



G. E. K. Jr. says: In answer to E. D. E. you say that the earth turns on its axis 365 times in 365 days...

F. W. B. asks: 1. What chemical reaction takes place between carbolic acid and iodine, when they are mixed in solution?...

J. H. B. asks: Can a man lift more with a rope over a large pulley than with one over a small pulley?...

F. A. says: I am told that the coins of the United States for one particular year are at present very scarce and valuable...

J. P. R. asks: How much power has an engine, 1 inch bore x 2 inches stroke, running at 200 revolutions per minute?...

I. S. S. asks: How thick should a cast lead sphere of 36 inches diameter be to stand a pressure of 35 lbs. to the square inch?...

W. D. G. asks: Why is it that in the block and tackle every additional pulley (the pulleys being all of one size) gives an increase of power?...

X. Y. Z. asks: 1. How can I make a small crucible? A. With fire clay, or a mixture of fire clay and plumbago...

M. E. asks: Why is it that, after digging a hole in the ground, the dirt will not fill it up as compactly as before?...

C. E. M. is correct as to the weight of the 40 feet cube of granite. It should have been given at about 5,333 tons.

G. McK. asks: 1. How can I mend a hydraulic cylinder that has a very fine flaw in it? I cannot see the crack when I have no pressure on it...

J. V. says: 1. We have a boiler of 40 inches diameter, 22 feet long, with two flues of 13 inches diameter. What should be the size of stack to insure the best draft?...

E. B. L. says: 1. Some of our steamboat chimneys get very hot when running, and others keep quite cool. What are the cause and remedy?...

J. B. says: I have some young evergreen trees growing under some walnut trees, but they do not thrive. Can you tell me the reason?...

F. H. H. asks: Why does water form an exception to the law of contraction by cold? What are the principles of its expansion when turning to ice?...

A. T. R. asks: What is the principle on which the Giffard injector works? A. The steam imparts sufficient velocity to the water with which it comes in contact to overcome the resistance offered by the pressure within the boiler.

Z. Z. asks: 1. What is the coloring matter of the leaves of plants? A. The coloring matters of flowers are referred to three distinct substances by certain chemists, one of which is a blue or rose color, while the other two are yellow...

J. C. M. asks: 1. How are the salts of nickel and ammonia used for plating? A. See pp. 91, 139, vol. 29. 2. How is wood stained in imitation of ebony?...

W. T. says (in reply to J. H. P., who says: Astronomers tell us that the earth for ages past has been gradually cooling, but the glacial theory necessitates the belief that the earth was once much colder than it is at present...)

J. L. R. says, in answer to F. O. C. H., who asked how to put a patch on a boiler with bolts so as not to leak: "I put one on a boiler about two months ago, and it does not leak and never will..."

M. Y. R. says that P. and G. G. can make a good invisible ink, that will appear upon the application of water, by dissolving powdered alum in the juice of a lemon...

C. D. S. says to J. H. P., who asks if any attempt has been made to reconcile the glacial theory with the theory that the earth was once in a molten state: The reason assigned by Benton for the change of climate which caused the glacial epoch is that the axis of the earth may not have had the same inclination to the plane of its orbit during the glacial epoch as at present...

S. T. says, in reply to H. C. R., who asks for a plan for an apron for a double ended ferry boat: "The first engine I ever handled was on such a boat on the Ohio river, and the two aprons were hung to the bow and stern decks, much as a barn door is hung..."

C. S. says that J. H. P. can cure the gapes in chickens by taking a stiff horsehair, some eight inches long, making a loop of it, putting it down the chicken's throat, and withdrawing it quickly, two or three times, for as many days. This is a sure cure.

F. A. R. says, in reply to P.'s query as to hydrogen: Probably your zinc is too pure; sometimes we are compelled to use very pure zinc and sulphuric acid, and then the hydrogen will come out very slowly, the pure zinc resisting the action of the sulphuric acid...

W. S. X. says, in answer to J. H. D., who asks how to reverse an engine: First make a mark on the side of the eccentric, near the shaft, with a scribe or small chisel; make a corresponding mark on the shaft at the same point, then place one point of a pair of calipers on the mark on the shaft, and with the other point find the center of the shaft on the opposite side...

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

A. M. G.—No. 1 is oxide of iron; No. 2, quartzose rock.

W. N. L.—These two specimens are iron pyrites.

J. W. Z.—No. 1 is clay ironstone; No. 2, sandstone impregnated with oxide of iron; No. 3, the same as No. 2; No. 4, brown ochre, a clay colored with oxide of iron. This might be of service as a pigment.

M. D. W.—This material is shale.

J. P. M.—This is an impure clay.

C. J. H.—The specimen sent is limestone. In answer to your other question: We know of no such process, but you can experiment.

G. W. S.—The sample is an impure silicate of alumina.

G. & W.—One of these specimens is a fossil bone, and the other argenteriferous galena. The subscription price of this journal is \$3 per annum, in all parts of the United States.

W. R. Jr.—Your specimen is an alloy consisting of copper and zinc, in other words, brass. It is possible that a piece of brass may have accidentally fallen into the stamp copper. Native brass has not as yet been found.

M. R. asks: 1. How are sewing machines japanned, what ingredients are used, and how are they applied?—O. S. asks: If 2,000 feet of 6 inch iron pipe is supplied by a pump driven by 24 horse power, will it be any advantage to attach a similar pump, driven by 18 horse power, at the other extremity of the main pipe, in throwing water from a hydrant placed in the center?...



then cut a round piece of paper of the same size as the pasteboard; place it on the pasteboard, and the other end of the tube in the mouth, and the strongest lungs cannot blow the paper off. Will you give me the philosophy of it?—B. says: I see in the SCIENTIFIC AMERICAN that Dr. Brown-Séquard advises people to cultivate the use of the left hand and left side of the body, thus exercising the left lobe of the brain, teaching it to think...

COMMUNICATIONS RECEIVED.

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

- On Steam Boiler Explosions. By W. M. D.
On the Attraction of the Sun and the Earth. By A. D., and by A. F.
On a Problem, etc. By G. W. E.
On an Aurora visible in Michigan. By B. B. S.
On Preventing Scale in Boilers. By C. L. E.
On the Beech Blight. By D. E. R.
On the Chameleon. By H. A. H. G.
On the Philosopher's Hunt. By T. H. C.
On a Double Lamb. By J. H. P.
On some Useful Recipes. By C. B. L.

Also enquiries and answers from the following: T. O'D.—E. P. J.—J. B. S. H.—G. N.—D. F.

Correspondents in different parts of the country ask: Who makes back rests for holding lumber in a lathe? Who sells small brick-making machines? Who sells lath-splitting machines? Who makes artesian well bor-

ing machinery? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN.

Several correspondents request us to publish replies to their enquiries about the patentability of their inventions, etc. Such enquiries will only be answered by letter, and the parties should give their addresses.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

[OFFICIAL.]

Index of Inventions

FOR WHICH Letters Patent of the United States WERE GRANTED IN THE WEEK ENDING April 7, 1874, AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

Advertising frame, E. A. G. Roulstone..... 149,310
Alarm, burglar, H. X. Wright..... 149,365
Bale tie, cotton, J. G. Angell..... 149,124
Bale tie, cotton, A. A. Goldsmith..... 149,468
Bale tie, cotton, T. F. Sherrill..... 149,531
Basket splints, cutting, S. I. Russell..... 149,343
Battery, galvanic, R. M. Lockwood..... 149,330
Bed attachment, spring, J. R. Bailey..... 149,569
Bed bottom, A. Adams..... 149,351
Bed bottom, spring, W. M. Trobaugh..... 149,547
Bell, call, H. A. Dierkes (r)..... 5,822
Bell, door, J. P. Connell..... 149,375
Bellows safety valve, C. W. Dunn..... 149,452
Belt tightener, C. L. Work..... 149,423
Billiard table leveler, L. A. Hunt..... 149,401
Bit stock, H. C. Hart..... 149,306
Blacking case, E. Sehenck..... 149,345
Blower, rotary, L. M. Andrews, 2d..... 149,568
Boat, life, M. Cason..... 149,577
Boiler, agricultural, W. Cade..... 149,437
Boiler and water heater, S. S. C. Hamlin..... 149,304
Boiler, steam, N. D. Harvey..... 149,395
Boot heel gage, A. Orebaugh..... 149,512
Boot soles, channeling, V. K. Spear..... 149,538
Boot jack, G. Geer..... 149,465
Boot stretcher, Compton & Hartz..... 149,446
Boot stretcher, O. F. Garvey..... 149,463
Bottle stopper, C. W. Osgood..... 149,331
Bottles, etc., cleaning, J. C. G. Hüpfel..... 149,402
Box, lunch, G. Booth..... 149,429
Brick machine, J. S. Derby..... 149,580
Bride bit, W. N. Martin..... 149,497
Broilers, D. E. Roe (r)..... 5,880, 5,831
Button hole cutter, D. Lumbert..... 149,409
Button hole cutter, R. Wolf..... 149,556
Can for oil, etc., A. C. Stoessiger..... 149,420
Can opener, G. C. Spangler..... 149,577
Car axle, W. F. Brooks..... 149,482
Car axle journal bearing, W. C. Baker..... 149,284
Car brake, W. C. Baker..... 149,283
Car coupling, J. F. Burner..... 149,572
Car coupling, W. A. Cummings..... 149,376
Car coupling, J. D. Gardner..... 149,462
Car frame, railway, E. S. Stiles..... 149,357
Car mover, C. J. Shirreff..... 149,348
Car seat, J. Hartman, Jr..... 149,308
Car, sleeping, R. P. Leary..... 149,488
Car spring, P. G. Gardner..... 149,299
Car starter, W. T. Beekman..... 149,427
Car starter, W. Guilfoyle..... 149,3, 2
Car starter, C. Melners..... 149,823
Car wheels, etc., W. S. G. Baker..... 149,570
Carpet beater, C. Pullis..... 149,524
Carriage clip die, F. B. Morse (r)..... 5,826
Carriage, ice, C. Hammelman..... 149,393
Cart brake and rest, W. C. Jardine..... 149,404
Cartridge capping implement, J. L. Raub..... 149,525
Casting moldboards, chill for, J. Oliver (r)..... 5,823
Cattle trough, rotating, D. Slaughter..... 149,319
Centrifugal machine, D. M. Weston..... 119,558
Chair, reclining, J. Wayland..... 149,522
Chair, tilting, J. J. Vollrath..... 149,550
Churn, C. H. Clark..... 149,374
Clocks, lighting attachment for, H. X. Wright..... 149,366
Clothes dryer, centrifugal, R. Pilkington..... 149,519
Clothes frame, towel rack, etc., Porter et al..... 149,335
Cordage slicking machine, F. Vonderheide..... 149,551
Corn, etc., preserving, Merrill et al..... 149,503
Corner strip, G. H. Pagels..... 149,413
Cotton chopper, T. E. Marable..... 149,492
Cultivator, D. S. Stafford, (r)..... 5,827
Cultivator, cotton, E. H. Sutton..... 149,548
Curtain fixture, J. B. Fish..... 149,457
Dental burring engine, D. W. Clancey..... 149,412
Dental rotary tool, F. Hickman..... 149,812
Distilling, preparing mash for, A. Woolner..... 149,558
Ditching, etc., machine, H. G. Richards..... 149,357
Drawers, men's, J. J. Fitz Patrick..... 149,525
Drill and fertilizer, seed, J. F. and S. C. Thomas..... 149,545
Egg carrier, F. M. Hunt..... 149,479
Ellipsograph, H. A. Hazen..... 149,474
Engine, etc., rotary, W. A. Graham..... 149,391
Engraving plates, ornamental, J. Gillham..... 149,467
Envelope, Kelly & Cobb..... 149,484
Faucet, J. Green..... 149,471
Feather renovator, A. B. Hutchins..... 149,403
Fifth wheel for vehicles, N. P. Nelson..... 149,509
Firearm, breech-loading, G. H. Ferriss..... 149,456
Fire arm, breech-loading, C. E. Snelder..... 149,352
Fire arm rebounding lock, C. E. Snelder..... 149,353
Fire brick stove lining, etc., E. H. Richter..... 149,338
Fire escape, I. H. Mulford..... 14,328
Fire kindler, J. W. Bynon..... 149,436
Fire kindler, J. Newman..... 149,510
Fire kindler, Wiehle et al..... 149,554
Fire wood carrier, Brisack et al..... 149,287
Flocking machine, E. C. Gould..... 149,390
Flour bolt, J. R. Gast..... 149,464
Fluting roller, T. Bobjohn..... 149,526
Flyframe, M. Fredeau..... 149,297
Fuel, etc., artificial, J. R. Hayes..... 149,396
Furnacegrate, G. R. Moore..... 149,825
Furnace, hot air, G. W. Walker..... 149,422
Furnace, tyre-heating, L. S. Rowell..... 149,341
Gaiter, button, P. McNulty..... 149,500
Game board, T. A. Schwennesen..... 149,418
Gas apparatus, domestic, H. Skolnes..... 149,533
Generator, sectional steam, J. A. Miller..... 149,504
Glass mold, C. D. Fox..... 149,461
Glass, etc., polishing, J. Meise..... 149,501
Grain basket, R. S. Bartlett..... 149,288
Grain cleaning machine, S. Burger..... 149,485
Guano bags, etc., waterproofing, J. H. Green..... 149,472
Harness pad, J. Huber..... 149,400