

VINTON v. HAMILTON.

Letters-patent No. 143,600, dated Oct. 14, 1873, and granted to John J. Vinton for an improvement in the manufacture of iron from blast-furnace slag, are void, inasmuch as the process and appliances described in his specification and claim were known and in common use before the date of his alleged invention.

APPEAL from the Circuit Court of the United States for the Northern District of Ohio.

The bill of complaint alleged that Hamilton and the other defendants were infringing certain letters-patent, No. 143,600, dated Oct. 14, 1873, and granted to John J. Vinton, one of the complainants, for an improvement in the manufacture of iron from furnace slag, and it prayed for an injunction to restrain them from further infringement, and for damages and an account of profits.

The answer denied that Vinton was the original or first inventor or discoverer of the patented improvement, and it denied infringement.

Upon final hearing, the bill was dismissed because the process described in the letters-patent was known and in common use before Vinton's application for them, and the same were, therefore, null and void.

The complainants thereupon appealed the case to this court.

The specification of the letters-patent declares as follows:—

“My invention relates to the production of cast-iron from the slag, or refuse of the smelting or blast furnace. Heretofore a large percentage of good metallic iron has been thrown away with the slag, and become lost to commerce, so far as its use as metallic iron is concerned. This is more particularly the case with rich ores, such as the Missouri and lake ores, which from their nature flux imperfectly in the ordinary smelting furnace. When imperfectly fluxed the slag assumes a thick consistency, and cools with a general grayish color, and though the presence of metal in it cannot be detected by the eye, yet the slag will be found to be of comparatively great specific gravity, and in fact contains a very large percentage of good metallic iron, often as great as the amount of metal reduced from the ore in the process of smelting.

"To reduce this metal from the heavy slag of the smelting furnace, and thereby increase the production of iron from the same amount of ore, is the object of my invention. To accomplish the desired result I employ a cupola furnace, but furnaces specially adapted to the purpose may be constructed and conveniently used in connection with the blast furnaces where the iron is smelted.

"The heavy slag is first pulverized or broken up into small pieces, or it may be made granulous or spongy by passing water or air through it when in a molten state, or in any of the well-known ways. A bed of coke or other suitable material is first placed in the cupola, and on the top of the coke a small quantity of scrap or other oxidized iron (preferably scale or black oxide of iron) is sprinkled.

"The slag to be operated on is then introduced as evenly as possible on the top of the coke and iron oxide, and on the top of the slag I sprinkle a small quantity of limestone broken up into small pieces, then a layer of coke, followed with scrap and scale slag and lime as before alternately until the whole cupola is charged.

"The fuel is then ignited, and when the fire is above the tuyeres the blast is turned on to the full. Owing to the presence of the iron oxides, the heat is very great when brought in contact with the slag, and the latter is speedily reduced, and as the operation goes on, fresh charges of the materials are supplied from the top of the cupola, provision being made for the passage of the remaining slag from the furnace at a point below the tuyeres.

"In this way it will be seen that the process is continuous, and the furnace is not permitted to get cool.

"The charge is made up in about the following proportions, but may be slightly varied as occasion requires: After the furnace is in operation, *first*, three bushels of coke; *second*, fifty pounds iron oxide (scrap or scale); *third*, eight hundred pounds slag; *fourth*, one-fourth of a bushel of limestone, thrown into the cupola in succession, and from time to time as required.

"When there is much sulphur in the iron a small quantity of the black oxide of manganese may be blown in through the tuyeres, and salt or litharge, or a mixture of any two or all three of these ingredients, may be used in this manner with good effect. The iron thus obtained is run into moulds in the usual way.

"What I claim as my invention, and desire to secure by letters-patent, is the herein-described method of reducing iron from the slag or refuse of blast or smelting furnaces, substantially as set forth."

Mr. Andrew McCallum for the appellants.

Mr. Thomas W. Sanderson for the appellees.

MR. JUSTICE WOODS, after stating the case, delivered the opinion of the court.

It is matter of general knowledge that pig-iron is made from iron ore in a blast or smelting furnace; that to secure this product the furnace is charged, first, with a layer of coke or charcoal, then with a layer of iron ore, mixed with broken limestone, and so on in alternate layers until the proper quantity of these materials is placed in the furnace. The fuel is then ignited, and, for the purpose of increasing the heat, streams of air are forced into the furnace by means of blast-pipes, the nozzles of which, called tuyeres, are inserted in openings in the walls of the furnace, usually from four to six feet above its bottom.

The limestone is used merely as a flux. The ore under this process undergoes a chemical change, and iron is formed and sinks in a molten state to the bottom of the hearth, by which is meant not only the bottom of the furnace, but its sides as high up as the foot of the boshes. The refuse left after the melted iron has dropped into the hearth is also in a molten state, and, being lighter than the iron, floats on its top. This is indifferently called "cinder" and "slag." About three or four times in every twenty-four hours the melted iron is drawn from the furnace. This is accomplished in the following manner: The furnace is constructed with two holes, one called the iron and the other the cinder notch. The iron notch is made at the bottom of the hearth. The cinder notch is higher up the side of the furnace, just below the level of the tuyeres; so high that the cinder can be drawn through it without letting off the molten iron. These holes are kept habitually closed with clay or other similar material. At frequent intervals, and always just before drawing off the molten iron, or making a cast, as the ironmongers call it, the cinder notch is opened, and the cinder or slag is allowed to escape, and is carried away from the furnace in a trough made of moistened sand. The cinder notch is then closed and the iron notch is opened, and the molten iron is drawn off through a sand-trough, and con-

ducted into moulds made in sand-beds, called the sow and pigs, where it is allowed to cool. The result is the pig-iron of commerce.

In the mean time, the furnace is supplied with constant charges of fuel and ore, mixed with limestone, in alternate layers, dumped in from the top; and this process is kept up without cessation for months and sometimes for years.

The sand-trough which connects the pig-beds with the iron notch is usually larger and deeper, but more elevated than the sow or general gutter which conducts the iron into the moulds or grooves in the pig-beds. When the metal is first let into the trough it accumulates so as to fill it nearly to the brim. As the flow from the iron notch decreases, the iron, and a small quantity of cinder or slag, which has been chilled by coming in contact with the cold surface of the trough, adhere to its sides and bottom. When the molten iron on the hearth is about exhausted, the blast is increased, and the material left on the hearth is blown out through the iron notch into the sand-trough. This also cools in the trough, and thus is formed what are known as trough runners, consisting of iron and slag, which have been forced through the iron notch by letting on the blast as just mentioned.

A cupola furnace is one used for melting pig-iron for the purpose of casting it into useful forms and articles. It constitutes part of the equipment of a foundry. In shape it is generally a hollow cylinder. The iron is melted by substantially the same process as the ore in a blast furnace. The cupola furnace has an iron notch but no cinder notch, because there is generally so little cinder or slag in pig-iron, as to render such an opening unnecessary.

In order to reach the merits of the controversy, it is necessary to obtain a definite idea of what, if anything, the appellants are entitled to under Vinton's patent.

The specifications are ambiguous in respect to the particular kind of slag which is to be used in the process therein described, that is to say, whether it is the slag drawn off through the cinder notch, or the runners which are left in the trough through which the molten iron is discharged from the iron notch of a blast furnace. It appears, however, from the

evidence that the use of the latter only is contemplated, the former containing such a very inconsiderable quantity of iron as to be valueless.

We observe, in the first place, that the patent cannot be held to cover the discovery that the slag, which is to be used in the process described in the specifications, contains so large a percentage of good metallic iron that it can be profitably extracted by again smelting it.

The evidence shows beyond controversy that for many years before Sept. 18, 1873, the earliest date assigned to the discovery or invention of Vinton, it had been well and generally known that the trough runners contained a large proportion of metallic iron, and they were broken up and resmelted in blast furnaces. They were thrown into the furnace with scrap iron and iron ore, and smelted in the same manner. It was formerly a notion among old-fashioned furnace men, that the use of this material injured the furnace, and deteriorated the quality of the iron produced. But this conceit had been exploded long before the date of his patent, and the runners and other heavy slag were used habitually in many blast furnaces as above stated.

Secondly, The use of a cupola furnace for the purpose of resmelting trough runners and heavy slag cannot be claimed as any part of Vinton's invention. The evidence in the record shows that as early as the year 1844, at the Jackson furnace, in Venango County, Pennsylvania, which was a blast furnace, a cupola furnace was erected and used for the purpose of smelting heavy slag, from which was manufactured plow-points and hollow-ware, such as skillets, pots, and Dutch-ovens. Sometimes the product was made into pig-iron. This cupola furnace was thus used for three or four years. The fact of such use was public; no effort was made to keep it secret, and it was known, in the language of the witnesses, "all around the furnace."

The testimony of Robert Paisley, William J. Shaner, and Thomas W. Kennedy, which is found in the record, shows that the Beaver Falls Co-operative Foundry Association, in April, 1872, made the experiment of using slag and runners in their cupola furnace; and the experiment proving successful, the

runners, as early as August, 1872, were procured by the car-load, and mixed with pig-iron and run into stove-plates. In this way fifty-eight or sixty tons of runners were used prior to Oct. 14, 1873, the date of Vinton's patent.

This use of heavy slag and runners was open and public. No one was excluded from the foundry where the work was carried on. Any one was at liberty to enter and see what was going on, and persons not interested in the furnace — among them the witness Thomas W. Kennedy — did so. No injunction of secrecy was imposed on them. It is true the operatives at the furnace, who were all stockholders of the association, said nothing about the use they were making of trough runners, because, as they said, if it was a good thing, they wanted to keep it to themselves; but they took no steps to keep it a secret, except that they did not talk about it. In fact, it was at the suggestion of Kennedy that the Beaver Falls Co-operative Foundry Association made the experiment of melting runners and heavy slag in their cupola furnace.

After the experiment made by the Beaver Falls Co-operative Foundry Association in April, 1872, had proved successful, Kennedy, in August, 1873, furnished the defendant, Hamilton, with a quantity of trough runners to be smelted in his cupola furnace, and before Oct. 1, 1873, had sold to foundrymen not less than one hundred tons of the same material to be used for the same purpose.

In fact, the record shows that Kennedy, more than a year before the date of Vinton's patent, revived the practice of smelting trough runners and heavy slag in a cupola furnace. As early as the spring of 1872 he declared to the defendant, Hamilton, Thomas Struthers, and others the feasibility of the process, and suggested to Struthers that they ought to take out a patent for it. But Struthers said that unless they could get up some new way of extracting the iron it would not be patentable, and that was the conclusion they came to after talking the matter over. But Kennedy at once, in the spring of 1872, commenced buying up the trough runners from the blast furnaces, and selling them to foundrymen for use in cupola furnaces.

It is, therefore, abundantly shown in the record that before

the date of Vinton's patent, or of his invention, the smelting of trough runners and other heavy slag in cupola furnaces was practised and well known.

Thirdly, The method of making slag granulous or spongy by passing water or air through it when in a molten state is not new, nor is it claimed to be new. Besides, there is no evidence that this process is used by the appellees.

Fourthly, The method of charging the cupola furnace and of smelting the slag as described in the specification of the patent is as old as the art of making pig-iron, except, perhaps, the sprinkling of scale or black oxide of iron on the top of the coke, and this is not done by the appellees.

Fifthly, The appellants do not claim that Vinton's invention covers a cupola furnace. A review of the case shows, therefore, that he did not first discover the value of furnace runners or heavy slag for resmelting, that he was not the first to smelt them and use them for running into pigs or castings, either in a blast furnace or a cupola furnace, and that there is nothing new in his process of smelting which is used by the appellees.

All, therefore, that is left for his invention to cover, and which the appellants can claim as infringed by the appellees, is the employment of a cinder notch or hole in a cupola furnace to draw off the cinder when the furnace is employed in smelting furnace runners or heavy slag. But if the testimony of unimpeached and uncontradicted witnesses is to be believed, as early as June, 1872, at Beaver Falls, Pennsylvania, a cinder notch was used by the Beaver Falls Co-operative Association in a cupola furnace when employed in smelting furnace runners. The notch was put in the cupola at the suggestion of the witness, Thomas W. Kennedy, who was not a member of the association, but who, being the owner of a blast furnace, was selling to it furnace runners to be resmelted and used for making castings. He testifies to the fact distinctly and clearly, and designates the part of the cupola where the notch was placed, namely, "between the tuyeres at the back of the cupola to draw off the slag." He is fully corroborated by the witness, W. J. Shaner, a member of the association, whose business was to do the smelting.

This use of the cinder notch in the cupola was public. No effort was made to exclude spectators from the foundry or to conceal the notch. The invention, therefore, of a cinder notch in a cupola furnace, if it was an invention at all, was made by Thomas W. Kennedy fifteen months before Vinton, according to his own testimony, ever conceived the idea; and Kennedy, during all that time, allowed it to be used by others, without any injunction or secrecy or any restriction or limitation, in a foundry which was open to all who might choose to visit it, and which was visited by many spectators not concerned in its operations.

But even if the application of a cinder notch to a cupola furnace was first made by Vinton, the question remains whether, standing alone, it implies invention and is patentable.

We think that this question must be answered in the negative. Neither a cupola furnace nor a cinder notch is new. The use of a cinder notch for drawing off cinders from a blast furnace is as old as blast furnaces themselves. The function which the cinder notch performs in the process covered by Vinton's invention is precisely the same for which it is used in a blast furnace. In smelting slag in a cupola furnace it was found that the molten cinder accumulated and floated on the top of the molten iron. The application to a cupola furnace, for the purpose of drawing off the cinder, of the cinder notch used in the blast furnace to accomplish the same end, would occur to any practical man. When applied to a cupola furnace the same function was performed in the same way by the same means. In making this application there was no invention. *Pearce v. Mulford*, 102 U. S. 112.

We are of opinion, therefore, that the application of a cinder notch to a cupola furnace for the purpose designated is neither patentable nor new, and that all the other parts of the process and appliances covered by Vinton's patent were old and well known long before the date of his alleged invention and the patent therefor. He was not the first inventor, either in fact or in law, of the discovery or invention described in his letters-patent. They are, therefore, void, and

the decree of the Circuit Court dismissing the bill was right, and must be

Affirmed.

MR. JUSTICE MATTHEWS did not sit in this case nor take any part in its decision.



BANK v. TENNESSEE.

A bank, by its charter, is required to "pay to the State an annual tax of one-half of one per cent on each share of capital stock, which shall be in lieu of all other taxes," and is authorized to "purchase and hold a lot of ground" for its use "as a place of business," and hold such real property as may be conveyed to it to secure its debts. With a portion of its capital stock it purchased a lot with a building thereon, a portion of which it occupies as a place of business. It took, to secure money loaned, a deed of trust upon three city lots, which it subsequently purchased under this deed, and now owns. *Held*, that the immunity from taxation extends only to so much of the building, the use whereof is required by the actual wants of the bank in carrying on its business. The remainder of its real estate is subject to taxation.

ERROR to the Supreme Court of the State of Tennessee.

The facts are stated in the opinion of the court.

Mr. William Y. C. Humes for the plaintiff in error.

Mr. Benjamin J. Lea, Attorney-General of Tennessee,
contra.

MR. JUSTICE FIELD delivered the opinion of the court.

The Bank of Commerce, plaintiff in this case, is a corporation created in 1856 by the legislature of Tennessee to engage in the business of discounting notes, buying and selling stock, dealing in exchange and gold and silver bullion, and receiving moneys on deposit. Its charter provides that it "may purchase and hold a lot of ground for the use of the institution as a place of business, and at pleasure sell and exchange the same, and may hold such real or personal property and estate as may be conveyed to it to secure debts due the institution, and may sell and convey the same." The charter also declares that the