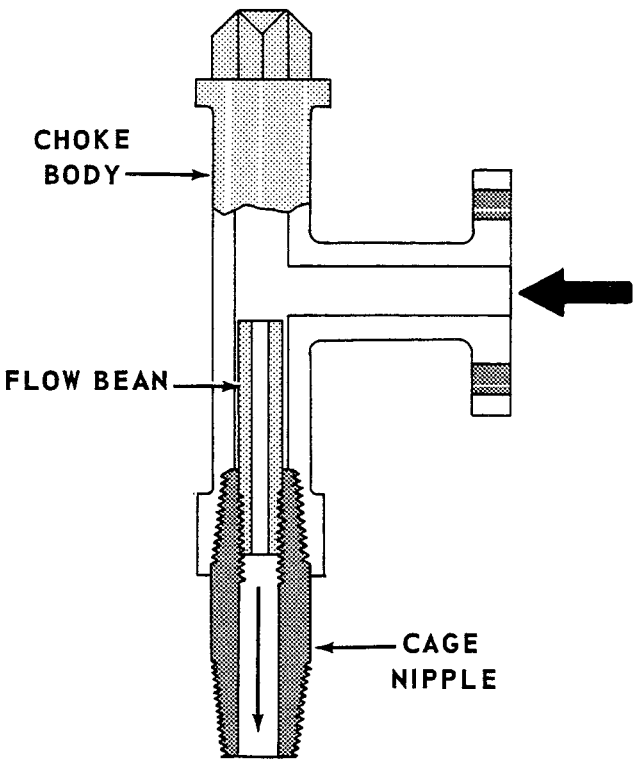
UNIT 2
DETAILS OF CONSTRUCTION OF FLOWING WELL EQUIPMENT

SURFACE CHOKES

Positive Chokes

1. This drawing shows the construction of one kind of positive surface choke.



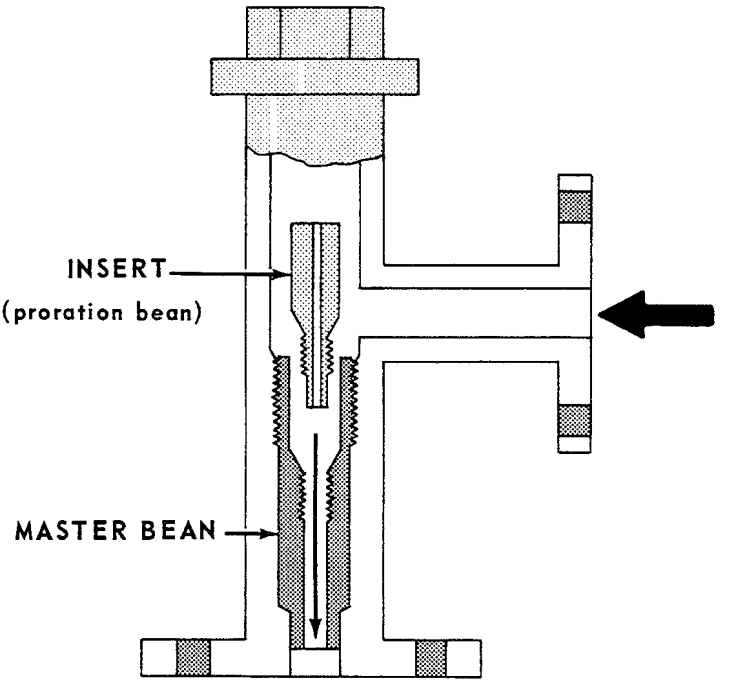
The cage nipple screws into the _____ _____.

2. The flow bean screws into the _____ _____.

3. The *orifice* size of the choke is the ID of the _____ _____.

4. In this choke, flow rates are changed by changing the _____ _____.

5. Some positive chokes have removable inserts (proration beans).



The insert, or proration bean, screws into threads in the _____ bean.

6. The master bean is threaded at the top to screw into the _____ _____.

7. To change the orifice size, (the proration bean and the master bean/only the proration bean) must be changed.

8. Or, in positive chokes with a cage nipple, the _____ _____ screws into the choke body and the rate is controlled by changing the size of the _____ _____.

9. Where there is no cage nipple, it is the _____ _____ that screws into the choke body, and the proration bean, or insert, is threaded to fit into the _____ _____.

10. Flow beans and proration beans are (permanent/removable).

11. Flow rates can be changed by changing the size of the _____ bean or _____ bean.

12. Flow beans for positive chokes are usually 6 inches long and come with orifices sized in 64ths of an inch.

    There is a greater restriction to flow when the orifice size is ($^{1}/_{64}$ / $^{32}/_{64}$) of an inch.

13. The smaller the number, the (greater/less) the restriction when the beans are sized in 64ths of an inch.

14. Some flow beans and most proration beans are sized in 100ths of an inch.

    ($^{1}/_{100}$ / $^{1}/_{64}$) is a smaller choke size.

15. A size 8 bean has a *wider* orifice if the choke is sized in (64ths of an inch/100ths of an inch).

16. Some beans are given catalog numbers.

    Then the number (is/is not) the same as the size of the orifice.

17. Proration beans are usually shorter than six inches.

    With the same orifice ID, a (longer/shorter) bean restricts flow more.

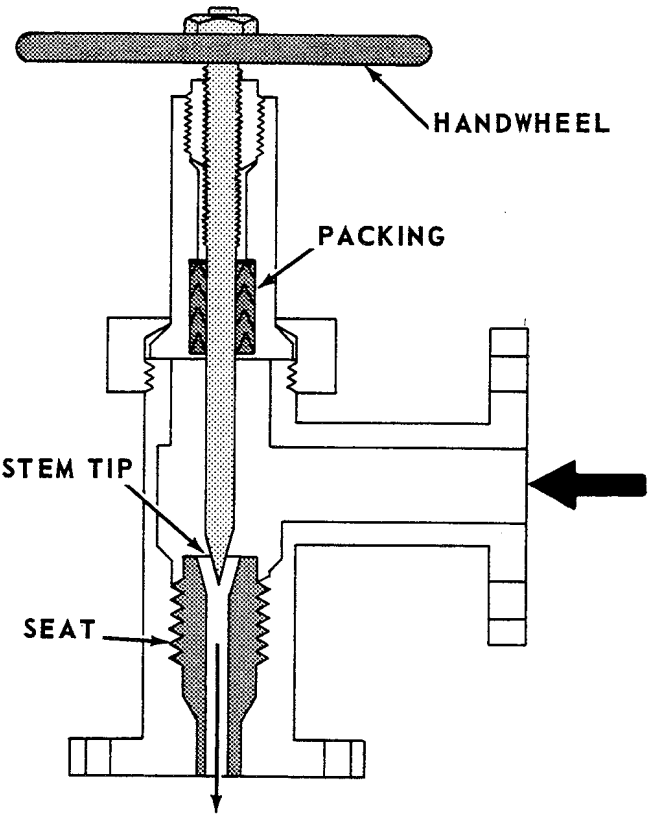
18. Or, with the same ID, (flow/proration) beans restrict flow more.

19. Manufacturers usually size proration beans according to equivalent flow bean sizes.

    Usually, the ID of a proration bean is actually (smaller/larger) than its stated bean size.

Adjustable Chokes

20. An adjustable choke can be adjusted while the well is flowing.



To change the size of the orifice, the stem tip is moved in or out of the removable _____.

21. Moving the tip toward the seat (increases/decreases) the orifice size.

22. Moving the tip away from the seat creates a (higher/lower) flow rate.

23. The stem is moved by turning a _____.

24. Near the handwheel, the stem is _____ to prevent leakage.

25. A *rising stem indicator* on the adjustable choke shows the orifice size.

    The stem rises higher when the orifice is (larger/smaller).

26. Marks on the indicator show the exact size of orifice created.

    To know the orifice size of an adjustable choke, you read the _____.

27. An adjustable choke is usually made in the form of a tee.

    The stem tip and seat are set (upstream/downstream) from the tee.

28. Suppose an adjustable choke is set with the stem tip upstream from the tee.

    Fluid entering the choke will flow (into/with) the tapered part of the stem.

29. The stem tip would soon become _____.

30. With the stem tip mounted downstream from the tee, the direction of flow is (with/against) the stem tip and wear is (increased/decreased).

31. It is easier to change the flow rate when the choke is (positive/adjustable).

32. To change the rate with an adjustable choke you (do/do not) need to shut in the well.

33. But sand and other solid particles more easily plug up (a positive/an adjustable) choke.

34. In an adjustable choke, fluid must flow around the stem tip.

    Flow is more *turbulent* with (a positive/an adjustable) choke.

35. So the choke parts wear more and need to be replaced more often in _____ _____ choke.

    When the flow rate is to be kept the same for long periods of time, (positive/adjustable) chokes are preferred.

36. Subsurface chokes are usually (positive/adjustable) chokes.

37. Some positive and adjustable chokes have the same type choke body.

    These chokes may be changed from positive to adjustable, or from adjustable to positive, without removing the _____ _____ from the line.

38. Flow is smoother with _____ _____ choke.

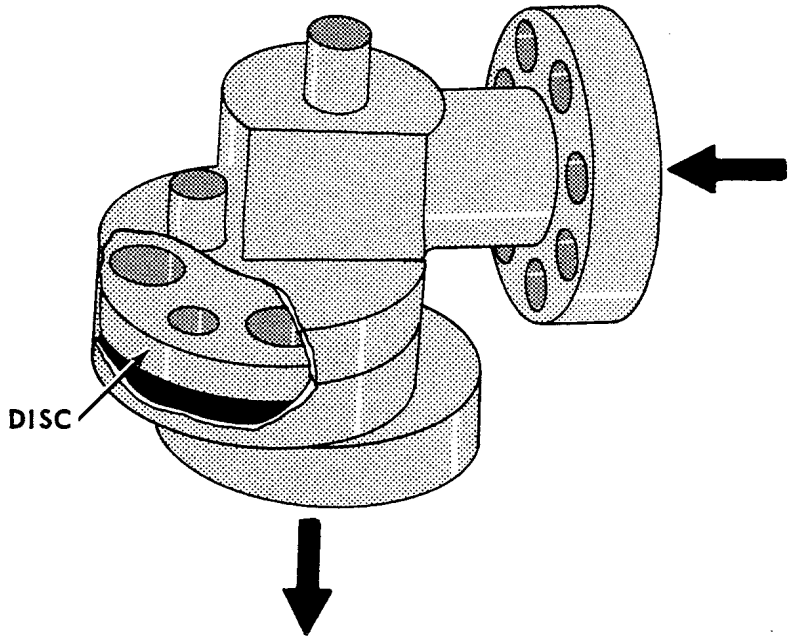
39. Adjustments are easier with _____ _____ choke.

40. Most bottom-hole chokes are _____ chokes.

41. The choke that is most likely to plug up is the _____ choke.

Rotary Chokes

42. Some wells have *rotary* chokes.



A rotary choke has several beans fastened on one _____.

43. To change the bean size, the disc is _____.

44. A typical disc may have five flow beans and one blank bean.

    A blank bean is a bean with no _____.

45. The blank bean on a rotary choke can be used to _____ flow.

46. The beans on a rotary choke are shaped like positive flow beans.

    Like positive chokes, rotary chokes wear (more/less) than adjustable chokes.

47. And there is less plugging in (a rotary/an adjustable) choke.

Review

48. Surface chokes may be _____ chokes, _____ chokes, or _____ chokes.

49. Flow is smoother with _____ chokes and _____ chokes.

50. _____ chokes and _____ chokes are easier to adjust.

51. A proration bean screws into a _____ _____.

52. A flow bean screws into a _____ _____.

53. The (cage nipple/master bean) protrudes from the choke body.

54. Positive chokes and adjustable chokes (can sometimes/ can never) fit into the same choke bodies.

55. The *leading* edge of a choke is the upstream edge.

    Both flow beans and choke seats wear more on their (leading/trailing) edge.

56. To tell if a choke is worn, you need to look at the _____ edge.

57. Erosion can change the orifice size in any choke.

    The orifice is (larger/smaller) in an eroded choke.

58. So, the flow rate is (higher/lower) when the choke is eroded.

59. If a flowing well is *overproducing,* the trouble could be an eroded _____.

60. Suppose the choke is plugged.

    Then the orifice is (larger/smaller), and production (increases/decreases).

61. If the flow rate drops, the choke is probably _____.

62. If the flow rate rises, the choke is probably _____.

SURFACE VALVES

63. At the well head, valves are used to _____ flow when the well is shut in, or when conditions become unsafe.

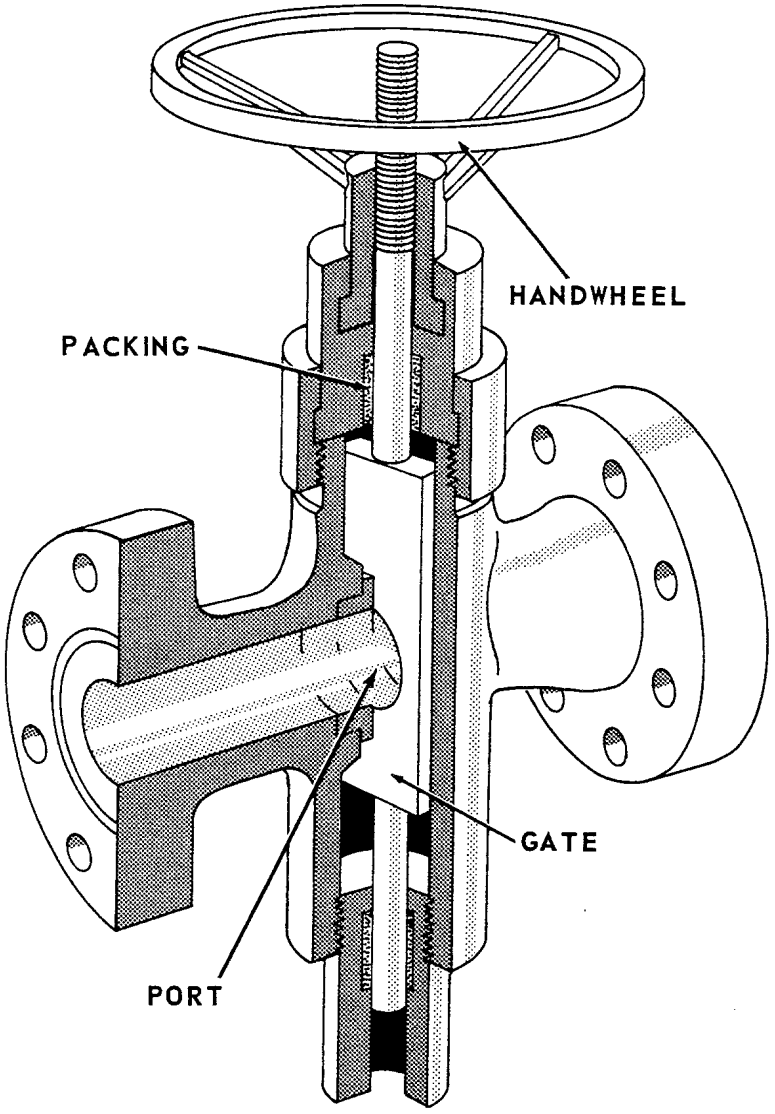
64. While the well is flowing, surface valves must be completely open.

    A partially open valve acts like a _____ in restricting flow.

65. And master valves and other surface valves _____ too fast if they are not completely open or completely closed.

Gate Valves

66. Here is a common type of surface valve.



The valve is opened and closed by moving a _____ up and down with a handwheel.

67. The valve is open when the _____ lines up with the flow line.

68. To prevent leakage, the stem of the valve is _____.

69. On some gate valves, the stem rises through the valve handle as the valve is opened.

The rising stem is an indicator that shows whether the valve is _____ or _____.

70. Other gate valves do not have rising stems.

On these valves, you must turn the _____ to tell whether the valve is open or closed.

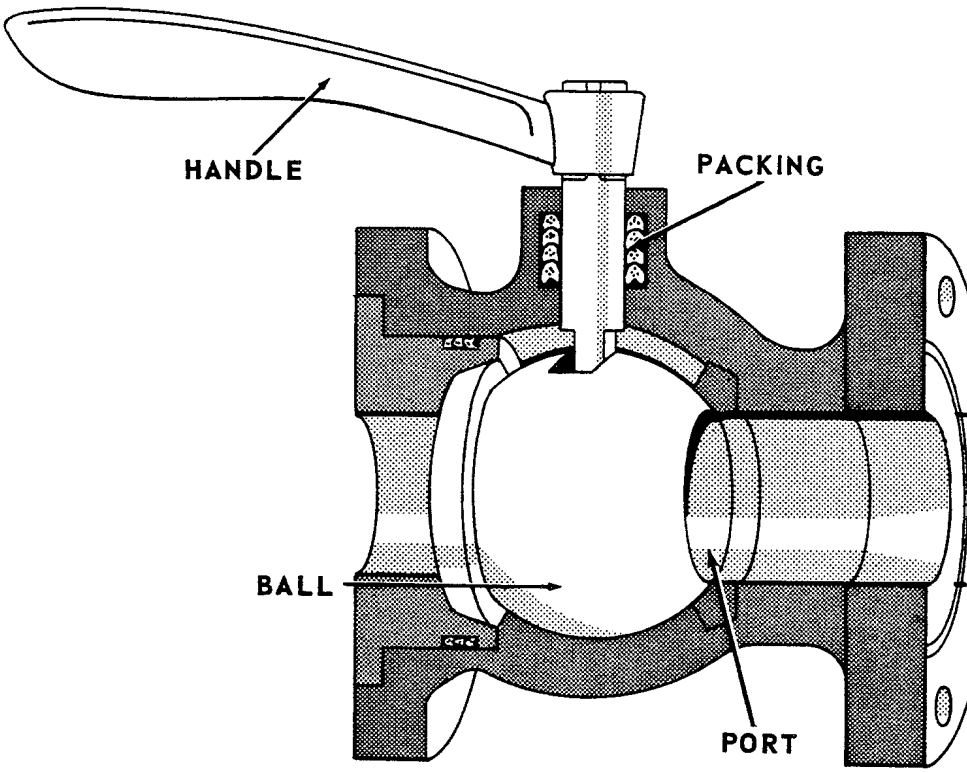
71. When a gate valve is used as a master valve, the port in the gate must have the same ID as the _____.

72. Ports can be smaller for (wing/master) valves.

73. Both master valves and wing valves erode too quickly when the valve is not completely _____ during flow.

Ball Valves

74. Here is a *ball* valve.



This valve is opened and closed by turning a handle that rotates a _____.

75. When the port in the ball lines up with the flow line, the valve is _____.

76. The ball valve shown in the drawing (is/is not) full-opening.

77. In this valve, the _____ in the ball is as large as the flow line.

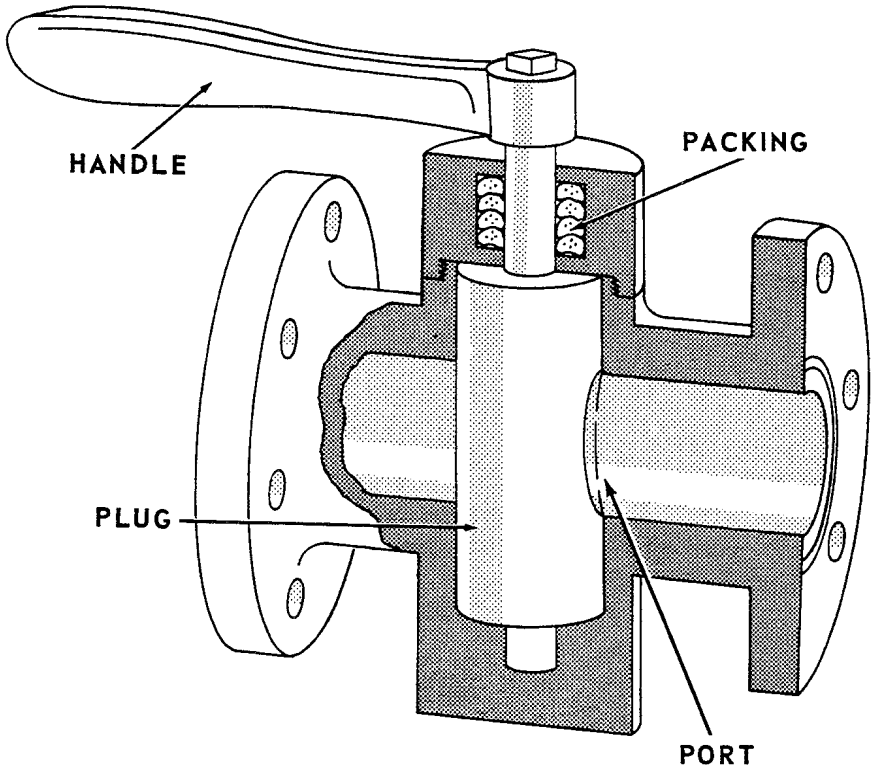
78. Like the gate valve, the ball valve is _____ near the handle to prevent leakage.

79. Both the gate valve and the ball valve shown are (flanged/threaded) into the line.

80. A ball valve (could/could not) be used as either a wing valve or a master valve.

Plug Valves

81. Or, wing valves and master valves may be *plug* valves.



A plug valve operates more like a (ball valve/gate valve).

Now turn the page, turn the book over, and go on.