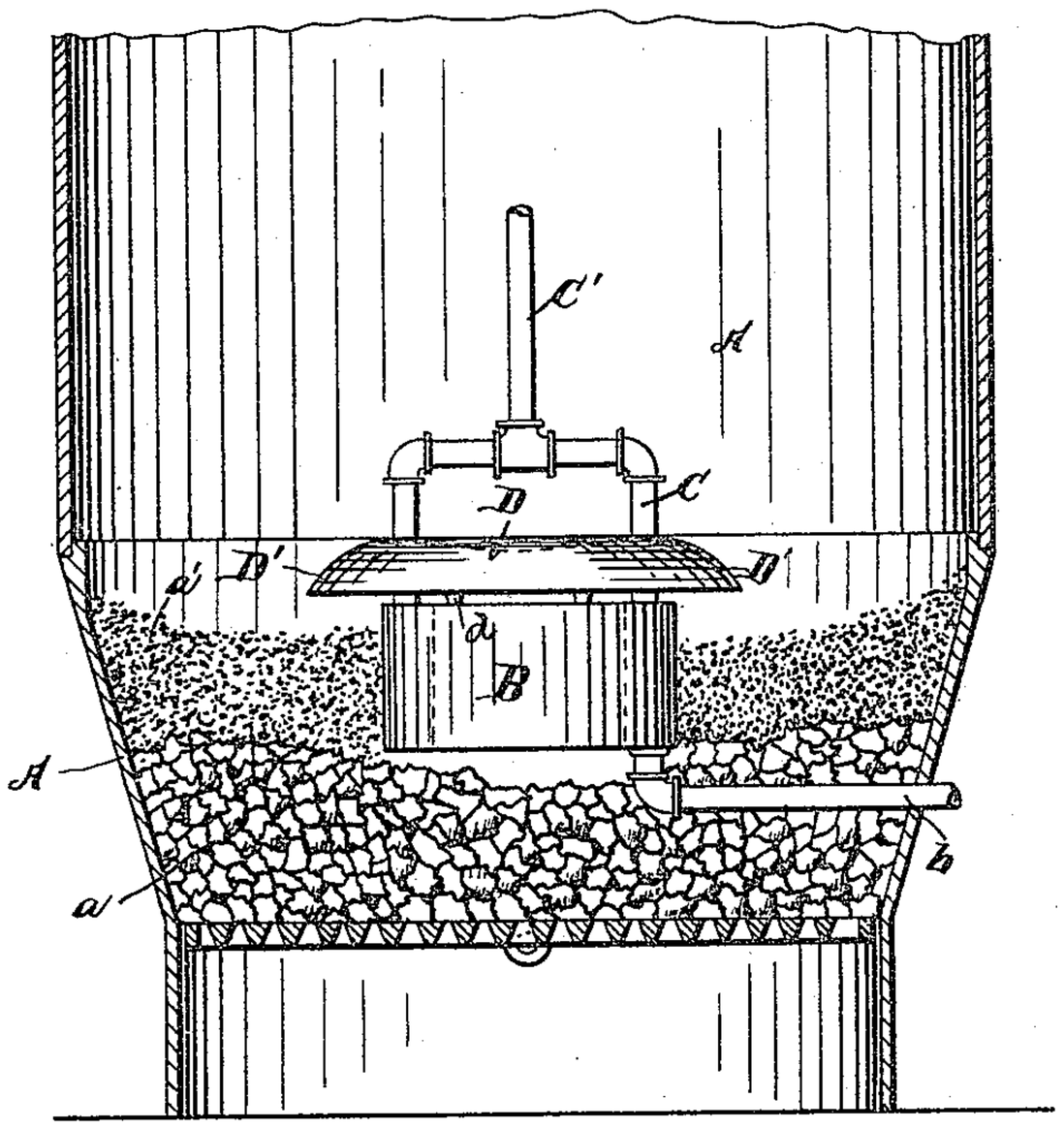
(No Model.)

C. O. AREY.

FURNACE ATTACHMENT.

No. 438,281. Patented Oct. 14, 1890.

Fig. 1.



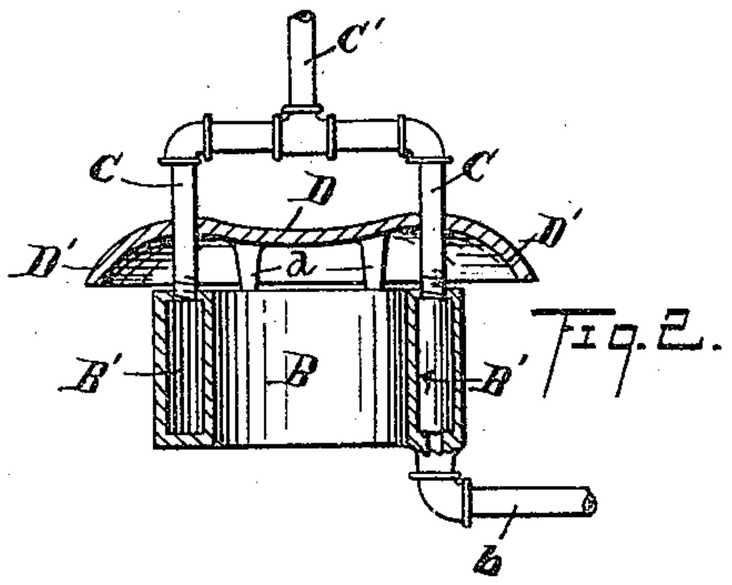


Fig. 2.

Witnesses.
Bell S. Lowrie
C. F. Wood

Inventor.
Clarence O. Arey.
Leggett and Leggett.
Attorneys.

UNITED STATES PATENT OFFICE.

CLARENCE O. AREY, OF CLEVELAND, OHIO.

FURNACE ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 438,281, dated October 14, 1890.

Application filed April 21, 1890. Serial No. 348,846. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE O. AREY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Furnace Attachments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in furnace attachments designed more especially for burning slack or very fine coal; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

Heretofore it has not usually been considered practicable to burn slack or very fine coal in a furnace for heating purposes, for the reason that it required too much attention, the fire having often to be replenished with small quantities of slack. Otherwise, if sufficient slack were applied at one time to last, for instance, overnight, the fire would be smothered. In view of these difficulties I have devised the furnace attachment illustrated in the accompanying drawings.

Figure 1 is a side elevation with the furnace in section. Fig. 2 is a vertical section through the center of the attachment.

A represents a furnace for heating purposes, that may be of any ordinary variety, having grate, fire-box, combustion-chamber, &c.

B represents a small upright hollow cylinder suspended in the fire-box of the furnace so that the lower end of the chamber is supposed to be in contact with the body of live coals, (shown at *a*.) The cylinder is usually of cast-iron, and has double side walls—that is, it is cored to provide a water space or chamber B′. An induction water-pipe *b* connects with the lower end of the cylinder, and this pipe from thence extends out through the furnace-walls, where it connects with the water-supply, the object being to keep chamber B′ constantly filled with water to prevent the cylinder from burning out. Eduction-pipes, any number of which may be employed, connect with the top of the cylinder, these pipes connecting in common with pipe C′, preferably centrally located over the cylinder for supporting the same, the latter pipe extending up to wherever it may conveniently be secured to some portion of the furnace. From thence pipe C′ leads outside the furnace, either through the top or side walls of the furnace, according to the construction of the latter. Pipe C′ may lead to the bath-room, kitchen, or wherever hot water may be wanted, and at least this pipe should be provided with a small vent enough to give circulation of water through chamber B′ and through the pipe to prevent these members from becoming overheated.

The fire having been started and a goodly quantity of live coal accumulated, as shown at *a*, a layer of slack or fine coal of sufficient depth to last, say, from twelve to fourteen hours, more or less, may be placed on top of the fire, as shown at *a′*. This thick body of slack does not smother the fire, for the reason that the products of combustion can pass freely through the central opening of the cylinder up past the layer of slack.

Just above the cylinder is located a deflector D, usually of cast-iron, and supported, preferably, by means of legs *d*, from the cylinder, although, if preferred, it may be supported from pipe C′. The depending rim D′ of the deflector directs the escaping gases downward onto the body of slack, by means of which the slack soon becomes ignited on top. Meantime the slack below is ignited by contact with the live coal. After perhaps twelve or fourteen hours, more or less, or whenever it becomes necessary to replenish the fire, the grate is shaken to discharge the ashes. The slack, of course, will have (much of it) been burned, and the remainder of it will be found in the form of coke, and this, if necessary, may be broken up and takes its place with the live coal below, after which a new supply of slack is added, as aforesaid.

I have reduced my invention to practice and find no difficulty in running my furnace night and day, supplying the slack only twice in twenty-four hours. The slack, of course, is very cheap as compared with the price of coal. Hence a great saving is effected. Of course the primary object of the water-chamber is to render the device durable. I have tried rings or cylinders constructed of cast-iron, fire-clay, plumbago, and other material,

but thus far have not found any cheap material that was sufficiently durable for the purpose without the protection afforded by the water-chamber and water-supply.

The essential features of my invention are, first, furnishing a free passage-way for the products of combustion from the fire up through the body of slack, and, second, directing such products of combustion downward upon the top surface of the slack.

Member B is shown cylindrical; but this form, although preferable, is not essential, as other forms—for instance, square or rectangular in plan—would answer the purpose.

What I claim is—

1. The combination, with a furnace, of a hollow bottomless member located in the fire-box of the furnace and adapted to furnish a duct or passage-way for the products of combustion from the fire upward through the upper section or layer of fuel and a deflector located over the upper end of said hollow member, substantially as set forth.

2. The combination, with a furnace and a hollow member located in the fire-box and adapted to furnish a passage-way from the fire up through the upper section or layer of fuel, of a deflector located above such passage-way and adapted to deflect the products of combustion downward upon the top surface of the fuel, substantially as set forth.

3. The combination, with a furnace and an upright hollow cylinder suspended in the fire-box, such cylinder having a water-chamber and suitable induction and eduction pipes connecting therewith, of a deflector located next above such cylinder and adapted to direct the escaping products of combustion downward upon the top surface of the fuel, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 11th day of April, 1890.

CLARENCE O. AREY.

Witnesses:
C. H. DORER,
WILL B. SAGE.