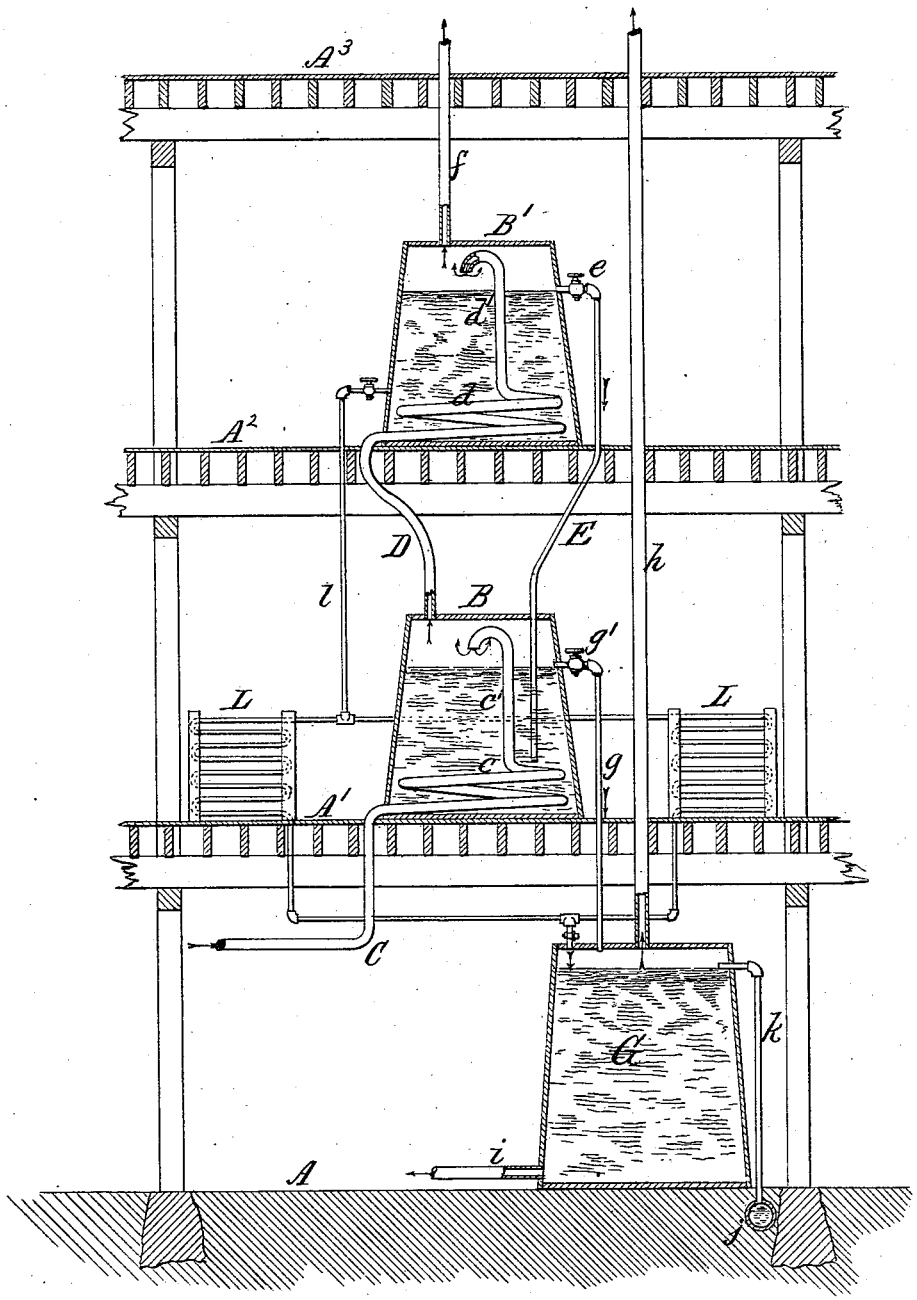
R. BULLYMORE.

Apparatus for Utilizing Exhaust Steam.

No. 208,370. Patented Sept. 24, 1878.



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RICHARD BULLYMORE, OF BUFFALO, NEW YORK.

IMPROVEMENT IN APPARATUS FOR UTILIZING EXHAUST-STEAM.

Specification forming part of Letters Patent No. **208,370**, dated September 24, 1878; application filed July 30, 1878.

To all whom it may concern:

Be it known that I, RICHARD BULLYMORE, of the city of Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Apparatus for Utilizing Exhaust-Steam, of which the following is a specification, reference being had to the accompanying drawing.

This invention relates to an improved apparatus for abstracting the heat from the exhaust-steam which escapes from the engine in slaughtering-houses and similar establishments.

The invention consists of the particular construction of the apparatus, whereby the exhaust-steam is utilized for heating water in a simple, cheap, and efficient manner, as will be hereinafter fully set forth.

The accompanying drawing represents a sectional elevation of my improved apparatus.

A A^1 A^2 represent several floors, and A^3 the roof, of a slaughtering-house or other building in which my improved apparatus is used. B B′ represent two closed heating vessels or tubs, arranged, respectively, upon the second and third floors of the building. C is the exhaust-pipe, connecting with the exhaust-port of the steam-engine, and entering the vessel B near its bottom. The pipe C is provided with several coils, *c*, arranged upon the bottom of the vessel B, and has an ascending portion, *c′*, opening in the upper part of the vessel B, in a downward direction, above the surface of the water contained in the vessel B. D is a secondary exhaust-pipe, leading from the top of the vessel B to the bottom of the vessel B′. The pipe D enters the vessel B′ near its bottom, and is provided with a coil, *d*, and an ascending open end, *d′*, in the same manner as the pipe C in the vessel B. E is an overflow-pipe, tapping the vessel B′ below the open mouth of the exhaust-pipe D, and leading downward to the top of the vessel B. *e* is a stop-cock, arranged in the overflow-pipe E, for regulating the flow of the water through the same. *f* is a vent-pipe, rising from the top of the tub B′ and opening above the roof A^3, for preventing an accidental accumulation of steam in the tub B′.

G is a receiving-tub, arranged on the ground-floor of the building, for receiving the hot water from the tub B, with which it is connected by an overflow-pipe, *g*, which taps the tub B below the open mouth of the exhaust-pipe C, and is provided with a suitable stop-cock, *g′*, for regulating the flow of the water. *h* is a vent-pipe, leading from the top of the tub G through the roof of the building, for carrying off any steam which may be formed in the tub G. *i* is a pipe, through which hot water is taken from the tub G for feeding a boiler, or for any other purpose for which it may be required. *k* is an overflow-pipe, tapping the tub G near its top, and discharging into a drain, *j*, any excess of hot water that may be received by the tub G.

The vessels B B′ G may be constructed of wood or metal, and are preferably provided with man-holes.

The exhaust-steam, passing through the pipe C, heats the water contained in the vessel B, first by contact with the heated surface of the exhaust-pipe, and then by the exhaust-steam being discharged upon the surface of the water. The steam which is not condensed in the vessel B passes through the pipe D into the vessel B′, and heats the water contained therein, in the same manner as the water in the vessel B is heated.

It is obvious that more than two heating-tubs, B B′, can be arranged above each other, according to the height of the building.

The upper tub, B′, is supplied with water from any convenient source. The heated water escapes from the tub B′ through the overflow-pipe E into the tub B, where it is still further heated, and finally passes through the pipe *g* into the receiving-tub G. If the apparatus is properly proportioned with reference to the amount of exhaust-steam which escapes from the engine, almost the entire quantity of heat contained in the exhaust-steam can be saved, so that the exhaust-steam is all condensed before it reaches the vent-pipe of the upper tub, B′. The condensed water collecting in the pipe D flows back into the tub B; and the pipe C may also be provided with a trap and pipe, conducting the condensed water into the receiver G. The condensed water, which is mixed continuously with the fresh water supplied to the upper tub, B′, renders the whole mass of water very soft, and suitable for feeding the boiler. If a larger quantity of hot water is produced in the heating-tubs B B′ than can be utilized

on the ground-floor, part of the water can be taken from one or more of the tubs by a pipe, *l*, and passed through radiators L, for heating the building; or in slaughter-houses it may be used for scalding hogs, or for any other purpose.

My improved apparatus is very simple, can be readily and cheaply constructed, and introduces an important economy in the use of steam.

I claim as my invention—

1. An apparatus for condensing exhaust-steam composed of two or more tubs, B B′, arranged one above the other, exhaust-pipes C D, provided, respectively, with coils *c d* and ascending open portions *c′ d′*, overflow-pipe E, and safety-escape *f*, substantially as shown and described.

2. An apparatus for condensing exhaust-steam composed of two or more tubs, B B′, arranged one above the other, exhaust-pipes C D, provided, respectively, with coils *c d* and ascending open portions *c′ d′*, overflow-pipes E *g*, receiving-tub G, and vents *f h*, substantially as shown and described.

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