(85) Our dwelling has an exposed wall which is damp inside, especially in rainy weather. It is covered with a coat of roughcasting (mortar), but does not seem to have the desired effect. Will you inform me of a remedy for this dampness, excluding wood?—A. J. C.

(86) Will you kindly inform me the method and machinery used in preparing the wood for the manufacture of matches, and wood best adapted for the purpose?—M. C. H.

(87) We have a hot water heating apparatus in our establishment. Any time in cold weather when fire is rushed we can turn air cock on a radiator and obtain a gas, igniting and burning with the characteristic hydrogen flame. The boiler manufactures this water gas whenever there is a good hot fire. May not steam boilers manufacture this same gas, and would that not be one of the reasons of the many unaccountable explosions?—F. S. W.

(88) I have nearly completed an electric motor one-half size of one you described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 641. Will you please inform me how many volts electromotive force will be required to operate it?—J. M. A.

(89) The size iron wire to use on an induction coil 6 inches in length, also the size copper wire and how many coils each way. Is a No. 2 Grenet battery sufficient to operate a coil of that size?—W. S. P.

(90) How is granite iron or tin ware made, that is, how is the color and gloss put on, and can other colors, such as red, blue, or white, be put on in the same way? And is there a patent on making such wares?—T. G. A.

(91) I have some galvanized wire netting nailed on frames on which I dry glue. The galvanizing has worn off and the wire rusted, and I want to find some solution with which to cover the wire to keep rust off the glue. Can you give it to me? Of course I could have it regalvanized, but the expense of taking wire off frames and nailing on again is too much.—W. H. B.

(92) Can I work 25 gallons silver solution with 3 cells of Wollaston batteries containing 4 gallons each, zincs to be 6 by 18 inches? Copper plates the same size. How can I produce a bluish black on brass that will be durable? I have seen some that was copper plated, and that was blacked, especially on smoke jacks of lamps in cars. Is it absolutely necessary to quick articles of brass or copper before placing them in bath, in order to produce good results?—S. B. R.

(93) 1. What is the first thing that moves on the locomotive, the valve or the piston, after the steam is admitted, that is, after the throttle is opened? 2. What moves first, the crossheads or the engine (locomotive)? 3. Place the engine on the back dead center, right side, with the reversing lever down in the corner (forward motion), now reverse the lever to the extreme back motion (but do not move the engine), is the valve on the right side in the same position as it was before she was reversed?—A. M. S.

(94) 1. I have a telephone line about ¼ of a mile, of No. 30 hard phosphor bronze wire. Will you tell us if that size wire (phosphor bronze) will carry current enough from battery, or the magneto call bell, to ring a bell at that distance? 2. How many cells, say the largest, of Dr. Gassner's dry battery will it require to instantly heat a No. 30 platinum wire to white heat?—C. B. H.

(95) How many, and what, are the constant movements of the ocean's waters?—S. P. E.

(96) What is the horse power of 200 gallons of water per minute over a 25 ft. fall, and what would the same be of a 50 ft. fall?—L. M. M.

(97) Please inform me which side of a belt is proper to turn next to a pulley—the smooth side or rough?—A.

Replies to Enquiries.

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

(1) In issue of December 22, (1) G. W. asks for a recipe for hardening soles of shoes. If a pair of new shoes has the soles made warm by holding them near a fire or stove, and then varnishing them with copal varnish, drying them, warming, and applying a second and third coat, the leather will become waterproof, and very hard, lasting about twice as long as if not thus treated.—D. P.

(15) Speed of House Fly.—The maximum rate of speed in flight of the common house fly (*Musca domestica*) is 53·35 meters per second.—R. B.

(32) Preventing Condensation of Moisture on Tin Roofs.—A tin roof should have placed under the tin a layer of shoddy sheathing paper, such as is used to make into tarred felt, but without the tar. This will prevent the condensation of moisture upon the lower side of the tin. The tin should be thoroughly painted upon both sides with Prince's metallic paint and linseed oil, half boiled and half raw. More tin roofs are destroyed by condensed moisture upon the lower, unpainted side of the tin than in any other way.

(32) To Prevent Dripping Ceiling.—Use tarred paper between tin and ceiling boards. This will tend to overcome the dripping by preventing too great chilling of the upper layer of air. Ventilation from the highest point of the roof will also alleviate the trouble.—X.

(32) J. A. B.—Preventing Moisture on Roofs.—Yes. Anything that will prevent the contact of the moist inside air with the cold tin. Tarred roofing paper is the best. If not attainable, hardware or carpet paper will answer the purpose.

(33) Lacquering Brass.—Caustic soda lye will loosen lacquer. The articles to be lacquered must be warm and perfectly clean. A finger touch will mar the work. Use alcoholic solution of shellac.

(33) About Lacquers.—Clean the brass work of instruments by boiling in caustic soda water, if convenient, otherwise soak in alcohol and wipe. For aluminum lacquer, dissolve bleached shellac in the best, or 95 per cent alcohol. Heat all work to about 212° before lacquering, use a broad camel's hair brush, work quickly and place the work in a hot oven or over a spirit lamp for a few minutes, to glaze the surface of the lacquer. To deaden the gloss on instrument work: Clean perfectly free from grease with soda water, rinse, and dip in a bath of nitric acid 1 part, water 4 parts, for from 2 to 5 seconds; rinse off the acid in hot water, dip again in hot soda water and in hot clean water to leave the surface perfectly from acid. Dry in sawdust. Color lacquers with dragon's blood and saffron to the required depth.

(34) Rules for Size of Wire for Given Current, etc.—1. There are several such rules founded on the heating of the wire. The English Board of Trade rule allows 1,000 amperes per 1 square inch sectional area. Of course this is well within the safe limit, and is often exceeded in practice. 2. The wire on a line should be as large as possible, as its resistance consumes energy. The armature of a dynamo requires a considerable number of turns of wire to give electromotive force at reasonable speed of rotation, and cannot well be made of large enough dimensions to use heavy wire. 3. Practical rules are obtained for the different types of machines. A true theoretical rule is yet a desideratum. 4. Yes.

(35) Circular Saw Practice.—You cannot work a saw from the shaft of your engine, as the speed is insufficient. You do not give enough particulars forrest of query to be intelligently answered.—Sawmill.

(35) X. L., Boilers and Belts.—If you carry 60 lb. pressure in your boiler and can run the engine at 150 revolutions per minute, you can make your saw available only by belting, so as to give it 1,000 revolutions per minute. At the above pressure and speed the engine should indicate 30 h. p. If your boiler is large enough, it will furnish steam for this power. You give us no data to compute the boiler power. It should have 300 square feet of heating surface to stand up fairly with the above speed. If you can run your saw at the above speed with the saw in good order, you should turn out 12,000 feet of pine lumber per day of 10 hours, or in proportion for less speed.

(36) In answer to R. D., No. 36, in your issue of December 15, we would say that we have a cell of the "gelatine battery" manufactured by the H. B. Cox Electric Company, of New Haven Conn., which has been ringing a bell in our office ever since September 6, and has not stopped yet—a total of 106 days. And it seems to vibrate as strongly now as any time in the past 60 days.—G. S. A.

(36) Bronzing Steel.—Expose cleansed objects to vapor of a heated mixture of concentrated hydrochloric and nitric acid for a few minutes and then heat to 572° to 662° F. until bronze color appears. Cool rub with vaseline and heat until latter is decomposed, and repeat process if necessary. Heating polished steel will develop the blue color.

(36) Bronzing and Bluing. — Steel spectacle frames are blued by placing them, polished and perfectly clean, in a muffle or oven heated to exactly the temperature necessary to bring out the exact color, which is between 500° and 600° F. The frames are laid on little racks, so that the heat will strike every part alike. The workmen watch for the color. When obtained, the rack is withdrawn and cooled in a cold air blast. The bronze frames are plated with a very thin coating of brass and heated in the same way as for bluing, but at a less temperature. A bronze color is also obtained by a higher polish on the steel and heating to a straw color, about 350° to 400°.

(37) Leather Tanning without Bark.—In 1877 Knapp patented a process for using iron salts. It is described in Davis' manufacture of leather.

(38) Your jars are very small for your purposes. Use a zinc plate well amalgamated and a carbon plate about ½ inch from the zinc. Excite with electropoion fluid (bichromate potash, sulphuric acid, and water). For each candle power you would need two or three such cups, and they would soon be exhausted.—Electric.

(39) Copying Writing without Blotting.—You may use too much water. The secret of success consists in using just the right amount.

(40) Luminous Paint.—It is best to buy it ready made. The SCIENTIFIC AMERICAN SUPPLEMENT, No. 249, describes the manufacture.—P. P.

(41) Burning Stumps, and Maple Sirup.—Bore holes in stumps and fill with kerosene or nitrate of soda and water. After long standing ignite them.—Filter maple sirup through bone-black to improve color. Before boiling filter through cotton drilling.—M. M.

(42) Coloring Gas Tar.—No powder is known that will color gas tar.—Gas Engineer.

(43) Sighting Rifles.—The sights are adjusted by the maker to cause their line and the axis of the barrel prolonged to intersect, as nearly as possible, at the different ranges for which the back sight is calibrated. Your question implies too broad an assertion, as with fixed sights no such fact obtains except at a single range. Even with the finest sighted pieces it is doubtful if such a requirement is practically applied.—Creedmore.

(43) Gun Sights.—The trajectory of the bullet makes an arched curve on the vertical plane of the sights. The sights are set to meet the curve at a certain distance, and are not parallel with the bore. Thus the setting of the sights for a 100 yard target are lower at the breech than for a 200 yard target. The distance of the front sight from the center of the barrel has no connection with the adjustment of the aim.

☞ Books or other publications referred to above can, in most cases, be promptly obtained through the SCIENTIFIC AMERICAN office, Munn & Co., 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 18, 1888,

AND EACH BEARING THAT DATE.

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

Alarm. See Burglar alarm.
Alarm, H. Warlinch ... 394,895
Alarm for grain elevators, etc., J. R. Beyon ... 394,815
Alarm lock, Cadbury & Rollason ... 394,831
Annunciator, W. C. Clark ... 394,555
Anvil and vise attachment, J. P. Holt ... 394,857
Armature core for dynamo-electric machinery, W. S. Belding ... 394,905
Atomizer, G. Kneuper ... 394,775
Atomizer, H. Smith ... 394,888
Bag. See Paper bag.
Bag catch, H. Kadow ... 394,861
Bag holder, J. Slide ... 394,942
Baling press, J. Price ... 394,662
Baling press, E. C. Sooy ... 394,628
Barometer, aneroid. H. S. S. Watkin ... 394,668
Barrel support, tilting, D. H. McKinnon ... 394,931
Barrow wheel, J. W. Kreps ... 394,703
Batteries, diaphragm for galvanic, I. L. Roberts ... 394,616
Batteries, diaphragm for galvanic, Roberts & Brevoort ... 394,617
Batteries, separating diaphragms for galvanic, Roberts & Brevoort ... 394,614
Batteries, separating partition for galvanic, Brevoort & Roberts ... 394,638
Batteries, separating partition for galvanic, I. L. Roberts ... 394,613
Batteries, treating diaphragms and cups for use in electric, I. L. Roberts ... 394,615
Battery. See Galvanic battery.
Battery connector, secondary, H. H. Wiegand ... 394,897
Bearing, roller, R. W. Hent ... 394,769
Bed, folding, W. T. Green ... 394,688
Bedstead, wardrobe, N. G. Augier ... 394,806
Beer cooler, A. Hallowell ... 394,920
Beer cooling apparatus, A. Hallowell ... 394,921
Blind, window, F. A. Bernard ... 394,553
Block. See Paving block.
Blowpipe, G. W. Melotte ... 394,657
Boiler, J. F. Gray ... 394,852
Boiler, W. T. Hopson ... 394,858
Boiler feeder, G. S. Neu ... 394,715
Boiler feeding device, steam, W. Burnham ... 394,828
Book, indexed shipping, F. C. Johnson ... 394,576
Boot crimper, J. Albrecht ... 394,748
Boot or shoe heels, nail for, H. A. Webster ... 394,802
Bouquet holder, J. G. S. Smith ... 394,889
Box. See Cigar box.
Brake. See Wagon brake.
Bricks, machine for elevating and delivering, C. H. Eichler ... 394,842
Bridge, suspension, E. E. Runyon ... 394,940
Bridge, truss, W. M. Parker ... 394,877
Broom bridle, H. Moore ... 394,658
Buckle, trace, J. F. Bartlett ... 394,671
Buggy curtain fastener, etc., B. R. Davenport ... 394,758
Bureau, C. H. French ... 394,547
Burglar alarm, J. L. Mikich ... 394,707
Burial apparatus, A. R. Young ... 394,947
Burner. See Gas burner.
Butter printing maching, Black & Stout ... 394,753
Button machine, C. J. Coleman ... 394,676
Button setting machine, L. C. Emerson ... 394,564
Button setting machine, H. Jones ... 394,579
Cable grip, D. A. Tinklepaugh ... 394,796
Cable roads, yoke frame for, J. Beavor-Webb ... 394,801
Calendar, L. J. Woolsey ... 394,905
Calk plate for shoes, Kellermann & Solveson ... 394,863
Can testing machine, W. H. Smyth ... 394,664
Car coupler, S. Burgess ... 394,755
Car coupling, B. Bush ... 394,909
Car coupling, C. H. Grambs ... 394,567
Car coupling, S. S. Lehman ... 394,584
Car coupling, T. L. McKeen ... 394,871
Car coupling, F. M. Wilder ... 394,745
Car door fastener, W. E. Heffner ... 394,571
Car door holder, freight, S. E. Henry ... 394,924
Car motor, street, I. Hodgson ... 394,572
Car mover, A. L. Wiley ... 394,628
Car unloading machine, J. Scully ... 394,727
Cars, drawhead for street, Lefman & McAllister ... 394,777
Cars, sliding door for street, P. M. Kling ... 394,774
Carbonating liquids, apparatus for, O. Brunler ... 394,821
Carpet stretcher and tacker, H. B. Pitner ... 394,934
Carriage curtain fastening, G. Roeder ... 394,884
Cart, road, C. Cumings ... 394,836
Cart, road, L. J. Lyman ... 394,705
Cart, road, S. J. McDonald ... 394,711
Cart, road, W. H. Price ... 394,790
Carving machine, S. F. Moore ... 394,710
Cash carrier apparatus, pneumatic, M. Barri ... 394,552
Cash registering and indicating device, J. L. Townsley ... 394,694
Cement from lime mud, manufacture of, J. S. Ruby ... 394,663
Chair. See Convertible chair. Mining chair.
Chair, J. Nichols ... 394,599
Checkrein holder, C. Morgel ... 394,591
Cigar box, H. Walker ... 394,945
Cigar bunching machine, Abraham & Martin ... 394,901
Cigar holder, D. B. James ... 394,575
Cigarette machine, Burns & Buckman ... 394,554
Clam extracts, making, A. H. Bailey ... 394,808
Clevis, self-adjusting, D. B. Henry ... 394,923
Clock, C. Bickford ... 394,816
Coat and hat hook, H. B. Baker ... 394,637
Collector, J. Tregoning ... 394,797
Coloring matters, manufacture of, C. Duisberg ... 394,841
Concentrator, J. A. Jones ... 394,654
Convertible chair, B. C. Odell ... 394,716
Cooler. See Beer cooler.
Coop, brood, J. A. Jackson ... 394,696
Corset cord fastener, H. A. Blanchard ... 394,817
Cotton gin, G. F. Brott ... 394,640
Coupling. See Car coupling. Whiffletree coupling.
Cuffs, making, J. R. Morrison ... 394,592
Cultivator, J. H. Scott ... 394,619
Cup. See Oil cup.
Curb stop, Staats & Illingworth ... 394,733
Cutter. See Gold leaf cutter. Rotary cutter.
Dental anodyne, R. L. Hunter ... 394,693
Desk and card holder, portable, E. P. Glascock ... 394,850
Dial, timepiece, M. V. B. Ethridge ... 394,845
Digger. See Potato digger.
Display frame, W. W. Ives ... 394,927
Ditching machine, C. C. Edwards ... 394,682
Door, adjustable screen, W. Hughes ... 394,651
Door check, B. A. Mitchell, Jr ... 394,709
Door hanger, J. C. & E. A. Haldeman ... 394,853
Door hanger, E. Y. Moore ... 394,873
Door hangers, rail support for, T. H. Day ... 394,643
Door hangers, rail support for, M. C. Richards ... 394,611
Drill. See Stone or marble drill.
Drum or radiator, heating, A. Walcott ... 394,899
Dyeing, hollow perforated tube for, H. F. Lippitt ... 394,778
Dyeing machine, H. & J. Hussong ... 394,694
Electric brake system, Widdifield & Bowman ... 394,627
Electric circuit, J. B. Wood ... 394,946
Electric circuit indicator, O. B. Shallenberger ... 394,728
Electric energy, conveying, S. Z. De Ferranti, 394,837, 394,838
Electric lights, support for incandescent, A. Dawes ... 394,680
Electric machine, dynamo, G. W. Riethmann ... 394,883
Electric machinery, dynamo, C. S. Bradley, 394,818, 394,819
Electric meter, Reckenzaun & Pentz ... 394,880
Electric meter, A. Reckenzaun ... 394,881
Electricity by secondary batteries, distribution of, T. P. Conant ... 394,642
Electrode for electric batteries, carbon, J. Beattie, Jr ... 394,810
Elevator. See Grain elevator.
Elevator, W. E. Nickerson ... 394,875
Elevator guide, L. S. Graves ... 394,769
Elevators, speed regulator for, W. E. Nickerson ... 394,660
End gate, E. B. Mode ... 394,786
Engine. See Rotary engine. Steam engine. Traction engine.
Envelope machine, D. M. Lester ... 394,586
Feed regulator, boiler, W. O. Gunckel ... 394,569
Feed water regulator, J. P. Lisk ... 394,929
Felt or other like articles, pouncing or finishing of, H. G. Wolcott ... 394,747
Fence making machine, power, E. E. Witter ... 394,631
Fence post, W. Helfenberger *et al* ... 394,854
Fence, stake and rail, A. O. Morgan ... 394,874
Fence, wire, E. C. Jones ... 394,773
Fertilizers, apparatus for, S. V. Mills ... 394,708
Fifth wheel for vehicles, R. D. Criswell ... 394,912
Finger ring, D. Kutner ... 394,928
Fire alarm circuits, magneto-generator for, W. L. Denio ... 394,839
Firearm, breech-loading, E. A. Harris ... 394,691
Firearms, ejector mechanism for breech-loading, Ellis & Wilkinson ... 394,843, 394,844
Firearms, load indicator for magazines of, W. R. Miller ... 394,872
Fire escape, W. H. Wells ... 394,625
Fire extinguishing apparatus, A. E. Grant ... 394,687
Flood gate, J. Erkmann ... 394,683
Flooring for buildings, J. Marthaler ... 394,588
Fluid meter, C. N. Dutton ... 394,562
Fly trap, C. H. Bennett ... 394,906
Frame. See Display frame. Lantern frame.
Fruit picker, F. & G. W. Ansley ... 394,550
Furnace. See Smoke preventing furnace. Welding furnace.
Gauge. See Water gauge.
Galvanic battery, R. D. Wright ... 394,670
Game counter, J. A. Yarger ... 394,900
Garment, ventilated, D. W. Crosby ... 394,552
Gas burner, D. Z. Evans ... 394,645
Gas mains, automatic cut-off for, G. W. McKenzie ... 394,597
Gas or other fluids, conduit for, C. R. Shepler ... 394,620
Gate. See End gate. Flood gate.
Gate, J. A. Stevenson ... 394,736
Gear for roving frames, etc., differential, Lawson & Dear ... 394,582
Generator. See Steam generator.
Generators, apparatus for returning water of condensation to, W. Irving ... 394,859
Generators, water returning system for, W. Brunham ... 394,829
Glass monument, H. C. Holl ... 394,650
Glassware, decorating, D. C. Ripley ... 394,612
Glove fastening, F. J. Martin ... 394,589
Gold leaf cutter, O'Hara & Kaulfuss ... 394,717
Gold saving apparatus, O. H. Bagley ... 394,666
Governor, steam engine, E. Huber ... 394,573
Grading and ditching machine, Bennett & Bunnell ... 394,907
Grading and ditching machine, M. G. Bunnell ... 394,908
Grain binders, tension device for, W. H. Stine ... 394,891
Grain elevator, A. Dieffenbach ... 394,560
Grain meter, automatic, Springer & Kent ... 394,665
Grain meter, rotary, J. H. Richford ... 394,938
Grate, heating and ventilating, E. A. Jackson ... 394,653
Grating and slicing device, J. Distelhorst ... 394,759
Grinding and mixing mill, G. Hughes ... 394,771
Grip tester or similar coin-controlled device, P. Beetz ... 394,812
Hanger. See Door hanger.
Harrow, J. G. Bailey ... 394,809
Harvester, corn, Lewis & Allen ... 394,704
Hat and clothes hook, combined, W. W. Shoe ... 394,792
Hay rake, P. D. Hardy ... 394,647
Head rest, pocket, A. W. Harrison ... 394,649
Heater. See Wheat heater.
Hinge, lock, L. W. Nimschke ... 394,788
Hinge, lock, W. P. Patton ... 394,605
Hoe, J. M. Hefner ... 394,692
Hoe, vineyard or farm, E. Cartwright ... 394,641
Holder. See Bag holder. Bouquet holder. Car door holder. Checkrein holder. Cigar holder. Tool holder. Window shade bracket holder.
Holdback, E. C. Sherwin ... 394,730
Hook. See Coat and hat hook. Hat and clothes hook. Snap hook. Spoon hook.
Hopple, lock, E. L. White ... 394,669
Horse brushing machine, C. Alexanderson ... 394,902
Hose carriage, M. P. Coleman ... 394,556
Hub attaching device, A. P. Olmstead ... 394,876
Hydrant, R. Hughes ... 394,652
Ice marker, J. B. Fischer ... 394,917
Incubators, heat regulator for, W. P. Shepard ... 394,866
Indicator. See Street or station indicator.
Ingot forming apparatus, J. Illingworth ... 394,695
Jack. See Wagon jack.
Jacquard machines, wire lift needle for, W. Wattie ... 394,800
Jewelry, plated wire stock for, J. S. Palmer ... 394,603
Joint. See Railway rail joint.
Kiln. See Pottery kiln.
Kiln for burning decorated china, C. H. Land ... 394,581
Kitchen cabinet, F. C. Pershing ... 394,878