DESCRIPTION

TITLE OF THE INVENTION: CONVERSION DEVICE FOR CONVERTING MANUAL LIQUID SUPPLY DEVICE INTO AUTOMATIC LIQUID SUPPLY DEVICE, AND ATTACHING PLATE PROVIDED TO CONVERSION DEVICE

TECHNICAL FIELD

[0001]

The present invention relates to a conversion device, adapted to be mounted to a manual liquid supply device, for converting the manual liquid supply device into an automated liquid supply device and, further, relates to a mounting plate included in the conversion device.

BACKGROUND ART

[0002]

A conversion device adapted to be mounted to a manual liquid supply device for converting this manual liquid supply device into an automated liquid supply device has been already suggested by the applicant of the present application and has been sold (refer to Patent Documents 1 and 2, for example). More specifically, the aforementioned conversion device can be mounted to a manual beer server including a manual operation lever without necessitating modification of the manual beer server. The conversion device is adapted to operate the operation lever and then automatically to pour beer into a mug when an operator just pushes an operation button included in the conversion device.

PRIOR ART DOCUMENTS

PATENT DOCUMENTS

[0003]

Patent Document 1: JP 2014-223942 A

Patent Document 2: JP 2014-223943 A

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0004]

As described above, the existing conversion device has been developed under the design concept of enabling mounting of the conversion device to a manual beer server without altering the manual beer server. As a result thereof, the conversion device made by the present applicant can be mounted to manual beer servers manufactured by almost all makers. Thus, this provides an overwhelming advantage of enabling pouring beer with certain quality regardless of the beer pouring skills of restaurant staffs and, further, largely contributes to reduction of labors of staffs and the like.

On the other hand, due to the aforementioned design concept, the conversion device needs to include structures for mounting and securing the device to the manual beer server, and the conversion device has points to be overcome, which are induced by such mounting and securing structures. Therefore, the existing conversion device still has rooms for improvement, in fact.

So, it is an object of the present invention to provide a conversion device which has been further improved and heightened in perfection and, further, to provide a mounting plate included in the conversion device.

MEANS FOR SOLVING THE PROBLEMS

[0005]

In order to attain the aforementioned object, there is provided a configuration, according to the present invention.

Namely, in one aspect of the present invention, there is provided a

conversion device configured to convert a manual liquid supply device into an automated liquid supply device by mounting the conversion device to the manual liquid supply device including a liquid discharging portion, the liquid discharging portion being protruded from a mounting surface in the manual liquid supply device and discharging or stopping liquid with an operation of a manual operation member in the liquid discharging portion, the conversion device comprising:

an automated operation portion configured to automatically operate the manual operation member; and

a mounting plate made of a resin, positioned between the automated operation portion and the mounting surface, and configured to mount the automated operation portion to the mounting surface,

the mounting plate including: a back surface facing to the manual liquid supply device and coming in contact with the mounting surface; a front surface opposed to the back surface and facing to the automated operation portion; and a liquid discharging portion opening passed through the front and back surfaces and through which the liquid discharging portion is inserted, and

the conversion device further comprising a spacer configured to be interspersed and sandwiched between the front surface and the automated operation portion, and configured to create a gap between the front surface and the automated operation portion.

EFFECTS OF THE INVENTION

[0006]

Since the aforementioned conversion device includes the spacer between the automated operation portion and the front surface of the mounting plate, it is possible to create a gap between the automated operation portion and the front

surface of the mounting plate. On the other hand, under the design concept explained above in the existing conversion device, the device has a larger contact area between a base plate corresponding to the mounting plate and a conversion device main body corresponding to the automated operation portion, as a structure for mounting and securing the conversion device to the manual beer server. As a result thereof, there is a possibility of adhesion of the base plate and the conversion device main body to each other, due to beer penetrated into a contact portion with the larger contact area, as one of the points to be overcome. In order to improve the point to be overcome, providing the spacer makes it possible to reduce a contact area between the mounting plate and the automated operation portion and inhibit the possibility of adhesion therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Fig. 1 is a perspective view illustrating the structure of a conversion device according to an embodiment of the present invention.

Fig. 2 is a perspective view illustrating an automated beer dispenser in a state where the conversion device illustrated in Fig. 1 has been mounted to a manual beer server.

Fig. 3A is a perspective view illustrating the front-surface side of a mounting plate included in the conversion device illustrated in Fig. 1.

Fig. 3B is a perspective view illustrating the back-surface side of the mounting plate included in the conversion device illustrated in Fig. 1.

Fig. 4 is a view illustrating a spacer included in the conversion device illustrated in Fig. 1.

Fig. 5 is a perspective view illustrating an example of modification of the

mounting plate included in the conversion device illustrated in Fig. 1, illustrating the mounting plate including spacers placed in a different manner.

Fig. 6 is a perspective view of a conversion device main body, illustrating a case where the spacers included in the conversion device illustrated in Fig. 1 are provided on the conversion device main body.

Fig. 7 is a perspective view illustrating the manual beer server illustrated in Fig. 2.

Fig. 8 is a perspective view illustrating a state where the mounting plate illustrated in Fig. 1 has been secured to the manual beer server illustrated in Fig. 2.

Fig. 9 is a view illustrating a state where the conversion device illustrated in Fig. 1 has been mounted to the manual beer server, in a case where a main body wall portion in the manual beer server forms a non-flat surface.

Fig. 10 is a perspective view illustrating an existing manual beer server.

Fig. 11 is a perspective view illustrating a state where an existing conversion device has been mounted to the manual beer server illustrated in Fig. 10.

Fig. 12 is a perspective view illustrating the structure of the existing conversion device.

Fig. 13 is a side view of the manual beer server illustrated in Fig. 10, illustrating a state where a liquid discharging portion has been detached therefrom.

Fig. 14 is a perspective view illustrating a state where a base plate included in the existing conversion device has been mounted to the manual beer server illustrated in Fig. 10.

Fig. 15 is a view for explaining operations for mounting the base plate included in the existing conversion device to the manual beer server illustrated in Fig. 10.

Fig. 16 is a view for explaining the operations for mounting the base plate included in the existing conversion device to the manual beer server illustrated in Fig. 10.

Fig. 17 is a perspective view for explaining a state where a conversion device main body included in the existing conversion device has been mounted to the base plate illustrated in Fig. 16.

EMBODIMENTS OF THE INVENTION

[0008]

Hereinafter, there will be described a conversion device for converting a manual liquid supply device into an automated liquid supply device according to an embodiment of the present invention, with reference to the drawings. Incidentally, throughout the drawings, the same or similar components are designated by the same reference characters. Further, in order to avoid unnecessary redundancy of the following descriptions for enabling those skilled in the art to easily understand them, matters which have been well known already will not be described in detail, and substantially the same structures will not be described redundantly, in some cases. Further, the contents of the following descriptions and the accompanying drawings are not intended to restrict the subjects defined by the claims.

[0009]

Further, in the following embodiment, there will be exemplified a beer dispenser, namely a beer server, as an example of a liquid supply device, but the

liquid supply device is not limited to be used for beer. Namely, the conversion device according to the embodiment is applicable to any manual liquid supply device which includes a manual operation member which can be operated by an operator, and which is capable of ejecting liquid when the manual operation member is operated.

[0010]

Before describing about the conversion device according to the present embodiment, an existing conversion device will be described in brief, at first, with reference to Figs. 10 to 12.

A manual beer server 10 illustrated in Fig. 10, which corresponds to an example of "a manual liquid supply device", has conventionally existed. In the manual beer server 10, a liquid discharging portion 1 is protruded from a main body wall portion 5 which corresponds to an example of "a mounting surface", with a lever mounting portion 3 interposed therebetween. For example, an operator such as a restaurant staff is enabled to discharge beer and foams into a mug and to stop them, by inclining an operation lever 1a in the manual beer server 10. Further, the liquid discharging portion 1 is made attachable and detachable to and from the lever mounting portion 3 in order to enable washing it.

[0011]

An existing conversion device 50 illustrated in Fig. 11 is a device for converting the manual beer server 10 into an automated beer dispenser 70 corresponding to an example of an automated liquid supply device, by being simply retrofitted to the manual beer server 10, without necessitating modification of the manual beer server 10.

The conversion device 50 as described above includes a conversion device

main body 51, a fixing ring 53 and a mounting base 55 as basic components, as illustrated in Fig. 12. In this case, the conversion device main body 51 is a component for enabling the operation lever 1a in the manual beer server 10 to be automatically operated. Further, the fixing ring 53 and the mounting base 55 are members for securing the conversion device main body 51 onto the manual beer server 10.

[0012]

The conversion device main body 51 includes a lever operation portion 51a at its upper portion, and a mug inclination portion 51b at its lower portion. The lever operation portion 51a mainly includes, thereinside, a lever operation mechanism for performing operations for inclining the operation lever 1a. Further, the lever operation portion 51a is structured to be movable upwardly and downwardly along a predetermined rail (not illustrated), similarly to in conventional manners. The mug inclination portion 51b includes a lower-portion cover 51c and also mainly includes a mug inclination mechanism thereinside, and this mug inclination mechanism is a mechanism for inclining a mug placing plate 51d for placing a mug thereon.

Further, the lever operation mechanism in the lever operation portion 51a and the mug inclination mechanism in the mug inclination portion 51b have the same structures as those of the respective mechanisms disclosed in the aforementioned Patent Documents 1 and 2. Therefore, they are not described herein.

[0013]

The mounting base 55 is formed with a metal plate member. The mounting base 55 is a member for mounting the conversion device main body 51

onto the main body wall portion 5 in the manual beer server 10 and includes a base plate 55a and base plate fixing bolts 55c. The base plate 55a is provided with a base plate mounting opening 55b, and a plurality of main body mounting openings 55d surrounding the base plate mounting opening 55b.

The base plate mounting opening 55b is formed at the center of the base plate 55a in the widthwise direction orthogonal to the longitudinal direction thereof and, further, has a size enough to insert, therethrough, the lever mounting portion 3 in the manual beer server 10. Accordingly, the base plate mounting opening 55b is an opening for mounting the mounting base 55 to the lever mounting portion 3.

Further, the main body mounting openings 55d are openings for latching and mounting the conversion device main body 51 onto the mounting base 55.

[0014]

The base plate fixing bolts 55c are bolts which can be adjusted in amount of protrusion from the base plate 55a toward the main body wall portion 5 of the manual beer server 10, since the base plate fixing bolts 55c are screwed into the base plate 55a. These base plate fixing bolts 55c are bolts for pressing the mounting base 55 toward the lever mounting portion 3 in order to secure the mounting base 55, by pushing out the bolts 55c against the main body wall portion 5, as will be described later.

[0015]

The fixing ring 53 is a member used for pressing and securing the mounting base 55 with respect to the lever mounting portion 3, as described above. The fixing ring 53 includes two split fixing rings 53a and 53b, and split-fixing-ring coupling bolts 53c. The split fixing rings 53a and 53b are two-split

members having respective half-circular shapes, and the split fixing rings 53a and 53b are coupled to each other through the split-fixing-ring coupling bolts 53c to be integrated. Further, as a result of the integration of them, there is formed a fixing-ring mounting opening 53d at a center portion of the fixing ring 53.

[0016]

Next, there will be described a method for mounting and securing the mounting base 55 onto the main body wall portion 5 in the manual beer server 10, using the fixing ring 53 and the mounting base 55 which have been described above, with reference to Figs. 13 to 16.

At first, as illustrated in Fig. 13, the liquid discharging portion 1 in the manual beer server 10 is detached, thereby realizing a state where only the lever mounting portion 3 is protruded from the main body wall portion 5.

Next, as illustrated in Fig. 14, the base plate mounting opening 55b in the mounting base 55 is inserted around the lever mounting portion 3, and the base plate 55a is placed along the main body wall portion 5.

[0017]

Next, as illustrated in Fig. 15, at the lever mounting portion 3, the fixing ring 53 is disposed between a cap nut 3a and the base plate 55a. More specifically, a shank 3b (Fig. 13) in the lever mounting portion 3 is caught between the two split fixing rings 53a and 53b, and these split fixing rings 53a and 53b are coupled to each other through the split-fixing-ring coupling bolts 53c, so that the fixing ring 53 is secured to the lever mounting portion 3. At this time, the fixing-ring mounting opening 53d in the fixing ring 53 has a smaller diameter than that of the cap nut 3a, which prevents the fixing ring 53 from being disengaged from the lever mounting portion 3.

Thus, the base plate 55a has been mounted to the manual beer server 10 in a state that the base plate 55a is sandwiched between the fixing ring 53 and the main body wall portion 5 in the manual beer server 10.

[0018]

Further, the base plate fixing bolts 55c in the mounting base 55 are rotated in such a way as to proceed from the base plate 55a toward the main body wall portion 5 in the manual beer server 10. On the other hand, the base plate 55a is restricted in movement by the fixing ring 53. Accordingly, by rotating the base plate fixing bolts 55c even after the tip ends of the base plate fixing bolts 55c have reached on the main body wall portion 5, the base plate fixing bolts 55c function as tension rods. As a result thereof, as illustrated in Fig. 16, the base plate 55a is certainly secured to the main body wall portion 5 in the manual beer server 10.

[0019]

With respect to the mounting base 55 having been secured to the main body wall portion 5 in the manual beer server 10 through the aforementioned operations, as illustrated in Fig. 17, mounting protrusions (not illustrated) in the conversion device main body 51 are fitted into the main body mounting openings 55d (Fig. 14) in the base plate 55a. Thus, the conversion device main body 51 can be mounted to the base plate 55a and, therefore, to the manual beer server 10.

[0020]

Further, the liquid discharging portion 1 which has been detached is mounted to the lever mounting portion 3. Next, the lever operation portion 51a is moved downwardly and is set such that the operation lever 1a is settled at a predetermined position in the lever operation portion 51a (Fig. 11).

Therefore, the manual beer server 10 has been made to form an automated beer dispenser 70 through the conversion device 50.

[0021]

Incidentally, means for certainly securing the base plate 55a to the main body wall portion 5 in the manual beer server 10 is not limited to the aforementioned base plate fixing bolts 55c. Namely, this means can be any pressing means capable of functioning as tension rods.

[0022]

As described above, the existing conversion device 50 is configured based on the design concept of performing no modification for mounting the conversion device 50 to the conventional manual beer server 10. As a merit thereof, the conversion device 50 can be mounted to manual beer servers manufactured by almost all makers, and can automate them, as described above. This is a significantly excellent advantage.

[0023]

On the other hand, in the mounting base 55 for mounting the conversion device main body 51 to the manual beer server 10, the base plate 55a is pressed against the fixing ring 53 through pressing means such as the base plate fixing bolts 55c, for example, in order to secure the base plate 55a onto the main body wall portion 5 in the manual beer server 10. Further, while there are plural positions at which the pressing means such as the base plate fixing bolts 55c is pushed out, there is only a single position, namely a position of the fixing ring 53, to which the base plate 55a is pressed. Due to these facts, the base plate 55a is required to have rigidity enough to withstand at least pressing (pressing operations), then in the conversion device 50, the base plate 55a is formed of a

metal plate. Further, a supporting surface 55e (Figs. 12 and 15 and the like) of the base plate 55a, which comes in contact with the conversion device main body 51 and supports it, is made to from a flat surface and, further, is made to have a contact area with the conversion device main body 51 as large as possible, in consideration of deformation due to the aforementioned pressing.

[0024]

On the other hand, due to the nature of the automated beer dispenser 70, the conversion device main body 51 may be splashed with beer due to spilling and the like of beer, for example. Further, it is also considered that beer may intrude into contact portions between the conversion device main body 51 and the supporting surface 55e of the base plate 55a. When the intruded beer has been dried, the supporting surface 55e and the conversion device main body 51 can be adhered to each other. This raises concern about inconvenience at the time of maintenance of the conversion device 50.

[0025]

Further, as described above, because of securing the base plate 55a through pressing operations, there is a need for the fixing ring 53 and the pressing means such as the base plate fixing bolts 55c. This consequently involves an increase of the number of members, which naturally requires time for operations for mounting them, and the like.

[0026]

A conversion device according to the present embodiment has been improved over the aforementioned existing conversion device 50, in terms of the points of the existing conversion device 50 which should be overcome.

Further, in the conversion device according to the present embodiment,

slight modification is performed on the manual beer server 10 in order to mount the conversion device according to the present embodiment to the manual beer server 10, based on a new design concept.

These points will be described in detail below.

[0027]

Fig. 1 illustrates a conversion device 150 according to the present embodiment, and Fig. 2 illustrates an automated liquid supply device constructed by mounting the conversion device 150 to a manual liquid supply device. In this case, the conversion device 150 is a device for converting the manual liquid supply device into the automated liquid supply device similarly to the existing conversion device 50. Further, the device corresponding to an example of the manual liquid supply device is a manual beer server 20 illustrated in Fig. 7, and the device corresponding to an example of the automated liquid supply device is an automated beer dispenser 200 illustrated in Fig. 2.

On the other hand, the conversion device 150 according to the present embodiment is configured based on the new design concept of performing slight modification with respect to the existing manual beer server in order to mount the conversion device 150 thereto. More specifically, as will be described later in detail, the manual beer server 20 illustrated in Fig. 7 includes screw holes 21 for mounting the conversion device 150 in the present embodiment. Further, the screw holes 21 correspond to an example of engagement portions to be engaged with fastening members which will be described later.

[0028]

Under this new design concept, the conversion device 150 according to the present embodiment includes a conversion device main body 51, a mounting

plate 110, and spacers 120, as illustrated in Fig. 1. Accordingly, this conversion device 150 does not include the fixing ring 53 and the base plate fixing bolts 55c (the pressing means), which enables reduction of the number of members, in comparison with the existing conversion device 50. As a result thereof, with the conversion device 150, it is possible to provide the advantages of reduction of the cost, reduction of mounting operation times, and the like, in comparison with the existing conversion device 50.

Hereinafter, the conversion device main body 51, the mounting plate 110 and the spacers 120 will be described sequentially.

[0029]

The conversion device main body 51 is the same as that included in the aforementioned conversion device 50 and corresponds to an example of an automated operation portion for automatically operating a manual operation member in the manual beer server 20 in Fig. 7. Accordingly, the conversion device main body 51 is not described in detail here. The conversion device main body 51 includes the lever operation portion 51a at its upper portion, and the mug inclination portion 51b at its lower portion. Incidentally, the aforementioned manual operation member corresponds to the operation lever 1a in the liquid discharging portion 1 illustrated in Fig. 7.

[0030]

Next, the mounting plate 110 will be described.

The mounting plate 110 is a member corresponding to the mounting base 55 included in the aforementioned conversion device 50. The mounting plate 110 is a member which is positioned between the conversion device main body 51 in the conversion device 150 according to the present embodiment and the main

body wall portion 5 in the manual beer server 20 for securing the conversion device main body 51 to the manual beer server 20. Further, the main body wall portion 5 corresponds to an example of "the mounting surface".

More specifically, in the present embodiment, the mounting plate 110 is made of a resin and molded using polyacetal, for example, and includes a back surface 110b which comes in contact with the main body wall portion 5 and faces the manual beer server 20, a front surface 110a which is opposed to the back surface 110b and faces the conversion device main body 51, and a liquid discharging portion opening 111 which is penetrated through the front surface 110a and the back surface 110b and is adapted to insert the liquid discharging portion 1 therethrough, as illustrated in Figs. 3A and 3B. Further, the mounting plate 110 includes main body mounting openings 55d, similarly to the mounting base 55 included in the conversion device 50. Further, the main body mounting openings 55d are hole portions to and with which hook members 51f protruded from a base plate 51e in the conversion device main body 51 are fitted and engaged. In the present embodiment, the main body mounting openings 55d are made to have a shape in which a part of the round shape is tapered, as illustrated in Fig. 1.

[0031]

Furthermore, the mounting plate 110 newly includes fastening-member holes 112, a reinforcement fastening-member hole 113, a latch opening 114, and the spacers 120 which will be described hereinafter.

The fastening-member holes 112 are holes for inserting, therethrough, fastening members 130 (Fig. 8) for securing the mounting plate 110 onto the main body wall portion 5 in the manual beer server 20. The fastening-member holes

112 are arranged at four corners of the mounting plate 110. Further, the fastening-member holes 112 include counterbores respectively around their peripheries in order to prevent heads of the fastening members 130 from protruding from the front surface 110a. Further, the mounting plate 110 just has to have at least three fastening members 130, since stable mounting of the mounting plate 110 can be achieved with at least three positions. Accordingly, the number of the fastening-member holes 112 is not limited to four and can be any number equal to or more than three.

[0032]

The reinforcement fastening-member hole 113, in other words, a reinforcement fastening member 131 illustrated in Figs. 1 and 8, is provided for the following reasons. That is, the mounting plate 110 and the conversion device main body 51 are attached with each other by engaging the main body mounting openings 55d in the mounting plate 110 with the hook members 51f (Fig. 6) protruded from the base plate 51e in the conversion device main body 51. In order to reinforce this engagement state, even if an excessive external force is exerted to the conversion device main body 51, due to collision of a person with the conversion device main body 51, for example, there is provided the reinforcement fastening member 131 (Figs. 1 and 8) which is simply penetrated through the mounting plate 110 for directly fastening between the lever operation portion 51a in the conversion device main body 51 and the main body wall portion 5 in the manual beer server 20, in the present embodiment. The reinforcement fastening-member hole 113 is a hole through which the reinforcement fastening member 131 is penetrated without being engaged therewith. Further, there just has to provide at least one reinforcement fastening member 131.

[0033]

Further, the reinforcement fastening member 131 is disposed at the center of the mounting plate 110 in the widthwise direction orthogonal to the longitudinal direction of the mounting plate 110. Namely, the reinforcement fastening member 131 is positioned at the center between the two main body mounting openings 55d which are positioned in the left and right sides of the mounting plate 110 in the widthwise direction. Since the reinforcement fastening member 131 is disposed in association with the positions of the main body mounting openings 55d as described above, it is possible to prevent the mounting plate 110 from unevenly damaging, even if an excessive external force described above is exerted on any of the left and right sides in the widthwise direction with respect to the conversion device main body 51. Further, the location of the reinforcement fastening member 131 in the mounting plate 110 is not limited to the aforementioned center.

[0034]

Further, the latch opening 114 is an opening with which a latch claw 51g (Fig. 6) provided at the lower end of the conversion device main body 51 is engaged.

[0035]

Next, the spacers 120 will be described.

The spacers 120 are members which are interspersed on the mounting plate 110 while being sandwiched between the front surface 110a of the mounting plate 110 and the conversion device main body 51, thereby generating a gap 121 between the front surface 110a and the conversion device main body 51, as illustrated in Fig. 4. There just has to be at least three spacers 120 interspersed

between the front surface 110a and the conversion device main body 51. By interspersing at least three spacers 120, it is possible to stably install the conversion device main body 51 onto the mounting plate 110 without inducing wobble. Further, the surfaces of the spacers 120 which come in contact with the conversion device main body 51 are made with flat surfaces in order to stably install the conversion device main body 51 thereon.

[0036]

In the present embodiment, as illustrated in Figs. 1 and 3A, the spacers 120 are placed to form respective rectangular shapes around the main body mounting openings 55d and the latch opening 114 in the mounting plate 110 and are formed integrally with the mounting plate 110 in such a way as to protrude from the front surface 110a. The provision of the spacers 120 together with the main body mounting openings 55d and the latch opening 114 as described above is advantageous in view of forming the spacers 120 and, also, is advantageous in view of stability of mounting of the conversion device main body 51 onto the mounting plate 110.

Further, since the spacers 120 just have to be at least three portions as described above, it is not necessarily required to provide the spacer 120 around the latch opening 114.

[0037]

The size of the spacers 120 is properly determined in consideration of the aim of the installation thereof, namely in consideration of prevention of adhesion between the conversion device main body 51 and the front surface 110a of the mounting plate 110. Particularly, the thickness of the spacers 120 is selected to be such a value as to inhibit spilled liquid from being stagnated in the gap formed

between the conversion device main body 51 and the front surface 110a of the mounting plate 110.

[0038]

In view of the aforementioned circumstances, the thickness of the spacers 120 is about 1 mm to 3 mm, in general. If the thickness of the spacers 120 is less than 1 mm, spilled liquid tends to be stagnated in the gap 121 formed by the spacers 120. On the other hand, if the thickness of the spacers 120 exceeds 3 mm, this may make the strength of the mounting of the conversion device main body 51 insufficient and may make the attitude of the mounting thereof instable.

Incidentally, in the present embodiment, for example, the thickness of each of the spacers 120 is made to be 2 mm.

[0039]

Further, in view of the size of the spacers 120, a contact area formed with the spacers 120 and the conversion device main body 51 has such a size as to allow an operator to easily separate the conversion device main body 51 from the mounting plate 110 with his or her hands, even when liquid has been penetrated into their contact portions and has been dried therein.

In view of the aforementioned circumstances, total of the contact areas of all spacers 120 is equal to or less than about 1/5 of the area of the front surface 110a of the mounting plate 110, preferably equal to or less than about 1/10 thereof, and more preferably equal to or less than about 1/12 thereof. If the total of the contact areas of all the spacers 120 is larger than about 1/5 of the area of the front surface 110a of the mounting plate 110, the mounting plate 110 and the conversion device main body 51 may be firmly adhered to each other, which may cause the operator to find difficulty in separating the conversion device main body

51 from the mounting plate 110 with his or her hands. The lower limit value of the total of the contact areas of all the spacers 120 is not particularly limited. However, the total of the contact areas of all the spacers 120 is required to have a value necessary for ensuring stability of the mounting of the conversion device main body 51. In view of such circumstances, the lower limit value of the total of the contact areas of all the spacers 120 is equal to or more than about 1/30 of the area of the front surface 110a of the mounting plate 110, preferably equal to or more than about 1/25 thereof and more preferably equal to or more than about 1/20 thereof.

[0040]

Due to the provision of the spacers 120 as described above, there is no case that the front surface 110a of the mounting plate 110 and the conversion device main body 51 come in contact with each other in their whole surfaces, unlike the case of using the existing base plate 55a. Accordingly, for example, even if the conversion device main body 51 is splashed with beer, and the beer is dried therein, there is hardly a possibility that the front surface 110a of the mounting plate 110 is adhered to the conversion device main body 51. This can provide the advantage of substantially eliminating the possibility of occurrences of inconvenience at the time of maintenance of the conversion device 150.

Further, since the spacers 120 have the function of preventing adhesion as described above, the spacers 120 can be also differently referred to as "an adhesion preventing member".

[0041]

Further, the locations at which the spacers 120 are positioned are not limited to the peripheries of the main body mounting openings 55d and the latch

opening 114 according to the present embodiment. For example, as in a mounting plate 110-1 illustrated in Fig. 5, the spacers 120 can be also positioned in such a way as to protrude from the front surface 110a, at least at three locations on the front surface 110a. The mounting plate 110-1 is also made of a resin, and the spacers 120 can be molded integrally with the mounting plate 110-1. Further, by disposing the spacers 120 at any location thereon, it is possible to position the spacers 120 in association with portions which are less prone to penetrate of beer, for example.

[0042]

Further, as in a conversion device main body 51-1 illustrated in Fig. 6, at least at three locations on a base plate 51e in the conversion device main body 51-1, spacers 120 can be also protruded from the base plate 51e and can be formed integrally with the base plate 51e. In the case of providing the spacers 120 on the base plate 51e, they can be formed through the press working. This can provide the advantage of ease of the processing.

[0043]

It has been described above that the locations at which the at least three spacers 120 are positioned are arbitrary. However, it is preferable that the locations at which the three spacers 120 are positioned are spaced apart from each other as much as possible, in view of the stability of the conversion device main body 51 or the conversion device main body 51-1 with respect to the mounting plate 110. For example, a single location of the spacer can be provided in each of the left and right sides of the upper portion of the mounting plate 110 and, further, another single location thereof can be provided at the center of the lower portion in the mounting plate 110.

[0044]

Further, it is not necessarily required that the spacers 120 are formed integrally with the mounting plate 110 and the base plate 51e, and spacers 120 separated from the mounting plate and the base plate can be also placed onto at least one of the mounting plate 110 and the base plate 51e.

Namely, the spacers 120 are members required only to create the gap 121 between the conversion device main body 51 and the front surface 110a of the mounting plate 110. Further, although the spacers 120 having a circular-plate shape are illustrated in Figs. 5 and 6, the shapes of the spacers 120 are not limited.

[0045]

Next, there will be described the mounting of the aforementioned mounting plate 110 to the main body wall portion 5 in the manual beer server 20.

As illustrated in Fig. 7, in the present embodiment, the manual beer server 20 includes the screw holes 21 at five positions on the main body wall portion 5 corresponding to the fastening-member holes 112 and the reinforcement fastening-member hole 113 in the mounting plate 110. Accordingly, with respect to the main body wall portion 5 in the state where the liquid discharging portion 1 has been disengaged therefrom and the lever mounting portion 3 is protruded therefrom, the lever mounting portion 3 is inserted through the liquid discharging portion opening 111 in the mounting plate 110, and the mounting plate 110 is set on the main body wall portion 5. Further, as illustrated in Fig. 8, for example, round screws, which correspond to an example of the fastening members 130, are screwed and fastened through the fastening-member holes 112 in the mounting plate 110, thereby securing the mounting plate 110 to the main body wall portion

5.

[0046]

As described above, in the present embodiment, securing the mounting plate 110 to the manual beer server 20 is performed with the fastening members 130 and, therefore, this securing can be attained easily and firmly in a shorter time. Further, whole of the back surface 110b of the mounting plate 110 comes in contact with the main body wall portion 5 to be supported thereby. This enables forming the mounting plate 110 from a resin material as described above. Further, the mounting plate 110 is completely prevented from being deformed during being secured. This eliminates the necessity of supporting the conversion device main body 51 with the entire front surface 110a of the mounting plate 110. This enables forming the gap 121 with the spacers 120, between the front surface 110a and the conversion device main body 51, as described above. As a result thereof, as already described, it is possible to substantially eliminate the possibility of occurrences of inconvenience at the time of maintenance of the conversion device 150.

[0047]

Further, there is a need for attaching and detaching the liquid discharging portion 1 with respect to the lever mounting portion 3 for daily washing. On the other hand, in the case of the existing conversion device 50, as described above, the lever mounting portion 3 and its periphery are used when securing the base plate 55a onto the manual beer server 10. Accordingly, in the existing conversion device 50, attaching and detaching the liquid discharging portion 1 with respect to the lever mounting portion are complicated.

On the contrary, in the present embodiment, the fastening members 130

are used, while the lever mounting portion 3 and its periphery are not used, in securing the mounting plate 110. This enables easily attaching and detaching the liquid discharging portion 1 with respect to the lever mounting portion 3 in a shorter time, in comparison with the case of the existing conversion device 50.

[0048]

In the present embodiment, screws are used as the fastening members 130 as described above. However, the fastening members 130 are not limited to screws. For example, full threads or stud bolts are protruded from the main body wall portion 5 in the manual beer server 20, and after they are inserted through the fastening-member holes 112 in the mounting plate 110, securing the mounting plate 110 can be performed by engaging nuts with the full threads or stud bolts.

[0049]

In the aforementioned way, the mounting plate 110 is secured to the main body wall portion 5 in the manual beer server 20. Further, after the securing, the hook members 51f in the conversion device main body 51 are engaged with the main body mounting openings 55d in the mounting plate 110, further, the conversion device main body 51 is moved downwardly, and the latch claw 51g in the conversion device main body 51 is engaged with the latch opening 114 in the mounting plate 110. Further, in the present embodiment, the reinforcement fastening member 131 is screwed from the lever operation portion 51a, in order to couple the lever operation portion 51a in the conversion device main body 51 and the main body wall portion 5 in the manual beer server 20 to each other.

[0050]

Due to the reinforcement fastening member 131, the conversion device

main body 51 not only can be mounted to the manual beer server 20 through the mounting plate 110 interposed therebetween, but also can be directly secured to the manual beer server 20. Accordingly, even if an excessive external force is applied to the conversion device main body 51, such as collision of a person with the conversion device main body 51, for example, it is possible to prevent and inhibit damages of the main body mounting openings 55d in the mounting plate 110, which keep the mounting plate 110 engaged with the hook members 51f (Fig. 6) in the conversion device main body 51.

[0051]

Further, beer supplying operations with the conversion device main body 51 in the conversion device 150 according to the present embodiment are the same as those with the existing conversion device 50, and thus are not described herein.

[0052]

In the present embodiment, the main body wall portion 5 in the manual beer server 20 forms a flat surface, which enables securing the mounting plate 110 with a flat-plate shape directly to the main body wall portion 5. On the other hand, there are some manual beer servers 20 including a main body wall portion 5 which forms a non-flat surface, such as a curved surface, for example, as illustrated in Fig. 9. In such cases, between the back surface 110b of the mounting plate 110 and the main body wall portion 5 with the curved surface, a pedestal member 140 for filling a gap between them can be attached on the back surface 110b. In this case, the pedestal member 140 is formed by a material with rigidity, such as a metal member, a resin member and the like, for example, in order to certainly secure the mounting plate 110 to the main body wall portion 5.

[0053]

Further, arbitrary embodiments out of the aforementioned various embodiments can be properly combined to provide their respective effects.

Although the present invention has been sufficiently described with respect to preferred embodiments, with reference to the accompanying drawings, various changes and modifications are apparent to those skilled in the art. It should be understood that such changes and modifications which fall within the scope of the present invention defined by the appended claims are embraced therein.

Further, the contents of the disclosures in the specification, the drawings, the claims and the abstract in Japanese Patent Application No. 2016-230765 filed on November 29, 2016 are incorporated herein in their entirety as reference.

INDUSTRIAL APPLICABILITY

[0054]

The present invention is applicable to a conversion device for converting a manual liquid supply device into an automated liquid supply device by being mounted to the manual liquid supply device.

DESCRIPTION OF REFERENCE SYMBOLS

[0055]

1	LIQUID DISCHARGING PORTION
1a	OPERATION LEVER
5	MAIN BODY WALL PORTION
20	MANUAL BEER SERVER
51	CONVERSION DEVICE MAIN BODY
55d	MAIN BODY MOUNTING OPENING

110 MOUNTING PLATE

110a FRONT SURFACE

110b BACK SURFACE

111 LIQUID DISCHARGING PORTION OPENING

112 FASTENING-MEMBER HOLE

113 REINFORCEMENT FASTENING-MEMBER HOLE

120 SPACER

121 GAP

130 FASTENING MEMBER

131 REINFORCEMENT FASTENING MEMBER

140 PEDESTAL MEMBER

150 CONVERSION DEVICE

CLAIMS

1. A conversion device configured to convert a manual liquid supply device into an automated liquid supply device by mounting the conversion device to the manual liquid supply device including a liquid discharging portion, the liquid discharging portion being protruded from a mounting surface in the manual liquid supply device and discharging or stopping liquid with an operation of a manual operation member in the liquid discharging portion, the conversion device comprising:

an automated operation portion configured to automatically operate the manual operation member; and

a mounting plate made of a resin, positioned between the automated operation portion and the mounting surface, and configured to mount the automated operation portion to the mounting surface,

the mounting plate including: a back surface facing to the manual liquid supply device and coming in contact with the mounting surface; a front surface opposed to the back surface and facing to the automated operation portion; and a liquid discharging portion opening passed through the front and back surfaces and through which the liquid discharging portion is inserted, and

the conversion device further comprising a spacer configured to be interspersed and sandwiched between the front surface and the automated operation portion, and configured to create a gap between the front surface and the automated operation portion.

2. The conversion device according to claim 1, wherein the spacer is provided on the front surface and formed integrally with the mounting plate.

3. The conversion device according to claim 1 or 2, wherein,

the mounting plate includes a main body mounting opening mounting the automated operation portion thereon, and

the spacer is provided on the front surface and is protruded from the front surface around a periphery of the main body mounting opening.

4. The conversion device according to claim 1, wherein the spacer is provided on the automated operation portion and is formed integrally with the automated operation portion.

5. The conversion device according to any one of claims 1 to 4, further comprising fastening members configured to fasten the mounting plate and the mounting surface in the manual liquid supply device to each other,

wherein the mounting plate includes fastening-member holes through which the fastening members are passed.

6. The conversion device according to claim 5, further comprising a reinforcement fastening member configured to fasten the automated operation portion and the mounting surface in the manual liquid supply device to each other,

wherein the mounting plate further includes a reinforcement fastening-member hole through which the reinforcement fastening member is passed.

7. The conversion device according to any one of claims 1 to 6, wherein in a configuration such that the mounting plate is a flat plate, and the mounting surface in the manual liquid supply device forms a non-flat surface, the back surface being flat has a pedestal member configured to fill a gap between the non-flat surface and the back surface.

8. A conversion device configured to convert a manual liquid supply device into an automated liquid supply device by mounting the conversion device to the manual liquid supply device including a liquid discharging portion, the liquid discharging portion being protruded from a mounting surface in the manual liquid supply device and discharging or stopping liquid with an operation of a manual operation member in the liquid discharging portion, the conversion device comprising:

an automated operation portion configured to automatically operate the manual operation member;

a mounting plate made of a resin, positioned between the automated operation portion and the mounting surface, and configured to mount the automated operation portion to the mounting surface; and

fastening members configured to secure the mounting plate to the mounting surface in the manual liquid supply device,

the manual liquid supply device further having engagement portions configured to engage with the fastening members,

the mounting plate including: a back surface facing to the manual liquid supply device and coming in contact with the mounting surface; a front surface opposed to the back surface and facing to the automated operation portion; and a liquid discharging portion opening passed through the front and back surfaces and through which the liquid discharging portion is inserted, and

the conversion device further comprising a spacer configured to be interspersed and sandwiched between the front surface and the automated operation portion, and configured to create a gap between the front surface and the automated operation portion.

9. A mounting plate included in a conversion device configured to convert a manual liquid supply device into an automated liquid supply device, the mounting plate being made of a resin, positioned between a mounting surface in the manual liquid supply device and an automated operation portion included in the conversion device and secured to the mounting surface, and configured to mount the automated operation portion to the mounting surface;

the mounting plate comprising:

a back surface facing to the manual liquid supply device and coming in contact with the mounting surface;

a front surface opposed to the back surface and facing to the automated operation portion; and

a spacer configured to be interspersed and sandwiched between the front surface and the automated operation portion, configured to be formed integrally with the front surface, and configured to create a gap between the front surface and the automated operation portion.