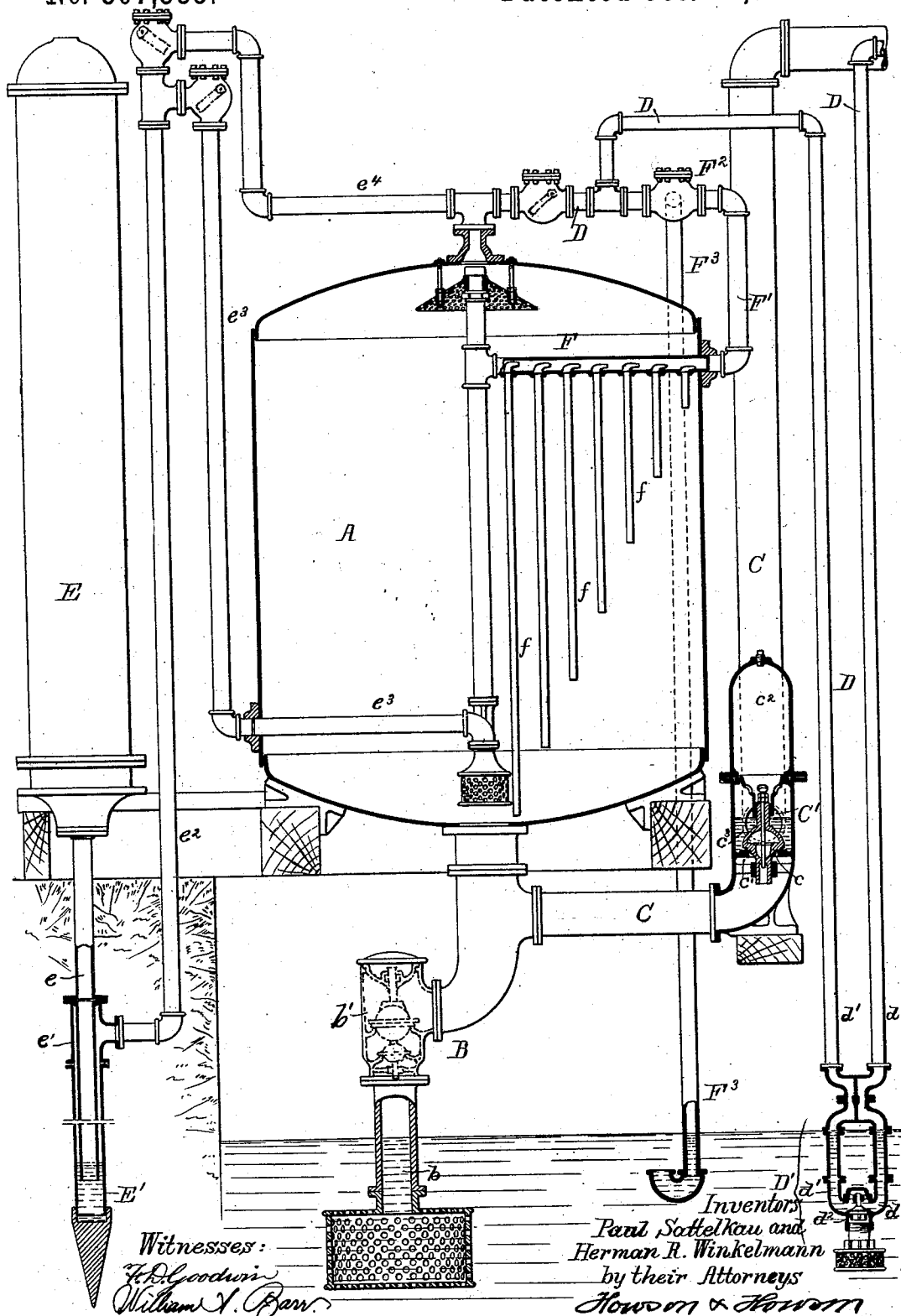


(No Model.)

P. SATTELKAU & H. R. WINKELMANN.
STEAM VACUUM WATER ELEVATOR.

No. 507,335.

Patented Oct. 24, 1893.



Witnesses:

Ed. Goodwin
William V. Barr

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UNITED STATES PATENT OFFICE.

PAUL SATTELKAU AND HERMAN R. WINKELMANN, OF PHILADELPHIA,
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STEAM VACUUM WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 507,335, dated October 24, 1893.

Application filed May 22, 1893. Serial No. 475,108. (No model.)

To all whom it may concern:

Be it known that we, PAUL SATTELKAU and HERMAN R. WINKELMANN, both citizens of the United States, and residents of Philadelphia, Pennsylvania, have invented certain Improvements in Steam Vacuum Water-Elevators, of which the following is a specification.

The object of our invention is to prevent the admission of air into the vacuum tank of a steam vacuum water elevator. This object we attain by providing a water seal for all the inlet and discharge pipes. We have found that an ordinary mechanical check cannot be relied upon.

The view in the accompanying drawing illustrates the water elevator in elevation, with the tank and other portions of the apparatus in section.

A is the tank supported in any suitable manner above the water in the well M.

B is the inlet pipe, the portion *b* of the pipe extending below the water line of the well forming an air seal for the said inlet pipe. This pipe is also provided with a check valve *b'* of the ordinary construction.

C is the outlet or discharge pipe having a valve structure *C'* in which is a valve *c* adapted to rest upon a seat *c'*. This valve acts to prevent the return of water through the pipe after it has been discharged from the tank.

*c*² is a water dome mounted directly above the valve *c* so that the water as it is discharged from the tank will flow into this dome *c*² as well as through the outlet pipe, and when the tank is emptied or the steam is cut off the valve *c* will first close resting upon its seat *c'* and the water in the dome *c*² will flow into the chamber above the valve and form a water seal *c*³, as clearly shown in the drawing.

The steam inlet pipe D is connected to the upper portion of the tank A and extends down into the well below the water level in the form of a loop, the water entering both arms *d*, *d'* of the loop, through a valved opening *d*² in the base of the loop. When steam is passing through the pipe D it closes the valve in the loop and forces the water already in the loop ahead of it and into the tank A, but as soon as steam is cut off the valve will open and water will flow into both arms of the loop to the level of the water in the well forming

a water seal for the pipe D. It will be understood that this loop may extend into a separate water tank and the same result will be accomplished but the arrangement shown is preferable.

The steam discharge pipe F having the depending tube *f* for carrying off superfluous steam is connected to a pipe F' which in turn is connected to a steam actuated valve structure F² and this valve structure is connected to an exhaust pipe F³ extending below the water line and is preferably turned as shown. The water from the well will seek its level in the pipe forming a water seal for the steam exhaust pipe.

E is the spray reservoir open to the atmosphere at the top and connected to the tank by the pipes *e*, *e'*, *e*², *e*³ and *e*⁴. The pipes *e*, *e'* extend beyond the suction limit of the vacuum tank and communicate at this point. We preferably extend them below the suction limit and mount one pipe within the other forming at all times a water seal E' preventing air which would otherwise leak through the pipes from gaining access to the vacuum tank.

The operation of the apparatus is as follows:—The tank being charged with water steam is admitted through the pipe D to force the water out of the tank through the discharge pipe C, the water in the loop of the steam pipe being forced ahead of the steam. The valve in the loop being closed, the water pressure in the pipe C will open the valve *c* and water will be discharged past the valve. A certain proportion of the water will enter the water dome and will remain there until the tank is emptied or the steam cut off, when the valve *c* will close and the water in the dome will form a water seal *c*³ above the valve. A certain proportion of the water discharged from the tank A will be forced through the pipe *e*³ and pipes *e'*, *e* into the spray reservoir E and when the steam is cut off the water in the spray reservoir will flow back into the tank through the pipes *e*, *e'* and *e*⁴ forming a spray which will quickly condense a certain proportion of the steam in the tank and will form a partial vacuum and water will be drawn from the well through the inlet pipe B into the tank. The water seal E' will not be broken

as it is beyond the suction limit of the tank. A certain proportion of the steam in the tank escapes through the pipe *f*, manifold *F* and exhaust pipe *F*³, but as soon as the steam has
5 escaped the water seal *f'* in the pipe *F*³ is formed.

Thus it will be seen that by the above construction all the inlets and outlets of the tank are water sealed preventing air leaking into
10 the tank through either the inlets or the outlets.

We claim as our invention—

1. A steam vacuum water tank having all its inlets and outlets water sealed, substantially
15 as specified.

2. The combination of a vacuum tank, the suction tube extending into the well, the water discharge pipe, a water seal and valve therefor, a steam supply pipe adapted to be
20 coupled to a source of steam supply, a water seal in said pipe when the pipe is uncoupled, a steam discharge from the tank, a water seal therefor, a spray reservoir, connecting pipes forming communication between the tank and
25 the reservoir, said pipes having a water seal that will not be broken by the suction caused

by the partial vacuum formed in the tank, the whole combined substantially as and for the purpose set forth.

3. The combination of the tank, the inlet 30 therefor, the discharge pipe, the steam inlet, and the spray reservoir and connections, a valve in the water discharge pipe adapted to open when steam is admitted to the tank to discharge the water past said valve, and a 35 dome above the valve into which a certain quantity of water is forced during the passage of water through the pipe, so that when the valve closes, the water from the dome will fall into the space above the valve, and be re- 40 tained there by the valve forming a water seal, for the water discharge pipe, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of 45 two subscribing witnesses.

PAUL SATTELKAU.
HERMAN R. WINKELMANN.

Witnesses:

H. F. REARDON,
FRANK E. BECHTOLD.