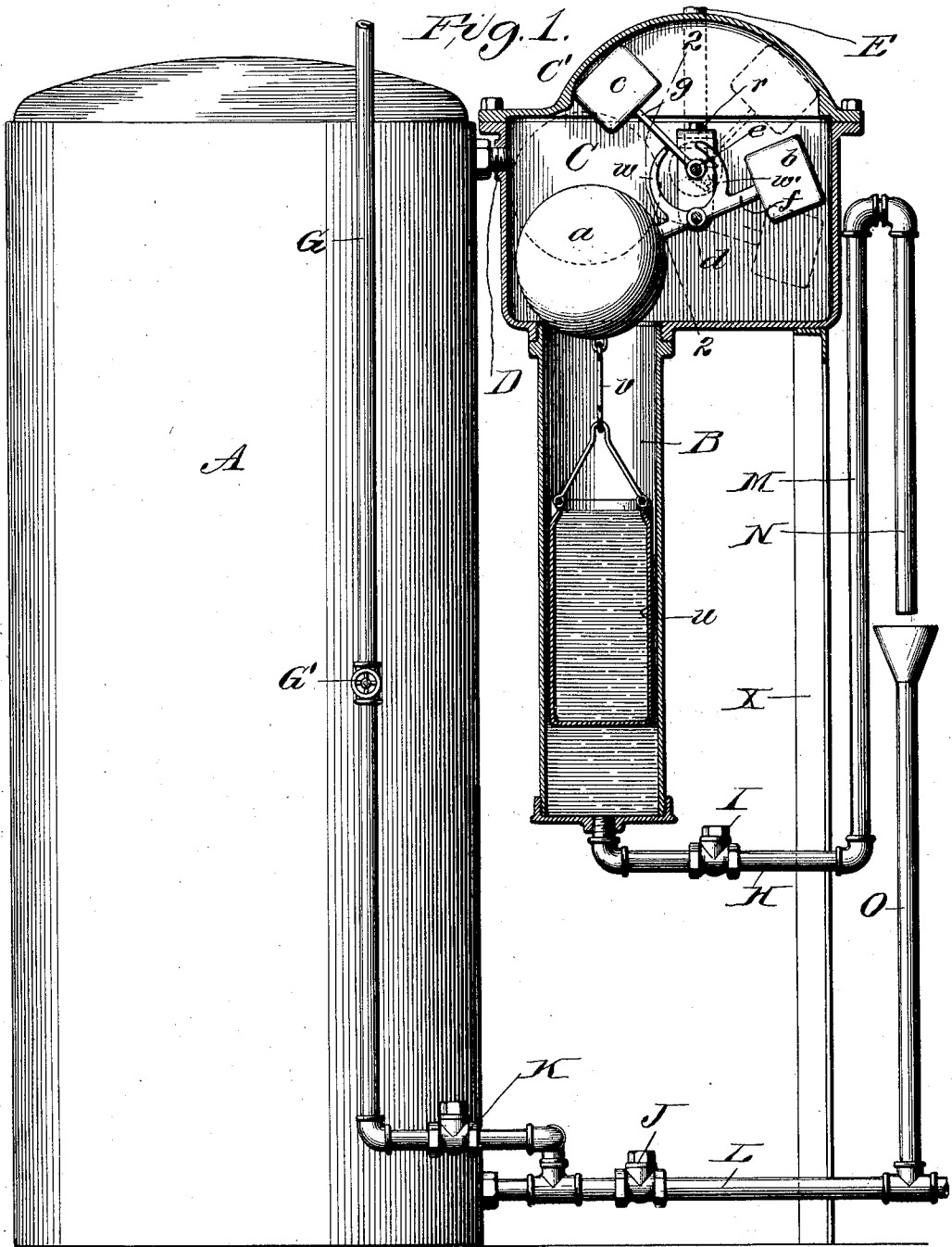


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 PUMP DEVICE.
 APPLICATION FILED SEPT. 16, 1912.

1,063,552.

Patented June 3, 1913.

2 SHEETS—SHEET 1.



Attest:
Wm H. Scott
 Theresa Suem.

Inventor:
John H. Kinealy

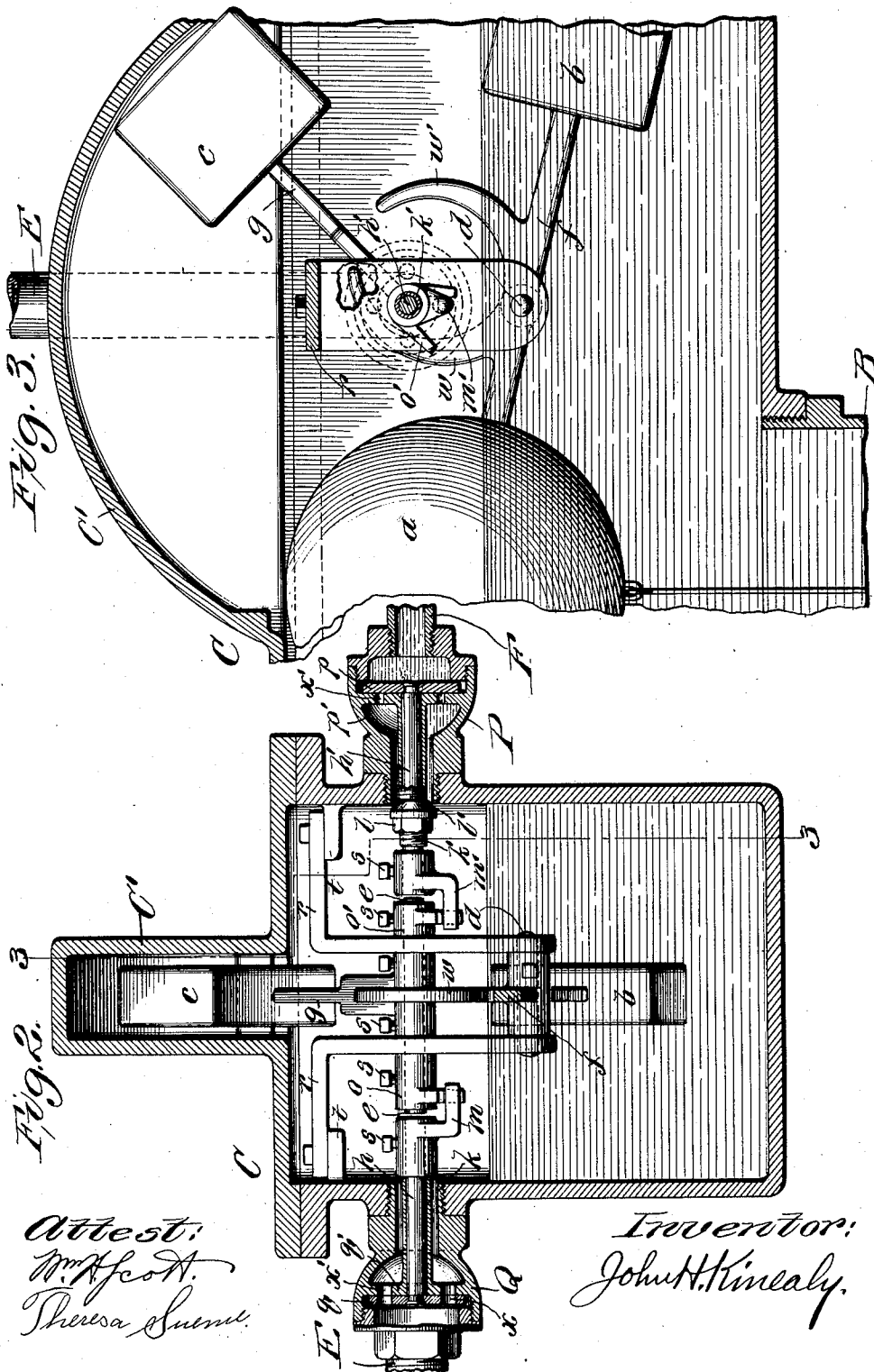
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UNITED STATES PATENT OFFICE.

JOHN H. KINEALY, OF FERGUSON, MISSOURI.

PUMP DEVICE.

1,063,552.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed September 16, 1912. Serial No. 720,633.

To all whom it may concern:

Be it known that I, JOHN H. KINEALY, a citizen of the United States, residing at Ferguson, in the county of St. Louis and the State of Missouri, have invented a new and useful Improvement in Pump Devices, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to that class of pump devices in which the fluid to be pumped is induced to flow into the device by a vacuum produced therein by the condensation of steam and the fluid to be pumped is made to flow out of and away from the device by the introduction therein of steam.

My invention relates especially to pump devices used in connection with heating systems for the purpose of withdrawing the air from said systems so as to make it easier for the steam to circulate through the various parts of said heating systems, and also to enable the steam to be circulated through said systems at a pressure less than that of the atmosphere.

The object of my invention is to provide a device that will comprise no parts that will be easily deranged or that will require any especial care or attention, and a device which may be operated with steam at a low pressure.

My invention is fully shown in the accompanying drawings where similar letters are used to designate similar parts.

Figure 1 is a view showing the device partly in elevation and partly in section and connected to the air line of a heating system; Fig. 2 is a vertical sectional view of Fig. 1 along the line 2—2; and Fig. 3 is a vertical sectional view of Fig. 2 along the line 3—3.

Referring to the figures, A is a closed tank forming a primary vessel; and B and C are parts of a secondary vessel connected to the vessel A by means of the nipple D which extends, preferably, from the upper part of the box C to the upper part of the vessel A.

C' is the top of the box or upper part C of the secondary vessel.

E is a steam pipe through which steam is conveyed from a suitable source of supply of the box C through the steam valve Q, and F is a water pipe through which water is conveyed from a suitable source of supply to the box C through the valve P.

G is an air pipe which is connected at one end to the heating system and at the other end to the tank A, preferably near the bottom thereof, and which serves as a suction pipe for the device. This pipe G is provided with a valve G' and a check valve K which latter is adapted to allow the passage therethrough of any fluid into the tank A but to prevent the passage therethrough of any fluid from the tank A.

H is a discharge pipe connected to the leg B of the secondary vessel. The pipe H is preferably connected into the bottom of the leg B as shown in the drawing and is provided with a siphon consisting of two vertical legs M and N.

I is a check valve adapted to allow the passage of a fluid from the leg B but to prevent the passage of a fluid into the leg B.

L is a discharge pipe which is provided with a check valve J adapted to allow the passage of a fluid from the tank A but to prevent the passage of a fluid into the tank A. The discharge pipe L is provided with a vertical branch O open at its upper end and adapted to receive water discharged from the leg N of the pipe H.

The steam valve Q and the water valve P are similar in construction and each comprises a body part whereby it is attached by a threaded projection to the side of the box C; and each has inside of it a seat q' and p' , respectively, in which are openings x' ; and each of these valves has a valve piece q and p , respectively, which is provided with perforations x adapted to register with the perforations x' in the seats q' and p' , respectively, when the valves q and p are open. The valve pieces q and p are adapted to rotate or turn in contact with the seats q' and p' , respectively.

h and h' are valve stems of the valves Q and P, respectively, which are attached to the valve pieces q' and p' and which rotate in and are supported by the tubular braces k and k' , respectively. These braces, k and k' , project inside of the box C, and the brace k' of the water valve P is threaded on that part which projects inside of the box C and carries a nut l having a beveled inner part l' which may be screwed up close to the inner end of the opening through the valve around the brace, so that when water passes through the valve it is made to enter the box in the form of spray or a finely divided mist.

The valves are operated by means of a device which comprises a float *a* attached to the lever *f*, which is pivotally supported on the pin *d*, and which carries on the end
5 opposite to that to which the float is attached a counterweight *b*.

c is an overweight mounted on the trip-rod *g* which is attached to the pin a shaft *e*.

The pins *d* and *e* are both adapted to
10 move in bearings in the supports *r* which are carried by the brackets *t* which project inwardly from the sides of the box C. Mounted on the upper ends of the pin *e* are U-trips *o* and *o'* which engage with the arms
15 *m* and *m'*, respectively, fastened to the valve stems *h* and *h'* respectively.

The rod *f* has attached to it two arms *w* and *w'* adapted to engage with and move the trip-rod *g*.

s represents set screws by which the U-trips and the arms *m* and *m'* are held in place.

u is a bucket suspended from the float *a* by means of the link *v*, and whose outside diameter is nearly the same as the inside diameter of the leg B. The weight of the box C and the leg B is carried partly by the nipple D and partly by the support X.

The operation of the pump is as follows:

30 When the valve mechanism is in the position shown in Fig. 1 the water valve P is open and water passes from the pipe F into the box C from where it passes down into the leg B. The water continues to flow into the box until it has accumulated in the leg
35 B, and the box C, and the pipe H until it has reached a level sufficient to raise the float *a* and move the trip-rod *g* toward the right just past a vertical position, then the influence of the overweight *c* is such that
40 instead of opposing the upward movement of the float it falls freely toward the right and carries with it the U-trips *o* and *o'* and they contact with the arms *m* and *m'*, respectively, and cause the valve pieces *q* and
45 *p* to rotate on their seats, thus closing the water valve P and opening the steam valve Q, as shown in Figs. 2 and 3. Then steam passes from the pipe E into the box C and from there through the nipple D into the
50 closed tank A. As the steam continues to enter the box C it exerts a slight pressure which is sufficient to depress the water in the box C so that it overflows the top of the siphon formed by the legs M and N of the pipe H, and then the water begins to
55 flow from the box C and the leg B through the pipe H into the open pipe O. The water continues to flow until the level of the water in the leg B has fallen so that the weight of the water which remains in the bucket *n* above the level of the water outside of this bucket is sufficient to move the float downward and make the arm *w'* engage with the
60 trip-rod *g* and cause this rod with the over-

weight *c* to move toward the left into the position shown in Fig. 1, and by this movement through the medium of the U-trips *o* and *o'* and the arms *m* and *m'* the steam valve Q will be closed and the water valve P will be opened so that steam will cease to
70 flow into the box C and water will begin to flow therein. While the water is being forced out of the box C and the leg B by the pressure of the steam, any air or water that may be in the tank A will be made to pass
75 out therefrom through the check valve J into the discharge pipe L. As soon as the steam valve Q is closed and the water valve P is opened the water entering the box C comes in contact with the steam in the upper part thereof and this steam is condensed and falls with the water to the bottom of the box and into the leg B. As fast
80 as the steam is condensed in the box C steam is drawn from the tank A through the nipple D into the box C and is there condensed so that a vacuum is formed in the tank A and in the box C and the upper part of the leg B. And while this vacuum is being formed and maintained air is prevented from entering the leg B through the pipe H by the check valve I, and air is also prevented from entering the vessel A from the discharge pipe L by the check valve J,
90 but since the check valve K is adapted to open inwardly toward the vessel air passes from the heating system through the air pipe G, which serves as a suction pipe for the apparatus, into the vessel A. Air continues to pass into the primary vessel A as long as a vacuum is maintained there by reason of the condensation of the steam in the box C of the secondary vessel, and when water has accumulated in the leg B and the
105 box C in sufficient quantity to again raise the float *a* so as to throw the trip-rod *g* from the position shown by the full lines in Fig. 1 to that indicated by the dotted lines in the same figure or to that indicated in Figs. 2 and 3, then the water valve P will be closed and the steam valve Q will be opened and steam will enter the apparatus and force the water out of the box C and the leg B while also forcing air and any water
110 that may have come with the air, out of the vessel A through the check valve J into the discharge pipe L. The tank A constitutes what may be termed a suction chamber or primary vessel while the box C with the leg B constitutes what may be termed a secondary vessel or a condenser; and the tank A is receiving or drawing in only during the time that water is being admitted into the secondary vessel, and the tank A is
120 discharging during the time that water is being discharged from the secondary vessel. That is to say, the action of the primary vessel A depends entirely upon what is taking place in the condenser or secondary ves- 130

self and this depends entirely upon the time required for the admission of water into the secondary vessel and also upon the time required for the discharge of the water therefrom. If the nut *l* be adjusted on the brace *k'* so that the water enters the box *C* in a very fine spray and in such an amount that considerable time is required for sufficient water to accumulate in the leg *B* and the box *C* to operate the valve mechanism so as to close the water valve *P* and open the steam valve *E*, the vessel *A* may be completely filled with air or other fluids, and if the resistance to the flow of water from the secondary vessel through the pipe *H* be such that the water flows therefrom quite slowly, then steam will continue to enter the box *C* and the vessel *A* for quite a long time and everything in the tank *A* may be forced therefrom through the check valve *J* and some steam even may pass out through the check valve *J* and be wasted.

It is advisable to have the discharge pipe *H* provided with a siphon as shown so that when the apparatus is started for the first time and while cold, sufficient water will accumulate in the secondary vessel to operate the valve mechanism before the water begins to flow through the opening end of the leg *N*. The top of the siphon formed by the legs *M* and *N* should preferably be somewhat above the point of highest level of the water in the box *C*, and the lower end of the leg *N* should preferably be somewhat above the point of lowest level of the water in the leg *B*.

What I claim as new and desire to secure by Letters Patent, is:

1. A pump device comprising a primary vessel, a secondary vessel, a pipe connecting said secondary vessel to said primary vessel, a suction pipe having means whereby flow therethrough from said device is prevented, a discharge pipe for said primary vessel having means whereby flow therethrough into said vessel is prevented, a discharge pipe for said secondary vessel having means whereby flow therethrough into said vessel is prevented, means whereby steam is supplied to said device, means whereby water is supplied to said device, and means governed by the quantity of water in said secondary vessel whereby steam and water are alternately admitted into said secondary vessel, substantially as described.

2. A pump device comprising a primary vessel, a secondary vessel, a pipe connecting said secondary vessel to said primary vessel, a suction pipe connected to said primary vessel near the bottom thereof and having means whereby flow therethrough from said vessel is prevented, a discharge pipe for said primary vessel having means whereby flow therethrough into said vessel is prevented, a discharge pipe for said secondary vessel hav-

ing means whereby flow therethrough into said vessel is prevented, means whereby steam is supplied to said device, means whereby water is supplied to said device, and means governed by the quantity of water in said secondary vessel whereby steam and water are alternately admitted into said secondary vessel, substantially as described.

3. A pump device comprising a primary vessel, a secondary vessel, a pipe connecting said primary vessel to said secondary vessel at a point above the highest level of water in said secondary vessel, a suction pipe connected to said primary vessel near the bottom thereof and having means whereby flow therethrough from said vessel is prevented, a discharge pipe for said primary vessel having means whereby flow therethrough into said vessel is prevented, a discharge pipe for said secondary vessel having means whereby flow therethrough into said vessel is prevented, a steam pipe connected to said secondary vessel above the highest level of the water therein, a water pipe connected to said secondary vessel above the highest level of the water therein, and means governed by the quantity of water in said secondary vessel whereby steam and water are alternately admitted through said steam and water pipes into said secondary vessel, substantially as described.

4. A pump device comprising a primary vessel, a secondary vessel, a pipe connecting said primary vessel to said secondary vessel at a point above the highest level of water in said secondary vessel, a suction pipe connected to said primary vessel near the bottom thereof and having means whereby flow therethrough from said vessel is prevented, a discharge pipe for said primary vessel having means whereby flow therethrough into said vessel is prevented, a steam pipe connected to said secondary vessel above the highest level of water therein, a water pipe connected to said secondary vessel above the highest level of water therein, means governed by the quantity of water in said secondary vessel whereby steam and water are alternately admitted through said steam and water pipes into said secondary vessel, a discharge pipe for said secondary vessel having means whereby flow therethrough into said vessel is prevented, and having a siphon whose highest point is above the highest level of water in said secondary vessel, substantially as described.

5. A pump device comprising a primary vessel, a secondary vessel, a pipe connecting said primary vessel to said secondary vessel at a point above the highest level of water in said secondary vessel, a suction pipe connected to said primary vessel near the bottom thereof, a check valve in said suction pipe, a discharge pipe for said primary vessel, a check valve in said discharge pipe,

a steam pipe connected to said secondary vessel above the highest level of water therein, a valve in said steam pipe, a water pipe connected to said secondary vessel above the highest level of water therein, a valve in said water pipe, means governed by the quantity of water in said secondary vessel whereby said valve in said steam pipe is opened and said valve in said water pipe is closed when the water reaches the highest level in said secondary vessel and whereby said valve in said steam pipe is closed and said valve in said water pipe is opened when the water reaches the lowest level in said

secondary vessel, a discharge pipe for said secondary vessel having a siphon whose highest point is above the highest level of water in said secondary vessel, and a check valve in said discharge pipe, substantially as described. 15 20

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. KINEALY.

Witnesses:

BELLE TIERNEY,
THERESA SUENE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
