Opening of Pressure Filters at Ashway Gap and Brushes

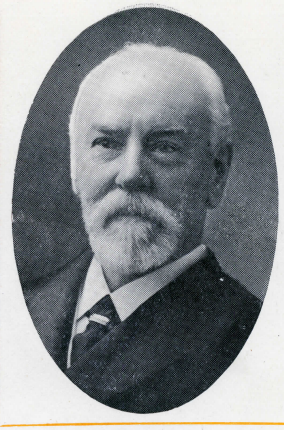
Ashton-under-Lyne
Stalybridge & Dukinfield
(District) Waterworks
Joint Committee

19th SEPTEMBER, 1912

ASHTON-UNDER-LYNE
STALYBRIDGE & DUKINFIELD
(DISTRICT) WATERWORKS
JOINT COMMITTEE

Opening of Pressure Filters at Ashway Gap and Brushes

MATHER & PLATT, LIMITED
ENGINEERS
MANCHESTER



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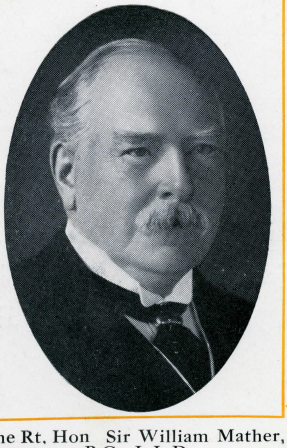
(Engineer.)



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CONTRACTORS:

Mather & Platt, Ltd.,
Engineers, Manchester.

BUILDER:

James Ridyard,
Railway Saw Mills, Ashton-under-Lyne.

ASHWAY GAP FILTER HOUSE

OPENING OF PRESSURE FILTERS

ASHTON-UNDER-LYNE STALYBRIDGE & DUKINFIELD (DISTRICT) WATERWORKS JOINT COMMITTEE

SEPTEMBER 19, 1912

GENERAL.

THE difficulties encountered by the administrative authority when a water supply is obtained from a peaty gathering ground are much greater than the average consumer realises. To obtain from such a source pure and wholesome water, free from all pathogenic organisms, non-erosive (when in contact with lead pipes), and bright and colourless in appearance, it is necessary to introduce a process of mechanical filtration combined with chemical treatment. The system described in the following pages, based on sound scientific principles, achieves the above much desired results without setting up any pernicious action in the water that would be detrimental to health.

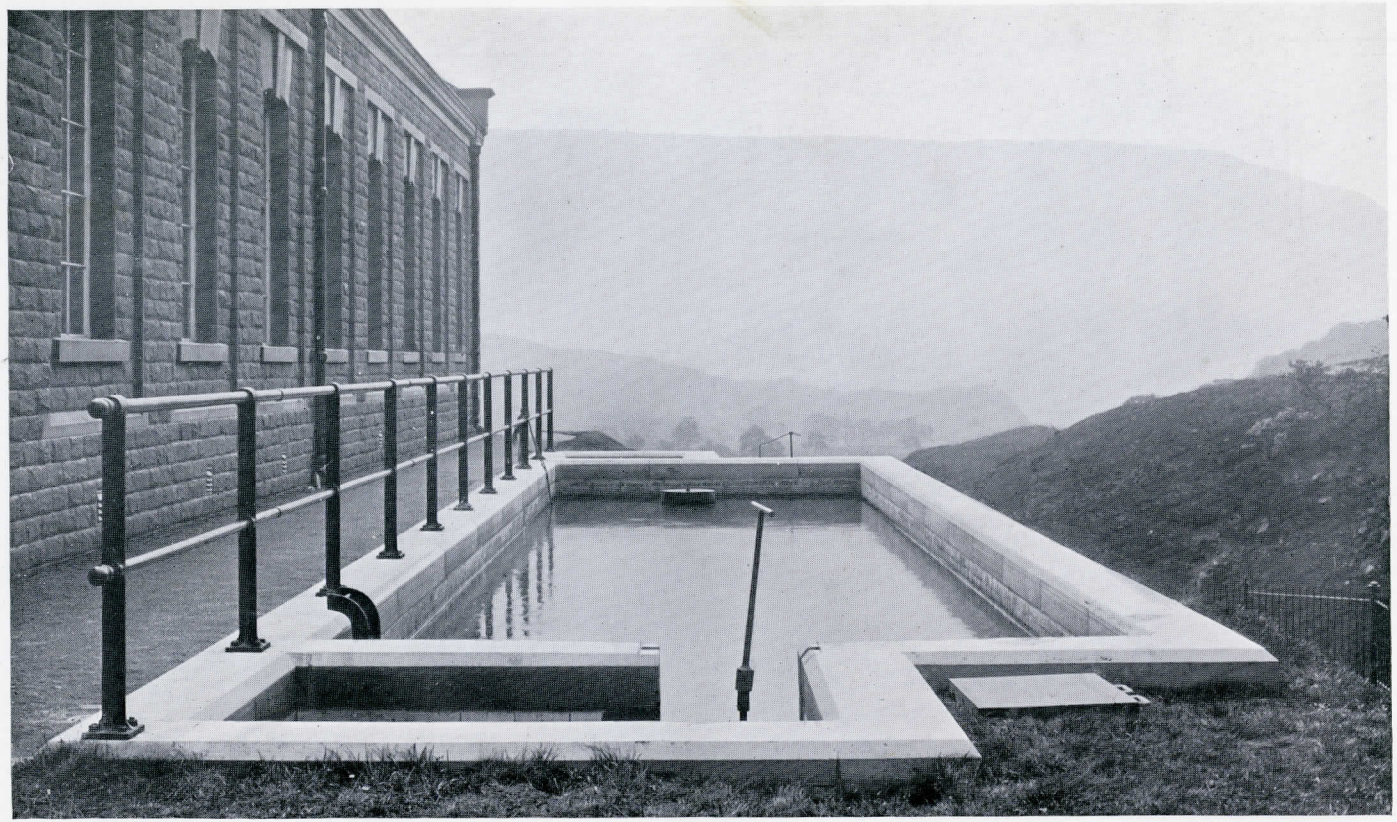
ASHWAY GAP FILTER HOUSE

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

EXPERIMENTAL INSTALLATION.

WITH this object in view, and with the knowledge of the class of water obtainable from the districts which supply the various towns and urban authorities constituted in the Ashton-under-Lyne, Stalybridge and Dukinfield (District) Waterworks Joint Committee, the administrative authority for the past 14 or 15 years have been treating certain water in the Swineshaw Valley with a neutralising re-agent for the purpose of rendering the water non-plumbo solvent, but as the discolouration and turbidity was not in any way removed under this somewhat primitive method of treatment, the Joint Committee decided, in the year 1908, to make exhaustive enquiries as to a more up-to-date plant, whereby the process of mechanical filtration and chemical treatment could be advantageously applied.

The results of the investigation were incorporated in a report presented by the Engineer, when the Joint Committee immediately decided to put down a small experimental plant at Ashway Gap, for the treatment of the water from the Greenfield Reservoir. Three



SEDIMENTATION TANK (Ashway Gap Filter House)

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

Pressure Filters, with a chemical apparatus, capable of dealing with a maximum flow of 432,000 gallons per 24 hours, were installed in June, 1909, under Messrs. Mather & Platt's Patent.

MAIN INSTALLATIONS.

THE results given by the experimental plant during the period under observation were so satisfactory that the Joint Committee decided to take steps to deal with all the water supplied in their district, and with a desire to obtain the best installation then on the market, the Joint Committee visited and inspected similar plants installed by other water authorities, and, after careful consideration, decided to instal in both valleys Mechanical Filters of Messrs. Mather & Platt's well-known Pressure Type, fitted with Patent Washing Apparatus.

The site of the Filter House at Ashway Gap, Greenfield, being already fixed by the existence of the experimental plant, it was only necessary to extend the existing building by about 75 feet.

Compensation Water Weir Gauge Recorder (Yeoman Hey Reservoir Water Course)

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

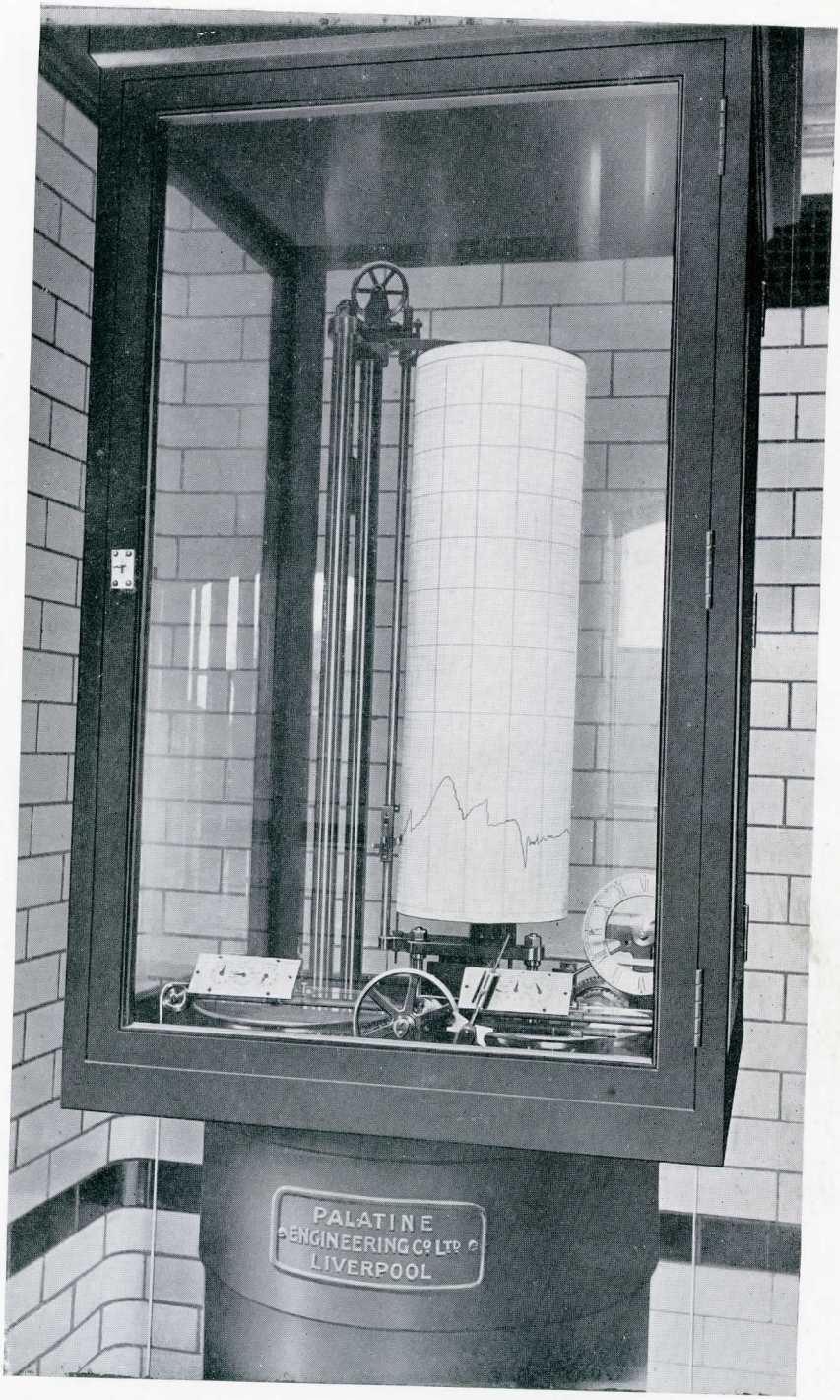
In the case of the Filter House for the Swineshaw Valley supply, it was desirable to select a site conveniently situated to control all the three reservoirs in the Swineshaw Valley used for domestic and trade purposes. The site decided upon was at the toe of the Brushes Reservoir embankment, owing to its sheltered and accessible position from an administrative point of view.

The two installations comprise 36 Pressure Filters, designed to purify collectively 5,352,000 gallons of water per day, and together form one of the largest ,Pressure Filtration schemes in the country.

GENERAL DESCRIPTION OF THE MECHANICAL FILTERS.

EACH installation consists of two major parts, viz: the Filters and the Chemical Plant.

The Filters, which are of the Pressure Type (as shown in section on page 26), have been supplied and erected by Messrs. Mather & Platt, Ltd., of Manchester, and each consists



Compensation Water Weir, Gauge and Recorder House (Yeoman Hey Reservoir Waste Water Course)

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

of a closed cylinder, having parallel sides with dished ends top and bottom, and is constructed of riveted steel plates. The Ashway Gap cylinders were tested under a hydraulic pressure equal to 150 lbs. per square inch, applied continuously for a period of one hour, and in the case of the Brushes cylinders the test was equal to 250 lbs. per square inch, applied continuously for a period of three hours. The filtering medium, which is of an average thickness of 3ft. 6in., consisting of specially graded quartz crystals, rests on a steel false bottom, riveted to the shell of the Filter, and fitted with circular phosphor bronze nozzles screwed in from the underside. Ready access to the nozzles can be obtained by means of the manhole placed in the collecting chamber, where they may be inspected or replaced without removing the quartz bed.

The object of the nozzles is to ensure the effective use of the filtering bed; also to prevent particles of the filtering medium getting into the filtered water main, and to ensure the proper distribution of the water used for washing out the filter.

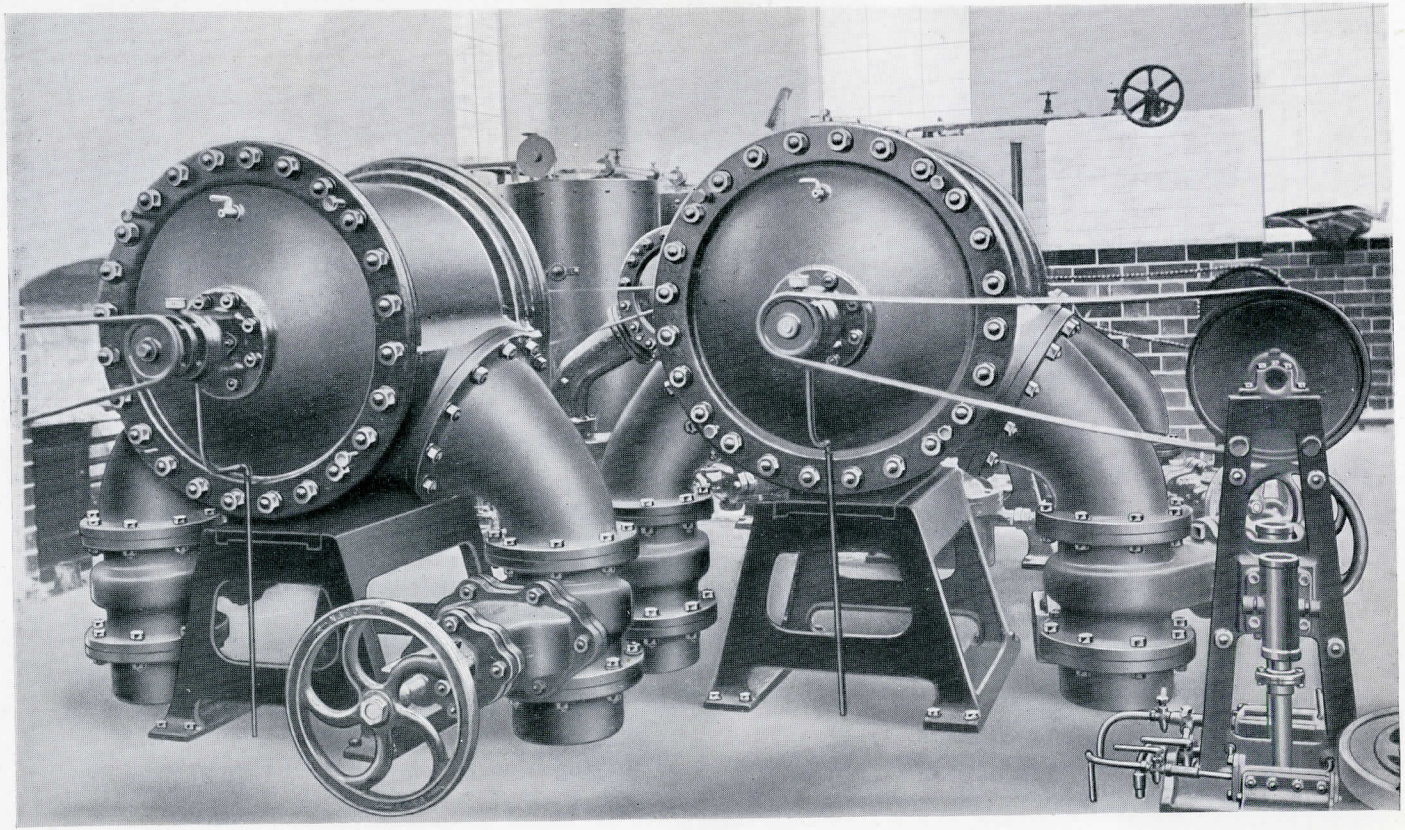
BRUSHES FILTER HOUSE

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

THE unfiltered water enters at the top of the Filter, and is evenly distributed over the bed, and after percolating through the filtering material, flows into the collecting chamber, and is then delivered into the filtered water mains, and thence direct to the service pipes for consumption.

For cleansing the filtering material a vertical tube is fixed in the centre of the bed, extending to within a few inches of the top level of the filtering material. Suspended in the tube is a steel shaft, on which are fixed, a short distance above the top of the tube, two jets connected with the filtered water main, and a propeller situated in the upper end of the tube. The shaft is driven from outside the Filter by means of belting.

When it is required to wash the bed, filtered water is admitted to the underside of the false bottom, and, rising through the nozzles, puts the bed in suspension. The shaft with the jets and propeller thereon is then caused to revolve at a high speed, and the quartz is thoroughly cleansed by being drawn up the vertical tube and passed over the top, where it comes in contact with clean filtered water issuing from the jets at a high velocity. The filtering medium then sinks in the filter,



Water Motors, Chemical Pumps, Lime and Alumina Tanks
(Brushes Filter House)

with dissolving trays and hand agitating gear; and lime tanks (built of steel riveted plates) provided with agitating gear driven by a small Pelton Wheel.

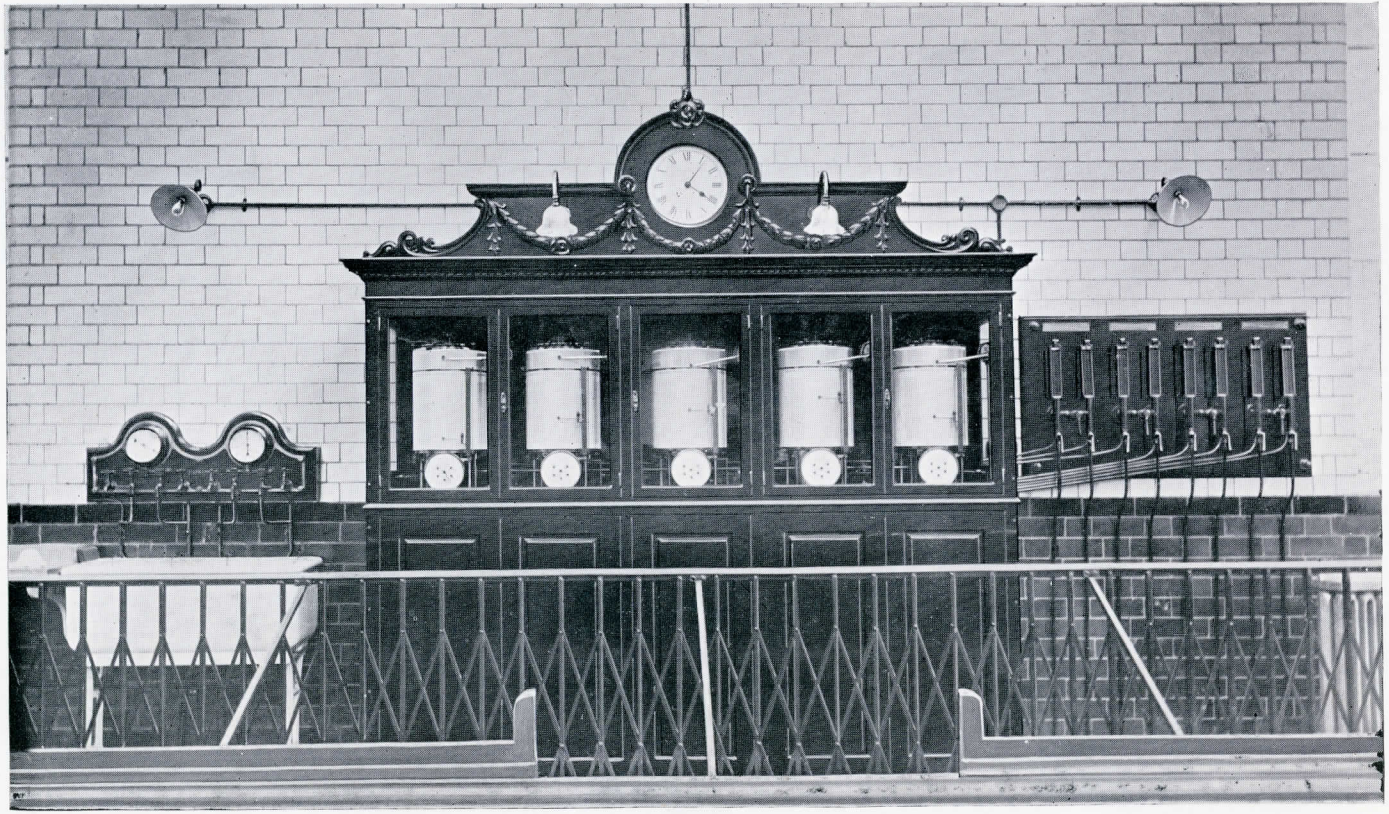
The Water Motors driving the chemical pumps are specially designed to vary their speed in the same ratio as the rate of flow to the filters. Consequently the quantity of chemical solutions pumped into the main is always in proportion to the quantity of water passing.

The Pumps are fed from the chemical tanks, and deliver the solutions into the water on the inlet side of the Water Motor. A thorough mixing of the solutions with the water is thus ensured.

ASHWAY GAP INSTALLATION.

THIS installation consists of 18 Filters, three 8ft. 6in. diameter, and fifteen 8ft. diameter, with chemical apparatus, housed in a building 111ft. long by 36ft. wide.

The water is conveyed to the Filters by two 15in. mains, one from Yeoman Hey Reservoir, under a head of 20 lbs. per square



Sample Basin and Venturi Meter Recorders (Brushes Filter House)

inch, and the other from Greenfield Reservoir, under a head of 75 lbs. per square inch.

The motive power used for driving the washing gear of the Filters is obtained from a Gilkes Vortex Turbine, working under a head of 130 feet, and driven by water taken from the "compensation" supply.

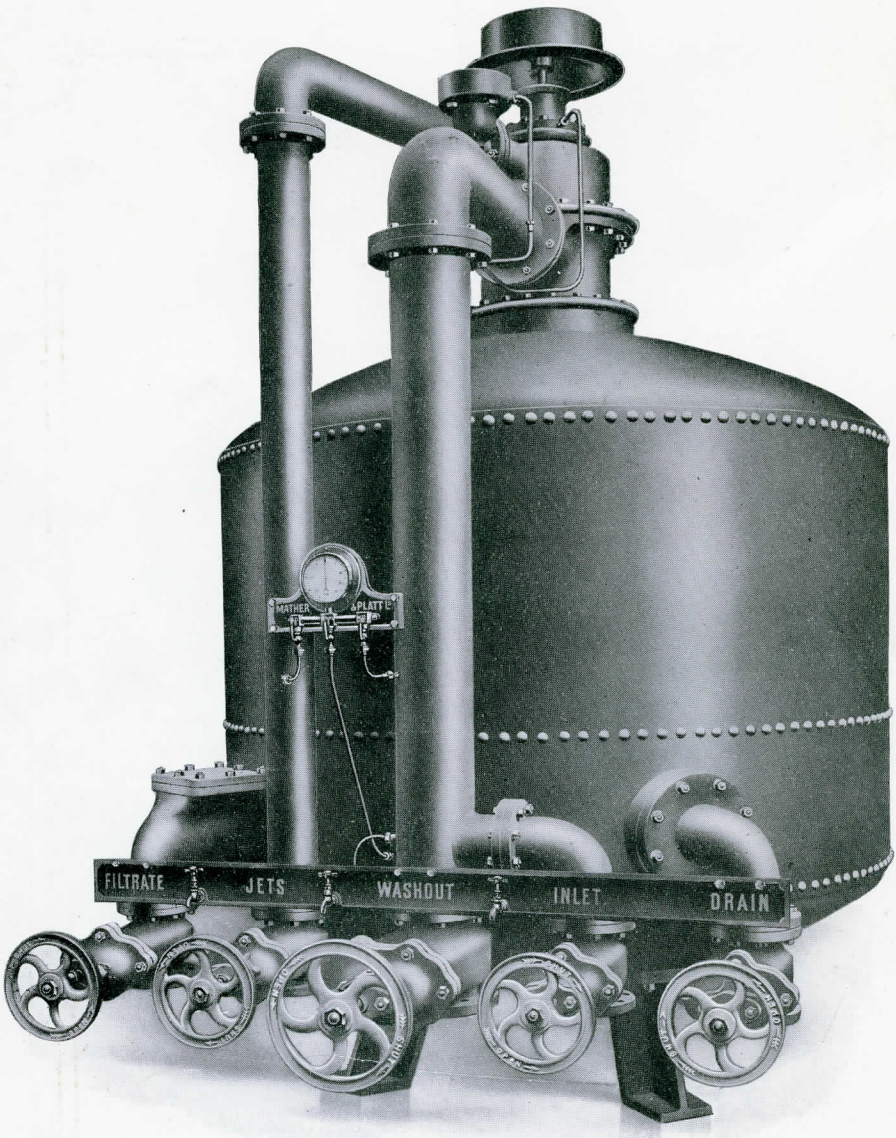
Main line shafting runs from end to end on each side of the building. Each shaft is fitted with patent friction clutches, one for each of the Filters, so that any one can be washed out independently.

The house is lighted by electricity, the current being generated by a dynamo, belt-driven, from an 8 b.h.p. Gilkes Pelton Wheel. The dynamo is capable of developing 28 amperes at 105 volts.

The house is warmed by means of a furnace placed in the basement, and 3in. hot water pipes.

A runway for the conveyance of chemicals traverses the whole length of the house, and so allows the chemical tanks to be fed from the chemical stores in the basement by the use of a false bottom skip, which discharges into hoppers fixed on the chemical tanks.

The water, after it passes through the filters, is registered through Kent's Venturi



VIEW OF FILTER

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

Meters fixed on the 15in. mains on the outside of the house.

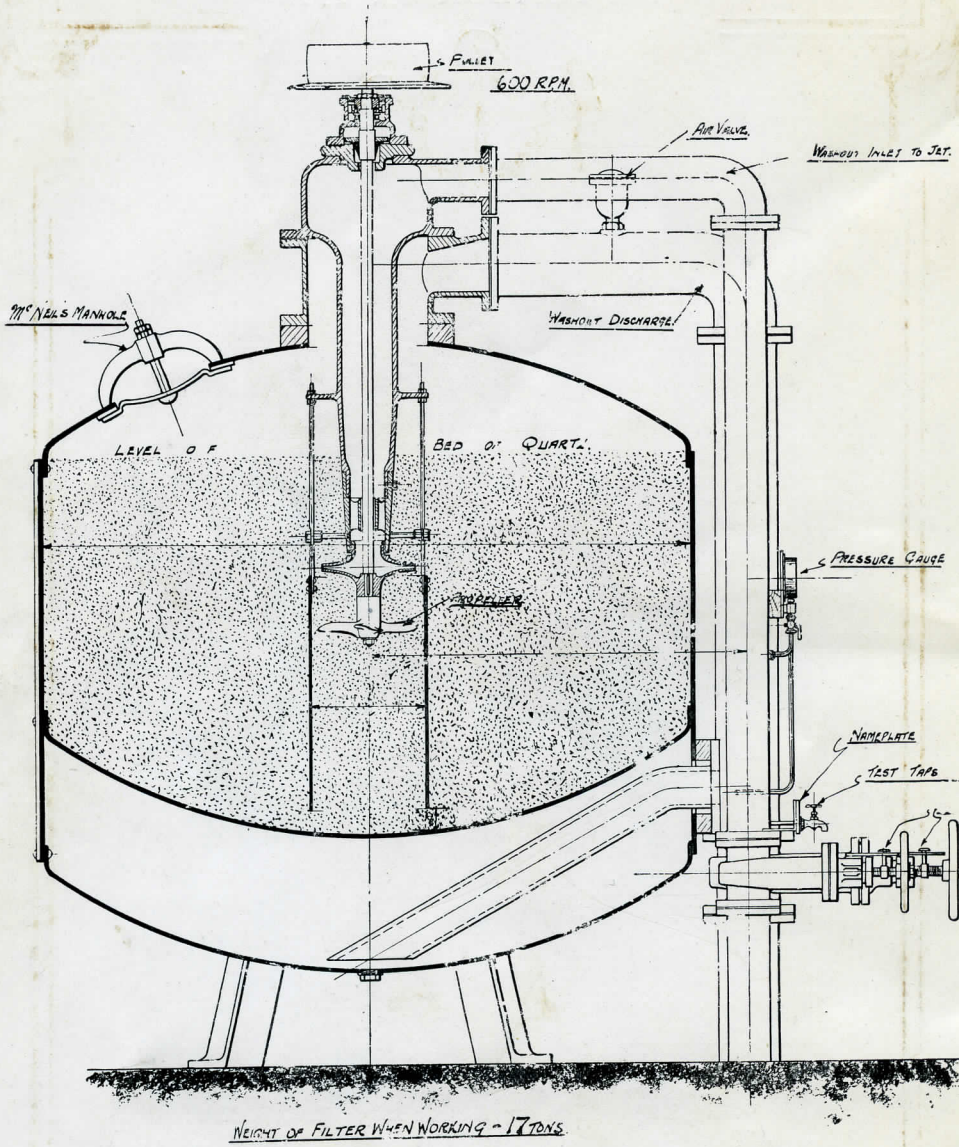
By-pass mains are provided, so that the water can go direct into consumption without passing through the filters.

A sedimentation tank with a capacity of 25,000 gallons is provided outside the Filter House, into which all wash water is discharged. After sedimentation the water is decanted automatically by means of a syphonic floating outlet, and the clear water is discharged into the compensation basin, while the sludge is pumped on to the land by a belt-driven 6in. ram pump. The wash water as it comes from the filters is registered through a 6in. Kent's waste-water meter.

A measuring gauge, provided with a Lord Kelvin water-lever recorder and counter, registers the amount of compensation water discharged below the Yeoman Hey Reservoir Embankment.

Chemical Stores, fitted up with scales for the weighing of the necessary chemicals, are provided in the basement at the end of the house.

The plant is capable of filtering and treating 2,760,000 gallons of water per 24 hours.



Sectional View of 8ft. diameter Filter

OPENING OF PRESSURE FILTERS AT ASHWAY GAP AND BRUSHES SEPTEMBER 19, 1912

BRUSHES INSTALLATION.

THIS installation consists of 18 Filters, 8ft. diameter, with chemical apparatus, housed in a building 126ft. long by 36ft. wide.

The water is conveyed to the Filters by a 24in. main from Brushes Reservoir, under a head of 20 lbs. per square inch and an 18in. main from Swineshaw Reservoirs, under a head of 130 lbs. per square inch.

The motive power used for driving the washing gear of the filters is obtained from a "Gunther" Pelton Wheel, supplied in duplicate, working under a head of 300 feet, and driven by water taken from the "compensation" supply. The water, after it leaves the tail race, is registered over a V notch by a "Lea Recorder."

Main line shafting runs from end to end on each side of the building, as in the Ashway Filter House.

The house is lighted by electricity, the current being generated by a dynamo, direct coupled to a "Gunther" 10 b.h.p. Pelton Wheel Turbine. The dynamo is capable of developing 50 amperes at 105 volts.

The house is warmed by means of a furnace and 3in. hot-water pipes.