the grating, in consequence of the collected floating matter, does not permit the air trapped in the gulley to escape. To overcome this difficulty, the area of the grating should be increased by which the desired results can be obtained. The process performed thus is that the upper part of the grating collects the water and the lower will allow the escape of sewer air. An increase in the grating cannot always be obtained, especially in narrow business streets or steep roads, where the horses are equipped with heavy shoes and long studs; alternations in the design of these gratings have to be made. In steep roads where gratings do not answer the purpose, on

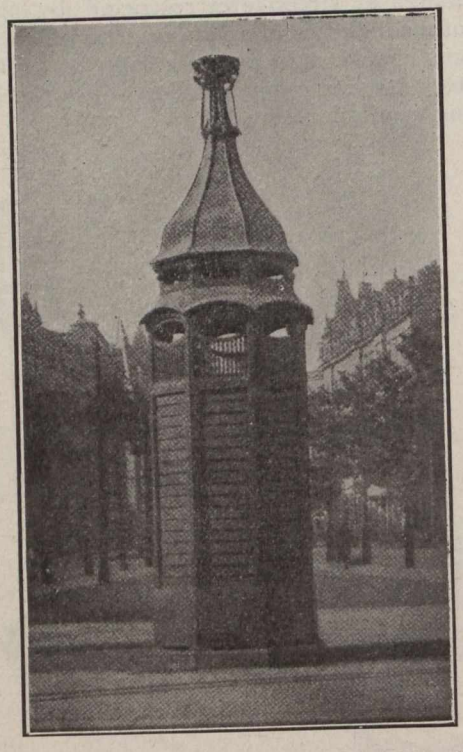

Fig. 7.—Superstructure for Ventilating a Trunk Sewer in Dresden. (The dome is equipped with self-recording rain gauges.)

account of the high velocity of the surface water and especially if the surface water contains much floating matter, it runs over the grating and the expensive and difficult installations of pre-grates have to be adopted so as to prevent the flooding of the streets in the lower districts. In these hilly districts gullies with side entrances have been successfully adopted. The side inlet gulley comprises all the advantages to the safety of run-off and of traffic, as well as ventilation. It carries away all floating matter and particles liable to clog the ordinary grating, and at the same time there is no danger to horses. With this installation the circulation of air in the sewerage system will always remain normal, as in times of storm its inlet is never wholly covered, thus the escape of air is not hampered. For these reasons the side inlet gulley is preferable and the adoption of gratings should only be permitted temporarily as is done in Schwetz, where broad streets with very little traffic are equipped with gratings.

It frequently happens that larger foreign matters are placed malignantly into the side entrance gullies by which the choking of the inlet takes place, which would otherwise be kept clear by the increased clearing power of the water rushing down. The removal of these matters can only be performed with difficulty and at considerable expense. The author considers it advisable to provide a funnel-shaped inlet with a movable grate, the openings of which are so arranged that only such matter is retained by which a choking of the drain is liable. By this method the ventilation would not be impaired.

By omitting the traps in the gullies the advantage is secured of the prevention of tension in the sewer air which is produced by the air adhering to the water in times of heavy precipitation. Even if the surface water discharged by the gullies contains atmospheric air, the ventilating orifices in the manhole covers will be relieved. As in times of storm, large quantities of air enter the sewer, attempts have been made to separate the mixture of air and water by what is known as air separators contained in bends or orifices in the down-pipes or special vent pipes in the down-pipes, but these attempts should not be considered on account of the dangers which may arise by the interruption of the duties required by the down-pipes.

Probably a better means for the conveyance of the air attracted through the down-pipes is by the use of the domestic soil pipes. It is a general practice in a combined system to convey the storm and sanitary flow by a common conduit to the sewer. Thus there would be no reason, in a combined sewerage system, to construct the house drainage on the separate system. With regard to the ventilation, however, there would be objections, and a separate introduction of storm and soil pipes from domestic premises into the sewers would be desired as well as in combined systems. We have already recognized the soil-pipes as the material means for sewer ventilation during dry weather as they are able to maintain by their higher temperature a constant current of air in the direction from the sewer to the atmosphere. It does not seem advisable to exclude these uniformly acting factors from the ventilating process during times of storm and to connect them with pipes which do not act air-ejecting as those do, but air-forcing. By the accelerated falling velocity, the down-pipes convey, during times of storm, quantities of air and water with such intensity that it cannot be of any effect to the soil-pipes on the sewer. If it is further considered that in dry weather the connection of both pipe systems in a common conduit promotes independent currents by the difference in the temperature prevailing between the down-pipes and soil-pipes, which results always in a trouble of the aspiring efficiency of the house connections on the sewer. The author thinks it advisable to introduce down- and soil-pipes as separate conduits. This would show that during dry weather the influence of the soil-pipe on the removal of the sewer air is greater than by the separation of the down-pipes and the trouble in the operation on the ventilating process would thus be eliminated.

During times of storm the sewers are quickly filled so that the house connections, the mouth of which are placed just above the level of the dry weather flow in the sewers, are soon submerged. It might be proposed to effect the introduction of the house drains at the top of the sewer. Thus, the ventilation of the sewerage system by means of the soil pipes would in any case separate again the quantities of air introduced by the down-pipes, and no tension in the sewer would occur.

If the introduction of the house drains at the dry weather flow level was placed so as not to be offensive to the workmen in the sewer by the discharge of domestic sewage, there would be no objection to the carrying out of this proposition for the inaccessible sewers, and as the exceedingly greater number of conduits in each sewerage system consists of inaccessible sewers there would be maintained in this greater part of the system an ample