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- DING, Pengfei
Wuxi, Jiangsu 214028 (CN)
- TU, Jinjun
Wuxi, Jiangsu 214028 (CN)
- ZHOU, Huihui
Wuxi, Jiangsu 214028 (CN)
- HAN, Yafang
Wuxi, Jiangsu 214028 (CN)

(30)

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(71)

Applicant: Wuxi Little Swan Electric Co., Ltd.
Wuxi, Jiangsu 214028 (CN)

(74)

Representative: RGTH
Patentanwälte PartGmbB
Neuer Wall 10
20354 Hamburg (DE)

(72)

Inventors:
• QI, Huan
Wuxi, Jiangsu 214028 (CN)

(54)

DISPENSER ASSEMBLY, DETERGENT BOX AND CLOTHING TREATMENT MACHINE

(57)

A dispenser assembly, a detergent box and a clothing treatment machine, wherein the dispenser assembly comprises a dispenser (10) and a water treatment apparatus (20); a replacement port (10a), a placement compartment (10b) and a liquid discharge port (10c) are formed in the dispenser, and the replacement port and the liquid discharge port are each communicated with the placement compartment; the water treatment apparatus (20) is detachably disposed in the placement compartment (10b), the water treatment apparatus has formed

therein a water inlet (20a), a water outlet (20b) and a reagent cavity (20c) used for containing a water treatment agent, the water inlet and the water outlet are each communicated with the reagent cavity, and the water outlet is communicated with the placement compartment.

The dispenser is used for providing a place to install the water treatment apparatus, the manufacturing cost is low, and a user can thus conveniently replace and/or perform maintenance on the water treatment apparatus.

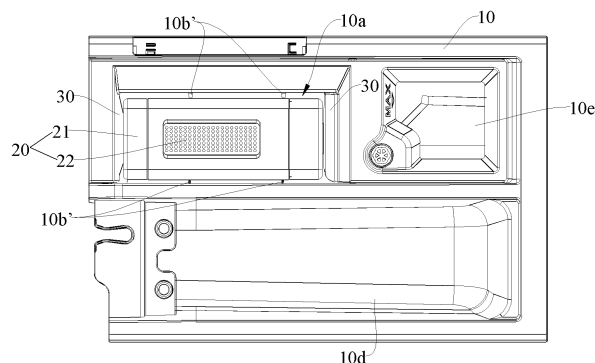


FIG. 1

Description

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is filed based on and claims priority to Chinese patent application No. 202210337065.X filed on March 31, 2022, the disclosure of which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The application relates to the technical field of clothing treatment, and in particular to a dispenser assembly, a detergent box and a clothing treatment machine.

BACKGROUND

[0003] In the related art, a water treatment module is arranged inside a clothing treatment machine, and is configured to perform scale inhibition and/or sterilization or other treatments on tap water, and then send the treated water into a washing drum. However, since the water treatment module is arranged inside the clothing treatment machine, as usage time increases, water treatment effects become worse and worse, while a user cannot replace the water treatment module.

SUMMARY

[0004] The application is desired to provide a dispenser assembly, a detergent box and a clothing treatment machine which facilitate replacement of a water treatment device.

[0005] An aspect of the application provides a dispenser assembly, the dispenser assembly comprises a dispenser and a water treatment device.

[0006] The dispenser is formed with a replacement opening, a placement groove and a liquid discharge opening, both the replacement opening and the liquid discharge opening are communicated with the placement groove.

[0007] The water treatment device is detachably arranged in the placement groove, and is formed with a water inlet, a water outlet, and a reagent cavity receiving a water treatment agent, both the water inlet and the water outlet are communicated with the reagent cavity, and the water outlet is communicated with the placement groove.

[0008] In some embodiments, the dispenser assembly may comprise elastic bodies, the elastic bodies are arranged on at least one side surface of the placement groove and abut against the water treatment device tightly.

[0009] In some embodiments, an end of the elastic body may be connected to the dispenser, another end of the elastic body may be a free end extending into the

placement groove, and the free end is formed with a protrusion abutting against the water treatment device.

[0010] In some embodiments, a part of a side surface of the water treatment device facing the elastic bodies may be recessed to form a groove, at least a part of the protrusion is located in the groove, and the protrusion abuts against a groove wall surface of the groove.

[0011] In some embodiments, the replacement opening may be formed in an upper side surface of the dispenser, the liquid discharge opening is formed in a rear side surface of the dispenser, the water inlet is formed in an upper side surface of the water treatment device, the water outlet is formed in a lower side surface of the water treatment device, and the elastic bodies are arranged in a front side surface and/or a rear side surface of the placement groove.

[0012] In some embodiments, convex ribs may be formed on a left side surface and/or a right side surface of the placement groove, and may abut against the water treatment device.

[0013] In some embodiments, limiting ribs may be formed on a bottom side surface of the placement groove, and may abut against the water treatment device.

[0014] In some embodiments, the dispenser may comprise a base and a bracket.

[0015] The base is formed with an open slot, the open slot is provided with an upper opening, and the liquid discharge opening is formed in a rear side surface of the open slot.

[0016] The bracket is arranged at the upper opening of the open slot to define the placement groove, and is formed with the replacement opening, the elastic bodies extend from the replacement opening into the placement groove, two elastic bodies of the elastic bodies are arranged at an interval in a front-rear direction, and the water treatment device is clamped between the two elastic bodies.

[0017] In some embodiments, the bracket may be detachably connected to the base, and the bracket and the elastic bodies may be in an integrally formed structure.

[0018] In some embodiments, the water treatment device may comprise a housing and a holding shell, the housing is formed with the water inlet, the water outlet and a water-passage cavity, both the water inlet and the water outlet are communicated with the water-passage cavity, the holding shell is arranged in the water-passage cavity and is formed with the reagent cavity and multiple filter holes, and the multiple filter holes are communicated with the water-passage cavity and the reagent cavity.

[0019] Another aspect of the application provides a detergent box, the detergent box comprises a box body and the dispenser assembly as described in any one of the above paragraphs.

[0020] The box body is formed with a water injection channel, a liquid discharge channel and an opening groove.

[0021] The dispenser is able to draw out from the opening groove or push into the opening groove through an opening of the opening groove, the water injection channel is able to inject water into the water inlet, and the liquid discharge channel is communicated with the liquid discharge opening.

[0022] The application further provides a clothing treatment machine, the clothing treatment machine comprises a washing drum and the detergent box as described above.

[0023] The washing drum is formed with a washing cavity.

[0024] The liquid discharge channel is communicated with the washing cavity.

[0025] In the dispenser assembly provided in the embodiments of the application, water may enter the reagent cavity through the water inlet, treated water obtained after it is treated by the water treatment agent enters the placement groove through the water outlet, and the treated water in the placement groove is discharged out of the dispenser through the liquid discharge opening. On one hand, the dispenser dispenses clothing treatment reagents such as detergent or the like, the dispenser is an accessory of the detergent box, and an installation position is provided for the water treatment device by using the dispenser, so that manufacturing cost is low, and the user may easily replace and/or maintain the water treatment device. On the other hand, the water treatment device may be taken out from the placement groove or put into the placement groove through the replacement opening, that is, the water treatment device is replaced by using the replacement opening. The user may replace water treatment devices with different functions according to requirements, which is easy to operate and provides a good user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

FIG. 1 is a schematic structural diagram of a dispenser assembly provided in an embodiment of the application.

FIG. 2 is a schematic structural diagram of a dispenser provided in an embodiment of the application.

FIG. 3 is a schematic cross-section view of the structure shown in FIG. 2.

FIG. 4 is a schematic structural diagram of a detergent box provided in an embodiment of the application.

FIG. 5 is a schematic cross-section view of the structure shown in FIG. 4.

FIG. 6 is a schematic structural diagram of a water treatment device provided in an embodiment of the application.

FIG. 7 is a schematic exploded view of the structure shown in FIG. 6.

FIG. 8 is a schematic structural diagram of a bracket and elastic bodies provided in an embodiment of the application.

5 DETAILED DESCRIPTION

[0027] It should be noted that embodiments of the application and technical features in the embodiments may be combined with each other without conflict. Detailed descriptions in specific implementations should be understood as an explanation and description of the purpose of the application, and should not be considered as undue limitation of the application.

[0028] In the embodiments of the application, orientation or position relationships such as "up", "down", "top", "bottom", "front", "rear", "left" and "right" are based on orientation or position relationships shown in FIG. 2 and FIG. 5. It should be understood that these orientation terms are only intended to facilitate describing the application and simplify descriptions, and are not intended to indicate or imply that the referred device or component must have a specific orientation, or must be configured and operate in a specific orientation, and thus cannot be understood as limitation of the application. The application will be further described in detail below with reference to the drawings and specific embodiments.

[0029] With reference to FIG. 1 to FIG. 7, an embodiment of the application provides a dispenser assembly, the dispenser assembly includes a dispenser 10 and a water treatment device 20. The dispenser 10 is formed with a replacement opening 10a, a placement groove 10b and a liquid discharge opening 10c, both the replacement opening 10a and the liquid discharge opening 10c are communicated with the placement groove 10b. The water treatment device 20 is detachably arranged in the placement groove 10b, and is formed with a water inlet 20a, a water outlet 20b, and a reagent cavity 20c configured to receive a water treatment agent, both the water inlet 20a and the water outlet 20b are communicated with the reagent cavity 20c, and the water outlet 20b is communicated with the placement groove 10b.

[0030] In the dispenser assembly provided in the embodiment of the application, water may enter the reagent cavity 20c through the water inlet 20a, treated water obtained after it is treated by the water treatment agent enters the placement groove 10b through the water outlet 20b, and the treated water in the placement groove 10b is discharged out of the dispenser 10 through the liquid discharge opening 10c. On one hand, the dispenser 10 is configured to dispense clothing treatment reagents such as detergent or the like, the dispenser 10 is an accessory of a detergent box, and an installation position is provided for the water treatment device 20 by using the dispenser 10, so that manufacturing cost is low, and the user may easily replace and/or maintain the water treatment device 20. On the other hand, the water treatment device 20 may be taken out from the placement groove 10b or put into the placement groove 10b through the replacement

opening 10a, that is, the water treatment device 20 is replaced by using the replacement opening 10a. The user may replace water treatment devices 20 with different functions according to requirements, which is easy to operate and provides a good user experience.

[0031] The water treatment agent refers to a reagent which may change compositions of water. Types of the water treatment agent are not limited. Exemplarily, the water treatment agent includes, but is not limited to a scale inhibitor, a bactericide, and/or an aromatherapy agent, etc.

[0032] Exemplarily, the scale inhibitor refers to a reagent which may disperse, interfere or prevent generation of insoluble inorganic salt. Hardness of the water is reduced by the scale inhibitor, to improve washing effects. The scale inhibitor may be a solid substance, and may be slowly dissolved and released when it is exposed to water. For example, the scale inhibitor is in a shape of granules. Modes of reducing hardness of the water by the scale inhibitor are not limited. Mechanisms of reducing hardness of the water by the scale inhibitor include, but are not limited to chelation and solubilization, agglomeration and dispersion, electrostatic repulsion, or crystal distortion, etc.

[0033] Exemplarily, the bactericide refers to a reagent which may inhibit growth of bacteria or eliminate bacteria. The bactericide includes, but is not limited to a silver ion bactericide, etc.

[0034] Exemplarily, the aromatherapy agent refers to a reagent which may release an aromatic substance. In this way, fragrance may be added to clothes.

[0035] The dispenser 10 is used in a detergent box of a clothing treatment machine. With reference to FIG. 4 to FIG. 7, the detergent box provided in an embodiment of the application includes a box body 40 and the dispenser assembly in any one of the embodiments of the application. The box body 40 is formed with a water injection channel 40a, a liquid discharge channel 40b and an opening groove 40c. The dispenser 10 is configured to draw out from the opening groove 40c or push into the opening groove 40c through an opening of the opening groove 40c, the water injection channel 40a is configured to inject water into the water inlet 20a, and the liquid discharge channel 40b is communicated with the liquid discharge opening 10c.

[0036] In the detergent box provided in the embodiment of the application, the dispenser 10 is movably arranged in the box body 40, so that when it needs to replace and/or maintain the water treatment device 20, the dispenser 10 is drawn out of the opening groove 40c through the opening of the opening groove 40c, and thus the water treatment device 20 may be taken out through the replacement opening 10a. After replacement and/or maintenance is completed, the dispenser 10 is pushed into the opening groove 40c, and both the dispenser 10 and the water treatment device 20 are hidden in the box body 40. In a state where both the water treatment device 20 and the dispenser 10 are located in the opening

groove 40c, the water injection channel 40a may inject water into the water inlet 20a, so that the water enters the reagent cavity 20c and comes into contact with the water treatment agent, and the treated water enters the liquid discharge channel 40b through the liquid discharge opening 10c.

[0037] In an embodiment, with reference to FIG. 5 to FIG. 7, the water treatment device 20 includes a housing 21 and a holding shell 22, the housing 21 is formed with the water inlet 20a, the water outlet 20b and a water-passage cavity 21a, both the water inlet 20a and the water outlet 20b are communicated with the water-passage cavity 21a, the holding shell 22 is arranged in the water-passage cavity 21a and is formed with the reagent cavity 20c and multiple filter holes 22a, and the filter holes 22a are communicated with the water-passage cavity 21a and the reagent cavity 20c. The filter holes 22a are configured to implement circulation of water between the water-passage cavity 21a and the reagent cavity 20c. The water in the water-passage cavity 21a enter the reagent cavity 20c through the filter holes 22a, to come into contact with the water treatment agent, and the treated water flows out of the reagent cavity 20c through the filter holes 22a, to be discharged into the opening groove 40c through the water outlet 20b. The water treatment agent is constrained by the holding shell 22, to prevent the water treatment agent from entering the water-passage cavity 21a. The water-passage cavity 21a provides a certain buffer space for the water, which increases time for the water to come into contact with the water treatment agent, so that the water may fully react with the water treatment agent.

[0038] The water treatment agent may be a solid substance, and may be slowly dissolved and released when it is exposed to water. For example, the water treatment agent is in a shape of granules, and the water treatment agent has a volume greater than size of the filter hole 22a, to prevent the water treatment agent from going out of the holding shell 22 through the filter holes 22a. The water treatment agent is constrained in the holding shell 22, and does not block the water inlet 20a and/or the water outlet 20b substantially, thereby keeping water passage unblocked.

[0039] In an embodiment, the holding shell 22 is detachably connected to the housing 21. In this way, the holding shell 22 is prevented from moving arbitrarily in the housing 21.

[0040] Exemplarily, in an embodiment, an end in a length direction of the holding shell 22 is plugged into the housing 21, and an end in the length direction of the holding shell 22 is snap-fitted with the housing 21. In this way, it not only facilitates positioning and assembly of the holding shell 22 and the housing 21, but also it may enhance structural strength of the holding shell 22, to prevent the holding shell 22 from bending and deforming with an impact of water flow.

[0041] Shapes of the holding shell 22 are not limited. Exemplarily, with reference to FIG. 6 and FIG. 7, the

shape of the holding shell 22 is substantially a cylindrical shape.

[0042] Shapes of the housing 21 are not limited. Exemplarily, with reference to FIG. 6, the shape of the housing 21 is substantially a hexahedral shape.

[0043] Specific structures of the housing 21 are not limited. Exemplarily, with reference to FIG. 6 and FIG. 7, the housing 21 includes a shell 211 and two end covers 212. The shell 211 is provided with openings at two ends in a length direction thereof. The two end covers 212 detachably cover the openings at two ends in the length direction of the shell 211 respectively, to define the water-passage cavity 21a together. Both the water inlet 20a and the water outlet 20b are formed on the shell 211. In this way, it facilitates quickly assembling the holding shell 22 into the housing 21, and it may also easily disassemble the holding shell 22. The user may also replace the holding shell 22 while reuse the housing 21, so that cost is low.

[0044] Exemplarily, in an embodiment, with reference to FIG. 7, one of the end covers 212 is snap-fitted with the shell 211, and another one of the end covers 212 is threadedly connected to the shell 211. In this way, it facilitates assembling the end covers 212 and the shell 21 more stably.

[0045] In an embodiment, the housing 21 is formed with overflow openings communicated with the water-passage cavity 21a. Exemplarily, one of the end covers 212 is formed with the overflow openings. The overflow openings improve water outlet capacity of the housing 21, speed up water discharge, and prevent the water in the water-passage cavity 21a from flowing back to the water inlet 20a to a certain extent.

[0046] Specific structures of the holding shell 22 are not limited. Exemplarily, in an embodiment, with reference to FIG. 6 and FIG. 7, the holding shell 22 includes a filter shell 221 and two fixation sleeves 222. The filter shell 221 is provided with openings at two ends in a length direction thereof. The two fixation sleeves 222 detachably cover the openings at two ends in the length direction of the filter shell 221 respectively, to define the reagent cavity 20c together. The filter holes 22a are formed in a circumferential surface of the filter shell 221. In this way, it not only facilitates quickly dispensing the water treatment agent into the holding shell 22, but also it may enhance structural strength of the filter shell 221 through the fixation sleeves 222, to prevent the water flow from impacting the filter shell 221 and making the filter shell 221 bent and deformed.

[0047] In an embodiment, with reference to FIG. 1 and FIG. 2, the dispenser assembly includes elastic bodies 30, the elastic bodies 30 are arranged on at least one side surface of the placement groove 10b and abut against the water treatment device 20 tightly. For example, the elastic bodies 30 abut against the housing 21 tightly. Elastic force of the elastic bodies 30 press against the water treatment device 20, and elastic deformation force of the elastic bodies 30 may increase friction force between the

elastic bodies 30 and the water treatment device 20. In this way, it is difficult for the water treatment device 20 to go out of the placement groove 10b through the replacement opening 10a.

5 **[0048]** Specific structures of the elastic bodies 30 are not limited. Exemplarily, in an embodiment, with reference to FIG. 3, the elastic bodies 30 are substantially in a structure of sheets. The elastic bodies 30 have simple structures, are easy to manufacture, and have low cost.

10 **[0049]** In an embodiment, with reference to FIG. 1 and FIG. 2, the elastic bodies 30 are arranged on two opposite side surfaces of the placement groove 10b, and two opposite side surfaces of the water treatment device 20 abut against two elastic bodies 30 respectively. Exemplarily, the two elastic bodies 30 are located at two sides in a length direction of the housing 21 respectively, and abut against two side surfaces in the length direction of the housing 21 respectively. The water treatment device 20 is clamped between the two elastic bodies 30, and has good stability. When it needs to disassemble the water treatment device 20, the user may grip the water treatment device 20 toward a side of one of the elastic bodies 30 with his/her hands, and push another one of the elastic bodies 30 to spread in a direction away from the water treatment device 20, to quickly take out the water treatment device 20.

20 **[0050]** In an embodiment, with reference to FIG. 1, FIG. 3 and FIG. 5, an end of the elastic body 30 is connected to the dispenser 10, another end of the elastic body 30 is a free end extending into the placement groove 10b, and the free end is formed with a respective protrusion 31 abutting against the water treatment device 20. Exemplarily, protrusions 31 are formed on side surfaces of respective free ends facing the housing 21 and abut against the housing 21. In this way, on one hand, the protrusions 31 may effectively come into contact with the water treatment device 20, and reduce scratches between the water treatment device 20 and the elastic bodies 30. On the other hand, there are gaps between the elastic bodies 30 and the water treatment device 20, so that the user's fingers may extend into the gaps to come into contact with a side surface of the water treatment device 20 facing the elastic bodies 30, thereby applying force to the water treatment device 20 to disassemble the water treatment device 20.

30 **[0051]** Shapes of the protrusions 31 are not limited. Exemplarily, with reference to FIG. 2, the protrusions 31 are substantially in a shape of strips. In this way, there are moderate contact areas between the protrusions 31 and the housing 21, so that both assembly stability and disassembly convenience are taken into account.

35 **[0052]** In an embodiment, with reference to FIG. 5 and FIG. 6, a part of a side surface of the water treatment device 20 facing the elastic bodies 30 is recessed to form a groove 20d, at least a part of the respective protrusion 31 is located in the groove 20d, and the respective protrusion 31 abuts against a groove wall surface of the groove 20d. Exemplarily, a part of a side surface of

the housing 21 facing the elastic bodies 30 is recessed to form the groove 20d. On one hand, the groove 20d may provide a hand-gripping position for the user, and the user's fingers come into contact with the groove wall surface of the groove 20d, to apply force to grip and move the water treatment device 20, and prevent the fingers from slipping off in a process of applying the force. On the other hand, the groove wall surface of the groove 20d abuts against protrusions 31, to play a role of bearing the water treatment device 20, and prevent the water treatment device 20 from slipping off in case that it is touched by mistake.

[0053] In an embodiment, with reference to FIG. 2, FIG. 3, FIG. 6 and FIG. 7, the replacement opening 10a is formed in an upper side surface of the dispenser 10, the liquid discharge opening 10c is formed in a rear side surface of the dispenser 10, the water inlet 20a is formed in an upper side surface of the water treatment device 20, the water outlet 20b is formed in a lower side surface of the water treatment device 20, and the elastic bodies 30 are arranged in a front side surface and/or a rear side surface of the placement groove 10b. Exemplarily, the water inlet 20a is formed in an upper side surface of the housing 21, and the water outlet 20b is formed in a lower side surface of the housing 21. Water flowing through the water treatment device 20 flows in from top and flows out from bottom, resistance thereof is small, which not only facilitates circulation of the water, but also drains the water in the water treatment device 20 such as the housing 21 as much as possible, to avoid residual water. The user may take or place the water treatment device 20 from top through the replacement opening 10a, which reduces the user's bending degree or hand raising height, and makes operations more comfortable.

[0054] Exemplarily, in some embodiments, the elastic bodies 30 are arranged on the front side surface of the placement groove 10b. In some other embodiments, the elastic bodies 30 are arranged on the rear side surface of the placement groove 10b. In some other embodiments, with reference to FIG. 3, the elastic bodies 30 are arranged on both the front side surface and the rear side surface of the placement groove 10b.

[0055] Exemplarily, in an embodiment, with reference to FIG. 5, in a state where the water treatment device 20 is assembled in the placement groove 10b, lower surfaces of protrusions 31 abut against the groove wall surface of the groove 20d. In this way, it needs to apply a large upward acting force to the water treatment device 20, so that the protrusions 31 go out of the groove 20d to disassemble the water treatment device 20, and the water treatment device 20 may be assembled in the dispenser 10 more stably.

[0056] Exemplarily, in an embodiment, with reference to FIG. 5, the opening of the opening groove 40c is formed in a front side surface of the box body 40. In this way, the user may draw out the dispenser 10 from front, and then take the water treatment device 20 from top, which are convenient for operations.

[0057] It should be noted that "up" refers to a direction facing the ceiling, and "down" refers to a direction opposite to "up"; "front" refers to a direction facing the user, and "rear" refers to a direction opposite to "front".

[0058] Exemplarily, in an embodiment, with reference to FIG. 5, multiple spray holes 40a' are formed in a lower side surface of the water injection channel 40a, and are located above the water inlet 20a. Taking a plane perpendicular to an up-down direction as a projection surface, projections of multiple spray holes 40a' are in a range of projection of the water inlet 20a. On one hand, the spray holes 40a' penetrate the lower side surface of the water injection channel 40a, and are configured to spray the water from the water injection channel 40a into the water inlet 20a. The spray holes 40a' may have small diameters to disperse water flow, and the water flow is sprayed into the water inlet 20a through multiple spray holes 40a' in a shower-like manner, which increases a contact area between the water flow and the water treatment agent. On the other hand, the water inlet 20a has a large size, and area of the water inlet 20a is greater than a sum of areas of multiple spray holes 40a', which facilitates the water inlet 20a to receive water from the spray holes 40a'.

[0059] In an embodiment, with reference to FIG. 1, convex ribs 10b' are formed on a left side surface and/or a right side surface of the placement groove 10b, and abut against the water treatment device 20. For example, the convex ribs 10b' may be formed on the left side surface of the placement groove 10b. For another example, the convex ribs 10b' may be formed on the right side surface of the placement groove 10b. For another example, with reference to FIG. 2, the convex ribs 10b' may be formed on the left side surface and the right side surface of the placement groove 10b. Exemplarily, the convex ribs 10b' abut against the housing 21. In this way, the convex ribs 10b' may effectively come into contact with the water treatment device 20 such as the housing 21, which may not only prevent the water treatment device 20 from offsetting in the placement groove 10b, to play a role of positioning and limiting, but also may reduce scratches between the water treatment device 20 and side surfaces of the placement groove 10b, to facilitate assembly and disassembly of the water treatment device 20.

[0060] There may be one or multiple convex ribs 10b' in number. "multiple" includes two and more than two.

[0061] Shapes of the convex ribs 10b' are not limited. With reference to FIG. 1, the convex ribs 10b' may be in point-shaped structures with small sizes.

[0062] In an embodiment, with reference to FIG. 2 and FIG. 5, limiting ribs 10b" are formed on a bottom side surface of the placement groove 10b, and abut against the water treatment device 20. Exemplarily, the limiting ribs 10b" abut against a bottom surface of the housing 21. In this way, a certain supportive force is provided by the limiting ribs 10b" to the water treatment device 20. There is an interval space between a bottom surface of the

water treatment device 20 such as the bottom surface of the housing 21 and the bottom side surface of the placement groove 10b, to prevent the bottom surface of the water treatment device 20 such as the bottom surface of the housing 21 from fitting the bottom side surface of the placement groove 10b. The water flow from the water outlet 20b may quickly flow to the liquid discharge opening 10c through the interval space.

[0063] It should be noted that "top" is consistent with an upper direction, and "bottom" is consistent with a lower direction.

[0064] There may be one or multiple limiting ribs 10b" in number. Shapes of the limiting ribs 10b" are not limited. Exemplarily, with reference to FIG. 2, the limiting ribs 10b" include, but are not limited to strip-shaped or point-shaped structures, etc.

[0065] In an embodiment, with reference to FIG. 2 and FIG. 5, the dispenser 10 is formed with a detergent groove 10d communicated with the liquid discharge channel 40b, and the detergent groove 10d is provided with an opening at an upper side thereof. The user may draw out the dispenser 10 from the opening groove 40c, and add detergent into the detergent groove 10d through the opening at the upper side thereof. The detergent may enter a washing cavity of a washing drum through the liquid discharge channel 40b, to wash clothes.

[0066] In an embodiment, with reference to FIG. 5, the dispenser 10 is formed with a softener groove 10e communicated with the liquid discharge channel 40b, and the softener groove 10e is provided with an opening at an upper side thereof. The user may draw out the dispenser 10 from the opening groove 40c, and add softener into the softener groove 10e through the opening at the upper side thereof. The softener may enter the washing cavity through the liquid discharge channel 40b, to brighten and soften clothes.

[0067] In an embodiment, the dispenser 10 is formed with a siphon channel communicated with the softener groove 10e and the liquid discharge channel 40b. The softener is sent into the liquid discharge channel 40b through siphon effects of the siphon channel.

[0068] In an embodiment, a communication opening is formed in the rear side surface of the dispenser 10, and is communicated with the detergent groove 10d and the liquid discharge channel 40b. In this way, the detergent enters the liquid discharge channel 40b through the communication opening.

[0069] In an embodiment, with reference to FIG. 2, the placement groove 10b and the softener groove 10e may be arranged at an interval in a front-rear direction. In this way, volumes of both the placement groove 10b and the softener groove 10e may be large without increasing size of the dispenser 10.

[0070] In an embodiment, with reference to FIG. 3 and FIG. 8, the dispenser 10 includes a base 11 and a bracket 12. The base 11 is formed with an open slot, the open slot is provided with an upper opening, and the liquid discharge opening 10c is formed in a rear side surface of the

open slot. The bracket 12 is arranged at the upper opening of the open slot to define the placement groove 10b, and is formed with the replacement opening 10a, the elastic bodies 30 extend from the replacement opening 10a into the placement groove 10b, two elastic bodies of the elastic bodies 30 are arranged at an interval in a front-rear direction, and the water treatment device 20 is clamped between the two elastic bodies 30. In this way, the water treatment device 20 is tightly clamped between the two elastic bodies 30 and has good stability. When it needs to assemble the water treatment device 20, the water treatment device 20 is pressed downward at the replacement opening 10a until the water treatment device 20 is clamped between the two elastic bodies 30, so that assembly of the water treatment device 20 is achieved quickly. When it needs to disassemble the water treatment device 20, the user may grip the water treatment device 20 toward a side of one of the elastic bodies 30 with his/her hands, and push another one of the elastic bodies 30 to spread in a direction away from the water treatment device 20. For example, the user may grip a front side surface of the water treatment device 20 with his/her hands, and push the elastic bodies 30 located at the rear to spread backward, to quickly take out the water treatment device 20.

[0071] In an embodiment, with reference to FIG. 3 and FIG. 8, the bracket 12 is detachably connected to the base 11, and the bracket 12 and the elastic bodies 30 are in an integrally formed structure. The base 11 and the bracket 12 may be structures independent of each other. That is, the base 11 and the bracket 12 may be manufactured separately and individually. In this way, design and production difficulty of the bracket 12 and the base 11 may be reduced, to improve production efficiency. The bracket 12 and the elastic bodies 30 are in an integrally formed structure, which may reduce assembly operations between the bracket 12 and the elastic bodies 30, and may also enhance structural strength of the bracket 12 and the elastic bodies 30.

[0072] Detachable connection between the bracket 12 and the base 11 includes, but is not limited to snap connection, screw connection or bolt connection, etc.

[0073] Exemplarily, in an embodiment, with reference to FIG. 3 and FIG. 8, the bracket 12 is formed with a clamping platform 121 and a clamping column 122 provided with a bump 1221, and the base 11 is formed with a clamping hole 111 and a flange 112. The clamping column 122 may penetrate into the clamping hole 111 in a recoverable deformation manner, so that the bump 1221 moves from being above the clamping hole 122 to being below the clamping hole 122 and abuts against a lower surface of the clamping hole 122. The clamping platform 121 may move from being above the flange 112 to being below the flange 112 in a recoverable deformation manner, so that the clamping platform 121 abuts against a lower surface of the flange 112. During assembly, an operator may press the bracket 12 downward, the bracket 12 is subject to a downward pressing force, the clamp-

ing column 122 may penetrate into the clamping hole 111 in a recoverable deformation manner, the clamping platform 121 may move from being above the flange 112 to being below the flange 112 in a recoverable deformation manner, the bump 1221 abuts against the lower surface of the clamping hole 111, and the clamping platform 121 abuts against the lower surface of the flange 112, to achieve snap connection between the bracket 12 and the base 11. In this way, the bracket 12 is arranged at the upper opening of the open slot. That is, the clamping column 122 may be elastically deformed, so that the bump 1221 avoids the clamping hole 111, and the bump 1221 may move from being above the clamping hole 111 to being below the clamping hole 111. The clamping platform 121 is provided with a portion which may be elastically deformed, so that it may move from being above the flange 112 to being below the flange 112.

[0074] In an embodiment, with reference to FIG. 3 and FIG. 8, convex ribs 10b' are formed on a right side surface of the bracket 12, convex ribs 10b' are formed on a left side surface of the open slot, and limiting ribs 10b'' are formed on a bottom side surface of the open slot.

[0075] In an embodiment, with reference to FIG. 3 and FIG. 8, the base 11 is formed with the softener groove 10e, and the bracket 12 is formed with the siphon channel. Liquid in the softener groove 10e may be discharged into the liquid discharge channel 40b with siphon effects of the siphon channel.

[0076] In an embodiment, with reference to FIG. 2, the placement groove 10b and the detergent groove 10d may be arranged at an interval in a left-right direction. In this way, volumes of both the placement groove 10b and the detergent groove 10d may be large without increasing size of the dispenser 10 in the up-down direction.

[0077] It should be noted that the up-down direction, the front-rear direction and the left-right direction are perpendicular to each other and form a three-dimensional vertical coordinate system together.

[0078] In an embodiment, the detergent groove 10d is separated from the placement groove 10b, and the box body 40 is formed with a water supply channel communicated with the detergent groove 10d. After water from the water supply channel enters the detergent groove 10d, the water flushes the detergent into the liquid discharge channel 40b.

[0079] The water supply channel and the water injection channel 40a may be separately controlled respectively for water entry, to implement multiple liquid entry modes and enrich functions of the clothing treatment machine. Exemplarily, in some embodiments, the water supply channel may be controlled to implement water entry separately, so that the detergent may be separately sent into the washing cavity. In some other embodiments, the water injection channel 40a may be controlled to implement water entry separately, so that the treated water may be separately sent into the washing cavity. In some other embodiments, the water injection channel 40a and the water supply channel may be controlled to

implement water entry synchronously, so that the treated water and detergent may be premixed in the liquid discharge channel 40b and then sent into the washing cavity.

5 **[0080]** In some embodiments, the opening groove 40c may also be communicated with the detergent groove 10d. In this way, the water flow in the opening groove 40c is used to flush the detergent in the detergent groove 10d into the liquid discharge channel 40b.

10 **[0081]** A clothing treatment machine provided in an embodiment of the application includes a washing drum and the detergent box in any one of the embodiments of the application. The washing drum is formed with a washing cavity. The liquid discharge channel 40b is communicated with the washing cavity.

15 **[0082]** In the clothing treatment machine provided in the embodiment of the application, the water treatment device 20 provides treated water for the washing cavity, and clothes are washed through the treated water, to improve clothing treatment effects. For example, a clothing treatment agent may be a scale inhibitor, hardness of water is reduced by the scale inhibitor, to form softened water, to prevent clothes from turning yellow and becoming stiff.

25 **[0083]** In an embodiment, the water injection channel 40a may be connected to a water inlet valve of the clothing treatment machine, and the water inlet valve is connected to a tap water pipe. In this way, the tap water enters the water treatment device 20 through the water injection channel 40a, to react with the water treatment agent, and then the treated water is discharged into the washing cavity through the liquid discharge channel 40b.

30 **[0084]** In an embodiment, the washing drum is rotatable. In this way, movement of the clothes and water flow may be driven by rotation of the washing drum, to wash the clothes. For example, cleaning, rinsing, dehydration or the like of the clothes may be implemented by rotation of the washing drum.

35 **[0085]** In an embodiment, the clothing treatment machine may include a tub sleeved out of the washing drum. Through holes may be formed in a circumferential surface of the washing drum. The tub may be configured to hold water, and the water in the tub may enter the washing drum or flow out of the washing drum through the through holes. The tub may be kept fixed, which facilitates arrangement of the water inlet valve, the box body 40 or other structures on the tub, to reduce assembly difficulty.

40 **[0086]** In an embodiment, a rotation axis of the washing drum may be in a horizontal direction. In other words, the clothing treatment machine may be a drum-type clothing treatment machine. Exemplarily, an axis of the tub and the rotation axis of the washing drum are in the horizontal direction, and both the washing drum and the tub are opened toward their front sides. In this way, the user may put clothes into the washing cavity or take clothes out of the washing cavity through openings at the front sides of the washing drum and the tub.

45 **[0087]** In an embodiment, the clothing treatment ma-

chine includes a casing, and both the washing drum and the box body 40 are arranged in the casing. The casing is formed with a drawing-pulling opening, and the opening of the opening groove 40c faces the drawing-pulling opening. The dispenser 10 may be drawn out of the casing or pushed into the casing through the drawing-pulling opening. The dispenser 10 is drawn out of the casing from the drawing-pulling opening, so that the user may add detergent into the dispenser 10 or replace the water treatment device 20. After processing is completed, the dispenser 10 is pushed into the casing. The casing may prevent the user or other objects from touching the dispenser 10 and the water treatment device 20 by mistake, which has high safety and good aesthetics.

[0088] In an embodiment, the drawing-pulling opening may be formed at an upper left corner or upper right corner of a front side surface of the casing. In this way, the drawing-pulling opening faces the user and is at a high height, and the user may draw and pull the dispenser 10 with his/her hands by bending down slightly or without bending down, to assemble and disassemble the water treatment device 20, which facilitates operations.

[0089] In an embodiment, the clothing treatment machine may also be provided with a drying function, that is, the clothing treatment machine may also be provided with a drying air duct communicated with the washing cavity. The drying air duct may supply airflow into the washing cavity, to dry clothes in the washing cavity.

[0090] The above descriptions are only specific implementations of the application, however, the scope of protection of the application is not limited thereto. Variation or replacement easily conceived by any technician familiar with this technical field within the technical scope disclosed in the application, should fall within the scope of protection of the application. Therefore, the scope of protection of the application should be subject to the scope of protection of the claims.

Claims

1. A dispenser assembly, comprising:

a dispenser, formed with a replacement opening, a placement groove and a liquid discharge opening, both the replacement opening and the liquid discharge opening communicated with the placement groove; and

a water treatment device, detachably arranged in the placement groove, and formed with a water inlet, a water outlet, and a reagent cavity receiving a water treatment agent, both the water inlet and the water outlet communicated with the reagent cavity, and the water outlet communicated with the placement groove.

2. The dispenser assembly of claim 1, comprising: elastic bodies, arranged on at least one side surface

of the placement groove and abutting against the water treatment device tightly.

3. The dispenser assembly of claim 2, wherein an end of the elastic body is connected to the dispenser, another end of the elastic body is a free end extending into the placement groove, and the free end is formed with a protrusion abutting against the water treatment device.

4. The dispenser assembly of claim 3, wherein a part of a side surface of the water treatment device facing the elastic bodies is recessed to form a groove, at least a part of the protrusion is located in the groove, and the protrusion abuts against a groove wall surface of the groove.

5. The dispenser assembly of claim 2, wherein the replacement opening is formed in an upper side surface of the dispenser, the liquid discharge opening is formed in a rear side surface of the dispenser, the water inlet is formed in an upper side surface of the water treatment device, the water outlet is formed in a lower side surface of the water treatment device, and the elastic bodies are arranged in a front side surface and/or a rear side surface of the placement groove.

6. The dispenser assembly of claim 5, wherein convex ribs are formed on a left side surface and/or a right side surface of the placement groove, and abut against the water treatment device.

7. The dispenser assembly of claim 5, wherein limiting ribs are formed on a bottom side surface of the placement groove, and abut against the water treatment device.

8. The dispenser assembly of claim 2, wherein the dispenser comprises:

a base, formed with an open slot, the open slot provided with an upper opening, and the liquid discharge opening formed in a rear side surface of the open slot; and

a bracket, arranged at the upper opening of the open slot to define the placement groove, and formed with the replacement opening, the elastic bodies extending from the replacement opening into the placement groove, two elastic bodies of the elastic bodies arranged at an interval in a front-rear direction, and the water treatment device clamped between the two elastic bodies.

9. The dispenser assembly of claim 8, wherein the bracket is detachably connected to the base, and the bracket and the elastic bodies are in an integrally formed structure.

10. The dispenser assembly of any one of claims 1 to 9, wherein the water treatment device comprises a housing and a holding shell, the housing is formed with the water inlet, the water outlet and a water-passage cavity, both the water inlet and the water outlet are communicated with the water-passage cavity, the holding shell is arranged in the water-passage cavity and is formed with the reagent cavity and a plurality of filter holes, and the plurality of filter holes are communicated with the water-passage cavity and the reagent cavity.

11. A detergent box, comprising:

a box body, formed with a water injection channel, a liquid discharge channel and an opening groove; and
a dispenser assembly of any one of claims 1 to 10, a dispenser being able to draw out from the opening groove or push into the opening groove through an opening of the opening groove, the water injection channel being able to inject water into a water inlet, and the liquid discharge channel communicated with a liquid discharge opening.

12. A clothing treatment machine, comprising:

a washing drum, formed with a washing cavity;
and
a detergent box of claim 11, a liquid discharge channel communicated with the washing cavity.

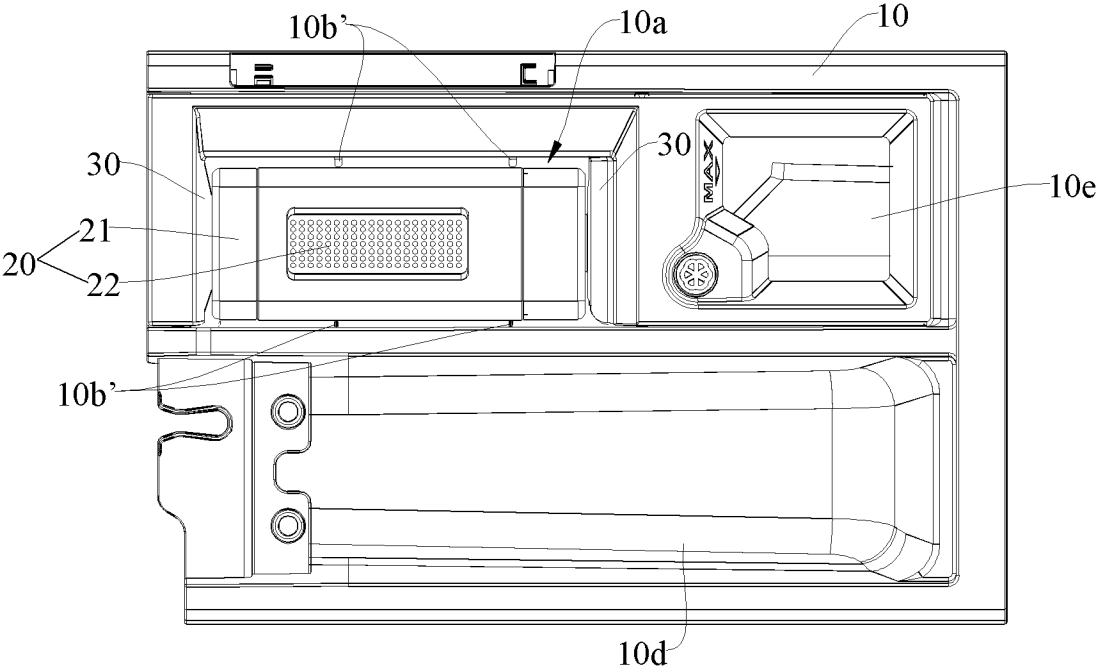


FIG. 1

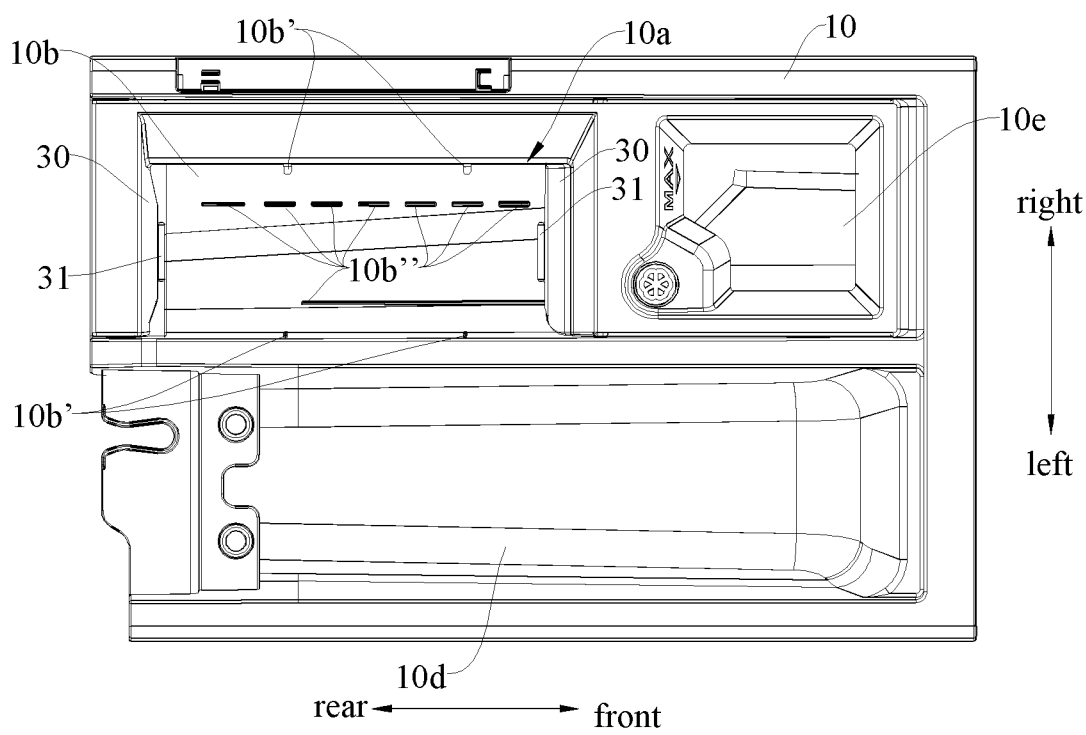


FIG. 2

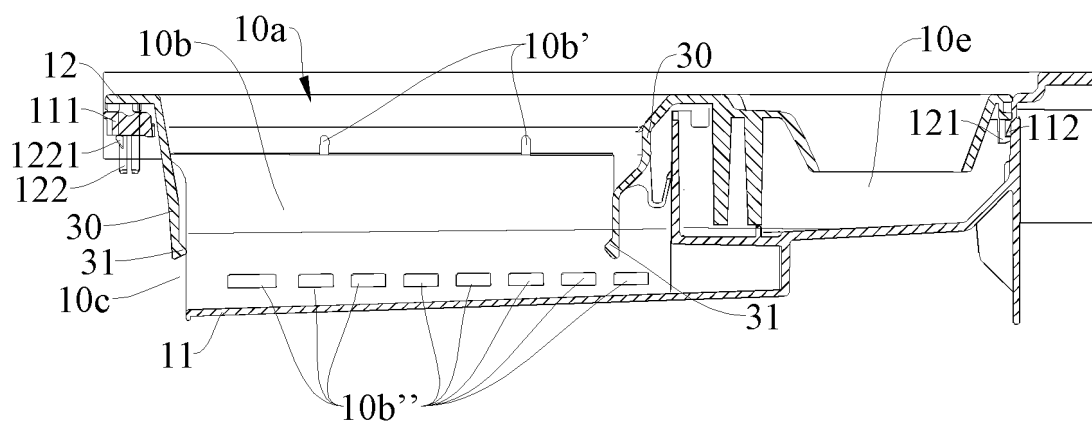


FIG. 3

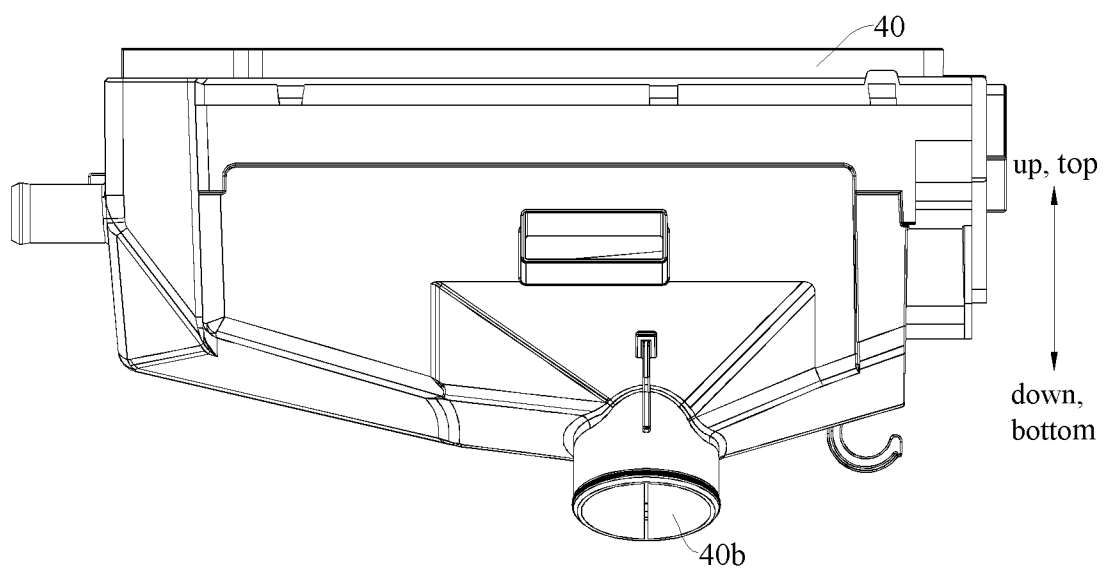


FIG. 4

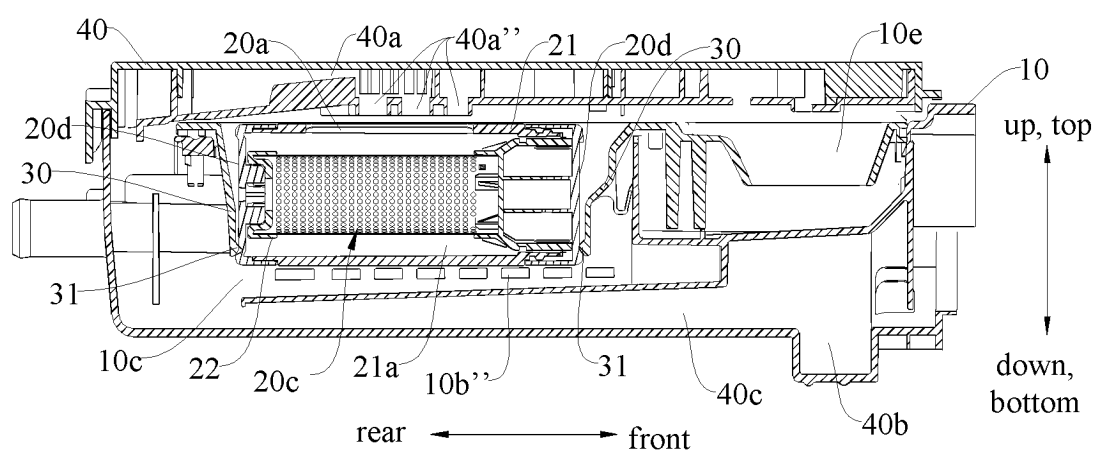


FIG. 5

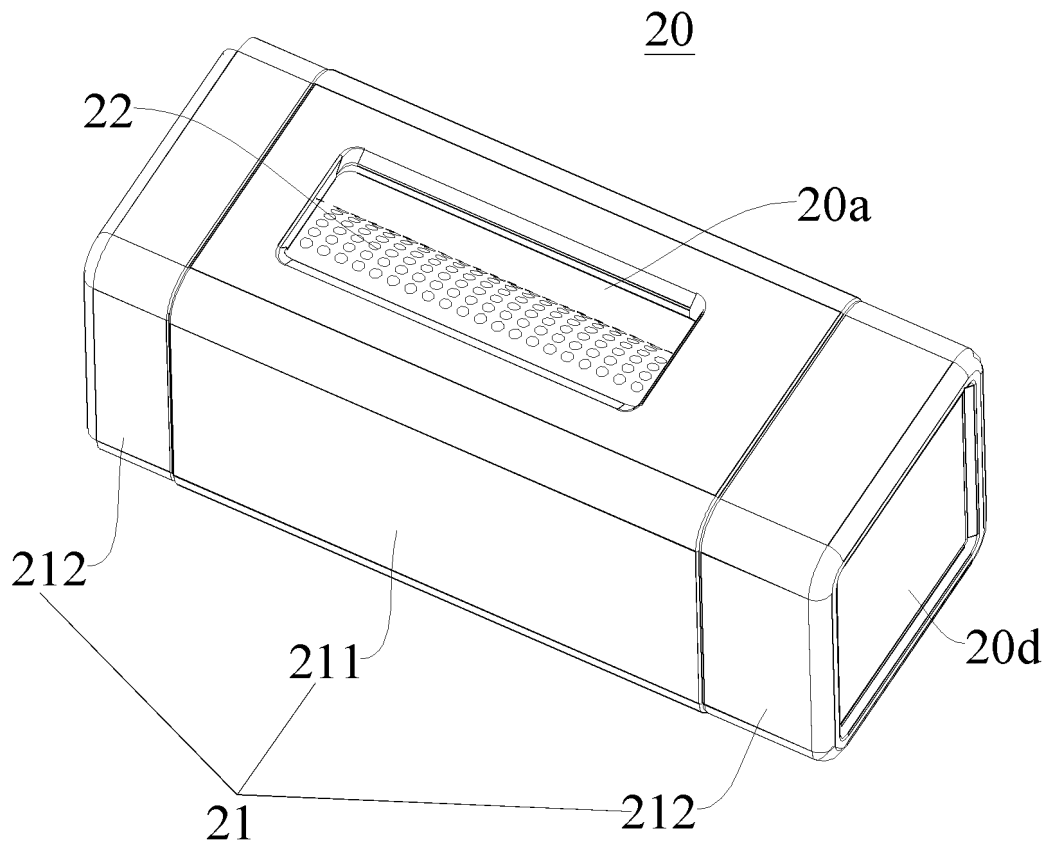


FIG. 6

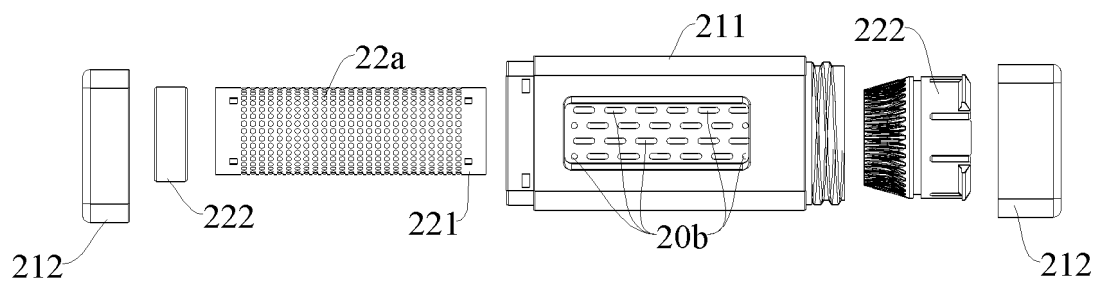


FIG. 7

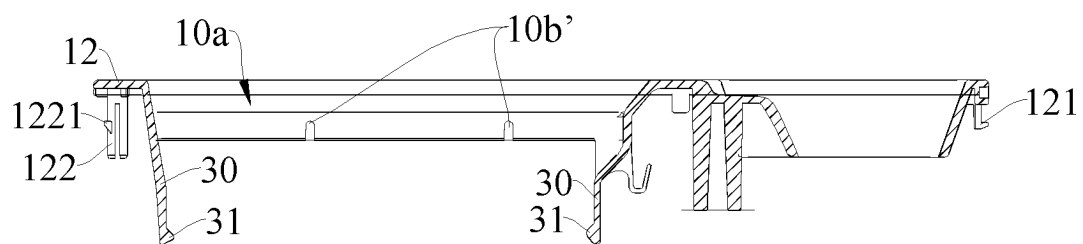


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/108636

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/02(2006.01)i; D06F 39/06(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F

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

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

CNTXT, DWPI, VEN: 软化, 抑垢, 阻垢, 除垢, 水处理, 可拆, 拆卸, 盒, 弹性, scale, soft, detach, remove, box, elastic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 114703634 A (WUXI LITTLE SWAN ELECTRIC CO., LTD.) 05 July 2022 (2022-07-05) claims	1-12
Y	CN 108570827 A (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 25 September 2018 (2018-09-25) description, paragraphs 38-45, and figures 1-7	1-12
Y	CN 112726137 A (YUNMI INTERNET TECHNOLOGY (GUANGDONG) CO., LTD.) 30 April 2021 (2021-04-30) description, paragraphs 47-78, and figures 1-7	1-12
A	CN 113802338 A (TOSHIBA LIFESTYLE PRODUCTS & SERVICES CORP.) 17 December 2021 (2021-12-17) entire document	1-12
A	CN 214736785 U (YUNMI INTERNET TECHNOLOGY (GUANGDONG) CO., LTD.) 16 November 2021 (2021-11-16) entire document	1-12
A	CN 1160104 A (PANASONIC CORP.) 24 September 1997 (1997-09-24) entire document	1-12

☒ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

31 August 2022

Date of mailing of the international search report

29 December 2022

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
CN)
No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing
100088, China

Facsimile No. (86-10)62019451

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/108636

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 109385842 A (QINGDAO HAIER WASHING MACHINE CO., LTD.) 26 February 2019 (2019-02-26) entire document	1-12
A	US 2010000573 A1 (WHIRLPOOL CORP.) 07 January 2010 (2010-01-07) entire document	1-12
A	EP 3473764 A1 (ELECTROLUX LAUNDRY SYSTEMS SWEDEN AB) 24 April 2019 (2019-04-24) entire document	1-12
A	DE 102008004258 A1 (BSH BOSCH SIEMENS HAUSGERAETE) 02 October 2008 (2008-10-02) entire document	1-12
A	CN 208701357 U (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 05 April 2019 (2019-04-05) entire document	1-12

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/108636

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 114703634 A	05 July 2022	None	
CN 108570827 A	25 September 2018	None	
CN 112726137 A	30 April 2021	None	
CN 113802338 A	17 December 2021	None	
CN 214736785 U	16 November 2021	None	
CN 1160104 A	24 September 1997	MY 115898 A	30 September 2003
		KR 970062163 A	12 September 1997
		TW 378242 B	01 January 2000
		IN 191035 B	13 September 2003
		IN 2002KOL00248 A1	25 March 2005
		JP H09225182 A	02 September 1997
CN 109385842 A	26 February 2019	None	
US 2010000573 A1	07 January 2010	DE 102009030331 A1	07 January 2010
EP 3473764 A1	24 April 2019	None	
DE 102008004258 A1	02 October 2008	None	
CN 208701357 U	05 April 2019	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 202210337065X [0001]