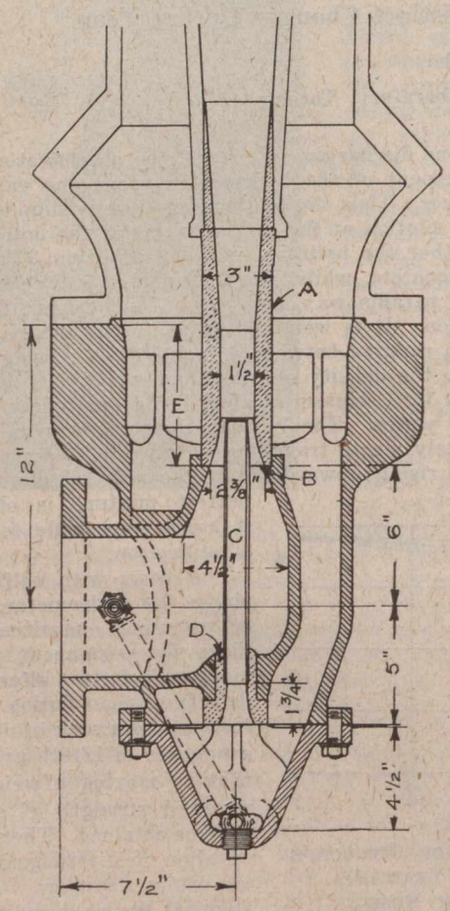
and 12 respectively. In the centre of the filter is a space 16⅔ ft. in diameter, in which is placed the raw water control balance. Each of the thirty units form a separate quadrilateral unit with sand extractors, sand washer and filtered-water-collecting system. For backwashing, an overflow channel 15 ins. wide and approximately 3 ft. deep is placed round the outer ring. At the bottom of each filter, partly embedded in the concrete, is a cast-iron collector pipe for the filtered water. Running out from the collector pipe are a series of 1½-in. wrought iron sheradized pipes, having ⅜-in. holes drilled on the underside, spaced about 6 ins. apart. These pipes have a cap on the outer end and the inner end is screwed into the cast-iron collector. On the top of the pipes is rounded gravel in three grades, varying from ¾ in. to 3/16 in., to a depth of 10 ins., and above that is 9 ft. of sand.



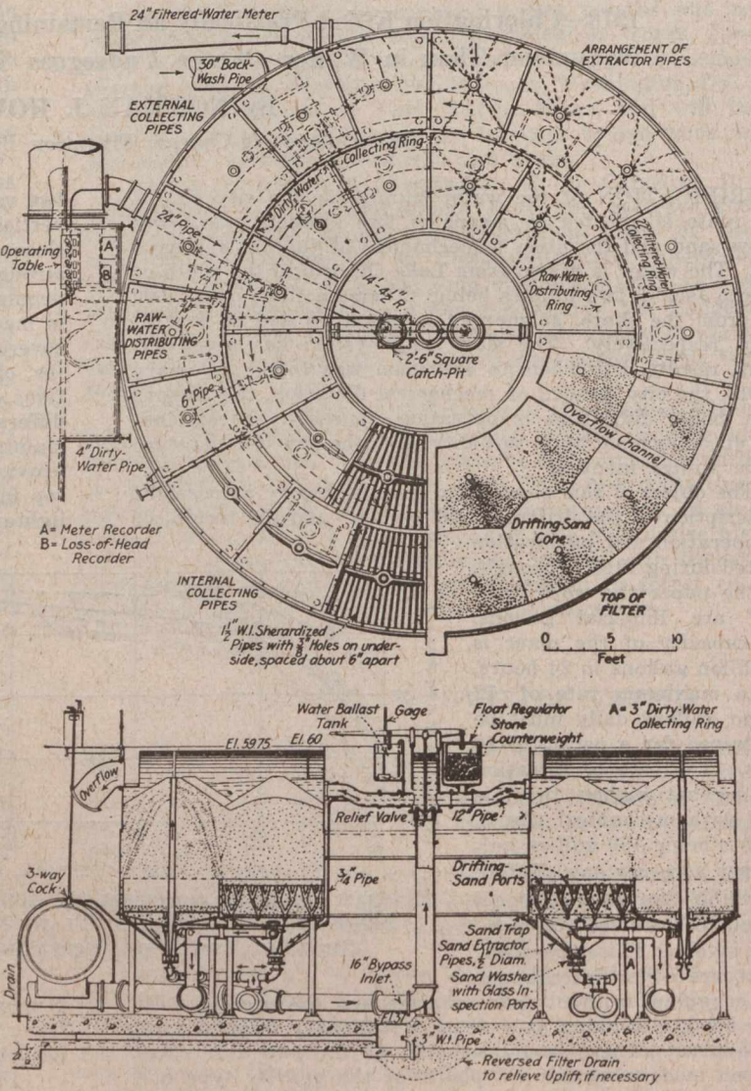

NEW TYPE OF SAND-WASHER NOW IN USE

(A) Throat made of drawn-steel tube, hardened right through; (B) thin rubber washer; (C) standard ¾-in. wrought iron pipe, hardened right through; (D) mild steel, hardened right through; (E) collar on throat to be set so that throat projects 6 1/16 ins. below flange face without compressing rubber ring at the top.

that the flow of sand from each extractor pipe can be observed. The sand washers are of cast iron. The throats are relined when occasion arises with wrought-iron pipe liners, specially hardened by a carbonizing process. The liners are in three steps and are 13½ ins. high.

### Description of Process

The coagulant is introduced as the water goes direct to the filters, on the suction side of the pump. Owing to the operation of the drifting sand system, the sand contained in the filters resolves itself into two bodies—a stationary sand body supported by the gravel resting on the water collecting system and a drifting sand body lying between the surface of the stationary sand and the sides of the filter.




DETAILS OF DRIFTING SAND FILTER AT VARIOUS HORIZONTAL AND VERTICAL PLANES

The total amount of sand in each filter is 600 cubic yards. No screens are used between the gravel and the sand. The sand has an average effective size of .375 mm., and a uniformity coefficient of from 1.6 to 2. Around each small unit is a system of slots and the drifting sand is withdrawn from the filter by means of extractor pipes, through which the sand flows to the bottom of the filter unit into a sand washer. At the sand washer the sand falls to the bottom through a current of raw water and is thus cleaned. It is picked up by the incoming raw water and carried back to the filter. The dirty water impurities or suspended matter pass upward and out at the top of the sand washer by an outlet suitably controlled. A water jet is provided to assist the flow of sand through the extractor pipes, and, below the point of discharge, a glass inspection port is provided, so

By causing the sand to drift across the path of the raw water, a large proportion of the impurities, including the aluminum hydrate and the bacteria that have been caught by the coagulant, are carried out along with a portion of the drifting sand. The stationary sand takes out the remaining impurities. The treated raw water enters the filter partly by a standpipe running through the centre of the unit, which passes through a sandwasher in the bottom, and delivers above the sand at the top of the pipe, and partly through a by-pass. Within the sandwasher the raw water pipe is constructed similar to that of the tube of a Venturi meter and the drifting sand after being collected and washed in the sandwasher, is inducted into the raw water at the throat of the Venturi tube. This sand passes up the stand-pipe with the raw water and is delivered at the top of the filter.