

Section 6

PIPING MATERIALS

GALVANIZED IRON PIPE

A Zinc coated iron pipe which resists corrosion, and is most generally used in low pressure water lines.

BLACK IRON PIPE

A wrought iron pipe that is corrosion resistant, used for hot and cold water piping where temperatures do not exceed 350 degrees F. Also used for low pressure gas or air service.

CAST IRON PIPE

Has a low elasticity and is very brittle, not suitable where there is strain, expansion, contraction, vibration. Usually it is used for Drainage pipes, traps, vents and sewage soil lines.

SEAMLESS STEEL PIPE

May be used for all purposes. It is required in fuel oil service lines and in all steam lines where the temperature is over 450 degrees F. or where the pressure is more than 350 psi.

COPPER PIPE

A ductile and malleable material and a good conductor of heat and electricity. Copper loses its strength rapidly after 400 degrees. Used in refrigeration and air conditioning work. Residential plumbing uses sweated copper pipe fittings for low pressure cold and hot water applications.

BRASS PIPE

A yellow alloy consisting of a proportion of copper and tin. Will not rust or corrode, but costs more than Galvanized iron.

LEAD PIPE

A gray material that is very soft, very malleable and ductible. Used in plumbing fixtures and plumbing drains. Being soft, it must be protected from mechanical injury.

PIPES SIZES AND LENGTHS

Small pipe come in 1/8 1/4 3/8 1/2 3/4 1" 1 1/4" 1 1/2 "

Large pipe come in 2 1/2" 3" 3 1/2" 4" 5" 6" 8" 10" 12"

Standard lengths for most pipe is 20 feet. Brass comes in 12 ft.

FITTINGS

The fittings used on either wrought-iron or steel pipe are generally made of malleable or cast iron. There are two general types of iron pipe fittings: the recessed type and the pressure type.

The pressure type of fitting is the standard fitting used on water pipe. The recessed type fitting, also known as a cast-iron drainage or Durham fitting, is generally required on all drainage lines. The recessed type is most suitable where a smooth joint is desired; it reduces the probability of grease or foreign material remaining in the joint and causing a stoppage in the line.

Types of iron pipe fittings include elbows, crosses, tees, and unions.

Four types of elbows used are 90 , 45 , street, and reducing elbows. The 90 elbow is used to change the direction of an iron pipe 90 , and a 45 elbow to change the direction 45 .

STREET elbows are used to change direction of an iron pipeline in close space where it would be impossible or impracticable to use an elbow and nipple. Both 45 and 90 types of street elbows are available. It is well to note also that street elbows have one female and one male thread rather than two female threads.

The REDUCING elbow is similar to the regular 90 elbow except that one opening is smaller than the other. For instance, a 3/4-inch pipe may be screwed into one opening of this fitting and a 1/2-inch pipe may be screwed into the other opening.

Iron pipe CROSSES are made of malleable iron in only one pattern and have female threads at all four branch points.

A common type of iron pipe tee is the STRAIGHT tee, which has a straight-through portion and a 90 takeoff on one side. All three openings of the straight tee are of the same size.

Another main type is the REDUCING tee. It is similar to the straight tee just described except that one of the threaded openings is of a different size than the others.

Two types of iron-pipe unions in general use are the ground joint union and the flange union. The GROUND JOINT UNION consists of three pieces, and the FLANGE UNION is made in two parts. Both types are used for joining two pipes together, and are so designed that they can be disconnected easily.

Other types of iron-pipe fittings, to mention a few, include couplings, nipples, pipe plugs, pipe caps, and pipe bushings.

Three common types of couplings are: straight, reducing, and eccentric reducing couplings. The STRAIGHT COUPLING is used for joining two lengths of pipe in a straight run which does not require additional fittings. A REDUCING COUPLING is used to join two pipes of different sizes. The ECCENTRIC REDUCING COUPLING has two female threads of different sizes with different centers so that, when joined, the two pieces of pipe will not be in line with each other.

A NIPPLE is a short length of pipe with a male thread on each end. It is used to make an extension from a fitting. In plumbing work, nipples often are used in great quantities. Nipples are available in many pre-cut sizes.

Pipe PLUGS are fittings with male (outside) threads. They are screwed into other fittings to close openings. Pipe plugs have various types of heads, such as square, slotted, and hexagon socket.

A pipe CAP is a fitting with a female (inside) thread. It is used for the same purpose as a plug except that the pipe cap screws on the male thread of a piece of pipe or nipple.

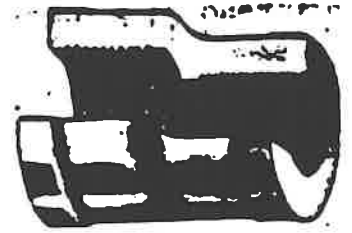
A pipe BUSHING is a specialized fitting with a male thread on the outside and a female thread on the inside. Bushings may be used to reduce the size of openings to any smaller diameter.



① STRAIGHT COUPLING



① REDUCING COUPLING



① ECCENTRIC REDUCING COUPLING



① CLOSE NIPPLE



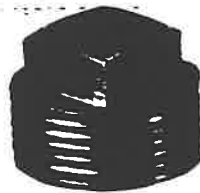
① SHOULDER NIPPLE



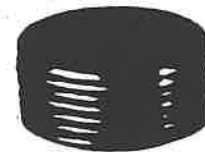
① NIPPLE



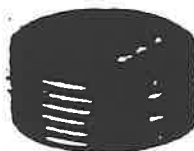
② NIPPLE



① SQUARE HEAD PIPE PLUG



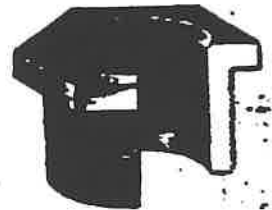
② SLOTTED HEAD PIPE PLUG



① HEXAGON SOCKET PIPE PLUG



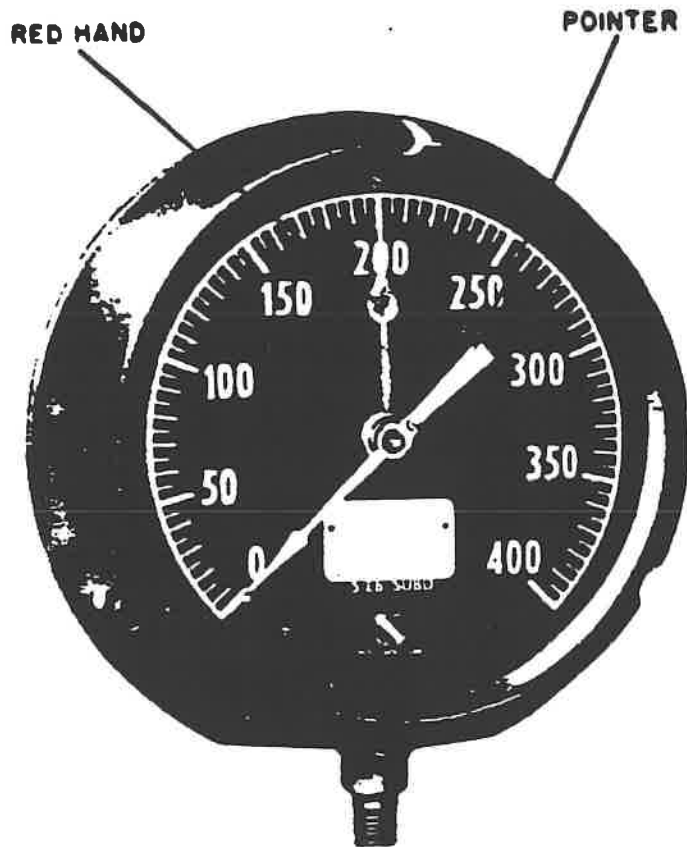
② PIPE CAP



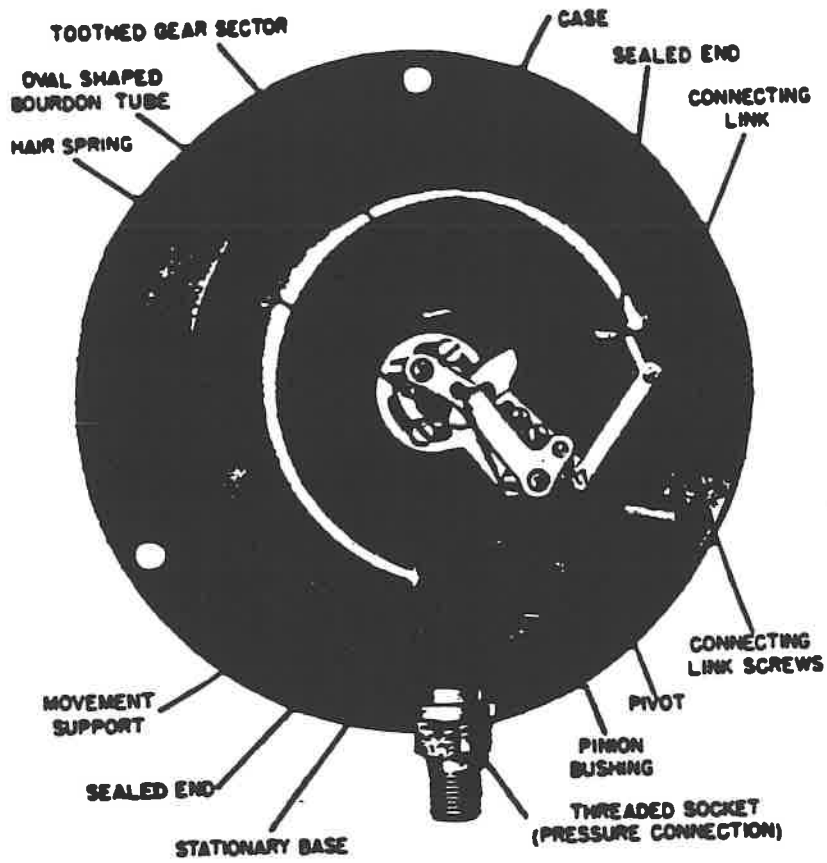
② PIPE BUSHING

- Types of iron pipecouplings, nipples, plugs, caps, and bushings.

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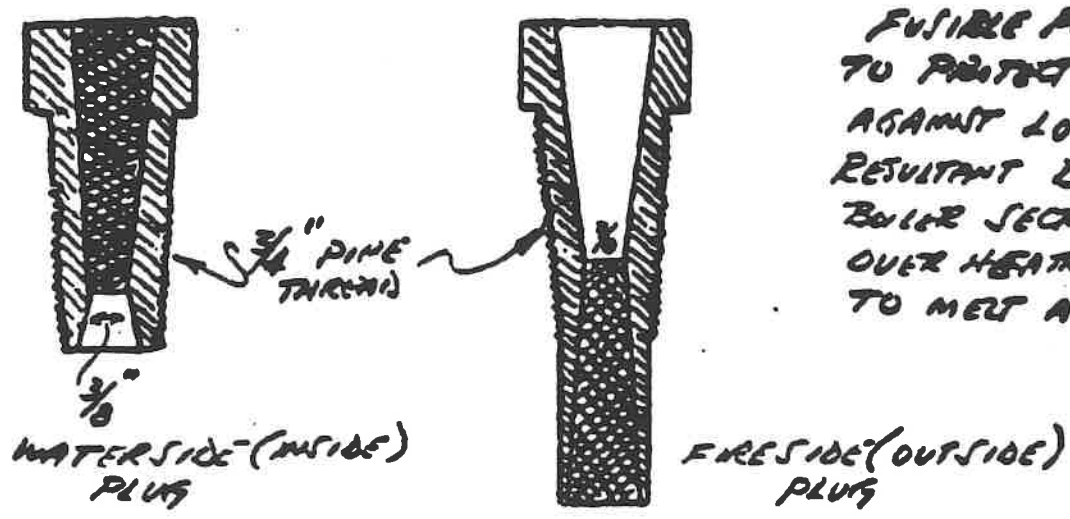


-Simplex Bourdon tube pressure gage.



-Bourdon tube installed in a gage case.

FUSIBLE PLUGS



FUSIBLE PLUGS INSTALLED TO PROTECT & GUARD AGAINST LOW WATER & RESULTANT DAMAGE TO BOILER SECTIONS DUE TO OVER HEATING. DESIGNED TO MELT AT 450°F.

FILLING -

| | | |
|------------------|---------|--------|
| PURE TIN | MINIMUM | 99.3 % |
| COPPER | MAXIMUM | 0.5 |
| LEAD | do | 0.1 |
| TOTAL IMPURITIES | do | 0.7 |

CASINGS -

BRASS - WATER SIDE NOT LESS THAN 2" LONG
 FIRE SIDE NOT LESS THAN 2 1/2" LONG.

REFILLING OF CASINGS NOT PERMISSIBLE.

BOILERS WITH WORKING PRESSURE ABOVE 250 PSIG - PLUGS NOT USED.

WHEN INSTALLED - PLUGS MUST PROJECT AT LEAST 3/4" ON THE WATER SIDE OF PLATE SHEET OR TUBE. ON FIRE SIDE IT SHALL EXTEND AS LITTLE AS POSSIBLE BUT NOT MORE THAN 1".

LOCATIONS BOILER TYPES

1. HRT BOILER - REAR HEAD - 1" ABOVE TOP ROW OF TUBES
2. LOCOMOTIVE BOILER - HIGHEST PART OF CROWN SHEET
3. VERTICAL FIRE TUBE BOILER - OUTSIDE TUBE 1/3 LENGTH ABOVE LOWER TUBE SHEET
4. WATER TUBE BOILERS - HORIZONTAL DRUM B/W TYPE - IN UPPER DRUM 6" ABOVE BOTTOM OVER FIRST PASS.
5. SCOTCH MARINE - CROWN SHEET
6. SCOTCH DRY BACK - REAR HEAD 2" ABOVE TOP ROW OF TU.

VARIOUS OTHER BOILER TYPES - IN DRUMS ON WATER TUBE IN HEADS OR CROWN SHEETS FIRE TUBE ALLOWING TO CURVE.

ERNST® PACKAGE UNIT SAFETY WATER COLUMN

HIGH AND LOW ALARM

For 250 Pounds W. S. P.
Steam and Water
Connection 1 1/4" on 18" Gage Centers.

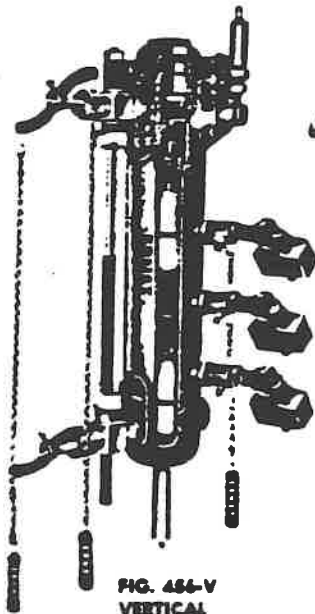


FIG. 486-V
VERTICAL

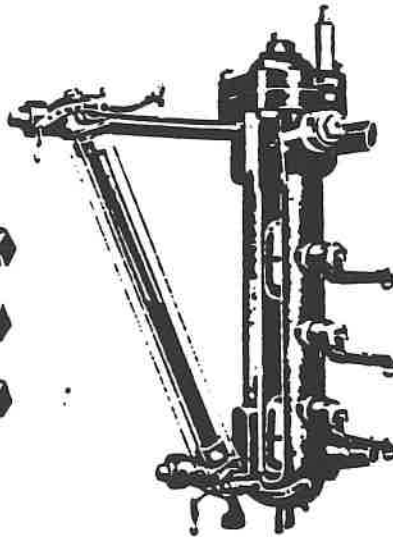
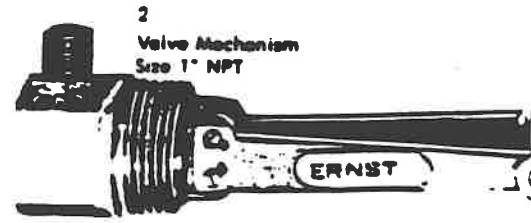


FIG. 486-P
INCLINED

HIGH AND LOW ALARM WATER COLUMN PARTS



1 1/2" Whistle



2 Valve Mechanism
Size 1" NPT



3 Cap Gasket

5 Foot Rod High Alarm

6 Foot Rod Low Alarm

PULL CHAIN
COPPER COATED

PULL HAND
Meets Requirements
the ASME boiler code



FIG. 79-C



FIG. 79-N



4 Oblong Stainless
Steel Foot

TRY COCKS FOR BOILER WATER COLUMNS

HAND WHEEL - POLISHED BRASS
250 PSI
1/2", 3/4", 1" NPT

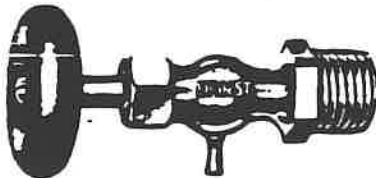


FIG. 726

HAND WHEEL - BRONZE
250 PSI
1/2", 3/4" NPT



FIG. 06

SPRING OPERATED - BRONZE
WITH RENEWABLE SEAT
250 PSI
1/2", 3/4" NPT



FIG. AS-250

LEVER - STAINLESS STEEL
1500 PSI
1/2", 3/4" NPT



FIG. 717

DCP WEIGHTED - BRONZE
WITH RENEWABLE SEAT
300 PSI
1/2", 3/4" NPT



FIG. 15

LEVER "SUPER" TRY COCK - MONEL/BRONZE
WITH RENEWABLE SEAT DISC
450 PSI
1/2", 3/4" NPT



SERIES 450
FIG. 13

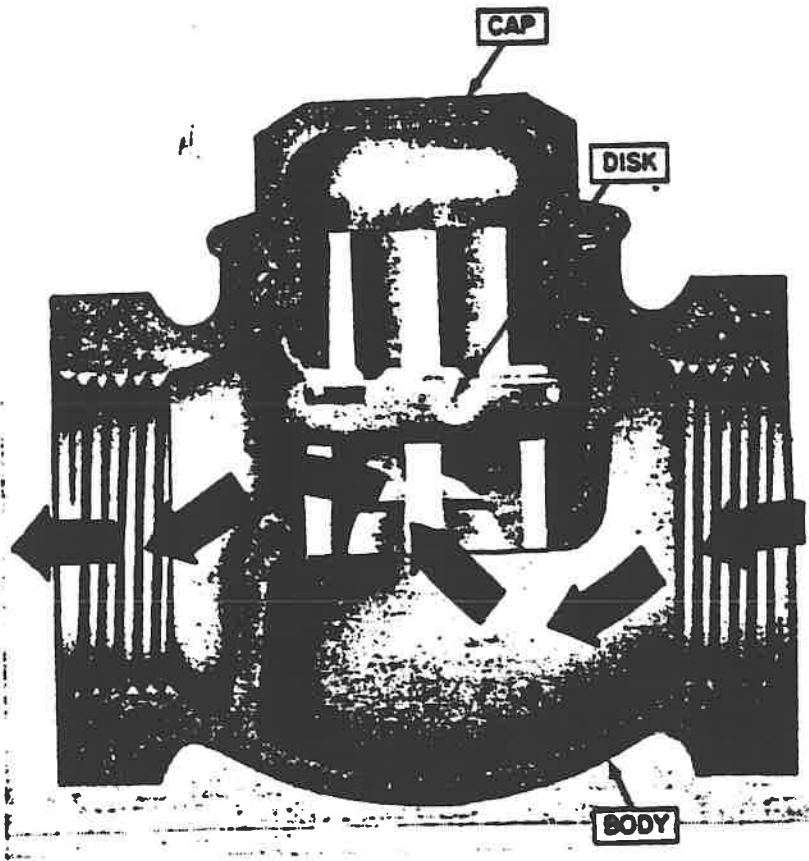
LEAKLESS:
This Ernst Leakless Try Cock assures maximum safety in boilers with pressures up to 450 lbs. Disc can be replaced under full boiler pressure.

ERNST® GAGE CO.

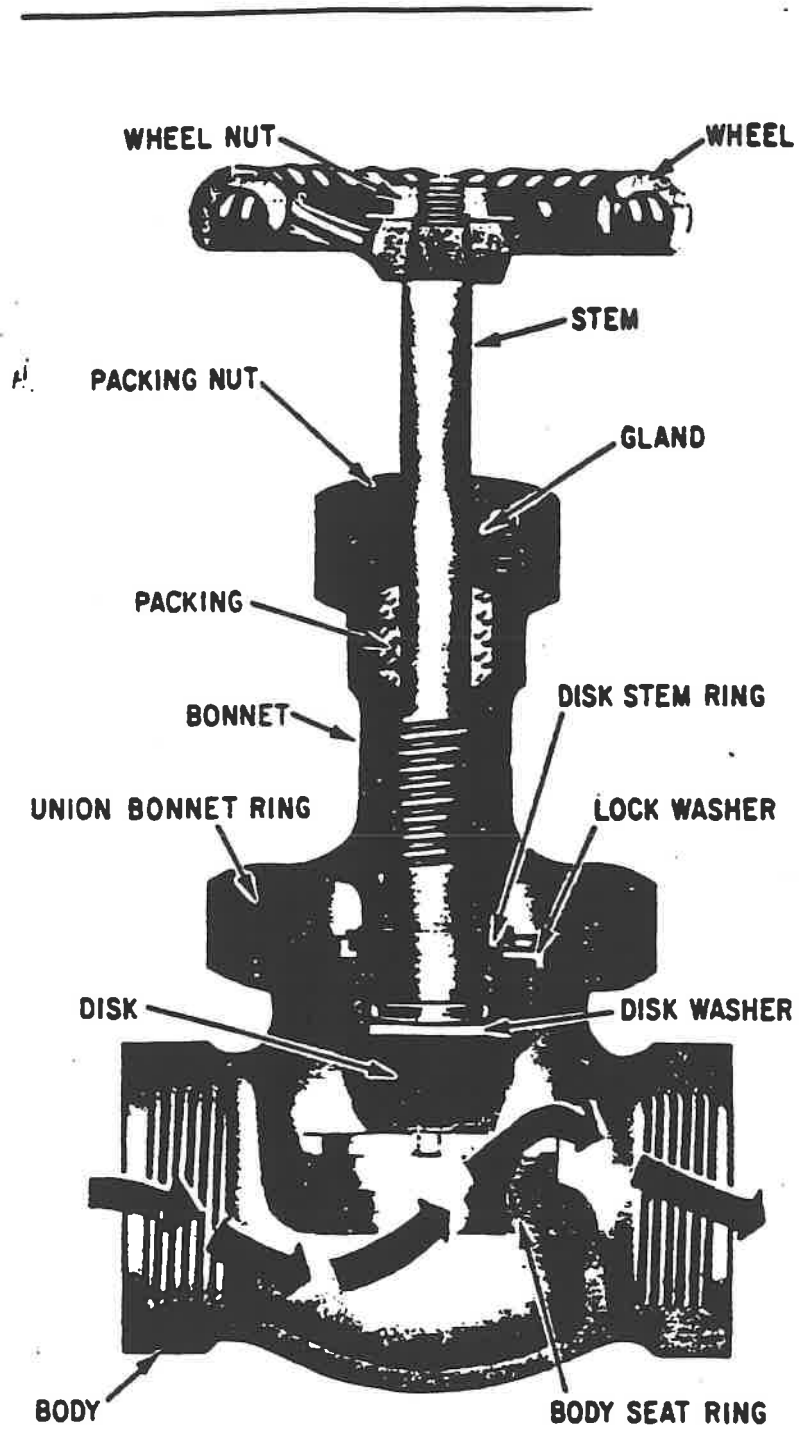
280 SOUTH LIVINGSTON AVENUE, LIVINGSTON, NEW JERSEY 07033

(201) 992-1400

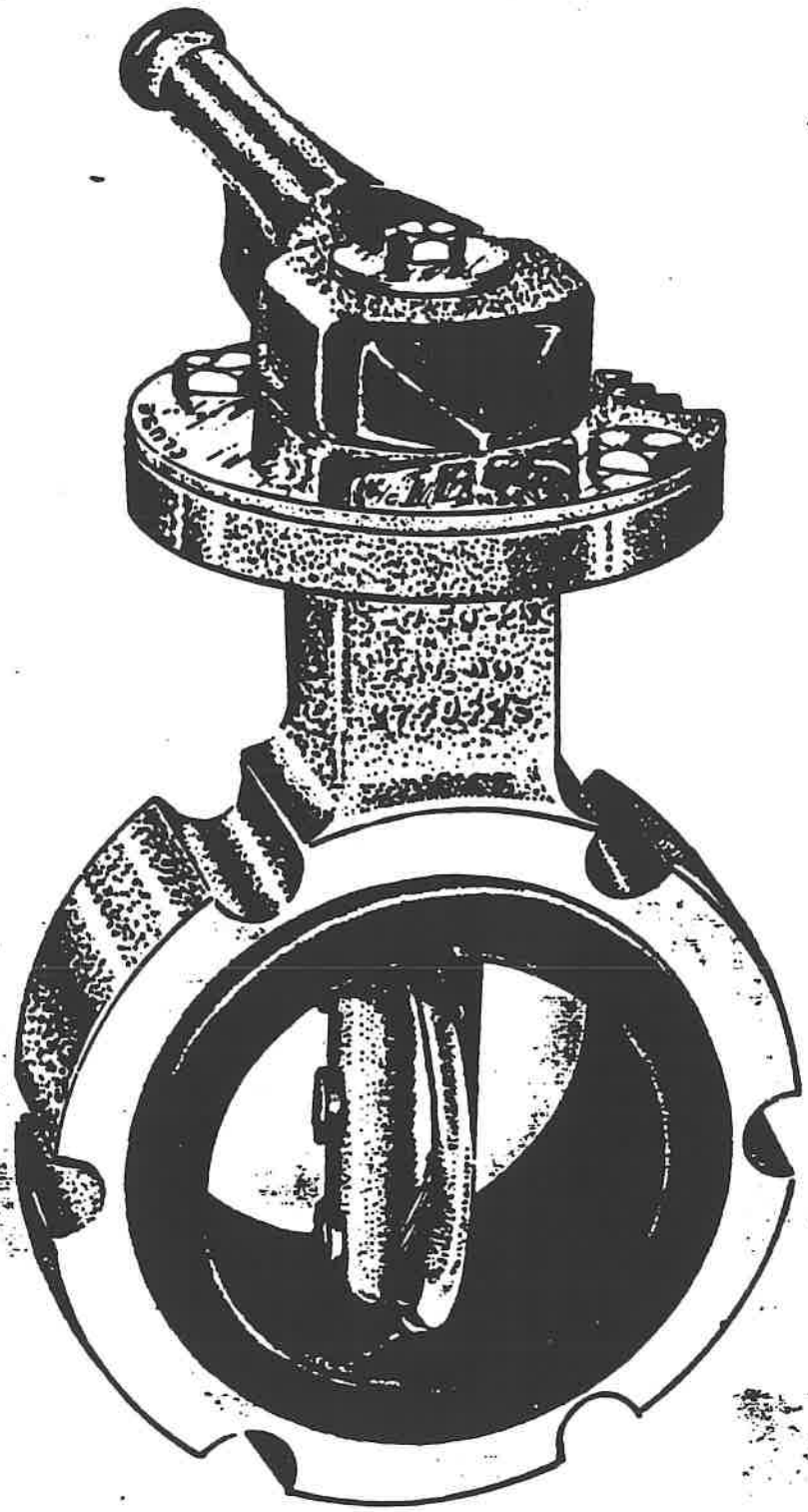
*Lesson
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—Cutaway view of lift-check valve.

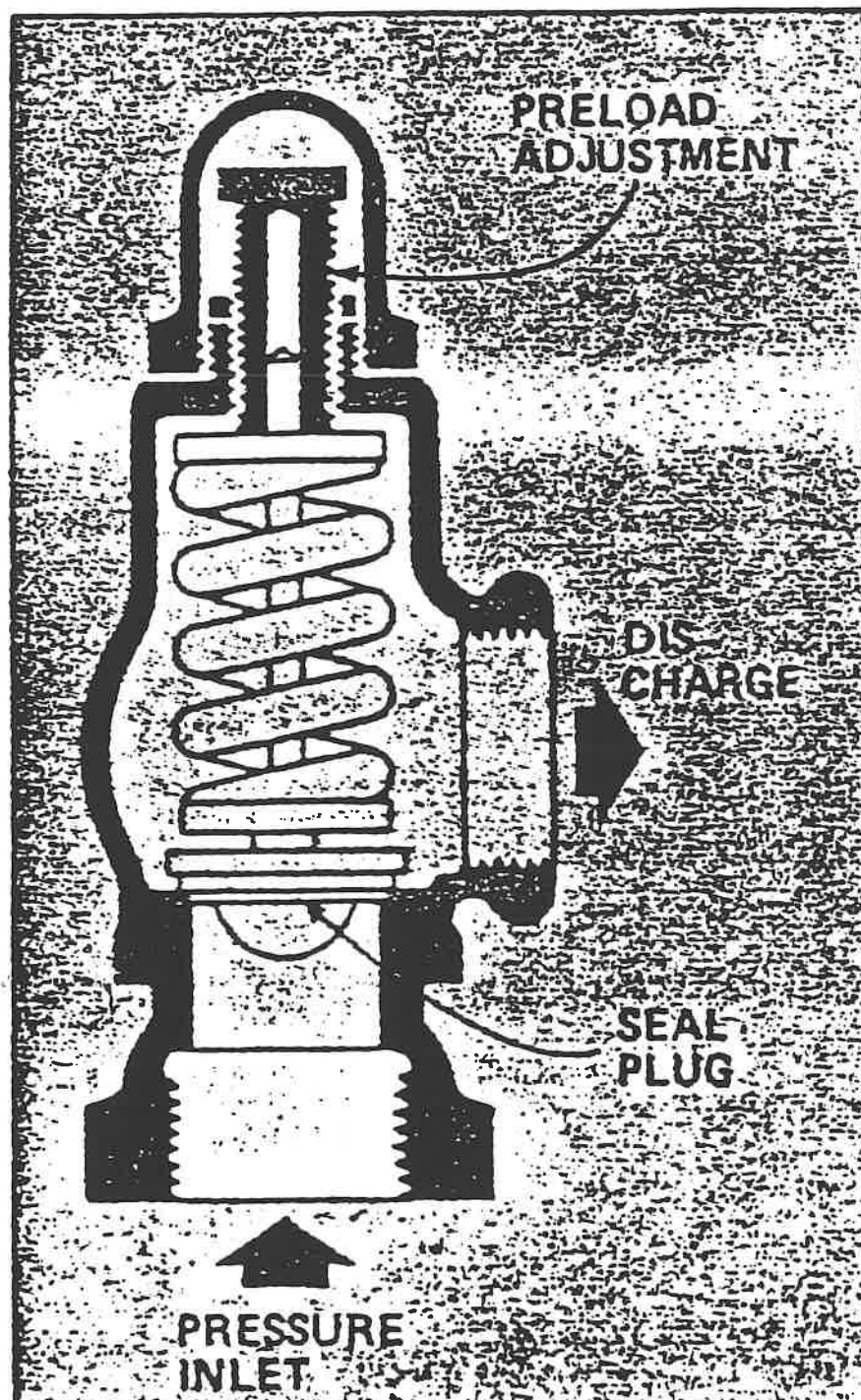


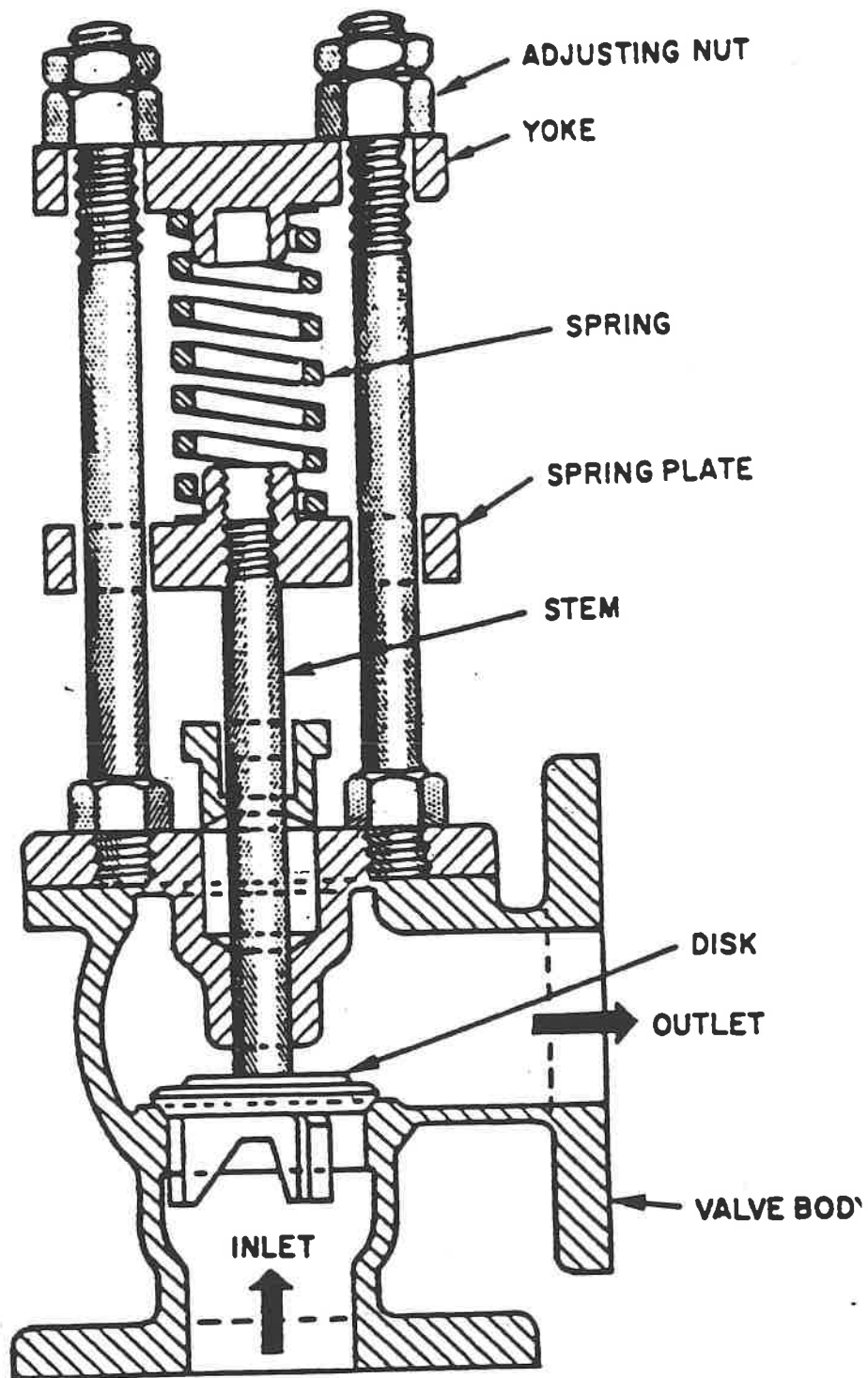
..Cutaway view of globe stop valve.



-Butterfly valve.

Fig. 2. Relief valves use a compression spring to hold a disk against a resilient seat. The compression spring force must be exceeded by the force of pressure acting within the seal diameter area to initiate relief action. Primary use is for noncompressible fluids.





.-Relief valve.

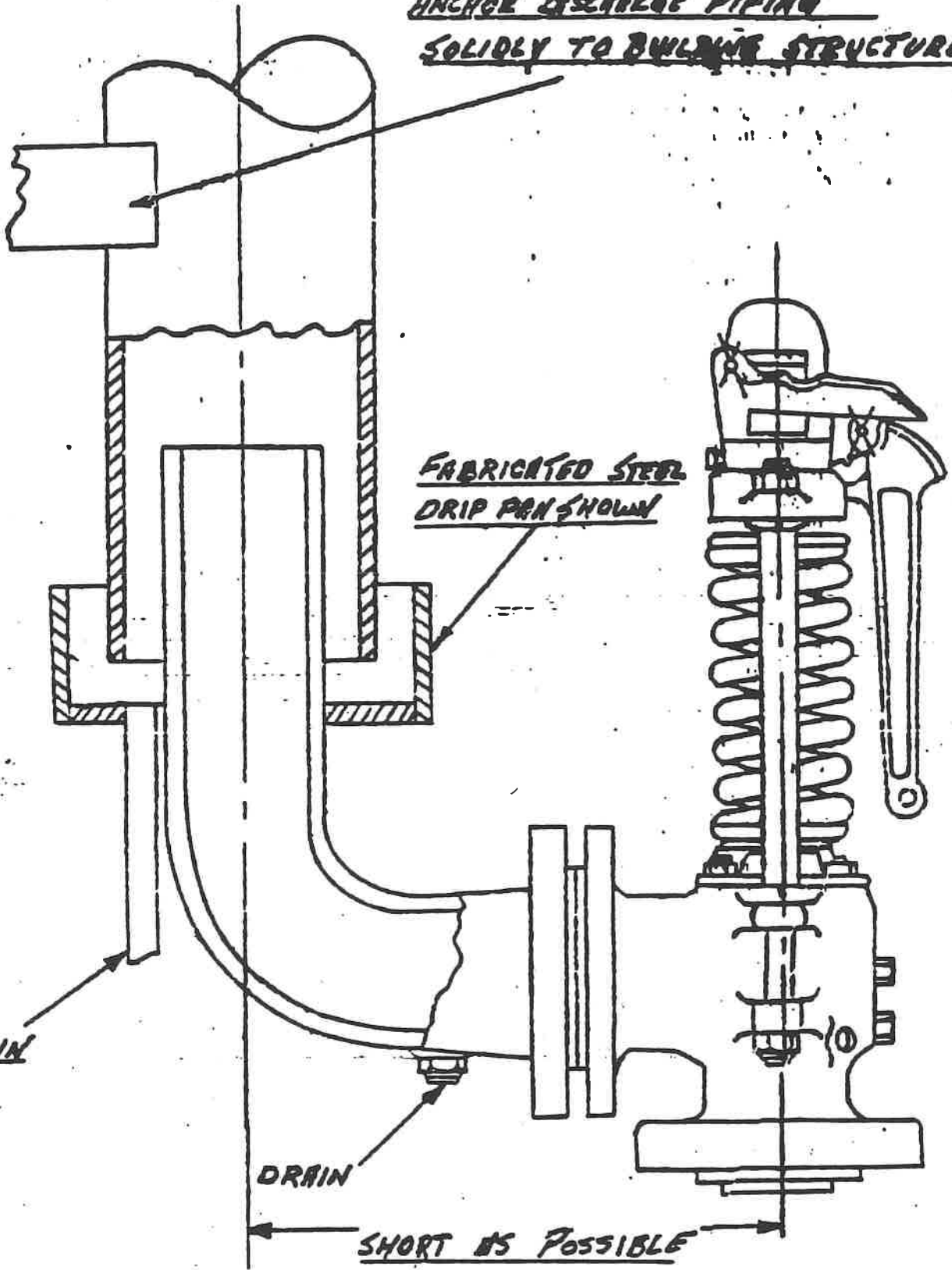
ANCHOR DISCHARGE PIPING
SOLIDLY TO BUILDING STRUCTURE

FABRICATED STEEL
DRIP PAN SHOWN

DRAIN

DRAIN

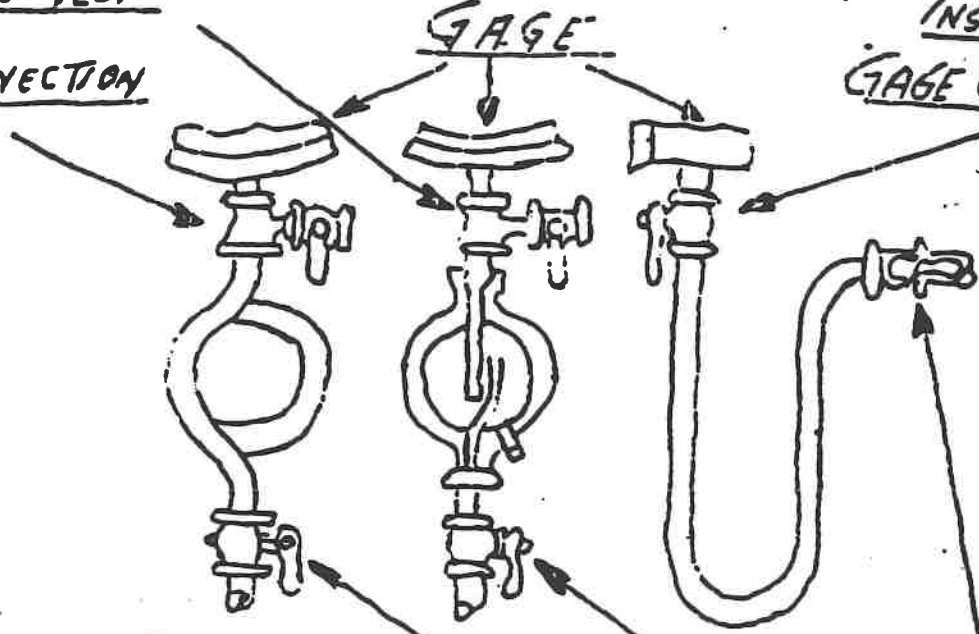
SHORT AS POSSIBLE



INSPECTORS TEST
GAGE CONNECTION

INSPECTORS TEST
GAGE CONNECTION

GAGE



LEVER HANDLE CUT-OFF
COCK

PIPE

RADIATOR

U-TUBE