May 14, 1957 J. J. IMBURGIA 2,792,009

WATER-DRAIN

Filed Feb. 1, 1955 2 Sheets-Sheet 1

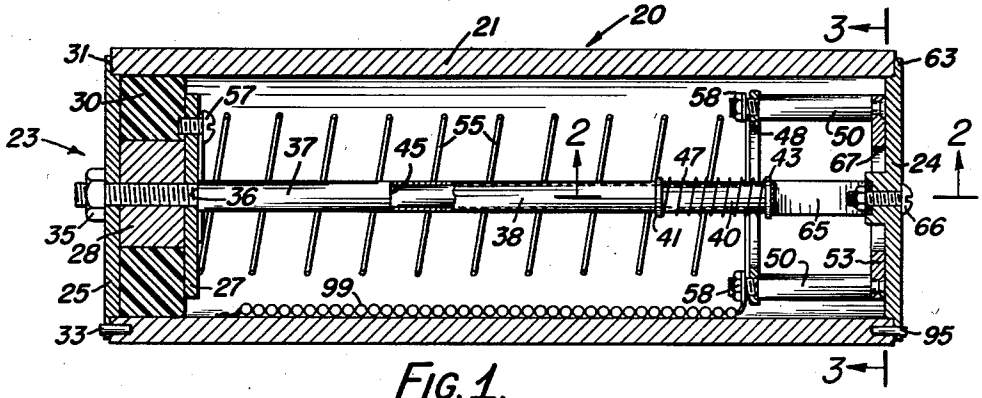


FIG. 1.

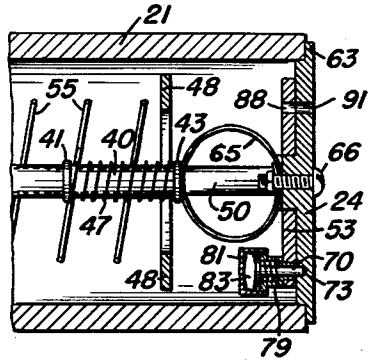


FIG. 2.

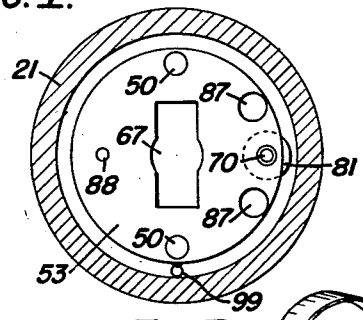


FIG. 3.

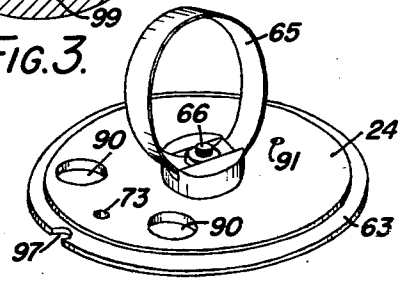


FIG. 4.

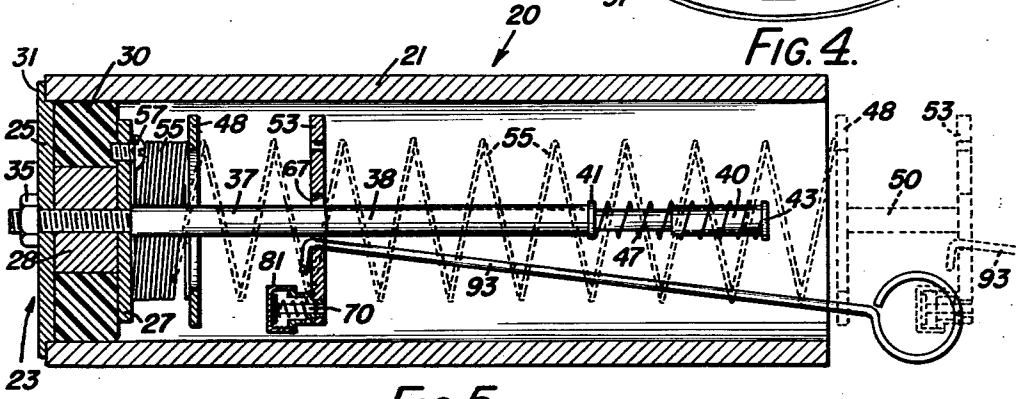


FIG. 5.

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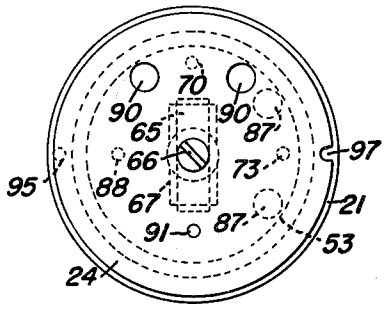


FIG. 6.

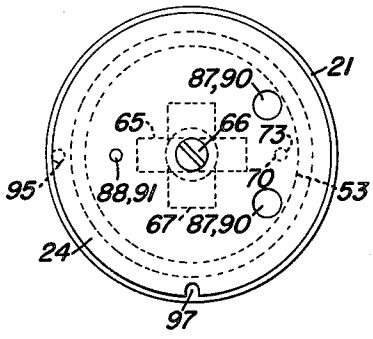


FIG. 7.

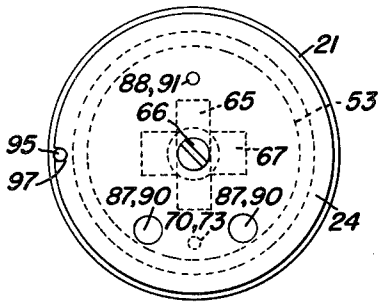


FIG. 8.

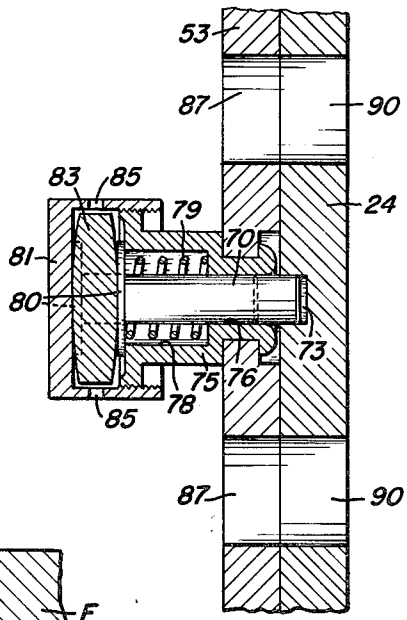


FIG. 9.

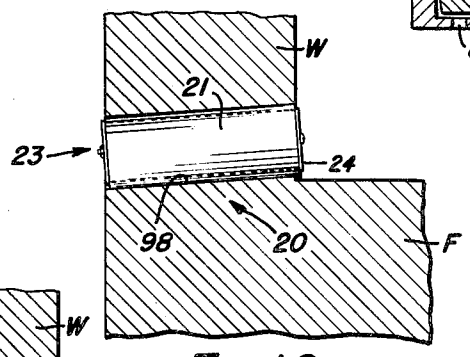


FIG. 10.

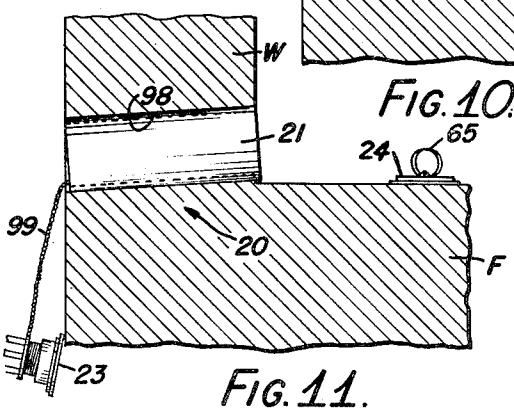


FIG. 11.

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2,792,009

WATER-DRAIN

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Application February 1, 1955, Serial No. 485,452

11 Claims. (Cl. 137—67)

The present invention relates generally to water drains and more particularly to a wall-scupper device or drain for use in buildings and other structures to drain water therefrom.

When an office building, warehouse, school or other large structure catches fire, water is poured into it to extinguish the fire. If the building is protected by a conventional automatically-operable sprinkler system the water from the sprinkler system may be added to the water poured into the building by the firemen. Frequently, the water applied to the fire is unable to drain from the building at as fast a rate as it is admitted. Thus, water builds up within the structure. If the fire is on the upper floor of a building, the water seeking an exit, may run off to the floors below damaging equipment, goods and furniture stored therein. In some instances, the building, which is weakened by fire, may be weighted down by the tons of water poured into it and collapse. It is a fact that the water used to extinguish a fire not infrequently causes more damage than the fire itself.

A primary object of the present invention is to provide means for insuring automatic drainage of water from a building, or other structure, when water on a floor or floors of a building reaches a predetermined depth.

Another object of this invention is to provide a normally-closed wall-scupper device which may be installed as a permanent part of a building and which will be automatically-opened, when the amount of water on a floor of a building reaches a predetermined level to provide an opening through which the water may drain off.

Another object of this invention is to provide a wall-scupper device which is normally closed and which is held in closed position by a detent that is released by action of water.

A further object of this invention is to provide a wall-scupper device of the character described which can be installed in the wall of a building and which, when in position and closed, will act to seal the building-opening in which it is installed, so that outside air, dust, or dirt cannot seep in through the scupper hole or through the scupper itself.

Other objects of this invention will be apparent hereinafter from the specification and from the recital of the appended claims.

In the drawings:

Fig. 1 is an axial section of a wall-scupper device constructed according to one embodiment of this invention, the device being shown in normal, cocked condition;

Fig. 2 is a fragmentary, axial section of this device taken at right angles to the section of Fig. 1 and on the line 2—2 of Fig. 1, looking in the direction of the arrows, this section showing particularly the detent for normally cocking the device in cocked position;

Fig. 3 is a section taken on the line 3—3 of Fig. 1 and looking in the direction of the arrows;

Fig. 4 is a perspective view looking at the inner or rear side of the closure-cap used to close the inner end of the device;

Fig. 5 is an axial section of the device, showing in solid lines the relative positions of the parts of the device before its inner closure cap is put on and before it is cocked, and in dotted lines the relative positions of the parts while the device is being cocked;

Figs. 6, 7 and 8 show successive steps in cocking the device by connecting the inner closure cap to the locking plate;

Fig. 9 is a fragmentary section on an enlarged scale taken substantially at right angles to Fig. 2 and showing in detail the detent construction;

Fig. 10 is a fragmentary section illustrating how a wall-scupper device constructed according to this invention may be mounted in a building, the device being shown here in closed position; and

Fig. 11 is a similar section but showing the scupper device after it has been automatically opened for use.

Referring now to the drawings by numerals of reference, 20 indicates generally a wall-scupper device constructed according to one embodiment of this invention. The scupper device comprises a tubular steel casing 21 adapted to have its outer end closed by a cap 23 and to have its inner end closed by a cap 24.

Cap 23 includes an outside plate 25, an inside plate 27, a cylindrical spacer block 28 interposed between the two plates, and an insulating ring 30, of plastic, or other suitable insulating material, mounted on the periphery of the spacer block. Outside plate 25 has a shoulder 31 which engages the end of casing 21; and ring 30 is of a diameter to fit closely in the bore of this casing. Cap 23, when in position, is held against rotation relative to the casing by a pin 33 which is secured in the outer end of the casing and engages in a peripheral notch in the cap.

The end cap 23 is secured by a nut 35 against a shoulder 36 formed on a stepped rod 37, the inner plate 27 of the cap seating against this shoulder. Rod 37 is adapted to extend axially of casing 21 when the cap 23 is in position. Slidably mounted on rod 37 are two axially-spaced sleeves 38 and 40 having flanges 41 and 43, respectively, at their inner ends. Sleeve 38 is adapted to seat against a shoulder 45 on the rod 37. Surrounding sleeve 40 and interposed between flanges 41 and 43 is a coil spring 47 which constantly urges sleeve 40 axially away from cap 23.

Surrounding the inner end of rod 37, sleeves 38 and 40, and spring 47 is a torsion spring 55. One end of this spring is connected to plate 27 by a screw 57. The opposite end of this spring is fastened to a ring 48 by means of nuts 58 which thread onto reduced diameter extensions of a pair of parallel, axially-extending, diametrically opposite posts 50 that are secured by the nuts in suitable holes in ring 48. Posts 50 are riveted at their forward ends to a trigger-plate 53, thereby rigidly connecting trigger plate 53 to ring 48.

The inner cap 24 has a shoulder 63 adaped to seat against the inner end of the casing. This cap has a circular leaf spring member 65 fastened centrally to its rear or inside face by a screw 66. Spring 65 is used in detachably connecting cap 24 to trigger-plate 53.

As shown in Fig. 3, trigger-plate 53 is provided with a centrally-disposed key-slot 67. The cap 24 is adapted to be connected to the trigger-plate by passing the spring 65 through slot 67 and turning the cap 24 ninety degrees. As shown in Fig. 6, the diameter of circular spring 65 is slightly greater than the length of slot 67. However, due to its resiliency, spring 65 can be easily passed through the slot.

To prevent cap 24 and trigger-plate 53 from rotating

relative to each other after they have been coupled together by spring 65, a pin or detent 70 is provided. This pin is carried by trigger plate 53. It is adapted to engage in a recess 73 in cap 24 when the plate and cap are properly oriented, that is, when spring 65 is in locking position relative to slot 67.

Pin 70 is part of the trigger and cocking mechanism. It is mounted reciprocably in a member 75 which is riveted in plate 53 (Fig. 9). Member 75 has a guide bore 76 in which pin 70 is slidable, and a counterbore 78 of large diameter which houses a coil spring 79 that is interposed between the member 75 and head 80 of pin 70. Adjustably threaded on the member 75 is a cap 81. A water-soluble element 83, such as an aspirin tablet, is adapted to be interposed between this cap and the head 80 of pin 70. Cap 81 holds water-soluble element 83 against head of pin 70; and when the pin 70 is in alignment with the recess 73 in cap 24, the cap 81 can be threaded up to force pin 70 into engagement with the recess 73.

Trigger plate 53 is provided with a pair of angularly-spaced water inlet holes 87 (Figs. 3, 6, 7, 8 and 9) and an air inlet hole 88 (Figs. 2, 3, 6, 7 and 8). Inside closure cap 24 also has a pair of angularly-spaced water inlet holes 90 (Figs. 4, 6, 7, 8 and 9) and an air inlet hole 91 (Figs. 2, 4, 6, 7 and 8). The respective water and air inlet holes of the trigger-plate 53 and closure cap 24 are, respectively, in register when the plate and cap are fastened together with pin or detent 70 of the trigger plate 53 engaging recess 73 of the cap 24. Cap 81 is provided with holes 85 so that water can have access to element 83.

The device is adapted to be used in any structure from which it is desired to drain water automatically when the water reaches a predetermined height. Figs. 10 and 11 show how it may be used in a building.

Casing 21 is here mounted in a hole 98 of appropriate size formed in the outside wall W of a building just above or just at the floor of the building. Hole 98 may be drilled in the wall of a building already constructed, or where a new building is under construction, casing 21 can be secured in the building wall as it is built.

The manner in which the device is cocked is shown in Figs. 5–8. The outer cap 23 with rod 37, spring 55, ring 48, and trigger plate 53 secured thereto is first inserted from the outside of the building or other structure into casing 21. Rod 37, of course, carries sleeves 38 and 40 and spring 47. Then a hook 93 is inserted in the inner end of the casing and engaged in slot 67 of trigger plate 53 to pull trigger plate 53 inwardly beyond the inner end of casing 21. Once plate 53 has cleared the inner end of casing 21 the plate can be held with the fingers and hook 93 is no longer needed. Cap 24 can now be secured to trigger plate 53 by passing spring 65 through the slot 67 in the trigger-plate and rotating the cap 24 ninety degrees. Fig. 6 shows the positions of cap 24 and trigger plate 53 for insertion of spring 65 through slot 67; and Fig. 7 shows the positions of cap 24 and trigger plate 53 after the cap has been rotated through the ninety degree angle to lock the cap to the trigger plate. In this position, water inlet holes 87 and 90 and air inlet holes 88 and 91 on the cap 24 and trigger-plate 53, respectively, are in register.

The cap 81 of the detent mechanism can now be removed; and the water soluble element 83 is inserted inside this cap. When this cap is rethreaded onto member 75 and tightened, the element 83 presses against head 80 of pin 70 and forces the pin to project beyond the outer face of trigger plate 53 to engage in the aligned recess 73 in the cap 24. Pin 70, therefore, engages in recess 73 thereby locking the cap and plate from rotary movement relative to each other. Trigger plate 53 and cap 24 are then rotated together 90°, from the position shown in Fig. 7 to the position shown in Fig. 8.

This twists torsion spring 55, putting it under load. Cap 24 and trigger plate 53 are prevented from being rotated by spring 55 back to the position of Fig. 7, however, by a pin 95 (Fig. 1) which engages a notch 97 (Fig. 4) in the cap. The torsion force in spring 55 produced by twisting it 90° is prevented from being dissipated through rotation of outside cap 23 by pin 33 (Fig. 1) which holds the outside cap from rotating.

When spring 65 is passed through slot 67 it engages the flanged end 43 of sleeve 40 and pushes the sleeve axially on rod 37 toward cap 23 thereby compressing spring 47. However, locking spring 65 holds the cap 24 in locked position against the force of spring 47.

The scupper device is now cocked and ready for operation, the parts of the device being in the relative positions shown in Fig. 1.

The number of wall-scupper devices which should be used in a particular structure, will depend upon various factors, particularly the size of the structure.

As shown in Figs. 10 and 11, casing 21 is mounted with its axis slightly inclined downwardly from the inside to the outside of the building to facilitate the flow of water through the scupper when it is in operation. The inner, lower edge of casing 21 is positioned about ¼ inch above the level of the building floor F from which it is to drain water. Holes 87 and 90 in trigger-plate 53 and closure cap 24, respectively, are about ¼ inch above the bottom edge of the casing (Fig. 8). Thus, a total of about ½ inch is provided from the floor level to the water inlet holes 87 and 90. This permits some slight buildup of water on floor F before water passes inside casing 21 and the scupper comes into use. Thus, a shallow body of water is allowed to accumulate over the entire floor.

Assuming that a building in which automatic wall-scuppers constructed according to this invention are incorporated catches fire, each scupper will operate as follows: water poured into the building from fire-fighting apparatus outside, and/or from sprinklers inside the building, will shower upon floor F. If the water is unable to escape under doors, down stairways and the like, and out of the building at as fast a rate as it is admitted, water will build up on floor F.

When the water level on floor F reaches ½ inch or thereabouts, the water passes through holes 87—90 and into casing 21. Once inside the casing, the water enters trigger cap 81 through holes 85 in the cap and contacts the water soluble member 83, causing it to rapidly dissolve. Spring 79 thereupon withdraws detent 70 from cap 24. As soon as the end of pin 70 clears recess 73 in cap 24, the trigger plate 53 will be rotated counterclockwise relative to cap 24 by torsion spring 55. Cap 24 is held against rotation by pin 95 which engages in notch 97.

When the trigger plate 53 has rotated 90°, spring 65 will register with the slot 67 in the trigger-plate. Spring 47 will thereupon force spring 65 through slot 67, thereby disconnecting cap 24 from the trigger plate, and kicking cap 24 free of pin 95 and forwardly onto floor F. Simultaneously, spring 55 recoils, pulling ring 48, posts 50 and trigger-plate 53 with it. These parts act like a projectile in casing 21, and move toward outside closure cap 23 with substantial force. When they strike plate 27, the force knocks cap 23 out of casing 21. Thus, the casing 21 is opened at both ends allowing flow off of water therethrough.

A chain 99 is secured at one end to the casing and at its opposite end to ring 48 to prevent the scupper mechanism connected with cap 23 from being lost and to permit it to be used again.

Buildings having automatically operable wall scuppers like the one just described are protected from water damage of the stock and furniture in the building and from destruction of the building by water weight. The scupper device can be manufactured at relatively small

cost and it offers no installation problems since it requires only the boring of a suitable hole in which casing 21 can be tightly fitted. In fact, in the case of new building the casing might be omitted and a hole cast into the wall to be closed at opposite ends by caps like caps 23 and 24. Obviously, the device can be made into various sizes, each device being constructed, however, with a length substantially equal to the thickness of the wall in which it is to be mounted. Thus, the presence of the scupper will be hidden from the casual observer, and will not detract from the appearance of a room in which it is used, or from the appearance of the outside of the building.

While this invention has been described in connection with a specific embodiment thereof, it will be understood that it is capable of further modifications, and this application is intended to cover any variations, uses, or adaptions of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention, what I claim is:

1. A wall scupper device comprising a tubular casing, a closure for said casing, means constantly urging said closure to open position, a detent holding said closure in closed position, means constantly urging said detent to inoperative position, and means including a water-soluble member normally preventing operation of said last-named means.

2. In combination with an outside wall of a building having a hole extending through it, of a closure for said hole, means constantly urging said closure to open position, and means including a water soluble member for holding said closure closed.

3. A scupper device comprising a tubular casing having an inner and an outer end, a closure cap for the outer end of said casing, a closure cap for the inner end of said casing, means biasing said inner closure cap to open position, a coil spring interposed between said caps, said spring being secured at one end to said outside closure cap, and being stretchable for releasable connection at its opposite end to said inside closure cap, the tension of said spring constantly urging its disconnection from said inside closure cap, a detent holding said spring connected to said inside closure cap, means constantly urging said detent to inoperative position, and a member preventing operation of said last-named means, said member being responsive to ambient conditions and being constructed to be rendered inoperative automatically upon occurrence of a predetermined ambient condition.

4. A scupper device comprising a tubular casing having an inner and an outer end, a closure cap for the outer end of said casing, a closure cap having a water inlet opening for the inner end of said casing, means biasing said inner closure cap to open position, a coil spring interposed between said caps, said spring being secured at one end to one of said caps and being connectable upon stretching of said spring to the other cap, the tension of said spring constantly urging its disconnection from said other cap, a detent holding said spring connected to said other cap, a spring constantly urging said detent to inoperative position, a water-soluble member normally preventing operation of said spring, and means for holding said water-soluble member in operative position.

5. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, connecting means for releasably connecting the other closure cap to said trigger plate upon tensioning of said spring and rotation of said other cap in one direction relative to said trigger plate, means biasing said other closure cap toward open position, means for releasably locking said other cap to said trigger plate in their connected positions, and a water-soluble element for holding said locking means in operative position, said other cap and said trigger plate being rotatable together in said casing, after being locked together, to load said torsion spring torsionally, and means for releasably securing said other cap to said casing in spring-loading position, said spring being operative upon dissolution of said water-soluble element to rotate said trigger plate relative to said other cap to release said connecting means and to snap said trigger plate toward said one cap, and means for admitting water to said water-soluble element.

6. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, connecting means for releasably connecting the other closure cap to said trigger plate upon tensioning of said spring and rotation of said other cap in one direction relative to said trigger plate, means for releasably locking said other cap to said trigger plate in their connected positions, and a water-soluble element for holding said locking means in operative position, said other cap and said trigger plate being rotatable together in said casing, after being locked together, to load said torsion spring torsionally, and means for releasably securing said other cap to said casing in spring-loading position, said spring being operative upon dissolution of said water-soluble element to rotate said trigger plate relative to said other cap to release said connecting means and to snap said trigger plate toward said one cap, and means for admitting water to said water-soluble element, and means for ejecting said other cap from said casing upon operation of said spring.

7. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, connecting means for releasably connecting the other closure cap to said trigger plate upon tensioning of said spring and rotation of said other cap in one direction relative to said trigger plate, means for releasably locking said other cap to said trigger plate in their connected positions, and a water-soluble element for holding said locking means in operative position, said other cap and said trigger plate being rotatable together in said casing, after being locked together, to load said torsion spring torsionally, and means for releasably securing said other cap to said casing in spring-loading position, said spring being operative upon dissolution of said water soluble element to rotate said trigger plate relative to said other cap to release said connecting means and to snap said trigger plate toward said one cap, and means for admitting water to said water-soluble element, and means cooperating with said connecting means to eject said other cap from said casing upon operation of said spring.

8. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, said trigger plate having a key-slot, said other closure cap having a member on its inside face which is passed through said key-slot and rotated relative to said trigger plate to connect said other cap to said trigger plate, means for releasably locking said other cap to said trigger plate in their connected positions, means biasing said other closure cap toward open

position when said member is in registry with said key-slot, and a water-soluble element for holding said locking means in operative position, said other cap and said trigger plate being rotatable in said casing, after being locked together, to load said torsion spring torsionally, and means for releasably securing said other cap to said casing in spring-loading position, said spring being operative upon dissolution of said water soluble element to rotate said trigger plate relative to said other cap to bring said member on said other cap into register with said key slot and thereby disconnect said trigger plate from said other cap, said spring upon disconnection of said trigger plate from said other cap snapping said trigger plate toward said one cap to thereby dislodge it, and means for admitting water to said water soluble element.

9. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, said trigger plate having a key-slot, said other closure cap having a member on its inside face which is passed through said key-slot and rotated relative to said trigger plate to connect said other cap to said trigger plate, means for releasably locking said other cap to said trigger plate in their connected positions, and a water-slouble element for holding said locking means in operative position, said other cap and said trigger plate being rotatable in said casing, after being locked together, to load said torsion spring torsionally, and means for releasably securing said other cap to said casing in spring-loading position, said spring being operative upon dissolution of said water soluble element to rotate said trigger plate relative to said other cap to bring said member on said other cap into register with said key slot and thereby disconnect said trigger plate from said other cap, said spring upon disconnection of said trigger plate from said other cap snapping said trigger plate toward said one cap, and means for admitting water to said water soluble element, and means operative against said member on said other cap for ejecting said other cap from said casing upon operation of said spring.

10. A scupper device comprising a tubular casing having an inner and an outer end both of which are open, a closure cap for the outer end of the casing, means for preventing said cap from rotating relative to said casing, a rod connected to said outer cap and extending axially into said casing, a pair of axially spaced sleeves flanged at their inner ends mounted on said rod, one of said sleeves extending beyond the inner end of said rod and slidable axially thereon relative to the other sleeve, a coil spring mounted on said one sleeve and interposed between the flanges on both of said sleeves, a combined tension and torsion spring within said casing having one end connected to said outer closure cap, a ring, a trigger-plate, means connecting said trigger-plate to said ring, means for connecting the opposite end of said tension and torsion spring to said ring, said tension and torsion spring serving constantly to urge said ring,

trigger plate and connecting means toward said outer cap, said trigger plate having a key-slot, a closure cap closing the inner end of said casing, a member carried on the inside of said inner closure cap which is passed through said key-slot and rotated to connect said inner cap to said trigger plate, said member engaging the inner end of said one sleeve and sliding it axially on said rod to compress said coil spring, means for releasably locking said inner cap to said trigger plate in their connected positions, a water-soluble element for holding said locking means in operative position, said inner cap and trigger plate being rotatable in said casing, after being locked together, to load said tension and torsion spring torsionally, and means for releasably securing said inner cap to said casing in spring loading position, said tension and torsion spring being operative upon dissolution of said water soluble element to rotate said trigger plate, said ring and the means for connecting the plate and ring relative to said inner cap to bring said member on said inner cap into register with said key slot and thereby disconnect said trigger plate from said outer cap, said coil spring kicking said inner cap outwardly from said casing upon disconnection of said trigger plate from said inner cap, said tension and torsion spring simultaneously snapping said trigger plate, ring and the means connecting the plate and ring toward said outer cap, and means for admitting water to said water soluble element.

11. A scupper device comprising a tubular casing open at both ends, a closure cap for each end of said casing, a trigger plate, a combined tension and torsion spring connecting one of said caps to said trigger plate, said spring serving constantly to urge said trigger plate toward said one cap, means for releasably holding said other closure cap connected to said trigger plate, means biasing said other closure cap toward disconnected position, said holding means being responsive to ambient conditions and being constructed to be rendered inoperative automatically upon occurrence of a predetermined ambient condition, said other cap and said trigger plate being rotatable together in said casing, after being connected together, to load said torsion spring torsionally, said spring being operative upon release of said holding means to rotate said trigger plate relative to said other cap to release said connecting means and to snap said trigger plate toward said one cap.

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