Sept. 29, 1931. S. F. WOGAN 1,825,498

UNIT FOR HEATING, COOLING, AND VENTILATING SYSTEM

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Fig. 1.

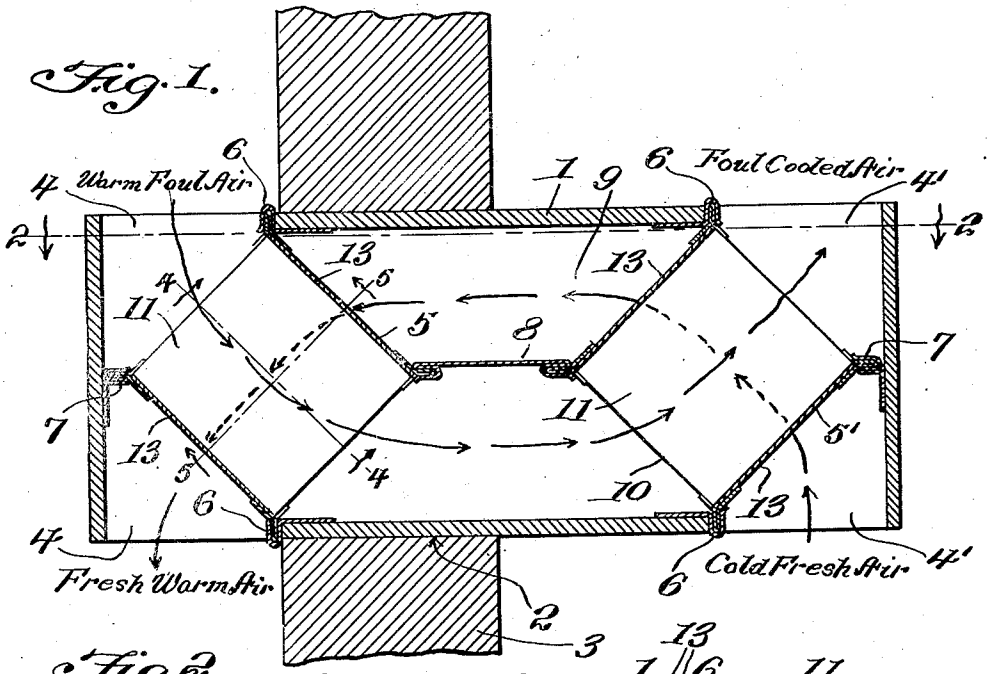


Fig. 2.

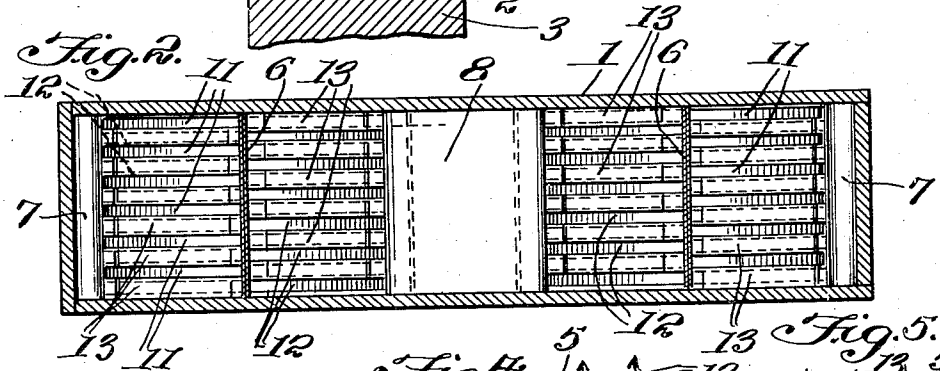


Fig. 3.

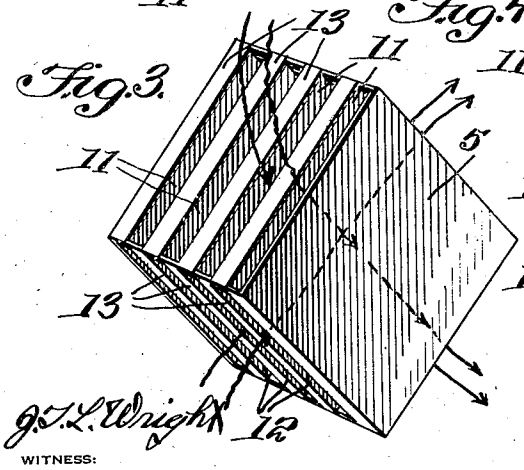


Fig. 4.

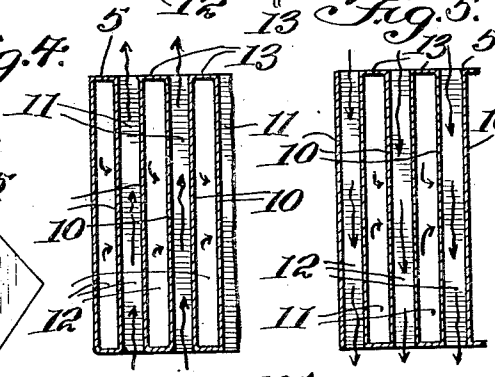


Fig. 5.

Selmer F. Wogan INVENTOR

BY Victor J. Evans

ATTORNEY

WITNESS:

J. L. Wright

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UNIT FOR HEATING, COOLING, AND VENTILATING SYSTEM

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Fig. 6.

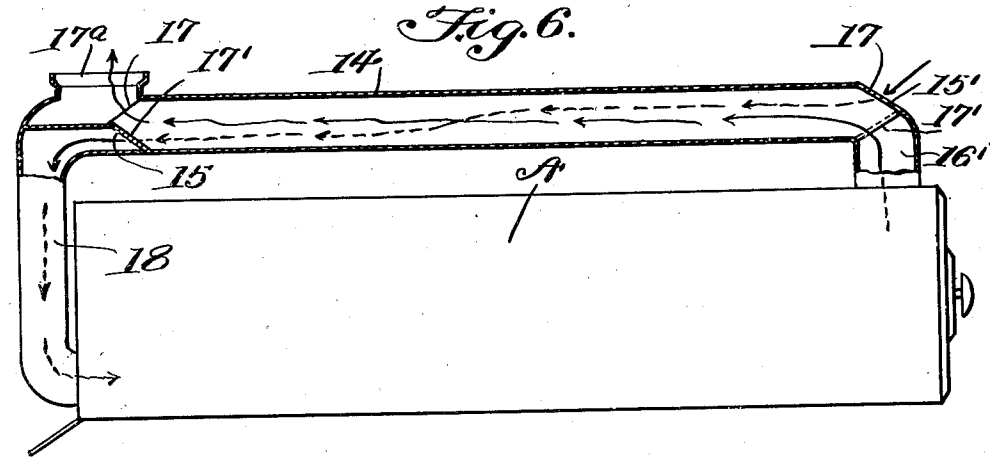


Fig. 7.

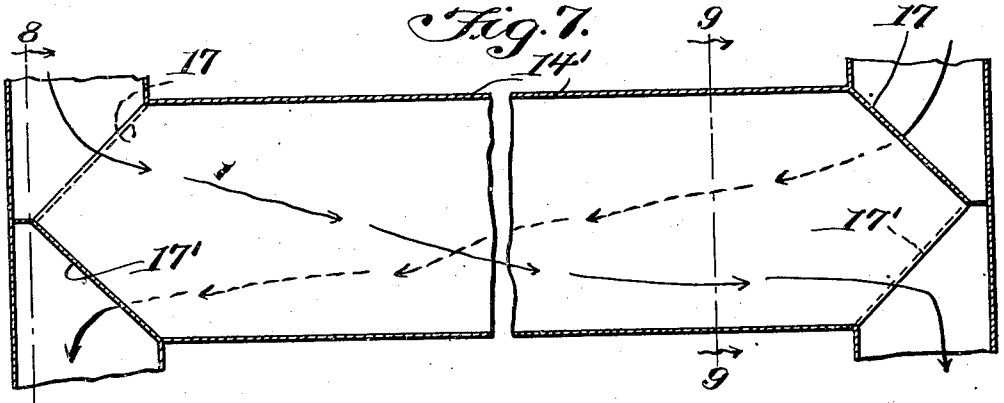


Fig. 8.

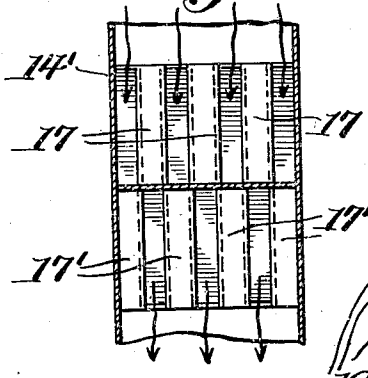


Fig. 9.

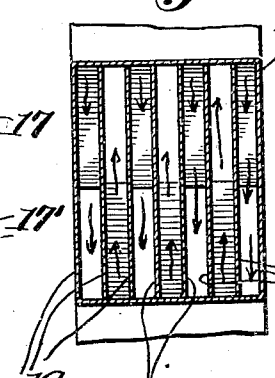
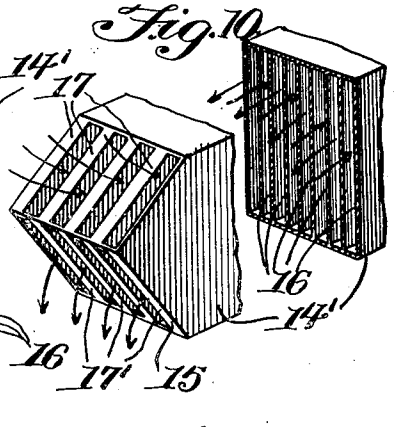


Fig. 10.



Selmer F. Wogan
INVENTOR

BY Victor J. Evans
ATTORNEY

J. O. L. Wright
WITNESS:

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UNIT FOR HEATING, COOLING, AND VENTILATING SYSTEM

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Fig. 11.

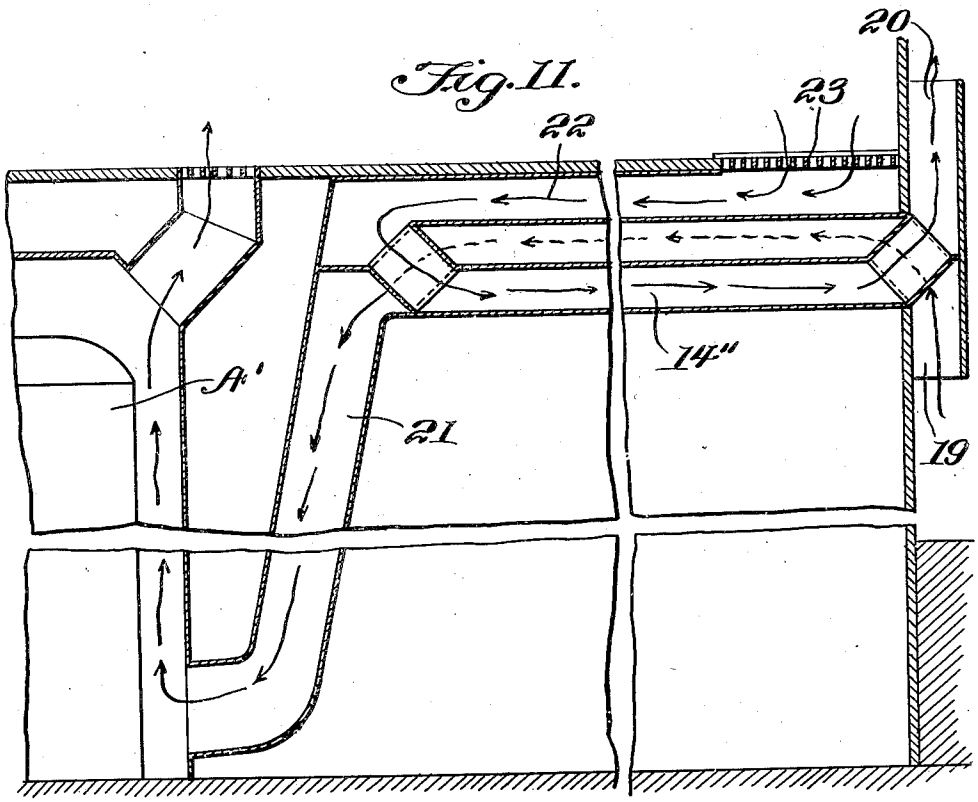


Fig. 12.

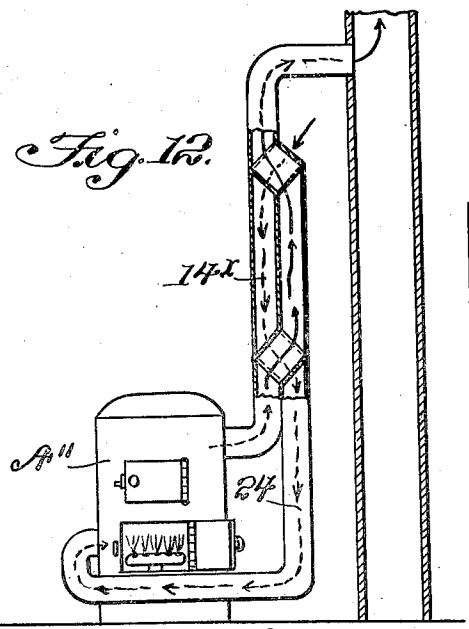
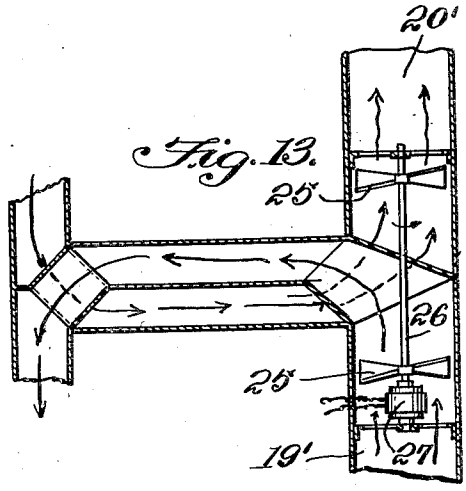


Fig. 13.



Selmer F. Wogan
INVENTOR

BY Victor J. Evans
ATTORNEY

WITNESS: J. L. Wright

Patented Sept. 29, 1931 1,825,498

UNITED STATES PATENT OFFICE

SELMER F. WOGAN, OF MONTEVIDEO, MINNESOTA

UNIT FOR HEATING, COOLING, AND VENTILATING SYSTEM

Application filed April 22, 1929. Serial No. 357,308.

This invention relates to a unit for heating, cooling and ventilating systems, the general object of the invention being to provide a member having passages so arranged therein that air or the like can pass through one set of passages without contacting with air or the like passing through the other set of passages, whereby the fluid passing through one set of passages will change the temperature of the fluid passing through the other set.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is a sectional view showing the invention used as a ventilator.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a perspective view of one of the rectangular parts of the device.

Figure 4 is a section on line 4—4 of Figure 1.

Figure 5 is a section on line 5—5 of Figure 1.

Figure 6 is a view showing a modification, applied to a furnace.

Figure 7 is a sectional view showing a modification.

Figure 8 is a section on line 8—8 of Figure 7.

Figure 9 is a section on line 9—9 of Figure 7.

Figure 10 is a perspective view, with parts in section, of the unit shown in Figure 6.

Figure 11 is a view showing the invention in use for ventilating a building by conducting cold fresh air to the air chamber of the furnace and conducting the foul air from the building.

Figure 12 is a view showing the invention used for heating the cold air entering the fire box of the furnace by the products of combustion passing from the furnace.

Figure 13 is a view showing fans used for creating a forced draft in both sets of air passages.

Referring to Figures 1 to 5, the numeral 1 indicates a casing passing through an opening 2 in a wall 3 of a building, this casing having a pair of upper and lower openings 4, 4′ in each end thereof, the openings 4 being in communication with the interior of the building and the openings 4′ with the atmosphere. A pair of rectangular housings 5 and 5′ is placed in the casing, one at each end thereof, each housing being diagonally positioned, with its upper and lower corners attached to the inner wall of the upper and lower openings, as shown at 6, and with its outer corner attached to each end of the casing, as shown at 7. A partition plate 8 connects the inner corners of the two housings together, so that this partition plate and portions of the housings form upper and lower chambers 9 in the casing. Each housing is divided by the partitions 10 into two sets of passages 11 and 12, one set of passages being arranged at right angles to the other set, with one set of passages of each housing being in communication with the lower chamber 9 and the other set being in communication with the upper chamber 9, the passages which are in communication with the upper chamber 9 being also in communication with the lower openings 4, 4′ and the passages which are in communication with the lower chamber 9 are in communication with the upper openings. Thus the foul air from the building will pass through the upper opening 4 through the passages 11 of the housing 5 into the lower chamber 9 and through the passages 11 of the housing 5′ to the atmosphere through the upper opening 4′. Cold air will pass through the lower opening 4′ through the passages 12 in the housing 5′ into the upper chamber 9 and then this cold air will pass through the passages 12 in the housing 5 and will enter the building through the lower opening 4. This cold air is heated as it passes through the device by coming into contact with the heated walls of the passages which

have been heated by the flow of warm foul air from the building. As shown in Figures 3, 4 and 5, the sides of the passages 12 are closed by the strips 13 which are connected with the ends of every other pair of partitions 10 and the sides of the passages 11 are closed by similar strips.

Thus it will be seen that I have provided simple means for not only supplying a building or the like with fresh air and ejecting the warm foul air, but I have also provided means whereby the inflowing cold air is heated by the outflowing warm air.

Figures 6, 7, 8, 9 and 10 show a slight modification, in which a housing 14 replaces the two housings 5 and 5′, the ends of this housing 14 being tapered, as shown at 15, with the partitions 16 forming the air passages in the housing also tapered. Strips 17 close the ends of alternate passages on one side of the tapered portion and similar strips 17′ close the ends of the other alternate passages on the opposite side of the tapered portion, so that the ends of one set of passages open out through one side of each tapered portion and the other set open out through the other side of each tapered portion. Thus by connecting two of the side portions of the tapered parts of the housing with two conduits and the other parts of the tapered portions with other conduits, air will flow in an opposite direction through the other set of passages. Figure 6 shows this arrangement used for heating an air supply to a furnace A by the products of combustion from the furnace. The housing is shown at 14, with one set of passages opening out into the atmosphere, as shown at 15, and the opposite set of passages being connected with the smoke pipe 16 of the furnace. The set of passages which are connected with the smoke pipe are also connected with a chimney, portion of which is shown at 17, and the other set of passages is connected by a conduit 18 with the ash pit or fire box of the furnace. Thus the products of combustion passing through one set of passages will heat the atmospheric air passing through the other set of passages so that this air will be heated before it enters the furnace, thus increasing the combustion of the fuel.

Figure 7 shows a housing 14′ used as ventilating means, in which the fluid passes in opposite directions through the passages, this arrangement being somewhat similar to that shown in Figure 1.

Figure 11 shows a housing 14″ used for ventilating a building which is heated by a hot air furnace A′, the outer ends of one set of passages being in communication with an air pipe 19, and the outer ends of the other passages being in communication with a discharge pipe 20. The other ends of the passages which are connected with the pipe 19 are connected by a pipe 21 with the air chamber of the furnace A′, and a conduit 22 leads from a register 23 in the floor of the room above the furnace room to the inner ends of the passages which are in communication with the discharge 20. Thus heated air will pass from the room or building through the register 23 and the conduit 22 and through one set of passages in the housing 14″ to the discharge 20 and fresh air will enter through the pipe 19, the other set of passages in the housing 14″ into the pipe 21 and thus enter the hot air chamber of the furnace and then pass into the building. In this way, the building or room is provided with fresh heated air, this air being heated by the foul warm air leaving the building or room.

Figure 12 shows a similar arrangement for supplying warm air to the fire box of an oil burning furnace A″, the products of combustion from the furnace passing through one set of passages in the housing 14× to the chimney, and air passing through the other set of passages in said housing 14× into the pipe 24 which leads it to the fire box of the furnace. Thus the air passing to the furnace is heated by the products of combustion therefrom.

Figure 13 is a modification showing the use of a fan 25 in each of the inlet members 19′ and outlet member 20′, these fans being arranged on the same shaft 28 which is driven by a motor 27. These fans act to force air through the device and to draw the warm air or products of combustion through the second set of passages in the device.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. A unit for heating, cooling and ventilating systems comprising a casing having upper and lower alined openings in each end thereof, a conduit diagonally supported within the casing adjacent each end and partitions dividing each conduit into two series of passages, one series being arranged at right angles to the other, whereby one series communicates with the upper opening, and the other series communicates with the lower opening of the casing for the purpose specified.

2. A unit for heating, cooling and ventilating systems comprising a casing having upper and lower alined openings in each end thereof, a conduit diagonally arranged in each end of the casing, means for supporting each conduit from the upper and lower wall of the casing at one side of said opening and from the adjacent end wall of the casing and partitions dividing each conduit into two series of passages, one series being arranged in right angular relation to the other, where-

by one series communicates with the upper opening, and the other series communicates with the lower opening of the casing for the purpose specified.

3. A unit for heating, cooling and ventilating systems comprising a casing having upper and lower alined openings in each end thereof, a conduit diagonally arranged in each end of the casing and having a portion located between said openings, partitions dividing each conduit into two series of passages, one series being arranged in right angular relation to the other, whereby one series communicates with the upper opening and the other series communicates with the lower opening of the casing, and a partition connecting the two adjacent conduits and dividing the casing into upper and lower compartments for the purpose specified.

In testimony whereof I affix my signature.

SELMER F. WOGAN.