and enclose the whole working side of the apparatus in an external shield or armature. This will cause a stronger and more even field to pass through the drum, or will make it possible to secure the present strength of field with far less current.

The only dry run that has been completely assayed was on a sample of sand containing about 57% metallic iron and 16.2% TiO_2. It is probable that the major part of the titanium was in the form of ilmenite. Some may have occurred as rutile, and some no doubt was contained in minute grains of ilmenite enclosed in magnetite. Assuming that the titanium occurred as ilmenite ($Fe\ Ti\ O_3$) the 16.2% of TiO_2 had combined with it 16.2 x 56/80=11.3% of iron, so the amount of iron capable of being magnetically separated from the titanium would be only 57.0—11.3=45.7%. If rutile (TiO_2) was present the percentage of iron free from titanium may have been more. If much titanium was enclosed in magnetite the free iron may have been less.

As preliminary work, several field strengths were tried, the weakest used gave practically no concentrates, while the strongest took out nearly all the titaniferous material as well as the magnetite. As magnetite has a much higher magnetic permeability than ilmenite, there should be some strength of field at which the heads product obtained contains almost all the magnetite and still very little ilmenite. Unfortunately grains of ilmenite cannot be distinguished by the eye from grains of magnetite and assays for titanium in the heads and for iron in the tails should have been made to show what were the limiting amperages for successful concentration. In the test in question, this was impracticable and a current of seven amperes was used.

The result from 52 lbs. of sand was 22 lbs. of heads assaying 70.46% of metallic iron and 1.91% of TiO_2 and 30 lbs. of tails assaying 45.30% of metallic iron and 23.30% of TiO_2. This works out to a recovery in the heads of 65% of the total free iron, the heads carrying less than 1/16 of the titanium. A considerably better recovery than this could have been obtained with a slightly higher amperage and no harm done to the product as iron ore having 2.5% of TiO_2 or under is not objected to by blast furnace people.

A screen analysis of 43¼ lbs. of tails from a somewhat similar dry run showed:

(1) Remaining on an 80 mesh sieve.. .. . .. 9¾ lbs.
(2) Remaining on a 100 mesh sieve.. .. .. .. 27¾ lbs.
(3) Passing through a 100 mesh sieve.. .. .. 5¾ lbs.