United States Patent [19]

Anderson et al.

[11] **3,926,206**

[45] **Dec. 16, 1975**

[54] **YARD HYDRANT**

[75] Inventors: **Noel M. Anderson,** Storm Lake; **Arlin W. Otto,** Lakeside, both of Iowa

[73] Assignee: **Merrill Manufacturing Company, Inc.,** Storm Lake, Iowa

[22] Filed: **Sept. 18, 1974**

[21] Appl. No.: **506,956**

[52] **U.S. Cl.** **137/281;** 137/283; 137/287; 137/299; 137/327

[51] **Int. Cl.²** **E03B 9/04**

[58] **Field of Search** 137/272, 281, 286, 287, 137/288, 299, 301–308, 326–328, 217, 218; 251/353; 92/34, 43

[56] **References Cited**

UNITED STATES PATENTS

3,017,896	1/1962	Papacek	137/287 X
3,523,549	8/1970	Anderson	137/288
3,770,000	11/1973	Murdock et al.	137/281 X

FOREIGN PATENTS OR APPLICATIONS

704,949	3/1931	France	137/281

Primary Examiner—Martin P. Schwadron
Assistant Examiner—Richard Gerard
Attorney, Agent, or Firm—Morton S. Adler

[57] **ABSTRACT**

A yard hydrant is designed to eliminate the standard drain hole in devices of this type. Water in the standpipe that previously drained to the outside when the hydrant is closed is collected in a self-contained reservoir and is available for use. The reservoir is of an expandable bellows structure arranged to expand with the closing of the hydrant valve to accommodate the drain water and to compress with the opening of the hydrant valve so that the stored water passes through the standpipe and out of the hydrant nozzle with the incoming water. The standpipe, bellows chamber and hydrant valve are so attached to the hydrant head that they can be conveniently withdrawn as a unit from the hydrant casing for repairs or maintenance.

6 Claims, 4 Drawing Figures

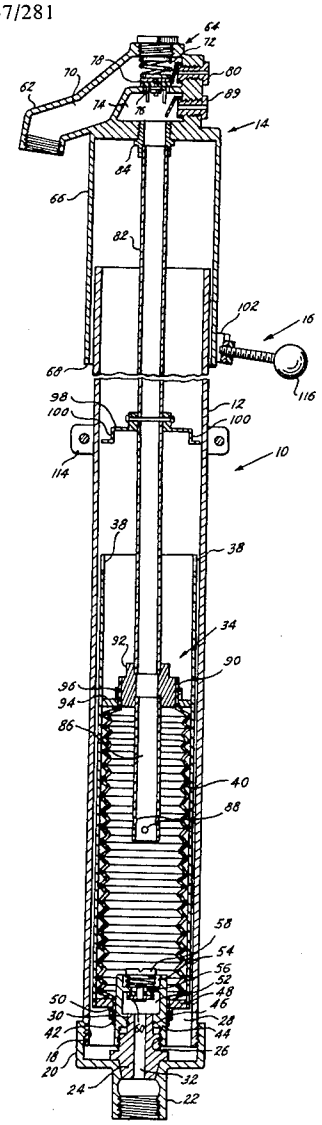


FIG. 1

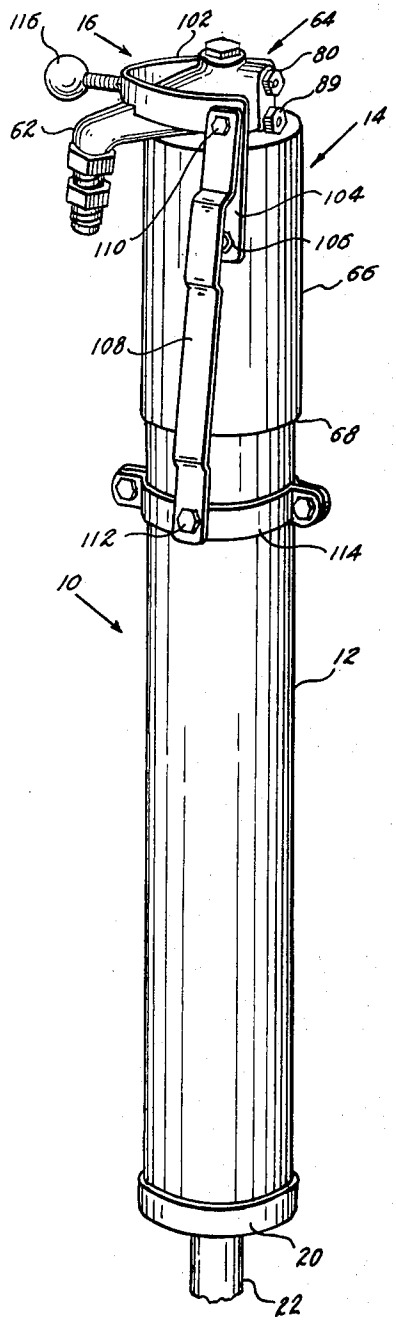

116
16
102
64
80
89
62
14
104
110
106
66
108
68
112
114
10
12
20
22

FIG. 2

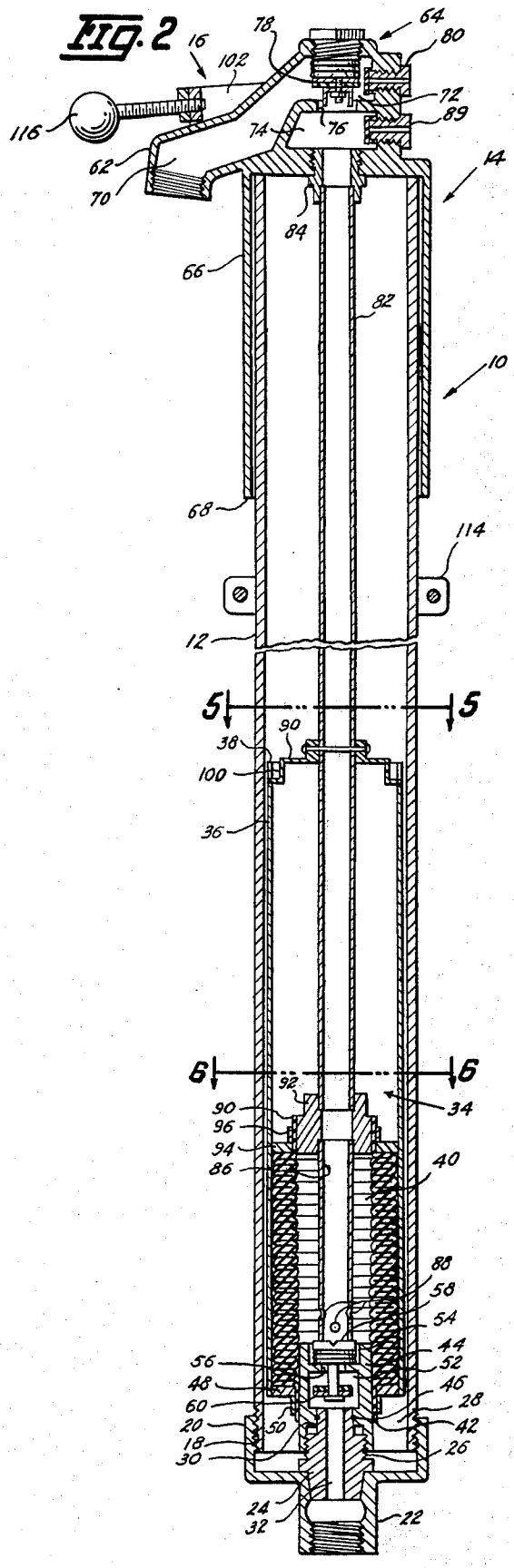

16
78
64
80
102
116
72
89
74
76
62
70
14
84
66
82
10
68
114
12
5
5
90
38
100
36
6
6
92
34
90
96
94
86
40
88
58
54
44
56
52
48
46
60
28
20
50
42
18
26
30
24
32
22

FIG. 3

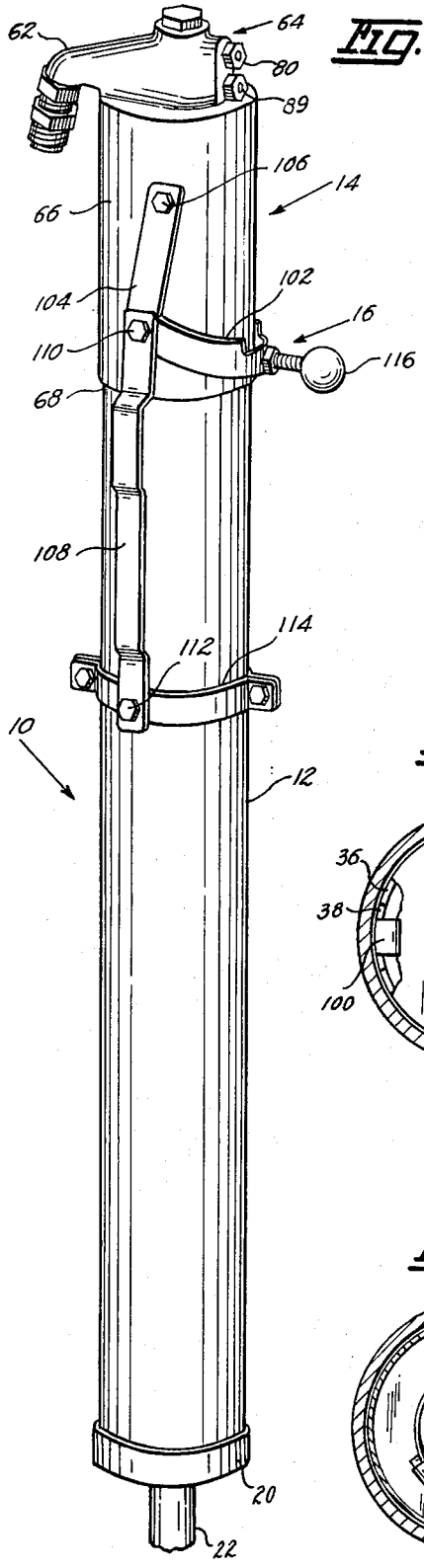


FIG. 4

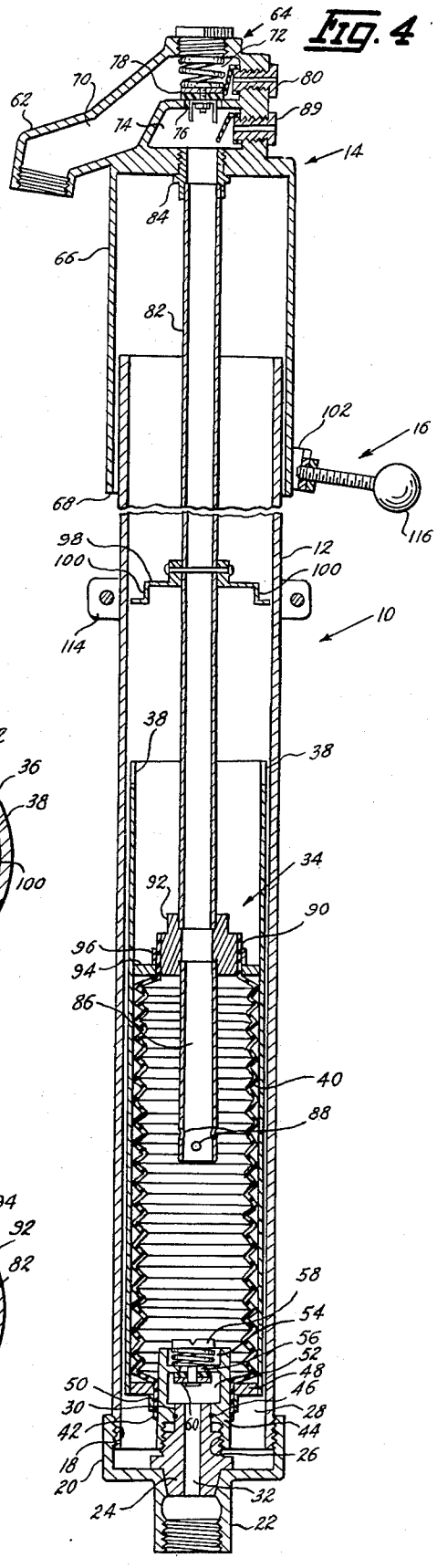


FIG. 5

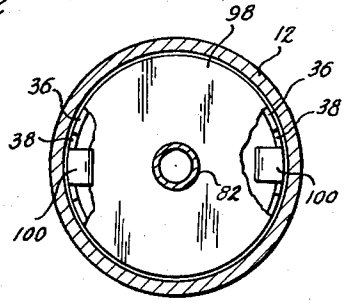
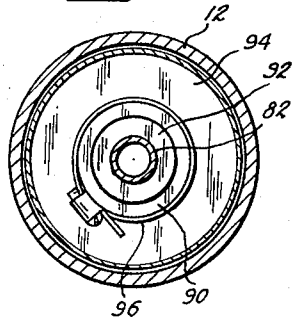


FIG. 6



YARD HYDRANT

BACKGROUND OF THE INVENTION

This invention relates to yard hydrants and more particularly to an improvement in hydrant structure wherein the traditional drain hole in such devices is completely eliminated and the water that heretofore drained away to the outside is collected in a self-contained reservoir and can be subsequently used.

The value and utility of yard hydrants have long been recognized with much of the hydrant art dating back to the late 1800's and early 1900's and illustrations particularly of the yard hydrant art can be found in the patents of one of the applicants here, Noel M. Anderson, U.S. Pat. Nos. 2,649,768, 2,649,111, 3,523,549 and 3,672,392. Characteristically of yard hydrants has been the presence of a drain hole at the bottom of the standpipe to carry away water left in such pipe after the valve is closed so that the water is dissipated into the surrounding ground. Notwithstanding the efficiency of such hydrant structures including the draining away of water as indicated, it appears that continuing attention to matters of sanitation, water purity and the like by those concerned with such art and also certain governmental regulatory bodies, indicate that the presence of a drain hole while affording a means to dispel water in the standpipe after the valve is closed, can also be a means for the reentry of water into the hydrant to be intermixed with other water passing therethrough. Under such conditions, the possibility of contamination from impure seepage can result in deleterious effects upon the consumer and, accordingly, the principal object of the present invention is to provide a yard hydrant which has no drain hole to the outside so as to eliminate the possibility of any water seepage from the outside ground into the hydrant.

Another object herein is to provide a yard hydrant of the above class which includes a self-contained reservoir into which water in the standpipe that heretofore drained to the outside when the hydrant valve was closed, can be accommodated and stored for future use. More particularly in this regard the reservoir provided is of an expandable bellows structure which expands when the hydrant is closed and contracts when the hydrant is open.

A further object is to provide a yard hydrant as characterized wherein the standpipe, bellows chamber and valve assembly is so constructed, connected and arranged that it can be easily, quickly and conveniently withdrawn as a unit from the hydrant casing for purposes of repairs and maintenance.

The foregoing objects and such further objects as may appear herein, or be hereinafter pointed out, together with the advantages of this invention will be more fully discussed and developed in the more detailed description of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of this new yard hydrant with the handle shown in the "on" position,

FIG. 2 is an enlarged longitudinal sectional view of the hydrant shown in FIG. 1,

FIG. 3 is a perspective view similar to FIG. 1 but showing the handle in its "off" position,

FIG. 4 is an enlarged longitudinal sectional view of the hydrant shown in FIG. 3,

FIG. 5 is a cross sectional view taken on the line 5—5 of FIG. 2, and

FIG. 6 is a cross sectional view taken on the line 6—6 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, this new yard hydrant is designated generally by the numeral **10** and, as seen in FIGS. **1** and **3,** includes an elongated upstanding outer casing **12** which houses certain of the working components as will later be described in detail, and a nozzle head assembly **14** journalled on the upper end of casing **12** and vertically reciprocal thereon as will appear, by the handle unit **16.** The lower end of casing **12** is securely affixed in any suitable manner as by the threaded engagement **18** (FIGS. **2** and **4**) to an appropriate cap-like fitting **20** having the down pipe portion **22** for connection to an underground source of water under pressure (not shown) in a well known manner. As a part of fitting **20** there is provided an axial orifice plug **24** having the externally threaded neck **26** extending into chamber **28** at the bottom of casing **12** and which neck has the further reduced portion **30.** An axial bore or passageway **32** through plug **24** communicates with pipe **22** and with chamber **28.**

It is to be noted that hydrant **10** is provided with no drain hole to the outside at the lower end of casing **12** which has heretofore been a standard provision in hydrants of this type and reference is now made particularly to FIGS. **2** and **4** relative to our improved bellows reservoir chamber assembly **34** to accommodate water previously allowed to drain out and which we shall now describe.

A cylinder **36,** open at opposite ends, of any suitable material which may include metal or plastic, is journalled in the lower portion of casing **12** so that the bottom end is disposed within chamber **28.** The upper end of cylinder **36** is notched **38** at oppositely disposed points for reasons to be later explained. Journalled within cylinder **36** is the cylindrically shaped bellows chamber or reservoir **40** designed as will appear, for compression as seen in FIG. **2** and for expansion as seen in FIG. **4.** Bellows **40** are in contact with the inner wall of cylinder **36** which serves to keep it confined and contained against radial expansion under water pressure as will become apparent.

The lower end of bellows **40** includes the integral projecting neck **42** into which is mounted the valve housing **44** that in turn is threadably attached to the external threads **26** of plug **24** in a sealed arrangement provided by the O-ring **46.** A metal washer **48** encircles neck **42** and valve housing **44** in abutment with the lowermost bellow fold of bellows **40** and a hose clamp **50** around neck **42** and housing **44** directly below washer **48** secures the lower end of bellows assembly **34** to the valve housing **44.** The periphery of washer **48** nests within the bottom inner edge of cylinder **36** and if the parts are of metal, they may be welded or attached by screws and if of plastic, a solvent weld can be used in a well known manner. Thus, by this arrangement, washer **48** provides an adequate stop at the bottom of bellows **40** relative to its expansion and contraction.

The valve housing **44** includes a lower chamber **52** in flow communication with passageway **32** and an upper chamber **54** in flow communication with chamber **52** through the valve seat **56** and with the interior of the bellows reservoir **40.** A spring loaded check valve **58** is

arranged in a well known manner relative to chambers **52** and **54** so that normally, valve end **60** is seated against the underside of seat **56** in closed position and is unseated or moved to open position by pressure from above as will appear.

The upper end of the bellows assembly **34** operates in cooperation with the nozzle head assembly **14** to which reference is now made. Assembly **14** includes a nozzle **62,** and an integral nozzle head section **64** from which there depends the integral cylindrical sleeve **66** open at its bottom end **68.** The water passageway **70** in nozzle **62** terminates in an upper chamber **72** in head **64** which in turn communicates with a lower chamber **74** through valve seat **76.** A spring loaded check valve **78** is mounted in chamber **72** relative to seat **76** and is closed (FIG. **4**) when hydrant **10** is closed and open under water pressure (FIG. **2**) when hydrant **10** is open all of which will be referred to later in more detail including the purpose of the air flow check valve **80** provided in the outside wall to the upper chamber **72.**

Sleeve **66** is slip-fitted over the top of casing **12** for vertical reciprocal movement thereon as will appear and an elongated standpipe **82** is secured at its upper end by fitting **84** to head section **64** so as to be in flow communication with the lower chamber **74** and extends downwardly to terminate at its lower end **86** well within the interior of bellows **40** and in axial alignment with valve **58.** One or more through lateral openings **88** are provided in the wall of standpipe **82** at end **86** about the periphery thereof and an air check valve **89** is provided in the outside wall to the lower chamber **74** in head section **64** in communication with standpipe **82.**

At the upper end of the bellows assembly **34** where standpipe **82** enters the same, bellows **40** are provided with a reduced neck portion **90,** similar to neck **42** at the lower end, which embraces a fitting **92** securely affixed to standpipe **82,** and a metal washer **94,** similar to washer **48** and functioning as a stop, encircles neck **90** and fitting **92** in abutment with the uppermost bellow fold of bellows **40** where it is locked in place by a hose clamp **96.** Also secured to standpipe **82** at a point spaced above fitting **92** and above the plane of the upper end of cylinder **36,** is a disc-shaped key **98** having opposed turned down lug portions **100** for engaging notches **38** in cylinder **36** which will be further described in the operation of this hydrant.

Handle unit **16** is designed to reciprocate the nozzle assembly **14** together with standpipe **82** as will appear and for this purpose includes a bail **102** having the respective right angle parallel crank arms **104** positioned astraddle of sleeve **66** and pivotally secured thereto as at **106** whereby bail **102** can be moved upwardly and across the top of heat section **64** (FIG. **1**) and downwardly along the side of sleeve **66** (FIG. **3**). A pair of opposed elongated like rigid links **108** (of which only one is shown) are each pivotally secured at corresponding ends to the respective crank arms **104** as at **110** being approximately the juncture of bail **102** ends and crank arms **104** and at their opposite ends, links **108** are pivotally attached as at **112** to a ring or band **114** securely affixed to casing **12** below the plane of end **68** of sleeve **66.** A knob **116** is secured to bail **102** to facilitate the operation of unit **16** and thus with hydrant **10** constructed and arranged as described, it is operated in the following manner.

Operation

Hydrant **10** in the usual arrangement for devices of this type is mounted upright in the ground as shown where a substantial portion of the casing **12** is buried for connection to the underground water supply and where the portion of the casing **12** which houses the bellows assembly **34** is below the frost line. Since the depth of the frost line may vary in different geographical locations, it will be understood that the length of casing **12** will be fabricated accordingly. The nozzle **62** is preferably approximately 2 feet above the ground level although this may, of course, be varied.

Referring first to FIGS. **1** and **2,** hydrant **10** is shown in the "on" position for delivery of water through standpipe **82** and out of nozzle **62.** Here, bail **102** of handle unit **16** is moved upwardly across the head section **64** whereby crank arms **104** move to their lowermost position relative to links **108** causing sleeve **66** to slide downwardly on casing **12** and at the same time, moving the standpipe **82** downwardly into engagement with valve **58** to unseat it from seat **56** and open flow communication from passageway **32** through standpipe **82** into chamber **74** of the head section **64.** Such water flow under pressure opens valve **78** into chamber **72** so that flow enters passageway **70** out of nozzle **62.** In the downward movement of standpipe **82,** the arrangement of fitting **92** and washer **94** acts against the upper end of the bellows reservoir **40** to compress it as shown in FIG. **2** and further effects of this will be explained after the following reference to the "off" position of hydrant **10** shown in FIGS. **3** and **4.**

By the movement of bail **102** from the position of FIGS. **1** and **2** to the position in FIGS. **3** and **4,** the direction of movement of sleeve **66** and standpipe **82** is reversed or upwardly which simultaneously retracts standpipe **82** from engagement with valve **58** so that such valve closes under its spring pressure and extends or expands the bellows reservoir **40** to enlarge its interior area as seen in FIG. **4.** As this occurs, valve **78** in head section chamber **72,** being free of water pressure, automatically closes and water in standpipe **82** will drain down such pipe for collection and storage in the expanded bellows reservoir **40.** Such drainage is expedited by air intake under atmospheric pressure through the air check valve **89** which is otherwise held closed by water pressure through chamber **74** when valve **58** is open.

The air check valve **80** into head chamber **72** functions similarly to check valve **89** when hydrant **10** is closed and is designed particularly to assure drainage of nozzle **62** if a length of hose (not shown) should at times be left attached to nozzle **62** as frequently occurs. Without any such attached hose, nozzle **62** will easily drain when the hydrant is closed but experience has shown this does not always properly occur with a hose attached and thus valve **80** is provided to assure proper drainage when required.

With the bellows reservoir **40** storing water from standpipe **82** as described in the "off" position shown in FIG. **4,** the compression or retraction of reservoir **40** (FIG. **2**) as the "on" position of the hydrant is effected, results in the stored water reentering the standpipe **82** through holes **88** where it is co-mingled with the new supply and can thereby be fully used without any waste or exposure to any contaminating source from outside of the casing **12.** By this arrangement, it will be appreciated that hydrant **10** functions adequately without the

traditional drain hole, is completely sealed from the surrounding terrain and that the stored standpipe water is held below the frost line where it is safe from freezing and available for future use.

With reference now more particularly to FIGS. **2** and **5**, it will be noted that in the illustrated position of the hydrant **10**, the lugs **100** on the disc key **98** are nested in the notches **38** at the upper end of cylinder **36**. Thus, by disconnecting the links **108** from bail **102**, assembly **14** can be rotated counterclockwise for the following purpose. Such rotation rotates standpipe **82** about its longitudinal axis whereby lugs **100** rotate cylinder **36** that is secured to valve housing **44** and disengages such housing from the external threads **26** on plug **24**. Accordingly, with housing **44** turned free of plug **24**, the standpipe **82**, bellows assembly **34** and housing **44** together with valve **58** can be quickly and easily withdrawn as a unit for repairs or maintenance. Such parts are reinserted in the reverse order of their removal. Thus, in view of all of the foregoing, it is thought a full understanding of the construction and operation of this invention will be had and the advantages of the same will be appreciated.

We claim:

1. A yard hydrant, comprising:

a casing having an upper and lower end,

a valve housing with a spring loaded valve means therein in the lower end of said casing and operatively connected to a source of fluid under pressure,

a head section including an integral nozzle,

means for arranging said head section relative to the upper end of said casing for vertical reciprocation relative thereto,

a longitudinal expandable and retractible bellows fluid reservoir having an upper and lower end arranged within said casing,

a standpipe within said casing having one end secured to said head section in flow communication therewith and its other end extended through the upper end of said reservoir and terminating within said reservoir,

said standpipe being vertically reciprocal with corresponding movement of said head section,

a respective integral axial projecting lower neck portion and upper neck portion at the respective lower and upper ends of said bellows reservoir,

said upper neck portion embracing said standpipe and said lower neck portion embracing said valve housing,

a first stop member embracing said lower neck portion and said valve housing and in abutment with the lower end of said bellows reservoir including means for locking said stop member in said position,

a second stop member embracing said upper neck portion and said standpipe and in abutment with the upper end of said bellows reservoir including means for locking said stop member in said position,

the downwardly movement of said standpipe effecting the retraction and compression of said reservoir and with said other end of said standpipe acting against said valve means to open fluid flow through said hydrant, and

the upwardly movement of said standpipe elevating the same from contact with said valve means permitting it to close and simultaneously expanding said reservoir whereby fluid in said standpipe upon closing of said valve means drains therefrom into said reservoir for storage.

2. A yard hydrant as defined in claim **1** including said standpipe being provided at its lower end with a lateral opening whereby with fluid stored in said expanded bellows reservoir while said valve means is closed, the movement of said standpipe for opening said valve means and simultaneously compressing said bellows reservoir causes the stored fluid to enter said standpipe through said lateral opening for reuse and commingling with fluid from the supply source for passage out of said nozzle.

3. A yard hydrant as defined in claim **1** including:

a cylinder having an upper and lower end and arranged in the lower end of said casing in embracing relationship to said bellows reservoir to hold it against radial expansion, and

means for operatively securing the lower end of said cylinder to said valve housing.

4. A yard hydrant as defined in claim **1** including:

a cylinder having an upper and lower end and arranged in the lower end of said casing in embracing relationship to said bellows reservoir to hold it against radial expansion,

means for securing the lower end of said cylinder to said first stop member, and

said second stop member being vertically reciprocal within said cylinder with corresponding movements of said standpipe.

5. A yard hydrant, comprising:

a casing having an upper and lower end,

a valve housing with a spring loaded valve means therein in the lower end of said casing and operatively connected to a source of fluid under pressure,

a head section including an integral nozzle,

means for arranging said head section relative to the upper end of said casing for vertical reciprocation and rotation relative thereto,

a longitudinal expandable and retractible bellows fluid reservoir having an upper and lower end arranged within said casing including means attaching the lower end of said reservoir to said valve housing,

a standpipe within said casing having one end secured to said head section in flow communication therewith and its other end extended through the upper end of said reservoir and terminating within said reservoir,

said standpipe being vertically reciprocal with corresponding movement of said head section,

means connecting the upper end of said reservoir to said standpipe for expansion and retraction with respective upwardly and downwardly movements of said standpipe,

the downwardly movement of said standpipe effecting the retraction and compression of said reservoir and with said other end of said standpipe acting against said valve means to open fluid flow through said hydrant,

the upwardly movement of said standpipe elevating the same from contact with said valve means permitting it to close and simultaneously expanding said reservoir whereby fluid in said standpipe upon closing of said valve means drains therefrom into said reservoir for storage,

a fitting means secured to the lower end of said casing and adapted for flow communication with the source of fluid under pressure,

said fitting means having an orifice plug with an externally threaded neck extended into the lower end of said casing, and

said valve housing being removably threadably attached to said threaded neck whereby an assembly comprising said head section, standpipe, bellows reservoir and valve housing with valve means can be manually rotated to remove said valve housing from said fitting means to permit withdrawal from said casing as a unit said assembly for purposes of repair or maintenance.

6. A yard hydrant as defined in claim **5** including:

a cylinder having an upper and lower end arranged in the lower end of said casing in embracing relationship to said bellows reservoir to hold it against radial expansion,

means for operatively securing the lower end of said cylinder to said valve housing,

the upper end of said cylinder being provided with a notch,

a lug key secured to said standpipe at a point thereon whereby in downwardly movement of said standpipe said lug key is engaged in said notch to effect a turning force at the upper end of the cylinder and facilitate the removal of said assembly including said cylinder.

* * * * *