Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

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 This is for our information, and not for publication

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

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

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(2570) F. J. McV. asks: Will you please inform me what kind of a paste or cement I can use to fasten a strip of wood to glass and brass? A. Melt together equal parts of common pitch or Burgundy pitch and gutta percha.

(2571) J. H. H. asks: What is the ratio of the increase in rapidity of vibration of the strings of a piano forte in the ascending scale for one octave? That is, a piano string, in sounding a particular note, vibrates so many times per second, the string that sounds the tone above vibrates a certain degree faster, and so on. Can you say what the ratio of the increase is for each note of the eight components of an octave? A. The vibrations of musical notes are arranged under two systems, the harmonic scale as fixed by the congress of Stuttgart and the tempered geometric scale. In the Stuttgart scale C below the treble clef has 264 vibrations; E, 330, with intervals for each half tone of 16½ vibrations; A has 440 vibrations, with intervals of 22 for each half tone from E. C in the clef has 528 vibrations, with intervals of 27½ between A, A sharp and A B; while from B to C is 33 vibrations difference. The geometrical system has the same octave vibrations of C as in the harmonic, but with a geometrical ratio of increase for each semitone, which ratio has a variable. It is too complex for full explanation here. You will find the whole tabulated in full for 8 octaves in Nystrom's Mechanics, $3.50 mailed.

(2572) W. H. B. asks: What is the precise nature of the work of a mechanical engineer? Is it work that could be performed by a man who has had only shop experience and a general education, but no technical education? Does mechanical engineering or civil engineering offer the better chance for position and advancement? A. Designing is the principal forte of the mechanical engineer. This requires a technical education in the principles of mechanics, ability as a draughtsman and experience as a guide. With all these he has a fair start for success in a business way. Shop experience is one of the necessities The other essentials are matters of study and aptitude within the power of the aspirant for mechanical fame. The civil engineer requires a higher education and a more extended experience in the mathematical and mechanical relations of the forces of nature. Both pay in their way.

(2573) J. F. S. says: I wish to construct an aquarium, size 2½ by 1¾ by 1¼ feet, bottom of wood and corner posts of wood, fastened by iron rods running through center of post, and bottom. I wish to know what is best wood, to use. How should wood be prepared to prevent leakage or dampness warping and cracking glass. Cement for corners and bottom edge. A. Make the frame of your aquarium sides and bottom of oak, with glass in bottom. Boil the frame before putting together in linseed oil for a few minutes. Make a cement of equal parts of litharge, fine white sand and plaster of Paris. Mix with boiled linseed oil, with a little drying oil, to a stiff putty. Let it stand a few hours before using. A frame bottom with glass is better than a solid wood bottom.

(2574) W. P. asks: 1. What is meant by a volt? I have seen it mentioned in several papers, but no two explain it the same. A. The volt is the unit of electromotive force or pressure of the current. The current from one cell of gravity battery has an E. M. F. of slightly more than 1 volt (1.07). 2. What is meant by shunt wound dynamos? A. A shunt wound dynamo is one in which the terminals of the armature are connected with the terminals of the field magnet and also with the external circuit, so that the current divides at the brushes, a part passing through the field magnet, the remainder through the external circuit. 3. How is the voltage measured in dynamos and batteries? A. Voltage or E. M. F. is measured by means of a voltmeter, or galvanometer. Consult any work on physics or electricity.

(2575) D. B. A. says: Some years ago a dam was built across a river here, and a short time since began leaking badly. Upon examination it was found cheaper to build a new dam than to repair the old one, consequently a new one was built, but a little further down the stream, and the water filling in soon became level on both sides of the old dam. Now a discussion has arisen as to which dam supports the pressure of weight of water in the lake above. One party contends that the old dam has still the same pressure upon it as formerly, while the other party claim that the new dam has now the whole pressure of the lake against it. A. The new dam supports the whole pressure of the lake as long as the water covers the old dam, which has the pressure on both sides, and is, in consequence of this balanced pressure, a neutral point. If there was a difference of level in the water above and below the old dam, the pressure would be divided by the hydrostatic difference of level.

(2576) H. G. C. asks: What kind of material shall I use for tanning alligator hides? A. Bark is mainly used for the tanning, but a special technical knowledge, possessed by but few in the trade is required for the preparation of the skins for the tan liquors, in order to make good leather.

(2577) A. E. B. says: Some people say that the B. B. caps No. 22 are injurious to the rifling of a gun. Is this so, and why? A. The B. B. are no more injurious than other caps of less strength, if the gun is properly cleaned after use. It is allowing the products of combustion to remain in the gun, even for a day, that does the mischief, by starting oxidation in the rifle grooves. In cleaning, the wiping wad should go tight and follow the rifle grooves, otherwise the dirt will lodge in the grooves and ronghen them by oxidation.

(2578) E. R. D. D. says: I have two wells, 38 feet and 35 feet deep respectively. In the first well is placed a steam pump, 10 feet from the top of well. Can I run a suction pipe from this pump, over the ground and down into the second well, and draw all the water out of it? The wells are 30 feet apart. A. You cannot draw all the water out of the second well, but by digging a trench for your suction pipe 5 feet deep, you may be able to draw the water down to within 3 feet of the bottom, possibly a little nearer.

(2579) N. O. L. asks: When a gun is discharged, what is the cause of the noise or report? Is it concussion of the air, or has it anything to do with the vacuum produced in the barrel? A. The noise of a gnn is caused by the concussion or vibration of the air at the instant of the charge leaving the gun. There is no vacuum formed, but on the contrary a momentary pressure made by the expansion of the gases or powder smoke.

(2580) J. H. G.—The plant sent for identification is a small form of *Helenium tenuifolium*, Nutt.

Replies to Enquiries.

The following replies relate to enquiries recently published in SCIENTIFIC AMERICAN, and to the numbers therein given:

(2475) If P. C. N., of query No. 2475, will thoroughly smoke his buckskin articles with any ordinary wood fire, the same as bacon is smoked, say hang them up in some closed building and build a good smudge under them three or four times each day for about a week, being careful not to get them too hot, he can then wash them the same as any woolen cloth is washed, and I guarantee, they will not get hard if the buckskins are thoroughly tanned.

Splitting Wood.—Please tell your inquirer of query No. 2459 to use 3 C blasting powder for splitting wood. If he cannot get this grade at the hardware store, to get either single F, double F, or E F blasting powder. Three C is the slowest powder made. It is the best for quarrying large fine stone or splitting straight-grained wood. When it explodes it merely gives a grunt, but it is sheol for smoke. Single F is the next quickest, double F the next, and 3 F the next. Judging by his query, he does not live in a mining district, and it is quite probable that he cannot get blasting powder. He should not use gunpowder by itself for splitting wood, unless it is very hard to split, as it would be liable to put a splinter in his eye. If he has to use gunpowder let him mix it with fine sand, one-third sand, two-thirds powder. The sand reduces the strength of the powder, but not its quickness. Gunpowder itself is too quick for wood, stone, or coal. Coal miners can use their drill dust instead of sand.—H. B.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

November 4, 1890,

AND EACH BEARING THAT DATE.

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

Advertising device, L. M. Devore 439,866
Air compressor, E. Hill 439,876
Alarm. See Burglar alarm.
Anchor, J. T. Williams 439,921
Atomizer, J. Buckley 440,002
Automatic sprinkler, J. Clapp 439,864
Axles, anti-friction bearing for car, L. W. Hardy 439,654
Baby jumper and swinging receptacle, convertible, I. N. Franklin 439,648
Bag. See Paper bag.
Bag holder, I. B. Tryon 440,073
Bags, acid proof, making, J. A. Lighthall 439,880
Bale tie, J. Hentz 439,657
Balls, machine for making, W. H. Wright 439,715
Band. See Sand band.
Banjo, C. M. Chapman 440,012
Barrel head wedge, J. A. Campbell 439,926
Barrel stand, H. H. Fisk 439,815
Baseball game, W. Schmitges 439,899
Basin top and trap, catch, R. Smith 440,067
Basins, etc., discharge attachment for wash, J. W. Reid 439,687
Bath. See Spray bath.
Battery plate, secondary, A. E. Woolf 439,850
Bearing, ball, H. Howard 439,877
Bed and other similar articles, folding, F. A. Muller 439,973
Bed, folding, D. J. Powers 439,983
Beer cooler, G. E. Runyan 439,764
Bell cord coupling, H. G. Kennedy 440,094
Belt shifter, J. M. Sailer 439,989
Belt tightener, A. Pollock 439,790
Bib, C. C. Webber 439,756
Bicycle support, W. H. King 439,879
Binder, temporary, Murphy, Jr. & Davison 440,110
Binding clips, opening instrument for, H. H. Ballard 439,994
Blacking, cabinet, G. E. & G. L. Bogart 439,831
Blanket holder, J. B. Whitbeck 439,988
Block. See Building block.
Board. See Wash board.
Boiler. Steam boiler. Wash boiler.
Boiler bottom, J. McGinnis 439,761
Boiler feeder and feed water heater, F. M. La Bonteaux 440,109
Boiler feeder and regulator, R. H. Kersey 439,749
Boiler furnace, S. Rauser 439,753
Boilers, apparatus for supplying pure water to steam, E. L. McGahan 439,788
Boilers, scraper for cleaning steam, Glover & Armstrong 440,028
Boilers, steam regulator for hot water, P. Rundquist 439,977
Bonnet, sun, N. L. Butler 440,005
Book and slate, combined, W. T. Jamison 440,037
Book case, I. C. Kiggins 439,782
Book, manifold memorandum or sales, R. Lan-Lan 440,044
Book shelf, roller, J. D. Edwards 439,869
Books, attaching hangers to, I. Fine 439,643
Bottle and bottle stopper, E. M. Sanger 439,685
Bottle washing machine, T. Saunders 439,895
Bottles, tool for driving combined stoppers and pouring nozzles into, E. H. Alling 439,618
Box. See Core box. Letter box. Paper box. Spool box. Tumbling box.
Box closure, A. M. Brainard 439,632
Braiding machine feeding attachment, D. D. Griffin 439,943
Brake. See Car brake. Wagon brake.
Brake beams, strut for, H. B. Robischung 440,117
Brake regulator, automatic, G. Westinghouse, Jr. 440,082
Breastpin, G. K. Webster 440,081
Brick kiln, O. Kail 440,041
Bridge, wire suspension, H. C. Carmack 439,741
Bridle, J. H. Carlstedt 439,806
Brush, O. Pederson 440,114
Brush, Welsh & Gates 439,914
Bucket and heater therefor, combined lunch, W. Kirkpatrick 440,107
Building block, J. M. Farrar 439,641
Burglar alarm, electrical, F. Pierce 440,115
Burner. See Lamp burner.
Burnishing jack, H. F. Reed 439,752
Button, L. A. Douillet 440,020
Button, A. J. Shipley 439,903
Button, Williams & Lade 439,920
Button, separable, M. D. Shipman 439,696
Calendar, J. Casseday 439,810
Caliper and centering gauge, combined, W. O. Nelson 439,975
Camera. See Photographic camera.
Can spout, J. O'Neill 440,052
Can testing machine, E. E. Angell 439,851
Car, F. C. Ingalls 439,781
Car, bicycle passenger, E. M. Boynton 439,710
Car brake, J. P. Clancy 440,014
Car brake, A. R. Drake 439,857
Car coupling, W. C. Brigam 440,000
Car coupling, Hammerstad & Lyken 439,653
Car coupling, Hodges & Isaacks 439,800
Car coupling, H. Megorden 439,967
Car coupling, W. J. Ponto 440,058
Car coupling, P. W. Ross 439,897
Car coupling, S. L. & J. Sangster 439,694
Car coupling, J. L. Stillman 439,982
Car guard, railway, F. W. Stutz 439,985
Car register, automatic, Sprague & Kellogg 440,006
Car wheel, W. F. McCready 440,050
Car wheel, A. Mayer 439,670
Cars, feeding rack for cattle, F. E. Canda 440,010
Cars, friction buffer for railway, J. A. Hinson 439,748
Carrier. See Cash carrier.
Cart, road, E. Borntrager 439,858
Case. See Book case. Post office distributing case.
Cash carrier, W. S. Reed 439,686
Cash register, W. Koch 440,108
Cash register and indicator, H. B. Renwick 440,116
Caster, G. J. Helmstaedter 439,777
Casting ingots, method of and apparatus for, J. Illingworth 439,780
Ceiling moulding, sheet metal, F. G. Caldwell 440,007
Ceiling panel, F. G. Caldwell 440,008
Chair. See Convertible chair.
Chair attachment, A. M. Whiteley 439,989
Chandeliers, device for operating, keys of gas, R. F. Bridewell 439,832
Chimney cap, W. H. Gardiner 439,816
Churn, J. P. Sinclair 439,697
Cigar bunching machine, F. A. Schleiff *et al* 439,978
Cigar or cigarette holder, A. Fritschi 439,649
Cigar pressing apparatus, F. R. De Estenoz 439,904
Cigarette machine, F. J. Ludington 439,963
Clamp. See Door clamp.
Clasp. See Corset clasp. Spring clasp.
Cleaner. See Cuspidor cleaner. Track cleaner.
Clevis, P. Brown 439,771
Clock chime, W. Matthews 439,965
Clock, motion, A. Bannatyne 439,854, 439,855
Clocks, electric actuating device for pendulum, J. H. Dyson 439,838
Closet. See Water closet.
Cloth brushing and cleaning machine, A. C. Heath 439,949
Clothes drier, E. E. Arnold 439,853
Clothes line apparatus, J. E. Kellogg 439,957
Clutch, friction, W. F. Lee 439,960
Coffee pots, etc., handle and cover for, H. S. Reynolds 440,061
Coin receptacle register, N. Stafford 439,791
Collar pad, W. T. O'Brien 439,678
Collar stiffener, C. Gibble 440,027
Colors on cotton or other vegetable fiber, producing azo, R. Holliday 439,953
Comb. See Curry comb.
Composition of matter, C. C. Shiber 440,066
Convertible chair, N. Bartelle 439,857
Convertible chair, J. W. Cuff 439,721
Cooking utensil, R. C. Andersen 439,768
Cooler. See Beer cooler
Copying cloths, moist pan for, H. G. Razall 439,896
Core box, Hill & McGuire 439,659
Corn cutter, Morden & Hoffman 439,969
Corn cutting machine, W. S. Morden 440,049
Corset, J. K. Ross 439,980
Corset clasp and brace, R. W. Parmanore 439,891
Coupling. See Bell cord coupling. Car coupling. Hose coupling. Shaft coupling. Thill coupling. Whiffletree coupling.
Cream of tartar, obtaining, A. Martignier 439,805
Cuff holder, E. N. Dodge 440,019
Cultivator shovel, M. Tompkin 440,090
Curry comb, J. Du Shane 440,022
Curry comb and brush, F. L. Lewis 439,668
Curtain fastening canopy top, A. R. Tully 440,074
Curtain fixture, J. F. Romer 439,848
Cuspidor, D. Lange 439,667
Cuspidor cleaner, M. Barker 439,740
Cutlery scourer, H. F. Warren 440,080
Cutter. See Corn cutter. Feed cutter. Pipe cutter.
Cutter head, universal, M. Morton 439,673
Cylindrical surfaces, producing, P. Howieson 439,819
Decorative material, manufacturing, T. J. Palmer 440,055
Digger. See Potato digger.
Distillation, treating residues of, E. M. Cook 439,639
Distilling column and condenser, combined, E. Bolton 440,087
Distilling oils, apparatus for, E. A. Edwards 439,745
Ditcher and cultivator, combined, O. T. Davies 439,933
Ditching machine, W. C. Witt, Jr 439,739
Door attachment, F. W. Gregg 439,942
Door clamp, sliding, E. Y. Moore 439,886
Dredging machines, bearing for rollers of, D. Urie 440,076
Drier. See Clothes drier. Pulp drier.
Drill. See Expansion drill.
Drill, J. Muirhead 439,972
Dust pans, brush attachment for, Dean & Earle 439,744
Dyeing, bleaching, and washing yarn, apparatus for, W. Maybury 439,966
Dyeing machine, yarn, L. Weldon 439,708
Dynamos and motors, automatic regulator for, Cleaver & Fassold 440,016
Dynamos, method of and apparatus for connecting, C. T. Child 439,929
Electric circuits, magazine fuse box for, W. F. Bossert 439,859
Electric conductors, device for applying a coating to, J. T. Whittlesey 439,916
Electric log, W. P. Granville 439,940
Electric heater, Drew & Francis 439,724
Electric heater, C. H. Talmage 440,071
Electric indicator, L. O. Chatfield 440,013
Electric motor and generator, A. Gartner 439,775
Electrical conductors, trolley lineswitch for overhead, W. L. Emmet 439,746
Electrical generator, F. L. McGahan 439,974
Electrode, secondary battery, Entz & Phillips 440,023
Electrodes for secondary batteries, making, Entz & Phillips 440,024
Elevator, C. W. Fowler 439,947
Elevator, R. C. Smith 439,731
Elevator gate operating device, W. H. Golder 439,940
Elevator guard, C. J. Latz 439,844
Elevator shafts, device for operating shutters for, Ranlett & Provost 439,823
Embryotome, S. H. Swain 439,908
End gate, wagon, A. G. Samuelson 440,062
Engine. See Petroleum engine. Rotary engine. Rotary steam engine. Steam engine. Vapor engine.
Engines, automatic cut-off for steam, J. H. Wheat 439,709
Engines, condenser for steam, J. B. Hutchison 439,664
Engines, cut-off for steam, G. Fussell, Jr 440,103
Engines, journal box for steam, G. Fussell, Jr 440,102
Expansion drill, C. A. Seley 440,065
Eyebolts and hooks, machine for making, J. W. Bowen 439,809
Feed cutter, F. F. Drinkhouse 440,021
Feed water, extractor for removing air, grease, and sediment from, H. See 439,695
Fertilizer distributer, S. Johnston 439,955
Fiber from fibrous plants, machine for extracting, J. J. Welcher 439,913
Fifth wheel, D. Wilcox 439,826
Fifth wheel, vehicle, Barney & Rahn 439,621
File, cabinet, J. Muhlhauser 439,971
Filter, water, W. T. Floyd 439,645
Firearms, magazine for breech-loading, L. F. Bruce 439,833
Fire escape, J. S. Lewis 440,045
Fire escape, G. F. Oehrl 439,976
Fire kindler, W. A. White 439,767
Fish trap, J. F. Allison 439,991
Flax thrasher, McGrath & Smith 439,889
Flour dresser, J. M. Lemmon 439,821
Flushing tank, J. E. Boyle 439,630
Focimeter, P. H. Maguire 439,732
Folding seat or commode, J. W. Bowen 439,797
Fork. See Hay fork.
Frame. Spectacle frame.
Fruit sizer and grader, C. H. Curtis 439,932
Fuel to fire, feeding, F. W. Wiesebrock 439,738
Furnace. See Boiler furnace. Oil flame furnace.
Furnace, P. Noonan 440,112
Furnace, R. L. Walker 439,705, 439,706
Furnace for burning hydrocarbon fuels, J. Burns 440,098
Gauge. See Ring gauge.
Galvanic cell, standard, E. Weston 439,737
Gas, apparatus for the manufacture of, H. Burgess 440,004
Gas light, incandescent, C. M. Lungren 439,882
Gate. See End gate.
Generator. See Electrical generator. Steam generator.
Governor, steam engine, A. Hendey 439,950
Grain washing apparatus, H. Smith 439,905
Grate, W. L. Mitchell 439,968
Grating machine, J. N. Colby 439,930
Gravity shifting apparatus, fluid-actuated, M. B. Mills 439,884
Grinding machine, H. H. Taylor 439,766
Grinding mill, J. R. Tobin 440,072
Guard. See Car guard. Elevator guard.
Gun, breech-loading, E. Pringle 439,895
Hame fastener, H. V. Padfield 440,054
Hammock or chair support, F. O. Farwell 439,642
Harrow, H. L. Mack 440,047
Harrow, C. S. Ruef 439,691
Harvesters, gavel carrier for grain, W. G. Whiting 439,710
Harvesters, manufacture of picker stems for cotton, G. N. Todd 439,794
Hat wires, machine for bending, J. Nutt 439,890
Hay fork, J. D. Carr 440,011
Hay loader, W. H. Haley 440,105
Hay rake, loader, and tedder, A. W. Heany 439,948
Heater. See Electric heater.
Heating and cooking apparatus spirit, Buch & Brose 439,772
Heating system, J. F. McElroy 439,888
Hobby horse, M. Bohlig 439,627
Holder. See Bag holder. Blanket holder. Cigar or cigarette holder. Cuff holder. Jar holder. Lantern holder. Lead or crayon holder. Music leaf holder. Paper holder. Photographic plate holder. Roll holder. Shade holder. Surgical needle holder. Telephone receiver holder.
Horseshoe guard plates, tool for applying and removing, G. T. Chapman 440,099
Horseshoes, device for attaching, Mayow & Castle 440,048
Hook, G. Bradshaw 439,997
Hook. See Snap hook.
Hose bridge for railway tracks, Donohue & Gore 439,868
Hose coupling, F. E. Sharon 439,902
Hose machine, B. Hershey 440,038
Incrustation in boilers, compound for preventing, W. Blackburn 439,756
Indicator. See Electric indicator. Street or station indicator.
Ingots in sectional moulds, forming steel, J. B. D. Boulton 440,097
Inhaler, Warren & Dow 439,707
Insulating composition, T. D. Bottome 439,796
Insulator for electric conductors, W. Kessler 440,042
Jack. See Burnishing jack. Lifting jack.
Jar holder, fruit, C. E. Crandall 439,931
Joint. See Rail joint.
Key. See Telegraph key.
Kiln. See Brick kiln.