GOOD NEWS FOR MIDDLESBROUGH.

CLEVELAND IRON AVAILABLE FOR STEEL PURPOSES.

The following appears in several of the morning papers, and will be read with interest. Whether the process described or other processes better known in this district are to be ultimately adopted, there can be no doubt we are approaching the solution of the great problem —

The great problem which has for so many years exercised the minds of the ironmasters and chemists of Cleveland, and, indeed, of other parts of the world — that of converting Middlesbrough iron into steel — has at length been satisfactorily solved, and with the name of a Newcastle man is identified the credit of the discovery. The inventor is the late Mr John Perry Downing, former joint owner of the Redheugh Steel Works with Mr Ald. Robinson, the present Mayor of Newcastle. The name of Mr Downing had, for a number of years prior to the discovery, been prominently connected with the steel trade from the fact that the firm had established for themselves a high reputation in the country as manufacturers by the various castings produced at their establishment.

The material, however, which they were obliged to use, being steel obtained from Hindostan and other countries, was so expensive that Mr Downing discovered that, in order to maintain the standing he had acquired, it was imperative necessary that he should cast about for metal which would be more available and less costly than the steel he had hitherto been compelled to bring such distances at such great expense. He did so, and after the most persevering endeavours he ultimately succeeded in accomplishing the manufacture of first-class steel from Cleveland iron at a moderate cost. Mr Downing, having achieved this result, and fully understanding its great importance, as being a discovery not only invaluable to him in his own business but calculated to revolutionise the iron and steel trade of the world, proceeded to ensure to himself the full advantages of his invention by taking out protection for it. Unhappily, however, he was not destined to reap the legitimate fruits of his discovery, for before he could complete the formalities necessary for finally patenting it he was seized with an illness, which in the course of last year terminated fatally.

The abolition of nitrogenuous or other compounds, converting the same at one operation into genuine steel ingots, having such properties as enable them to be manufactured into bars, plates, rails, tools, cutlery, &c. To effect this the following is the plan adopted — In a furnace or cupola, such as is used for producing the refined iron after being tapped, a quantity of pig iron of a poor description, such as that of Cleveland, with 25 lbs to 60 lbs, or thereabouts, of the scoria obtained from puddling or mill furnaces, and about 100 lbs of good scrap iron. When these are melted the furnace or cupola is run to the heat at which cast steel melts, and this heat is kept up for about thirty or forty minutes. The scoria has by this time floated to the surface, carrying with it all the impurities which have not been volatised, and this is disposed of by being tapped off. From 25 lbs to 60 lbs of the red oxide of iron called by miners' language hematite is, together with three ounces of the black oxide of manganese, stirred in with the incandescent mass; and at the same time, or immediately after, from 1 lb. to 3 lbs of chloride of ammonia is introduced. The furnace or cupola is run again for about thirty minutes, at the end of which time about 100 lbs of steel is obtained.

When this has been cast, and when the same is thoroughly cooled, the scavenger is added, the whole mixture being immediately stirred once or twice. Great care must be taken not to puddle or boil the iron. The dispensing with puddling is a most important feature in the patent, as it is by obviating the necessity of that expensive process that the patentees claim to be enabled to produce the steel at an extraordinarily low price they purport. After the method of procedure we have already described has been adopted, the contents of the furnace, when at a great heat, are run off into ingots ready for use, and the manufacture of the steel is completed.

The production of refined iron and steel, as summarised by the patent, is effected by vapourising injurious elements by means of great and varying degrees of heat in one single furnace operation, and by the use of the ingredients named in the particular manner in which they are employed, the chemical combinations acting and re-acting upon each other in such a manner as to liberate detrimental bodies; and by a species of synthesis to introduce nitrogen into the iron, and thereby complete its conversion into steel.

The importance of this discovery cannot be questioned in the face of the fact that it will not only enable Cleveland iron to be converted into steel, but also Scotch, Black Country, Lincolnsire, and other irons to be used for the same purpose. Samples of steel produced by experiments by this process have been shown to those in the best position to
Mrs Downing, the widow of the deceased—who has also since died—and Mr John Perry Downing, son of the inventor, assigned a large portion of their interest in the invention to Mr Adolphus Mann, merchant, of Newcastle-upon-Tyne; Mr Thomas McWhirter Wilson, civil engineer, also of the same town; Mr John Henry Garbutt, iron merchant, of Darlington; and Mr William Harrison, of the firm of Messrs Harrison, Ainslie, and Co., ironmasters, of Ulverston; and these gentlemen, in conjunction with Mr J. P. Downing, now form the company by which the important discovery is to be practically introduced to the world. At the expiration of a short period after the death of Mr Downing, the final specifications were filed in England, the United States, France, Germany, and Belgium. Under patent have now been duly granted in each of these countries, and steps will be taken without further delay for the commencement of the manufacture of the steel in Middlesbrough, and in the other centres of the iron trade throughout Great Britain, Europe, and America. The patent is not only available for the manufacture of steel from Cleveland iron, but applies equally to all other ores which are contaminated by the same obnoxious elements as the Middlesbrough ore. The new invention also provides not merely for the manufacture of a high quality of steel, but also that of refined iron, the process for producing the latter being practically a mere continuation of the method employed to obtain steel. The invention, as set forth in the abstract of the patent, has for its object the manufacture of iron of a superior class from ores of any description, or from the pig iron derived from the smelting of such ores, purifying it from matters of an objectionable nature by one single operation of smelting, and also for the manufacture of steel from either poor or rich ores, even if such ore or pig contain chemical combinations of a detrimental nature which at present are not eliminated by one single furnace operation. In the first place, a suitable furnace or cupola of any description, the lining of which would be capable of resisting a high degree of heat, must be employed. The pig iron or ore, if of poor quality and injuriously contaminated by the presence of simple elementary substances, must be placed in the furnace or cupola; and to every ton of pig iron is added one cwt of iron of the best description, such as that made from iron melted by charcoal from 25lbs to 65lbs, scorings or tap cinders, obtained from puddling or mill furnaces, also 100lbs. or thereabouts of scrap iron. These are melted together for about half an hour, the furnace being run at such a temperature as will melt cast steel. When the iron is in a perfect fluid state the heat is continued for about...
two hours. The metal is then drawn off, and it is now discovered that it has become perfectly refined iron. The best quality, if required, can be made simply by the use of larger quantities of superior iron than those previously stated—that is, by mixing with the poor iron twice or thrice the quantity of the superior kind to that already specified, but for the generality of purposes the quantity first mentioned will be found sufficient. The chief merit, however, claimed for the invention is the manufacture of steel—in the furnace or cupola—from poor pig iron, as well as from the red oxides of that metal, or the ores from which pig iron is made, at one single operation, such result being obtained by, in the first place, refining such iron or iron ore, etc.