RECENTLY PATENTED INVENTIONS.

Engineering.

CAR UNCOUPLING DEVICE.—William O. Rutledge, Galveston, Texas. This invention covers a novel construction and arrangement of apparatus whereby the uncoupling may be quickly and readily effected from either the side or top of a car or from the locomotive, while the brakes will be automatically applied by the detachment of the brake couplings.

Agricultural.

COTTON PLANTER.—David H. Ellington, Cuthbert, Ga. This is a machine designed to open the furrow, drop the seed, and cover it in one passage over the field, in a manner to economize the seed and prevent uprooting or damage to the plants intended for full growth when the plants are chopped to a stand, while the machine may also be used advantageously for distributing fertilizers.

COTTON PICKER.—James W. Wallis, Birmingham, Ala. This is a machine having pickers for extracting cotton from the bolls, the pickers being alternately thrust into and withdrawn from the cotton plants as the machine travels along, while the machine has devices for transferring the cotton extracted by the pickers back to a suitable receptacle.

Miscellaneous.

FIRE ESCAPE.—Thomas B. Nutting, Morristown, N. J. This device is made with two detachably connected roller cages, each having a lever arm from which the body-supporting slings are suspended, an adjusting lever being also arranged in connection with the roller cages, whereby the frictional grip upon the rope may be varied by the party using the escape to increase or decrease the speed of descent.

SURGICAL KNIFE.—Justus Schmitt, Osnabruck, Germany. The knife handle is made with detachable and interlocking parts in which the blades are pivoted, the parts of the handle being locked together when the blades are closed, but free to be separated when the blades are open, while the knives may be readily taken apart and thoroughly cleaned after use.

PAPER MAKING MACHINE.—Lyman E. Smith, Mittineague, Mass. This invention provides a new and improved stuff regulator for paper machines, for regulating automatically the flow of pulp from the pulp box to the paper machine, the invention covering various novel features of construction and combinations of parts.

CASTER FRAME.—James J. Sullivan, Brooklyn, N. Y. The frame or horn is U-shaped, with apertures or bearings for the wheel axis, while the lower ends of its sides extend in front and rear of the apertures, beyond the periphery of the wheel and below the axis, so that the casters will prevent the chair or other article in which they are used from being easily tipped over.

PACKING AND BARRELING MACHINE.—Daniel F. Shoup, Ludington, Mich. This is a machine designed to pack salt, sugar, cement, and similar materials in barrels, from a pile, its parts being adjustable relatively to each other as may be required within a packing room without any change of the main shaft-supporting frame.

OIL DISTRIBUTER.—Edward Williams, Lynn, Mass. It consists of a double truncated, cone-shaped receptacle, having apertures for the flow of oil in connection with a protective covering, the distributer to be cast overboard and drawn along through the water, or to be hung from a ship's side, to allow of the escape of oil in rough weather to quiet the sea.

FELT HAT.—Frederick W. Cheetham, Hyde, Chester County, England. This invention consists in a felt hat formed of a completely felted body having an exterior or superficial veneer or covering of fine fur or wool, free from proofing or stiffening material.

SAWING ATTACHMENT.—George M. Cobb, Philadelphia, Pa. This is an improved attachment for shapers or like tools, having a reciprocating movement to saw off metallic or other bars, or to form slots, splines, etc., the attachment being also adapted to various other machines having a reciprocating movement.

BALING PRESS.—Anton Freytag, Flatonia, Texas. This is a press which can be conveniently manipulated in either a vertical or horizontal position, and readily transported in a field from stack to stack of hay, while it may be effectively and expeditiously operated by two persons.

SHIRT.—Thomas J. Holmes, Sioux City, Ia. This is an improved garment, wherein the body is made of one material, as of woolen, while the collar band, bosom, and cuffs are of another material, as of linen or cotton, the invention covering novel features of construction and combinations of parts.

LOCK.—George E. Hyatt, New York City. This is an improved combination lock especially adapted for use in connection with a letter box, the invention providing a simple and easily manipulated device whereby the use of a key will be dispensed with.

GOLD LEAF CUTTER.—James F. O'Hara and Robert H. Kaulfuss, Brooklyn, N. Y. It is a kind of knife composed of several strips with interposed blades beveled at their ends, and united by solder, the device being adapted to cut gold and other leaf into several narrow strips at a time, without waste of gold.

SOAP.—Inrank A. Packard and John D. Struble, Salina, Kansas. This is a composition designed for use in connection especially with laundry soap, and by the use of which bleaching liquids or powders and acids may be dispensed with, this soap compound being designed to effectually clean and whiten the most delicate fabric, as silk, satin, laces, etc.

THILL COUPLING.—William H. Pardee, Columbia, Dakota Ter. Two patents have been granted this inventor on this subject, the coupling being provided with a bar having an elongated right-angled end, a mortised and slotted lever being received upon the bar and adapted to bear on the inner end of the thill iron, a threaded stud being inserted in the elongated bar and having a milled nut bearing upon the slotted end of the lever. in connection with a spiral spring, one of the patents also being specifically for a simple and efficient coupling bolt fastener to prevent rattling, and which cannot become accidentally loosened.

SNOW PLOW.—Combined with a frame mounted to travel on a railroad track in front of a locomotive are section plows mounted one above another, the highest one held sightly in advance of the one just below, and designed to remove the top layer of snow, steam being used to heat the plow sections, and thus aid the latter in readily entering hard-packed snow.

FINGER RING.—David Kutner, Brooklyn, N. Y. The ring is formed with a gem box and surrounding flange having screw sockets, in combination with small screw clamps for holding the setting in the gem box in such way that it may be readily removed and another put in its place, the invention being also applicable for brooches, lockets, etc.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Best in market; "New Model Crandall Type Writer," 202 LaSalle Street, Chicago. Send for circular.

Air compressor for sale cheap. Also steel tanks, iron rail, cars, etc. Address The Buffalo Wood Vulcanizing Co., Buffalo, N. Y.

Pratt & Letchworth, Buffalo, N. Y., solicit correspondence relative to manufacturing specialties requiring malleable gray iron, brass, or steel castings.

For the latest improved diamond prospecting drills, address the M. C. Bullock Mfg. Co., Chicago, Ill.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

Link Belting and Wheels. Link Belt M. Co., Chicago.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Perforated metals of all kinds for all purposes. The Robert Aitchison Perforated Metal Co., Chicago, Ill.

The Holly Manufacturing Co., of Lockport, N. Y., will send their pamphlet, describing water works machinery, and containing reports of tests, on application.

Pedestal tenoner. All kinds woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

Billings' Drop Forged Lathe Dogs, 12 sizes—⅜ to 4 inches. Billings & Spencer Co., Hartford, Conn.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Hoisting Engines, Friction Clutch Pulleys, Cut-off Couplings. The D. Frisbie Co., 112 Liberty St., N. Y.

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

Automatic taper lathes. Heading and box board machines. Rollstone Machine Co., Fitchburg, Mass.

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

☞ Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

NEW BOOKS AND PUBLICATIONS.

KRUPP AND DE BANGE. By E. Mouthaye. New York: Thomas Prosser & Son.

ALFRED KRUPP. By K. W. and O. E. Michaelis. New York: Thomas Prosser & Son.

It is perhaps but natural that the New York firm which has for years been the representative in this country of the famous steel works at Essen should feel sufficient admiration for their founders and proprietors to become the publishers of these monograms. The comparison of the Krupp and De Bange systems of heavy guns is made by a captain on the Belgian general staff, and, although it contains much matter of interest, it is evident that such comparisons have yet to be carried much farther than they have yet been to reach judgments that will be entirely conclusive. The sketch of the life and work of Alfred Krupp is translated from the German of Victor Niemeyer.

THE ELECTRIC MOTOR AND ITS APPLICATIONS. By Thomas Commerford Martin and Joseph Wetzler. New York: W. J. Johnston. Quarto. Pp. 282. Price $3.

The design has been in this work to treat the modern motor with the utmost fullness possible, the contents of the book being largely based upon articles that have appeared within the past two or three years in an electrical journal of which the authors are editors. The book is profusely illustrated, and the typography is excellent. Among the systems treated of with most thoroughness may be mentioned the Daft, the Sprague, the Field, and the Van Depoele, for a prolonged examination of which the authors have had special facilities.

The Pope Manufacturing Company, of Boston, has issued the Columbia Bicycle Calendar and Stand, a convenient little memorandum pad suitable to occupy any vacant space on a desk. The pad is well filled with quotations designed to be of especial interest to the bicycler.

Received.

THE CHEMISTS' AND DRUGGISTS' DIARY, 1889. Published by the *Chemist and Druggist*, London, Eng., and presented to every subscriber.

PREPARING FOR INDICATION; or, practical hints resulting from twenty-three years' experience with the steam engine indicator. By Robert Grimshaw. New York: Practical Publishing Company.

STEAM HEATING. By Robert Briggs. New York: D. Van Nostrand.

Notes & Queries

HINTS TO CORRESPONDENTS.

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.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(44) D. J.—Wood is not petrified by any artificial treatment.

(45) J. V. B. writes: A coating varying in color from dark brown to gray forms on the zinc plates of a bichromate of potash battery. Zincs are best quality rolled zinc, well amalgamated and 6×4×¼ inch. Carbons are electric light carbons, with copper removed by nitric acid. How can such accumulation be prevented, as the battery is much weaker after first using? A. A simple bichromate battery is quickly exhausted; the zinc also is attacked by the chromic acid. For constant current you need a porous cup for the carbons, with the bichromate solution contained in it, with dilute sulphuric acid in the large cup. A porous cup combination will overcome your trouble.

(46) C. O. M.—The following is a gear table for 11-thread feed screw. You may interpolate for any required thread by dividing teeth in spindle gear by the number of threads on feed screw and multiply the quotient by number of thread required. The product will be the number of teeth in the screw gear. Use any other gear in the list for transfer, or two gears of the same size to change the motion.

	Screw gear.	Spindle gear.
For 10 threads	40	44
11 "	44	44
12 "	48	44
14 "	56	44
16 "	64	44
18 "	72	44
20 "	80	44
24 "	96	44
30 "	90	33
40 "	80	22
50 "	100	22
60 "	120	22
120 "	240	22

(47) F. R. C. asks: 1. Will a boiler 20 feet long with 2 flues 14 inches in diameter consume more fuel than a tubular boiler of the same capacity per horse power, using coal or wood? A. The economy of a boiler can only be known from observations of the amount of waste heat radiating from the brickwork, the exposed part of the boiler, and, the most important of all, the temperature of the gases going up the chimney. Any form of boiler that is overworked is not economical. Any properly set boiler, well covered in on top, and from which the heat in the flue chamber after it has left the boiler is not over 600°, may be said to be economical, whether it is a flue boiler or a tubular boiler. This heat standard is also modified somewhat by the pressure of steam carried in the boiler. The waste gases with a high pressure (say 100 pounds) are naturally of a higher temperature than from a low pressure (say 50 pounds), when run with the most economy as to fuel and use of steam. A flue boiler that is driven to excessive work may waste more heat than a tubular boiler having the same amount of effective heating surface. The large flues allow the heated air to flow in larger masses and at greater velocities, which is the principal point against flue boilers. 2. I have an engine 9 inches bore and 9 inches stroke, which I am running at 120 revolutions per minute, or the piston travels 180 feet per minute. Do I gain power by running the engine so fast? A. Your engine is running at an economical speed. You gain in power over lesser speeds. The figures you give are not sufficient for definite opinion.

(48) J. A. W.—Mange is a parasitic disease and is cured by insecticidal applications. Many formulæ have been tried. One runs thus:

Sublimed sulphur	16 parts.
Whale oil	16 "
Mercurial ointment	1 "
Oil of tar	1 "

The disease is recognized by loss of hair, local irritation, and desire to scratch. If not perfectly eradicated, it will reappear on cessation of treatment.

(49) E. De F. asks how to make and keep glue liquor always ready for use, that is glue water, so it will not, when cool, thicken. A. To keep glue liquid add a little acetic or nitric acids. For liquid glue the following formula is given:

Glue	8 ounces.
Water	½ pint.
Nitric acid (sp. gr. 1380)	2½ ounces.

We doubt if we can give you a wood filler combining the requirements stated.

(50) R. E. H. asks: 1. How can I keep a fine surface on a canoe in salt water? I have tried spar varnish, and it does not answer. A. We know of nothing better than boiled linseed oil, often rubbing clean with raw linseed oil on a coarse woolen cloth. 2. How can I make glue clear? A. You cannot make common glue clear. Use only white glue or isinglass.

(51) D. R. J.—The specimen sent is pyrites in calcite. It may contain a little copper, but not enough to make it of any value.

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.

(52) Please give through your paper a process for giving wire a smooth polish, either by pickling or galvanizing, and oblige.—W. D. R.

(53) Kindly furnish me with a good formula for a good brick enamel for various colors, and the *modus operandi* for obtaining a good and lasting enamel upon the bricks.—O. K.

(54) 1. I want to make small springs for my violin holder, about ¼ of an inch wide and 2 in. long. What kind of steel shall I use, and how can I make them? 2. I desire to print my name in gold upon velvet. How can I make it?—R. T. F.

(55) Our city water mains carry a pressure of 60 lb. Suppose we attach a hose to one hydrant with a 1¼ inch nozzle and to another hydrant we attach a hose with a 1 in. nozzle, which of the two will throw the highest stream of water with the same pressure?—W. H. G.

(56) Will you please inform me the number of horse power a pipe five feet in diameter and thirty miles in length would convey of compressed air, the pressure being 100 lb. and 200 lb. per square inch?—J. S.

(57) 1. How many horse power will it require to drive a dynamo large enough to produce electricity enough to heat a round plate of iron 6 in. in diameter and 2 in. thick, to a low red heat, say 1,000° F. in 30 minutes time? How much power will it require to heat said plate to 2,000° F. in same length of time? 2. How much more power will it take per hour to heat a plate 8 in. in diameter by 4 in. thick and hold it at 2,000° for 24 hours, the temperature in room being held at 75°?—G. S.

(58) What is the test for China clay, and how does it sell?—W. H. C.

(59) I am a engineer and am running 35 horse power boiler and engine, but I am only utilizing 15 horse power. Now, for economy, I would like to know how far should the grate bars be from the boiler to give the best results in burning coal. We are going to change our firebox from wood burning to coal burning. Our boiler is a horizontal flue boiler, 12 ft. long 4 ft. diameter. Please state in your next issue, if possible. A constant reader.—F. H. G.

(60) Can you write me how to figure or give the rule how to figure the horse power of engines? Also how to figure out the safety valve of a steam boiler.—H. B.

Replies to Enquiries.

The following replies relate to enquiries published in last week's SCIENTIFIC AMERICAN, and to the numbers therein given:

(15) Speed of Fly.—The house fly gives 330 beats per second when [illegible]. Its absolute speed I do not know.—T. S.

(15) The flight of a house fly is impulsive and curvilinear. They are seldom seen to move in a straight or nearly straight line. Their momentary speed of flight is estimated at from 10 to 15 feet per second, under the impulse of getting out of harm's way.

(15) How fast can a house fly fly? Prof. C. V. Riley, of the U. S. Department of Agriculture, Division of Entomology, says he is not familiar with any published statement as to the rate of speed of the house fly, and has not made any observations upon the subject. He doubts whether this insect is capable of a long continued flight, and his impression is, from observing its short darts about a room, that it probably does not fly faster than 20 feet per second or thereabout, which would be at the rate of something over 13½ miles an hour. This, however, is a mere guess on his part, and should not be taken as at all authoritative.

(16) Grafting Wax.—(*a*) Take:

Pitch	4 ounces.
Resin	4 "
Lard	2 "
Beeswax	2 "

Melt over a slow fire, or (*b*) melt together equal quantities resin and beeswax and add enough tallow to produce the proper consistency.—A. V.

(16) Grafting Wax.—

Pine resin	50 parts.
Tallow	10 "
Turpentine	5 "
Spirits of wine	5 "

The resin is melted in an iron vessel. The turpentine is added, next the tallow, and finally the spirits of wine. Stir the ingredients thoroughly and cool.

(17) Speed of Birds.—The vulture is credited with a speed of 150 miles per hour; the wild goose and swallow, 90 miles per hour; the crow, 25 miles per hour. Carrier pigeons are credited with 600 miles in 8 hours, and 3 miles in 3 minutes and 24 seconds. Recent trials give about 1,100 yards per minute for carrier pigeons.—V. S.

(17) The vulture is supposed to be the swiftest bird, 150 miles per hour. The wild goose and swallow 90 miles. Carrier pigeon from Pesth, Hungary, to Cologne, Germany, 600 miles in 8 hours—75 miles per hour. Trials in New Jersey average about 60 miles per hour. No record of the hawk. See interesting articles in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 298, 271, 310, flight of birds and migration.

(18) Violin Varnish.—The famous Italian violin makers used, it is said, the following sort of varnish on their instruments: Rectified alcohol, half a gallon; six ounces of gum sandarac, three ounces of gum mastic, and half a pint of turpentine varnish. The above ingredients are put into a tin can by the stove and frequently shaken until the whole is well dissolved. It is finally strained and kept for use. If upon application it is seen to be too thick, thin with an addition of more turpentine varnish. The wood should be stained

before applying the varnish. For a red stain use camwood, logwood, or aniline. You can find the tone of a piece of wood by comparing its note when it is struck with the notes of any musical instrument tuned to standard pitch.

(18) C. C. M.—Red Varnish for Violins.—Dissolve over a moderate fire—

Sandarac	12 parts.
Shellac	6 "
Mastic	6 "
Elemi	3 "

In 150 parts 95 per cent alcohol which has been colored red with cochineal, or if a darker red is required, add dragon's blood gum. When the above is dissolved add 6 parts Venice turpentine. As this varnish is highly inflammable, use caution as to fire. Find the tone of a piece of wood by direct comparison with similar notes on the piano or any standard instrument. A violin in tone at the proper pitch by a tuning fork is very convenient.

(18) Varnish for Violins—Tone of Wood for. Same.—Dissolve by heat 2 ounces amber in oil of turpentine 5 ounces, and drying linseed oil, 5 ounces. Color with dragon's blood or extract alkanet root. The tone given by a piece of wood depends upon its size, thickness, etc. Therefore, a test must be comparative. Cut square plates of equal size and thickness of a known wood and of the wood to be tried. Place the center of the plate upon the end of a cork or spool placed upon a table near the edge. Press the center of the plate of wood with the thumb and bow it near one of the corners. This will give the lowest note such a plate can produce, or the normal tone. The higher the tone, the better the wood.—T. S.

(19) Self-Propeller.—This approaches the perpetual motion problem, which has not been solved as yet. We know of nothing unless animated nature is a mechanical device.

(19) Mechanical Device.—Not in a mechanical sense. If built of good material, it would probably be perpetual motion, which is an impossibility. A machine could easily be made so fragile as to go to pieces when set in motion.—Y.

(20) Relief Maps.—Make the original in intaglio in plaster of Paris. Then beat papier mache into its cavities with a brush, as making paper cliches for electrotyping. See query No. 5 in SCIENTIFIC AMERICAN, December 15, 1888.—W.

(20) Relief maps are made in clay or wax and a plater cast taken from which a relief cast may be taken in plaster or papier mache. To make the papier mache cast requires that the mould of plaster should be backed by a stone slab, to allow of pressure by beating the papier mache into the mould with a stiff brush, and applying pressure with a cushion of sponge. Oil the moulds wih linseed oil to prevent sticking.

(21) Utilization of Leather Scraps: Paper Ware.—These are trade secrets; have tried to find them out, and have failed.

(21) Sundry Recipes.—I [illegible] "Leather Receipt Book," which largely treats of artificial leathers, papier mache, and water proofing. The chapter on imitations and substitutes covers a large range. See pp. 174 to 184. Paper gas pipe, bottles, etc., p. 454, 455. Papier mache for buckets, spittoons, etc., pp. 62 and 63. All of which appertains to this query.—G. D. H.

(22) Grafting Pear Trees.—Spring if done outdoors; on small stocks, it may be done indoors in winter, the stocks being kept in a cellar. There are good articles on the subject in Appleton's Cyclopedia. Also see SCIENTIFIC AMERICAN SUPPLEMENT, No. 122.

(22) Grafting.—For an article on the art of grafting see SCIENTIFIC AMERICAN SUPPLEMENT, No. 122. For a good grafting wax see Note and Query No. 16 (present list). The best time depends upon the season; after the sap starts and before budding time.

(23) Boiling Limed Eggs: Making Cider Vinegar.—(*a*) Try boiling slowly, beginning with cold water and bringing it to a boil. The eggs will then be cooked. If this does not answer, make a pin hole in the large end. (*b*) Add to your barrel, a quantity of the mother or lees of vinegar. Leave bung hole open; you may stick the neck of a bottle into it.—S. S.

(23) Limed Eggs.—We know of no way to prevent limed eggs from cracking when boiled. It is the confined gas expanded by heat that cracks them. Add a little yeast, ¼ a pint to a barrel, to start your vinegar.

(24) Varnish for Maps.—Use Canada balsam or dammar varnish. The principal trouble will be in removing the old wax. The paper must be perfectly dry.—A. A. W.

(24) Mounted maps are sized with thin white glue and varnished with mastic.

(25) To Bleach Ivory: Cleaning Marble.—Bleach ivory by exposure to the sun under glass, or soak in a solution of binoxide of hydrogen. To clean marble, mix a quantity of the strongest soap lye with quicklime to the consistency of cream and lay on the stone for a day, clean it off afterward and rub with putty powder or whiting.

(25) To bleach ivory, place the ivory in a saturated solution of alum for an hour. Polish with a woolen cloth and wrap in linen to dry. Also with peroxide of hydrogen, to 1 pint add 1 ounce aqua ammonia. Warm, soak the ivory for 24 hours, wipe and polish with chalk.

(26) Refining Cotton Seed Oil.—Ten tons of crude oil are treated with 30 cwt. caustic soda lye of 10° to 12° Twaddell at 60° Fah. After agitation, if oil is not yet colorless more lye is added, and eventually all is left to stand 12 or 15 hours. The clear oil is then run off, washed, and bleached with chloride of lime or exposure to sun. It may be used directly to fry in, as lard.

(26) Refining of Cotton Seed Oil.—To 100 gallons crude oil add gradually 3 gallons caustic potash lye (45° Baume), with constant stirring for several hours; or, the same quantity of oil, add 6 gallons soda lye of 25° to 30° Baume, heat to 200° to 240° Fah., with constant stirring. Allow it to settle and cool. Decant the clear oil and filter the residue with canvas bags and pressure. When properly and cleanly done, the refined oil has the color, transparency, and taste of olive oil, and is largely used for culinary purposes, and used as an adulterant of olive oil.

(27) Bell Telephone, Battery, etc.—1. No. 2. Use No. 36 copper wire, silk covered. Wind to 80 ohms resistance. This will require about 35 feet of wire. 3. A properly made single contact transmitter will give every satisfaction. The multiple-contact instruments are sometimes considered more sensitive. 4. For details on telephone apparatus, consult "Bell's Electric Speaking Telephone," by Prescott. 5. Lead is unsuitable, as it will not hold the carbons firmly. Dip the dry carbon tops in melted paraffine, copper-plate them, and cast the plate in type metal. This will give a first class job. You may cast the cover directly around the carbons if you wish. It will not crack them. 6. The cast iron-zinc couple excited by caustic soda is probably best for your purposes.

(28) Erasing Ink.—Oxalic acid mixed with citric acid may be used. There are two distinct species of red ink, aniline and carmine, on the market, and some will be found hard to remove.

(28) For Ink Eraser.—Equal parts of cream of tartar and citric acid in solution with water. Or, a more powerful one, a saturated solution of oxalic acid in water. The red inks are made of various bases for the color, as Brazil wood, cochineal, and aniline red. The aniline red may be removed by alcohol acidulated with nitric acid. No receipt for the other reds.—G. D. H.

(29) Driving ⅛ H. P. C. and C. Motor.— Your water power (⅜ tap, 25 feet head) is ample. Donaldson's "Water Wheels" gives details of such matters. For battery, you would need large bichromate cells, say one gallon each. Eight or ten such cells should suffice.—C. H. P.

(30) Tempering Steel.— SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 71, 36, 37, 95, 103, 105, and many others treat of this subject of tempering steel.—Sup.

(30) Tempering Tools.—To temper cutlery, daggers, bowie knives, butcher knives, etc. Edged cutlery should be hardened before the blades are finished or sharpened to prevent cracking. Should be heated to the lowest temperature at which the particular kind of steel that it is made of will harden. If of German or spring steel, a full cherry red; if of tool steel, a lesser brightness in the heat. A slow fire that is long enough to heat the whole length of the blade equally is necessary. When at the proper heat, plunge the blade exactly vertical in water at shop temperature. Add a little salt, a handful to a pail. Then smear the surface thickly with whale oil or linseed oil and heat carefully over the open fire, so as not to overheat the point, until the oil flashes flame all along the blade. Then plunge vertically in oil or warm water. See also a valuable paper by Joshua Rose on The Hardening and Tempering of Steel, in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 95, 103, 105.

(31) Rubber Oxygen Bag.—It is best to buy one. Make of rubber cloth (cotton drill coated with rubber), double seaming at joints, and paying same with India rubber cement. A copper or brass reflector can be silvered by regular electroplating process. First amalgamate the surface to be plated. Directions for plating can be found in many books and back numbers of SCIENTIFIC AMERICAN SUPPLEMENTS.

(31) H. P.—Bags for Gas.—Rubber bags suitable for oxygen gas are beyond the ways and means of an amateur. We recommend you to obtain one through the rubber trade. The silvering of a metal reflector should be an electro deposit, which you will find described and illustrated in SCIENTIFIC AMERICAN SUPPLEMENT, No. 310. The polishing of the silver surface you may do by rubbing the surface with a buckskin pad stuffed with cotton and wet with a paste of rouge and water.

S. H. sends a beetle specimen, and says: The inclosed beetle was found in a pine seat of a painted chair. It was embedded in a cavity about 1¼ inches deep. The writer having been in the furniture business a number of years, and this being the first instance under his notice of an insect attacking painted furniture, would be under obligations should you enlighten him concerning the name, habits, and other information relating to the subject.—A. Prof. C. V. Riley, of the U. S. Department of Agriculture, Division of Entomology, says the specimen is a common longicorn beetle known as *Monohammus scutellatus*, which is a common borer of pine trees. It is found all through the Northern United States, infesting, of course, only standing trees. It remains for a long time in its preparatory stages, and is also under unnatural conditions capable of considerable retardation of development. Either in the larva or pupa state it was living in the tree when it was cut, and its particular burrow was undisturbed by the sawing and the subsequent manufacture of the chair, from the seat of which it afterward emerged. Instances of this kind are not uncommon, and all are to be explained in this way. It does not, of course, as S. H. imagines, "attack painted furniture."

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 11, 1888,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Acid proof receptacle and lining therefor, E. R. Rand ... 394,298
Adding machine, W. Snider ... 394,219
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