

FIG. 25. SINGLE PORT FLOAT TRAP

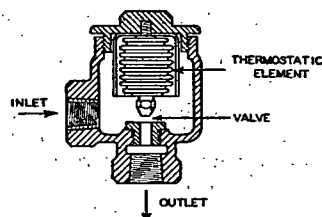


FIG. 26. THERMOSTATIC TRAP BELLWS TYPE

STEAM TRAPS

Steam traps, as the name implies, are automatic devices used to trap or hold steam in an apparatus or piping system until it has given up its latent heat, and to allow condensate and air to pass as soon as it accumulates. In general, traps consist of a vessel in which to accumulate the condensate, an orifice through which the condensate is discharged, a valve to close the orifice port, mechanisms to operate the valve, and inlet and outlet openings for the entrance and discharge of the condensate from the trap vessel.

Steam traps are classified according to the type of operating device by which they function. The traps which are available on the market today may be classified as (1) float, (2) thermostatic, (3) float and thermostatic, (4) upright bucket, (5) inverted bucket, (6) flash, (7) impulse, (8) lifting, and (9) boiler return trap or alternating receiver.

Float Traps. Float traps operate by the rise and fall of a float due to a change of condensate level in the trap. When the trap is empty, the float is in its lowest position and the discharge valve is closed. As condensate accumulates in the trap chamber, the float rises and gradually opens the valve, and the pressure of the steam pushes the condensate out of the valve. The discharge from a float trap is generally continuous, since the opening of the valve is proportioned to the flow of condensate through the trap. A gage glass may be used to indicate the height of condensate in the trap chamber. Unless float traps are well made and proportioned, there is danger of considerable steam leakage through the discharge valve due to unequal expansion of the valve and seat, and the sticking of moving parts. Float traps are made in sizes from $\frac{1}{2}$ to 3 in., and for pressures varying from vacuum conditions to 200 psig. Float traps are used for draining condensate from steam separators, steam headers, blast coils, heating systems, steam water heaters, laundry equipment, sterilizers, and other equipment. When used for draining low pressure systems, float traps should be equipped with a thermostatic air vent (See Float and Thermostatic Traps). Fig. 25 illustrates a single port float trap.

Thermostatic Traps. Thermostatic traps function by means of elements which expand and contract under the influence of heat and cold. Early types of thermo-

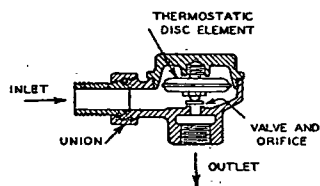


FIG. 27. THERMOSTATIC TRAP DISC TYPE

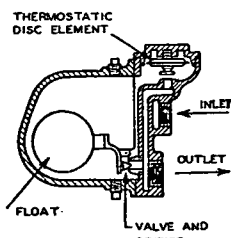


FIG. 28. TYPICAL FLOAT AND THERMOSTATIC TRAP

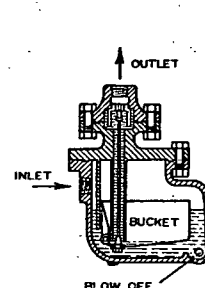


FIG. 29. UPRIGHT BUCKET TRAP

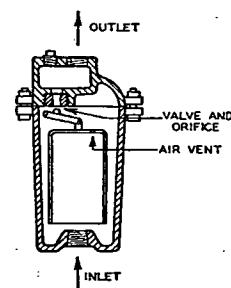


FIG. 30. INVERTED BUCKET TRAP

static traps employed carbon posts and bi-metallic elements for expansion. In general, the modern type of thermostatic trap consists of thin corrugated metal bellows or discs enclosing a hollow chamber. The chamber is either filled with a liquid, or a small amount of a volatile liquid, such as alcohol, is introduced. The liquid expands or becomes a gas when steam comes in contact with the expansive element. The pressure created in either case expands the element and closes the valve of the trap against the escape of steam. When condensate or air comes in contact with the element, it cools and contracts, opening the valve and allowing them to escape.

The discharge from this type of trap is intermittent. Thermostatic traps find their use generally for the draining of condensate from radiators, convectors, pipe coils, drips, unit heaters, water heaters, cooking kettles, and other equipment. Except for radiators and convectors, it is recommended that a strainer be installed on the inlet connection to the trap to prevent dirt, pipe scale, and other foreign substance from entering the trap. A cooling leg of a length of pipe should also be provided ahead of the trap on unit heaters and similar apparatus to cool the condensate in order to help in the trap action. Thermostatic traps are made in sizes from $\frac{1}{2}$ to 2 in., and for pressures ranging from vacuum conditions to 300 psig. Figs. 26 and 27 illustrate types of thermostatic traps which are available at the present time.

Float and Thermostatic Traps. This type of trap is a combination of the float trap and the thermostatic trap, and finds its use in the draining of condensate from unit heaters, blast heaters, and coil heaters for water, oil or other liquids where there is apt to be a large volume of condensate which would not permit successful operation of thermostatic traps alone. The function of the float element of this trap is to handle the condensate, and of the thermostatic element to permit the flow of air and to prevent the flow of steam around the float valve. Float and thermostatic traps are made in sizes from $\frac{1}{2}$ to 2 in. and usually operate under pressures varying from vacuum conditions to 40 psig, although some are made to operate at a maximum pressure of 200 psig. Fig. 28 illustrates a typical float and thermostatic trap.

Upright Bucket Traps. In this type of trap, the condensate enters the trap chamber and fills the space between the bucket and the walls of the trap. This causes the bucket to float, and forces the valve against its seat, the valve and its stem usually

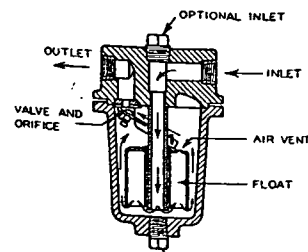


FIG. 31. INVERTED BUCKET TRAP WITH CENTRAL GUIDE

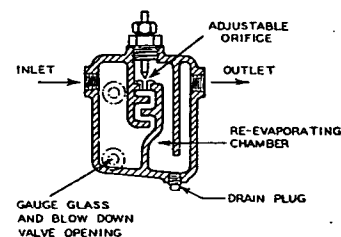


FIG. 32. FLASH TRAP