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Patented June 24, 1902.

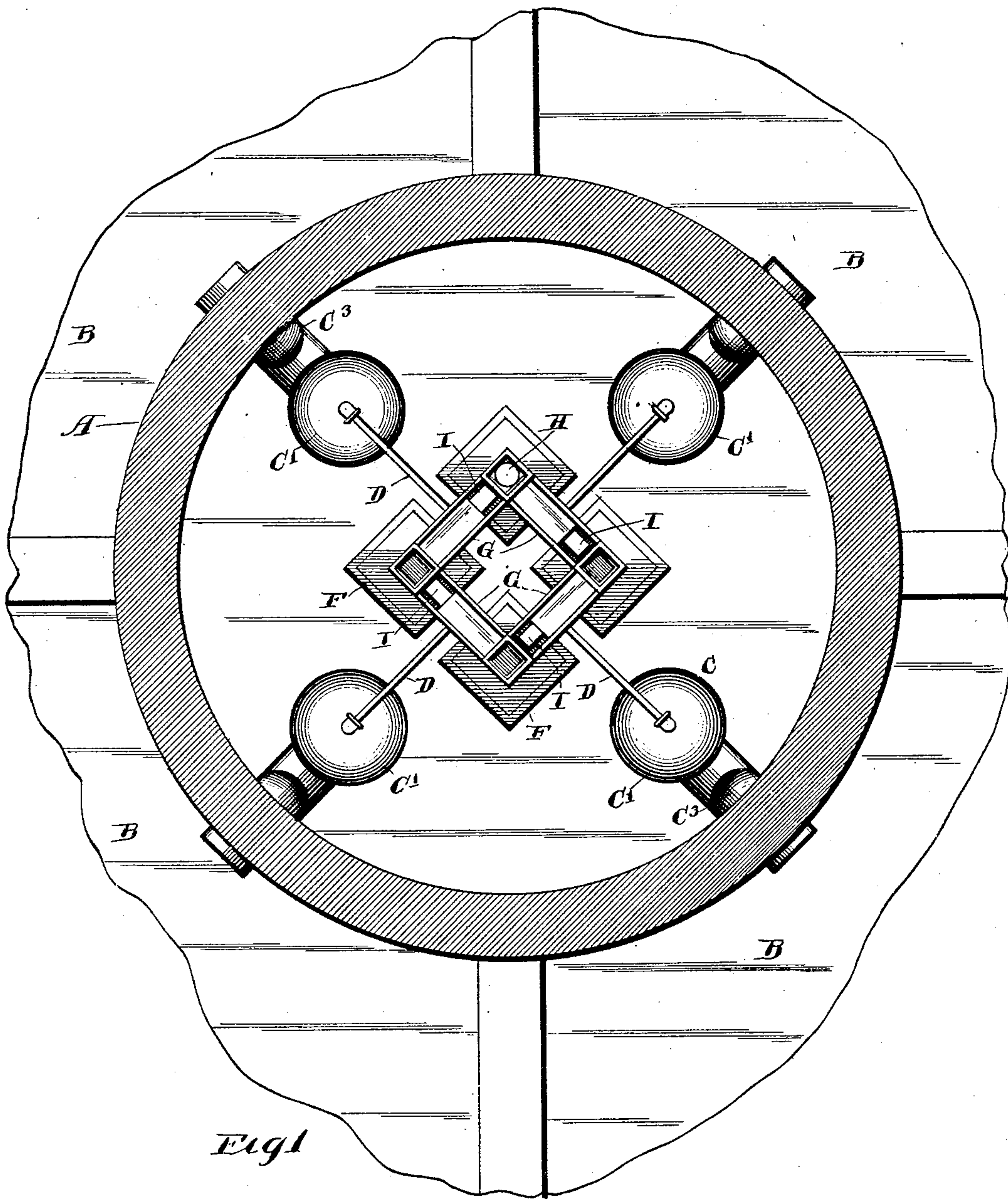
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AUTOMATIC DEVICE FOR DISCHARGING LIQUID TANKS.

(Application filed Oct. 28, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:-

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Pole & Brown
his Attorneys

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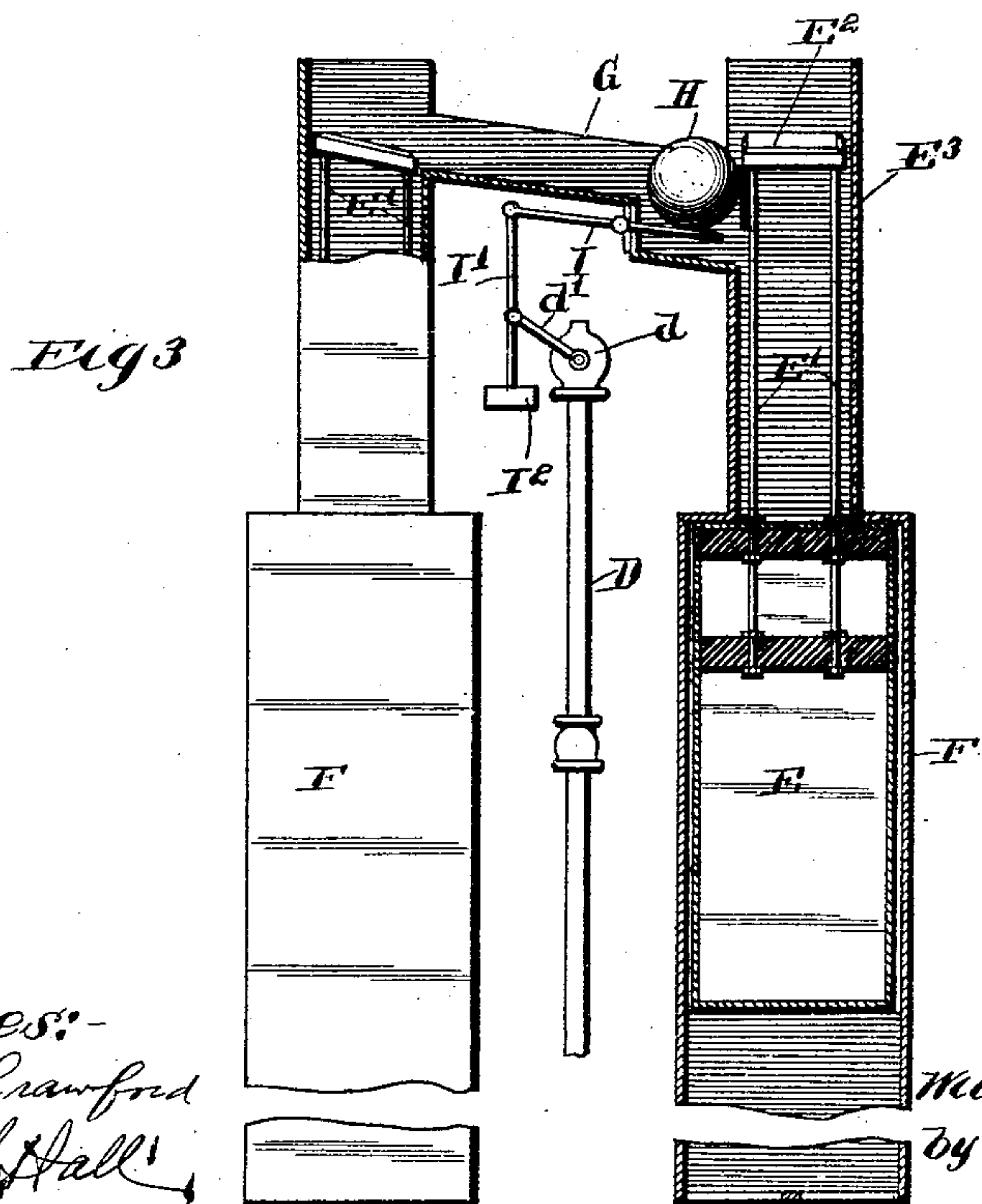
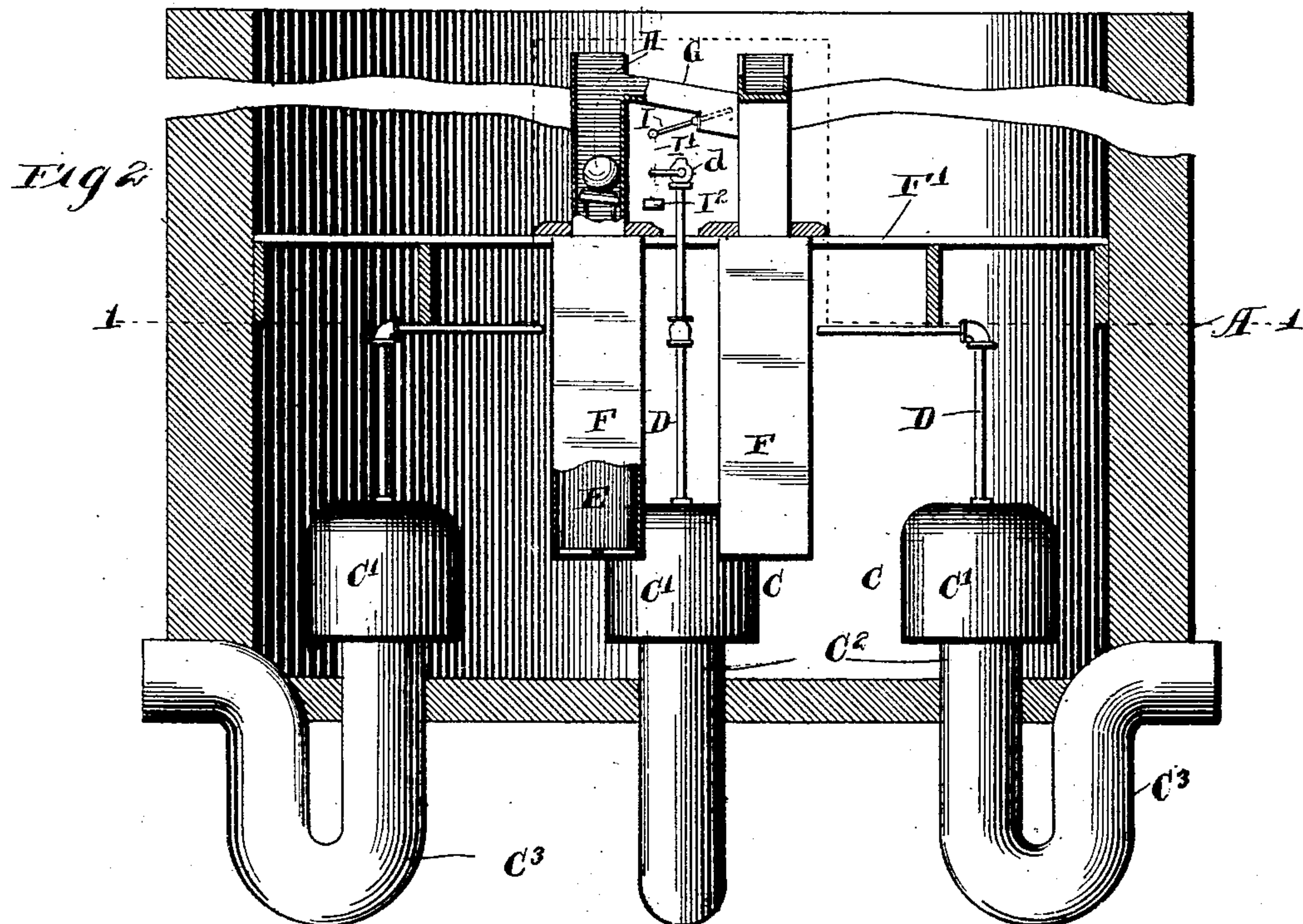
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UNITED STATES PATENT OFFICE.

WILLIAM S. SHIELDS, OF CHICAGO, ILLINOIS.

AUTOMATIC DEVICE FOR DISCHARGING LIQUID-TANKS.

SPECIFICATION forming part of Letters Patent No. 703,090, dated June 24, 1902.

Application filed October 28, 1901. Serial No. 80,204. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SHIELDS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Automatic Devices for Discharging 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
10 letters of reference marked thereon, which form a part of this specification.

This invention relates to an apparatus for automatically discharging the contents of a primary liquid tank or receptacle into a plu-
15 rality of secondary tanks or receptacles in a predetermined recurrent or rotative order. The apparatus may be employed wherever it is desirable to automatically discharge the contents of a primary receptacle into a num-
20 ber of secondary receptacles, and one of the uses to which my apparatus may be conveniently adapted and for which it has been designed is the treatment of sewage by what is known as the "septic system" to purify
25 and render harmless the effluent resulting from such treatment, said apparatus being adapted to be located between the septic tank or tanks of such system and the contact-beds and to receive the effluent from the septic-
30 tank and periodically discharge it upon the several contact-beds of the system in a predetermined rotative order.

An apparatus embodying the improvements constituting my invention embraces a
35 primary tank or receptacle to which liquid is supplied in any suitable manner, a plurality of deep-seal siphons located therein, which operate to successively discharge the contents thereof into a plurality of secondary
40 tanks or receptacles, there being one siphon provided for each secondary tank or receptacle and means for controlling the action of said siphons, whereby they are brought into op-
eration in recurrent or rotative order to empty
45 the contents of the primary tank or receptacle successively into the several secondary tanks or receptacles. For the purpose of controlling the operation of the several siphons in a manner to prevent more than a predeter-
50 mined number of siphons operating at one time, and to thereby prevent the contents of the primary tank or receptacle being dis-

charged into all of the secondary tanks or re-
ceptacles alike, a controlling mechanism is provided and operated by the rise and fall of
55 the liquid in the primary tank or receptacle, and the operation of which is so timed that the controlling means are brought into ac-
tion to operate one or more of the siphons be-
fore the liquid-head in said primary tank or
60 receptacle is sufficient to overcome the seals in the traps connected with the discharge-
limbs of the siphons, thereby insuring that the liquid shall be discharged from the pri-
mary tank or receptacle through a given si-
65 phon or siphons in each operation of the ap-
paratus.

In the drawings I have shown a practical embodiment of my invention, in which—

Figure 1 is a plan sectional view, taken on
70 line 1 1 of Fig. 2, showing a primary tank or receptacle and surrounding secondary tanks or receptacles and the siphons and control-
ling devices for said siphons. Fig. 2 is a ver-
tical section of the primary tank or recepta-
75 cle with parts of the interior mechanism broken away. Fig. 3 is an enlarged detail section of two float-chambers and a track-sec-
tion connecting the same and which consti-
tute parts of the siphon-controlling mech-
80 anism.

As shown in said drawings, A designates the primary tank or receptacle, and B B frag-
ments of a plurality of secondary tanks or
85 receptacles surrounding said primary tank or
receptacle.

C C designate as a whole a plurality of deep-
seal siphons symmetrically disposed in the
primary tank or receptacle and discharging
90 into the secondary tanks or receptacles, there
being four siphons shown—one for each sec-
ondary tank or receptacle. The shorter leg
of each siphon consists of a bell-shaped dome
C', supported over the upper open end of the
longer leg C², and said longer leg of each si-
95 phon communicates with a trap C³, in which is
formed the usual liquid seal.

D D designate air-pipes extending up-
wardly from the domes C' and communicating
with the interiors of the siphons, and said
100 pipes are provided with valves *d d* of any pre-
ferred type.

E E designate a plurality of floats, of which
there is one for each siphon, and said floats

are contained and rise and fall within vertical float-chambers F F, which are grouped centrally in the tank or receptacle A. Said float-chambers are supported on transverse timbers F', extending across the tank or receptacle in the manner shown in Fig. 2. Said floats consist, as shown, of hollow sheet-metal bodies and are provided with upright reduced extensions, each consisting of four rods E', which are attached at their lower ends to the float and support at their upper ends an inclined plate or head E², which constitutes the extreme top of the float. The upper ends E³ of said float-chambers, through which the upper ends of the floats extend, are reduced in diameter to correspond with the size of the float extensions, and said upper ends of the float-chambers are connected by means of short inclined trough-like track-sections G, the walls of said chambers being provided in alinement with the track-sections with openings through which the track-sections communicate with said chambers. Each of said track-sections is inclined from one of said float-chambers to the other, so that the discharge end of the track-section connected with each chamber is located below the receiving end of the next succeeding track-section communicating with said chamber. The track-sections and upper ends of the chambers taken together form a race or track, which is traversed by a traveling weight H, hereinafter to be described, which latter successively actuates the valves *d* of the air-pipes D through mechanism hereinafter to be described, thereby successively bringing the siphons into operation. Said traveling weight in its passage from one track-section to the other passes transversely through one of the chambers, said weight passing into said chamber upon the upper end of the float therein at a time when said float is depressed and when the tank or receptacle A is empty. When said chamber is filled, therefore, and the float is elevated, the weight is lifted to the level of the receiving end of the next adjacent track-section and is delivered to and through said track-section to the next float-chamber in advance. The part of each valve mechanism acted upon by the weight is located in one of the track-sections between two adjacent float-chambers, and, as herein shown, such mechanism is made as follows: Projecting into each of said track-sections is a trip-lever I, which lever is operatively connected with the valve *d* of one of the air-pipes D. Each of said levers I is pivoted between its ends to the bottom wall of its associated track-section, and the end of said levers which extends into the track-section is made wide or flat, as indicated in Fig. 1, for engagement with the traveling weight H. The part of said track-section below said trip-lever is offset below the other parts thereof, and the pivot of said lever is connected with the vertical or offset part of the bottom wall, as shown in Fig. 3, to permit the necessary os-

cillation of the lever for actuating the valve. The opposite end of said lever is pivoted to a link I', which latter is pivoted to one end of a crank-arm *d'*, rigid with the stem of the associated valve *d*. The parts described are so arranged that when the end of the trip-lever extending into the track-section is depressed the valve will be opened, and said valve is closed when the traveling weight passes off the trip-lever by means of a counterweight I², attached to the lower end of the link I'. Obviously a spring applied to the said valve-operating mechanism will act to close the valve in the same manner as said weight.

The operation of the apparatus is as follows: Before the tank or receptacle A is filled all of the floats are in their lowermost positions, as indicated in Fig. 2, the valves *d* of the pipes D are closed, and the free ends of the trip-levers I project obliquely upwardly into the track-sections G in the path of the traveling weights. When the liquid is supplied to the tank or receptacle A, the rising of the liquid-level therein causes all the floats E to rise, and one of the floats carries upwardly with it the traveling weight H, which is resting on the upper end of the extension of said float. The length of the float is so proportioned that when a predetermined depth of liquid has been reached in the tank or receptacle and prior to the time when the liquid-head therein is sufficient to start the siphons into operation the traveling weight is raised by the float on which it rests above the level of the receiving end of the next adjacent track-section G, and the inclination of the upper end or head of said float acts to direct said weight into and through said track-section toward the next float-chamber in advance. In the passage of said weight through said track-section it is brought into contact with and operates the trip-lever I of one of the valve mechanisms and opens one of said valves. This operation in the form of apparatus here shown releases the air from the siphons with which the said valve *d* is associated, starts said siphon into operation, and discharges the primary tank or receptacle therethrough into one of the secondary tanks or receptacles. When the traveling weight H is directed into the track-section in the manner described, said weight passes to the lower end of the said track-section, as shown in Fig. 3; but by reason of the fact that the extension of the next adjacent float is above the level of the discharge end of said track-section said weight is confined therein until the float is depressed, which occurs during the discharge of the liquid from the primary tank or receptacle. When the floats are lowered by the lowering of the liquid-level in said tank or receptacle, the said weight drops upon the adjacent float and is supported on said float until said float again arises by the refilling of the tank or receptacle, said weight being confined at this time on said float by the walls of the chamber. When the tank is

again filled, all of the floats rise as before, and the traveling weight is again raised by the float supporting the same until it reaches the level of the receiving end of the next adjacent track-section, whereupon it is discharged into and through said track-section and trips the valve mechanism of another siphon, thereby starting said siphon into operation and discharging the liquid contents of the primary tank or receptacle there-through into another one of the secondary tanks or receptacles. The traveling weight in this manner passes from one float-chamber to the other and is by each of the floats successively raised and directed to the float-chamber next in advance, and in its passage from one of said float-chambers to the other successively and in recurrent order actuates the valves of said siphons.

The invention is not limited to any particular number of siphons associated in one battery, and where a large number of siphons are employed more than one weight may be used at the same time to operate two or more siphons simultaneously. Moreover, a single weight may be made to operate more than one siphon by connecting the air-pipes of two or more siphons with one valve, whereby when said valve is opened all of the siphons connected with said valve are set in operation. Such connected siphons may be located in one tank or in different tanks and at different elevations. Moreover, it will be obvious that the different float-chambers and floats need not necessarily be located in the primary tank or receptacle, but may be located in a tank or receptacle communicating therewith.

I claim as my invention—

1. An apparatus for the purpose set forth comprising a liquid tank or receptacle, a plurality of discharge devices for emptying the same, and means for successively operating said discharge devices comprising a float mechanism, and a traveling weight controlled by said float mechanism.

2. An apparatus for the purpose set forth comprising a liquid tank or receptacle, a plurality of discharge devices for successively emptying said tank, a plurality of floats one associated with each discharge device, and means operated by the rise and fall of said floats for successively operating the discharge

devices embracing a traveling weight the movement of which is controlled by said floats.

3. An apparatus for the purpose set forth comprising a liquid tank or receptacle, a plurality of siphons which act successively to discharge the contents of said tank, a plurality of floats, one associated with each siphon, and means operated by the rise and fall of said floats for successively starting said siphons into action, embracing a traveling weight, the movement of which is controlled by said floats.

4. The combination with a liquid tank or receptacle, of a plurality of siphons for discharging the contents of the same, an air-pipe connected with each siphon, valves in said pipes, and a traveling weight adapted to severally actuate said valves in a predetermined rotative order for successively starting the siphons into operation and thereby emptying said tank or receptacle.

5. An apparatus for the purpose set forth comprising a liquid tank or receptacle, a plurality of siphons for discharging the contents of the tank, mechanism for starting said siphons into operation, and an actuating-weight which travels from one siphon-actuating mechanism to the other.

6. The combination with a liquid tank or receptacle, of a plurality of siphons for discharging the contents of the same, a corresponding number of float-chambers, floats in said chambers which rise and fall with the rise and fall of the liquid in the receptacle, inclined troughs or track-sections connecting said chambers, a traveling weight which passes by gravity through said troughs or track-sections from one float-chamber to the other, said weight being lifted by said floats to the receiving ends of the several troughs or track-sections, an air-pipe connected with each siphon, a valve in each pipe, and a trip-lever projecting into the trough in the path of said moving weight and operatively connected with the valve.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 25th day of October, A. D. 1901.

WILLIAM S. SHIELDS.

Witnesses:

C. CLARENCE POOLE,
WILLIAM L. HALL.