

(No Model.)

2 Sheets—Sheet 1.

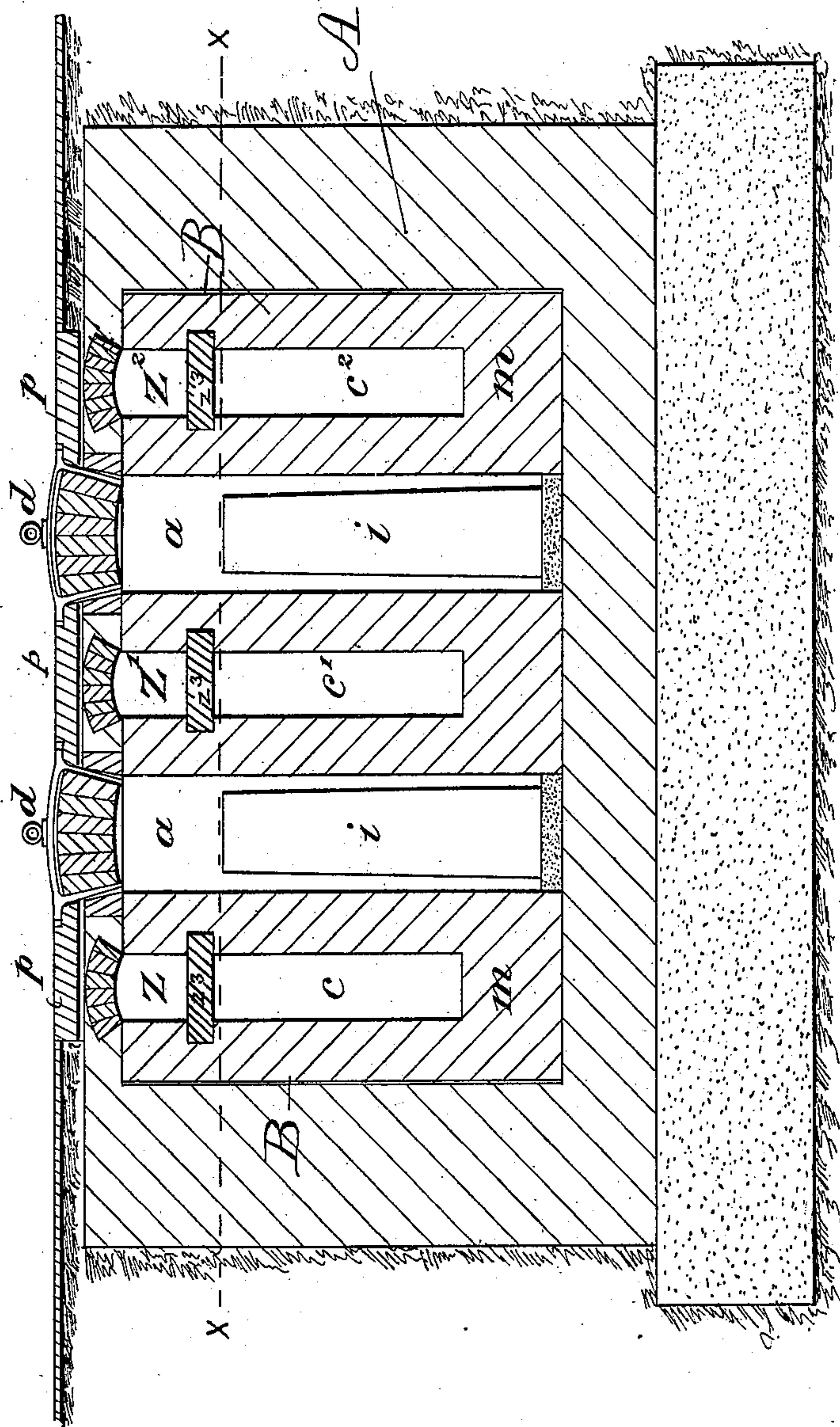
J. RILEY.

SOAKING PIT FOR STEEL INGOTS.

No. 333,027.

Patented Dec. 22, 1885.

*Fig. 1.*



Witnesses;  
Jost H. Blackwood  
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Inventor,  
James Riley,  
By M. M. Poolittle  
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(No Model.)

2 Sheets—Sheet 2.

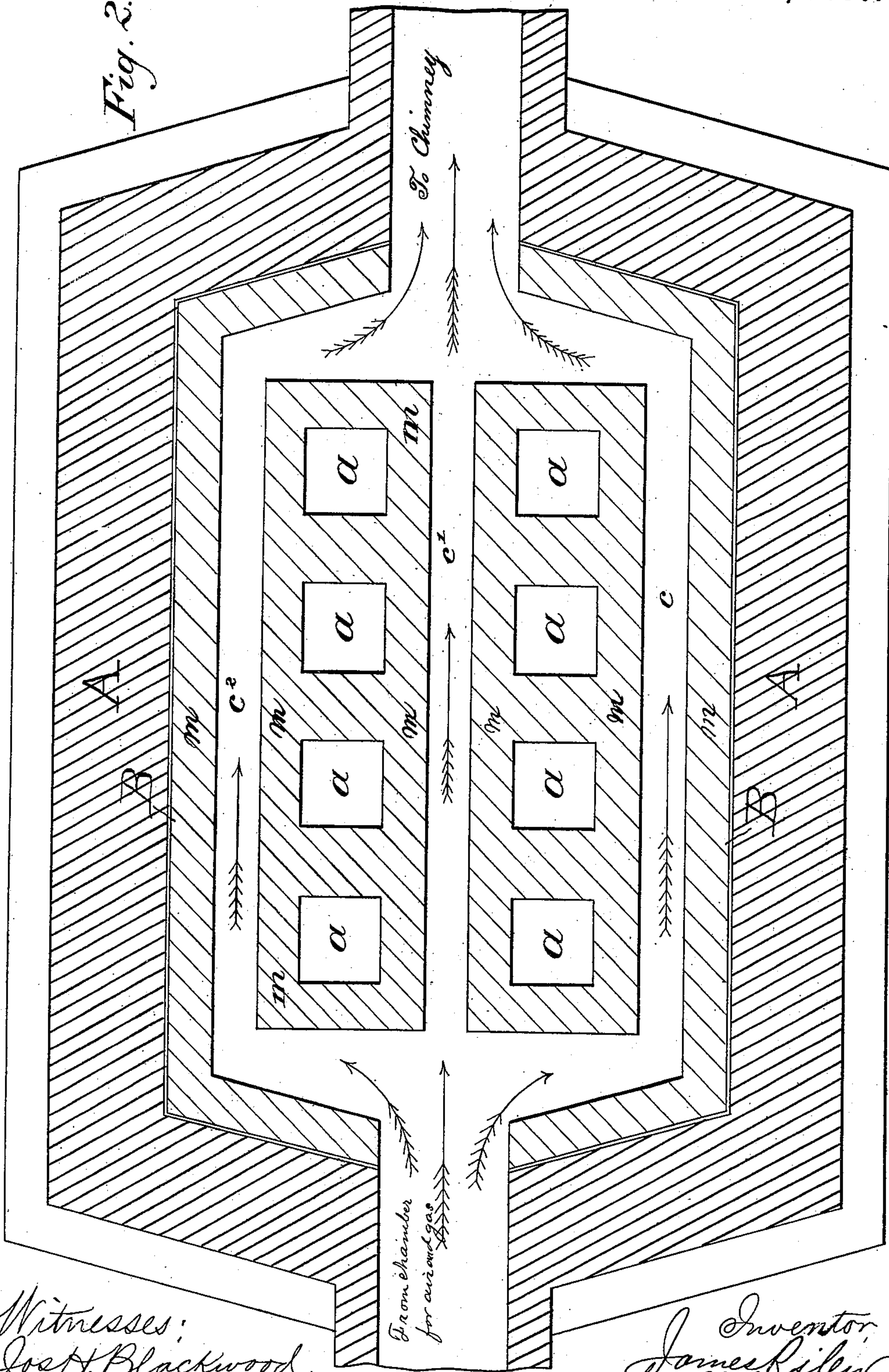
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*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

JAMES RILEY, OF GLASGOW, SCOTLAND, ASSIGNOR TO JOHN GJERS, OF MIDDLESBROUGH-ON-TEES, ENGLAND.

## SOAKING-PIT FOR STEEL INGOTS.

SPECIFICATION forming part of Letters Patent No. 333,027, dated December 22, 1885.

Application filed May 1, 1885. Serial No. 164,134. (No model.) Patented in Germany May 9, 1882, No. 21,716; in England August 6, 1884, No. 10,971; in Belgium February 21, 1885, No. 67,968; in France February 21, 1885, No. 167,216; in Sweden February 28, 1885, No. 85; in Luxemburg March 1, 1885, No. 505, and in Austria March 13, 1885, No. 47,144.

*To all whom it may concern:*

Be it known that I, JAMES RILEY, a subject of the Queen of Great Britain and Ireland, residing at Glasgow, Scotland, 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.

The present invention relates to a further development of the mode or process of treating steel ingots in soaking-pits for which John Gjers 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 generally 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 the pit thus covered the ingot is allowed to stand and "soak" (as the inventor calls 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 the 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.

Now, my present invention has for its object 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.

Various attempts have been made to apply supplementary heat to compensate for lowering of temperature of the soaking-pits from the cause indicated; but the plans proposed and tried have been objectionable on account of various difficulties or inconvenience, but, principally, because of their neutralizing what is believed to be one of the principal advantages of the soaking operation—namely, the avoidance of loss of metal by oxidation.

My invention consists in an improvement in the means of applying ignited gas to the soaking-pits at the times when the temperature would otherwise become too low. Instead of burning the gas in or introducing the ignited gas into the pits themselves and in contact with the ingots, I form passages or flues in the walls of the soaking-pits, and pass the ignited gas through these passages or flues, so as to maintain the walls of the pits at such temperature that heat will not be injuriously radiated from the ingots.

My invention may be carried out in various ways, but in a convenient modification I form a small chamber into which the heating gas and air are admitted, the air being by preference forced in by blowing apparatus and through injecting apparatus arranged to draw in the gas, so that the ignited gas may have some pressure. The gas and air are ignited in the chamber, and thence pass through a series of flues or passages formed in the walls of the soaking-pits to a flue leading to a chimney. The pipes or flues leading the gas and air to the chamber where they are ignited are by preference passed through the ground or building near the soaking-pits, so as to take up heat which would otherwise pass off by conduction.



My invention, so far as applicable to the form of soaking-pits above described, is illustrated in the accompanying drawings. The chamber in which the gases are ignited and the forcing and blowing apparatuses, being of well-known construction, are not here illustrated.

Figure 1 represents a vertical section of an arrangement of soaking-pits, showing the application of my invention; and Fig. 2, a plan sectional view of a similar arrangement on a line indicated by  $x\ x$ , Fig. 1, at a point between the tops and bottoms of the flues, but with the ingots removed.

In the drawings, A is the surrounding wall of the soaking-pit chamber B.

The heating of the brick-work  $m$  of the soaking-pits  $a$  is effected only from the outside by means of the gases passing through the flues  $c\ c'\ c''$  in the direction of the arrows. Through the flues  $Z\ Z'\ Z''$ , above the gas-flues  $c\ c'\ c''$ , air is admitted and passes through in an opposite direction to the gases, whereby it becomes warmer, and when thus leaving the flues it is mixed with the gas and increases combustion.

$i\ i$  represent ingots in the soaking-pits.  $d$  are removable covers, and  $p$  is the covering-plate, of cast-iron.

The smaller rectangles  $z^3$  below the letters  $Z\ Z'\ Z''$  are walls or partitions separating the

flues  $c\ c'\ c''$  from the flues  $Z\ Z'\ Z''$ . The latter flues are not represented in Fig. 2, as they are situated directly above flues  $c\ c'\ c''$ .

What I claim as my invention is—

1. An apparatus for treating steel ingots, to equalize their temperature before rolling, comprising a soaking pit or pits, in combination with a gas passage or passages formed in the walls of the soaking-pits and outside thereof, whereby heat from burning fuel is imparted to the walls of said pit or pits, and not directly to the pits themselves, substantially as described.

2. In apparatus for treating steel ingots, to equalize their temperature before rolling, comprising a soaking pit or pits and means for imparting heat to the walls thereof from burning fuel, a small chamber into which the heating gases and air are admitted and ignited, in combination with a series of flues or passages formed in the walls of the soaking-pits and a flue leading to a chimney, substantially as described, for the purposes specified.

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Witnesses:

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JAMES MAXWELL,  
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