

(No Model.)

4 Sheets—Sheet 1.

O. L. F. BROWNE.

DEVICE FOR ECONOMIZING HEAT FROM THE PRODUCTS OF COMBUSTION.

No. 261,994.

Patented Aug. 1, 1882.

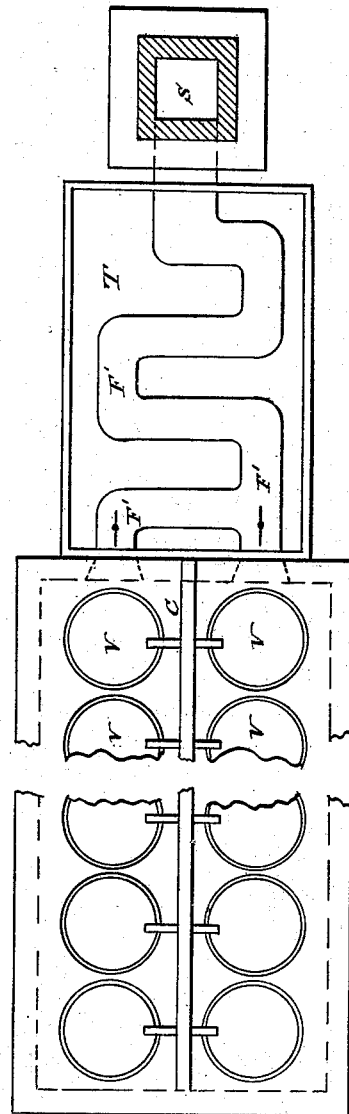


Fig. 1

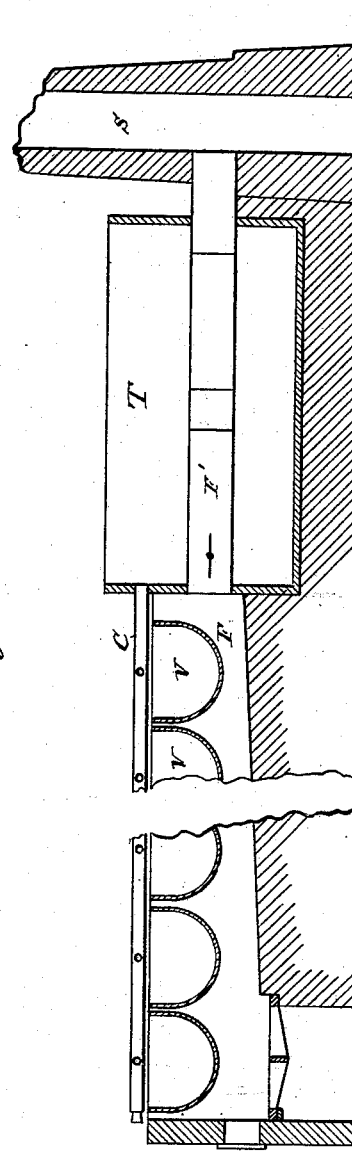


Fig. 2

WITNESSES:

C. Bendixon.  
Wm L. Raymond.

INVENTOR:

Oliver L. F. Browne  
per Buck, Laessle & Hay  
Atty

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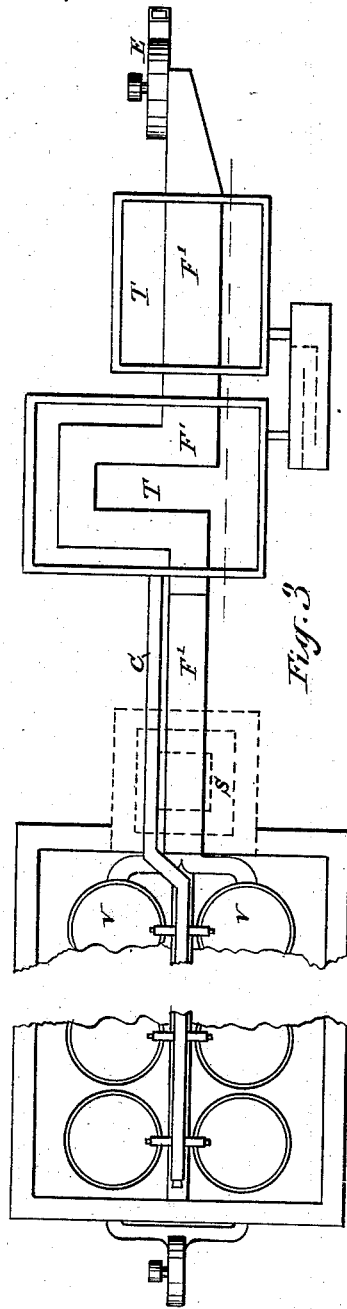


Fig. 3

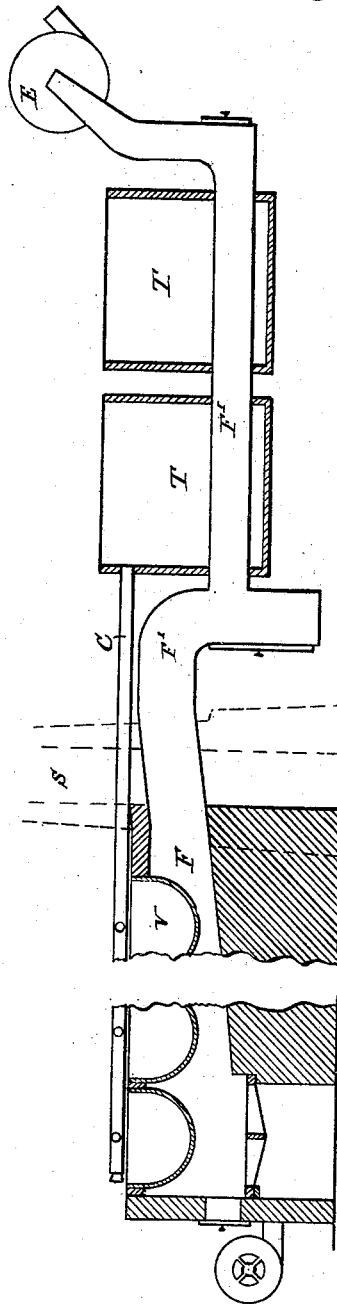


Fig. 4

WITNESSES:

C. Bendixon.  
Wm. L. Graymond.

INVENTOR:

Oliver L. F. Browne  
per Duell, Laessle & Hey  
attys

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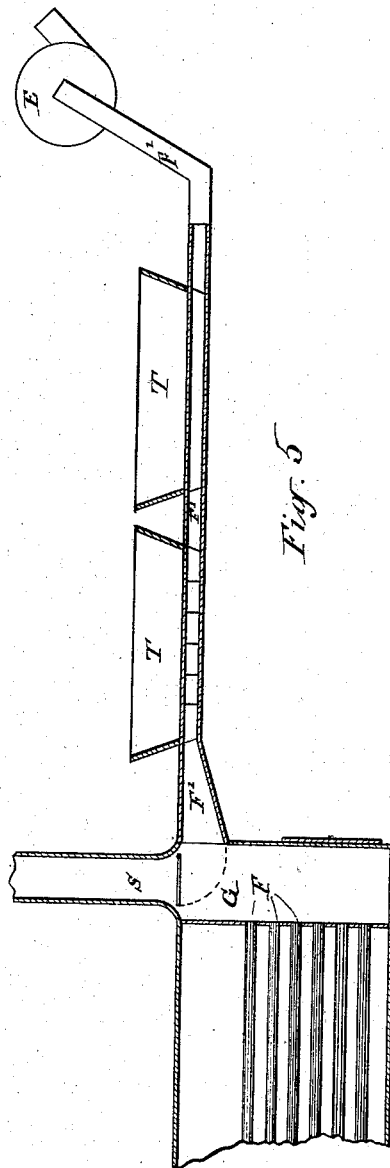


Fig. 5

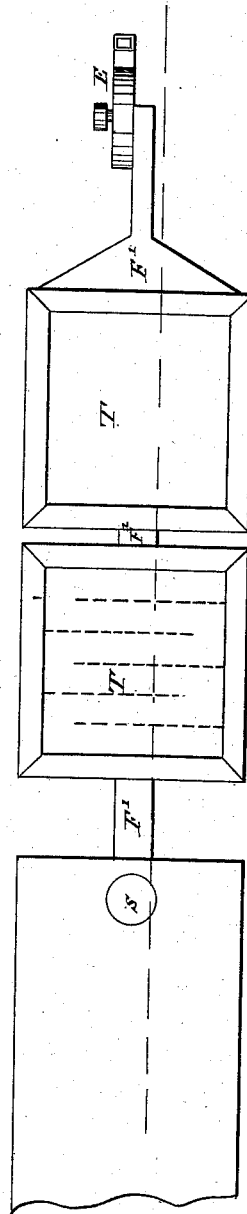


Fig. 6

WITNESSES:

W. Bendixon  
Wm L. Raymond.

INVENTOR:

Oliver L. F. Browne  
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(No Model.)

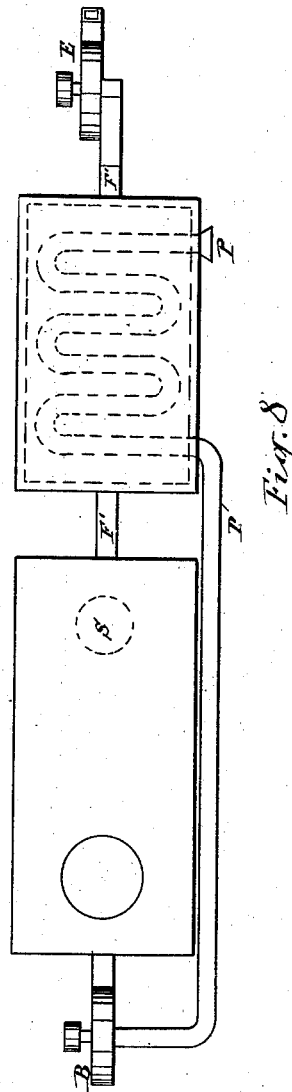
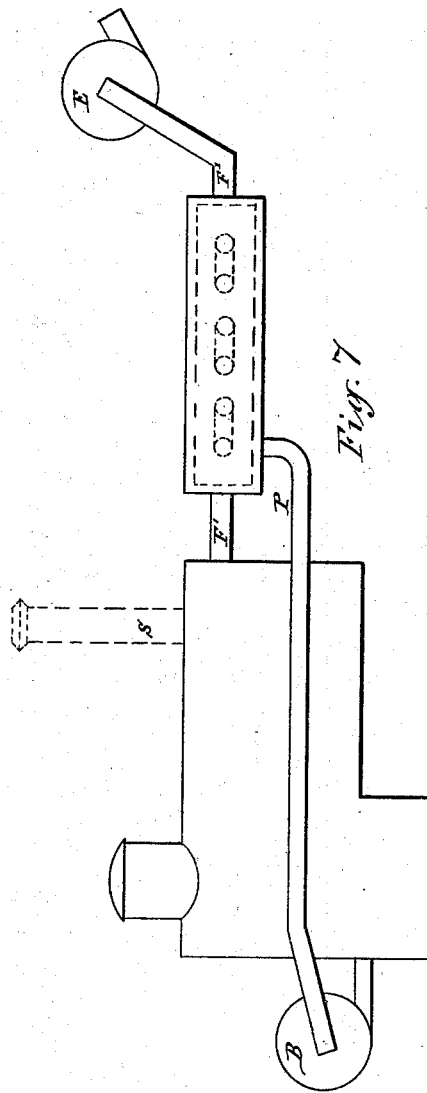
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Patented Aug. 1, 1882.



WITNESSES:

W. B. Benson.  
Wm. L. Raymond.

INVENTOR:

Oliver L. F. Browne  
per Ouel, Laess & Hey  
attys

# UNITED STATES PATENT OFFICE.

OLIVER L. F. BROWNE, OF SYRACUSE, NEW YORK, ASSIGNOR OF ONE-HALF  
TO DANIEL H. GOWING, OF SAME PLACE.

DEVICE FOR ECONOMIZING HEAT FROM THE PRODUCTS OF COMBUSTION.

SPECIFICATION forming part of Letters Patent No. 261,994, dated August 1, 1882.

Application filed January 22, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER L. F. BROWNE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Devices for Economizing Heat from Products of Combustion, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The chief object of this invention is to economize and utilize the heat which usually accompanies products of combustion at that point where they enter into the smoke-box or chimney or stack; and it consists essentially of a prolongation of the smoke-flue or smoke-box, and the combination therewith of an apparatus arranged to absorb the heat from the products of combustion in their passage through said prolonged smoke box or flue, and an exhaust-fan connected with the exit of said flue for the purpose of producing an artificial draft and accelerating the current of the products of combustion through the same, all as herein-after more fully described.

In the accompanying drawings, Figures 1 and 2 are a plan view and a longitudinal section respectively of my invention as applied to an ordinary salt-water-evaporating apparatus. Figs. 3 and 4 illustrate another application of my invention to the same apparatus. Figs. 5 and 6 are a longitudinal section and a plan view respectively of my invention as applied to a steam-boiler, and Figs. 7 and 8 illustrate another mode of applying my invention to a steam-boiler.

Similar letters of reference indicate corresponding parts.

F in Figs. 2 and 4 denotes the fire-flue of an evaporating apparatus, and bears the same relation thereto as that of the flues F to the boiler shown in Fig. 5 of the drawings, said flues usually communicating direct with the chimney or stack S, and allowing that heat which usually attends the products of combustion to escape and waste through said stack. To obviate this waste I prolong the smoke-flue F, as represented by F' in the several figures of the drawings. This prolonged flue I prefer to make of metal, so as to allow the heat accom-

panying the products of combustion in their passage through said flue to readily radiate therefrom. In order to utilize this heat I apply to the flue F' a tank or chamber in such a manner as to absorb and collect the heat from the products of combustion.

When my invention is to be applied to an ordinary salt-water-evaporating apparatus I place a tank or vat, T, between the end of the series of evaporating-vessels V and the chimney S, and pass the flue F' through said tank, as illustrated in Figs. 1 and 2 of the drawings. In this case the tank T may either constitute part of the evaporating apparatus or serve as a means for merely bringing the brine to the degree of saturation and causing the impurities of same to precipitate, the pure brine being drawn from the top of the tank and conveyed to the evaporating-vessels V by a conduit, C.

In order to obtain greater control and a more extensive and perfect utilization of the heat attending the products of combustion, I apply to the discharge end of the flue F' an exhaust-fan, E, which augments the draft and accelerates the circulation of the current of the products of combustion, thus admitting of a greater prolongation of the flue F' and more extensive appliances for absorbing the heat therefrom.

When my invention is to be applied to a steam-boiler I connect the flue F' to the smoke-box G, as represented in Figs. 5, 6, 7, and 8 of the drawings, Figs. 5 and 6 showing the flue F' applied to vats or vessels T, for heating or evaporating liquids, and involving the principle illustrated in Figs. 3 and 4 of the drawings, while in Figs. 7 and 8 the heat accompanying the products of combustion is utilized for heating air which passes through a pipe, P, extended in a sinuous course through a chamber, which is intersected by and constitutes part of the flue F'. The heated air I force into the fire-box of the boiler, as shown, for the purpose of accelerating combustion. In every instance the prolonged fire-flue F is arranged tortuously in the tank or receptacle containing the substance to be heated, so as to obtain a maximum heating-surface, and thus thoroughly diffuse the heat through the substance.

Having described my invention, what I claim is—

1. As a means for utilizing the heat accompanying products of combustion at their exit from the fire-flue proper or their entrance in the usual within-described smoke-box, the substitution for the chimney or stack of a tortuous prolongation of the smoke-flue or smoke-box and an apparatus arranged to absorb the heat from the products of combustion in their passage through said prolonged flue, and an exhaust-fan connected with the discharge end of the latter, substantially as specified and shown.

2. The combination, with a furnace or fire-arch, of the tortuous prolonged flue F', tank or chamber T, exhaust-fan E, and blower B, substantially as described and shown.

3. The combination, with a furnace or fire-arch, of the tortuous prolonged flue or smoke-

box F', exhaust-fan E, and the duct P, substantially as and for the purpose set forth.

4. The combination, with a furnace or fire-arch, of the prolonged flue or smoke-box F', the duct P, and blower B, substantially as shown and set forth.

5. The combination, with a furnace or fire-arch, of the prolonged flue F', exhaust-fan E, duct P, and blower B, substantially in the manner and for the purpose shown and set forth.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 20th day of January, 1881.

OLIVER L. F. BROWNE. [L. S.]

Witnesses:

C. BENDIXON,  
WM. C. RAYMOND.