

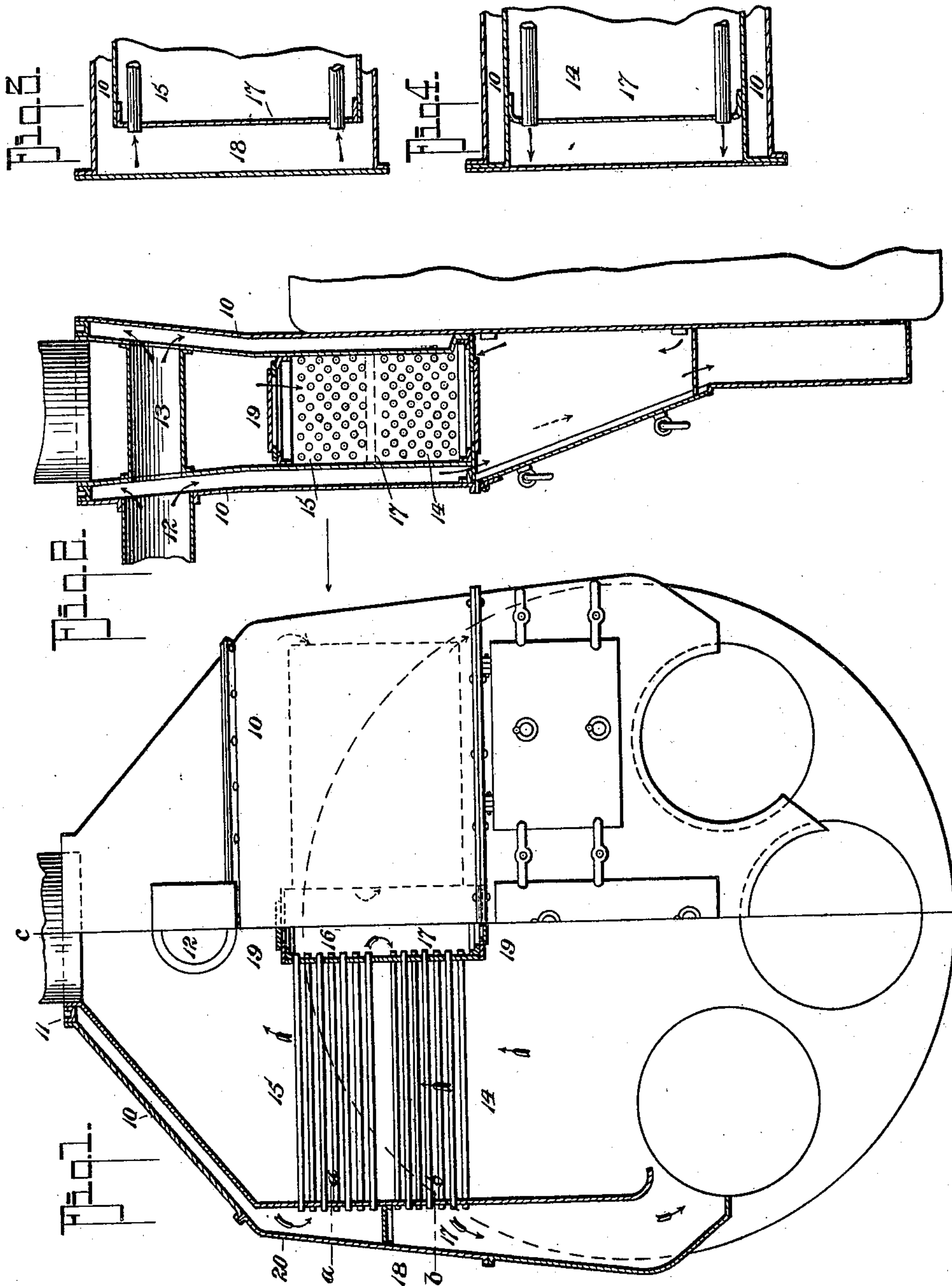
No. 627,853.

Patented June 27, 1899.

J. B. HOUSTON.
DRAFT ECONOMIZER FOR FURNACES.

(Application filed Nov. 28, 1898.)

(No Model.)



WITNESSES:

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JOHN B. HOUSTON, OF VANCOUVER, CANADA.

DRAFT-ECONOMIZER FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 627,853, dated June 27, 1899.

Application filed November 28, 1898. Serial No. 697,680. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. HOUSTON, a subject of the Queen of Great Britain, residing at Vancouver, in the Province of British Columbia, Canada, have invented a new and useful Draft-Economizer for Furnaces, of which the following is a specification.

My invention relates to improvements in economizers for heating the air supply or draft for furnaces.

The objects of my invention are, first, to utilize the escaping gases from the furnace for heating the air-supply before it comes in contact with the furnace. This is accomplished by arranging nests of air-tubes horizontally in the uptake and passing the incoming air-draft through the upper nests to a central chamber and back through lower nests of pipes to the outer jacket, whence it goes directly to the furnace. The heated gases pass around the tubes composing the suspended nests of air-pipes, and by this means a maximum heated surface is presented to the incoming flow of air; and my second object is to so arrange the nests of air-tubes in the uptake that they may be easily removed and replaced in case of breakage or in any other event, and at the same time utilizing all of the heating-surface in the uptake for preparing the incoming air for the furnace to obtain the most economical results. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of an uptake with a section thereof removed, showing the position and arrangement of my invention. Fig. 2 is a vertical section of the same on the line C C and viewed in the direction of the arrow. Fig. 3 is a detailed plan of one of the upper nests of tubes sectioned on the line *a a*, and Fig. 4 is a similar detailed section of one of the lower nests at the line *b b*.

Similar letters and numerals designate corresponding parts throughout the several views.

The enlarged portion of the uptake A is provided with a jacket 10. Around the top of this jacket 10 and forming a closure between the uptake A and the said jacket is an annular collar 11. The jacket is carried downward to proximity with the furnace-doors

and the air-space connected directly with the furnace.

As better shown in Fig. 2, the air is introduced into the jacket 10 by a duct 12, and for better and immediate distribution of the air around the uptake a pipe 13 is passed through the same. This not only facilitates the flow of air around the uptake, but the pipe 13 is also utilized as a heating-surface to the incoming air by reason of the said pipe being directly in the flow of heated gas. Suspended horizontally on either side and within the uptake, immediately above the boiler-flues, are nests of air-tubes 14, and placed directly above these tubes are like nests of air-tubes 15. Centrally located between the oppositely-placed nests of air-tubes is a vertical air-chamber 16. The nests of air-tubes on each side of the uptake are secured together by vertical plates 17. These plates are perforated, and the tubes snugly fit the apertures and project slightly beyond the outer surfaces of the plates; but the tubes are so arranged that they may be drawn from the openings in the plates for a reason to appear presently.

At the outer opposite ends of the tubes the upper nests are divided off from the lower ones by horizontal plates 18, which form partitions, so that as the cold air passes downward it will be conducted inward through the upper nests of tubes 15 to the inner chamber 16, from where it will return back to the jacket 10, and will thus be heated in proportion to the velocity it is traveling and the condition of the fires in the furnace.

The central chamber 16 is provided with covers or manholes 19 at the top and bottom. This allows convenient access to the inner ends of the nests of tubes for repairing or removing any of the parts.

When it is desirable to come at the nests of air-pipes, the plates 20 on each side of the jacket are removed, and the central chamber 16 may be entered through the lower man-hole or through an opening in the uptake above the jacket.

By reason of all the outer walls of the uptake and the surface exposed to the heated gases from the furnace having their opposite surfaces exposed to the cold air danger of any of the parts being burned or damaged by heat is minimized very much, as the flow of cool

air will keep the temperature of the metals down, and a further advantage is the beneficial and economical effect of exposing all of the heated parts inclosed by the jacket to the incoming flow of air, this being one of the essential features requisite.

It is obvious from the arrangement of the nests of tubes that the draft may be natural, forced, or induced, as the air will first radiate from the pipes 12 and 13 and pass to the opposite outer ends of the pipes 15, through which it will be introduced to the chamber 16 and through the lower pipes 14 to the furnace without fans for forcing or inducing, this flow being caused by the draft of the furnace.

It is evident that although the air-tubes will give better results by being arranged in nests on opposite sides of the uptake, in small furnaces it will be more economical in construction to dispense with the central chamber 16 and let the tubes extend across the uptake to the jacket on each side, in which case the colder air would pass from the left or right side of the jacket, as most convenient, and return to the same side and thence to the furnace. This would be advantageous where the uptake was narrow, the modification being merely to dispense with one upper and lower set of the nests. The air would travel right across instead of to the central chamber only.

Having now described my invention, what I claim as new, and desire to be protected in by Letters Patent, is—

1. In an economizer for furnaces, in combination with an uptake for the gases and smoke, a jacket surrounding said uptake in proximity to the furnace, means for passing air thereto; of nests of tubes placed horizontally on opposite sides within the uptake, a

central chamber dividing the said tubes, other nests of tubes arranged beneath the first ones, and communicating from the central chamber to the jacket beneath parting-walls 18, which divide the lower tubes off from the upper ones, as specified.

2. In an economizer for furnaces, having an uptake to receive the heated gases generated thereby, the combination of a jacket surrounding the lower part of the uptake, and means for distributing cold air around the said uptake within the jacket, of a central chamber 16 arranged in the uptake; of a nest of tubes 15 on opposite sides of the central chamber, said tubes communicating between the jacket and the central chamber, and of other nests of tubes 14 arranged beneath the tubes 15, which also connect between the jacket and the central chamber, and parting-plates 18, which divide the outer ends of the nests of tubes, as and for the purposes specified.

3. In combination with an uptake, having a jacket arranged thereon and means for passing a flow of air to the jacket; of a central chamber 16 arranged in the uptake, perforations in the opposite walls of the chamber 16, and the outer side walls of the uptake, nests of tubes or pipes passed through said perforations communicating between the jacket and the chamber 16, and horizontal parting-walls 18 placed between the jacket and the uptake dividing the outer ends of the upper and lower nests of tubes, so that the incoming air-flow will pass through the upper tubes to the central chamber and back through the lower nests of tubes to the jacket, as specified.

JOHN B. HOUSTON.

Witnesses:

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