E. Skelly,

Steam-Boiler Furnace,

No. 20,591, Patented June 15, 1858.

Fig. 1.

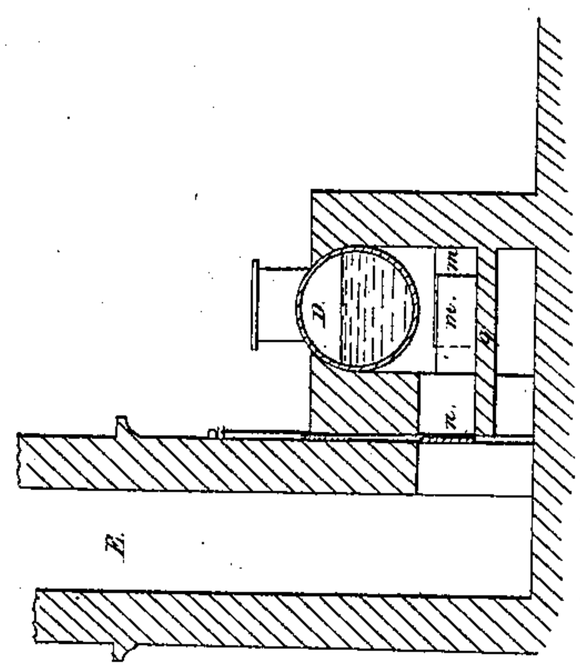


Fig. 3.

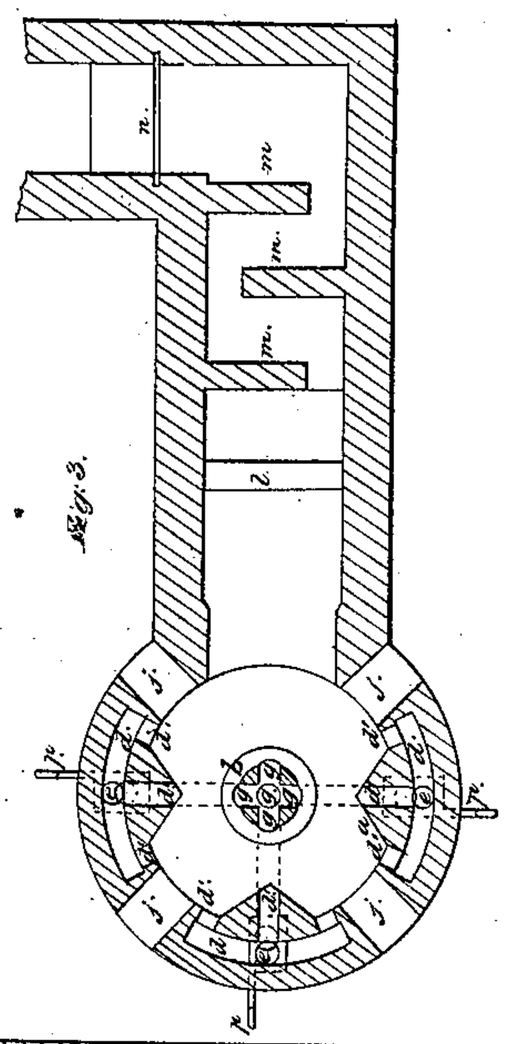


Fig. 4.

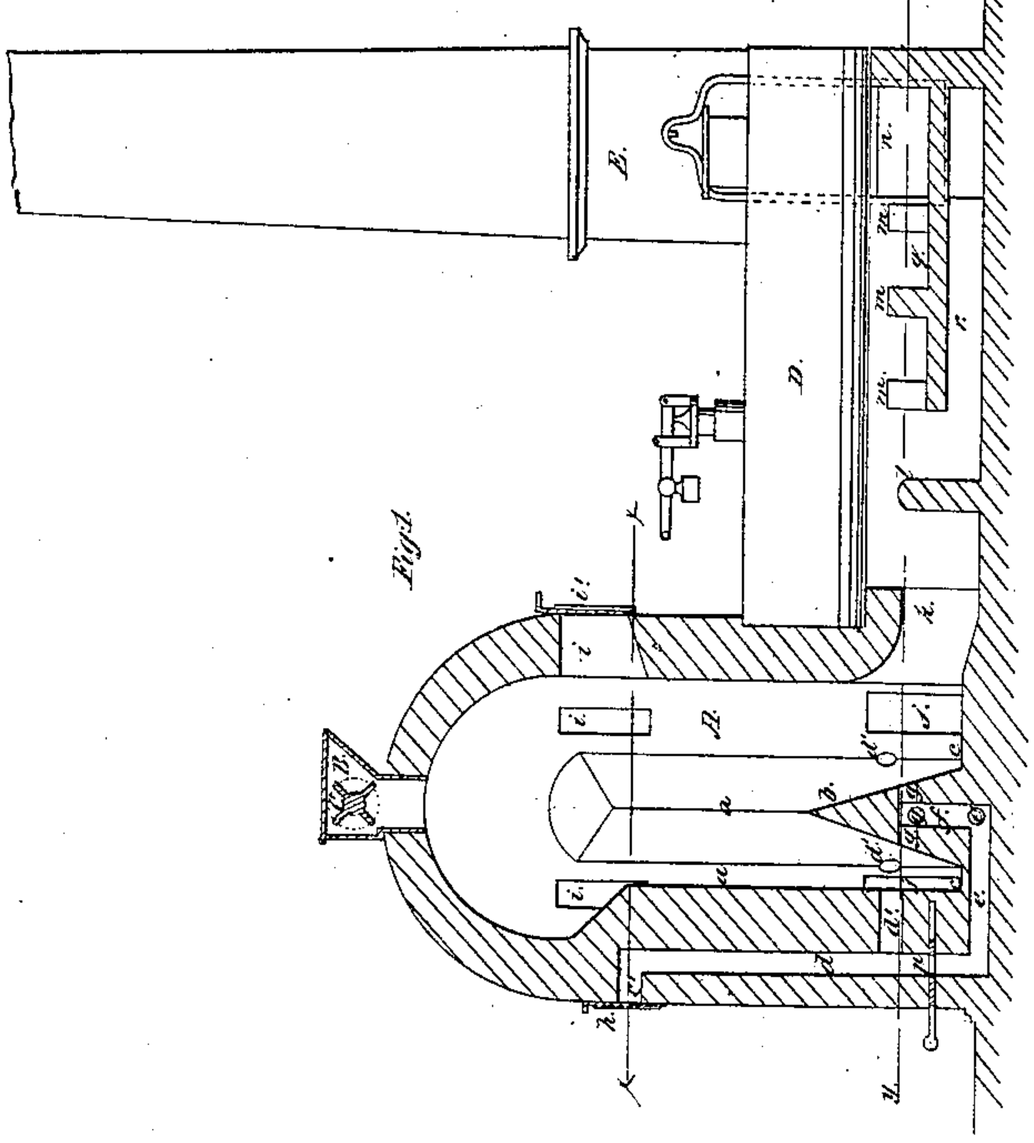
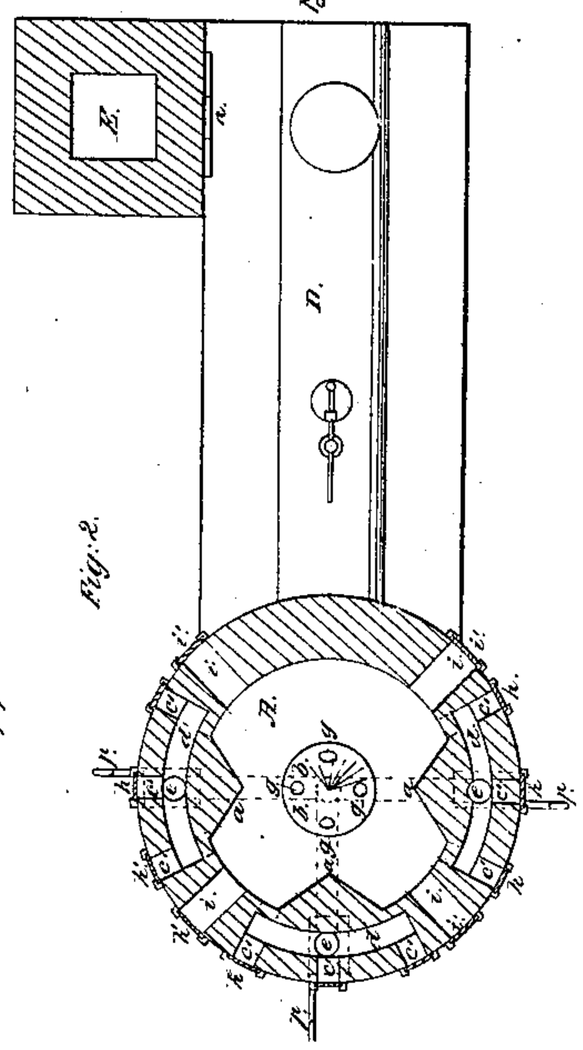


Fig. 2.



UNITED STATES PATENT OFFICE.

E. SKELLY, OF PLAQUEMINE, LOUISIANA.

FURNACE FOR BURNING BAGASSE, &c.

Specification of Letters Patent No. 20,591, dated June 15, 1858.

To all whom it may concern:

Be it known that I, EVAN SKELLY, of Plaquemine, in the parish of Iberville and State of Louisiana, have invented a new and useful Improvement in Furnaces for the Use of Bagasse, Tanbark, Sawdust, and other Small or Refuse Matters Suitable for Fuel; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a longitudinal vertical section of a boiler furnace with my improvements. Fig. 2, is a horizontal section of the same, in the plane indicated by the line *x*, *x*, of Fig. 1. Fig. 3 is a horizontal section of the same, in the plane indicated by the line *y*, *y*, of Fig. 1. Fig. 4 is a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in a certain construction of the furnace and arrangement of air-passages for heating and supplying air to the fire, whereby a very perfect combustion of the small or refuse fuel is obtained with the use of a very small quantity of wood.

To enable others to make and use my invention, I will now proceed to describe its construction and operation.

A, is the fire-chamber of the furnace, the general form of whose horizontal section is that of a circle, but there are a number of angular projections *a*, *a*, on its interior extending from the bottom up to or nearly up to the commencement of the roof of the fire chamber which is of the form of a dome. This chamber is built of masonry and lined with firebrick. In the center of the bottom of the said chamber there is a cone *b*, of firebrick, and over this cone in the center of the dome-shaped roof, there is a hopper B, through which the fuel is supplied, the supply being regulated by means of a revolving feed wheel C, which is constructed something like a fan-blower and fitted into the said hopper. The fuel falling on the cone is distributed evenly over its surface and over the bed or bottom *c*, of the fire chamber.

The walls of the fire chamber are constructed with wide upright passages *d*, *d*, (see Figs. 1, 2, and 3) extending from the bottom up to near the commencement of the dome, for the purpose of heating air and supplying it to the fire-chamber, among the fuel, and each of these passages has entries *c'*, *c'*, at the top from the exterior of the furnace, and branch passages *d'*, *d'*, entering the fire-chamber near the bottom thereof and each has a branch passage *e*, leading under the bed *c*, into a cavity *f*, in the center of the cone *b*, from which cavity there are passages *g*, *g*, leading into the lower part of the fire chamber. The entries *c'*, *c'*, to the passages *d*, *d*, are all furnished with doors *h*, *h*, which may be opened more or less to regulate the supply of air to the fire. The branch passages *e*, are fitted with dampers *p*, *p*, by which to shut off or regulate the supply through the passages *g*, *g*.

i, *i*, are openings in the upper part of the furnace, fitted with doors *i'*, *i'*, for viewing the operation.

j, *j*, are openings close to the bottom, fitted with doors *j'*, *j'*, to permit the cleaning out of the fire chamber and lighting of the fire.

k, is an opening at one side of and near the bottom of the fire-chamber for the escape of the flame and gaseous products of combustion to pass under the boiler D, where are arranged the firebridge *l*, and a number of flame bridges *m*, *m*, arranged with openings on opposite sides alternately, as shown in Fig. 3, to cause the flame and products of combustion to take a serpentine direction to the chimney E, so that they may impart as much as possible of their heat to the boiler. The bridges *m*, *m*, are erected upon an arch *q*, under which there is a passage *r*, commencing behind the firebridge *l*, and leading to the chimney; and at the end of said passage, next the chimney, there is a damper *n*, which may be made to open either the said passage or the passage directly under the boiler to the chimney.

The operation of the furnace is as follows: The furnace having been charged with a sufficient quantity of fuel through the hopper B, and the fire kindled through the openings *j*, *j*, the doors *j'*, *j'*, are closed and those *h'*, *h'*, are opened to admit air to and among the fuel in sufficient quantity. The air in passing down the passages *d*, *d*, becomes highly heated, and in that state it is distributed among the fuel through the passages *d*, *d*, and *e*, *e*, in such a manner as to produce such very intense and very perfect combustion that no smoke ever escapes. By the arrangement of the passages *d*, *d*, to

heat the air on its way to the fire, not only is a great loss of heat prevented, but the risk of fire by the overheating of the exterior of the fire-chamber is prevented, and the walls are prevented cracking by being overheated. The angular projections *a*, *a*, in the interior of the fire chamber, serve the purpose of preventing the air circulating around and around the interior, and of deflecting it that it may shoot across the fire-chamber in all direcetions for the purpose of causing it to penetrate among all portions of the fuel, and also causing a thorough mixture of air with the gaseous products of combustion, so that neither escapes under the boiler unconsumed.

What I claim as my invention, and desire to secure by Letters-Patent, is:—

The angular internal projections *a*, *a*, central cone *b*, and air passages *c*, *d*, *d'*, *e*, *f*, *g*, combined and arranged substantially as described to operate as set forth

Plaquemine, Iberville 20th April 1858.

EVAN SKELLY.

Witnesses:

O. Lobaurc,

E. B. Trinidad.