

it should eventually supersede the crucible process, especially as there seems every reason to believe that the special alloy steels now being so largely introduced for high speed cutting tools could be readily made in this furnace. How far this electric furnace can compete with the ordinary Siemens process under the conditions prevailing in Canada is a much more difficult question to decide, as the cost of production largely depends upon the output, and to get a large output with low labor charges means very large furnaces, as practically a 30 or 40-ton furnace requires hardly any more men than a three or four-ton furnace, provided mechanical appliances are arranged for charging.

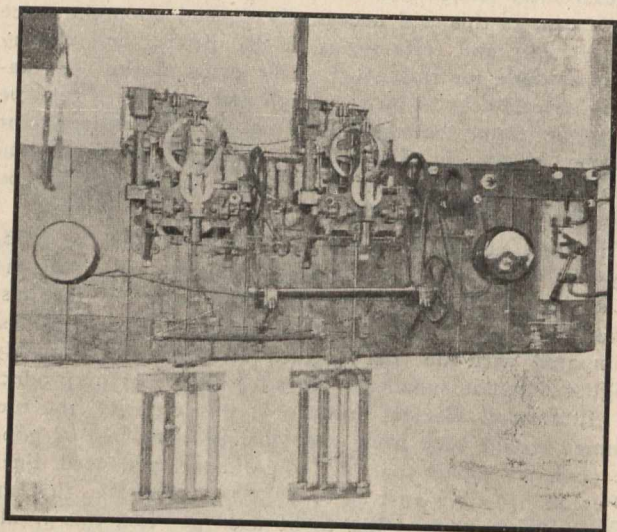


Plate II. Regulator of Electrodes.

The Héroult furnace is extremely well designed, and I see no reason why furnaces up to 10, or possibly 15 tons should not give satisfactory results; but at present I should hesitate to recommend larger furnaces than this. I do not think, therefore, that furnaces of this size could hold their own against gas-fired furnaces of 40 to 50 tons' capacity, or against the still larger furnaces of 100 to 200 tons working on the Talbot system, where labor charges are reduced to a minimum. It must also be remembered that in making structural steel in large quantities, pig, ore and scrap would have to be used, as it would not be possible to get sufficient quantities of scrap to supply a large plant. This would take a longer time to convert into steel than scrap charges, and the consumption of electric energy would be greater. On the other hand, the consumption of fuel in the large gas-fired furnaces per ton of steel produced would be less, not exceeding 800 lbs. of small coal, costing \$2. Taking our electric energy as the same as was found experimentally, viz., 0.153 E.H.P. years per ton, and assuming it was the same for a pig and ore charge in the larger furnace and the cost of electrodes the same, we should have \$1.73 for electric energy and cost of electrodes against \$2 for fuel, and the larger furnaces would still have considerable advantages in smaller labor charges per ton of steel produced. Notwithstanding the slight advantage shown in the above assumptions in favor of electric energy, I am of the opinion that, although the Héroult furnace is admirably adapted under existing conditions for the manufacture commercially of highest class tool steels, ordnance steels, high-class wire, and similar steels, it cannot at present, under Canadian conditions, compete with the ordinary Siemens process for the manufacture of structural and rail steel. Analyses of drillings from different parts of ingots from each charge show that the steel is remarkably uniform in quality and that there is no appreciable liquation."

—Glasgow, Scotland, reports that Canada has been ordering pipe in that city, and that a large business in this direction is expected. The imports of German semi-manufactured iron are increasing.

—The Niagara Frontier Bridge Company is incorporated by a bill introduced in the New York Assembly to construct a bridge across the Niagara river, between Niagara Falls and Lewiston, for electric and steam cars, vehicles and pedestrians.

INDIANAPOLIS AND CINCINNATI TRACTION CO.

The opening of the present year marks the beginning of a new era in electric transportation, for it finds the alternating current railway system a commercial reality. The Indianapolis and Cincinnati Traction Company was organized in 1903 to build a traction line from Indianapolis, via Rushville and Connorsville, Indiana, and Hamilton, Ohio, to Cincinnati. The dominant idea in the minds of the originators was to build a double track through line from Indianapolis to Cincinnati, which would take care of the traffic between these two cities in a more satisfactory way than is now done by the steam roads. To this end the company secured a desirable private right-of-way. Where the land is level and there are no considerable fills or cuts, a right-of-way four rods wide has been purchased, but wherever a considerable fill or cut has been necessary, additional width of right-of-way has been secured. In all the smaller towns a private right-of-way has been continued through, and the road is not constructed upon streets or highways except in cities or towns of such size as to make it necessary. In all cases inconvenient curves are avoided, and such an alignment has been secured between cities and towns as will permit of very rapid running, with entire safety to passengers and equipment.

In most instances the right-of-way is protected by a woven wire fence erected under an agreement with the land-owner, whereby the land-owner maintains the fence and keeps all its gates closed. Wherever such an agreement was not secured, the right-of-way is fenced with barbed wire. In most cases the deeds of conveyance also provide that the company has a right to cut and keep out any timber on adjacent lands that might interfere with wires or fencing or with the operation of the railroad.

Under the provision of the franchise of the Indianapolis Traction and Terminal Company, interurban lines are allowed to enter the city over the tracks of the city company by such routes as the city designates, upon payment to the city company of an agreed or ascertained compensation. The Indianapolis Traction and Terminal Company has made a uniform agreement with interurban roads for entrance into the city over its tracks, whereby interurban roads pay four cents for each passenger carried on the interurban cars while on the city lines, and this entitles them to all of the privileges of the terminal station, where all the interurban roads enter. The Indianapolis and Cincinnati Traction Company has franchises in all of the cities and towns in Indiana through which the line passes, giving to it the most favored franchises within the State. They uniformly run for a period of fifty years, and contain no provisions regarding the pavement of streets, the erection of iron poles, or the payment of a certain franchise tax to the state or town. The franchises of the cities of Rushville and Connorsville permit of running limited cars, making only one stop in each city. In all smaller towns the franchises also provide for the carrying of freight, express and mail matter under reasonable regulations of the various cities and towns, so that the company confidently expects a large income from this source. All private rights-of-way and franchises outside of the cities and towns run in perpetuity.

The line has already been constructed between Indianapolis and Rushville, a distance of forty-one miles, and a through service between those towns will soon be established. At an early date the road will be extended to Connorsville.

Roadway.—The track is graded in accordance with the best practice for steam roads, cuts and fills being made so as to avoid excessive or frequent grades. Between Indianapolis and a point eight miles east of Rushville—a distance of nearly 50 miles—there is no grade exceeding 1½ per cent. So far as the profile of the road has been as yet determined, the heaviest grade will be 4 per cent., and it is believed that no greater grade will be necessary on the entire line. The roadbed is graded 28 feet wide on top for a double track, with slopes on fills and in cuts of 1½ to 1, and upon a grade line that puts the track in most instances