

was substantially the same as that of Rieppe, and he was not aware that steel had ever been made in a puddling furnace before this patent was taken out. Dr. Frankland and Mr. Hoberham, as well as several other witnesses, gave similar testimony for the plaintiff.

The defense contended that they did not employ the same process, that Rieppe's specification was vague; and besides this, his patent was void, because the process was quite old and had been practiced in England long before 1850. Dr. Lyon Playfair, professor of chemistry in Edinburgh, was then called. He had given great attention to the manufacture of steel, and had published a work on the subject. The average quantity of carbon in cast iron is 3 per cent; in steel, from $\frac{1}{2}$ to $\frac{3}{4}$ per cent; in wrought iron, rarely more than 2-10ths per cent. The process of making steel from ore had been known from the days of Aristotle, and from cast iron, for several centuries. He had read Rieppe's patent and thought steel could not be made if the temperature (cherry-red) mentioned in it were adhered to. Redness, in scientific works, is used for a temperature of about 1,000° Fah.; cast iron melts at 2,700°, Fah. In his judgment Spence's process was different, because two fires were used and the furnace was kept at a strong white heat, which was a great advantage over the process where the damper was shut down and the temperature lowered.

Crace Calvert, professor of chemistry in Manchester, also a witness, agreed with Professor Playfair; but the most important witness was Mr. Joseyh Beezley, iron-master at Smethwick, Birmingham, who produced a specimen of steel iron, and said it was made by him in a puddling furnace before 1850 (the date of Rieppe's patent). He asserted that he had made some hundreds of tons of it before that date. He regulated the heat of the furnace with a damper, and used cinder, slack and *physic*, and obtained as great a heat as possible in the furnace. The process adopted by him was similar to that of Rieppe, only he employed a higher temperature in the furnace, and this was an advantage.

The judge called attention to this evidence and stated that unless the plaintiff could convince the jury that Mr. Beezley was telling an entire falsehood, which he did not believe was possible, it was fatal to his case. The solicitor-general (Sir Wm. Atherton), for the plaintiff, admitted this, and rather than allow it to go to the jury for a decision, he selected to be non-suited.

TUNGSTEN.

The article on "tungsten steel," published on page 256 of the present volume of the SCIENTIFIC AMERICAN, has excited considerable attention, and many persons have expressed a desire to know something more than is there stated about this metal.

Tungsten is a distinct metal, one of the known simple substances, like gold, silver, copper, &c. It exists in the form of tungstic acid in several minerals, the most important of which are the tungstate of lime and *wolfram*—the tungstate of manganese and iron. Its name—tungsten—means "heavy stone" in Swedish. Tungstic acid parts with its oxygen easily, and may be reduced in a glass tube by dry hydrogen gas at a red heat. The metal is obtained in the state of a dense dark grey powder, which requires a very intense heat to fuse into globules. When melted it has the color and luster of iron, and is not altered by exposure to the air. Wolfram is found in the tin ores of Cornwall, but its tungsten can only be separated by a chemical process. Sulphate of soda is mixed with the ore and a small quantity of charcoal dust added, and the whole kept at a red heat for some time in a furnace. The tungstic acid combines with the soda forming the tungstate of soda. This product is now removed, while hot, into tanks containing water; this quickly dissolves the tungstate of soda, which is then run off into receivers and crystallizes by evaporation. It has been proposed to use this tungstate for dyeing, as a substitute for that common mordant, "stannate of soda," but it has been seldom employed, as yet, for this purpose. Tungstate of lime makes a very good white paint, so does the tungstate of lead. Fused with sulphur, to make the sulphuret of tungsten, it forms a dark substance which has been proposed as a substitute for black lead. Metallic tungsten combines with several metals forming peculiar alloys, and forms a great number of salts by chemical combinations.

PEASE'S IMPROVED OILS.

The readers of the SCIENTIFIC AMERICAN have no doubt noticed, in the advertising columns of this paper, for several years past, a modest advertisement of F. S. Pease, of Buffalo, N. Y., relating to a patent oil sold by him for both lubricating and burning purposes. We have often heard the article highly spoken of by persons who had used it for a long period, but who had no selfish interest to promote in recommending it.

Often having inquiries from manufacturers and railroad superintendents for information concerning lubricating materials, we have taken some trouble to inform ourselves relative to the oil manufactured and sold by Mr. Pease, and the following we have learned respecting it, which we communicate through these columns for the benefit of those who have occasion to use lubricating material. This oil has been in use on the New York Central for over five years, on the Buffalo, New York and Erie for over six years, on the Toledo and Wabash for over four years, on the Buffalo and Erie, and a number of other first-class roads, and recommended by them in point of economy and durability for railroad purposes. It has been in use for several years on our government steamers, and is endorsed and recommended by the United States government for lighthouses, signals and engine use. A dynamometer test was made at the American Institute with the greatest care, by an instrument as accurate as mechanism could make it, arranged for testing the friction of metals and oils. These oils proved themselves equal to the best sperm, and they granted to the exhibitor a medal. Chemical tests by Headly show that these oils have no acid reaction; that they stand the greatest degree of heat without change; that of melted lead 600° Fah. and higher without change, and consequently were unaffected when other oils were burned or dried up. In burning, some parties testify that they proved themselves equal, if not superior, to the best sperm, the heating of the lamp being much less and the burning far better than sperm; but this statement should be taken with some degree of allowance. In a trial made with the car oil, as the manufacturer terms it, on the New York Central Railroad, a sleeping car was run over 10,000 miles with only one oiling; the bearings remaining in good order and free from gum. This oil is equally superior for manufacturers, steam engines and mechanical works generally, from what we learn of it, as it is for railroad purposes; and while it is not a volatile oil, it is free from acid reaction, and will stand a great degree of cold or high degree of heat. Mr. Pease is in possession of folios of recommendations from users of his oil, some of them speaking of it in terms too flattering for us to believe.

Having thus called the attention of our readers to what we believe to be a good article, we refer them to Mr. Pease, whose advertisement appears in our columns from week to week, for further information.

OUR OBSTINATE CRITIC AGAIN.—The editor of the *Engineer* seems to have lost the power of directing aright the axes of both eyes towards one object. Failing in his attempts to overthrow the logic we directed against his apparent ignorance of the fundamental laws of chemistry, he swings out in a recent issue, right and left, striking at objects in every direction which appear to float before his visual organs. He contents himself with simply denying our teachings respecting the oxydization of iron—denounces our explanation of the Giffard injector—manifests considerable flunkeyism over a short paragraph which appeared in the SCIENTIFIC AMERICAN about Lord Renfrew's visit to the Patent Office; and even takes up a palpable typographical error which ordinary professional courtesy might have caused him to overlook, and makes himself unhappy generally. If the *Engineer* man is mad, we pity him; if not, we commend him to a more sound discretion, and to a better knowledge of some things whereof he undertakes to write. We drop him to fight on his own hook.

A LITERARY CAB DRIVER.—A prize of \$100 for the best essay on the effects of Sunday cab driving has been won by John Cochrane, a London cab driver. At the meeting at which the prize was awarded, Cochrane told his audience that the essay consisted of 19,000 words, and was all written in the open air, on the top of his cab.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements lately patented:—

QUARTZ CRUSHER.

This invention consists in the use of one or more pairs of crushing rollers of peculiar form, in connection with a rotating cylinder provided with a bed of novel construction and with drags; all being arranged to operate in the most efficient manner to favor the separation of the gold from the quartz. The difficulty attending the operation of the ordinary stampers has been that the quartz, although crushed, is allowed to carry away particles of gold imbedded in it and covered by foreign substances, such as sulphuret of iron. The object of this invention is to obviate this difficulty by dragging or scraping, by a sort of grinding process, the gold which may be imbedded in the sands of the crushed quartz, so that such particles of gold may be exposed, amalgamated and saved with the general mass. T. A. Morris, of Green Bay, Wis., is the inventor.

VALVES FOR STEAM ENGINES.

H. E. Woodford, of Watertown, N. Y., is the inventor of an improvement in oscillating induction and education valves for steam engines, the object of which is to bring the faces of the valves as near as practicable to the bore of the cylinder, and so to prevent as far as possible the loss of steam in filling the passages. The improvement consists in so constructing and arranging such valves that while their axes of oscillation are transverse to the axis of the cylinder, the longitudinal profiles of their sides form arcs concentric with the latter axis.

OIL LAMP PRIZES.

On page 377 of the last volume of the SCIENTIFIC AMERICAN, we called the attention of inventors to the premiums of \$4,500 for four improved lamps, offered by the oil merchants of New Bedford, Mass. A large number of inventors competed for the prizes, but the committee appointed to investigate the merits of the lamps have reported that none are entitled to the premiums. They, however, give the following prizes to the best lamps, to encourage the inventors to perfect and introduce them. For stand lamps, J. W. Taber, of New Bedford, \$600; to Jared Parkhurst, of Baltimore, \$600; to Wm. H. Topham, of New Bedford, \$500; to A. D. Richmond & Co., of New Bedford, \$250; to James Duff, of New Bedford, for solar lamp, \$100; to O. P. Drake, of Boston, for stand carcel lamp, \$100; to A. D. Richmond & Co., of New Bedford, for hand lamp, \$100; to M. Burnett, \$100; to James Beete, \$100. The committee are of opinion that bleached whale oil, burned in the best manner, is a cheaper light material than any other oil in the market.

DAVIDSON'S BOAT-LOWERING APPARATUS.

On page 321 of our last volume, the reader will find an engraving and description of a new boat-lowering and detaching apparatus, the invention of Lieutenant Davidson, of Annapolis, Md. Commander Craven, of the practice ship *Plymouth*, has reported favorably as to its practicability. We make the following extract:—"The cry of 'Man overboard' was given when the ship was going at the rate of eight knots; the life buoy was let go, a boat was lowered, the ship brought to, the body picked up, the boat brought alongside again and hoisted up in her place, the ship filled away and was standing on her course under all sail in seven minutes and twenty seconds from the time the first alarm was given." The report further shows that the life boat was loosed from her grippings, lowered and detached in twenty-five seconds, without arresting the headway of the vessel. The boat was drawn up and secured again in one minute.

HAVE YOUR MODELS PERFECT.—We learn from R. D. M. Edwards, of Tecumseh, Mich., that in our illustration of his Wool Folder in No. 15 (page 232) of the present volume of our journal, there was an omission of a board to be placed over the wool when the follower is pressed up against the wool from below by the treadle. This omission resulted from the piece not being attached to the model sent us, from which the illustration was prepared. Other persons forwarding models for illustration will please take warning from this circumstance, and see that their models are complete.