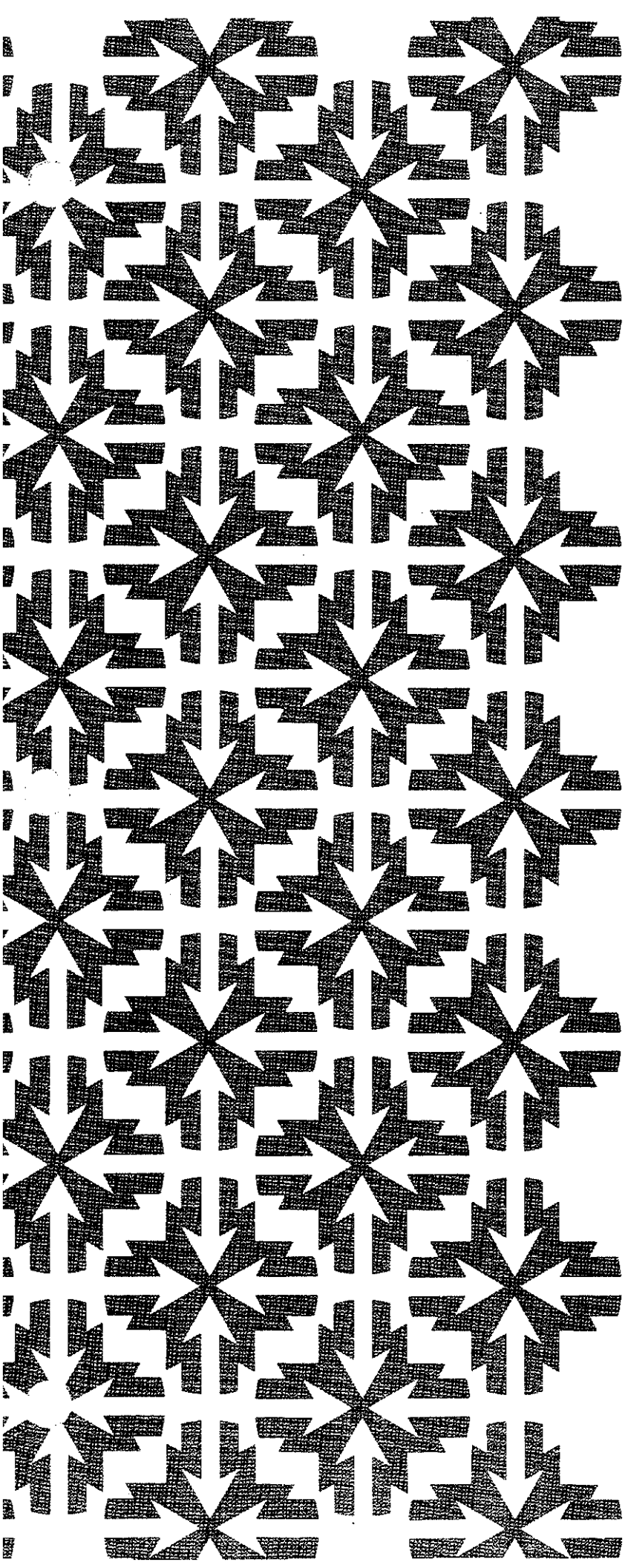


Flowserve

Anchor/Darling Valve Company

Maintenance Manual For Tilting Disc Check Valves

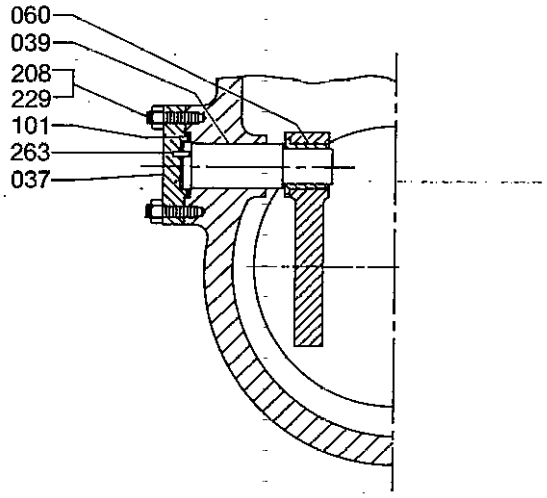
This maintenance manual is provided to users of Anchor/Darling valves to enable them to obtain maximum availability from the equipment. Inside are various instructions, some of which pertain to maintenance operations that require disassembly of the equipment.

Please note that disassembly during the warranty period without prior authorization or without the supervison of an Anchor/Darling Field Service Engineer may void subsequent claims.

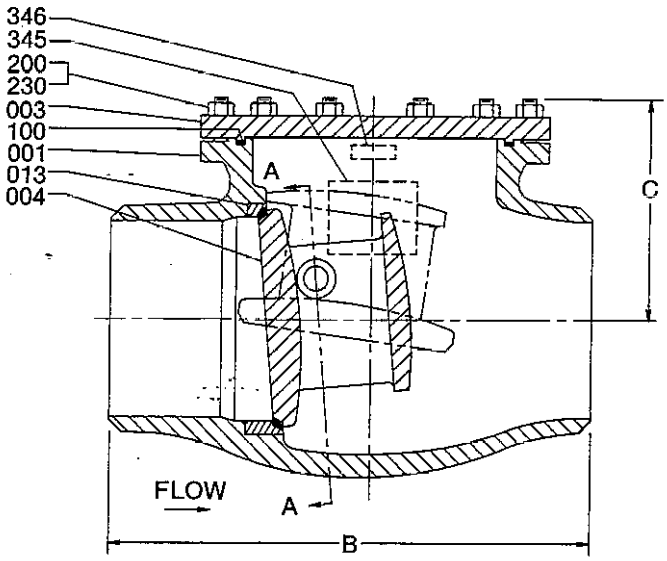
The information contained herein applies to Anchor/Darling valves in general. More detailed information on specific valves is contained on the assembly drawing supplied with each unit. This drawing should be referred to prior to servicing any valve. If a drawing is not available one may be obtained by contacting Anchor/Darling and supplying the valve serial number.

Anchor/Darling Valve Company will not be held liable or responsible to the receiver of this manual, its officers, agents, or employees, for any personal injury or property damages arising out of the content, omissions, or representations made by Anchor/Darling Valve Company.

TABLE OF CONTENTS

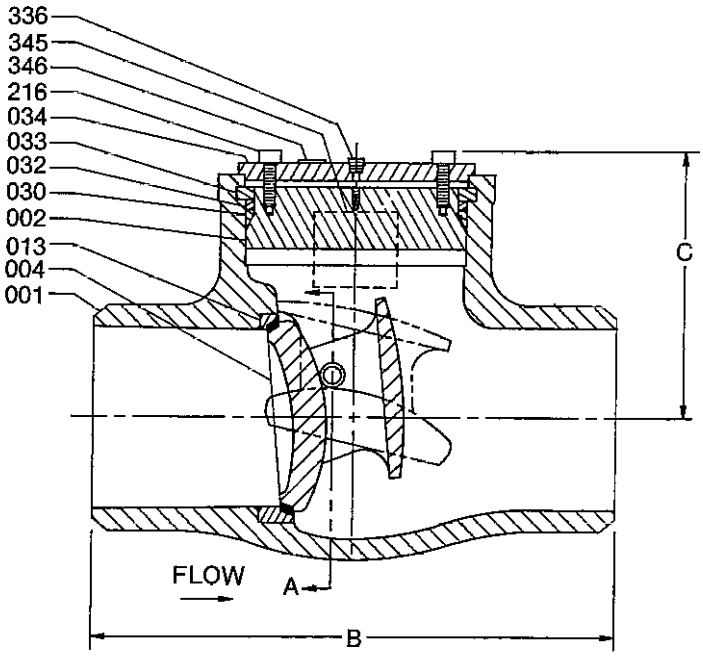


SECTION A-A



2½" thru 24"
150 lb. & 300 lb. class

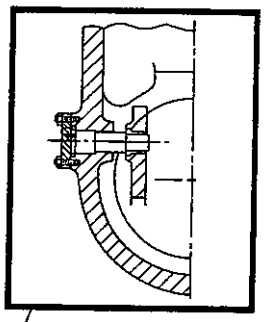
ITEM NO.	DESCRIPTION
001	BODY
002	BONNET
003	BONNET CAP
004	DISC
013	SEAT RING
030	PRESSURE SEAL GASKET
032	SPACER RING
033	GASKET RETAINER
034	BONNET RETAINER
037	COVER
039	HINGE PIN
060	BUSHING
100	GASKET (BONNET)
101	GASKET (HINGE PIN COVER)
200	BONNET STUDS
208	COVER STUDS
216	BONNET CAPSCREWS
229	COVER NUT
230	BONNET NUT
263	ROLL PIN
336	PIPE PLUG
345	NAMEPLATE
346	I.D. PLATE



2½" thru 24"
600 lb. thru 2500 lb. class

TILTING DISC CHECK

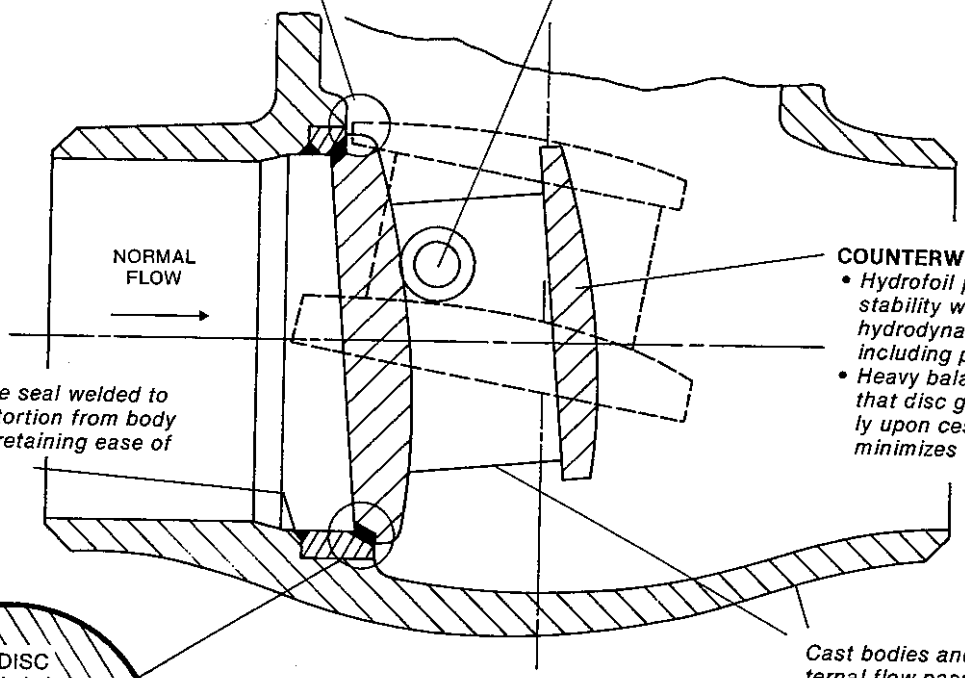
Anchor/Darling's tilting disc check valves provide non-slam closure with minimal pressure drop.



HINGE ARRANGEMENT:

- *Body penetration is sealed with blind flange and spiral-wound gasket.*
- *Hinge pin is located near the disc center of gravity, minimizing sealing surface radius rotation and thus velocity.*

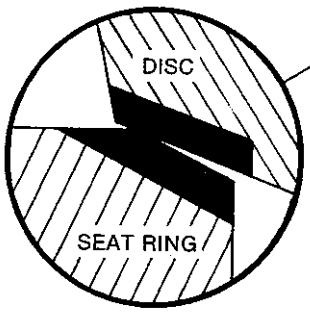
Disc stop impacts body away from sealing surfaces; it also maintains disc open in best position to minimize pressure drop.



COUNTERWEIGHT

- *Hydrofoil profile: maintains disc stability while being lifted by hydrodynamic forces at any flow, including pulsating.*
- *Heavy balanced weight insures that disc goes to seat immediately upon cessation of flow and minimizes water hammer.*

Seat rings are seal welded to minimize distortion from body stress while retaining ease of replacement.



Differential mating angles between disc and seat ring assures better seal with low seating force. This conical design minimizes seating impact loads and assures proper disc alignment, thus improving sealing capabilities.

Cast bodies and discs permit the internal flow passage to be designed with large radius curves. This provides smooth transitions and reduces damaging turbulence which is unavoidable in components of forged and fabricated designs. The one piece body design provides complete internal access through the bonnet and eliminates the problems associated with in-line flanged joints.

APPLICATIONS:

- Protection from water hammer.
- Stable at low and pulsating flows.
- *Acceptable pressure drop.*
- Designs available for installation in horizontal and vertical lines (with flow upward).

1.0 — VALVE DESCRIPTION

1.1 — RECOMMENDED USES

Anchor/Darling Tilting Disc Check Valves are designed to prevent the reversal of flow in a piping system and to have non-slamming characteristics. While they may hold pressure in the reverse direction, they are not intended for use as isolation valves unless special features are incorporated in the design, e.g. — a secondary elastomeric seat.

A reliable seal across the disc can be expected if the reverse flow and differential pressure is large. However, when the differential pressure is low, a tight seal may not be obtained without special features being added to the valve. If system operation requires sealing against low pressure, or installation in a vertical pipeline, Anchor/Darling should be consulted.

1.2 — PRINCIPLES OF OPERATION (Fig. 1)

The principle parts of a tilting disc check valve are the body, bonnet, disc and hinge pin assembly. The body, bonnet and hinge pin closures retain the fluid within the system. The disc is supported by, and rotates about the hinge pins, which are contained in thru-body bores. The pivot axis is located above the centerline and near the C. G. of the disc, and in such a geometric position to allow the conical seating surface of the disc to rotate into the matching cone of the body seat without interference.

Flow in the normal direction creates a force on the disc, which because of the offset pivot axis, causes the disc to rotate away from the seat. The contours of the disc are hydrodynamically designed to provide a maximum opening with minimum velocity.

Upon cessation of forward flow or reversal of flow, the force holding the disc open is no longer present and the weight of the disc combined with the force of the reverse flow causes the disc to return to the seat.

Sealing between the disc and the seat results solely from the differential pressure across the disc forcing the cone of the disc into the matching cone of the seat. Hence, the difficulty in maintaining a tight seal at low pressures.

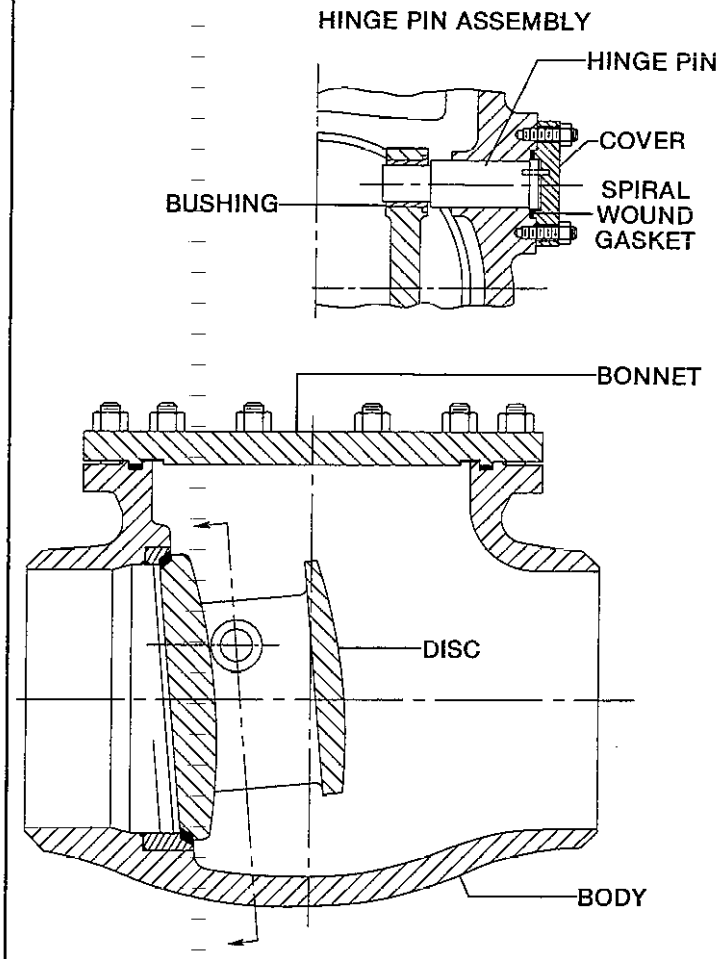


Fig. 1

1.0 — VALVE DESCRIPTION (continued)

1.3 — DESIGN FEATURES

1.3.1 — BONNET SEALS

Anchor/Darling Tilting Disc Check Valves are supplied with two basic types of body-bonnet closures; bolted bonnet or pressure seal.

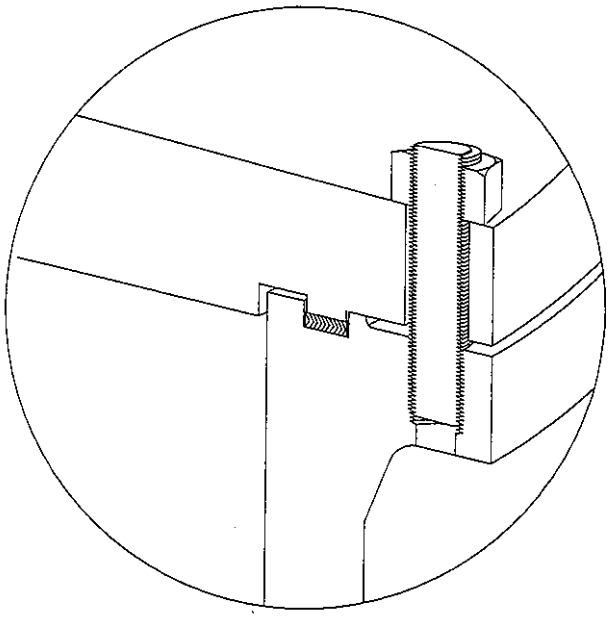


Fig. 2

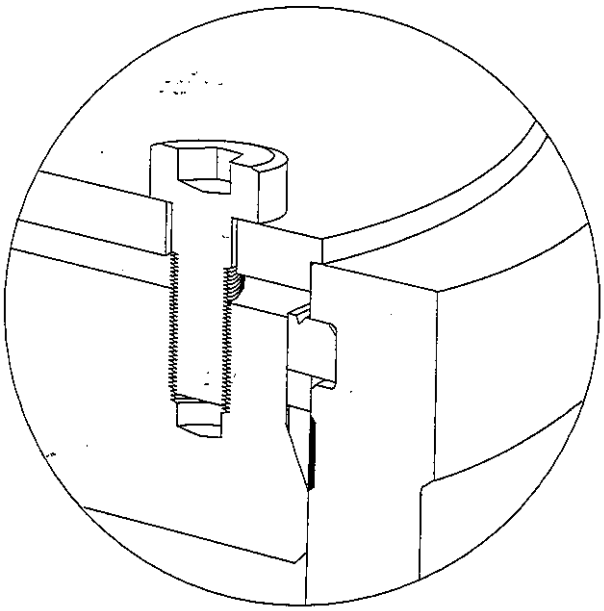


Fig. 3

The bolted bonnet closure (Fig. 2) is a bolted flange tongue and groove joint with a gasket generally comprised of spiral-wound stainless steel and asbestos filler. The seal depends upon the bolt preload to maintain sufficient compressive force on the gasket.

Pressure seal type closures (Fig. 3) utilize a tapered soft metal ring gasket for sealing. The gasket is contained within the body neck bore by a retaining ring. The tapered inner surface of the gasket bears against a mating angular surface on the valve bonnet. Under internal pressure, the bonnet is forced against the pressure seal gasket, wedging it against the body neck wall. A slight interference angle produces a line contact and high sealing pressure. The greater the valve pressure the tighter the metal-to-metal seal. No bolting is required to maintain the seal although the bonnet is initially drawn into contact with the pressure seal by cap screws.

1.0 — VALVE DESCRIPTION (continued)

1.3.2 — DISC AND HINGE PIN ASSEMBLY

The disc is cast with an integral counterweight connected to the pressure retaining part of the disc by two webs. Two hinge pins support the disc in the body. The hinge pins are retained in thru body bores. The disc rotates about bores in the web portion of the disc. The rotation axis is precisely located by line boring the disc and body hinge pin bores together, while the disc is secured in the closed position. Normally the hinge pins are stainless steel and the bushings in the disc are stellite or hardened stainless steel.

The hinge pin body penetrations are sealed by bolted blind flanges containing spiral-wound gaskets. On some older designs (Fig. 7) a metal pressure seal closure is used, or on smaller valves, a pipe plug type cover with a retained spiral wound gasket (Fig. 6).

On some valves that must hold against low differential pressure, a special dual seated disc is provided. The disc has a retained elastomeric seal in addition to the stellite seat. Consult the assembly drawing provided with the valve for details.

1.3.3 — SEAT

On most valves the seat ring is set into a machined recess in the body port which supports and retains the ring. A seal weld is provided between the body and the ring. This weld is for sealing only and is not structural. The seat ring is replaceable. Some older valves in the smaller size have integral seats that can be lapped but not replaced.

1.3.4 — EXERCISABLE AND SPRING ASSISTED VALVES

Some Anchor/Darling Tilting Disc Check Valves are provided with various arrangements of air cylinders and springs to provide external actuation of the disc. The two most common modes are spring assisted closure of the disc and remote actuation to verify operability. The assembly drawing and manual provided with the valve should be consulted for maintenance information. Anchor/Darling Field Service should be contacted if any malfunctions or service problems occur.

2.0 — CARE OF VALVE PRIOR TO INSTALLATION

2.1 — RECEIVING INSPECTION

Upon receipt of the valve, thoroughly inspect it for shipping damage. As a minimum, the following items should be checked:

1. Missing or loose bolting?
2. End covers in place?
3. Is valve securely fastened to shipping skid?
4. Abrasion - damaged paint?
5. Are spare parts shipped with valve in place and secure?

2.2 — HANDLING

Anchor/Darling valves are shipped strapped to wooden skids designed to be moved by forklift. It is recommended that when being handled prior to installation, the valve be kept on its skids and a forklift truck be used for moving. If an overhead crane is used, care must be exercised to center the load. The slings should not lift the valve by the wooden skid structure alone, but must pass under the valve.

2.3 — STORAGE

Store valves on their shipping skids in a clean dry area protected from the weather.

3.0 — INSTALLATION INSTRUCTIONS

3.1 — RIGGING

When lifting the valve for installation in the line, it is important that slings of adequate size be used. The capacity of the sling must exceed the weight of the valve. Slings should pass under the valve body. Block carefully to prevent damage or abrasion of component parts and finishes.

3.2 — CLEANING

Prior to installation remove the valve end covers and inspect for cleanliness. If any sign of foreign matter is observed in the valve internals, open the valve and place it on its side and flush thoroughly with water. Steam or air may be used if water is not available but exercise caution that the high velocity does not drive debris into clearance spaces.

3.3 — INSTALLING VALVE IN LINE

The pipe must be properly supported and aligned with the valve. Seat leakage in valves is frequently caused by seat misalignment resulting from excessive end movements introduced in the cold springing of the connecting pipe.

Tilting disk check valves must be installed with the flow in the proper direction. The arrow on body should point in the normal flow direction, i.e., the direction in which flow is desired.

Tilting disc check valves can be furnished for installation in both horizontal and vertical lines. However, in vertical lines the normal flow must be upward and the checked flow downward. Special consideration must be given to disc design when vertical use is required. Contact the factory for this special feature.

In all installations the valve must be oriented such that the hinge pin is horizontal.

4.0 — VALVE MAINTENANCE

Anchor/Darling Valves are designed to be essentially maintenance free pieces of equipment. When used in the proper application and operated correctly they will provide reliable operation for many years. Some other maintenance recommendations are included in the following sections for information.

4.1 — INSPECTION

The most important aspect of valve maintenance is periodic inspection. The early detection of a malfunction can, in many cases, prevent a minor defect from becoming a major problem. It is very important that leakage from any of the major seals (disc/seat, body-bonnet) be addressed immediately. The smallest weepage can quickly become a major problem if it is not treated promptly.

Some other areas that should be included in a periodic inspection program are:

1. Cleaning: Pressure Seal Area and Body Bonnet Studs
2. Bolting: Body-Bonnet and Hinge Pin Cover

4.2 — CLEANING

The frequency and extent of cleaning will depend on the valves' location and service conditions. Do not allow water or dirt to collect in the body neck bore area above the pressure seal of pressure seal valves. The build up of corrosion or extraneous material may interfere with removal of the bonnet. For the same reason, excessive rust should not be allowed to build-up on the body-bonnet bolting of bolted bonnet valves.

4.0 — VALVE MAINTENANCE (continued)

4.3 — BOLT TORQUING

At regular intervals, not more than six months, check the tightness of all bolting. Bolted bonnet valves should have the body-bonnet bolting torqued to the values shown in Table 1.

4.4 — REFINISHING SEALING SURFACES

Minor discontinuities in both the disc and seat sealing surfaces, which may cause leakage, can, in many cases, be removed by lapping. Major defects such as cracks or deep gouges will generally require replacement of the part.

NOTE: Lapping is a polishing process in which a sealing surface is ground with an abrasive held in place by a special fixture. The abrasive is commonly found in paste form or bonded to a paper backing. Detailed instructions on the use of lapping abrasives and fixtures, normally supplied with such equipment, should be adhered to.

5.0 — DISASSEMBLY

By carefully following these instructions, any Anchor/Darling valve can be easily disassembled and reassembled. If problems are encountered with equipment, Anchor/Darling Field Service should be contacted. The use of improper tools or methods may cause severe damage to the valve and may void the warranty.

Prior to attempting disassembly of a particular valve, the specific assembly drawing for the valve should be referred to.

5.1 — FLANGED BONNET VALVES

5.1.1 — BONNET (Fig. 4)

Remove the nuts (230) from the bonnet studs (200). Although it is not imperative, it may be helpful to loosen the nuts in a criss-cross pattern (Fig. 13).

With the nuts removed, the bonnet (003) can be lifted off the body. Tapped holes are provided in the top of larger bonnets to accept eyebolts. The bonnets on these valves are most easily raised using slings attached to the eyebolts.

With the bonnet removed, the old gasket (100) should be lifted out of its groove. Be careful not to damage the gasket sealing surface.

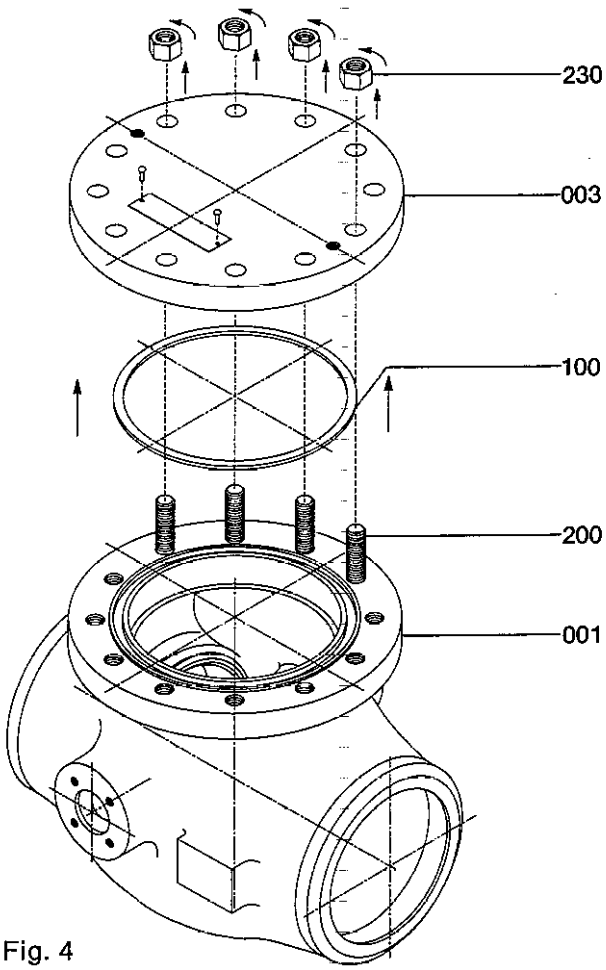


Fig. 4

5.0 — DISASSEMBLY (continued)

5.1.2 — DISC AND HINGE PINS

Removal of the disc requires the disc to be supported by a sling while the hinge pins are withdrawn thru the sides of the body. (On small valves the disc may be supported by hand).

NOTE: Identify the hinge pins with respect to the valve body side to assure each is reinstalled in the same side as originally furnished. Hinge pins are custom fit.

A strap sling is recommended, rigged as shown in Fig. 5.

The hinge pins are retained and sealed in the body by one of three methods: pipe plug seal cover, pressure seal cover or blind flange cover (standard design). Their removal is described in the following paragraphs. It is important that the weight of the disc be supported by the sling (or hand) during withdrawal of the pins. Otherwise, damage to the bushings and disc may result.

When hoisting the disc from the body, exercise caution not to impact the disc seating surface or the gasket sealing surfaces in the body neck. Lay the disc down in a protected location — taking care not to damage or scratch the seating surface.

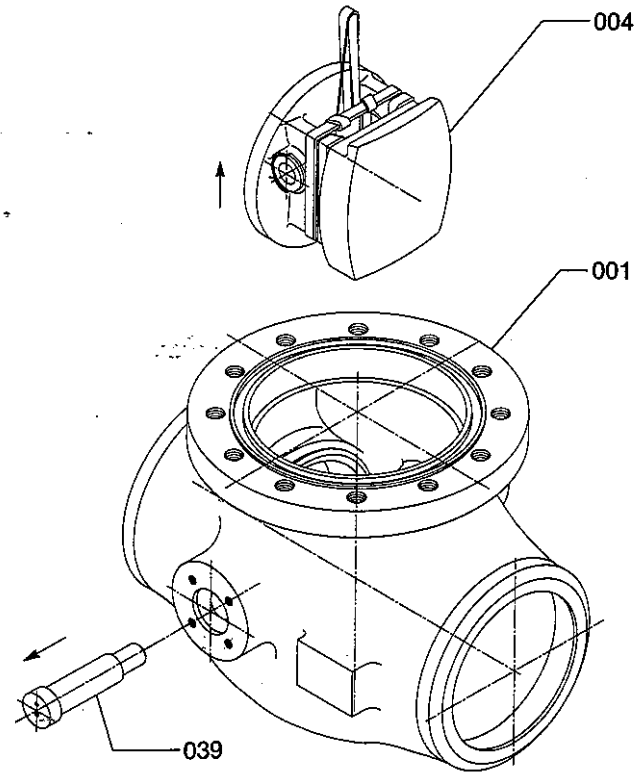


Fig. 5

5.1.2.1 — PIPE PLUG SEAL COVER (Fig. 6)

In this design the hinge pin (005) is threaded into the body. The seal is a spiral wound gasket (101) contained in a recess under the pipe plug type head of the hinge pin.

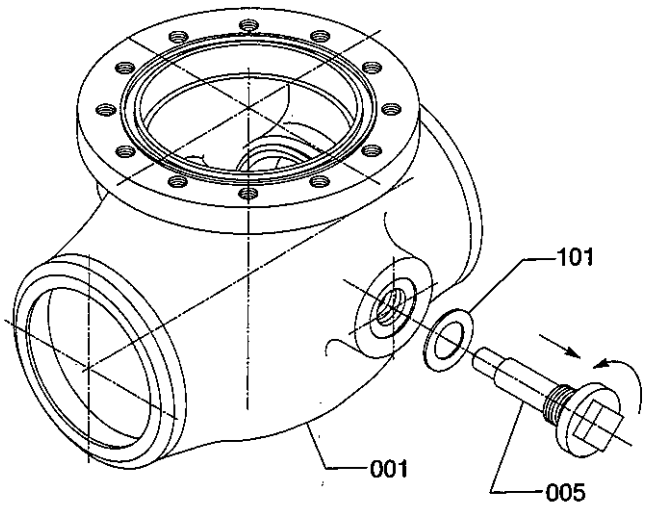


Fig. 6

5.0 — DISASSEMBLY (continued)

5.1.2.2. — PRESSURE SEAL COVER (Fig. 7)

In this design, the hinge pin cover (037) holds a metal gasket (6A) against the hinge pin bonnet (2A) by studs threaded into the body. The bonnet may be an integral part of the hinge pin (5). To remove the cover, unthread the nuts (229) off the studs (208). The cover can then be removed. The gasket and bonnet are most easily removed as one unit. The bonnet is provided with a tapped hole in the end. If the hinge pin cover has not been disassembled for a long period of time the gasket and bonnet may stick in the body. Prior to attempting removal, lubricate the area well with penetrating oil. Although the hole in the bonnet is intended for an eye bolt, if the bonnet is extremely tight a slide hammer may be attached to the bonnet to free it. In withdrawing the bonnet/gasket it is important to pull on the assembly squarely. If the bonnet/gasket becomes cocked, removal can be quite difficult.

Once the bonnet and gasket are removed, the hinge pin can be withdrawn.

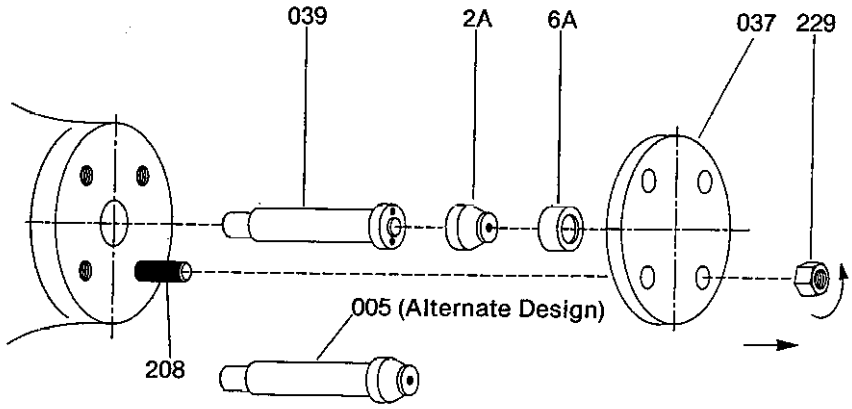


Fig. 7

5.1.2.3 — BLIND FLANGE COVER (Fig. 8)

In this design the cover (037) is held against a spiral wound gasket (101) by nuts on studs threaded into the body. The cover can be removed after the cover nuts (229) are unthreaded off the studs (208). A roll pin (263) inserted into the cover and the end of the hinge pin (039) is used to prevent rotation of the hinge pin. Care must be taken during disassembly to avoid misplacing it. With the cover off, the hinge pin can be withdrawn. A tapped hole is provided in the end of the hinge pin to facilitate withdrawal.

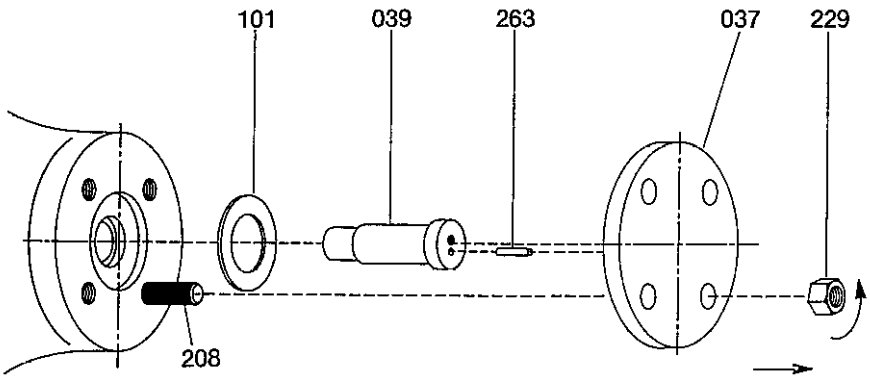


Fig. 8

5.0 — DISASSEMBLY (continued)

5.2 — PRESSURE SEAL BONNET VALVES (Fig. 9)

5.2.1 — BONNET

A. Unbolt the capscrews (bonnet) (216) and remove the bonnet retainer (034). Set aside for use later.

B. Tap the bonnet sharply to break the seal between it and the pressure seal gasket (030). The bonnet will drop downward against its stop, uncovering the retaining ring (gasket) (033).

C. The retaining ring (gasket) (033) is comprised of four segments, one of which has a small drilled hole. Remove this piece first. The groove in the top of the retaining ring gasket permits the use of a pry bar or screwdriver in removing the segments. In some cases, it may be necessary to loosen the segments by tapping with a hammer or bar.

D. The bonnet is now ready for removal from the body. The tight clearances between the body bonnet and gasket, necessary for a reliable seal, require that the bonnet be withdrawn squarely from the neck bore. The slightest cocking of the bonnet during withdrawal can cause it to bind. Therefore, it is recommended prior to removal, that the squareness of bonnet and gasket with respect to the body be checked. This is most easily accomplished by measuring the distance between the top of the gasket and top of the body neck. If the gasket is not square, it should be tapped with a brass rod until it is.

   With large bonnets it is a good idea as well to periodically check the squareness of bonnet as it is being withdrawn.

   Binding any time during withdrawal indicates the bonnet has cocked. Further efforts to force the bonnet will generally make the situation worse. At the first sign of binding, stop and check the squareness of the bonnet.

E. The preferred method of lifting the bonnet is by using slings attached to an eyebolt threaded into the tapped hole in its center.

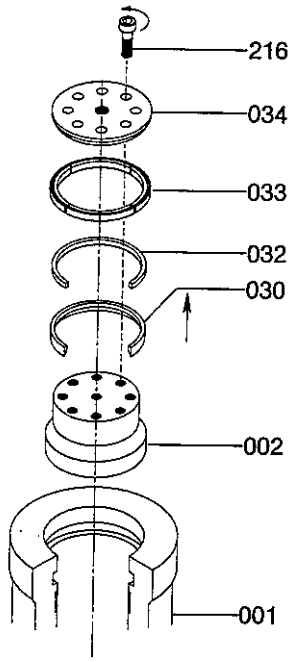


Fig. 9

F. Following the above procedure will, in most cases, result in removal of the bonnet with little difficulty.

   However, certain circumstances, such as installation of the valve in other than a horizontal orientation, may cause complications. If greater difficulty is encountered, an Anchor/Darling service engineer should be consulted. **Excessive force which may damage critical surfaces should be avoided.**

G. It is not normally recommended that the pressure seal gasket be reused. However, if a spare gasket is not available, mark the gasket, bonnet and body prior to removal so that the gasket may be reinstalled in its original orientation.

5.2.2 DISC AND HINGE PINS

Disassembly is identical to that for bolted bonnet valves. See Section 5.1.2

6.0 — ASSEMBLY

Before starting the reassembly of the valve, all parts should be thoroughly cleaned and inspected. All foreign material should be removed from any area of the valve. However, there are certain critical areas that must be free of dirt, weld spatter, filings, etc. These include the following:

1. Disc and seat sealing surfaces
2. Bonnet OD (on pressure seal valves)
3. Body neck ID (on pressure seal valves)
4. Gasket tongue (on flanged bonnets)
5. Gasket groove (on flanged bodies)
6. Bonnet studs and nuts
7. Hinge pin
8. Hinge pin cover gasket groove in body
9. Hinge pin cover
10. Pressure seal gasket

The above areas must also be free of any nicks, scratches, gouges, etc. Any damage in these areas must be repaired. Any questions about the acceptability of any surface condition should be discussed with a service engineer prior to using the part.

6.1 — FLANGED BONNET VALVES

6.1.1 — DISC AND HINGE PINS

Lower the disc into the body with the same rigging used for removal (Fig. 5). Take care not to damage the disc seating surface or the body neck bore, if it is a pressure seal valve. **NOTE: If a replacement disc is to be installed , an Anchor/Darling Valve Field Service Engineer should be present. This is a specialized operation.**

Align the disc assembly holes with the hinge pin bores in the body and insert the hinge pins. **NOTE: Always reinstall hinge pins on the same side from which they were removed.**

If the hinge pins are the pipe plug type (Fig. 6), the gasket (101) must be installed on the pin before insertion. Where a spiral wound gasket is used, the plug should be tightened until the proper gasket compression is achieved as follows:

Original Thickness	Compressed Thickness
.125″	.090 to .100″
.175″	.125 to .135″

Where pressure seal type covers are used (Fig. 10), the pin and bonnet or pin/bonnet is first inserted and the P.S. gasket then lubricated and inserted into contact with the bonnet. The cover is then installed and the nuts torqued to the values given in Table 1.

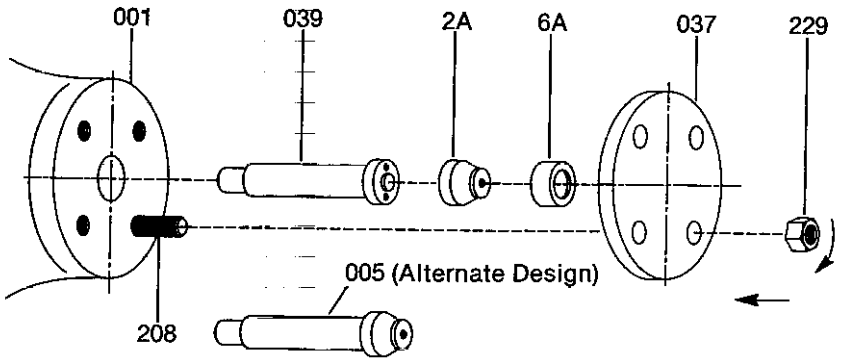


Fig. 10

6.0 — ASSEMBLY (continued)

6.1.1 — DISC AND HINGE PINS (Continued)

Where blind flange type covers are used (Fig. 11), the spiral wound gasket (101) and roll pin (263) are put in place after the hinge pins are inserted. The cover (037) is then installed and the nuts torqued to the values given in Table 2.

NOTE: Make sure the roll pin is mated properly with both the hinge pin and the cover. The hinge pin can be rotated from inside the valve to accomplish this. Use channel lock pliers or similar tool.

After the disc and pins are installed, remove the rigging and rotate the disc thru its full travel to verify that there is no binding. The disc should be centered in the valve. There must be side clearance (approx. .005″ to .030″) between the bushing and the shoulder on the hinge pin. Also, when the disc is in the closed position, there should be radial clearance between the back of the pin and the bushing. See Fig. 12. If there is any doubt, contact the Anchor/Darling Valve Field Service Engineer.

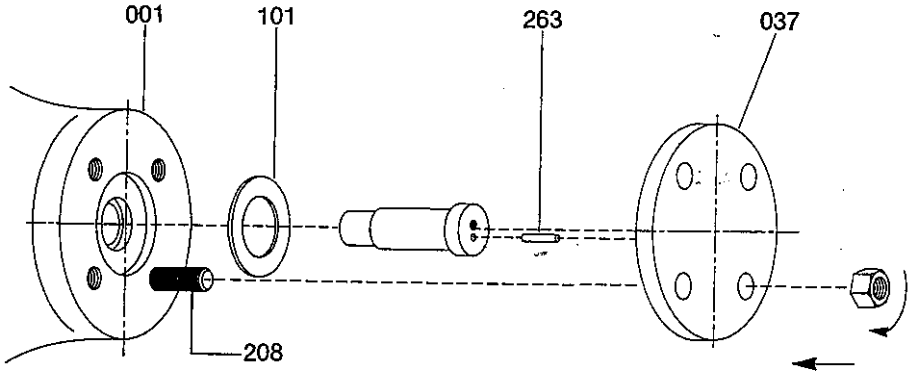


Fig. 11

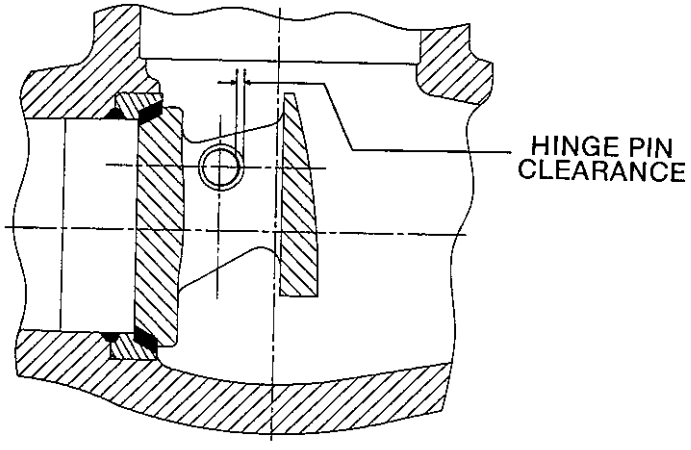


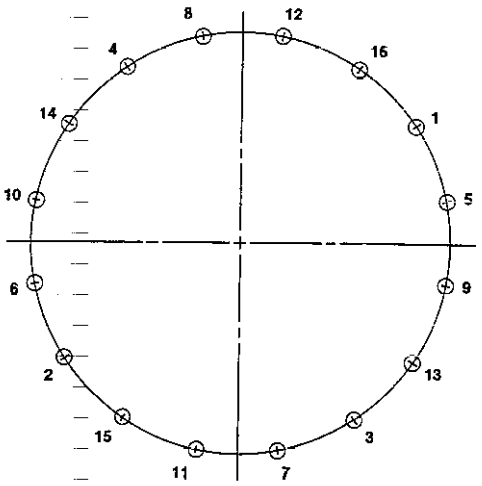
Fig. 12

6.0 — ASSEMBLY (continued)

6.1.2 — BONNET

Prior to lowering the cap (003) into position, a new gasket (100) should be placed in the gasket groove on the body flange. The bonnet can then be lowered into place. With the bonnet in place, the studs (200) and nuts (230) can be installed. Prior to installation the studs and nuts should be cleaned and thoroughly lubricated with a high quality lubricant. Any nuts or studs with damaged threads should be replaced. It is very important that the body-bonnet bolting be torqued to specific values in accordance with the procedure listed below. The torque values are shown in Table 1 for various diameter studs and materials.

The nuts should be tightened evenly using a criss-cross pattern similar to the one shown in Fig. 13. Tighten all of the nuts to 1/3 of the recommended value initially. Then repeat the sequence raising the torque to 2/3 of full torque. Finally, torque all the nuts to the recommended value following the criss-cross pattern. It is essential that the flange faces remain parallel and all the bolting has uniform tension. Failure to achieve this may cause gasket weepage when the joint is subjected to operating pressures and temperatures.



TYPICAL BOLT TIGHTENING SEQUENCE

Fig. 13

MAXIMUM TORQUES FOR FIELD SERVICE (Ft. Lb.)

The following torque values are provided for guidance in field work. These maximum torque values provide for a range of friction coefficients without damage to the designated bolting material.

STUD SIZE	A193 B7 & B16	A193 B8 & B8M	A453 660	A564 630	CAP SCREW SIZE	A574
5/16-18	11	6.5	12	13	5/16-18	15
3/8-16	20	12	20	23	3/8-16	26
7/16-14	30	19	30	36	7/16-14	44
1/2-13	45	28	50	55		
9/16-12	70	40	70	80		
5/8-11	90	56	100	110	1/2-13	67
3/4-10	165	100	165	195	5/8-11	130
7/8-9	270	160	280	310		
1-8	400	240	420	470		
1-1/8-8	600	350	600	690	3/4-10	230
1-1/4-8	800	500	850	970	7/8-9	375
1-3/8-8	1100	675	1200	1320	1-8	560
1-1/2-8	1500	900	1600	1750		
1-5/8-8	1900	1150	2000	2250		
1-3/4-8	2400	1450	2500	2850	1-1/8-7	800
1-7/8-8	3000	1800	3200	3500	1-1/4-7	1140
2-8	3700	2200	3900	4300	1-3/8-6	1500
2-1/8-8	4400	2650	4700	5200		
2-1/4-8	5300	3200	5600	6200		
2-1/2-8	7400	4400	8000	8600	1-1/2-6	1970
2-3/4-8	8700	5900	10400	11600	1-3/4-5	3100
3-8	11400	7800	13000	15200	2-1/2-4	4600

* Nominal torque values are 20% less than these values.

TABLE 1

6.0 — ASSEMBLY (continued)

6.2 — PRESSURE SEAL BONNET VALVES

6.2.1 — DISC AND HINGE PINS

The disc assembly procedure in a pressure seal valve is identical to the one for flanged bonnet valves included in section 6.1.1. Refer to it for instructions.

6.2.2 — BONNET

Once the hinge - disc assembly is in place, the bonnet (002) can be inserted into the neck. Care must be taken in lowering the bonnet. It is again very important to keep the bonnet from cocking, as it is lowered into the body. If it does bind, the bonnet must be straightened before insertion can continue. Measuring from the bonnet bolting surface to the top of the body is the simplest way to detect cocking.

With the bonnet resting on the counterbore in the neck, a new gasket (030) and the spacer ring (032) can be inserted. The gasket may also cock, it must be inserted with care. Once these are in in place, the four-piece gasket retainer (033) can be put into place. It is important to remember that the piece with the drilled hole must be positioned last. If the valve is installed in other than a horizontal position, it may be necessary to orient or hold the retainer such that the pieces stay in place until the bonnet is moved into its raised position.

Prior to installing the bonnet retainer, the pipe plug (336) should be removed. A threaded rod, long enough to extend from the top of the bonnet above the body neck should be inserted into the tapped hole in the center of the bonnet. The bonnet retainer (034) can now be lowered over the top of the rod and set into position. Using the threaded rod the bonnet can be raised into its position and the bonnet capscrews (216) inserted through the retainer and threaded into their holes in the bonnet. By turning each capscrew a couple of turns, proceeding to the adjacent capscrew, turning it and then repeating this around the bolt circle, the bonnet will be raised squarely until it is firmly in contact with the gasket. Note that while the capscrews need not be torqued to a specific value to maintain a tight seal at system pressures, they should be tightened with wrench to insure good gasket-body-bonnet seal contact before the full pressure is reached.

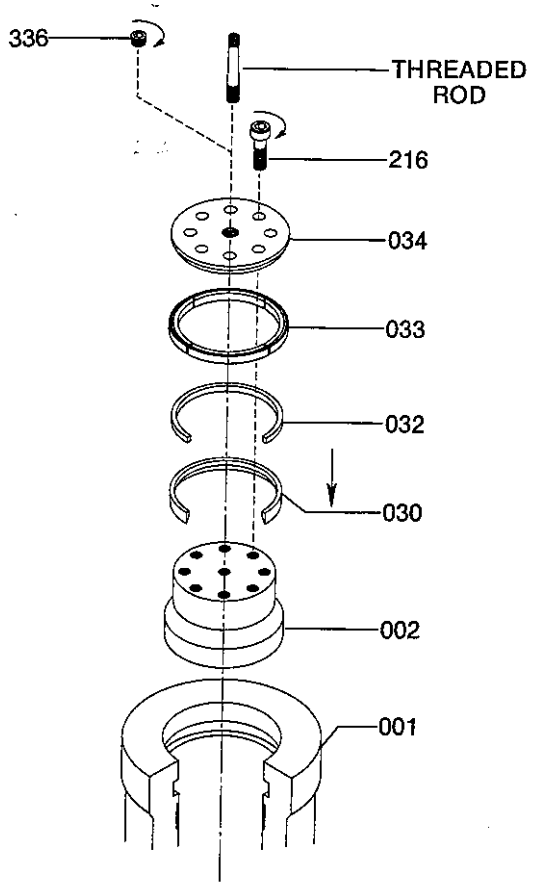
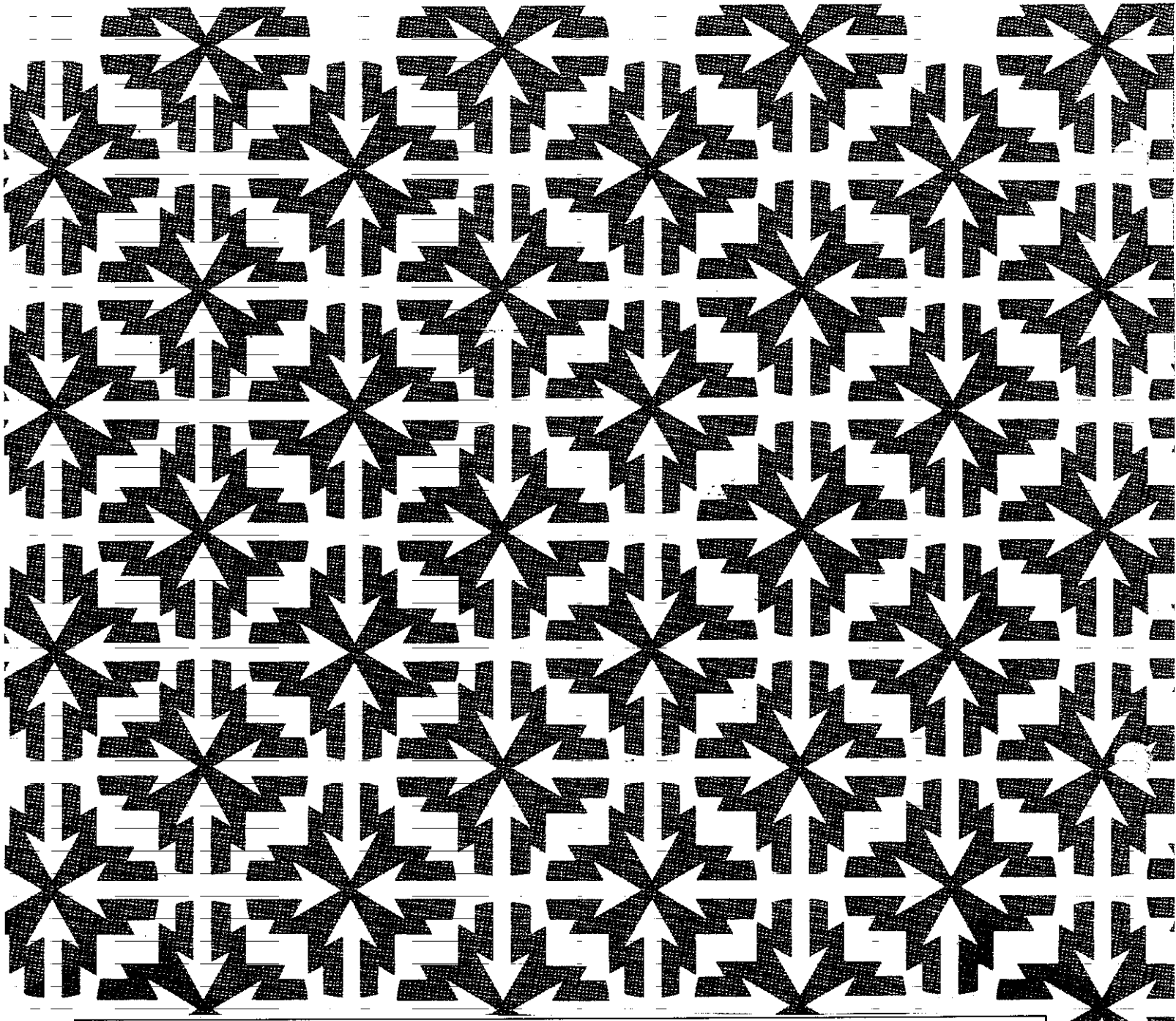


Fig. 14



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