

No. 644,368.

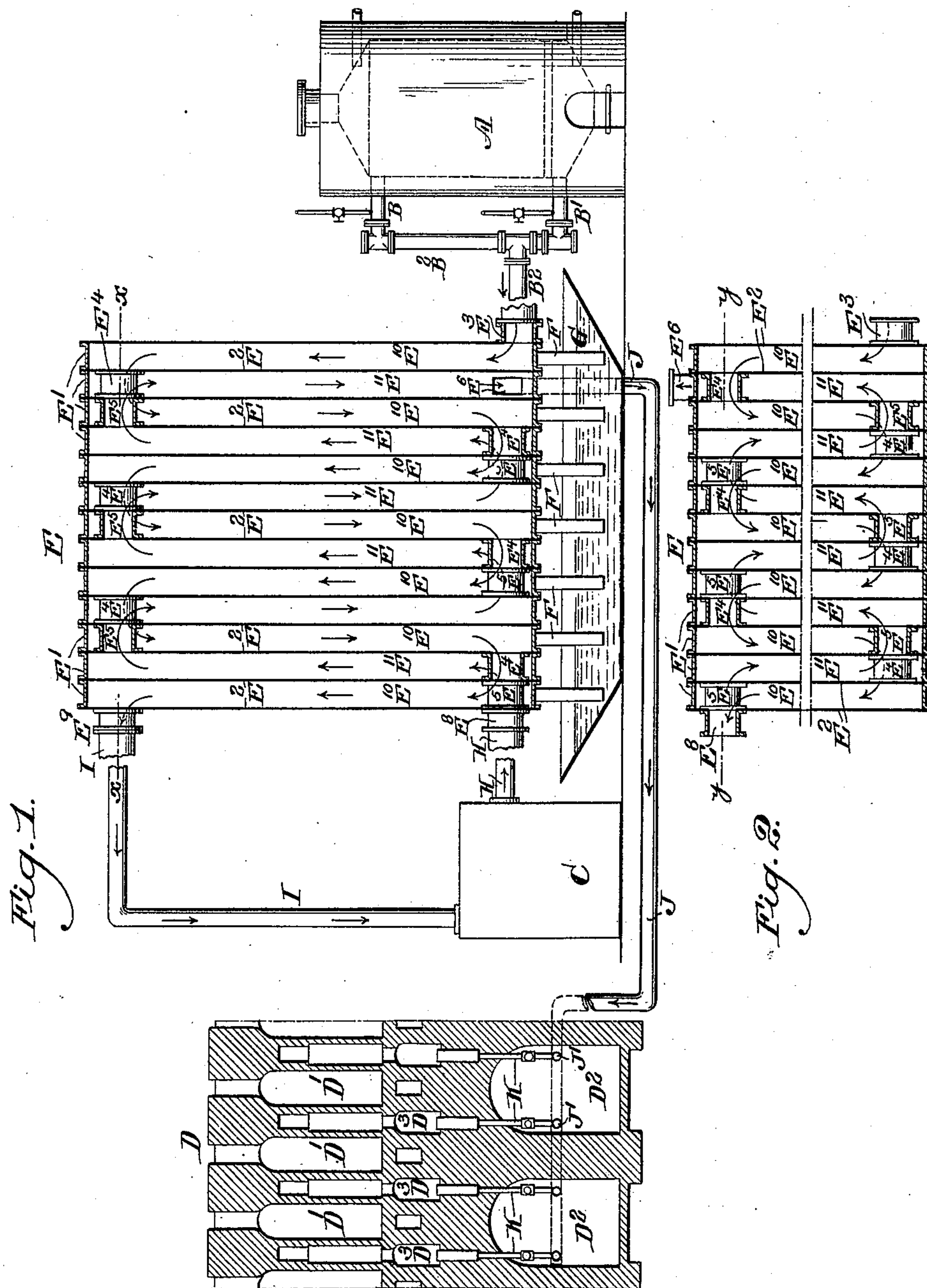
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F. W. C. SCHNIEWIND.

APPARATUS FOR TRANSFERRING HEAT FROM ONE FLUID TO ANOTHER.

(Application filed Aug. 11, 1897.)

(No Model.)



Witnesses.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRANSFERRING HEAT FROM ONE FLUID TO ANOTHER.

SPECIFICATION forming part of Letters Patent No. 644,368, dated February 27, 1900.

Application filed August 11, 1897. Serial No. 647,837. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC W. C. SCHNIEWIND, a citizen of the United States of America, residing in the city of Pittsburg, in the county of Allegheny, in the State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Transferring Heat from One Fluid to Another, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates, generally speaking, to the construction of an apparatus for facilitating the transfer of heat from one fluid to another. Particularly my apparatus is designed for use in connection with a gas generator, purifier, and a bank of coke-ovens, the hot gases of the generator being passed through the transferring apparatus in order to cool them before they reach the purifier, while the cool gases from the purifier are passed through the apparatus in the reverse direction in order to heat them before they are delivered to the heating-flues of the coke-ovens.

The nature of my improvement will be best understood as described in connection with the drawings, in which it is illustrated, and in which—

Figure 1 is a partly-diagrammatic view showing my improved transferring apparatus on an enlarged scale in connection with the generator, gas-cleaner, and bank of coke-ovens, the transferring apparatus being shown in section, as on the line *y y* of Fig. 2, while Fig. 2 is a sectional view of the transferring apparatus, taken as on the section-line *x x* of Fig. 1.

A indicates the gas-generator, gas-take-off pipes B and B' leading from the top and bottom of the generator into a common gas-pipe B².

C indicates conventionally a gas-purifying plant.

D indicates a portion of a bank of coke-ovens, D' D' indicating the ovens proper, D² D² tunnels or galleries in the masonry underneath the ovens, and D³ D³ the heating-flues.

E indicates my improved apparatus for transferring heat and is made up of a series

of frames E', preferably made of cast-iron and flanged, as indicated, and between each pair of frames a thin plate or diaphragm E² is secured, said plates also being indicated as attached to the ends of the two outer frames E'. The plates E² form a series of chambers E¹⁰ E¹¹, the alternate chambers being connected into two conduits, as indicated, by the use of flanged pipe-sections E⁴ and E⁵, the connections E⁴ connecting the chambers E¹⁰ into a continuous conduit, while the connections E⁵ connect the chambers E¹¹ into a similar conduit. Preferably the connections between the chambers E¹⁰ and E¹¹ are made inside the frames E' and by means of the flanged connecting-pipes E⁴ and E⁵, as shown, this being at once the simplest and best construction, although obviously the chambers could be connected by conduits secured on the outside of the frames and connecting alternate frames together.

In the construction shown the hot gases leaving the generator by the conduit B² enter the transferring apparatus through the nipple E³, passing into the end chamber E¹⁰, and thence passing upward through the connection E⁴ to the next chamber E¹⁰, then downward, and so on upward and downward until they leave the transferring apparatus through the nipple E⁹, passing thence through pipe I to the gas cleaning and scrubbing chamber C, from which they issue by the pipe H passing through nipple E⁸ and an adjoining connecting-conduit E⁵ into the chamber E¹¹ at the left-hand side of the figure, thence alternately upward and downward through connections E⁵ and chambers E¹¹ until they issue from the transferring apparatus through the nipple E⁶, which leads, as indicated, through the cast-iron frame E', and from which they pass through the pipe J to the various distributing-pipes J' and thence through the burners K into the combustion-flues D³.

From the above description it will be obvious that the cooled gases issuing from the scrubbing and cleaning apparatus will in passing through the transferring apparatus absorb the heat of the gases also passing through the said apparatus from the genera-

tor, the generator-gases thus reaching the cleaning and scrubbing apparatus in a comparatively cooled condition, while the cooled gases issuing from the cleaning apparatus will
 5 be heated to a high degree before they reach the coke-ovens where they are burned.

As considerable dust is liable to be deposited in the chambers E^{10} by the gases coming from the generator, I provide dust-pipes F F ,
 10 &c., leading from the bottom of the chambers E^{10} into a water-receptacle G , in this way dropping the dust out of the flues or chambers without permitting the escape of gas or entrance of cold air.

15 While, as stated, my heat-transferring apparatus is especially adapted for the use indicated in the drawings and above described, it is useful also as a means of cooling and heating or cooling or heating any and all
 20 fluids, the apparatus being exceedingly simple in construction, very efficient in operation, and readily repaired in case it gets out of order.

Having now described my invention, what
 25 I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus for transferring heat from one fluid to another having in combination a series of frames E' , thin plates or diaphragms
 30 E^2 separate from and secured between each pair of frames to form chambers E^{10} E^{11} , conduits E^4 connecting each alternate pair of chambers E^{10} , conduits E^5 connecting each alternate pair of chambers E^{11} and inlet and
 35 outlet conduits leading to and from each set of connected chambers E^{10} and E^{11} .

2. An apparatus for transferring heat from one fluid to another having in combination a series of frames E' , having flanges around the
 40 edges thereof, thin plates or diaphragms E^2 separate from and secured between each pair of frames to form chambers E^{10} E^{11} , conduits E^4 connecting each alternate pair of chambers E^{10} , conduits E^5 connecting each alter-
 45 nate pair of chambers E^{11} said conduits being

situated between the plates E^2 as specified and inlet and outlet conduits leading to and from each set of connected chambers E^{10} and E^{11} .

3. An apparatus for cooling gas by trans- 50
 ferring its sensible heat to another fluid having in combination a series of frames E' , thin plates or diaphragms E^2 secured between each adjacent pair of frames to form chambers E^{10} and E^{11} , conduits E^4 connecting each alternate 55
 pair of chambers E^{10} into a conduit for the hot gas, conduits E^5 connecting each alternate pair of chambers E^{11} into a conduit for the cooling fluid, inlet and outlet conduits to and from each series of connected chambers, 60
 a water-receptacle G and dust-conduits F leading from the bottoms of chambers E^{10} into the water-receptacle.

4. In combination with a gas-generator A , a gas-cleaner C , and a bank of coke-ovens D , 65
 and apparatus E made up of a series of frames E' having thin plates E^2 separate from and secured between them to form chambers E^{10} E^{11} , means for connecting the alternate cham- 70
 bers E^{10} into a conduit and the alternate chambers E^{11} into another conduit, the conduit comprising the chamber E^{10} connecting with the producer and the cleaner and the conduit comprising the chambers E^{10} connect- 75
 ing with the cleaner and the coke-oven bank as and for the purpose specified.

5. In an apparatus for transferring heat from one fluid to another, the combination of a series of flanged frames E' , thin plates or diaphragms coextensive with said frames, and 80
 secured between the flanges of each pair of frames to form chambers, conduits connecting the chambers in alternate pairs, inlet and outlet conduits leading to and from each set of connected chambers, and dust-conduits 85
 leading from alternate chambers.

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Witnesses:

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