W. & W. JAMES, Jr.

Hot-Air Furnace.

No. 108,790. Patented Nov. 1, 1870

Fig: 1.

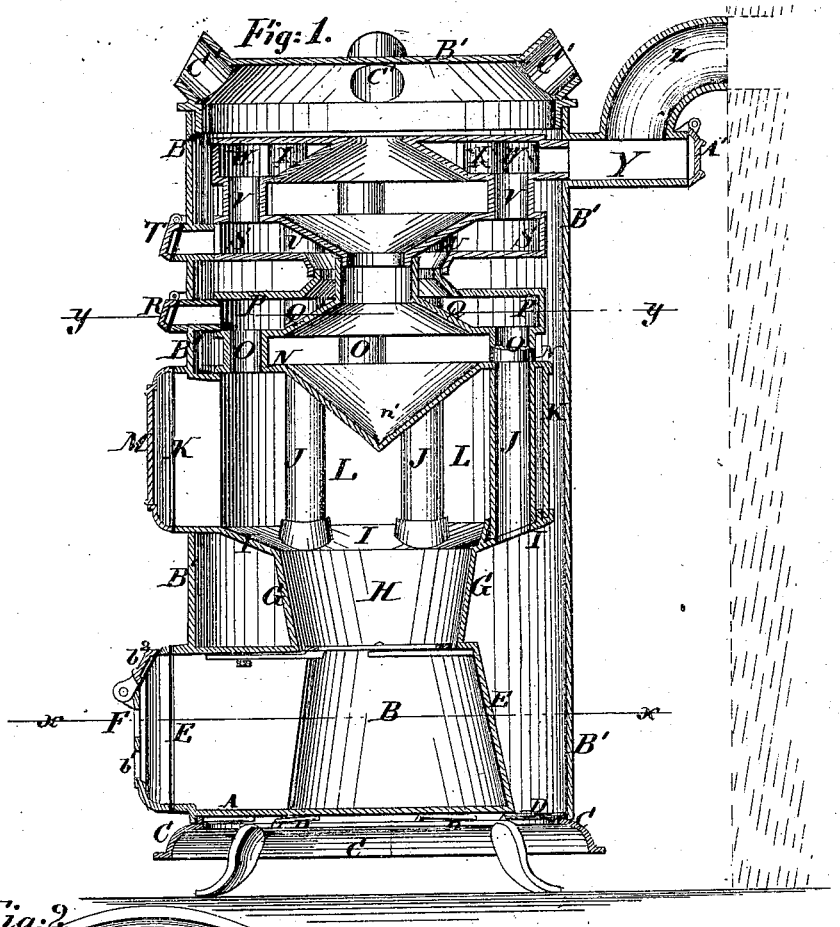


Fig: 2.

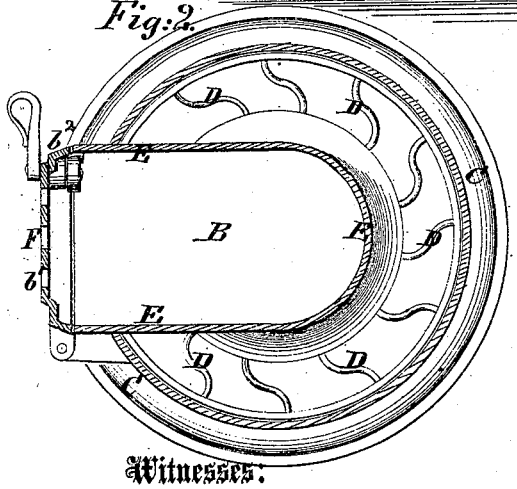
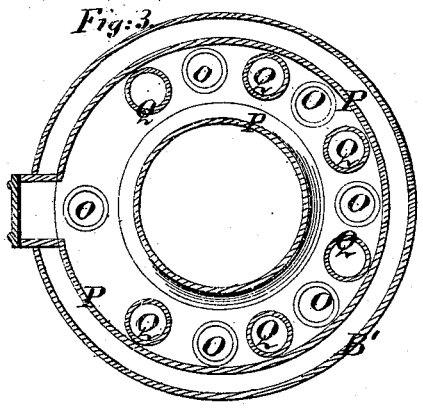


Fig: 3.



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WILLIAM JAMES AND WILLIAM JAMES, JR., OF MONTREAL, CANADA.

Letters Patent No. 108,790, dated November 1, 1870.

IMPROVEMENT IN HOT-AIR FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, WILLIAM JAMES and WILLIAM JAMES, Jr., of the city of Montreal, in the District of Montreal, Province of Quebec, Dominion of Canada, have invented a new and useful Improvement in Hot-air Furnaces; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of our improved furnace.

Figure 2 is a horizontal section of the same, taken through the line *x x*, fig. 1.

Figure 3 is a horizontal section of the same, taken through the line *y y*, fig. 1.

Similar letters of reference indicate corresponding parts.

Our invention has for its object to improve the construction of hot-air furnaces so as to obtain a greater amount of heat from the same amount of fuel than is possible with furnaces constructed in the ordinary manner; and

It consists in the construction and combination of the various parts of the furnace, as hereinafter more fully described.

A is a plate, made of suitable form for the bottom of the ash-pit B, and which is connected with the ring-plate C by S or other shaped arms D, leaving a space between the outer edge of the plate A, and the inner edge of the ring-plate C, for the free passage of the air to be heated. At the front of the furnace, the plate A is extended out to the ring-plate C, to form the bottom of the mouth of the said ash-pit, as shown in figures 1 and 2.

E is a curved plate which forms the sides of the ash-pit, and the ends of which are extended to form the mouth of the ash-pit, which is closed with a door, F, in the lower part of which are formed draught-openings b^1, which should be provided with a sliding-damper.

In the upper part of the door F is formed another draught-opening, closed with a small door b^2, so that the draught of the furnace may be regulated at will.

With the upper edge of the plate E, is connected the lower edge of the plate G, which forms the sides of the fire-pot H, said fire-pot being made in the form of an inverted truncated cone.

With the upper edge of the plate G is connected the inner edge of the dish-shaped ring-plate I, which is perforated to receive the lower ends of the air-pipes J, and with the outer edge of which is connected the lower edge of the plate K, which forms the walls of the chamber L, which forms a continuation or extension of the fire or combustion-chamber H.

The ends of the plate K are extended out to the front of the furnace, to form the opening for the introduction of fuel, which opening is closed with a closely-fitting door, M.

With the upper edge of the plate K is connected the outer edge of the plate N, the middle part *n'* of which is made in the form of an inverted cone, as shown in fig. 1, so as to distribute the products of combustion equally around the outer part of the chamber L, and about the air-pipes J.

The outer or horizontal part of the plate N is perforated to receive the upper ends of the air-pipes J, as shown in fig. 1 The air-pipes J are thus passed through the chamber L, and have both their ends open, so that the air may pass through them freely, and while passing through may be exposed to the full heat of the chamber L.

The horizontal part of the plate N is also perforated to receive the lower ends of the short pipes O, the upper ends of which enter perforations in the horizontal part of the base plate of the drum P, so that the products of combustion may pass through the pipes O from the chamber L to the drum P.

The outer or horizontal parts of the top and bottom plates of the drum P are perforated to receive the upper and lower ends of the air-pipes Q, so that the air while passing through said pipes Q may be exposed to the full heat of the products of combustion in the drum P.

The ends of the side plate of the drum P are extended out to the front of the furnace, to form an opening closed with a small door, R, for convenience in removing the ashes and cinders that may lodge in the said drum P.

The middle part of the base plate of the drum P, is bent upward in the shape of a truncated cone, and the upper part of said bent plate is extended in the form of a pipe or tube, to meet the downwardly-projecting top plate of the drum S, thus forming an air-tube pipe or passage for the air through the middle parts of the drums P and S, as shown in fig. 1. The middle part of the top plate of the drum P is bent upward to meet the downwardly-projecting middle part of the bottom plate of the drum S, thus forming a ring-shaped passage for the products of combustion to pass through from the drum P to the drum S.

The ends of the side plate of the drum S are extended to the front of the furnace, to form an opening which is closed with a small door, T, for convenience in removing the ashes and cinders that may lodge in the said drum S.

The outer or horizontal parts of the top and bottom plates of the drum S are perforated to receive the upper and lower ends of the air-pipes U, so that the air, in passing through the said pipes U,

may be exposed to the full heat of the products of combustion in the said drum S.

The outer or horizontal part of the top plate of the drum S, is also perforated to receive the lower ends of the short pipes V, the upper ends of which enter perforations in the horizontal part of the base-plate of the drum W, to conduct the products of combustion from the said drum S to the said drum W.

The middle part of the base plate of the drum W is bent upward into the form of a truncated cone, its upper edge being connected with the inner edge of the top plate of said drum, as shown in fig. 1.

The top and bottom plates of the drum W are perforated to receive the ends of the pipes X, so that the air in passing through said pipes may receive any heat that may still be in the smoke and other products of combustion passing through the drum W.

The ends of the side plate of the drum W are connected with the sides of the box Y, which project at the rear side of the furnace, and with which the smoke-pipe Z is connected that receives the smoke and other products of combustion and conducts them to the chimney.

In the outer end of the box Y is formed an opening, closed with a small door, A′, for convenience in removing the cinders, ashes, &c., that may have lodged in the said drum W.

B′ is the outer casing of the furnace, the lower edge of which is connected with the ring-plate C, and the upper end of which is provided with pipes C′, one or more, to conduct the heated air to the room or rooms to be warmed. The middle or hottest part of the furnace may be provided with an additional plate or casing when desired or necessary, or when the furnace is to stand near woodwork, to prevent the outer case from becoming too greatly heated.

Having thus described our invention,

We claim as new and desire to secure by Letters Patent—

1. The combination of the plate A, arms D, ring-plate C, plate E, door F with its draught-openings, plate G, dished ring-plate I, air-pipes J, plate K with its door M, ring-plate N, pipes O, drum P with its air-pipes Q and door R, drum S with its air-pipes U and door T, pipes V, drum W with its air-pipes X, box Y, and door A′, smoke-pipe Z, and outer case B′, provided with one or more hot-air pipes C′, with each other, said parts being constructed and operating substantially as herein shown and described, and for the purpose set forth.

2. The cone *a′*, projecting downward above the fire-chamber of the furnace, in combination with the other parts of the furnace, substantially as herein shown and described, and for the purpose set forth.

3. The drums P S W, one or more, provided with their smoke-pipes, and with their air-pipes and passages, in combination with the other parts of the furnace, substantially as herein shown and described, and for the purpose set forth.

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Witnesses:

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