

## POWER TRANSFORMERS

### Expansion Tank and Elbow Relief

#### INSTRUCTIONS

#### General Description

**Expansion Tanks**—Transformers may be equipped with expansion tanks when requested. The expansion tank is a horizontal cylindrical steel oil reservoir above the level of the cover. It is normally supported at the low voltage side of the tank with an offset governed by voltage clearances to leads and bushings. It has a pipe connection to the side of the tank which allows the transformer tank to remain full of oil despite the expansion or contraction of the oil with temperature. The expansion tank also reduces the rate of oxidation of the oil, partly because of the reduced oil surface exposed to the air and partly because of the reduced temperature of the oil which is exposed to the air in the expansion tank.

The size of the expansion tank required is determined by the volume of oil in the transformer and the range of operating temperature. The normal range of temperature variation provided for is from  $-5^{\circ}\text{C}.$  to the maximum full

load rise above a  $40^{\circ}\text{C}.$  ambient. At  $25^{\circ}\text{C}.$ , the expansion tank will be approximately one-third full. A magnetic oil gauge is provided on the expansion tank to indicate the oil level during operation.

The expansion tank has a small pipe connection joining its gas space to the top of the transformer tank so that any gas initially above the oil in the transformer will be forced into the expansion tank, allowing the transformer tank to be completely filled with oil. The expansion tank is also provided with a sump from which any water present may be drained. On transformers equipped with expansion tanks the upper filter press valve is located on the expansion tank.

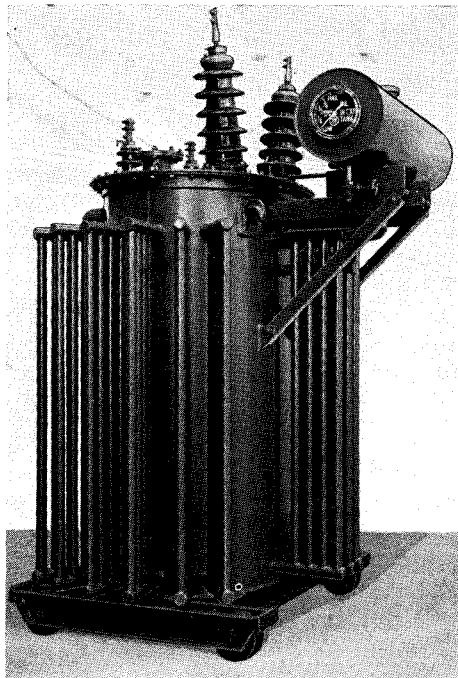
**Elbow Relief**—When a transformer is equipped with an expansion tank an elbow relief device is also provided. The device consists of a large diameter steel pipe on the cover which is usually at an angle to the vertical, but which may be vertical. The pipe has an elbow at its

end and is of sufficient length that the oil could rise in it to the maximum level designed for in the expansion tank without spilling over the elbow portion. A thin glass relief diaphragm, which will rupture to relieve the pressure in the main tank whenever it rises to dangerous values, is placed at the top of the device above the maximum oil level. A protective hood extends past the diaphragm and prevents moisture from entering in case the diaphragm is accidentally ruptured.

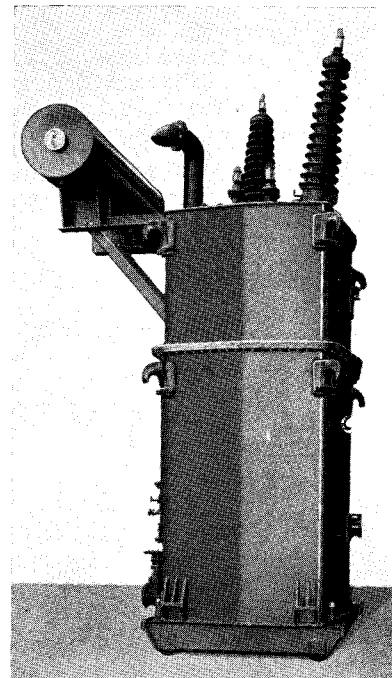
Figure 1 shows power transformers with expansion tanks as they would appear when shipped completely assembled.

**Shipment and Installation**—The expansion tank and relief device are shipped on the transformer tank for smaller transformers but are shipped separately on larger ones and must be assembled when installed.

When necessary to ship the expan-



(a) Small Power Transformer with Expansion Tank



(b) Large Power Transformer with Expansion Tank

FIGURE 1

## POWER TRANSFORMERS

### Expansion Tank and Elbow Relief—Continued

#### INSTRUCTIONS—Continued

sion tank separate from the transformer a blind flange or pipe cap is placed over the expansion tank connection. The main tank is then usually filled with oil to a point a few inches below the cover. The expansion tank, bushings and accessories are boxed or crated separately.

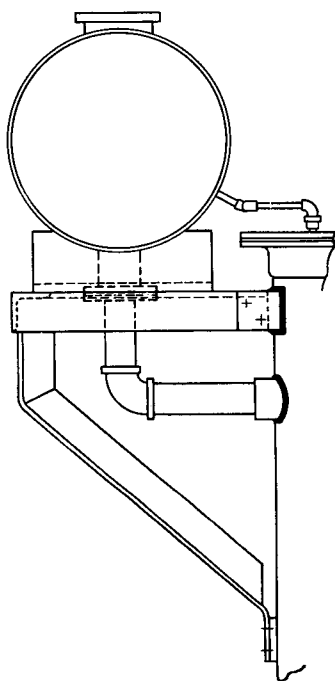
When an expansion tank is shipped separate from the main tank, it is necessary to lower the oil below the level of the expansion tank connection before attempting to install the expansion tank. Remove the blind flange or pipe cap over the expansion tank connection

and install expansion tank in accordance with the outline drawing. Fig. 2 (a), (b) and (c) show typical construction and method of supporting expansion tanks.

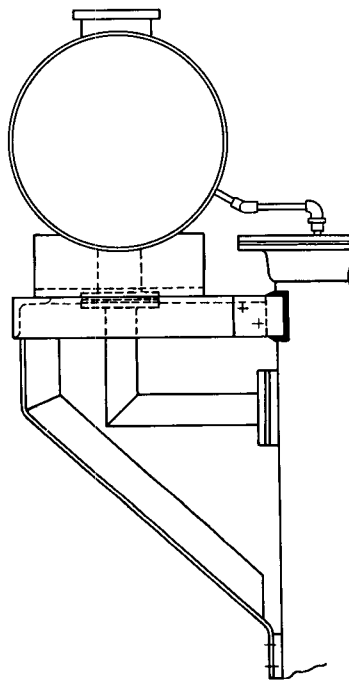
Details of supporting expansion tanks may vary with the special requirements of different transformers but the general scheme of support will be the same.

The expansion tank supporting frame should first be bolted to the main tank. The expansion tank should then be set in place and the feet bolted to the sup-

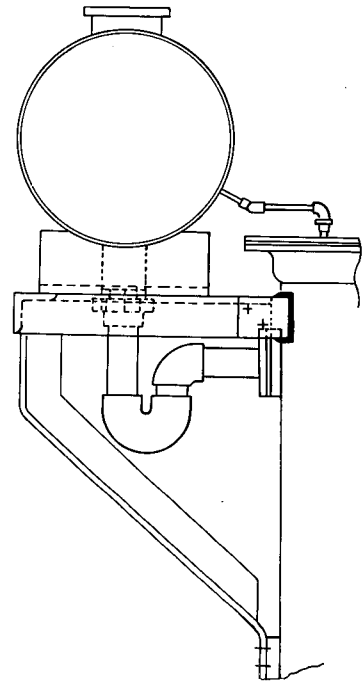
porting frame. Make the pipe connections from top of the expansion tank to cover of main tank. Assemble the main pipe connection between the bottom of the expansion tank and the main tank. This connection may be either a screwed connection or a flanged connection. If a flanged connection, assemble the flange with necessary gasket, and gasket cement tightening the flange with uniform pressure. Use gasket cement Style No. 471880-E supplied with the transformer on all threads of pipe connections.



(a) Expansion Tank with Screwed Fitting



(b) Expansion Tank with Flanged Fitting



(c) Expansion Tank with Gooseneck Connection

FIGURE 2