

## ENGINEERING INVENTIONS.

An apparatus for raising water has been patented by Mr. Thomas Arthur, of Bangor, Pa. The invention consists in a combination of tanks, siphons, inverted siphons, water pipes, air pipes, levers, floats, valves, and a stop cock, whereby the withdrawal of air from the initial siphons successively will cause a continuous raising of water.

A car coupling has been patented by Mr. Luther B. Owen, of Cedartown, Ga. The coupling pin, by means of a system of levers and rods, is made capable of being manipulated from the ends and sides of the car, while a bail may be operated from either side of car to control the coupling link without going in between the cars.

A driving belt has been patented by Mr. Gilman Jaquith, of Maysville, Ky. It consists of a single strip of cotton cloth folded repeatedly, with the warp running in the direction of the length of the band, and ends doubled upon itself for connection by a clip or hook shaped fastening, the whole stitched together to unite the folds and prevent raveling.

A compensator for wire ropes or cables has been patented by Mr. Richard B. Ireland, of Trenton, N. J. It consists in a wheel or roller carrying the rope and combined with the operating lever in such manner that normally the wheel is free, and is locked up by the movement of the lever, making an automatic and positive mechanism to allow for the expansion and contraction of wire ropes or cables.

## AGRICULTURAL INVENTIONS.

A plow has been patented by Mr. Donald M. McAlpine, of Savannah, Ga. This invention covers a novel construction whereby a short beam can be used and the draught attachment can be readily adjusted as the character of the soil may require.

A harrow has been patented by Mr. Phillip Hense, of Dyersville, Iowa. This harrow can be formed of one, two, or three sections, as may be desired, the invention covering a novel combination and construction of parts, to facilitate the operating and controlling of harrows and promote their durability.

A combined gang and subsoil plow has been patented by Mr. William S. Haven, of Shreveport, La. This invention covers a novel construction of a double plow which may be drawn through old ridges, turning the soil into furrows previously formed, so new ridges can be readily completed, and the labor of preparing land for the next crop greatly lessened.

A combined seed planter and cultivator has been patented by Mr. Thomas B. Shannon, of Huntsville, Tex. The construction is such that when the machine is to be used for cultivating plants the hopper and its attachments can be removed, or the clutches can be thrown out of gear with the wheels to prevent the seed dropping appliances from operating.

An attachment for cultivators has been patented by Mr. Frederick Albrecht, of Ohio, Ill. It is made with a clamp secured to the standard of the cultivator, and holding the arm of a crank rod, to the other end of which is secured a blade by a hook bolt, so the blade will be secured to the standard, and can be readily adjusted.

A plow attachment has been patented by Mr. William P. Brown, of Zanesville, O. The invention provides an adjustable connection that will allow the shovels to be made unusually long, so that as they wear away they may be set lower, also allowing one shovel to be set higher than the other, where plants to be cultivated are on different levels, with other novel features.

## MISCELLANEOUS INVENTIONS.

A metallic cap for corks has been patented by Mr. Alfred L. Bernardin, of Evansville, Ind. The cap has, in addition to an open ended slot, elevations or nodules upon its upper surface, to effectually hold the binding wire thereon, and thus bind the cap upon the stoppers or corks.

A machine for cutting glass has been patented by Mr. Price C. Claffin, of Stevens Point, Wis. A bed is mounted to be revolved on a suitable frame, with a guide arm to project radially over the bed, a cutter holder for the cutting tool being fixed in a slot in the guide arm, with other novel features.

A churn power has been patented by Mr. Fredrick F. Williams, of Salado, Texas. A vertically movable carriage has a drum with a rope wound on it, the upper end being secured, and from the drum a wheel on the carriage is operated by gearing, the wheel being connected with the dasher staff.

A combined folding chair and bath tub has been patented by Scott J. Beach and Sarah A. Beach, of Norfolk, Conn. This invention covers novel details and combinations of parts for an apparatus which can be adjusted for use as a large or small chair, a large or small cot, or a large or small bath tub.

A lady's bicycle has been patented by Mr. Louis P. Valiquet, of New York city. It is constructed with a frame suspended from and below the axles, in such manner that it can be conveniently used by ladies, and is further designed to promote efficiency in the application of power to bicycles.

A tile ditcher has been patented by Mr. Oscar Booth, of Creston, Iowa. It is mounted on wheels to move over the ground to dig trenches for laying tiles or drain pipes, and is intended to cut a trench to any required depth at one operation, to raise the earth, and to carry it some distance to one side of the trench.

A fire escape has been patented by Mr. Augustus H. Terwilliger, of Newburg, N. Y. It is adapted to be built into the wall of a building, and to be closed when not in use by a sliding shield or cover, and is also calculated to facilitate the entrance of firemen to different stories of a building in case of fire.

A wedge shaped air balloon has been patented by Mr. George Wellner, of Brunn, Austria-Hungary. It has a vertical edge at the front end and a transverse edge at the rear end, with an inverted

cone shaped projection on its belly to which the car is fastened, the balloon being calculated to ascend and descend obliquely.

A bag fastener and holder has been patented by Mr. John W. Rickart, of Quincy, Ill. This invention provides for peculiarly constructed hooking appliances, so the hooks of the fastening are not liable to be accidentally detached when the bag is closed, the contents tending to tighten the fastening, and the hooks forming means of suspending the bag when open.

A device for suspending hogs has been patented by Mr. William G. Reed, of Avon, Ind. The object is to take hogs from the scalding tub or bristling table and hang them for further work, for which a special construction is provided, intended to be especially useful on farms and by country butchers doing a small business.

An apparatus for tanning hides has been patented by Mr. Emile de Solminiac, of Lorient, France. A skeleton drum or cylinder is provided, upon the circumference of which the hides or skins are held and stretched, secured by clips, centrifugal action being utilized for causing the penetration of the tanning material through the pores of the hide or skin.

A dynamo electric machine has been patented by Mr. Elisha B. Cutton, of Kingsbridge, N. Y. It is constructed with the parts of the field magnet that receive the wire tapered from the pole pieces to the yoke, to make a sufficiently strong field with less iron and less wire, and consequently a lower resistance and smaller percentage of power than are now used.

A wheel for vehicles has been patented by Mr. Alonzo E. Butler, of Leipsic, O. The invention covers a novel construction and combination of the hub, rim, and spokes, and manner of attaching and adjusting the spokes, making a light, cheap, and durable wheel, in which the spokes can be readily tightened or taken out.

A still for the manufacture of brandy has been patented by Mr. John M. Foy, of San Francisco, Cal. The heater is made in one with the still, the bottom of the latter being double or with a jacket, and there are several novel features enabling the operations to be carried on rapidly, and avoiding the delays usually necessary for charging and discharging.

A device for sharpening machine knives has been patented by Mr. Robert O. Owen, of Lynchburg, Va. This invention covers a peculiar construction and arrangement of a sharpening disk or wheel mounted in a frame and arranged in relation to the machine knife so as to be adjusted to or from the same while the latter is in motion.

An apparatus for making Roman candles has been patented by Messrs. Otto A. Minch, Hermann Minch, and Frank Minch, of Newark, N. J. This invention covers various novel details of construction whereby the clay, powder, stars, and combustible composition can be introduced into the cases in regular order, one, two, or more series of powder, stars, etc., as desired.

A churning device has been patented by Mr. Alexander Cairns, of Mount Hope, Wis. In combination with a block adapted to be coupled to a pivot is a revolving churn box, a shaft connected with the block by a universal joint, and a transverse shaft connected by gearing with the shaft connected with the block, the transverse shaft having crankhandles at its ends.

A bone black drier has been patented by Mr. Edward P. Eastwick, of New York city. This invention covers a novel construction for applying currents of air to absorb and carry off the moisture the bone black contains, and to oxidize the organic matter therein. A bone black kiln has also been patented by the same inventor for reburning and reactivating bone black, and especially adapted for use in sugar refining.

A marine record preserver has been patented by Mr. Duncan Sinclair, of Wai-Nui Omata, Wellington, New Zealand. It is constructed with outer and inner cases connected at their open lower ends by an annular plate, and having a cork filling and separable tube attached at its lower end to a cap plate screwing into the annular bottom plate, for preserving records of ships lost at sea, etc.

A polarized telegraphic relay has been patented by Mr. Wirt B. Harvey, of Memphis, Tenn. Combined with a swinging armature, having one end held between the two poles of a magnet, is a coil held opposite the other end of the armature, the coil having a core part screw threaded, so by turning the core and the coil thereon the coil can be adjusted a greater or less distance from the end of the armature.

An axle gauge has been patented by Mr. Hector McQuarry, of Allandale, Ontario, Canada. The object of this invention is to provide a simple, readily adjustable, and reliable tool for bending the arms of vehicle axles downward to give the proper "set" to cause the wheels to travel on a plumb spoke, and forward to give the proper "gather" to the wheels, for which a novel construction is provided.

A printing press has been patented by Mr. Thomas Forknall, of Manchester, Eng. The invention consists in a ring or circular plate held in place on the yoke by screws and having its outer circular edges screw threaded, on which plate a ring nut is screwed, to facilitate the adjusting of the platen according to the thickness of the paper, as by turning the ring nut the platen will be pressed a greater or less distance from the yoke.

A photographic camera has been patented by Mr. Walter Clark, of New York city. It combines an adjustable lens with a device for holding and exposing the sensitive plate, a focusing glass in the top or side of the camera box, a reflector, adjustable into or out of line with the lens, for throwing the image on the focusing glass and afterward exposing the sensitive plate, with other novel features. The same inventor has also obtained another patent for a camera that does not require the plate holder to be removed to obtain a focus, and which has shutters for instantaneous photographing, operated automatically by the lens holder, for field work, the camera being fitted in a case of bag or novel construction and arrangement.

## Special.

## LIFE IN SIAM.

In 1841 a young man, named Jno. H. Chandler, felt it to be his duty to go to Burmah and join in the work of Baptist missions in that country. The name of Chandler is an honored one in the literature and labor of the Baptist Church; and on this gentleman and his accomplished wife has fallen a just share of the honor which follows devoted toil. Mr. Chandler at first went only as a lay missionary, but subsequently entered the ministry as a regularly ordained clergyman. He brought to the work the skill of a mechanical engineer and a thorough mastery of the arts of printing and type-founding. He was soon transferred to Siam, and made his home at Bangkok, the capital of the kingdom. Here his ready facility for acquiring the language made him both useful and busy. He wrote several religious and scientific works in Siamese, and rendered himself valuable to the king and his court as translator of important documents. His wife, formerly Miss Crossman, of Utica, N. Y., made herself eminently useful in connection with the work of the mission. Both in Burmah and Siam she was at the head of schools for the natives, and in later years she had at Bangkok a school for the children of the nobles and princes.

One of the almost inevitable results of mission work is the breaking down of the health of those engaged in it. And this is especially the case in such a debilitating climate as that of Siam. This breaking down generally comes after a short term of service. The Rev. Mr. Chandler and his wife were no exceptions in this respect, to the ordinary lot of missionaries. Their labors had been arduous and various. Mr. Chandler had served with the Foreign Missionary Society till 1856. Then he was occupied with various evangelical and literary duties, until in 1859 he became U. S. Consul at Bangkok. He was also tutor to the present King of Siam, whose full name is Chulalongkorn Chul Chom Chou Yuhua. The official title of this monarch is simply "Chulalongkorn."

The undermining of Mr. Chandler's health went on gradually for years, until in 1872 he entirely broke down. In Bangkok he received medical treatment, and also on his way to this country and back again in 1876. But the effect of all this was rather to patch up than to cure. It was not until 1880 that he and his wife began to experience substantial relief. But we will let them tell their own story, which will be found exceedingly interesting. Recently a correspondent of one of our daily papers visited them at their home in Camden, N. J., at which place they have been residing since their return from Siam. He found them hearty and cheerful people, considerably past middle life, and giving no indication, either in appearance or manner, of ever having been miserable invalids.

The Rev. Mr. Chandler, conversing freely about his experience, said, substantially:

"After coming to this country in 1876 I returned to Siam with somewhat improved health, intending to stay six years. Such was my condition, however, and that of my wife, that we were compelled to return in three. I was a complete wreck. My lung weakness was so great that for months at a time I could not write or read. The nerves of my stomach were totally demoralized. My food would not digest. I had to lay aside all my teaching and missionary labor. I required an attendant all the time, and was unable to do either mental or physical work. My sleep was broken and unsatisfactory. I was also troubled with palpitation of the heart, with diabetes and with an obstinate catarrh of ten years' standing. Altogether I was a very, very sick man."

"While thus a sufferer, the Rev. Dr. MacFarland, a Presbyterian missionary at Bangkok, called my attention to 'Compound Oxygen.' He had tried it for indigestion and general debility, and had found it very beneficial."

"While I was on my way home I found myself in a very critical condition, and almost gave up the hope of recovering health. On reaching Philadelphia I consulted Drs. Starkey & Palen, and at once began the use of Compound Oxygen. It acted like a charm. Very soon I felt signs of returning strength. In the matter of diabetes, the relief was particularly noticeable. Improvement went on gradually, but surely. I became so that I could eat with regularity and really enjoy my food. In time my old symptoms of wretchedness and weariness passed away, and I was myself again."

"To what extent are you able to perform such labors as you formerly could?" was asked.

"You may judge of my strength and health when I tell you that I was with the Siamese Embassy in New York and Washington a few months ago, traveling with them and going about as freely and energetically as any of them. Compound Oxygen has so recruited my system that the unusual exercise of travel had no unpleasant effect on me; nor was I in any respect the worse for my journey. I think I am now able to endure almost as severe labors as at any period of my life."

Mrs. Chandler, who seemed to be in excellent health, then cheerfully gave her experience. She said in substance:

"From my early girlhood I had been ambitious to attain the highest degree of knowledge and of usefulness. I wanted to go as a missionary to some heathen country, and I labored to be prepared for it. My gift for the acquisition of languages proved of great service to me. First, I assisted in a missionary school in Burmah; then I taught schools of the native Siamese; I had, among others, the brother of the present king under my care and a number of the children of the nobility, to whom I taught the English language. I also did much translating. So arduous were my labors that my health, which had for some time been failing, broke down in 1873. I had been of buoyant spirit, but my nerves were exhausted, and I sank down. Vitality gave out. Endurance failed. I gave up all my work. I was so low that on arriving in this country in 1876 no physician would give me any encouragement. When I returned to Siam, it was with only partially restored health. I broke down again, and for months was absolutely helpless. I was nervous to a frightful extent, and, in spite of the most earnest endeavors, could not obtain satisfactory sleep. We could not see our way clear to leave Bangkok until 1880. When I began to pack, I was afraid I could not go through such a heavy undertaking. In the midst of this terrible state of depression and dejection Dr. MacFarland handed my husband one of the 'Starkey & Palen' books about Compound Oxygen. It seemed to me that this must be a beneficial remedy. On the homeward voyage I improved a little."

"On arriving here I at once sought Starkey & Palen, procured a home treatment and faithfully followed the directions. Has it done me good? Look at me now. I am restored to my old good health. There could have been no severer test than in my case."

In concluding a very pleasant conversation, the Rev. Mr. Chandler and his excellent lady both remarked that with gratitude to God for their restoration, they are at all times free to speak of what Drs. Starkey & Palen

have done for them with Compound Oxygen. Considering the remedy completely adapted to their cases and to similar ones, they have no hesitation in making their recovery known, for the benefit of the great army of invalids who are seeking relief and who may be happy in thus finding it.

A "Treatise on Compound Oxygen," containing a history of the discovery and mode of action of this remarkable curative agent, and a large record of surprising cures in Consumption, Catarrh, Neuralgia, Bronchitis, Asthma, etc., and a wide range of diseases, will be sent free. Address Drs. STARKEY & PALEN, 1109 and 1111 Girard Street, Philadelphia.

## 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 at least as Thursday morning to appear in next issue.

Steam Heater.—Wanted, party or parties to sell the American Steam Heater in N. Y. and Eastern States. State Rights for sale. Description of Heater found in SCIENTIFIC AMERICAN, Sept. 6, page 147. Address H. Arden, 35 Vesey Street, New York.

Inventors or dealers having patented articles for physicians' use, and desiring to have them introduced direct, address Dr. W. Molesworth, 69 Gold St., New York.

\$15 Telephone Magnet Bells. W. E. Lewis, Corry, Pa. Signs.—How to prevent boards from splitting, bulging, and opening at the joints, free. Address J. G. Jory, Baltimore, Md.

Cheap, cheap, cheap. Best Popular Science Works. J. Fitzgerald, 20 Lafayette Place, N. Y. Catalogue free.

A first-class mechanic, with good executive capacity, with some of his own inventions of articles that can be sold readily to hardware or house-furnishing goods trade, can learn of an advantageous opening as partner and superintendent of another established business having more power, machinery, and room than needed at present, by addressing Box 158, Buffalo, N. Y.

Experimental Machinery Perfected, models, patterns, etc. Tolhurst Machine Works, Troy, N. Y.

Wanted.—To correspond with works, corporations and cities desiring first-class, and at the same time low cost, electric light plants, with or without engines and boilers. "S. C. Forsyth Machine Company, Manchester, N. H."

Brush Electric Arc Lights and Storage Batteries. Twenty thousand Arc Lights already sold. Our largest machine gives 65 Arc Lights with 45 horse power. Our Storage Battery is the only practical one in the market. Brush Electric Co., Cleveland, O.

The Cyclone Steam Flue Cleaner on 30 days' trial to reliable parties. Crescent Mfg. Co., Cleveland, O.

For Steam and Power Pumping Machinery of Single and Duplex Pattern, embracing boiler feed, fire and low pressure pumps, independent condensing outfits, vacuum, hydraulic, artesian, and deep well pumps, air compressors, address Geo. F. Blake Mfg. Co., 4 Washington St., Boston; 97 Liberty St., N. Y. Send for Catalogue.

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Steam Boilers, Rotary Bleachers, Wrought Iron Turn Tables, Plate Iron Work. Tippet & Wood, Easton, Pa. Send for Monthly Machinery List to the George Place Machinery Company, 121 Chambers and 103 Reade Streets, New York.

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

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent Agency, 361 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Steam Pumping Machinery of every description. Send for catalogue.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. Complete outfit for plating, etc. Hanson & Van Winkle, Newark, N. J., and 92 and 94 Liberty St., New York.

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Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

C. B. Rogers & Co., Norwich, Conn., Wood Working Machinery of every kind. See adv., page 350.

Curtis Pressure Regulator and Steam Trap. See p. 390.

Woodwork's Mach'y. Rollstone Mach. Co. Adv., p. 390.

Drop Forgings. Billings & Spencer Co., Hartford, Conn.

Brass & Copper in sheets, wires & blanks. See adv. p. 406.

The Chester Steel Castings Co., office 407 Library St., Philadelphia, Pa., can prove by 20,000 Crank Shafts and 15,000 Gear Wheels, now in use, the superiority of their Castings over all others. Circular and price list free.

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

Hoisting Engines. D. Frisbie & Co., Philadelphia, Pa.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p. 404.

Cotton Belling, three, four, five, and six ply, for elevator and driving belts. Greene, Tweed & Co., New York.

Practical Instruction in Steam Engineering, and situations furnished. Send for pamphlets. National Institute, 70 and 74 West 23d St., N. Y.

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Knurling Tool, self-centering, for lathe use. Pratt & Whitney Co., Hartford, Conn.

Shipman Steam Engines.—Small power practical engines burning kerosene. Shipman Engine Co., Boston. See page 405.

Blake's Patent Belt Studs, the strongest and best fastening for Leather and Rubber belts. Greene, Tweed & Co., N. Y.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name 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 Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remittance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Minerals sent for examination should be distinctly marked or labeled.

(1) E. B. H. asks the actual as well as nominal horse power of engine, cylinder 10 inches diameter, 36 inches stroke, 65 revolutions, and 85 pounds pressure on steam gauge. A. Nominal, 39 horsepower. Actual at one-half cut-off, 88 horse power. The working power depends upon the point of cut-off, which you do not give.

(2) G. K. G. asks (1) a recipe for violet water. A. 6 pounds violet pomade, 1 gallon rectified spirit; macerate and digest in closed vessel for a month and decant. Then add 3 ounces tinc. orris root and 3 ounces cassia spirit to each pint. 2. Also one for polishing nickel stove trimmings. A. Polish nickel plating with rouge upon soft leather or buckskin slightly moistened; finish dry.

(3) C. F. M. asks if oil poured on the top of a gravity battery will prevent the water from freezing. Also from evaporation. If not, what will keep the water from freezing? A. Oil poured upon the top of a gravity battery will, in a measure, prevent evaporation and the creeping of the zinc sulphate over the top of the jar, but it will not keep the solution from freezing. The only safe way of preventing the freezing of a battery is to place it in a cellar, or inclose it in some way to prevent the frost from reaching it. The gravity battery does not work well in a very low temperature.

(4) Q. P. asks: What power could be got from an electric motor, a ten horse power engine being used to drive the dynamo? A. About 50 per cent of the motive power can be realized in the electric motor, provided the dynamo and the motor are of approved construction.

(5) W. J. asks the difference between the common brass wire and the brass wire that door springs are made of. A. The difference is mainly in drawing the wire. Spring wire is drawn hard and not annealed. You can purchase spring wire from all the prominent brass companies.

(6) C. L.—A thermostatic bar is generally made by riveting or brazing together strips of brass and steel. When the bar is heated, the brass expanding more than the steel causes the bar to spring, rendering the brass side convex and the steel side of the bar concave. We do not know that the thermostatic bars are kept for sale, but they are easily made.

(7) F. S. asks a recipe for making the material used to block or stick the heads of stationary together. A. A quarter of an ounce crude gutta percha; dissolve in bisulphate of carbon to the consistency of mucilage. Apply to the edges of the paper where required.

(8) V. S. W. writes: Being desirous of building a small electric machine, I would like to know how many times I would have to increase the drawings in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, vol. vii., to the best advantage for a 2x4 steam engine. A. We think that the dynamo described in SUPPLEMENT, No. 161, would furnish sufficient work for your 2x4 steam engine, unless your steam pressure is very great. If you desire to make a larger dynamo than that described in the SUPPLEMENT, we advise you to copy one of the more modern machines—Siemens', Weston's, or Edison's.

(9) S. S. asks: Is there power enough in a bichromate battery of 6 or 8 large cells to run a small incandescent lamp, say of 16 candle power, a Brush-Swan lamp for example? A. We think you would find the resistance of your lamp too great for your battery. There is no economy in running a single lamp by means of a battery.

(10) A Reader asks for a receipt for making white ink, suitable for pen drawing. A. Kilner gives the following: Mix pure freshly precipitated barium sulphate or flake white with water containing enough gum arabic to prevent the immediate settling of the substance. Starch or magnesium carbonate may be used in a similar way. This must be reduced to impalpable powders.

(11) H. W. H. writes: Can you inform me of the property in luminous paint which causes it to

emit light in the dark? What chemical reaction, if any, does the paint undergo? A. The luminous property is due to what is termed phosphorescence. It is probably a slow combustion or oxidation. See the article on Phosphorescent Substances, SCIENTIFIC AMERICAN SUPPLEMENT, No. 318.

(12) G. R. F. asks: 1. What is the best liquid to use in a hydraulic lift in frosty weather, when I cannot use water? Would kerosene injure it in any way? A. If you use kerosene or petroleum in your lift, you will require the full quantity necessary for operating it; the only objection will arise from its leakage. Water with 20 per cent crude glycerine will not freeze at zero, and in colder weather will not freeze to give trouble. Whisky has been much used in hydraulic cylinders exposed to low temperatures. Crude petroleum is the cheapest. 2. I am building an ice house; is it necessary or advisable to have ventilation in the roof? If so, why? Will not ventilation promote circulation of air around the ice, and consequently make it waste faster than it would if close or air tight? A. In ice houses the top of the ice is generally well covered with hay or saw dust to keep it from contact with the warm air under the roof. The roof in summer gets very hot from the heat of the sun; the air beneath it becomes much hotter when confined than with thorough ventilation. The roof requires ventilation, not the ice.

(13) W. E. asks: What is used for coating steel mould boards of plows to keep them from rusting after they have been polished? A. Lard oil, tallow, and white lead, about equal parts, brushed on warm, is much used on machinery. If you wish the plows to show the polish, it will be well to varnish the polished parts with a cheap copal varnish thinned with turpentine. Polished hardware is varnished with thin shellac varnish, a little cobalt blue, or other color; the articles to be heated previous to varnishing to about 212°.

(14) J. W. H. writes: It is a common belief that to shingle the hair of children makes it thicker. How is it? A. Professor Wilson in an article on the Hygiene of the Hair, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 102, says: "Cutting does not encourage growth as much as is commonly believed, but it is advantageous in the case of the short, slender hairs, commonly called young hairs."

(15) J. M. L. B.—The flattening of boiler heads is a matter of different practice with boiler makers. Some can turn the flanges without raising the centers, while others manage to warp them, when they are generally straightened cold to avoid the warping effects of heat. If the boring tools are sharp, and lip counter bores used, the plate should not bulge in boring. A bulged head requires tubes of unequal length, which is not good practice. If they become bulged by bad treatment, they should be restored by a better treatment of heating the whole to a black heat or about 700°, and pressing flat upon the flattening plate.

(16) A. A. F. asks: Is there any way to plate or cover a steel knife with tin, or any solution for it? If so, please let me know how to do it? A. Boil 1 ounce cream tartar, 1 1/2 ounces grain tin, or tin shavings, in 1 quart water for an hour. Clean the knife thoroughly, and dip in the boiling solution.

(17) J. F. asks for a recipe for melting rubber. A. Rubber can be melted by heating it over a water bath. In order to get it into a liquid state, however, it is generally brought into solution by dissolving thin strips of rubber in ether, petroleum, naphtha, carbon disulphide, or any other of the numerous solvents. A very full account of the rubber industries will be found in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 249, 251, and 252.

(18) J. E. H. writes: 1. How many horse power will it require to run a dynamo like one in SUPPLEMENT, No. 161, with two incandescent lamps, to light a room 50x100? A. The dynamo described in SUPPLEMENT, No. 161, is too small for your purpose. 2. Which is the best lamp to use with such a machine—the incandescence or the Swan lamp? About how much will one lamp cost me? A. The machine will run two, 3 candle power, incandescent lamps. For the price of lamps address the Edison Company, East Newark, N. J. 3. Can an electro motor be made to run such a dynamo? A. Yes, but the electric current required to drive the motor would operate twice as many lamps as the dynamo driven by the motor. For information on electric lamps consult SUPPLEMENT, Nos. 162 and 370.

(19) P. E. C. writes: I have two good portrait lenses—a quarter and a half Daltol. I would like to use them to improve my magic lantern. Which one should I use, and at what distance from the condensers will I have to nail the board holding the lens? A. The distance between your camera tube and your lantern slide should be about the same as that between the tube and the ground glass in the photographic camera. The quarter tube will answer for ordinary lantern views, and the half tube will do for larger views, provided your condensers are large enough to illuminate them.

(20) R. L. D. writes: I have made a telephone similar to the one in SUPPLEMENT, No. 162, only used three ounces of No. 30 cotton covered wire on each spool. The current is more than a man can conveniently take if I use wet sponges, but the poles of my magnets are so close together that it is impossible to put the call on the same machine. So I made magnets with five-sixteenths coarsest inch long, and wound three-quarter ounce No. 36 silk covered wire. The call is so weak that if I make a spring light enough so as to work, the slightest jar of the floor will cause the bell ringing. 1. Is my current strong enough? A. Yes, 2. Will the machine I have described generate a suitable current to work a call over a quarter of a mile of wire? (The line is an acoustic cable of three No. 22 copper wires twisted.) The telephones work well with this wire at this distance. A. Yes, provided you use a polarized bell. 3. Is there any better style of call than that? A. No. 4. How much No. 36 wire does it require for the magnets in call illustrated in SUPPLEMENT, No. 162? A. About 200 feet. 5. How is the call hammer made to vibrate in the company's telephones?

A. The armature is polarized, so that it is alternately attracted and repelled as the current is reversed.

(21) M. M. asks if there is any way of preventing mica from scratching, also if the edge can be made so as not to break or rattle, if sprung into a bevel. A. We know of no way to treat mica so that it will answer your purpose.

(22) B. P. writes: I have never seen in your paper any reference to a kind of electric light described in my Natural Philosophy as follows: "The brightest artificial light known is made by placing two points of charcoal within an inch or two of each other, and connecting them with the opposite poles of a galvanic battery. The space between the points will be occupied by an arch of flame equaling in dazzling brightness the rays of the sun, etc. The charcoal points never wear away, the battery alone having to be replenished." I would like to ask you what has been found the matter with such lights, or have so much better ones been found? A. You refer to the old experiment of producing the electric arc in a vacuum; it is interesting only as an experiment, and has no commercial value. The ordinary arc lights operate on substantially the same principle, the carbons being arranged to feed as they are consumed.

(23) I. B. writes: I am running a 150 horse power engine; the main belt leads up over head, and sometimes is so highly charged with electricity that, when I stoop down to pass under it, I experience a severe electric shock on the bottoms of my feet, if by chance I step on any nail heads in the floor. Sometimes it causes my hair to rise up on end; at other times it has a reverse action of pressing it flat down. Now can you give me the cause of a belt becoming so charged and discharged? In other words, what is the best and most generally accepted philosophy of this strange phenomenon? A. The electricity of belts is of the same nature as the frictional electricity of the electrical machines, and is supposed to be generated by the friction of the belt upon the pulley, or by the friction of the particles composing the belt as it leaves the pulley. The most acceptable theory is, that the belt acts upon the principle of the electrophorus, and generates the electricity by the act of parting from the pulley. 2. I have a double bell whistle 8 inches diameter, cast brass; with 65 pounds steam, how far should the edge of the bells be from the annular orifices? A. The whistle bell cannot beset exactly without a trial. Steam whistles generally have a screw on the spindle, with jam nuts for adjustment. Set your bell mouth an inch and a quarter from the orifice, and vary it after trials to suit your taste.

(24) W. R. H. asks for the best method for polishing furniture made of open grained wood. A. A furniture polish which has been recently recommended is prepared as follows: Melt three or four pieces of sandarac, each of the size of a walnut; add one pint of boiled oil, and boil together for an hour. While cooling add one drachm of Venice turpentine, and if too thick, a little oil of turpentine also. Apply this all over the furniture, and after some hours rub it off; rub the furniture daily, without applying fresh varnish, except about once in two months. Water does not injure this polish, and any stain or scratch may again be covered, which cannot be done with French polish.

(25) E. F. F. writes: Is there anything that will stop the disagreeable noise to which the pipes of steam heaters sometimes treat us? The noise is often so loud as to make all conversation impossible, and makes the impression as though the pipes were struck with a hammer. What causes it? A. The water hammer in steam heating pipes is mostly owing to defects in planning the steam and return pipes, either in their position or relative size. Sometimes heating engineers are hampered by architectural conditions. Occasionally engineers are negligent in failing to blow the air out of the pipes. Much of the trouble arises from partially opening or coloring the radiators, causing the water to accumulate in them, when upon fully opening such a radiator the water rushes into the return pipe to disturb a whole building by its vibration. Much more of this trouble occurs in moderate weather, when in most large buildings a large number of radiators are closed or partially so; the connecting pipes leading to such radiators become partially filled with water, the vibration of which causes the noise.

(26) J. L. writes: I find several recipes for preserving eggs, in your paper; I have tried two of them—liquid glass and paraffine. I want to get a recipe for cleaning the shells that will be cheap and quickly done—solvents for the glass and paraffine. A. A little dilute acid or vinegar can be used to clean the shell, if desired. Liquid glass is soluble in water, especially hot water. Paraffine is soluble in warm benzene or carbon bisulphide. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 317, several methods of preserving eggs are given. Paper can be paraffined, and the eggs can then be wrapped in that material, but it is not so satisfactory as paraffine or soluble glass; various varnishes are also used, the object in all cases being simply to completely exclude the air from the shell.

(27) D. B. writes: What is the process (if any) by which perfect deodorization of sponge from taste or smell can be obtained? We want them for filtration. A. One of the best processes is said to be the following, which has for some time been in use at Bellevue Hospital: Soak the sponges, previously deprived of sand and dirt, by washing in a one percent solution of potassium permanganate; remove, wash thoroughly, and press. In order to bleach them, continue by placing them in a solution of one-half pound sodium hypochlorite in one gallon of water to which one ounce of oxalic acid has recently been added, and allow to remain fifteen minutes. Remove and wash thoroughly.

(28) J. B. R. asks whether or not the 6 inch pipe from a Sturtevant blower should be smaller near the cupola, that is tapering like a nozzle, and how far from bottom should pipes be for 36 inch cupola? A. It is not necessary to have the blow pipe for cupola tapering. The best practice now is to have a square pipe extending around the shell, and attached to it with mica peep holes in doors opposite the nozzles, the

nozzles being only holes through the shell and brick lining, which can be trimmed up with clay at each melting, in the same manner as the draw spout. The distance from the bottom should be as small as the quantity of metal that you wish to accumulate before pouring will allow. Some bed the bottom with sand when they have a small heat, for economy in fuel. You do not say that your cupola is 36 inches inside or outside. If 36 inches inside, you may make the nozzle 8, 10, 12, or 14 inches from bed, according to the manner and amount of work. An economically managed cupola here of 22 inches internal diameter turns out from 2 to 3 tons of castings in 3 hours. Depth of bed from tuyere, 9 inches.

(29) Y. C. writes: Professor Angell, on "Sanitary Examination of Drinking Water," published in the SUPPLEMENT of November 8, 1884, that in 437.5 grains of salt there are 265.5 grains of chlorine. I would like to know from whose formula NaCl he figures this result. Graham gives a table of equivalents, according to which Na has 24 for its number and Cl 36. The Dispensatory says Cl+Na=35.5+23=58.5. Josiah P. Cooke, Jr., says Cl+Na=35.67984+23.12016=58.8. Why is it that there are such differences among authorities? In some works we are taught one thing, and in others the reverse; for instance, *ide* and *uret* are said to have different meanings when attached to names, but are used by others in the same names. A. We know that 1 ounce avoirdupois contains 437.5 grains troy. The atomic weight of chlorine is 35.5 for all practical purposes, and that of sodium 23. (According to Roscoe, 35.37 and 22.99.) In regard to the atomic weights, it must be borne in mind that they are deduced from experimental work, and therefore until all sources of error are eliminated they will be variable, and are given differently in works on chemistry, according to the latest data at command when the book was written. It is therefore best for our correspondent to consult the latest books on the subject. Professor Graham has been dead nearly twenty years, and his figures are no more authority on atomic weights than the census returns of 1860 are valid for Ohio to-day. The molecular weight of sodium chloride therefore is 35.5+23=58.5. To determine the amount of chlorine in 1 oz. av. of sodium chloride we employ the following proportion: The molecular weight of sodium chloride is to the atomic weight of chlorine as the weight of the sodium chloride is to the weight of the chlorine:

58.5 : 35.5 :: 437.5 : x.  
x equals the weight of chlorine, approximately 265.5. *Uret* is the old term for *ide*, and is not used in modern chemical text books. The best advice we can give to you is the recommendation to study the science, either with some good text book or under some competent teacher.

(30) J. C. P. says: In your Notes and Queries, November 15, query 32, E. C., asks for glossy marking ink for show cards. Lampblack and turpentine will make a mark, and it sometimes stains the card where it should appear clean and white. Asphaltum varnish is the article for marking show cards. The letters may be first painted with India ink and the varnish put over them, but I use nothing but the varnish.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 2, 1884, AND EACH BEARING THAT DATE.

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

Table listing inventions and their patent numbers, including items like Alarm lock, Alum manufacture, Amalgamator, Anchor, Anvil and vise, Automatic gate, Axle gauge, Axle setting machine, Bag fastener, Bag fastening attachment, Bag lock, Balloon, Barrel heads, Bearing, Bed folding, Beer, Bell straps, Belt, Belt shifter, Belt tie, Belting, Bicycle, Bidet, Billiard marker, Boiler, Boiler cleaners, Boiler furnace, Boiler tube cleaner, Bolt, Bolting reel, Book corner, Boots and shoes, Brake, Brush, Burnishing tool, Bushing, Button, Button or stud, Button to boots, Car brake, Car coupling, Car coupling, Car coupling, Car, Car, Car, Carding machine.