NATIONAL WATER PURIFYING CO.

145 BROADWAY AND 86 LIBERTY ST.

NEW YORK

U.S.A.

DIRECTORS.

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ISSUED JULY 1st, 1889,
by the
NATIONAL WATER PURIFYING CO.,
New York, U. S. A.

THE

National System of Purifying Water

FOR

PUBLIC WATER SUPPLY,

MANUFACTURING AND PRIVATE RESIDENCES.

NATIONAL WATER PURIFYING CO.,

145 Broadway, and 86 Liberty Street, New York.

WM M. DEUTSCH, President. THEO. F. MILLER, Treasurer. JNO. C. SYMONS, Secretary.

What Gives the National Filter the Supremacy?

Simplicity in Construction!

Efficiency and Economy in Operation!

Surface Washing System!

Saving in First Cost!

Purification of Water.

In recent years the sentiment of communities throughout the country has grown so strongly in favor of public water supply that it is fast becoming the exception, where a short time ago it was the rule, to find a town of even moderate size where Water Works have not either already been introduced or are being discussed. Not only has experience shown the people that the proper protection of their property against fire demands a thorough system of Water Works, but it has educated them to regard a public water supply as an indispensable sanitary measure and essential to their personal comfort.

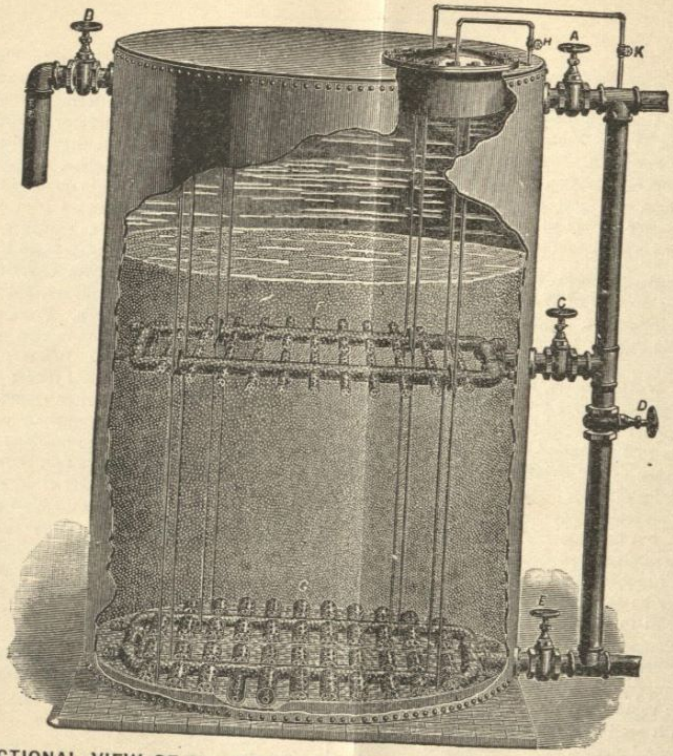
The rapid development of this sentiment during the last few years, and the extraordinary increase in the number of Water Works Plants projected, have attracted universal attention. But with this widespread demand for clear, wholesome water, has been developed a constantly increasing difficulty in obtaining it. As any one at all familar with the history of Water Works knows, in many localities sources of supply, once entirely satisfactory, have grown polluted and unfit for use through the encroachments of population, until now the question of where suitable water is to be obtained is one of serious moment, striking at the very existence of the communities involved. This question has been settled in many of these instances by the adoption of plans calling for the expenditure of large sums of money to procure water from remote districts, but the majority of places unable to bear the expense of such an alternative have been obliged to look further for relief. Many sources of suppy may be entirely free from deleterious matter and yet the water be so filled with muddy sediment or discolored with vegetable stain, as to be a source of serious complaint. The people have come to demand of Water Works Companies or Departments, that the water supplied by them be not only wholesome but free from any objectionable properties; this makes the difficulty still more prominent, and with the rapid decrease, or pollution of the present available sources, renders it well nigh insurmountable unless recourse can be had to some mechanical method of overcoming it.

Filtration is a method that naturally suggests itself. Filters have been in use for many years both in the form of tanks filled with filtering material, and of basins excavated in the ground with the water passing through the natural soil. They have heretofore met with limited acceptance, however, owing to the common defect they all possessed in the expense and trouble incident to cleansing them and removing the impurities filtered out. It has always been admitted that so long as they remain clean they effectually removed the foreign material, but as they become clogged (more or less rapidly, depending upon the condition of the water filtered), they in time have to be cleansed or they are rendered worse than useless. Experiments in this direction recently demonstrated that a certain quality of sand was the most efficient filtering medium (much more so than any form of bone-dust, sponges, charcoal or coke, that up to that time had been considered the best), and that it could be effectually cleansed if a reversed current of water were made to pass through it with sufficient force to agitate and separate the grains. This was a discovery, and marked an important advance in this department of research. From this discovery may be said to date the development and introduction of the NATIONAL FILTER to which attention is herein drawn. It was found that a layer of this sand, a few feet in depth would clear and render bright the most turbulent water, and provided it was cleaned often enough by a return current, would retain its filtering properties unimpaired for an indefinite length of time. This one point established, the remaining one was to provide means for producing this return current that should be effectual, easily manipulated and free from the possibility of derangement. This we submit we have secured, and to the patent methods which we control we invite the careful investigation of Water Works Engineers and others interested in this subject. Not only do these methods cover all that is necessary to clear the water, but they include such combined chemical and mechanical treatment as to render it in all cases free from bacteria or other noxious impurities. Where such impure water is to be dealt with we always retain the services and advice of PROF. ALBERT R. LEEDS, as to the analysis of the water and the special treatment demanded. PROF. LEEDS is an acknowledged authority in this country on the chemistry of potable waters, and to him is due the credit of the most advanced discoveries in this direction.

By reference to the accompanying illustrations the design and construction of the NATIONAL FILTER can be easily comprehended without the necessity of more than a brief description.

NATIONAL WATER PURIFYING CO.

GREAT ECONOMY BY



SECTIONAL VIEW OF No. 17 FILTER, 10 FEET DIAMETER, 7 FEET HIGH.
MINIMUM CAPACITY, 250 GALLONS PER MINUTE.

SURFACE WASHING.

The National Filter.

While this is the simplest and most efficient Filter ever invented, it is also the cheapest in first cost, and most economical in service.

The main points of superiority over all other Filters are as follows:—

1st.—Simplicity and durability.

2d.—Quickness and thoroughness in cleansing.

3d.—Economy in water for cleansing the filter bed (by first washing the top part of the bed where all the impurities are deposited), it requiring but one-half as much water to cleanse the NATIONAL FILTER as it requires to clean the best filters in the market.

4th.—There is no loss of "head" or pressure, or of the filtering material.

5th.—They cost less than any other filter giving equal results.

6th.—There are no moving parts inside of Filter to get out of order.

Their capacity is from five gallons per minute to 100 million gallons per day.

Every "NATIONAL FILTER" is guaranteed, and can be made to withstand any desired pressure.

WE USE ONLY ABOUT ONE-HALF THE AMOUNT OF WATER IN WASHING OUR FILTERS THAT IS REQUIRED TO CLEAN ANY OTHER FILTER.

We give a guaranteed capacity for about one-half (½) the price others charge.

When the condition of the water requires chemical treatment (although the NATIONAL FITLER can be so quickly cleaned that it obviates the necessity of using chemicals in most cases), we furnish, without extra charge, all the appliances for automatically precipitating the clay and vegetable stain in the water.

OUR LARGEST FILTERS CAN BE THOROUGHLY CLEANSED IN FIVE TO TEN MINUTES.

By the use of our "NATIONAL FILTER" in connection with *Steam Boilers*, all *Scale* is prevented, and a great economy in *Fuel* effected, the result being to precipitate or crystalize the salts and remove same by means of the filter bed. In writing, please state horse-power of boiler.

In writing for information regarding filtration please state:—

1st.—What is the source of water supply.

2d.—The size of the main pipe.

3d.—The maximum pressure on the main pipe.

4th.—The quantity of water used in twenty-four hours or per minute.

5th.—Is the water clear, turbid, hard or soft.

6th.—Has the water any odor.

7th.—Is the water used for drinking or mechanical purposes.

Upon receipt of the above information we will either answer by return mail, or will give the matter our personal attention and inspection, and we will in all cases *guarantee* the results to be satisfactory in every particular.

SIZES AND CAPACITIES OF MILL OR FACTORY FILTERS.

No.	Diam.	Height.	Inlet and Outlet Pipes.	Waste Pipe.	Gallons per Minute.	Gallons per 24 Hours.	Test Pressure per sq. inch.	Bushels of Filtering Material.	Price F. O. B. N. Y.
8	16 in	3ft 2in	¾ in.	1¼ in.	5	7,000	75 lbs.	3	$
9	16 "	4"	¾ "	1¼ "	5	7,000	75 "	4	
10	20 "	4 " 6 "	1 "	1¼ "	7	10,000	75 "	12	
11	30 "	5"	1½ "	2 "	15	21,500	60 "	20	
12	40 "	5 " 6 "	2 "	3 "	30	43,250	60 "	50	
13	50"	6"	2½ "	3 "	45	65,000	60 "	75	
15	80 "	6 " 6 "	3 "	4 "	105	151,000	100 "	175	
17	10 ft.	7"	6 "	8 "	250	360,000	40 "	425	

These Filters can be made to withstand any required pressure at additional cost for strengthening same.

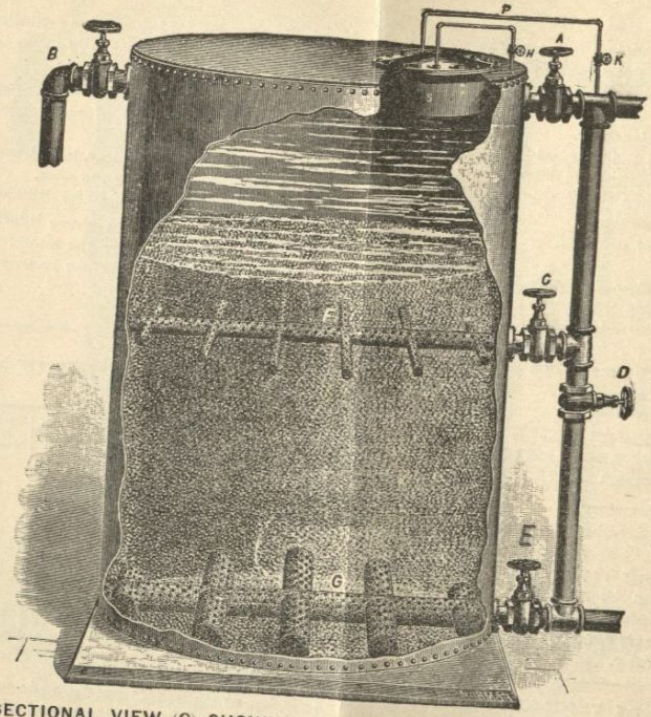
Larger sizes made for city water supply with capacity from 1 million to 3 million gallons per day for each Filter.

Delivery in all cases F. O. B., New York City.

Also Open Top Gravity Filters, where engineering conditions are favorable.

[OVER]

SURFACE
WASHING.



SECTIONAL VIEW (C) SHOWING GENERAL INSIDE ARRANGMENT
OF FILTERS Nos. 9, 10, 11, 12, 13, 15.

SURFACE
WASHING.

The National Filter.—Continued.

DESCRIPTION.

ONE OF THE FEATURES OF A SUCCESSFUL FILTER IS THAT IT MUST HAVE NO MOVING PARTS INSIDE BECAUSE:

1st.—THEY ARE LIABLE TO GET OUT OF ORDER THROUGH CORROSION AND THE ACTION OF THE SAND UPON THEM.

2d.—BECAUSE YOU CAN NEVER SEE IF THEY ARE OPERATING AS THEY ARE INTENDED TO DO, OWING TO THEIR BEING COVERED WITH THE BED.

The National Filter is so simple that it hardly requires further explanation than that furnished by the sectional cuts.

Its operation is as follows:

The water to be filtered, enters at the top and right of Filter, at A, as shown in cut annexed, and passes down through the bed of fine sharp sea sand and out through the pipe or gravel valves G, at the bottom of the Filter. These valves are so arranged as to allow the filtered water to pass freely, but will not permit a grain of sand to escape with the filtered water.

S is the precipitating device, which can be made by means of valves H and K to give a certain amount of the alum (or other chemical) to the water as it flows into the Filter, without obstructing its pressure or flow, and can be closed entirely when washing the Filter. In its operation the chemical used to precipitate sewage, vegetable stain, etc., is deposited with the impurities at the top of the bed and thrown out when the Filter is washed, no trace of the chemical being found in the filtered water. For City Filter Plants, where the amount of chemical injected must be positive, we use a small pump, thereby avoiding all chance of an excess of chemical being introduced into the water.

TO WASH.

IN WASHING FILTER ALWAYS WASH THE TOP OR SURFACE FIRST (WHERE THE MAIN PORTION OF THE IMPURITIES ARE LODGED) LETTING THE WATER FLOW FROM THREE TO FIVE MINUTES, THEN CONTINUE THE WASHING FROM THE BOTTOM, THROWING OUT THE FINER IMPURITIES AND BREAKING UP THE ENTIRE BED.

Close valves A, E and D, then open the waste valve B, at the top and left of the Filter, also open the valve C, to the surface washing pipe F, shown in the cut (under the top of the bed of filtering material,) which sends a reverse current through the top or surface of the filter bed. After three to five minutes have elapsed open valves D and E, then close valve C to upper washing pipe. Let the water flow through Filter at valve E for five minutes, more or less, until the water runs clear from waste pipe B, which can be ascertained by means of a small pet cock inserted in the waste pipe. When washing it will always be best to cut out the precipitating device, by closing the valves H and K. Where it can be arranged, this washing should always be done with filtered water, which can be readily accomplished if there are two or more filters, or if the filtered water can be drawn from an elevated tank, or supply pipe under pressure. Where there is but one Filter, and no means of washing same with filtered water, a waste pipe should be put in near valve E, so as to draw back the unfiltered water that is left in the sand after each washing.

Ordinarily once a day will answer to wash the lower part of the bed, and for the top say once each day, or oftener if the water is very turbid or impure, or filled with vegetable matter.

TO RESUME FILTERING.

Close valve D and waste valve B, (valve E remaining open), and open valve A.

[OVER]

ALSO SEE PAGES 13, 15.

The National Filter.—Continued.

It is a well known fact that in filter beds the impurities taken from the water are all lodged in the first one or two inches at the top of the bed, and that in Pressure Filters the impurities are retained in the six inches below the top of the bed (unless the Filter is run longer than 24 hours without cleansing). In the NATIONAL FILTER the first layer of washing pipes is located from ten to twelve inches below the top of the bed, thus permitting all impurities to be washed out in five minutes' time by sending a reverse current through the top of the bed, thus violently agitating the sand, and, by the attrition, thoroughly cleansing the bed, the impurities passing off through the waste pipe at the left.

All other makes of large Filters from ten to forty feet in diameter, take from twenty to sixty minutes in cleaning, which renders them too expensive for city and town use, particularly where the water is pumped, as the amount of water used in washing such Filters would equal about five per cent. of the total quantity filtered each day, which, to a city using 20,000,000 gallons per day, would equal 1,000,000 gallons each day to be pumped for cleaning the Filters, *whereas the National Filter, by the system of washing the top surface of the bed* would only use about one-half of the amount of water in washing such a plant that is used by the best Filters heretofore put upon the market.

AERATION FOR CITY AND TOWN WATER SUPPLIES.

It has been demonstrated beyond question that the thorough *purification of drinking water* can be accomplished by combining Aeration, Precipitation and Filtration as covered in our process.

Scientists claim that the thorough aeration of water under pressure has the effect of *destroying bacteria and plant life that would be injurious to health.*

Our process is very simple and inexpensive, and by it the amount of air forced into the water can be regulated to the exact requirements in each case. It will prevent all *odor* in the mains, also vegetable growth, such as *algae*, etc., in reservoirs.

Our system of *Aeration* has been in successful operation for years in :

HOBOKEN, N. J.,
HACKENSACK, N. J.,
CHAMPAIGN, ILL.,
NORFOLK, VA.,
PHILADELPHIA, PA.,
MEXICO, MO.

Also in other parts of this country and Europe, and is accomplished by means of an *Air Compressor*, whereby air is forced into the water under high pressure, thus producing a chemical action which destroys the *discase germs* in the water and makes it clear and sparkling.

For city or other service, water can be pumped directly through our NATIONAL FILTER into the mains or into a reservoir.

Our system can be applied to open filter beds quite as well as to the Closed Top Pressure Filters, such as are shown in cut. It is a great saving in labor, as the pressure of the water in washing the filter beds by our process, does in ten (10) minutes the work that takes fifty men a full day to accomplish by the old methods in connection with filter beds.

We solicit the patronage of the public and all Water Works Corporations, and shall be pleased to give estimates for City and Town use, Hotels, Laundries, Mills, Factories, etc.

FOR FURTHER INFORMATION OR PARTICULARS, PLEASE ADDRESS

NATIONAL WATER PURIFYING CO.,
145 BROADWAY, AND 86 LIBERTY STREET,
NEW YORK.

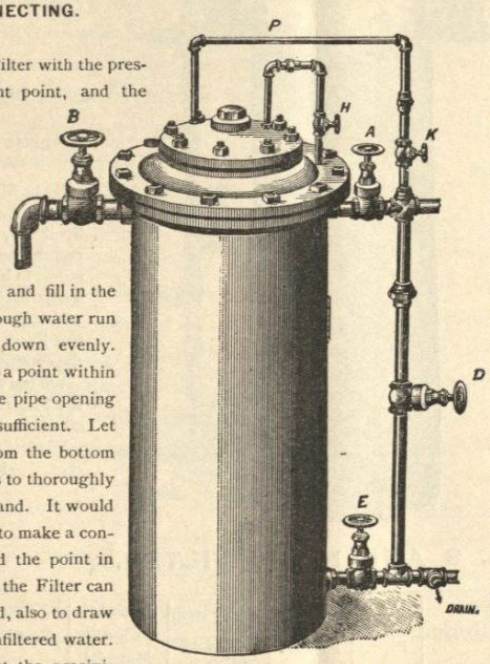
WM. M. DEUTSCH, Prest. THEO. F. MILLER, Treas.
JNO. C. SYMONS, Sec.

House Filter No. 8.

This Filter is intended for House Service and will filter the entire supply of water for a house having a 5/8 or 3/4 connection to main. It should be placed in the cellar and connected at any convenient point where the main enters the house, making calculation to connect the waste to overflow from cellar drain. The Filter should be washed each day.

DIRECTIONS FOR CONNECTING.

Connect the inlet pipe (A) of the Filter with the present service pipe at some convenient point, and the outlet (E) (at the bottom of the Filter,) also to the service pipe, and between the two connections place a valve for diverting the flow through the Filter and back into the service pipe. After this is done, remove the top of the Filter and fill in the sand. While doing this let just enough water run into the Filter to settle the sand down evenly. When the Filter is filled with sand to a point within 9 inches from the bottom of the waste pipe opening (B), the sand being wet, it will be sufficient. Let the water flow through the sand from the bottom pipe valves for about 30 minutes, so as to thoroughly wash out the salt that is in the sea sand. It would be well in connecting up the piping to make a connection between the waste pipe and the point in outlet pipe marked "DRAIN" so that the Filter can be emptied out at any time if desired, also to draw the water back after washing with unfiltered water. Put on the top of the Filter, connect the precipitating device, as shown in sketch, and proceed to filter as per the directions below.



Diameter, 16 inches. Height, 3 ft. 2 inches.
Supply Pipe, ¾ " Cap'y per min. 5 gals.
Weight of Filter (crated), 600 pounds.
Weight of Filtering Material, 450 pounds.

DIRECTIONS FOR OPERATING.

Open valves A and E (B and D being closed). If precipitation is required open valves H and K, then by cramping valve A more less, a portion of the inlet flow will be forced through the pipe P into the precipitating tank, and thence into the Filter. The quantity of precipitating solution required can be regulated by valve H. (In case any of the precipitating pipes become clogged, close valve A and open B, H and K. The pressure of the water will then clear the pipes). The water now enters the Filter near the top, strikes the precipitating solution inside of the Filter case, passes down through the sand and outlet pipe, back into service pipe again.

DIRECTIONS FOR WASHING.

Open valves B, E and D, and close A. Let water run for five minutes, more or less, until it runs clear from waste pipe B, which can be ascertained by means of a small pet cock. After the Filter has been washed let the first water drawn run to waste through pipe marked "DRAIN," as the first water that comes from the Filter after washing will not be filtered. It will take but about three minutes for the water to run clear when the Drain can be closed and the water allowed to pass up through the house pipes for use. Always close valves H and K while washing.

To resume filtering, close valves D and waste valve B, (valve E remaining open,) and open valve A.

This Filter is intended for house service, and is more compact than our larger form of Filters with surface washing attachment.
This Filter is shipped in a crate, with the piping all attached as shown above.

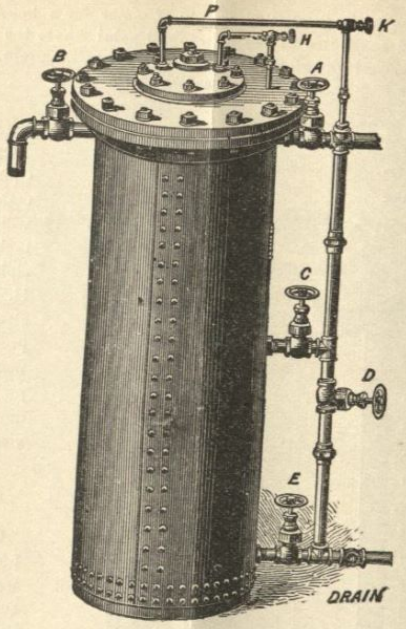
SEE DIRECTIONS FOR CONNECTING AND OPERATING, PAGE 11.

CHARLES H. HUMBERT,
SANITARY ENGINEER.
TO THE NATIONAL WATER PURIFYING CO.,
145 Broadway, N. Y.

PITTSBURGH, Jan. 16, 1888.

GENTLEMEN: In answer to your inquiries as to the workings and qualities of the National Filter, I would say that during the past 12 years I have been interested in the matter of Filters and Filtration, and have at last succeeded in securing just what I wanted, viz.: a Filter that will do the work thoroughly, and constructed in such a manner that a woman can handle it; this I found in the National Filter. There is no Filter its equal on the market at this date, and I cheerfully recommend it to all who want satisfaction in filtration.

Yours most respectfully,
CHAS. H. HUMBERT.



J. H. MILLARD, President.
A. U. WYMAN, Vice-President.
WM. WALLACE, Cashier.

OMAHA NATIONAL BANK.

OMAHA, FEB. 4, 1888.

NATIONAL WATER PURIFYING CO.,
OMAHA, NEB.

DEAR SIRS: The National Filter, purchased by me through your representative, Mr. H. Spellman, for my house, has been in use four months, and given the best satisfaction. There seems to be no trouble in taking care of it; has never been out of order, and the city water, which is never very clear, after passing through this Filter, seems as pure as any spring water in the country.

We use the water for all purposes, the size of the Filter being ample for laundry, bath, and all domestic purposes.

We feel the Filter is a sure comfort and success. Respectfully, J. H. MILLARD.

No. 9 AND No. 10 FILTER.

THESE FILTERS ARE INTENDED FOR ALL SERVICES COVERED BY ADJOINING CAPACITIES.

No.	Diam.	Height.	Supply Pipe.	Galls. per Minute.	Wt. of shell Crated.	Weight of Filtering Material.
9	16 in.	4 ft.	3/4 in.	5	855 lbs.	600 lbs.
10	20 "	4 " 6 in.	1 "	7	750 "	1200 "

THEY ARE SHIPPED IN CRATES WITH THE PIPING ALL ATTACHED AS SHOWN ABOVE.

Directions for Connecting, &c.

Connect the inlet pipe (A) of the Filter with the present service pipe at some convenient point, and the outlet E (at the bottom of the Filter,) also to the service pipe, and between the two connections place a valve for diverting the flow through the Filter and back into the service pipe. After this is done, remove the top of the Filter and fill in the sand While doing this let just enough water run into the Filter to settle the sand down evenly. When the Filter is filled with sand to a point within 9 inches from the bottom of the waste pipe opening (B_1) the sand being wet, it will be sufficient. Let the water flow through the sand from the bottom pipe valves for about 30 minutes, so as to thoroughly wash out the salt that is in the sea sand. It would be well in connecting up the piping to make a connection between the waste pipe and the point in outlet pipe marked "Drain," so that the Filter can be emptied out at any time if desired; also to draw the water back after washing with unfiltered water. Put on top of the Filter, connect the precipitating device, as shown in sketch, and proceed to filter as per the directions below.

DIRECTIONS FOR OPERATING.

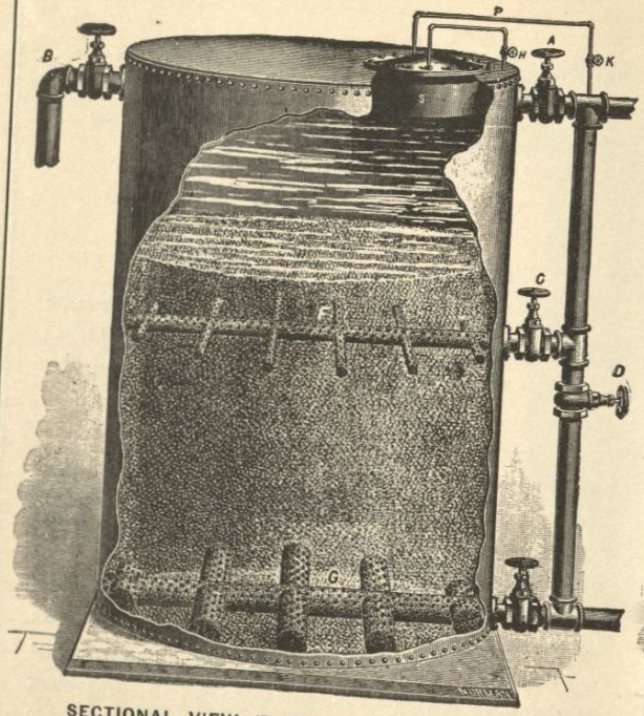
Open valves A and E (B, C and D being closed). If precipitation is required open valves H and K, then by cramping valve A, more or less, a portion of the inlet flow will be forced through the pipe P into the precipitating tank, and thence into the Filter. The quantity of precipitating solution required can be regulated by valve H (in case any of the precipitating pipes become clogged, close valve A and open B, H and K. The pressure of the water, thus produced, will then clear the pipes). The water now enters the Filter near the top, strikes the precipitating solution inside of the Filter case, passes down through the sand and outlet pipe back into the service pipe again.

DIRECTIONS FOR WASHING.

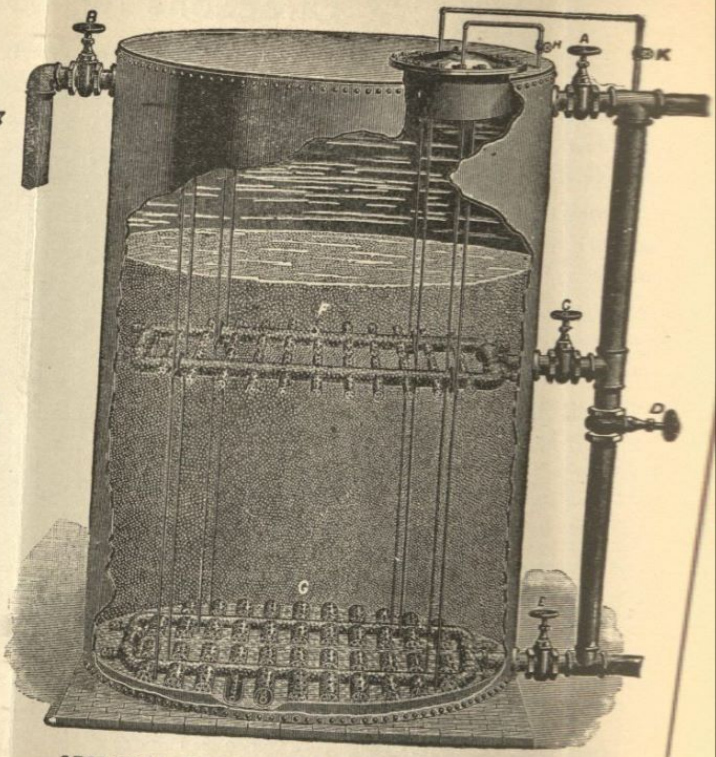
In washing Filter always wash the top, or surface first (where the main portion of the impurities are lodged) letting the water flow from 3 to 5 minutes, then continue the washing from the bottom throwing out the finer impurities and breaking up the entire bed. Close valves A and E, (D being closed) then open valves B and C which will send a reverse current through the top, or surface of the filter bed. After 3 to 5 minutes have elapsed, open valves D and E and close valve C. Let the water flow through Filter at valve E for five minutes, more or less, until the water runs clear from the waste pipe B, which can be ascertained by means of a small pet cock. When washing always cut out the precipitating device by closing the valves H and K. After the Filter has been washed let the first water drawn run to waste through pipe marked "Drain," as the first water that comes from the Filter after washing will not be filtered. It will take but about 3 minutes for the water to run clear, when the Drain can be closed and the water allowed to pass through delivery, or service, pipe again.

To resume filtering, close valve D and waste pipe valve B (valve E remaining open) and open valve A.

ALSO SEE PAGE 15.

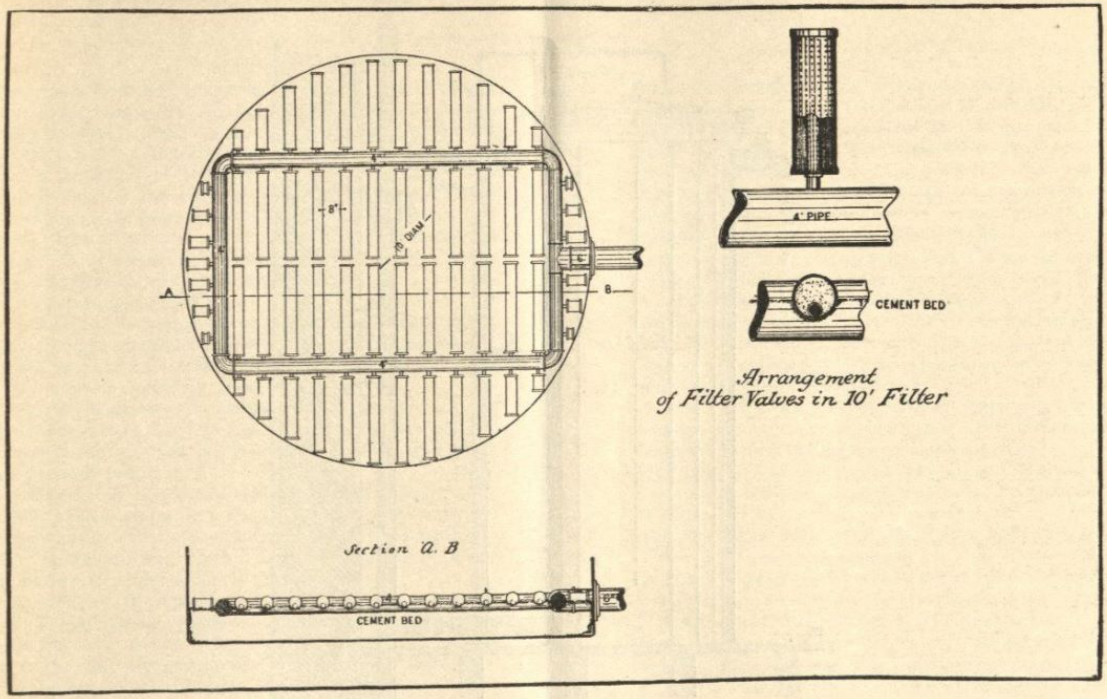


SECTIONAL VIEW (C) SHOWING GENERAL INSIDE ARRANGEMENT OF FILTERS Nos. 9, 10, 11, 12, 13, 15.



SECTIONAL VIEW (A) SHOWING GENERAL INSIDE ARRANGEMENT OF FILTER No. 17.

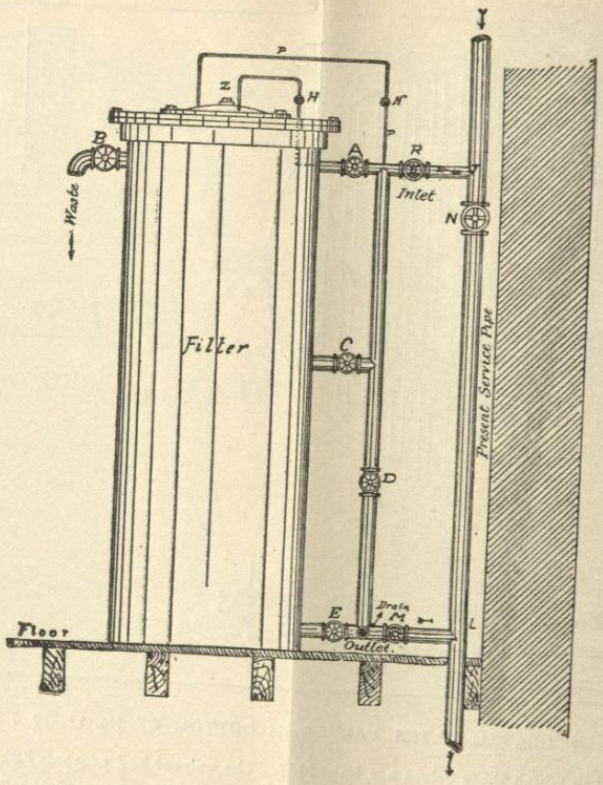
FOR DIRECTIONS FOR ERECTING, CONNECTING AND OPERATING, SEE PAGE 15.
FOR DIMENSIONS, CAPACITIES, ETC., SEE PAGE 5.



Arrangement of Filter Valves in 10' Filter

ARRANGEMENT OF GRAVEL FILTER VALVES IN BOTTOM OF No. 17 (10 FT. DIAM.) FILTER.

Also showing line of cement in which these valves are imbedded. The cement bed prevents filth and disease germs from settling below these Gravel Filter Valves, (which are made of brass and will not corrode), where they could not be dislodged by a reverse current. The upper system of surface washing pipes correspond in number and position with these Gravel Filter Valves.



GENERAL FILTER ARRANGEMENT, ACCOMPANYING DIRECTIONS FOR CONNECTING AND OPERATING ALL SIZES OF THE NATIONAL FILTERS.

Directions for Connecting and Operating Filter.

1st.—Connect the present inlet pipe of Filter with the present service pipe at some convenient point J, and the outlet pipe at the bottom of Filter at a point L, below the inlet J. Between the points J and L put the valve N. After this is done place the 3″ tubular brass valves in the bottom of the Filter, having their perforated side facing upwards. These valves are connected to the central pipe in the bottom of the Filter by three-quarter inch galvanized iron nipples. After these valves are in position it will be necessary to support them by a stone or brick at the further end from where they are connected to the central pipe.

2nd.—Put in the stay-rods of the Filter.

3rd.—Run cement into the bottom of the Filter to a point that will just reach the bottom of the tubular valves and make a perfect support for them, yet not so much as to imbed them in the cement more than say one-and-a-half inch. (See cut, page 13.)

4th.—Insert the three-quarter inch washing pipes, which are covered with brass wire cloth, into the upper central pipe (of which C is the valve) inside the Filter, being careful in handling them not to break said wire cloth.

5th.—Put on the side man-hole plate and fill in the sand through the top man-hole. While putting in the sand, let just enough water run into the Filter to settle the sand down evenly. When the Filter is filled up to a point within 9 inches from the bottom of the waste pipe opening, the sand being wet, it will be sufficient.

6th.—Let the water flow through the sand from the bottom pipe valves for about thirty minutes, so as to thoroughly wash out the salt that is in the sea sand. In connecting up the piping make a connection between the waste pipe and the point in outlet pipe marked DRAIN, so that you can empty the Filter at any time if desired.

7th.—Put on top man-hole cover—or insert the precipitating device, if same is to be used—as shown in sketch, and proceed to Filter as per directions given below.

OPERATING.

To Filter.—Close valve N and open A and E, (C, B and D, being closed). If precipitation is required, open valves H and K, then by cramping valve A more or less, a portion of the inlet flow will be forced through the pipe P into the precipitating tank, and thence into the Filter. The quantity of precipitating solution required can be regulated by valve H. (In case any of the precipitating pipes become clogged close valve A and open B, H and K. The pressure of the water thus produced will clear the pipes.) The water now enters the Filter near the top, strikes the coagulating substance inside the Filter case, passes down through the sand and outlet pipe back into the present service pipe at L.

To Wash.—In washing Filter always wash the top or surface first, (where the main portion of the impurities are lodged,) letting the water flow from 3 to 5 minutes, then continue the washing from the bottom, throwing out the finer impurities and breaking up the entire bed. A small pet cock should be placed in the waste pipe B so as to see when the Filter is clean, which is shown by the water coming from the waste pipe clear. If unfiltered water is used to wash with, it is best to let the water run to waste for 5 minutes through outlet marked Drain, after washing as above indicated, so as to free the bed of unfiltered water.

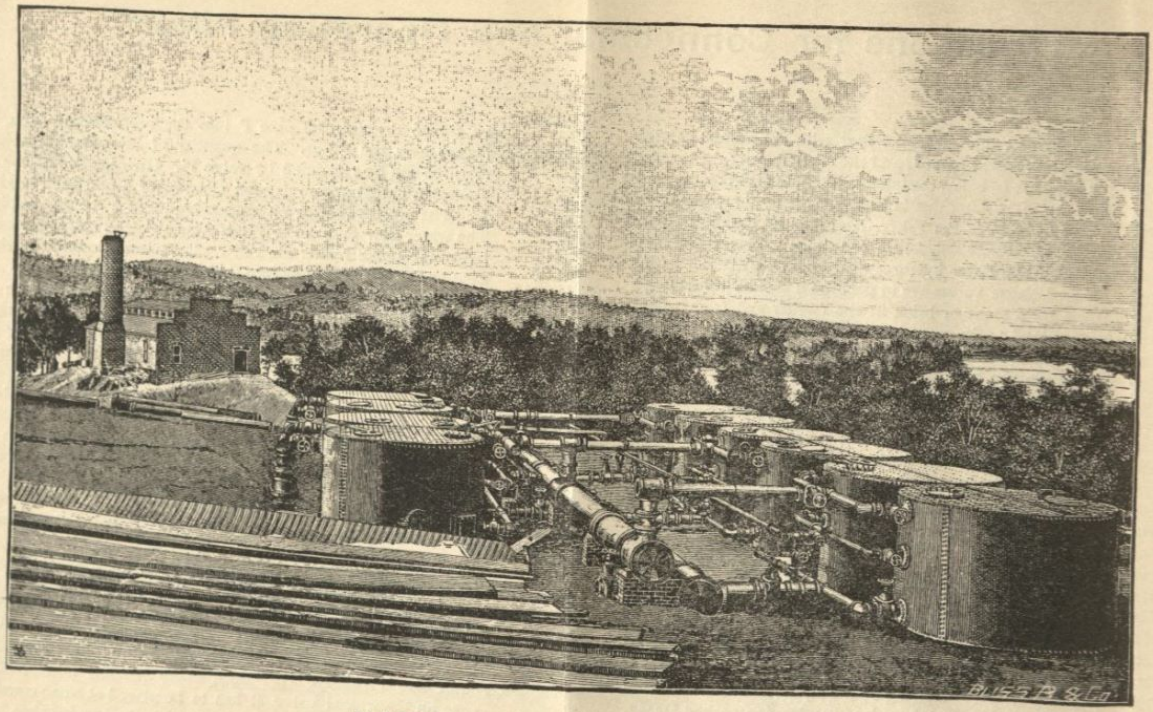
To Wash the Top of the Filter Bed, *using Unfiltered Water.*—Open valves B and C. Close A and E, (D being closed) and let the water run for 5 minutes.

To Wash from the Bottom of the Filter Bed, *using Unfiltered Water.*—Open valves B, E and D, and close A, C and M, (which latter valve M must in this case be put in). Let the water run for 5 minutes, then set the valves for filtering again as at first. Valves H and K should *in all cases* be closed when washing the Filter.

To Wash the Top of Filter Bed, *using Filtered Water.*—In this case an additional valve R has to be placed at some convenient point before the inlet pipe connects with the service pipe. Then open B, D and C and close A, R and E as before.

To Wash from the Bottom of Filter Bed, *using Filtered Water.*—Open valves B and E, close A, C and D. Let the water run about 5 minutes, then set the valves for filtering again as at first. *In all above cases* keep valves H and K closed while washing.

To Refill Precipitating Tank.—Remove the plug Z and by manes of a syphon draw out the water and fill the tank with crystal lump alum, filling the interstices with the water draw out as above, and replace plug Z.



NATIONAL FILTER PLANT.

CHATTANOOGA, TENNESSEE.

3,000,000 Gallons Capacity Per Day.

(OCTOBER, 1888, INCREASED TO 4,000,000 GALLONS CAPACITY PER DAY.)

(JANUARY, 1889, INCREASED TO 5,000,000 GALLONS CAPACITY PER DAY.)

Report on National Filter Plant at Chattanooga, Tenn.

To W. S. Kuhn, General Manager,

American Water Works and Guarantee Company.

Pittsburgh, Pa.

Dear Sir: Having made a thorough test of the National Filter Plant, I find as follows:

That it will readily purify three million gallons per day; in fact, the ten No. 17 Filters gave four million gallons in 24 hours, of Tennessee River water, removing all suspended matter and impurities, and rendering the water clear and bright.

In washing the Filters they are arranged to wash two at once, doing away with the necessity of operating one set of valves.

Each battery of two Filters takes but 24 minutes in cleaning, or two hours to thoroughly wash the entire plant of ten Filters, using a four-inch pipe in washing under 45 lbs. water pressure, thus making the plant very economical in time and water in cleansing.

There is a bed five feet deep of Long Island sea sand in each Filter. This sand is entirely without crevices and can be thoroughly cleansed by a reversed current.

In washing the Filters, the top of the bed, say six to twelve inches, is washed first, as most of the impurity taken from the water in 24 hours is lodged on the SURFACE of the sand bed.

Four minutes' flow of water will answer for the SURFACE washing; then a reverse current is sent through the bottom of the bed, which breaks it up and throws out all of the finer particles in the lower part of the sand bed.

No labor is required in the process of washing, the pressure of the water alone accomplishing, by the reverse current, a thorough cleansing of the sand bed in the Filters, the only labor necessary being to open and close the valves in the pipes once each day, which requires no skill.

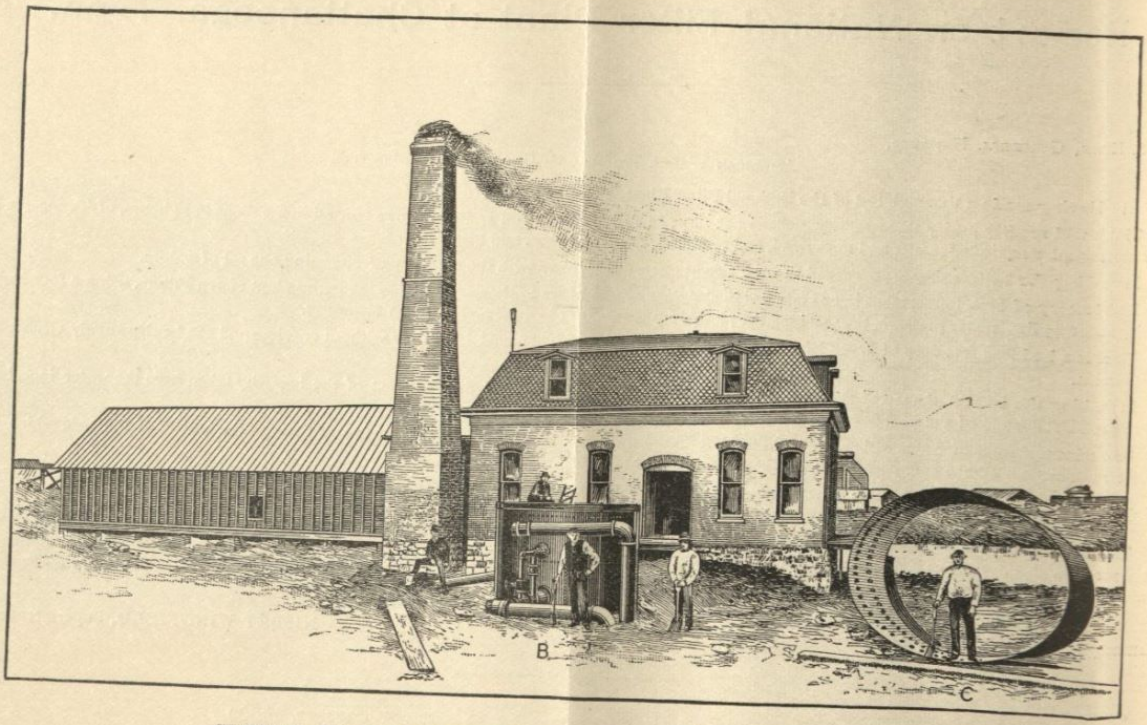
The citizens of Chattanooga are to be congratulated on the result produced by our National Filter Plant; and in future they will have as handsome and pure a water supply as New York City, which is conceded to be the best in the world for domestic and manufacturing purposes; and this fact of the purity of our city water supply should lead to an increased interest in our city and a rapid growth in population.

Respectfully submitted,

NISBET WINGFIELD, Superintendent.

Chattanooga, Tenn., June 25, 1888.

(1,000,000 gallons additional Filter Plant ordered October, 1888.)
(1,000,000 gallons additional Filter Plant ordered January, 1889.)



SKETCH OF A FILTER PLANT AT SIOUX FALLS, DAKOTA.
AFTER BEING ALTERED OVER TO THE NATIONAL SYSTEM.

Report on National Filter Plant at Sioux Falls, Dakota.

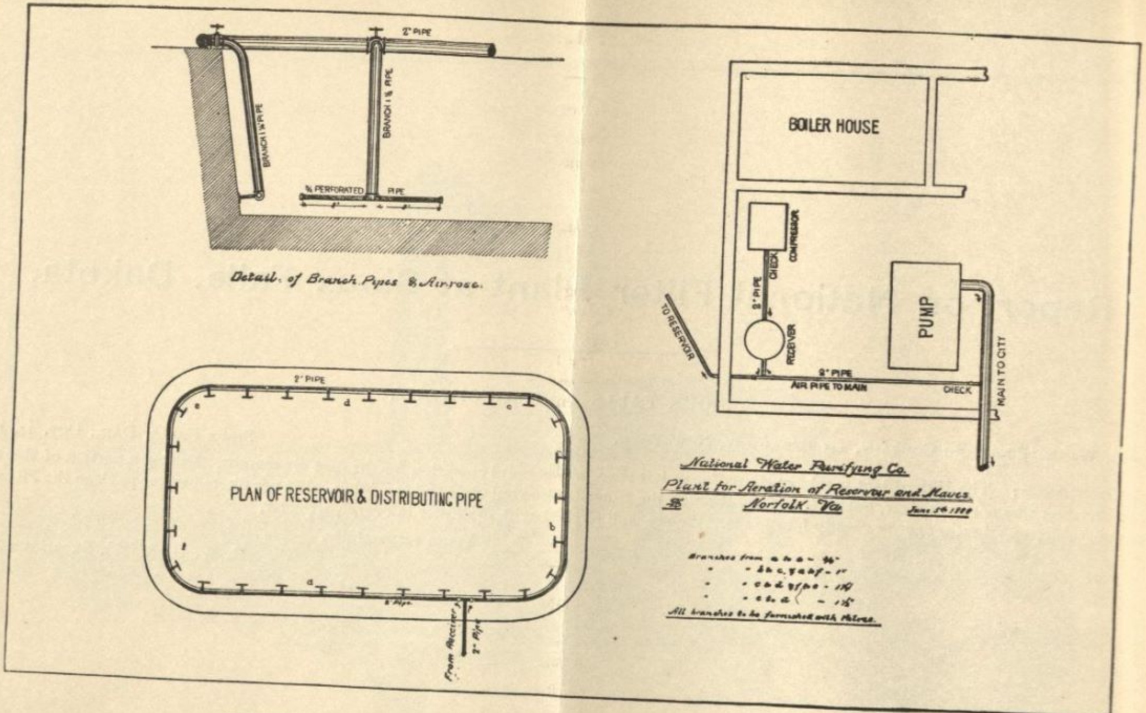
SIOUX FALLS WATER COMPANY.

National Water Purifying Company, 145 Broadway, New York. Sioux Falls, Dak., Oct. 12, 1888.

Gentlemen: The Filter Plant you have set up for us has been in successful operation for the past six months. During a portion of this time the water in the river was not very clear, but after passing through the Filter it came out clear and sparkling. We use filtered water to clean the Filter, which requires only thirteen minutes once in twenty-four hours. We are well pleased with the Filter in every particular.

Yours respectfully,

R. W. BARNES, Superintendent.



3,000,000 GALLONS AERATION PLANT AT NORFOLK, VA.
AERATING SIMULTANEOUSLY WATER IN RESERVOIR AND IN MAINS (40 LBS. PRESSURE.)

"NATIONAL" AERATION SYSTEM ADOPTED BY:
NORFOLK, VA. CHAMPAIGN, ILL. HACKENSACK, N. J. HOBOKEN, N. J. PHILADELPHIA, PA. MEXICO, MO.

Reports on National Aeration Plants at Norfolk, Va., and Hoboken, N. J.

Office of the
BOARD OF WATER COMMISSIONERS,
No. 31 Bank Street.

Thomas Bottimore, President,
W. M. Jones, Treasurer,

R. Y. Zachary, Superintendent,
John R. Todd, Registrar,

D. S. Burwell, Secretary.

Norfolk, Va., December 27th, 1888.

National Water Purifying Company, New York.

Gentlemen: In reply to your esteemed favor of 26th inst., inquiring as to the benefits we have derived from the aeration of our water supply, I take great pleasure in stating that during the past summer we used an 8″ by 10″ Compressor of the Ingersoll Rock Drill Company's pattern, put in by your Company, *which resulted in a very marked improvement in our water.*

We thought, however, that the Compressor was not sufficiently large for a daily supply of 3,000,000 gallons, and at our request, after its use had been discontinued for the summer, you removed the small Compressor and substituted a larger one 12″ by 18″ of the same pattern, which is now ready for use and will be put into operation as soon as the return of warm weather renders it necessary. As our reservoir seldom, if ever, freezes over, it is not necessary to use artificial aeration in the winter time.

Judging from our past gratifying experience with the small Compressor, we have every reason to believe that when the larger one is put into operation our expectations of beneficial results, from aeration, will be fully realized.

Wishing you continued success, I remain,
Very truly yours,
R. Y. ZACHARY, Superintendent.

HACKENSACK WATER COMPANY, RE-ORGANIZED.

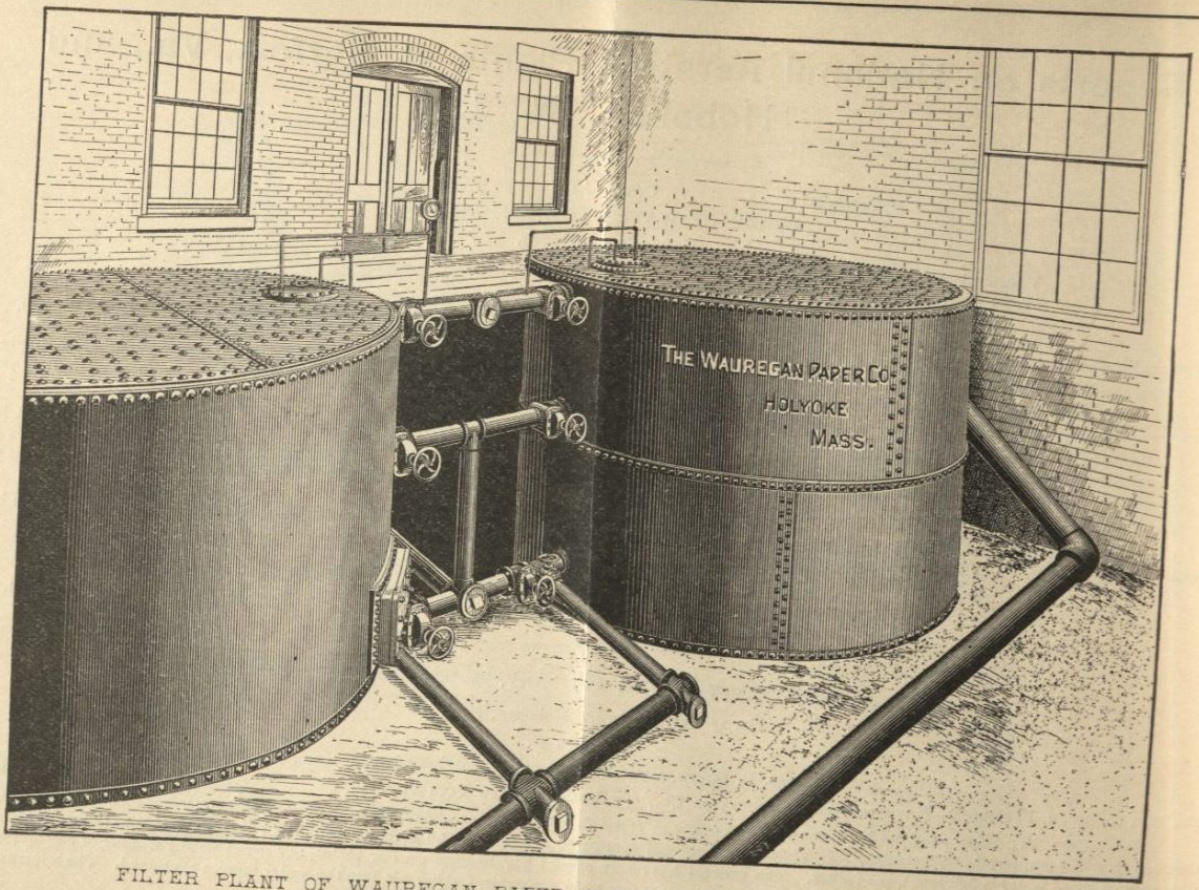
No. 15 Newark Street, Hoboken, N. J.
P. O. Box 56.
Chas. B. Brush, Chief Engineer and Superintendent.

December 19th, 1888.

Mr. Wm. Deutsch, President—National Water Purifying Co., 145 Broadway, New York City.

Dear Sir: This Company has been using a Compressor to force air into its mains under pressures varying from 90 to 125 lbs., per square inch at the main pumping station since September, 1884, under your National system of aeration. The distance from the pumping station to the main reservoir, where this aerated water is delivered, is 15 miles. The process has never caused any leakage on our mains, nor given us any trouble or embarassment. During the last year we have also had another Compressor at work at our main reservoir, forcing air into the water therein contained. The advantage of aeration has been very obvious in improving the quality of the water.

Yours respectfully,
CHARLES B. BRUSH.

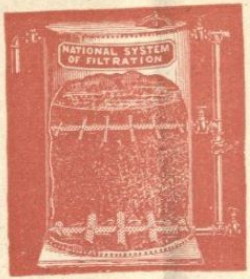


FILTER PLANT OF WAUREGAN PAPER COMPANY, HOLYOKE, MASSACHUSETTS.

Minimum Capacity, Five Hundred Gallons per Minute.

SEE TESTIMONIAL LETTER, PAGE 28.

NATIONAL FILTER.



Since our Catalogue of July 1, 1889, was issued, a large number of National Filter Plants have been sold for all services, including many sold through Agencies and the Trade, which do not appear in the following list:

WATER WORKS PLANTS AT:

Wakefield, R. I.;
Rocky Brook, R. I.;
Caldwell, Kansas;
Peace Dale, R. I.;
Narragansett Pier, R. I.;
Terre Haute, Ind.

TERRE HAUTE BEING 3,000,000 GALLONS CAPACITY PER DAY.

MISCELLANEOUS.

Firmenich Manufacturing Co.	Marshalltown, Iowa.
Pioneer Worsted Co	Louisville, Ky.
Independent Cotton Seed Oil Co.	New Orleans, La.
Canton Mfg. and Bleaching Co., (2d order)	Boston, Mass.
Michigan Carbon Works. (2d order)	Detroit, Mich.
Morse Wool Scouring Co.	St. Louis, Mo.
Spiral Weld Tube Co	East Orange, N. J.
American Glucose Co.	Buffalo, N. Y.
Firth Bros. & Foster.	Philadelphia, Pa.
Philadelphia Company, Building	Pittsburgh, Pa.

PULP AND PAPER.

Curtis & Bro., (2d order)	Newark, Del.
Muncie Pulp Co., (1,500,000 gallons capacity)	Muncie, Ind.

LAUNDRIES.

Empire Laundry Co	Birmingtom, Ala.
Swiss Steam Laundry, (Ira Godfrey)	Washington, D. C.
Columbia Steam Laundry, (M. F. Crow)	Columbia, Mo.

LAUNDRIES.—Continued.

Birmingham Steam Laundry	Pittsburgh, Pa.
G. W. Thompson	Nashville, Tenn.
The O'Thayne New Shirt Laundry	Grove St., New York City.

HOTELS AND RESIDENCES.

A. F. Godefroy	3502 Olive St., St. Louis, Mo.
Sigmund Katz	New Orleans, La.
Morris J. Hart	New Orleans, La.
Hotel Nonderbank	Germantown, Pa.
Dr. Wm. R. Dutton.	Philadelphia, Pa.
Cheney Kilburn (Hall & Kilburn Mfg. Co.)	Pittsburgh, Pa.
James P. Hanna	Pittsburgh, Pa.
C. G. Hussey	Reading, Pa.
J. H. Sternburgh	Memphis, Tenn.
Hotel Luehrmann	

ICE.

Los Angeles Ice & Cold Storage Co.	Los Angeles, Cal.

THE NATIONAL FILTER.

Turbid and Impure Water can be rendered Bright, Clear and Wholesome, by the National Filter.

SIZES AND CAPACITY OF FILTERS CARRIED IN STOCK.

No.	Diam.	Height.	Inlet and Outlet Pipes.	Waste Pipe.	Gallons per Minute.	Gallons per 24 Hours.	Test Pressure Per Sq. Inch.	Shipping Weight. Filter.	Shipping Weight. Sand.
8	16 in.	3 ft. 2 in.	¾ in.	1¼ in.	5	7,000	100 lbs.	600 lbs.	450 lbs.
9	16 "	4 " 6 "	¾ "	1¼ "	5	7,000	100 "	700 "	600 "
10	20 "	4 " 6 "	1 "	1¼ "	7	10,000	100 "	700 "	1,200 "
11	30 "	5 "	1½ "	2 "	15	21,500	60 "	1,000 "	2,000 "
12	40 "	5 " 6 "	2 "	3 "	30	43,250	60 "	1,600 "	4,500 "
13	50 "	6 "	2½ "	3 "	40	65,000	60 "	2,500 "	7,500 "
15	80 "	6 " 6 "	3 "	4 "	105	151,000	60 "	4,800 "	17,500 "
17	10 ft.	7 "	6 "	8 "	250	360,000	40 "	12,000 "	42,500 "

These Filters can be made to withstand any required pressure at additional cost for strengthening same.

We are the only Filter Company in the World manufacturing Filters 20 ft. diameter, to operate under pressure.

Larger sizes made for city water supply with capacity from One Million to Three Million gallons per day for each Filter.

Delivery in all cases F. O. B., New York City.

Also Open Top Gravity Filters, where engineering conditions are favorable.

Address for estimates, etc.,

National Water Purifying Co.,

145 Broadway, and 86 Liberty St.,

NEW YORK.

January 1st, 1890.

For Additional Names and Testimonials see Pages 23 to 32 of our July 1, 1889, Catalogue.

The National System is Endorsed by the following Cities:

CHAMPAIGN, ILLINOIS;
LAWRENCE, KANSAS;
LOUISIANA, MISSOURI;
KOKOMO, INDIANA;
EXETER, NEW HAMPSHIRE;
WINNIPEG, MANITOBA;
MASSILLON, OHIO;
SIOUX FALLS, DAKOTA;
MEXICO, MISSOURI.

CHATTANOOGA, TENNESSEE.

(1,000,000 gallons additional Filter Plant ordered for Chattanooga, Tenn., October, 1888.)
(1,000,000 gallons additional Filter Plant ordered for Chattanooga, Tenn., January, 1889.)

Aeration Plants for Mains and Reservoirs at:

PHILADELPHIA, PENNSYLVANIA;
HACKENSACK, NEW JERSEY;
CHAMPAIGN, ILLINOIS;
NORFOLK, VIRGINIA;
HOBOKEN, NEW JERSEY;
MEXICO, MISSOURI.

Partial List of Users of National Filters.

MISCELLANEOUS.

James L. Howard & Co	Hartford, Conn.
Tingue Manufacturing Company	Seymour, Conn.
Charles Gurd & Co., Soda Water	Montreal, Canada.
R. H. Buchanan & Co.	Montreal, Canada.
Meagher Brothers	Montreal, Canada.
Sibley Manufacturing Company	Augusta, Ga.
Louis H. Herbert	Cairo, Ill.
Baker & Smith Steam Heating Co.	Chicago, Ill.
Charles Pope Glucose Co., (Duplicate order)	Venice, Ill.
Louisana Insane Asylum	New Orleans, La.
John A. Morris	New Orleans, La.
Jewish Widows & Orphans Home	New Orleans, La.
Canton Manufacturing Co	Boston, Mass.
Hadley Company	Holyoke, Mass.
American Waltham Watch Co	Waltham, Mass.
Government Prison	Guadalajara, Mexico.
Michigan Carbon Works	Detroit, Mich.
A. Booth Packing Company	St. Louis, Mo.
Commercial Building	St. Louis, Mo.
St. Louis Machine Supply Company	St. Louis, Mo.
Manion & Co	East St. Louis, Mo.
New York Life Insurance Building	Kansas City, Mo.
F. L. Wilson & Co., Apothecaries	Berlin Falls, N. H.
Welsbach Incandescent Gas Light Co	Gloucester City, N. J.
The Fred'k Crane Chemical Co	Short Hills, N. J.
Globe Knitting Mills	Amsterdam, N. Y.
Morris Mark	Herkimer, N. Y.
C. R. Woodward	Lockport, N. Y.
F. W. Specht	Lockport, N. Y.
Holly Manufacturing Co	Lockport, N. Y
Everard's Baths	New York City.

MISCELLANEOUS.—Continued.

Fairchild Bros. & Foster, Drugs	New York City.
New York Life Insurance Building	Omaha, Neb.
Woods, Jenks & Co	Cleveland, O.
Cincinnati & Newport Iron and Pipe Company	Cincinnati, O.
The Thomas Gibson Company	Cincinnati, O.
Laidlaw & Dun Company	Cincinnati, O.
American Encaustic Tiling Company	Zanesville, O.
Frederick Rumpf & Brother	Philadelphia, Pa.
J. B. Stetson & Co	Philadelphia, Pa.
Oil Well Supply Company	Pittsburgh, Pa.
B. Himmelrich & Sons	Pittsburgh, Pa.
Oliver & Roberts Wire Company, Limited	Pittsburgh, Pa.
Westinghouse Building	Pittsburgh, Pa.
Scranton I. H. & P. Company	Scranton, Pa.
Valley Worsted Mills	Providence, R. I.
G. Brulay	Brownsville, Tex.

PAPER.

Curtis & Bro	Newark, Del.
Vernon Brothers (Fairfield Paper Company)	Salmon Falls, Mass.
Wauregan Paper Company.	Holyoke, Mass.
Newton Paper Company	Holyoke, Mass.
L. L. Brown Paper Company	Adams, Mass.
The Ashland Paper Mills	Manayunk, Pa.
Mt. Holly Paper Company	Mt. Holly Springs, Pa.
P. H. Glatfelter	Spring Forge, Pa.
Whiteman Paper Mills	Dansville, N Y.
Richmond Paper Manufacturing Co.	Richmond, Va.

ICE.

The Lea Pusey Company	Wilmington, Del.
C. F. Smith	Fitchburg, Mass.
William E. Worth & Co.	Wilmington, N. C.

ICE—Continued.

The Hendrick Manufacturing Company.....Carbondale, Pa.
York Manufacturing Company.....York, Pa.
Cincinnati Ice Manufacturing & Cold Storage Company.....Cincinnati, O.
Bohlen-Huse Ice Company, (Duplicate order)..Memphis, Tenn.
Lexington Ice Works.....Lexington, Va.
Petersburgh Crystal Ice Company.....Petersburgh, Va.
Diamond Ice Company.....Roanoke, Va.

LAUNDRIES.

Millar Brothers, (Duplicate order).....Sheffield, Ala.
Hutchinson, Pierce & Co.....Bridgeport, Conn.
Henry Wagner.....Washington, D. C.
West End Steam Laundry.....Washington, D. C.
Empire Laundry Machinery Company.....Chicago, Ill.
Bowman & Son.....Sedalia, Mo.
Empire Steam Laundry.....Sedalia, Mo.
S. Zimmerman & Son.....Sedalia, Mo.
American Steam Laundry.....St. Louis, Mo.
H. J. Schendel.....St. Louis, Mo.
Peterson's Laundry.....St. Louis, Mo.
Cook, James & Co.....Lockport, N. Y.
Columbus Steam Laundry.....Columbus, Ohio.
W. M. Armstrong & Co.....Columbus, Ohio.
Excelsior Steam Laundry.....Columbus, Ohio.
L. B. Kohnle & Co.....Columbus, Ohio.
Cincinnati Family Laundry Company.....Cincinnati, Ohio.
Empire Laundry Machinery Company.....Ironton, Ohio.
Harper Bros., (Crystal Steam Laundry).....Ironton, Ohio.
Quaker City Laundry.....Philadelphia, Pa.
Frank A. Shute.....Philadelphia, Pa.
William M. Barnes.....Philadelphia, Pa.
Colonnade Hotel Laundry.....Philadelphia, Pa.
Henry Loeb.....Memphis, Tenn.
Eugene Shepardson.....Richmond, Va.

LAUNDRIES.—Continued.

New York City Laundry.....Richmond, Va.
C. M. Fisher, 52 and 54 Grove St.....New York City.

HOTELS AND RESIDENCES.

A. P. Brayton.....San Francisco, Cal.
St. Lawrence Hall (Hotel).....Montreal, Canada.
Jno. L. Waterbury.....Stamford, Conn.
M. J. Duffy.....Louisville, Ky.
Durant La Porte.....New Orleans, La.
Southern Hotel.....St. Louis, Mo.
J. H. Millard.....Omaha, Neb.
Markel & Swobe (The Millard Hotel).....Omaha, Neb.
First National Bank.....Omaha, Neb.
Merchants National Bank.....Omaha, Neb.
W. A. Wallace.....Omaha, Neb.
James M. Woolworth.....Omaha, Neb.
B. B. Wood.....Omaha, Neb.
W. A. Paxton.....Omaha, Neb.
E. L. Stone.....Omaha, Neb.
Max Meyer.....Omaha, Neb.
Frank J. Ramge.....Omaha, Neb.
Capt. W. W. Marsh.....Omaha, Neb.
S. T. Bailey.....Camden, N. J.
S. B. Duryea.....Brooklyn, N. Y.
Charles C. Worthington.....Irvington, N. Y.
Edward Colston.....Cincinnati, Ohio.
Jno. Douglas & Co.....Cincinnati, O.
Matt. Addy, Pres. Cin. & Newp't Iron & Pipe Co., Cincinnati, Ohio.
A. E. W. Painter.....Alleghany City, Pa.
Calvin Wells, Lincoln Ave.....Allegheny City, Pa.
W. L. King.....Pittsburgh, Pa.
Charles H. Humbert.....Pittsburgh, Pa.
George Singer, Jr.....Pittsburgh, Pa.
S. S. Pinkerton.....Pittsburgh, Pa.
P. H. Glatfelter.....Spring Forge, Pa.

A Few Testimonials from Various Trades.

WATER WORKS.

REPORT ON NATIONAL FILTER PLANT AT CHATTANOOGA, TENNESSEE.

To W. S. Kuhn, General Manager, American Water Works and Guarantee Co., Pittsburgh, Pa.

Dear Sir: Having made a thorough test of the National Filter Plant, I find as follows:

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Four minutes' flow of water will answer for the SURFACE washing; then a reverse current is sent through the bottom of the bed, which breaks it up and throws out all the finer particles in the lower part of the sand bed.

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The citizens of Chattanooga are to be congratulated on the result produced by our National Filter Plant; and in future they will have as handsome and pure a water supply as New York City, which is conceded to be the best in the world for domestic and manufacturing purposes; and this fact of the purity of our city water supply should lead to an increased interest in our city and a rapid growth in population.

Chattanooga, Tenn., June 25, 1889. Respectfully submitted, NISBET WINGFIELD, Superintendent.

(1,000,000 gallons additional Filter Plant ordered October, 1888.)
(1,000,000 gallons additional Filter Plant ordered January, 1889.)

UNION WATER SUPPLY CO.

Mr. Jno. C. Symons, Sec'y National Water Purifying Co., 145 Broadway, Cor. Liberty Street, New York.

Champaign, Ill., January 14th, 1888.

Dear Sir: The Filter Plant which you placed in our Works, June last, has been working satisfactorily, and the combined influence of Aeration, Lime Precipitation, and Filteration, renders our water clear and bright, free from odor and vegetable matter, and sparkling in appearance, resembling the namesake of our town (Champagne). It also removes the hardness of the water.

As regards the Filter: It is very simple and efficient, and very quickly cleaned.

We take pleasure, after this six months' test, in expressing our satisfaction, and giving you permission to use this as a testimonial, if you desire.

Very truly, S. L. NELSON, Superintendent.

Office of THE MASSILLON WATER COMPANY.

Mr. Jno. C. Symons, Sec'y National Filter Co., 145 Broadway, New York.

Massillon, Ohio, September 25th, 1888.

Dear Sir: I have your favor 18th inst., and, in reply thereto, will say:

We have two 10 feet by 7 feet NATIONAL FILTERS, and can wash each complete in 9 minutes with a three-inch pipe from the centre and the bottom of FILTER.

We have a pressure of 65 pounds, on an average, when washing.

Can filter 700,000 gallons nice, clear water in 24 hours, back pressure ranging from 4 pounds to 15 pounds, according to condition of water to be filtered.

One man can run pumps, fire the boilers and attend the Filters with ease.

The entire apparatus is most efficient and economical to accomplish good results, and we take pleasure, after five months' trial, in expressing our satisfaction with the plant.

Yours truly, A. W. MacCALLUM, Superintendent.

A Few Testimonials from Various Trades.—Continued.

WATER WORKS.—Continued.

SIOUX FALLS WATER COMPANY.

National Water Purifying Company, 145 Broadway, New York.

Sioux Falls, Dak., October 12th, 1888.

Gentlemen: The Filter Plant you have set up for us has been in successful operation for the past six months. During a portion of this time the water in the river was not very clear, but after passing through the Filter it came out clear and sparkling. We used filtered water to clean the Filter, which requires only thirteen minutes once in twenty-four hours. We are well pleased with the Filter in every particular.

Yours respectfully, R. W. BARNES, Superintendent.

Office of the BOARD OF WATER COMMISSIONERS.

Thomas Bottimore, President. No. 31 Bank Street. R. Y. Zachary, Superintendent.
W. M. Jones, Treasurer. John R. Todd, Registrar.
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National Water Purifying Co., New York.

Norfolk, Va., December 27th, 1888.

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Wishing you continued success, I remain, very truly yours, R. Y. ZACHARY, Superintendent.

HACKENSACK WATER CO., RE-ORGANIZED.

Charles B. Brush, Chief Engineer and Superintendent.

Mr. Wm. Deutsch, Prest. National Water Purifying Co. P. O. Box 56.
145 Broadway, New York City.

No. 15 Newark Street, Hoboken, N. J., Dec. 19th, 1888.

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Yours respectfully, CHARLES B. BRUSH.

WORSTED MILL.

VALLEY WORSTED MILLS.

National Water Purifying Co., 145 Broadway, New York.

Providence, R. I., June 20th, 1888.

Gentlemen: The large Filter placed in operation in our works last April has done its work well, giving us clear, bright water for use in our dye house, and it has made a marked improvement in our boilers, which have not primed since the Filter has been in use.

The operation of cleansing the Filter is very simply and very quickly done, and the wash water shows a large amount of mud and other impurities taken from the water. We take pleasure in sending you this testimonal and remain,

Yours truly, VALLEY WORSTED MILLS, Wm. R. Arnold, Treasurer.

KNITTING MILL.

HERKIMER KNITTING MILLS.

National Water Purifying Company.

Herkimer, N. Y., November 30th, 1887.

Gentlemen: The Ten-foot Filter which I have had in operation about three months, works to my entire satisfaction; it takes ten minutes to clean it thoroughly.

MORRIS MARK.

A Few Testimonials from Various Trades.—Continued.

PAPER MILLS.

VERNON BROTHERS & CO.

MANUFACTURERS, COMMISSION MERCHANTS, IMPORTERS AND DEALERS IN PAPER.

NATIONAL WATER PURIFYING CO. NEW YORK, December 19th, 1887.

GENTLEMEN: We enclose our check in full payment for the Filter you supplied for our Mill at Salmon Falls, which the Superintendent speaks very favorably of, and should we require another we should give yours the preference over any that we know of.

Yours truly, VERNON BROTHERS & CO.

WAUREGAN PAPER COMPANY.

NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK. HOLYOKE, MASS., January 21st, 1888.

DEAR SIRS: The "Filter Plant" you have set up for us, consisting of two Filters ten feet in diameter each, has now been in successful operation nearly two months. During a portion of this time the water in the river was quite roily, requiring the Filters to be washed out every ten hours, and supplying the washing engines with five hundred (500) gallons or more of bright, clear water per minute. At the present time the river water is quite clear, and in its best condition during the year, and yet one would be surprised to see the amount of foreign matter we remove every twenty-four hours, when we wash out the Filters. This foreign matter consists largely of small pieces and fibres of bark, wood, grasses, cotton, wool, etc. It requires only from ten to twenty minutes, according to the condition of the water, to thoroughly wash out the Filters, and yet the washing of the Filters is very simple and effective. It requires much less time and attention to do this work and care for the Filters than to put on and care for the strainer bags, tied upon the spouts of the water pipes for retaining the foreign matter, which otherwise might go into the washing and beating engine tubs, to say nothing of the danger arising from the bursting of the bags, and allowing the accumulated rubbish to fall into the tubs.

In fine, we will simply say, we deem our Filter Plant a complete success.

Yours truly, JAMES H. NEWTON, President.

ICE FACTORIES.

THE NATIONAL WATER PURIFYING CO., NEW YORK, N. Y. W. M. HABLISTON.

PETERSBURG, VIRGINIA, December 3d, 1887.

GENTLEMEN: We take pleasure in testifying that your Filter is doing good work, and stating that it has been of great benefit to us. You are at liberty to use this as a testimonial.

PETERSBURG CRYSTAL ICE CO., Per W. M. HABLISTON, President.

BOHLEN-HUSE, MACHINE & LAKE ICE CO.

(Artificial and Lake Ice.)

NATIONAL WATER PURIFYING CO., NEW YORK. 57 MADISON STREET.

MEMPHIS, TENNESSEE, July 27th, 1888.

GENTLEMEN: Yours of the 24th is received. We are getting on first-class with your Filter. Our engineer and all the experts about us are more than pleased with the results obtained. Just now we have some experts here from New York and St. Louis making a twenty-days' test of an ice machine, and all agree that your Filter is all that you claim for it; in fact, it is a bang-up good job every way, and we shall likely have to have one for our old factory as soon as the Artesian water in Water Company's mains reaches South Memphis later in the season. * * * *

Yours truly, R. C. GRAVES, Treasurer.

BOHLEN-HUSE MACHINE & LAKE ICE COMPANY.

MEMPHIS, TENNESSEE, May 21st, 1889.

We forward you contract by to-night's mail, filled out as per blanks.

We have had very good results from your Filter, or should not have given you a second order, as we could have bought other filters quite a good deal cheaper.

Hoping for the prompt filling of our order, also to hear from you soon, we are Yours very truly,

BOHLEN-HUSE MACHINE & LAKE ICE CO.

A Few Testimonials from Various Trades.—Continued.

LAUNDRIES.

NATIONAL WATER PURIFYING CO. SEDALIA, MO., October 29th, 1888.

GENTLEMEN: After a thorough test of the National Filter in my laundry I heartily endorse same, and trusting that you may be well rewarded for your achievement in the filtration line, I am,

Respectfully yours, (Signed) BOWMAN & SON.

COLUMBUS STEAM LAUNDRY, CORNER STATE AND FRONT STREETS.

EMPIRE LAUNDRY MACHINERY CO., CHICAGO, ILLINOIS. COLUMBUS, OHIO, April 23d, 1888.

GENTLEMEN: Your favor of the 21st at hand. In reply will say, "The National Filter" purchased from you some time ago is giving entire satisfaction. It furnishes us with a full supply of clear, sparkling water at all times, no matter what the condition of the supply is.

Yours respectfully,
COLUMBUS STEAM LAUNDRY.

W. M. BARNES, Proprietor. "THE FINEST" STEAM LAUNDRY.

NATIONAL WATER PURIFYING CO., NEW YORK. 140 N. NINTH STREET, PHILADELPHIA, October 29, 1888.

GENTLEMEN: I purchased one of your Filters from the Empire Laundry Machinery Co. some time ago, and it has proven very satisfactory. By its use I am enabled to have clear and pure water at all times, no mater what the condition of the water is when it reaches the Filter, and besides is easily cleaned and simple in construction.

Respectfully yours,
W. M. BARNES.

COLONNADE HOTEL, CHESTNUT STREET, CORNER 15th STREET.

NATIONAL WATER PURIFYING CO., NEW YORK. PHILADELPHIA, October 22d, 1888.

DEAR SIRS: The National Filter in use in our Laundry here has done good work, and furnished bright water since the plant was started up in September last.

Yours truly,
H. J. & G. R. CRUMP.

OFFICE OF H. J. SCHENDEL'S STEAM LAUNDRY, 928 N. BROADWAY.

NATIONAL WATER PURIFYING CO., NEW YORK. ST. LOUIS, MO., November 1, 1888.

GENTLEMEN: I wish to say to you that I am highly pleased with the National Filter I bought of you last March. A Filter that will clear St. Louis (Missouri River) water will stand the test anywhere, and the *National does it to perfection.* Respectfully yours,
H. J. SCHENDEL,

COOK, JAMES & CO.,
MANUFACTURERS OF NIAGARA AND LOCK CITY SHIRT AND SHIRT FRONTS.

NATIONAL WATER PURIFYING CO., NEW YORK. LOCKPORT, N. Y., December 24th, 1888.

GENTLEMEN: The Filter we purchased of you a month ago is now in use in our Laundry, and doing excellent work. We take pleasure in recommending them to any one in want of a Filter. Our only wonder is how we ever got along without it. Yours, etc.,
COOK, JAMES & CO.

ST. LOUIS MACHINE SUPPLY CO., ST. LOUIS, MO. ST. LOUIS, November 21st, 1888.

GENTLEMEN: We have in our Steam Laundry one of your National Filters, and the same has been in use for over eight months. We have found it well adapted for all purposes for which we use it; it gives us entire satisfaction, and we take pleasure in recommending it to all laundries who want a first-class machine.

Respectfully yours,
AMERICAN STEAM LAUNDRY CO.

A Few Testimonials from Various Trades.—Continued.

RESIDENCE.

J. H. MILLARD, President. A. U. WYMAN, Vice-President. WM. WALLACE, Cashier.

OMAHA NATIONAL BANK.

NATIONAL WATER PURIFYING CO., OMAHA, NEB.

OMAHA, February 4th, 1888.

DEAR SIR: The National Filter, purchased by me through your representative, Mr. H. Spellman, for my house, has been in use four months, and has given the best satisfaction. There seems to be no trouble in taking care of it; has never been out of order, and the city water, which is never very clear, after passing through this Filter, seems as pure as any spring water in the country.

We use the water for all purposes, the size of the Filter being ample for laundry, bath, and all domestic purposes.

We feel the Filter is a sure comfort and success.

Respectfully, J. H. MILLARD.

P. H. GLATFELTER, MANUFACTURER OF PRINTING PAPER.

NATIONAL WATER PURIFYING CO.

SPRING FORGE, PENNSYLVANIA, October 10th, 1888.

GENTS: I have had one of your 20″ Filters in use in my residence since March last, and I am glad to say that it is working very satisfactorily.

I am, Yours respectfully, W. L. GLATFELTER.

HARMON, COLSTON, GOLDSMITH & HOADLEY, ATTORNEYS AT LAW.

St. Paul Building, 35 W. Fourth Street.

THE NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK.

CINCINNATI, OHIO, October 12th, 1888.

GENTLEMEN: I am in receipt of your favor of the 10th inst., asking if I would give a testimonial in favor of your National Filter. I have had one of your large size Filters in my residence since March last, and am free to say it has worked satisfactorily. The past season here has been peculiar, owing to the fact that the Ohio River, from which we obtain our water supply, has been bank-full on account of frequent rains, causing the water to be all the time very muddy. This state of the water put your Filter to a severe test, in view of which the result is significant.

Yours very truly, EDWARD COLSTON.

MR. CHAS. H. HUMBERT, PITTSBURGH, PA.

PITTSBURGH, January 7th, 1889.

DEAR SIR: The National Filter which I purchased from you for my house, has been in use now about six months or so.

It gives me pleasure to say it has given entire satisfaction. It is easily managed and has proved very effective in furnishing beautiful, clear, and pure water. I consider it an admirable Filter and an indispensable necessity. You are at liberty to make such use of this as you desire by way of a testimonial.

Yours very truly, GEORGE SINGER, JR.

MR. CHARLES H. HUMBERT, PITTSBURGH, PA.

PITTSBURGH, January 7th, 1889.

DEAR SIR: The 30″ National Filter, which you placed in my residence, is giving entire satisfaction. On account of building, it has been necessary to use large quantities of water, which was at all times delivered through the Filter clear and free from impurities.

Yours truly, A. E. W. PAINTER.

BOILER USE.

NATIONAL WATER PURIFYING CO., NEW YORK. OIL WELL SUPPLY CO., LIMITED.

PITTSBURGH, PENNSYLVANIA, October 10th, 1888.

GENTLEMEN: Answering your favor of the 8th inst., saying you would be obliged if we would give you the result of our experience with the Filter purchased from you, would say that we are entirely satisfied with it.

It furnishes us all the water we want for the boiler, and the water is clean and nice; and so far we have got nothing but praises to give for the Filter. Another feature that we like very much about it is that it is so easily cleaned out.

Yours very truly,

OIL WELL SUPPLY CO., LIMITED.

JOHN EATON, President.

A Few Testimonials From Various Trades.—Continued.

BOILER USE.—Continued.

JAMES L. HOWARD & CO.

RAILWAY AND CAR BUILDERS' GENERAL SUPPLIES, 440 AND 448 ASYLUM STREET.

NATIONAL WATER PURIFYING CO., JNO. C. SYMONS, ESQ., SEC'Y. HARTFORD, CONNECTICUT, November 25th, 1887.

DEAR SIR: In reply to yours of 19th inst., we have to say—
That the Filter, which we have used now about two months, running through 200 gallons per hour (as we estimate), continues to do its work well, and we are much pleased with its operation.

Yours truly,
JAS. L. HOWARD, President.

NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK CITY. NEWARK, NEW JERSEY, January 19, 1888.

DEAR SIRS: We have been using, at the Brown Building, Newark, N. J., your system of softening and purifying water with perfect success.
After a thorough test of six months we find no scale whatever in our boilers.
The lime mixing device is very simple, and thoroughly precipitates the scale producing properties in the water, which is taken from our driven well 80 feet in depth.

Yours truly,
JOHN ARLINGTON, Engineer.

(10 months later.)

NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK CITY. NEWARK, NEW JERSEY, October 29th, 1888.

GENTLEMEN: I have just examined my boilers, in the Brown Building, Newark, and find that they are as entirely free from scale or any other deposit as they were when last I wrote you, on January 19th, 1888. Your system of softening and purifying the hard water taken from our driven well being the means of producing this satisfactory result.

Yours truly,
JOHN ARLINGTON, Engineer.

HOTELS.

THE MILLARD.

NATIONAL WATER PURIFYING CO., OMAHA, NEBRASKA. OMAHA, February 3d, 1888.

DEAR SIRS: We have been using one of your National Filters, which we purchased through your sales-agent, Wm. H. Spellman, of this city, in our hotel for eight months, and we desire to express our satisfaction with the results attained by the Filter. It renders the water clear, bright and sparkling—all that we could desire. Any servant can operate or clean it, as both operations are so simple, and it only requires ten minutes to thoroughly wash or cleanse it.

Yours,
MARKEL & SWOBE, Proprietors Millard Hotel, Omaha, Neb.

TO ALL WHOM IT MAY CONCERN:— MONTREAL, October 12th, 1888.

This is to certify that I have one of the "National Filters" (for filtering water) in operation at my hotel for the past twelve months, and do gladly recommend it to any one needing one, as it does its work thoroughly, and has given me entire satisfaction.

HENRY HOGAN, Proprietor St. Lawrence Hall, Montreal.

MISCELLANEOUS.

THE TINGUE MANUFACTURING CO.

THE NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK. SEYMOUR, CONNECTICUT, January 4th, 1888.

GENTLEMEN: Replying to yours of the 3d inst., the "National Filter" is doing for us all that you claimed for it, and is giving us entire satisfaction.

Yours truly,
THE TINGUE MANUFACTURING CO.,
CHARLES COUPLAND, Treasurer.

A Few Testimonials from Various Trades.—Continued.

MISCELLANEOUS.—Continued.

THE AMERICAN ENCAUSTIC TILING COMPANY.

WORKS: Zanesville, Ohio. OFFICE AND SALESROOMS: 116 West 23d Street, New York.

NATIONAL WATER PURIFYING CO., NEW YORK.

ZANESVILLE, OHIO, October 18th, 1888.

GENTLEMEN: We have one of your Filters in our factory. It is doing good work for us. Our water is taken from the Muskingum River and at times is very heavily charged with mud, but after passing through the Filter is clear and bright. It now looks as though the Water Works Commissioners, of this city, would put in a plant to filter all the water for the city. If they do not, we will want another Filter to furnish water for our boilers. The one we now have furnishes the water for our glaze and enamels.

Respectfully yours,

GEO. A. STANBERY, General Superintendent.

CHARLES H. HUMBERT, SANITARY ENGINEER.

TO THE NATIONAL WATER PURIFYING CO., 145 BROADWAY, N. Y.

PITTSBURGH, January 16th, 1888.

GENTLEMEN: In answer to your inquiries as to the workings and qualities of the National Filter, I would say that during the past twelve (12) years I have been interested in the matter of Filters and Filtration, and have at last succeeded in securing just what I wanted, viz.: a Filter that will do the work thoroughly, and constructed in such a manner that a woman can handle it; this I found in the National Filter. There is no Filter its equal on the market at this date, and I cheerfully recommend it to all who want satisfaction in filtration.

Yours most respectfully,

CHARLES H. HUMBERT.

F. L. WILSON & CO.,

Druggists and Pharmacists and Dealers in Paints, Oils and Colors, Etc.

NATIONAL WATER PURIFYING CO.

BERLIN FALLS, N. H., December 28th, 1888.

GENTLEMEN: We have used your Filter for the last season. It has given perfect satisfaction.

Yours respectfully,

F. L. WILSON & CO.

ST. LOUIS MACHINE SUPPLY CO., ST. LOUIS, MO.

ST. LOUIS, MO., November 21st, 1888.

GENTLEMEN: In reply to your favor of this inst., we beg to say: We have one of your National Filters in our Packing House, which has given us entire satisfaction, and we take pleasure in recommending your Filter to all who desire absolutely clear water.

Respectfully yours, A. BOOTH PACKING CO.

CANTON MANUFACTURING CO.,

Office, 160 Congress St., Boston.

Sole Owners and Manufacturers under the TOPPAN PATENTS, of

"CANTON BLEACH,"

CANTON WOOL AND CLOTH-SCOURING COMPOUNDS, WOOL OIL SUBSTITUTE COTTON SOFTNER, CLEARENE.

Works at Canton.

NATIONAL WATER PURIFYING CO., NEW YORK.

BOSTON, December 30, 1888.

GENTLEMEN: We are glad to report favoraoly on the 10 ft. Filter you placed in our works last August. At that time our river water furnished an excellent test of your system, and though bleaching the finest cottons, we could discover no decline in the quality of our work as against that previously produced with water from a fine spring.

As regards capacity, it thus far somewhat exceeds your promises; and from the experience of these few months, we are of the opinion the Filter will prove a success in bleaching.

Yours truly,

CANTON MANUFACTURING CO.

NOTE.—The Canton Manufacturing Co. are bleachers of fine Cottons whose work successfully competes with any Bleachers in America.

OFFICE OF

FRED'K RUMPF & BROTHER,

Manufacturers of

FANCY BED COVERLETS, JACQUARD, TOILET AND HONEY-COMB QUILTS, TURKEY-RED TABLE CLOTHS, DAMASK, ETC.,

N. W. Corner of Huntingdon and Hancock Streets.

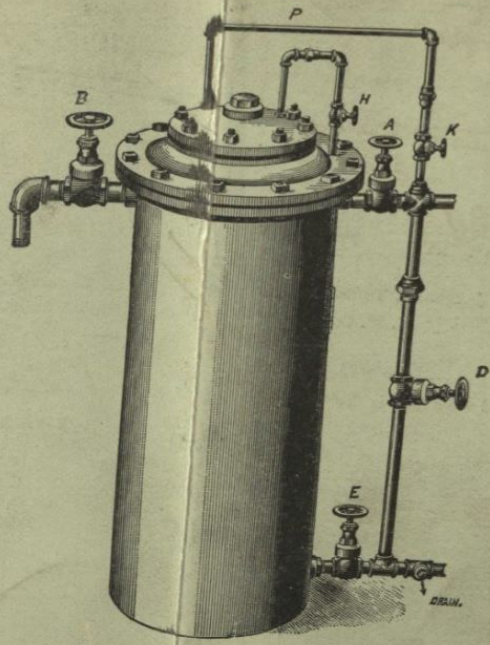
NATIONAL WATER PURIFYING CO., 145 BROADWAY, NEW YORK.

PHILADELPHIA, June 17th, 1889.

GENTLEMEN: The Filter purchased from you is giving entire satisfaction. It gives bright, clear water, and should we want additional supply, we will give you another order.

Yours respectfully,

F. RUMPF & BRO.



SPECIAL SIZE HOUSE FILTER.

SEE PAGE 9.