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(54) **DRY SPRINKLER SYSTEM MANIFOLD ADAPTER**

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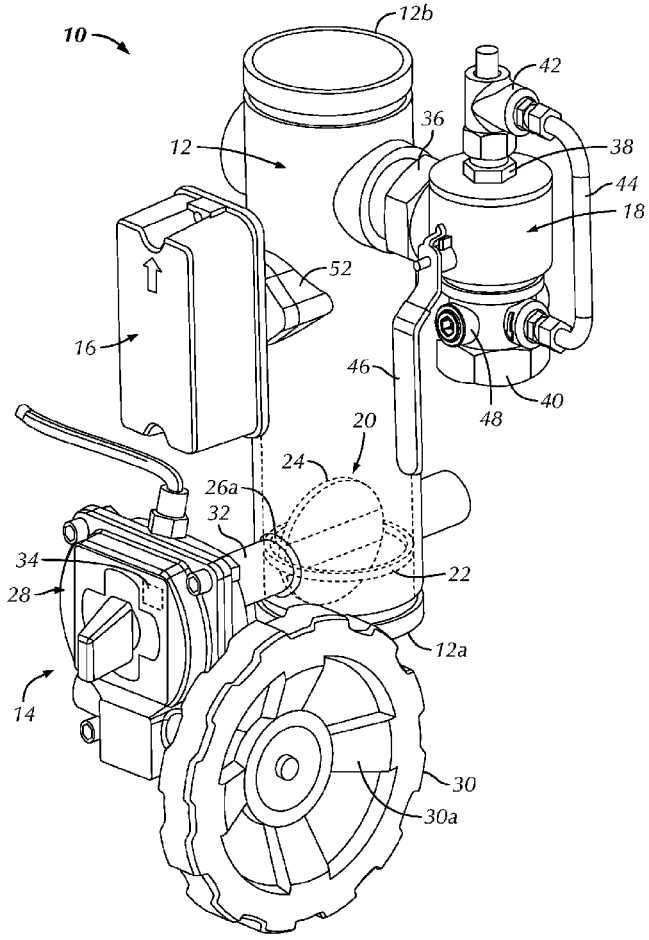
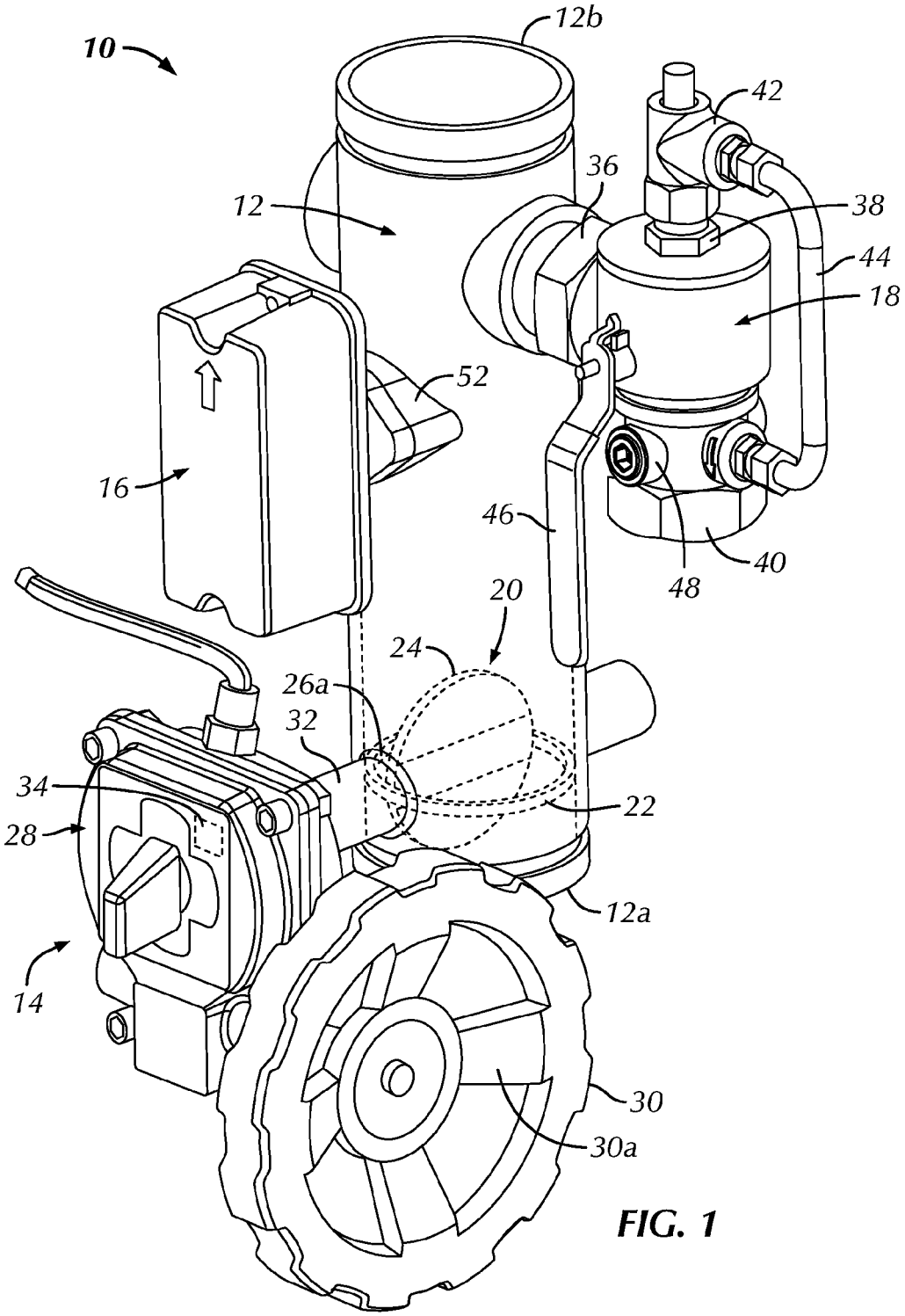
(57) **ABSTRACT**

A manifold assembly is mountable to a piping manifold for a dry sprinkler system having a non-wet valve assembly separating pressurized gas on a downstream side thereof from a water supply on an upstream side thereof. The manifold assembly includes a single piece body having an inlet for removably coupling to, and receiving water from, an upstream wet standpipe, and an outlet for removably coupling to, and delivering water to, the non-wet valve assembly. A control valve assembly is mounted to the body and a mechanically independent flow detection switch is mounted to the body. Each of a test and drain valve and a pressure relief valve is fluidly connected with the body downstream of the control valve assembly and upstream of the




10
12b
42
36
12
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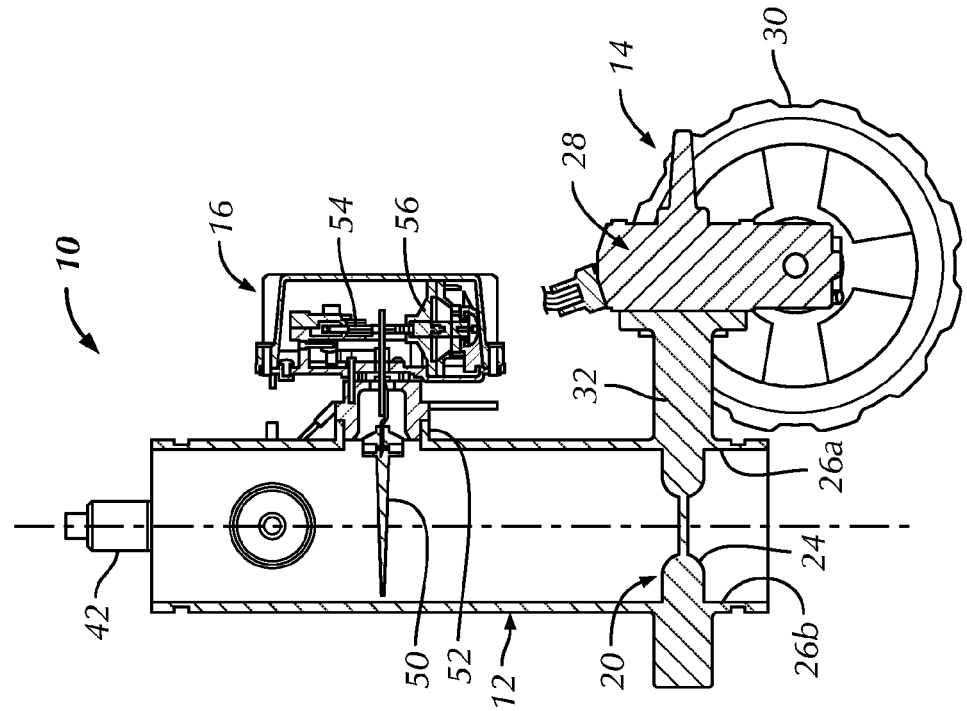
30a

FIG. 1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24
26b
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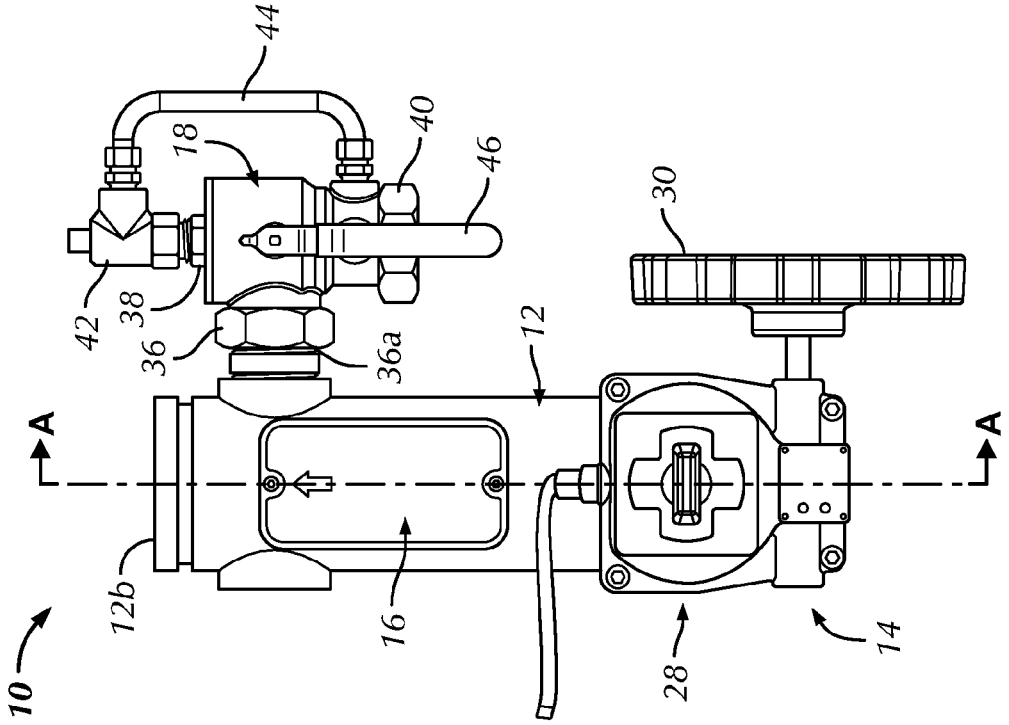
42

FIG. 3


10
44
18
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46
30
42
38
36
36a
12
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12b
16
28
14

FIG. 2

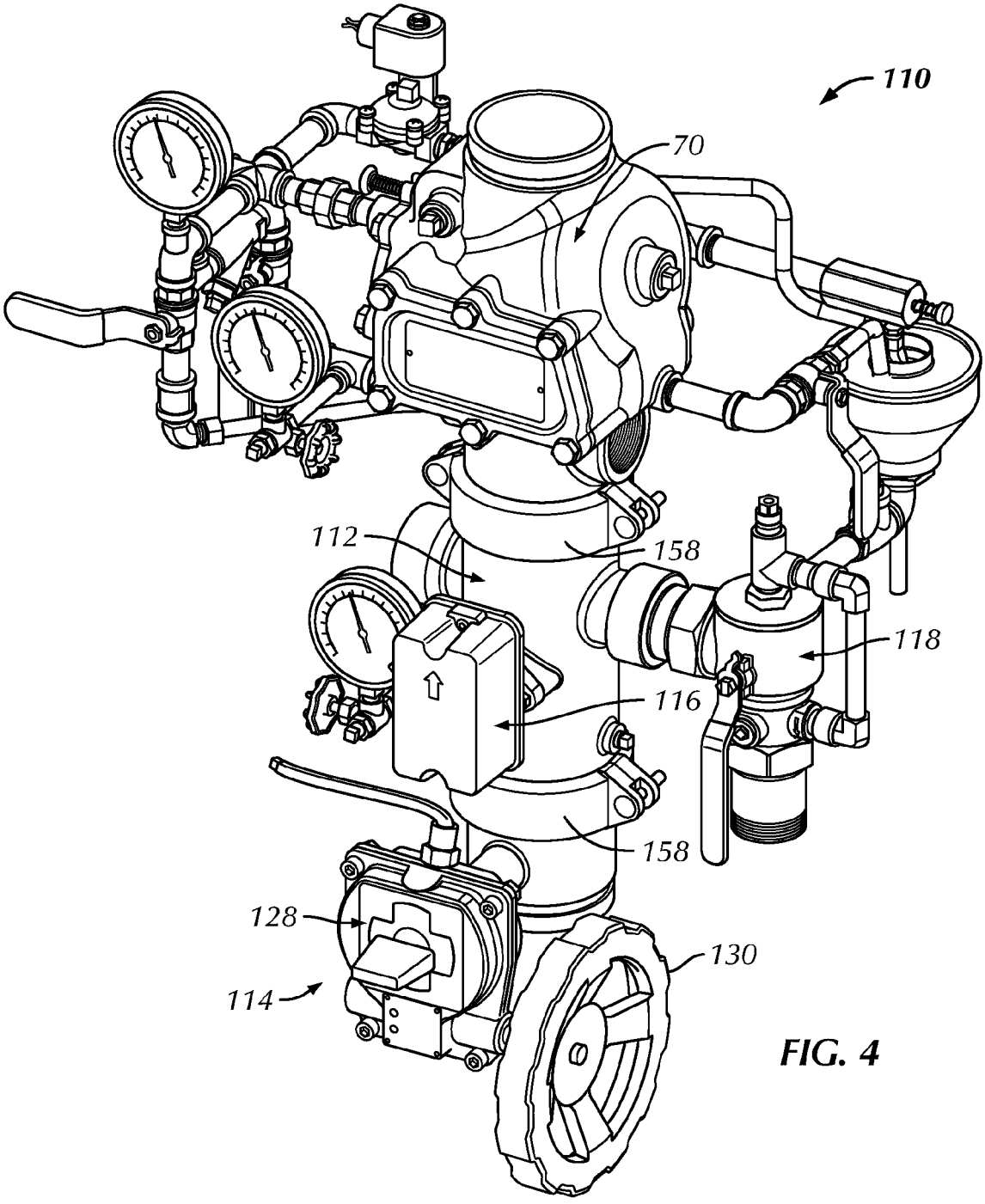

FIG. 4

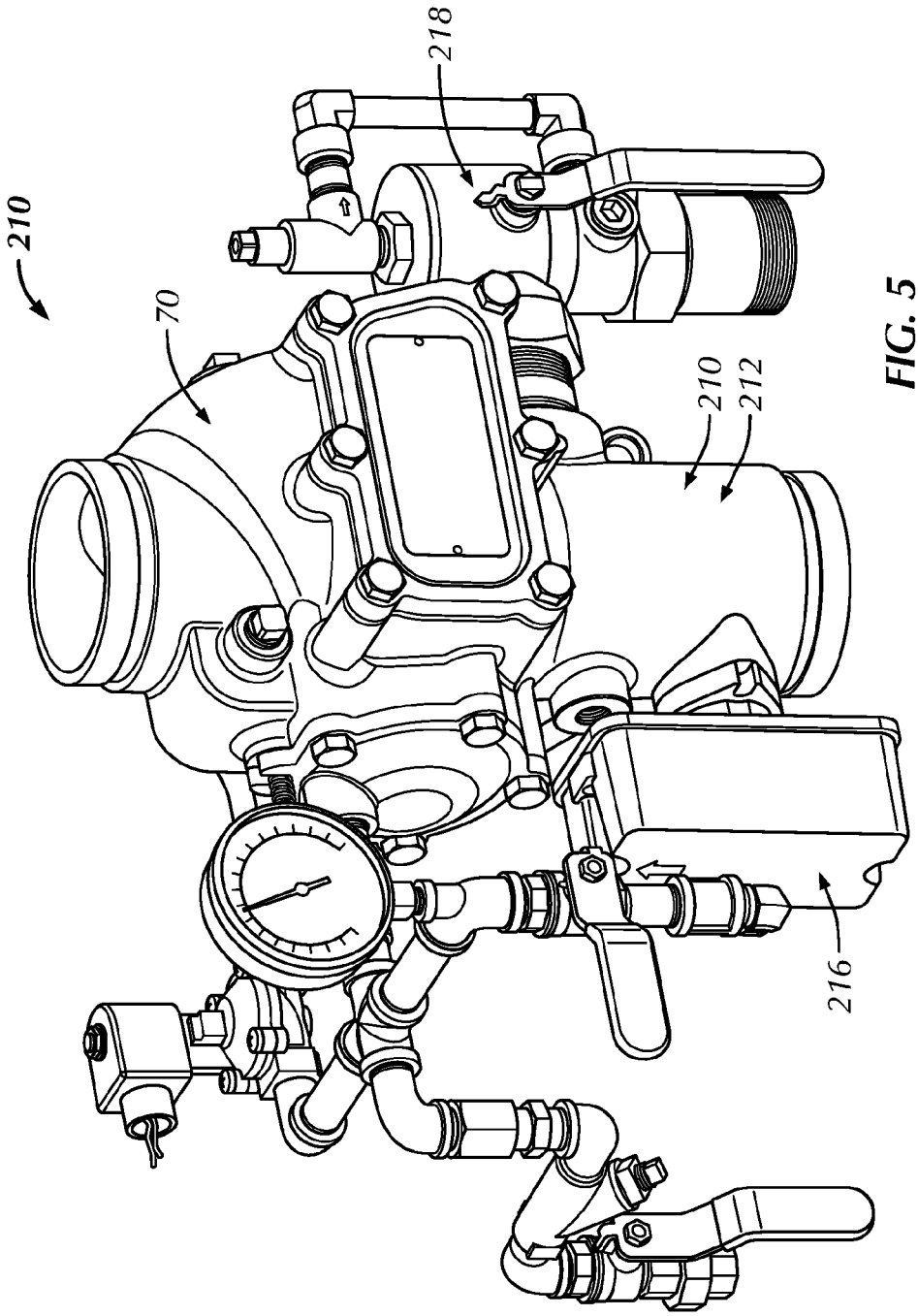

FIG. 5

DRY SPRINKLER SYSTEM MANIFOLD ADAPTER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from U.S. Provisional Patent Application No. 62/451,244, titled "Dry Sprinkler System Manifold Adapter", filed on Jan. 27, 2017, the entire contents of which are incorporated by reference herein.

BACKGROUND OF THE INVENTION

[0002] The present invention is generally directed to a manifold adapter for a sprinkler system, and more particularly to a manifold adapter for a dry sprinkler system used to control and monitor water released to downstream sprinkler heads.

[0003] Fire suppression sprinkler systems designed for protection of commercial and non-commercial properties include some combination or all of a control valve, a check valve, a water flow detection switch, a test and drain system and a pressure relief valve. The control valve is required to control shutting off the water flow to the sprinklers downstream thereof, e.g., for maintenance purposes. The flow detection switch is required at least to sound an alarm when the sprinklers are activated. The test and drain system is required for testing of the sprinkler system and also for draining the sprinkler system, e.g., also for maintenance purposes. The pressure relief valve is required to ensure that the water pressure within the sprinkler system does not surpass a safe level.

[0004] In areas subject to freezing temperatures, water in the wet pipes is likely to freeze, resulting in costly damage to the sprinkler system, such as pipe bursting. A dry system is, therefore, generally considered for areas where the temperature cannot be maintained above 40° F. In a dry system, sprinkler heads are attached to a piping system containing pressurized gas, e.g., air or nitrogen, in lieu of water. The check valve in a dry system, i.e., a non-wet valve, is a valve that separates the pressurized gas on the downstream side thereof from the water supply on the upstream side thereof. The supply-side piping system up to the non-wet valve assembly, and associated equipment, is installed within a heated environment (or at least an environment not subject to freezing temperatures) to prevent freezing. The piping network downstream of the non-wet valve to the sprinkler heads extends in the cold environment.

[0005] In operation, the pressurized gas maintains the non-wet valve in a closed position when the sprinkler heads are closed, according to a pressure differential across the valve. Upon release of the pressurized gas downstream of the non-wet valve, e.g., from the opening of one or more sprinkler heads, the water pressure upstream of the non-wet valve pushes the valve open, flows through the dry portion of the system and to the open sprinkler heads.

[0006] Conventional dry pipe sprinkler systems utilize a pressure actuated water flow detection switch, e.g., a PS-10 series pressure actuated switch manufactured by Potter, for sounding an alarm upon detection of a waterflow condition in the dry portion of the system. The pressure actuated water flow detection switch is not directly mounted to the water flow piping manifold. Rather, the flow switch is fluidly connected with the water flow piping manifold via an intricate and complicated plumbing network extending from an intermediate chamber located in the non-wet valve assembly. In part due to the plumbing network for the pressure actuated flow detection switch, the piping for a dry sprinkler system has a complex and relatively large footprint, is costly to manufacture and is both time consuming, complicated and costly to assemble. Nonetheless, pressure actuated water flow detection switches continue to be utilized in dry sprinkler systems because the National Fire Protection Agency does not allow vane-type water flow detection switches mounted directly on the dry side of the system. This is because when the non-wet valve opens, water rushes in with such force that the paddle of the vane-type flow switch may be damaged, e.g., detached from the flow switch.

[0007] Therefore, it would be advantageous to manufacture a manifold adapter for a dry sprinkler system, having a compact footprint, with a control valve, a flow detection switch, a test and drain, and a pressure relief module, or some combination thereof, mounted directly thereto, thereby eliminating the complex portions of the manifold piping and the associated footprint, as well as minimizing the cost and time of manufacture and complex assembly thereof.

BRIEF SUMMARY OF THE INVENTION

[0008] Briefly stated, one aspect of the present invention is directed to a manifold assembly mountable to a piping manifold for a dry sprinkler system having a non-wet valve assembly separating pressurized gas on a downstream side thereof from a water supply on an upstream side thereof. The manifold assembly comprises a single piece body having an inlet for removably coupling to, and receiving water from, an upstream wet standpipe, and an outlet for removably coupling to, and delivering water to, the non-wet valve assembly. A control valve assembly is mounted to the body and a mechanically independent flow detection switch is mounted to the body. The manifold assembly further comprises a test and drain valve and a pressure relief valve, each being fluidly connected with the body downstream of the control valve assembly and upstream of the outlet.

[0009] Another aspect of the present invention is directed to a manifold assembly mountable to a piping manifold for a dry sprinkler system having a non-wet valve assembly separating pressurized gas on a downstream side thereof from a water supply on an upstream side thereof. The manifold assembly comprises a control valve assembly for fluidly connecting with an upstream wet standpipe and a body having an inlet for removably coupling to, and receiving water from, the control valve assembly, and an outlet for removably coupling to, and delivering water to, the non-wet valve assembly. A mechanically independent flow detection switch is mounted to the body. The manifold assembly further comprises a test and drain valve and a pressure relief valve, each coupled to the valve body downstream from the flow detection switch.

[0010] Another aspect of the present invention is directed to a non-wet valve assembly mountable to a piping manifold for a dry sprinkler system, between pressurized gas on a downstream side thereof and water supply on an upstream side thereof. The non-wet valve assembly comprises a throat defining a monolithic extension of an upstream side of the non-wet valve assembly, the throat having an inlet for removably coupling to, and receiving water from, a control valve assembly. A mechanically independent flow detection

switch is mounted to the throat. Each of a test and drain valve and a pressure relief valve is coupled to the throat downstream from the flow detection switch.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The following detailed description of preferred embodiments of the invention will be better understood when read in conjunction with the appended drawings. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0012] FIG. **1** is a perspective front and side view of a single piece dry sprinkler system manifold adapter according to a first embodiment of the present invention;

[0013] FIG. **2** is a front elevational view of the single piece dry sprinkler system manifold adapter of FIG. **1**;

[0014] FIG. **3** is a cross-sectional view of the single piece dry sprinkler system manifold adapter of FIG. **1**, taken along the sectional line A-A of FIG. **2**;

[0015] FIG. **4** is a perspective front and side view of a multiple piece dry sprinkler system manifold adapter according to a second embodiment of the present invention; and

[0016] FIG. **5** is a perspective front and side view of a dry sprinkler system manifold according to a third embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Certain terminology is used in the following description for convenience only and is not limiting. The words "lower," "bottom," "upper" and "top" designate directions in the drawings to which reference is made. The words "inwardly," "outwardly," "upwardly" and "downwardly" refer to directions toward and away from, respectively, the geometric center of the manifold adapter, and designated parts thereof, in accordance with the present disclosure. Unless specifically set forth herein, the terms "a," "an" and "the" are not limited to one element, but instead should be read as meaning "at least one." The terminology includes the words noted above, derivatives thereof and words of similar import.

[0018] It should also be understood that the terms "about," "approximately," "generally," "substantially" and like terms, used herein when referring to a dimension or characteristic of a component of the invention, indicate that the described dimension/characteristic is not a strict boundary or parameter and does not exclude minor variations therefrom that are functionally similar. At a minimum, such references that include a numerical parameter would include variations that, using mathematical and industrial principles accepted in the art (e.g., rounding, measurement or other systematic errors, manufacturing tolerances, etc.), would not vary the least significant digit.

[0019] Referring to the drawings in detail, wherein like numerals indicate like elements throughout, there is shown in FIGS. **1-3** a manifold adapter, generally designated **10**, in accordance with a first preferred embodiment of the present invention. The manifold adapter **10** is mountable to a piping manifold for a dry sprinkler system, between a non-wet valve assembly **70** (FIG. **4**), e.g., a pre-action valve, a deluge valve, or another non-wet valve, and a wet standpipe (not shown).

[0020] The manifold adapter **10** comprises a generally tubular, single piece, e.g., integral, unitary and monolithic, body **12** having a control valve assembly **14**, a mechanically independent vane-type flow detection switch **16** and a test, drain, and pressure relief module **18** mounted thereto. As should be understood, the control valve assembly **14** controls manual shut-off of the wet portion of the sprinkler system for maintenance purposes or to turn off water flow to the sprinkler heads (not shown) once a fire event is extinguished. As also should be understood by those of ordinary skill in the art, aside from closing the sprinkler system for maintenance purposes the control valve assembly **14** should generally be fully open at all times in order to ensure water flow readiness to the sprinkler heads in the event of an emergency.

[0021] The body **12** defines an inlet **12***a* of the manifold adapter **10** at a base end thereof (according to the orientation depicted in the Figs.), for coupling to, and receiving water from, an upstream wet standpipe (not shown). The body **12** also defines an outlet **12***b* of the manifold adapter **12** at an uppermost end thereof (according to the same orientation), for coupling and delivering water to the downstream non-wet valve assembly **70**. In the illustrated embodiment, both ends **12***a*, **12***b* have respective outer peripheral grooves for mating in a conventional fashion with the wet standpipe and the non-wet valve assembly, respectively. Alternatively, the ends **12***a*, **12***b* could be threaded, flanged or the like for other types of conventional mating.

[0022] In the illustrated embodiments, the control valve assembly **14** comprises a butterfly control valve **20** within the body **12**, having an endless, e.g., annular, seal **22** and an operatively associated butterfly valve disk **24**. The annular seal **22** functions as a valve seat for the butterfly disk **24** when rotated into a closed position thereof. The term "butterfly valve," as used herein, is sufficiently broad to cover any valve having a generally disk-shaped closure that is pivotable about an axis along a cross-section of a pipe, i.e., perpendicular to the direction of fluid flow, to regulate fluid flow.

[0023] Openings **26***a* and **26***b* are oppositely provided in the sidewall of the body **12**, and sealingly receive components of a valve actuation assembly indicated generally at **28**. The valve actuation assembly **28** includes a hand wheel **30** (located outside of the body **12**) having a plurality of spokes **30***a*, operatively connected with the butterfly disk **24** (located inside the body **12**) in a conventional manner, e.g., via a control arm **32**. As should be understood by those of ordinary skill in the art, the butterfly disk **24** is rotatable about an axis across the diameter of the body **12** between a closed position (FIG. **3**) (the disk **24** being oriented perpendicular to the direction of fluid flow through the body **12**), substantially preventing fluid flow through the body **12**, and an open position (FIG. **1**) (the disk **24** being oriented generally parallel or non-perpendicularly to the direction of fluid flow through the body **12**), permitting fluid flow through the body **12**.

[0024] Clockwise and counterclockwise rotation of the hand wheel **30** pivots the butterfly valve disk **24** between the open and closed positions thereof (in a manner well understood by those of ordinary skill in the art) corresponding to open and closed configurations of the control valve assembly **14**, respectively. Accordingly, to manually shut-off the sprinkler system, e.g., for maintenance purposes or to shut off water flow to turn the sprinkler heads after a fire event is

extinguished, a user rotates the hand wheel **30** to rotate the butterfly valve disk **24** into the closed position thereof (FIG. **1**). To return the sprinkler system into the normal operating condition thereof (FIGS. **2**, **3**), the user rotates the hand wheel **30** in the opposite direction to rotate the butterfly valve disk **24** back to the open position thereof.

[0025] Optionally, the valve actuation assembly **28** may further include a conventional, commercially available, worm gear transmission (not-shown) between the valve hand wheel **30** and the control arm **32** controlling rotation of the butterfly disk **24**, to provide a reduction ratio. As should be understood, a worm gear transmission provides the necessary mechanical advantage to manually open and close the butterfly valve **20** under the operating pressure thereof. The control valve assembly **14** is also provided in a conventional fashion with one or more internal supervisory switches **34**, i.e., a tamper evident switch, which operate(s) in a manner well understood by those of ordinary skill in the art, and which is operatively connected to the control valve assembly **14** in a conventional manner. The supervisory switch **34** is also connected in a manner well understood by those of ordinary skill in the art to a monitoring system (not shown), which produces a warning signal to energize an alarm, turn on a light, or the like in the event an unauthorized person starts to open or close the control valve assembly **14**.

[0026] Turning to the test, drain and pressure relief module **18**, the test, drain and pressure relief features are combined into a single unit, fluidly connected with the body **12** downstream of the control valve assembly **14** and upstream of the outlet **12***b* in the illustrated embodiment. Combining the test, drain and pressure relief systems into a single module **18** eliminates the need for an additional piping manifold, extending from the wet standpipe, for separately mounting the test valve, the drain valve and the pressure relief valve thereto. Therefore, the footprint of the sprinkler system is greatly reduced with the elimination of the piping manifold for separate test, drain and pressure relief connections, as well as the associated time, cost and complexity of assembly. As should be understood by those of ordinary skill in the art, however, the test, drain and pressure relief valves may nonetheless be separately and removably attached to the body **12**. As a further alternative, one or more of the test, drain and pressure relief valves may be separately attached to the sprinkler system, in a conventional manner, such as, for example, by being mounted to the non-wet valve assembly **70** (not shown).

[0027] In the illustrated embodiment, and as shown in FIGS. **1** and **2**, the module **18** includes three fluidly connectable ports **36**, **38**, **40** and an internal flow valve (not shown), which directs the flow between the three ports. In one embodiment, the internal flow valve may take the form of a ball valve, but is not so limited, and may alternatively take the form of any valve currently known, or that later becomes known, capable of performing the functions of the internal flow valve described herein, such as, for example, without limitation, a spool valve (not shown).

[0028] The first port **36** of the module **18** (labeled "test" in FIGS. **1**, **2**) is fluidly connected at an inlet side **36***a* thereof to the body **12**, and operates as the inlet port for the module **18**. A pressure relief valve **42** is mounted on the second port **38** (labeled "off" in FIGS. **1**, **2**). A discharge pipe **44** branches off of the pressure relief valve **42** and is fluidly connected with the third port **40** for pressure relief. The third port **40** (labeled "drain" in FIG. **1**) fluidly connects the first port **36** with a drainage pipe (not shown), and operates as the exit port for the module **18**. A lever **46** controls the internal flow valve.

[0029] When the lever **46** is oriented in the "test" position (not shown), the internal ball valve is oriented to be partially open or restricted between the first and third ports **36**, **40**, and fully closed to the second port **38**. Accordingly, water from the body **12** flows into the module **18** from the first port **36** in a restricted manner and exits the module **18** through the third port **40**. A transparent window **48** allows a user to see whether water is flowing into the third port **46**. As should be understood, the "test" position is utilized to check whether water is present in the body **12** as required.

[0030] When the lever **46** is oriented in the "drain" position (not shown), the internal flow valve is oriented to be fully open between the first and third ports **36**, **40**, and fully closed to the second port **38**. Accordingly, water drains out from the body **12** and into the module **18** in an unrestricted manner via the first port **36** and exits the module **18** through the third port **40**. The drain position is utilized to drain water on a respective floor, e.g., for maintenance.

[0031] During normal operation, the lever **46** is oriented in the "off position" (FIG. **1**). When the lever **46** is oriented in the "off" position, the internal flow valve is oriented to be fully open between the first port **36** and the second port **38**, and fully closed to the third port **40**. The pressure relief valve **42**, mounted to the second port **38**, is generally set to a threshold pressure of approximately 175 psi under normal operation. Therefore, if the pressure within the body **12** exceeds 175 psi, the pressure relief valve **42** opens and releases water through the discharge pipe **44** to the drain port **40** until the pressure falls to less than 175 psi. A general purpose of the pressure relief valve is to allow the ability to maintain appropriate water pressure at the top floors of a building without over pressurizing the bottom floors of the building.

[0032] Turning to the flow detection switch **16**, the vane-type flow detection switch **16** is removably mounted to the body **12** between the test, drain and pressure relief module **18** and the control valve **14**. Alternatively, in another configuration (not shown), the flow detection switch **16** may be removably mounted to the body **12** upstream of the control valve **14** (i.e., below the control valve **14** in the illustrated orientation). Mounting of a vane-type flow detection switch in the wet portion of a dry sprinkler system is permissible under the guidelines of the National Fire Protection Agency.

[0033] The flow detection switch **16** is mechanically independent of any valve within the dry sprinkler system, i.e., the flow detection switch **16** is not mechanically coupled or linked to any valve within the dry sprinkler system, and opening or closing of any valve within the dry sprinkler system does not mechanically actuate the flow detection switch **16**. As shown best in FIG. **3**, the flow detection switch **16** is actuated by a lever arm **50** extending from the flow detection switch **16**, through a port **52** and into the interior of the body **12**. The lever arm **50** extends along a plane substantially perpendicular to the direction of water flow within the body **12**. A rear end of the lever arm **50** contacts an electric switch **54** which is connected with an alarm system (not shown). Water flow through body **12**, across the lever arm **50**, such as, without limitation, when the non-wet valve (which is not mechanically linked to the lever arm **50**) opens, moves, i.e., pivots, the lever arm **50** and activates the

switch **16** and sounds an alarm in a manner well understood by those of ordinary skill in the art.

[0034] The flow detection switch **16** includes an adjustable time delay **56**, which is set to a predetermined period of time during which the switch **16** must remain in the activated state prior to sounding an alarm, indicating that either the sprinklers are activated or that the test, drain and pressure relief module **18** is draining water out of the body **12**. The time delay accounts for sporadic and temporary pressure surges in the standpipe, without the sprinklers or the test, drain and pressure relief module **18** actually being activated. As should be understood by those of ordinary skill in the art, however, the flow detection switch **16** is not limited to a lever-actuated flow detection switch. For example, without limitation, the flow detection switch **16** may take the form of a magnetically-actuated flow detection switch (not shown) triggered by magnetic detection of movement of the non-wet valve or the test, drain and pressure relief module **18**, a pressure actuated water flow detection switch, and the like.

[0035] Advantageously, the manifold adapter **10**, connecting the wet standpipe (not shown) with the non-wet valve **70** and having a vane-type flow detection switch **16** and a test, drain and pressure relief module **18** directed mounted thereto, greatly reduces the piping network of a dry sprinkler system.

[0036] FIG. **4** illustrates a second embodiment of the manifold adapter **110**. The reference numerals of the present embodiment are distinguishable from those of the above-described embodiment by a factor of one-hundred (100), but otherwise indicate the same elements as indicated above, except as otherwise specified. The manifold adapter **110** of the present embodiment is substantially similar to that of the earlier embodiment. Therefore, the description of certain similarities between the embodiments may be omitted herein for the sake of brevity and convenience, and, therefore, is not limiting.

[0037] A primary difference between the manifold adapters **10** and **110** is that the body **112** of the manifold adapter **110** takes the form of a separate spool pipe, fluidly connected in-line between the downstream non-wet valve assembly **70** and the upstream control valve assembly **114**. As shown in FIG. **4**, the flow detection switch **116** is mounted to the spool pipe body **112** in like manner as described with respect to the manifold adapter **10**. Likewise, the test, drain and pressure relief module **118** is mounted to the spool pipe body **112**, downstream of the flow detection switch **116**, in like manner as described with respect to the manifold adapter **10**. In the illustrated embodiment, the upstream (lower) end of the spool pipe body **112** is connected with the control valve assembly **114** via a mechanical coupling **158**, and the downstream (upper) end of the spool pipe body **112** is connected with the non-wet valve assembly **70** via another mechanical coupling **158**. As should be understood, however, the spool pipe body **112** may be connected to the non-wet valve assembly **70** and the control valve assembly **114** in any conventional manner known by those of ordinary skill in the art.

[0038] FIG. **5** illustrates a third embodiment of the manifold adapter **210**. The reference numerals of the present embodiment are distinguishable from those of the above-described embodiment by a factor of two-hundred (200), but otherwise indicate the same elements as indicated above, except as otherwise specified. The manifold adapter **210** of the present embodiment is substantially similar to that of the earlier embodiment. Therefore, the description of certain similarities between the embodiments may be omitted herein for the sake of brevity and convenience, and, therefore, is not limiting.

[0039] A primary difference between the manifold adapters **10**, **110** and **210** is that the manifold adapter **210** takes the form of an extension of the throat of the non-wet valve assembly **70**. That is, the body **212** of the manifold adapter **210** is an integral, unitary and monolithic extension of the upstream side of the non-wet valve assembly **70**. Similarly to the body **112**, the flow detection switch **216** and the test, drain and pressure relief module **218** are mounted to the body **212** in like manner as described with respect to the manifold adapter **10**, the module **218** being mounted downstream of the flow detection switch **216**. The body **212** is connected to the control valve assembly (not shown) at an upstream end thereof, in like manner as described with respect to the manifold adapter **110**.

[0040] It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the present invention, as set forth in the appended claims.

We claim:

1. A manifold assembly mountable to a piping manifold for a dry sprinkler system having a non-wet valve assembly separating pressurized gas on a downstream side thereof from a water supply on an upstream side thereof, the manifold assembly comprising:

a single piece body having an inlet for removably coupling to, and receiving water from, an upstream wet standpipe, and an outlet for removably coupling to, and delivering water to, the non-wet valve assembly;

a control valve assembly mounted to the body;

a mechanically independent flow detection switch mounted to the body; and

a test and drain valve and a pressure relief valve, each being fluidly connected with the body downstream of the control valve assembly and upstream of the outlet.

2. The manifold assembly of claim **1**, wherein the control valve assembly comprises a butterfly control valve within the body having an endless seal and an operatively associated butterfly valve disk, the butterfly valve disk being rotatable about an axis extending generally perpendicular to water flowing from the inlet to the outlet of the body between a closed position, substantially preventing fluid flow through the body, and an open position, permitting fluid flow through the body.

3. The manifold assembly of claim **2**, further comprising a valve actuation assembly having a hand wheel operatively connected with the butterfly valve disk via a control arm.

4. The manifold assembly of claim **1**, wherein the test and drain valve and the pressure relief valve are combined into a single module.

5. The manifold assembly of claim **1**, wherein the flow detection switch is mounted to the body upstream of the test and drain valve and the pressure relief valve.

6. The manifold assembly of claim **5**, wherein the flow detection switch is mounted to the body downstream of the control valve.

7. The manifold assembly of claim 5, wherein the flow detection switch is mounted to the body upstream of the control valve.

8. The manifold assembly of claim 1, wherein the flow detection switch is a vane-type flow detection switch.

9. A manifold assembly mountable to a piping manifold for a dry sprinkler system having a non-wet valve assembly separating pressurized gas on a downstream side thereof from a water supply on an upstream side thereof, the manifold assembly comprising:

a control valve assembly for fluidly connecting with an upstream wet standpipe;

a body having an inlet for removably coupling to, and receiving water from, the control valve assembly, and an outlet for removably coupling to, and delivering water to, the non-wet valve assembly;

a mechanically independent flow detection switch mounted to the body; and

a test and drain valve and a pressure relief valve, each coupled to the valve body downstream from the flow detection switch.

10. The manifold assembly of claim 9, wherein the control valve assembly comprises a butterfly control valve within the body having an endless seal and an operatively associated butterfly valve disk, the butterfly valve disk being rotatable about an axis extending generally perpendicular to water flowing from the inlet to the outlet of the body between a closed position, substantially preventing fluid flow through the body, and an open position, permitting fluid flow through the body.

11. The manifold assembly of claim 10, further comprising a valve actuation assembly having a hand wheel operatively connected with the butterfly valve disk via a control arm.

12. The manifold assembly of claim 9, wherein the test and drain valve and the pressure relief valve are combined into a single module.

13. The manifold assembly of claim 9, wherein the body comprises a spool pipe.

14. The manifold assembly of claim 9, wherein the flow detection switch is a vane-type flow detection switch.

15. A non-wet valve assembly mountable to a piping manifold for a dry sprinkler system, between pressurized gas on a downstream side thereof and water supply on an upstream side thereof, the non-wet valve assembly comprising:

a throat defining a monolithic extension of an upstream side of the non-wet valve assembly, the throat having an inlet for removably coupling to, and receiving water from, a control valve assembly;

a mechanically independent flow detection switch mounted to the throat; and

a test and drain valve and a pressure relief valve, each coupled to the throat downstream from the flow detection switch.

16. The non-wet valve assembly of claim 15, wherein the test and drain valve and the pressure relief valve are combined into a single module.

17. The non-wet valve assembly of claim 15, where the flow detection switch is a vane-type flow detection switch.

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