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A FLUID TREATMENT DEVICE AND COUNTER MECHANISM

FIELD OF THE INVENTION

[0001]The present invention relates to a fluid treatment device and, more particularly, to a water filter system having a plurality of selective filter usage counter mechanisms for monitoring the number of uses of the replaceable filter cartridge and including a color coding element for visual inspection to permit the user to determine the status of the filter.

BACKGROUND OF THE INVENTION

[0002] Fluid treatment devices are known and used in homes for removing contaminants from normal tap water. Since the filters fail to perform after many successive uses, an indicator must be visible and readable to the user to permit the user to determine when to replace a filter. Duncan, U.S. Patent 5,190,643; Gebhard, U.S. Patent No. 6,033,557; Tanner, U.S. Patent No. 5,882,507; Lund, U.S. Patent No. 5,785,844; Hoffman, U.S. Patent No. 6,074,550; Huang et al., U.S. Patent No. 5,873,995; Levene, U.S. Patent No. 5,665,224; Land, U.S. Patent No. 5,536,394 and Bailey, U.S. Patent No. 6,001,249 all pertain to filter systems with an indicator to tell when the filters needs to be replaced. Such devices include float mechanisms, ratchet and pawl mechanisms and the like.

OBJECTS AND SUMMARY OF THE INVENTION

[0003] It is an object of this invention to provide a device for fluid treatment which will enable the user to determine at any time the status of the filter by color coding. A further object of this invention is to provide a fluid filter usage indicating mechanism which will permit the consumer to change the cycle depending upon the statutory usage required in various countries around the world where replacement filters must be changed according to existing regulations which are known to vary from

country to country.

[0004] Yet another object of this invention is to provide a unit which is readily assembled and will not dislodge, tilt, come apart or disintegrate under adverse conditions.

Still a further object of this invention is to provide a filter unit in which color coding is used which will not scratch or bleed off during use or washing. This is particularly true where dishwashers are used which might cause the color dyes on the system to be washed away or otherwise destroyed.

[0005] Yet another object of this invention is to provide fluid treatment mechanisms which will fully drain all liquid from the assembly after it is immersed and washed.

[0006] Yet another object of this invention is to provide a filter cartridge mechanism which will operate when the cap is replaced regardless of the orientation of the placement.

[0007] Another object of this invention is to provide a fluid filter mechanism which will have a minimum useful life of at least 3,000 cycles at one filter change setting or 7,000 cycles at another filter change setting depending upon the country of use thus permitting up to approximately 9.6 years of use if the product is used twice a day.

[0008] Yet a further object of this invention is to permit the replacement mechanism to indicate when the filter cartridge must be replaced when the amount of water discharged through the cartridges is at least about 80% of the approved capacity of the cartridges.

[0009] Still a further object of this invention is to provide a fluid filter mechanism which cannot be disassembled except by destruction

of the item, thus avoiding accidental loosening of parts which might fall off during washing or other uses.

Yet another object of this invention is to permit the counter mechanism to accurately count the number of times the container has been filled.

[0010] In summary, this invention relates to a fluid treatment and filter counter mechanism which monitors the number of uses of the filter cartridge indicating when it must be replaced, such as by, for example, color coding. The counter mechanism also includes a plurality of selective filter counter mechanisms depending upon the requirements of a particular country.

[0011] It will be appreciated that relative terms such as left, right, up, down, clockwise, and counterclockwise are for convenience only and are not intended to be limiting.

These objects and summary will be understood from a detailed reading of the following description including the drawings which are as follows:

BRIEF DESCRIPTIONS OF THE DRAWINGS

[0012] Figure 1 is perspective view of a fluid treatment device;

[0013] Figure 2 is top plan view of a fluid treatment device;

[0014] Figure 3 is fragmentary cross-sectional side;

[0015] Figure 4 is exploded view of the assembly;

[0016] Figure 5 is top plan view of the chassis assembly with portion shows in phantom line and showing color coding;

[0017]Figure 6 is fragmentary cross-section enlarged takes along the line 6-6 of Figure 5 and viewed in the direction of the arrows;

[0018]Figure 7 is fragmentary cross-section taken along line 7-7 of Figure 5 and viewed in the direction of the arrows;

[0019]Figure 8 is fragmentary cross-section taken along line 8-8 of Figure 5 and viewed in the direction of the arrows;

[0020]Figure 9 is top plan viewed of the chassis assembly with portions show in phantom lines indicating one position of the pawl;

[0021]Figure 10 is fragmentary cross-section enlarged take along the line 10-10 of Figure 9 and viewed in the direction of the arrows.

[0022]Figure 11 is top plan view of the chassis assembly with portion shows in phantom lines;

[0023]Figure 12 is fragmentary cross-section enlarged takes along the line 12-12 of Figure 11 and viewed in the direction of the arrows; Figure 13 is top plan viewed of the chassis assembly with portion shows in phantom lines and indicating another position of the pawl;

[0024]Figure 14 is fragmentary cross-section enlarged takes along the line 14-14 of Figure 12 and viewed in the direction of the arrows; and

[0025]Figure 15 is bottom plan view of water treatment chassis.

DETAILED DESCRIPTION OF THE INVENTION

FIGURES 1, 2, AND 3

[0026] Figures 1, 2, and 3 show a fluid treatment device D. The fluid treatment device D has a removable and replaceable cap C having an outer lid X and an inner lid Y. In the embodiment shown, the removable and replaceable cap C as a generally elliptical shape. The device D includes a pouring spout P which is formed and extends along one side thereof and a handle H on the opposite side thereof. A lip 2 is formed on the removable and replaceable inner lid Y. A window W located on the removable and replaceable cap C for viewing a painted consumer indicator dial subsequently described.

[0027] Figure 3 shows a filter 4 placed between first chamber 6 and second chamber 8. When the consumer wants to drink filtered water, the consumer lifts lid Y, and unfiltered water is poured into first chamber 6, the water goes through filter 4 and into the second chamber 8, thereby being filtered.

FIGURES 4 THROUGH 15

[0028] Figure 4, shows a chassis bottom cover 10 of mechanism M. The chassis 10 comprises a gear and ratchet plate 12 and pawl follower 14 and a hub 16. The gear and ratchet plate 12 is secured to the hub 16 by a lock washer 36 or a nut or other fastener. The gear and ratchet plate 12 includes gear teeth 18, a plurality of ratchet wheels 20 and 22, a slot 24, and color indicator 26. A return spring 28 engages with the gear teeth 18

causing the gear teeth 18 to go counterclockwise.

The follower 14 can be set at the large diameter ratchet wheel 20 or can be set at the smaller diameter 22, depending on the filter cycle used.

[0029] Figure 6 shows the pawl follower 14 and an enlarged fragment 30 of this assembly. A portion 32 rides over portion 34 and, when depressed, indexes either ratchet wheel 20 or ratchet wheel 22.

The lock washer 36 locks spindle 38 so every part will be secured when the lid Y is removed or replaced on the cap C.

[0030] Follower 14 is positioned on the teeth 38 of gear 22. A return arm 40 is set at the end of slot 24. A reset spring 42 is positioned on pin 44 and engages in hole 46. A pawl 48 mounted on pin 50 engages teeth 18 of the gear and ratchet plate 12. The return arm 40 is fixed on spindle 38. The reset spring 42 is mounted on pin 52. Pawl followers 14 is mounted on pin 54 and has a slot 56. An opening 58 in the pawl and ratchet 14 engages a push button 60 having a cam top 62 and a bottom projection 64 which enters opening 66. The button 60 is received in a cap 68 of a chassis cover 70. Bottom projection 64 is raised upwardly into opening 58 causing the pawl and ratchet 14 to moved on pin 54 positioned on slot 56 to index a pawl 72. Pawl and ratchet 14 can be shifted from gear 20 to gear 22, when a pin 74 is moved in a slot or opening 76 from one position 78 to another position 80.

[0031]It is possible to provide more concentric ratchet wheels than the two shown and additional slots in the opening 76.

The return arm 40 is provided with an opening 82 and mounted on the spindle 38 extending to the gear and ratchet plate 12. The return arm 40 exits from the chassis cover 70 and an opening 84 and is secured by lock washer 36. Cover chassis 70 has a view sleeve 86 with window W. The cover chassis 70 is locked by means of snap members 88 to the chassis.

Hub handle 16 is rotated in order to reset the gear and ratchet plate 12. Each time the chassis 10 and its assembly are indexed the selective ratchet wheel 20 or 22 causes the color coding indicator 26 on the gear and ratchet plate 12 to be exposed to the window W. As will be noted in Figures 5, 9, and 11, color runs from green in the lighter area G to the darker yellow H to darkest area red J, thus indicating to the consumer the status of the filter in the device D. Holes 90 mounted with bolt 92 keep the chassis cover on cap C tight.

Operation

[0032] In the operation of the fluid treatment device D, the knob 94 is rotated substantially until the green color indicates at the window W. This begins the sequence of operation of the ratchet and pawl mechanism 20 and 22 depending on which one is used. The pin 74 shifts from position 78 to position 80 in order changes the gearing counter mechanism.

[0033] While this invention has been described as having preferred design, it is understood that it capable of further modification, uses and/or adaptations following in general the principle of the invention and including such departures from the present disclosure as come within known or customary practice in art to which the invention pertains, and as may be applied to the essential features set forth, and fall within the scope of the invention or the limits of the appended claims.

WE CLAIM:

1. In a fluid treatment device of the type comprising a container, said container having a filter, and said container having first and second chambers, the improvement wherein:
 - a) said filter is positioned in said first chamber;
 - b) a connecting element for connecting said first chamber to said second chamber for permitting fluid to travel from said first chamber through said filter and into said second chamber is provided;
 - c) a removable and replaceable cap is provided for said first chamber;
 - d) said removable and replaceable cap has a counter mechanism;
 - e) an indexing element is provided on said removable and replaceable cap for indexing said counter mechanism when said removable and replaceable cap is replaced after said removable and replaceable cap has been removed; and
 - f) said counter mechanism has a sequentially changing visual color coding system for indicating the present status of the filter.
2. In fluid treatment device of the type comprising a container, said container having a filter, said container having first and second chambers the improvement wherein:
 - a) said filter is positioned in said first chamber;
 - b) a connecting element connects said first chamber to said second chamber for permitting fluid to travel from said first chamber through said filter and into said second chamber;

- c) a removable and replaceable cap is provided for said first chamber;
 - d) said removable and replaceable cap has a counter mechanism;
 - e) an indexing element is provided on said removable and replaceable cap for indexing said counter mechanism when said removable and replaceable cap is replaced after said removable and replaceable cap is removed; and
 - f) said counter mechanism has at least two selective counter cycles as determined by the amount of filtration required by law pertaining to the required water purity.
3. A fluid treatment device as in claim 1, and wherein;
- a) said visual color coding system includes at least two color changes.
4. A fluid treatment device as in claim 1, and wherein;
- a) said visual color coding system includes green, yellow, and red color codes.
5. A fluid treatment device as in claim 4, and wherein;
- a) said green, yellow, and red color codes are in sequence starting with green an ending with red.
6. A fluid treatment device as in claim 2, and including;
- a) said at least two selective counter cycles include at least two ratchet wheels, and
 - b) a selective pawl follower for selecting one of said at least two ratchet wheels.
7. A device for use in a fluid treatment device of the type having a removable filter, the device comprising:

- a) a removable and replaceable cap;
- b) said removable and replaceable cap having a counter mechanism;
- c) an indexing element on said removable and replaceable cap for indexing said counter mechanism when said removable and replaceable cap is replaced after said removable and replaceable cap is removed; and
- d) said counter mechanism having a sequentially changing visual color coding system for indicating the present status of the filter.

8. A device for use in a fluid treatment device of the type having a removable filter, the device comprising;

- a) a removable and replaceable cap;
- b) said removable and replaceable cap having a counter mechanism;
- c) an indexing element on said removable and replaceable cap for indexing said counter mechanism when said removable and replaceable cap is replaced after said removable and replaceable cap is removed; and
- d) said counter mechanism having at least two selective counter cycles as determined by the amount of filtration required by law pertaining to the required water purity.

9. A device for use in a removable device having a removable filter as in claim 7; and wherein:

- a) said sequentially changing visual color coding system includes green, yellow and red color codes.

10. A device for use in a fluid treatment device having a

removable filter as in claim 8 and wherein;

- a) said counter mechanism includes at least two selective counter cycles including at least two ratchet wheels, and
- b) a selective pawl follower for selecting one of said at least two ratchet wheels.