

April 30, 1935.

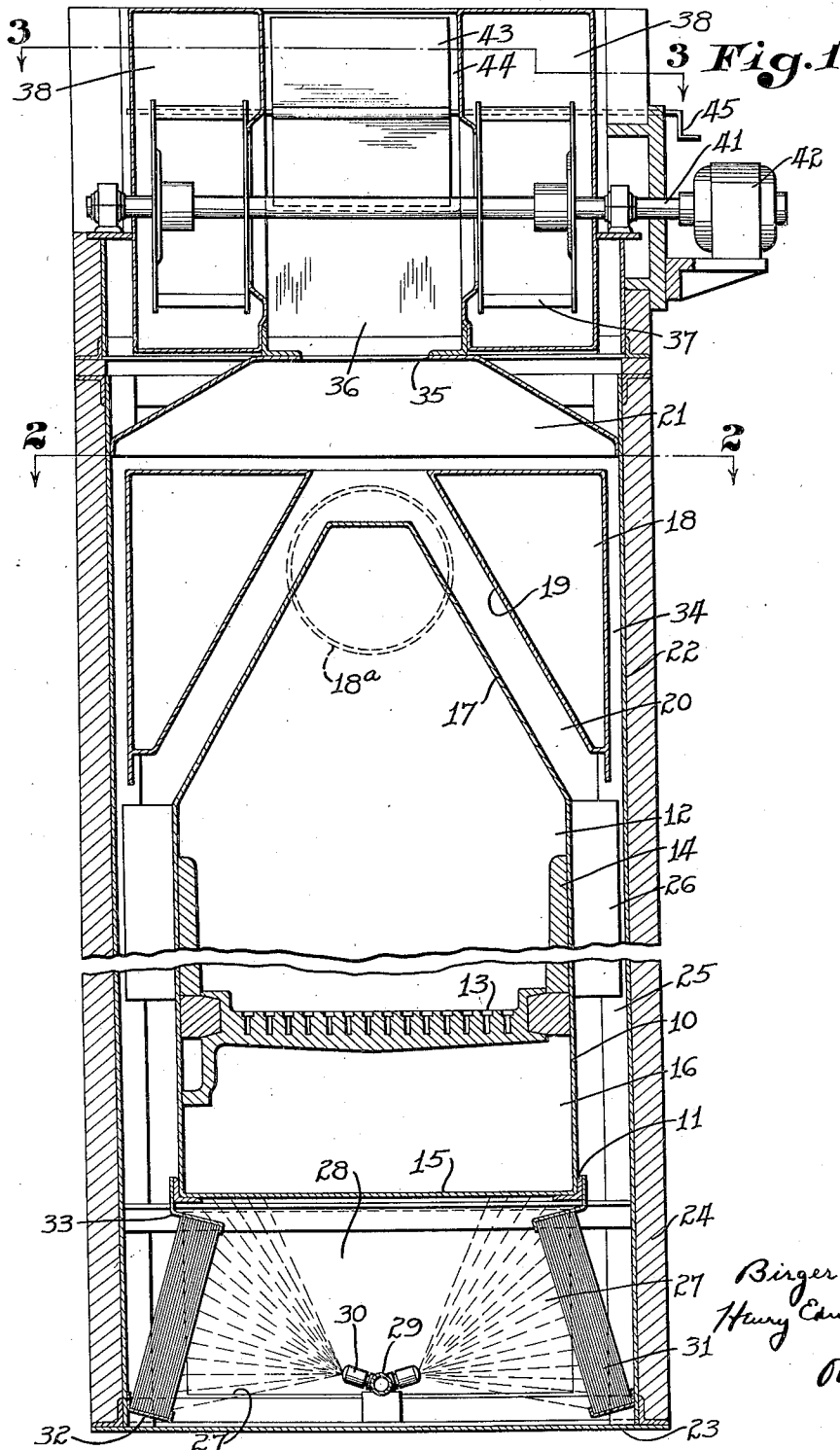
B. V. ZAMORE ET AL

1,999,495

AIR CONDITIONING APPARATUS

Filed March 13, 1933

3 Sheets-Sheet 1



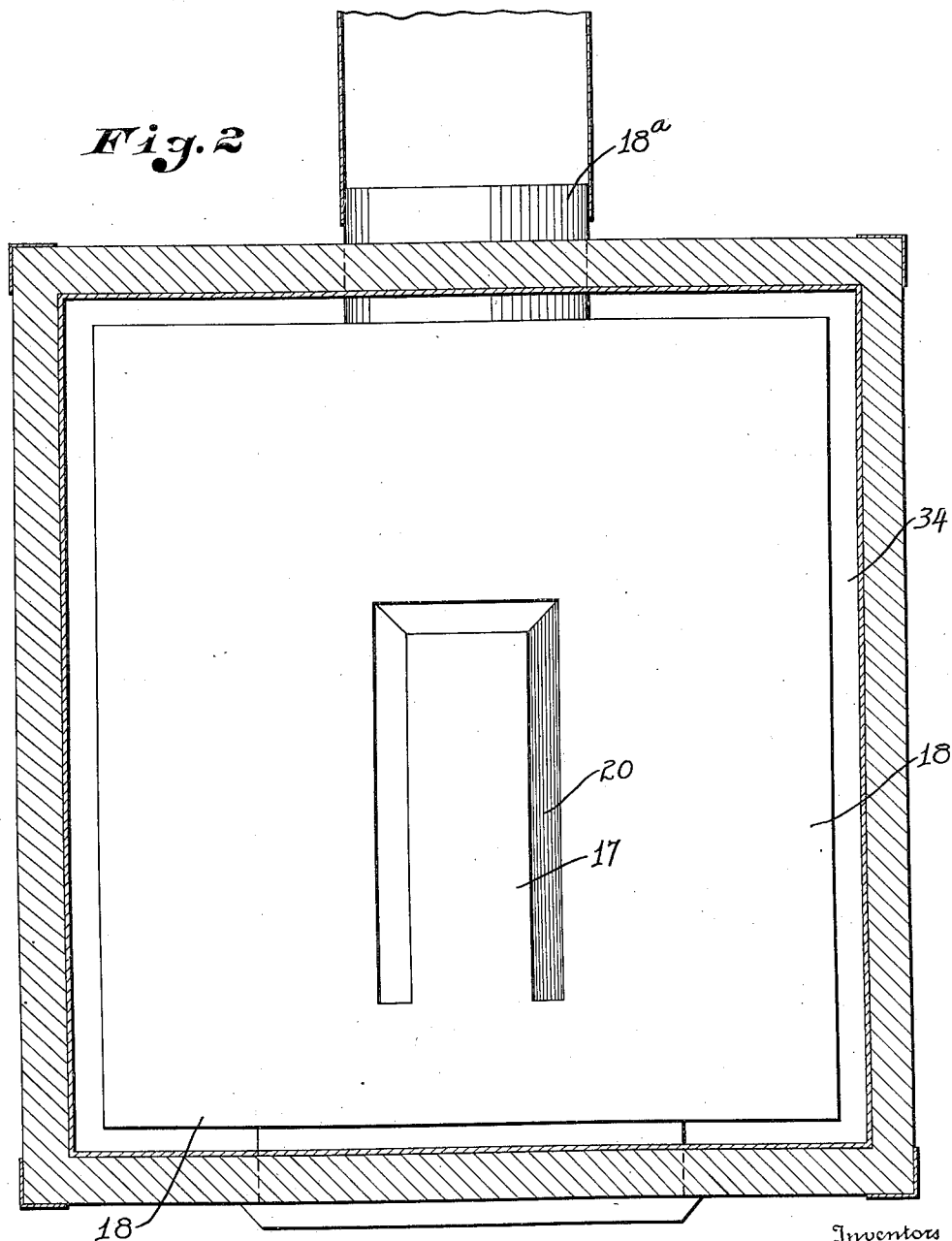
April 30, 1935.

B. V. ZAMORE ET AL
AIR CONDITIONING APPARATUS

1,999,495

Filed March 13, 1933

3 Sheets-Sheet 2



Inventors

Birger V. Zamore
Henry Edward Sperling

Wm. W. Wm.

Attorneys

By

April 30, 1935.

B. V. ZAMORE ET AL

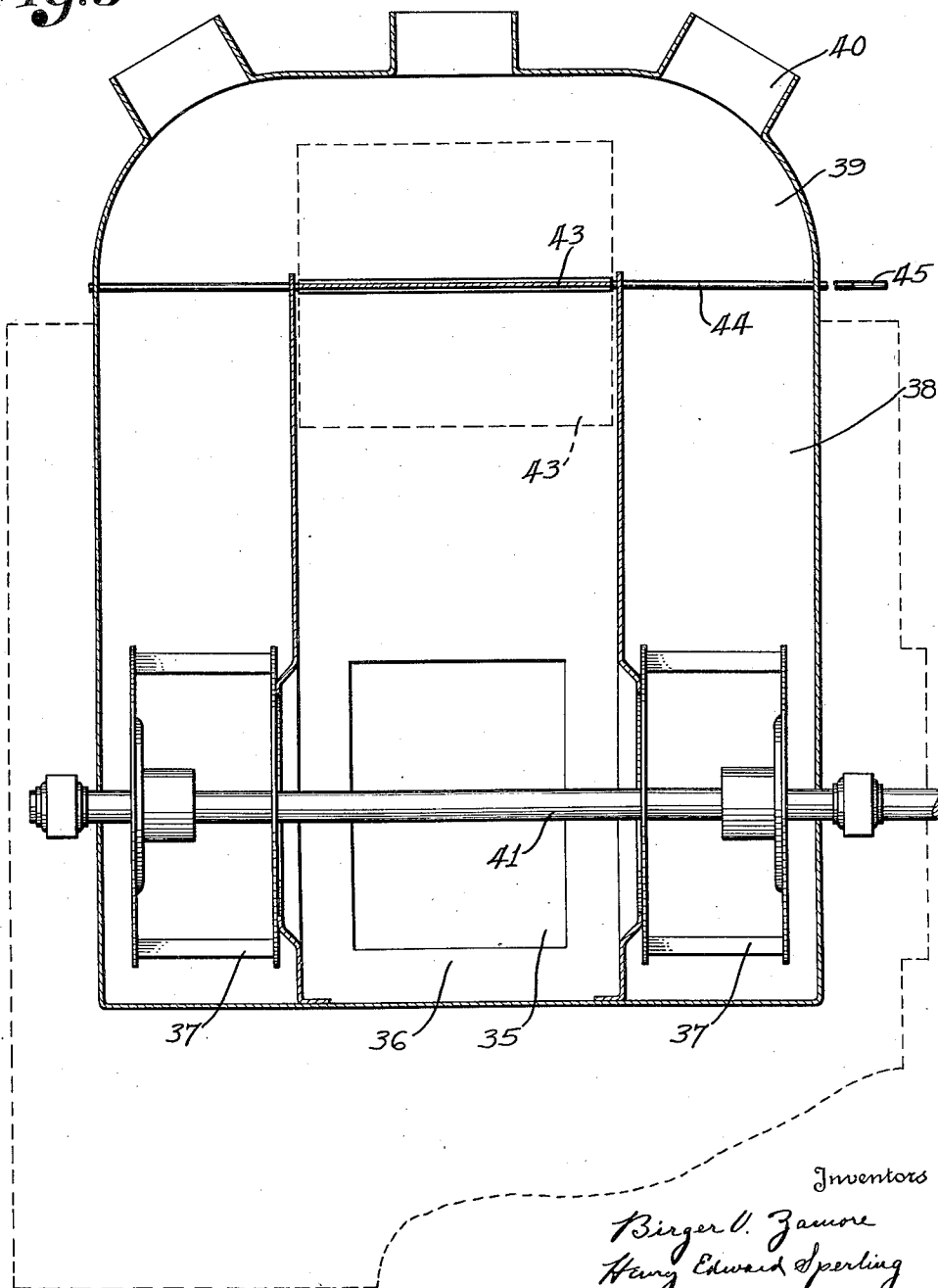
1,999,495

AIR CONDITIONING APPARATUS

Filed March 13, 1933

3 Sheets-Sheet 3

Fig. 3



Inventors

Birger V. Zamore
Harry Edward Sperling
Owen & Owen

Attorneys

By

UNITED STATES PATENT OFFICE

1,999,495

AIR CONDITIONING APPARATUS

Birger V. Zamore and Henry Edward Sperling,
Toledo, Ohio

Application March 13, 1933, Serial No. 660,490

9 Claims. (Cl. 126—113)

This invention relates to air conditioning apparatus, but more particularly to apparatus for residence installation by which the air can be suitably tempered and washed and humidified to supply air which is not only humidified and washed of dirt and impurities, but also is properly tempered, and an object is to produce a simple and efficient apparatus of this character which can be inexpensively manufactured and installed and has the novel features of construction, arrangement and operation hereinafter described.

Another object is to produce a method of treating air by which the air is washed, humidified, and thereafter the air stream is propelled through a zone where in a novel manner the air is tempered readily and efficiently.

Further objects and advantages will hereinafter appear, and, for purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which:

Figure 1 is a vertical sectional elevation of an air conditioning apparatus;

Figure 2 is an enlarged sectional view on the line 2—2 of Figure 1; and

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 1.

The illustrated embodiment of the invention comprises a furnace having a sheet metal casing 10, which is suitably supported on angle irons 11, and in the lower region thereof is a fire box 12 having the usual door opening (not shown). In this instance a grate 13 for coal is mounted in the casing and a suitable lining 14 covers a portion of the side walls. Although a coal furnace is shown, it could be readily adapted for the use of gas or oil without difficulty. It will be seen that the casing 10 has a sheet metal bottom wall 15 which also forms the bottom of an ash pit 16.

The upper portion 17 of the metal casing 10 is frusto pyramidal in shape, and the products of combustion pass from the frusto pyramidal portion into a radiator 18 which is joined to the portion 17 at the front portion thereof, as shown in Figure 2, and from the radiator 18 they are discharged from the furnace through a pipe 18^a leading to the usual chimney. The inner wall of the radiator 18, except for that portion joined to the frusto conical portion 17, has an upwardly and inwardly inclined inner wall 19, which extends parallel to the outer wall of the portion 17, but is spaced laterally therefrom to provide an upwardly and inwardly inclined air passage

20, the air from such passage being discharged into a chamber 21 disposed directly above the radiator.

Spaced laterally from the radiator 18 and enclosing the same is a sheet metal housing 22, the lower end of which rests on a plate 23 forming the bottom of the furnace, and outside of the housing 22 is a suitable layer 24 of insulation. It will be noted that the casing 10 is spaced a substantial distance from the housing 22 to provide a vertical air passage or duct 25. From the outer wall of the casing 10 project a series of baffles or fins 26 to assist in heating or tempering the air passing upwardly through the ducts.

The lower ends of the ducts 25 communicate with a moisture or spray chamber 27, which is disposed directly beneath the ash pit 16; in fact, the bottom wall 15 of the ash pit provides the top wall of the moisture chamber 27, to which air is introduced through an inlet opening 28. Disposed in the chamber 27 is a pipe 29 having a plurality of spray nozzles 30, which create a fine mist or spray within the chamber 27 to humidify and wash the air which enters through the inlet 28. In operation, the mist, or water vapor, impinging against the underside of the heated wall 15, assists in the vaporization thereof and greatly facilitates humidifying the air therein.

Covering the outlet from the moisture chamber 27 to the vertical ducts are filters 31, which are disposed vertically with the upper ends thereof inclined inwardly toward each other. A bracket 32 supports the lower edge of each filter, and a bracket 33 releasably engages the upper edge portion of each filter. In practice, it is found that spun glass filters are effective and desirable for this purpose, owing to their efficiency and because they can readily and repeatedly be cleansed of the dirt particles, and other foreign matter. The filters 31 are mounted in such manner that the spray from the nozzles 30 is thrown against them, and the water not only cleanses them, but also washes the air passing therethrough. It is to be understood the water is sprayed into the chamber 28 only when the rooms to which heated air is supplied, requires additional humidity.

From the above description it is apparent that the air from the moisture chamber 27 passes upwardly through the ducts 25 and the stream of air is divided, a portion passing through the duct 29, and the other portion passing through a duct 34 comprising a continuation of a portion of the duct 25 and formed between the housing 22 and the outer wall of the radiator 18.

As will hereinafter appear, the suction created

in the chamber 21 above the radiator 18, is such that the suction in the ducts 34 and 20 is substantially the same so that the velocity of air in the two ducts is approximately the same. The duct 20 is shown approximately twice the size of duct 34, but since the duct 20 is heated to a higher degree, the temperature of the air discharged from both ducts is approximately the same. In this manner the heating of the air is more efficiently effected since a greater heated area is contacted by the air before being discharged from the apparatus.

From the chamber 21 the heated air is drawn through an opening 35 disposed centrally of the top wall of the chamber 21 and into a chamber 36, on opposite sides of which are disposed blowers 37 which operate to draw the air from the chamber 21 and force it through passages 38 into a collecting chamber 39 from which extend pipes 40 leading to the various rooms. The blowers 37 are mounted on a shaft 41, which may be suitably driven by an electric motor 42, or in any other desired manner. If desired, the motor 42 may be thermostatically controlled in a well known manner, so that when the temperature falls below a predetermined minimum degree the blowers will be driven.

In order to provide an air passage larger than that afforded by the ducts leading from the blower fans 37, when the fans are not running a damper 43 controls an opening 44 disposed between the blowers 37. By swinging the damper to open position a relatively free air passage is provided from the chamber 36 into the collecting chamber 39. As shown, the damper 43 is mounted on a shaft 44 and has a crank 45 on the outside of the casing. The crank may be actuated, for example, by the same thermostatic device which controls the operation of the motor 42. Any suitable means well known in the art may be provided for this purpose.

It is to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claims.

What we claim as new and desire to secure by Letters Patent is:

1. An air conditioning apparatus having a furnace provided with a fire box, an ash pit beneath said fire box, and a spray chamber beneath said ash pit having an air inlet, said apparatus comprising means for spraying liquid into said spraying chamber for impingement against a heated wall of said ash pit, and means providing an air duct leading laterally from said spray chamber and thence upwardly along the side of said furnace in heat-exchanging relation thereto.

2. An air conditioning apparatus comprising a spray chamber having an air inlet and an air outlet, an air filter arranged in inclined position in said outlet, means for spraying water in said chamber for humidifying the air therein and in such manner as to direct same against said filter and against a wall of said chamber, means for heating said wall and for heating the water in contact therewith for facilitating vaporization thereof, means providing an air duct leading upwardly from said outlet, and means for heating the air in said duct.

3. In an air conditioning apparatus having a furnace provided with a fire box, a radiator disposed above said fire box through which pass the products of combustion, and an ash pit below said fire box, said apparatus comprising a spray

chamber below said ash pit, means for creating liquid spray in said chamber, said chamber having air inlet and outlet openings, a filter in said outlet opening for filtering the air passing there-through, said filter being so arranged as to be washed by the spray formed in said chamber, means providing a duct leading upwardly from said outlet, said radiator being formed to provide upwardly diverging ducts communicating with said last duct, and blower means above said radiator for drawing air through said ducts and forcing same from the apparatus.

4. In an air conditioning apparatus having a furnace provided with a fire box, a radiator disposed above said fire box through which pass the products of combustion, and an ash pit below said fire box, said apparatus comprising a spray chamber below said ash pit, means for creating liquid spray in said chamber, said chamber having air inlet and outlet openings, a filter in said outlet opening for filtering the air passage there-through, said filter being so arranged as to be washed by the spray formed in said chamber, means providing a duct leading upwardly from said outlet, said radiator being formed to provide upwardly diverging ducts communicating with said last duct, a pair of laterally spaced blowers disposed above said diverging ducts, means providing an air passage between said blowers for supplying air in an axial direction to said blowers, ducts leading from said blowers respectively, a chamber for receiving the air from said blowers, a duct communicating with a space between said blowers, a normally closed damper controlling said last duct, and means for opening said damper.

5. In an air conditioning apparatus having a furnace provided with a fire box, a radiator disposed above said fire box through which pass the products of combustion, an ash pit below said fire box, and a spray chamber below said ash pit, said apparatus comprising means for creating liquid spray in said chamber, said chamber having air inlet and outlet openings, a filter in said outlet opening for filtering the air passage there-through, said filter being so arranged as to be washed by the spray formed in said chamber, means providing a duct leading upwardly from said outlet, fins in said duct extending laterally from said furnace for increasing the temperature of the air passing therethrough, said radiator being formed to provide upwardly diverging ducts communicating with said last duct, a pair of laterally spaced blowers disposed above said diverging ducts, means providing an air passage between said blowers for supplying air in an axial direction to said blowers, ducts leading from said blowers respectively, a chamber for receiving the air from said blowers, a duct communicating with a space between said blowers, a normally closed damper controlling said last duct, and means for opening said damper.

6. In an air conditioning apparatus having a furnace provided with a fire box, said apparatus comprising a wall beneath said fire box having at least a portion thereof of heat-conducting material, a spray chamber in the lower portion of the furnace communicating with said wall, said chamber having an air inlet, air-humidifying means in said chamber for impinging a liquid spray against said wall, and means providing an air duct leading upwardly along the side of said furnace and in heat-exchanging relation thereto.

7. An air conditioning apparatus having a furnace provided with a heating chamber, said appa-

ratus comprising a spray chamber adjacent said heating chamber, means to transmit heat from said heating chamber to said spray chamber, air-humidifying means in said spray chamber for

5 impinging spray against said heat transmitting means, and means providing an air duct leading upwardly from said spray chamber along the side of said furnace and in heat-exchanging relation thereto.

10 8. In an air conditioning apparatus having a fire box, an ash pit below said fire box, a spray chamber below said ash pit having air inlet and outlet openings, the upper wall of said chamber being of heat conducting material and constitut-

15 ing the bottom wall of the ash pit, and means

for spraying liquid in said chamber for impingement against said heated wall.

9. In an air conditioning apparatus having a furnace provided with a heating chamber, said apparatus comprising a spray chamber one wall 5 of which is common to said heating chamber and through which heat is adapted to pass, means for spraying a liquid in said spray chamber for impingement against said wall, said spray chamber having air inlet and outlet openings, and 10 filter means covering one of said openings and arranged to be washed by the spray.

BIRGER V. ZAMORE.

HENRY EDWARD SPERLING. 15