

fact that the constant change in the sensitiveness of the retina makes it most difficult to judge of the amount of red light which is being used. For example, one man is in the habit of leaving his brilliantly lighted studio, and immediately entering his dark plate room. At this time his retina is at its lowest sensitiveness. He will tell you: "I work in a place about as dark as pitch, and yet my plates fog if I do not keep them shaded from the apology for a light which I do have."

Another man exposes plates in the field. He brings a number home and develops them a few hours after sunset. He will tell you: "I use plenty of light. Ruby, doubtless, but a perfect flood of it, and my plates never fog." Now it may seem astonishing, but it is more than likely that the first photographer was working in a very much more bright light than the second, even although the non-actinic medium may have been of the same color in both cases.

A room which will—for developing—appear brilliantly lighted when entered some hours after sunset, will appear absolutely dark if entered from the open air at midday. We believe we do not exaggerate when we say that the photographer sometimes works in the daytime with a light a hundred times more bright than one which he would not consider safe if he entered his room at night.—*Photo News.*

DECISIONS RELATING TO PATENTS. Supreme Court of the United States.

PATENT FOR MANUFACTURE OF IRON.—VINTON vs.
HAMILTON *et al.*

The bill of complaint alleged that the defendants were infringing certain letters patent, dated October 14, 1873, granted to the complainant, John J. Vinton, for an improvement in the manufacture of iron from furnace slag, and prayed for an injunction to restrain them from further infringement and for damages and an account of profits. The answer of the defendants denied that Vinton was the original or first inventor or discoverer of the improvement in the manufacture of iron from furnace slag or from the slag of blast or smelting furnaces, set out in his patent, and denied infringement. Upon final hearing in the Circuit Court the bill was dismissed because the process described in complainant's letters patent was known and in common use before the complainant's application for his letters patent, and the same were therefore null and void. The complainants, therefore, appealed the case to this court.

Mr. Justice Woods 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 conducted 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 meantime 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 their 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 September 18, 1873 (the earliest date assigned to the discovery or invention of the complainant), 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 furnacemen 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 appellant's patent, and the runners and other heavy slag were used habitually in many blast furnaces, as above stated.

Secondly. The appellant cannot claim as any part of his invention the use of a cupola furnace for the purpose of resmelting trough runners and heavy slag. 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."

It is therefore abundantly shown in the record that before the date of complainant's patent or of his invention the smelting of trough runners and other heavy slag in cupola furnaces was practiced 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 appellant's 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 appellant does not claim that his invention covers a cupola furnace. A review of the case shows, therefore, that appellant 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 appellant 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.

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

We think 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 the appellant'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 vs. 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 appellant's patent were old and well known long before the date of his alleged invention and the patent therefor. The complainant was not the first inventor, either in fact or in law, of the discovery or invention described in his letters patent. The patent is therefore void, and the decree of the circuit court dismissing the bill was right and must be affirmed.

MISCELLANEOUS INVENTIONS.

An instrument for training and strengthening the muscles used in writing, for the use of learners, and also to correct bad habits of penmanship, has been patented by Mr. Horace Forbush, of New York city. The invention consists in a spring-slide provided with a handle for being held, and fitted so as to be moved in a manner similar to writing and to enforce correct position of the operator's hand.

Mr. James M. Hendershot, of Atchison, Kan., has patented a flexible spout for loading cars with grain from grain-elevators, and of the particular construction and arrangement thereof in connection with a wooden spout leading from the elevator. The spout or conduit is made of rings tapering, or sections hinged together in sets, the hinges of the sets being arranged on different diametrical lines of the spout.

A novel well-bucket, patented by Mr. William T. Hendricks, of Athens, Ala., consists of a bucket provided with pivots and a pull-frame made of a single piece of metal, and having a ring secured between the lower ends of its side pieces. By means of the frame the bucket is supported in such manner that the contents of the bucket may be easily emptied into another vessel by simply turning the bucket on its pivots.

A novel pole-rest for annealing-ovens, patented by Mr. Niles Granger, of Saratoga, N. Y., consists in providing the ordinary pole-rest bar of annealing-ovens with a bracket in which is pivoted a stand or support for a grooved wheel. In using the invention the pole, instead of being supported directly on the bar, rests in the groove of the wheel, which, by reducing the friction of the pole, lessens the noise and labor of packing the ware.

Telegraphic Progress in England.

Lecturing recently on "Electricity and the Electric Telegraph," at Kensington, Mr. Robert W. Johnston, Postmaster of the Eastern Central or "City" district, quoted some of the statistics of the Postal Telegraph system, which are interesting and instructive at the present moment. He showed that whereas the earliest telegraph of which we have any account required a separate wire for each letter of the alphabet, and that in the first really practical telegraph two wires were necessary for the transmission of a single message, as many as four messages can now be sent on a single wire at the same time—that the 6,000,000 telegrams forwarded by all the companies in their palmiest days had increased to more than 31,000,000 forwarded by the Post Office last year, and that whereas it might be remembered when the charge for a message from Edinburgh to London was something like 12s. 6d., it was now possible to telegraph from Scilly to Shetland, or from Jersey to John o'Groat's for 1s. Fifty thousand miles of wire in 1870 had increased to considerably more than 100,000 in 1882; 2,200 instruments worked by all the companies had increased to nearly 9,000 worked by the Post Office; and 2,500 telegraph offices under the old régime had increased to more than 5,500 under the new. Four thousand persons of all classes employed by the companies had increased to nearly 12,000 employed by the Post Office, and of these about 1,600 were women, of whom 600 are employed in the Central Telegraph Office alone. As to the transmission of news for the press, the Post Office had converted into an attractive monopoly what used to be a rather repulsive combination on the part of the old telegraph companies, and on one occasion quite recently as many as 7,000 words, equal to 350 average columns, had been transmitted from the Central Office alone. The lecture, which was of a thoroughly popular character, was illustrated by specimens of most of the instruments in use by the Post Office, as well as by a working model of the pneumatic tube system, telephones in circuit, and some minor experiments with the electric light.

THE ethereal oil of *Satureja montana*, L., is an orange yellow liquid having a specific gravity of 0.7394; $n_D^{20} = 1.465$. On shaking this oil with dilute sodium hydrate a phenol is obtained which was recognized as carvacrol. The oil contains 30 to 40 per cent of carvacrol. The hydrocarbons boil at 172° and 182°, and appear to be terpenes.—*A. Haller in Comptes Rendus*, xciv., 132.

Asbestos Paint.

ENGLEWOOD, N. J., March 1, 1882.

H. W. Johns Mfg. Co., New York:

DEAR SIRS: After three years' test of your asbestos liquid paint on my hotel, the Palisades Mountain House, I am pleased to say I consider it superior in every respect to any other I have ever used—not excepting the best white lead. Although only one coat of your paint was used, it looks as fresh and perfect to-day as if it had been applied within a month. As you are aware, I am a large user of paints, and in future shall use no other.

Yours truly,

WILLIAM B. DANA.—[Adv.]