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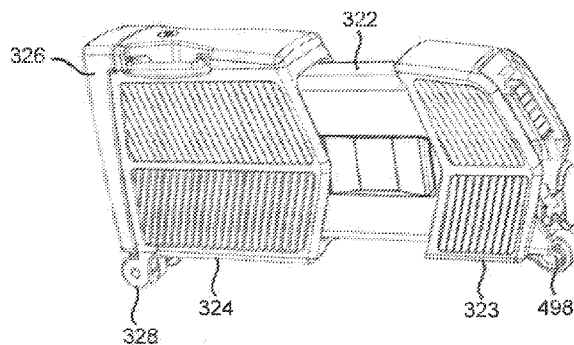


FIG. 14

(57) Abstract: A lighter having a main fuel containment housing body and a forward hinged lid with a closed position and an open position, the open position providing access to the flame generator assembly. The flame generator assembly providing a wind shield with a flame outlet that, when the lighter is in an operation orientation, is directed upwardly and in a direction generally perpendicular to the major dimension of the lighter in the closed position. The windshield having dimples with apertures extending outwardly for reducing wind while providing oxygen. The lighter may have a forward sleeve with a closeable lid, the sleeve extending around the four sides of the housing and slidable on the fuel containment housing. An actuation portion effects a transition from the closed position to an operational position, opening the lid and sliding the sleeve downwardly exposing the flame generation system out of an opening in the sleeve.



LIGHTER

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to U.S. Provisional Pat. App. 63/078,651 filed
5 September 15, 2021. Said application is incorporated by reference herein.

BACKGROUND OF THE INVENTION

Refillable lighters are utilized for lighting cigarettes, cigars, for starting campfires and
the like. Common refillable lighters utilize butane or liquid lighter fluid, for example naphtha,
10 for the fuel. A disadvantage with butane is that its performance degrades in extreme cold
conditions. Most lighters that utilize liquid lighter fluid are not fluid tight and can leak the
liquid lighter fluid and/or the lighter fluid evaporates in a relatively short period of time. Any
improvements in the performance of lighters would be well received by the lighter-using
public.

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SUMMARY OF THE INVENTION

A fueled lighter for cigarettes, cigars, and the like having a main fuel containment
housing body and a forward lighting end, with a forward hinged lid having closed position and
an open position, the open position providing access to a flame generator assembly. The flame
20 generator assembly providing a wind shield with a flame outlet that is perpendicular to the
major dimension and elongate axis of the lighter. When the flame generator is actuated, this
orients the flame upwardly with the housing body extending generally horizontally or slightly
tilted from the horizontal. The flame generator assembly comprising a flame generator base
with a fuel port positioned into the wind shield and an ignition means adjacent to the fuel port.
25 The flame generator base is unitary or integrated with a post extending from the flame generator
base, rearwardly. The post having a threaded end exposed at a rearward end of the housing. A
threaded connector, which may be configured as a knob, attaches to the threaded end of the
post and is tightened securing the fuel containment housing together that defines fuel reservoir.
In an embodiment, the post and threaded connector hold a rearward end cap in a sealing
30 arrangement with the housing. In an embodiment, the post and threaded connector hold the
flame generator base in a sealing engagement with the housing.

In embodiments, the lighter has a forward sleeve with a closeable lid, the sleeve
extending around the four sides of the housing and slidable on the fuel containment housing.
The forward sleeve with the closeable lid having a first closed position on the containment

housing where the lid is closed on the sleeve, and the sleeve with lid is forwardly positioned with respect to the fuel containment housing, and where the sleeve and closed lid enclose the flame generator assembly, including the wind shield and wick. In embodiments, the wind shield is entirely positioned rearwardly of the lid and is totally within the confines of the sliding forward sleeve in the closed position. The lighter further having an actuation portion that activates a transition from the closed position to an operational position. In the operational position, the lid is released from the sleeve and a bias to the lid causes the lid to rotate about 270 degrees to lay along a lower margin of the sleeve. Additionally, in the transition, the fuel containment housing moves forwardly within the sleeve such that at the operational position the windshield with wick projects forwardly out of the sleeve.

In embodiments, the flame generator base having a periphery that sealingly engages with the housing and also sealingly engages with the lid hinged to the housing when the lid is in the closed position. The sealing engagements may be provided by a pair of O-rings. The fuel port may include a wick extending from an eyelet in the flame generator base, the wick extending into the fuel reservoir defined by the fuel containment housing body.

In embodiments, the post having a bore for receiving flints, the bore extending to a flint wheel rotatably positioned below the wind shield when the lighter is in the operational position. A spring may bias the flints into engagement with the flint wheel. In embodiments, a central axis of the bore with the flints is positioned forward of the axis of the rotatable flint wheel. An upper portion of the flint wheel is positioned in a lower slot defined in the windshield.

A feature and advantage of embodiments where the lid or cover is substantially flat and does not cover the windshield when in a closed position. This reduces the cumbersome extra volume of a cup shaped lighter lid when in an operational position.

A feature and advantage of embodiments is that the body configured as a fuel housing is sealingly attached to the flame generator base of the lighter with one or more O-rings sealing the connection. Moreover, when the lid is closed, an O-ring seals the lid also to the flame generator base. All component junctures providing a leakage or evaporation pathway are sealed with O-rings, providing a lighter that will retain its fuel much longer than a conventional liquid fuel lighter.

A feature and advantage of embodiments is that the wind shield opens generally at a 90 degree angle from the greater dimension of the body. This allows the lighter to be held horizontally with the wind shield open in an upwardly direction.

A feature and advantage of embodiments is that the wind shield has a plurality of outwardly projecting tapered nozzle portions. Such outwardly projection nozzles are believed

to be more effective than simple holes in providing wind protection while allowing sufficient air for combustion. As air enters the narrow opening and the opening expands on the inside of nozzle, the air velocity is reduced more so that with simple aperture in a wall.

5 A feature and advantage of embodiments is a hinged lid that is retained in a sealed closed position by a pivoting latch. Additionally, a U-shaped pivoting latch provides a secondary securement of the hinged lid. The U-shaped pivoting latch pivots at a lower having a latched position where it extends forwardly toward the lid, and an unlatched position where

10 A lower integral or unitary latch bracket extends downwardly from the housing. A first latch has a pivoting latch lever with a latching end that hooks onto a feature on the hinged lid and an opposite manual actuation portion that can be depressed to disengage the latching end from the hinged lid. The lever may be spring loaded to urge it into the latch position.

A feature and advantage is a flame generator base that has an O-ring groove for sealing connection to the housing and an adjacent exposed O-ring groove for sealing connection to the hinged lid.

15 A feature and advantage of embodiments is a lighter with the opening of the windshield and the opening of a hinged lid are perpendicular or substantially perpendicular to one another. This provides enhanced wind protection and further provides a barrier to contacting the flame.
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20 A feature and advantage of embodiments is that a manually rotatable knob, rotatable without tools, projects from a rearward end of a lighter housing body providing an ergonomic configuration for easy gripping in the lighting-operational orientation. In embodiments, the knob threadedly attached to the flint tube holds the lighter together pulling a flame generating base unitary with the flint tube towards and into the housing body and an O-ring seals the opening.

25 A feature and advantage of embodiments is that a manually rotatable knob, rotatable without tools, projects from a rearward end of a lighter housing secures main components of the lighter together and closes the flint tube.

30 In embodiments, the knob engages against a rearward housing cap that is sealing engaged with an open lower end of the housing by sandwiching a seal between the cap and the lower housing margin.

In embodiments, the knob covers a flint reservoir that has a bore with internal threads on the post defining the bore, and threaded cap with external threads is secured in the bore. A coil spring in the bore and engaging the threaded cap urges the flints toward a flint wheel mounted on the flame generator base.

A feature and advantage of embodiments is that the metallic fuel containment housing is contained within non-metallic outer housing components to provide an enhanced gripping and holding surfaces. The outer housing may be a polymer, for example, with a significant lower heat conductivity than the metal of a main body of the fuel containment housing. In
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embodiments, a non metallic end cap extends over a rearward open end of the main body of the fuel containment housing, and a forward non metallic sleeve extends over the forward end of the fuel containment housing and enclose the metallic forward end of the fuel containment housing and the metallic windshield within the forward outer housing component, the sleeve, when the lighter is in a closed or non use state. Both outer housing components extending
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radially outward from the inner fuel containment housing such that during handling of the lighter, the metallic inner fuel containment housing is not contacted or is minimally contacted by the user. Particularly in cold ambient conditions, this is more user friendly.

A feature and advantage of embodiments is that the height of the lighter in the use position is significantly less that conventional lighters. First, the lighter has a use position
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where greatest dimension of the lighter is positioned horizontally. The height then is the second greatest dimension of the lighter. Secondly, the hinged lid is configured as a flap rather than being a cup, and the lid lays along the body barely increasing the height of the lighter. This minimal height of the lighter is more conducive to use in camping for example, to extend the lit lighter into openings in campfire wood piles.

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DESCRIPTION OF THE FIGURES

Figure 1 is a perspective view of the lighter in a closed position.
Figure 2 is a perspective view of the lighter in a closed position.
Figure 3 is a perspective you of the lighter in an open position.
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Figure 4 is a perspective view of the lighter in an open position.
Figure 5A is a perspective view of the lighter in an open position.
Figure 5B is a perspective view of the lighter in an open position.
Figure 6 is a partial cross section of a dimple of the windshield.
Figure 7 is an exploded view of the lighter.
30
Figure 8 is another exploded view of the lighter.
Figure 9 is an end elevational view of the open lighter.
Figure 10A is a cross-sectional view of the lighter taken at line 10-10 of Figure 9.
Figure 10B is another cross-sectional view of the lighter in the closed position.
Figure 11 is a view of the lighter being utilized with a thumb operating the flint wheel.

Figure 12 is another view of the lighter using the fore finger to operate the flint wheel.

Figure 13 is a perspective view of an embodiment of a lighter in accordance with the embodiments.

Figure 14 is another perspective view of the lighter of Figure 13.

5 Figure 15 is a perspective view of the lighter of Figures 13 and 14 from the opposite side of those views.

Figure 16 is a side elevation view of the lighter of Figures 13-15 in an open state.

Figure 17 is a perspective view of the open lighter of Figure 16 showing the actuation portion.

10 Figure 18 is a cross section view of the lighter of Figures 14-17.

Figure 19 is an exploded view of the lighter of Figures 14-18.

Figure 20 is an exploded view for the side opposite that of Figure 19.

Figure 21 is a perspective view of a housing sleeve.

Figure 22 is a perspective view of a housing end cap.

15 Figure 23 is a perspective view of the housing end cap of Figure 22 taken from an opposite side.

Figure 24 is a perspective view of the housing sleeve of Figure 21 taken from an opposite side.

Figure 25 is a perspective view of a lid.

20 Figure 26 is a perspective view of the lid of Figure 25 with the cooperating latch and seal.

Figure 27 is an exploded view of the lid of Figure 26.

Figures 28A-28D show an operating sequence of a lighter according to the embodiments.

25 Figures 29A-29C illustrate an operating sequence for filling the fuel and flints of a lighter according to the embodiments.

DETAILED DESCRIPTION

Referring to Figures 1-6, a lighter 20 is illustrated in a closed position and an open use or operational position and generally comprises a fuel containment housing 22 having a housing body 24 and a lid 26 hingedly connected by way of hinge 28, a latching assembly 30, and a rearwardly extending knob 32. A flame generation assembly 40 is exposed when the lid 26 is opened and comprises a flame generation base 42, windshield 44 extending from the base, a fuel port 46, an ignition means 48 on the base. The lighter has a greatest dimension D1, a length, which extends generally horizontally when the lighter is in a closed position with an

axis $\alpha 1$ horizontal. The lighter has a second greatest dimension D2, which is a height when in the use position, and a third greatest dimension D3, a thickness or width. Length dimension D1 illustrates the length when and the width dimension will each have a

In embodiments, the windshield 44 has four walls, two upright lateral opposing walls 52, 53 extending from the flame generation base, a lower wall 54 also extending from the base 42 connecting the two lateral opposing walls, and an distal upright wall 55 connecting the two lateral opposing walls. The windshield defines an open flame region 58 and a windshield flame outlet 59 which has an axis $\alpha 2$. The lateral side walls have outwardly projecting dimples 60 with apertures 61. The dimples are configured as outwardly projecting nozzle portions 64 formed in the sidewalls. These are believed to provide enhanced wind protection to prevent the extinguishment of a flame, but also providing adequate air for the combustion. As depicted in Figure 6, high velocity air flow 67 when it enters the opening is slowed to a slower air flow 68 when it expands due to the increasing area of the diverging nozzle 69 of funnel.

The lid defines an opening 66 with an axis $\alpha 3$ that is perpendicular or substantially perpendicular to the axis of the windshield 44. The lid is attached to the housing body 24 by hinge 28 having hinge portions 72, 73 projecting upwardly from the housing body and are connected with hinge pin 75. A spring 76 can urge the lid to the open position.

Referring to Figures 1-7, the latching assembly 30 comprises a latching base 80 disposed on the housing body, a first latch 82 and a second latch 84. The first latch may be configured as a lever 86, with a fulcrum configured as a pin 88, and an actuation portion 89, and a hook portion 90 opposite the actuation portion with respect to the pin 88. The hook portion engages structure, such as a lip 91, best shown in Figure 10, outwardly allowing the lid to be opened. A spring 92, shown in Figure 7, may urge the lever to the latched position. Depression of the actuation portion 89 pivots the hook portion 90 outwardly allowing the lid to be opened from the closed position.

The second latch 84 comprises a U-shaped latch member 96 that has ends 98 extending into openings 101 on ribs 103, 104 of the latching base 80. A polymer tube or covering 106 may provide an engagement portion for the latch member. The latch member swings from a double latched position shown in Figure 1 and 2, to the seated unlatched position of Figures 3 and 4. The legs 107, 108 of the member may provide feet for seating on a flat surface. In embodiments, the second latch needs to be unlatched before the first latch can be released, providing assurance that the lid is securely sealed on the housing body 24.

Referring to Figures 3-10B, the flame generation assembly includes the flame generation base 42 which has a plate portion 120 which is sized for insertion into the open

interior 122 of the housing body 24. A pair of O-ring grooves 126, 128 receive O-rings 130, 131 formed of compliant material that seal the juncture 134 between the housing body 24 and the flame generation base and the juncture 136 between the lid and the flame generation base when the lid is closed.

5 A post 150 extends from the flame generation base 42 through the fuel reservoir 151 defined by the housing body 24 and flame generation base 42 toward the rearward end 152 of the housing base and has a threaded end 154 to which is attached the knob 32. As best shown in Figure 10B, the post has an open interior configured as a bore 160 that defines a flint reservoir 162 for receiving flints 164. The flint reservoir having an axis $\alpha 4$. The bore may
10 have interior threads 165 that receive a cap 168 with exterior threads 169. A spring 174 urges the flints 164 toward a flint wheel 180 that is rotatably attached to the flame generation base, such as be supports 182, 183 formed from the windshield and a rivet 185. The flint wheel having an axis of rotation of $\alpha 5$. See Figure 7, for example. The flame generation base 42 has the fuel port 46 having an opening 190 extending into the open interior 192 of the housing body
15 which may have filament material, such as rayon, to hold liquid lighter fluid. A wick 200 extends into the flame region and into the fluid reservoir 202 defined by the open interior 192 which may be filled with absorbent material 203. A felt pad 204 may be received in the fuel reservoir and fibrous absorbant material held in the reservoir. In embodiments, as best shown in Figure 10A, the axis $\alpha 4$ of the flint reservoir is offset from the rotational axis $\alpha 5$ of the flint
20 wheel. This provides an advantageous enhanced spark generation as the spark is angled more into the flame region 58 as illustrated by spark 210 in Figure 10B, and there is more surface to surface contact between the flint and flint wheel compared to conventional arrangement where the axis intersect.

The knob 32 has an O-ring groove 221 and receives an O-ring 225 that seals the juncture
25 226 between the knob and housing body 24, precluding leakage of fluid. Figures 11 and 12 illustrate optional way to utilize the lighter, the lid, in embodiments, may provide enhanced wind protection. The knob seats comfortably in the palm of the user's hand.

Referring to Figures 13-18, a lighter 320 is illustrated with an outer housing 321 and an inner fuel containment housing 322. The outer housing comprising a pair of outer housing
30 components, a rear housing end cap 323 and a forward housing sleeve 324. A lid 326 connected to the housing sleeve by way of a hinge 328. A latching assembly 330 releasably secures the lid to a forward edge 331 of the housing sleeve 324 as shown in figures 13-15, with the lighter 320 in a closed position or state. Figures 16 and 17 show the lighter in an open use position or state with the lid 326 rotated about the hinge 328 to lay along the outer surface 339 of the

housing sleeve 324 revealing the flame generation assembly 340 attached to or extending from a flame generation base which in this embodiment is unitary with a main fuel containment housing body 341 and with components of the flame generation assembly 340 mounted to a flame generation base 342. The flame generation assembly includes a windshield 344, with
5 opposing lateral walls 352, 353 extending from the flame generation base. An end wall 353 connects the two opposing lateral walls and the end wall 354 the two opposing lateral walls and the flame generation base 342 defining a flame outlet 359. The windscreen defining an open flame region 358. A fuel port 360 in the flame generation base 342 has an exposed wick 363 extending therefrom.

10 Referring in particular to Figures 13-20 and 25-27, the lid 326 may be configured as a flap with no side walls or minimal sidewalls extending around the margin 364 of the lid toward the housing sleeve 324. The lid 326 is attached to a housing sleeve 324 by hinge portions 372, 373 projecting upwardly from the housing sleeve 324 and are connected with hinge pin 375. A metal coil spring 376 can bias the lid 326 to the open position. The latching assembly 330 can
15 comprise a spring latch member 380 with two latch ends 384, 385 two manual deflectable portions 387, 388, and an end portion 390. The spring latch member 380 held in place by a retention plate 392 having a recess 394 that conforms to the latch member 380 and exposes the two deflectable portions 387, 388 that are laterally exposed. A screw 389 secures the plate and the latch member 380. The latch ends 384, 385 are removably engageable with catch portions
20 396, 397 on the lid. The two latch ends 384, 385 having a lid retention position when the deflectable portions are not deflected where they are engaged with and capturing the catch portions on the lid 326 and a release position where the deflectable portions are squeezed inward moving the latch ends inward to an open region 399 between the catch portions 396, 397 such that the latch ends 384, 385 release the catch portions of the lid 326 allowing the lid
25 to open under the bias provided by the spring 376. The spring latch member may be formed of spring steel. When released the lid rotates from the position of Figures 13-15 to the position of Figures 16 and 17 with the lid laying along the outer surface 339 of the housing sleeve with a rib 401 that may cooperate with and interface with an elongate groove 402 on the sleeve. This cooperation and interfacing reduces the overall height of the lighter and provides a more
30 secure seating of the lid on the sleeve. Impacts or forces on the lid, when the lighter is open and the lid seated on the sleeve may be absorbed by the sleeve rather than being transmitted to the hinge with potential damage to the hinge. The lid further has a recess 404 on its inside surface 405 that receives a compliant seal 406 formed of compliant material. When the lid is

closed and captured by the latch member, the compliant seal is compressed effectively sealing the lid to the sleeve.

Referring to Figures 13-21 and 24, the forward housing sleeve 324 is slidably engaged with the fuel containment housing body 341, sliding between a forward position as illustrated in Figures 13-15 and a retracted position as illustrated by Figures 16 and 17, these positions corresponding to the closed lighter state and the open use state. The housing sleeve 324 has a tab 416 that rides in slot 418 and engages a spring 420 that is contained within the sleeve between the sleeve and fuel containment housing body 341 as best shown in Figure 18. The spring 420 is compressed within the sleeve such that a bias is provided to the sleeve to the retracted position of Figures 16 and 17. When the lid 326 is released from the captured closed position and rotates about the hinge, the fuel containment housing body 322 then is released to extend out of the sleeve, or in other words, the sleeve is released to retract downwardly toward the housing end cap 323. The housing sleeve 324 as depicted also has tabs 431, 432 that ride in the recesses 435, 436 on opposing sides of the main fuel containment housing body 341. The housing sleeve may be formed of a resilient non metallic material such as polymers that provide a resilient spring action of the tabs into the recesses 345, 346. The recess may have stop indentations 350, 352 at one or both ends of the respective recesses to releasably secure the respective tab therein and consequently provide a position fixation of the sleeve with respect to the fuel containment housing body 341. The tabs 431, 432 function as detents for retention of the sleeve in the fully retracted position and/or the fully extended position corresponding to the open state and closed state of the lighter respectively. The sleeve may have repeating indentations or other surface structure thereon for providing gripping surfaces 357.

Referring to Figures 18-20, the fuel containment housing body has a seal groove 439 and compliant seal 440 therein that engages the inside surface of the housing sleeve when the housing sleeve is in its full forward position corresponding to the closed state of the lighter. This seal 440 in conjunction with the seal 406 on the lid 326 provides a sealed chamber enclosing the flame generation assembly thereby minimizing leakage or evaporation of the fuel.

Referring to Figures 18-20 and 22-23, in embodiments, the main fuel containment housing body 322 has the flame generation base 342 unitary with the containment wall 448 that extends rearwardly from the base 342. The main fuel containment housing body 322 has a rearward opening 452 opposite the flame generation base that is capped by the housing end cap 323. The housing end cap 323 may also be made of a polymer, such as the polymer of the housing sleeve, and have surface indentations or structure defining gripping surfaces 457. The

housing end cap 323 is conformingly sized to the exterior circumference 459 at the rearward end 461 of the fuel containment housing body 322 and has a recess 465 on the surface 466 facing the fuel containment housing body that receives a compliant seal 468 formed of compliant material 469. The seal 468 is conformingly sized to the recess 465 and engages and seals against the rearward edge 470 of the fuel containment housing body 322.

Continuing to refer to Figures 18-20 and 22-23, in embodiments, the fuel containment housing also has a post 473 configured as a tube extending from the forward end 475 of the fuel containment housing body 341, the forward end configured as the flame generation base 342. The tube positioned at the flame generation base at and opening to the flint wheel 480 for providing a column of flints to engage the flint wheel. The tube extending through the fuel reservoir 482 defined by the fuel containment housing to terminate at or about at the rearward opening 452. The fuel reservoir may have fibrous material 483 for absorbing lighter fuel. The tube 473 having internal threads 484 that cooperate with threaded member 486 for loading the flints 487 in the tube and also for clamping together the housing components of the lighter. Specifically, the threaded member has an exterior handle or knob 492 integrated with the threaded member 486, the inside surface 490 of the knob 492 engages the exterior surface 493 of the end cap 323 and extends through opening 494 in the end cap. As the knob is rotated, the end cap 323 is drawn toward the fuel containment housing sandwiching the seal 468 between the end cap and the rearward and open end of the fuel containment body 341. The threaded member also effecting a forward bias to flints 487 by way of the tip 489 of the threaded member engaging the flint spring 488. The end cap 323 may have a pivoting extension handle 495 extending therefrom that may be used to provide addition leveraged force to rotate the threaded member to tighten and untighten the member for loading flints 487 or refueling the lighter as explained below. The pivoting extension handle may be received in a recess 496 defined on the outer surface 497 of the exterior housing end cap 323. The housing end cap 323 may also have an aperture 498 for receiving a tether or strap.

Referring to Figures 28A-28D and 30A-30C, operation of embodiments of the lighter 320 are illustrated. The lighter is intended to be operated in more of a horizontal manner than conventional wicked lighters. The closed lighter of Fig. 28A and 30A may be actuated to transition between the closed state to the open state by actuation of the latching system by pushing inwardly on the deflectable portions 387, 388 of the latch member 380 which releases the lid 326 as shown in Figures 28B and 30B. The lid 326 rotates about the hinge 328 toward the housing sleeve 324. With the clearance of the lid 326 from the open front 499 of the housing sleeve 324, the biased fuel containment housing body 341, specifically the flame generation

assembly 340, can extend out of the open front 499 as shown in Figure 28C. As the sleeve extends downward to its fully seated position, which may be in engagement with the end cap 323, the lid has seated on the exterior surface of the housing sleeve. The user may then rotate the flint wheel to provide a spark to light the exposed wick.

5 Referring to Figures 29A-29C, steps to load flints and lighter fluid are disclosed. The threaded member 486 is unscrewed from the fuel containment housing body 341 allowing removal of the end cap 323. The flint spring 488 may be removed by rotating the rearward end of the fuel containment housing downwardly (not shown in these views). Flints may be inserted in the tube 473 and fuel 500 may be added to the absorbent material 483 exposed at the open
10 end 452 of the fuel containment housing body 341. The flint spring may be reinserted in the tube and the end cap 323 may then be reinstalled with the threaded member 486 inserted in the tube and tightened, closing the flint tube, biasing the flints towards the flint wheel, and clamping the lighter housing components together and compressing the compliant seal between the end cap and the fuel containment housing body.

15 In embodiments, the lighter is known as a cigarette or cigar lighter, the volumetric space occupied by the lighter is relatively small, from 2 cubic inches to 4 cubic inches. The weight of the lighter is less than 4 ounces.

In embodiments, the ignition means may be electronic and the fuel may be a gaseous fuel such as butane. See, for example U.S. Pat. Nos. 32800600, 7654821, 5055034, 3353376,
20 2424781, 4128393, 3521985, 2867753, 3311789. The above references in all sections of this application are herein incorporated by references in their entirety for all purposes.

All of the features disclosed in this specification (including the references incorporated by reference, including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except
25 combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including references incorporated by reference, any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic
30 series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any incorporated by reference references, any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any

method or process so disclosed. The above references in all sections of this application are herein incorporated by reference in their entirety for all purposes.

Although specific examples have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement calculated to achieve the same purpose could be substituted for the specific examples shown. This application is intended to cover adaptations or variations of the present subject matter. Therefore, it is intended that the invention be defined by the attached claims and their legal equivalents, as well as the following illustrative aspects. The above described aspects and embodiments of the invention are merely descriptive of its principles and are not to be considered limiting. Further modifications of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention.

Claim:

1. A lighter comprising:
 - a fuel containment housing defining an open interior fuel reservoir, the body having an axis extending four side walls, an open front, a closed rear wall with an aperture when the lighter is in an operational orientation;
 - a lid hingedly attached to the fuel containment housing body, the lid having an open position and a closed position;
 - a flame generator assembly comprising:
 - a flame generator base seated in the open front of the housing body;
 - a wind shield extending forwardly from the flame generator base, the wind shield defining a flame region and the wind shield being open upwardly defining a flame outlet;
 - a ignitor means mounted on the flame generator base below the wind shield;
 - a post extending from the flame generator base rearwardly to the aperture in the rear wall of the fuel containment housing body;
 - a knob attached to the end of the post and engaging the post
 - a fuel providing port in the flame generator base.
2. The lighter of claim 1, wherein the end of the post is threaded and the knob is threadedly attached to the end of the post.
3. The lighter of claim 2, wherein the knob is tightened on the threaded end putting the post under tension.
4. The lighter of any of claims 1-3, wherein the post has a through hole extending from the end of the post to the ignitor means, and wherein flint is positioned in the through hole, and wherein the ignitor comprises a flint wheel rotatably mounted with respect to the flame generator base, the flame generator assembly further comprising a wick extending from the fuel reservoir through the port and into the flame region.
5. The lighter of claim 4, wherein the lid when closed engages a compliant seal on the flame generator base.

6. The lighter of claim 4, wherein the through hole of the post has an axis that is positioned above a rotation axis of the flint wheel.
7. The lighter of claim 1, wherein the wind shield having a plurality of apertured dimples projecting outwardly from opposing sidewalls of the wind shield, each dimple having a central aperture.
8. The lighter of claim 1, wherein the wind shield having a plurality of outwardly projecting nozzle portions on lateral side walls of the wind shield.
9. The lighter of claim 1, wherein the ignitor means is a flint wheel and flint, and wherein the flint wheel is rotatably mounted to the flame generator base, and the flint is disposed to engagement the flint wheel.
10. The lighter of claim 9, wherein the flint is urged against the flint wheel along an axis that is positioned between a rotational axis of the flint wheel and the flame region.
11. The lighter of any of claims 1-3 and 7-10, wherein the flame generation base is sealingly engaged with the housing by a seal.
12. The lighter of any of claims 1-3 and 7-10, wherein when the lid is in the closed position it is sealingly engaged with the flame generation base by an O-ring engaged in an O-ring groove in the flame generation base.
13. The lighter of any of claims 1-3 and 7-10, wherein the knob is sealingly engaged with an O-ring positioned on the knob and compressed against the housing body.
14. The lighter of any of claims 1-3 and 7-10, wherein a latch base is disposed at the lower side of the housing base, and wherein a latching lever is pivotally attached to the latch base at a pivot point, the latching lever having a hook portion that engages structure on the lid and a actuation portion that when depressed releases the hook portion from the lid structure.
15. The lighter of claim 14, further comprising a U-shaped wire latch that pivots on the latch base, the U-shaped wire latch movable from a latching position where the wire latch is

secured on lid structure to an opposite seated position where the wire latch is extending rearwardly and is retained on structure extending from the latch base.

16. The lighter of claim 15, wherein when the U-shaped wire latch is in retained on structure extending from the latch base, the wire latch provides feet for engaging a planar surface to seat the lighter on said planar surface.

17. A lighter having a flame generation assembly comprising a flame generation base sealingly engaged by an O-ring to a fuel containment housing defining a fluid fuel reservoir, a threaded post extending from the flame generation base rearwardly through the fuel reservoir and through an aperture in the fuel containment housing with a cooperating threaded member attached to the threaded post to secure the fuel containment housing to the flame generation base.

18. The lighter of claim 17, further comprising a housing lid hinged to the housing base, the lid having a closed position wherein it is sealingly engaged with an O ring seated in an O-ring groove on the flame generation base.

19. A lighter having a flame generation assembly secured in a fuel containment housing by way of a post extending from a flame generation base of the flame generation assembly, the post extending through an opening in the fuel containment housing and wherein a nut connects to a threaded end of the post, the nut securing the housing to the flame generation base.

20. The lighter of claim 19, wherein an O-ring extends around the flame generation base and is positioned intermediate the fuel containment housing and the flame generation base.

21. The lighter of claim 20, wherein a second O-ring extends around the flame generation base and engages a lid hingedly attached to the fuel containment housing.

22. A lighter with a fuel containment housing having a latch base disposed at a side of the housing base, and wherein a latching lever is pivotally attached to the latch base at a pivot point, the latching lever having a hook portion that engages structure on the lid and a actuation portion that when depressed releases the hook portion from the lid structure.

23. The lighter of claim 22, further comprising a U-shaped wire latch that pivots on the latch base, the U-shaped wire latch movable from a latching position where the wire latch is secured on lid structure to an opposite seated position where the wire latch is extending rearwardly and is retained on structure extending from the latch base.

24. The lighter of claim 23, wherein when the U-shaped wire latch is in retained on structure extending from the latch base, the wire latch provides feet for engaging a planar surface to seat the lighter on said planar surface.

25. A lighter with an ignitor means comprising is a flint wheel and flint, and wherein the flint wheel is rotatably mounted to a flame generator base, and the flint is disposed to engage the flint wheel, and wherein the flint is urged against the flint wheel along an axis that is positioned between a rotational axis of the flint wheel and a wick of the lighter.

26. A lighter wherein the lid has an opening with an axis extending therefrom and the wind shield has four sides with a flame opening that has an axis and wherein when the lid is open, the axis of the lid opening is perpendicular or substantially perpendicular to the axis of the windshield opening.

27. The lighter of any of claims 17-26, wherein the lid has an opening with an axis extending therefrom and the wind shield has a flame opening with an axis and wherein when the lid is open the maximum amount, the axis of the lid opening to the axis of the windshield flame opening is in a range of 70 to 120 degrees.

28. A lighter with a housing body and a hinged lid, the housing body having a projection extending from a rearward end of housing body at the corner of the housing body, the projection extending a distance from the housing body, the distance being in the range of 10% to 30% of the length of the housing body and lid when in the lid is in a closed position.

29. The lighter of claim 28, wherein the projection is a knob threadingly attached to a post extending from a flame generation base at the forward end of the housing body.

30. The lighter of claim 29, wherein the knob covers a threaded cap on the post that covers a flint reservoir.

31. A lighter comprising:
- a fuel containment housing with an open interior fuel reservoir, the body having an axis extending four side walls, an open front, a closed rear wall with an aperture when the lighter is in an operational orientation;
 - a lid hingedly attached to the fuel containment housing body, the lid having an open position and a closed position;
 - a flame generator assembly comprising:
 - a flame generator base seated in the open front of the housing body;
 - a wind shield extending forwardly from the flame generator base, the wind shield defining a flame region and the wind shield being open upwardly defining a flame outlet;
 - a ignitor means mounted on the flame generator base below the wind shield;
 - a post extending from the flame generator base rearwardly to the aperture in the rear wall of the fuel containment housing body;
 - a knob attached to the end of the post and engaging the post
 - a fuel providing port in the flame generator base.
32. The lighter of claim 31, wherein the end of the post is threaded and the knob is threadedly attached to the end of the post.
33. The lighter of claim 32, wherein the knob is tightened on the threaded end putting the post under tension.
34. The lighter of any of claims 41-33, wherein the post has a through hole extending from the end of the post to the ignitor means, and wherein flint is positioned in the through hole, and wherein the ignitor comprises a flint wheel rotatably mounted with respect to the flame generator base, the flame generator assembly further comprising a wick extending from the fuel reservoir through the port and into the flame region.
35. The lighter of claim 34, wherein the through hole of the post has an axis that is positioned above a rotation axis of the flint wheel.
36. The lighter of claim 31, wherein the wind shield having a plurality of apertured dimples projection outwardly from opposing sidewalls of the wind shield.

37. The lighter of claim 31, wherein the wind shield having a plurality of outwardly projecting nozzle portions on lateral side walls of the wind shield.
38. The lighter of claim 31, wherein the ignitor means is a flint wheel and flint, and wherein the flint wheel is rotatably mounted to the flame generator base, and the flint is disposed to engagement the flint wheel.
39. The lighter of claim 38, wherein the flint is urged against the flint wheel along an axis that is positioned between a rotational axis of the flint wheel and the flame region.
40. The lighter of any of one of claims 32-33 and 36-39, wherein the flame generation base is sealingly engaged with the housing by a compliant seal.
41. The lighter of any of one of claims 32-33 and 36-39, wherein when the lid is in the closed position, it is sealingly engaged with the flame generation base by an O-ring engaged in an O-ring groove in the flame generation base.
42. The lighter of any of one of claims 32-33 and 36-39, wherein the knob is sealingly engaged with an O-ring positioned on the knob and compressed against the housing body.
43. The lighter of any of one of claims 32-33 and 36-39, wherein a latch base is disposed at the lower side of the housing base, and wherein a latching lever is pivotally attached to the latch base at a pivot point, the latching lever having a hook portion that engages structure on the lid and a actuation portion that when depressed releases the hook portion from the lid structure.
44. A lighter with a fuel containment housing defining a fuel reservoir, the fuel containment housing comprising four unitary sidewalls defining an open end, the open end closed with an end wall component and an compliant seal position between the end wall component and the four unitary walls, the lighter further comprising a hinged lid with an elastomeric seal for sealingly closing a flame generator of the lighter when the lid is closed.
45. A lighter having a fuel reservoir defined by a plurality of fuel containment housing components, the fuel containment housing components sealingly coupled together defining at

least one juncture therebetween, with each juncture between the plurality of fuel containment housing components sealed with compliant seal material, and wherein the only access opening to the fuel reservoir not having compliant seal material is a fuel dispensing conduit with a wick therein, the fuel dispensing conduit leading to a flame generation region defined in part by a windshield, the flame generation region openable and closable at least in part by a hinged lid, the hinged lid having a compliant seal material sealingly enclosing the flame generation region when the lid is in a closed position.

46. A lighter comprising a housing, the housing defining a fuel reservoir defined by a fuel containment housing components, the fuel reservoir having an access opening to a flame generation region defined in part by a windshield, the flame generation region openable and closable at least in part by a hinged lid, the hinged lid when closed defining a closing juncture that is sealingly closed by compliant seal material, the compliant seal material compressed between the hinged lid and the housing when the lid is closed and the compliant seal material not compressed between the lid and the housing when the lid is not closed.

47. The lighter of claim 45 or 46, wherein the compliant seal material defines at least one o-ring.

48. The lighter of claim 47, wherein the at least one o-ring is compressed by the lid when the lid is in a closed position.

49. The lighter of claim 45 or 46, wherein the compliant seal material defines a gasket form fit into a gasket recess on an inside surface of the hinged lid.

50. The lighter of claim 49, wherein the gasket forms a closed loop and has a cross section that is polygonal in shape.

51. A lighter with an elongate axis, the lighter comprising an elongate body, the elongate body having the elongate axis extending in the elongate direction, the lighter having a forward lighting end and a rearward fuel fill end, the lighter further comprising a flame generator assembly at the lighting end that comprises a windshield, the windshield having a flame opening with a flame opening axis, the flame opening positioned in a perpendicular direction

with respect to the axis of the body, whereby when the lighter is held with the axis in a horizontal direction, the flame opening of the windshield is oriented upwardly.

52. The lighter of claim 51, wherein when the lighter is in the use position with the elongate axis horizontal, the windshield has two lateral sidewalls with a plurality of dimples projecting outwardly with central apertures on each dimple, the flame opening is open upwardly.

53. The lighter of claim 51 or 52, wherein the lighter has a hinged lid that sealingly closes the windshield when the lighter is in the closed position, the hinged lid attached to the body at a lower hinge below the windshield when the elongate axis of the lighter is horizontal.

54. A lighter comprising a flame generator assembly on a forward end of a fuel containment housing, the flame generator mounted on the fuel containment housing, the flame generator assembly comprising a windshield with an open side, the lighter further comprising an outer housing sleeve slidingly positioned on and extending around the fuel containment housing, the outer housing sleeve having a hinged lid configured as a rigid flap, positioned at a forward end of the outer housing sleeve, the lighter having a closed position and an open operational position, wherein when in the closed position, the flame generation assembly is substantially or completely within the outer housing sleeve and is contained within a sealed chamber defined by the hinged lid sealingly engaged with a forward edge of the outer housing sleeve, wherein when in the open operational position, the hinged lid is rotated to a position with an outer surface of the hinged lid laying along an outer surface of the outer housing sleeve, and the flame generator is substantially beyond the forward edge of the outer housing sleeve.

55. The lighter of claim 54, wherein the sealed chamber is further defined by an inner housing compliant seal positioned rearward of the forward edge of the outer housing sleeve and positioned to be compressed between an inner surface of the outer housing and the fuel containment housing when the lighter is in the closed position, and wherein when the lighter is in the use position the inner housing compliant seal is not compressed between the inner surface of the outer housing and the fuel containment housing.

56. A lighter comprising a flame generator assembly on a forward end of a fuel containment housing, the flame generator mounted on the fuel containment housing, the flame generator assembly comprising a windshield with an open side, the lighter further comprising an outer

housing sleeve slidably positioned on and extending around the fuel containment housing, the outer body having a hinged flap, positioned at a forward end of the outer housing sleeve, the lighter having a closed position and an open operational position, wherein when in the closed position, the forward end of the fuel containment housing is retracted in the outer housing sleeve and is contained within a sealed chamber, the lighter having an actuation portion to release the lighter from the closed position whereby the hinged flap opens and the forward end of the containment housing including the flame generator assembly extends forwardly out of the housing sleeve under a bias provided by a spring.

57. The lighter of claim 56, further comprising a flint wheel positioned on the same side of the windshield as the hinge of the hinged flap.

58. The lighter of claim 56, wherein the hinged lid has a compliant seal seated in a groove therein to seal with the outer housing sleeve.

59. A lighter comprising:

an inner metallic fuel containment housing body;

a flame generation assembly forwardly mounted on the inner fuel containment housing body at a forward end of the fuel containment housing;

a rigid outer non-metallic housing that extends around a circumference of the metallic fuel containment housing body, the housing extending around a circumference at the forward end and extending around a circumference at the rearward end of the metallic housing.

60. The lighter of claim 59, wherein the rigid outer non-metallic housing comprises a forward outer housing sleeve and a rearward outer housing component.

61. The lighter of claim 60, wherein the rearward outer housing component defines an end cap for the fuel containment housing.

62. The lighter of claim 59, wherein the outer housing is a polymer.

63. The lighter of any one of claims 59-62, wherein the outer housing comprises a non metallic slidable forward outer housing sleeve, the forward outer housing sleeve slidable with respect to the inner fuel containment housing.
64. The lighter of claim 63, wherein a lid is hingedly attached to a forward end of the forward outer housing sleeve.
65. The lighter of claim 64, wherein the lighter has a closed non use state and a open use state, wherein in the open use state, the lid is rotated to lay along the forward outer housing sleeve.
66. The lighter of claim 64, wherein the lighter has a closed non use state and a open use state, wherein in the open use state, and wherein a actuator is attached to the forward sleeve to effect transition between the closed non use state and the open use state.
67. The lighter of claim 64, wherein the actuator is one of a hinged lever and a wire catch member.
68. The lighter of claim 64, wherein the forward outer housing sleeve has repeating indentations thereon substantially covering each of at least two outer side surfaces.
69. The lighter of claim 64, wherein the hinged lid is biased toward an open position and the lighter further comprises a latch for retaining the lid in a closed position.
70. The lighter of any of claims 64-69, wherein the outer non metallic housing has gripping indentations on a plurality of side surfaces.

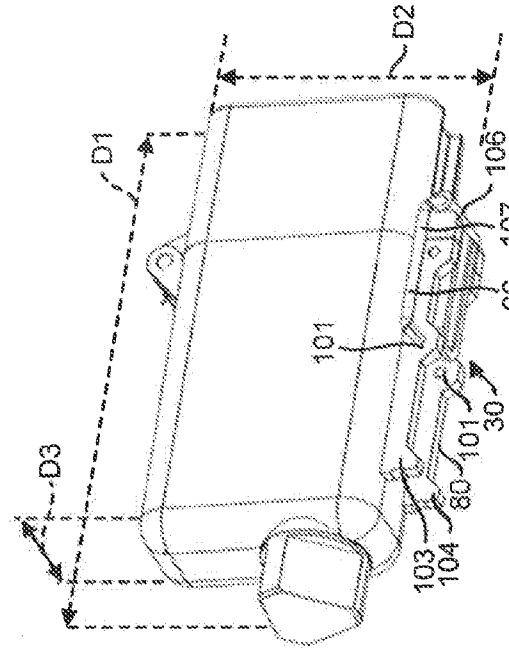


FIG. 2

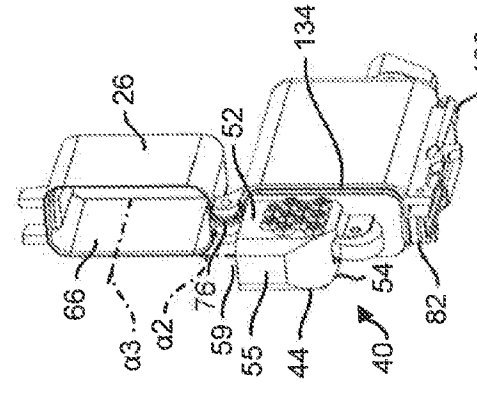


FIG. 4

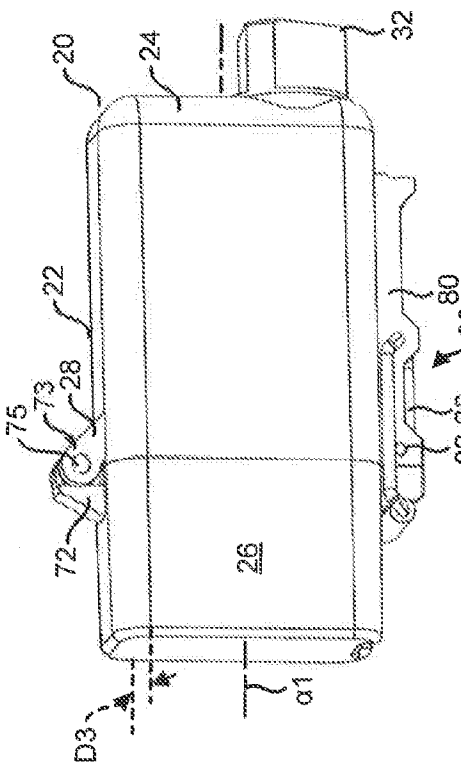


FIG. 1

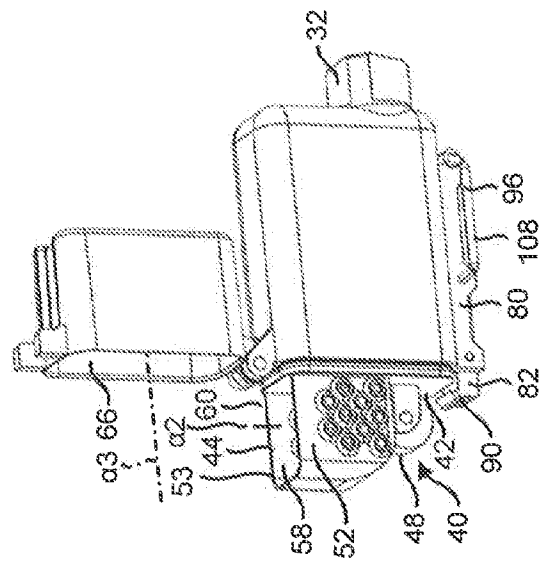


FIG. 3

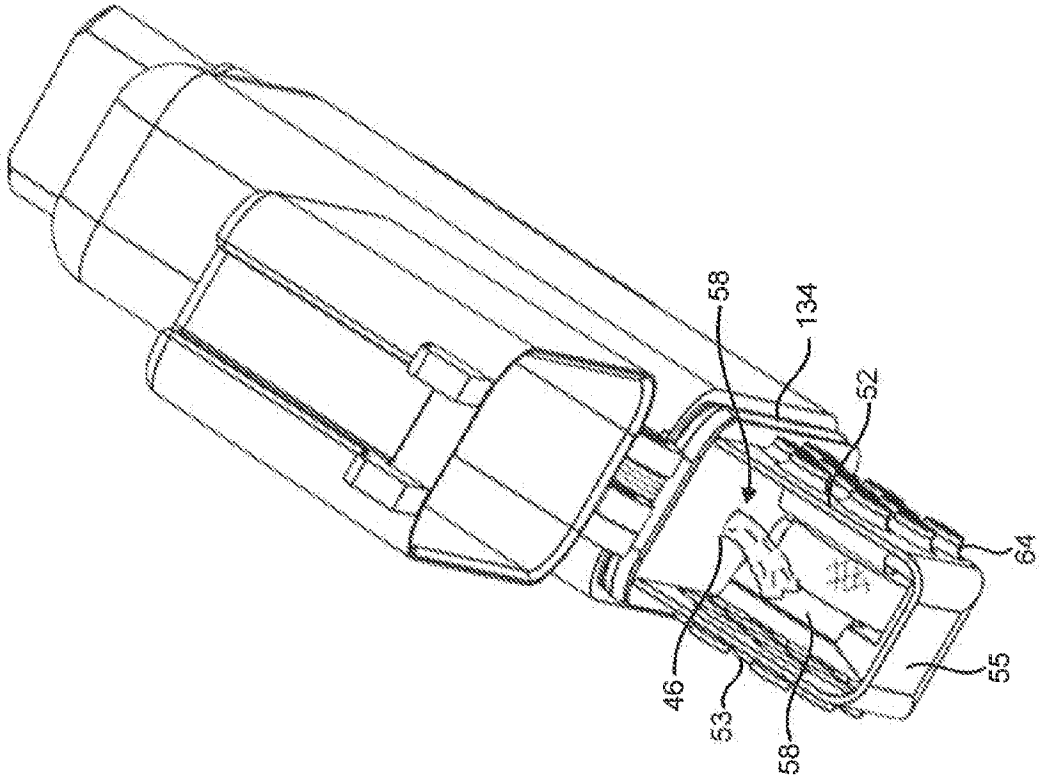


FIG. 5B

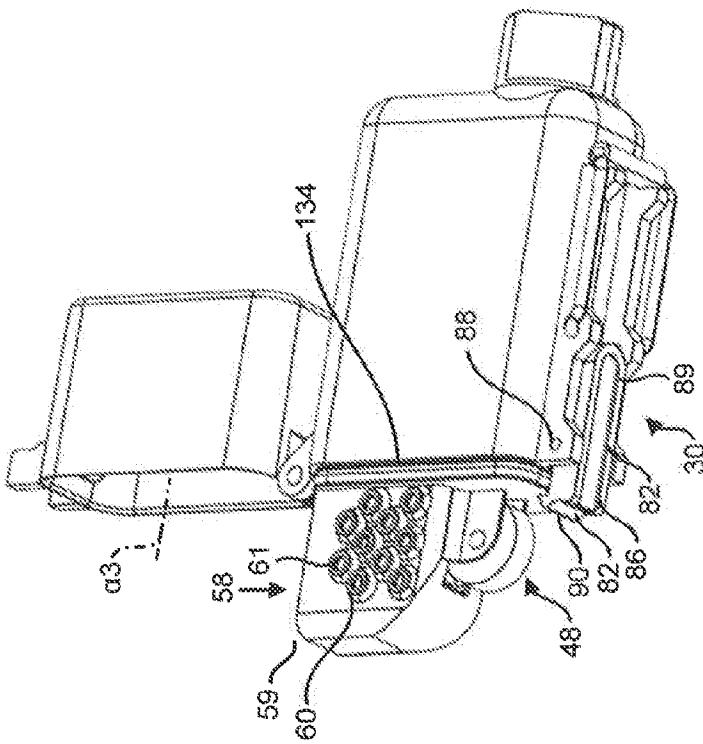


FIG. 5A

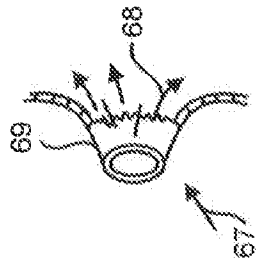


FIG. 6

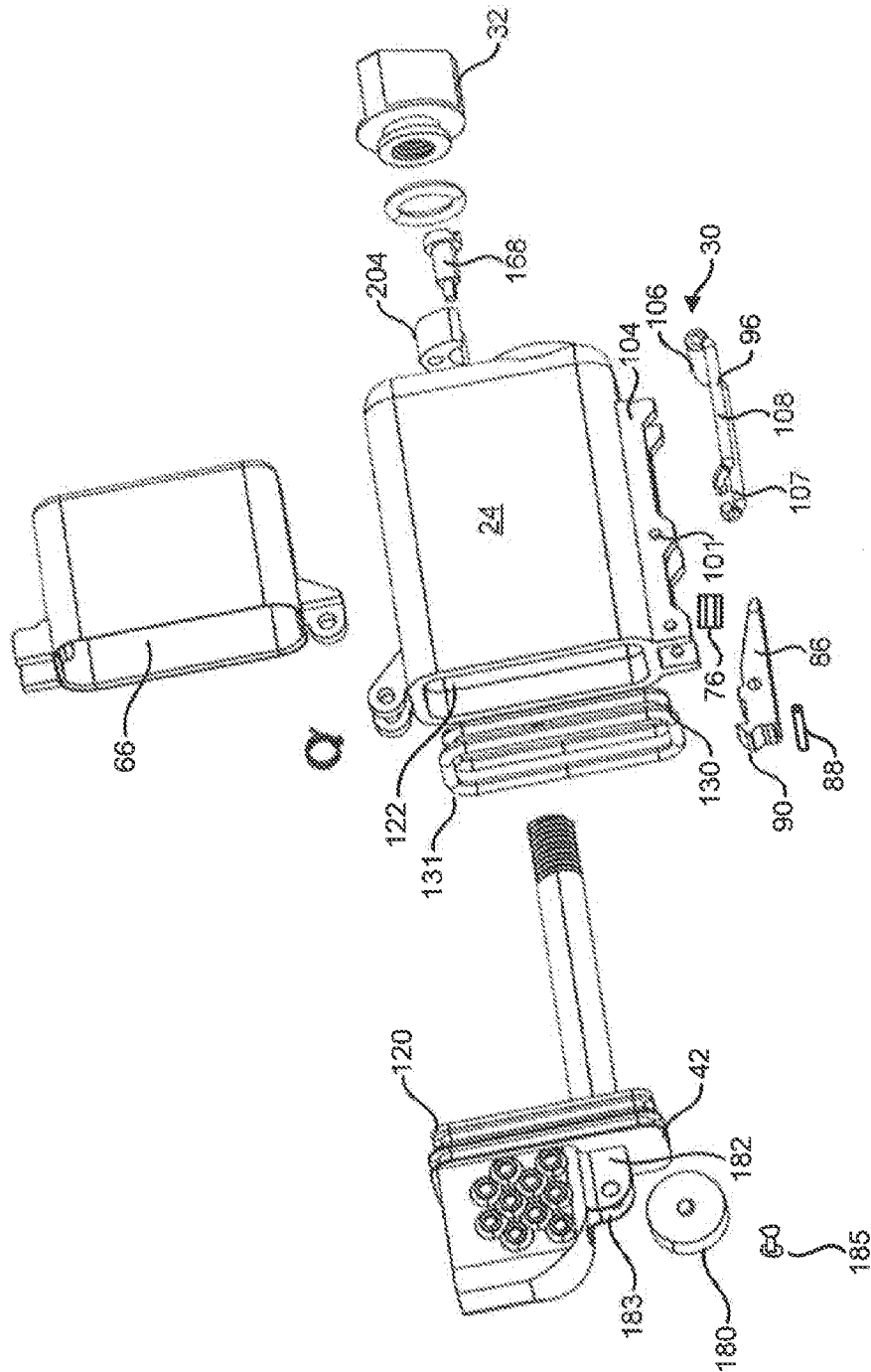


FIG. 7

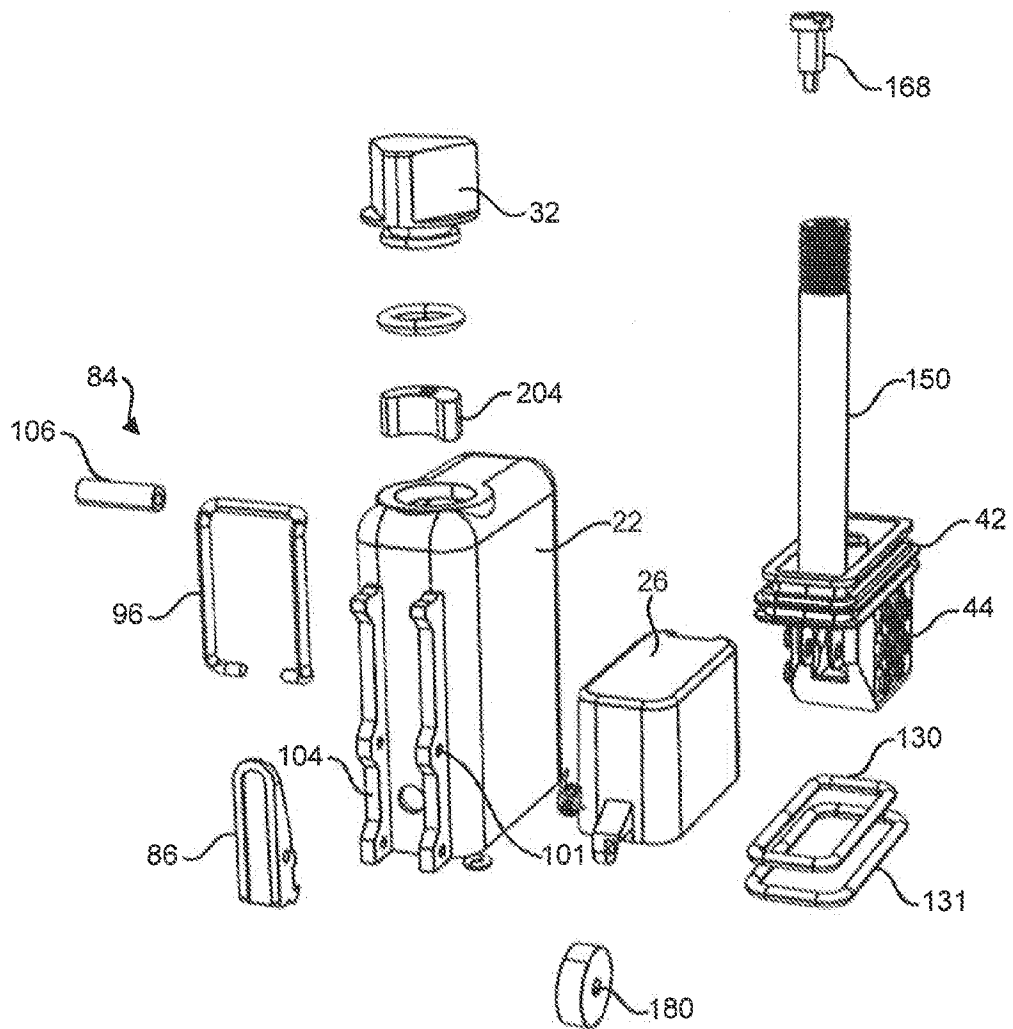


FIG. 8

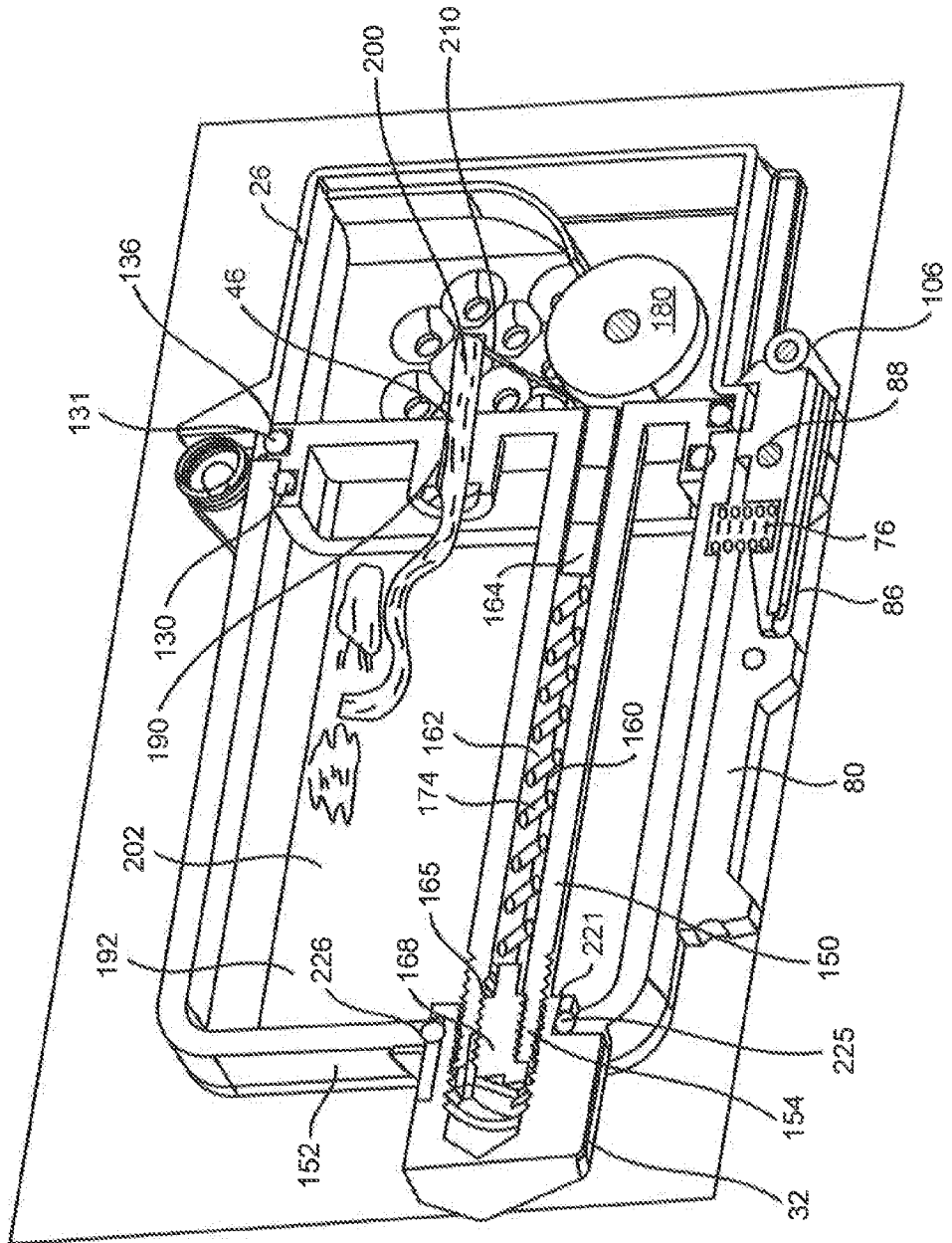


FIG. 10B

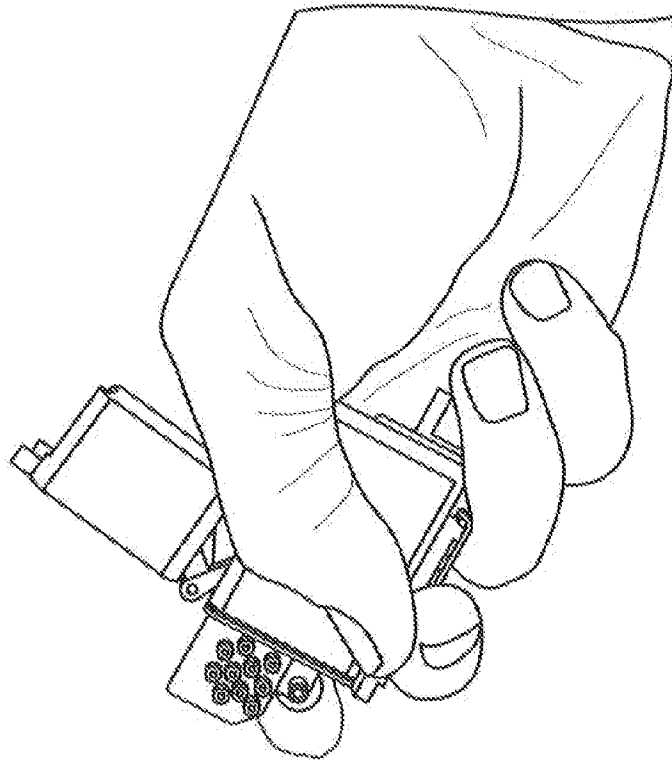


FIG. 12

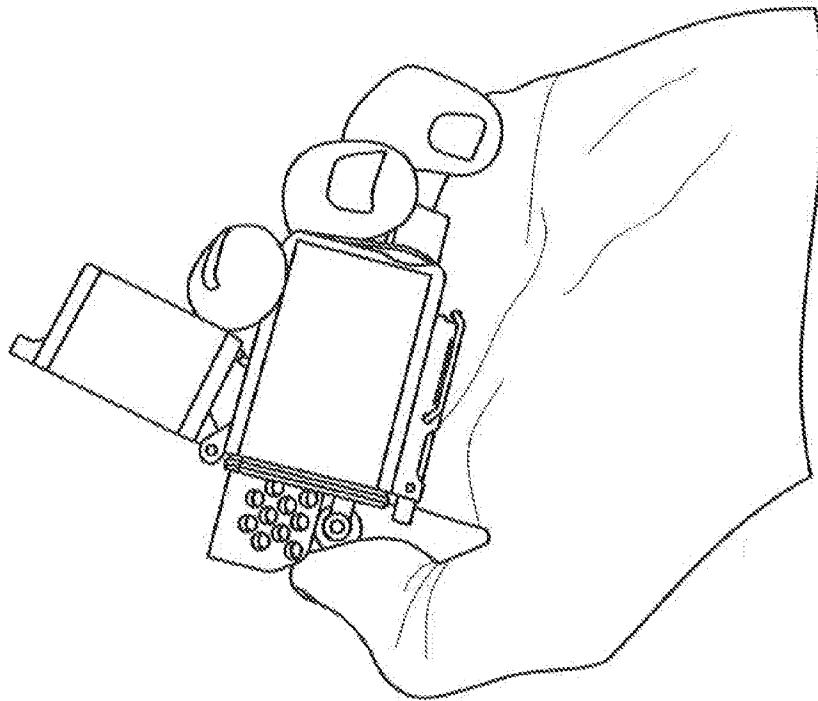


FIG. 11

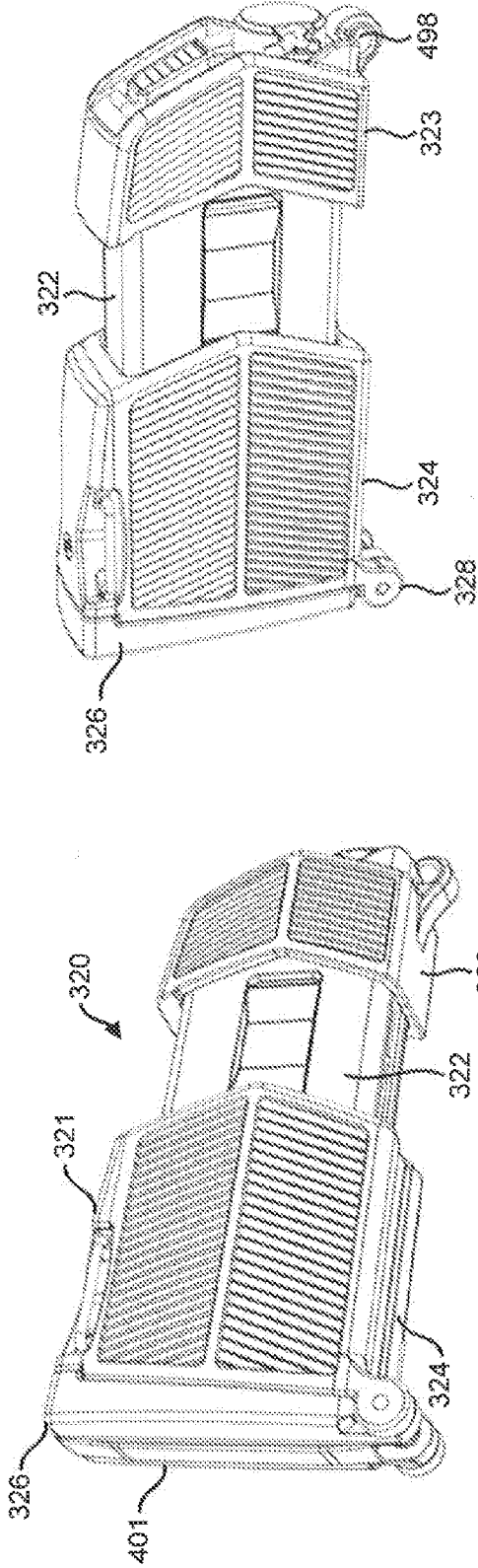


FIG. 14

FIG. 13

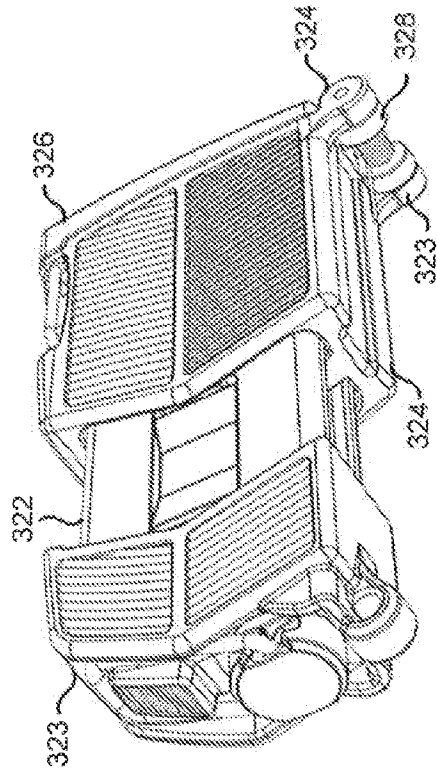


FIG. 15

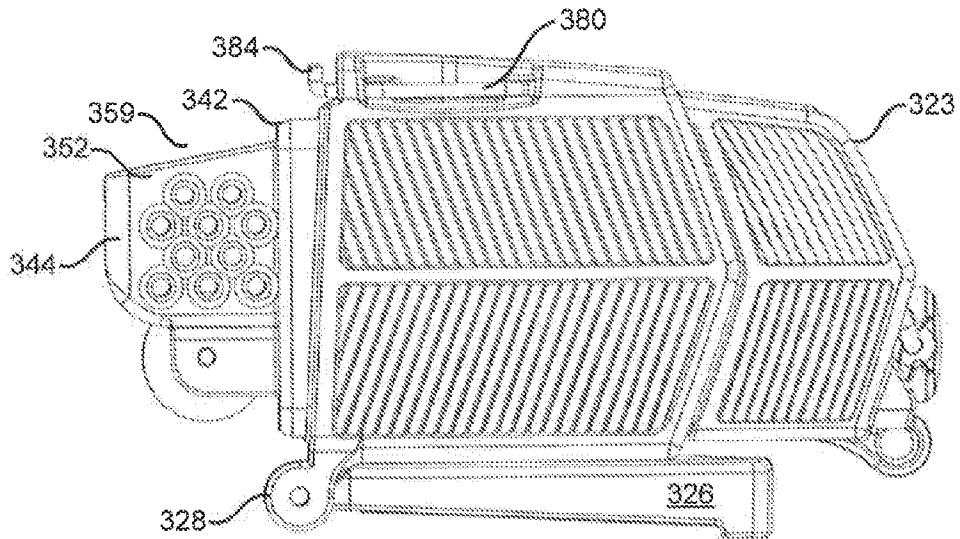


FIG. 16

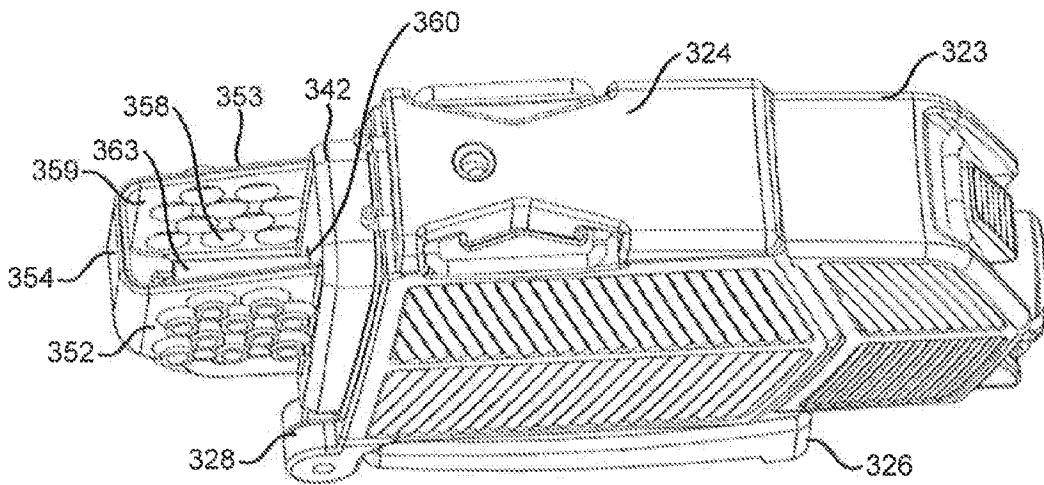


FIG. 17

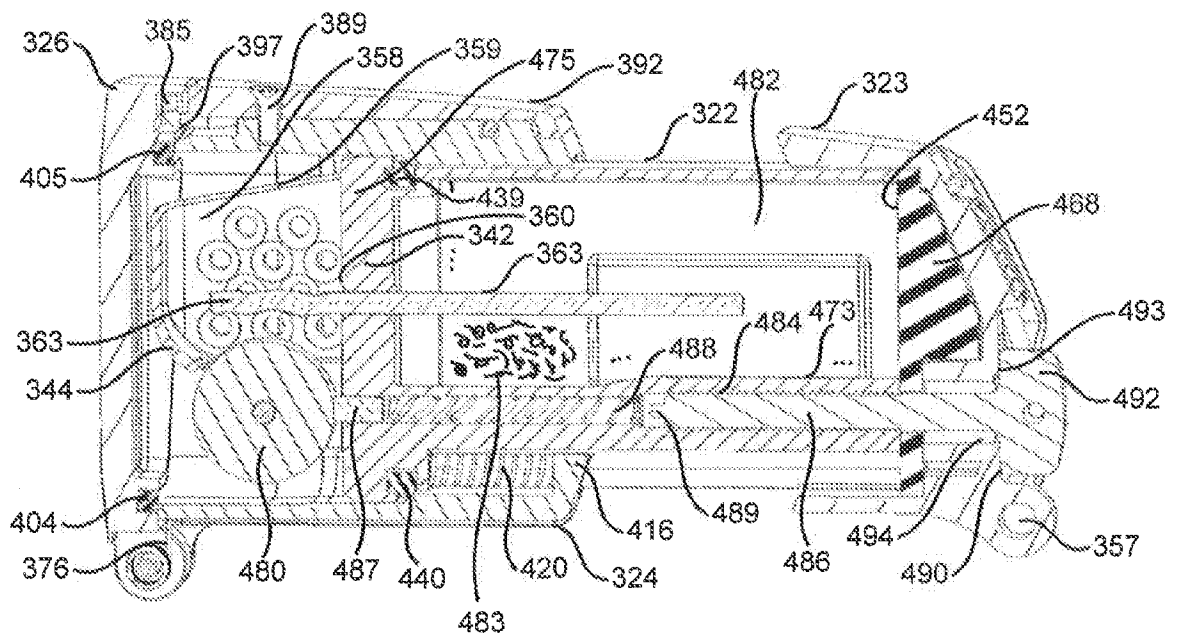


FIG. 18

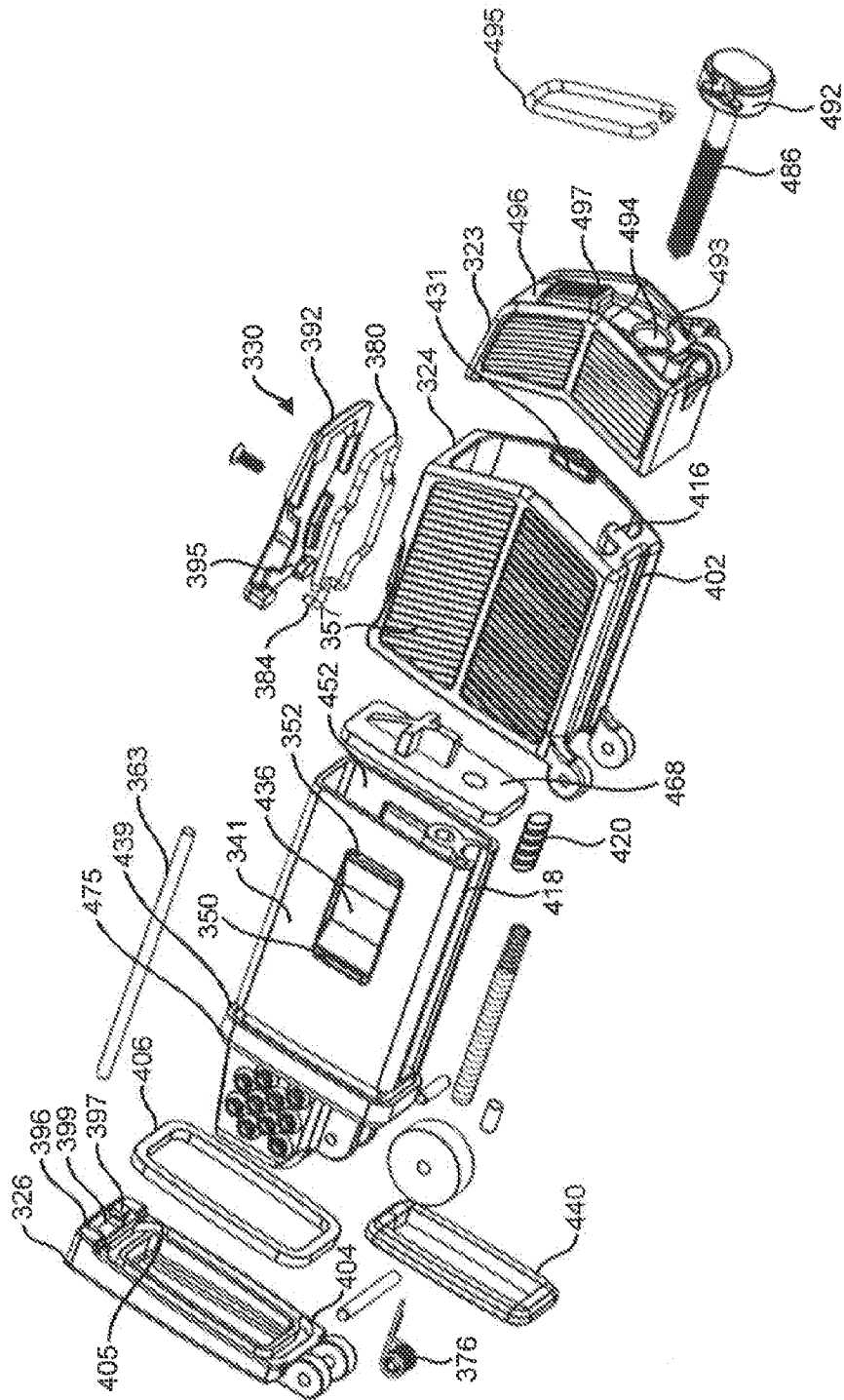


FIG. 19

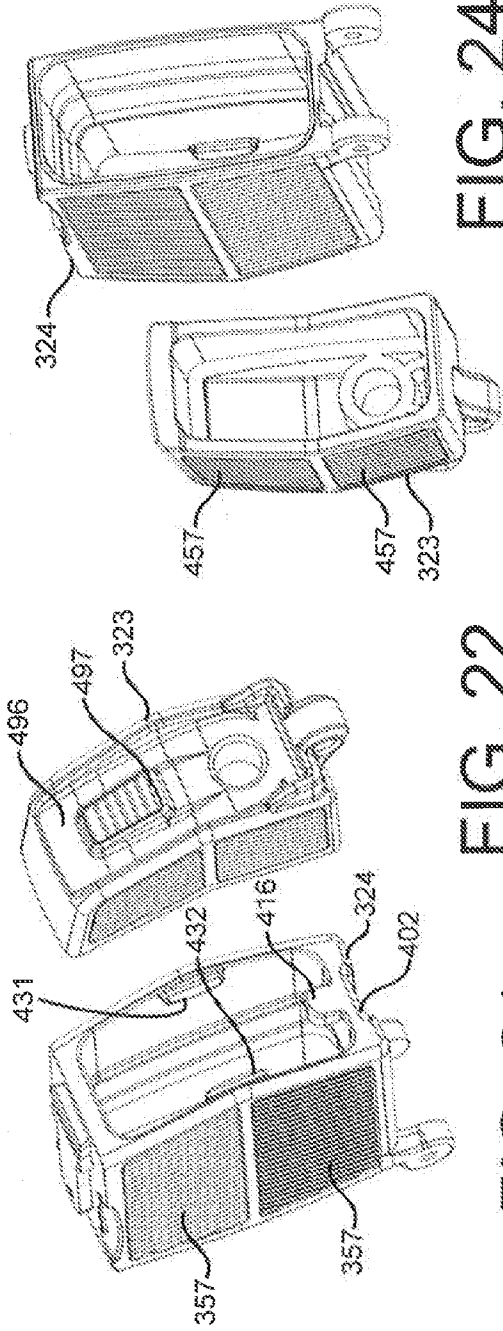


FIG. 24

FIG. 23

FIG. 22

FIG. 21

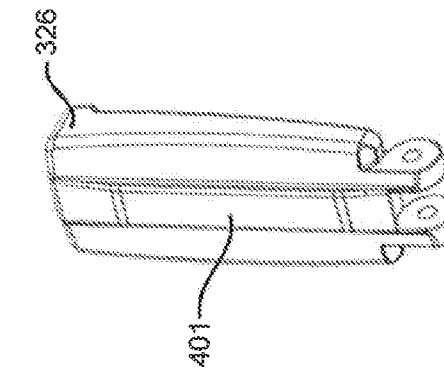
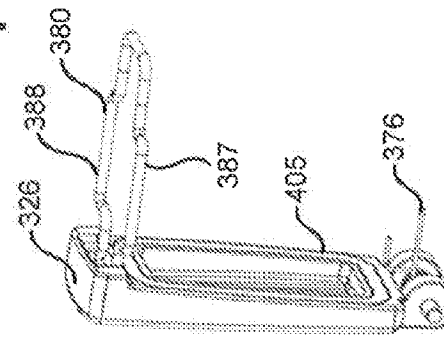
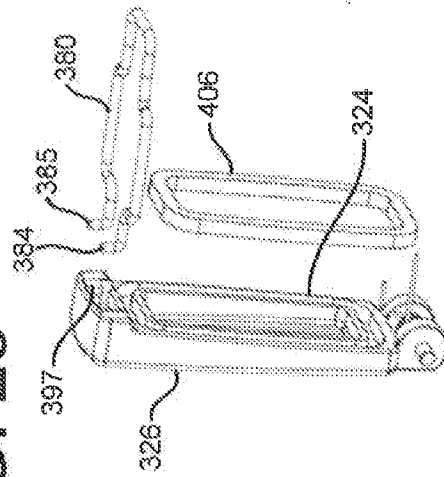


FIG. 27

FIG. 26

FIG. 25

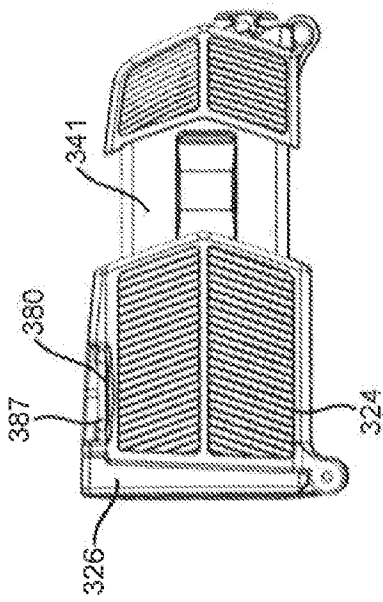


FIG. 28A

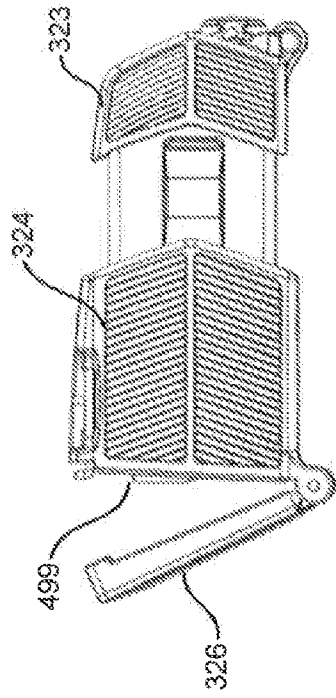


FIG. 28B

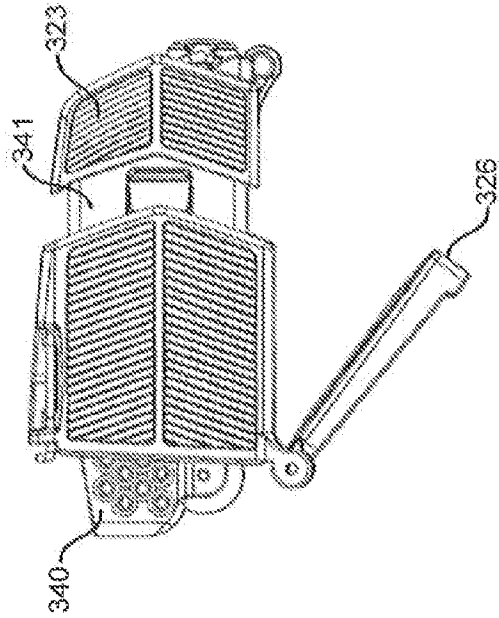


FIG. 28C

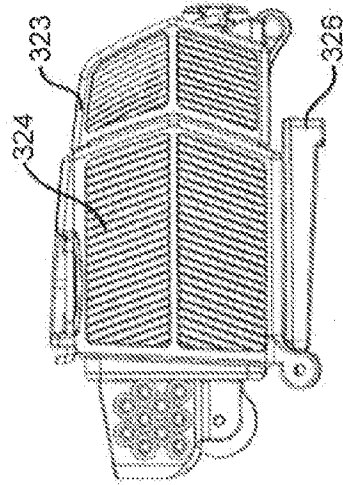


FIG. 28D

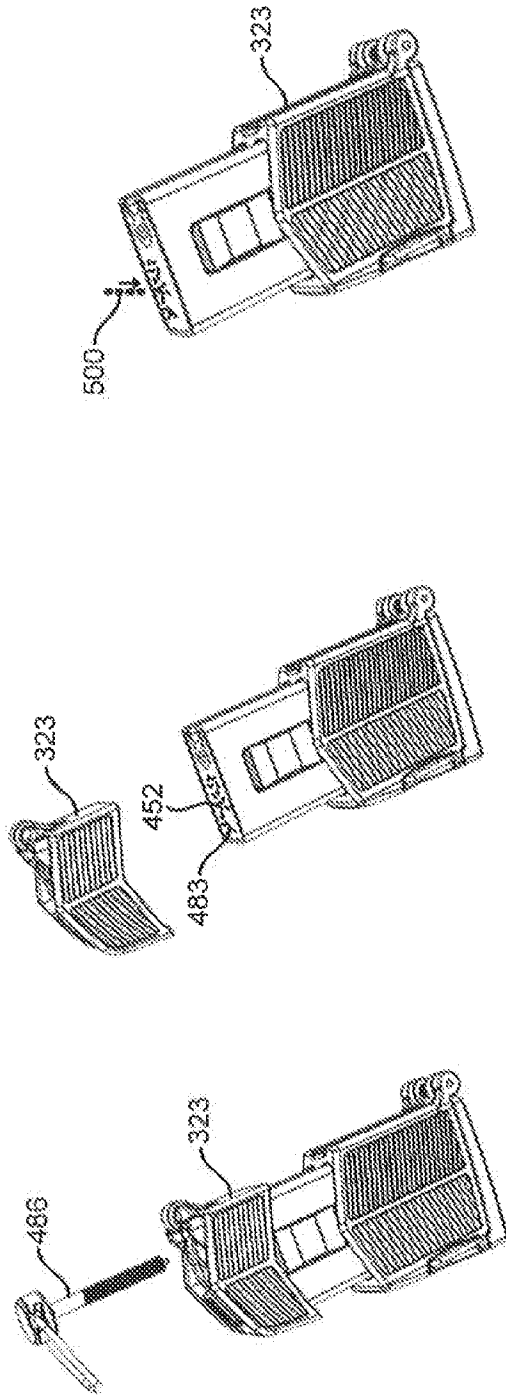


FIG. 29C

FIG. 29B

FIG. 29A

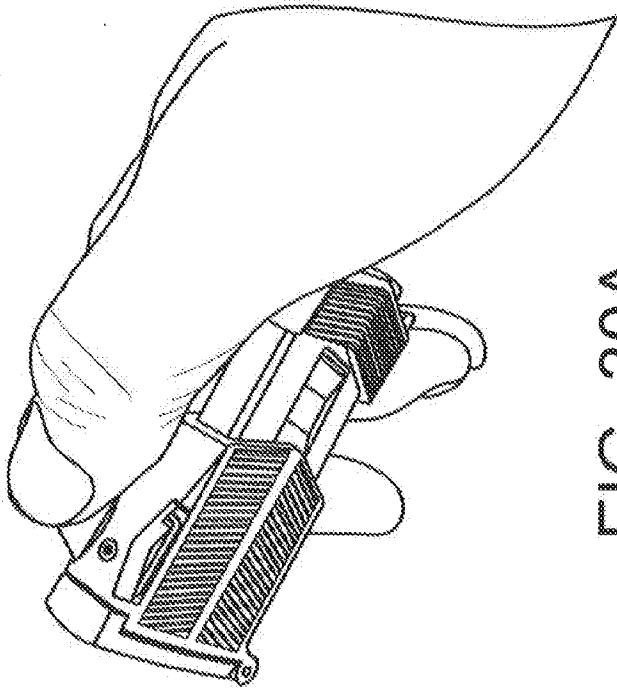


FIG. 30A

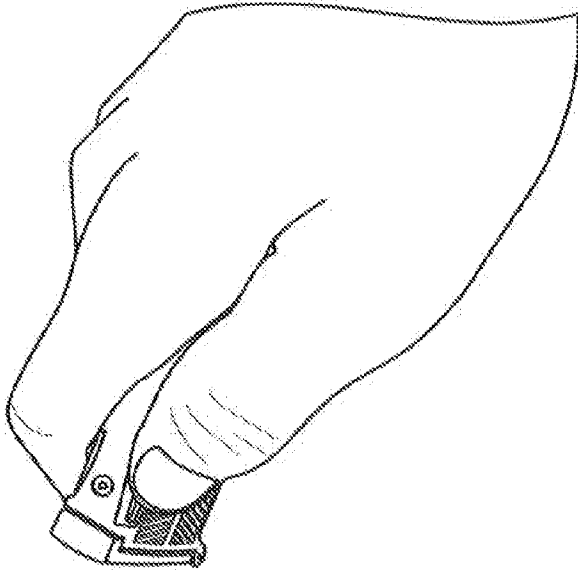


FIG. 30B

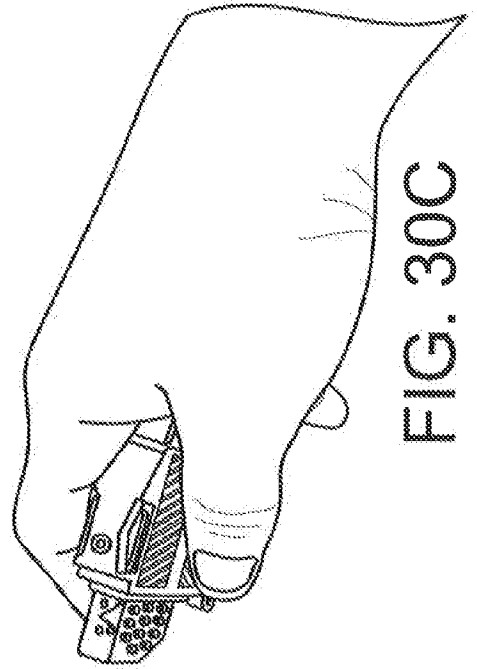


FIG. 30C

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2021/050559

A. CLASSIFICATION OF SUBJECT MATTER
 IPC(8) - F23Q 2/02; F23Q 2/04; F23Q 2/06; F23Q 2/42; F23Q 2/44; F23Q 2/48; F23Q 2/50 (2022.01)
 CPC - F23Q 2/02; F23Q 2/04; F23Q 2/06; F23Q 2/42; F23Q 2/44; F23Q 2/48; F23Q 2/50 (2022.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 see Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 see Search History document

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 see Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/140053 A2 (SCRIPTO-TOKAI INC et al) 06 December 2007 (06.12.2007) entire document	44-50
Y	US 2,932,960 A (IRELAND) 19 April 1960 (19.04.1960) entire document	51, 53
Y	US 2016/0018108 A1 (RAHBAR) 21 January 2016 (21.01.2016) entire document	51, 53
Y	US 2,490,300 A (HETTINGER et al) 06 December 1949 (06.12.1949) entire document	53
A	US 2014/0011144 A1 (HANCOCK et al) 09 January 2014 (09.01.2014) entire document	1-21, 27, 31-53
A	GB 1 426 566 A (COLIBRI LIGHTERS LIMITED) 03 March 1976 (03.03.1976) entire document	1-21, 27, 31-53

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

10 January 2022

Date of mailing of the international search report

FEB 03 2022

Name and mailing address of the ISA/US

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 P.O. Box 1450, Alexandria, VA 22313-1450

Facsimile No. 571-273-8300

Authorized officer

Harry Kim

Telephone No. PCT Helpdesk: 571-272-4300

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2021/050559

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.: 70
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet(s).

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-21, 27, 31-53

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

Continued from Box No. III Observations where unity of invention is lacking

Claim 34 is recited to be dependent from claims 41-33, which is considered "typographical error". Therefore, claim 34 is considered to be dependent from claims 31-33 herein.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-21, 27, 31-53, is drawn to a lighter comprising: a fuel containment housing defining an open interior fuel reservoir, the body having an axis extending four side walls, an open front, a closed rear wall with an aperture when the lighter is in an operational orientation.

Group II, claims 22-24, 27, is drawn to a lighter with a fuel containment housing having a latch base disposed at a side of the housing base, and wherein a latching lever is pivotally attached to the latch base at a pivot point.

Group III, claims 25, 27, is drawn to a lighter with an ignitor means comprising is a flint wheel and flint, and wherein the flint wheel is rotatably mounted to a flame generator base.

Group IV, claims 26-27, is drawn to a lighter wherein the lid has an opening with an axis extending therefrom and the wind shield has four sides with a flame opening that has an axis.

Group V, claims 28-30, is drawn to a lighter with a housing body and a hinged lid, the housing body having a projection extending from a rearward end of housing body at the corner of the housing body.

Group VI, claims 54-69, is drawn to a lighter comprising a flame generator assembly on a forward end of a fuel containment housing, the flame generator mounted on the fuel containment housing, the flame generator assembly comprising a windshield with an open side, the lighter further comprising an outer housing sleeve slidably positioned on and extending around the fuel containment housing.

The inventions listed as Groups I-VI do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: the body having an axis extending four side walls, an open front, a closed rear wall with an aperture when the lighter is in an operational orientation; a lid hingedly attached to the fuel containment housing body, the lid having an open position and a closed position; a flame generator assembly comprising: a flame generator base seated in the open front of the housing body; a wind shield extending forwardly from the flame generator base, the wind shield defining a flame region and the wind shield being open upwardly defining a flame outlet; an ignitor means mounted on the flame generator base below the wind shield; a post extending from the flame generator base rearwardly to the aperture in the rear wall of the fuel containment housing body; a knob attached to the end of the post and engaging the post a fuel providing port in the flame generator base as claimed therein is not present in the invention of Groups II-VI. The special technical feature of the Group II invention: a fuel containment housing having a latch base disposed at a side of the housing base, and wherein a latching lever is pivotally attached to the latch base at a pivot point, the latching lever having a hook portion that engages structure on the lid and an actuation portion that when depressed releases the hook portion from the lid structure as claimed therein is not present in the invention of Groups I, III-VI. The special technical feature of the Group III invention: a flint wheel and flint, and wherein the flint wheel is rotatably mounted to a flame generator base, and the flint is disposed to engage the flint wheel, and wherein the flint is urged against the flint wheel along an axis that is positioned between a rotational axis of the flint wheel and a wick of the lighter as claimed therein is not present in the invention of Groups I, II, IV-VI. The special technical feature of the Group IV invention: the lid has an opening with an axis extending therefrom and the wind shield has four sides with a flame opening that has an axis and wherein when the lid is open, the axis of the lid opening is perpendicular or substantially perpendicular to the axis of the windshield opening as claimed therein is not present in the invention of Groups I, II, III or V-VI. The special technical feature of the Group V invention: the housing body having a projection extending from a rearward end of housing body at the corner of the housing body, the projection extending a distance from the housing body, the distance being in the range of 10% to 30% of the length of the housing body and lid when in the lid is in a closed position as claimed therein is not present in the invention of Groups I-IV or VI. The special technical feature of the Group VI invention: the lighter further comprising an outer housing sleeve slidably positioned on and extending around the fuel containment housing, the outer housing sleeve having a hinged lid configured as a rigid flap, positioned at a forward end of the outer housing sleeve, the lighter having a closed position and an open operational position, wherein when in the closed position, the flame generation assembly is substantially or completely within the outer housing sleeve and is contained within a sealed chamber defined by the hinged lid sealingly engaged with a forward edge of the outer housing sleeve as claimed therein is not present in the invention of Groups I-V.

Groups I, II, III, IV, V, and VI lack unity of invention because even though the inventions of these groups require the technical feature of a lighter with a fuel containment housing and a lid, wherein the lighter further comprising a flame generator assembly mounted on the fuel containment housing, the flame generator assembly comprising a windshield, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 5,310,336 to Segawa teaches a lighter with a fuel containment housing and a lid, wherein the lighter further comprising a flame generator assembly mounted on the fuel containment housing, the flame generator assembly comprising a windshield (a lighter including a fuel tank (FT), col. 2, lines 19-20. FIG. 6 is a longitudinal section similar to FIG. 1, illustrating the use of the lighter in a windshilded flame mode with the lid C3 open, col. 3, lines 54-56).

Since none of the special technical features of the Group I, II, III, IV, V, or VI inventions are found in more than one of the inventions, unity of invention is lacking.