(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 oot 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.