

No. 613,820.

Patented Nov. 8, 1898.

T. LEVOZ.
CONVERTER.

(Application filed Feb. 24, 1898.)

(No Model.)

Fig. 1.

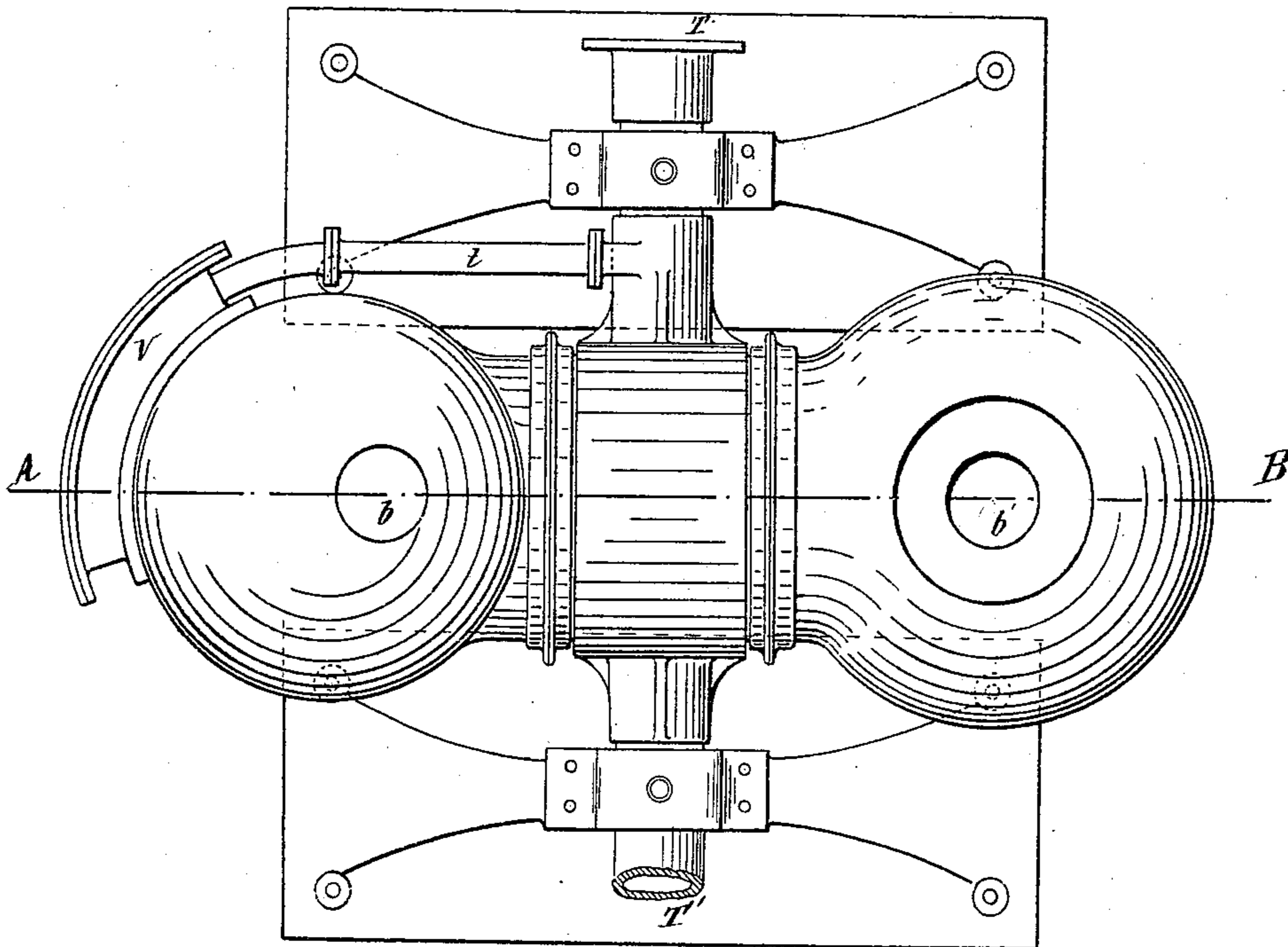
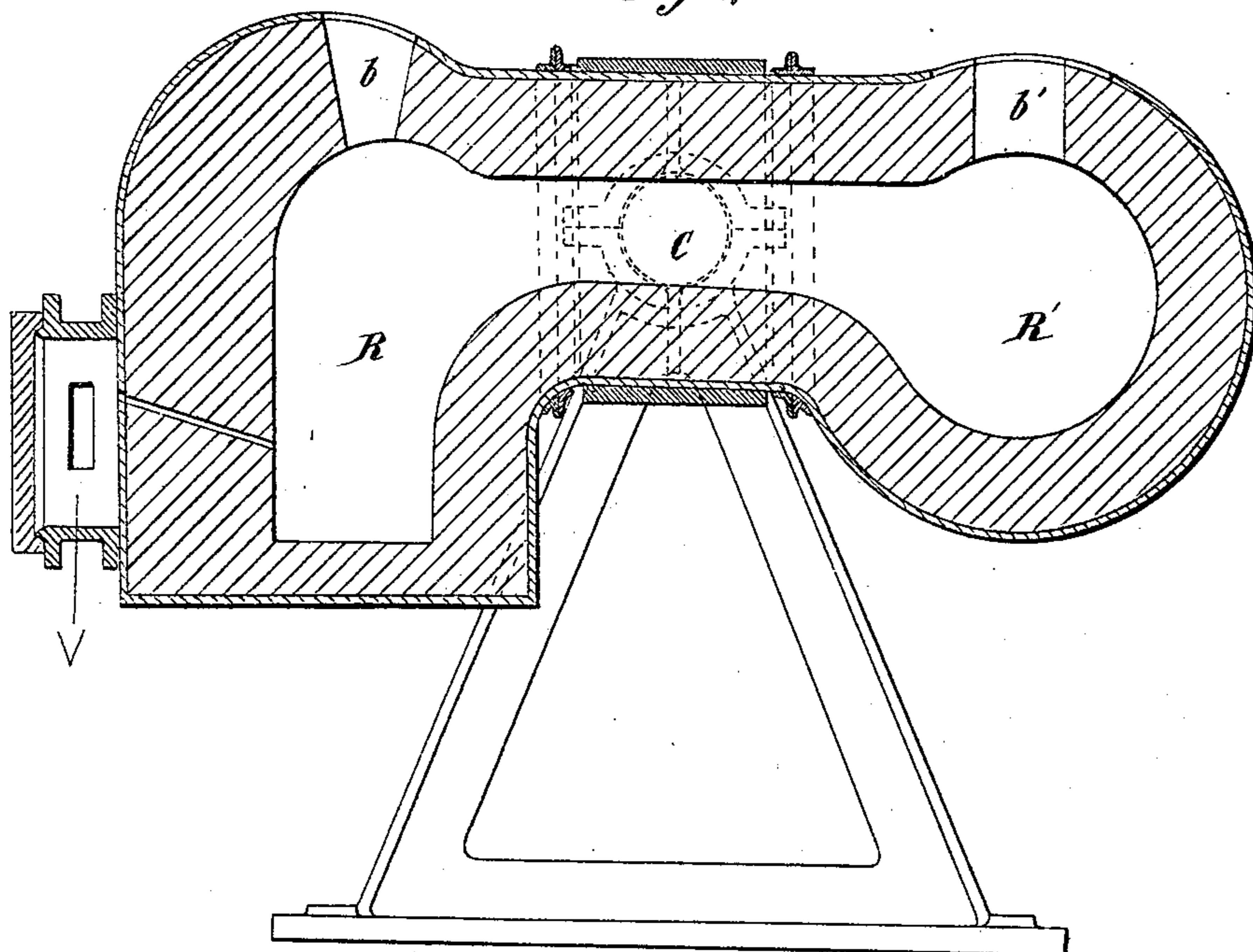


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

TOUSSAINT LEVOZ, OF BRUSSELS, BELGIUM.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 613,820, dated November 8, 1898.

Application filed February 24, 1898. Serial No. 671,481. (No model.)

To all whom it may concern:

Be it known that I, TOUSSAINT LEVOZ, engineer, a subject of the King of Belgium, residing at 14 Rue du Trône, Brussels, Brabant, Belgium, have invented certain new and useful Improvements in Constructions of Converter Apparatus for Producing Steel and Wrought-Iron of Superior Quality; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object a new construction of converter apparatus for the production of a superior quality of steel or iron for ingots or castings by means of air-blast while using raw materials for this purpose that are less expensive than those used in the Bessemer process. In general the mixture of materials employed in the Siemens-Martin process may be used, while the apparatus is of a more simple construction and maintainable at a less cost, the metal produced being at the same time better suited to the purposes required.

I will describe my said invention with reference to the accompanying drawings, wherein—

Figure 1 shows a plan of the apparatus, and Fig. 2 a vertical section on line A B.

The apparatus consists of two receptacles R R', of sheet-iron, communicating with each other by means of a tubular part C, the whole being provided with a refractory lining, and the complete apparatus is divided into three parts for facilitating repairs. The part C is provided with a steel belt carrying two trunnions T T'. The trunnion T is hollow and serves for the passage of the air-blast from a blowing-engine, the blast being led thence to the receptacle R through the pipe t, windchest V, and lateral twyers. The trunnion T serves to receive the requisite rocking motion for the apparatus, which is imparted either by hand or by mechanical or hydraulic power. The two trunnions are carried on chairs which allow the apparatus to be manipulated in a similar manner to ordinary converters.

The twyers in the receptacle R are made convergent and are inclined toward the bottom or bed of the receptacle, so that the jets

of air will pass through the bath of metal from above downward under a pressure of about fifty centimeters of mercury. In the drawings the twyers are shown in a lateral position. The opening b serves for the introduction of the liquid cast-iron into the receptacle R. It also serves for the inspection and repairs of the twyers. This opening is closed during the working in order to force the gases to pass into the receptacle R'. The opening b' serves for discharging the gases after they have heated the receptacle R'. It serves also for running off the metal when all the operations have been completed.

It is to be observed that the entire arrangement of the lateral twyers in a converging position and inclined toward the bed must be scrupulously maintained for obtaining the maximum amount of heat given off by the combustion of the gases produced by the oxidation of the carbon and other elements contained in the cast-iron.

The process of conversion by means of this apparatus is carried out as follows: The cast-iron, previously melted down in an ordinary cupola, will have about two per cent. of silicon when it enters the receptacle R. This percentage can also be obtained by employing the most silicious cast-iron, to which is added scrap-iron in the cupola. This cast-iron being at once subjected to the oxidizing action of the blast in the receptacle R is rapidly heated up by the combustion of the silicon. It soon attains the temperature of fusion of steel or wrought-iron by the oxidation of the carbon. The cast-iron bath develops at this moment more than 2,000° centigrade. The characteristic flame of the heat produced, instead of passing into the atmosphere through the opening b, passes through the tubular passage C into the receptacle R', which it heats to a high degree, escaping eventually through the opening b'. In proportion as the heat increases in the receptacle R' there is introduced through the opening b' iron or steel scrap, which is fused by the heat of the gases passing off from R. A minute before the termination of the operation there are introduced, also through b', three different additions of ferromanganese, ferrosilicon, or silicic spiegeleisen in order to prevent too great a degree of oxidation of the

fused scrap. The operation being completed, the apparatus is inclined so that the bath of metal contained in R passes into R'. The mixture then at once takes place in an intimate manner, owing to the great heat of the bath. A sample is then taken in a similar manner to the Siemens-Martin process, and if the metal is not in the condition desired further scrap may be added by means of spiegeleisen or powdered coke. The metal obtained as above described will not be subject to ebullition when the carbon is added, which proves the superiority of the metal over all the steel obtained either in the Siemens-Martin furnace or in the ordinary converter, as if there were ebullition this would show the presence of oxid of iron in the bath.

Owing to the favorable arrangement of the apparatus, the steel or iron bath will have retained sufficient heat to allow of its being run into molds through the spout *b'*.

The advantages obtained by the above-described invention, in particular for foundries, may be stated as follows:

First. A mixture of cast-iron and very cheap steel may be treated without having recourse to the very expensive regenerative gas-furnaces of the Siemens-Martin process.

Second. The metal which may be thrown out of the receptacle R instead of being lost, as in the case of the Bessemer converter, is caught in the receptacle R'.

Third. The waste will be greatly reduced.

Fourth. The lining of the receptacle R, being in less direct contact with the atmospheric air, will wear less rapidly.

Fifth. The additions of scrap will readily allow of increasing the charge treated and of casting large pieces.

Sixth. The additions of soft iron will allow

of the production of a uniform metal for use in electrical apparatus.

Seventh. The manner of treating the cast-iron as regards the oxidation and admixture of scrap will afford a liquid metal which will attack the molding-sand less. The casting will consequently be more easily cleaned of adhering sand.

Eighth. For the same reasons the metal will have no blow-holes or honeycomb and, which is essential, cavities due to shrinkage, settling, &c., will be avoided, a result which has never yet been obtained.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim as new, and desire to secure by Letters Patent, is—

An apparatus for making iron and steel consisting of the two receptacles R, R', a passage *c* connecting the upper part of said receptacles, the rotary supports for the receptacles whereby upon tilting the apparatus the metal will pass from one receptacle to the other through the upper passage, each of said receptacles having an opening above it through the top of the casing and a wind-chest and twyers in connection with the receptacle R the arrangement being such that the heat of the blast from the receptacle R passes through the passage *c* to heat the metal in the receptacle R' and passes through the opening above the same, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

TOUSSAINT LEVOZ.

Witnesses:

AUGUSTE DE CEUSTER,
CHARLES RENOBLE.