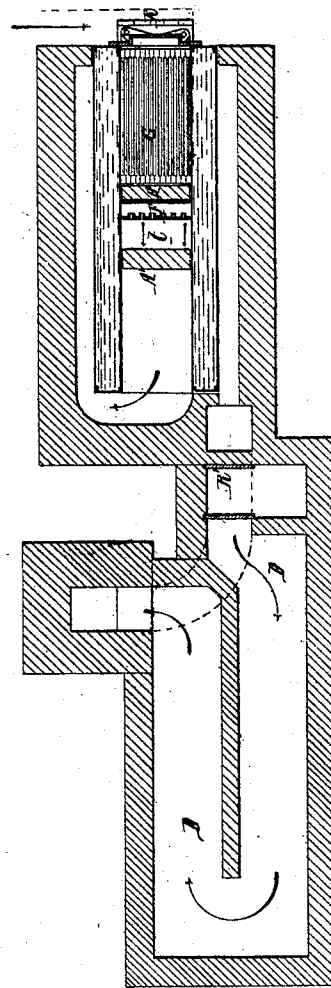
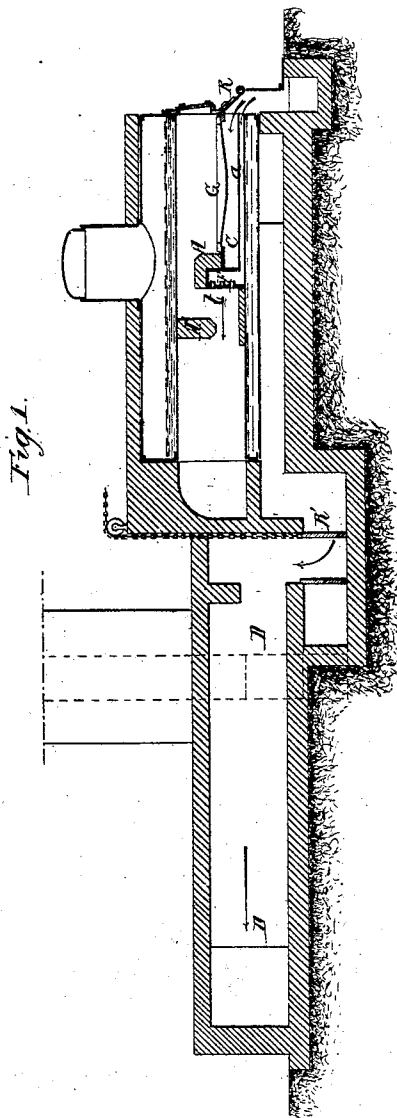


J. TISSOT.

Furnaces for Burning Coal-Dust, Small Fuel, &c.

No. 135,298.

Patented Jan. 28, 1873.



Witnesses {  
Harry Smith  
John K. Rupertus

Jean Tissot  
by his Attor.  
Hudson and Son

# UNITED STATES PATENT OFFICE.

JEAN TISSOT, OF PARIS, FRANCE.

## IMPROVEMENT IN FURNACES FOR BURNING COAL-DUST, SMALL FUEL, &c.

Specification forming part of Letters Patent No. 135,298, dated January 28, 1873.

### *To all whom it may concern:*

Be it known that I, JEAN TISSOT, engineer, of Paris, France, have invented certain Improvements in Apparatus Fitted to Burn Small Fuel, Coal-Dust, &c., of which the following is a specification:

The abandonment of the use of coal-dust and other small fuel is only due in part to the unfitness of the apparatus employed to burn it. If large grates are employed a considerable portion of the fuel falls through into the ash-pit, and the remainder conglomerates and forms a crust or clinker which intercepts the currents, diminishes the activity of the combustion, and requires the frequent use of pokers to break it up. Close grates in an ordinary furnace are but little better, as the fuel will conglomerate, and the constant use of pokers is necessary. Hence small fuel is only sold to the trade in the form of bricks or balls, molded into shape and held together by some adhesive substance, a kind of fuel too expensive for general use. The possibility of burning small fuel or dust in a loose state will be a source of much saving, and will enable the large deposits in the vicinity of mines to be utilized. The improvements which constitute my invention enable this small fuel to be burned with facility, and the annexed drawing shows the arrangement of furnace which I have applied to a steam-generator, and in which—

Figure 1 represents a longitudinal vertical section of the apparatus, and Fig. 2 a sectional plan.

The grate G is formed of bars placed very closely together so that they may retain the granulated fuel, and so that the air may be separated into a number of films in passing between the same. A blower, placed at any suitable point, forces air in under the grate through pipes which conduct it first into the ash-pit C, the latter being hermetically sealed so as to prevent the escape of this air except in the course intended. The constant passage of air under pressure to the fuel laid upon the grate in thin layers insures an uniform combustion, and enables the usual raking between the bars to be done away with, a proceeding which divides the fuel, a great part of which falls through the grate and is thrown away

with the ashes. The dross or crust only forms in small quantities and in such thin scales as to be readily removed by a scraper. A register, R, placed above the air-passage, regulates the admission of air. Another sliding register, R', operated by a chain and counterpoise from a position outside the furnace, enables the engineer to maintain an equilibrium between the quantity of air introduced and that expelled through the chimney, so that the ash-pan, which forms an air-chamber, shall of itself, even while the furnace-door is open, furnish the wants of combustion. When full heat is on the register R' is nearly closed, so that the mixture of the gaseous products of combustion becomes closer, and the consequence is an intense heat in the flues.

To attain a perfect combustion of the hydro-carburets which escape over the bridge-wall A, I arrange behind and beneath the latter a cast-iron air-chamber, F, from which the air supplied to the said chamber from the blower through a passage, *a*, passes through tubes or openings *t*, and heats the gaseous currents, whose direction is changed by the counter bridge-wall A', and thus brought into intimate relation with the currents of hot air from the chamber F, the elevated temperature of which is necessary to the chemical combination and perfect combustion of the gases being thus obtained.

The slow combustion which I obtain by my improved apparatus necessitates an extended grate-surface as to the products of combustion, which always escape at a temperature of 350° to 450°, and which are not depended upon to keep up the draft, since it is produced by the blower; they can be utilized for the heating of feed-water, &c., and thus be deprived of all their heat before being permitted to pass off to the chimney.

If the exhaust-steam is employed for heating the feed-water the hot gases can be utilized for the heating of halls, &c., since it is possible to extend them over a large surface without affecting the draft.

To deprive the gases of the particles of carbon which they hold in suspension, and which in ordinary furnaces pass off through the chimney and fall to the ground after becoming cool, I cause the said gaseous products to circulate

in a chamber or gallery, D, of much greater size than the chimney, the result being a cooling and slackening of the velocity of the currents, and the precipitation from the same, upon the bottom of the furnace, of the light particles held in suspension.

I claim as my invention—

1. The combination, with the bridge of a furnace, of an air-chamber, and openings arranged to permit the air to pass out at the rear side of the bridge, as set forth.

2. The combination of the air-passage with its register R, the ash-pit C, grate G, bridge-walls A and A', hot-air chamber F with its

perforations, and the register R', all substantially as described.

3. The combination, substantially as described, of the chamber D, with a furnace into which air is forced for the support of combustion.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JEAN TISSOT.

Witnesses:

FRANCOIS MILSIM VERDIL,  
EMILE RIENARD.