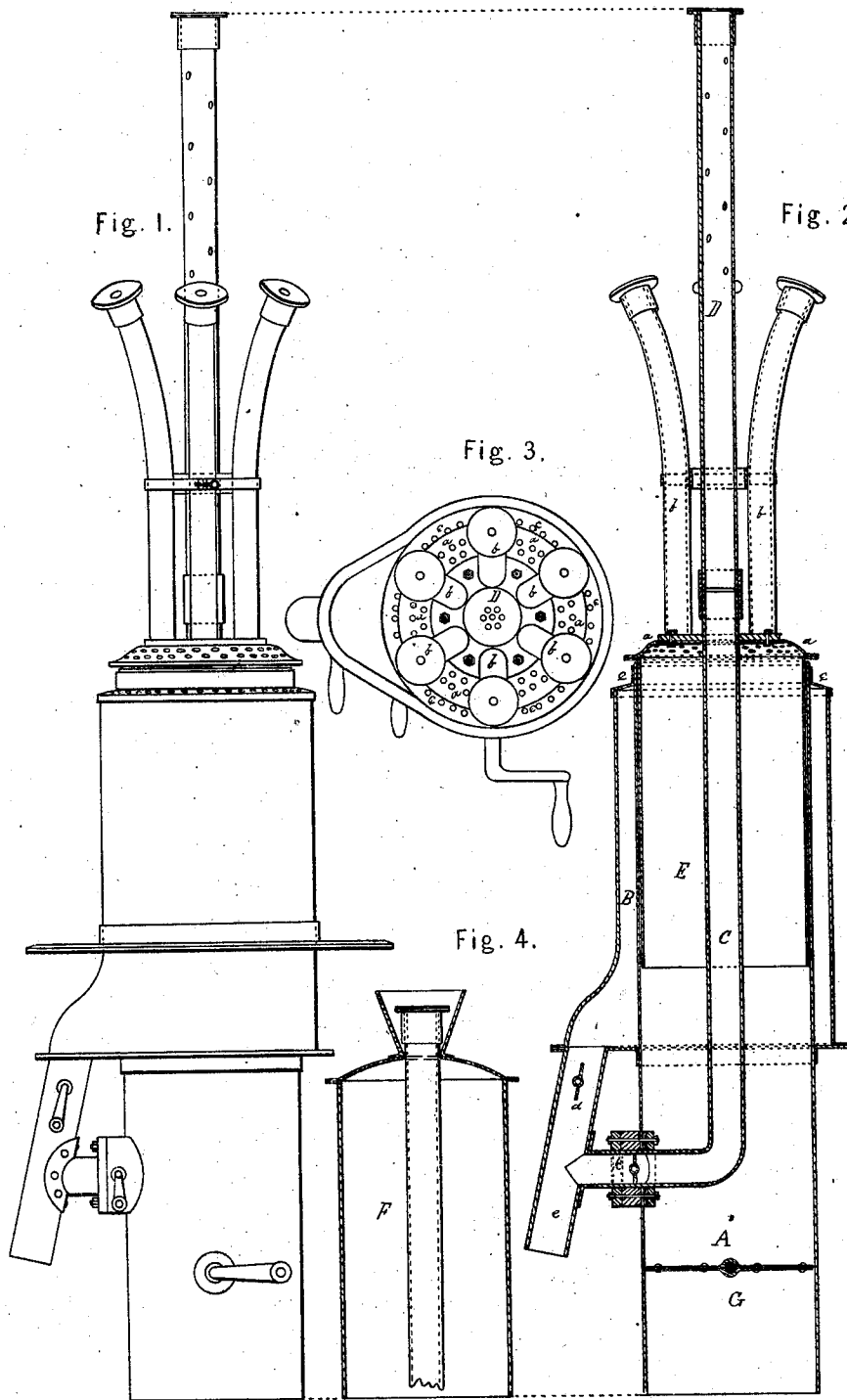


C. G. LARSON.

Improvement in Apparatus for Heating the Converters  
and other Vessels used in the Bessemer Process  
of Treating Iron.

No. 116,201.

Patented June 20, 1871.



Witnesses.

*Abel M. Kirk*  
*Harold von Harnitz*

Inventor

*Carl G. Larson*

C. G. LARSON.  
Improvement in Apparatus for Heating the Converters  
and other Vessels used in the Bessemer Process  
of Treating Iron.

No. 116,201.

Patented June 20, 1871.

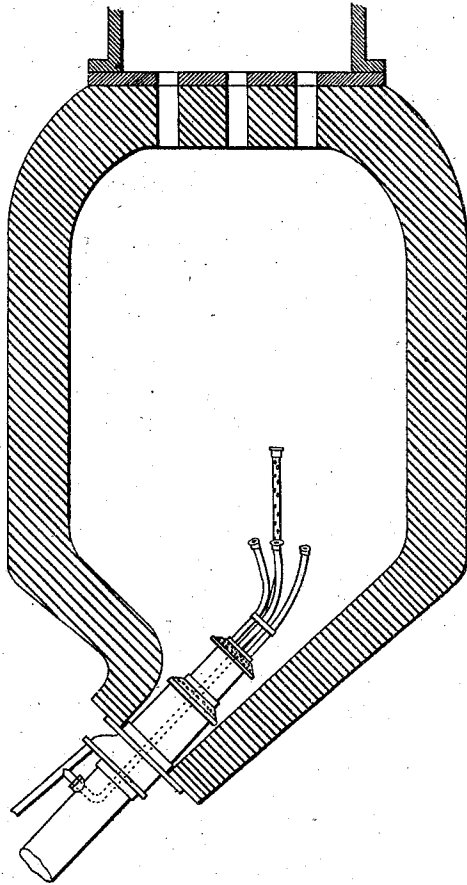
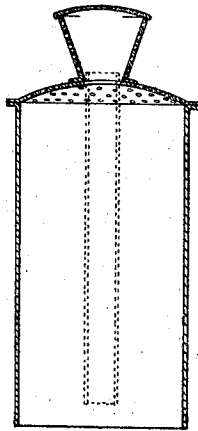


Fig. 5.



Witnesses.

*Abel Mink*  
*Harald von Hammer*

Inventor.

*C. G. Larson*

# UNITED STATES PATENT OFFICE.

CARL G. LARSON, OF STOCKHOLM, SWEDEN.

IMPROVEMENT IN APPARATUS FOR HEATING THE CONVERTERS AND OTHER VESSELS USED IN THE BESSEMER PROCESS OF TREATING IRON.

Specification forming part of Letters Patent No. 116,201, dated June 20, 1871.

*To all whom it may concern:*

Be it known that I, CARL G. LARSON, of Stockholm, Sweden, have invented a new and useful Machine for Heating Converters, Casting-Ladles, Tools, &c., in the Bessemer Process, by means of Gas; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing making a part of this specification, in which—

Figure 1 is an exterior view, Fig. 2 a longitudinal section, Fig. 3 a transverse section, and Figs. 4 and 5 are modifications of the cover of the machine.

The hitherto customary manner of heating different apparatus required for the manufacturing of Bessemer steel at foundries, as, for instance, converters, ladles, tools, &c., and which usually is done by coal-fire or other kind of fuel, with or without blast of air, is, besides being expensive, connected with many disadvantages in regard to the conservation of the apparatus. The object of my present invention is to remedy, or at least diminish, these disadvantages. By direct experiments I have found it not only possible, but even advantageous, to heat the apparatus and utensils used for the manufacturing of Bessemer steel, or for other metallurgical operations, for drying, &c., by the gas generated at blast-furnaces or other metallurgical furnaces, of which, as a natural consequence, it follows that gas, especially for the purpose, generated from other materials, may be used whether it is purified or not. The gas may burn in the vessel which is to be heated with or without the supply of compressed air, or by a blast of air effected in one way or the other. The introduction of the gas, as well as of the blast, where such is used, may be effected either by a separate apparatus, constructed by me and described below, which is inserted in the vessel which is to be heated; or direct, by introducing the gas, for instance, in a converter, through the trunnion into the air-chest, wherefrom it is led through the forms and, by draught or pressure, consumed in the converter.

As indicated in the annexed drawing, the above-mentioned apparatus, called gas-heater, (the appearance of which may be altered in a

great many different ways,) consists, in its simplest form, of a funnel, A, through which the gas intended to be burned is led. The upper part is closed by the tube-shaped cover E, which is provided with several small holes, *aa*, and straight or crooked pipes *bb*. The air necessary for the combustion is led in through the pipe *e*, where it expands partly to the exterior cylinder B, and further out through the holes *cc*, partly through the inner pipe C, the upper part of which, D, straight or crooked, is provided with a quantity of small holes. When the gas now rushes out, either through the holes *aa* or the pipes *bb*, the air is, either by compression or draught, coming in through the holes *cc* and through the openings in the pipe D, whereby the gas is lit and the combustion kept up continually. The draught of air is regulated by the valves *d* and *k*, and the gas by the valve G, which valves can, of course, be arranged in many different ways. If this apparatus is inserted, for instance, in a converter a high temperature is effected by the said combustion, and the converter is heated. A modification of the cover E is shown by the Fig. 4. The pipe D is here taken away, and the tube C opens into a funnel-shaped cap, and is closed by a cover provided with several holes. This arrangement is particularly suitable for heating casting-ladles, &c. A further improvement is shown in Fig. 5 of the drawing, which only differs from Fig. 4 in this, that the tube C is open, and projects only slightly above the base of the funnel. The funnel is furnished with a convex cover, which, as well as the sides of the funnel, is closely perforated with holes. This modification is to be used in the heating as well of the converters as the ladles.

The advantages of this heating system, in preference to the common one with solid fuel, are, first, a considerable saving (amounting to about three-fourths) of the fuel required for the heating of furnaces and casting-ladles, &c.; second, a more even heating of the apparatus and their longer duration, as they are not cooled between each time they are used, which, for instance, is the case with Bessemer furnaces; third, saving of motive-power, inasmuch as the blast of air necessary for the combustion of the gas can be obtained from the blast of the smelting-furnaces, or from any other sepa-

ately-arranged less powerful blast; whereas, under present circumstances, the heating of, for instance, a Bessemer converting-vessel requires a motive power of forty to fifty horse-powers during about half an hour to each process.

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

The apparatus called "gas-heater," and described in specification and drawing, which, by means of air as well as gas led from a fur-

nace or from a separate gas-generator, coursing through the same, heats the converters, ladles, and other tools and utensils requisite in the Bessemer process and other metallurgic operations, or in repeated operations retains said apparatus at high temperature.

Stockholm, the 23d of December, 1870.

CARL G. LARSON.

Witnesses:

ABDE MORK,

HARALD VON HANNON.