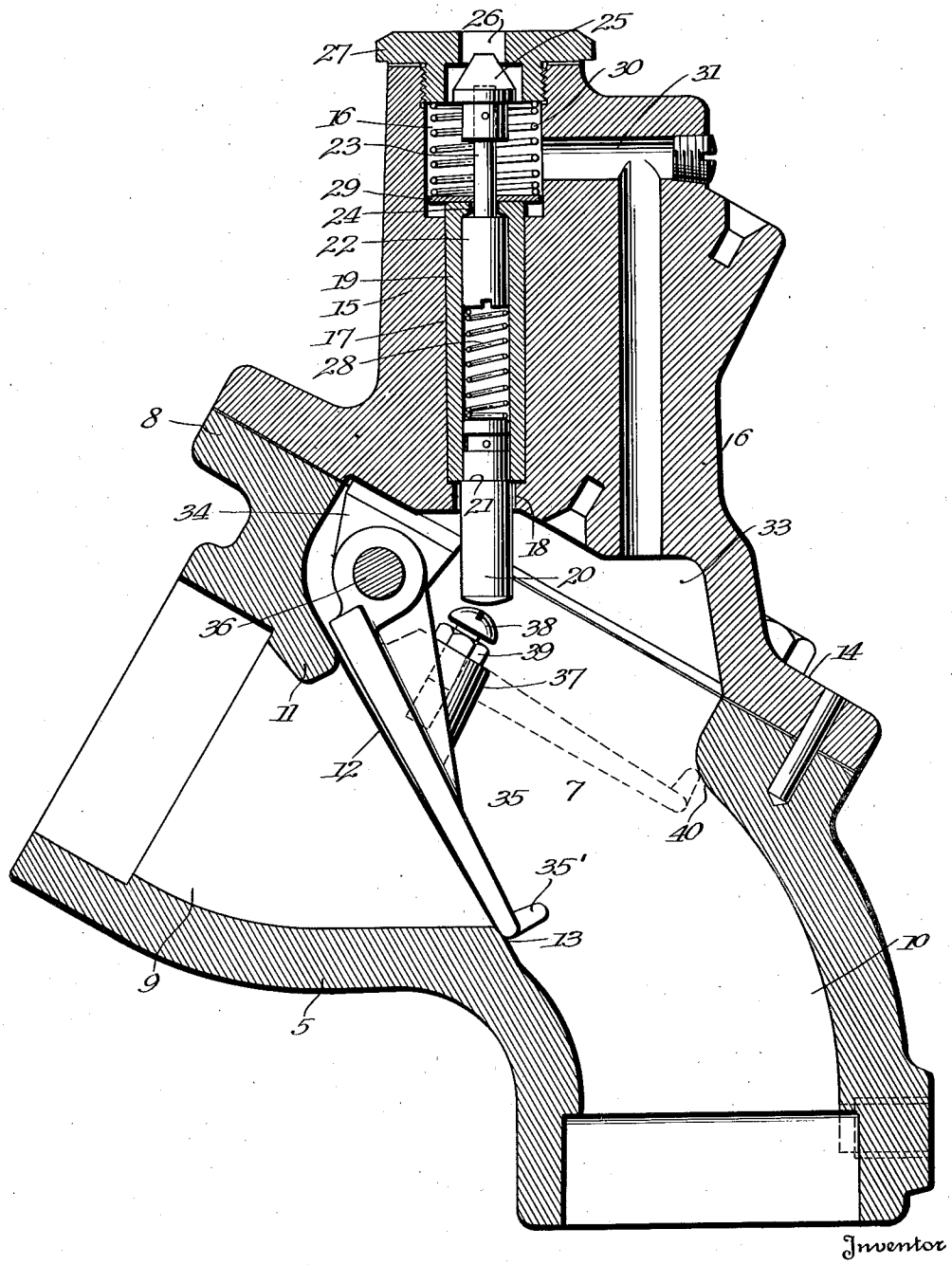
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SIPHON BREAKER

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SIPHON BREAKER

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10 Claims. (Cl. 137—152)

The present invention relates to a siphon breaker particularly adapted for interposition in the discharge line of a tank truck, in which relation it is shown in my application Serial No. 664,255, filed April 3, 1933, of which the present application is a division.

The device of the invention comprises a normally open vent and means for closing the vent automatically and holding it closed upon liquid flow through the device. In the particular embodiment shown by way of example in the accompanying drawing, a movable flap is provided in position to be impinged by liquid flowing through the device, the flap in its initial movement carrying a vent closure valve to closed position. Upon cessation of flow the flap returns to normal position, permitting the vent valve to move to uncover the vent so that siphoning through the device is prevented.

The single drawing herewith shows the device in normal disposition and is a section substantially on the central longitudinal vertical plane of the device.

Referring to the drawing, the device comprises a body preferably made in two parts, as here shown, 5 and 6. The body portion 5 has formed therein a chamber 7 which is provided with an upward opening in an oblique plane, the opening being surrounded by a machined flange 8. An inlet branch 9 leads into the chamber 7 and an outlet branch 10 leads therefrom, the former as here shown extending substantially horizontally and the latter downwardly.

The inlet branch 9 is demarked from the chamber 7 by a circumferential ledge including a top lip portion 11, side portions as at 12, and a bottom portion 13.

The top body portion 6 has a base flange 14 adapted to seat on flange 8 and to be secured thereto. Portion 6 also comprises a vertically extending neck 15 in which are formed a plurality of coaxial bores 16, 17 and 18, of progressively decreasing diameter. In bore 17 is disposed a hollow plunger member 19 with a close sliding fit so as to be reciprocable in the bore. A plunger portion 20 is fixed in the lower end of portion 19 and has a shoulder 21 which seats against the lower end of portion 19. A further plunger portion 22 is positioned in the upper portion of member 19 in slidable relation thereto and has a stem 23 projecting through a restricted opening 24 in the upper end of member 19.

Fixed on the upper end of stem 23 is a conical valve member 25 which is adapted upon upward movement to close a vent opening 26 formed in a cap 27 which has a skirt threaded in the upper end of bore 16.

A compression spring 28 is interposed between plunger elements 20 and 22 within portion 19 so that element 22 is normally held against the top wall of portion 22 as shown in the drawing. The plunger portions 19, 20 and 22 thus constitute a spring-expanded telescoping plunger unit. A washer 29 resting on top of plunger portion 19 has seated thereagainst the lower end of a compression spring 30 whose upper end seats against the lower portion of the cap 27. A bore 31 and counterbore 32 communicate bore 16 with a lower recess 33 which overlies the opening of chamber 7. The vent opening is thus in communication with the liquid passage in body portion 5.

Body portion 6 has secured or formed on its lower side a pair of downwardly projecting lugs as at 34, these being positioned so as to lie above lip 11 of body portion 5. A flap 35 is hinged on a horizontal pin 36 supported by lugs 34 and is of such size as to overlie the ledge constituted by portions 11, 12 and 13, the lower edge of the flap normally lying against ledge portion 13 as shown. A boss 37 on the flap has a threaded bore therein receiving an abutment screw 38 which is adapted to be locked in position by means of a nut 39. The head of screw 38 lies immediately beneath the lower end of plunger portion 20 when the body portions are brought together in operative relation as shown.

Liquid flowing through inlet branch 9 impinges flap 35 and swings it in an anti-clockwise direction about pin 36. As soon as screw 38 strikes plunger element 20 the latter is moved upwardly, carrying with it, against the action of spring 30, plunger portion 19 and, through the intermediary of spring 28, element 22, stem 23, and valve member 25, so that the latter is immediately moved to close vent 26, this operation occurring during a relatively short initial movement of the flap. Upon continued movement of the flap, spring 30 is further compressed and spring 28 is compressed upon movement of plunger portions 19 and 20 which must now be relative to portion 22 since further upward movement of the latter is prevented by the valve which has seated. Eventually a lug 35' at the lower end of flap 35 strikes a wall portion 40 of body portion 5 so that further movement of the valve is prevented, valve 25 of course being maintained seated. The construction thus affords quick closing of the vent upon initial movement of the flap but permits the flap to move further to a position wherein it is substantially non-obstructing to the flow of liquid.

The lower end of passage 32 lies intermediate the lateral edges of flap 35 so that in the dotted line position of the latter it prevents access of liquid to passage 32. Lip portion 11 acts as a baffle to prevent access of the liquid to the top of chamber 7 above the flap.

Upon cessation of flow, springs 28 and 30 are allowed to expand so that the parts resume the positions shown in the drawing, flap 35 completing its lowering movement under gravity. Screw 38 is adjustable to obtain the proper position therefor relative to plunger element 20.

As used in a tank truck, the device has a tank discharge pipe connected into inlet branch 9, the discharge line being continued beyond the siphon breaker ordinarily by a downwardly extending pipe in connection with outlet branch 10. Ordinarily when discharge is sought to be shut off, a siphon action occurs by reason of the liquid in the downwardly extending pipe. With the use of the siphon breaker, however, vent 26 is opened as soon as discharge is interrupted so that the downwardly extending pipe is permitted to empty without exerting suction on the liquid in the line behind the siphon breaker.

It will be understood that I do not necessarily limit myself to the details of construction shown and described. The invention is susceptible of varied embodiment, and accordingly I do not limit myself except as in the following claims.

I claim:

1. A siphon breaker comprising a body having a chamber therein and inlet and outlet branches in connection with said chamber, the inlet branch debouching into said chamber on the horizontal, a baffle lip at the top of the inlet branch between the latter and the chamber, a flap in the chamber normally overlying the inlet, a horizontal pivotal mounting for said flap disposed behind said baffle lip, said body having a vent opening in communication with said chamber, a valve element for closing said vent opening but normally uncovering the same, and means for moving said valve element to closed position upon movement of said flap caused by impingement of incoming liquid thereagainst.

2. A siphon breaker comprising a body having a chamber therein and inlet and outlet branches in connection with said chamber, the inlet branch debouching into said chamber on the horizontal, a baffle lip at the top of the inlet branch between the latter and the chamber, a flap in the chamber normally overlying the inlet, a horizontal pivotal mounting for said flap disposed behind said baffle lip, said body having a vent opening in communication through a duct with said chamber, a valve element for closing said vent opening but normally uncovering the same, and means for moving said valve element to closed position upon movement of said flap caused by impingement of incoming liquid thereagainst, said duct debouching into said chamber at a point above said flap when the latter is moved.

3. A siphon breaker comprising a body having a chamber therein and inlet and outlet branches in connection with said chamber, the inlet branch debouching into said chamber on the horizontal, a ledge in said chamber surrounding the inlet, a pendent flap in said chamber pivotally supported on a horizontal axis above the inlet with its margins normally overlying said ledge, and vent means closed upon movement of said flap upon impingement of incoming fluid thereagainst.

4. A siphon breaker comprising a body having a through liquid passage and an upwardly projecting neck above said passage, the neck having a vent opening at the top thereof and a vertical bore below said opening, said vent opening communicating with said passage, a plunger reciprocable in said bore and carrying at its upper end a valve member adapted to close the vent upon upward movement of said plunger, means normally yieldingly holding the plunger in a lowered position wherein the valve member uncovers the vent opening, and a flap pivoted in said body and swung upon flow of liquid in said passage to move said plunger upwardly whereby the valve member is seated.

5. A siphon breaker comprising a body having a through liquid passage and an upwardly projecting neck above said passage, the neck having a vent opening at the top thereof and a vertical bore below said opening, said vent opening communicating with said passage, a plunger reciprocable in said bore and carrying at its upper end a valve member adapted to close the vent upon upward movement of said plunger, means normally yieldingly holding the plunger in a lowered position wherein the valve member uncovers the vent opening, and a flap pivoted in said body and swung upon flow of liquid in said passage to move said plunger upwardly whereby the valve member is seated, said plunger being longitudinally spring-extended and collapsible to permit further movement of the flap after the valve member is seated.

6. A siphon breaker comprising a body having separable upper and lower portions, said lower portion having a chamber therein closed by the upper portion and having inlet and outlet branches in connection with said chamber, a flap pivoted to and solely supported by said upper portion on a horizontal axis and depending in said chamber in front of the inlet, and vent means in said upper portion for said chamber and closed upon swinging movement of the flap caused by impingement of inflowing liquid thereagainst, the assembled upper portion as a whole being adapted to be brought together with said lower portion in assembling said body.

7. A siphon breaker comprising a body having separable upper and lower portions, said lower portion having a chamber therein closed by the upper portion and having inlet and outlet branches in connection with said chamber, a flap pivoted to and solely supported by said upper portion on a horizontal axis and depending in said chamber in front of the inlet, and vent means in said upper portion for said chamber and closed upon swinging movement of the flap caused by impingement of inflowing liquid thereagainst, said last named means comprising a plunger reciprocable in said upper portion, the assembled upper portion as a whole being adapted to be brought together with said lower portion in assembling said body.

8. A siphon breaker comprising a body having separable upper and lower portions, said lower portion having a chamber therein closed by the upper portion and having inlet and outlet branches in connection with said chamber, a flap pivoted to and solely supported by said upper portion on a horizontal axis and depending in said chamber in front of the inlet, and vent means in said upper portion for said chamber and closed upon swinging movement of the flap caused by impingement of inflowing liquid thereagainst, said last named means comprising a longitudinally yieldable plunger reciprocable in said upper

portion, the assembled upper portion as a whole being adapted to be brought together with said lower portion in assembling said body.

9. A siphon breaker comprising a body having inlet and outlet openings and a passage connecting said openings, means defining a hollow enlargement at one side of and communicating with said passage, a member in and normally extending across said passage and presenting a surface for impingement by fluid flowing through the passage, said member having pivotal support on an axis located in said enlargement, means defining an upright extension above said enlargement, said extension having a vertical through passage communicating at its lower end with said hollow enlargement, a valve slidably guided in said extension and reciprocable between opening and closing positions for said vertical passage, said valve being normally in opening position, and transmission means between said member and said valve whereby flow-induced swinging movement of said member acts to move said valve to closing position.

10. A siphon breaker comprising a body having inlet and outlet openings and a passage connecting said openings, means defining a hollow enlargement at one side of and communicating with said passage, a member in and normally extending across said passage and presenting a surface for impingement by fluid flowing through the passage, said member having pivotal support on an axis located in said enlargement, said passage having constricting means therein and immediately behind which said member normally lies, means defininig an upright extension above said enlargement, said extension having a vertical through passage communicating at its lower end with said hollow enlargement, a valve slidably guided in said extension and reciprocable between opening and closing positions for said vertical passage, said valve being normally in opening position, and transmission means between said member and said valve whereby flow-induced swinging movement of said member acts to move said valve to closing position.

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