(34) E. H. R. suggests that if J. D. B. (p. 155, current volume) should make his elevator pit of cast iron, the trouble about leakage would be ended.

(35) A. W. asks: How can green cherry lumber be seasoned without checking? A. If it is seasoned by immersion in water, the difficulty you speak of will probably be avoided. Some of the patented processes of seasoning may perhaps be applied to advantage.

(36) J. W. writes: Am I right in understanding that bearings should always be softer than the spindles which run in them? Is that only necessary in case of the oil being forced out? I use hardened steel spindles running in Babbitt boxes (woodworking machinery). As I use refined blacklead and oil as a lubricant, which does not answer so well with soft metals, I am desirous of employing iron or steel in future for bearings. What kind of iron or steel should I use for this purpose? A. The condition you lay down is by no means a necessary one. Cast iron makes a good bearing if plenty of surface is exposed to the pressure.

(37) J. S. S. writes: 1. I have a 10½ x 36 engine with a 10 foot fly wheel; boiler 3 feet diameter and 10 feet long, with 30 flues of 3 inches inside diameter. With this, how much Alabama pine ought I to saw in 10 hours? A. With a first class saw mill you might cut from 8,000 to 10,000 feet of inch boards if the logs are of good size. 2. How much corn ought I to grind in 10 hours with wood fuel, and 3½ foot Esopus stones? A. When the millstones are sharp you should grind from 12 to 15 bushels of corn per hour.

(38) G. S. writes: 1. I wish to put up some telegraph wire. Will common unannealed wire do, or will it have a tendency to act as a permanent magnet? A. It will do. We have not heard of its having a noticeable tendency to act in the way you mention. 2. Would not a 10 gallon jar, with zinc and copper to correspond, give as much electricity as 10 one gallon cells? A. It would be apt to give a greater quantity of electricity, but the tension of the electricity, or its ability to overcome resistance, would be nearly $\frac{1}{10}$ of the tension of electricity produced by the battery formed of 10 one gallon jars.

(39) T. C. wishes to stretch a 1 inch iron wire rope a distance of 400 feet, allowing but 10 feet sag in the middle, and carrying on the rope a weight of from 1,500 to 1,800 lbs. With these conditions he desires to know what will be the strain on the rope. A. According to Mr. Trautwine's tables, the strain = 5·03 ×(weight of rope+suspended weight).

(40) E. M. asks: What is the best material for a flat roof for a machine shop and foundry? A. Tin will answer very well. Corrugated iron and various patented materials are also frequently used.

(41) W. C. asks: 1. How are ocean cables repaired? A. The ends are hauled up and united. 2. Has a diverever been to the bottom of the ocean? A. We are not aware of any diver having reached a depth of over 170 feet.

(42) C. E. S. asks: 1. In making an Æolian harp, what kind of strings is preferable catgut or wire? A. Ordinary violin or guitar strings answer very well. 2. How many strings are used? A. There is no particular limit to the number.

(43) M. J. C. writes: Please explain to me the difference between brace, stay, and gusset, and also what is meant by crow-foot? A. A brace supports parts in compression, and a stay, parts in tension. A gusset is an angle piece in a structure, used to stiffen it, and a crow-foot is a casting with three or more feet, used to secure from the outside, covers to holes that bear on the inside of a plate.

(44) H. N. L. asks: How much counterbalance must be put in a crank arm to make an engine run without vibration? A. The vibration cannot be prevented under all circumstances. You will find the principles of counterbalancing clearly laid down in Rankine's "Machinery and Millwork."

(45) T. W. W. asks: 1. Is it practicable to grind common oats into meal or flour suitable for bread on an ordinary country mill? A. They must first be kiln-dried. 2. What is the best dress for 30 inch granite stones, which are intended to grind wheat and corn? A. Furrows of moderate depth.

(46) St. C. asks: 1. What thickness of steel is necessary to resist a bullet fired from an army revolver? A. We think a plate from one eighth to three sixteenths inch thick will answer. 2. Which of the metals, steel or iron, presents the strongest resistance to leaden balls? A. Steel, generally. 3. Would a plate formed by riveting several sheets of steel together be stronger than a solid piece of the same thickness? A. No.

(47) W. T. W. asks: Is it possible to make a horizontal engine reversible using only one eccentric, and that a fixed one? A. Yes.

(48) C. B. asks: Who was the engineer in charge of the construction of the Hoosac tunnel? A. Thomas Doane.

What will prevent the falling out of hair from the head of a young person who is otherwise in perfect health? A. It is sometimes beneficial to cut the hair. Consult a physician.

(49) G. J. B. asks: What is the best way to soften thin portions of chilled castings, in order to drill them? A. Anneal them.

(50) F. B. asks for instructions for making a small steam launch. A. Take your pattern from a good rowboat, and put in just as large an engine and boiler as you can conveniently carry. See SUPPLEMENT, Nos. 69 and 81.

(51) J. S. writes: I have one of Landis' domestic steam engines, of 1½ horse power; upright boiler, 18 inches in diameter and 32 inches high, with 15 one-inch flues, full length of boiler. I am using about 60 lbs. of coal and 1 barrel of water per day of, say, 10 working hours. Can I economically substitute gas for coal, and if so, how should the gas be applied? A. We think that the coal would be so much more economical that its use is advisable, unless there is some other special reason for heating by gas. In case gas is used, some one of the patent heaters in the market might be applied to advantage.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J. H. P.—The fragment contains a little copper blende, pyrites, and lead sulphide.—A. R. B.—It is a crystal of smoky quartz, the angles of which have been rounded by attrition.—D. N. LaB.—It is fine asbestos, of some value.—C. W. S. T.—No. 1. Clay containing much carbonaceous matter, iron, and alkaline earths, which renders it quite fusible. It may be used with other clays for earthenware, etc., and (pressed) for some decorative purposes. No. 2. Clay containing much sand. Tempered with other clay it might be employed in brickmaking. No. 3. Similar to No. 2. If washed it might perhaps be used by paper makers. No. 4. Clay slate. No. 5. An ocherous clay, suitable for a cheap pigment if burned and ground. No. 6. Sandstone. No. 7. It is a valuable copper ore—chalcopyrite, etc. Nos. 8 and 9 are chalcedony, of some value. No. 10 is barytes—sulphate of baryta—of good quality.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure the receipt of original papers and contributions on the following subjects:

Telephonic Phenomena. By W. E. G.
A Brilliant Meteor. By G. W. S.
Snake Cannibalism. By H. R. H. and D. L.
Power Required for Velocipedes. By E. B. C. and G. F. S.
Nickel Plating. By W. H. F.
Darwinian Theory. By E. S. M.
Treatment of Inebriates. By T. P. P.
Perpetual Motion. By E. R. M.
Calculation of Horse Power. By T. J. L.
A Leech Barometer. By E. S. C.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

February 19, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Annunciator, electric, T. L. Reed	200,569
Axle box, A. A. Freeman	200,385
Axle box, J. Stephenson (r)	8,084, 8,085, 8,086, 8,087
Axle sleeve, J. Dickens	200,519
Bale tie, J. R. Blossom	200,428
Bale tie, J. J. Hagins (r)	8,094
Bale tie, W. E. Borst	200,371
Ballot box, M. D. Williams	200,495
Barrel, J. D. McEachren	200,468
Bed bottom, E. A. Jeffery	200,397
Bedstead, cabinet, J. G. & J. W. Knapp	200,401
Bedstead, invalid, J. Kaylor	200,543
Bee feeding device, E. Carter	200,506
Belting, W. H. Curtiss	200,517
Binder, H. E. Thompson, Jr	200,488
Bleacher and dyer squeezing machine, W. Birch	200,427
Book rack, A. R. Sherman	200,576
Boot and shoe heel plate, L. W. Buxton	200,505
Boot tree, J. T. Flynn	200,525
Bottle register, W. S. Lynn	200,552
Bottle stopper, L. Rose	200,409
Brick surfaces, wash for covering, Bartlett & Ward	200,498
Brush, T. J. Connell	200,434
Buckle, W. Bray, Jr	200,501
Buckle, A. E. McConnell	200,466
Burglar alarm, G. F. Busby	200,372
Butter pressing apparatus, J. Harlan	200,392
Button, E. W. McGlaulin	200,554
Cabinet, toilet, G. Rivera	200,480
Car coupling, M. R. Delay	200,438
Car coupling, D. R. Halter	200,451
Car draught and buffing apparatus, E. L. Caum (r)	8,095
Cars, driving gear for street, J. Bishop	200,499
Carbureter, W. H Reed	200,568
Carpet fastener, W. Aldrich	200,421
Carriage boot, Dodge & Brown	200,440
Carriage seat, shifting rail for, C. Fritschy	200,447
Cask washing machine, A. Muntzenberger *et al*	200,470
Chair fan attachment, Thompson & Bergstrom	200,414
Chair, folding, C. D. Hyde	200,456
Chair, sewing machine, F. Chichester	200,508
Chair, window cleaning, A. Dormitzer	200,441
Chamber vessel, A. M. Rontey	200,481
Cheese cutter, J. N. Parker	200,472
Cheese manufacture, E. V. Lapham	200,547
Churn, B. B. Hess	200,531
Churn folding stand, J. McAnespey	200,403
Clock movement, A. E. Hotchkiss	200,534
Clock striking movement, Davies & Lambert	200,518
Clock striking movement, H. D. Northrop	200,564
Clutch mechanism, G. Crompton	200,375
Cock for steam boilers, stop, J. L. Heald	200,453
Cock, gauge, A. H. Jarecki	200,396
Coffee roaster, G. H. Downie	200,520
Collar, W. M. House	200,535
Cooker, feed, Cunningham, Winhofer & Rice	200,515
Cooking utensil, Shepard & Adams, Jr	200,575
Copy holder, J. D. Moore	200,560
Cord finishing machine, W. Buckton	200,503
Corset, C. A. Blohm	200,500
Corset, L. H. Foy	200,384
Corset manufacture, J. C. Tallman	200,583
Dam or dike, C. M. Scott	200,412
Dental plate, Fahnestock & Powell	200,445
Ditching machine, W. Smith	200,579
Egg case, J. L. & G. W. Stevens (r)	8,091
Elevator, hay, C. M. Mallory	200,465
Envelope, M. J. Duffee	200,442
Faucet, J. O. Waddell	200,416
Feather renovator, Sanders & Smith	200,411
Feed water regulator, C. Mendenhall	200,405
Fence, L. P. Judson (r)	8,096
Fence wire, C. F. Washburn	200,494
Fence wire stretcher, C. S. Davis	200,377
Fertilizer distributer, H. P. Underhill	200,490
Fire escape, G. W. Foster	200,526
Fire escape, W. B. Garoutte	200,387
Fire pot or portable furnace, J. W. Fisher	200,523
Foot rest, J. M. Shaw	200,483
Foot rest for hot air registers, J. Bonnet	200,429
Forge, Morrison, Mildren & Moore	200,562
Fruit drier, P. Riley	200,479
Furnace for heating links, J. H. Helm	200,394
Game apparatus, C. A. Roth	200,571
Garter, J. L. Moore	200,561
Gasoline burner, F. A. Lyman	200,464
Gate, F. J. Borgia	200,430
Gate, Cristy & Jay	200,514
Gate, J. E Johnston	200,398
Gate, W. G. Mentzer	200,555
Grain binder, M. A. Keller	200,544
Grain separator, J. S. Upton	200,585
Grater, S. Barker	200,423
Hame, J. M. Lasater	200,462
Harness, B. Jones	200,399
Harness attaching apparatus, M. H. M. Smith	200,486
Harvester, S. Hevener	200,532
Hat, E. Copleston	200,374
Heater, J. W. Hardwick	200,391
Hinge for moulders' flasks, A. Barker	200,422
Honey comb, artificial, A. B. Lawther	203,549
Horse detacher, N. Johnston	200,541
Horse power, W. W. Dingee	200,439
Horseshoe, H. J. Batchelder	200,425
Indexing books, J. Echols	200,381
Inkstand, H. G. Squires	200,581
Insect and vermin fumigator, F. Hanson	200,529
Insect exterminator, W. T. Daughtrey	200,376
Insect trap, Schreiber & Weigand	200,574
Ironing machine, T. S. Wiles	200,419
Ironing table, S. C. Terry	200,584
Journal for car axles, etc., H. Wakeman	200,492
Key, C. C. Coleman	200,512
Key fastener, R. McCully	200,404
Knife, C. Luetters	200,551
Knife scourer, S. K. Luce	200,550
Knitting machine, G. A. Leighton	200,463
Knob shanks, J. W. Haines	200,450
Ladder, J. W. Pine	200,475
Ladder, J. Flinn	200,524
Lamp, F. Carrier	200,373
Lamp chimney, E. R. Roswell	200,408
Lamps, globe for street, F. L. Senour	200,413
Lantern, T. B. Osborne	200,565
Leather boarding and graining, L. Townsend (r)	8,088
Life boat, G. F. Sievern	200,485
Life preserver, D. Ruge	200,572
Lighting apparatus, electric, J. King	200,545
Lock, C. C. Coleman	200,511
Loom, E. Howard	200,536
Lubricator, G. H. Flower	200,446
Lubricator for shafting, A. D. Hoffman	200,395
Meat, preserving, D. C. Link (r)	8,090
Mill, B. Whitney (r)	8,097, 8,098
Mill, C. C. Phillips	200,567
Mill spindle bush and tram, E. G. Cushing	200,436
Motion, reciprocating and rotary, E. Meredith	200,556
Motor, J. K. Cummings	200,516
Nut lock, J. & J. Collman, Jr	200,513
Oil saver and casing head, E. J. Northrup	200,471
Organ, H. F. Graetzel	200,528
Organ pipe, A. Gemunder	200,449
Overalls, H. F. Woodward (r)	8,093
Paddlewheel, L. Shook	200,577
Paddlewheel, W. C. Smalstig	200,578
Paging machine, E. Gorenflo	200,527
Paper pulp machine, W. W. D. Jeffers	200,540
Pen, drawing, R. L. Walter	200,588
Phonograph or speaking machine, T. A. Edison	200,521
Pillow, H. J. Buell	200,504
Pin, picket, P. J. Tweed	200,489
Picture exhibitor, J. C. Koch	200,460
Pitman connection, R. M. Lamson	200,461
Planter, H. Timmersmann	200,415
Planter, etc., R. B. Werner	200,590
Planter, L. J. Corbin (r)	8,089
Planter, check row attachment, E. W. Quincy	200,407
Plow, W. S. Moon	200,559
Plow, J. H. Riggan	200,478
Plow, H. F. & G. F. Shaw	200,413
Plow, R. C. Buckley	200,502
Plow and seeder, P. H. Elliott	200,444
Portfolio, J. D. Richards	200,477
Post marking and canceling, R. L. Grinnan	200,389
Press for fruits, etc., E. A. Stears	200,487
Press, seal, S. Larkin	200,548
Printing pills, machine for, W. R. Warner	200,589
Punching sheet metal tubing, E. O. Higgins	200,454
Rain gauge, Dunne & Richmond	200,443
Rake, W. M. White	200,592
Rolling metal, J. H. Swett	200,582
Ruling machine, J. McAdams	200,553
Saddle, J. R. Dempsy	200,378
Satchel handle, G. Havell	200,530
Saw mill, F. C. Frost	200,448
Sawing machine, C. H. Jones	200,542
Scales, A. B. Pearson	200,406
Scales, C. A. Fredericks	200,386
Screen, J. H. Cavanagh	200,433
Screw thread machine, Fairbairn & Simon	200,522
Seed cleaning machine, I. B. Sandusky	200,410
Sewer trap, J. Sargent	200,573
Sewing machine embroiderer, G. E. Hart	200,452
Sewing machine ruffler, G. W. Burgess	200,431
Shingle sawing machine, D. Lane	200,546
Shoe tip, E. F. Partridge	200,566
Signaling apparatus, D. H. Iseminger	200,457
Skate, E. H. Barney	200,424
Soldering device, F. B. Davis	200,437
Speaking tube, T. J. & G. O. Woolcocks	200,420
Spring, G. K. Smith	200,580
Spring, D. F. Cooper	200,435
Stamp, H. Wickham, Jr	200,418
Stave jointer, T. M. Chapman	200,507
Steam generator, W. S. Salisbury	200,482
Steamer, A W. Humphry	200,537
Stone sawing machine, H. Young	200,593, 200,594
Stove leg, H. H. Huntley	200,538
Stove oven shelf, C. N. Buzzell	200,432
Strainer for faucets, etc., A. H. Willoughby	200,496
Stuffing box, C. C. Jerome	200,458, 200,459
Tap with turnable outlets, C. G. Fischer	200,383
Target, E. B. Beer	200,426
Temperature, indicating, etc., E. Armstrong	200,497
Terret, C. L. Pond	200,476
Thermostat, W. B. Farrar	200,382
Thill coupling, D. D. Whitney	200,591
Tile laying machine, J. I. & W. J. Mettler	200,557
Tin from tin scrap, separating, P. C. Vogellus	200,587
Torpedo for oil wells, E. A. L. Roberts	200,570
Torpedo for oil wells, G. S. Vaughn	200,491
Toy money box, W. H. Lotz	200,402
Treadle, S. Haas	200,390
Truck, J. O. A. Bennett (r)	8,092
Tube expander and trimmer, J. E. Minshull	200,558
Tubing, armor for flexible, H. Wakeman	200,493
Twin hook, H. B. Cole	200,510
Valve, balanced rotary, J. S. Glenn	200,388
Vapor burner, F. H. Shepherd	200,484
Vat, C. Visel	200,586
Veneer cutting machine, J. D. McEachren	200,467
Vest of paper, etc., Weber & Kruse	200,417
Wagon gear and brake, J. J. Pennington	200,474
Washing machine, C. H. Horne	200,455
Washing machine, J. Metais	200,469
Watch case, O. Domon	200,379
Watch plate, Hutchinson & Dehouck	200,539
Watch and clock escapement, J. M. Hitchcock	200,533
Watch, stem winding and setting, O. Domon	200,380
Water closet disinfector, J. F. Naulty	200,563
Wells, steam heater for oil, J. Harris	200,393
Wheel, car, E. Kaselowsky	200,400
Wool washing machine, J. Clegg	200,509

English Patents Issued to Americans,

February 9 to February 21, inclusive.

Axle box.—G. A. Morse, South Egremont, Mass.
Glove fastener.—G. Havell, Newark, N. J.
Horseshoe.—J. Russell *et al.*, Newark, N. J.
Intrenching tool.—J. L. Buskett, St. Louis, Mo.
Lamp.—C. Chinnock, Brooklyn, N. Y.
Microscope object glass.—E. Gundlach *et al.*, Rochester, N. Y.
Mineral waters, etc.—G. D. Dows, Boston, Mass.
Mining machine.—F. M. Lechner, Columbus, O.
Oil stove.—E. B. Cox, Brooklyn, N. Y.
Railway brake.—A. K. Hadley *et al.*, New York city.
Refrigerator, J. Lorillard, New York city.
Revolver.—O. Jones, Philadelphia, Pa.
Rock drill.—A. H. Elliott, New York city.
Ship armor.—E. W. Serrell, New York city.
Steam and hydraulic press.—J. F. Taylor, Glenville, Conn.
Telephone.—G. B. Richmond, Lansing, Mich.
Telescope object glass.—E. Gundlach *et al.*, Rochester, N. Y.