

G. E. K. Jr. asks: In answer to E. D. E. you say that the earth turns on its axis 365 times in 365 days. I supposed that it only turned 364 times, the solar day being not a revolution of the earth once on its axis, but the return of the sun to a given meridian, which I think is less by about four minutes than a complete rotation (or sidereal day) on account of the onward motion of the earth in its orbit, which would necessarily make one day in a year if the earth did not turn on its axis at all. Am I not right? A. The tropical year, or interval between two successive passages of the sun through the mean vernal equinox, equals 365.2422 mean solar days, or 366.2422 sidereal days.

F. W. B. asks: 1. What chemical reaction takes place between carbolic acid and iodine, when they are mixed in solution? A. Little if any chemical action. The iodine colors the carbolic acid a dark reddish brown color. 2. Is it known whether the action of carbolic acid on iodine would produce such a change in the iodine as would alter the therapeutic action on the system? A. No.

J. H. B. asks: Can a man lift more with a rope over a large pulley than with one over a small pulley? A. In the case of a stiff rope, yes. It is harder to bend a stiff rope over a small pulley than over a large one.

F. A. says: I am told that the coins of the United States for one particular year are at present very scarce and valuable. Will you please tell me what year that is, and also what are the several present values of silver dollars of 1796 and 1799? A. Dollars of 1804, but three known. Dollars of 1794, very scarce. The rest are easily procured at a small premium, if at all rubbed or indented. No dollars were coined from 1805 to 1835. Half dollars of 1804, but one known. Of 1797, very rare. None coined from 1798 to 1800, nor in 1816. Quarter dollars of 1823 and 1827, very rare. Coined irregularly until 1831. Dimes: Very rare for the four following years, varied in the order of their rarity: 1804, 1797, 1802, 1803. Coined yearly from 1827. Half dimes of 1802, but three known. Of 1791 and 1803, very scarce. None coined from 1806 to 1828. Three cent pieces of 1835, very scarce. Cents of 1793, 1799, and 1804, very rare. Coined yearly from 1798, except in 1815. Half cents of 1796, rare. Not coined in a regular series. But few of the gold pieces are very rare. The quarter eagle of 1797 is most valuable.

J. P. R. asks: How much power has an engine, 1 inch bore x 2 inches stroke, running at 200 revolutions per minute? How large a boiler should I have, and what kind of metal would be best? A. See article entitled "Indicating Steam Engines," in SCIENTIFIC AMERICAN for January 31, 1874. Allow about 20 square feet of heating surface for a horse power. You can make the boiler of copper or sheet or cast iron, whichever is most convenient.

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? How thick one of 30 inches diameter? A. For the sphere, the bursting pressure is equal to the product of the tenacity of the material multiplied by the thickness, and divided by the diameter. For a cylinder, the bursting pressure is equal to the product of the first two terms, divided by the radius of the cylinder. From these rules you can find the necessary thickness.

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? A. It is not true that every additional pulley increases the power, but it tends to increase the space over which the force acts in overcoming a given resistance; so that the same force can overcome more resistance, but requires a longer time. Thus the power developed, which is composed of force or pressure exerted over a distance, remains the same.

X. Y. Z. asks: 1. How can I make a small crucible? A. With fire clay, or a mixture of fire clay and plumbago. Your best plan will be to buy one. 2. What is laminated steel? A. It is a mixture of steel and iron. 3. Is $\frac{1}{180} \times 60$ = the chord of one minute? A. No.

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? A. It will, if moistened and rammed.

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. A. Possibly you can secure a patch with bolts, and braze the joint. 2. What is the best preparation for putting on a rope that has to run on or wrap around a small pulley under water, so as to make the rope last? A. Tar.

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? We have 16 square feet grate surface. Would that be enough to burn sawdust, provided the draft were strong enough? A. Make the area of chimney from $\frac{1}{2}$ to 1-10 area of grate. 2. Which saw will cut the easier for both hard and soft wood, the one which is sawed sufficiently for clearance, or one in which the teeth are sprung for set? A. This is a question between rival manufacturers. It can readily be determined by experiment. 3. How can I make the most durable friction wheel, for the feed of a circular saw? A. Probably cast iron will be as suitable as anything.

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? A. It is because of improper design in the boilers, or on account of unduly forcing the fires. 2. Is there anything I can put on pine plank to make it fireproof or incombustible? A. There are several varieties of paint that are said to make wood fireproof.

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? A. The reason is that the walnuts shade the evergreens and deprive their roots of proper nourishment. As an antidote, remove the trees where each may have abundance of air, light, and root space.

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. One volume of water at 82° gives 1-102 of ice at the same temperature. There is then an increase of one tenth of the volume in passing from the liquid to the solid condition, the temperature remaining the same. But previously fixing themselves rigidly in certain positions so as to form crystals of ice, the particles of water take up relative positions with regard to one another, in which they occupy a larger volume.

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. The former is produced by a compound which has been termed cyanin. Cyanin may be obtained from the petals of the violet or of the iris. To the yellow matter which is insoluble in water the name of xanthine is given, and to the yellow matter which is soluble, the name of xanthine. See article "Chromatology," Quarterly Journal of Science, 1873. 2. Are not the metals of the highest specific gravity the scarcest, and is not this caused by their sinking near the center of earth when the earth was in its molten state? A. The rare metals, which are also noble metals, are of great specific gravity, and many geologists have supposed that this had a close connection with their slight diffusion. But it is a theory difficult of satisfactory demonstration.

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? A. Steep the wood for two or three days in lukewarm water, in which a little alum has been dissolved: then put a handful of logwood, cut small, into a pint of water, and boil it down to less than half a pint. If a little indigo is added, the color will be more beautiful. Spread a layer of this liquor quite hot on the wood with a pencil, which will give it a violet color. When it is dry, spread on another layer, dry it again, and give it a third; then boil verdigris at discretion in its own vinegar, and spread a layer of it on the wood; when it is dry, rub it with a brush, and then with oiled chamolis skin. 3. What is your price for binding two volumes (in one book) of the SCIENTIFIC AMERICAN? A. Two dollars.

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. Has any attempt been made to reconcile the two theories?): Allow me to answer this question, Such an attempt has been made, and, it seems, very successfully, by the celebrated geologist Oscar Von Heer. Astronomers tell us that the sun, with the earth and the other planets, is steadily progressing in space, moving in a very long period around its central body, very probably the star Alpha Centauri. It is almost certain that matters are not equally distributed in space, and that there are regions of the heavens where there are more celestial bodies in one given space than another, and consequently these regions are warmer from the heat coming forth from the stars, which all are surrounded by glowing gases, as the spectroscope proves. But in the regions in which they are less abundant, the temperature is colder. O. Von Heer now suggests that formerly, especially during the eocene period, the sun (with the earth) was in a region thronged with stars, and therefore the climate on earth was warmer than it is now; and by gradually progressing to other regions, the climate became colder and colder, until the lowest temperature was reached in the glacial period, and that it moves now to regions that are warmer again. It is my opinion that the earth's heat has not affected its climate since the end of the jurassic period at least, and perhaps very much earlier."

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. The patch was 24 bolts long and 4 wide, over where the sheets were riveted. The inside sheet was cracked from one hole to the other for that length. Proceed as follows: Punch or drill your holes and fit the patch to the boiler; make the holes to fit well for $\frac{1}{2}$ bolts $1\frac{1}{2}$ inches long, with heads of 1 inch, made solid, and good threads. Put 4 rounds of candle wick with stiff white lead round each bolt and draw it tight. In putting the bolts in, have the heads square with the boiler, and hold them so; be sure not to let them turn. After screwing on the nuts, hammer the heads down hard and screw again, also hammer the patch after it is screwed tight. Caulk the same as a new boiler. It may leak a little before you get up steam; but when you get 30 lbs., and your engine started, it will be tight and will stay so."

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; the density of the ink is procured by the amount of alum used, but half a teaspoonful to the juice of one lemon is enough.

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; at the early stage of the earth's existence, volcanicaaction must have been much more frequent and powerful than at present, and this volcanic action may have caused an upheaval at some point of the surface, accompanied by a corresponding depression at an opposite point, which would be sufficient to alter the center of gravity to such an extent as to change the inclination of the earth's axis to the plane of its orbit. As there is no trace of glacial action within the tropics, some geologists contend that the part of the northern hemisphere on which traces of glacial action are found may have occupied a position analogous to the poles of the earth at present. For a full and satisfactory explanation of this and many other points, read Benton's "Lectures on Geology in America."

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, with the difference that the battens were of 5x8 timber and 24 feet long. The apron was 10 feet long. The apron boards were bolted to under side of timbers, and long iron hinges were bolted to apron and deck. This method throws the timbers near each side of the boat, out of the way of teams; and a large clevis on deck, looping over end of timbers, secured the apron up when crossing. On nearing shore, the clevis was dropped off, letting the apron fall on shore. The steering oar had a pin fast in its balance center, and a hole in the outboard of either apron to receive it, so that both ends of the boat could go ahead."

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. By adding a few drops of chloride of platinum, however, the hydrogen will be produced very quickly, and probably sulphate of copper would be just as well for your purposes as chloride of platinum.

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 callipers on the mark on the shaft, and with the other point find the center of the shaft on the opposite side. Then, with a scribe, mark this point also. Now unscrew the eccentric and move it around in the direction in which the engine is intended to run, until the mark on the eccentric comes into line with the second mark on the shaft; then make the eccentric fast, and the engine will run in the opposite direction. It does not make any difference in what direction the crank is when the eccentric is moved.

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 ocher, 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.

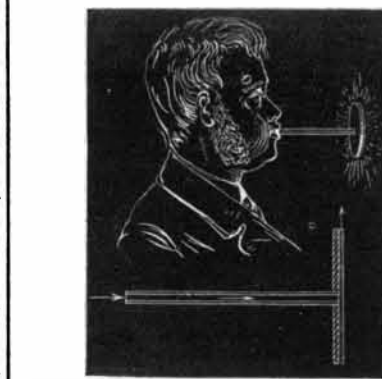
C. J. H.—The specimen sent is limestone. In answer to your other question: We know of no such process, but you can experiment.

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

G. & W.—One of these specimens is a fossil bone, and the other argentiferous 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 jappaned, 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? If so, what?—J. C. C. asks: After being drowned, how long will a person lie under water before he will rise? Is there any difference in the time between fresh and salt water? What is the cause of the rising? If it be gas, what produces it? What is the theory of firing cannons over the water where it is supposed that a person has been drowned?—E. H. K. asks: In the drive wheel of the locomotive engine, where does natural philosophy place the fulcrum, the power and the weight respectively?—E. C. B. asks: What do jewelers use for cleaning diamonds? Is it a solution of arsenic or potash?—J. A. McC. Jr. says: Take a tube, 3-16 inch in diameter, of any length, and cut a round piece of pasteboard $2\frac{1}{2}$ inches in diameter. Make a hole in the center of the board, and insert one end of the tube in the hole:



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. He recommends learning to write with the left hand. Can any of the readers of the SCIENTIFIC AMERICAN give directions for the proper holding of the pen and the proper slope of the writing in left-handed penmanship?

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 boring 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.....	149,340
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 spiltans, cutting, S. I. Russell.....	149,348
Battery, galvanic, R. M. Lockwood.....	149,390
Bed attachment, spring, J. R. Bailey.....	149,369
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.....	149,806
Blacking case, E. Sehenck.....	149,345
Blower, rotary, L. Andrews, 2d.....	149,568
Boat, life, M. Cusson.....	149,377
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.....	149,380
Bride bit, W. N. Martin.....	149,497
Brollers, 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.....	149,470
Can opener, G. C. Spangler.....	149,377
Car axle, W. F. Brooks.....	149,462
Car axle journal bearing, W. C. Baker.....	149,284
Car brake, W. C. Baker.....	149,283
Car coupling, J. F. Burner.....	149,372
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.....	149,303
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.....	149,327
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.....	149,349
Centrifugal machine, D. M. Weston.....	149,558
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.....	149,376
Clothes dryer, centrifugal, R. Pilkington.....	149,519
Clothes frame, towel rack, etc., Porter et al.....	149,335
Cordage sticking 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.....	149,442
Dental rotary tool, F. Hickman.....	149,812
Distilling, preparing mash for, A. Woolner.....	149,558
Ditching, etc., machine, H. G. Richards.....	149,337
Drawers, men's, J. J. Fitz Patrick.....	149,325
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
Fire arm, 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. Brynson.....	149,436
Fire kindler, J. Newman.....	149,510
Fire kindler, Wiehle et al.....	149,554
Fire wood carrier, Brissack et al.....	149,287
Flocking machine, E. C. Gould.....	149,390
Flour bolt, J. R. Gast.....	149,464
Fluting roller, T. Bobjohn.....	149,526
Fly frame, M. Fredeau.....	149,297
Fuel, etc., artificial, J. R. Hayes.....	149,396
Furnace grate, G. R. Moore.....	149,325
Furnace, hot air, G. W. Walker.....	149,422
Furnace, tyre-heating, L. S. Rowell.....	149,341
Gaiter, button, P. McNulty.....	149,400
Game board, T. A. Schwennesen.....	149,518
Gas apparatus, domestic, H. Skones.....	149,533
Generator, sectional steam, J. A. Miller.....	149,504
Glass mold, C. D. Fox.....	149,601
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.....	149,460

Table listing various items and their prices, including Harness pad plate, Harrow, Harvester, Hat, Heating carriages, Horse power, Hose coupling, Hydrocarbons, Ice cream freezer, Lamp shade, Life preserver, Lumber carrier, Matches, Mattress, Measure, Mill, Millstone, Molding machine, Mortising machine, Motion, Motor, Nose jewel, Nut lock, Paper box, Paper machine, Paper water-repellent, Parafol handle, Paste, Photograph retouching machine, Planoforie, Picture frame clamp, Pins, Pipe, Planing machine, Plow, Plow mold boards, Pot, Power hand and foot, Press, Press cotton, Press hay and cotton, Puddler, Pulleys, Purifier, Purifier middlings, Railroad frog, Rake, Reflector, Reflector ventilating, Refrigerator, Rein hold, Roof, Roofing tile, Rubber, Sawing machine, Scoop and sifter, Seeding machine, Sewer inlets, Sewing machine fan, Sewing machine table, Sheet metal seaming machine, Shoe lacer, Shoemaker's burnishing tool, Shoe nail extractor, Shoe press bed, Shovel, Sinks, Snow plow, Sounding boards, Speeder for drawing roving, Spike machine, Spring door, Steamer for potatoes, Stereopticon, Stocking supports, Stone, Stopper or bung, Stove, Stove coal, Stove grate, Stove magazine, Stove pipe shelf, Stove platform, Stove polish, Sugar, Sugar apparatus, Suspenders, Table ironing, Table ironing, Telegraph sounder, Thill coupling.

Table listing various items and their prices, including Ticket box, Time recorder, Toy, Trap, Treadle for machinery, Tree protector, Tubing, Umbrella case, Valve, Valve stop, Vat, Vehicle hub, Vehicle spring, Velocipede, Wagon brake, Wall pocket, Washing machine, Washstand, Water closet, Wedges, Wheels, Windmill, Wire polishing machine, Yoke.

APPLICATIONS FOR EXTENSION. Applications have been duly filed and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned: 29,085.—CENTER BOARD VESSEL.—C. E. Ketchum et al. June 24. 29,128.—REVOLVING FIRE ARM.—A. J. Gibson. June 24. 29,200.—STEERING VESSELS.—F. E. Sickels. July 1. 29,238.—GRIDIRON.—J. S. Brooks. July 8. 29,409.—RAILROAD CATTLE CAR.—J. B. Shafer. July 15.

EXTENSIONS GRANTED. 27,781.—CLOTHES WRINGER.—E. Dickerman. 27,809.—WASHING MACHINE.—J. Johnson. 27,821.—EXTENSION LADDER.—G. B. Mickel et al. 27,832.—HARVESTER.—L. C. Reese. 27,839.—STREET SWEEPING MACHINE.—R. A. Smith. 27,846.—BELTING.—H. Underwood. 27,852.—HARVESTING MACHINE.—B. F. Witt. 27,855.—NIGHT LIGHT PROTECTOR.—J. Wyberd. 27,860.—LOOM.—J. C. Cooke. 27,866.—COTTON BALE TIE.—J. McMurtry.

DISCLAIMERS. 27,781.—CLOTHES WRINGER.—E. Dickerman. 27,832.—HARVESTER.—L. C. Reese. 27,839.—STREET CLEANING MACHINE.—R. A. Smith.

TRADE MARKS REGISTERED. 1,708.—BOBBINS.—J. H. Bullard, Chicopee Falls, Mass. 1,709.—WHISKY.—Harthill & Co., Louisville, Ky. 1,710 & 1,711.—WHISKIES.—G. W. Kidd & Co., N. Y. city. 1,712.—CANNED OYSTERS.—H. M. Rowe & Co., Balt., Md. 1,713.—PERFUMERY, ETC.—B. F. Ulmer, Savannah, Ga. 1,714.—FERTILIZERS.—Walton & Co., Wilmington, Del. 1,715.—STOVES.—Western Stove Mfg Co., St. Louis, Mo.

Table listing various items and their prices, including Schedule of Patent Fees, On each caveat, On each Trade Mark, On filing each application for a Patent, On issuing each original Patent, On appeal to Commissioner-in-Chief, On appeal to Commissioner of Patents, On application for Rehearsal, On application for Extension of Patent, On granting Extension, On filing a Disclaimer, On an application for Design (3 1/2 years), On application for Design (7 years), On application for Design (14 years).

CANADIAN PATENTS. LIST OF PATENTS GRANTED IN CANADA. APRIL 8 TO APRIL 10, 1874.

Table listing various items and their prices, including B. G. Martin, H. C. Copley, Edward Beanes, D. N. B. Coffin, J. A. Tripper, J. A. Ripper, James Inglis, A. Fritz, J. A. Tripper, W. P. Hale, W. P. Hale, I. Newton.

3,291.—C. H. Thurston, Marlborough, N. H. Useful invention having reference to wooden knobs, closet pins, or handles, called "The Thurston Knob." April 10, 1874. 3,292.—R. Smallwood, Charlottetown, Queen's county, P. E. Island. Improvements on shingle sawing machines, called "Smallwood's Lever Feed for Shingle Sawing Machines." April 10, 1874. 3,293.—T. H. Marsh, Toronto, York county, Ont. Useful agitator to be used in pigeon and bird shooting from the trap, called "Marsh's Agitator." April 10, 1874.

Advertisements. Back Page - - - - - \$1.00 a line. Inside Page - - - - - 75 cents a line. Engravings may head advertisements at the same rate per line, by measurement, as the letter press. Advertisements must be received at publication office as early as Friday morning to appear in next issue.

NEW PUBLICATION. Only a Penny a Picture, AND ALL THE VALUABLE READING MATTER THROWN IN. Such is the fact in regard to the Illustrated Annual of New York and Brooklyn Churches, now selling so rapidly. It contains 128 pages, and has a beautiful and attractive make-up, and sells at the extremely low price of FIFTY CENTS A COPY. Agents are making money selling it. Orders are coming in from all sections of the country for the Sample with all the necessary instructions and outfit for agents, sent on receipt of price. Big inducements to good workers. Address

NELSON & PHILLIPS, 805 Broadway, New York. MOORE'S REVOLVING BLADE SCROLL Sawing Machine.—The best in the world. Send for circular. CHAS. D. MOORE, Agent, Lawrence, Mass.

\$250 Will buy 2 good Cylinder Boilers 24 in. x 30 ft., with Connections and Safety Valve. Sold for want of use. GEO. E. STAUFFER & CO., East Stroudsburg, Pa. HEMP MACHINE. The Neill patent on Hemp Machine is offered for sale on very reasonable terms. It is a valuable invention; but the patent is dead, and his family are anxious to realize. Address for terms and other particulars, CAPT. J. F. GEIGER, Key West, Fla.

A REAL GENTLEMAN may see himself in the May number PHEENOLOGICAL JOURNAL. Now Ready. Also, Charles Sumner, Sir Bartle Frere, with portraits; Latin and Teutonic Races; Deep Sea Life; How to Govern and Train a Child; A Study of Faces; Horse Phylogony, etc. Only 30 cents, or \$3 a year. Newsmen have it. Address S. R. WELLS, 389 Broadway, New York.

OUT AT LAST—Heist's Extension Platform Express or Freight Wagon, with or without Springs, extends from 10 to 40 ft. For information, testimonials, circulars, &c., apply to A. G. HEIST, Patentee, or JACOB SNEYDER, Confidential Clerk, Allentown, Pa.

MONSON'S PATENT BIT. Since this Gimlet Screw Bit was illustrated in this paper, Feb. 19, I have had an enormous number of letters inquiring where they may be obtained, &c. In answer, would say I have a few samples, and as soon as they are more extensively manufactured my correspondents will hear from me. I wish to dispose of half or whole patent. Royalty preferred. Communications from Bit and Auger Manufacturers will receive prompt reply. Offers solicited from any source. Address C. MONSON, Patentee, Moscow, Wis.

PAGE'S Water Flame Coal Lime Kiln, with coal or wood. No 1 Soft White Lime or Cement with use of water. C.D.PAGE, Patentee, Rochester, N.Y. REMOVAL. L. & J. W. FEUCHTWANGER, Chemists and Manufacturers of Silicates, Soluble Glass, etc., have removed to 180 Fulton St., New York.

PATENTS. The publishers of the SCIENTIFIC AMERICAN have acted as solicitors of patents in the United States and foreign countries for more than one quarter of a century. More than FIFTY THOUSAND inventors have availed themselves of their services. All patents secured through this agency receive a special notice in the SCIENTIFIC AMERICAN, which frequently attracts purchasers for the patent.

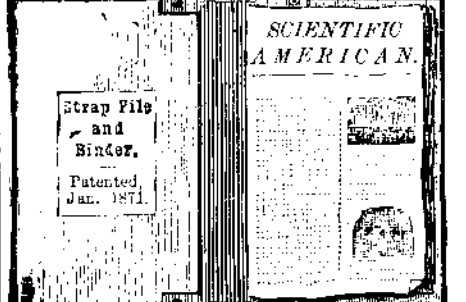
WOOD WORKING MACHINERY. For Planing Mills, Car Shops, Sash, Blind and Door Makers, &c., &c. Send for Illustrated Catalogue and price list. Factory, at Worcester, Mass. Salesroom, at 121 Chambers & 103 Reade Sts., New York. E. M. MAYO'S PAT. BOLT CUTTER. Send for Illustrated Circular, Cincinnati, Ohio. SMALL TOOLS of all kinds; also GEAR WHEELS, parts of MODELS, and materials of all kinds. Castings of Small Lathes, Engines, Slide Rests, &c. Catalogues free. GOODNOW & WIGHTMAN, 23 Cornhill, Boston, Mass. INVENTORS, CAPITALISTS, & MFRS. will do well to communicate with us. A well selected variety of patents constantly on hand for negotiation. Circulars to inventors free. E. E. ROBERTS, 119 Liberty Street, New York. THIS MACHINE will mortise two Blind Stiles at once for Fixed Sills, in all kinds of wood, regardless of knots; making 50 per minute, leaving them clear of chips, and will bore for rolling slats, 150 per minute. This way of automatically making mortises is covered by five distinct Patents, and parties infringing any of them will be prosecuted to the extent of the law. MARTIN BUCK, Agent, Lebanon, N.H. THE SUN GAS ILLUMINATOR. SIMPLE, DURABLE, AND CHEAP!!! Can be applied to any gas burner in use, thereby producing one third increase in the light by making a more perfect combustion of the Carbon. Agents wanted in every City in the Union. Samples and Circulars sent by mail on receipt of fifty cents. Exclusive rights granted upon reasonable terms. J. C. DODGE, 12 Warren St., New York City. MACHINERY. WOOD AND IRON WORKING. Specialties from new and improved tools. Boring, Planing and Matching Machines, Rotary Bed, Panel Buzz and Daniel's Planers, Saw Benches, Band Saws. BUSS & BRADLEY, 59 Sudbury St., Boston, Mass.

GENUINE CHESTER EMERY. Reduction in Price. The present increase in the production of the Chester Emery Mine enables us to reduce the price to seven cents per grain and four cents for flour, with important discounts to dealers, manufacturers and larger purchasers. The genuine Chester Emery is made from the purest and hardest crystals, and its cutting and polishing qualities are superior to any emery used in this market. F. V. BATHWOUT & CO., 23 Park Place, New York.

GREAT BARGAIN. The property of the Yale Iron Works, consisting of one machine shop 6x16 1/2 ft. Basement, two Boilers and acid, with new engine and boiler, Shutting, Tools, etc. all in running order, suitable for manufacturing Engines, Tools, &c. Also one Foundry Building 28x41 1/2 ft., with two Cupolas, crane, Backs, scales, and every thing complete for doing a large iron foundry business. The buildings are brick situated on the corner of Chapel St., the business Street of the city. The buildings will be sold separate or together, with or without the machinery. Also, large assortment of engines and tools ready for delivery. All things considered, this is a chance of a lifetime for a most profitable investment. New Haven, Conn. H. B. BIGELOW, Assignee.

TABLES FOR SETTING OUT CURVES For Railways, Canals, Roads, &c., varying from a radius of 5 chains to 3 miles, either with or without a Theodolite. By A. Kennedy and R. W. Hackwood, Civil Engineers. 2mo. 4s. OUR IRON CLADS AND MERCHANT SHIPS: Giving popular Proofs of Errors in the current mode of estimating the Stability of Ships. With an Outline of a Correct and Rapid Mode of Calculation, proved by mathematical reasoning. By Rear-Admiral E. G. Fishbourne C. B. 8vo. 4s. THE A. B. C. UNIVERSAL COMMERCIAL ELECTRIC Telegraphic Code; specially adapted for the use of Merchants, Ship owners, Brokers, Agents, &c. By W. Clouston-Thue. 8vo. 4s. E. & F. N. SPON, 446 Broome St., N. Y.

THE Strap File and Binder, ADAPTED FOR THE SCIENTIFIC AMERICAN AND OTHER ILLUSTRATED PAPERS. This File and Binder consists simply of stiff covers in cloth, with a flexible back, and broad heavy leather straps across the back at the top and bottom of the inside, between which are stretched stout cords, for holding six or twelve months' numbers of a weekly periodical, as illustrated by the following cut:



The File is used by merely opening a paper to its central fold, and slipping one side under the first vacant cord on the right, allowing the cord to rest in the center of the fold. For the convenience of our subscribers, we have had a supply of Files constructed as above, holding fifty-two papers, and lettered "SCIENTIFIC AMERICAN" in gilt on the side. Price at this Office.....\$1.25 by mail, postage prepaid..... 1.50 Address and remit

MUNN & CO., PUBLISHERS SCIENTIFIC AMERICAN 37 PARK ROW, NEW YORK.



R. BALL & CO. WOOD WORKING MACHINERY. For Planing Mills, Car Shops, Sash, Blind and Door Makers, &c., &c. Send for Illustrated Catalogue and price list. Factory, at Worcester, Mass. Salesroom, at 121 Chambers & 103 Reade Sts., New York.

E. M. MAYO'S PAT. BOLT CUTTER. Send for Illustrated Circular, Cincinnati, Ohio.

SMALL TOOLS of all kinds; also GEAR WHEELS, parts of MODELS, and materials of all kinds. Castings of Small Lathes, Engines, Slide Rests, &c. Catalogues free. GOODNOW & WIGHTMAN, 23 Cornhill, Boston, Mass.

INVENTORS, CAPITALISTS, & MFRS. will do well to communicate with us. A well selected variety of patents constantly on hand for negotiation. Circulars to inventors free. E. E. ROBERTS, 119 Liberty Street, New York. THIS MACHINE will mortise two Blind Stiles at once for Fixed Sills, in all kinds of wood, regardless of knots; making 50 per minute, leaving them clear of chips, and will bore for rolling slats, 150 per minute. This way of automatically making mortises is covered by five distinct Patents, and parties infringing any of them will be prosecuted to the extent of the law. MARTIN BUCK, Agent, Lebanon, N.H.

THE SUN GAS ILLUMINATOR. SIMPLE, DURABLE, AND CHEAP!!! Can be applied to any gas burner in use, thereby producing one third increase in the light by making a more perfect combustion of the Carbon. Agents wanted in every City in the Union. Samples and Circulars sent by mail on receipt of fifty cents. Exclusive rights granted upon reasonable terms. J. C. DODGE, 12 Warren St., New York City. MACHINERY. WOOD AND IRON WORKING. Specialties from new and improved tools. Boring, Planing and Matching Machines, Rotary Bed, Panel Buzz and Daniel's Planers, Saw Benches, Band Saws. BUSS & BRADLEY, 59 Sudbury St., Boston, Mass.