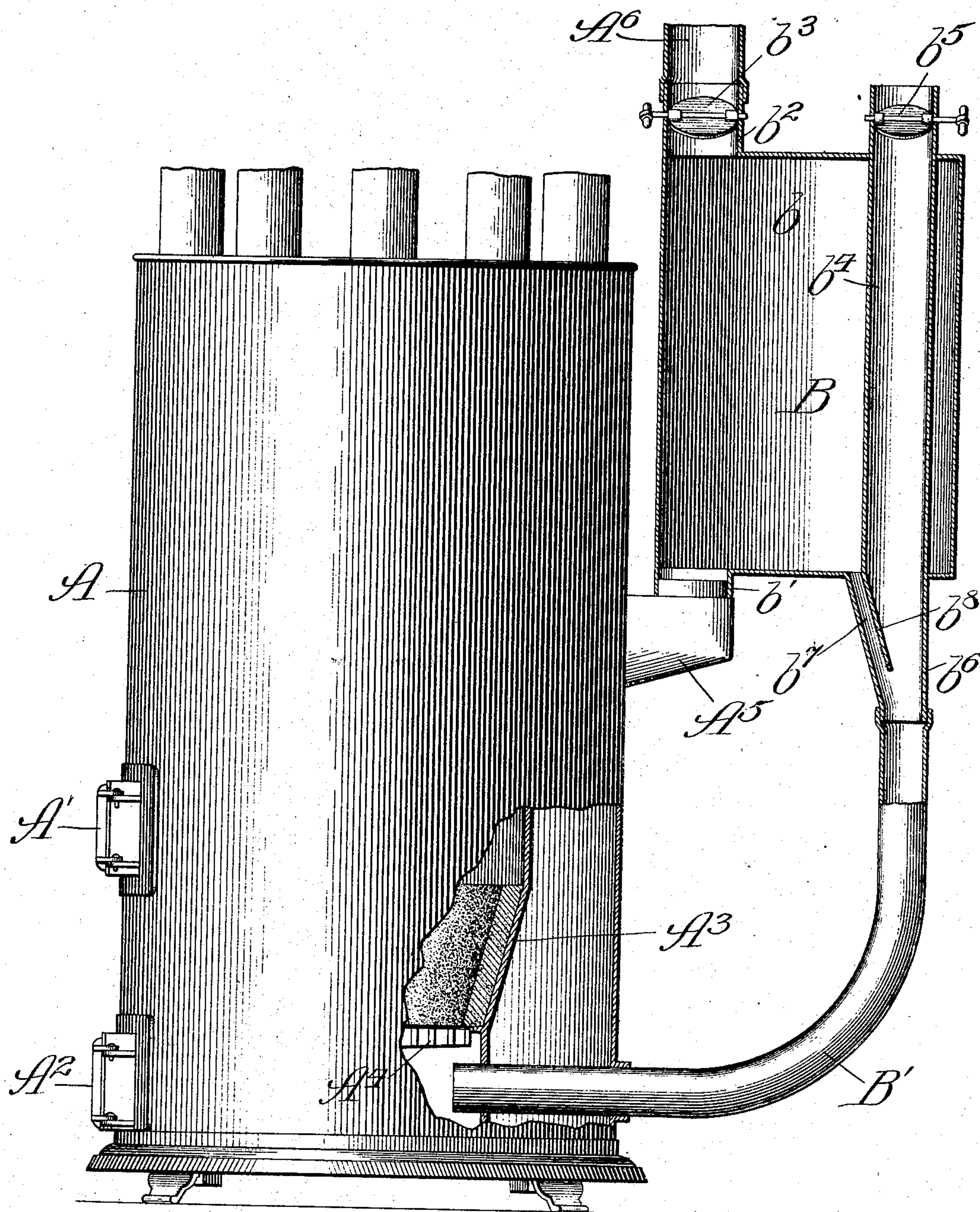


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PATENTED FEB. 14, 1905.

J. T. KELLY.
FURNACE.

APPLICATION FILED MAY 17, 1904.



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UNITED STATES PATENT OFFICE.

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FURNACE.

SPECIFICATION forming part of Letters Patent No. 782,508, dated February 14, 1905.

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To all whom it may concern:

Be it known that I, JOSEPH T. KELLY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Furnaces, of which the following is a specification.

My invention relates particularly to means for insuring complete combustion in furnaces; and my primary object is to provide a simple device whereby unconsumed gases and solid particles of fuel will be returned to the fire-chamber and the air required for purposes of combustion will be preparatorily heated prior to its introduction into the furnace.

The invention is illustrated in its preferred embodiment in the accompanying drawing.

A represents a furnace provided with a fire-chamber door A' and ash-pit door A².

A³ represents the fire-pot of the furnace, and A⁴ the grate.

A⁵ represents the base of the smoke-stack of the furnace.

A⁶ represents the smoke-stack, and B represents my improved device for insuring a return of the unconsumed fuel to the fire-chamber, the same being provided with a duct B', which passes within the shell of the furnace and has its discharge end located beneath the grate thereof. The device B comprises a chamber b, provided with a short sleeve or nipple b', which fits upon the base A⁵, a sleeve or socket b², equipped with a damper b³, serving as a support for the pipe A⁶, an air-pipe b⁴, extending longitudinally through the chamber B and equipped above said chamber with a damper b⁵, and a tapering sleeve or nipple b⁶ at the lower end of the chamber b and in communication with the lower end of the pipe b⁴ and also in communication, through a passage b⁷, with the lower end of the chamber b. The extension b⁶ is fitted into the upper end of the pipe B', as shown. An inclined partition b⁸ forms one wall of the passage b⁷, virtually producing a taper for the lower end of the pipe b⁴.

In the operation of a furnace equipped with my improvement the entire draft to the furnace is preferably supplied through the pipe b⁴, so that the air will be preparatorily heated

during its passage to the furnace. The inlet of air is regulated by means of the damper b⁵, and the outlet of the products of combustion is regulated by the damper b³. The operation is such that the unconsumed particles of carbon passing into the chamber B are drawn back by the induced current through the duct B' and discharged with the heated air beneath the grate A⁴ of the furnace, whence they pass with the air as fuel into the fire-chamber and are wholly consumed.

Experiment has shown that by means of the simple and inexpensive device described practically complete combustion may be obtained, even when a low grade of bituminous coal is employed as fuel.

Changes in minor details of construction and in the disposition of the parts are contemplated. For instance, the device has been applied to a furnace with the chamber B in a horizontal position instead of a vertical position with entirely satisfactory results.

What I regard as new, and desire to secure by Letters Patent, is—

1. In combination with a furnace, a device of the character described, comprising a chamber equipped at one end with means for attaching it to the smoke-stack base of the furnace, and at the other end with means for attaching the smoke-stack, an air-duct connected with said chamber where air may be preparatorily heated, a damper controlling the inlet for said air-duct, a damper controlling the outlet through said smoke-stack, a pipe communicating with said air-duct and having its discharge end entering the furnace adjacent to the fire-pot, and a duct through which unconsumed fuel may pass from said chamber into said pipe, for the purpose set forth.

2. A device, for the purpose set forth, comprising a chamber equipped at one end with means for attaching it to the smoke-stack base of a furnace and at the other end with means for attaching a smoke-stack, a damper regulating the outlet to the smoke-stack, an air-duct extending longitudinally through said chamber and equipped outside said chamber with a damper, a pipe connection adjacent to the means for connection with the smoke-stack base, and a pipe communicating with said air-

duct and with said chamber and having its discharge end beneath the furnace-grate, for the purpose set forth.

3. A device of the character described, comprising a chamber equipped at one end with a nipple for connection with the smoke-stack base of the furnace, and at the other end with a nipple for connection with the smoke-stack, a damper controlling the outlet to the smoke-stack, an air-duct extending through said chamber and equipped above the same with a damper, pipe connection at the lower end of

said chamber in communication with said air-duct, and adapted to be connected with a pipe leading to the furnace beneath the grate thereof, said air-duct having a tapering discharge portion at said pipe connection, and a duct adjacent to said tapering discharge portion and affording a passage from said chamber into said pipe connection, for the purpose set forth. 15 20

JOSEPH T. KELLY.

In presence of—

L. HEISLAR,

WALTER N. WINBERG.