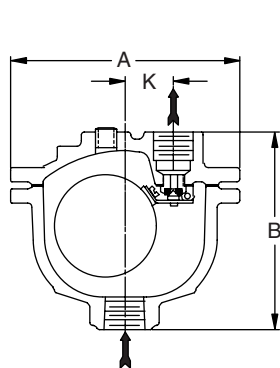
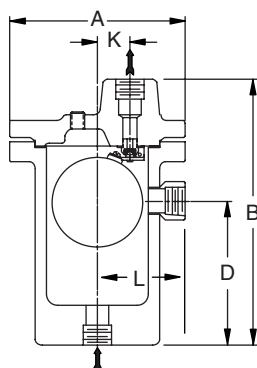


Fixed Pivot Ball Float Air/Gas Vents

For Pressures to 600 psig (41 bar) or Specific Gravity Down to 0.83



Model 21-AR



Model 21-312 AR/VAR



Physical Data				
Model No.	Cast Iron		Forged Steel	
	21-AR		21-312 AR/VAR	
Pipe Connections	in	mm	in	mm
"A"	1/2, 3/4	15, 20	1/2, 3/4	15, 20
"B"	5-1/4	133	10-1/4	260
"D"	-	-	5-9/16	141
"K"	1-5/16	33	1-1/4	32
"L"	-	-	3-5/16	84
Approximate Weight, lb (kg)	8 (4)		30 (14)	
Maximum Allowable Pressure (Vessel Design)	250 psi @ 450°F** (17 bar @ 232°C**)		600 psig @ 100°F (41 bar @ 38°C) 500 psig @ 750°F** (34 bar @ 399°C**)	

**Viton valve seat insert limited to 400°F (204°C).

21-AR—A small, high-quality economical air vent. It employs a single lever with a fixed pivot and viton seat, ensuring a tight shut-off.

For a fully detailed certified drawing, refer to CD #1037.

21-312 AR/VAR —Forged steel version of the Model 21 with a larger float and higher leverage. Available with screwed, socketweld or flanged connections.

For a fully detailed certified drawing, refer to CD #1106.

21-AR Maximum Operating Pressures				
Minimum Specific Gravity	0.49		0.84	
Float Weight, oz (g)	2.25 (64)		4.12 (118)	
Orifice (in)	Maximum Operating Pressure			
	psi	bar	psi	bar
7/32	17	1.2	-	-
3/16	23	1.6	-	-
5/32	33	2.3	-	-
9/64	41	2.8	-	-
1/8	52	3.6	-	-
3/32	92	6.4	-	-
5/64	133	9.2	-	-
1/16	208	14	-	-
1/16	-	-	250	17

21-312 AR/VAR Maximum Operating Pressures			
Model	Minimum Specific Gravity	0.83	
	Float Weight, oz (g)	5 (143)	
	Orifice (in)	Maximum Operating Pressure	
		psi	bar
21-312AR	1/4	22	1.5
	7/32	28	1.9
	3/16	38	2.7
	5/32	55	3.8
	9/64	68	4.7
21-312VAR	1/8	173	12
	3/32	308	21
	5/64	443	31
	1/16	600	41

List of Materials							
Model No.	Valve	Seat	Leverage System	Float	Body & Cap	Gasket	Bolting
21-AR	Stainless Steel	Stainless Steel with *Viton Insert	Stainless Steel	Stainless Steel	ASTM A48 Class 30 Cast Iron	Non-Asbestos	Bolts SAE Gr. 2 Nuts ASTM A563 Gr. A
21-312 AR 21-312 VAR					ASTM A105 Forged Steel		Bolts and Nuts ASTM B633 Type 1

NOTE: Above vents available in T-316 SS bodies and caps and all SS internals. Aluminum body and cap available for Model 21-AR only.

*Other seat insert materials available. Consult factory.

Designs, materials, weights and performance ratings are approximate and subject to change without notice. Visit armstronginternational.com for up-to-date information.

I. Internals Maintenance:

- Remove the complete vent from the line;
- Unscrew bolts (9) and nuts (8) and remove the cap (1) with the operating mechanism fixed on it;
- Unscrew the seat (3) and replace the complete Mechanism Less Float (3, 4, 5);
- Screw back the seat (3) and make sure that the lever (5) is aligned in the axis of the cap (1). A clearance of 0,1 mm should be left in order to allow the lever (5) to move horizontally;
- Replace the float (6) if necessary;
- Replace gasket (7);
- Put the cap (1) back on the body (2) and screw bolts (9) and nuts (8).

GB

I. Wartung und Reparatur:

- Komplette Armatur aus der Rohrleitung ausbauen;
- Schrauben (9) und Muttern (8) lösen, Deckel (1) und Mechanismus abnehmen;
- Sitz (3) abschrauben und gesamten Mechanismus ohne Schwimmer austauschen (3, 4, 5);
- Sitz (3) wieder montieren, wobei der Hebel (5) auf die Achse des Deckels (1) ausgerichtet sein muß. Für die horizontale Bewegung des Hebels (5) einen Abstand von 0,1 mm lassen;
- Schwimmer (6) bei Bedarf erneuern;
- Gehäusedichtung (7) erneuern;
- Deckel (1) auf das Gehäuse (2) setzen, Schrauben (9) und Muttern (8) wieder anziehen.

D

I. Entretien des pièces internes :

- Enlever le purgeur de la conduite;
- Dévisser les boulons (9) et les écrous (8) et enlever le couvercle (1) avec le mécanisme qui y est attaché;
- Dévisser le siège (3) et remplacer l'équipement mobile complet (3, 4, 5);
- Revisser le siège (3) et s'assurer que le levier (5) soit aligné dans l'axe du couvercle (1). Un espace de 0,1 mm doit être laissé pour que le levier (5) puisse se mouvoir horizontalement;
- Remplacer le flotteur (6) si nécessaire;
- Remplacer le joint de corps (7);
- Remplacer le couvercle (1) sur le corps (2) et revisser les boulons (9) et les écrous (8).

F

I. Mantenimiento de las piezas internas:

- Retire el purgador completo de la línea;
- Afloje los pernos (9) y las tuercas (8) y retire la tapa (1) con el mecanismo de funcionamiento sujeto a ella;
- Desajuste el asiento (3) y cambie el mecanismo sin boya completo (3, 4, 5);
- Vuelva a ajustar el asiento (3) y asegúrese de que la palanca (5) está alineada en el eje de la tapa (1). Debe quedar un espacio libre de 0,1 mm para que la palanca (5) se pueda mover horizontalmente.
- Cambie la boya (6) si es necesario;
- Cambie la junta (7);
- Vuelva a colocar la tapa (1) en el cuerpo (2) y ajuste los pernos (9) y las tuercas (8).

E

I. Binnenwerk vervangen:

- Verwijder de gehele ontluchter uit de leiding;
- Verwijder bouten (9) en moeren (8) en verwijder de kap (1) inclusief het mechanisme;
- Draai zitting (3) los en vervang het complete mechanisme zonder vlotter (3, 4, 5);
- Monteer de zitting (3) terug en overtuig Uzelf ervan dat de hefboom (5) is uitgelijnd in de as van het deksel (1). 0,1 mm vrije ruimte moet aanwezig om de hefboom (5) horizontaal te laten bewegen;
- Vervang de vlotter (6) indien nodig;
- Vervang pakking (7);
- Plaats het deksel (1) terug op het huis (2) en draai bouten (9) en moeren (8) weer vast.

NL

I. Manutenzione degli organi interni:

- Smontare dalla linea l'intero eliminatore d'aria;
- Svitare i bulloni (9), i dadi (8) e sollevare la testa (1) con il meccanismo ad essa solidale;
- Svitare la sede (3) e sostituire l'intero meccanismo (3, 4, 5) senza il galleggiante;
- Riavvitare la sede (3) ed assicurarsi che la leva (5) sia allineata sull'asse della testa (1). Per permettere alla leva (5) di muoversi orizzontalmente bisogna lasciare una luce di 0,1 mm;
- Sostituire il galleggiante (6), se necessario;
- Sostituire la guarnizione (7);
- Rimontare la testa (1) sul corpo (2) ed avvitare bulloni (9) e dadi (8).

I



Model 21-AR

Fixed Pivot Air/Gas Vents Luft/Gas-Entlüfter mit Fixem Hebelmechanismus Purgeurs d'Air/de Gaz à Axe Fixe Purgadores de Aire y Gas de Pivote Fijo Ontluchters - met Vast Draaipunt Eliminatori d'Aria e Gas da Liquidi in Pressione

*These instructions should be used by experienced personnel !
Diese Gebrauchsanweisung ist durch Fachpersonal zu benutzen !
Ces instructions devraient être utilisées par du personnel expérimenté !
¡Estas instrucciones deben ser utilizadas por personal experimentado !
Onderhoud uitsluitend uit te voeren door ervaren personeel !
Queste istruzioni devono essere utilizzate da personale esperto !*

PRODUCT DESCRIPTION - PRODUKTBESCHREIBUNG - DESCRIPTION DU PRODUIT DESCRIPCION DEL PRODUCTO - PRODUKT OMSCHRIJVING - DESCRIZIONE DEL PRODOTTO

- GB** Armstrong Cast Iron Fixed Pivot Air/Gas Vent
Vertical Connection
- D** Armstrong Luft/Gas-Entlüfter aus Grauguß mit Fixem
Hebelmechanismus
Vertikaler Anschluß
- F** Purgeur d'Air/de Gaz en Fonte, à Axe Fixe
Raccordement Vertical
- E** Purgador de Aire y Gas de Pivote Fijo Armstrong en
Fundición
Conexión Vertical
- NL** Armstrong Gietijzeren Ontluchter met Vast Draaipunt
Verticale Aansluiting
- I** Eliminatore d'Aria e Gas da Liquidi in Pressione - In Ghisa
Connessioni Verticali



For detailed material specifications, options, approximate dimensions and weights, see Armstrong literature or consult your local Representative.

Für detaillierte Werkstoffangaben, Zubehör, Abmessungen und Gewichte, sehen Sie die Armstrong Datenblätter oder fragen Sie Ihre Armstrong-Vertretung.
Pour toute spécification détaillée des matières, options, dimensions et poids, veuillez vous référer à la littérature Armstrong ou prendre contact avec votre Représentant local.

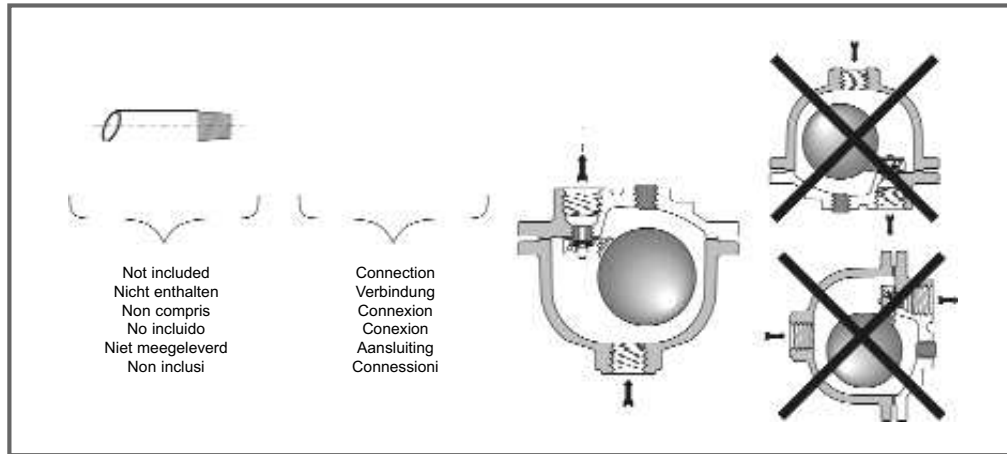
Para especificaciones de materiales detalladas, opciones, dimensiones aproximadas y pesos, ver catálogos Armstrong o consultar con su Representante local.

Voor gedetailleerde materiaal specificaties, afmetingen en gewichten, zie de Armstrong documentatie of neem contact op met uw plaatselijke Vertegenwoordiger.

Per la specifica dettagliata dei materiali, accessori opzionali, dimensioni e pesi approssimativi, vedere la documentazione appropriata o contattare il Distributore locale.

INSTALLATION - INSTALLATIONSANWEISUNG - INSTALLATION INSTALACION - INSTALLATIE - INSTALLAZIONE

Possible connections: screwed - Mögliche Anschlußarten: Muffengewinde
Raccordement possible: taraudé - Conexiones posibles: roscada
Mogelijke aansluitingen: draad - Connessioni disponibili: filettate



START-UP PROCEDURE (Bottom Inlet - Top Outlet) - INBETRIEBNAHME (Einlaß unten - Auslaß oben) PROCEDURE DE DEMARRAGE (Entrée par le bas - Sortie vers le haut) - PROCEDIMIENTO DE PUESTA EN MARCHA (Entrada inferior - Salida superior) - OPSTARTPROCEDURE (Bodem inlaat - Top uitlaat) PROCEDURA D'AVVIAMENTO (Entrata sul fondo - Uscita dall'alto)

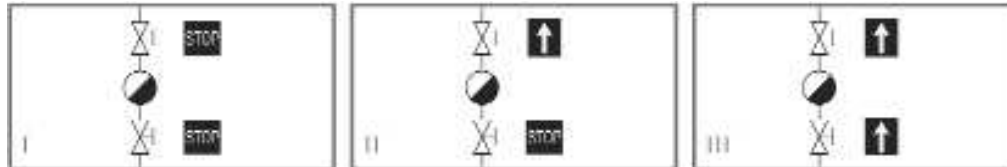
For detailed hookups and adapted start-up and shut-down procedures, see Armstrong literature or consult your local Representative.
Für detaillierte Informationen über Installation, Inbetriebnahme und Außerbetriebnahme sehen Sie die Armstrong Datenblätter oder fragen Sie Ihre Armstrong-Vertretung.

Pour plus de détails à propos des procédures de démarrage et d'arrêt, ainsi que pour l'installation, veuillez vous référer à la littérature Armstrong ou prendre contact avec votre Représentant local.

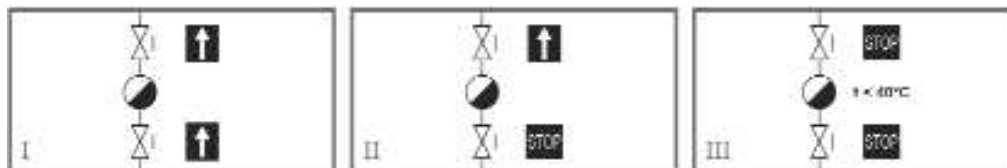
Para posibilidades de conexionado y procedimientos de parada y puesta en marcha, ver catálogos Armstrong o consultar con su Representante local.

Voor gedetailleerde montage en installatie instructies zie het betreffende Armstrong documentatieblad of neem contact op met uw plaatselijke Vertegenwoordiger.

Per procedure dettagliate di collegamento, d'avviamento e di fermata, vedere la documentazione Armstrong o consultare il Distributore locale.



SHUT-DOWN PROCEDURE (Bottom Inlet - Top Outlet) - AUßERBETRIEBNAHME (Einlaß unten - Auslaß oben) PROCEDURE D'ARRET (Entrée par le bas - Sortie vers le haut) - PROCEDIMIENTO DE PARADA (Entrada inferior - Salida superior) - UIT BEDRIJFNAME (Bodem inlaat - Top uitlaat) PROCEDURA DI FERMATA (Entrata sul fondo - Uscita dall'alto)



MAINTENANCE - WARTUNGSMITTELS - MAINTENANCE MANTENIMIENTO - ONDERHOUD - MANUTENZIONE

For troubleshooting, testing methods, frequency of maintenance and detailed spare parts list, see Armstrong literature or consult your local Representative.

Für detaillierte Informationen über Fehlersuche, Testmethoden, Wartungsintervallen und Ersatzteillisten fragen Sie Ihre Armstrong-Vertretung.

Pour le dépannage, les méthodes de test, la fréquence d'entretien et la liste détaillée des pièces de rechange, veuillez vous référer à la littérature Armstrong ou prendre contact avec votre Représentant local.

Para detección de posibles averías, métodos de test, frecuencia de mantenimiento y lista detallada de repuestos, ver catálogos Armstrong o consultar con su Representante local.

Voor het oplossen van problemen, test methodes, onderhoud en gedetailleerde onderdelenlijsten, zie de Armstrong documentatie of neem contact op met uw plaatselijke Vertegenwoordiger.

Per la soluzione di eventuali problemi, metodi di prova funzionalità, frequenza di manutenzione e dettaglio della lista ricambi, vedere la documentazione Armstrong o consultare il Distributore locale.



*Equipment under pressure - Operating temperature might be > 90°C
Make sure vent is cold before handling !*



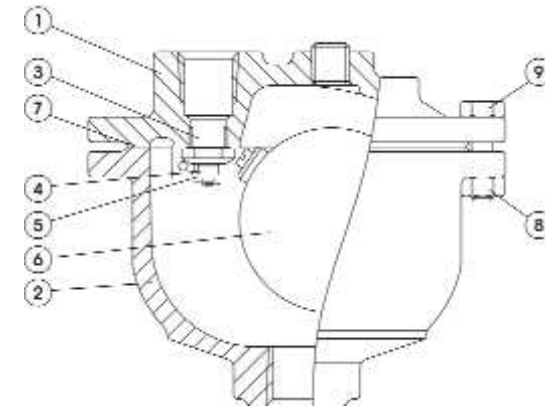
*Armatur steht unter Druck - Arbeitstemperatur kann > 90°C sein
Stellen sie sicher, dass die Armatur kalt und drucklos ist, bevor an dieser gearbeitet wird !*

*Equipement sous pression - Température en fonctionnement > 90°C
Laisser le purgeur refroidir avant toute manipulation !*

*Equipo bajo presión - Temperatura posible de trabajo > 90°C
¡Asegúrese de que el purgador esté frío antes de manipularlo !*

*Toestel onder druk, werktemperatuur > 90°C
Ontluchter moet afgekoeld zijn alvorens eraan te werken !*

*Apparecchiatura in pressione - Temperatura operativa potrebbe essere > 90°C
Assicurarsi che l'eliminatore sia freddo prima d'intervenire !*





Installation and Maintenance

ARMSTRONG NO. 21AR AND NO. 21-312AR AIR VENTS

This bulletin should be used by experienced personnel as a guide to the installation of Armstrong No. 21-AR and No. 21-312AR air vents and their repair parts. Selection or installation of equipment should always be accompanied by competent technical assistance. We encourage you to contact Armstrong or its local representative if further information is required.

The maximum operating pressures for No. 21AR and No. 21-312 AR are listed in Table 1. DO NOT EXCEED THE MAXIMUM OPERATING PRESSURE.

The vessel design limitations of the No. 21-AR are 250 psig @ 450°F.

Vessel design limitations for the No. 21-312AR are 750 psig @ 100°F. and 500 psig @ 750°F.

Table 1

Model Number	Orifice Size, Inches	Specific Gravity Range, 1.00 to .50	Model Number	Orifice Size, Inches	Specific Gravity, Range, 1.00 to .85
No. 21 AR	7/32	15 psi	No. 21-312 AR,	7/32	25 psi
Cast	3/16	20 psi	Forged Steel	3/16	35 psi
Iron	5/32	30 psi	With Std.	5/32	55 psi
With	9/64	35 psi	5 oz. Float	9/64	65 psi
Standard	1/8	45 psi			
2 1/4 oz.	3/32	80 psi	No. 21-312V AR,	1/8	165 psi
Float	5/64	125 psi	Forged Steel	3/32	300 psi
	1/16	175 psi	With Std.	5/64	430 psi
No. 21 AR		250 psi	5 oz. Float	1/16	680 psi
With 4 1/4 oz. Float		(Sp. Gr. 1.00 to .85)	and High Leverage Mechanism		

INSTALLATION

FOR TYPICAL INSTALLATIONS, SEE FIG. 1-7.

1. The inlet and the outlet piping should be the same size as the air vent connections. Do not reduce the size of the inlet on light loads; however, smaller pipe or tubing may be used on the outlet. Keep the piping as short as possible, with a minimum of fittings and valves. DO NOT USE ELBOWS IN THE INLET LINE, FROM THE EQUIPMENT TO THE VENT.
2. Install gate valves so the air vent can be isolated from the system to permit cleaning and repair. DO NOT USE GLOBE VALVES.



ARMSTRONG 21AR AND 21-312AR AIR VENTS

3. Before installing the vent, flush out the line to remove loose dirt. Use pipe dope or teflon sparingly and on male threads only. Leave the end thread exposed to avoid introducing sealant into the system.
4. DO NOT use a pipe strainer in the line leading to the vent.
5. For occasional venting, a single pipe 3/4" or larger is a suitable connection. Once the system is filled with water, only small additional amounts of air need to be vented, so there is no difficulty in getting air to enter the vent countercurrent to the water displaced.
6. For continuous operation, an equalizing line is usually necessary. Where gas enters the system continuously or when very fast venting is required, an equalizing line should be provided, as shown in Fig. 3.
7. Be certain the vent is installed properly, with the CAP AT THE TOP for air and gas relief service.
8. Install the air vent at the high points of the system. See the accompanying diagrams for typical installations.
9. Air vents should be installed so that they can be checked periodically. A drain line should be piped to a floor drain, slop sink, or other visible location where maintenance personnel can regularly check for leakage.
10. The pipe plug in the cap of the air vent can be replaced with a test cock or test valve for vent testing or even manual venting. A test cock makes it possible to check that the vent is not air bound due to the orifice being clogged. In addition, the manual test cock will enable the operator to vent the unit manually should the automatic vent fail.
11. If the vent is installed in an inaccessible location, a 1/4" copper tube drain line to a slop sink, floor drain, or other visible location makes periodic inspection practicable.

MAINTENANCE

1. No discharge from the vent is normal on hydronic systems, but is not proof that the vent functions properly. To check the air vent, crack the test cock. If the vent is working correctly, a little air should escape, followed by water.
2. Vent Does Not Open.
If a lot of air escapes out of the test cock before water begins to discharge, it is a sign that the vent body was full of air and that the float did not sink to open the valve, or that the valve was plugged. Isolate the vent by closing the gate valve before opening for inspection.
 - a. Remove the vent cover and inspect the mechanism. If the mechanism cannot be made to operate freely after cleaning and inspection, order a new assembly.
 - b. Check the orifice for dirt. Clean the orifice. If the orifice cannot be cleared, order a new mechanism.
 - c. On new installations, an air vent may fail to open if the orifice is too large for the operating pressure. Replace the mechanism with one sized for your operating pressure.



- d. An unusual increase in system pressure may cause the air vent to lock shut. Either eliminate the cause of the increased pressure or replace the mechanism with one that can handle the peak pressures.
3. Vent Fails to Close Tightly (Leaks Water).
 - a. Dirt may be lodged in the orifice. Clean the orifice, the mechanism, the body, and the cap.
 - b. The valve and seat may be worn. Replace the whole mechanism.
 - c. There may be a leak in the float. Disconnect the float and shake it close to your ear. If liquid has leaked inside you will be able to hear it sloshing. Replace the float.
 - d. An unlikely possibility is that the float has collapsed. Replace the float.

For help with unusual installations or service problems, contact your Armstrong Representative or the Armstrong Machine Works Applications Engineering Department.

REPLACEMENT OF LEVERAGE SYSTEM FOR NO. 21-AR.NO. 21-312AR

1. Make sure the parts you have received are for the correct orifice size for your operating pressure. The orifice size (**7/32"**, for example) is stamped on the valve seat.
2. Remove the air vent cap and place it in a vise with the mechanism up.
3. Disassemble the float and lever mechanism by removing the valve lever pin and the valve seat.
4. Clean all dirt, pipe scale, and foreign materials from the cap, especially from the threaded holes.
5. Place the valve seat through the hole in the valve lever clip and tighten both parts into the air vent cap. When the valve seat is tightened, the lever clip should be symmetrical with respect to the gasket surfaces to the left and right of it and with respect to the centerline of the cap. The ears for the valve lever pin should be on the side of the valve seat closest to the gasket surface (away from the center of the cap).

DO NOT use pipe dope or lubricant on the valve seat threads. The seal is made, not by the threads, but by metal to metal contact at the ground end of the valve seat. Make sure the seating area in the cap is clean before screwing the valve seat into position.

6. Use the valve lever pin to assemble the valve lever to the valve lever clip. The ears of the valve lever fit in between the ears of the valve lever clip.



7. Check the sideways motion of the valve lever in the lever clip. Total motion should be about $\frac{1}{32}$ " ($\frac{1}{64}$ " to the left and to the right of center). Adjustments can be made by tapping the ears of the valve lever clip VERY LIGHTLY left or right with a SMALL HAMMER (4 oz.).
8. Check the seating of the valve. The point of the cone valve should easily drop into the orifice with no hang-up on the edges of the orifice. When the valve is shut, the valve lever should be visually parallel to the valve lever clip. **(See Figure 8)** Adjustments maybe made to the front or back of the lever pin ears by tapping VERY LIGHTLY with a SMALL HAMMER.
9. Use the float screw to assemble the float to the valve lever.
10. Remove the cap from the vise, invert it, and assemble it to the air vent body.
11. Remove the plug in the cap of the air vent.
12. Turn the air vent over so that the cap is at the bottom.
13. Insert a pencil or rod into the plug hole to lift the float. The float should readily move upward and strike the body wall. All motion must be free and easy. Lowering the float should result in the valve seating in the orifice and no contact between the float and the body of the air vent. When moving the float, the pencil or rod should travel $\frac{1}{4}$ " up and down.
14. When the valve is in position to function properly, disassemble the cap from the body. Remove the float. Tap the valve VERY **LIGHTLY** with a SMALL HAMMER (4 oz.) to produce a seating ring.
15. Replace the float.
16. Put the body gasket in place.
17. Assemble the cap to the body.
18. Check the float motion as in step 13 above. If the valve seats properly, replace the plug.

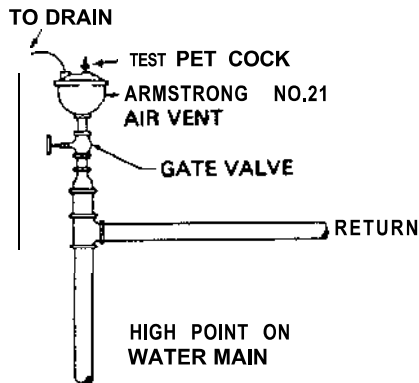


Fig. 1. Air vent on high point of main of hydronic heating system. Test pet cock is optional. Gate valve for isolating vent to permit cleaning and repair if necessary.

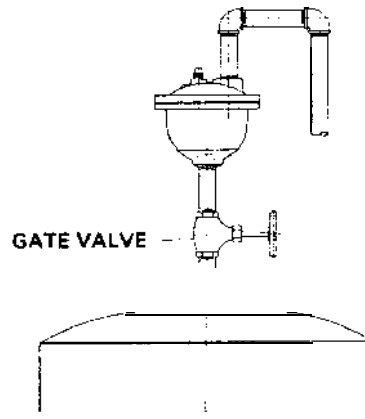


Fig. 2. Vent to remove air when filling tank with liquid. If moderate amounts of air must be vented after tank is filled use 3/4" pipe and a 3/4" gate valve (if trap is to be isolated for cleaning and/or repair).

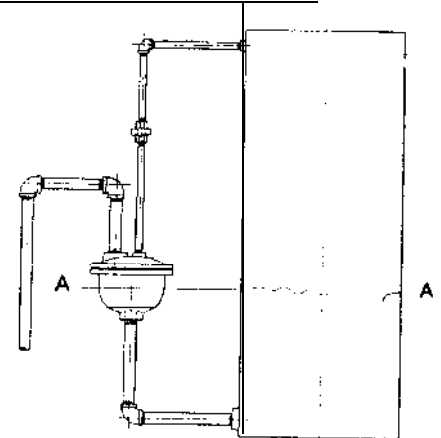


Fig. 3. Hook up for No. 21AR to vent surplus air from a water storage tank. If vent is to be isolated use gate valves. Pipe size can be 1/2". Line A-A shows water level - position vent to secure level desired.

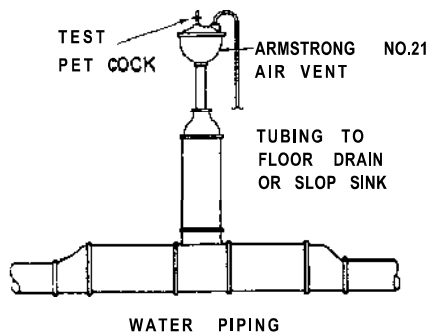


Fig. 4. Installation of automatic air vent on water piping.

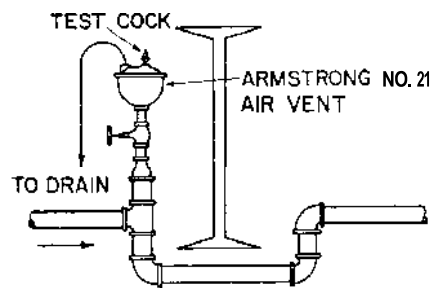


Fig. 5. Installation of automatic air vent on loop in piping.

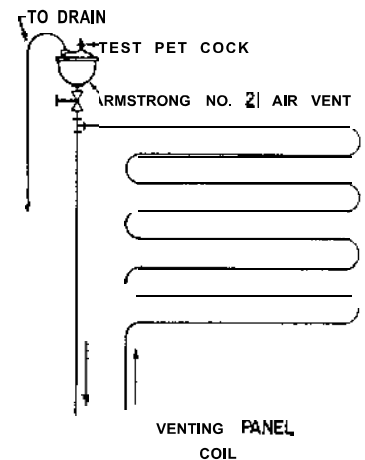


Fig. 6. Installation of automatic air vent on panel coil.

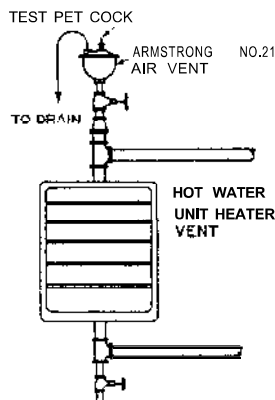


Fig. 7. Installation of automatic air vent on hot water unit heater.

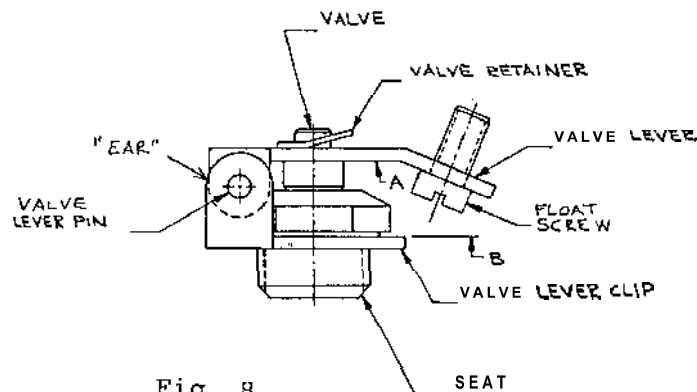


Fig. 8.