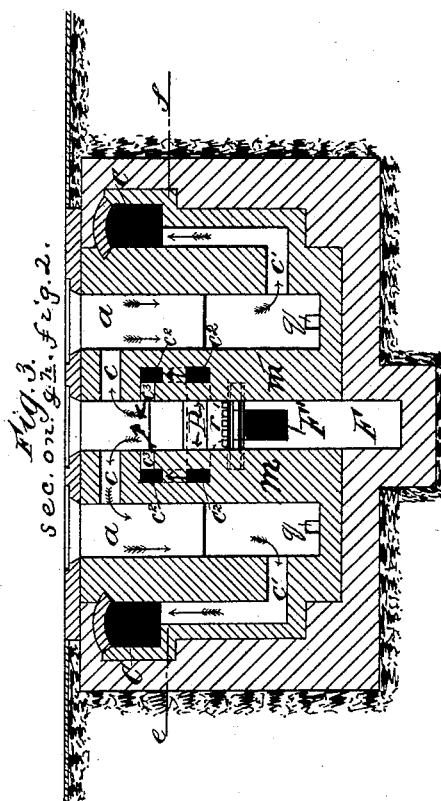
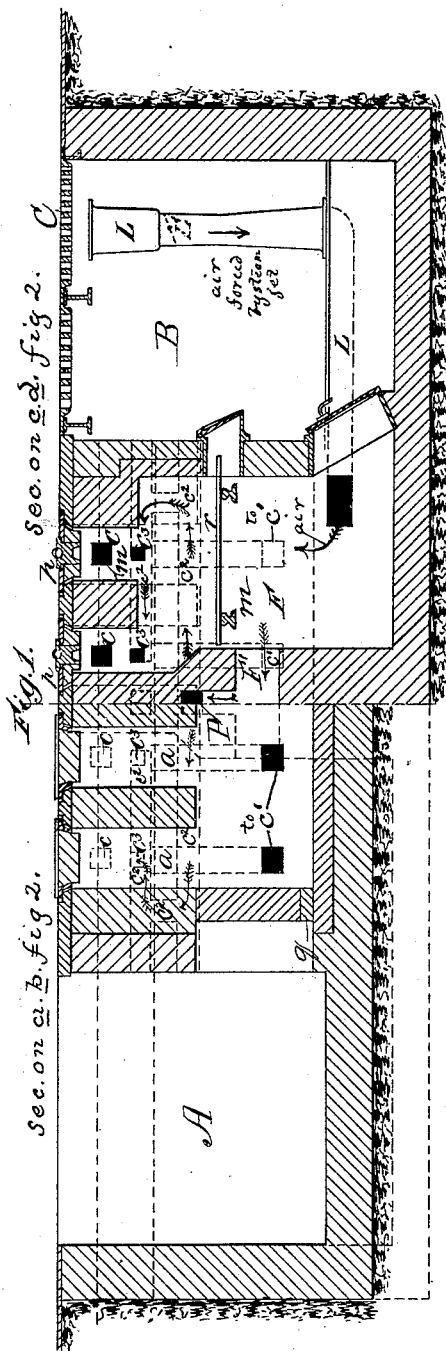


J. GJERS.

SOAKING PIT FOR STEEL INGOTS.

No. 342,200.

Patented May 18, 1886.



Witnesses:  
Josh H. Blackwood.  
R. D. Bois

Inventor:  
John Gjers  
by M. M. Doolittle, Atty

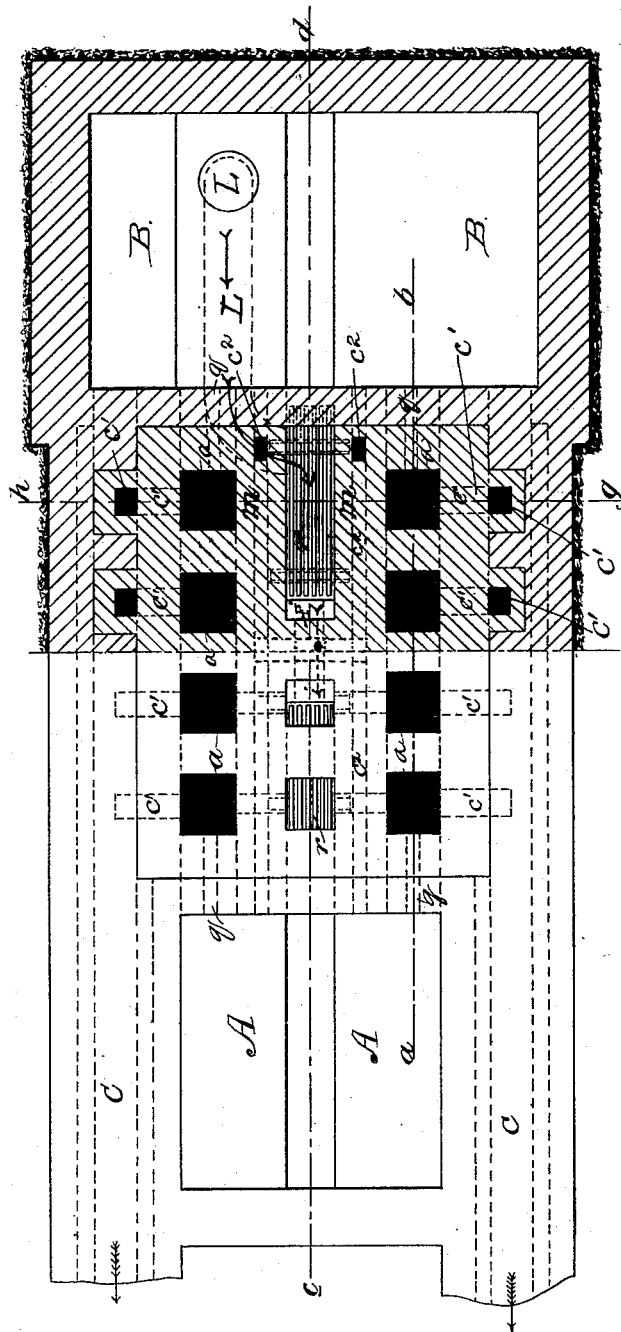
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Fig. 2.



Witnesses;  
Jas. H. Blackwood.  
R. E. D. Boig

Inventor;  
John Gjers  
by M. A. Salter  
Attorney

# UNITED STATES PATENT OFFICE.

JOHN GJERS, OF MIDDLESBROUGH-ON-TEES, ENGLAND.

## SOAKING-PIT FOR STEEL INGOTS.

SPECIFICATION forming part of Letters Patent No. 342,200, dated May 18, 1886.

Application filed March 27, 1885. Serial No. 160,356. (No model.) Patented in England February 20, 1885, No. 2,338; in France February 21, 1885, No. 167,216; in Belgium February 21, 1885, No. 67,968; in Sweden February 28, 1885, No. 85; in Luxemburg March 1, 1885, No. 505; in Austria March 13, 1885, No. 47,144, and in Italy December 31, 1885, XXXVIII, 90.

*To all whom it may concern:*

Be it known that I, JOHN GJERS, a subject of the Queen of Great Britain and Ireland, residing at Middlesbrough-on-Tees, Kingdom of Great Britain and Ireland, have invented new and useful Improvements in Soaking Pits for Steel Ingots, of which the following is a specification.

My present invention relates to a further development of the mode or process of treating steel ingots in soaking-pits for which I obtained Letters Patent of the United States under date the 21st day of August, 1883, No. 283,735. As is well known, the invention forming the subject of that patent is usually carried out in practice in the following manner: The ingot, as soon as it is stripped, is with the least possible delay placed upright within a previously-heated upright soaking-pit, which is constructed of a cross-section only slightly larger than that of the ingot and of a depth deeper than the length of the ingot, and then this soaking-pit is immediately covered over with a cover or lid such as will practically exclude the air. In this pit thus covered the ingot is allowed to stand and "soak" (as I call it) until it assumes throughout a suitable temperature for being rolled or otherwise pressed into a bloom or other shaped article. An experienced workman, as is well known, can judge from the appearance of the ingot when it is in a fit state to be rolled. When starting, the cold pit is first subjected to a preliminary heating, which is usually effected by introducing into the pit in the first instance hot ingots, which, after imparting the requisite heat, are withdrawn and require to be reheated before they are rolled. It has been found that the operation as just above described is perfectly successful if the works have been adapted from the beginning for such treatment, and if charges of recently cast ingots pass through the soaking-pits with sufficient regularity and rapidity; but in works where the casting of ingots takes place at some distance from the rolling-mill, or where the ingots produced are either of very small size or are cast at long intervals, it becomes somewhat difficult to preserve such a surplus of heat in the soaking-

pit as is necessary for the attainment throughout the ingots of a sufficient temperature for rolling. To supply additional heat to the walls of the soaking-pits, and also to insure the retention by them of the temperature to which they have been raised, so that they may always be hot enough to receive a new charge of ingots, an arrangement of apparatus has been described in the specification of an application for Letters Patent of the United States by James Riley, No. 164,134, filed the same day as my present application.

Now, according to my present invention the heat is applied internally, and this internal heating is effected while there are no ingots in the soaking-pits. The soaking pits or chambers then become capable of supplying to the ingots a certain amount of auxiliary heat, sufficient with that already contained in the steel to bring the whole to the proper temperature for rolling.

Soaking pits or chambers may be heated either by solid fuel or by gas from a producer, or by the use of liquid fuel or natural gas where available. The heat of the escaping gases may be used for generating steam.

Referring to the annexed drawings, Figure 1 shows in vertical section along the lines *a b* and *c d*, respectively, of Fig. 2, the right of the figure being on *c d* and the left of it on *a b*, an arrangement of soaking-pits heated internally by the products of combustion from solid fuel. Fig. 2 represents partly a horizontal section along the line *e f* of Fig. 3 and partly a plan view of the arrangement, the covering-plates *p* being removed. Fig. 3 represents a transverse section along the line *g h* of Fig. 2.

*a a a* show eight soaking pits or chambers formed in refractory brick-work, and arranged in two series. Between the inner walls, *m m*, two fire-grates, *rr*, are situated. Fuel is introduced from the top through small openings closed by plugs *p*.

A and B are stoke-holes. C is a grated floor over stoke-hole B. (There is a like one over A.)

Beneath the fire-grates *rr* terminates a pipe, L, through which, by means of a steam-jet, air is blown in to urge the fire. The pipe L is fitted with a shut-off valve, L'.

The pipe L, by which air is injected to the ash-pit F, is the only air-inlet by which air is supplied to the grates *r r*. The ash-pit (not shown) of the fire-grate to the left of Fig. 1 (see 5 *r* to the left of Fig. 2) derives its air-supply from F by the passage F', Fig. 1. Some air from F' passes upward to inlet P, (shown in full lines, Fig. 1, and dotted in Fig. 3,) and then laterally and vertically by the flues *c' c'* to flues *c'*.

*q q* are holes for removal of slag from soaking-pits.

The requisite quantity of air for combustion, introduced through horizontal air-flues *c' c'*, becomes heated in its passage through or in 15 contact with the hot walls before entering through the laterally-arranged openings *c' c'* into the space above the fire grates. The gases of combustion arising from the fuel pass 20 through the flues *c c* of the inner walls, *m m*, enter into the soaking-pits *a a a*, and pass downward, surrounding and heating the inner surfaces of the walls, and escape through the side channels, *c' c'*, into the chimney by flues 25 C C, each fitted with a damper.

In the specification of my application for Letters Patent of the United States filed April 7, 1884, Serial No. 126,962, I described the application of gas-heating apparatus in con- 30 junction with soaking-pits according to my invention; but in that case the gas is used to act upon and heat the upper parts of the ingots, as distinguished from the use of gaseous or other fuel according to my present inven-

tion, in which the flame is not to have any 35 contact with the ingots, nor are the products of combustion to be allowed to enter the soaking pit or pits when there are ingots therein.

What I claim is—

1. An apparatus for treating steel ingots to 40 equalize their temperature before rolling, comprising, in combination with a stationary mass of brick-work serving as an accumulator of heat, stationary soaking-pits for the ingots, built within the said mass of brick-work, and 45 a furnace or combustion-chamber also inclosed in the same brick-work, and communicating flues, whereby the entire arrangement is self-contained, the flame caused to act directly upon the interior surface of the pits, and loss of 50 heat is obviated, substantially as described.

2. The apparatus for treating steel ingots to equalize their temperature, comprising soaking-pits *a*, formed in refractory brick-work, with inner walls, *m m*, fire-grates *r r*, with 55 openings for fuel closed by plugs *p*, pipe L, for introduction of air to urge the fire, the inlet P, and the flue F, shut-off valve L', horizontal air-flues *c' c'*, laterally-arranged openings *c' c'*, flues *c c*, side channels, *c' c'*, and flues 60 C C, each fitted with a damper, all substantially as described, for the purpose specified.

JOHN GJERS.

Witnesses:

JAS. L. ADAMS,

52 Hartington Road, Middlesbrough.

JAMES B. DALES,

10 Benson Street, Middlesbrough.