(No Model.)

F. KERNAN, Jr., & W. H. LANDERS.

HOT AIR FURNACE.

No. 448,783. Patented Mar. 24, 1891.

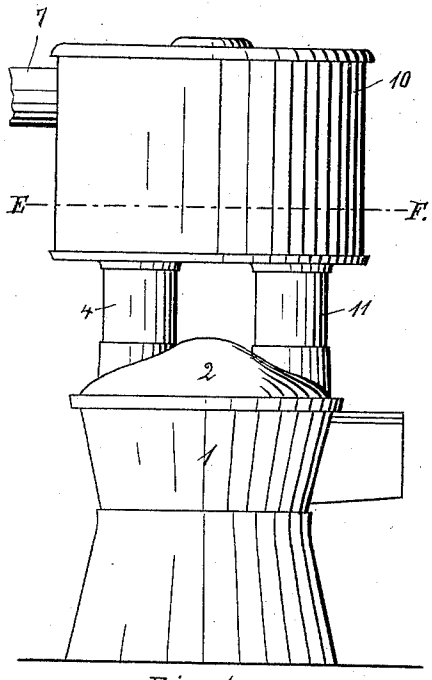

Fig. 1.

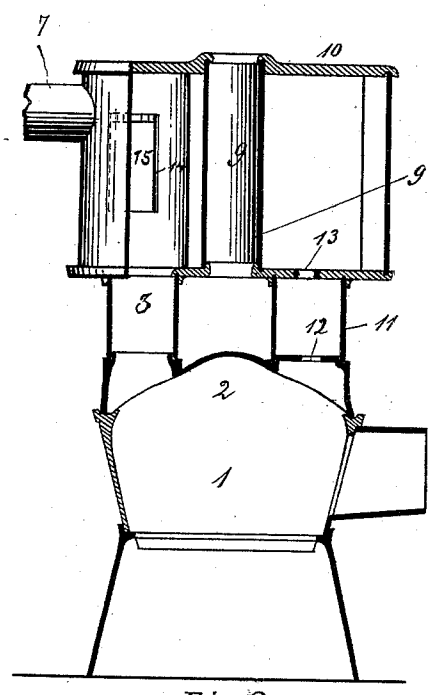

Fig. 2.

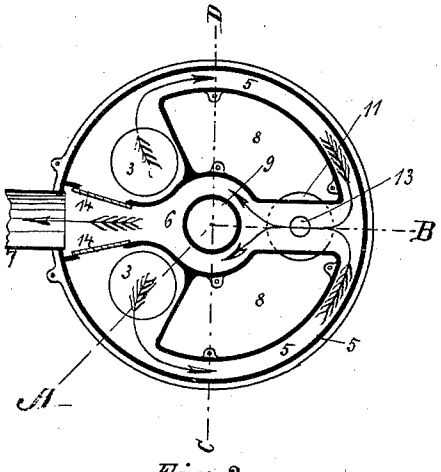

Fig. 3.

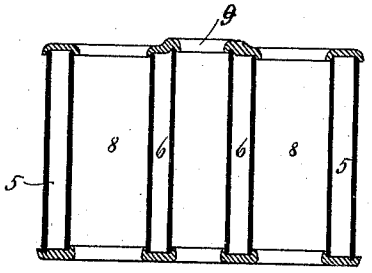

Fig. 4.

WITNESSES.
Rich. A. George.
Edward H. Ruby

INVENTORS.
Francis Kernan Jr.
W. H. Landers.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANCIS KERNAN, JR., AND WILLIAM H. LANDERS, OF UTICA, NEW YORK, ASSIGNORS TO THE KERNAN FURNACE COMPANY, OF NEW YORK.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 448,783, dated March 24, 1891.

Application filed July 23, 1890. Serial No. 359,616. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS KERNAN, Jr., and WILLIAM H. LANDERS, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Hot-Air Furnaces; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form part of this specification.

Our invention relates to a hot-air furnace; and it consists in the mechanism hereinafter pointed out and claimed.

In the drawings, Figure 1 shows a side elevation of our improved furnace. Fig. 2 represents a vertical central section on line A B of Fig. 3. Fig. 3 represents a top view, looking downward, taken on line E F of Fig. 1. Fig. 4 represents a section of the radiator on line C D of Fig. 3.

The object of our invention is to produce a hot-air furnace which will impart the maximum amount of heat from a given quantity of coal, and we claim to attain this result by employing and constructing our furnace with a feed-section 1, flaring outward from the bottom toward the top, the upper portion of the feed-section being provided with a cup-shaped joint *a* for receiving the flange of the convex cover 2, which fits into the cup-shaped joint, and is arranged so that the cover and the radiator, which is supported upon the cover, may be swung into any position to accommodate the smoke-exit.

By the arrangement and construction of the feed-section and the cover an expanding gas-chamber is formed above the fire, and the cover is brought into closer proximity to the fire than in furnaces heretofore constructed, and facilitates a more thorough and complete combustion of the gases than is possible in furnaces having a large dome over the fire, thereby augmenting the heating qualities of the furnace, and at the same time furnishing a sufficient expanding-chamber to accommodate the expansion of the gases in the process of combustion.

In the cover to one side of its center we provide two openings 3 3, arranged to receive tubes 4 4, which connect with and support the radiator, located above the feed-section and cover, the flues or passage-ways 4 4, connecting the cover with the radiator, the latter flues connecting with the encircling flue 5 in the radiator, the portions of which unite at a point opposite to flues 4 4, and thence deliver into the horizontal flue 6 through the radiator to the smoke-exit 7. By this arrangement the cover and radiator can be swung into any position to accommodate the smoke-exit without reference to the location or arrangement of the feed-section and the ash-pit opening. The arrangement and location of the portions of the flue leading from the feed-section to the radiator to one side of the center connecting with the encircling flues uniting in the horizontal flue at a point opposite to the entrance of the gases into the circular flue, and thence horizontally through the radiator to the smoke-exit, leave hot-air spaces 8 8, which are surrounded by the flues, so that both sides of the column of heated air are heated in its passage in the distributing-chamber above the furnace. By admitting the heated current of smoke and gases from the furnace into the encircling flue of the radiator and carrying the same through the encircling flue to the horizontal flue and then to the smoke-exit there is afforded a large heating and radiating surface, which will impart the maximum amount of heat from the minimum amount of coal, and by passing flue 6 over the center of the cover, that being the center of the fire, added heat is imparted to the moving current of air in its passage through openings 8 8 in the radiator, and by locating the furnace-casing in close proximity to the periphery of the radiator the heated column of air is kept in the draft of the fire-pot and feed-section in close proximity to the furnace, thereby imparting heat which could not be attained by allowing the heated air of the fire-pot to pass outside of the radiator.

For providing an additional heating-flue for the passage of heated air through the radiator we provide a vertical flue 9 through the radiator 10, which is elevated above the feed-section. The flue-opening over the cen-

ter of the cover and fire accelerates the movement of the current of air in its upward passage, and this flue may be connected at the upper surface of the radiator by a hot-air pipe with any portion of the building and afford a strong moving current of hot-air for distribution in the room to be heated.

For preventing any injury to the furnace arising from the explosion of gas therein we provided openings 14 14 between the encircling flue and the horizontal flue near the smoke-exit, which are covered with automatic dampers 15 15, Figs. 2 and 3, which open whenever the pressure of gas in the encircling flue is sufficient to move the dampers, and when the pressure is relieved the dampers automatically fall into position and close openings 14 14, thus forcing the heated gases and smoke through the encircling flue to the horizontal flue and then to the smoke-exit. While the openings between the encircling and horizontal flues and their dampers are shown they may be omitted without departing from the spirit of our invention, and a like omission may be made of the vertical flue through the radiator, although we believe it to be much preferable, as it affords a greater air-space in the radiator where the moving column of heated air can be heated on both sides and its movement thereby accelerated. The radiator is supported in part by tube 11, connecting with cover 2, provided with opening 12 of less diameter than the size of the flue, with a like opening 13 into the horizontal flue of the radiator, through which a slight passage is provided for admitting of some draft in the furnace. The openings 12 and 13 may, however, be omitted.

What we claim is—

The combination, in a furnace, of a fire-pot, dome, and radiator having an encircling flue, a cross-flue communicating with the encircling-flue at one side of the radiator and extending diametrically across the radiator to the smoke-exit, being divided to surround a vertical central air-passage through the radiator and cutting off the encircling flue at the smoke-exit, the encircling flue having an enlarged portion at each end and next to the smoke-exit, the automatically outwardly-opening dampers closing openings in the enlarged ends of the encircling flue and the two equal flues between the furnace-dome and radiator and opening into the enlarged end of the encircling flue of the radiator adjacent to the smoke-exit, substantially as set forth.

In witness whereof we have affixed our signatures in presence of two witnesses.

FRANCIS KERNAN, JR.
WILLIAM H. LANDERS.

Witnesses:
EDWIN H. RIDLEY,
C. D. ROSE.