FLOWSERVE

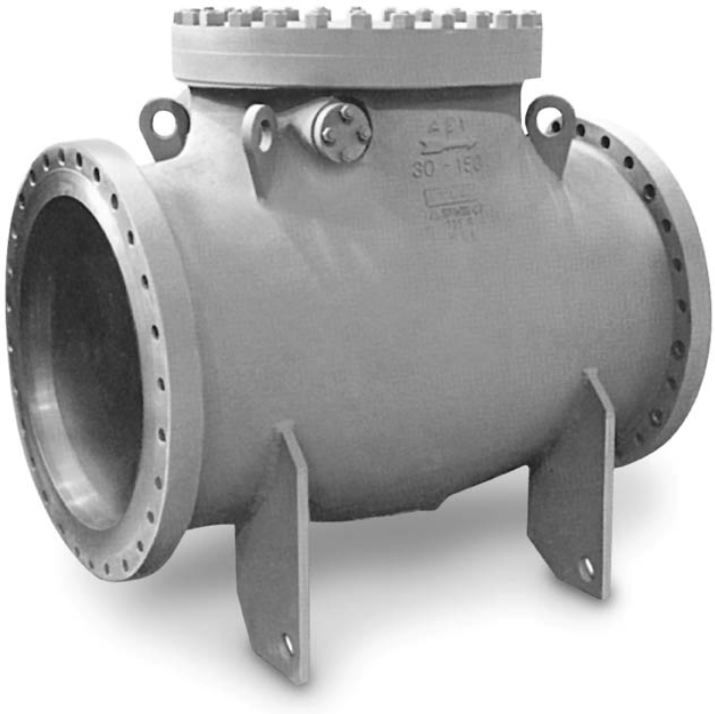
INSTRUCTION MANUAL

Anchor Darling Swing Check

Sizes 2-1/2” through 24”

Installation
Operation
Maintenance

FCD ADENIM0013-00



Experience In Motion

REVISION RECORD

Revision	Section	Description	Date
-	All	Original Issue	09/18/2003

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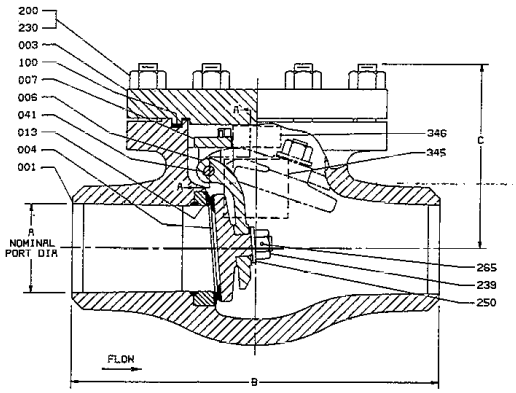
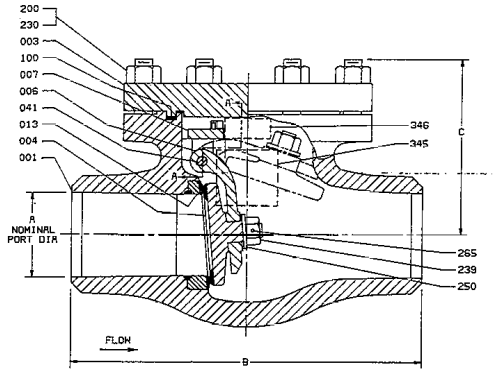


2½" thru 8"

150# & 300#



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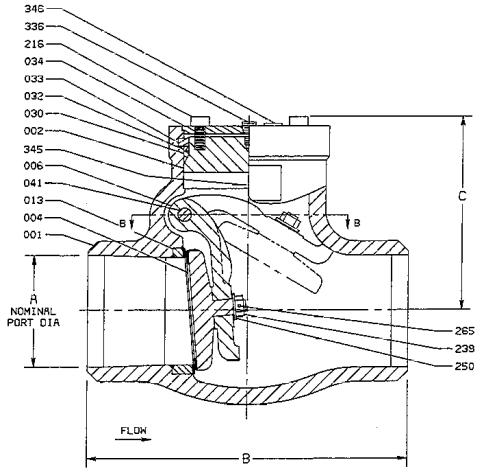


2½" thru 24"

600# - 2500#

1.0 VALVE DESCRIPTION

1.1 Recommended Uses

Anchor/Darling Swing Check Valves are designed to prevent the reversal of flow in a piping system. While they may hold pressure in the reverse direction, they are not intended for use as isolation valves without special provisions e.g. elastomeric seats. A reliable seal across the disc can be expected if the reverse flow or differential pressure is large. However, when the differential pressure is low, difficulty may be encountered in obtaining a tight seal without special features being added to the valve. If the system operation requires sealing against a low pressure, Anchor/Darling should be consulted.

1.2 Principles of Operation (Fig. 1)

The principle parts of a swing check valve are the body, bonnet, disc and hinge assembly. The body and bonnet contain the fluid within the system. The disc is mounted on a hinge arm which rotates about a shaft positioned above the seat in the body neck. Flow in the normal direction creates a force on the disc which causes it and the hinge to rotate about the shaft. With increasing flow the disc assembly is rotated further from the seat up into the body neck. In the full open position a stop on the back of the hinge contacts the body. This positions the major portion of the assembly out of the flow stream and permits unobstructed fluid flow through the valve. Upon the cessation of forward flow or reversal of flow direction, the force holding the disc assembly open is no longer present, whereupon the weight of the assembly combined with the reverse flow causes the disc to return to the seat. Any seal obtained between the disc and the seat results solely from the difference in pressure across the disc. Hence, the difficulty in maintaining a tight seal at low pressures.

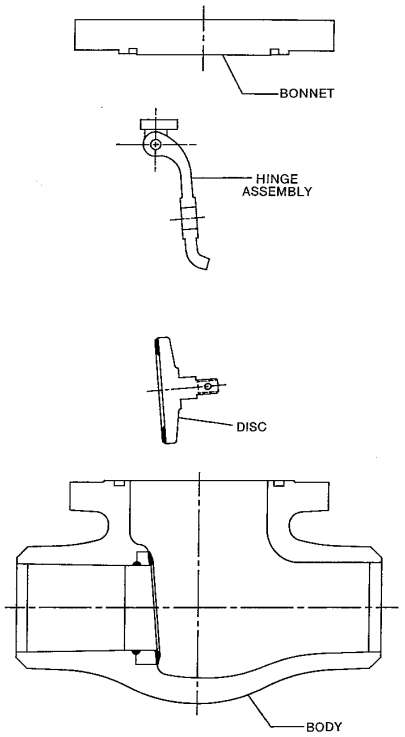


Figure 1

1.0 VALVE DESCRIPTION (Continued)

1.3 Design Features

1.3.1 Bonnet Seals

Anchor/Darling swing check valves are supplied with two basic types of body/bonnet closures; bolted bonnet or pressure seal. 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.

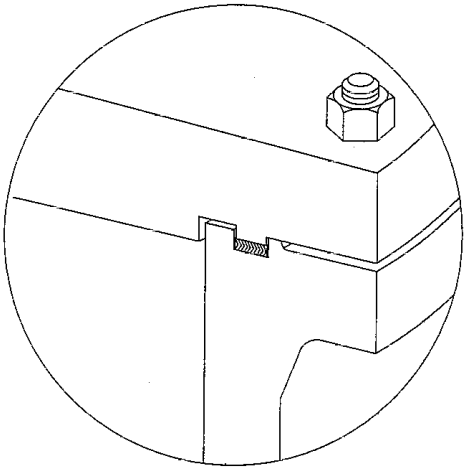


Figure 2

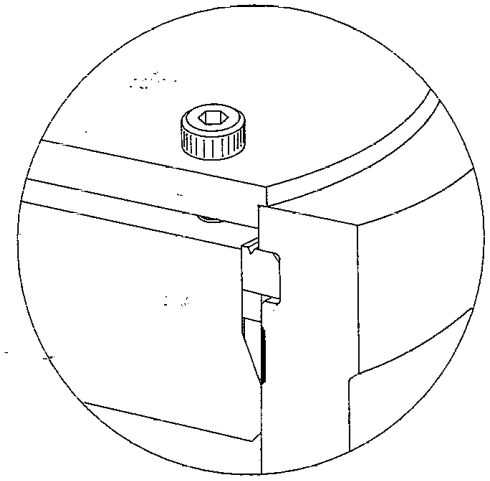


Figure 3

1.0 VALVE DESCRIPTION (Continued)

1.3.2 Disc Assembly

The disc assembly (Fig. 4) consists of a flat faced disc tapering back to an integral disc pin. The threaded pin (and disc), loosely mounted in a hole in the bottom of the hinge arm, is held in place by a heavy nut that is drilled and pinned. The flexible disc-hinge connection permits the disc to completely contact the seat even if there is minor seat face movement. The hinge arm rotates about the hinge pin and has a stop on its tail below the disc pin hole. The stop contacts the body in the fully open position and prevents damaging impact forces from reaching the disc.

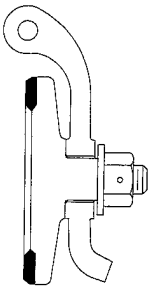


Figure 4

Three methods of supporting the hinge pin in the body have been used. Where shaft penetration of the body is acceptable (Fig. 5) or desirable, the pin is supported in journals that are integrally cast in the body neck above the seat ring. One journal is drilled through the body wall to permit insertion of the pin. In this design, the body penetration is sealed by a spiral wound gasket and a blind flange.

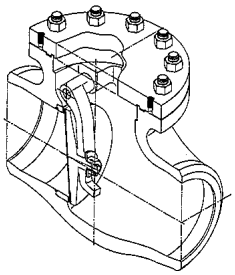


Figure 5

1.0 VALVE DESCRIPTION (Continued)

1.3.2 Disc Assembly (continued)

In an alternate arrangement (Fig. 6) the pin is supported in a bracket that mounts on two pads located above the seat ring. The pin and hinge fit down between the pads and are captured by them. In a third configuration (Fig. 7), the pin is supported in a bracket attached to the bonnet.

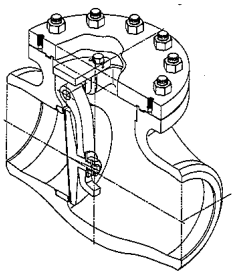


Figure 6

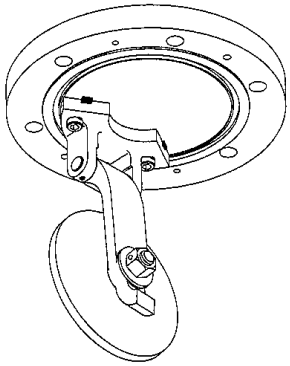


Figure 7

1.3.3 Seat

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.

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 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.

2.0 CARE OF VALVE PRIOR TO INSTALLATION (Continued)

2.3 Storage

Store valves on their shipping skids in a clean and 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. Check valves, with their automatic operation, 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. Swing check valves can be installed in both horizontal and vertical lines. However, in vertical lines the normal flow must be upward and the checked flow downward. 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.

4.0 VALVE MAINTENANCE (Continued)

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.

4.3 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 valves shown in Table 2.

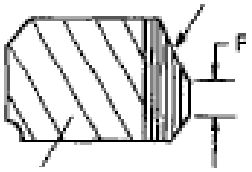
4.4 Refinishing Sealing Surfaces

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). In addition to the following lapping materials manufacturers' recommendations, the following precaution should be observed. Anchor/Darling swing check valves are supplied with a crowned sealing surface on the seat in order to provide precise seat width and tight sealing. Lapping of the seat will cause the sealing band width to be significantly increased.
Subsequent to all seat refinishing operations, the seat width must be checked against dimensions supplied in Table 1 and reduced if necessary. Failure to do so may create leakage problems, particularly at low pressures.

4.0 VALVE MAINTENANCE (Continued)

4.4 Refinishing Sealing Surfaces (Continued)

Hardfacing



Seat Ring

Swing Check
For 150# and 300#

F = 3/32"

NOMINAL SEAT WIDTH

Valve Size	F		
	600#	900#	1500#
2-1/2	.090	.090	.125
3	.090	.090	.125
4	.090	.090	.156
6	.125	.125	.187
8	.125	.156	.218
10	.156	.156	.250
12	.156	.187	.250
14	.156	.187	.250
16	.187	.218	.281
18	.187	.218	.312
20	.187	.218	.312
22	.187	.218	.312
24	.187	.218	.312

TABLE 1

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, refer to the specific assembly drawing for the valve.

5.1 Flanged Bonnet Valves

5.1.1 Bonnet (Fig. 8)

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. 18). With the nuts removed, the bonnet 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. (NOTE: Some older Anchor/Darling swing check valves were designed with the disc assembly attached to the bonnet (See 5.1.2.2). With this design care should be taken in raising the bonnet so that the disc is not damaged.) With the bonnet removed, the old gasket (100) should be lifted out of its groove. Be careful not to damage the gasket sealing surface.

5.0 DISASSEMBLY (Continued)

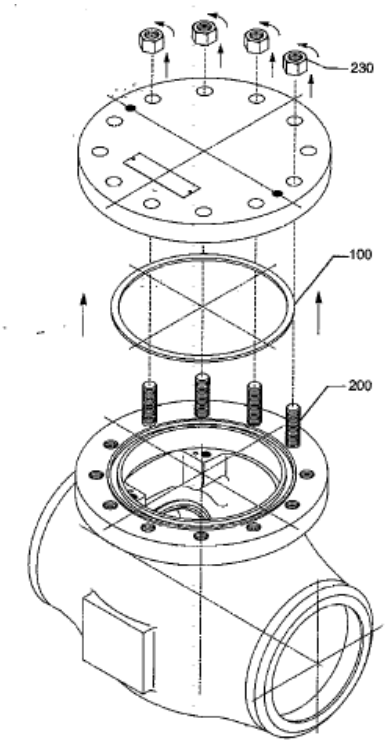


FIGURE 8

5.0 DISASSEMBLY (Continued)

5.1.2 Disc Assembly

Three methods of supporting the disc assembly in the body have been used by Anchor/Darling.

A. Hinge rotates on pin inserted through body wall (Fig. 9).
B. Hinge rotates on pin mounted in bracket hung from bonnet (Fig. 14).
C. Hinge rotates on pin supported in bracket mounted on pads above seat ring (Fig 15).

(Fig. 15) is the design currently supplied by Anchor/Darling.

5.1.2.1 Configuration A (Figure 9)

Removal of the disc assembly in this design, necessitates withdrawing the hinge pin (5) from side of body. The hinge pin is retained in the body by one of three methods. The hinge pin cover in each of the designs is used to seal the penetration of the body.

A. Pipe plug threaded into body and sealed by either an asbestos or spiral wound gasket.
B. Pressure seal joint.
C. Blind flange attached to body by studs and sealed with a spiral wound gasket or seal welded.

Prior to withdrawing the hinge pin in this configuration, make sure the hinge/disc assembly is properly supported either by hand or with slings and that the weight of the assembly is not on the hinge pin.

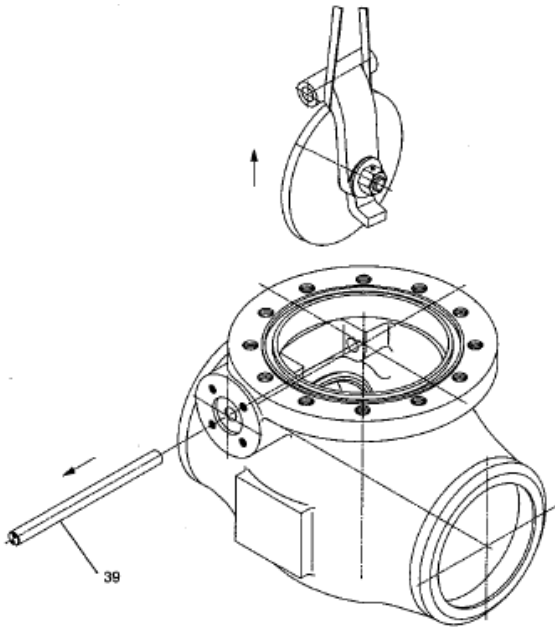


FIGURE 9

5.0 DISASSEMBLY (Continued)

5.1.2.1.1 Pipe Plug Seal Cover (Fig 10 & 11)

In this design the cover (5A) is removed by unthreading the plug out of the body. In some smaller valves, the plug may be an integral part of hinge pin (5) and its removal will as well withdraw the pin. In larger valves, the plug is a separate part and can be removed by itself. Where a separate plug is provided, a roll pin (58), inserted into the ends of both the plug and the hinge pin, serves to prevent hinge pin rotation. Care must be taken during disassembly not to misplace it.

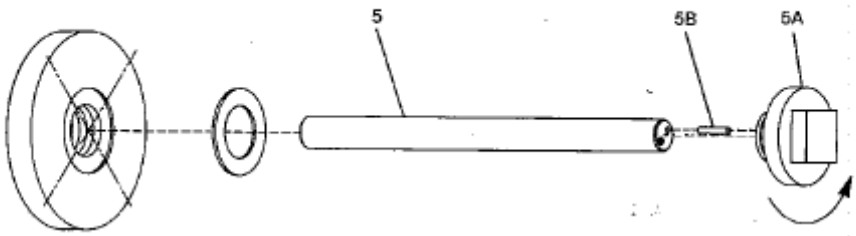


FIGURE 10

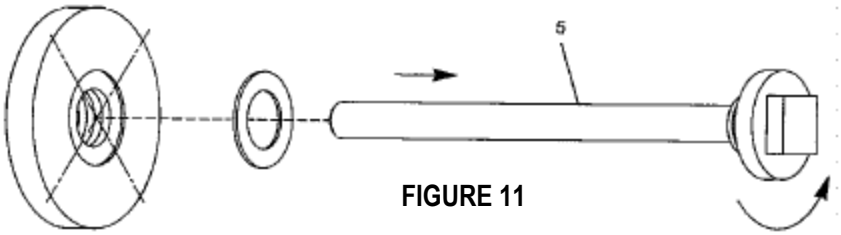


FIGURE 11

5.0 DISASSEMBLY (Continued)

5.1.2.1.2 Pressure Seal Cover (Fig 12)

In this design, the hinge pin cover (10) holds a metal gasket (6A) against the hinge pin bonnet (2A) by studs threaded into the body. As with the pipe plug design, in small valves the bonnet may be an integral part of the hinge pin (5). To remove the cover, unthread the nuts (8A) off the studs (8). 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.

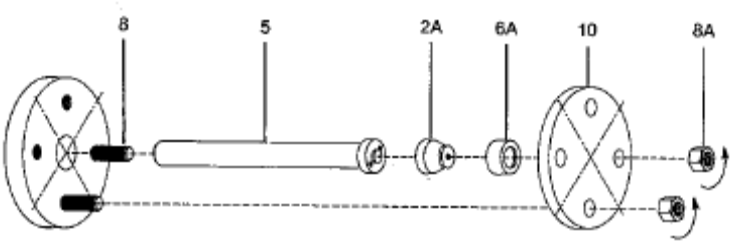


FIGURE 12

5.1.2.1.3 Blind Flange Cover (Fig 13)

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. 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.

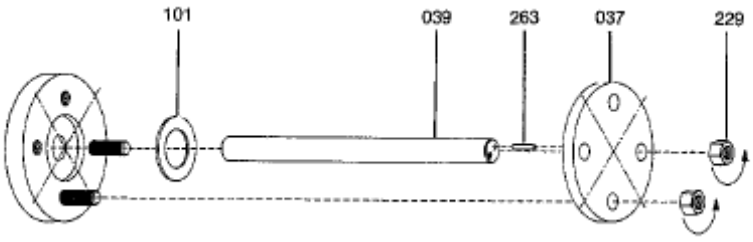


FIGURE 13

5.0 DISASSEMBLY (Continued)

5.1.2.2 Configuration (Fig. 14)

In this configuration, the disc assembly is attached to the bonnet and will come out of the body along with it. Once free of the body, the bonnet can be laid down with disc assembly upmost. To remove the disc/hinge assembly, loosen the staked-setscrew(220) that holds the hinge pin (041) in the hinge support bracket (007). With the disc/hinge assembly properly supported the pin can be withdrawn.

(NOTE: The hinge support bracket mounting position on the bonnet is critical. Removal of the bracket should not be attempted unless the bracket is damaged beyond further use. If replacement of the bracket is required, an Anchor/Darling Field Service Engineer should be contacted for assistance.)

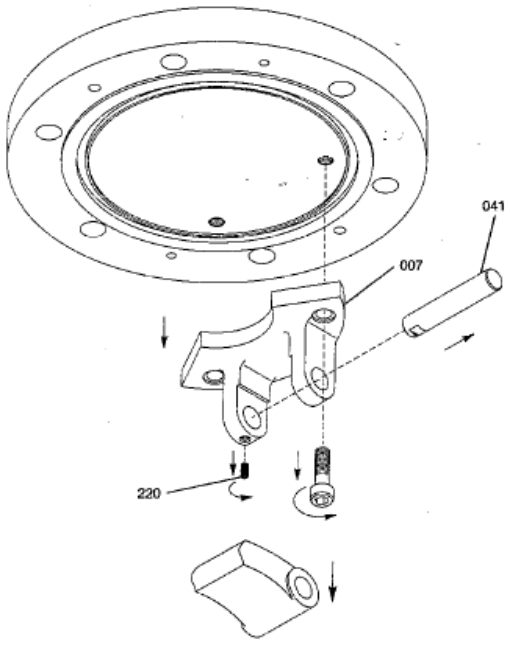


FIGURE 14

5.0 DISASSEMBLY (Continued)

5.1.2.3 Configuration C (Fig. 15)

In this configuration, the disc assembly is mounted on pads in the body and held in place by hex head bolts. To remove the assembly, bend back the tabs on the tab lock washers (251) and unthread the hex head bolts (289). The hinge support (007) can now be raised. The hinge pin (041) is held in place by two retaining rings (245). Once the disc assembly is safely supported, the retaining rings can be removed and the pin withdrawn. A pin (257) is used to prevent rotation of pin in the bracket. Care should be taken not to misplace it.

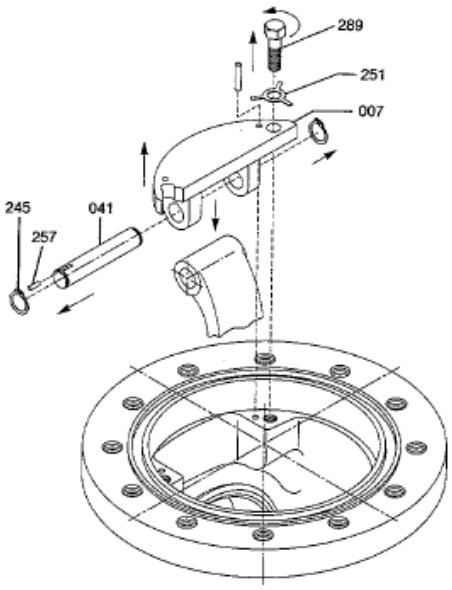


FIGURE 15

5.0 DISASSEMBLY (Continued)

5.1.2.4 Disc/Hinge Assembly (Fig. 16)

The disc (004) in all Anchor/Darling swing check valves is attached to the hinge by means of a disc in (an integral part of the disc) which is inserted into a hole in the lower portion of the hinge. It is held in place by a disc nut (239 or 4B) and a disc washer (250 or 4A) threaded on the disc pin. The nut is locked by either a lock wire or a disc nut pin (265 or 4C). The disc can be removed from the hinge by removing the disc nut pin, the disc nut and the disc washer, in that order. The disc can then be separated from the hinge.

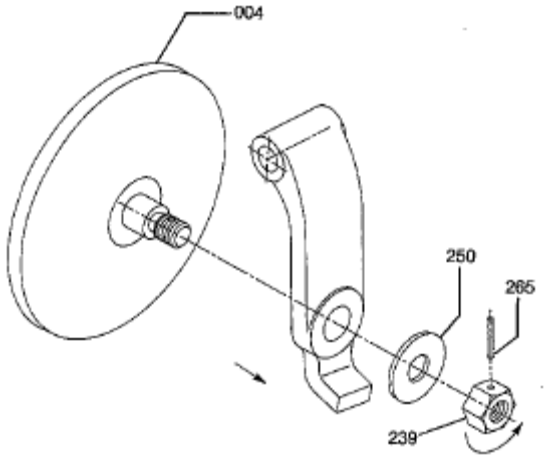


FIGURE 16

5.0 DISASSEMBLY (Continued)

5.2 Pressure Seal Bonnet Valves (Fig 17)

5.2.1 Bonnet

A. Unbolt the capscrews (bonnet) (216) and remove the bonnet retainer (034). Set aside for use later.
B. Tap Ule 150nnet 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 i(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.
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 Assembly

Anchor/Darling pressure seal swing check valves have been supplied with disc support configurations as described in sections 5.1.2.1 and 5.1.2.3. Refer to these sections and section 5.1.2.4 for disassembly procedures.

5.0 DISASSEMBLY (Continued)

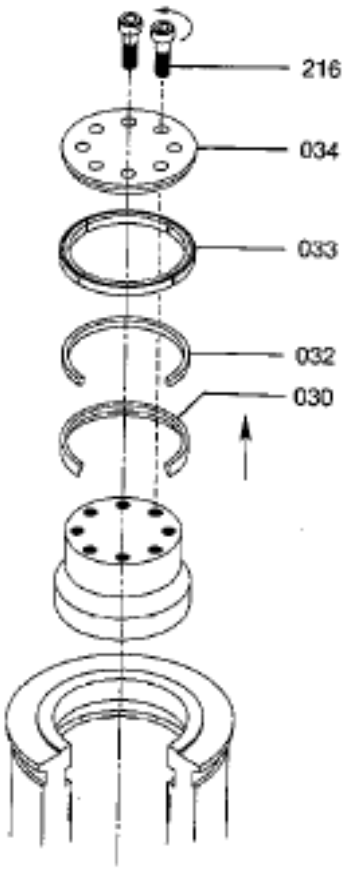


FIGURE 17

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 00 (on pressure seal valves)
3. Body neck 10 (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 Assembly

6.1.1.1 Disc/Hinge Connection (Fig. 16)

The disc (004) is attached to the hinge (006) by inserting the pin on the back of the disc through the hole in the lower end of the hinge. The disc washer (250 or 4A) and the disc nut (239 or 4B) are then threaded on the pin. With the disc nut tight on the pin, there should be freedom of movement between the disc and the hinge. If the disc if tightly connected, back off the disc nut one turn.
If the valve is being reassembled with the original parts, the correct position of the nut can be determined by aligning the disc nut pin holes in the nut and the disc pin. If new parts are being used, the hole for the disc nut pin must be drilled through the nut and disc pin. Once the nut is positioned properly, the disc nut pin (265) should then be inserted into the hole and the ends peened over.

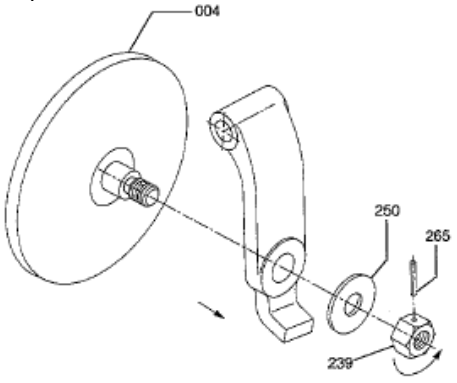


FIGURE 16

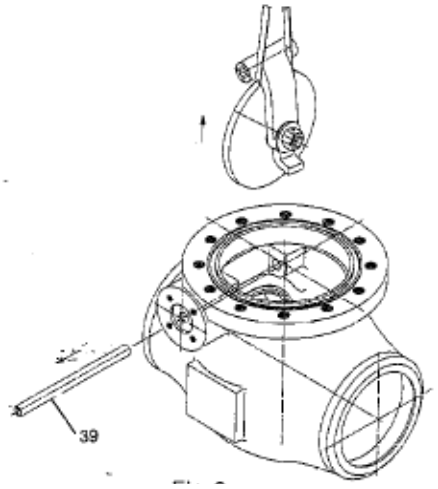
6.0 ASSEMBLY (Continued)

6.1.1.2 Hinge Mounting

6.1.1.2.1 Pin Mounted in Body Wall (Figs. 9-13)

Pin Mounted in Body Wall (Figs. 9-13). The disc assembly should be lowered into the body and supported either by hand or with a sling. With the pin (039, 041, 5) partially inserted through the body wall, align the hinge assembly with the pin and push the pin through the hinge, into the journal on the opposite body wall. Depending on the type of hinge cover supplied it may be necessary to affix a roll pin (58) between the end of the hinge pin and the cover, plug or bonnet (037, 10, SA). With the plug type cover (Fig. 11) in which the plug is an integral part of the pin the gasket should be placed on the plug prior to insertion of the pin. If the plug is separate, the gasket and the roll pin should be affixed and the plug screwed into the body. Where a spiral wound gasket is used, care must be taken to correctly compress the gasket. The plug should be tightened until the proper compressed gasket thickness is achieved.

Where a pressure seal bonnet has been supplied, the pin (5) and bonnet (2A) or integral pin/bonnet should be inserted. The gasket can then be inserted into the bore until it contacts the bonnet. With the above in position the cover (10) is fitted on to the studs (11) and pushed up against the gasket. Using a criss cross pattern the nuts should be torqued to the valves shown in Table (2). Where a blind flange cover is used, the gasket (101) and roll pin (263) should be affixed and the cover (037) placed over the studs (208). After the nuts (229) have been threaded on to the studs, they should be torqued to the values listed in Table 2.



The following values should be used:

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

FIGURE 9

6.0 ASSEMBLY (Continued)

6.1.1.2.1 Pin Mounted in Body Wall (Figs. 9-13)(Continued)

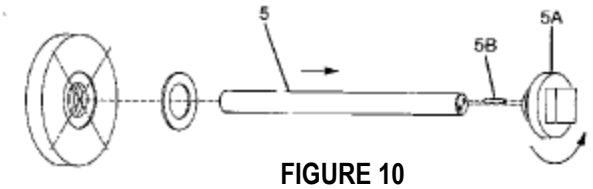


FIGURE 10

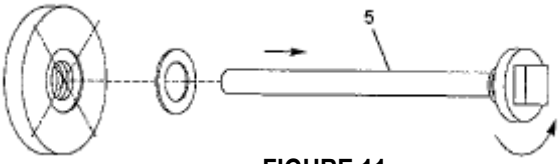


FIGURE 11

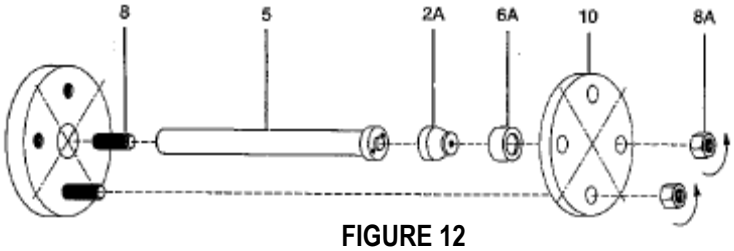


FIGURE 12

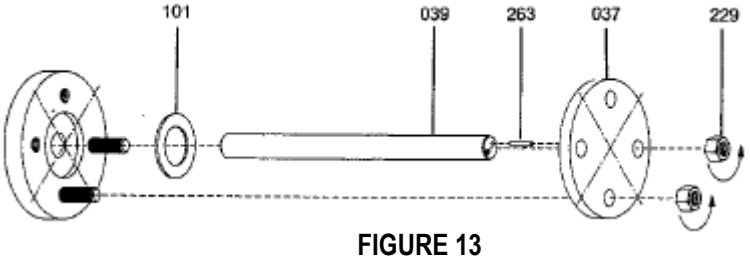


FIGURE 13

6.0 ASSEMBLY (Continued)

6.1.1.2.2 Pin Mounted in Bracket on Bonnet (Fig 14)

Where a pressure seal bonnet has been supplied, the pin (5) and bonnet (2A) or integral pin/bonnet should be inserted. The gasket can then be inserted into the bore until it contacts the bonnet. With the above in position the cover (10) is fitted on to the studs (11) and pushed up against the gasket. Using a criss cross pattern the nuts should be torqued to
the vaives shown in Table (2). Where a blind flange cover is used, the gasket (101) and roll pin (263) should be affixed and the cover (037) placed over the studs (208). After the nuts (229) have been threaded on to the studs, they should be torqued to the values listed in Table 2.

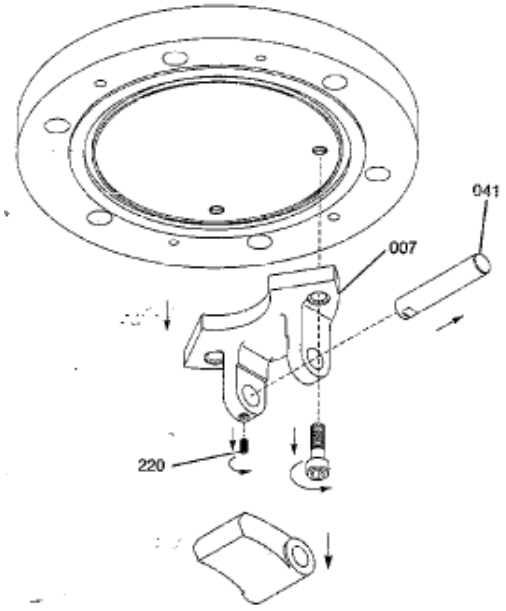


FIGURE 14

6.0 ASSEMBLY (Continued)

6.1.1.2.3 Pin Mounted on Bracket in Body (Fig 15)

With the hinge assembly supported, the hinge support (007) should be placed over the hinge end and the hinge pin (041) (with the retaining pin (257) in place) inserted into position. Prior to installing the assembly in the body, position the two spring pins (258) on the pads in the body. The assembly can now be lowered over the pins into position on the pads. Put a washer (Tab Lock) (251) on each hinge support bolt (289), insert them through the hinge support bracket into the body and tighten. Once they are in place, the tabs on the lock washer should be bent over.

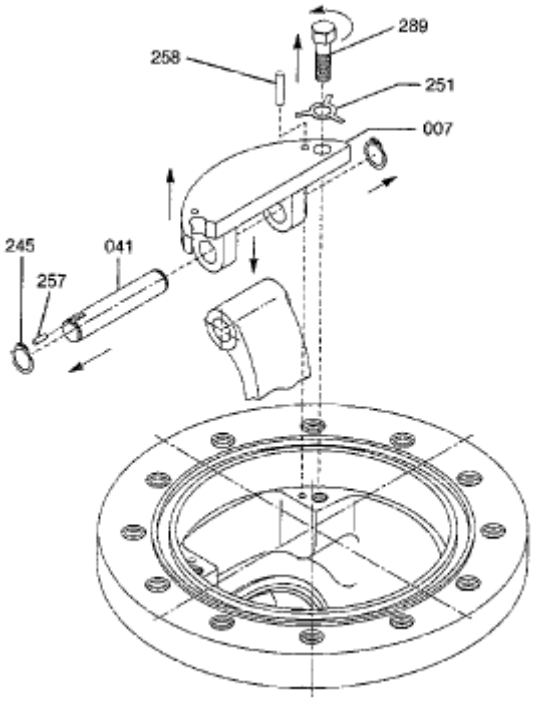


FIGURE 15

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. On valves where the hinge is attached to the bonnet, care should be taken to insure that the disc is aligned correctly with the seat. This is accomplished by lining up the dowel pin with the holes in the body and bonnet. 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 2 for various diameter studs and materials. The nuts should be tightened evenly using a crisscross pattern similar to the one shown in Fig. 18. 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.

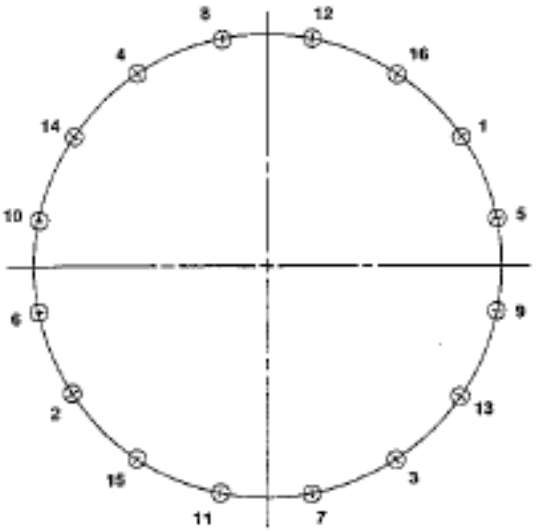


FIGURE 18

6.0 ASSEMBLY (Continued)

MAXIMUM TORQUES FOR FIELD SERVICE (Ft. Lb.)

The following torque values are provided for guidance in filed 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	A574
5/16 -18	**11**	**6.5**	**12**	**13**	**15**
3/8 – 16	**20**	**12**	**20**	**23**	**26**
7/16 – 14	**30**	**19**	**30**	**36**	**44**
½ - 13	**45**	**28**	**50**	**55**	**67**
9/16 – 12	**70**	**40**	**70**	**80**	**-**
5/8 – 11	**90**	**56**	**100**	**110**	**130**
¾ - 10	**165**	**100**	**165**	**195**	**230**
7/8 – 9	**270**	**160**	**280**	**310**	**375**
1 – 8	**400**	**240**	**420**	**470**	**560**
1 1/8 - 8	**600**	**350**	**600**	**690**	**800**
1 ¼ - 8	**800**	**500**	**850**	**970**	**1140**
1 3/8 – 8	**1100**	**675**	**1200**	**1320**	**1500**
1 ½ - 8	**1500**	**900**	**1600**	**1750**	**1970**
1 5/8 – 8	**1900**	**1150**	**2000**	**2250**	**-**
1 ¾ - 8	**2400**	**1450**	**2500**	**2850**	**3100**
1 7/8 – 8	**3000**	**1800**	**3200**	**3500**	**-**
2 – 8	**3700**	**2200**	**3900**	**4300**	**4600**
2 1/8 – 8	**4400**	**2650**	**4700**	**5200**	**-**
2 ¼ - 8	**5300**	**3200**	**5600**	**6200**	**6900**
2 ½ - 8	**7400**	**4400**	**8000**	**8600**	**9400**
2 ¾ - 8	**8700**	**5900**	**10400**	**11600**	**12800**
3 – 8	**11400**	**7800**	**13000**	**15200**	**16900**

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

TABLE 2

6.2 Pressure Seal Bonnet Valves

6.2.1 Disc – Hinge Assembly

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.

6.0 ASSEMBLY (Continued)

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. In that the gasket may also cock, it must be inserted with care. Once these are 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.

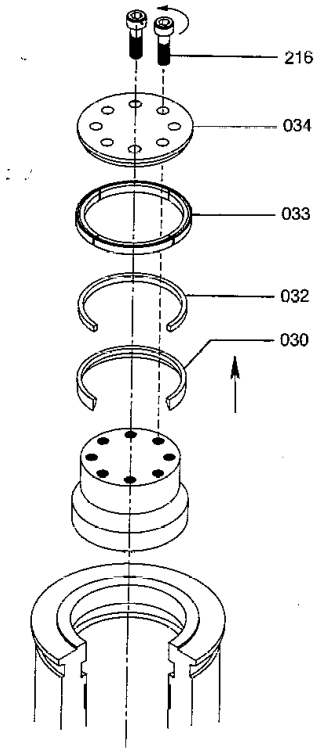


FIGURE 17

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