

ERICHSEN & MAARDT.

Improvement in Coke-Ovens.

No. 129,803.

Patented July 23, 1872.

Fig. 1.

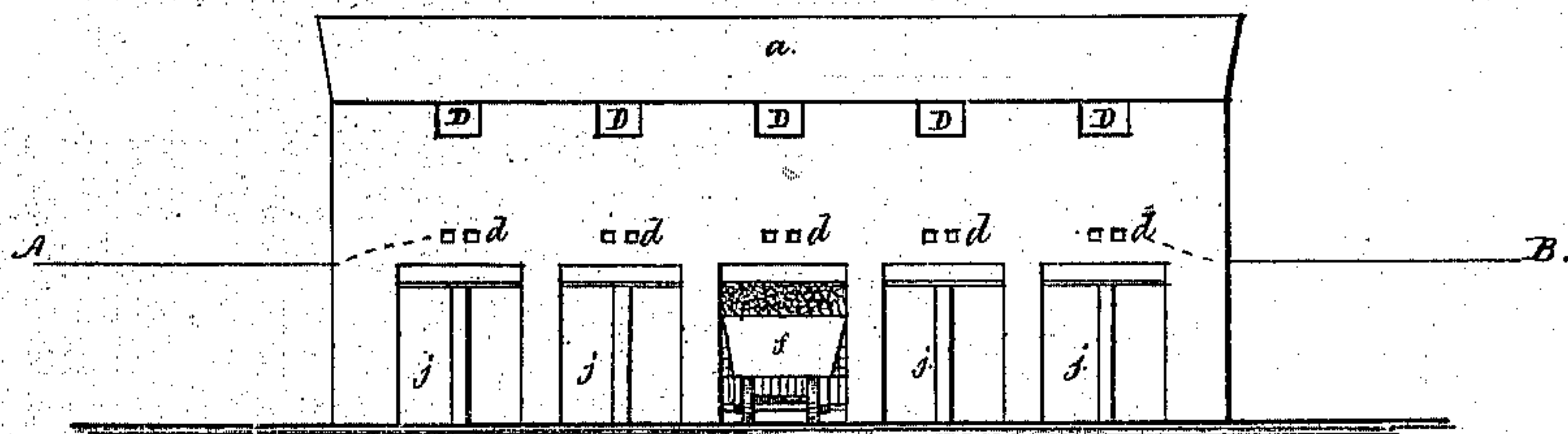


Fig. 2.

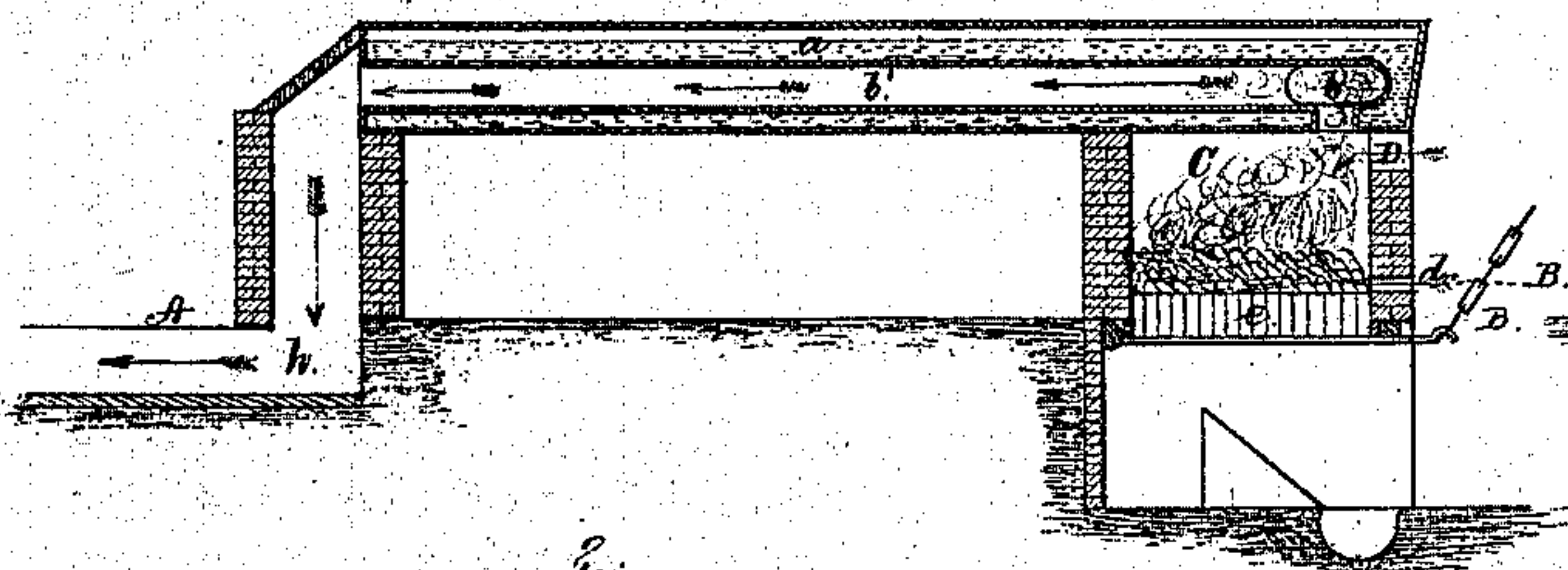


Fig. 3.

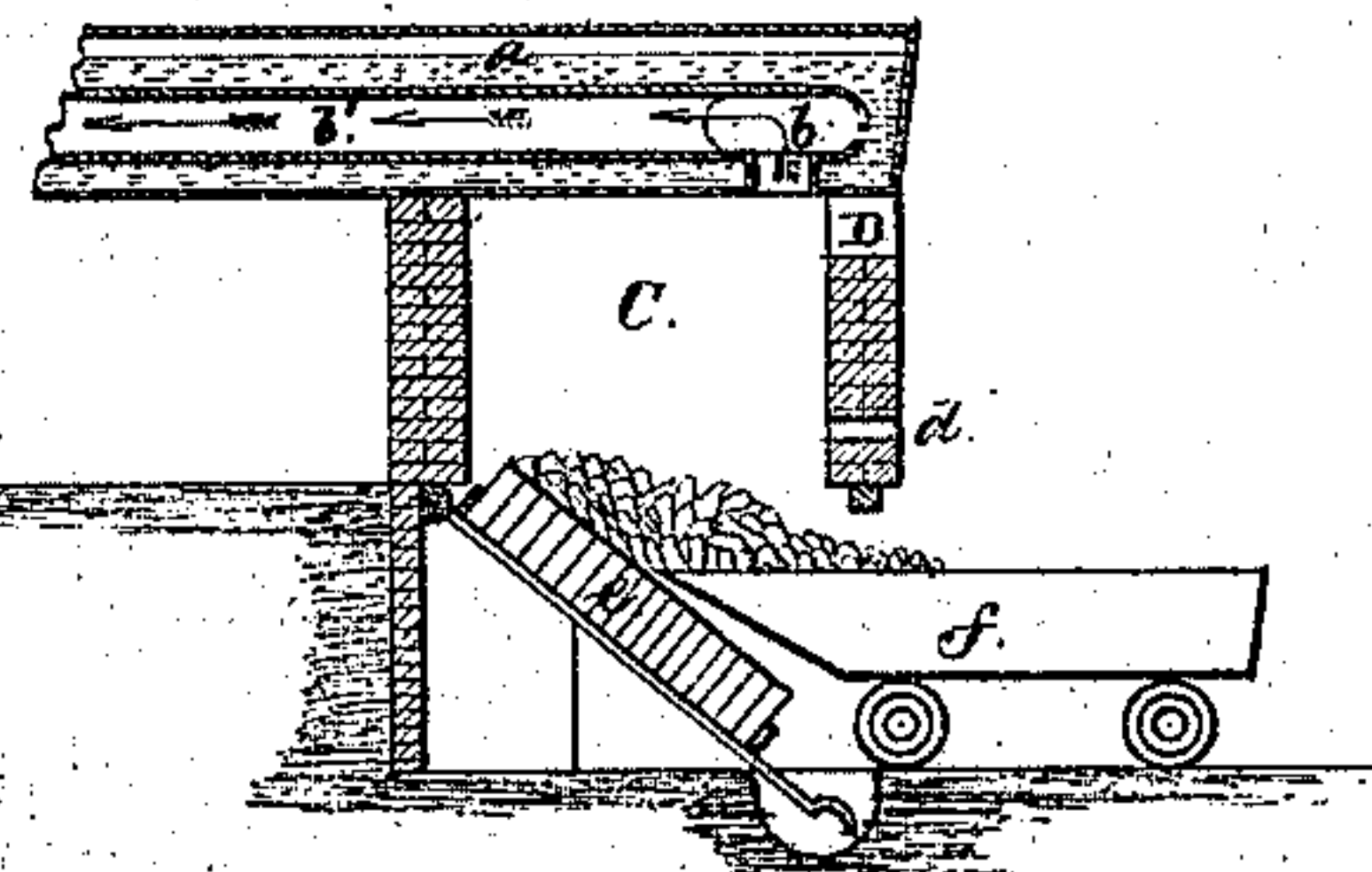


Fig. 4.

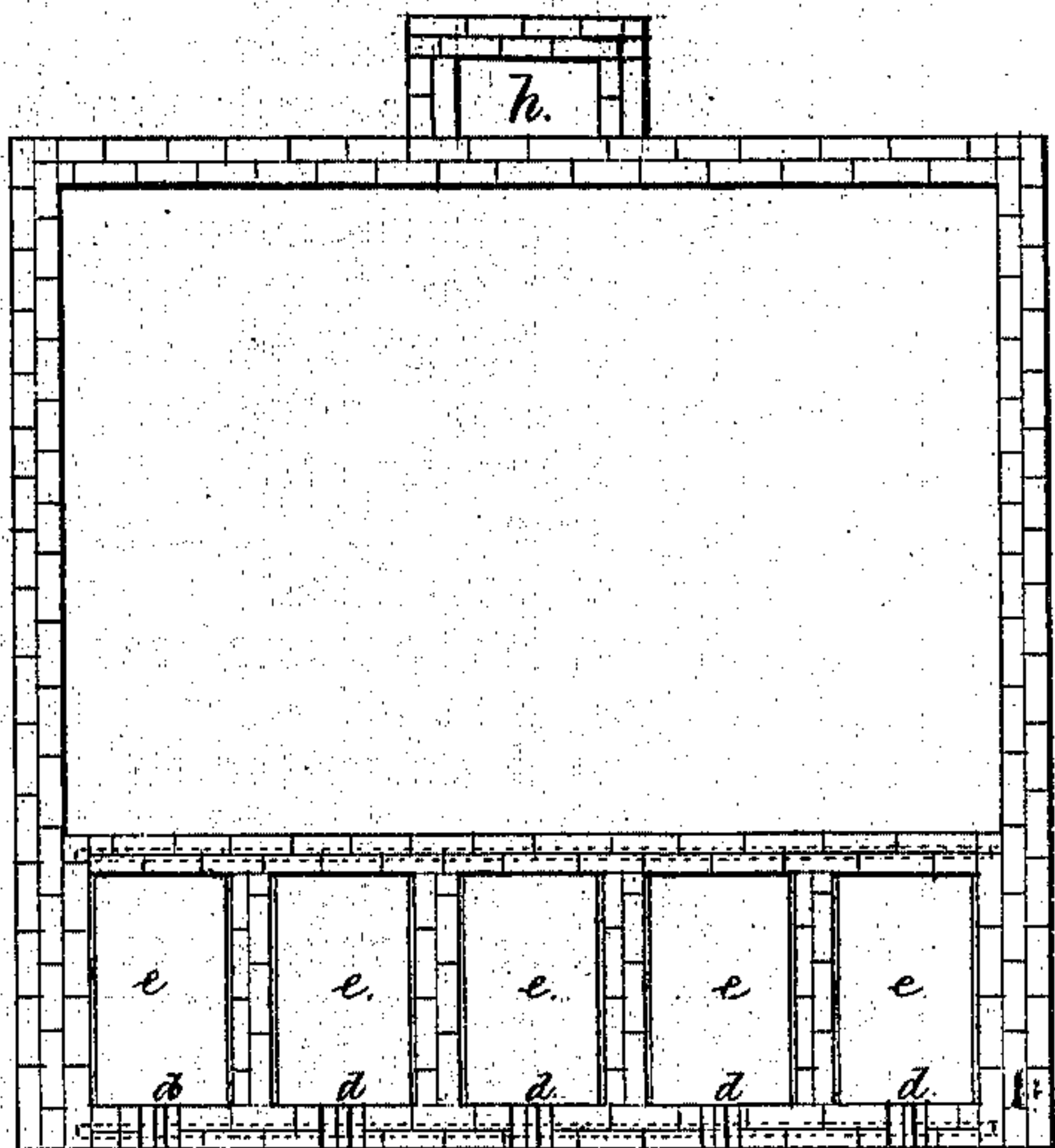
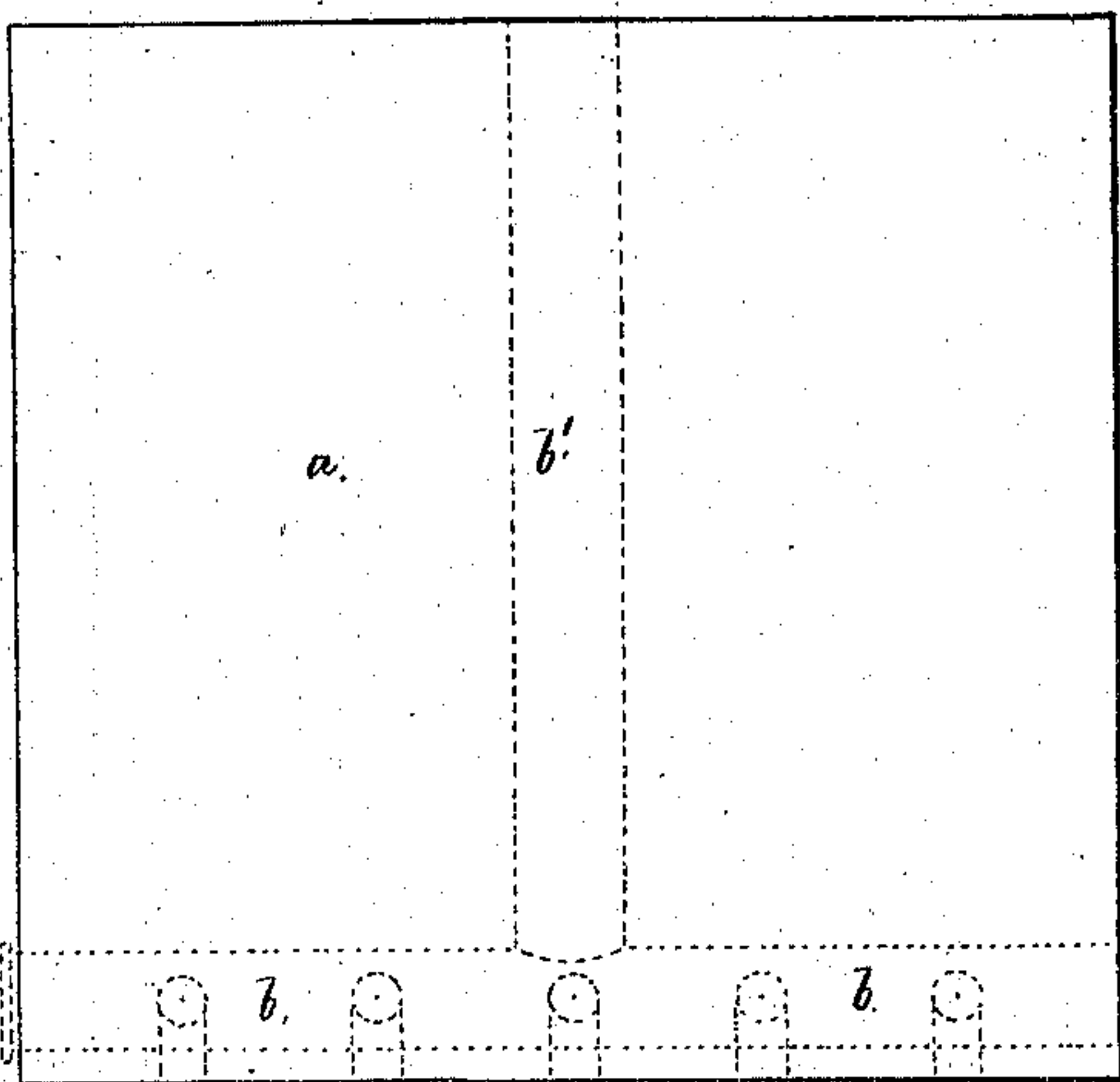


Fig. 5.



Witnesses

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# UNITED STATES PATENT OFFICE.

JULIUS ERICHSEN AND JÖRGEN GEORG MAARDT, OF LONDON, ENGLAND.

## IMPROVEMENT IN COKE-OVENS.

Specification forming part of Letters Patent No. 129,803, dated July 23, 1872.

Specification describing certain "Improvements in the construction of Coke-Ovens, in the utilization of the waste heat therefrom, and in an apparatus connected therewith," invented by JULIUS ERICHSEN and JÖRGEN GEORG MAARDT, both of Copenhagen, in the Kingdom of Denmark, but at present residing at 89 Chancery Lane, London, in the county of Middlesex, England.

The coke-ovens are arranged in a row, side by side. They may be in a straight row, as shown on the drawing, which illustrates our invention as applied to a salt-evaporating pan, *a*, which is heated by the waste heat from the coke-ovens.

Figure 1 is a front elevation of a row of five ovens, the center one being shown in the position of being emptied into a cart, *f*, placed beneath the oven-bed. Fig. 2 is a longitudinal section through one of the ovens and the salt-pan. Fig. 3 is a similar but partial view only, with the oven-bed *e* down. Fig. 4 is a horizontal section through the line A B, Fig. 2; and Fig. 5 is a plan, showing the flues in the salt-pan in dotted lines.

The front part of the salt-pan bottom forms the roof of the ovens. The front wall rests on a strong iron bar, and has one or more air or vent holes, *d*, and one or more charging-holes, *D*. The back wall of the ovens also wholly or partially rests on an iron bar, to which the solid iron beds *e* of the ovens *O* are hinged, being propped up, if required, by removable bars *J* in front. The oven-bed consists of fire-bricks, or other suitable refractory material, set on an iron plate and held together by an iron hoop. The front of the bed hangs in one or more chains passing over a winch-barrel. When let down it rests on a brick slope, as shown. *f* is the cart for taking away the coke. The front projects, as shown. By this arrangement great height is saved under the oven-bed. The holes in the front wall are closed up when the ovens are fully at work; but sufficient leakage is allowed in order to supply the necessary air for supporting the combustion in the oven, and for burning the gases evolved from the fuel in the oven. These then pass through a separate flue from each oven into a flue, *b*, running transversely across the front of the salt-pan, as shown at Fig. 5. One or more longitudinal flues, *b'*, pass from the trans-

verse flue *b* through the salt-pan to the chimney-flue *h*. Soot-doors are provided where needed. When the pan is filled with brine the coke-ovens are charged with coals and lighted. The coking is accomplished in from twelve to eighteen hours. The ovens are then emptied one after another, and the crystallized salt emptied out of the pan.

A series of coke-ovens constructed and arranged as above described may also have the waste heat proceeding from them utilized for heating one or more steam-boilers or other evaporating or boiling apparatus, or drying-stoves, or heating apparatus for dwelling-houses or other buildings by hot air or water, or for other heating purposes.

For burning limestone, we arrange one or more lime-kilns on and forming the top of the coke-ovens; and the bottom of the lime-kiln consists, then, either of a grating or of a perforated diaphragm, in both cases made of suitable refractory materials. We place the boiler or boilers or pan or pans so that one end of it or them forms the top of the coke-ovens. The hot gases from the coke-ovens, after having been properly mixed with sufficient quantity of atmospheric air in order to insure a perfect combustion, pass by preference, first, into one or more tube-flues, going through the boiler in a straight or other direction. They then, by preference, pass on along the sides of the boiler through suitable flues.

In order to utilize part of the waste heat for producing lighting gas, a retort of suitable dimensions may be placed above the fuel in the coke-oven, and resting on the front and back walls of the oven. The gas may be utilized for ordinary lighting purposes, or for driving a gas-engine. The retort may be charged with coals, or with crude petroleum or other suitable hydrocarbon. The air necessary for the further or complete combustion of the gases as they come from the fuel in the coke-ovens is properly admitted in suitable quantity above the fire-brick arches or crowns of the coke-ovens when applied to lime-burning; and, as regards all the other heating purposes hereinbefore named, the additional air must also be properly admitted in sufficient quantity above or beyond the coke in the oven.

We claim as our invention—



1. The hinged bed *e*, in combination with the ovens or fire-chambers *C*, and mechanism, substantially as specified, for raising and lowering the front edge of the bed *e*, for the purposes set forth.

2. The coke-carts *f*, made with an inclined front, in combination with the hinged bed *e*, for the purposes set forth.

3. The range of coke-ovens *c* and hinged

beds *e*, in combination with the flue *b* and pan or boiler *a*, substantially as set forth.

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