The above gives the maximum value; friction, etc., are neglected. (See Fig. 3.)

Expansion joints serve another purpose. (Referring particularly to gravity retaining walls.) They act as settlement joints, thus eliminating the danger of a wall-face being ruined with cracks caused by slight uneven settlement in the footings.

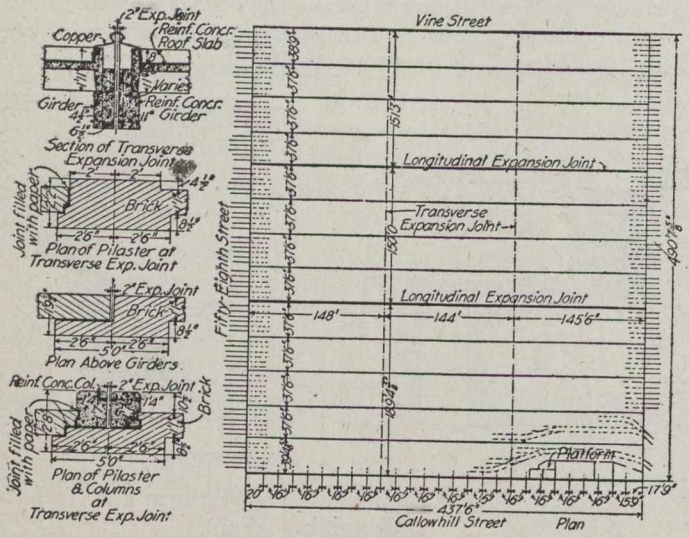

Fig. 9.—Expansion Joints in Car House, Philadelphia Rapid Transit Co.

In a reinforced wall the steel will reduce shrinkage and contraction cracks to a minimum and the steel will hold a wall true to line and grade when a plain wall joint might settle. It is possible by proper reinforcing to erect considerable lengths of reinforced wall without expansion joints.

Figs. 4 and 5 represent typical type of expansion joint and method of waterproofing same in the case of an arched roof or side wall and the deck type of bridge, respectively.

Fig. 6 represents types of waterproofed expansion joints that may be used for an arch or retaining wall and scheme for taking care of expansion and waterproofing of a platform slab.

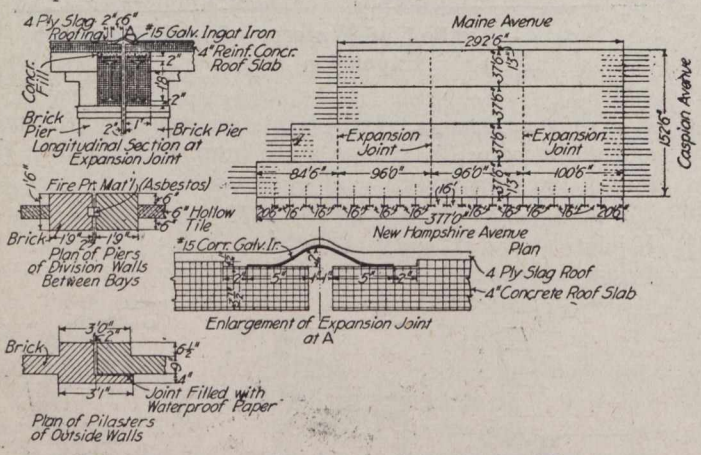

Fig. 10.—Design of Expansion Joint in Car House at Atlantic City.

Fig. 7 represents a method that may be followed in the case of a bridge slab.

Fig. 8 illustrates method of curing leaks in a bridge structure that have developed due to cracks caused by expansion and contraction.

Figs. 9, 10 and 11 clearly show details of this very interesting case for both roof and side walls.

NEW PROCESS FOR LEAD JOINTS.

A new material called "amalgaline" has been introduced in England for making joints between lead surfaces, and it is said to have been widely adopted by shipbuilders in Scotland and the north of England, as it is useful in flanging and the seaming of lead used in lining refrigerating chambers.

The system is not confined to use on small pipes, but is used in an ordinary way on pipes varying in bore from 3 inches to 9 inches. It is an autogenous process, but instead of using an intense local heat the fusion is effected by the action of the amalgaline on the surfaces to be welded, forming an amalgamation between the lead of the flange and the lead pipe.

The material is in the form of a metallic ribbon 0.002 inch thick, practically a pure metal, which, when placed between the surfaces of lead and subjected to heat, fuses at a temperature of 160 degrees—lower than the actual fusing point of lead—and in fusing it causes the lead surfaces to run together at a lower melting point than that of the body of the lead. This running together has an autogenous effect, and the minute particles of amalgaline are dissipated into the body of the lead, which, by reason of the absorption, becomes stronger at the junction than elsewhere.—"Engineering Digest."

EXTERNAL CORROSION OF CAST-IRON PIPE.

In a paper read before the American Society of Civil Engineers, Mr. M. R. Pugh mentions instances, in several countries, in which cast-iron water-pipe has remained in perfect condition after a hundred years' service or more when laid underground or immersed in fresh water. When, however, they have been laid in salt marshes or immersed in sea water their useful life is measured by a few years only. From a comprehensive analysis of the subject the following conclusions are reached: (1) Under ordinary conditions of soil, cast-iron pipe has a probable life of from one to three centuries, so far as external corrosion is concerned. (2) Under certain soil conditions, such as salt marshes or saline soils, cast-iron pipe may be rendered useless in from seven to twenty years. (3) At times cinder and slag fills may exert a strongly deleterious influence. Acid mine waters are also destructive. (4) Substituting wrought iron or steel pipe for cast iron is ineffectual. (5) Remedies fall under four heads: (a) Increasing the skin resistance of cast iron; (b) utilizing the protective influence of alkalis by surrounding the pipe with lime or cement where practicable; (c) exclusion of acids, salt or air; (d) galvanizing the cast-iron pipe, thus protecting it at the expense of the zinc.

Drilling has been commenced by the O'Brien Mining Company on its property in Gillies Limit. A shaft will be sunk to the 200 ft, level. The vein is strong, and galena, with a low silver content, have been taken out. The intention is to sink the shaft to the contact, which, from observations on the neighbouring properties, should be reached at about 200 ft.