

ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. Lee P. Alden, of Tustin, Mich. This invention provides a coupling designed to be simple, durable, and effective, and in which the coupling may be automatically made and the cars uncoupled without the operator going between them.

A railroad switch has been patented by Mr. John S. Meyers, of St. Paul, Minn. This invention covers an improved switch adapted for use with fixed rails and points, designed to be simple and reliable, and capable of being operated by a lever located near the track or automatically from the engine.

A rotary engine has been patented by Mr. Charles F. Sleight, of Fort Wayne, Ind. It has a cylinder having an outer steam chamber separated by annular inwardly extending flanges from an inner chamber in which a piston is held to rotate, provided at each end with a hub turning in suitable bearings on the steam cylinder, with other novel features.

A lubricator for car axles has been patented by Mr. Benjamin E. Dupont, of Lexington, Ky. This invention covers an improvement on a former patented invention of the same inventor, the lubricator being distributed to the bearing by a saturated waste packing, the present invention covering means to facilitate the introduction of the lubricating attachment and more equal distribution of the lubricant.

AGRICULTURAL INVENTIONS.

A stalk puller has been patented by Mr. John T. Whilden, of Stockton, Ga. A vertical shaft is supported by an axle platform, a wheel on the shaft having V-shaped teeth for holding the stalks, while a clearer is held above the wheel, so that as the machine advances the stalks will be pulled up by their roots and fall to the ground.

A churn has been patented by Mr. Nelson Smith, of Kearney, Neb. It has two sets of paddles, so arranged in a casing as to present their blades at an obtuse angle to each other, the length of the paddles being such that when revolved they will just clear the top, bottom, and ends of the case, and the paddle shaft adjacent, thus rapidly acting on every portion of the milk or cream.

MISCELLANEOUS INVENTIONS.

A combined latch and lock has been patented by Mr. Albert A. Kellogg, of Clinton, Mo. This invention covers a novel construction and combination of parts in a device which can be used for either or both purposes, and is durable and simple in construction and effective in operation.

A lock for sliding doors has been patented by Messrs. John M. Tunis and William F. Bedford, of Madison, N. J. This invention combines both a latch and lock, designed to be simple, durable, and inexpensive, which will not be unlocked by jarring, and applicable to rolling doors of all kinds.

A friction clutch has been patented by Mr. William E. Talcott, of Croton Landing, N. Y. It is especially adapted for use in connection with brick-making machines, the clutch section having a bearing face with undercut groove, in which ride the heads of clamping bolts of a second clutch section, with means for clamping the sections together quickly and readily.

A brick machine has also been patented by the above inventor. The invention provides means for starting, driving, and stopping the operating portions, improving the construction of the press box with yieldingly mounted traps, providing for adjusting the plunger when the machine is in operation, with other novel features.

An elastic pump rod has been patented by Mr. George D. Pierce, of Shelby, Iowa. The pump rod has a novel construction of springs and sliding guides for forming a connection between two sections of the pump rod, to cushion the stroke and thus reduce wear and tear by lessening the hammering action.

A roll paper holder and cutter has been patented by Mr. John Zerr, of Keokuk, Iowa. The construction is such that the paper, as it is drawn out in front of the fixture, is separated into the desired lengths by a slight pull sidewise over a suitable cutter, the free end portion of the roll being thrown up ready for the fingers to take hold of again.

A device for increasing the speed of vessels has been patented by Mr. Henry C. Smith, of Brooklyn, N. Y. A jacket is provided into which the blades of the propeller discharge water, which is forced into violent and constant contact with the back water, in a manner designed to aid the propeller in propelling the vessel.

A chicken brooder has been patented by Mr. John D. Wingert, of Fayetteville, Pa. It has a novel heat-distributing apparatus, consisting of a sheet metal plate with central opening, transverse ridges and deflecting plate, in connection with a special construction of box, swinging gang board, ventilating openings, and other novel features.

An apparatus for grinding button edges has been patented by Mr. Jacob Mahla, of Gablonz-on-Neisse, Bohemia, Austria-Hungary. This invention covers a novel construction and arrangement of parts in a machine for grinding the edges of buttons into a cylindrical or conical shape, the machine being adapted to grind several buttons at the same time.

A rod joint has been patented by Mr. John G. Spear, of West Winsted, Conn. This invention relates to joints for coupling the sections of gun rods, and is designed to simplify and strengthen the mounting of the spring bolt in the rod section and to facilitate the disengagement of the bolt from the hole in the sleeve on the other section.

An escape attachment for vapors and odors from cooking vessels has been patented by Anna-

bella and Martha A. Kelly, of Holman Station, Ind. From each cooking vessel a bent pipe leads to a duct along the under side of the long or main cross bar of the stove top, and leading to the smoke pipe, whereby all obnoxious fumes or vapors will be conducted away.

A tailor's square has been patented by Mr. Herman A. Sens, of Cincinnati, Ohio. This invention provides an instrument wherein measures may be taken from the true angle of a square in any direction, being especially adapted for use by merchant tailors, dress and mantua makers, for establishing accurately the essential lines of a garment.

A music rack holder has been patented by Mr. Albert W. Utzinger, of Astoria, Oregon. It is adapted more especially for holding a book or sheet music on a clarinet, piccolo, flute, or other musical instrument, having rings adapted to the body of the instrument, and eyes to which a bar is fitted, with a collar fitted on the bar carrying a music rack.

An attachment for window frames has been patented by Mr. Valdy C. Overton, of Mobile, Ala. It has revolving stops, which may be turned into recesses in the casements of the door or window frames when it is desired to remove the door or window sash, whereby such removal will be facilitated for cleaning, painting, etc., while also affording a protection lock when they are replaced.

SCIENTIFIC AMERICAN BUILDING EDITION.

SEPTEMBER NUMBER.—(No. 35.)

TABLE OF CONTENTS.

- 1. Elegant plate, in colors, of a dwelling lately erected on Jersey City Heights, N. J., with floor plans, sheet of details, etc. Cost, fourteen thousand dollars.
2. Elegant plate, in colors, of a comfortable dwelling, costing nineteen hundred and fifty dollars. Floor plans and details.
3. Perspective view and floor plans of a beautiful residence at Rochelle Park, near New York. Our engraving was made from a photograph taken specially for the SCIENTIFIC AMERICAN BUILDING EDITION.
4. Perspective and floor plans of the residence of I. C. Goodridge, Esq., at Rochester, N. Y.
5. A Queen Anne cottage lately erected in Rochelle Park, near New York. Perspective and floor plans. Cost, five thousand six hundred dollars, complete.
6. A beautiful seaside cottage, at Bath Beach, Long Island. Floor plans and perspective. Cost, about two thousand five hundred dollars.
7. A modern cottage for eighteen hundred dollars, lately built, at Asbury Park, N. J. Perspective and floor plans.
8. A beautiful house in the colonial style, lately erected, in Rochelle Park, New Rochelle, N. Y. Perspective view and floor plans. Cost, ten thousand dollars, complete.
9. Engraving showing perspective, with accompanying plans, of a six room cottage, lately erected on Hancock Avenue, Bridgeport, Conn., at a cost of sixteen hundred dollars.
10. A one thousand dollar cottage, built at Bridgeport, Conn. Perspective and plans.
11. A cottage for two thousand eight hundred dollars, built at Bridgeport, Conn. Plans and perspective.
12. A basement cottage, lately built, at Bath Beach, Long Island, at a cost of two thousand three hundred dollars, complete. Floor plans and perspective.
13. Page of engraving showing various residences and hotels.
14. Photographic illustration showing a cottage for two thousand five hundred dollars, built at Bridgeport, Conn. Perspective and floor plans.
15. A residence at Nangis. Plans and perspective.
16. A beautiful double house for four thousand five hundred dollars, lately erected in Bridgeport, Conn. Perspective view and floor plans.
17. Miscellaneous contents: Ancient use of bronze.—An experiment in optics.—Planting ornamental trees.—Disinfection of sewers.—The rose jar.—Effect of time on slaked lime.—How to build a barn, with plans.—Interior finish.—Seamless eaves troughs with mitered corners (illustrated).—The oscillation of high chimneys.—Imitative and conventional ornament.—A model Boston kitchen.—Weeds.—Artistic furniture (illustrated).—Improved ventilating fans (illustrated).—Bent glass for circular fronts and towers.—Stains for coloring and tinting mortar.—Roof painting.—The Florida steam and hot water heaters (illustrated).—A venerable larch.

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Notes & Queries

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

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

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

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Minerals sent for examination should be distinctly marked or labeled.

(1) A. L. S. asks: Is blacklead made of carbon? If so, could not the waste carbon stubs from electric lights be pulverized and used, and would it be suitable for moulding purposes? A. Blacklead is a mineral, and represents a modification of carbon never practically produced artificially. It exists in cast iron and to a certain extent in gas carbon, but battery carbons would not afford it.

(2) J. R. asks what oil of amber is, and how adulterated. A. Oil of amber is made from amber by dry distillation. It may be rectified by distillation from six volumes of water, (Sp.) gr. 0.840-0.940. Unattacked by iodine, sulphuric acid, or potash. It is used in medicine and perfumery. It is said that kerosene, turpentine, and resin are used in falsifications of it. We cannot give reliable formulæ of proprietary medicines.

(3) J. B. W.—The water pressure in locks is static, and equal to 0.43 of a pound per square inch for each foot in depth. Thus, at the bottom of a gate 10 feet in depth, the pressure would be 4.03 lb. per square inch, but the average pressure against the whole gate would be half the bottom pressure, as there is no pressure at the top. The pressure, is much greater on the paddle wheels of steamers from the impact or striking of the water by the paddles. The amount of pressure varies with the relative speed of the vessel and the slip. The dip of the wheels also is a factor.

(4) A. H. S. asks: If a boiler is tested to a pressure of 100 pounds per square inch, cold water pressure, what is the pressure of steam the boiler will safely carry? A. Boilers, when tested by competent inspectors at 100 pounds pressure, are allowed to carry two-thirds the test pressure. The difference between hydraulic and steam pressure as generally used in testing boilers. A. There is no difference between hydraulic pressure and steam pressure, except the safety and convenience of examination. 3. Should the city inspector injure a boiler by putting on excessive pressure, would the city be responsible? A. This depends upon their motive. They are supposed to apply a test of 50 per cent more than the pressure that engineers and owners desire to carry. If the boiler does not stand it, or is injured, the boiler must be repaired, strengthened, or condemned.

(5) T. P. L.—The setting of the slide valves on a double engine is not different from the setting of the valves of two separate engines, i. e., set each valve for its own engine. See Edwards' Practical Steam Engineer's Guide, \$2.50, which we can mail. Die-cut threads on bolts and the like are slightly stronger than chased threads. The die compresses and hardens the iron in the thread.

(6) H. J. G.—For a free flowing solder use a mixture of two parts tin, one part lead. For a good soldering fluid dissolve zinc in muriatic acid to saturation. Then add a little sal ammoniac and dilute with 10 to 20 per cent of water.

(7) F. X. B. asks: Can the best quality of imported English tool steel be manufactured in this country? If not, what is the reason? A. Tool steel is made in the United States fully equal to the best English tool steel. What is still better, it is made in all the grades suitable for various kinds of tools.

(8) H. R. Y. writes: 1. Am making the Holtz electric machine described in SUPPLEMENT, No. 278, and would like to know if wood posts will do as a substitute for glass for holding the collecting combs. A. Wood dried and dipped in melted paraffine or thickly shellaced will answer. 2. Will diamond cement do to cement the apertured plate with? A. Yes.

(9) S. E. H. asks: 1. How much will a body of air be reduced from its original volume when subjected to a pressure of 20 pounds to the square inch? A. 1/4 of its original volume. 2. What pressure per square inch will reduce the volume to one third? A. 45 pounds. 3. One half the original volume? A. 30 pounds. These are all on the assumption that the normal pressure of the atmosphere is 15 pounds to the square inch, which is approximately true.

(10) W. B. C. asks: How should I change the winding on the motor described some time ago, in order to use gravity cells? If these cannot be used, what is the reason? A. Gravity cells cannot be used for the motor, owing to their high resistance.

(11) C. H. F. asks: 1. How are steel ornaments, such as beads, etc., prepared to resist rusting as well as they do? A. Their very high degree of polish preserves the steel ornaments. 2. What compound placed in a case with albuminized silvered paper will prevent the paper from discoloring without injuring it? A. Keep the sheets of silvered paper between dry blotting pads previously dipped in a saturated solution of carbonate of soda. It should also be kept in a dry place. Prepared paper is sometimes preserved in tin boxes having a small quantity of chloride of calcium in the bottom.

(12) A. H. A. asks for a good acid proof cement for lining storage cells. A. Apply to the perfectly dry cells a mixture of 4 parts resin, 1 part gutta percha, and a little boiled oil, melted together and used hot.

(13) A. C. P. writes: A bets B that the sun is nearer New York city in summer than in winter. If at same distance, bet is off. Who wins A or B? A. B wins. The earth's orbit is eccentric. The perihelion or nearest approach to the sun takes place during the last days of December. New York is farthest from the sun about the last of June.

(14) C. A. B. asks in what year copper toed boots and shoes were introduced. A. The first use of copper for such purpose in any way is probably very ancient, but we believe the modern manufacture in a large way of such goods was commenced about twenty years ago.

(15) Q. A. S. asks: 1. Of what should I make the valves of a small air pump in connection with a small steam engine? A. Of rubber pure gum. 2. Provided the air pump has the same stroke as the engine, of what diameter should it be for a single, a double, and a triple cylinder engine, in comparison with the diameter of the high pressure cylinder? A. For equal stroke one-fifth the area of the high pressure cylinder in either case.

(16) E. G. B. asks the different ingredients that are put into the cheap blue glass that bottles are made of at the present time. A. 100 parts sand, 30 parts kelp or impure soda, 40 parts wood ashes, 100 parts potter's clay, 100 parts cullet or broken glass. Oxide of cobalt or smalt is added to produce the blue color.

(17) A. E. S. — Corrosive sublimate is chloride of mercury, an active poison. The Mammoth Cave, in Kentucky, had a subterranean stream that was called a river. Eyeless fishes were caught there many years since.

(18) W. M. asks how to prepare linseed oil to give it a heavy body that will endure, for coating houses on which the paint is dull. A. Simmer, with frequent stirring, 1 gallon linseed oil with 3/4 pound powdered litharge until a skin begins to form, then remove the scum, and when it has become cold and has settled, decant the clear portions.

(19) H. C. H. asks whether, in laying out a trotting track, the distance is measured on the outside center or inside lines. A. All trotting and running tracks are measured 3 feet exactly from the inside curve or pole. No allowances are made on the track for time or drivings. Athletic tracks are measured 18 inches from curve in America, and 12 inches in Great Britain.

(20) F. J. R. asks (1) what wash leather is. A. It is usually split sheepskin dressed with oil, in imitation of chamois. 2. Whether iron rods can be used in place of brass ones on the Carre's dielectrical machine with as good effect? A. Yes, except for liability to rust.

(21) W. L. A. asks how to soften light leather, such as in lines, saddles, bridles, etc., without discoloring it. A. It is not practicable to do this after the leather is made up. Rubbing well with oil and tallow, after a slight dampening, will soften the leather, but will also somewhat discolor it.

(22) U. H. P.—For soldering solution, See query 6. This also makes a good dipping solution for tinning everything but cast iron. We know of no way of tinning cast iron by dipping. It can be imperfectly tinned by scraping the surface clean and using a copper soldering iron with pure tin and sal-ammoniac.

(23) J. R. desires (1) a receipt for a good ink for soldiers' belts. A. Dissolve 3 sticks of the best black sealing wax in 1/2 pint spirits of wine; keep in a glass bottle and shake well previous to use. 2. A compound to give a durable polish. A. Put 1/2 lb. shellac broken up in small pieces into a quart bottle or jug, cover with alcohol, cork it tight, and put it on the shelf in a warm place; shake it well several times a day, then add a piece of camphoras large as a hen's egg, shake it well, and in a few hours shake it again and add one ounce lampblack. If the alcohol is good, it will all be dissolved in two days; then shake and use. If the materials were of the proper kind and the polish correctly prepared, it will dry in about five minutes, giving a gloss equal to patent leather. For a white belt use white shellac and zinc white finely powdered instead of the lampblack. 3. What should be mixed with logwood to make ink? A. See recipes for inks in SCIENTIFIC AMERICAN SUPPLEMENT, No. 157.

(24) W. C., Jr., asks: 1. How are cattle horns, which are sold in art stores, polished, dyed, and mounted? A. Boil the horn to remove the core, unless it is already out. Scrape with glass or a sharp knife, dipping the horn in hot water occasionally to keep it soft. When all the roughness and spots are off, rub with fine sand paper or emery paper. When smooth as it can be made in this way, take powdered pumice stone or rotten stone, with a flannel cloth and linseed oil, and rub lengthwise until all the sandpaper marks are removed; then rub with a clean flannel cloth till fully polished. It is said that after this a cotton cloth and, finally, tissue paper will produce a still higher polish. A pair of horns can be mounted by taking a block of wood long enough to extend into the horns, leaving them the original distance apart. Then fill the horns with wet plaster of Paris and push them on the ends of the block. When dry, they will be solid. Cover the block with satin or plush. 2. How are metal vessels glazed? A. See "Enamels and Glazes" in Spence's "Workshop Receipts," 3d series, p. 204 et seq. We can send the volume post paid for \$2. 3. If rain water becomes foul in a cistern, how can it be made pure, or how can it be kept from becoming foul? A. It can be purified by filtering through charcoal. There is no way to prevent its becoming foul except to keep the cistern clean, and have abundant access of air to the water.

(25) G. B. D. asks how to destroy vermin in a building. The building to be vacant. I wish something which will not destroy paint or wall paper. A. Close the windows and doors and burn sulphur. It will kill all vermin, but it will also bleach the wall paper. Unless you use sulphur, you will be obliged to fall back on borax and insect powder. Neither of which is radical.

(26) C. R. desires the receipt for preparing mocking bird food. A. Mix together 2 parts corn meal, 2 parts pea meal, and 1 part moss meal; add a little melted lard, but not sufficient to make the mixture too greasy, and sweeten with molasses. Fry in a frying pan for 1/2 hour, stirring constantly, and taking care not to let burn. This makes it keep well. Keep it in a covered jar.

(27) A. N. W. writes: 1. My plants are often infested with green lice, and sometimes with a small white fly or miller which remains on the under side of the leaf. Will you kindly give measures for destroying the insects? A. Take of quassia chips 3/4 oz., larkspur seed 5 drachms; boil these together in 7 pints of water until the decoction is reduced to 5 pints. When the liquid is cooled, it is to be strained and used with a watering pot or syringe, as most convenient. 2. What will kill carpet bugs or prevent their doing mischief to carpets and clothing? A. See "Sure Death to Buffalo Moths" on p. 112 of SCIENTIFIC AMERICAN for August 25, 1888. 3. Please give pronunciation of the word potpourri, and receipt for preparing the compound. A. Po'-poor-ee', see Webster's Unabridged Dictionary. During the rose season, gather a half peck of rose petals, take a large china bowl, strew a handful of table salt in the bottom, then three handfuls of petals, then salt and so on, until all petals are used. Let it remain five days, stirring and turning twice a day. They should now appear moist, when add three ounces of coarsely powdered allspice and one ounce bruised cinnamon. This forms the stock. Allow to remain a week, turning daily from bottom to top. Then put into

the permanent jar one ounce of allspice, and, adding the stock layer by layer, sprinkle between the layers the following mixture: One ounce cloves, one ounce cinnamon, two nutmegs coarsely powdered, some ginger root sliced thin, half an ounce anise seed bruised, ten grains finest musk, half a pound freshly dried lavender flowers, two ounces powderedorris root, orange and lemon peel, and such freshly dried flowers violets, tuberose, clove pinks or other varieties of highly scented flowers. Then add cologne, rose or orange and Florida water and any fine extract that will greatly add to the perfume. Shake and stir the jar once or twice a week and open only during the daily odorizing given to the apartments. Add at pleasure the following essential oils: Jasmine, rose, geranium, vervain, musk, rosemary, or neroli.

(28) T. A. S. writes: I do a great deal of plating in silver by an old process, but have forgotten the manner of dissolving gold into a liquid state. As soon as I dissolve the silver I can commence plating, but the manner of dissolving the gold to make it fluid I cannot find. A. Gold is dissolved by boiling in aqua regia and the nitric acid expelled by adding hydrochloric. The resulting solution of chloride of gold is boiled nearly to crystallization and then is dissolved in water. For manipulation in connection with the battery, see the article on "Electro-Metallurgy" in SCIENTIFIC AMERICAN SUPPLEMENT, No. 310

(29) B. B. asks: 1. What will remove cod liver oil spots from flannel and cambric? A. See the table given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, for removal of oil and other spots from various fabrics. 2. How can I make pine or deal as white as new? A. Take one part calcined soda and allow it to stand 1/2 hour in 1 part slaked lime, then add 15 parts water and boil. Spread the solution thus obtained upon the board with a rag, and after drying, rub with a hard brush, and fine sand and water. A solution of 1 part concentrated sulphuric acid and 8 parts water will enliven the wood after above application.

(30) C. L. W. asks: 1. What is the process of transferring a lithograph from paper to glass, so that it will become transparent? A. First coat the glass with copal varnish, when nearly dry but still tacky press on the wetted picture, face downward, smoothly and tightly. Let it dry thoroughly. Next damp the paper and rub it off with the finger, leaving the picture to be looked at through the glass. 2. How to make imitation frosted glass. A. Make a saturated solution of alum in water and wet the glass with the liquid. It is advisable to have the glass in a horizontal position, as then the solution is not likely to drain off. 3. How to make a stain for glass for the following colors: Bright red, orange, brilliant green, blue, purple? A. The addition of aniline colors that are soluble in water to the foregoing mixture, or a varnish colored with aniline dyes, may be used, but, of course, they are not permanent.

(31) W. J. asks: 1. What kind of tree is used in some countries for making bread? Do they use the bark only? Is there any nutriment in common sawdust? A. The breadfruit tree (Artocarpus incisa) furnishes a fruit that resembles bread in taste. It grows in the Pacific islands and elsewhere in the tropics. The cassava tree (Manihot utilisima) is indigenous to Brazil, and is cultivated in other parts of South America. The root, which is tuberous, contains starch and a poisonous matter. The starch is separated and made into meal, which is used to make bread. There is no nutriment in sawdust. 2. Is the Shipman engine patented in England? A. Yes.

(32) J. E. B. asks how to make a composition for statuettes, one which has clean white color, is strong, hard, and not too expensive. A. Soak plaster of Paris in a solution of alum, bake it in an oven, and then grind it to a powder. In using it, mix with water, and to produce clouds and veins, stir in any dry color you wish. This forms an artificial marble, and is susceptible of a high polish.

(33) J. E. D. asks: Will sound of cannons, bells, etc., break glass? Is there any case on record? Will sound if confined split a door? A. The concussion following or incidental to loud sounds has broken glass, etc., but we doubt if any authentic instance of such destruction by sound alone can be cited. Sound could not split a door.

(34) C. L. K. asks: 1. Was an absolute vacuum ever attained? If so, in what manner? Was Torricelli's a complete vacuum? Was there not vapor of mercury in it? A. The nearest approach to an absolute vacuum probably contains some vapor of mercury. It is doubtful if an absolute vacuum was ever produced, although it has very nearly been reached, so great a rarefaction being obtained that the static discharge would not pass. 2. What is the cause of the blue color of the sky? A. This has long puzzled meteorologists. It is believed that it may be due to very fine particles of liquid water in the upper regions of the atmosphere. The question is discussed in Ganot's Physics under meteorology, and the cause assigned is based on Tyndall's researches on the decomposition of vapors by light.

(35) M. A. M. and A. K. ask how to manufacture chewing gum, such as is sold by confectioners. A. Take of prepared balsam of tolu 2 ounces, white sugar 1 ounce, oatmeal 3 ounces; soften the gum in water bath and mix in the ingredients, then roll in finely powdered sugar or flour to form sticks to suit.

(36) G. H. H.—Spence metal is composed of ferrous sulphide of iron (FeS) mixed with melted sulphur. The ferrous sulphide is made by roasting iron pyrites and pulverizing before adding to the melted sulphur. See account of its discovery and uses in SCIENTIFIC AMERICAN SUPPLEMENT, No. 222.

(37) B. M. asks: What should be the size of a pair of small cylinders, suitable to run steam tricycle, on same plan as the one described in SCIENTIFIC AMERICAN, February 18. Also height, diameter, and thickness of plate for boiler, and number and size of tubes for same. A. The two cylinders should be 2 in. diam., with 3 in. stroke; boiler made of 1/2 in. copper shell, 1/4 in. heads, riveted and brazed, and

20 seamless copper tubes 1 in. outside diameter and 1-16 in. thick. Diameter of boiler, 12 in.; height, 24 in.; fire chamber, 9 in. diameter, 10 in. high. Or you may use the smallest size Shipman boiler, with 30 lb. steam pressure, and should be able to go 10 miles per hour over ordinary grades.

(38) J. B.—A pendulum in a perfect vacuum and absolutely free from friction should continue to vibrate indefinitely, possibly perpetually. But a perfect vacuum and freedom from friction are impossible. Granting the possibility of freedom from atmospheric and other friction, the motion of the earth around its axis, and the displacement of the center of attraction by the motion of the moon, would finally bring the motion of the pendulum within the variability of the centers of attraction, so that if there should remain any element of oscillation, it would be imperceptible.

(39) F. W. P. asks: How much white oak wood will make as much steam as a ton of good soft coal, such as is used for furnace purposes? A. One cord is the mean of many trials. Of hickory a little less is needed, and with pine a little more, white oak being a medium for steam making.

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INDEX OF INVENTIONS For which Letters Patent of the United States were Granted September 11, 1888, AND EACH BEARING THAT DATE.

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

Alarm. See Burglar alarm. 389,270
Animal releasing device, G. A. Waterhouse..... 389,269
Annunciator, R. P. Garsed..... 389,378
Asbestos, preparing, C. A. Faure..... 389,210
Axle lubricator, S. H. Cottrell..... 389,508
Axle lubricator, car, B. E. Dupont..... 389,368
Axle lubricator, car, R. Faas..... 389,372, 389,373
Bag. See Paper bag.
Bake pan, B. H. Bicknell..... 389,357
Baling press, W. L. Wight..... 389,349
Bar. See Boring bar.
Battery. See Secondary battery.
Battery jar, J. Serson..... 389,532
Bearing, ball, E. B. Lake..... 389,231
Bed, etc., O. Flohr..... 389,282
Bed lounge leg, folding, I. Haif..... 389,299
Bevel and square, H. W. Evans..... 389,370
Block. See Meat block.
Board. See Drawing board.
Boat davit attachment, C. F. Rodin..... 389,410
Boiler. See Sectional boiler. Steam boiler.
Boot, button, M. J. Ferren..... 389,211
Boot strap gauge, O. Johnson..... 389,474
Boring bar, Bramwell & Boyle..... 389,360
Bottle stopper holder, C. A. Tatum..... 389,268
Box. See Delivery box. Journal box. Paper box.
Box for packing cloaks, etc., C. W. Lewis..... 389,309
Box opener, R. A. Knight..... 389,228
Bracket for window sills, etc., Himmele & Holt..... 389,224
Brake. See Wagon brake.
Briek machine, W. E. Tallcot..... 389,338
Brick machine, reciprocating, W. S. & J. M. Smith..... 389,334
Brooder, chicken, J. D. Wingert..... 389,428
Brush, flexible back horse, W. J. Scott..... 389,531
Buckle, S. Scheuer..... 389,252
Buggy top, F. Hill..... 389,222
Burglar alarm, M. W. Brooks..... 389,361
Burner. See Hay burner. Refuse burner. Vapor burner.
Butter package, G. W. Bradley..... 389,285
Button, G. L. Sutton..... 389,420
Button attaching machine, E. M. Murray..... 389,237
Button edges, apparatus for grinding, J. Mahla..... 389,312
Button fastener, T. R. Hyde, Jr..... 389,386
Button machine, J. C. F. Dick..... 389,453
Button shanks and fasteners, machine for connecting, E. M. Murray..... 389,238
Calendar, W. B. Fowle..... 389,212
Can. See Oil can.
Can, I. C. Mayo..... 389,234
Can opener, J. F. French..... 389,238
Candy, apparatus for making, Patton & Wisley..... 389,406
Cap threading machine, P. Eley..... 389,208
Car bodies, hanging, A. L. Feraud..... 389,374
Car coupler, E. J. Miller..... 389,525
Car coupling, L. P. Alden..... 389,491
Car coupling, J. A. Hinson..... 389,510
Car railway, T. A. Bissell..... 389,358
Car, railway, Bissell & Bergman..... 389,359, 389,437
Car seat, R. M. Hunter..... 389,514
Car, sleeping, F. S. Tull..... 389,344
Cars, apparatus for automatically extinguishing fires and lamps and operating the brakes on railway, Mills & Koeller..... 389,236
Carriage canopy joint, Gates & Snell..... 389,379
Cart, road, S. Craig..... 389,444
Cartridge, J. H. Brown..... 389,496
Cartridge loading machine, E. A. Franklin..... 289,535
Cartridge loading machine, C. C. Hill..... 389,221, 389,385
Case. See Piano case.
Caster, furniture, J. Toler..... 389,341
Chair seat and cushion, combined, A. Morris..... 389,481
Chart for draughting garments, E. P. Follett..... 389,377
Chart for draughting sleeves of garments, E. P. Follett..... 389,376
Chimney cap and ventilator, A. Martin..... 389,538
Churn, N. Smith..... 389,331
Cleaner. See Saw cleaner.
Clevis and pin, W. H. Baker..... 389,493
Clothes drier, J. Stunden..... 389,336

Clutch, friction, W. E. Tallcot..... 389,339
Coal drilling and cutting machine, E. Moser..... 389,402
Coal drilling apparatus, M. A. Michales..... 389,524
Coffee roaster, N. A. Durham..... 389,454
Collar pad, horse, F. W. Krause..... 389,478
Comb. See Curry comb.
Composition of matter, C. T. Lee..... 389,519
Conveying apparatus, H. U. Palmer..... 389,242
Cooking vessels, escape attachment for vapors and odors from, A. & M. A. Kelly..... 389,306
Copies of writings, drawings, and the like, apparatus for use in producing, E. De Zuccato..... 389,452
Corn popper, rotary, W. C. Moore..... 389,316
Corn silking machine, Conant & Stickney..... 389,442
Coupling. See Car coupling. Whiffletree coupling.
Curry comb, L. M. Devore..... 389,451
Cutter. See Paper cutter.
Cutting tapering or irregularly shaped holes, tool for, F. Josett..... 389,389
Damper, fireplace, J. D. Vance..... 389,424
Delivery box, automatic, E. G. Hoffmann..... 389,025
Digger. See Potato digger.
Dishes, machine for making chip, C. Spofford..... 389,417
Door plate, W. A. Stafford..... 389,260
Drawing board, F. A. Hopkins..... 389,472
Drier. See Clothes drier.
Drill and dredge, E. Derbec..... 389,449
Drill jar reamer, A. Walker..... 389,347
Dust pan, E. C. Cunningham..... 389,366
Eccentric, S. Walkden..... 389,268
Edge trimmer, straight, Robinson & Watt..... 389,529
Electric circuits, reversing switch and rheostat for, C. G. Bickley..... 389,356
Electric conductors and uniting the same, C. McIntire..... 389,314
Electric lighting system, W. W. Griscom..... 389,297
Electric motor, H. A. Chase..... 389,197
Electric motor, A. E. Eastwick..... 389,207
Electric motor, alternate current, W. A. Anthony et al..... 389,352
Electric motor switch, G. D. Shepardson..... 389,254
Electric resistance or currents, thermal device for varying, E. Thomson..... 389,265
Electrical protective system, E. Weston..... 389,272
Electro magnetic device, H. A. Chase..... 389,196
Electrode for secondary batteries, R. M. Elliott..... 389,455
Elevator gate, automatic, J. M. Caldwell..... 389,263
Engine. See Rotary engine.
Envelope, H. Oliver..... 389,318
Fabric turning implement, W. H. Smith..... 389,383
Fatty constituents from wash waters, recovering the, W. Graff..... 389,295
Feather, artificial, S. Roggenburger..... 389,411
Fence, A. R. Buchanan..... 389,286
File, paper, P. J. Schlicht..... 389,530
Filter, sugar cane juice, Wells & Johnstone..... 389,427
Fodder cutters and thrashing machines, carrier for, W. R. Harrison..... 389,467
Folding table, A. W. Steiger..... 389,535
Food for animals, preparing, F. W. Wendenburg, 389,270, 389,271
Food, preparing cattle, T. S. Harrison..... 389,507
Forge, portable, W. T. Kellogg..... 389,305
Furniture, etc., base or support for, A. Green..... 389,457
Gauge. See Boot strap gauge.
Galvanometer, standard tangent, E. Weston..... 389,274
Gang edgers, shifter for, F. W. Cook..... 389,443
Gas lighting device, electric, Tag & Smith..... 389,421
Gases from liquids, apparatus for removing, E. Luhmann..... 389,521
Gate. See Elevator gate. Swinging gate.
Gate and step, combined, P. H. Boyle..... 389,284
Gates, opening and closing drive, J. M. Gustin..... 389,219
Generator. See Steam generator.
Gong, electro mechanical, J. P. Tirrell..... 389,423
Grate, W. Wicke..... 389,489
Grate, fire, J. Cooper..... 389,289
Grate, shaking, W. P. Hartman..... 389,220
Grinding mill, Lister & Richmond..... 389,310
Guard. See Railway guard.
Hair washing and separating machine, H. Bright..... 389,191
Hame attachment, J. Lipps..... 389,520
Hammer, wrench, and staple puller, combined, J. H. Hebblethwaite..... 389,384
Hanger. See Saw frame hanger. Window hanger.
Harness attachment, L. Hewitt..... 389,471
Harness rosette, D. M. Ireland..... 389,387
Harness tool, C. M. Crane..... 389,203
Harrow, J. H. & T. K. Barley..... 389,188
Harrow, M. Daley..... 389,502
Harrow, A. B. Friedrich..... 389,216
Hay burner, G. Laube..... 389,393
Heater. See Water heater.
Heater, E. Gurney..... 389,459
Hinge leaves, making, W. H. Hart..... 389,508
Hinge, spring, Devore & Hofer..... 389,450
Holder. See Bottle stopper holder. Lamp holder. Lamp shade holder. Music rack holder. Opera glass holder. Paper holder. Pen holder. Sash holder. Scarf holder.
Hoof trimmer, H. R. Hage..... 389,463
Hook. See Siding hook. Snap hook. Whiffletree hook.
Horse detacher, A. Ayer..... 389,354
Hose, tool for applying couplings to, C. Callahan..... 389,441
Hydrostatic sight feed lubricator, F. C. & R. S. Prindle..... 389,528
Ice cutting machine, L. Smith..... 389,416
Illuminator, heater, and blowpipe, combined, J. S. Thompson..... 389,264
Indicator. See Low water indicator. Station indicator.
Insect destroyer, A. J. Owens..... 389,482
Jack. See Telescopic jack.
Jar. See Battery jar.
Jewelry, inlaid, Cziner & Brettner..... 389,446
Joint. See Carriage canopy joint. Railway rail joint. Rod joint.
Journal box, J. H. Aldrich..... 389,185
Key seat cutting machine, Palmer & Palethorp..... 389,243
Knit fabrics, machine for uniting, T. S. Smith..... 389,533
Lamp, central draught, C. A. Everts..... 389,371
Lamp, extension pedestal, W. Crede..... 389,445
Lamp holder, adjustable, A. F. & J. S. Lent..... 389,308
Lamp, incandescent electric, F. Moore..... 389,526
Lamp, incandescent electric, T. A. Edison..... 389,469
Lamp, reservoir, W. P. Butler..... 389,440
Lamp socket, electric, S. Bergmann..... 389,280
Lamp shade holder, W. P. Butler..... 389,439
Lamps, oil reservoir for street or other, Volta & Butler..... 389,426
Lamps, shade ring for hanging, E. Fisher..... 389,375
Lamps, suspension device for, F. Rhind..... 389,409
Last, L. W. Hawkes..... 389,468
Latch, E. E. Knowles..... 389,390
Latch and lock combined, A. J. Kellogg..... 389,304
Lathes, back gear for turning, J. R. Baker..... 389,481
Lead wire, etc., die for making, J. Robertson..... 389,321
Leather staking machine, W. M. Hoffman..... 389,511
Lifter. See Transom lifter.
Lock. See Seal lock.