The more important part, that is, the base, of the sandwasher, as finally developed by these experiments, is shown in Fig. 2. A run at the full rate during four hundred hours, using this sandwasher did not disclose any scour whatever. It was believed that the problem of scour had been satisfactorily solved, and subsequent events have proved this to be the case.

Losses of Head in Typical Drifting Sand Filter

In order to make clear the nature of the work the sandwasher is called upon to do, the following table is given which shows observations of the various losses of head in the

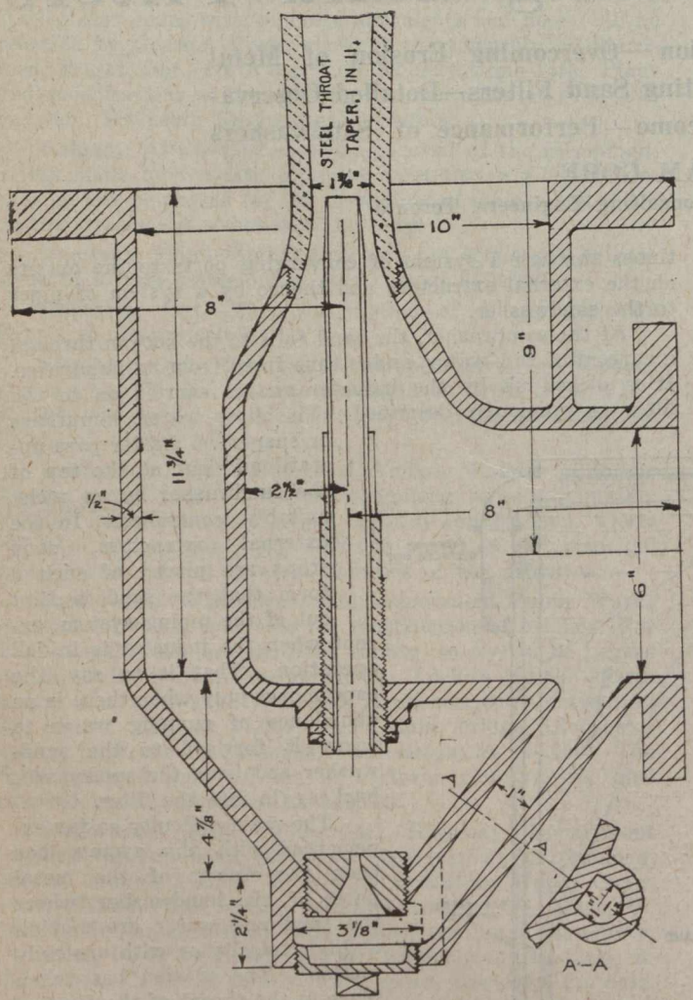

FIG. 2—BASE OF SANDWASHER OF TEST FILTER

typical drifting sand filter. The observations were made upon the test filter during a run of 120 hours, but during working hours only, the water being pumped from a local pond in which there was a considerable amount of suspended matter. The figures apply almost equally well to the Toronto plant, as sand of the same depth and quality is used, with water containing on the whole less suspended matter of a vegetable origin but more of a mineral origin.

During most of this test, about two-thirds of the water being filtered was passed through the sandwasher, and the remainder by-passed to the top of the filter. At the first set of observations, and again when the filter began to clog after 110 hrs., an increased proportion of water was sent through the sandwasher. This is shown in column 3 by the increased losses of head.

The drifting sand filter has very definite loss-of-head characteristics which are brought out by the table and these affect the working of the sandwasher. These characteristics have been studied in considerable detail. It will be noted that under normal working conditions, an induction head (column 6) of less than 5 ft. is required in the sandwasher body. During the early hours of a run, a maximum slowly develops and fades away again. This is due to the effect of the flat sand surface remaining immediately after a backwash. Another maximum develops towards the end of the run. This appears to be due to a less effective drift

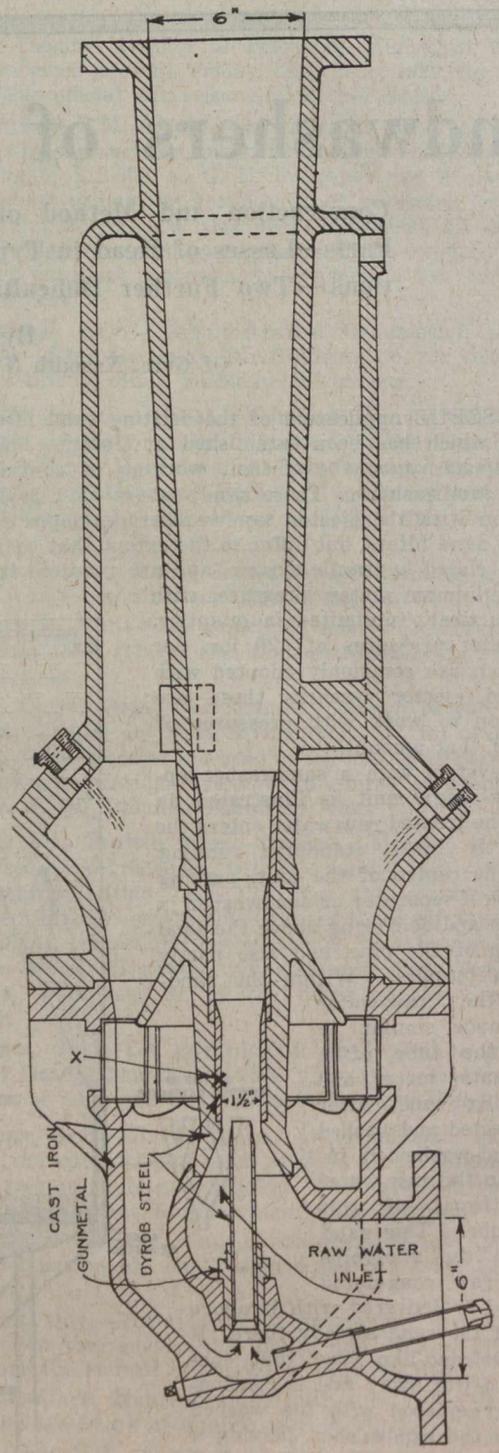

FIG. 3—SANDWASHER, TORONTO FILTRATION PLANT

of the sand, as clogging takes place in the stationary sand which increases in bulk and area at the expense of the drifting sand, reducing the filtration area of the drifting sand. The greater part of the induction head provided by the sandwasher ejector is taken up by the filtration losses in the drifting sand, (column 4). Thus, if no filtration was in progress, an induction head of one foot or less (column 7) is all that is necessary to cause the sand to circulate. But as the water passing through the sand-