

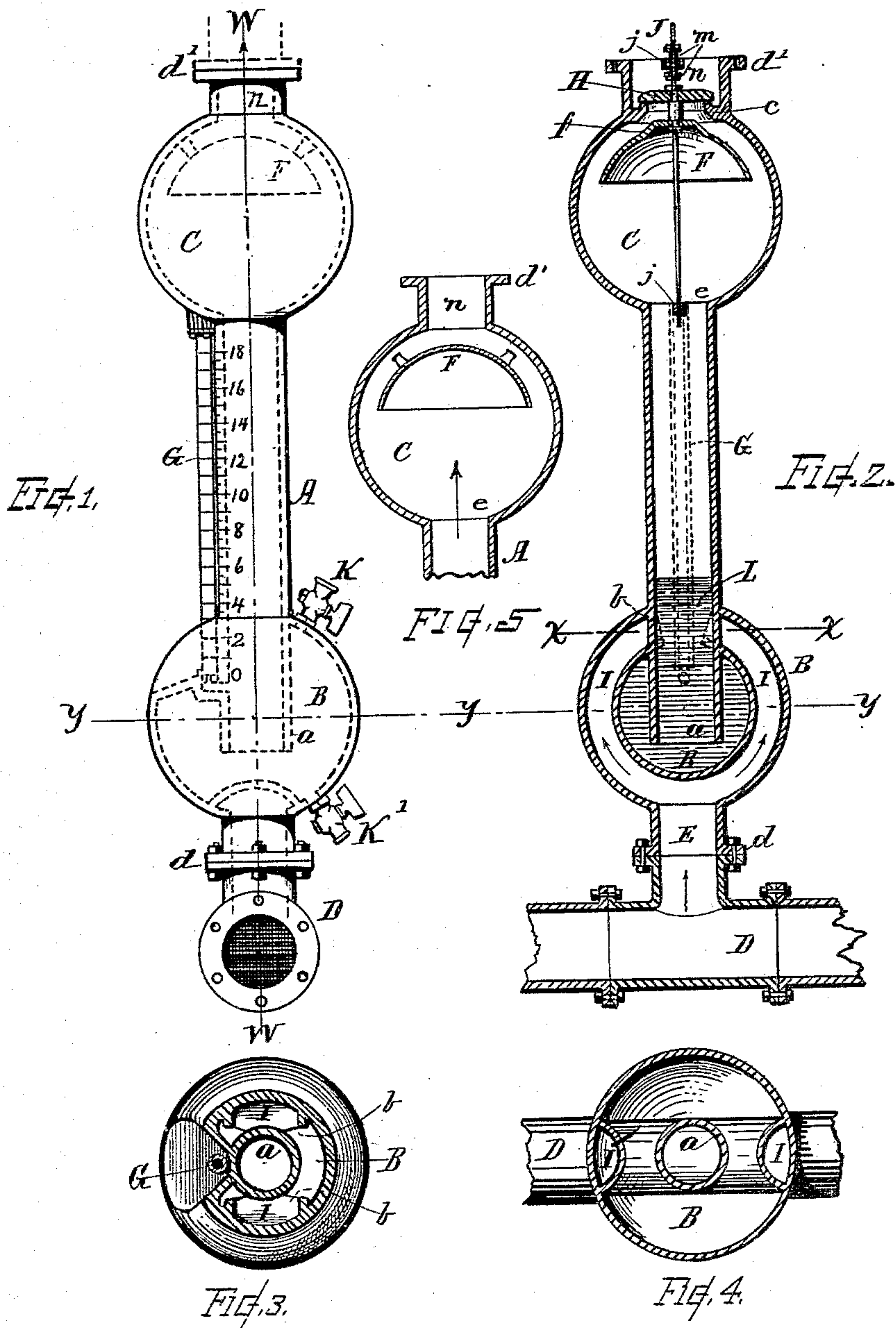
(No Model.)

J. C. CONROY.

LIQUID SAFETY VALVE FOR GAS DISTRIBUTING PIPES.

No. 401,136.

Patented Apr. 9, 1889.



WITNESSES

Edw. P. Blenue
Egbert S. Bullard.

INVENTOR

James C. Conroy
By Charles H. Buelcigh
Attorney

UNITED STATES PATENT OFFICE.

JAMES C. CONROY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO THE UNION WATER METER COMPANY, OF WORCESTER, MASSACHUSETTS.

LIQUID SAFETY-VALVE FOR GAS-DISTRIBUTING PIPES.

SPECIFICATION forming part of Letters Patent No. 401,136, dated April 9, 1889.

Application filed January 2, 1889. Serial No. 295,153. (No model.)

To all whom it may concern:

Be it known that I, JAMES C. CONROY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Liquid Safety-Valves for Gas-Distributing Pipes, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my invention is to provide an efficient and reliable pressure-relieving escapement apparatus or liquid safety-valve for use on gas-distributing pipes in connection with reducers or regulators and for similar purposes, said apparatus being more especially designed for natural-gas distribution, where pressure is reduced from a high intensity of, say, about five hundred to eight hundred pounds (more or less) to a nominal working-pressure suitable for general delivery and use, my said invention being adapted to serve as a guard for relieving the distributing main or pipe in case of any accident to the reducing or regulating mechanism which throws undue pressure into said distributing-main, thus allowing the gas to escape for reducing the excess of pressure in said distributing-main without damage to or derangement in the working of apparatus at the point or points of distribution. These objects I attain by mechanism the nature, construction, and operation of which are shown and explained, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a side view of my improved liquid safety-valve. Fig. 2 is a vertical section at line W W, showing the apparatus provided with a movable shield or float and check-valve at the top exit-passage. Fig. 3 is a horizontal section at line x x. Fig. 4 is a horizontal section at line y y; and Fig. 5 is a vertical section of the upper chamber, showing a stationary shield without a valve.

My apparatus consists, essentially, of an upright tubular standard, A, having a lower chambered bulb, B, and an upper chambered

bulb, C, of spherical or other suitable form, 50 connected therewith, as indicated.

The apparatus is provided at its lower part with a flange or suitable connecting-boss, d, whereby it can be attached to a branch of the distributing-main D, and at its upper end with a hub or flange, d', to facilitate the connection therewith of an escape-pipe, when required, for conducting the escaping gas to any desired place of discharge. 55

The standard A and chambered enlargements B and C can be made of cast metal integral, as shown, or of separable parts properly joined together, if preferred. The tube A extends within the lower bulb, B, as indicated at a, and its end opens into the chamber near the bottom thereof. A channel or channels, I, divided from the chamber by suitable partitions, lead from the main inlet-passage E and open into the upper part of the chambers at b b, thereby forming a pocket for containing a liquid that seals or makes a dip-valve with the end a of the tube A. The top end of the tube A opens flush with the bottom of the chamber C, as indicated at e. The chamber C is of sufficient capacity to contain the contents of the liquid-receptacle, or of greater capacity. A glass tube or suitable indicating-gage, G, is attached to one side of the standard A, through which the level of the liquid can be seen, and a graduated index for showing the relative pressure is combined therewith. A shield or guard, F, is provided within the chamber C, arranged as an inverted cup above the opening of the tube A. Said shield can be stationary or movable, as illustrated. About the upper or exit passage, n, from the chamber C there is formed a valve-seat, c, upon which closes a puppet-valve, H, that is connected with the shield F, or fixed upon a spindle, J, which serves as a support and guide for both the puppet and shield and which is retained in proper central relation to the passage by suitable guiding-eyes at j j, so that it can move up and down freely within a given limit. The top of the shield at f is fitted to serve as a valve against the under part of the valve-seat when said shield is lifted to a sufficient height. 95

An adjustable sleeve, *m*, with check-nuts or other suitable adjusting-stops, is preferably combined with the valve I, spindle, or shield F for arresting the upward movement at any
 5 desired position before the top *f* of the shield strikes the seat *c'*, so that it can be adjusted to come more or less closely to the seat, as desired, without completely closing the exit-
 10 passage.

10 The lower chamber, B, is provided with a suitable filling-cock, K, and a drain-cock, K', for introducing and withdrawing liquid to and from the interior of said chamber. A quan-
 15 tity of liquid, L, sufficient to balance the normal working-pressure of the gas, is filled into the chamber B to form the seal or dip valve with the end of this tube A. For this pur-
 20 pose oil, glycerine, mercury, or other suitable liquid may be employed. So long as the normal pressure is maintained in the distribut-
 25 ing-main D the liquid stands in equilibrium therewith; but in the event of any accident that causes a sudden and excessive pressure of gas within the main then the oil or liquid
 30 is forced up the tube into the upper chamber, C, and the gas flows out through the exit-
 35 passage *n* until the pressure in the main is relieved. When excess of pressure ceases, the oil or liquid flows back into the lower cham-
 40 ber and again seals the passage. The shield F prevents the liquid L, when forced up into the chamber C, from being thrown out of the
 45 exit-passage *n*, and in case the valve H is employed said shield also serves as a float for raising the valve. In the latter case the valve
 50 mechanism acts as a check for graduating the escape of gas, while the puppet serves to close the exit and prevent backward action or suck-
 55 ing in the dip-seal under circumstances that might occur.

This safety apparatus, while primarily de-
 60 signed to meet the requirements of service in natural-gas distribution, can be successfully and beneficially employed as a safety-valve
 65 and gage for artificial gas, steam, or air under similar conditions of pressure and action, and may be constructed with the stationary shield
 70 or guard F, or with the movable shield and valve, as desired, the capacity of the appa-
 75 ratus and resisting power of the liquid-valve being proportioned or modified in degree to meet the requirements of service or for light
 80 or heavy pressures, according to the circumstances of particular situations where used.

55 The size of the tubular standard A and pas-
 60 sages through the apparatus can, if desired, be made substantially of the same sectional area as the distributing-main D, whereon the
 65 apparatus is used, thus providing an escape that will without difficulty instantly relieve the distributing-main and allow any excess in
 70 pressure or quantity of gas to pass off through the escapement apparatus.

I claim as my invention to be secured by
 75 Letters Patent—

1. A liquid safety-valve and escapement
 80 apparatus comprising the tubular standard

provided at its lower end with a chambered
 85 bulb having an inlet and gas passages and forming a liquid-containing pocket about the
 90 end of the tube, and having at its upper end a chambered bulb or enlargement joining
 95 flush with said tube and furnished with an exit-passage, and provided with attaching
 100 flanges or bosses at the inlet and exit for con-
 105 necting said apparatus with a main and a discharge pipe, substantially as and for the
 110 purpose set forth.

2. The combination, with the tubular stand-
 115 ard provided with the lower chambered bulb
 120 having inlet and gas passages arranged to form a pocket for liquid for sealing the end
 125 of the tube, and the upper chambered bulb having an exit-passage, of the shield disposed
 130 within said upper chamber above the tube, substantially as and for the purpose set forth.

3. The combination, substantially as de-
 135 scribed, of the tubular standard provided with upper and lower chambered bulbs, gas
 140 inlet and exit passages, and liquid seal for the lower end of said tube, a gage-glass for
 145 denoting the level of liquid within the tube, and the inverted-cup-shaped shield suspended
 150 within the upper chamber, for the purposes set forth.

4. The combination, substantially as de-
 155 scribed, of the tubular standard provided with the lower chambered bulb having inlet
 160 and gas passages adapted for containing a liquid to form a seal or liquid-valve at the
 165 lower extremity of the tube, the upper cham-
 170 bered bulb provided with the exit or escape-
 175 ment passage, and a movable shield suspended within said upper chamber over the tube and
 180 having at its top a disk or surface filled at its
 185 top to close or partially close said exit-pas-
 190 sage, substantially as and for the purpose set forth.

5. The combination, substantially as de-
 195 scribed, of the tubular standard provided with a lower chambered bulb or enlargement
 200 having inlet and gas passages and fitted for containing liquid to seal the lower end of the
 205 tube, the upper chambered bulb having an exit-
 210 passage with a valve-seat about said passage, a movable shield suspended within said upper
 215 chamber over the end of the tube and hav-
 220 ing its top fitted for closing outward to said
 225 valve-seat, and an adjusting-stop, *m*, for ar-
 230 resting the upward movement of said shield at a given position in relation to said valve-
 235 seat, for the purpose set forth.

6. The combination, substantially as de-
 240 scribed, of the tubular standard provided with a lower chambered bulb or enlargement
 245 having inlet and gas passages and fitted for containing liquid to seal the lower end of the
 250 tube, the upper chambered bulb having an exit-passage with a valve-seat about said pas-
 255 sage, a puppet-valve closing inward against
 260 said seat, a movable shield connected with
 265 said valve and suspended within said upper
 270 chamber over the end of the tube and fitted
 275 for closing outward to said valve-seat, and

an adjusting-stop for arresting the upward movement of said puppet-valve and shield at a given position in relation to the seat, for the purpose set forth.

5 7. The combination, with a gas-distributing pipe or main, of the tubular standard provided with the lower chambered bulb having inlet-passages disposed for maintaining a liquid seal at the lower end of the tube, a
10 chamber at the upper end of said tube, into and from which said sealing-liquid can flow, an escapement or exit opening at the top of said

upper chamber, a shield disposed within, between the tube and escapement-opening, and an indicator or gage-gears fixed on the side 15 of said tubular standard, all arranged for operation, substantially as and for the purpose set forth.

Witness my hand this 26th day of December, A. D. 1888.

JAMES C. CONROY.

Witnesses:

A. G. HERMAN,
H. E. TROUTMAN.