The invention relates to improvements in a combination of valves or nozzles in which the advantages of a momentarily adjustable nozzle valve are combined with the advantages of a momentarily adjustable flood valve.

The principal object of the invention is to provide the advantages and use of each valve at virtually the same time and in the same device so that a liquid will emerge from the device when it is so set in the desired range of from a trickle to full flood with scarcely more than the force of gravity; and when alternately set, in the conventional forceful spray patterns of an adjustable nozzle; or, the combination in alternate form, will mix dissimilar substances upon effusion. Such a device will provide the gardener with the full range of water efficient choices; not just the nozzle or the barrel. In addition to conventional nozzle patterns the flood valve provides a means of placing measured amounts of water more precisely and upon delicate plants which might otherwise be damaged or destroyed by a pressurized spray.

One form of the invention is illustrated in the accompanying drawing wherein an essential portion of a conventional nozzle valve is itself mounted inside a housing, the whole forming an integral combination of concentric valves having a common antechamber. Each depends for actuation on the same common actuating means. When the nozzle valve barrel is turned to 28, revolution the means of locking the flood valve closed and unlocking it prevents or permits the flood valve between it and the housing from being opened or to be opened.

The accompanying drawings illustrate the preferred details of construction wherein:

FIGURE 1 is a side view partial section showing the nozzle valve in the closed position and the flood valve in the locked closed position.

FIGURE 2 is a side view partial section showing the nozzle valve closed and the flood valve open.

FIGURE 3 is an enlarged end view from the plane 3--3, FIGURE 1.

FIGURE 4 is an enlarged end view from the plane 4--4, FIGURE 2.

FIGURE 5 is an enlarged sectional view showing means of sealing in greater detail.

The flood valve and nozzle valve combination may be constructed substantially as shown in FIGURE 1 in which a body frame housing 1 is formed and machined as necessary for attachment in a conventional manner at end 2 to the end of a garden hose. It includes an outer barrel portion 3 to internally and coaxially receive an inner nozzle barrel 4 and an independent resilient means in the form of a compression spring 5.

At the inner end of barrel 3 is a resilient washer 6, a non-resilient washer 7, an 0 shaped or torus ring resilient seal 8 and a packing gland 9 having a slot 10 for driving purposes. One end of barrel 4 projects beyond the end of barrel 3 as shown in FIGURE 5. On nozzle barrel 4 is an integral annular shoulder 11 which serves as a stop for the spring 5 and as a valve seat on its opposite surface in cooperative engagement with the annular ring seat 12. The ring 12 is an integral part of housing barrel 3. A resilient sealing washer 13 is positioned between the parts, 11 and 12. The nozzle valve formed by nozzle barrel 4, nozzle needle piece 20, seats 22 and 24, washer 23 and spring 21, depends upon a locking means for retaining the inner barrel 4 in fixed relationship to the outer barrel 3 which means is in the form of four circumferentially spaced lugs 14 integrally positioned on the interior of barrel housing 3 as shown and against which the four lugs 15 bear or are engaged when barrel 4 is locked in position as shown in FIGURE 1 and FIGURE 3. Lugs 14 also serve as centering guide surfaces for the axial or reciprocal movement of nozzle barrel 4. The inner barrel 4 is reciprocally contained within the outer barrel 3 in spaced relation thereby. When barrel 4 is locked in this position with respect to barrel 3 as shown in FIGURES 1 and 3 manual depression of handle 16 in the form of a first class lever with fulcrum pin 17 through the handle 16 and trunnion lug 18 on body frame housing 1 as shown bears against knurled adjusting nut 19. The adjusting nut 19 is screwed onto one end of the axially movable shaft of nozzle needle piece 20. The force of an independent resilient means in the form of a compression spring 21 is overcome causing nozzle needle piece 20 to move the integrally formed nozzle seat shoulder 22 away from washer 23 and seat 24, an integral part of nozzle barrel 4, thereby opening the nozzle valve in the conventional manner. The seats 11 and 12 and washer 13 form a flood valve which is normally held in closed position by the spring 5.

The axially movable shaft of nozzle needle piece 20 near the knurled collar 32 end of barrel 4 is sealed in nozzle barrel 4 by means of resilient seal 25, non-resilient washer 26, an 0 shaped or torus ring resilient seal 27, and packing gland 28, having slot 29 for driving purposes. Nozzle barrel 4 is internally threaded with threads 30 to receive packing gland 28. Mounted between needle piece seat shoulder 22 and resilient washer 25, and around nozzle needle piece 20, is a first independent resilient means in the form of a compression spring 21. Compression spring 21 is sufficiently strong to force nozzle seat 22 against washer 23 and seat 24 forming an effective seal and nozzle valve closure.

The second independent means, compression spring 5, positioned between annular shoulder 11 on nozzle barrel 4 and resilient washer 6, and around nozzle barrel 4, is sufficiently strong to force valve seat 11 against washer 13 and seat 12 forming an effective valve seal. Compression spring 21 is sufficiently stronger than compression spring 5 and liquid line pressure so that when lugs 15 are disengaged by rotation of nozzle barrel 4 from lugs 14 as shown in FIGURES 2 and 4 and handle 16 actuates nut 19, nozzle barrel 4 will move axially with respect to housing barrel 3 opening the flood valve formed by seats 11 and 13, washer 13, nozzle barrel 4, housing barrel 3 and spring 5. Because spring 21 is sufficiently stronger than spring 5 and line pressure, nozzle piece 20 will not move with respect to nozzle barrel 4 but both will move with respect to barrel 3 so that the nozzle valve, formed by valve seats 22 and 24, washer 23, nozzle needle piece 20, nozzle barrel 4 and spring 21, will remain closed. Rotation to disengage and engage lugs 15 on nozzle barrel 4 with lugs 14 on barrel 3 is effected by a manual torque applied on knurled collar 32, an integral part of nozzle barrel 4. An inlet hole 33 through the side of nozzle barrel 4 as shown permits liquid to enter nozzle barrel 4.

The opening action of each valve depends upon a common means which includes the handle 16, fulcrum pin 17, trunnion lug 18 on body housing frame 1, the knurled adjusting nut 19, the axially movable shaft of nozzle needle piece 20 and the shoulder 22. The closing action of each depends upon independent resilient means in the form of compression springs 5 and 21, one of greater force than the other. Spring 21 must be stronger than spring 5 so that the flood valve may be...
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opened by force transmitted through spring 21. In this respect when lugs 14 and 15 are disengaged as shown in FIGURES 2 and 4 and since spring 5 is weaker than spring 21, spring 21 acts as a solid non-resistant means moving nozzle barrel 4 and compressing spring 5 and thereby opening the flood valve.

What I claim as new is:

1. A combination nozzle of the character described comprising an outer barrel, an inner barrel reciprocally contained within said outer barrel in spaced relationship thereto, a fluid passage into said inner barrel, coacting valve means on adjacent surfaces of said barrels, locking means on adjacent surfaces of said barrels releasably engageable in locking relationship, a shaft extending coaxially through said inner barrel and beyond the opposite ends thereof, means connected to the shaft for causing axial movement of said shaft, valve means on said shaft adjacent one end of the inner barrel, a first resilient means to urge said valve means on said shaft toward the discharge end of the inner barrel and a second resilient means to urge said valve means on the outer surface of said inner barrel into engagement with the coacting valve means on said outer barrel.

2. A combination nozzle of the character described comprising an outer barrel, an inner barrel reciprocally contained within said outer barrel in spaced relationship thereto, one end of said inner barrel projecting beyond the adjacent end of said outer barrel, a fluid passage into said inner barrel, coacting valve means on adjacent surfaces of said barrels, locking means on adjacent surfaces of said barrels releasably engageable in locking relationship, means on said projecting end of said inner barrel for reciprocally moving said inner barrel with respect to said outer barrel, a shaft extending coaxially through said inner barrel and beyond the opposite ends thereof, means connected to the shaft for causing axial movement of said shaft, valve means on said shaft adjacent one end of said inner barrel, and a resilient means to urge said valve means on said shaft toward the discharge end of the inner barrel.

3. A combination nozzle of the character described comprising an outer barrel, an inner barrel reciprocally contained within said outer barrel in spaced relationship thereto, a fluid passage into said inner barrel, coacting valve means on adjacent surfaces of said barrels, locking means on adjacent surfaces of said barrels releasably engageable in locking relationship, a shaft extending coaxially through said inner barrel and beyond the ends thereof, means connected to the shaft for causing axial movement of said shaft, second valve means on said shaft engageable with one end of the inner barrel, a first resilient means to urge said second valve means toward the discharge end of the inner barrel and a second resilient means engageable with said inner barrel to urge said coacting valve means to closed position.

4. A nozzle structure as in claim 3 wherein said inner barrel is rotatably contained within said outer barrel and said locking means comprises circumferentially spaced lugs on the adjacent surfaces of the barrels which are adapted to be engaged and disengaged incident to the rotation of said inner barrel.

5. A valve structure as in claim 3 wherein said coacting valve means on adjacent surfaces of said barrels is spaced inwardly from the discharge end of said barrels.

6. A nozzle structure as in claim 3 wherein said first resilient means is of greater force than said second resilient means.

7. A combination nozzle of the character described comprising an outer barrel, an inner barrel reciprocally and rotatably contained within said outer barrel in spaced relationship thereto, coacting valve means on the adjacent surfaces of said barrels, locking means on adjacent surfaces of said barrels engageable in locking relationship and adapted when locked to prevent relative reciprocal movement of said inner and outer barrels, a shaft extending coaxially through said inner barrel and extending from one end thereof, means connected to the shaft for causing axial movement of said shaft, valve means on said shaft adapted to close one end of the inner barrel, a first resilient means engageable with said shaft to move the shaft toward the discharge end of said inner barrel and a second resilient means positioned between said barrels and engageable with said inner barrel to move said inner barrel relative to said outer barrel.

8. A valve structure as in claim 7 wherein one end of the inner barrel projects beyond the adjacent end of the outer barrel and means is provided on said projecting end for rotating said inner barrel.

9. A combination nozzle of the character described comprising an outer barrel, an inner barrel reciprocally and rotatably contained within said outer barrel in spaced relationship thereto, coacting valve means on the adjacent surfaces of said barrels inwardly spaced from the discharge end thereof, locking means on adjacent surfaces of said barrels engageable in locking relationship to prevent relative reciprocal movement of said inner and outer barrels, said locking means comprising circumferentially spaced lugs on each barrel engageable incident the rotation of said inner barrel, a shaft extending coaxially through said inner barrel, means connected to the shaft for causing axial movement of said shaft, an extension of said shaft projecting from the discharge end of said inner barrel, valve means on said shaft adapted to close one end of the inner barrel, barre1 rotating means on one end of said inner barrel, a fluid passage into said inner barrel to permit the flow of fluid to the interior thereof, a first resilient means acting upon and between said inner barrel and said valve means on said shaft, a second resilient means acting upon and between said outer and inner barrels, and said first resilient means of greater force than said second resilient means.

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