the liquids by pre-tanks and then lifting them separately by pumping apparatus best adapted to each service from the standpoint of both reliability and efficiency.

Instead of the ordinary screens the solids are separated out by pre-tanks in which baffles, collecting weirs, self-cleaning screens, etc, are so arranged that the solids are retained in one portion of the tank and the clarified liquid passes on to another. The solids, which make up only a few per cent. of the total volume, gravitate into Priestman pneumatic ejectors and are discharged by compressed air into the delivery main

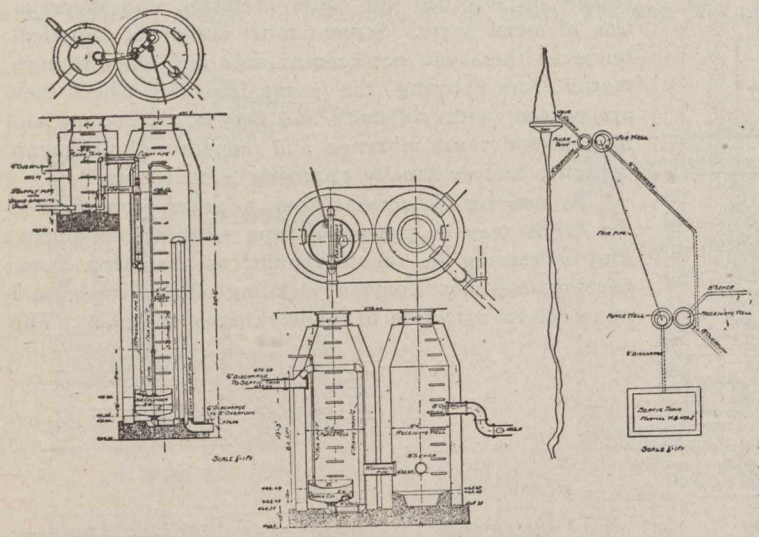

Fig. 10.

by-passing the pump or else to a separate discharge pipe. The clarified liquid is pumped by either high efficiency centrifugal or plunger pumps. The pumps can be driven by motors, gas or oil engines or steam turbines. The air compressor is small and may be readily driven by belting or from the shaft of the main driving motor or engine.

Figs. 6 and 7 show the sewage pumping stations designed on the Priestman natural compound pumping system comprising Priestman ejectors for the sludge and high efficiency triplex plunger pumps for the clarified sewage. Instead of the plunger pumps, centrifugal pumps could also be used. Fig. 8 shows the pre-tank as used in the installation shown in Fig. 7. The drawing shows the inlet chamber, the sludge chamber, weir chamber and the pump well from which the clarified sewage is lifted while the sludge gravitates to the ejectors.

Automatic Sewage Lifts and Water Power.—By use of the automatic sewage lift, sewage may be pumped by sewage,

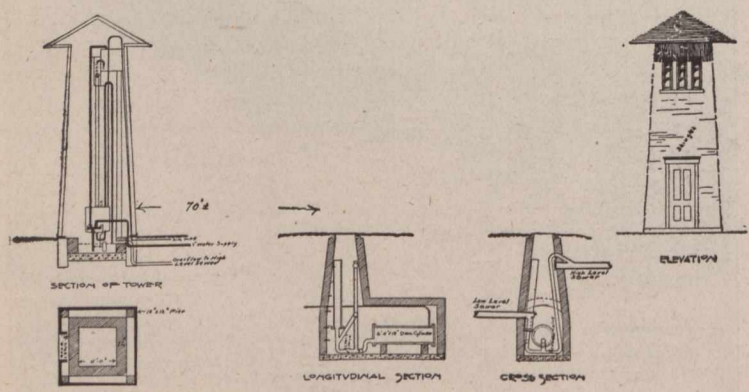

Fig. 11.

without cost, or else with the water power lift by water. As conditions do not always permit of the use of the lifts, they are not found so generally in service, but the entire absence of operating cost with these devices warrants their consideration under all circumstances.

The cost of a sewage system may be decreased by draining a low-lying district separately and lifting the sewage, thus avoiding deepening the excavation throughout the entire system. A pumping station may not be advisable owing to the cost of attendance of operation. In such cases a study should be made of the possibility of using the automatic sewage lift. Very often topographical conditions permit of using the power stored in high level sewage to compress air so that the low level sewage may in turn be lifted by using this compressed air furnished at no cost. The lift is entirely automatic and clogging is avoided by the flushing effect of successive discharges of sewage. A typical installation of an automatic sewage lift is shown in Fig. 9.

Instead of pumping the low level sewage by power derived from the fall of high level sewage, water from a nearby stream or city main may be used instead. Fig. 10 shows a sewage lift wherein the power is derived from damming a small stream and Fig. 11 shows a water power lift operating on city water.

PLASTIC FIRE BRICKS.

Boiler-door arches and furnace linings in one solid piece are now said to be practicable, owing to an invention of plastic fire brick by the late Lester Betson. The brick is pounded into the shape desired. It is quite stiff, and will remain as placed, it is said, without the use of forms or molds, except for a simple temporary support in a door-opening or under an arch. It is then set by means of a slow fire in a short time. When it becomes very hard it may be put to immediate use.

It is claimed that the bricks are neutralized for expansion and contraction, so that they are not cracked or otherwise affected by sudden changes of temperature. Clinkers do not readily adhere to the surface, which is smooth and unbroken. As it fills all crevices, it should be gas and air-tight. The brick is being introduced into Canada by the Inland Sales Company, Limited, of Winnipeg.

The International Engineering Works, Limited, of Amherst, N.S., Canada, have recently opened three new offices in addition to their regular offices at Montreal, Toronto, etc. These representatives are George M. Taylor, 816 Burrards Street, Vancouver, B.C.; J. F. Tracey, 321 Edmonton Street, Winnipeg, Man., and Grodwards Company, Cobalt, Ont.

The experiments of British railway companies which are considering the adoption of wireless telegrapry for railway signalling, marks a new departure in the progress of wireless and in the advance of railway science. The Midland, and the London and Southwestern railway companies have experimented with the Prentice automatic system, a Canadian invention, based upon co-operation between electrical and mechanical devices on a traction engine. (See *The Canadian Engineer* for Sept. 18th, page 470.) The London and Southwestern has laid a high frequency wave wire on the centre track and a series of insulated wires beneath a locomotive to receive radiant energy worked from these.

A green light in the engine cab indicates that the line is clear, and when the section ahead is not clear a red light shows. An audible warning is given and the brakes are applied automatically. The Midland Railway is using an improved pattern of the Railophore system employed on German state railways, rendering the passing of set danger signals impossible. Four distinct signals in the engine cab are followed by automatic brake application.