ABSTRACTS.

GENERAL CHEMISTRY.

Combustion under High Pressure. W. HEMPEL.

It is a known fact, that the combustion of sulphur furnishes noticeable quantities of sulphuric anhydride along with sulphur dioxide. Also that hydrogen, illuminating gas or carbon when burned, allows the formation of nitrous acid easily to be shown. In the present research the attempt was made to study the influence of increased pressure upon these phenomenæ.

The combustions of sulphur was performed in dry oxygen and in iron vessels, for those of nitrogen a drilled piece of cast steel was used, which formed an "autoclave" of 28 c. c. capacity, lined inside with platinum. The inflammation was performed with the aid of a platinum wire, of 0.15 to 0.2 m. m. thickness, which by means of the electric current was momentarily heated to its melting point. For this purpose two insulated pieces of thick platinum wire had been introduced through the head of the autoclave. These acted at the same time as a support for pieces of sulphur or carbon. The air was compressed by a powerful air pump. Oxygen and detonating gas were condensed by the pressure formed by developing these gases in a closed space. Oxygen was developed from a mixture of equal parts of $K\,ClO_3$ and $Mn\,O_2$ in a retort formed from a bent iron tube of thick wall. A small iron digestor served for the preparation of detonating gas in which water, acidulated by H_2SO_4, was decomposed electrolytically. The digestor itself was the cathode, while a piece of platinum sheet, well insulated, led into it. During the performance of the experiments the apparatus was surrounded by a protective screen formed of boxes filled with sand. When very high pressures were used the experiments were performed with the aid of mirrors, so that operations were possible without endangering the experimenter.

This mode of arranging the experiments has the advantage that no combustion takes place during the time of compression: combustion occurs at comparatively low pressures when using a pump. Thus oxygen will set on fire the leather packing at about 40 atm. It is evident that even when using asbestos packing (which Wroblewsky used in his experiments on condensation of gases), the combustion of detonating gas cannot be avoided. The compression of the gases sets free so much heat, that the temperature of combustion is reached at a pressure of several hundred atmospheres. Lead disks which were used for packing will resist a pressure of several thousand atmospheres. The pressures were read by means of manometers furnished by Schaeffer and Budenberg.

The experiments with sulphur show that it is possible to convert half of the amount used directly into sulphuric anhydride. When the digestor was opened fumes appeared as when a bottle of sulphuric anhydride is opened. When water was introduced hissing occurred.

The experiments with a mixture of nitrogen and detonating gas and those with nitrogen and lignite proved that great quantities of nitrogen may be directly united with oxygen under high pressures. (*Ber. d. Chem. Ges.*, **23**, *1455*.) L. H. F.

Formation of Nitrous Acid and Ammonia from Free Nitrogen. O. Loew.

Dried platinum sponge, which will not yield to water even traces of either nitrous acid or ammonia, at once furnishes these two bodies when treated with sodium hydrate solution. If this solution is very dilute $\left(\text{about } \frac{1}{1000}\right)$, nitrous acid reactions are obtained and not those of ammonia. As Nessler's reagent indicates $\frac{1}{10000000}$ of ammonia just as distinctly as the reaction of Griess' does the same amount of nitrous acid, the conclusion is drawn that two processes take place under the simultaneous influence of the sponge and of the sodium hydrate:

1. Nitrogen, condensed in small quantities together with oxy-

gen upon the platinum sponge, is directly oxidized to nitric oxide, and this then further into nitrous acid.

2. Using concentrated sodium hydrate, the nitrogen also *reacts with water*, forming ammonium nitrite. (*Ber. d. Chem. Ges.*, **23**, *1443.*) L. H. F.

Action of the Electric Arc Light upon Gaseous Bodies and its Use for Demonstrations. B. LEPSIUS.

The arc light is used with success in quite a number of experiments instead of the induction spark or the dark discharge. The volumetric relations between CO_2 and CO, of O to CO, of O to CO and CO_2 have so far been studied. (*Ber. d. Chem. Ges.*, **23**, *1418.*) L. H. F.

The Chemical Constitution of Talc. F. W. CLARKE and E. A. SCHNEIDER.

The stability of talc towards hydrochloric acid is shown, as well as its decomposition on heating, setting free silicic acid.

These facts can only be reconciled with a formula indicating a meta-silicate. (*Ber. d. Chem. Ges.*, **23**, *1537.*) L. H. F.

The Constitution of Solutions. FR. RÜDORFF.

It follows from this research on the freezing points of solutions of mixed salts, that salts which are able to form double salts react upon each other when dissolved together, even far from the point of saturation. This is not the case for salts that do not form double salts. (*Ber. d. Chem. Ges.*, **23**, *1846.*) L. H. F.

The Carbohydrates of the Sweet Potatoe (*Batatas edulis*). W. E. STONE.

This research shows that the sweet potatoe does not contain reducing sugar, but cane sugar in quantities of 1½ to 2 per cent. Baking transforms a considerable amount of the starch into a soluble form, at the same time hydrolizing saccharose to glucose. (*Ber. d. Chem. Ges.*, **23**, *1406.*) L. H. F.

A new Crystallizable Carbohydrate. A. VON PLANTA and E. SCHULZE.

The nodose roots of *Stachys tuberifera* furnish a crystallizable carbohydrate of the composition $C_{18}H_{32}O_{16}$, or a multiple of the same. The body crystallizes with $3\ H_2O$. It has received the name stachyose and belongs to the group which Tollens calls crystallizable polysaccharides, embracing: raffinose (melitose), gentianose and lactosin. The stachyose resembles most this last mentioned one. (*Ber. d. Chem. Ges.*, **23**, *1692.*) L. H. F.

On a Second Monobrombenzol. F. FITTICA.

A. Hand has not only disputed the existence of the author's fourth monobromphenol,* but also that of his second monobrombenzol. In rebuttal, Fittica describes the precautions to be taken in the preparation of this second monobrombenzol which boils at 62° C., while the common monobrombenzol has the boiling point 155° C. (*Ber. d. Chem. Ges.*, **23**, *1398.*) L. H. F.

A New Method for the Determination of Free and Combined Carbon in Iron or Steel. OTTO PETTERSSON and A. SMITT.

0.4 to 0.8 grms. of the material, best in the form of filings or as a single thin sheet, is fused with potassium bisulphate. The operation takes from 5 to 12 minutes, or longer when filings are used. The iron is transformed into ferrous sulphate while equivalent quantities of SO_2 are developed. The combined carbon is oxidized to CO_2, the graphite remains in the shape of bright, crystalline leaves. By means of a current of air, free from CO_2, sulphur dioxide and carbon dioxide are expelled and absorbed by a measured quantity of caustic soda and baryta lye; thus barium sulphite and barium carbonate are precipitated. The former is oxidized to sulphate by permanganate in slight excess. The liquid is then acidulated with HNO_3 and the CO_2 determined, using aluminium wire to assist in the development of gas.† The

* New York Acad. Ann., **3**, 67, (1884).

† See Otto Pettersson's method for the determination of CO_2, page 354.

graphitic carbon is retained in the fused mass which is perfectly white and easily soluble in warm HCl. The graphite is collected on a little platinum filter with asbestos, dried, gently heated and weighed. Then the filter, while glowing, is subjected for a few minutes to a current of air charged with nitrous vapors. After thus burning the graphite, the filter is weighed again and is at once ready for new use. The development of this mode of analysis occupied over three years until the desirable exactness of 0.01 to 0.02 pr. ct. was assured. (*Ber. d. Chem. Ges.*, **23**, *1401.*)

L. H. F.

Experiments for Quantitative Determination of Arsenic by Marsh's Test. Behavior of Arsine towards Potassium Hydrate. B. KÜHN and O. SAEGER.

The experiments described tend to show that larger quantities of arsenious acid (0.11 grms. As_2O_3 dissolved in 25 c. c. water to which a few drops of KOH sol. were mixed), hence, if the latter be added in greater concentration to the hydrogen apparatus, the arsenic is transformed within three hours almost quantitatively into AsH_3 and from this into elementary arsenic.

Attention is drawn to the fact that an error has crept from Dragendorf's[1] "Lehrbuch" into all others. It is said in Dragendorf that arsine is not decomposed by potassium hydrate, while stibine is entirely decomposed by the same. This is not correct. Arsine is decomposed more slowly and not as perfectly, but the introduction of a potassium hydrate tube in medico-legal cases is not permissible. If antimony should be present it must be separated previously and by precipitation. (*Ber. d. Chem. Ges.*, **23**, *1798.*)

L. H. F.

Determination of Nitric Acid, according to Schulze-Tiemann. L. SPIEGEL.

Several years ago, when reporting upon the determination of nitric acid in potable water, the author criticised Schulze-Tiemann's method, claiming that it yielded results with an error

[1] Dragendorf, Die gerichtlich-chemische Ermittlung der Gifte. 2 Auflage, S. 633.

of at least 3 per cent. This determination being performed with the aid of ferrous chloride, and conc. HCl, in a partial vacuum, the error referred to may be avoided by using a current of carbon dioxide, free from air, towards the end of the process. Tiemann in a new edition of his "Water analysis," does not accept this modification of the process. The author maintains the value of his proposal; he works from the beginning in a current of CO_2, and describes a simple apparatus which serves for this determination. (*Ber. d. Chem. Ges.*, **23**, *1361.*) L. H. F.

Method for the Determination of Carbon Dioxide. OTTO PETTERSSON.

A general mode of determining CO_2 quantitatively in all solid and liquid substances. The method is particularly useful for estimating CO_2 in a state of solution or of partial combination *e. g.*, in natural well or sea water. For details of this method see the original article which describes the apparatus used and gives a diagram. A peculiarity of this determination is that a small piece of iron or aluminium wire is used as a hydrogen developer in the vacuum apparatus in which carbon dioxide is set free. This simultaneous generation of minute quantities of hydrogen is claimed as essential, partly in order to drive out all of the CO_2, partly to prevent bumping. The gases developed are measured while moist in a burette over mercury. Afterwards the CO_2 is absorbed in the ordinary manner by KOH solution in an Orsat tube.

This apparatus has lately been of great service in the analyses of sea water in hydrographic researches in the Skagerack and Kattegatt. The CO_2 was thus determined in more than 110 samples taken from different depths. Franz Müller, in Bonn, makes the apparatus in a most careful manner. (*Ber. d. Chem. Ges.*, **23**, *1402.*) L. H. F.

Abstracts of American Patents Relating to Chemistry.

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

(Issued July 15th, 1890.)

432,058.—Vegetable black. E. A. de Lisle.

Contains as its essential characteristic material the calcined residuum of cinchona bark, from which the genuine has been primarily extracted.

432,060.—Composition for preserving eggs. Silas C. Matteson.

Consists of a mixture of ground silica, alumina, peat, ash and clay.

432,091.—Phosphatic fertilizer. J. D. Simmons.

Consists of wood ashes, phosphate of lime, muriate of potash, pulverized sulphur, and nitrate of soda.

432,118.—Wood filler. B. J. Couhig.

Consists of molasses, water, starch, pulverized gypsum, glue and alcohol.

432,151.—Transparent water color paint. R. T. Swenning.

Consists of an aniline dye, water, gum arabic, gelatin, white sugar and alcohol.

432,190.—Apparatus for making vinegar. E. E. Murphy, and W. Berkel.

432,198.—Process of purifying crude alcohol. G. Guignard.

The process of separating the aldehydes or like products from alcohols in general, and the alcohols of the distillery in particular, through the formation of sulphite compounds of the aldehydes or like products by treating the crude or impure alcohol with alkaline bisulphite or alkaline sulphite and bisulphite to form said sulphite compounds, and separating such compounds and the alcohol from each other.

432,240.—Paint compound. A. A. Jackson.

A water and fire proof paint, consisting of coal tar, asphaltum varnish, cane syrup, spirits of turpentine, red mineral, yellow ocher, whiting, water, soda, salt, and alchocol.

432,251.—Refining cocoanut oil. A. Smith.

Cocoanut oil is deodorized by boiling with a sulphide, washing, boiling again with a bisulphite and washing.

432,270.—Carburetor. G. Hargreaves, E. W. Porter, and J. P. Scranton.

432,280.—Metallurgical furnace. R. F. Nenninger.

432,281.—Apparatus for producing highly heated gas. R. F. Nenninger.

432,313.—Lubricant. R. Hutchison.

Composed of lime combined with margaric, stearic or oleic acid, or any suitable mixture of such acids and mineral or hydrocarbon oil, there being an excess of the acid sufficient to make the mineral or hydrocarbon oil combine with the lime compound.

432,336.—Explosive compound. S. D. Smolianinoff.

Consists of nitroglycerin, an alcohol, and an absorbent.

432,383.—Process of reducing iron ore. C. J. Eames.

432,437.—Detergent. P. K. Post, Jr.

Consists of borax, saturated with ammonia, in the form of a paste or semi-solid.

432,497.—Welding compound. H. B. Strant and C. B. Shute.

Consists of borax, prussiate of potash ammonium chloride, water and chalk.

Issued July 22d, 1890.

432,546.—Filter. T. A. Myers.

432,604.—Apparatus for producing bisulphites. C. Cornwell.

432,692.—Apparatus for producing bisulphite solutions. T. P. Burgess.

432,698.—Process of manufacturing alloys of metal of the aluminium group. G. A. Taurie.

The process consists in exposing an intimate mixture of the oxide of the group metal, carbon, and sulphuric acid to an intense heat, mixing therewith filings of the alloying metal, and exposing the mixture to a white heat.

432,718.—Apparatus for producing gaseous fuel. J. M. Ayer.

432,777.—Fire extinguishing compound. R. T. Van Valkenburg.

Consists of sulphuric acid, a sulphite and a carbonate.

432,784.—Manufacture of white lead. J. A. Boand.

The process consists in constantly stirring and agitating a mass of lead oxide in a closed vessel, passing a stream of carbon dioxide into the mass, and simultaneously passing steam laden with vapor of acetic acid into the mass.

432,808.—Process of extracting oil from fish. P. C. Vogellus.

432,815.—Process of obtaining oxygen from air. A. Brin.

Barium oxide is heated, admitting air thereto until peroxidation takes place, then shutting off the air supply and deoxidizing the barium by reducing the pressure without changing the temperature of the heating chamber.

432,853.—Leather blacking. J. J. Baulch, F. C. Steele, W. J. Lees, and J. F. Evans.

A waterproof leather dressing, consisting of beeswax, neat's foot oil, drop black, heel ball and molasses.

432,861.—Process of fermenting. E. Carez.

The development of injurious and destructive ferments in the manufacture of syrups, sugar or alcohol, is prevented by subjecting the wort of amylaceous substances to the action of hydrofluoric acid.

432,926.—Process of making acetic acid. I. A. T. Bang and M. C. A. Ruffin.

A hot solution of calcium acetate is decomposed with hot sulphuric acid.

432,939.—Apparatus for manufacturing wood gas. J. Hanlon.

(Issued July 29th, 1890.)

432,989.—Blue dye. C. Duisberg.

Produced by the action of the tetrazo compound of benzidinesulphonedisulpho acid upon phenylbetanaphthylamine. In the dry state it is an indigo blue, amorphous powder, difficultly soluble in cold water, easily soluble in hot water and alcohol, insoluble in benzol. In concentrated sulphuric acid it dissolves with red violet color. It dyes unmordanted cotton in alkaline bath, and wool and silk in a neutral bath with a fine indigo blue shade.

433,066.—Process of making soap. J. B. N. Berry.

Pine needles are treated with an alkaline solution to extract the resin, after which the fatty materials are added to the solution and saponified.

433,074.—Art of silvering mirrors. A. B. Drautz.

A solution for silvering mirrors consisting of ammoniacal silver nitrate, sodium and potassium tartrate, milk sugar, silver sulphate, a lead salt, sulphuric acid and water.

433,086.—Process of deoxidizing copper. W. W. Keys.

Copper and its alloys are deoxidized and purified by melting the metal by exposure to the hot products of combustion developed by burning hydrocarbon oils, then raising the molten metal to a high temperature, and then while practically excluding atmospheric oxygen further exposing the metal to the flaming products of combustion afforded by the oil.

433,119.—Process of making potash soap. H. Eurich.

A strong solution of caustic potash is added to a fat, and the mixture kept at a high heat until a product is obtained, which on cooling is a hard potash soap.

433,126.—Gas purifier. J. Hearne.

433,129.—Process of manufacturing and in the composition of refractory cements. W. S. Lea.

The process consists of the following steps : Disintegrating materials whose chemical composition is chiefly that of a compound silicate of alumina and of alkalies and earthy bases, mixed with quartz by subjecting the same to the simultaneous action of heat and vapors of nitric and hydrochloric acids, reducing the disintegrated materials and mixing therewith silicious materials whose composition is chiefly hydrated silicate of

alumina, together with calcium phosphate and carbonate, caustic potash and manganese, again reducing the compound and mixing therewith sodium chloride and an alkaline silicate.

433,131.—Process of ageing wine. G. H. Malter.

Consists in passing the wine through vapors produced by heating another wine.

433,135.—Apparatus for decomposing metallic salts. O. B. Peck.

433,152.—Extracting fats and oils. M. Schroeder.

The materials containing fats and oils are subjected to the elutriating action of sulphurous acid, after which the sulphurous acid is removed by distillation and condensation.

433,185.—Dental vulcanizer. J. E. Quinn.

433,215.—Insulating compound. I. Rabinowicz.

Consists of tartaric acid, a tartrate, gilsonite and palm stearin pitch.

433,326.—Process of preparing wood pulp. W. N. Cornell.

433,336.—Apparatus for oxygenating and carbureting air. C. Fiesse.

433,341.—Regenerative gas lamp. E. Tullford.

433,395.—Obtaining pepsin. J. Brill.

The process consists in, first, finely chopping hogs' stomachs; second, subjecting the prepared mass to the action of acid and water, and heating it for about three hours; third, pressing the juice from the mass; fourth, clarifying the juice by a benzine bath, and then drying the precipitated pepsin.

(*Issued August 7th, 1890.*)

433,455.—Solidified perfume. G. H. Dubelle.

Consists of paraffin intimately mixed with powdered orris root and a volatile perfume.

433,495.—Carburetor. A. B. Smith.

433,534.—Apparatus for washing the fumes of sulphur. T. W. Montgomery and J. Warnke.

433,537.—Glass tube cutter. T. McGar.

433,603.—Regeneaative furnace. S. R. Smythe.

433,604.—Regenerative furnace. S. R. Smythe.

433,653.—Lump fuel of coal, charcoal or coke screenings. A. Mayer.

A lump or block fuel, composed of coal, coke or charcoal screenings or dust, a glutinous substance, an oleaginous substance, a plastic substance, and a fibrous substance combined with silicate of soda.

433,729.—Process of manufacturing butter. G. H. Hamrick.

The raising of cream from milk is effected by the action of sulphurous acid gas.

433,784.—Process and apparatus for manufacturing, heating and illuminating gas. C. F. Hadley.

The process consists in burning fluid hydrocarbon in conjunction with

air and steam, then condensing and eliminating the aqueous vapor from the gaseous product, and then reheating the product in conjuction with fluid hydrocarbon.

433,790.—Process of dyeing. T. Ingham.

A process of dyeing woven or knitted fabrics of mixed animal and vegetable fibres (such as yarns woven together in the gray state), consisting in first submitting the mixed fabric to a bath of the required coloring matter or solution without any mordant; second, dyeing the fabric; third, oxidizing the coloring material on the dried fabric by passing the same through a solution having the property of fixing the colors both upon the vegetable and animal fibres at one and the same time.

433,802.—Apparatus for the manufacture of gas. K. M. Mitchell.

433,861.—Composition of matter for plaster. De L. Haigh.

A compound for admixture with lime, etc., in the formation of plaster, consisting of fine silicious material coated with a soluble sulphate and borax.

433,877.—Disinfectant. W. F. Simes.

Consists of naphthalene, oil of camphor, and caustic soda.

433,890.—Process of purifying water. P. Degener.

Organic impurities are precipitated by adding magnesium carbonate, then lime or its equivalent is added to precipitate the magnesia, and finally, a chemical, such as carbon dioxide is added, to precipitate the excess of the precipitant.

433,893.—Insulating material. J. Tottrell.

Consists of a mixture of india rubber and aluminium.

433,899.—Artificial plaster. H. Leichsenring.

Consists of glycolline, plaster of paris, water and coloring matter.

433,926.—Apparatus for the manufacture of gas. J. B. Archer.

(Issued August 12th, 1890.)

434,016.—Antifriction compound. H. B. Devlan.

Consists of bamboo fiber, paper pulp, asbestus, plumbago, and a sizing, such as sodium silicate.

434,039.—Explosive compound. H. S. Maxim.

The process of manufacturing consists in mixing and agitating pyroxyline or gun cotton with a compound of nitroglycerin, castor oil, and a proportion of a solvent, such as acetone, insufficient to dissolve the entire gun cotton, then subjecting the product in a partial vacuum to the action of acetone, and then to pressure.

434,074.—Process of sugar refining. L. Sternberg.

An improvement in the art of refining low grade sugars, molasses, syrups, or vegetable juices, consisting, first, in boiling the saccharine solution with a suitable quantity of lime, or its equivalent, thereby decomposing the glucose present, and then separating the resulting insoluble

glucose compounds by filtration ; and, secondly, in treating the remaining solution with acid, and precipitating and removing by a second filtration the resulting lime compounds and the remaining impurities present, preparatory to subjecting the solution thus freed from glucose and injurious compounds resulting from the decomposing of the glucose to further treatment for the extraction of the crystallizable sugar.

434,184.—Furnace for melting glass. L. Houze.

434,243.—Combined fertilizer and insecticide. L. J. Carlile and G. B. Rumph.

Consists of refuse tobacco, bran, cotton seed meal, paris green, powdered hellebore, arsenious oxide and India berries.

434,287.—Process of manufacturing nitrocellulose. G. M. Mowbray.

434,288.—Machine for the continuous manufacture of nitrocellulose. G. M. Mowbray.

434,296.—Flux or solution for coating metals. B. S. Richardson.

A solution for the preparation of iron for coating it with lead, consisting of zinc chloride, oxalic acid, ammonium chloride, and sodium sulphite.

434,330.—Varnish. W. D. Field.

Consists of saturated solutions of pyroxyline and resins or gum resins in suitable solvents.

Issued August 19th, 1890.

434,490.—Composition of matter for mortar. M. Furley, G. W. Chamberlin and P. M. Pomeroy.

Consists of ashes, sand, marble dust, plaster of paris, shorts, and sugar or other saccharine matter.

434,493.—Blue dye. A. Weinberg.

Has the chemical constitution of a disulphonated tertiary dibenzyl derivative of thionine, and shows the following characteristics: it is easily soluble in water with a bright blue color, less soluble in alcohol, insoluble in ether; it dissolves in strong sulphuric acid with a green color, which is changed into blue by addition of water; by reducing agents it is transformed into leucosulpho acid. It dyes animal fibre in an acid bath a greenish blue.

434,502.—Muffle furnace for desulphurizing ores. G. H. Chick.

434,556.—Fireproof paint. J. T. Durkee.

Consists of gas tar, asbestus and clay.

434,569.—Plastering composition. W. Robinson.

Consists of sawdust saturated with a solution of quicklime, alum, and white lead with plaster of paris, glue and sand.

434,570.—Filter. W. H. Sargent.

434,471.—Filter. W. H. Sargent.

434,621.—Apparatus for the manufacture of gas. J. B. Archer.

434,623.—Process of making white lead. A. C. Bradley.

Consists in subjecting a solution of the basic acetate of lead containing between 10 and 12 per cent. of the basic acetate in a slowly moving thin sheet to the joint action of heat of about 120° F and carbon dioxide.

434,645.—Process of treating hides. J. Schmitt.

The process consists in coating the fleshy side of the hides with a warm solution of fresh slaked lime and water while the hair is on the hides, and then piling them one upon the other with the hairy side down and allowing them to remain in this condition from half an hour to an hour, this step in the process serving to raise the hides and increase the thickness thereof, and preceding the usual steps of the depilating lime bath.

434,666.—Water purifying apparatus. O. H. Jewell and W. M. Jewell.

434,694 —Process of reducing iron ores with heated gases. C. Adams.

434,696.—Process of extracting oil. C. F. Binder.

Consists in subjecting the material from which the oil is to be extracted to direct contact with superheated or dry steam of such a high temperature that only sufficient moisture is applied to the material to take the place of the oil in the cells, and then expressing the oil.

434,739.—Method of manufacturing articles for containing petroleum. H. Thame.

Vessels, pipes and other receptacles are made by saturating or impregnating a bibulous paper with a solution of shellac, and then wrapping it layer upon layer to the thickness required, the layers being united by interposed films of shellac.

434,790.—Stove polish. S. A. Kingsland.

Consists of water, borax, shellac, wax and burned cork.

434,798.—Paint. J. G. W. Mastens.

Consists of water, bone black, charcoal, red lead, boiled linseed oil and saltpetre.

434,831.—Filter press. F. Kleemann.

(Issued August 26th, 1890.)

434,941.—Gas washer. W. Morava.

434,948.—Mixer for natural gas. A. A. Phillips.

434,977.—Process of preparing fertilizers. C. Clifford.

Refuse leather is dampened and placed in heaps to sweat or ferment, after which the heaps are opened and exposed to the air. These operations are repeated as long as the fermentation continues, and the resulting product is ground or passed through sieves.

435,000.—Apparatus for cooling and aerating wort for malt liquors. C. D. Stanford.

435,009.—Apparatus for burning hydrocarbon oils. J. H. Bullard and F. A. Nickerson.

435,050.—Composition of manganese and iron for brake shoes. W. W. Snow.

An alloy containing 5 to 15 per cent. manganese.

435,070.—Apparatus for the manufacture of illuminating gas. P. W. Mackenzie.

435,071.—Process of manufacturing illuminating gas. P. W. Mackenzie.

The process consists in evaporating hydrocarbon oil, mixing the products of evaporation with the products of combustion of hydrocarbon oil, steam and oxygen or air, conveying away the gaseous products resulting therefrom and fixing them, employing the fixed gas to evaporate the hydrocarbon oil and conveying away the heavy unevaporated oil and residual products at different levels below the oil being evaporated.

435,076.—Artificial fuel. A. Pagenstecher.

Consists of pulverized coal, charcoal or coke, and starch, saltpetre, and brown sandstone.

435,096.—Funnel. H. W. Hoops.

The bell of the funnel is provided with undercut ribs.

435,129.—Process of crystalizing soda alum. E. Augé.

A solution of aluminium and sodium sulphates is concentrated to a specific gravity of between 1.32 and 1.42 and cooled until it assumes a pasty consistency. The paste is then exposed in layers, upon inclined surfaces, to a temperature between 15 and 20° C. till the mother liquors are separated, whereby crystals of uniform composition and size are obtained.

435,198.—Process of refining crude asphaltum. R. Alexander.

The process consists in dessicating crude asphaltum, recovering the condensable oil given off during the desiccation, and subsequently returning said oils to the desiccated material.

435,269.—Apparatus for burning hydrocarbons. J. H. Bullard.

435,270.—Hydrocarbon burning apparatus. J. H. Bullard.

435,280.—Process of making ammonium nitrate. E. Carey.

Barium sulphate is calcined out of contact with air with a mixture of charcoal and resin oil (or other hydrocarbon), and the product of the reaction boiled with sulphur and water to produce a polysulphide. This is then converted into barium nitrate by means of sodium nitrate. The crystalized barium nitrate is finally decomposed with ammonium sulphate.

(Issued September 2d, 1890.)

435,421.—Battery compound. E. M. G. Hewett.

Consists of chromic oxide and ammonium chloride dissolved in water and combined with sulphuric acid or its equivalent.

435,464.—Ammonia still. G. Stroh and G. Osius.

435,485.—Composition of matter for artificial stone. J. Elliott.

Consists of Kentish rag, Portland or York stone, finely sifted Bath stone dust and water mixed with Portland cement.

435,509.—Insecticide. W. Mann.

Consists of flowers of smart weed, lime and sulphur.

435,670.—Regenerative gas burner. F. Stellwag.

435,720.—Apparatus for the manufacture of gas. J. B. Archer.

435,747.—Diffusion apparatus. L. F. Haubtman.

435,760.—Apparatus for galvanizing. C. E. Matteson.

435,784.—Apparatus for the treatment of cane juice. J. J. Adams and L. W. Tracy.

435,856.—Carburetor. L. C. Parker.

435,862.—Process of making carbon tetrachloride. E. G. Scott.

The process consists in passing dry chlorine gas slowly through carbon bisulphide and iodine, separating the carbon bisulphide and carbon tetrachloride, which is formed from the sulphur chloride by distillation, then fractioning the tetrachloride and treating it with caustic alkali to remove the iodine. The concentrated aqeous solution of iodine is treated with a strong mineral acid and chlorine to set free the iodine. This is extracted with carbon bisulphide and the solution is used in the first step of the process.

435,911.—Preserving compound. O. Williams.

Consists of ground coffee berries, ground cinchona bark and ground cinnamon mixed with flowers of sulphur, pulverized sugar and pulverized potassium nitrate.

(Issued September 9th, 1890.)

435,922.—Process of tanning hides. T. L. Crafton.

The process consists in first immersing the hides in a mixture consisting of fifteen gallons of water, six quarts slaked lime, six quarts ashes and one pound of soda; second, removing the lime from the hides by immersing them in a bath consisting of twenty gallons salt water, one peck of wheat bran, two gallons of buttermilk, half pound of acetic acid (6%) or strong vinegar, and three pounds of salt; third, submerging then in a tan ooze consisting of fifteen gallons of water, ten pounds of gambier, four pounds of salt, three pounds of saltpetre and one pound of acetic acid (6%) or strong vinegar.

435,940.—Compound for converting wrought iron into steel. W. J. Miles, Jr.

Consists of potassium ferrocyanide, glycerrhizinum ammoniatum, and ammoniacum.

436,029.—Apparatus for charging inclined gas retorts. L. VanVestrant.

436,044.—Filtering apparatus, R. E. Miller.

436,133.—Process of separating fats from emulsions. C. D. Hellström.

The emulsions are subjected simultaneously to centrifugal force and to temporary accellerations parallel or nearly so with the axis on which the centrifugal force is generated.

436,199.—Percolator. W. D. Warwick and C. E. Cunningham.

436,225.—Insulator. J. C. Firth.

Consists of pumice stone.

436,227.—Apparatus for extracting oils with the acid of solvents. W. T. Forbes.

436,244.—Method of and apparatus for the production of mineral wool. W. H. Kennedy.

436,250.—Substitute for iodoform. J. Messinger and G. Vortmann.

A red brown odorless powder derived from iodine and salicylic acid, which is insoluble in water, alcohol, ether, and oil, changing to a bright red powder by heating it with mineral acids and melting at about 225° C., with decomposition, and being insoluble in alkalies.

(*Issued September 16th, 1890.*)

436,414.—Tower for condensing acid. C. Graham.

436,497.—Steel alloy. R. Hadfield.

Contains chromium, together with manganese and silicon.

436,534.—Process of manufacturing beer. A. J. Metzler.

Consists in maintaining the beer under a partial vacuum during the ruh stage until it has ripened, then adding a small proportion of saccharine matter, and permitting the carbonic acid gas developed to relieve the vacuum in the cask and beer.

436,535.—Process of making beer. A. J. Metzler.

436,536.—Process of manufacturing beer. A. J. Metzler.

436,537.—Process of preparing ruh beer for market. A. J. Metzler.

436,587.—Process of producing photographic films. J. Schwartz.

The sensitiveness to light is increased by treating the film with formaldehyde.

436,599.—Composition for making fabrics fireproof. R. R. Graf.

Consists of ammonium sulphate, ammonium phosphate, ammonium chloride, lime, sodium tungstate, and water.

436,623.—Apparatus for making extracts. G. S. Andres.

436,624.—Apparatus for making extracts. G. S. Andres.

436,633.—Process of purifying brines. M. M. Monsanto.

Uses trisodium phosphate.

436,684.—Apparatus for and process of continuous rectification of spirits, alcohol, etc. E. A. Barbet.

436,733.—Insulating material. J. W. Easton.

Consists of soapstone, waterproofing material and a fibrous substance.

436,735.—Process of and apparatus for manufacturing alcohol. G. Gingnard and A. Hédouin.

436,764.—Process of and apparatus for rectifying and distilling alcohol. E. A. Barbet.

(*Issued September 23d, 1890.*)

436,812.—Apparatus for making hydrogen gas. J. W. Tallmadge.

436,881.—Apparatus for the manufacture of oil gas. D. E. Teal.

436,882.—Apparatus for making coke and gas. C. N. Trump.

436,895.—Process of electro-depositing aluminium. J. A. Jeançon.

Consists in subjecting a supersaturated solution of an oxysalt of aluminium in water to the action of an electrolytic current passed through the electrolyte between an anode plate of aluminium in a state of division or porosity, and a suitable metallic cathode to be plated.

436,898.—Manufacture of explosives. H. S. Maxim.

Consists in confining gun cotton in a receiver, exhausting the air from the same, then introducing a vaporized solvent into the exhausted receiver until the gun cotton is partially dissolved, then compressing it, and then dividing it up into small pieces or grains.

436,975.—Gas generator. C. W. Gibson.

436,994.—Standpipe for ammonia gas generators. M. Poschinger and H. Vogt.

437,098.—Gas producer. J. W. Culmer.

437,136.—Gas machine. J. S. Wood.

437,140.—Process of calcining gypsum. J. Sickler.

437,163.—Process of manufacturing artificial fuel. W. B. McClure.

437,164.—Artificial fuel. W. B. McClure.

Consists of pulverized culm or coal dust, sand, calcined lime dust, and solid and naturally liquid asphaltums. W. R.