

ing more than 1 cwt. each, the advantages of being able to make steel equal in all respects as to quality, in quantities of 15 tons and possibly more, will readily be apparent.

If steel, to satisfy the exacting requirements of the highest class of tool steel, can be produced, there can be no question as to the production of steel of a quality suitable for what we may term medium-class steels, and it then be-

form of continuous open-hearth process, in which molten pig-iron is first converted into what we may term "molten scrap steel" in a gas-fired furnace, and then transferred in the molten state to the electric furnace for final purification. By this means the additional cost over ordinary open-hearth steel would be comparatively small, the melting and preliminary refining have been done in the gas-fire surface, and the electric furnace being employed only to do the final refining at such high temperatures as those at which it alone is able to work most efficiently and economically.

The design of the Heroult furnace (Figs. 1 and 2), so far as the general construction is concerned, is particularly

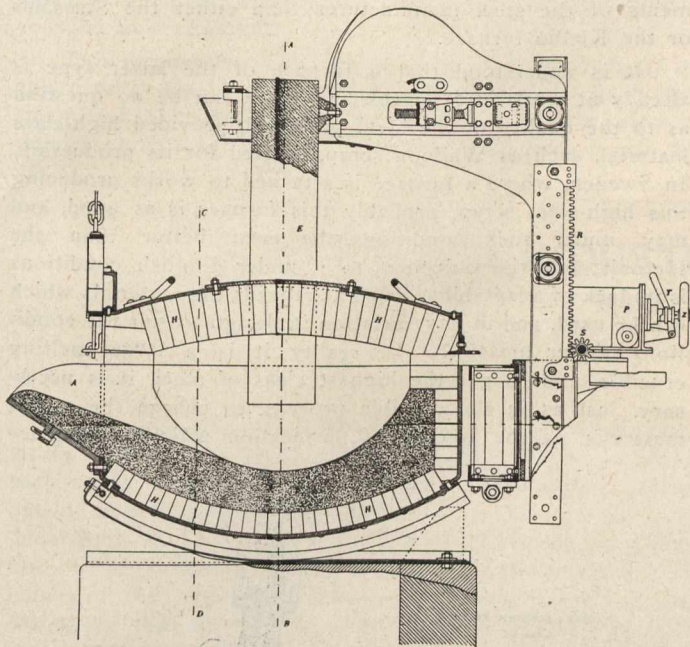


FIG. 1. TRANSVERSE SECTION.

Heroult Resistance Type Electric Furnace.

comes simply a question of cost, and whether the electric furnace can compete in this respect with Swedish Bessemer steel, or steel made from Swedish pig-iron, or steel of specially selected English brands.

In the electric furnace of the resistance type, which may be said to be represented by the Heroult (Figs. 1 and 2) and Keller (Figs. 3 and 4) furnaces, the highest-class steel can be made from ordinary English scrap, such as rail ends, but against the saving effected in this direction, has to be set

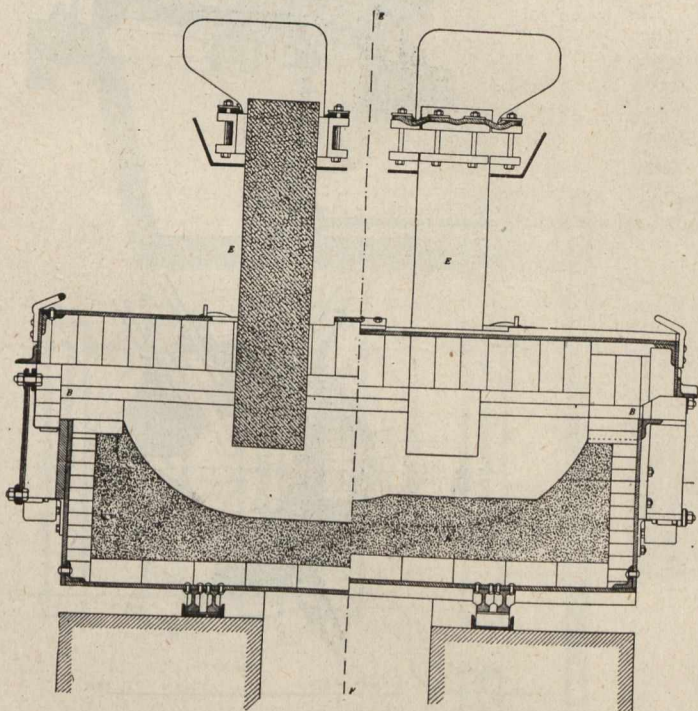
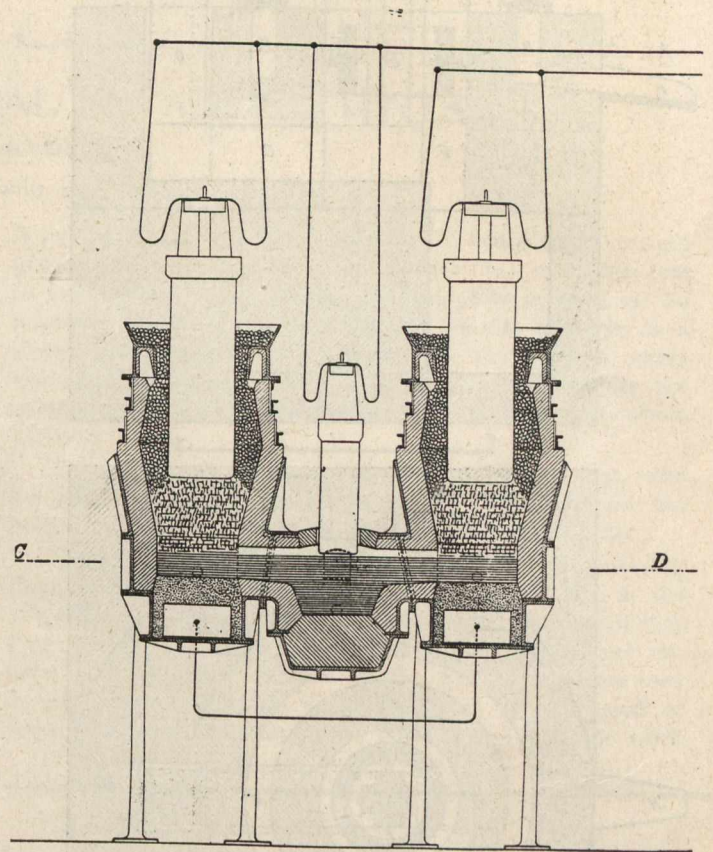
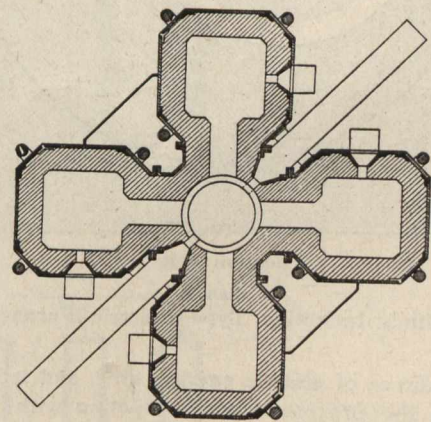


FIG. 2. LONGITUDINAL SECTIONS.

Heroult's Resistance Type Electric Furnace.

the cost of the electric energy required. The electric furnace, even under the best conditions, is not a cheap melter, but as a refining furnace towards the end of the operation, when a very high temperature is required, it is far more efficient; it therefore seems probable that the future development of the electric furnace will be in combination with some



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FIG. 3 and 4.

Keller's Resistance Type Electric Furnace.

well adapted to work in combination with an open-hearth tilting furnace, and if, instead of charging cold scrap, or even molten pig iron, converted metal were charged on some such lines as suggested, a steel superior to best Swedish steel, or steel made from Swedish pig iron, should be obtained at a less cost. Given a large output, so that labor costs are reduced to a minimum, the price at which such a steel could be produced would no doubt induce many manufacturers to employ it for purposes for which at present they are content to use inferior steel, and thus it will soon create a demand for high-class material, apart from