E. THAYER.

Burning Fine Fuel.

No. 44,263. Patented Sept. 13, 1864.

Fig 1

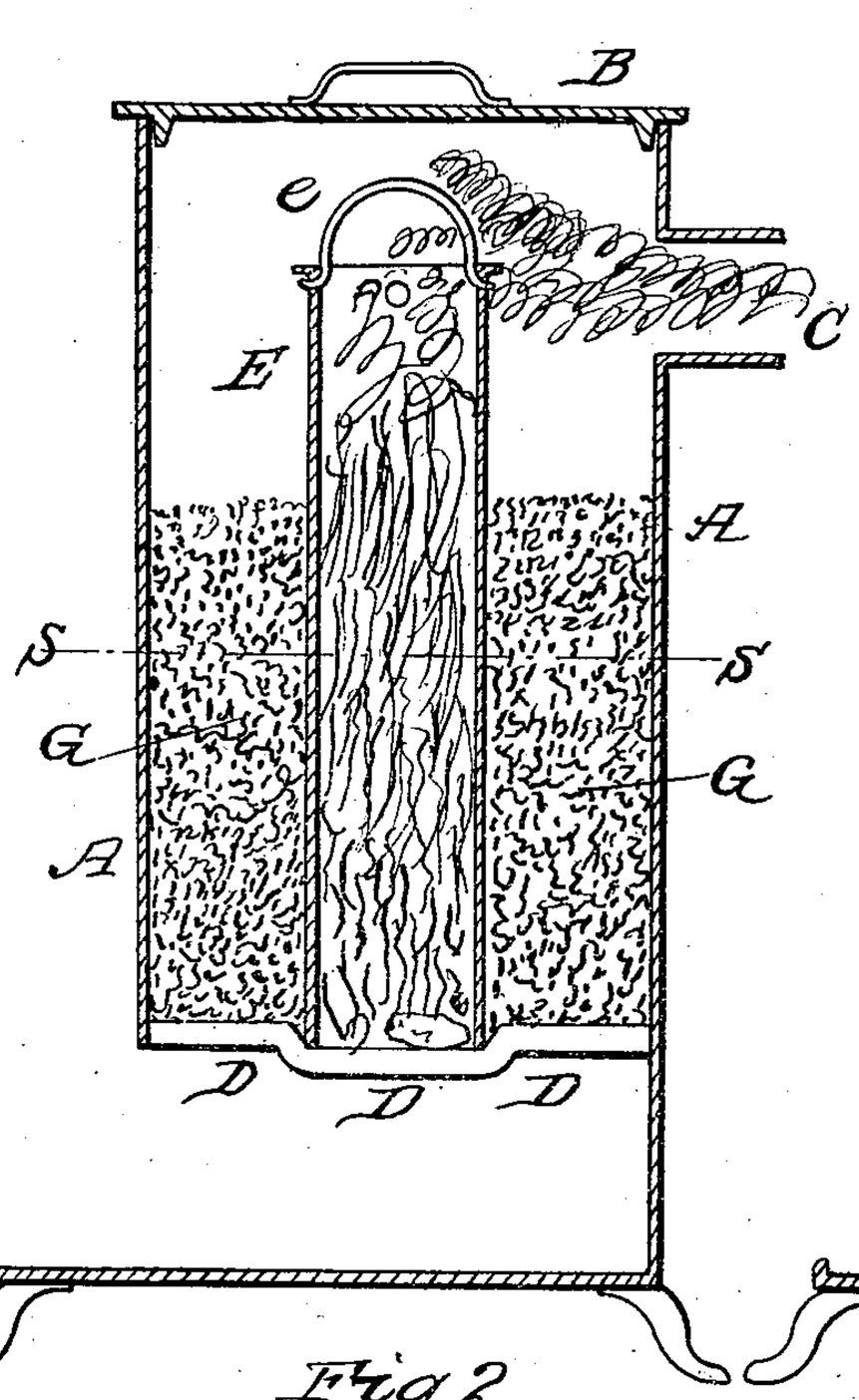


Fig 2

Fig 3

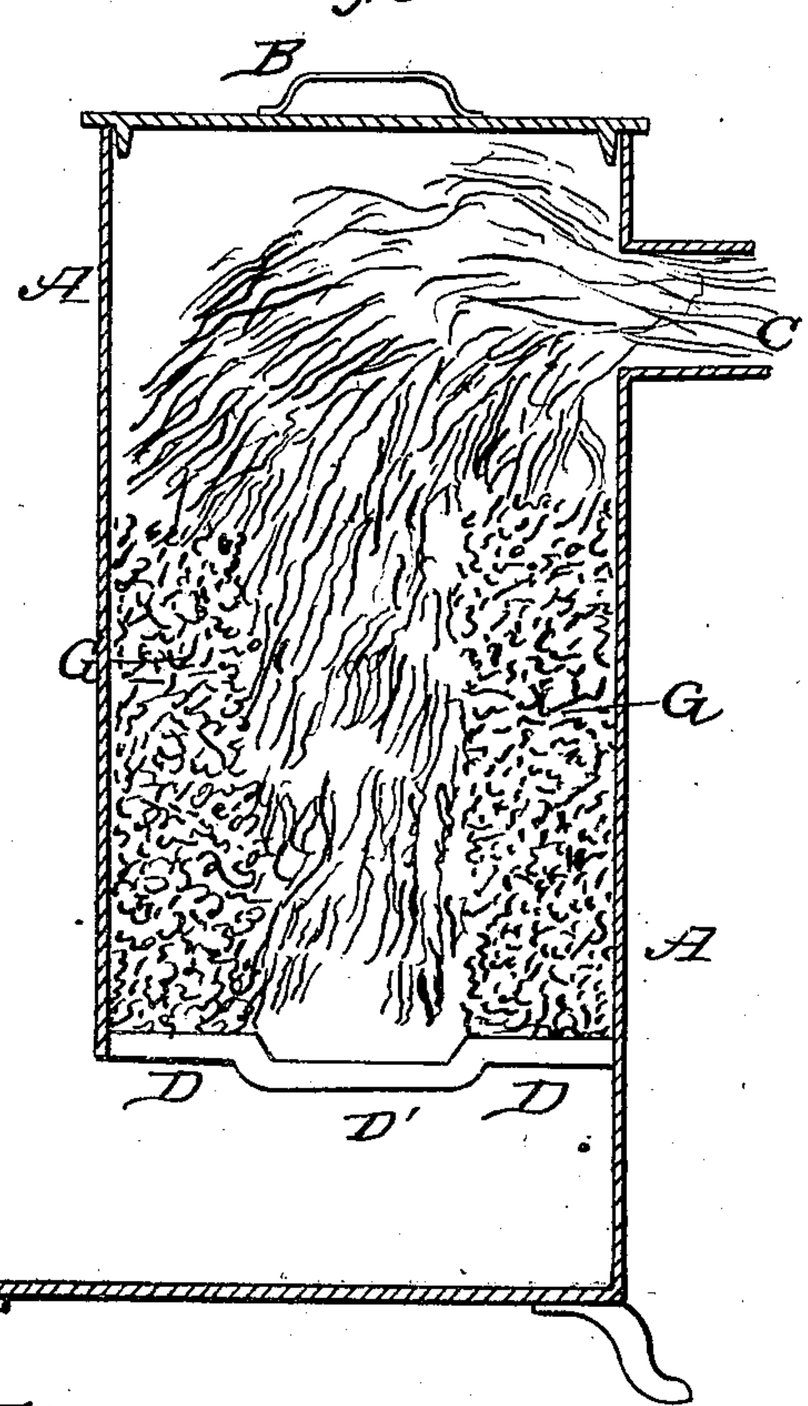


Fig 4

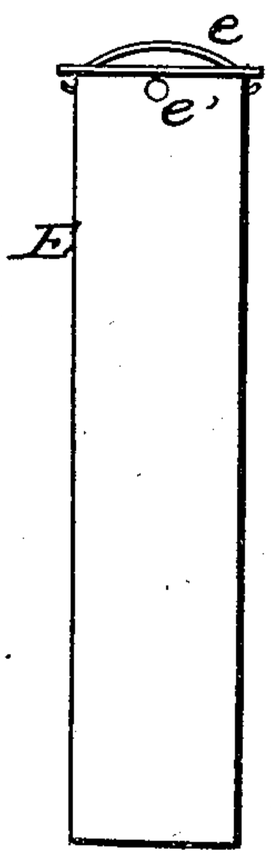
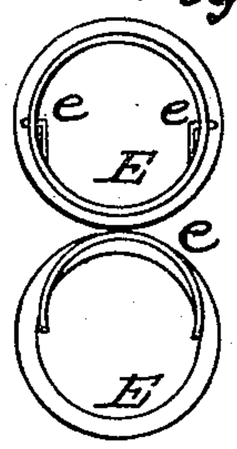
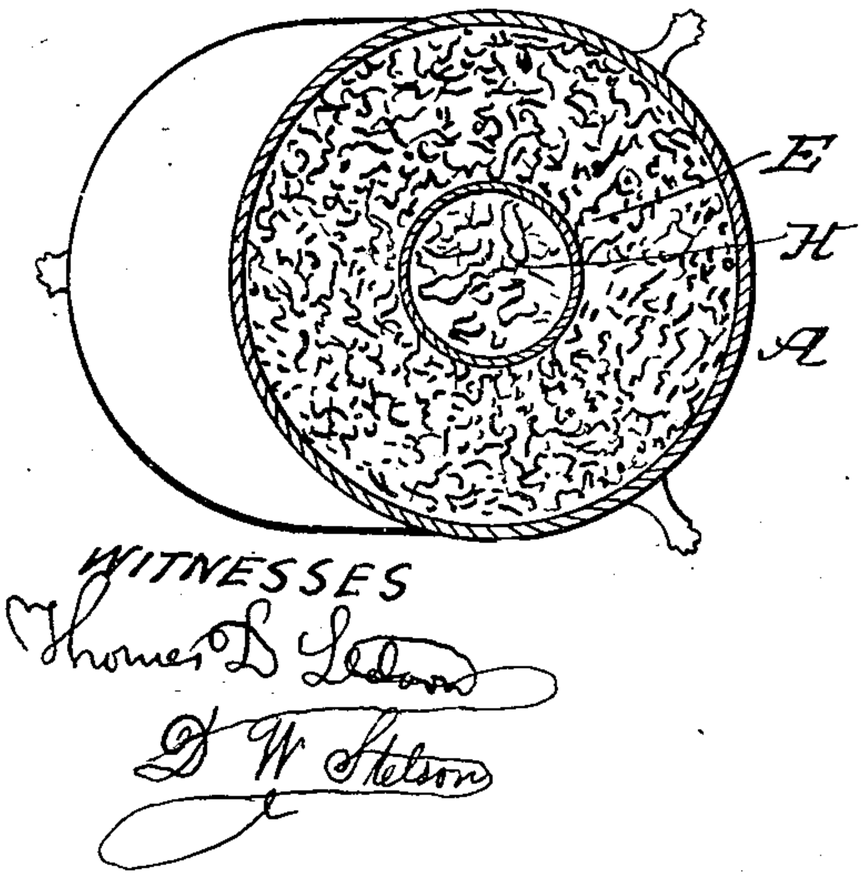


Fig 6





WITNESSES

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IMPROVED APPARATUS FOR BURNING FINE COAL, &c.

Specification forming part of Letters Patent No. **44,263,** dated September 13, 1864.

To all whom it may concern:

Be it known that I, ELI THAYER, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in the Means of Utilizing Fine Fuel; and I do hereby declare that the following is a full and exact description thereof.

My invention is intended more particularly for rendering available the finely-divided coal and dirt which accumulates in large quantities where coal is used or handled. It is useful, however, in burning finely-divided peat or other pulverized material, which would otherwise be of little value.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation by the aid of drawings and letters of reference marked thereon.

Figure 1 is a central vertical section through a stove and through a device which I temporarily introduce therein, and also through the material which is to be burned, and which is arranged around the central device. Shavings, kindling-wood, and coal are thrown into the hollow interior of the central device, and are represented as just ignited and commencing to receive air through the open bottom and discharge smoke at the top. Fig. 2 is a section on the line S S in Fig. 1. Fig. 3 is a central vertical section showing the condition of the fine material after the central device has been removed and the fine material has commenced to burn. Figs. 4, 5, and 6 represent the central device detached from the stove, Fig. 4 being a side view, Fig. 5 a top view, and Fig. 6 a bottom view.

Similar letters of reference indicate like parts in all the figures.

A is the main body of a stove; B, a removable cover; C, the pipe, and D D′ the grate. The central portion, D′, of the grate is lower than the annual part D, which surrounds it, and the inner edge of the annular part D is beveled, as represented.

E is a hollow cylinder of sheet iron, open at both ends, adapted to be introduced and removed at pleasure. It is of a diameter a little less than that of the inner edge of the annular part D of the grate, and of a length something less than the height of the interior of the stove. I term it a "hollow former," and it is adapted, first, to give a proper form to the mass of plastic fuel; and, second, to allow the kindling material to burn in it until the inner surface of the mass is heated and dried. Its upper edge is turned outward, so as to form a flange, as represented. A bail, *e*, is attached, which is capable of turning down, so as to allow of the free introduction of kindling material into the interior.

G is a compound of coal-dust, quicklime, and water, mixed into a plastic mass. It is introduced wet into the stove after the hollow former E, just described, has been put in place. The proportions for this composition which I have found very successful are as follows: twenty parts fine coal, one part quicklime, and sufficient water to slack the lime and allow it and the coal to be well incorporated together. I usually mix the material in an ordinary coal scuttle or hod, and I find little difficulty in pouring it around with tolerable uniformity on all sides of the hollow former E.

In first making a fire, I fill the interior of E with suitable shavings, sticks, coal, and the like, as indicated by H. I ignite such either at the bottom or top, and after they have burned a little while the inner wall of the plastic mass G will become hardened by the heat. I then reach down from above with a suitable hook or poker, and by lifting the bail *e* draw out the hollow frame E and remove it from the stove. I then replace the top B of the stove, and the kindling material H now communicates fire to the interior surface of the mass G, and the combustion of the latter proceeds thence slowly and uniformly. The diameter of the hollow former E may be about four inches. When it becomes necessary to apply more fuel, I introduce again the hollow former E, and again pour on freshly-mixed composition G.

The composition may be used with good effect by allowing it to harden in the air at the ordinary temperature, either in the annular form herein represented, or in bricks, or in chunks of irregular form; but I prefer the method above described.

By using the composition freshly mixed I avoid the labor of molding and drying it, and the water, by being presented to the fire in the form of steam, increases the clearness of

the fire and is generally believed to add to the heat produced. I believe it to be of great benefit.

Stoves of any ordinary form, lined with fire-brick or soapstone, may be used in the place of my cylindrical stove A, and grates of any ordinary character may be used in place of my grate D D′.

I prefer my grate as represented, because it holds the hollow former E very accurately in the center; but a common flat grate may serve very well with a little care in applying the plastic material G.

The grate may be provided with any approved modes of traversing, tilting, &c., for disposing of the ashes and clinkers.

I find the material G, operated as above described, to give a very desirable heat for a long time. I have tried it most in a stove of elliptical section, of which the longest axis or diameter would measure about two feet. I have used it in a very large room successfully, and the fire required attention only once in twenty-four hours. I have used at times both anthracite and bituminous slack, and have kept the fire steadily going for several weeks.

I can lift my hollow former E by taking hold with a hook or otherwise of the flange which surrounds its top, instead of taking hold of the bail *e;* or I can provide holes, as indicated by *e′*, in which to introduce a suitable hook for withdrawing this former.

I can make my hollow former E in other forms than circular—thus, it may be oval, square, star-shaped, or in any polygonal forms. A cone very slightly tapering, the largest end carrying the bail, flange, &c., is a very good form. I can make it of cast-iron, sheet-iron, or various other incombustible and strong materials. It need not necessarily be placed exactly in the center of the mass G.

I have observed that the fuel G in practice usually burns away more rapidly at the bottom than at the top, but this fact may not be important. The free access of the air through the grate allows the bottom to consume away rapidly, while the top and a great portion of the surface around the hole E is enveloped in the products of combustion, and not fresh air, and although intensely heated consumes very slowly, if at all. The ring of unconsumed fuel sinks down as the bottom is consumed away.

Having now fully described my invention, what I claim as new, and desire to secure by these Letters Patent, (marked B,) is as follows:

As a new article of manufacture, the hollow former E, provided with means for readily withrawing it, and adapted to be used in the interior of a mass of plastic fuel, G, substantially in the manner and for the purpose herein set forth.

ELI THAYER.

Witnesses:

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