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(54) BUCKET FOR HANDLING LIQUIDS

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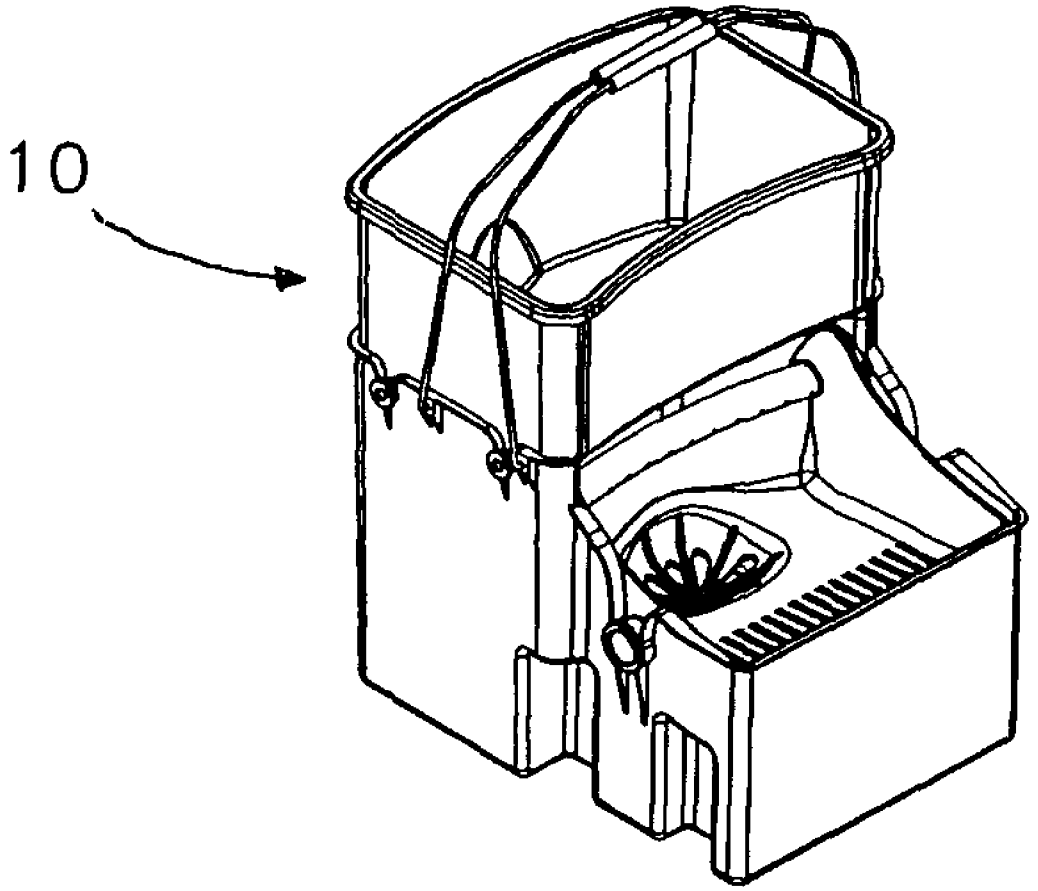
(52) **U.S. Cl.** **15/260**; 15/264

(57) **ABSTRACT**

A bucket for handling liquids comprising a collector reservoir, a wringer receptacle having a collector outlet in fluid communication with the collector reservoir and a storage reservoir comprising at least one discharge aperture. The wringer receptacle is positionable between a first position wherein the wringer receptacle blocks the discharge aperture and a second position wherein the wringer receptacle allows fluid communication between the storage reservoir and the wringer receptacle through the discharge aperture. Rinsing of a cleaning medium in the bucket according to the invention is controlled through use of the cleaning medium actuating the wringer receptacle. The storage reservoir may also comprise a valve that can be actuated by movement of the wringer receptacle.



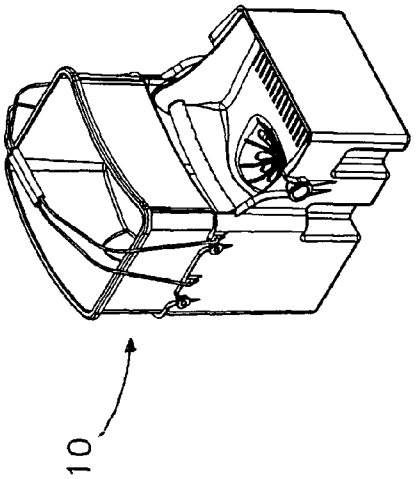


FIG. 1A

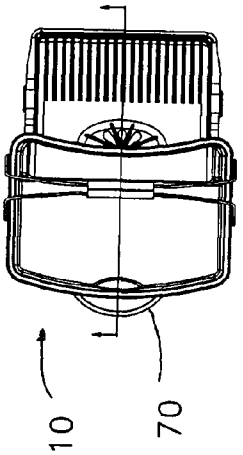


FIG. 1B

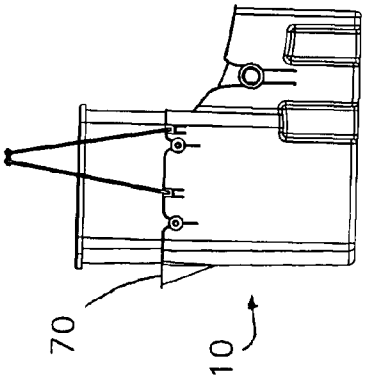


FIG. 1C

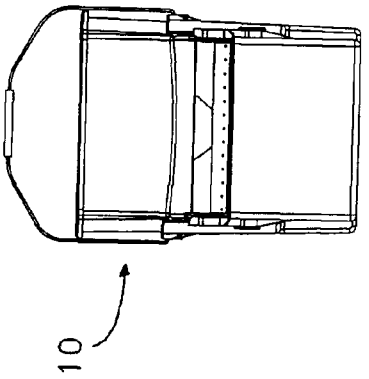


FIG. 1D

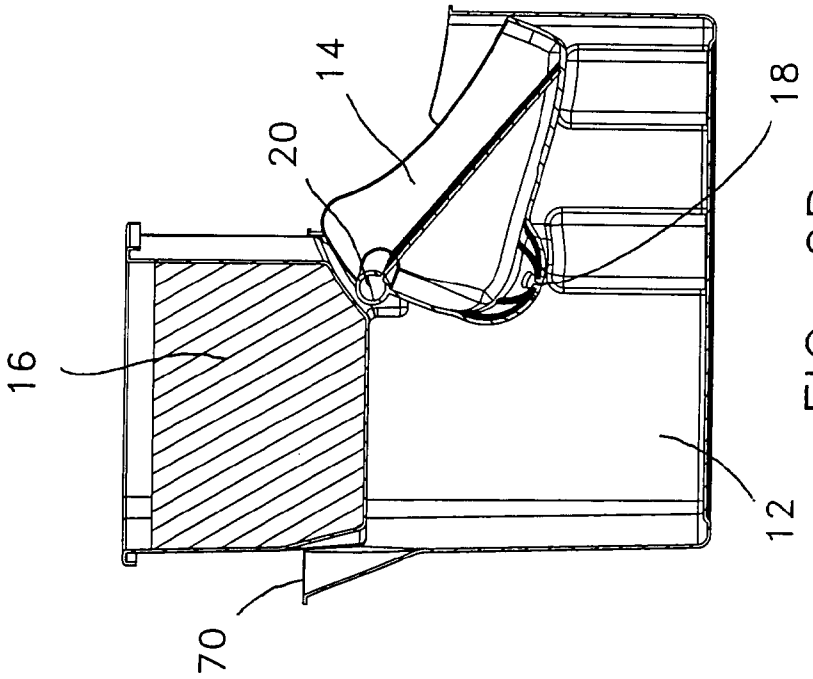


FIG. 2B

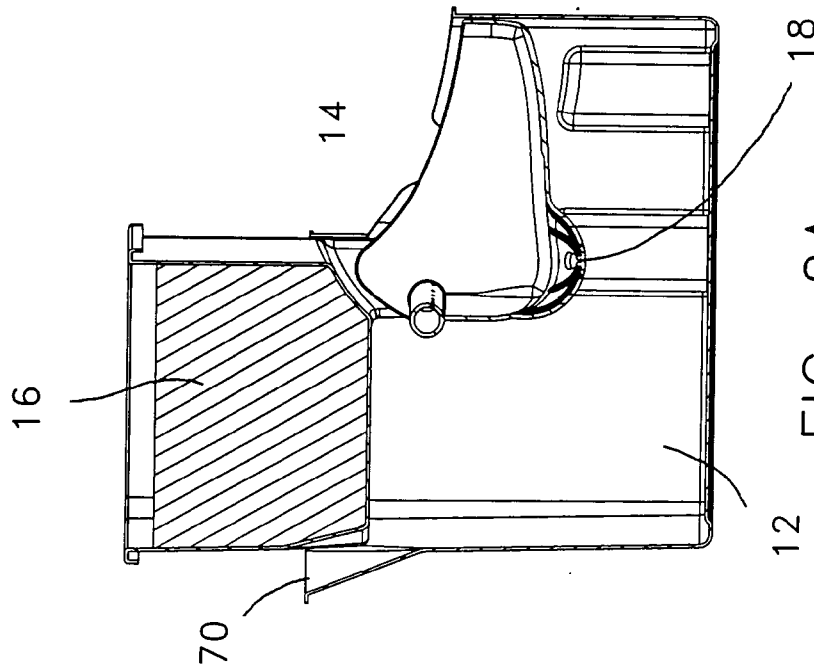


FIG. 2A

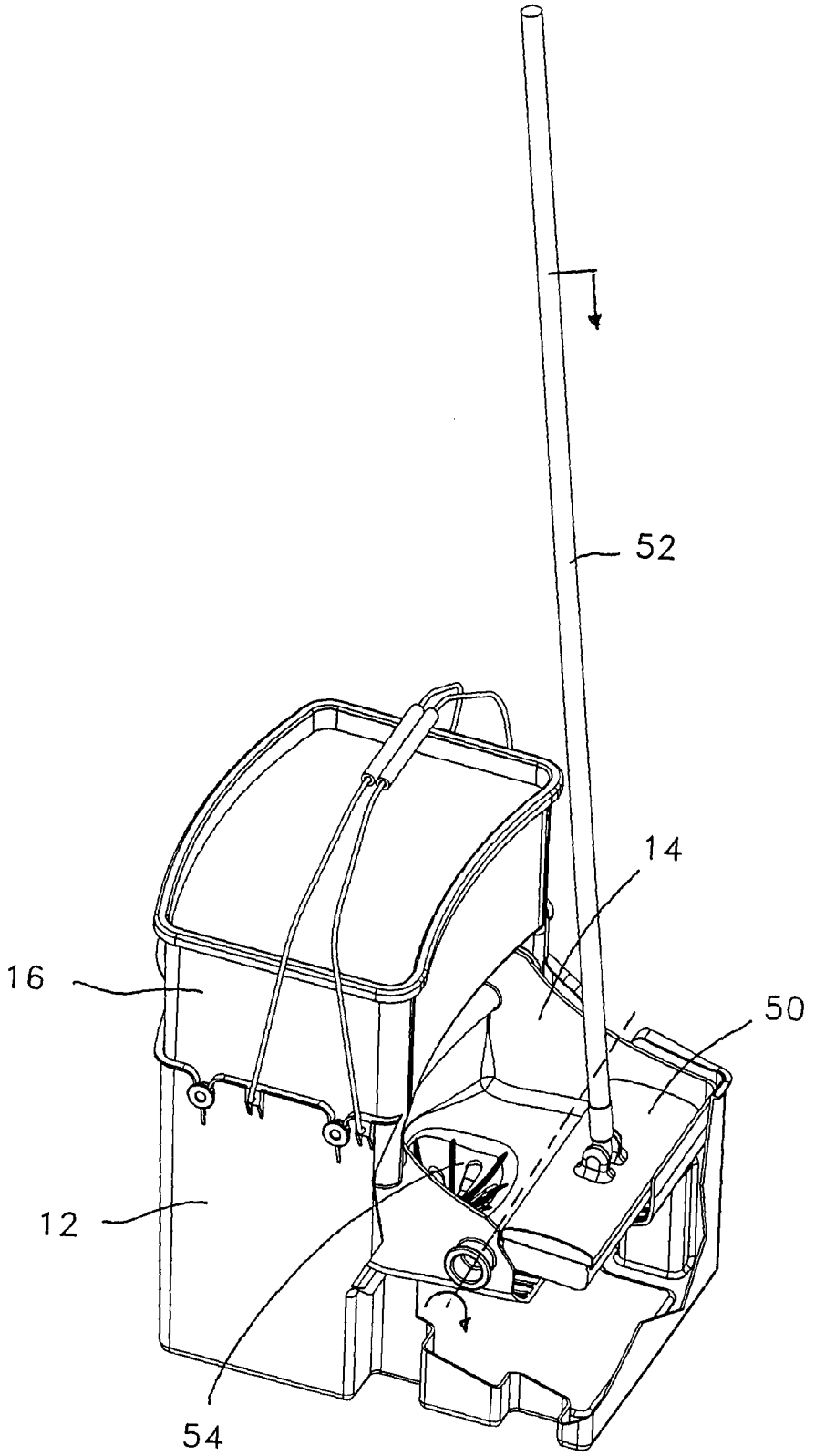


FIG. 3

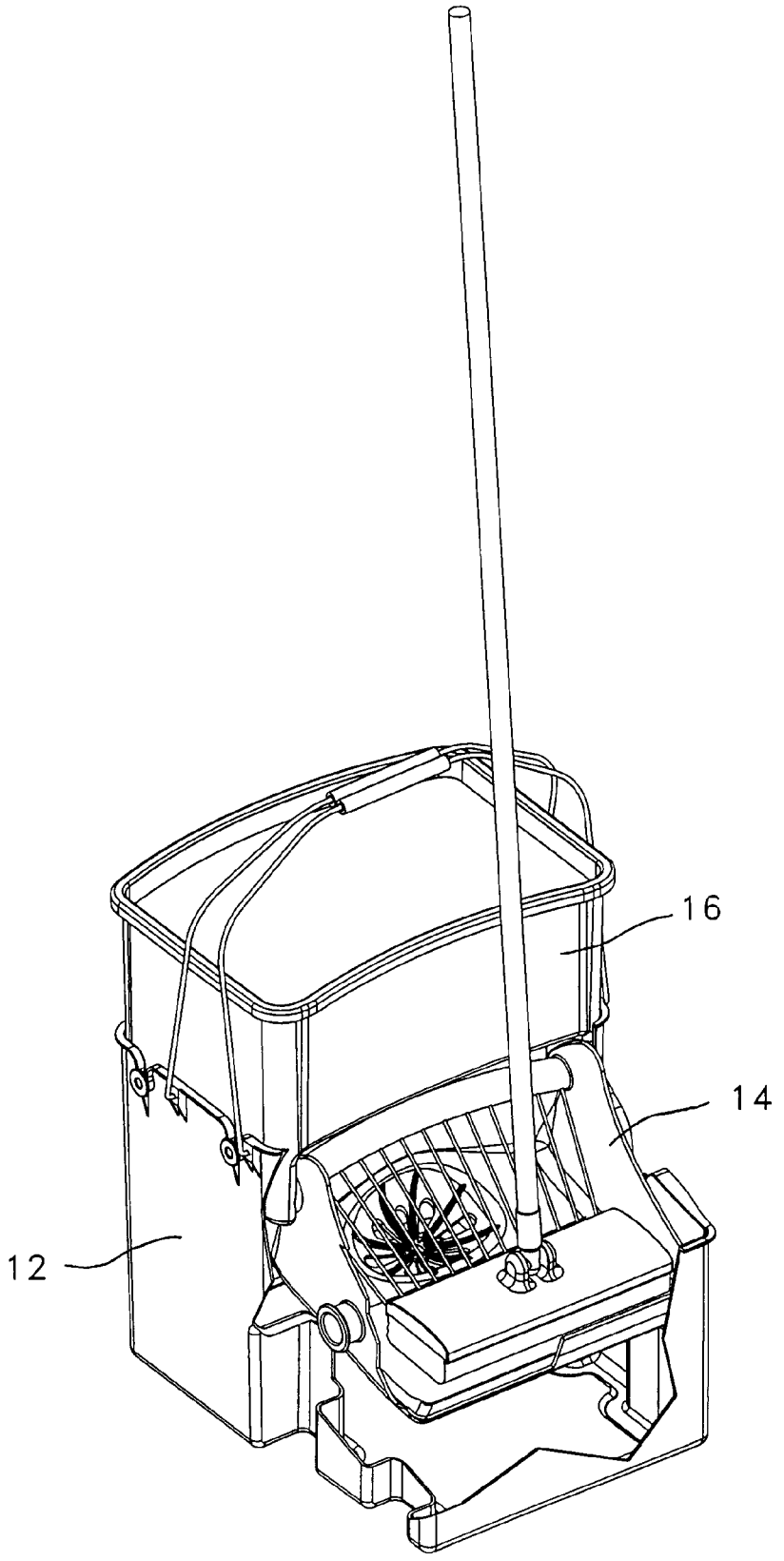


FIG. 4

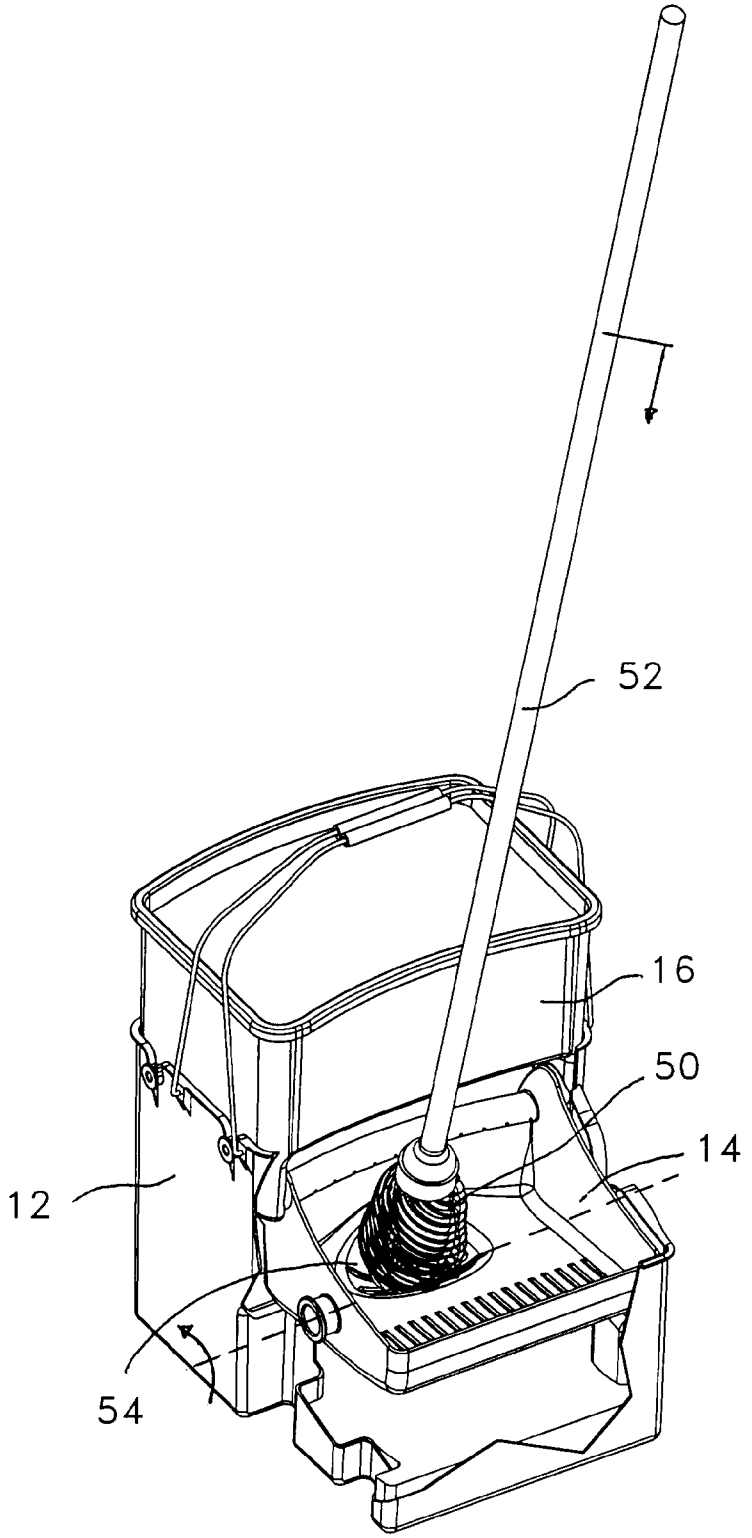


FIG. 5

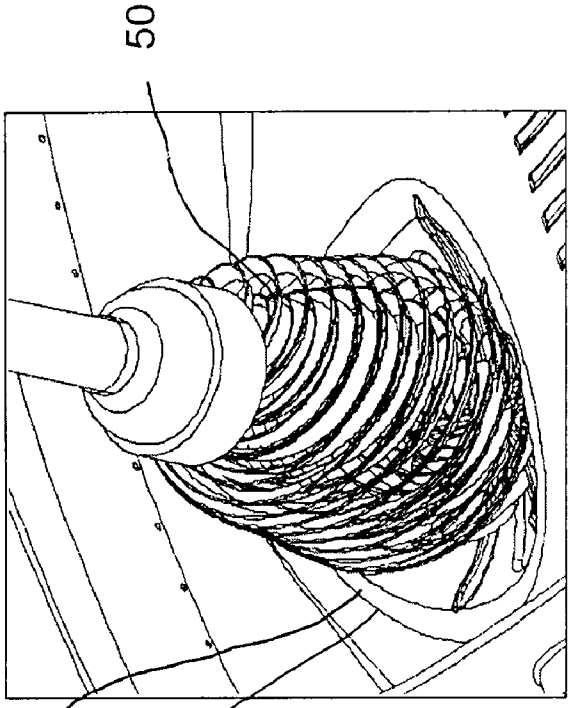


FIG. 6A

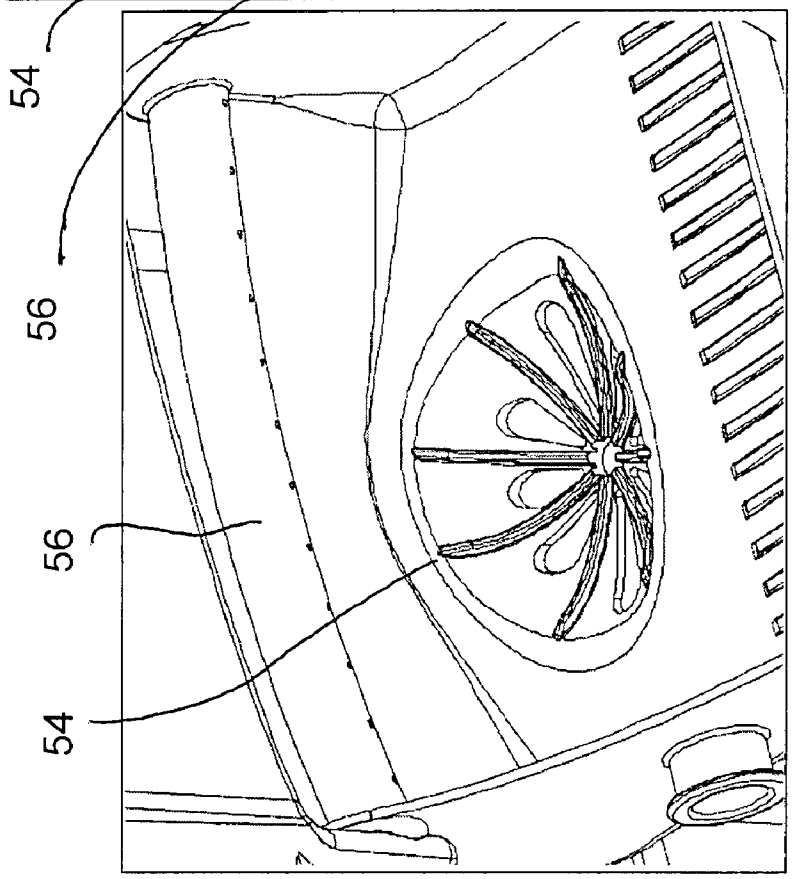


FIG. 6B

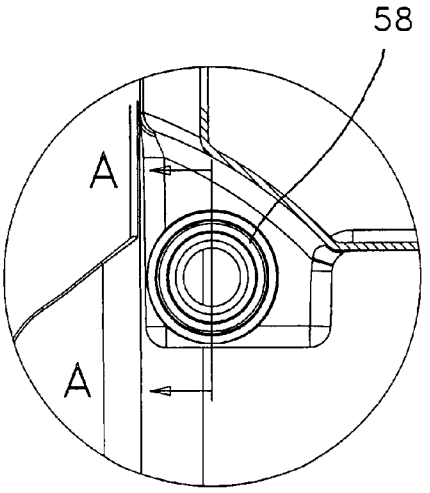
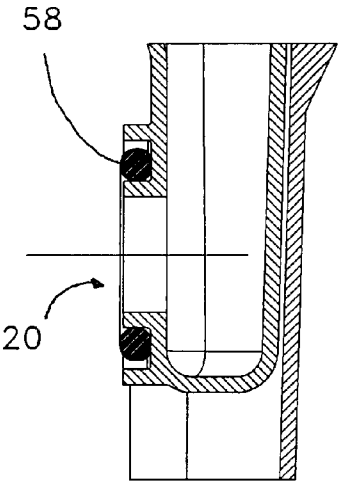


FIG. 7B



SECTION A –A

FIG. 7C

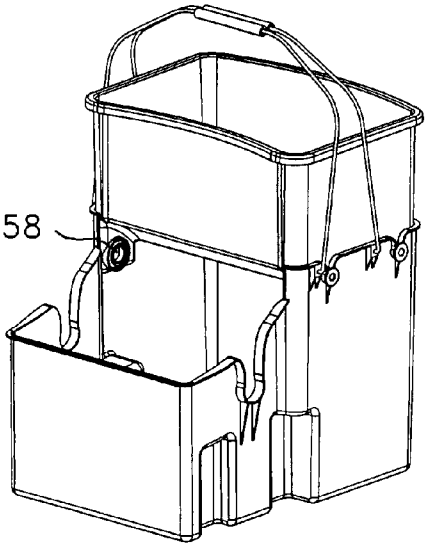


FIG. 7A

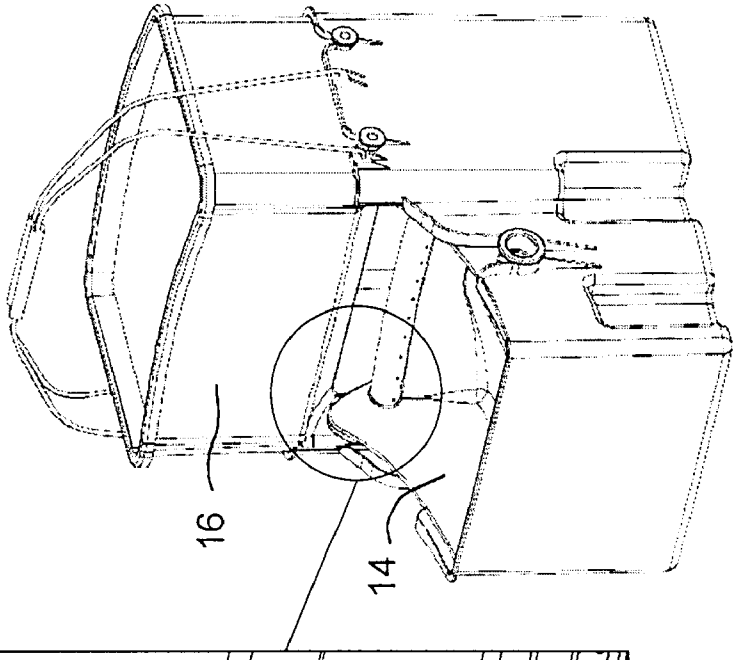


FIG. 8A

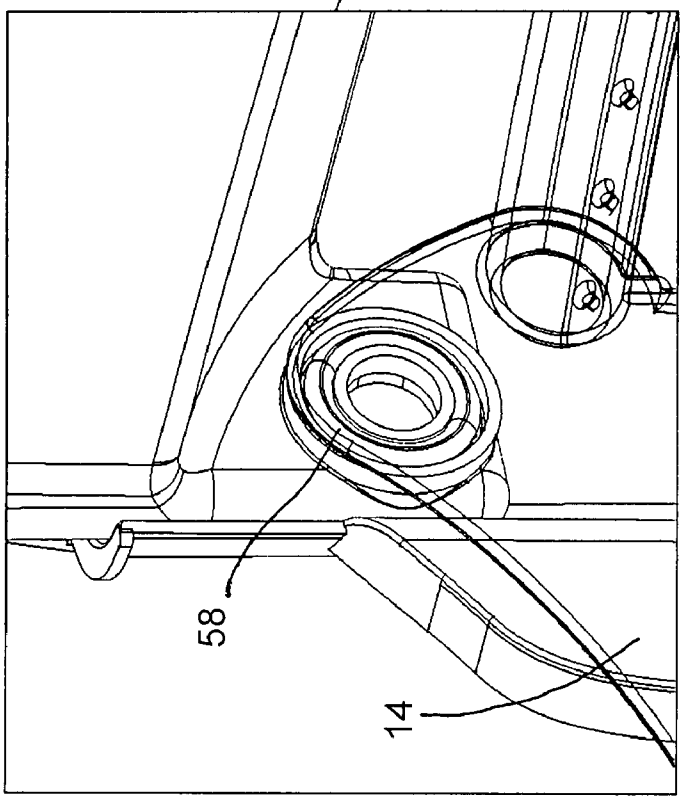


FIG. 8B

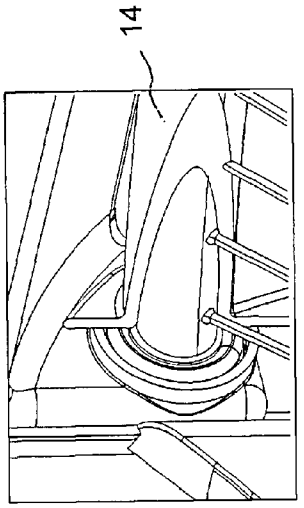


FIG. 9C

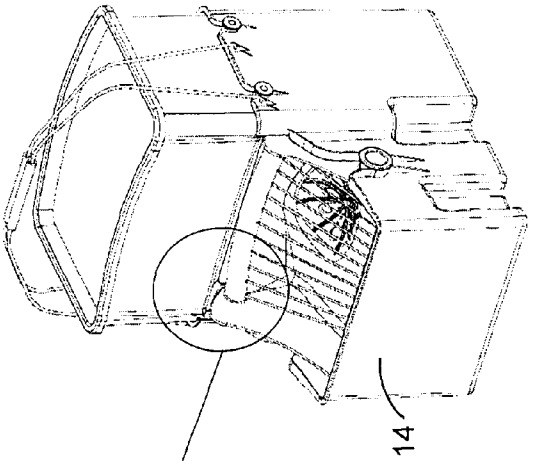


FIG. 9A

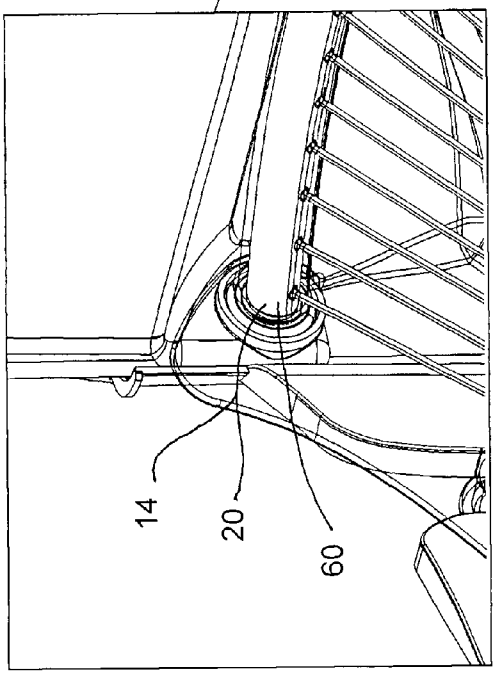


FIG. 9B

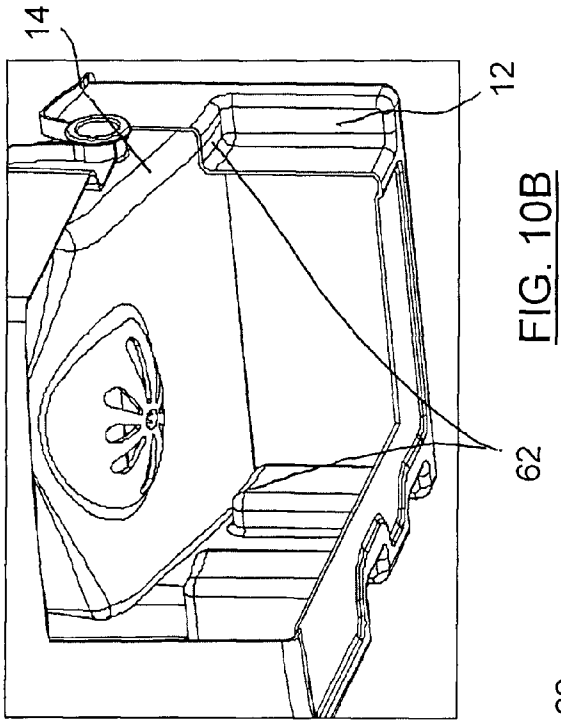


FIG. 10B

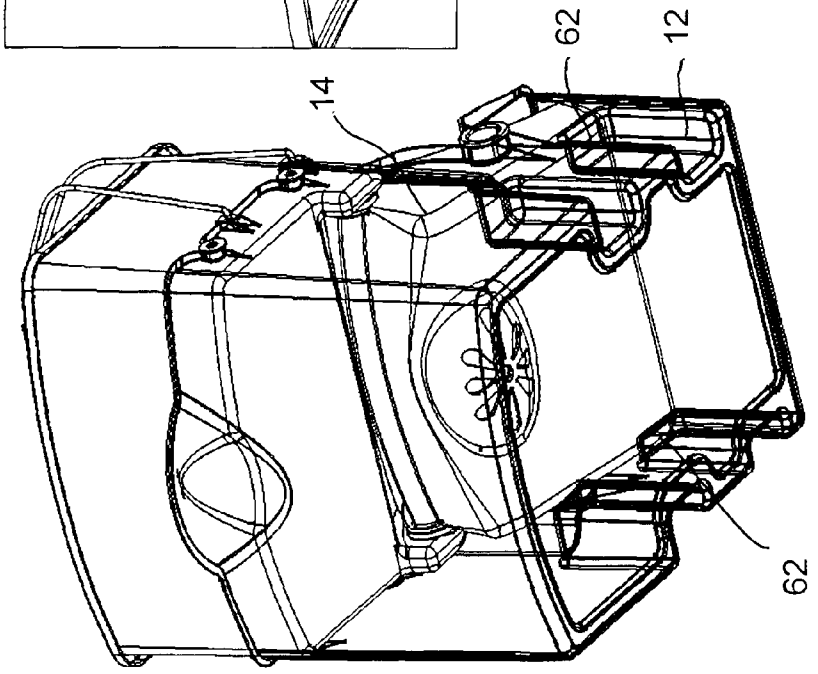


FIG. 10A

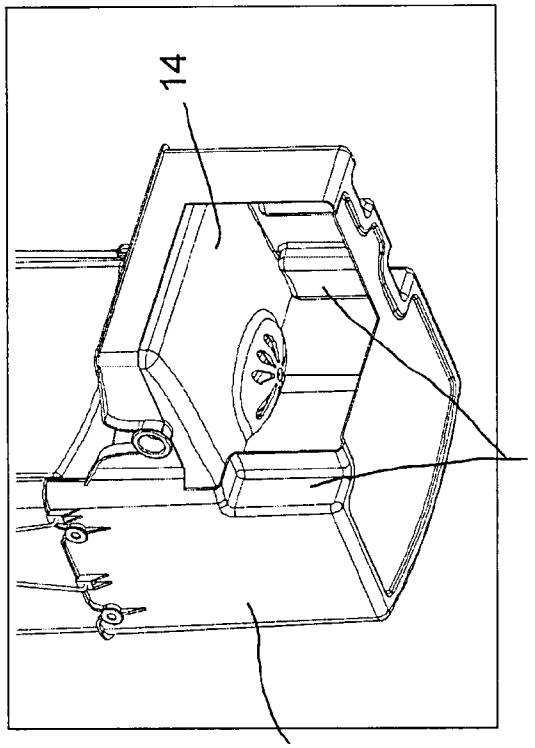


FIG. 11B

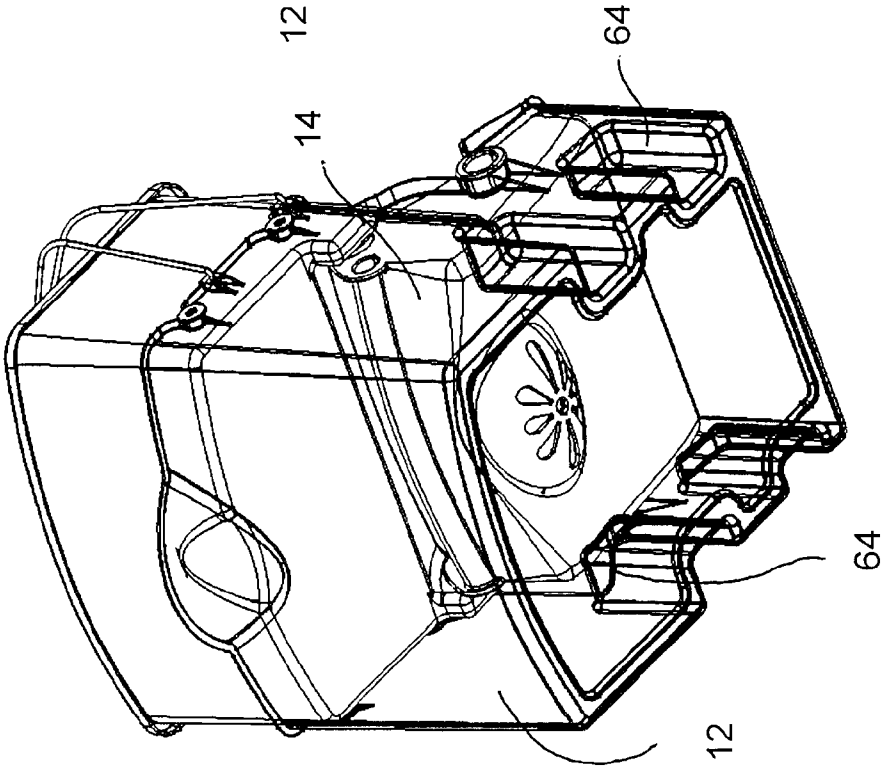


FIG. 11A

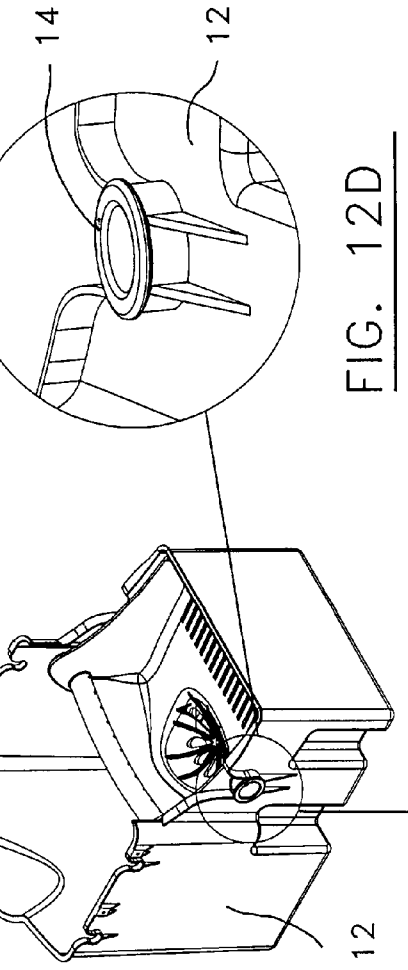


FIG. 12D

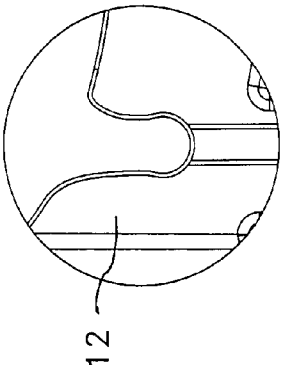


FIG. 12E

FIG. 12B

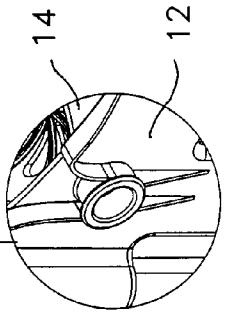


FIG. 12C

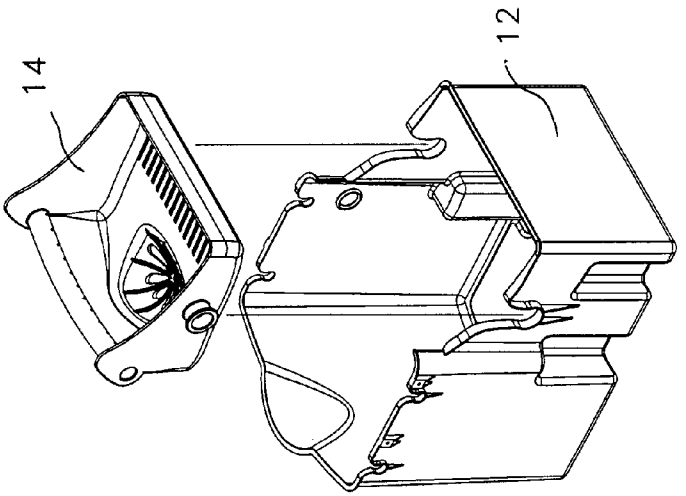


FIG. 12A

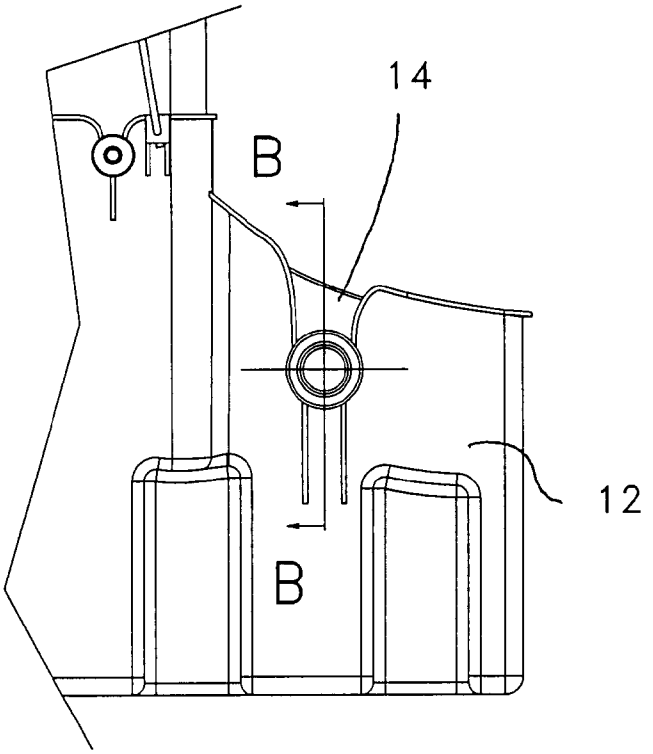
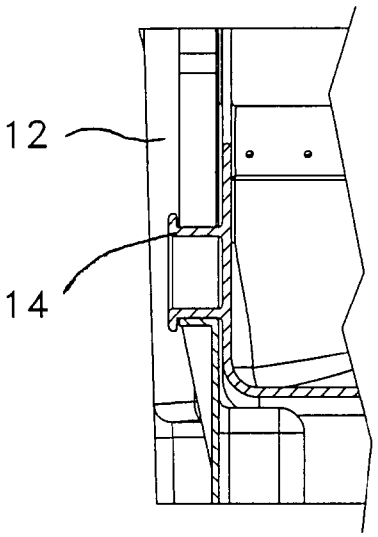


FIG. 13A



SECTION B –B

FIG. 13B

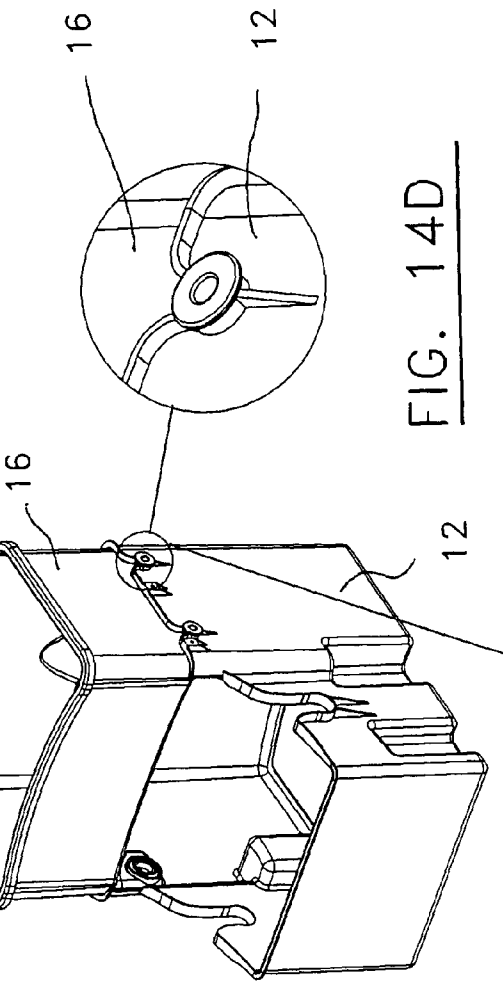


FIG. 14D

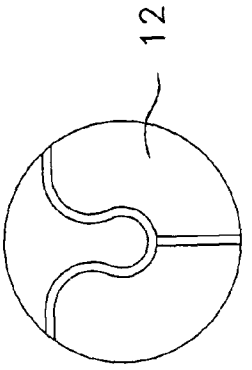


FIG. 14E

FIG. 14B

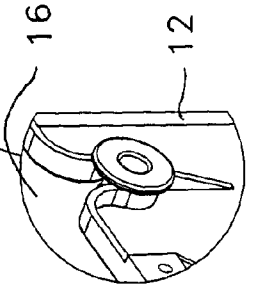


FIG. 14C

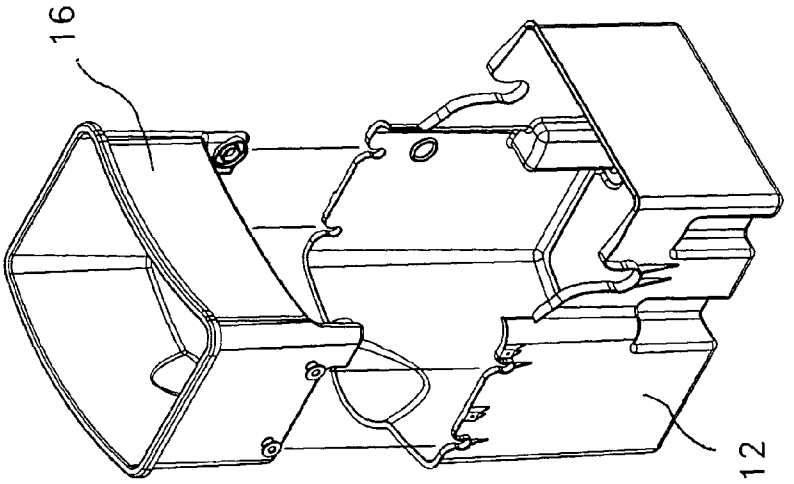


FIG. 14A

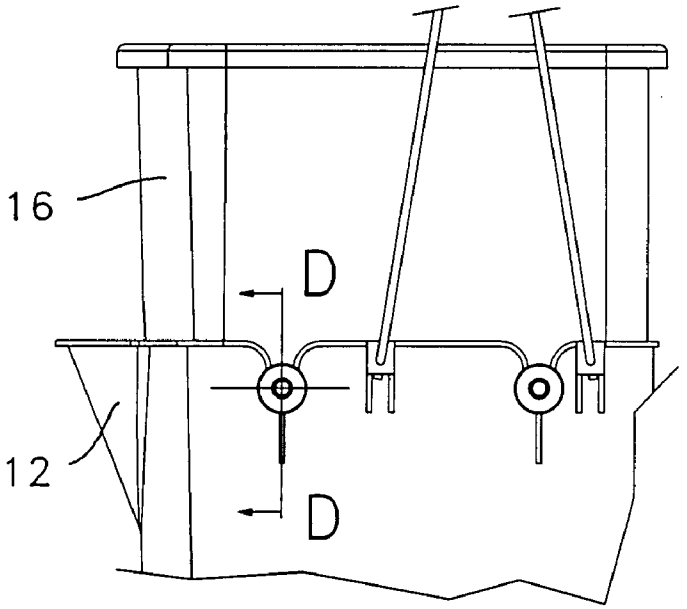
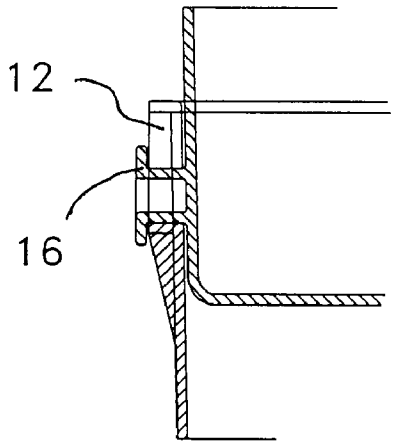


FIG. 15A



SECTION D –D

FIG. 15B

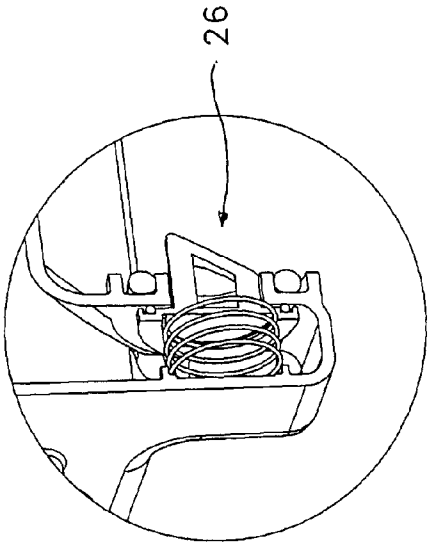


FIG. 16B

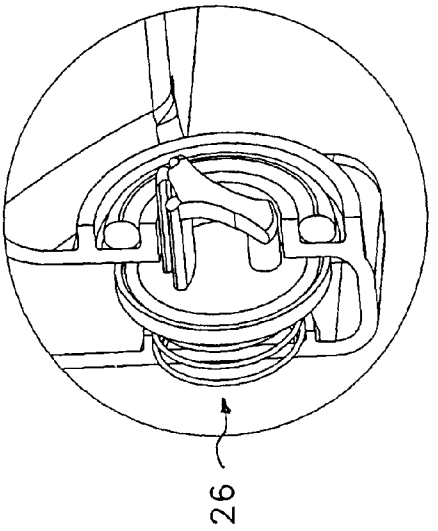


FIG. 16C

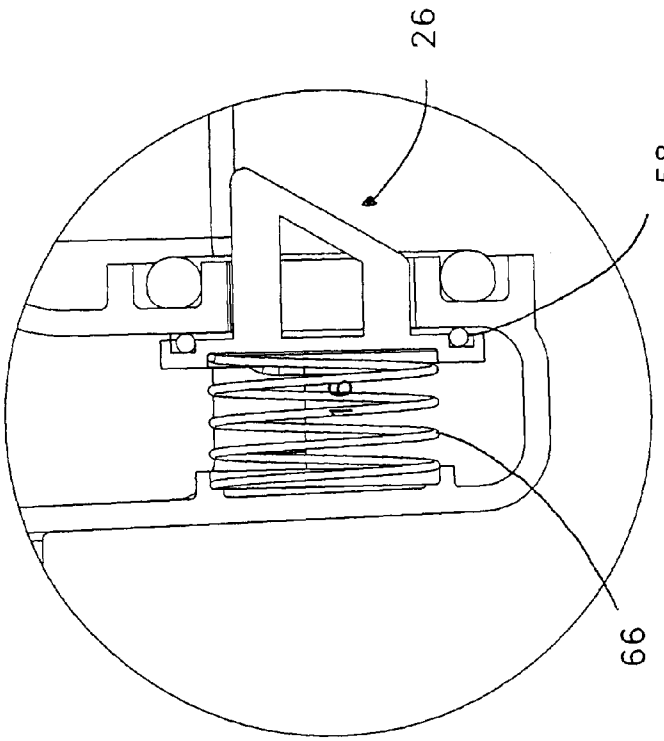


FIG. 16A

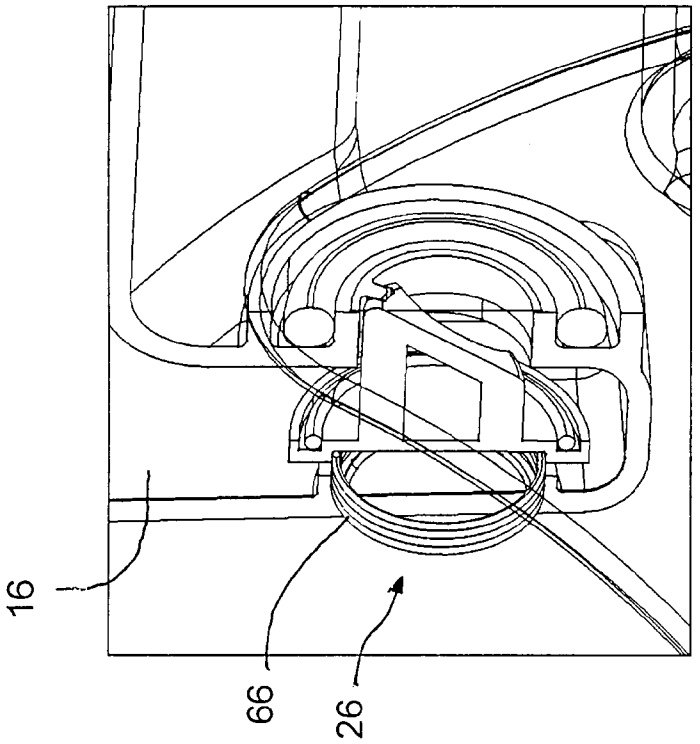


FIG. 17B

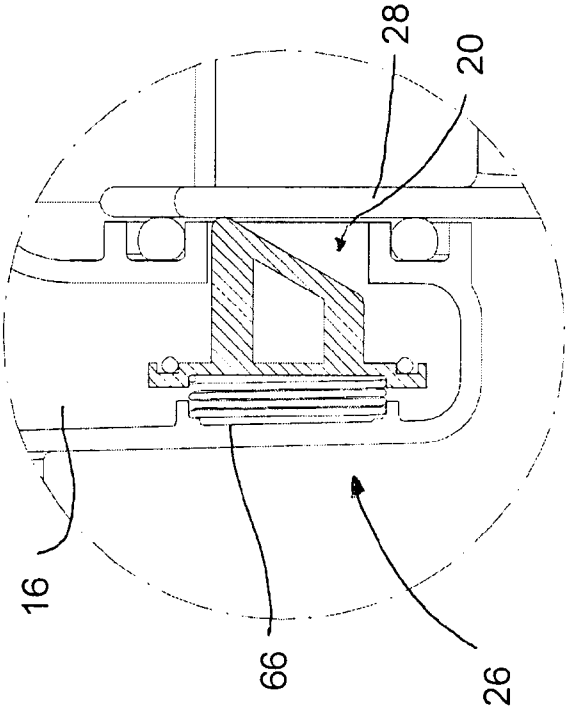


FIG. 17A

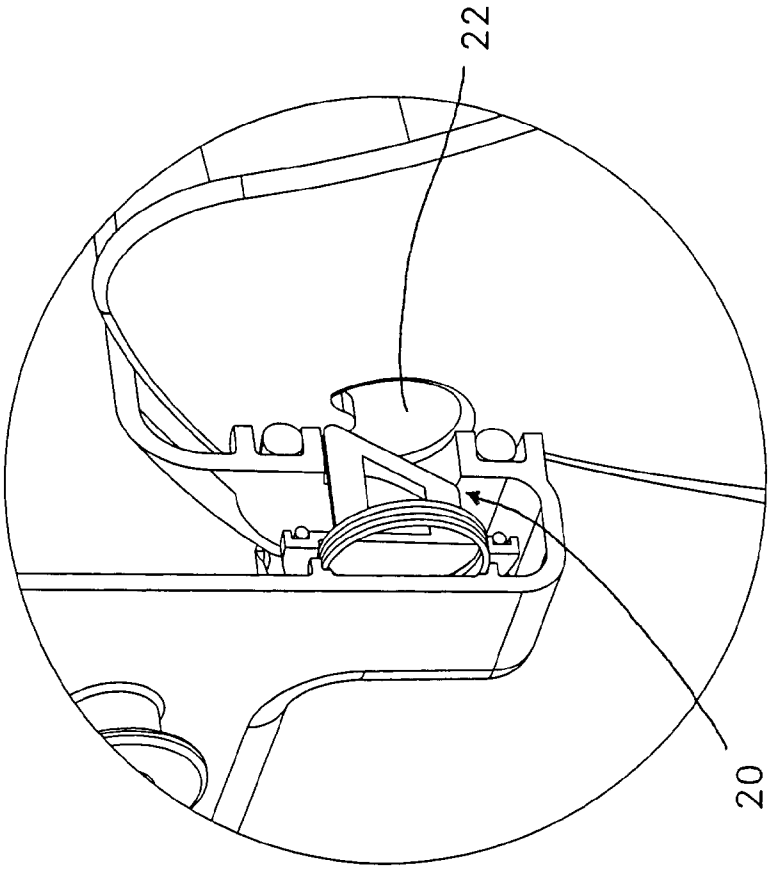


FIG. 18B

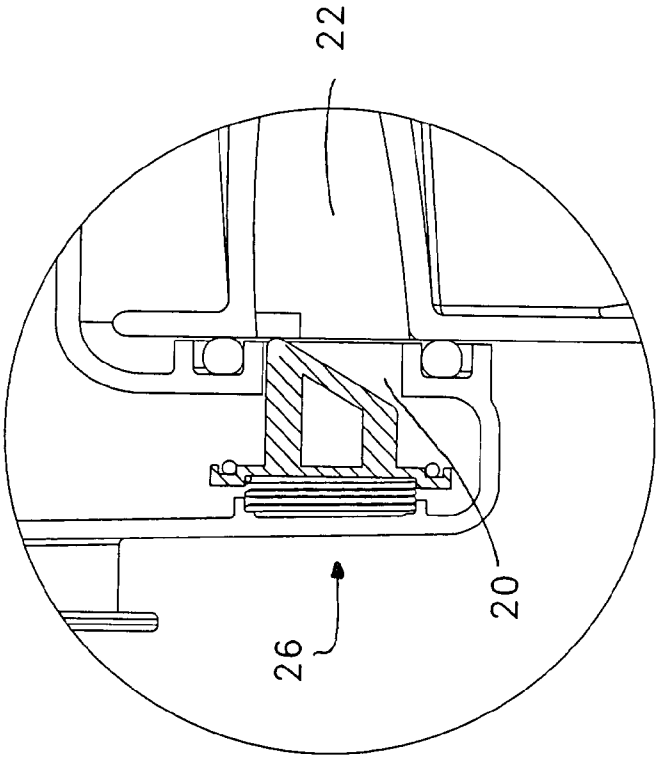


FIG. 18A

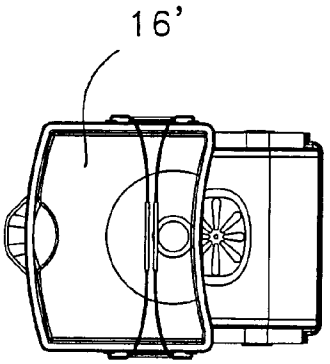


FIG. 19B

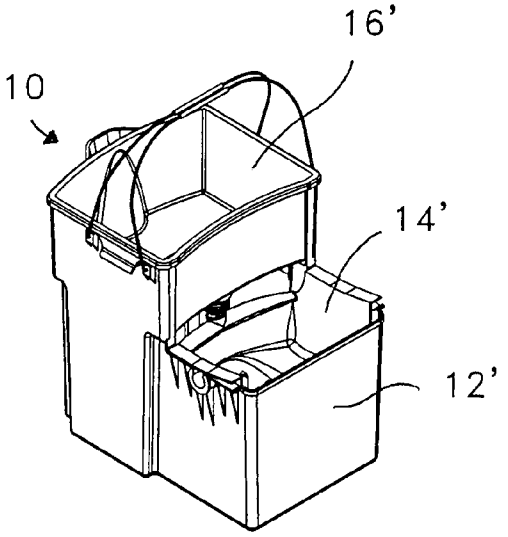


FIG. 19A

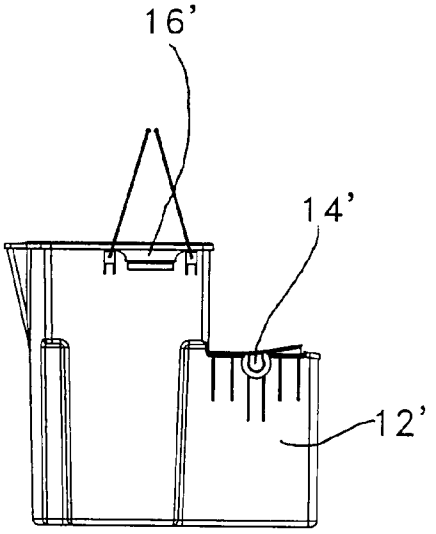


FIG. 19C

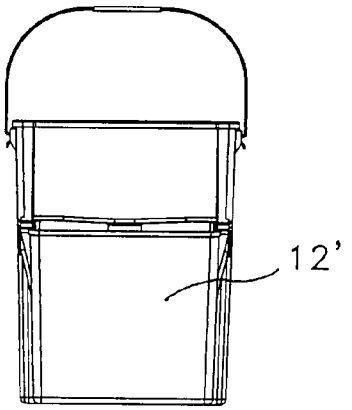


FIG. 19D

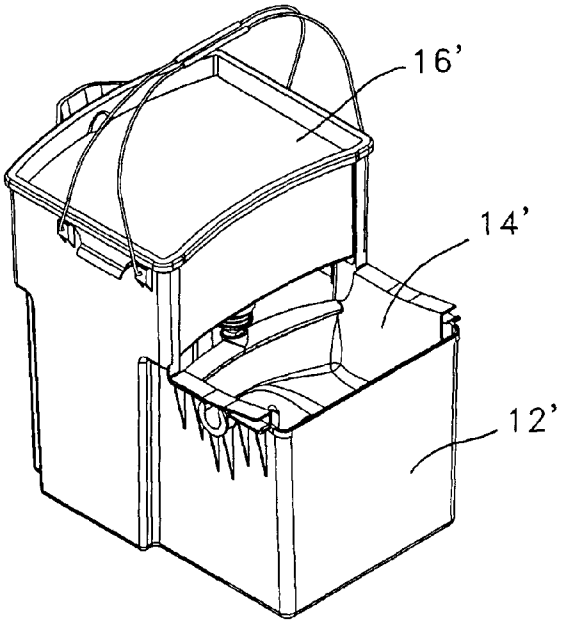


FIG. 20A

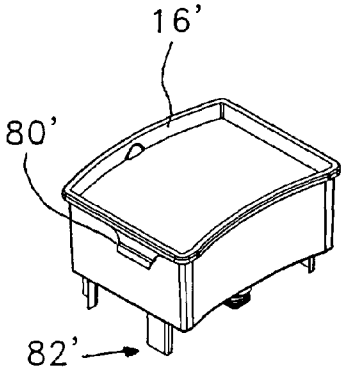


FIG. 20B

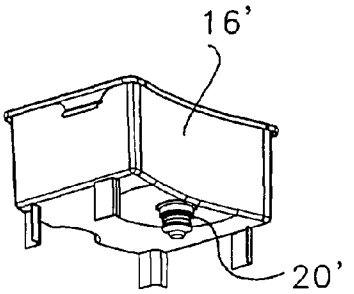


FIG. 20C

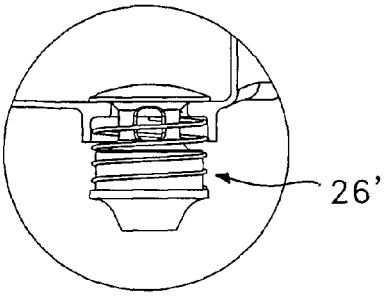


FIG. 20D

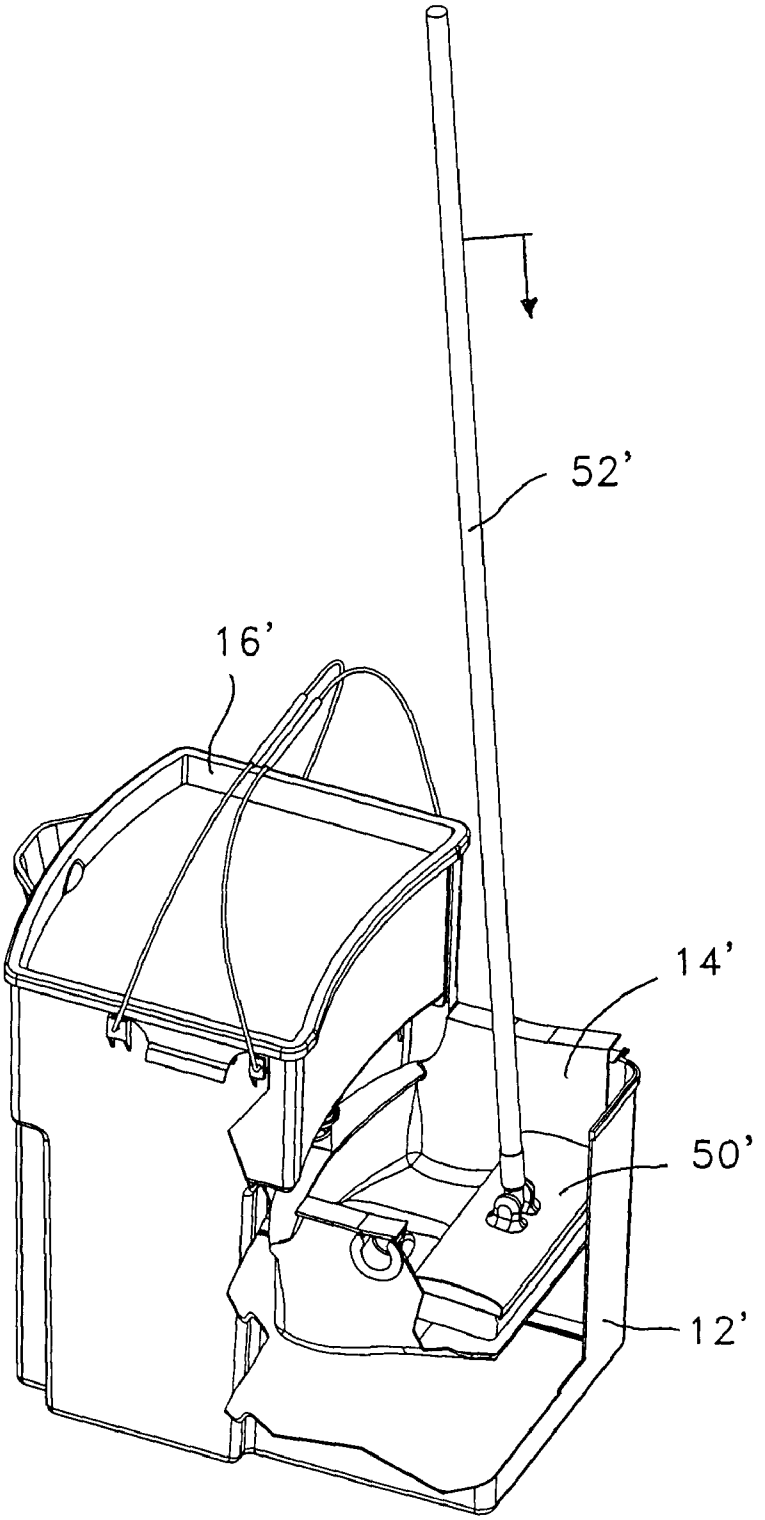


FIG. 21

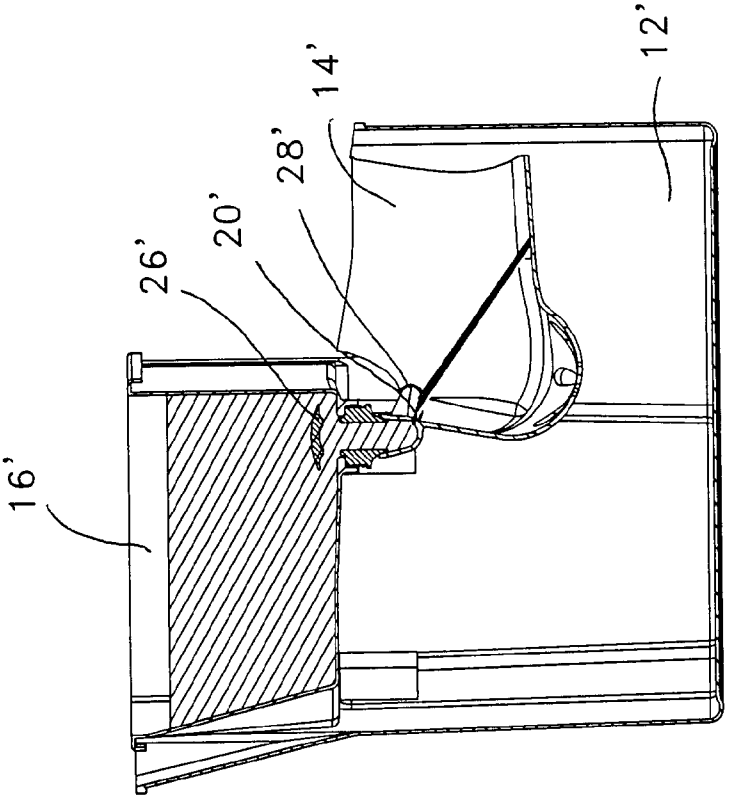


FIG. 22B

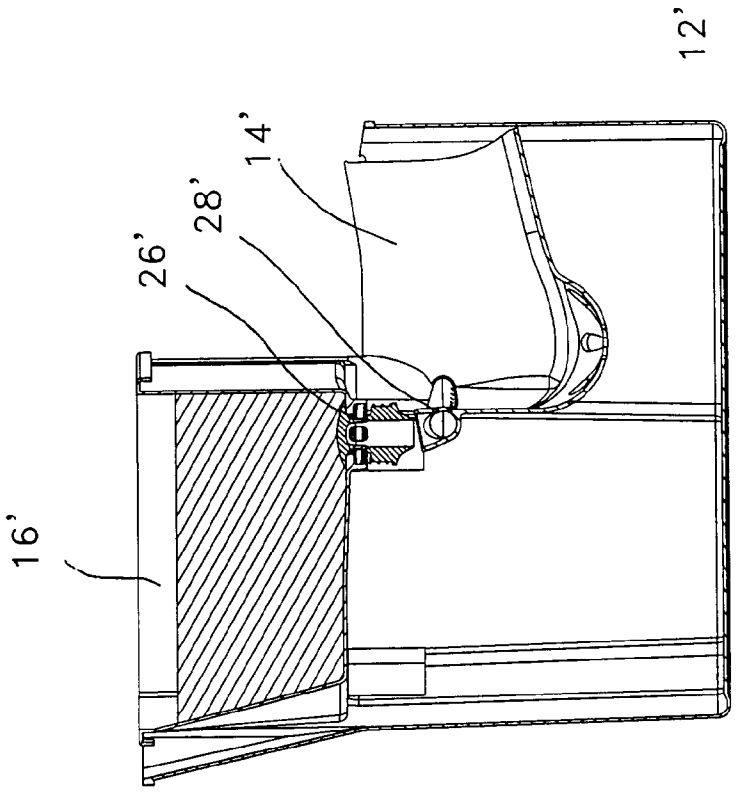


FIG. 22A

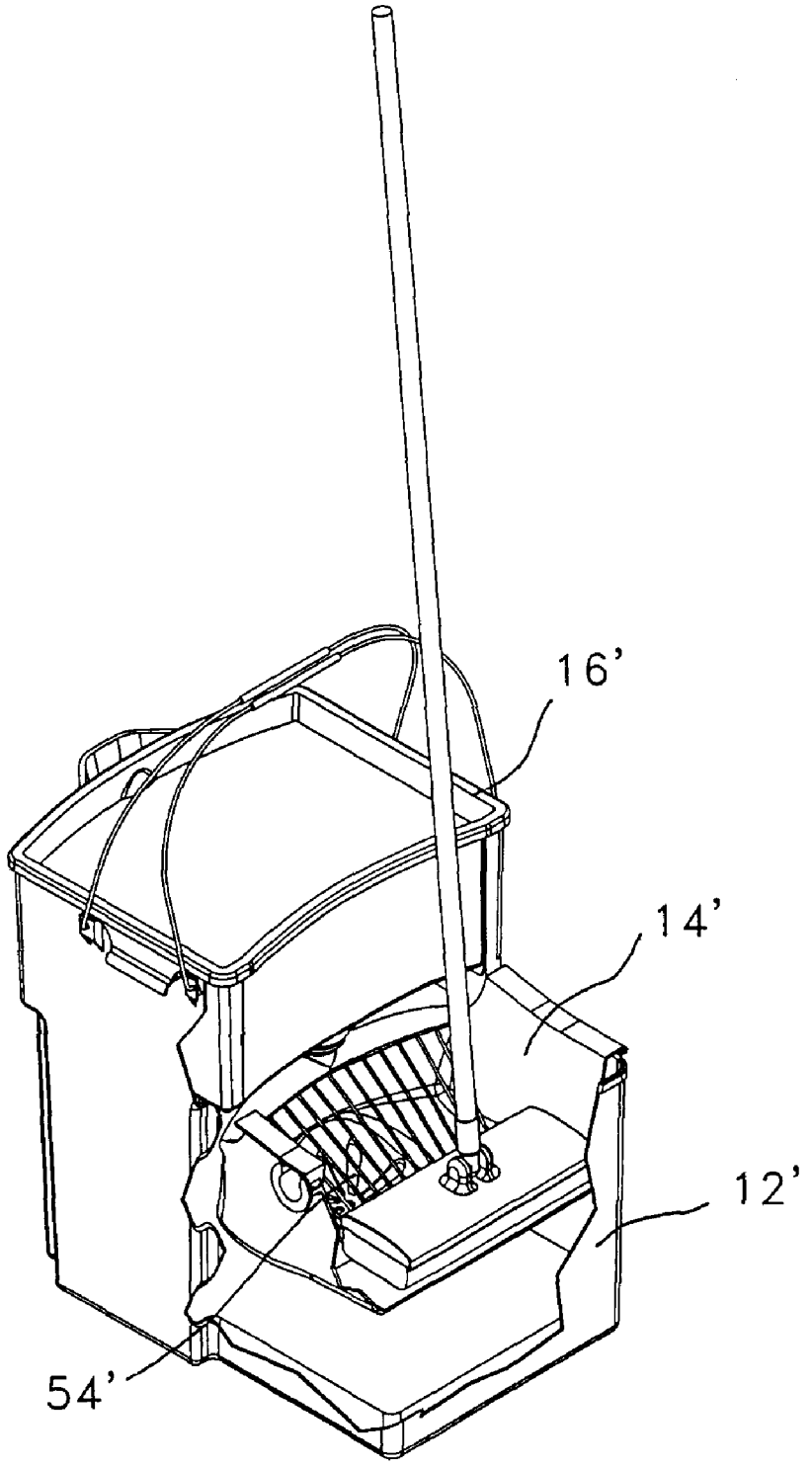


FIG. 23

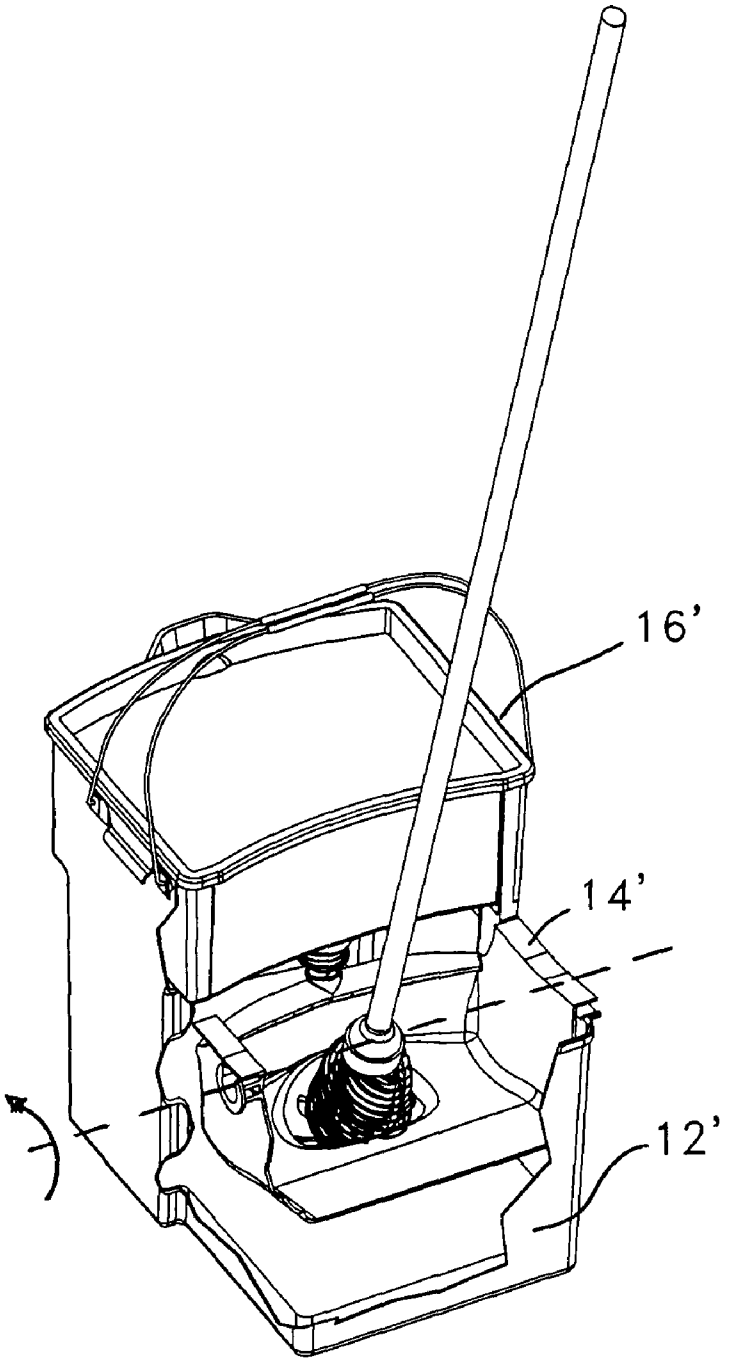


FIG. 24

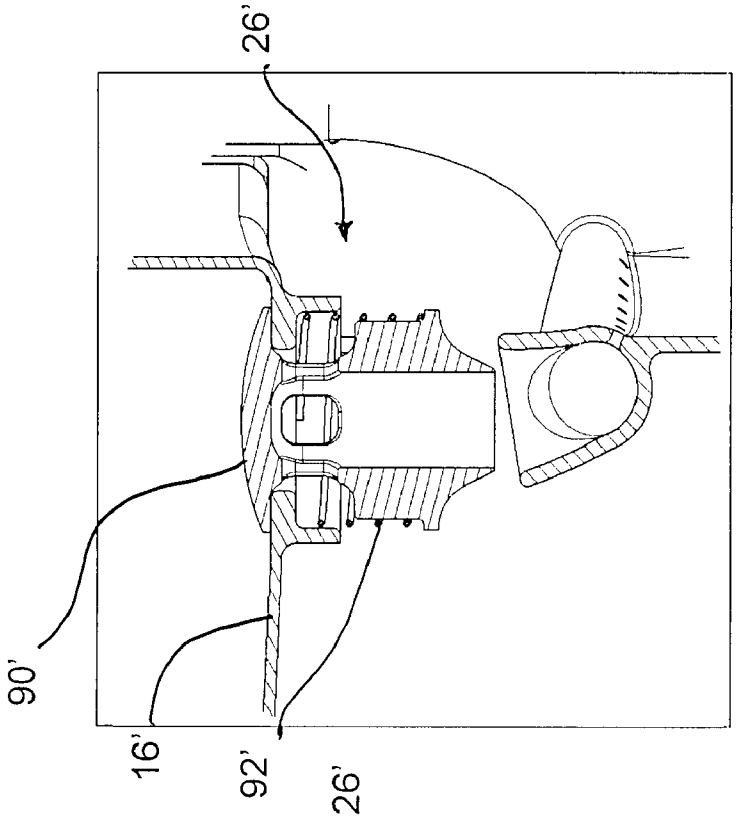


FIG. 25B

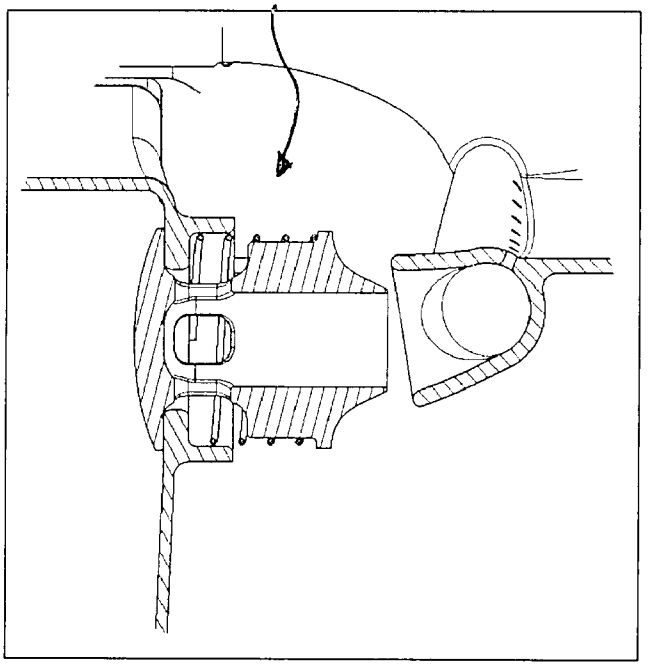


FIG. 25A

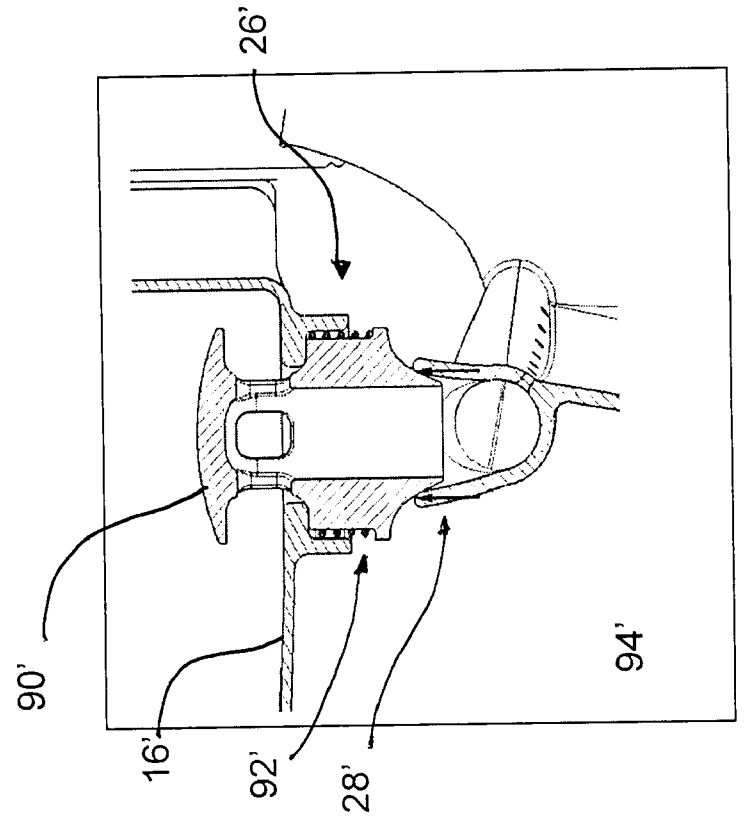


FIG. 26B

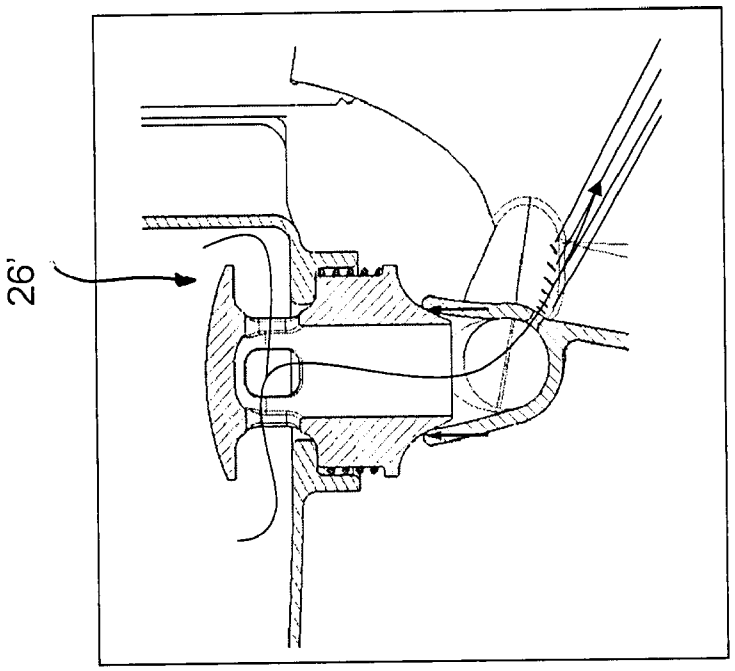


FIG. 26A

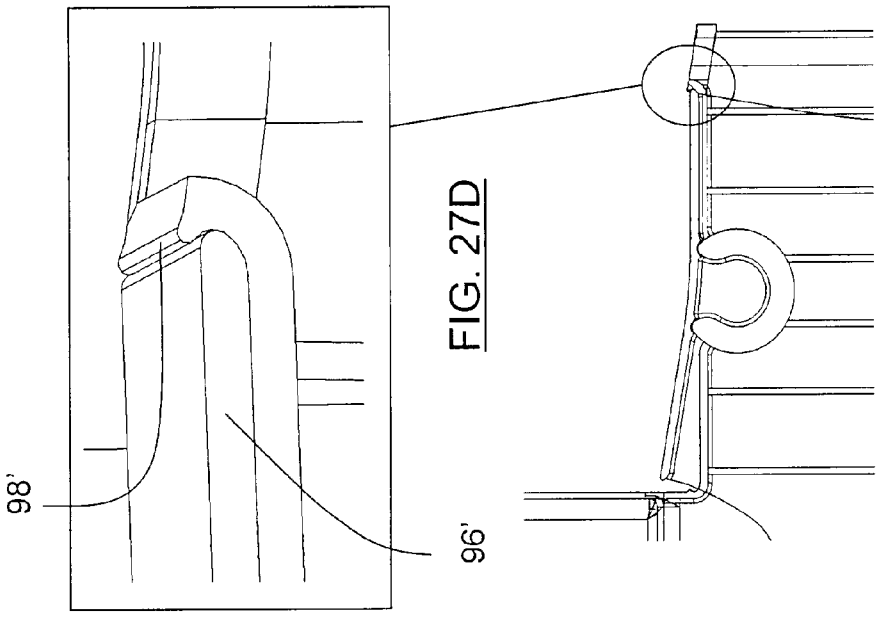


FIG. 27D

FIG. 27C

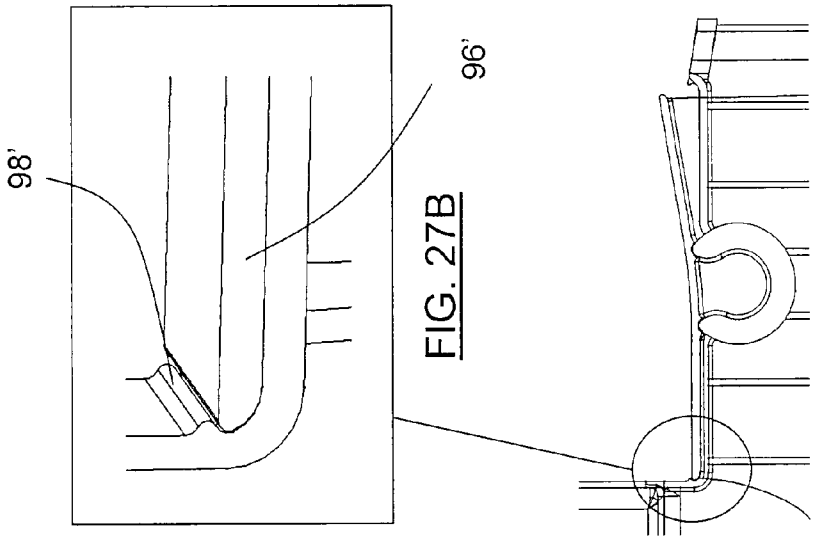
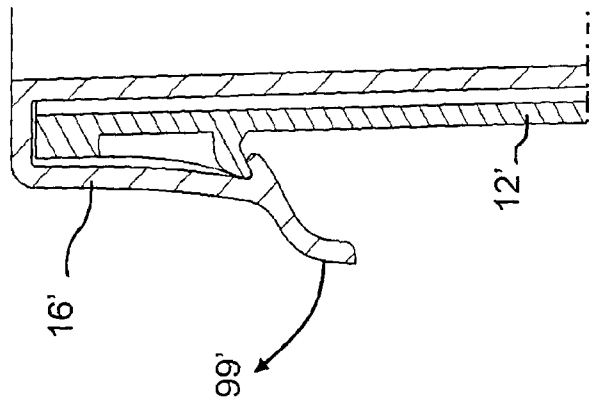


FIG. 27B

FIG. 27A



SECTION C - C

FIG. 28C

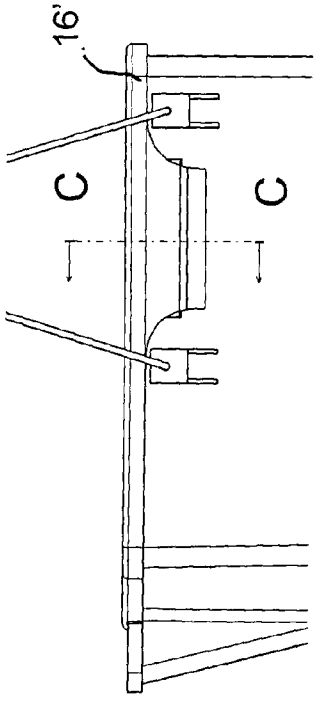


FIG. 28B

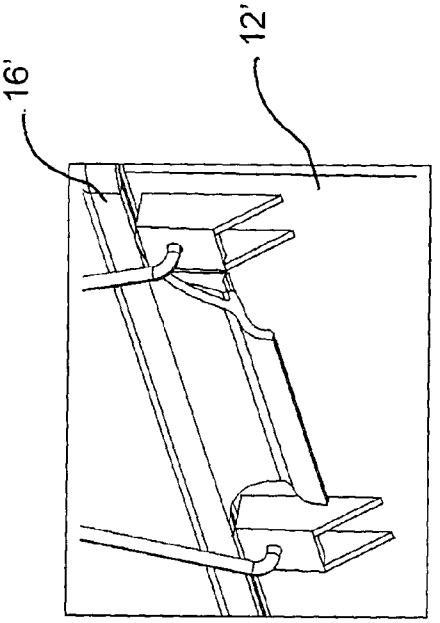


FIG. 28A

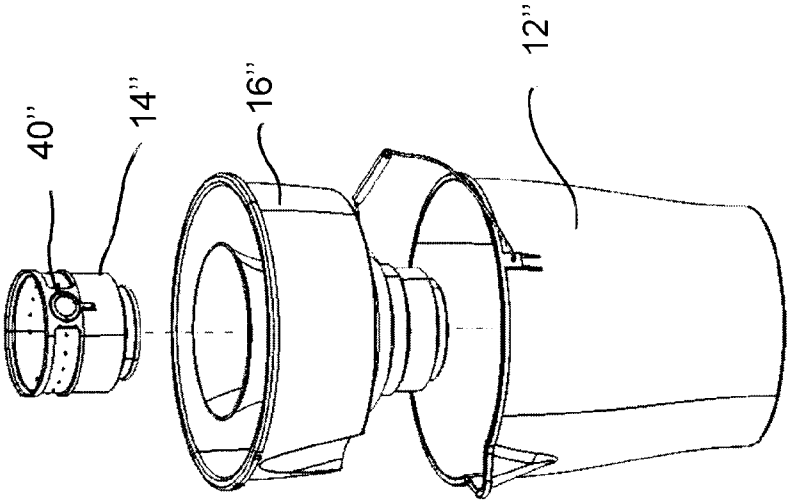


FIG. 29B

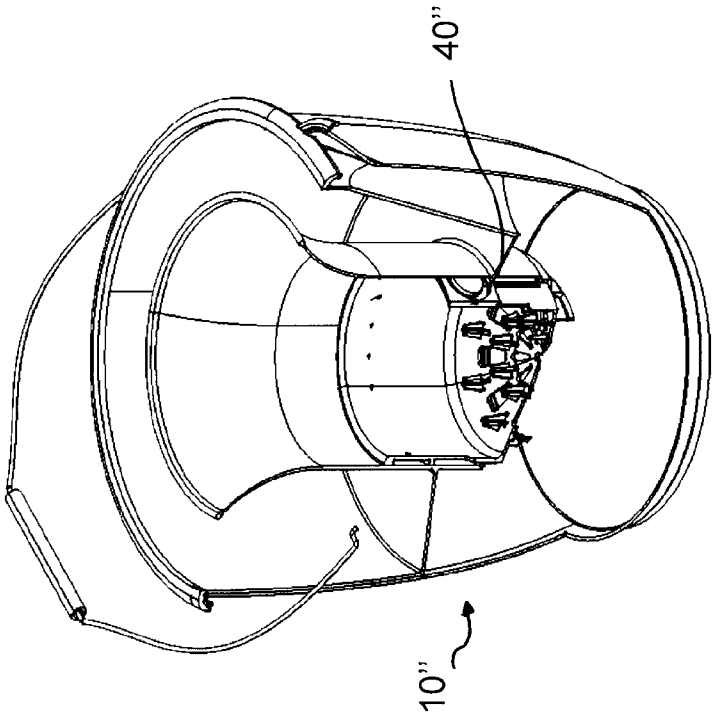


FIG. 29A

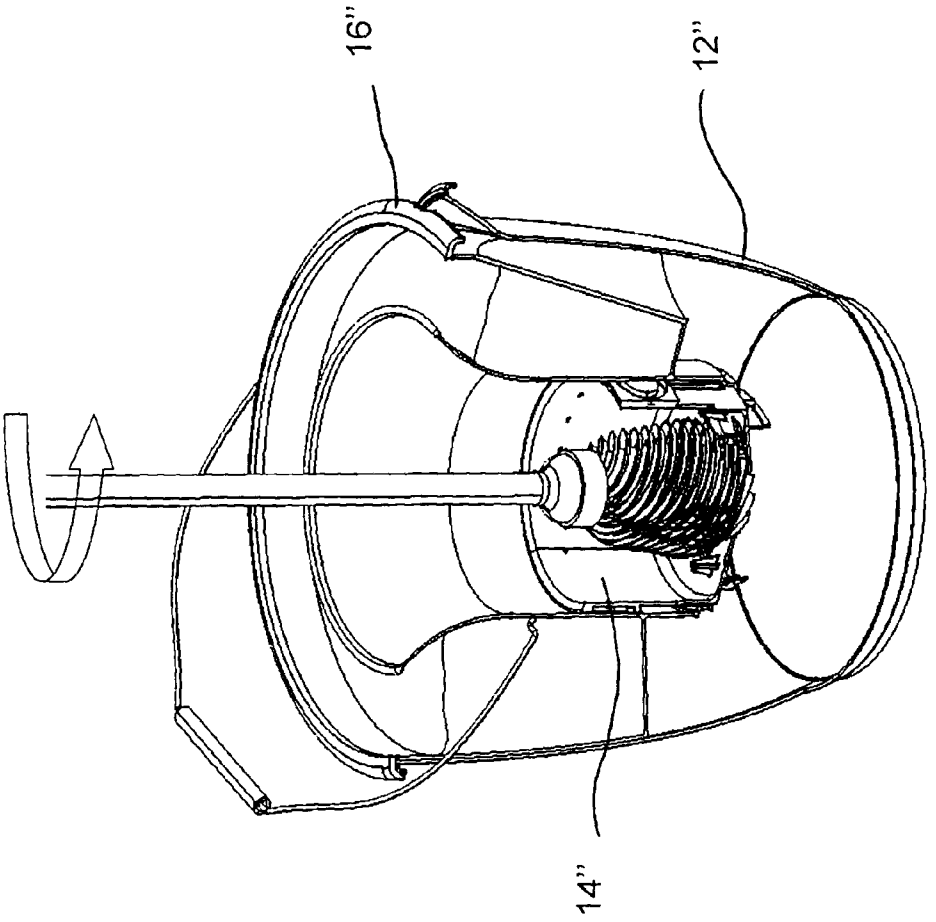


FIG. 30

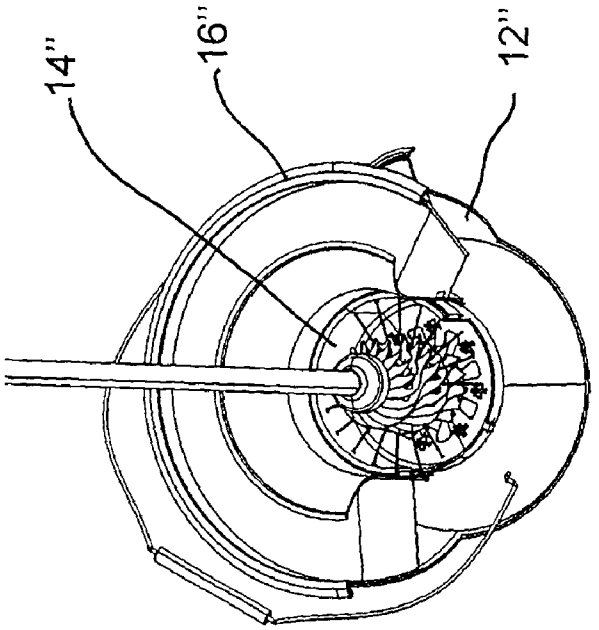


FIG. 31B

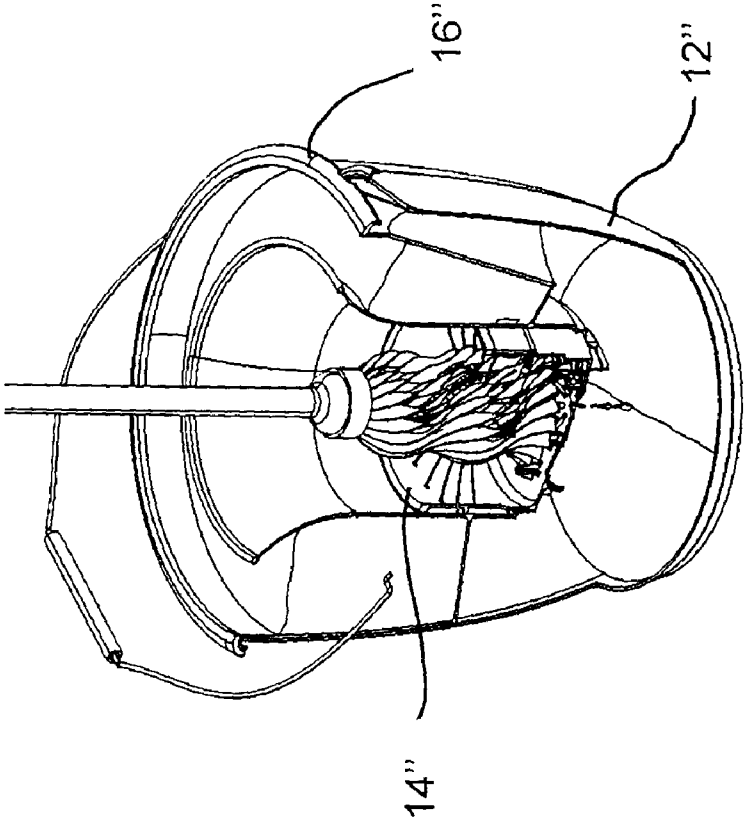


FIG. 31A

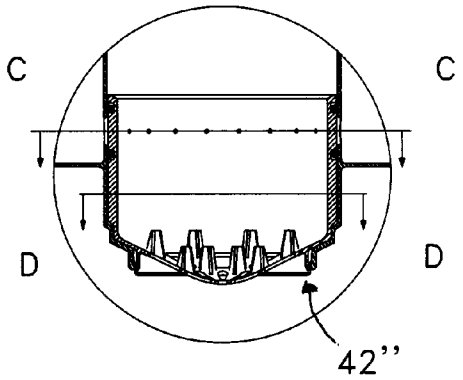


FIG. 32A

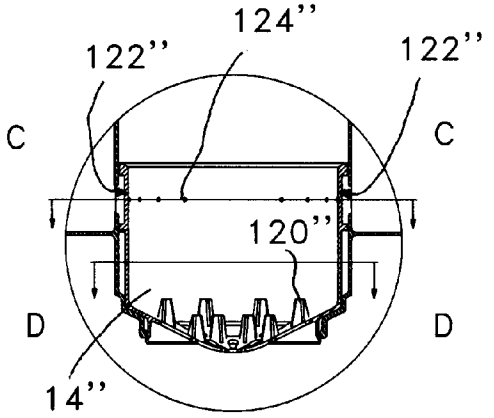
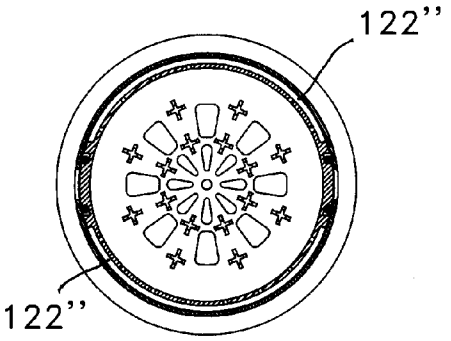
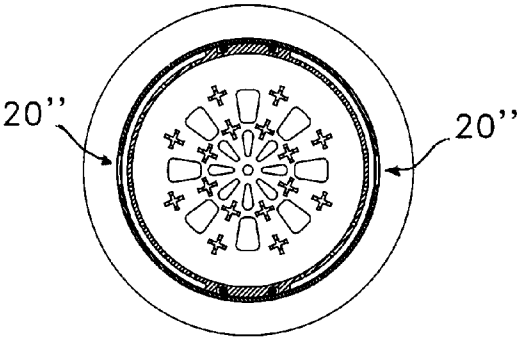


FIG. 32D



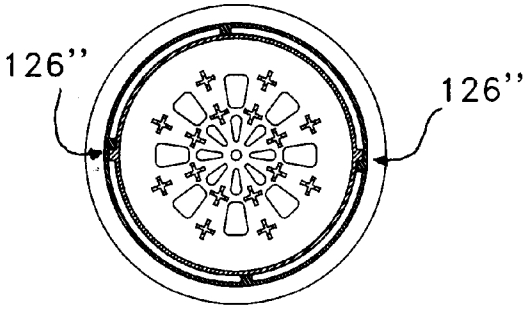
SECTION C–C

FIG. 32B



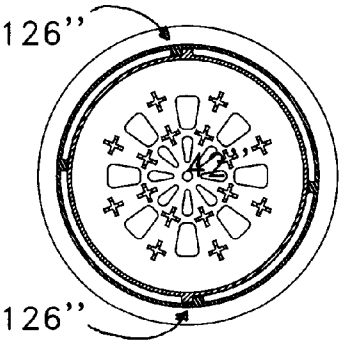
SECTION C–C

FIG. 32E



SECTION D–D

FIG. 32C



SECTION D–D

FIG. 32F

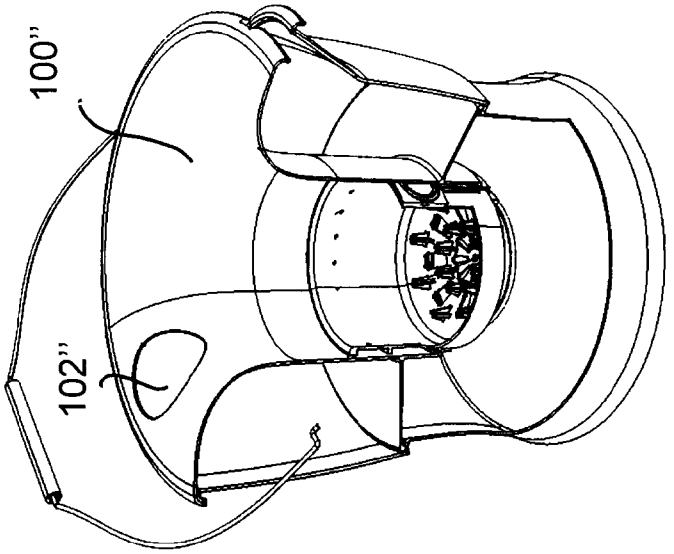


FIG. 33B

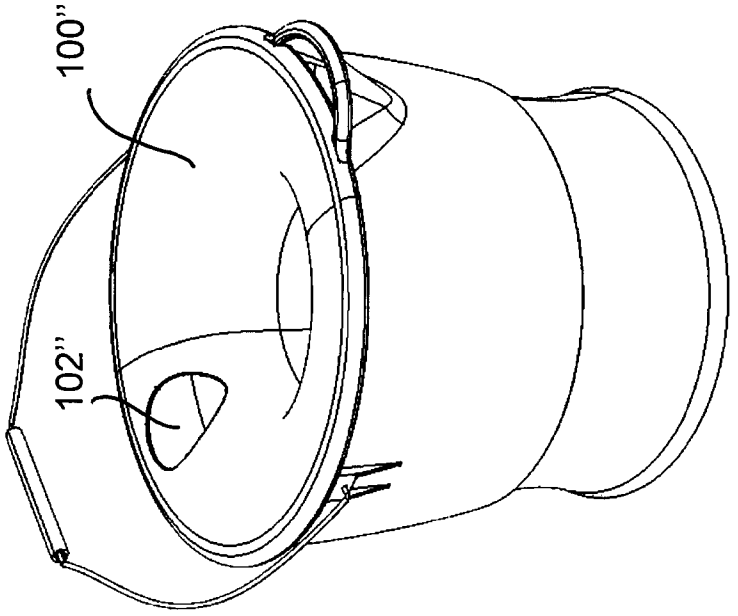


FIG. 33A

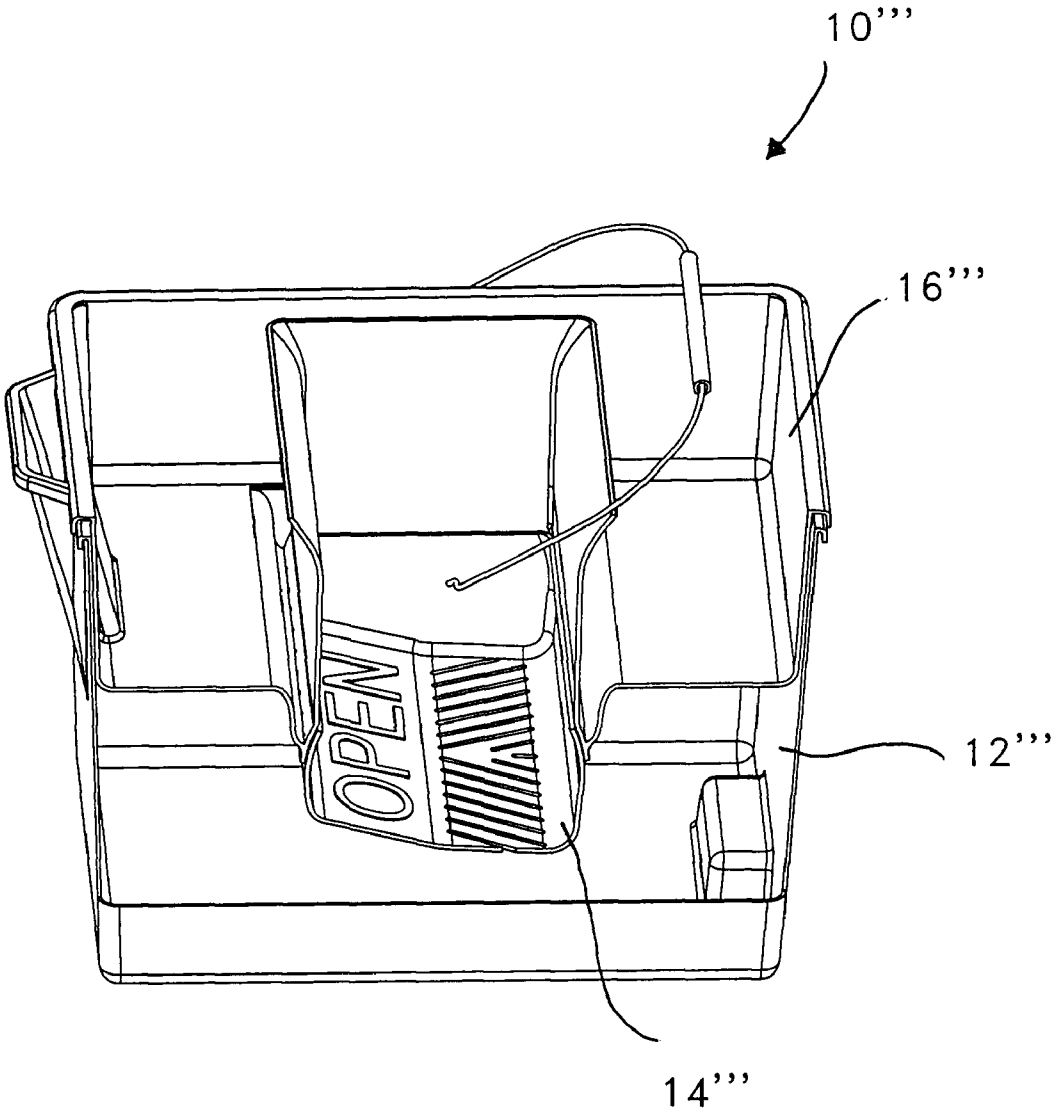


FIG. 34

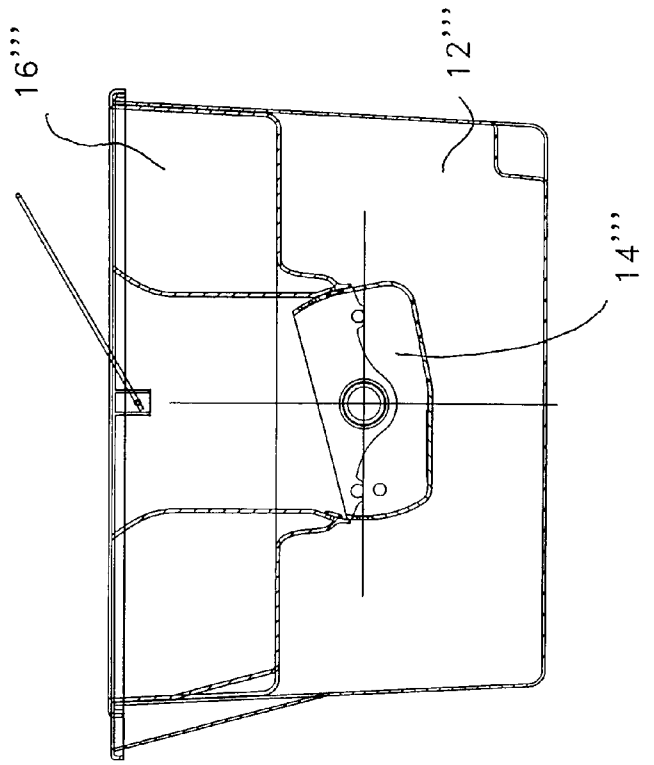


FIG. 35B

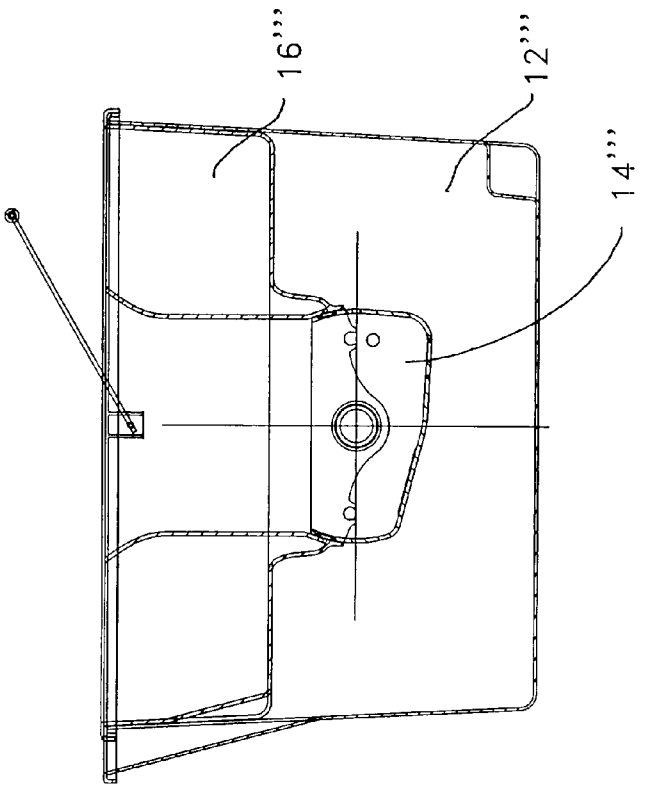


FIG. 35A

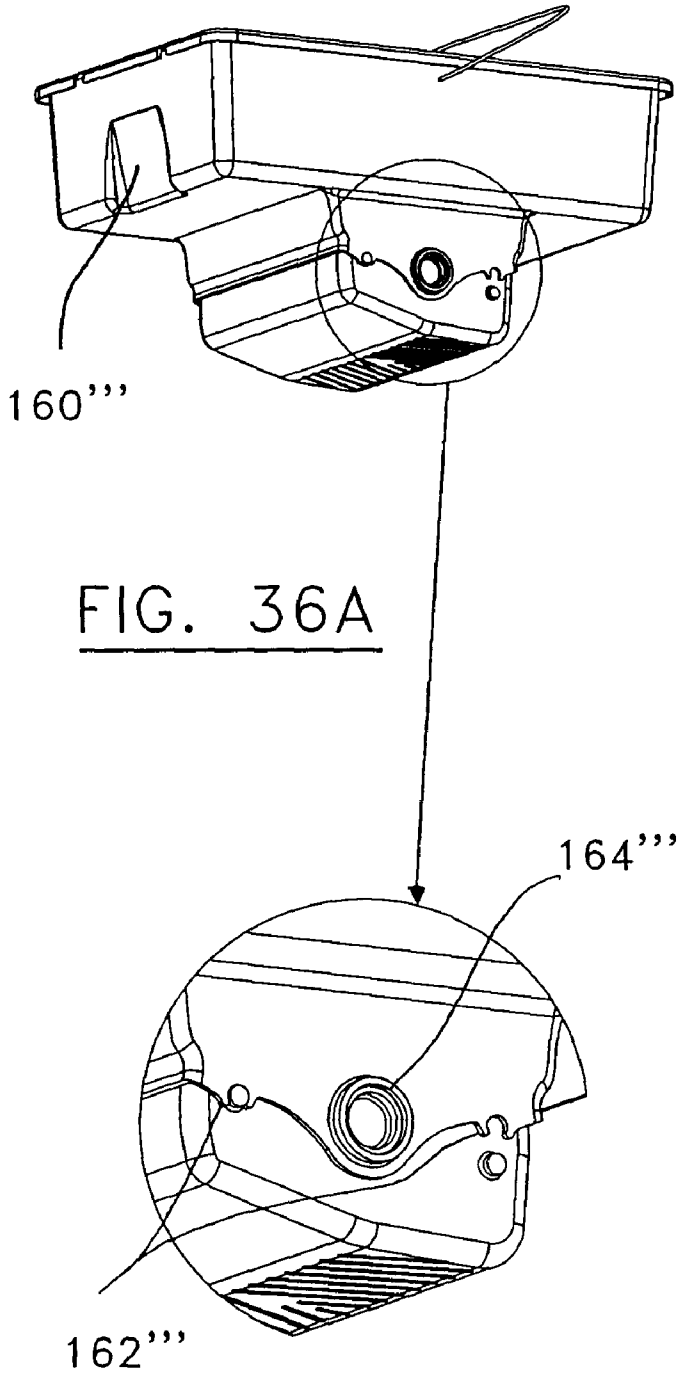


FIG. 36A

FIG. 36B

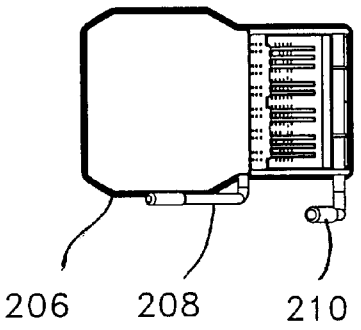


FIG. 37D

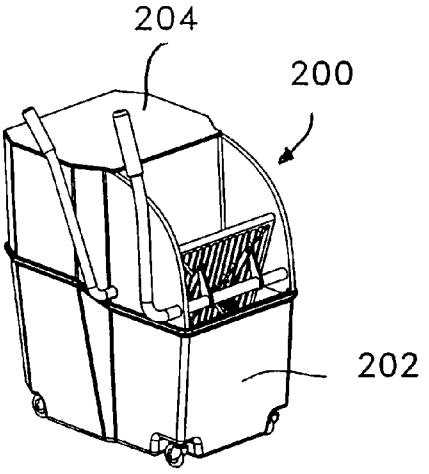


FIG. 37A

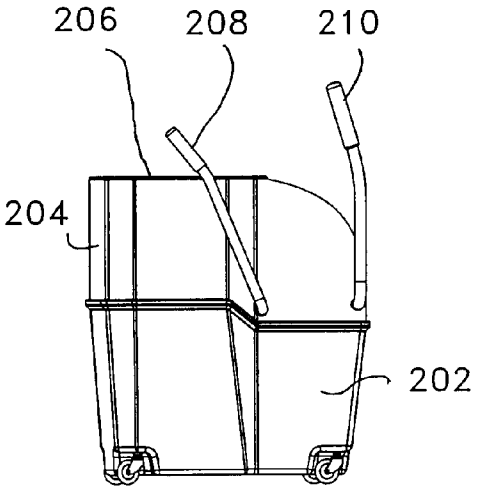


FIG. 37C

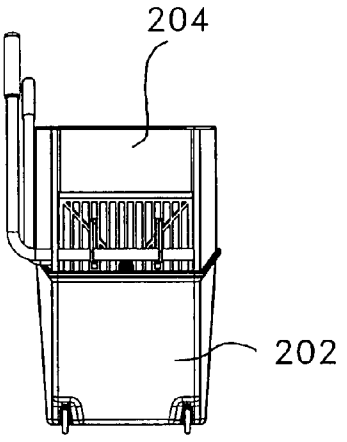


FIG. 37B

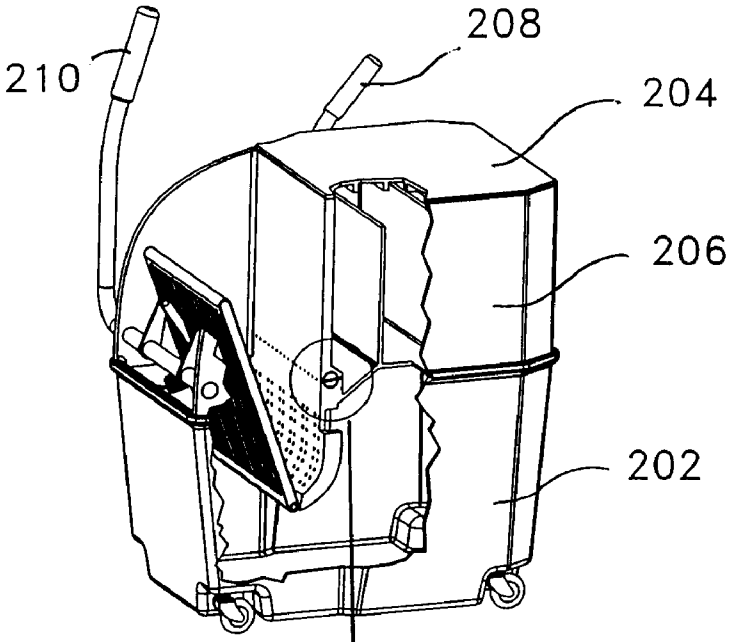


FIG. 38A

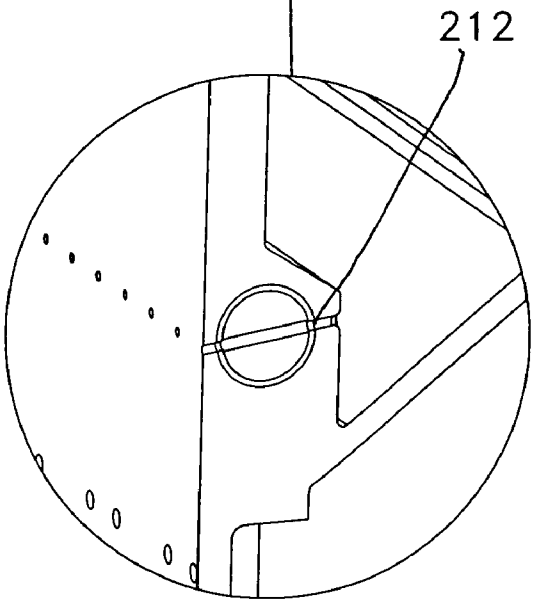


FIG. 38B

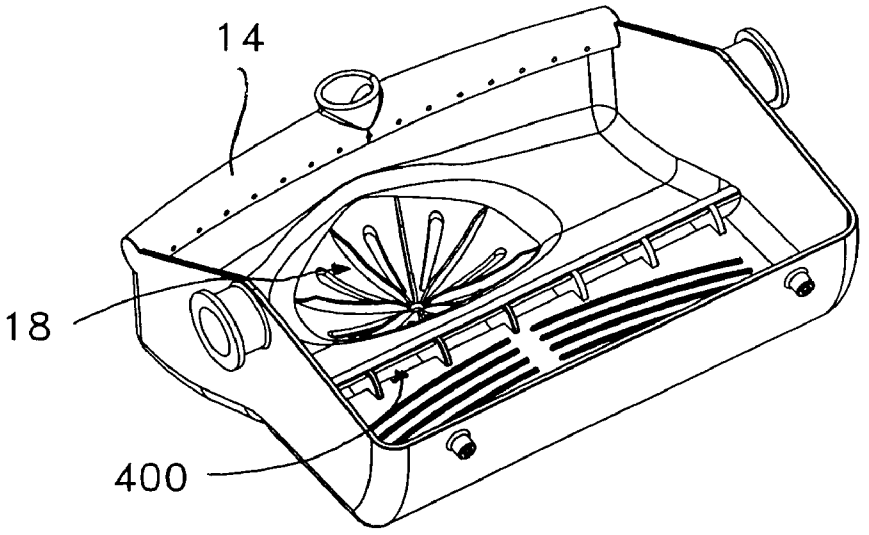


FIG. 39A

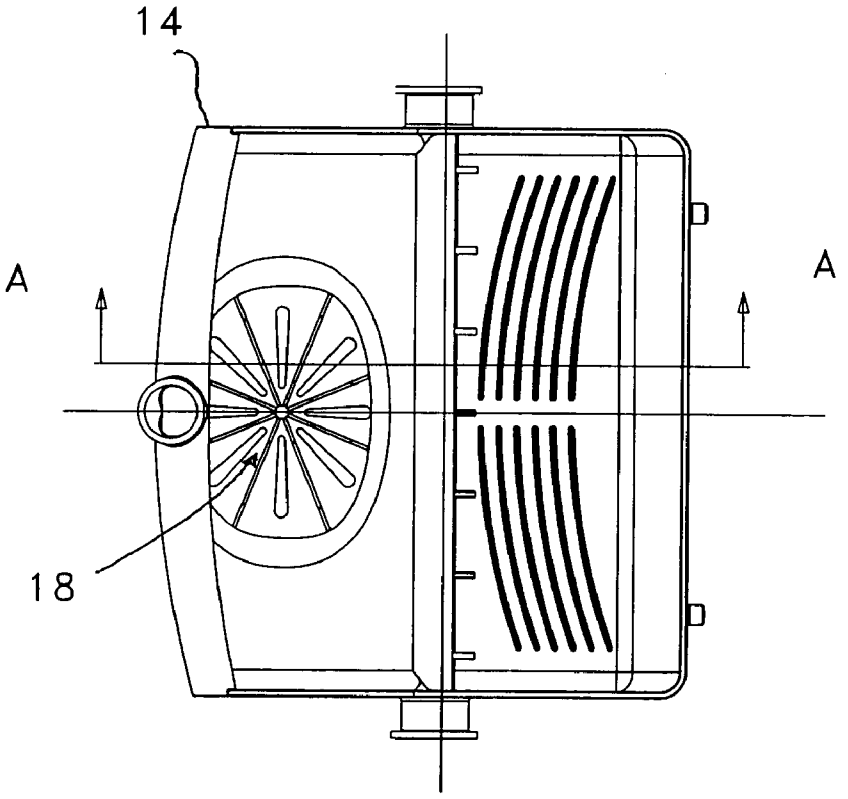


FIG. 39B

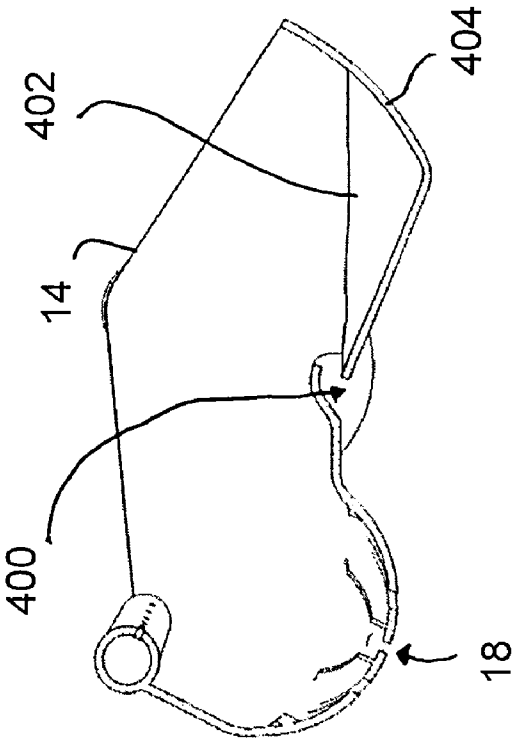


FIG. 40B

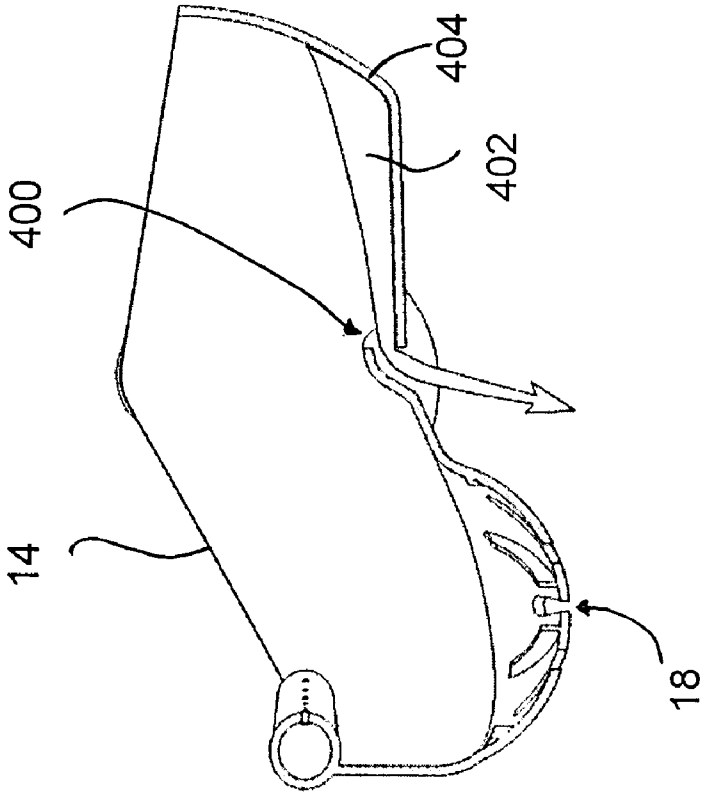


FIG. 40A

BUCKET FOR HANDLING LIQUIDS

[0001] The present invention claims priority of U.S. provisional patent applications 60/892,634 filed Mar. 2, 2007 and 60/939,078 filed May 20, 2007, the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention generally relates to cleaning products. More particularly, it relates to a cleaning bucket for handling liquids.

BACKGROUND OF THE INVENTION

[0003] In basic cleaning buckets, the mop is immersed in the clean wash solution and, in so doing, contaminates the clean wash solution by direct contact with the dirty mop. The cleaning medium is thus repeatedly rinsed in soiled wash solution from previous soakings and wringings. This results in the spreading of soiled or dirty wash solution on the surfaces to be cleaned. This method of cleaning is counter-productive and not optimal since contaminated water is then used for cleaning tasks.

[0004] There exist a certain number of multi-compartmented cleaning buckets that have been developed as improvements over the basic cleaning bucket (with a single compartment). Such buckets provide for separate containment of the dirty wash liquid and the clean wash solution which are isolated from each other.

[0005] U.S. Pat. No. 4,798,307 describes a compartmented cleaning bucket. However, in such a system, discharge of the cleaning wash liquid into a discharge transfer compartment is not easily controlled by the user.

[0006] U.S. Pat. No. 3,045,252 describes another compartmented cleaning bucket in which discharge of the clean wash liquid into a transfer compartment is controlled with a valve. However, a user must constantly open and close the valve manually in order to rinse the mop in a clean liquid solution.

[0007] Other bucket systems known to the applicant are described in http://vvww.limpieza.com/busca_docs.asp?id=612, and in the following patents or patent applications WO 0000077, EP 0,956,807, U.S. Pat. No. 5,548,865, U.S. Pat. No. 6,006,397, U.S. Pat. No. 6,260,230, U.S. Pat. No. 6,279,195 and U.S. Pat. No. 6,457203.

[0008] Thus, there is still presently a need for a bucket that can control the amount of clean wash solution being applied on the cleaning medium (mop, sponge or any other item) while isolating the soiled water from the clean wash solution. The control has to be easily accomplished by the user without necessarily having to release the cleaning medium being rinsed or wringed. Such a bucket would allow for efficient and hygienic cleaning tasks using a clean wash solution only and thus reduce the spreading of soiled water on the surfaces to be cleaned in an efficient manner.

SUMMARY OF THE INVENTION

[0009] An object of the present invention is to propose a bucket that satisfies the above-mentioned need.

[0010] More particularly, the present invention provides a bucket for handling liquids comprising:

[0011] a collector reservoir;

[0012] a wringer receptacle comprising:

[0013] a collector outlet in fluid communication with the collector reservoir; and

[0014] a storage reservoir comprising at least one discharge aperture.

[0015] The wringer receptacle is positionable between a first position wherein the wringer receptacle blocks the at least one discharge aperture and a second position wherein the wringer receptacle allows fluid communication between the storage reservoir and the wringer receptacle through the at least one discharge aperture.

[0016] The present invention also provides a bucket for handling liquids comprising:

[0017] a collector reservoir;

[0018] a wringer receptacle comprising:

[0019] a collector outlet in fluid communication with the collector reservoir; and

[0020] a biasing structure; and

[0021] a storage reservoir comprising:

[0022] a discharge aperture; and

[0023] a spring valve closing the discharge aperture.

[0024] The wringer receptacle is positionable between a first position wherein the wringer receptacle biasing structure allows fluid communication between the storage reservoir and the wringer receptacle through the at least one discharge aperture by actuating the spring valve, and a second position wherein the wringer receptacle biasing structure releases the spring valves and blocks fluid communication between the storage reservoir and the wringer receptacle.

[0025] Such a cleaning bucket eliminates wash solution contamination which typically occurs after the wringing, rinsing or soaking of a cleaning medium (mop, sponge, cloth or any other item) in the wash solution. This is achieved by metering of the wash solution into the wringer receptacle for the cleaning medium. This allows for an improved cleaning process which yields cleaner surfaces since the wash solution used for cleaning remains always clean and contaminant free.

[0026] The present invention represents an improvement over other compartmented cleaning buckets because the cleaning medium, such as a mop head, never enters in the clean wash solution compartment. The clean wash solution flows on the mop head directly into the wringer receptacle. This prevents clean wash solution contamination and therefore prevents contaminated wash solution from being deposited over and over again on the target surfaces to be cleaned.

[0027] Similarly, the present invention facilitates cleaning tasks by not requiring several replacements of the wash solution which normally becomes soiled after a certain number of soakings of the cleaning medium. The design also minimizes movement or displacements of the cleaning medium since rinsing and wringing are carried out in a same location, the wringer receptacle. Rinsing can also be controlled through use of the cleaning medium itself.

[0028] The present invention also has an environmental benefit as less water is required to perform the cleaning task since no replacement of the wash solution is required. Moreover, a smaller amount of wash solution is required in the first place.

[0029] The present invention also represents a simple mechanical solution as it has only one principal moving part and is inexpensive to manufacture.

[0030] A non-restrictive description of preferred embodiments of the invention will now be given with reference to the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIGS. **1**A to **1**D are perspective, top, side and front views respectively of a bucket according to an embodiment of the present invention;

[0032] FIGS. **2**A and **2**B are cross-sectional views of the bucket shown in FIG. **1**A in a closed flow configuration and an open flow configuration;

[0033] FIG. **3** is a perspective view of the bucket shown in FIG. **1**A with a mop inserted in the wringer receptacle;

[0034] FIG. **4** is another perspective view of the bucket shown in FIG. **3** with liquid rinsing the mop;

[0035] FIG. **5** is another perspective view of the bucket shown in FIG. **3** with the mop being wrung;

[0036] FIGS. **6**A and **6**B are detailed views of the wringer receptacle shown in FIG. **5**;

[0037] FIGS. **7**A to **7**C are respectively perspective and two detailed views of the bucket shown in FIG. **1**A with the wringer receptacle removed;

[0038] FIGS. **8**A and **8**B are respectively perspective and detailed views of the bucket shown in FIG. **1**A, in a closed flow configuration;

[0039] FIGS. **9**A to **9**C are respectively perspective and two detailed views of the bucket shown in FIG. **1**A, in an open flow configuration;

[0040] FIGS. **10**A and **10**B are bottom partially-cut perspective and detailed views respectively of the bucket shown in FIG. **1**A;

[0041] FIGS. **11**A and **11**B are other bottom partially-cut perspective and detailed views respectively of the bucket shown in FIG. **1**A;

[0042] FIGS. **12**A to **12**E are assembly views showing the interface between the collector reservoir and the wringer receptacle of the bucket shown in FIG. **1**A;

[0043] FIGS. **13**A and **13**B are side and cross-sectional views of the interface shown in FIGS. **12**A to **12**E;

[0044] FIGS. **14**A to **14**E are assembly views showing the interface between the storage reservoir and the collector reservoir of the bucket shown in FIG. **1**A;

[0045] FIGS. **15**A and **15**B are side and cross-sectional views of the interface shown in FIGS. **14**A to **14**E;

[0046] FIGS. **16**A to **16**C are side and two perspective views of a valve used in the bucket shown in FIG. **1**A;

[0047] FIGS. **17**A and **17**B are side and perspective partially-cut views of the valve shown in FIGS. **16**A to **16**C with the bucket in a closed flow configuration;

[0048] FIGS. **18**A and **18**B are side and perspective partially-cut views of the valve shown in FIGS. **16**A to **16**C with the bucket in an open flow configuration;

[0049] FIGS. **19**A to **19**D are perspective, top, side and front views respectively of a bucket according to another embodiment of the present invention;

[0050] FIGS. **20**A to **20**D are perspective assembly views of the bucket shown in FIG. **19**A, highlighting assembly of the storage reservoir and its spring valve;

[0051] FIG. **21** is a perspective view of the bucket shown in FIG. **19**A with a mop inserted in the wringer receptacle;

[0052] FIGS. **22**A and **22**B are cross-sectional views of the bucket shown in FIG. **19**A in a closed flow configuration and an open flow configuration;

[0053] FIG. **23** is another perspective view of the bucket shown in FIG. **21** with liquid rinsing the mop;

[0054] FIG. **24** is another perspective view of the bucket shown in FIG. **21** with the mop being wrung;

[0055] FIGS. **25**A and **25**B are cross-section side views of the valve shown in FIG. **20**D with the bucket in a closed flow configuration;

[0056] FIGS. **26**A and **26**B are cross-section side views of the valve shown in FIG. **20**D with the bucket in an open flow configuration;

[0057] FIGS. **27**A to **27**D are side and perspective views of the operation of the wringer receptacle rotation stops and locking features between closed flow position and open flow position of the bucket shown in FIG. **19**A;

[0058] FIGS. **28**A to **28**C are perspective, side and cross-sectional views respectively of the storage reservoir snap lock feature with the collector reservoir of the bucket shown in FIG. **19**A;

[0059] FIGS. **29**A and **29**B are partially cut perspective and exploded views respectively of a bucket according to another embodiment of the present invention;

[0060] FIG. **30** is a partially cut perspective view of the bucket shown in FIG. **29**A with a mop;

[0061] FIGS. **31**A and **32**B are partially cut perspective view of the bucket shown in FIG. **29**A with a mop in the open flow configuration;

[0062] FIGS. **32**A to **32**F are a pair of side cross-sectional and two top views respectively of the storage reservoir and wringer receptacle interface of the bucket shown in FIG. **29**A in a closed and open flow configuration;

[0063] FIGS. **33**A and **33**B are perspective and partially-cut perspective views of a bucket according to another embodiment of the present invention;

[0064] FIG. **34** is a partially-cut perspective view of a bucket according to another embodiment of the present invention;

[0065] FIGS. **35**A and **35**B are cross-sectional views of the bucket shown in FIG. **34** in a closed flow configuration and an open flow configuration;

[0066] FIGS. **36**A and **36**B are bottom perspective and detailed views respectively of the storage reservoir and the wringer receptacle of the bucket shown in FIG. **34**;

[0067] FIGS. **37**A to **37**D are perspective, front, side and top views respectively of a bucket according to another embodiment of the present invention;

[0068] FIGS. **38**A and **38**B are partially cut and detailed views respectively of the bucket shown in FIG. **37**A in an open flow configuration.

[0069] FIGS. **39**A and **39**B are perspective and top views of a wringer receptacle according to another preferred embodiment of the present invention.

[0070] FIGS. **40**A and **40**B are side views in a closed flow position and an open flow position of the wringer receptacle shown in FIGS. **39**A and **39**B.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0071] Referring to any one of FIGS. **1**A to **18**B, a bucket **10** for handling liquids according to a first embodiment of the present invention is shown.

[0072] According to the present invention, as shown in FIGS. **2**A and **2**B, the bucket **10** comprises a collector reservoir **12** and a wringer receptacle **14**. The wringer receptacle **14** has a collector outlet **18** in fluid communication with the collector reservoir **12**. The bucket also comprises a storage reservoir **16** having at least one discharge aperture **20**. The aperture **20** is better illustrated in FIGS. **8**A and **8**B. The wringer receptacle **14** is positionable between a first position (shown in FIG. **2**A) wherein the wringer receptacle **14** blocks the discharge aperture **20** and a second position (shown in FIG. **2**B) wherein the wringer receptacle **14** allows fluid com-

munication between the storage reservoir **16** and the wringer receptacle **14** through the discharge aperture **20**.

[0073] Preferably, the wringer receptacle **14** is rotatably positionable between the first position and the second position.

[0074] In another embodiment of the present invention, the bucket **10** preferably comprises a spring mechanism for biasing the wringer receptacle **14** towards the first position.

[0075] Preferably, as shown in FIGS. **14**A to **14**E, the storage reservoir **16** is removably attached to the bucket. In another embodiment of the present invention, the storage reservoir may be integral to the collector reservoir.

[0076] Preferably, the storage reservoir comprises a first floor surface, the wringer receptacle comprises a second floor surface, the collector reservoir comprises a third floor surface, the first floor surface is higher than the second floor surface and the second floor surface is higher than the third floor surface. This implies that liquids in the bucket flow through gravitational effects from the storage reservoir, to the wringer receptacle and then to the collector reservoir.

[0077] Preferably, the wringer receptacle **14** comprises at least one fluid inlet aperture **22** and the at least one fluid inlet aperture **22** is in register with the at least one discharge aperture **20** when the wringer receptacle **14** is in the second position as shown in FIGS. **9**A to **9**B.

[0078] Preferably, as shown in FIGS. **16**A to **17**B, the storage reservoir **16** further comprises at least one spring valve **26** closing the at least one discharge aperture.

[0079] As shown in FIGS. **17**A and **17**B, the wringer receptacle preferably comprises a biasing structure **28**. As mentioned previously, the storage reservoir may comprise a discharge aperture **20** and a spring valve **26** closing the discharge aperture **20**. Hence, the wringer receptacle **14** is positionable between a first position (shown in FIGS. **17**A and **17**B) wherein the wringer receptacle biasing structure **28** allows fluid communication between the storage reservoir **16** and the wringer receptacle **14** through the discharge aperture **20** by actuating the spring valve **26**, and a second position (shown FIGS. **16**A to **16**C) wherein the wringer receptacle biasing structure **28** releases the spring valve **26** and blocks fluid communication between the storage reservoir **16** and the wringer receptacle **14**.

[0080] Operational Use of the Bucket

[0081] Similar to conventional mop and bucket systems, a user may start a mopping task by filling the storage reservoir **16** with a desired cleaning solution. In a first embodiment of the present invention, the storage reservoir has a capacity of 10 L (2.64 Gallons). Once this is accomplished, the operation can be broken down into two phases: mop rinsing and mop wringing.

[0082] Mop Rinsing

[0083] The mop head **50** (rectangular sponge-type mop or round-type threaded mop) is positioned in the wringer receptacle **14** as shown in FIG. **3**. The wringer receptacle may have an inscription "OPEN" where the mop head is to be placed. A downward force is then applied on the wringer receptacle **14** by applying a downward pushing force on the mop handle **52**.

[0084] As shown in FIGS. **2**A and **2**B, this will impose a 20° degree rotation of the wringer receptacle. This moves away any structure located in front of the storage reservoir **16** aperture **20** and sealing structure **58**. The mop is soaked and rinsed by 13 jets of flowing cleaning solution until the desired level of rinsing is achieved as shown in FIG. **4**. Any excess cleaning solution is automatically drained by gravity through drain openings **54** to the collector reservoir **12**. There is also a pooling effect of clean wash solution accumulating in the wringer receptacle **14**. Pool water is drained when wringer receptacle **14** is rotated back to the closed flow position.

[0085] Mop Wringing

[0086] Wash solution flow into the wringer receptacle is interrupted by applying a downward force on the wringer receptacle **14**, on the face where drain openings **54** are located. This will impose a 20° degree rotation of the wringer receptacle in a direction opposite the mop rinsing procedure, aligning back the blocking structure located on the wringer receptacle **14** in front of the outlet aperture **20**. Mop wringing is also accomplished within the wringer receptacle by the same downward motion of the mop releasing excess solution into the collector reservoir **12** by gravity. The mop can now be lifted from the bucket and is ready for cleaning tasks.

[0087] As shown in FIGS. **6**A and **6**B, the wringer receptacle **14** preferably comprises a built-in mop wringing receptacle **56**.

[0088] As shown in FIGS. **7**A to **7**C, the storage reservoir **16** preferably comprises for sealing purposes two 0.210" cross section O-rings **58** installed in grooves on the storage reservoir **16**.

[0089] FIGS. **8**A and **8**B illustrate sealing with the wringer receptacle **14** in the closed position. A face seal is created between the wringer receptacle **14** side surfaces and the O-ring **58**.

[0090] FIGS. **9**A to **9**C illustrate sealing with the wringer receptacle **14** in the open flow position. In this configuration, the wringer receptacle manifold openings **60** are aligned with storage reservoir apertures **20**.

[0091] FIGS. **10**A and **10**B show wringer receptacle rotation stop structures **62** with the wringer receptacle **14** in the open flow position. In this configuration, collector reservoir **12** cavities act as wringer rotation stops.

[0092] FIGS. **11**A and **11**B show wringer receptacle rotation stop structures **64** with the wringer receptacle **14** in the closed position. In this configuration, collector reservoir **12** cavities act as wringer rotation stops.

[0093] FIGS. **12**A to **13**B illustrate how the wringer receptacle **14** can be snap fitted onto the collector reservoir **12** through appropriate interfaces.

[0094] FIGS. **14**A to **15**B illustrate how the storage reservoir can be snap fitted onto the collector reservoir **12** through appropriate interfaces.

[0095] Preferably, as shown in FIGS. **16**A to **18**B, as an option, the storage reservoir **16** comprises a self-closing valve **26** having a spring **66**.

[0096] As shown in FIGS. **16**A to **16**C, the storage may be removed from the bucket assembly for filling, thus placing the valve **26** in a closed position.

[0097] Then, when the storage reservoir is placed in the bucket, the valve **26** is opened as shown in FIGS. **17**A and **17**B.

[0098] To allow flow between the storage reservoir **16** and the wringer receptacle **14**, the wringer receptacle fluid inlet aperture **22** is placed in register with the storage reservoir discharge aperture **20** as shown in FIGS. **18**A and **18**B.

[0099] Wash Solution Disposal

[0100] Once the mopping task is completed, the wash solution is disposed of by first emptying the excess water solution located in the storage reservoir **16** into the collector reservoir **12**. This is accomplished by opening the wringer valve (as is done in the mop rinsing phase) to allow drainage into the

collector reservoir. With all the solution now located in the collector reservoir **12**, the bucket may be tilted to allow the fluid to flow out through a collector reservoir spout **70** (shown for example in FIGS. **1**B and **1**C).

[0101] The above-mentioned first embodiment of the present invention is compatible with rectangular sponge type mops, traditional yarn mops, sponges, cleaning cloths and other hand held cleaning mediums, and is ideal for car wash applications.

[0102] Moreover, the low access wringer requires minimal lifting of the mop. The bucket is easy and intuitive to operate.

[0103] Referring to any one of FIGS. **19**A to **28**C, a bucket **10** for handling liquids according to a second embodiment of the present invention is shown.

[0104] As shown in FIGS. **22**A and **22**B, the bucket **10** comprises a collector reservoir **12'** and a wringer receptacle **14'**. The wringer receptacle **14'** has a collector outlet **18'** in fluid communication with the collector reservoir **12'**. The bucket also comprises a storage reservoir **16'** having at least one discharge aperture **20'**. The aperture **20'** is better illustrated in FIGS. **20**C and **20**D. The wringer receptacle **14'** is positionable between a first position (shown in FIG. **22**A) wherein the wringer receptacle **14'** blocks the discharge aperture **20'** and a second position (shown in FIG. **22**B) wherein the wringer receptacle **14'** allows fluid communication between the storage reservoir **16'** and the wringer receptacle **14'** through the discharge aperture **20'**.

[0105] Preferably, as shown in FIGS. **20**A to **20**C, the storage reservoir **16'** is removably attached to the bucket. If desired, the storage reservoir **16'** can be lifted off and filled in a sink separately. The storage reservoir preferably has 8" total height. The reservoir also has handles **80'** to snap fit on/off the reservoir on the bucket. Four legs **82'** maintain the reservoir horizontal while filling. The storage reservoir also preferably comprises a self closing valve **26'** as shown in FIG. **20**D. The storage reservoir preferably has a tank capacity of 8.9 L (2.35 Gallons).

[0106] Preferably, the wringer receptacle **14** comprises at least one fluid inlet aperture **22'** and the at least one fluid inlet aperture **22'** is in register with the at least one discharge aperture **20'** when the wringer receptacle **14'** is in the second position as shown in FIGS. **22**A and **22**B.

[0107] As also shown in FIGS. **22**A and **22**B, the wringer receptacle preferably comprises a biasing structure **28'**. As mentioned previously, the storage reservoir may comprise a discharge aperture **20'** and a spring valve **26'** closing the discharge aperture **20'**. Hence, the wringer receptacle **14'** is positionable between a first position wherein the wringer receptacle biasing structure **28'** allows fluid communication between the storage reservoir **16'** and the wringer receptacle **14'** through the discharge aperture **20'** by actuating the spring valve **26'**, and a second position wherein the wringer receptacle biasing structure **28'** releases the spring valve **26'** and blocks fluid communication between the storage reservoir **16'** and the wringer receptacle **14'**.

[0108] Operational Use of the Bucket

[0109] As mentioned previously, a user may start a mopping task by filling the storage reservoir **16'** with a desired cleaning solution. Once this is accomplished, the operation can be broken down into two phases: mop rinsing and mop wringing.

[0110] Mop Rinsing

[0111] The mop head **50'** (rectangular sponge-type mop or round-type threaded mop) is positioned in the wringer receptacle **14'** as shown in FIG. **3**. The wringer receptacle may have an inscription "OPEN" where the mop head is to be placed. A downward force is then applied on the wringer receptacle **14'** by applying a downward pushing force on the mop handle **52'**.

[0112] As shown in FIGS. **22**A and **22**B, this will impose a 10° degree rotation of the wringer receptacle. This moves the wringer receptacle biasing structure against the spring valve **26'** which allows fluid communication between the storage reservoir **16'** and the wringer receptacle. The mop is soaked and rinsed by **13** jets of flowing cleaning solution until the desired level of rinsing is achieved as shown in FIG. **23**. The average debit flow is 0.1 L/sec (3.4 Fl. Oz/sec.). As the storage reservoir preferably has a capacity of flowing for 100 sec, there are 10 rinses possible at 10 sec per rinse for example. Any excess cleaning solution is automatically drained by gravity through drain openings **54'** to the collector reservoir **12'**. There is also a pooling effect of clean wash solution accumulating in the wringer receptacle **14'**. Pool water is drained when wringer receptacle **14'** is rotated back to the closed flow position.

[0113] Mop Wringing

[0114] Wash solution flow into the wringer receptacle is interrupted by applying a downward force on the wringer receptacle **14'**, on the face where drain openings **54'** are located as shown in FIG. **24**. This will impose a 10° degree rotation of the wringer receptacle in a direction opposite the mop rinsing procedure, moving the wringer receptacle biasing structure **28'** away from the spring valve **26'**. Mop wringing is also accomplished within the wringer receptacle by the same downward motion of the mop releasing excess solution into the collector reservoir **12'** by gravity. The mop can now be lifted from the bucket and is ready for cleaning tasks.

[0115] FIGS. **25**A and **25**B illustrate operation of the valve in the closed flow position. The valve **26'** comprises a plug **90'** and a compressing spring **92'**. The compression spring **92'** imposes a downward force on the plug **90'** for sealing cleaning solution flow.

[0116] FIGS. **26**A and **26**B illustrate operation of the valve in the open flow position. Wringer receptacle **14'** rotation imposes an upward force **94'** acting against the valve **26'** pushing up the plug **90'**, allowing cleaning solution to flow through the plug **90'** into the wringer receptacle **14'**.

[0117] FIGS. **27**A to **27**D illustrate the operation of the wringer receptacle rotation stops and locking features between closed flow position shown in FIGS. **27**A and **27**B and the open flow position shown in FIGS. **27**C and **27**D. As shown in the figures, the wringer receptacle lateral extensions **96'** snap fit against a collector reservoir snap-fit feature **98'**.

[0118] FIGS. **28**A to **28**C illustrate the storage reservoir **16'** snap lock feature with the collector reservoir **12'**. Handles **99'** are provided to release the storage reservoir from the collector reservoir.

[0119] The above-mentioned second embodiment of the present invention is compatible with rectangular sponge type mops, traditional yarn mops, sponges, cleaning cloths and other hand held cleaning mediums, and is ideal for car wash applications.

[0120] Preferably, according to another preferred embodiment of the present invention, as shown in FIGS. **39**A to **40**B, the wringer receptacle **14** further comprises a pool drain **400** for draining liquids **402** from the wringer receptacle **14** independently of the collector outlet **18**. This drain **400** prevents the pool water from coming in contact with the cleaning medium once the wringer is rotated to the closed flow position

as illustrated in FIGS. **40**A and **40**B. The wringer receptacle **14** also comprises a concave-like floor **404** at one end allowing for liquids to pool up when it is rotated in the open flow position shown in FIG. **40**B. These pooled liquids **402** then exit the wringer receptacle **14** through the pool drain **400** when the receptacle is rotated back to the closed flow position shown in FIG. **40**A.

[0121] FIGS. **29**A to **33**B show a bucket **10** according to another preferred embodiment of the present invention. It is simple in design, has a low manufacturing cost and offers a high gross margin.

[0122] The three main parts are once again the collector reservoir **12"**, the wringer receptacle **14** and the storage reservoir **16** and can be assembled through a snap fit assembly. Additionally, the design provides for two standard sealing rings **40"** that are installed in their mating wringer receptacle grooves.

[0123] All components may be manufactured from plastic materials through injection molding.

[0124] The wringer receptacle **14"** is assembled onto the storage reservoir **16"** by a simple snap fit feature **42"** (shown in FIG. **32**A). In turn, the storage reservoir **16"** is secured onto the bucket **10** by snapping onto a reinforced top edge of the collector reservoir **12"**.

[0125] Cleaning Solution Filling

[0126] The storage reservoir **16"** is filled with the desired solution.

[0127] The mop is placed at the bottom of the wringer receptacle **14"**, a twist of the mop handle rotates the wringer valve and opens the wash solution flow as shown in FIGS. **30** to **31**B.

[0128] The mop is soaked and rinsed by 16 jets of flowing cleaning solution until the desired level of rinsing is achieved.

[0129] Excess cleaning solution is automatically drained by gravity to the collector reservoir **12"**.

[0130] A clockwise twist of the mop handle rotates the wringer valve back to the closed position, interrupting the cleaning solution flow and allowing for in-situ mop wringing.

[0131] Wringed out fluid is drained by gravity to the collector reservoir **12"**.

[0132] FIGS. **32**A to **32**F illustrate operation of the wringer receptacle between the closed flow position (FIGS. **32**A to **32**C) and the open flow position (FIGS. **32**D to **32**F). The mop head is first bottomed in the wringer receptacle **14"** allowing the mop threads to position themselves between circumferentially arrayed cross-shaped protrusions **120"**. This allows the wringer receptacle **14"** to be rotated by simple torsion of the mop handle. The torsion applied to the mop handle is transferred to the wringer receptacle via an interlocking effect of the mop threads between the cross-shaped protrusions **120"**.

[0133] A 90 degree counter-clockwise rotation of the wringer receptacle **14"**, will align each of the two wringer receptacle inlets **122"** with the apertures of the storage reservoir, allowing for clean wash solution to flow through the sixteen wringer receptacle discharge holes **124"**. The wringer receptacle preferably comprises two rotation stoppers **126"** which limit rotation. The mop can be freely manipulated and soaked until the desired level of rinsing is achieved. Wash solution flow is interrupted by applying a 90 degree clockwise rotation of the wringer receptacle.

[0134] Preferably, as shown in FIGS. **33**A and **33**B, the wringer receptacle **14"** further comprises a housing cover **100"** projecting over a top area of the storage reservoir **16**. The housing cover **100"** comprises a pouring aperture **102"** for allowing pouring of fluids therethrough into the storage reservoir **16"**.

[0135] FIGS. **34** to **36**B show a bucket **10'''** according to yet another preferred embodiment of the present invention. The design is compatible with rectangular sponge type mops and with threaded mops.

[0136] FIGS. **35**A and **35**B illustrate how the wringer receptacle **14'''** rotates between the closed flow and open flow positions in this embodiment. In this case, a 15° wringer receptacle rotation is required to open and close cleaning solution flow.

[0137] A shown in FIGS. **36**A and **36**B, the main differences between this bucket and the previously shown ones include a recessed cavity **160'''** for easy disposal of waste water through the collector reservoir spout. The storage reservoir also comprises rotation stops which also act as wringer receptacle locking features. A cylindrical snap-fit assembly feature **164'''** is also provided.

[0138] Operation of this bucket is similar to the other ones described above. First, the storage reservoir is filled with the desired solution. The mop is then placed on the OPEN side of the wringer receptacle, and a downward push of the mop handle rotates the wringer receptacle, this opening the wash solution flow. The mop is soaked and rinsed by 18 jets of flowing cleaning solution until the desired level of rinsing is achieved. Excess cleaning solution is automatically drained by gravity to the Drain Bucket. For wringing, the mop is placed on the drain side of the wringer receptacle, and a downward push of the mop handle rotates the wringer receptacle, thus closing the wash solution flow. The mop can then be wringed out in-situ.

[0139] Commercial Version of the Bucket

[0140] FIGS. **37**A to **38**B illustrate another preferred embodiment of the present invention adapted to commercial-grade mop buckets and lever-actuated type mop wringers.

[0141] The commercial bucket **200** comprises two main assemblies, a collector reservoir **202** and a tank and wringer assembly **204**. The collector reservoir **202** has two main functions: (1) capturing and storing used wash solution and (2) supporting the tank and wringer assembly **204** mounted on top of it. The bucket is fitted with four directional wheels typically used in commercial grade mop buckets.

[0142] As shown in FIGS. **37**C and **37**D, the tank and wringer assembly **204** can be divided into three sections: a wash solution tank **206**, a wash solution flow control **208** and a wringer **210**.

[0143] The wash solution tank **206** incorporates baffles to alleviate wash solution inertia caused by displacement of the product. It is also fitted with a cover which can be pivotally mounted to the tank or be designed as a stand-alone lid.

[0144] It should be noted that most existing lever-actuated wringer designs can be used in the wringer section of the tank and wringer assembly **204**.

[0145] Preferably, as shown in FIGS. **38**A and **38**B, the bucket **10** comprises a flow control valve for controlling a flow rate through the at least one discharge aperture **20**. This flow control mechanism **208** consists of a flow control lever acting as a valve. The horizontal section of the handle features multiple parallel holes through which the wash solution flows into the wringer receptacle. The holes are positioned in such a way that when the lever is in the closed position (vertical position), the wash solution flow is blocked by the handle's cylindrical surface. When the handle is rotated to the open

flow position (as shown in FIGS. **38**A and **38**B), the holes **212** align with the tank and wringer assembly holes, thus allowing wash solution to flow into the wringer receptacle.

[0146] Preferably, according to another embodiment of the present invention, the bucket **10** may further comprise a storage drawer removably attached to the bucket **10** or added to the tank and wringer assembly. This compartment can be located below the tank section and be accessible from the front side. The storage feature of the product can take the shape of a drawer-type storage system or a simple opening giving access to a storage volume area.

[0147] The commercial bucket design has the benefit of requiring less effort from a user than with traditional commercial mop bucket and wringers while delivering superior cleaning results.

[0148] To operate the commercial bucket, a dry mop is first placed in the wringer receptacle. The flow control lever **208** is then rotated to open the wash solution flow into the wringer receptacle (as shown in FIG. **38**B). At this point, the mop is subjected to several jets of clean wash solution allowing for rinsing and soaking of the mop to a desired level. The excess wash solution is automatically drained into the collector reservoir. The flow of wash solution is interrupted by rotating the flow control lever **208** back to its original position. The mop, which is already located in the wringer, can easily be wrung out of excess wash solution and then used for cleaning.

[0149] Consequently, a product line based on the present invention may be developed. The bucket can be designed into multiple variations of shape and size. A floor mopping system option can be designed with bucket operation requiring a specially designed mop. Or a general purpose cleaning bucket may be designed for other cleaning media (sponge, cloth, etc.)

[0150] Although the present invention has been explained hereinabove by way of preferred embodiments thereof, it should be pointed out that any modifications to these preferred embodiments within the scope of the appended claims is not deemed to alter or change the nature and scope of the present invention.

[0151] For example, the bucket geometry and wringer receptacle mechanism can be modified according to different designs and functional applications. The bucket components may be of circular or rectangular or any other shape. In all cases, the operating principles remain similar. Alternately, the storage reservoir can be closed off to form an integral storage tank. A housing cover is another alternative. The wringer valve mechanism can be alternately designed to operate by vertical translation rather than by rotation. In such a design configuration, a downward force on the mop stick opens the wash solution flow. The flow can then stop upon relieving the applied force. A compression spring may then be used in this configuration to load the wringer receptacle towards a closed position. The wringer receptacle mechanism can also be designed to allow for modulation of the wash solution flow rate (volume of solution per second) into the wringer receptacle. Numerous changes as the ones presented above may be attempted without departing from the spirit or scope of the invention.

1. A bucket for handling liquids comprising:

a collector reservoir; -a wringer receptacle comprising:

a collector outlet in fluid communication with the collector reservoir; and

a storage reservoir comprising at least one discharge aperture, said wringer receptacle being positionable between a first position wherein the wringer receptacle blocks the at least one discharge aperture and a second position wherein the wringer receptacle allows fluid communication between the storage reservoir and the wringer receptacle through the at least one discharge aperture.

2. The bucket according to claim **1**, wherein the wringer receptacle is rotatably positionable between the first position and the second position.

3. The bucket according to claim **1**, further comprising a spring mechanism for biasing the wringer receptacle towards the first position.

4. The bucket according to claim **1**, wherein the storage reservoir is removably attached to the bucket.

5. The bucket according to claim **1**, further comprising a flow control valve for controlling a flow rate through the at least one discharge aperture.

6. The bucket according to claim **1**, wherein the wringer receptacle further comprises at least one fluid inlet aperture and the at least one fluid inlet aperture is in register with the at least one discharge aperture when the wringer receptacle is in the second position.

7. The bucket according to claim **4**, wherein the storage reservoir further comprises at least one spring valve closing the at least one discharge aperture.

8. A bucket for handling liquids comprising: -a collector reservoir; a wringer receptacle comprising:

a collector outlet in fluid communication with the collector reservoir; and a biasing structure; and -a storage reservoir comprising:

a discharge aperture; and -a spring valve closing the discharge aperture; said wringer receptacle being positionable between a first position wherein the wringer receptacle biasing structure allows fluid communication between the storage reservoir and the wringer receptacle through the at least one discharge aperture by actuating the spring valve, and a second position wherein the wringer receptacle biasing structure releases the spring valve and blocks fluid communication between the storage reservoir and the wringer receptacle.

9. The bucket according to claim **8**, wherein the wringer receptacle is rotatably positionable between the first position and the second position.

10. The bucket according to claim **8**, further comprising a spring mechanism for biasing the wringer receptacle towards the second position.

11. The bucket according to claim **8**, wherein the storage reservoir is removably attached to the bucket.

12. The bucket according to claim **8**, further comprising a flow control valve for controlling a flow rate through the at least one discharge aperture.

13. The bucket according to claim **8**, wherein the wringer receptacle further comprises at least one fluid inlet aperture and the at least one fluid inlet aperture is in register with the at least one discharge aperture when the wringer receptacle is in the first position.

14. The bucket according to claim **1**, wherein the storage reservoir comprises a first floor surface, the wringer receptacle comprises a second floor surface, the collector reservoir comprises a third floor surface, the first floor surface is higher than the second floor surface and the second floor surface is higher than the third floor surface.

15. The bucket according to claim **1**, wherein the wringer receptacle further comprises a pool drain for draining liquids from the wringer receptacle independently of the collector outlet.

16. The bucket according to claim **8**, wherein the storage reservoir comprises a first floor surface, the wringer receptacle comprises a second floor surface, the collector reservoir comprises a third floor surface, the first floor surface is higher than the second floor surface and the second floor surface is higher than the third floor surface.

17. The bucket according to claim **8**, wherein the wringer receptacle further comprises a pool drain for draining liquids from the wringer receptacle independently of the collector outlet.

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