of the other processes; in other words, the greater the percentage of suspended solids removed, the larger is the volume of sewage that can be treated on the same area of filter; in fact, throughout the report the elimination of the suspended matter from sewage before allowing the flow to pass on to the filters or into a stream, or by way of storm water overflow, is considered a matter of the highest importance. Any means, therefore, which can be successfully and economically adopted for the removal of the suspended matter are well worth our consideration; if, at the same time, they facilitate the handling of the solid matter or sludge, that will also be of advantage.

The object of this paper is to bring before your notice one or two arrangements for attaining these ends which are being successfully worked on the continent and in this country.

The first of these, like many other good as well as indifferent things, comes from Germany, and is known there as the Kessel, the name probably being derived from the boiler-like shape of the apparatus. Its main feature is a vertical cylinder with an inverted cone-shaped bottom, and a cone-shaped or domed top. This is fixed on wrought-iron or brick supports above the level of the flow of sewage to be treated. The apparatus is so arranged that the flow is syphoned through this cylinder with a loss of two or three inches only in the level of the sewer. This is effected as follows:—

A manhole, or chamber, is constructed at the point on the sewer from which the sewage is taken, the floor of which is a foot or more below the invert of the sewer at this point. Into this the short leg of the syphon is brought and finishes below the invert of the sewer, so that it is always trapped.

On the opposite side of the Kessel a corresponding manhole or chamber is provided to receive the long leg of the syphon, which is trapped in a similar manner.

The invert of the outfall from this second chamber is kept two or three inches below the invert of the sewer as it enters the first manhole to ensure syphonic action.

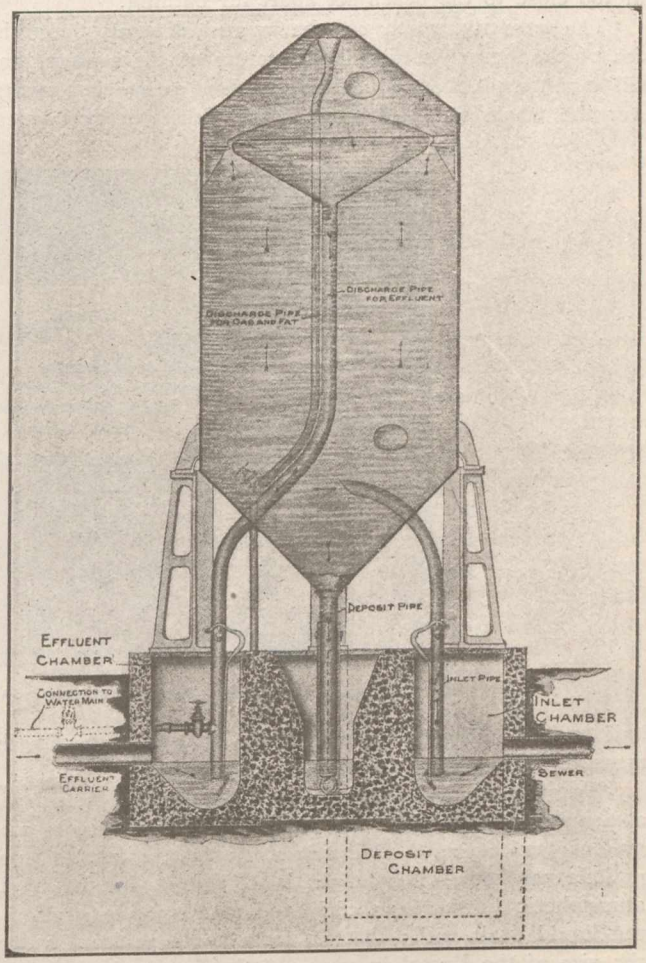
Directly below the Kessel a third chamber is provided, and into this a third pipe or leg (known as the deposit pipe), is brought from the bottom of the cone. This also is arranged so that the foot of the pipe or leg is trapped.

Reference to the accompanying diagram will make this clear, and it will be seen that the short leg of the syphon, or inlet pipe, as it is called in the diagram, passes through the cone-shaped bottom of the Kessel and finishes inside same immediately over the centre of the inverted cone, the end of the pipe being shaped so as to deflect the heavier solids in that direction. The long leg of the syphon, or discharge pipe for effluent, is also carried through the cone-shaped bottom of the Kessel up the centre of same to near the top of the cylindrical portion, where it finishes in a covered inverted cone, the greatest diameter of which approximates the internal diameter of the cylinder of the Kessel. The inlet to this cone is through a narrow slot extending the whole circumference of same, immediately below the cover. You will also notice in the diagram that there is a fourth pipe marked "Discharge pipe for gas and fat," which passes through the cone-shaped bottom, and finishes with a small cone-shaped mouth directly below the centre of the cone or dome-shaped top.

For easier manipulation all four of these pipes are fitted with valves. To ensure syphonic action through the Kessel it is necessary to first fill it with water, and for this purpose a connection to the water main is provided to one or other of the before-mentioned legs. In the diagram this is shown connected with the discharge pipe for effluent, or long leg of the syphon.

The action of the apparatus is as follows:—

The large cylinder or Kessel having first been filled with water, and the three chambers into which the legs of the syphons are conducted filled sufficiently to trap the legs, and the valves in the legs opened, syphonic action at once commences, and the sewage finding its way into the inlet chamber passes up into the Kessel. The shape of the inlet pipe, as before mentioned, deflects the solids in suspension towards the bottom of the inverted cone, and the coarser and heavier solids at once find their way through the deposit pipe into the centre chamber; the lighter solids, on the other hand, rise to the top of the Kessel, while the liquid, still carrying a large proportion of fine solids in suspension, commences to gradually rise in the Kessel. These finer solids are gradually dropped during the slow upward rise



The Kessel.

of the sewage in the large cylinder or Kessel, and before the level of the outlet connected to the long arm or discharge pipe is reached, practically all the solids in suspension have been left behind, and the effluent leaving by the discharge pipe is quite free therefrom.

The heavier solids on reaching the bottom of the Kessel are diverted by the inverted cone-shaped bottom thereof to the central or deposit pipe, and through this into the chamber. This latter may be extended to a size sufficient to hold any desired quantity of solids. It is a curious fact that as this chamber fills with the solids, the liquid portion of the contents passes out through the same pipe by which the solids enter; consequently this chamber may be worked until the percentage of liquid left is sufficiently small to enable the solid contents to be handled with comparative ease.