(No Model.)

W. A. BARNES.

MECHANISM FOR BURNING FINE FUEL.

No. 345,019. Patented July 6, 1886.

Fig. 1.

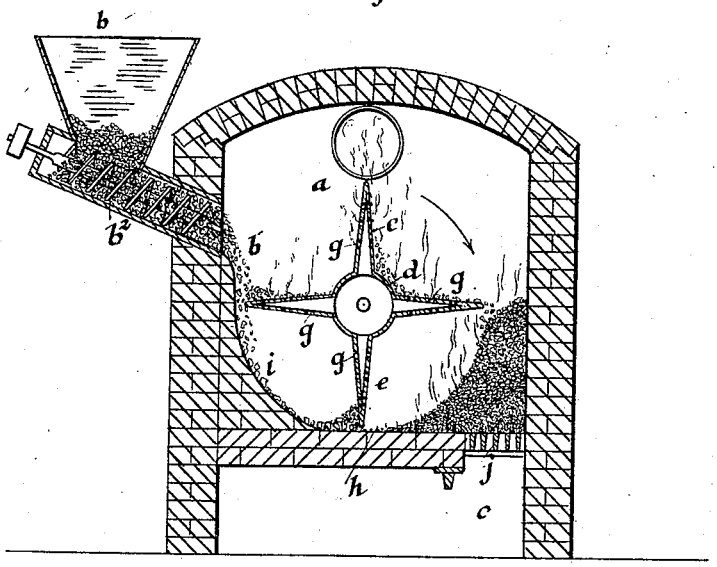
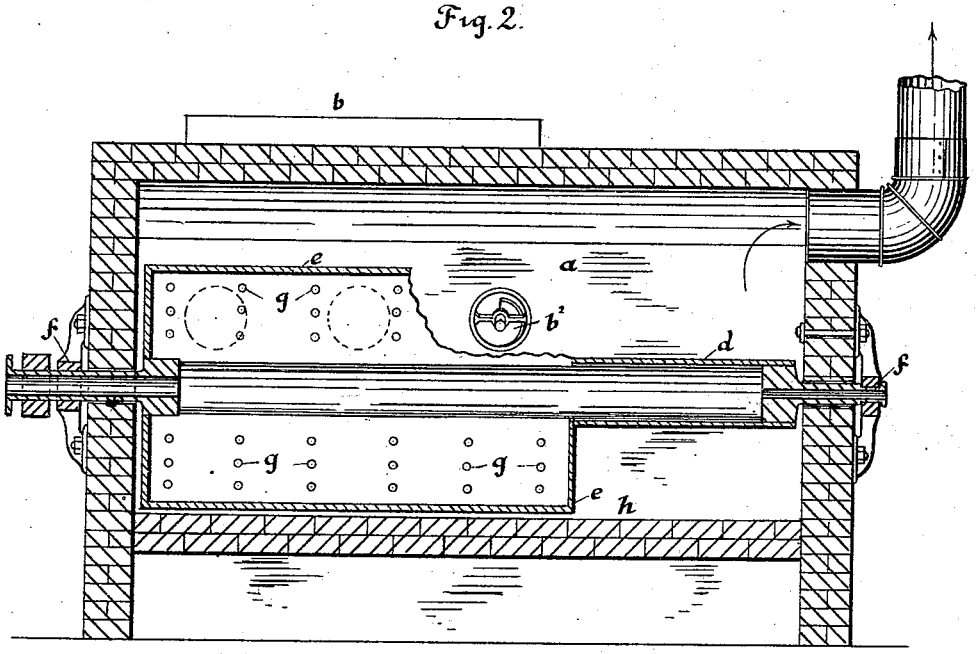


Fig. 2.



WITNESSES.

Jos. S. Lockwood.

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atty

UNITED STATES PATENT OFFICE.

WILLIS A. BARNES, OF NEW YORK, N. Y.

MECHANISM FOR BURNING FINE FUEL.

SPECIFICATION forming part of Letters Patent No. 345,019, dated July 6, 1886.

Application filed January 14, 1886. Serial No. 188,616. (No model.)

To all whom it may concern:

Be it known that I, WILLIS A. BARNES, a citizen of the United States, residing at New York city, in the county and State of New York, have invented new and useful Improvements in Mechanism for Burning Fine Fuel, of which the following is a specification.

The invention consists of improved means of effecting more intimate admixture of the elements of combustion, and especially for facilitating the combustion of refuse fuel, as hereinafter more fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a transverse section of a furnace illustrating the invention, and Fig. 2 is a longitudinal section.

a represents a combustion-chamber.

b represents a feed-hopper, from which material to be burned is introduced into the chamber at *b'* by aid of a worm-screw, b^2, working into the furnace. The ash or residuum is withdrawn through the ash-flue *c* beneath the limited grated portion *j* at the back of the furnace, the rest of the bottom or floor of the furnace being an imperforate bed, *h*, with a curved section, *i*, to retain the fuel subject to the action of the stirrer, which is represented by a cylinder or tube, *d*, having wings or arms *e*. These wings or arms may be made solid or hollow. I prefer to have them hollow. The cylinder *d* is made to revolve on bearings *f*, resting in the walls of the combustion-chamber, said cylinder being in practice connected with power outside. The shaft upon which the cylinder revolves is made hollow, so that with suitable connections, which are well understood, steam and air, either or both, or water, may be admitted to the interior of the cylinder and wings or arms and to pass away therefrom for protecting them from the heat; but in the preferable arrangement of the cylinder, and also the wings or arms, they are made with perforations or holes *g* in them, with one end of the shaft closed, so that when steam or air is blown into the cylinder it may escape distributedly into the combustion-chamber through these perforations in fire-jets.

The operation of combustion is briefly described as follows: A fire is started on the grate-bars over the ash-flue *c*. When this fire is fully under way, the coal refuse is fed into the combustion-chamber at *b'*. The cylinder *d* is slowly revolved. The wings *e* carry the material to be burned over to the rear of the chamber, where it falls into the starting fire at *j*, and combustion begins. In a few moments the burning mass will begin to accumulate and burn more slowly. Then the greater utility of the arms or wings *e* comes into play. Said arms, reaching into the burning mass will stir it up, and when perforated admit into it the air and steam which are being blown through the cylinder and wings. Thus a perfect combustion will be made, and when fully under way the whole combustion-chamber will be filled with a body of burning material, for the cylinder and wings will carry live coals around, which, coming in contact with the coal-supply, will ignite it in suspension, and a very hot fire is the result with a perfect combustion of all the available carbon in the material burned. The heat from the combustion-chamber passes off through proper flues to the thing to be heated. The introduction of live steam into the chamber through the cylinder, and its arms will in this manner, it is believed, owing to their capacity for properly heating the steam before discharging it and the efficient distribution and admixture of the same with the carbon, facilitate the decomposition of the steam in greater measure than any known contrivance, the requisite conditions of which are the most intimate admixture of the atoms of the steam and the carbon in a temperature of sufficient power. For this purpose steam alone will be used, the air being wholly excluded.

The introduction of live steam or air through the cylinder and wings will prevent their destruction by the great heat. Suitable regulating-cocks will be employed to control the air and steam supply.

The combustion-chamber may be of any desired form and the mode of feeding into it. The material to be burned may be such as experiment may dictate to be best. I prefer the method of feeding by the worm-screw, as it insures and enables a uniform feed in proportion to the rapidity of combustion and size of chamber.

I am aware that a rotating and perforated air-supplying device has been employed solely

for the uniform distribution of the air in a furnace, and I do not claim such device, broadly, but only when contrived to effect continuous distribution of the fuel as well.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, with a combustion-chamber, of a revolving cylinder or tube having wings or arms, the cylinder, wings, or arms being adapted to receive and distribute the fuel, and also being perforated with holes, whereby steam or air may be blown into the combustion-chamber of a furnace.

2. The combination, with a combustion-chamber, of a continuous-feeding apparatus and a revolving cylinder or tube having wings or arms, the cylinder wings or arms being adapted to receive and distribute the fuel, and also being perforated with holes, whereby steam or air may be blown into the combustion-chamber of a furnace.

3. The combination of the hollow revolving cylinder having perforated wings or arms with a combustion-furnace having the imperforate floor beneath the cylinder, and the rear grated section, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIS A. BARNES.

Witnesses:
W. J. MORGAN,
S. H. MORGAN.