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Matthew Logan SE
Brady Frick, SE

Memo

To: James Jacobsen
Jay Hardcastle
Clough Toppan
Linda Robinson ✓
Dave Rocque

From: Albert Frick

Date: 3/1/01

Re: U.S. Patent approval of FRICKle Filter

Enclosed is a copy of the U.S. Patent approval that describes the 'art'.

It took close to two years to obtain approval from the U.S. Patent Office.

The United States of America

The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the U.S. filing date, subject to any statutory extension. If the application contains a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121 or 365(c), the term of the patent is twenty years from the date on which the earliest application was filed, subject to any statutory extensions.

Nicholas P. Godici

Acting Director of the United States Patent and Trademark Office

Marcia L. Campbell-Jones

Attest

NOTICE

If the application for this patent was filed on or after December 12, 1980, maintenance fees are due three years and six months, seven years and six months, and eleven years and six months after the date of this grant, or within a grace period of six months thereafter upon payment of a surcharge as provided by law. The amount, number of timing of the maintenance fees required may be changed by law or regulation. Unless payment of the applicable maintenance fee is received in the United States Patent and Trademark Office on or before the date the fee is due or within a grace period of six months thereafter, the patent will expire as of the end of such grace period.

US006190548B1

(12) **United States Patent**
Frick

(10) **Patent No.: US 6,190,548 B1**
(45) **Date of Patent: Feb. 20, 2001**

(54) **MULTI-CHAMBERED TREATMENT FILTER**

(76) Inventor: **Albert Frick**, 95A County Rd., Gorham, ME (US) 04038

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

(21) Appl. No.: **09/270,584**

(22) Filed: **Mar. 16, 1999**

(51) **Int. Cl.**[7] **C02F 9/00**

(52) **U.S. Cl.** **210/170**; 210/252; 210/264; 210/286; 210/295; 210/316; 210/472; 210/605; 210/617; 210/630; 210/807

(58) **Field of Search** 210/605, 617, 210/630, 264, 283, 263, 284, 285, 286, 170, 532.2, 807, 252, 295, 316, 472

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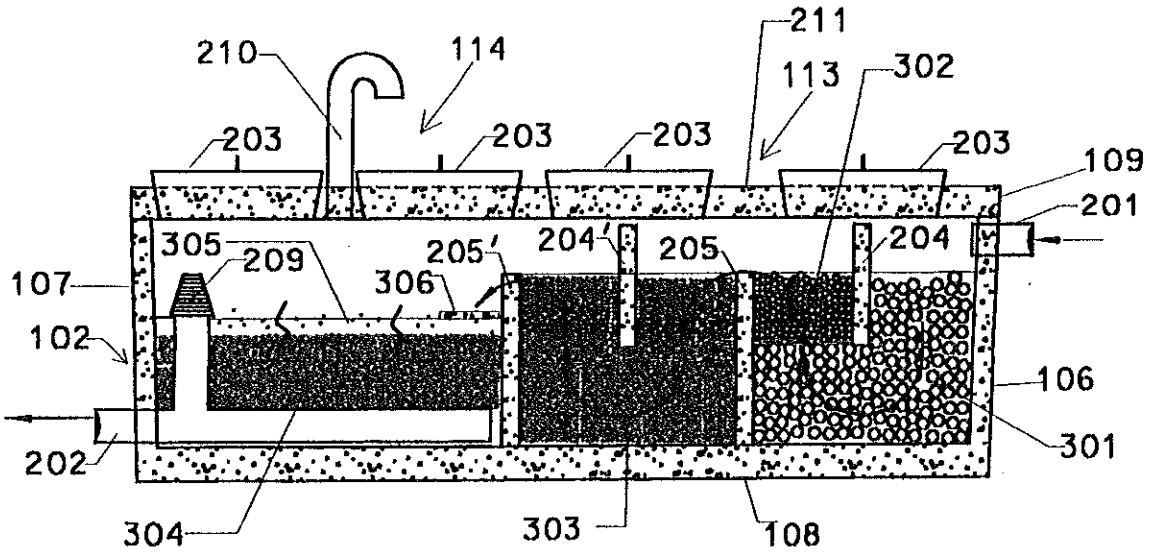
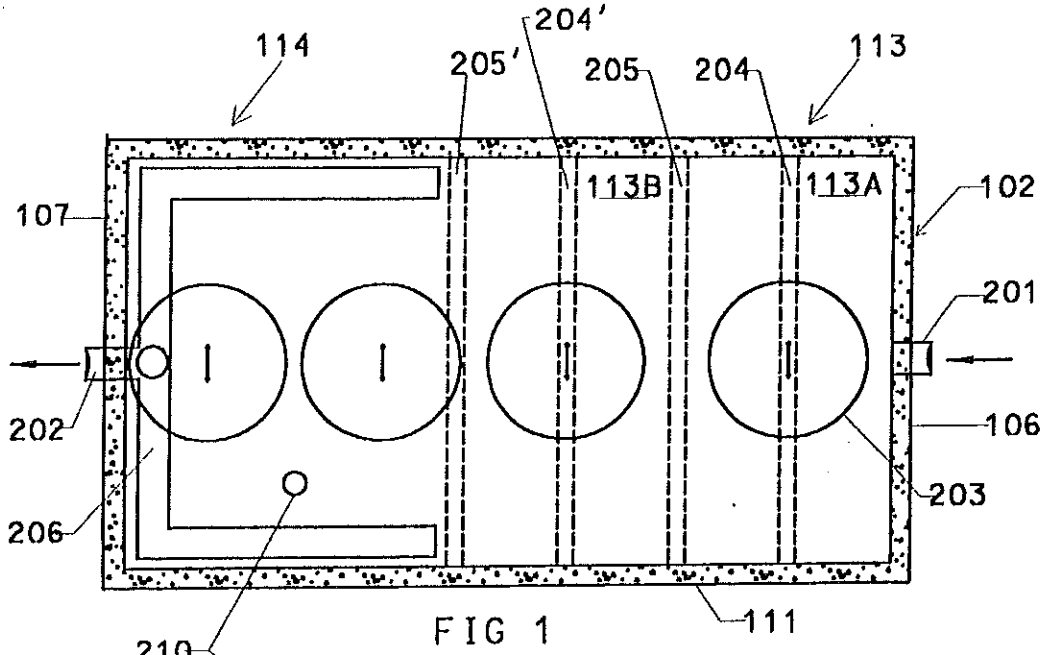
Primary Examiner—Chester T. Barry

(57) **ABSTRACT**

An enclosed, elongated structure for placement in the ground to filter and biologically pretreat wastewater after it leaves a septic tank and before it enters a drain field. The structure includes an upstream chamber or compartment connected to an inlet and containing a filter media such as stone and two or more baffles positioned crosswise to the direction of flow to direct the wastewater through multiple, sequential downward and upward flow paths through the stone for filtering and for anaerobic biological conversion of undesirable substances in the wastewater. A downstream chamber or compartment vented to atmosphere contains a filter media such as gravelly sand and receives the wastewater flow from the upstream chamber for further progressive filtering and for aerobic biological conversion of undesirable substances. Beneath the gravelly sand is a U-shaped perforated pipe for collecting the wastewater and directing it to an outlet leading to the drain field. Preferably, the structure is placed in the ground such that the wastewater flows from the inlet to the outlet by gravity, or, alternatively, pumping means can be provided.

11 Claims, 4 Drawing Sheets




114
205'
204'
205
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113
107
113B
113A
102
201
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106
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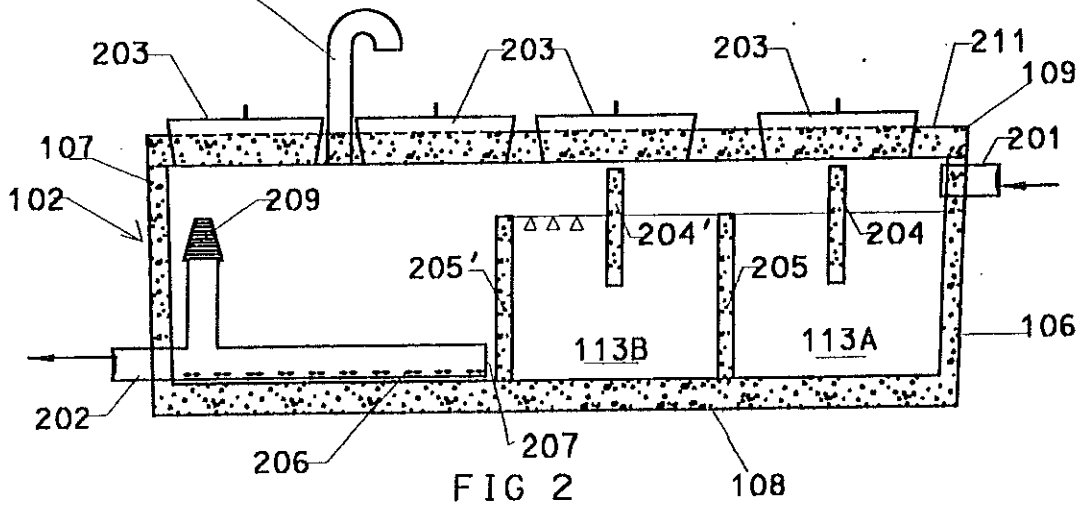
210
111

FIG 1


203
203
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204'
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113B
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FIG 2

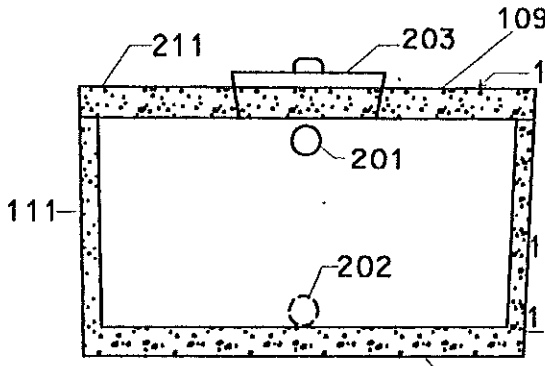


FIG 3

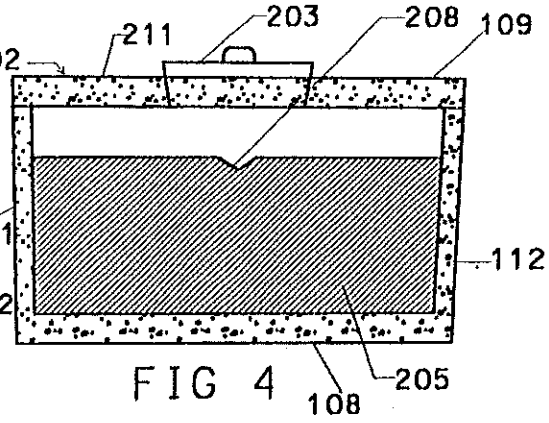


FIG 4

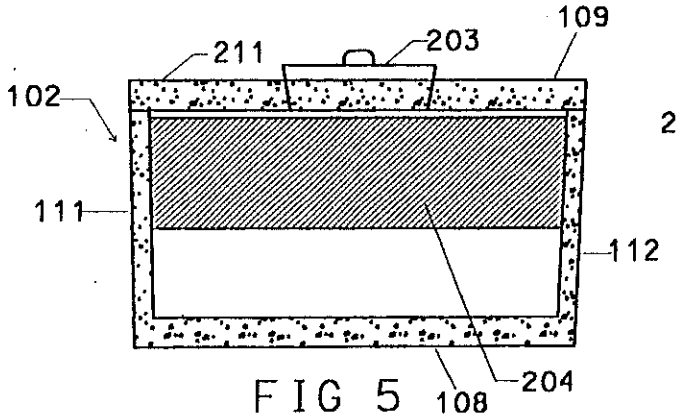


FIG 5

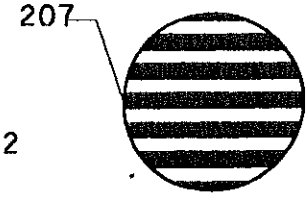


FIG 6

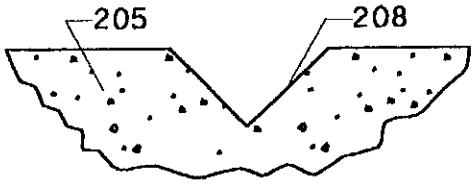


FIG 7

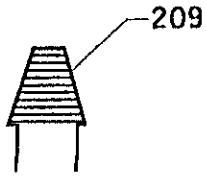
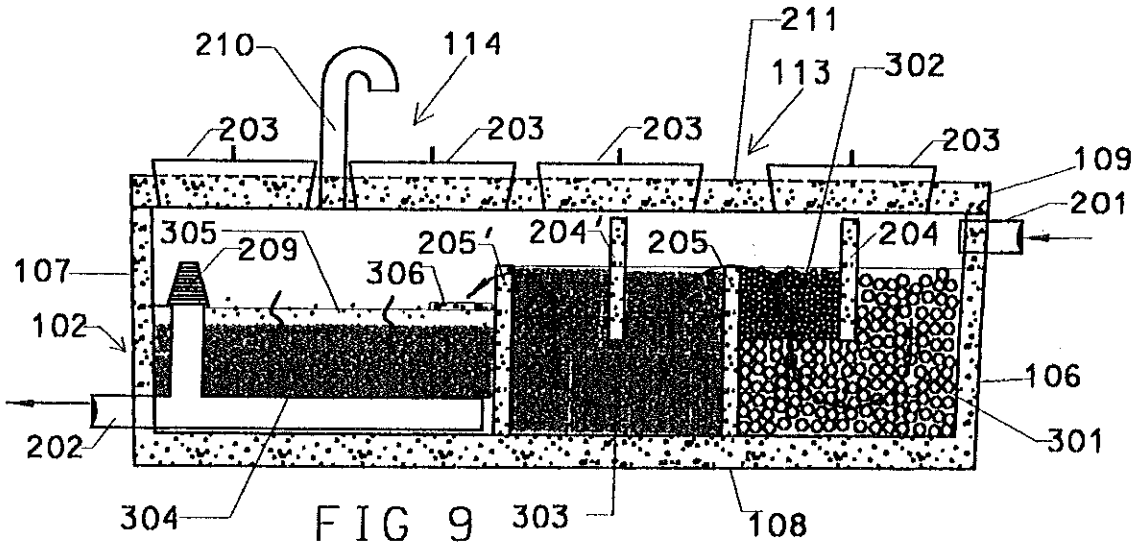


FIG 8


210
114
211
113
302
203
203
203
203
109
201
305
209
205'
204'
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204
107
306
102
106
202
301
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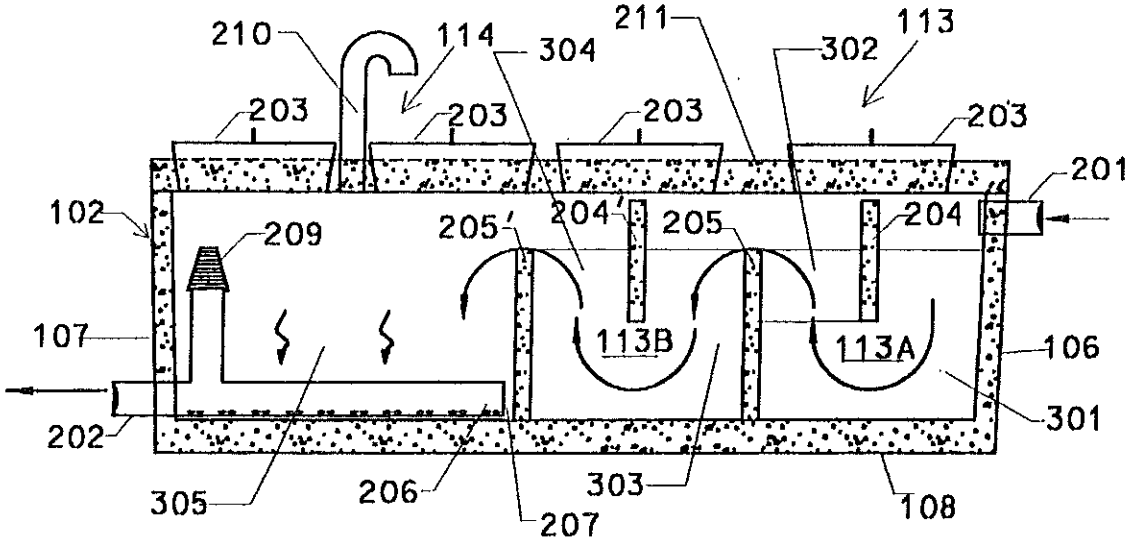
303
108

FIG 9


210
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113B
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FIG 10

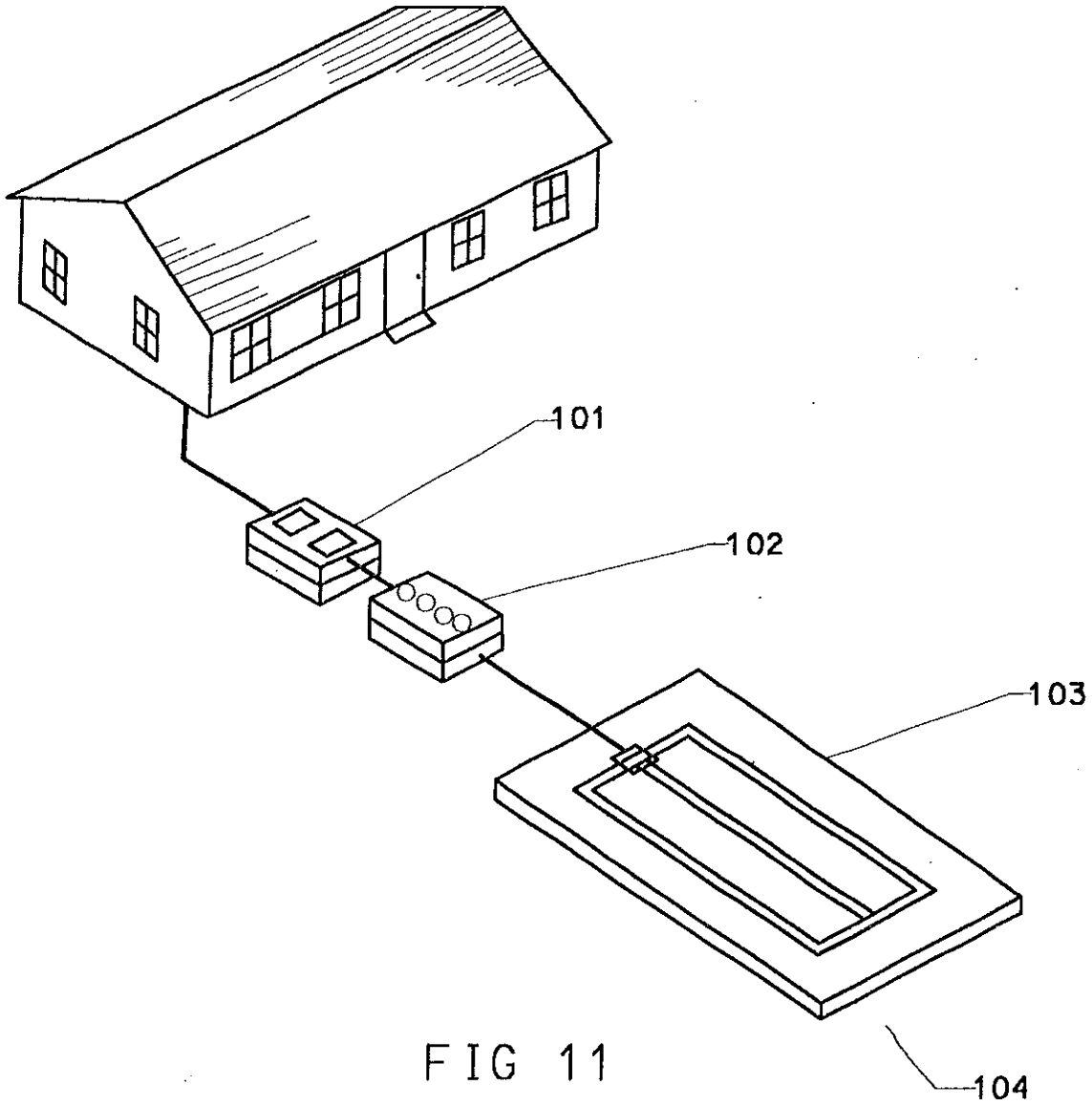

FIG 11

MULTI-CHAMBERED TREATMENT FILTER

CROSS-REFERENCES TO RELATED APPLICATIONS

Not Applicable

BACKGROUND

1. Field of Invention

This invention relates generally to the treatment of settled wastewater, and in particular to efficiently treating the water flowing from an on-site treatment process such as a septic tank by mechanical removal and biological conversion in a multi-chambered tank containing various media.

2. Description of Prior Art

Common subsurface wastewater disposal systems are designed with septic tank effluent flowing to some form of a soil absorption disposal area as regulated by local or State Health Codes.

Various types of filters and treatments have been offered in the art to provide some form of filtering or pre-treatment of wastewater prior to final disposal to a subsurface wastewater disposal system. Supplemental treatment to wastewater is provided in efforts to assure environmental sanitation and improve the quality of effluent which eventually enters the groundwater and surface waters.

There have been inventors proposing revisions to septic tanks. U.S. Pat. No. D371,423 to Salagnac (1996) discloses an aesthetic shaped septic tank. U.S. Pat. No. 4,997,564 to Warner (1989) improved the efficiency of the septic tank by adding multiple compartments. This design utilizes multi compartments but they are installed inside a septic tank without filter media or providing an aerobic environment.

U.S. Pat. No. 5,766,454 by Cox et al (1996) proposed home wastewater treatment and denitrification systems utilizing a separate aerobic and anaerobic tank for denitrification. This design teaches away from this invention and requires a mechanical pump for stirring of the wastewater to produce denitrification. U.S. Pat. No. 5,496,472 by Slack et al (1996) was directed at a method and application for denitrification using a weir block and laminal flow. This patent is designed to convey water through a weir and along a wall of a denitrifying vessel.

Several inventions proposed septic tank filters to be placed inside the septic tank to improve wastewater quality, U.S. Pat. No. 5,482,621 to Norse (1994), U.S. Pat. No. 5,635,064 to Bovington (1995), and U.S. Pat. No. 5,683,577 to Norse (1996).

Several inventions have proposed sand filter designs for wastewater effluent management; U.S. Pat. No. 5,667,670 to Drewey (1996) and U.S. Pat. No. 5,770,071 to Drewey (1996), and U.S. Pat. No. 4,100,073 to Hopcroft (1976) proposed a sand filter designed for discharge to surface water bodies.

U.S. Pat. No. 5,618,431 to Kondo et al (1996) proposed a method of preparing and cleaning floating filter medium for a biological cleaning apparatus.

There has been work, in the art, of an anaerobic/aerobic filter plant that is intended for use between a septic tank and a drain field and includes a filter tank that receives effluent from a septic tank. U.S. Pat. No. 4,895,645 to Zorich, Jr. (1997) proposed a filter tank containing aerobic and anaerobic treatment environments. This unit relies on a mechanical pump for circulation and recirculation and does not utilize multi-compartmental design.

The object of my invention is to provide a filter to be utilized between a septic tank and drain field, which will reduce the wastewater strength (i.e., total settleable solids, biochemical oxygen demand, fecal coliform, and total nitrogen) going to the drain field which will either allow for the drain field to be decreased in size or provide a safety factor to reduce failure risk, or improve wastewater quality discharged to the soil, groundwaters, and surface waters.

The filter is relatively compact compared to a conventional sand filter and reduces biochemical oxygen demand, total suspended solids, nitrogen and fecal coliform prior to effluent entering the drain field. The unit elongates the pathway of wastewater flow through several downflow and upflow anaerobic columns and downflow aerobic column of varying filter media. It does not require mechanical devices, however, a pump can be added to recirculate the water if a higher level of wastewater treatment is required.

SUMMARY OF THE INVENTION

The present invention is an enclosed, elongated structure for filtering and treating wastewater after it leaves a settling area, such as a septic tank, and before it enters a drain field. The structure includes an upstream chamber or compartment having an inlet to receive wastewater from the settling area. The upstream chamber contains a filtering media and has two or more baffles positioned crosswise to the direction of flow to direct the wastewater through multiple downward and upward paths. The enclosed chamber acts anaerobically on the wastewater to biologically convert undesirable substances. A downstream chamber vented to atmosphere contains a filtering media and receives the flow of wastewater exiting the upstream chamber. The wastewater is progressively filtered while undesirable substances are aerobically and biologically converted. The wastewater is then collected by a drain and directed to the outlet for discharge into the drain field.

In the preferred embodiment, the wastewater first passes through a relatively coarse filtering media, such as stone, in a first section of the upstream chamber followed by a less coarse stone in a second section of the upstream chamber. The filter media in the downstream chamber is progressively less coarse than the upstream chamber to remove the fines. Preferably, the structure is placed in the ground so that the wastewater flows from the inlet end to the outlet end by gravity.

DRAWING FIGURES

FIG. **1** is a top view of the filter tank.

FIG. **2** is a cross-sectional side view.

FIG. **3** is a front view of filter tank.

FIG. **4** is a front view of the underflow baffle.

FIG. **5** is a front view of the overflow baffle.

FIG. **6** is a grate detail.

FIG. **7** is an overflow weir detail.

FIG. **8** is an overflow grate detail.

FIG. **9** is an internal cross-section of the filter.

FIG. **10** is an internal cross-section of the filter treatment process.

FIG. **11** is a perspective view illustrating the proposed location of the filter in a subsurface wastewater disposal system.

REFERENCE NUMERALS IN DRAWINGS

101	septic tank
102	filter tank
103	disposal area (leach field)
201	inlet
202	outlet
203	inspection covers
204	underflow baffle
205	overflow baffle
206	collection outfall pipe
207	grate
208	weir
209	overflow grate
210	vent
211	removable cover
301	coarse-textured anaerobic filter column (1½" dia stone)
302	medium-textured upflow anaerobic filter column (¾" dia)
303	fine-textured downflow anaerobic filter column (⅜" dia)
304	fine-textured upflow anaerobic filter column (⅜" dia)
305	skim coat (gravelly coarse sand)
306	splash plate

Description—Preferred Embodiment—FIGS. **1, 2, 3, 4, 5, 6, 7** and **8**

Reference is made to the drawings and specifically to FIGS. 1–10. Reference is herein made to the drawings wherein substantially identical parts are designated by the same number.

A preferred embodiment of the treatment filter of the present invention is illustrated in FIG. 1 (top view), FIG. 2 (side cross-sectional view) and FIG. 3 (end view). The treatment tank (**102**) is comprised of multi-chambered compartments formed by internal underflow baffles (**204**) and **204'** and internal overflow baffles (**205**) and **205'** as shown in FIGS. **4** and **5**. The tank **102** is defined by endwall **106** at the inlet end, endwall **107** at the outlet end, a base **108**, a top **109**, and sidewalls **111** and **112**.

At one end at the top of the said treatment tank is an inlet pipe (**201**) and at the other end at the bottom of the said tank is an outlet pipe (**202**). Filtered water is collected in the tank through holes in a perforated pipe (**206**) and through end grates (**207**) as illustrated in FIG. **6**.

Water flows over the overflow baffles (**205**) and **205'** through a weir (**208**) as shown in FIG. **4** and FIG. **7**.

An overflow grate (**209**) as shown in FIG. **8** and FIG. **9** is provided for a by-pass precaution. Inspection and access baffles (**203**) are provided to observe filter media conditions. A removable cover (**211**) is provided to install, maintain and replace media. The tank **102** contains an upstream chamber or compartment **113**, and a downstream chamber or compartment **114**. Chamber **113** is generally defined by the endwall **106**, the base **108**, the top **109** and the overflow baffle **205'**. Within chamber **113** is a first section **113A** which comprises the space between the endwall **106** and the overflow baffle **205**, and a second section **113B** which comprises the space between the overflow baffles **205** and **205'**. The downstream chamber **114** is generally defined by the overflow baffle **205'**, the endwall **107**, the base **108** and the top **109**.

Coarser textured filter media (**301**) is provided on the inlet side of the treatment filter. The designer used 1½" diameter stone. Medium textured filter media (**302**) (designer used ¾" diameter stone for example) in the middle sections of the multi-chambered compartments progresses to finer textured filter media (**303**) (designer used ⅜" diameter stone). A fine textured media (**304**) is provided on the outlet side of the treatment tank. The designer used ⅜" diameter stone. A skim coat of gravelly coarse sand 2" deep is applied to top of the outside side of the treatment tank top to cause the wastewater to flood the entire section (**305**).

Advantages

From the description above, a number of advantages of my treatment tank become evident:

a) the design allows for gravity flow

b) the internal baffles provide an elongated path causing water to pass through more filter media to improve cleaning efficiency

c) the design and placement of the baffles cause upflow and downflow filtering

d) the compartment design produces potential anaerobic and aerobic environments to promote biological treatment mechanisms

e) the treatment filter is non-mechanical

f) the treatment tank geometry provides efficient use of a relatively compact volume with minimal head loss to provide for increased gravity flow potential to the disposal area.

g) the media can be varied to accomplish intended treatment ps Operation—FIGS. **9, 10** and **11**

The manner of using the treatment tank is illustrated in FIGS. **9, 10** and **11**.

As illustrated in FIG. **11**, the prefilter (**102**) is intended to be utilized between the septic tank (**101**) and disposal field (**103**) to treat wastewater effluent from a dwelling or structure (**100**) prior to ultimate disposal to the surrounding soil (**104**).

Wastewater from the septic tank enters the unit at the inlet (**201**). The wastewater flow path is elongated and caused to be both downflow and upflow by internal baffling (**204**) and **204'** and (**205**) and **205'**. A progressive anaerobic filter is made by installing various filter material progressing from relatively coarse to relatively fine (**301**), (**302**), (**303**) as the wastewater passes through sections **113A** and **113B**, respectively. An aerobic upflow filter section is provided in (**304**). The inventor utilized 1½ inch diameter stone in (**301**), ¾ inch diameter stone in (**302**), ⅜ inch diameter stone in (**303**), and ⅜ inch diameter stone in (**304**) coated with a 2 inch thick layer of gravelly coarse sand in (**305**). A splash plate is utilized to prevent scouring.

The wastewater flows between the upflow anaerobic column to the downflow anaerobic column or aerobic downflow column through a weir (**208**).

The wastewater is collected in a perforated pipe **206** at the base of the downstream chamber **114** and outlet (**202**) to a conventional disposal system (**103**).

The filter can be used with differing types of media and sizes to filter wastewater. The filter can be used in series with other prefilters to further polish effluent. The filter itself can be made from various materials (concrete, FIBERGLAS®, glass fiber material etc.). Persons skilled in the art can vary the filter media depending upon the desired results. Natural earth media such as, but not limited to, crushed stone, gravel, sand, soil particles, saw dust, peat moss, can be used as well as man-made material such as, but not limited to, plastics, foam, crushed rubber. The relative size, number, and configuration of the multi-chambers can vary based on size and nature of filter media. Persons skilled in the art can vary the juxtaposition of the inlet and outlet locations of the multi-chamber to elongate the path even more by causing the water flow to not only flow end to end but also side to side through the tank.

It appears the best application is for treating household and commercial wastewater when it is installed after a septic tank but prior to a subsurface wastewater disposal field.

However, individuals skilled in the art may find appropriate applications to other wastewater, water, and other liquids to improve quality.

Persons skilled in the art can perhaps find an application to filter water and other liquids. The best mode of operation depends upon the wastewater quality and the targeted output quality. For example, to treat domestic wastewater to approximate 50% reductions in biochemical oxygen demand, total settleable solids, fecal coliform, and total nitrogen, the multi chambered tank can be set with media as described. If increased wastewater quality is desired, an additional tank installed in series, and/or a tank with larger volume, a tank with longer detention time, or finer filter media may be utilized. The size of tank, number of compartments, types and size of media can be varied by persons skilled in the art to treat wastewater quality.

CONCLUSIONS, RAMIFICATIONS, AND SCOPE

This invention is an improvement upon conventional subsurface wastewater disposal systems and is intended for use between a septic tank and a disposal field. The prefilter tank includes a series of internal baffles that form an elongated path for wastewater to pass through. The design of the tank produces anaerobic and aerobic environments to enhance wastewater treatment. The wastewater flow routing causes both downflow and upflow paths. Wastewater enters the prefilter at the top and is treated anaerobically by a relatively coarse textured media in a downflow column. The effluent then is caused to flow upward through a slightly finer textured media and across a weir into an anaerobic downflow column of an even finer textured media, then upflow through the media to a weir. The effluent then is caused to cascade into an aerobic downflow column of finer textured media for ultimate discharge to a conventional disposal field with improved wastewater quality. Additionally, the filter is longer than it is deep which reduces head loss and increases potential for gravity flow situations to conventional disposal systems.

The overall results are a significant decrease in the wastewater strength from the filter inlet to the filter outlet, of 50% reduction in biochemical oxygen demand, 50% reduction total settle-able solids, 50% in total nitrogen and 50% in fecal coliform bacteria.

While the invention has been described in connection within a presently preferred embodiment thereof, those skilled in the art will recognize that many modifications and changes may be made to the specific described embodiment without departing from the true spirit and scope of the invention, which accordingly is intended to be defined solely by the following claims.

What is claimed is:

1. A sub-surface waste treatment system comprising:

a sub-surface septic tank for receiving effluent from a source, said septic tank being adapted to pass the effluent therethrough by gravity;

a sub-surface disposal field spaced laterally from said septic tank, said disposal field being adapted to pass the effluent therethrough by gravity;

an elongated, generally enclosed intermediate tank positioned between said septic tank and said disposal field and spaced laterally therefrom, the intermediate tank having an inlet at one end connected to receive effluent from the septic tank and a laterally displaced outlet at an opposite end thereof connected to said disposal field;

said intermediate tank having an upstream chamber connected to the inlet to receive the effluent, and having at least two baffles positioned crosswise to the direction of flow for directing the effluent sequentially in downward and upward directions as it passes through said upstream chamber;

said upstream chamber containing a filter material in anaerobic contact with the effluent for filtering and biologically improving the quality of said effluent;

said intermediate tank having a downstream chamber which receives the effluent from the upstream chamber, said downstream chamber containing a filter material between and in contact with opposing walls of said tank and the more or most downstream of said upward directing baffles, said filter material being in aerobic contact with the effluent for further filtering and biologically improving the quality of said effluent;

a drain pipe for collecting the effluent after it passes through the filter material in said downstream chamber and delivering it to the outlet for disposal in said disposal field; and

said septic tank, upstream chamber, and downstream chamber being positioned such that gravity will cause the flow serially from the septic tank, through the upstream chamber, and to the downstream chamber.

2. The system of claim 1, wherein the filter material in said upstream chamber is coarser than the filter material in said downstream chamber.

3. The system of claim 2, wherein the filter material in said upstream chamber is stone and the filter material in said downstream chamber is gravelly coarse sand.

4. The system of claim 1, wherein the at least two baffles in said upstream chamber comprise serially a downflow baffle, an upflow baffle, a downflow baffle, and an upflow baffle so as to create a serpentine effluent flow path from the inlet of the tank that is first downward, then upward, then downward and then upward before the effluent reaches said downstream chamber.

5. The system of claim 4, wherein the filter material in said upstream chamber comprises more coarse material being positioned upstream of less coarse material, and wherein the filter material in said downstream chamber is still less coarse than the less coarse material in said upstream chamber.

6. The system of claim 4, wherein each of said upflow baffles includes a weir positioned generally in the middle of the upper edge thereof for directing the effluent flowing therethrough into the middle of the succeeding chamber.

7. The system of claim 1, wherein said intermediate tank is made of rigid material so that it can be placed beneath the ground without appreciable deformation, and wherein said intermediate tank is adapted to be placed in the ground with the effluent flowing from the inlet end to the outlet end under the force of gravity.

8. An improved sub-surface waste disposal system of the type having a sub-surface septic tank for receiving effluent from a source, said septic tank being adapted to pass the effluent therethrough by gravity, and a sub-surface disposal field spaced laterally from said septic tank, said disposal field being adapted to pass the effluent therethrough by gravity, wherein the improvement comprises:

a rigid, enclosed and elongated treatment structure positioned intermediate said septic tank and said disposal field and spaced laterally therefrom and having an inlet end and a laterally displaced outlet end;

an upstream chamber in said structure for receiving effluent at the inlet end from said septic tank, said upstream chamber having means for directing the efflu-

ent sequentially through multiple downward and upward paths to increase the effective length of the travel of the effluent as it passes through said upstream chamber and thereby increase the effective time for anaerobic biological conversion in said upstream chamber;

first filter means in said upstream chamber for removing solids from the effluent as it passes through said upstream chamber;

a downstream chamber vented to atmosphere for receiving the effluent from said upstream chamber to provide aerobic biological conversion in said downstream chamber;

second filter means in said downstream chamber between and in contact with opposing walls of said downstream chamber for removing solids that have passed through said first filter means;

means for collecting the effluent that has passed through said second filter means and for directing it to the outlet end of said treatment structure so that it can be discharged into said disposal field; and

said septic tank, upstream chamber, and downstream chamber being positioned such that gravity will cause the flow serially from the septic tank, through the upstream chamber, and to the downstream chamber.

9. The system of claim **8**, wherein said first filter means is a coarser media than said second filter means.

10. The system of claim **8**, wherein said first filter means consists of stone, and wherein said second filter means consists of gravelly coarse sand.

11. The system of claim **8**, wherein

said means for directing the effluent consists of sequentially a first downflow baffle, a first upflow baffle having a weir, a second downflow baffle and a second upflow baffle having a weir so as to create a circuitous flow path for the effluent;

said first filter means consists of a coarser media that is coarser than said second filter means; and wherein

said treatment structure is adapted to be placed beneath the ground without appreciable deformation.

* * * * *

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
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04333-0010

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January 9, 2001

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95A County Road
Gorham, Maine 04038

Subject: Product Registration, FRICKle Filter

Dear Mr. Frick:

Thank you for your letter dated December 18, 2000. In that letter, you requested that the FRICKle Filter be incorporated into the list of approved proprietary devices in Appendix B of the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules. You also requested that the approval conditions in the Division's May 3, 1999 letter be incorporated into this inclusion.

The Division approves this request, and we will add the FRICKle Filter to Appendix B of the Rules.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of FRICKle Filter. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar products.

Please feel free to copy and distribute this letter. If you have any questions please contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: File

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE
Brady Frick, SE

December 18, 2000

James Jacobsen
DHE
10 State Street Station
Augusta, ME 04333

Re: FRICKle Filter, Subsurface Wastewater Disposal Rule Approval

Dear Jim:

This letter is a follow-up to our telephone discussion of Decmber 18, 2000.

I respectfully request that the FRICKLE Filter be added to the Rules as registered proprietary devices in Appendix B.

I respectfully request that it be added to Section B-107.0 believing that it is more than a septic tank filter providing additional treatment.

I respectfully request that the provisions of your May 3, 1999 letter of product registration be accepted.

Please contact me if you have any questions or additional matters for discussion.

Respectfully,

Albert Frick

Albert Frick
AF/nd

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

May 3, 1999

Albert Frick Associates, Inc.
Attn.: Albert Frick
95A County Road
Gorham, Maine 04038

Subject: Product Registration, FRICKle Filter

Dear Mr. Frick:

Thank you for your letter dated March 26, 1999 regarding your company's product. It is our understanding that the FRICKle Filter is a multiple chamber, gravity flow filter device using anaerobic and aerobic processes. Data gathered from operation of your prototype shows reduction in BOD^5, TSS, fecal coliform bacteria, and total nitrogen levels generally on the order of 50 percent.

You have requested that use of this filter be allowed a 20 percent reduction to the size of replacement disposal areas, on a preliminary basis. You have also requested that use of this product be assessed 10 points toward new system variances.

Under provisions of Section 1802 of the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules (copy enclosed), any manufacturer or distributor submitting a new product for code registration needs to demonstrate that:

1. The product is designed to protect public health, prevent the creation of any nuisance, and prevent environmental pollution to the same extent as comparable products presently authorized by Department for use in this code, and

2. The product is based on sound engineering principles and can be expected to provide the same level of protection to public health and the environment as offered by the authorized products presently authorized by the Department for use in this code.

According to the information you provided, FRICKle Filters should perform as anticipated and described in your supporting information, and as specified above. On that basis, the Division has determined that FRICKle Filter is acceptable for use in the State of Maine, provided that it is installed, operated, and maintained in conformance with the manufacturer's directions.

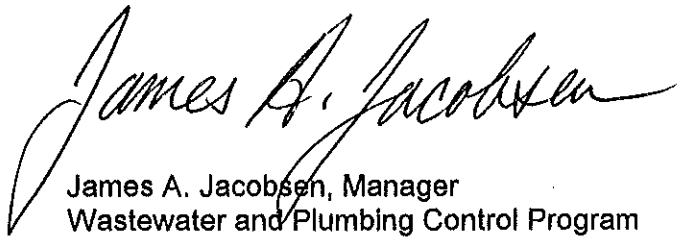
Further, for a period of one calendar year from the date of this letter, on a provisional basis use of a FRICKle Filter in a replacement system shall be allowed a 20 percent reduction to the base design flow, due to the improved quality of the effluent. At the end of this one year period, the provisional status shall be upgraded to permanent if there does not appear to be an unreasonable adverse impact from such reductions.

Further, use of a FRICKle Filter in a new system shall be assessed 10 points toward a first time system variance, if applicable. Again, this allowance is due to the improved quality of effluent from use of the filter.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of FRICKle Filter. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar products.

Please feel free to copy and distribute this letter. If you have any questions please contact me at (207) 287-5695.

Sincerely,



James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: File

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Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE
Brady Frick, SE

Memo

To: Jim Jacobsen
Jay Hardcastle
Linda Robinson

From: Albert Frick

Cc: James Morris, P.E.
Tom Chappell, Toms' of Maine
Gary Rittershaus, Tom's of Maine
Al Hansen, Appalachian Mountain Club/Cornell University

Date: 9/20/00

Re: FRICKle Filter performance with polyurethane foam (synthetic media)

For your information update:

I set-up a prototype of our patent filter, utilizing polyurethane foam for treatment media in lieu of stone and gravel.

Attached are grab samples of Inlet & Outlet analyses with the filter retrofitted to the lighter synthetic media.

The filter appears to be removing:

Reduction	Mg/l
72% BOD_5	230 reduced to 64
32% Total Suspended Solids	90 reduced to 61
18% nitrogen	100 reduced to 82./

We have been approved to install a unit on Appledore Island/Cornell University Isle of Shoals Marine Research Laboratory, Tom's of Maine and Appalachian Mountain Club in Georgetown Sea Kayak Center.

We look forward to further improvements and upgrades.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Albert Frick
Albert Frick Associates, Inc.
95A County Road

Gorham, ME 04038

Lab Sample ID: WQ2612-1
Report Date: 9/12/2000 10:02:05 AM
PO No.: 08.31.00
Project: FRICKLE FILTER
SDG:
Solids (%) N/A

Sample Description	Matrix	Date Sampled	Date Received
FILTER INLET	AQ	8/31/2000	8/31/2000

Parameter	Result	Adj. PQL	DF	PQL	Analytical Method	Analysis Date	By	Prep Method	Prep Date	By	Notes
BOD5	230 mg/L	6.0	1	6	E405.1	09/06/00	JLB	E405.1	09/01/00	PAQ	
Nitrate as N	<0.05 mg/L	0.05	1	0.05	353.2	8/31/00	MJB	N/A	N/A	N/A	
Nitrogen, Total Kjeldahl as N	100 mg/L	1.0	10	0.1	E351.2	09/08/00	CBU	351.2	09/05/00	CBU	
Solids - Non Filterable Residue (TSS)	90 mg/L	4.0	1	4	E160.2	09/05/00	JF	E160.2	09/01/00	JF	

Notes:

340 County Road No. 5
P.O.Box 720, Westbrook, ME 04098
Tel: (207) 874-2400 Fax: (207) 775-4029

http://katahdinlab.com

210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Albert Frick
Albert Frick Associates, Inc.
95A County Road

Gorham, ME 04038

Lab Sample ID: WQ2612-2
Report Date: 9/12/2000 10:02:05 AM
PO No.: 08.31.00
Project: FRICKLE FILTER
SDG:
Solids (%) N/A

Sample Description	Matrix	Date Sampled	Date Received
FILTER OUTLET	AQ	8/31/2000	8/31/2000

Parameter	Result	Adj. PQL	DF	PQL	Analytical Method	Analysis Date	By	Prep Method	Prep Date	By	Notes
BOD5	64 mg/L	6.0	1	6	E405.1	09/06/00	JLB	E405.1	09/01/00	PAG	
Nitrate as N	<0.05 mg/L	0.05	1	0.05	353.2	8/31/00	MJB	N/A	N/A	N/A	
Nitrogen, Total Kjeldahl as N	82 mg/L	1.0	10	0.1	E351.2	09/08/00	CBU	351.2	09/05/00	CBU	
Solids - Non Filterable Residue (TSS)	61 mg/L	4.0	1	4	E160.2	09/05/00	JF	E160.2	09/01/00	JF	

Notes:

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P.O.Box 720, Westbrook, ME 04098
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210 West Road No. 5, Portsmouth, NH 03801
Tel: (603) 431-5777 Fax: (603) 436-3356

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

July 11, 2000

Albert Frick Associates, Inc.
Attn.: Albert Frick
95-A County Road
Gorham, Maine 04038

Subject: Royalty Disclosure

Dear Mr. Frick:

Thank you for sending the Division a copy of the disclosure form you plan to use in association with the Frickle Filter. The Division finds that this notice is acceptable, and in fact is a very good idea.

If you have any questions please feel free to contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

/jaj

xc: File

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE
Brady Frick, SE

Memo

To: Jim Jacobsen
Jay Hardcastle

From: Albert Frick

CC: Richard Sweet
Dave Moyse
Dave Kamila
Doug Coombs
Paul Beers

Date: 6/5/00

Re: Professional Ethics/royalty disclosure

The MASE Technical Review committee, while reviewing the proposed code of ethics, discussed Site Evaluators' responsibility to disclose any financial benefit in utilizing proprietary devices in a design.

We intend to use the attached disclosure to notify our clients of AFA financial connection to the FRICKle Filter.

Please review and let me know if this is sufficient disclosure from the Department's perspective to meet standards. I also intend to have our attorney review the document after we hear from the Department.

It is my opinion that the topic of Site Evaluator financial involvement in propriety devices should be announced to all Site Evaluators (perhaps through the DHE newsletter) to promote good professional ethics.

FRICKle Filter$_{TM}$
Professional Disclosure

Professional ethics require disclosure that *Albert Frick Associates* receives a royalty fee from the sale of the specified prefilter (i.e. FRICKle Filter$_{TM}$). The U.S. Patent Office granted Albert Frick a patent on the technology used in the design of the filter. *Oldcastle Precast (d.b.a. Superior Concrete Co.)* purchased the rights to manufacture, sell and distribute the unit in Maine and pays *Albert Frick Associates* a royalty fee for the right to manufacture and sell.

There are numerous advanced treatment units on the market, however, they all require mechanical pumps and/or mechanical aeration units. Most mechanical advanced wastewater treatment systems approved by the Division of Health Engineering will meet or exceed the FRICKle Filter performance if maintained and operated properly and can be substituted in it's place if the property has electrical power. The FRICKle Filter as specified is the only available commercial filter to our knowledge that is non-mechanical, gravity flow (one pass).

Div. of Health Engineering

Div. of Health Engineering

Phone:
FAX:
email:

Memorandum

To: *Jim Jacobsen*
From: *JH*
cc: *N/A*
Date: *Wednesday, June 7, 2000*
Subject: *FRICKle Filter*

Jim:

After reviewing Al Frick's 'patent rights and ties' statement to the FRICKle Filter and in his interest in disclosing his relation to same in a 'public' disclosure report is commendable. Although, I thought possibly the Division should suggest to Al that if his firm were to include the FRICKle Filter any of ***their*** designs that they should disclose their affiliation with the product to their clients. If this were to be Al's company policy then this should remove any taint of 'product' nepotism.

Jay

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
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Memo

To: Jim Jacobsen
Jay Hardcastle

From: Albert Frick

CC: Richard Sweet
Dave Moyse
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Paul Beers

Date: 6/5/00

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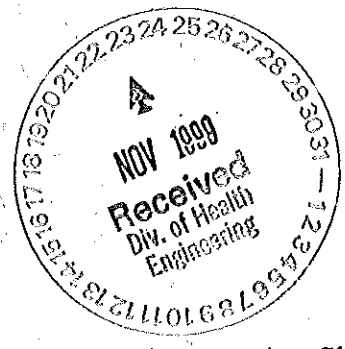


November 18, 1999

John Thompson, Code Enforcement Officer
Town of Naples
P.O. Box 237
Naples, ME 04055

Re: Albert & Charlene Frick, Harbor Road [Map U-27, Lot 24], Lot 33, Sebago Harbor Shores, Naples

Dear John:

I am working with SUPERIOR CONCRETE to experiment with the FRICKle Filter and synthetic media to improve wastewater quality. We are trying to develop a lighter filter media that will be more easily handled and decrease the weight of the unit for installation in tight places and on islands.

I would like to get a permit to install a treatment unit at the above property. The existing system is currently properly functioning and it is intended to be an add-on upgrade. Also, since there is 24' of piping required to connect the filter to the disposal area, I would like to expand the disposal area by 24' by using three Equalizers.

Enclosed is an expansion subsurface wastewater disposal system application and check for permit. Also enclosed is a sworn affidavit by Garrison Webb, previous owner, that testifies that the use of the property qualifies for *grandfathered* year-round status. I would like to obtain a seasonal conversion permit based on Mr. Webb's testimony inclusive with this permit.

We intend to monitor BOD & TSS from the septic tank effluent and FRICKle Filter to attempt to improve on wastewater quality being disposed around lakes and sensitive areas.

A check for $150 is in the mail to you that is intended for a permit for Treatment Tank and expansion ($100) and seasonal conversion ($50). Please contact me if you have any further questions or matters for additional discussion.

Respectfully,

Albert Frick

Albert Frick

AF/nd

Enc.
Cc. Steve Ray, SUPERIOR CONCRETE
James Jacobsen, DHE
[Notification sent to advise of prototype use and continued research with varied media type]

I, Gaynor Webb, have owned at Lot 24, Sebago Harbor Shores, from 1974 Jan. to this date. This location has been used as my permanent year-round residence during that time period, with the exception of approximately 6 years where I had a year-round tenant reside in this home. I returned to this residence and have lived there for the past 10 years approximately.

I listed the residence for voting, filing tax returns, automobile registration and lived at that location in excess of 7 months in any calendar year as required per Title 30-A, MRSA § 4215 (2) to be a year-round residence.

This 30th day of April, 1999.

Gaynor D Webb
Gaynor Webb

State of Maine

County of Cumberland, SS. April 30, 1999

Gaynor Webb personally appeared, and acknowledged the foregoing instrument to be his free act and deed.

Before me,

Steph V Collins
Notary Public

Print name:

My commission expires:

STEPHEN V. COLLINS
NOTARY PUBLIC, MAINE
COMMISSION EXPIRES AUGUST 14, 2001

REPLACEMENT SYSTEM VARIANCE REQUEST

THE LIMITATIONS OF THE REPLACEMENT SYSTEM VARIANCE REQUEST

This form shall be attached to an application (HHE-200) for the proposed replacement system which requires a variance to the Rules. The LPI shall review the Replacement System Variance Request an HHE-200 and may approve the Request if all of the following requirements can be met, and the variance(s) requested fall within the limits of LPI's authority.

1. The proposed design meets the definition of a Replacement System as defined in the Rules (Sec. 1903).
2. There will be no change in use of the structure except as authorized for one-time exempted expansions outside the shoreland zone of major waterbodies/courses.
3. The replacement system is determined by the Site Evaluator and LPI to be the most practical method to treat and dispose of the wastewater.
4. The BOD_5 plus S.S. content of the wastewater is no greater than that of normal domestic effluent.

GENERAL INFORMATION

Town of NAPLES

Permit No. _____ Date Permit Issued _____

Property Owner's Name: ALBERT & CHARLENE FRICK Tel. No.: 839-5563

System's Location: LOT 33 HARBOR RD, MAP U-27 LOT 24

Property Owner's Address: 95 COUNTY ROAD

(if different from above) GORHAM, ME 04038

SPECIFIC INSTRUCTIONS TO THE:

LOCAL PLUMBING INSPECTOR (LPI):

If any of the variances exceed your approval authority and/or do not meet all of the requirements listed under the Limitations Section above, then you are to send this Replacement System Variance Request, along with the Application, to the Department for review and approval consideration before issuing a Permit. (See reverse side for Comments Section and your signature.)

SITE EVALUATOR:

If after completing the Application, you find that a variance for the proposed replacement system is needed, complete the Replacement Variance Request with your signature on reverse side of form.

PROPERTY OWNER:

If has been determined by the Site Evaluator that a variance to the Rules is required for the proposed replacement system. This variance request is due to physical limitations of the site and/or soil conditions. Both the Site Evaluator and the LPI have considered the site/soil restrictions and have concluded that a replacement system in total compliance with the Rules is not possible.

PROPERTY OWNER

I understand that the proposed system requires a variance to the Rules. Should the proposed system malfunction, I release all concerned provided they have performed their duties in a reasonable and proper manner, and I will promptly notify the Local Plumbing Inspector and make any corrections required by the Rules. By signing the variance request form, I acknowledge permission for representatives of the Department to enter onto the property to perform such duties as may be necessary to evaluate the variance request.

_____ 11/19/99
SIGNATURE OF OWNER DATE

LOCAL PLUMBING INSPECTOR

I, _____, the undersigned, have visited the above property and have determined to the best of my knowledge that it cannot be installed in compliance with the Rules. As a result of my review of the Replacement Variance Request, the Application, and my on-site investigation, I (check and complete either a or b):

☐ a. (☐ approve, ☐ disapprove) the variance request based on my authority to grant this variance. Note: If the LPI does not give his approval, he shall list his reasons for denial in Comments Section below and return to the applicant. –OR–

☐ b. find that one or more of the requested Variances exceeds my approval authority as LPI. I (☐ recommend, ☐ do not recommend) the Department's approval of the variances. Note: If the LPI does not recommend the Department's approval, she shall state his reasons in Comments Section below as to why the proposed replacement system is not being recommended.

Comments: _____

_____

_____ _____
LPI SIGNATURE DATE

Replacement System Variance Request

VARIANCE CATEGORY	VARIANCE REQUESTED		LIMIT OF LPI'S APPROVAL AUTHORITY		VARIANCE REQUESTED TO:	
SOILS						
Soil Profile	Ground Water Table		to 7"			inches
Soil Condition	Restrictive Layer		to 7"			inches
from HHE-200	Bedrock		to 12"			inches
SETBACK DISTANCES (in feet)	Disposal Fields		Septic Tanks		Disposal Fields	Septic Tanks
From	Less than 1000 gpd	1000 to 2000 gpd	Less Than 1000 gpd	1000 to 2000 gpd	To	TREATMENT To
Wells with water usage of 2000 or more gpd	300[a] ft	300[a] ft	100[a] ft	100[a] ft		
Owner's wells	100 down to 50 ft	200 down to 100 ft	100[b] down to 50 ft	100 down to 50 ft		
Neighbor's wells	100[b] down to 60 ft	200[b] down to 120 ft	100[b] down to 50 ft	100[b] down to 75 ft		
Water supply line	10 ft[a]	20 ft[a]	10 ft[a]	10 ft[a]		
Water course, major - for replacements only, see Table 400.4 for exempted expansions	100 down to 60 ft	200 down to 120 ft	100 down to 50 ft	100 down to 50 ft		
Water course, minor	50 down to 25 ft	100 down to 50 ft	50 down to 25 ft	50 down to 25 ft		
Drainage ditches	25 down to 12 ft	50 down to 25 ft	25 down to 12 ft	25 down to 12 ft		
Coastal wetlands, special freshwater wetlands, great ponds, rivers, streams (edge of fill extension)	25 ft[d]	25 ft[d]	25 ft[d]	25 ft[d]		
Slopes greater than 3:1	10 ft	18 ft	N/A	N/A		
No full basement [e.g. slab, frost wall, columns]	15 down to 7 ft	30 down to 15 ft	8 down to 5 ft	14 down to 7 ft		
Full basement [below grade foundation]	20 down to 10 ft	30 down to 15 ft	8 down to 5 ft	14 down to 7 ft		
Property lines	10 down to 5[c] ft	18 ft down to 9[c] ft	10 ft down to 4[c] ft	15 ft down to 7[c] ft	7-8'	4-5'
Burial sites or graveyards, measured from the down toe of the fill extension	25 ft	25 ft	25 ft	25 ft		

OTHER

1. Fill extension Grade - to 3:1

2.

3.

Footnotes:

a. This setback distance cannot be reduced by the LPI, but may be considered for reduction by State variance.
b. Written Permission from the owner of a well is required when a replacement system will be located less than 100 (or 200 ft. for 1000-2000 gpd) feet and closer to that well than the system it is replacing.
c. Sufficient distance shall be maintained to assure that the toe of the fill does not extend to the 3:1 slope or property line.
d. Natural Resources Protection Act requires a 25 foot setback on slopes with less than 20% from the edge of disturbance and 100 feet on slopes greater than 20% except for the repair or installation of a replacement system when no practical alternative exists.

Robert Frick — SITE EVALUATOR'S SIGNATURE

11/18/99 — DATE

FOR USE BY THE DEPARTMENT ONLY

The Department has reviewed the variance(s) and (☐ does ☐ does not) give its approval. Any additional requirements, recommendations, or reasons for the Variance denial, are given in the attached letter.

SIGNATURE OF THE DEPARTMENT

DATE

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Department of Human Services
Division of Health Engineering, Station 10
(207) 287-5672 FAX (207) 287-4172

PROPERTY LOCATION

City, Town, or Plantation	NAPLES
Street or Road	HARBOR ROAD
Subdivision, Lot *	LOT 33

OWNER/APPLICANT INFORMATION

Name (last, first, MI)	FRICK ALBERT & CHARLENE (Owner / Applicant)
Mailing Address of ☐ Owner ☐ Applicant	95 COUNTY ROAD GORHAM, ME 04038
Daytime Tel. *	839-5563

>> Caution: Permit Required – Attach In Space Below <<

The Subsurface Wastewater Disposal System *shall not* be installed until a Permit is attached HERE by the Local Plumbing Inspector. The Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.

Municipal Tax Map * 027 Lot * 24

Owner or Applicant Statement

I state that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a permit.

Signature of Owner/Applicant — Date: 11/18/99

Caution: Inspections Required

I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application.

Local Plumbing Inspector Signature — (1st) Date Approved — (2nd) Date Approved

PERMIT INFORMATION

TYPE OF APPLICATION

1. ☐ First Time System
2. ☐ Replacement System
   Type Replaced: _____
   Year Installed: _____
3. ■ Expanded System
   a. ■ One-time exempted
   b. ☐ Non exempted
4. ☐ Experimental System
5. ■ Seasonal Conversion

THIS APPLICATION REQUIRES

1. ☐ No Rule Variance
2. ☐ First Time System Variance
   a. ☐ Local Plumbing Inspector Approval
   b. ☐ State & Local Plumbing Inspector Approval
3. Replacement System Variance
   a. ■ Local Plumbing Inspector Approval
   b. ☐ State & Local Plumbing Inspector Approval
4. ☐ Minimum Lot Size Variance
5. ■ Seasonal Conversion Approval

DISPOSAL SYSTEM COMPONENT(S)

SEE ATTACHED LETTER OF 11/18/99

1. ■ Complete Non-Engineered System
2. ☐ Primitive System(graywater & alt toilet)
3. ☐ Alternative Toilet, specify: _____
4. ☐ Non-Engineered Treatment Tank (only
5. ☐ Holding Tank, _____ Gallons
6. ☐ Non-Engineered Disposal Field (only)
7. ☐ Separated Laundry System
8. ☐ Complete Engineered System(2000gpd+)
9. ☐ Engineered Treatment Tank (only)
10. ☐ Engineered Disposal field (only)
11. ☐ Pre-treatment, specify:
12. ☐ Miscellaneous components

SIZE OF PROPERTY

7,490 ■ sq. ft. ☐ acres

DISPOSAL SYSTEM TO SERVE

1. ■ Single Family Dwelling Unit, No. of Bedrooms: _____
2. ☐ Multiple Family Dwelling, No of Units: _____
3. ☐ Other: _____ SPECIFY

TYPE OF WATER SUPPLY

1. ☐ Drilled Well 2. ☐ Dug Well 3. ☐ Private
4. ☐ Public 5. ■ Other: COMMUNITY

SHORELAND ZONING

■ Yes ☐ No

DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)

TREATMENT TANK

EXISTING

1. ■ Concrete
   a. ■ Regular
   b. ☐ Low Profile
2. ☐ Plastic
3. ☐ Other: _____
   CAPACITY 1000 gallons

DISPOSAL FIELD TYPE & SIZE

1. ☐ Stone Bed 2. Stone Trench
3. ■ Proprietary Device
   a. ☐ Cluster array c. ■ Linear
   b. ■ Regular d. ■ H-20 loaded
4. ☐ Other:
   SIZE _____ ☐ sq. ft. ☐ lin. ft.
   3 EQUALIZERS

GARBAGE DISPOSAL UNIT

1. ■ No 3. ☐ Maybe
2. ☐ Yes >> Specify one below:
   a. ☐ Multi-compartment tank
   b. ☐ Tank in series
   c. ☐ Increase in tank capacity
   d. ☐ Filter on tank outlet

DESIGN FLOW

270 gallons per day

BASED ON:

1. ☐ Table 501.1 (dwelling unit(s))
2. ☐ Table 501.2 (other facilities)
   SHOW CALCULATIONS
   - for other facilities -

SINGLE FAMILY DWELLING
3 BEDROOMS
90 GPD/BEDROOM = 270

3. ☐ Section 503.0 (meter readings)
   ATTACH WATER-METER DATA

SOIL DATA & DESIGN CLASS

PROFILE CONDITION DESIGN

12 / B / 1

AT Observation Hole * TP1
Depth _____ " Elevation _____ "
OF MOST LIMITING SOIL FACTOR

DISPOSAL FIELD SIZING

1. ☐ Small - 2.0 sq.ft./gpd
2. ■ Medium - 2.6 sq.ft./gpd
3. ☐ Medium-Large - 3.3 sq.ft./gpd
4. ☐ Large - 4.1 sq.ft./gpd
5. ☐ Extra-Large - 5.0 sq.ft./gpd

EXISTING PUMPING

1. ☐ Not required
2. ☐ May be required
3. ■ Required >>Specify only for engineered or experimental systems:

DOSE: Gallons

SITE EVALUATOR STATEMENT

I Certify that on 11/13/99 (date) I completed a site evaluation on this property and state that the data reported is accurate and that the proposed sytem is in compliance with the Subsurface Wastewater Disposal Rules (10-144A CMR 241).

Albert Frick — Site Evaluator Signature

163 — SE *

11/18/99 — Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD ROAD GORHAM, MAINE 04038 – (207) 839-5563

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

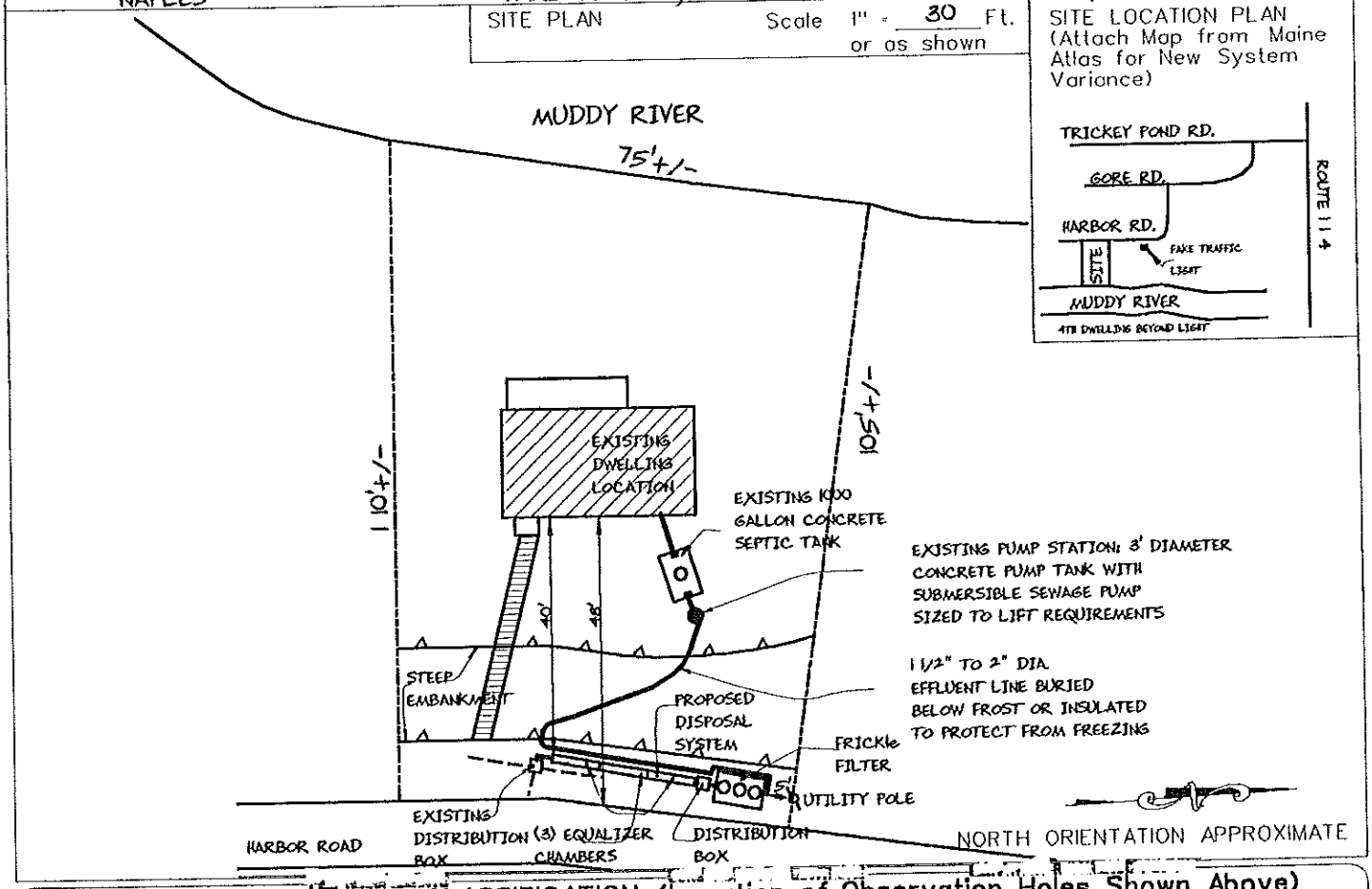
Department of Human Services
Division of Health Engineering

Town, City, Plantation: NAPLES

Street, Road Subdivision: HARBOR ROAD, LOT 33

Owner's Name: ALBERT & CHARLENE FRICK

SITE PLAN — Scale 1" = 30 Ft. or as shown



SITE LOCATION PLAN (Attach Map from Maine Atlas for New System Variance)

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 1 ■ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)	Texture	Consistency	Color	Mottling
0–10	LOAMY SAND TO SAND FILL	FRIABLE	PALE BROWN	
10–20				
20–30				
30–40				
40–50				

Soil Classification		Slope	Limiting Factor	
12 (Profile)	B (Condition)	___ %	___	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Observation Hole ___ ☐ Test Pit ☐ Boring

" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)	Texture	Consistency	Color	Mottling
0–10				
10–20				
20–30				
30–40				
40–50				

Soil Classification		Slope	Limiting Factor	
Profile	Condition	___ %	___	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Albert Frick
Site Evaluator Signature

163
SE #

11/18/99
Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD ROAD GORHAM, MAINE 04038 – (207) 839-6563

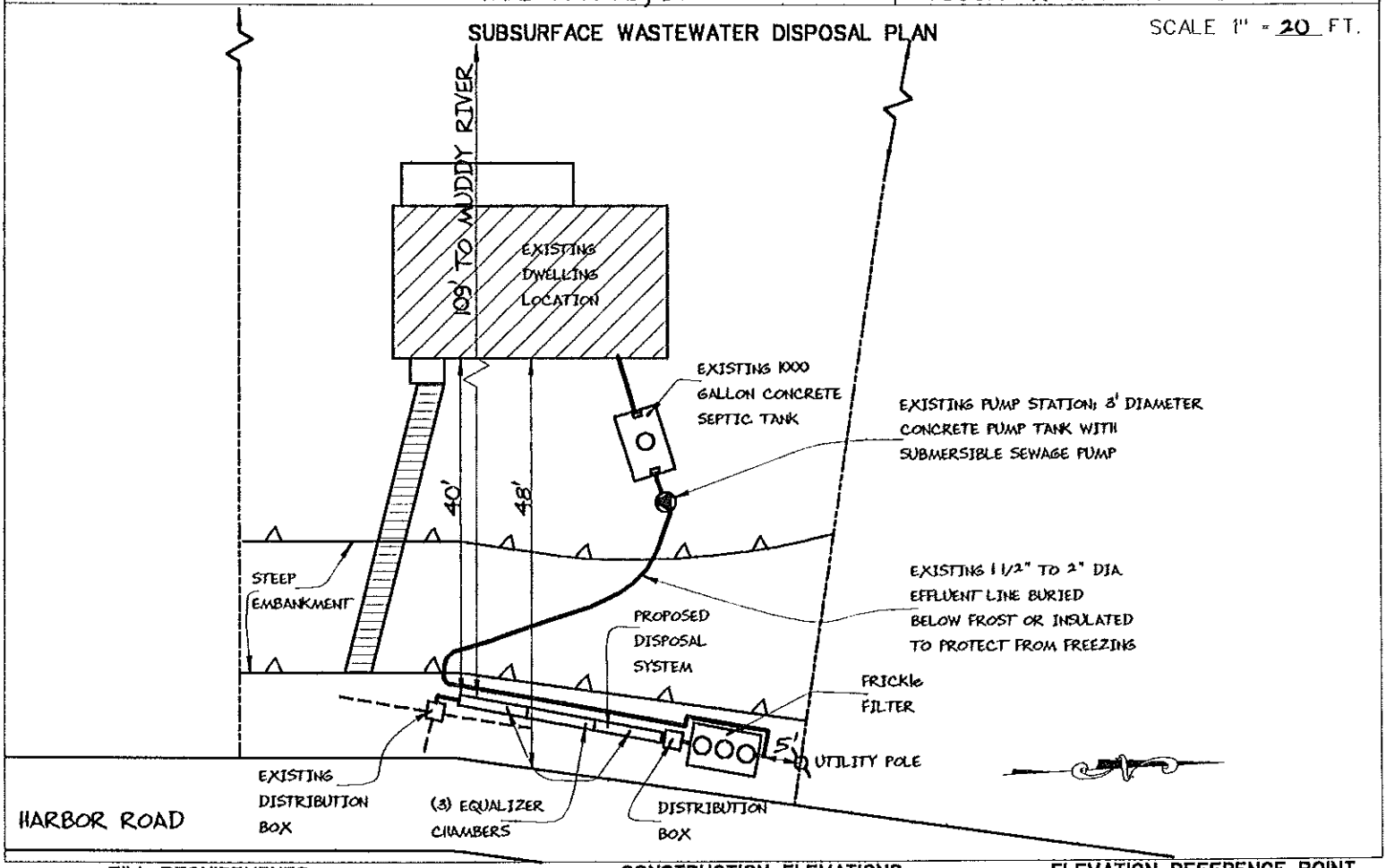
SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Department of Human Services
Division of Health Engineering

Town, City, Plantation	Street, Road, Subdivision	Owner's Name
NAPLES	HARBOR ROAD, LOT 33	ALBERT & CHARLENE FRICK

SUBSURFACE WASTEWATER DISPOSAL PLAN

SCALE 1" = 20 FT.



FILL REQUIREMENTS

Depth of Fill (Upslope)	± 0
Depth of Fill (Downslope)	± 0

CONSTRUCTION ELEVATIONS

Finished Grade Elevation	+ 24"
Top of Distribution Pipe or Proprietary Device	00
Bottom of Disposal Area	-11"

ELEVATION REFERENCE POINT

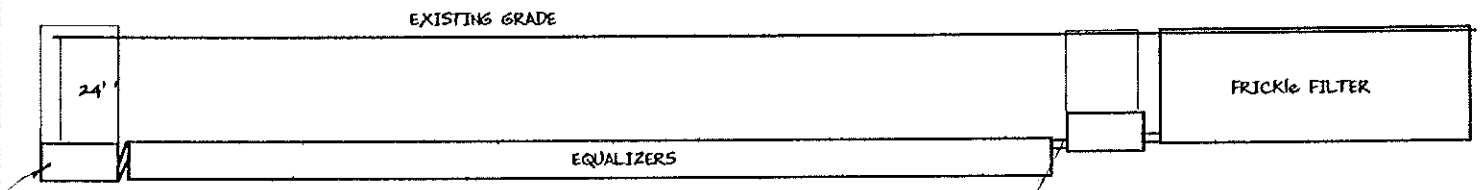
Location & Description: TOP OF EXISTING DISTRIBUTION BOX

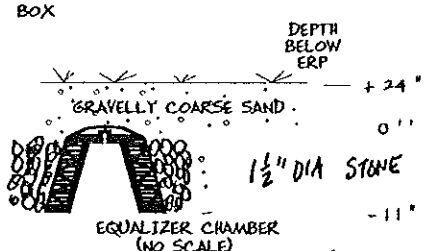
Reference Elevation:

DISPOSAL AREA CROSS SECTION

SCALE:
VERTICAL: 1" = 5'
HORIZONTAL: 1" = 5'

NOTES:





Albert Frick
Site Evaluator Signature

163
SE #

11/16/99
Date

ALBERT FRICK ASSOCIATES – 95A COUNTY ROAD ROAD GORHAM, MAINE 04038 – (207) 839-5563

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563

NAPLES HARBOR ROAD FRICK

TOWN LOCATION APPLICANT'S NAME

1) The Plumbing and Subsurface Wastewater Disposal Rules adopted by the State of Maine, Department of Human Services pursuant to 22 M.R.S.A. § 42 (the "Rules") are incorporated herein by reference and made a part of this application and shall be consulted by the owner/applicant, the system installer and/or building contractor for further construction details and material specifications. The system installer should contact Albert Frick Associates, Inc. 839-5563, if there are any questions concerning materials, procedures or designs. The system installer and/or building contractor installing the system shall be solely responsible for compliance with the Rules and with all state and municipal laws and ordinances pertaining to the permitting, inspection and construction of subsurface wastewater disposal systems.

2) This application is intended to represent facts pertinent to the Rules only. **It shall be the responsibility of the owner/applicant, system installer and/or building contractor to determine compliance with and to obtain permits under all applicable local, state and/or federal laws and regulations (including, without limitation, Natural Resources Protection Act, wetland regulations, zoning ordinances, subdivision regulations, Site Location of Development Act and minimum lot size laws) before installing this system or considering the property on which the system is to be installed a "buildable" lot.** It is recommended that a wetland scientist be consulted regarding wetland regulations.

Prior to the commencement of construction/installation, the local plumbing inspector shall inform the owner/applicant and Albert Frick Associates, Inc. of any local ordinances which are more restrictive than the Rules in order that the design may be amended. All designs are subject to review by local, state and/or federal authorities. Albert Frick Associates, Inc.'s liability shall be limited to revisions required by regulatory agencies pursuant to laws or regulations in effect at the time of preparation of this application.

3) All information shown on this application relating to property lines, well locations, subsurface structures and underground facilities (such as, utility lines, drains, septic systems, water lines, etc.) are based solely upon information provided by the owner/applicant and has been relied upon by Albert Frick Associates, Inc. in preparing this application. The owner/applicant shall review this application prior to the start of construction and confirm this information.

4) Installation of a garbage (grinder) disposal is not recommended. If one is installed, an additional 1000 gallon septic tank or a septic tank filter should be connected in series to the proposed septic tank.

5) The system user shall avoid introducing kitchen grease or fats into this system. Chemicals such as septic tank cleaners and/or chlorine (such as from water treatment) and controlled or hazardous substances shall not be disposed of in this system.

ATTACHMENT TO SUBSURFACE WASTEWATER DISPOSAL APPLICATION

NAPLES	HARBOR ROAD	FRICK
TOWN	LOCATION	APPLICANT'S NAME

6) The septic tank should be pumped within two years of installation and subsequently as recommended by the pump service, but in no event should the septic tank be pumped less often than once every three years.

7) The actual water flow or number of bedrooms shall not exceed the design criteria indicated on this application without a re-evaluation of the system as proposed. If the system is supplied by public water or a private service with a water meter, the water consumption per period should be divided by the number of days to calculate the average daily water consumption (water usage (cu.ft.) x 7.48 cu.ft.(gallons per cu.ft.) ÷ # of days in period).

8) The general minimum setbacks between a well and septic system serving a single family residence is 100-300 feet, unless the local municipality has a more stringent requirement. A well installed by an abutter within the minimum setback distances prior to the issuance of a permit for the proposed disposal system may void this design.

9) When a gravity system is proposed: **BEFORE CONSTRUCTION/INSTALLATION BEGINS**, the system installer or building contractor shall review the elevations of all points given in this application and the elevation of the existing and/or proposed building drain and septic tank inverts for compatibility to minimum slope requirements. In gravity systems, the invert of the septic tank(s) outlet(s) shall be at least 4 inches above the invert of the distribution box outlet at the disposal area. When an effluent pump is required, provisions shall be made to make certain that surface ground water does not enter the septic tank or pump station. An alarm device warning of a pump failure shall be installed. Also, when pumping is required to a chamber system, install a "T" connection in the distribution box and place 3 inches of stone or a splash plate in the first chamber. Insulate gravity pipes, pump lines and the distribution box as necessary to prevent freezing.

10) On all systems, remove the vegetation, organic duff and old fill material from under the disposal area and any fill extension. On sites where the proposed system is to be installed in natural soil, scarify the bottom and sides of the excavated disposal area with a rake. Do not use wheeled equipment on the scarified soil surface. For systems installed in fill, scarify the native soil by roto-tilling to a depth of at least 8 inches over the entire disposal and fill extension area to prevent glazing and to promote fill bonding. Place fill in loose layers no deeper than 8 inches and compact thoroughly before placing more fill (this ensures that voids and loose pockets are eliminated to minimize the chance of leakage). Do not use wheeled equipment on the scarified soil area until after 12 inches of fill is in place. Keep equipment off the chambers. Divert the surface water away from the disposal area by ditching or shallow swales.

11) Unless noted otherwise, fill shall be gravelly coarse sand which contains no more than 5% fines (silt and clay).

12) Do not install systems on loamy, silty, or clayey soils during wet periods since soil smearing/glazing may seal off the soil interface.

13) Seed all filled and disturbed surfaces with perennial grass seed, then mulch with hay or equivalent material to prevent erosion.

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Cumberland, Maine 04021
(207) 829-5563

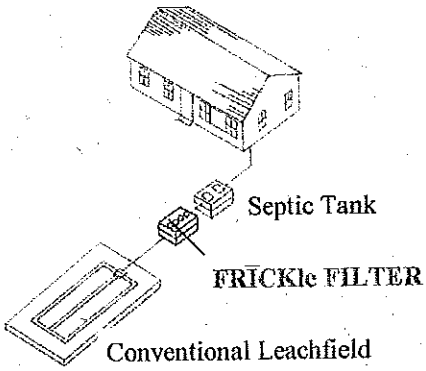
FRICKle FILTER™

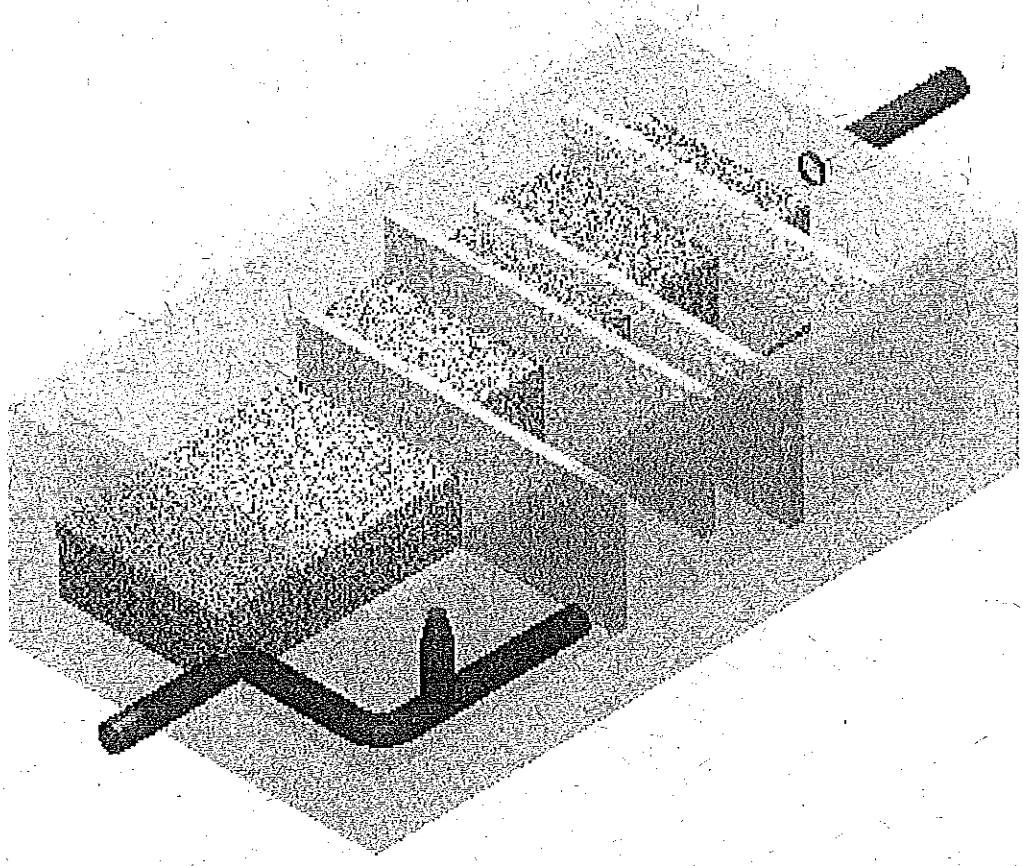
U.S. PATENT PENDING

WASTEWATER TREATMENT SYSTEM

WHAT IS IT?

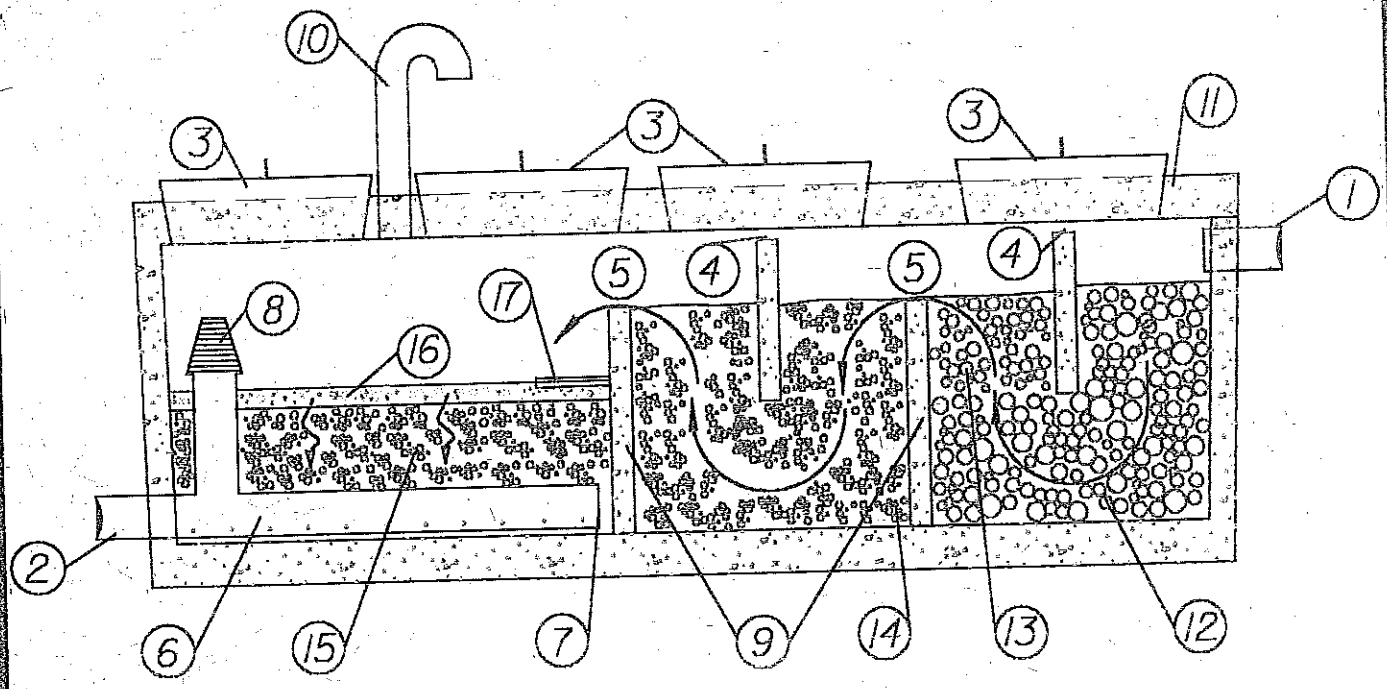
The **FRICKle FILTER**™ is a multi-chambered filter that is used between the septic tank and the disposal area in a wastewater disposal system. The **FRICKle FILTER** improves the wastewater quality by reducing the biochemical oxygen demand, total settleable solids, fecal coliform, and total nitrogen concentrations) before it reaches the leachfield. The **FRICKle FILTER**, by improving wastewater quality, will reduce failure risks of disposal systems by reducing soil clogging caused by excessive biomat development. Water quality discharged to the soil , groundwaters, and surface waters will be improved. There may be potential reduction in the disposal area required by the Local Health Departments.





HOW DOES THE FRICKle FILTER WORK?

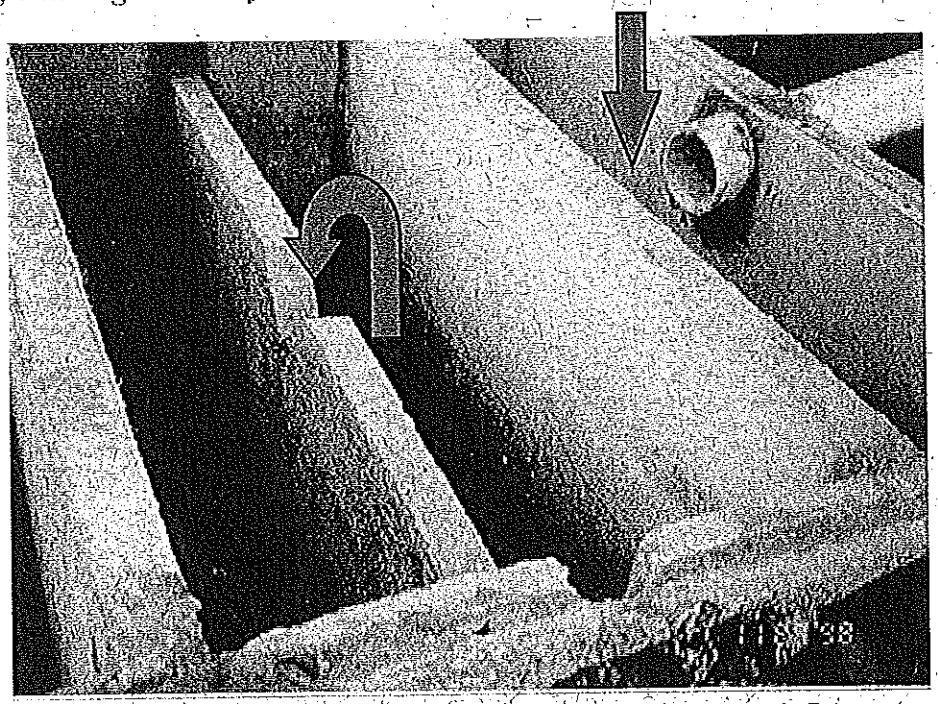
Wastewater from the septic tank enters the **FRICKle FILTER** at the inlet (**1**). The wastewater flow path is elongated and is caused to be both downward and upward by the internal baffling arrangement consisting of a series of underflow baffles (**2**) and overflow baffles (**3**). A progressive anaerobic filter is made by installing various filter material progressing from relatively coarse to relatively fine (**12**), (**13**), (**14**). An aerobic downflow filter section is provided in (**15**). A typical progressive filter media is 1 1/2 inch diameter stone in (**12**), 3/4 inch diameter stone in (**13**), 3/8 inch diameter stone in (**14**), and 3/8 inch diameter stone in (**15**) coated with a 2 inch thick layer of gravelly coarse sand in (**16**). A splash plate is utilized to prevent scouring (**17**). The wastewater is collected in an underdrain collection outfall pipe (**6**) and piped to a leach field. A removable cover (**11**) and a series of inspection covers (**3**) are provided for ease of access, inspection and maintenance.



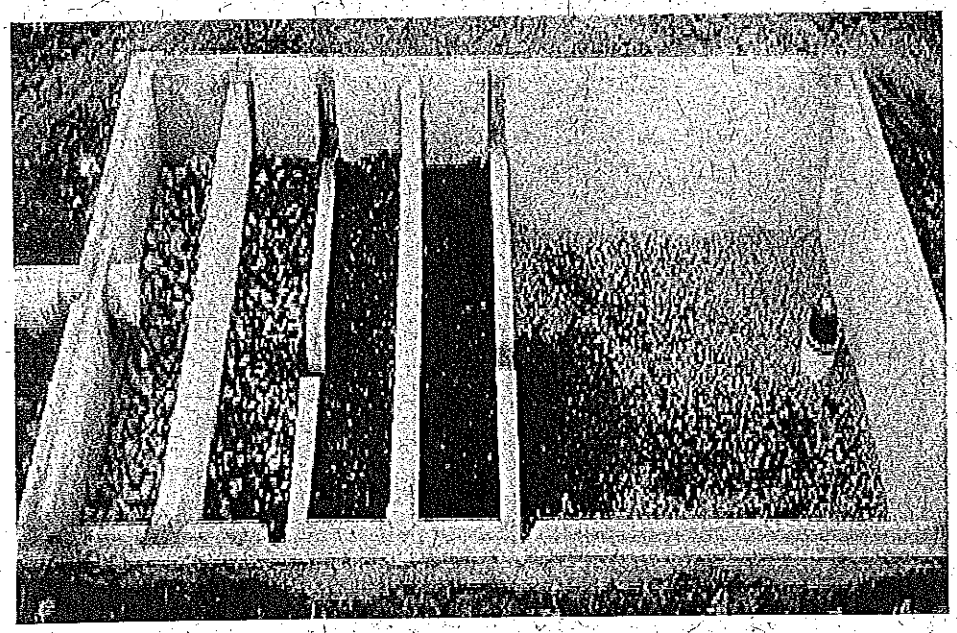
1	inlet	10	vent
2	outlet	11	removable cover
3	inspection covers	12	coarse-textured anaerobic filter column (1½" dia stone)
4	underflow baffle	13	medium-textured upflow anaerobic filter column (¾" dia)
5	overflow baffle	14	fine-textured downflow anaerobic filter column (3/8" dia)
6	collection outfall pipe	15	fine-textured upflow aerobic filter column (3/8 " dia)
7	grate	16	skim coat (gravely coarse sand)
8	overflow grate	17	splash plate
9	weir		

What are some of the FRICKle FILTER features?

Internal baffles provide an elongated path that caused wastewater to travel through more filter media improving cleaning efficiency.

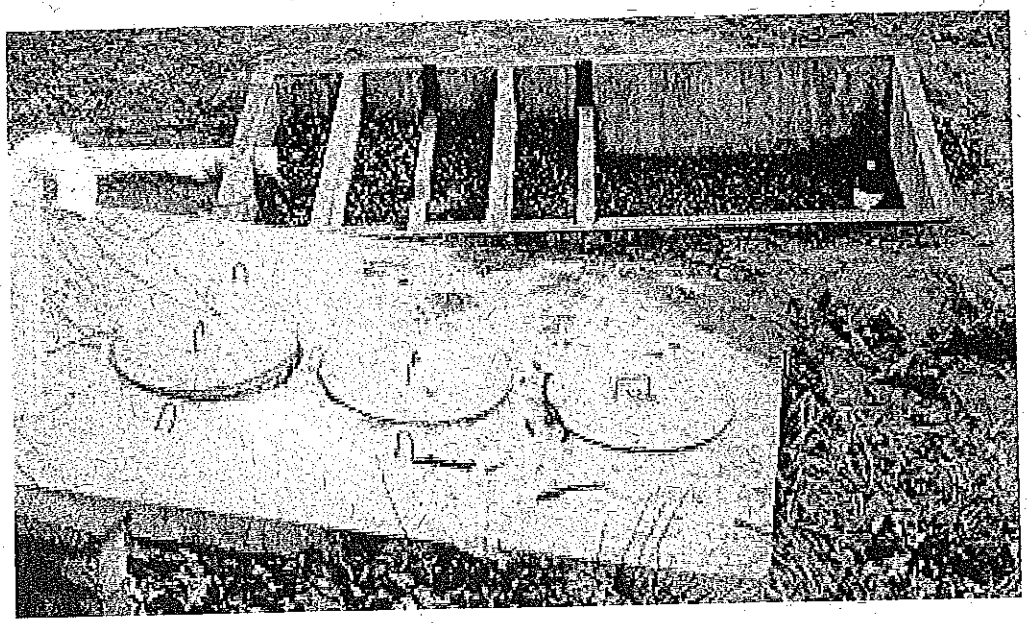


Provides multi-biological system environments with progressive filtration. Potential for anaerobic and aerobic environments are provided and modulars for successively finer filtration.



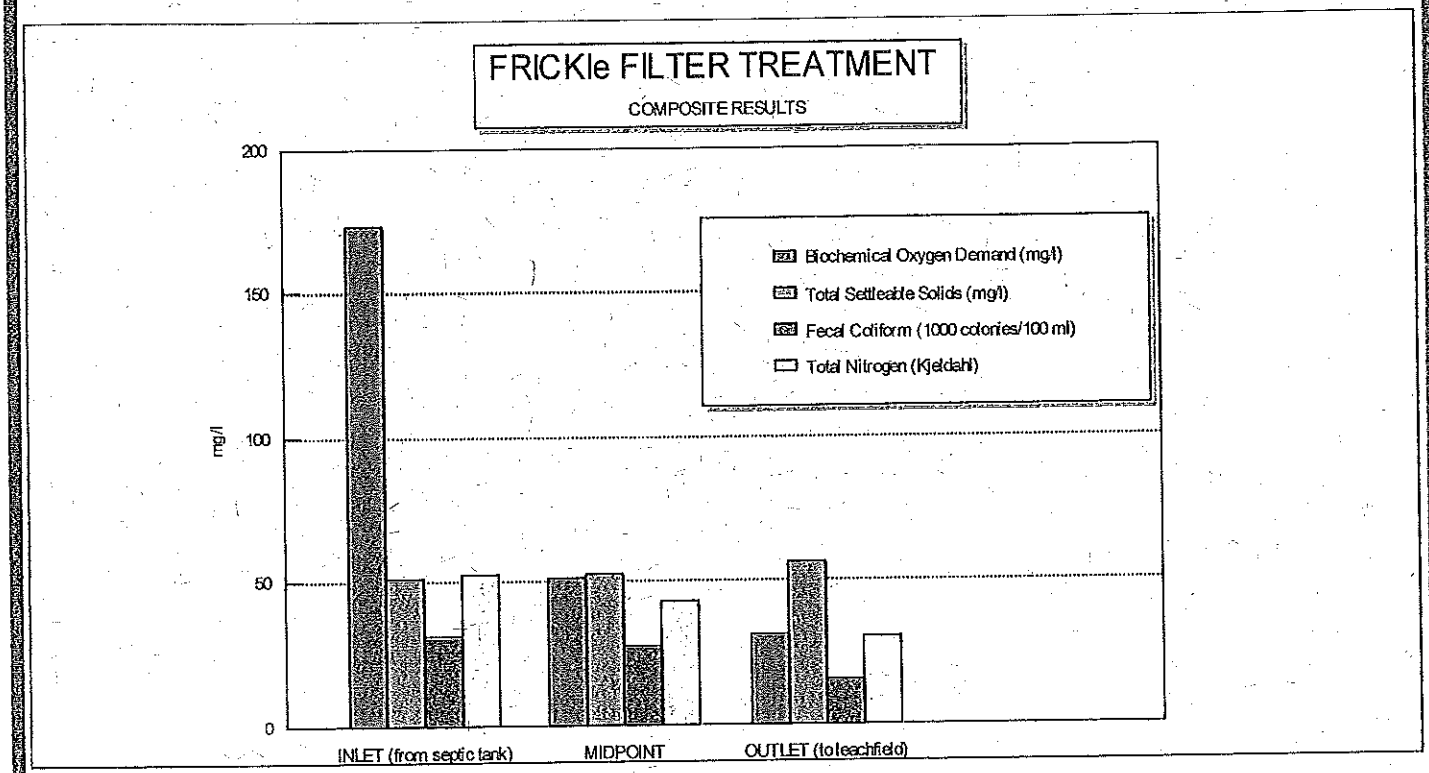
Anaerobic sections ponded **Aerobic section with underdrains**

Removable cover with access/inspection ports for filter maintenance.



The FRICKle FILTER functions as a living biological system providing wastewater treatment.

WHAT IS THE WASTEWATER QUALITY FROM A TYPICAL SINGLE FAMILY DWELLING AFTER IT PASSES THROUGH A FRICKle FILTER?



RANGE

	INLET	MID-POINT	OUTLET
BOD	(125-210)	(112-180)	(86-150)
TSS	(26-69)	(45-58)	(20-58)
FECAL COLIFORM	(10,000-42,5000)	(25,000-30,000)	(6,000-20,000)
TKN	(36-81)	(27-59)	(21-49)

MEAN

	INLET	MID-POINT	OUTLET
BOD	173	146	110
TSS	51	52	56
FECAL COLIFORM	30,833	27,500	15,333
TKN	52	43	30

ADVANTAGES

♦ REDUCES RISK OF LEACH FIELD FAILURE

The FRICKle FILTER functions as an effective filter to reduce failure risk for sensitive properties, small parcels, shoreland areas, heavily landscaped area, or access-limited areas. There are numerous sites that have limited suitable and/or available areas for siting on-site subsurface wastewater disposal systems. The use of a filter to increase the life span of the leach field or safeguard it's performance, is very cost-effective.

♦ IMPROVES WASTEWATER QUALITY

The FRICKle Filter IMPROVES the wastewater s quality by reducing BOD, TSS, FECAL COLIFORM, and NITROGEN so a higher quality of effluent is discharged to the surrounding soil media of the leach field and to ground waters. Tests on domestic wastewater quality have shown reductions by approximately 50% (see page 5). Federal, state and local environmental laws and regulations are requiring higher wastewater discharge quality in specific settings.

♦ NOT MECHANICALLY DEPENDENT

The FRICKle FILTER relies upon a one-pass gravity flow design. The head loss (vertical height loss) through the system is 24 inches to provide the highest potential for gravity flow to the leach fields, or discharging points. The design relies on passive, simple technology with very low maintenance needs.

♦ VARIED MEDIA CAN BE UTILIZED FOR SPECIFIC TREATMENTS

Designs have flexibility in media materials, sizing and configuration to customize wastewater treatment. A typical filter media set-up constructs a progressive filter of 11/2" diameter stone, followed by 3/4" diameter stone, 3/8' diameter stone, to gravelly coarse sand. Designers skilled in the art can vary the media treatment to suit de sired needs. Filter media size and composition is variable and can include organic and inorganic materials.

♦ PROVIDES THE POTENTIAL FOR SMALLER LEACHFIELD

The wastewater strength is significantly reduced (ie.BOD, TSS, TKN, fecal coliform). This allows for less biological mat development at the soil interface to optimize soil hydraulic permeability rates. Wastewater with high BOD, TSS and nitrogen promote a biological mat to develop to a high level causing soil permeability to decrease. Pro viding a cleaner water quality helps to keep the soil pores open to accept the wastewa ter. A smaller disposal area with open soil pores functions as well as, if not better than, larger disposal areas with clogged pores.

ADVANTAGES

- **PROVIDES SERIAL USE POTENTIAL**

  Additional filters can be added successively to further improve the wastewater quality. If space, costs, and gradients allow, two or more FRICKle FILTERS can be used in series to supply finer filtration and treatment.

- **COMPACT SIZE**

  The FRICKle FILTER for a single family dwelling occupies approximately the same area as a septic tank. A typical volume 5' wide, 8' long and 3' deep is the space required to accommodate a filter.

- **ECONOMICAL COMPARED TO EXPENSIVE REPLACEMENTS OF DISPOSAL AREAS AND COSTLY MECHANICAL TREATMENT SYSTEMS**

  The FRICKle FILTER is less expensive than the more advanced wastewater treatment systems that require pumps, meters, and electronic circuitry.

- **SIMPLE TO USE AND MAINTAIN**

  The FRICKle FILTER relies on biological growth and physical filtration. Very little maintenance is expected. Pumping the septic tank at normal frequency is the required maintenance. If the biological growth in the filter be comes excessive over time to decrease flow, the inspection covers can be re moved and the media raked. If more extensive maintenance is needed, the cover can be removed with light equipment and the complete media can be re moved and replaced. Replacing a clogged filter is less expensive, easier, and less impacting than replacing an entire on-site subsurface wastewater disposal area and surrounding soil.

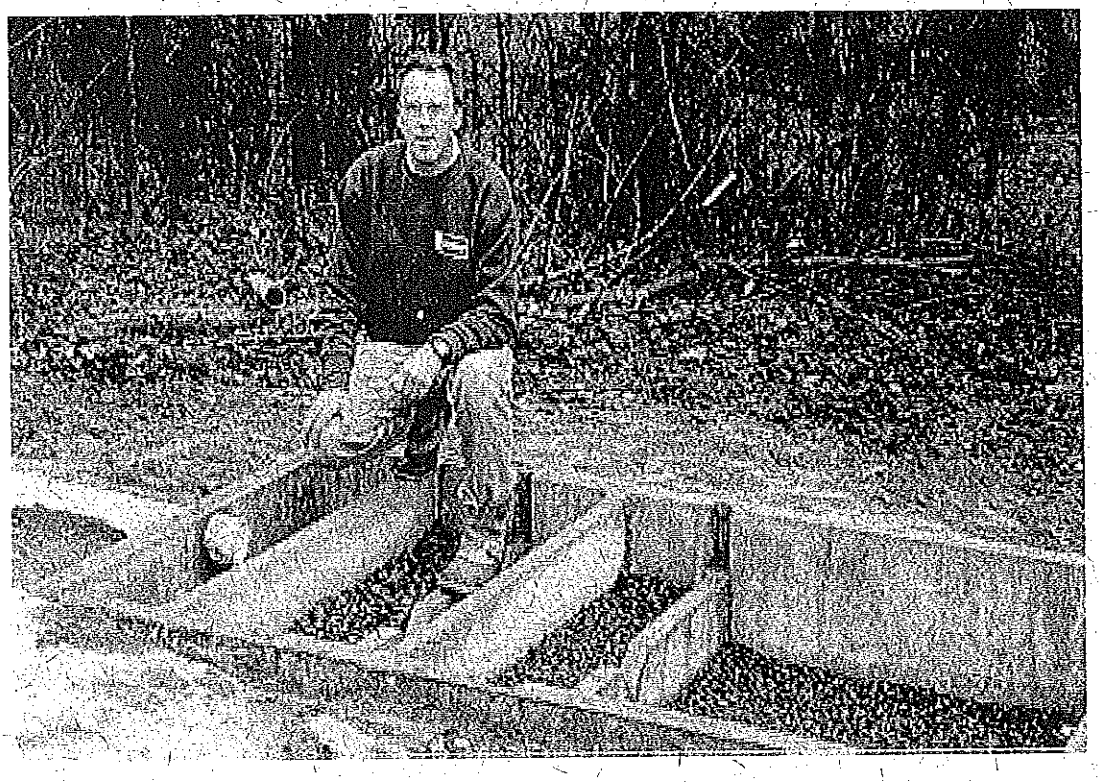
- **EASE OF INSTALLATION**

  Since the FRICKle FILTER is approximately the same size as a con ventional septic tank, excavating contractors will find installation to be simple and straight-forward.

- **ENVIRONMENTALLY SENSITIVE SITES**

  The FRICKle FILTER can provide enhanced wastewater treatment on sites with difficult or non-conforming setback distances, replacement system variance requirements, or sites with extremely limited area for wastewater disposal.

Typical size of filter to serve a single family dwelling.



FOR MORE INFORMATION CONTACT

ALBERT FRICK ASSOCIATES, INC.
95A County Road
Gorham, Maine 04038

Tel: (207) 839-5563 FAX: (207) 839-5564
E-MAIL: albertfrick@worldnet.att.net

STATE OF MAINE
DEPARTMENT OF HUMAN SERVICES
DIVISION OF HEALTH ENGINEERING
10 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0010

ANGUS S. KING, JR.
GOVERNOR

KEVIN W. CONCANNON
COMMISSIONER

May 3, 1999

Albert Frick Associates, Inc.
Attn.: Albert Frick
95A County Road
Gorham, Maine 04038

Subject: Product Registration, FRICKle Filter

Dear Mr. Frick:

Thank you for your letter dated March 26, 1999 regarding your company's product. It is our understanding that the FRICKle Filter is a multiple chamber, gravity flow filter device using anaerobic and aerobic processes. Data gathered from operation of your prototype shows reduction in BOD^5, TSS, fecal coliform bacteria, and total nitrogen levels generally on the order of 50 percent.

You have requested that use of this filter be allowed a 20 percent reduction to the size of replacement disposal areas, on a preliminary basis. You have also requested that use of this product be assessed 10 points toward new system variances.

Under provisions of Section 1802 of the Maine State Plumbing Code, Subsurface Wastewater Disposal Rules (copy enclosed), any manufacturer or distributor submitting a new product for code registration needs to demonstrate that:

1. The product is designed to protect public health, prevent the creation of any nuisance, and prevent environmental pollution to the same extent as comparable products presently authorized by Department for use in this code, and

2. The product is based on sound engineering principles and can be expected to provide the same level of protection to public health and the environment as offered by the authorized products presently authorized by the Department for use in this code.

According to the information you provided, FRICKle Filters should perform as anticipated and described in your supporting information, and as specified above. On that basis, the Division has determined that FRICKle Filter is acceptable for use in the State of Maine, provided that it is installed, operated, and maintained in conformance with the manufacturer's directions.

Further, for a period of one calendar year from the date of this letter, on a provisional basis use of a FRICKle Filter in a replacement system shall be allowed a 20 percent reduction to the base design flow, due to the improved quality of the effluent. At the end of this one year period, the provisional status shall be upgraded to permanent if there does not appear to be an unreasonable adverse impact from such reductions.

Further, use of a FRICKle Filter in a new system shall be assessed 10 points toward a first time system variance, if applicable. Again, this allowance is due to the improved quality of effluent from use of the filter.

Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Division makes no representation or guarantee as to the efficiency and/or operation of FRICKle Filter. Further, registration of this product for use in the State of Maine does not represent Division preference or recommendation for this product over similar products.

Please feel free to copy and distribute this letter. If you have any questions please contact me at (207) 287-5695.

Sincerely,

James A. Jacobsen, Manager
Wastewater and Plumbing Control Program
Division of Health Engineering
e-mail: james.jacobsen@state.me.us

xc: File

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE

MEMO

To: James Jacobsen
From: Albert
Subject: FRICKle Filter
Date: April 22, 1999

Dear Jim:

This is a written follow-up to my initial application and our subsequent conversation concerning approval of the proposed filter for use in Maine for subsurface wastewater disposal.

We would like to promote the unit as a safety factor for new construction, but would like the Division to consider a preliminary 20% reduction for replacement systems.

Also we were interested in having the Division give a point value for use with new system variances. We would like to receive 10 points for the unit in a new system variance setting.

Your attention to this matter would be much appreciated. if you have any interest in reviewing a FRICKle Filter in operation, I would be glad to show you it's performance.

Respectfully,

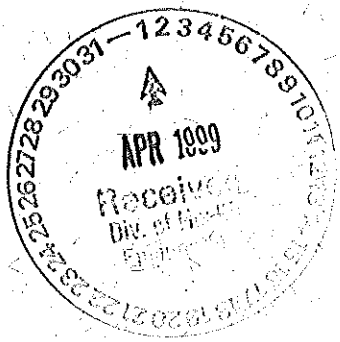
Albert Frick

AF/nd

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE

March 26, 1999



James Jacobsen
Division of Health Engineering
State House, Station #10
Augusta, Maine 04333

Re: FRICKle Filter, Wastewater Treatment System

Dear Jim:

We have made substantial progress on the FRICKle filter:

- Prototype has been built and operated for 4 months
- Performance results have been documented
- A patent application has been filed with the U.S. Patent Office
- Several national distributors of pre-cast and/or wastewater disposal treatment have shown significant interest in looking into manufacturing

Enclosed please find:

- FRICKle FILTER Brochure
- U.S.Patent Application and correspondence
- Check for $100 for DHE product review fee.

We would like you to review this information in accordance with Section 1800 of the State of Maine Subsurface Wastewater Disposal Rules for approval for use in the State of Maine.

A working system is in the ground at our office/dwelling and is available for your review and examination. I also would like an opportunity to meet with you to discuss the results and some of our ideas for applications and potential efficiencies. We are continuing to sample and test the system performance.

I am looking forward to talking with you shortly.

Respectfully,

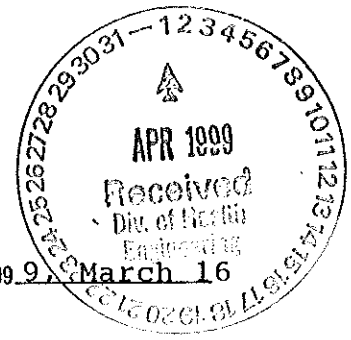
Albert Frick

AF/nd
enc.
cc. Jay Hardcastle
Linda Robinson

FRICKLE FILTER
TREATMENT RESULTS

DATE SAMPLED	PARAMETER	INLET	MID POINT	OUTLET	
12/16/98	BOD	185		93	50,2%
12/16/98	TSS	59		20	↓
12/16/98	FECAL C.	10,000		6000	
12/16/98	TKN	40		21	
1/22/99	BOD	125	112	86	
1/22/99	TSS	69	45	53	76
1/22/99	FECAL C.	40,000	30,000	20,000	
1/22/99	TKN	36	27	21	
2/19/99	BOD	210	180	150	
2/19/99	TSS	26	58	58	
2/19/99	FECAL C.	42,500	25,000	20,000	
2/19/99	TKN	81	59	49	
	BOD (RANGE)	(125 - 210)	(112 - 180)	(86 -150)	
	BOD (MEAN	173	146	110	↓ 63,5%
	TSS (RANGE)	(26 - 69)	(45 - 58)	(20 - 58)	↑
	TSS (MEAN)	51	52	56	
	FECAL C. (RANGE)	(10,000 -42,500)	(25,000 -30,000)	(6,000 - 20,000)	
	FECAL C. (MEAN)	30,833	27,500	15,333	↓ 99,7 %
	TKN (RANGE)	(36 - 81)	(27- 59)	(21 - 49)	
	TKN (MEAN)	52	43	30	↓ 57,7%

In the United States Patent and Trademark Office



Mailed 199 9 , March 16

Box Patent Application
Assistant Commissioner for Patents
Washington, District of Columbia 20231

Sir:

Please file the following enclosed patent application papers:

Applicant #1, Name: Albert Frick

Applicant #2, Name: _____

Title: Multi-Chambered Treatment Filter

☒ Specification, Claims, and Abstract: Nr. of Sheets 11

☒ Declaration: Date Signed: March 1999

☒ Drawing(s): Nr. of Sheets Enc.: Formal: 4 Informal: _____

☒ Small Entity Declaration of Inventor(s) ☐ SED of Non-Inventor / Assignee / Licensee

☒ Assignment enclosed with cover sheet and recordal fee; please record and return.

☒ Check for $ 395 for:

☒ $ 395 for filing fee (not more than three independent claims and twenty total claims are presented).

☐ $ _____ additional if Assignment is enclosed for recordal.

☐ Disclosure Document Program reference letter.

☐ Pursuant to 35 U.S.C. §119(e)(i), applicant(s) claim priority of Provisional Patent Application Ser. Nr. _____, filed _____.

☒ Return Receipt Postcard Addressed to Applicant #1.

☒ **Request Under MPEP § 707.07(j):** The undersigned, a pro se applicant, respectfully requests that if the Examiner finds patentable subject matter disclosed in this application, but feels that Applicant's present claims are not entirely suitable, the Examiner draft one or more allowable claims for applicant.

Very respectfully,

Albert Frick
Applicant #1 Signature

_____
Applicant #2 Signature

95A County Road
Address (Send Correspondence Here)

Gorham, ME 04038

_____
Address

Express Mail

Deposit 199 _____

Form 10-1: Patent Application Transmittal Letter

In the United States Patent and Trademark Office

Mailed 199 March 16, 1999

Box Patent Application
Assistant Commissioner for Patents
Washington, District of Columbia 20231

Fee Transmittal

First-Named Applicant: Albert Frick

Title of Invention: " Multi-Chambered Treatment Filter "

Total Payment Enclosed (From Calculation Below): $ 395 ☒ Check ☐ Money Order

Sir:

Enclosed is the following small entity filing fee for the above patent application:

Fee Code	Fee Description	Fee ($)
214	Provisional Pat. Appn. Filing Fee	
201	Basic Utility Appn. Filing Fee	395
206	Basic Design Appn. Filing Fee	
	Subtotal (1)	
203	Total Claims: 5 − 20 = ____; X ____ (fee for each claim over 20) =	0
202	Tot. Indep. Claims 1 − 3 = ____; X ____ (fee for each indep. claim over 3) =	0
	Subtotal (2)	
	Total Payment Enclosed [Sum of Subtotals (1) and (2)]	395

Very respectfully,

Albert Frick
Signature of First-Named Applicant

Albert Frick
Print Name of First-Named Applicant

95A County Road
Address

Gorham, ME 04038

Form 10-1A: Fee Transmittal

Patent Application of

Albert Frick

for

TITLE: MULTI-CHAMBERED TREATMENT FILTER

CROSS-REFERENCES TO RELATED APPLICATIONS

Not Applicable

BACKGROUND - FIELD OF INVENTION

This invention relates generally to the treatment of settled wastewater, and in particular to efficiently treating the water flowing from an on-site treatment process such as a septic tank by mechanical removal and biological conversion in a multi-chambered tank containing various media.

BACKGROUND - DESCRIPTION OF PRIOR ART

Common subsurface wastewater disposal systems are designed with septic tank effluent flowing to some form of a soil absorption disposal area as regulated by local or State Health Codes.

Various types of filters and treatments have been offered in the art to provide some form of filtering or pre-treatment of wastewater prior to final disposal to a subsurface wastewater disposal system. Supplemental treatment to wastewater is provided in efforts to assure environmental sanitation and improve the quality of effluent which eventually enters the groundwater and surface waters.

There have been inventors proposing revisions to septic tanks. U.S. Patent D371,423 to Salagnac (1996) discloses an aesthetic shaped septic tank. U.S. Patent 4,997,564 to Warner

(1989) improved the efficiency of the septic tank by adding multiple compartments. This design utilizes multi compartments but they are installed inside a septic tank without filter media or providing an aerobic environment.

U.S. Patent 5,766,454 by Cox et al (1996) proposed home wastewater treatment and denitrification systems utilizing a separate aerobic and anaerobic tank for denitrification. This design teaches away from this invention and requires a mechanical pump for stirring of the wastewater to produce denitrification. U.S. Patent 5,496,472 by Slack et al (1996) was directed at a method and application for denitrification using a weir block and laminal flow. This patent is designed to convey water through a weir and along a wall of a denitrifying vessel.

Several inventions proposed septic tank filters to be placed inside the septic tank to improve wastewater quality, U.S. Patent 5,482,621 to Norse (1994), U.S. Patent 5,635,064 to Bovington (1995), and U.S. Patent 5,683,577 to Norse (1996).

Several inventions have proposed sand filter designs for wastewater effluent management; U.S. Patent 5,667,670 to Drewey (1996) and U.S. Patent 5,770,071 to Drewey (1996), and U.S. Patent 4,100,073 to Hopcroft (1976) proposed a sand filter designed for discharge to surface water bodies.

U.S. Patent 5,618,431 to Kondo et al (1996) proposed a method of preparing and cleaning floating filter medium for a biological cleaning apparatus.

There has been work, in the art, of an anaerobic/aerobic filter plant that is intended for use between a septic tank and a drain field and includes a filter tank that receives effluent from a septic tank. U.S. Patent 4,895,645 to Zorich, Jr. (1997) proposed a filter tank containing aerobic and anaerobic treatment environments. This unit relies on a mechanical pump for circulation and recirculation and does not utilize multi-compartmental design.

The object of my invention is to provide a filter to be utilized between a septic tank and drain field, which will reduce the wastewater strength (ie. total settleable solids, biochemical oxygen demand, fecal coliform, and total nitrogen) going to the drain field which will either allow for the drain field to be decreased in size or provide a safety factor to reduce failure risk, or improve wastewater quality discharged to the soil, groundwaters, and surface waters.

The filter is relatively compact compared to a conventional sand filter and reduces biochemical oxygen demand, total suspended solids, nitrogen and fecal coliform prior to effluent entering the drain field. The unit elongates the pathway of wastewater flow through several downflow and upflow anaerobic columns and downflow aerobic column of varying filter media. It does not require mechanical devices, however, a pump can be added to recirculate the water if a higher level of wastewater treatment is required.

SUMMARY

In accordance with the present invention, a treatment filter comprises a multi-compartment tank that produces an elongated path with upflow and downflow columns with progressive filtering media forming anaerobic and aerobic environments to promote wastewater treatment.

DRAWING FIGURES

Fig. 1 is a top view of the filter tank.

Fig. 2 is a cross-sectional side view.

Fig. 3 is a front view of filter tank.

Fig. 4 is a front view of the underflow baffle.

Fig. 5 is a front view of the overflow baffle.

Fig. 6 is a grate detail.

Fig. 7 is an overflow weir detail.

Fig. 8 is an overflow grate detail.

Fig. 9 is an internal cross-section of the filter.

Fig. 10 is an internal cross-section of the filter treatment process.

Fig. 11 is a perspective view illustrating the proposed location of the filter in a subsurface wastewater disposal system.

Reference Numerals in Drawings

101 septic tank	208 weir
102 filter tank	209 overflow grate
103 disposal area (leach field)	210 vent
201 inlet	211 removable cover
202 outlet	301 coarse-textured anaerobic filter column (1½" dia stone)
203 inspection covers	302 medium-textured upflow anaerobic filter column (¾" dia)
204 underflow baffle	303 fine-textured downflow anaerobic filter column (⅜" dia)
205 overflow baffle	304 fine-textured upflow anaerobic filter column (⅜" dia)
206 collection outfall pipe	305 skim coat (gravelly coarse sand)
207 grate	306 splash plate

DESCRIPTION - Preferred Embodiment - Figs. 1, 2, 3, 4, 5, 6, 7 and 8

Reference is made to the drawings and specifically to Figs. 1-8. Reference is herein made to the drawings wherein substantially identical parts are designated by the same number.

A preferred embodiment of the treatment filter of the present invention is illustrated in Fig. 1 (top view), Fig. 2 (side cross-sectional view) and Fig. 3 (end view). The treatment tank (**102**) is comprised of multi-chambered compartments formed by internal underflow baffles (**204**) and internal overflow baffles (**205**) as shown in Figures 4 and 5.

At one end at the top of the said treatment tank is an inlet pipe (**201**) and at the other end at the bottom of the said tank is an outlet pipe (**202**). Filtered water is collected in the tank through holes in a perforated pipe (**206**) and through end grates (**207**) as illustrated in Fig. 6.

Water flows over the overflow baffles (**205**) through a weir (**208**) as shown in Fig. 4 and Fig. 7.

An overflow grate (**209**) as shown in Fig. 8 and Fig. 9 is provided for a by-pass precaution. Inspection and access baffles (**203**) are provided to observe filter media conditions. A removable cover (**211**) is provided to install, maintain and replace media.

Coarser textured filter media (**301**) is provided on the inlet side of the treatment filter. The designer used 1½" diameter stone. Medium textured filter media (**302**) (designer used ¾" diameter stone for example) in the middle sections of the multi-chambered compartments progresses to finer textured filter media (**303**) (designer used ⅜" diameter stone). A fine textured media (**304**) is provided on the outlet side of the treatment tank. The designer used ⅜" diameter stone. A skim coat of gravelly coarse sand 2" deep is applied to top of the outside side of the treatment tank top to cause the wastewater to flood the entire section (**305**).

Advantages

From the description above, a number of advantages of my treatment tank become evident:

a) the design allows for gravity flow

b) the internal baffles provide an elongated path causing water to pass through more filter media to improve cleaning efficiency

c) the design and placement of the baffles cause upflow and downflow filtering

d) the compartment design produces potential anaerobic and aerobic environments to promote biological treatment mechanisms

e) the treatment filter is non-mechanical

f) the treatment tank geometry provides efficient use of a relatively compact volume with minimal head loss to provide for increased gravity flow potential to the disposal area

g) the media can be varied to accomplish intended treatment

Operation - Figs. 9, 10 and 11.

The manner of using the treatment tank is illustrated in Figures 9, 10 and 11.

As illustrated in Fig.11, the prefilter (**102**) is intended to be utilized between the septic tank (**101**) and disposal field (**103**) to treat wastewater effluent from a dwelling or structure (**100**) prior to ultimate disposal to the surrounding soil (**104**).

Wastewater from the septic tank enters the unit at the inlet (**201**). The wastewater flow path is elongated and caused to be both downflow and upflow by internal baffling (204) and (205). A progressive anaerobic filter is made by installing various filter material progressing from relatively coarse to relatively fine (**301**), (**302**), (**303**). An aerobic downflow filter section is provided in (**304**). The inventor utilized 1 1/2 inch diameter stone in (**301**), 3/4 inch diameter stone in (**302**), 3/8 inch diameter stone in (**303**), and 3/8 inch diameter stone in (**304**) coated with a 2 inch thick layer of gravelly coarse sand in (**305**). A splash plate is utilized to prevent scouring.

The wastewater flows between the upflow anaerobic column to the downflow anaerobic column or aerobic downflow column through a weir (**208**).

The wastewater is collected in a perforated pipe at the base of the aerobic section (**206**) and outlet (**202**) to a conventional disposal system (**103**).

The filter can be used with differing types of media and sizes to filter wastewater. The filter can be used in series with other prefilters to further polish effluent. The filter itself can be made from various materials (concrete, fiberglass, etc.). Persons skilled in the art can vary the filter media depending upon the desired results. Natural earth media such as, but not limited to, crushed stone, gravel, sand, soil particles, saw dust, peat moss, can be used as well as man-made material such as, but not limited to, plastics, foam, crushed rubber. The relative size, number, and configuration of the multi-chambers can vary based on size and nature of filter media. Persons skilled in the art can vary the juxtaposition of the inlet and outlet locations of the multi-chamber to elongate the path even more by causing the water flow to not only flow end to end but also side to side through the tank.

It appears the best application is for treating household and commercial wastewater when it is installed after a septic tank but prior to a subsurface wastewater disposal field. However, individuals skilled in the art may find appropriate applications to other wastewater, water, and other liquids to improve quality.

Persons skilled in the art can perhaps find an application to filter water and other liquids. The best mode of operation depends upon the wastewater quality and the targeted output quality. For example, to treat domestic wastewater to approximate 50% reductions in biochemical oxygen demand, total settleable solids, fecal coliform, and total nitrogen, the multi chambered tank can be set with media as described. If increased wastewater quality is desired, an additional tank installed in series, and/or a tank with larger volume, a tank with longer detention time, or finer filter media may be utilized. The size of tank, number of compartments, types and size of

media can be varied by persons skilled in the art to treat wastewater quality.

Conclusions, Ramifications, and Scope

This invention is an improvement upon conventional subsurface wastewater disposal systems and is intended for use between a septic tank and a disposal field. The prefilter tank includes a series of internal baffles that form an elongated path for wastewater to pass through. The design of the tank produces anaerobic and aerobic environments to enhance wastewater treatment. The wastewater flow routing causes both downflow and upflow paths. Wastewater enters the prefilter at the top and is treated anaerobically by a relatively coarse textured media in a downflow column. The effluent then is caused to flow upward through a slightly finer textured media and across a weir into an anaerobic downflow column of an even finer textured media, then upflow through the media to a weir. The effluent then is caused to cascade into an aerobic downflow column of finer textured media for ultimate discharge to a conventional disposal field with improved wastewater quality. Additionally, the filter is longer than it is deep which reduces head loss and increases potential for gravity flow situations to conventional disposal systems.

The overall results are a significant decrease in the wastewater strength from the filter inlet to the filter outlet, of 50% reduction in biochemical oxygen demand, 50% reduction total settle-able solids, 50% in total nitrogen and 50% in fecal coliform bacteria.

While the invention has been described in connection within a presently preferred embodiment thereof, those skilled in the art will recognize that many modifications and changes may be made to the specific described embodiment without departing from the true spirit and scope of the invention, which accordingly is intended to be defined solely by the following claims.

WHAT IS CLAIMED IS:

1. A device for treating wastewater comprising of a predetermined:

   a) tank

   b) a plurality of multi-compartments within the tank

   c) filter media

   whereby the said components will form an elongated pathway through filtering medium or media to improve water quality and

   whereby the pathway will provide upflow and downflow travel and

   whereby the multi-compartment will provide the potential for anaerobic and aerobic environments

2. A device for treating wastewater of claim 1 which is comprised of a tank of concrete, about the size of the lower half of a septic tank, with internal baffles that produce an elongated flow path of both upward and downward flow and creating anaerobic and aerobic treatment environments.

3. A device for treating wastewater of claim 1 which is comprised of a tank of light weight materials with internal baffles that produce an elongated flow path of both upward and downward flow and creating anaerobic and aerobic treatment environments.

4. The multi-compartments of claim l whereby a plurality of baffles are utilized within said tank producing an elongated flow path.

5. The utilization of filter media of claim 1 wherein the material includes finer sized solid particles whereby the sequencing produces a progressive filtering structure.

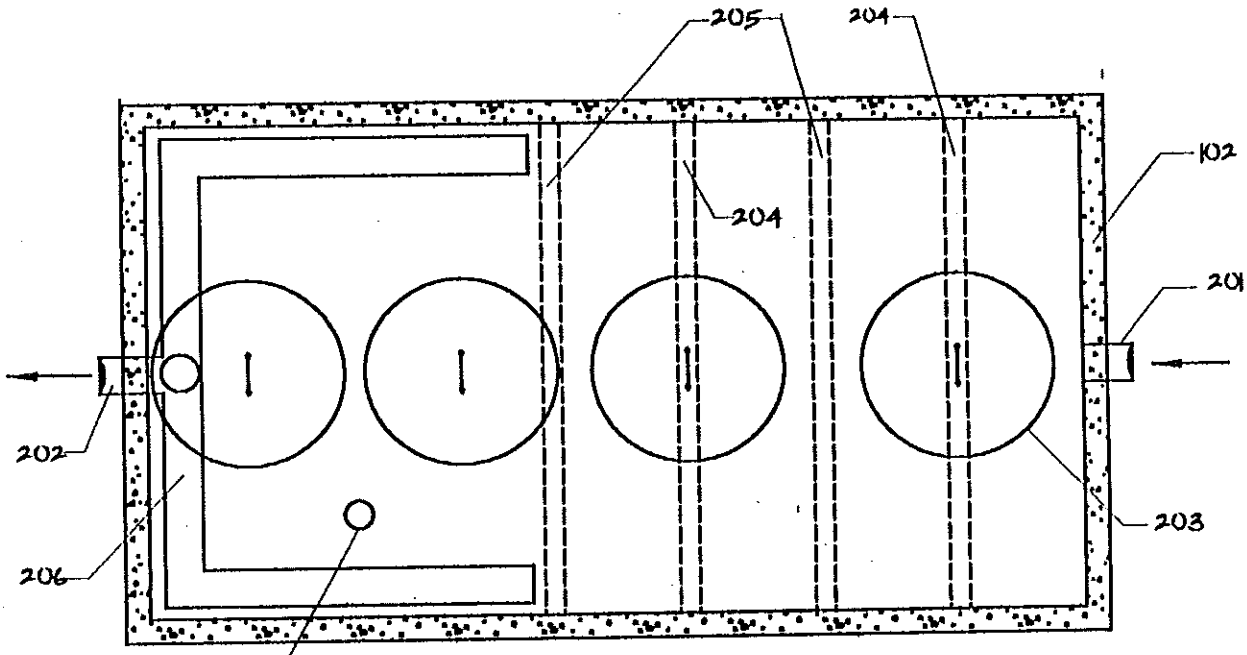

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FIG 1

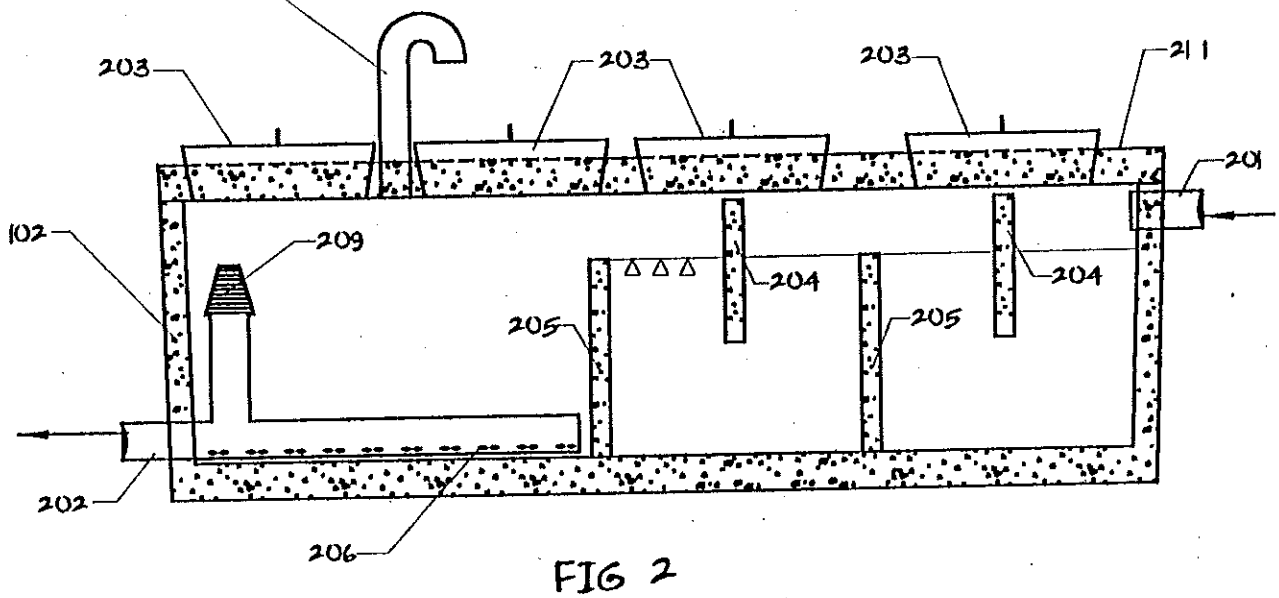
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FIG 2

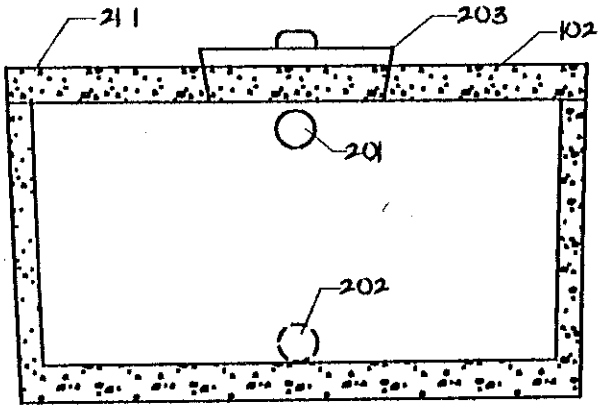

FIG 3

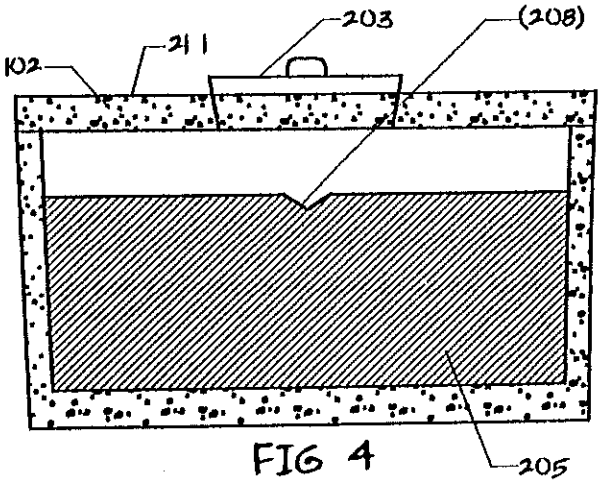

FIG 4

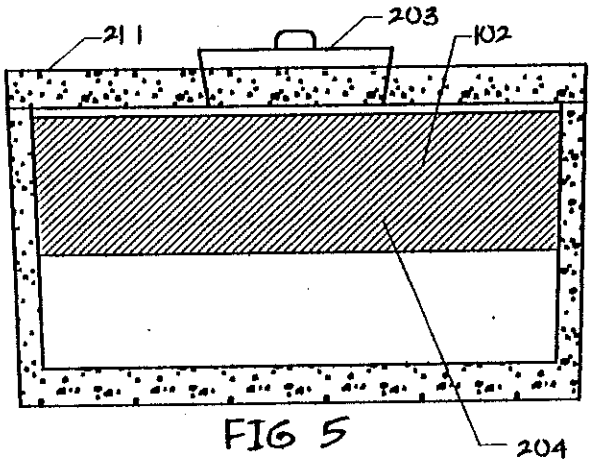

FIG 5

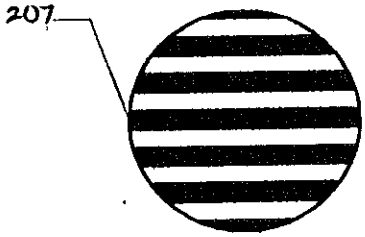

FIG 6

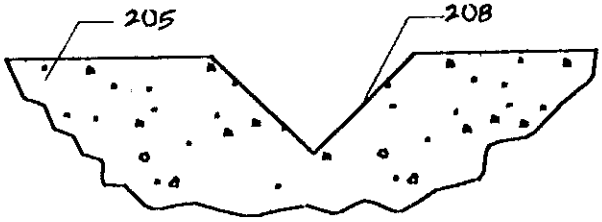

FIG 7

FIG 8

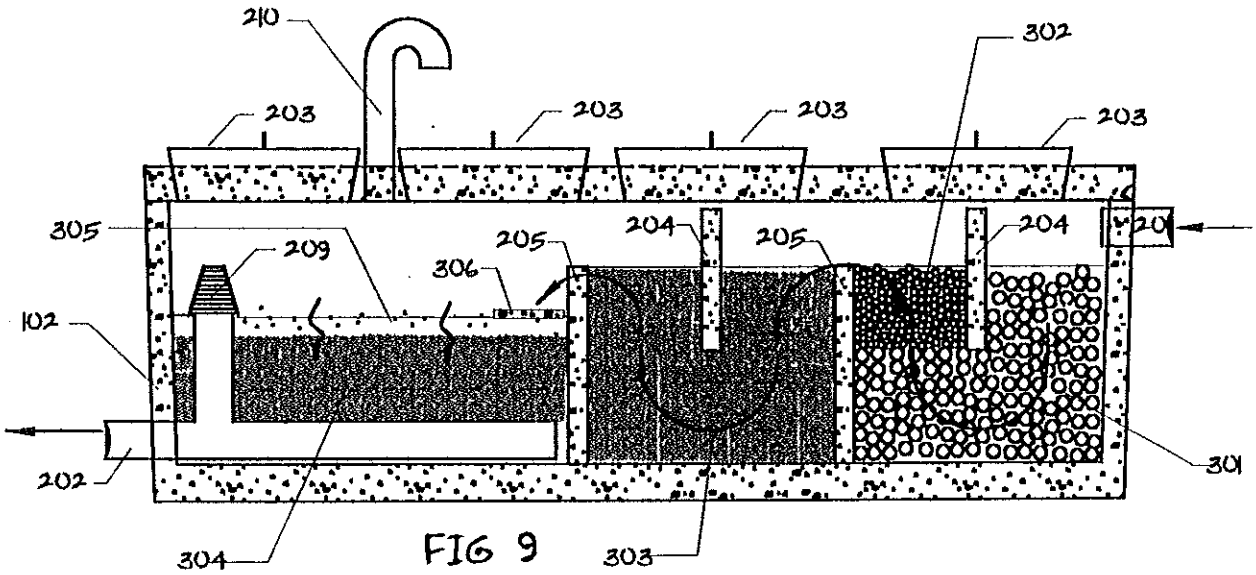
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FIG 9

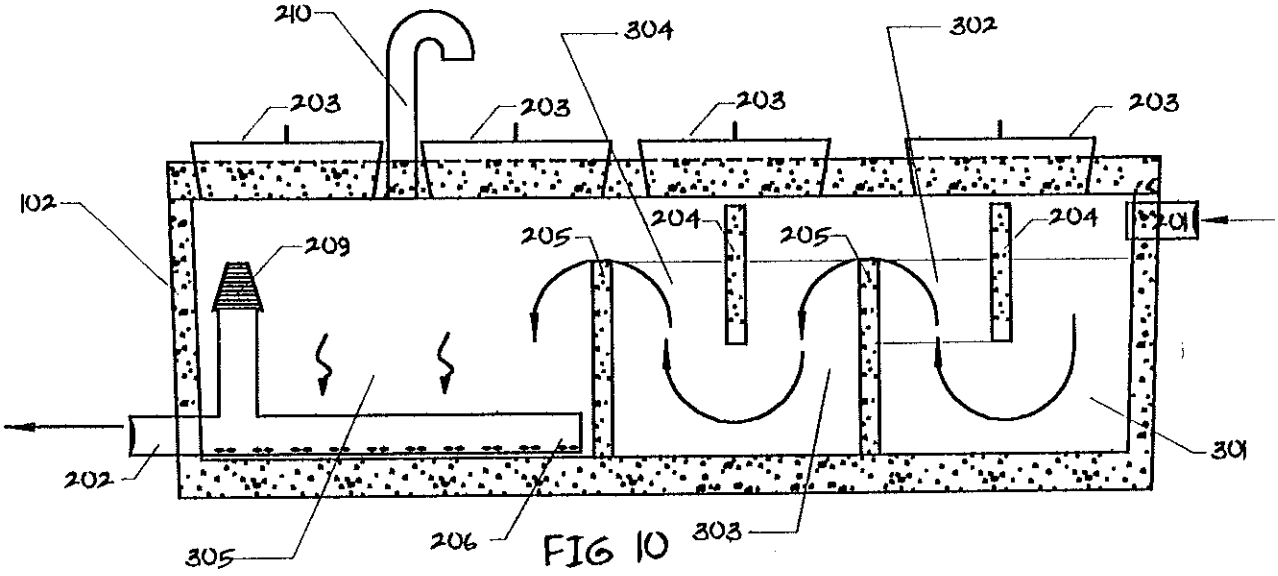
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FIG 10

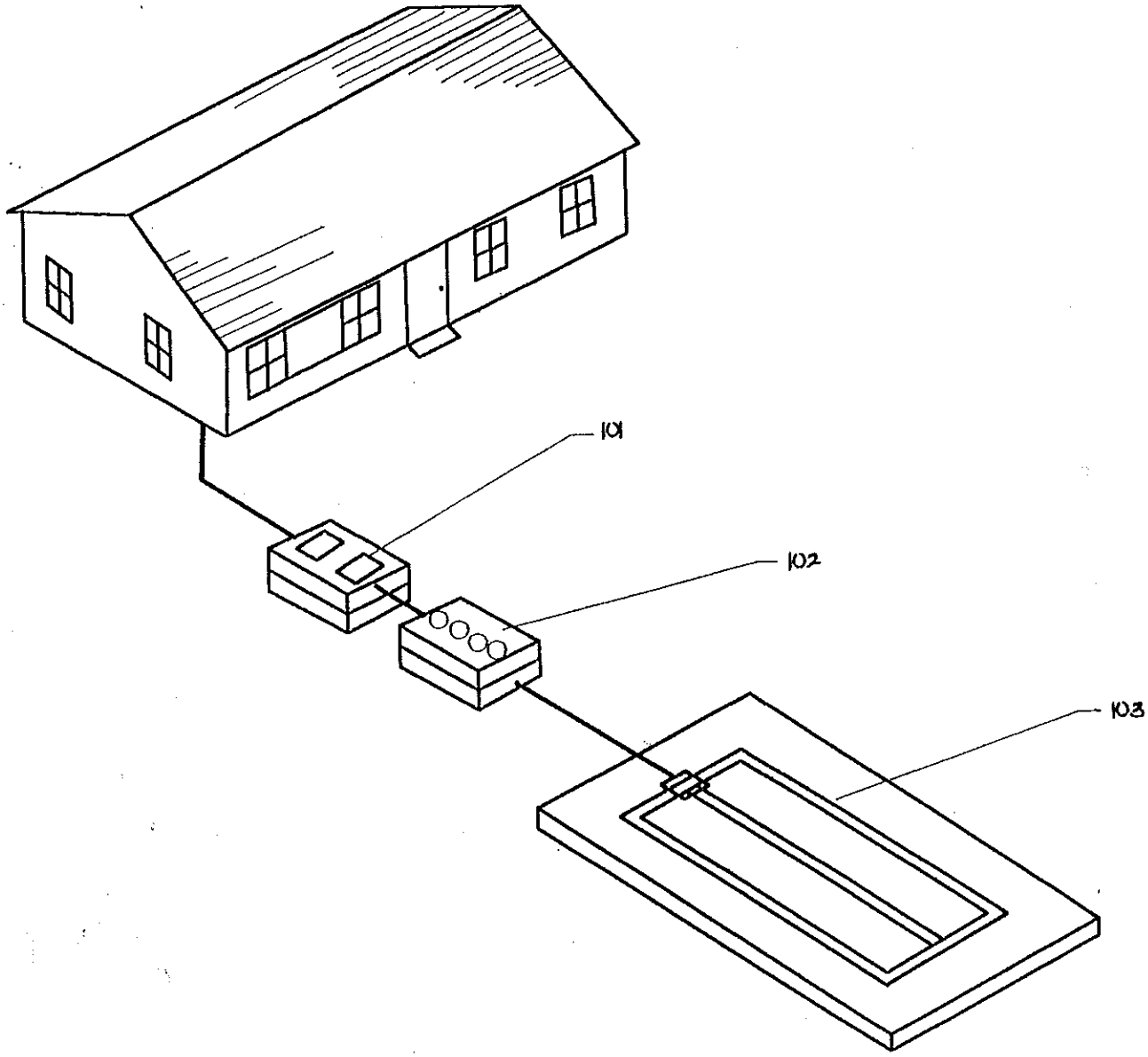

FIG 11

Multi-Chambered Treatment Filter

Abstract: This invention consists of a tank **(102)** comprised of multi-compartments **(301) (302) (303) (304) (305)** created by baffles **(204) (205)** so that an elongated wastewater flow path is provided, thereby creating both upflow and downflow filtration in anaerobic and aerobic environments. Filtering media provides a progressive filter of varying material and size to improve wastewater, water or liquid quality.

Declaration for Utility or Design Patent Application

As a below-named inventor, I hereby declare that my residence, post office address, and citizenship are as stated below next to my name and that I believe that I am the original, first, and sole inventor (if only one name is listed below) or an original, first, and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention, the specification of which is attached hereto and which has the following title:

MULTI-CHAMBERED TREATMENT FILTER

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment specifically referred to in the oath or declaration. I acknowledge a duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Please send correspondence and make telephone calls to the First Inventor below.

Signature: Sole/First Inventor: Albert Frick

Print Name: Albert Frick Date: 3/16/99

Legal Residence:* Gorham, Maine Citizen of: U.S.A.

Post Office Address: 95A County Road

Gorham, ME 04038

Telephone: (207) 839-5563

Signature: Joint/Second Inventor: _____

Print Name: _____ Date: _____

Legal Residence:* _____ Citizen of: _____

Post Office Address: _____

_____

Telephone: _____

* City and state, county and state or city, state and country, if foreign.

In the United States Patent and Trademark Office

First/Sole Applicant: Albert Frick

Joint/Second Applicant: _____

Title: "President"

Small Entity Declaration—Small Business Concern

I hereby declare that I am

XX the owner of the small business concern identified below:

XX an officer of the small business concern empowered to act on behalf of the concern identified below:

Name of Concern: Albert Frick Associates, Inc.

Address of Concern: 95A County Road

Gorham, ME 04038

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121, for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above entitled invention of the above applicants and the specification filed herewith.

I acknowledge a duty to file, in the above application for patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Albert Frick

Signature of Officer of Small Business Concern

3/16/99

Date

Albert Frick, President

Name and Title of Officer

(same)

Address of Officer

Form 10-4B

In the United States Patent and Trademark Office

Serial Number: _____

Appn. Filed: _____

Applicant(s): Albert Frick

Appn. Title: President

Examiner/GAU: _____

Mailed: _____

At: _____

Information Disclosure Statement

Assistant Commissioner for Patents
Washington, District of Columbia 20231

Sir:

Attached is a completed Form PTO-1449 and copies of the pertinent parts of the references cited thereon. Following are comments on any non-English-language references pursuant to Rule 98:

Very respectfully,

Applicant(s): Albert Frick

ALBERT FRICK

Enc.: PTO-1449 & References

c/o: Albert Frick Associates, Inc.
95A County Road
Gorham, ME 04038
Telephone: (207) 839-5563

Certificate of Mailing

I certify that this correspondence will be deposited with the United States Postal Service as first class mail with proper postage affixed in an envelope addressed to: "Assistant Commissioner for Patents, Washington, DC 20231" on the date below.

Date: 1999 March 16 Albert Frick

FORM PTO-1449 (Substitute)	ATTY. DOCKET NO.	SERIAL NO.
LIST OF PRIOR ART CITED BY APPLICANT *(Use several sheets if necessary)*	APPLICANT Albert Frick	
	FILING DATE March 16, 1999	GROUP

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	D371,423	1996	Salagnac			
	AB	4,997,564	1989	Warner			
	AC	5,766,454	1996	Cox et al			
	AD	5,496,472	1996	Slack et al			
	AE	5,482,621	1994	Norse			
	AF	5,635,064	1995	Bovington			
	AG	5,683,577	1996	Norse			
	AH	5,667,670	1996	Drewey			
	AI	5,770,071	1996	Drewey			
	AJ	4,100,073	1976	Hopcroft			
	AK	5,618,431	1996	Kondo et al			

FOREIGN PATENT DOCUMENTS

	AL						
	AM						
	AN						
	AO						
	AP						

OTHER PRIOR ART *(Including Author, Title, Date, Pertinent Pages, Etc.)*

	AR						
	AS						
	AT						

EXAMINER	DATE CONSIDERED

*EXAMINER: *Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.*

FORM PTO-1449 (Substitute)

LIST OF PRIOR ART CITED BY APPLICANT

(Use several sheets if necessary)

ATTY. DOCKET NO.	SERIAL NO.
APPLICANT	
FILING DATE	GROUP

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	4,895,645	1997	Zorich			
	AB						
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						

FOREIGN PATENT DOCUMENTS

	AL						
	AM						
	AN						
	AO						
	AP						

OTHER PRIOR ART *(Including Author, Title, Date, Pertinent Pages, Etc.)*

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	AS						
	AT						

EXAMINER	DATE CONSIDERED

*EXAMINER: *Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.*

In the United States Patent and Trademark Office

Serial Number: _____

Appn. Filed: _____

Applicant(s): Albert Frick

Appn. Title: President

Examiner/GAU: _____

Mailed: _____

At: _____

Petition to Make Special

Assistant Commissioner for Patents
Washington, District of Columbia 20231

Sir:

Applicant hereby respectfully petitions that the above application be made special under MPEP Sec. 708.02 for the following reason; attached is a declaration in support thereof:

I. ☐ Manufacturer Available;*

II. ☐ Infringement Exists;*

III. ☐ Applicant's Health Is Poor;

IV. ☐ Applicant's Age Is 65 or Greater;

V. ☒ Environmental Quality Will Be Enhanced;

VI. ☐ Energy Savings Will Result;

VII. ☐ Recombinant DNA Is Involved;*

VIII. ☐ Special Procedure: Search Was Made;*

IX. ☐ Superconductivity Is Advanced;

X. ☐ Relates to HIV/AIDS or Cancer.*

XI. ☐ Counters Terrorism*

* ☐ Also attached, since reason I, II, VII, VIII, X or XI has been checked, is the $ _____ Petition Fee pursuant to Rules 102 and 17(i).

Very respectfully,

Applicant(s): Albert Frick

_____

Attachment(s): Fee if indicated and supporting Declaration

c/o: Albert Frick Associates, Inc.
95A County Road
Gorham, ME 04038

Telephone: (207) 839-5563

Certificate of Mailing

I certify that this correspondence will be deposited with the United States Postal Service as first class mail with proper postage affixed in an envelope addressed to: "Assistant Commissioner for Patents, Washington, DC 20231" on the date below.

Date: 1997 March 16 Albert Frick, Applicant

Form 10-7

In the United States Patent and Trademark Office

Mailed: 199X Dec I 1 Wed

At: Gorham, ME

Declaration In Support of Accompanying Petition to Make Special
Reason V-Enhancement of Environmental Quality

In support of the accompanying Petition to Make Special, applicant declares as follows:

1. I am the applicant in the above-identified patent application.
2. The invention of the above application will materially enhance the quality of the environment of human kind by contributing to the restoration or maintenance of the basic life-sustaining natural elements of air and water in the manner described below.
3. Specifically, the invention of the above application is an improved wastewater filter for a higher quality of wastewater to be disposed of into the soil from domestic single-family dwellings relying on subsurface wastewater disposal systems.
4. The overall wastewater quality can be improved by approximately 50% with reductions in biochemical oxygen demand, total settleable solids, fecal coliform and total nitrogen as evidenced by attached laboratory results of prototype shown in attached photograph..
5. By improving wastewater quality prior to disposal to the soil, it enables a higher quality of water recycling to our surface and groundwater. As a result, the quality of water discharging from individual dwellings and commercial buildings utilizing subsurface wastewater disposal systems will be improved, thereby resulting in less water pollution due to reduced effluents in waterways from such conventional septic systems. Thus pollution of such water, groundwater and waterways will be reduced so that water quality will be improved.
6. I further declare that all statements made herein of my own knowledge are true and that all statements made upon information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application and any patent issuing therefrom.

Respectfully,

Albert Frick

Albert Frick

95A County Road
Gorham, ME 04038
207-839-5563

FRICKLE FILTER
TREATMENT RESULTS

DATE SAMPLED	PARAMETER	INLET	MID POINT	OUTLET
12/16/98	BOD	185		93
12/16/98	TSS	59		20
12/16/98	FECAL C.	10,000		6000
12/16/98	TKN	40		21
1/22/99	BOD	125	112	86
1/22/99	TSS	69	45	53
1/22/99	FECAL C.	40,000	30,000	20,000
1/22/99	TKN	36	27	21
2/19/99	BOD	210	180	150
2/19/99	TSS	26	58	58
2/19/99	FECAL C.	42,500	25,000	20,000
2/19/99	TKN	81	59	49
	BOD (RANGE)	**(125 - 210)**	**(112 - 180)**	**(86 -150)**
	BOD (MEAN	**173**	**146**	**110**
	TSS (RANGE)	**(26 - 69)**	**(45 - 58)**	**(20 - 58)**
	TSS (MEAN)	**51**	**52**	**56**
	FECAL C. (RANGE)	**(10,000 -42,500)**	**(25,000 -30,000)**	**(6,000 - 20,000)**
	FECAL C. (MEAN)	**30,833**	**27,500**	**15,333**
	TKN (RANGE)	**(36 - 81)**	**(27- 59)**	**(21 - 49)**
	TKN (MEAN)	**52**	**43**	**30**

P.O. Box 400 (Rte. 115)
North Windham, Maine 04062
207-892-4486
FAX: 207-892-2559

Est. 1973 State Certified

McFARLAND LABORATORIES
ENVIRONMENTAL LABORATORY
WATER SPECIALISTS

Office Hours
8:00 AM to 4:00 PM
Mon. - Fri.

Lab No. 70067
Bottle No. IN - OUT

Customer:
ALBERT FRICK ASSOC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
INLET - OUTLET

Tel. (207)839-5563

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

Date Collected: 12/16/98
Date Received: 12/17/98
Date Reported: 12/22/98
Tested By: JPB

PARAMETER	RESULTS		DATE ANALYZED	METHOD #
	INLET	OUTLET		
BOD:	184.7	93.0	12/17	405.1
TSS:	59.0	20.0	12/17	160.2
TKN:	40.2	21.3	12/17	351.4
FECAL COLIFORM:	10,000 COL/100MLS	6,000	12/17	909-C

* RESULTS EXPRESSED IN mg/L UNLESS OTHERWISE DESIGNATED.
< = Less Than > = Greater Than ND = None Detected

MAI assumes no responsibility or liability for those matters not under its' direct control including but not limited to sample collection date and sampling procedures.

Reviewed By : _____

P.O. Box 400 (Rte. 115)
North Windham, Maine 04062
207-892-4485
FAX: 207-892-2559

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McFARLAND LABORATORIES
ENVIRONMENTAL LABORATORY
WATER SPECIALISTS

Office Hours
8:00 AM to 4:00 PM
Mon. - Fri.

Lab No. 70274
Bottle No. 274

Customer:
ALBERT FRICK ASSOC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
OUTLET

Tel.

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

Date Collected: 01/22/99
Date Received: 01/22/99
Date Reported: 01/28/99
Tested By: JPB

PARAMETER	RESULTS		DATE ANALYZED	METHOD #
BOD:	86.1		1/22	405.1
TSS:	53.0		1/23	160.2
TKN:	21.3		1/23	351.4
FECAL COLIFORM:	20,000	COL/100MLS	1/22	909-C

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< = Less Than > = Greater Than ND = None Detected

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Reviewed By : JPB

P.O. Box 400 (Rte. 115)
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Est. 1973 State Certified

McFARLAND LABORATORIES
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WATER SPECIALISTS

Office Hours
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Mon. - Fri.

Lab No. 70275
Bottle No. 275

Customer:
ALBERT FRICK ASSOC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
MID FILTER

Tel. (207)839-5563

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

Date Collected: 01/22/99
Date Received: 01/22/99
Date Reported: 01/28/99
Tested By: JPB

PARAMETER	RESULTS		DATE ANALYZED	METHOD #
BOD:	112.1		1/22	405.1
TSS:	45.0		1/23	160.2
TKN:	26.7		1/23	351.4
FECAL COLIFORM:	30,000	COL/100MLS	1/22	909-C

* RESULTS EXPRESSED IN mg/L UNLESS OTHERWISE DESIGNATED.
< = Less Than > = Greater Than ND = None Detected

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Reviewed By : JJB

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ENVIRONMENTAL LABORATORY
WATER SPECIALISTS

Office Hours
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Mon. - Fri.

Lab No. 70273
Bottle No. 273

Customer:
ALBERT FRICK ASSOC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
INLET

Tel. (207)839-5563

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

Date Collected: 01/22/99
Date Received: 01/22/99
Date Reported: 01/28/99
Tested By: JPB

PARAMETER	RESULTS		DATE ANALYZED	METHOD #
BOD:	125.2		1/22	405.1
TSS:	69.0		1/23	160.2
TKN:	36.4		1/23	351.4
FECAL COLIFORM:	40,000	COL/100MLS	1/22	909-C

* RESULTS EXPRESSED IN mg/L UNLESS OTHERWISE DESIGNATED.
< = Less Than > = Greater Than ND = None Detected

MAI assumes no responsibility or liability for those matters not under its' direct control including but not limited to sample collection date and sampling procedures.

Reviewed By : JJB

P.O. Box 400 (Rte. 115)
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ENVIRONMENTAL LABORATORY
WATER SPECIALISTS

Office Hours
8:00 AM to 4:00 PM
Mon. - Fri.

Lab No. 70500
Bottle No. 500

Customer:
ALBERT FRICK ASSOC., INC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
INLET
FILTER MIDPOINT
FILTER OUTLET

Tel. (207)839-5563

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

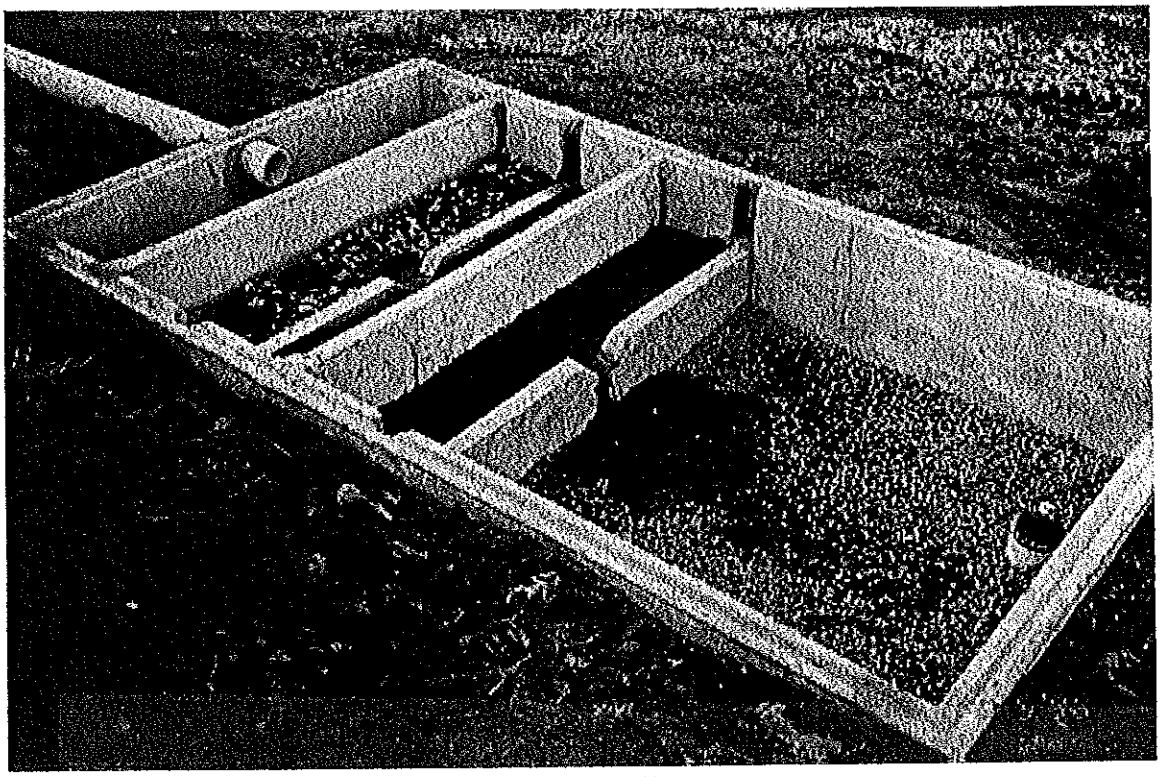
Date Collected: 02/19/99
Date Received: 02/19/99
Date Reported: 03/02/99
Tested By: JPB

PARAMETER	RESULTS			DATE ANALYZED	METHOD #
	INLET	MIDPOINT	OUTLET		
TKN:	81.6	58.7	48.9	2/20	351.3
TSS:	26.0	58.0	58.0	2/20	160.2
BOD:	210.0	180.0	150.0	2/19	405.1
FECAL COLIFORM:	42,500	25,000 COL/100MLS	20,000	2/19	9222D

* RESULTS EXPRESSED IN mg/L UNLESS OTHERWISE DESIGNATED.
< = Less Than > = Greater Than ND = None Detected

MAI assumes no responsibility or liability for those matters not under its' direct control including but not limited to sample collection date and sampling procedures.

Reviewed By : JPB



Prototype Filter

PTO/SB/17 (2/98)
Approved for use through 9/30/2000 OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

FEE TRANSMITTAL

Patent fees are subject to annual revision on October 1. These are the fees effective October 1, 1997.
Small Entity payments must be supported by a small entity statement, otherwise large entity fees must be paid. See Forms PTO/SB/09-12. See 37 C.F.R. §§ 1.27 and 1.28.

TOTAL AMOUNT OF PAYMENT ($)

Complete If Known	
Application Number	
Filing Date	
First Named Inventor	Albert Frick
Examiner Name	
Group / Art Unit	
Attorney Docket No.	

METHOD OF PAYMENT (check one)

1. — The Commissioner is hereby authorized to charge indicated fees and credit any over payments to:

Deposit Account Number
Deposit Account Name

— Charge Any Additional Fee Required Under 37 C.F.R. §§ 1.16 and 1.17
— Charge the Issue Fee Set in 37 C.F.R. § 1.18 at the Mailing of the Notice of Allowance

2. X Payment Enclosed:
X Check — Money Order — Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	790	201	395	Utility filing fee	395
106	330	206	165	Design filing fee	
107	540	207	270	Plant filing fee	
108	790	208	395	Reissue filing fee	
114	150	214	75	Provisional filing fee	
				SUBTOTAL (1) ($)	395

2. EXTRA CLAIM FEES

		Extra Claims		Fee from below	Fee Paid
Total Claims	5	-20** =		X	= 0
Independent Claims	1	- 3** =		X	= 0
Multiple Dependent					=

**or number previously paid, if greater; For Reissues, see below

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	22	203	11	Claims in excess of 20
102	82	202	41	Independent claims in excess of 3
104	270	204	135	Multiple dependent claim, if not paid
109	82	209	41	** Reissue independent claims over original patent
110	22	210	11	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	400	216	200	Extension for reply within second month	
117	950	217	475	Extension for reply within third month	
118	1,510	218	755	Extension for reply within fourth month	
128	2,060	228	1,030	Extension for reply within fifth month	
119	310	219	155	Notice of Appeal	
120	310	220	155	Filing a brief in support of an appeal	
121	270	221	135	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,320	241	660	Petition to revive - unintentional	
142	1,320	242	660	Utility issue fee (or reissue)	
143	450	243	225	Design issue fee	
144	670	244	335	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	790	246	395	Filing a submission after final rejection (37 CFR 1.129(a))	
149	790	249	395	For each additional invention to be examined (37 CFR 1.129(b))	
Other fee (specify)				Petition to make special	0
Other fee (specify)				(V)	

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 395

SUBMITTED BY		Complete (if applicable)
Typed or Printed Name	Albert Frick	Reg. Number
Signature	Albert Frick	Date 3/16/99 — Deposit Account User ID

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box —

PTO/SB/05 (4/98)
Approved for use through 09/30/2000. OMB 0651-0032
Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	
First Inventor or Application Identifier	Albert Frick
Title	President
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. ___ * Fee Transmittal Form *(e.g., PTO/SB/17)*
   X *(Submit an original and a duplicate for fee processing)*
2. X Specification [*Total Pages* 10]
   (preferred arrangement set forth below)
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)

   X - Abstract of the Disclosure
3. X Drawing(s) *(35 U.S.C. 113)* [*Total Sheets* 4]
4. Oath or Declaration [*Total Pages*]
   a. X Newly executed (original or copy)
   b. ___ Copy from a prior application (37 C.F.R. § 1.63(d))
   (for continuation/divisional with Box 16 completed)
   i. ___ DELETION OF INVENTOR(S)
   Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

**NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).*

5. ___ Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. ___ Computer Readable Copy
   b. ___ Paper Copy (identical to computer copy)
   c. ___ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. X Assignment Papers (cover sheet & document(s))
8. ___ 37 C.F.R.§3.73(b) Statement ___ Power of ___ Attorney *(when there is an assignee)*
9. ___ English Translation Document *(if applicable)*
10. ___ Information Disclosure Statement (IDS)/PTO-1449 ___ Copies of IDS ___ Citations
11. ___ Preliminary Amendment
12. X Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
13. X * Small Entity ___ Statement filed in prior application, ___ Statement(s) *(PTO/SB/09-12)* ___ Status still proper and desired
14. ___ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
15. X Other* Form PTO-1449 Substitute list of prior art cited by applicant
    *Petition to make special

16. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment:*
    ___ Continuation ___ Divisional ___ Continuation-in-part (CIP) of prior application No: ___/___
    Prior application information: *Examiner* ___ *Group / Art Unit:* ___
    For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

___ *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* or XX *Correspondence address below*

Name	Albert Frick
Address	95A County Road
City	Gorham
State	ME
Zip Code	04038
Country	U.S.A.
Telephone	(207) 839-5563
Fax	(207) 839-5564

Name (Print/Type) Albert Frick	*Registration No. (Attorney/Agent)*
Signature Albert Frick	*Date* 3/16/99

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231.

Albert Frick Associates, Inc.
Soil Scientists & Site Evaluators
95A County Road Gorham, Maine 04038
(207) 839-5563 FAX (207) 839-5564

Albert Frick SS, SE
James Logan SS, SE
Matthew Logan SE

January 6, 1999

JAN -1999

James Jacobsen
Division of Health Engineering
State House, Station #10
Augusta, Maine 04333

Re: *Frickin* Filter Pretreatment Unit

Dear Jim:

I have been working on a PRETREATMENT unit for subsurface wastewater disposal. The pretreatment unit is envisioned to fill a niche between the conventional system and the Bio-Clere/Septi-Tec units.

The unit is less expensive, passive, and has achieved a BOD_5 + TSS value of 113, which appears to be worthy of a 20 to 25% reduction.

I am excited about the unit, in the reductions of the wastewater strength and the safety value in relatively inexpensive protection of disposal fields.

I am in the process of writing up the technology and would like to meet with you this winter to review. I would be glad to come to Augusta to show you photographs and more lab results when available, but I would prefer to show you the real working unit. Jay and Dave Rocque saw it when they were down here but it was before I had the laboratory results of it's output.

50% reduction in BOD_5
33% reduction in TSS
50% reduction on Total Nitrogen
60% reduction in Fecal Coliform

I will call you shortly to discuss.

Respectfully,

Albert Frick

Albert Frick

AF/nd
enc.
cc. Jay Hardcastle
David Rocque
Linda Robinson

FILTER PRETREATMENT UNIT

Figure 1: Prototype pretreatment unit under construction.

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Est. 1973 State Certified

McFARLAND LABORATORIES
ENVIRONMENTAL LABORATORY
WATER SPECIALISTS

Office Hours
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Mon. - Fri.

Lab No. 70067
Bottle No. IN - OUT

Customer:
ALBERT FRICK ASSOC.
95A COUNTY ROAD
GORHAM , ME 04038

Location:
INLET - OUTLET

Tel. (207)839-5563

Subject:WATER ANALYSIS
Sampled by:CLIENT
P.O. No.:

Date Collected: 12/16/98
Date Received: 12/17/98
Date Reported: 12/22/98
Tested By: JPB

PARAMETER	RESULTS		DATE ANALYZED	METHOD #
	INLET	OUTLET		
BOD:	184.7	93.0	12/17	405.1
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* RESULTS EXPRESSED IN mg/L UNLESS OTHERWISE DESIGNATED.
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Reviewed By :_____