RECENTLY PATENTED INVENTIONS.

Engineering.

CAR COUPLING.—Daniel B. Davis and Josiah J. Fisher, Laramie, Wyoming Ter. This invention provides a means of coupling cars without passing between them, also for elevating the drawhead or adjusting it laterally, and for sustaining the coupling pin in an elevated position when the cars are uncoupled.

AUTOMATIC CAR BRAKE.—Willard R. Wood, Jr., Hedgesville, N. Y. A gear wheel is secured to one of the axles, with which a segmental gear wheel is adapted for engagement, yielding bearings carrying the segmental gear wheel, and a double wedge engaging the yielding bearings, and operated from the brake staffs so as to move the segmental gear wheel into and out of mesh with the wheel on the axle.

RAILWAY SWITCH.—Henry Lesly, Birmingham, Ala. The switch frame is pivoted and consists of pointed rails and suitable cross pieces, with an arm having slots and a projection in combination with a connecting rod, whereby either switch frame may be operated independently of the other by the same lever, or both switch frames may be operated simultaneously in opposite directions.

HYDROCARBON MOTOR.—Oscar Brunler, New York City, and Emil Capitaine, Berlin, Germany. This invention relates to motors worked by a mixture of air and finely divided oil, petroleum, or naphtha, an appliance being arranged within the piston for dividing or sprinkling the oil or naphtha, while the air is caused to pass with great velocity through the appliance into the cylinder, in the direction of the cylinder cover.

GAS COMPRESSING PUMP.—Thomas Farnsworth, San Antoino, Texas. This is a compressor pump for use in connection with refrigerating machines, all parts being open to the action of water or other cooling medium, preventing the gas from becoming superheated and producing more pressure than is required, while the construction is simplified.

WELL SINKING MACHINE.—William B. and Joseph R. Coffin, Bliss, Neb. This invention covers a novel construction and arrangement of parts, the tube to be used in drilling the well to be operated by hydraulic pressure, while the tube itself is made to form a permanent part of the well after water is reached.

ROCK DRILLING TOOL.—James W. Wyckoff, Marquette, Mich. The drill has a cutting head with an operating face formed with acute angular opposite ends and side cutting edges, whereby, when reciprocated, the drill holes will be made long in proportion to their width, and the rock will be split off in merchantable blocks or slabs, requiring less labor in finishing or dressing the quarried stone.

AIR COMPRESSOR.—Emil Kaselowsky, Berlin, Germany. This compressor combines with a water jacket externally ribbed initial compression cylinders, open at their upper ends, and a final compression cylinder within the jacket, with other novel features designed to improve the construction of apparatus for pumping and compressing air.

Miscellaneous.

FOLDING BED.—Walter T. Green, Clinton, Mo. This is a bed of which the casing may be a dressing case or other article of furniture, the bed being of simple and economical construction, wherein the bedding will be contained within the bed when folded up, while the body of the bed is so light as to be readily manipulated with but little effort.

TELEGRAPHY.—Percy F. Jamieson, Batavia, Ohio. This invention provides a telegraph system in which the key used in sending messages will automatically close the circuit as soon as released by the operator, thereby avoiding the necessity of switches and the inconvenience arising from leaving the line open.

STOVE LID.—William A. Martel, South Orange, N. J. This lid is formed with a network disk and a ring having vertical pins which pass through holes in the disk and project above it, to constitute a support for a pan or kettle, being specially adapted for use over an oil flame, whereby the heat will radiate freely and the soot be prevented from escaping.

PUMP.—William Keast, Russell Gulch, Col. This invention relates to an improved valve-operating mechanism to be applied to the suction box of a pump formerly patented by the same inventor, whereby all springs are avoided, and the operating rods will not be distorted in operation.

BURGLAR ALARM.—Janko L. Mikich, Dallas, Texas. It is a door and window burglar alarm which can be conveniently carried from place to place and readily put in position for use, a cartridge being detonated by the tripping of the alarm, as a door or window is opened, when the alarm has been placed in position adjacent thereto, the invention being especially useful for travelers.

VEHICLE WHEEL.—Gunder Olsen, Houghton, Dakota Ter. The hub and connected parts of this wheel are so arranged that, by a slight movement of the hub and parts, a force is exerted on the spokes and felly to tighten or loosen the ties, the wheel being also so constructed as to exclude dust from the journal.

PRINTING TELEGRAPH.—George V. Sheffield, Schenectady, N. Y. The invention consists in a transmitter formed of two rollers to carry forward a perforated sheet, spring-actuated fingers and line wires corresponding to them, with other novel features, for sending messages telegraphically in the form of a printed strip or stencil, with an attachment for making an audible signal for each letter printed.

BOUQUET HOLDER.—John G. S. Smith, Rome, Ga. This invention consists of a small bottle supported on a shield, adapted to be secured to clothing or drapery by means of pins held in the shield, whereby the stems of the flowers are supplied with water and kept fresh a long time.

SNAP HOOK.—Charles E. McClintock, St. Joseph, Mo. This hook has a spring-actuated tongue prolonged beyond its pivot through the back of the hook, and provided with a thumb piece by means of which the tongue may be operated.

LAMP FILLER.—Marion W. Paxson, Virginia City, Nev. This is a filler which may be attached to an oil can and the valve opened, when, by pressing on the sides of the can, the oil may be started and caused to flow, being an improved device for drawing oil from a can by siphon action.

STAR FINDER.—Hubert R. Johnson, Natrona, Pa. An arm is mounted to turn on a suitably constructed tripod, the upper part of the arm supporting a clamping screw on which turns an upwardly extending arm carrying a screw with an arm supporting at its upper end a disk with degrees and subdivisions, the instrument being used in connection with a table in which the north polar distances and the right ascension of each star or other heavenly object are given.

FOUNTAIN RULING PEN.—Julius G. Zwicker, Austin, Minn. Combined with the two jaws and a tubular handle is a centrally arranged feed tube, with yoke-shaped piece and screw nut for adjusting the jaws, a swiveling thimble, and other novel features, avoiding the necessity of frequently refilling the pen, preserving the adjustment of the jaws, and being economical of ink.

DENTAL ANODYNE.—Robert I. Hunter, Norfolk, Va. This is a compound designed to be employed for allaying the sensitiveness of decayed teeth, and consists of cocaine, chloral, and other ingredients, used in proportions and after a manner described.

ROAD CART.—Lewis J. Lyman, Manhattan, Kansas. To the axle are secured the two side bars to the rear ends of which the ends of the rear spring are attached by flexible connections, which suspend the spring and permit it to swing in all directions, with other novel features, whereby the body is relieved of much jar and motion and rendered much easier riding than the common road carts.

CLOCK STRIKING MECHANISM.—Chaim Aronson, Brooklyn, N. Y. This is an improvement adaptable to clocks operated either by springs or weights, whereby the full hour is struck at every quarter hour, the mechanism for driving the minute and hour hands being of any approved construction.

NIGHT LIGHT ATTACHMENT.—James and William J. Stratton, Brooklyn, N. Y. This invention relates to an improvement on a formerly patented invention of the same inventors, improving the connection between the stand and the lamp socket, facilitating an adjustment to throw the light at different angles and upon different objects as desired.

LOCK HINGE.—Thomas Spriggs, Mitchell, Kansas. This is a door check for holding doors in different open positions, a socket piece being mounted on the door frame and a socket piece on the door, in combination with a vertically sliding bolt having locking projections adapted to engage the socket pieces, and a lever for operating the bolt.

SHOE FASTENING.—George T. Stevens, Auckland, New Zealand. The shoe is made with a stiffening at the top to sustain the strain of the laces, and provide means whereby the shoe may be conveniently and readily expanded at the top for the insertion of the foot, and will then be expeditiously laced by simply drawing upon the projecting extremities of the strings.

FUMIGATOR.—John S. Dillman and William B. Kyle, Moscow, Idaho Ter. This is a device for forcing poisonous fumes or gases into holes in the earth to destroy gophers, rabbits, or other burrowing animals, being an exterminator consisting of an air and smoke pump, and a fire box arranged for easy connection, so as to be readily operated with straw or wood and sulphur.

WASHING MACHINE.—Cyrus R. Crane, Housatonic, Mass. The machine consists of a series of tanks, each having a separate water supply and separate overflow, and with revolving rollers, being particularly designed for use in various bleaching operations wherein the fabrics are treated in continuous lengths.

TWO-WHEELED VEHICLE.—Emery W. Baxter, Burr Oak, Mich. The body of the vehicle is made with curved side bars, each formed of two curved plates, preferably of steel, bolted or riveted together, and between them, at the bottom of the body, are curved plates, preferably of cast iron, with bolts to which the slats are secured, a guard being attached to each plate to hold the yoke in place.

WAGON GEAR.—Robert Fernandez, Brooklyn, N. Y. An elliptical spring mounted on the head block supports the body in the usual manner, while this spring is relieved by a semi-elliptical spring arranged central to the wagon, the lower half of this semi-elliptical spring being secured to the upper fifth wheel by a clip, the invention covering also other novel features.

COCKEYE.—John H. Charters, Ekalaka, Montana Ter. The device is preferably made of a flat plate stamped with slot for attachment to the trace, and with two other connected apertures, one of which is of sufficient size to pass readily over the head of a headed bolt on the end of the singletree, the other aperture being of about the same diameter as the shank of the bolt.

HORSE COLLAR.—Alexander McKenzie, Auburn, Ontario, Canada. This collar has a rim, designed to be a practical substitute for hames, and to compel the pad to essentially retain its shape under all conditions until rendered worthless by constant use, while the construction is intended to be simple and economical.

WATER HEATING MANTEL.—Jacob Friedlander, Memphis, Tenn. The mantel, having a grate fireplace, is built with hollow portions and connecting pipes projecting beyond its face, other pipes built in the chimney breast connecting with the hollow portions, while air openings and a water inlet are provided, making a mantel which will effectually aid in heating the room without generating foul or dry air.

SELF-BINDERS, ETC.—Edwin B. Karn, Britton, Dakota Ter. This invention is in the nature of a roller tension device for self-binding harvesters, but which is also designed to be applicable for general use, the invention covering a peculiar construction and arrangement of devices operating under a rolling friction, whereby the tension is not likely to break the cord or twine if lumpy or weak in places.

PIANO ACTION.—Joseph C. Price, Baltimore, Md. This invention provides simple constructions for lifting the rear ends of the keys when the soft pedal is operated to correspond with the movement of the hammer rest, effected by such movement of the soft pedal, so as to preserve the elasticity of the keys and cause all parts to work in harmony.

BOX FRAME BENDING MACHINE.—Sylvester Valentine, Hagerstown, Md. It is specially designed for bending into shape previously prepared wood, and has a work bed with a fixed or stationary section and a series of folding sections actuated by a lever, to dispose the bed sections at right angles to each other, with an automatically retracting gauge, means for effecting individual movement of the sections, and other novel features.

ICE CUTTER.—Daniel Williamson, Sunbury, Pa. It is a hand cutting machine, slowly propelled by means of a crank, the same power also operating the cutting chisel, for cutting grooves upon the surface of the ice upon rivers, to facilitate its division into regular blocks preparatory to harvesting.

SHOW CASE AND BIN.—William V. Young, North Clarendon, Pa. The case or bin has a contracted bottom chamber provided with a chute having a valve or cut-off, in combination with a scoop having its bowl fitted to the bottom chamber, and having an adjustable false head at its inner end, being designed to facilitate dealing out the contents of the bin as merchandise.

NEW BOOKS AND PUBLICATIONS.

THE PRINCIPLES OF THERMODYNAMICS, WITH SPECIAL APPLICATIONS TO HOT AIR, GAS AND STEAM ENGINES. By Robert Rontgen, Teacher in the Polytechnic School at Remscheid. Translated, revised, and enlarged by A. Jay Du Bois, Ph.D., Professor of Dynamic Engineering in the Sheffield Scientific School of Yale College. In two parts. Part I. General principles, hot air and gas engines. Part II. Heat, steam, and steam engines. With 103 wood cuts in the text. Second edition. John Wiley & Sons, New York, 1888. Pp. xx, 707. Price $5.

The work opens with two lectures of Professor Verdet on the mechanical theory of heat, giving popular and scientific expositions of this important subject. The investigation of heat engines forms the subject proper of the second lecture, and it also gives a very complete review of those applications of the new theory which lie outside the domain of physics, and especially of mechanics. The part of the work on thermodynamics, immediately following the lectures and notes, contains the mathematical treatment of the subject of heat, and is presented in an elementary form well suited to beginners, demanding of them only a knowledge of algebra and the simplest principles of mechanics. Following this portion, we have another valuable feature of the work, in the application of the theory of heat to all the more important cases arising in practice. This has been so fully and completely done as to make the work extremely valuable as a book of reference. Numerous practical examples have also been given, with the reduction and heat tables necessary for their rapid solution. An abstract from Mons. Pernolet's work, "L'Air Comprimé," follows, containing, among other things, a diagram of practical value, inasmuch as the important quantities—initial pressure and degree of expansion—can be directly obtained from it for an engine consuming a given quantity of air and of a given horse power. Zeuner's theory of superheated steam is another of the valuable additions to English engineering literature contained in this new work. In the portion relating to superheated steam, as in other portions of the work, the practical bearings of the subject have received full consideration. There is also a summary of the principle which should govern the construction of the steam engine. A complete calculation of a proposed engine is given, taking into account the action of the steam in the cylinder, the proper degree of expansion and compression, the cross section of steam passages, the theory of the crank, the dimensions of journals and flywheels, the mean effective pressure for overcoming the resistance of friction and for working the cold water and air pumps, the consumption of steam and fuel per hour, and the cost of a horse power per hour. Complete steam tables are given, both for English and French measures.

ELEMENTS OF MACHINE DESIGN. By J. F. Klein, Professor of Mechanical Engineering in the Lehigh University. The Comenius Press, Bethlehem, Pa., 1889. Pp. vi, 208.

The subject of scientific design of machinery elements, including gearing, bolts and nuts, screw threads, keys, belt gearing, rotating pieces, bearings, and connecting rods, is very fully treated in this book, with full formulæ and many illustrations of parts. The illustrations are on bond paper, and are designed with special reference to be made subjects of studies for mechanical draughtsmen. At the end of the book a number of supplementary tables for calculating gearing are given. The work, in a short compass, contains an immense amount of material and illustrates a type of book which should be in the hands of every intelligent machinery constructor.

ALGEBRA, AN ELEMENTARY TEXT BOOK, FOR THE HIGHER CLASSES OF SECONDARY SCHOOLS AND FOR COLLEGES. By G. Chrystal, M.A., late Fellow and Lecturer Corpus Christi College, Cambridge; Professor of Mathematics in the University of Edinburgh. Part I. Adams & Charles Black, Edinburgh, 1886. Pp. xx, 542.

The first part of this elaborate work, following the general order of algebraic treatises, goes through fractions, ratio and proportion, equations, series, logarithms, interest and annuities. Although purporting to be merely an elementary text book, the fact that the first part comprises nearly 600 pages gives some idea of the thoroughness with which the matter is treated by the distinguished author.

LA TELEGRAHPIE ACTUELLE EN FRANCE ET A L'ETRANGER. Par L. Montillot. Paris, J. B. Bailliere et Fils, 1889. Pp. viii, 334. 131 illustrations.

This book, liberally illustrated, treats of the different kinds of telegraph apparatus in actual use, the subject of batteries and their arrangement with particular reference to telegraphic uses, and various designs for poles and general line installations and many practical details make up the work. A rapid apparatus of the Wheatstone type and multiple transmission apparatus and marine telegraphy are included. A portion of the work is devoted to the telephone.

ELEKTRISCHE APPARATE, MASCHINEN UND EINRICHTUNGEN. Von W. E. Fein. Stuttgart, 1888. Pp. xii, 292. 297 illustrations.

A large series of electric apparatus for which the author of this work is responsible is described in its pages. The different pieces of apparatus are described, each one in the order of its production as regards time, beginning with the year 1867. The dynamo-electric machine is described. Through successive years the work carries us down to July, 1887, under which date a new form of a bipolar dynamo-electric machine is given. Between these two dates a great variety of apparatus is

described, including clocks, telephones, lighting apparatus, signaling appliances, telegraphy, measuring apparatus, etc. As the chronological order followed causes the apparatus to be described without any reference to a general plan, a table of contents is given, in which the whole body of material is systematized and the different subjects are referred to by page number. A portrait of the author is also given.

DIE ERZEUGUNG UND VERTEILUNG DER ELEKTRIZITAT IN ZENTRAL-STATIONEN. Von Dr. Martin Krieg. Band II. Magdeburg, 1888. Pp. xvi, 376.

Central station plants, with details for wiring districts, the use of accumulators, systems of regulating the current, and all practical details which come under this subject, are very fully treated in this work. It is illustrated by 141 cuts, and numbers of formulæ are given throughout the work for calculating the working of different types of apparatus. The illustrations are both diagrammatic and perspective, and the entire work gives a very full view of the subject of electric lighting plant.

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Friction Clutch Pulleys. The D. Frisbie Co., N.Y. city.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N.Y. See illus. adv., p. 28.

No. 11 planer and matcher. All kinds of woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

Duplex Steam Pumps. Volker & Felthousen Co., Buffalo, N. Y.

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Notes & Queries

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Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

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Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(98) S. S. B. writes: Please give directions for ventilating a dry room. I want to know the correct method of removing vapor or dampened air from a room artificially heated room used for drying fabrics, yarns, fibers, etc. Where should fresh air be let in, if at all, and where let out, or should the damp air be removed by exhaust from floor? If so located, at what height from floor? A. Drying rooms should have a fresh air inlet immediately beneath the source of heat. If a stove is used, it should be so arranged that the air shall enter and surround the stove and receive its heat before spreading into the room. If steam coils are used, they should be placed or spread a few inches above the floor, with the fresh air entering and spreading under the pipes. The amount of air passing through a drying room should not be so great as to depress the temperature to a degree that will lessen the time of drying, which should always be regulated to suit the amount of heat and the proportion of water to be evaporated. Very wet goods require strong heat as well as rapid circulation. The exit holes should be so distributed as to force the current through all parts of the room alike, especial attention being given to induce circulation of air in the corners. For goods that have passed through a wringer or centrifugal, the room should have a temperature of from 130° to 140°, with vent openings of one square foot to a thousand cubic feet of space, with natural draught due to the height of the room only. This can be increased by a flue or fan if enough heat is developed to keep up the temperature and thus expedite the work. The practice with some establishments is to close the room entirely with a full charge and heat the contents up to 175° and then ventilate, when the goods apparently steam themselves dry. This cannot be done if goods are required to be constantly fed to and withdrawn, as in the laundry business.

(99) F. H. P.—"Harden and temper" is the proper phrase to use in speaking of preparing steel tools. Tempering only refers to the reduction of the hardness to the required temper, which is generally regulated by the color of oxidation. The words "temper" and "tempering" as translated from the Odyssey and Pliny's works, and as used by writers in the middle ages, are used to mean the two operations of hardening and drawing to a temper, which is only a condition of hardness; so that, in this light, its use may by custom make it proper, but among those using technical distinctions for special operations the words harden and temper, or drawing the temper, have distinct meanings. The word temper is also applied to many mechanical operations that signify alloying or modifying.

(100) W. R. writes: In answer to query in the SCIENTIFIC AMERICAN, of September 1, 1888, query No. 18, concerning the relative power of engines, you state that one engine, 15¼ inches by 17 inches stroke, will produce 25 per cent more power than two engines, 12 inches by 12 inches, all conditions being equal. I differ from you in that respect, as the combined areas of the two 12-inch cylinders exceed the one 15¼-inch cylinder. Please explain why the indicated horse power is not greatest in the two 12-inch engines. A. The areas alone do not make a proper comparison between the two engines 12×12 and one engine 15¼×17. It is the volume or contents of the cylinders that should be compared at the same number of revolutions. The indicated horse power of the larger engine is 15 per cent greater than the two small ones. The difference in friction and loss by clearance, leakage, etc., will add about 10 per cent in favor of the large engine, making really an economy of 25 per cent.

(101) D. H. C. asks: How can I make a gold bronze solution? One of such a color as hardware trimmings are finished in. I have tried innumerable proportions of copper and zinc salts and also with the muriate of tin. The color runs direct from the red copper to the yellow brass, and I obtain no intermediate shades. A. The shading of the color in bronze mixtures of the salts of copper and zinc or tin is rather a delicate and difficult matter. It is done by touching the articles in solution with a stick of zinc to start a galvanic action, when by varying the quantities of the salts in the mixture a desired color may be had. See a most interesting and valuable article on the bronzing and coloring of metals in "The Techno-Chemical Receipt Book," which we can mail for $2.

(102) E. W. E. and L. T. & S.—To make printers' rollers, use:

Best glue	10½ lb.
Black molasses or honey	2½ gals.
India rubber, dissolved in alcohol	1 lb.
Venice turpentine	2 oz.
Glycerine	12 "
Vinegar	4 "

The above formula is given for the mysterious "black composition," so durable and elastic, and known but to very few persons until recently. Purified India rubber only is used. To recast add 20 per cent new material. The old home receipt is, 2 pounds best glue, soaked over night, to 1 gallon of New Orleans molasses. Will not recast.

(103) E. B. writes: Can you give me any information regarding an invention for producing power from sound? I have read of such a discovery having been made, but I cannot obtain any information as to whom the inventor is or what the invention consists of. Can you enlighten me? A. You probably refer to Edison's motophone. This is fully described and illustrated in the SCIENTIFIC AMERICAN of July 27, 1878, page 51. The motions of a diaphragm carrying a ratchet and pawl or claw, and spoken against, cause a wheel to rotate. It is only a scientific curiosity.

(104) G. H. writes: I would ask if there are sea-going steamships that have propellers forward and aft. If not, would it not be practical to have propellers in both ends of sea going steamships? A. No such steamer is now running. It would seem quite practical to build one. The long shaft would, however, occupy valuable room. A ferryboat is devoted to deck accommodation, and an ocean steamer to hull accommodation, hence the double screw is better adapted to the former.

(105) J. McJ. & B.—In article on page 356, referring to manufacture of wine, to reduce figures given to American weights and measures make following substitutions. For liters read 0·88 quart, for kilogramme read 2·02 pounds, For hectoliters read 88 quarts. For 15° C. read 59° Fah. (common thermometer), for 20° C. read 68° Fah., for 30° C. read 86° Fah.

(106) Inquirer asks for a recipe for koumiss. A. Consult SCIENTIFIC AMERICAN SUPPLEMENT, No. 130. Also SCIENTIFIC AMERICAN, vol. 51, pages 3 and 225.

(107) W. W. C.—Small streams that have not been used by the public, or made navigable by special act, can be fenced by owners of property through which they run. Having been so fenced for a time without objection from others interested in keeping the stream free, the title becomes legal as against the right of breakage, but does not bar a legislative act making the steam a navigable one in law.

(108) J. J. C. writes: I would like to know from you what illuminating gas will dissolve. A. Nothing under ordinary conditions. It will attack gradually hydrocarbons, and soft India rubber, but no true solution in the gas occurs.

(109) H. A. G. asks: What would be proper speed for line shaft in machine shop, doing light work? A. For light shafting, 175 revolutions per minute is a convenient and medium speed. Circumstances may require more or less, from 150 to 250 revolutions. The higher speeds are generally used for wood-working machinery.

(110) J. J. T. asks: How many heat units are there in one pound of (*a*) good coal. Also of (*b*) average coal. A. (*a*) 7,760; (*b*) 7,500.

(111) J. P. E. asks if the battery described in SCIENTIFIC AMERICAN reference book will do for electro-plating; if so, how large should it be made to run a vat containing one gallon of nickel solution? A. The battery is too small; the plates should be held in a jar six or eight inches deep and four inches apart. Three or four such would answer for a gallon bath. We advise you to study our SUPPLEMENT on electro-plating before trying it practically.

(112) E. C. B.—There are many ores of copper—malachite or carbonate, oxides, sulphides, etc., and finally native copper. The latter may be nearly pure metal, and some of the low grade ores may run below ten per cent of metallic copper.

(113) O. G. writes: In melting granulated sugar, a blue scum rises on the top. Is it injurious? A. No; from the description it is impossible to say what it is.

(114) The writer is seventy years of age, and has been a constant reader of your paper since the issue of its first number, and I have a number of the paper by Porter that preceded its issue. I think I have perused the columns of every copy of the SCIENTIFIC AMERICAN, and a large part of the SUPPLEMENT. I have a fine specimen of a bolide or meteorite, and all the phenomena of their passage through our atmosphere are explained in scientific writings except their explosion, which sometimes occurs. I have witnessed the explosion and heard the report of one that passed over the city of St. Louis many years since. My inquiry is, what is the cause of their explosion, or how does it occur? I think a correct explanation in the SCIENTIFIC AMERICAN would be read with interest by others than myself. R. F. STEVENS, M.D.

A. As to the cause of the explosion of the meteorite, Haidinger suggested that it was not due to the breaking of the meteoric mass, but rather to the sudden rush of air into a vacuum which is so quickly left behind in the early part of its course. Perhaps of considerable interest in this line is Maskelyne's reference to the three explosions of the meteor which fell at Butsura, India, on May 12, 1861. They were heard at Goruckpur, 60 miles distant. Fragments of the stone were picked up three or four miles apart, and, strange to say, it was possible to reconstruct with considerable certainty portions of the meteorite of which they were a part. In this case two of the fragments found some miles apart fitted perfectly, and were not incrusted at the surface of the fracture, indicating a second explosion or rupture of the time when the velocity of the meteorite had been so far reduced that the material of the new pieces was not melted to the generation of heat. Of the meteoric stone which fell on May 13, 1864, at Orgueil, France, fragments reached the ground before the sound of the explosion was heard, proving that the fracture had taken place at a period of its course when the velocity was greater than that of the sound vibrations, which travel 1,100 feet per second. Hence it is believed that the sudden generation of heat resulting in the expansion of the outer shells accounts not only for the breaking of the meteorite into fragments, but also for the crash like that of thunder which is the usual accompaniment of the fall of the meteorite. After the explosion sounds are generally heard which have been likened to the flapping of the wings of wild geese, roaring of fire in the chimney, and rumbling of the vehicles over the pavement, tearing of calico or the bellowing of cattle, which are evidently due to the whirling of the fragments in the air in the vicinity of the observers. GEORGE F. KUNZ.

(115) J. J. asks how to reduce objects to microscopic size by photography. A. Place along side of the object to be reduced a large hand bill with big printed letters thereon. Then carry the camera far enough away until the print is just clearly discernible on the ground glass, or, in photographic terms, is accurately sharp. The image of the object to be copied will then probably appear too small to be seen by the naked eye. Make the exposure in the regular way. By examining the resulting negative with a microscope, the details of the object should appear distinct and clear. From the negative, positives on glass are readily made.

(116) G. J. H. asks for a platinum toning solution. A. The following is recommended as a good platinum toning solution:

Chloride platinum	1 grain.
Nitric acid	1 minim.
Water	4 oz.

(117) F. W. A. asks how to save the silver from dry plates that have been carelessly exposed to white light. A. Prepare a strong bath of hyposulphite soda and water (4 oz. of water to one ounce of soda), put the plates in this until the film is cleared. When all of the silver in the plates has thus been dissolved out, immerse in the solution three or four strips of bright fresh zinc about two inches wide by six inches long. After standing about a week, the silver will collect upon the surface of the zinc. In lieu of this, the silver may be thrown down by a solution of sulphuret of potash in the form of a black sulphide. It is dried and submitted to further processes until it is refined. This is better done by a refiner. 2. How may a camera bellows full of pin holes be repaired? A. The best way is to remove it and make a new bellows out of paper, as described in SCIENTIFIC AMERICAN SUPPLEMENT, 625. A coating of an alcoholic solution of shellac and lamp black on the outside might stop the pin holes, but a new bellows is preferable.

(118) J. H. B. asks: What power would an overshot water wheel develop that is eighteen feet diameter, four feet buckets, with cogs screwed to spokes four feet from hub? Flume twelve inches square, pinion ten inches. A. With a 12 inch square open flume or a 12 inch square weir, which is indicated by your letter, with 18 feet fall the whole value will be 9 n. p.; with a well constructed overshot wheel you may realize 7½ effective horse power. If the flume is under pressure, we must know the head and length for a correct answer.

(119) W. W. S. asks how the soap composition used by painters as a vehicle is made. A. Slice 2½ lb. yellow soap and dissolve in 1½ gallons boiling water, and while hot mix and grind with 3½ gallons of oil paint of the desired color. This makes a flexible paint, suitable for canvas.

(120) J. M. W. asks: Which is the best engine for pleasure yachts, say 27 ft. over all, 6½ ft. beam, also the best motive power—steam, electricity, or compressed air; the best fuel, coal or oil or naphtha? What are the names of the different marine engines and companies who deal in them? A. There is quite a variety of engines for small yachts or launches, with steam boilers using coal, crude and refined petroleum, and naphtha. We cannot undertake to particularize in these columns as to which would be best for special uses, but advise you to write to some of our advertisers for their catalogues. Electricity has not yet been made practically available for such purposes except in an experimental way, and compressed air, we believe, not at all.

(121) S. B. D. L. asks us to publish instructions how to set the valve of a plain slide valve engine. Also how the cam on engine shaft should be set. A. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 13, which we mail for 10 cents.

(122) J. C. T. asks: What kind of oil should be used for drawing the temper of steel, the oil to be heated to 500° or 600°? An oil that will not take fire, heats readily, and does not evaporate too fast is what is wanted. A. There is no oil that does not take fire at some temperature. Linseed oil boils at 597°, whale oil at 630°. Whale oil is the best to temper with.

(123) G. V. asks: 1. How do you account for the so-called Northern Lights and the Dipper stars, being seen toward the south when observed from positions north of the 78th degree? A. The Dipper stars have a less latitude than 78°. The Aurora or Northern Lights are supposed to have a focal point around the magnetic pole, which is in latitude 70° in North America. Hence observers at the north of the magnetic pole will often see the Aurora at the south, though not always. 2. How is it that the sun in the neighborhood of Behring's Strait can be seen due north on the night of June 21? A. Because it is in sight for 24 hours during the long summer daylight, and hence is during part of its course due north. 3. If Keely's motor is a humbug, as you have often published, then why did the chief justice put him in jail? A. Keely was imprisoned for contempt of court-mandamus.

(124) W. O. suggests that lamp chimeys at the bottom should be made large enough to get the hand in for cleaning purposes, and that a diameter of four inches would answer. This would also give a broader base for the chimney, and make it safer.

MINERALS, ETC.—A specimen has been received from the following correspondent and examined with the results stated.

C. E. H.—The mineral is iron pyrites, of no value. Many species oxidize and go to pieces in the air.

Enquiries to be Answered.

The following enquiries have been sent in by some of our subscribers, and doubtless others of our readers will take pleasure in answering them. The *number* of the enquiry should head the reply.

(125) I have been staining ivory with a solution of nitrate of silver. After remaining in the light a few minutes it turns black, but after being excluded from the light awhile it turns to a pale yellow. On being exposed to light again, it turns black again. Can you inform me of anything that will keep it a permanent black, or of anything in place of it?—E. J. D.

(126) In a discussion with a gentleman widely noted for his good judgment on certain scientific questions, I could not agree with him on the question of heating a room, and appeal to the SCIENTIFIC AMERICAN as referee. We are heating with overhead steam pipes, and he claims that a ventilating grate at the bottom of a flue would assist in heating the room—would suck out the cold air at the bottom and pull down the hot air from above. I claim the only effect of the grate would be better ventilation at the expense of heating, as cold air must come in from outside the room if any is led away up the flue from the inside. 2. Can an air-tight room be heated with a coal or wood stove within it? And if not, why? 3. Do you accept the theory of direct heat rays from any heated surface? My disputant claims heat is only conveyed by air next an object becoming heated and in turn heating contiguous objects.—B. L. A.

(127) Is there any process by which the green and blue stains found in rock can be produced permanently by artificial means, that is, by chemicals or heat?—H. W.

(128) Please to inform me how to make violin bow resin.—O. S.

(129) I would like to know if the aldermen of a city have the legal right to grant privileges to individuals or corporations in the public highway, that are detrimental to the traveling interest, and if they can, is there any limit to their power?—E. R.

(130) I have a military uniform that is trimmed with gilt braid. The braid has become dirty looking. Can you please inform me how I can brighten the braid without injuring the cloth?—P. C. W.

(131) Two pulleys exactly alike and each doing the same work in the same time, say, for instance, lifting a load of 1,000 pounds; in one case the pulley does the work directly, in the other case a countershaft is used and geared two to one, one pulley of course running twice as fast as the other one; S claims that the pulley running fastest will require less set