

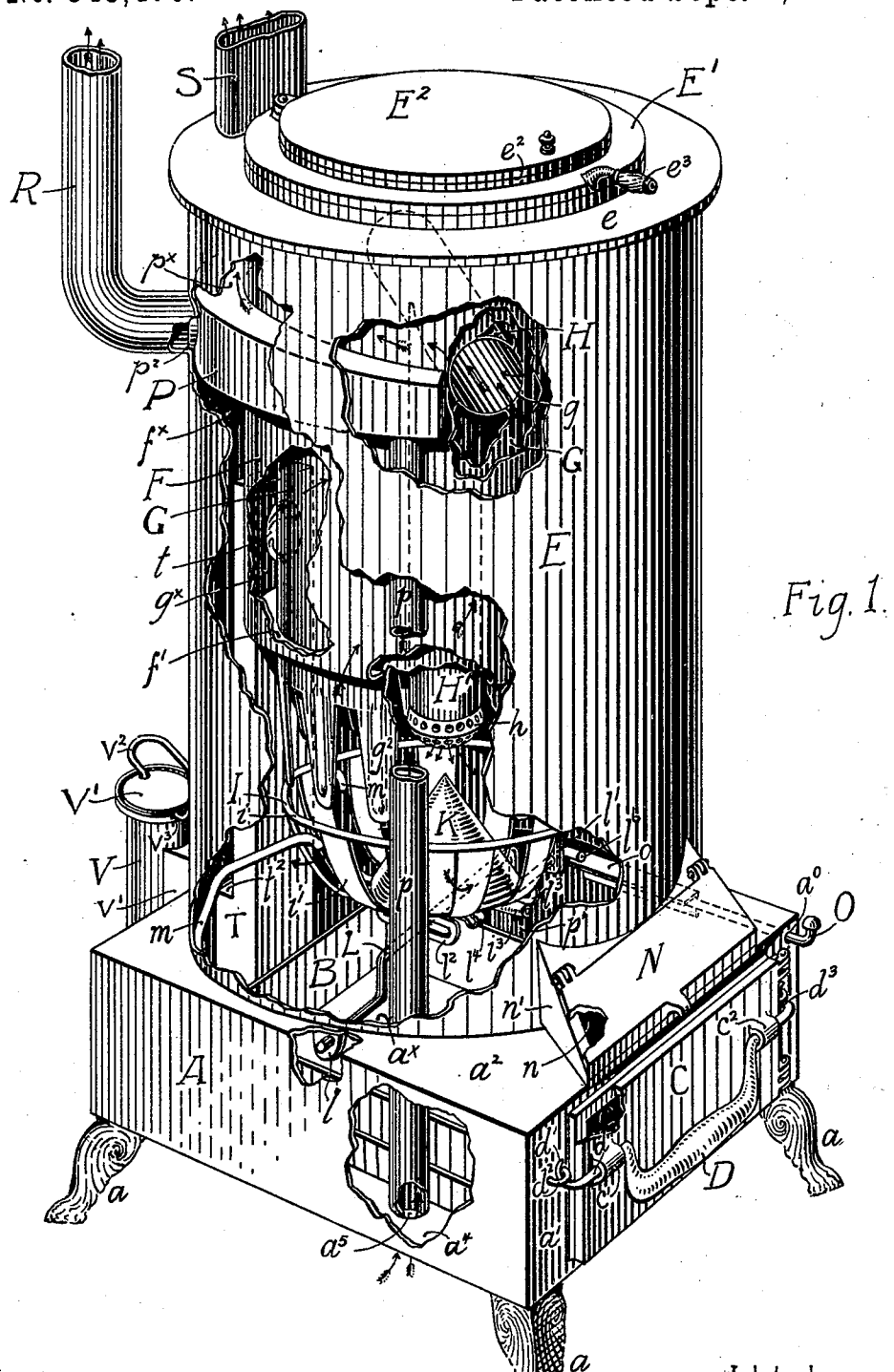
(No Model.)

2 Sheets—Sheet 1.

C. FISCHER.
HEATING APPARATUS.

No. 545,470.

Patented Sept. 3, 1895.



WITNESSES

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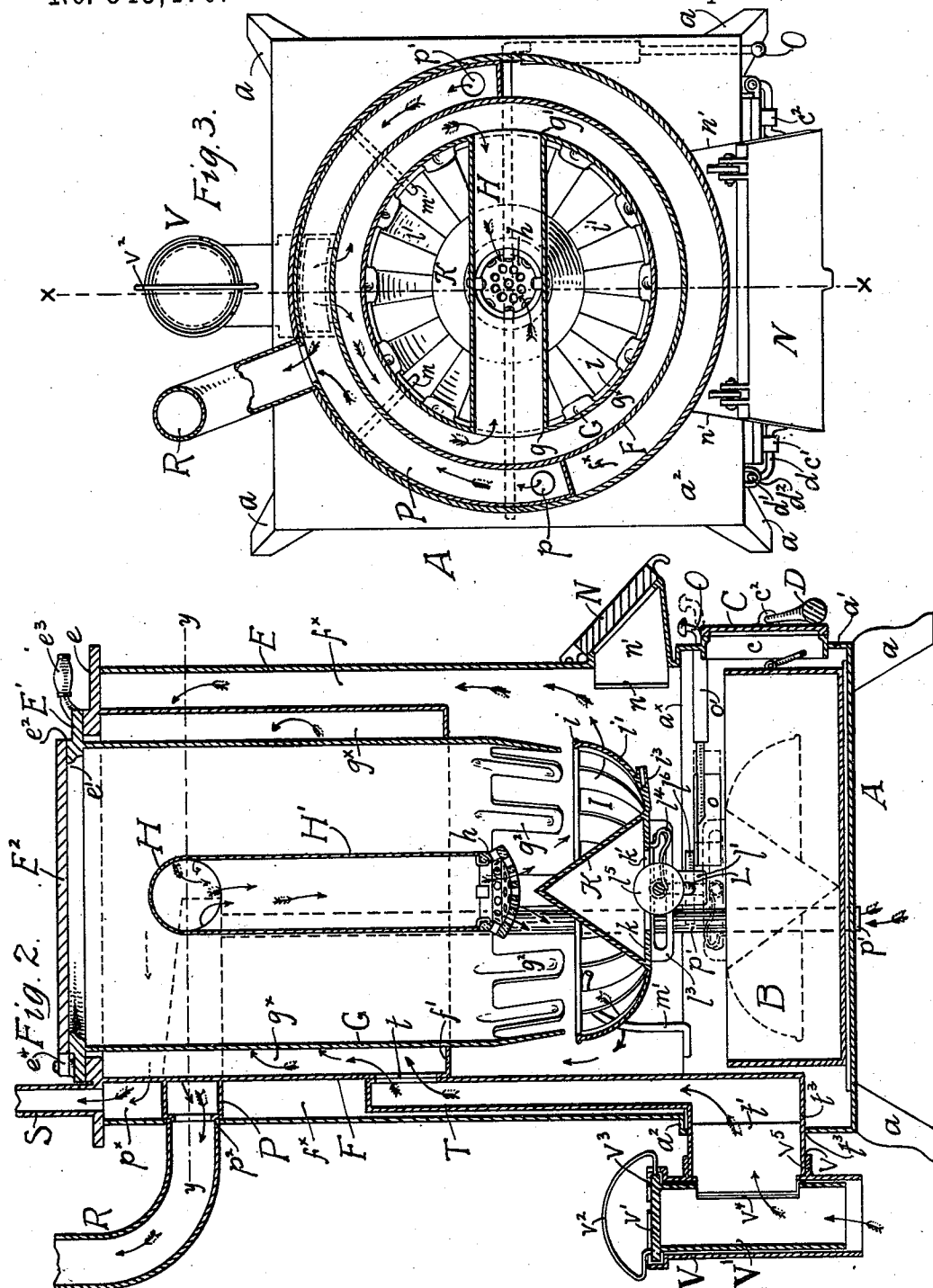
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UNITED STATES PATENT OFFICE.

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HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 545,470, dated September 3, 1895.

Application filed April 8, 1895. Serial No. 545,014. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN FISCHER, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Heating Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention has for its objects, primarily, to sustain combustion in a heating apparatus solely by descending air-currents, and thereby obtain the maximum degrees of heat from the products of combustion; second, to effect an excess of heat radiation from the front portion of heating apparatus; and, third, to increase the flow of caloric in the ventiducts.

My invention consists in the novel construction and combination of parts, such as will first be fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a view in perspective of the improved heating apparatus with portions of the outer casing or shell broken away to show the novel parts. Fig. 2 is a vertical sectional view of the improved heating apparatus, taken on line xx of Fig. 3. Fig. 3 is a horizontal sectional view taken on the line yy of Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents the base of the heating apparatus or stove, which consists of a rectangular-shaped box made of suitable depth and supported by the legs a a . In the front end a' of the box or base A is an opening c , which extends the greater part of the length of said end, and is of the proper height to permit the entrance and removal of the receptacle B for the ashes.

C is the door which extends over the opening c and past the respective sides of said opening, and is made to fit closely against the end a' of base A. To insure a nearly perfect exclusion of air-currents from the base A, the parts of the door and of the end a' of the box A which come in contact are made smooth and the door C clamped to said

end in the following manner: Upon the outer side portion and at each end of the door C are cast the lugs c' c^2 , which lugs are perforated horizontally and in a plane parallel with said door. In the lugs c' c^2 is pivoted a U-shaped crank lever D, the main portion of which between the respective lugs c' c^2 is weighted in the desired degree. One of the pivots d of the lever D extends beyond the outer edge portion of the door C, and is bent at right angles in the direction of the end a' of the base A, so as to form a crank, and also at d' in an upward direction in a single curved line. Upon the end a' of the box or case is a fixed staple d^2 , which is in the path of and receives the said curved end d' of the pivot d . The other pivot in the lug c^2 at the other end of door C is extended beyond the outer edge portion of said door, and is bent in the direction of the end a' of the base, and also extended upwardly in a curved line and made to engage with a staple d^3 , which is arranged in position on the end a' of the base in precisely the same manner as described of staple d^2 and the engaging portion d' of pivot d .

The heat-radiator consists of an external cylindrical shell or case E, the lower end of which rests upon the top a^2 of the base A, and extends in a line concentric with and a short distance from the edge of the circular opening a^x in the top a^2 of the base A, and is connected with said base in such a manner as to exclude air-currents between said shell and base. Upon the upper end portion of the cylinder or case E, which extends upwardly a considerable distance, is rigidly attached an annular flat top portion e of the stove, the edges of which project outwardly a short distance from the outer side portion of the radiating-case E. Within case E and to the inner side portion of the part e of the top is rigidly attached the upper end portion of a cylindrical case or shell F, the diameter of which case is about one-third less than the described diameter of the case or shell E. The case F is arranged concentric in position within the case E, so that its parts are at a corresponding distance from the interior portions of the case E, and the lower end of said case F extends in a downward direction a short distance below a point equidistant from the respective upper and lower ends of said

shell E, so as to form between the external and internal cases E and F a circular smoke-flue f^x . At the lower end portion of the case F and upon the inner side portion thereof is rigidly attached an annular flange f' , extending at right angles from said case, and which flange is comparatively narrow in width and its outer edge portion concentric with the case F. Within the case or shell F is arranged the rotatable fuel-magazine G, which also consists of a removable cylindrical case, the diameter of which is considerably less than the described diameter of the case F. The upper end portion of the magazine G extends through an opening e^0 in the top e of the stove and is rigidly attached to a rotatable annular flat plate E' , which rests upon the annular supporting-flange e . The lower end portion of the magazine extends in a downward direction a short distance below the under side portion of the flange f' on the case F, the outer side portion fitting closely the concentric inner edge of said flange, thereby forming a circular hot-air and draft chamber g^x between the fuel-magazine G and the case F.

To the lower end portion of the magazine is connected the upper end portion of the separate grate-bars $g^2 g^2$, which are arranged a short distance apart and extend entirely around the lower end of said magazine and form the upper portion of the fire-pot for the passage of the elements of combustion. Each bar g^2 extends in a downward direction a considerable distance and the lower end made narrower in width than the upper end. In the plate E' is a circular opening e' for the fuel. To the plate E' is pivoted at e^4 an annular cover E^2 , the edge e^2 of which is fitted to extend over the opening e' .

In the side of the magazine G, a short distance below the top E, is a circular pipe-opening g . In the other side of the magazine, diametrically opposite the opening g , is an opening g' . In the opening g is secured rigidly one end of an air-conducting pipe H, which communicates with the chamber g^x . The other end of pipe H extends within the magazine and the opening g' and also communicates with the circular chamber g^x . To the inner side portion of the pipe H, within the fuel-magazine and at a point equidistant from the inner side portion of the magazine G, is rigidly attached the upper end portion of the air-supply pipe H', the diameter of which is the same as pipe H'. The lower end of pipe H extends in a downward direction to a position a short distance below a line described transversely to the magazine and through the upper end of the bars g^2 of the fire-pot. To said end of pipe H' is attached in any well-known manner a perforated cap h , which is composed of fire-clay or other suitable material. Beneath the pipe H' is the rotatable portion I of the fire-pot. Said portion I consists of a cone-shaped case or deflector K, the apex of which deflector ex-

tends upwardly in the direction of and to a position within a short distance of the perforated cap h on the lower end of the air-draft pipe H'. To the bottom portion k of the deflector K is connected rigidly the lower end portions of the respective flat grate-bars $i' i'$, which bars are arranged a suitable distance apart in the direction of the circumference of the base of said deflector K, and each bar extends from said bottom in an outward direction from a common center a short distance, and thence upwardly in a curved line and its upper end attached rigidly to a circular ring i , which ring is in position near the lower end portions of the bars g^2 , forming the upper portion of the fire-pot. The other bars are connected with the ring i in the same manner as described of bar i' , the upper end of the said bars being considerably wider than the lower ends.

To the top portion a^2 of base A and near the rear end of the said base within the case E is attached rigidly one end of a curved supporting-bar m , the other end of which bar bears against the rear portion of the grate I' and supports said grate in position. Upon the other side of the base A is a supporting-bar W', (see Fig. 2,) which is arranged to support the other side of the grate in like manner.

For the purpose of placing the fuel in the fire-pot in the initial preparation of the stove for use and also operating said fire-pot, a rectangular-shaped opening n is made in the case E, extending from the top a^2 of the base above the door C a short distance, and so far transversely as to permit the operation of the shaker-bar. On each side of the opening n are flanges $n' n'$, connected with the outer side portion of the case E, the upper edges of which incline downwardly toward the top a^2 of the base. The opening n is securely closed by a drop-door N, hinged to the lateral extensions of the flanges $n' n'$, forming part of the cover to the opening n . Said door N is made to fit closely the inclined edges of the flanges $n' n'$ and exclude air-currents.

In the chamber f^x , between case E and case F and near the top of the stove, is arranged a separate air-circulatory chamber or case P. Said case extends in width from the inner side portion of case E to the outer side portion of case F and in the circular direction described by said chamber from a position corresponding to one side of case E toward the rear part of said case and to a point directly opposite in chamber f^x the other end of said case. Said case is closed at both ends and attached fixedly in position to the case E, above which is a smoke-passage p^x . A ventiduct p is connected with the under side portion and end of the case P. Near one end of said case the other end extends in a downward direction and fitted closely in an opening a^5 in the bottom a^4 of the base A. To the other end of case P is connected a ventiduct p' , which extends within a similar opening to opening a^5 in the bottom a^4 of the base.

In the case P in the direction of the rear end of the stove is a registering flanged opening p^2 , and in the side of the case E is an opening registering therewith through which the flange is passed. To the flanged opening p^2 is connected one end of a heat-conducting pipe R, which is extended in an upward direction into an apartment above or in any required direction. To the top portion e of the stove, at a point removed a short distance laterally from the position of the pipe R, is connected the smoke-carrying pipe S, which communicates with the chamber f^x .

In the chamber f^x between the respective cases E F is arranged a vertical air-flue T. Said flue consists of a longitudinal box closed at both ends. One end of the flue T extends in an upward direction in chamber f^x a considerable height above the lower end of the case F and is attached to said case. In the case F and the flue T at the point of connection is a registering opening t communicating with the chamber g^x . The lower end of the flue T extends downwardly to the inner side of the bottom a^4 of base A in rear of the ash-pan B. In the side of the flue T, in the direction of the rear end of the base A, is an opening t' of considerable size, around which is a flange t^4 , which flange extends through and closely fits the opening t^3 in the rear end of the said base A and a short distance beyond the outer side portion of said end. To regulate the admission of air to the flue T an air valve or tube V, open at its lower end, is provided with an opening v slightly larger in dimensions than the opening t' in one side, around which opening is a flange v^5 , which fits over the flange t^2 of the flue T. In the tube V is fitted an air valve or tube V', which is provided with a cap v' at its upper end. To the said cap is connected a cross-bar or handle v^3 , which engages with the notches v^3 in the circular upper edge of the tube V. In the side portion of the tube V' is a longitudinal slot v^4 , which registers with the opening t' in the flue T.

In the initial preparation for the introduction of the fuel within the stove the door N is raised in position and the shaker applied to the lug z^3 on grate T. The rod O is then drawn outwardly, so as to release the crank-bar L, and the portion I' of the fire-pot is moved forward and downwardly and adjusts itself in position, as seen in dotted lines, Fig. 2, the declension of the crank-bar being sufficient to afford space above the fire-pot to insert the amount of kindlings which is introduced. The hand is then applied to the bent end l^3 of the crank-bar L, and guided by the shaker the fire-pot is raised upwardly in position near the magazine and the rod O operated to push the angle-iron beneath the lever or bent portion l^3 of the crank-bar and the fire-pot is secured in said position. The cover E² of the magazine is then removed and the magazine filled with coal or other fuel for

combustion, which falls upon the kindlings in the fire-pot. Air is then admitted to the draft-pipe H' through valve V. Fire is applied to the kindlings in the fire-pot and the oxygen admitted to the flue T in sufficient quantity, which passes to the chamber g^x , which chamber also prevents the intense heat from extending to the magazine G. It will be observed that the only supply of oxygen afforded to the fire is obtained through the draft-tube T, which enters the chamber g^x and becomes heated to a high degree, thence passes to the pipe H, thence downwardly through pipe H', and through the perforated cap h , aiding the combustion. Upon the ignition of the combustible materials in the fire-pot the flame is fed around the cone K, which as the fire increases in intensity deflects the flame outwardly in the direction of the openings between the grate-bars g^2 of the fire-pot, and the elements of combustion pass upwardly between the cases E F and in chamber f^x , and are diverted by the chamber P, and pass around the ends of said chamber into the passage p^x , thence upwardly through the smoke-conducting pipe S, in which movement the flame is caused to extend forward in the direction of the front part of the stove, and the radiation which follows is thereby increased in case E in the front part of the stove. The heat imparted to the chamber P causes an induction of cold air through the ventiducts $p p'$, and which becomes rapidly heated as the combustion increases in the fire-pot, and this heated air is conveyed through pipe R to the desired apartment. In the heat generated around the cone K and below the end h of the draft-pipe the flame consumes the fuel in the fire-pot I'; or, in other words, no air is supplied from below the fire-pot, and necessarily the flame is diverted from the center of the fire outwardly, consuming the material as it falls, the ashes falling through the fire-pot I into the ash-pan B. In this manner combustion is nearly perfect and the air-currents are not intercepted by the accumulated ashes. The intensity of the fire is regulated by the valve V', which is operated by lifting the handle from the notches on valve V, and by means of which valve the cold air is admitted in greater or less quantity, and as all parts of the stove are so made as to exclude the air-currents, except through the draft-tubes, the slow combustion of the fuel is maintained at long intervals of time and with great economy in the quantity of fuel required for consumption. The replenishing of the magazine with fuel is sufficient to insure continued combustion without further manipulation of the fire-pot, there being no clinkers formed from refuse ashes and no obstruction to the quantity of oxygen supplied through the air-ducts. The partial rotation of the magazine, however, which is effected by the lever e^3 , and also of the fire-pot, serves to accelerate the supply of fuel and disintegrate coarse mate-

rial which may fall adjacent to the independently-rotating parts of the fire-pot. The grate-bars g^2 may be made separate from the magazine and attached to a separate circular plate, if preferred.

The apparatus may be constructed with or without the ventiducts and the chamber P and the smoke transmitted from the chamber g^x direct to pipe S, if preferred.

My invention is applicable to all heating apparatus, and especially to portable furnaces.

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

1. In a heating apparatus comprising a case, a magazine for fuel within said case having a passage for the products of combustion between said case and magazine, and an outlet in said case, a hot air and draft chamber between said magazine and said case in said passage, and openings in the sides of said magazine, and an air conducting pipe within said magazine, and in said openings and communicating with said hot air and draft chamber, a draft pipe connected with said air conducting pipe extending downwardly within said magazine to the place of combustion and means for supplying air to the hot air and draft chamber substantially in the manner and for the purpose set forth.

2. In a heating stove a case having an outlet for the products of combustion in its upper portion, and an inlet for the cold air in the base of said stove, a magazine within said stove having a hot air and draft chamber between said magazine and said case, and pipe openings in the sides of said magazine, and a pipe in said openings communicating with said hot air and draft chamber, and a draft pipe connected with said air conducting pipe extending downwardly in said magazine to the place of combustion, a fire pot beneath said magazine and a cold air conductor within the cold air inlet extending to and connected

with the said hot air and draft chamber substantially as and for the purpose described.

3. In a heating stove a case having an outlet for the products of combustion in the upper part thereof and an inlet for the cold air in the base of said stove, an interior concentric hot air and draft case having a circular passage for the products of combustion between the respective cases a magazine on the inner side of the concentric hot air and draft case having pipe openings communicating with said hot air and draft case, a fire pot beneath said magazine, an air conducting pipe in said pipe openings and a draft pipe connected with said air conducting pipe extending downwardly within said fire pot, and a cold air conductor in the said cold air inlet in the base of said stove extending within the passage for the products of combustion and connected with said hot air and draft case, and means for regulating the supply of cold air to the said conductor substantially as described.

4. In a heating stove a case having an outlet in the upper part thereof for the products of combustion and an inlet for the cold air in the base of said stove an interior concentric hot air case having a circular passage for the products of combustion between the respective cases, and a horizontal circular deflecting flue within the passage for the products of combustion and immediately below the outlet in the exterior case and extending part of the distance in said passage in opposite directions a heat conducting pipe connected with said horizontal flue extending through the exterior case and ventiducts connected at one end with the said deflecting flue and having the other end extending through the base of said stove for the purpose described.

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Witnesses:

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