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HEATING APPARATUS.

APPLICATION FILED APR. 10, 1915.

1,175,069.

Patented Mar. 14, 1916.

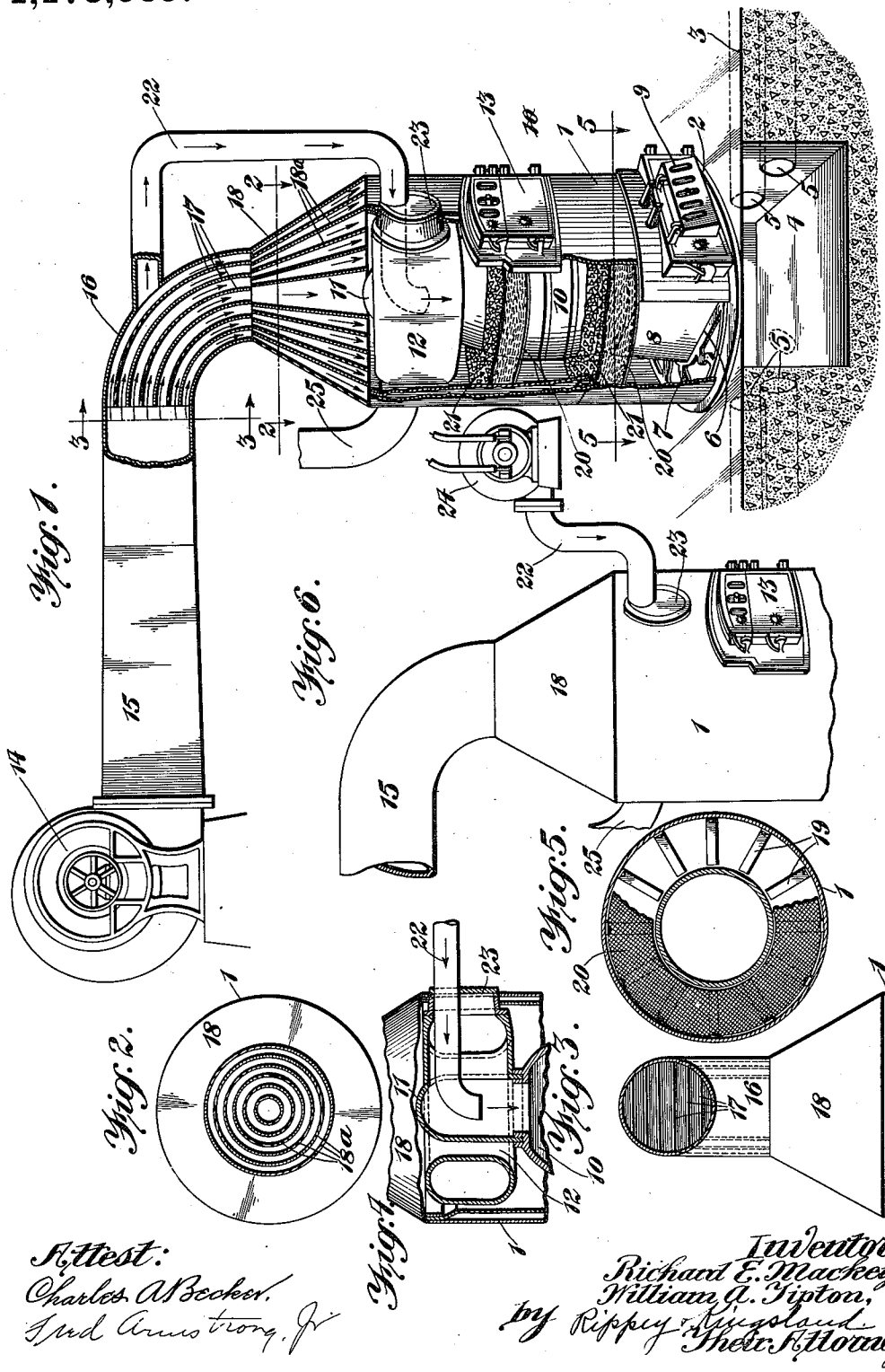

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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HEATING APPARATUS.

1,175,069. Specification of Letters Patent. Patented Mar. 14, 1916.

Application filed April 10, 1915. Serial No. 20,427.

To all whom it may concern:

Be it known that we, RICHARD E. MACKEY and WILLIAM A. TIPTON, citizens of the United States, residing at the city of St. Louis and State of Missouri, have invented a new and useful Heating Apparatus, of which the following is a specification.

This invention relates to improvements in heating apparatus and consists in the novel construction hereinafter more fully disclosed.

An object of the invention is to provide an efficient heating apparatus which will be economical in operation with provision for utilizing to the maximum degree the heat radiated from the fire chamber of the apparatus.

Another object of the invention is to provide a heating apparatus comprising an outer casing and a heating drum disposed therein, in combination with novel means for distributing the incoming air substantially uniformly throughout the area between the heating drum and the outer casing and for distributing the heated air throughout the system.

Another object of the invention is to equip a furnace of the hot air type with means for introducing the fresh air under a forced draft and passing the same through beds of material heated by radiated heat and distributing the heated air from the lower portion of the furnace to the distributing system.

Another object of the invention is to equip a furnace of the type described with means for increasing the combustion of the fuel thereby reducing the amount of smoke emanating from the bed of fuel in the process of combustion.

Having in view particularly the objects mentioned and also additional advantages attainable from the improved construction of the present invention we have designed, combined and arranged a heating apparatus as hereinafter disclosed in detail, reference being made to the accompanying drawings in which—

Figure 1 is a perspective view of an apparatus with portions broken away to more fully disclose the construction showing in assembled relation the parts and features of a preferred embodiment of the invention. Fig. 2 is a cross section taken substantially on the line 2—2 of Fig. 1 showing the disposition of the deflecting walls for the distribution of the incoming fresh air to the heating area of the apparatus. Fig. 3 is a cross section taken substantially on the line 3—3 of Fig. 1 showing the distributing walls of the intake conduit in the elbow above the furnace case. Fig. 4 is a cross section through the upper portion of the apparatus showing further details of construction. Fig. 5 is a cross section taken substantially on the line 5—5 of Fig. 1 showing a supporting frame for the bed of heat radiating material, and Fig. 6 is an elevation of the upper section of a modified embodiment of the invention.

In the embodiment of the invention illustrated in the drawing the furnace casing 1 is carried by a plate or base casting 2 which is mounted upon a foundation 3 of substantial construction, being made preferably of concrete.

A pit 4 is formed in the foundation and disposed below the base of the furnace. Distributing pipes 5, preferably embedded in the foundation, lead from the pit 4. The base casting 2 is in the form of an annular ring having a plate 6 for supporting the ash pit and arms 7 extending inwardly from said ring and connecting with the plate thereby providing spaces or passage-ways between the plate and the ring for the passage of the heated air from the casing into the pit.

Within the casing 1 and supported by the plate 7 is an ash pit 8 to which access is gained through an ash pit opening equipped with an ash pit door 9. Above the ash pit and arranged in the usual manner is a fire pot or drum 10 from the upper portion of which extends a dome 11 into which a radiator casting 12 of known construction connects. Access to the fire pot or drum is attained through the usual charging opening which is equipped with a door 13.

It will be understood that the construction of the ash pit, fire pot, dome and radiator, is substantially that which is well known in furnaces of the hot air type and that there is no claim of novelty to any specific form, design or arrangement of these parts and that they are specifically described merely for the purpose of making clear the embodiment of the present invention.

The design and purpose of the heating apparatus is to introduce a continuous volume of fresh cool air into the top of the casing and distribute the same substantially

uniformly throughout the area between the interior heating elements of the furnace and the casing and to force the same downwardly through beds of material from which heat is radiated into the pit below the furnace from which it is distributed through the system.

In the preferred embodiment of the invention the fresh air is forced from a blower 14 of a suitable design into the conduit 15 from whence it passes into a distributing device comprising an elbow 16 in which is formed a series of parallel partition walls 17. The elbow 16 opens into a conical hood 18 which is mounted upon the top of the furnace casing. Within the hood 18 is a series of concentrically arranged circular parallel walls 18^a which incline outwardly from the top of the hood substantially parallel with the side walls thereof. Thus the air entering the section 16 is deflected as it passes through said section and the hood 18 so that it will be distributed substantially uniformly as it is emitted into the top of the casing 1 of the apparatus. Within the space between the inner wall of the casing and the fire pot and arranged on different horizontal planes are provided supporting frames for beds of heat radiating material. The supporting frames comprise a series of supporting arms in the form of angle plates 19 secured to the casing and arranged in a series on radial lines. The brackets 19 are adapted to support respectively an annular reticulated wall 20 formed preferably of wire screening or other suitable material.

In the embodiment of the invention illustrated in the drawing we have shown two of the supporting frames formed as described but it will be understood that one or any greater number may be used as desired. Upon each of the supporting frames is arranged a bed 21 of metal clippings or other material that will radiate heat. Thus it will be understood that the air entering the top of the casing as it is forced downwardly passes through the interstices between the metal clippings, forming the beds 21, from which beds in addition to the heat radiated from the fire pot, radiator, and dome, it receives additional heat units. Thus it will be seen that the heating surface with which the air is compelled to come in contact with before exiting into the pit 4, is greatly increased by the fact that it is compelled to pass through the heated material forming the beds 21. This construction not only facilitates the heating of the air but utilizes to a greater degree the heat units generated by the bed of fuel.

An additional feature of the present invention is the forced draft air supply to the combustion chamber, two forms of which are shown in the drawings. That form shown in Fig. 1 of the drawings consists in a by-pass conduit 22 which leads through an opening 23 in the casing 1 into the dome 11 which surmounts the fire pot 10, from the fresh air conduit 15. In the form shown in Fig. 6 the supply passage 22 is supplied from an independent blower 24. It is contemplated in the embodiment shown in Fig. 6 that the air supply will be taken from the lower portion of the casing and will exit through the conduit 15.

It will be readily apparent that the device for supplying a volume of air to the fire pot may also be applied to a furnace of any type, such for instance as a furnace of a hot water or steam heater or other similar apparatus. It will also be understood that the purpose of the introduction of the fresh air to the fire pot is to increase the supply of oxygen in the combustion chamber thereby causing an increased degree of combustion, resulting in saving of fuel, as well as reducing the volume of smoke or products of combustion passing off from the bed of fuel. The products of combustion pass from the fire pot into the radiator from whence they are conducted through the usual smoke conduit 25.

We are aware that a number of modifications may be made in the construction of the apparatus and we do not desire to limit ourselves, therefore, to the exact construction shown and described, but

What we claim and desire to secure by Letters Patent is:

1. In a heating apparatus, the combination with a casing and a heating drum disposed within the casing, of a fresh air conduit entering said casing, a device for introducing a forced draft in said fresh air conduit, an air distributing device between said fresh air conduit and the casing, a chamber in communication with the casing, distributing pipes leading from said chamber, and heat radiating material disposed in the path of movement of the air, substantially as specified.

2. A heating apparatus comprising a casing and a heat radiating structure located within said casing, a fresh air conduit, a device for introducing a continuous volume of fresh air into said conduit under a forced draft, a deflecting device between said conduit and said casing for distributing the incoming current of air, outlets from the lower end of said casing, a chamber for receiving the volume of air from said outlets, and heat distributing passages in communication with said chamber, substantially as specified.

3. In a heating apparatus, the combination with a casing and a heating drum disposed within the casing, a fresh air conduit, a blower for introducing a forced draft in said conduit, a hood disposed between said conduit and the casing, a series of concentric

partition walls in said hood adapted to distribute the current of air passing from said conduit to said casing, supports mounted within said casing and disposed between the inner wall of the casing and the outer wall of said heating drum, beds of heat radiating material on said supports, and an outlet passage through which the air passes from the casing after passing through said beds of heat radiating material, substantially as specified.

4. In a heating apparatus, the combination with a casing and a heating drum located therein, of a fresh air conduit adapted to deliver fresh air to said casing, a blower in said conduit for creating a forced draft in said conduit, a series of partition walls between said conduit and said casing for distributing the incoming current of air, and heat distributing passages leading from said casing, substantially as specified.

In witness whereof, we have signed this specification in the presence of two subscribing witnesses.

RICHARD E. MACKEY.
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Witnesses:
L. C. KINGSLAND,
R. M. LAWRENCE.