

DESCRIPTION

Title of the Invention: Pouring Device

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Technical Field

[0001] The present invention relates to a pouring device that is attached to a portable container and configured to pour an amount of carbonated beverage held in the portable container.

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Background Art

[0002] Conventionally, for carbonated beverages represented by beer (to be referred to also as “beer or the like” hereinafter), it is preferred that about 30 percent of a layer of creamy foam be formed on top of about 70 percent of beer layer. This is because the finer the foam, the longer beer can keep its quality, so that good taste of beer or the like can be made long lasting with effective prevention of loss of carbonic acid remaining in the beer and retardation of oxidization of the beer or the like.

[0003] In a beer hall, a beer garden, a shop such as a bar (to be referred to as “beer hall or the like” hereinafter), beer is dispensed from e.g. a beer keg into a beer mug or the like with use of a specially made beer dispenser. In order to form a creamy foam layer on top of the layer of beer or the like, good experience and skill are required for operation of a pouring tap and adjustment of pouring amount, adjustment of gas pressure, and so on.

[0004] Respecting such pouring of beer or the like, Patent Document 1 proposes a tap including an ultrasonic generating device attached to a pouring channel of a beer dispenser. With such device, it has become possible even for an unskilled user to form a creamy foam easily.

[0005] Incidentally, in a beer hall or the like, a shop attendant pours beer or the like into an individual beer mug or the like from a beer dispenser and serves it to a customer. In addition, beer can sometimes to be served to a customer with using a portable container called “pitcher” capable of holding therein several servings of beer or the like. Beer or the like served in such a pitcher will be poured into an individual

beer mug or the like at each table by a customer himself/herself.

Background Art Document

Patent Document

- 5 [0006] Patent Document 1: Japanese Unexamined Patent Application
Publication No: 2000-327096

Summary

Problem to be Solved by Invention

- 10 [0007] As the pitcher, one for shop use having a capacity of 1 L to 2L is often used. When this pitcher is filled with an amount of beer or the like, the total weight thereof can sometimes be as much as 2 kg or more due to the weight of beer in addition to the weight of the pitcher per se.

- 15 It is difficult for a customer not used to pouring of beer or the like to handle such heavy pitcher smoothly. If beer or the like is poured too quickly, poured beer will have too much foam on the liquid surface of the beer or the like inside the beer mug or the like. Conversely, if the beer or the like is poured too slowly, the poured beer will have too little foam top.

- 20 In this way, it is very difficult to generate an appropriate amount of creamy foam in a beer mug or the like.

- [0008] Like the above-described case, generating an appropriate amount of creamy foam is also difficult when beer or the like is poured into an individual beer mug or the like from a portable container such as a can, a glass bottle, instead of a pitcher, in an outdoor resort or inside a home.

- [0009] The present invention has been made to overcome the above-described problem. An object of the invention is to provide a pouring device which allows one to add an appropriate volume of creamy foam to an amount of carbonated beverage poured into a mug or the like from a portable container, without requiring good skill or experience.

Solution

- 35 [0010] According to a first characterizing feature of a pouring device relating to the present invention, a pouring device that is attached to a portable container and configured to pour an amount of carbonated

beverage held in the portable container, the pouring device comprises:

an inlet for introducing an amount of carbonated beverage held in a portable container;

5 an outlet for pouring the carbonated beverage introduced through the inlet;

a flow channel communicating between the inlet and the outlet;

a flow state changing mechanism for changing a flow state of the carbonated beverage flown through the flow channel to at least a first pouring state or a second pouring state; and

10 a vibration applying mechanism for applying vibration to the carbonated beverage which is being flown through the flow channel, the vibration applying mechanism being activated under the second pouring state.

[0011] When vibration is applied by the vibration applying mechanism to carbonated beverage, foam will be generated due to carbonic acid gas dissolved therein. When the flow state of the carbonated beverage is the first flow state by the flow state changing mechanism, no vibration is applied by the vibration applying mechanism, thus restricting foam generation. Conversely, under the second pouring state, vibration is applied by the vibration applying mechanism to carbonated beverage which is being flown through the flow channel, whereby creamy foam can be generated. Therefore, an appropriate amount of creamy foam can be added without requiring good experience or skill.

20 [0012] According to a second characterizing feature of the present invention:

25 the carbonated beverage is poured from the outlet when the portable container is brought into a tilted pouring posture; and

the flow state changing mechanism is configured to be capable of changing a pouring amount of the carbonated beverage poured from the outlet to a fixed amount or to a small amount, the first pouring state being a state when the pouring amount is the fixed amount, the second pouring state being a state when the pouring amount is the small amount.

30 [0013] When it is desired to pour an amount of carbonated beverage into a beer mug or the like, the pouring amount of carbonated beverage to be poured from the outlet is set to the fixed amount by the flow state

changing mechanism, whereby speedy pouring is made possible. On the other hand, when it is desired to pour an amount of foam into the beer mug or the like, the pouring amount of carbonated beverage to be poured from the outlet is set to the small amount by the flow state changing mechanism, so that foam can be generated under this state. Namely, as the pouring amount is the small amount, the risk of generating too much foam is eliminated. Therefore, an appropriate amount of creamy foam can be poured into a beer mug or the like without requiring good experience or skill.

[0014] According to a third characterizing feature of the present invention:

the flow channel is comprised of a plurality of flow pipes communicating the inlet and the outlet at least one respectively of which are provided;

the flow state changing mechanism is configured to change the pouring amount from the fixed amount to the small amount by closing at least one flow pipe of the plurality of flow pipes; and

the vibration applying mechanism applies vibration to the carbonated beverage which is being flown through the other non-closed flow pipe of the plurality of flow pipes.

[0015] With the simple configuration of providing a plurality of flow pipes and closing at least one of them, change of pouring amount becomes readily possible.

[0016] According to a fourth characterizing feature of the present invention, of the plurality of flow pipes, the flow pipe to be closed by the flow state changing mechanism has a total flow cross sectional area which is larger than a total flow cross sectional area of the other flow pipe(s).

[0017] The flow pipe to be closed is a flow channel for carbonated beverage. Therefore, by setting the total flow cross sectional area of this flow pipe larger than a total flow cross sectional area of the other flow pipe(s), it is possible to secure a sufficient pouring amount for carbonated beverage. The flow pipe not to be closed is a flow channel for foam generation. Therefore, by setting the total flow cross sectional area of this flow pipe smaller than the total flow cross sectional area of the flow pipe to be closed, it is possible to cause foam to be generated

within the flow pipe reliably and also to keep the generation amount of foam appropriate.

[0018] According to a fifth characterizing feature of the present invention, of the plurality of flow pipes, the flow pipe to be closed by the flow state changing mechanism is disposed at a position relatively downwardly of the other flow pipe when the portable container is placed under the pouring posture.

[0019] With the above, the possibility of excessive foam generated inside the portable container being inadvertently poured together with the carbonated beverage when the carbonated beverage is poured into a mug or the like is lessened.

[0020] According to a sixth characterizing feature of the present invention:

the flow channel is comprised of at least one flow pipe communicating the inlet and the outlet at least one respectively of which are provided;

the flow state changing mechanism is configured to change the pouring amount from the fixed amount to the small amount by reducing flow channel cross sectional area of the flow pipe; and

the vibration applying mechanism applies vibration to the carbonated beverage which is being flown through the flow pipe.

[0021] When it is desired to pour an amount of carbonated beverage into a beer mug or the like, the pouring amount of carbonated beverage to be poured from the outlet is set to the fixed amount by the flow state changing mechanism, whereby speedy pouring is made possible. On the other hand, when it is desired to pour an amount of foam into the beer mug or the like, the pouring amount of carbonated beverage to be poured from the outlet is set to the small amount by the flow state changing mechanism, and foam can be generated under this state. Namely, as the pouring amount is the small amount, the risk of generating too much foam is eliminated. Therefore, an appropriate amount of foam can be poured into a beer mug or the like easily without requiring good experience or skill.

[0022] According to a seventh characterizing feature of the present invention:

the flow state changing mechanism includes an operating portion,

a movable portion and a flexible tube disposed at least a portion of the flow pipe; and

the movable portion causes pressing deformation of the tube in association with an operation of the operating portion, thereby to switch ON an activation switch of the vibration applying mechanism.

[0023] The flow state changing mechanism is configured to close or reduce a flow cross sectional area of the flow pipe by causing pressing deformation of a flexible tube. Therefore, there is no need to use any complex and expensive mechanism and the mechanism can be realized simply, light-weight and inexpensively.

[0024] According to an eighth characterizing feature of the present invention:

the flow state changing mechanism includes an operating portion, a movable portion and a flow amount varying valve disposed at least a portion of the flow pipe; and

the movable portion changes an opening degree of the flow amount varying valve in association with an operation of the operating portion, thereby to switch ON an activation switch of the vibration applying mechanism.

[0025] As the flow state changing mechanism is configured to close or reduce a flow cross sectional area of the flow pipe by opening/closing of the flow amount varying valve, the flow amount of fluid can be changed in a reliable manner.

[0026] According to a ninth characterizing feature of the present invention:

the flow state changing mechanism includes a position maintaining mechanism for maintaining the movable portion at a predetermined movable position; and

the position maintaining mechanism maintains the movable portion at the movable position thereby to maintain the pouring amount at the small amount if the operating portion is operated when the movable portion is not maintained at the movable position and releases the maintenance thereby to maintain the pouring amount to the fixed amount if the operating portion is operated when the movable portion is maintained at the movable position.

[0027] With provision of the position maintaining mechanism, the flow

amount of carbonated beverage flown through the flow channel can be maintained to the small amount even if the operational portion is not operated continuously. When the operational portion is operated again, the small amount state of the flow amount is released.

5 [0028] According to a tenth characterizing feature of the present invention, the vibration applying mechanism is stopped when the pouring amount is changed from the small amount to the fixed amount by the flow state changing mechanism.

10 [0029] In association with an operation of stopping pouring of carbonated beverage, the vibration applying mechanism too can be stopped.

[0030] According to an eleventh characterizing feature of the present invention:

15 the pouring device further comprises a gas feeding mechanism for feeding gas into the portable container;

the carbonated beverage is poured from the outlet when an inside pressure of the portable container is increased by gas fed by the gas feeding mechanism;

the outlet includes a first outlet and a second outlet;

20 the flow channel includes a first flow channel communicating between the inlet and the first outlet and a second flow channel communicating between the inlet and the second outlet;

the flow state changing mechanism is configured to be capable of selecting the first flow channel or the second flow channel; and

25 the first pouring state is realized when the first flow channel is selected and the second pouring state is realized when the second flow channel is selected.

30 [0031] When the first flow channel is selected by the flow state changing mechanism, no vibration is applied by the vibration applying mechanism, thus restricting generation of foam. Whereas, when the second flow channel is selected by the same, vibration is applied by the vibration applying mechanism to carbonated beverage which is being flown through the flow channel, whereby creamy foam can be generated. With provision of separate flow channels for carbonated beverage and
35 foam and selective use thereof, pouring modes suitable respectively therefor can be realized.

[0032] According to a twelfth characterizing feature of the present invention, a channel cross sectional area of the first flow channel is set larger than a channel cross sectional area of the second flow channel.

[0033] When it is desired to pour an amount of carbonated beverage into a beer mug or the like, with selection of the first flow channel having the larger channel cross sectional area by the flow state changing mechanism, the pouring amount of carbonated beverage to be poured from the outlet is set to the fixed amount by the flow state changing mechanism, whereby speedy pouring is made possible. On the other hand, when it is desired to pour an amount of foam into the beer mug or the like, with selection of the second flow channel having the smaller channel cross sectional area by the flow state changing mechanism, the pouring amount of carbonated beverage to be poured from the outlet is set to the small amount by the flow state changing mechanism, and foam can be generated under this state. Namely, as the pouring amount is the small amount, the risk of generating too much foam is eliminated. Therefore, an appropriate amount of creamy foam can be poured into a beer mug or the like without requiring good experience or skill.

[0034] According to a thirteenth characterizing feature of the present invention:

the pouring device further comprises a discharging channel for discharging the gas fed into the portable container; and

the flow state changing mechanism opens up the discharging channel when neither the first flow channel nor the second flow channel is selected.

[0035] In a situation when neither carbonated beverage nor foam is being poured into a mug or the like, gas fed into the portable container will be discharged thereby to release the pressured state inside it, whereby the risk of accidental pouring of carbonated beverage or foam through the first flow channel or the second flow channel from the outlet can be effectively prevented.

[0036] According to a fourteenth characterizing feature of the present invention, the vibration applying mechanism comprises an ultrasonic generating means; and the ultrasonic generating means applies vibration through ultrasonic wave via the flow channel to the carbonated beverage being flown through this flow channel.

[0037] With the ultrasonic generation means, it is possible to render finer the foam generated due to the ultrasonic generation vibration.

[0038] According to a fifteenth characterizing feature of the present invention, the pouring device further comprises an adjusting portion for adjusting vibration frequency and vibration amplitude of the ultrasonic generating means.

[0039] By changing vibration frequency and vibration amplitude by the adjusting portion, condition of foam can be freely adjusted. As condition of foam generated will differ depending on such conditions as the temperature, the kind and brand of the carbonated beverage, it is also possible to arrange such that optimum setting for each carbonated beverage to be held in the portable container be stored in a plurality.

Brief Description of the Drawings

[0040] [Fig. 1] is a schematic showing a condition where a pouring device according to a first embodiment is attached to a pitcher,

[Fig. 2] is an explanatory view of the pouring device according to the first embodiment and the pitcher,

[Fig. 3] is an explanatory view of a machine portion of the pouring device according to the first embodiment,

[Fig. 4] is an explanatory view of a main body portion of the pouring device according to the first embodiment,

[Fig. 5] is a section view taken along IV-IV in Fig. 4,

[Fig. 6] is an explanatory view of pouring of foam by the pouring device according to the first embodiment,

[Fig. 7] is an explanatory view of pouring of foam by a pouring device according to a second embodiment,

[Fig. 8] are explanatory views of a pouring device according to a third embodiment, with (a) being a plan view, (b) being a side view,

[Fig. 9] is an explanatory view of the pouring device according to the third embodiment and the pitcher and being a side view in section taken along a line IX-IX in Fig. 10,

[Fig.10] is an explanatory view of a main body portion of the pouring device according to the third embodiment,

[Fig.11] are explanatory views of a position maintaining mechanism, with (a) being an explanatory view when position

maintenance is released, (b) being an explanatory view when position is maintained,

[Fig.12] is an explanatory view of an anti-detachment lever, which is a side view in section taken along XII-XII in Fig.10,

5 [Fig. 13] is an explanatory view of beer pouring by the pouring device according to the third embodiment,

[Fig.14] is an explanatory view of foam pouring by the pouring device according to the third embodiment,

10 [Fig. 15] are explanatory views of a pouring device according to a fourth embodiment, with (a) being a plan view, (b) being a front view, (c) being a side view,

[Fig. 16] is an explanatory view of an inner construction of the pouring device according to the fourth embodiment,

15 [Fig. 17] is an explanatory view of principal portions of the pouring device according to the fourth embodiment,

[Fig. 18] is an explanatory view of principal portions of the pouring device according to the fourth embodiment,

[Fig. 19] is an explanatory view of the pouring device according to the fourth embodiment at the time of standby, and

20 [Fig. 20] is an explanatory view of the pouring device according to the fourth embodiment at the time of foam pouring.

Embodiments

25 [0041] Next, a pouring device relating to the present invention will be explained with reference to the accompanying drawings.

Firstly, a first embodiment of the pouring device relating to the present invention will be explained.

30 Here, an explanation will be given with taking beer as an example of a carbonated beverage. Further, in the explanation to follow, a pitcher is used as an example of a portable container. Incidentally, in this description, the term “beer” represents a broad concept inclusive of carbonated alcoholic beverages of the top fermentation, bottom fermentation, natural fermentation types, carbonated beer-like beverages, as well as non-alcoholic beer-taste beverages, the concept
35 being not limited to any special type or brand. Further, the term “pitcher” represents e.g. a beer pitcher used for pouring beer into a beer

mug or the like.

[0042] Fig. 1 shows a pitcher 10 and a pouring device 30 attached to the pitcher 10 in such a manner to cover the top opening of the pitcher 10 entirely.

5 [0043] The pitcher 10, for business use, generally has a capacity of 2 liters approximately and can hold an amount of beer for several servings of a standard mug. A shop attendant will put beer into the pitcher from a beer dispenser, and the beer will be poured into individual mugs at a customer's table or a customer served the beer-filled pitcher 10 from a
10 shop attendant will pour into individual mugs or the like. Therefore, in the context of the present invention, a term "user" refers to a person who pours beer into a mug or the like from the pitcher 10.

[0044] With reference to Fig. 1, Fig. 2, Fig. 5, the pitcher 10 will be explained. The beer pitcher 10 includes an inner container portion 11
15 for holding an amount of beer therein and an outer container portion 12 disposed along the outer circumference of the inner container portion 11 and forming a heat-insulation space relative to the inner container portion 11. The inner container portion 11 and the outer container portion 12 respectively are formed of synthetic resin material such as
20 methacrylate resin having good moldability and heat insularity.

[0045] The inner container portion 11 includes a circumferential wall portion 15 having an upwardly widening approximately conical shape extending from a bottom wall portion 13 to an upper end opening portion 14, and a skirt portion 16 extended integrally toward outer lower side
25 from the opening portion 14 along the entire outer circumference. At a portion of the opening portion 14, there is formed a spout 17 having a V-shaped cross sectional shape extending obliquely to the upper outer side.

[0046] The outer container portion 12 includes a bottom wall portion 18,
30 and a circumferential wall portion 19 formed integrally with the bottom wall portion 18. The upper end portion of the circumferential wall portion 19 is connected integrally with the lower end portion of the skirt portion 16, thus constituting a connecting portion 20. In the circumferential wall portion 19 of the outer container portion 12 and at a
35 position opposed to the spout 17, there is provided a handle 21 to be gripped by a user for holding the pitcher 10 for instance.

[0047] Next, the pouring device 30 will be explained. This pouring device 30 includes a main body portion 31 and a machine portion 32. The exteriors per se of the main body portion 31 and the machine portion 32 are formed of synthetic resin such as ABS resin. In this embodiment, the main body portion 31 and the machine portion 32 are provided as separate members. Instead, these may be formed integral with incorporating the mechanism of the machine portion 32 within an exterior shared with the main body portion 31.

[0048] Firstly, with reference to Fig. 2, Fig. 4 and Fig. 5, the main body portion 31 of the pouring device 30 will be explained. The main body portion 31 includes a circumferential wall portion 35 having an upwardly widening approximately conical shape extending from a lower end opening portion 33 to an upper end opening portion 34, a sectioning portion 36 formed at a middle body of the inside of the circumferential wall portion 35 and sectioning between the lower end opening portion 33 and the upper end opening portion 34, and a skirt portion 37 extended from the upper end of the circumferential wall portion 35 toward outer lower side along the entire outer circumference thereof. The outer circumferential wall of the circumferential wall portion 35 has a shape which is approximately similar to the shape of the opening portion 14 including the spout 17 of the inner container portion 11 of the pitcher 10, so that this outer circumferential wall can be fitted in by a predetermined depth relative to the pitcher 10 from above the opening portion 14. A packing 38 is provided along the circumferential direction on the outer circumferential wall downwardly of the circumferential wall portion 35. Then, when the circumferential wall portion 35 is pressed into the inner container portion 11 of the pitcher 10, the packing 38 seals a gap formed between the inner container portion 11 and the circumferential wall portion 35. With this, when the pitcher 10 body is tilted, leakage of beer inside this pitcher 10 to the outside from the gap between the inner container portion 11 and the circumferential wall portion 35 can be prevented. A boundary portion 39 between the outer circumference of the circumferential wall portion 35 and the inner circumference of the skirt portion 37 is configured to partially cover in the circumferential direction the circumferential edge of the opening portion 14 of the pitcher 10 which has advanced into the gap between the

outer circumference of the circumferential wall portion 35 and the inner circumference of the skirt portion 37.

[0049] Further, the main body portion 31 includes a flow channel 40 for pouring beer held in the inner container portion 11 when the pouring device 30 is attached to the pitcher 10.

The flow channel 40 is a channel communicating between a first inlet 41 and a second inlet 42 that are provided at a predetermined position inside the circumferential wall portion 35 which is a position corresponding to the spout 17 of the pitcher 10 when the pouring device 30 is attached to the pitcher 10 and that are used for introducing beer held in the pitcher 10, and an outlet 43 for pouring the beer introduced through the first inlet 41 and the second inlet 42 into a beer mug or the like.

[0050] The flow channel 40 includes a beer flow pipe 44, a shared-use flow pipe 45 for beer and foam, and a merging portion 46 for the beer flow pipe 44 and the shared-use flow pipe 45. Inside the main body portion 31, the beer flow pipe 44 is disposed at a position which is located relatively lower than the shared-use flow pipe 45 when the pitcher 10 assumes a tilted posture (to be referred to as “tilted posture” hereinafter) for pouring beer as shown in Fig. 6.

[0051] The beer flow pipe 44 communicates the first inlet 41 formed at the position corresponding to the spout 17 in the lower face of the sectioning portion 36 with the outlet 43 formed at the position corresponding to the spout 17 in the upper face of the circumferential wall portion 35. The shared-use flow pipe 45 communicates the second inlet 42 formed at the position corresponding to the spout 17 and upwardly of the first inlet 41 in the lower face of the sectioning portion 36 when the pitcher assumes the pouring posture with the merging portion 46 formed downstream the beer flow pipe 44 and branched obliquely downwards from the outlet 43. Therefore, the shared-use flow pipe 45 is connected at one end thereof with the merging portion 46 assuming the tilted posture and is bent at an intermediate portion thereof to assume a perpendicular posture to be connected with the second inlet 42.

[0052] The beer flow pipe 44 and the shared-use flow pipe 45 respectively comprise a flexible tube having appropriate elasticity that

can withstand pressure of beer being flown therein, with at least the beer flow pipe 44 being deformable by a load applied from the outside. For material forming this tube, an appropriate material will be selected which does not provide any adverse effect to the quality of beer being flown therein. A channel cross sectional area of the beer flow pipe 44 is set larger than a channel cross sectional area of the shared-use flow pipe 45. Incidentally, as an alternative, by providing each single pipe of the beer flow pipe 44 and the shared-use flow pipe 45 with a same channel cross sectional area and by providing a greater number of beer flow pipes 44 than the shared-use flow pipes 45, the total channel cross sectional area of the beer flow pipes 44 may be larger than the total channel cross sectional area of the shared-use flow pipe 45.

[0053] In the sectioning portion 36, an air vent 47 is formed at a predetermined position opposing to the position where the flow channel 40 is disposed. This air vent 47 communicates an inside space above the liquid surface of beer in the pitcher 10 and the outside space of the main body portion 31, thus eliminating any atmospheric pressure difference between the air pressure of the inside space of the pitcher 10 and the outside space of the pitcher 10. This arrangement allows smooth pouring of beer.

[0054] Further, the main body portion 31 includes a beer flow amount varying mechanism 50 for varying a flow amount of beer flown through the flow channel 40. The flow amount varying mechanism 50 includes an operating portion 51 and a movable portion 52 operably connected with the operating portion 51. The operating portion 51 is constituted of a support shaft 53 fixed to a position which is opposed to the outlet 43 of the main body portion 31 and upwardly of the handle 21 of the pitcher 10, upwardly of the boundary portion 39 between the circumferential wall portion 35 and the skirt portion 37 and of an operating lever 54 pivotally supported to the support shaft 53.

[0055] The operating lever 54 includes a press-down portion 55 extending to a position which can be easily pressed down by e.g. a thumb of a user when this user grips the handle 21 of the pitcher 10, toward the outer lower side from the support shaft 53, and an acting portion 56 extending from the support shaft 55 toward an inner lower side of the main body portion 31.

[0056] The movable portion 52 includes a movable bar 57 to be placed on the upper face of the sectioning portion 36. The movable bar 57 is disposed to be slidable in a predetermined direction along a pair of guide portions 58 projecting from predetermined positions in the upper face of the sectioning portion 36.

[0057] At one end of the movable bar 57, there is provided a pressing portion 60 configured to press and close the beer flow pipe 44, in cooperation with a pressure receiving portion 59 disposed at a position corresponding to the beer flow pipe 44 in the inner circumferential wall of the main body portion 31. At the other end of the movable bar 57, there is provided a contact portion 61 to which the acting portion 56 comes into contact. On the back side of the portion of the contact portion 61 to which the acting portion 56 comes into contact, a compression spring 63 is disposed between pressure receiving portions 62 projecting from predetermined positions in the upper face of the sectioning portion 36. Therefore, the movable bar 57 is constantly urged toward the acting portion 56 side by an elastic force of the compression spring 63. This position when the movable bar 57 is located on the operating lever 54 side will be referred to as the "initial position".

[0058] When a user operates the operating lever 54, that is, presses the press-down portion 55 with the thumb of the hand gripping the handle 21 of the pitcher 10, in association with pivoting of the operating lever 54 about the support shaft 53, the acting portion 56 will be pivoted about the support shaft 53 to move in the direction away from the circumferential wall portion 35, thus sliding the movable bar 57 via the contact portion 61 from the initial position in the direction opposing the elasticity of the compression spring 63 and the pressing portion 60, in cooperation with the pressure receiving portion 59 on the main body portion 31 side, deforms the tube constituting the beer flow pipe 44, thus closing this beer flow pipe 44. The position when the movable bar 57 has been moved toward the beer flow pipe 44 against the elasticity of the compression spring 63 will be referred to as "pressing position".

[0059] As described above, when the beer flow pipe 44 is closed, beer of the pitcher 10 can be poured only from the shared-use flow pipe 45. In this way, the flow amount varying mechanism 50 changes the pouring amount of beer to be poured from the outlet 43 from a fixed amount to a

small amount by closing at least one flow pipe of a plurality of flow pipes.

[0060] When the user releases the operating lever 54, that is, stops pressing down the press-down portion 55, due to the elasticity of the compression spring 63 and the elasticity of the tube per se, the movable bar 57 will be moved from the pressing position back to the initial position. With this, the closing of the beer flow pipe 44 of the flow channel 40 is released and the pouring amount of beer to be poured from the outlet 43 is changed from the small amount to the fixed amount. Namely, in the instant embodiment, the flow amount varying mechanism 50 constitutes a “flow state changing mechanism” for changing a flow state of the carbonated beverage flown through the flow channel 40 to at least a first pouring state or a second pouring state. A state of the beer flow pipe 44 being not closed constitutes the first pouring state and a state of the beer flow pipe 44 being closed constitutes the second pouring state.

[0061] The movable bar 57 further includes, between the pressing portion 60 and the contact portion 61, a coupling portion 64 projecting upwardly therefrom. The coupling portion 64 is moved in association with sliding of the movable bar 57 to turn ON/OFF an activation switch 75 of an ultrasonic generator 72 to be described later.

[0062] Further, the main body portion 31 includes a protection lid 86 for covering a portion including a portion of the removable bar 57 and the compression spring 63. In the protection lid 86, there is formed a slit 87 into which the coupling portion 64 of the movable bar 57 can enter.

[0063] Next, with reference to Fig.2, Fig. 3 and Fig. 5, the machine portion 32 of the pouring device 30 will be explained.

The machine portion 32 includes a housing portion 70 to be accommodated in the space which is sectioned into the circumferential wall portion 35 and the sectioning portion 36 from above the main body portion 31. An upper portion of the housing portion 70 extends to an outer circumferential side so as to constitute a “canopy” for the upper end opening portion 34 of the pouring device 30.

[0064] The housing portion 70 accommodates a vibration applying mechanism 71. The vibration applying mechanism 71 comprises an electrically interconnected assembly of an ultrasonic generator 72 for applying vibration to beer which is being flown through the flow channel

40, a circuit board 73 mounting a drive circuit of the ultrasonic generator 72, a battery box 74 for accommodating two size AA batteries as a power source to be supplied to the circuit board 73 of the ultrasonic generator 72, and the activation switch 75 for turning ON/OFF operation of the ultrasonic generator 72. Incidentally, the power source is not limited to the above-described dry cells, but can be any from which power needed for driving the ultrasonic generator 72 can be obtained.

[0065] The ultrasonic generator 72 is an ultrasonic generating means having a piezoelectric device driven by the drive circuit mounted on the circuit board 73 and is configured to generate ultrasonic wave having a predetermined vibration frequency and vibration amplitude. It is preferred that the vibration frequency be set to from 20 to 40 kHz approximately. The ultrasonic generator 72 has its circumference guided obliquely downwards to the lateral side of the housing portion 70 and is urged to the outer side by a compression spring 76 disposed inside thereof, with its vibrating face 77 being exposed to the outside. When the machine portion 32 is accommodated in the main body portion 31, the vibrating face 77 will come into contact with the merging portion 46 of the flow channel 40. Therefore, the merging portion 46 is vibrated by ultrasonic wave generated by the ultrasonic generator 72, whereby foam will be excited in beer while this beer is passing through the merging portion 46, so that creamy foam will be generated and poured from the outlet 43.

[0066] The housing portion 70 includes a detachable lid 78 in its lower face and the vibration applying mechanism 71 will be accommodated therewith with the lid 78 being opened. The vibration applying mechanism 71 is appropriately fixed inside the housing portion 70 with unillustrated screws or the like. At an appropriate position of the lid 78 of the housing portion 70 which position corresponds to the slit 87 of the protection lid 86, there is formed a slit 79 in which the coupling portion 64 of the above-described movable bar 57 can enter. And, at a predetermined position inside this slit 79, the activation switch 75 is disposed. When the coupling portion 64 presses the activation switch 75 in association with sliding movement of the movable bar 57, power from the dry cells accommodated in the battery box 74 is supplied to the circuit board 73, and the drive circuit activates the ultrasonic generator

72. The ON state is maintained while the activation switch 75 is being pressed. When the coupling portion 64 leaves the activation switch 75, the power supply to the circuit board 73 is stopped and the ultrasonic generator 72 is stopped.

5 [0067] The drive circuit of the circuit board 73 can be configured to drive the ultrasonic generator 72 so as to generate ultrasonic wave with a predetermined vibration frequency and vibration amplitude or can be configured also such that the vibration frequency and vibration amplitude of the vibration generated by the ultrasonic generator 72 are varied. In accordance with timing of pouring of foam, fineness of foam can be changed. Further, the machine portion 32 can include an adjusting portion capable of variably setting the vibration frequency and vibration amplitude of vibration generated by the ultrasonic generator 72, in addition to ON/OFF of the ultrasonic generator 72. With use of
10 such adjusting portion for varying the vibration frequency and vibration amplitude, the mode of foam to be poured can be freely adjusted. As condition of foam generated will vary also depending on such conditions as the temperature, the type, the brand of beer held in the pitcher 10, an arrangement can be provided such that a plurality of optimal settings thereof may be stored.

20 [0068] The disposing position of the ultrasonic generator 72 can be freely selected as long as the position allows application of vibration by ultrasonic wave to beer flown through the flow channel 40. For instance, it is possible to arrange such that the vibrating face 77 comes
25 into contact with not the merging portion 46, but the tube constituting the shared-use flow tube 45, thereby to vibrate this tube for generating foam in beer flown through this tube. Further, the vibrating face 77 of the ultrasonic generator 72 can come into contact with the merging portion 46 at the time of vibration only, rather than being placed in
30 contact constantly with the merging portion 46 of the flow channel 40. Further alternatively, the vibrating face 77 can be embedded in the flow channel 40 or can be exposed through the inner wall of the flow channel 40 so as to directly apply vibration to beer. Further, the ultrasonic generator 72 can be provided in plurality, rather than only one.
35 Moreover, in the drive circuit mounted on the circuit board 73, a delaying means can be provided so that the ultrasonic generator 72 can be

activated after lapse of a predetermined period subsequent to switching ON of the activation switch 75 or be activated only for a predetermined period with use of a timer or these arrangements can be used in any appropriate combination.

5 **[0069]** Next, pouring of beer using the pouring device 30 configured as described above will be explained.

Beer will be poured by e.g. a shop attendant from a beer dispenser into the pitcher 10 in such a manner to minimize foam generation. When a predetermined amount of beer has been held in the
10 pitcher 10, this pitcher 10 with the pouring device 30 attached thereto will be served to a customer. Then, the customer served with this pitcher will pour beer into individual beer mugs or the like.

[0070] The customer, i.e. a user, will lift up the pitcher 10 by gripping the handle 21 and change its posture (to be referred to as the “normal posture” hereinafter) gradually into the tilted posture of the pitcher 10,
15 thus starting pouring into the mug or the like. At this stage, beer will be poured gently so as to minimize generation of foam inside the mug or the like. When the beer has been poured into the mug or the like up to about seventy percent of its capacity, the user will press down the
20 press-down portion 55 of the operating lever 54 with the thumb of the hand gripping the handle 21 of the pitcher 10.

[0071] Then, as shown in Fig. 6, the pressing portion 60 at the leading end of the movable bar 57 will close the beer flow pipe 44 in cooperation with the pressure receiving portion 59, whereby flow will occur only in
25 the shared-use flow pipe 45. In operative association with this, the coupling portion 64 of the movable bar 57 turns ON the activation switch 75, so that the drive circuit activates the ultrasonic generator 72, thus vibrating the merging portion 46 downstream the shared-use flow pipe 45. When beer passes in the merging portion 46, vibration is applied
30 thereto to excite foam therein, so that creamy foam is formed and poured from the outlet 43 into the mug or the like. When a predetermined amount of foam has been poured into the mug or the like, the user will release the thumb from the press-down portion 55 while returning the pitcher 10 from the pouring posture back to the normal posture. As
35 described above, it is possible to add an appropriate amount of creamy foam to beer poured from the pitcher 10 into a mug or the like, without

requiring good experience or skill.

[0072] Next, a second embodiment of the pouring device relating to the present invention will be explained. In the following explanation, those portions different from the first embodiment will be discussed in details, and same features will be provided with same reference marks/numerals and explained only briefly or explanation thereof will be omitted entirely.

As shown in Fig. 7, the main body portion 31 of the pouring device 30 includes a flow channel 80 for pouring beer held in the inner container portion 11. The flow channel 80 is a channel communicating between an inlet 81 provided at a predetermined position inside the circumferential wall portion 35 which is a position corresponding to the spout 17 of the pitcher 10 when the pouring device 30 is attached to the pitcher 10 and used for introducing beer held in the pitcher 10, and an outlet 82 for pouring the beer introduced through the inlet 81 into a beer mug or the like.

[0073] The flow channel 80 is formed of a flexible tube 83 communicating between the inlet 81 and the outlet 82. With this flow channel 80 in operation, when a user operates the operating lever 54 of the flow amount varying mechanism 50, that is, presses the press-down portion 55 with the thumb of the hand gripping the handle 21 of the pitcher 10, the pouring amount of beer to be poured from the outlet 82 is changed from the fixed amount to the small amount. Then, in association with a pivotal movement of the operating lever 54 about the support shaft 53, the acting portion 56 will pivot about the support shaft 53 to move in the direction away from the circumferential wall portion 35, thus sliding the movable bar 57 via the contact portion 61. So that the pressing portion 60, in cooperation with the pressure receiving portion 59 of the main body portion 31 side, deforms the tube 83 constituting the flow channel 80, thereby to reduce its channel cross sectional area.

[0074] When the user releases the operating lever 54, that is, stops pressing down the press-down portion 55, due to the elasticity of the compression spring 63 and the elasticity of the tube per se, the movable bar 57 will be moved from the pressing position back to the initial position. With this, the deforming of the flow channel 80 is released and the pouring amount of beer to be poured from the outlet 82 is changed from the small amount to the fixed amount. Namely, in the instant

embodiment, the flow amount varying mechanism 50 constitutes a “flow state changing mechanism” for changing a flow state of the carbonated beverage flown through the flow channel 80 to at least a first pouring state or a second pouring state. A state of the flow channel 80 being not deformed constitutes the first pouring state and a state of the flow channel 80 being deformed constitutes the second pouring state.

[0075] The vibrating face 77 of the ultrasonic generator 72 is disposed such that one end portion of the flow channel 80 will come into contact with a piping portion 84 constituting the outlet 82. In association with deformation of the tube 83 to reduce its channel cross sectional area by an operation of the operating lever 54, the coupling portion 64 of the movable bar 57 turns ON the activation switch 75, so that the drive circuit activates the ultrasonic generator 72 to vibrate the piping portion 84. As beer passes through this piping portion 84, vibration is applied thereto to excite foam therein, so that creamy foam is formed and poured from the outlet 82 into a mug or the like. When a predetermined amount of foam has been poured into the mug or the like, the user will release the thumb from the press-down portion 55 while returning the pitcher 10 from the pouring posture back to the normal posture. As described above, it is possible to add an appropriate amount of creamy foam to beer poured from the pitcher 10 into a mug or the like, without requiring good experience or skill. Incidentally, the configuration of the vibrating face 77 is not limited to the above in which the face 77 comes into contact with the piping portion 84, the vibrating face 77 can be configured to come into contact with the tube 83, thus vibrating this tube 83, so that vibration may be applied to beer being flown within the tube 83 to generate foam therein.

[0076] Next, a third embodiment of the pouring device relating to the present invention will be explained. In the following explanation, those portions different from the first embodiment will be discussed in details, and same features will be provided with same reference marks/numerals and explained only briefly or explanation thereof will be omitted entirely.

[0077] Fig. 8 shows the pitcher 10 and a pouring device 301 attached to the pitcher 10 in such a manner to close its opening entirely. The pouring device 301 includes a main body portion 311 and a machine portion 321.

[0078] Next, with reference to Fig. 8 and Fig. 9, the main body portion

311 of the pouring device 301 will be explained.

The main body portion 311 includes a circumferential wall portion 35 having an upwardly widening approximately conical shape extending from a lower end opening portion 33 to an upper end opening portion 34, a sectioning portion 36 formed at an intermediate body inside the circumferential wall portion 35 and sectioning between the lower end opening portion 33 and the upper end opening portion 34, and a skirt portion 371 extending to an outer lower side along the entirety or part of the circumference from the upper end of the opening portion 14 in the circumferential direction. The outer circumferential wall of the circumferential wall portion 35 has a similar shape to the shape of the opening portion 14 that includes the inner container portion 11 of the pitcher 10 including the spout 17 and can be inserted into the pitcher 10 by a predetermined depth from above the opening portion 14.

At the boundary portion 39 between the outer circumference of the circumferential wall portion 35 and the inner circumference of the skirt portion 371, a packing 381 is provided along the entire circumference thereof. When the pouring device 301 is attached to the pitcher 10, the packing 381 seals the gap between the inner container portion 11 and the boundary portion 39. With this, when the pitcher 10 body is tilted, leakage of beer inside this pitcher 10 to the outside from the gap between the inner container portion 11 and the boundary portion 39 can be prevented.

[0079] Furthermore, the main body portion 311 includes a flow channel 401 for pouring beer held in the inner container portion 11 when the pouring device 301 is attached to the pitcher 10.

The flow channel 401 is a channel communicating between the first inlet 41 and the second inlet 42 and the outlet 43 for pouring the beer introduced through the first inlet 41 and the second inlet 42 into a beer mug or the like.

The flow channel 401 includes a beer flow pipe 441, a shared-use flow pipe 451 for beer and foam, and a merging portion 461 for the beer flow pipe 441 and the shared-use flow pipe 451. Inside the main body portion 311, the beer flow pipe 441 is disposed at a position which is located relatively lower than the shared-use flow pipe 451 when the pitcher 10 assumes the tilted posture as shown in Fig. 13.

[0080] The beer flow pipe 441 communicates the first inlet 41 formed at the position corresponding to the spout 17 in the lower face of the sectioning portion 36 with the outlet 43 formed at the position corresponding to the spout 17 in the upper face of the circumferential wall portion 35. The shared-use flow pipe 451 communicates the second inlet 42 formed at the position corresponding to the spout 17 and upwardly of the first inlet 41 in the lower face of the sectioning portion 36 when the pitcher 10 assumes the pouring posture with the merging portion 461 formed downstream the beer flow pipe 441 and branched obliquely downwards from the outlet 43. Therefore, the shared-use flow pipe 451 is connected at one end thereof with the merging portion 461 assuming the tilted posture and is bent at an intermediate portion thereof to assume a perpendicular posture to be connected with the second inlet 42.

[0081] A channel cross sectional area of the beer flow pipe 441 is set larger than a channel cross sectional area of the shared-use flow pipe 451. Incidentally, as an alternative, an arrangement can be provided such that by providing each single pipe of the beer flow pipe 441 and the shared-use flow pipe 451 with a same channel cross sectional area and by providing a greater number of beer flow pipes 441 than the shared-use flow pipes 451, so that the total channel cross sectional area of the beer flow pipes 441 may be larger than the total channel cross sectional area of the shared-use flow pipe 451. The beer flow pipe 441 and the shared-use flow pipe 451 respectively comprise a flexible pipe having appropriate elasticity that can withstand pressure of beer being flown therein. For material forming this pipe, an appropriate material will be selected which does not provide any adverse effect to the quality of beer being flown therein. As preferred examples thereof, resins such as PP or POM can be cited.

[0082] Further, the main body portion 311 includes a beer flow amount varying mechanism 501 for varying a flow amount of beer flown through the flow channel 401. The flow amount varying mechanism 501 includes an operating portion 51, a movable portion 521 operably connected with the operating portion 51 and a flow amount varying valve 48.

[0083] The movable portion 521 includes a movable bar 571 to be

placed on the upper face of the sectioning portion 36. The movable bar 571 is disposed to be slidable in a predetermined direction along a pair of guide portions 58 projecting from predetermined positions in the upper face of the sectioning portion 36.

5 **[0084]** The movable bar 571 comprises a member having a crank-like shape in a plan view, including a front portion 571a, a rear portion 571b and an intermediate portion 571c interconnecting the front and rear portions 571a, 571b. In the front portion 571a, there is disposed a rack gear 601 for pivoting a valve body 482 to be described later, in
10 cooperation with a pinion gear 484 to be also described later. In the rear portion 571b, there is disposed a contact portion 611 to which the acting portion 56 comes into contact. On the left side of the intermediate portion 571c, there is disposed the compression spring 63 between the pressure receiving portions 62 projecting from
15 predetermined positions in the upper face of the sectioning portion 36. Accordingly, the movable bar 571 is constantly urged toward the acting portion 56 side by the elasticity of the compression spring 63.

[0085] As shown in Fig. 11 (a), (b), in the movable portion 521, there is provided a position maintaining mechanism 90 configured to maintain
20 the movable bar 571 at the predetermined position on the beer flow pipe 441 side against the elasticity of the compression spring 63. The position maintaining mechanism 90 includes a guide groove 91 having a heart-shape as seen in a plan view and disposed in the rear portion 571b, and a pin 92 having a hook-like leading end 92a slidably disposed within
25 the guide groove 91 and a hook-like rear end 92b pivotally held to a lateral portion of the pressure receiving portion 62.

[0086] The bottom face of the guide groove 91 is tilted such that the depth thereof becomes shallower in the counterclockwise direction in the plan view from the disposing position of the leading end 92a of the pin 92
30 shown in Fig. 11 (a) and the depth becomes greater at a stepped portion 91a, and then becomes shallower from the deep portion in the counterclockwise direction in the plan view and then becomes shallow again at a stepped portion 91b. Further, inside the guide groove 91, there is disposed a pin receiving portion 91c formed like an island having
35 a heart-shape in its plan view. And, an inner wall projecting portion 91d opposing to the pin receiving portion 91c of the guide groove 91 is

disposed with a slight downward offset in the illustration relative to the pin receiving portion 91c.

[0087] When the operating lever 54 of the operating portion 51 is operated, the movable bar 571 is moved to the left side against the elasticity of the compression spring 63. In association with this, as the leading end 92a of the pin 92 is restricted in its movement in the clockwise direction by the stepped portion 91b, this end 92a is slid counterclockwise within the guide groove 91.

When the operation on the operating lever 54 is stopped after the leading end 92a of the pin 92 passes the stepped portion 91b, the movable bar 571 will tend to move to the right due to the elasticity of the compression spring 63, so that the leading end 92a comes into engagement with the pin receiving portion 91c. With this, the movable bar 571 is maintained at the predetermined position shifted to the beer flow pipe 441 side against the elasticity of the compression spring 63. The position under this state will be referred to as “movable position” hereinafter.

[0088] When the operating lever 54 of the operating portion 51 is operated again, in association with movement of the movable bar 571 to the left side against the elasticity of the compression spring 63, the leading end 92a of the pin 92 is detached from the pin receiving portion 91c and guided upwards within the guide groove 91 along the inner wall projecting portion 91d. In this way, the maintaining of the movable bar 571 by the position maintaining mechanism 90 is released.

Thereafter, when the operation on the operating lever 54 is stopped, in association with movement of the movable bar 571 to the initial position due to the elasticity of the compression spring 63, it slides counterclockwise within the guide groove 91. Then, the leading end 92a of the pin 92 passes the stepped portion 91b and returns to the position shown in Fig. 11 (a), so the movable bar 571 too returns to its initial position.

Incidentally, a detachable protection lid 861 covers a portion including a portion of the removable bar 571, the compression spring 63 and the position maintaining mechanism 90.

[0089] The flow amount varying valve 48 includes a tubular valve holding portion 481 disposed in midway of the beer flow pipe 441 and a

valve body 482 pivotally held within the valve holding portion 481.

The valve body 482 defines therethrough a flow channel 483 which can communicate with the beer flow pipe 441. Further, at one end face in an axial direction thereof, there is provided the pinion gear 484 integrally. In association with movements of the rack gear 601 to the front/rear sides, the pinion gear 484 and the valve body 482 are rotated. As a result, the flow amount varying valve 48 opens up the flow channel 483 to be communicated with the beer flow pipe 441 as illustrated in Fig. 13 or closes the flow channel 483 not to be communicated with the beer flow pipe 441 as illustrated in Fig. 14.

[0090] With the above-described configuration in operation, when a user operates the operating lever 54, the movable bar 571 is moved toward the beer flow pipe 441 side, and the rack gear 601 rotates the valve body 482 via the pinion gear 484 to close the flow amount varying valve 48, whereby the beer flow pipe 441 is closed. In this, due to the action of the position maintaining mechanism 90, the leading end 92a of the pin 92 is engaged with the pin receiving portion 91c, whereby the movable bar 571 is maintained at the movable position. Therefore, the user need not keep operating the operating lever 54.

[0091] When the beer flow pipe 441 is closed, beer in the pitcher 10 can be poured from the shared-use flow pipe 451 only. In this way, the flow amount varying mechanism 501 changes the pouring amount of beer to be poured from the outlet 43 from the fixed amount to the small amount by closing at least one flow pipe of a plurality of flow pipes.

When the user operates the operating lever 54 again, the restriction of the movement of the pin 92 by the position maintaining mechanism 90 is released, whereby the movable bar 57 returns to its initial position due to the elasticity of the compression spring 63 and in association with this, the rack gear 601 rotates the valve body 482 via the pinion gear 484 and the flow amount varying valve 48 is opened thus releasing the closure of the beer flow pipe 44. As a result, the pouring amount of beer to be poured from the outlet 43 is changed from the small amount to the fixed amount. That is, in the instant embodiment, the flow amount varying mechanism 501 constitutes a “flow state changing mechanism” for changing a flow state of beer flown through the flow channel 401 to at least a first pouring state or a second pouring state. A

state of the beer flow pipe 441 being not closed constitutes the first pouring state and a state of the beer flow pipe 441 being closed constitutes the second pouring state.

[0092] The movable bar 57 includes, upwardly the acting portion 56, a coupling portion 641 extending to the front side. The coupling portion 641 is moved to the front/rear side in association with sliding of the movable bar 57 to turn ON/OFF an activation switch 751 of an ultrasonic generator 72 to be described later. Incidentally, this activation switch 571 too has its ON/OFF state maintained by the position maintaining mechanism 90, without needing continued stable operation on the operating lever 54.

[0093] Next, with reference to Fig. 9 and Fig. 12, the machine portion 321 of the pouring device 301 will be explained.

The machine portion 321 includes a housing portion 701 to be accommodated in the space which is sectioned into the circumferential wall portion 35 and the sectioning portion 36 from above the main body portion 311. In the housing portion 701, there are provided a pair of anti-detachment levers 372 disposed astride the circumferential wall portion 35 of the pitcher 10.

[0094] To the top face of the housing portion 701, a handle 702 is attached and in this handle 702, there are disposed a pair of button members 704 which are urged away from each other by a compression spring 703 disposed inside the handle 702. The button member 704 integrally forms an extension portion 705 which extends in the radial direction along the interior of the top face of the housing portion 701 and to the leading end of the extension portion 705, the upper end of the anti-detachment lever 372 is connected. The anti-detachment lever 372 is disposed to be pivotable about the portion of a packing 381 and extends to an outer lower side from the upper end of the circumferential wall portion 35, and at the lower end thereof, this is provided a pawl portion 372a to be retained to a retained portion provided in the outer circumference of the pitcher 10, e.g. its connecting portion 20.

[0095] For attaching the pouring device 301 to the pitcher 10, the pouring device 301 is inserted downwards relative to the pitcher 10. The pawl portions 372a are spread out as sliding in contact with the connecting portion 20 of the pitcher 10.

The anti-detachment levers 372 are pivoted about the portion of the packing 381, whereby the extension portions 705 are moved radially inwards against the elasticity of the compression spring 703.

5 Upon insertion to a position where the upper end of the opening portion 14 contacts the packing 381 of the pouring device 301 and the pawl portions 372a can engage with the connecting portion 20, due to the elasticity of the compression spring 703, the extension portions 705 are moved radially outwards, and the anti-detachment levers 372 are pivoted about the portion of the packing 381 and the pawl portions 372a
10 are retained to the connecting portion 20.

In this way, since the pawl portions 372a of the anti-detachment levers 372 are retained to the connecting portion 20 of the pitcher 10, the pouring device can be fixed to the pitcher 10 in a reliable manner, thus eliminating the possibility of inadvertent detachment of the pouring
15 device 301 from the pitcher 10 in the course of pouring of beer.

[0096] When both the button members 704 are pressed against the elasticity of the compression spring 703, both the extension portions 705 are moved radially inwards, and both the anti-detachment levers 372 are pivoted about the portion of the packing 381, whereby the pawl portions
20 372a are opened away from the connecting portion 20, thus releasing the retention. By pulling up the pouring device 301 from the pitcher 10 under this condition, the pouring device 301 can be detached from the pitcher 10.

[0097] The housing portion 701 accommodates therein the ultrasonic generator 72 constituting the vibration applying mechanism 71, the
25 circuit board 73 mounting the drive circuit for the ultrasonic generator 72, the battery box 74 accommodating three size AA dry battery cells therein as the power source to be supplied to the circuit board 73 of the ultrasonic generator 72, an activation switch 751 for switching ON/OFF
30 the operation of the ultrasonic generator 72, and an LED 85 which is illuminated to indicate that the ultrasonic generator 72 is under driven state and is flashed on/off to prompt replacement of the batteries when the voltage of the batteries has fallen below a predetermined threshold value, with the above components being electrically connected to each
35 other.

Incidentally, the housing portion 70 includes a packing on the lid

portion of the battery box 74 and also a fastening mechanism for fastening the lid portion as being pressed against the packing, thus having a water-resistance property of IP04 approximately.

[0098] The activation switch 751 is disposed at a position opposed to the coupling portion 641 of the operating lever 54. When the coupling portion 641 depresses the activation switch 751 in response to an operation on the operating lever 54, power from the battery cells accommodated in the battery box 74 is supplied to the circuit board 73, whereby the drive circuit activates the ultrasonic generator 72. The activation switch 751 keeps its ON state while being depressed. When the acting portion 56 moves away from the activation switch 751, the power supply to the circuit board 73 is stopped, whereby the ultrasonic generator 72 is stopped.

[0099] The ultrasonic generator 72 is disposed such that its vibrating face 77 comes into contact with the merging portion 461 of the flow channel 401. Therefore, the merging portion 461 is vibrated by ultrasonic wave generated by the ultrasonic generator 72 and foam is excited in the beer which is passing through the merging portion 461, whereby creamy foam is generated and poured from the outlet 43.

[0100] With the above-described configuration, it has become possible to provide a pouring device capable of adding an appropriate amount of creamy foam to a carbonated beverage introduced into a mug or the like from a portable container, without requiring good experience or skill.

[0101] Incidentally, in the third embodiment described above, the flow channel 401 includes the beer flow pipe 441, the shared-use flow pipe 451 for beer and foam, and the merging portion 461 for the beer flow pipe 441 and the shared-use flow pipe 451. Instead, the flow channel 401 may not be provided with the shared-use flow pipe 451, the merging portion 461 and the second inlet 42.

In this case, the flow amount varying valve 48 to be provided in the beer flow pipe 441 will be configured such that this valve will close the beer flow pipe 441 not completely even when the movable bar 571 is located at the movable position, thus changing the flow amount of the carbonated beverage to be poured from the outlet 43 from the fixed amount to the small amount.

[0102] The position maintaining mechanism 90 provided in the

above-described third embodiment can be applied to the first and second embodiments as well. As the movable bar 57 can be maintained at the depressed position by the position maintaining mechanism 90, the movable bar 57 will keep closing the tube even when the operation on the operating lever 54 is stopped. Therefore, there is no need for a user to keep operating the operating lever 54 at the time of pouring foam.

[0103] Further, the activation switch 751 and the coupling portion 641 provided in the third embodiment can be applied to the first and second embodiments also. Further, the anti-detachment lever 372 provided in the third embodiment can be applied to the first and second embodiments also.

[0104] The pouring device 30 according to the present invention can be configured to be attachable to other pitchers such as a pitcher having no heat-insulating space therein, then the above-described pitcher 10 having a double-construction. The pouring device 30 is not limited to the one covering the entire opening of the pitcher 10. For instance, a portion of the opening can remain exposed.

[0105] In the above-described first through third embodiments, there have been explained a case of the portable container being the pitcher 10. However, the portable container can be a can, a bottle or a resin container as well.

Next, a fourth embodiment of the present invention will be explained, with taking a case in which the portable container is a can as an example.

[0106] As shown in Fig. 15 (a), (b), (c) and Fig. 16, a pouring device 100 includes a lower housing portion 102 in which an accommodating portion 111 capable of introducing a can 101 from a rear face opening 104 and a piping portion 120 for pouring beer or foam from the can 101 accommodated in the accommodating portion 111 via a first outlet 121 or a second outlet 122 disposed upwardly of its front face, and an upper housing portion 103 in which there is disposed a controlling section 150 capable of pouring beer or foam by controlling the piping portion 120 based on an operation on an operating lever 164 attached to the top face. At a lower portion of the lower housing portion 102, there is provided a base portion 112 in the form of a circular disc which is formed larger than the lower housing portion 102, and forwardly of the base portion

112, there is disposed a receiving portion 113 for receiving any amount of beer or foam which has overflowed from the first outlet 121 or the second outlet 122.

5 [0107] The upper housing portion 103 includes a pair of engaging portions 107 in its lateral face, which portions 107 are engageable with engaged portions 108 provided in the circumference of the lower housing portion 102. With engagement/disengagement between the engaging portions 107 and the engaged portions 108, the upper housing portion 103 can be attached to or detached from the lower housing portion 102.

10 [0108] At the center of the base portion 112, there is disposed a mounting portion 114 having a convex portion engageable with a concave portion in the bottom face of the can 101. In the bottom face of the mounting portion 114, there is provided a sloped face 115 having a depth progressively increased along the circumferential direction.

15 [0109] Inside the base portion 112 and downwardly of the mounting portion 114, there is provided a lower sliding member 116 having a handle 116a. When the handle 116a is operated about a vertical axis of the can 101, the lower sliding member 116 is slid about the above axis. In this lower sliding member 116, there is provided a projecting portion
20 117 which can come into contact with the sloped face 115 of the mounting portion 114. The projecting portion 117 has a length which is approximately equal to the depth of the sloped face 115 at its deepest part. The projecting portion 117 is slid along the sloped face 115 in association with sliding movement of the lower sliding member 116 and
25 as the sloped face 115 becomes shallower, the projecting portion 117 pushes up the mounting portion 114 by an amount corresponding to the difference between the deepest part and the shallowest part of the sloped face 115.

30 [0110] At an upper inner portion of the lower housing portion 102, there is disposed a packing 118 capable of lid-covering the top face of the can 101. In this packing 118 and at a position corresponding to a threading-tightening portion 105 of the top face circumference of the can, there is formed a recessed portion 119 capable of accommodating the threading-tightening portion 105.

35 The distance from the mounting portion 114 to the packing 118 is a distance slightly shorter than the distance combining the height of the

can 101 with the difference between the deepest part and the shallowest part of the sloped face 115, which distance being set so as to allow smooth mounting of the can 101 when the mounting portion 114 is located at the lowest position. Further, the distance from the
5 threading-tightening portion 105 of the can 101 to the recessed portion 119 is set as a distance which is shorter than the distance of the difference between the deepest part and the shallowest part of the sloped face 115. With this, when the mounting portion 114 is pushed up, the
10 threading-tightening portion 105 is pressed against the recessed portion 119. With the above-described arrangement in operation, while the mounting portion 114 is located at the lowest position, the can 101 will be placed on the mounting portion 114 and then the handle of the lower sliding member 116 will be operated, whereby the mounting portion 114 is pushed up and the threading-tightening portion 105 of the can 101 is
15 pressed against the recessed portion 119 of the packing 118, thus being sealed strongly.

[0111] Incidentally, the distance from the mounting portion 114 to the packing 118 is set based on the height of a 500 mL can, so as to allow mounting of any one of 500 mL can, 350 mL can and 330 mL can.
20 Therefore, when a 350 mL can or a 330 mL can is used, a spacer member will be placed on the mounting portion 114 in order to compensate for its height difference from the 500 mL can respectively. Thus, the 350 mL can or 330 mL can will be placed on top of the spacer. Incidentally, the opening 104 too is sized to allow entrance and exit of 500 mL can.

[0112] On the top face of the packing 118, there is vertically disposed a piping 123 which can be inserted into a tap portion 106 which will be formed with an operation of a tab of the can 101. The length of the piping 123 is set to allow an inlet 123a at the lower end thereof to reach the bottom face of the can 101 sufficiently and its upper end portion
25 extends through the packing 118 to be connected to the piping 120. Further, in the packing 118, there is provided a gas passage 124 for allowing inflow of gas from the piping 120 side to the can 101 side or outflow of gas from the can 101 side to the piping 120 side. Incidentally, the exterior components such as the upper housing portion 103, the
30 lower housing portion 102, the base portion 112 and the mounting portion 114, and so on are formed of synthetic resin such as ABS resin or
35

the like.

[0113] As shown in Fig. 17 and Fig. 18, the piping 120 includes a manifold 125 in which an amount of beer introduced from the inlet 123a is buffered, and a first pouring piping 126 extending to the first outlet 121 and a second pouring piping 127 extending to the second outlet 122 are respectively communicated with the manifold 125. Therefore, the channel extending from the inlet 123a through the manifold 125 and the first pouring piping 126 to the first outlet 121 constitutes a first flow channel 128, and the channel extending from the inlet 123a through the manifold 125 and the second pouring piping 127 to the second outlet 122 constitutes a second flow channel 129. The channel cross sectional area of the first pouring piping 126 is set greater than the channel cross sectional area of the second pouring piping 127. As the material for forming the piping 120, an appropriate material will be selected which will not provide any adverse effect to the quality of beer flown therein. As preferred examples thereof, resins such as PP, POM and ABS resin can be cited.

[0114] Further, the piping 120 includes a chamber 130 which is communicated with the gas passage 124. This chamber 130 is communicated with a discharge outlet 131 communicated to the outside space. Therefore, the channel from the can 101 via the gas passage 124, the chamber 130 and the discharge outlet 131 constitutes a discharge channel.

[0115] Referring back to Fig. 16, the upper housing portion 103 includes a vibration applying mechanism 140 for vibrating the second flow channel 129 of the piping 120, a gas feeding mechanism A for feeding as to the chamber 130 and the controlling section 150 for controlling the above members.

[0116] The vibration applying mechanism 140 includes an ultrasonic generator 141 for applying vibration to beer which is being flown through the second flow channel 129. The gas feeding mechanism A includes a pump 170 and a motor 171 for driving the pump 170.

[0117] The controlling section 150 includes a circuit board mounting a drive circuit of the ultrasonic generator 141 and a drive circuit of the motor 171, a battery box for accommodating two size AA batteries as a power source to be supplied to the circuit board, an activation switch 173

for turning ON/OFF the ultrasonic generator 141, and an activation switch 172 for turning ON/OFF the motor 171, with these components being electrically connected to each other. Incidentally, the electric power source is not limited to the above-described dry cells, but can be any from which power needed for driving the ultrasonic generator 141 and the motor 171 can be obtained.

[0118] The ultrasonic generator 141 is an ultrasonic generating means having a piezoelectric device driven by the drive circuit mounted on the circuit board and is configured to generate ultrasonic wave having a predetermined vibration frequency and vibration amplitude. It is preferred that the vibration frequency be set to from 20 to 40 kHz approximately. The ultrasonic generator 141 has its circumference guided obliquely downwards to the lateral side of the upper housing portion 103 and is urged to the outer side by a compression spring 144 (see Fig. 19) disposed inside thereof, with its vibrating face 145 being exposed to the outside and the vibrating face 145 coming into contact with the second flow channel 129. Therefore, the second flow channel 129 is vibrated by ultrasonic wave generated by the ultrasonic generator 141, whereby foam will be excited in beer while this beer is passing through the second flow channel 129, so that creamy foam will be generated and poured from the second outlet 122.

[0119] When the operating lever 164 is tilted, the activation switch 173 is switched ON, whereby the power from the dry cells is supplied to the circuit board and the drive circuit activates the ultrasonic generator 141. The activation switch 173 maintains the ON state while the operating lever 164 is tilted. When the operating lever 164 is returned to the original position, the activation switch 173 is switched OFF, whereby the supply of power to the circuit board is stopped and the ultrasonic generator 141 is stopped.

[0120] As described above, the vibration applying mechanism 140 is operably associated with an operation on the operating lever 164, such that when a first valve member 152 is closed and a second valve member 152 is opened, that is, when the first flow channel 128 is closed and the second flow channel 129 is communicated, this mechanism 140 is activated. Of the beer being flown through the first flow channel 128 and the second flow channel 129, only the beer which is flown through

the second flow channel 129 generates foam.

[0121] The drive circuit can be configured to drive the ultrasonic generator 141 so as to generate ultrasonic wave with a predetermined vibration frequency and vibration amplitude or can be configured also such that the vibration frequency and vibration amplitude of the vibration generated by the ultrasonic generator 141 are varied. In accordance with timing of pouring of foam, fineness of foam can be changed. Further, the drive circuit can include an adjusting portion capable of variably setting the vibration frequency and vibration amplitude of vibration generated by the ultrasonic generator 141, in addition to ON/OFF of the ultrasonic generator 141. With use of such adjusting portion for varying the vibration frequency and vibration amplitude, the mode of foam to be poured can be freely adjusted. As condition of foam generated will vary also depending on such conditions as the temperature, the type, the brand of beer, an arrangement can be provided such that a plurality of settings are stored in advance.

[0122] The disposing position of the ultrasonic generator 141 can be freely selected as long as the position allows application of vibration by ultrasonic wave to beer flown through the second flow channel 129. For instance, the ultrasonic generator 141 can be configured to come into contact with the second flow channel 129 at the time of vibration only, rather than being in constant contact with the second flow channel 129. Further alternatively, it can be embedded in the second flow channel 129 or can be exposed through the inner wall of the second flow channel 129 so as to directly apply vibration to beer. Further, the ultrasonic generator 141 can be provided in plurality, rather than only one. Moreover, in the drive circuit mounted on the circuit board, a delaying means can be provided so that the ultrasonic generator 141 can be activated after lapse of a predetermined period subsequent to switching ON of the activation switch 173 or be activated only for a predetermined period with use of a timer or these arrangements can be used in any appropriate combination.

[0123] The pump 170 is configured such that this is driven by the motor 171 driven by the drive circuit mounted on the circuit board so as to feed ambient air to the chamber 130. The pressure of the gas being fed is set to a predetermined pressure that presses the liquid surface of beer inside

the can 101, thereby to allow the beer to be poured from the first outlet 121 or the second outlet 122.

[0124] When the operating lever 164 is tilted, the activation switch 172 is switched ON, whereby the power from the dry cells is supplied to the circuit board and the drive circuit activates the motor 171. The activation switch 172 maintains the ON state while the operating lever 164 is tilted. When the operating lever 164 is returned to the original position, the activation switch 172 is switched OFF, whereby the supply of power to the circuit board is stopped and the motor 171 is stopped.

[0125] When gas is fed into the chamber 130 by the pump 170, this gas is fed through the gas passage 124 into the space sectioned by the packing 118 and the top face of the can 101 and fed also through the tap 106 into the space sectioned by the inner face of the can 101 and the liquid surface of the beer.

[0126] The inside pressure of the can 101 is increased by the gas fed by the pump 170, that is, the liquid surface of beer is depressed downwards, and beer is pushed into the manifold 125 via the inlet 123a and the piping 123. Then, the beer is poured from the first outlet 121 or the second outlet 122 via the first flow channel 128 or the second flow channel 129.

[0127] As shown in Fig. 17 and Fig. 18, the controlling section 150 includes a first valve member 151 capable of closing the pouring piping 126 of the piping 120, a second valve member 152 capable of closing the second pouring piping 127 and a third valve member 153 capable of closing the discharge outlet 131.

[0128] The respective valve members 151, 152, 153 have an identical construction. Therefore, the construction of the first valve member 151 alone will be explained. Explanation of the constructions of the other members will be omitted.

The first valve member 151 includes a valve support portion 151a, a valve body portion 151b vertically slidably accommodated within the valve support portion 151a, a valve head portion 151c connected to the upper end of the valve body portion 151b and a valve leg portion 151d covering the lower portion for the valve body portion 151b.

Between the valve support portion 151a and the valve head portion 151c, there is disposed a compression coil spring 151e for

upwardly urging the first valve member 151.

The valve leg portion 151d comprises a bellows member having its upper end fixed to the valve support portion 151a side and its lower end vertically movable in association with the vertical movement of the valve body portion 151b.

When the valve head portion 151c is pressed downwards against the elasticity of the compression coil spring 151e, due to the elasticity, the valve body portion 151b is moved downwards inside the valve support portion 151a, and the valve leg portion 151d, with its lower face, will close a flow opening 126a extending from the manifold 125 to the first pouring piping 126.

[0129] Further, the controlling section 150 includes a cam mechanism 160 configured to control opening/closing of the respective valve members 151, 152, 153, based on an operation on the operating lever 164.

As shown in Fig. 19 and Fig. 20, the cam mechanism 160 includes a shaft portion 165 to which the operating lever 164 is attached, a support member 166 for supporting the shaft portion 165, and first, second and third cams 161, 162, 163 attached to the shaft portion 165.

The first cam 161, the second cam 162 and the third cam 163 comprise plate cams that are pivoted in association with a pivotal movement of the shaft portion 165 by an operation for tilting the operating lever 164 and can press down the first valve member 151, the second valve member 152 and the third valve member 153 with circumferential faces thereof.

[0130] The first cam 161 has an eccentric shape such that this cam 161 releases the downward pressing of the first valve member 151 when the operating lever 164 is tilted to one side and presses down the first valve member 151 when the operating lever 164 is not tilted or tilted to the other side. In the circumferential face of the first cam 161, a restricting portion 161b is formed to extend at a position thereof which is located upwards when the operating lever 164 is not tilted. This restricting portion 161b comes into contact with a stopper provided in the support member 166 when the operating lever 164 is tilted to the one side, thus restricting further pivotal movement of the operating lever 164. Alternatively, a torsion spring 161c can be provided on the lateral side of

the first cam 161, such that this torsion spring 161c, by its elasticity, urges the first cam 161 to the other side when the operating lever 164 is tilted to the one side, thus restricting more than necessary pivotal movement of the operating lever 164. Or, the above-described arrangements can be used in combination also.

[0131] In the circumferential face of the first cam 161, there is formed an extension portion 161a which extends outwards. When the operating lever 164 is not tilted or tilted to the one side, the extension portion 161a is located away from the activation switch 172 of the pump 170. When the operating lever 164 is tilted to the other side, the extension portion 161a comes into contact with the activation switch 172 of the pump 170, thus switching it ON.

Further, on the side of the first cam 161 only, laterally of the activation switch 172, there is disposed the activation switch 172 for the vibration applying mechanism 140, so that the extension portion 161a provides switching ON/OFF simultaneously with switching ON/OFF of the activation switch 172.

[0132] The second cam 162 basically has a same shape as the first cam 161. But, this second cam 162 is disposed in 180 degree rotation symmetry relative to the operating lever 164.

In the circumferential face of the second cam 162, a restricting portion 162b is formed to extend at a position thereof which is located upwards when the operating lever 164 is not tilted. This restricting portion 162b comes into contact with the stopper provided in the support member 166 when the operating lever 164 is tilted to the other side, thus restricting further pivotal movement of the operating lever 164. Alternatively, a torsion spring 162c can be provided on the lateral side of the second cam 162, such that this torsion spring 162c, by its elasticity, urges the second cam 162 to the one side when the operating lever 164 is tilted to the other side, thus restricting more than necessary pivotal movement of the operating lever 164. Or, the above-described arrangements can be used in combination also.

[0133] In the circumferential face of the second cam 162, there is formed an extension portion 162a which extends outwards. When the operating lever 164 is not tilted or tilted to the one side, the extension portion 162a presses down the second valve member 152; and when the

lever 164 is tilted to the other side, the extension portion 162a releases the pressing down of the second valve member 152.

When the operating lever 164 is tilted to the one side, the extension portion 162a comes into contact with the activation switch 172 of the pump 170, thus switching it ON. When the operating lever 164 is not tilted or tilted to the other side, the extension portion 162a is located away from the activation switch 172 of the pump 170.

[0134] The third cam 163 has an eccentric shape such that this cam 163 presses down the third valve member 153 when the operating lever 164 is tilted to the one side or tilted to the other side and the cam 163 does not press down the third valve member 153 when the operating lever 164 is not tilted at all.

[0135] Therefore, the piping 120 and the cam mechanism 160 together constitute a “flow state changing mechanism” capable of selecting a first porting state for pouring beer via the first flow channel 128 when the operating lever 164 is tilted to the one side and a second pouring state for pouring foam via the second flow channel 129 when the operating lever 164 is tilted to the other side. Incidentally, the flow state changing mechanism can be alternatively configured to be capable of selecting the first porting state for pouring beer via the first flow channel 128 when the operating lever 164 is tilted to the other side and the second pouring state for pouring foam via the second flow channel 129 when the operating lever 164 is tilted to the one side.

[0136] Further, the flow state changing mechanism opens up the discharge outlet 131 to vent gas fed into the can 101, thus returning the increased inside pressure back to the atmospheric pressure, when neither the first flow channel 128 nor the second flow channel 129 is selected, that is, when the operating lever 164 is not tilted. With this release of pressurized state inside the can 101, the possibility of accidental leak of beer or foam from the first outlet 121 or the second outlet 122 can be prevented

[0137] Next, pouring of beer using the pouring device 100 configured as described above will now be explained.

Firstly, a user opens the tap 106 of the beer can 101 and inserts the inlet 123a of the piping 123 disposed vertically within the accommodating portion 111 of the pouring device 100 to the tap 106 and

at the same time places the can 101 on the mounting portion 114 inside the accommodating portion 111. Then, the user slides the handle 116a of the base portion 112 to push up the mounting portion 114 and confirms that the threading-tightening portion 105 of the can 101 has engaged
5 with the recessed portion 119 of the packing 118.

[0138] Next, the user will tilt a beer mug or the like and keep it adjacent the first outlet 121 and the second outlet 122 and then tilts the operating lever 164 to the one side. With this, the pump 170 is driven and gas supplied by the pump 170 increases the inside pressure of the
10 can 101, whereby the liquid surface of beer is pressed down and beer is pushed into the manifold 125 via the inlet 123a and the piping 123 and the beer is eventually poured from the first outlet 121 via the first flow channel 128. At this stage, beer will be poured gently so as to minimize generation of foam inside the mug or the like. When beer has been
15 poured to about 70 % of the capacity of the mug or the like, the user will return the operating lever 164 to its non-tilted state.

[0139] Next, the operating lever 164 is tilted to the other side. With this, the pump 170 is driven again, so that gas supplied by the pump 170 increases the inside pressure of the can 101, whereby the liquid surface
20 of beer is pressed down and beer is pushed into the manifold 125 via the inlet 123a and the piping 123 and the beer is eventually poured from the second outlet 122 via the second flow channel 129. In the course of this, the drive circuit activates the vibration applying mechanism 140 to vibrate the second flow channel 129, so during its passage through the
25 second flow channel 129, the beer receives the vibration so that foam is excited. Eventually, the beer poured from the second outlet 122 will be formed into creamy foam to be poured into the mug or the like. When a desired amount of foam has been poured into the mug or the like, the user will return the operating lever 164 to the non-tilted state. As
30 described above, it is possible to add an appropriate amount of creamy foam to beer soured into a mug or the like, without requiring good experience or skill.

[0140] In the above, beer has been used as an example of carbonated beverage in the explanation. However, the the carbonated beverage is
35 not limited thereto, but can be any carbonated liquor, cider or low-alcoholic beverage or the like. Further, the beverage is not limited

to beverage or drink containing alcohol, but can be beverage or drink not containing alcohol.

Description of Reference Marks

5	[0141]	10: pitcher
		30: pouring device
		301: pouring device
		40: flow channel
		401: flow channel
10		41: first inlet
		42: second inlet
		43: outlet
		44: beer flow pipe
		441: beer flow pipe
15		45: shared-use flow pipe
		451: shared-use flow pipe
		48: flow amount varying valve
		50: flow amount varying mechanism
		501: flow amount varying mechanism
20		51: operating portion
		52: movable portion
		521: movable portion
		71: vibration applying mechanism
		72: ultrasonic generator
25		75: activation switch
		751: activation switch
		80: flow channel
		81: inlet
		82: outlet
30		83: tube
		84: piping
		90: position maintaining mechanism
		100: pouring device
		101: can
35		120: piping
		121: first outlet

	122:	second outlet
	123:	piping
	123a:	outlet
	128:	first flow channel
5	129:	second flow channel
	131:	discharge outlet
	140:	vibration applying mechanism
	141:	ultrasonic generator
	150:	controlling portion
10	160:	cam mechanism
	170:	pump
	171:	motor

CLAIMS

1. A pouring device that is attached to a portable container and configured to pour an amount of carbonated beverage held in the portable container, the pouring device comprising:

an inlet for introducing an amount of carbonated beverage held in a portable container;

an outlet for pouring the carbonated beverage introduced through the inlet;

a flow channel communicating between the inlet and the outlet;

a flow state changing mechanism for changing a flow state of the carbonated beverage flown through the flow channel to at least a first pouring state or a second pouring state; and

a vibration applying mechanism for applying vibration to the carbonated beverage which is being flown through the flow channel, the vibration applying mechanism being activated under the second pouring state,

wherein:

the carbonated beverage is poured from the outlet when the portable container is brought into a tilted pouring posture; and

the flow state changing mechanism is configured to be capable of changing a pouring amount of the carbonated beverage poured from the outlet to a fixed amount or to a small amount, the first pouring state being a state when the pouring amount is the fixed amount, the second pouring state being a state when the pouring amount is the small amount.

2. The pouring device according to claim 1, wherein:

the flow channel is comprised of a plurality of flow pipes communicating the inlet and the outlet at least one respectively of which are provided;

the flow state changing mechanism is configured to change the pouring amount from the fixed amount to the small amount by closing at least one flow pipe of the plurality of flow pipes; and

the vibration applying mechanism applies vibration to the carbonated beverage which is being flown through the other non-closed flow pipe of the plurality of flow pipes.

3. The pouring device according to claim 2, wherein of the plurality of flow pipes, the flow pipe to be closed by the flow state changing mechanism has a total flow cross sectional area which is larger than a total flow cross sectional area of the other flow pipe(s).

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4. The pouring device according to claim 2 or 3, wherein of the plurality of flow pipes, the flow pipe to be closed by the flow state changing mechanism is disposed at a position relatively downwardly of the other flow pipe when the portable container is placed under the pouring posture.

10

5. The pouring device according to claim 1, wherein:
the flow channel is comprised of at least one flow pipe communicating the inlet and the outlet at least one respectively of which are provided;

15

the flow state changing mechanism is configured to change the pouring amount from the fixed amount to the small amount by reducing flow channel cross sectional area of the flow pipe; and

the vibration applying mechanism applies vibration to the carbonated beverage which is being flown through the flow pipe.

20

6. The pouring device according to any one of claims 2 - 5, wherein:

the flow state changing mechanism includes an operating portion, a movable portion and a flexible tube disposed at least a portion of the flow pipe; and

25

the movable portion causes pressing deformation of the tube in association with an operation of the operating portion, thereby to switch ON an activation switch of the vibration applying mechanism.

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7. The pouring device according to any one of claims 2 - 5, wherein:

the flow state changing mechanism includes an operating portion, a movable portion and a flow amount varying valve disposed at least a portion of the flow pipe; and

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the movable portion changes an opening degree of the flow amount varying valve in association with an operation of the operating

portion, thereby to switch ON an activation switch of the vibration applying mechanism.

8. The pouring device according to claim 6 or 7, wherein:
5 the flow state changing mechanism includes a position maintaining mechanism for maintaining the movable portion at a predetermined movable position; and

the position maintaining mechanism maintains the movable portion at the movable position thereby to maintain the pouring amount at the small amount if the operating portion is operated when the movable portion is not maintained at the movable position and releases the maintenance thereby to maintain the pouring amount to the fixed amount if the operating portion is operated when the movable portion is maintained at the movable position.

15 9. The pouring device according to any one of claims 1 - 8, wherein the vibration applying mechanism is stopped when the pouring amount is changed from the small amount to the fixed amount by the flow state changing mechanism.

20 10. A pouring device that is attached to a portable container and configured to pour an amount of carbonated beverage held in the portable container, the pouring device comprising:

an inlet for introducing an amount of carbonated beverage held
25 in a portable container;

an outlet for pouring the carbonated beverage introduced through the inlet;

a flow channel communicating between the inlet and the outlet;

a flow state changing mechanism for changing a flow state of the carbonated beverage flown through the flow channel to at least a first pouring state or a second pouring state; and

30 a vibration applying mechanism for applying vibration to the carbonated beverage which is being flown through the flow channel, the vibration applying mechanism being activated under the second pouring state,
35 state,

wherein:

the pouring device further comprises a gas feeding mechanism

for feeding gas into the portable container;

the carbonated beverage is poured from the outlet when an inside pressure of the portable container is increased by gas fed by the gas feeding mechanism;

5 the outlet includes a first outlet and a second outlet;

the flow channel includes a first flow channel communicating between the inlet and the first outlet and a second flow channel communicating between the inlet and the second outlet;

10 the flow state changing mechanism is configured to be capable of selecting the first flow channel or the second flow channel; and

the first pouring state is realized when the first flow channel is selected and the second pouring state is realized when the second flow channel is selected.

15 11. The pouring device according to claim 10, wherein a channel cross sectional area of the first flow channel is set larger than a channel cross sectional area of the second flow channel.

20 12. The pouring device according to claim 10 or 11, wherein: the pouring device further comprises a discharging channel for discharging the gas fed into the portable container; and

the flow state changing mechanism opens up the discharging channel when neither the first flow channel nor the second flow channel is selected.

25

13. The pouring device according to any one of claims 1 - 12, wherein:

the vibration applying mechanism comprises an ultrasonic generating means; and

30 the ultrasonic generating means applies vibration through ultrasonic wave via the flow channel to the carbonated beverage being flown through this flow channel.

35 14. The pouring device according to claim 13 wherein the pouring device further comprises an adjusting portion for adjusting vibration frequency and vibration amplitude of the ultrasonic generating means.