those available in the Eastern and Middle States. Many furnaces import hematites from Lake Superior, which cost them at the furnace from $6 to $7 per ton, because these ores are comparatively free from phosphorus, while nearer at hand they have titaniferous ores as rich in iron or richer and yet more free from phosphorus, but which they do not dare to work.

Even in Colorado, ores free from titanic acid are shipped, at a great cost, to certain works which do not care to treat the immense banks of titaniferous ores near by.

The question of the use or of the exclusion of such ores is one which ought to attract the serious attention of metallurgists in this country. Enough has been done elsewhere to encourage efforts in this direction; the metallurgy of titaniferous ores is no secret. The results, if favorable, and there are all reasons to believe that they would be if we trust to what has been done in Europe, would richly pay for the expense incurred.

New York, March, 1890.

ABSTRACTS.

ANALYTICAL CHEMISTRY.

Analysis of Chrome Iron. R. Fresenius and E. Hintz.

The authors effect the solution of chrome iron by subjecting it, while heated, to a current of dry chlorine gas. About 5 grms. of the chrome iron are placed in a small porcelain boat and then inserted into a refractory glass tube of about 60 cm. length. Suitable safety tubes containing water are attached to collect the volatilized chlorides. The porcelain boat must be heated very gradually, and the heat, finally, is so regulated that but little of the ferric chloride reaches the first safety tube. The operation requires about 3 to 4 hours. For details as to the method for the complete analysis of chrome iron, see the original article. (*Ztschr. anal. Chem.*, **29**, *28–35.*) J. F. G.

Separation of Barium from Strontium. R. FRESENIUS.

The author, in a series of test experiments upon the separation of barium and strontium from one another, finds that the methods depending upon the treatment of the mixed sulphates of barium and strontium with solutions of ammonium carbonate or potassium carbonate, either with or without the presence of a soluble sulphate, are unreliable. Although separately the barium sulphate is not appreciably affected by a solution of ammonium carbonate, yet in mixture with strontium sulphate it is partly changed to carbonate when the strontium is largely in excess. When the barium is largely in excess, it prevents the decomposition of the strontium sulphate. (*Ztschr. anal. Chem.*, **29**, *20–28.*)

J. F. G.

Butter Fat. ST. BONDZYNSKI and H. RUFI.

The authors, as a result of their researches, confirm the reports of others, that fresh butter fat may contain free insoluble fatty acids, and that the rancidity of butter is due principally to the separation of free insoluble fatty acids and not to the volatile acids, since the latter first appear in the more advanced stages of the rancidity. (*Ztschr. anal. Chem.*, **29**, *1–6.*) J. F. G.

Examination of Alcohol. H. BORNTRÄGER.

In testing for such impurities of alcohol as aldehyde, acetal, and amyl alcohol, the author recommends the following tests :

I.—(*a.*) Dilute some of the sample with a large quantity of water. If oily drops separate, test these for acetal, by (6), and for amyl alcohol, by (7), as indicated below.

(*b.*) Test another portion for aldehyde by (8) and (3).

II.—If drops do not separate on dilution with water.

(*a.*) Test for aldehyde.

(*b.*) Dilute some of the alcohol with two volumes of water, add chloroform, mix thoroughly, and after separation, evaporate the chloroform at a low temperature and test the residue for acetal and amyl alcohol as indicated below.

If concentrated sulphuric acid and K OH produce no discoloration, only insignificant quantities of the above three impurities can be present

(1.) Chloroform	Aldehyde is taken up, increasing the volume of the separated chloroform layer.*	Acetal, do*	Amyl alcohol, ditto.
(2.) Ammon. Silver Sol. and water on warming	Silver mirror	No mirror but traces of reduction	No reduction.
(3.) Colorless, aqueous sol. of fuchsin and $NaHSO_3$	Strong violet color changed to blue* by conc. HCl (Detects 1:500.000)	No color	No color.
(4.) Addition of an equal volume of conc. H_2SO_4	Turns brown	Ditto	Ditto.
(5.) Add an equal vol. of solution of KOH (1 : 3)	Yellow color	Ditto	Ditto.
(6.) Add equal vol. of conc. H_2SO_4, and then KOH	Carbonized and faint smell of acrolein*	Strong odor of acrolein*	Colored sol. of agreeable odor.*
(7.) Add 3 drops conc. HCl and 10 drops colorless aniline oil	Yellowish red color if much aldehyde	No color	Raspberry red color.
(8.) Add conc. sol. of KI	Brown discoloration	No color	No color.

(*Ztschr. anal. Chem.*, **28**, *60–62.*) J. F. G.

Examination of Alcohol. By H. BORNTRÄGER.

In continuation of the above (*Ztschr. anal. Chem.*, *60*) the author points out the following characteristics of propyl alcohol, C_3H_8O,

* The author's own observation.

and the butyl alcohol of fermentation, C_4H_9OH, both of which may occur in crude alcohol :

	Normal Propyl Alcohol.	Fermentation Butyl Alcohol.
1. Sp. Gr.	0.813	0.805.
2. Boiling point	97° C	108–109° C.
3. Solubility in Water	Easily	With difficulty.
4. Odor when rubbed on the hand	Agreeable, fruity odor	Disagreeable, oily odor, suggestive of fusel oil.
5. Add chloroform to the alcoholic sol. 30%	Not taken up.	Taken up by the chloroform.
6. Reaction of 10 c. c. of the alcoholic sol. with 3 drops of conc. HCl and 10 drops aniline oil		Raspberry red color (if the imp. is present in large quantity).

Hence if a 30% crude alcohol is shaken with chloroform, the latter will contain, after separation, the amyl alcohol, acetal, aldehyde, and butyl alcohol of fermentation while ethyl alcohol, acetic acid and propyl alcohol will remain in the supernatant liquid. (*Ztschr. anal. Chem.*, **28**, *670.*) J. F. G.

Estimation of Quinine in Quinine Tannate. SIGMUND NEUMANN.

The author in examining quinine tannates by Orrillard's method found the method extremely unreliable, and, therefore, resorted to the following process :

2 grms. of the finely pulverized quinine tannate were added to 20–25 c. c. of KOH solution (sp. gr. 1.240) contained in a glass stoppered cylinder of about 300 c. c. capacity. The mixture was thoroughly shaken, diluted with water to 60–80 c. c., 100 c. c of ether added and the whole again shaken. After separation of the ether, an aliquot* part of the latter was taken for evaporation and the quinine calculated from the residue. Quinine tannate should contain from 25–30% of quinine. (*Ztschr. anal. Chem.*, **28**, *663–668.*) J. F. G.

*More accurate results would be obtained by exhausting the alkaline solution with chloroform or ether and taking the whole of the solvent used, which would prevent the errors due to change in volume of the ether through evaporation or change in temperature. J. F. G.

Abstracts of American Patents Relating to Chemistry.

(*From the U. S. Patent Office Gazette.*)

Issued March 18th, 1890.

423,408.—Centrifugal machine. D. H. Benjamin.

423,430.—Filter. O. H. Jewell.

423,479.—Composition for felting boots, etc. A. D. Kizer.

Consists of alum, oil of vitriol and water.

423,516.—Apparatus for manufacturing oil gas. H. H. Engleman.

423,522.—Lubricant. J. Lewandowski.

Consists of prussiate of potash, sulphur and oil.

423,530.—Disinfectant. J. M. Raymond.

Consists of zinc acetate, boric acid, aluminium sulphate and acetate, sodium hyposulphite, mercuric iodide and acetic acid.

423,550.—Process of making blue dyes. C. Duisberg.

A blue coloring matter that will dye cotton in an unmordanted bath, and wool in a neutral bath is obtained by combining the tetrazo-compound of benzidine disulphono-disulpho acid, with alpha or beta naphthylamine, or their alkyl derivatives.

423,569.—Azo dye. P. Ott.

The process of obtaining substantive dyestuffs from intermediate products not dyestuffs in themselves, derived from diamidodiphenylene oxide and from diamidoditoluylene oxide, which consists in combining the tetrazo compound of the latter with one molecule of an amine or a phenol, or their sulpho or carbo or their sulpho-carbo acids, and combining the product of the reaction with another molecule of an amine or a phenol, or their sulpho or carbo acids or their sulpho-carbo acids.

423,583.—Fire and waterproof roof covering. J. G. Wolf.

Is composed of fine particles of woody material, burnt magnesite and magnesium chloride.

423,615.—Filter. W. Mailler.

423,656.—Paint. C. L. Baker and M. Thorkelson.

Consists of raw linseed oil, lamp black, coach japan, turpentine and natural mineral paint.

423,683.—Acid bottle. E. Hart.

The bottle is constructed of mineral and animal wax, and provided with a stopper of the same material.

423,699.—Roofing composition. M. W. Powell.

Consists of resin, asphaltum, petroleum residuum, kidney oil and actinolite.

423,767.—Filter. W. M. Hough.

423,768.—Air pumping apparatus. S. E. Hughes.

423,866.—Soap. J. A. Gunn.

A hard soap having animal hair in appreciable and interlocking and intertwining lengths combined therewith.

423,868.—Production of chlorine gas. C. Hornbostel.

423,869.—Apparatus for making fluid extracts. J. W. Hyatt.

423,875.—Disinfectant. D. W. Macdonald and J. G. Flower.

Consists of boric acid and salicylic acid in combination with potassium permanganate and a silicate.

423,883.—Disinfectant. W. P. Taggart.

Consists of chloride of lime, water, potassium permanganate, salt and saltpetre.

Issued March 25th, 1890.

423,896.—Laboratory burner, specially useful with gasoline gas. J. F. Barker.

423,898.—Air carburetor. R. D. Bradley.

423,927.—Soap powder. H. Hayward.

A mixture of ammonium chloride, borax, sodium carbonate, and soap not melted, but ground together in a cold and dry state.

423,930.—Process of diffusion for sorghum cane, etc. H. A. Hughes.

423,949.—Process of purifying brine. C. C. Peck.

The brine is treated with sodium carbonate at its boiling point.

423,970.—Blue carbon dye. M. Ulrich.

The process of obtaining substantive dyestuffs from intermediary products that are not dyestuffs, which consists in combining one molecule of a paradiamine with one molecule of a dioxynaphthaline sulpho acid, and then combining one molecule of the intermediary product obtained with another molecule of dioxynaphthaline sulpho acid.

423,978.—Bottle stopper. E. W. Abbe.

423,995.—Wire galvanizing apparatus. B. A. Grant.

424,005.—Ice machine. J. C. Kitton.

424,019.—Brown carbon dye. R. Nielzki.

Yellowish brown coloring matter of the formula $C_n H_{2n}—8 (NO_2) N_2 C_n H_{2n}—9 (OH) (COOH)$ produced by condensing a nitro-diazo body with an ortho-oxycarbonic acid, insoluble in water and dilute acids, readily soluble in alcohol, ether and diluted alkalies.

424,024.—Blowpipe. W. R. Rawlings and J. J. Rawlings.

424,080.—Transparent filler. J. A. Skerry and J. Derosier.

Consists of oil, turpentine, drier and lime.

424,124.—Apparatus for purifying water. F. H. Moore.

424,228.—Method of applying designs to watch dials. F. Schmalz and J. C. Firmbach.

The process consists in covering the face of the dial with a soluble sensitive coating, which becomes insoluble on exposure to light, exposing the

dial to light under a negative, then applying a liquid enamel or ink over the whole surface, covering both the exposed and unexposed portions, then washing off the portions of the coating remaining soluble, and finally firing the dial to set the remaining portions of the enamel coating.

424,252.—Composition for ornamental brick. J. C. Anderson.

A mixture of clay and brass.

424,253.—Composition for ornamental brick. J. C. Anderson.

A mixture of clay and copper.

424,254.—Composition for ornamental brick. J. C. Anderson.

A mixture of clay and phosphor bronze.

424,299.—Combustible coal brick. J. H. Hiertz.

Consists of coal dust or slack, slaked lime, tar, salt and turpentine.

424,303.—Filtering apparatus. H. J. E. Jenson.

424,325.—Apparatus for mixing and aerating wort and yeast. J. Meier.

424,328.—Composition for fireproof paper or board. J. G. Merrill.

Consists of vegetable or animal fiber, asbestus, alum or copperas, a coloring matter, infusorial earth, and sodium silicate.

424,352.—Process of producing marble-like or enamel-like objects. L. Preussner.

Consists of basic magnesium chloride and a filler.

424,353.—Process of producing artificial stone. L. Preussner.

Burnt magnesia of commerce is mixed with concentrated hydrochloric and boric acid, in proportions to produce a basic magnesium chloride and magnesium borate, and the product is mixed with a filling material.

424,357.—Pepsin. J. B. Russel.

Is obtained by macerating hogs' stomachs, clarifying the resulting solution, subjecting the solution to dialysis, and evaporating the remaining solution.

424,375.—Filtering apparatus. T. Stewart.

Issued April 1st, 1890.

424,464.—Filtering machine. J. A. Crocker.

424,547.—Plaster. J. E. Turner.

Consists of sand, plaster of paris, prepared slag, glue and alum.

424,590.—Candle for killing insects. R. Atkinson.

Consists of stearin or other equivalent material mixed with insect powder and alum, and molded around a wick.

426,615.—Apparatus for refining camphor. W. V. McKenzie.

426,653.—Paint. R. Morris.

Consists of about 20 parts resin, and 7 parts each of zinc oxide and gypsum, powdered and mixed together and adapted to be either fused by heat upon the surface to be protected or to be liquefied by a solvent.

424,679.—Filter. F. Lascar.

424,755.—Furnace for recovering soda. H. Blackman.

424,756.—Process of recovering soda. H. Blackman.

426,760.—Apparatus for drying starch or other solid matter. F. M. F. Cazin.

426,762.—Filter. W. D. Cunmings.

Issued April 8th, 1890.

424,961.—Composition for treating fuel. J. C. Cooper.

Consists of sodium chloride, aluminium sulphate and potassium carbonate.

424,991.—Simultaneous manufacture of soaps and carbonic acid. E. D. Mellen.

An alkaline carbonate or bicarbonate is mixed with rosin or any suitable organic acid in a digester provided with suitable means both for regulating the chemical action and for withdrawing the gas, and spraying the mixture with fine jets of steam.

425,039.—Chloral formamide. J. F. von Mering.

425,040.—Chloral formamide. J. F. von Mering.

Prepared by treating chloral with formamide.

425,081.—Process of making zinc sulphide. A. Keiller.

To a solution of a zinc salt is added an alkaline sulphate and hydrothionic acid.

425,246.—Bunsen gas burner. L. Paget.

425,292.—Apparatus for manufacturing oxides of metals. S. R. Bradley and A. C. Bradley.

425,310.—Apparatus for the pasteurization of beer. T. Evans.

425,316.—Process of distilling water. A. Gerdes and B. Thoens.

425,350.—Method of and apparatus for manufacturing artificial fuel. G. Y. Smith.

425,351.—Artificial fuel. G. Y. Smith.

Consists of peat, 1,200 parts; culm, 600 parts; rosin, 100 parts; pitch, 100 parts; rye flour, 5 parts, and lime, 5 parts.

425,374.—Filter. C. B. Elliott. W. R.

Issued April 15th, 1890.

425,412.—Composition for coating iron and wood. I. T. Dyer.

Consists of asphaltum, sulphur, lamp-black and lard oil.

425,418.—Welding compound. M. Garrison.

Consists of borax, carbonate of iron, clay, and small particles of iron filings.

425,421.—Apparatus for treating beer. C. Haefner.

An apparatus for forcing the carbon dioxide produced by fermentation into the casks of beer.

425,431.—Filter of porous fabric. J. W. Hyatt.

425,504.—Red dye. R. Gnehm.

Obtained from succinic acid and dimethylmeta-amidophenol.

425,525.—Orthonitroparadiamidodiphenyl. J. Schmid.

425,537.—Water filter. C. H. Dismitt and G. W. Walters.

425,545.—Apparatus for saving gold, silver and quicksilver. F. A. Luckenbach.

425,573.—Filter. O. H. Jewell and W. M. Jewell.

425,603.—Process of treating kitchen garbage. G. Fleischman.

The garbage is converted into a dry fertilizer and grease, by drying and extracting with a volatile solvent.

425,614.—Dyeing apparatus. C. L. Klander.

425,648.—Gelatinous explosive. F. A. Abel.

Consists of nitroglycerin and nitrocellulose to which tannin is added, whereby the explosive is rendered of a propulsive instead of a disruptive character.

425,661.—Process of galvanizing plates. E. A. Davies.

425,668.—Compound for cleaning jewelry. F. Graffe, Jr.

Consists of potassium bitartrate, rouge, potassium hydroxide and water.

425,675.—Means for coating metal pipes. J. D. Hooker.

Metallic pipes are coated inside and outside with the gummy residuum produced in the distillation of some petroleums, and known as "purified maltha."

425,703.—Dye vat. C. A. G. Schmidt.

425,813.—Apparatus for the reduction of argentiferous ores. O. Luniaghi.

427,877.—Process of carbureting air or gas. S. Hanford.

425,885.—Process of making azo dyes. M. Kohn.

The process of producing violet to blue-black azo dyes for dyeing wool, which consists in combining the diazo compounds of the sulpho acid of aniline or its specified equivalents with alpha-naphthylamine, again diazotizing the amidoazo compounds thus obtained, and combining therewith phenylalphanaphthylamine or a homologue thereof.

425,869.—Art of reclaiming rubber from waste rubber stock. N. C. Mitchell.

425,904.—Composition for preserving food. W. Radam.

A fumigating composition consisting of sulphur, sodium nitrate, manganese dioxide, sandalwood, and potassium chlorate.

425,905.—Process of utilizing acid for residuums. C. Rave.

425,919.—Dye for leather. E. O. Wallace and S. M. Wallace.

Consists of ferrous sulphate, aniline, potassium bichromate and cupric sulphate. W. R.