

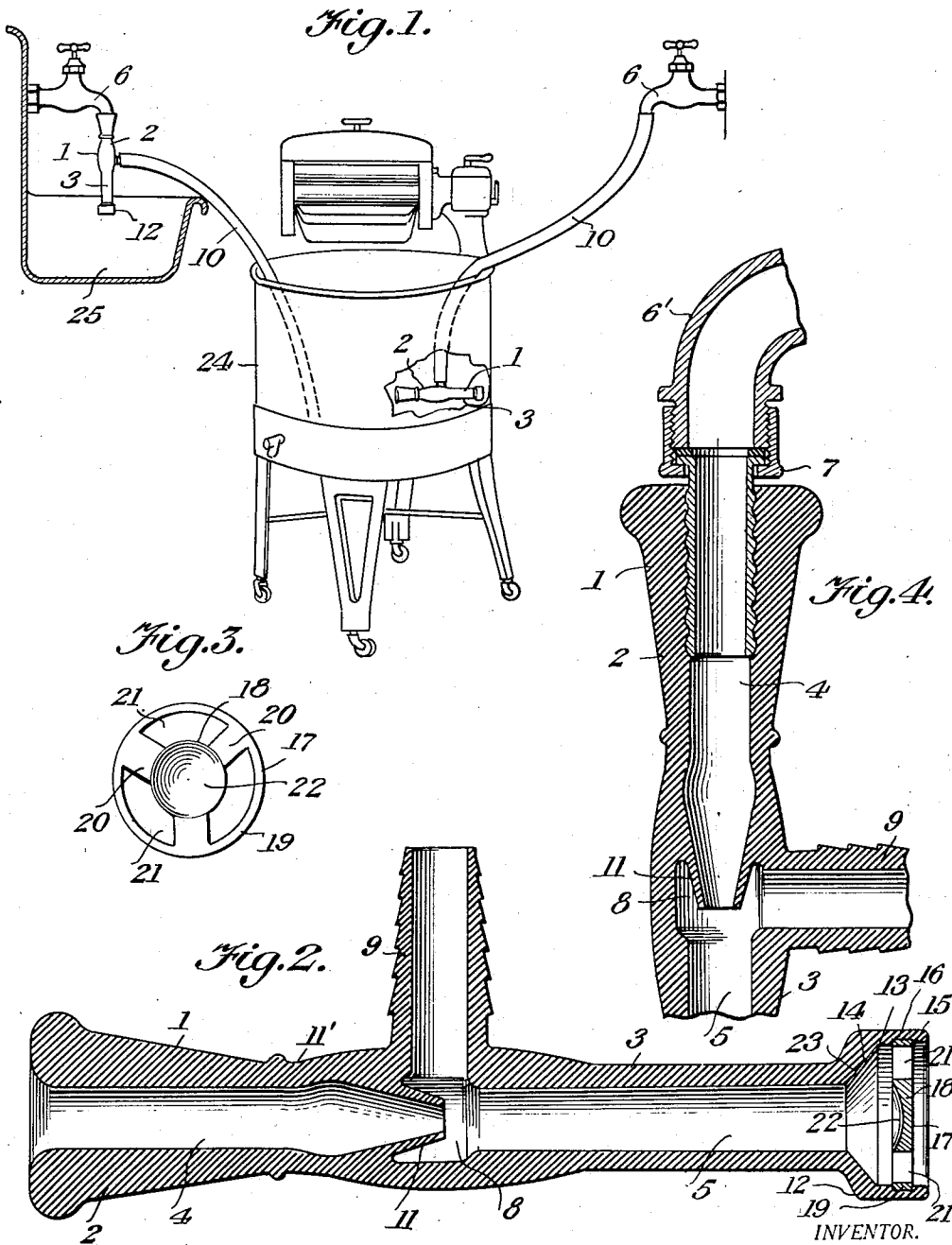
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RECEPTACLE FILLING AND EMPTYING DEVICE

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RECEPTACLE FILLING AND EMPTYING
DEVICE

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12 Claims. (Cl. 103—262)

This invention relates to a receptacle filling and emptying device, and has special reference to the provision of a device whereby a receptacle, such as a wash tub or the clothes washing receptacle of a washing machine, may be easily and conveniently filled with water from a water supply faucet of a kitchen sink, stationary wash tub or the like and as easily and conveniently emptied into the sink or other waste outlet through a suction or syphonage action instituted by means of the faucet.

The primary object of the invention is to provide a reversible combined filling and discharge suction or syphonage type of device of this character which is simple of construction and made wholly of rubber, so that it is light in weight and may be economically produced and employed without liability of any part of it becoming dented or otherwise injured in reversing it for the stated uses, or any part becoming lost and rendering the device inoperative, or of any part becoming rusted or mutilated from careless handling, such as is liable to happen in the manufacture of the device in many parts or of metal or a combination of materials.

Another object of the invention is to provide a device of this character which may be used with plain (unthreaded) or threaded faucets at will and in a ready and convenient manner.

Another object of the invention is to provide a device which produces a strong suction and syphonage action while regulating the flow and discharge of liquid therefrom so as to prevent objectionable noise or gushing or splashing of the liquid.

In the accompanying drawing,—

Fig. 1 is a perspective view showing in the one view, for convenience and simplicity of illustration, the use of the device in filling and emptying a clothes washer.

Fig. 2 is a vertical longitudinal section through the device on an enlarged scale.

Fig. 3 is a view of the retarding disk.

Fig. 4 is a sectional view showing the use of an adaptor for threaded faucets.

Referring now more particularly to the drawing, 1 designates the body of the device which is in the form of an elongated tube having longitudinally aligned inlet and discharge portions 2 and 3, respectively, said portions being provided with the channels 4 and 5, respectively. These channels are of the same or substantially the same diameter, the channel 4 being of a suitable diameter to receive the outlet of a smooth-surfaced water-supply faucet 6, as in Fig. 1, or

to receive a threaded adapter 7 for connecting the inlet end of the device to a threaded faucet 6', as shown in Fig. 4.

At a point intermediate of its length, and between the proximate ends of the channels 4 and 5, the tube 1 is provided with an annularly enlarged suction chamber 8. With one side of this chamber communicates a nipple 9 extending laterally from the tube and which is preferably annularly corrugated or threaded to receive and tightly engage a hose or flexible pipe 10. This nipple has special characteristics, as hereinafter set forth. Also communicating with the chamber 8 is a tapered suction tube or aspirator cone or nozzle 11 which extends from the channel 4 into said chamber to a point forwardly, or toward the channel 5, beyond the axial center of the bore of the nipple 9. By extending the nozzle to such degree forward its aspirating action is greatly increased, or, in other words, the suction pull in the chamber 8 is greatly increased over what it would otherwise be, and the efficiency of operation of the device in emptying a receptacle of liquid correspondingly increased, as hereinafter described. Preferably the parts referred to are formed as a unit of vulcanized rubber rigid enough as a whole to be self-sustaining but having certain of its portions elastic enough to expand and contract under pressure. For example, the nipple 5 is made of fairly rigid rubber in order that it will maintain its shape when the hose 10 is applied thereto and in order that a secure retention of the hose 10 thereon may be secured, as I have found that the engagement of rubber with rubber and particularly the grip of the softer rubber of the hose on the harder rubber of the nipple will effect a coupling which is absolutely tight or leak-proof and ensures the holding of the hose against pulling off without the use of a clamp or other fastening required with other coupling connections. The branch portion 2, for example, is of sufficient elasticity to require its inlet end to be distended in fitting it on a faucet or adaptor so that it will by reaction and compaction have an elastic grip thereon. It will be observed that the branch 2 of tube 1 is tapered longitudinally and reduced in diameter and its wall thickness progressively decreased between its outer and inlet end and a point 11' where the channel 4 communicates with the nozzle 11, so as to increase the elasticity of the tube, i. e., reduce its resistance to expansion and contraction at this point. By this means the pressure of the fluid flowing

through channel 4 at this point 11' behind the nozzle causes a certain degree of expansion of the tube at such point, resulting in a corresponding contraction of the inlet end of the tube portion 2 about the faucet 6 or adapter 6. A tight gripping engagement between the tube 1 and a faucet will thus be obtained to prevent liability of the tube pulling off the faucet without the necessity of making the tube unduly elastic.

The branch portion 3, while elastic, may be stiffer or more rigid than the branch 2 and the outer end of channel 5 of this branch portion 3 terminates in an enlargement 12 formed to provide a discharge chamber 13 having an inner tapered portion 14 and an outer circular portion 15. The circular portion 15 forms an elastic gripping portion which is provided with a keeper groove 16 to receive a replaceable baffle or retarder 17. This baffle or retarder comprises a disk preferably formed of hard rubber and having a hub or center portion 18, a rim portion 19 and a series of radiating spokes or arms 20 connecting the two and forming an annular series of fluid discharge ports 21. This disk is adapted to be held in place by pressing it into the part 15 of the discharge chamber until its rim 19 engages the groove 16, the elasticity of part 5 allowing it to expand to permit insertion of the disk and then to contract to hold the disk in place. The function of this disk is to retard the outflow of the discharging water sufficiently to ensure the filling and sealing of the parts 5 and 8 with water against the entrance of air so as to produce a strong suction and to prevent the water from splashing or gushing irregularly or with undue force and to secure the discharge of the liquid in a more or less regularly flowing stream. The liquid passing out through channel 5 will, it is obvious, be prevented from discharging directly with force by the hub 18 which acts as a baffle and which causes the liquid to flow uniformly and laterally to the ports 21 for discharge. Preferably the side of the hub 18 facing the channel 5 is concaved or dished, as shown at 22, to deflect the liquid toward the beveled deflecting walls 23 of the chamber 13 so that the baffling action will be increased and so that a proper and easy guidance of the water to the discharge parts will be obtained without undue agitation or backlash.

Fig. 1 shows the use of the device in filling and emptying a washtub or washing receptacle 24 of a washing machine. In the use of the device for filling a receptacle 24, as shown at the right hand side of Fig. 1, the free end of the hose or conductor 10 is fitted over the outlet of the faucet 6 and the opposite end of said conductor to which the device 1 is attached is disposed within the tub. The faucet is then turned on for the flow of the water and the water passes through the hose 10, nipple 9 and through both channels 4 and 5 of the device 1 into the tub. When, on the other hand, it is desired to empty the tub of washing or rinsing water, the device is reversed as shown at the left hand side of Fig. 1 and the free end of the hose is submerged in the water in the tub, while the inlet end of the device 1 is fitted over the discharge end of the faucet 6, as shown in Fig. 1, or, in case of a threaded faucet 6', as in Fig. 4, the inlet end of the device 1 is applied to a threaded adapter 7 which is secured to the faucet. With the device thus applied, the faucet

is opened for the supply of water which passes along the channel 4 and through the nozzle 11 into the suction chamber 8 and thence through the channel 5 to and through the discharge chamber 13. By this means a suction will be instituted in the chamber 8 which will cause a suction pull in the nipple 9 and hose 10, as a result of which a syphonic action will be instituted to cause the water to flow from the tub 24 through the hose 10 into the suction chamber 8 and through channel 5 to the discharge chamber 13 and thence through the ports in the retarding disk to the sink or waste receptacle 25. Owing to the fact that a strong suction action is instituted, a rapid flow of water and quick emptying of the receptacle 24 will occur. As soon as a proper syphonic action is established, the faucet 6 may be closed, or such faucet may be allowed to remain open to a predetermined extent to keep the channel 4 filled and to prevent the breaking of the syphonic action. In such use of the parts, the syphonic pull may tend to cause displacement of the device 1 from the faucet 6, but this action is counteracted and prevented with my construction by reason of the expansion under pressure of the member 1 at the point 11', which not only prevents dilation of the inlet end of the part 2 but causes its contraction so that it will grip the faucet or the adapter still more firmly and maintain its engagement therewith. The flow of the water into and through chamber 13 would ordinarily be to some extent irregular and forceful and cause objectionable gushing or splashing of the discharging water. This is overcome in my device by the construction of the retarding disk and the baffling surfaces of said disk and baffled wall of the tapered portion of the discharge chamber, whereby the stream of water, on striking the disk, is arrested and the central portion of the stream retarded and prevented from flowing directly outward and the entire stream of water then caused to pass laterally in all directions in the chamber and to discharge in spray form through the discharge ports in the baffle disk.

It will be observed that the device comprises in effect only two parts, that is to say, the body 1, which is unitarily formed of rubber, and a retarding disk, which is also preferably formed of rubber, so that a very simple structure is provided which may be easily manufactured and sold at a low cost, which is composed of a minimum number of parts, avoiding the use of complex parts liable to be lost or mislaid, and which also avoids the use of parts liable to be bent or broken in handling or of becoming rusted in service.

By forming the device of a body of elastic rubber a number of other important and desirable advantages are gained, in that the device may be interchangeably used as a filler and an emptier without employing special or unusual care in its handling, since it can be placed on or dropped into any receptacle without liability of marring or scratching the receptacle, whether made of porcelain or metal, and also without liability of injury to the filler or emptier, the device, in other words, being capable of withstanding rough handling such as would be liable to cause injury to the device if made wholly or partly of metal or to receptacles or faucets in connection with which it is used.

Furthermore, the elastic body construction of the device adapts it to be made so that it may

be applied to plain (unthreaded) water faucets by simply slipping it over with an elastic fit onto the discharge end of the faucet, as well as in enabling it to be used in connection with faucets having threaded outlets by the use of a simple type of adapter as shown in Fig. 4.

In either use a tight gripping action is ensured by the construction and coaction of parts 2, 3, 8, 11 and 17. The result of the retarding action of part 17 is not only to cause the channels 4, 5 and 8 and that of part 9 to be completely filled with water and sealed against the entrance of air, whereby a strong suction is produced, but such retarding action of part 17 is effective in cooperation with the action of parts 8 and 11 in securing a strong gripping action of the outer end of part or branch 2 about the outlet of a faucet and in counteracting back pressure tending to cause the "blowing" of water out between the engaging portions of the device and the faucet and detachment of the latter from the former. As stated the bore or channel 4 is expanded in rear of the cone 11 to provide a diametrically expansible and contractible portion 11' and between this portion 11' and the cone 11 the bore 4 is tapered in the direction of the cone. When the device is applied to a faucet and the latter turned on for the flow of water through the channels 4 and 5 a back pressure to a certain degree is immediately set up by the retarder 7 since the retarding action of the retarder ensures a rapid fill of the channels 4 and 5 to capacity with water under sufficient back pressure to cause the part 11' to diametrically expand with the result of contracting the outer or faucet engaging end of branch 2 to cause the same to grip the faucet tightly, the varying thickness and degree of elasticity of the tapered faucet engaging end or fitting of branch 2 and its degree of contraction being sufficient to adapt said faucet fitting end to receive and grip faucets of different forms and sizes in a firm and secure manner against possibility of accidental displacement. If, however, the back pressure of the water should increase to an unnecessary or undesirable extent, relief will be afforded, as the cone 11 will diametrically expand at a predetermined pressure and act as a relief valve or regulator increasing the diameter of the passage through it to facilitate the flow of water and thus keep the pressure in the channel 4 not only below that sufficient to cause the water to escape between the faucet fitting of branch 2 and the faucet and blow the device off the faucet, but also below that at which the expansion of part 11' and contraction of branch 2 about the nozzle would be nullified or reduced to any material degree. The extent to which the suction-valve-regulator-cone 11 thus automatically regulates the pressure in the channel 4 and gripping action of the faucet fitting part of branch 2 depends upon the size of the engaged end of the faucet, since the extent of expansion of part 11' is dependent upon the extent to which the outer end of branch 2 is expanded to fit about the faucet, and hence the gripping action is automatically varied to suit the size and shape of the faucet and so that faucets of all sizes and shapes will be tightly gripped. By the use of the baffle the branch 5 may be made shorter than would otherwise be required in order to secure a filling and sealing action sufficient to produce an expanding pressure on part 11' for the required variable contracting and gripping action of the outer end of part 2, as will

be readily understood. By the provision of the replaceable baffle or retarder disk of the type set forth, a broken or mutilated disk may be easily replaced by a new one when required and, in the event of possible clogging of the branch, removal of the disk will allow the obstructing substance to be easily dislodged. It will be understood that when the device is used with hose 10 applied to nipple 5 for filling a tub and is disposed with its branches in a horizontal position water will flow outward through both branches 2 and 3, but by disposing the device in a vertical position with branch 3 directed downward the device may be used as an efficient washing-out tool or sprayer for washing out a tub, as in this position substantially all the water will be sprayed or jetted through the branch 3. This is due to the fact that in the vertical position of the device the cone acts as an obstructor to the upward flow of water into the branch 2, which obstructor tends to close under pressure of water from the nipple so that substantially all of the water will be sprayed with some force through the openings in the baffle disk.

From the foregoing description, taken in connection with the drawing, the construction, mode of operation and advantages of my improved filling and emptying device will be obtained without a further and extended description, and it will be seen that the invention provides a device of this character which is simple of construction, reliable and efficient in action, adapted to be manufactured and sold at a low cost, and which possesses manifold conveniences and advantages over devices of its kind heretofore in use. While the construction of the device as disclosed is preferred, it will, of course, be understood that changes in the form, proportions, and details of construction and in the arrangement of parts may be made within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim is:—

1. A receptacle filling and discharge device comprising a unitary tubular elastic rubber body provided with linearly continuous unitary inlet and discharge branches having longitudinally aligned liquid inlet and discharge channels, an annular enlarged suction chamber, interposed between said channels, a laterally extending intake nipple having its axis in alinement with and communicating with said chamber, an aspirator nozzle integral with the inlet branch and projecting from the inlet channel into the suction chamber, the delivery end of said nozzle projecting toward the discharge channel to a point beyond the center line of the bore of the nozzle, said discharge branch being provided at its free end with a laterally expanded discharge chamber, and a retarding and deflecting disk in said chamber.

2. A receptacle filling and discharge device comprising a tubular elastic rubber body provided with linearly continuous unitary inlet and discharge portions having longitudinally aligned liquid inlet and discharge channels, an annular enlarged suction chamber interposed between said channel, a laterally extending intake nipple communicating with said chamber, an aspirator nozzle projecting from the inlet channel into the suction chamber, an enlarged outlet chamber at the end of the discharge channel having an outer circular portion and an inner flaring portion, and a retarding disk fitted in said circular portion of the outlet chamber

and having a center portion, a rim portion and an annular series of ports between the same, the inner face of said central portion being provided with a concaved deflecting surface coacting with the deflecting surface formed by the flaring portion of the discharge chamber.

3. A receptacle filling and discharge device comprising a tubular elastic rubber body provided with linearly continuous unitary inlet and discharge portions having longitudinally alined liquid inlet and discharge channels, an annular enlarged suction chamber interposed between said channel, a laterally extending intake nipple communicating with said chamber, an aspirator nozzle projecting from the inlet channel into the suction chamber, an enlarged outlet chamber at the end of the discharge channel having an outer circular portion and an inner flaring portion, said circular portion of the outlet chamber having a groove therein, and a retarding disk fitted in said groove in said circular portion of the outlet chamber and having a center portion, a rim portion and an annular series of ports between the same, the inner face of said central portion being provided with a concaved deflecting surface coacting with the deflecting surface formed by the flaring portion of the discharge chamber.

4. A receptacle filling and discharge device comprising a tubular elastic rubber body provided with linearly continuous unitary inlet and discharge portions having longitudinally alined liquid inlet and discharge channels, an annular enlarged suction chamber interposed between said channel, a laterally extending intake nipple communicating with said chamber, an aspirator nozzle integral with the inlet portion and projecting from the inlet channel into the suction chamber, the delivery end of said nozzle projecting toward the discharge channel beyond the center line of the bore of the nozzle, an enlarged outlet chamber at the end of the discharge channel having an outer circular portion and an inner flaring portion, and a retarding disk fitted in said circular portion of the outlet chamber and having a center portion, a rim portion and an annular series of ports between the same, the inner face of said central portion being provided with a concaved deflecting surface coacting with the deflecting surface formed by the flaring portion of the discharge chamber.

5. A receptacle filling and discharge device comprising a tubular elastic rubber body provided with linearly continuous unitary inlet and discharge portions having longitudinally alined liquid inlet and discharge channels, an annular enlarged suction chamber interposed between said channel, a laterally extending intake nipple communicating with said chamber, an aspirator nozzle integral with the inlet portion and projecting from the inlet channel into the suction chamber, the delivery end of said nozzle projecting toward the discharge channel beyond the center line of the bore of the nozzle an enlarged outlet chamber at the end of the discharge channel having an outer circular portion and an inner flaring portion, said circular portion of the outlet chamber having a groove therein, and a retarding disk fitted in said groove in said circular portion of the outlet chamber and having a center portion, a rim portion and an annular series of ports between the same, the inner face of said central portion being provided with a concaved deflecting

surface coacting with the deflecting surface formed by the flaring portion of the discharge chamber.

6. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in a portion forming a suction chamber, a nipple arranged at an angle to and communicating at its inner end with said suction chamber, and a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, the inlet branch being provided adjacent to and in rear of said cone and between the same and the elastic fitting with an elastic portion diametrically expansible under pressure of fluid flowing through the bores and chamber to effect a gripping contraction of said elastic fitting about the faucet or adapter.

7. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in a portion forming a suction chamber, a nipple arranged at an angle to and communicating at its inner end with said suction chamber, and a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, said cone being diametrically expansible and contractible so as to act as a regulating relief valve under variations of pressure in the bores, the inlet branch being provided adjacent to and in rear of said cone and between the same and the elastic fitting with an elastic portion diametrically expansible under pressure of fluid flowing through the bores and chamber to effect a gripping contraction of the engaging end of the inlet branch about the faucet or adapter.

8. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in a portion forming a suction chamber, a nipple arranged at an angle to and communicating at its inner end with said suction chamber, and a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, the inlet branch being provided adjacent to and in rear of said cone with an elastic portion diametrically expansible under pressure of fluid flowing through the bores and chamber to effect a gripping contraction of the engaging end of the inlet branch about the faucet or adapter, the said inlet and outlet branches, cone and nipple being formed as a unitary structure of rubber of sufficient rigidity to make the structure self-supporting but of sufficient elasticity to adapt the diametrically expansible and contractible portion to function as set forth.

9. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to

provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in a suction chamber, a nipple arranged at an angle to and communicating at its inner end with said suction chamber, a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, the inlet branch being provided adjacent to and in rear of said cone and between the same and the elastic fitting with an elastic portion diametrically expandible under back pressure of fluid flowing through the bores and chamber to effect a gripping contraction of the engaging end of the inlet branch about the faucet or adapter, and a baffle member at the outer end of the outlet branch structurally operative to retard the outflow of water to a sufficient degree to cause such back pressure.

10. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in an enlarged portion forming a suction chamber, a nipple arranged substantially at right angles to and communicating at its inner end with said suction chamber, and a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, said cone being diametrically expandible and contractible so as to act as a regulating relief valve under variations of pressure in the bores, the inlet branch being provided adjacent to and in rear of said cone with an elastic portion diametrically expandible under pressure of fluid flowing through the bores and chamber to effect a gripping contraction of the engaging end of the inlet branch about the faucet or adapter, the said inlet and outlet branches, cone and nipple being formed as a unitary structure of rubber of a sufficient degree of rigidity to make the structure self-supporting but of a sufficient degree of elasticity to adapt the diametrically expandible and contractible portion to function as set forth.

11. In a syphonage filling and emptying device, a body having an inlet branch provided with a longitudinal bore formed at its outer end to provide an elastic fitting to engage a faucet or an adapter applied thereto, a discharge branch provided with a longitudinal bore in axial alinement with the bore of the inlet branch, the inner end of said bore terminating in an enlarged portion forming a suction chamber, a nipple arranged substantially at right angles to and communicating at its inner end with said suction chamber, a suction cone communicating with the outlet end of the bore of the inlet branch and extending into the suction chamber, the inlet branch being provided adjacent to and in rear of said cone with an elastic portion diametrically expandible under pressure of fluid flowing through the bores and chamber to effect a gripping contraction of the elastic fitting about the faucet or adapter, and a baffle member at the outer end of the outlet branch structurally operative for retarding the outflow of water to cause sufficient pressure of the fluid to effect such contraction of the fitting, the said inlet and outlet branches, cone and nipple being formed as a unitary structure of rubber of a sufficient degree of rigidity to make the structure self-supporting but of a sufficient degree of elasticity to adapt the diametrically expandible and contractible portion to function as set forth.

12. In a syphonage filling and emptying device, a T-shaped hollow body formed of rubber and comprising, in a unitary structure, continuous inlet and discharge branches arranged in longitudinal alinement and formed with a suction chamber at their point of intersection, an expandible and contractible suction cone extending from the inlet branch into said chamber, said inlet branch having an elastic faucet fitting at its inlet end and a diametrically expandible and contractible portion adjacent to and between said cone and elastic fitting, and a nipple disposed at right angles to said branches and communicating with said chamber, and a baffle member at the outlet end of the discharge branch operating to retard the outflow of fluid to a degree to effect expansion of the said expandible and contractible portion of the inlet branch by the fluid to cause a diametric gripping contraction of said elastic fitting.

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