

United States Patent

[11] 3,563,267

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| [22] | Filed | Sept. 30, 1968 |
| [45] | Patented | Feb. 16, 1971 |
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FOREIGN PATENTS

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- [54] GAS DISPENSING DOUBLE CHECK VALVE
CONSTRUCTION
7 Claims, 3 Drawing Figs.**

- [52] **U.S. Cl.**..... 137/329.1,
137/360, 137/614.5, 137/614.19, 137/614.21,
251/149.6
- [51] **Int. Cl.**..... **F16k 15/18**,
F16k 43/00
- [50] **Field of Search**..... 137/329.1,
329.2, 329.3, 329.4, 358, 360, 361, 614.5, 614.19,
614.21; 52/284; 287/189.36 (D); 285/64;
251/149.6

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| [56] | | References Cited |
| | | UNITED STATES PATENTS |
| 2,908,511 | 10/1959 | Rogers |
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ABSTRACT: A valve construction comprising an outlet and an adapter, the outlet comprising a primary and secondary housing adapted to be fitted together under a gas keying arrangement, the primary housing including a primary check valve and the secondary housing including a secondary check valve, the secondary check valve being constantly maintained in open position when said primary housing is gas key fitted into the secondary housing, the dimensions of the respective housings being such that plaster finishes of varying thickness are permitted, the primary housing having an adapter keying arrangement so that only a specific adapter can be fitted thereto, the specific adapter moving the primary check valve to open position to permit gas flow passed the secondary check and primary check through the adapter to the area of its final use, the primary housing and primary check valve therein having at least a pair of seals acting to prevent blowby through the primary housing.

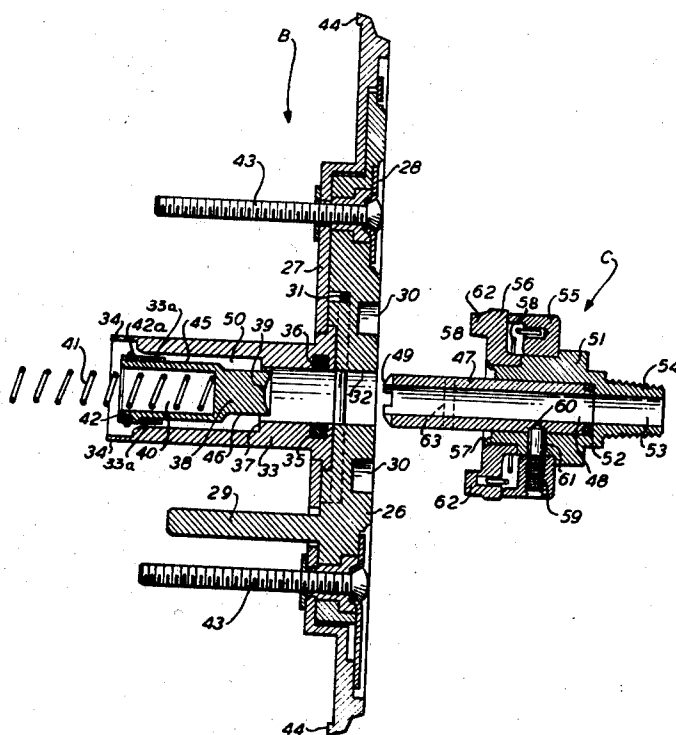
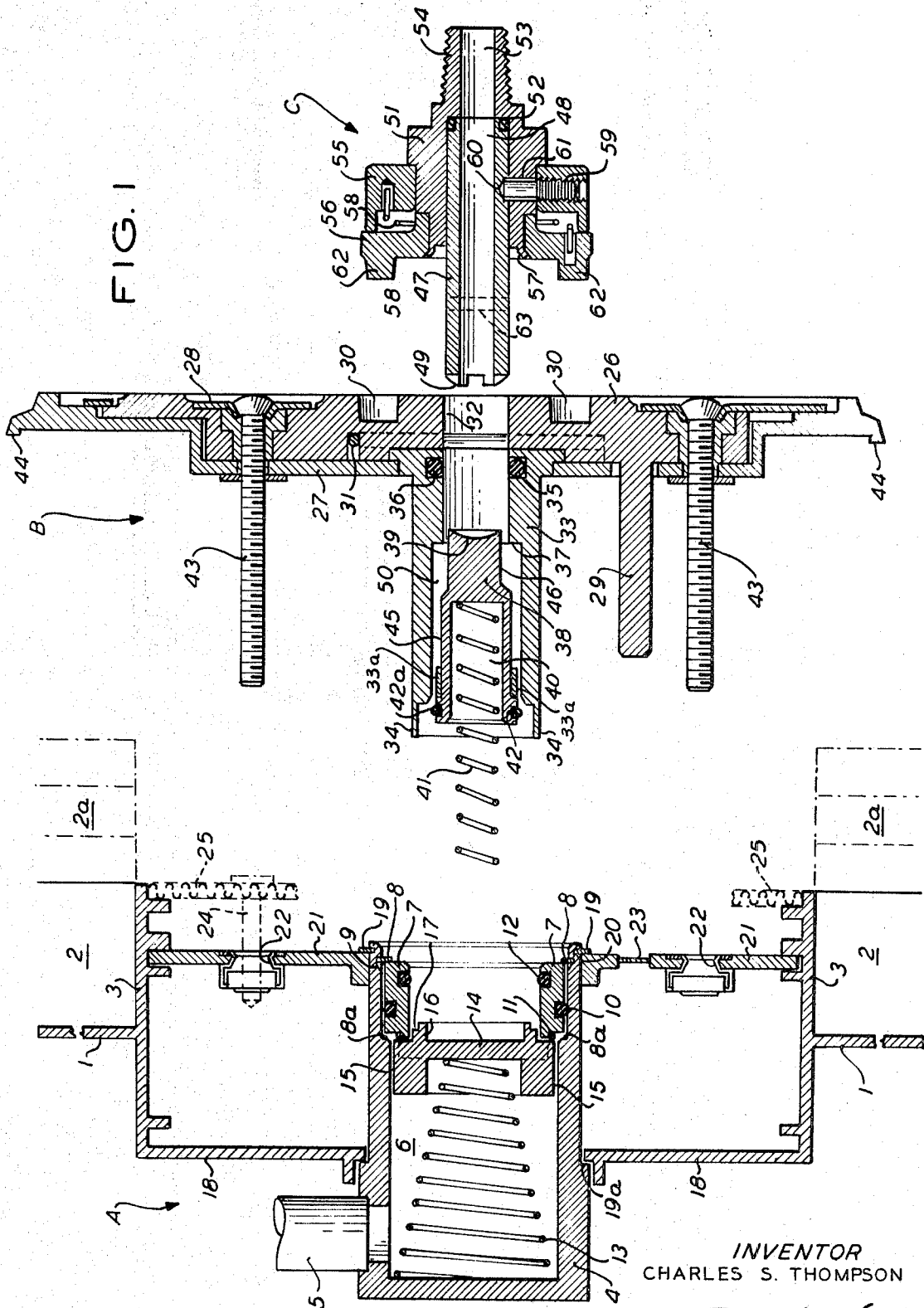


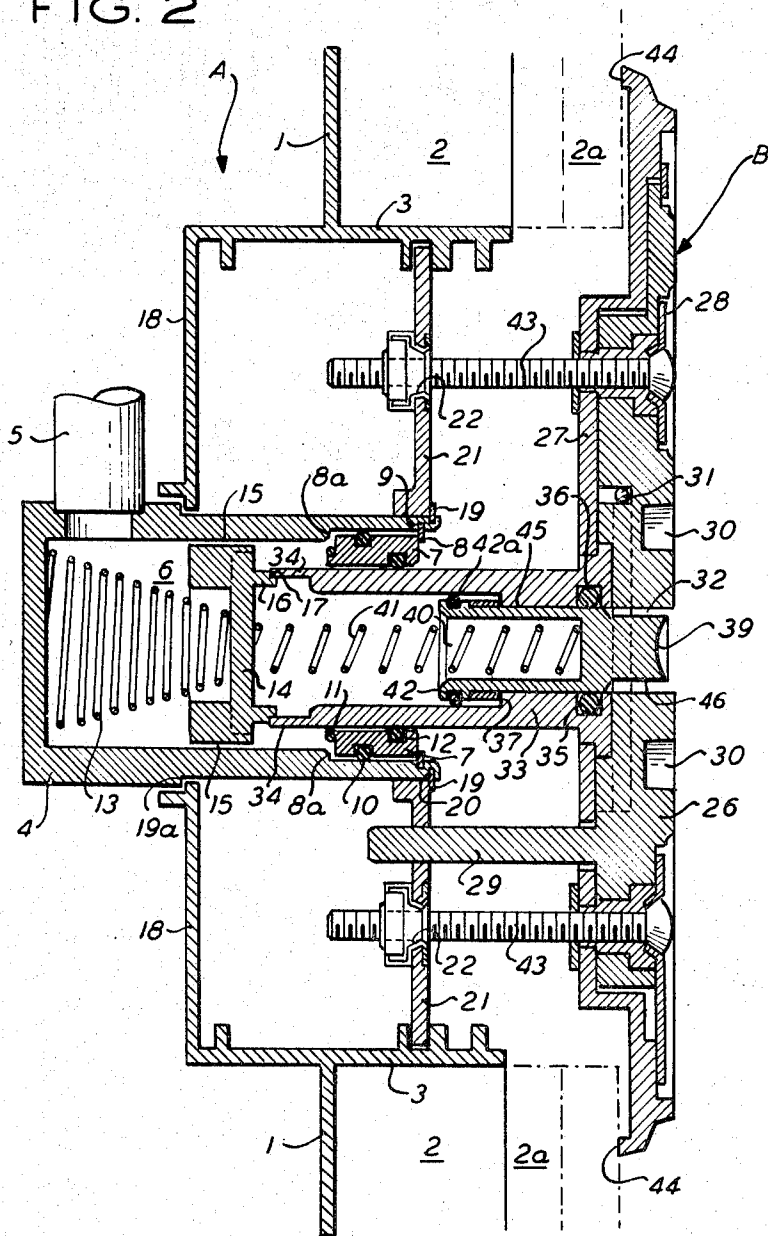
FIG. 1



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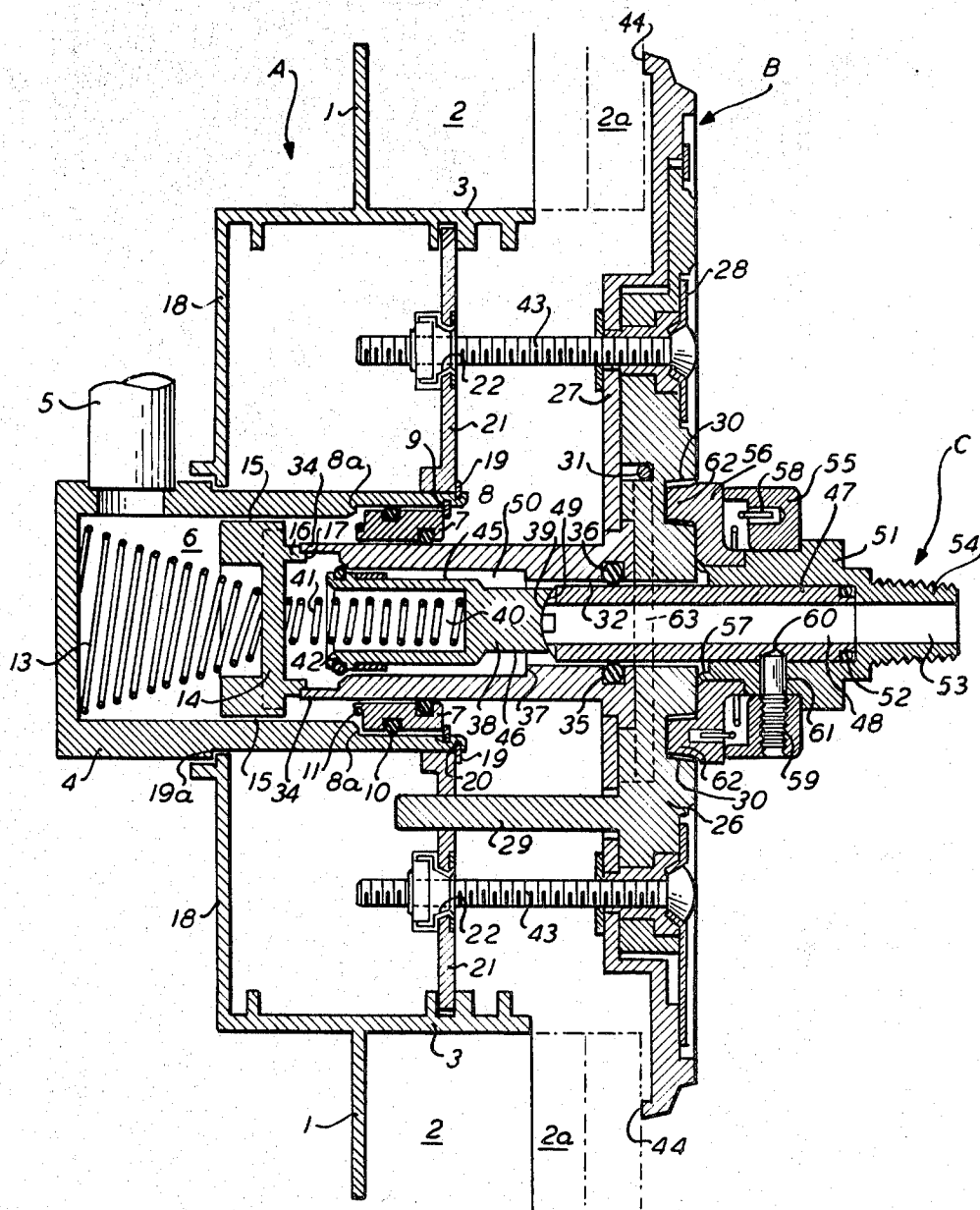
FIG. 2



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FIG. 3



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GAS DISPENSING DOUBLE CHECK VALVE CONSTRUCTION

BACKGROUND OF THE INVENTION

High pressure gas pipe line systems are in use which require an outlet and adapter construction to permit transfer from a bulk storage source to the area of final use. Since many of the piped gases are flammable or have explosive properties, it is imperative to make sure that the outlet permits no gas leakage but permits the replacement of work or damaged parts without opening the pipeline to atmosphere.

For example, many hospitals now provide gases such as anesthetics, oxygen, etc., which are conveyed under pressure through pipelines from bulk storage source located outside the immediate hospital area to the individual rooms where final use is to take place. Since the pipeline is provided at the room wall with an outlet and an adapter is connected to a conduit leading the gas from the outlet to its final area of use, the outlet and the adapter construction can be considered somewhat analogous to the electrical outlet and plug. However, because of the nature of the piped gases, the valve construction employed must preclude leakage from the pipeline to the atmosphere during repair work thereto and must include special keying means between the adapter and the outlet to prevent the erroneous connection of a conduit requiring one type of gas to an outlet supplying another.

Furthermore, since the pipelines and outlets are generally built in during the construction of the facility with which they are utilized, dimensional problems at the outlet involving plaster finishes arise. Also "blowby" of the gas can occur if a proper sealing arrangement is not utilized.

Examples of the prior art relating to applicant's disclosure are U.S. Pat. No. 2,320,719 and No. 2,905,487. The former patent discloses merely an adapter and outlet with no keying arrangement or means to preclude gas leakage from the pipeline to atmosphere when and if repair is necessary for the outlet. The latter patent discloses a keying arrangement and the provision of a secondary check valve construction to preclude gas leakage on removal of the primary check valve for replacement or repair. However, no provision is made to efficiently combat "blowby" and permit various thicknesses of plaster finish without redimensioning outlet parts. Furthermore, the continuous movement of the secondary check valve on activation on the primary check valve creates the likelihood of secondary check valve wear which, when the secondary check valve is all-important on removal of the primary check valve unit, might not efficiently preclude gas leakage to atmosphere with its inherent dangers.

SUMMARY OF THE INVENTION

This invention relates to the application of a double check valve construction to a high pressure gas pipeline at a wall outlet. The construction of this invention permits wall finish adjustment without change in the construction dimensions, provides an open, substantially wear-free secondary check valve in operation which is adapted to preclude the leakage of gas in the pipeline to atmosphere on removal of the primary check valve, provides a primary check valve arrangement which prevents "blowby", and has an adapter which permits ease of insertion and withdrawal into and from an outlet with a minimum of parts and resultant effort.

It is therefore an object of the present invention to provide a primary and secondary check valve arrangement wherein the secondary check valve is always open when the primary check valve is operable and closed when the primary check valve is removed from the outlet. This construction prevents wear on the secondary check valve as occurs in the prior art where the secondary check valve is opened each time the primary check valve is opened. Thus, whenever the primary check valve is removed in applicant's invention, the secondary check can be counted on to preclude the flow of gas from the pipeline to atmosphere.

It is another object of the present invention to provide an outlet construction which permits various thicknesses of plaster finish without requiring a change in the dimensions of the construction.

It is also an object of the present invention to prevent "blowby" in the primary check valve construction by providing therein a novel sealing arrangement.

It is a further object of the present invention to provide an adapter which permits ease of insertion and withdrawal into and from an outlet and which is made up of a minimum number of parts to obtain this desired result.

These and other objects are accomplished by the provision of an outlet having primary and secondary housings with each housing having a respective check valve and with the check valve of the secondary housing being constantly open when the primary and secondary housings are interrelated. The interrelationship between the primary and secondary housings permit the accommodation of various plaster finishes without interfering with the operation of the check valves. Furthermore, by providing a combination sealing arrangement in the primary housing with one seal stationary and with the other moving with the primary check valve, applicant prevents "blowby".

These and other objects, features, and advantages will become apparent when the following description is viewed in the light of the accompanying drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional view of the primary and secondary housings and the adapter prior to their interrelationship;

FIG. 2 is a cross-sectional view of the primary and secondary housings interrelated to form the outlet; and

FIG. 3 is a cross-sectional view of the primary and secondary housings interrelated to form the outlet with finished walls having a 1/2 inch over plaster and the adapter plugged in the outlet to present the primary check valve in open position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now more particularly to the drawing with reference numerals, FIG. 1 shows a secondary housing A, a primary housing B, and an adapter C. Housing A includes a mounting flange 1 against which the finished wall is fit with the end of the wall 2 abutting against member 3. The finished wall can take, as shown in dotted lines, various plaster thickness finishes 2a up to 3/4 inch over plaster. The secondary housing comprises a body member 4 of cylindrical configuration having a gas inlet tube 5 communicating with the interior 6 thereof, the inlet tube being a part of a pipeline system from a bulk storage gas source. The body 4 has a valve seat 7 of ring shape which fits within the interior 6 of the body and is held therein on one side by stop means 8 received within an annular groove 9 in the body 4, and by annular shoulder 8a on the other side. The valve seat is sealed with respect to the body by O-ring gasket 10 and further has O-ring gaskets 11 and 12 to be more fully described hereinbelow.

A spring 13 is positioned within the body interior 6 and biases secondary check valve 14 to closed position. The secondary check valve has a platelike configuration which is spaced around its peripheral edge from the body interior as shown at 15. Thus, gas received in the interior 6 from inlet tube 5 can pass around the secondary check valve 14 by way of the spacing 15. The gasket 11 received within an annular groove in the valve seat 7 precludes the escape of gas from the interior 6 when the valve 14 seats thereon. The secondary check valve has an annular projection 16 with a recess 17 therein to be more fully disclosed hereafter.

The secondary housing also has a mounting box 18 which circumscribes the periphery of the body 4 and is positioned thereon on one side by stop means 19 received within annular groove 20 on the body and on the other side by annular shoulder 19a. The mounting box includes a primary housing retaining wall 21 which has a pair of nuts 22 and a knockout

gas keying hole 23. The nuts are adapted to receive screws 24 shown in dotted lines which retain plaster shield 25 also shown in dotted lines so that the plaster finish may be applied to the wall without regarding to the secondary housing and can be removed from over the secondary housing to expose same to fitting with the primary housing B by removal of the plaster shield when desired. Thus, the finished wall with desired over plaster can be applied without time loss due to concern with housing A and without damage thereto.

The primary housing B comprises keying disc 26, cover plate 27 and a finish plate 28. The keying disc has integral therewith a gas keying pin 29 and a pair of adapter keying holes 30. The keying disc also has a locking spring 31 fitted in a groove therein, which spring transversely intersects a through-hole 32 in the disc. The cover plate and the keying disc combine to form a retainer for valve body 33 as well as spring 31. The valve body 33 is of cylindrical configuration and includes end projection 34 which is adapted to seat in recess 17 of the secondary check valve 14 to move valve 14 to open position. The body 33 also has an internal groove 35 within which is positioned an O-ring gasket 36, the function of which will be described hereinafter. The body 33 has an internal shoulder 37 against which the primary check valve 38 seats. The valve 38 has a concave nose portion 39 and a spring retaining bore 40 receiving spring 41 therein. The primary check valve also has an annular groove 42 receiving O-ring gasket 42a, while the primary housing has retaining screws 43 extending through aligned apertures in the finish plate, keying disc, and cover plate, which screws are adapted to be received in the nuts 22 of the secondary housing to secure the interrelationship of the primary and secondary housings. The body 33 also has circumferentially spaced lugs 33a which permit gas flow thereby but space the O-ring 42a from shoulder 37.

After the plaster shield has been removed exposing the secondary housing, the primary housing B can be interrelated to the secondary housing to form the wall outlet. This interrelation is established by the insertion of screws 43 into nuts 22 until the surface 44 of the cover plate contacts the plaster finish. It should be noted that as the screws 43 are received in the nuts 22, the projection 34 of the valve body 33 is received in the recess 17 of the secondary check valve to move the valve 14 away from the seat 7 and its gasket 11 until the surface 44 contacts the plaster finish. When the secondary check valve becomes unseated, a seal is already established between the body 33 and valve seat 7 at gasket 12 to prevent leakage since the primary check valve is sealed at 36 and 42a in closed position. Of course the dimensions could be changed if necessary to permit plaster finishes out of the ordinary.

It should be noted, as shown in FIG. 2, that in order for the projections 34 on the primary housing body to contact the secondary check valve and move it to open position, the gas-keying pin 29 must be received through the knockout gas-keying hole 23. This is necessary in order to prevent a mixup in the intended gas to be supplied. For example, the keying disc 26 has keying holes 30 which can receive only the specific adapter having keys of the type shown at 62 and which prevent the possibility of the wrong gas supplied to the final destination. However, in order to make certain that the right primary housing is interrelated with the wall-embedded secondary housing, the keying pin 29 and knockout hole 23 arrangement is provided so that there can be no erroneous connection of the adapter through the primary housing to the secondary housing to obtain the wrong gas.

FIG. 2 also shows the wall outlet comprising the primary and secondary housings with a 1/2 inch over plaster and the secondary check valve 14 removed from the valve seat a distance proportionate to the plastic thickness. The primary check valve seals the outlet at gaskets 36 and 42a from leaking gas that passes the secondary check valve along space 15. It should be noted that the surface 45 does not distend the lock spring 31 in normal valve closed position since the reduced surface 46 extends in the area where the lock spring 31 intersects the opening 32.

FIG. 3 shows the spring 41, as also seen in FIG. 2, abutting against the secondary check valve and biasing the primary check valve to its normal closed position. The adapter C is shown interrelated with the outlet such that the primary check valve is moved to open position. The adapter comprises a nose 47 having a through bore 48 and a convex front portion 49 which complements the nose portion 49 of the valve 38. The nose has grooves therein adjacent portion 49 which permit communication between the interior 50 of the body 33 and the bore 48. The nose is removably received within the adapter body 51, is sealed with respect thereto by an O-ring gasket 52, and is rotatable with respect thereto. The adapter body has a through-bore 53 which is axially aligned with the bore 48 of the nose and is threaded at 54 and connectable to a conduit leading to the area of intended use of the gas. The adapter body has circumscribing it a ring 55 which is rotatable with respect thereto and a keying member 56 which is fastened thereto by lug 57. The ring 55 is shown being connected to the keying member 56 by a spring 58 so that the ring can be rotated with respect to the body 51 and returned to its original position by the torsional spring action effected by the anchorage of the spring to the keying member, which is fixed to the body. The ring is fixed with respect to the nose 47 by a setscrew 59 which is threadably received in the ring and securely received in recess 60 in the nose. The body 51 has a slot 61 in which the screw 59 can move when the ring is rotated with respect to the body. Rotation of the ring rotates the nose which is fixed with respect thereto and thereby cams the spring 31 out of the pair of opposed, transverse nose slots 63 so that the adapter can be removed from the outlet.

It should be noted here, again, that each gas has a particularly keying arrangement for the interrelating of the primary and secondary housings and the adapter with the resultant outlet to prevent interchangeability. In operation, the nose 47 contacts and moves the primary check valve 38 toward the secondary check valve and in so doing seals itself against the body 33 at gasket 36 to prevent gas flow except through bore 48. However, the gasket 42a remains in contact with the body internal surface preventing gas flow to the nose as long as the keys 62 are not received in the holes 30. If the adapter C is the proper adapter for use with this particular outlet, i.e. the keys 62 and holes 30 interfit, the gasket 42a will be moved passed the final contact point with the body 33 and gas will flow into the interior 50 of the body through nose and adapter body bores 48 and 53, respectively, to the conduit leading to the point of final use. By sealing the valve 38 to the body 33 at 42a as well as at 36, the possibility of blowby can be substantially eliminated.

The spring 31 is distended by nose portion 49 and pops into the pair of opposed, transverse slots 63 as they move into a common plane. Again, the adapter is released from the outlet by rotating the ring 55 which rotates the nose therewith to cam the spring out of the slots 63 to a distended position so that the adapter can be pulled out.

Since numerous changes may be made in the above description without departing from the spirit of the present invention, the above description should be viewed as illustrative and not in a limiting sense.

I claim:

1. A double valve construction comprising a primary and a secondary housing interrelated with each other, each housing having a check valve and a valve seat, said secondary housing adapted to be connected to gas source means, said primary housing adapted to receive valve operating means to move the primary housing check valve between an open and closed position, said secondary housing check valve being held constantly in valve open position by the interrelation between said primary and secondary housings, and said secondary housing check valve being biased to valve closed position when said primary housing is removed from interrelation with the secondary housing.

2. The construction as set forth in claim 1 wherein each primary and secondary housing has a keying arrangement so that

only a specifically designated primary housing may be interrelated with any secondary housing.

3. The construction set forth in claim 1 wherein said primary housing has projection means extending toward said secondary housing and said secondary housing check valve has recess means receiving said projection means on interrelation of said primary housing and said secondary housing to move and maintain the secondary housing check valve constantly in open position.

4. The construction set forth in claim 3 wherein said secondary housing is embedded in a wall adapted to have a plaster finish, the movement of the secondary housing check valve to valve open position on reception of the projection means in said recess means is variable, and said primary housing can be interrelated with said secondary housing to accommodate various plaster finish thickness and still maintain the secondary housing check valve in valve open position in accordance with the variable movement thereof.

5. A valve construction for governing fluid flow comprising a housing having an opening therethrough with a reciprocative valve movement element therein adapted to move between valve open and closed positions, stop means in said opening against which said element abuts in valve closed position; said element being biased to closed position and having first sealing means moveable therewith relative to the housing in sealing contact between the exterior of said element and the periphery of said opening, said housing having second sealing

means on the periphery of said opening fixed with respect thereto in sealing contact between the periphery of the opening and the exterior of said element, and valve opening means insertable in said opening and adapted to move said valve element to valve open position, first breaking the sealing contact of said second sealing means and subsequently breaking the sealing contact of said first sealing means to permit fluid flow through the construction.

6. The construction set forth in claim 5 wherein the housing and the valve opening means have a keying arrangement, the sealing contact of the second sealing means with respect to the valve element is breakable under any insertion of the opening means in the opening, said the sealing contact of the first sealing means is breakable only if the keying arrangement is effected.

7. A double check valve construction comprising a primary and a secondary housing interrelated with each other, each housing having a check valve and a valve seat, said secondary housing adapted to be connected to gas source means, operating means adapted to move the primary housing check valve between open and closed positions, said secondary housing check valve being held constantly in valve open position by the interrelation between said primary and secondary housings, and said secondary housing check valve being biased to valve closed position when said primary housing is removed from interrelation with the secondary housing.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,563,267 Dated February 16, 1971

Inventor(s) Charles S. Thompson

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 1, line 46, "on" should read -- of --.

Col. 2, line 18, "permit" should read -- permits.

Col. 3, line 4, "regarding" should read -- regard;
line 59, -- being -- should be inserted before
"supplied";
line 69, "plastic" should read -- plaster --.

Col. 4, line 33, "larly" should read -- lar --;
line 45, -- the -- should be inserted before "nose"

Col. 5, line 16, "thickness" should read -- thicknesses --;
line 21, "movement" should be deleted.

Col. 6, line 13, "said" should read -- and --.

Signed and sealed this 31st day of August 1971.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents