

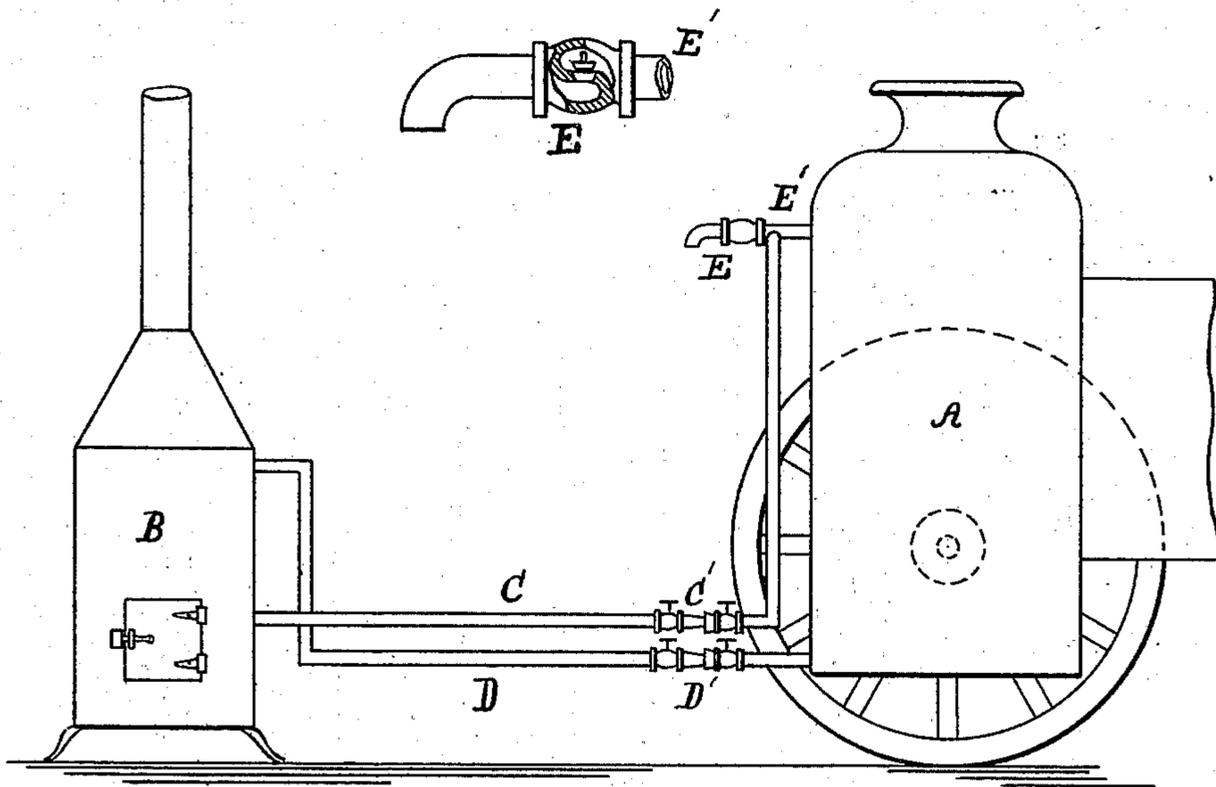
(No Model.)

C. BRESNAHAN.

VACUUM RELIEF FOR FIRE ENGINE BOILERS AND HEATERS.

No. 277,862.

Patented May 15, 1883.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

CORNELIUS BRESNAHAN, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF  
TO DANIEL BATTLE, OF SAME PLACE.

## VACUUM-RELIEF FOR FIRE-ENGINE BOILERS AND HEATERS.

SPECIFICATION forming part of Letters Patent No. 277,862, dated May 15, 1883.

Application filed January 12, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CORNELIUS BRESNAHAN, of Detroit, county of Wayne, State of Michigan, have invented a new and useful Improvement in Vacuum-Reliefs for Fire-Engine Boilers and Heaters; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawing, which forms a part of this specification.

My invention consists in the combinations of devices and appliances hereinafter specified, and more particularly pointed out in the claims.

The drawing represents in elevation a device embodying my invention, showing parts in section.

Heretofore it has been customary with steam fire-engines, when the engine is at rest within its engine-house, to connect its boiler with a secondary heater located within the engine-house, and within which a fire is constantly maintained, so as to hold the temperature in the boiler a trifle above or very near the boiling-point, so that when the engine is called into service and its fuel is lighted it will begin at once to make steam and generate a pressure for operating the pumps. In such cases, however, in case there should be steam-pressure in the boiler at the time of re-entering the engine-house, and at the time of reconnecting it with its heater, the temperature subsequently in moderating is generally reduced below the boiling-point and condensation takes place within the boiler above the water-level. This produces a vacuum, to supply which it draws the water from the heater into the boiler. This bakes the flues in the heater, and causes it to quickly burn out, or may frequently create an explosion.

It is the object of my invention to obviate this difficulty, and I accomplish the same as follows:

A represents a fire-engine; B, its subsidiary heater.

C and D are pipes connecting the heater with the boiler of the fire-engine in such relation that there is constant circulation main-

tained from the heater through the boiler and back to the heater.

C' and D' are the ordinary slip-joints or other connections by which the fire-engine boiler is connected with its heater when it is again returned to the engine-house after being in service.

E is a check-valve located in the pipe E', which communicates with the steam-space in the fire-engine boiler. This check-valve closes by pressure from within and opens by pressure from without.

The operation of the device is apparent. If there should be steam-pressure in the boiler at the time or before it was connected with the heater, and the temperature should be so reduced as to fall below the boiling-point, the resulting vacuum above the water-level, produced by condensation, would cause the check-valve E to open by the superior pressure of the atmosphere, and the vacuum would be immediately relieved by the inflowing air, and as a consequence the water would not be sucked from the heater into the boiler. It will be understood, of course, that by dumping the fire the temperature may have already decreased below the boiling-point, so as to leave a vacuum above the water-level before the engine is reconnected with its heater, so that this sucking action and consequent emptying of the heater into the boiler might take place instantly upon opening the valves in the pipes C and D; but in any event the relief-valve E would remedy the difficulty, because it would open whenever the pressure within was less than the pressure of the atmosphere.

It is apparent that this device is not necessarily limited to steam fire-engines, but is equally applicable in any similar situation where heat in a boiler is maintained through the action of a subsidiary heater.

What I claim is—

1. The combination of an engine, A, a subsidiary heater, B, and two pipes, C and D, connecting the heater with the engine-boiler for creating a circulation between the same with an air-pipe, E, connecting with the steam-space of the engine-boiler, and an outwardly-opening valve, E', located in said pipe, substantially as and for the purposes described.

2. The combination of a fire-engine, A, and  
a subsidiary heater, B, detachably connected  
by pipes C and D, which establish communi-  
cation between the engine-boiler and the heater,  
5 with a pipe, E, open to the external atmosphere,  
and connected to the steam-space of the en-  
gine-boiler, and the automatic check-valve E',  
located in said pipe, substantially as and for  
the purposes described.

In testimony whereof I sign this specification in  
the presence of two witnesses.

CORNELIUS BRESNAHAN.

Witnesses:

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THOS. F. WATSON.