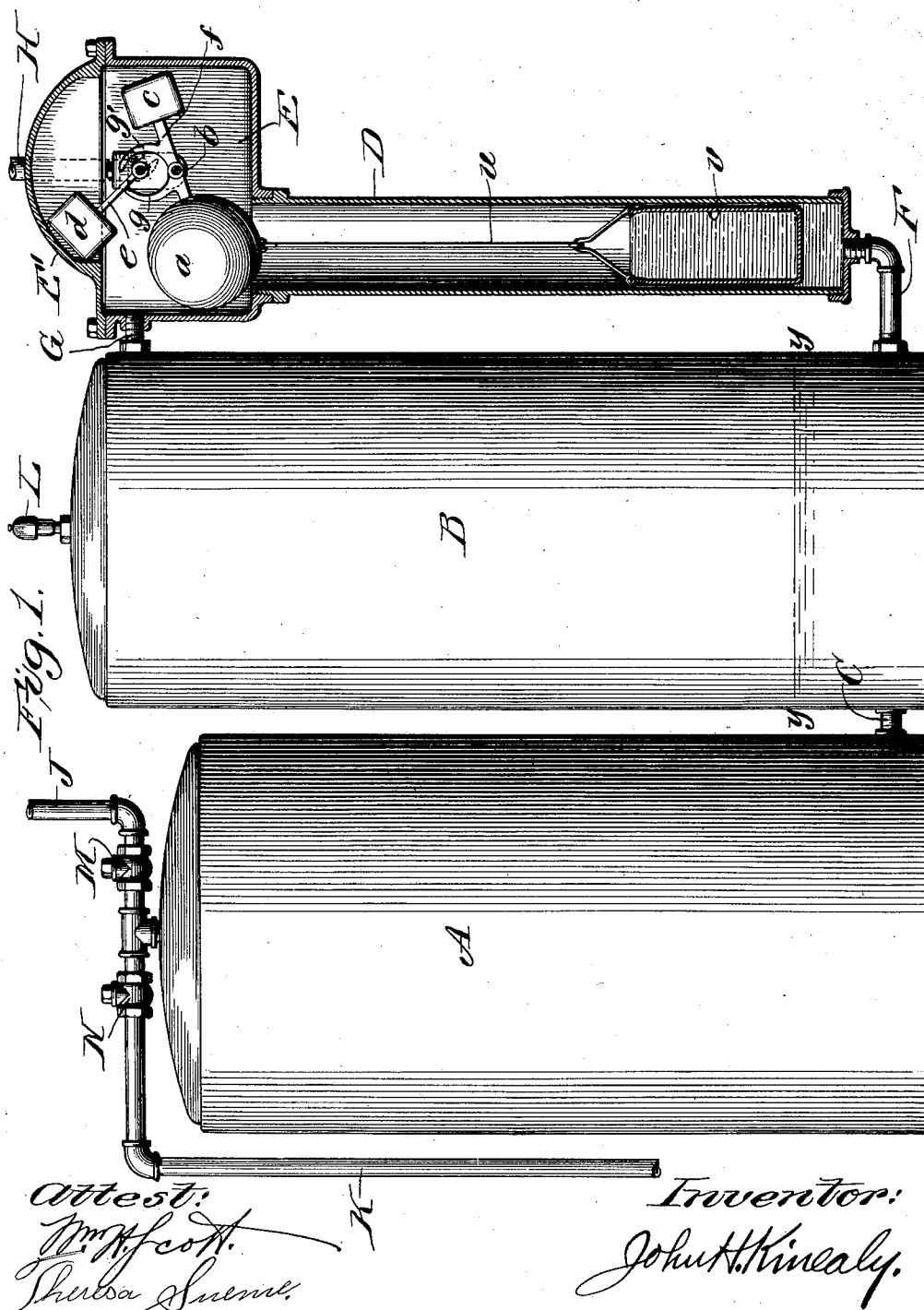


PUMP DEVICE.

1,063,553.

2 SHEETS—SHEET 1.

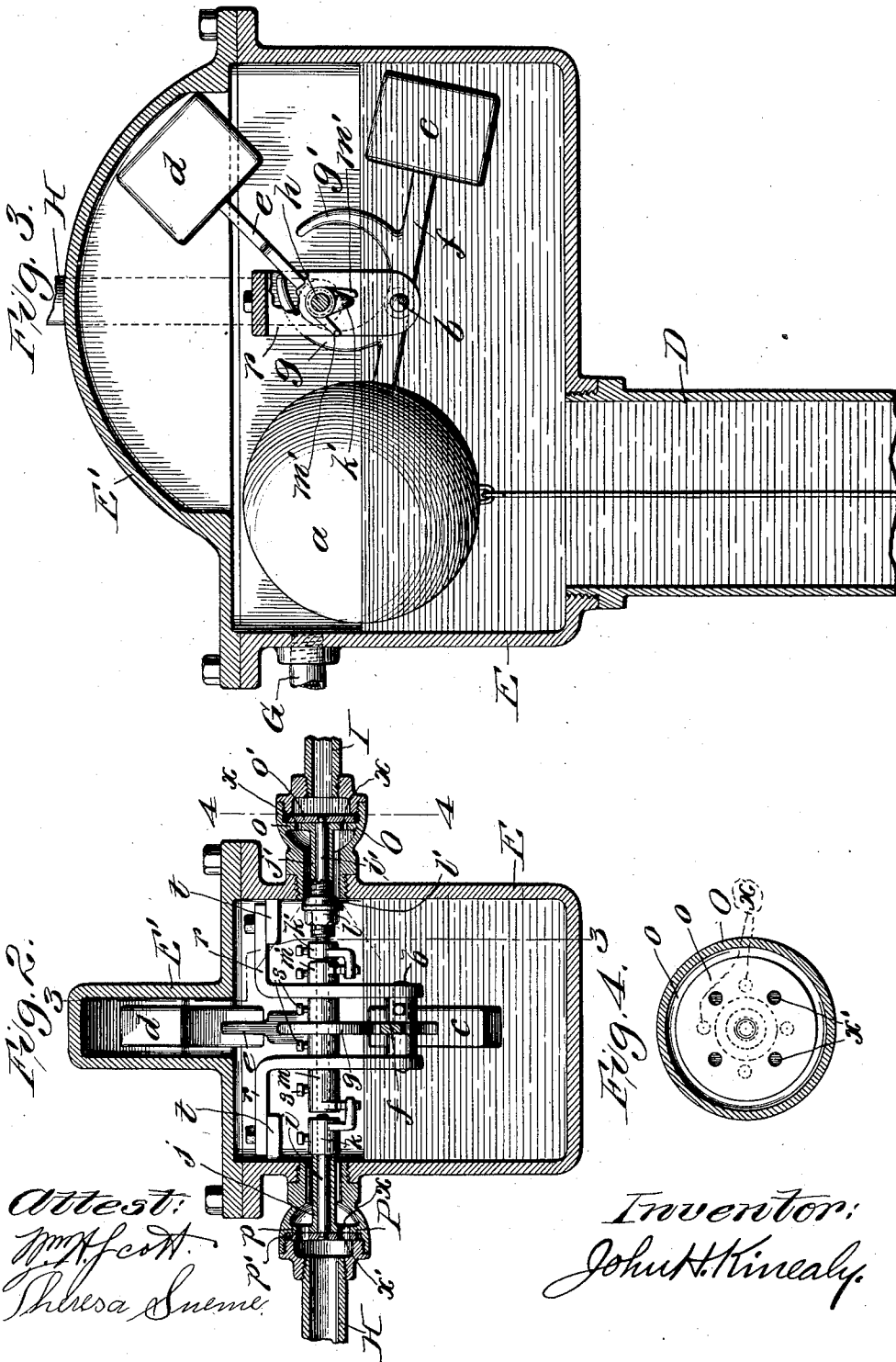


J. H. KINEALY.
PUMP DEVICE.
APPLICATION FILED SEPT. 23, 1912.

1,063,553.

Patented June 3, 1913.

2 SHEETS—SHEET 2.



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JOHN H. KINEALY, OF FERGUSON, MISSOURI.

PUMP DEVICE.

1,063,553.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed September 23, 1912. Serial No. 721,813.

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 because of 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 because of the pressure created therein by the introduction 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 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 can be easily deranged or that will require any special care or attention, and also to provide a device that 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 part in elevation and part in section, and connected to the air line of a heating system; Fig. 2 is a sectional view showing a part of the valve operating mechanism in elevation; Fig. 3 is a sectional view of Fig. 2 along the line 3—3; and Fig. 4 is a sectional view of Fig. 2 along the line 4—4.

Referring to the figures, A is a closed tank forming a primary vessel and B is a second tank connected to the tank A by means of the pipe or nipple C.

D is a leg having at its upper end a box E connected at its lower end to the tank B by means of the pipe F.

G is a pipe or nipple connecting the upper part of the box E to the tank B.

The tank B with the box E and the leg D form what may be called a secondary vessel.

The box E is provided with a removable cap or cover E' and the tank B is provided with an air valve L. This air valve L is adapted to allow the flow of air or of steam from the tank B when the pressure therein is greater than that of the atmosphere, and to prevent the flow of air into the tank when the pressure therein is less than that of the atmosphere. The valve is not shown in detail because it is of a type whose construction is old and well known.

J is the air pipe by means of which the device is connected to the heating system, and it serves as a suction pipe through which the air drawn from the heating system passes into the primary vessel A. The pipe J is provided with a check valve M which allows the passage of a fluid into the vessel A, but prevents the passage therefrom.

K is a discharge pipe through which any fluid pumped into the primary vessel A is discharged, and it is provided with a check valve N which prevents the passage of any fluid into the vessel A through the pipe K.

H is a steam pipe through which steam is conveyed from any suitable source of supply to the device, and I is a water pipe by means of which water is conveyed from a suitable source of supply to the device.

O and P are valves by which the flow of water and steam from their respective pipes into the apparatus is controlled. These valves are similar in construction and comprise a body portion having a seat *o* and *p* in the valve O and P, respectively.

o' and *p'* are valve pieces adapted to rotate on the seats of the water valve and the steam valve respectively, and *i'* and *i* are valve stems attached to the valve pieces of the water valve and the steam valve respectively. The valve stems rotate in and are carried by tubular braces *j* and *j'* of the steam valve and water valve respectively. These braces extend inside of the box E, and that of the water valve is threaded on its inner end and has engaging with the threaded portion a nut *l* which has a beveled por-

tion l' that can be screwed up close to the inner end of the water valve so that the water passing through the valve into the box E is made to enter the box in a spray or finely divided condition.

The seats o and p of the water and steam valves respectively, are provided with perforations x and the valve pieces o' and p' are provided with perforations x' which are adapted to register with the perforations x when the valve is opened as is shown in the case of the valve P in Fig. 2, and when the valve is closed the perforations x' in the valve piece do not register with the perforations x in the valve seat but are somewhat in the position shown in the case of the water valve O in Figs. 2 and 4.

The valve stems i and i' have attached to them at their inner ends arms k and k' respectively, which are adapted to engage with the U-trips m and m' respectively mounted on the outer ends of the pin or shaft h .

e is a trip-rod mounted on the pin or shaft h and adapted to oscillate about the center of this pin as an axis and to carry the pin and the U-trips m and m' with it.

d is an overweight mounted on the trip-rod e .

s are set-screws by which the arms k and k' and the U-trips m and m' and also the trip-rod e are held in position on the valve stems j and j' and the pin or shaft h , respectively.

a is a float carried on the rod f which is mounted on the pin or shaft b and which has on the end opposite to that to which the float is attached a counterweight c .

g and g' are arms, preferably made integral with the arm f , adapted to engage with and move the trip-rod e .

The pins b and h are mounted in bearings carried by the supports r which are fastened to the lugs t formed on the sides of the box E.

u is a link by means of which the bucket v is attached to the underside of the float a .

When the float a and the trip-rod e are in the position shown in Fig. 1 the steam valve P is closed and the water valve O is open so that water can pass from the water pipe into the box E; and when the float a and the trip-rod e are in the position in Figs. 2 and 3, the steam valve P is open and steam can enter the apparatus, but the water valve O is closed. When steam enters the apparatus it passes from the box E through the nipple G into the upper part of the tank B and there acts upon the air and the water in this tank. The pressure of the steam opens the air valve L and makes the air pass out therethrough; and the pressure of the steam exerted upon the surface of the water

in the tank B and in the box E forces this water from the secondary vessel through the pipe C into the tank A and when the water has been depressed in this secondary tank until its surface is as indicated by the line $y-y$ in Fig. 1 the weight of the water in the bucket v will act upon the float a and the rod f in such a way as to make the trip-rod e move from the position shown in Figs. 2 and 3 to that shown in Fig. 1, thus closing the steam valve and opening the water valve. Then water will pass from the pipe I through the valve O past the beveled surface l' of the nut l and enter the box E in a sprayed or finely divided condition, and this water coming in contact with the steam in the box E will condense this steam and create a partial vacuum whereby steam will be drawn through the nipple G from the upper part of the tank B into the box where it will be condensed. In this way the pressure in the secondary vessel, comprising the tank B the leg D and the box E, will be made less than that of the atmosphere and the air valve L will close and the water in the primary vessel will pass through the nipple C into the secondary vessel. The water in the tank B and the leg D will always stand at the same height because of the pipes F and G. As the water falls in the primary tank A a partial vacuum will be created above the surface thereof and this will cause air or any other fluid to pass from the pipe J through the check valve M into the tank A. When the surface of the water has risen in the secondary vessel so that the water comes in contact with the float a the float will be raised and the arm g will contact with the trip-rod e and raise it to a vertical or neutral position after which a slight upward motion of the float will tip the trip-rod e just beyond the vertical and then the overweight d will make the rod fall to the right into the position shown in Figs. 2 and 3, and this movement will cause the pin h to turn in its bearings and carry with it the U-trips m and m' which will engage with the arms k and k' respectively and thus make the valve pieces p' and o' rotate upon their respective seats so that the water valve O will be closed and the steam valve P will be opened as indicated in Fig. 2. The steam will enter the box E and pass through the pipe or nipple G into the upper part of the tank B and the pressure thereof will force the air and some steam out through the air valve L and will depress the water in the secondary tank and make it flow over into the primary tank A. As the water rises in the primary tank A the air that is in this tank will be forced out through the check valve N into the discharge pipe K. As long as the bucket v is sub-

merged the weight of the float *a* being counterbalanced by the counterweight *c* the steam valve will remain open and the water valve will remain closed, but when the surface of the water has fallen in the secondary vessel to a point such as is indicated by the line *y-y* in Fig. 1 the weight of that water in the bucket above the surface of the water outside of the bucket will be sufficient to pull the float down and make the arm *g'* act upon the trip-rod *e* so as to move it toward the left just past the vertical position, and then the overweight *d* will cause the trip-rod to fall toward the left to the position shown in Fig. 1 and thus open the water valve *O* and close the steam valve *P* through the medium of the U-trips *m* and *m'* acting upon the arms *h* and *h'* respectively. If during the process of forcing the water from the secondary vessel into the primary vessel there is more water forced into the primary vessel than is required to fill it this excess of water will be discharged through the check valve *N* into the discharge pipe *K*. And if no water be supplied to the pipe *I* to the device it may still work although somewhat slowly, for in this case the steam in the secondary vessel will be condensed only because of the radiation from the parts thereof. But this condensation will be sufficient in some cases to cause the water to be drawn from the primary vessel into the secondary and rise therein to a level sufficient to operate the valve mechanism. It is, however, preferable to have water supplied to the device through the pipe *I*, as then the operation is more rapid and certain.

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

1. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel and having means whereby flow therethrough from said vessel is prevented, a discharge pipe connected to said primary vessel and having means whereby flow therethrough into said vessel is prevented, an air valve on said secondary vessel, a steam pipe connected to said secondary vessel, and means whereby steam from said steam pipe is alternately admitted to and debarred from said secondary vessel, substantially as described.
2. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel and having means whereby flow therethrough from said vessel is prevented, a discharge pipe connected to said primary vessel and having means whereby flow therethrough into said vessel is prevented, an air

valve on said secondary vessel, a steam pipe connected to said secondary vessel, a water pipe connected to said secondary vessel, and means whereby steam from said steam pipe and water from said water pipe are alternately admitted to said secondary vessel, substantially as described.

3. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel at the top thereof and having means whereby flow therethrough from said vessel is prevented, a discharge pipe connected to said primary vessel at the top thereof and having means whereby flow therethrough into said vessel is prevented, an air valve on said secondary vessel, a steam pipe connected to said secondary vessel, and means whereby steam from said steam pipe is alternately admitted to and debarred from said secondary vessel, substantially as described.

4. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel at the top thereof and having means whereby flow therethrough from said vessel is prevented, a discharge pipe connected to said primary vessel at the top thereof and having means whereby flow therethrough into said vessel is prevented, an air valve on said secondary vessel, a steam pipe connected to said secondary vessel, a water pipe connected to said secondary vessel, and means whereby steam from said steam pipe and water from said water pipe are alternately admitted to said secondary vessel, substantially as described.

5. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel at the top, a check valve in said suction pipe, a discharge pipe connected to said primary vessel at the top, a check valve in said discharge pipe, an air valve on said secondary vessel, a steam pipe connected to said secondary vessel, a steam valve in said steam pipe, and means whereby said steam valve is opened when the water is at a certain high level in said secondary vessel and whereby said steam valve is closed when the water is at a certain low level in said secondary vessel, substantially as described.

6. A pump device comprising a closed primary vessel, a closed secondary vessel, a pipe connecting said vessels near the bottom, a suction pipe connected to said primary vessel at the top, a check valve in said suction pipe, a discharge pipe connected to said primary vessel at the top, a check valve in said

discharge pipe, an air valve on said second-
ary vessel, a steam pipe connected to said
secondary vessel, a steam valve in said steam
pipe, a water pipe connected to said second-
5 ary vessel, a water valve in said water pipe,
and means whereby said steam valve is
opened and said water valve is closed when
the water has reached a certain high level in
said secondary vessel and whereby said steam
10 valve is closed and said water valve is

opened when the water has reached a certain
low level in said secondary vessel, substan-
tially as described.

In testimony whereof I have signed my
name to this specification in the presence of 15
two subscribing witnesses.

JOHN H. KINEALY.

Witnesses:

BELLE TIERNEY,
THERESA SUEME.

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