# US Patent & Trademark Office
# Patent Public Search | Text View

United States Patent Application Publication 20250262569
Kind Code A1
Publication Date August 21, 2025
Inventor(s) Melkonian; Arman et al.


# REPLACEABLE FILTER CARTRIDGE ASSEMBLY


## Abstract

A replaceable cartridge filtration assembly for a water dispenser that has a replaceable filter cartridge that can easily installed or removed by a technician or a user of the water dispenser. The replaceable filter cartridge has a handle with locking extensions that engage notches formed in the cartridge housing that the replaceable filter cartridge fits into to lock the replaceable filter cartridge in place.



**Inventors:** **Melkonian; Arman (La Cañada Flintridge, CA), Melkonian; Mark (Northridge, CA), Sawhney; Ravi (Malibu, CA), Steele; Craig (Manhattan Beach, CA), Patel; Samaykumar (Santa Clarita, CA), Kulick; Michael (Simi Valley, CA)**

**Applicant:** **Brio Water Technology, Inc.** (City of Industry, CA)



**Family ID:** **1000008278518**

**Assignee:** **Brio Water Technology, Inc. (City of Industry, CA)**

**Appl. No.:** **18/970316**

**Filed:** **December 05, 2024**


## Related U.S. Application Data

parent US division 18581105 20240219 parent-grant-document US 12194395 child US 18970316

## Publication Classification

**Int. Cl.:** **B01D27/08** (20060101); **B01D29/96** (20060101)

**U.S. Cl.:**

CPC **B01D27/08** (20130101); **B01D29/96** (20130101); B01D2201/4023 (20130101); B01D2221/02 (20130101)

## Background/Summary

REFERENCE TO RELATED APPLICATION [0001] This application is a divisional application of, and claims priority from, application U.S. patent application Ser. No. 18/581,105 filed on Feb. 19, 2024; the disclosure of which is incorporated herein in its entirety.

BACKGROUND

[0002] A water dispenser typically has a series of filters that the incoming water passes through before the water is dispensed to the consumer. These filters can be sediment filters, carbon filters, reverse osmosis filters or any other filter the consumer of the water wants to use to make the water taste better, remove sediment or purify the output water. These types of filter systems have had replaceable cartridge systems for years. The replaceable cartridges of these systems, though, are difficult to replace. They usually are in hard-to-reach places in the dispenser; behind other components and use cumbersome screw-in threading for the engagement between components.

[0003] Some systems have sought to address some of the issues with these older, more traditional replaceable cartridge filter systems. The assembly discussed in patent publication US 2019/0039004 is one such attempt. Systems such as this, though, still have significant drawbacks. In such systems, the replaceable cartridge is separate from the locking mechanism of the filter housing. Because of this, the inlet and outlet ports of the replacement cartridge do not always align properly with the inlet and outlet ports of the filter housing when the replacement cartridge is inserted into the filter housing. When the cartridge and housing are misaligned, the locking mechanism cannot engage the cartridge cover correctly, and the cartridge cover cannot be closed. As a result, the technician, or the user replacing the cartridge, must remove the replacement cartridge and start the process all over again. Or, if somehow, the technician or user can force the cartridge cover closed, this creates an unfortunate situation where the seals of the cartridge and housing inlet and outlet ports are not properly aligned, which will cause the dispenser to leak when used. Also, by forcing the cartridge cover closed, components of the cartridge or housing may get cracked.

[0004] Further, cartridges in such systems like US 2019/0039004 can still be difficult to remove and require unnecessary steps for removal and replacement of the cartridge. In such systems, to remove a cartridge, the technician or user has to first unlatch the cartridge cover connected to the housing. The user then rotates the cartridge cover upward, giving access to the replaceable cartridge. The technician or user then needs to grab a handle connected to the replaceable cartridge to pull the cartridge from the housing. This entire process requires dexterity on the part of the technician or user, especially if they have larger hands, and makes removing and replacing a cartridge more difficult and time consuming than it should be.

[0005] Accordingly, there is a need for a replaceable filter cartridge assembly that makes it easier for a user to remove and replace a filtration cartridge. There is also a further need for a replaceable filter cartridge assembly that makes alignment of the inlet and outlet ports of the cartridge and housing during installation of the cartridge easier and more reliable.

SUMMARY

[0006] According to one aspect of the present invention. a replaceable filter cartridge for use in a

filter assembly of a fluid dispenser may include a filter housing having an integrated rotatable handle, an inlet port and an outlet port; where the rotatable handle has a locking extension formed integral with an end of the rotatable handle.
[0007] According to another aspect of the present invention, a filter cartridge housing for use in a filter assembly of a fluid dispenser may include a housing shell defining a cavity and having a pair of sidewalls where a filtration cartridge locking notch is formed in one of the sidewalls.
[0008] According to yet another aspect of the present invention, a replaceable cartridge filter assembly of a fluid dispenser may include a replaceable filter cartridge having a filter housing; a pair of pivot connectors; a rotatable handle having a locking extension formed in an end of the rotatable handle, and the rotatable handle being connected to the filter housing by the pair of pivot connectors, where the rotatable handle has a first portion disposed on one side of the pair of pivot connectors; where a locking extension is formed integral with an end of the rotatable handle disposed on an opposite side of one of the pair of pivot connectors. This aspect of the present invention may further include a filter cartridge housing defining a cavity having a pair of sidewalls where a locking notch is formed in one of the pair sidewalls; a handle locking latch connected to the sidewalls opposite the end of the sidewalls where the locking notch is formed; and where the replaceable cartridge filter assembly has an assembled and an unassembled configuration, where, in an assembled configuration, the replaceable filter cartridge sits within the cavity of the filter cartridge housing; the rotatable handle has been rotated to insert the locking extension into the locking notch formed in one of the pair of sidewalls of the filter cartridge housing; and the handle locking latch is engaged with the first portion of the rotatable handle to lock the replaceable filter cartridge into the filter cartridge housing.

---

## Description

DRAWINGS
[0009] Objects, features, and advantages of the present invention will become apparent upon reading the following description in conjunction with the drawing figures, in which:
[0010] FIG. **1** is a front perspective view of a water dispenser depicting an embodiment of several replaceable cartridge filtration assemblies of the present invention installed in filtration racks of the water dispenser;
[0011] FIG. **2**A depicts a filtration rack removed from the water dispenser with an exploded view of an embodiment of a pair of replaceable cartridge filtration assemblies of the present invention;
[0012] FIG. **2**B is a top view of a filtration rack illustrating an embodiment of a pair of filter cartridge housings of the present invention;
[0013] FIG. **3**A is a right side view of an embodiment of the replaceable filter cartridge of the present invention;
[0014] FIG. **3**B is a sectional view of the filtration rack along section line **3**B-**3**B of FIG. **2**B depicting a right side view of an embodiment of the filter cartridge housing of the present invention;
[0015] FIG. **4**A is a left side view of an embodiment of the replaceable filter cartridge of the present invention;
[0016] FIG. **4**B is a sectional view of the filtration rack along section line **4**B-**4**B of FIG. **2**B depicting a left side view of an embodiment of the filter cartridge housing of the present invention;
[0017] FIG. **5** is a front perspective view of a water dispenser depicting an embodiment of several filter cartridge housings of the present invention without replaceable cartridge filter cartridges installed;
[0018] FIG. **6** is perspective view depicting a first stage of inserting a replaceable filter cartridge into a filter cartridge housing;

[0019] FIG. **7** is perspective view depicting a second stage of inserting a replaceable filter cartridge into a filter cartridge housing;
[0020] FIG. **8** is perspective view depicting a third stage of inserting a replaceable filter cartridge into a filter cartridge housing;
[0021] FIG. **9**A is perspective view of a replaceable cartridge filtration assembly of the present invention depicting the interaction between a handle and a locking latch of the present invention;
[0022] FIG. **9**B is side view of a replaceable cartridge filtration assembly of the present invention depicting the interaction between a handle and a locking latch of the present invention;
[0023] FIG. **10**A is a perspective view of a replaceable cartridge filtration assembly of the present invention with a locking latch of the present invention in a locked position; and
[0024] FIG. **10**B is side view of a replaceable cartridge filtration assembly of the present invention with a locking latch of the present invention in a locked position.

DESCRIPTION

[0025] Referring to FIG. **1**, an exemplary water dispenser **20**, with its filter access door **21** removed, is depicted. In this exemplary water dispenser **20**, the water dispenser **20** has two filtration racks **22**, **23**. Filtration rack **22** contains a pair of replaceable cartridge filtration assemblies **24***a*, **24***b* of the present invention. Filtration rack **23** has components similar to filtration rack **22**, and such components are identified similarly (e.g **24***c*, **24***d*). Referring now to FIGS. **2**A-**2**B, the replaceable cartridge filtration assembly **24***a* of the present invention includes a replaceable filter cartridge **26***a* and a filter cartridge housing **28***a*. In use, as explained in detail below, the replaceable filter cartridge **26***a* is seated in the filter cartridge housing **28***a* to filter fluid. It should be understood that any replaceable cartridge filtration assembly **24** described herein has the same components as replaceable cartridge filtration assembly **24***a* and functions in the same way (i.e. **24***b*, **24***c*, **24***d*).
[0026] FIGS. **3**A, **4**A depict an embodiment of a replaceable filter cartridge **26** of the present invention. In this embodiment, the replaceable filter cartridge **26** includes a filter housing **30** having a cover piece **40**; a handle **32** rotatably connected to the cover piece **40** at a pair of pivot connectors **42**, **44**; a pair of inlet ports **34** and a pair of outlet ports **36**. Each inlet port **34** includes a seal **35**, and each outlet port **36** has a seal **37** as well. In this embodiment of the present invention, the seals **35**, **37** are O-rings. The replaceable filter cartridge **26** also includes a filter element (not shown) that sits inside the filter housing **30**. In this embodiment, the rotatable handle **32** has a first portion **45** that is U-shaped that extends between the two pivot connectors **42**, **44**. The handle **32** also includes a first locking extension portion **46** (FIG. **3**A) that is formed integral with the first portion **45** of the handle **32** around the pivot connector **42**. In this embodiment, the handle **32** also includes a second locking extension portion **48** (FIG. **4**A) that is also formed integral with the first portion **45** of the handle **32** around the pivot connector **44**. It should also be understood that any water dispenser **20** using the replaceable cartridge filtration assemblies **24** of the present invention may utilize any number of replaceable cartridge filtration assemblies **24**, as needed, in as many filtration racks **22**, as needed. In the embodiment depicted, the filter cartridge housings **28***a*, **28***b*, **28***c*, **28***d* are formed integral with the filter racks **22**, **23**. In other embodiments, the filter cartridge housings **28***a*, **28***b*, **28***c*, **28***d* may be formed so that they are separable or separate from their respective filter racks **22**, **23** and from each other.
[0027] FIGS. **3**B, **4**B depict an embodiment of a filter cartridge housing **28** of the present invention. In this embodiment, the filter cartridge housing **28** has cavities and openings formed therein; specifically, a cavity **50** for receiving the replaceable filter cartridge **26**; a pair of openings **52** for receiving the inlet ports **34** of the replaceable filter cartridge **26** and a pair of openings **54** for receiving the pair of outlet ports **36** of the replaceable filter cartridge **26**. The filter cartridge housing **28** also includes a pair of top sidewalls **60**, **62** (FIGS. **2**A, **2**B) along the top of the filter cartridge housing **28**. (In FIGS. **2**A, **2**B, the filter cartridge housings **28***a*, **28***b*, share a common top sidewall **61**, which has the features of a sidewall **62***a* and a sidewall **60***b* if the filter cartridge

housings **28***a*, **28***b* were separate, stand-alone filter cartridge housings **28**.) In this embodiment, each top sidewall **60**, **62** has a locking notch **64**, **66** formed therein, and each locking notch **64**, **66** has a respective opening **63**, **65** formed with it. It should be understood that the number of locking notches **64**, **66**, typically, match the number of extension portions **46**, **48** of the handle **32**. The filter cartridge housing **28** of this embodiment also includes a locking latch **70** that is rotatably connected to the pair of top sidewalls **60**, **62**. The locking latch **70**, in this embodiment, includes a bottom arm **72** and a shorter top arm **74** that, in combination with a back wall **73**, define an opening **76** that has an opening width substantially equal to the width of the first portion **45** of the handle **32**. The locking latch **70** also includes a release handle **78**. The locking latch **70**, in this embodiment, when not in a locked position, is maintained in an open, unlocked position by a leaf spring (not shown).

[0028] Referring now to FIG. **5**, in this illustration, all of the filter cartridge housings **28***a*, **28***b*, **28***c*, **28***d* are empty and do not have replaceable filter cartridges **26***a*, **26***b*, **26***c*, **26***d* installed in them yet. In order to install replaceable filter cartridges **26***a*, **26***b* into the filter cartridge housings **28***a*, **28***b*, a technician or user, in this embodiment, rotates the filtration rack **22** forward to give him easier access to the filter cartridge housings **28***a*, **28***b*. The technician or user then grabs the first replaceable cartridge filter **26** to be installed by the handle **32** and lines up the first replaceable filter cartridge **26** with its corresponding filter cartridge housing **28**. Referring to FIG. **6**, in the exemplary embodiment depicted, the technician is installing replaceable filter cartridge **26***b* into filter cartridge housing **28***b*. After lining up the replaceable filter cartridge **26***b* with filter cartridge housing **28***b*, the technician or user then pushes the replaceable filter cartridge **26***b* into the cavity **50***b* of the filter cartridge housing **28***b*. As the technician or user pushes the replaceable filter cartridge **26***b* downward, the locking extension portions **46***b*, **48***b* (FIG. **4**A) each contact the openings **63***b*, **65***b* of the corresponding notches **64***b*, **66***b* (FIG. **4**B) formed in the top sidewalls **62***b*, **61** (FIG. **7**).

[0029] With the locking extension portions **46***b*, **48***b* now in contact with the corresponding openings **63***b*, **65***b* of notches **64***b*, **66***b*, as illustrated in FIG. **8**, the technician or user rotates the first portion **45***b* of the handle **32***b* forward and downward around the pivot connectors **42***b*, **44***b*. As the first portion **45***b* of the handle **32***b* rotates downward in this fashion, the locking extension portions **46***b*, **48***b* continue to further engage the corresponding notches **64***b*, **66***b*. The engagement of the locking extension portions **46***b*, **48***b* with the notches **64***b*, **66***b* makes the replaceable filter cartridge **26***b* self-align with the filter cartridge housing **28***b*, causing the inlet ports **34***b* and seals **35***b* to properly align with the opening **52***b* and causing the outlet ports **36***b* and their seals **37***b* to properly align with each corresponding opening **54***b*. Because the components of the replaceable filter cartridge **26***b* self-align with the components of the filter cartridge housing **28***b*, the technician or user does not need to worry about misalignment which might cause the components to seal improperly or require the technician or user to force a cartridge cover down over the cartridge.

[0030] With the locking extension portions **46***b*, **48***b* now engaged with the notches **64***b*, **66***b*, as illustrated in FIGS. **9**A, **9**B, the technician or user continues to rotate the first portion **45***b* of the handle **32***b* downward until the first portion **45***b* of the handle **32***b* engages the bottom arm **72***b* of the locking latch **70***b*. As the technician or user continues to push down on the handle **32***b*, the first portion **45***b* of the handle **32***b* pushes down on the bottom arm **72***b* of the locking latch **70***b* rotating the back wall **73***b* and the top arm **74***b* towards the handle **32***b*. As this motion continues, the first portion **45***b* of the handle **32***b* fits into the opening **76***b*, and the top arm **74***b* of the locking latch **70***b* engages the top of the first portion **45***b* of the handle **32***b;* locking the handle **32***b*, and the replaceable filter cartridge **26***b*, into filter cartridge housing **28***b* (FIGS. **10**A, **10**B).

[0031] Referring again to FIG. **5**, the technician or user next installs the replaceable filter cartridge **26***a* into filter cartridge housing **28***a* in the same way as described above for installing replaceable filter cartridge **26***b*. Once the replaceable filter cartridge **26***a* is installed, the technician or user can then rotate the filtration rack **22** back into the closed position, and then rotate the filtration rack **23** outward to an open position to install the replaceable filter cartridges **26***c*, **26***d* in the same manner

as the other replaceable filter cartridges **26***a*, **26***b*. Once the replaceable filter cartridges **26***a*, **26***b*, **26***c*, **26***d* are installed to form the replaceable cartridge filtration assemblies **24***a*, **24***b*, **24***c*, **24***d* and the filtration racks **22**, **23** are in the closed position, the technician or user can replace the filter access door and put the water dispenser **20** into operation.

[0032] When the replaceable filter cartridge filters **26***a*, **26***b*, **26***c*, **26***d* need to be replaced, the technician or user removes the replaceable filter cartridge filters **26***a*, **26***b*, **26***c*, **26***d* in the opposite manner from how they were installed. The technician or user removes the filter access door and tilts the filtration racks **22**, **23** as necessary. By way of example, referring to FIG. **10**B, with the filtration rack **22** rotated forward, the technician or user pulls the release handle **78***b* outward away from the handle **32***b*. This movement causes the bottom arm **72***b* of the locking latch **70***b* to push up on the first portion **45***b* of the handle **32***b;* causing the first portion **45***b* of the handle **32***b* to separate from the locking latch **70***b* as the release handle **78***b* continues to rotate outward. With the first portion **45***b* of the handle **32***b* separated from the locking latch **70***b*, the technician or user can grab the handle **32***b* and continue to rotate the handle **32***b* upward. As the first portion **45***b* of the handle **32***b* rotates upwards in this manner, the locking extension portions **46***b*, **48***b* disengage from the corresponding notches **64***b*, **66***b*. Once the locking extension portions **46***b*, **48***b* are fully disengaged from the corresponding notches **64***b*, **66***b*, the technician or user can pull the replaceable filter cartridge **26***b* out of the filter cartridge housing **28***b;* disengaging the seals **35***b* from the openings **52***b* and disengaging the seals **37***b* from their corresponding openings **54***b*. With the replaceable filter cartridge **26***b* fully removed from the filter cartridge housing **28***b*, the filter cartridge housing **28***b* is now ready to have a new replaceable filter cartridge **26***b* installed within it.

[0033] Although certain embodiments and features of a replaceable cartridge filtration assembly have been described herein, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all embodiments of the teachings of the disclosure that fairly fall within the scope of permissible equivalents.

## Claims

**1**. A replaceable filter cartridge for use in a filter assembly of a fluid dispenser, comprising: a filter housing having an integrated rotatable handle, at least one inlet port and at least one outlet port; wherein the rotatable handle has at least one locking extension formed integral with an end of the rotatable handle.

**2**. The replaceable filter cartridge of claim 1, wherein the rotatable handle has a pair of locking extensions with each locking extension formed in the opposing ends of the rotatable handle.

**3**. The replaceable filter cartridge of claim 2, wherein the replaceable filter cartridge further comprises a pair of pivot connectors; wherein the rotatable handle is connected to the filter housing by the pair of pivot connectors.

**4**. The replaceable filter cartridge of claim 3, wherein the rotatable handle has a first portion disposed on one side of the pair of pivot connectors and wherein one of the pair locking extensions is formed integral with an end of the rotatable handle disposed on an opposite side of one of the pair of pivot connectors, and the other of the pair locking extensions is formed integral with the other end of the rotatable handle disposed on an opposite side of the other of the pair of pivot connectors.

**5**. The replaceable filter cartridge of claim 1, further comprising, a cover piece connected to the filter housing having an inlet port and an outlet port.

**6**. The replaceable filter cartridge of claim 1, further comprising, a cover piece connected to the filter housing having a pair of inlet ports and a pair of outlet ports.