

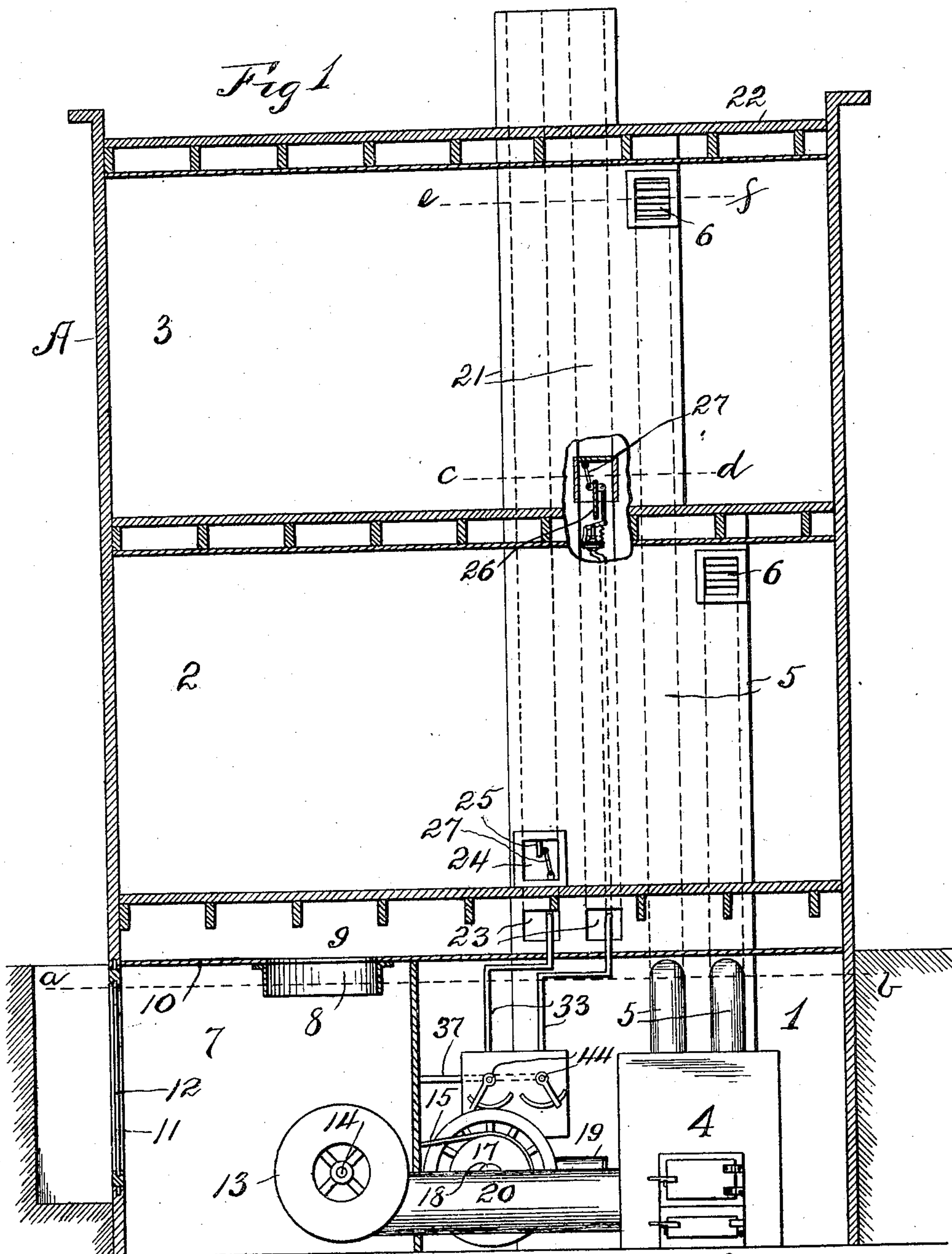
No. 862,158.

PATENTED AUG. 6, 1907.

J. HEDLUND & W. W. McMAHON.
HEATING SYSTEM.

APPLICATION FILED JUNE 5, 1906.

2 SHEETS--SHEET 1.



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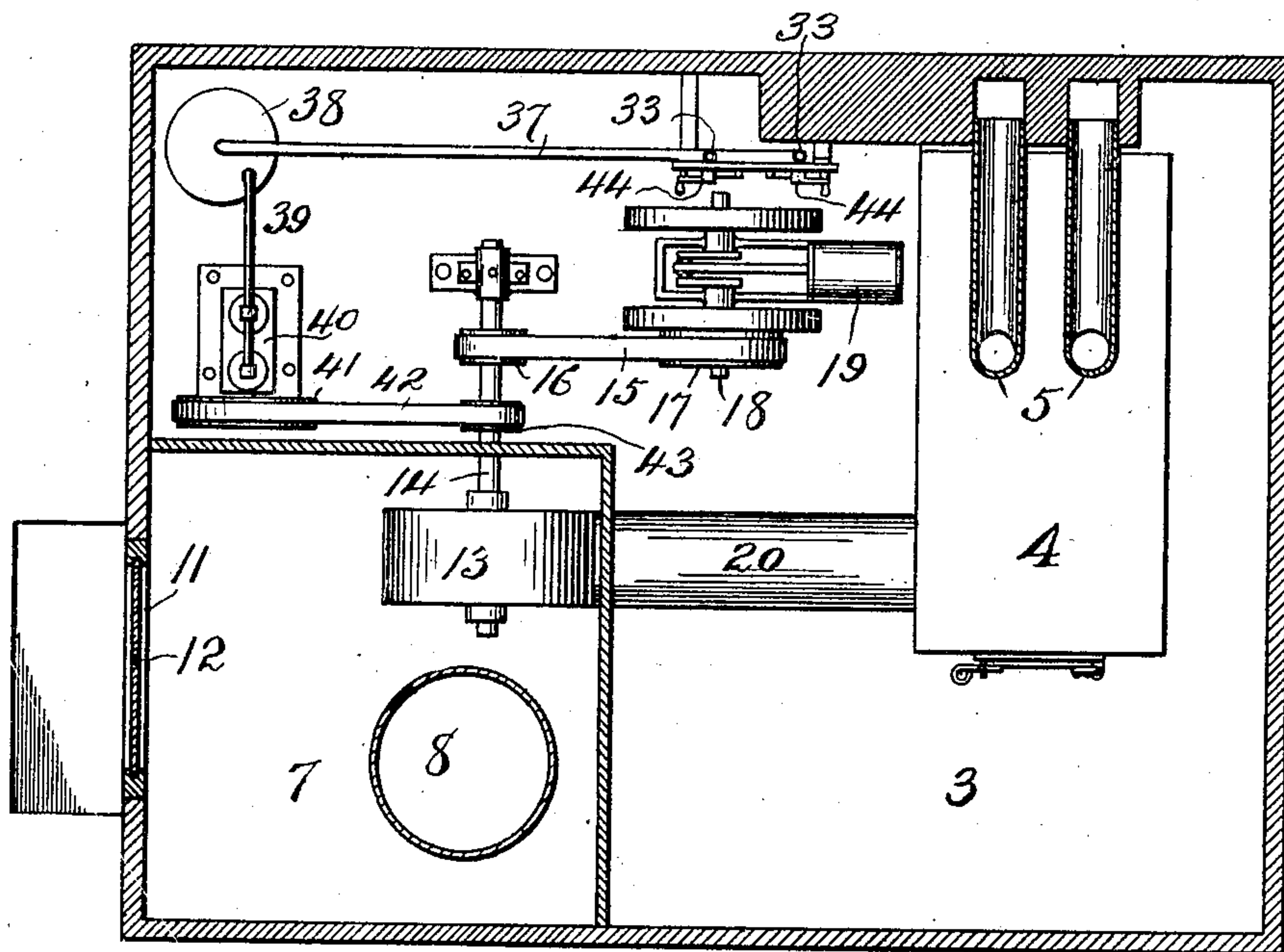


Fig 2

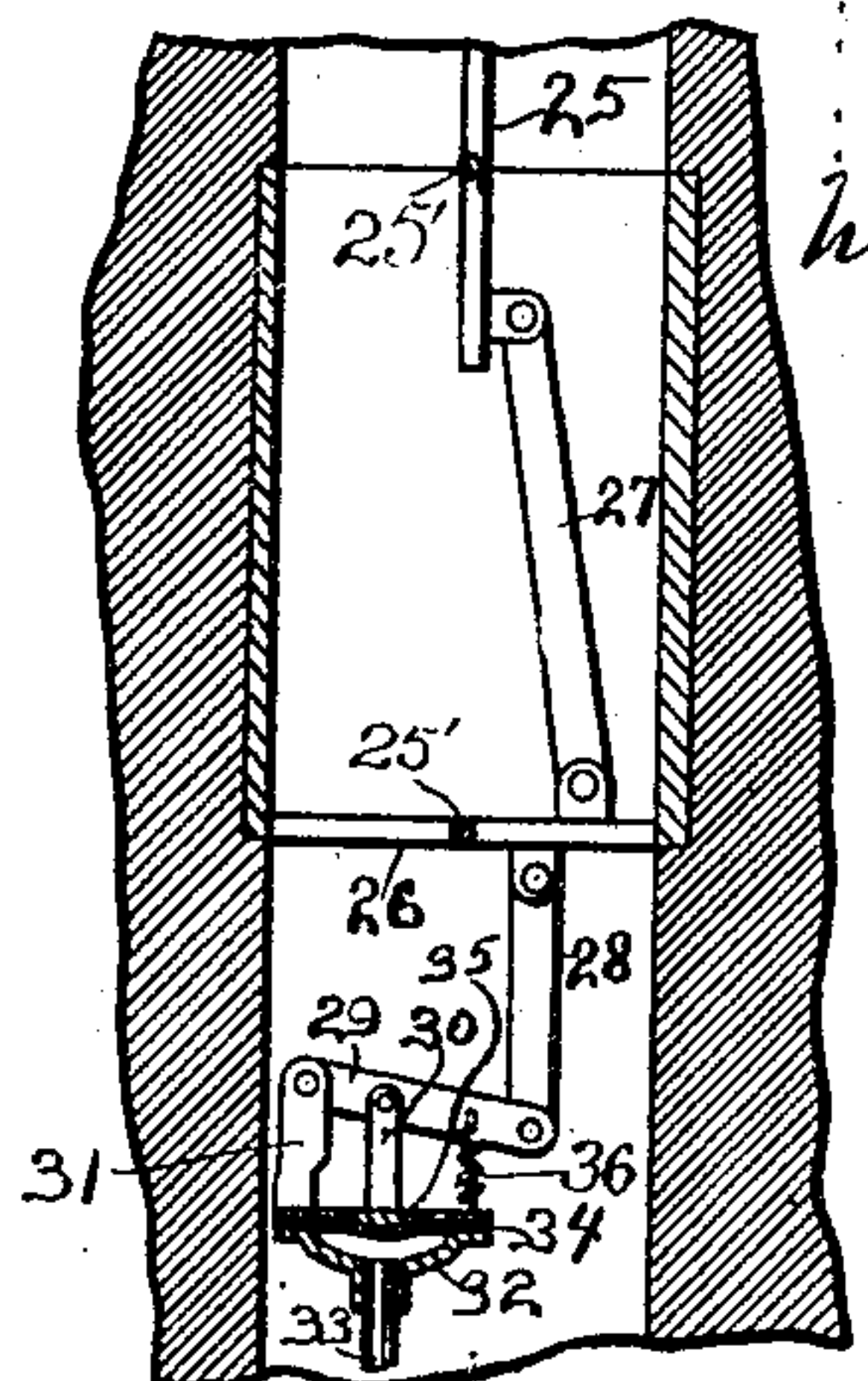
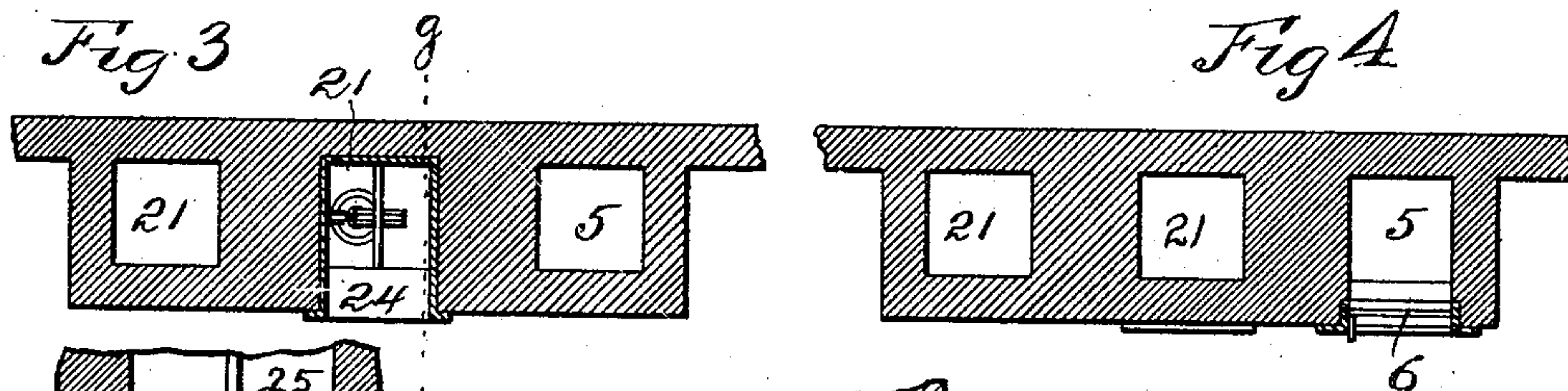


Fig 6

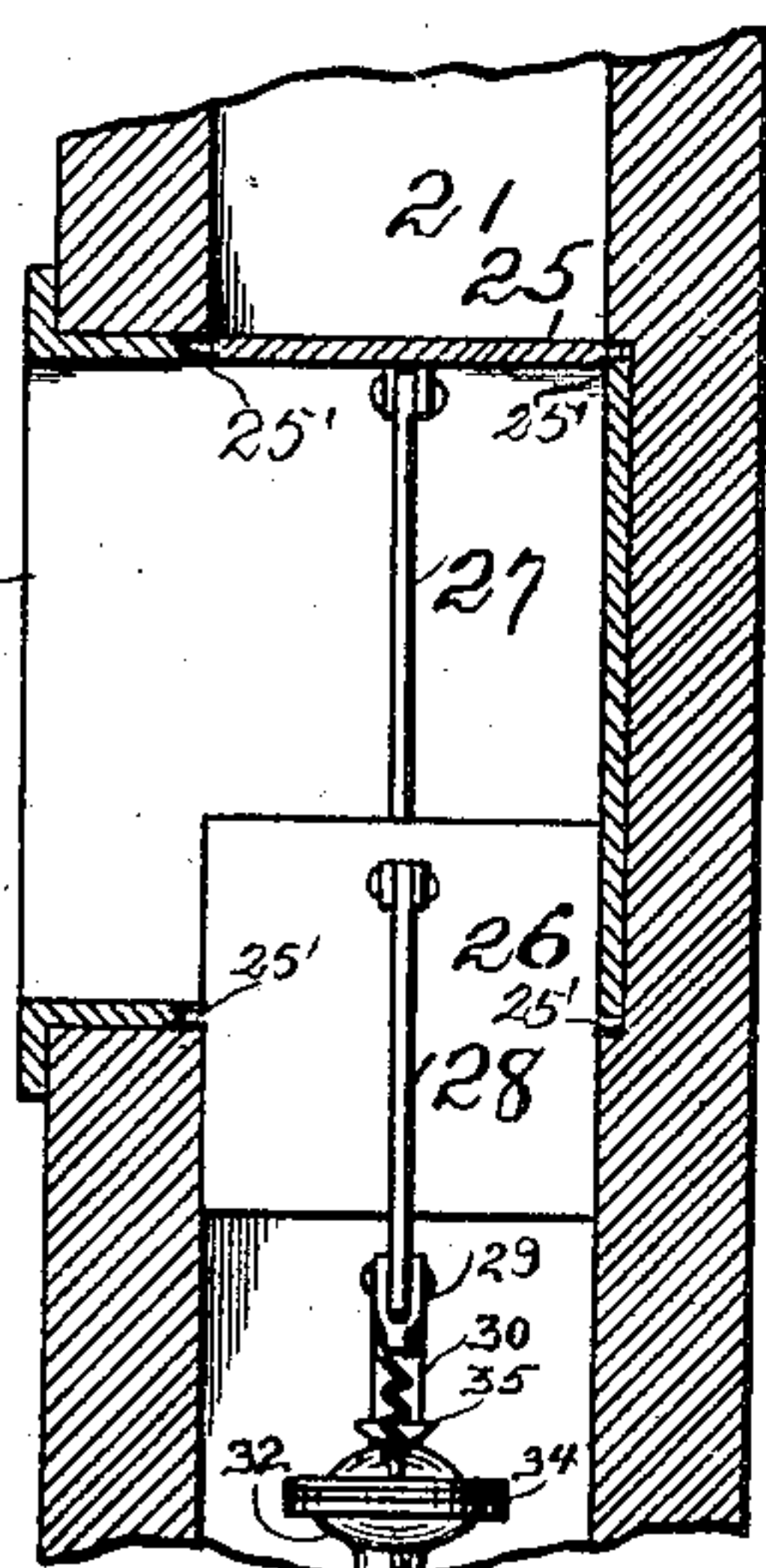


Fig 5

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UNITED STATES PATENT OFFICE.

JOHN HEDLUND AND WILLIAM W. McMAHON, OF KANSAS CITY, MISSOURI.

HEATING SYSTEM.

No. 862,158.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed June 5, 1906. Serial No. 320,274.

To all whom it may concern:

Be it known that we, JOHN HEDLUND and WILLIAM W. McMAHON, citizens of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Heating Systems, of which the following is a specification.

Our invention relates to improvements in heating systems.

10 The object of our invention is to provide means by which the upper and lower portions of one or more rooms of a building, such as a school or church or other public building, may be evenly and economically heated prior to their occupation.

15 In carrying our invention into effect, the air is first heated and forced into the room by an opening adjacent the ceiling, the air then being carried by means of a cold air conductor, having an inlet communicating with the room adjacent the floor thereof, into the room
20 containing the heating apparatus. The apparatus is provided with means by which, after the room has been sufficiently heated and is about to be occupied, cold fresh air is admitted to the heater and after being heated and discharged into the room is carried through said
25 inlet into the cold air conductor and discharged into the open air, thus affording to the occupants of the room, after occupation, a fresh supply of heated air.

Our invention comprises the novel features herein-after fully described and claimed.

30 In the accompanying drawings illustrative of our heating system, Figure 1 is a vertical sectional view of a two story building having a basement containing the pumping and heating apparatus, and showing two rooms equipped with our improved mechanism. In
35 this view, one of the cold air conductors is shown broken away to disclose the dampers. Fig. 2 is a horizontal sectional view taken on the dotted line *a—b* of Fig. 1. Fig. 3 is a cross section taken on the dotted line *c—d* of Fig. 1. Fig. 4 is a cross section taken on
40 the dotted line *e—f* of Fig. 1. Fig. 5 is a vertical sectional view showing a portion of the cold air conductor and dampers, and taken on the dotted line *g—h* of Fig. 3. Fig. 6 is a view similar to Fig. 5, showing the dampers reversed in position and at right angles to
45 those in Fig. 5.

Similar characters of reference denote similar parts.

1, 2 and 3 denote respectively the basement or heating room, and rooms in the first and second story of the building, A, 4 denotes an air heating apparatus of any
50 desired kind.

5 are hot air conductors connected respectively at their upper ends with the rooms 2 and 3 by means of outlet openings 6 disposed each adjacent the ceiling of the room in which it discharges the hot air.

55 In the room 1 is a pumping chamber 7 communicating by means of opening 8 with a space 9 formed be-

tween the floor of room 2 and the ceiling 10 of room 1. Said chamber 7 is also provided with an opening 11 communicating with the open air and adapted to be closed by a pivoted closure 12 which can be adjusted to
60 or from the closed position. In the chamber 7 is an air pump 13 having a shaft 14 which may be rotated by means of a belt 15 connecting pulley 16 on shaft 14 with the pulley 17 on the shaft 18 of an engine, such as a gas engine, 19. Chamber 7 is connected by a con-
65 ductor 20 with the air heater 4.

21 denotes cold air conductors extending, preferably, vertically from the room 1 through the roof 22 of the building A. Each conductor 21 discharges at its upper end into the open air and adjacent its lower end com-
70 municates by openings 23 with the space 9. One of conductors 21 is provided with an inlet opening 24 communicating with room 2 adjacent the floor thereof. The other conductor 21 is similarly provided with an-
75 other inlet opening 24.

Means are provided by which when air is pumped from heater 4 into the rooms 2 and 3 through openings 6, the air passing out openings 24 may be shunted up-
80 ward into the open air or downward into space 9, and thence into chamber 7 and thence into the heater again. The preferable means for so shunting the air currents in conductors 21 comprises two dampers 25 and 26 piv-
85 otally mounted on pivots 25' in each conductor 21, one above and the other below the opening 24 of said conductor. The dampers 25 and 26 are connected piv-
otally equidistant from their pivots to opposite ends of a link 27.

Pivoted to the under side of damper 26 is a rod 28 the lower end of which is pivoted to a lever 29 pivoted to a bracket 31 supported on a diaphragm cup 32 mounted
90 upon the upper end of a tube 33, located one in each conductor 21.

On each cup 32 is mounted a diaphragm 34 upon which rests a saucer shaped member 35 provided with a central upwardly extending stem 30 pivoted to the
95 lever 29 intermediate the rod 28 and the bracket 31.

The disposition of the dampers 25 and 26 and the length of link 27 are such that when one damper is in the vertical position the other damper will be hori-
100 zontally disposed. By reversing the positions of the dampers the air entering openings 24 may be shunted upward or downward. To swing the dampers to the position shown in Fig. 6 a coil spring 36 has one end at-
105 tached to lever 29 and the other end to cup 32. By forcing air into conductors 33 the diaphragm 34 will be raised thus raising saucer shaped member 35, lever 29 and rod 28 and swinging damper 26 to the vertical po-
sition, and damper 25 to the horizontal position.

The lower ends of tubes 33 are connected to a hori-
110 zontal tube 37 connected to a reservoir 38 which is connected by a tube 39 to an ordinary rotary air compressor of any suitable type and denoted by 40. On

the pulley 41 of the compressor 40 is mounted a belt 42 also mounted on a pulley 43 secured on shaft 14 of fan pump 13.

44 denote valves for shutting off tubes 33 from pipe 37.

5 In operating our invention, some little time before the rooms are to be occupied, the closure 12 is shut, the gas engine 19 started, thus driving pump 13 and compressor 40. The valves 44 are then turned so as to connect tubes 33 with tube 37, at which the air will be
10 forced through the tubes 33 and swinging, as already described, the dampers 25 and 26 to the positions shown in Fig. 5. The air will now pass from the pump 13 through conductor 20 into and through heater 4, thence
15 by conductors 5 into the upper parts of rooms 2 and 3, and thence downward and through openings 24 into conductors 21 in which the air will pass downward and through openings 23 into space 9, which space will be
20 heated by heater 4. From space 9 the air will pass by opening 8 into chamber 7, and thence by fan 13 and conductor 20 back to heater 4. When the rooms are thoroughly heated in this manner, and just prior to their occupancy, the valve 44 are closed, and closure 12
25 adjusted to the open position. The springs 36 will now retract the dampers 25 and 26 to the positions shown in Fig. 6, and the conductors 21 above openings 24 will now be closed from communication with space 9. The fan 13 continuing to run will now draw its supply of air through opening 11, and the air thus drawn after passing through the heater 4 and conductors 5 to rooms 2
30 and 3, will pass from said rooms by openings 24 and thence upward through conductors 21 to the open air. In this manner the initial heating of the rooms will be accomplished at small expense comparatively and after they are thoroughly heated, the rooms will be supplied
35 with fresh air.

Our invention may be modified in many ways within the scope of the appended claims without departing from its spirit.

Having thus described our invention, what we claim
40 and desire to secure by Letters Patent, is:—

1. In a heating system, the combination with a hot air conductor and a cold air conductor each leading to the room to be heated, the hot air conductor having an outlet discharging into the room adjacent the ceiling, and the
45 cold air conductor having an inlet opening into the room adjacent the floor, said cold air conductor leading upwardly and discharging outside the room, and having a discharge opening located below the floor, an air heater connected with and discharging into the hot air pipe, means by which air is, withdrawn from said discharge
50 opening and discharged into said air heater, of two dampers disposed in said cold air conductor, one above and one below the inlet opening, means by which when one damper is moved to the closed position, the other damper
55 will be moved to the open position and means actuated by air pressure for moving said dampers.

2. In a heating system, the combination with a hot air conductor having an outlet discharging into the room adjacent the ceiling, of a cold air conductor having an inlet
60 opening into the room above and adjacent the floor, said cold air conductor leading upwardly and discharging outside the room, and provided with a discharge opening located below the floor, an air heater discharging into said hot air pipe, a chamber having an opening for receiving air
65 from the exterior of the building, a closure for said chamber opening, a conductor communicating with said chamber and said cold air discharge opening located below the floor, means for conveying air from said chamber into said air heater, a pump for forcing air into and through said
70 conveying means, two dampers disposed in said cold air conductor, one above and one below said inlet opening,

means for simultaneously moving one damper to the closed and the other to the open position and means actuated by air pressure for moving said dampers.

3. In a heating system, the combination with two rooms 75 disposed one above the other, the lower room having the ceiling disposed at a distance below the floor of the upper room so as to form a heating chamber or conductor, of a pumping chamber located below the said ceiling in said lower room, and having an opening leading to the exterior 80 of said lower room, a closure for said opening in said pumping chamber, the pumping chamber having an opening communicating with the space above said ceiling of the lower room, an air heater in the lower room outside said pumping chamber, an air pump in said pumping chamber, a conductor leading from said pump to said air heater, a hot air pipe leading from said air heater to and discharging into said upper room adjacent the ceiling thereof, a cold air conductor leading upwardly through said upper room and discharging at its upper end into the atmosphere 90 outside said upper chamber and having an inlet opening communicating with the upper room adjacent the floor thereof, and having an opening communicating with the space above the ceiling of the lower room, two dampers disposed in said cold air conductor one above and the other 95 below said inlet opening, means by which when one damper is moved to the closed position, the other damper will be moved to the open position and means actuated by air pressure for moving said dampers.

4. In a heating system, the combination with suitable 100 air heating means, of a chamber having a cold air inlet communicating with the exterior of the building, a closure for said inlet opening adapted to be adjusted to the open or closed positions, the room to be heated, a hot air conductor leading from said air heater to and discharging 105 into said room adjacent the ceiling thereof, a cold air conductor having an inlet opening communicating with said room adjacent the floor thereof, means for conveying air from said cold air conductor from below said inlet opening thereof to said chamber, said cold air conductor discharging above the said inlet opening into the open air, air conducting means connecting said air heater and said chamber, a pump for forcing air from said chamber through the conductor connecting said chamber with the air heater, means by which the current of air entering said cold air 115 inlet from said room may be shunted upward into the open air through said cold air conductor or downward and into said chamber and means actuated by air pressure for operating said air shunting means.

5. The combination with two rooms disposed one above 120 the other, of means for heating the air, means for forcing the heated air from the lower room into the upper room and discharging the hot air into the upper room adjacent the ceiling thereof, a cold air conductor communicating at its lower end with said lower room and at its upper end 125 discharging into the open air and having an inlet communicating with the upper room adjacent the floor thereof, means by which air entering said inlet from the upper room may be shunted through the cold air conductor into the open air or downward into the lower room and means 130 actuated by air pressure for operating said air shunting means.

6. The combination with two rooms disposed one above 135 the other, the lower room having the ceiling disposed apart from the floor of the upper room and forming a heating space, of a chamber in the lower room having an opening communicating with said space, and having an opening communicating with the open air, an adjustable closure for the latter named opening, an air heater in the lower room disposed outside said chamber, a conductor connecting the chamber with said air heater, means for conveying 140 air from said heater into the upper room and discharging the hot air in said upper room adjacent the ceiling thereof, a cold air conductor discharging at its upper end into the open air and at its lower end into said space, and having 145 an inlet communicating with the upper room adjacent the floor thereof, means by which air entering said inlet in said cold air conductor may be shunted through said cold air conductor into the open air or into said space and means actuated by air pressure for operating said air 150 shunting means.

7. The combination with two rooms disposed one above the other, of a heater located in the lower room, means for forcing the air through said heater from the lower room into the upper room at a point adjacent the ceiling of the latter, a cold air conductor communicating at its lower end with the lower room and discharging at its upper end into the open air and having an inlet communicating with the upper room adjacent the floor thereof, two dampers pivotally mounted in said cold air conductor one above and the other below said inlet, a link connecting said dampers, one damper being horizontal when the other is vertical, means connected with one damper for reversing their positions and means actuated by air pressure for swinging said valves.
8. The combination with two rooms disposed one above the other, of an air heater, a hot air conductor leading from said heater and discharging adjacent the ceiling in the upper room, a cold air conductor connected with the

lower room and discharging into the open air and having an inlet communicating with the upper room adjacent the floor thereof, means by which air entering said inlet may be shunted through the cold air conductor into the open air or downward into the lower room, means actuated by compressed air for operating said air shunting means, an air compressor for supplying compressed air to said compressed air actuated means, a pump for forcing air through said heater into said hot air conductor, and an engine for operating said pump and air compressor.

In testimony whereof we affix our signature in presence of two witnesses.

JOHN HEDLUND.
WILLIAM W. McMAHON.

Witnesses:

E. B. HOUSE,
G. C. LA MOUNTAIN.