defined in a bottom portion of frame 12.

[0021] Handle 30 can, thus, be manually actuated from within vehicle 2 by a person (not shown). Typically, such a person will be an armed guard who, while holding a

gun (not shown) in one hand, actuates handle 30 of the gun port arrangement 10 with the other hand to remove closure plate 20 from its position flush with the exterior mount plate 14 to allow sighting, laying and aiming of the gun. The arrangement 10 is advantageously fitted to an opening in side wall 4 so that the connector 50 and handle 30 are substantially in linear alignment with each other at the bottom portion of frame 12.

[0022] Handle 30 is, thus, operable to be displaced between a locked position in which an internal surface of closure plate 20 abuts an external surface of the exterior mount plate 14 and an unlocked position in which the closure plate 20 is displaced relative to the exterior mount plate 14 so that a barrel of a gun can extend through the open gun port 18.

[0023] In order to achieve displacement as described above, handle 30 needs to be actuated, i.e. pushed in towards the exterior of the vehicle 2 thereby actuating first bias means 40 and second bias means 60, which are associated with handle 30 and connector 50 respectively, as best shown in Figure 5.

[0024] First bias means 40 is biased to keep handle 30 in the locked position whereas the second bias means 60 is biased to keep the closure plate 20 in abutment with the exterior mount plate 14. The second bias means 60 is, preferably, but not necessarily a coil spring capable of applying a tension force larger than that which the first bias means 40 is adapted to apply. The coil spring 60 is shown to be co-axial with part of the intermediate portion 53 of the push-rod 50 and secured thereto between a base 36 of the handle 30 and an internal mount plate 16 of the frame 12. The coil spring 60 is further configured to apply a tension force between the handle's base 36 and the internal mount plate 16 tending to in use draw the closure plate 20 into a mouth of the gun port 18 to facilitate rapid closure of the gun port 18.

[0025] In particular, handle 30 consists of a locking member 32 which projects from a first end of handle 30. Locking member 32 also has a seat 34 to in use facilitate maintaining the handle 30 in a locked position when it abuts a fixed stop 22, which is associated with the frame 12, so as to prevent displacement of the closure plate 20 relative to the exterior mount plate 14. The seat 34 is located at a remote end of the locking member 32 and forms an end portion of the locking member 32, the end portion or seat is bent substantially perpendicularly relative to the direction in which the locking member 32 extends.

[0026] The first bias means 40 is shown to be a coil spring, but may take many other shapes and configurations of commonly available springy members. Coil spring 40 is secured to a bottom of a cavity formed in the fixed base 36 of the handle 30. In its normal extended state, spring 40 pushes against an internal surface of an actuating member 38 of handle 30 so that seat 34 is pivoted about a pivot point 39 and pressed against intermediate portion 53 in line with an interior end or stop 22 of an open-ended sleeve 24. The sleeve is connected to,

and extends from, the interior mount plate 16 of the frame 12 and locates around part of the intermediate portion 53 of the connector 50. As the seat 34 is pressed against the intermediate portion 53 only a small gap is left between stop 22 and seat 34. By pushing actuating member 38 downwards towards contact with a flat outer surface 37 of fixed base 36, coil spring 40 is compressed and seat 34 is pivoted out of line relative to the interior end or stop 22 of the open-ended sleeve 24.

[0027] Further pushing of actuating member 38, which after initial pushing already is in contact with a flat outer surface 37 of fixed base 36, inwards or towards the exterior of gun port arrangement 10 compresses coil spring 60 and moves seat 34 past stop 22 so that same is slidably locked-in behind stop 22. In so doing, closure plate 20 is moved along a rectilinear path away from exterior mount plate 14 until moved far enough out of the mouth of port 18 and free of any bottom support previously provided by peripheral edge 26 so that gravity pulls the closure plate 20 downward with the result that push-rod 50, consequently rotates within the frame's elongate chamber.

[0028] It is envisaged that the closure plate 20 and frame 12 will be manufactured from armoured material which is heavy so that upon linear displacement of the closure plate 20 away from the exterior mount plate 14, gravity automatically urges the closure plate 20 downwards whereby the push-rod 50 rotates within the elongate chamber as shown in Figure 8.

[0029] The reverse operation is also easy to effect since the actuating member 38 can be rotated until closure plate 20 slides past peripheral edge 26 and snaps, under the influence of tension forces created by coil spring 60, into position flush with exterior mount plate 14 to close off port 18. At the same time seat 34 is urged backwards and as a result seat 34 slides past stop 22 to end up in line therewith. Thereby stop 22 blocks and/or prevents unauthorised displacement of closure plate 20 from exterior mount plate 14.

[0030] A gun port arrangement having a 90° peripheral edge 26, which in locking position abuts a 90° peripheral edge 21 of closure plate 20, as shown in Figures 4 to 6, is not ideal. When closure plate 20 is hit by a bullet near edge 21 or 26, the armoured material may be deformed or swaged so as to form a protuberance which can cause the closure plate 20 to get trapped in the locking position.

[0031] Having both edges 121 and 126 complementary tapered, as shown in an alternative embodiment of gun port arrangement 10, gun port arrangement 100 of Figures 9 and 10 ensures that bullets hitting approximate edge 121 and 126 cannot jam or trap closure plate 120 in the locked position. It is envisaged that having at least one of said edges tapered relative to the other can also prevent jamming. Apart from differences in edge shape and configuration, gun port arrangements 100 and 200 are quite similar to gun port arrangement 10.

[0032] Further alternatively, as shown in Figures 11 and 12, a stepped edge configuration of edges 221 and

226 of gun port arrangement 200 is also envisaged to prevent unwanted jamming of closure plate 220 when bullets hit approximate said edges.

[0033] It will be appreciated that when the closure plate 20, 120, 220 is urged into abutment with the exterior mount plate 14, the gun port arrangement 10 is automatically locked by means of seat 34 and stop 22 and the applicant believes that this differentiates the gun port arrangement of the invention from known gun port arrangements.

[0034] While a preferred embodiment of the invention is shown and described, it will be understood that it is not intended to limit the extent of the invention, but rather it is intended to cover all modifications and alternate methods, including: methods, for manufacturing the gun port arrangement 10, 100, 200 and components thereof, falling within the scope of the invention.

[0035] The applicant believes that gun port arrangement 10, 100, 200 provides a unique quick release mechanism for opening or closing a gun port located in an armoured structure. As such, the invention provides a neat, easy to use, and affordable alternative to gun port arrangements previously known in the art.

Claims

1. A gun port arrangement (10, 100, 200) for an armoured structure (2), the gun port arrangement having:

a frame (12) for mounting the gun port arrangement to the armoured structure, the frame (12) including interior and exterior mount plates (16, 14) that define a gun port (18) dimensioned to support a closure plate (20), which is openable and closable relative to the gun port (18) so as to allow laying, sighting, and aiming from within an interior of the armoured structure;

a handle (30) operable to be displaced between a locked position in which the closure plate (20) abuts the exterior mount plate (14) and an unlocked position in which the closure plate (20) is displaced relative to the exterior mount plate (14), the handle (30) having first bias means (40) biasing the handle (30) to remain in the locked position; and

a connector (50) having exterior and interior ends (54, 52) and an intermediate portion (53) disposed between said ends (54, 52), the exterior end (54) of the connector (50) being secured to the closure plate (20), the interior end (52) being secured to the handle (30), and the intermediate portion (53) being arranged to pass through a chamber defined in the frame (12) and extending between the exterior mount plate (14) and the interior mount plate (16), the connector (50) having second bias means (60) biasing the

closure plate (20) to remain in abutment with the exterior mount plate (14).

2. The gun port arrangement of claim 1, wherein the handle (30) comprises a locking member (32) which projects from a first end of the handle (30), said locking member (32) having a seat (34) to in use facilitate maintaining the handle (30) in a locked position by abutting a fixed stop (22), which is associated with the frame (12), so as to prevent displacement of the closure plate (20) relative to the exterior mount plate (14).
3. The gun port arrangement of claim 2 wherein the seat (34) is located at a remote end of the locking member (32) and comprises an end portion of the locking member (32) which is bent substantially perpendicularly relative to the direction in which the locking member (32) generally extends.
4. The gun port arrangement of claim 2 or 3 wherein the first bias means (40) comprises a springy member adapted to urge the seat (34) into a position in line with the stop (22) so as to prevent displacement of the closure plate (20) from the exterior mount plate (14).
5. The gun port arrangement of any one of claims 2 to 4, wherein the stop (22) is formed on an interior end of an open-ended sleeve (24), which sleeve (24) is connected to, and extends from, the interior mount plate (16) and locates around part of the intermediate portion (53) of the connector (50).
6. The gun port arrangement of any one of claims 1 to 5, wherein the interior end (52) of the connector (50) is secured to a fixed base (36) of the handle (30), which base (36) includes a cavity for locating the first bias means (40).
7. The gun port arrangement of any one of claims 1 to 6, wherein the second bias means (60) is co-axial with the intermediate portion (53) of the connector (50) and secured thereto between a base (36) of the handle (30) and an interior mount plate (16) of the frame (12), the second bias means (60) being configured to apply a tension force between the handle's base (36) and the interior mount plate (16) tending to in use draw the closure plate (20) into a mouth of the gun port (18) to facilitate rapid abutment of the closure plate (20) against the exterior mount plate (14) and closure of the gun port (18).
8. The gun port arrangement of any one of the preceding claims, wherein the second bias means (60) comprises a springy member capable of applying a tension force larger than that which the first bias means (40) is adapted to apply.

9. The gun port arrangement of any one of the preceding claims, wherein the closure plate (20) and frame (12) is manufactured from armoured materials so that upon linear displacement of the closure plate (20) away from the exterior mount plate (14), gravity automatically urges the closure plate (20) downwards whereby the connector (50) rotates within the chamber. 5
10. The gun port arrangement of any one of the preceding claims, wherein the connector (50) is secured to a peripheral or a central region of the closure plate (20). 10
11. The gun port arrangement of any one of the preceding claims, wherein peripheral edges (121, 126) of both the closure plate (120) and the exterior mount plate (114) are complementary tapered to facilitate opening and closing of the closure plate (120) relative to the exterior mount plate (114) even when indentations are formed in any way in outer surfaces of the closure plate (20) and frame (112) adjacent said peripheral edges (121, 126). 15 20
12. The gun port arrangement of any one of claims 1 to 10, wherein at least one of the peripheral edges (221, 226) of the closure plate (220) and the exterior mount plate (214) are tapered to facilitate opening and closing of the closure plate (20). 25 30
13. An armoured structure (2) including a gun port arrangement (10, 100, 200) as claimed in any of claims 1 to 12.
14. A method for opening a gun port arrangement (10, 100, 200) from within an armoured structure (2), the gun port arrangement having: 35
- a frame (12) for mounting the gun port arrangement (10, 100, 200) to the armoured structure (2), the frame (12) including interior and exterior mount plates (16, 14) that define a gun port (18) dimensioned to support a closure plate (20), which is openable and closable relative to the gun port (18) so as to allow laying, sighting, and aiming from within an interior of the armoured structure (2); 40
- a handle (30) operable to be displaced between a locked position in which the closure plate (20) abuts the exterior mount plate (14) and an unlocked position in which the closure plate (20) is displaced relative to the exterior mount plate (14), the handle (30) having first bias means (40) biasing the handle (30) to remain in the locked position; and 45 50
- a connector (50) having exterior and interior ends (54, 52) with an intermediate portion (53) disposed between said ends (54, 52), the exte-

rior end (54) of the connector (53) being secured to the closure plate (20), the interior end (52) being secured to the handle (30), and the intermediate portion (53) being arranged to pass through a chamber defined in the frame (12) and extending between the exterior mount plate (14) and the interior mount plate (16), the connector (50) having second bias means (60) biasing the closure plate (20) to remain in abutment with the exterior mount plate (14),

the method including:

displacing the handle (30) so as to act against the first biasing means (40) and cause unblocking of a seat (34) of a locking member (32) of said handle (30) by a stop (22) provided for the interior mount plate (16) thereby facilitating movement of the seat (34) relative to said stop (22) in a direction extending substantially perpendicular to the longitudinal axis of the intermediate portion (53);

further displacing the handle (30) so as to act against the second biasing means (60) and cause movement of the seat (34), and consequently the connector (50), relative to said stop (22) in a direction extending substantially along the longitudinal axis of the intermediate portion (53) towards the exterior mount plate (16); and

in so doing, the closure plate (50) is moved along a rectilinear path away from the exterior mount plate (14) until moved far enough out of a mouth of the gun port (18) and free of any bottom support previously provided by an internal peripheral edge (26) of the frame (12) proximate the exterior mount plate (14) so that gravity pulls the closure plate (20) downward with the result that the connector (50) rotates within the chamber and a top portion of the closure plate (20) is secured behind an outer surface of the frame (12) leaving the gun port (18) open.

15. A method for closing a gun port arrangement (10, 100, 200) from within an armoured structure (2), the gun port arrangement having:

a frame (12) for mounting the gun port arrangement (10, 100, 200) to the armoured structure (2), the frame (12) including interior and exterior mount plates (16, 14) that define a gun port (18) dimensioned to support a closure plate (20), which is openable and closable relative to the gun port (18) so as to allow laying, sighting, and aiming from within an interior of the armoured structure (2);

a handle (30) operable to be displaced between a locked position in which the closure plate (20) abuts the exterior mount plate (14) and an un-

locked position in which the closure plate (20) is displaced relative to the exterior mount plate (14), the handle (30) having first bias means (40) biasing the handle (30) to remain in the locked position; and

5

a connector (50) having exterior and interior ends (54, 52) with an intermediate portion (53) disposed between said ends (54, 52), the exterior end (54) of the connector (53) being secured to the closure plate (20), the interior end (52) being secured to the handle (30), and the intermediate portion (53) being arranged to pass through a chamber defined in the frame (12) and extending between the exterior mount plate (14) and the interior mount plate (16), the connector (50) having second bias means (60) biasing the closure plate (20) to remain in abutment with the exterior mount plate (14),

10

15

the method including:

20

rotating the handle (30) so that the connector (50) and consequently the closure plate (20) is rotated into alignment with a mouth of the gun port (18);

25

releasing the handle (30) so that the second biasing means (60) and first biasing means (40) both applies a tension force to cause movement of a seat (34), of a locking member (32) of said handle (30), the force applied by the second biasing means (60) urging the seat (34) away from the exterior mount plate (14) in a direction extending substantially along the longitudinal axis of the intermediate portion (53) whereas the force applied by the first biasing means (40) urges the seat (34) in a direction extending substantially perpendicular to the longitudinal axis of the intermediate portion (53) until the seat (34) locks in behind a stop (22) provided for the interior mount plate (16); and

30

35

40

in so doing, the closure plate (20) is moved along a rectilinear path towards, and into abutment with said, exterior mount plate (14) so as to shut the gun port (18) and have bottom support provided by an internal peripheral edge (21) of the frame proximate the exterior mount plate (14).

45

50

55

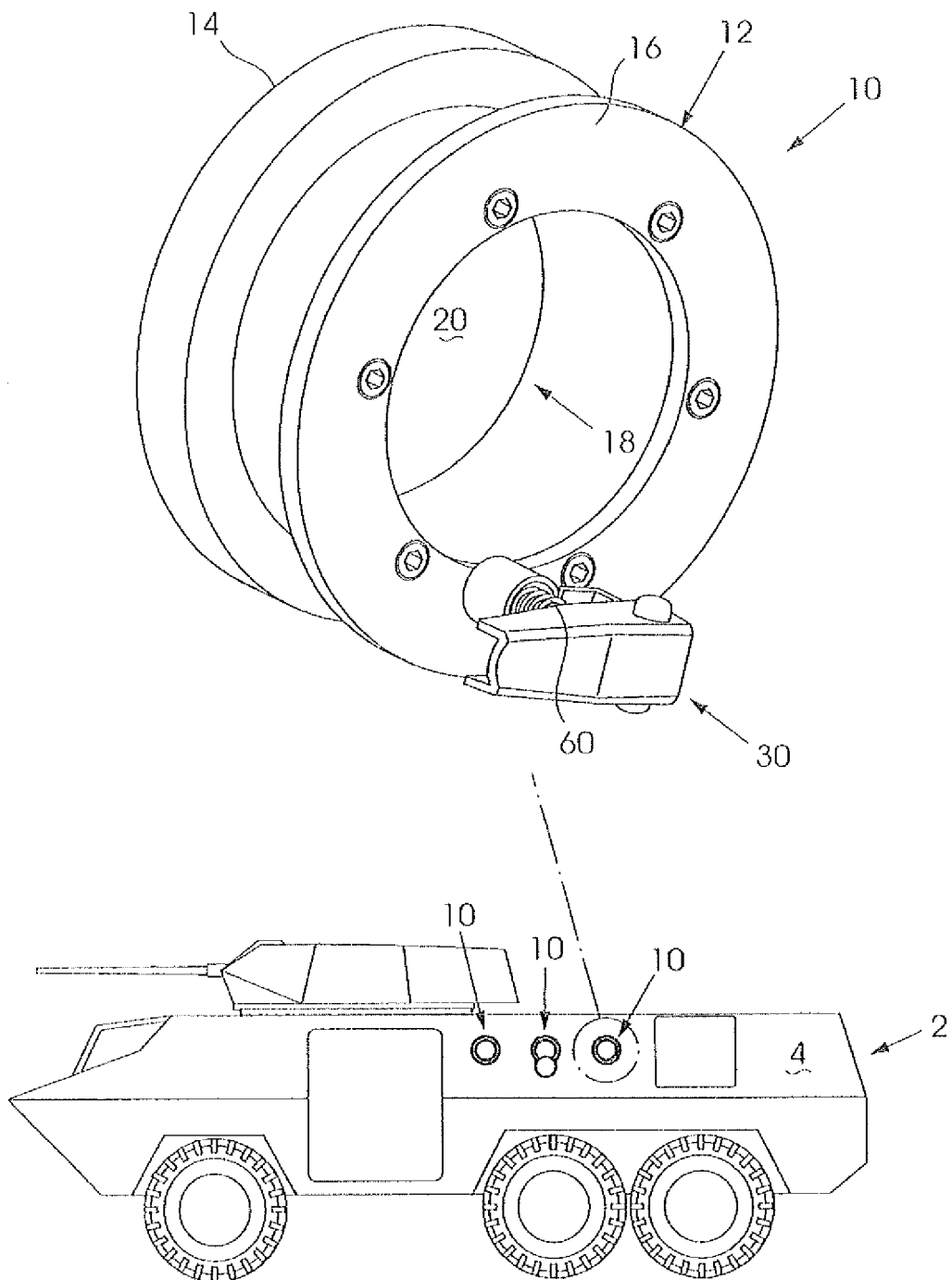
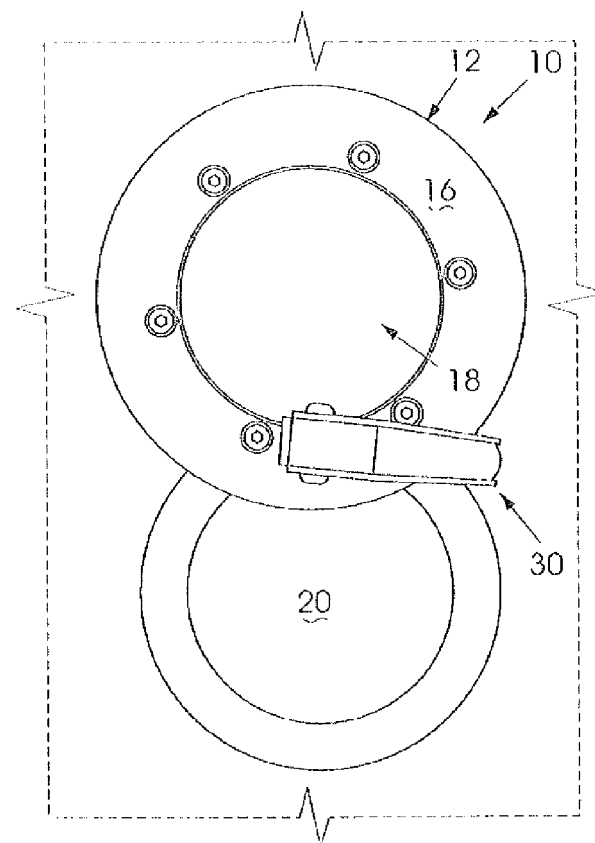
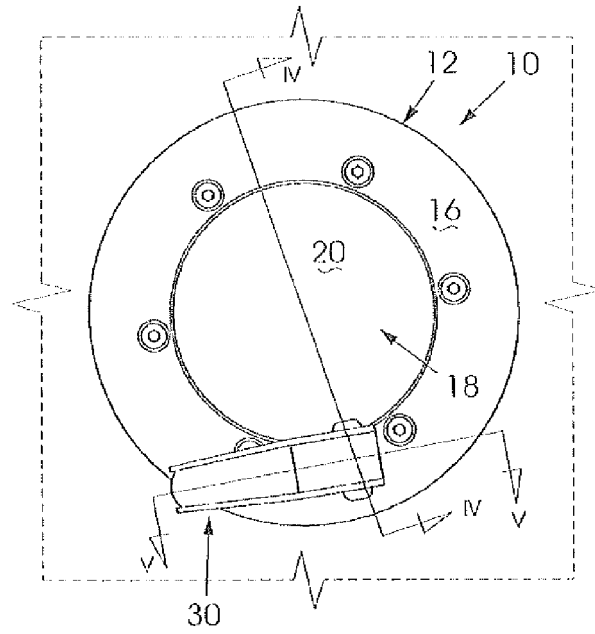
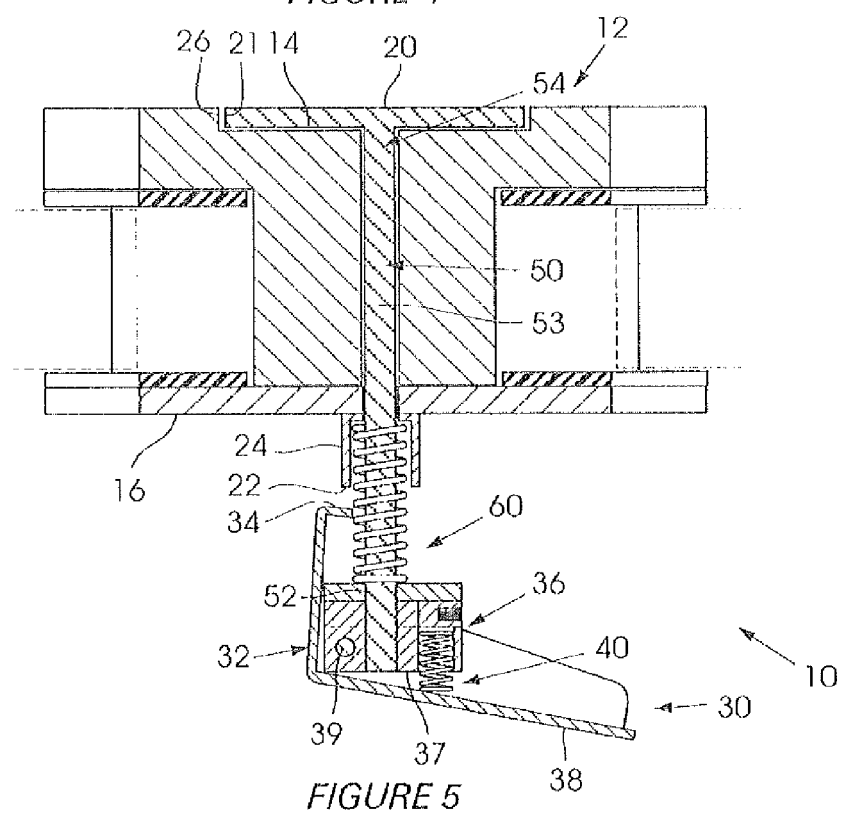
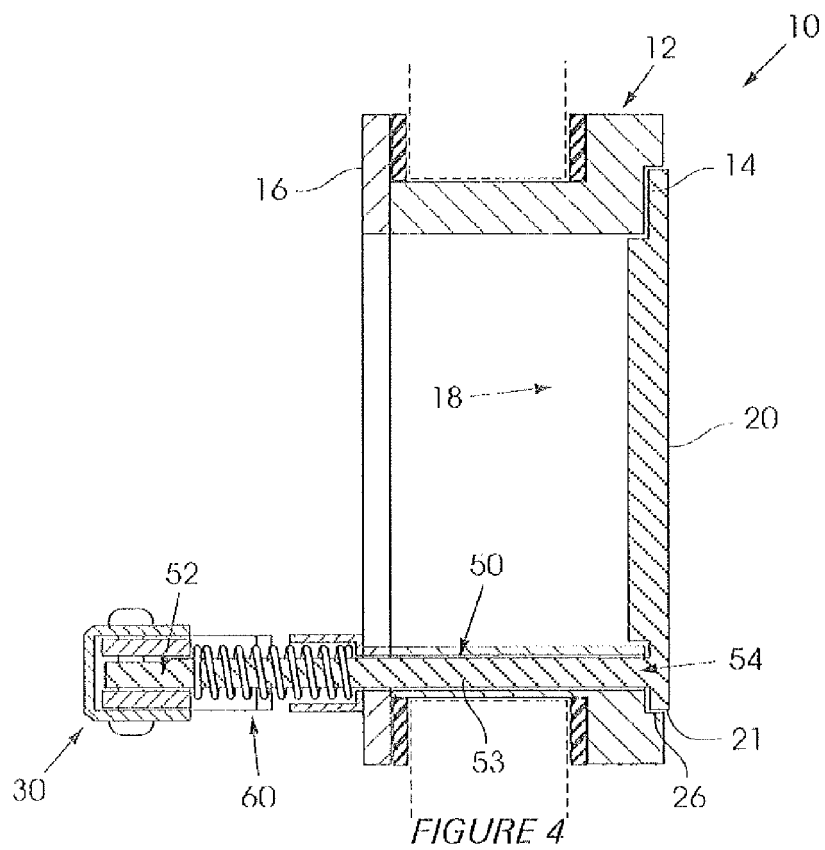


FIGURE 1





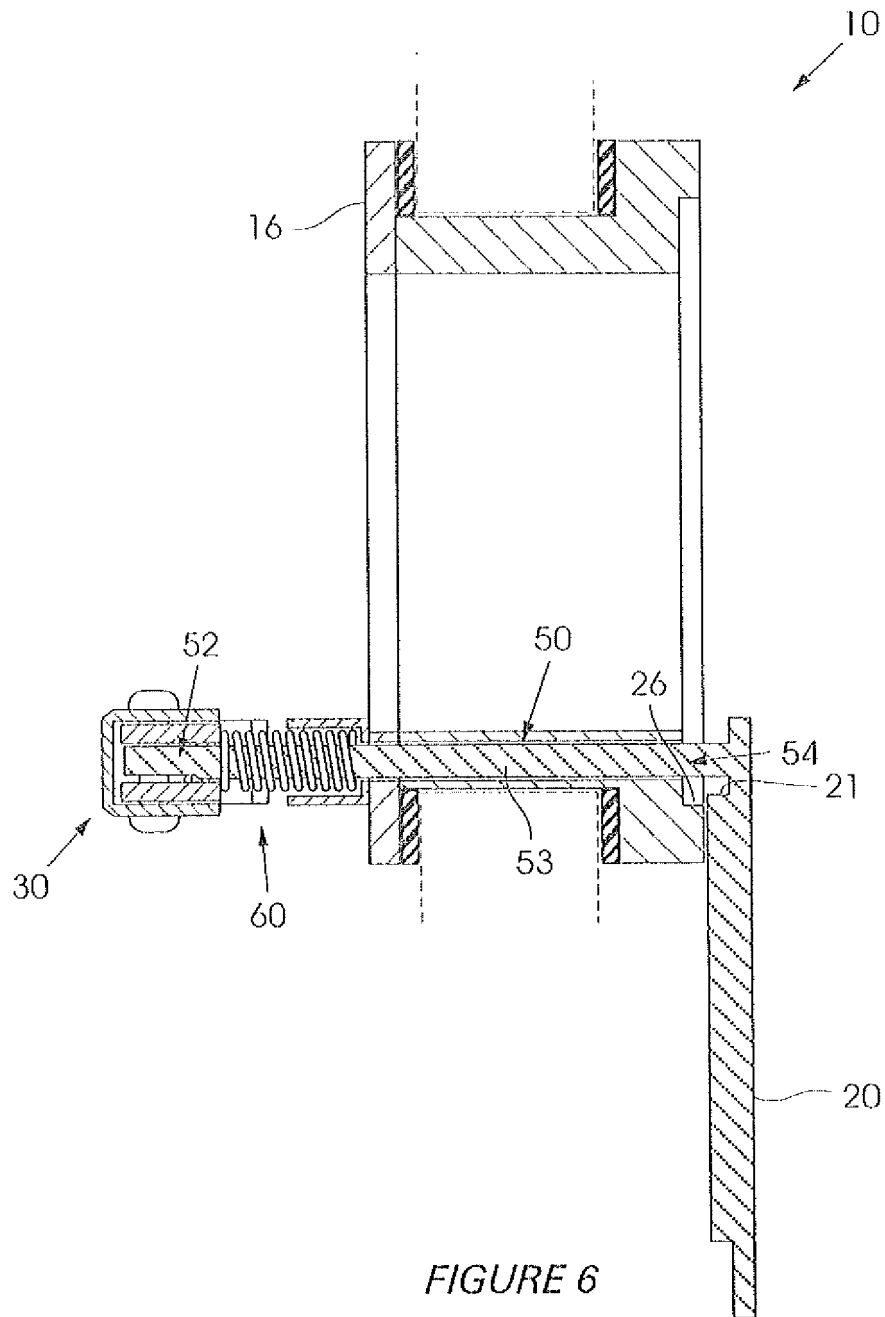
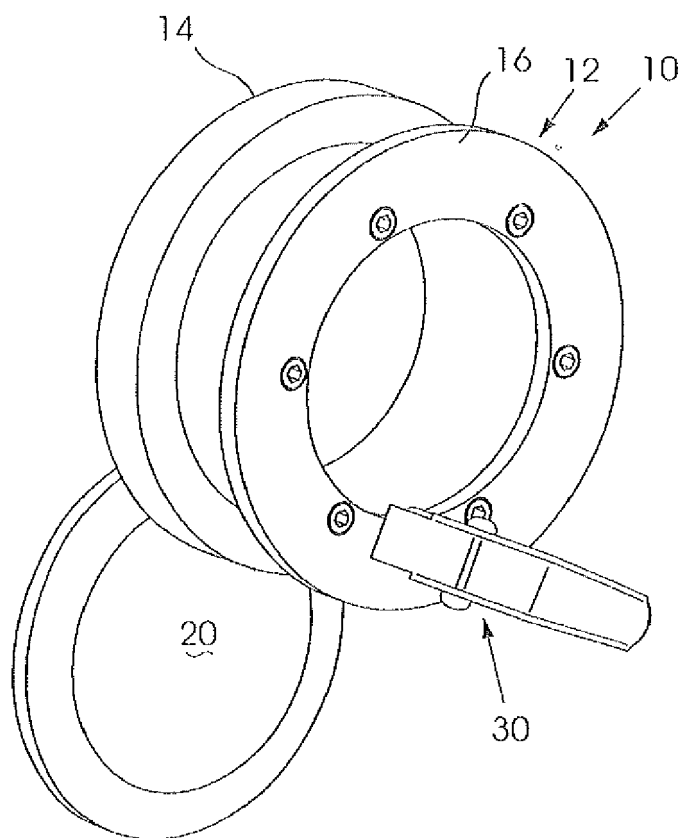
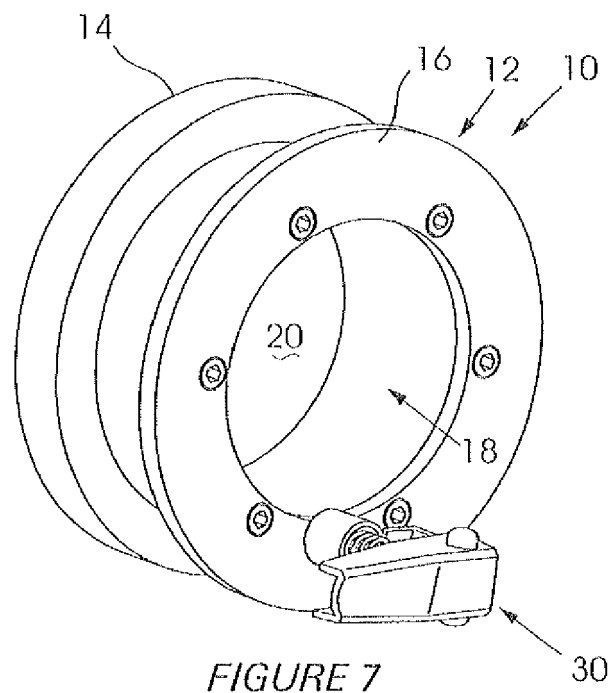
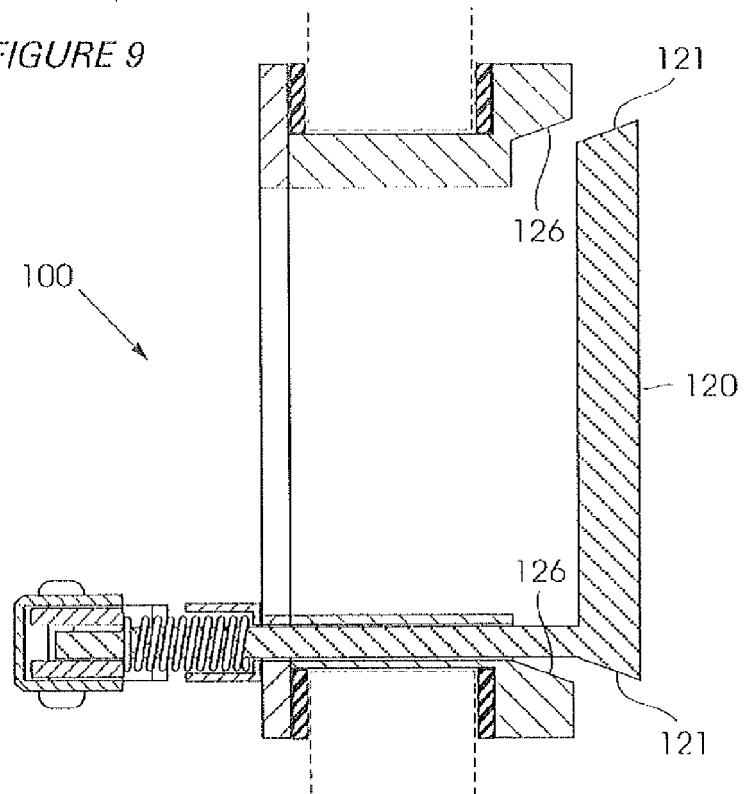
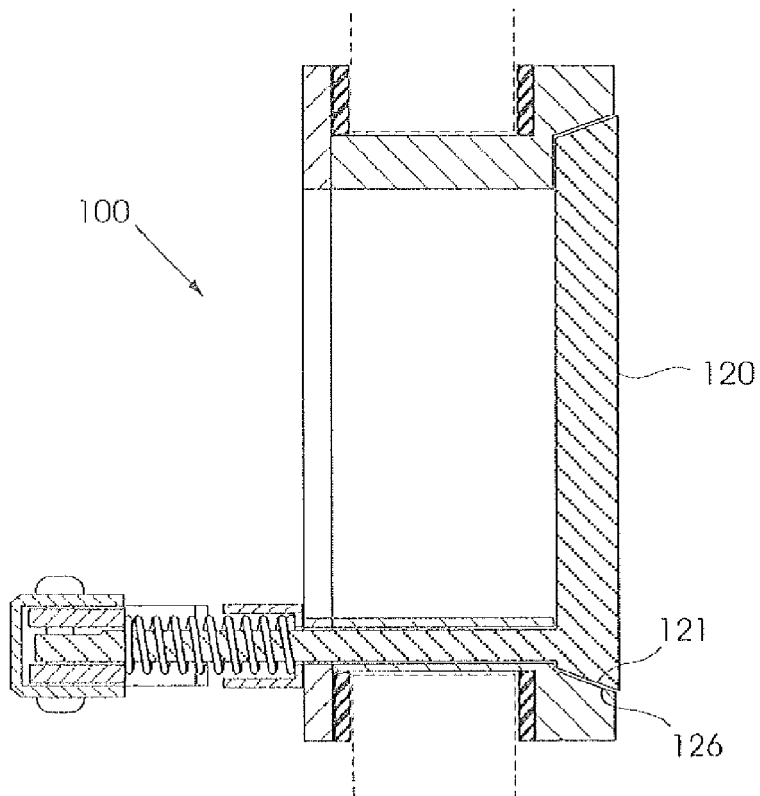


FIGURE 6





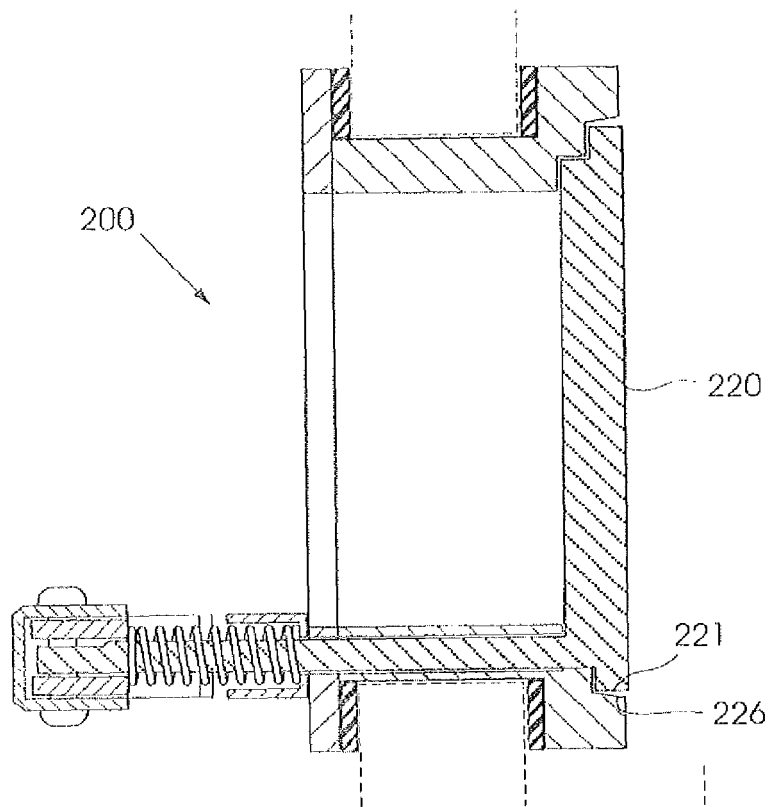


FIGURE 11

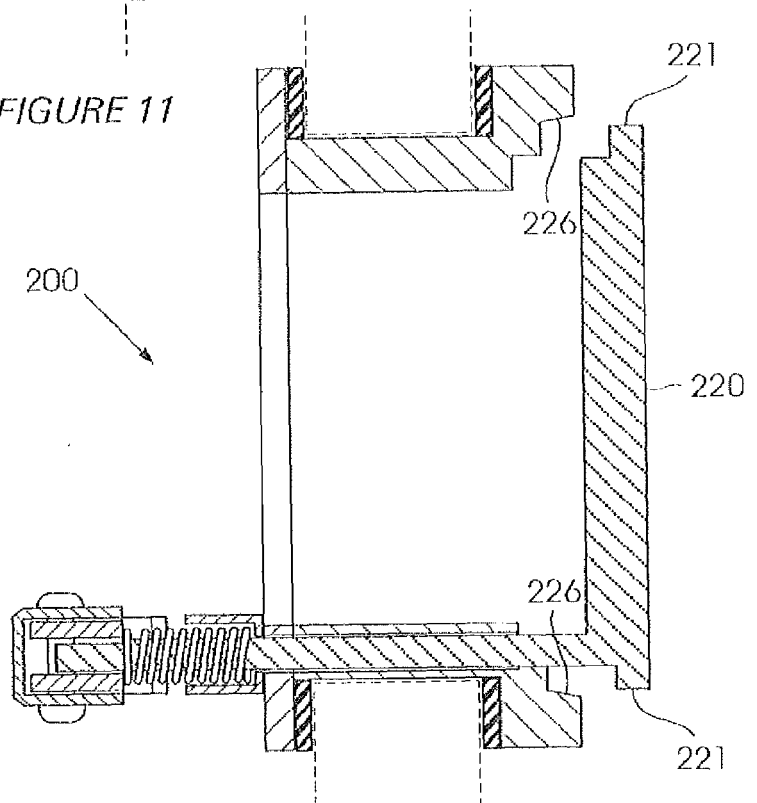


FIGURE 12