

the character of the improvements and the change in the art which is attributable to them. . . . In short, we are constrained to say that to this inventor belongs the credit of constructing the first commercially successful tabulator. The changes introduced by him seem simple and obvious in the light of the present . . . but his device was an improvement of such vital nature that the art, when considered from a practical and commercial point of view, began with him. He converted a theory into a fact. His invention belongs to that large class which has ever been treated with liberality by the Courts, when the inventor by an apparently simple change, addition or transposition of parts, has converted imperfection into completeness."

The practice of the English Courts in this respect, as evinced in the judgment above cited, is to be carefully noted by all who have any interest in British patents. W. J. WILLIAMS.

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**Use of Ferrotitanium in Bessemer Rails.** P. H. DUDLEY. (*J. Ind. Eng. Chem.*, ii, 299.)—Ferrotitanium augments the toughness and ductility of the Bessemer rails containing 0.5 per cent. carbon and 0.096 per cent. phosphorus, which were designed for the N. Y. Central lines. The first severe tests were very satisfactory, and these results have now been further verified by two winters' service. While the plain Bessemer rails, in a 6-inch, 100-lb. section, had developed a number of fractures, those containing ferrotitanium, under the same experimental conditions passed through the unusually severe winter of 1909 without a single failure. The use of ferrotitanium improved the setting of the ingots, and helped to purify the metal. Acting as a subsidiary deoxidizer, in addition to reducing a large percentage of iron oxides in the steel, the ferrotitanium also reduced a portion of the nitrogen, thus decreasing the brittleness and increasing the toughness of the metal. For the same carbon content the ductility averages higher and runs more uniformly for a large number of heats when ferrotitanium is used than with ordinary Bessemer steel. Plotting the elongation under the drop-test (2000 lbs. falling 20 ft.) and the ductility, has been found to be of great value in guiding rail manufacture for high-speed trains.

**Decomposition of Thorium Sulphate by Water.** BARRE. (*Comptes rend.*, cli, 70.)—On heating thorium sulphate solution it gradually splits up into a fibrous mass of basic sulphate and free acid, decomposition beginning about 55°C. The basic salt slowly changes into a second, very crystalline basic sulphate. The first salt is obtained when thorium sulphate is added to sufficient water to ensure complete decomposition.