(779) W. R. asks how to make a spark coil. A. Make a ¾ inch bundle of iron wire 8 inches long, wrap it with five pounds No. 20 magnet wire. It will with battery and proper appliances light gas, but not an oil lamp.

(780) J. S. writes: Is beef a more digestible meat than veal? A. Beef is far more digestible. 2. In which time about is the former, and in which time the latter digested? A. Beef—boiled 2 hours 45 minutes, roasted 3 hours. Veal—roasted 4 hours, fried 4 hours 50 minutes.

(781) O. H. P. writes: 1. What is the meaning of the words ampere and ohm? A. See answer to queries 236 (Jan. 26) and 427 (March 9). 2. Give a good receipt for making a copying pad which will not spoil in warm weather. I desire to make from 20 to 50 copies from one copy. A. See SUPPLEMENT, No. 438, which we can send you for 10 cents. Mix a very little oil of cloves with it for hot weather.

(782) S. H. G. writes: Referring to the SCIENTIFIC AMERICAN of January 21, 1888, page 42, Prof. Mendelejef's "theory of the formation or origin of petroleum," where does he place the laboratory—as low down as "Cambrian," or not? A. Far below any geological horizon, in the incandescent regions of the earth's interior.

(783) M. S. asks: What is the usual treatment of apatite to extract the phosphoric acid, and also about what per cent it usually carries? A. It is treated with sulphuric acid to convert it into a superphosphate.

(784) J. W. D. writes: 1. Will vapor gas such as used by gasoline stoves answer for heating purposes, either by hot water or steam? A. Yes; but it is dangerous, as involving the storing and handling of large amounts of naphtha. 2. Would it be as cheap as bituminous coal at $3 per ton or anthracite at $6 per 2,000 lb.? A. Probably it would prove cheaper, because so easily extinguished and started, and because of there being no ashes to dispose of, etc. 3. From what is the gas made that H. Disston is using for fuel in his saw works, and is it the same with which Westchester, Pa., is to be supplied for fuel? A. We cannot answer this. Address the party named. 4. What is the probable comparative cost of kerosene, or crude oil, or fuel gas, or coal for generating steam? A. Allow 3½ barrels of oil to the ton of coal, and 55 to 65 lb. of coal to 1,000 cubic feet of gas for equal calorific powers. From these figures make your estimates according to relative prices in your vicinity.

(785) R. T. F. writes: 1. Can you give me a good simple recipe for making a nice liquid or solid shoe blacking, that will produce a quick shine? A. Various receipts have been published in our Notes and Queries. We also refer you to "Trade Secrets," which we can supply for 60 cents by mail. 2. Can you tell me what makes my hands perspire while playing the violin, and can you tell me of a harmless remedy to prevent it? A. It is constitutional. Try bathing the hands in alcohol and use powdered corn starch or soapstone on them before playing.

(786) T. L. R. asks: Will the receipt No. 653 in April 20, 1889, issue, for gumming labels, do to use in fastening papers, such as a bunch of note or letter heads? If not, will you please give a good receipt? Something that does not requireheatingwhen to be used, cheap and gummy. A. No. The regular composition used is made from best glue and glycerine and water colored with aniline. This needs heating. A solution of gum tragacanth with a little glycerine might answer your requirements, but we advise the first. For 5 lb. of dry glue allow 1 lb. of glycerine.

(787) H. C. asks: 1. Is there a paper published, anywhere in the world, which is devoted entirely to the subject of "Aerial Navigation"? A. Yes; in France. 2. What is the lifting power of 1,000 cubic feet of what is called "water gas," being made from steam, coal, and naphtha? A. About twenty pounds.

(788) W. H. M. asks: Can you give me the formula of a liniment of which sulphuric acid is a component part? A. No officinal liniment of this character is given. A mixture of the strong acid with saffron, forming a paste, is a strong caustic which has been used successfully. It is very powerful, and must be used with caution.

(789) O. V. writes: 1. Can you inform me what sort of cement is used in wooden boxes to make battery cells? A. Have boxes perfectly dry, smear them inside with a hot mixture of four parts resin, one part gutta percha, and a little boiled oil. The mixture must be thoroughly melted and stirred before use. A hot rod of iron may be used to melt it into the crevices. 2. Are they only good for Bunsen batteries or Grenet? A. They can be used for any ordinary type of battery. 3. What are dry batteries composed of, and are they any good for a medical coil? A. A good effect can be obtained from a paste of plaster of Paris one pound, oxide of zinc one-fourth pound, saturated solution of chloride of zinc enough to make a stiff paste. They are very good for medical coils.

(790) L. W. asks: 1. How to wash copper wire with mercury. I wish to use it for internal use. A. Dip in mercury covered with dilute sulphuric acid. 2. Also, is mercury poison? A. Yes. 3. Also how to silver copper wire and pan. A. Best by electroplating described in our SUPPLEMENT, Nos. 157, 158, and 159.

(791) O. B. asks how rubber cement is made, such as is used for repairing rubber boots. A. For solution of India rubber see SUPPLEMENT, Nos. 249, 251, and 252. Gutta percha dissolved in bisulphide of carbon may answer your purpose.

(792) A. J. P. writes: What effect has mercury on a man's system, and the way to extract it? A. It produces salivation and tends to disturb the entire gastric and intestinal system, and in sufficient quantity and form acts as a strong corrosive poison. Local blood letting, demulcent drinks, etc., are applied after cases of mercurial poison. Its effects vary according to the form in which it is administered. In many cases, the effects of a disease which has been treated by mercurial medicines are considered the effects of the mercury itself. A physician should be consulted in all such cases. It probably does not remain long in the system.

(793) Constant Reader asks: Some years ago I had some talk in regard to albumen, caseine, etc., with Prof. Chas. Joy, and he referred to the extraction of albumen by using ozone generated by passing air through spirits turpentine, if I remember correctly. What I want to ask is, Is ozone generated in that way by any one? A. Turpentine, has a bleaching action formerly attributed to the presence of ozone. This is now not credited, the bleaching power being supposed due to an organic compound, $C_{10}H_{14}O_4$. We have no record of ozone being thus successfully generated.

(794) An Old Reader asks for a good receipt for making honey, if possible, without using honey as one of the ingredients? A. 5 lb. white sugar, 2 lb. water, gradually bring to a boil and skim well. When cool add 1 lb. bees' honey and 4 drops peppermint. To make of better quality add less water and more real honey. Other formulæ are given in Dick's Encyclopedia, which we can supply for $5. 2. Would also like to know what the chemical composition of honey is. A. Principally of saccharine matter and water, about as follows: Levulose 38½ to 40 per cent, dextrose 31¾ to 39 per cent, water 20 to 30 per cent, besides ash and other minor constituents.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

April 23, 1889,

AND EACH BEARING THAT DATE.

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

Acid, purifying acetic, Bang & Ruffin 401,932
Alarm. See Burglar alarm.
Animal releasing device, G. A. Waterhouse 401,914
Animal shears, A. A. White 401,806
Annunciator drop, J. M. Stuart 402,043
Auger, post hole, H. C. Cloyd 401,999
Axle making machine, A. Paterson 402,101
Axles, making, A. Paterson 402,102
Barrels, mechanism for the manufacture of, W. H. Cram 401,981
Battery. See Galvanic battery. Secondary battery.
Bearing, ball, H. Kunath 401,748
Bearing, roller, R. W. Hent 401,884
Beehive, F. Dazenbaker 402,002
Belt, electric, C. H. Grimley 401,882
Belting for machinery, W. C. Edge 401,779
Binder, load, T. A. Rogers 401,857
Bit. See Drenching bit.
Blacking and polishing shoes, machine for, A. Kitson 401,890
Blast furnaces, flux feeder for, N. A. Pratt 402,103
Block. See Glass building block.
Block barking and splitting machine, combined, O. W. Stearns 401,866
Board. See Condenser switch board. Game board. Ironing board.
Boiler. See Steam boiler. Wash boiler.
Bombs, distributer for explosives, H. W. Parsons 401,851
Book, combined record and sales, Harsha & Duval 401,948
Book, pad, E. Schonacker 401,909
Book, school record, J. Du Shane 402,072
Bottle, J. Stone 402,042
Bottle stand, C. K. Hall 401,829
Bottle stopper, D. J. Corcoran 402,124
Bottle stopper, C. C. Haley 402,078
Bottles, stopper receiver for, A. T. Scher 401,760
Box. See Desk box. Display box.
Box fastener, J. L. Lillientbal 401,893
Brake. See Pump brake. Rail brake. Vehicle brake.
Brake, Massey & Normand 402,092
Brake mechanisms, automatic, pump governor for, G. Westinghouse, Jr 401,915
Brick machine, wire cut-off, S. W. Lasor 401,750
Bridge, pontoon, S. N. Stewart 401,765
Buildings or bridges, truss for, J. T. Wells 401,870
Bureaus, banger for mirrors of, J. R. Anderson 401,921
Burglar alarm and testing system, F. H. Nutter 401,789
Burner. See Petroleum burner. Stove burner.
Buttonhole strips, making, M. P. Bray 401,995
Button hook and bracelet, combined, A. Johnstone 401,746
Button, separable, G. A. Schlechter 401,908
Button setting machine, J. H. Vinton 402,047
Cab, C. A. Reade 401,758
Cable grip, T. W. Lemieux 401,842
Cable grip, S. F. McDill 401,895
Camera. See Photographic camera.
Can. See Metal can. Milk can.
Can bodies, machine for applying heads to tin, W. Hipperling 401,886
Car coupling, J. Coup 401,775
Car coupling, J. J. Jeter 402,085
Car coupling, E. J. Knapp 402,021
Car coupling, J. Poffenbarger 401,854
Car, electric, J. W. Henderson 402,080
Car heater, H. Schreiner 401,794
Car heater, railway, R. M. La Rue 401,749
Car ventilator, Tappey, Jr., & Evans 402,044
Cars, letter box for street, G. B. McAllister 402,028
Cars, steam pipe coupling for railway, L. Aldrich 401,920
Caramel holder, G. W. & E. E. Chase 401,774
Card teetb, making, G. & E. Ashworth 401,991
Carding machines, doffer cleaner for, G. Bebb 401,811
Carriage, folding, J. F. Flad 401,939
Carrier. See Poultry carrier. Quilting machine shuttle carrier. Sheaf carrier.
Carriers, driving mechanism for endless, J. Dick 401,777
Cart, road, M. L. Cleveland 401,785
Cart, road, J. G. Hess 401,834
Cartridges, pocket for, G. Barnard 401,923
Case. See Knockdown case. Show and shot case. Typewriter case.
Ceiling, metallic, L. L. Sagendorph 401,906
Chain, W. C. Edge 401,935
Chair. See Convertible suspending chair. Reed chair. Reed or rattan chair.
Chairs, bellows attachment for rocking, F. Marschall 402,026
Chandelier, L. F. Griswold 402,077
Check protector, E. O. Abbott 401,871
Chimney, J. A. Hodel 401,836
Churns, motor for operating, Shafer & King 401,861
Cigar bunching machine, J. E. Smith 402,068, 402,069
Clasp, P. Frantzen 401,880
Clasp, O. C. Mann 401,844
Clasp, F. B. Spooner 401,977
Clutch, L. Goddu 402,014
Coffee or tea pot, G. W. Adams 401,919
Coffin fastener, C. E. Temple 401,767
Comb. See Curry comb.
Computating device, D. W. Thompson 401,801
Condenser switch board, W. Marshall 402,027
Convertible suspending chair, M. E. Schutt 402,110
Copying apparatus, G. H. Smith 401,762
Coupling. See Car coupling. Pipe or tube coupling. Thill coupling.
Crank for motors, S. F. Armstrong 402,052
Cultivator, J. Dodge 401,778
Cup. See Dental impression cup.
Curry comb, O. Smith 401,864
Cutlery, table, F. C. Feicker 401,739
Dampening machine, Wendell & Wiles 401,770
Dental impression cup, J. Scheffler 401,792
Desk box, A. W. Phillips 401,757
Desk fastening, school, J. B. Sherwood 402,037
Detergent, F. C. Taylor 401,766
Die. See Gripping die. Thread cutting die.
Diffusion apparatus, F. Bianchi 402,056
Display box, H. D. & F. A. Smith 401,974
Dredging machine, hydraulic, J. McFarlane 401,896
Drenching bit, C. W. Crannell 402,068
Drill. See Ratchet drill.
Earring lobe, Doran & Hall 402,071
Electric cables, splice box for, T. J. Dewees 402,007
Electric conductor, T. Egleston 401,936
Electric machine, dynamo, C. Coerper 402,066
Electric meter, E. Thomson 401,803
Electric motor for tramway vehicles, W. D. Sandwell 401,970
Electric motor trolley switch, W. Christy 402,064
Electric wires, box for the distribution of, D. Brooks, Jr 401,927
Electrotypes, matrix plate for curved, Benedict & Furlong 401,729
Elevator belt shifter, E. W. Houser 401,951
Emery wheels, instrument for cutting or grinding, W. Diebel 401,828
End gate, A. H. Stark 402,111
Engine. See Rotary engine.
Engine, J. Jonson 402,086
Excavators, loading and unloading mechanism for sewer, N. E. Green 402,016
Extractor. See Stump extractor.
Fabrics, machine for tentering and drying, F. Craven 401,932
Faucet, automatically closing, E. E. Furney 402,075
Faucet, basin, B. Johnson 401,952
File, newspaper, T. Lomas 402,024
Filtering apparatus, R. Cooper *et al* 401,930
Finger ring, M. Freed 402,011
Fire escape, I. H. Athey 402,053
Fireproof plaster cloth for ceilings and walls, A. J. Paris 401,967
Fishing reel, G. Paddock 401,849
Flooring jack, Townsend & Winslow 401,868
Fork. See Hay fork.
Fracture apparatus, W. H. De Camp 401,933
Furnace grate, W. H. Lahman 401,955
Furnace joint, sectional, E. Gurney 401,827
Galvanic battery, R. J. Pratt 402,104
Game board, S. T. F. Sterick 402,112
Garment hanger, W. Gowen 401,943
Garment pattern, combination, M. Tuch 402,046
Gas incandescent, L. Paget 401,899
Gas incandescents, making, L. Paget 401,898
Gate. See End gate. Railway gate. Water gate.
Gearing, M. E. Benedict 401,993
Gears, machine for cutting, J. S. Waterman 401,987
Glass building block, G. Falconnier 402,073
Glassware, manufacture of, G. W. Leighton 402,090
Governor for engines, hydraulic, W. H. & J. D. Gray 402,015
Grain separator, S. Freeman 402,012
Grinding and sharpening machinery, H. Buckingham 401,875
Grinding mill, J. B. Alltree 401,572
Gripping die, W. Taylor 401,912
Halter, E. Barnard 401,922
Handle, J. B. Hartman 401,832
Hanger. See Garment hanger.
Harness, A. Schunck 401,973
Harrow and cultivator, disk, E. C. Boyer 401,994
Harrow, disk, R. W. Hardie 401,745
Harrow, spring tooth, Hench & Dromgold 402,079
Harrow, spring tooth, E. W. Herendeen 401,843
Harrow, spring toothed, T. R. Crane 402,000
Harvester, S. D. Maddin 402,025
Harvester binder, H. E. Pridmore 401,901
Harvester, corn, W. D. Steele 402,040
Hat moulding machine, T. P. Wilkinson 401,809
Hay and grain rack, G. Carr 401,733
Hay fork, N. F. Mathewson 402,093
Head rest, chin support, and eye closer for corpses, combined, F. Moharter 402,095
Heater. See Car heater.
Heating apparatus, E. N. Gates 401,940
Heating apparatus, automatic heat regulator for hot water, E. N. Gates 402,076
Hides or skins, machinery for shaving or dressing green, J. Rood 401,905
Hinge, spring, Spruce & Comstock 401,978
Hoisting machine, T. W. Lemieux 401,841
Holder. See Caramel holder. Paper bag holder. Shade holder. Tooth holder.
Hoof shears, J. P. Lee 401,892
Hook. See Button hook. Ladder hook.
Horse boot, J. J. Ryan 402,109
Horse detacher, W. M. Morrison 402,097
Hydrant, A. J. Tyler 402,115
Injector, Lombard & Connor 401,753
Insect powder duster, C. B. Glover 401,941
Insecticide, M. B. Church 401,928
Iron and steel, manufacturing, J. Reese 401,903
Ironing board, A. T. Scanland 401,858
Ironing tabble, J. A. Kimball 401,786
Jack. See Flooring jack. Lifting jack.
Jewelry, plating stock for, J. S. Palmer 401,900
Joint. See Furnace joint. Pipe joint.
Journal bearing, W. E. Elliott 402,009
Key. See Pulley key.
Kitchen cabinet and flour chest, Stone & Colman 402,113
Knitting machine, circular, Pepper & Davis 401,791
Knockdown case for eggs, etc., W. M. Baker 401,873
Ladder hook, J. B. Foote 401,742
Lamps or lanterns, globe or shade for, P. R. D. D'Humy 401,934
Lawn rake, J. B. Detweiler 401,822
Level, spirit, Lewis & Armstrong 401,843
Lifting jack, A. J. Souders 401,865
Light fixture, extension, G. W. Bayley 401,925
Liquids under pressure, reservoir for holding, W. H. Thayer 401,980
Lock. See Nut lock.
Loom, H. Wyman 402,122
Loom shedding mechanism, C. Hahlo *et al* 401,947
Loom stop mechanism, Crompton & Wyman 402,004
Mandrels, keys, etc., machine for driving, Richards & Walker 401,968
Manure distributer, J. A. Tigner 401,768
Mechanical movement, J. Hunt 402,018
Mechanical movement, F. H. Richards 401,904
Message and time recorder, J. C. Wilson 402,120
Metal can, box, or other receptacle, G. A. Waeber 401,913
Metal strips for ornamental metal lattice or fence work, machine for shaping, F. H. Kindl 402,087
Metallic mould, N. Washburn 401,804
Meter. See Electric meter. Power meter.
Milk can, A. W. H. Smith 401,863
Mill. See Grinding mill. Ore grinding mill.
Mould. See Metallic mould.
Motor. See Electric motor. Railway motor. Water motor.
Motor, W. H. Patton 401,756
Motor and electric generator, combined, J. F. Shawhan 401,761
Mower, P. C. Close 401,817
Musical instruments, arm rest for, J. Bohmann 401,814
Nut lock, J. L. Bay 402,054
Nut lock, I. F. Leiby 402,023
Oar, bow facing, S. R. Sweet 402,114
Ore concentrator, W. H. Meginness 402,094
Ore grinding mill, J. McKenzie 401,964
Oven and flatiron heater, S. E. Robinson 401,969
Packing, rod, S. Udstad 401,984
Paper bag holder, H. E. Gage 401,825
Paper making machinery, S. Wilmot 401,917
Paper reel, H. T. Wilson 402,050
Paper weight, F. B. Whipple 402,048
Passenger register, A. Romain 402,035
Pavement for streets or roads, M. Levi 401,752
Pen, fountain, W. Van Demark 401,985
Petroleum burner, C. V. Fleetwood 401,741
Phonographs or telephones, mouthpiece guard for, W. L. Candee 401,732
Photographic camera, E. Hackh 401,946
Photographic cameras, attachment for, G. D. Thompson 401,802
Photographic plates with emulsion, apparatus for coating, R. E. M. Bain 401,771
Pin. See Safety pin.
Pipe joint, F. A. Lane 402,089
Pipe moulding apparatus, former for, McNeal & Stineruck 402,029
Pipe or tube coupling, G. W. H. Brogden 401,996
Pipe wrench, L. J. Bergendahl 401,926
Pitman, P. R. Pulliam 402,105
Planter, corn or cotton, Armstrong & Lowrey 401,723
Planter, seed, J. Mitchell 401,897
Plow attachment, gang, E. H. Farmer 401,937
Plow, ditching, W. Burton 401,998
Plug for sinks, tubs, etc., W. B. Smith 401,976
Pot. See Coffee or tea pot.
Poultry carrier, G. M. Besbower 401,812
Power meter, Clark & Low 401,929
Press. See Printing press.
Pressure contact arm, universal upward, C. J. Van Depoele 402,117
Printing machine, J. W. Osborne 401,790
Printing press, band, J. Kunze 401,839
Printing presses, paper folding attachment for, T. C. Dexter 401,737
Propeller, screw, A. Vogelsang (r) 10,997
Protector. See Check protector. Scarf protector.
Pulley key, C. W. Clark 402,065
Pulverizer, rotary, M. B. Dodge 401,578
Pulverizing clay and extracting stone, machine for, J. W. Shaffer 401,862
Pump, G. W. Stafford 401,979
Pump brake, A. J. Tyler 402,116
Pump bucket, C. La Dow 401,954
Pumps, valve gear for duplex steam, N. E. Nash 402,100
Punch, W. H. Woglom 401,918
Punching, shearing, and such like machine, C. Schumacher *et al* 401,795
Puzzle, F. Howard 402,017
Quilting machine shuttle carrier, Thomas & Creter 401,981
Rack. See Hay and grain rack. Umbrella or cane rack.
Rail brake, M. A. Michales 401,755
Railway bridges, danger signal for, J. W. Steele, 401,763, 401,764, 401,799, 401,800
Railway gate, A. J. McDonald 401,754
Railway, incline electric, R. M. Hunter 402,084
Railway motor, street, B. C. Pole 401,855
Railway rail, E. J. Knapp 402,022
Railway signal and switch connections, compensator for, Mitchell & Stevens 402,030
Railway system, electric, S. H. Short 401,796
Railway tie, metallic, A. J. Hartford 401,949
Railways, sheaf supporting frame for cable, J. Walker 401,986
Railways, system of elevated conductors for electric, S. H. Short 401,797
Rake. See Lawn rake.
Rammer, steam road, F. W. Carter 402,063
Ratchet drill, W. G. Morgan 402,096
Razor strop, flexible, J. L. Pomeroy 402,033
Recorder. See message and time recorder.
Reed chair, etc., J. Lemman 401,959
Reed or rattan chair, etc., H. T. Leavis 401,958
Reel. See Fishing reel. Paper reel.
Reel for machines for forming and reeling ropes or strands, M. H. Day 402,044
Register. See Passenger register.
Ring. See Ear ring. Finger ring.
Rivet, A. Kirks 401,747
Riveting, hydraulic machine for, H. Smith 401,975
Roller mill feeder, R. Wilcox 402,049
Rotary engine, M. A. Buford 401,816
Rotary engine, J. F. Hines, Sr 401,835
Ruling machine, paper, H. A. Brissard 402,057
Saddle trees, forming flexible, J. M. Fink 401,938
Safety pin, J. Alcock 402,051
Sash fastener, Trost & Weston 402,074
Sawmill carriages, offset mechanism for, W. Gowen 401,942
Sawmill carriages, offsetting device for, W. Gowen 401,944, 401,945