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 APPARATUS FOR EMPTYING CONTENTS OF TANKS.
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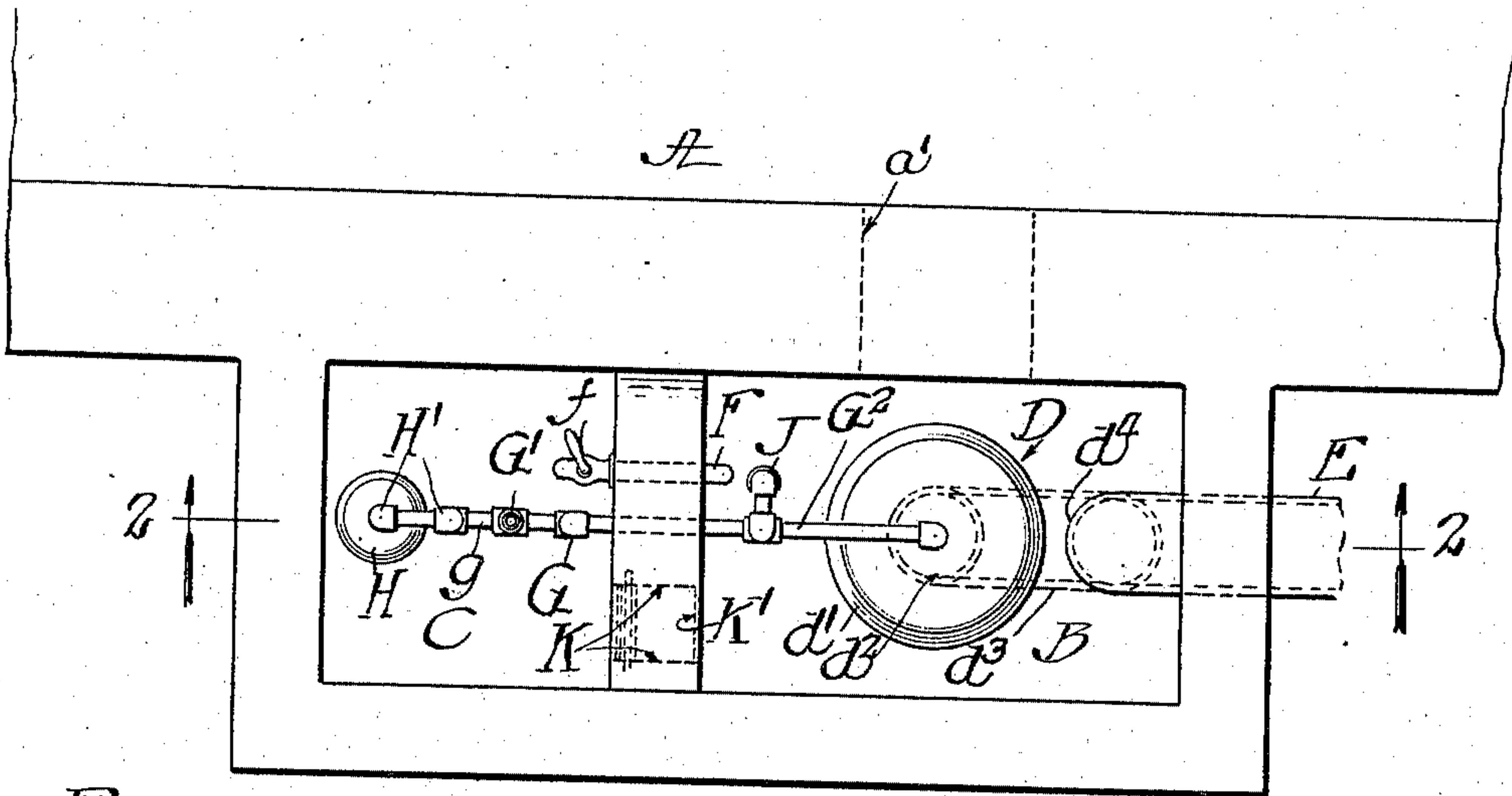


Fig. 1

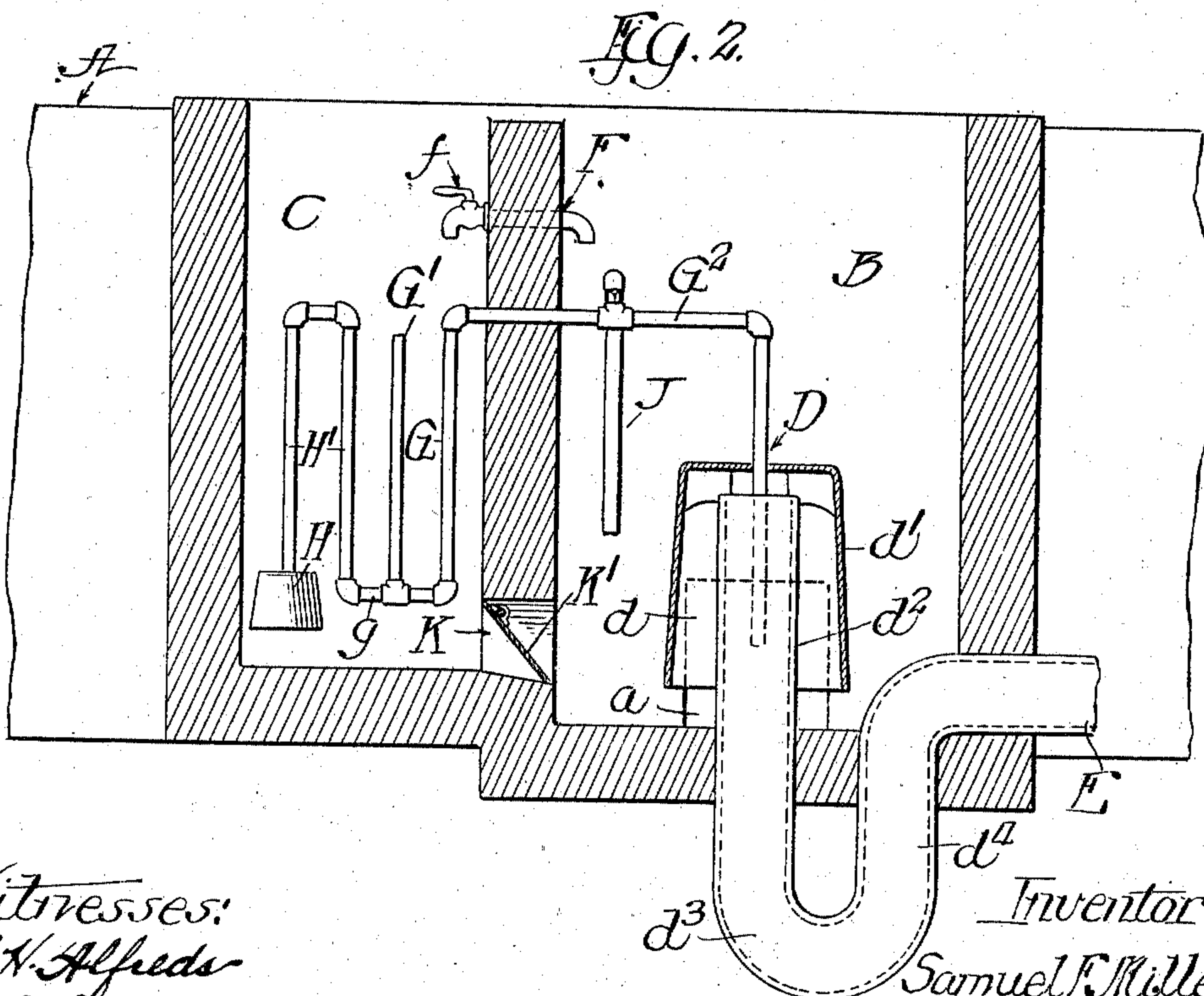


Fig. 2

Witnesses:
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APPARATUS FOR EMPTYING CONTENTS OF TANKS.

967,539.

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To all whom it may concern:

Be it known that I, SAMUEL F. MILLER, a citizen of the United States, and a resident of South Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Emptying Contents of 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 means for emptying the liquid contents of tanks or receptacles, such as the contact beds of sewage purifying systems, and the invention consists in the matters hereinafter described and more particularly pointed out in the appended claims.

The means for emptying the contact beds of sewage purifying systems generally includes a discharge chamber which is connected to the contact bed so as to fill with the contact bed and which is adapted to be emptied at periodic intervals either by means of a siphon or other means. It is usually desirable to have the liquid remain in contact with the filtering medium for a predetermined length of time after the contact bed and discharge chamber have been filled and to this end, there is provided adjacent to the discharge chamber an auxiliary timing chamber which is filled from the discharge chamber by a pipe provided with an adjustable gate-valve, through which the water flows after the liquid in the discharge chamber has reached or approached its highest level. The gate-valve may be so adjusted that it will require a certain definite period of time to fill the timing chamber after the discharge chamber has been filled. Means are provided in the timing chamber for controlling the discharge from the discharge chamber which controlling means is brought into operation when the liquid in the timing chamber has reached a predetermined level. The siphon or other discharging means is then started into operation and the discharge chamber and filter bed emptied. It is also necessary to provide means for emptying the timing chamber. The object of the present invention is to provide a simple and improved means for emptying said timing chamber.

In the drawings:—Figure 1 is a top plan view showing a portion of the contact filter bed, the discharge chamber, and the timing chamber. Fig. 2 is a vertical section through the discharge and timing chambers on the line 2—2 of Fig. 1.

A indicates the filter bed which is of any usual or preferred construction; B, the discharge chamber or tank, and C, the timing chamber. A passage a' connects the filter with the discharge chamber. In the example of my invention illustrated herein, I have shown a discharge chamber provided with a siphon for emptying it and means located in the timing chamber for controlling the discharge of the siphon, substantially as illustrated in Letters Patent No. 727,991, granted May 12th, 1903, to Sidney W. Miller. It is to be understood, however, that any means other than a siphon may be used for emptying the discharge chamber and also other means than that shown for controlling the discharging means.

D is a siphon of any usual form with its short leg d' formed by a downwardly opening bell d^1 inverted over an upwardly projecting pipe d^2 which forms the long leg of the siphon. The long leg d^2 discharges through a sealed trap d^3 having a vertical outlet leg d^4 leading to a conduit E through which the liquid discharged by the siphon is conveyed to any suitable place of disposal.

F is a pipe, connecting the chamber B with the chamber C, by means of which the chamber C is adapted to be filled from the chamber B when the liquid in the chamber B reaches the level of said pipe. Said pipe is located near the high level of the liquid in the chamber B and is provided with a valve f to determine the rate of flow there-through.

The head in the chamber B is not sufficient to produce sufficient pressure to start the siphon into operation. The liquid head in the tank is supplemented by pressure applied through the medium of an auxiliary pressure device as follows: Communicating with the siphon is an auxiliary trap located in the timing chamber C and comprising a longer limb G and a shorter limb G^1 , which are connected at the lower end of the trap by a short transverse pipe g . The longer limb of the trap communicates with the siphon by means of a connecting-pipe G^2

which may enter the siphon at any suitable place, but is shown herein as curved downwardly, and extends through the bell or shorter limb of the siphon and a distance into the longer limb thereof. Said auxiliary trap has a less depth of seal than that of the main trap.

The auxiliary or supplemental pressure relied upon to set the siphon into operation is applied directly to the auxiliary trap, and such application of pressure is applied by devices made as follows: H designates a downwardly-opening bell located in the chamber C, said bell in practice being supported in any suitable manner in said chamber. H¹ indicates an inverted U-shaped pipe, one end of which communicates with the top of the bell H and the other end of which communicates with the auxiliary trap, being herein shown as communicating with the bottom connection-pipe g of the auxiliary trap. The upper or closed part of said pipe extends above the maximum level to which the liquid rises in the chamber C, so as to prevent flooding of the trap through the bell and connecting-pipe.

In the operation of the device as thus far described the tank B is filled; but the pressure due to the liquid-head therein is not sufficient to set the siphon in operation to empty the same. After the tank B is filled above the level of the highest part of the filling-pipe F, the chamber C begins filling from the tank B, and as the liquid rises in the tank C and submerges the bell H, pressure is exerted in said bell and pipe H¹ and is transmitted through said pipe to the auxiliary trap. The liquid continues to rise in said chamber C until sufficient pressure is generated in said bell and pipe H¹ to force the auxiliary trap, at which time pressure in the siphon is released through said auxiliary trap and the siphon set in operation. Thereafter, the tank B is emptied through said siphon in the usual manner.

Means are provided for refilling the auxiliary trap after the air in the siphon has escaped therethrough, and, as herein shown, said trap is filled from the liquid in the tank B prior to the passage of the liquid into said siphon. Such refilling means consist of a pipe J, communicating with the pipe G², which connects the auxiliary trap with the siphon, said pipe J depending from said connecting-pipe and being submerged in the liquid of said tank when said tank is filled. Said pipe and the connecting-pipe G² are wholly submerged in the liquid contents of the tank B when the latter is filled to its maximum level, so that after the auxiliary trap is forced and the siphon begins operation the liquid rushes through the pipes J and G² and refills the auxiliary trap.

The improved means for emptying the timing chamber is as follows: The chamber

C is preferably located at a slightly higher level than the bottom of the chamber B. At the bottom of the chamber C is located a passage or opening K which is normally closed by a swinging flap-valve K¹ and which is adapted to discharge the liquid contents of said chamber C into the chamber B when said flap-valve K¹ is opened. This gate K¹ is inclined to the vertical and is hinged to swing upward and toward the chamber B. Said valve K¹ is thus normally held in closed position by its own weight, so that water cannot pass from the chamber B to the chamber C through the passageway K and as the liquid rises in the chamber B the increasing head of the liquid adds its weight, acting downward on the gate K¹, to lock said gate in its closed position. Thus while chamber B is filling no liquid may pass from it to the chamber C through the passage K. After the chamber B is filled and water begins to flow into the chamber C through the pipe F, the head in the chamber B acting upward on the valve K¹, tends to open it but the differential head holds the valve closed as long as the head in the chamber B is greater than that in chamber C. The construction is so arranged that the siphon will be started when the liquid in the chamber C has reached a predetermined level below that of the high level of the liquid in the chamber B. The valve K¹ will therefore remain closed until the chamber B begins to be emptied. When the chamber B begins to empty the level of the liquid therein gradually falls below that of the level of the liquid in the chamber C so that conditions are now reversed, the liquid in chamber C being at a higher level than in chamber B. The differential pressure now produces an upward lift on the valve K¹, causing it to open. Throughout the time of discharge of the liquid from the chamber B this condition maintains so that the chamber C will be entirely drained of its liquid contents, which will flow into the chamber B and will be emptied from that by the particular emptying means employed therein, in this instance a siphon.

I claim as my invention:—

1. In combination with a tank, an auxiliary timing chamber which is filled from said tank, and means for emptying said tank when the liquid in said timing chamber has reached a predetermined level below high level of the liquid in said tank, means for emptying said timing chamber into said tank embracing an opening between said timing chamber and said tank at or near the bottom of said timing chamber, and a valve normally closing said opening, said valve being controlled by the differential head of the liquid in said tank and said timing chamber.

2. In combination with a tank, an auxiliary timing chamber which is filled from said tank, and means for emptying said tank when the liquid in said timing chamber has reached a predetermined level below high level of the liquid in said tank, means for emptying said timing chamber into said tank embracing an opening between said timing chamber and said tank at or near the bottom of said timing chamber, and a swinging valve normally closing said opening,

said valve being inclined to the vertical and opening upwardly and toward said tank.

In testimony that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this fifth day of April A. D. 1910.

SAMUEL F. MILLER.

Witnesses:

WALTER C. KANE,
E. M. FLUGGE.