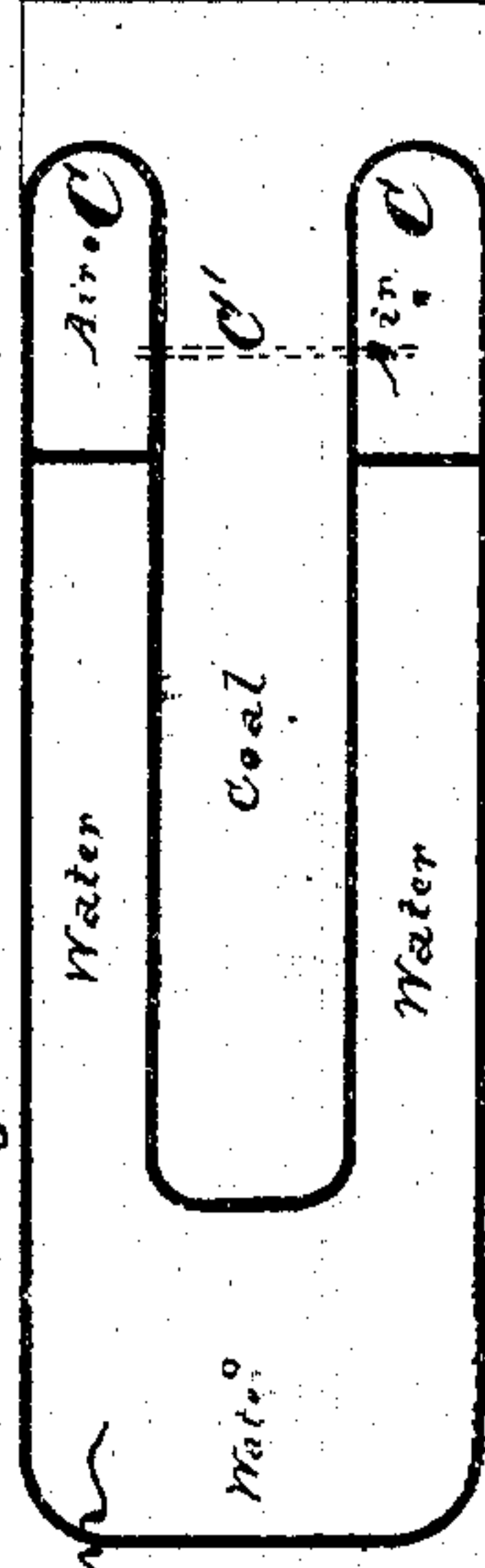
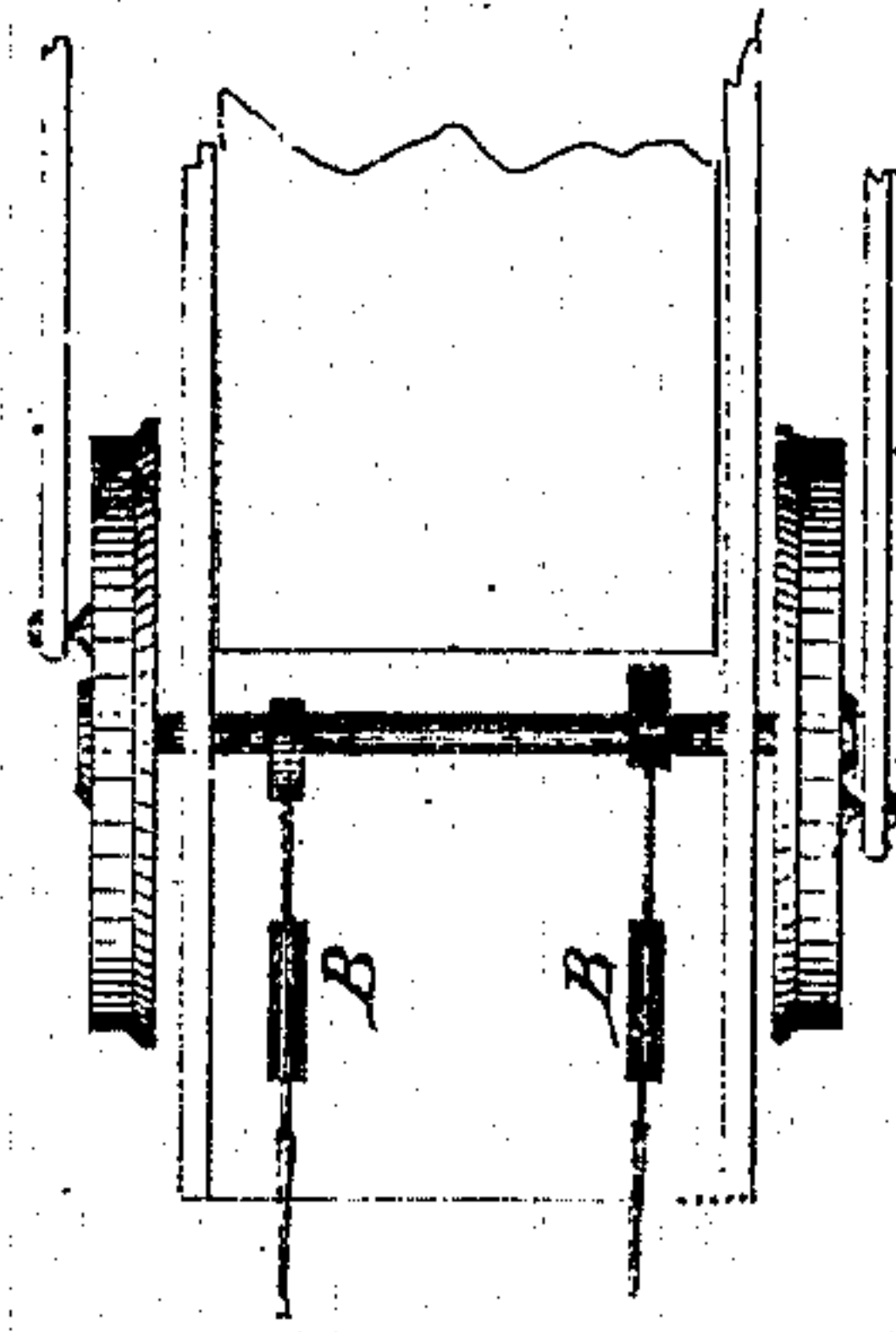
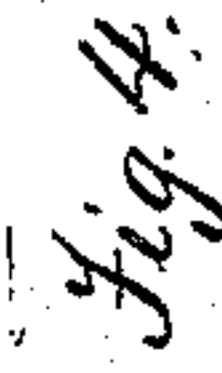
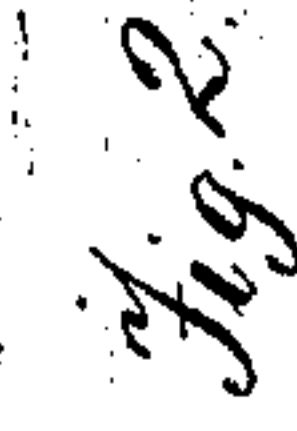
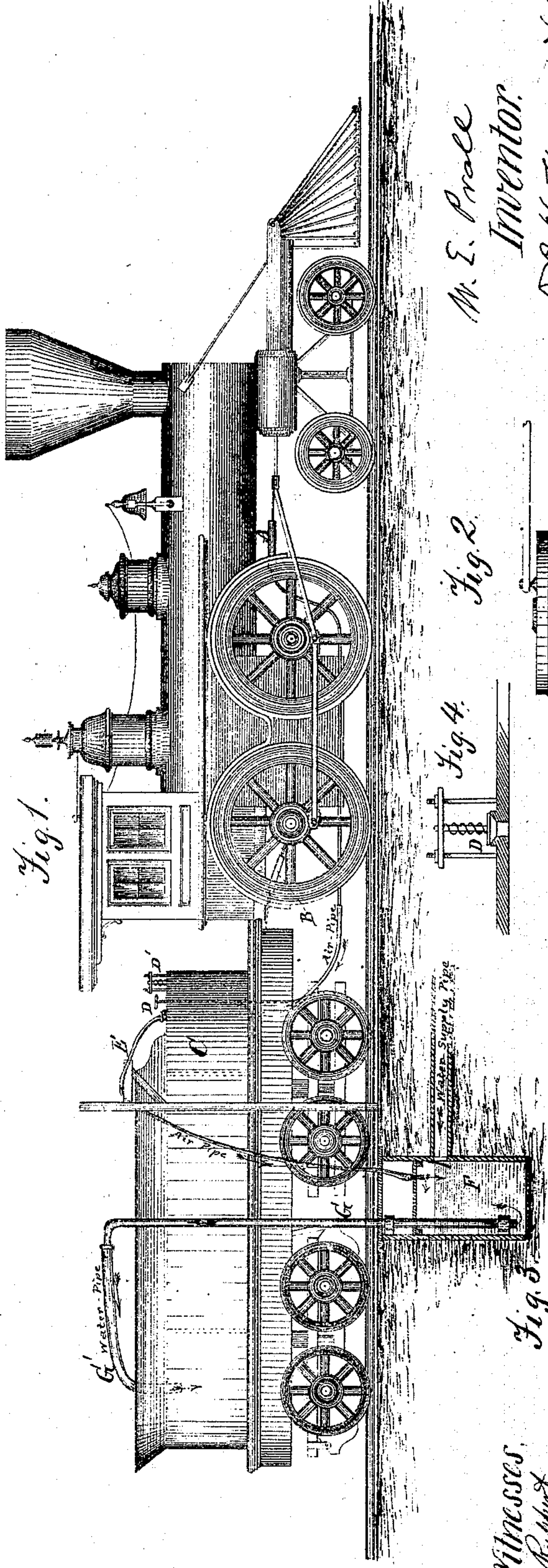


Wm. F. Prall.  
Supplying Locomotive Tenders  
with Water.  
PATENT

116752

PATENTED JUL 4 1871



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Dec 21 - 1874



# UNITED STATES PATENT OFFICE.

WILLIAM E. PRALL, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO HIMSELF AND J. M. BLANCHARD & CO., OF SAME PLACE.

## IMPROVEMENT IN DEVICES FOR SUPPLYING LOCOMOTIVE-TENDERS WITH WATER.

Specification forming part of Letters Patent No. 116,752, dated July 4, 1871.

*To all whom it may concern:*

Be it known that I, WILLIAM E. PRALL, of the city and county of Washington and District of Columbia, have invented a new and useful Improvement in Means for Supplying Locomotive-Tenders with Water; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing making part of this specification, in which—

Figure I is an elevation of a locomotive and its tender, a section of the rails upon which it runs, a water-tank which is placed by the side of the tender and having an induction-pipe for water and one for air, and an eduction water-pipe attached to it. Fig. II is a detached plan view of a portion of a locomotive, showing how air-pumps may be attached thereto. Fig. III is a plan view of the tank of a locomotive-tender, showing reservoirs for water, air, and a space for coal or other fuel; and Fig. IV is an elevation of a safety-valve.

Corresponding letters refer to corresponding parts in the several figures.

This invention relates to the supplying of the tenders of locomotives with water; and it consists in a novel combination and arrangement of devices for that purpose, as will be more fully explained hereinafter.

The production of some better means than those now in use for supplying the tenders of locomotives with water has become a necessity which is felt and acknowledged by many railroad men, and hence the efforts which have recently been made and are now being made to furnish such means. The usual means employed for effecting this result consist of a pump for running water from a well or reservoir placed below the surface of the earth, a tank or reservoir placed at a sufficient height above the tank to admit of the water being drawn from it to the tank, a house to cover such tank to keep it from freezing, and the necessary means for warming such house in cold weather.

I am aware that tanks have been sunk in wells and the water permitted to flow into them, so that when the train arrived a connection could be made with the boiler of the locomotive and steam admitted to the tank in the well, and the

water driven into the tank upon the tender by the pressure of the steam; but this plan has been found to be objectionable on account of the rapid condensation of the steam in the cold tank.

My invention has for its object the production of a cheap and reliable means of producing the result above named, and which shall be free from the objections which may be urged against the foregoing and others now in use.

In carrying out my invention an ordinary locomotive is used, the only change required in it being that an air-pump or pumps should be attached to it in some convenient place, to be worked by some of the moving parts thereof for compressing air into a suitable reservoir, so that upon the arrival of the train at any station such air may be used to force water into its tank. The air-pump or pumps may be placed at the point indicated by A in the drawing and be worked directly from the cross-head; or it may be under the foot-board, as indicated by B B, and worked by an eccentric upon the driving-wheel shaft; or it may be located in any desired position and be driven by any of the rolling parts of the machine which will give the requisite movement. These air-pumps may be of any approved form of construction, and be connected with reservoirs for the reception of the air by suitable pipes and flexible hose, as shown in the drawing.

For the purpose of preserving the general appearance of the engine and tender, and facilitating the application of my plan to the engines and tenders now in use, the reservoirs for the air are shown as being located in the front ends of the legs of the tank, their positions being indicated by C C. To adapt the tanks now in use upon tenders to this purpose it will only be necessary to remove a portion of the front end of each leg or arm of such tank, and replace it with iron of sufficient strength to hold air when compressed sufficiently to expel water from a reservoir placed below the surface of the earth and deliver it into the tank upon the tender. When using the air-reservoir in the positions indicated, a pipe, C', is made to extend from one to the other beneath the floor of the tender, or it may pass through the water-space of the tender for the purpose of equalizing at all times the pressure in the two reservoirs. These reservoirs may, if preferred,



be of different construction and be placed within or between the two arms of the tank, they or it being of such thickness or depth as to form the floor upon which the fuel rests; or a reservoir may be made in any suitable form and be suspended underneath the frame of the tender or of the foot-board of the engine.

When the air-reservoir is placed, it is to be provided with the means for attaching to it the indicated pipe or hose, and with a valve or cock for closing the induction-aperture when the reservoir has been filled, or when it is necessary to separate the engine and tender; and also with convenient means for attaching thereto the eduction-pipe or hose which leads the air to the reservoir which contains the water. At D in the drawing there is shown one method of operating the induction-valve or cock, it consisting of a rod which passes up through the air-reservoir and is provided with a handle or wheel upon its upper end. Upon the upper portion of each of the air-reservoirs there is to be placed a nozzle, its outer end being provided with a screw-thread or other means for attaching thereto the eduction-pipe or hose E, which leads therefrom to the water-reservoir. This nozzle is also to be provided with a suitable valve or cock for closing its aperture when the hose is detached therefrom, and for regulating the amount of air which shall pass to the water-reservoir in a given time, and thus regulating the pressure within said water-tank. To prevent an undue pressure from obtaining within the tank C, a safety-valve, D', is attached to the air-reservoir, which is capable of being set to different pressures, in order that, when the air has been compressed to a certain limit, the valve will open and allow any surplus of air which may be forced into the tank or reservoir to escape. The eduction-pipe or hose E, which leads from the air-tank or reservoir C to the water-tank or reservoir in the ground, is to be firmly secured to the water-tank, either to its upper head or end, or to a diaphragm placed in such tank, from which point it passes up and may be supported upon a post having an arm upon it, or in any other suitable manner. For the reception of the water to be raised, a tank or reservoir, F, is placed in the ground or in a well, it being constructed in any desired form and of wood or metal or any other material which will give to it the required strength. It is believed, however, that galvanized wrought-iron will be found to be the best material out of which to construct these tanks, the proper location of which will be near the trench of the road, but far enough therefrom to allow all trains to pass without coming in contact with the pipes.

The drawing shows an induction water-pipe, which is placed below the frost-line of the earth, its inner end being controlled by a valve which opens inward, or so as to permit water to flow into the tank or reservoir, but which will be closed the moment air is admitted to form sufficient pressure in such tank. This induction-pipe is only intended to be used where running water

can be obtained for filling the reservoir, the construction of such reservoir being changed when inserted into wells or immersed in any pond or stream of water, so that the water may be admitted through perforations formed in some portion of its surface, such perforations being provided with suitable valves which open inward to admit the water, but which will be closed by the pressure applied to expel such water.

In order that the water may be conducted from the water-tank or reservoir F, which is below the surface of the earth or of the water in which it is immersed, a pipe, G, of suitable diameter, is attached to or is held in position in said reservoir, the lower end of which extends downward to near the bottom of such tank, and up through its upper end or portion and above the surface of the earth far enough to admit of there being a hose, G', attached to its upper bent end that shall carry the water to the tank of the tender. The devices for conducting the water may be varied from these herein described according to circumstances, as, for instance, where it becomes necessary to have the water-reservoir at greater distance from the track, in which case the air may be conveyed to it through a combination of hose and pipes, such pipes being permanently attached to the water-reservoir, and the other end to the air-tanks, by a flexible hose.

The following are some of the advantages which result from my arrangement: 1st, the amount of money necessary to be expended in order to supply locomotive-tenders with water is largely reduced, there being no houses to erect over or around such tanks or engines to drive costly pumps, the cost of the tank in the ground not being much, if any, more than the expense of the one made above the earth. 2d, when an arrangement of this kind is once effected no attendant is required, and of course the cost of attendance is saved. 3d, the cost of compressing the air is merely nominal, it only amounting to the first cost and maintenance of the air-pumps and the pipes, and a slight increase of cost for the tank which receives the air. The compressing of the air in such tanks being effected by pumps worked by the engine, it follows that the cost of such compression, so far as it relates to the production of power, will not be perceptible, as it may be done when descending grades, when there is always a surplus of power, which frequently has to be neutralized by the application of brakes to the wheels of the train.

My claim is not intended to be limited to any particular arrangement of parts; nor, on the other hand, does it extend to the principle of raising water from a closed tank by atmospheric pressure on its surface, for this I am aware has been often done; but

Having thus described my invention, what I do claim, and desire to secure by Letters Patent, is—

In combination with a locomotive-tender, an air-chamber, carried with the locomotive and tender for receiving and retaining atmospheric air un-



der pressure, a sunken reservoir containing water, pipes for conveying the air to the water-chamber and communicating its pressure to the surface of the water and for conveying the water to the tender, and means for conveniently forming the connection of said pipes with the air and water-chamber respectively.

In testimony whereof I have signed my name

to this specification, in the presence of two subscribing witnesses.

W. E. PRALL.

Witnesses:

EDM. F. BROWN,  
B. EDW. J. EILS.