RECENTLY PATENTED INVENTIONS.

Engineering.

OIL BURNING FURNACE. — Frank B. Meyers, Fort Plain, N. Y. This is a simple and durable hydrocarbon burner, designed to completely atomize the oil and permit of directing the flame from the center to one side, to distribute the heat uniformly within the furnace. A pipe is held centrally in a casing connected with an air supply, an oil pipe discharging into the central pipe, on the inner end of which is held an atomizing disk, while a valve formed of two plates having semicircular openings at their inner edges is fitted to slide transversely to regulate the admission of air to the casing without shutting off the air supply to the central pipe.

Mechanical Appliances.

BOLT GRIP. — Thomas Spriggs, Little River, Kansas. A pair of spring-pressed jaws pivoted in a frame have converging points with inwardly extending thumb screws in their upper ends, a wedge-shaped chisel sliding in the frame between the thumb screws, a yoke being fixed to the chisel and extending beyond the frame, while a screw mounted in the yoke and frame has a suitable handle. The device is designed to be very useful in removing carriage bolts and tire bolts from wheels, or where a nut has become rusted upon a bolt, and it also may be used instead of pinchers for pulling nails, etc., and for clipping bolts and rivets and holding gas pipe.

PUMP.—Charles J. McKenzie and David M. Mikesell, Wauseon, Ohio. This is a double-acting force and lift pump of simple and durable construction, not liable to get out of order. The pump has a cylindrical barrel with no projections whatever on its outside, permitting of its being placed in a fixed pipe such as are usually employed in drill wells, and it pumps a continuous stream of water on the up and down stroke of the plunger, the water being lifted or forced to any desired height.

COOLER FOR CALCINED MATERIAL.—Amable B. Bonneville, Allentown, Pa. This is a cooling apparatus more especially designed for use in manufacturing Portland cement, where the stone is subjected to a high heat to combine the lime, silicate, and alumina, excluding air as much as possible while the material is highly heated. The material after burning is discharged by a conveyer into a receptacle in the shape of clinkers, the receptacle having at its inside a series of hoppers forming air spaces connected by openings in the wall with the outside, whereby the calcined substances are cooled without undue exposure to the atmosphere. It is designed to take about three days to draw the material from the top to the bottom, thereby insuring a slow and gradual curing and cooling of the clinkers.

ASBESTOS SEPARATOR. — Henry Powers, Cranbourne, Canada. Rock containing short fiber, usually considered worthless, may, by this improved apparatus, be manipulated in a simple manner to extract the fiber contained as a clean and marketable article. The method consists in simultaneously pulverizing the rock and crushing the asbestos in it, causing the disintegration of the asbestos in an agitated body of water having an upward current to float off the fibers, the pulverized rock sinking in the water.

ORE WASHER. — James O. Campbell, Colton, Utah. This device is designed more especially for washing gold sand, to obtain all the precious metal it contains without a great expenditure of water or labor. It is designed to be simple and durable in construction and very effective in operation, consisting of an inclined frame mounted to slide laterally and supporting a series of buckets arranged one in front of the other and one above the other, the higher one discharging into the next lower one.

CLEARING AND EVAPORATING SACCHARINE JUICES.—Ramon F. Cordero, Rubio, Venezuela. There are cleaning pans directly over the furnace of this apparatus, and on the furnace flue rests an evaporating pan having a longitudinal partition forming a return channel, one of the cleaning receptacles discharging into this passage at its end over the furnace outlet. The apparatus has other novel features, and is designed to be economical in fuel, for which only cane refuse is used, while presenting extensive evaporating surface, the juices being successively cleaned in the several pans and the scum removed before passing to the evaporating pan.

ELECTRIC APPARATUS FOR DEFECATING SACCHARINE JUICES. — Elias Maigrot and Jose Sabates, Havana, Cuba. Combined with troughs having longitudinal porous partitions, with pipes connecting the two sets of compartments in two separate series, one series for the circulation of water and the other for the circulation of saccharine juices, are electrodes suspended in the compartments and connected with an electric generator. The apparatus is designed to give an increased yield of prismatic sugar by subjecting the juices to the action of electric currents, to decompose, alter, transfer and remove from the juices alkaline salts, acids, albuminous and other deleterious substances.

Agricultural.

CULTIVATOR. — Edward W. Freiburghouse, Sabetha, Kansas. In this implement a number of disk cutters are employed, held in adjustable hangers, forming a cultivator capable of effective work on level ground, on a hillside, or for cultivating side ridges, as in listed corn. The cultivator blades are designed to be conveniently and expeditiously adjusted laterally to throw the dirt away from or toward the plants and adjusted vertically to stand at any desired angle to the ground.

Miscellaneous.

SPRINKLER. — Alpheus J. Bartlett, Pomona, Cal. Combined with a tubular body having a branch and a packing located at the top of the body is a T-shaped sprinkling tube, whose vertical member extends through the packing into the body, and has an exterior collar of less diameter than the body, adapted to turn upon a water cushion or bearing. The device forms an improved rotary lawn sprinkler, whose rotary section revolves upon a water bearing, thus reducing the friction to a minimum.

VEHICLE STEP. — Milton Frost, New Bedford, Mass. This step consists of a wheel mounted to turn on a sleeve secured to the shank supporting the step, the wheel having an open web, and a scraper in the form of a rubber ring being arranged concentric with the rim of the wheel and held in the open web. The construction is simple and durable, and insures safety by preventing the foot from slipping off the step.

TOY MORTAR.— Edward P. Eastwick, Jr., New York City. This mortar has an annular rounding shoulder or swell within its bore in rear of the muzzle, forming a cup-shaped or flaring seat for the ball, while a firecracker opening leads through the upper side of the barrel at the breech, it being designed to fire a ball by the explosion of the ordinary firecracker, without incurring the danger common to toy fire arms charged with cartridges.

CHIROPODIST'S FILE. — Charles S. Levy, New York City. The body plate of this file is essentially triangular in cross section, while it has an upper semicircular file surface and a lower flat file surface, a recessed core being secured within the body, which consists of a strip of metal bent upon itself to the desired shape. It is a simple and compact implement, capable of convenient manipulation for removing callous surfaces, protuberances upon the skin, etc.

COOLER AND FREEZER. — Paul L. Dermigny, New York City. This invention is an improvement on a former patented invention of the same inventor, and provides a simple and durable apparatus, especially intended for family use, to cool or freeze water and other liquids, or to make ice cream, etc. It has an outer and an inner receptacle, with a chamber between them for the reception of the water or other liquid to be cooled or frozen, while the freezing mixture is contained in the inner receptacle, which has two sets of beaters or stirrers that are revolved in opposite directions by the turning of a crank arm.

FILTERING APPARATUS.—William E. Hershberger, Neosho, Mo. Combined with a vessel having a series of apertures in its bottom, is used a filtering block of porous material, preferably tripoli stone, in cylindrical form, the block having a recess in its lower face forming a flange resting on the bottom beyond its openings, while a series of passages lead up into the block from the recess. The block is fastened in place by a bolt, so it can be readily removed for cleaning, and has a sufficient number of passages to adapt it for filtering a large quantity of water for drinking or other purposes.

LIFTING JACK. — Joseph S. Locke, Bartonia, Ind. This invention is more particularly designed for wagon or carriage jacks, when the lifting bar is of stepped construction on its upper end, to adapt it to varied heights of the axles from the ground. The invention covers a novel construction of parts and pivoted connection of two levers with the lifting bar and standard of the jack, whereby the lifting bar and standard are hinged together, and kept from shackling, increasing the durability of the jack, while a more perfect lock is secured, the lock being the tighter as greater weight is thrown on the jack.

STOVE. — William Forbes, Plainwell, Mich. This invention relates to heating stoves in which either coal, coke, or wood are used as fuel, the construction providing a large area of heating surface that has direct contact with the burning fuel and the air surrounding the stove. The fire pot of this stove is revoluble, and is composed of hollow bars or tubes that have communication with the air outside of the stove, and it can be readily removed from the walls of the stove for repairs.

REVOLVING DOOR.— Charles F. Chew, Philadelphia, Pa. Combined with two oppositely curved casement walls, a rounded cap plate and a circular floor, is a main door pivoted at its center in the cap plate and floor, curved wing walls being hinged and braced to the door, forming an improved revolving storm door. The device permits the free ingress and egress of one or more persons at a time, and seals the outer opening simultaneously with the opening of the inner one, thus affording a vestibule for the protection of an exposed entrance to a building, while providing a wide and unobstructed passage.

HANDLE. — George H. Bradshaw, Knoxville, Tenn. This invention provides a simple and convenient handle designed to be readily attached to or removed from chests, trunks, refrigerators, etc., and which when not in use will drop out of the way, so as not to be easily broken. The device consists of a plate to be secured to the article, and having projecting shoulders near a side and bottom edge, and a handle pivoted on the plate to swing laterally between the shoulders.

FOLDING POULTRY CRATE.—Harry B. Cornish, Hampton, Iowa. This is designed to be a very simple and durable crate, which can be expeditiously set up to receive poultry, and readily folded for return transportation. It has an apertured and ribbed top plate and a solid flanged bottom plate, apertured side pieces hinged to the top plate engaging the bottom flanges, and other apertured side pieces hinged to the top plate being connected by strap hinges to the bottom plate.

TOBACCO SMOKER'S DEVICE. — Valeriano Gonzalez, Durango, Mexico. This device is in the form of a cigar holder, and also applicable to the end of a pipe, and has a reservoir to collect the nicotine, back of which is a chamber with a sponge saturated with a solution of tannin, while within this chamber is also secured a medicine cup designed to be filled with a readily evaporated medicament, possessing properties beneficial in diseases of the throat and mouth, or any substance which would impart an agreeable flavor to the smoke. The object of the device is to render tobacco smoking always harmless and in some cases particularly beneficial.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

WOMAN AND HEALTH. A mother's hygienic hand book. By M. Augusta Fairchild, M.D. 1890. Published by the author. Quincy, Ill. Price $2.50.

In this volume a woman undertakes to tell women of their needs in matters relating to maternity, also including specific directions for the treatment and cure of acute and chronic ailments generally. The book is written in dialogue form, and embraces nothing beyond the comprehension of people of ordinary intelligence, dress, dietetics, hygienic cooking, sunshine, exercise, sleep, each forming the subjects of separate chapters.

Steam, its Generation and Use, with catalogue of the manufactures of the Babcock & Wilcox Co., forms a handsome volume of 150 octavo pages, containing a great variety of valuable information in addition to the details furnished relative to this well known style of boilers. The volume for 1891 is the twenty-third edition of the work, which was originally published in 1879, and has been enlarged through the successive editions since issued in deference to the high appreciation with which its facts and figures have been received, no less than the striking success which has attended the introduction and use of the Babcock & Wilcox boilers. The company now has manufactories in the United States, Scotland, France, Germany, and Austria. The book is sent free on application.

SCIENTIFIC AMERICAN BUILDING EDITION.

JULY NUMBER.—(No. 69.)

TABLE OF CONTENTS.

1. Elegant plate in colors and floor plans showing a colonial cottage at Brookline, Mass. An admirable design. Cost $4,500 complete.
2. Colored plate illustrating a row of dwellings with ornamental fronts, erected at Philadelphia. Perspective and floor plans. Cost from $7,500 to $5,800 complete. Architects G. U. & U. D. Hewitt, Phila.
3. A residence at Longwood, near Boston, Mass. An excellent design. Floor plans, perspective elevation, etc. Cost $8,700 complete. Brigham & Spofford, architects, Boston.
4. View of the new building for the Hibernia Savings and Loan Society at San Francisco, Cal.
5. A stone residence at Germantown, Pa. Cost $10,245 complete. Perspective and floor plans.
6. Perspective and plans of the country residence of Mr. Walter E. Rex, at Chestnut Hill, Pa. Cost $14,000 complete.
7. A very attractive and convenient cottage, of colonial style, erected at Longwood, Mass. Cost $4,500 complete. Messrs. Rand & Taylor, of Boston, architects.
8. Perspective view of the new and substantial residence of E. A. Merrill, Esq., at Minneapolis, Minn.
9. Nine double houses of Queen Anne style erected at Syracuse, N. Y., by Mr. E. E. Price, at a cost of $75,000. Plans and perspective.
10. A coach house and stable erected for Mr. Walter Rex at Chestnut Hill, Pa. Plan and perspective view. Cost $1,000 complete.
11. A suburban cottage at Brookline, Mass., of colonial architecture. Cost $3,600 complete.
12. Design for a two story summer residence. R. A. Briggs, architect.
13. A picturesque design for a gardener's lodge.
14. Cottage at Narberth Park, Pa. Cost $4,500 complete. Perspective view and floor plans.
15. A farm house for $1,000. Floor plans and perspective elevation.
16. Miscellaneous contents: Decorative treatment and materials.—Wall paper.—The hall.—The Bexley system of emptying cesspools. — Decorative don'ts.—Heat from the moon.—An improved hot water heater, illustrated.—Improved steel ceiling, illustrated.—Foundations under water. — Staircase and balaster designs, illustrated.—Enrichments for mouldings, friezes, etc., illustrated.—Concrete.—The Richardson & Boynton heater, illustrated.

The Scientific American Architects and Builders Edition is issued monthly. $2.50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practically, a large and splendid MAGAZINE OF ARCHITECTURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

The Fullness, Richness, Cheapness, and Convenience of this work have won for it the LARGEST CIRCULATION of any Architectural publication in the world. Sold by all newsdealers.

MUNN & CO., PUBLISHERS,
361 Broadway, New York.

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 the following week's issue.

I wish to buy second hand lathes, planers, drills, shapers, engines, boilers, and machinery. Must be in good order. Will pay cash. W. P. Davis, Rochester, N. Y.

Acme engine, 1 to 5 H. P. See adv. next issue.

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

Best Ice and Refrigerating Machines made by David Boyle, Chicago, Ill. 170 machines in satisfactory use.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Gun and Machine Makers' Screwdrivers, drop forged in best Tool Steel. Billings & Spencer Co., Hartford, Ct.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 300.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $4; Munn & Co., publishers, 361 Broadway, N. Y.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J. S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, 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.

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.

(3166) M. L. S. asks (1) for a cement that could be used to cement glass to metal (brass and iron) and which would not be attacked by bisulphide of carbon, water, alcohol, etc. A. Dissolve gelatine in water, add a small percentage of glycerine to render it slightly elastic, also a small quantity of bichromate of potash to make it insoluble. 2. Is there an odorless bisulphide of carbon, and if so, what is its cost and index of refraction? A. Purified and deodorized bisulphide of carbon costs 70 cents per pound. Its index of refraction is the same as that of the commercial article. 3. Just what kind of a lens is a collimating lens? A. Any lens which will bring light rays into the line of vision is a collimating lens. 4. How much heat is there in crude petroleum as compared to coal, equal costs A. In England the difference between the cost of crude petroleum and coal for fuel is as 2 to 1. In this country, there is a slight difference in favor of coal. There are, however, varieties of crude petroleum which are worthless for the purposes of the refiner. As a fuel, this sort of petroleum is more economical than coal. 5. What substances are transparent to heat and how can I make a heat lens? A. Glass is transparent to heat. You can make a heat lens from glass alone, or you can make a hollow glass lens and fill it with carbon disulphide. 6. How can I detect the presence of carbonic acid gas in the atmosphere when in small quantities? A. By passing the air through clear lime water, a very small percentage of carbonic acid absorbed by the solution will produce carbonate of lime, which renders the water turbid. 7. What is the chemical nature of impure and injurious air? A. The nature of impure air varies with the locality. It will be impossible to give a general answer to this query. Ordinary air contains, besides nitrogen and oxygen, a little carbonic acid, a variable proportion of aqueous vapor, a trace of ammonia, and sometimes a little carbureted hydrogen. 8. Does throwing a picture (as in a camera) upon a plate of glass in any wise affect its transparency to other light rays while it retains the image? A. No. 9. Did Professor Herz refract induction, and where can I find the particulars of his experiments for the past two years? A. Professor Herz refracted induction by the use of an asphalt prism. 10. I understand that magnetization affects the length of an electro magnet's core. With what rapidity can this change be effected, *i. e.*, to how many magnetizations and demagnetizations will the core respond in a second of time? A. We do not know that any limit has been discovered. 11. How frequently can the power of a magnet be changed in a second? I do not mean how many times a second can it be completely magnetized and demagnetized, for I understand there is a residual magnetism, but how many times can the strength of a magnet be varied per second? A. No limit has been discovered. 12. How does the resistance of selenium vary from light to darkness? A. Exposure to diffused daylight diminishes the electric resistance of selenium to one-half of what it was before. 13. Is there any work published giving the cost of experimental materials, such as selenium, bisulphide of carbon, etc.? Catalogues of course can be had occasionally containing prices of one or two things required, but has any one ever published an extended list of approximate prices? A. All large dealers in physical apparatus supply catalogues of materials and apparatus. Write the dealers in New York, Philadelphia and Boston. 14. Is it true that light passed through a highly magnetized ring undergoes refraction as if through a lens? If so, why?

A. Light passing through a magnetized ring is not refracted, but in the case of polarized light, its plane of polarization is rotated. 15. Is there any known mechanical means of feeding a wheel forward through successive steps, which steps shall be perfectly gaugeable, and be as desired any portion of the circumference? I desire a positive motion, with stops to prevent slipping or the passage of wheel beyond proper points. A. We think a worm wheel, driven by a worm operated by a pawl and ratchet, would answer your purpose.

(3167) S. M. K. asks: 1. Have you any description of a simple air engine of about one-eighth to one-sixteenth horse power? A. You will find caloric engines described in SUPPLEMENT, Nos. 49, 162,623, 633, 536,573. 695 and 727. 2. Have you a description of a simple steam engine of about one-eight or one-sixteenth horse power? A. SUPPLEMENT, No. 279, contains a description of such an engine. 3. How can I make a boiler to be put on a stove for use in connection with a small steam engine? A. For small boilers consult SUPPLEMENT, No. 702. 4. Have you directions for making a simple electric motor? A. See SUPPLEMENT, No. 641. 5. How to make a dynamo for 6 or 8 lights? A. Consult SUPPLEMENT, No. 600. 6. How to make a battery for running small electric lights? A. See SUPPLEMENT, No. 792. 7. What is a good treatment for dandruff? A. Wash the head in a weak solution of borax.

(3168) E. J. H. asks: 1. How can a luxuriant growth of beard be permanently removed from the face without serious injury to the skin? Will you suggest a course of experiments likely to give the desired result? A. In our SUPPLEMENT, Nos. 176 and 353, you will find the results of the electrolytic method. 2. By Act of Congress, March 22, 1862, $60,000,000 in currency was made full legal tender money. How long did it remain in circulation at par with gold, and at what time, and for what reason was it withdrawn from circulation? A. In December, 1861, the banks suspended specie payments, and there was thereafter a premium on gold until the resumption of specie payments by the government in 1879. The government was sustained, through 1861, by treasury demand notes, payable in coin, but the first legal tender act was for the issue of $150,000. It passed the House of Representatives February 24, 1862, and passed the Senate and was signed by the President the next day. The total authorized issues of legal tenders were $450,000. Subsequent to the war up to 1874, $44,000,000 of legal tenders were retired, as part payment of an acknowledged debt by the government, further payments being restricted because of their acknowledged convenience as currency when the ability of the government to maintain them at par had been demonstrated. During the war and up to 1874, $48,151,000 of fractio currency were issued, the greater part of which been redeemed before the resumption of specie p. ments.

(3169) C. E. R. asks for the mode used in varnish works to bleach shellac, and if chlorine is used, the cheapest form to make it. A. Two pounds chloride of lime are made into a paste with water, which is strained through a cloth. The residue on the cloth is washed out with two pints of water. For each pound of chloride of lime add 4 ounces carbonate of potassium diesolved in 1 pint of water. Two pounds of shellac have meanwhile been digested in 1 gallon of alcohol for a few days. The above fluid is added with constant stirring to the alcoholic solution. After half an hour enough hydrochloric acid is added to show an acid reaction. The shellac is precipitated as a white tough mass, which is freed from the acid by rinsing and is washed with hot water until the latter comes off clear. The shellac is kneaded or worked into strips and is dried upon a platform or board in the air. The alcohol can be recovered by distillation. Enough carbonate of potash should be added to the original chloride of lime solution to precipitate all the lime. The quantity given is approximate only. Each sample will require a different amount.

(3170) C. I. sends following receipt and asks concerning its merits: "A patented shoe blacking, which contains no acid, is made in Germany by dissolving casein in a solution of borax or soda and adding resinate of iron, besides the usual boneblack, grease, and sugar. A brilliant luster is imparted by casein. and the resinate of iron gives a deep black color." A. The receipt is suggestive and worth trying. The doubtful point is as to its lasting black color. The resinate of iron is made by saponifying resin with caustic soda. dissolving in water and adding to a solution of copperas. The iron salt will be precipitated. Filter, wash, and dry it for use. Carbon blackings are given in many places in the SCIENTIFIC AMERICAN.

(3171) S. L. asks: 1. Which is the best non-conductor of heat—felt, asbestos, or air? A. Asbestos. 2. Will air inclosed in a vessel hermetically sealed expand by heat? If so, how much, and with what force? A. Air, at atmospheric pressure and with a temperature of 32° Fah. will, when heated to 680°, give a pressure of 15 pounds above that of the atmosphere. 3. Is a partly vacuum a better non-conductor of heat than air? A. Yes. 4. What causes the explosion of kerosene lamps, and stoves. Is it because the gas from the oil comes in contact with the oxygen of the air or with the flame? A. The explosion of kerosene lamps and stoves is caused by the mixture of petroleum vapor driven off by the burner and air. 5. Which is the lightest of all gases? A. Hydrogen. 6. If a vacuum were created in a vessel, would it be lighter than if charged with the lightest gas? A. Yes.

(3172) P. C. T. asks: 1. What is the so-called "bottled electricity" used for headache and the curing of catarrh? A. The bottle contains no electricity. It is simply filled with sponge, and the sponge is saturated with oil of mustard. 2. Where does the first electrical impulse come from in the dynamo, as there is no magnetism present when the machine is at rest? A. If there were no magnetism in the cores of the field magnet the machine could not be started. The field magnet of every dynamo retains a little magnetism, which is sufficient to start the inductive process.

(3173) R. E., Jr., says: We want to use the water in our mines for boilers, and it is impregnated with sulphur, iron, copper, etc. What method can we use to purify it so as not to be destructive to the iron? A. The best chance of purifying the water is to add enough lime water to precipitate its impurities, and to allow it to settle. Or you may let it stand in wooden tanks with scrap iron. Either method is imperfect and your boilers will undoubtedly suffer whatever you do. After standing over scrap iron, the lime treatment might be used in addition.

(3174) H. McD. asks for any known liquid, outside of alcohol, that will not evaporate by exposure, and only freezes at a very low temperature. A. Glycerine.

(3175) S. M. B. writes: Can you give me any information of any one who has a process or method of removing salt and alkali from water so that it will render or make the water fit or suitable for making steam? A. Salt and alkali cannot be removed from water in any practical way for boiler use. Run the boiler by the hydrometer, adding new water to keep it at a constant degree of saturation. Blow off frequently from the bottom to expel deposited matter.

(3176) F. A. S asks how many pounds of wire there are on armature and on field magnet of the small electric motor described in "Experimental Science," page 497. A. We cannot give the exact amount of wire on the motor referred to, but we think there is about one-third pound on the armature and 1 pound on field magnet.

(3177) E. V.—To make a mould for ornaments, etc.: Soak 12 ounces of gelatine for a few hours in water until it has absorbed as much as it can, then apply heat, by which it will liquefy. If the mould is required to be elastic, add 3 ounces of molasses and mix well with the gelatine. If a little chrome alum be added to the gelatine, it loses its property of again being dissolved in water. A saturated solution of potassium bichromate brushed over the surface of the mould, and allowed to become dry and afterward exposed to sunlight for a few minutes renders the surface so hard as te be unaffected by moisture. To prevent the plaster sticking, brush with olive oil.

(3178) F. H. F.—Since making our former answer as to the heaviest locomotive used on any railroad in the world, we are informed that the Canadian Locomotive Works, at Kingston, Ont., is building four locomotives for the Chignecto Ship Railway, each of which will have a weight of 45,000 pounds on each of four pairs of drivers, or a total of 180,000 pounds, light, for each locomotive. We know of no locomotives so heavy as this at present in use.

(3179) A. D. B. asks (1) for the relative proportion of piston area and length of stroke in gasoline engines, considering the expansive force of the gas (not any particular make of engine). A. There is no fixed rule for the proportions of gas engines; some makers think a stroke at least double the diameter of the cylinder is advisable, while others make the diameter of the cylinder and the stroke the same. 2. How many volumes should the charge be compressed? A. About three. 3. What are the best proportions of gasoline gas and air for greatest force? Also for greatest expansion. A. Eight or nine volumes of air to one of gasoline vapor gives the best results. 4. Would it be practical (considering economy) to admit gas and air (of the proper mixture) in proportion to the load, the same to be compressed in the same space of a full charge? A. A variable mixture does not work well in practice.

(3180) C. A. H. asks: In rewinding a small electric motor, say about one-eighth horse power, to adapt it to Edison 105 volt circuit, what should the resistance be in the fields and armature, and the best way to connect up shunt or series? A. The resistance of the machine should be such as to use the amount of current required for the power needed. An electrical horse power is 746 watts. A watt is one ampere multiplied into a volt. If you require one-eighth horse power, you will need about 93 watts. Your E. M. F. is 110 volts; therefore, if you divide the voltage by the number of watts, you will have the current in amperes required, which is 1·18 amperes. Now, to arrive at the total resistance of the machine, you will divide the voltage by the amperage, which will give you 92 ohms. Of this amount, if the machine is series wound, the resistance of the field magnet should be about one-half that of the armature, while if it is shunt wound, the resistance of the field magnet should be about fourteen times that of the armature.

(3181) S. R. S. asks: How can I remove a wart? A. Cover the skin around the wart with lard; apply over the surface of the growth one or two drops of strong hydrochloric or nitric acid; then keep the part covered up until the scab separates.

(3182) C. G. C. asks: How can I remove rust stains from nickel plate? A. Grease the rust stains with oil, and after a few days rub thoroughly with a cloth moistened with ammonia. If any spots still remain, remove them with dilute hydrochloric acid and polish with tripoli.

(3183) W. P. S. asks: 1. How can I make the black enamel used on bicycles? A. For temporary use to cover places where the enamel has been chipped, use asphaltum dissolved in turpentine. If the whole machine needs japanning, send to the factory and have it japanned. 2. What cement must I use to cement on the tire? A. Melt together equal parts of pitch and gutta percha; use hot. 3. What cement can be used to mend cuts? A. Use the following: carbon bisulphide, 5 oz.; gutta percha, 5 oz.; pure unvulcanized rubber, 10 oz.; fish glue, 2½ oz. Use no more than necessary, and bind the tire firmly with string until the cement has set. 4. What oil is used to oil bicycles and typewriters? A. Use sperm oil.

(3184) E. H. R. asks how to remove ink stains from an oak desk. A. Try a mixture of two parts of cream of tartar and one of powdered alum.

(3185) F. B. D. asks how to make tin foil labels adhere to block tin collapsible tubes. A. Use a mixture of the best fish glue and gum arabic dissolved in water. A little glycerin may be added to advantage.

(3186) J. C. asks: 1. What kind of wax is used in making wax flowers, and how is it prepared? A. Use nothing but the purest virgin white wax; a little of the finest grade of Venice turpentine is added to render it ductile. It must not be melted in an iron pan; use tin or enamel ware; when stiff leaves are to be made, a little spermaccti may be added. The colors in fine powder are mixed with essence of lavender and this paste is mixed in with the wax. Pour in moulds while still warm. 2. How is beeswax bleached? A. Melt the wax in a jar and put into it sodium nitrate in the proportion of one ounce to the pound of wax; add afterward by degrees two ounces of sulphuric acid diluted with ten times its weight of water. Keep the wax warm and stir. Let it stand a short time, then fill up the jar with hot water, and allow the whole to cool. Afterward wash with water to remove any nitric acid stains that may remain, or finely shred it and expose to the sun for several days.

(3187) A. M. asks: How can I obtain a fine gloss on collars and cuffs? A. Melt 2½ lb. of the very best A 1 paraffine wax over a slow fire. When liquefied, remove from the fire and stir in 100 drops of citronella. Have ready some round tin pie plates (new); place them on a level table, coat them slightly with sweet oil, and pour about six tablespoonfuls of the enamel into each tin. The pan can be floated on water to cool it. Break up into pieces the size of a lozenge. Two of the pieces added to each pint of starch will cause the smoothing iron to impart the finest possible finish, leaving the clothes perfumed. See SUPPLEMENT 577.

(3188) W. S. B. says: 1. In toning prints they sometimes assume a deep red color, which cannot be removed, although the print is left in the solution for hours. The redness sometimes covers the whole print and is sometimes in spots. I wash my prints in running water for half an hour. What is the cause and how can it be remedied? A. The redness is due to too acid a toning bath, or insufficient gold in the bath. See that the toning bath is alkaline, and test with a piece of red litmus paper, which should turn blue if the bath is alkaline. 2. Are time exposures preferable to instantaneous? A. Yes.

(3189) T. P. R. asks how to prevent photographs from fading. A. See formula on page 10621, SCIENTIFIC AMERICAN SUPPLEMENT, No. 665. Keep the photograph in a dark place.

(3190) J. Z. G. asks why lead castings sometimes crack while cooling. A. The cracking of lead castings is due to shrinkage, and generally occurs in sharp angles. All metals are liable to shrinkage cracks in the recessed angles, unless filleted.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

July 14, 1891.

AND EACH BEARING THAT DATE.

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

Acid, manufacture of tartaric, R. W. Schedler 455,768
Addressing machine, G. S. Couch 455,814
Armature for dynamo-electric machines, E. W. Rice, Jr. 455,887
Armature for dynamos, F. L. McGahan 455,971
Assorting machine, H. H. Hutchins 456,022
Axle coupling, vehicle, J. J. Morrison 455,849
Axle cutter, J. Swegles 455,935
Axle, self-oiling car, R. P. Sholl 455,841
Bag fastening, traveling, C. F. Kurz 456,040
Bait cage, S. Moulsong 455,758
Baling press, C. E. Bates 455,731
Baling press, E. M. Pine 456,057
Ballot box, A. Reppmann 456,768
Banjo, F. Gretsch 456,029
Barrel, Tinker & Benjamin 456,099
Bating powder, H. Poydenot 455,851
Batteries, terminal for electric, Hayes & Hibbard 455,986
Battery plate, secondary, J. R. MacLaughlan 455,968
Bed couch, G. Goldschmidt 455,921
Bedstead, etc., iron, C. A. Sprague 455,976
Beer buck, F. T. Cladek 456,937
Bell, E. D. Rockwell 456,062
Belt, electric, L. N. Fancher 456,021
Belt tightener, C. A. Norlin 455,799
Belting, C. A. Schieren 455,852
Berth safe, J. A. Brittain 456,010
Bevel, P. J. Mabye 456,044
Bicycle, W. F. Cornelius 455,864
Bicycle, Huelsen & Nagel 455,945
Blind, Venetian, Simmons & Angus 455,912
Board. See Game board.
Boiler. See Dinner boiler. Steam boiler.
Boiler, O. W. Noble 456,090
Book support and desk, H. J. Harrison 456,089
Books, binding, J. H. Workman 455,894
Boom stick, D. W. Case 455,996
Boot or shoe, S. C. Howard *et al.* 455,847
Bottle stopper, G. S. Chamberlin 455,737
Bouquet holder, N. R. Sheets 455,928
Box. See Ballot box. Fare box. File box. Letter box. Locomotive sand box.
Brake. See Car brake. Vehicle brake.
Brake regulator, automatic, F. Moore 455,902
Brake staffs, pawl and ratchet mechanism for, Emerson & Emery 456,026
Brick mould and press, C. W. Raymond 455,951
Brush, F. Consene 455,740
Buoy, bell, J. Gibson 455,746
Bureau and commode, Merritt & Taylor 455,883
Burner. See Vapor burner.
Butter moulds and vinegar measures out of wood, machine for manufacturing, F. K. Winsor 455,862
Button, J. M. Crews 455,908
Car brake, S. R. Lewis 455,753
Car brake, T. D. Osborne 455,927
Car, cable, J. Stephenson 455,774
Car coupling, J. M. Birtels 456,080
Car coupling, M. Howe 455,795
Car coupling, J. Kormil 456,039
Car coupling, S. W. Wright 456,074
Car gate, railway, F. C. Cash 456,017
Car safety attachment, B. C. Seaton 456,126
Car seat, E. L. Busbnell 456,015
Car, street, Smith, Jr., & Williamson 455,842
Car trolley, electric, W. H. Knight 455,796
Cars, street and station indicator for, G. H. Tietjen 456,096
Carding engines, grinding the flats of traveling flat, W. Dobson 455,883
Carpet stiffener, M. Lincoln 456,002
Carpet stretcher, clamp, L. Hinkle 456,001
Carriage, baby, Davis & Dicks 455,909
Carriage, spring, J. D. Brunner 455,736
Carriages, shifting seat for, J. T. Clarkson 455,738
Cart, road, Kirkpatrick & McDaniel 455,831
Cart, road, S. D. Palmer 456,056
Cart, road, L. M. Smith 455,860
Case. See Display case. Show case.
Cash register, C. Angus *et al.* 455,916
Caster, furniture, A. E. Brown 455,906
Centrifugal machine, T. Muller 455,832
Chair iron, tilting, A. E. Quinlan 455,866
Chamber attachment, noiseless, V. M. Cone 455,907
Chart, dress, E. Hood 455,749
Chimneys, construction of, A. Boettcher 456,109
Churns, means for operating, L. H. Conner 455,739
Cigar stamping machine, G. F. & J. W. McIndoe 455,820
Clamp. See Easel clamp.
Clasp. See Pocketbook clasp.
Clip. See Thill coupling clip. Yoke clip.
Closets, etc., hermetical cover with cleansing apparatus for, Siemang & Gufttmann 455,975
Clothes line elevator, E. E. Taylor 456,070
Clothes rack, W. R. Freeman 456,874
Clover hullers, feeder for, A. B. Reeves 455,886
Clutch, W. C. Wright 455,978
Coat hook, H. C. Hart 456,030
Comb. See Curry comb.
Commutators, holder for carbon brushes of, C. H. Farrington 455,856
Cooking utensil, I. Stegemann 455,803
Copier, letter, E. W. Wickey 455,823
Cork, treating, J. T. Smith 456,068
Corkscrew, D. W. Davis 455,826
Coupling. See Axle coupling. Car coupling. Thill coupling. Vehicle coupling.
Cultivator, A. Lindgren 455,755
Cultivator, H. S. Moore 456,050
Cultivator, J. V. Webster 455,914
Cultivator, lister, W. Y. Smith 456,005
Cultivator, tongueless wheel, A. Lindgren 455,754
Current motor, alternating, Stanley, Jr., & Kelly 455,773
Curry comb, C. S. Starr 455,930
Curtain fixture, W. Bishman 455,982
Cutter. See Axle cutter.
Damping apparatus, W. N. Cornell 455,741
Dead centers, mechanism for overcoming, L. Hauck 456,031
Dice throwing apparatus, M. Vogelgesang 456,091
Dinner boiler, R. J. Nourse, Jr. 455,760
Dish washer, F. S. Miller 455,988
Display case, I. M. Smith 455,770
Doormat, W. B. Curtis 456,085
Draught equalizer, J. G. Stowe 455,861
Drain pipe, H. E. Ogden 455,926
Drill. See Rock drill.
Drinking fountain for fowls, L. B. Lord 455,756
Dyestuff, brown, C. Ris 455,962
Dyestuff, red, M. Ceresole 456,081
Easel clamp, E. H. Friedrichs 455,844
Electric cut-off apparatus, E. W. Rice, Jr. 455,900
Electric indicator, E. C. Eldredge 455,855
Electric machine or motor, dynamo, J. B. Entz 455,790
Electric motor, H. H. Porter 455,765
Electric motor or dynamo-electric machine, C. G. Curtis 455,898
Electric switch, Dahlgren & Svensson 455,837
Electricity, apparatus for administering, G. H. Bethel 455,981
Elevator. See Clothes line elevator. Skirt elevator. Sucker rod elevator.
Elevator, C. W. Baldwin 456,106
Elevator, T. W. Heermans 455,794
Elevator, G. B. Mills 456,048
Elevator controller, C. W. Baldwin 456,107
Elevator control ing device, G. H. Reynolds ..... 456,121 to 456,123
Elevator indicator, C. Ludovici 455,947
Elevator operating machine, N. C. Bassett 456,108
Elevators, means for controlling, G. H. Reynolds 456,124
Embossing machine, F. Berner, Jr. 456,079
Engine. See Rotary engine. Steam engine. Traction engine.
Engine indicators, device for operating steam, J. Gill 455,999
Engines, accumulator for direct-acting, C. C. Worthington 455,935
Extractor. See Honey extractor. Juice extractor.
Fare box, J. L. Kail 455,881
Feed water heater and purifier, W. Webster 456,072
Fence, M. A. Fenner 455,940
Fence, G. P. Ruble 456,064
Fence making implement, wire, McCormack & Craig 456,093
Fence strands, tool for joining wire, J. D. Jones 455,869
Fence, wire, A. F. Dickey *et al.* 456,022
Fencing, die used in making sheet metal, T. V. Allis 455,867
File box, knockdown, H. C. Yeiser 455,075
Filter, Manwaring & Vanderhoef 456,119
Fire alarm apparatus, Chase & Eaton 455,812
Firearm sight, W. Lyman 455,911
Fire escape, Schneider & Maschino 456,003
Flask. See Moulder's flask.
Flower holder and fly trap, combined, J. Rosenfeld 455,888
Folding gate, Bayer & Scherbner 455,960
Fork, T. Hausler 456,032
Fountain. See Drinking fountain.
Frame. See Sewing machine quilting frame.
Game board, G. M. Snow 456,069
Garment hook, H. M. York 455,992
Gas in gas service pipes, means for equalizing the pressure of, W. A. Walker 455,913
Gas, machine for generating illuminating, D. S. Green 456,116
Gas, prepayment attachment for vending, R. W. Brownhill 456,011
Gate. See Car gate. Folding gate.
Gate, G. H. Damon 456,020
Glove, Hooper & Moore 456,035
Governor, J. H. Hamilton 456,095
Grain cleaning, mill, L. Bartholomew 456,077
Grain separating screen, C. Closz 455,998
Grain separator, C. Closz 455,997
Gun, air, C. J. Hamilton 455,942
Hammer, A. F. Street 455,776
Hammer, automatic, E. Thomson 455,905
Handle. See Pendent handle.
Harness, E. Walrath 455,991
Harvester, corn, W. Orcutt 456,055
Hatchway doors, device for operating, C. K. Rogers 456,063
Hay rack, C. Zengler 455,895
Hay stacker, P. Bernard 455,996
Heater. See Feed water heater.
Heater, J. Shackleton 456,004
Heel burnishing machine, E. P. Richardson 455,871
Heel burnishing machine, W. F. Sampson 456,066
Heel seat trimmer, A. McDowell 456,884
Holder. See Bouquet holder. Flower holder. Sash holder. Shade or globe holder. Spool holder. Train order holder. Type holder.
Honey extractor, centrifugal, A. J. Lawson 456,043
Hoof expander, G. T. Chapman 456,082
Hook. See Coat hook. Garment hook.
Hoop sawing machine, barrel, J. C. Ballew 455,980
Horse driver, O. M. Bryan 456,013
Hose pipes, clamping collar for, Lusk & Hinkle 455,907
Hydrant, P. White 455,782
Ice creeper, M. E. Reilly 455,080
Index, W. H. Tucker 456,807
Index, marginal, F. W. Hewes 455,817
Indicator. See Electric indicator. Elevator indicator. Street and station indicator.
Inseam trimming machine, A. La Bonte 456,041
Insulated conductors, manufacturing, C. Cuttriss 455,789
Insulated electric conductor, E. D. McCracken 456,120
Insulated electrical conductor, E. D. McCracken 455,904
Iron. See Chair iron. Sad iron.
Jack. See Lifting jack.
Jambs, cushioning and padding for, H. W. French 455,791
Juice extractor, H. E. Davidson 456,938
Knife. See Pocket knife.
Knife and burglar alarm, combined, A. Iske 455,797
Knife and shears sharpener, J. S. Blood 455,917
Knitting machine stop motion, D. C. Bellis 455,786
Knitting machines, device for regulating the yarn tensions in, H. P. Ballou 455,896
Ladder, step, Parr & Edwards 455,793
Lamps, cut-out for arc, C. E. Scribner 455,853
Lamps or oil stoves, safety appliance for, J. A. Secor 456,127
Lasting machine, T. O'Bolger 455,762
Latch, A. H. Applegate 456,008
Latch, A. A. Page 455,949
Lathe for tuning cones and disks, C. E. Albro 456,076
Lathe, wood turning, C. A. Wagner 455,780
Letter box, house door, Wiles & Goldthwait 455,783
Level, spirit, R. Forwood 456,086
Lifting jack, J. Barrett ..... 455,993 to 455,995
Lightning arrester, Van Nuis & Vail 455,955
Lint coating and packaging machine, J. W. Johnson 455,865
Liquid tester, J. M. Bell 455,733
Liquid treating apparatus, F. W. Wiesebrock 455,893
Litter, M. Tell 455,778
Locomotive sand box, J. McDonald 456,054
Loom shuttle box operating mechanism, G. W. Stafford 455,772
Loom temple, C. A. Littlefield 456,118
Loop switch, W. M. Goodridge 455,747
Magnetic separator, H. G. Fiske 455,984
Magnetic separator, J. Wenstrom 455,809
Mat. See Door mat.
Matrix making machines, alignment bar for, Beckwith & Street 455,732