

C. L. Stevens.

Steam Water-Elevator.

N<sup>o</sup>. 76264

Patented Mar. 31, 1868.

Fig. 1.

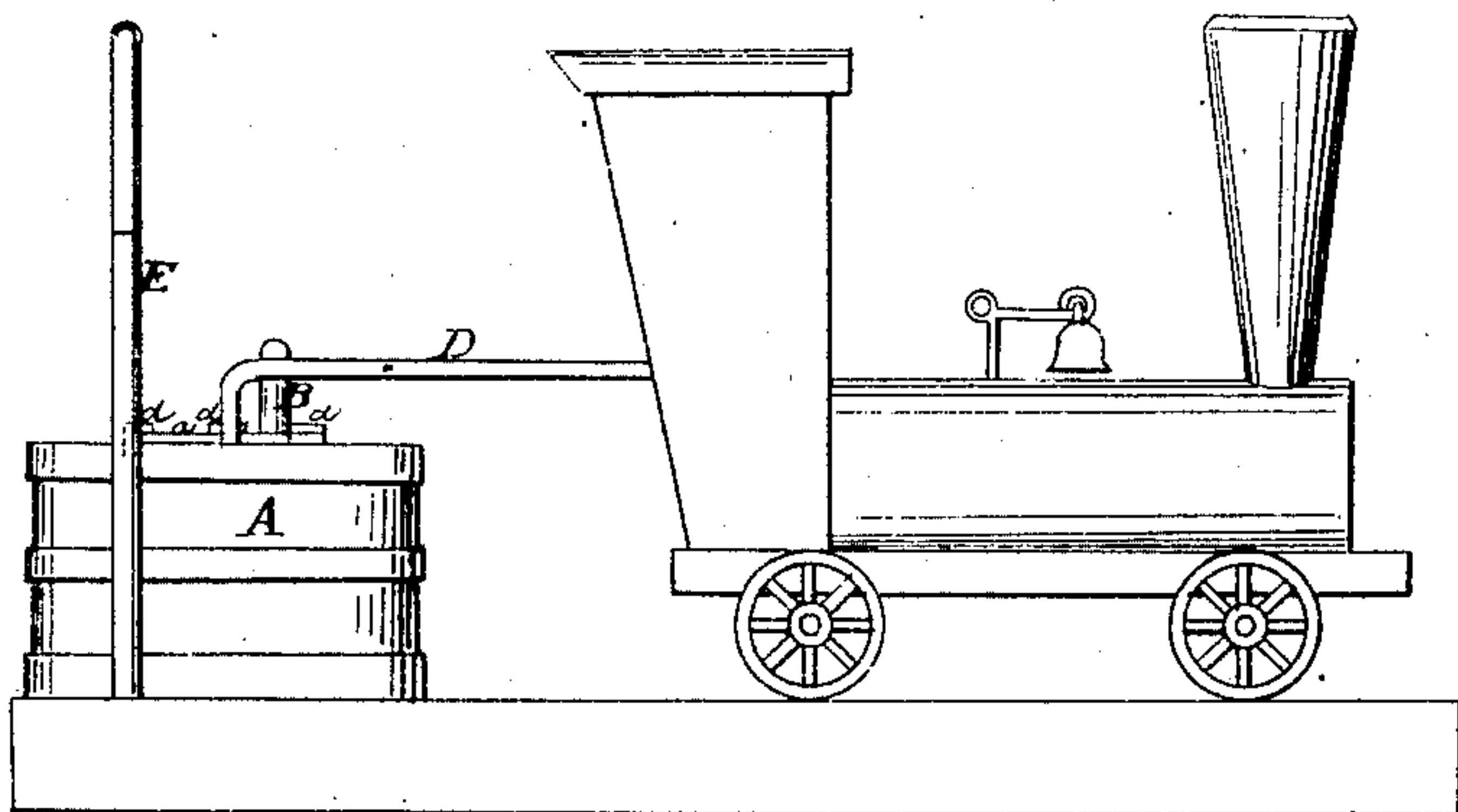


Fig. 2.

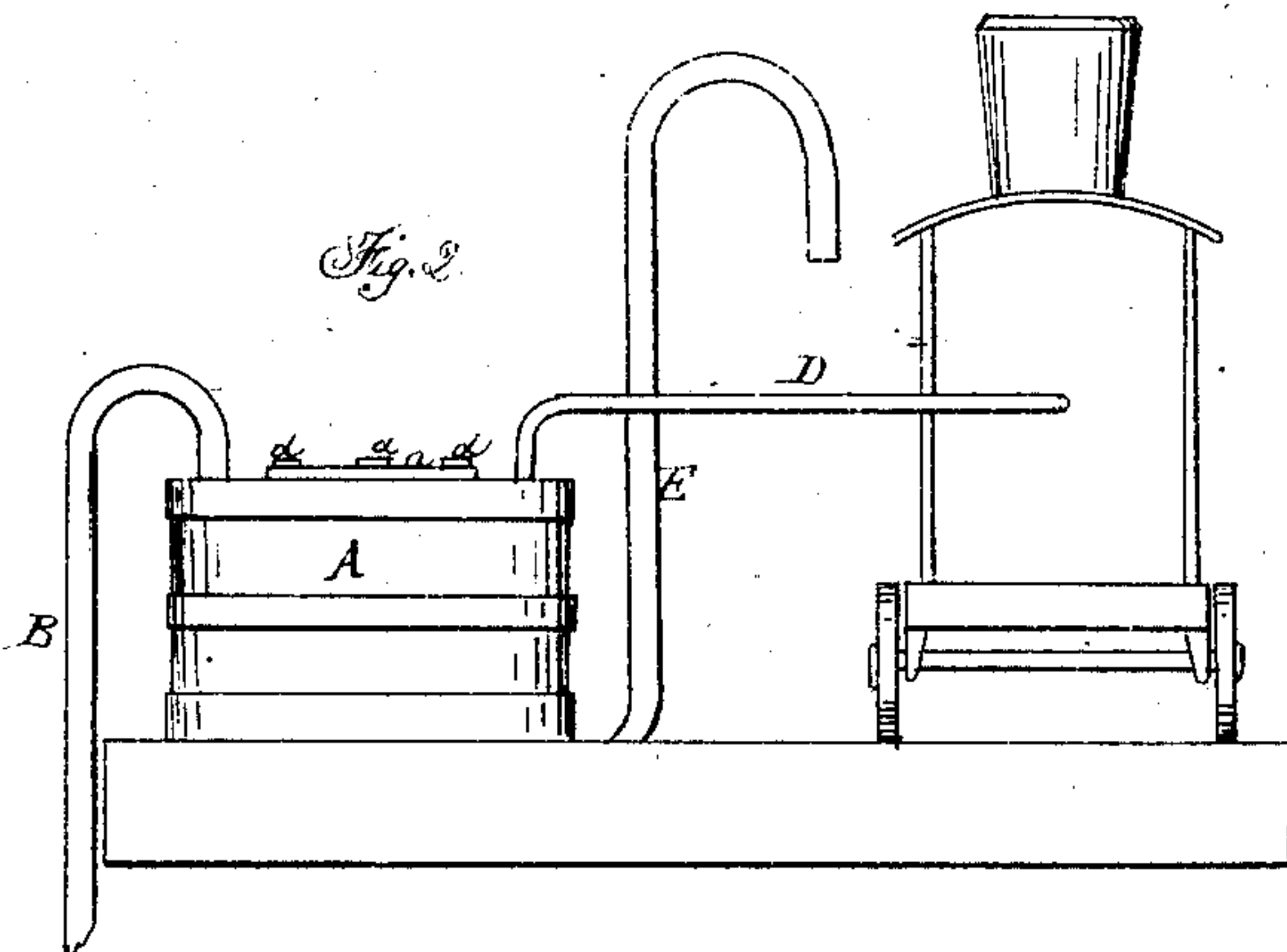


Fig. 3.

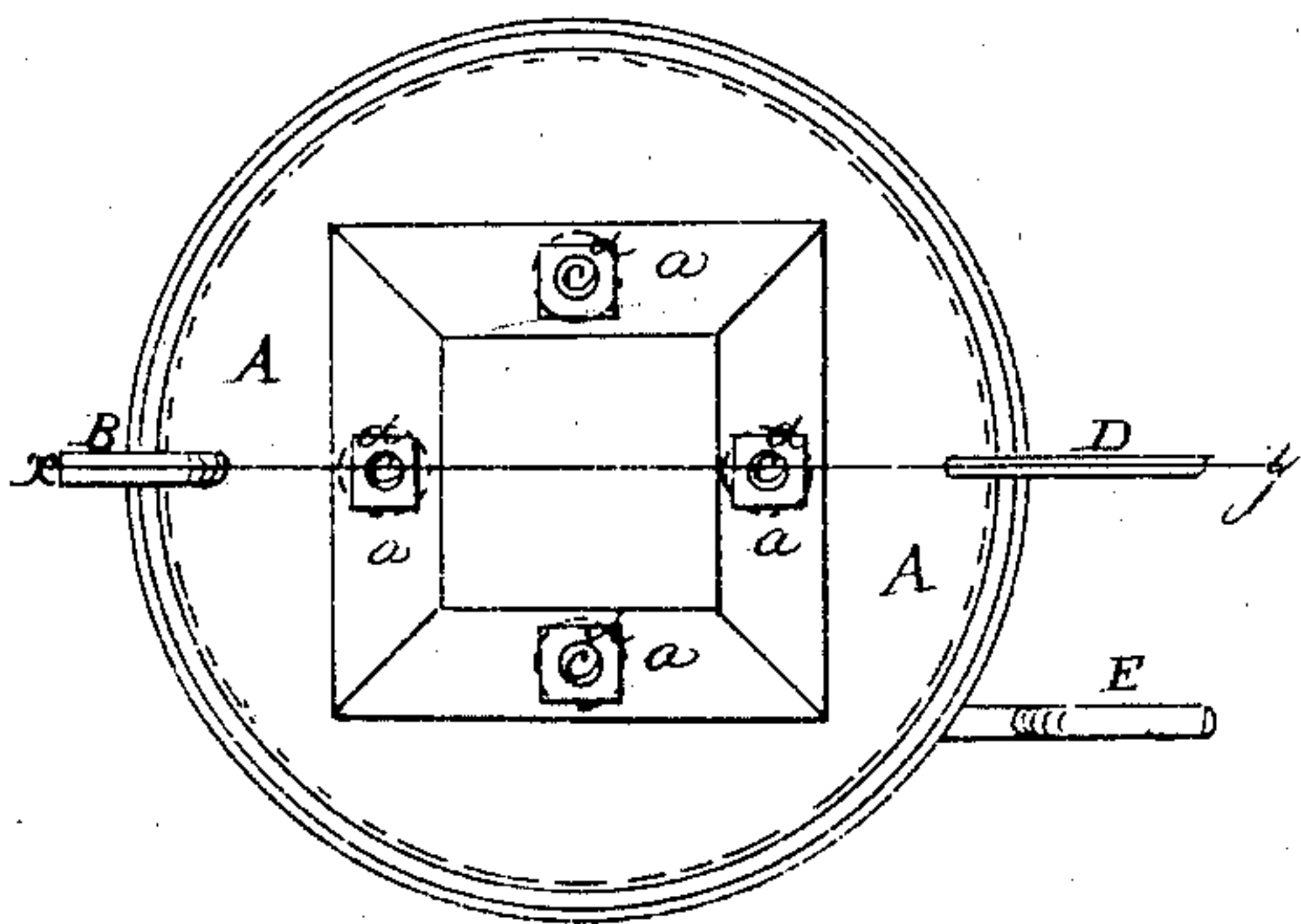
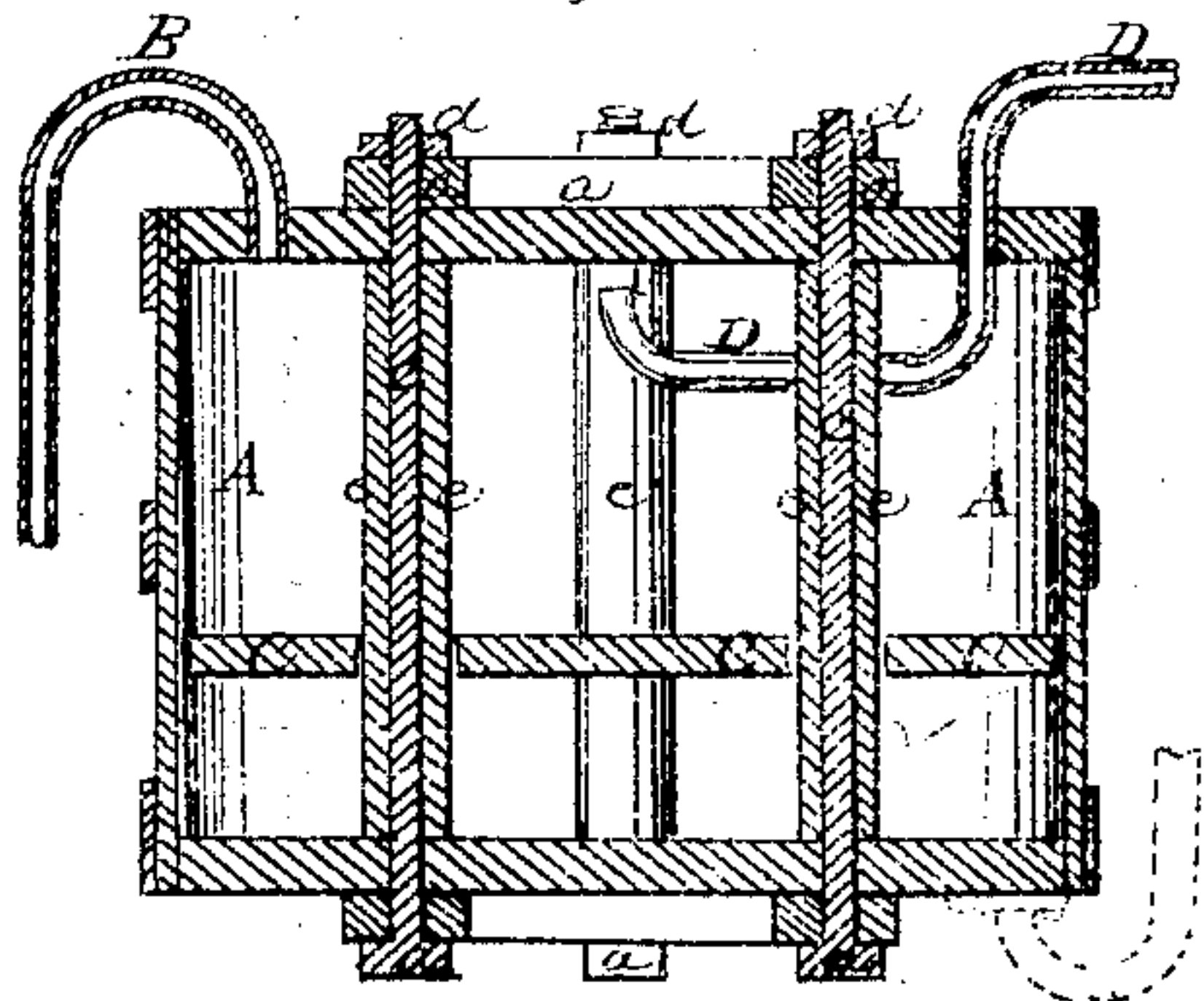


Fig. 4.



Witnesses  
James E. Fitch  
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# United States Patent Office.

CHARLES L. STEVENS, OF GALESBURG, ILLINOIS, ASSIGNOR TO HIMSELF  
AND ALBERT A. DENTON, OF SAME PLACE.

*Letters Patent No. 76,264, dated March 31, 1868.*

## IMPROVEMENT IN STEAM WATER-ELEVATORS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CHARLES L. STEVENS, of the city of Galesburg, in the county of Knox, and State of Illinois, have invented a new and useful Improvement in Steam-Vacuum Water-Elevators; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of the tank and locomotive as the locomotive-tender is being filled from tank.

Figure 2 is a back or end view of same, showing the connections of the pipes.

Figure 3 is a top view of the tank.

Figure 4 is a vertical section of the tank as indicated by the line *xy* of fig. 3.

Like letters in the different figures of the drawings indicate like parts.

The nature of my invention consists in the construction of a wooden air-tight tank, for elevating water by steam, with the required strength to endure atmospheric and steam pressure, by means of iron bolts and battens which support the tank outwardly and prevent liability of bursting, and of wooden casings over the iron bolts supporting the ends of tank inwardly; the wooden casings also preventing the steam from coming in contact with the metallic bolts, and thus condensation is avoided, and a complete air-tight non-condensing tank and steam water-elevator is secured at less than one-fourth the cost of tanks for this purpose made entirely of iron, or of those made of iron and lined with wood.

To enable any one skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

### *Construction.*

I construct a tank, A, of wood or other non-condensing material, the sides of which are circular, and are made of staves of any required thickness and width. The ends are made of planks, of suitable thickness and width, and are supported and strengthened by the battens *a a a a*, (see fig. 3,) and the iron bolts *c c c c* pass through the heads or ends of the tank, and are properly secured by nuts *d d d d*, (see fig. 4.) Wooden casings *e e e e* are placed over the iron bolts (see fig. 4) to prevent the steam from coming in contact with the metal, and thus avoiding condensation. And these casings are made with shoulders or square straight ends, so as to support the ends or heads of the tank against the atmospheric pressure, and suitable packing may be placed between the ends of the casings and the heads of the tank to render it entirely steam and air-tight. The ends of the tank are made to fit neatly inside the sides thereof, and, by the bolts and nuts, are screwed to and securely held against the ends or shoulders of the wooden casings, or the ends of the tank may be grooved into the sides, and suitable packing may be used to render it perfectly air and steam-tight, but if made to fit neatly, as above named, the grooving and packing will not be required.

B is a water-pipe, connecting with the well or cistern, and with the tank at the top, the end of said pipe passing through the top of the tank.

D is a steam-pipe, leading from the boiler to the tank, passing through the top of the tank, and the end turned up, so as to discharge the steam up against the top.

E is a discharge-pipe, connected with the tank through the bottom thereof.

The sides of the tank are supported and strengthened externally by iron hoops, which may be of any required thickness and width in proportion to the size and capacity required, and the diameter of the tank should be about three times the height, so as to make the distance that the water is to be elevated as small as practicable, and it may be placed entirely under ground, beyond the reach of frost.

### *Operation.*

The steam is introduced through the steam-pipe D, and is discharged up against the top of the tank, and the pressure is thus so distributed and communicated to the float C, as that the steam does not come in contact with the water, and thus condensation is prevented, and the pressure of the steam thus upon the float forces the water from the tank through the pipe E into the locomotive-tender, or tank, or other vessel, as required. The



water and air being thus forced out of the tank by the steam, and the tank closed by the action of proper valves, a vacuum is formed almost immediately by the steam commencing to cool and to condense, and immediately the water commences to flow into the tank through the pipe B, and is thrown upon the bottom of the tank, producing spray, which facilitates the condensation of the steam, and in a few seconds the tank will thus be filled, ready to be ejected, as above described.

I am aware that metallic air-tight tanks have been used heretofore for this purpose, but none made entirely of wood, or other non-condensing materials, and the rapid condensation of the steam, in coming in contact with the cold metal, has rendered the metallic tanks almost impracticable, owing to the great consumption of steam and the time required in ejecting the water. I have completely overcome this great difficulty by constructing the tank of wood, or other non-condensing material, and by providing the same with a float of the same material, and have fully demonstrated the same by numerous experiments, both with the iron and wooden tanks. The water could not be expelled from the iron tank, even with a heavy pressure of steam, until the water therein was heated sufficiently (that is, was boiling hot) to cause condensation in the tank to cease. But with the wooden tank there is no counteraction by condensation, and the full force of the steam is brought to bear upon the float, ejecting and elevating the water within a time and to a height in proportion to the pressure of the steam. The time required, for example, in filling the tank of a locomotive-tender is only about one-fourth the time now required to fill the same tank with the present arrangement used for that purpose on railroads, and the steam consumed is not more than is ordinarily blown off while the locomotive is standing.

Tanks made of iron, and lined with wood, are not as perfect non-condensers, and cost much more than those made entirely of wood, according to my plan.

There is no serious difficulty in making wooden tanks of sufficient strength to support all required pressure, as has been fully demonstrated by experiments with a tank, constructed as described, of forty-five barrels' capacity. The water was drawn about twenty-five feet, and the tank filled in a few seconds, and the whole quantity ejected in about one minute, elevating it about eight and a half feet, and throwing it about one hundred feet, without the slightest perceptible injury to the tank.

Having thus fully described my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

*Claim.*

The construction of a wooden air-tight tank, strengthened and supported with the iron bolts, battens, and wooden casings, substantially in the manner and for the purpose as herein set forth.

CHAS. L. STEVENS.

Witnesses:

W. BURRIS,  
JAMES E. FITCH.