

(No Model.)

J. B. HYDE.

MEANS FOR FEEDING PULVERIZED FUEL.

No. 274,778.

Patented Mar. 27, 1883.

Fig. 1.

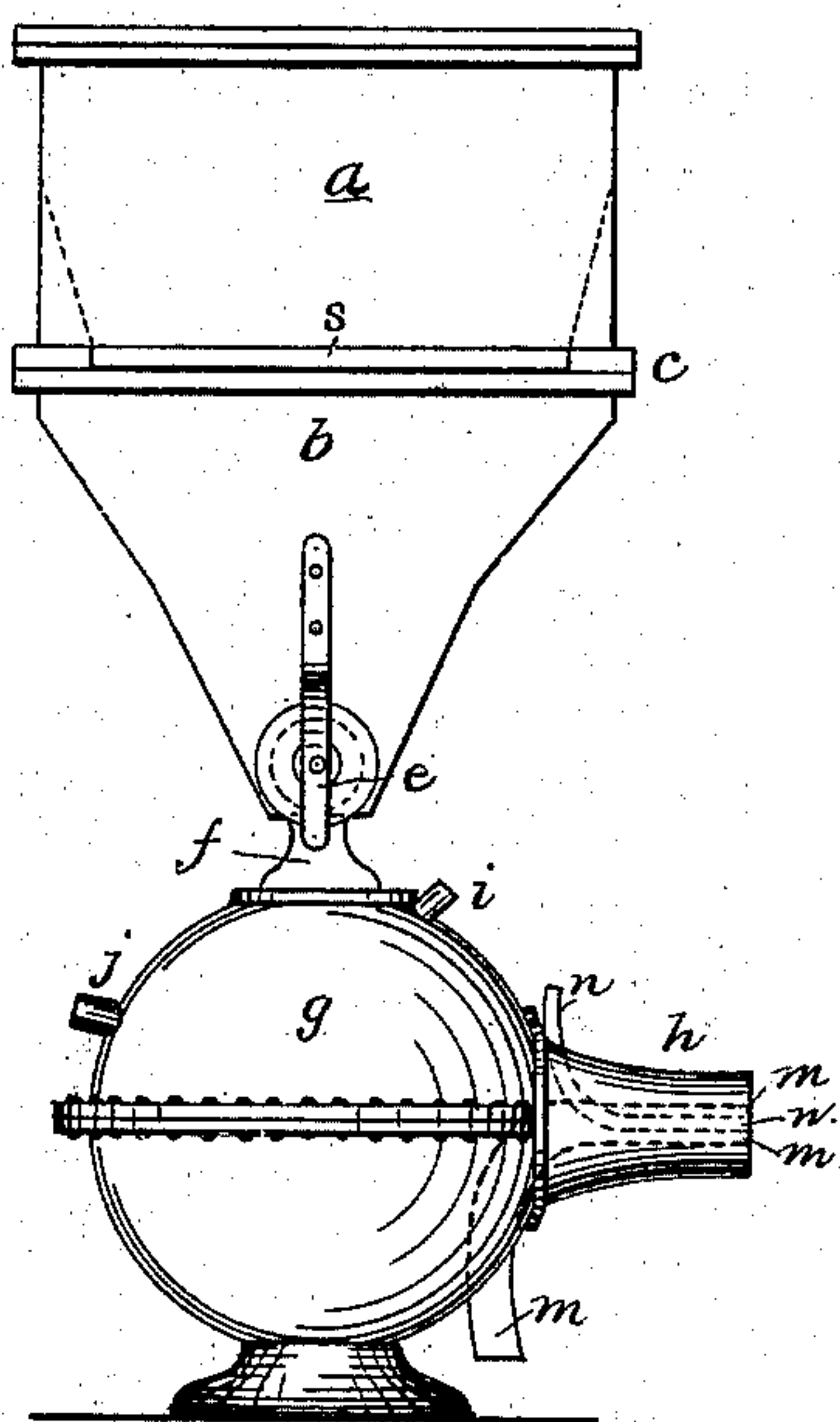
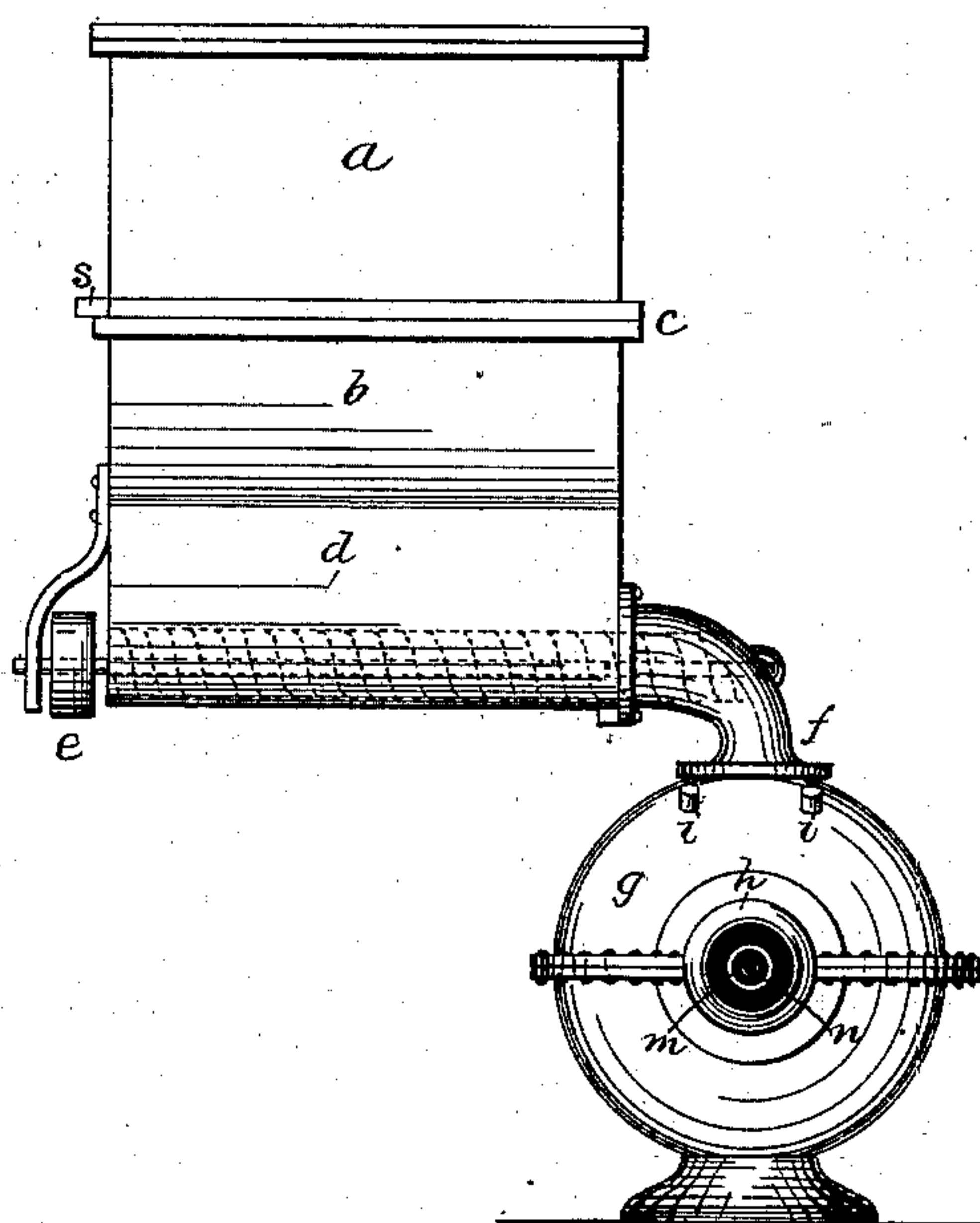


Fig. 2.



WITNESSES:

A. Robertson.
A. Harry Semmes.

INVENTOR

J. B. Hyde

UNITED STATES PATENT OFFICE.

J. BURROWS HYDE, OF NEW YORK, N. Y.

MEANS FOR FEEDING PULVERIZED FUEL.

SPECIFICATION forming part of Letters Patent No. 274,778, dated March 27, 1883.

Application filed May 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, J. BURROWS HYDE, a citizen of the United States of America, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Means for Feeding Pulverized Fuel, of which the following is a specification, reference being had therein to the accompanying drawings.

My improvement consists in a novel method of preparing and using peaty matters for calorific purposes in treating minerals or metals; also for use in chemical manipulations, steam generation, and other purposes in the arts; and my invention includes an apparatus for feeding such powdered fuel to the fire space.

Peat varies greatly in quality from its state of decomposition and the proportion of incorporated earthy matters. I prefer peat that is free from leaves or fiber, and shows a smooth surface when cut out with a shovel, and when burned will yield the least proportion of ashes. Free-burning peat may vary from two to thirty per cent. of ashy residue, arising from the admixture of earthy matters, that impoverish the heating value of the fuel. The calorific power of good peat is, pound for pound, equal to that of mineral coal. A ton of such peat will yield, on distillation, ten thousand to fifteen thousand cubic feet of gas of five to ten candle power, and five hundred to seven hundred pounds superior quality charcoal. It therefore possesses great heating-power. The ashes are fine and so very light that the slightest draft in the flues sweeps them into the chimney, leaving the heating-surfaces free from deposit, and clean iron ore treated with this powdered peat produces superior charcoal-iron. The peat should be dug from the bed and spread on the ground a few inches deep, or, better, if upon raised platforms, and when well dried should be ground fine in any proper mill for the purpose; but as such peat dried directly from the bed is usually light, spongy, and friable, it will be increased in specific gravity, and greatly improved as fuel if it be passed out from the bed through a kind of pug-mill or masticator, from which it should flow in a smooth homogeneous mass, and then be spread, dried, and ground into fine powder, as described. This peat product from the drying-bed will be hard and compact as mineral

coal, and its ground particles will not pack in the mill, and yet be found dense and substantial. This prepared peat having been ground to a fine powder, it cannot be utilized unless blown into the furnace or combustion-chamber in a diffused cloud-like condition of uniform density by a current of hot or cold air, steam, or other projecting medium working directly in connection with the pulverizer through a proper conductor from the mill to the furnace, but generally requiring special apparatus therefor, and which constitutes the second portion of my invention, consisting as follows, (see drawings, side and end elevations, Figures 1 and 2:)

a represents a covered supply-hopper, into which the pulverized peat is placed and below which the feed-hopper *b* is secured, between which receptacles is a division, *c*, provided with a slide, *s*, forming the bottom of *a* and top of *b*, the opening of which slide allows the fuel to drop from *a* into *b*, and when closed *a* may be opened to be recharged. The sides of *b* converge at the bottom to receive the screw-conveyer *d*, (shown by dotted lines,) the shaft of which, at the back end, passes through the casing of *b* to receive the actuating-belt pulley *e*, the opposite end of this shaft being prolonged into, and takes bearing through a curved feed-pipe, *f*, of cast-iron, made fast to the end of *d*, and its lower end secured to an opening at the top of a cast-iron spherical vessel or box, *g*, made by preference in two flanged parts screwed together. This vessel, for convenience, I designate the "cloud-chamber," on the front side of which is a circular opening to receive a flanged delivery-pipe, *h*, also of cast-iron, secured by screws, as shown.

i i show two short pipes fixed through and near the top and front side of *g*, to receive air-tubes, the direction of the currents from which will be at an angle of about forty-five degrees downward toward the rear of the chamber, or otherwise. *j* shows a third air-tube, of larger capacity than those in front, the current from which will be toward the center of *h* and across those of *i i*. The purpose of these crossing air-currents is to open the particles of fuel as they drop from the feed-pipe *f* and impel them to the delivery-pipe *h*, uniformly diffused as a cloud amid the carrying-current. *m* shows

a bent tube passing through the shell *g* and into the central line of *h*, to project the fuel into the combustion-chamber, for which it will not in all cases be necessary. These four air-pipes may be all connected with the same blowing apparatus, or with different blowers, conveying hot or cold air, or both; or in some cases an exhaust may be used with advantage, the blower being placed within or at the outlet of the train of flues.

n represents a small bent tube passing through *h* and into the center of *m*, to conduct steam or fluid hydrocarbon in cases where it may serve to assist the combustion of or increase the heat from the powdered fuel. Some one or more of these tubes may be dispensed with in cases that practice will suggest.

I am aware that mineral coal and certain other fuel substances as fine powder have been used for heating by blowing them into furnaces; also that several differing contrivances have been used for blowing the powdered fuel into the combustion-chamber. Therefore I lay no claim, broadly, to either fuel-pulverization or to feeding such fuel to furnaces by air-current, or to an apparatus simply therefor, as they are all well known. Peat has the advantage over other pulverized fuel for reasons before assigned, also in its cheapness, particularly in districts remote from coal deposits, being generally common throughout the manufacturing districts of our country, and my feed apparatus has advantage of economy of construction, application, and efficiency in improved working capacity.

Having thus described the nature of my improvement, the method by which it is carried into practice is as follows: The peat being converted into a fine dry powder, as described, the cloud-chamber secured in proper position convenient to the furnace, and its delivery-tube *h* united thereto by a prolonging-pipe of requisite length and more or less direct, according to their relative positions, with blowing attachment and power added, the hopper *a* is then charged with the pulverized material and the slide *s* withdrawn for it to fall into the feed-hopper *b*, the slide closed, and *a* refilled with a supply-charge. The furnace should be provided with an igniting convenience—as a bed of incandescent coal or other fire—over and across which the powdered fuel is projected and ignited into a vigorous flame, which the impelling-current diffuses through the furnace or material by which it is charged;

but in many cases the cloud apparatus may be dispensed with and the pulverizer and blower be united to the furnace direct by a conducting-pipe, so that the fuel will be supplied without any intermediate manipulation.

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

1. The described process of supplying peat-fuel to furnaces, consisting of first feeding the fuel from a receptacle into a cloud-chamber, then agitating it by cross-jets, and then forcing it, under pressure, with liquid hydrocarbon-gas, air, or steam jets across a bed of incandescent fuel in a cloud-like form, as described.

2. In an apparatus for conveying powdered peat-fuel to a combustion-chamber or furnace, the combination of a pulverizer, a jet cloud-chamber, and a furnace connected by a conducting-pipe for carrying the said fuel from the mill to the furnace through the agency of and with an impelling force, substantially as described.

3. In an apparatus for conveying powdered fuel to a combustion-chamber or furnace, the following elements in combination: the cloud-chamber *g*, directing outlet-pipe *h*, and air-jets *i j*, all arranged and operating substantially as set forth.

4. In an apparatus for conveying powdered fuel to a combustion-chamber or furnace, the following elements in combination: the feed-hopper *b*, conducting-screw *d*, distributing feed-pipe *f*, cloud-chamber *g*, and outlet-pipe *h*, constructed and operating substantially as and for the uses set forth.

5. In an apparatus for conveying powdered fuel to a combustion-chamber or furnace, the combination of the outlet directing-pipe *h*, tubes *m n* for liquid fuel, air, or steam, and cloud-chamber *g*, constructed, arranged, and operating substantially as set forth.

6. In an apparatus for conveying powdered fuel to a combustion-chamber or furnace, an apparatus embracing the following elements: the hopper *b*, screw-feed *d*, feed-pipe *f*, cloud-chamber *g*, and directing-pipe *h*, constructed and arranged in the manner substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

J. BURROWS HYDE.

Witnesses:

F. O. McCLEARY,
G. B. HARRIS.