

for steel made under electro thermic conditions, is that it is possible to deoxidize the molten metal to a high degree of perfection. This has been entirely borne out in the work on this furnace. In fact, it was soon apparent in the early stages of the work that the solid condition of the steel, due to this absence of oxides, made the metal very desirable for steel castings. The steel resulting from

A great deal of care has also been spent in experimenting with various mixes of moulding sands, etc. The extremely high temperature attainable in the furnace gives a very fluid metal, suitable for the most intricate steel casting, but which requires facings and sands refractory enough to withstand being completely fused. Steel flasks made by bending channel iron are used entirely. The transformer is of the core type, three-phase and water-cooled. Provision has been made to allow of a voltage regulation of from 56 to 84 volts, giving a range suitable for any condition met in such a furnace. Electrode regulation is carried out entirely by hand, no difficulty being experienced in maintaining even conditions.

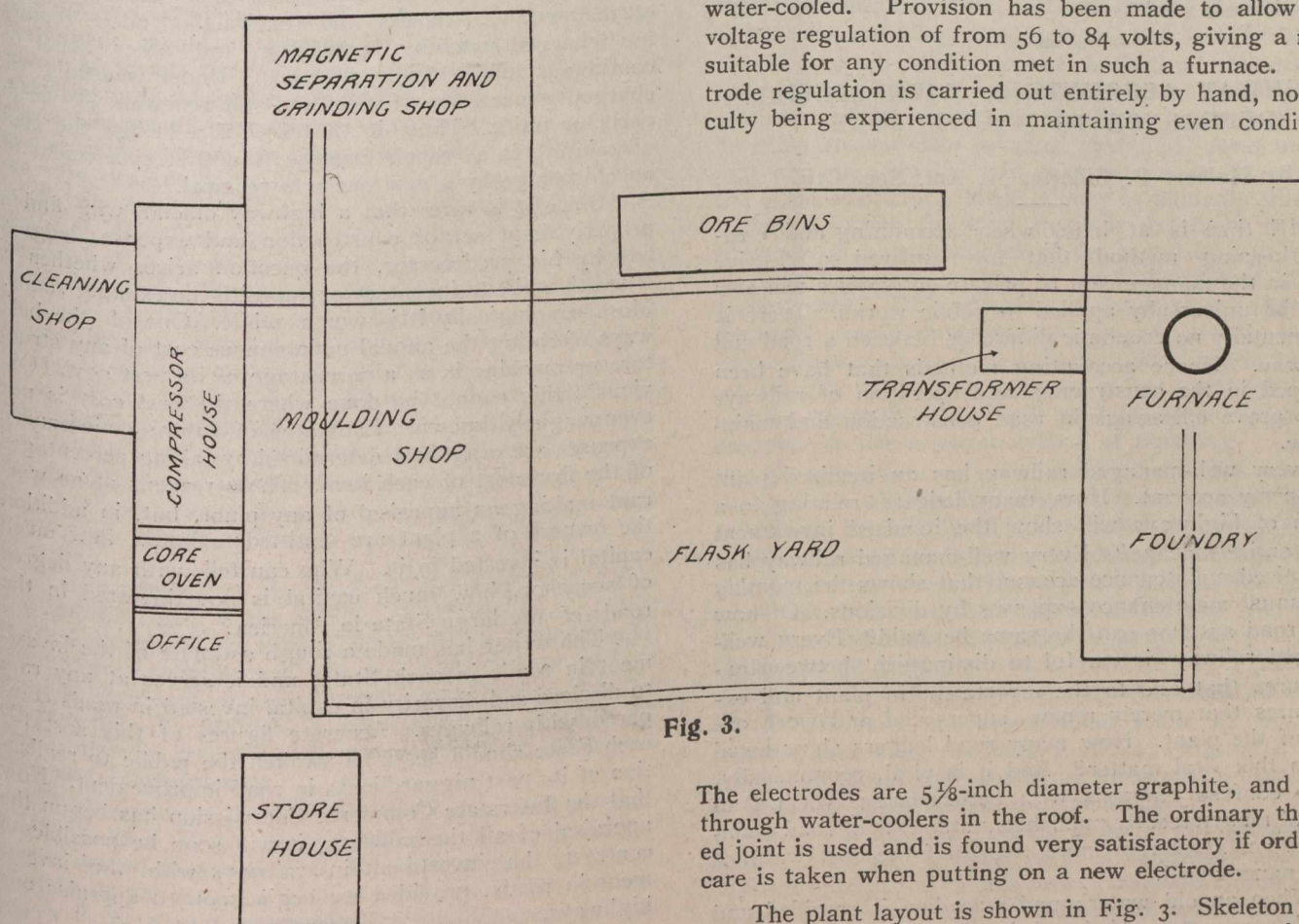


Fig. 3.

The electrodes are $5\frac{1}{8}$ -inch diameter graphite, and pass through water-coolers in the roof. The ordinary threaded joint is used and is found very satisfactory if ordinary care is taken when putting on a new electrode.

The plant layout is shown in Fig. 3. Skeleton steel construction was used in the foundry building, a view of

the process had very much the qualities of the best crucible steel, and physical tests show a tensile strength well above the average; but, this alone does not explain the wearing qualities of castings made from this steel. Indeed, it is only on the basis of the purity of the metal that any explanation of the quality can be made. So far no actual analyses for the presence of oxides and other injurious elements have been made, but the heat analyses for the ordinary elements looked for, show a high-grade metal. The following are some samples:—

C	Si	Mn.	P	S
.20	.30	.71	.03	.010
.30	.25	.78	.03	.010
.32	.25	.75	.035	.010

It is particularly noticeable that there is no difficulty in getting good metal heat after heat, due, of course, to the excellent control of temperature and slag conditions obtainable in the electric furnace.

The furnace, which was built to take 300 kw., is very seldom operated to full capacity, except at the end of a heat, so as to obtain a high temperature in the metal before tapping. A very complete system of oil burners has been installed for ladle heating which has proven to be an important item in the production of good castings. These ladles are of two-ton capacity, but are seldom called on to take off a heat of more than a ton at a time.

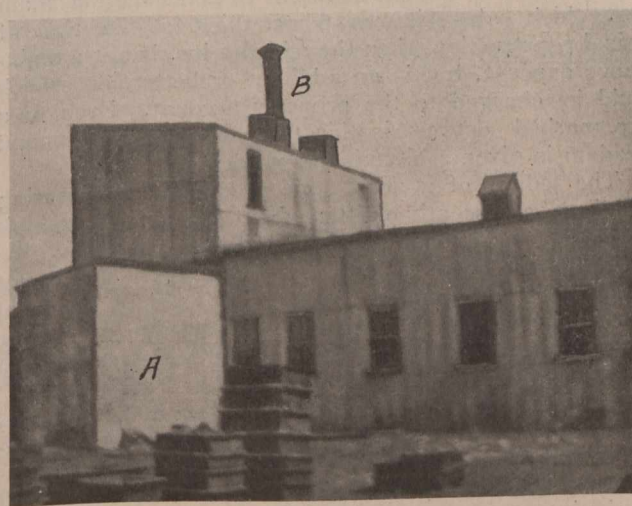


Fig. 4.

which is shown in Fig. 4. The stack B (Fig. 4) is for leading off the waste gases from the reduction chamber. The transformer house A (Fig. 4) is a separate unit containing all the instruments and the electrode control ap-