circulation and during times of storm the air quantities introduced by the roof water would easily be removed. With this construction no special auxiliary means, such as vent shafts, would be required. In larger sewers this proposal can scarcely be effected. Here also, a possibly high introduction of house drains would be desired. A higher location of the mouth in height of the springing line could not be attained as already in normal conditions in larger sewers complaints of offences become numerous by the workmen in consequence of the splashing of sewage. Thus in big sewers where the distance between the manholes is greater, the adoption of vent shafts must be introduced.

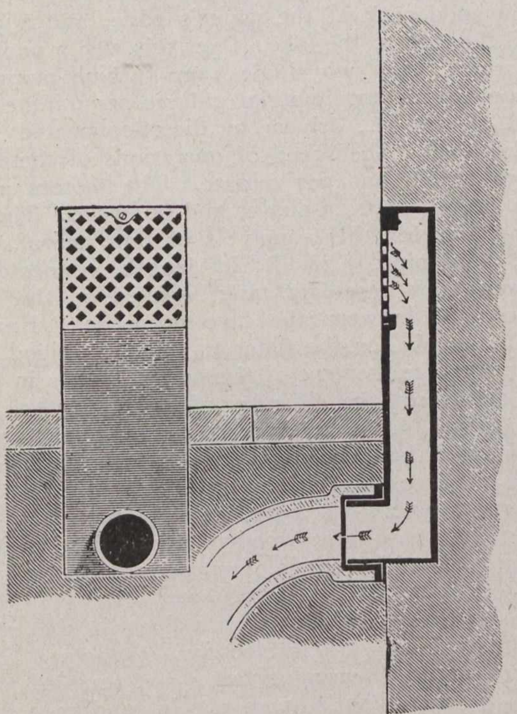

Fig. 8.—Air Inlets.

Every sewerage system has further series of subterranean structures not to be avoided, such as side entrances or shafts with stairs. At these points the air would reach, under circumstances, abnormal tensions. On the other hand, these chambers will flood during times of storm and will be covered with sludge so that in such cases sufficient ventilation should be provided. These should be located at the highest points, as a nuisance to passers-by and neighbors may arise. They should also be equipped with special vent pipes which lead to suitable places in the atmosphere. In Paris, for instance, this is done by the use of the numerous public urinals, and in Dresden special superstructures have been erected over special entrances. (Figs. 6 and 7.) In some cities the efficiency of these vent pipes has been increased by artificial means, and in Brunswick gas stoves were used until recently in the trunk sewer vents. Leipzig used two electric fans to increase the suction through the vents, while in Magdeburg the aspiring ability of houses and high chimneys for the removal of the sewer air has been effective, similar to the ventilating efficiency of the soil pipes. In low-lying districts where manhole covers are air-tight, generally on account of floodings which occur, other means of ventilation must be adopted. In order to effect the circulation by two groups at different levels, a number of inlets have to be installed in lieu of air-tight manhole covers which could be designed in such a manner as is used in England. (Fig. 8.) The removal of the sewer air will then be performed by the soil pipes, or if this is insufficient an additional number of special vent pipes have to be provided.

The question as to the most efficient system of the ventilation of public sewers can therefore be answered thus: By constantly keeping a circulation of air in the sewers during the time of dry weather flow, thus preventing development of gases, and at time of storm to eliminate air tension. Therefore, there must be a constant circulation during dry weather from the perforated manhole and street gullies, without a trap, through the sewer to the soil pipes placed in a warm location and carried above the roof, and in times of rain an air current must be possible in the reverse direction from the down pipes to the manholes. The gullies without a trap and the soil pipes have to perform the separation of the attracted atmospheric air.

In such a manner it would be possible to remove the sewage from houses and premises without creating a nuisance or source of danger to the health of the community by the sewer air, and thus the modern system, that of numerous openings to the air, will have reached the highest degree of perfection.

DRAINING OF KERR LAKE.

An interesting feature of 1913 mining development operations in the Cobalt district was the draining of Kerr Lake in order to make available the ore in the immediate lake bottom, and also to allow prospecting under the lake to be carried on with greater safety. The following notes on these draining operations at Kerr Lake during the summer and autumn of 1913 have been supplied by Mr. Robert Livermore, manager of the Kerr Lake Mine, and appear in the recent report of the Temiskaming and Northern Ontario Railway, prepared by Mr. Arthur A. Cole, Mining Engineer to the Commission:—

After the granting of permission in May, by the Mining Commissioner to dewater Kerr Lake, work was taken in hand at once. All preliminary surveys had been made some time previously, defining the route for the water via a 20-in. pipe line directly from Kerr to Giroux Lake, crossing the Kerr Lake property over the height of land between the two lakes. The greatest elevation of the line above water level of Kerr Lake is 53 feet, the linear distance from lake to lake 2,400 feet, and the difference in elevation between the two lakes 20 feet.

Kerr Lake at this time covered an area of 30 acres, of which 18 belonged to the Crown Reserve, 6 to Kerr Lake, and 6 to the former Drummond Mine. The purchase of the latter acreage by the Crown Reserve and Kerr Lake Companies jointly included the total area of Kerr Lake under the ownership of the latter companies, by whom the entire operation was jointly undertaken and managed. Soundings made of Kerr Lake during the previous winter had established the fact that there were approximately 400,000,000 gallons of water and semi-liquid mud. Giroux Lake covers some 230 acres, and is of great depth, with a large outlet flowing to the Montreal River, so that by using the direct route instead of via Kerr Lake outlet and Glen Lake, to Giroux as at first proposed, there was no possibility of flooding other properties.

On account of the necessity of pumping a certain amount of mud together with the water in order to clear the bottom of the lake sufficiently for mining purposes, and on account of the changing level of Kerr Lake, and the consequent increase of head against which this material must be pumped, a pumping plant capable of