

about \$25 consumption of lamps alone. Attendance, oil and general maintenance cannot possibly be estimated without full knowledge of the case. It would require a comparatively small portion of a man's time.

(2674) G. C. W. asks (1) for formula for arsenic complexion wafers. A. Arsenic should only be taken internally under advice of a physician. 2. Recommend books for the beginner at pattern making.

(2675) W. E. D. writes: On examination of a burned-out Edison incandescent electric lamp (16 candle power), I noticed around the inside of the neck of the globe a very thin deposition of what appears by reflected light to be copper.

(2676) J. H. B. asks how large copper pipes are brazed and bent, say 4 inches to 6 inches diameter, and whether flanges to be attached to such pipes by brazing require a special mixture or will any ordinary brass answer?

(2677) R. A. asks: How many feet of illuminating gas will a gallon of 88° gasoline make in a carburetor where the air is passed through the gasoline in small jets under pressure?

(2678) W. C. Van N. writes: On page 400, of vol. lviii., there was a description of a new style of pad for hektographic work. In trying to use it I made a failure.

(2679) G. W. L. asks: How long must two cylinders of tin or galvanized iron, 1 foot in diameter, be to support 200 pounds on the water and not sink over 6 inches?

(2680) W. R. asks how to make a bright green ink from verdigris (copper acetate). A. You can approach to what you want by mixing verdigris with a solution of shellac in borax water.

(2681) F. H. V. asks: 1. Can you inform me through your paper what is used in painting blackboards? I have painted one, but it does not seem to take the chalk very easy.

(2682) G. C. asks for the best process to soften a cow's horn, so as to straighten it? A. Immerse in boiling water.

(2683) S. B. B. asks the best methods for testing old gold for its purity. Also the best tests for silver. A. An assay or analysis is the only good method.

method is to determine its specific gravity. Silver may be dissolved in nitric acid. It should, with excess of ammonia, give a colorless, clear solution.

(2684) G. S. writes: A man has a field whose sides are to each other as 5 to 6; if one foot be added to each side, it will contain 304 square feet.

x : y :: 5 : 6 or x = 5/6 y (1)

From the conditions of the problem we have (x+1) x (y+1) = 304 (2)

substituting (5/6 y + 1) x (y + 1) = 304 reducing y^2 + 2 2/3 y = 363 1/6 solving y = 15 "

The problem cannot easily be solved by pure arithmetic.

(2685) J. S. writes: How should I connect coil with cells, in a pocket battery? Battery is a physician's battery with three cells, current breaker and induction coil.

(2686) H. W. R. writes: I have two jars of acid deadened with zinc; one jar I used sheet zinc, the other I used zinc out of galvanizing pot; the one with sheet zinc I can use, the other I cannot use;

(2687) C. A. C. asks for a preparation for cleaning kiln gloves to take the blackness off. A. Use bread crumb or India rubber sponge.

(2688) E. C. W. asks: 1. What is the effect of glycerine added to tobacco? A. It keeps it soft. 2. What will keep cut tobacco moist in packages?

(2689) A. T. asks: Can you suggest a convenient method by which one could index the Notes and Queries, one of most valuable features of the paper, for future reference?

(2690) P. J. L. asks: 1. If an electric motor were used to run a dynamo, would the dynamo develop more electricity than the battery that would be necessary to work the motor?

(2691) E. P. A. asks the meaning of the term "A curve of versed sines." I know what a versed sine is, and have a table of such sines, but am puzzled to understand how they can form a curve.

(2692) G. W. L. asks: How long must two cylinders of tin or galvanized iron, 1 foot in diameter, be to support 200 pounds on the water and not sink over 6 inches?

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere.

INDEX OF INVENTIONS For which Letters Patent of the United States were Granted December 30, 1890, AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.] Alloy, I. H. Johannes. 443,943 Altar bread or wafers, apparatus for cutting, P. H. Horan. 443,766 Alum cake, making, H. W. Shepard. 443,685 Animal trap, Mellon & Best. 443,970 Announcer, electrical, Luthie & Jeavons. 443,975 Arm rest, G. B. Steinbauer. 443,839 Art panels, etc., constructing, E. A. Galindo. 443,651 Axle bearing, self-oiling, J. S. Patten. 443,974 Axle nut, carriage, A. Folsom. 443,828 Baby walker, M. Hoyer. 443,853 Balance escapement, S. Riefler. 443,891 Bale cover, cotton, W. Orr. 443,620 Band cutter, A. & M. Stanzel. 443,875

Table listing inventions with patent numbers, including: Banjo, A. C. Fairbanks. 443,510; Barrel washing machine, U. & H. E. Eberhardt. 443,751; Basket cover fastener, J. F. Donley. 443,710; Bath. See Electrical and vapor face bath. Battery. See Galvanic battery. Secondary battery. Beans to walls and truss and girder beam. Bed clothing, G. C. Whittlock. 443,657; Bedclothes fastener, A. E. Birdsall. 443,742; Bed pan, B. A. Dugot. 443,538; Bevel, G. M. Redway. 443,531; Bicycle, F. H. Bolte. 443,815; Bicycle, F. H. Fleming. 443,338; Bicycle, F. H. Hunt. 443,721; Binder, temporary, Blackburn & Brimm. 443,951; Binder, temporary, C. B. Clark. 443,607; Binder, temporary, T. Faifer. 443,935; Blacking case, C. F. Demme. 443,825; Board. See Wash board. Boiler. See Steam boiler. Boiler incrustation, apparatus for preventing steam, J. Langstaffe. 443,596; Bookbinding, R. A. W. Winzenburg. 443,588; Bookcase and student's table, W. J. Mecoy. 443,713; Book coupon account, D. F. Parker. 443,973; Book rack, A. Pann. 443,926; Book receipt and record, H. Loewenbach. 443,550; Book stand, J. W. & C. T. Knipp. 443,806; Books, machine for securing hangers to the corners of, J. W. Collier. 443,499; Boot or shoe sole cutting machine, C. A. Gilman. 443,515; Boring machine, F. L. Bryant. 443,699; Borax machines, foot attachment for, A. Wavra. 443,701; Bottle disk, A. L. Bernardin. 443,981; Bottle stopper, M. J. McHugh. 443,371; Bottles, tool for forming the necks of, W. Painter. 443,728; Box. See Fire box. Match box. Bread preserver and protector, J. A. Parker. 443,637; Bridge, N. W. McGinn. 443,714; Bridle bits, T-head mouthpiece for, G. Meyer. 443,533; Brush, window cleaning, M. S. W. Martinot. 443,988; Buckle, P. L. Gallepe. 443,511; Burial guard, R. W. Walker. 443,546; Burner. See Gas burner. Gas burner. Hydrocarbon burner. Petroleum burner. Button fastener, J. C. F. Dick. 443,669; Calendar, O. C. Blackmer. 443,894; Camera apparatus, slide, and extension bed, H. C. B. 443,610; Cane shredding apparatus, H. A. Hughes. 443,522; Cane, etc., shredding apparatus for, H. A. Hughes. 443,523; Car brake, H. G. Bird. 443,965; Car brake mechanism, R. Sheldon. 443,871; Car coupling, C. N. Alderman. 443,841; Car coupling, G. H. Duke. 443,958; Car coupling, Harvey & Kane. 443,916; Car coupling, J. E. Kline. 443,587; Car coupling, J. W. Manchester. 443,937; Car coupling, R. B. Cherry. 443,872; Car coupling, G. W. Moon. 443,582; Car coupling, J. Rawles. 443,867; Car coupling, E. B. Reid. 443,540; Car coupling, S. Robertson. 443,921; Car coupling, D. Roche. 443,774; Car door, Crumbaugh & Prater. 443,956; Car heater, H. B. Keiper. 443,770; Car heating apparatus, J. Emerson. 443,935; Car safety device, street, A. E. Appleford. 443,738; Car wheel dressing machine, E. J. Abbott. 443,928; Car wheel dressing machine, W. J. Abbott. 443,882; Cars on inclined railways, driving mechanism for, C. W. Hunt. 443,768; Cars, pipe coupling for railway, J. Emerson. 443,934; Cars, steam and air pipe coupling for railway, J. Emerson. 443,936; Carriage, C. H. E. 443,584; Carrier. See Trace carrier. Wire carrier. Cart, road, L. Burg. 443,592; Carving machine, Smith & Post. 443,802; Case. See Blacking case. Book case. Cash carrier apparatus, J. Davis. 443,908; Cash register and indicator, J. T. Cowley. 443,922; Casting machine, stereotype, H. G. Lange. 443,662; Casting machine, stereotype, Strong & Lange. 443,656; Cellar doors, device for raising and lowering, C. E. Golden. 443,962; Chain, drive, O. P. Hurford. 443,769; Chair, C. H. E. 443,584; Chair, Gage & Herrick. 443,913; Chocolate, preparing, Tobias & Fischer. 443,979; Chopping knife, M. Ludwig. 443,700; Chuck, dredge, J. H. Turner. 443,905; Chuck, drill, N. E. Austin. 443,490; Chuck, lathe, E. Cherry. 443,720; Churn motor, C. W. Lillie. 443,682; Cigar cutting machine, F. W. Hoffmann. 443,676; Cinders, apparatus for transporting and dumping, J. M. Hartman. 443,574; Clamp. 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Gilbert. 443,514; Cut-off and filtering joint, A. Anderson. 443,810; Cutter. See Band cutter. Food cutter. Meat cutter. Cutting irregular shapes, machine for, F. H. Hiemann. 443,535; Cylinder coupling joint, T. W. Moran. 443,946; Damper regulator, electric, J. O'Meara. 443,716; Dental grindstone wetter and wiper, E. C. Goeldner. 443,572; Dental instrument, E. Gash. 443,572; Dental plugger, L. West. 443,631; Dental tool, G. H. Pelree. 443,705; Dental vulcanizer, F. W. Seabury. 443,649; Dies, manufacture of, J. A. House. 443,767; Digestor, S. Smith. 443,922 to 443,924; Dish, egg, R. N. Ross. 443,538; Door, E. Richardson. 443,541; Door check and spring, pneumatic, F. J. Wood. 443,702; Door hanger, L. Terry. 443,638; Door lock, sliding, G. A. Colton. 443,849; Dough sheeting machine, continuous, J. H. Mitchell. 443,882; Drawing knife, E. Snyder. 443,874; Drier. See Clothes drier. Drill. See Rock or earth drill. Well drill. Dynamo stations, safety device for, C. E. Ongley. 443,727; Electric conductors, apparatus for laying, T. J. Cope. 443,823; Electric motor, C. P. Elices. 443,642; Electric motor, C. J. Van Depele. 443,680; Electric protective and signaling system, C. E. Ongley. 443,790; Electric stop mechanism, magneto, W. H. Kilbourn. 443,646; Electric, J. J. Wood. 443,493; Electrical and vapor face bath, N. Lyke. 443,580; Electrical conductors, apparatus for automatically grounding or cutting out of circuit exposed, F. W. Jones. 443,527; Electrical conductors with lead, machine for covering, F. H. Stillinger. 443,541; Embroidering machine, Buss & Saurer. 443,820; Engine. See Wind engine. Envelope, E. A. Dubey. 443,611; Eraser, rubber, A. S. Fitch. 443,613; Eraser, rubber, W. Friend. 443,615 to 443,617; Excavator, electrical, Luthie & Jeavons. 443,974; Exercising machine, J. R. Hamilton. 443,631; Exhibiting goods, means for, A. Pratel. 443,614; Farm gate, S. S. Aispach. 443,843; Fatty products, recovering, M. L. 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Table listing inventions with patent numbers, including: Fire box, revolving, J. C. Henderson. 443,866; Fire escape, R. G. Strother. 443,552; Fire extinguisher, B. J. C. Howe. 443,983; Fire extinguisher, automatic, W. S. Fuller. 443,911; Flask. See Moulder's flask. Flooring clamp, J. H. Giesey. 443,861; Flush tank siphon, O. Mulvey. 443,754; Food cutter. See Band cutter. Fountain. See Soda-water fountain. Fruit wrapping machine, H. B. Stevens. 443,560; Fuel burner, liquid, C. J. Edmonds. 443,670; Fulling mill, F. & G. Martin. 443,722; Furnace. See Hot air furnace. Furnace, G. W. Essinger. 443,733; Gauge. See Micrometer gauge. Planter gauge. Galvanic battery, G. A. Smith. 443,976; Game, C. B. Todd. 443,684; Game apparatus, W. J. Armstrong. 443,889; Game apparatus, D. Clement. 443,868; Game extending. See Levants or cooking Levants. Gas and electric lights, key turner for, L. H. Rockafellow. 443,543; Gas, apparatus for generating illuminating water, J. D. 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Palmer. 443,791; Harvesters, straw dump attachment for combined, A. McDonald. 443,648; Heater. See Car heater. Water heater. Heating apparatus, gas, S. B. Havens. 443,829; Heating apparatus, for cooking vessels, etc., apparatus for, D. Grove. 443,516; Heel making machine, W. J. Fahley. 443,968; High resistance compound, W. G. Bremer. 443,497; Hinge, H. L. Biddle. 443,486; Hoisting device, stock, A. L. Hinchman. 443,964; Hoist, motor, W. W. Ward. 443,719; Holder. See Cup holder. Sash holder. Hook. See Snap hook. Horseshoes, machine for forming clips on, J. D. Billings. 443,893; Hot air furnace, H. N. Hemingway. 443,691; Hydrocarbon burner, B. N. Hawes. 443,763; Ice, ice cream, etc., machine for making, L. D. Ralsback. 443,984; Indicator. See Station indicator. Instand attachment, B. M. Everson. 443,957; Jack. See Split jack. Joint. See Cylinder coupling joint. Rail joint. Kiln. See Lime kiln. Knife. See Chopping knife. Drawing knife. Knife, N. P. 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