No. 760,770. PATENTED MAY 24, 1904.

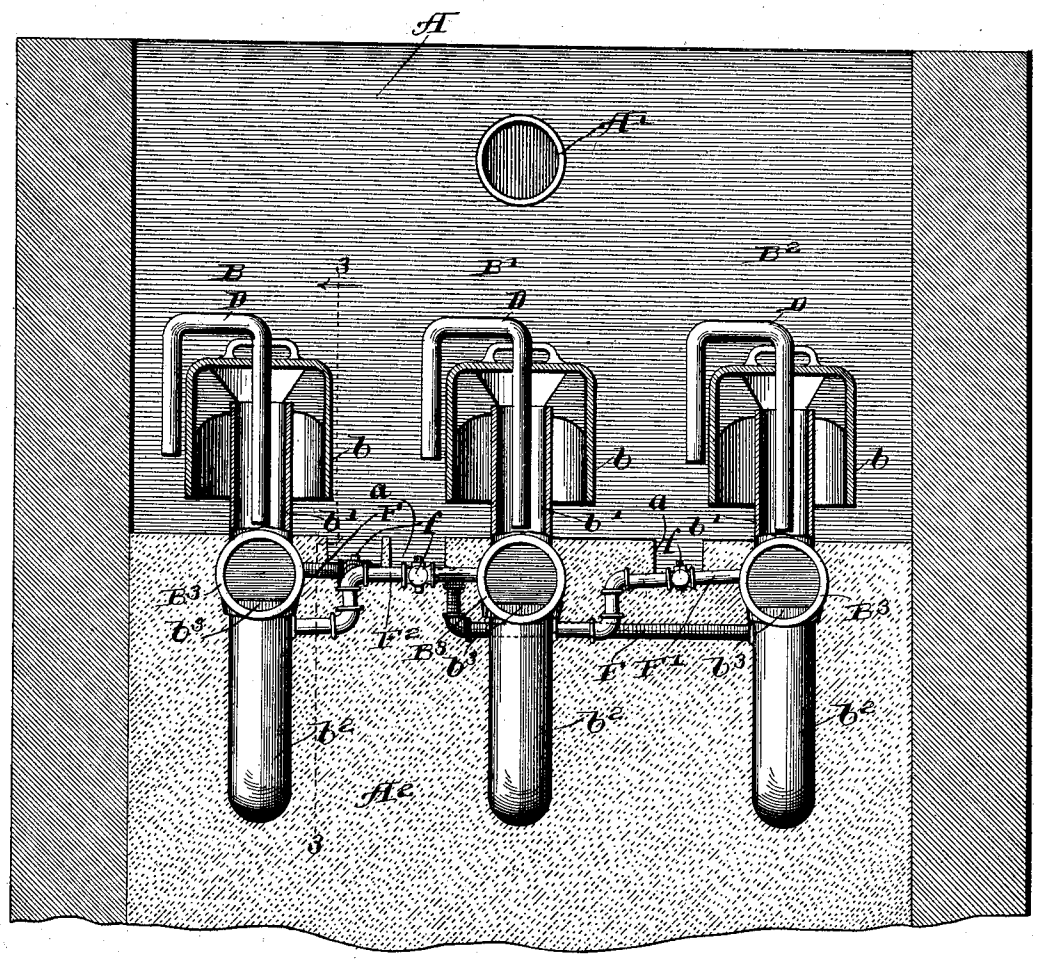
M. J. ADAMS.

APPARATUS FOR EMPTYING LIQUID TANKS.

APPLICATION FILED OCT. 29, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig 1.



Witnesses:
Carl S. Crawford
William L. Hall

Inventor:
Moses James Adams
by Poole & Brown
his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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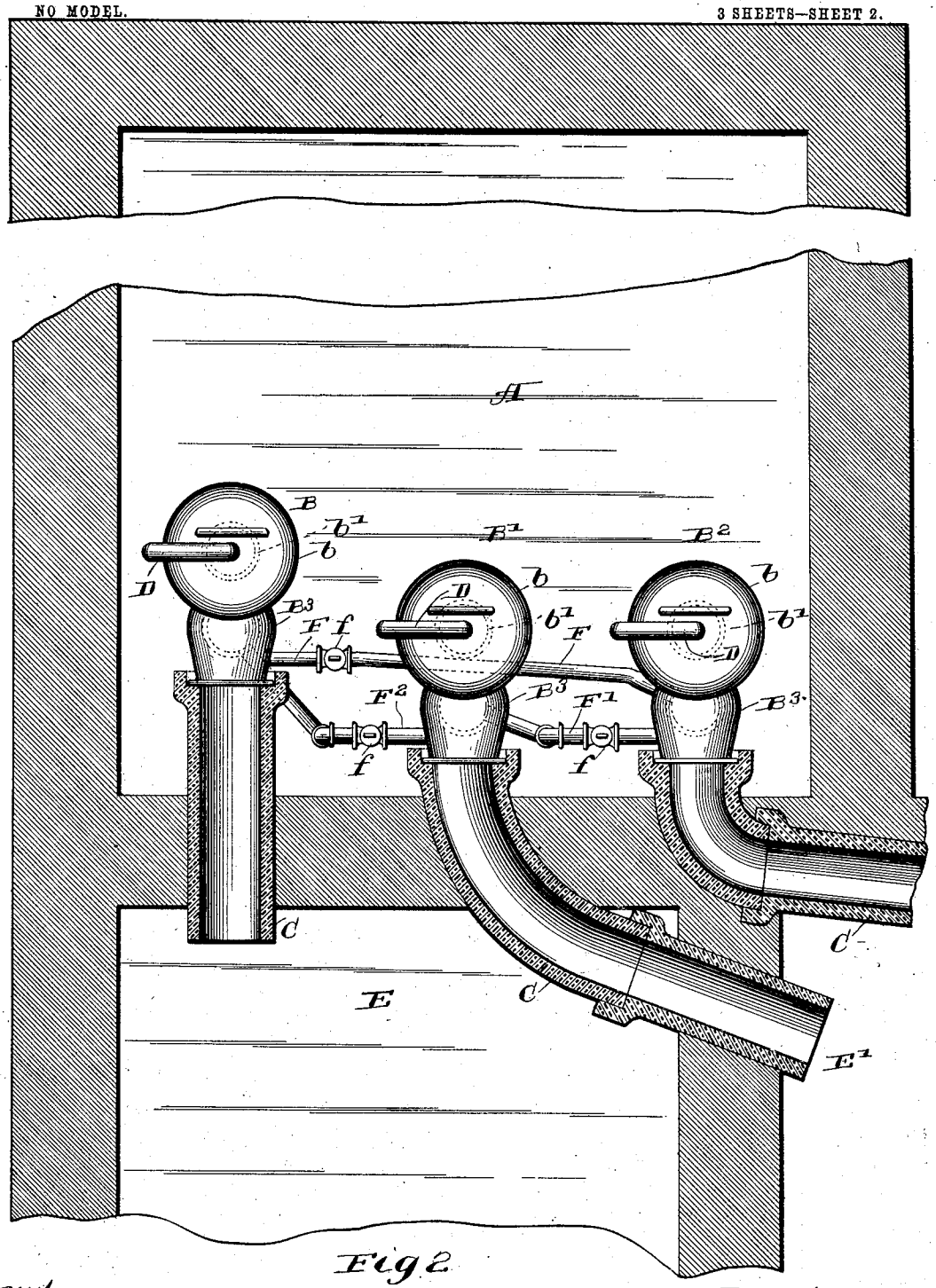


Fig 2.

Witnesses:-
Carl A. Crawford
William L. Stoll

Inventor:
Moses James Adams
by Robert Brown
his Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 3 SHEETS—SHEET 3.

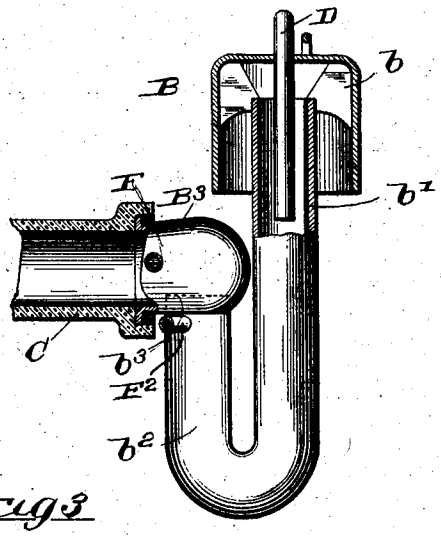


Fig 3

Witnesses:
Carl H. Crawford
William L. Hall.

Inventor:-
Moses James Adams
by Robert V. Brown
his Attorneys

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No. 760,770. Patented May 24, 1904.

UNITED STATES PATENT OFFICE.

MOSES JAMES ADAMS, OF SCOTSWOOD-ON-TYNE, ENGLAND, ASSIGNOR TO SAMUEL HENRY ADAMS, OF HARROGATE, ENGLAND.

APPARATUS FOR EMPTYING LIQUID-TANKS.

SPECIFICATION forming part of Letters Patent No. 760,770, dated May 24, 1904.

Application filed October 29, 1902. Serial No. 129,265. (No model.)

To all whom it may concern:

Be it known that I, MOSES JAMES ADAMS, of Scotswood-on-Tyne, in the county of Northumberland, England, have invented certain new and useful Improvements in Apparatus for Emptying Liquid-Tanks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus designed for controlling the flow of liquid from a main tank or receptacle which is adapted to be intermittingly emptied into a plurality of tanks or receptacles and so arranged that the said plurality of receptacles may be filled or charged in a predetermined rotative order from said main tank or receptacle.

The invention has been designed more especially for use in connection with a system for the septic treatment of sewage for purifying the same, said apparatus being adapted to be located between the septic-tank and the contact or filter beds so as to receive the sewage from the septic-tank and properly distribute the same to said contact or filter beds; but it will be understood that said apparatus may be used wherever it is desirable to distribute a liquid in the general manner stated.

In the drawings, Figure 1 is a vertical section of a tank provided with my improved emptying apparatus, parts of said apparatus being shown in section and other parts in elevation. Fig. 2 is a plan section of the tank and parts of the adjacent contact-beds, showing the emptying apparatus in partial top plan and partial plan section, the bottoms of the tank and beds being omitted to illustrate the connections between the siphons. Fig. 3 is a vertical section taken on line 3 3 of Fig. 1.

As shown in the drawings, A designates a tank which may be termed a main "distributing" or "dosing" tank and is adapted for connection with a source supplying liquid—such, for instance, as a septic-tank when the apparatus is designed for use in connection with a sewage purification system—through the medium of a pipe A′. Said tank is made of masonry or other suitable construction and when used in connection with a sewage purifying system may be made of sufficient capacity to contain a charge of sewage sufficient to fill either of the contact or filter beds in connection with which it is used. The contents of said tank is designed to be emptied into a plurality of receptacles, such as the contact or filter beds referred to, through the medium of a plurality of siphons B B′ B^2, which are located in said tank near one end thereof, as herein shown. The short leg b of each siphon consists of a downwardly-opening bell, which is supported over the upper end of the longer leg b' in any suitable manner. Said longer leg of each siphon communicates with a deep-seal trap b^2, having an upturned portion which empties into a pipe or conduit C, leading to one of the contact-beds or other suitable place for the disposal of the liquid discharged from the tank. Each of said siphons is provided with a vent-pipe D of familiar form and construction for the purpose of thoroughly venting the siphon after each operation thereof. The traps b^2 of the siphons are embedded in a concrete foundation A^2, such foundation serving to support the siphons in an upright position, as clearly indicated in Fig. 1. The pipe or conduit C, through which the siphon B discharges, empties into a contact-bed E, located adjacent to the tank, while the pipe C, leading from the siphon B′, discharges into a contact or filter bed E′, located at one side of the contact-bed E, and the pipe C, connected with the siphon B^2, leads to a third contact or filter bed. (Not shown in the drawings.)

The siphons B B′ B^2 are designed to operate in a predetermined rotative order to empty the contents of the tank A into the several contact-beds, and the rotative control of said siphons is automatically established and maintained. If two deep-seal siphons be located in a distributing or dosing tank of the character referred to, the contents of said tank will be alternately discharged through said siphons, for the reason that the first siphon to be discharged will while such discharge takes place fill its own trap, while the trap of the

other siphon will be only partially filled. This is due to the fact that the pressure of the liquid head in the tank displaces equal quantities of the liquid in both traps before either siphon is brought into operation, and as the trap of the idle siphon is not replenished during the emptying of the tank its trap after the tank is emptied will be only partially filled and the seal thereof weakened relatively to that of the other siphon. When the tank is again filled, the siphon having the weakened seal is forced or brought into operation before the depth of the liquid in the tank is sufficient to bring the first siphon into operation. In the event of using more than two unconnected siphons a given rotative order of emptying the tank therethrough cannot be maintained, for the reason that the seals of all of the siphons, with the exception of the one operating to empty the tank, are weakened and there is no means of determining which of the siphons having the weakened seals will be next brought into operation to empty the tank.

The term "weakened seal" as herein used is conveniently employed to designate the seal which will be first forced or broken when the tank is again filled and which therefore determines through which of the siphons the tank will next be emptied.

It is the object of this invention to employ three or more siphons for intermittingly and alternately emptying a dosing or distributing tank of the character described in a predetermined rotative order. This result is accomplished by filling all of the traps of the several siphons from an operating siphon, with the exception of that of the siphon next to be brought into action, so that when the tank or receptacle is again filled only the siphon having the weakened seal is brought into operation to empty the tank. In this manner the rotative order of operation of the siphons may be established and maintained.

I have shown in the drawings one form of apparatus for effecting this result, said apparatus being employed in connection with three siphons. The type of siphon herein illustrated is like that shown in the prior United States Letters Patent to Sidney W. Miller, No. 449,083, issued on the 24th of March, 1891. In this type of siphon the fitting B^3, which connects the trap with the effluent conduit C, is provided with a lip b^3, which extends above the lower wall of said fitting. Said lip in the present instance is formed by the extended upper end of the outlet-leg of the trap, which projects above the lower wall of said fitting. As shown in said drawings, the outlet-leg of the trap of the first siphon B of the series is connected with the outlet-leg of the third siphon B^2 or the last of the series by the means of a pipe F. The outlet-leg of the trap of the siphon B^2 is similarly connected with the trap of siphon B′ by means of a similar pipe F′, and the trap of siphon B′ is likewise connected with the trap of the siphon B by means of a pipe F^2. Said pipes F F′ F^2 each communicate at one end with the fitting B^3 of the siphon from which it leads and enters at its other end the upper or outlet end of the trap of another siphon below said fitting. Said pipes F′ F^2 F^3 are provided with hand-actuated valves *f*, whereby the passage of fluid therethrough may be controlled. In the practical installation of the apparatus the pipes F F′ F^2, as well as the traps of the siphons, are embedded in the concrete foundation A^2 of the tank, and openings *a* are provided in the floor of said tanks to permit access to said valves.

The operation of the apparatus described is as follows: The siphons are so set with respect to each other that one of said siphons is brought into operation before the others. As the apparatus is here constructed it is not important which of the siphons is first brought into operation, as after the first siphon operates sequential or rotative order of operation thereof is established and maintained. It is understood, of course, that before either of the siphons are brought into operation the traps of all the siphons are filled and that the head of liquid necessary to force the first siphon will depend upon the strength of the seal thereof. In the following description it is assumed that the seal of the trap of siphon B is the weakest when the traps are filled, so that said siphon B will be the first to be brought into operation. As the liquid rises in the tank A in the first filling thereof the pressure exerted thereby effects a displacement of the liquid in the traps of all of the siphons alike, and such displacement of the liquid in the traps is continued until the trap having the weakest seal (that belonging to the siphon B in the present instance) is forced. At this time the siphon associated with such trap is brought into action to empty the tank A. When siphonic action of siphon B takes place and the tank is emptied therethrough, the liquid passing through said siphon fills its own trap; but by reason of the fact that no emptying flow takes place in the other siphons if the connections herein shown be omitted the traps of the other siphons will remain only partially filled. Again reverting to the particular construction shown and to the assumption that the siphon B is first brought into action, it will be seen that while the tank is being emptied through the siphon B a portion of the liquid passing through said siphon will be diverted in the fitting B^3 to the pipe F and therethrough directed to the outlet-leg of the trap of the siphon B^2, thereby filling said trap and strengthening the seal thereof to approximately that of the siphon B. No fluid passes, however, during said emptying operation through or into the trap of siphon B′, so that the seal of said siphon is

weakened relatively to the seals of the other siphons. When, therefore, the tank A is again filled, the siphon B′ will next be brought into operation to empty the tank. When this action occurs, a portion of the liquid flowing through the siphon B′ will pass by way of pipe F^2 to the outlet-leg of the siphon B, so that after the tank has been emptied through the siphon B′ the seals in both traps of siphons B and B′ will be of approximately the same strength, while the seal in the siphon B^2 will be weakened. After the tank has been emptied by the siphon B′ and is again filled said tank will next be emptied through siphon B^2 by reason of its weakened seal. A portion of the liquid flowing through said siphon B^2 will be diverted through the pipe F′ to the trap of siphon B′, so that after the tank has been emptied by the siphon B^2 the seals of siphons B′ B^2 will be strengthened, while the seal in the trap of siphon B is weakened, whereby said latter siphon will next be brought into operation to discharge the contents of the tank A. In this manner the order or sequence of operation of the siphons to alternately empty the tank is established and maintained so long as liquid is supplied to said tank.

I have herein illustrated but three siphons for discharging liquid from the chamber A to three different places for the disposal of said liquid; but it will be understood that a larger number of siphons may be employed to alternately empty said tank. In such instance it will be necessary to connect the siphon-traps by pipes, as the pipes F F′ F^2, in such manner that during the operation of each siphon all of the traps of the other siphons, with the exception of the trap of the siphon next to be brought into operation, will be filled from the operating siphon, so that there will remain after the operation of each siphon but one siphon having a weakened seal. It will be understood, furthermore, that the rotative order of operation of the siphons may be varied from that herein shown by varying the arrangement of the pipes connecting the traps of the siphons.

It will be observed that the discharge ends of the pipes F F′ F^2 enter the fittings B^3 at points outside of the projecting lips b^3 of said fittings and that whatever liquid may be forced backwardly through said pipes during the operation of the siphons will be discharged into said fittings outside of such lips b^3 and prevented from entering said traps in a manner to strengthen the seals therein. In case the siphons employed are not provided with the projecting lips b^3 referred to other suitable means may be provided for preventing liquid backing through the pipes F F′ F^2 from entering the trap from which said pipes lead. For instance, the outlet ends of the pipes F F′ F^2 may be carried into the fittings B^3 and turned downwardly in the direction of the liquid flow, and thereby prevent such backflow of the liquid.

As before intimated, the siphons employed for emptying the tank A may be of any preferred type. Moreover, I do not wish to be limited to the other details of construction shown, except as hereinafter made the subject of specific claims.

I claim as my invention—

1. The combination with a liquid tank or receptacle of at least three sealed siphons for emptying the same and means acting during the flow of one siphon for strengthening the seal of another siphon of the series.

2. The combination with a liquid tank or receptacle, of a series of trapped siphons for emptying the same, and means operating at the time of the flow of one of the siphons for refilling the trap or traps of the siphon or siphons of the series from the liquid in said tank, with the exception of the trap of the siphon next to be brought into operation.

3. The combination with a liquid tank or receptacle of at least three siphons having trapped discharge-legs for emptying the same and means acting during the flow of one siphon for diverting a portion of the liquid therefrom to the trap of another siphon.

4. The combination with a liquid tank or receptacle of at least three siphons having trapped discharge-legs for emptying the same and a pipe leading from the discharge end of the trap of each siphon to the trap of another siphon of the series.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 8th day of October, A. D. 1902.

MOSES JAMES ADAMS.

Witnesses:

ROBERT HALL WHITFIELD,

J. O. ARMSTRONG.