(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 511 587 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.10.2012 Bulletin 2012/42

(51) Int Cl.:
F17C 13/04 *(2006.01)*

(21) Application number: **12163776.3**

(22) Date of filing: **11.04.2012**

(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

(30) Priority: **11.04.2011 GB 201106105**

(71) Applicant: **SWG Filling Services Limited**
Sheffield, South Yorkshire S20 1DJ (GB)

(72) Inventors:
- **Nash, Simon J.**
  2042 Johannesburg (ZA)
- **Jones, Anthony C.**
  Sheffield S1 2NU (GB)

(74) Representative: **Foot, Paul Matthew James**
Withers & Rogers LLP
4 More London Riverside
London
SE1 2AU (GB)

(54) An adapter

(57) An adapter for insertion into a valve cup of a gas cartridge incorporating a valve boss defining an axis, the adapter including an arrangement for non-rotatable securement relative to the gas cartridge about the axis and at least one lug extending in an axial direction so as to be engageable in a corresponding formation on a gas appliance.

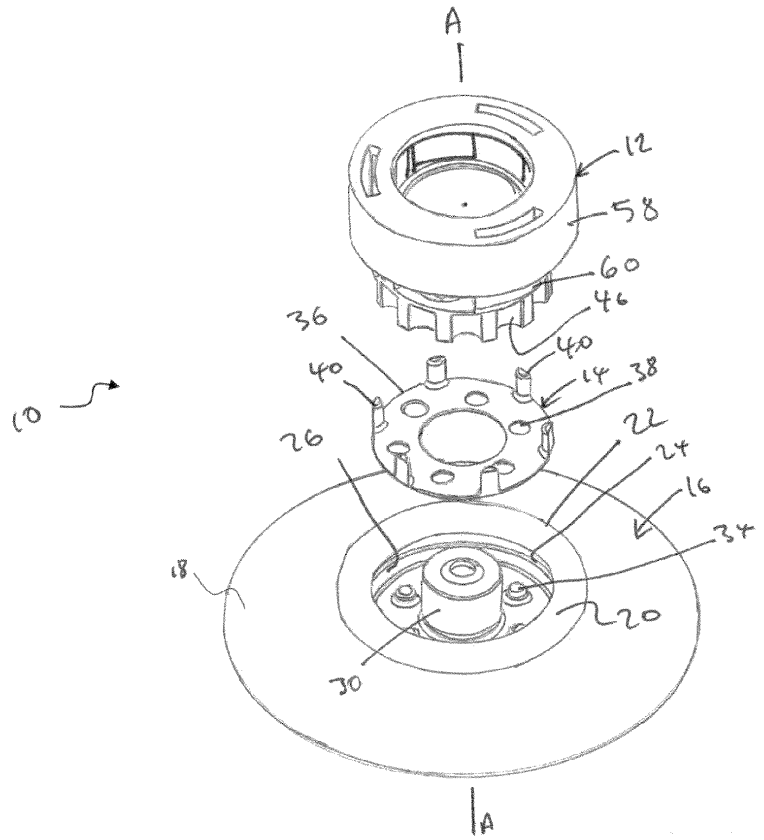


Fig. 1

EP 2 511 587 A2

Description

[0001] The present invention relates to an adapter. More particularly, but not exclusively, the present invention relates to an adapter for use with portable gas cartridges. Additionally, the present invention relates to a cartridge and to a kit of parts including an adapter and a cartridge.

[0002] Gas cartridges are well known in the fields of camping and backpacking. Such cartridges typically hold liquefied petroleum gases such as propane, isobutane, butane or a mixture of the above. Cartridges are typically cylindrical in plan view and formed from multiple pressed/drawn sheet steel components to form the pressure vessel.

[0003] A valve on the top of the cartridge enables gas to flow from the cartridge to an appliance, such as a stove or lantern when attached thereto, but automatically closes to block flow when the appliance is removed. The valve is incorporated into a valve cup at the top of the cartridge and comprises a valve boss or pedestal extending, upwardly coaxially with the major axis of the cartridge. The dimensions of the boss, valve actuator and valve seat are governed by BS EN 417:2003. This ensures that minimum safety standards may be achieved, and that cartridges and appliances from different manufacturers are interoperable.

[0004] However, certain manufacturers have used the standard as a basis for their own proprietary attachment systems in place of known threaded bosses or clamped attachments. In turn, this means that it has not been possible for a single basic cartridge to be supplied that can be used both with standard appliances and the proprietary appliances.

[0005] The present invention seeks to overcome or at least mitigate the problems of the prior art.

[0006] A first aspect of the present invention provides an adapter for insertion into a valve cup of a gas cartridge incorporating a valve boss defining an axis, the adapter including an arrangement for non-rotatable securement relative to the gas cartridge about the axis and at least one lug preferably extending in a generally axial direction so as to be engageable in a corresponding formation on a gas appliance.

[0007] Preferably the adapter comprises an at least partial ring shaped body portion arranged so as to at least partially encircle the valve boss, more preferably a complete ring.

[0008] The arrangement may be a mechanical arrangement. In one preferred variant the arrangement is a frictionally engaging fit, more preferably wherein the arrangement comprises at least one projection dimensioned so as to deform a wall of the valve portion upon insertion. The or each projection advantageously extends radially.

[0009] In an alternative preferred embodiment, the arrangement is an interference arrangement and advantageously comprises at least one recess on one of the adapter or cartridge configured to receive a corresponding tooth provided on the other of the adapter or cartridge. More preferably the recess is an aperture provided on the adapter, and even more preferably or alternatively the body portion incorporates the or each recess or tooth.

[0010] The body portion advantageously comprises a plurality of equi-angularly spaced recesses or teeth.

[0011] In a further preferred embodiment, the interference arrangement comprises a non-circular profile to the inner and/or outer profile of the body portion, arranged to engage a complementary formation of the cartridge.

[0012] In a still further alternative preferred embodiment the arrangement is an adhesive, and even more preferably a removable liner is arranged to cover the adhesive and be removed therefrom prior to securement to the cartridge.

[0013] A second aspect of the present invention provides a gas cartridge having a valve cup portion for receiving an adapter having at least one lug to be engaged in a corresponding formation of a gas appliance, the cartridge comprising an interference arrangement for engaging a complementary arrangement on the adapter such that the adapter is non-rotatably secured relative to the cartridge.

[0014] Preferably, the arrangement comprises at least one recess on one of the adapter or cartridge configured to receive a corresponding tooth provided on the other of the adapter or cartridge. More preferably the tooth is provided on the cartridge. Even more preferably it is provided on a base wall of the valve cup.

[0015] Further or alternatively, the interference arrangement comprises a non-circular profile to the inner profile of the outer wall and/or outer profile of the valve boss, arranged to engage a complementary formation of the adapter.

[0016] A third aspect of the present invention provides a kit comprising an adapter according to the first embodiment of the present invention and a complementary gas cartridge.

[0017] Embodiments of the present invention will now be described in detail with reference to the accompanying drawings in which:

FIGURE 1 is an exploded isometric view of an assembly incorporating an adapter and cartridge according to a first embodiment of the present invention, together with an connector portion of a proprietary appliance;

FIGURE 2 is an isometric view of the underside of the connector portion of the proprietary appliance shown in Figure 1;

FIGURE 3 is an isometric view of the adapter of Figure 1;

FIGURE 4 is a vertical cross-section through the cartridge of Figure 1; and

FIGURES 5 to 8 are exploded isometric views of adapters and cartridges according to second, third, fourth and fifth embodiments of the present invention respectively.

[0018] Figure 1 shows generally at 10 an assembly comprising a known proprietary connector 12 for a gas cartridge fuelled appliance (e.g. a stove or lantern - not shown), and an adapter 14 and cartridge 16 according to a first embodiment of the present invention.

[0019] With particular reference to Figure 4, the cartridge 16 is generally of the type described above, except for the adaptations described below, being generally cylindrical in shape, and formed from a drawn steel top and side wall body component 18 (partially shown in Figure 1), a concave base (not shown) and a valve cup 20.

[0020] The valve cup 20 is a separate formed metal component from the body 18, arranged to fit within an opening in the top of the body. The valve cup 20 is circular in plan view, defining a central axis A-A. Radially outermost from this axis A-A is a rolled bead 22 to mechanically engage the body component 18. The bead 22 merges into an axially extending outer wall 24 having a radial groove 26 therein. In this embodiment, the outer wall is deeper than conventional outer walls by at least the depth of the adapter, so as to provide sufficient clearance for the connector 12.

[0021] A base wall 28 extends radially inwardly from the outer wall 24 and terminates in a circular valve boss or pedestal 30 extending axially upwards to be capped by a top valve seat wall 32 with a central opening 34 through which gas may pass to the appliance. A valve mechanism (not shown) is housed within the boss 30 to close the cartridge 16 when the appliance is removed. In certain embodiments the boss 30 is threaded, but in this embodiment the boss is smooth.

[0022] In this embodiment six circular teeth 34, not present in conventional cartridges extend axially upwardly from the base wall 28, with equal angles (i.e. 60°) therebetween. These teeth 34 are preferably pressed into the valve cap on part of the forming operation thereof. Each tooth is approximately midway between the boss 30 and outer wall 24 radially. In other embodiments the number of teeth 34 may be decreased or increased as desired.

[0023] Referring to Figure 3 in particular, the adapter 14 comprises, in this embodiment, a ring-shaped, flat body portion 36 including six recesses in the form of apertures 38 positioned and dimensioned so as to be an interference fit with the teeth 34. Again the number of apertures 38 may be increased or decreased, provided there are as many or a multiple of apertures compared to teeth 34 (e.g. two teeth and four or eight apertures)

[0024] The radially outer periphery of the body portion 36 is provided with six lugs 40 extending upwardly at right angles to the plane of the body portion 36. Each lug 40 is substantially semi-circular in cross section and spaced at equal angles around the body portion 36. In a preferred embodiment, the adapter 14 is a plastics component such as injection moulded ABS or polyethylene.

[0025] For ease of understanding, Figure 2 in particular illustrates the known proprietary connector 12 with which the present invention is to be used. Specifically this connector is known as a "Campingaz^{RTM} Easy Clic Plus^{RTM}" connector produced by Application Des Gaz of Saint-Genis-Laval, France.

[0026] The connector 12, which is shown inverted in Figure 2 comprises an inner portion 41 having central recess 42 to accommodate the valve boss 30, and a central pin 42 to depress the valve when married with the cartridge 16. On the radial outer edge of the inner portion are a series of twelve equally spaced scallops 46. On the cartridges specifically designed for this connector (not shown), four hemispherical pips extend radially inwardly from the outer wall of the valve cup to engage the scallops 46 and prevent rotation of the inner portion.

[0027] A radially stepped region 48 is additionally provided on the inner portion above the scallops 46 in which three first sectors 50 have a relatively large diameter, and adjacent second sectors 52 have a relatively small diameter.

[0028] An outer portion 54 of the connector 12 is rotatable relative to the inner portion 41 and has three tongues 56 extending downwardly from a collar 58. The tongues 56 are resilient and have ridges 60 at their lower end dimensioned to fit within the annular groove 26 of the valve cup 20. The lower end of the tongues 56 overlie either the smaller or larger diameter sectors 52 and 50, dependent upon the relative angular positions of the inner and outer portions 41 and 54.

[0029] Thus, in use on the specifically designed cartridges, the connector 12 is inserted with the tongues 56 overlying the small diameter sectors 52 so the tongues may flex inwardly as they contact the outer wall of the valve cup, before straightening when they reach the annular groove. The user then rotates the collar 58, and with the inner portion 41 held by the pips, the large diameter sectors 50 are aligned with the tongues 56. This prevents the tongues 56 flexing inwardly, so that the connector 12 is held in place by the engagement of the ridges 60 with the groove 26.

[0030] In the present invention by contrast, the adapter 14 is placed in position in the valve cup 20 with the teeth 34 inserted in the apertures 38, so the adapter is unable to rotate. Thereafter, the user may attach the connector 12 to the cartridge in the same way as with the specifically designed cartridge, but with the lugs 40 of the adapter taking over the same function as the pips of the specific cartridge - i.e. preventing rotation of the inner portion 41 relative to the cartridge 16. Consequently, the appliance can be connected by rotating the collar 58 through a part turn, so the ridges 60 are blocked from retracting from the annular groove 26. In this embodiment the lugs 40 are sufficiently rigid to be self-supporting when engaged by the scallops 46. In other embodiments, the lugs 40 may be supported from flexing radially outwardly by the

outer wall 24.

[0031] Removal of the connector 12 is simply the reverse of attachment.

[0032] It will be appreciated that the use of the adapter 14 together a suitable cartridge enables the same cartridge may be used for proprietary and standard appliance connectors. In some instances, the adapter may be left in place for use with both types of connectors, whereas in others, the adapter 14 may require removal for use with standard appliances. However removal is a very simple operation.

[0033] Furthermore, it will be appreciated that the adapter may be selectively supplied by a manufacturer or retailer with a cartridge, dependent upon whether it is intended for use with standard or proprietary connectors. Alternatively, adapters may be supplied with all suitable cartridges so a user can be assured that the cartridge with the widest range of appliances. As another alternative adapters may be offered as a separate extra cost item to the end user to be reused with multiple suitable cartridges.

[0034] Figure 5 illustrates an adapter and valve cup according to a second embodiment of the present invention, in which like parts are labelled by the same numerals, but with the prefix "1". Only parts that differ from the first embodiment are discussed in detail.

[0035] In this embodiment, the adapter is formed from pressed steel, and is provided with radially extending teeth 138, dimensioned so that the adapter 114 is press-fitted into the valve cup and the teeth frictionally engage the outer wall 124 to prevent rotation of the adapter 136 relative to the valve cup 120. The lugs 140 in this embodiment are formed from bent portions of the steel plate. In this embodiment, the cartridge may require no adaptation from a standard cartridge, or the only adaptation may be a slight lowering of the base wall 128 to allow for the thickness of the adapter body portion 136.

[0036] Figure 6 illustrates a third embodiment, in which like parts are labelled by like numerals with the prefix "2". In this embodiment, the adapter 214 is also formed from a pressed metal ring, but the lugs 140 are hooked over, and the adapter is secured in place by adhesive (not shown). This may be in the form of a self-adhesive tape or pad, with a liner in place to protect the adhesive until use.

[0037] Figure 7 shows a fourth embodiment, in which like parts are labelled by the prefix "3". This embodiment utilises a hexagonal outer profile 338 to the adapter that mates with a complementary hexagonal form 334 pressed into the outer wall 324 of the valve cup 320 below the annular groove 326.

[0038] In the fifth embodiment of Figure 8 in which the prefix "4" is used, a similar approach is adopted, but with a square inner profile 438 on the adapter, and a complementary square outer profile 434 around the base of the boss 430 to prevent relative rotation

[0039] It will be appreciated that terms such as inner and outer, upper and lower are used for ease of explanation, and should not be regarded as limiting.

[0040] It will be understood that numerous changes may be made within the scope of the present invention. For example, the number of lugs, teeth and apertures may be adjusted. In the first embodiment, the teeth may be provided to extend downwardly into complementary recesses in the base wall of the valve cup. In the fourth and fifth embodiments, the number of flats may be increased or decreased. The insert may be provided as a one piece moulding together with a protective cap over the valve, and may be frangibly connected thereto to remain in place once the cap is removed.

Claims

1. An adapter for insertion into a valve cup of a gas cartridge incorporating a valve boss defining an axis, the adapter including an arrangement for non-rotatable securement relative to the gas cartridge about the axis and at least one lug extending in an axial direction so as to be engageable in a corresponding formation on a gas appliance.

2. An adapter according to claim 1 comprising an at least partial ring shaped body portion arranged so as to at least partially encircle the valve boss, preferably wherein the body portion is a complete ring.

3. An adapter according to any preceding claim wherein the arrangement is a mechanical arrangement.

4. An adapter according to claim 3 wherein the arrangement is a frictionally engaging fit.

5. An adapter according to claim 4 wherein the arrangement comprises at least one projection dimensioned so as to deform a wall of the valve portion upon insertion, preferably wherein the or each projection extends radially.

6. An adapter according to any preceding claim wherein arrangement is an interference arrangement. Preferably wherein the arrangement comprises at least one recess on one of the adapter or cartridge configured to receive a corresponding tooth provided on the other of the adapter or cartridge, more preferably wherein the recess is an aperture provided on the adapter.

7. An adapter according to claim 6 wherein the body portion incorporates the or each recess or tooth, preferably wherein the body portion comprises a plurality of equi-angularly spaced recesses or teeth.

8. An adapter according to claim 6 to 7 when dependent upon any one of claims 2 to 7 wherein the interference arrangement comprises a non-circular profile

to the inner and/or outer profile of the body portion, arranged to engage a complementary formation of the cartridge.

9. An adapter according to any preceding claim wherein the arrangement is an adhesive. Preferably further comprising a removable liner arranged to cover the adhesive and be removed therefrom prior to securement to the cartridge.

10. A gas cartridge for receiving an adapter at a valve cup portion thereof and having at least one lug to be engaged in a corresponding formation of a gas appliance, the cartridge comprising an interference arrangement for engaging a complementary arrangement on the adapter such that the adapter is non-rotatably secured relative to the cartridge.

11. A gas cartridge according to claim 10 wherein the arrangement comprises at least one recess on one of the adapter or cartridge configured to receive a corresponding tooth provided on the other of the adapter or cartridge. Preferably wherein the tooth provided on the valve cup portion. More preferably wherein the tooth is provided on a base wall of the valve cup.

12. A gas cartridge according to claim 10 or 11, wherein the interference arrangement comprises a non-circular profile to the inner profile of the outer wall and/or outer profile of the valve boss, arranged to engage a complementary formation of the adapter.

13. A kit comprising an adapter according to any one of claims 1 to 9 and a complementary cartridge.

14. A kit comprising an adapter according to any one of claims 6 to 9 and a complementary cartridge according to any one of claims 10 to 12.

15. A kit comprising an adapter according to claim 8 and a complementary cartridge according to claim 12.

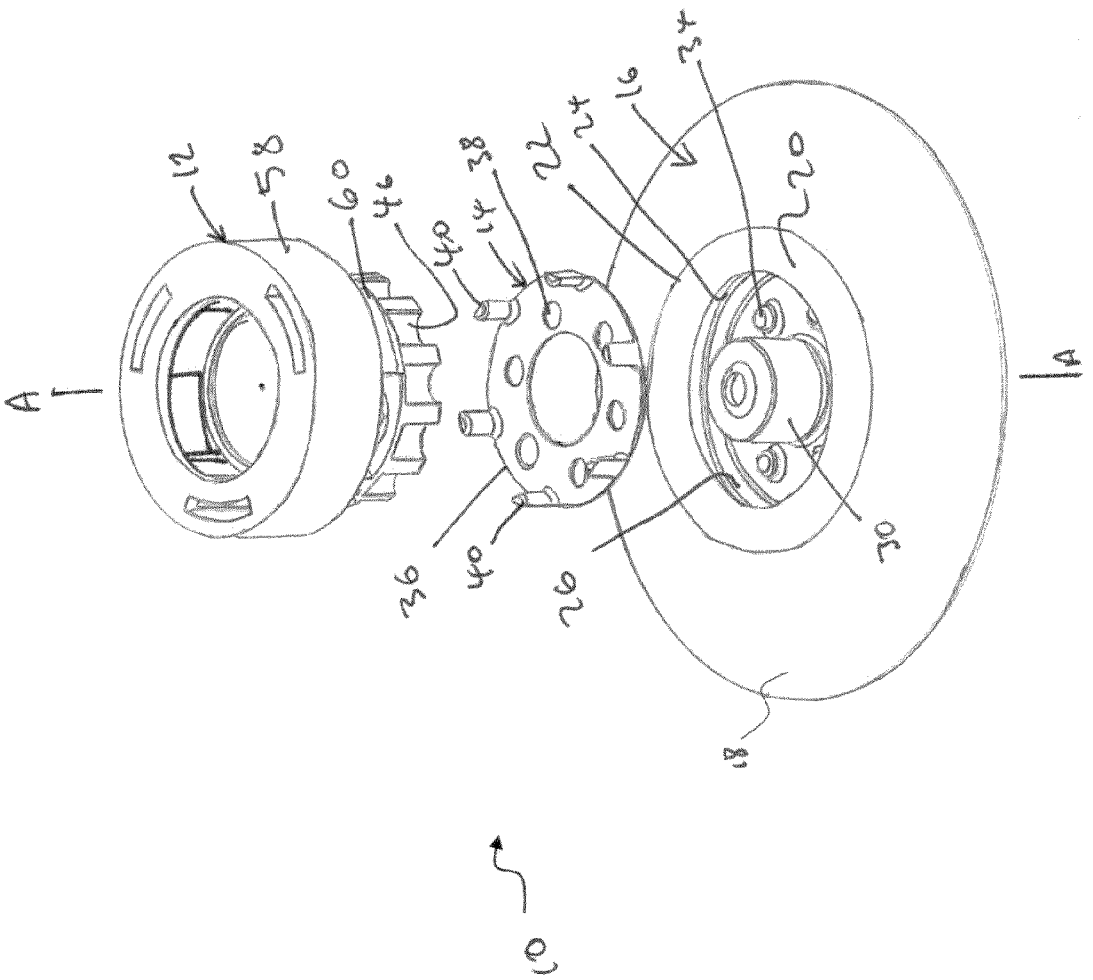


Fig. 1

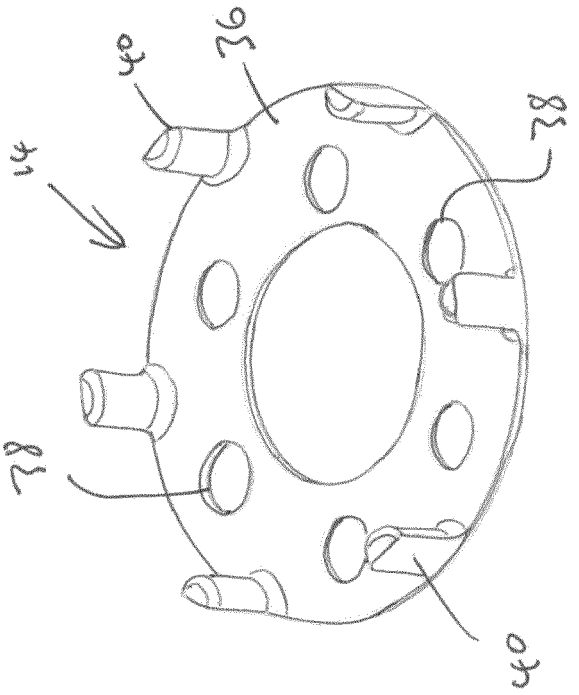


Fig. 3

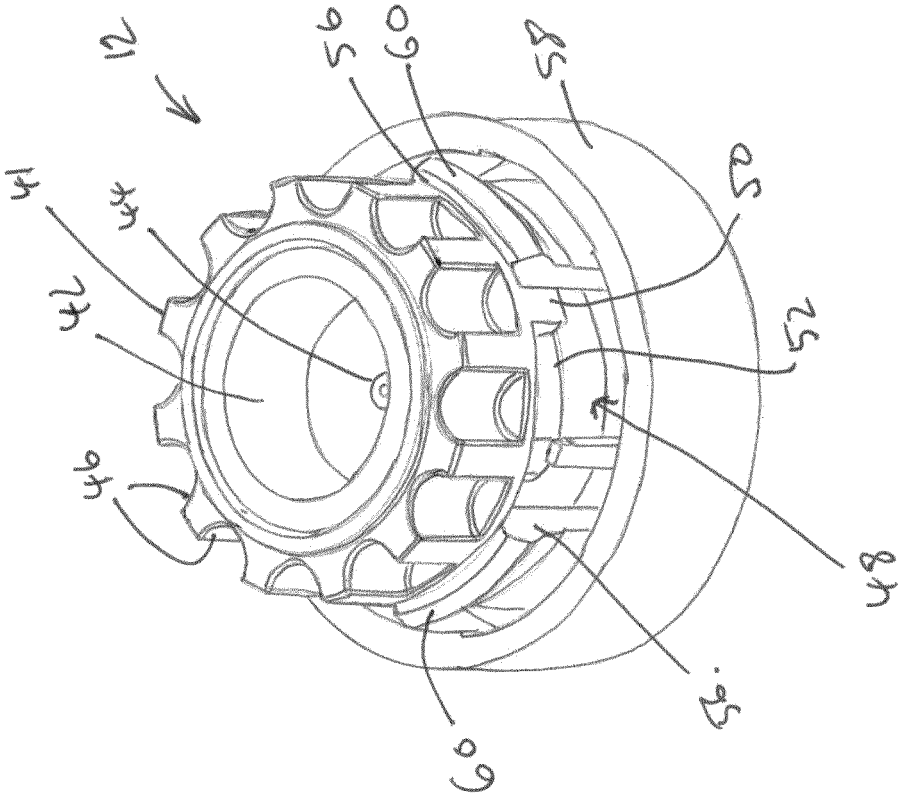


Fig. 2

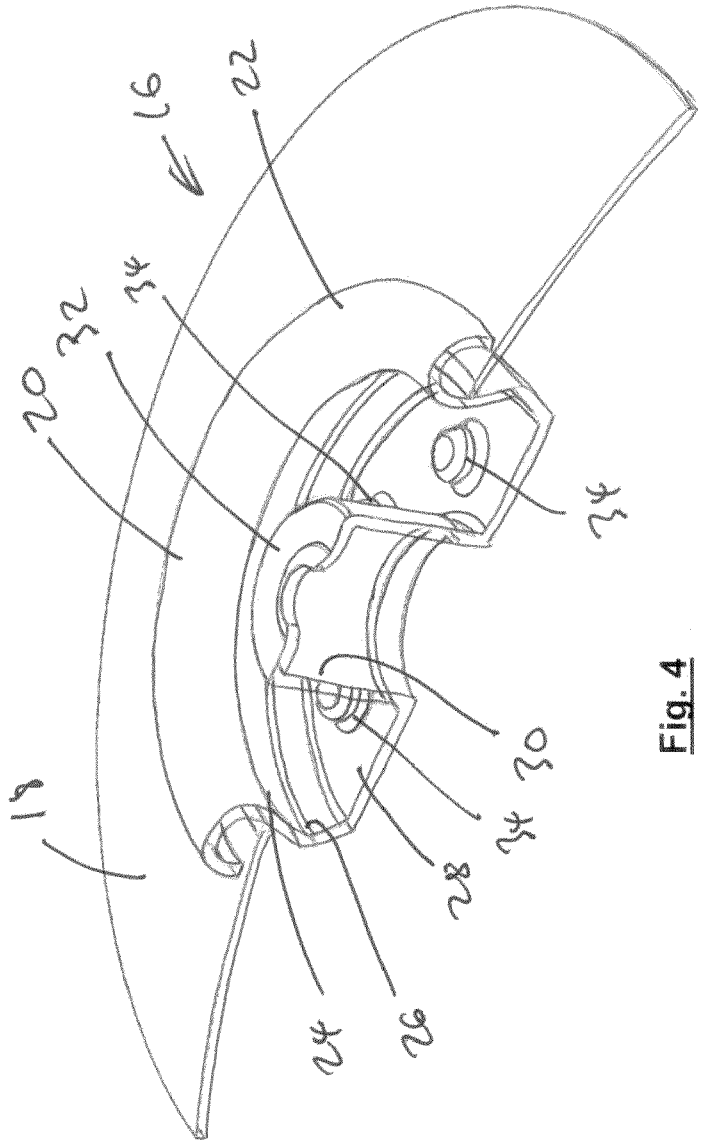


Fig. 4

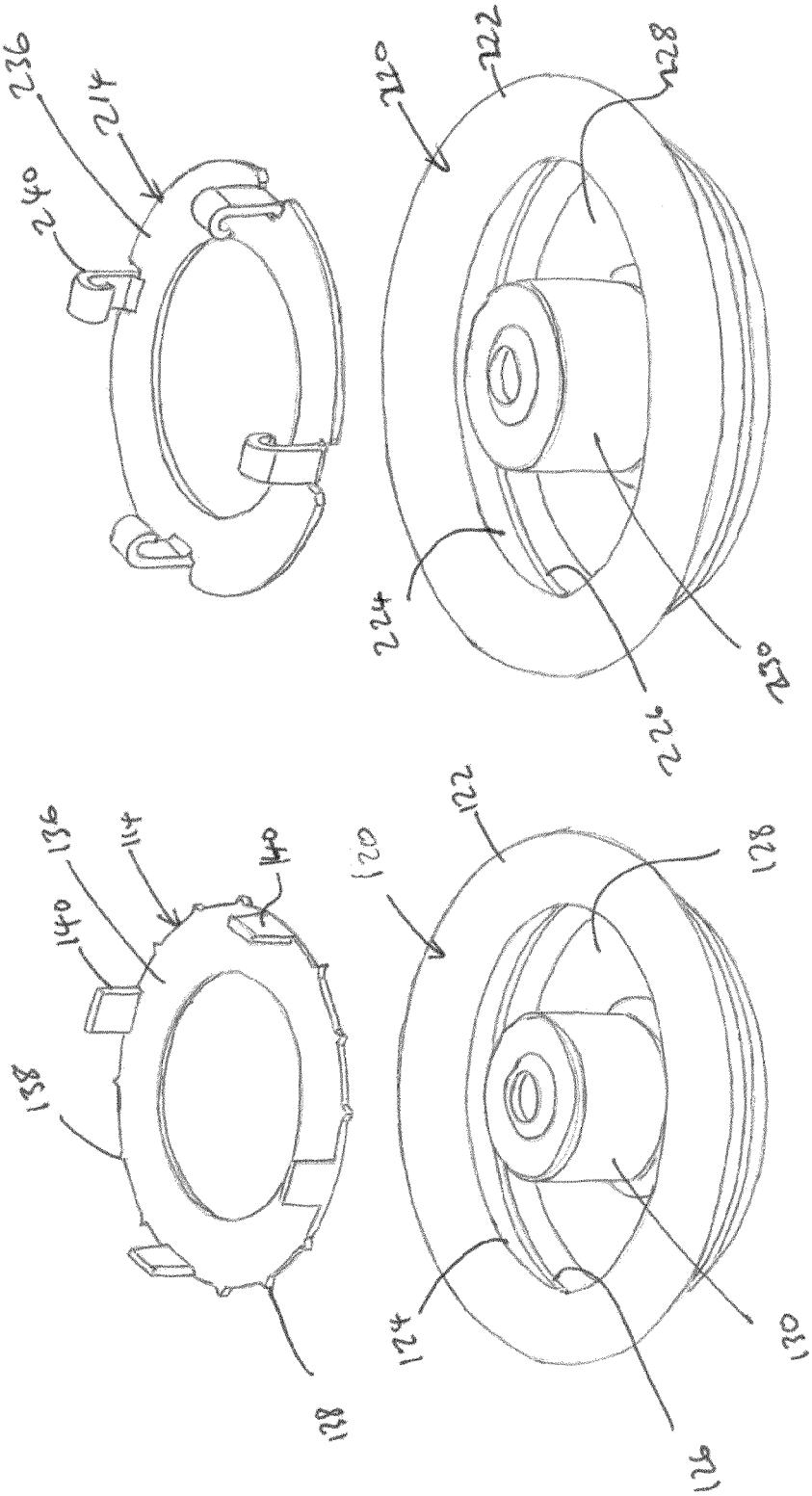
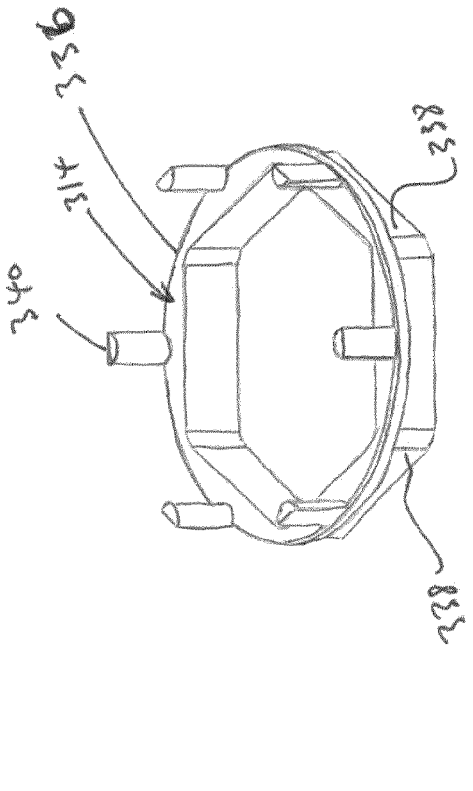

236
214
240
220
222
228
224
226
230
138
136
140
114
140
128
120
122
128
124
130
126

Fig. 6

Fig. 5


340
342
344
346
338
328

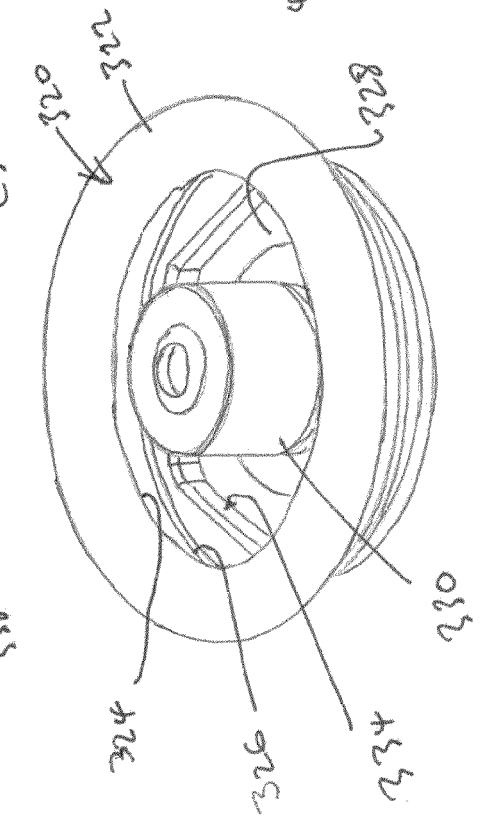
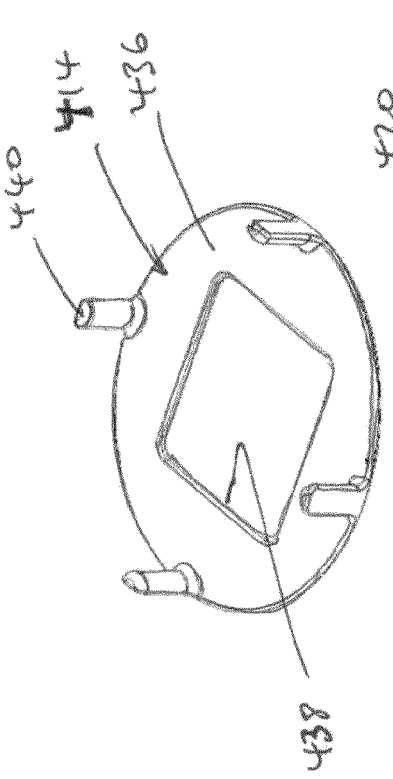

320
322
324
326
328
330

Fig. 7


440
414
436
438

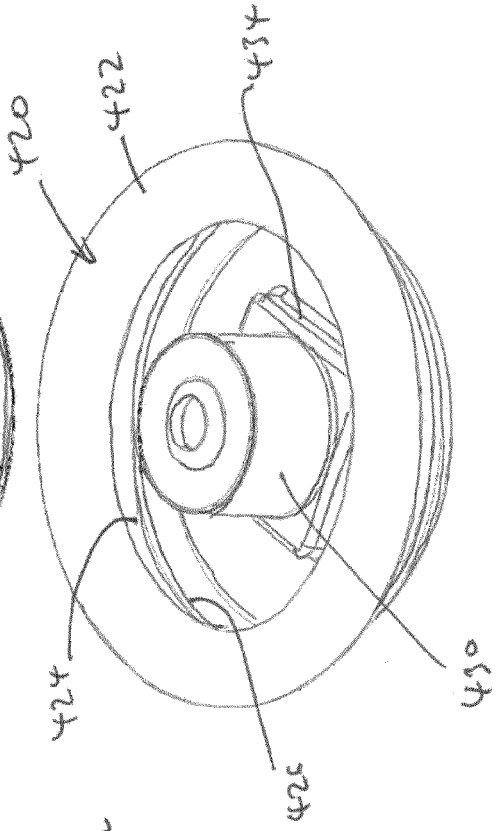

420
422
424
426
428
430

Fig. 8