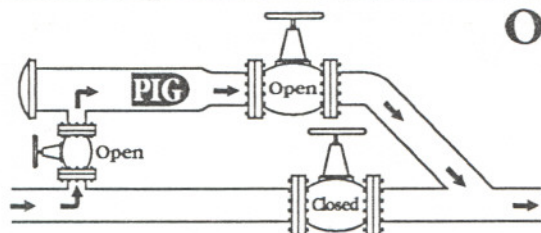
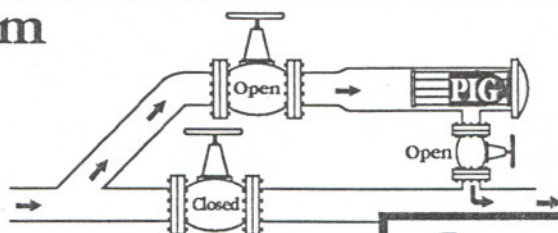


LAUNCH & RETRIEVAL METHODS

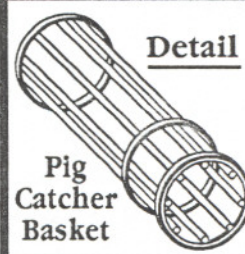
On Stream



Entry

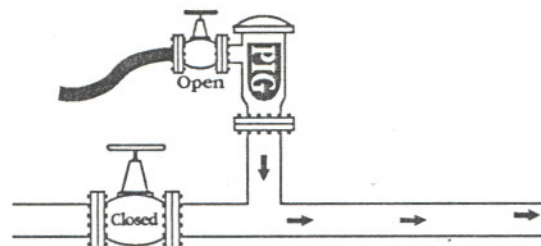


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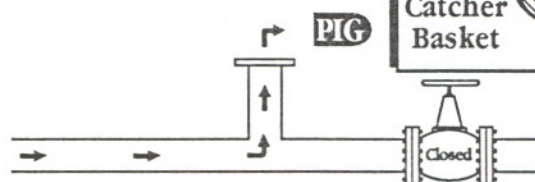


Detail

Tee

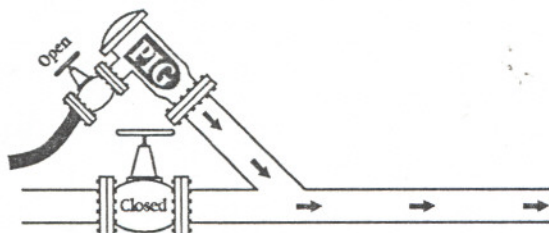


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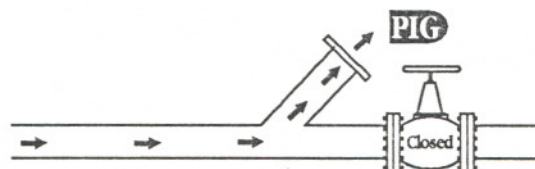


Exit

Wye

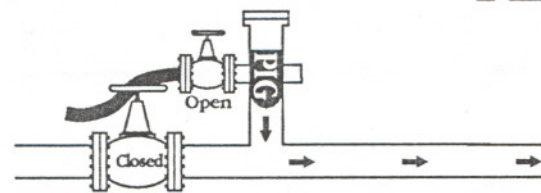


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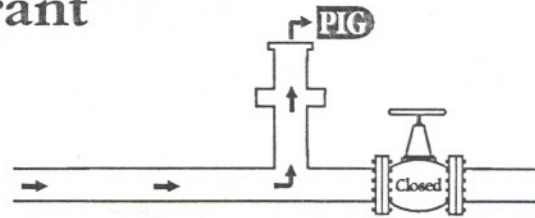


Exit

Fire Hydrant

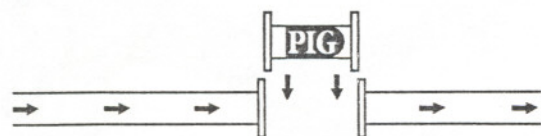


Entry



Exit

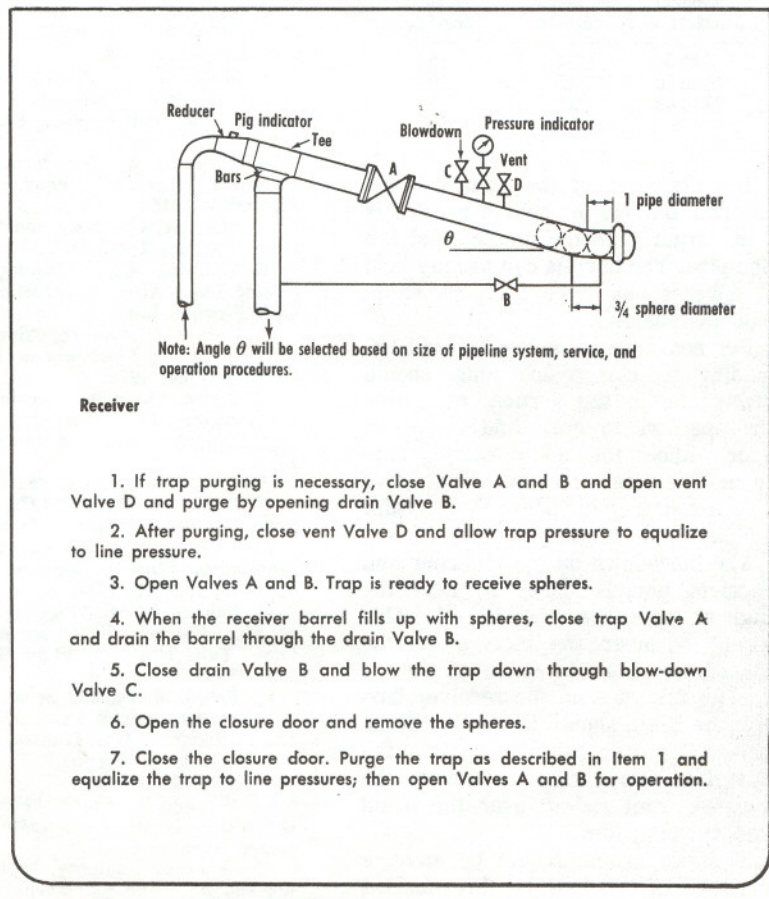
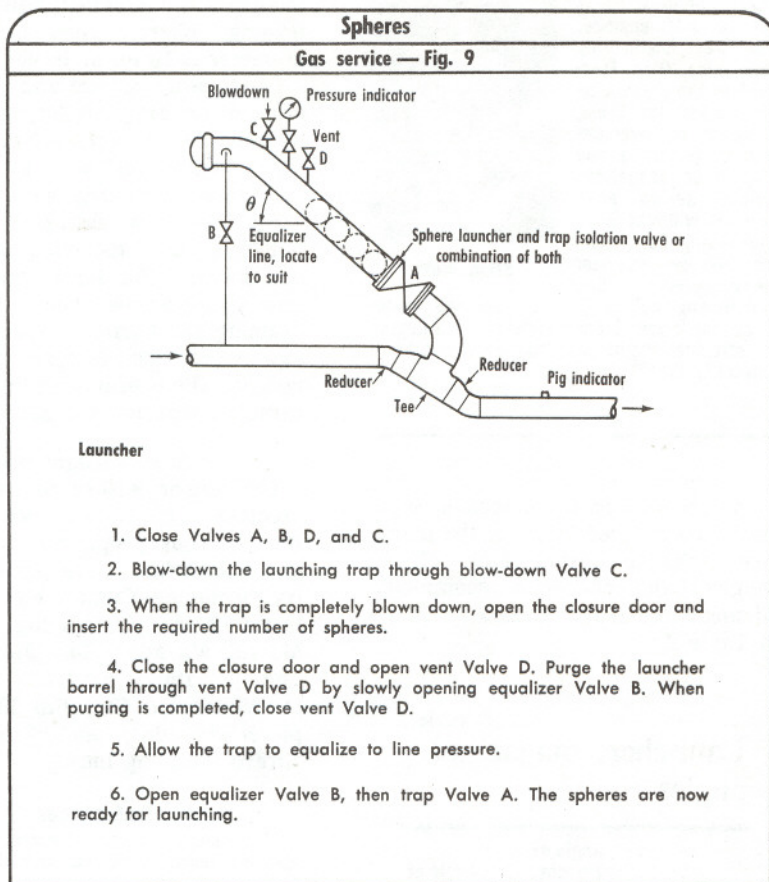
Spool Piece



Entry



Exit



weld and on receiver traps $1\frac{1}{2}$ -times the length of the pig from the bypass line to the closure weld.

A short pup is placed between the reducer and the trap valve to provide head space for the pig. This pup prevents the steel nose of the pig from coming into contact with the trap valve during pressurization. If contact is made with sufficient pressure differential, the pig may damage the valve.

In the case of large-diameter land pipelines transporting natural gas, crude oil, or refined products, the trap valve and side valve should be buried with the barrel above ground. This will provide additional head space on the barrel. This extra length is especially necessary on receiving traps.

In gas service, the velocities at receiving traps can exceed 30 mph. The extra head space is required to stop the pig and prevent it from hitting the closure door.

The bypass line is attached to the barrel near the closure on launching traps and near the reducer on receiver traps. The size of the bypass varies with service, but the diameter is usually a minimum of 22% of the pipeline diameter.

Pig indicators should be located on the barrel pup joint near the reducer on receiving traps, and downstream of the side valve tee on launcher traps. The pig indicator should be located on top of the pipe to prevent foreign material from making the indicator inoperative.

Liquid pipelines require a drain on the barrel along with a pressure gauge, thermal-pressure relief valve, and vent valve. The drain valve should be located in the vertical position directly under the barrel. This is to prevent an accumulation of material from plugging the drain and making the drain valve inoperative.

Gas-pipeline pig traps require a blowdown valve, pressure gauge, and a utility or vent valve. Large-diameter pipelines usually require a lifting device to load and unload pigs. The device is usually installed when the pigs exceed 100 lbs. The device consists of a swivel loading arm equipped with a chain hoist or come-along.

Procedures for launching and receiving pigs in various services is included (Figs. 7 and 8) to demonstrate the general practice. This procedure may vary from pipeline to pipeline because of the unique circumstances of each pipeline system and combinations of services.

Concerning the procedure for launching and receiving pigs in gas

service (Fig. 7), note that Valves E, F, and D on launcher traps and Valve E on receiver traps are used only in large-diameter land-pipeline service with buried valves. These valves provide an extra margin of safety for purging and protecting the valve gate from damage. For small-diameter pipelines and in restricted areas, these valves can be eliminated. This is a decision of the operator.

Sphere launchers. Sphere launchers differ from pig launchers because they are equipped with extra-length barrels for multiple launching.¹⁵ These extra length barrels are called magazines. This feature of spheres makes them readily adaptable to unmanned launching.

The operator can load the magazine with several spheres, and the launching can be activated either automatically or remotely. This process is used extensively in two-phase-flow pipelines in remote areas.

Various launching mechanisms are available on the market so the selection of launchers is a matter of choice. Launchers consist of check valves, ball valves with only one side of the ball cut out, pins, and rocker mechanisms.

Additional valves are sometimes installed downstream of the launching mechanism to facilitate repairs on the launcher without shutting down the pipeline system.

The launcher will consist of the launcher barrel, launching mechanism, isolation valve, equalizer valve and reducer tee. The receiver will consist of a barrel, isolation valve, reducer tee and a drain that will suffice as an equalizer line (Fig. 9).

Both launcher and receiver should be equipped with a pressure gauge, blow-down, and utility valve. Pig indicators are installed on the launcher downstream of the side-tee reducer and on the receiver just upstream of the tee.

A sphere-launcher barrel or magazine will hold several spheres ready for launching. The length of the magazine depends upon the frequency of running spheres and the frequency of reloading.

In remote areas such as offshore platforms that are affected by weather, a safety factor should be included in the event the reloading schedule cannot be met and pigging must be maintained to prevent shut-down of facilities.

Large magazines can become too long or tilted at an excessive angle, causing excessive weight on the bottom sphere. This will cause the spheres to bind and the release mechanism to malfunction.

The author . . .

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To prevent this, the magazine angle should be reduced to cause the magazine walls to absorb most of the weight of the spheres. A recommended angle for the magazine is shown in Table 2.

Table 2

Launcher, magazine angles

Nominal diameter, in.	Angle of launcher mechanism, degrees	Angle of magazines, degrees
4 to 8	45	15
10 to 20	20	10
22 to 48	20	5

The diameter of the launcher and receiver barrels for sphere service is 2 in. larger than the diameter of the line pipe. The barrels can usually hold 10 spheres and have been known to hold 15 spheres.

For convenience of loading and unloading, the closure-door hinge should always be in the vertical to enable the operator to open and close the door without the aid of extra equipment. The receiver barrel should have a horizontal pup near the closure which is one diameter in length.

The blow-down on the launcher and receiver barrels should be near the highest point on the barrel. This would be near the closure on the launcher and at the valve on the receiver. Likewise on the receiver barrel, the drain should be at the lowest point. The drain should tap into the barrel in two places to prevent the spheres from rolling over the drain and stopping flow.

The two drains should be apart a distance of one-half to three-fourths

the sphere diameter. The equalizer line and valve on the launcher can be located at operator's convenience.

Hoisting mechanisms should be available to facilitate loading and unloading spheres when the pipeline diameter is 20 in. or larger.

Combination sphere and pig launchers can be designed for special conditions where spheres are required for liquid control and pigs are required for periodic cleaning operations.

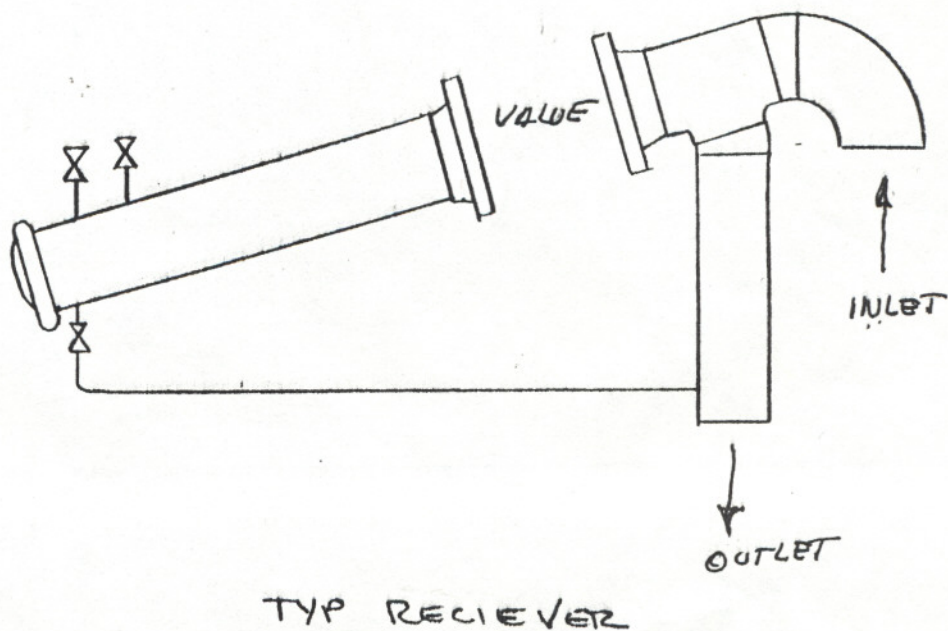
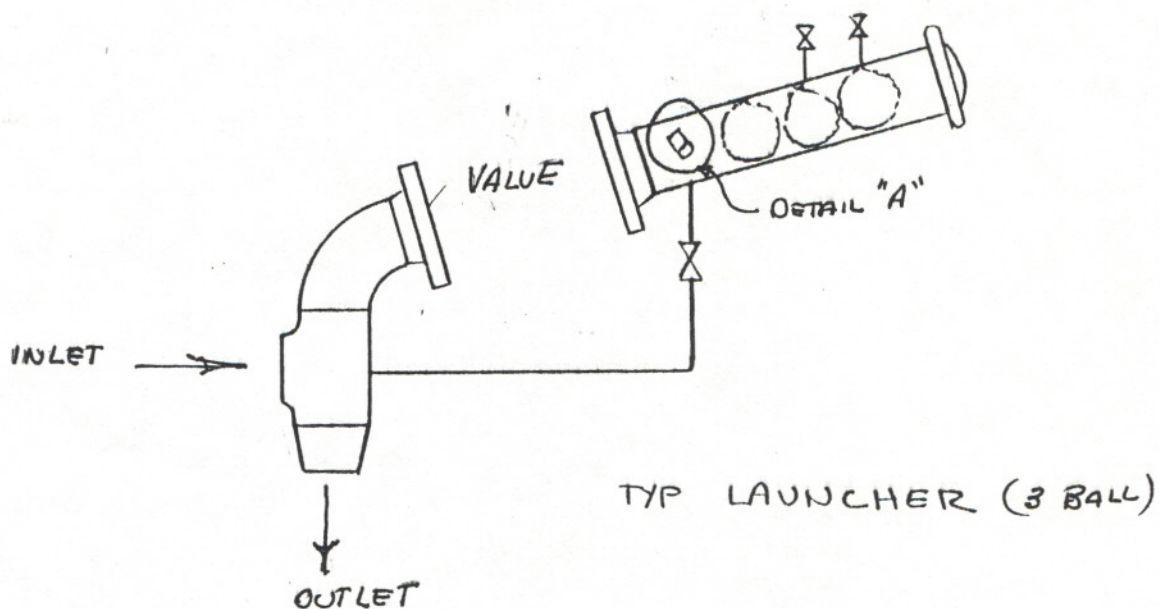
Fig. 9 gives the procedure for launching and receiving spheres in gas service. For liquid service, certain modifications must be made for draining the barrels to prevent spillage when the closure doors are opened. The operation is basically the same as that for gas service.

Acknowledgments

The author wishes to express appreciation for information obtained from various people with experience and knowledge in the pipeline industry, including Clinton McClure, Williams Bros. Engineering Co.; Del Moore, Wheatley Co.; Jim Forster, Tom Wheatley Co.; Larry Payne, T. D. Williamson Co.; Bill Fulton, Explorer Pipeline; and Frank Gray, Girard Polly-Pig Inc.

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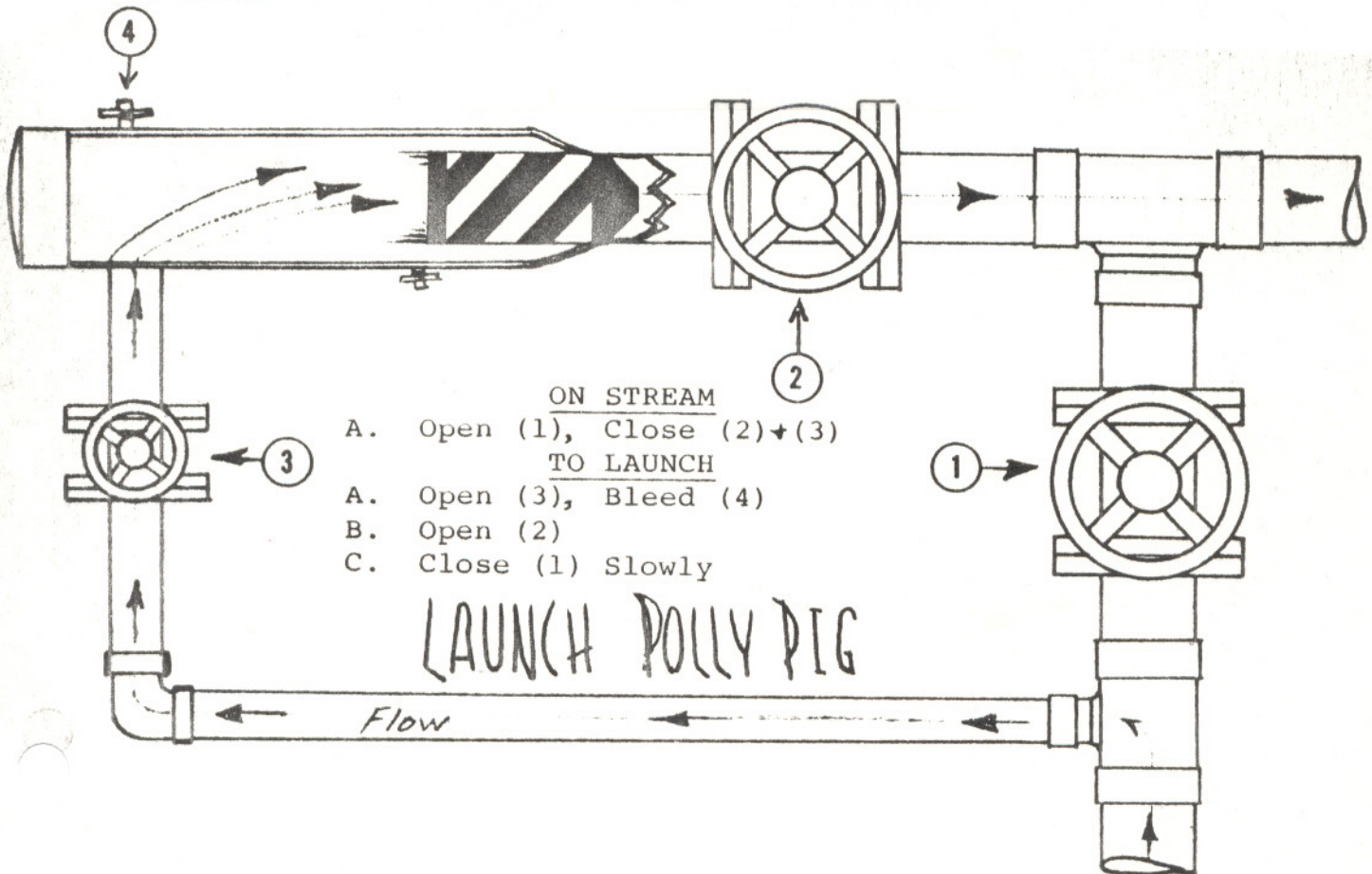
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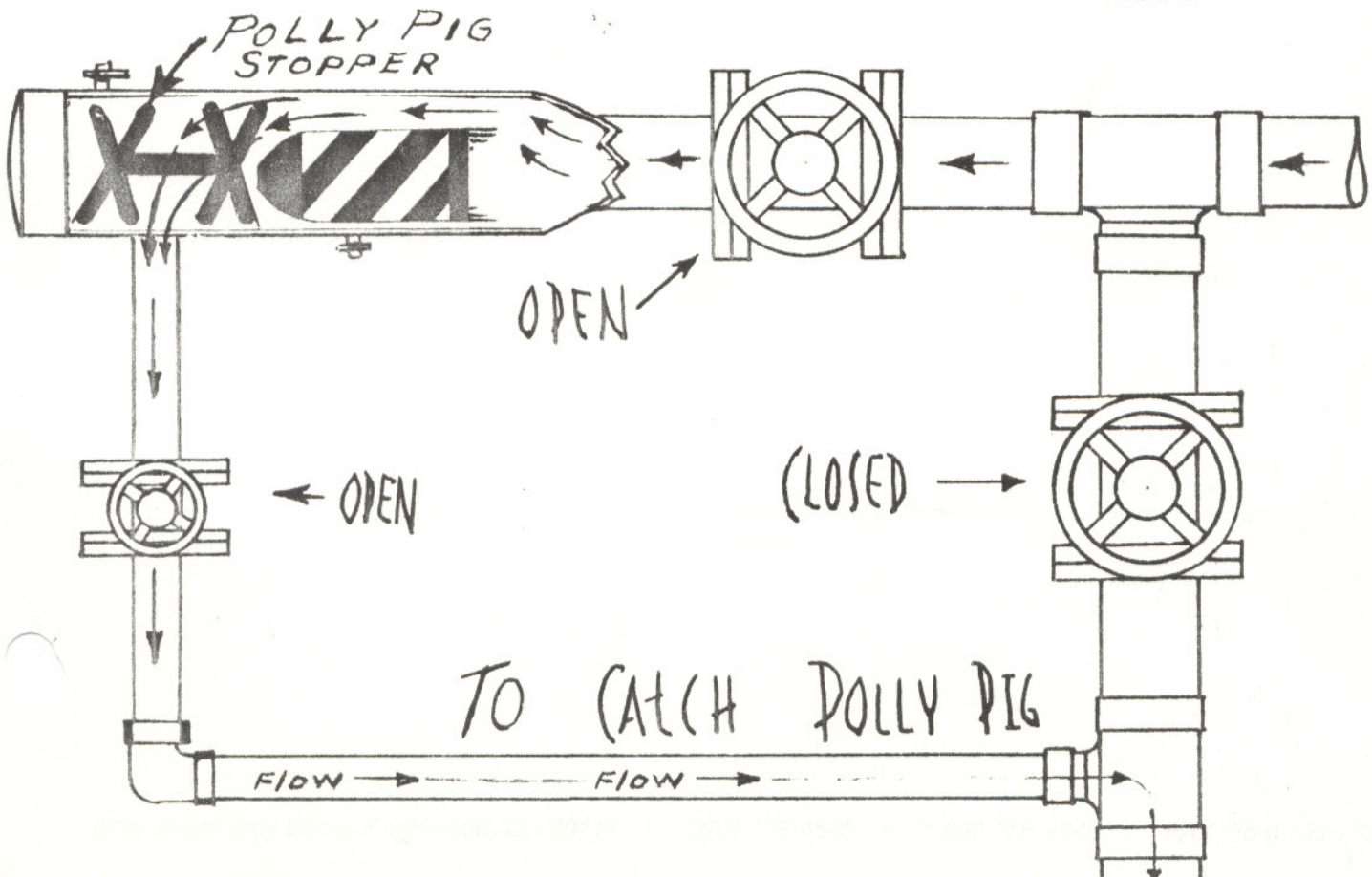
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- ON STREAM
A. Open (1), Close (2) + (3)
TO LAUNCH
A. Open (3), Bleed (4)
B. Open (2)
C. Close (1) Slowly

LAUNCH POLLY PIG





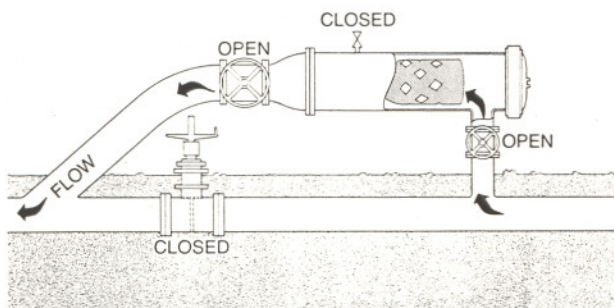
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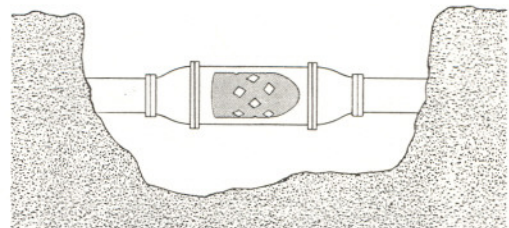
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LAUNCHING

CONVENTIONAL PIG LAUNCHING

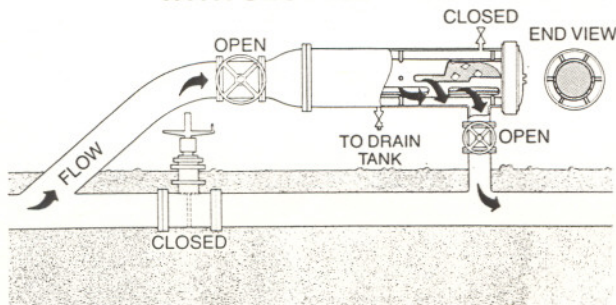


**LAUNCHING PIG
IN WATER MAIN SECTION**

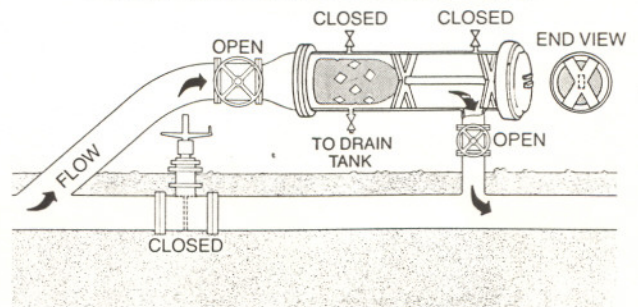


RETRIEVAL

**TRAPPING PIG
WITH SLOTTED TRAY**



CONVENTIONAL PIG TRAPPING

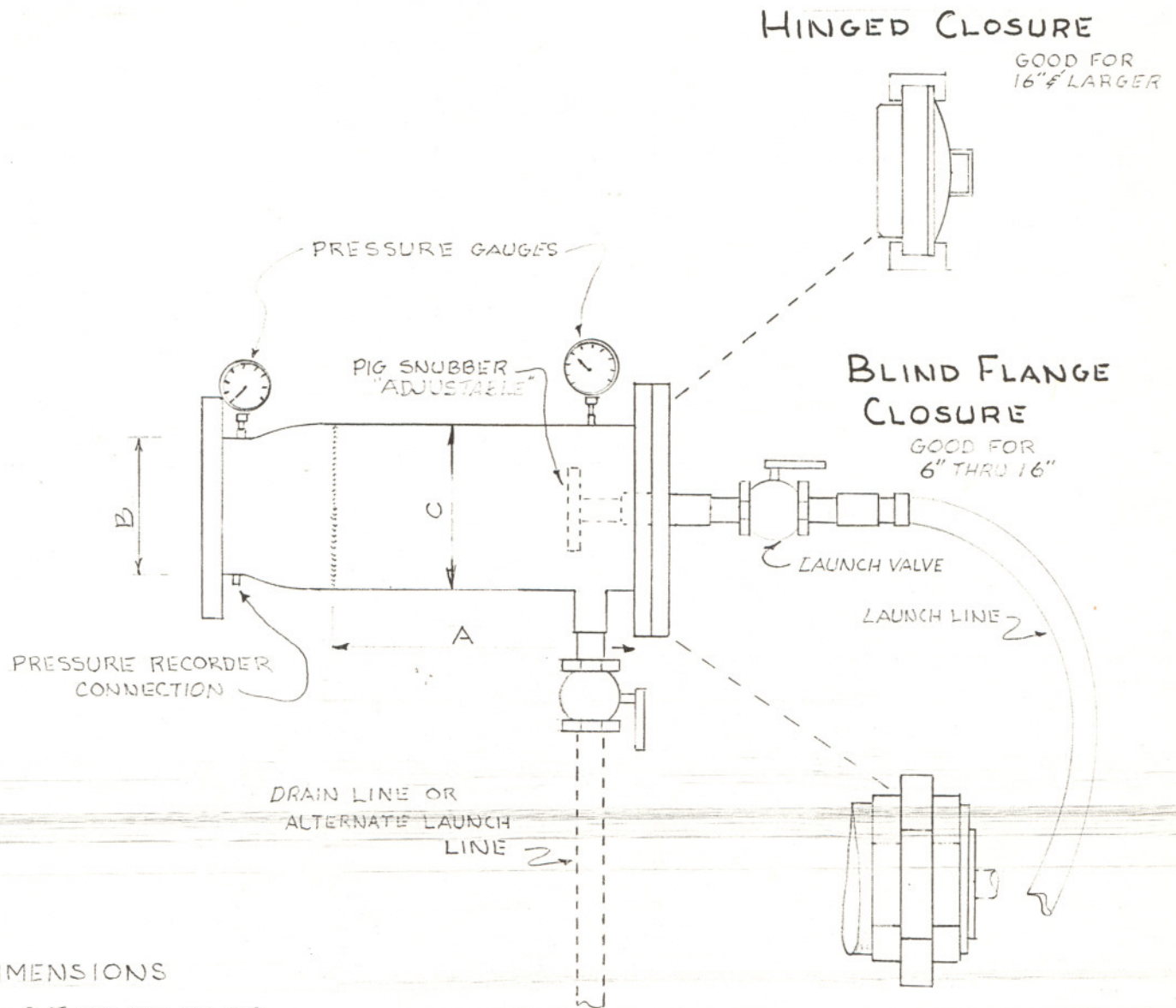




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Products to operate and maintain pipelines



DIMENSIONS

- A. 2 TIMES DIA OF PIG
- B. DIA. OF LINE TO BE CLEANED
- C. ONE PIPE SIZE LARGER THAN PIG

SUGGESTED LAUNCHED DESIGN