"From the experiments with the sprinklers it is seen that, while the mean rate upon the area wet may be kept down to the point where good purification is assured, small portions of this area are receiving the bulk of the sewage at rates many times greater than practical, while the larger portion of the filter is being operated at a very low rate. The result is that a considerable proportion of the sewage may pass through the filter practically unchanged, and a small portion be highly purified; in other words, the effluent from the filter may be a mixture of highly purified effluent and of practically unpurified sewage, rather than a uniformly purified effluent."

"The sprinkler tests have shown that, as the head is increased, the size of the area covered by any sprinkler, and the rate of discharge by the sprinkler increase, but that, the mean rate on the area wet diminishes. These tests have shown, also, that nearly all sprinklers are more efficient in producing uniform distribution when operated at the higher heads, and that only a small variation in this efficiency is produced by elevating the sprinkler above the surface. The rates obtained with nearly all of the sprinklers have been so large that they could not be operated continuously without causing the filter to be flooded at much higher rates than are at present believed to be advisable; and for this reason a system of distribution by sprinklers of any of these types should also include some device for producing intermittent operation. Operating the sprinklers under variable head has resulted in wetting the portion of the surface adjacent to the sprinkler which was entirely overthrown by the same sprinkler under constant head; but this more complete wetting has not resulted in any material increase in the uniformity of distribution, since a greater volume of sewage is concentrated upon a smaller overdosed area."

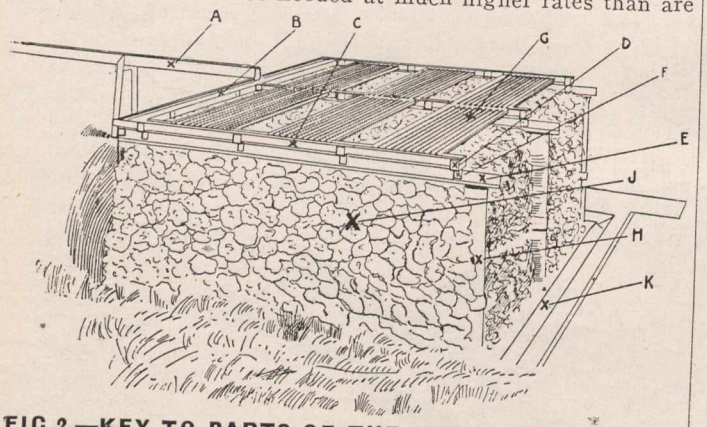


**FIG 2.—KEY TO PARTS OF THE STODDART SEWAGE FILTER.**

A—Feed Channel from Tank.
B—Main Channel
C—Supply Channel.
D—Stopend or Penstock.
E—Iron Tee.
F—Chair with Set Screw.
G—Distributor.
H—Pier.
J—Filter Body (clinker).
K—Collecting Channel.

The Royal Commission dealing with the above question have to state (page 92, 5th report), "Distribution by means of perforated pipes or nozzles laid over a filtering area is almost always rather unequal, and this would be a disadvantage, except in the case of fairly deep beds, constructed of fine or medium material, or deep beds, (say eight feet or more), of coarse material. This method of distribution, moreover, needs a considerable head of liquid for proper working, and also requires constant attention to keep the pipes and distributing holes clean and free. At Birmingham, where the nozzle form of distributor is in use on a large scale, for each acre and a half of filter, one man is constantly employed night and day in cleaning nozzles."

(To be Continued).

## THE ELECTRIC FURNACE AT DOMNARFVET. SWEDEN, ETC.*

**By Eugene Haanel, Ph.D. (Director of Mines for Canada).**

In the winter of 1905-6, a series of experiments in electric smelting were conducted at Sault Ste. Marie, Ont., under the auspices of the Dominion Government, with the object of establishing the feasibility of economically smelting Canadian magnetic iron ores comparatively high in sulphur, but free from manganese; and using charcoal as the reducing agent.

As a result of these experiments, the electro-metallurgy of the reduction of refractory iron ores without the use of coal or coke fuel was established; and—as far as could be expected from a small, experimental furnace—the output of pig iron per electrical horse-power-year, determined. Moreover, based upon the experience thus gained, certain fundamental changes and improvements necessary in the construction of an economic electric furnace in the future were suggested, in order to render it suitable for the production of pig iron on a commercial scale.

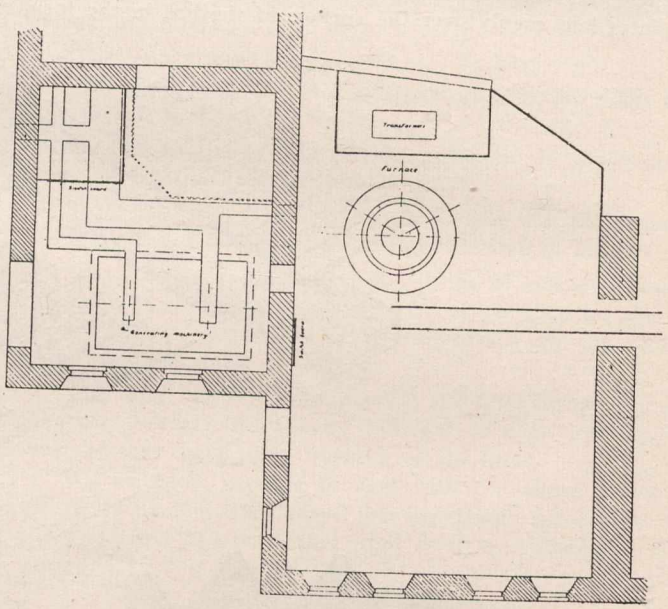

**Fig. I.—Plan of Electric Smelting Plant.**

Although the Canadian experiments of 1905-6, proved entirely successful as regards the special objects aimed at, and while considerable interest in the reduction of iron ores by the electro-thermic process was manifested at the time, no additional experimentation of any significance has been undertaken in Canada, along the line suggested in the Mines Branch report, to ensure the commercial success of electric smelting. In Sweden, however, where the conditions governing the economical use of the raw materials necessary for an iron industry are very similar to, and in many respects identical with, those existing in several of the provinces of the Dominion of Canada, the importance of an economic, commercial, electric smelting process was fully realized by three young Swedish engineers some two years ago. These engineers, viz., Assar Grönwall, Axel Lindblad, and Otto Stalhane—stimulated by the successful results of the work done at Sault Ste. Marie—undertook to solve the problem of designing and constructing a commercial electric furnace.

* Report to the Department of Mines, Canada.