

TITLE: WASHING CONTAINER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a washing container, having a receiving barrel, a rotatable brush and an upper cover. When food is put in from the throw-in port and falls down in the receiving barrel filled with water within the surrounding of the rotatable brush, activate the rotatable brush to rotate, the food to be cleaned can be brushed and washed, this is favorable to washing of various granular food, and especially applicable for medium and small size granular fruits.

2. Description of the Prior Art

Most fruits need to be washed before eating, so as to avoid eating residual pesticide left on the fruit skins or eating other fine dirt and decayed bacterial injurious to health of human.

Normally, medium size fruits such as apples, pears etc. will be washed cleaner due to their larger smooth skins, when they are flushed, the hands of the washer can contact most skins of them, they still need to be washed one by one though. When it is to wash smaller fruits such as grapes, jujubes and cherries etc., because of the smaller volume and larger quantity thereof, quite a lot of time shall be taken if they are to be washed one by one, yet it is improbable to thoroughly cleans them all. In

view of this, most people place the small fruits into a receiving barrel, and pour water therein to stir the fruits with hands, after that, they tip water to count it as finished, the fruits are not cleansed at all, and pesticide left or bacteria in the fungi of the damaged fruit skins make the situation even worse, they are in no way eliminated.

In addition to these, other food edible or to be going to be washed before cooking, e.g., the plants such as mushrooms, small tomatoes, the seafood such as clams, shrimps etc., when they are washed, the problems stated above of inability to wash them clean or necessity of wash them one by one by taking too much time still exist; such problems are widely encountered in the kitchens of families or restaurants, cooks have been long bothered by such problems.

SUMMARY OF THE INVENTION

The object of the present invention is to design and provide a washing tool for use by cooks to complete washing of various foods in a easy, quick and safer way, yet the foods can be cleaned more thoroughly. In the procedure of study and developing, a measure of dealing being referred to is that, users mostly place various food into a receiving barrel, and pour water therein to stir the food with hands, so that every individual of the food is washed by water. In this view, when the tool is

used to stir, a hand grip is used to drive a rotatable axle structure for rotation stirring, or a motor is provided to drive the rotatable axle for rotation stirring.

However, the above stated stirring method can not wash food clean, then another measure is referred, where-in, a fine brush is used to brush food for getting the cleansing effect. And however, when the food is washed, skins of some of the food are flexible and are subjected to breaking, material making the brush shall not be too stiff. When in washing by using of the tool and in the operation mode using the afore mentioned rotatable axle for rotation stirring, a cylindrical brush washer provided with fine, dense and soft brush down or brush strips can be contemplated to be provided to be driven by the rotatable axle for rotation, thereby, to form a rotating brush pivotally provided in the receiving barrel.

Besides, using of ozone generator is gradually popularized, ozone can kill bacteria and neutralize little residual pesticide, therefore, it can render food not to be easily decayed and can keep their freshness or be not toxic, in the recent years, it has been effectively used in refrigerators, yet some clothes washing machines also are added with ozone for washing clothes to get rid of leaving of bacteria in the clothes.

Moreover, anions generated by an anion generator can absorb substances such as cations and dust etc., this is

widely used in the household appliances such as air filters, when water is stirred with food therein, a great lot of air bubbles are formed during stirring, if anions are added in the bubbles, dust or dirt on the food can be carried away of the surfaces thereof by contact of the bubbles with the food. In view of this, when using a washing tool, a base including an ozone or an ozone/anion generator can be contemplated to be provided, then put a receiving barrel on the base, so that cleansing of food will be faster, cleaner and more sanitary.

10 In conclusion, in reference to the conditions favorable in practising being considered in the procedure of invention of the present invention, the present invention should be comprised at least of: a receiving barrel, a rotatable brush and an upper cover; wherein:

15 The receiving barrel is in a form of a tank for receiving therein clean water and articles to be washed, a protruding axle seat and a groove are provided on the upper surface of the bottom thereof, the groove extends externally to one lateral edge thereof to connect with a connecting pipe.

20 The rotatable brush is in a form of a cylinder, and is put on the axle seat with its periphery keeping a suitable distance from the inner rim of the receiving barrel, fine and soft brush down or brush strips are uniformly provided thereon, a driving portion is provided on the top central position thereof.

The upper cover covers the top of the receiving barrel, a hand grip and a throw-in port are provided on the top thereof, the hand grip can be rotated to drive a gear set and in turn to drive a rotatable axle which extends to the bottom of the upper cover to connect to the driving portion of the rotatable brush; the throw-in port is an access to the receiving barrel for the articles to be cleansed and clean water.

By means of the above stated structure, when the space between the inner rim of the receiving barrel and the external periphery of the rotatable brush is put in with a lot of the articles to be cleansed and clean water, the hand grip can be rotated to turn the rotatable brush, therefore, the clean water and the articles to be cleansed will interflow and move cross wise, thus the brush down or brush strips on the surface of the rotatable brush can brush and wash the surfaces of the articles to be cleansed, and cleansing effect can thus be achieved.

Additionally, the receiving barrel can be provided with a base on the bottom thereof, the base is provided therein with an ozone or an ozone/anion generator which is connected to an air pipe, a connector is provided on the end of the air pipe and is connected to a connecting pipe provided at the bottom of the receiving barrel, the connecting pipe extends into a groove; when in cleansing, air carrying ozone or ozone/anion generated in the base

is injected through the connector into the receiving barrel to generate air bubbles, so that when the articles to be cleansed is brushed and washed by water and the rotatable brush, they are treated by the ozone and anions, the residual pesticide, impurities and bacteria on the surfaces thereof are fast cleaned.

The present invention will be apparent in its technical characteristics after reading the detailed description of the preferred embodiments thereof in reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 is a partial sectional analytical perspective view of the members composing the present invention;

Fig. 2 is a perspective view showing assembling of the receiving barrel and the rotatable brush of the present invention is completed, while the upper cover therein is turned over;

Fig. 3 is an analytic perspective view of the upper cover of the present invention;

Fig. 4 is a sectional view showing assembling of the present invention is completed for use;

Fig. 5 is a sectional view showing the second embodiment of the rotatable brush of the present invention;

Fig. 6 is a sectional view showing the third embodiment of the rotatable brush of the present invention;

Fig. 7 is an analytic perspective view showing the present invention is assembled with a base having an ozone or ozone/anion generator therein;

5 Fig. 8 is a sectional view showing the present invention is assembled with the base having an ozone or ozone/anion generator therein;

Fig. 9 is an analytic perspective view showing a bubble connector of the present invention;

10 Fig. 10 is a sectional view showing the bubble connector of the present invention provided on the bottom of the receiving barrel;

Fig. 11 is a sectional view showing the present invention is used with a base having a rotatable brush driven by a motor.

15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, the washing container of the present invention is comprised of: a receiving barrel 10, a rotatable brush 20 and an upper cover 30. wherein: the receiving barrel 10 is in a form of a tank for receiving therein clean water and articles to be washed, a plurality of flow disturbance plates 101 are provided surroundingly therewithin, a protruding axle seat 102 is provided on the upper surface of the bottom thereof, two locking hooks 103 are provided on the external upper surface thereof.

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The rotatable brush 20 is in a form of a cylinder, and is placed in the receiving barrel 10, fine and soft brush down or brush strips 201 are uniformly provided on the external surface thereof, an axle sleeve 202 is provided at the center position thereof, the bottom end of the axle sleeve 202 can be fitted over the axle seat 102 provided on the upper surface of the bottom of the receiving barrel 10, and a driving portion 203 is provided on the top of the axle sleeve 202.

The upper cover 30 covers the top of the receiving barrel 10, a locking member 301 is provided correspondingly for each of the above mentioned locking hook 103, a hand grip 302 and a throw-in port 303 are provided on the top of the upper cover 30.

Please refer to Fig. 2, the above mentioned rotatable brush 20 is placed in the receiving barrel 10 with its external periphery keeping a suitable distance from the inner rim of the receiving barrel 10. The upper cover 30 can be closed over by engagement of the locking members 301 with the locking hooks 103 provided on the receiving barrel 10, so that the upper cover 30 covers the top of the receiving barrel 10, the throw-in port 303 on the upper cover 30 extends from the top through the bottom of the upper cover 30, and is located exactly above a position between the inner rim of the receiving barrel 10 and the external periphery of the rotatable brush 20; the

bottom of the upper cover 30 is provided with a protruding rotating axle 304 mating with the driving portion 203 provided on the top of the axle sleeve 202, the rotating axle 304 can be inserted into the driving portion 203.

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Please refer to Fig. 3, the above mentioned upper cover 30 is provided at the bottom thereof with a bottom plate 305 to keep a space between the body of the upper cover 30 and the bottom plate 305, a driving gear set 306 can be provided in the space, the hand grip 302 provided on the top of the upper cover 30 is engaged on the bottom thereof with the driving gear set 306, so that when the hand grip 302 is rotated, by driving of the driving gear set 306, the rotating axle 304 can be rotated.

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Please refer to Fig. 4, in completion of assembling of the washing container of the present invention, the protruding axle seat 102 provided on the upper surface of the bottom of the receiving barrel 10 is pivotably connected to the bottom of the axle sleeve 202 at the center of the rotatable brush 20, while the driving portion 203 provided on the top of the axle sleeve 202 is engaged in the rotating axle 304 provided on the bottom of the upper cover 30, the upper cover 30 is fixedly locked by the locking members 301 onto the locking hooks 103 provided on the receiving barrel 10, while the throw-in port 303 is located above a position between the inner rim of the re-

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ceiving barrel 10 and the external periphery of the rotatable brush 20; when a user holds the hand grip 302 and rotate the same, the driving gear set 306 will be driven, the rotatable brush 20 can then be rotated by the action
5 that the driving gear set 306 drives the rotating axle 304 which in turn drives the driving portion 203.

By means of the above structure, when the user places a plurality of articles "A" to be washed and clean water into the space between the inner rim of the receiving barrel 10 and the rotatable brush 20, the rotated hand grip
10 302 can turn the rotatable brush 20, by displacement of the brush down or brush strips 201 provided on the rotatable brush 20 and by disturbance of the flow disturbance plates 101 provided on the inner wall of the receiving
15 barrel 10, the articles "A" to be washed in water can be floated and flow, so that the articles "A" can avoid precipitating on the bottom of the receiving barrel 10, while the brush down or brush strips 201 can thoroughly brush the surfaces of the articles "A" to be washed, the
20 articles "A" can thus be ready for use, and effect of cleansing can be achieved. Moreover, when in brushing and washing, salt can be added through the the throw-in port 303 to treat the articles "A" to be washed even cleaner.

Referring to Fig. 4, 5 and 6, when in operation of
25 the brush down or brush strips 201 provided on the external periphery of the rotatable brush 20, as is shown in

Fig. 4, coarser and longer brush strips 201 can be used and arranged alternately, also as shown in Fig. 5, brush strips 212 can be formed and all in equal length, or as shown in Fig. 6, softer and finer brush down 213 can be used, by all means, providing and arranging of the brush down 213 can also be of equal length or alternatively long and short down, so that when in washing of the articles "A" to be washed, the rotatable brush 20 can be chosen according to softness of the surfaces of, or size of granules of the articles "A" to be washed or its easiness of being destroyed. The external diameter of the rotatable brush 20 can be variable in pursuance of the sizes of the articles "A" to be washed.

Referring to Fig. 7, when in practising of the present invention, a base 40 can be provided, the receiving barrel 10 is placed on the top of the base 40, when in brushing and washing of the above stated structure of washing container, the base 40 can generate bubbles containing ozone or ozone/anion to be injected into the receiving barrel 10, by the nature that ozone can kill bacteria and neutralize little residual pesticide and the function that anions can carry impurities such as dust etc. away from the surfaces of the articles to be washed, the articles "A" to be washed can be cleansed much cleaner. In this embodiment, the upper surface of the bottom of the receiving barrel 10 is further excavated downward

to form a groove 104 which extends externally to connect with a connecting pipe 105; the bottom of the receiving barrel 10 is further extended downward to form a plurality of legs 106, two locking hooks 107 are provided on the external lower surface thereof. The above mentioned base 40 is provided with a seating surface 401 on the top thereof for placing the receiving barrel 10; the seating surface 401 is provided on the top thereof with a recessed portion 402 corresponding to the groove 104 of the receiving barrel 10 and with a plurality of positioning holes 403 corresponding to the legs 106, the base 40 is provided with locking members 404 on two mutually opposed top edges thereof corresponding to the locking hooks 107; an air drawing pump 405 and an ozone or an ozone/anion generator 406 is further provided beneath the seating surface 401 in the interior of the base 40, the ozone or the ozone/anion generator 406 is connected to an outwardly extending air pipe 407 of which an end is provided with an air bubble connector 408, the air bubble connector 408 can be placed exactly into a connecting pipe 105 provided at the bottom of the receiving barrel 10 to thereby extend in the groove 104. Besides, the base 40 is provided on one external lateral surface thereof with a plurality of control keys 409 which can control activation, operating time and switching of the ozone or the ozone/anion generator 406 to generate ozone or anion or ozone/anion to put out from the air pipe 407.

Referring to Fig. 8, when the receiving barrel 10 and the base 40 are combined together, the bottom of the receiving barrel 10 is superimposed on the top of the seating surface 401, and is fixed by engaging of the legs 106 in the positioning holes 403, the groove 104 in the recessed portion 402, and the locking members 404 in the locking hooks 107. When in completion of fixing, the bubble connector 408 is inserted into the connecting pipe 105 provided at the bottom of the receiving barrel 10 to thereby extend in the groove 104 provided at the bottom of the receiving barrel 10, so that when clean water is stored in the receiving barrel 10, the air bubble connector 408 is dipped in water, thus assembling of the receiving barrel 10 and the base 40 is completed.

In using, after completion of assembling of the receiving barrel 10, the rotatable brush 20 and the upper cover 30 and superimposing of the receiving barrel 10 on the base 40 as is stated in the preceding statement, when the articles "A" to be washed and clean water are placed into the space between the inner rim of the receiving barrel 10 and the rotatable brush 20 via the the throw-in port 303 of the upper cover 30, and the rotated hand grip 302 on the receiving barrel 10 rotates the rotatable brush 20 to brush the articles "A" to be washed, by the function of the air drawing pump 405 and the ozone or ozone/anion generator 406 in the base 40 activated by the

control keys 409 (Fig. 7), the ozone or ozone/anion generator 406 will produce air containing ozone or ozone/anion to be put out through the air pipe 407 to the air bubble connector 408 which can generate in the groove 104 provided at the bottom of the receiving barrel 10 bubbles and mix the air into water, so that when the articles "A" to be washed is brushed by the rotatable brush 20, residual pesticide, dust and bacteria can be eliminated by the bubbles containing ozone or ozone/anion, and therefore, the articles "A" to be washed can be cleansed very fast and convenient.

Referring to Fig. 9, when the air bubble connector 408 is dipped in water, the air put out therefrom will form a great lot of extremely small bubbles. In practising, as is shown in the drawing, the air bubble connector 408 is comprised of a connecting head 481, an air outlet 482, a connecting member 483, a stop member 484, an elastic element 485, a plurality of air ventilation sheets 486, and a cap 487, wherein:

The connecting head 481 is provided on the front end thereof with a connecting pipe 4811 which can be telescopically inserted in the above mentioned air pipe 407, and is provided in the center thereof with a throughhole 4812 which extends through the connecting head 481.

The air outlet 482 is provided on the front end thereof with a sleeve connector 4821 fitting over the end of

the connecting head 481, the end of the sleeve connector 4821 is provided with a screw 4822 extending rearwardly therefrom, both sides of the screw 4822 are excavated to form grooves 4823 which are communicated with the interior of the sleeve connector 4821.

The connecting member 483 is in a form of hollow hood, the front end thereof slips over the connecting head 481, while the inner periphery thereof is kept an adequate distance from the sleeve connector 4821 of the air outlet 482.

The stop member 484 and the elastic element 485 are provided in the sleeve connector 4821, the stop member 484 is located behind the connecting head 481, while the elastic element 485 is located behind the stop member 484.

The air ventilation sheets 486 are fitted over the screw 4822 and lapped over one by one, having knurls 4861 on the lateral sides thereof (as shown in Fig. 9A, 9B and 9C), and each with engaging protrusions 4862 on one side and corresponding engaging grooves 4863 on the other side thereof, so that the air ventilation sheets 486 can be engaged with one another in lapping, the air ventilation sheets 486 are each provided on the inner periphery thereof, which fits over the screw 4822, with a declined surface 4864.

The cap 487 covers the end of the screw 4822, while the front end thereof abuts against the last air ventilation sheet 486, so that the grooves 4823 on both sides of the screw 4822 are sealed.

5 Referring to Fig. 10, by means of the above stated structure, when the air bubble connector 408 and the connecting pipe 105 are connected with each other, the air outlet 482 is placed into the connecting pipe 105 provided on the front end thereof with a rubber gasket 151,
10 the connecting pipe 105 thus is placed in the gap between the wall of the air outlet 482 and the connecting member 483, the inner wall of the connecting member 483 is screw connected tightly with the external wall of the connecting pipe 105, the rubber gasket 151 on the front end of
15 the connecting pipe 105 is used for preventing from water leaking; at this time, the end of the air outlet 482 is extended into the groove 104 on the bottom of the receiving barrel 10. When air in the air pipe 407 is injected from the connecting pipe 4811 of the connecting head 481,
20 air passing through the throughhole 4812 can open the stop member 484 at the end of the throughhole 4812 to compress the elastic element 485, so that the air can get into the sleeve connector 4821 of the air outlet 482 and then out of the grooves 4823 on both sides of the screw
25 4822 at the end of the air outlet 482; due to the fact that the end of the grooves 4823 are sealed by the cap

487, air can only gets out of the grooves 4823 through the gaps formed in the upper screw portion of the screw 4822 (Fig. 10 A) and at the declined surfaces 4864 provided at the connection of the inner periphery of the air ventilation sheets 486 and the screw 4822, air can be uniformly distributed at the inner periphery due to the declined surfaces 4864 circling along the whole round periphery of the air ventilation sheets 486, then the air can gets out of the air ventilation sheets 486 through the knurls 4861 on the lateral sides of the air ventilation sheets 486. Because that the air outlet 482 and the air ventilation sheets 486 fitted over it are extended into the groove 104 on the receiving barrel 10 and are thereby dipped in water, so that air emitting out of them forms in the water extremely small bubbles to help the aforementioned cleansing; when the air pipe 407 is stopped supplying air, the elastic element 485 can abut against the stop member 484 by elasticity to render the stop member 484 to seal the end of the throughhole 4812 and thus prevent air in the air outlet 482 from flowing in contrary direction.

Please refer to Fig. 11, function of the above mentioned base 40 is not limited to that of generating air bubbles having ozone or ozone/anion, in practising, the top of the base 40 is provided with the seating surface 401 which is provided with, in addition to the position-

ing holes 403, an axle hole 410 at the center position thereof, the base 40 is provided therein with a motor 411 under the seating surface 401, the driving axle 412 of the motor 411 extends out of an axle hole 410 and thus is exposed to the upper side of the seating surface 401, activation, turning off and duration of activation of the motor 411 can be controlled by the control keys 409 provided on one external lateral surface of the base 40. The receiving barrel 10 in this embodiment has the driving portion 203 of the axle sleeve 202 provided on the bottom thereof to connect with a driving axle 412. The upper cover 30 in this embodiment is provided only with the throw-in port 303 on the top thereof. When the control keys 409 activate the motor 411 to drive rotatably the driving axle 412 which in turn drives the rotatable brush 20 to brush the articles "A" to be washed, so that function of automatic washing can be achieved.

Names for the elements are used in the above specification only for description of the structure of the present invention. It will be apparent to those skilled in this art that various modifications or substitutions can be made to the present apparatus without departing from the spirit and scope of this invention. Accordingly, all such modifications and substitutions also fall within the scope of the appended claims and are intended to form part of this invention.

CLAIMS

1. A washing container, including:

a receiving barrel in a form of a tank for receiving therein clean water and articles to be washed, having a protruding axle seat centrally provided on the upper surface of the bottom thereof;

a rotatable brush in a form of a cylinder and placed in said receiving barrel and put on said axle seat with its periphery keeping a suitable distance from the inner rim of said receiving barrel, fine and soft brush down or brush strips being uniformly provided on the external surface thereof, an axle sleeve being provided at the center position thereof, and a driving portion being provided on the top of said axle sleeve;

an upper cover covering the top of said receiving barrel, a hand grip and a throw-in port being provided on the top thereof, said hand grip being rotated to turn a rotating axle by driving of a driving gear set, said rotating axle provided on the bottom of said upper cover being engaged in a driving portion of said rotatable brush to render said rotatable brush to rotate, while said throw-in port being placed therethrough clean water and articles to be washed which are then put into the space between the inner wall of said receiving barrel and the external surface of said rotatable brush, when said rotatable brush being rotated by said hand grip, the ar-



articles to be washed being brushed by said brush down or brush strips on said rotatable brush.

2. A washing container as claimed in claim 1, wherein:

5 said receiving barrel can be superimposed with its bottom on the top of a base which is provided therein with an ozone or an ozone/anion generator and an air drawing pump, said ozone or ozone/anion generator is connected to an outwardly extending air pipe of which an end is
10 provided with an air bubble connector, said air bubble connector can be placed into a connecting pipe provided at the bottom of said receiving barrel and extending in a groove formed on the inner bottom of said receiving barrel, when said air drawing pump draws air into said ozone
15 or ozone/anion generator, function of said ozone or ozone/anion generator is that it can put out air containing ozone or ozone/anion through said air pipe into said air bubble connector which can generate in said groove provided at the bottom of said receiving barrel bubbles, so
20 that injurious substance and bacteria on the surfaces of the articles to be washed can be eliminated.

3. A washing container as claimed in claim 1, wherein:

 said receiving barrel can be superimposed with its
25 bottom on the top of a base which is provided therein with a motor, the driving axle of said motor extends up



through the top surface of said base into said receiving barrel;

said driving portion of said rotatable brush is provided at the bottom of said axle sleeve and can be fitted over said driving axle, said rotatable brush can brush the articles to be washed by driving of said driving axle of said motor, this can take the place of said hand grip driving structure on said upper cover.

4. A washing container as claimed in claim 1, wherein:

said upper cover is provided with two locking members engageable with two locking hooks opposed thereto and provided on said receiving barrel for fixing.

5. A washing container as claimed in claim 1, wherein:

said upper cover is provided on the bottom thereof with a bottom plate to keep a space between the body of said upper cover and said bottom plate to receive a driving gear set for engaging with said hand grip and said rotating axle, when said hand grip is rotated, by driving of said driving gear set, said rotating axle can be rotated.

6. A washing container as claimed in claim 1, wherein:

a plurality of flow disturbance plates are provided surroundingly within said receiving barrel, when said



rotatable brush is rotated, said flow disturbance plates will create flow disturbance to the water in said receiving barrel, in order to avoid the articles to be washed from precipitation on the bottom surface.

7. A washing container as claimed in claim 1, wherein:

said brush down or brush strips provided on the external periphery of said rotatable brush can be of equal length or of shorter and longer brush down or brush strips arranged alternately.

8. A washing container as claimed in claim 1, wherein:

said rotatable brush can be one of various size of diameters.

9. A washing container as claimed in claim 2, wherein:

said base is provided on the top thereof with a plurality of positioning holes, a plurality of legs are provided on the bottom of said receiving barrel and are extended into said positioning holes; a seating surface provided on the top of said base is provided with a recessed portion for receiving therein a groove provided on said receiving barrel; a plurality of control keys for an air drawing pump and an ozone or an ozone/anion generator are further provided on one external lateral surface of said base.



10. An air bubble connector connectable to the bottom of said receiving barrel and providing a connecting pipe having on the front end thereof a rubber gasket, being provided thereon an air outlet which is extended into a groove formed on the bottom of said receiving barrel, and including:

a connecting head providing on the front end thereof with a connecting pipe telescopically inserted in an air pipe, and being provided in the center thereof with a throughhole which extends through said connecting head;

an air outlet provided on the front end thereof with a sleeve connector fitting over the end of said connecting head, the end of said sleeve connector being provided with a screw extending rearwardly therefrom, both sides of said screw are excavated to form grooves which are communicated with the interior of said sleeve connector;

a connecting member in a form of hollow hood, the front end thereof slips over said connecting head, while the inner periphery thereof is kept an adequate distance from said sleeve connector of said air outlet;

a stop member provided in said sleeve connector and located behind said connecting head;

an elastic element provided in said sleeve connector and located behind said stop member;



a plurality of air ventilation sheets fitted over said screw and lapped over one by one, having knurls on the lateral sides thereof, and each with engaging protrusions on one side and corresponding engaging grooves on the other side thereof, so that said air ventilation sheets being engaged with one another in lapping, said air ventilation sheets being each provided on the inner periphery thereof, which fits over the screw, with a declined surface.

a cap covering the end of said screw, while the front end thereof abutting against the last of said air ventilation sheets, so that said grooves on both sides of said screw being sealed;

by means of the above stated structure, said air outlet is placed into said connecting pipe, said connecting pipe thus is placed between the wall of said air outlet and said connecting member, by arrangement that said connecting member is screw connected tightly with the external wall of said connecting pipe, the end of said air outlet, said air ventilation sheets and said cap are located in said groove on the bottom of said receiving barrel and are dipped in water when said receiving barrel is filled with water; when air in said air pipe is put out, air passing through said throughhole of said connecting head can open said stop member to flow into said air outlet, and flow to the space between said screw and said



ventilation sheets; by means of said declined surfaces of
said air ventilation sheets, air uniformly distributes at
the inner periphery thereof; and by means of said knurls
on the lateral sides of said air ventilation sheets, air
5 emitting out of them forms in the water in said receiving
barrel a great lot of extremely small bubbles; when said
air pipe is stopped supplying air, said elastic element
can abut against said stop member to render said stop
member to seal the end of said throughhole and thus pre-
10 vent air from flowing out in contrary direction.

