

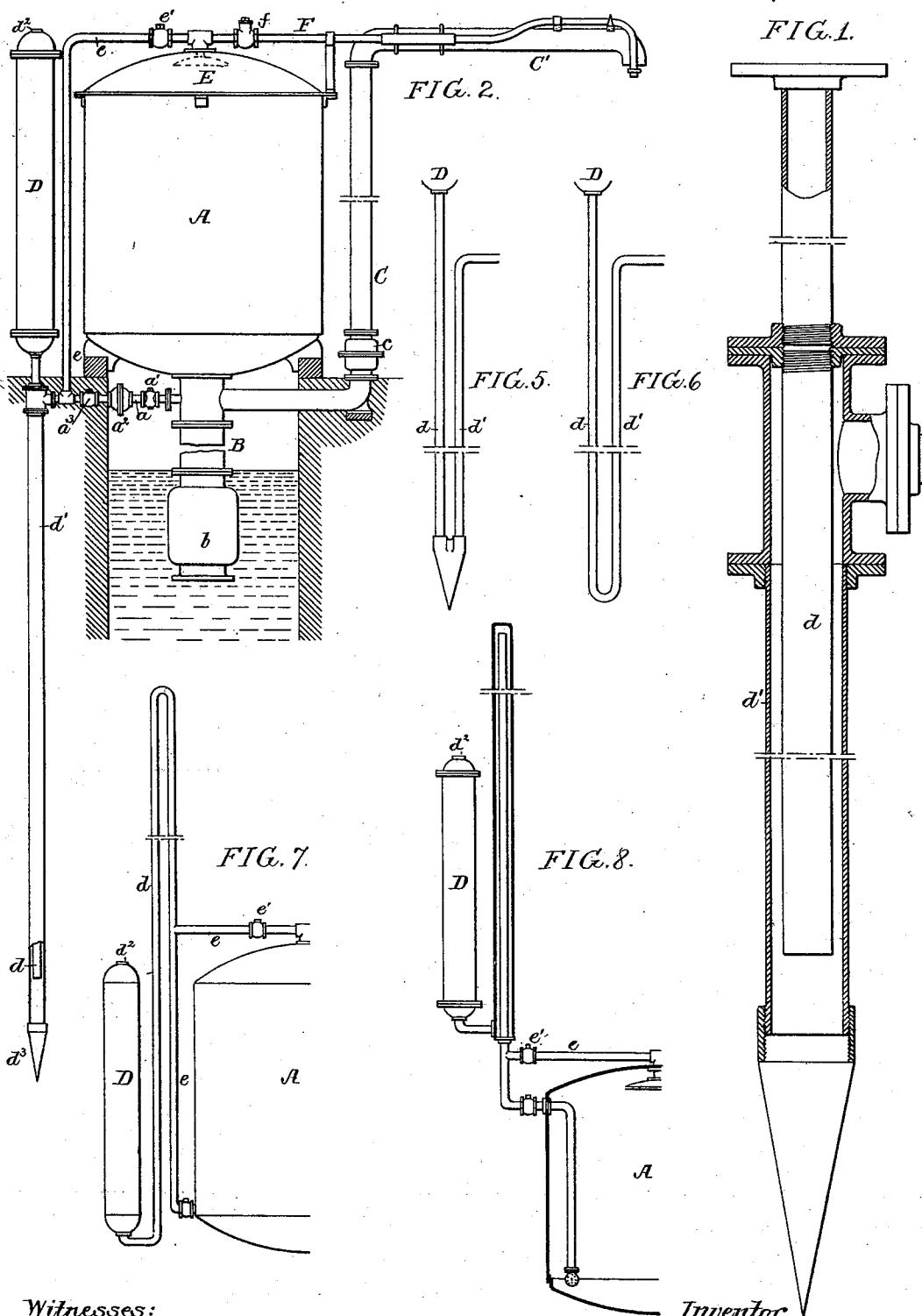
(No Model.)

3 Sheets—Sheet 1.

P. SATTELKAU.
VACUUM WATER ELEVATOR.

No. 507,334.

Patented Oct. 24, 1893.



Witnesses:
Alex. Barkoff
Joseph A. Klein.

Inventor
Paul Sattelkau
by his Attorneys
Howman & Howman

(No Model.)

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FIG. 3.

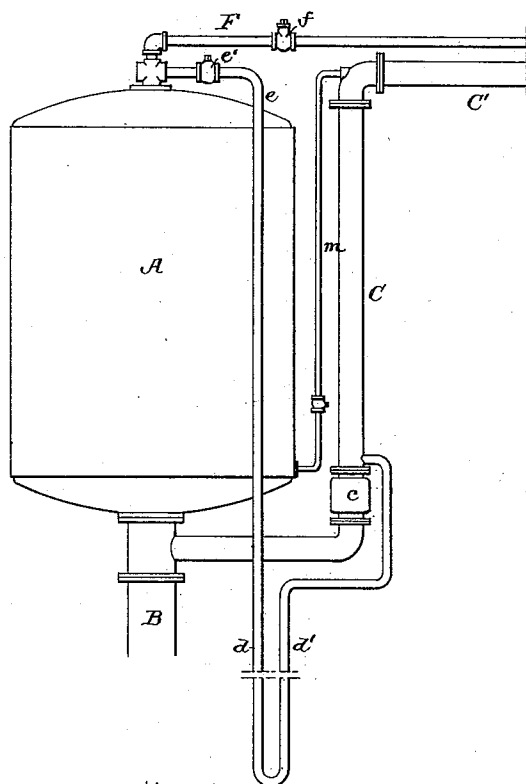
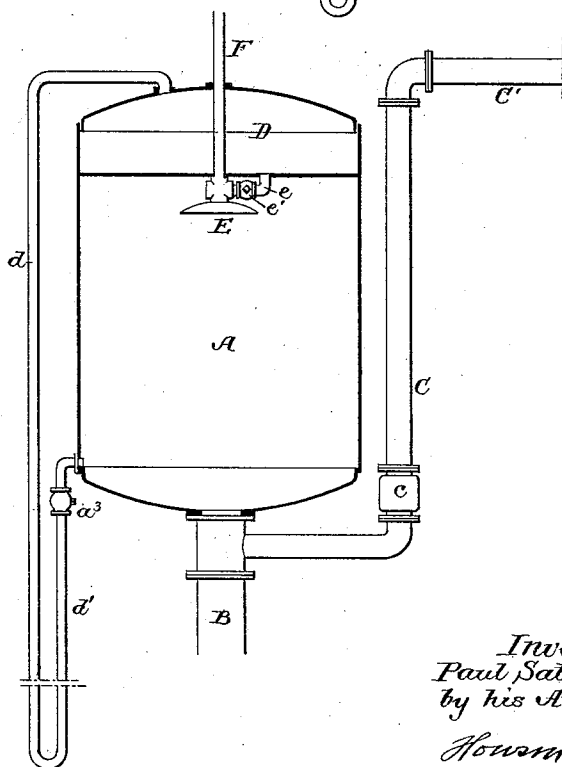


FIG. 4.



Witnesses:
Alex. Barkoff
Joseph H. Klein.

Inventor
Paul Sattelkau
by his Attorneys
Housen & Housen

(No Model.)

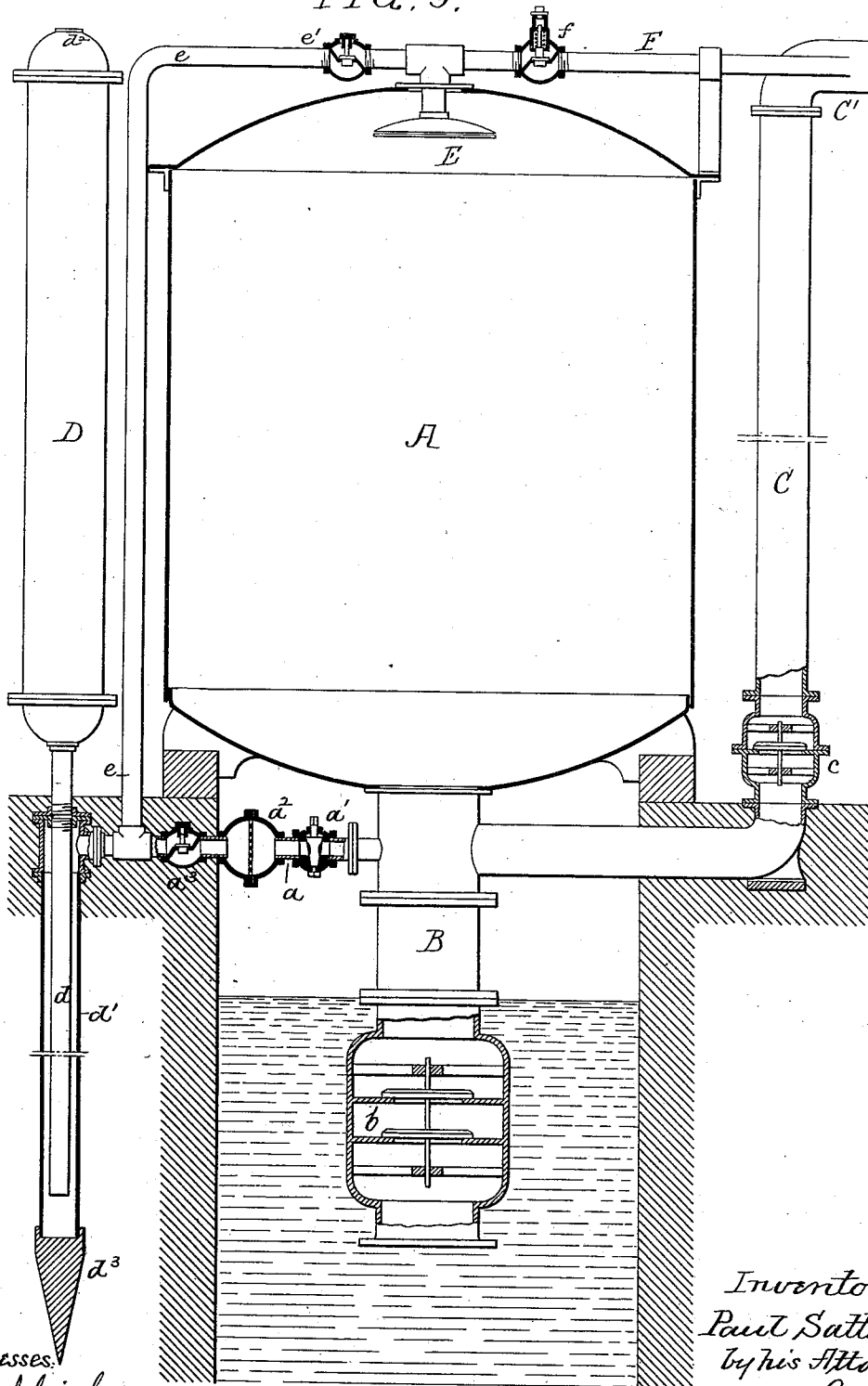
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FIG. 9.



Witnesses.
R. Schleicher.
Hamilton D. Turner.

Inventor
Paul Sattelkau
by his Attorneys
Horn & Horn

UNITED STATES PATENT OFFICE.

PAUL SATTELKAU, OF PHILADELPHIA, PENNSYLVANIA.

VACUUM WATER-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 507,334, dated October 24, 1893.

Application filed May 10, 1893. Serial No. 473,651. (No model.)

To all whom it may concern:

Be it known that I, PAUL SATTELKAU, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain

Improvements in Vacuum Water-Elevators, of which the following is a specification.

My invention relates especially to water elevators in which steam is used to force water out of the tank, the steam being afterward condensed, forming a partial vacuum in the tank which will fill again with water by suction.

The object of my invention is to provide an air seal in the stand pipe structure so that the breaking of the vacuum by air is avoided, as fully described hereinafter.

In the accompanying drawings:—Figure 1, is a view of my improved air seal. Fig. 2, is a view in elevation of a vacuum water elevator illustrating my invention. Figs. 3 and 4, are views illustrating different applications of the invention. Figs. 5 and 6, are modifications of the air seal; and Figs. 7 and 8, are views showing further modifications. Fig. 9, is an enlarged view, partly in section, illustrating the tank and its valves.

I will describe my invention in connection with a water elevator for railroad purposes, for feeding the tender tanks of locomotives, but it will be understood that my invention can be used in connection with any water elevator using the vacuum system.

A is the tank of the water elevator.

B is the inlet pipe from the source of supply, having an inlet valve *b*.

C is the outlet pipe connected to the gooseneck *C'*, which overhangs the track in the present instance. The pipe C has a check valve *c* to prevent the admission of air into the tank through said pipe.

D is the reservoir for holding a sufficient supply of water to condense the steam in the tank. This reservoir D receives its supply of water from the main tank A through the pipe *a* and the pipes *d* and *d'*. These pipes *d* and *d'* extend down to a point below the suction limit of the tank, and as shown in Fig. 1, the pipe *d* is arranged within the pipe *d'*, and terminates at a point above the end of said pipe so as to allow the water to flow from one pipe to the other, and yet allow sufficient space for the accumulation of mud.

I preferably arrange in the pipe *a*, a valve *a'* for controlling the supply of water to the reservoir D; a water filter *a²* and a check valve *a³*, the check valve preventing the water flowing from the stand pipe into the pipe *a*. Connected to the pipe *a* is an outlet pipe *e* attached to the sprayer E, situated in the upper portion of the tank, and this pipe has a check valve *e'* to prevent back pressure, and the flow of steam through the pipe.

F is a steam pipe connected to the sprayer E, which has steam passages independent of the water passages. This steam pipe is connected to the steam pipe of the locomotive or other source of steam supply, and has a suitable regulating valve to regulate the flow of steam through the pipe. The pipe is also provided with an air check valve *f* to prevent air entering the tank when steam is cut off.

In the upper end of the reservoir is an air vent *d²* to allow the water to readily flow into or out of the reservoir. Attached to the end of the pipe *d'* is a point *d³* arranged so that the pipe can be driven into the ground when required.

In Fig. 3, I have shown an arrangement of parts which enable me to utilize the discharge pipe from the tank as the reservoir for the spray water; the air seal pipe extends from a point above the valve *c* to a point beyond the suction limit of the tank and then to the spraying device at the top of the tank. A tube *m* is used to connect the upper portion of the outlet pipe with the base of the tank, or the lower portion of the pipe so that the steam will not force all the water out of the pipe, but leave an amount therein sufficient to form a spray.

In Fig. 4, I have shown the reservoir D in the upper portion of the tank casing. It will be understood that the reservoir may be placed at any point or in any position, providing it will allow the flow of water to the tank at the proper time, to form a spray and condense the steam for the purpose described.

In Fig. 5, I have shown the pipe *d'* coupled to the pipe *d*, and in Fig. 6, I have shown the pipes *d* and *d'* combined and looped. This arrangement may be used when it is not required to drive the pipes into the ground.

The operation is as follows: I would state that the device shown is a railway water

tank for supplying the tenders of locomotives with water, and is arranged adjacent to the track and close to a supply of water. The supply pipe B extends down below the natural water line, while the pipes *d*, *d'* extend considerably below the water line, and beyond the suction limit of the tank, so that in no case could the tank bring the water from the bottom of the pipes *d*, *d'* and break the water seal. If, for instance, the tank is filled with water, steam is admitted to the pipe F and forces the water out of the tank through the outlet pipe C, at the same time forcing water through the pipe *a* and pipes *d*, *d'* into the reservoir D. When the tank is emptied of water, the steam is cut off, and as the steam immediately commences to condense, the water in the reservoir D returns to the tank through the pipes *d*, *d'* and pipe *e*, discharging through the sprayer E, and thus condenses the steam in the tank forming a partial vacuum, and as this partial vacuum is formed, water flows through the inlet pipe B into the tank filling it to the proper level. The reservoir is arranged in such position in respect to the tank, that the desired pressure is attained.

In Figs. 7 and 8, I have shown the pipes *d*, *d'* extending upward beyond the suction limit instead of down below the suction limit; the reservoir D may be arranged on the same level as the tank, Fig. 7, or elevated as shown in Fig. 8. The construction shown in Figs. 7 and 8 may be used when it is impossible to extend the pipes below the suction tank.

By the above described apparatus the accurate working of the tank is insured, as the water seal in the pipes *d*, *d'* cannot be broken to admit air into the tank and break the vacuum. It will be understood that my improved water elevator can be used not only for the supply tanks of railways, but in any instance where a supply of water is desired.

I claim as my invention—

1. The combination of a tank, a reservoir, water supply and outlet for the tank, with an air seal communicating with the tank and the reservoir, said air seal being beyond the suction limit of the tank, substantially as described.

2. The combination of the tank, the water inlet and the water outlet therefor, a steam supply pipe entering the tank at the top, a reservoir, pipes forming communication between the reservoir and the upper and lower portions of the tank, and extending beyond the suction limit of the tank, substantially as described.

3. The combination of the tank A, the supply pipe B, the outlet pipe C, the steam pipe F, pipes *a* and *e*, valves in said pipes, pipes *d*, *d'* extending below the suction limit of the tank forming a water seal, with a reservoir extending above the base of the tank, and connected with the pipe *d*, substantially as described.

4. The combination of the tank, the inlet and outlet therefor, a reservoir, a pipe *d* connected to said reservoir, a pipe *d'* incasing said pipe *d* and connected with the reservoir, said pipes *d*, *d'* extending beyond the suction limit of the tank, substantially as described.

5. The combination of the tank, inlets and outlets therefor, a reservoir, pipes *d* and *d'* forming the communication between the reservoir and the tank, and extending below the suction line of the tank, with a point *d*³ on one of said pipes so that the pipes can be driven into the ground, substantially as described.

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

PAUL SATTELKAU.

Witnesses:

H. F. REARDON,
WILLIAM A. BARR.