

gas be used for the same purpose as natural gas? I am trying to find out if I can use coal gas for welding iron on a small scale. A. Natural gas contains hydrogen, nitrogen, marsh gas and other hydrocarbons, carbon monoxide, etc. Coal gas is inferior to it for welding, because it contains too high a percentage of carbon. It can be used with a hot blast with some success. Water gas made by passing steam through white hot coal is superior to either for welding iron.

(3478) E. D. H. asks: 1. What is the best formula for making dry hop yeast? What is the best mode of drying it? If dried by heat, about what should the temperature be? A. Mix 3 1/4 ounces of hops with 15 quarts hot water and 3 3/4 pounds rye flour. When it has cooled to a lukewarm temperature only add 1/2 pint of beer yeast, and allow it to ferment. After standing over night add 7 1/2 pounds of corn or barley meal, knead into dough, and roll out to a thickness of 1/4 inch. Cut this into small cakes and dry in a warm room or in the sun, turning from time to time. To use, a piece is soaked in warm water left to stand 12 hours in a warm place, when it is ready for use. 2. Is there any cold air process by which it can be dried by evaporation? A. It can be dried by being placed in a tight jar in which a lump of quicklime is placed. The yeast must of course be in its own proper receptacle, and not in contact with the lime.

(3479) L. S. says: We send inclosed two worms found in a piece of plush. Would you kindly tell me what they are and whether they are liable to injure goods? The darker worm was found in a substance resembling silk and which adhered pretty firmly to the plush. A. Reply by Prof. C. V. Riley.—One of the larvæ forwarded had transformed to pupa in transit, but the other is still active. It is the larva of a beetle of the family Cleridæ and the genus Corynetis. This family of beetles is, as a rule, carnivorous or predaceous in the early stages. It is therefore probable that the larvæ were attracted to the goods by the presence of other larvæ, the latter probably of some of the common "clothes moths." I hope to rear the imago and should much like to have other specimens. If it turns out, as seems probable, that this larva will prey upon the various clothes moths that so trouble the housekeeper, it is well to know the fact, as possibly it may be encouraged and utilized to advantage. On the other hand, one of the species of the genus, namely, Corynetis rufipes, is known to be injurious to preserved meat and has been found particularly bad in hams. An account of its injuries has been published by me in my Sixth Report on the Insects of Missouri, page 98. The species sent by your correspondent is smaller, yet all the species of the genus in the larva state, so far as known, feed on dead rather than live animal matter, and the presumption is that in this case the two specimens had left some such matter and got on the plush accidentally, or they may have fed on the exuvie of the clothes moths. The substance resembling silk may have been the cocoon of the clothes moth larvæ or else a cocoon made by the Corynetis larva itself, preparatory to pupation.

(3480) W. R. B. asks how to make beef, iron and wine. A. Liebig's extract of beef 1/2 ounce avoirdupois, ammonio-citrate of iron 256 grains, spirits of orange 1/4 fluid ounce, distilled water 1 1/2 fluid ounces, sherry wine sufficient to make 16 fluid ounces. Dissolve the ammonio citrate of iron in the water, dissolve the extract of beef in the sherry wine, add the spirit of orange and mix the solutions.—Beef, iron, and wine for soda fountains: Beef, iron, and wine 1 ounce, vanilla sirup 3 ounces.—For dispensing: For 2 quarts, concentrated extract of beef, 2 ounces; pyrophosphate iron, 1/2 grain. Dissolve in 1/2 pint boiling water. Add tincture curacao, 2 ounces; tincture orange peel, 2 ounces; sirup, 12 1/4 ounces; alcohol, 12 1/4 ounces; solution citrate of ammonia, 2 ounces; sherry wine, 23 ounces. The information given above is taken from "The Scientific American Cyclopaedia of Receipts, Notes and Queries." In press.

(3481) G. L. B. asks how to make bluing for laundry use. A. 1. Dissolve good cotton blue (aniline blue 6 B) in cold water. 2. Dissolve fine Prussian or Berlin blue with 1/2 part of oxalic acid in water, or use ferrocyanide of potassium (1-12 part) in place of oxalic acid. 3. A disinfecting laundry blue.—Mix together 16 parts of Prussian blue, 2 parts of carbolic acid, 1 part of boric acid, and 1 part of gum arabic into a stiff dough. Roll it out into balls as large as hazel nuts, and coat them with gelatin or gum, to prevent the carbolic acid from escaping. 4. Water 15 parts: dissolve in this 1 1/2 parts indigo carmine, add 3/4 part gum arabic. From "The Scientific American Cyclopaedia of Receipts, Notes and Queries." In press.

(3482) K. F. asks: 1. What will cement thin ivory pads on nickel-plated steel triangles without coloring the ivory or injuring the triangle and that will set in 48 hours or less? A. Mastic varnish 1 part, isinglass 2 parts. Dissolve the isinglass in a little water as possible with a little alcohol, and mix with the varnish. The latter is prepared by making a strong solution of gum mastic in alcohol and benzine. 2. What is the best book on surveying, more especially with the transit? A. We recommend and can supply Johnson's "Theory and Practice of Surveying," price \$3.50 by mail, also Gillespie's "Practical Treatise on Surveying," price \$3.50. 3. What is the best book on mining surveying? A. We recommend Brough's "Mining Surveying," price \$2.50 mailed.

(3483) H. G. J. asks: What is the velocity of light and of the electric current? A. The velocity of light is 185,420 miles per second. Wheatstone gives the velocity of static electricity as 288,000 miles per second, which is greater than that of light. Current electricity, where it meets with no resistance, has about the same velocity as light. The velocity of electricity on an iron wire is variously estimated at from 18,400 to 62,100 miles per second, and on a copper wire 111,780 miles per second. The nature of the conductor and its environment has an influence on the velocity.

(3484) C. A. W. asks: Which travels the faster—light or electricity? Please state also the rate of each. A. See reply above.

(3485) I. E. asks: 1. Is alumina manufactured in the United States anywhere. If so, where

and by whom? A. Address the Pennsylvania Salt Company, Philadelphia. It is a dyer's chemical. 2. Could gas be compressed in tank and carried any distance and used to drive an Otto gas engine, and would the tanks empty themselves through the engine without any pressure above atmospheric pressure? A. Yes. 3. Where could I get a cheap work on the use of gas or its manufacture? A. We can supply you with works on this subject such as "A Treatise on the Manufacture of Illuminating and Heating Gas," by Burn-, price \$1.50, also Richard's "Practical Treatise on the Manufacture and Distribution of Coal Gas," price \$12 by mail post paid.

(3486) J. C. writes: 1. In speaking of the resistance of fields in a shunt dynamo as being 14 times that of the armature, do you mean all the wire on armature or only half between the brushes, or as some say only a quarter of the armature wire is taken as the resistance of armature when comparing it with fields. A. The resistance of the armature is meant. This is one quarter of the resistance of the total length of wire on the armature, for the reason that the current goes through the two halves of the wire in parallel, thus reducing the length of the conductor one-half, and at the same time doubling its sectional area, thus reducing the resistance as above stated. 2. Does the same resistance do for motor shunt-wound? Yes.

(3487) R. N. asks: During an argument in this city a few days ago, as to the component parts of glass, one party asserted that glass could be manufactured from straw. Immediately a bet was made that he was mistaken, and the parties to the wager agreed to leave it to the SCIENTIFIC AMERICAN for decision. A. The ashes of straw might be fused into a species of glass. To this extent the assertion is true.

(3488) F. F. writes: Can you tell me of a glue or cement, for the purpose of attaching cloth or felt to garments, that is absolutely waterproof, and will resist 140° Fah. of heat, also dry quickly? What is the best method of using same? A. We know of nothing better than the sheet gutta percha used by tailors for the purpose you mention. It answers to all the qualities you call for except the heat. It softens under heat. In use place a sheet of the percha between the two surfaces of fabric to be joined, and press the same with a hot flat iron. The operation is quick and effective, provided the heat is maintained long enough to penetrate the fabric and melt the percha.

(3489) E. G. H. asks (1) for some preparations that will render cane pole fireproof. I refer to the "fishing pole" grown in the South. In working the material I have considerable waste and propose to make pipes, for smoking tobacco in, so want to "get on to" a treatment not expensive, that will admit of using them in that way. Would like a chemical that they could be soaked in, and that would not give off any unpleasant odor or taste. A. Soak the cane in a solution of phosphate of soda. 2. A good formula for marking ink to be used in laundry for marking clothes, that will not require to be (the goods) prepared in any way before or after marking, but be ready to go into the wash. A. For ink formula in general we refer you to our SUPPLEMENT, No. 157. 3. Can you give me an idea of some preparation for bleaching in laundry work, better than chloride of lime? A. For real bleaching we cannot. For laundry work in general we refer you to SCIENTIFIC AMERICAN, No. 9, vol. 61; SUPPLEMENT, No. 577.

(3490) G.—A machine that will always keep itself in motion without exterior aid, and without consuming fuel, might be termed a perpetual motion. No reward offered.

(3491) M. S. P. asks: What can I coat tin battery cells with to make them acid proof? A. Try a coating of coal tar pitch.

(3492) E. B. C. asks: 1. Where can I obtain paramidophenol to be used for a developer as described in your paper of August 29? A. From the principal dealers in photographic materials in New York. 2. How much does it cost? A. \$8 per ounce. 3. In what proportions should I use it in developing? A. In the proportions given in SCIENTIFIC AMERICAN. 4. Is it poisonous, and if so, what forms a good antidote for it? A. Yes, to take internally. Antidote, a strong emetic. 5. Is hydroquinone poisonous, and if so, what is a good antidote? A. Yes. Antidote, a strong emetic. 6. What is the formula of paramidophenol? A. The chemical formula is C6H4(NH2)OH. 7. How much did the Philadelphia cost? A. \$1,350,000. 8. What is her type? A. See SCIENTIFIC AMERICAN, vol. 61, Nos. 6 and 11, for illustrations of her. 9. Is there any good book published exclusively on the new American navy? And if so, how much does it cost? A. Consult the back numbers of the SCIENTIFIC AMERICAN. There is no book on the subject. 10. I have a room, size 25 x 30 feet, in which there is a fireplace that is 6 feet long, and whenever a fire is lighted it will always smoke unless a window is opened, and no matter how little the window is opened, the fire stops smoking. Now, how can I fix it so that I can have the windows all shut, and have the fire not to smoke? A. Conduct a special air flue under the floor from the outside of the house to the fireplace, having the aperture at the grate closed with a register. This will supply a constant current of air when the room is closed. 11. How much about per night would it cost to run a lime light in a Marcy sciopticon, for say about two hours at a time? A. The cost for gas will be about \$3.50, for lime 10 cents. 12. Would it be safe to use a lime light, and what good book can I get on the subject, and how much does it cost? A. It will be safe to use the lime light if the gases are compressed in iron cylinders. We refer you to the "Book of the Lantern," by T. C. Hepworth, which we can send by mail. Price \$2.

(3493) J. M. L. writes: I have a well about 105 feet deep. When the well digger got down some 85 feet, the solid rock was struck. Then a hole was drilled 15 feet, water was found in either slate or soapstone, judging from the appearance of the material that stuck to the drill. The water rose within 3 feet of the top of the rock. I have a windmill which pumps the water out faster than it comes in, although two men say that they can hear the water rushing through the

bottom of the well. I want to know what I ought to have done to increase the supply of water. I have been told if I drop into the hole 2 pounds of quicksilver, it will cause the water to come in more freely. I am told of a man in Quincy who wanted to dry up his well; he was told to put quicksilver in it; he did so, but it had the contrary effect. The water rose in the well, flooded his cellar, and he had no relief until he connected with the sewer. Can you give me any information if the quicksilver will have the desired effect? I have built small fish ponds, and I want to keep it supplied with water from the well. A. We have no confidence in the quicksilver yarn. Drill the hole deeper to get more water.

(3494) R. W. S. asks: 1. If a rifle ball be fired perpendicularly into the air, what velocity will it have when it returns to the earth? 2. If at close range it will penetrate 5 inches into a piece of wood, how far will it penetrate the same piece of wood after falling from a perpendicular shot? A. The return velocity depends upon the initial. The greater difference with the greater height that the ball reaches before returning. The friction of the air retarding the velocity both ways. We cannot give definite figures on account of the uncertainty of muzzle velocity and height of projection, as well as relative densities of bullet and air. A. elongated and globular ball having different frictional exponents. Under all circumstances the return will have a greatly lessened penetration.

(3495) E. P. G. says: Kindly inform me through the inquiries column in your paper what is the cheapest way of dressing the surface of a grindstone which has worn unevenly, to produce an even and true surface again? It is not valuable enough to warrant purchasing a diamond tool, and I am not in or near a town where such a tool is owned, the use of which could be hired for this one occasion. A. Nail or fasten a block of wood across the frame as close as possible to the stone; use a piece of 3/4 or 1 inch gas pipe, with the end resting on the block, and the edge against the stone; by rolling the gas pipe back and forth along the face of the stone it can be turned off true. Use no water.

(3496) P. W. K. asks: Will it make any difference which way you jump (while in a car moving at the rate of 60 miles per hour), either against or with the motion of the train? By the difference I mean difference in distance jumped, measuring from a certain spot in the car floor. A. It will make no difference which way you jump; the distance jumped will be the same, as you are moving with the same motion as the car.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

October 6, 1891.

AND EACH BEARING THAT DATE.

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

Table listing various inventions with their corresponding patent numbers, including items like 'Advertising purposes at night, illuminating balloon for A. Gross', 'Alarm, See Electrical alarm', 'Aquarium, G. P. A. Gunther', 'Axle box, car, T. B. Stewart', 'Axle lubricator, J. A. Scarborough', 'Axe, vehicle, Johnson & Mandt', 'Axe, beheading, Miller & Griswold', 'Bag holder, W. G. Adams', 'Bag making machine, three-cornered, Baron & Bibby', 'Baling cotton, J. G. Goldthwaite', 'Bathing apparatus for supplying water to wash, J. J. Boyle', 'Basket wiring machine, J. Knopp', 'Bed brace, Critcher & Webber', 'Bed, folding, C. L. Gill', 'Bed, invalid, G. A. Leonard', 'Bell spring and copper holder, G. G. Campbell', 'Belting joint, D. B. Kelly', 'Bicycle, W. R. Mercer', 'Billiard table, pneumatic, E. L. McConaughy', 'Bit holder, compensating, S. B. Minnich', 'Board, See Game board', 'Boat detaching apparatus, automatic, B. A. Caperton', 'Boiler, See Steam boiler, Wash boiler', 'Bolting devices, flap board for, J. A. Segbers', 'Boot or shoe heel, O. Zietz', 'Bottle, nursing, H. O. Flodin', 'Box, See Axle box, Document box, Letter box, Paper box', 'Box, J. H. Hartridge', 'Box lid fastener, H. H. Snow', 'Box lifter, E. Treasure', 'Brace, See Bed brace', 'Bracket for adjustable shelving, T. F. Mark', 'Brake, See Vehicle brake', 'Bread knife, R. J. Christy', 'Bread, meat, and vegetable slicer, S. Fehr', 'Brick kiln, W. L. Gregg', 'Bridge gate, M. & J. Higgins', 'Bridge, wooden, B. F. Ferguson', 'Bridle attachment, J. W. Beam', 'Buckle, G. W. Bussey', 'Buckle, J. Parker', 'Burner, See Gas burner, Hydrocarbon burner, Oil burner', 'Cable crossing, J. Dunott', 'Call boxes, central station apparatus for, E. R. Hart', 'Camera roll holder register, H. C. Boyer', 'Can labeling machine, H. Albert', 'Cane juice straining device, W. C. Hazlip', 'Car brake mechanism, M. Leary', 'Car coupling, W. Bentley', 'Car coupling, Goss & Harrell', 'Car coupling, J. W. Kirby', 'Car coupling, Molsed & Finch', 'Car coupling, H. L. Peck', 'Car door lock, C. H. Ives', 'Car, express, F. P. Doering', 'Car, hand, T. Lo Castro', 'Car journals, cap for lubricating boxes for, J. Parker', 'Car seal, E. S. Wheeler, Jr.', 'Carpenter cleaning apparatus, pneumatic, G. L. Cummings', 'Carriage, S. R. Bailey', 'Carriage body, H. A. Muckle', 'Carriage seat, J. Currier', 'Carrier, See Parcel carrier', 'Cart, road, W. F. Murphy', 'Cartridge, P. Amjorn', 'Case, See Mailing case', 'Cash indicator, register, and recorder, P. Yoe', 'Casting grids, machine for, A. F. Madden', 'Centering device, R. C. Nutent', 'Chair, J. W. Doubler', 'Chopper, See Cotton chopper', 'Chuck, lathe, J. N. Skinner', 'Chuck for holding pipe nipples, R. G. Ferguson', 'Churn, G. P. Laval', 'Clear box, printing machine, H. Leiman', 'Clamp for books, etc., J. Q. Moxley', 'Cleaner, See Cotton cleaner', 'Clock, alarm, W. Madel', 'Clothes drainer, A. L. Eversmeyer', 'Clutch, combined friction and positive, J. S. Adams', 'Coal conveyor, T. H. Lewis', 'Cock, compression, C. A. Sandlass', 'Coffee or tea pots, cold handle for, T. Bauer', 'Collar, J. A. Scriven', 'Collar and bames, combined horse, D. Paquet', 'Combining machines, mechanism for actuating the dabbng brushes of, J. Parkin', 'Compressing apparatus, F. Windhausen', 'Concentrator, G. Lang', 'Conveyer, J. M. Finch', 'Cooker, J. H. Gardner', 'Cord, W. Jolchennin', 'Cornice, H. Fritz', 'Cotton chopper, G. W. Allen', 'Cotton cleaner, seed, T. P. Townley', 'Coupling, Sea Car coupling, Thill coupling, Trace coupling', 'Crank motion, variable, A. Kitson', 'Cultivator, garden, J. A. Everitt', 'Cultivator tooth, J. W. Kraus', 'Curling iron, G. L. Thompson', 'Curtain fixture, H. S. Wainwright', 'Curtain pole ring, J. A. Rings', 'Cut-out, automatic safety, W. B. Cleveland', 'Cutter, See B. Doubler', 'Cutting and punching machines, spacing device for, F. Rittenhouse', 'Cutting device, electrically controlled, L. S. White', 'Damp, automatic draught regulating, C. D. Howard', 'Dental engine, A. W. Browne', 'Dental engine head, A. J. Harris', 'Dial, timepiece, M. B. Martin', 'Die, See Sheet metal drawing die. Sole cutting die', 'Direct-acting engine, H. G. Williams', 'Dish pans or other vessels, stand for, M. C. Powell', 'Dish washer, F. W. Hoppe', 'Display stand, E. A. G. Kurth', 'Document box, Andrews & Jenness', 'Door closer, J. B. Kleinert', 'Dress shield, I. B. Kleinert', 'Drill, See Jeweler's drill', 'Drilling machine, F. H. Richards', 'Eaves troughs, machine for forming, J. Klein', 'Egg holder for setting eggs, Schuster & Link', 'Egg separator, J. L. Johnson', 'Electric conductor, W. Vogler', 'Electric motors, regulating the speed of, M. J. Wightman', 'Electric solenoids, core for, J. T. Williams', 'Electric switch, C. Wirt', 'Electric wire, W. Siegler', 'Electrical alarm, H. P. Smith', 'Electrode, secondary battery, W. A. Rosenbaum', 'Elevator, See Water elevator', 'Elevator controlling device, J. McAdams', 'Elevator gate operating device, A. C. Stewart', 'Elevator gate device, J. Johnson', 'Elevator wells, device for operating gates to, W. H. Wheeler', 'End gate, wagon, D. O. Duncan', 'Engine, See Dental engine, Direct acting engine, Engineer's slide rule, W. Cox', 'Engraving machine, F. W. Sabel', 'Engraving machine, pantographic, W. Goudie', 'Eraser and pencil sharpener, combined, G. W. Washburn', 'Evaluating pan, J. M. Duncan', 'Extractor, See Knife extractor', 'Feed water heater for steam boilers, J. Baird', 'Feeling machine, C. A. Whipple', 'Fence machine, wire, J. J. Gardner', 'Fence post, metallic, J. J. Farner', 'Fence stay fastening, wire, S. Eberly', 'Firearm, magazine of single loading, A. W. Savage', 'Fire escape, I. Mills', 'Fish tank or aquarium, G. P. A. Gunther', 'Flood gate, T. F. Emans', 'Floor set, N. B. Marston', 'Flour bolting machine, J. C. Hamilton', 'Fruit picker, J. H. Woodward', 'Fruit stoning machine, J. S. Briggs', 'Furnace, See Heating furnace', 'Furnaces, apparatus for feeding sawdust and shavings to, Scott & Shearer', 'Furnaces, bell and hopper for blast, B. F. Conner', 'Game apparatus, C. M. Fisk', 'Game board, pneumatic, E. L. McConaughy', 'Gas burner, oil, W. H. Phillips', 'Gas holder, G. T. Thompson', 'Gases, apparatus for testing mine, T. Shaw', 'Gate, See Bridge gate, End gate, Flood gate, Sliding gate', 'Gate, M. Yackley', 'Gate opening and closing device, S. F. Rolston', 'Glass soaping and polishing machine, C. Delrue', 'Glassware, method of and apparatus for engraving hollow, A. Paschke', 'Glove fastening device, L. A. Douillet', 'Gold and silver from their ores, apparatus for washing and separating, W. J. Tanner', 'Goods forms, adjustable stand for, Huffer & Buehl', 'Grader, road, M. E. Lasher', 'Grain binder knottor, O. H. Watkins', 'Grain elevators, power transmission for, D. A. Robinson', 'Grain sampler, J. M. Stacy', 'Grain separator, McGill & Van', 'Grass seed, machine for cleaning, J. Smith', 'Grooving machine, C. E. Thurlow', 'Guard, See Knife guard', 'Hackle for drawing and roving, gill, J. McGrath', 'Hammock support and canopy holder, F. Welling', 'Harvester, corn, J. C. Entekin et al.', 'Harvester, F. L. Stinchcomb', 'Harvesters, finger beam attachment for, H. P. Galligan', 'Hatchway door operating device, R. Hallenstein', 'Hay rake, horse, G. Ward', 'Heater, See Feed water heater', 'Heater, W. H. Randall', 'Heating and ventilating apparatus and system, J. A. Skilton', 'Heating furnace, J. N. Hersh', 'Heel nailing machine, G. H. Cogswell', 'Heel seat beating machine, W. W. Aire', 'Hinge, F. L. Lock', 'Hinge, F. L. Stinchcomb', 'Hinge lock, T. Corscaen', 'Hoisting machine, South & Chapman', 'Hoisting machines, drum shifter for, J. U. Elwood', 'Holder, See Bag holder, Bit holder, Egg holder, Gas holder, Hoop holder, Rein holder, Sash holder, Ticket holder, Typewriter copy holder', 'Hook, See Whiffletree hook', 'Horse, wearing pad for, J. E. Hayward', 'Hose, B. L. Stowe', 'Hose, fire, E. L. Swain', 'Hydrocarbon burner, W. F. Otis', 'Index, H. Brown', 'Indicator, See Cash indicator, Switch indicator', 'Ingot for plated wire, G. U. Meyer', 'Ingots for seamless plated wire, making, G. U. Meyer', 'Insulating material, composition for, E. Thomson', 'Insulation for electric wires, J. R. Markle', 'Iron, See Curling iron, Sad iron, Jack, See Lifting jack', 'Jeweler's drill, L. F. Claxton', 'Joint, See Belting joint, Rail joint', 'Kiln, See Brick kiln', 'Knife, See Bread knife', 'Knife guard, C. S. Wright', 'Knob spindle fastener, C. F. Garland', 'Lace fastener, arc, I. L. Roberts', 'Ladle, R. W. Grace', 'Lamp chimneys, heating attachment for, G. L. Thompson', 'Lamp, electric arc, H. W. Libbey', 'Lamp electrode, arc, H. W. Libbey', 'Lamp, electrode, arc, I. L. Roberts', 'Lamp, electric, arc, I. L. Roberts', 'Lamp pencil, arc, I. L. Roberts', 'Lamps, globe protector for electric arc, E. J. Op- enlander', 'Lathing, metal, C. H. Curtis', 'Letter box, counter door, E. Markell', 'Levee wall, B. E. Folmer', 'Lifter, See Box lifter', 'Lifting jack, A. F. Rott', 'Lime, hydraulic, J. H. Wright', 'Lock, See Car door lock, Hinge lock, Permuta- tion lock', 'Lock, J. T. Cole