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(54) **PAINT CAN ADAPTER FOR HANDHELD SPRAY DEVICE**

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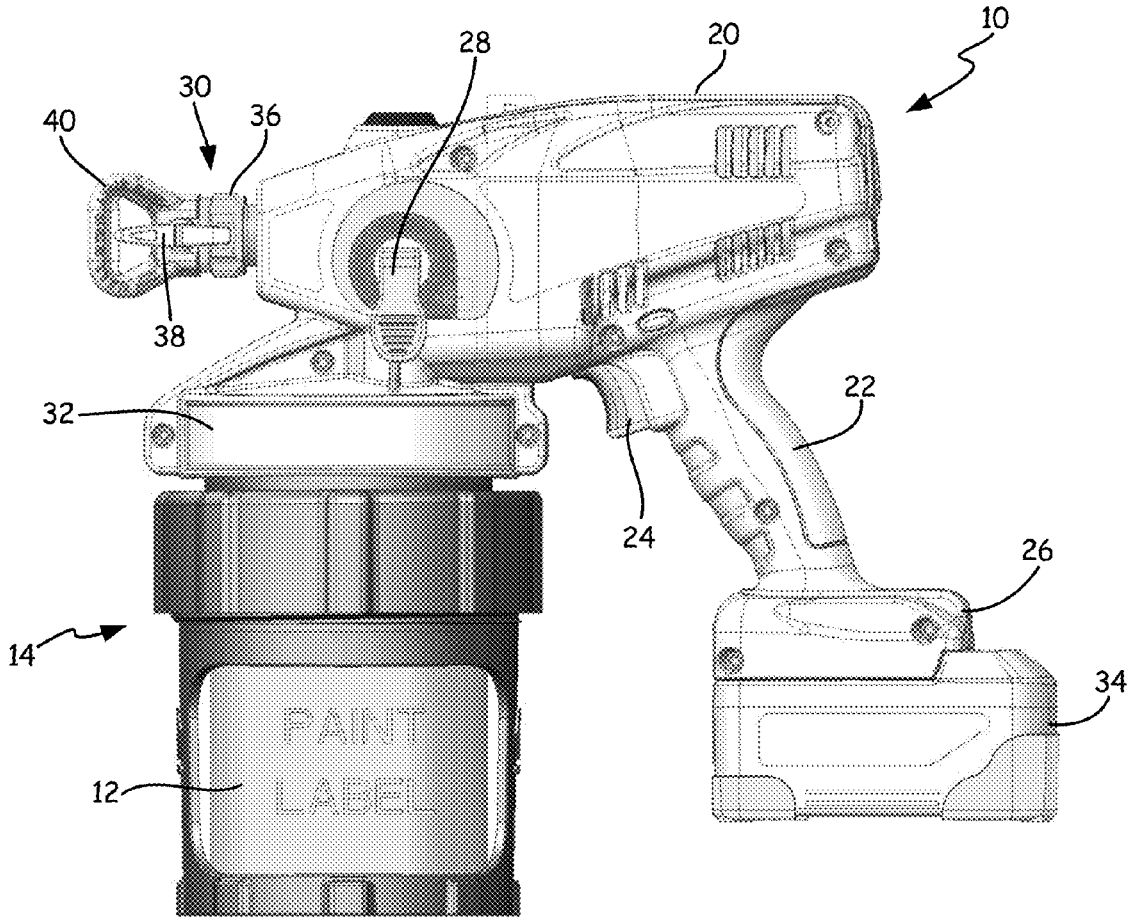
(52) **U.S. Cl.**

CPC ***B05B 15/065*** (2013.01); ***B05B 7/02*** (2013.01); ***B05B 7/2402*** (2013.01); ***B05B 11/0008*** (2013.01)

USPC **239/302**; 248/312

(57) **ABSTRACT**

An adapter allows direct connection of a handheld spray device to paint cans of varying dimensions. The adapter includes a cage for holding the paint can, a cap that connects the cage to the handheld spray device, and a gasket that seals the open upper end of the paint can to the cap. The adapter may also include a suction tube extension that is connectable between the pump inlet and the suction tube of the spray device. A can spacer insert is positionable in the cage to elevate paint cans of varying heights so that the upper ring of the paint can engages the gasket.



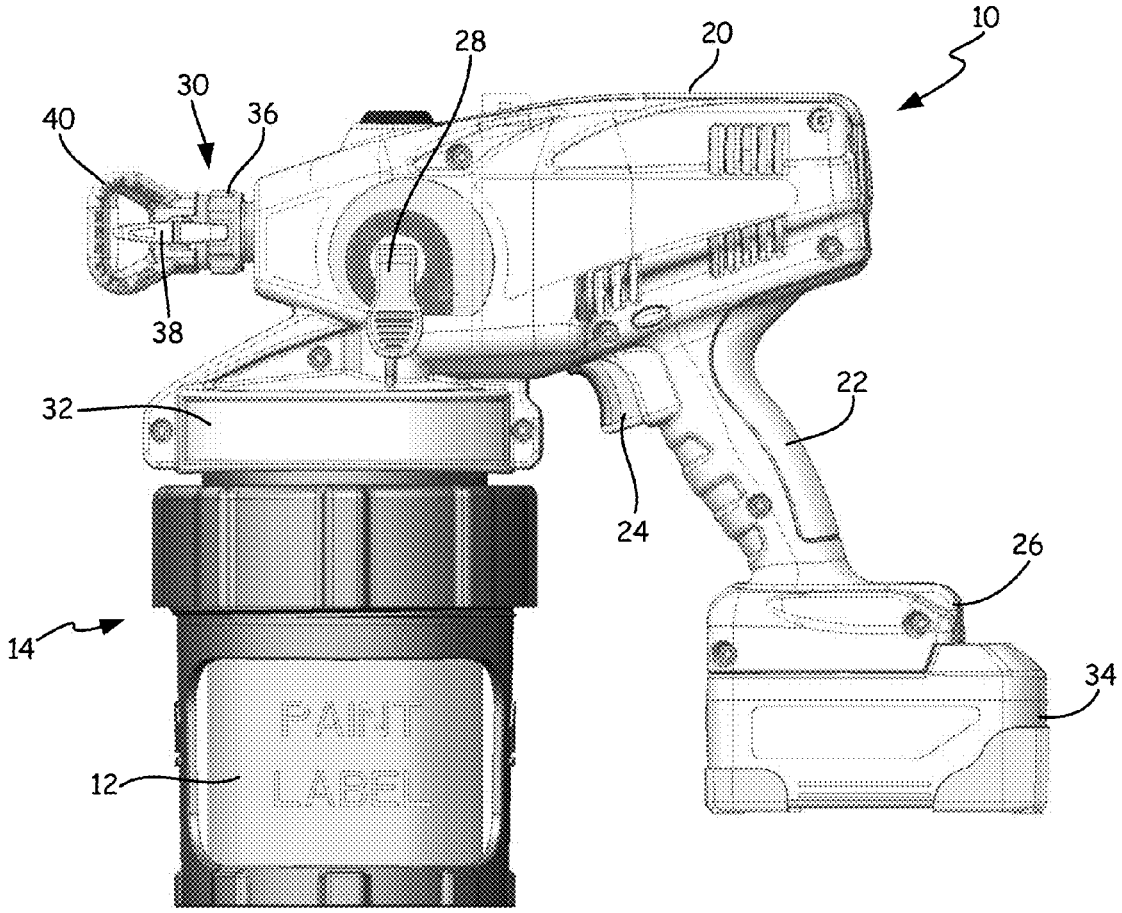


Fig. 1A

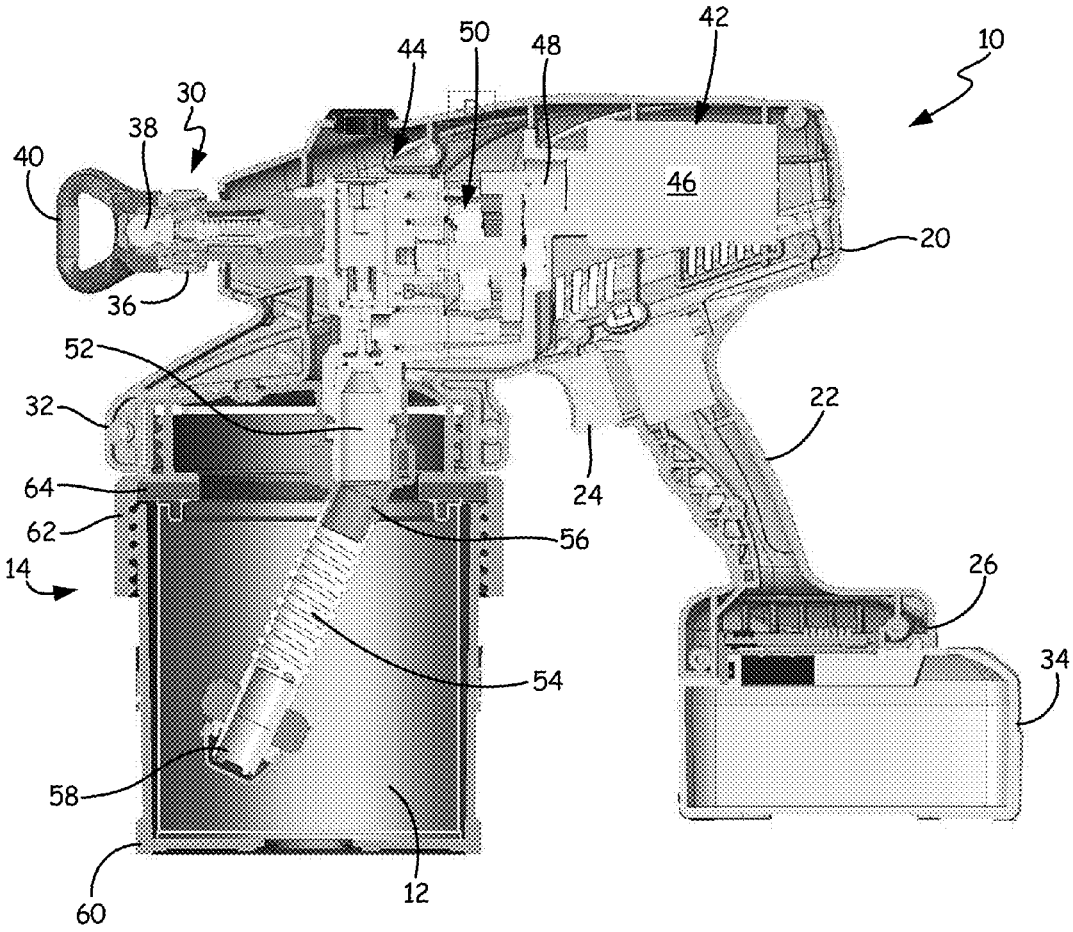

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Fig. 1B

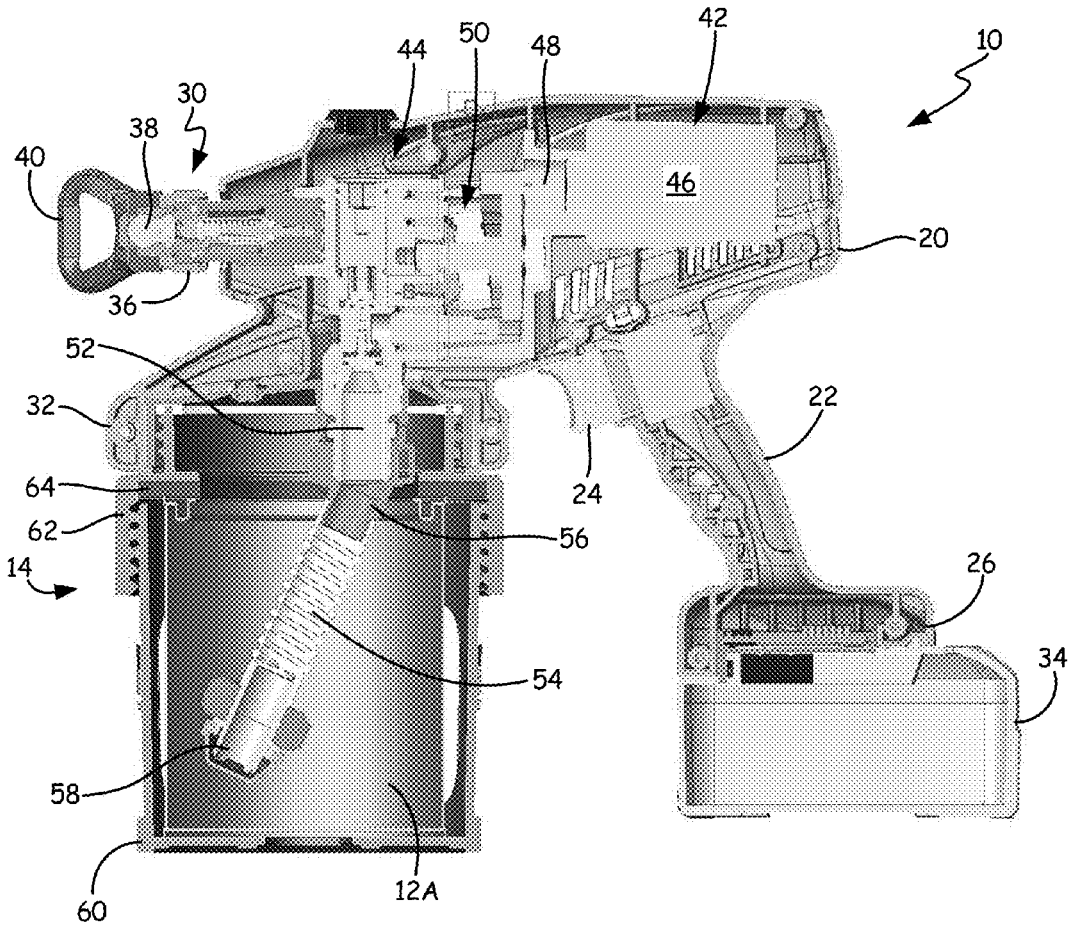
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Fig. 2A

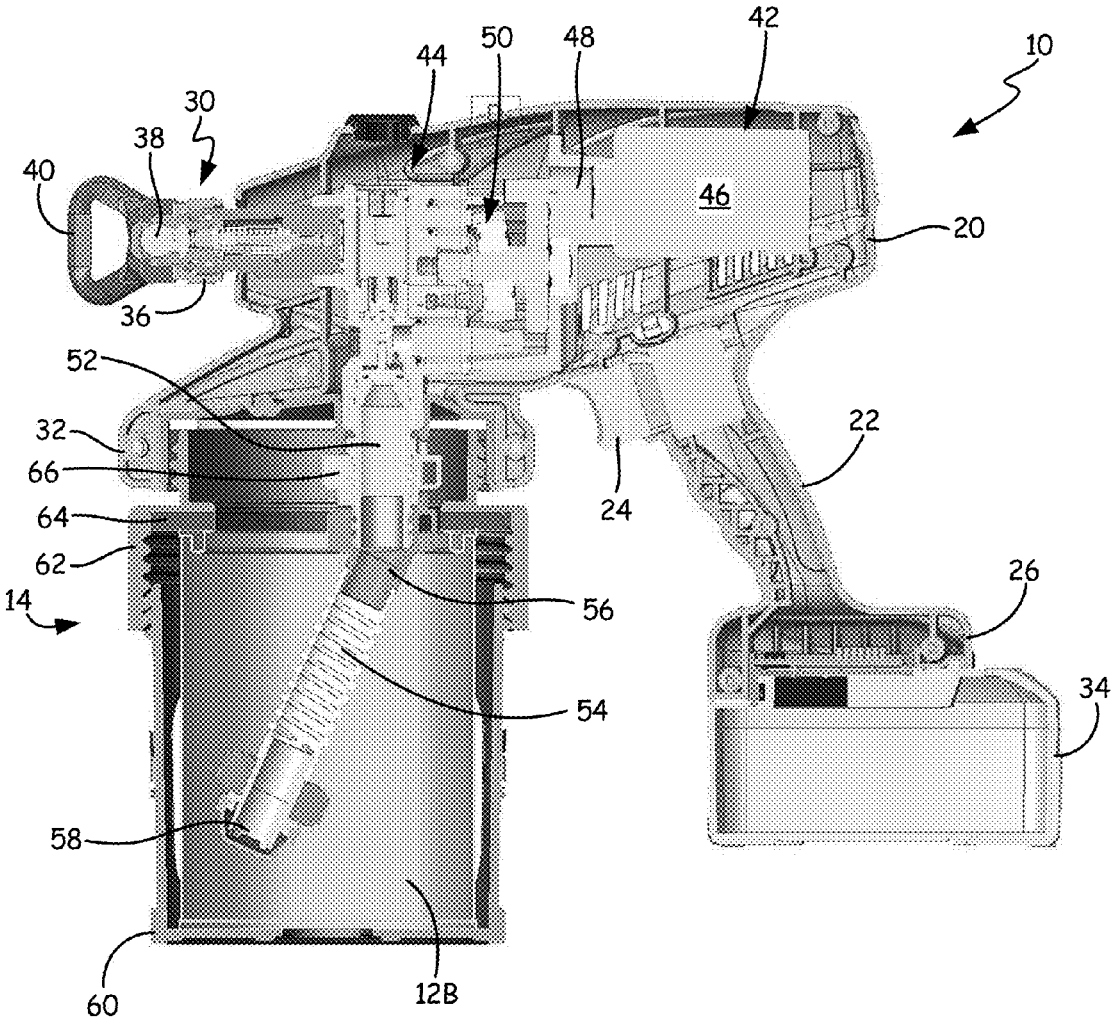
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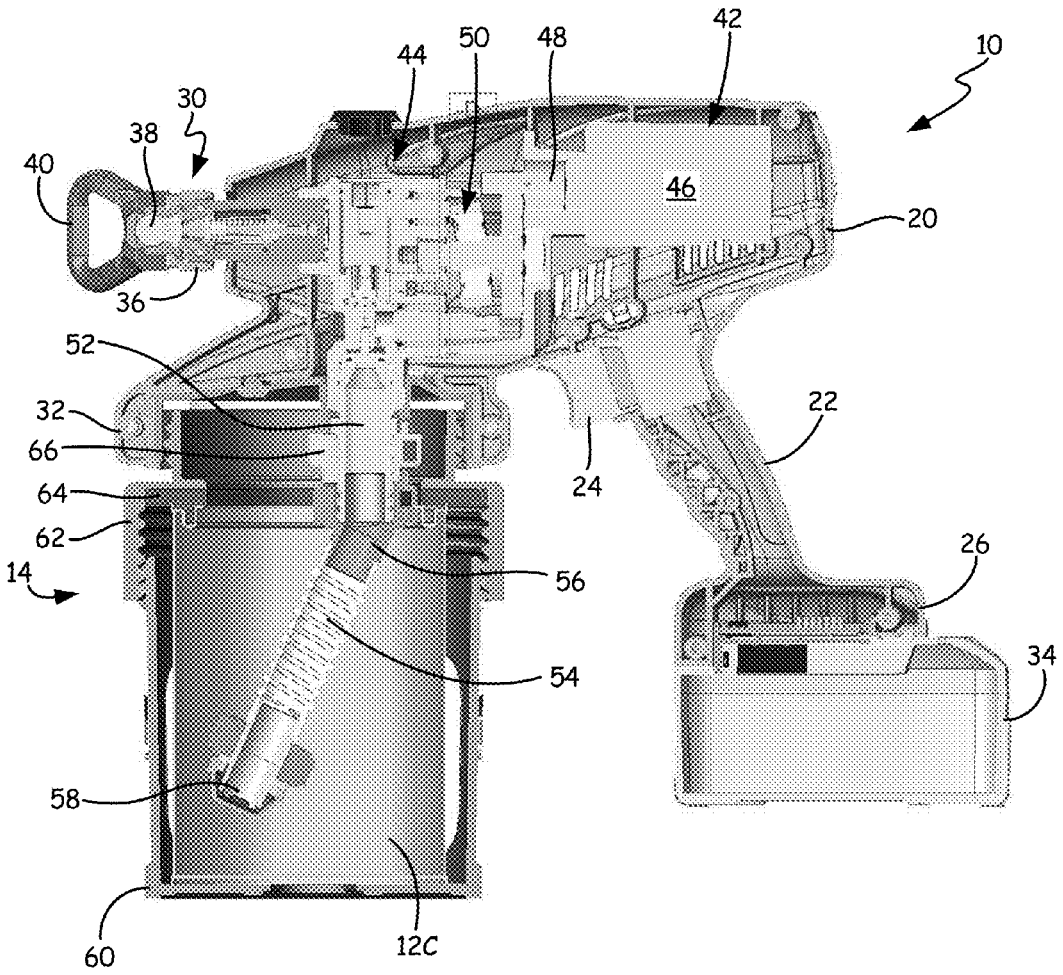
Fig. 2B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12C

Fig. 2C

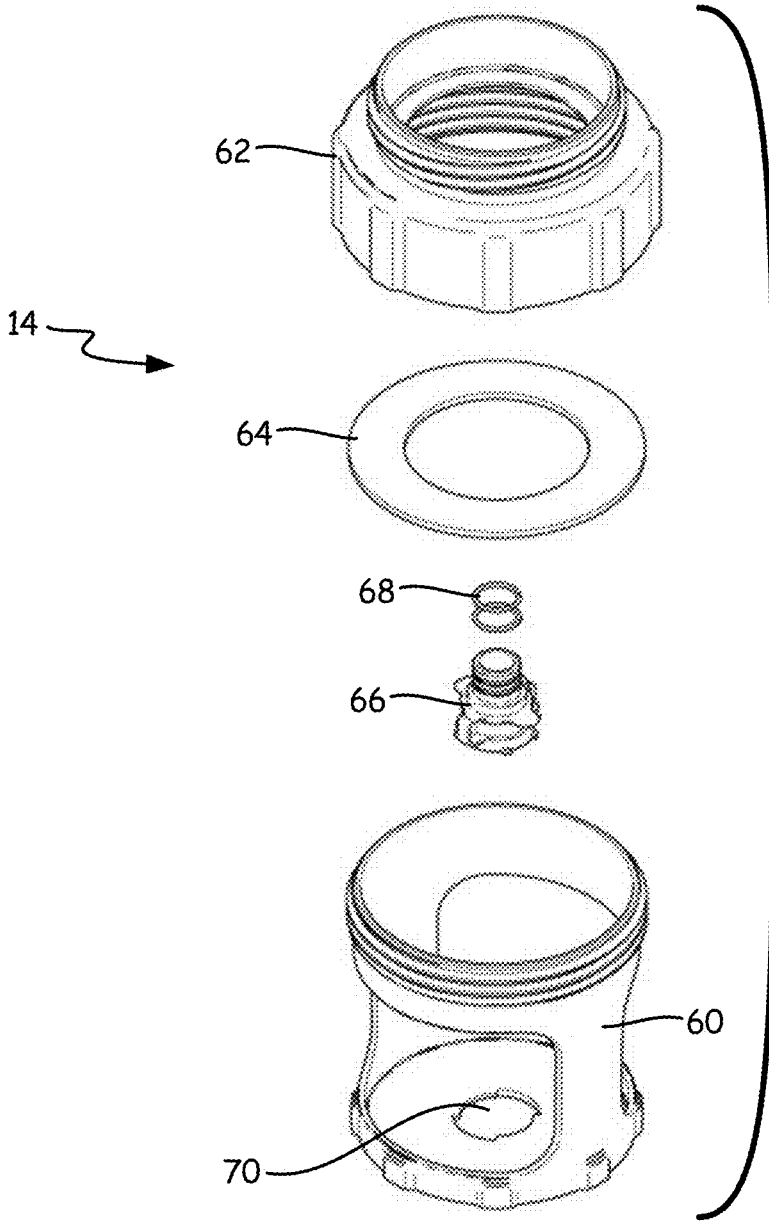

Fig. 3

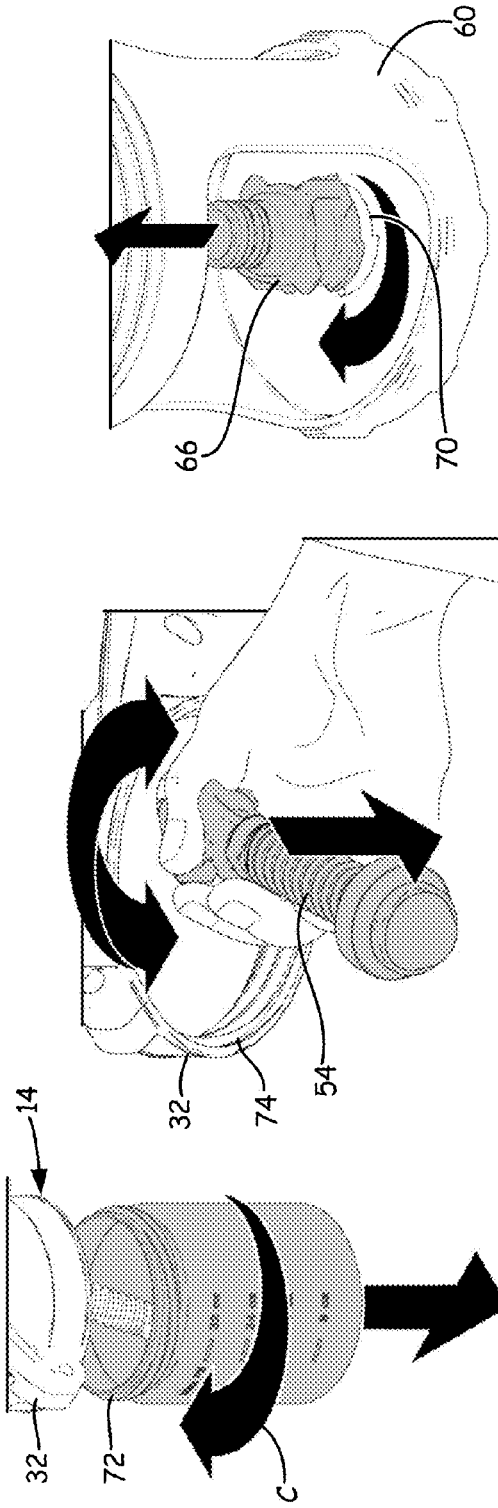

Fig. 4A

Fig. 4B

Fig. 4C

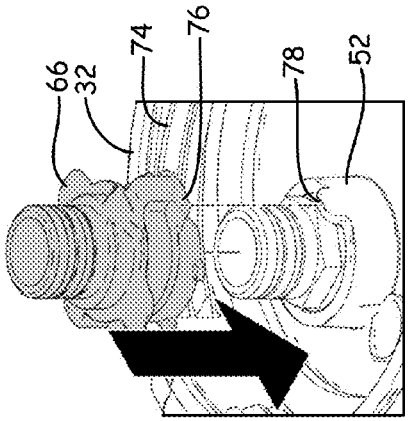

Fig. 4D

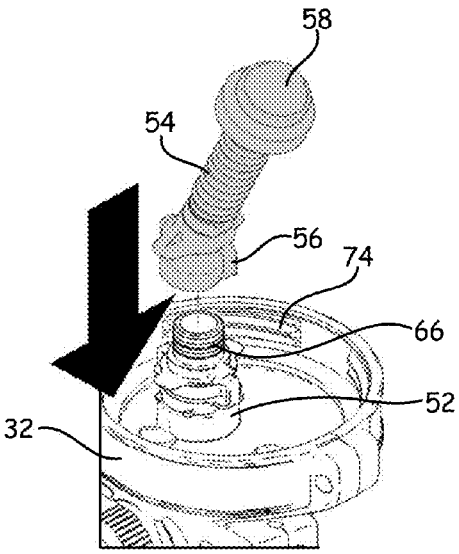

Fig. 4E

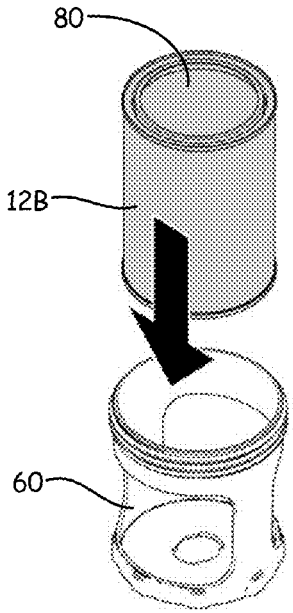

Fig. 4F

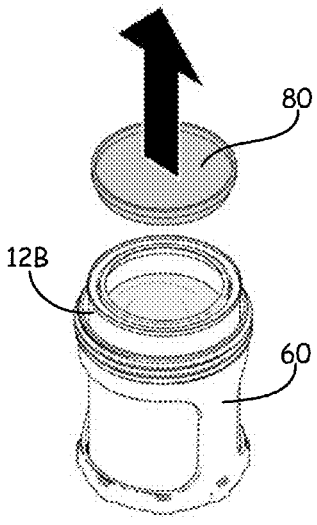

Fig. 4G

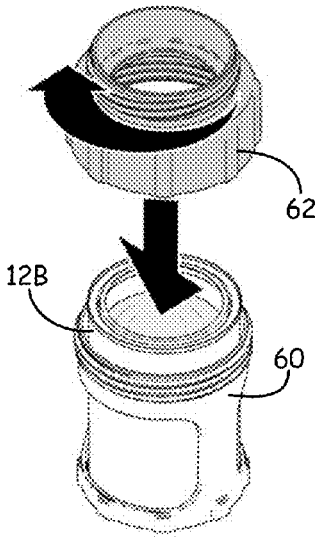

Fig. 4H

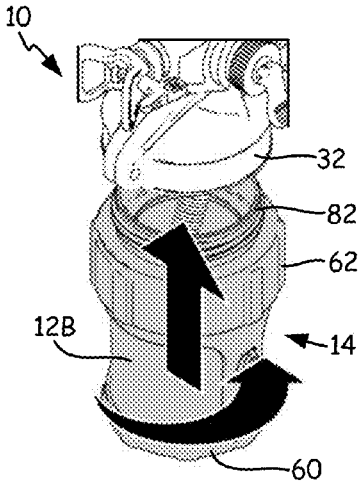

Fig. 4I

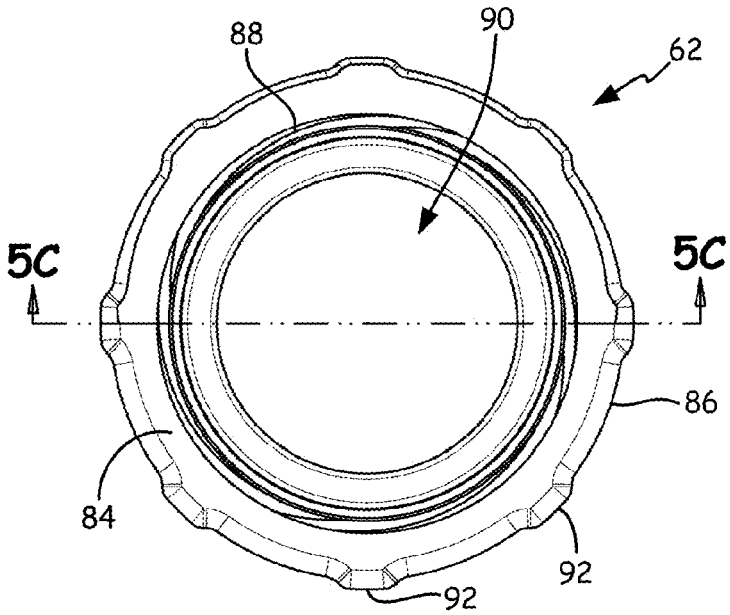

Fig. 5A

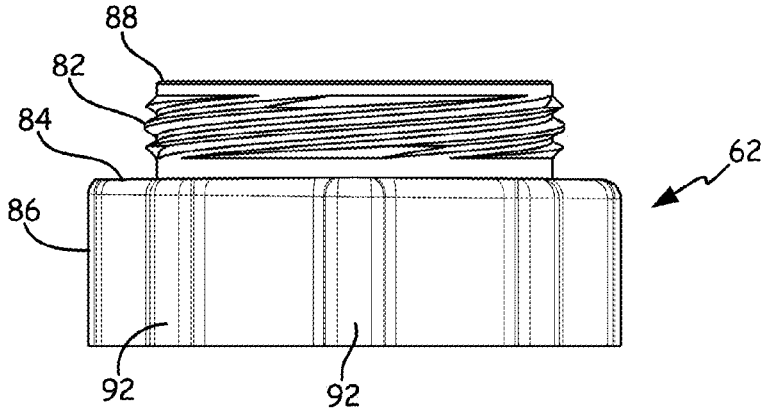

Fig. 5B

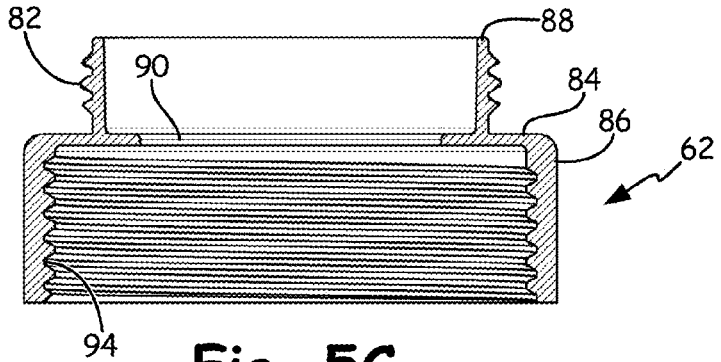

Fig. 5C

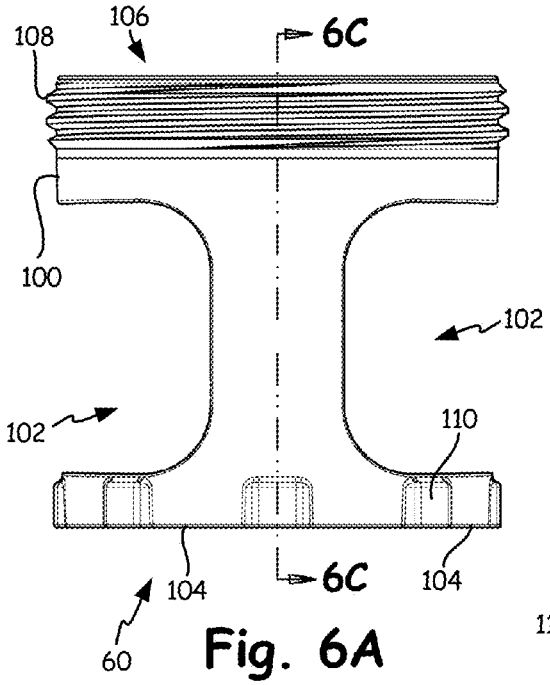

Fig. 6A

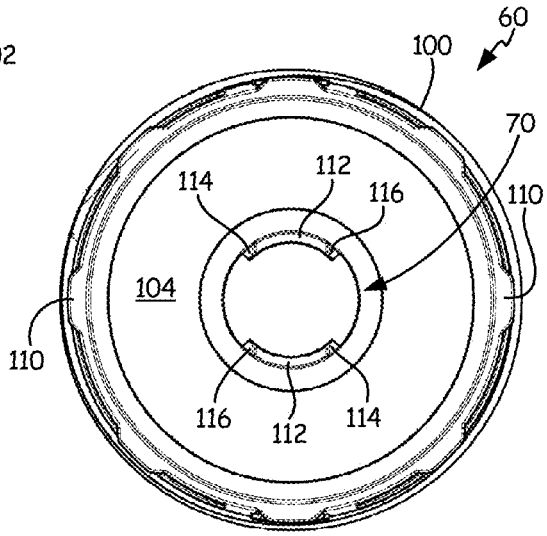

Fig. 6B

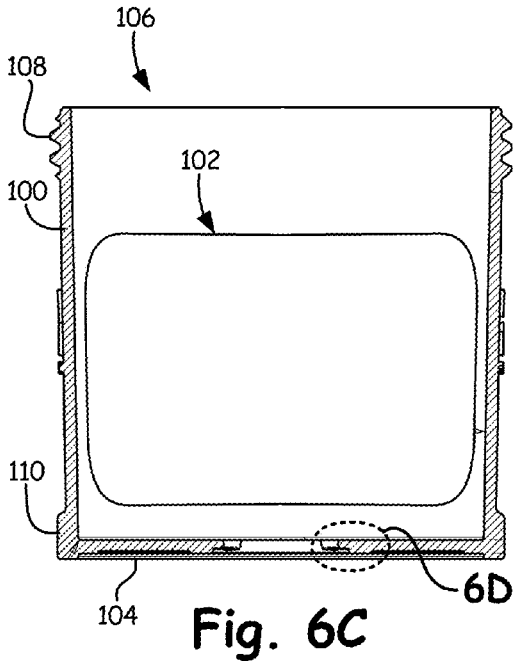

Fig. 6C

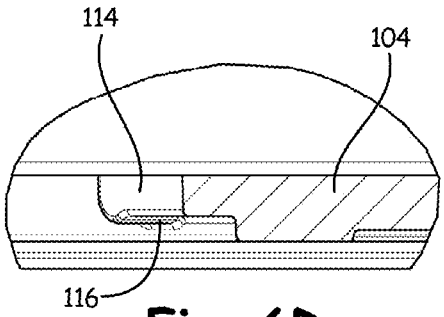

Fig. 6D

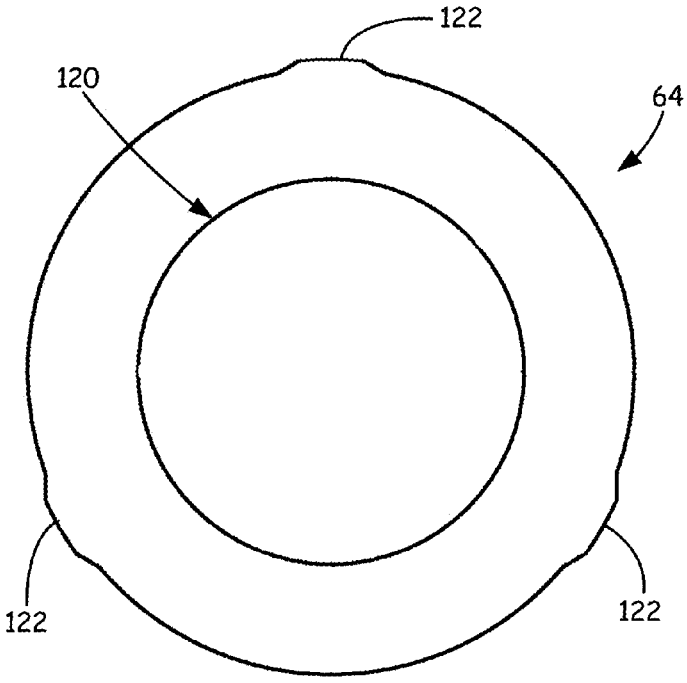

Fig. 7A

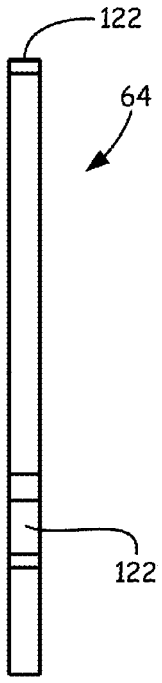

Fig. 7B

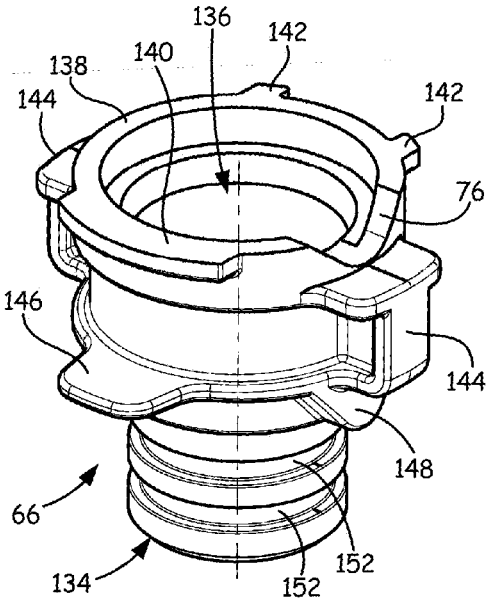

Fig. 8A

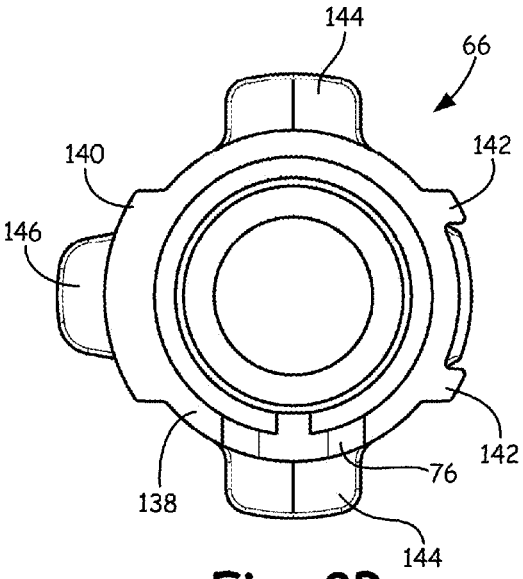

Fig. 8B

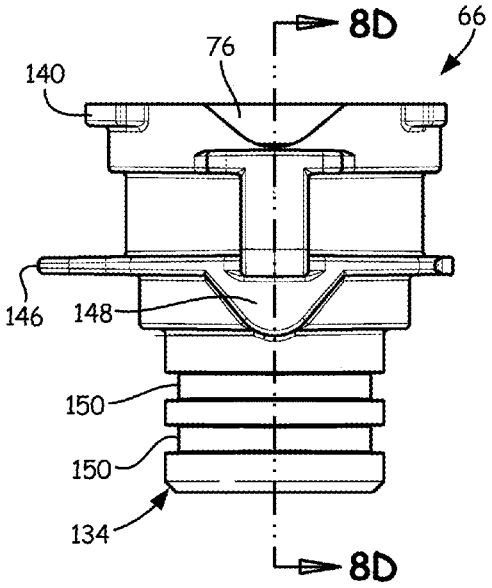

Fig. 8C

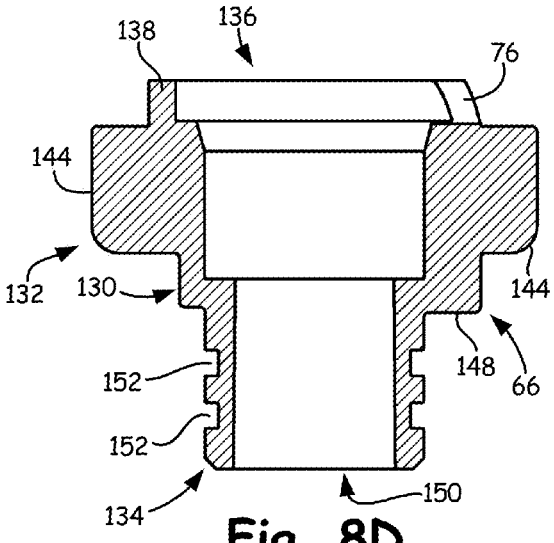

Fig. 8D

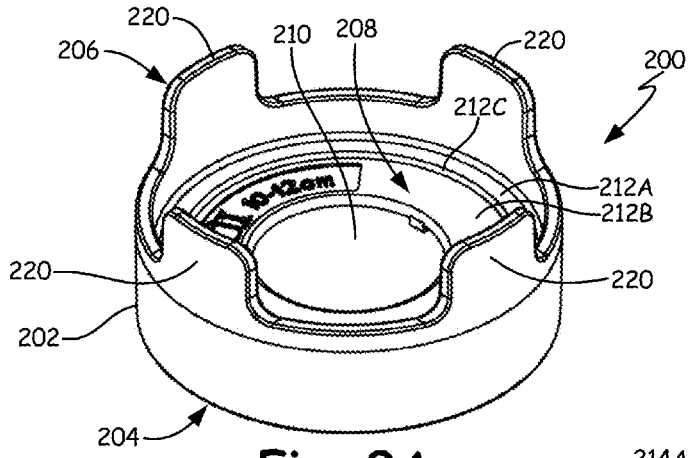

Fig. 9A

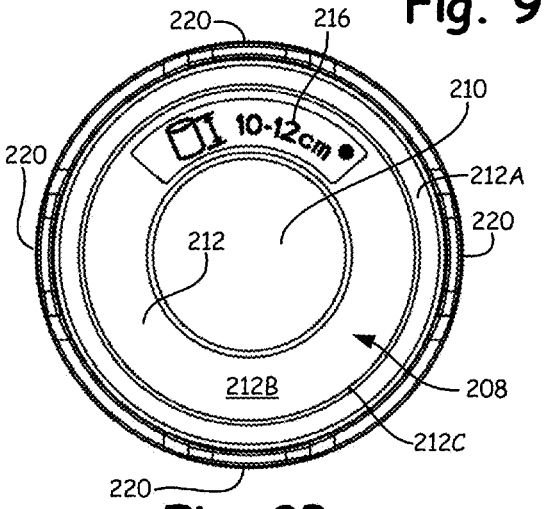

Fig. 9B

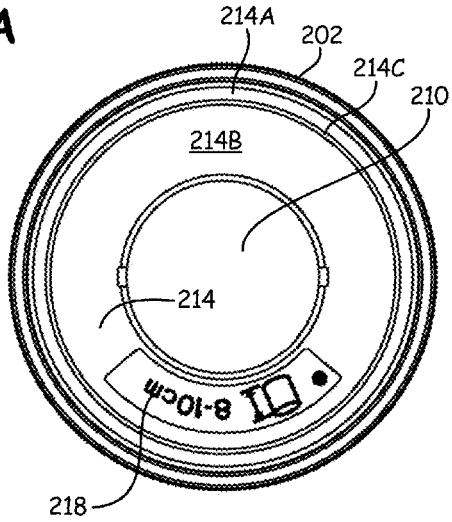

Fig. 9D

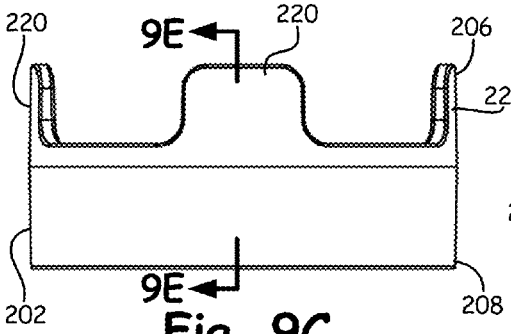

Fig. 9C

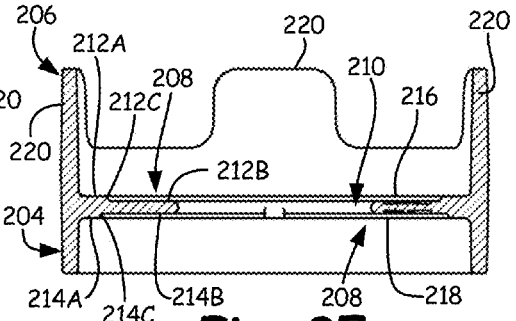

Fig. 9E

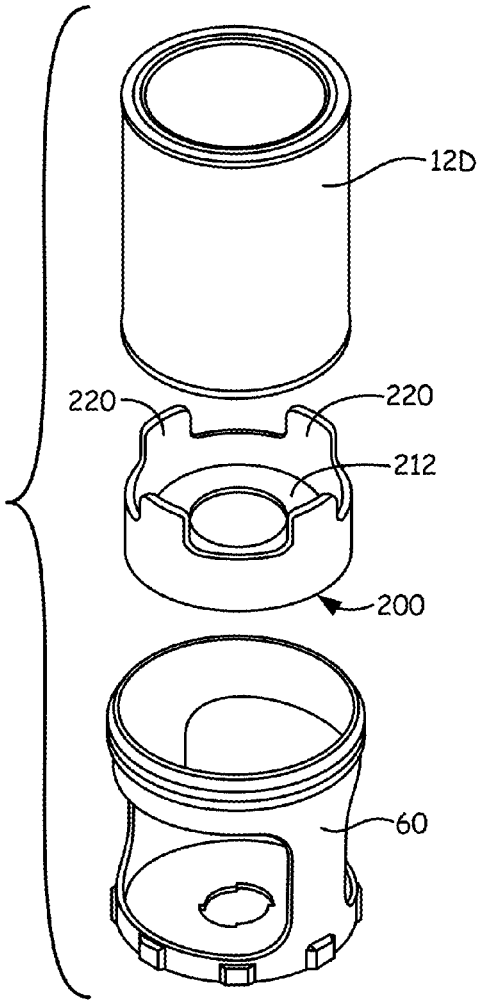

Fig. 10A

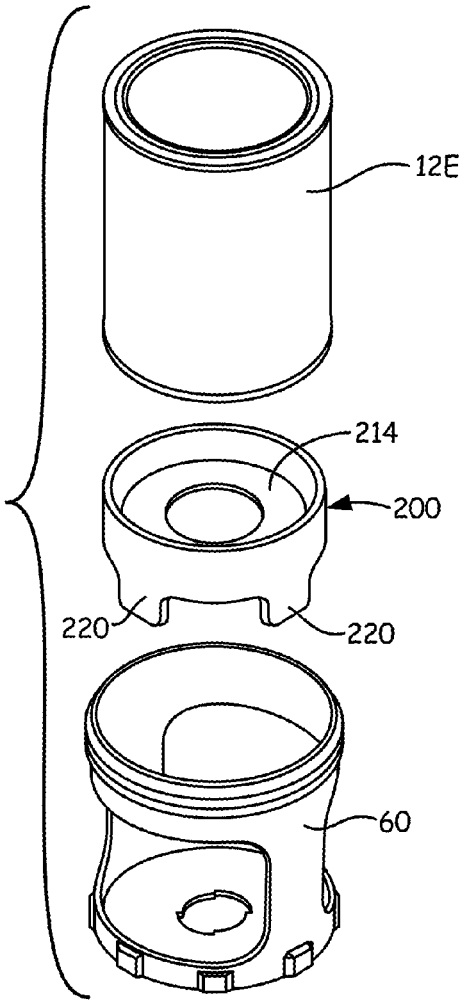

Fig. 10B

PAINT CAN ADAPTER FOR HANDHELD SPRAY DEVICE

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application is a continuation-in-part of International Application No. PCT/US2014/037244 filed May 8, 2014. This application claims priority from U.S. Provisional Application Ser. No. 61/820,943, filed May 8, 2013, entitled INDUSTRY STANDARD PAINT CONTAINER ADAPTER TO HAND HELD SPRAY DEVICE, which is incorporated by reference.

BACKGROUND

[0002] Paint sprayers are well-known and popular for use in painting surfaces, such as architectural structures, furniture, and the like. For smaller jobs, which use a limited amount of paint, handheld spray devices are particularly advantageous. A handheld spray device includes a reservoir, typically in the form of a cup that is filled with paint and attached to the spray device. The overall weight of the spray device and the paint within the reservoir is small enough to allow the user to hold and orient the spray device in a variety of different directions in order to apply paint that is needed.

[0003] Paint is typically sold in paint containers (e.g., metal cans) in several industry standard sizes (volumes), which vary throughout the world. For example, in the United States, one common industry standard paint container size is one quart. In Europe, a common industry standard container size for paint is one liter.

[0004] Although industry standard paint container sizes exist, and the typical shape of the container is a cylindrical metal can with a friction fit lid, the dimensions of the paint container cans vary from manufacturer to manufacturer. For example, one liter paint cans may vary from about 4.2 to 4.4 inches in outer diameter and from about 5.0 inches to 5.7 inches in height. Similar variations exist for one quart metal paint cans.

[0005] Users of handheld paint sprayers have typically been required to pour paint from the paint can in which the paint was sold into the cup or reservoir that fits with the particular handheld spray device. When a paint job is completed, the reservoir is detached from the paint sprayer and any unused paint must be poured back into the paint can. Each time a job is completed, the reservoir must be emptied and cleaned, so that it will be ready for the next job.

SUMMARY

[0006] An adapter allows a paint can to act as a reservoir for a handheld spray device. The adapter connects and seals an open paint can to the handheld spray device so that paint from the paint can is supplied to an inlet of the handheld spray device. The gasket is positioned within the cap and engages the open upper end of the paint can to the cap.

[0007] In some embodiments, a can spacer insert is positionable in the cage to elevate the paint can so that the upper ring of the paint can engages the gasket.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIGS. **1**A and **1**B are a side elevational view and cross-sectional view, respectively, of a handheld spray device and an adapter for directly connecting a paint can to the paint spray device.

[0009] FIG. **2**A-**2**C are sectional views of the handheld spray device and adapter of FIGS. **1**A and **1**B with paint cans of different dimensions.

[0010] FIG. **3** is an exploded view of the adapter.

[0011] FIGS. **4**A-**4**I illustrate steps performed in connecting a paint can to the handheld spray device using the adapter.

[0012] FIGS. **5**A-**5**C are views of the cap of the adapter.

[0013] FIGS. **6**A-**6**D are views of the cage of the adapter.

[0014] FIGS. **7**A-**7**B are views of the gasket of the adapter.

[0015] FIGS. **8**A-**8**D are views of a suction tube extension for use with the adapter.

[0016] FIG. **9**A is a perspective view of a spacer insert for use with the adapter.

[0017] FIG. **9**B is a top view of the spacer insert.

[0018] FIG. **9**C is a side view of the spacer insert.

[0019] FIG. **9**D is a bottom view of the spacer insert.

[0020] FIG. **9**E is a sectional view along section **9**E-**9**E of FIG. **9**C.

[0021] FIG. **10**A is an exploded view showing a paint can, the spacer insert, and the cage, with the spacer insert oriented for use with paint cans of a first height range.

[0022] FIG. **10**B is an exploded view showing a paint can, the spacer insert, and the cage, with the spacer insert oriented for use with paint cans of a second height range.

DETAILED DESCRIPTION

[0023] FIGS. **1**A and **1**B show a side view and a cross-sectional view, respectively, of handheld spray gun **10**, paint can **12**, and paint can adapter **14**. In the embodiment shown in FIG. **1**, handheld spray gun **10** is an airless spray gun of the type shown in U.S. Pat. No. 8,596,555, which is incorporated by reference.

[0024] The paint that is dispensed by sprayer gun **10** is supplied from paint can **12**. Adapter **14** allows direct connection of industry standard paint containers of varying dimension (for example, one liter or one quart metal cans with a friction fit lid) to handheld spray devices (such as handheld airless spray gun **10** or other handheld spray devices such as high volume low pressure (HVLP) sprayers, air spray sprayers, and cup type spray guns) for spraying/dispensing without required use of a secondary container. The end user may thereby easily spray/dispense coatings from the original labeled paint container while using a handheld spray/dispensing device.

[0025] In the embodiments shown in FIGS. **1**A and **1**B, spray gun **10** includes housing **20**, handle **22**, trigger **24**, battery port **26**, pressure relief valve **28**, spray tip assembly **30**, and lid **32**. Battery **34**, which is attachable to battery port **26**, provides electrical power used to operate spray gun **10**. Spray tip assembly **30** includes connector **36**, spray tip **38**, and guard **40**.

[0026] As shown in FIG. **1**B, drive system **42** and pumping mechanism **44** are located within housing **20**. Drive system **42** includes electric motor **46**, gear train **48**, and wobble plate **50** to the pistons of pump mechanism **44**. Pump inlet **52** at the lower end of pump mechanism **44** extends through lid **32** and connects to suction tube **54** at outlet end **56**. Suction tube **54** extends generally downward into adapter **14** and into the interior of paint can **12**, so that inlet end **58** of suction tube **54** is positioned near the bottom end of can **12**.

[0027] Adapter **14** includes cage **60**, cap **62**, and gasket **64**. Cage **60** is sized to hold paint cans of a particular industry standard size, such as one liter or one quart. Depending on the particular paint manufacturer, can **12** may have the industry

standard size (i.e., volume) while the diameter and height of can **12** can vary. Adapter **14** accommodates the potential variations in both diameter and height of can **12**.

[0028] When can **12** is positioned within cage **60**, as shown in FIG. **1**B and the can lid (not shown) of can **12** is removed, cap **62** is threaded onto the upper end of cage **60** until gasket **64** seals the upper end of can **12** to cap **62**. Adapter **14** along with can **12** can then be attached to spray gun **10** by threading cap **62** into lid **32**, which is an integral part of housing **20**.

[0029] Once adapter **14** is connected to spray gun **10**, paint from can **12** can be sprayed by gun **10** by actuation of trigger **24**. When trigger **24** is actuated, electrical power from battery **34** is supplied to electric motor **46**, which drives wobble plate **50** through gear train **48**. Motion of wobble plate **50** drives the pistons of pump mechanism **44**. As a result, paint is drawn from the interior of can **12** through suction tube **54** and pump inlet **52** into pumping mechanism **44**. Pressurized paint from pumping mechanism **44** is delivered to spray tip assembly **30**, which produces a highly atomized flow of paint out of spray tip **38**. Tip guard **40** prevents objects from contacting the high velocity output of fluid from spray tip **38**.

[0030] FIGS. **2**A-**2**C are cross-sectional views of handheld spray gun **10** and adapter **14** used with cans **12**A-**12**C that have different dimensions than can **12** shown in FIG. **1**B. In FIGS. **2**A-**2**C, elements similar to those shown in FIGS. **1**A and **1**B are labeled with similar reference numerals.

[0031] In FIG. **2**A, can **12**A has a height which is similar to the height of can **12** in FIG. **1**B. The diameter of can **12**A, however, is smaller than the diameter of can **12**. As shown in FIGS. **1**B and **2**A, the height of cans **12** and **12**A is such that cap **62** is threaded onto cage **60** to nearly the full extent allowed by the respective threads on cage **60** and cap **62**. In both FIGS. **1**B and **2**A, the upper ends of cans **12** and **12**A is sealed by gasket **64** to cap **62**. Although the diameter of can **12**A is smaller, the central apertures of cap **62** and gasket **64** have diameters that are small enough to still provide a seal of can **12**A, while providing sufficient clearance to allow suction tube **54** to extend into can **12**A.

[0032] FIGS. **2**B and **2**C show cans **12**B and **12**C, respectively. Cans **12**B and **12**C are taller than cans **12** and **12**A shown in FIGS. **1**B and **2**A, respectively. As a result, cap **62** is not threaded as far downward on the upper end of cage **60** in FIGS. **2**B and **2**C, as compared to FIGS. **1**B and **2**A.

[0033] There is another difference shown in FIGS. **2**B and **2**C resulting from the greater height of cans **12**B and **12**C. Adapter **14** also includes, in FIGS. **2**B and **2**C, suction tube extension **66**, which is inserted between pump inlet **52** and suction tube outlet **56**. The upper end of extension **66** fits on the lower end of pump inlet **52**. The lower end of extension **66** extends into the upper end of suction tube outlet **56**. The addition of extension **66** shown in FIGS. **2**B and **2**C allows inlet end **58** of suction tube **54** to be positioned near the lower end of cans **12**B and **12**C.

[0034] The diameter of can **12**C shown in FIG. **2**C is smaller than the diameter of can **12**B, shown in FIG. **2**B. Despite the variation in can diameter, gasket **64** still provides a seal between the upper end of cans **12**B and **12**C and cap **62**.

[0035] FIG. **3** is an exploded view of adapter **14**, showing cage **60**, cap **62**, gasket **64**, suction tube extension **66**, and O-ring **68**, which mounts on extension **66**. As seen in FIG. **3**, cage **60** includes mounting aperture **70** for receiving and holding extension **66** when adapter **14** is not in use. A twist lock connection is provided between cage **60** and extension **66** by aperture **70** and mating portions of extension **66**.

[0036] FIGS. **4**A-**4**I illustrate how adapter **14** is used to provide a direct connection between paint can **12**B (shown in FIG. **2**B) and handheld spray gun **10**. In FIG. **4**A, cup C is disconnected from lid **32** of handheld spray gun **10**. Cup C is a typical cup used as a reservoir for holding paint, and is connected by external thread **72** to internal thread **74** of lid **32**. In FIG. **2**B, cup C has been removed. Suction tube **54** is being removed by twisting back and forth and pulling on suction tube **54** to remove it from pump inlet **52** (shown in FIGS. **1**B, **2**A-**2**C, and **4**B.

[0037] In FIG. **4**C, suction tube extension **66** is removed from cage **60** by twisting a quarter turn and removing upward from aperture **70**. Suction tube extension **66** must be removed before cage **60** can receive and hold a paint can.

[0038] In FIG. **4**D, lid **32** (and spray gun **10**) are inverted so that pump inlet **52** is extending upward. Extension **66** is inserted onto pump inlet **52**. Detent or notch **76** of extension **66** is aligned with orientation lug **78** of pump inlet **52** to ensure a consistent placement of extension **66** with respect to pump inlet **52**. In some cases, as illustrated in FIGS. **1**B and **2**A, use of extension **66** is not required.

[0039] In FIG. **4**E, lid **32** remains in an inverted position. Suction tube **54** is connected to extension **66** by inserting outlet end **56** onto extension **66**.

[0040] In FIG. **4**F, paint can **12**B is inserted downward into cage **60**. Can lid **80** covers the top end of can **12**B in FIG. **4**F.

[0041] In FIG. **4**G, can **12**B is in place within cage **60**. Can lid **80** is removed so that the top end of can **12**B is open.

[0042] In FIG. **4**H, cap **62** is threaded onto the upper end of cage **60**. Cap **62** will be rotated in a clockwise direction shown in FIG. **4**H until gasket **64** (not shown) seals with the upper end of can **12**B.

[0043] In FIG. **4**I, adapter **14** is attached to lid **32** of handheld spray gun **10**. External threads **82** at the upper end of cap **62** engage internal threads **74** of lid **32**. Adapter **14** is rotated in a counterclockwise direction to engage threads **82** with threads **74**. Once adapter **14** is connected to lid **32**, handheld spray gun **10** is ready for use.

[0044] After spraying has been completed, the process shown in FIGS. **4**A-**4**I is reversed. Adapter **14** is detached from handheld spray gun **10** by rotating adapter **14** in a clockwise direction. Once adapter **14** is disconnected from spray gun **10**, cap **62** can be removed from cage **60**, can lid **80** can be placed on the top end of can **12**B, and can **12**B can be removed from cage **60**.

[0045] Clean up can be performed using cup C filled with water or other appropriate solvent. Suction tube **54** can be inserted into the water in cup C and spray gun **10** can be operated to flush water through suction tube **54**, extension **66**, pump inlet **52**, pumping mechanism **44**, and spray tip mechanism **30** to clean the components that were in contact with the paint. Suction tube **54** can then be disconnected from extension **66**, so that extension **66** can be removed and re-stowed within cage **60** of adapter **14**. Suction tube **54** can then be reattached to pump inlet **52**, and cup C (after any remaining water has been removed) can be reattached to lid **32**.

[0046] FIGS. **5**A-**5**C show cover **62** of adapter **14** in further detail. FIG. **5**A is a top view, FIG. **5**B is a front view, and FIG. **5**C is a sectional view along section **5**C-**5**C of FIG. **5**A.

[0047] Cover **62** includes top **84**, cylindrical sidewall or skirt **86** and neck **88**. Top **84** includes center aperture **90**, through which suction tube **54** is inserted. Sidewall **86** has

vertical ribs **92** on its outer surface and internal threads **94** on its inner surface. External threads **82** are located on the outer surface of neck **88**.

[0048] FIGS. **6**A-**6**D show views of cage **60**. FIG. **6**A is a front view, **6**B is a bottom view, FIG. **6**C is a sectional view along section **6**C-**6**C of FIG. **6**A, and FIG. **6**D is a detail view of detail **6**D in FIG. **6**C.

[0049] Cage **60** includes cylindrical sidewall **100** with windows or apertures **102**, closed bottom **104**, and opened top **106**. External threads **108** are located at the upper end of sidewall **100**. Ribs **110** are located at the bottom end of sidewall **100**.

[0050] Mounting hole **70** for extension **66** is located in bottom **104**. Arcuate flanges **112** with ramps **114** and stops **116** provide a locking mechanism to hold extension **66** in place.

[0051] A quarter turn (90 degrees) of extension **66** in one direction will lock extension **66** in place. Rotation by a quarter turn (90 degrees) in the opposite direction will release extension **66** from being held in place by arcuate flanges **112** so that extension **66** can be removed from cage **60** when adapter **14** is to be used.

[0052] As shown in FIGS. **2**A-**2**C and in FIGS. **5**C and **6**A, external threads **108** on cage **60** are shorter than internal threads **94** of cap **62**. This allows cap **62** to be threaded onto cage **60** to different extents, depending upon the height of the paint can that has been placed in cage **60**.

[0053] In one embodiment, cage **60** and cap **62** are made of high impact strength polypropylene. This provides impact strength for adapter **14** and also provides resistance to solvents that may be present in some of the materials that can be sprayed.

[0054] FIG. **7**A and **7**B show gasket **64**. FIG. **7**A is a top view, and FIG. **7**B is a side view of gasket **64**. Gasket **64** is a flat ring of resilient foam material such as crosslinked polyethylene foam. The foam material is a closed cell foam, so that paint that contacts gasket **64** will not be absorbed into gasket **64**.

[0055] Gasket **64** includes central aperture **120**, which is typically of the same diameter as aperture **90** in cap **62**. Along the outer edge of gasket **64** are tabs **122**, which will engage internal threads **94** of cap **62** to hold gasket **64** in place against the inner surface of top **84** of cap **62**. In one embodiment, gasket **64** has a thickness of about 0.25 inches.

[0056] FIGS. **8**A-**8**D show suction tube extension **66**, which is used in order to ensure that inlet end **58** of suction tube **54** will be positioned near the bottom of the paint can. FIG. **8**A is a perspective view, FIG. **8**B is a top view, FIG. **8**C is a front view, and FIG. **8**D is a sectional view along section **8**D-**8**D of FIG. **8**C. As shown in FIGS. **8**A-**8**C, extension **66** is oriented as it will be when it is to be attached to pump inlet **52** of spray gun **10**. When extension **66** is to be stored in cage **60**, it is in an inverted orientation.

[0057] As shown in FIGS. **8**A-**8**D, extension **66** is formed by unitary plastic molded body **130** at upper section **132** and lower section **134**. Upper section **132** includes upper bore **136**, upper rim **138**, flange **140**, fingers **142**, wings **144**, handle **146**, and V-shaped orientation lug **148**. V-shaped detent **76** is located in rim **138**. Lower section **134** with lower bore **150** that connects to upper bore **136** and annular grooves **152** which hold O-rings **68** shown in FIG. **3**.

[0058] When extension **66** is in use, upper bore **136** receives the lower end of pump inlet **52**. Detent **76** receives orientation lug **78** of pump inlet **52**, as shown in FIG. **4**D. Lower section **134** is inserted into outlet end **56** of suction tube **54**. Orientation lug **148** mates with a corresponding detent in outlet end **56** of suction tube **54**. Detent **76** and lug **148** of extension **66** are aligned, so that the desired orientation of suction tube **54** with respect to pump inlet **52** is maintained when extension **66** is placed between pump inlet **52** and suction tube **54**.

[0059] When extension **66** is to be stored in cage **60**, flange **140** and fingers **142** are placed into mounting hole **70** in cage **60**. Flange **140** fits into one gap between flanges **112**, and fingers **142** fit into the opposite gap between flanges **112** in cage **60**. A quarter turn of extension **66** with respect to cage **60** causes flange **140** to ride up over one ramp **114** and into engagement with one flange **112**, while fingers **142** ride over the other ramp **114** and onto the other flange **112**. Stops **116** prevent further rotation of extension **66**. When extension **66** is to be removed, it is rotated in the opposite direction by 90 degrees, and then can be lifted out of mounting aperture **70** and removed from cage **60**.

[0060] Adapter **14** allows direct connection of industry standard paint containers such as paint cans to handheld spray devices. Although adapter **14** has been described in conjunction with an airless handheld spray device, other handheld spray devices can also be used in conjunction with adapter **14**. This allows the end user to easily spray and dispense coatings from the original labeled containers, rather than requiring the use of a secondary container and the associated pouring of paint from one container to another.

[0061] In order to accommodate paint cans of varying dimensions, several parameters should be considered. First, the inner diameter of cage **60** should be at least as large as the largest outer diameter of the variety of containers with which it will be used. Second, the inner container receiving height of cage **60** should be no higher than the shortest of the variety of containers with which it will be used without a spacer insert. This is required so that cap **62** and gasket **64** will be allowed to engage and seal to the top end of the paint can. Third, the threads connecting cage **60** and cap **62** must extend axially a sufficient distance to allow engagement while accommodating containers of varying height.

[0062] The dimensions of paint container cans vary from manufacturer-to-manufacturer, and may also vary from country-to-country. The threaded connection between cage **60** and cap **62** allow adapter **14** to accommodate containers of varying heights. FIGS. **9**A-**9**E show spacer insert **200**, which can be used to extend the range of can heights that can be accommodated by adapter **14**. Spacer insert **200** can be positioned at the bottom of cage **60** to raise cans of short height so that the opened upper end of a paint can will engage gasket **64**. In the embodiment shown in FIGS. **9**A-**9**E, spacer insert **200** can be mounted in two different orientations within cage **60** to act as a platform or shim for two different height ranges of paint cans.

[0063] Spacer insert **200** includes cylindrical sidewall **202** having bottom end **204** and top end **206**, and shelf **208**, which extends radially inward from sidewall **202** to central aperture **210**. Shelf **208** defines first can support surface **212** (with outer ring **212**A adjacent sidewall **202** and inner ring **212**B adjacent outer ring **212**A) and second can support surface **214** (with outer ring **214**A adjacent sidewall **202** and inner ring **214**B adjacent outer ring **214**A).

[0064] Shelf **208** is located closer to lower end **204** than upper end **206** of sidewall **202**. As a result, spacer insert **200** can provide two different platform height ranges for support-

ing a paint can, depending upon whether insert **200** is in the position shown in FIGS. **9**A-**9**E, or is inverted.

[0065] First support surface **212** of shelf **208** includes label **216**, which includes an indication of the range of can heights that are to be supported on first support surface **212**. In this particular embodiment, the range of can heights is 10 to 12 cm.

[0066] Similarly, second support surface **214** includes label **218**, which includes an indication of another range of can heights that are to be supported by can support surface **214**. In this example, the can heights associated with support surface **214** are in a range of 8 to 10 cm. Labels **216** and **218** may be adhesively attached to surfaces **212** and **214**, the label may be printed onto surfaces **212** and **214**, or may be formed as part of a molding process that creates insert **200**.

[0067] Inner rings **212**B and **214**B are recessed with respect to outer rings **212**A and **214**A, respectively. As a result, shoulder **212**C is formed between rings **212**A and **212**B, and shoulder **214**C is formed between rings **214**A and **214**B. Outer rings **212**A and **214**A support larger outer diameter paint cans, while inner rings **212**B and **214**B support smaller outer diameter paint cans. Shoulders **212**C and **214**C keep smaller outer diameter paint cans centered within cage **60**, so that the upper ends of the smaller diameter paint cans will seal properly with gasket **64**.

[0068] In the embodiment shown in FIGS. **9**A-**9**E, upper end **206** of insert **200** is castellated. Four tabs (or castellations) **220** extend upward when insert **200** is oriented as shown in FIGS. **9**A-**9**E.

[0069] Aperture **210** in floor **208** is sized so that insert **200** can be positioned at the bottom of cage **60** for storage, with extension **66** also mounted at the bottom of cage **60** for storage purposes. Extension **66** extends upward through aperture **210** when adapter **14** is not in use.

[0070] FIGS. **10**A and **10**B show two different orientations of adapter **200**, for use with two different can height ranges. In FIG. **10**A, insert **200** is oriented so that tabs **220** extend upward. In this orientation, paint can **12**D will be positioned within cage **60** with the bottom of can **12**D resting on support surface **212** of floor **208**.

[0071] In FIG. **10**B, insert **200** has been inverted from the orientation shown in FIG. **10**A. Tabs **220** face downward, and support surface **214** faces upward. The bottom of paint can **12**E will rest on support surface **214** of insert **200**, with can **12**E and insert **200** both positioned within cage **60**. In FIG. **10**A, the platform height provided by insert **200** to elevate can **12**D is based upon the distance between the bottom edge of bottom section **204** of adapter **200** and support surface **212**. In FIG. **10**B, the platform height provided to support can **12**E based upon the distance between the end surfaces of tabs **220** and support surface **214**.

[0072] The use of adapter **14** provides a number of advantages. Easy, reliable, and sealed connection of standard industry paint cans and containers of varying dimensions to spray devices is achieved. Easy change and storage of multiple paint colors can be achieved. The use of the paint can as the reservoir eliminates the need for cleaning a secondary container after every paint job. The open sided cage allows spraying/dispensing of paints in their originally labeled containers and allows the exterior of the container to be viewed by the user for convenient identification of the type/color of material currently connected to the sprayer. With the use of adapter **14**, including insert **200**, the vast majority of paint cans on the market in North America and Europe are compatible with a handheld spray gun.

[0073] While the invention has been described with reference to an exemplary embodiment(s), it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment(s) disclosed, but that the invention will include all embodiments falling within the scope of the appended claims. For example, although the attachment of adapter **14** to spray gun **10** and the attachment of cap **62** to cage **60** are shown as threaded connections, other forms of connection systems can be used to reliably attach and seal a standard paint container (paint can) to a handheld paint spray device.

[0074] While the invention has been described with reference to an exemplary embodiment(s), it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular embodiment(s) disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.

1. An adapter for connecting a paint can to an inlet of a handheld spray device, the adapter comprising:

a cage for holding an open paint can;

a connector for connecting the cage and open paint can to the handheld spray device; and

a gasket for sealing the open paint can to the handheld spray device.

2. The adapter of claim **1** and further comprising:

a cap mountable on an upper end of the cage and carrying the connector and the gasket.

3. The adapter of claim **2**, wherein the cap and the gasket include apertures through which a suction tube connected to the inlet can extend into the paint can.

4. The adapter of claim **3** and further comprising:

a suction tube extension connectable between the inlet and an outlet end of the suction tube.

5. The adapter of claim **4**, wherein the cage includes a mount aperture for receiving and holding the suction tube extension when the adapter is not in use.

6. The adapter of claim **1**, wherein the cap includes a neck and wherein the connector comprise threads on the neck for engaging threads on the handheld spray device.

7. The adapter of claim **1**, wherein the cage includes external threads at an upper end of the cage, and the cap includes internal threads for engaging the external threads of the cage to mount the cap on the upper end of the cage.

8. The adapter of claim **1**, wherein the gasket comprises a foam ring formed of a closed cell crosslinked polyethylene foam.

9. The adapter of claim **8**, wherein the foam ring includes a plurality of outward extending tabs for engaging an inner surface of the cap.

10. An adapter of claim **1** and further comprising:
a can spacer insert for positioning on the bottom of the cage to support a bottom end of the paint can as spaced distance above the bottom of the cage.

11. The adapter of claim **10**, wherein the can spacer insert comprises:
a cylindrical body having an open first end and an open second end; and
a shelf positioned within the cylindrical body at a location between the open first end and the open second end.

12. The adapter of claim **11**, wherein the shelf is positioned within the cylindrical body closer to the open second end than the open first end.

13. The adapter of claim **12**, wherein the shelf has a first support surface and a second support surface.

14. The adapter of claim **13**, wherein the first support surface includes an outer ring adjacent the cylindrical body and an inner ring adjacent the outer ring.

15. The adapter of claim **14**, wherein the inner ring is recessed with respect to the outer ring.

16. The adapter of claim **15**, wherein the second support surface includes an outer ring adjacent the cylindrical body and an inner ring adjacent the outer ring.

17. The adapter of claim **13**, wherein the inner ring of the second support surface is recessed with respect to the outer ring of the second support surface.

18. The adapter of claim **13**, wherein the first support surface carries a first label identifying a height range of paint cans supportable by the first support surface.

19. The adapter of claim **18**, wherein the second support surface carries a second label identifying a height range of paint cans supportable by the second support surface.

20. The adapter of claim **11**, wherein the open first end is castellated.

21. A paint spraying system comprising:
a handheld spray device having an inlet for receiving paint to be sprayed; and
an adapter that connects and seals an open paint can to the handheld spray device so that paint from the paint can is supplied to the inlet.

22. The system of claim **21**, wherein the adapter comprises:
a cage for holding an open paint can;
a cap mounted on an upper end of the cage for connecting the cage and the paint can to the handheld spray device so that a suction tube extends from the inlet through the cap and into the open paint can; and
a gasket positioned within the cap for sealing an upper ring of the paint can to the cap.

23. The system of claim **22**, wherein the handheld spray device includes a lid surrounding the inlet, and wherein the cap forms a threaded connection with the lid.

24. The system of claim **22**, wherein the cage includes external threads at an upper end of the cage, and the cap includes internal threads for engaging the external threads of the cage to mount the cap on the upper end of the cage.

25. The system of claim **22**, wherein the gasket comprise a foam ring.

26. The system of claim **22**, wherein the foam ring includes a plurality of outward extending tabs for engaging an inner surface of the cap.

27. A system of claim **22**, wherein the adapter comprises:
a cage for holding an open paint can;
a cap mounted on an upper end of the cage for connecting the cage and the paint can to the handheld spray device so that a suction tube extends from the inlet through the cap and into the open paint can;
a gasket positioned within the cap for sealing an upper ring of the paint can to the cap; and
a can spacer insert for positioning within the cage to elevate the paint can so that the upper ring of the paint can engages the gasket.

28. The system of claim **27**, wherein the handheld spray device includes a lid surrounding the inlet, and wherein the cap forms a threaded connection with the lid

29. The system of claim **27**, wherein the cage includes external threads at an upper end of the cage, and the cap includes internal threads for engaging the external threads of the cage to mount the cap on the upper end of the cage.

30. The system of claim **27** wherein the can spacer insert comprises:
a cylindrical body having an open first end, an open second end; and
a shelf positioned within the cylindrical body at a location between the open first end and the open second end.

31. The system of claim **30**, wherein the shelf is positioned within the cylindrical body closer to the open second end than the open first end.

32. The system of claim **31**, wherein the shelf has a first support surface and a second support surface.

33. The system of claim **32**, wherein the first support surface includes an outer ring adjacent the cylindrical body and an inner ring adjacent the outer ring.

34. The system of claim **33**, wherein the inner ring is recessed with respect to the outer ring.

35. The system of claim **34**, wherein the second support surface includes an outer ring adjacent the cylindrical body and an inner ring adjacent the outer ring.

36. The system of claim **35**, wherein the inner ring of the second support surface is recessed with respect to the outer ring of the second support surface.

37. The system of claim **32**, wherein the first support surface carries a first label identifying a height range of paint cans supportable by the first support surface.

38. The system of claim **37**, wherein the second support surface carries a second label identifying a height range of paint cans supportable by the second support surface.

39. The system of claim **30**, wherein the open first end is castellated.

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